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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 1801039

Marine Corps Air Station Yuma
Yuma, Arizona

November 2019

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

June 12, 2018

Vista Work Order No. 1801039

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 25, 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. 1801039
Case Narrative

Sample Condition on Receipt:

Eight 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. Sample collection times were revised as directed by email. As requested, the analyses of samples "A1-MW-07-SA1" and "A1-MW-07-SA1D" were cancelled.

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 LCS/LCSD recoveries were within the acceptance criteria.

The extracts of all samples except "FRB-20180524" were re-injected because one or more Injection Internal Standard Analyte response areas were outside of criteria. The results were similar in the second injections. The results from the original injections have been reported.

The labeled standard recoveries outside the acceptance criteria are listed in the table below. The recoveries of 13C-PFBS are biased high due to ion suppresion of the 13C5-PFHxA. Dilutions did not reduce the matrix interferences. The quantification of the PFBS was not affected.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1801039-01	A1-MW-13-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	419
1801039-02	A1-MW-11-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	271
1801039-03	A1-MW-14-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	527
1801039-04	A1-MW-15-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	235
1801039-07	A1-MW-25-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	428

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1801039-01	A1-MW-13-SA1	24-May-18 07:44	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-02	A1-MW-11-SA1	24-May-18 08:51	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-03	A1-MW-14-SA1	24-May-18 10:05	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-04	A1-MW-15-SA1	24-May-18 11:11	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-05	A1-MW-07-SA1	24-May-18 13:04	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-06	A1-MW-07-SA1D	24-May-18 13:14	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-07	A1-MW-25-SA1	24-May-18 14:18	25-May-18 09:34	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801039-08	FRB-20180524	24-May-18 15:30	25-May-18 09:34	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. Matrix: Aqueous
Project: 4663.3803

Laboratory Data
Lab Sample: B8F0004-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	0.000448	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFHxA	307-24-4	ND	0.000545	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFHpA	375-85-9	ND	0.000148	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFHxS	355-46-4	ND	0.000237	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFOA	335-67-1	ND	0.000163	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFNA	375-95-1	ND	0.000203	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFOS	1763-23-1	ND	0.000202	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFDA	335-76-2	ND	0.000373	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
MeFOSAA	2355-31-9	ND	0.000413	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
EtFOSAA	2991-50-6	ND	0.000343	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFUnA	2058-94-8	ND	0.000263	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFDoA	307-55-1	ND	0.000198	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFTrDA	72629-94-8	ND	0.000124	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
PFTeDA	376-06-7	ND	0.000189	0.00125	0.00200	U	B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	141	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFHxA	IS	92.9	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C4-PFHpA	IS	106	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
18O2-PFHxS	IS	98.3	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFOA	IS	89.3	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C5-PFNA	IS	97.0	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C8-PFOS	IS	94.6	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFDA	IS	89.2	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
d3-MeFOSAA	IS	71.3	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
d5-EtFOSAA	IS	75.0	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFUnA	IS	75.0	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFDoA	IS	74.6	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	1
13C2-PFTeDA	IS	66.4	50 - 150		B8F0004	01-Jun-18	0.500 L	04-Jun-18 00:17	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:	B8F0004-BS1/B8F0004-BSD1
Project:	4663.3803	QC Batch:	B8F0004
Matrix:	Aqueous	Samp Size:	0.500/0.500 L
		Date Extracted:	01-Jun-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	0.0212	0.0200	106		0.0210	0.0200	105	1.25		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFHxA	307-24-4	0.0227	0.0200	114		0.0218	0.0200	109	4.00		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFHpA	375-85-9	0.0217	0.0200	108		0.0221	0.0200	111	2.03		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFHxS	355-46-4	0.0205	0.0200	102		0.0207	0.0200	103	0.969		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFOA	335-67-1	0.0202	0.0200	101		0.0199	0.0200	99.5	1.54		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFNA	375-95-1	0.0190	0.0200	94.8		0.0190	0.0200	95.0	0.272		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFOS	1763-23-1	0.0208	0.0200	104		0.0218	0.0200	109	4.90		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFDA	335-76-2	0.0214	0.0200	107		0.0218	0.0200	109	1.74		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
MeFOSAA	2355-31-9	0.0182	0.0200	90.8		0.0191	0.0200	95.6	5.15		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
EtFOSAA	2991-50-6	0.0182	0.0200	90.9		0.0195	0.0200	97.7	7.23		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFUnA	2058-94-8	0.0240	0.0200	120		0.0228	0.0200	114	4.84		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFDoA	307-55-1	0.0186	0.0200	93.1		0.0146	0.0200	72.8	24.4		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFTrDA	72629-94-8	0.0171	0.0200	85.4		0.0169	0.0200	84.3	1.30		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1
PFTeDA	376-06-7	0.0237	0.0200	118		0.0253	0.0200	127	6.83		70-130	30	03-Jun-18 23:56	1	04-Jun-18 00:06	1

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBS	IS	112		139		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFHxA	IS	94.2		91.9		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C4-PFHpA	IS	88.1		97.1		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
18O2-PFHxS	IS	110		98.5		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFOA	IS	97.7		92.7		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C5-PFNA	IS	90.1		86.4		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C8-PFOS	IS	95.7		91.4		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFDA	IS	97.9		91.2		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
d3-MeFOSAA	IS	88.0		71.9		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
d5-EtFOSAA	IS	92.2		71.4		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFUnA	IS	80.7		56.8		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFDoA	IS	82.2		87.3		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1
13C2-PFTeDA	IS	80.5		66.9		50-150	03-Jun-18 23:56	1	04-Jun-18 00:06	1

Sample ID: A1-MW-13-SA1

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 24-May-18 07:44

Laboratory Data

Lab Sample: 1801039-01
Date Received: 25-May-18 09:34

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.318	0.00204	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFHxA	307-24-4	0.878	0.00248	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFHpA	375-85-9	0.0795	0.000674	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFHxS	355-46-4	0.240	0.00108	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFOA	335-67-1	0.0423	0.000742	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFNA	375-95-1	ND	0.000923	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFOS	1763-23-1	0.0405	0.000920	0.00568	0.00912		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFDA	335-76-2	ND	0.00170	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
MeFOSAA	2355-31-9	ND	0.00188	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
EtFOSAA	2991-50-6	ND	0.00156	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFUnA	2058-94-8	ND	0.00120	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFDoA	307-55-1	ND	0.000903	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFTrDA	72629-94-8	ND	0.000563	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
PFTeDA	376-06-7	ND	0.000861	0.00568	0.00912	U	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	419	50 - 150	H	B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFHxA	IS	88.8	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C4-PFHpA	IS	101	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
18O2-PFHxS	IS	104	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFOA	IS	103	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C5-PFNA	IS	80.9	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C8-PFOS	IS	86.8	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFDA	IS	73.6	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
d3-MeFOSAA	IS	106	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
d5-EtFOSAA	IS	110	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFUnA	IS	69.2	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFDoA	IS	87.1	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	1
13C2-PFTeDA	IS	85.2	50 - 150		B8F0004	01-Jun-18	0.110 L	04-Jun-18 00:27	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-11-SA1

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 24-May-18 08:51

Laboratory Data

Lab Sample: 1801039-02
Date Received: 25-May-18 09:34

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.109	0.00192	0.00539	0.00860		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFHxA	307-24-4	0.294	0.00234	0.00539	0.00860		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFHpA	375-85-9	0.0201	0.000636	0.00539	0.00860		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFHxS	355-46-4	0.0643	0.00102	0.00539	0.00860		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFOA	335-67-1	0.0220	0.000700	0.00539	0.00860		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFNA	375-95-1	ND	0.000871	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFOS	1763-23-1	0.00359	0.000868	0.00539	0.00860	J	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFDA	335-76-2	ND	0.00160	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
MeFOSAA	2355-31-9	ND	0.00177	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
EtFOSAA	2991-50-6	ND	0.00147	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFUnA	2058-94-8	ND	0.00113	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFDoA	307-55-1	ND	0.000852	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFTrDA	72629-94-8	ND	0.000531	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
PFTeDA	376-06-7	ND	0.000812	0.00539	0.00860	U	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	271	50 - 150	H	B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFHxA	IS	92.1	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C4-PFHpA	IS	102	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
18O2-PFHxS	IS	100	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFOA	IS	89.5	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C5-PFNA	IS	93.5	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C8-PFOS	IS	94.3	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFDA	IS	80.2	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
d3-MeFOSAA	IS	104	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
d5-EtFOSAA	IS	102	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFUnA	IS	71.8	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFDoA	IS	68.2	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	1
13C2-PFTeDA	IS	87.0	50 - 150		B8F0004	01-Jun-18	0.116 L	04-Jun-18 00:38	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-14-SA1

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 24-May-18 10:05

Laboratory Data

Lab Sample: 1801039-03
Date Received: 25-May-18 09:34

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.118	0.00200	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFHxA	307-24-4	0.495	0.00243	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFHpA	375-85-9	0.0633	0.000660	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFHxS	355-46-4	0.250	0.00106	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFOA	335-67-1	0.0506	0.000727	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFNA	375-95-1	ND	0.000905	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFOS	1763-23-1	0.0709	0.000901	0.00558	0.00893		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFDA	335-76-2	ND	0.00166	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
MeFOSAA	2355-31-9	ND	0.00184	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
EtFOSAA	2991-50-6	ND	0.00153	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFUnA	2058-94-8	ND	0.00117	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFDoA	307-55-1	ND	0.000884	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFTrDA	72629-94-8	ND	0.000552	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
PFTeDA	376-06-7	ND	0.000843	0.00558	0.00893	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	527	50 - 150	H	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFHxA	IS	86.8	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C4-PFHpA	IS	111	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
18O2-PFHxS	IS	97.4	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFOA	IS	88.7	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C5-PFNA	IS	76.6	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C8-PFOS	IS	99.5	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFDA	IS	77.4	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
d3-MeFOSAA	IS	105	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
d5-EtFOSAA	IS	109	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFUnA	IS	50.1	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFDoA	IS	91.5	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	1
13C2-PFTeDA	IS	84.9	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:48	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-15-SA1

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 24-May-18 11:11

Laboratory Data

Lab Sample: 1801039-04
Date Received: 25-May-18 09:34

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.523	0.00199	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFHxA	307-24-4	0.951	0.00242	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFHpA	375-85-9	0.188	0.000657	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFHxS	355-46-4	0.733	0.00105	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFOA	335-67-1	0.245	0.000723	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFNA	375-95-1	ND	0.000900	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFOS	1763-23-1	0.0236	0.000897	0.00558	0.00889		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFDA	335-76-2	ND	0.00166	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
MeFOSAA	2355-31-9	ND	0.00183	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
EtFOSAA	2991-50-6	ND	0.00152	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFUnA	2058-94-8	ND	0.00117	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFDoA	307-55-1	ND	0.000880	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFTrDA	72629-94-8	ND	0.000549	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
PFTeDA	376-06-7	ND	0.000839	0.00558	0.00889	U	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	235	50 - 150	H	B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFHxA	IS	99.4	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C4-PFHpA	IS	117	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
18O2-PFHxS	IS	95.2	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFOA	IS	95.0	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C5-PFNA	IS	84.9	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C8-PFOS	IS	103	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFDA	IS	66.1	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
d3-MeFOSAA	IS	73.9	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
d5-EtFOSAA	IS	80.8	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFUnA	IS	71.6	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFDoA	IS	58.1	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	1
13C2-PFTeDA	IS	68.8	50 - 150		B8F0004	01-Jun-18	0.112 L	04-Jun-18 00:59	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-25-SA1

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 24-May-18 14:18

Laboratory Data

Lab Sample: 1801039-07
Date Received: 25-May-18 09:34

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.355	0.00199	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFHxA	307-24-4	1.23	0.00242	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFHpA	375-85-9	0.0797	0.000657	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFHxS	355-46-4	0.419	0.00105	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFOA	335-67-1	0.0578	0.000723	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFNA	375-95-1	ND	0.000900	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFOS	1763-23-1	0.0172	0.000897	0.00553	0.00889		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFDA	335-76-2	ND	0.00166	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
MeFOSAA	2355-31-9	ND	0.00183	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
EtFOSAA	2991-50-6	ND	0.00152	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFUnA	2058-94-8	ND	0.00117	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFDoA	307-55-1	ND	0.000880	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFTrDA	72629-94-8	ND	0.000549	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
PFTeDA	376-06-7	ND	0.000839	0.00553	0.00889	U	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	428	50 - 150	H	B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFHxA	IS	93.9	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C4-PFHpA	IS	106	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
18O2-PFHxS	IS	105	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFOA	IS	96.6	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C5-PFNA	IS	82.2	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C8-PFOS	IS	92.1	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFDA	IS	72.9	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
d3-MeFOSAA	IS	131	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
d5-EtFOSAA	IS	145	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFUnA	IS	73.8	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFDoA	IS	102	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	1
13C2-PFTeDA	IS	110	50 - 150		B8F0004	01-Jun-18	0.113 L	04-Jun-18 01:09	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-20180524 **PFAS Isotope Dilution Method**

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ
Matrix: Water
Date Collected: 24-May-18 15:30

Laboratory Data

Lab Sample: 1801039-08
Date Received: 25-May-18 09:34
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00191	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFHxA	307-24-4	ND	0.00233	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFHpA	375-85-9	ND	0.000632	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFHxS	355-46-4	ND	0.00101	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFOA	335-67-1	ND	0.000696	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFNA	375-95-1	ND	0.000866	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFOS	1763-23-1	ND	0.000863	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFDA	335-76-2	ND	0.00159	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
MeFOSAA	2355-31-9	ND	0.00176	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
EtFOSAA	2991-50-6	ND	0.00146	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFUnA	2058-94-8	ND	0.00112	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFDoA	307-55-1	ND	0.000847	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFTrDA	72629-94-8	ND	0.000528	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
PFTeDA	376-06-7	ND	0.000807	0.00534	0.00855	U	B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	117	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFHxA	IS	97.3	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C4-PFHpA	IS	94.5	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
18O2-PFHxS	IS	95.0	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFOA	IS	111	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C5-PFNA	IS	82.7	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C8-PFOS	IS	91.1	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFDA	IS	74.3	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
d3-MeFOSAA	IS	71.7	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
d5-EtFOSAA	IS	71.6	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFUnA	IS	56.6	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFDoA	IS	64.3	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	1
13C2-PFTeDA	IS	69.8	50 - 150		B8F0004	01-Jun-18	0.117 L	04-Jun-18 01:19	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.

ORIGINAL COC ARRIVED DAMAGED.
KE 05-25-18

EXACT COPY OF ORIGINAL
Init KE 05/25/18

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1801039 Temp: 5.6 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

Project ID: 4663.3803 PO#: 1152405 Sampler: Spencer Doolittle (name)

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

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Accts Payable	Tetra Tech EC, Inc.	1230 Columbia St. Suite 750	San Diego	CA	619-234-8696	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Spencer Doolittle SD	5/24/18	1545	MICHAEL O'HARE	5/24/18	1545
MICHAEL O'HARE	5/24/18	1600	FED EX received: KIM ELRIC	5/24/18 05/25/18	1600 1000

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 EX →

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
AI-MW-13-SA1	5/24/18	0744	YUMA, AZ		P	W			X						
AI-MW-11-SA1	5/24/18	0851	Yuma, AZ		P	W			X						
AI-MW-14-SA1	5/24/18	1005	Yuma, AZ		P	W			X						
AI-MW-15-SA1	5/24/18	1111	Yuma AZ		P	W			X						
AI-MW-07-SA1	5/24/18	1304	Yuma AZ		P	W			X						
AI-MW-07-SA1D	5/24/18	1314	Yuma AZ		P	W			X						
AI-MW-25-SA1	5/24/18	1418	Yuma AZ		P	W			X						
FRB-20180524	5/24/18	1530	Yuma AZ		P	W			X						

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Sabina Sudoko
Company: Tetra Tech EC, Inc.
Address: 17885 Von Karman Avenue, Suite 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:

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

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

Vista Analytical Laboratory

Sample Log-in Checklist

Vista Work Order #: 1801039 **TAT** 15

Samples Arrival:	**Date/Time** 05/25/18 0934	**Initials:** KG	**Location:** WR-2 **Shelf/Rack:** N/A
Logged In:	**Date/Time** 05/25/18 1127	**Initials:** KG	**Location:** WR-2 **Shelf/Rack:** F-4

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

Temp °C: 5.7 (uncorrected)	**Time:** 1001	**Thermometer ID:** IR-4
Temp °C: 5.4 (corrected)	**Probe used:** Yes☐ No☑	

	YES	NO	NA
Adequate Sample Volume Received?	KG		
Holding Time Acceptable?	KG		
Shipping Container(s) Intact?	KG		
Shipping Custody Seals Intact?	KG		
Shipping Documentation Present?	KG		
Airbill — Trk # 7811 2257 2757	KG		
Sample Container Intact?	KG		
Sample Custody Seals Intact?			KG
Chain of Custody / Sample Documentation Present?	KG		
COC Anomaly/Sample Acceptance Form completed?		KG	KG
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			KG

Preservation Documented:	$Na_2S_2O_3$		Trizma	None	Yes	No	(NA)
Shipping Container	Vista		(Client)	Retain	(Return)	Dispose	

Comments:



ORIGIN ID:YUMA (619) 252-0460
TETRATECH EC INC

1230 COLUMBIA ST STE 750

SAN DIEGO, CA 92101
UNITED STATES US

SHIP DATE: 24MAY18
ACTWGT: 27.00 LB
CAD: 006995180/SSFE1904
DIMS: 24x14x13 IN

BILL THIRD PARTY

Part # 156297-439 RRD EXP 11/18

TO **VISTA ANALYTICAL**

1104 WINDFIELD WAY

EL DORADO HILLS CA 95762

(916) 673-1520 REF:
INV:
PO: DEPT:

FedEx Express

E

J181118012601uv

FRI - 25 MAY 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7811 2257 2757**

WD MHRA

95762
CA-US **SMF**

EXTRACTION INFORMATION

RUSH

Process Sheet

15-DAY TAT

Workorder: 1801039

Prep Expiration: 2018-Jun-07
Client: Tetra Tech EC, Inc.

Workorder Due: 09-Jun-18 00:00

TAT: 15

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

Prep Batch: B8F0004

Prep Data Entered: 6/4/18 JR
Date and Initials

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

Initial Sequence: S8F0007

LabSampID	A/B	Prep Rec	Spike Rec	ClientSampleID	Comments	Location	Container
1801039-01	A	☑	☑	A1-MW-13-SA1		WR-2 F-4	HDPE Bottle, 125 mL
1801039-02		☑	☑	A1-MW-11-SA1		WR-2 F-4	HDPE Bottle, 125 mL
1801039-03		☑	☑	A1-MW-14-SA1		WR-2 F-4	HDPE Bottle, 125 mL
1801039-04		☑	☑	A1-MW-15-SA1		WR-2 F-4	HDPE Bottle, 125 mL
1801039-07		☑	☑	A1-MW-25-SA1		WR-2 F-4	HDPE Bottle, 125 mL
1801039-08		☑	☑	FRB-20180524		WR-2 F-4	HDPE Bottle, 125 mL

#5 & 6 cancelled.

Pre-Prep Check Out: LT 06/01/18

Pre-Prep Check In: NA

Prep Check Out: NA

Prep Check In: NA

Prep Reconciled Initals/Date: LT 06/01/18

Spike Reconciled Initals/Date: JR JR 6/11/18 5 6/01/18

VialBoxID: Priority Rush

Internal Chain of Custody
1801039

Vista Analytical Laboratory

Client: Tetra Tech EC, Inc. | Project Number: 4663.3803 | Received: 25-May-18 09:34 | Received By: Kim Elric

		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
1801039-01	A/B	KE 5/25/18 F-4 WR-2	LT 06/01/18 SOIL LAB	JR 6/01/18 Arr Lab consumed	JR 6/4/18 JR 6/1/18 JR NA	JR 6/2/18 R7	Dm 6/4/18 0007 Instrument
1801039-02	A/B	KE 5/25/18 F-4 WR-2					
1801039-03	A/B	KE 5/25/18 F-4 WR-2					
1801039-04	A/B	KE 5/25/18 F-4 WR-2					
1801039-05	A/B	KE 5/25/18 F-4 WR-2					
1801039-06	A/B	KE 5/25/18 F-4 WR-2					
1801039-07	A/B	KE 5/25/18 F-4 WR-2					
1801039-08	A/B	KE 5/25/18 F-4 WR-2					

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

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537M PFAS DOD (LOQ as mRL)

B8F0004

Chemist: HN

Prep Date: 6/1/18

Prep Time: 12:00

Prepared using: LCMS - SPE Extraction-LCMS

Date/Initals: LT 06/01/18 | BalanceID: HRMS -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
☐	B8F0004-BLK1 (A)	5	2	0	2	N/A	N/A	(0.500)	HN JR 6/1/18	JR 7R 6/1/18	HL JR 6.2.18
☐	B8F0004-BS1	5	2	0	2			(0.500)			
☐	B8F0004-BSD1	5	2	0	2			(0.500)			
☐	1801039-01	5	2	0	3	136.62	26.95	0.10967 ✓			
☐	1801039-02	5	2	0	3	143.24	27.00	0.11624 ✓			
☐	1801039-03	5	2	0	3	138.86	26.92	0.11194 ✓			
☐	1801039-04	6	2	0	3	139.43	26.95	0.11248 ✓			
☐	1801039-07	5	2	0	3	139.37	26.85	0.11252 ✓			
☐	1801039-08	5	2	0	1	143.73	26.78	0.11695 ✓			
☐	1801071-01	5	2	0	3	144.03	26.98	0.11705			
☐	1801071-02	5	2	0	2	141.27	26.99	0.11428			
☐	1801071-03	5	2	0	2	141.32	26.96	0.11436			
☐	1801071-04	6	2	0	3	146.03	26.95	0.11908			
☐	1801071-05	5	2	0	1	543.13	44.35	0.49878			

IS: 18D2004, 10µL (V3)

IS SUP: NA

NS: 18E0923, 10µL (V5)

RS: 18D2005, 10µL (V3)

SPE Chem: Strata X-AW 33µm 200mg/6mL

Ele SOLV: MeOH/0.5% NH4OH in MeOH

Final Volume(s) 1mL

Notes: (A) Supelco ENVI-carb used. Lot # 10186601

Comments: Assume 1 g = 1 mL

Cen = Centrifuged

Batch: B8F0004

Matrix: Aqueous

LabNumber	WetWeight (Initial)	% Solids (Extraction Solids)	DryWeight	Final	Extracted	Ext By	Spike	SpikeAmount	ClientMatrix	Analysis
1801039-01	0.10967 ✓	NA	NA	1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801039-02	0.11624 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801039-03	0.11194 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801039-04	0.11248 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801039-07	0.11252 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801039-08	0.11695 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801071-01	0.11705 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801071-02	0.11428 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801071-03	0.11436 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801071-04	0.11908 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
1801071-05	0.49878 ✓			1000	01-Jun-18 12:00	HN			Water	537M PFAS DOD (LOQ as
B8F0004-BLK1	0.5 ✓			1000	01-Jun-18 12:00	HN				QC
B8F0004-BS1	0.5 ✓			1000	01-Jun-18 12:00	HN	18E0923 ✓	10 ✓		QC
B8F0004-BSD1	0.5 ✓			1000	01-Jun-18 12:00	HN	18E0923 ✓	10 ✓		QC

JR 6/4/18

Printed: 6/4/2018 7:27:23AM

Sample Data – PFAS Isotope Dilution Method

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:28 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-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	3	PFBS	299.0 > 79.7		1.74e3	0.500		2.64						
2	5	PFHxA	313.2 > 268.9		3.35e3	0.500		3.13						
3	7	PFHpA	363.0 > 318.9		1.08e4	0.500		3.74						
4	8	L-PFHxS	398.9 > 79.6	3.91e0	1.40e3	0.500		3.89	3.89	0.0350			0.995	YES
5	11	L-PFOA	413 > 368.7		1.80e4	0.500		4.25						
6	14	PFNA	463.0 > 418.8		1.59e4	0.500		4.68						
7	16	L-PFOS	499.1 > 79.9		3.66e3	0.500		4.77						
8	18	PFDA	513 > 468.8		2.19e4	0.500		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.68e3	0.500		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.72e3	0.500		5.37						

MJT 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-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	25	PFUdA	563.0 > 518.9		2.03e4	0.500		5.39						
2	27	PFDoA	612.9 > 569.0		1.86e4	0.500		5.67						
3	29	PFTrDA	662.9 > 618.9		1.86e4	0.500		5.92						
4	30	PFTeDA	712.9 > 668.8		1.62e4	0.500		6.14						
5	38	13C3-PFBS	302. > 98.8	1.74e3	1.21e4	0.500	0.102	2.61	2.64	1.80	35.1617	140.6		
6	39	13C2-4:2 FTS	329.2>308.9	3.44e3	1.21e4	0.500	0.231	3.02	3.05	3.55	30.7181	122.9		
7	40	13C2-PFHxA	315 > 269.8	3.35e3	1.21e4	0.500	0.744	3.10	3.13	3.46	9.2946	92.9		
8	41	13C4-PFHpA	367.2 > 321.8	1.08e4	1.21e4	0.500	0.841	3.72	3.74	11.1	26.4306	105.7		
9	42	18O2-PFHxS	403.0 > 102.6	1.40e3	3.42e3	0.500	0.415	3.87	3.89	5.10	24.5754	98.3		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.43e3	1.60e4	0.500	0.232	4.19	4.20	2.67	23.0795	92.3		
11	44	13C2-PFOA	414.9 > 369.7	1.80e4	1.60e4	0.500	1.256	4.25	4.26	14.0	22.3311	89.3		
12	45	13C5-PFNA	468.2 > 422.9	1.59e4	1.70e4	0.500	0.960	4.69	4.69	11.6	24.2595	97.0		
13	46	13C8-PFOSA	506.1 > 77.7	1.06e3	2.83e4	0.500	0.145	4.75	4.76	0.469	6.4592	25.8		
14	47	13C8-PFOS	507.0 > 79.9	3.66e3	3.69e3	0.500	1.047	4.77	4.77	12.4	23.6619	94.6		
15	48	13C2-PFDA	515.1 > 469.9	2.19e4	2.19e4	0.500	1.118	5.06	5.06	12.5	22.3110	89.2		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.09e3	1.21e4	0.500	0.211	5.03	5.03	3.18	30.2049	120.8		
17	50	d3-N-MeFOSAA	573.3 > 419	3.68e3	2.83e4	0.500	0.182	5.21	5.20	1.63	17.8172	71.3		
18	51	d5-N-EtFOSAA	589.3 > 419	4.72e3	2.83e4	0.500	0.223	5.37	5.36	2.09	18.7457	75.0		
19	52	13C2-PFUdA	565 > 519.8	2.03e4	2.83e4	0.500	0.958	5.39	5.37	8.98	18.7478	75.0		
20	53	13C2-PFDoA	615.0 > 569.7	1.86e4	2.19e4	0.500	1.138	5.67	5.65	10.6	18.6609	74.6		
21	54	d3-N-MeFOSA	515.2 > 168.9		2.83e4	0.500	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.62e4	2.83e4	0.500	0.862	6.14	6.11	7.15	16.5940	66.4		
23	56	d5-N-ETFOSA	531.1 > 168.9		2.83e4	0.500	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.56e3	2.83e4	0.500	1.173	6.48	6.44	4.23	7.2097	72.1		
25	58	d7-N-MeFOSE	623.1 > 58.9		2.83e4	0.500	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		2.83e4	0.500	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	6.67e3	6.67e3	0.500	1.000	1.33	1.39	12.5	25.0000	100.0		
28	61	13C5-PFHxA	318 > 272.9	1.21e4	1.21e4	0.500	1.000	3.10	3.13	12.5	25.0000	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.42e3	3.42e3	0.500	1.000	3.87	3.89	12.5	25.0000	100.0		
30	63	13C8-PFOA	421.3 > 376	1.60e4	1.60e4	0.500	1.000	4.25	4.26	12.5	25.0000	100.0		
31	64	13C9-PFNA	472.2 > 426.9	1.70e4	1.70e4	0.500	1.000	4.69	4.69	12.5	25.0000	100.0		
32	65	13C4-PFOS	503 > 79.9	3.69e3	3.69e3	0.500	1.000	4.77	4.77	12.5	25.0000	100.0		MJT 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-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	66	13C6-PFDA	519.1 > 473.7	2.19e4	2.19e4	0.500	1.000	5.06	5.06	12.5	25.0000	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	2.83e4	2.83e4	0.500	1.000	5.39	5.37	12.5	25.0000	100.0		
35	68	Total PFHxS	398.9 > 79.6	3.91e0	1.40e3	0.500		4.05		0.000				
36	69	Total PFOA	413 > 368.7	0.00e0	1.80e4	0.500		4.30		0.000				
37	70	Total PFOS	499.1 > 79.9	0.00e0	3.66e3	0.500		4.90		0.000				
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.68e3	0.500		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.72e3	0.500		5.70		0.000				

MJT 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

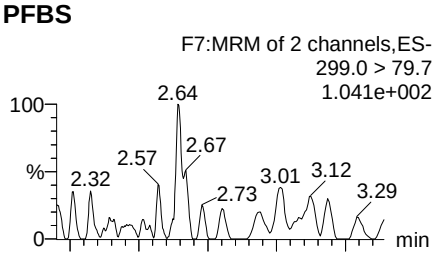
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

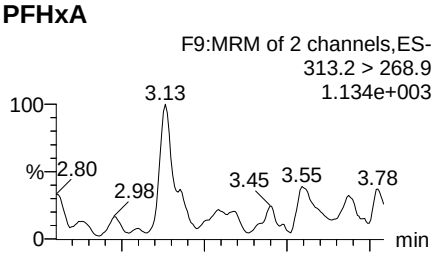
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

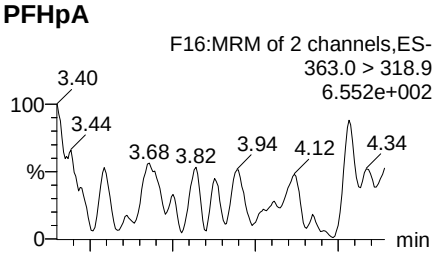
PFBS



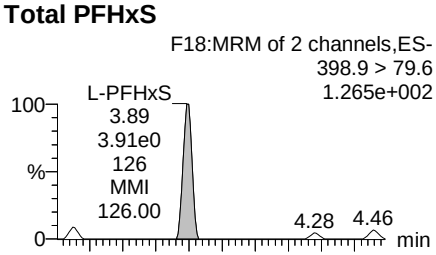
PFHxA



PFHpA



Total PFHxS



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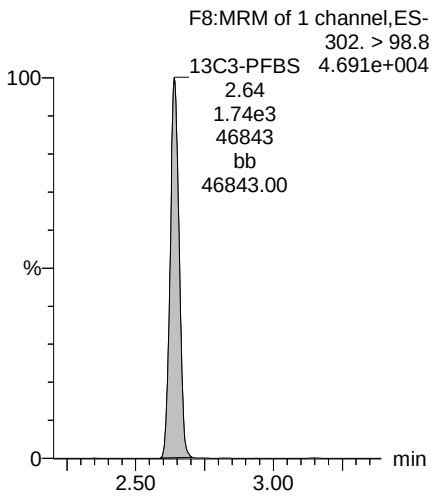

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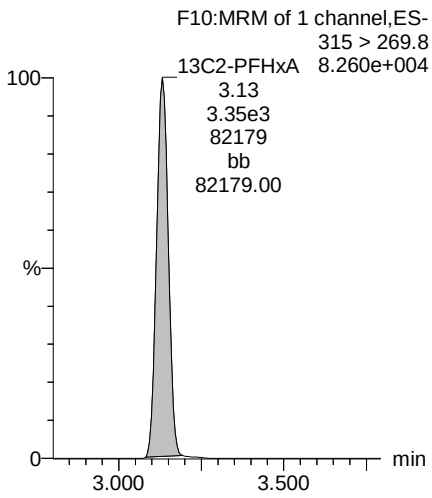
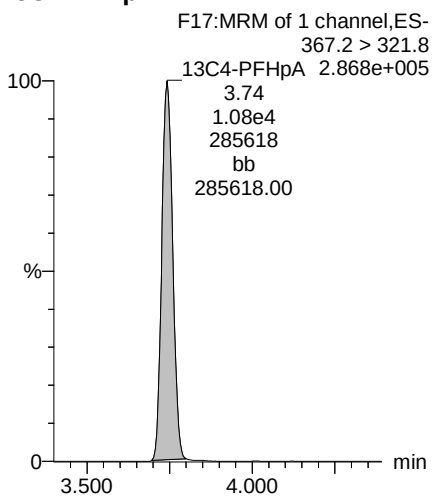
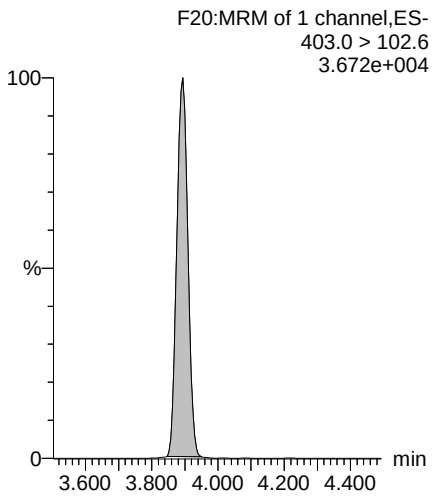


13C4-PFHpA



18O2-PFHxS



MJT 6/11/2018

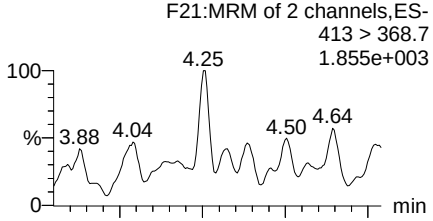
MM 6/11/2018

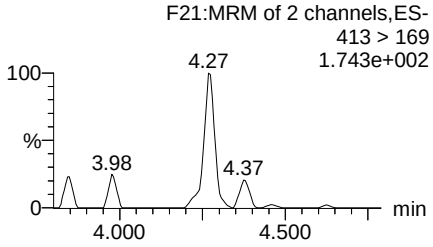
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

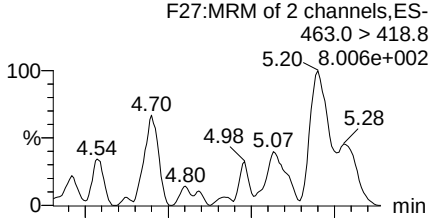
Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

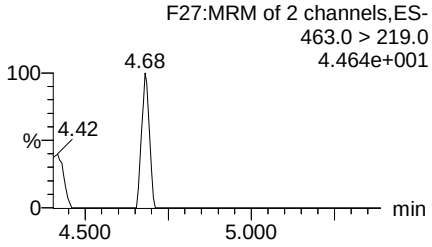
Total PFOA



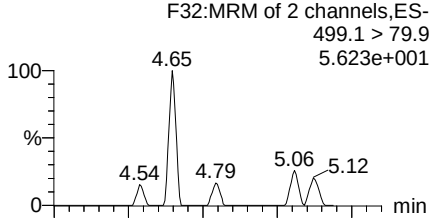


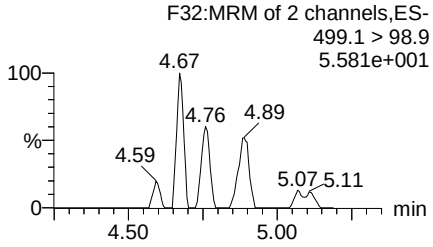
PFNA



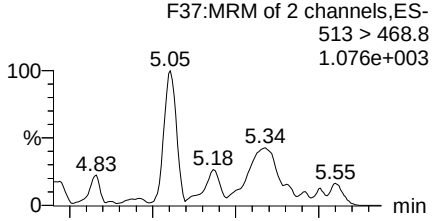


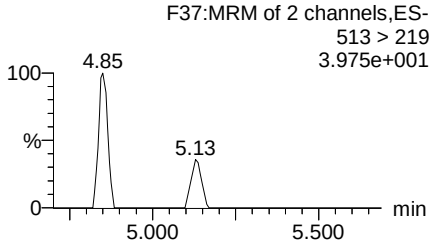
Total PFOS



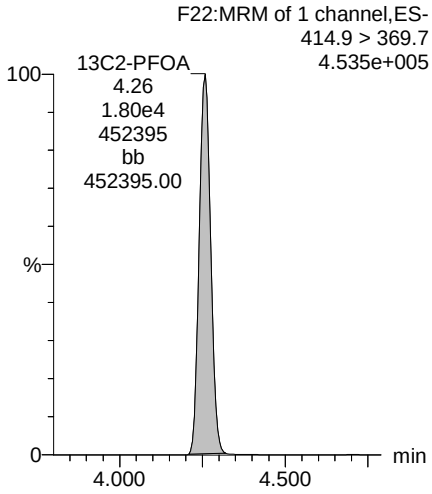


PFDA

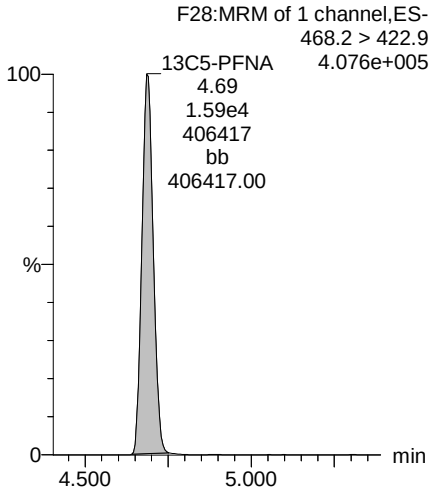




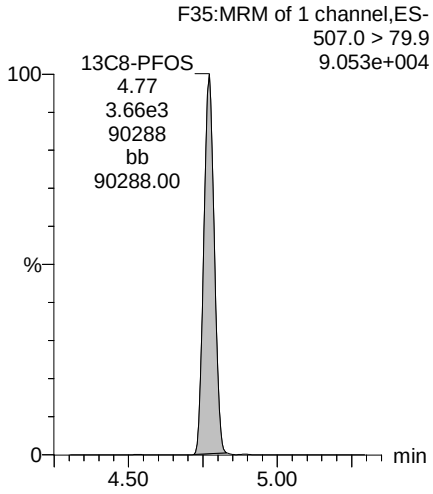
13C2-PFOA



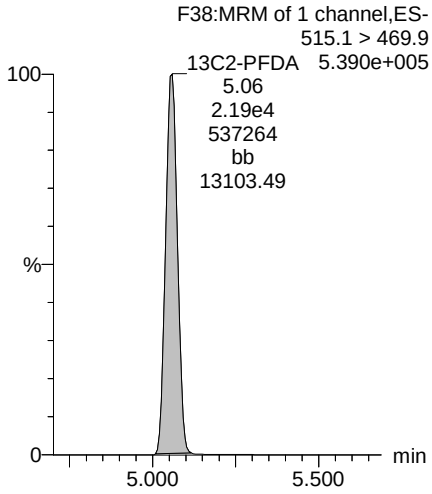
13C5-PFNA



13C8-PFOS



13C2-PFDA



MJT 6/11/2018

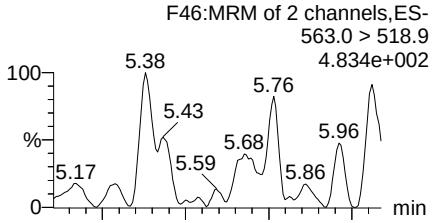
MM 6/11/2018

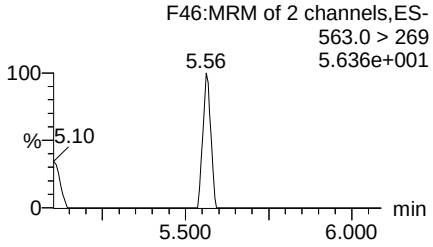
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

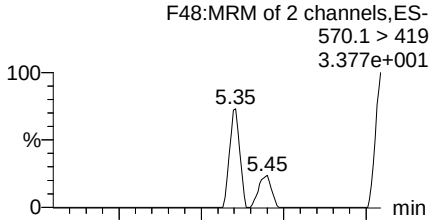
Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

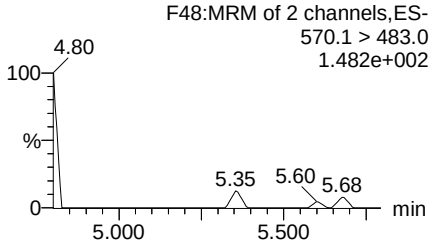
PFUdA



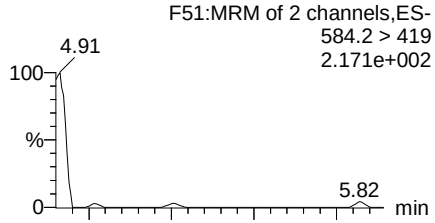


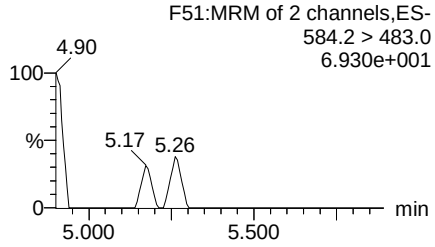
Total N-MeFOSAA



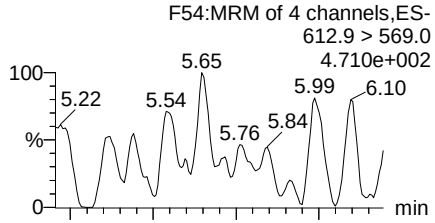


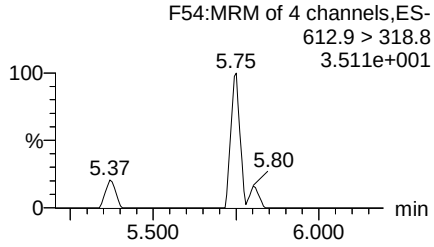
Total N-EtFOSAA



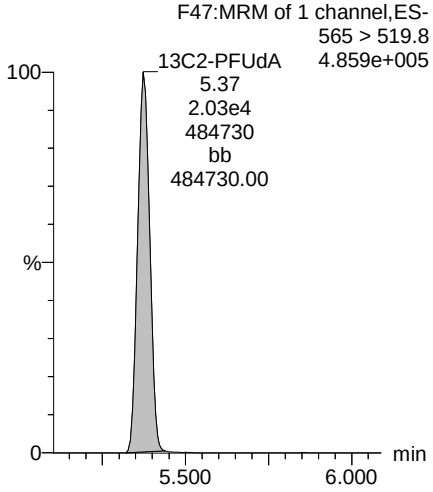


PFDoA

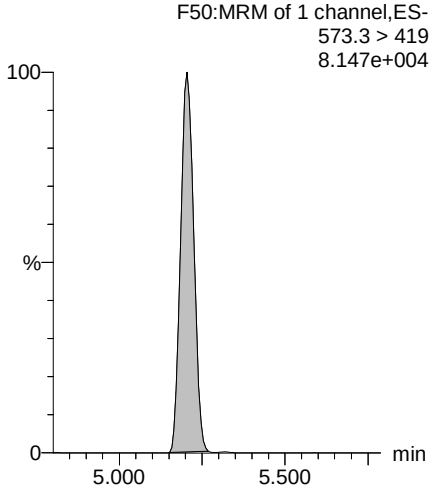




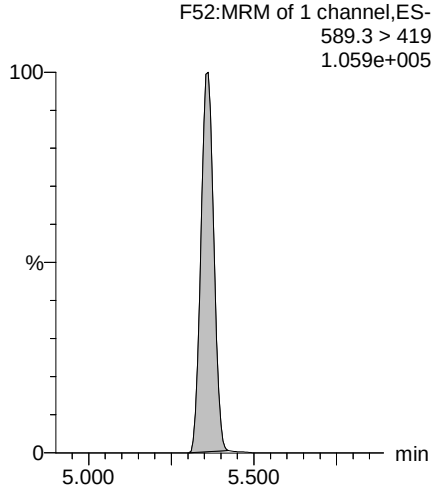
13C2-PFUdA



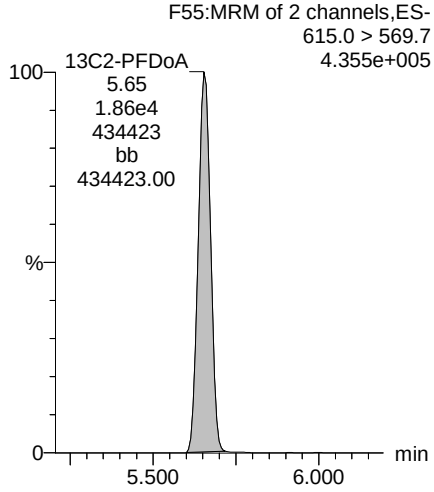
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



MJT 6/11/2018

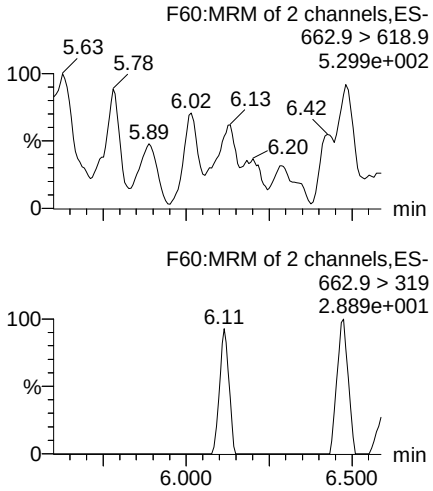
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

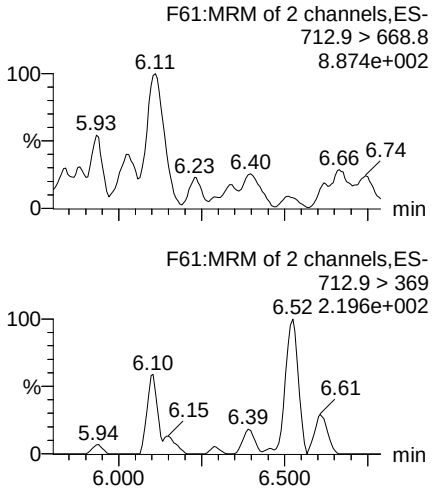
Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

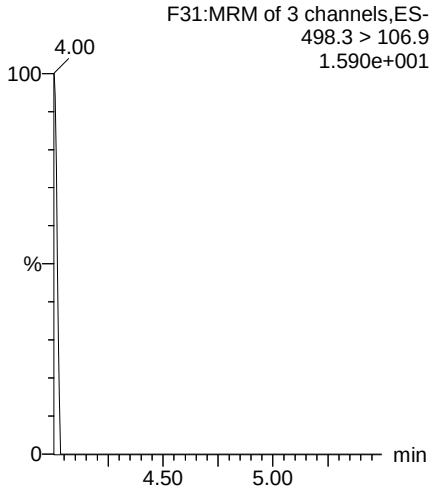
PFTrDA



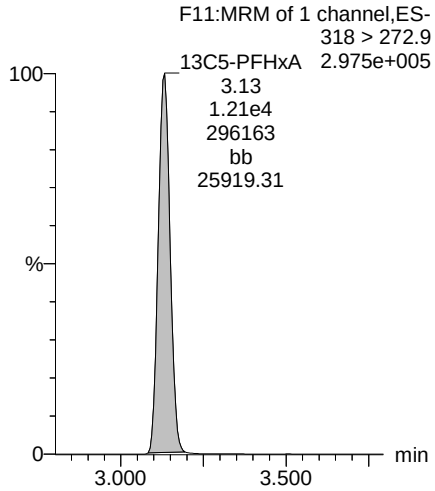
PFTeDA



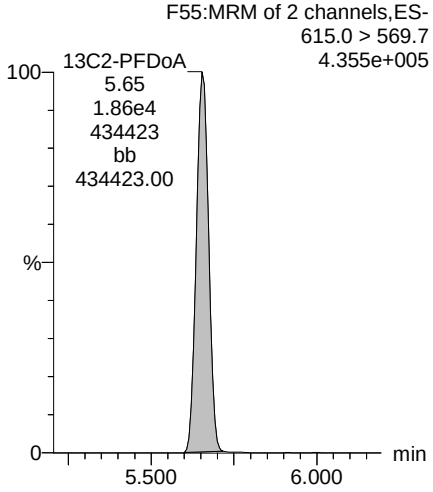
TCDA



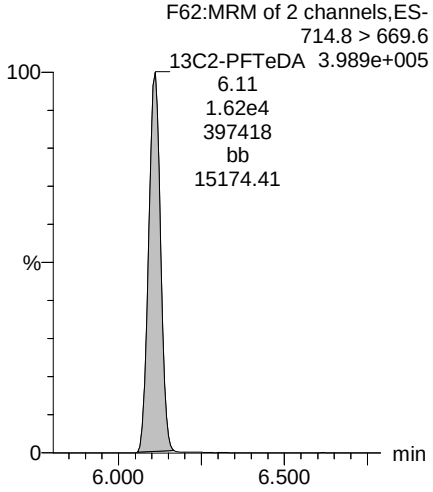
13C5-PFHxA



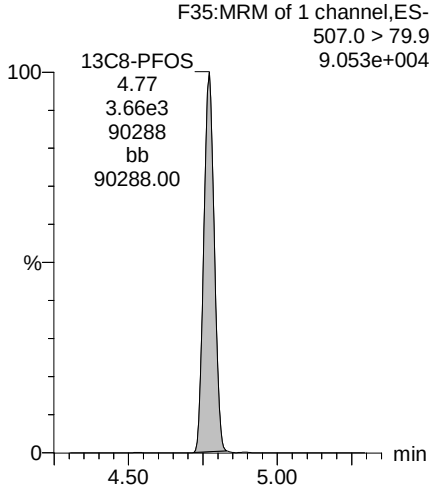
13C2-PFDoA



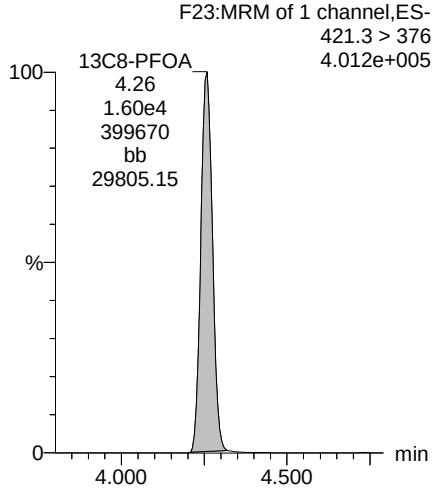
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



MJT 6/11/2018

Vista Analytical Laboratory

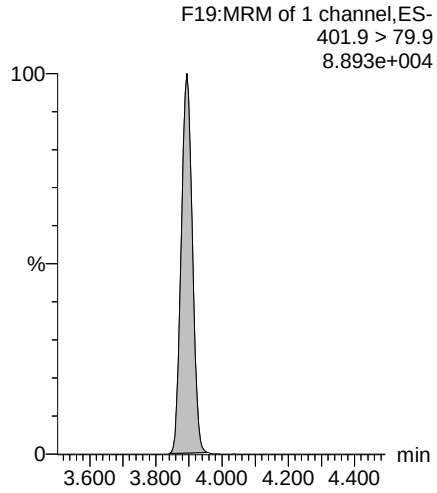
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-37.qld

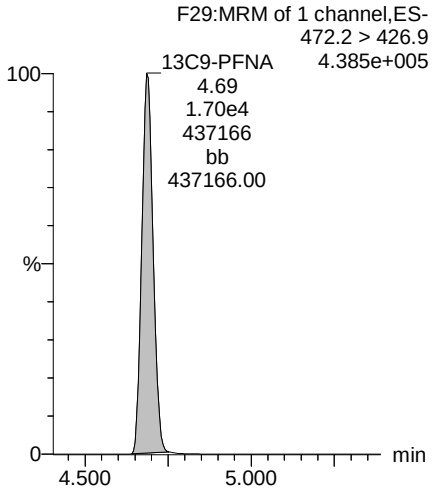
Last Altered: Monday, June 11, 2018 11:10:23 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:12:51 Pacific Daylight Time

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

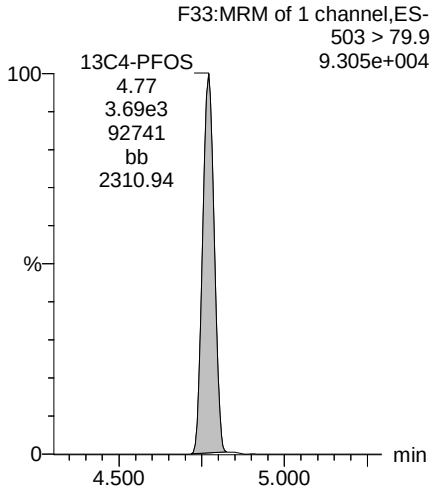
13C3-PFHxS



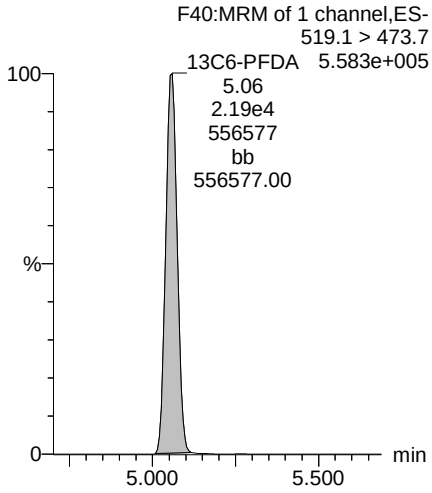
13C9-PFNA



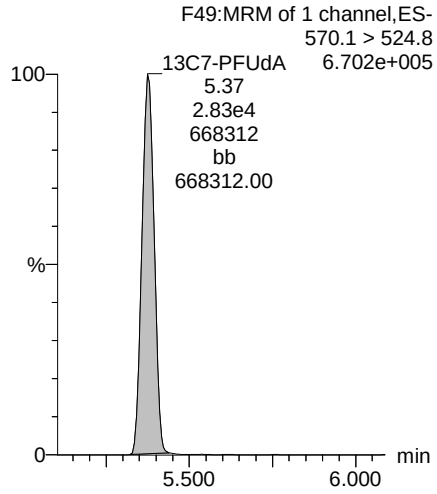
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-35 500ML.qld

Last Altered: Monday, June 11, 2018 10:31:34 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:06:21 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_35, Date: 03-Jun-2018, Time: 23:56:15, ID: B8F0004-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	3	PFBS	299.0 > 79.7	2.62e3	1.58e3	0.500		2.64	2.64	20.7	21.2271	106.1	2.631	NO
2	5	PFHxA	313.2 > 268.9	1.35e4	3.87e3	0.500		3.13	3.13	17.4	22.7412	113.7	227.522	NO
3	7	PFHpA	363.0 > 318.9	1.03e4	1.02e4	0.500		3.74	3.74	12.5	21.6948	108.5	19.149	NO
4	8	L-PFHxS	398.9 > 79.6	2.15e3	1.37e3	0.500		3.89	3.89	19.6	20.4783	102.4	1.856	NO
5	11	L-PFOA	413 > 368.7	1.53e4	1.91e4	0.500		4.25	4.26	9.99	20.2168	101.1	4.746	NO
6	14	PFNA	463.0 > 418.8	1.70e4	1.66e4	0.500		4.68	4.68	12.8	18.9549	94.8	4.613	NO
7	16	L-PFOS	499.1 > 79.9	2.57e3	3.38e3	0.500		4.77	4.77	9.52	20.7570	103.8	1.897	NO
8	18	PFDA	513 > 468.8	1.75e4	2.01e4	0.500		5.06	5.06	10.9	21.4403	107.2	6.566	NO
9	21	L-MeFOSAA	570.1 > 419	5.35e3	3.66e3	0.500		5.22	5.21	18.3	18.1509	90.8	21.030	YES
10	23	L-EtFOSAA	584.2 > 419	4.05e3	4.68e3	0.500		5.37	5.36	10.8	18.1802	90.9	11.437	NO

MJT6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-35 500ML.qld

Last Altered: Monday, June 11, 2018 10:31:34 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:06:30 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_35, Date: 03-Jun-2018, Time: 23:56:15, ID: B8F0004-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	25	PFUdA	563.0 > 518.9	1.55e4	1.76e4	0.500		5.39	5.38	11.0	23.9601	119.8	11.920	NO
2	27	PFDoA	612.9 > 569.0	1.80e4	1.72e4	0.500		5.67	5.65	13.1	18.6161	93.1	7.981	NO
3	29	PFTrDA	662.9 > 618.9	1.69e4	1.72e4	0.500		5.92	5.89	12.3	17.0754	85.4	38.373	YES
4	30	PFTeDA	712.9 > 668.8	1.64e4	1.58e4	0.500		6.14	6.11	12.9	23.6515	118.3	11.354	NO
5	38	13C3-PFBS	302. > 98.8	1.58e3	1.38e4	0.500	0.102	2.61	2.64	1.43	28.0337	112.1		
6	39	13C2-4:2 FTS	329.2>308.9	3.33e3	1.38e4	0.500	0.231	3.02	3.05	3.02	26.1003	104.4		
7	40	13C2-PFHxA	315 > 269.8	3.87e3	1.38e4	0.500	0.744	3.10	3.13	3.50	9.4151	94.2		
8	41	13C4-PFHpA	367.2 > 321.8	1.02e4	1.38e4	0.500	0.841	3.72	3.74	9.27	22.0322	88.1		
9	42	18O2-PFHxS	403.0 > 102.6	1.37e3	3.00e3	0.500	0.415	3.87	3.89	5.69	27.4540	109.8		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.49e3	1.56e4	0.500	0.232	4.19	4.20	2.80	24.1888	96.8		
11	44	13C2-PFOA	414.9 > 369.7	1.91e4	1.56e4	0.500	1.256	4.25	4.26	15.3	24.4148	97.7		
12	45	13C5-PFNA	468.2 > 422.9	1.66e4	1.92e4	0.500	0.960	4.69	4.69	10.8	22.5353	90.1		
13	46	13C8-PFOSA	506.1 > 77.7	1.55e3	2.28e4	0.500	0.145	4.75	4.76	0.848	11.6903	46.8		
14	47	13C8-PFOS	507.0 > 79.9	3.38e3	3.37e3	0.500	1.047	4.77	4.77	12.5	23.9205	95.7		
15	48	13C2-PFDA	515.1 > 469.9	2.01e4	1.83e4	0.500	1.118	5.06	5.05	13.7	24.4698	97.9		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.19e3	1.38e4	0.500	0.211	5.03	5.03	2.89	27.3976	109.6		
17	50	d3-N-MeFOSAA	573.3 > 419	3.66e3	2.28e4	0.500	0.182	5.21	5.20	2.01	21.9969	88.0		
18	51	d5-N-EtFOSAA	589.3 > 419	4.68e3	2.28e4	0.500	0.223	5.37	5.36	2.56	23.0432	92.2		
19	52	13C2-PFUdA	565 > 519.8	1.76e4	2.28e4	0.500	0.958	5.39	5.37	9.67	20.1811	80.7		
20	53	13C2-PFDoA	615.0 > 569.7	1.72e4	1.83e4	0.500	1.138	5.67	5.65	11.7	20.5468	82.2		
21	54	d3-N-MeFOSA	515.2 > 168.9	6.34e0	2.28e4	0.500	0.051	5.85	5.86	0.00348	0.1368	0.0		
22	55	13C2-PFTeDA	714.8 > 669.6	1.58e4	2.28e4	0.500	0.862	6.14	6.11	8.68	20.1347	80.5		
23	56	d5-N-ETFOSA	531.1 > 168.9		2.28e4	0.500	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.74e3	2.28e4	0.500	1.173	6.48	6.44	5.34	9.1077	91.1		
25	58	d7-N-MeFOSE	623.1 > 58.9		2.28e4	0.500	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		2.28e4	0.500	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	9.03e3	9.03e3	0.500	1.000	1.33	1.40	12.5	25.0000	100.0		
28	61	13C5-PFHxA	318 > 272.9	1.38e4	1.38e4	0.500	1.000	3.10	3.13	12.5	25.0000	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.00e3	3.00e3	0.500	1.000	3.87	3.89	12.5	25.0000	100.0		
30	63	13C8-PFOA	421.3 > 376	1.56e4	1.56e4	0.500	1.000	4.25	4.26	12.5	25.0000	100.0		
31	64	13C9-PFNA	472.2 > 426.9	1.92e4	1.92e4	0.500	1.000	4.69	4.69	12.5	25.0000	100.0		
32	65	13C4-PFOS	503 > 79.9	3.37e3	3.37e3	0.500	1.000	4.77	4.77	12.5	25.0000	100.0		MJT6/11/2018

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-35 500ML.qld

Last Altered: Monday, June 11, 2018 10:31:34 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:06:30 Pacific Daylight Time

Name: 180603M2_35, Date: 03-Jun-2018, Time: 23:56:15, ID: B8F0004-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	66	13C6-PFDA	519.1 > 473.7	1.83e4	1.83e4	0.500	1.000	5.06	5.06	12.5	25.0000	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	2.28e4	2.28e4	0.500	1.000	5.39	5.37	12.5	25.0000	100.0		
35	68	Total PFHxS	398.9 > 79.6	2.15e3	1.37e3	0.500		4.05		19.6	20.4783			
36	69	Total PFOA	413 > 368.7	1.53e4	1.91e4	0.500		4.30		9.99	20.2168			
37	70	Total PFOS	499.1 > 79.9	2.57e3	3.38e3	0.500		4.90		9.52	20.7570			
38	71	Total N-MeFOSAA	570.1 > 419	5.35e3	3.66e3	0.500		5.55		18.3	18.1509			
39	72	Total N-EtFOSAA	584.2 > 419	4.05e3	4.68e3	0.500		5.70		10.8	18.1802			

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Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_35, Date: 03-Jun-2018, Time: 23:56:15, ID: B8F0004-BS1 OPR 0.125, Description: OPR

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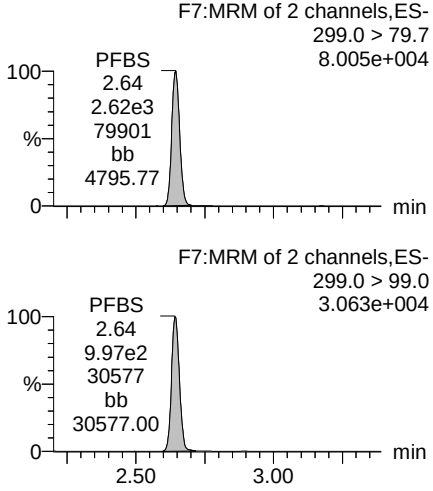

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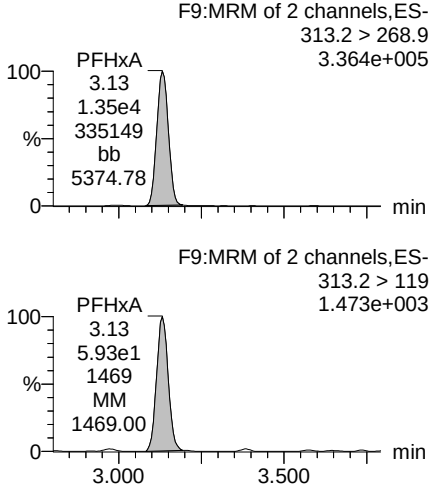

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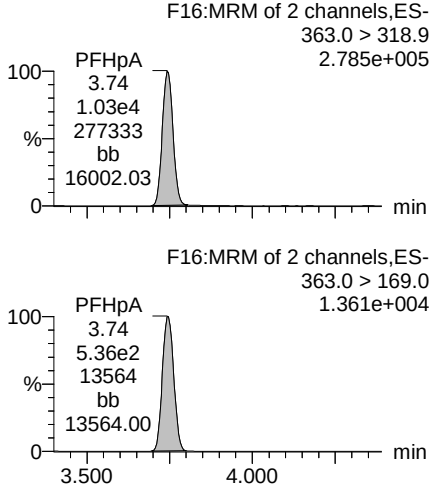

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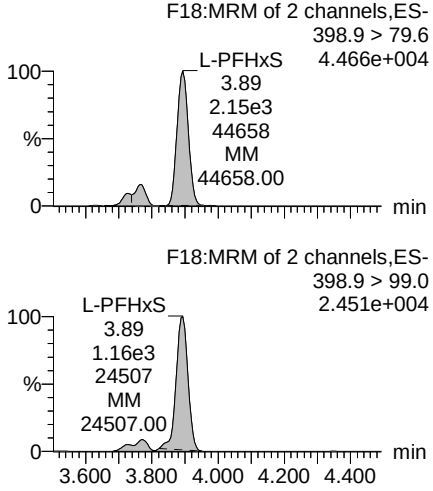

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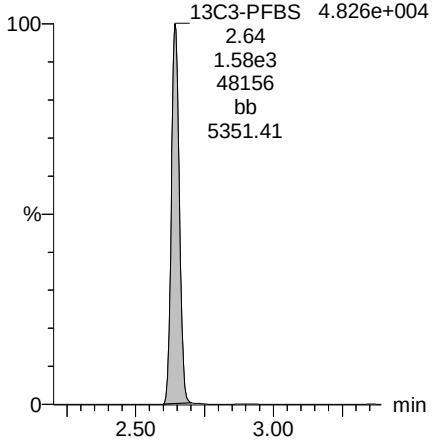

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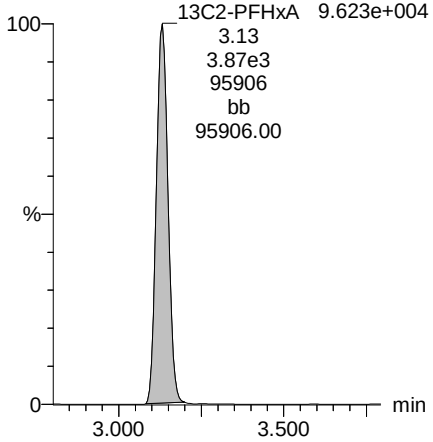

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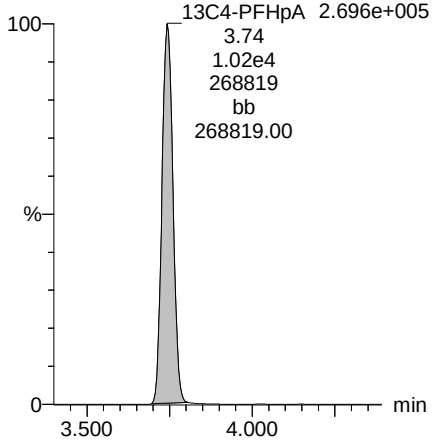

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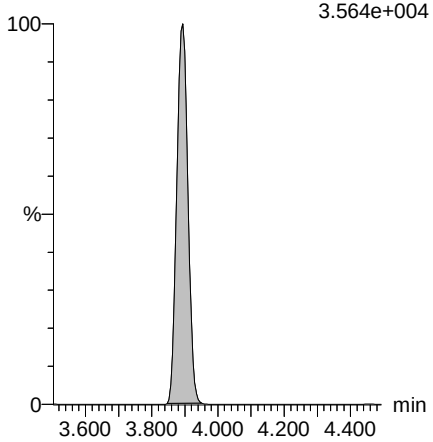

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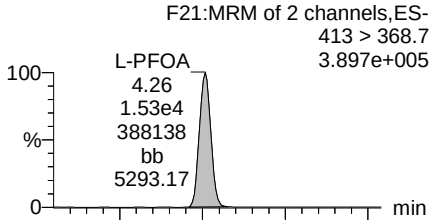

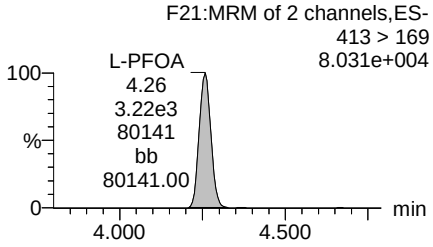

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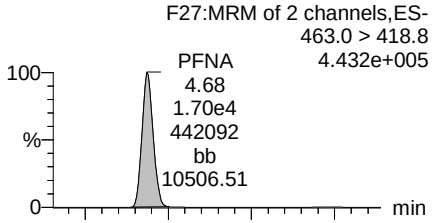

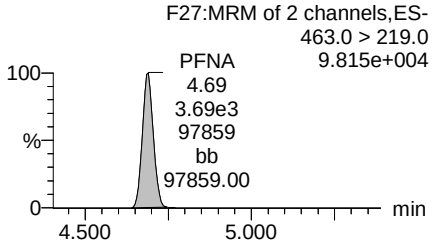

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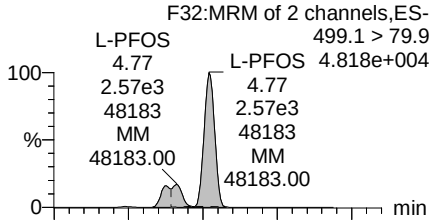

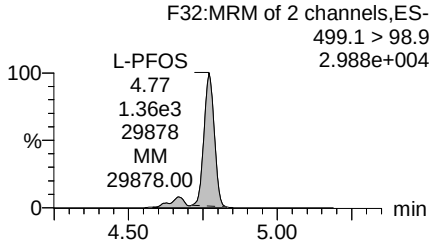

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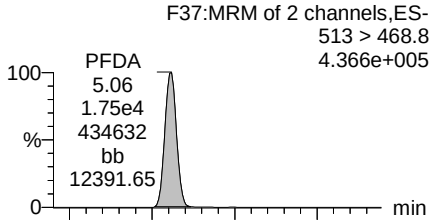

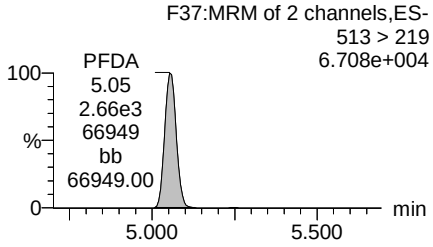

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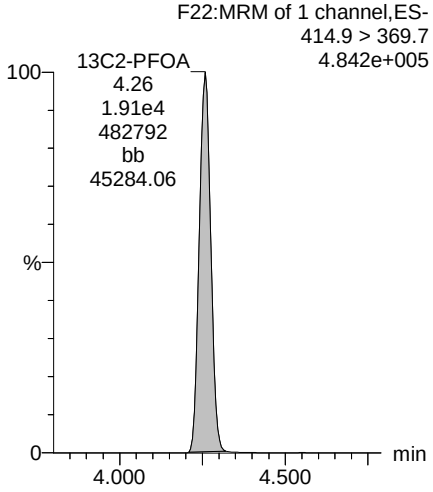

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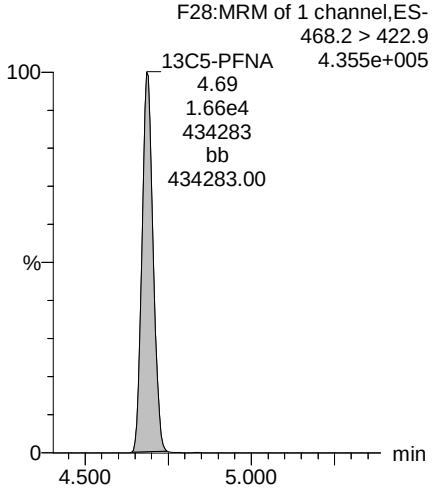

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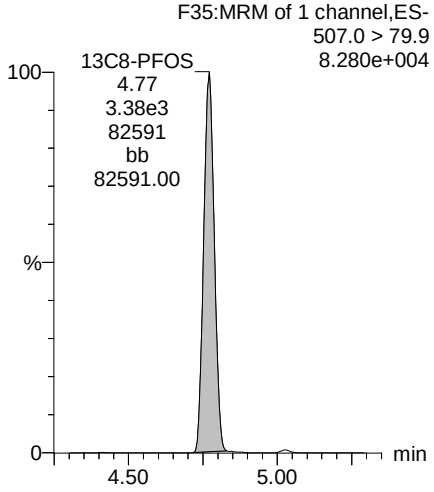

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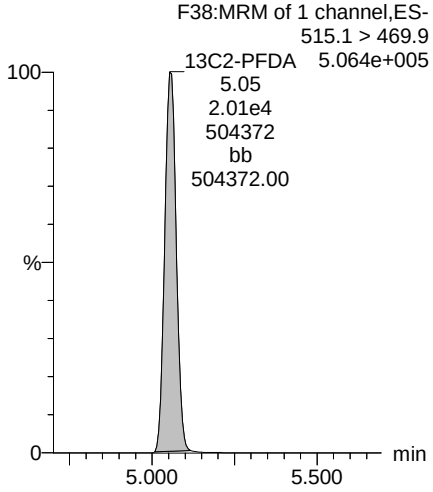

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MM 6/11/2018

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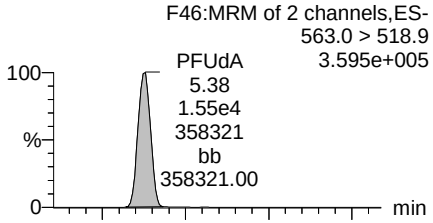

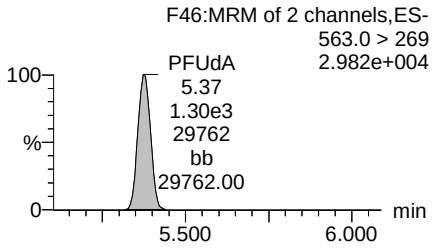

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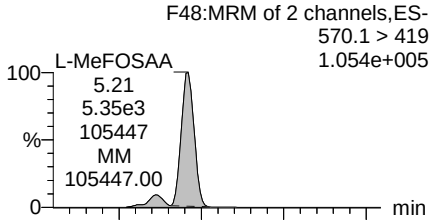

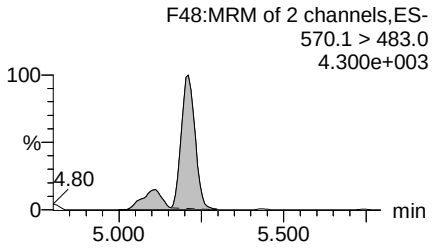

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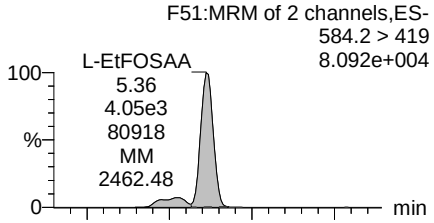

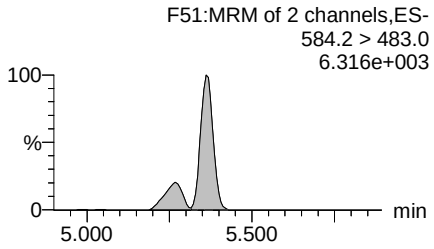

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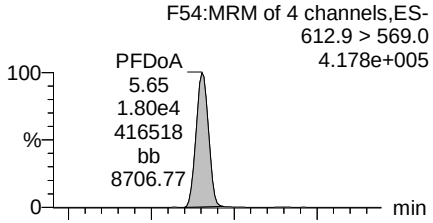

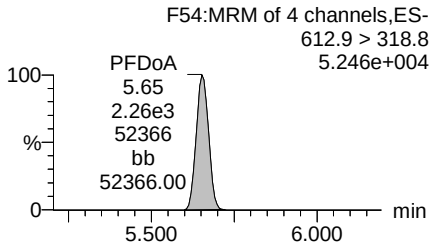

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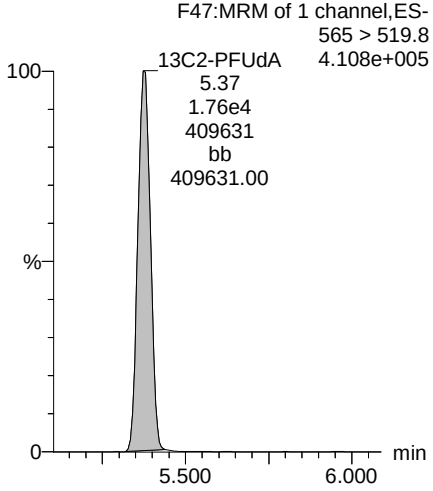

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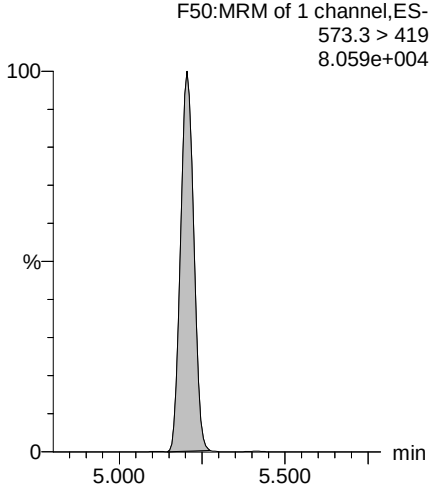

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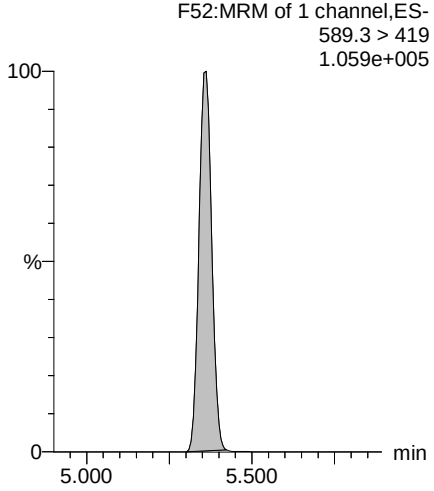

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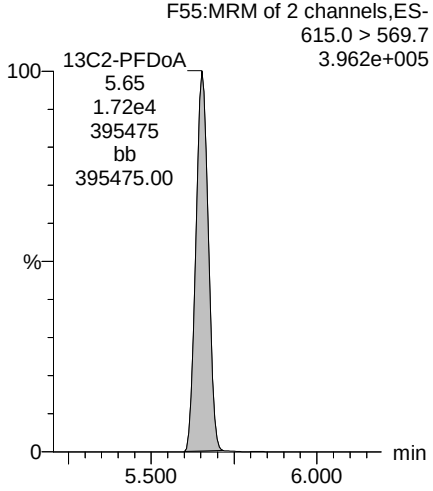

MJT6/11/2018

MM 6/11/2018

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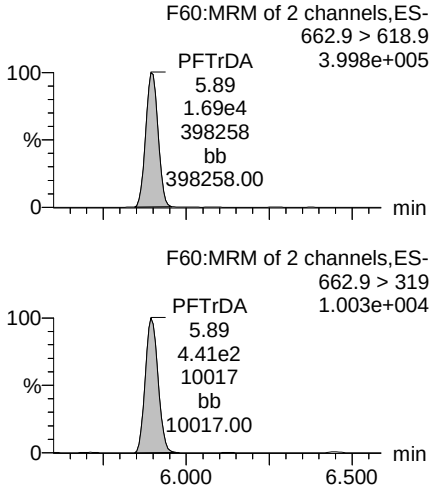

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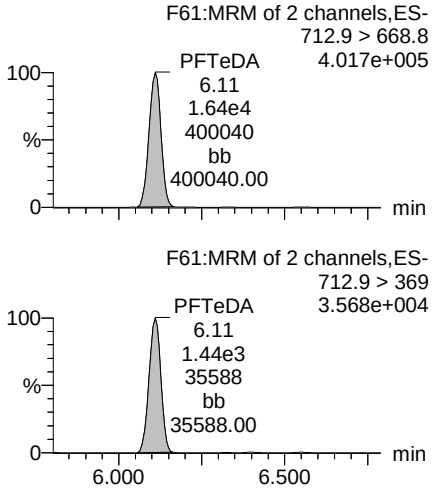

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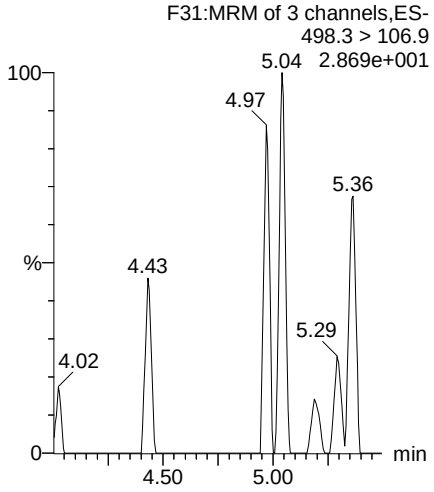

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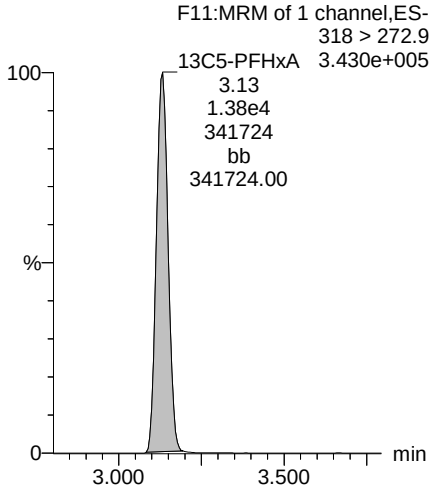

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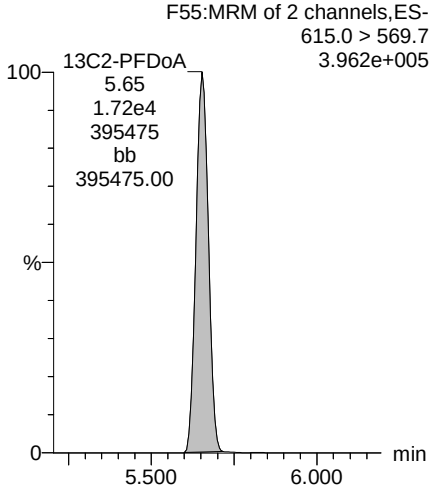

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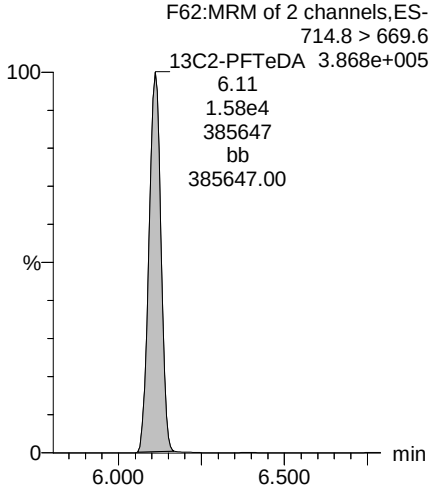

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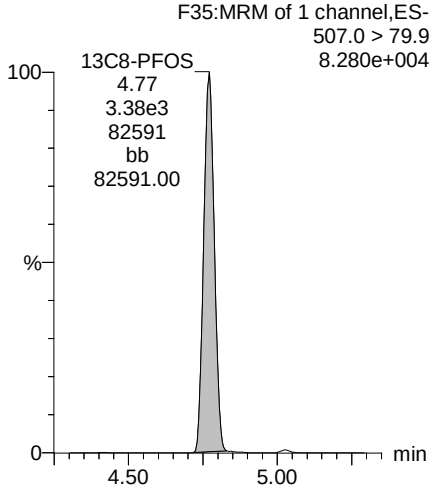

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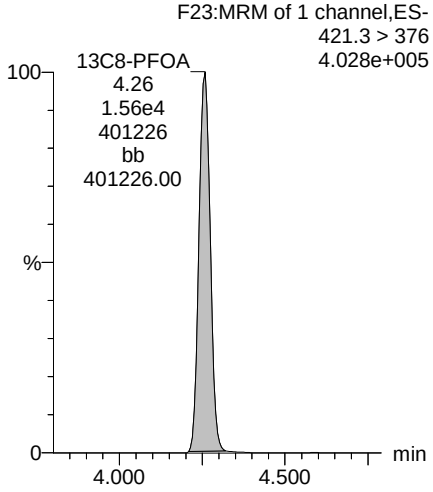

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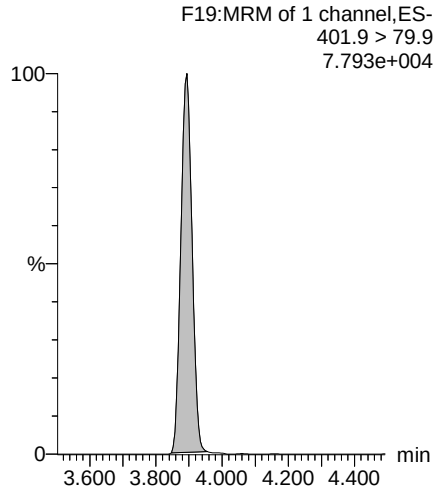
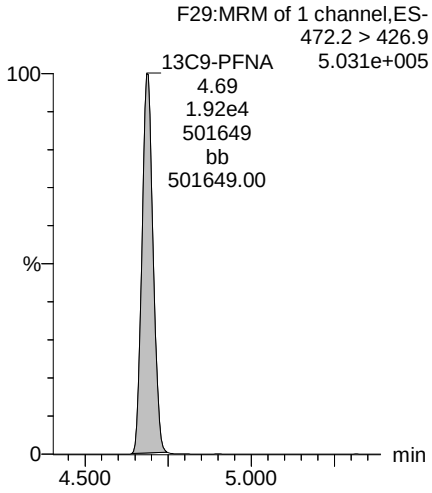
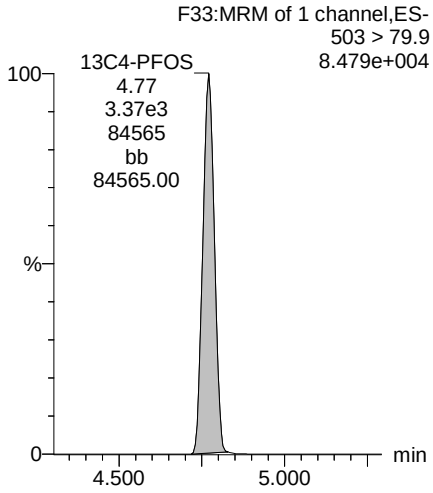
13C3-PFHxS



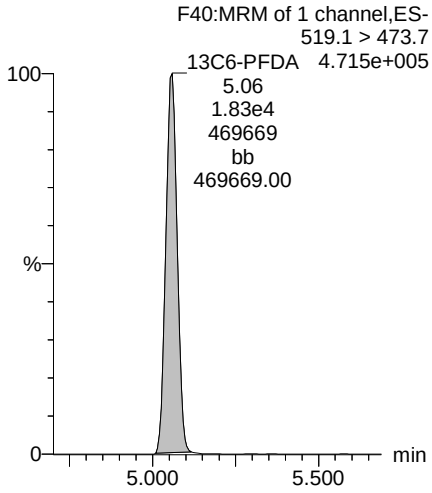
13C9-PFNA



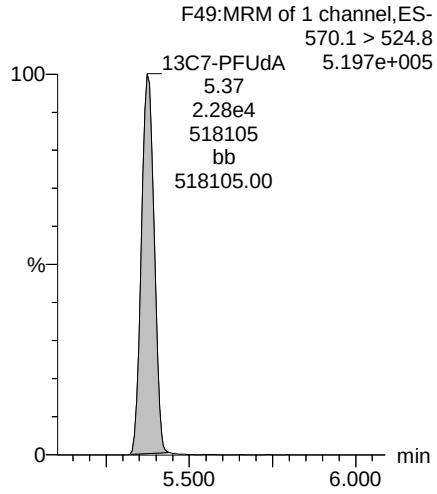
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 10:59:58 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-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	3	PFBS	299.0 > 79.7	2.76e3	1.69e3	0.500		2.64	2.64	20.5	20.9628	104.8	2.664	NO
2	5	PFHxA	313.2 > 268.9	1.09e4	3.24e3	0.500		3.13	3.13	16.7	21.8489	109.2	167.611	NO
3	7	PFHpA	363.0 > 318.9	9.90e3	9.69e3	0.500		3.74	3.74	12.8	22.1398	110.7	19.816	NO
4	8	L-PFHxS	398.9 > 79.6	2.19e3	1.38e3	0.500		3.89	3.89	19.8	20.6778	103.4	1.641	NO
5	11	L-PFOA	413 > 368.7	1.37e4	1.74e4	0.500		4.25	4.26	9.84	19.9074	99.5	4.297	NO
6	14	PFNA	463.0 > 418.8	1.69e4	1.65e4	0.500		4.68	4.69	12.8	19.0065	95.0	5.149	NO
7	16	L-PFOS	499.1 > 79.9	2.75e3	3.43e3	0.500		4.77	4.77	10.0	21.8000	109.0	1.940	NO
8	18	PFDA	513 > 468.8	1.71e4	1.93e4	0.500		5.06	5.06	11.1	21.8176	109.1	6.322	NO
9	21	L-MeFOSAA	570.1 > 419	5.63e3	3.66e3	0.500		5.22	5.21	19.2	19.1104	95.6	15.045	NO
10	23	L-EtFOSAA	584.2 > 419	4.13e3	4.44e3	0.500		5.37	5.36	11.6	19.5430	97.7	15.597	NO

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Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-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	25	PFUdA	563.0 > 518.9	1.27e4	1.52e4	0.500		5.39	5.37	10.5	22.8269	114.1	9.790	NO
2	27	PFDoA	612.9 > 569.0	1.57e4	1.88e4	0.500		5.67	5.65	10.4	14.5679	72.8	9.693	NO
3	29	PFTrDA	662.9 > 618.9	1.83e4	1.88e4	0.500		5.92	5.89	12.2	16.8553	84.3	24.242	NO
4	30	PFTeDA	712.9 > 668.8	1.78e4	1.61e4	0.500		6.14	6.11	13.8	25.3250	126.6	16.284	YES
5	38	13C3-PFBS	302. > 98.8	1.69e3	1.19e4	0.500	0.102	2.61	2.64	1.78	34.8484	139.4		
6	39	13C2-4:2 FTS	329.2>308.9	3.23e3	1.19e4	0.500	0.231	3.02	3.05	3.40	29.4449	117.8		
7	40	13C2-PFHxA	315 > 269.8	3.24e3	1.19e4	0.500	0.744	3.10	3.13	3.42	9.1899	91.9		
8	41	13C4-PFHpA	367.2 > 321.8	9.69e3	1.19e4	0.500	0.841	3.72	3.74	10.2	24.2870	97.1		
9	42	18O2-PFHxS	403.0 > 102.6	1.38e3	3.37e3	0.500	0.415	3.87	3.89	5.11	24.6313	98.5		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.33e3	1.49e4	0.500	0.232	4.19	4.20	2.78	24.0173	96.1		
11	44	13C2-PFOA	414.9 > 369.7	1.74e4	1.49e4	0.500	1.256	4.25	4.26	14.6	23.1869	92.7		
12	45	13C5-PFNA	468.2 > 422.9	1.65e4	1.99e4	0.500	0.960	4.69	4.69	10.4	21.5915	86.4		
13	46	13C8-PFOSA	506.1 > 77.7	1.23e3	2.79e4	0.500	0.145	4.75	4.76	0.549	7.5666	30.3		
14	47	13C8-PFOS	507.0 > 79.9	3.43e3	3.59e3	0.500	1.047	4.77	4.77	12.0	22.8392	91.4		
15	48	13C2-PFDA	515.1 > 469.9	1.93e4	1.89e4	0.500	1.118	5.06	5.05	12.8	22.8055	91.2		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.24e3	1.19e4	0.500	0.211	5.03	5.03	3.42	32.4138	129.7		
17	50	d3-N-MeFOSAA	573.3 > 419	3.66e3	2.79e4	0.500	0.182	5.21	5.20	1.64	17.9632	71.9		
18	51	d5-N-EtFOSAA	589.3 > 419	4.44e3	2.79e4	0.500	0.223	5.37	5.36	1.99	17.8485	71.4		
19	52	13C2-PFUdA	565 > 519.8	1.52e4	2.79e4	0.500	0.958	5.39	5.37	6.80	14.2017	56.8		
20	53	13C2-PFDoA	615.0 > 569.7	1.88e4	1.89e4	0.500	1.138	5.67	5.65	12.4	21.8355	87.3		
21	54	d3-N-MeFOSA	515.2 > 168.9		2.79e4	0.500	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.61e4	2.79e4	0.500	0.862	6.14	6.11	7.20	16.7156	66.9		
23	56	d5-N-ETFOSA	531.1 > 168.9		2.79e4	0.500	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	1.03e4	2.79e4	0.500	1.173	6.48	6.44	4.63	7.9047	79.0		
25	58	d7-N-MeFOSE	623.1 > 58.9		2.79e4	0.500	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		2.79e4	0.500	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	6.12e3	6.12e3	0.500	1.000	1.33	1.40	12.5	25.0000	100.0		
28	61	13C5-PFHxA	318 > 272.9	1.19e4	1.19e4	0.500	1.000	3.10	3.13	12.5	25.0000	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.37e3	3.37e3	0.500	1.000	3.87	3.89	12.5	25.0000	100.0		
30	63	13C8-PFOA	421.3 > 376	1.49e4	1.49e4	0.500	1.000	4.25	4.26	12.5	25.0000	100.0		
31	64	13C9-PFNA	472.2 > 426.9	1.99e4	1.99e4	0.500	1.000	4.69	4.69	12.5	25.0000	100.0		
32	65	13C4-PFOS	503 > 79.9	3.59e3	3.59e3	0.500	1.000	4.77	4.77	12.5	25.0000	100.0		MJT6/11/2018

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MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-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	66	13C6-PFDA	519.1 > 473.7	1.89e4	1.89e4	0.500	1.000	5.06	5.05	12.5	25.0000	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	2.79e4	2.79e4	0.500	1.000	5.39	5.37	12.5	25.0000	100.0		
35	68	Total PFHxS	398.9 > 79.6	2.19e3	1.38e3	0.500		4.05		19.8	20.6778			
36	69	Total PFOA	413 > 368.7	1.37e4	1.74e4	0.500		4.30		9.84	19.9074			
37	70	Total PFOS	499.1 > 79.9	2.75e3	3.43e3	0.500		4.90		10.0	21.8000			
38	71	Total N-MeFOSAA	570.1 > 419	5.63e3	3.66e3	0.500		5.55		19.2	19.1104			
39	72	Total N-EtFOSAA	584.2 > 419	4.13e3	4.44e3	0.500		5.70		11.6	19.5430			

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MM 6/11/2018

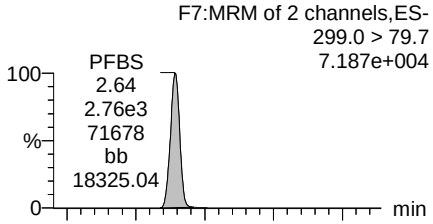
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

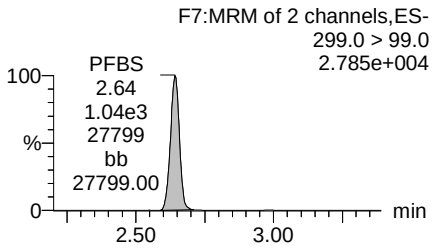
Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

PFBS





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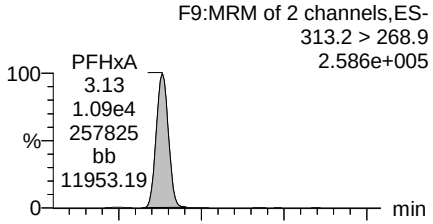
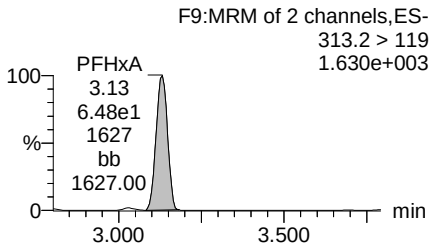
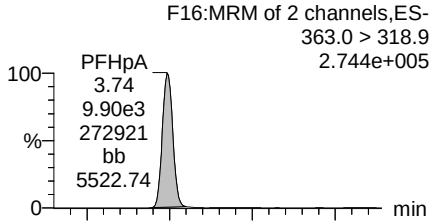
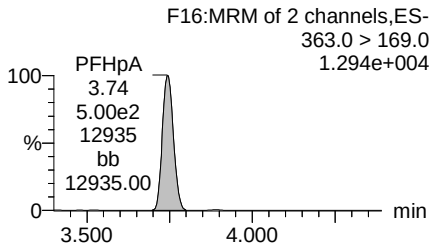


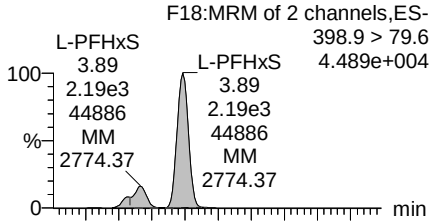


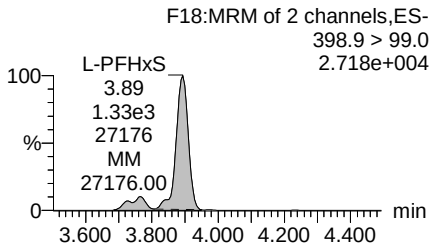
PFHpA



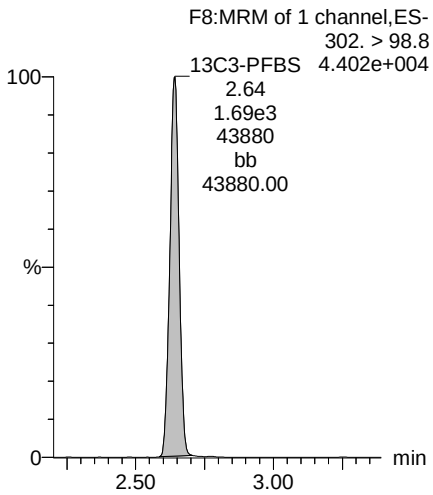


Total PFHxS

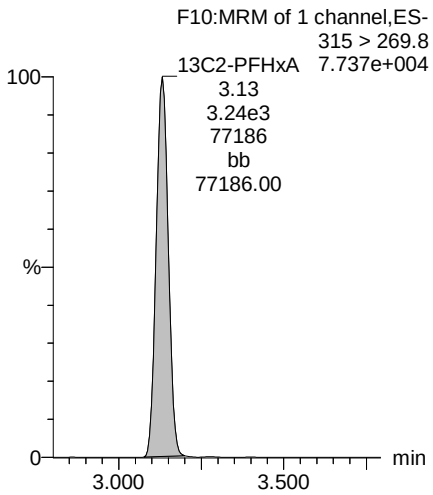




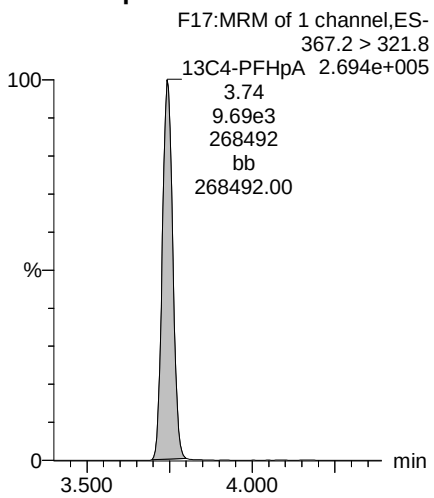
13C3-PFBS



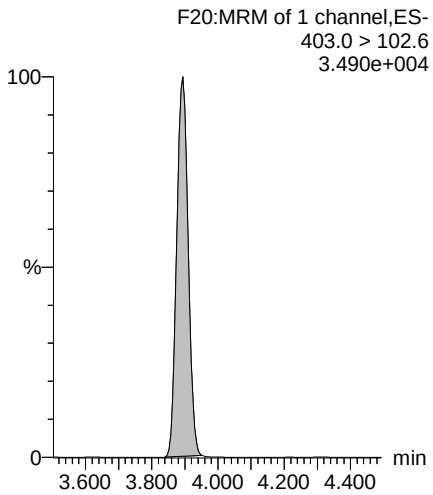
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



MJT6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

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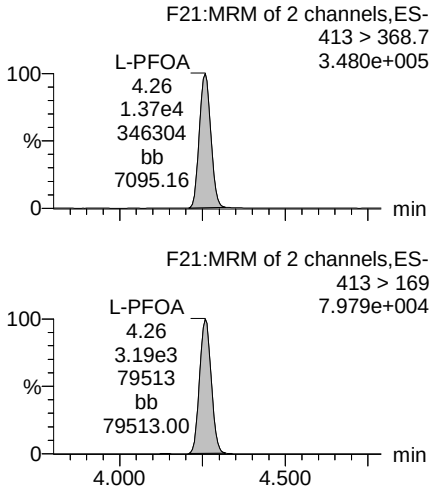
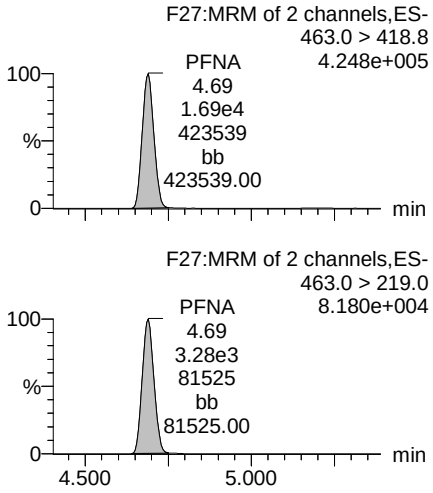
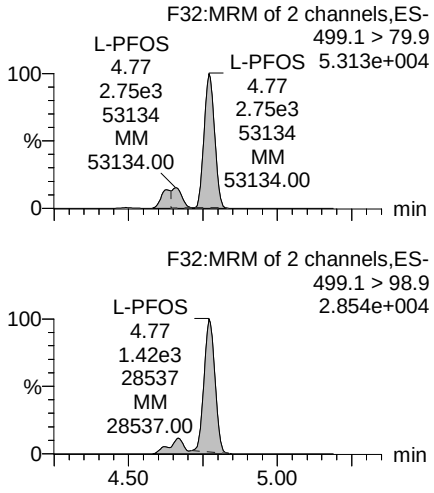


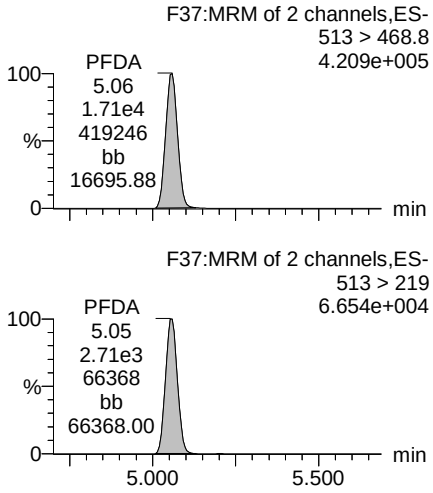
PFNA



Total PFOS



PFDA



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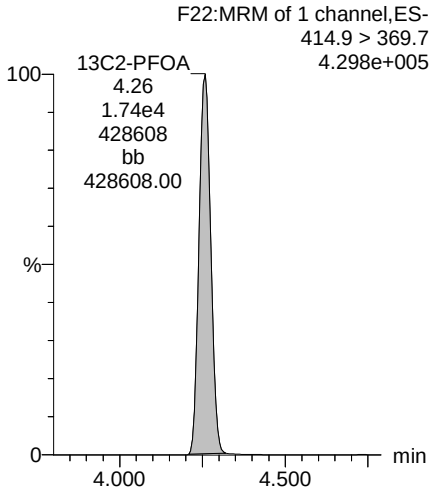
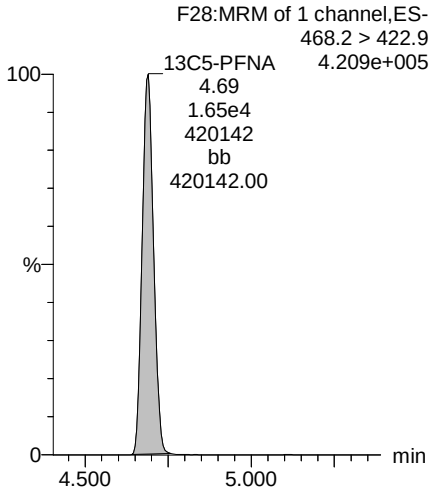
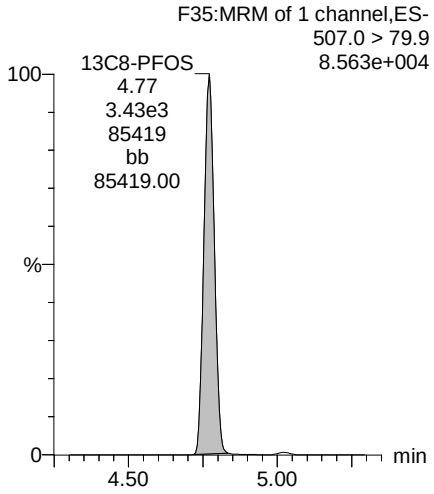


13C5-PFNA



13C8-PFOS



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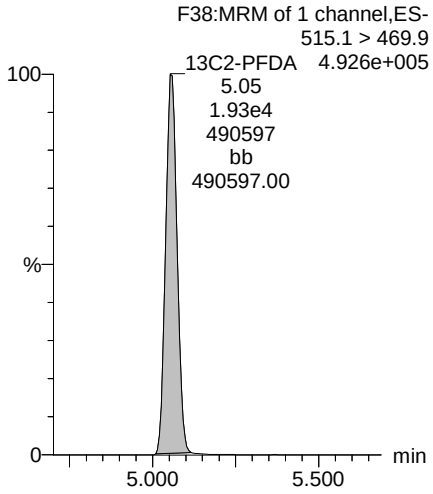


MJT6/11/2018

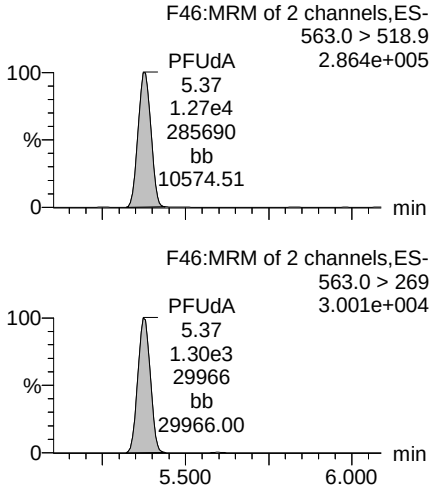
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

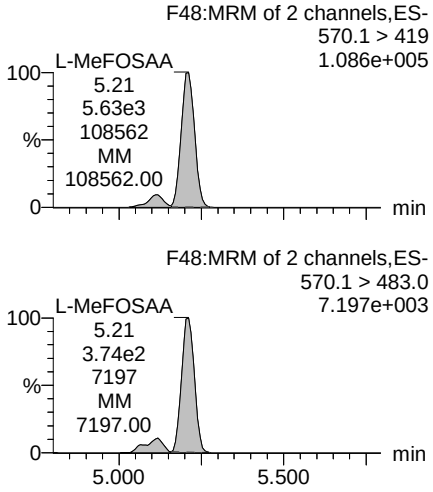
Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

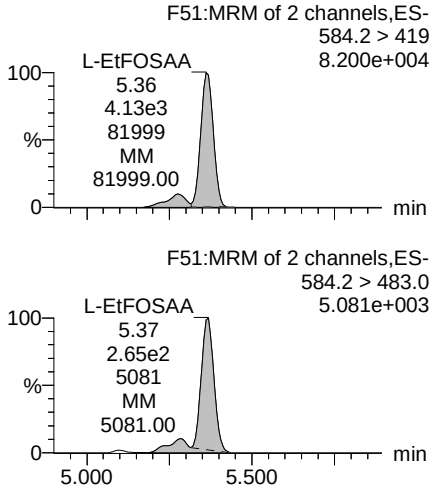
PFUdA



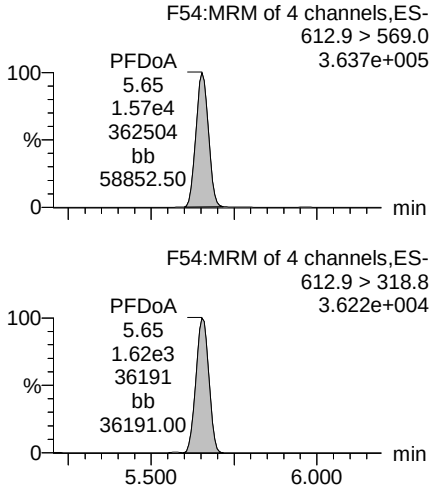
Total N-MeFOSAA



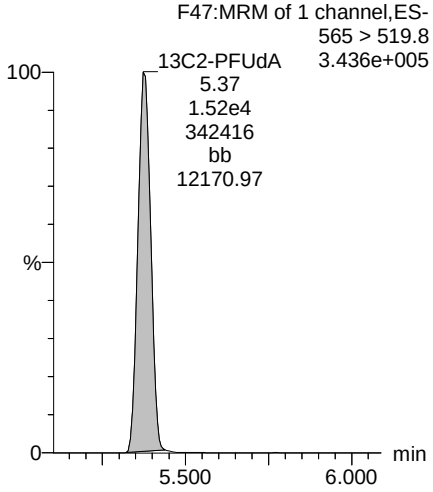
Total N-EtFOSAA



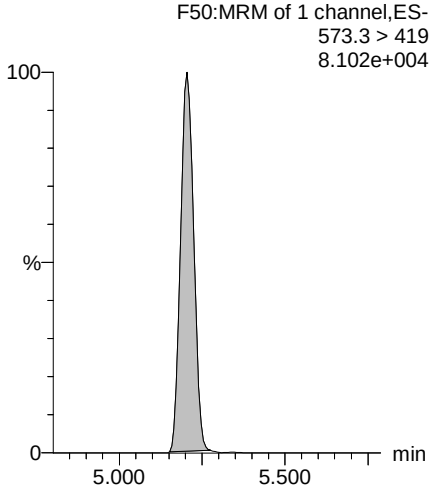
PFDoA



13C2-PFUdA



d3-N-MeFOSAA



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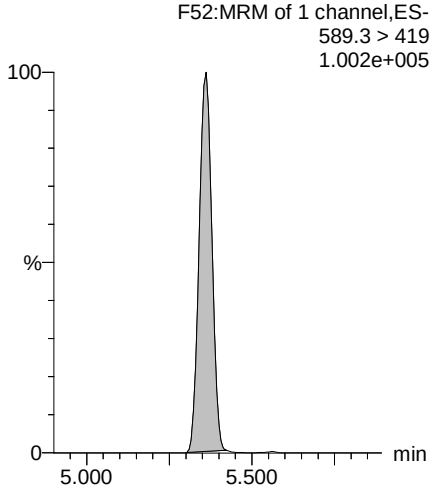
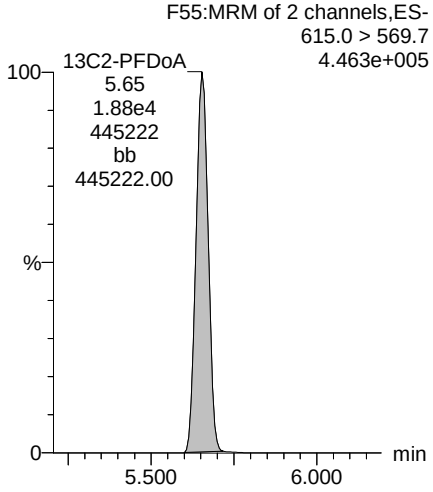


13C2-PFDoA



MJT6/11/2018

Vista Analytical Laboratory

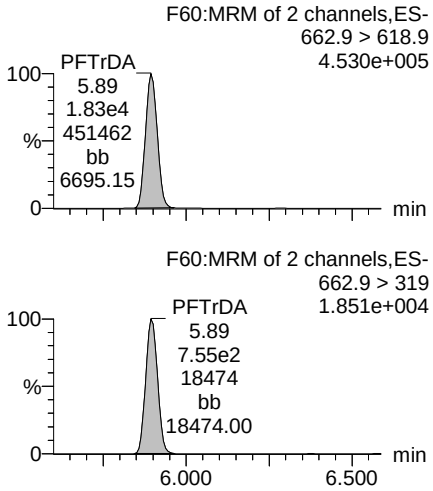
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

PFTrDA



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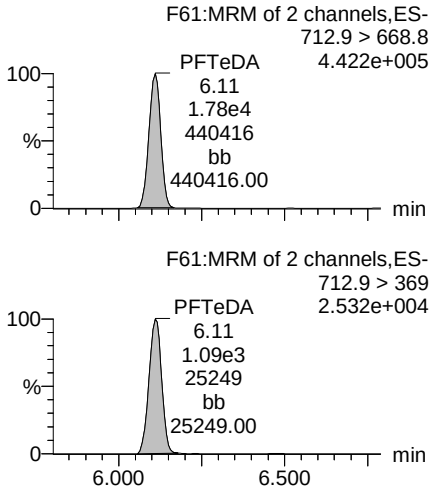
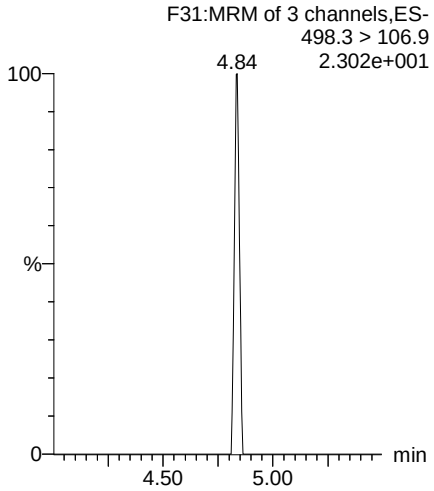
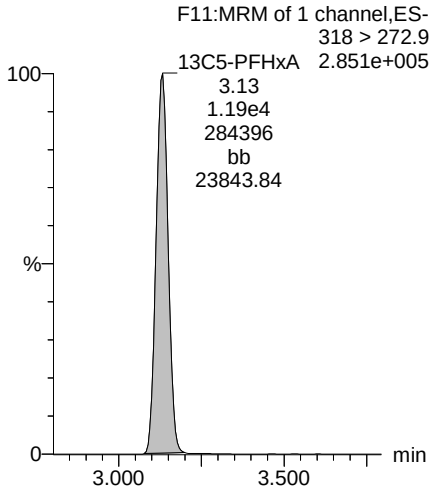


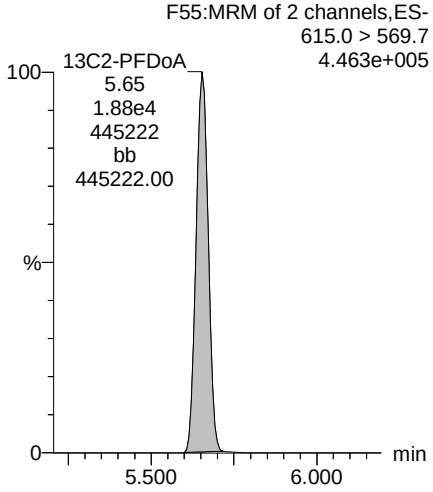
TCDA



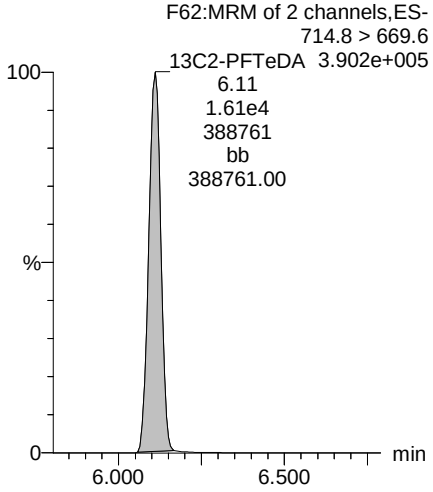
13C5-PFHxA



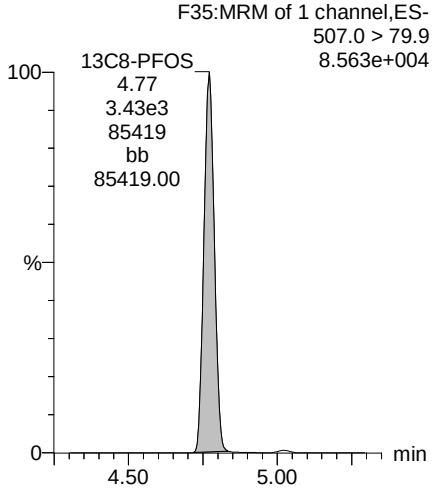
13C2-PFDoA



13C2-PFTeDA



13C8-PFOS



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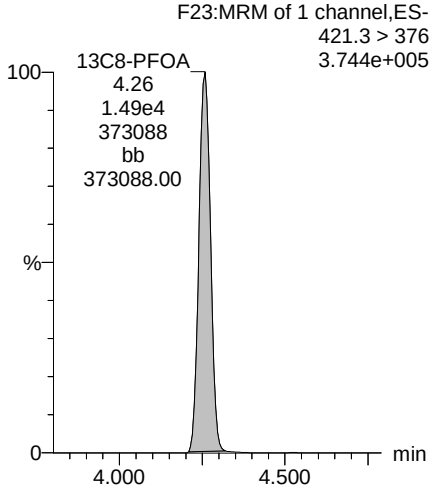


MJT6/11/2018

Vista Analytical Laboratory

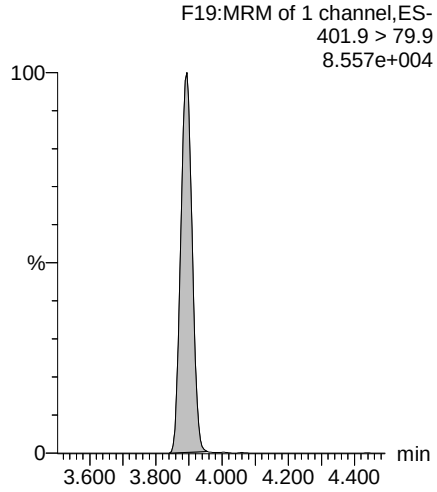
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-36.qld

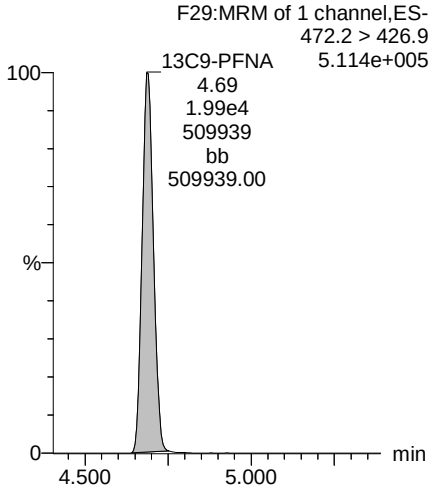
Last Altered: Monday, June 11, 2018 10:40:16 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:00:10 Pacific Daylight Time

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

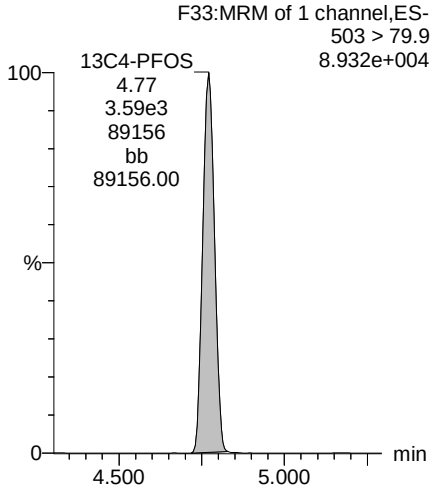
13C3-PFHxS



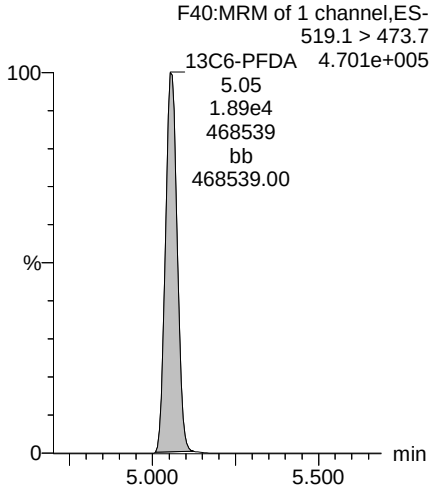
13C9-PFNA



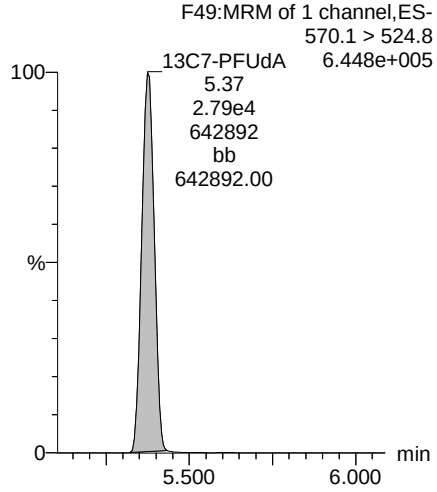
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:42 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-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	9.63e3	1.77e3	0.110		2.64	2.64	68.2	317.7230		2.637	NO
2	5	PFHxA	313.2 > 268.9	3.24e4	1.09e3	0.110		3.13	3.13	148	877.5715		223.589	NO
3	7	PFHpA	363.0 > 318.9	2.83e3	3.52e3	0.110		3.74	3.74	10.1	79.4573		21.262	NO
4	8	L-PFHxS	398.9 > 79.6	6.18e3	1.53e3	0.110		3.89	3.89	50.3	239.7086		1.766	NO
5	11	L-PFOA	413 > 368.7	2.29e3	7.16e3	0.110		4.25	4.26	4.00	36.6988		4.060	NO
6	14	PFNA	463.0 > 418.8		7.49e3	0.110		4.68						
7	16	L-PFOS	499.1 > 79.9	1.19e3	3.69e3	0.110		4.77	4.77	4.04	40.4660		2.130	NO
8	18	PFDA	513 > 468.8		1.14e4	0.110		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.44e3	0.110		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.35e3	0.110		5.37						

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Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-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		1.18e4	0.110		5.39						
2	27	PFDoA	612.9 > 569.0		1.37e4	0.110		5.67						
3	29	PFTrDA	662.9 > 618.9		1.37e4	0.110		5.92						
4	30	PFTeDA	712.9 > 668.8		1.30e4	0.110		6.14						
5	38	13C3-PFBS	302. > 98.8	1.77e3	4.13e3	0.110	0.102	2.61	2.64	5.35	477.4350	418.9		
6	39	13C2-4:2 FTS	329.2>308.9	3.64e3	4.13e3	0.110	0.231	3.02	3.05	11.0	434.5656	381.3		
7	40	13C2-PFHxA	315 > 269.8	1.09e3	4.13e3	0.110	0.744	3.10	3.13	3.30	40.4685	88.8		
8	41	13C4-PFHpA	367.2 > 321.8	3.52e3	4.13e3	0.110	0.841	3.72	3.74	10.7	115.5059	101.3		
9	42	18O2-PFHxS	403.0 > 102.6	1.53e3	3.56e3	0.110	0.415	3.87	3.89	5.39	118.4942	104.0		
10	43	13C2-6:2 FTS	429.1 > 408.9	4.03e3	5.54e3	0.110	0.232	4.19	4.20	9.11	358.6185	314.6		
11	44	13C2-PFOA	414.9 > 369.7	7.16e3	5.54e3	0.110	1.256	4.25	4.26	16.2	117.3294	102.9		
12	45	13C5-PFNA	468.2 > 422.9	7.49e3	9.65e3	0.110	0.960	4.69	4.69	9.70	92.1687	80.9		
13	46	13C8-PFOSA	506.1 > 77.7	1.18e3	1.77e4	0.110	0.145	4.75	4.76	0.830	52.1593	45.8		
14	47	13C8-PFOS	507.0 > 79.9	3.69e3	4.06e3	0.110	1.047	4.77	4.77	11.4	98.9591	86.8		
15	48	13C2-PFDA	515.1 > 469.9	1.14e4	1.38e4	0.110	1.118	5.06	5.06	10.3	83.8898	73.6		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.10e3	4.13e3	0.110	0.211	5.03	5.03	9.40	406.5717	356.7		
17	50	d3-N-MeFOSAA	573.3 > 419	3.44e3	1.77e4	0.110	0.182	5.21	5.20	2.43	121.2194	106.4		
18	51	d5-N-EtFOSAA	589.3 > 419	4.35e3	1.77e4	0.110	0.223	5.37	5.36	3.06	125.4624	110.1		
19	52	13C2-PFUdA	565 > 519.8	1.18e4	1.77e4	0.110	0.958	5.39	5.37	8.29	78.8607	69.2		
20	53	13C2-PFDoA	615.0 > 569.7	1.37e4	1.38e4	0.110	1.138	5.67	5.65	12.4	99.2568	87.1		
21	54	d3-N-MeFOSA	515.2 > 168.9		1.77e4	0.110	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.30e4	1.77e4	0.110	0.862	6.14	6.11	9.18	97.1542	85.2		
23	56	d5-N-ETFOSA	531.1 > 168.9		1.77e4	0.110	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	8.41e3	1.77e4	0.110	1.173	6.48	6.44	5.93	46.0794	101.1		
25	58	d7-N-MeFOSE	623.1 > 58.9		1.77e4	0.110	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		1.77e4	0.110	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	2.33e3	2.33e3	0.110	1.000	1.33	1.40	12.5	113.9783	100.0		
28	61	13C5-PFHxA	318 > 272.9	4.13e3	4.13e3	0.110	1.000	3.10	3.13	12.5	113.9783	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.56e3	3.56e3	0.110	1.000	3.87	3.89	12.5	113.9783	100.0		
30	63	13C8-PFOA	421.3 > 376	5.54e3	5.54e3	0.110	1.000	4.25	4.26	12.5	113.9783	100.0		
31	64	13C9-PFNA	472.2 > 426.9	9.65e3	9.65e3	0.110	1.000	4.69	4.69	12.5	113.9783	100.0		
32	65	13C4-PFOS	503 > 79.9	4.06e3	4.06e3	0.110	1.000	4.77	4.77	12.5	113.9783	1	MJT FOR ANP 6/11/2018	

Vista Analytical Laboratory

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.38e4	1.38e4	0.110	1.000	5.06	5.06	12.5	113.9783	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	1.77e4	1.77e4	0.110	1.000	5.39	5.37	12.5	113.9783	100.0		
35	68	Total PFHxS	398.9 > 79.6	6.18e3	1.53e3	0.110		4.05		50.3	239.7086			
36	69	Total PFOA	413 > 368.7	2.65e3	7.16e3	0.110		4.30		4.63	42.2541			
37	70	Total PFOS	499.1 > 79.9	1.19e3	3.69e3	0.110		4.90		4.04	40.4660			
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.44e3	0.110		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.35e3	0.110		5.70		0.000				

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Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
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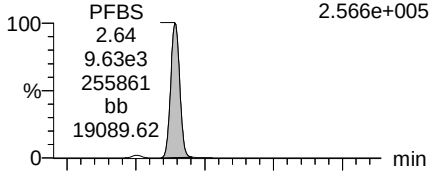
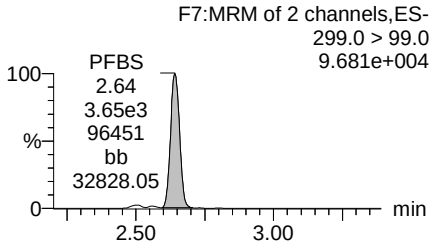
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

PFBS





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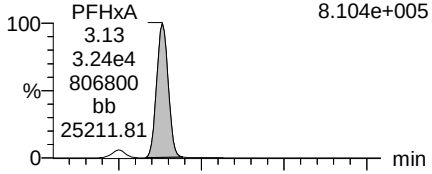
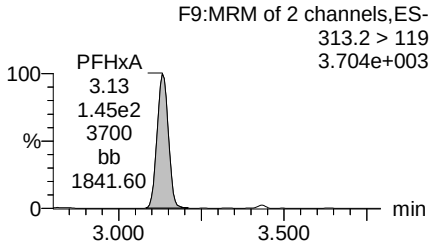
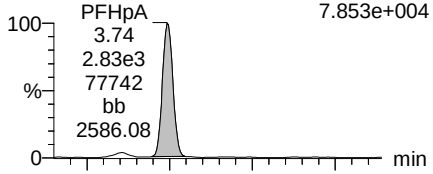
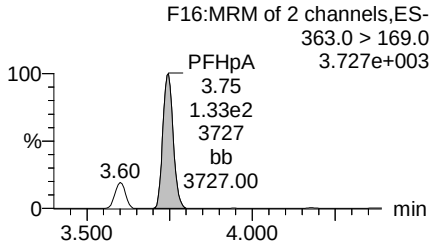




PFHpA





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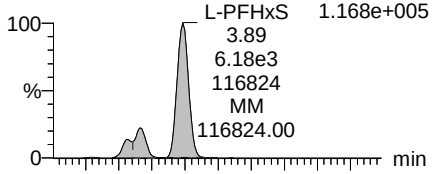
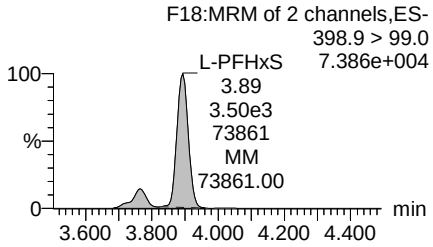
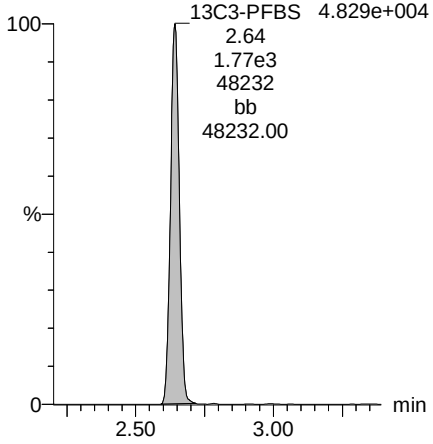
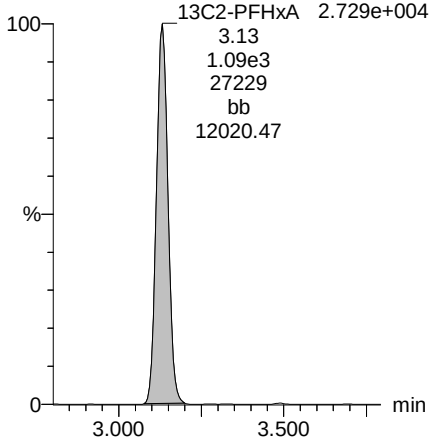




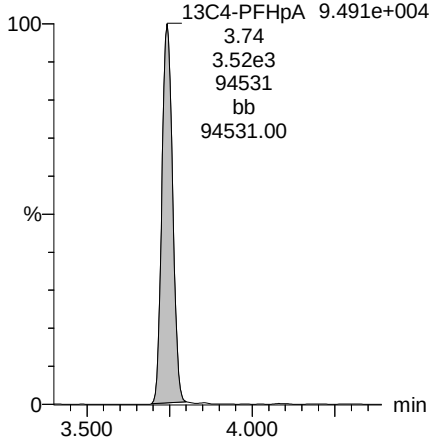
13C3-PFBS



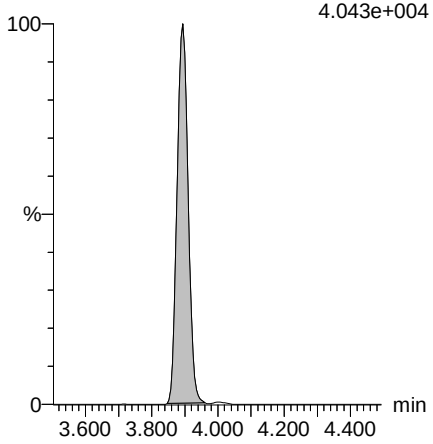
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



MJT FOR ANP 6/11/2018

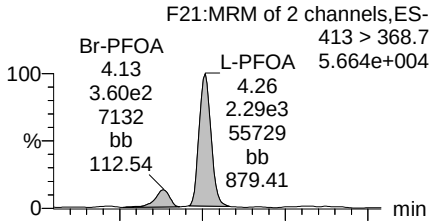
MM 6/11/2018

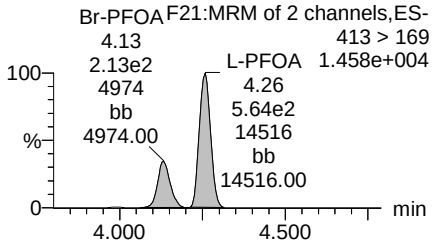
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

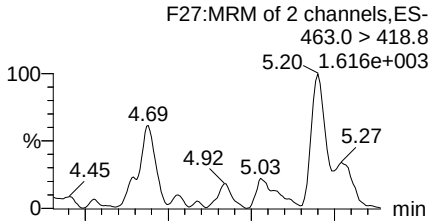
Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

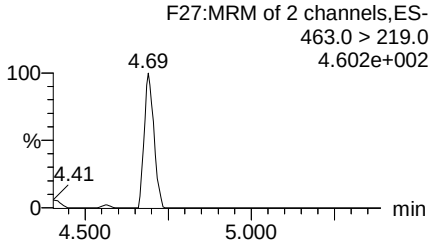
Total PFOA



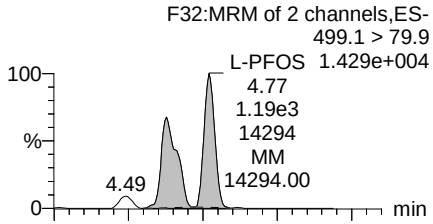


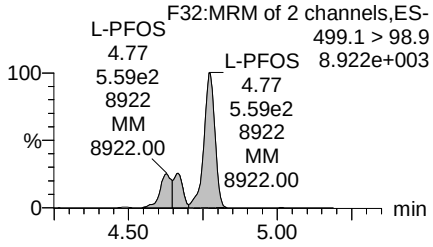
PFNA



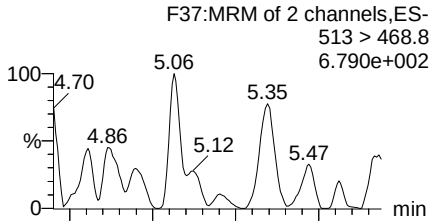


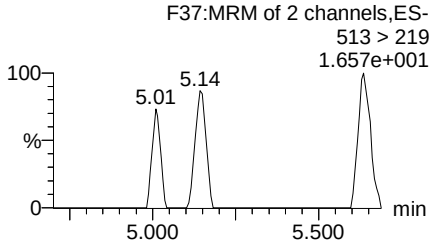
Total PFOS



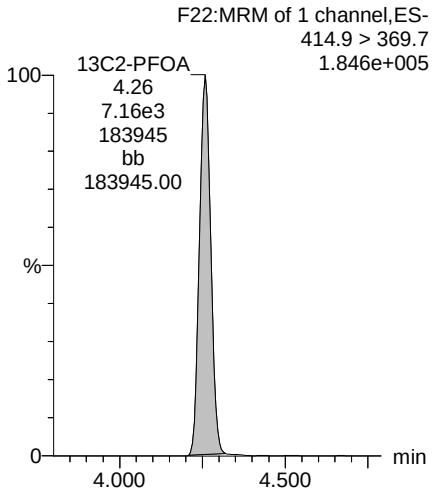


PFDA

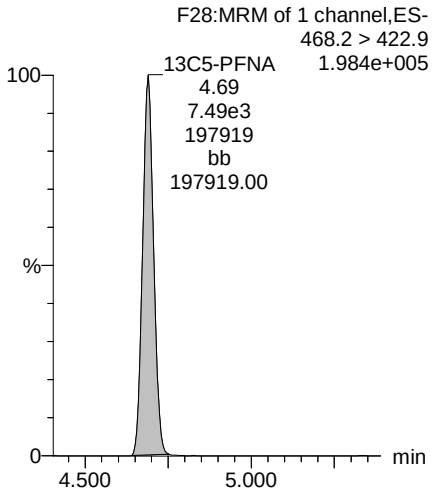




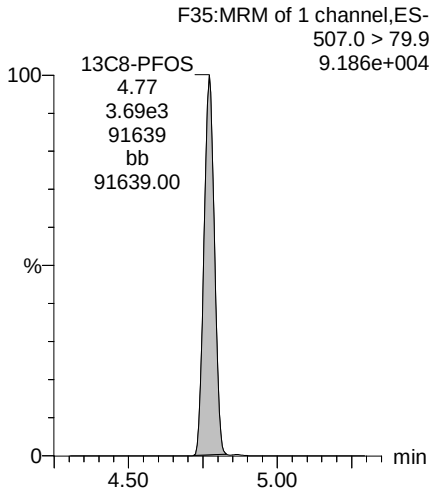
13C2-PFOA



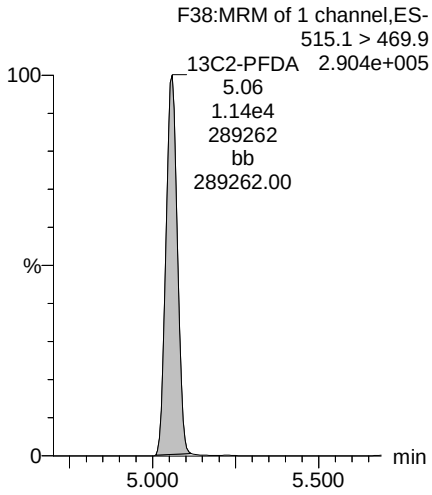
13C5-PFNA



13C8-PFOS



13C2-PFDA



MJT FOR ANP 6/11/2018

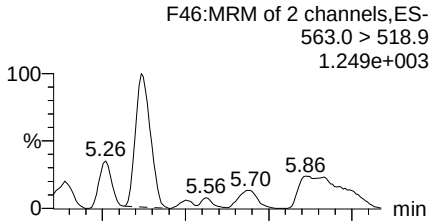
MM 6/11/2018

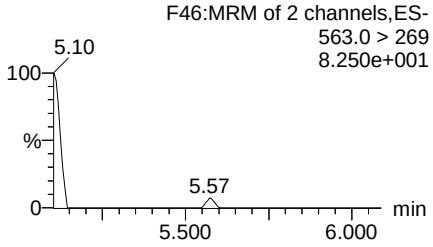
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

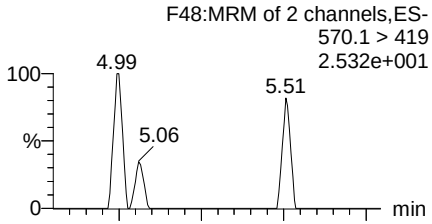
Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

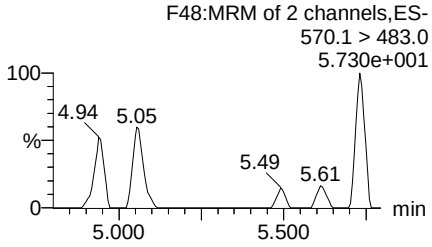
PFUdA



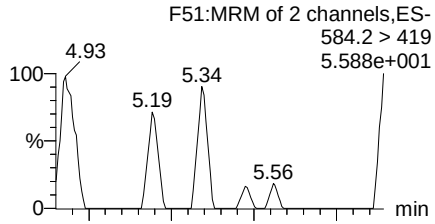


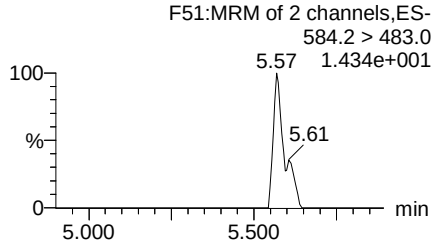
Total N-MeFOSAA



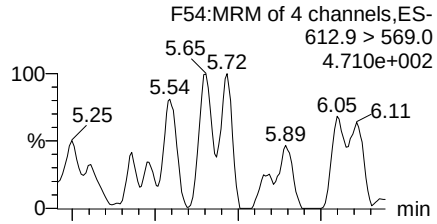


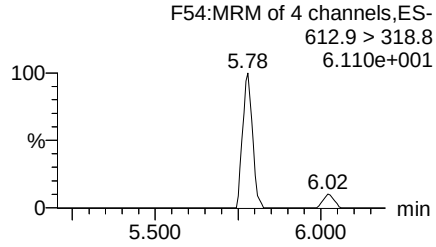
Total N-EtFOSAA



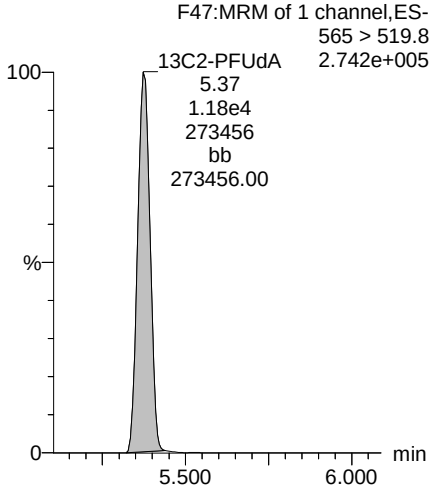


PFDoA

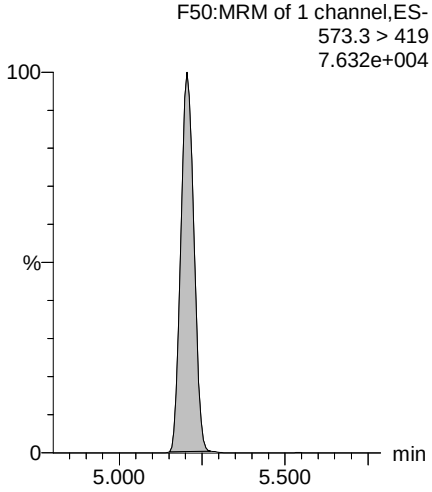




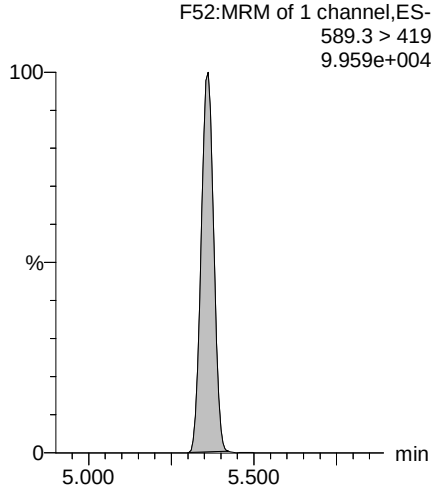
13C2-PFUdA



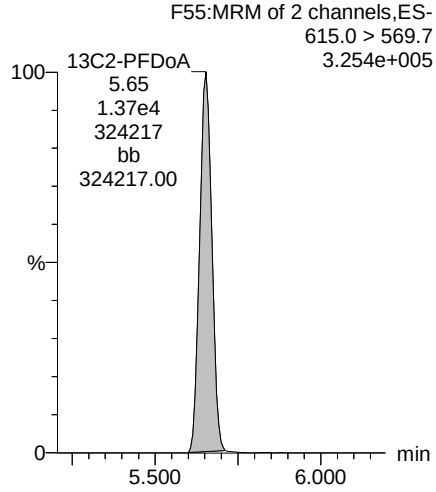
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

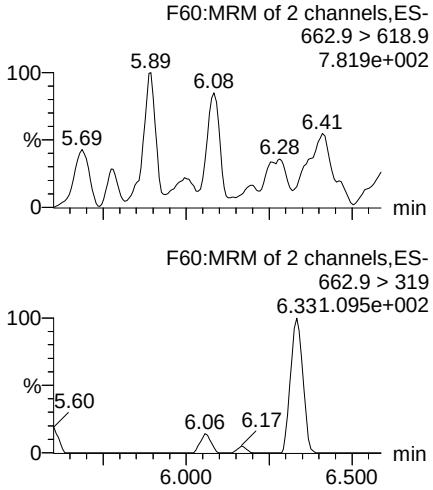
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

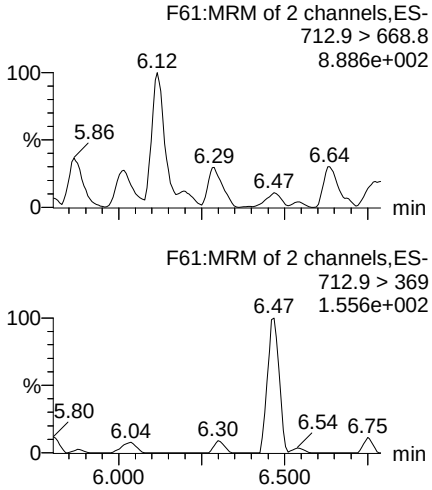
Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

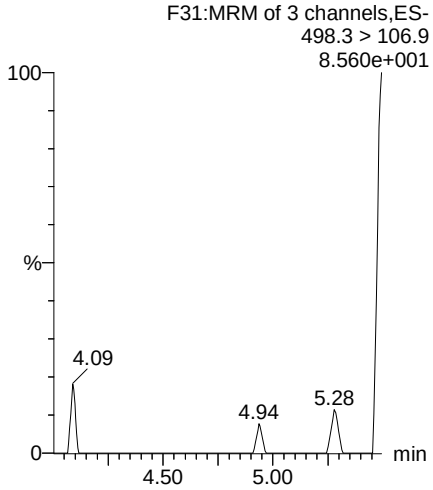
PFTrDA



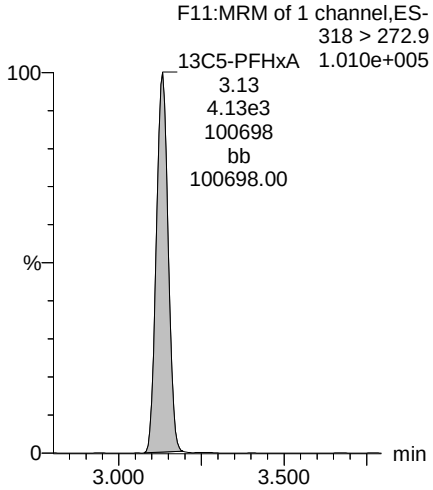
PFTeDA



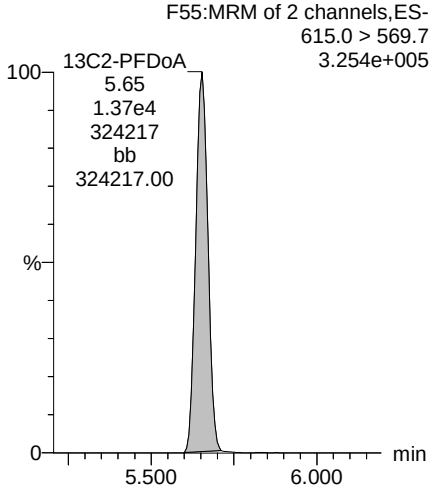
TCDA



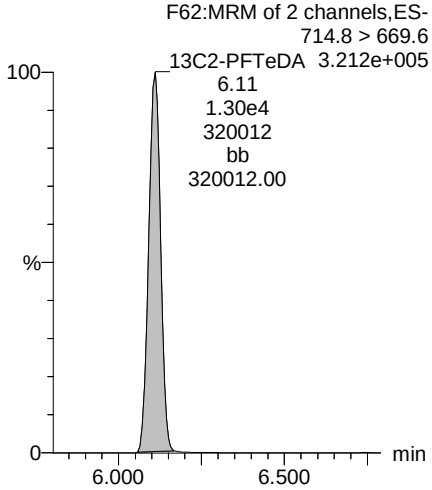
13C5-PFHxA



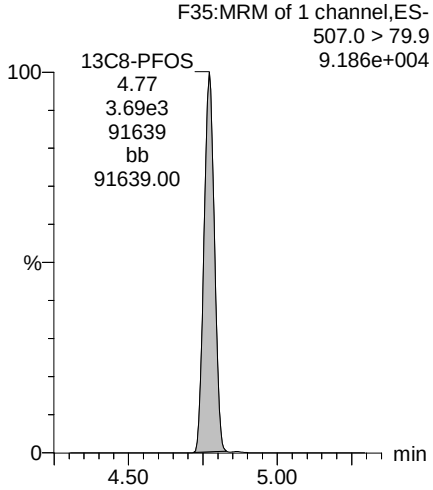
13C2-PFDoA



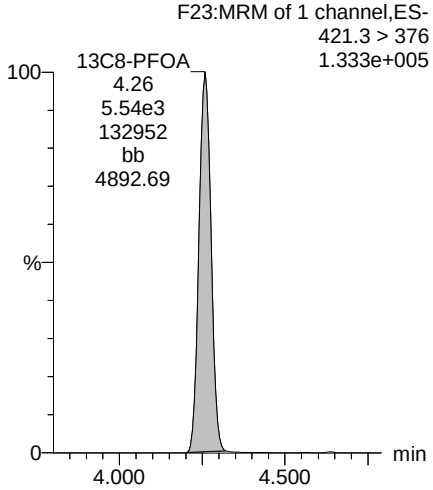
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

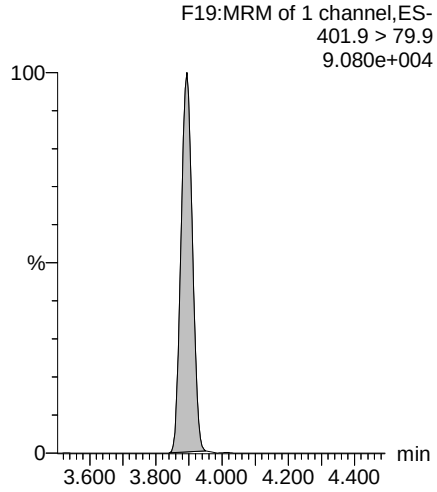
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-38.qld

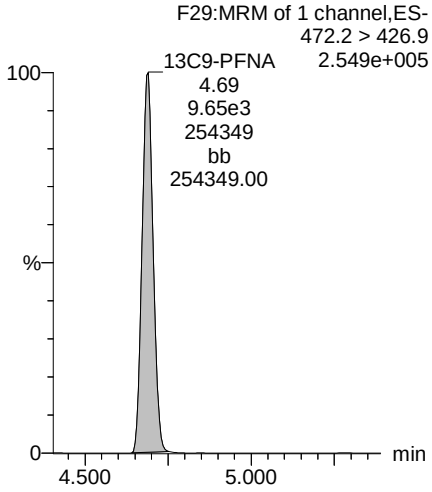
Last Altered: Friday, June 08, 2018 10:57:28 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:15:53 Pacific Daylight Time

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

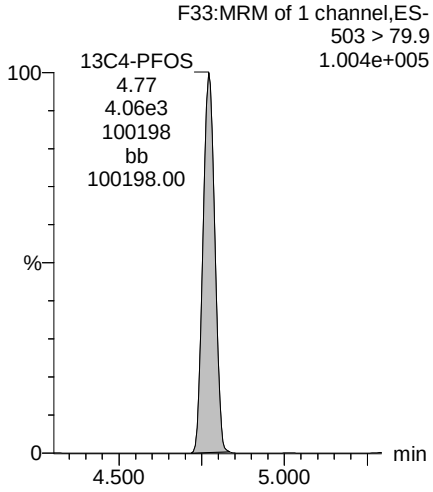
13C3-PFHxS



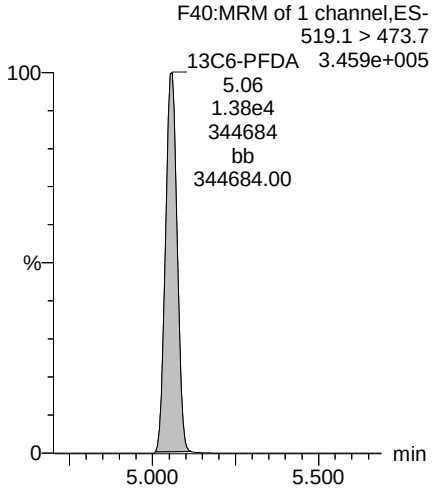
13C9-PFNA



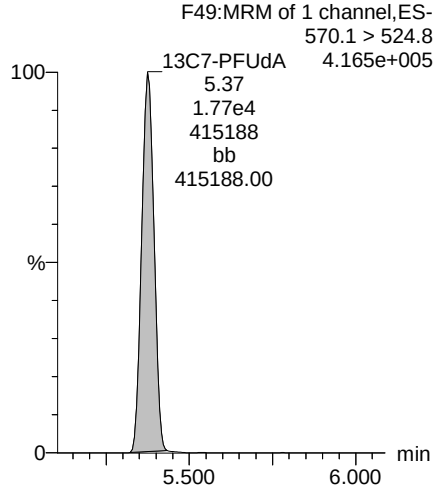
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:17 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-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	3.12e3	1.59e3	0.116		2.65	2.64	24.6	108.5118		2.694	NO
2	5	PFHxA	313.2 > 268.9	1.64e4	1.57e3	0.116		3.13	3.13	52.3	293.5734		236.966	NO
3	7	PFHpA	363.0 > 318.9	1.07e3	4.91e3	0.116		3.75	3.74	2.73	20.0686		26.962	YES
4	8	L-PFHxS	398.9 > 79.6	1.53e3	1.33e3	0.116		3.89	3.89	14.4	64.3191		1.706	NO
5	11	L-PFOA	413 > 368.7	1.36e3	7.71e3	0.116		4.25	4.26	2.21	19.0460		3.710	NO
6	14	PFNA	463.0 > 418.8		9.34e3	0.116		4.68						
7	16	L-PFOS	499.1 > 79.9	8.64e1	3.33e3	0.116		4.77	4.67	0.324	3.5857		2.651	YES
8	18	PFDA	513 > 468.8		1.25e4	0.116		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.71e3	0.116		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.44e3	0.116		5.37						

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-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		1.35e4	0.116		5.39						
2	27	PFDoA	612.9 > 569.0		1.08e4	0.116		5.67						
3	29	PFTrDA	662.9 > 618.9		1.08e4	0.116		5.92						
4	30	PFTeDA	712.9 > 668.8		1.47e4	0.116		6.14						
5	38	13C3-PFBS	302. > 98.8	1.59e3	5.73e3	0.116	0.102	2.61	2.65	3.46	291.3347	270.9		
6	39	13C2-4:2 FTS	329.2>308.9	3.41e3	5.73e3	0.116	0.231	3.02	3.05	7.44	276.7486	257.4		
7	40	13C2-PFHxA	315 > 269.8	1.57e3	5.73e3	0.116	0.744	3.10	3.13	3.43	39.6162	92.1		
8	41	13C4-PFHpA	367.2 > 321.8	4.91e3	5.73e3	0.116	0.841	3.72	3.75	10.7	109.5339	101.9		
9	42	18O2-PFHxS	403.0 > 102.6	1.33e3	3.21e3	0.116	0.415	3.87	3.89	5.19	107.7177	100.2		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.59e3	6.86e3	0.116	0.232	4.19	4.20	6.54	242.9002	225.9		
11	44	13C2-PFOA	414.9 > 369.7	7.71e3	6.86e3	0.116	1.256	4.25	4.26	14.0	96.2121	89.5		
12	45	13C5-PFNA	468.2 > 422.9	9.34e3	1.04e4	0.116	0.960	4.69	4.69	11.2	100.5197	93.5		
13	46	13C8-PFOSA	506.1 > 77.7	1.46e3	1.96e4	0.116	0.145	4.75	4.76	0.930	55.1363	51.3		
14	47	13C8-PFOS	507.0 > 79.9	3.33e3	3.37e3	0.116	1.047	4.77	4.77	12.3	101.4392	94.3		
15	48	13C2-PFDA	515.1 > 469.9	1.25e4	1.39e4	0.116	1.118	5.06	5.06	11.2	86.2515	80.2		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.01e3	5.73e3	0.116	0.211	5.03	5.03	6.57	268.1671	249.4		
17	50	d3-N-MeFOSAA	573.3 > 419	3.71e3	1.96e4	0.116	0.182	5.21	5.20	2.37	111.5611	103.7		
18	51	d5-N-EtFOSAA	589.3 > 419	4.44e3	1.96e4	0.116	0.223	5.37	5.36	2.83	109.3910	101.7		
19	52	13C2-PFUdA	565 > 519.8	1.35e4	1.96e4	0.116	0.958	5.39	5.38	8.59	77.1658	71.8		
20	53	13C2-PFDoA	615.0 > 569.7	1.08e4	1.39e4	0.116	1.138	5.67	5.65	9.70	73.3308	68.2		
21	54	d3-N-MeFOSA	515.2 > 168.9		1.96e4	0.116	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.47e4	1.96e4	0.116	0.862	6.14	6.11	9.38	93.6074	87.0		
23	56	d5-N-ETFOSA	531.1 > 168.9		1.96e4	0.116	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.24e3	1.96e4	0.116	1.173	6.48	6.44	5.89	43.2066	100.4		
25	58	d7-N-MeFOSE	623.1 > 58.9		1.96e4	0.116	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		1.96e4	0.116	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	3.69e3	3.69e3	0.116	1.000	1.33	1.40	12.5	107.5361	100.0		
28	61	13C5-PFHxA	318 > 272.9	5.73e3	5.73e3	0.116	1.000	3.10	3.13	12.5	107.5361	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.21e3	3.21e3	0.116	1.000	3.87	3.89	12.5	107.5361	100.0		
30	63	13C8-PFOA	421.3 > 376	6.86e3	6.86e3	0.116	1.000	4.25	4.26	12.5	107.5361	100.0		
31	64	13C9-PFNA	472.2 > 426.9	1.04e4	1.04e4	0.116	1.000	4.69	4.69	12.5	107.5361	100.0		
32	65	13C4-PFOS	503 > 79.9	3.37e3	3.37e3	0.116	1.000	4.77	4.77	12.5	107.5361	1	MJT FOR ANP 6/11/2018	

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.39e4	1.39e4	0.116	1.000	5.06	5.06	12.5	107.5361	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	1.96e4	1.96e4	0.116	1.000	5.39	5.38	12.5	107.5361	100.0		
35	68	Total PFHxS	398.9 > 79.6	1.53e3	1.33e3	0.116		4.05		14.4	64.3191			
36	69	Total PFOA	413 > 368.7	1.59e3	7.71e3	0.116		4.30		2.58	22.0118			
37	70	Total PFOS	499.1 > 79.9	8.64e1	3.33e3	0.116		4.90		0.324	3.5857			
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.71e3	0.116		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.44e3	0.116		5.70		0.000				

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

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Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

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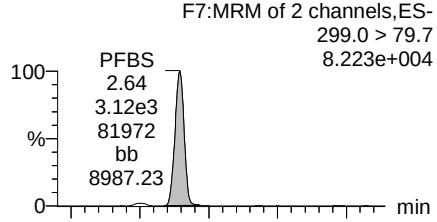

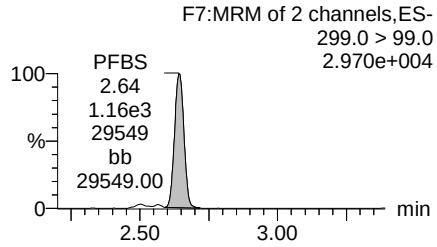

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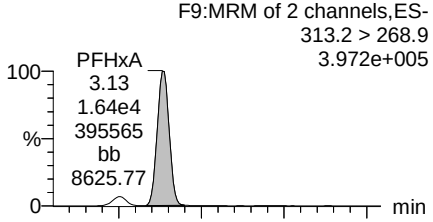

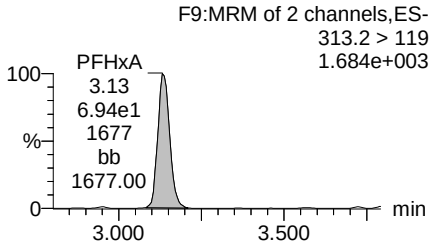

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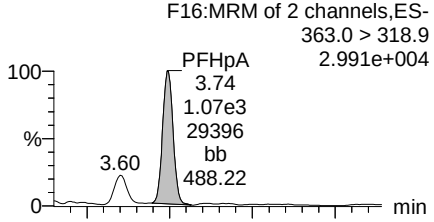

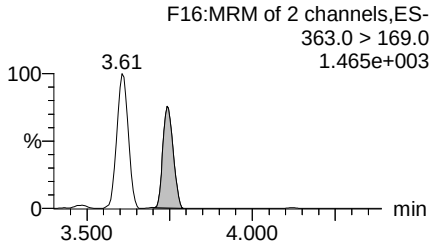

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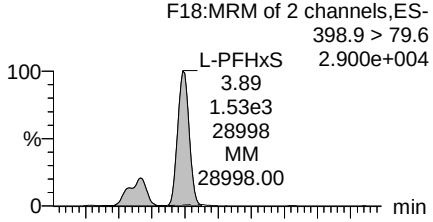

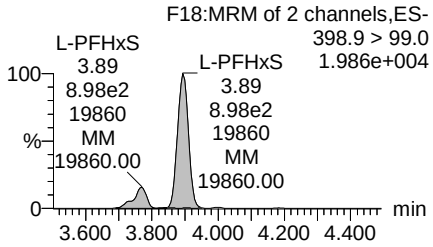

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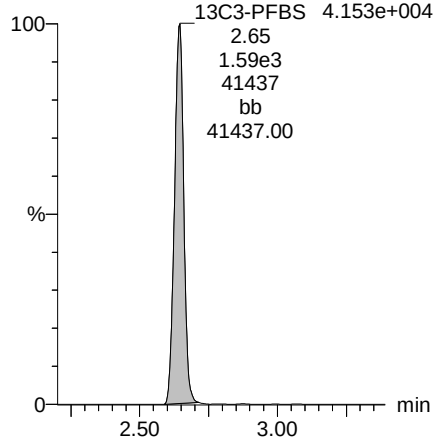

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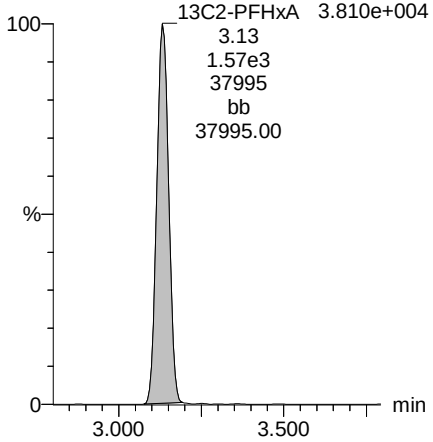

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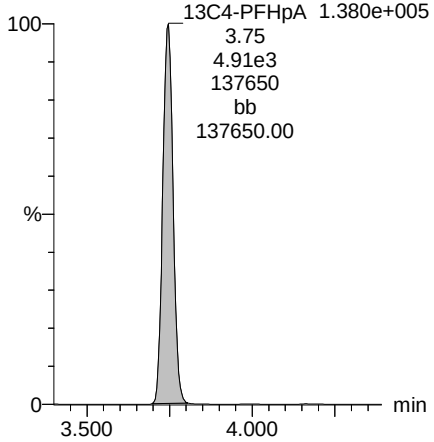

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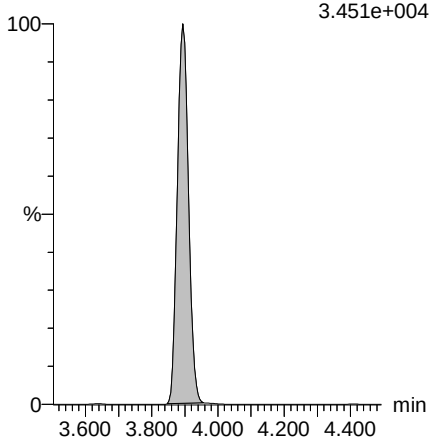

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

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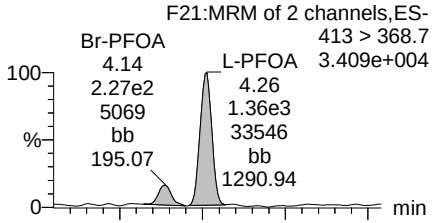

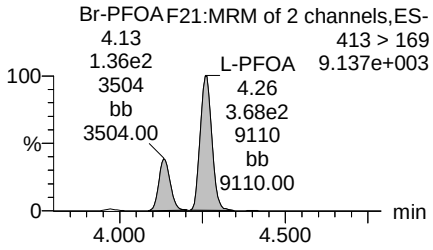

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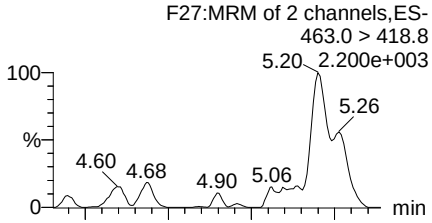

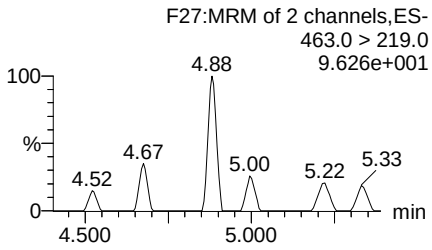

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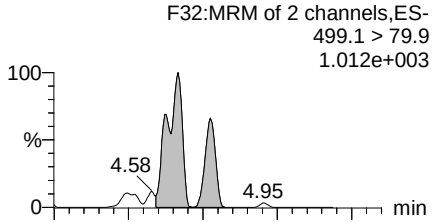

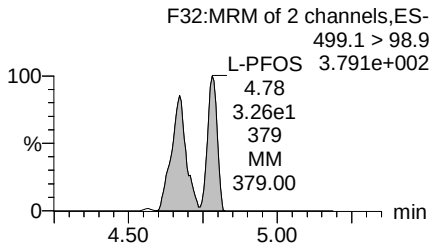

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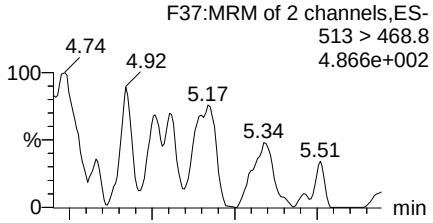

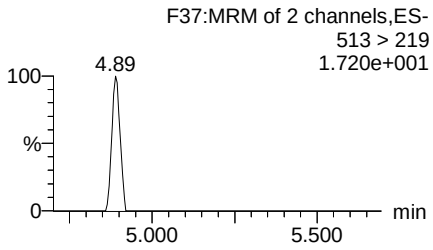

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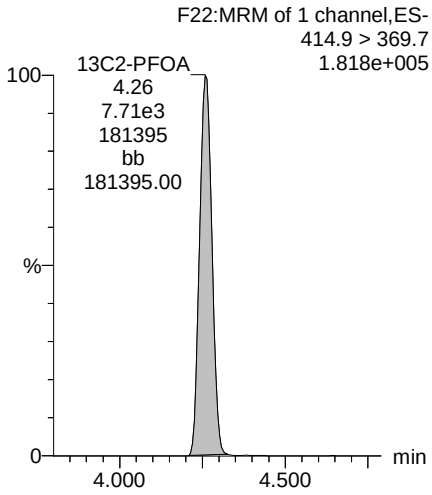

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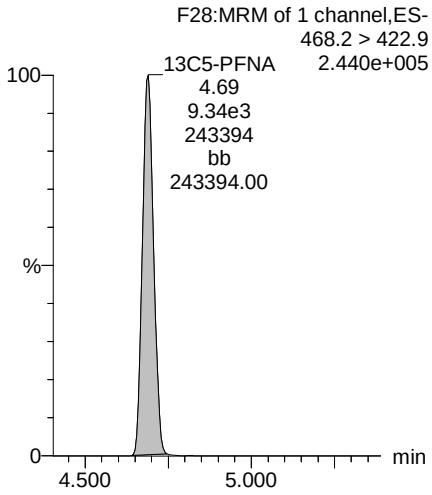

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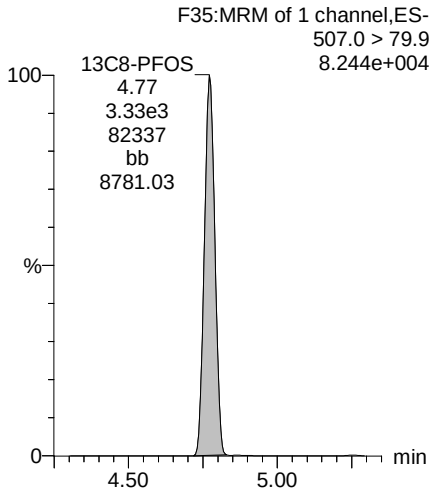

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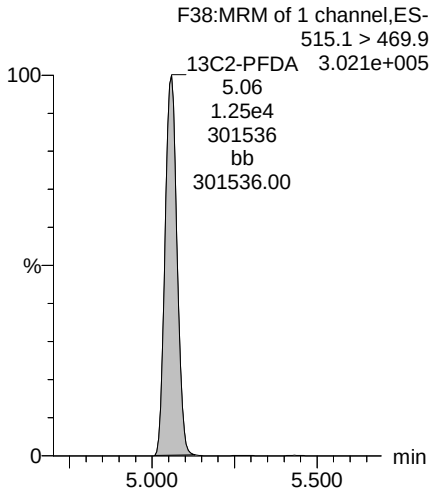

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

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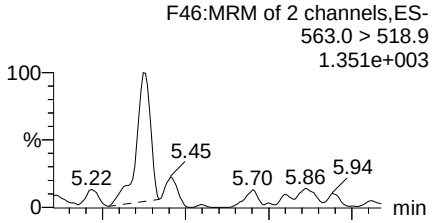
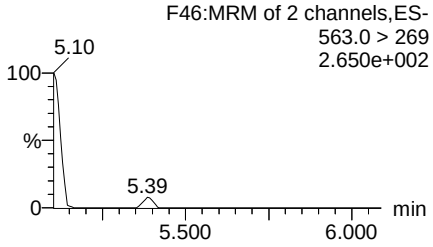
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

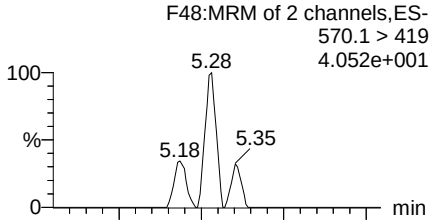
Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

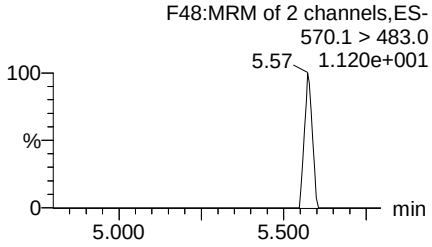
PFUdA





Total N-MeFOSAA





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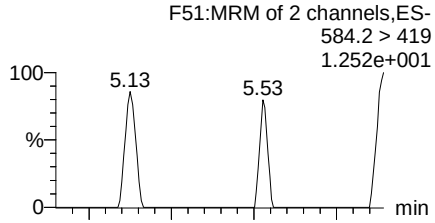

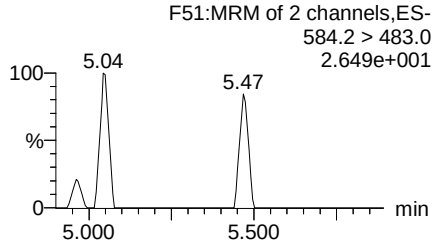

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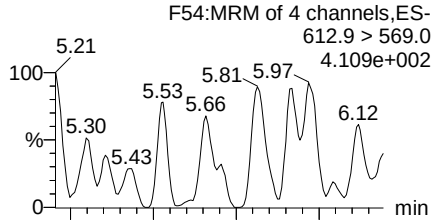

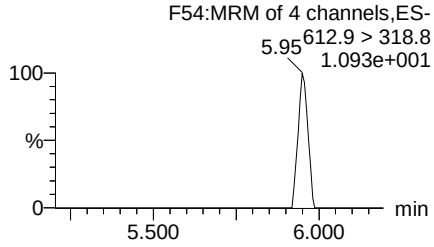

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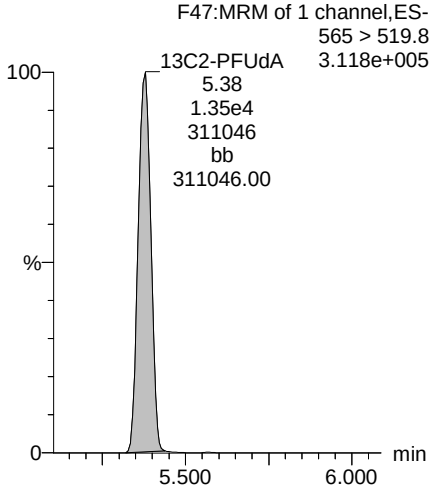

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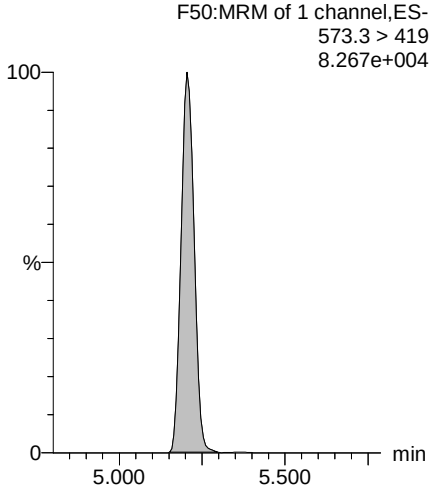

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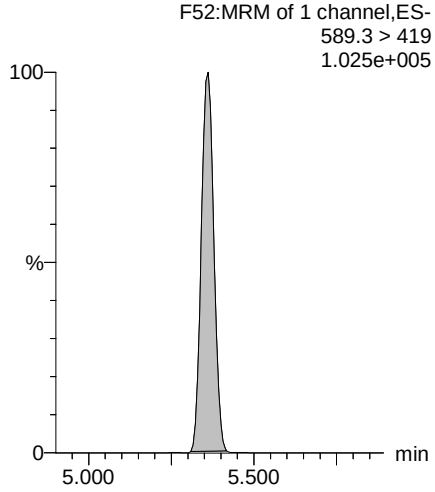

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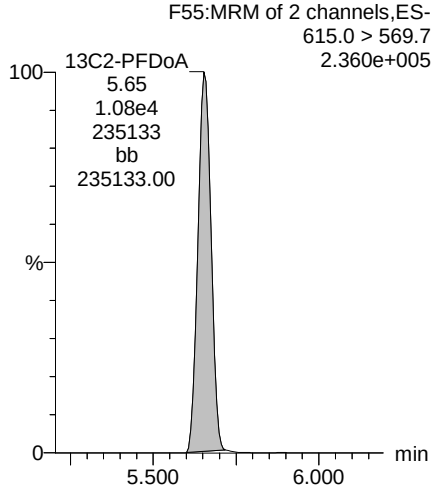

MJT FOR ANP 6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

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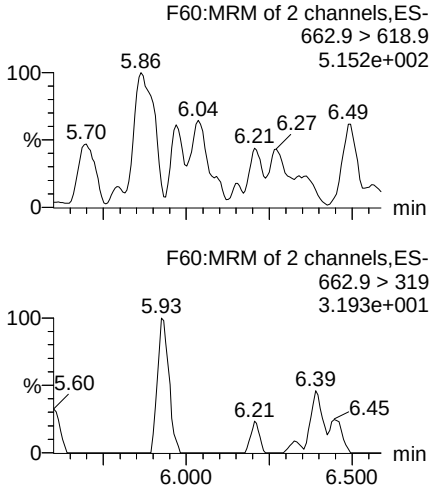

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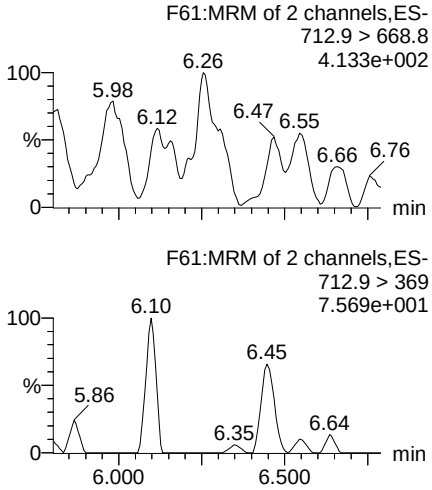

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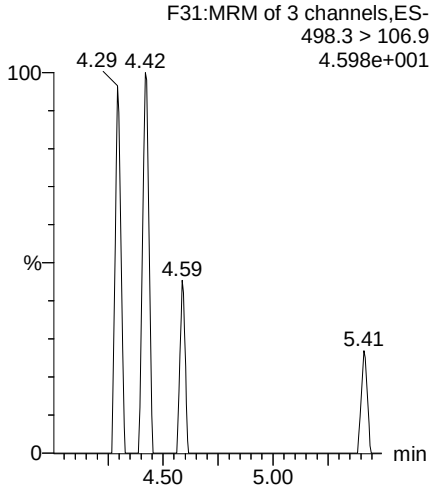
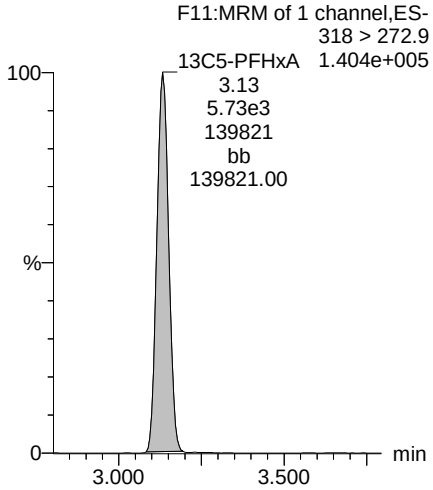
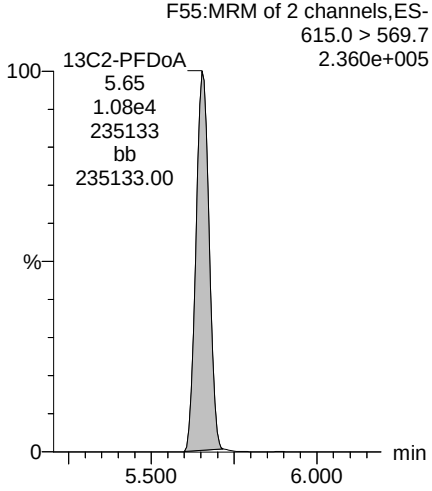


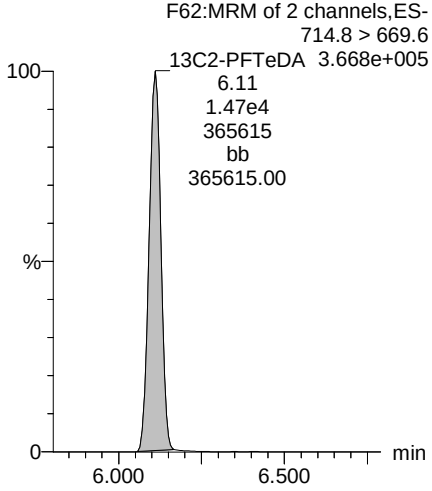
13C5-PFHxA



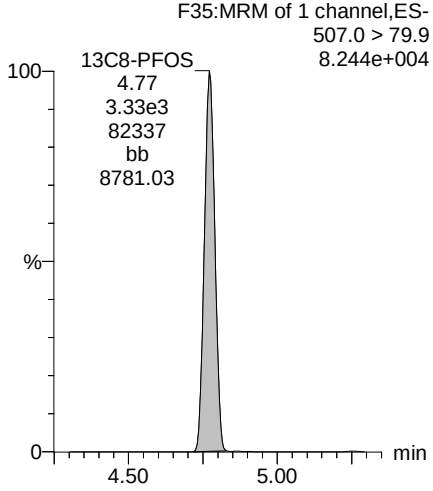
13C2-PFDoA



13C2-PFTeDA



13C8-PFOS



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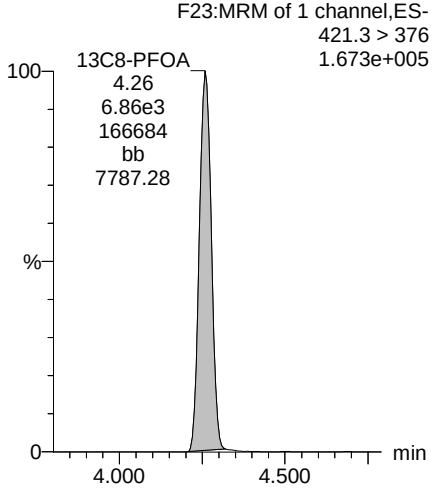


MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

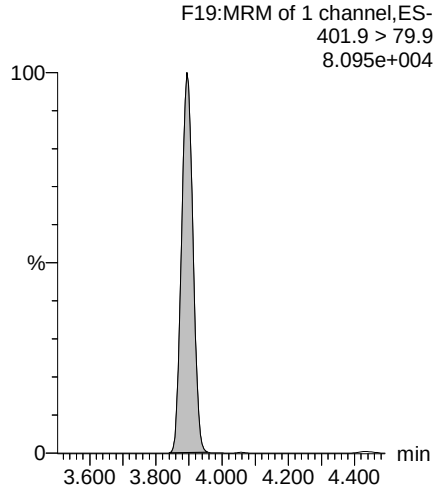
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-39.qld

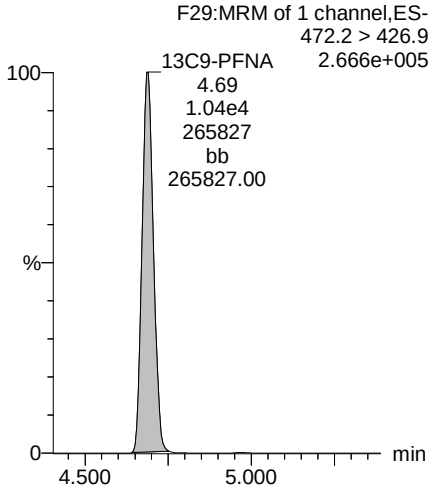
Last Altered: Friday, June 08, 2018 11:03:04 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:17:28 Pacific Daylight Time

Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

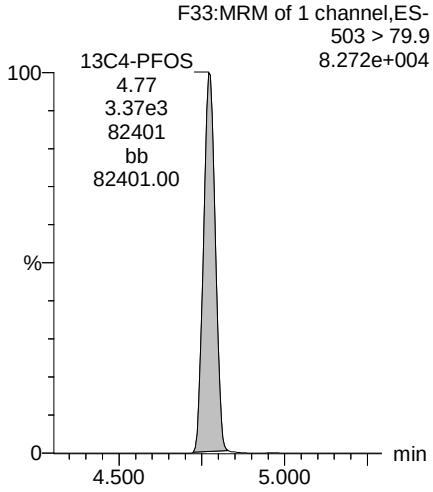
13C3-PFHxS



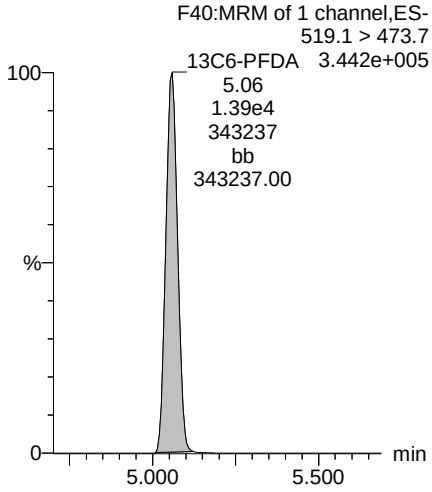
13C9-PFNA



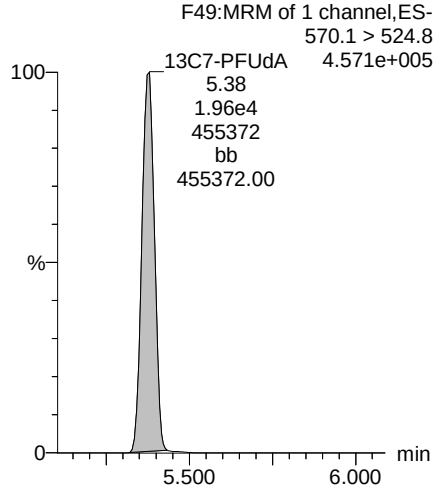
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:02 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-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	3.77e3	1.82e3	0.112		2.65	2.64	25.9	118.4850		2.682	NO
2	5	PFHxA	313.2 > 268.9	1.49e4	8.74e2	0.112		3.13	3.13	85.1	495.0267		380.434	YES
3	7	PFHpA	363.0 > 318.9	2.07e3	3.16e3	0.112		3.74	3.74	8.18	63.2526		17.140	NO
4	8	L-PFHxS	398.9 > 79.6	6.47e3	1.51e3	0.112		3.89	3.89	53.7	250.3719		1.873	NO
5	11	L-PFOA	413 > 368.7	2.41e3	6.02e3	0.112		4.25	4.26	5.00	45.0471		4.174	NO
6	14	PFNA	463.0 > 418.8		5.70e3	0.112		4.68						
7	16	L-PFOS	499.1 > 79.9	2.25e3	3.87e3	0.112		4.77	4.77	7.26	70.8944		2.135	NO
8	18	PFDA	513 > 468.8		9.03e3	0.112		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.11e3	0.112		5.22						
10	23	L-EtFOSAA	584.2 > 419		3.93e3	0.112		5.37						

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-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		7.79e3	0.112		5.39						
2	27	PFDoA	612.9 > 569.0		1.09e4	0.112		5.67						
3	29	PFTrDA	662.9 > 618.9		1.09e4	0.112		5.92						
4	30	PFTeDA	712.9 > 668.8		1.19e4	0.112		6.14						
5	38	13C3-PFBS	302. > 98.8	1.82e3	3.38e3	0.112	0.102	2.61	2.65	6.73	588.9369	527.4		
6	39	13C2-4:2 FTS	329.2>308.9	3.82e3	3.38e3	0.112	0.231	3.02	3.05	14.1	545.0830	488.1		
7	40	13C2-PFHxA	315 > 269.8	8.74e2	3.38e3	0.112	0.744	3.10	3.13	3.23	38.7718	86.8		
8	41	13C4-PFHpA	367.2 > 321.8	3.16e3	3.38e3	0.112	0.841	3.72	3.74	11.7	124.0221	111.1		
9	42	18O2-PFHxS	403.0 > 102.6	1.51e3	3.73e3	0.112	0.415	3.87	3.89	5.05	108.8097	97.4		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.99e3	5.41e3	0.112	0.232	4.19	4.20	9.22	355.7117	318.5		
11	44	13C2-PFOA	414.9 > 369.7	6.02e3	5.41e3	0.112	1.256	4.25	4.26	13.9	99.0111	88.7		
12	45	13C5-PFNA	468.2 > 422.9	5.70e3	7.75e3	0.112	0.960	4.69	4.69	9.19	85.5347	76.6		
13	46	13C8-PFOSA	506.1 > 77.7	6.70e2	1.62e4	0.112	0.145	4.75	4.76	0.516	31.7641	28.4		
14	47	13C8-PFOS	507.0 > 79.9	3.87e3	3.71e3	0.112	1.047	4.77	4.77	13.0	111.1306	99.5		
15	48	13C2-PFDA	515.1 > 469.9	9.03e3	1.04e4	0.112	1.118	5.06	5.06	10.8	86.4043	77.4		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.19e3	3.38e3	0.112	0.211	5.03	5.03	11.8	500.0248	447.8		
17	50	d3-N-MeFOSAA	573.3 > 419	3.11e3	1.62e4	0.112	0.182	5.21	5.20	2.40	117.4261	105.2		
18	51	d5-N-EtFOSAA	589.3 > 419	3.93e3	1.62e4	0.112	0.223	5.37	5.36	3.03	121.4888	108.8		
19	52	13C2-PFUdA	565 > 519.8	7.79e3	1.62e4	0.112	0.958	5.39	5.37	6.00	55.9283	50.1		
20	53	13C2-PFDoA	615.0 > 569.7	1.09e4	1.04e4	0.112	1.138	5.67	5.65	13.0	102.1535	91.5		
21	54	d3-N-MeFOSA	515.2 > 168.9		1.62e4	0.112	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.19e4	1.62e4	0.112	0.862	6.14	6.11	9.14	94.7816	84.9		
23	56	d5-N-ETFOSA	531.1 > 168.9		1.62e4	0.112	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.34e3	1.62e4	0.112	1.173	6.48	6.44	7.20	54.8164	122.7		
25	58	d7-N-MeFOSE	623.1 > 58.9		1.62e4	0.112	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		1.62e4	0.112	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	1.93e3	1.93e3	0.112	1.000	1.33	1.40	12.5	111.6670	100.0		
28	61	13C5-PFHxA	318 > 272.9	3.38e3	3.38e3	0.112	1.000	3.10	3.13	12.5	111.6670	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.73e3	3.73e3	0.112	1.000	3.87	3.89	12.5	111.6670	100.0		
30	63	13C8-PFOA	421.3 > 376	5.41e3	5.41e3	0.112	1.000	4.25	4.26	12.5	111.6670	100.0		
31	64	13C9-PFNA	472.2 > 426.9	7.75e3	7.75e3	0.112	1.000	4.69	4.69	12.5	111.6670	100.0		
32	65	13C4-PFOS	503 > 79.9	3.71e3	3.71e3	0.112	1.000	4.77	4.77	12.5	111.6670	1	MJT FOR ANP 6/11/2018	

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.04e4	1.04e4	0.112	1.000	5.06	5.06	12.5	111.6670	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	1.62e4	1.62e4	0.112	1.000	5.39	5.37	12.5	111.6670	100.0		
35	68	Total PFHxS	398.9 > 79.6	6.47e3	1.51e3	0.112		4.05		53.7	250.3719			
36	69	Total PFOA	413 > 368.7	2.72e3	6.02e3	0.112		4.30		5.64	50.5946			
37	70	Total PFOS	499.1 > 79.9	2.25e3	3.87e3	0.112		4.90		7.26	70.8944			
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.11e3	0.112		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	3.93e3	0.112		5.70		0.000				

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
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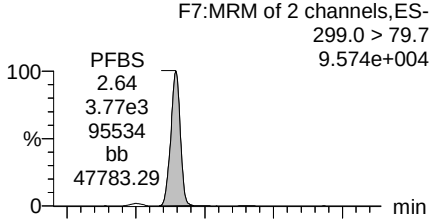
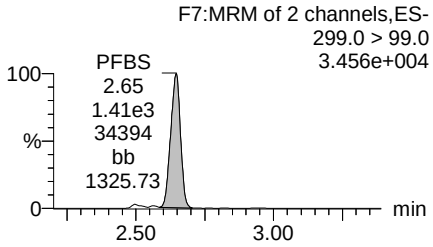
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

PFBS





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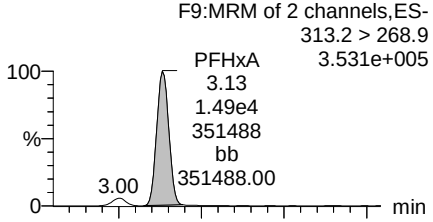

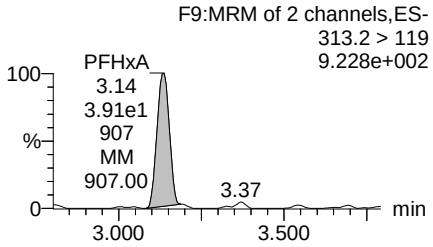

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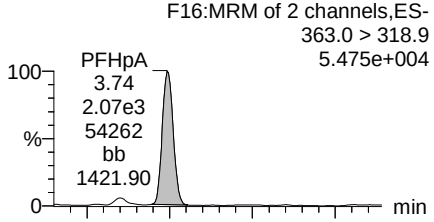
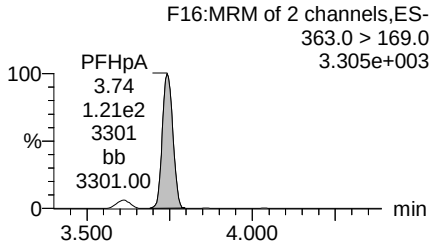
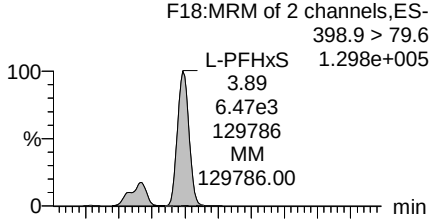
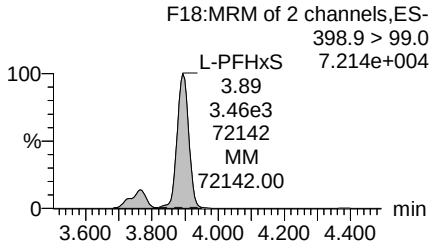




Total PFHxS





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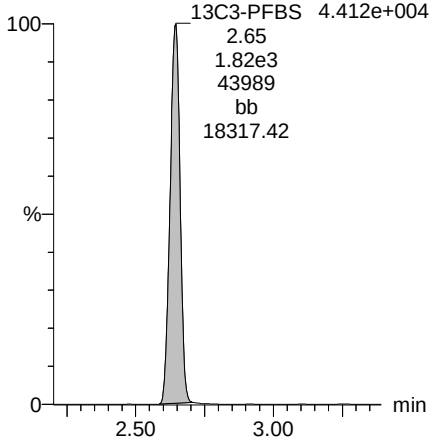

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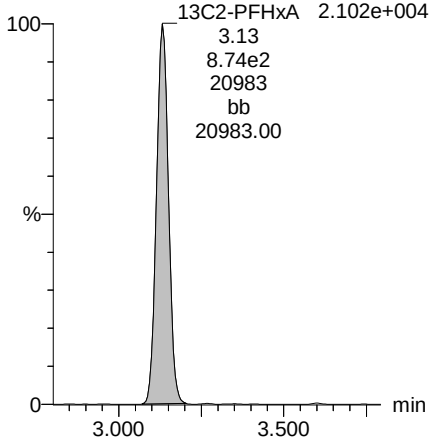

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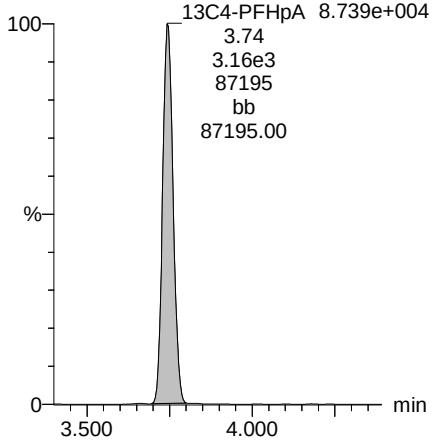

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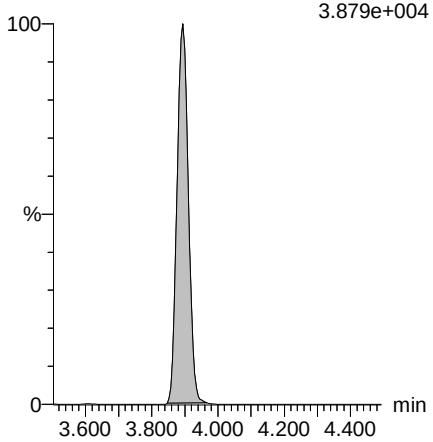


MJT FOR ANP 6/11/2018

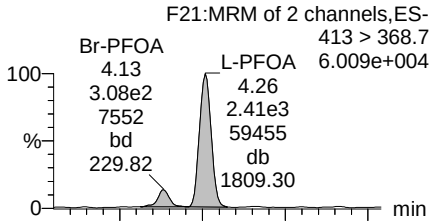
MM 6/11/2018

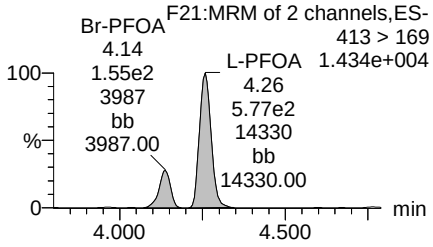
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

Total PFOA





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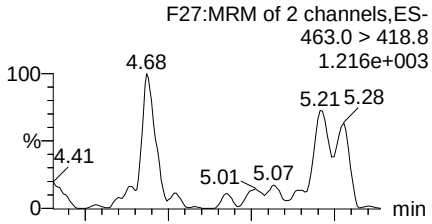
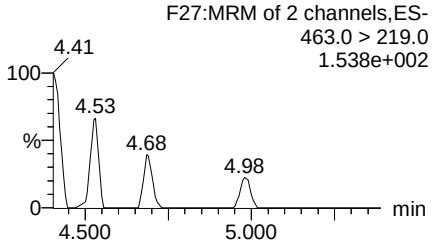
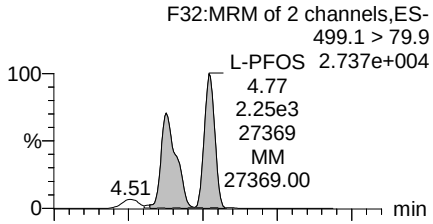
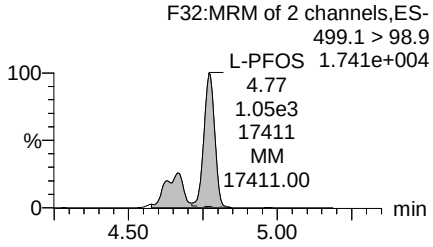


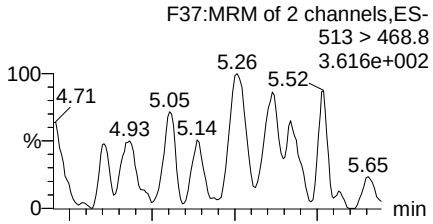


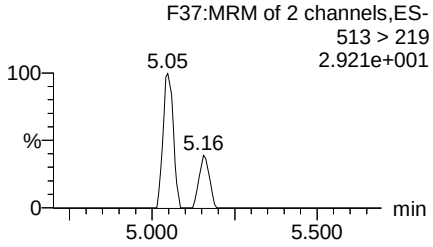
Total PFOS



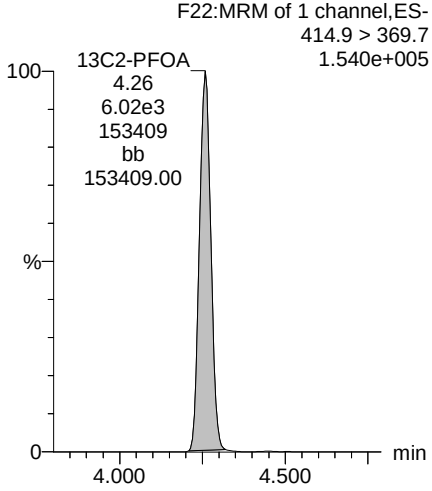


PFDA

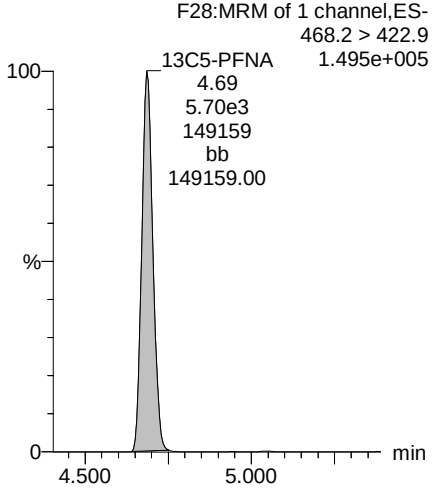




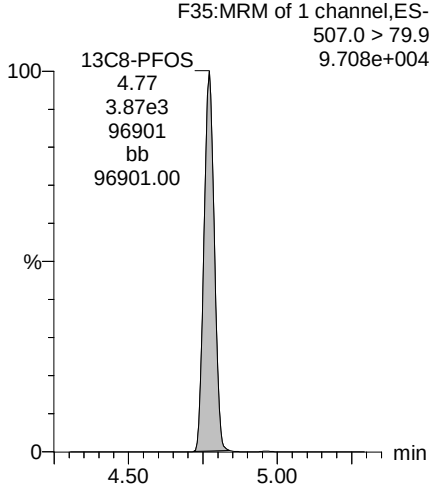
13C2-PFOA



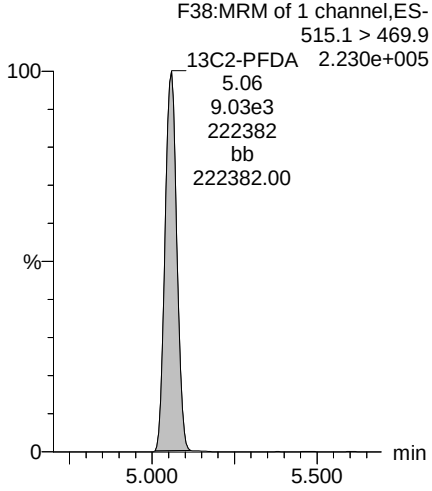
13C5-PFNA



13C8-PFOS



13C2-PFDA



MJT FOR ANP 6/11/2018

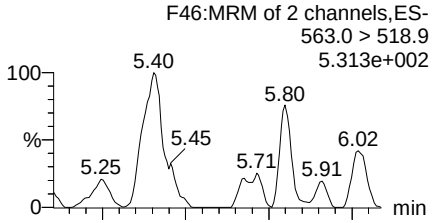
MM 6/11/2018

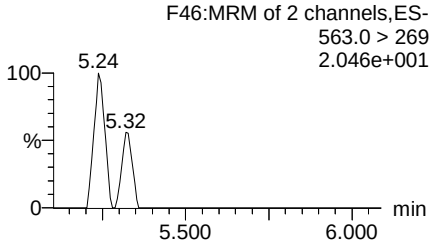
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

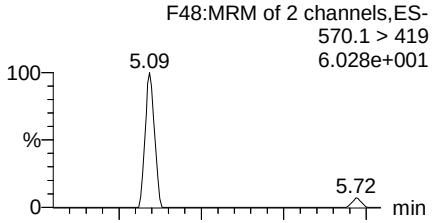
Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

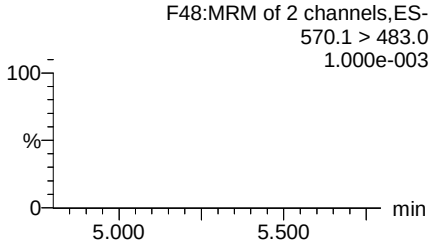
PFUdA



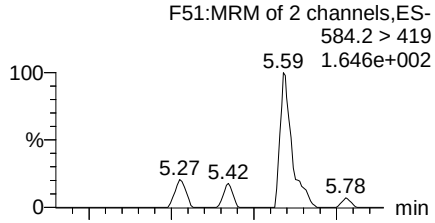


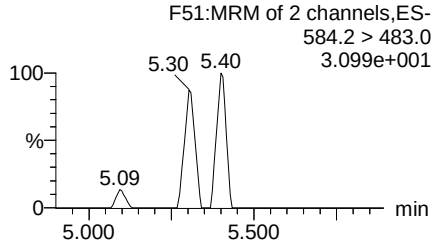
Total N-MeFOSAA



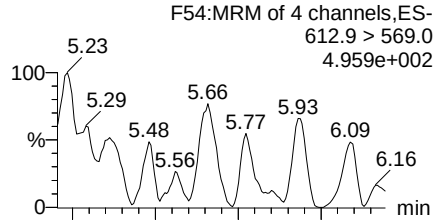


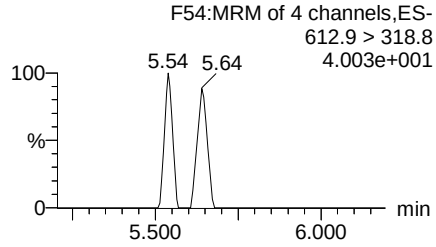
Total N-EtFOSAA



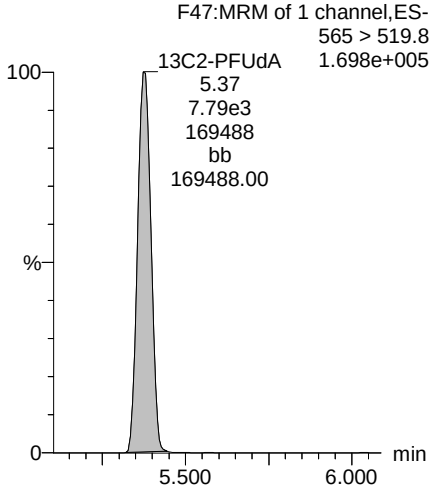


PFDoA

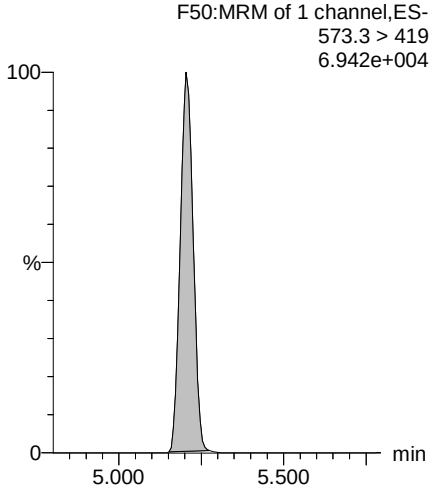




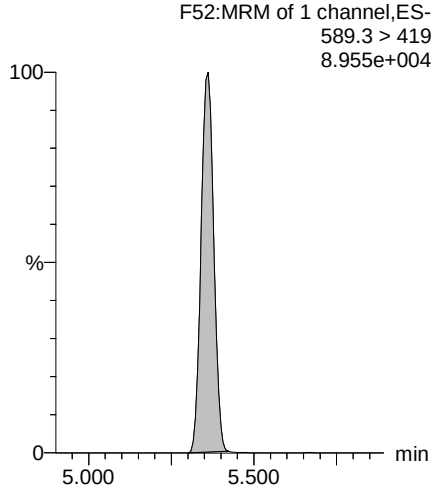
13C2-PFUdA



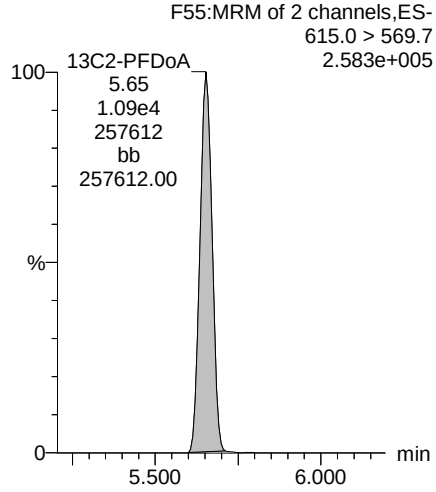
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



MJT FOR ANP 6/11/2018

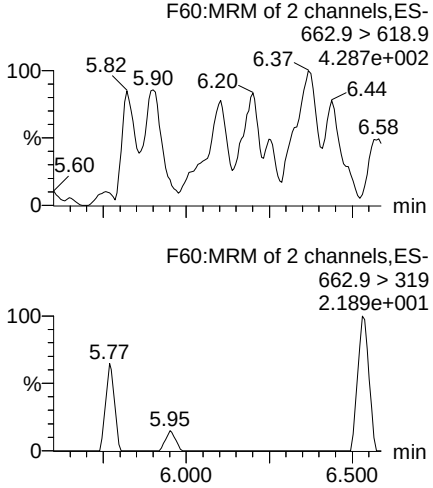
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

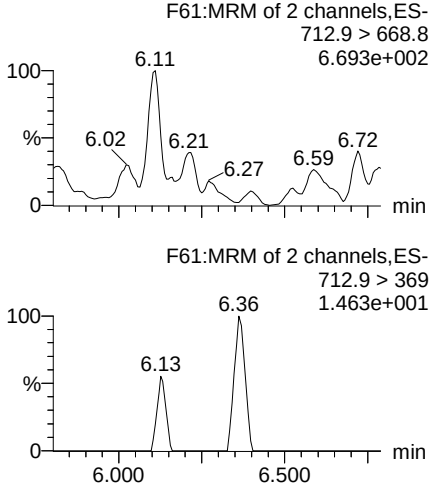
Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

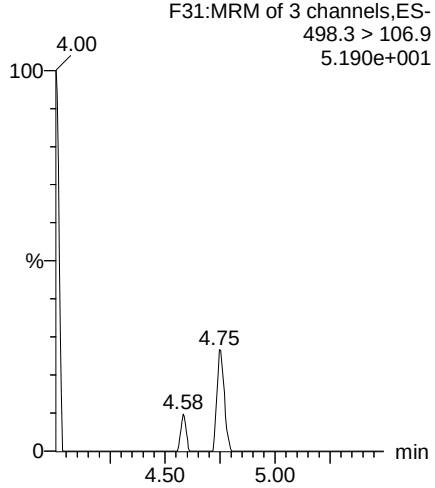
PFTrDA



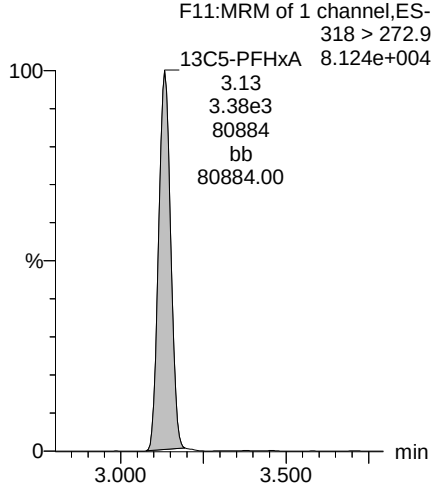
PFTeDA



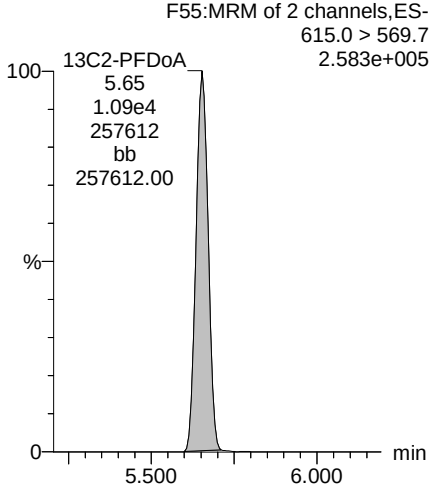
TCDA



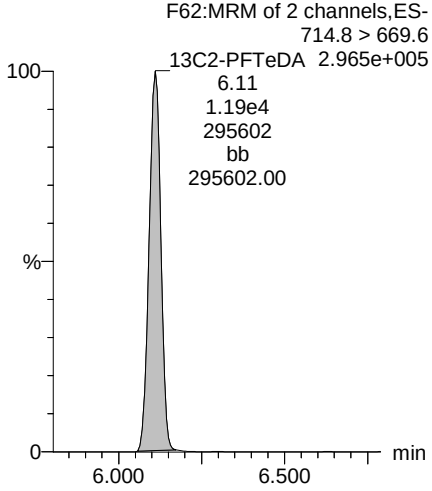
13C5-PFHxA



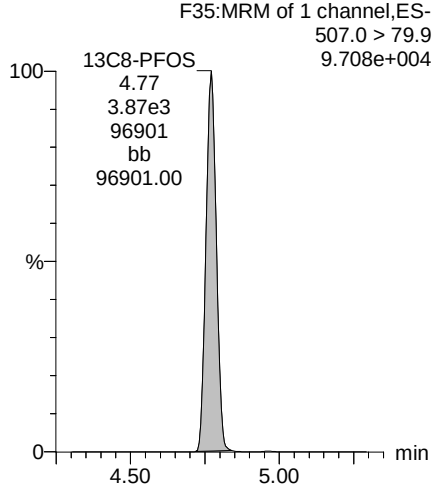
13C2-PFDoA



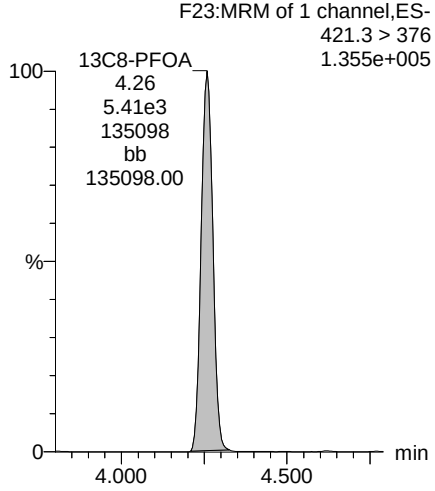
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

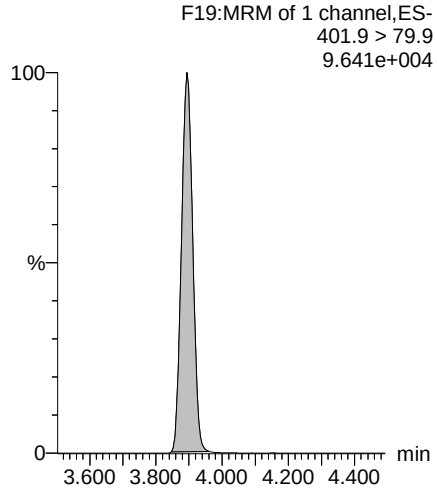
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-40.qld

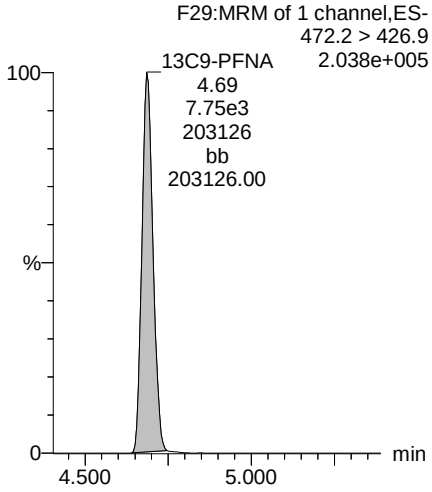
Last Altered: Friday, June 08, 2018 11:32:30 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:19:13 Pacific Daylight Time

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

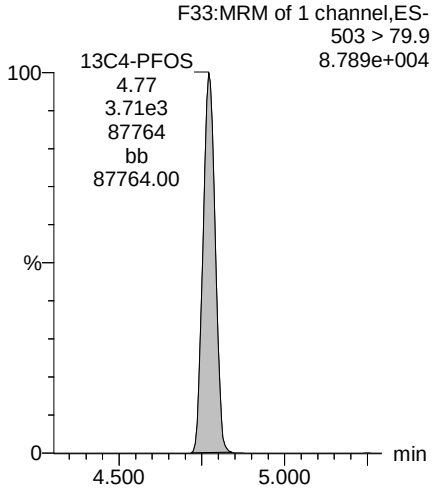
13C3-PFHxS



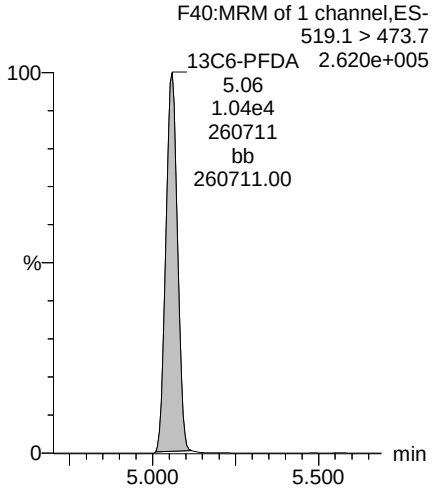
13C9-PFNA



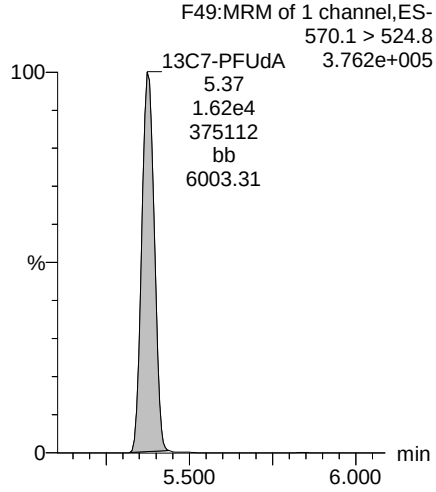
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:21:01 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-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	1.60e4	1.73e3	0.112		2.65	2.64	115	523.4407		2.774	NO
2	5	PFHxA	313.2 > 268.9	7.04e4	2.13e3	0.112		3.13	3.13	165	951.3925		240.138	NO
3	7	PFHpA	363.0 > 318.9	1.39e4	7.11e3	0.112		3.75	3.75	24.5	188.0651		19.106	NO
4	8	L-PFHxS	398.9 > 79.6	1.81e4	1.44e3	0.112		3.89	3.89	158	733.3510		1.798	NO
5	11	L-PFOA	413 > 368.7	1.96e4	1.31e4	0.112		4.25	4.26	18.6	168.1078		3.970	NO
6	14	PFNA	463.0 > 418.8		1.15e4	0.112		4.68						
7	16	L-PFOS	499.1 > 79.9	7.74e2	4.04e3	0.112		4.77	4.77	2.39	23.6456		2.239	NO
8	18	PFDA	513 > 468.8		1.32e4	0.112		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.13e3	0.112		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.18e3	0.112		5.37						

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:21:18 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-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		1.59e4	0.112		5.39						
2	27	PFDoA	612.9 > 569.0		1.18e4	0.112		5.67						
3	29	PFTrDA	662.9 > 618.9		1.18e4	0.112		5.92						
4	30	PFTeDA	712.9 > 668.8		1.38e4	0.112		6.14						
5	38	13C3-PFBS	302. > 98.8	1.73e3	7.20e3	0.112	0.102	2.61	2.65	3.00	261.4650	235.3		
6	39	13C2-4:2 FTS	329.2>308.9	3.66e3	7.20e3	0.112	0.231	3.02	3.05	6.36	244.4561	220.0		
7	40	13C2-PFHxA	315 > 269.8	2.13e3	7.20e3	0.112	0.744	3.10	3.13	3.70	44.1679	99.4		
8	41	13C4-PFHpA	367.2 > 321.8	7.11e3	7.20e3	0.112	0.841	3.72	3.75	12.3	130.3808	117.3		
9	42	18O2-PFHxS	403.0 > 102.6	1.44e3	3.64e3	0.112	0.415	3.87	3.89	4.94	105.8221	95.2		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.81e3	1.10e4	0.112	0.232	4.19	4.20	4.32	166.0268	149.4		
11	44	13C2-PFOA	414.9 > 369.7	1.31e4	1.10e4	0.112	1.256	4.25	4.26	14.9	105.5673	95.0		
12	45	13C5-PFNA	468.2 > 422.9	1.15e4	1.41e4	0.112	0.960	4.69	4.69	10.2	94.3711	84.9		
13	46	13C8-PFOSA	506.1 > 77.7	9.47e2	2.32e4	0.112	0.145	4.75	4.76	0.510	31.2174	28.1		
14	47	13C8-PFOS	507.0 > 79.9	4.04e3	3.77e3	0.112	1.047	4.77	4.77	13.4	113.9179	102.5		
15	48	13C2-PFDA	515.1 > 469.9	1.32e4	1.79e4	0.112	1.118	5.06	5.06	9.23	73.4098	66.1		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.09e3	7.20e3	0.112	0.211	5.03	5.03	5.37	226.3950	203.7		
17	50	d3-N-MeFOSAA	573.3 > 419	3.13e3	2.32e4	0.112	0.182	5.21	5.20	1.69	82.1305	73.9		
18	51	d5-N-EtFOSAA	589.3 > 419	4.18e3	2.32e4	0.112	0.223	5.37	5.36	2.25	89.7403	80.8		
19	52	13C2-PFUdA	565 > 519.8	1.59e4	2.32e4	0.112	0.958	5.39	5.38	8.58	79.5870	71.6		
20	53	13C2-PFDoA	615.0 > 569.7	1.18e4	1.79e4	0.112	1.138	5.67	5.65	8.26	64.5543	58.1		
21	54	d3-N-MeFOSA	515.2 > 168.9		2.32e4	0.112	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.38e4	2.32e4	0.112	0.862	6.14	6.11	7.41	76.4679	68.8		
23	56	d5-N-ETFOSA	531.1 > 168.9		2.32e4	0.112	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	1.01e4	2.32e4	0.112	1.173	6.48	6.45	5.43	41.2009	92.7		
25	58	d7-N-MeFOSE	623.1 > 58.9		2.32e4	0.112	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		2.32e4	0.112	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	3.93e3	3.93e3	0.112	1.000	1.33	1.40	12.5	111.1309	100.0		
28	61	13C5-PFHxA	318 > 272.9	7.20e3	7.20e3	0.112	1.000	3.10	3.13	12.5	111.1309	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.64e3	3.64e3	0.112	1.000	3.87	3.89	12.5	111.1309	100.0		
30	63	13C8-PFOA	421.3 > 376	1.10e4	1.10e4	0.112	1.000	4.25	4.26	12.5	111.1309	100.0		
31	64	13C9-PFNA	472.2 > 426.9	1.41e4	1.41e4	0.112	1.000	4.69	4.69	12.5	111.1309	100.0		
32	65	13C4-PFOS	503 > 79.9	3.77e3	3.77e3	0.112	1.000	4.77	4.77	12.5	111.1309	1	MJT FOR ANP 6/11/2018	

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MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:21:18 Pacific Daylight Time

Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.79e4	1.79e4	0.112	1.000	5.06	5.06	12.5	111.1309	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	2.32e4	2.32e4	0.112	1.000	5.39	5.38	12.5	111.1309	100.0		
35	68	Total PFHxS	398.9 > 79.6	1.81e4	1.44e3	0.112		4.05		158	733.3510			
36	69	Total PFOA	413 > 368.7	2.85e4	1.31e4	0.112		4.30		27.2	244.6358			
37	70	Total PFOS	499.1 > 79.9	7.74e2	4.04e3	0.112		4.90		2.39	23.6456			
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.13e3	0.112		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.18e3	0.112		5.70		0.000				

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

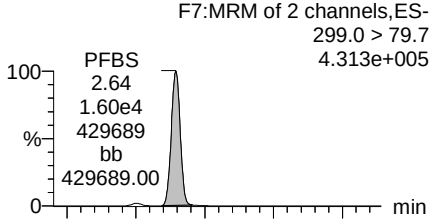
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

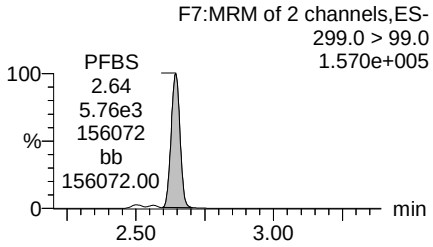
Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:21:18 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

PFBS





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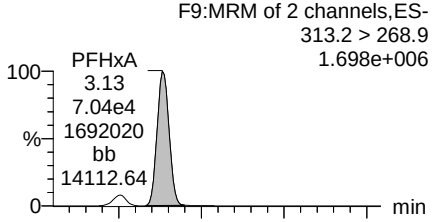

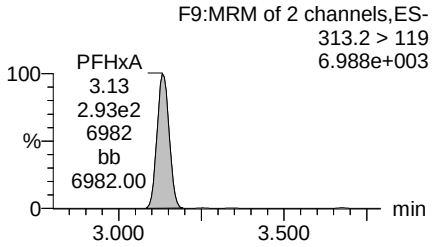

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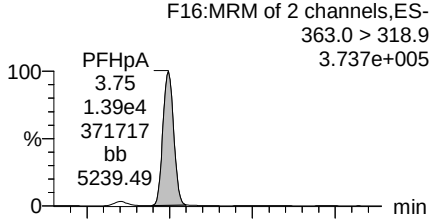

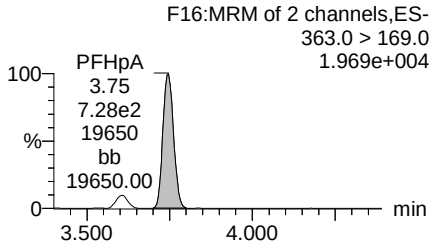

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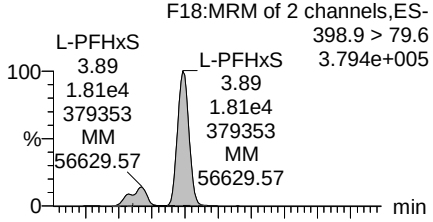

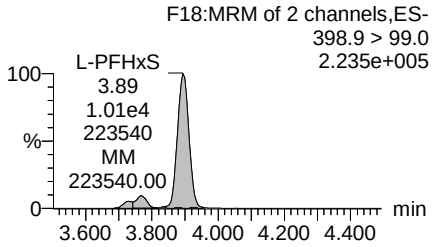

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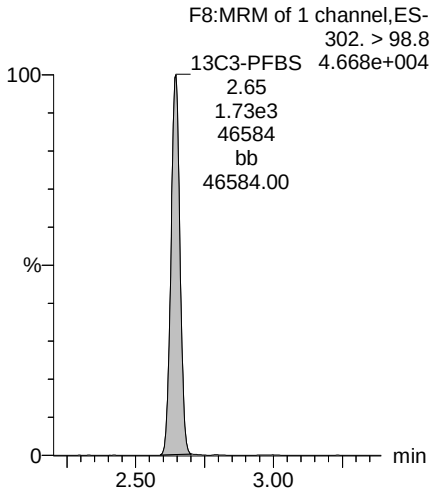

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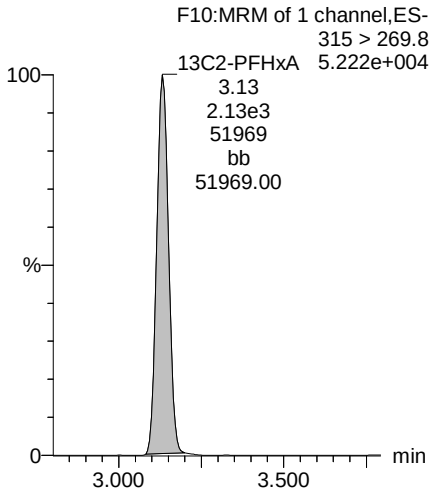

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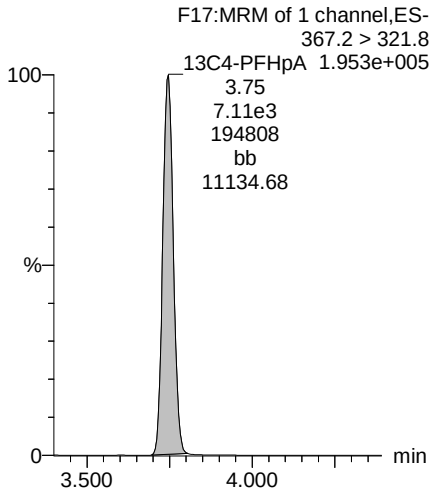

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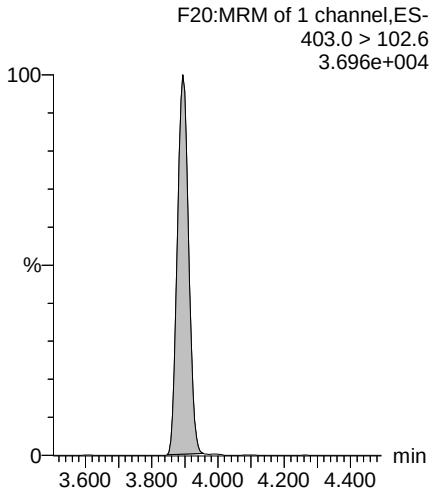

MJT FOR ANP 6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
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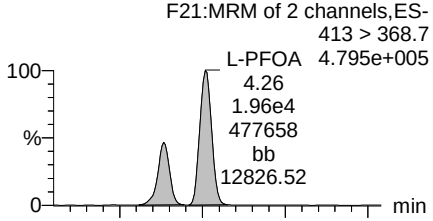
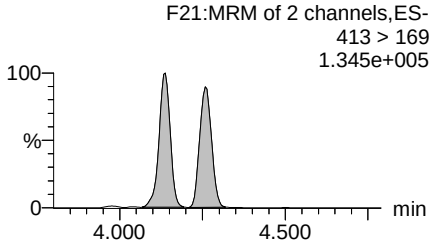
Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

Total PFOA





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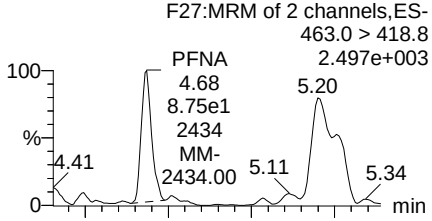

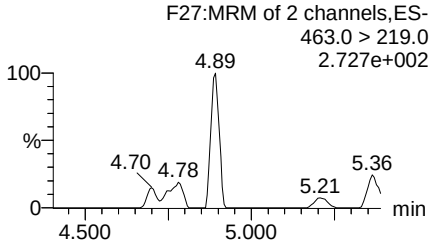

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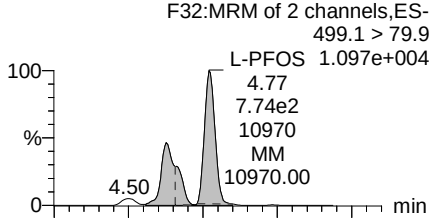

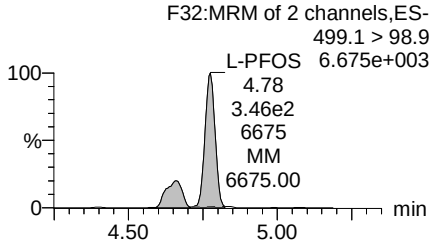

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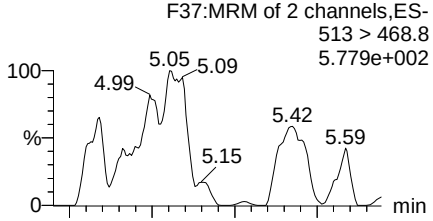

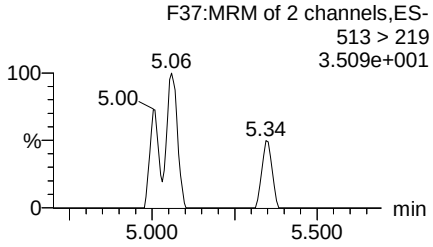

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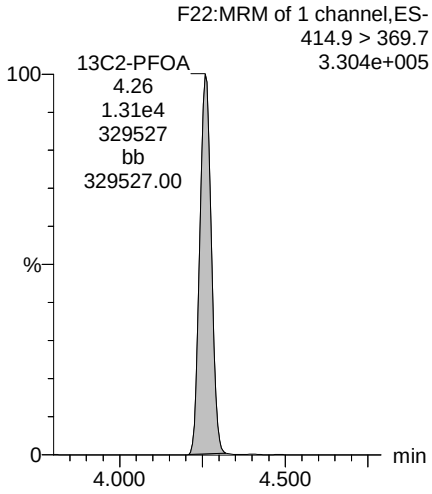

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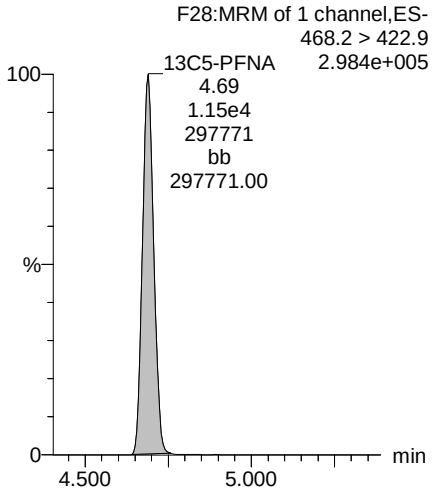

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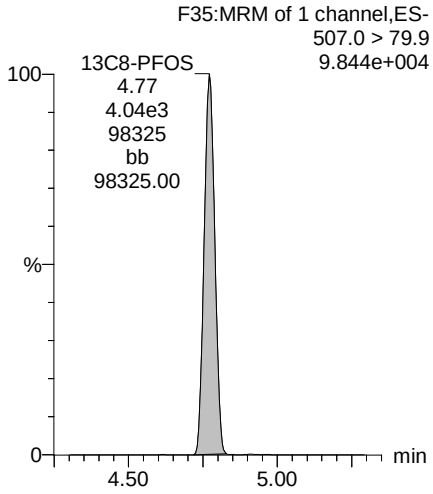

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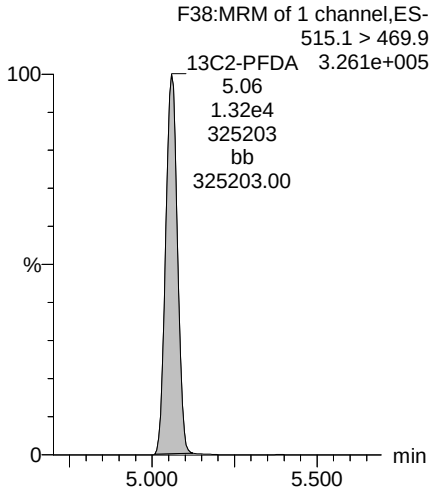

MJT FOR ANP 6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
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Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

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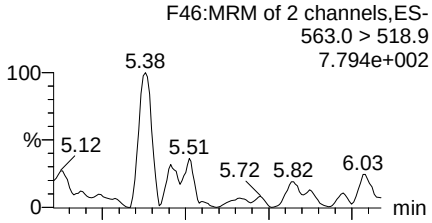

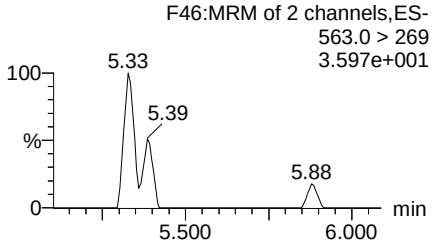

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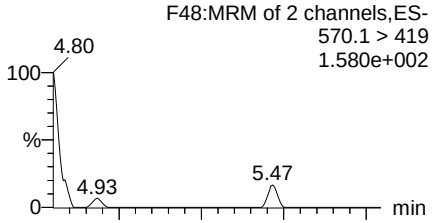

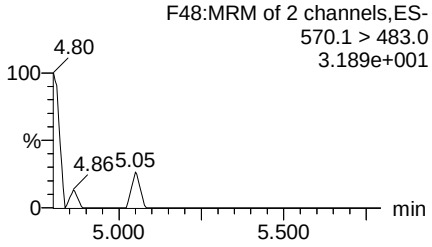

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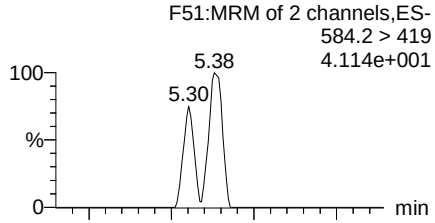
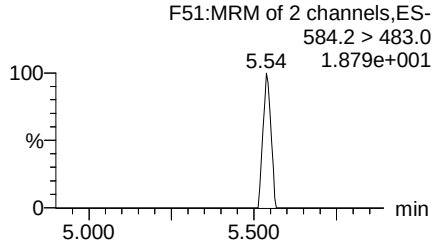
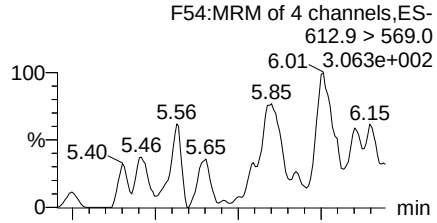
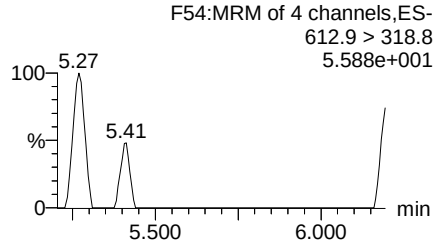




PFDoA





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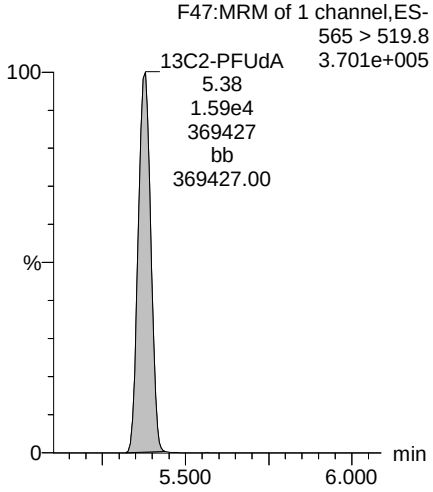

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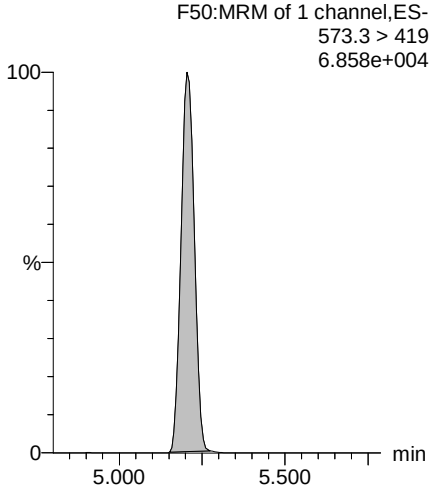

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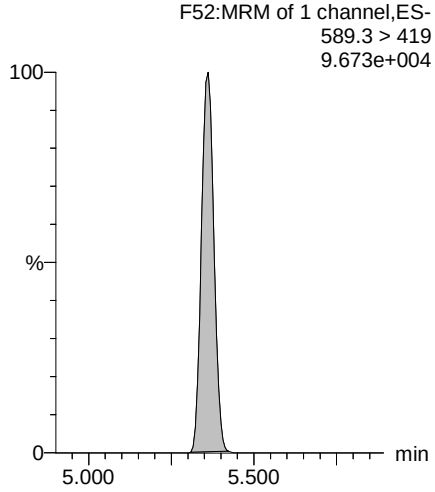

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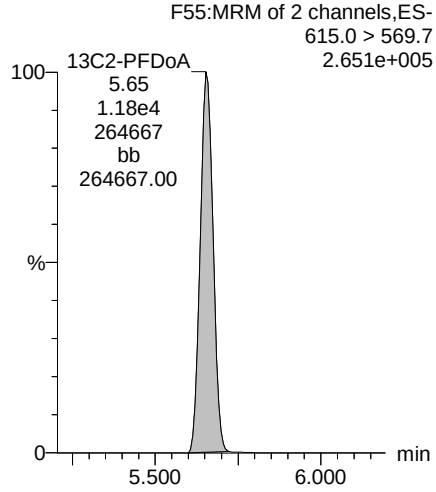

MJT FOR ANP 6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

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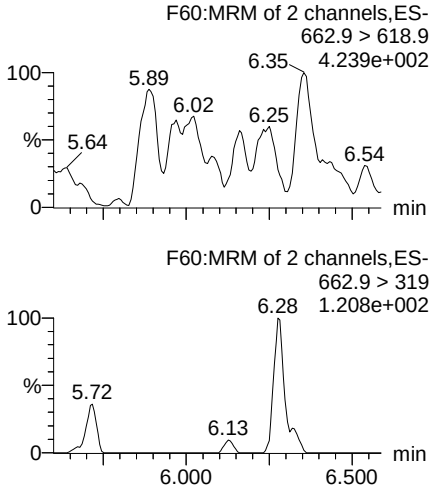
Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

PFTrDA



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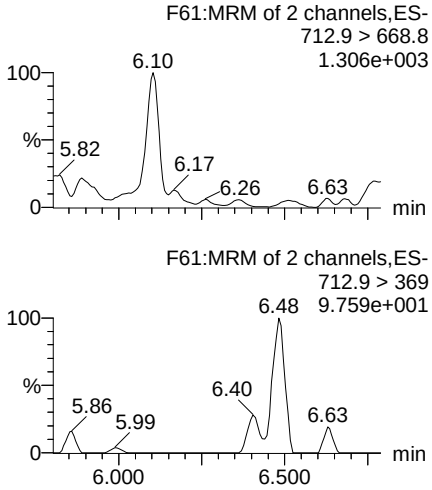

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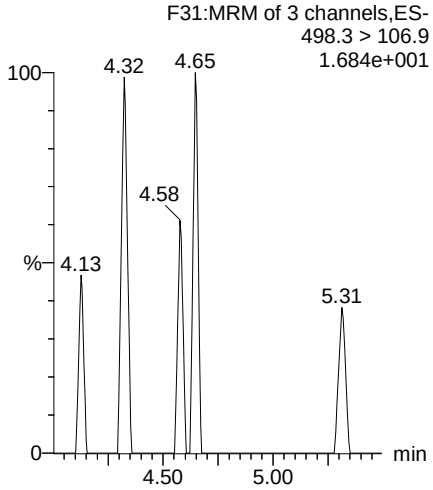

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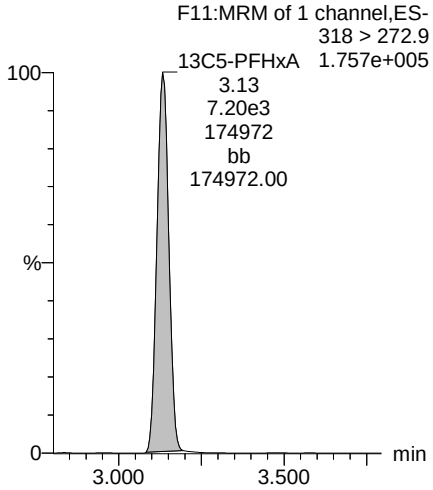

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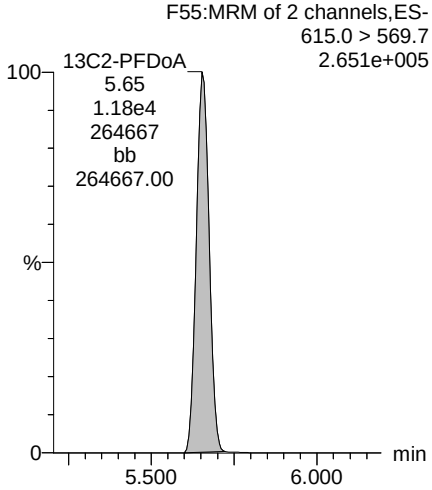

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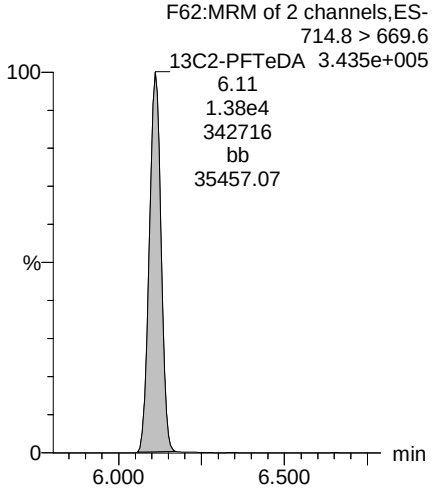

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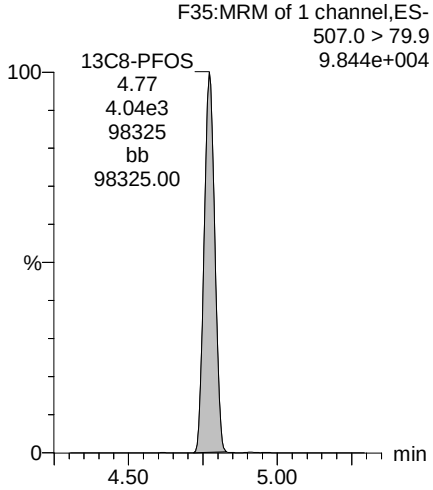

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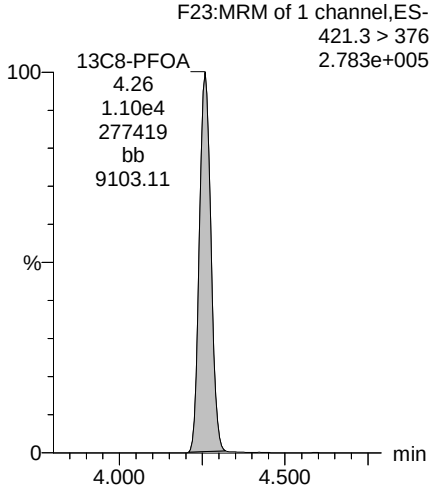

MJT FOR ANP 6/11/2018

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-41.qld

Last Altered: Friday, June 08, 2018 11:42:39 Pacific Daylight Time
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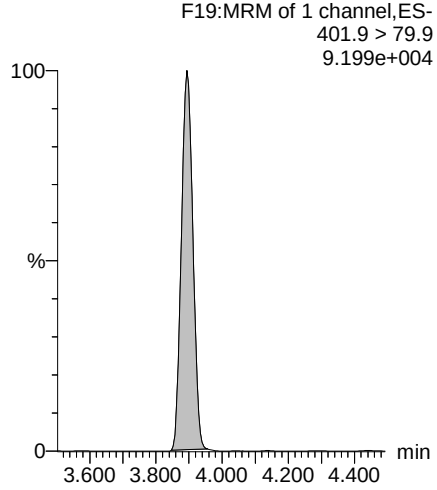
Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

13C3-PFHxS



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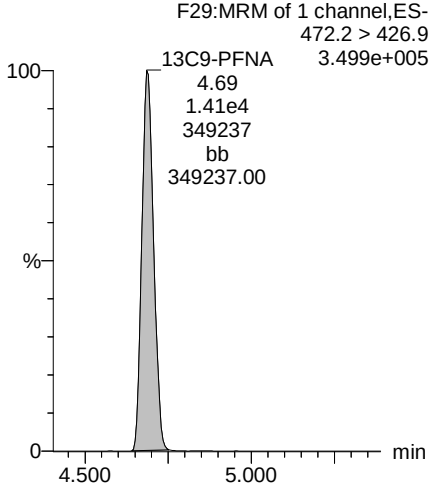

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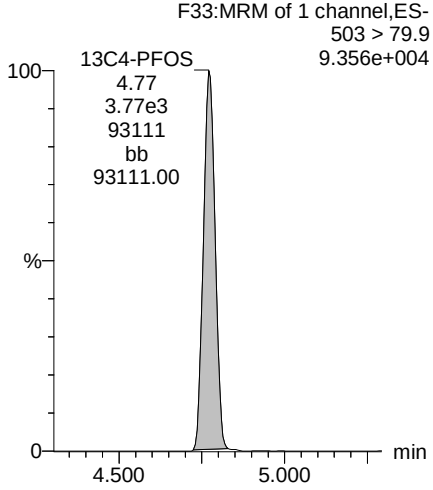
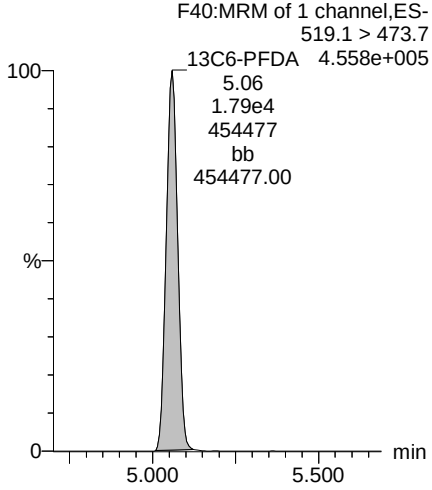
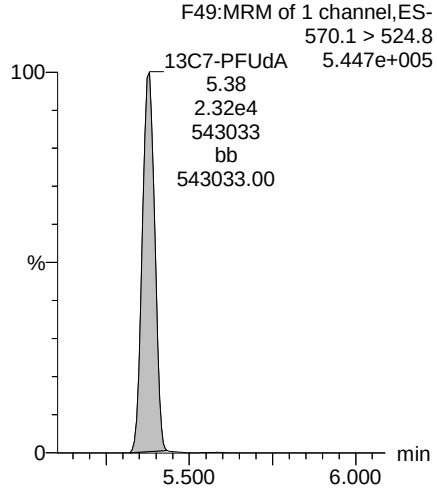


13C6-PFDA



13C7-PFUdA



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MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:31 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-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	9.63e3	1.54e3	0.113		2.65	2.64	78.3	355.4954		2.744	NO
2	5	PFHxA	313.2 > 268.9	4.21e4	9.83e2	0.113		3.14	3.13	214	1230.3969		236.793	NO
3	7	PFHpA	363.0 > 318.9	2.60e3	3.14e3	0.113		3.75	3.75	10.4	79.7204		20.985	NO
4	8	L-PFHxS	398.9 > 79.6	9.63e3	1.33e3	0.113		3.89	3.89	90.1	418.5829		1.895	NO
5	11	L-PFOA	413 > 368.7	2.65e3	6.15e3	0.113		4.25	4.26	5.40	48.3529		5.475	NO
6	14	PFNA	463.0 > 418.8		6.46e3	0.113		4.68						
7	16	L-PFOS	499.1 > 79.9	4.14e2	3.01e3	0.113		4.77	4.77	1.72	17.1520		2.598	YES
8	18	PFDA	513 > 468.8		8.30e3	0.113		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.35e3	0.113		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.50e3	0.113		5.37						

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-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		9.89e3	0.113		5.39						
2	27	PFDoA	612.9 > 569.0		1.19e4	0.113		5.67						
3	29	PFTrDA	662.9 > 618.9		1.19e4	0.113		5.92						
4	30	PFTeDA	712.9 > 668.8		1.32e4	0.113		6.14						
5	38	13C3-PFBS	302. > 98.8	1.54e3	3.52e3	0.113	0.102	2.61	2.65	5.47	475.6141	428.1		
6	39	13C2-4:2 FTS	329.2>308.9	3.33e3	3.52e3	0.113	0.231	3.02	3.05	11.8	455.4563	410.0		
7	40	13C2-PFHxA	315 > 269.8	9.83e2	3.52e3	0.113	0.744	3.10	3.14	3.49	41.7124	93.9		
8	41	13C4-PFHpA	367.2 > 321.8	3.14e3	3.52e3	0.113	0.841	3.72	3.75	11.1	117.7856	106.0		
9	42	18O2-PFHxS	403.0 > 102.6	1.33e3	3.06e3	0.113	0.415	3.87	3.89	5.45	116.7359	105.1		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.41e3	5.07e3	0.113	0.232	4.19	4.20	8.40	322.3470	290.2		
11	44	13C2-PFOA	414.9 > 369.7	6.15e3	5.07e3	0.113	1.256	4.25	4.26	15.2	107.3217	96.6		
12	45	13C5-PFNA	468.2 > 422.9	6.46e3	8.19e3	0.113	0.960	4.69	4.69	9.86	91.3415	82.2		
13	46	13C8-PFOSA	506.1 > 77.7	1.18e3	1.40e4	0.113	0.145	4.75	4.76	1.06	64.6674	58.2		
14	47	13C8-PFOS	507.0 > 79.9	3.01e3	3.12e3	0.113	1.047	4.77	4.77	12.0	102.3141	92.1		
15	48	13C2-PFDA	515.1 > 469.9	8.30e3	1.02e4	0.113	1.118	5.06	5.06	10.2	80.9645	72.9		
16	49	13C2-8:2 FTS	529.1 > 508.7	3.01e3	3.52e3	0.113	0.211	5.03	5.03	10.7	451.3448	406.3		
17	50	d3-N-MeFOSAA	573.3 > 419	3.35e3	1.40e4	0.113	0.182	5.21	5.20	2.99	145.7851	131.2		
18	51	d5-N-EtFOSAA	589.3 > 419	4.50e3	1.40e4	0.113	0.223	5.37	5.36	4.02	160.4732	144.5		
19	52	13C2-PFUdA	565 > 519.8	9.89e3	1.40e4	0.113	0.958	5.39	5.38	8.84	82.0235	73.8		
20	53	13C2-PFDoA	615.0 > 569.7	1.19e4	1.02e4	0.113	1.138	5.67	5.65	14.6	113.7019	102.3		
21	54	d3-N-MeFOSA	515.2 > 168.9		1.40e4	0.113	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.32e4	1.40e4	0.113	0.862	6.14	6.11	11.8	122.0181	109.8		
23	56	d5-N-ETFOSA	531.1 > 168.9		1.40e4	0.113	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.51e3	1.40e4	0.113	1.173	6.48	6.44	8.50	64.4497	145.0		
25	58	d7-N-MeFOSE	623.1 > 58.9		1.40e4	0.113	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		1.40e4	0.113	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	2.10e3	2.10e3	0.113	1.000	1.33	1.40	12.5	111.0914	100.0		
28	61	13C5-PFHxA	318 > 272.9	3.52e3	3.52e3	0.113	1.000	3.10	3.13	12.5	111.0914	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.06e3	3.06e3	0.113	1.000	3.87	3.89	12.5	111.0914	100.0		
30	63	13C8-PFOA	421.3 > 376	5.07e3	5.07e3	0.113	1.000	4.25	4.26	12.5	111.0914	100.0		
31	64	13C9-PFNA	472.2 > 426.9	8.19e3	8.19e3	0.113	1.000	4.69	4.69	12.5	111.0914	100.0		
32	65	13C4-PFOS	503 > 79.9	3.12e3	3.12e3	0.113	1.000	4.77	4.77	12.5	111.0914	100.		

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Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.02e4	1.02e4	0.113	1.000	5.06	5.06	12.5	111.0914	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	1.40e4	1.40e4	0.113	1.000	5.39	5.37	12.5	111.0914	100.0		
35	68	Total PFHxS	398.9 > 79.6	9.63e3	1.33e3	0.113		4.05		90.1	418.5829			
36	69	Total PFOA	413 > 368.7	3.18e3	6.15e3	0.113		4.30		6.47	57.7745			
37	70	Total PFOS	499.1 > 79.9	4.14e2	3.01e3	0.113		4.90		1.72	17.1520			
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.35e3	0.113		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.50e3	0.113		5.70		0.000				

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
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Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

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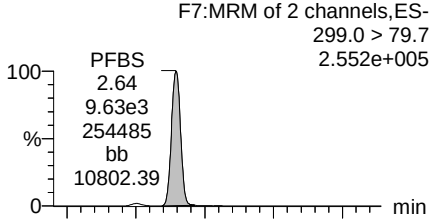

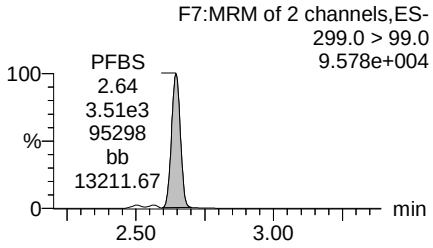

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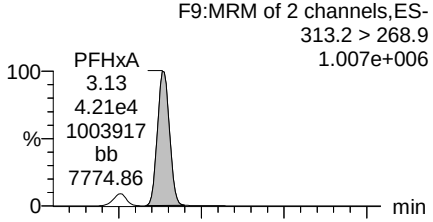

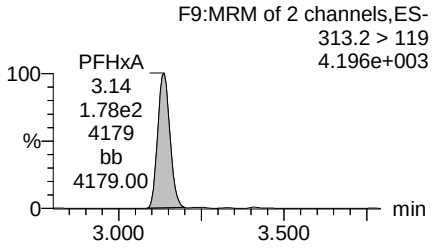

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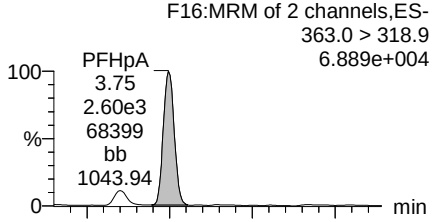

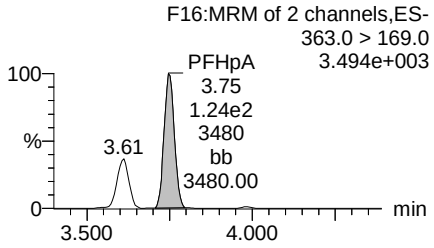

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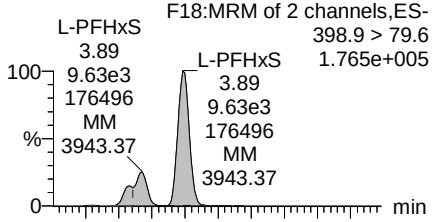

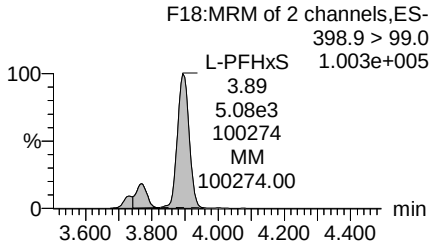

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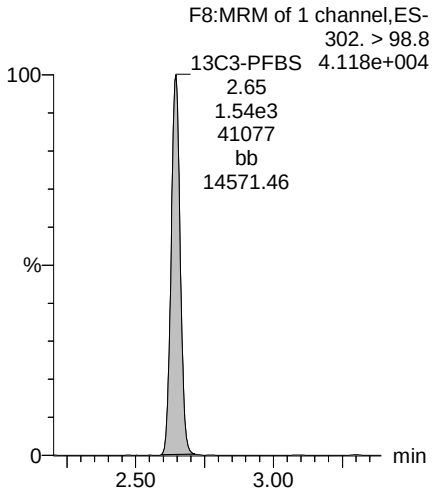

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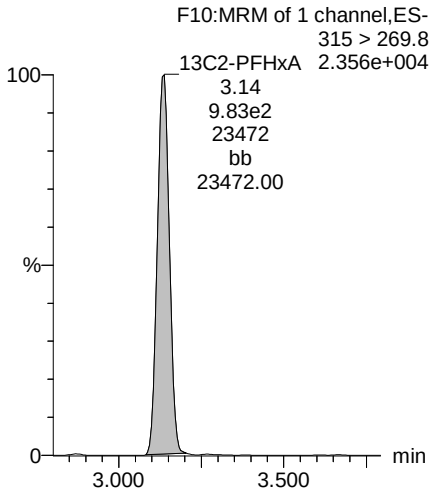

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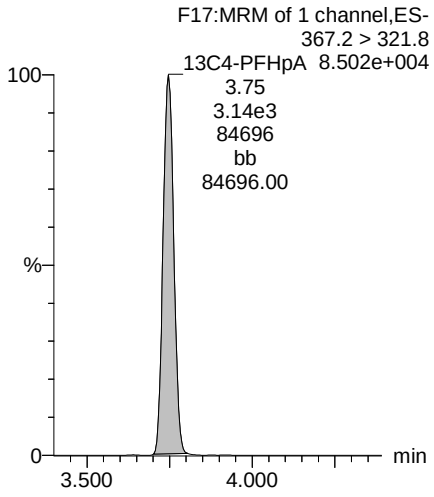

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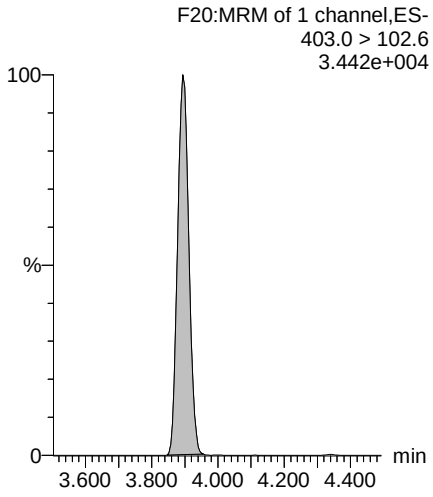


MJT FOR ANP 6/11/2018

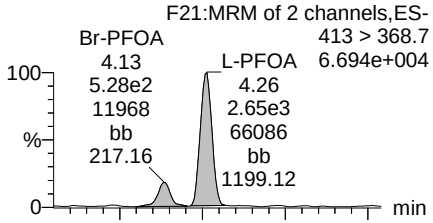
MM 6/11/2018

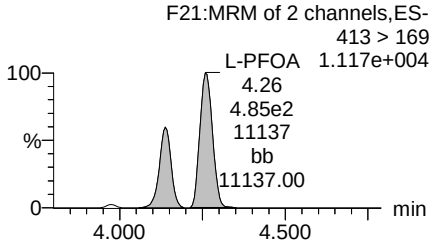
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

Total PFOA





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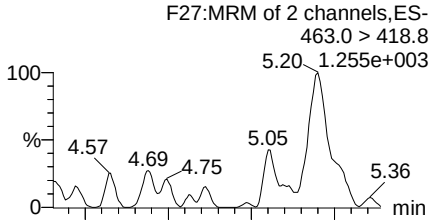

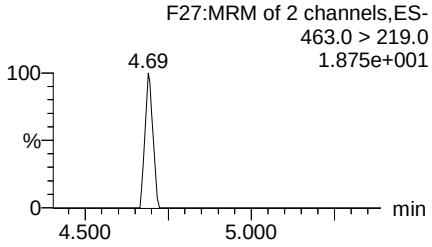

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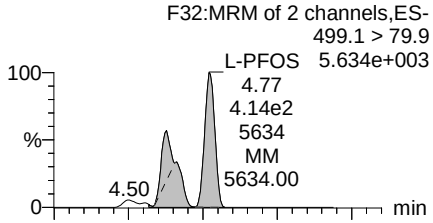

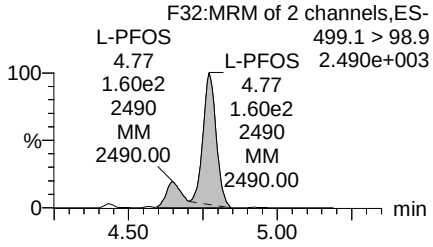

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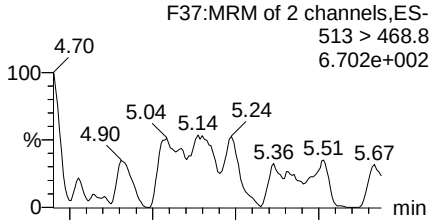

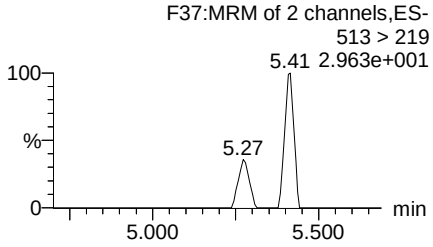

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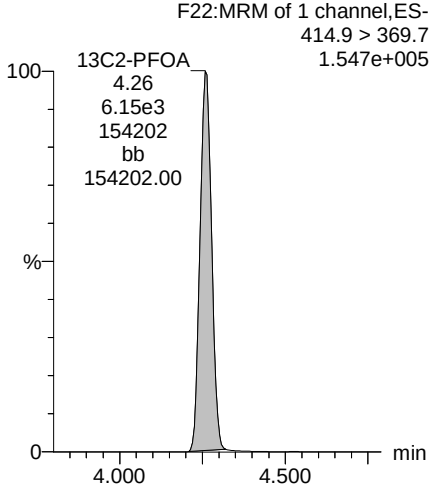

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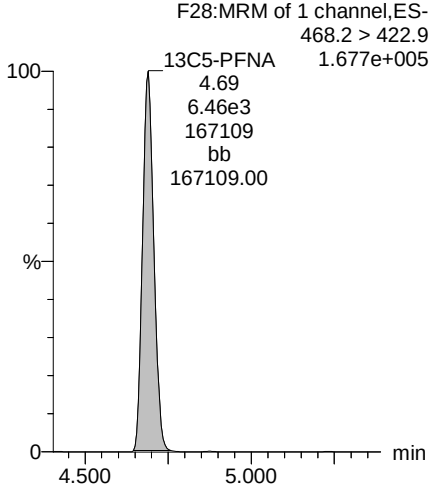
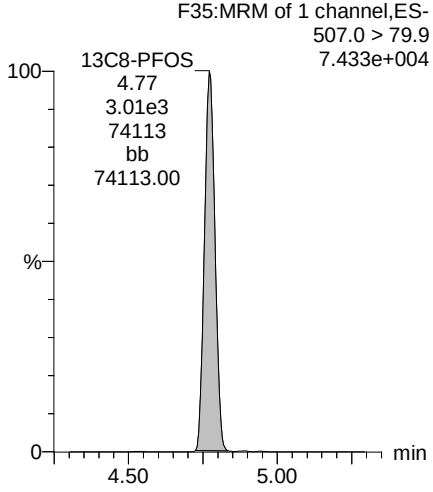


13C8-PFOS



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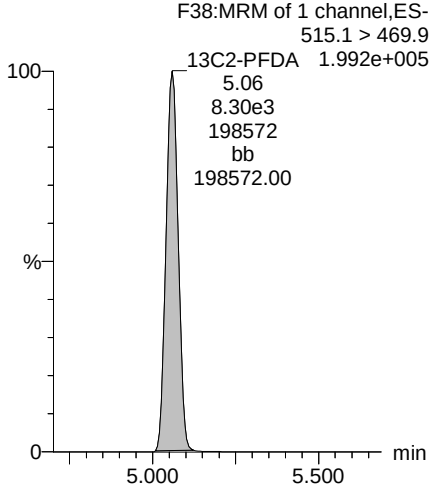


MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

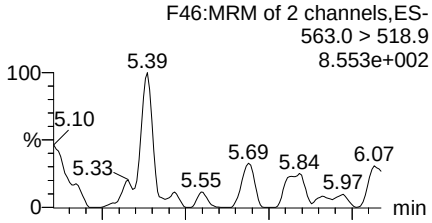
MM 6/11/2018

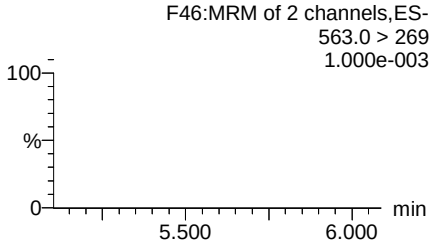
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

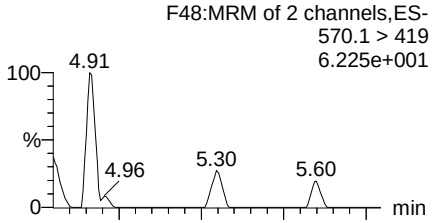
Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

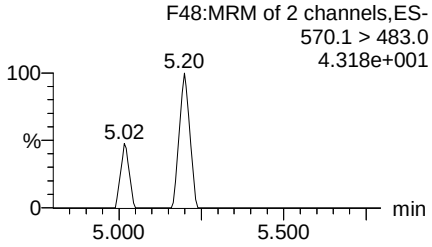
PFUdA





Total N-MeFOSAA





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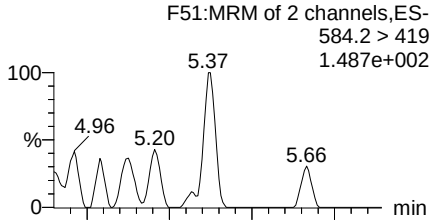
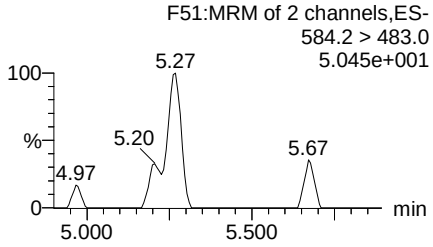
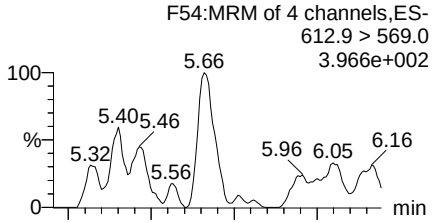
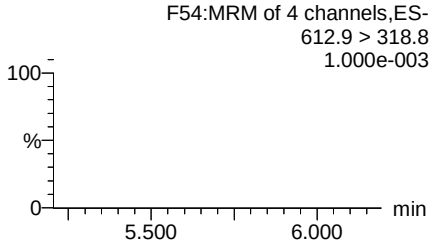




PFDoA





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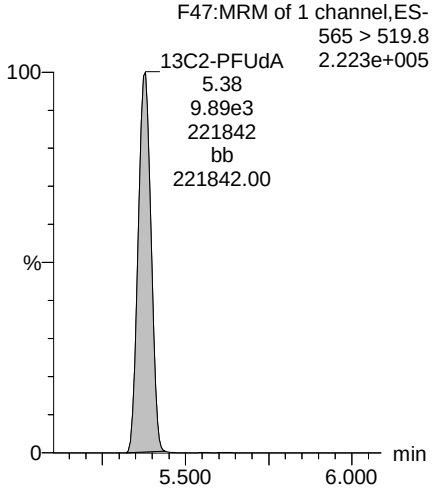
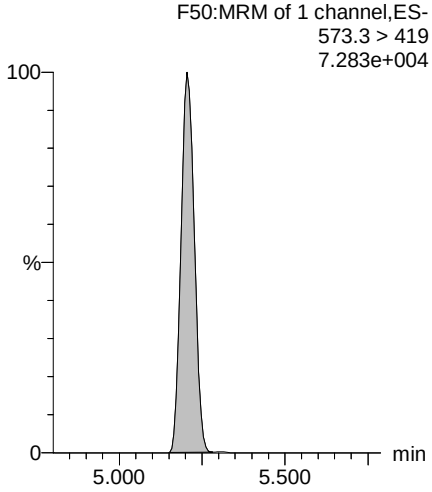


d3-N-MeFOSAA



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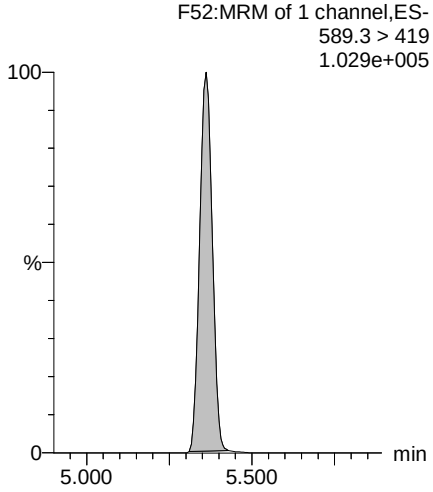

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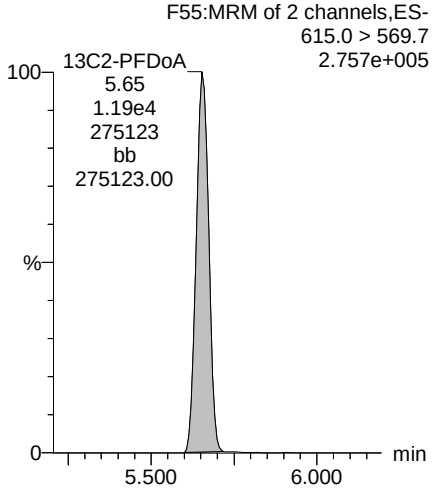

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

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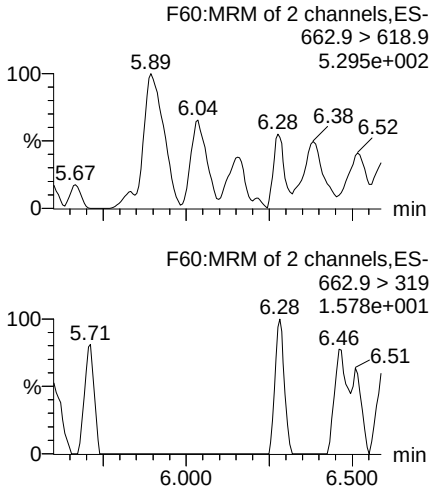

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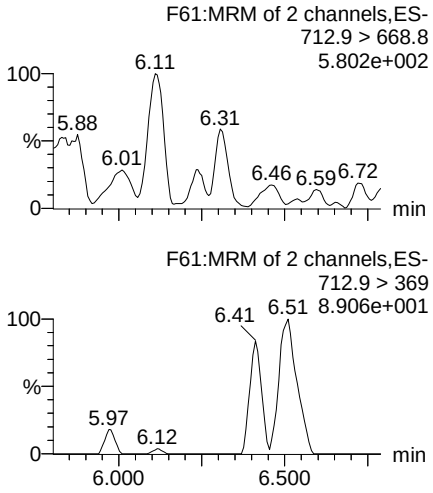

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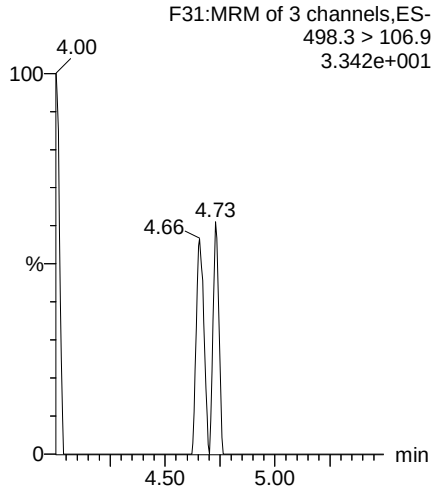

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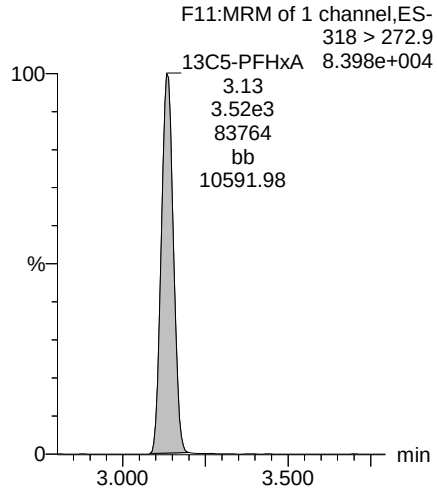

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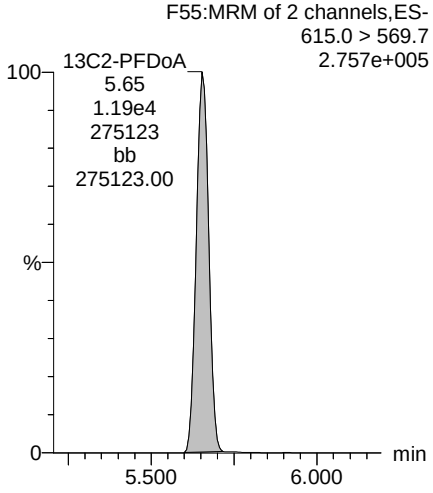

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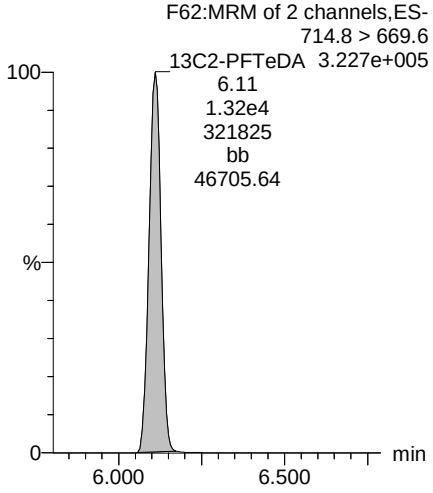

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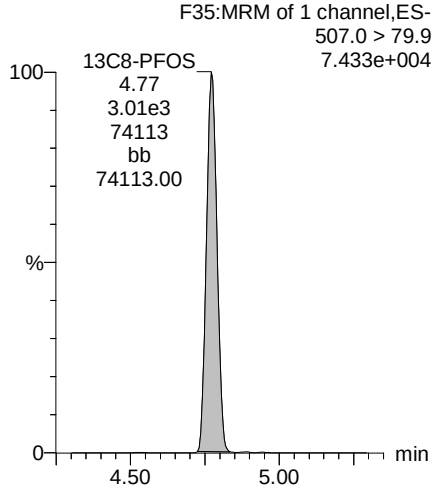

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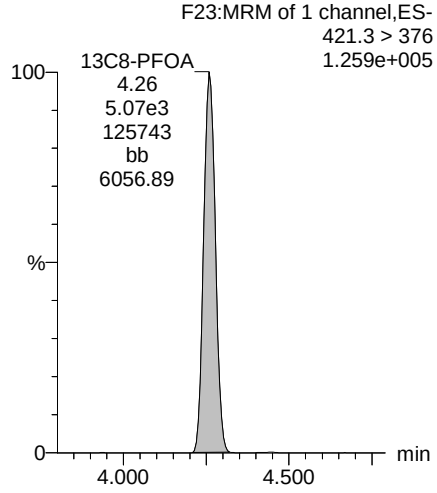


MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

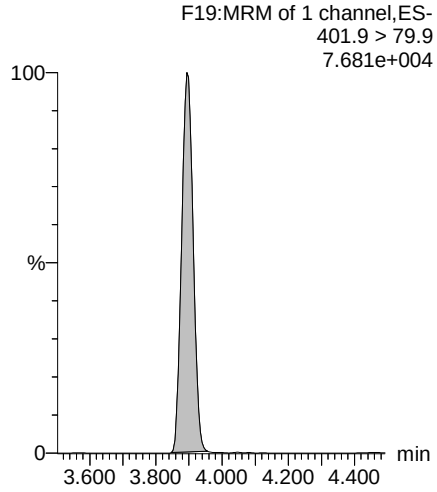
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-42.qld

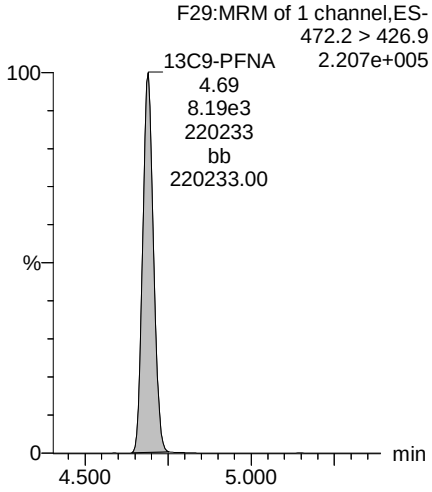
Last Altered: Friday, June 08, 2018 11:47:40 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:22:41 Pacific Daylight Time

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

13C3-PFHxS



13C9-PFNA



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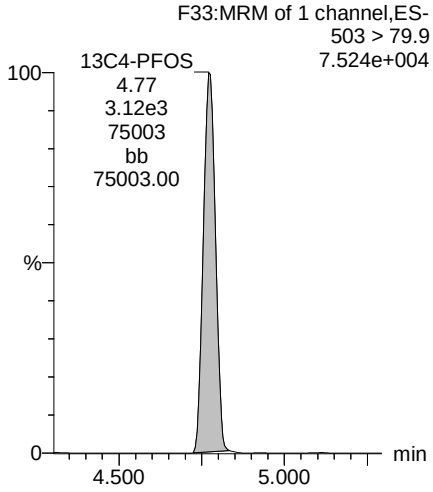
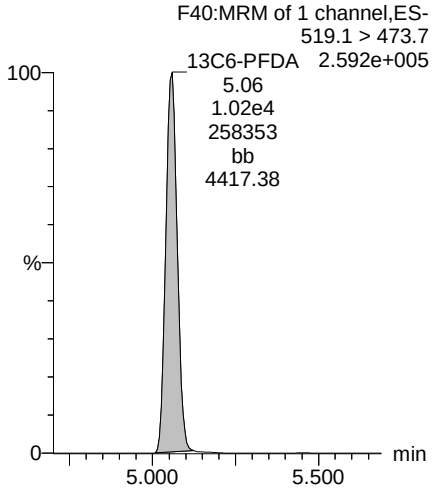
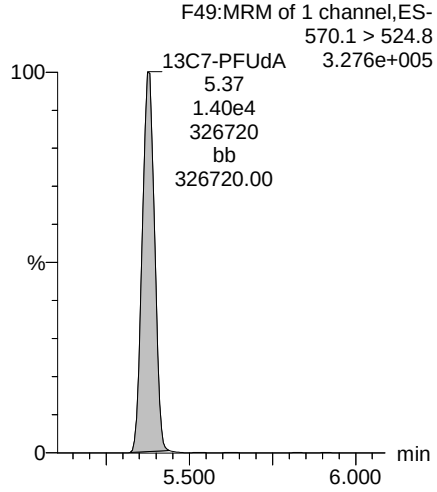


13C6-PFDA



13C7-PFUdA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:21 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

	#	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	4.36e0	1.62e3	0.117		2.65	2.64	0.0336	0.0274		4.030	YES
2	5	PFHxA	313.2 > 268.9		3.92e3	0.117		3.13						
3	7	PFHpA	363.0 > 318.9		1.08e4	0.117		3.75						
4	8	L-PFHxS	398.9 > 79.6	1.06e1	1.34e3	0.117		3.89	3.90	0.0989	0.1681		3.155	YES
5	11	L-PFOA	413 > 368.7		1.84e4	0.117		4.25						
6	14	PFNA	463.0 > 418.8		1.66e4	0.117		4.68						
7	16	L-PFOS	499.1 > 79.9		3.44e3	0.117		4.77						
8	18	PFDA	513 > 468.8		1.64e4	0.117		5.06						
9	21	L-MeFOSAA	570.1 > 419		3.40e3	0.117		5.22						
10	23	L-EtFOSAA	584.2 > 419		4.13e3	0.117		5.37						

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

	#	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		1.41e4	0.117		5.39						
2	27	PFDoA	612.9 > 569.0		1.45e4	0.117		5.67						
3	29	PFTrDA	662.9 > 618.9		1.45e4	0.117		5.92						
4	30	PFTeDA	712.9 > 668.8		1.56e4	0.117		6.14						
5	38	13C3-PFBS	302. > 98.8	1.62e3	1.35e4	0.117	0.102	2.61	2.65	1.50	125.4625	117.4		
6	39	13C2-4:2 FTS	329.2>308.9	3.36e3	1.35e4	0.117	0.231	3.02	3.05	3.11	114.9026	107.5		
7	40	13C2-PFHxA	315 > 269.8	3.92e3	1.35e4	0.117	0.744	3.10	3.13	3.62	41.6071	97.3		
8	41	13C4-PFHpA	367.2 > 321.8	1.08e4	1.35e4	0.117	0.841	3.72	3.75	9.93	100.9639	94.5		
9	42	18O2-PFHxS	403.0 > 102.6	1.34e3	3.41e3	0.117	0.415	3.87	3.89	4.92	101.4903	95.0		
10	43	13C2-6:2 FTS	429.1 > 408.9	3.60e3	1.32e4	0.117	0.232	4.19	4.20	3.41	125.8611	117.8		
11	44	13C2-PFOA	414.9 > 369.7	1.84e4	1.32e4	0.117	1.256	4.25	4.26	17.5	118.9817	111.3		
12	45	13C5-PFNA	468.2 > 422.9	1.66e4	2.09e4	0.117	0.960	4.69	4.69	9.92	88.4179	82.7		
13	46	13C8-PFOSA	506.1 > 77.7	9.97e2	2.59e4	0.117	0.145	4.75	4.76	0.480	28.2984	26.5		
14	47	13C8-PFOS	507.0 > 79.9	3.44e3	3.61e3	0.117	1.047	4.77	4.77	11.9	97.3587	91.1		
15	48	13C2-PFDA	515.1 > 469.9	1.64e4	1.98e4	0.117	1.118	5.06	5.06	10.4	79.4109	74.3		
16	49	13C2-8:2 FTS	529.1 > 508.7	2.64e3	1.35e4	0.117	0.211	5.03	5.03	2.44	98.7735	92.4		
17	50	d3-N-MeFOSAA	573.3 > 419	3.40e3	2.59e4	0.117	0.182	5.21	5.20	1.64	76.6852	71.7		
18	51	d5-N-EtFOSAA	589.3 > 419	4.13e3	2.59e4	0.117	0.223	5.37	5.36	1.99	76.5035	71.6		
19	52	13C2-PFUdA	565 > 519.8	1.41e4	2.59e4	0.117	0.958	5.39	5.38	6.78	60.5459	56.6		
20	53	13C2-PFDoA	615.0 > 569.7	1.45e4	1.98e4	0.117	1.138	5.67	5.65	9.15	68.7672	64.3		
21	54	d3-N-MeFOSA	515.2 > 168.9		2.59e4	0.117	0.051	5.85						
22	55	13C2-PFTeDA	714.8 > 669.6	1.56e4	2.59e4	0.117	0.862	6.14	6.11	7.52	74.5778	69.8		
23	56	d5-N-ETFOSA	531.1 > 168.9		2.59e4	0.117	0.066	6.26						
24	57	13C2-PFHxDA	815 > 769.7	9.15e3	2.59e4	0.117	1.173	6.48	6.44	4.41	32.1634	75.2		
25	58	d7-N-MeFOSE	623.1 > 58.9		2.59e4	0.117	0.038	6.40						
26	59	d9-N-EtFOSE	639.2 > 58.8		2.59e4	0.117	0.035	6.54						
27	60	13C4-PFBA	217. > 171.8	8.07e3	8.07e3	0.117	1.000	1.33	1.40	12.5	106.8833	100.0		
28	61	13C5-PFHxA	318 > 272.9	1.35e4	1.35e4	0.117	1.000	3.10	3.13	12.5	106.8833	100.0		
29	62	13C3-PFHxS	401.9 > 79.9	3.41e3	3.41e3	0.117	1.000	3.87	3.89	12.5	106.8833	100.0		
30	63	13C8-PFOA	421.3 > 376	1.32e4	1.32e4	0.117	1.000	4.25	4.26	12.5	106.8833	100.0		
31	64	13C9-PFNA	472.2 > 426.9	2.09e4	2.09e4	0.117	1.000	4.69	4.69	12.5	106.8833	100.0		
32	65	13C4-PFOS	503 > 79.9	3.61e3	3.61e3	0.117	1.000	4.77	4.77	12.5	106.8833	100.		

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	66	13C6-PFDA	519.1 > 473.7	1.98e4	1.98e4	0.117	1.000	5.06	5.06	12.5	106.8833	100.0		
34	67	13C7-PFUdA	570.1 > 524.8	2.59e4	2.59e4	0.117	1.000	5.39	5.37	12.5	106.8833	100.0		
35	68	Total PFHxS	398.9 > 79.6	1.06e1	1.34e3	0.117		4.05		0.0989	0.1681			
36	69	Total PFOA	413 > 368.7	0.00e0	1.84e4	0.117		4.30		0.000				
37	70	Total PFOS	499.1 > 79.9	0.00e0	3.44e3	0.117		4.90		0.000				
38	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.40e3	0.117		5.55		0.000				
39	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.13e3	0.117		5.70		0.000				

MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
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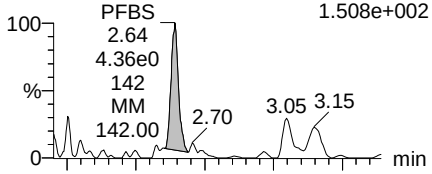
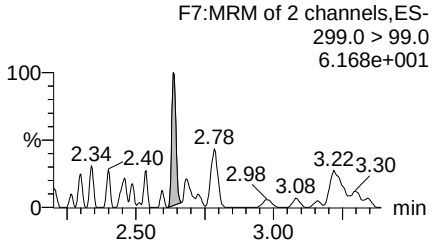
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

PFBS





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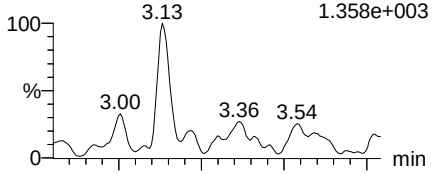
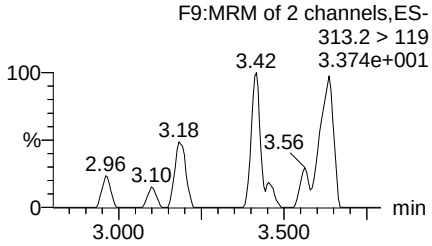
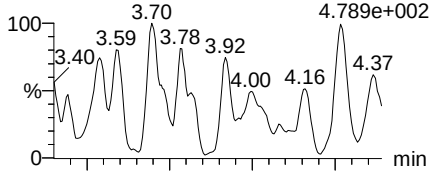
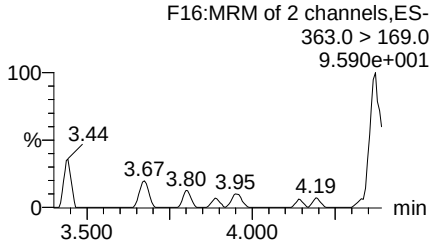


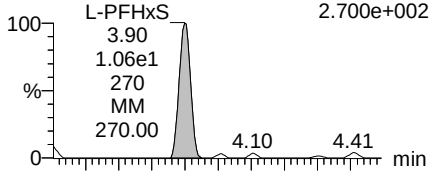


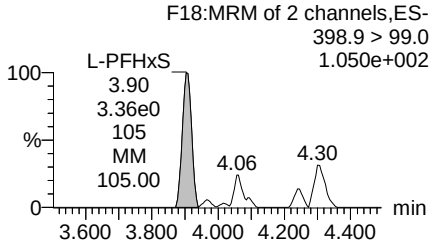
PFHpA



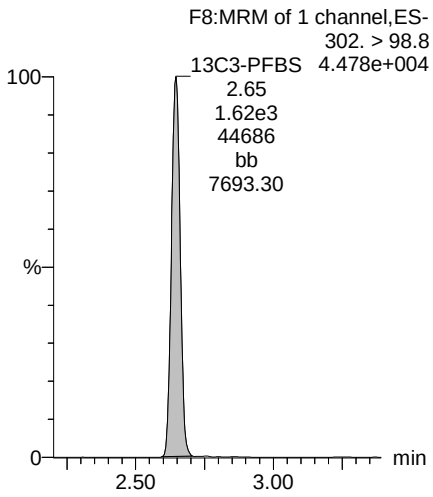


Total PFHxS

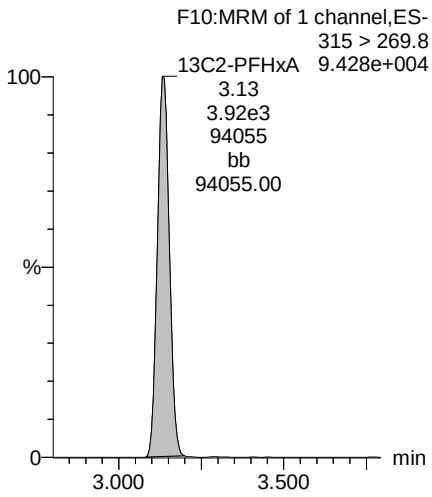




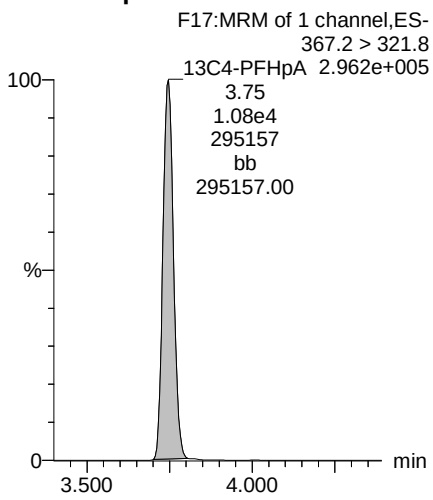
13C3-PFBS



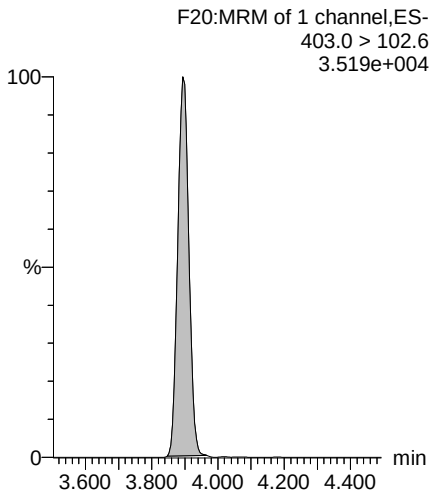
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

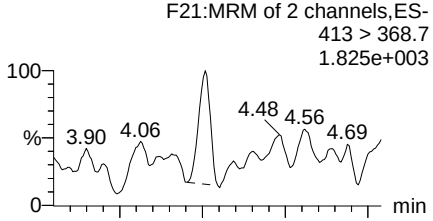
MM 6/11/2018

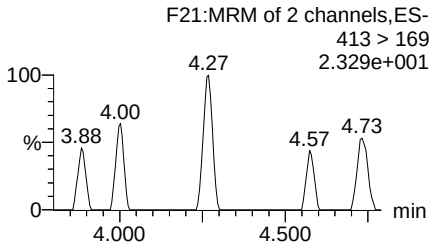
Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

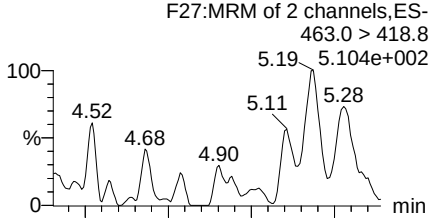
Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

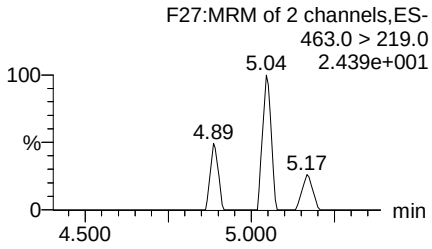
Total PFOA



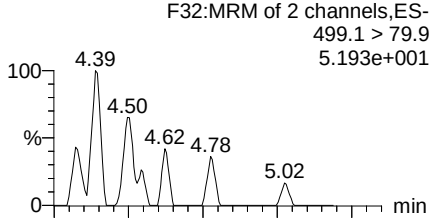


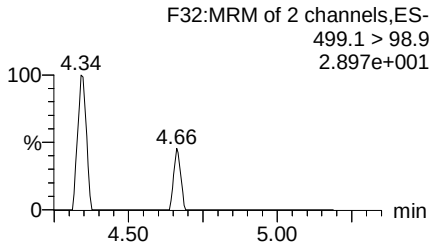
PFNA



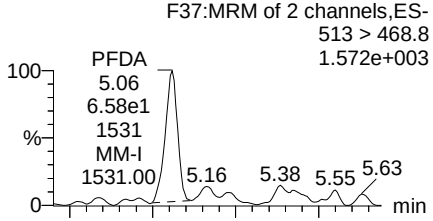


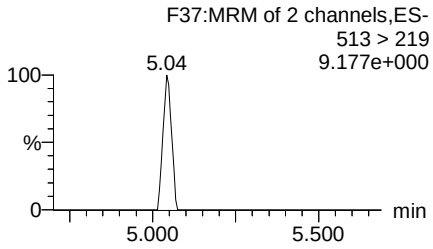
Total PFOS



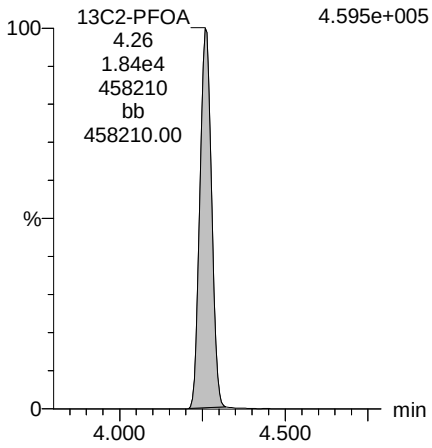


PFDA

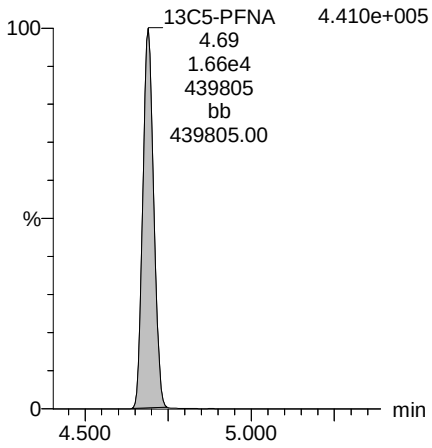




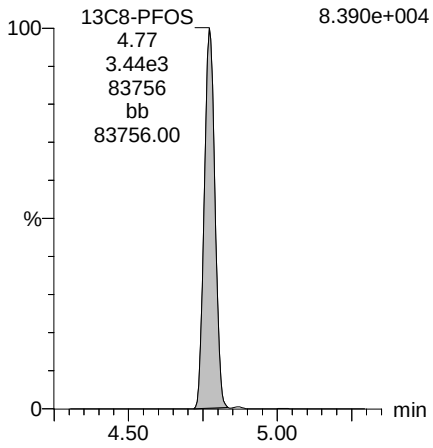
13C2-PFOA



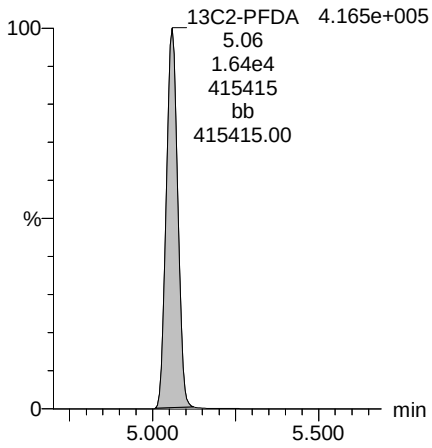
13C5-PFNA



13C8-PFOS



13C2-PFDA



MJT FOR ANP 6/11/2018

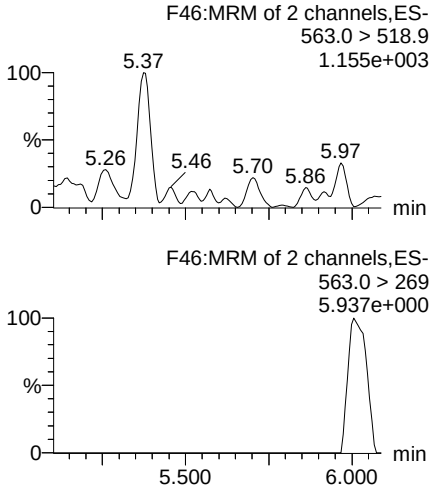
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

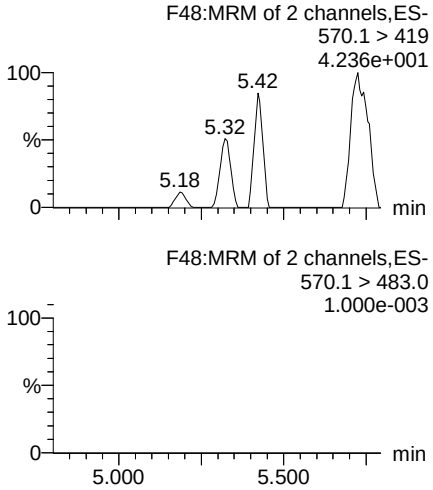
Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

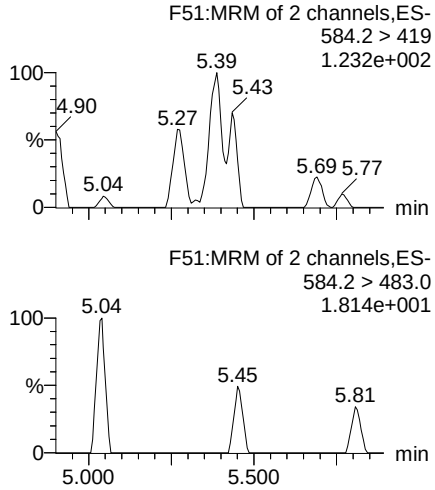
PFUdA



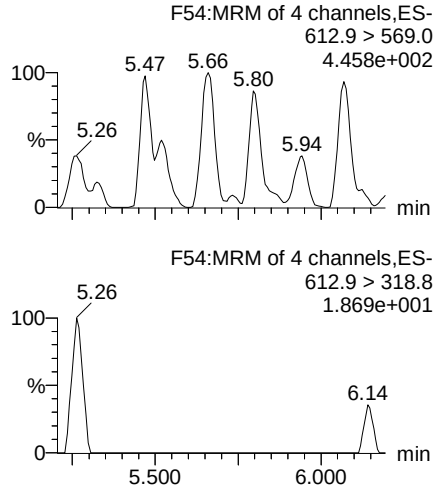
Total N-MeFOSAA



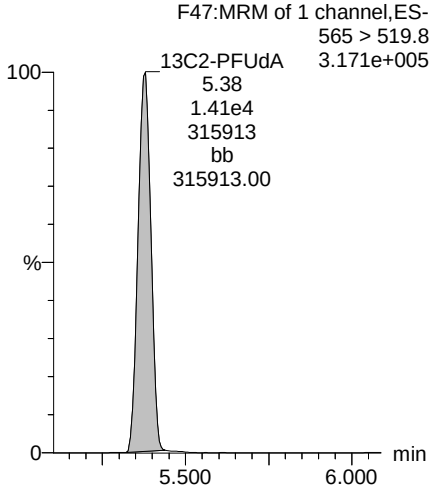
Total N-EtFOSAA



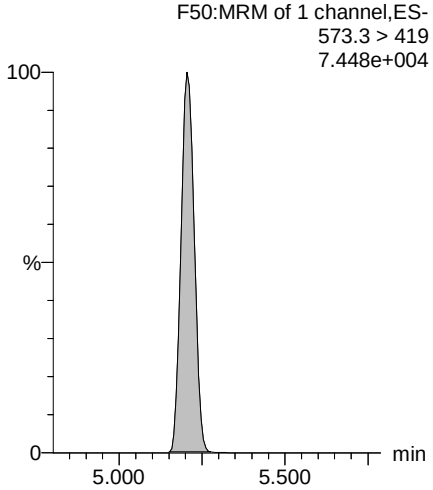
PFDoA



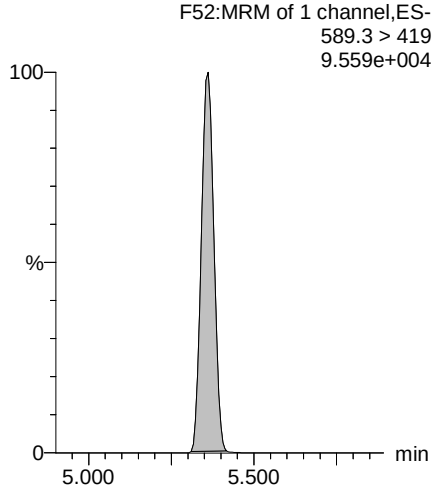
13C2-PFUdA



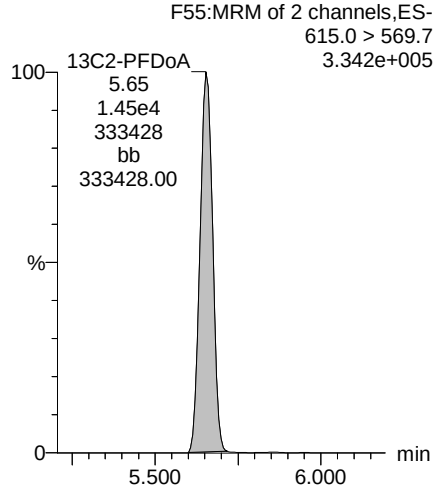
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



MJT FOR ANP 6/11/2018

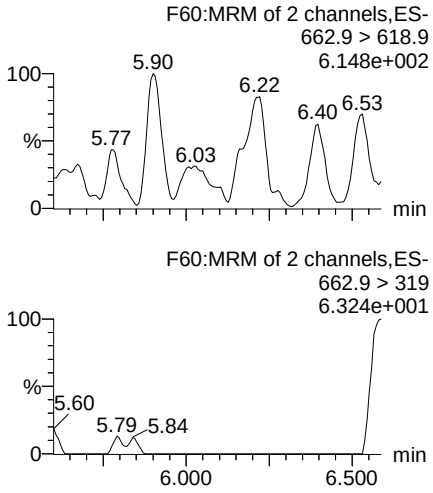
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

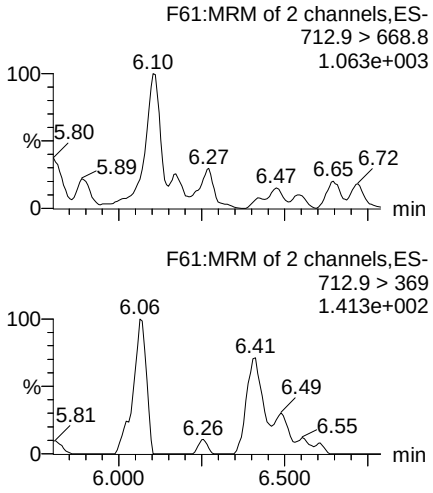
Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

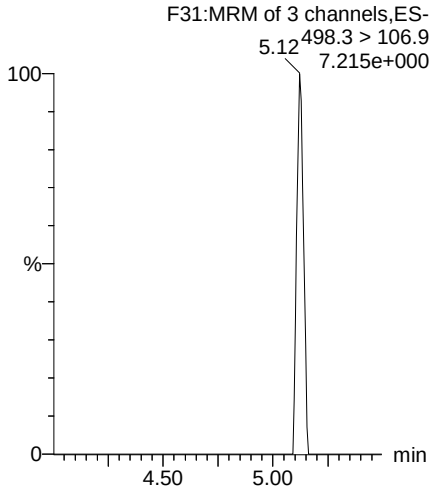
PFTrDA



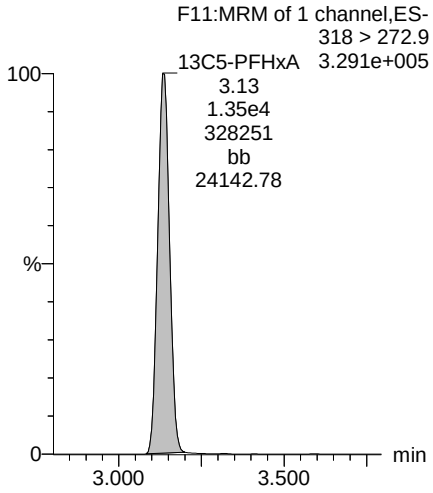
PFTeDA



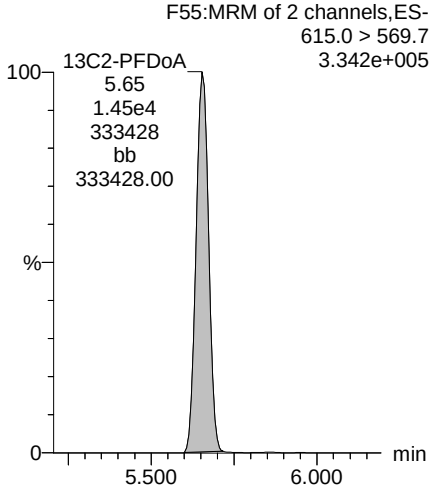
TCDA



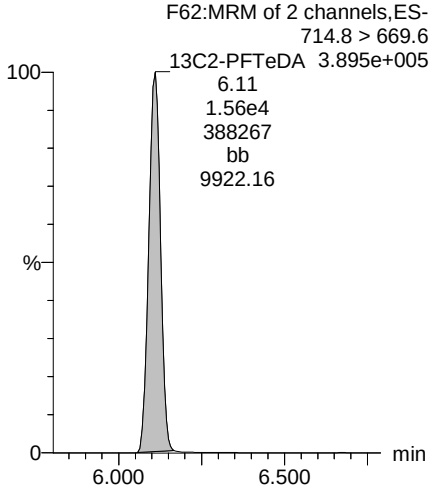
13C5-PFHxA



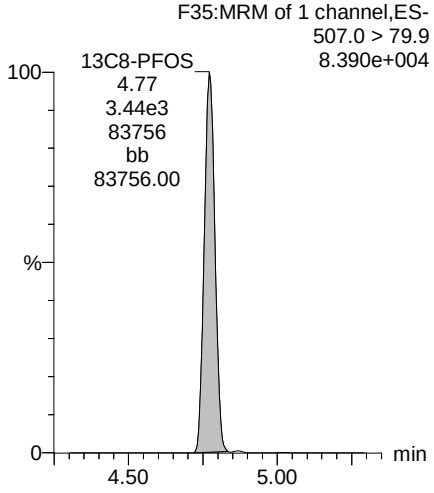
13C2-PFDoA



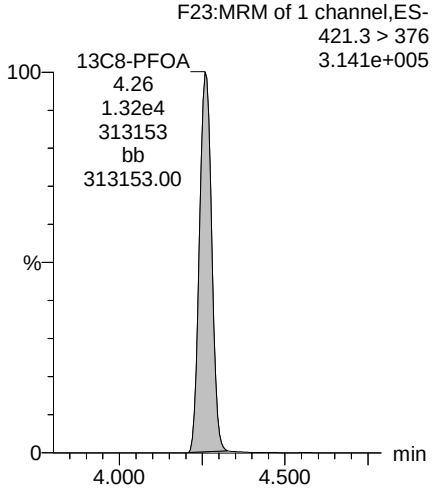
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



MJT FOR ANP 6/11/2018

Vista Analytical Laboratory

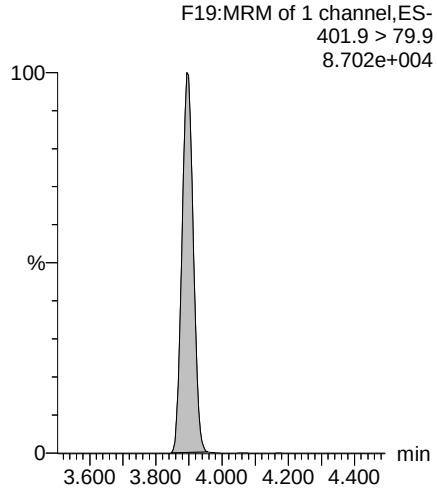
MM 6/11/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180603M2\180603M2-43.qld

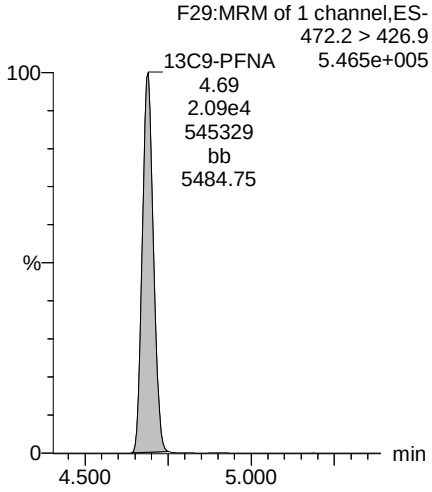
Last Altered: Friday, June 08, 2018 12:36:45 Pacific Daylight Time
Printed: Monday, June 11, 2018 11:24:30 Pacific Daylight Time

Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

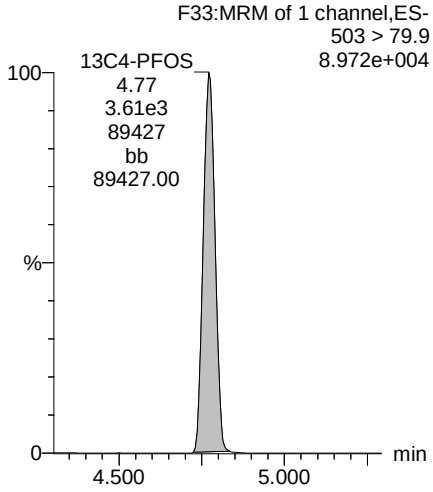
13C3-PFHxS



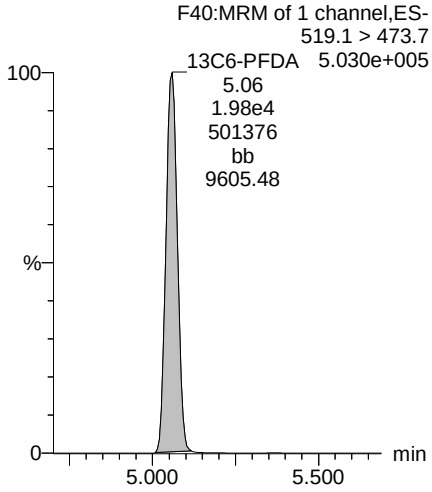
13C9-PFNA



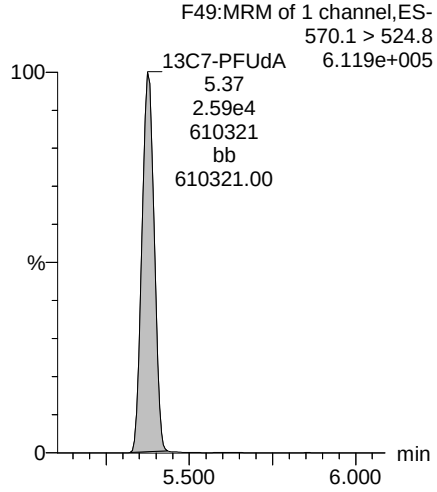
13C4-PFOS



13C6-PFDA



13C7-PFUdA



MJT FOR ANP 6/11/2018

INJECTION INTERNAL STANDARD (IIS) AREAS,

INSTRUMENT BLANKS (IB)

AND

CONTINUTING CALIBRATION VERIFICATIONS CCV)

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:18:29 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:33:03 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_RS-5-19-18.mdb 20 May 2018 12:59:37
Calibration: 05 Jun 2018 09:18:29

Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-6 PFC CS3 18E2907	1.19e4	100.0	NO
2	2	13C5-PFHxA	ST180603M2-6 PFC CS3 18E2907	1.77e4	100.0	NO
3	3	13C3-PFHxS	ST180603M2-6 PFC CS3 18E2907	3.36e3	100.0	NO
4	4	13C8-PFOA	ST180603M2-6 PFC CS3 18E2907	1.73e4	100.0	NO
5	5	13C9-PFNA	ST180603M2-6 PFC CS3 18E2907	2.02e4	100.0	NO
6	6	13C4-PFOS	ST180603M2-6 PFC CS3 18E2907	3.59e3	100.0	NO
7	7	13C6-PFDA	ST180603M2-6 PFC CS3 18E2907	2.31e4	100.0	NO
8	8	13C7-PFUdA	ST180603M2-6 PFC CS3 18E2907	2.94e4	100.0	NO

Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-7 PFC CS4 18E2908	1.28e4	107.7	NO
2	2	13C5-PFHxA	ST180603M2-7 PFC CS4 18E2908	1.77e4	100.1	NO
3	3	13C3-PFHxS	ST180603M2-7 PFC CS4 18E2908	3.64e3	108.3	NO
4	4	13C8-PFOA	ST180603M2-7 PFC CS4 18E2908	2.08e4	120.8	NO
5	5	13C9-PFNA	ST180603M2-7 PFC CS4 18E2908	2.08e4	103.2	NO
6	6	13C4-PFOS	ST180603M2-7 PFC CS4 18E2908	3.65e3	101.7	NO
7	7	13C6-PFDA	ST180603M2-7 PFC CS4 18E2908	2.64e4	114.0	NO
8	8	13C7-PFUdA	ST180603M2-7 PFC CS4 18E2908	2.29e4	78.0	NO

Name: 180603M2_9, Date: 03-Jun-2018, Time: 19:21:07, ID: ST180603M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

	#	Name	ID	Area	%Rec	Area Out
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2	2	13C5-PFHxA	ST180603M2-8 PFC CS5 18E2909	1.66e4	94.1	NO
3	3	13C3-PFHxS	ST180603M2-8 PFC CS5 18E2909	3.44e3	102.4	NO
4	4	13C8-PFOA	ST180603M2-8 PFC CS5 18E2909	1.66e4	96.3	NO
5	5	13C9-PFNA	ST180603M2-8 PFC CS5 18E2909	2.15e4	106.4	NO
6	6	13C4-PFOS	ST180603M2-8 PFC CS5 18E2909	3.20e3	89.3	NO
7	7	13C6-PFDA	ST180603M2-8 PFC CS5 18E2909	2.11e4	91.2	NO
8	8	13C7-PFUdA	ST180603M2-8 PFC CS5 18E2909	2.82e4	96.0	NO

Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

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2	2	13C5-PFHxA	ST180603M2-9 PFC CS6 18E2910	1.63e4	92.0	NO
3	3	13C3-PFHxS	ST180603M2-9 PFC CS6 18E2910	3.18e3	94.7	NO
4	4	13C8-PFOA	ST180603M2-9 PFC CS6 18E2910	1.68e4	97.5	NO
5	5	13C9-PFNA	ST180603M2-9 PFC CS6 18E2910	1.74e4	86.0	NO
6	6	13C4-PFOS	ST180603M2-9 PFC CS6 18E2910	3.22e3	89.6	NO
7	7	13C6-PFDA	ST180603M2-9 PFC CS6 18E2910	2.13e4	92.2	NO
8	8	13C7-PFUdA	ST180603M2-9 PFC CS6 18E2910	2.15e4	73.2	NO

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Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-10 PFC CS7 18E2911	1.10e4	92.1	NO
2	2	13C5-PFHxA	ST180603M2-10 PFC CS7 18E2911	1.45e4	81.8	NO
3	3	13C3-PFHxS	ST180603M2-10 PFC CS7 18E2911	2.79e3	83.1	NO
4	4	13C8-PFOA	ST180603M2-10 PFC CS7 18E2911	1.34e4	77.4	NO
5	5	13C9-PFNA	ST180603M2-10 PFC CS7 18E2911	1.87e4	92.6	NO
6	6	13C4-PFOS	ST180603M2-10 PFC CS7 18E2911	2.93e3	81.6	NO
7	7	13C6-PFDA	ST180603M2-10 PFC CS7 18E2911	1.81e4	78.3	NO
8	8	13C7-PFUdA	ST180603M2-10 PFC CS7 18E2911	2.14e4	72.7	NO

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, 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: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ICV180603M2-1 PFC 537 ICV 18E2901	1.14e4	96.2	NO
2	2	13C5-PFHxA	ICV180603M2-1 PFC 537 ICV 18E2901	1.66e4	94.2	NO
3	3	13C3-PFHxS	ICV180603M2-1 PFC 537 ICV 18E2901	3.55e3	105.6	NO
4	4	13C8-PFOA	ICV180603M2-1 PFC 537 ICV 18E2901	1.87e4	108.3	NO
5	5	13C9-PFNA	ICV180603M2-1 PFC 537 ICV 18E2901	2.10e4	104.2	NO
6	6	13C4-PFOS	ICV180603M2-1 PFC 537 ICV 18E2901	3.48e3	96.8	NO
7	7	13C6-PFDA	ICV180603M2-1 PFC 537 ICV 18E2901	2.33e4	100.8	NO
8	8	13C7-PFUdA	ICV180603M2-1 PFC 537 ICV 18E2901	2.83e4	96.4	NO

Name: 180603M2_14, Date: 03-Jun-2018, Time: 20:13:28, 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

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Name: 180603M2_15, Date: 03-Jun-2018, Time: 20:27:03, ID: B8F0002-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0002-BS1 OPR 0.125	7.76e3	65.2	NO
2	2	13C5-PFHxA	B8F0002-BS1 OPR 0.125	1.18e4	66.5	NO
3	3	13C3-PFHxS	B8F0002-BS1 OPR 0.125	2.90e3	86.5	NO
4	4	13C8-PFOA	B8F0002-BS1 OPR 0.125	1.29e4	74.9	NO
5	5	13C9-PFNA	B8F0002-BS1 OPR 0.125	1.67e4	82.6	NO
6	6	13C4-PFOS	B8F0002-BS1 OPR 0.125	3.06e3	85.2	NO
7	7	13C6-PFDA	B8F0002-BS1 OPR 0.125	1.65e4	71.5	NO
8	8	13C7-PFUdA	B8F0002-BS1 OPR 0.125	2.51e4	85.4	NO

Name: 180603M2_16, Date: 03-Jun-2018, Time: 20:37:28, ID: B8F0002-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0002-BLK1 Method Blank 0.125	8.85e3	74.4	NO
2	2	13C5-PFHxA	B8F0002-BLK1 Method Blank 0.125	1.42e4	80.2	NO
3	3	13C3-PFHxS	B8F0002-BLK1 Method Blank 0.125	3.36e3	100.2	NO
4	4	13C8-PFOA	B8F0002-BLK1 Method Blank 0.125	1.61e4	93.5	NO
5	5	13C9-PFNA	B8F0002-BLK1 Method Blank 0.125	1.88e4	93.3	NO
6	6	13C4-PFOS	B8F0002-BLK1 Method Blank 0.125	3.63e3	101.0	NO
7	7	13C6-PFDA	B8F0002-BLK1 Method Blank 0.125	2.34e4	101.0	NO
8	8	13C7-PFUdA	B8F0002-BLK1 Method Blank 0.125	2.57e4	87.5	NO

Name: 180603M2_17, Date: 03-Jun-2018, Time: 20:47:59, ID: 1801010-01RE1 GSUMW00505101805l6GSC 0.24314, Description: GSUMW00505101805l6GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-01RE1 GSUMW00505101805...	1.03e4	86.3	NO
2	2	13C5-PFHxA	1801010-01RE1 GSUMW00505101805...	1.48e4	83.9	NO
3	3	13C3-PFHxS	1801010-01RE1 GSUMW00505101805...	3.47e3	103.3	NO
4	4	13C8-PFOA	1801010-01RE1 GSUMW00505101805...	1.63e4	94.7	NO
5	5	13C9-PFNA	1801010-01RE1 GSUMW00505101805...	1.94e4	96.0	NO
6	6	13C4-PFOS	1801010-01RE1 GSUMW00505101805...	3.48e3	96.8	NO
7	7	13C6-PFDA	1801010-01RE1 GSUMW00505101805...	2.00e4	86.5	NO
8	8	13C7-PFUdA	1801010-01RE1 GSUMW00505101805...	3.01e4	102.4	NO

Name: 180603M2_18, Date: 03-Jun-2018, Time: 20:58:23, ID: 1801010-02RE1 MW0081819180517GSC 0.23679, Description: MW0081819180517GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-02RE1 MW0081819180517G...	8.15e3	68.5	NO
2	2	13C5-PFHxA	1801010-02RE1 MW0081819180517G...	1.28e4	72.5	NO
3	3	13C3-PFHxS	1801010-02RE1 MW0081819180517G...	3.09e3	92.1	NO
4	4	13C8-PFOA	1801010-02RE1 MW0081819180517G...	1.46e4	84.4	NO
5	5	13C9-PFNA	1801010-02RE1 MW0081819180517G...	1.56e4	77.3	NO
6	6	13C4-PFOS	1801010-02RE1 MW0081819180517G...	3.11e3	86.5	NO
7	7	13C6-PFDA	1801010-02RE1 MW0081819180517G...	1.75e4	75.8	NO
8	8	13C7-PFUdA	1801010-02RE1 MW0081819180517G...	1.83e4	62.4	NO

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Name: 180603M2_19, Date: 03-Jun-2018, Time: 21:08:54, ID: 1801010-03RE1 MW0083738180517RAP 0.25096, Description: MW0083738180517RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-03RE1 MW0083738180517R...	9.20e3	77.3	NO
2	2	13C5-PFHxA	1801010-03RE1 MW0083738180517R...	1.39e4	78.7	NO
3	3	13C3-PFHxS	1801010-03RE1 MW0083738180517R...	3.60e3	107.3	NO
4	4	13C8-PFOA	1801010-03RE1 MW0083738180517R...	1.53e4	88.7	NO
5	5	13C9-PFNA	1801010-03RE1 MW0083738180517R...	2.04e4	101.2	NO
6	6	13C4-PFOS	1801010-03RE1 MW0083738180517R...	3.72e3	103.6	NO
7	7	13C6-PFDA	1801010-03RE1 MW0083738180517R...	2.13e4	92.0	NO
8	8	13C7-PFUdA	1801010-03RE1 MW0083738180517R...	2.66e4	90.7	NO

Name: 180603M2_20, Date: 03-Jun-2018, Time: 21:19:18, ID: 1801010-04RE1 MW0052021180517MK 0.24417, Description: MW0052021180517MK

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-04RE1 MW0052021180517M...	8.62e3	72.5	NO
2	2	13C5-PFHxA	1801010-04RE1 MW0052021180517M...	1.35e4	76.5	NO
3	3	13C3-PFHxS	1801010-04RE1 MW0052021180517M...	3.68e3	109.7	NO
4	4	13C8-PFOA	1801010-04RE1 MW0052021180517M...	1.42e4	82.3	NO
5	5	13C9-PFNA	1801010-04RE1 MW0052021180517M...	1.61e4	80.0	NO
6	6	13C4-PFOS	1801010-04RE1 MW0052021180517M...	3.59e3	99.9	NO
7	7	13C6-PFDA	1801010-04RE1 MW0052021180517M...	1.87e4	80.7	NO
8	8	13C7-PFUdA	1801010-04RE1 MW0052021180517M...	2.57e4	87.6	NO

Name: 180603M2_21, Date: 03-Jun-2018, Time: 21:29:49, ID: 1801010-05RE1 MW0056061180517RAP 0.23251, Description: MW0056061180517RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-05RE1 MW0056061180517R...	1.01e4	84.7	NO
2	2	13C5-PFHxA	1801010-05RE1 MW0056061180517R...	1.55e4	87.7	NO
3	3	13C3-PFHxS	1801010-05RE1 MW0056061180517R...	3.36e3	100.2	NO
4	4	13C8-PFOA	1801010-05RE1 MW0056061180517R...	1.67e4	96.7	NO
5	5	13C9-PFNA	1801010-05RE1 MW0056061180517R...	1.91e4	94.8	NO
6	6	13C4-PFOS	1801010-05RE1 MW0056061180517R...	3.58e3	99.7	NO
7	7	13C6-PFDA	1801010-05RE1 MW0056061180517R...	1.98e4	85.7	NO
8	8	13C7-PFUdA	1801010-05RE1 MW0056061180517R...	2.57e4	87.5	NO

Name: 180603M2_22, Date: 03-Jun-2018, Time: 21:40:13, ID: 1801010-06RE1 MW0071920180517RAP 0.23669, Description: MW0071920180517RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-06RE1 MW0071920180517R...	9.40e3	79.0	NO
2	2	13C5-PFHxA	1801010-06RE1 MW0071920180517R...	1.42e4	80.6	NO
3	3	13C3-PFHxS	1801010-06RE1 MW0071920180517R...	2.99e3	89.1	NO
4	4	13C8-PFOA	1801010-06RE1 MW0071920180517R...	1.45e4	83.9	NO
5	5	13C9-PFNA	1801010-06RE1 MW0071920180517R...	1.78e4	88.1	NO
6	6	13C4-PFOS	1801010-06RE1 MW0071920180517R...	3.13e3	87.2	NO
7	7	13C6-PFDA	1801010-06RE1 MW0071920180517R...	1.89e4	81.9	NO
8	8	13C7-PFUdA	1801010-06RE1 MW0071920180517R...	2.41e4	82.0	NO

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Name: 180603M2_23, Date: 03-Jun-2018, Time: 21:50:44, ID: 1801010-07RE1 MW0074849180517GSC 0.24972, Description: MW0074849180517GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-07RE1 MW0074849180517G...	9.61e3	80.7	NO
2	2	13C5-PFHxA	1801010-07RE1 MW0074849180517G...	1.50e4	84.7	NO
3	3	13C3-PFHxS	1801010-07RE1 MW0074849180517G...	3.36e3	100.2	NO
4	4	13C8-PFOA	1801010-07RE1 MW0074849180517G...	1.49e4	86.5	NO
5	5	13C9-PFNA	1801010-07RE1 MW0074849180517G...	1.93e4	95.6	NO
6	6	13C4-PFOS	1801010-07RE1 MW0074849180517G...	3.21e3	89.5	NO
7	7	13C6-PFDA	1801010-07RE1 MW0074849180517G...	1.84e4	79.7	NO
8	8	13C7-PFUdA	1801010-07RE1 MW0074849180517G...	2.48e4	84.3	NO

Name: 180603M2_24, Date: 03-Jun-2018, Time: 22:01:08, ID: 1801010-08RE1 MW0065051180517RAP 0.24826, Description: MW0065051180517RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-08RE1 MW0065051180517R...	8.91e3	74.9	NO
2	2	13C5-PFHxA	1801010-08RE1 MW0065051180517R...	1.44e4	81.3	NO
3	3	13C3-PFHxS	1801010-08RE1 MW0065051180517R...	2.98e3	88.7	NO
4	4	13C8-PFOA	1801010-08RE1 MW0065051180517R...	1.55e4	90.1	NO
5	5	13C9-PFNA	1801010-08RE1 MW0065051180517R...	1.95e4	96.4	NO
6	6	13C4-PFOS	1801010-08RE1 MW0065051180517R...	3.14e3	87.4	NO
7	7	13C6-PFDA	1801010-08RE1 MW0065051180517R...	1.85e4	80.2	NO
8	8	13C7-PFUdA	1801010-08RE1 MW0065051180517R...	2.56e4	87.0	NO

Name: 180603M2_25, Date: 03-Jun-2018, Time: 22:11:39, ID: 1801010-09RE1 MW0060510180517GSC 0.24083, Description: MW0060510180517GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-09RE1 MW0060510180517G...	8.78e3	73.8	NO
2	2	13C5-PFHxA	1801010-09RE1 MW0060510180517G...	1.33e4	75.4	NO
3	3	13C3-PFHxS	1801010-09RE1 MW0060510180517G...	3.22e3	95.9	NO
4	4	13C8-PFOA	1801010-09RE1 MW0060510180517G...	1.41e4	81.8	NO
5	5	13C9-PFNA	1801010-09RE1 MW0060510180517G...	1.87e4	92.5	NO
6	6	13C4-PFOS	1801010-09RE1 MW0060510180517G...	3.44e3	95.7	NO
7	7	13C6-PFDA	1801010-09RE1 MW0060510180517G...	1.80e4	77.6	NO
8	8	13C7-PFUdA	1801010-09RE1 MW0060510180517G...	1.95e4	66.4	NO

Name: 180603M2_26, Date: 03-Jun-2018, Time: 22:22:04, ID: 1801010-10RE1 MW0010308180518GSC 0.24601, Description: MW0010308180518GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-10RE1 MW0010308180518G...	9.01e3	75.7	NO
2	2	13C5-PFHxA	1801010-10RE1 MW0010308180518G...	1.41e4	79.6	NO
3	3	13C3-PFHxS	1801010-10RE1 MW0010308180518G...	3.14e3	93.4	NO
4	4	13C8-PFOA	1801010-10RE1 MW0010308180518G...	1.52e4	88.0	NO
5	5	13C9-PFNA	1801010-10RE1 MW0010308180518G...	1.70e4	84.4	NO
6	6	13C4-PFOS	1801010-10RE1 MW0010308180518G...	3.24e3	90.1	NO
7	7	13C6-PFDA	1801010-10RE1 MW0010308180518G...	1.81e4	78.3	NO
8	8	13C7-PFUdA	1801010-10RE1 MW0010308180518G...	2.13e4	72.4	NO

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Name: 180603M2_27, Date: 03-Jun-2018, Time: 22:32:34, 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: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-11 PFC CS3 18E2907	1.27e4	106.4	NO
2	2	13C5-PFHxA	ST180603M2-11 PFC CS3 18E2907	1.83e4	103.7	NO
3	3	13C3-PFHxS	ST180603M2-11 PFC CS3 18E2907	4.12e3	122.9	NO
4	4	13C8-PFOA	ST180603M2-11 PFC CS3 18E2907	1.82e4	105.4	NO
5	5	13C9-PFNA	ST180603M2-11 PFC CS3 18E2907	2.27e4	112.6	NO
6	6	13C4-PFOS	ST180603M2-11 PFC CS3 18E2907	3.97e3	110.6	NO
7	7	13C6-PFDA	ST180603M2-11 PFC CS3 18E2907	2.09e4	90.3	NO
8	8	13C7-PFUdA	ST180603M2-11 PFC CS3 18E2907	2.60e4	88.4	NO

Name: 180603M2_29, Date: 03-Jun-2018, Time: 22:53:29, 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: 180603M2_30, Date: 03-Jun-2018, Time: 23:03:59, ID: 1801010-11RE1 MW0030207180518GSC 0.24202, Description: MW0030207180518GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-11RE1 MW0030207180518G...	9.57e3	80.4	NO
2	2	13C5-PFHxA	1801010-11RE1 MW0030207180518G...	1.48e4	83.6	NO
3	3	13C3-PFHxS	1801010-11RE1 MW0030207180518G...	3.31e3	98.6	NO
4	4	13C8-PFOA	1801010-11RE1 MW0030207180518G...	1.46e4	84.6	NO
5	5	13C9-PFNA	1801010-11RE1 MW0030207180518G...	1.83e4	90.5	NO
6	6	13C4-PFOS	1801010-11RE1 MW0030207180518G...	3.52e3	97.9	NO
7	7	13C6-PFDA	1801010-11RE1 MW0030207180518G...	1.85e4	80.0	NO
8	8	13C7-PFUdA	1801010-11RE1 MW0030207180518G...	2.49e4	84.9	NO

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Name: 180603M2_31, Date: 03-Jun-2018, Time: 23:14:25, ID: 1801010-12RE1 MW0034647180518RAP 0.25022, Description: MW0034647180518RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-12RE1 MW0034647180518R...	9.81e3	82.4	NO
2	2	13C5-PFHxA	1801010-12RE1 MW0034647180518R...	1.45e4	81.8	NO
3	3	13C3-PFHxS	1801010-12RE1 MW0034647180518R...	3.46e3	103.0	NO
4	4	13C8-PFOA	1801010-12RE1 MW0034647180518R...	1.61e4	93.4	NO
5	5	13C9-PFNA	1801010-12RE1 MW0034647180518R...	1.68e4	83.1	NO
6	6	13C4-PFOS	1801010-12RE1 MW0034647180518R...	3.45e3	96.1	NO
7	7	13C6-PFDA	1801010-12RE1 MW0034647180518R...	1.99e4	86.2	NO
8	8	13C7-PFUdA	1801010-12RE1 MW0034647180518R...	2.56e4	87.2	NO

Name: 180603M2_32, Date: 03-Jun-2018, Time: 23:24:55, ID: 1801010-13RE1 GSUMW0031116180518GSC 0.24665, Description: GSUMW0031116180518GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-13RE1 GSUMW00311161805...	8.25e3	69.3	NO
2	2	13C5-PFHxA	1801010-13RE1 GSUMW00311161805...	1.30e4	73.6	NO
3	3	13C3-PFHxS	1801010-13RE1 GSUMW00311161805...	2.97e3	88.4	NO
4	4	13C8-PFOA	1801010-13RE1 GSUMW00311161805...	1.41e4	82.0	NO
5	5	13C9-PFNA	1801010-13RE1 GSUMW00311161805...	1.61e4	79.5	NO
6	6	13C4-PFOS	1801010-13RE1 GSUMW00311161805...	3.15e3	87.7	NO
7	7	13C6-PFDA	1801010-13RE1 GSUMW00311161805...	1.45e4	62.7	NO
8	8	13C7-PFUdA	1801010-13RE1 GSUMW00311161805...	1.93e4	65.7	NO

Name: 180603M2_33, Date: 03-Jun-2018, Time: 23:35:20, ID: 1801010-14RE1 MW0093233180518RAP 0.23472, Description: MW0093233180518RAP

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-14RE1 MW0093233180518R...	8.81e3	74.0	NO
2	2	13C5-PFHxA	1801010-14RE1 MW0093233180518R...	1.37e4	77.7	NO
3	3	13C3-PFHxS	1801010-14RE1 MW0093233180518R...	3.31e3	98.7	NO
4	4	13C8-PFOA	1801010-14RE1 MW0093233180518R...	1.51e4	87.8	NO
5	5	13C9-PFNA	1801010-14RE1 MW0093233180518R...	1.84e4	91.3	NO
6	6	13C4-PFOS	1801010-14RE1 MW0093233180518R...	3.70e3	103.0	NO
7	7	13C6-PFDA	1801010-14RE1 MW0093233180518R...	1.97e4	85.1	NO
8	8	13C7-PFUdA	1801010-14RE1 MW0093233180518R...	2.04e4	69.5	NO

Name: 180603M2_34, Date: 03-Jun-2018, Time: 23:45:50, ID: 1801010-15RE1 MW0091516180518MK 0.24729, Description: MW0091516180518MK

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801010-15RE1 MW0091516180518M...	8.55e3	71.8	NO
2	2	13C5-PFHxA	1801010-15RE1 MW0091516180518M...	1.36e4	76.7	NO
3	3	13C3-PFHxS	1801010-15RE1 MW0091516180518M...	3.43e3	102.2	NO
4	4	13C8-PFOA	1801010-15RE1 MW0091516180518M...	1.48e4	85.7	NO
5	5	13C9-PFNA	1801010-15RE1 MW0091516180518M...	1.83e4	90.5	NO
6	6	13C4-PFOS	1801010-15RE1 MW0091516180518M...	3.57e3	99.5	NO
7	7	13C6-PFDA	1801010-15RE1 MW0091516180518M...	1.95e4	84.3	NO
8	8	13C7-PFUdA	1801010-15RE1 MW0091516180518M...	2.58e4	87.7	NO

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Name: 180603M2_35, Date: 03-Jun-2018, Time: 23:56:15, ID: B8F0004-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0004-BS1 OPR 0.125	9.03e3	75.9	NO
2	2	13C5-PFHxA	B8F0004-BS1 OPR 0.125	1.38e4	78.1	NO
3	3	13C3-PFHxS	B8F0004-BS1 OPR 0.125	3.00e3	89.4	NO
4	4	13C8-PFOA	B8F0004-BS1 OPR 0.125	1.56e4	90.3	NO
5	5	13C9-PFNA	B8F0004-BS1 OPR 0.125	1.92e4	95.3	NO
6	6	13C4-PFOS	B8F0004-BS1 OPR 0.125	3.37e3	93.9	NO
7	7	13C6-PFDA	B8F0004-BS1 OPR 0.125	1.83e4	79.3	NO
8	8	13C7-PFUdA	B8F0004-BS1 OPR 0.125	2.28e4	77.6	NO

Name: 180603M2_36, Date: 04-Jun-2018, Time: 00:06:45, ID: B8F0004-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0004-BSD1 LCSD 0.125	6.12e3	51.4	NO
2	2	13C5-PFHxA	B8F0004-BSD1 LCSD 0.125	1.19e4	67.1	NO
3	3	13C3-PFHxS	B8F0004-BSD1 LCSD 0.125	3.37e3	100.5	NO
4	4	13C8-PFOA	B8F0004-BSD1 LCSD 0.125	1.49e4	86.6	NO
5	5	13C9-PFNA	B8F0004-BSD1 LCSD 0.125	1.99e4	98.5	NO
6	6	13C4-PFOS	B8F0004-BSD1 LCSD 0.125	3.59e3	100.0	NO
7	7	13C6-PFDA	B8F0004-BSD1 LCSD 0.125	1.89e4	81.9	NO
8	8	13C7-PFUdA	B8F0004-BSD1 LCSD 0.125	2.79e4	95.0	NO

Name: 180603M2_37, Date: 04-Jun-2018, Time: 00:17:09, ID: B8F0004-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0004-BLK1 Method Blank 0.125	6.67e3	56.0	NO
2	2	13C5-PFHxA	B8F0004-BLK1 Method Blank 0.125	1.21e4	68.6	NO
3	3	13C3-PFHxS	B8F0004-BLK1 Method Blank 0.125	3.42e3	102.0	NO
4	4	13C8-PFOA	B8F0004-BLK1 Method Blank 0.125	1.60e4	92.9	NO
5	5	13C9-PFNA	B8F0004-BLK1 Method Blank 0.125	1.70e4	84.4	NO
6	6	13C4-PFOS	B8F0004-BLK1 Method Blank 0.125	3.69e3	102.8	NO
7	7	13C6-PFDA	B8F0004-BLK1 Method Blank 0.125	2.19e4	94.8	NO
8	8	13C7-PFUdA	B8F0004-BLK1 Method Blank 0.125	2.83e4	96.3	NO

Name: 180603M2_38, Date: 04-Jun-2018, Time: 00:27:40, 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	2.33e3	19.6	YES
2	2	13C5-PFHxA	1801039-01 A1-MW-13-SA1 0.10967	4.13e3	23.3	YES
3	3	13C3-PFHxS	1801039-01 A1-MW-13-SA1 0.10967	3.56e3	106.0	NO
4	4	13C8-PFOA	1801039-01 A1-MW-13-SA1 0.10967	5.54e3	32.1	YES
5	5	13C9-PFNA	1801039-01 A1-MW-13-SA1 0.10967	9.65e3	47.8	YES
6	6	13C4-PFOS	1801039-01 A1-MW-13-SA1 0.10967	4.06e3	113.1	NO
7	7	13C6-PFDA	1801039-01 A1-MW-13-SA1 0.10967	1.38e4	59.8	NO
8	8	13C7-PFUdA	1801039-01 A1-MW-13-SA1 0.10967	1.77e4	60.4	NO

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Name: 180603M2_39, Date: 04-Jun-2018, Time: 00:38:04, 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	3.69e3	31.0	YES
2	2	13C5-PFHxA	1801039-02 A1-MW-11-SA1 0.11624	5.73e3	32.4	YES
3	3	13C3-PFHxS	1801039-02 A1-MW-11-SA1 0.11624	3.21e3	95.7	NO
4	4	13C8-PFOA	1801039-02 A1-MW-11-SA1 0.11624	6.86e3	39.8	YES
5	5	13C9-PFNA	1801039-02 A1-MW-11-SA1 0.11624	1.04e4	51.6	NO
6	6	13C4-PFOS	1801039-02 A1-MW-11-SA1 0.11624	3.37e3	93.9	NO
7	7	13C6-PFDA	1801039-02 A1-MW-11-SA1 0.11624	1.39e4	60.0	NO
8	8	13C7-PFUdA	1801039-02 A1-MW-11-SA1 0.11624	1.96e4	66.7	NO

Name: 180603M2_40, Date: 04-Jun-2018, Time: 00:48:35, 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	1.93e3	16.2	YES
2	2	13C5-PFHxA	1801039-03 A1-MW-14-SA1 0.11194	3.38e3	19.1	YES
3	3	13C3-PFHxS	1801039-03 A1-MW-14-SA1 0.11194	3.73e3	111.2	NO
4	4	13C8-PFOA	1801039-03 A1-MW-14-SA1 0.11194	5.41e3	31.3	YES
5	5	13C9-PFNA	1801039-03 A1-MW-14-SA1 0.11194	7.75e3	38.4	YES
6	6	13C4-PFOS	1801039-03 A1-MW-14-SA1 0.11194	3.71e3	103.4	NO
7	7	13C6-PFDA	1801039-03 A1-MW-14-SA1 0.11194	1.04e4	45.1	YES
8	8	13C7-PFUdA	1801039-03 A1-MW-14-SA1 0.11194	1.62e4	55.2	NO

Name: 180603M2_41, Date: 04-Jun-2018, Time: 00:59:00, 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	3.93e3	33.0	YES
2	2	13C5-PFHxA	1801039-04 A1-MW-15-SA1 0.11248	7.20e3	40.7	YES
3	3	13C3-PFHxS	1801039-04 A1-MW-15-SA1 0.11248	3.64e3	108.4	NO
4	4	13C8-PFOA	1801039-04 A1-MW-15-SA1 0.11248	1.10e4	63.8	NO
5	5	13C9-PFNA	1801039-04 A1-MW-15-SA1 0.11248	1.41e4	69.9	NO
6	6	13C4-PFOS	1801039-04 A1-MW-15-SA1 0.11248	3.77e3	104.9	NO
7	7	13C6-PFDA	1801039-04 A1-MW-15-SA1 0.11248	1.79e4	77.5	NO
8	8	13C7-PFUdA	1801039-04 A1-MW-15-SA1 0.11248	2.32e4	79.1	NO

Name: 180603M2_42, Date: 04-Jun-2018, Time: 01:09:30, 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	2.10e3	17.7	YES
2	2	13C5-PFHxA	1801039-07 A1-MW-25-SA1 0.11252	3.52e3	19.9	YES
3	3	13C3-PFHxS	1801039-07 A1-MW-25-SA1 0.11252	3.06e3	91.3	NO
4	4	13C8-PFOA	1801039-07 A1-MW-25-SA1 0.11252	5.07e3	29.4	YES
5	5	13C9-PFNA	1801039-07 A1-MW-25-SA1 0.11252	8.19e3	40.6	YES
6	6	13C4-PFOS	1801039-07 A1-MW-25-SA1 0.11252	3.12e3	87.0	NO
7	7	13C6-PFDA	1801039-07 A1-MW-25-SA1 0.11252	1.02e4	44.0	YES
8	8	13C7-PFUdA	1801039-07 A1-MW-25-SA1 0.11252	1.40e4	47.6	YES

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Name: 180603M2_43, Date: 04-Jun-2018, Time: 01:19:55, ID: 1801039-08 FRB-20180524 0.11695, Description: FRB-20180524

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-08 FRB-20180524 0.11695	8.07e3	67.8	NO
2	2	13C5-PFHxA	1801039-08 FRB-20180524 0.11695	1.35e4	76.6	NO
3	3	13C3-PFHxS	1801039-08 FRB-20180524 0.11695	3.41e3	101.5	NO
4	4	13C8-PFOA	1801039-08 FRB-20180524 0.11695	1.32e4	76.5	NO
5	5	13C9-PFNA	1801039-08 FRB-20180524 0.11695	2.09e4	103.6	NO
6	6	13C4-PFOS	1801039-08 FRB-20180524 0.11695	3.61e3	100.6	NO
7	7	13C6-PFDA	1801039-08 FRB-20180524 0.11695	1.98e4	85.5	NO
8	8	13C7-PFUdA	1801039-08 FRB-20180524 0.11695	2.59e4	88.3	NO

Name: 180603M2_44, Date: 04-Jun-2018, Time: 01:30:25, ID: B8F0003-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0003-BS1 OPR 0.125	1.14e4	96.1	NO
2	2	13C5-PFHxA	B8F0003-BS1 OPR 0.125	1.66e4	94.0	NO
3	3	13C3-PFHxS	B8F0003-BS1 OPR 0.125	3.52e3	105.0	NO
4	4	13C8-PFOA	B8F0003-BS1 OPR 0.125	1.81e4	105.1	NO
5	5	13C9-PFNA	B8F0003-BS1 OPR 0.125	2.11e4	104.7	NO
6	6	13C4-PFOS	B8F0003-BS1 OPR 0.125	3.58e3	99.7	NO
7	7	13C6-PFDA	B8F0003-BS1 OPR 0.125	2.36e4	102.0	NO
8	8	13C7-PFUdA	B8F0003-BS1 OPR 0.125	2.38e4	81.1	NO

Name: 180603M2_45, Date: 04-Jun-2018, Time: 01:40:51, ID: B8F0003-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8F0003-BLK1 Method Blank 0.125	1.18e4	99.2	NO
2	2	13C5-PFHxA	B8F0003-BLK1 Method Blank 0.125	1.71e4	97.0	NO
3	3	13C3-PFHxS	B8F0003-BLK1 Method Blank 0.125	3.72e3	110.8	NO
4	4	13C8-PFOA	B8F0003-BLK1 Method Blank 0.125	1.87e4	108.3	NO
5	5	13C9-PFNA	B8F0003-BLK1 Method Blank 0.125	2.26e4	111.9	NO
6	6	13C4-PFOS	B8F0003-BLK1 Method Blank 0.125	3.99e3	111.0	NO
7	7	13C6-PFDA	B8F0003-BLK1 Method Blank 0.125	2.01e4	86.8	NO
8	8	13C7-PFUdA	B8F0003-BLK1 Method Blank 0.125	2.73e4	93.0	NO

Name: 180603M2_46, Date: 04-Jun-2018, Time: 01:51:22, 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	5.88e0	0.0	YES
8	8	13C7-PFUdA	IPA			NO

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Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-12 PFC CS3 18E2907	1.32e4	110.5	NO
2	2	13C5-PFHxA	ST180603M2-12 PFC CS3 18E2907	1.88e4	106.4	NO
3	3	13C3-PFHxS	ST180603M2-12 PFC CS3 18E2907	3.97e3	118.3	NO
4	4	13C8-PFOA	ST180603M2-12 PFC CS3 18E2907	2.23e4	129.4	NO
5	5	13C9-PFNA	ST180603M2-12 PFC CS3 18E2907	2.32e4	115.0	NO
6	6	13C4-PFOS	ST180603M2-12 PFC CS3 18E2907	4.24e3	118.2	NO
7	7	13C6-PFDA	ST180603M2-12 PFC CS3 18E2907	2.49e4	107.7	NO
8	8	13C7-PFUdA	ST180603M2-12 PFC CS3 18E2907	2.63e4	89.4	NO

Name: 180603M2_48, Date: 04-Jun-2018, Time: 02:12:16, 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: 180603M2_49, Date: 04-Jun-2018, Time: 02:22:47, ID: 1800937-01RE1 CL1TMW0118180503N 0.26212, Description: CL1TMW0118180503N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-01RE1 CL1TMW0118180503...	1.01e4	85.1	NO
2	2	13C5-PFHxA	1800937-01RE1 CL1TMW0118180503...	1.57e4	88.5	NO
3	3	13C3-PFHxS	1800937-01RE1 CL1TMW0118180503...	3.50e3	104.2	NO
4	4	13C8-PFOA	1800937-01RE1 CL1TMW0118180503...	1.52e4	87.8	NO
5	5	13C9-PFNA	1800937-01RE1 CL1TMW0118180503...	1.61e4	79.9	NO
6	6	13C4-PFOS	1800937-01RE1 CL1TMW0118180503...	3.45e3	96.2	NO
7	7	13C6-PFDA	1800937-01RE1 CL1TMW0118180503...	1.48e4	64.0	NO
8	8	13C7-PFUdA	1800937-01RE1 CL1TMW0118180503...	2.04e4	69.5	NO

Name: 180603M2_50, Date: 04-Jun-2018, Time: 02:33:17, ID: 1800937-02RE1 CL1TMW0405180504N 0.25472, Description: CL1TMW0405180504N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-02RE1 CL1TMW0405180504...	9.87e3	82.9	NO
2	2	13C5-PFHxA	1800937-02RE1 CL1TMW0405180504...	1.42e4	80.2	NO
3	3	13C3-PFHxS	1800937-02RE1 CL1TMW0405180504...	3.57e3	106.3	NO
4	4	13C8-PFOA	1800937-02RE1 CL1TMW0405180504...	1.35e4	78.4	NO
5	5	13C9-PFNA	1800937-02RE1 CL1TMW0405180504...	1.70e4	84.4	NO
6	6	13C4-PFOS	1800937-02RE1 CL1TMW0405180504...	9.22e2	25.7	YES
7	7	13C6-PFDA	1800937-02RE1 CL1TMW0405180504...	1.81e4	78.2	NO
8	8	13C7-PFUdA	1800937-02RE1 CL1TMW0405180504...	2.35e4	79.9	NO

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Name: 180603M2_51, Date: 04-Jun-2018, Time: 02:43:42, ID: 1800937-03RE1 CL1SW0300180508N 0.25704, Description: CL1SW0300180508N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-03RE1 CL1SW0300180508N ...	9.56e3	80.3	NO
2	2	13C5-PFHxA	1800937-03RE1 CL1SW0300180508N ...	1.41e4	79.9	NO
3	3	13C3-PFHxS	1800937-03RE1 CL1SW0300180508N ...	3.21e3	95.6	NO
4	4	13C8-PFOA	1800937-03RE1 CL1SW0300180508N ...	1.54e4	89.2	NO
5	5	13C9-PFNA	1800937-03RE1 CL1SW0300180508N ...	1.78e4	88.4	NO
6	6	13C4-PFOS	1800937-03RE1 CL1SW0300180508N ...	2.76e3	77.0	NO
7	7	13C6-PFDA	1800937-03RE1 CL1SW0300180508N ...	1.98e4	85.8	NO
8	8	13C7-PFUdA	1800937-03RE1 CL1SW0300180508N ...	2.40e4	81.6	NO

Name: 180603M2_52, Date: 04-Jun-2018, Time: 02:54:12, ID: 1800937-04RE1 CL1SW0400180508N 0.25921, Description: CL1SW0400180508N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-04RE1 CL1SW0400180508N ...	1.01e4	84.7	NO
2	2	13C5-PFHxA	1800937-04RE1 CL1SW0400180508N ...	1.45e4	82.2	NO
3	3	13C3-PFHxS	1800937-04RE1 CL1SW0400180508N ...	3.33e3	99.3	NO
4	4	13C8-PFOA	1800937-04RE1 CL1SW0400180508N ...	1.67e4	96.9	NO
5	5	13C9-PFNA	1800937-04RE1 CL1SW0400180508N ...	1.84e4	91.4	NO
6	6	13C4-PFOS	1800937-04RE1 CL1SW0400180508N ...	3.41e3	94.9	NO
7	7	13C6-PFDA	1800937-04RE1 CL1SW0400180508N ...	1.99e4	85.8	NO
8	8	13C7-PFUdA	1800937-04RE1 CL1SW0400180508N ...	2.61e4	88.9	NO

Name: 180603M2_53, Date: 04-Jun-2018, Time: 03:04:35, ID: 1800937-05RE1 CL1SW0500180508N 0.25542, Description: CL1SW0500180508N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-05RE1 CL1SW0500180508N ...	9.78e3	82.2	NO
2	2	13C5-PFHxA	1800937-05RE1 CL1SW0500180508N ...	1.38e4	78.3	NO
3	3	13C3-PFHxS	1800937-05RE1 CL1SW0500180508N ...	3.22e3	95.9	NO
4	4	13C8-PFOA	1800937-05RE1 CL1SW0500180508N ...	1.60e4	92.6	NO
5	5	13C9-PFNA	1800937-05RE1 CL1SW0500180508N ...	1.88e4	93.3	NO
6	6	13C4-PFOS	1800937-05RE1 CL1SW0500180508N ...	3.45e3	96.2	NO
7	7	13C6-PFDA	1800937-05RE1 CL1SW0500180508N ...	2.00e4	86.5	NO
8	8	13C7-PFUdA	1800937-05RE1 CL1SW0500180508N ...	1.97e4	66.9	NO

Name: 180603M2_54, Date: 04-Jun-2018, Time: 03:15:06, ID: 1800937-06RE1 CL1DR0100180508N 0.25416, Description: CL1DR0100180508N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-06RE1 CL1DR0100180508N ...	1.01e4	84.5	NO
2	2	13C5-PFHxA	1800937-06RE1 CL1DR0100180508N ...	1.46e4	82.4	NO
3	3	13C3-PFHxS	1800937-06RE1 CL1DR0100180508N ...	3.24e3	96.4	NO
4	4	13C8-PFOA	1800937-06RE1 CL1DR0100180508N ...	1.76e4	102.1	NO
5	5	13C9-PFNA	1800937-06RE1 CL1DR0100180508N ...	1.75e4	86.5	NO
6	6	13C4-PFOS	1800937-06RE1 CL1DR0100180508N ...	3.30e3	92.0	NO
7	7	13C6-PFDA	1800937-06RE1 CL1DR0100180508N ...	1.94e4	84.1	NO
8	8	13C7-PFUdA	1800937-06RE1 CL1DR0100180508N ...	2.40e4	81.7	NO

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Name: 180603M2_55, Date: 04-Jun-2018, Time: 03:25:30, ID: 1800937-07RE1 CL1DR0300180508N 0.26057, Description: CL1DR0300180508N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-07RE1 CL1DR0300180508N ...	1.01e4	85.2	NO
2	2	13C5-PFHxA	1800937-07RE1 CL1DR0300180508N ...	1.47e4	83.0	NO
3	3	13C3-PFHxS	1800937-07RE1 CL1DR0300180508N ...	3.49e3	103.9	NO
4	4	13C8-PFOA	1800937-07RE1 CL1DR0300180508N ...	1.45e4	83.8	NO
5	5	13C9-PFNA	1800937-07RE1 CL1DR0300180508N ...	1.88e4	93.3	NO
6	6	13C4-PFOS	1800937-07RE1 CL1DR0300180508N ...	3.55e3	99.0	NO
7	7	13C6-PFDA	1800937-07RE1 CL1DR0300180508N ...	1.77e4	76.6	NO
8	8	13C7-PFUdA	1800937-07RE1 CL1DR0300180508N ...	2.48e4	84.3	NO

Name: 180603M2_56, Date: 04-Jun-2018, Time: 03:36:00, ID: 1800937-08RE1 CL1DR0200180509N 0.25133, Description: CL1DR0200180509N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-08RE1 CL1DR0200180509N ...	8.58e3	72.1	NO
2	2	13C5-PFHxA	1800937-08RE1 CL1DR0200180509N ...	1.31e4	74.1	NO
3	3	13C3-PFHxS	1800937-08RE1 CL1DR0200180509N ...	3.05e3	90.9	NO
4	4	13C8-PFOA	1800937-08RE1 CL1DR0200180509N ...	1.30e4	75.1	NO
5	5	13C9-PFNA	1800937-08RE1 CL1DR0200180509N ...	1.58e4	78.1	NO
6	6	13C4-PFOS	1800937-08RE1 CL1DR0200180509N ...	2.46e3	68.6	NO
7	7	13C6-PFDA	1800937-08RE1 CL1DR0200180509N ...	1.83e4	79.2	NO
8	8	13C7-PFUdA	1800937-08RE1 CL1DR0200180509N ...	2.07e4	70.4	NO

Name: 180603M2_57, Date: 04-Jun-2018, Time: 03:46:30, ID: 1800937-09RE1 CL1SW0100180509N 0.25634, Description: CL1SW0100180509N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-09RE1 CL1SW0100180509N ...	1.03e4	86.7	NO
2	2	13C5-PFHxA	1800937-09RE1 CL1SW0100180509N ...	1.51e4	85.2	NO
3	3	13C3-PFHxS	1800937-09RE1 CL1SW0100180509N ...	3.47e3	103.4	NO
4	4	13C8-PFOA	1800937-09RE1 CL1SW0100180509N ...	1.58e4	91.7	NO
5	5	13C9-PFNA	1800937-09RE1 CL1SW0100180509N ...	1.67e4	82.7	NO
6	6	13C4-PFOS	1800937-09RE1 CL1SW0100180509N ...	3.44e3	95.9	NO
7	7	13C6-PFDA	1800937-09RE1 CL1SW0100180509N ...	1.95e4	84.4	NO
8	8	13C7-PFUdA	1800937-09RE1 CL1SW0100180509N ...	2.26e4	76.8	NO

Name: 180603M2_58, Date: 04-Jun-2018, Time: 03:56:55, ID: 1800937-10RE1 CL1SW0200180509N 0.25044, Description: CL1SW0200180509N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800937-10RE1 CL1SW0200180509N ...	1.14e4	95.9	NO
2	2	13C5-PFHxA	1800937-10RE1 CL1SW0200180509N ...	1.63e4	92.1	NO
3	3	13C3-PFHxS	1800937-10RE1 CL1SW0200180509N ...	3.85e3	114.7	NO
4	4	13C8-PFOA	1800937-10RE1 CL1SW0200180509N ...	1.71e4	99.3	NO
5	5	13C9-PFNA	1800937-10RE1 CL1SW0200180509N ...	2.16e4	107.1	NO
6	6	13C4-PFOS	1800937-10RE1 CL1SW0200180509N ...	4.02e3	112.1	NO
7	7	13C6-PFDA	1800937-10RE1 CL1SW0200180509N ...	1.87e4	81.0	NO
8	8	13C7-PFUdA	1800937-10RE1 CL1SW0200180509N ...	2.57e4	87.3	NO

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Name: 180603M2_59, Date: 04-Jun-2018, Time: 04:07:25, 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: 180603M2_60, Date: 04-Jun-2018, Time: 04:17:50, ID: ST180603M2-13 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-13 PFC CS3 18E2907	1.36e4	114.6	NO
2	2	13C5-PFHxA	ST180603M2-13 PFC CS3 18E2907	1.96e4	110.9	NO
3	3	13C3-PFHxS	ST180603M2-13 PFC CS3 18E2907	4.08e3	121.6	NO
4	4	13C8-PFOA	ST180603M2-13 PFC CS3 18E2907	2.07e4	120.1	NO
5	5	13C9-PFNA	ST180603M2-13 PFC CS3 18E2907	2.18e4	107.8	NO
6	6	13C4-PFOS	ST180603M2-13 PFC CS3 18E2907	3.97e3	110.5	NO
7	7	13C6-PFDA	ST180603M2-13 PFC CS3 18E2907	2.68e4	115.8	NO
8	8	13C7-PFUdA	ST180603M2-13 PFC CS3 18E2907	2.97e4	101.2	NO

Name: 180603M2_61, Date: 04-Jun-2018, Time: 04:28:21, 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: 180603M2_62, Date: 04-Jun-2018, Time: 04:38:46, ID: ST180603M2-14 PFC CS0 18E2904, Description: PFC CS0 18E2904

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-14 PFC CS0 18E2904	1.41e4	118.3	NO
2	2	13C5-PFHxA	ST180603M2-14 PFC CS0 18E2904	2.13e4	120.7	NO
3	3	13C3-PFHxS	ST180603M2-14 PFC CS0 18E2904	4.20e3	125.1	NO
4	4	13C8-PFOA	ST180603M2-14 PFC CS0 18E2904	1.91e4	110.5	NO
5	5	13C9-PFNA	ST180603M2-14 PFC CS0 18E2904	2.50e4	123.9	NO
6	6	13C4-PFOS	ST180603M2-14 PFC CS0 18E2904	4.40e3	122.4	NO
7	7	13C6-PFDA	ST180603M2-14 PFC CS0 18E2904	2.57e4	111.0	NO
8	8	13C7-PFUdA	ST180603M2-14 PFC CS0 18E2904	3.13e4	106.6	NO

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Name: 180603M2_63, Date: 04-Jun-2018, Time: 04:49:16, 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: 180603M2_64, Date: 04-Jun-2018, Time: 04:59:39, ID: 1800882-02RE1 731 0.12084, Description: 731

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800882-02RE1 731 0.12084	7.41e3	62.3	NO
2	2	13C5-PFHxA	1800882-02RE1 731 0.12084	1.11e4	62.9	NO
3	3	13C3-PFHxS	1800882-02RE1 731 0.12084	3.12e3	92.9	NO
4	4	13C8-PFOA	1800882-02RE1 731 0.12084	1.39e4	80.3	NO
5	5	13C9-PFNA	1800882-02RE1 731 0.12084	1.55e4	76.8	NO
6	6	13C4-PFOS	1800882-02RE1 731 0.12084	2.98e3	83.1	NO
7	7	13C6-PFDA	1800882-02RE1 731 0.12084	1.56e4	67.6	NO
8	8	13C7-PFUdA	1800882-02RE1 731 0.12084	2.14e4	72.9	NO

Name: 180603M2_65, Date: 04-Jun-2018, Time: 05:10:10, ID: 1800882-03RE1 781 0.11874, Description: 781

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800882-03RE1 781 0.11874	7.16e3	60.2	NO
2	2	13C5-PFHxA	1800882-03RE1 781 0.11874	1.06e4	60.2	NO
3	3	13C3-PFHxS	1800882-03RE1 781 0.11874	3.01e3	89.6	NO
4	4	13C8-PFOA	1800882-03RE1 781 0.11874	1.33e4	77.0	NO
5	5	13C9-PFNA	1800882-03RE1 781 0.11874	1.71e4	84.8	NO
6	6	13C4-PFOS	1800882-03RE1 781 0.11874	3.13e3	87.1	NO
7	7	13C6-PFDA	1800882-03RE1 781 0.11874	1.55e4	67.0	NO
8	8	13C7-PFUdA	1800882-03RE1 781 0.11874	1.90e4	64.7	NO

Name: 180603M2_66, Date: 04-Jun-2018, Time: 05:20:35, ID: 1800882-04RE1 702 0.11993, Description: 702

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800882-04RE1 702 0.11993	8.64e3	72.6	NO
2	2	13C5-PFHxA	1800882-04RE1 702 0.11993	1.33e4	75.1	NO
3	3	13C3-PFHxS	1800882-04RE1 702 0.11993	3.62e3	107.7	NO
4	4	13C8-PFOA	1800882-04RE1 702 0.11993	1.56e4	90.3	NO
5	5	13C9-PFNA	1800882-04RE1 702 0.11993	1.81e4	89.5	NO
6	6	13C4-PFOS	1800882-04RE1 702 0.11993	3.55e3	98.8	NO
7	7	13C6-PFDA	1800882-04RE1 702 0.11993	1.61e4	69.7	NO
8	8	13C7-PFUdA	1800882-04RE1 702 0.11993	2.29e4	78.0	NO

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Name: 180603M2_67, Date: 04-Jun-2018, Time: 05:31:05, ID: 1800882-05RE1 Trip Blank 0.12132, Description: Trip Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800882-05RE1 Trip Blank 0.12132	8.99e3	75.5	NO
2	2	13C5-PFHxA	1800882-05RE1 Trip Blank 0.12132	1.25e4	70.5	NO
3	3	13C3-PFHxS	1800882-05RE1 Trip Blank 0.12132	2.82e3	84.1	NO
4	4	13C8-PFOA	1800882-05RE1 Trip Blank 0.12132	1.45e4	84.0	NO
5	5	13C9-PFNA	1800882-05RE1 Trip Blank 0.12132	1.61e4	79.7	NO
6	6	13C4-PFOS	1800882-05RE1 Trip Blank 0.12132	2.90e3	80.9	NO
7	7	13C6-PFDA	1800882-05RE1 Trip Blank 0.12132	1.43e4	62.0	NO
8	8	13C7-PFUdA	1800882-05RE1 Trip Blank 0.12132	2.14e4	72.9	NO

Name: 180603M2_68, Date: 04-Jun-2018, Time: 05:41:30, ID: 1800882-06RE1 Trip Blank 0.12059, Description: Trip Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800882-06RE1 Trip Blank 0.12059	9.20e3	77.3	NO
2	2	13C5-PFHxA	1800882-06RE1 Trip Blank 0.12059	1.39e4	78.4	NO
3	3	13C3-PFHxS	1800882-06RE1 Trip Blank 0.12059	3.30e3	98.4	NO
4	4	13C8-PFOA	1800882-06RE1 Trip Blank 0.12059	1.50e4	87.2	NO
5	5	13C9-PFNA	1800882-06RE1 Trip Blank 0.12059	1.77e4	87.8	NO
6	6	13C4-PFOS	1800882-06RE1 Trip Blank 0.12059	3.19e3	88.8	NO
7	7	13C6-PFDA	1800882-06RE1 Trip Blank 0.12059	1.88e4	81.2	NO
8	8	13C7-PFUdA	1800882-06RE1 Trip Blank 0.12059	1.94e4	65.9	NO

Name: 180603M2_69, Date: 04-Jun-2018, Time: 05:52:00, ID: B8E0215-BS1 OPR 1, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0215-BS1 OPR 1	7.16e3	60.1	NO
2	2	13C5-PFHxA	B8E0215-BS1 OPR 1	1.13e4	64.1	NO
3	3	13C3-PFHxS	B8E0215-BS1 OPR 1	2.89e3	86.2	NO
4	4	13C8-PFOA	B8E0215-BS1 OPR 1	1.21e4	70.4	NO
5	5	13C9-PFNA	B8E0215-BS1 OPR 1	1.42e4	70.6	NO
6	6	13C4-PFOS	B8E0215-BS1 OPR 1	2.74e3	76.2	NO
7	7	13C6-PFDA	B8E0215-BS1 OPR 1	1.59e4	68.6	NO
8	8	13C7-PFUdA	B8E0215-BS1 OPR 1	2.00e4	68.1	NO

Name: 180603M2_70, Date: 04-Jun-2018, Time: 06:02:25, ID: B8E0215-BLK1 Method Blank 1, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0215-BLK1 Method Blank 1	6.27e3	52.7	NO
2	2	13C5-PFHxA	B8E0215-BLK1 Method Blank 1	9.59e3	54.2	NO
3	3	13C3-PFHxS	B8E0215-BLK1 Method Blank 1	2.33e3	69.5	NO
4	4	13C8-PFOA	B8E0215-BLK1 Method Blank 1	1.21e4	70.3	NO
5	5	13C9-PFNA	B8E0215-BLK1 Method Blank 1	1.37e4	68.1	NO
6	6	13C4-PFOS	B8E0215-BLK1 Method Blank 1	2.51e3	69.9	NO
7	7	13C6-PFDA	B8E0215-BLK1 Method Blank 1	1.10e4	47.5	YES
8	8	13C7-PFUdA	B8E0215-BLK1 Method Blank 1	1.64e4	55.8	NO

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Name: 180603M2_71, Date: 04-Jun-2018, Time: 06:12:55, ID: 1800935-05 CL1MC0100180509N 1.11, Description: CL1MC0100180509N

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800935-05 CL1MC0100180509N 1.11	7.99e3	67.1	NO
2	2	13C5-PFHxA	1800935-05 CL1MC0100180509N 1.11	1.15e4	65.1	NO
3	3	13C3-PFHxS	1800935-05 CL1MC0100180509N 1.11	2.56e3	76.4	NO
4	4	13C8-PFOA	1800935-05 CL1MC0100180509N 1.11	1.32e4	76.7	NO
5	5	13C9-PFNA	1800935-05 CL1MC0100180509N 1.11	1.56e4	77.2	NO
6	6	13C4-PFOS	1800935-05 CL1MC0100180509N 1.11	2.51e3	69.9	NO
7	7	13C6-PFDA	1800935-05 CL1MC0100180509N 1.11	1.32e4	57.2	NO
8	8	13C7-PFUdA	1800935-05 CL1MC0100180509N 1.11	1.89e4	64.3	NO

Name: 180603M2_72, Date: 04-Jun-2018, Time: 06:23:20, ID: B8E0212-BS1 OPR 5, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0212-BS1 OPR 5	1.09e4	91.7	NO
2	2	13C5-PFHxA	B8E0212-BS1 OPR 5	1.64e4	93.0	NO
3	3	13C3-PFHxS	B8E0212-BS1 OPR 5	3.64e3	108.5	NO
4	4	13C8-PFOA	B8E0212-BS1 OPR 5	1.70e4	98.6	NO
5	5	13C9-PFNA	B8E0212-BS1 OPR 5	1.82e4	90.4	NO
6	6	13C4-PFOS	B8E0212-BS1 OPR 5	3.85e3	107.3	NO
7	7	13C6-PFDA	B8E0212-BS1 OPR 5	1.85e4	79.8	NO
8	8	13C7-PFUdA	B8E0212-BS1 OPR 5	2.63e4	89.7	NO

Name: 180603M2_73, Date: 04-Jun-2018, Time: 06:33:50, ID: B8E0212-BLK1 Method Blank 5, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0212-BLK1 Method Blank 5	9.18e3	77.2	NO
2	2	13C5-PFHxA	B8E0212-BLK1 Method Blank 5	1.35e4	76.1	NO
3	3	13C3-PFHxS	B8E0212-BLK1 Method Blank 5	3.02e3	90.1	NO
4	4	13C8-PFOA	B8E0212-BLK1 Method Blank 5	1.55e4	89.6	NO
5	5	13C9-PFNA	B8E0212-BLK1 Method Blank 5	1.65e4	81.7	NO
6	6	13C4-PFOS	B8E0212-BLK1 Method Blank 5	2.85e3	79.5	NO
7	7	13C6-PFDA	B8E0212-BLK1 Method Blank 5	1.78e4	77.0	NO
8	8	13C7-PFUdA	B8E0212-BLK1 Method Blank 5	2.21e4	75.3	NO

Name: 180603M2_74, Date: 04-Jun-2018, Time: 06:44:15, ID: 1801036-01 Milk 5, Description: Milk

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801036-01 Milk 5	8.82e3	74.1	NO
2	2	13C5-PFHxA	1801036-01 Milk 5	1.31e4	74.0	NO
3	3	13C3-PFHxS	1801036-01 Milk 5	2.83e3	84.5	NO
4	4	13C8-PFOA	1801036-01 Milk 5	1.52e4	87.8	NO
5	5	13C9-PFNA	1801036-01 Milk 5	1.89e4	93.7	NO
6	6	13C4-PFOS	1801036-01 Milk 5	3.02e3	84.1	NO
7	7	13C6-PFDA	1801036-01 Milk 5	1.92e4	83.1	NO
8	8	13C7-PFUdA	1801036-01 Milk 5	1.80e4	61.4	NO

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Name: 180603M2_75, Date: 04-Jun-2018, Time: 06:54:46, ID: B8E0173-BS1 OPR 0.25, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0173-BS1 OPR 0.25	9.47e3	79.5	NO
2	2	13C5-PFHxA	B8E0173-BS1 OPR 0.25	1.46e4	82.7	NO
3	3	13C3-PFHxS	B8E0173-BS1 OPR 0.25	3.16e3	94.1	NO
4	4	13C8-PFOA	B8E0173-BS1 OPR 0.25	1.49e4	86.2	NO
5	5	13C9-PFNA	B8E0173-BS1 OPR 0.25	1.79e4	88.7	NO
6	6	13C4-PFOS	B8E0173-BS1 OPR 0.25	3.14e3	87.5	NO
7	7	13C6-PFDA	B8E0173-BS1 OPR 0.25	1.98e4	85.7	NO
8	8	13C7-PFUdA	B8E0173-BS1 OPR 0.25	2.34e4	79.7	NO

Name: 180603M2_76, Date: 04-Jun-2018, Time: 07:05:11, ID: B8E0173-BLK1 Method Blank 0.25, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0173-BLK1 Method Blank 0.25	9.45e3	79.4	NO
2	2	13C5-PFHxA	B8E0173-BLK1 Method Blank 0.25	1.40e4	79.4	NO
3	3	13C3-PFHxS	B8E0173-BLK1 Method Blank 0.25	3.03e3	90.3	NO
4	4	13C8-PFOA	B8E0173-BLK1 Method Blank 0.25	1.44e4	83.3	NO
5	5	13C9-PFNA	B8E0173-BLK1 Method Blank 0.25	1.79e4	88.7	NO
6	6	13C4-PFOS	B8E0173-BLK1 Method Blank 0.25	3.19e3	89.0	NO
7	7	13C6-PFDA	B8E0173-BLK1 Method Blank 0.25	1.36e4	58.9	NO
8	8	13C7-PFUdA	B8E0173-BLK1 Method Blank 0.25	2.26e4	77.0	NO

Name: 180603M2_77, Date: 04-Jun-2018, Time: 07:15:41, ID: 1800999-01 DPH-MW10 0.11774, Description: DPH-MW10

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800999-01 DPH-MW10 0.11774	8.94e3	75.1	NO
2	2	13C5-PFHxA	1800999-01 DPH-MW10 0.11774	1.38e4	78.0	NO
3	3	13C3-PFHxS	1800999-01 DPH-MW10 0.11774	3.45e3	102.9	NO
4	4	13C8-PFOA	1800999-01 DPH-MW10 0.11774	1.33e4	77.2	NO
5	5	13C9-PFNA	1800999-01 DPH-MW10 0.11774	1.75e4	87.0	NO
6	6	13C4-PFOS	1800999-01 DPH-MW10 0.11774	3.67e3	102.3	NO
7	7	13C6-PFDA	1800999-01 DPH-MW10 0.11774	1.62e4	69.9	NO
8	8	13C7-PFUdA	1800999-01 DPH-MW10 0.11774	2.01e4	68.4	NO

Name: 180603M2_78, Date: 04-Jun-2018, Time: 07:26:05, ID: 1800999-02 DPH-MW19 0.12462, Description: DPH-MW19

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800999-02 DPH-MW19 0.12462	9.72e3	81.7	NO
2	2	13C5-PFHxA	1800999-02 DPH-MW19 0.12462	1.54e4	87.3	NO
3	3	13C3-PFHxS	1800999-02 DPH-MW19 0.12462	3.67e3	109.4	NO
4	4	13C8-PFOA	1800999-02 DPH-MW19 0.12462	1.69e4	98.2	NO
5	5	13C9-PFNA	1800999-02 DPH-MW19 0.12462	1.90e4	94.4	NO
6	6	13C4-PFOS	1800999-02 DPH-MW19 0.12462	3.49e3	97.1	NO
7	7	13C6-PFDA	1800999-02 DPH-MW19 0.12462	2.07e4	89.4	NO
8	8	13C7-PFUdA	1800999-02 DPH-MW19 0.12462	2.35e4	80.1	NO

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Name: 180603M2_79, Date: 04-Jun-2018, Time: 07:36:36, ID: 1800999-03 DPH-MW23 0.1216, Description: DPH-MW23

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800999-03 DPH-MW23 0.1216	7.99e3	67.2	NO
2	2	13C5-PFHxA	1800999-03 DPH-MW23 0.1216	1.23e4	69.8	NO
3	3	13C3-PFHxS	1800999-03 DPH-MW23 0.1216	3.34e3	99.4	NO
4	4	13C8-PFOA	1800999-03 DPH-MW23 0.1216	1.38e4	79.8	NO
5	5	13C9-PFNA	1800999-03 DPH-MW23 0.1216	1.59e4	78.7	NO
6	6	13C4-PFOS	1800999-03 DPH-MW23 0.1216	3.38e3	94.0	NO
7	7	13C6-PFDA	1800999-03 DPH-MW23 0.1216	1.69e4	73.0	NO
8	8	13C7-PFUdA	1800999-03 DPH-MW23 0.1216	1.86e4	63.2	NO

Name: 180603M2_80, Date: 04-Jun-2018, Time: 07:47:01, 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: 180603M2_81, Date: 04-Jun-2018, Time: 07:57:31, ID: ST180603M2-15 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-15 PFC CS3 18E2907	1.45e4	121.9	NO
2	2	13C5-PFHxA	ST180603M2-15 PFC CS3 18E2907	2.20e4	124.2	NO
3	3	13C3-PFHxS	ST180603M2-15 PFC CS3 18E2907	4.46e3	132.9	NO
4	4	13C8-PFOA	ST180603M2-15 PFC CS3 18E2907	2.25e4	130.6	NO
5	5	13C9-PFNA	ST180603M2-15 PFC CS3 18E2907	2.60e4	128.9	NO
6	6	13C4-PFOS	ST180603M2-15 PFC CS3 18E2907	4.28e3	119.1	NO
7	7	13C6-PFDA	ST180603M2-15 PFC CS3 18E2907	2.56e4	110.8	NO
8	8	13C7-PFUdA	ST180603M2-15 PFC CS3 18E2907	3.38e4	115.1	NO

Name: 180603M2_82, Date: 04-Jun-2018, Time: 08:07:56, 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: 180603M2_83, Date: 04-Jun-2018, Time: 08:18:27, ID: 1800837-12 REEPDW409FRB 0.12029, Description: REEPDW409FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800837-12 REEPDW409FRB 0.12029	9.82e3	82.5	NO
2	2	13C5-PFHxA	1800837-12 REEPDW409FRB 0.12029	1.47e4	82.9	NO
3	3	13C3-PFHxS	1800837-12 REEPDW409FRB 0.12029	3.06e3	91.1	NO
4	4	13C8-PFOA	1800837-12 REEPDW409FRB 0.12029	1.66e4	96.4	NO
5	5	13C9-PFNA	1800837-12 REEPDW409FRB 0.12029	1.83e4	90.9	NO
6	6	13C4-PFOS	1800837-12 REEPDW409FRB 0.12029	3.29e3	91.6	NO
7	7	13C6-PFDA	1800837-12 REEPDW409FRB 0.12029	1.93e4	83.2	NO
8	8	13C7-PFUdA	1800837-12 REEPDW409FRB 0.12029	2.60e4	88.6	NO

Name: 180603M2_84, Date: 04-Jun-2018, Time: 08:28:51, ID: B8E0169-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0169-BS1 OPR 0.125	1.03e4	86.6	NO
2	2	13C5-PFHxA	B8E0169-BS1 OPR 0.125	1.65e4	93.2	NO
3	3	13C3-PFHxS	B8E0169-BS1 OPR 0.125	3.82e3	114.0	NO
4	4	13C8-PFOA	B8E0169-BS1 OPR 0.125	1.78e4	102.9	NO
5	5	13C9-PFNA	B8E0169-BS1 OPR 0.125	2.03e4	100.5	NO
6	6	13C4-PFOS	B8E0169-BS1 OPR 0.125	3.60e3	100.2	NO
7	7	13C6-PFDA	B8E0169-BS1 OPR 0.125	1.84e4	79.5	NO
8	8	13C7-PFUdA	B8E0169-BS1 OPR 0.125	2.65e4	90.3	NO

Name: 180603M2_85, Date: 04-Jun-2018, Time: 08:39:22, ID: B8E0169-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0169-BSD1 LCSD 0.125	1.34e4	112.9	NO
2	2	13C5-PFHxA	B8E0169-BSD1 LCSD 0.125	2.03e4	114.8	NO
3	3	13C3-PFHxS	B8E0169-BSD1 LCSD 0.125	4.72e3	140.6	NO
4	4	13C8-PFOA	B8E0169-BSD1 LCSD 0.125	2.33e4	135.0	NO
5	5	13C9-PFNA	B8E0169-BSD1 LCSD 0.125	2.47e4	122.6	NO
6	6	13C4-PFOS	B8E0169-BSD1 LCSD 0.125	5.06e3	140.8	NO
7	7	13C6-PFDA	B8E0169-BSD1 LCSD 0.125	2.64e4	114.0	NO
8	8	13C7-PFUdA	B8E0169-BSD1 LCSD 0.125	3.42e4	116.5	NO

Name: 180603M2_86, Date: 04-Jun-2018, Time: 08:49:47, ID: B8E0169-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0169-BLK1 Method Blank 0.125	1.43e4	120.2	NO
2	2	13C5-PFHxA	B8E0169-BLK1 Method Blank 0.125	2.04e4	115.5	NO
3	3	13C3-PFHxS	B8E0169-BLK1 Method Blank 0.125	4.59e3	136.9	NO
4	4	13C8-PFOA	B8E0169-BLK1 Method Blank 0.125	2.36e4	136.5	NO
5	5	13C9-PFNA	B8E0169-BLK1 Method Blank 0.125	2.81e4	139.3	NO
6	6	13C4-PFOS	B8E0169-BLK1 Method Blank 0.125	4.96e3	138.2	NO
7	7	13C6-PFDA	B8E0169-BLK1 Method Blank 0.125	2.99e4	129.2	NO
8	8	13C7-PFUdA	B8E0169-BLK1 Method Blank 0.125	3.51e4	119.3	NO

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Name: 180603M2_87, Date: 04-Jun-2018, Time: 09:00:17, ID: 1800954-01 REEPDW499 0.12056, Description: REEPDW499

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-01 REEPDW499 0.12056	8.71e3	73.2	NO
2	2	13C5-PFHxA	1800954-01 REEPDW499 0.12056	1.33e4	75.0	NO
3	3	13C3-PFHxS	1800954-01 REEPDW499 0.12056	3.69e3	110.0	NO
4	4	13C8-PFOA	1800954-01 REEPDW499 0.12056	1.45e4	84.2	NO
5	5	13C9-PFNA	1800954-01 REEPDW499 0.12056	1.40e4	69.4	NO
6	6	13C4-PFOS	1800954-01 REEPDW499 0.12056	4.12e3	114.7	NO
7	7	13C6-PFDA	1800954-01 REEPDW499 0.12056	1.78e4	77.1	NO
8	8	13C7-PFUdA	1800954-01 REEPDW499 0.12056	2.56e4	87.2	NO

Name: 180603M2_88, Date: 04-Jun-2018, Time: 09:10:47, ID: 1800954-02 REEPDW1007 0.11869, Description: REEPDW1007

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-02 REEPDW1007 0.11869	1.11e4	93.6	NO
2	2	13C5-PFHxA	1800954-02 REEPDW1007 0.11869	1.58e4	89.3	NO
3	3	13C3-PFHxS	1800954-02 REEPDW1007 0.11869	3.77e3	112.3	NO
4	4	13C8-PFOA	1800954-02 REEPDW1007 0.11869	1.67e4	96.9	NO
5	5	13C9-PFNA	1800954-02 REEPDW1007 0.11869	1.99e4	98.6	NO
6	6	13C4-PFOS	1800954-02 REEPDW1007 0.11869	4.37e3	121.7	NO
7	7	13C6-PFDA	1800954-02 REEPDW1007 0.11869	1.94e4	83.8	NO
8	8	13C7-PFUdA	1800954-02 REEPDW1007 0.11869	2.89e4	98.5	NO

Name: 180603M2_89, Date: 04-Jun-2018, Time: 09:21:11, ID: 1800954-03 REEPDW1008 0.11591, Description: REEPDW1008

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-03 REEPDW1008 0.11591	1.16e4	97.7	NO
2	2	13C5-PFHxA	1800954-03 REEPDW1008 0.11591	1.70e4	96.0	NO
3	3	13C3-PFHxS	1800954-03 REEPDW1008 0.11591	4.44e3	132.3	NO
4	4	13C8-PFOA	1800954-03 REEPDW1008 0.11591	1.78e4	103.0	NO
5	5	13C9-PFNA	1800954-03 REEPDW1008 0.11591	1.69e4	83.9	NO
6	6	13C4-PFOS	1800954-03 REEPDW1008 0.11591	4.00e3	111.4	NO
7	7	13C6-PFDA	1800954-03 REEPDW1008 0.11591	1.97e4	85.2	NO
8	8	13C7-PFUdA	1800954-03 REEPDW1008 0.11591	2.77e4	94.4	NO

Name: 180603M2_90, Date: 04-Jun-2018, Time: 09:31:42, ID: 1800954-04 REEPDW1009 0.11871, Description: REEPDW1009

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-04 REEPDW1009 0.11871	8.54e3	71.8	NO
2	2	13C5-PFHxA	1800954-04 REEPDW1009 0.11871	1.28e4	72.3	NO
3	3	13C3-PFHxS	1800954-04 REEPDW1009 0.11871	3.08e3	91.7	NO
4	4	13C8-PFOA	1800954-04 REEPDW1009 0.11871	1.19e4	69.0	NO
5	5	13C9-PFNA	1800954-04 REEPDW1009 0.11871	1.52e4	75.5	NO
6	6	13C4-PFOS	1800954-04 REEPDW1009 0.11871	3.19e3	88.9	NO
7	7	13C6-PFDA	1800954-04 REEPDW1009 0.11871	1.48e4	64.0	NO
8	8	13C7-PFUdA	1800954-04 REEPDW1009 0.11871	1.99e4	67.8	NO

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Name: 180603M2_91, Date: 04-Jun-2018, Time: 09:42:06, ID: 1800954-05 REEPDW1010 0.1202, Description: REEPDW1010

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-05 REEPDW1010 0.1202	7.56e3	63.5	NO
2	2	13C5-PFHxA	1800954-05 REEPDW1010 0.1202	1.11e4	62.7	NO
3	3	13C3-PFHxS	1800954-05 REEPDW1010 0.1202	3.31e3	98.7	NO
4	4	13C8-PFOA	1800954-05 REEPDW1010 0.1202	1.11e4	64.1	NO
5	5	13C9-PFNA	1800954-05 REEPDW1010 0.1202	1.36e4	67.6	NO
6	6	13C4-PFOS	1800954-05 REEPDW1010 0.1202	3.50e3	97.6	NO
7	7	13C6-PFDA	1800954-05 REEPDW1010 0.1202	1.54e4	66.5	NO
8	8	13C7-PFUdA	1800954-05 REEPDW1010 0.1202	2.01e4	68.3	NO

Name: 180603M2_92, Date: 04-Jun-2018, Time: 09:52:36, ID: 1800954-06 REEPDW550 0.11863, Description: REEPDW550

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-06 REEPDW550 0.11863	1.13e4	94.6	NO
2	2	13C5-PFHxA	1800954-06 REEPDW550 0.11863	1.70e4	96.4	NO
3	3	13C3-PFHxS	1800954-06 REEPDW550 0.11863	4.49e3	133.8	NO
4	4	13C8-PFOA	1800954-06 REEPDW550 0.11863	1.81e4	104.7	NO
5	5	13C9-PFNA	1800954-06 REEPDW550 0.11863	2.17e4	107.5	NO
6	6	13C4-PFOS	1800954-06 REEPDW550 0.11863	4.65e3	129.4	NO
7	7	13C6-PFDA	1800954-06 REEPDW550 0.11863	2.03e4	87.7	NO
8	8	13C7-PFUdA	1800954-06 REEPDW550 0.11863	3.43e4	116.7	NO

Name: 180603M2_93, Date: 04-Jun-2018, Time: 10:03:01, ID: 1800954-07 REEPDW1011 0.11919, Description: REEPDW1011

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-07 REEPDW1011 0.11919	1.06e4	89.2	NO
2	2	13C5-PFHxA	1800954-07 REEPDW1011 0.11919	1.50e4	85.1	NO
3	3	13C3-PFHxS	1800954-07 REEPDW1011 0.11919	3.88e3	115.7	NO
4	4	13C8-PFOA	1800954-07 REEPDW1011 0.11919	1.62e4	93.6	NO
5	5	13C9-PFNA	1800954-07 REEPDW1011 0.11919	1.85e4	91.7	NO
6	6	13C4-PFOS	1800954-07 REEPDW1011 0.11919	4.00e3	111.3	NO
7	7	13C6-PFDA	1800954-07 REEPDW1011 0.11919	2.11e4	91.2	NO
8	8	13C7-PFUdA	1800954-07 REEPDW1011 0.11919	2.59e4	88.3	NO

Name: 180603M2_94, Date: 04-Jun-2018, Time: 10:13:31, ID: 1800954-08 REEPDW1012 0.11288, Description: REEPDW1012

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-08 REEPDW1012 0.11288	7.48e3	62.8	NO
2	2	13C5-PFHxA	1800954-08 REEPDW1012 0.11288	1.04e4	58.8	NO
3	3	13C3-PFHxS	1800954-08 REEPDW1012 0.11288	3.10e3	92.3	NO
4	4	13C8-PFOA	1800954-08 REEPDW1012 0.11288	1.12e4	65.1	NO
5	5	13C9-PFNA	1800954-08 REEPDW1012 0.11288	1.28e4	63.4	NO
6	6	13C4-PFOS	1800954-08 REEPDW1012 0.11288	3.18e3	88.4	NO
7	7	13C6-PFDA	1800954-08 REEPDW1012 0.11288	1.43e4	61.7	NO
8	8	13C7-PFUdA	1800954-08 REEPDW1012 0.11288	1.67e4	56.7	NO

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Name: 180603M2_95, Date: 04-Jun-2018, Time: 10:23:57, ID: 1800954-09 REEPDW1001 0.12106, Description: REEPDW1001

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-09 REEPDW1001 0.12106	7.78e3	65.3	NO
2	2	13C5-PFHxA	1800954-09 REEPDW1001 0.12106	1.12e4	63.3	NO
3	3	13C3-PFHxS	1800954-09 REEPDW1001 0.12106	3.11e3	92.6	NO
4	4	13C8-PFOA	1800954-09 REEPDW1001 0.12106	1.11e4	64.5	NO
5	5	13C9-PFNA	1800954-09 REEPDW1001 0.12106	1.42e4	70.5	NO
6	6	13C4-PFOS	1800954-09 REEPDW1001 0.12106	3.26e3	90.9	NO
7	7	13C6-PFDA	1800954-09 REEPDW1001 0.12106	1.59e4	68.8	NO
8	8	13C7-PFUdA	1800954-09 REEPDW1001 0.12106	1.89e4	64.4	NO

Name: 180603M2_96, Date: 04-Jun-2018, Time: 10:34:27, ID: 1800954-10 REEPDW1003 0.11189, Description: REEPDW1003

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-10 REEPDW1003 0.11189	6.38e3	53.6	NO
2	2	13C5-PFHxA	1800954-10 REEPDW1003 0.11189	9.04e3	51.1	NO
3	3	13C3-PFHxS	1800954-10 REEPDW1003 0.11189	2.81e3	83.8	NO
4	4	13C8-PFOA	1800954-10 REEPDW1003 0.11189	8.27e3	47.9	YES
5	5	13C9-PFNA	1800954-10 REEPDW1003 0.11189	1.09e4	53.8	NO
6	6	13C4-PFOS	1800954-10 REEPDW1003 0.11189	2.95e3	82.1	NO
7	7	13C6-PFDA	1800954-10 REEPDW1003 0.11189	1.14e4	49.1	YES
8	8	13C7-PFUdA	1800954-10 REEPDW1003 0.11189	1.45e4	49.5	YES

Name: 180603M2_97, Date: 04-Jun-2018, Time: 10:44:52, 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: 180603M2_98, Date: 04-Jun-2018, Time: 10:55:22, ID: ST180603M2-16 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-16 PFC CS3 18E2907	1.60e4	134.8	NO
2	2	13C5-PFHxA	ST180603M2-16 PFC CS3 18E2907	2.12e4	119.9	NO
3	3	13C3-PFHxS	ST180603M2-16 PFC CS3 18E2907	4.61e3	137.5	NO
4	4	13C8-PFOA	ST180603M2-16 PFC CS3 18E2907	2.18e4	126.3	NO
5	5	13C9-PFNA	ST180603M2-16 PFC CS3 18E2907	2.81e4	139.4	NO
6	6	13C4-PFOS	ST180603M2-16 PFC CS3 18E2907	4.51e3	125.7	NO
7	7	13C6-PFDA	ST180603M2-16 PFC CS3 18E2907	2.75e4	119.1	NO
8	8	13C7-PFUdA	ST180603M2-16 PFC CS3 18E2907	3.41e4	116.2	NO

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Name: 180603M2_99, Date: 04-Jun-2018, Time: 11:05:53, 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: 180603M2_100, Date: 04-Jun-2018, Time: 11:16:18, ID: 1800954-11 REEPDW1004 0.11763, Description: REEPDW1004

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-11 REEPDW1004 0.11763	1.03e4	86.8	NO
2	2	13C5-PFHxA	1800954-11 REEPDW1004 0.11763	1.51e4	85.1	NO
3	3	13C3-PFHxS	1800954-11 REEPDW1004 0.11763	3.96e3	118.1	NO
4	4	13C8-PFOA	1800954-11 REEPDW1004 0.11763	1.72e4	99.6	NO
5	5	13C9-PFNA	1800954-11 REEPDW1004 0.11763	1.99e4	98.5	NO
6	6	13C4-PFOS	1800954-11 REEPDW1004 0.11763	4.36e3	121.3	NO
7	7	13C6-PFDA	1800954-11 REEPDW1004 0.11763	1.98e4	85.5	NO
8	8	13C7-PFUdA	1800954-11 REEPDW1004 0.11763	2.67e4	90.8	NO

Name: 180603M2_101, Date: 04-Jun-2018, Time: 11:26:48, ID: 1800954-12 REEPDW1006 0.11887, Description: REEPDW1006

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-12 REEPDW1006 0.11887	1.04e4	87.8	NO
2	2	13C5-PFHxA	1800954-12 REEPDW1006 0.11887	1.50e4	84.7	NO
3	3	13C3-PFHxS	1800954-12 REEPDW1006 0.11887	3.60e3	107.4	NO
4	4	13C8-PFOA	1800954-12 REEPDW1006 0.11887	1.51e4	87.6	NO
5	5	13C9-PFNA	1800954-12 REEPDW1006 0.11887	1.79e4	88.9	NO
6	6	13C4-PFOS	1800954-12 REEPDW1006 0.11887	3.61e3	100.7	NO
7	7	13C6-PFDA	1800954-12 REEPDW1006 0.11887	1.87e4	80.8	NO
8	8	13C7-PFUdA	1800954-12 REEPDW1006 0.11887	2.24e4	76.2	NO

Name: 180603M2_102, Date: 04-Jun-2018, Time: 11:37:13, ID: 1800954-13 REEPDW1013 0.11579, Description: REEPDW1013

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-13 REEPDW1013 0.11579	1.06e4	89.4	NO
2	2	13C5-PFHxA	1800954-13 REEPDW1013 0.11579	1.48e4	83.7	NO
3	3	13C3-PFHxS	1800954-13 REEPDW1013 0.11579	3.57e3	106.2	NO
4	4	13C8-PFOA	1800954-13 REEPDW1013 0.11579	1.55e4	89.8	NO
5	5	13C9-PFNA	1800954-13 REEPDW1013 0.11579	1.90e4	94.3	NO
6	6	13C4-PFOS	1800954-13 REEPDW1013 0.11579	3.66e3	101.9	NO
7	7	13C6-PFDA	1800954-13 REEPDW1013 0.11579	1.81e4	78.1	NO
8	8	13C7-PFUdA	1800954-13 REEPDW1013 0.11579	2.26e4	76.8	NO

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Name: 180603M2_103, Date: 04-Jun-2018, Time: 11:47:43, ID: 1800954-14 REEPDW1014 0.11881, Description: REEPDW1014

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-14 REEPDW1014 0.11881	9.22e3	77.5	NO
2	2	13C5-PFHxA	1800954-14 REEPDW1014 0.11881	1.25e4	70.9	NO
3	3	13C3-PFHxS	1800954-14 REEPDW1014 0.11881	3.45e3	102.7	NO
4	4	13C8-PFOA	1800954-14 REEPDW1014 0.11881	1.28e4	74.4	NO
5	5	13C9-PFNA	1800954-14 REEPDW1014 0.11881	1.43e4	71.0	NO
6	6	13C4-PFOS	1800954-14 REEPDW1014 0.11881	3.71e3	103.4	NO
7	7	13C6-PFDA	1800954-14 REEPDW1014 0.11881	1.58e4	68.3	NO
8	8	13C7-PFUdA	1800954-14 REEPDW1014 0.11881	2.10e4	71.4	NO

Name: 180603M2_104, Date: 04-Jun-2018, Time: 11:58:08, ID: 1800954-15 REEPDW1002 0.12307, Description: REEPDW1002

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-15 REEPDW1002 0.12307	1.04e4	87.1	NO
2	2	13C5-PFHxA	1800954-15 REEPDW1002 0.12307	1.45e4	82.1	NO
3	3	13C3-PFHxS	1800954-15 REEPDW1002 0.12307	3.24e3	96.5	NO
4	4	13C8-PFOA	1800954-15 REEPDW1002 0.12307	1.47e4	85.4	NO
5	5	13C9-PFNA	1800954-15 REEPDW1002 0.12307	1.79e4	88.6	NO
6	6	13C4-PFOS	1800954-15 REEPDW1002 0.12307	3.27e3	91.0	NO
7	7	13C6-PFDA	1800954-15 REEPDW1002 0.12307	1.90e4	81.9	NO
8	8	13C7-PFUdA	1800954-15 REEPDW1002 0.12307	2.14e4	72.8	NO

Name: 180603M2_105, Date: 04-Jun-2018, Time: 12:08:38, ID: 1800954-16 REEPDW1005 0.12281, Description: REEPDW1005

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800954-16 REEPDW1005 0.12281	7.83e3	65.8	NO
2	2	13C5-PFHxA	1800954-16 REEPDW1005 0.12281	1.21e4	68.6	NO
3	3	13C3-PFHxS	1800954-16 REEPDW1005 0.12281	2.98e3	88.8	NO
4	4	13C8-PFOA	1800954-16 REEPDW1005 0.12281	1.02e4	58.9	NO
5	5	13C9-PFNA	1800954-16 REEPDW1005 0.12281	1.37e4	68.0	NO
6	6	13C4-PFOS	1800954-16 REEPDW1005 0.12281	3.15e3	87.8	NO
7	7	13C6-PFDA	1800954-16 REEPDW1005 0.12281	1.56e4	67.4	NO
8	8	13C7-PFUdA	1800954-16 REEPDW1005 0.12281	1.96e4	66.8	NO

Name: 180603M2_106, Date: 04-Jun-2018, Time: 12:19:02, ID: B8E0167-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0167-BS1 OPR 0.125	1.02e4	85.9	NO
2	2	13C5-PFHxA	B8E0167-BS1 OPR 0.125	1.50e4	84.9	NO
3	3	13C3-PFHxS	B8E0167-BS1 OPR 0.125	3.57e3	106.3	NO
4	4	13C8-PFOA	B8E0167-BS1 OPR 0.125	1.66e4	96.0	NO
5	5	13C9-PFNA	B8E0167-BS1 OPR 0.125	2.10e4	104.3	NO
6	6	13C4-PFOS	B8E0167-BS1 OPR 0.125	3.60e3	100.3	NO
7	7	13C6-PFDA	B8E0167-BS1 OPR 0.125	1.96e4	84.9	NO
8	8	13C7-PFUdA	B8E0167-BS1 OPR 0.125	2.53e4	86.0	NO

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Name: 180603M2_107, Date: 04-Jun-2018, Time: 12:29:32, ID: B8E0167-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0167-BSD1 LCSD 0.125	8.17e3	68.7	NO
2	2	13C5-PFHxA	B8E0167-BSD1 LCSD 0.125	1.29e4	73.0	NO
3	3	13C3-PFHxS	B8E0167-BSD1 LCSD 0.125	3.02e3	90.1	NO
4	4	13C8-PFOA	B8E0167-BSD1 LCSD 0.125	1.27e4	73.3	NO
5	5	13C9-PFNA	B8E0167-BSD1 LCSD 0.125	1.47e4	72.8	NO
6	6	13C4-PFOS	B8E0167-BSD1 LCSD 0.125	3.01e3	83.8	NO
7	7	13C6-PFDA	B8E0167-BSD1 LCSD 0.125	1.70e4	73.5	NO
8	8	13C7-PFUdA	B8E0167-BSD1 LCSD 0.125	2.17e4	73.8	NO

Name: 180603M2_108, Date: 04-Jun-2018, Time: 12:39:56, ID: B8E0167-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0167-BLK1 Method Blank 0.125	9.62e3	80.9	NO
2	2	13C5-PFHxA	B8E0167-BLK1 Method Blank 0.125	1.38e4	77.9	NO
3	3	13C3-PFHxS	B8E0167-BLK1 Method Blank 0.125	3.10e3	92.3	NO
4	4	13C8-PFOA	B8E0167-BLK1 Method Blank 0.125	1.50e4	86.7	NO
5	5	13C9-PFNA	B8E0167-BLK1 Method Blank 0.125	1.87e4	92.6	NO
6	6	13C4-PFOS	B8E0167-BLK1 Method Blank 0.125	3.34e3	93.1	NO
7	7	13C6-PFDA	B8E0167-BLK1 Method Blank 0.125	1.89e4	81.7	NO
8	8	13C7-PFUdA	B8E0167-BLK1 Method Blank 0.125	2.27e4	77.4	NO

Name: 180603M2_109, Date: 04-Jun-2018, Time: 12:50:27, ID: 1800982-01 REEPDW1037 0.11872, Description: REEPDW1037

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-01 REEPDW1037 0.11872	8.54e3	71.7	NO
2	2	13C5-PFHxA	1800982-01 REEPDW1037 0.11872	1.27e4	71.6	NO
3	3	13C3-PFHxS	1800982-01 REEPDW1037 0.11872	2.92e3	87.1	NO
4	4	13C8-PFOA	1800982-01 REEPDW1037 0.11872	1.27e4	73.4	NO
5	5	13C9-PFNA	1800982-01 REEPDW1037 0.11872	1.56e4	77.4	NO
6	6	13C4-PFOS	1800982-01 REEPDW1037 0.11872	2.97e3	82.6	NO
7	7	13C6-PFDA	1800982-01 REEPDW1037 0.11872	1.69e4	72.9	NO
8	8	13C7-PFUdA	1800982-01 REEPDW1037 0.11872	1.89e4	64.3	NO

Name: 180603M2_110, Date: 04-Jun-2018, Time: 13:00:57, ID: 1800982-02 REEPDW1048 0.12739, Description: REEPDW1048

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-02 REEPDW1048 0.12739	1.02e4	85.7	NO
2	2	13C5-PFHxA	1800982-02 REEPDW1048 0.12739	1.46e4	82.5	NO
3	3	13C3-PFHxS	1800982-02 REEPDW1048 0.12739	3.71e3	110.6	NO
4	4	13C8-PFOA	1800982-02 REEPDW1048 0.12739	1.63e4	94.3	NO
5	5	13C9-PFNA	1800982-02 REEPDW1048 0.12739	2.13e4	105.6	NO
6	6	13C4-PFOS	1800982-02 REEPDW1048 0.12739	3.93e3	109.5	NO
7	7	13C6-PFDA	1800982-02 REEPDW1048 0.12739	1.76e4	76.1	NO
8	8	13C7-PFUdA	1800982-02 REEPDW1048 0.12739	2.85e4	97.0	NO

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Name: 180603M2_111, Date: 04-Jun-2018, Time: 13:11:23, ID: 1800982-03 REEPDW1049 0.12389, Description: REEPDW1049

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-03 REEPDW1049 0.12389	9.88e3	83.0	NO
2	2	13C5-PFHxA	1800982-03 REEPDW1049 0.12389	1.46e4	82.4	NO
3	3	13C3-PFHxS	1800982-03 REEPDW1049 0.12389	3.81e3	113.6	NO
4	4	13C8-PFOA	1800982-03 REEPDW1049 0.12389	1.50e4	86.7	NO
5	5	13C9-PFNA	1800982-03 REEPDW1049 0.12389	1.81e4	89.8	NO
6	6	13C4-PFOS	1800982-03 REEPDW1049 0.12389	3.91e3	109.0	NO
7	7	13C6-PFDA	1800982-03 REEPDW1049 0.12389	2.00e4	86.6	NO
8	8	13C7-PFUdA	1800982-03 REEPDW1049 0.12389	2.48e4	84.4	NO

Name: 180603M2_112, Date: 04-Jun-2018, Time: 13:21:53, ID: 1800982-04 REEPDW1050 0.12048, Description: REEPDW1050

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-04 REEPDW1050 0.12048	9.03e3	75.9	NO
2	2	13C5-PFHxA	1800982-04 REEPDW1050 0.12048	1.47e4	83.2	NO
3	3	13C3-PFHxS	1800982-04 REEPDW1050 0.12048	3.29e3	98.2	NO
4	4	13C8-PFOA	1800982-04 REEPDW1050 0.12048	1.51e4	87.2	NO
5	5	13C9-PFNA	1800982-04 REEPDW1050 0.12048	1.72e4	85.2	NO
6	6	13C4-PFOS	1800982-04 REEPDW1050 0.12048	3.17e3	88.2	NO
7	7	13C6-PFDA	1800982-04 REEPDW1050 0.12048	1.93e4	83.3	NO
8	8	13C7-PFUdA	1800982-04 REEPDW1050 0.12048	2.46e4	83.7	NO

Name: 180603M2_113, Date: 04-Jun-2018, Time: 13:32:17, 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: 180603M2_114, Date: 04-Jun-2018, Time: 13:42:48, ID: ST180603M2-17 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-17 PFC CS3 18E2907	1.66e4	139.7	NO
2	2	13C5-PFHxA	ST180603M2-17 PFC CS3 18E2907	2.36e4	133.6	NO
3	3	13C3-PFHxS	ST180603M2-17 PFC CS3 18E2907	4.58e3	136.4	NO
4	4	13C8-PFOA	ST180603M2-17 PFC CS3 18E2907	2.41e4	139.8	NO
5	5	13C9-PFNA	ST180603M2-17 PFC CS3 18E2907	2.99e4	147.9	NO
6	6	13C4-PFOS	ST180603M2-17 PFC CS3 18E2907	4.82e3	134.1	NO
7	7	13C6-PFDA	ST180603M2-17 PFC CS3 18E2907	2.96e4	128.0	NO
8	8	13C7-PFUdA	ST180603M2-17 PFC CS3 18E2907	3.92e4	133.5	NO

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Name: 180603M2_115, Date: 04-Jun-2018, Time: 13:53:18, 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: 180603M2_116, Date: 04-Jun-2018, Time: 14:03:43, ID: 1800982-05 REEPDW554 0.11977, Description: REEPDW554

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-05 REEPDW554 0.11977	9.94e3	83.5	NO
2	2	13C5-PFHxA	1800982-05 REEPDW554 0.11977	1.43e4	80.8	NO
3	3	13C3-PFHxS	1800982-05 REEPDW554 0.11977	3.58e3	106.6	NO
4	4	13C8-PFOA	1800982-05 REEPDW554 0.11977	1.61e4	93.1	NO
5	5	13C9-PFNA	1800982-05 REEPDW554 0.11977	1.85e4	91.5	NO
6	6	13C4-PFOS	1800982-05 REEPDW554 0.11977	3.77e3	105.1	NO
7	7	13C6-PFDA	1800982-05 REEPDW554 0.11977	2.06e4	89.2	NO
8	8	13C7-PFUdA	1800982-05 REEPDW554 0.11977	2.46e4	83.7	NO

Name: 180603M2_117, Date: 04-Jun-2018, Time: 14:14:13, ID: 1800982-06 REEPDW1043 0.12141, Description: REEPDW1043

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-06 REEPDW1043 0.12141	7.77e3	65.3	NO
2	2	13C5-PFHxA	1800982-06 REEPDW1043 0.12141	1.28e4	72.7	NO
3	3	13C3-PFHxS	1800982-06 REEPDW1043 0.12141	3.22e3	95.9	NO
4	4	13C8-PFOA	1800982-06 REEPDW1043 0.12141	1.10e4	63.9	NO
5	5	13C9-PFNA	1800982-06 REEPDW1043 0.12141	1.52e4	75.5	NO
6	6	13C4-PFOS	1800982-06 REEPDW1043 0.12141	3.36e3	93.6	NO
7	7	13C6-PFDA	1800982-06 REEPDW1043 0.12141	1.59e4	68.6	NO
8	8	13C7-PFUdA	1800982-06 REEPDW1043 0.12141	1.99e4	67.7	NO

Name: 180603M2_118, Date: 04-Jun-2018, Time: 14:24:38, ID: B8E0141-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0141-BS1 OPR 0.125	1.28e4	107.8	NO
2	2	13C5-PFHxA	B8E0141-BS1 OPR 0.125	1.83e4	103.4	NO
3	3	13C3-PFHxS	B8E0141-BS1 OPR 0.125	3.80e3	113.1	NO
4	4	13C8-PFOA	B8E0141-BS1 OPR 0.125	1.94e4	112.6	NO
5	5	13C9-PFNA	B8E0141-BS1 OPR 0.125	2.24e4	110.8	NO
6	6	13C4-PFOS	B8E0141-BS1 OPR 0.125	3.98e3	110.9	NO
7	7	13C6-PFDA	B8E0141-BS1 OPR 0.125	2.48e4	107.1	NO
8	8	13C7-PFUdA	B8E0141-BS1 OPR 0.125	2.87e4	97.6	NO

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:18:29 Pacific Daylight Time
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Name: 180603M2_119, Date: 04-Jun-2018, Time: 14:35:08, ID: B8E0224-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0224-BSD1 LCSD 0.125	8.09e3	67.9	NO
2	2	13C5-PFHxA	B8E0224-BSD1 LCSD 0.125	1.28e4	72.3	NO
3	3	13C3-PFHxS	B8E0224-BSD1 LCSD 0.125	2.80e3	83.5	NO
4	4	13C8-PFOA	B8E0224-BSD1 LCSD 0.125	1.36e4	78.8	NO
5	5	13C9-PFNA	B8E0224-BSD1 LCSD 0.125	1.57e4	77.9	NO
6	6	13C4-PFOS	B8E0224-BSD1 LCSD 0.125	2.84e3	79.0	NO
7	7	13C6-PFDA	B8E0224-BSD1 LCSD 0.125	1.70e4	73.7	NO
8	8	13C7-PFUdA	B8E0224-BSD1 LCSD 0.125	2.20e4	74.7	NO

Name: 180603M2_120, Date: 04-Jun-2018, Time: 14:45:32, ID: B8E0224-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0224-BS1 OPR 0.125	8.49e3	71.4	NO
2	2	13C5-PFHxA	B8E0224-BS1 OPR 0.125	1.15e4	65.3	NO
3	3	13C3-PFHxS	B8E0224-BS1 OPR 0.125	2.48e3	73.9	NO
4	4	13C8-PFOA	B8E0224-BS1 OPR 0.125	1.19e4	68.7	NO
5	5	13C9-PFNA	B8E0224-BS1 OPR 0.125	1.27e4	62.8	NO
6	6	13C4-PFOS	B8E0224-BS1 OPR 0.125	2.65e3	73.9	NO
7	7	13C6-PFDA	B8E0224-BS1 OPR 0.125	1.49e4	64.2	NO
8	8	13C7-PFUdA	B8E0224-BS1 OPR 0.125	1.98e4	67.5	NO

Name: 180603M2_121, Date: 04-Jun-2018, Time: 14:56:03, 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	9.12e3	76.6	NO
2	2	13C5-PFHxA	B8E0224-BLK1 Method Blank 0.125	1.49e4	84.4	NO
3	3	13C3-PFHxS	B8E0224-BLK1 Method Blank 0.125	3.12e3	93.0	NO
4	4	13C8-PFOA	B8E0224-BLK1 Method Blank 0.125	1.54e4	89.2	NO
5	5	13C9-PFNA	B8E0224-BLK1 Method Blank 0.125	1.81e4	89.5	NO
6	6	13C4-PFOS	B8E0224-BLK1 Method Blank 0.125	3.12e3	86.8	NO
7	7	13C6-PFDA	B8E0224-BLK1 Method Blank 0.125	2.16e4	93.5	NO
8	8	13C7-PFUdA	B8E0224-BLK1 Method Blank 0.125	2.45e4	83.5	NO

Name: 180603M2_122, Date: 04-Jun-2018, Time: 15:06:25, ID: 1800952-13RE1 REEPDW488 0.11053, Description: REEPDW488

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800952-13RE1 REEPDW488 0.11053	5.95e3	50.0	NO
2	2	13C5-PFHxA	1800952-13RE1 REEPDW488 0.11053	9.65e3	54.6	NO
3	3	13C3-PFHxS	1800952-13RE1 REEPDW488 0.11053	3.02e3	90.1	NO
4	4	13C8-PFOA	1800952-13RE1 REEPDW488 0.11053	1.03e4	59.9	NO
5	5	13C9-PFNA	1800952-13RE1 REEPDW488 0.11053	1.24e4	61.7	NO
6	6	13C4-PFOS	1800952-13RE1 REEPDW488 0.11053	3.25e3	90.5	NO
7	7	13C6-PFDA	1800952-13RE1 REEPDW488 0.11053	1.58e4	68.4	NO
8	8	13C7-PFUdA	1800952-13RE1 REEPDW488 0.11053	1.95e4	66.3	NO

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:18:29 Pacific Daylight Time
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Name: 180603M2_123, Date: 04-Jun-2018, Time: 15:16:56, 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	5.28e0	0.0	YES
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: 180603M2_124, Date: 04-Jun-2018, Time: 15:27:21, ID: ST180603M2-18 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180603M2-18 PFC CS3 18E2907	1.52e4	127.9	NO
2	2	13C5-PFHxA	ST180603M2-18 PFC CS3 18E2907	2.16e4	122.3	NO
3	3	13C3-PFHxS	ST180603M2-18 PFC CS3 18E2907	4.30e3	128.1	NO
4	4	13C8-PFOA	ST180603M2-18 PFC CS3 18E2907	2.07e4	120.2	NO
5	5	13C9-PFNA	ST180603M2-18 PFC CS3 18E2907	2.53e4	125.6	NO
6	6	13C4-PFOS	ST180603M2-18 PFC CS3 18E2907	4.53e3	126.1	NO
7	7	13C6-PFDA	ST180603M2-18 PFC CS3 18E2907	2.74e4	118.6	NO
8	8	13C7-PFUdA	ST180603M2-18 PFC CS3 18E2907	3.64e4	123.9	NO

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Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

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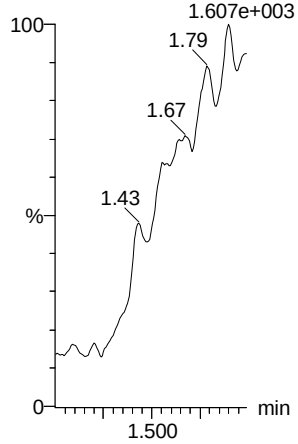

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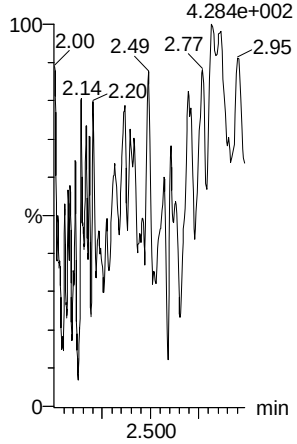

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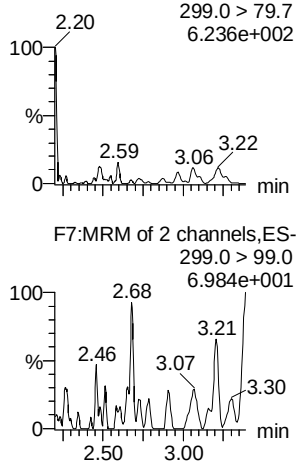
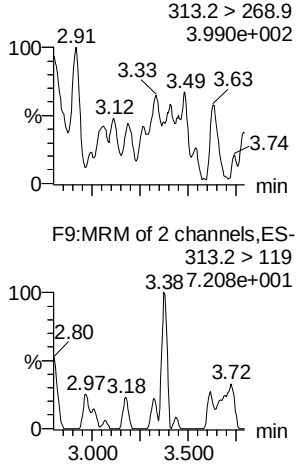
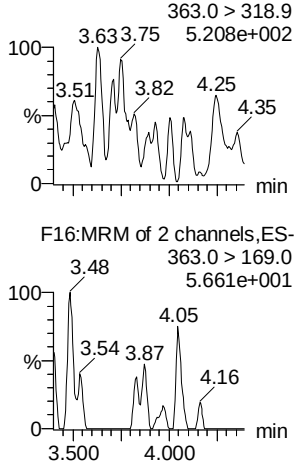


PFHxA



PFHpA



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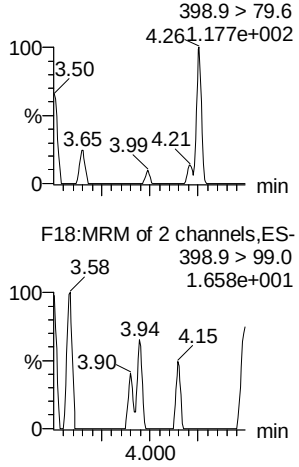

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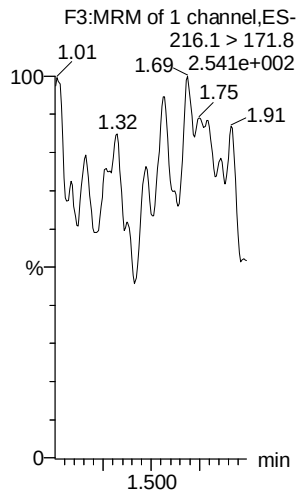

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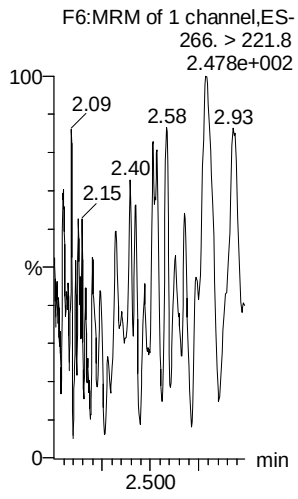

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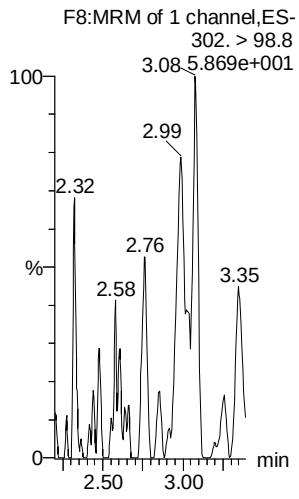
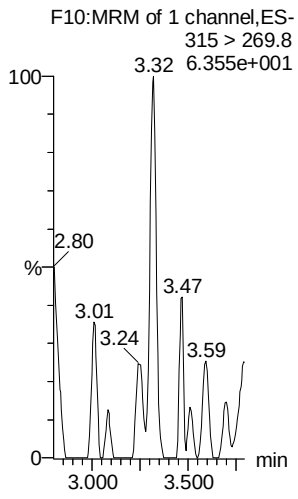


13C2-PFHxA



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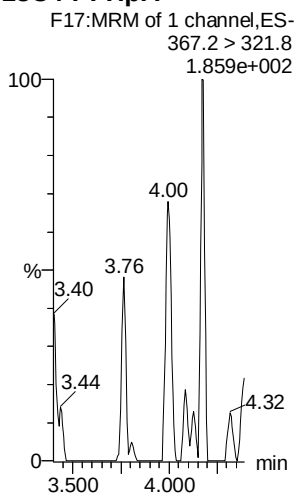
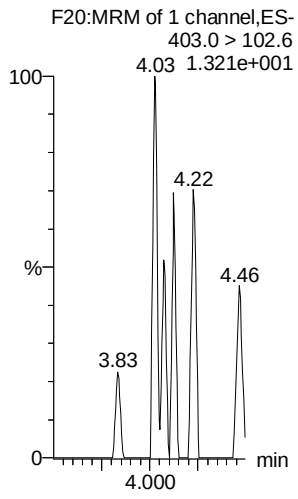


18O2-PFHxS



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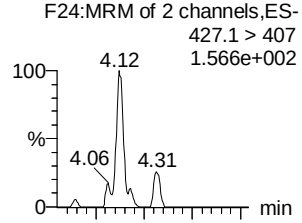
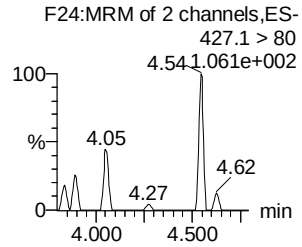
Printed: Tuesday, June 05, 2018 09:55:12 Pacific Daylight Time

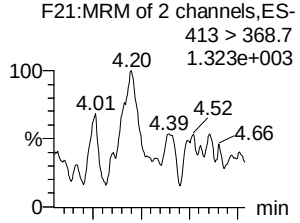
Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

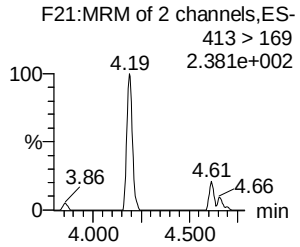
6:2 FTS



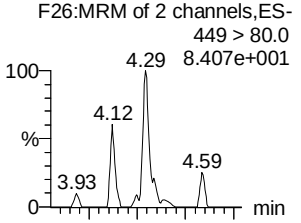


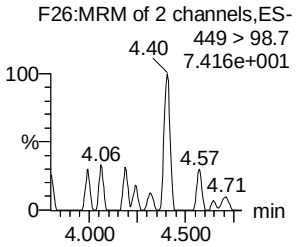
L-PFOA





PFHpS





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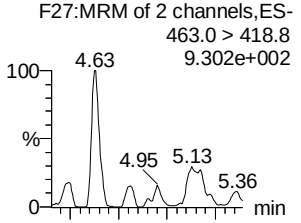

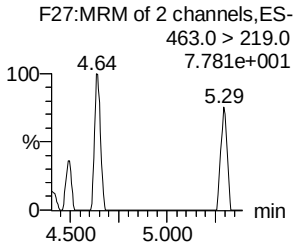

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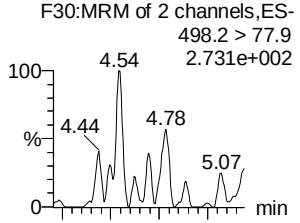
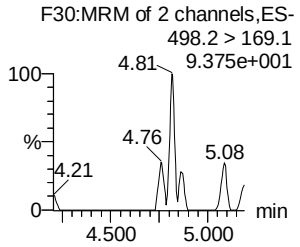
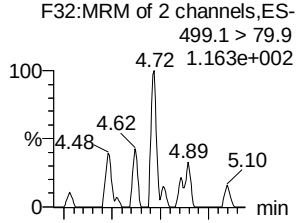
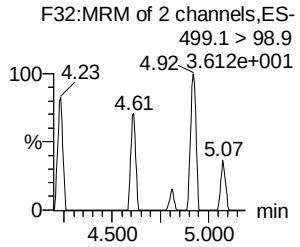




L-PFOS





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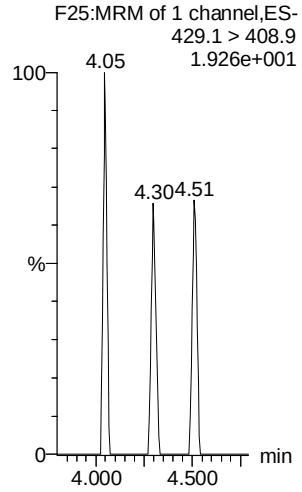
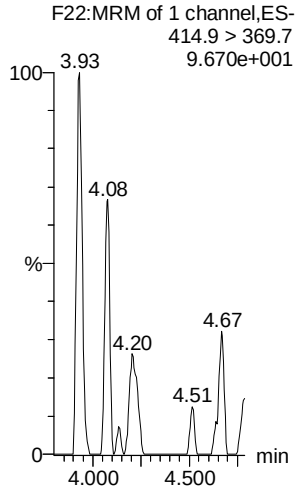


13C2-PFOA



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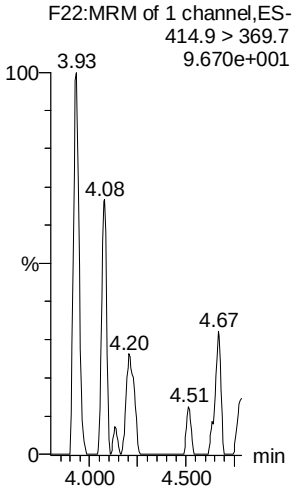

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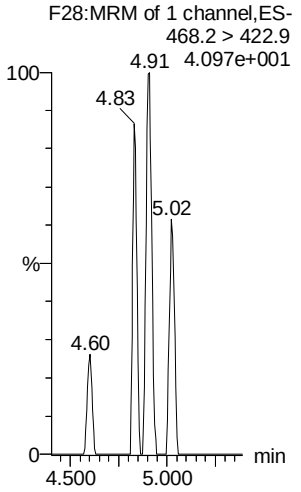

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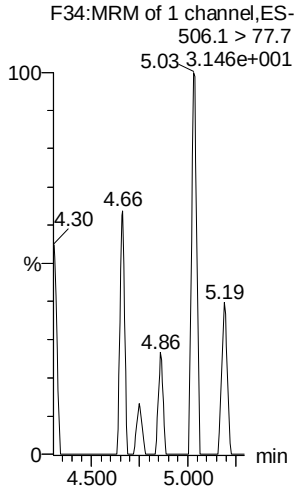

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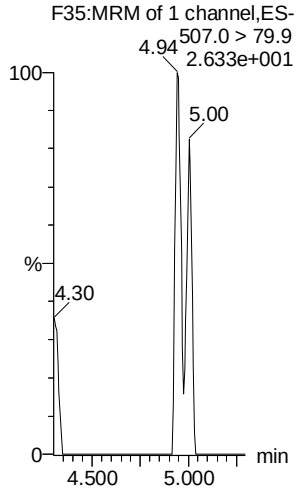

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Last Altered: Tuesday, June 05, 2018 09:54:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:55:12 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

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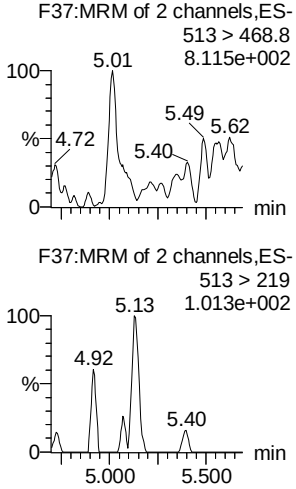
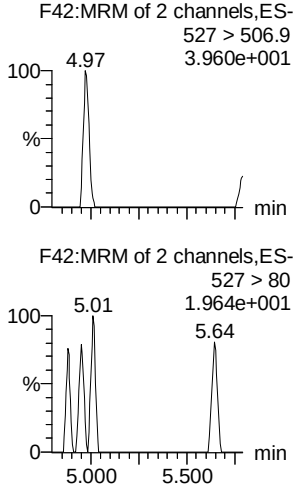


8:2 FTS



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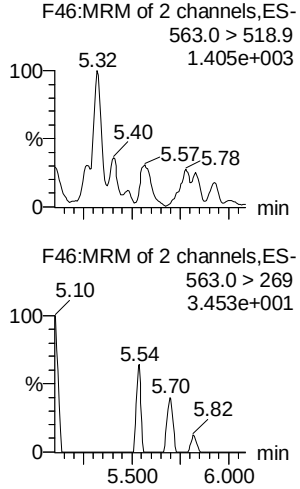

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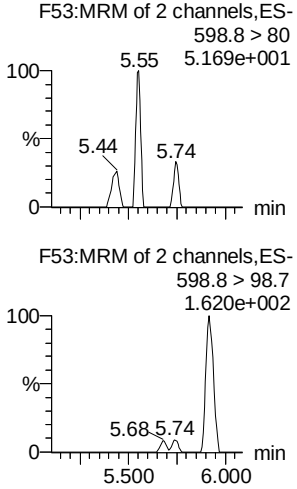

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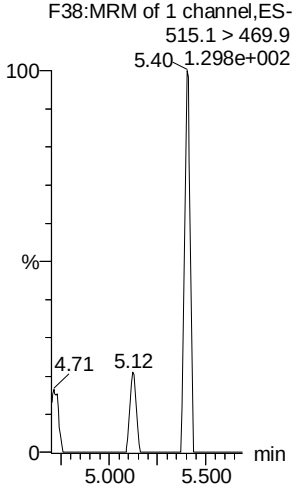

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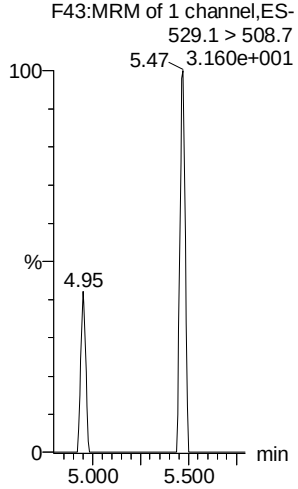
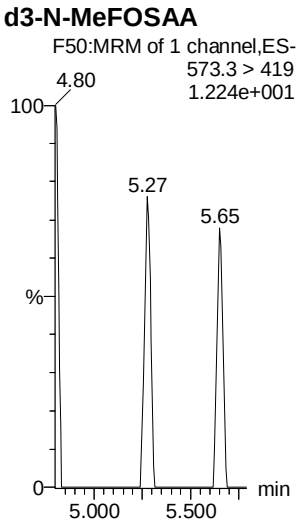
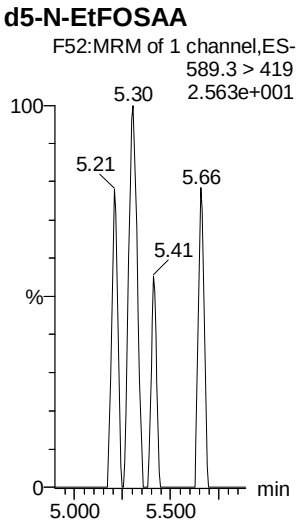


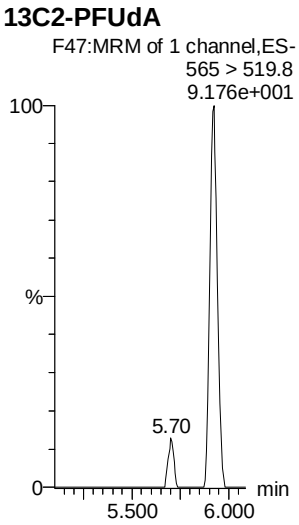
d3-N-MeFOSAA



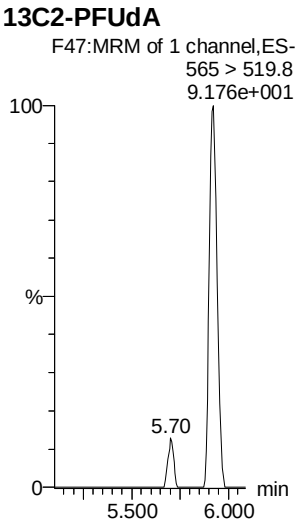
d5-N-EtFOSAA



13C2-PFUdA



13C2-PFUdA



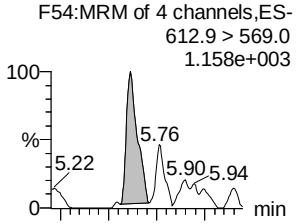
Vista Analytical Laboratory

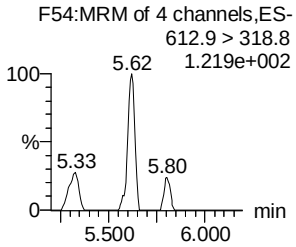
Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:54:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:55:12 Pacific Daylight Time

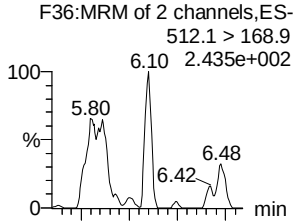
Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

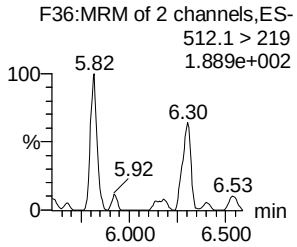
PFDoA



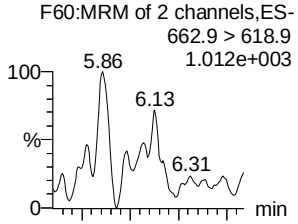


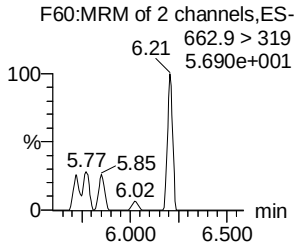
N-MeFOSA



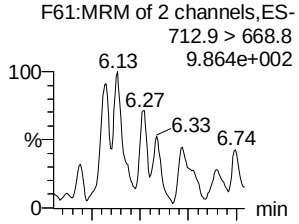


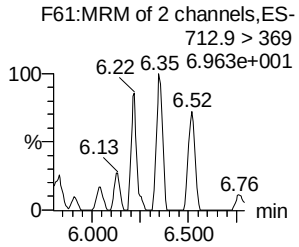
PFTrDA



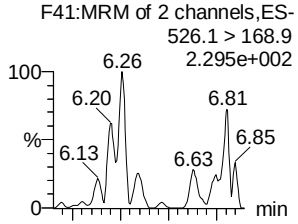


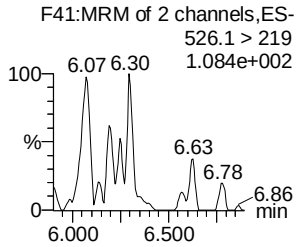
PFTeDA



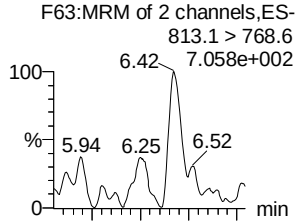


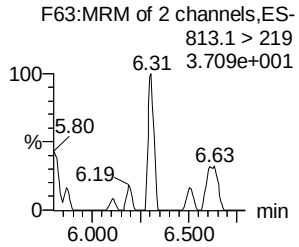
N-EtFOSA



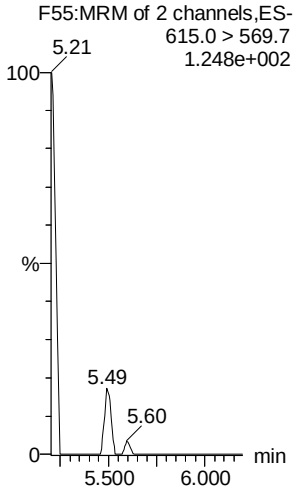


PFHxDA

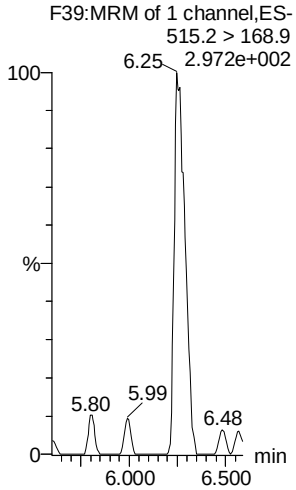




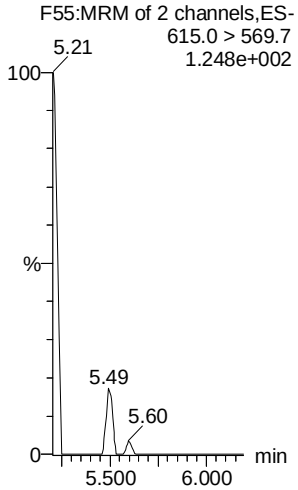
13C2-PFDoA



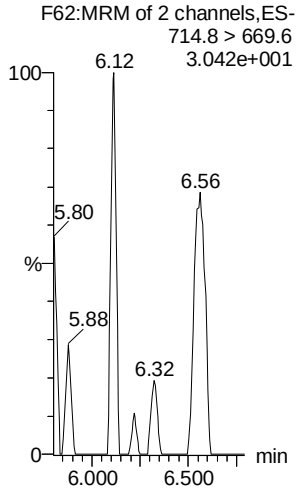
d3-N-MeFOSA



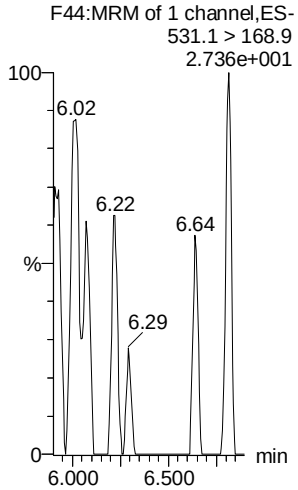
13C2-PFDoA



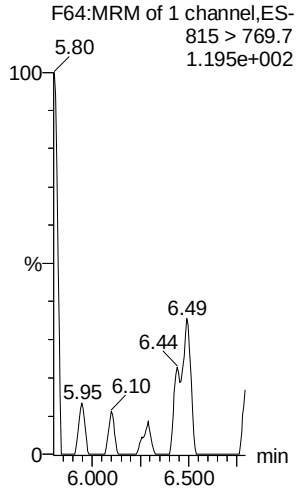
13C2-PFTeDA



d5-N-ETFOSA



13C2-PFHxDA



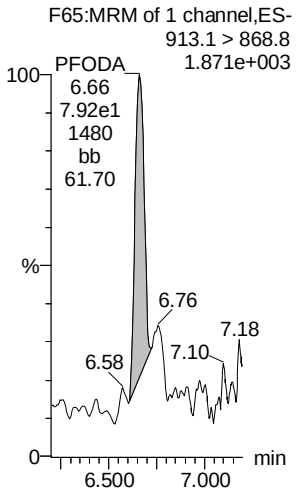
Vista Analytical Laboratory

Dataset: Untitled

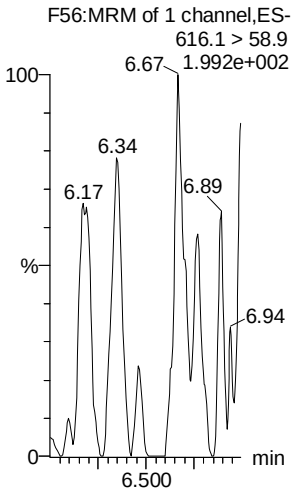
Last Altered: Tuesday, June 05, 2018 09:54:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:55:12 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

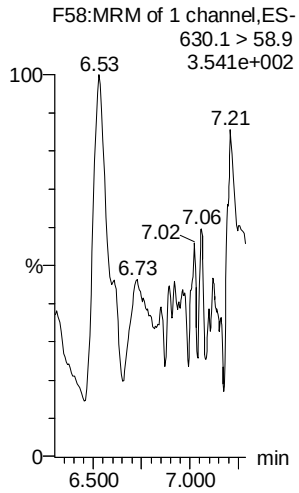
PFODA



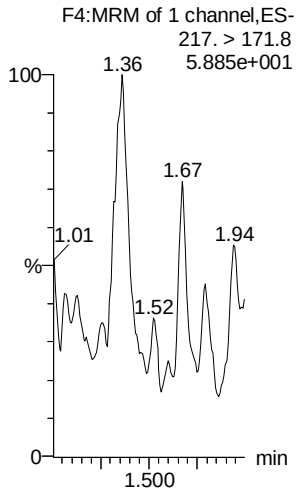
N-MeFOSE



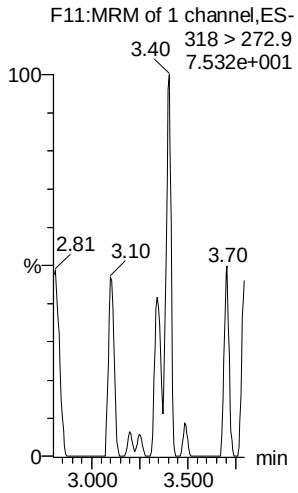
N-EtFOSE



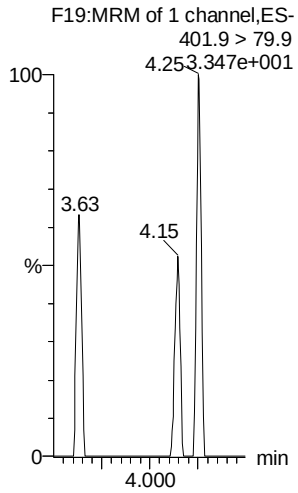
13C4-PFBA



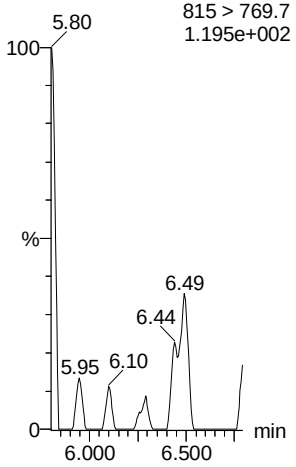
13C5-PFHxA



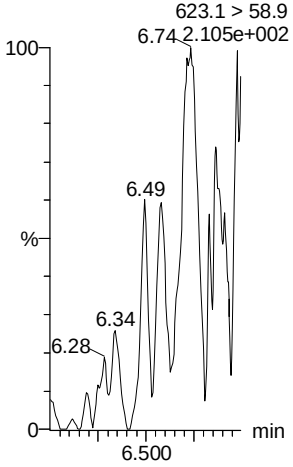
13C3-PFHxS



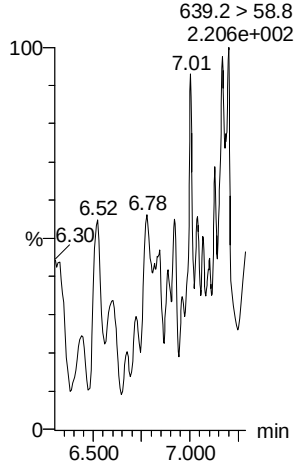
13C2-PFHxDA



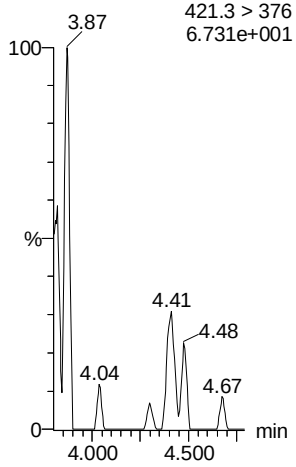
d7-N-MeFOSE



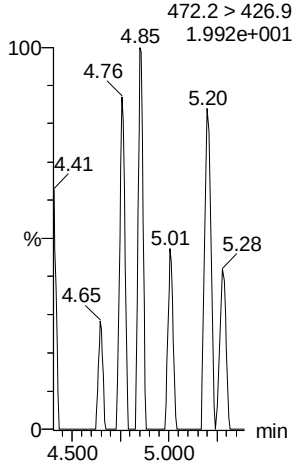
d9-N-EtFOSE



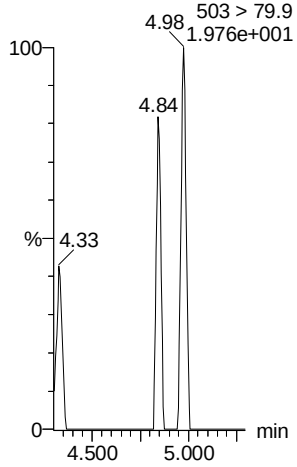
13C8-PFOA



13C9-PFNA



13C4-PFOS



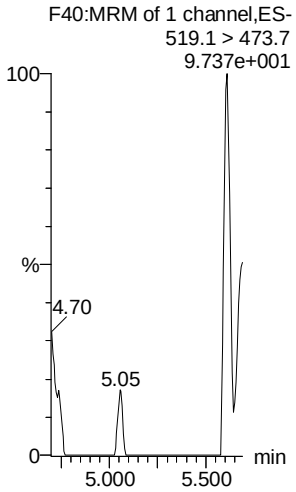
Vista Analytical Laboratory

Dataset: Untitled

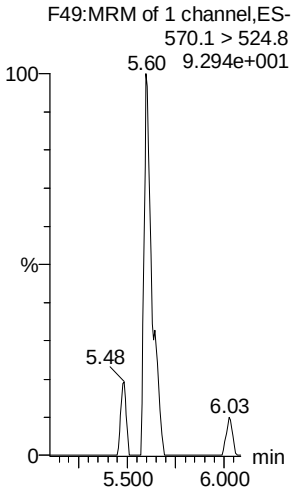
Last Altered: Tuesday, June 05, 2018 09:54:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:55:12 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

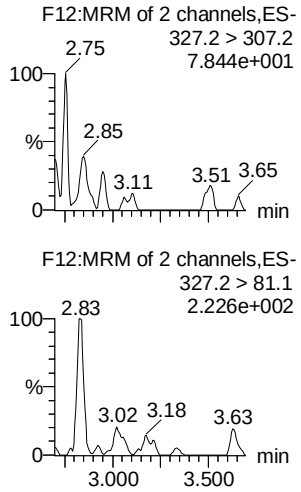
13C6-PFDA



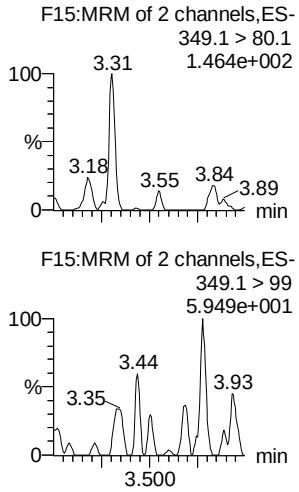
13C7-PFUdA



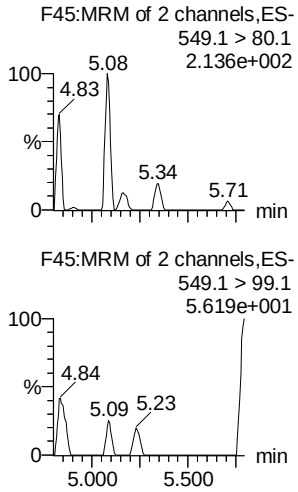
4:2 FTS



PFPeS



PFNS



LC Calibration Standards Review Checklist Q4

		ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manual Integrations	N/A
Calibration ID: ST180603M2-11	L (M) H	☐	☐	☐	☐	☐	☐	☐
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: -17	L (M) H	☐	☐	☐	☐	☐	☐	☐
Calibration ID: -18	L (M) H	☐	☐ (A)	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 5/30/18

Run Log Present: ☑

# of Samples per Sequence Checked: ☑

Instrument Blank Saved ☑

IIS Area Saved ☑

Reviewed By: 6/5/18
Initials/Date

Comments:

(A) PFDoA < 10%.

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:24 Pacific Daylight Time

JAD 6/5/18

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 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...	1.02e4	1.13e4		1.40	1.39	11.3	10.1	100.5	NO		
2	2	PFPeA	263.1 > 21...	1.27e4	1.53e4		2.35	2.35	10.4	10.3	102.9	NO		
3	3	PFBS	299.0 > 79.7	3.16e3	1.94e3		2.64	2.64	20.4	10.4	104.4	NO	2.640	NO
4	4	4:2 FTS	327.2>307.2	3.89e3	4.20e3		3.04	3.04	11.6	10.2	102.3	NO	1.932	NO
5	5	PFHxA	313.2 > 26...	1.70e4	5.22e3		3.13	3.13	16.3	10.6	106.2	NO	275.627	YES
6	6	PFPeS	349.1>80.1	2.69e3	1.94e3		3.34	3.33	17.4	9.46	94.6	NO	1.596	NO
7	7	PFHpA	363.0 > 31...	1.52e4	1.61e4		3.74	3.74	11.8	10.2	102.5	NO	19.074	NO
8	8	L-PFHxS	398.9 > 79.6	2.33e3	1.55e3		3.89	3.89	18.8	9.78	97.8	NO	1.571	NO
9	10	6:2 FTS	427.1 > 407	4.30e3	4.33e3		4.19	4.20	12.4	10.6	106.2	NO	3.062	NO
10	11	L-PFOA	413 > 368.7	1.84e4	2.28e4		4.25	4.25	10.1	10.2	101.8	NO	4.115	NO
11	13	PFHpS	449 > 80.0	3.21e3	2.28e4		4.36	4.36	1.76	10.9	109.0	NO	1.984	NO
12	14	PFNA	463.0 > 41...	2.21e4	1.87e4		4.68	4.68	14.8	11.0	109.6	NO	4.793	NO
13	15	PFOSA	498.2 > 77.9	2.93e3	4.01e3		4.75	4.76	9.13	10.8	107.7	NO	23.146	NO
14	16	L-PFOS	499.1 > 79.9	2.77e3	4.15e3		4.77	4.77	8.33	9.09	90.9	NO	1.795	NO
15	18	PFDA	513 > 468.8	2.57e4	3.03e4		5.06	5.05	10.6	10.4	104.4	NO	6.718	NO
16	19	8:2 FTS	527 > 506.9	4.54e3	3.90e3		5.03	5.03	14.6	10.3	102.8	NO	3.215	NO
17	20	PFNS	549.1>80.1	2.49e3	4.15e3		5.13	5.12	7.50	9.33	93.3	NO	1.675	NO
18	21	L-MeFOSAA	570.1 > 419	8.48e3	5.90e3		5.22	5.20	18.0	8.94	89.4	NO	13.849	NO
19	23	L-EtFOSAA	584.2 > 419	6.24e3	7.25e3		5.37	5.36	10.8	9.04	90.4	NO	12.069	NO

GM 6/4/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 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...	2.15e4	2.61e4		5.39	5.37	10.3	11.2	112.3	NO	11.934	NO
2	26	PFDS	598.8 > 80	3.46e3	2.61e4		5.44	5.42	1.66	10.9	109.4	NO	2.225	NO
3	27	PFDoA	612.9 > 56...	2.95e4	2.56e4		5.67	5.65	14.4	10.3	102.6	NO	8.775	NO
4	28	N-MeFOSA	512.1 > 16...	6.25e3	1.74e4		5.83	5.87	53.8	52.1	104.1	NO	1.387	NO
5	29	PFTrDA	662.9 > 61...	2.79e4	2.56e4		5.92	5.89	13.6	9.47	94.7	NO	31.479	NO
6	30	PFTeDA	712.9 > 66...	2.17e4	1.94e4		6.14	6.11	14.0	12.8	127.9	NO	12.762	NO
7	31	N-EtFOSA	526.1 > 16...	7.44e3	2.30e4		6.24	6.25	48.5	53.0	106.0	NO	1.574	NO
8	32	PFHxDA	813.1 > 76...	1.47e4	1.23e4		6.48	6.44	5.94	9.94	99.4	NO	39.764	NO
9	33	PFODA	913.1 > 86...	2.24e4	1.23e4		6.71	6.67	9.10	11.7	117.1	NO		
10	34	N-MeFOSE	616.1 > 58.9	4.00e3	1.18e4		6.41	6.38	50.8	51.8	103.5	NO		
11	35	N-EtFOSE	630.1 > 58.9	4.66e3	1.12e4		6.56	6.53	62.3	50.5	101.0	NO		
12	36	13C3-PFBA	216.1 > 17...	1.13e4	1.27e4	0.892	1.33	1.39	11.2	12.5	100.2	NO		
13	37	13C3-PFPeA	266. > 221.8	1.53e4	1.83e4	0.848	2.32	2.35	10.4	12.3	98.5	NO		
14	38	13C3-PFBS	302. > 98.8	1.94e3	1.83e4	0.102	2.61	2.64	1.32	12.9	103.5	NO		
15	39	13C2-4:2 FTS	329.2>308.9	4.20e3	1.83e4	0.231	3.02	3.04	2.86	12.4	99.1	NO		
16	40	13C2-PFHxA	315 > 269.8	5.22e3	1.83e4	0.744	3.10	3.13	3.56	4.78	95.7	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.61e4	1.83e4	0.841	3.72	3.74	11.0	13.1	104.4	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.55e3	4.12e3	0.415	3.87	3.89	4.71	11.4	90.9	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	4.33e3	1.82e4	0.232	4.19	4.20	2.97	12.8	102.8	NO		
20	44	13C2-PFOA	414.9 > 36...	2.28e4	1.82e4	1.256	4.25	4.25	15.7	12.5	100.0	NO		
21	45	13C5-PFNA	468.2 > 42...	1.87e4	2.27e4	0.960	4.69	4.69	10.3	10.7	85.8	NO		
22	46	13C8-PFOSA	506.1 > 77.7	4.01e3	2.60e4	0.145	4.75	4.76	1.93	13.3	106.4	NO		
23	47	13C8-PFOS	507.0 > 79.9	4.15e3	3.97e3	1.047	4.77	4.77	13.1	12.5	99.8	NO		
24	48	13C2-PFDA	515.1 > 46...	3.03e4	2.09e4	1.118	5.06	5.05	18.1	16.2	129.8	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.90e3	1.83e4	0.211	5.03	5.03	2.66	12.6	100.8	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	5.90e3	2.60e4	0.182	5.21	5.20	2.84	15.5	124.4	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	7.25e3	2.60e4	0.223	5.37	5.36	3.49	15.7	125.4	NO		
28	52	13C2-PFUdA	565 > 519.8	2.61e4	2.60e4	0.958	5.39	5.37	12.5	13.1	104.7	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.56e4	2.09e4	1.138	5.67	5.65	15.3	13.5	107.9	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.74e4	2.60e4	0.051	5.85	5.90	8.38	165	109.9	NO		
31	55	13C2-PFTeDA	714.8 > 66...	1.94e4	2.60e4	0.862	6.14	6.11	9.35	10.9	86.8	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	2.30e4	2.60e4	0.066	6.26	6.27	11.1	167	111.4	NO		

GM 6/4/2018

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 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	1.23e4	2.60e4	1.173	6.48	6.44	5.93	5.06	101.1	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.18e4	2.60e4	0.038	6.40	6.37	5.68	151	100.7	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	1.12e4	2.60e4	0.035	6.54	6.52	5.40	153	101.9	NO		
36	60	13C4-PFBA	217. > 171.8	1.27e4	1.27e4	1.000	1.33	1.39	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.83e4	1.83e4	1.000	3.10	3.13	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	4.12e3	4.12e3	1.000	3.87	3.89	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	1.82e4	1.82e4	1.000	4.25	4.25	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	2.27e4	2.27e4	1.000	4.69	4.69	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	3.97e3	3.97e3	1.000	4.77	4.77	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.09e4	2.09e4	1.000	5.06	5.05	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.60e4	2.60e4	1.000	5.39	5.37	12.5	12.5	100.0	NO		

GM 6/4/2018

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:20:15 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180603M2_1	IPA	03-Jun-18	17:55:38
2	2	180603M2_2	ST180603M2-2 PFC CS-2 18E2902	03-Jun-18	18:07:52
3	3	180603M2_3	ST180603M2-2 PFC CS-1 18E2903	03-Jun-18	18:18:22
4	4	180603M2_4	ST180603M2-3 PFC CS0 18E2904	03-Jun-18	18:28:47
5	5	180603M2_5	ST180603M2-4 PFC CS1 18E2905	03-Jun-18	18:39:17
6	6	180603M2_6	ST180603M2-5 PFC CS2 18E2906	03-Jun-18	18:49:42
7	7	180603M2_7	ST180603M2-6 PFC CS3 18E2907	03-Jun-18	19:00:12
8	8	180603M2_8	ST180603M2-7 PFC CS4 18E2908	03-Jun-18	19:10:37
9	9	180603M2_9	ST180603M2-8 PFC CS5 18E2909	03-Jun-18	19:21:07
10	10	180603M2_10	ST180603M2-9 PFC CS6 18E2910	03-Jun-18	19:31:33
11	11	180603M2_11	ST180603M2-10 PFC CS7 18E2911	03-Jun-18	19:42:03
12	12	180603M2_12	IPA	03-Jun-18	19:52:27
13	13	180603M2_13	ICV180603M2-1 PFC 537 ICV 18E2901	03-Jun-18	20:02:58
14	14	180603M2_14	IPA	03-Jun-18	20:13:28
15	15	180603M2_15	B8F0002-BS1 OPR 0.125	03-Jun-18	20:27:03
16	16	180603M2_16	B8F0002-BLK1 Method Blank 0.125	03-Jun-18	20:37:28
17	17	180603M2_17	1801010-01RE1 GSUMW00505101805...	03-Jun-18	20:47:59
18	18	180603M2_18	1801010-02RE1 MW0081819180517G...	03-Jun-18	20:58:23
19	19	180603M2_19	1801010-03RE1 MW0083738180517R...	03-Jun-18	21:08:54
20	20	180603M2_20	1801010-04RE1 MW0052021180517M...	03-Jun-18	21:19:18
21	21	180603M2_21	1801010-05RE1 MW0056061180517R...	03-Jun-18	21:29:49
22	22	180603M2_22	1801010-06RE1 MW0071920180517R...	03-Jun-18	21:40:13
23	23	180603M2_23	1801010-07RE1 MW0074849180517G...	03-Jun-18	21:50:44
24	24	180603M2_24	1801010-08RE1 MW0065051180517R...	03-Jun-18	22:01:08
25	25	180603M2_25	1801010-09RE1 MW0060510180517G...	03-Jun-18	22:11:39
26	26	180603M2_26	1801010-10RE1 MW0010308180518G...	03-Jun-18	22:22:04
27	27	180603M2_27	IPA	03-Jun-18	22:32:34
28	28	180603M2_28	ST180603M2-11 PFC CS3 18E2907	03-Jun-18	22:42:58
29	29	180603M2_29	IPA	03-Jun-18	22:53:29
30	30	180603M2_30	1801010-11RE1 MW0030207180518G...	03-Jun-18	23:03:59
31	31	180603M2_31	1801010-12RE1 MW0034647180518R...	03-Jun-18	23:14:25
32	32	180603M2_32	1801010-13RE1 GSUMW00311161805...	03-Jun-18	23:24:55

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:20:15 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
33	33	180603M2_33	1801010-14RE1 MW0093233180518R...	03-Jun-18	23:35:20
34	34	180603M2_34	1801010-15RE1 MW0091516180518M...	03-Jun-18	23:45:50
35	35	180603M2_35	B8F0004-BS1 OPR 0.125	03-Jun-18	23:56:15
36	36	180603M2_36	B8F0004-BSD1 LCSD 0.125	04-Jun-18	00:06:45
37	37	180603M2_37	B8F0004-BLK1 Method Blank 0.125	04-Jun-18	00:17:09
38	38	180603M2_38	1801039-01 A1-MW-13-SA1 0.10967	04-Jun-18	00:27:40
39	39	180603M2_39	1801039-02 A1-MW-11-SA1 0.11624	04-Jun-18	00:38:04
40	40	180603M2_40	1801039-03 A1-MW-14-SA1 0.11194	04-Jun-18	00:48:35
41	41	180603M2_41	1801039-04 A1-MW-15-SA1 0.11248	04-Jun-18	00:59:00
42	42	180603M2_42	1801039-07 A1-MW-25-SA1 0.11252	04-Jun-18	01:09:30
43	43	180603M2_43	1801039-08 FRB-20180524 0.11695	04-Jun-18	01:19:55
44	44	180603M2_44	B8F0003-BS1 OPR 0.125	04-Jun-18	01:30:25
45	45	180603M2_45	B8F0003-BLK1 Method Blank 0.125	04-Jun-18	01:40:51
46	46	180603M2_46	IPA	04-Jun-18	01:51:22
47	47	180603M2_47	ST180603M2-12 PFC CS3 18E2907	04-Jun-18	02:01:52
48	48	180603M2_48	IPA	04-Jun-18	02:12:16
49	49	180603M2_49	1800937-01RE1 CL1TMW0118180503...	04-Jun-18	02:22:47
50	50	180603M2_50	1800937-02RE1 CL1TMW0405180504...	04-Jun-18	02:33:17
51	51	180603M2_51	1800937-03RE1 CL1SW0300180508N ...	04-Jun-18	02:43:42
52	52	180603M2_52	1800937-04RE1 CL1SW0400180508N ...	04-Jun-18	02:54:12
53	53	180603M2_53	1800937-05RE1 CL1SW0500180508N ...	04-Jun-18	03:04:35
54	54	180603M2_54	1800937-06RE1 CL1DR0100180508N ...	04-Jun-18	03:15:06
55	55	180603M2_55	1800937-07RE1 CL1DR0300180508N ...	04-Jun-18	03:25:30
56	56	180603M2_56	1800937-08RE1 CL1DR0200180509N ...	04-Jun-18	03:36:00
57	57	180603M2_57	1800937-09RE1 CL1SW0100180509N ...	04-Jun-18	03:46:30
58	58	180603M2_58	1800937-10RE1 CL1SW0200180509N ...	04-Jun-18	03:56:55
59	59	180603M2_59	IPA	04-Jun-18	04:07:25
60	60	180603M2_60	ST180603M2-13 PFC CS3 18E2907	04-Jun-18	04:17:50
61	61	180603M2_61	IPA	04-Jun-18	04:28:21
62	62	180603M2_62	ST180603M2-14 PFC CS0 18E2904	04-Jun-18	04:38:46
63	63	180603M2_63	IPA	04-Jun-18	04:49:16
64	64	180603M2_64	1800882-02RE1 731 0.12084	04-Jun-18	04:59:39
65	65	180603M2_65	1800882-03RE1 781 0.11874	04-Jun-18	05:10:10
66	66	180603M2_66	1800882-04RE1 702 0.11993	04-Jun-18	05:20:35
67	67	180603M2_67	1800882-05RE1 Trip Blank 0.12132	04-Jun-18	05:31:05
68	68	180603M2_68	1800882-06RE1 Trip Blank 0.12059	04-Jun-18	05:41:30

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
69	69	180603M2_69	B8E0215-BS1 OPR 1	04-Jun-18	05:52:00
70	70	180603M2_70	B8E0215-BLK1 Method Blank 1	04-Jun-18	06:02:25
71	71	180603M2_71	1800935-05 CL1MC0100180509N 1.11	04-Jun-18	06:12:55
72	72	180603M2_72	B8E0212-BS1 OPR 5	04-Jun-18	06:23:20
73	73	180603M2_73	B8E0212-BLK1 Method Blank 5	04-Jun-18	06:33:50
74	74	180603M2_74	1801036-01 Milk 5	04-Jun-18	06:44:15
75	75	180603M2_75	B8E0173-BS1 OPR 0.25	04-Jun-18	06:54:46
76	76	180603M2_76	B8E0173-BLK1 Method Blank 0.25	04-Jun-18	07:05:11
77	77	180603M2_77	1800999-01 DPH-MW10 0.11774	04-Jun-18	07:15:41
78	78	180603M2_78	1800999-02 DPH-MW19 0.12462	04-Jun-18	07:26:05
79	79	180603M2_79	1800999-03 DPH-MW23 0.1216	04-Jun-18	07:36:36
80	80	180603M2_80	IPA	04-Jun-18	07:47:01
81	81	180603M2_81	ST180603M2-15 PFC CS3 18E2907	04-Jun-18	07:57:31
82	82	180603M2_82	IPA	04-Jun-18	08:07:56
83	83	180603M2_83	1800837-12 REEPDW409FRB 0.12029	04-Jun-18	08:18:27
84	84	180603M2_84	B8E0169-BS1 OPR 0.125	04-Jun-18	08:28:51
85	85	180603M2_85	B8E0169-BSD1 LCSD 0.125	04-Jun-18	08:39:22
86	86	180603M2_86	B8E0169-BLK1 Method Blank 0.125	04-Jun-18	08:49:47
87	87	180603M2_87	1800954-01 REEPDW499 0.12056	04-Jun-18	09:00:17
88	88	180603M2_88	1800954-02 REEPDW1007 0.11869	04-Jun-18	09:10:47
89	89	180603M2_89	1800954-03 REEPDW1008 0.11591	04-Jun-18	09:21:11
90	90	180603M2_90	1800954-04 REEPDW1009 0.11871	04-Jun-18	09:31:42
91	91	180603M2_91	1800954-05 REEPDW1010 0.1202	04-Jun-18	09:42:06
92	92	180603M2_92	1800954-06 REEPDW550 0.11863	04-Jun-18	09:52:36
93	93	180603M2_93	1800954-07 REEPDW1011 0.11919	04-Jun-18	10:03:01
94	94	180603M2_94	1800954-08 REEPDW1012 0.11288	04-Jun-18	10:13:31
95	95	180603M2_95	1800954-09 REEPDW1001 0.12106	04-Jun-18	10:23:57
96	96	180603M2_96	1800954-10 REEPDW1003 0.11189	04-Jun-18	10:34:27
97	97	180603M2_97	IPA	04-Jun-18	10:44:52
98	98	180603M2_98	ST180603M2-16 PFC CS3 18E2907	04-Jun-18	10:55:22
99	99	180603M2_99	IPA	04-Jun-18	11:05:53
100	1...	180603M2_100	1800954-11 REEPDW1004 0.11763	04-Jun-18	11:16:18
101	1...	180603M2_101	1800954-12 REEPDW1006 0.11887	04-Jun-18	11:26:48
102	1...	180603M2_102	1800954-13 REEPDW1013 0.11579	04-Jun-18	11:37:13
103	1...	180603M2_103	1800954-14 REEPDW1014 0.11881	04-Jun-18	11:47:43
104	1...	180603M2_104	1800954-15 REEPDW1002 0.12307	04-Jun-18	11:58:08

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:20:15 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
105	1...	180603M2_105	1800954-16 REEPDW1005 0.12281	04-Jun-18	12:08:38
106	1...	180603M2_106	B8E0167-BS1 OPR 0.125	04-Jun-18	12:19:02
107	1...	180603M2_107	B8E0167-BSD1 LCSD 0.125	04-Jun-18	12:29:32
108	1...	180603M2_108	B8E0167-BLK1 Method Blank 0.125	04-Jun-18	12:39:56
109	1...	180603M2_109	1800982-01 REEPDW1037 0.11872	04-Jun-18	12:50:27
110	1...	180603M2_110	1800982-02 REEPDW1048 0.12739	04-Jun-18	13:00:57
111	1...	180603M2_111	1800982-03 REEPDW1049 0.12389	04-Jun-18	13:11:23
112	1...	180603M2_112	1800982-04 REEPDW1050 0.12048	04-Jun-18	13:21:53
113	1...	180603M2_113	IPA	04-Jun-18	13:32:17
114	1...	180603M2_114	ST180603M2-17 PFC CS3 18E2907	04-Jun-18	13:42:48
115	1...	180603M2_115	IPA	04-Jun-18	13:53:18
116	1...	180603M2_116	1800982-05 REEPDW554 0.11977	04-Jun-18	14:03:43
117	1...	180603M2_117	1800982-06 REEPDW1043 0.12141	04-Jun-18	14:14:13
118	1...	180603M2_118	B8E0141-BS1 OPR 0.125	04-Jun-18	14:24:38
119	1...	180603M2_119	B8E0224-BSD1 LCSD 0.125	04-Jun-18	14:35:08
120	1...	180603M2_120	B8E0224-BS1 OPR 0.125	04-Jun-18	14:45:32
121	1...	180603M2_121	B8E0224-BLK1 Method Blank 0.125	04-Jun-18	14:56:03
122	1...	180603M2_122	1800952-13RE1 REEPDW488 0.11053	04-Jun-18	15:06:25
123	1...	180603M2_123	IPA	04-Jun-18	15:16:56
124	1...	180603M2_124	ST180603M2-18 PFC CS3 18E2907	04-Jun-18	15:27:21
125	1...	180603M2_125	IPA	04-Jun-18	15:37:51

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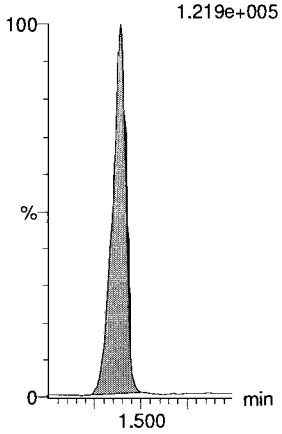
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

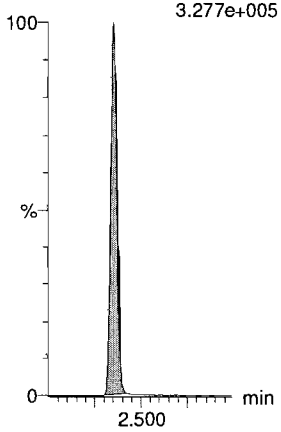
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

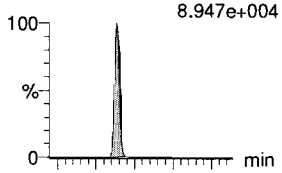
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
1.219e+005



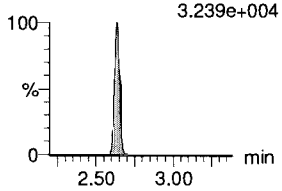
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
3.277e+005



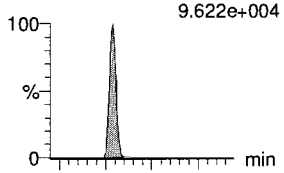
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
8.947e+004



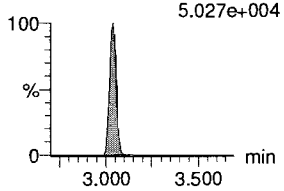
F7:MRM of 2 channels,ES-
299.0 > 99.0
3.239e+004



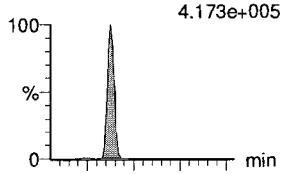
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
9.622e+004



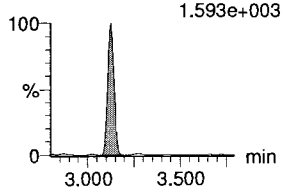
F12:MRM of 2 channels,ES-
327.2 > 81.1
5.027e+004



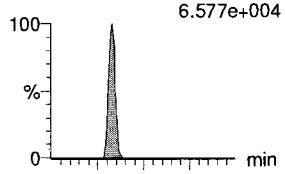
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
4.173e+005



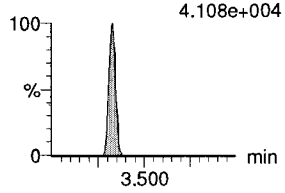
F9:MRM of 2 channels,ES-
313.2 > 119
1.593e+003



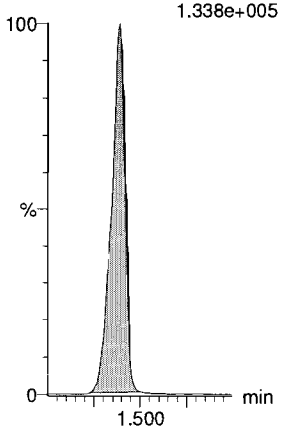
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
6.577e+004



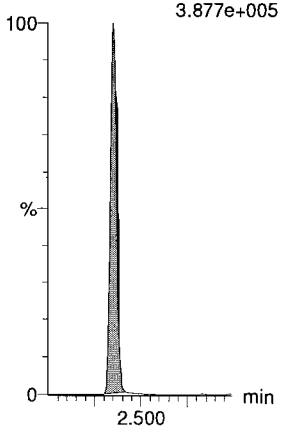
F15:MRM of 2 channels,ES-
349.1 > 99
4.108e+004



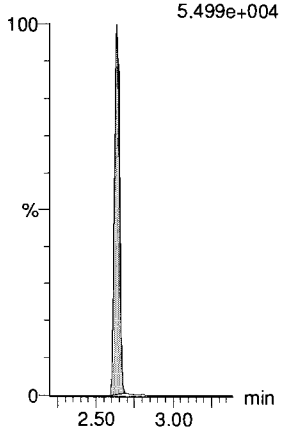
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.338e+005



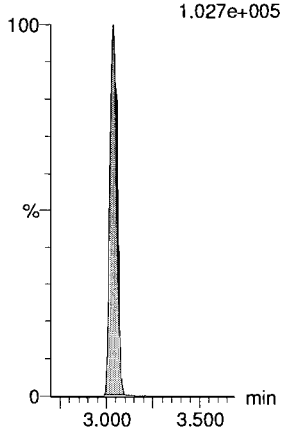
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.877e+005



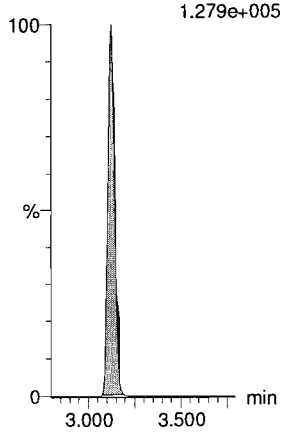
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.499e+004



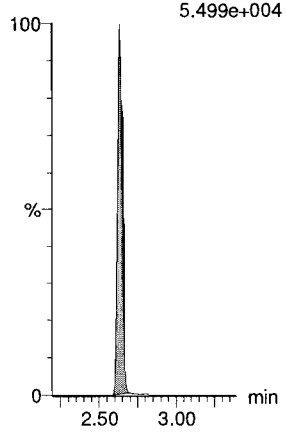
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.027e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.279e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.499e+004



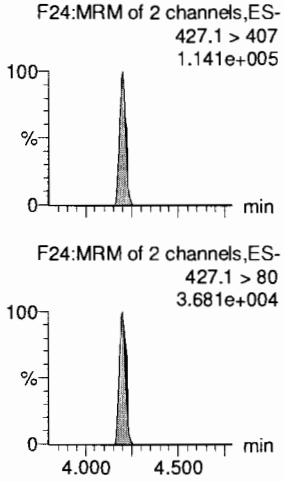
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

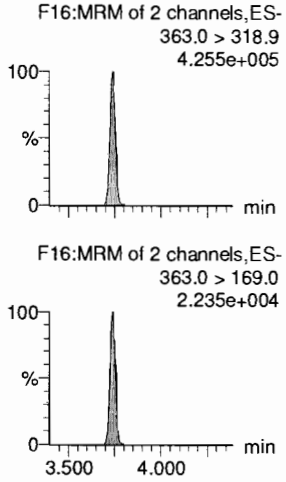
Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

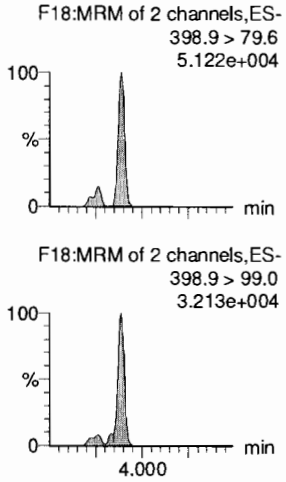
6:2 FTS



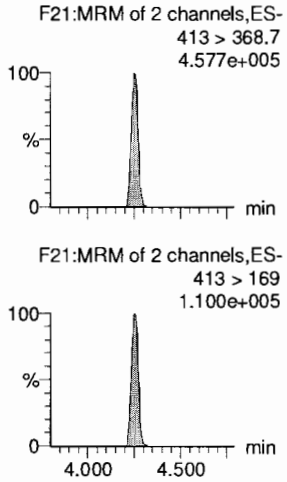
PFHpA



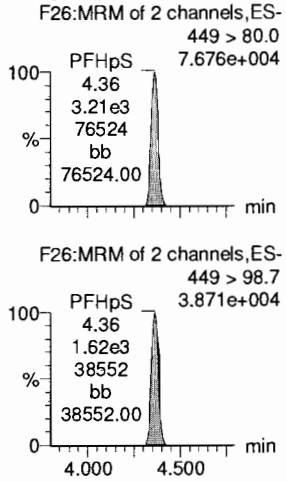
L-PFHxS



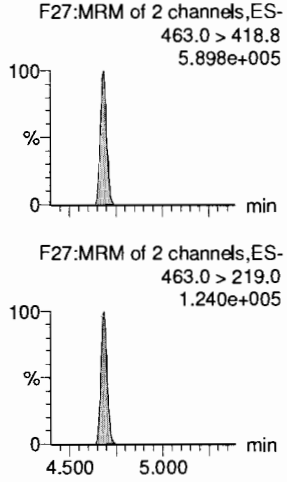
L-PFOA



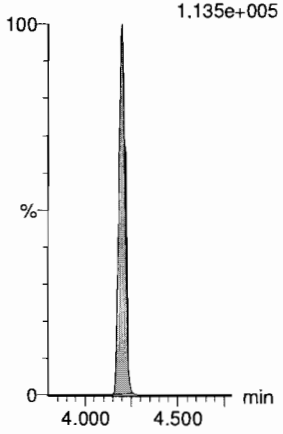
PFHpS



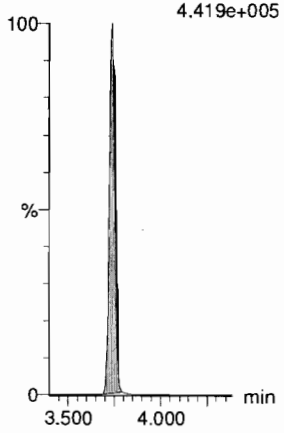
PFNA



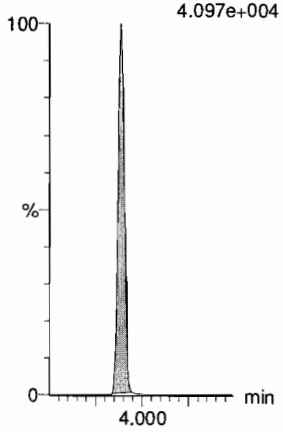
13C2-6:2 FTS



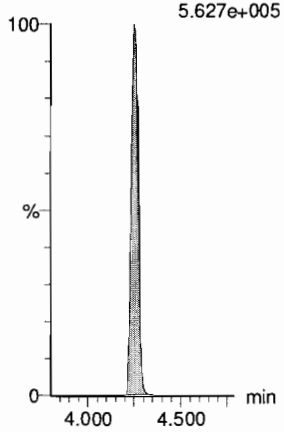
13C4-PFHpA



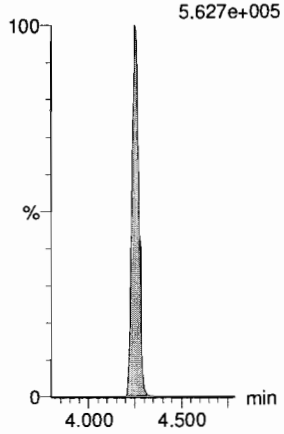
18O2-PFHxS



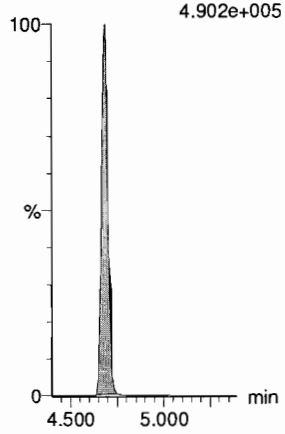
13C2-PFOA



13C2-PFOA



13C5-PFNA



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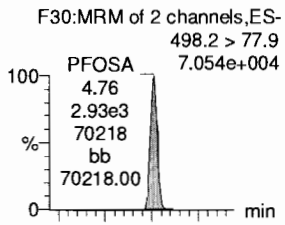
Vista Analytical Laboratory

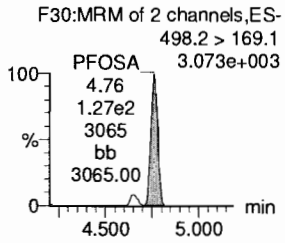
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

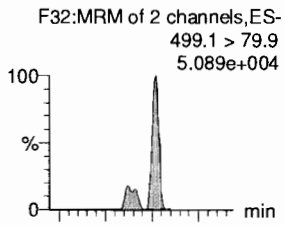
Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

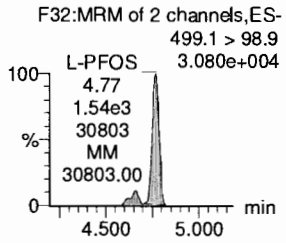
PFOSA



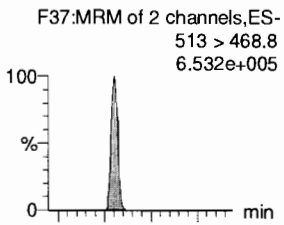


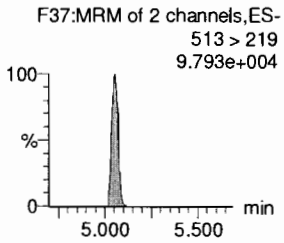
L-PFOS



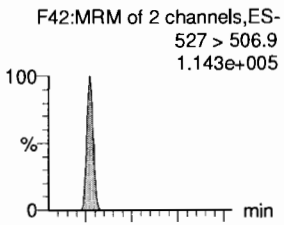


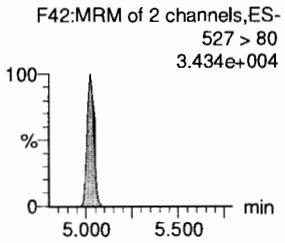
PFDA



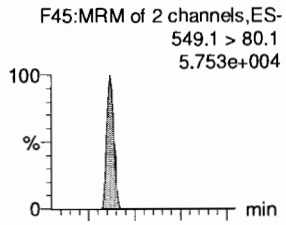


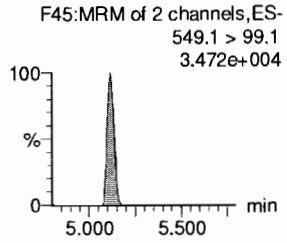
8:2 FTS



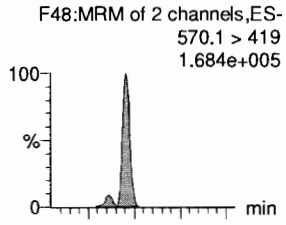


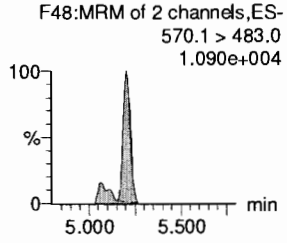
PFNS



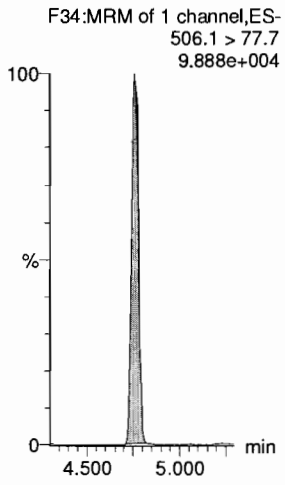


L-MeFOSAA

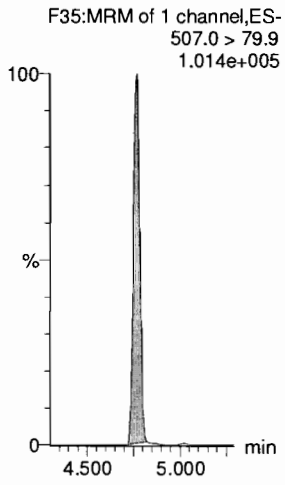




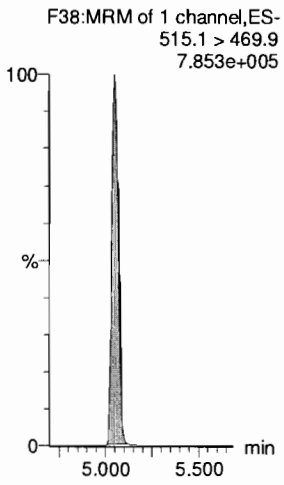
13C8-PFOSA



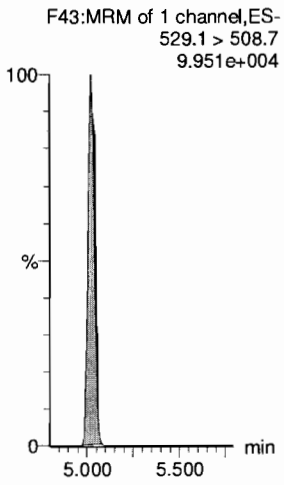
13C8-PFOS



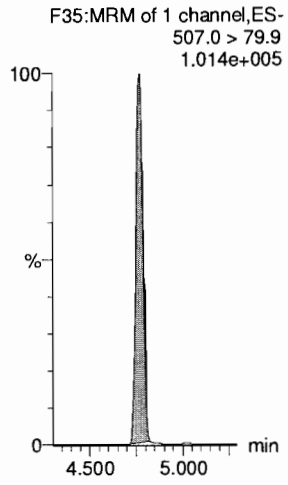
13C2-PFDA



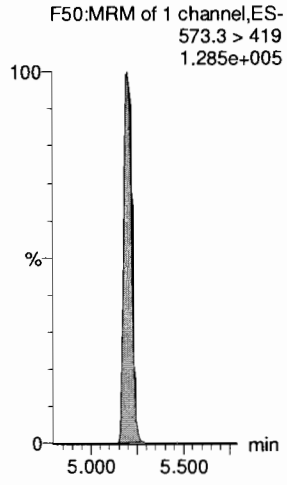
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



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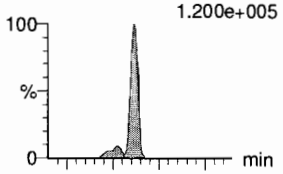
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

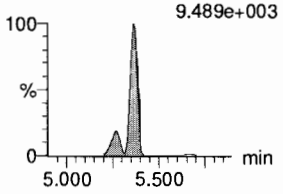
Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

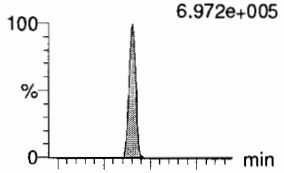
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.2 > 419
1.200e+005



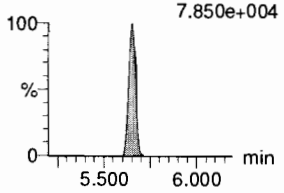
F51:MRM of 2 channels,ES-
584.2 > 483.0
9.489e+003



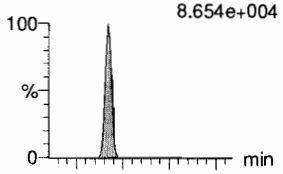
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
6.972e+005



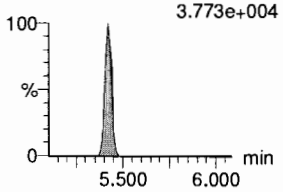
F54:MRM of 4 channels,ES-
612.9 > 318.8
7.850e+004



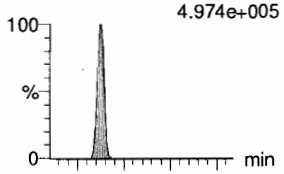
PFDS
F53:MRM of 2 channels,ES-
598.8 > 80
8.654e+004



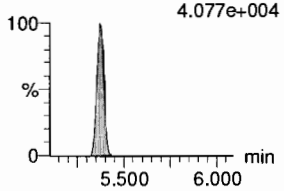
F53:MRM of 2 channels,ES-
598.8 > 98.7
3.773e+004



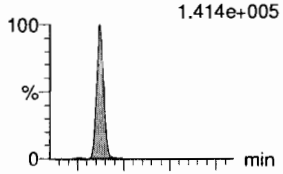
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
4.974e+005



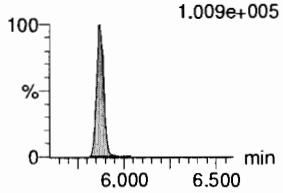
F46:MRM of 2 channels,ES-
563.0 > 269
4.077e+004



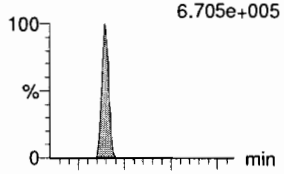
N-MeFOSA
F36:MRM of 2 channels,ES-
512.1 > 168.9
1.414e+005



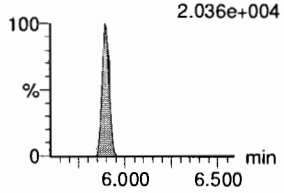
F36:MRM of 2 channels,ES-
512.1 > 219
1.009e+005



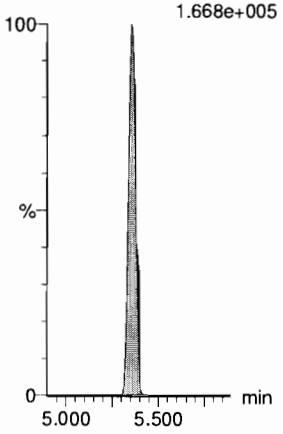
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
6.705e+005



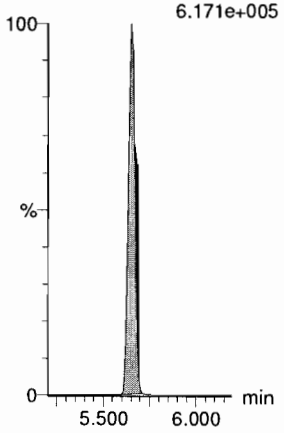
F60:MRM of 2 channels,ES-
662.9 > 319
2.036e+004



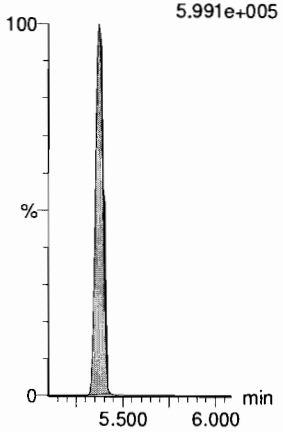
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
1.668e+005



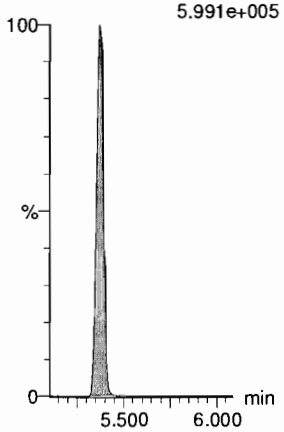
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
6.171e+005



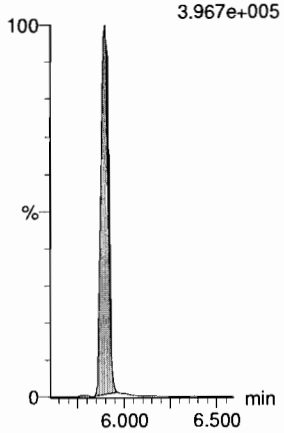
13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
5.991e+005



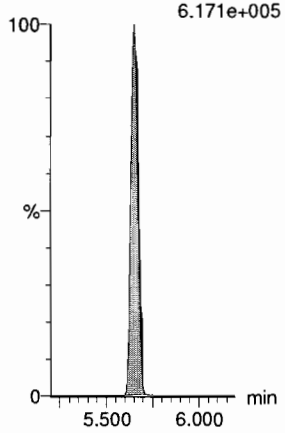
13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
5.991e+005



d3-N-MeFOSA
F39:MRM of 1 channel,ES-
515.2 > 168.9
3.967e+005



13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
6.171e+005



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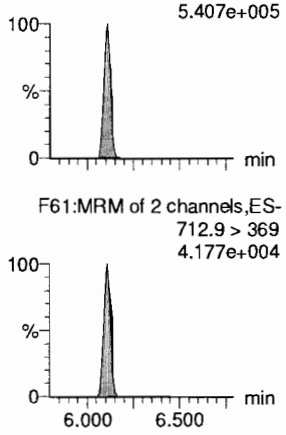
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

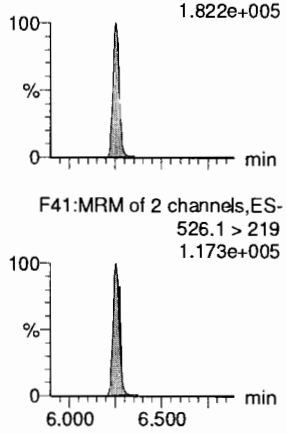
Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

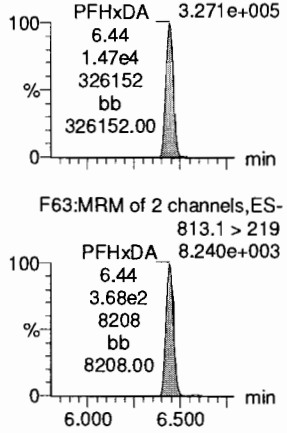
PFTeDA



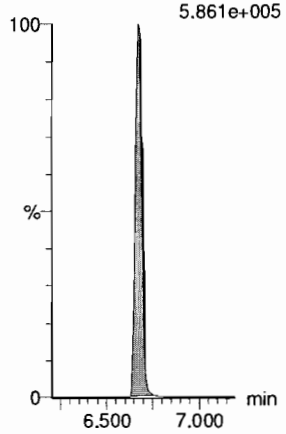
N-EtFOSA



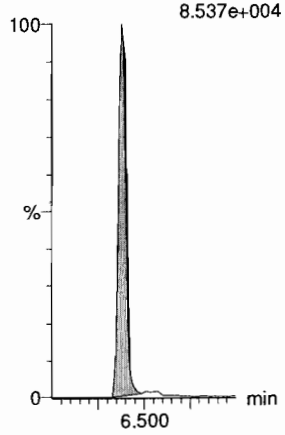
PFHxDA



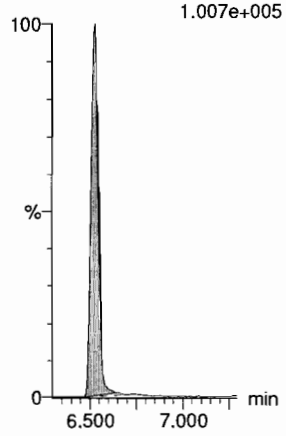
PFODA



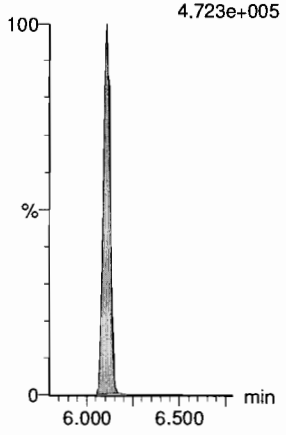
N-MeFOSE



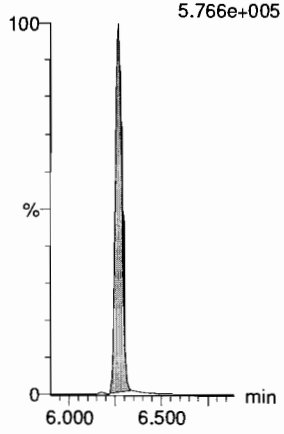
N-EtFOSE



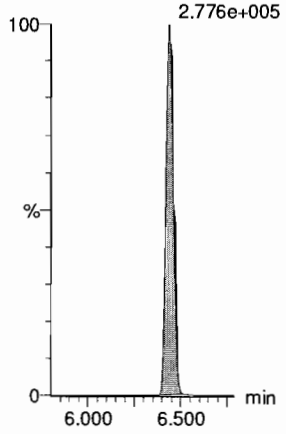
13C2-PFTeDA



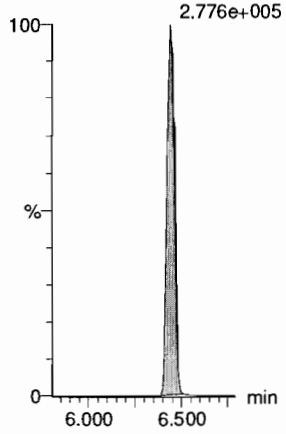
d5-N-ETFOSA



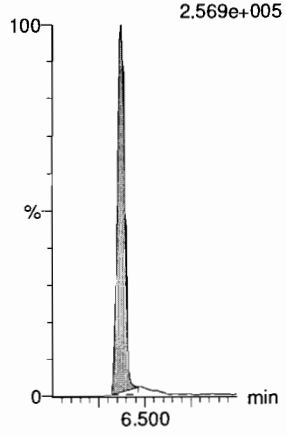
13C2-PFHxDA



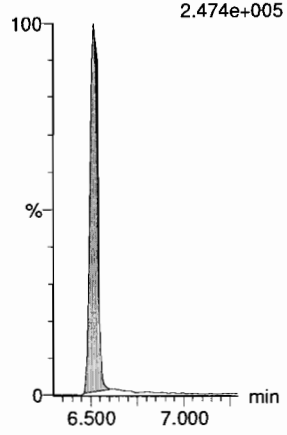
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



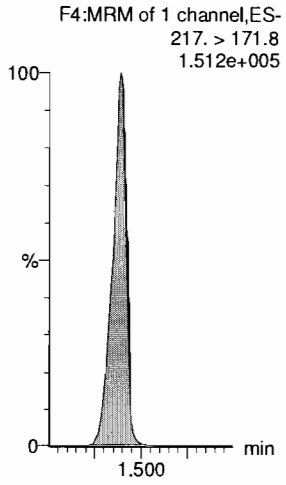
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-28.qld

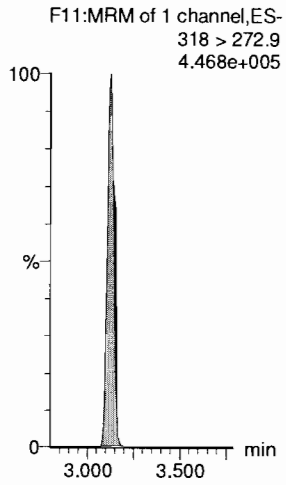
Last Altered: Monday, June 04, 2018 14:18:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:18:34 Pacific Daylight Time

Name: 180603M2_28, Date: 03-Jun-2018, Time: 22:42:58, ID: ST180603M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

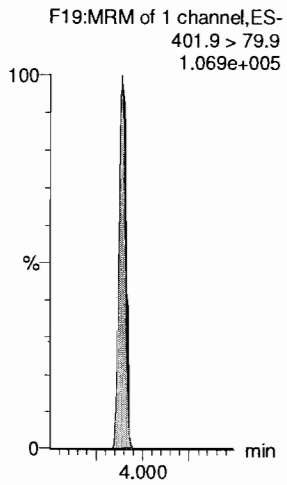
13C4-PFBA



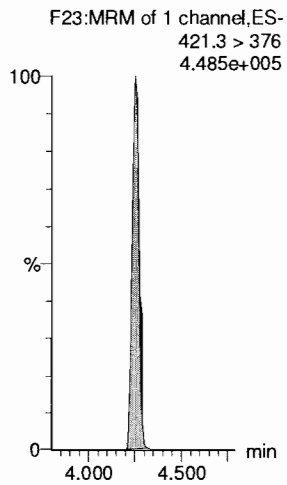
13C5-PFHxA



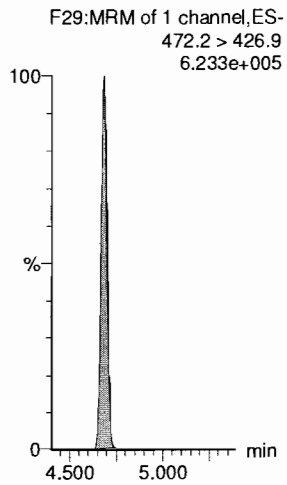
13C3-PFHxS



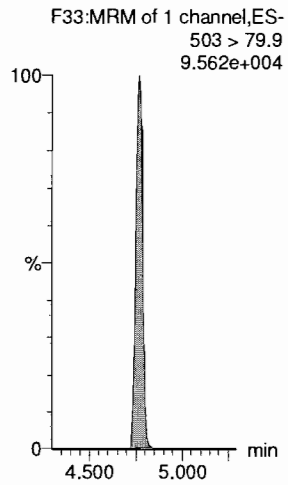
13C8-PFOA



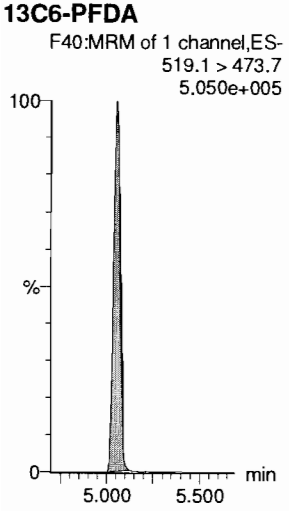
13C9-PFNA



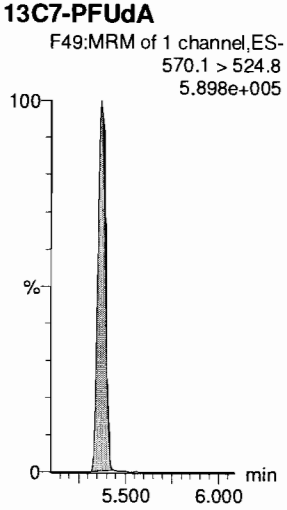
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:42 Pacific Daylight Time

JAD 6/5/18

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 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...	1.06e4	1.18e4		1.41	1.40	11.2	10.0	100.2	NO		
2	2	PFPeA	263.1 > 21...	1.32e4	1.60e4		2.36	2.37	10.3	10.2	101.9	NO		
3	3	PFBS	299.0 > 79.7	3.19e3	2.03e3		2.65	2.65	19.6	10.0	100.5	NO	2.618	NO
4	4	4:2 FTS	327.2>307.2	3.81e3	4.13e3		3.05	3.05	11.5	10.2	101.9	NO	1.927	NO
5	5	PFHxA	313.2 > 26...	1.78e4	5.54e3		3.14	3.14	16.0	10.5	104.7	NO	245.010	YES
6	6	PFPeS	349.1>80.1	2.88e3	2.03e3		3.35	3.34	17.7	9.67	96.7	NO	1.704	NO
7	7	PFHpA	363.0 > 31...	1.49e4	1.54e4		3.75	3.75	12.1	10.5	104.9	NO	20.295	NO
8	8	L-PFHxS	398.9 > 79.6	2.50e3	1.76e3		3.90	3.90	17.7	9.23	92.3	NO	1.646	NO
9	10	6:2 FTS	427.1 > 407	4.23e3	4.22e3		4.19	4.21	12.5	10.7	107.1	NO	3.206	NO
10	11	L-PFOA	413 > 368.7	1.82e4	2.49e4		4.25	4.26	9.15	9.25	92.5	NO	4.211	NO
11	13	PFHpS	449 > 80.0	3.15e3	2.49e4		4.36	4.37	1.58	9.83	98.3	NO	1.840	NO
12	14	PFNA	463.0 > 41...	2.44e4	2.31e4		4.68	4.69	13.2	9.81	98.1	NO	5.142	NO
13	15	PFOSA	498.2 > 77.9	3.02e3	3.96e3		4.75	4.77	9.52	11.2	112.3	NO	26.781	NO
14	16	L-PFOS	499.1 > 79.9	3.20e3	4.15e3		4.77	4.78	9.65	10.5	105.2	NO	2.062	NO
15	18	PFDA	513 > 468.8	2.46e4	3.09e4		5.06	5.06	9.94	9.78	97.8	NO	6.964	NO
16	19	8:2 FTS	527 > 506.9	4.69e3	3.80e3		5.03	5.03	15.4	10.9	108.9	NO	2.908	NO
17	20	PFNS	549.1>80.1	2.82e3	4.15e3		5.13	5.12	8.50	10.6	105.6	NO	1.709	NO
18	21	L-MeFOSAA	570.1 > 419	7.99e3	5.82e3		5.22	5.21	17.2	8.53	85.3	NO	12.086	NO
19	23	L-EtFOSAA	584.2 > 419	6.52e3	7.58e3		5.37	5.37	10.7	9.03	90.3	NO	16.875	NO

GM 6/4/2018

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 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...	2.33e4	2.93e4		5.39	5.38	9.91	10.8	108.1	NO	12.108	NO
2	26	PFDS	598.8 > 80	3.38e3	2.93e4		5.44	5.42	1.44	9.50	95.0	NO	2.083	NO
3	27	PFDoA	612.9 > 56...	2.43e4	2.76e4		5.67	5.66	11.0	7.71	77.1	NO	8.409	NO
4	28	N-MeFOSA	512.1 > 16...	6.20e3	1.74e4		5.83	5.88	53.6	51.8	103.6	NO	1.365	NO
5	29	PFTrDA	662.9 > 61...	2.90e4	2.76e4		5.92	5.90	13.1	9.13	91.3	NO	29.538	NO
6	30	PFTeDA	712.9 > 66...	2.13e4	2.28e4		6.14	6.11	11.7	10.7	106.7	NO	12.630	NO
7	31	N-EtFOSA	526.1 > 16...	7.40e3	2.39e4		6.24	6.26	46.4	50.7	101.4	NO	1.519	NO
8	32	PFHxDA	813.1 > 76...	1.45e4	1.28e4		6.48	6.44	5.65	9.44	94.4	NO	35.022	NO
9	33	PFODA	913.1 > 86...	2.18e4	1.28e4		6.71	6.68	8.49	10.9	109.2	NO		
10	34	N-MeFOSE	616.1 > 58.9	4.04e3	1.25e4		6.41	6.38	48.4	49.4	98.7	NO		
11	35	N-EtFOSE	630.1 > 58.9	4.90e3	1.15e4		6.56	6.53	64.0	52.0	103.9	NO		
12	36	13C3-PFBA	216.1 > 17...	1.18e4	1.32e4	0.892	1.33	1.41	11.2	12.5	100.3	NO		
13	37	13C3-PFPeA	266. > 221.8	1.60e4	1.88e4	0.848	2.32	2.37	10.6	12.5	100.0	NO		
14	38	13C3-PFBS	302. > 98.8	2.03e3	1.88e4	0.102	2.61	2.65	1.35	13.2	105.8	NO		
15	39	13C2-4:2 FTS	329.2>308.9	4.13e3	1.88e4	0.231	3.02	3.05	2.75	11.9	95.0	NO		
16	40	13C2-PFHxA	315 > 269.8	5.54e3	1.88e4	0.744	3.10	3.14	3.68	4.94	98.9	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.54e4	1.88e4	0.841	3.72	3.75	10.2	12.2	97.5	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.76e3	3.97e3	0.415	3.87	3.90	5.55	13.4	107.0	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	4.22e3	2.23e4	0.232	4.19	4.21	2.36	10.2	81.7	NO		
20	44	13C2-PFOA	414.9 > 36...	2.49e4	2.23e4	1.256	4.25	4.26	13.9	11.1	88.8	NO		
21	45	13C5-PFNA	468.2 > 42...	2.31e4	2.32e4	0.960	4.69	4.69	12.4	13.0	103.7	NO		
22	46	13C8-PFOSA	506.1 > 77.7	3.96e3	2.63e4	0.145	4.75	4.77	1.88	13.0	103.9	NO		
23	47	13C8-PFOS	507.0 > 79.9	4.15e3	4.24e3	1.047	4.77	4.78	12.2	11.7	93.5	NO		
24	48	13C2-PFDA	515.1 > 46...	3.09e4	2.49e4	1.118	5.06	5.06	15.5	13.9	111.1	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.80e3	1.88e4	0.211	5.03	5.03	2.53	12.0	95.9	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	5.82e3	2.63e4	0.182	5.21	5.20	2.77	15.2	121.4	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	7.58e3	2.63e4	0.223	5.37	5.36	3.61	16.2	129.6	NO		
28	52	13C2-PFUdA	565 > 519.8	2.93e4	2.63e4	0.958	5.39	5.38	14.0	14.6	116.6	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.76e4	2.49e4	1.138	5.67	5.65	13.9	12.2	97.4	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.74e4	2.63e4	0.051	5.85	5.90	8.26	162	108.3	NO		
31	55	13C2-PFTeDA	714.8 > 66...	2.28e4	2.63e4	0.862	6.14	6.11	10.8	12.6	100.5	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	2.39e4	2.63e4	0.066	6.26	6.28	11.4	172	114.6	NO		

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 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	1.28e4	2.63e4	1.173	6.48	6.44	6.10	5.20	104.1	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.25e4	2.63e4	0.038	6.40	6.37	5.96	158	105.5	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	1.15e4	2.63e4	0.035	6.54	6.52	5.46	155	103.1	NO		
36	60	13C4-PFBA	217. > 171.8	1.32e4	1.32e4	1.000	1.33	1.41	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.88e4	1.88e4	1.000	3.10	3.14	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	3.97e3	3.97e3	1.000	3.87	3.90	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	2.23e4	2.23e4	1.000	4.25	4.26	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	2.32e4	2.32e4	1.000	4.69	4.69	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	4.24e3	4.24e3	1.000	4.77	4.78	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.49e4	2.49e4	1.000	5.06	5.06	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.63e4	2.63e4	1.000	5.39	5.38	12.5	12.5	100.0	NO		

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 09:20:15 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180603M2_1	IPA	03-Jun-18	17:55:38
2	2	180603M2_2	ST180603M2-2 PFC CS-2 18E2902	03-Jun-18	18:07:52
3	3	180603M2_3	ST180603M2-2 PFC CS-1 18E2903	03-Jun-18	18:18:22
4	4	180603M2_4	ST180603M2-3 PFC CS0 18E2904	03-Jun-18	18:28:47
5	5	180603M2_5	ST180603M2-4 PFC CS1 18E2905	03-Jun-18	18:39:17
6	6	180603M2_6	ST180603M2-5 PFC CS2 18E2906	03-Jun-18	18:49:42
7	7	180603M2_7	ST180603M2-6 PFC CS3 18E2907	03-Jun-18	19:00:12
8	8	180603M2_8	ST180603M2-7 PFC CS4 18E2908	03-Jun-18	19:10:37
9	9	180603M2_9	ST180603M2-8 PFC CS5 18E2909	03-Jun-18	19:21:07
10	10	180603M2_10	ST180603M2-9 PFC CS6 18E2910	03-Jun-18	19:31:33
11	11	180603M2_11	ST180603M2-10 PFC CS7 18E2911	03-Jun-18	19:42:03
12	12	180603M2_12	IPA	03-Jun-18	19:52:27
13	13	180603M2_13	ICV180603M2-1 PFC 537 ICV 18E2901	03-Jun-18	20:02:58
14	14	180603M2_14	IPA	03-Jun-18	20:13:28
15	15	180603M2_15	B8F0002-BS1 OPR 0.125	03-Jun-18	20:27:03
16	16	180603M2_16	B8F0002-BLK1 Method Blank 0.125	03-Jun-18	20:37:28
17	17	180603M2_17	1801010-01RE1 GSUMW00505101805...	03-Jun-18	20:47:59
18	18	180603M2_18	1801010-02RE1 MW0081819180517G...	03-Jun-18	20:58:23
19	19	180603M2_19	1801010-03RE1 MW0083738180517R...	03-Jun-18	21:08:54
20	20	180603M2_20	1801010-04RE1 MW0052021180517M...	03-Jun-18	21:19:18
21	21	180603M2_21	1801010-05RE1 MW0056061180517R...	03-Jun-18	21:29:49
22	22	180603M2_22	1801010-06RE1 MW0071920180517R...	03-Jun-18	21:40:13
23	23	180603M2_23	1801010-07RE1 MW0074849180517G...	03-Jun-18	21:50:44
24	24	180603M2_24	1801010-08RE1 MW0065051180517R...	03-Jun-18	22:01:08
25	25	180603M2_25	1801010-09RE1 MW0060510180517G...	03-Jun-18	22:11:39
26	26	180603M2_26	1801010-10RE1 MW0010308180518G...	03-Jun-18	22:22:04
27	27	180603M2_27	IPA	03-Jun-18	22:32:34
28	28	180603M2_28	ST180603M2-11 PFC CS3 18E2907	03-Jun-18	22:42:58
29	29	180603M2_29	IPA	03-Jun-18	22:53:29
30	30	180603M2_30	1801010-11RE1 MW0030207180518G...	03-Jun-18	23:03:59
31	31	180603M2_31	1801010-12RE1 MW0034647180518R...	03-Jun-18	23:14:25
32	32	180603M2_32	1801010-13RE1 GSUMW00311161805...	03-Jun-18	23:24:55

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Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
33	33	180603M2_33	1801010-14RE1 MW0093233180518R...	03-Jun-18	23:35:20
34	34	180603M2_34	1801010-15RE1 MW0091516180518M...	03-Jun-18	23:45:50
35	35	180603M2_35	B8F0004-BS1 OPR 0.125	03-Jun-18	23:56:15
36	36	180603M2_36	B8F0004-BSD1 LCSD 0.125	04-Jun-18	00:06:45
37	37	180603M2_37	B8F0004-BLK1 Method Blank 0.125	04-Jun-18	00:17:09
38	38	180603M2_38	1801039-01 A1-MW-13-SA1 0.10967	04-Jun-18	00:27:40
39	39	180603M2_39	1801039-02 A1-MW-11-SA1 0.11624	04-Jun-18	00:38:04
40	40	180603M2_40	1801039-03 A1-MW-14-SA1 0.11194	04-Jun-18	00:48:35
41	41	180603M2_41	1801039-04 A1-MW-15-SA1 0.11248	04-Jun-18	00:59:00
42	42	180603M2_42	1801039-07 A1-MW-25-SA1 0.11252	04-Jun-18	01:09:30
43	43	180603M2_43	1801039-08 FRB-20180524 0.11695	04-Jun-18	01:19:55
44	44	180603M2_44	B8F0003-BS1 OPR 0.125	04-Jun-18	01:30:25
45	45	180603M2_45	B8F0003-BLK1 Method Blank 0.125	04-Jun-18	01:40:51
46	46	180603M2_46	IPA	04-Jun-18	01:51:22
47	47	180603M2_47	ST180603M2-12 PFC CS3 18E2907	04-Jun-18	02:01:52
48	48	180603M2_48	IPA	04-Jun-18	02:12:16
49	49	180603M2_49	1800937-01RE1 CL1TMW0118180503...	04-Jun-18	02:22:47
50	50	180603M2_50	1800937-02RE1 CL1TMW0405180504...	04-Jun-18	02:33:17
51	51	180603M2_51	1800937-03RE1 CL1SW0300180508N ...	04-Jun-18	02:43:42
52	52	180603M2_52	1800937-04RE1 CL1SW0400180508N ...	04-Jun-18	02:54:12
53	53	180603M2_53	1800937-05RE1 CL1SW0500180508N ...	04-Jun-18	03:04:35
54	54	180603M2_54	1800937-06RE1 CL1DR0100180508N ...	04-Jun-18	03:15:06
55	55	180603M2_55	1800937-07RE1 CL1DR0300180508N ...	04-Jun-18	03:25:30
56	56	180603M2_56	1800937-08RE1 CL1DR0200180509N ...	04-Jun-18	03:36:00
57	57	180603M2_57	1800937-09RE1 CL1SW0100180509N ...	04-Jun-18	03:46:30
58	58	180603M2_58	1800937-10RE1 CL1SW0200180509N ...	04-Jun-18	03:56:55
59	59	180603M2_59	IPA	04-Jun-18	04:07:25
60	60	180603M2_60	ST180603M2-13 PFC CS3 18E2907	04-Jun-18	04:17:50
61	61	180603M2_61	IPA	04-Jun-18	04:28:21
62	62	180603M2_62	ST180603M2-14 PFC CS0 18E2904	04-Jun-18	04:38:46
63	63	180603M2_63	IPA	04-Jun-18	04:49:16
64	64	180603M2_64	1800882-02RE1 731 0.12084	04-Jun-18	04:59:39
65	65	180603M2_65	1800882-03RE1 781 0.11874	04-Jun-18	05:10:10
66	66	180603M2_66	1800882-04RE1 702 0.11993	04-Jun-18	05:20:35
67	67	180603M2_67	1800882-05RE1 Trip Blank 0.12132	04-Jun-18	05:31:05
68	68	180603M2_68	1800882-06RE1 Trip Blank 0.12059	04-Jun-18	05:41:30

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Last Altered: Tuesday, June 05, 2018 09:19:21 Pacific Daylight Time
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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
69	69	180603M2_69	B8E0215-BS1 OPR 1	04-Jun-18	05:52:00
70	70	180603M2_70	B8E0215-BLK1 Method Blank 1	04-Jun-18	06:02:25
71	71	180603M2_71	1800935-05 CL1MC0100180509N 1.11	04-Jun-18	06:12:55
72	72	180603M2_72	B8E0212-BS1 OPR 5	04-Jun-18	06:23:20
73	73	180603M2_73	B8E0212-BLK1 Method Blank 5	04-Jun-18	06:33:50
74	74	180603M2_74	1801036-01 Milk 5	04-Jun-18	06:44:15
75	75	180603M2_75	B8E0173-BS1 OPR 0.25	04-Jun-18	06:54:46
76	76	180603M2_76	B8E0173-BLK1 Method Blank 0.25	04-Jun-18	07:05:11
77	77	180603M2_77	1800999-01 DPH-MW10 0.11774	04-Jun-18	07:15:41
78	78	180603M2_78	1800999-02 DPH-MW19 0.12462	04-Jun-18	07:26:05
79	79	180603M2_79	1800999-03 DPH-MW23 0.1216	04-Jun-18	07:36:36
80	80	180603M2_80	IPA	04-Jun-18	07:47:01
81	81	180603M2_81	ST180603M2-15 PFC CS3 18E2907	04-Jun-18	07:57:31
82	82	180603M2_82	IPA	04-Jun-18	08:07:56
83	83	180603M2_83	1800837-12 REEPDW409FRB 0.12029	04-Jun-18	08:18:27
84	84	180603M2_84	B8E0169-BS1 OPR 0.125	04-Jun-18	08:28:51
85	85	180603M2_85	B8E0169-BSD1 LCSD 0.125	04-Jun-18	08:39:22
86	86	180603M2_86	B8E0169-BLK1 Method Blank 0.125	04-Jun-18	08:49:47
87	87	180603M2_87	1800954-01 REEPDW499 0.12056	04-Jun-18	09:00:17
88	88	180603M2_88	1800954-02 REEPDW1007 0.11869	04-Jun-18	09:10:47
89	89	180603M2_89	1800954-03 REEPDW1008 0.11591	04-Jun-18	09:21:11
90	90	180603M2_90	1800954-04 REEPDW1009 0.11871	04-Jun-18	09:31:42
91	91	180603M2_91	1800954-05 REEPDW1010 0.1202	04-Jun-18	09:42:06
92	92	180603M2_92	1800954-06 REEPDW550 0.11863	04-Jun-18	09:52:36
93	93	180603M2_93	1800954-07 REEPDW1011 0.11919	04-Jun-18	10:03:01
94	94	180603M2_94	1800954-08 REEPDW1012 0.11288	04-Jun-18	10:13:31
95	95	180603M2_95	1800954-09 REEPDW1001 0.12106	04-Jun-18	10:23:57
96	96	180603M2_96	1800954-10 REEPDW1003 0.11189	04-Jun-18	10:34:27
97	97	180603M2_97	IPA	04-Jun-18	10:44:52
98	98	180603M2_98	ST180603M2-16 PFC CS3 18E2907	04-Jun-18	10:55:22
99	99	180603M2_99	IPA	04-Jun-18	11:05:53
100	1...	180603M2_100	1800954-11 REEPDW1004 0.11763	04-Jun-18	11:16:18
101	1...	180603M2_101	1800954-12 REEPDW1006 0.11887	04-Jun-18	11:26:48
102	1...	180603M2_102	1800954-13 REEPDW1013 0.11579	04-Jun-18	11:37:13
103	1...	180603M2_103	1800954-14 REEPDW1014 0.11881	04-Jun-18	11:47:43
104	1...	180603M2_104	1800954-15 REEPDW1002 0.12307	04-Jun-18	11:58:08

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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
105	1...	180603M2_105	1800954-16 REEPDW1005 0.12281	04-Jun-18	12:08:38
106	1...	180603M2_106	B8E0167-BS1 OPR 0.125	04-Jun-18	12:19:02
107	1...	180603M2_107	B8E0167-BSD1 LCSD 0.125	04-Jun-18	12:29:32
108	1...	180603M2_108	B8E0167-BLK1 Method Blank 0.125	04-Jun-18	12:39:56
109	1...	180603M2_109	1800982-01 REEPDW1037 0.11872	04-Jun-18	12:50:27
110	1...	180603M2_110	1800982-02 REEPDW1048 0.12739	04-Jun-18	13:00:57
111	1...	180603M2_111	1800982-03 REEPDW1049 0.12389	04-Jun-18	13:11:23
112	1...	180603M2_112	1800982-04 REEPDW1050 0.12048	04-Jun-18	13:21:53
113	1...	180603M2_113	IPA	04-Jun-18	13:32:17
114	1...	180603M2_114	ST180603M2-17 PFC CS3 18E2907	04-Jun-18	13:42:48
115	1...	180603M2_115	IPA	04-Jun-18	13:53:18
116	1...	180603M2_116	1800982-05 REEPDW554 0.11977	04-Jun-18	14:03:43
117	1...	180603M2_117	1800982-06 REEPDW1043 0.12141	04-Jun-18	14:14:13
118	1...	180603M2_118	B8E0141-BS1 OPR 0.125	04-Jun-18	14:24:38
119	1...	180603M2_119	B8E0224-BSD1 LCSD 0.125	04-Jun-18	14:35:08
120	1...	180603M2_120	B8E0224-BS1 OPR 0.125	04-Jun-18	14:45:32
121	1...	180603M2_121	B8E0224-BLK1 Method Blank 0.125	04-Jun-18	14:56:03
122	1...	180603M2_122	1800952-13RE1 REEPDW488 0.11053	04-Jun-18	15:06:25
123	1...	180603M2_123	IPA	04-Jun-18	15:16:56
124	1...	180603M2_124	ST180603M2-18 PFC CS3 18E2907	04-Jun-18	15:27:21
125	1...	180603M2_125	IPA	04-Jun-18	15:37:51

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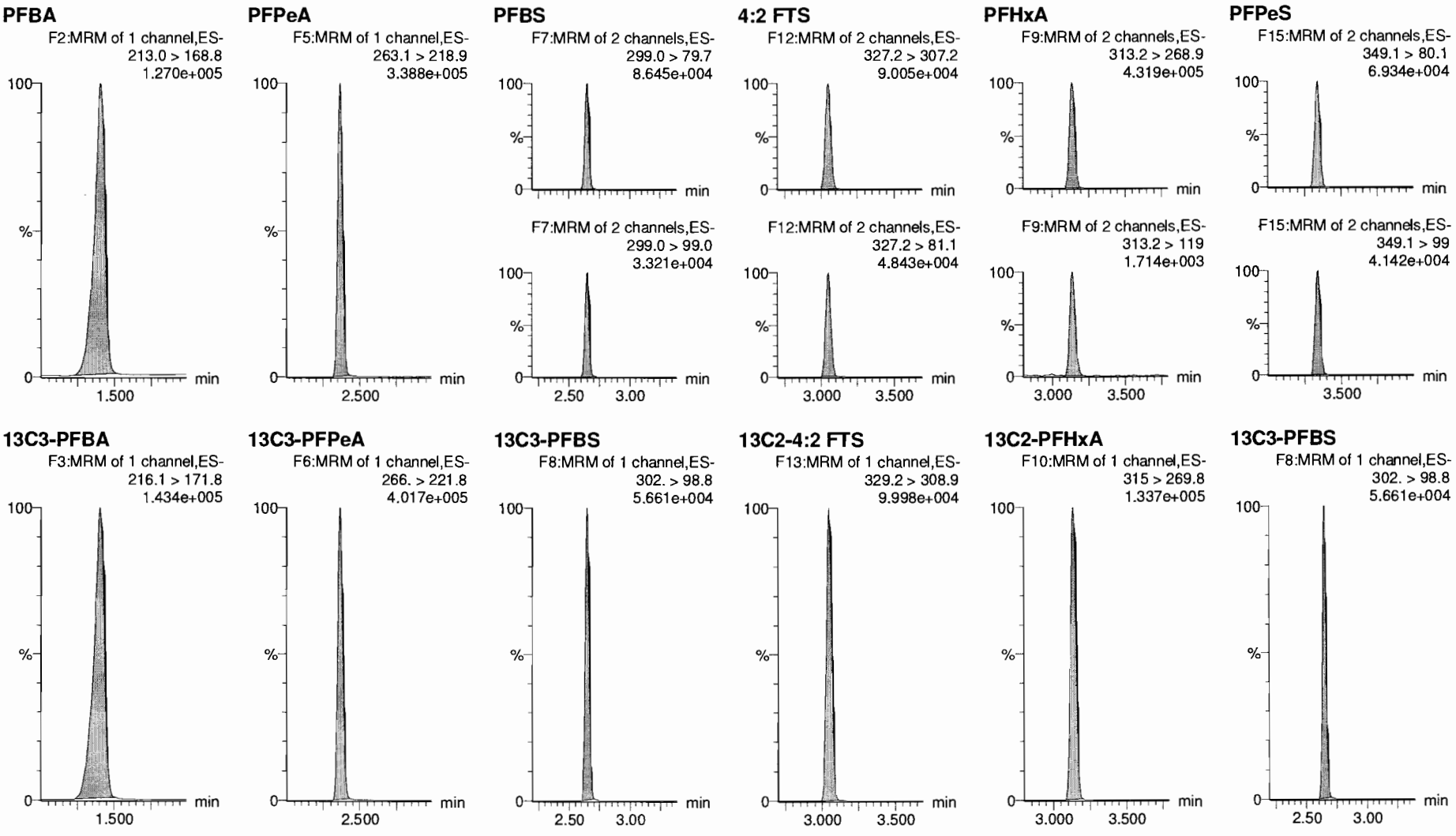
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907



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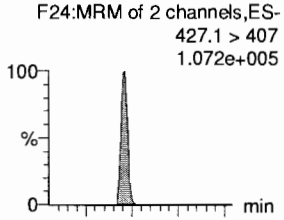
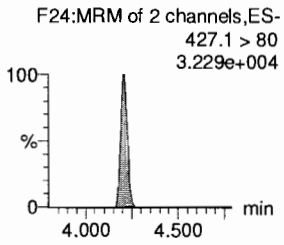
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

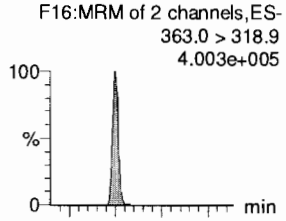
Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

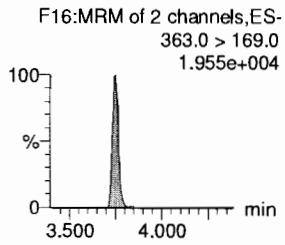
6:2 FTS



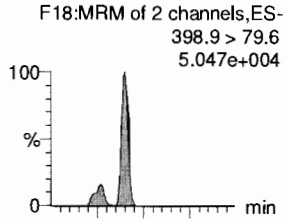


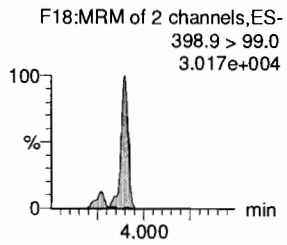
PFHpA



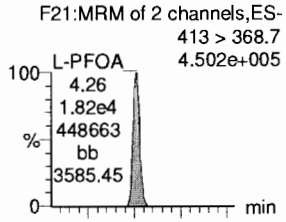


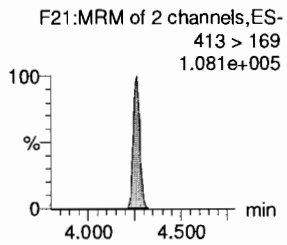
L-PFHxS



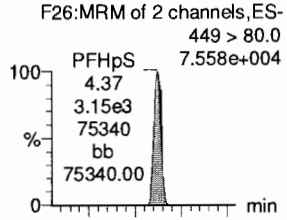


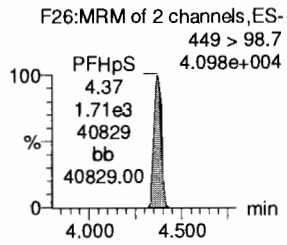
L-PFOA



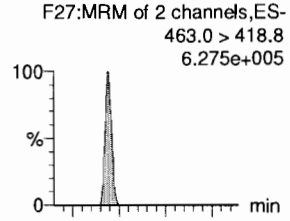


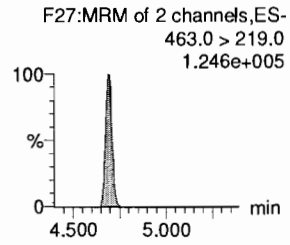
PFHpS



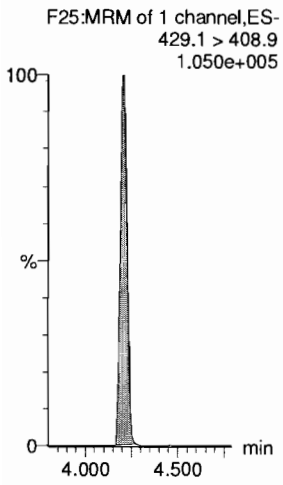


PFNA

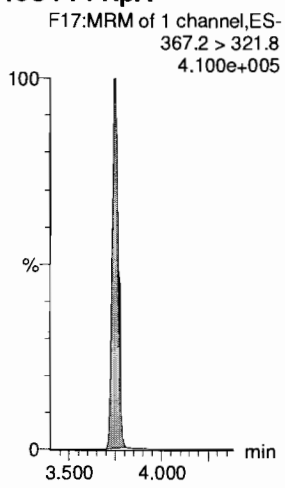




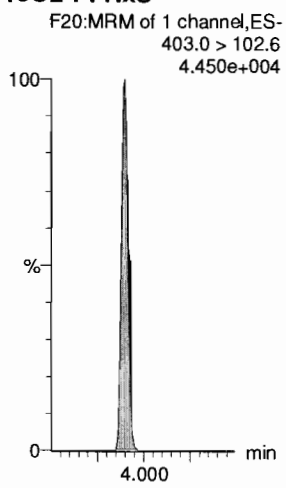
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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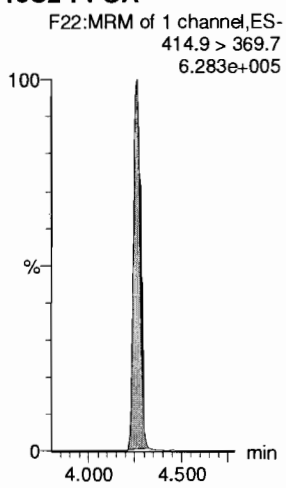
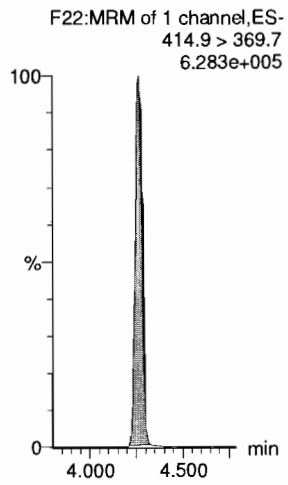
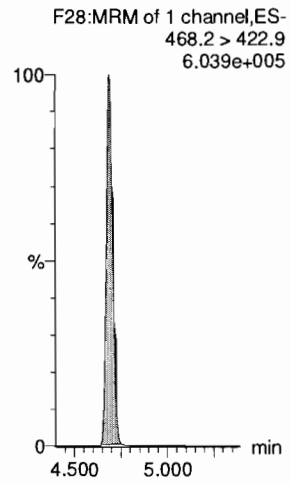


13C2-PFOA



13C5-PFNA



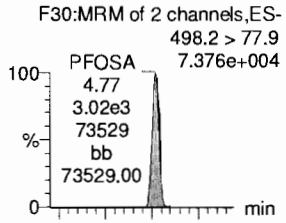
GM 6/4/2018

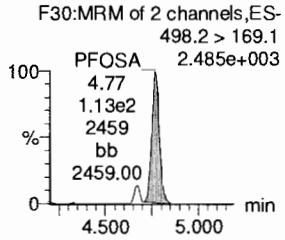
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

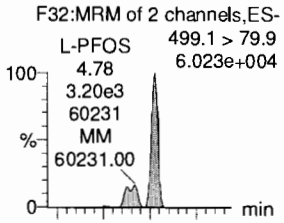
Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

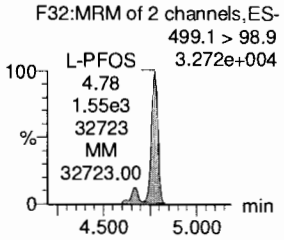
PFOSA



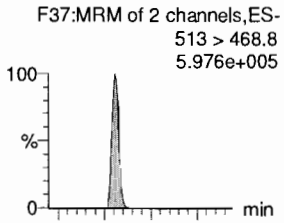


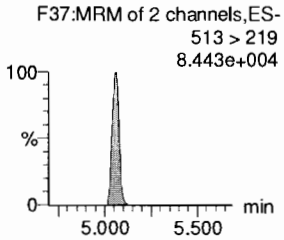
L-PFOS



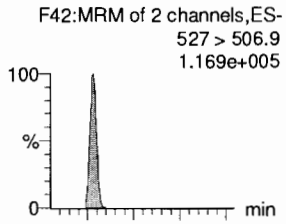


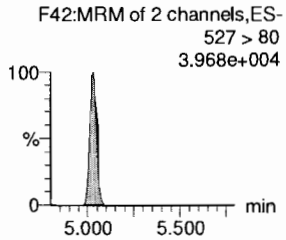
PFDA



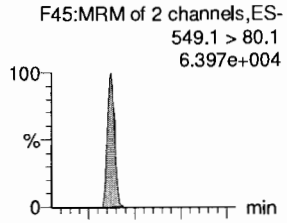


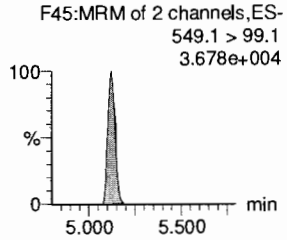
8:2 FTS



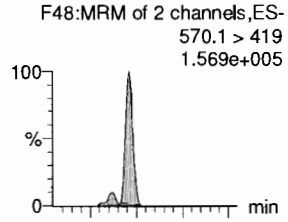


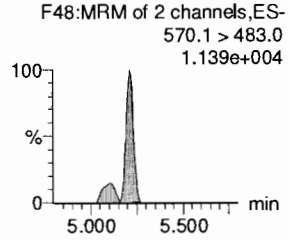
PFNS



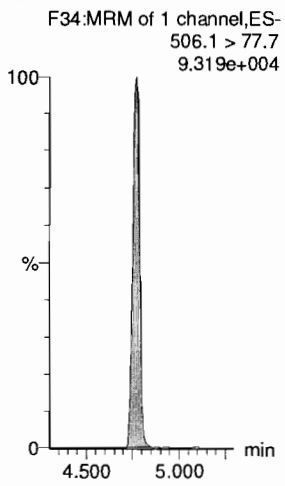


L-MeFOSAA

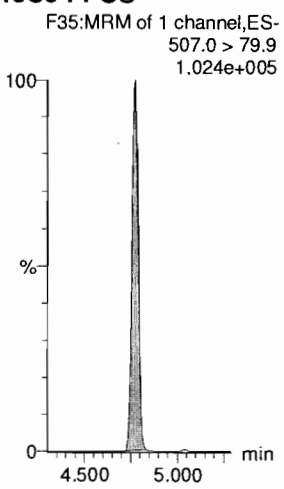




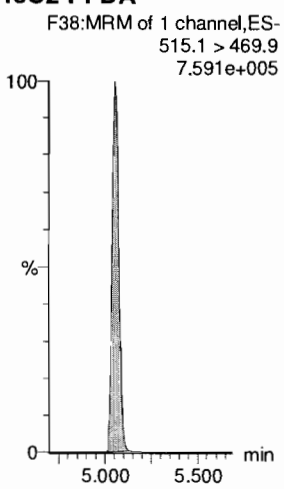
13C8-PFOSA



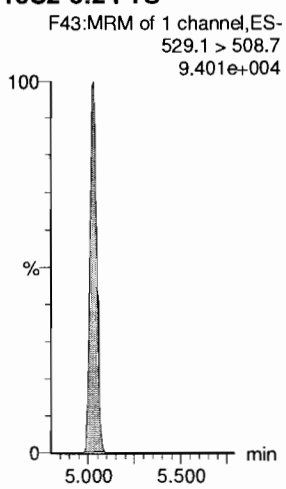
13C8-PFOS



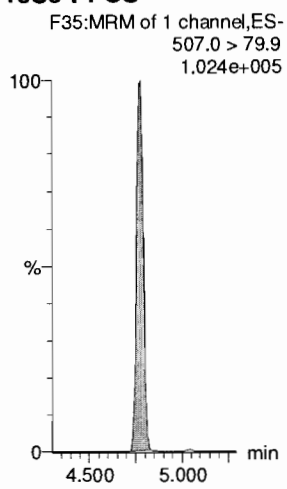
13C2-PFDA



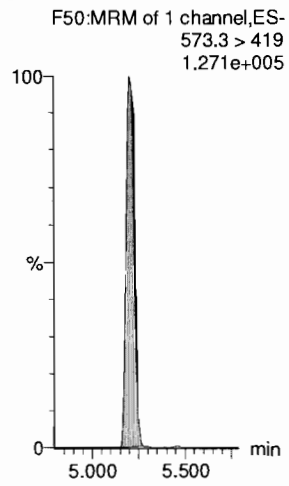
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



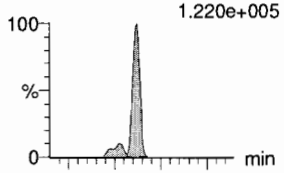
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

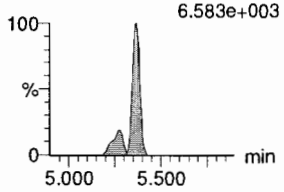
Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

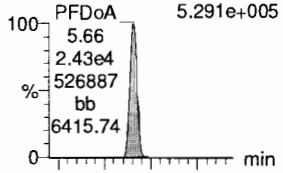
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.2 > 419
1.220e+005



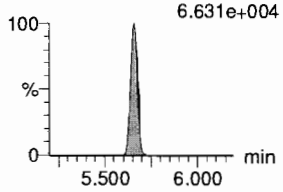
F51:MRM of 2 channels,ES-
584.2 > 483.0
6.583e+003



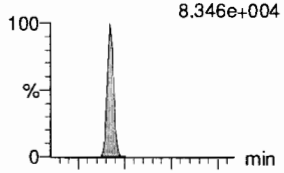
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
5.291e+005



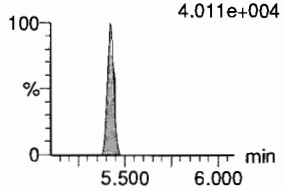
F54:MRM of 4 channels,ES-
612.9 > 318.8
6.631e+004



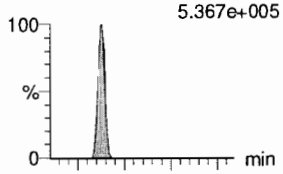
PFDS
F53:MRM of 2 channels,ES-
598.8 > 80
8.346e+004



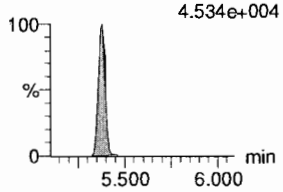
F53:MRM of 2 channels,ES-
598.8 > 98.7
4.011e+004



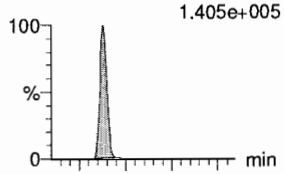
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
5.367e+005



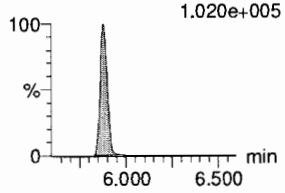
F46:MRM of 2 channels,ES-
563.0 > 269
4.534e+004



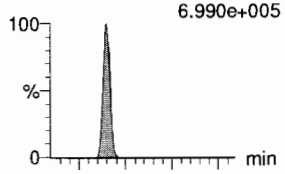
N-MeFOSA
F36:MRM of 2 channels,ES-
512.1 > 168.9
1.405e+005



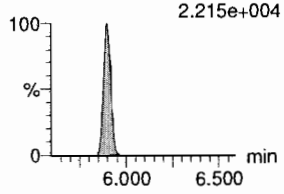
F36:MRM of 2 channels,ES-
512.1 > 219
1.020e+005



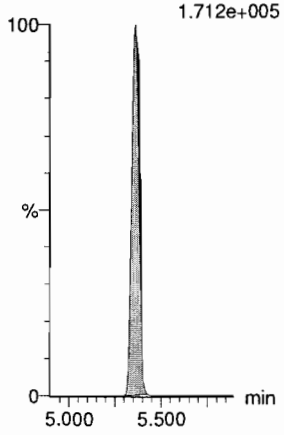
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
6.990e+005



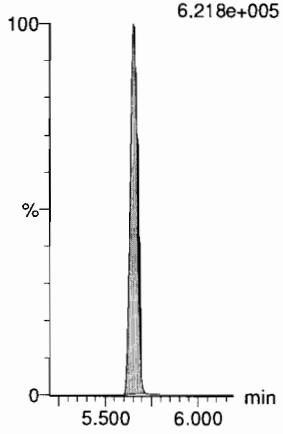
F60:MRM of 2 channels,ES-
662.9 > 319
2.215e+004



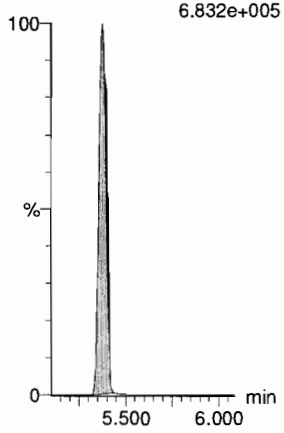
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
1.712e+005



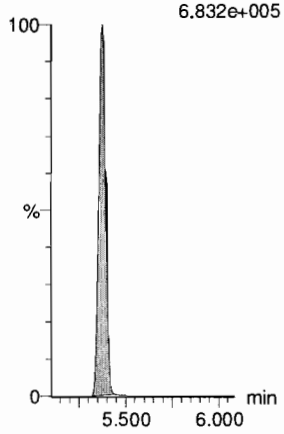
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
6.218e+005



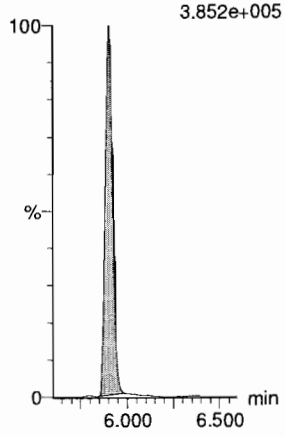
13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
6.832e+005



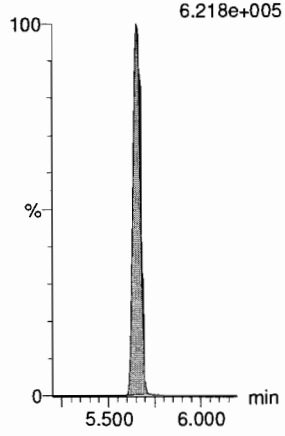
13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
6.832e+005



d3-N-MeFOSA
F39:MRM of 1 channel,ES-
515.2 > 168.9
3.852e+005



13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
6.218e+005



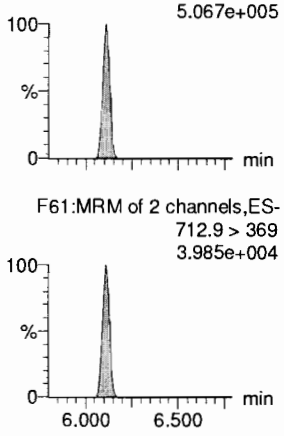
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

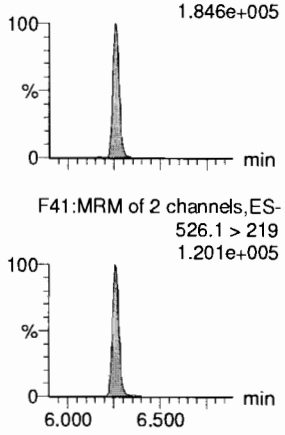
Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

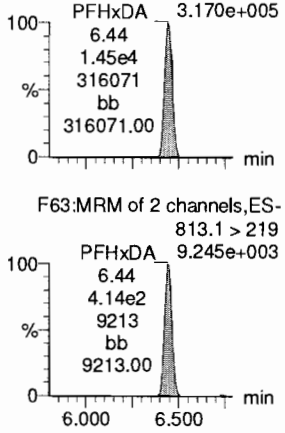
PFTeDA



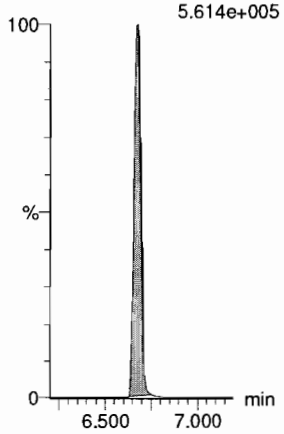
N-EtFOSA



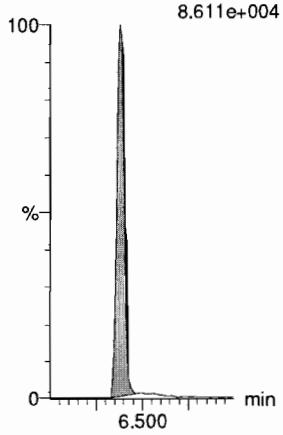
PFHxDA



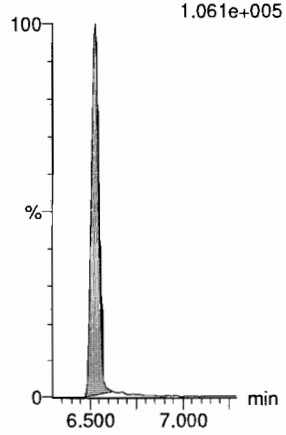
PFODA



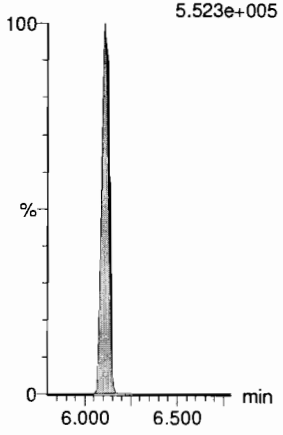
N-MeFOSE



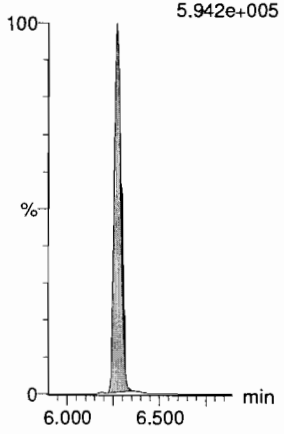
N-EtFOSE



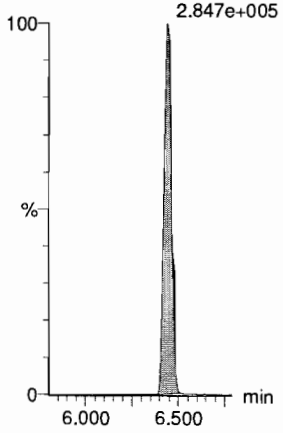
13C2-PFTeDA



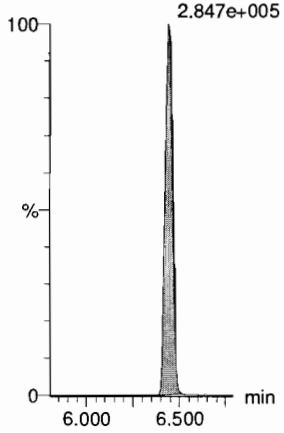
d5-N-ETFOSA



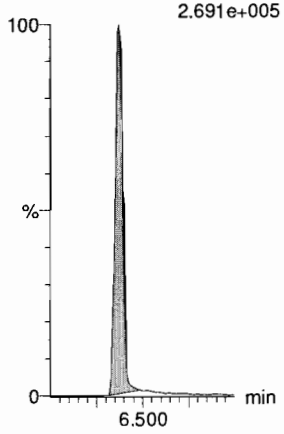
13C2-PFHxDA



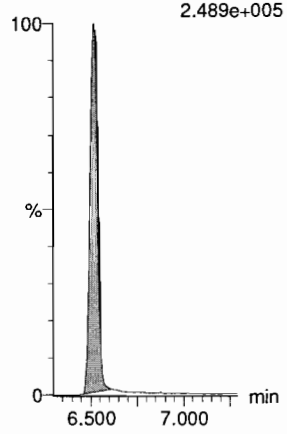
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



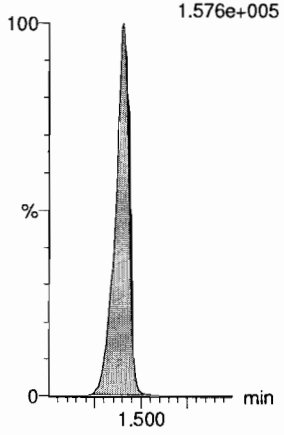
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-47.qld

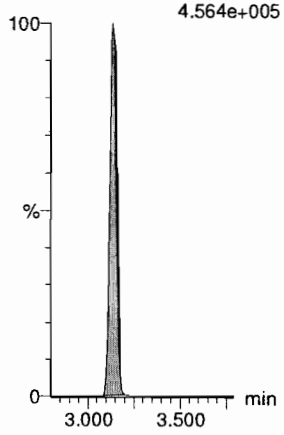
Last Altered: Monday, June 04, 2018 14:07:15 Pacific Daylight Time
Printed: Monday, June 04, 2018 14:07:53 Pacific Daylight Time

Name: 180603M2_47, Date: 04-Jun-2018, Time: 02:01:52, ID: ST180603M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

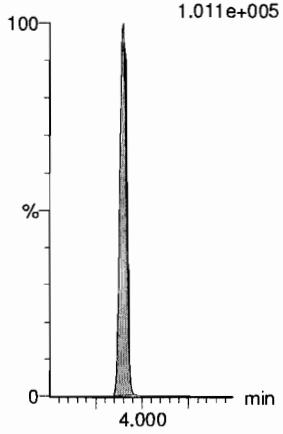
13C4-PFBA



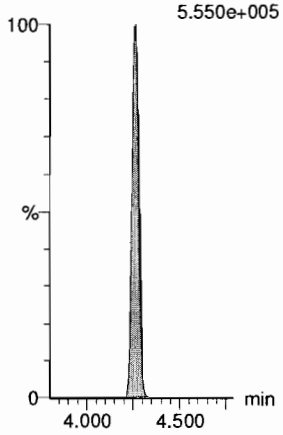
13C5-PFHxA



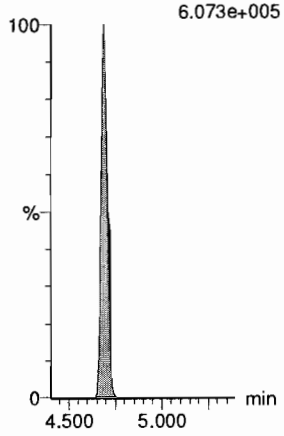
13C3-PFHxS



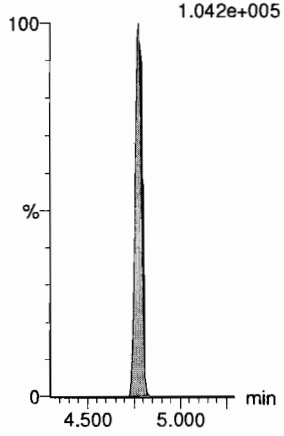
13C8-PFOA



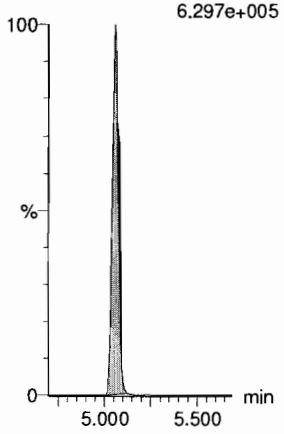
13C9-PFNA



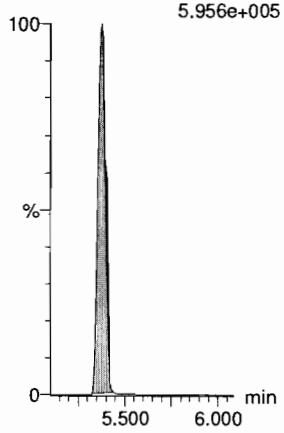
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 6/4/2018

INITIAL CALIBRATION (ICAL)

INCLUDING ASSOCIATED

INITIAL CALIBRATION VERIFICATION (ICV) AND INSTRUMENT BLANK (IB)

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:48:04 Pacific Daylight Time

high pt
4:2 FTS = 160
6:2
6:2
PFHpA = 250
PFDS =
PFDoA = 50
PFTrDA = 100
~~PFHxDA~~
PFHxDA 250

low pt
PFDS = 0.5

KBF 6/4/18
✓ KBF 6/4/18
am 6/4/18

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFBA
Correlation coefficient: r = 0.999917, r^2 = 0.999834
Calibration curve: 1.11767 * x + 0.0424299
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	180603M2_2	Standard	0.250	1.38	286.551	11057.410	0.324	0.3	0.7	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	1.38	525.447	10852.338	0.605	0.5	0.7	NO	1.000	NO	MM
3	3	180603M2_4	Standard	1.000	1.37	1104.250	11239.817	1.228	1.1	6.1	NO	1.000	NO	MM
4	4	180603M2_5	Standard	2.000	1.38	2024.444	11221.023	2.255	2.0	-1.0	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	1.38	4964.079	10714.076	5.792	5.1	2.9	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	1.38	9701.181	10688.383	11.345	10.1	1.1	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	1.38	51839.383	11217.190	57.768	51.6	3.3	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	1.38	94748.172	10361.961	114.298	102.2	2.2	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	1.38	232989.359	10428.025	279.283	249.8	-0.1	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	1.38	439369.313	9906.605	554.389	496.0	-0.8	NO	1.000	NO	bb

Compound name: PFPeA
Correlation coefficient: r = 0.999979, r^2 = 0.999958
Calibration curve: 1.01016 * x + 0.0157886
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	180603M2_2	Standard	0.250	2.34	310.555	14942.807	0.260	0.2	-3.4	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	2.34	582.212	14112.663	0.516	0.5	-1.0	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	2.34	1274.344	15401.912	1.034	1.0	0.8	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	2.34	2427.608	15167.869	2.001	2.0	-1.8	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	2.34	6160.964	14695.008	5.241	5.2	3.4	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	2.34	11782.319	14556.021	10.118	10.0	0.0	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	2.35	62629.465	15159.774	51.641	51.1	2.2	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	2.34	114228.859	14101.499	101.256	100.2	0.2	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	2.34	270507.875	13457.060	251.269	248.7	-0.5	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:48:04 Pacific Daylight Time

Compound name: PFPeA

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
10	10 180603M2_11	Standard	500.000	2.35	498344.125	12337.635	504.902	499.8	-0.0	NO	1.000	NO	bb

Compound name: PFBS
Coefficient of Determination: R^2 = 0.999815
Calibration curve: 0.000223532 * x^2 + 1.94727 * x + 0.0273154
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 180603M2_2	Standard	0.250	2.62	74.906	1835.080	0.510	0.2	-0.8	NO	1.000	NO	bb
2	2 180603M2_3	Standard	0.500	2.62	133.534	1810.358	0.922	0.5	-8.1	NO	1.000	NO	bb
3	3 180603M2_4	Standard	1.000	2.62	293.311	1862.340	1.969	1.0	-0.3	NO	1.000	NO	bb
4	4 180603M2_5	Standard	2.000	2.63	598.211	1827.688	4.091	2.1	4.3	NO	1.000	NO	bb
5	5 180603M2_6	Standard	5.000	2.63	1476.721	1851.845	9.968	5.1	2.0	NO	1.000	NO	bb
6	6 180603M2_7	Standard	10.000	2.63	2849.810	1823.998	19.530	10.0	0.0	NO	1.000	NO	bb
7	7 180603M2_8	Standard	50.000	2.63	14726.879	1818.162	101.248	51.7	3.3	NO	1.000	NO	bb
8	8 180603M2_9	Standard	100.000	2.63	26329.846	1654.700	198.902	101.0	1.0	NO	1.000	NO	bb
9	9 180603M2_10	Standard	250.000	2.63	62087.715	1579.831	491.253	245.4	-1.9	NO	1.000	NO	bb
10	10 180603M2_11	Standard	500.000	2.63	108591.102	1313.247	1033.613	501.9	0.4	NO	1.000	NO	bb

Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998088
Calibration curve: -0.00365524 * x^2 + 1.16824 * x + -0.00106813
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 180603M2_2	Standard	0.250	3.02	89.738	3696.335	0.303	0.3	4.4	NO	0.998	NO	bb
2	2 180603M2_3	Standard	0.500	3.02	174.562	3663.609	0.596	0.5	2.3	NO	0.998	NO	bb
3	3 180603M2_4	Standard	1.000	3.02	381.686	4043.533	1.180	1.0	1.4	NO	0.998	NO	bb
4	4 180603M2_5	Standard	2.000	3.03	649.867	4135.085	1.964	1.7	-15.4	NO	0.998	NO	bb
5	5 180603M2_6	Standard	5.000	3.03	1772.508	3892.281	5.692	5.0	-1.0	NO	0.998	NO	bb
6	6 180603M2_7	Standard	10.000	3.03	3550.676	3554.119	12.488	11.1	10.7	NO	0.998	NO	bb
7	7 180603M2_8	Standard	50.000	3.03	16842.332	4396.625	47.884	48.3	-3.4	NO	0.998	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:48:04 Pacific Daylight Time

Compound name: 4:2 FTS

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
8	8	180603M2_9	Standard	100.000	3.03	30500.734	4715.182	80.858	101.4	1.4	NO	0.998	NO	bb
9	9	180603M2_10	Standard	250.000	3.03	67775.594	6011.217	140.936			NO	0.998	YES	bbXI
10	10	180603M2_11	Standard	500.000	3.03	115218.445	7896.673	182.384			NO	0.998	YES	bbXI

Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999878
Calibration curve: 0.000139344 * x^2 + 1.52767 * x + 0.0390743
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	180603M2_2	Standard	0.250	3.11	447.201	5140.567	0.435	0.3	3.7	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	3.11	810.592	4993.331	0.812	0.5	1.1	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	3.11	1690.606	5403.152	1.564	1.0	-0.2	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	3.12	3210.010	5252.656	3.056	2.0	-1.3	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	3.12	8063.087	4943.626	8.155	5.3	6.2	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	3.12	16252.355	5255.675	15.462	10.1	0.9	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	3.12	80081.844	5289.254	75.702	49.3	-1.4	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	3.12	161610.250	5130.039	157.514	102.1	2.1	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	3.12	373608.781	4837.902	386.127	247.2	-1.1	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	3.12	684514.625	4275.990	800.417	501.0	0.2	NO	1.000	NO	bb

Compound name: PFPeS
Correlation coefficient: r = 0.999461, r^2 = 0.998922
Calibration curve: 1.84123 * x + -0.0692894
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	180603M2_2	Standard	0.250	3.31	59.087	1835.080	0.402	0.3	2.5	NO	0.999	NO	MM
2	2	180603M2_3	Standard	0.500	3.31	138.987	1810.358	0.960	0.6	11.8	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	3.31	273.028	1862.340	1.833	1.0	3.3	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	3.31	507.099	1827.688	3.468	1.9	-3.9	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	3.32	1309.499	1851.845	8.839	4.8	-3.2	NO	0.999	NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Compound name: PFPeS

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
6	6	180603M2_7	Standard	10.000	3.32	2394.907	1823.998	16.412	9.0	-10.5	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	3.32	13382.591	1818.162	92.006	50.0	0.0	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	3.32	25042.957	1654.700	189.180	102.8	2.8	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	3.32	55407.176	1579.831	438.395	238.1	-4.7	NO	0.999	NO	bb
10	10	180603M2_11	Standard	500.000	3.32	98697.797	1313.247	939.444	510.3	2.1	NO	0.999	NO	bb

Compound name: PFHpA
Coefficient of Determination: R^2 = 0.999980
Calibration curve: 0.000463938 * x^2 + 1.14345 * x + 0.0577121
Response type: Internal Std (Ref 41), 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	180603M2_2	Standard	0.250	3.72	446.629	15583.414	0.358	0.3	5.1	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	3.72	687.279	14360.869	0.598	0.5	-5.5	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	3.72	1460.633	15052.655	1.213	1.0	1.0	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	3.73	2725.334	14984.784	2.273	1.9	-3.2	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	3.73	6677.411	14228.897	5.866	5.1	1.4	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	3.73	13455.714	14349.260	11.722	10.2	1.6	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	3.73	74517.766	16035.928	58.087	49.7	-0.5	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	3.73	134000.703	14057.480	119.154	100.1	0.1	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	3.73	300126.250	11912.625	314.925	250.0	0.0	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	3.73	537888.813	12317.354	545.865	409.3	-18.1	NO	1.000	NO	bbX

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Compound name: L-PFHxS
Correlation coefficient: r = 0.999509, r^2 = 0.999018
Calibration curve: 1.91268 * x + 0.0612931
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	180603M2_2	Standard	0.250	3.87	62.591	1569.461	0.499	0.2	-8.6	NO	0.999	NO	MM
2	2	180603M2_3	Standard	0.500	3.87	123.751	1468.555	1.053	0.5	3.7	NO	0.999	NO	MM
3	3	180603M2_4	Standard	1.000	3.88	238.473	1523.706	1.956	1.0	-0.9	NO	0.999	NO	MM
4	4	180603M2_5	Standard	2.000	3.88	401.807	1579.854	3.179	1.6	-18.5	NO	0.999	NO	MM
5	5	180603M2_6	Standard	5.000	3.88	1119.416	1445.307	9.681	5.0	0.6	NO	0.999	NO	MM
6	6	180603M2_7	Standard	10.000	3.88	2364.440	1321.032	22.373	11.7	16.7	NO	0.999	NO	MM
7	7	180603M2_8	Standard	50.000	3.88	11503.629	1434.082	100.270	52.4	4.8	NO	0.999	NO	MM
8	8	180603M2_9	Standard	100.000	3.88	21132.445	1312.576	201.250	105.2	5.2	NO	0.999	NO	MM
9	9	180603M2_10	Standard	250.000	3.88	50240.836	1345.168	466.864	244.1	-2.4	NO	0.999	NO	MM
10	10	180603M2_11	Standard	500.000	3.88	92474.094	1215.786	950.765	497.1	-0.6	NO	0.999	NO	MM

Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.999137
Calibration curve: -0.0035598 * x^2 + 1.20118 * x + 0.0541796
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	180603M2_2	Standard	0.250	4.18	87.986	4037.636	0.272	0.2	-27.3	NO	0.999	NO	bb
2	2	180603M2_3	Standard	0.500	4.19	239.779	3826.547	0.783	0.6	21.6	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	4.19	460.277	4275.934	1.346	1.1	7.9	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	4.19	794.809	4334.623	2.292	1.9	-6.3	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	4.19	1981.093	3887.852	6.369	5.3	6.8	NO	0.999	NO	bb
6	6	180603M2_7	Standard	10.000	4.19	3926.914	4284.948	11.456	9.8	-2.3	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	4.19	19953.633	4897.353	50.930	49.7	-0.7	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	4.19	33197.195	4897.862	84.724	100.3	0.3	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	4.19	73101.953	6074.168	150.436			NO	0.999	NO	bbXI
10	10	180603M2_11	Standard	500.000	4.19	136067.703	8700.849	195.480			NO	0.999	NO	bbXI

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Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999677
Calibration curve: -0.000155657 * x^2 + 0.987655 * x + 0.0270012
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	180603M2_2	Standard	0.250	4.24	400.645	22788.426	0.220	0.2	-21.9	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	4.24	1064.795	24507.855	0.543	0.5	4.5	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	4.24	1973.284	20461.670	1.205	1.2	19.3	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	4.25	3714.788	21747.594	2.135	2.1	6.8	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	4.25	9208.882	24783.598	4.645	4.7	-6.4	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	4.25	17243.697	22439.563	9.606	9.7	-2.9	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	4.25	93982.422	24377.400	48.191	49.1	-1.7	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	4.25	169589.406	21079.920	100.563	103.5	3.5	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	4.25	404866.969	21629.521	233.978	246.4	-1.4	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	4.25	730202.813	20017.283	455.983	501.3	0.3	NO	1.000	NO	bb

Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999582
Calibration curve: -4.10026e-005 * x^2 + 0.161763 * x + -0.00185584
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	180603M2_2	Standard	0.250	4.36	77.028	22788.426	0.042	0.3	9.1	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	4.35	137.685	24507.855	0.070	0.4	-10.9	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	4.35	275.145	20461.670	0.168	1.1	5.1	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	4.36	605.363	21747.594	0.348	2.2	8.2	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	4.36	1351.098	24783.598	0.681	4.2	-15.4	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	4.36	2974.053	22439.563	1.657	10.3	2.8	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	4.36	15446.921	24377.400	7.921	49.6	-0.8	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	4.36	27450.936	21079.920	16.278	103.3	3.3	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	4.36	64486.059	21629.521	37.267	245.7	-1.7	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	4.36	113437.180	20017.283	70.837	501.7	0.3	NO	1.000	NO	bb

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Compound name: PFNA
Coefficient of Determination: R^2 = 0.999693
Calibration curve: -0.000217884 * x^2 + 1.35711 * x + -0.0685492
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	180603M2_2	Standard	0.250	4.68	455.861	18769.938	0.304	0.3	9.7	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	4.68	991.397	19999.146	0.620	0.5	1.4	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	4.68	2256.575	21268.121	1.326	1.0	2.8	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	4.68	4515.422	21763.053	2.594	2.0	-1.9	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	4.68	9690.759	20024.189	6.049	4.5	-9.8	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	4.68	20174.797	18644.572	13.526	10.0	0.3	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	4.68	110124.781	21593.049	63.750	47.4	-5.2	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	4.68	202862.750	18663.838	135.866	101.8	1.8	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	4.68	456948.063	17350.898	329.196	252.9	1.2	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	4.68	819872.125	16474.229	622.087	498.3	-0.3	NO	1.000	NO	bb

Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999799
Calibration curve: 0.000223926 * x^2 + 0.845984 * x + -0.00644957
Response type: Internal Std (Ref 46), 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	180603M2_2	Standard	0.250	4.75	75.893	4192.226	0.226	0.3	10.0	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	4.75	132.574	4063.638	0.408	0.5	-2.1	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	4.75	273.436	4162.143	0.821	1.0	-2.2	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	4.75	481.785	4279.650	1.407	1.7	-16.5	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	4.75	1426.368	3993.287	4.465	5.3	5.6	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	4.76	2810.253	4037.472	8.701	10.3	2.6	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	4.76	14588.447	4124.677	44.211	51.6	3.1	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	4.76	26476.270	3787.264	87.386	100.6	0.6	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	4.76	59064.559	3328.501	221.814	246.2	-1.5	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	4.75	107827.313	2804.786	480.551	501.5	0.3	NO	1.000	NO	bb

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Compound name: L-PFOS
Coefficient of Determination: R^2 = 0.999820
Calibration curve: -4.1577e-006 * x^2 + 0.922959 * x + -0.0602006
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	180603M2_2	Standard	0.250	4.76	55.488	3858.577	0.180	0.3	4.0	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	4.75	127.855	3737.641	0.428	0.5	5.7	NO	1.000	NO	MM
3	3	180603M2_4	Standard	1.000	4.76	250.208	3996.144	0.783	0.9	-8.7	NO	1.000	NO	MM
4	4	180603M2_5	Standard	2.000	4.76	584.407	4026.793	1.814	2.0	1.5	NO	1.000	NO	MM
5	5	180603M2_6	Standard	5.000	4.76	1372.660	3687.167	4.654	5.1	2.1	NO	1.000	NO	MM
6	6	180603M2_7	Standard	10.000	4.76	2784.985	3904.877	8.915	9.7	-2.8	NO	1.000	NO	MM
7	7	180603M2_8	Standard	50.000	4.77	13870.730	3932.378	44.091	47.8	-4.3	NO	1.000	NO	MM
8	8	180603M2_9	Standard	100.000	4.76	25634.572	3402.080	94.187	102.2	2.2	NO	1.000	NO	MM
9	9	180603M2_10	Standard	250.000	4.76	62176.391	3362.496	231.139	250.8	0.3	NO	1.000	NO	MM
10	10	180603M2_11	Standard	500.000	4.76	112323.016	3053.424	459.824	499.4	-0.1	NO	1.000	NO	MM

Compound name: PFDA
Coefficient of Determination: R^2 = 0.999020
Calibration curve: -5.14851e-005 * x^2 + 1.0054 * x + 0.115839
Response type: Internal Std (Ref 48), 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	180603M2_2	Standard	0.250	5.04	606.281	19146.543	0.396	0.3	11.4	NO	0.999	NO	bb
2	2	180603M2_3	Standard	0.500	5.05	1156.627	24584.350	0.588	0.5	-6.1	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	5.05	2444.568	25779.711	1.185	1.1	6.4	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	5.05	4028.061	28702.930	1.754	1.6	-18.5	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	5.05	10516.037	22483.127	5.847	5.7	14.0	NO	0.999	NO	bb
6	6	180603M2_7	Standard	10.000	5.05	20838.709	25993.691	10.021	9.9	-1.4	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	5.05	108621.992	30067.543	45.157	44.9	-10.2	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	5.05	218180.609	26322.408	103.610	103.5	3.5	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	5.05	535189.563	26612.340	251.382	253.2	1.3	NO	0.999	NO	bb
10	10	180603M2_11	Standard	500.000	5.05	801119.688	20512.344	488.194	498.2	-0.4	NO	0.999	NO	bb

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Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.999540
Calibration curve: -0.00513967 * x^2 + 1.47988 * x + -0.0800285
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	180603M2_2	Standard	0.250	5.01	77.105	3490.642	0.276	0.2	-3.7	NO	1.000	NO	bb
2	2	180603M2_3	Standard	0.500	5.02	171.627	3449.516	0.622	0.5	-5.0	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	5.02	354.847	3255.954	1.362	1.0	-2.2	NO	1.000	NO	MM
4	4	180603M2_5	Standard	2.000	5.02	869.792	3546.990	3.065	2.1	7.1	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	5.02	2000.263	3392.747	7.370	5.1	2.5	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	5.02	4110.259	3514.228	14.620	10.3	3.0	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	5.03	20445.855	4278.210	59.738	48.6	-2.7	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	5.02	33879.699	4360.501	97.121	101.4	1.4	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	5.02	75701.227	5610.659	168.655			NO	1.000	YES	bbXI
10	10	180603M2_11	Standard	500.000	5.02	128454.219	7991.470	200.924			NO	1.000	YES	bbXI

Compound name: PFNS
Coefficient of Determination: R^2 = 0.999614
Calibration curve: -0.000139909 * x^2 + 0.813563 * x + -0.0732691
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	180603M2_2	Standard	0.250	5.11	39.185	3858.577	0.127	0.2	-1.6	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	5.11	110.038	3737.641	0.368	0.5	8.5	NO	1.000	NO	bb
3	3	180603M2_4	Standard	1.000	5.12	238.574	3996.144	0.746	1.0	0.8	NO	1.000	NO	bb
4	4	180603M2_5	Standard	2.000	5.12	489.052	4026.793	1.518	2.0	-2.2	NO	1.000	NO	bb
5	5	180603M2_6	Standard	5.000	5.12	1227.593	3687.167	4.162	5.2	4.2	NO	1.000	NO	bb
6	6	180603M2_7	Standard	10.000	5.12	2344.380	3904.877	7.505	9.3	-6.7	NO	1.000	NO	bb
7	7	180603M2_8	Standard	50.000	5.12	11916.333	3932.378	37.879	47.0	-5.9	NO	1.000	NO	bb
8	8	180603M2_9	Standard	100.000	5.12	22160.154	3402.080	81.421	102.0	2.0	NO	1.000	NO	bb
9	9	180603M2_10	Standard	250.000	5.12	53023.473	3362.496	197.114	253.4	1.4	NO	1.000	NO	bb
10	10	180603M2_11	Standard	500.000	5.11	90479.094	3053.424	370.400	498.0	-0.4	NO	1.000	NO	bb

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Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999746
Calibration curve: -0.000512206 * x^2 + 2.03689 * x + -0.180528
Response type: Internal Std (Ref 50), 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	180603M2_2	Standard	0.250	5.20	96.344	5166.020	0.233	0.2	-18.8	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	5.20	359.172	5019.486	0.894	0.5	5.6	NO	1.000	NO	MM
3	3	180603M2_4	Standard	1.000	5.20	738.561	5033.387	1.834	1.0	-1.1	NO	1.000	NO	MM
4	4	180603M2_5	Standard	2.000	5.20	1424.651	4867.027	3.659	1.9	-5.7	NO	1.000	NO	MM
5	5	180603M2_6	Standard	5.000	5.20	3491.628	4913.452	8.883	4.5	-10.9	NO	1.000	NO	MM
6	6	180603M2_7	Standard	10.000	5.20	7710.028	5024.185	19.182	9.5	-4.7	NO	1.000	NO	MM
7	7	180603M2_8	Standard	50.000	5.20	40902.418	5116.544	99.927	49.8	-0.5	NO	1.000	NO	MM
8	8	180603M2_9	Standard	100.000	5.20	71466.523	4530.335	197.189	99.4	-0.6	NO	1.000	NO	MM
9	9	180603M2_10	Standard	250.000	5.20	176961.563	4566.378	484.414	254.2	1.7	NO	1.000	NO	MM
10	10	180603M2_11	Standard	500.000	5.20	295891.813	4170.621	886.834	497.8	-0.4	NO	1.000	NO	MM

Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999632
Calibration curve: -8.02336e-005 * x^2 + 1.19845 * x + -0.0686469
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	180603M2_2	Standard	0.250	5.35	134.087	6561.538	0.255	0.3	8.2	NO	1.000	NO	MM
2	2	180603M2_3	Standard	0.500	5.35	243.079	6339.493	0.479	0.5	-8.6	NO	1.000	NO	MM
3	3	180603M2_4	Standard	1.000	5.36	574.807	6870.538	1.046	0.9	-7.0	NO	1.000	NO	MM
4	4	180603M2_5	Standard	2.000	5.36	1077.656	6666.748	2.021	1.7	-12.8	NO	1.000	NO	MM
5	5	180603M2_6	Standard	5.000	5.36	2744.886	6075.031	5.648	4.8	-4.6	NO	1.000	NO	MM
6	6	180603M2_7	Standard	10.000	5.36	5733.157	5966.752	12.011	10.1	0.9	NO	1.000	NO	MM
7	7	180603M2_8	Standard	50.000	5.36	29068.436	6199.922	58.606	49.1	-1.8	NO	1.000	NO	MM
8	8	180603M2_9	Standard	100.000	5.36	53240.363	5371.537	123.895	104.2	4.2	NO	1.000	NO	MM
9	9	180603M2_10	Standard	250.000	5.36	117902.656	5087.055	289.712	245.8	-1.7	NO	1.000	NO	MM
10	10	180603M2_11	Standard	500.000	5.35	202765.750	4365.234	580.627	501.4	0.3	NO	1.000	NO	MM

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFUdA
Coefficient of Determination: R^2 = 0.993431
Calibration curve: 7.49062e-005 * x^2 + 0.907352 * x + 0.092432
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	180603M2_2	Standard	0.250	5.37	672.602	28893.295	0.291	0.2	-12.5	NO	0.993	NO	bb
2	2	180603M2_3	Standard	0.500	5.37	919.764	25446.445	0.452	0.4	-20.8	NO	0.993	NO	bb
3	3	180603M2_4	Standard	1.000	5.37	2522.366	29251.656	1.078	1.1	8.6	NO	0.993	NO	bb
4	4	180603M2_5	Standard	2.000	5.37	4952.942	29319.832	2.112	2.2	11.2	NO	0.993	NO	bb
5	5	180603M2_6	Standard	5.000	5.37	10516.431	25472.016	5.161	5.6	11.7	NO	0.993	NO	bb
6	6	180603M2_7	Standard	10.000	5.37	20506.277	24071.061	10.649	11.6	16.2	NO	0.993	NO	bb
7	7	180603M2_8	Standard	50.000	5.38	70669.508	26738.559	33.037	36.2	-27.6	NO	0.993	NO	bb
8	8	180603M2_9	Standard	100.000	5.37	191166.375	22839.299	104.626	114.1	14.1	NO	0.993	NO	bb
9	9	180603M2_10	Standard	250.000	5.37	396499.125	21626.578	229.174	247.4	-1.0	NO	0.993	NO	bb
10	10	180603M2_11	Standard	500.000	5.37	814809.688	21563.584	472.330	499.8	-0.0	NO	0.993	NO	bb

Compound name: PFDS
Coefficient of Determination: R^2 = 0.999337
Calibration curve: 3.37363e-005 * x^2 + 0.151074 * x + 0.00103366
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	180603M2_2	Standard	0.250	5.41	76.075	28893.295	0.033	0.2	-15.6	NO	0.999	NO	bbX
2	2	180603M2_3	Standard	0.500	5.41	198.623	25446.445	0.098	0.6	27.8	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	5.42	309.305	29251.656	0.132	0.9	-13.2	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	5.42	626.270	29319.832	0.267	1.8	-12.0	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	5.42	1508.822	25472.016	0.740	4.9	-2.2	NO	0.999	NO	bb
6	6	180603M2_7	Standard	10.000	5.42	2948.322	24071.061	1.531	10.1	1.0	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	5.42	15648.399	26738.559	7.315	47.9	-4.2	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	5.42	29120.176	22839.299	15.938	103.1	3.1	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	5.42	68765.688	21626.578	39.746	249.2	-0.3	NO	0.999	NO	bb

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Compound name: PFDS

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
10	10	180603M2_11	Standard	500.000	5.42	125058.352	21563.584	72.494	437.2	-12.6	NO	0.999	NO	bbX

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.997043
Calibration curve: -0.0110656 * x^2 + 1.52836 * x + -0.124406
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	180603M2_2	Standard	0.250	5.65	611.902	27089.834	0.282	0.3	6.7	NO	0.997	NO	bb
2	2	180603M2_3	Standard	0.500	5.65	1223.981	25434.553	0.602	0.5	-4.7	NO	0.997	NO	bb
3	3	180603M2_4	Standard	1.000	5.65	2665.908	20996.686	1.587	1.1	12.9	NO	0.997	NO	bb
4	4	180603M2_5	Standard	2.000	5.65	5081.723	25954.611	2.447	1.7	-14.8	NO	0.997	NO	bb
5	5	180603M2_6	Standard	5.000	5.65	13357.369	24319.283	6.866	4.7	-5.3	NO	0.997	NO	bb
6	6	180603M2_7	Standard	10.000	5.65	27840.262	23548.979	14.778	10.6	5.6	NO	0.997	NO	bb
7	7	180603M2_8	Standard	50.000	5.65	111015.328	28591.041	48.536	49.8	-0.4	NO	0.997	NO	bb
8	8	180603M2_9	Standard	100.000	5.65	220454.250	26644.039	103.426			NO	0.997	YES	bbXI
9	9	180603M2_10	Standard	250.000	5.65	595843.313	25941.885	287.105			NO	0.997	NO	bbXI
10	10	180603M2_11	Standard	500.000	5.65	1123108.875	23659.391	593.374			NO	0.997	NO	bbXI

Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999650
Calibration curve: -2.95889e-005 * x^2 + 1.0319 * x + 0.180174
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	180603M2_2	Standard	1.250	5.85	147.178	16316.126	1.353	1.1	-9.1	NO	1.000	NO	bb
2	2	180603M2_3	Standard	2.500	5.85	318.136	15902.306	3.001	2.7	9.3	NO	1.000	NO	bb
3	3	180603M2_4	Standard	5.000	5.85	603.899	17272.928	5.244	4.9	-1.8	NO	1.000	NO	bb
4	4	180603M2_5	Standard	10.000	5.86	1238.090	16655.211	11.150	10.6	6.3	NO	1.000	NO	bb
5	5	180603M2_6	Standard	25.000	5.86	2948.163	16771.635	26.367	25.4	1.6	NO	1.000	NO	bb
6	6	180603M2_7	Standard	50.000	5.87	5739.637	15901.850	54.141	52.4	4.7	NO	1.000	NO	bb
7	7	180603M2_8	Standard	250.000	5.87	30080.166	16876.580	267.354	260.9	4.3	NO	1.000	NO	bb

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Compound name: N-MeFOSA

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
8	8	180603M2_9	Standard	500.000	5.87	54334.594	15954.447	510.841	502.1	0.4	NO	1.000	NO	bb
9	9	180603M2_10	Standard	1250.000	5.87	127343.031	15739.222	1213.621	1218.5	-2.5	NO	1.000	NO	bb
10	10	180603M2_11	Standard	2500.000	5.87	226441.766	14102.471	2408.533	2515.3	0.6	NO	1.000	NO	bb

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.999367
Calibration curve: -0.00564413 * x^2 + 1.50166 * x + -0.0916805
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	180603M2_2	Standard	0.250	5.89	646.807	27089.834	0.298	0.3	4.0	NO	0.999	NO	bb
2	2	180603M2_3	Standard	0.500	5.89	1324.573	25434.553	0.651	0.5	-0.9	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	5.89	2593.420	20996.686	1.544	1.1	9.4	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	5.89	5216.774	25954.611	2.512	1.7	-12.7	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	5.89	13752.351	24319.283	7.069	4.9	-2.9	NO	0.999	NO	bb
6	6	180603M2_7	Standard	10.000	5.89	27854.697	23548.979	14.786	10.3	3.1	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	5.89	139420.359	28591.041	60.955	50.1	0.2	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	5.89	199448.344	26644.039	93.571	99.8	-0.2	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	5.89	635908.375	25941.885	306.410			NO	0.999	YES	bbXI
10	10	180603M2_11	Standard	500.000	5.89	987634.313	23659.391	521.798			NO	0.999	YES	bbXI

Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999342
Calibration curve: -0.000283258 * x^2 + 1.08661 * x + 0.131629
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	180603M2_2	Standard	0.250	6.10	589.160	21462.785	0.343	0.2	-22.1	NO	0.999	NO	bb
2	2	180603M2_3	Standard	0.500	6.11	1060.987	20578.910	0.644	0.5	-5.6	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	6.11	2137.071	22493.512	1.188	1.0	-2.8	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	6.11	4478.981	21672.035	2.583	2.3	12.9	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	6.11	11080.009	22196.295	6.240	5.6	12.6	NO	0.999	NO	bb

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Compound name: PFTeDA

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
6	6	180603M2_7	Standard	10.000	6.11	20780.854	22325.559	11.635	10.6	6.2	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	6.11	108525.688	24476.057	55.424	51.6	3.2	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	6.11	194406.453	24183.275	100.486	94.7	-5.3	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	6.11	497414.563	24206.561	256.859	252.9	1.2	NO	0.999	NO	bb
10	10	180603M2_11	Standard	500.000	6.11	856963.125	22688.400	472.137	499.4	-0.1	NO	0.999	NO	bb

Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999923
Calibration curve: -3.23078e-005 * x^2 + 0.917289 * x + -0.023268
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	180603M2_2	Standard	1.250	6.24	156.003	22190.391	1.055	1.2	-6.0	NO	1.000	NO	MM
2	2	180603M2_3	Standard	2.500	6.24	335.743	21433.010	2.350	2.6	3.5	NO	1.000	NO	bb
3	3	180603M2_4	Standard	5.000	6.25	674.030	22178.873	4.559	5.0	-0.1	NO	1.000	NO	bb
4	4	180603M2_5	Standard	10.000	6.25	1428.180	22210.188	9.645	10.5	5.4	NO	1.000	NO	bb
5	5	180603M2_6	Standard	25.000	6.25	3234.898	22281.158	21.778	23.8	-4.9	NO	1.000	NO	bb
6	6	180603M2_7	Standard	50.000	6.25	6629.320	21612.400	46.011	50.3	0.5	NO	1.000	NO	bb
7	7	180603M2_8	Standard	250.000	6.25	34265.512	22298.518	230.501	253.6	1.4	NO	1.000	NO	bb
8	8	180603M2_9	Standard	500.000	6.25	60645.512	20023.377	454.310	504.3	0.9	NO	1.000	NO	bb
9	9	180603M2_10	Standard	1250.000	6.25	140657.344	19445.982	1084.985	1236.7	-1.1	NO	1.000	NO	bb
10	10	180603M2_11	Standard	2500.000	6.25	243064.703	17396.836	2095.766	2505.9	0.2	NO	1.000	NO	bb

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Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.998869
Calibration curve: 3.05812e-005 * x^2 + 0.593492 * x + 0.0405458
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	180603M2_2	Standard	0.250	6.44	359.357	11781.388	0.153	0.2	-24.5	NO	0.999	NO	bb
2	2	180603M2_3	Standard	0.500	6.44	874.038	11436.419	0.382	0.6	15.1	NO	0.999	NO	bb
3	3	180603M2_4	Standard	1.000	6.44	1716.728	12740.659	0.674	1.1	6.7	NO	0.999	NO	bb
4	4	180603M2_5	Standard	2.000	6.44	3067.526	12174.550	1.260	2.1	2.7	NO	0.999	NO	bb
5	5	180603M2_6	Standard	5.000	6.44	7148.614	12790.587	2.794	4.6	-7.2	NO	0.999	NO	bb
6	6	180603M2_7	Standard	10.000	6.44	15429.646	12262.140	6.292	10.5	5.3	NO	0.999	NO	bb
7	7	180603M2_8	Standard	50.000	6.45	80981.695	12825.989	31.569	53.0	6.0	NO	0.999	NO	bb
8	8	180603M2_9	Standard	100.000	6.44	146653.563	12855.009	57.041	95.6	-4.4	NO	0.999	NO	bb
9	9	180603M2_10	Standard	250.000	6.44	363454.000	12033.121	151.022	251.1	0.5	NO	0.999	NO	bb
10	10	180603M2_11	Standard	500.000	6.44	650310.500	12648.990	257.060	423.8	-15.2	NO	0.999	NO	bbX

Compound name: PFODA
Coefficient of Determination: R^2 = 0.998051
Calibration curve: -0.000306754 * x^2 + 0.779034 * x + 0.0170433
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	180603M2_2	Standard	0.250	6.67	539.721	11781.388	0.229	0.3	8.9	NO	0.998	NO	bb
2	2	180603M2_3	Standard	0.500	6.67	979.894	11436.419	0.428	0.5	5.6	NO	0.998	NO	bb
3	3	180603M2_4	Standard	1.000	6.67	2009.271	12740.659	0.789	1.0	-0.9	NO	0.998	NO	bb
4	4	180603M2_5	Standard	2.000	6.68	3908.802	12174.550	1.605	2.0	2.0	NO	0.998	NO	bb
5	5	180603M2_6	Standard	5.000	6.68	9559.715	12790.587	3.737	4.8	-4.3	NO	0.998	NO	bb
6	6	180603M2_7	Standard	10.000	6.68	18974.896	12262.140	7.737	9.9	-0.5	NO	0.998	NO	MM
7	7	180603M2_8	Standard	50.000	6.68	100644.023	12825.989	39.234	51.4	2.8	NO	0.998	NO	MM
8	8	180603M2_9	Standard	100.000	6.68	175568.188	12855.009	68.288	90.9	-9.1	NO	0.998	NO	MM
9	9	180603M2_10	Standard	250.000	6.68	444097.875	12033.121	184.531	264.4	5.7	NO	0.998	NO	MM
10	10	180603M2_11	Standard	500.000	6.68	783208.813	12648.990	309.593	493.1	-1.4	NO	0.998	NO	MM

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Compound name: N-MeFOSE
Coefficient of Determination: R^2 = 0.999572
Calibration curve: -3.91662e-005 * x^2 + 0.983423 * x + -0.00480812
Response type: Internal Std (Ref 58), 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	180603M2_2	Standard	1.250	6.38	95.922	11628.039	1.237	1.3	1.1	NO	1.000	NO	bb
2	2	180603M2_3	Standard	2.500	6.38	221.428	11147.111	2.980	3.0	21.4	NO	1.000	NO	bb
3	3	180603M2_4	Standard	5.000	6.38	371.733	12015.749	4.641	4.7	-5.5	NO	1.000	NO	bb
4	4	180603M2_5	Standard	10.000	6.38	770.934	11662.517	9.916	10.1	0.9	NO	1.000	NO	bb
5	5	180603M2_6	Standard	25.000	6.38	1783.383	11666.826	22.929	23.3	-6.6	NO	1.000	NO	bb
6	6	180603M2_7	Standard	50.000	6.38	3512.457	11845.252	44.479	45.3	-9.4	NO	1.000	NO	bb
7	7	180603M2_8	Standard	250.000	6.39	19763.857	12670.946	233.967	240.2	-3.9	NO	1.000	NO	MM
8	8	180603M2_9	Standard	500.000	6.38	37095.145	11510.365	483.414	501.6	0.3	NO	1.000	NO	MM
9	9	180603M2_10	Standard	1250.000	6.39	96539.555	12126.395	1194.166	1279.5	2.4	NO	1.000	NO	bb
10	10	180603M2_11	Standard	2500.000	6.38	182751.734	12452.011	2201.473	2484.4	-0.6	NO	1.000	NO	MM

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999756
Calibration curve: -1.63295e-005 * x^2 + 1.23645 * x + -0.173527
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	180603M2_2	Standard	1.250	6.52	119.109	11307.576	1.580	1.4	13.5	NO	1.000	NO	bb
2	2	180603M2_3	Standard	2.500	6.53	211.440	11422.320	2.777	2.4	-4.6	NO	1.000	NO	bb
3	3	180603M2_4	Standard	5.000	6.53	458.865	11465.017	6.003	5.0	-0.1	NO	1.000	NO	bb
4	4	180603M2_5	Standard	10.000	6.53	869.957	11764.180	11.092	9.1	-8.9	NO	1.000	NO	bb
5	5	180603M2_6	Standard	25.000	6.53	2293.827	10799.432	31.860	25.9	3.7	NO	1.000	NO	bb
6	6	180603M2_7	Standard	50.000	6.53	4370.568	10715.487	61.181	49.7	-0.7	NO	1.000	NO	bb
7	7	180603M2_8	Standard	250.000	6.53	23031.424	11835.431	291.896	237.0	-5.2	NO	1.000	NO	bb
8	8	180603M2_9	Standard	500.000	6.53	44147.000	10613.874	623.905	508.1	1.6	NO	1.000	NO	bb
9	9	180603M2_10	Standard	1250.000	6.53	112786.555	11032.510	1533.466	1261.4	0.9	NO	1.000	NO	MM
10	10	180603M2_11	Standard	2500.000	6.53	218495.094	10991.780	2981.707	2493.8	-0.2	NO	1.000	NO	MM

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Compound name: 13C3-PFBA
Response Factor: 0.891546
RRF SD: 0.0117184, Relative SD: 1.31439
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	180603M2_2	Standard	12.500	1.37	11057.410	12438.893	11.112	12.5	-0.3	NO		NO	bb
2	2	180603M2_3	Standard	12.500	1.37	10852.338	11874.155	11.424	12.8	2.5	NO		NO	bb
3	3	180603M2_4	Standard	12.500	1.37	11239.817	12632.165	11.122	12.5	-0.2	NO		NO	bb
4	4	180603M2_5	Standard	12.500	1.37	11221.023	12725.610	11.022	12.4	-1.1	NO		NO	bb
5	5	180603M2_6	Standard	12.500	1.38	10714.076	12050.026	11.114	12.5	-0.3	NO		NO	bb
6	6	180603M2_7	Standard	12.500	1.38	10688.383	11901.224	11.226	12.6	0.7	NO		NO	bb
7	7	180603M2_8	Standard	12.500	1.38	11217.190	12816.611	10.940	12.3	-1.8	NO		NO	bb
8	8	180603M2_9	Standard	12.500	1.38	10361.961	11575.312	11.190	12.6	0.4	NO		NO	bb
9	9	180603M2_10	Standard	12.500	1.38	10428.025	11857.146	10.993	12.3	-1.4	NO		NO	bb
10	10	180603M2_11	Standard	12.500	1.38	9906.605	10959.182	11.299	12.7	1.4	NO		NO	bb

Compound name: 13C3-PFPeA
Response Factor: 0.848002
RRF SD: 0.0343672, Relative SD: 4.05273
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	180603M2_2	Standard	12.500	2.33	14942.807	17369.111	10.754	12.7	1.5	NO		NO	bb
2	2	180603M2_3	Standard	12.500	2.33	14112.663	17353.324	10.166	12.0	-4.1	NO		NO	bb
3	3	180603M2_4	Standard	12.500	2.34	15401.912	16617.988	11.585	13.7	9.3	NO		NO	bb
4	4	180603M2_5	Standard	12.500	2.34	15167.869	17547.277	10.805	12.7	1.9	NO		NO	bb
5	5	180603M2_6	Standard	12.500	2.34	14695.008	18200.756	10.092	11.9	-4.8	NO		NO	bb
6	6	180603M2_7	Standard	12.500	2.34	14556.021	17679.705	10.291	12.1	-2.9	NO		NO	bb
7	7	180603M2_8	Standard	12.500	2.34	15159.774	17705.752	10.703	12.6	1.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	2.34	14101.499	16636.857	10.595	12.5	-0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	2.34	13457.060	16268.162	10.340	12.2	-2.5	NO		NO	bb
10	10	180603M2_11	Standard	12.500	2.34	12337.635	14454.978	10.669	12.6	0.7	NO		NO	bb

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Compound name: 13C3-PFBS
Response Factor: 0.102123
RRF SD: 0.00558922, Relative SD: 5.47305
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	180603M2_2	Standard	12.500	2.62	1835.080	17369.111	1.321	12.9	3.5	NO		NO	bb
2	2	180603M2_3	Standard	12.500	2.62	1810.358	17353.324	1.304	12.8	2.2	NO		NO	bb
3	3	180603M2_4	Standard	12.500	2.62	1862.340	16617.988	1.401	13.7	9.7	NO		NO	bb
4	4	180603M2_5	Standard	12.500	2.62	1827.688	17547.277	1.302	12.7	2.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	2.63	1851.845	18200.756	1.272	12.5	-0.4	NO		NO	bb
6	6	180603M2_7	Standard	12.500	2.62	1823.998	17679.705	1.290	12.6	1.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	2.63	1818.162	17705.752	1.284	12.6	0.6	NO		NO	bb
8	8	180603M2_9	Standard	12.500	2.63	1654.700	16636.857	1.243	12.2	-2.6	NO		NO	bb
9	9	180603M2_10	Standard	12.500	2.63	1579.831	16268.162	1.214	11.9	-4.9	NO		NO	bb
10	10	180603M2_11	Standard	12.500	2.63	1313.247	14454.978	1.136	11.1	-11.0	NO		NO	bb

Compound name: 13C2-4:2 FTS
Response Factor: 0.23119
RRF SD: 0.0270955, Relative SD: 11.72
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	180603M2_2	Standard	12.500	3.02	3696.335	17369.111	2.660	11.5	-7.9	NO		NO	bb
2	2	180603M2_3	Standard	12.500	3.02	3663.609	17353.324	2.639	11.4	-8.7	NO		NO	bb
3	3	180603M2_4	Standard	12.500	3.02	4043.533	16617.988	3.042	13.2	5.2	NO		NO	bb
4	4	180603M2_5	Standard	12.500	3.02	4135.085	17547.277	2.946	12.7	1.9	NO		NO	bb
5	5	180603M2_6	Standard	12.500	3.03	3892.281	18200.756	2.673	11.6	-7.5	NO		NO	bb
6	6	180603M2_7	Standard	12.500	3.03	3554.119	17679.705	2.513	10.9	-13.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	3.03	4396.625	17705.752	3.104	13.4	7.4	NO		NO	bb
8	8	180603M2_9	Standard	12.500	3.03	4715.182	16636.857	3.543	15.3	22.6	NO		NO	bb
9	9	180603M2_10	Standard	12.500	3.03	6011.217	16268.162	4.619	20.0	59.8	NO		NO	bbX
10	10	180603M2_11	Standard	12.500	3.03	7896.673	14454.978	6.829	29.5	136.3	NO		NO	bbX

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Compound name: 13C2-PFHxA
Response Factor: 0.74434
RRF SD: 0.0339163, Relative SD: 4.55656
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	180603M2_2	Standard	5.000	3.11	5140.567	17369.111	3.700	5.0	-0.6	NO		NO	bb
2	2	180603M2_3	Standard	5.000	3.11	4993.331	17353.324	3.597	4.8	-3.4	NO		NO	bb
3	3	180603M2_4	Standard	5.000	3.11	5403.152	16617.988	4.064	5.5	9.2	NO		NO	bb
4	4	180603M2_5	Standard	5.000	3.11	5252.656	17547.277	3.742	5.0	0.5	NO		NO	bb
5	5	180603M2_6	Standard	5.000	3.12	4943.626	18200.756	3.395	4.6	-8.8	NO		NO	bb
6	6	180603M2_7	Standard	5.000	3.12	5255.675	17679.705	3.716	5.0	-0.2	NO		NO	bb
7	7	180603M2_8	Standard	5.000	3.12	5289.254	17705.752	3.734	5.0	0.3	NO		NO	bb
8	8	180603M2_9	Standard	5.000	3.12	5130.039	16636.857	3.854	5.2	3.6	NO		NO	bb
9	9	180603M2_10	Standard	5.000	3.12	4837.902	16268.162	3.717	5.0	-0.1	NO		NO	bb
10	10	180603M2_11	Standard	5.000	3.12	4275.990	14454.978	3.698	5.0	-0.6	NO		NO	bb

Compound name: 13C4-PFHpA
Response Factor: 0.841295
RRF SD: 0.0559989, Relative SD: 6.65627
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	180603M2_2	Standard	12.500	3.72	15583.414	17369.111	11.215	13.3	6.6	NO		NO	bb
2	2	180603M2_3	Standard	12.500	3.72	14360.869	17353.324	10.344	12.3	-1.6	NO		NO	bb
3	3	180603M2_4	Standard	12.500	3.72	15052.655	16617.988	11.323	13.5	7.7	NO		NO	bb
4	4	180603M2_5	Standard	12.500	3.73	14984.784	17547.277	10.675	12.7	1.5	NO		NO	bb
5	5	180603M2_6	Standard	12.500	3.73	14228.897	18200.756	9.772	11.6	-7.1	NO		NO	bb
6	6	180603M2_7	Standard	12.500	3.73	14349.260	17679.705	10.145	12.1	-3.5	NO		NO	bb
7	7	180603M2_8	Standard	12.500	3.73	16035.928	17705.752	11.321	13.5	7.7	NO		NO	bb
8	8	180603M2_9	Standard	12.500	3.73	14057.480	16636.857	10.562	12.6	0.4	NO		NO	bb
9	9	180603M2_10	Standard	12.500	3.73	11912.625	16268.162	9.153	10.9	-13.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	3.73	12317.354	14454.978	10.651	12.7	1.3	NO		NO	bb

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Compound name: 18O2-PFHxS
Response Factor: 0.414742
RRF SD: 0.019201, Relative SD: 4.62963
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	180603M2_2	Standard	12.500	3.87	1569.461	3649.349	5.376	13.0	3.7	NO		NO	bb
2	2	180603M2_3	Standard	12.500	3.87	1468.555	3566.594	5.147	12.4	-0.7	NO		NO	bb
3	3	180603M2_4	Standard	12.500	3.88	1523.706	3531.828	5.393	13.0	4.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	3.88	1579.854	3647.114	5.415	13.1	4.4	NO		NO	bb
5	5	180603M2_6	Standard	12.500	3.88	1445.307	3511.669	5.145	12.4	-0.8	NO		NO	bb
6	6	180603M2_7	Standard	12.500	3.88	1321.032	3355.920	4.921	11.9	-5.1	NO		NO	bb
7	7	180603M2_8	Standard	12.500	3.88	1434.082	3635.302	4.931	11.9	-4.9	NO		NO	bb
8	8	180603M2_9	Standard	12.500	3.88	1312.576	3435.816	4.775	11.5	-7.9	NO		NO	bb
9	9	180603M2_10	Standard	12.500	3.88	1345.168	3176.855	5.293	12.8	2.1	NO		NO	bb
10	10	180603M2_11	Standard	12.500	3.88	1215.786	2789.534	5.448	13.1	5.1	NO		NO	bb

Compound name: 13C2-6:2 FTS
Response Factor: 0.231582
RRF SD: 0.0307411, Relative SD: 13.2744
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	180603M2_2	Standard	12.500	4.19	4037.636	17243.055	2.927	12.6	1.1	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.19	3826.547	19366.088	2.470	10.7	-14.7	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.19	4275.934	19639.508	2.722	11.8	-6.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.19	4334.623	19325.984	2.804	12.1	-3.1	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.19	3887.852	19348.805	2.512	10.8	-13.2	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.19	4284.948	17256.188	3.104	13.4	7.2	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.19	4897.353	20839.855	2.937	12.7	1.5	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.19	4897.862	16622.969	3.683	15.9	27.2	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.19	6074.168	16830.904	4.511	19.5	55.8	NO		NO	bbX
10	10	180603M2_11	Standard	12.500	4.19	8700.849	13356.788	8.143	35.2	181.3	NO		NO	bbX

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Compound name: 13C2-PFOA
Response Factor: 1.25572
RRF SD: 0.123484, Relative SD: 9.83376
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	180603M2_2	Standard	12.500	4.24	22788.426	17243.055	16.520	13.2	5.2	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.24	24507.855	19366.088	15.819	12.6	0.8	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.24	20461.670	19639.508	13.023	10.4	-17.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.25	21747.594	19325.984	14.066	11.2	-10.4	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.25	24783.598	19348.805	16.011	12.8	2.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.25	22439.563	17256.188	16.255	12.9	3.6	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.25	24377.400	20839.855	14.622	11.6	-6.8	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.25	21079.920	16622.969	15.852	12.6	1.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.25	21629.521	16830.904	16.064	12.8	2.3	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.25	20017.283	13356.788	18.733	14.9	19.3	NO		NO	bb

Compound name: 13C5-PFNA
Response Factor: 0.959622
RRF SD: 0.0746783, Relative SD: 7.78206
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	180603M2_2	Standard	12.500	4.67	18769.938	21271.105	11.030	11.5	-8.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.68	19999.146	18996.654	13.160	13.7	9.7	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.68	21268.121	20756.463	12.808	13.3	6.8	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.68	21763.053	21194.082	12.836	13.4	7.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.68	20024.189	22315.174	11.217	11.7	-6.5	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.68	18644.572	20178.691	11.550	12.0	-3.7	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.69	21593.049	20832.438	12.956	13.5	8.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.68	18663.838	21461.229	10.871	11.3	-9.4	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.68	17350.898	17350.639	12.500	13.0	4.2	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.68	16474.229	18677.258	11.026	11.5	-8.1	NO		NO	bb

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Compound name: 13C8-PFOSA
Response Factor: 0.145124
RRF SD: 0.0146183, Relative SD: 10.073
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	180603M2_2	Standard	12.500	4.75	4192.226	30976.199	1.692	11.7	-6.7	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.75	4063.638	30286.340	1.677	11.6	-7.5	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.75	4162.143	28408.111	1.831	12.6	1.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.75	4279.650	28944.660	1.848	12.7	1.9	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.75	3993.287	26693.467	1.870	12.9	3.1	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.75	4037.472	29381.432	1.718	11.8	-5.3	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.75	4124.677	22912.762	2.250	15.5	24.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.75	3787.264	28219.096	1.678	11.6	-7.5	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.76	3328.501	21508.281	1.934	13.3	6.6	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.75	2804.786	21351.475	1.642	11.3	-9.5	NO		NO	bb

Compound name: 13C8-PFOS
Response Factor: 1.04659
RRF SD: 0.0294897, Relative SD: 2.81769
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	180603M2_2	Standard	12.500	4.76	3858.577	3607.125	13.371	12.8	2.2	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.76	3737.641	3724.928	12.543	12.0	-4.1	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.76	3996.144	4010.002	12.457	11.9	-4.8	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.76	4026.793	3842.256	13.100	12.5	0.1	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.76	3687.167	3557.653	12.955	12.4	-1.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.76	3904.877	3590.565	13.594	13.0	3.9	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.76	3932.378	3653.382	13.455	12.9	2.8	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.76	3402.080	3204.611	13.270	12.7	1.4	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.76	3362.496	3218.791	13.058	12.5	-0.2	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.76	3053.424	2931.359	13.021	12.4	-0.5	NO		NO	bb

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Compound name: 13C2-PFDA
Response Factor: 1.11821
RRF SD: 0.109082, Relative SD: 9.75501
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	180603M2_2	Standard	12.500	5.05	19146.543	19808.373	12.082	10.8	-13.6	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.04	24584.350	23192.090	13.250	11.8	-5.2	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.05	25779.711	24616.742	13.091	11.7	-6.3	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.05	28702.930	22939.766	15.640	14.0	11.9	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.05	22483.127	23315.555	12.054	10.8	-13.8	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.05	25993.691	23125.375	14.050	12.6	0.5	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.05	30067.543	26363.756	14.256	12.7	2.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.05	26322.408	21092.996	15.599	13.9	11.6	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.05	26612.340	21331.662	15.594	13.9	11.6	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.05	20512.344	18108.209	14.160	12.7	1.3	NO		NO	bb

Compound name: 13C2-8:2 FTS
Response Factor: 0.210841
RRF SD: 0.0263463, Relative SD: 12.4958
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	180603M2_2	Standard	12.500	5.02	3490.642	17369.111	2.512	11.9	-4.7	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.02	3449.516	17353.324	2.485	11.8	-5.7	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.02	3255.954	16617.988	2.449	11.6	-7.1	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.02	3546.990	17547.277	2.527	12.0	-4.1	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.02	3392.747	18200.756	2.330	11.1	-11.6	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.02	3514.228	17679.705	2.485	11.8	-5.7	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.03	4278.210	17705.752	3.020	14.3	14.6	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.02	4360.501	16636.857	3.276	15.5	24.3	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.02	5610.659	16268.162	4.311	20.4	63.6	NO		NO	bbX
10	10	180603M2_11	Standard	12.500	5.02	7991.470	14454.978	6.911	32.8	162.2	NO		NO	bbX

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Compound name: d3-N-MeFOSAA
Response Factor: 0.182439
RRF SD: 0.0213379, Relative SD: 11.6959
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	180603M2_2	Standard	12.500	5.19	5166.020	30976.199	2.085	11.4	-8.6	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.19	5019.486	30286.340	2.072	11.4	-9.2	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.20	5033.387	28408.111	2.215	12.1	-2.9	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.20	4867.027	28944.660	2.102	11.5	-7.8	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.20	4913.452	26693.467	2.301	12.6	0.9	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.20	5024.185	29381.432	2.137	11.7	-6.3	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.20	5116.544	22912.762	2.791	15.3	22.4	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.20	4530.335	28219.096	2.007	11.0	-12.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.20	4566.378	21508.281	2.654	14.5	16.4	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.20	4170.621	21351.475	2.442	13.4	7.1	NO		NO	bb

Compound name: d5-N-EtFOSAA
Response Factor: 0.222589
RRF SD: 0.023558, Relative SD: 10.5836
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	180603M2_2	Standard	12.500	5.35	6561.538	30976.199	2.648	11.9	-4.8	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.35	6339.493	30286.340	2.616	11.8	-6.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.35	6870.538	28408.111	3.023	13.6	8.7	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.36	6666.748	28944.660	2.879	12.9	3.5	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.36	6075.031	26693.467	2.845	12.8	2.2	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.36	5966.752	29381.432	2.538	11.4	-8.8	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.35	6199.922	22912.762	3.382	15.2	21.6	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.35	5371.537	28219.096	2.379	10.7	-14.5	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.35	5087.055	21508.281	2.956	13.3	6.3	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.35	4365.234	21351.475	2.556	11.5	-8.2	NO		NO	bb

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Compound name: 13C2-PFUdA
Response Factor: 0.958087
RRF SD: 0.111881, Relative SD: 11.6775
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	180603M2_2	Standard	12.500	5.37	28893.295	30976.199	11.659	12.2	-2.6	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.37	25446.445	30286.340	10.502	11.0	-12.3	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.37	29251.656	28408.111	12.871	13.4	7.5	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.37	29319.832	28944.660	12.662	13.2	5.7	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.37	25472.016	26693.467	11.928	12.4	-0.4	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.37	24071.061	29381.432	10.241	10.7	-14.5	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.37	26738.559	22912.762	14.587	15.2	21.8	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.37	22839.299	28219.096	10.117	10.6	-15.5	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.37	21626.578	21508.281	12.569	13.1	4.9	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.37	21563.584	21351.475	12.624	13.2	5.4	NO		NO	bb

Compound name: 13C2-PFDoA
Response Factor: 1.13804
RRF SD: 0.153517, Relative SD: 13.4896
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	180603M2_2	Standard	12.500	5.65	27089.834	19808.373	17.095	15.0	20.2	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.65	25434.553	23192.090	13.709	12.0	-3.6	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.65	20996.686	24616.742	10.662	9.4	-25.1	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.65	25954.611	22939.766	14.143	12.4	-0.6	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.65	24319.283	23315.555	13.038	11.5	-8.3	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.65	23548.979	23125.375	12.729	11.2	-10.5	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.65	28591.041	26363.756	13.556	11.9	-4.7	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.65	26644.039	21092.996	15.790	13.9	11.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.65	25941.885	21331.662	15.202	13.4	6.9	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.65	23659.391	18108.209	16.332	14.4	14.8	NO		NO	bb

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Compound name: d3-N-MeFOSA
Response Factor: 0.0508247
RRF SD: 0.00656166, Relative SD: 12.9104
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	180603M2_2	Standard	150.000	5.88	16316.126	30976.199	6.584	129.5	-13.6	NO		NO	bb
2	2	180603M2_3	Standard	150.000	5.88	15902.306	30286.340	6.563	129.1	-13.9	NO		NO	bb
3	3	180603M2_4	Standard	150.000	5.88	17272.928	28408.111	7.600	149.5	-0.3	NO		NO	bb
4	4	180603M2_5	Standard	150.000	5.88	16655.211	28944.660	7.193	141.5	-5.7	NO		NO	bb
5	5	180603M2_6	Standard	150.000	5.88	16771.635	26693.467	7.854	154.5	3.0	NO		NO	bb
6	6	180603M2_7	Standard	150.000	5.89	15901.850	29381.432	6.765	133.1	-11.3	NO		NO	bb
7	7	180603M2_8	Standard	150.000	5.89	16876.580	22912.762	9.207	181.2	20.8	NO		NO	bb
8	8	180603M2_9	Standard	150.000	5.89	15954.447	28219.096	7.067	139.1	-7.3	NO		NO	bb
9	9	180603M2_10	Standard	150.000	5.89	15739.222	21508.281	9.147	180.0	20.0	NO		NO	bb
10	10	180603M2_11	Standard	150.000	5.89	14102.471	21351.475	8.256	162.4	8.3	NO		NO	bb

Compound name: 13C2-PFTeDA
Response Factor: 0.861755
RRF SD: 0.164399, Relative SD: 19.0772
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	180603M2_2	Standard	12.500	6.10	21462.785	30976.199	8.661	10.1	-19.6	NO		NO	bb
2	2	180603M2_3	Standard	12.500	6.10	20578.910	30286.340	8.493	9.9	-21.2	NO		NO	bb
3	3	180603M2_4	Standard	12.500	6.11	22493.512	28408.111	9.897	11.5	-8.1	NO		NO	bb
4	4	180603M2_5	Standard	12.500	6.11	21672.035	28944.660	9.359	10.9	-13.1	NO		NO	bb
5	5	180603M2_6	Standard	12.500	6.11	22196.295	26693.467	10.394	12.1	-3.5	NO		NO	bb
6	6	180603M2_7	Standard	12.500	6.11	22325.559	29381.432	9.498	11.0	-11.8	NO		NO	bb
7	7	180603M2_8	Standard	12.500	6.11	24476.057	22912.762	13.353	15.5	24.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	6.11	24183.275	28219.096	10.712	12.4	-0.6	NO		NO	bb
9	9	180603M2_10	Standard	12.500	6.11	24206.561	21508.281	14.068	16.3	30.6	NO		NO	bb
10	10	180603M2_11	Standard	12.500	6.11	22688.400	21351.475	13.283	15.4	23.3	NO		NO	bb

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Compound name: d5-N-ETFOSA
Response Factor: 0.0662004
RRF SD: 0.00741356, Relative SD: 11.1987
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	180603M2_2	Standard	150.000	6.26	22190.391	30976.199	8.955	135.3	-9.8	NO		NO	bb
2	2	180603M2_3	Standard	150.000	6.26	21433.010	30286.340	8.846	133.6	-10.9	NO		NO	bb
3	3	180603M2_4	Standard	150.000	6.26	22178.873	28408.111	9.759	147.4	-1.7	NO		NO	bb
4	4	180603M2_5	Standard	150.000	6.26	22210.188	28944.660	9.592	144.9	-3.4	NO		NO	bb
5	5	180603M2_6	Standard	150.000	6.26	22281.158	26693.467	10.434	157.6	5.1	NO		NO	bb
6	6	180603M2_7	Standard	150.000	6.26	21612.400	29381.432	9.195	138.9	-7.4	NO		NO	bb
7	7	180603M2_8	Standard	150.000	6.27	22298.518	22912.762	12.165	183.8	22.5	NO		NO	bb
8	8	180603M2_9	Standard	150.000	6.27	20023.377	28219.096	8.870	134.0	-10.7	NO		NO	bb
9	9	180603M2_10	Standard	150.000	6.27	19445.982	21508.281	11.301	170.7	13.8	NO		NO	bb
10	10	180603M2_11	Standard	150.000	6.27	17396.836	21351.475	10.185	153.8	2.6	NO		NO	bb

Compound name: 13C2-PFHxDA
Response Factor: 1.17269
RRF SD: 0.192902, Relative SD: 16.4495
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	180603M2_2	Standard	5.000	6.44	11781.388	30976.199	4.754	4.1	-18.9	NO		NO	bb
2	2	180603M2_3	Standard	5.000	6.44	11436.419	30286.340	4.720	4.0	-19.5	NO		NO	bb
3	3	180603M2_4	Standard	5.000	6.44	12740.659	28408.111	5.606	4.8	-4.4	NO		NO	bb
4	4	180603M2_5	Standard	5.000	6.44	12174.550	28944.660	5.258	4.5	-10.3	NO		NO	bb
5	5	180603M2_6	Standard	5.000	6.44	12790.587	26693.467	5.990	5.1	2.2	NO		NO	bb
6	6	180603M2_7	Standard	5.000	6.44	12262.140	29381.432	5.217	4.4	-11.0	NO		NO	bb
7	7	180603M2_8	Standard	5.000	6.45	12825.989	22912.762	6.997	6.0	19.3	NO		NO	bb
8	8	180603M2_9	Standard	5.000	6.44	12855.009	28219.096	5.694	4.9	-2.9	NO		NO	bb
9	9	180603M2_10	Standard	5.000	6.44	12033.121	21508.281	6.993	6.0	19.3	NO		NO	bb
10	10	180603M2_11	Standard	5.000	6.44	12648.990	21351.475	7.405	6.3	26.3	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Compound name: d7-N-MeFOSE
Response Factor: 0.0376454
RRF SD: 0.00684002, Relative SD: 18.1696
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	180603M2_2	Standard	150.000	6.37	11628.039	30976.199	4.692	124.6	-16.9	NO		NO	MM
2	2	180603M2_3	Standard	150.000	6.37	11147.11	30286.340	4.601	122.2	-18.5	NO		NO	bb
3	3	180603M2_4	Standard	150.000	6.37	12015.749	28408.111	5.287	140.4	-6.4	NO		NO	bb
4	4	180603M2_5	Standard	150.000	6.37	11662.517	28944.660	5.037	133.8	-10.8	NO		NO	bb
5	5	180603M2_6	Standard	150.000	6.37	11666.826	26693.467	5.463	145.1	-3.2	NO		NO	MM
6	6	180603M2_7	Standard	150.000	6.37	11845.252	29381.432	5.039	133.9	-10.8	NO		NO	MM
7	7	180603M2_8	Standard	150.000	6.37	12670.946	22912.762	6.913	183.6	22.4	NO		NO	MM
8	8	180603M2_9	Standard	150.000	6.37	11510.365	28219.096	5.099	135.4	-9.7	NO		NO	bb
9	9	180603M2_10	Standard	150.000	6.37	12126.395	21508.281	7.048	187.2	24.8	NO		NO	MM
10	10	180603M2_11	Standard	150.000	6.37	12452.011	21351.475	7.290	193.6	29.1	NO		NO	MM

Compound name: d9-N-EtFOSE
Response Factor: 0.0353491
RRF SD: 0.00536495, Relative SD: 15.1771
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	180603M2_2	Standard	150.000	6.52	11307.576	30976.199	4.563	129.1	-13.9	NO		NO	MM
2	2	180603M2_3	Standard	150.000	6.52	11422.320	30286.340	4.714	133.4	-11.1	NO		NO	bb
3	3	180603M2_4	Standard	150.000	6.52	11465.017	28408.111	5.045	142.7	-4.9	NO		NO	bb
4	4	180603M2_5	Standard	150.000	6.52	11764.180	28944.660	5.080	143.7	-4.2	NO		NO	bb
5	5	180603M2_6	Standard	150.000	6.52	10799.432	26693.467	5.057	143.1	-4.6	NO		NO	bb
6	6	180603M2_7	Standard	150.000	6.52	10715.487	29381.432	4.559	129.0	-14.0	NO		NO	bb
7	7	180603M2_8	Standard	150.000	6.52	11835.431	22912.762	6.457	182.7	21.8	NO		NO	bb
8	8	180603M2_9	Standard	150.000	6.52	10613.874	28219.096	4.702	133.0	-11.3	NO		NO	bb
9	9	180603M2_10	Standard	150.000	6.52	11032.510	21508.281	6.412	181.4	20.9	NO		NO	bb
10	10	180603M2_11	Standard	150.000	6.52	10991.780	21351.475	6.435	182.0	21.4	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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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	180603M2_2	Standard	12.500	1.37	12438.893	12438.893	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	1.37	11874.155	11874.155	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	1.37	12632.165	12632.165	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	1.37	12725.610	12725.610	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	1.37	12050.026	12050.026	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	1.37	11901.224	11901.224	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	1.38	12816.611	12816.611	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	1.38	11575.312	11575.312	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	1.38	11857.146	11857.146	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	1.38	10959.182	10959.182	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C5-PFHxA
Response Factor: 1
RRF SD: 8.27511e-017, Relative SD: 8.27511e-015
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	180603M2_2	Standard	12.500	3.11	17369.111	17369.111	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	3.10	17353.324	17353.324	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	3.11	16617.988	16617.988	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	3.11	17547.277	17547.277	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	3.12	18200.756	18200.756	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	3.12	17679.705	17679.705	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	3.12	17705.752	17705.752	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	3.12	16636.857	16636.857	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	3.12	16268.162	16268.162	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	3.12	14454.978	14454.978	12.500	12.5	0.0	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Compound name: 13C3-PFHxS
Response Factor: 1
RRF SD: 3.70074e-017, Relative SD: 3.70074e-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	180603M2_2	Standard	12.500	3.87	3649.349	3649.349	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	3.87	3566.594	3566.594	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	3.88	3531.828	3531.828	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	3.88	3647.114	3647.114	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	3.88	3511.669	3511.669	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	3.88	3355.920	3355.920	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	3.88	3635.302	3635.302	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	3.88	3435.816	3435.816	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	3.88	3176.855	3176.855	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	3.88	2789.534	2789.534	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C8-PFOA
Response Factor: 1
RRF SD: 0, Relative SD: 0
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	180603M2_2	Standard	12.500	4.24	17243.055	17243.055	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.24	19366.088	19366.088	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.24	19639.508	19639.508	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.25	19325.984	19325.984	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.25	19348.805	19348.805	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.25	17256.188	17256.188	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.25	20839.855	20839.855	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.25	16622.969	16622.969	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.25	16830.904	16830.904	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.25	13356.788	13356.788	12.500	12.5	0.0	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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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	180603M2_2	Standard	12.500	4.67	21271.105	21271.105	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.68	18996.654	18996.654	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.68	20756.463	20756.463	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.68	21194.082	21194.082	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.68	22315.174	22315.174	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.68	20178.691	20178.691	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.68	20832.438	20832.438	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.69	21461.229	21461.229	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.68	17350.639	17350.639	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.68	18677.258	18677.258	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 0, Relative SD: 0
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	180603M2_2	Standard	12.500	4.76	3607.125	3607.125	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	4.76	3724.928	3724.928	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	4.76	4010.002	4010.002	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	4.76	3842.256	3842.256	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	4.76	3557.653	3557.653	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	4.76	3590.565	3590.565	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	4.76	3653.382	3653.382	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	4.76	3204.611	3204.611	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	4.76	3218.791	3218.791	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	4.76	2931.359	2931.359	12.500	12.5	0.0	NO		NO	bb

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Compound name: 13C6-PFDA
Response Factor: 1
RRF SD: 0, Relative SD: 0
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	180603M2_2	Standard	12.500	5.05	19808.373	19808.373	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.05	23192.090	23192.090	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.05	24616.742	24616.742	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.05	22939.766	22939.766	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.05	23315.555	23315.555	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.05	23125.375	23125.375	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.05	26363.756	26363.756	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.05	21092.996	21092.996	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.05	21331.662	21331.662	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.05	18108.209	18108.209	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C7-PFUdA
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-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	180603M2_2	Standard	12.500	5.37	30976.199	30976.199	12.500	12.5	0.0	NO		NO	bb
2	2	180603M2_3	Standard	12.500	5.37	30286.340	30286.340	12.500	12.5	0.0	NO		NO	bb
3	3	180603M2_4	Standard	12.500	5.37	28408.111	28408.111	12.500	12.5	0.0	NO		NO	bb
4	4	180603M2_5	Standard	12.500	5.37	28944.660	28944.660	12.500	12.5	0.0	NO		NO	bb
5	5	180603M2_6	Standard	12.500	5.37	26693.467	26693.467	12.500	12.5	0.0	NO		NO	bb
6	6	180603M2_7	Standard	12.500	5.37	29381.432	29381.432	12.500	12.5	0.0	NO		NO	bb
7	7	180603M2_8	Standard	12.500	5.37	22912.762	22912.762	12.500	12.5	0.0	NO		NO	bb
8	8	180603M2_9	Standard	12.500	5.37	28219.096	28219.096	12.500	12.5	0.0	NO		NO	bb
9	9	180603M2_10	Standard	12.500	5.37	21508.281	21508.281	12.500	12.5	0.0	NO		NO	bb
10	10	180603M2_11	Standard	12.500	5.37	21351.475	21351.475	12.500	12.5	0.0	NO		NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
1	1	PFBA	36	0.9998	NO	
2	2	PFPeA	37	1.0000	NO	
3	3	PFBS	38	0.9998	NO	
4	4	4:2 FTS	39	0.9981	NO	
5	5	PFHxA	40	0.9999	NO	
6	6	PFPeS	38	0.9989	NO	
7	7	PFHpA	41	1.0000	NO	
8	8	L-PFHxS	42	0.9990	NO	
9	10	6:2 FTS	43	0.9991	NO	
10	11	L-PFOA	44	0.9997	NO	
11	13	PFHpS	44	0.9996	NO	
12	14	PFNA	45	0.9997	NO	
13	15	PFOSA	46	0.9998	NO	
14	16	L-PFOS	47	0.9998	NO	
15	18	PFDA	48	0.9990	NO	
16	19	8:2 FTS	49	0.9995	NO	
17	20	PFNS	47	0.9996	NO	
18	21	L-MeFOSAA	50	0.9997	NO	
19	23	L-EtFOSAA	51	0.9996	NO	

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
1	25	PFUdA	52	0.9934	NO	
2	26	PFDS	52	0.9993	NO	
3	27	PFDoA	53	0.9970	NO	
4	28	N-MeFOSA	54	0.9996	NO	
5	29	PFTrDA	53	0.9994	NO	
6	30	PFTeDA	55	0.9993	NO	
7	31	N-EtFOSA	56	0.9999	NO	
8	32	PFHxDA	57	0.9989	NO	
9	33	PFODA	57	0.9981	NO	
10	34	N-MeFOSE	58	0.9996	NO	
11	35	N-EtFOSE	59	0.9998	NO	
12	36	13C3-PFBA	60		NO	1.314
13	37	13C3-PFPeA	61		NO	4.053
14	38	13C3-PFBS	61		NO	5.473
15	39	13C2-4:2 FTS	61		NO	11.720
16	40	13C2-PFHxA	61		NO	4.557
17	41	13C4-PFHpA	61		NO	6.656
18	42	18O2-PFHxS	62		NO	4.630
19	43	13C2-6:2 FTS	63		NO	13.274
20	44	13C2-PFOA	63		NO	9.834
21	45	13C5-PFNA	64		NO	7.782
22	46	13C8-PFOSA	67		NO	10.073
23	47	13C8-PFOS	65		NO	2.818
24	48	13C2-PFDA	66		NO	9.755
25	49	13C2-8:2 FTS	61		NO	12.496
26	50	d3-N-MeFOSAA	67		NO	11.696
27	51	d5-N-EtFOSAA	67		NO	10.584
28	52	13C2-PFUdA	67		NO	11.678
29	53	13C2-PFDoA	66		NO	13.490
30	54	d3-N-MeFOSA	67		NO	12.910
31	55	13C2-PFTeDA	67		NO	19.077

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:48:17 Pacific Daylight Time

Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
32	56	d5-N-ETFOSA	67		NO	11.199
33	57	13C2-PFHxDA	67		NO	16.450
34	58	d7-N-MeFOSE	67		NO	18.170
35	59	d9-N-EtFOSE	67		NO	15.177
36	60	13C4-PFBA	60		NO	0.000
37	61	13C5-PFHxA	61		NO	0.000
38	62	13C3-PFHxS	62		NO	0.000
39	63	13C8-PFOA	63		NO	0.000
40	64	13C9-PFNA	64		NO	0.000
41	65	13C4-PFOS	65		NO	0.000
42	66	13C6-PFDA	66		NO	0.000
43	67	13C7-PFUdA	67		NO	0.000

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:03:06 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	Name	Ion Ratio	Ratio out?
1	PFBA		
2	PFPeA		
3	PFBS	2.638	NO
4	4:2 FTS	1.894	NO
5	PFHxA	186.035	NO
6	PFPeS	1.660	NO
7	PFHpA	17.747	NO
8	L-PFHxS	1.719	NO
9	6:2 FTS	3.055	NO
10	L-PFOA	4.213	NO
11	PFHpS	2.095	NO
12	PFNA	5.321	NO
13	PFOSA	20.979	NO
14	L-PFOS	1.919	NO
15	PFDA	5.728	NO
16	8:2 FTS	2.581	NO
17	PFNS	1.942	NO
18	L-MeFOSAA	12.946	NO
19	L-EtFOSAA	14.455	NO

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Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:03:13 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	Name	Ion Ratio	Ratio out?
1	PFUdA	11.410	NO
2	PFDS	2.020	NO
3	PFDoA	9.313	NO
4	N-MeFOSA	1.402	NO
5	PFTrDA	29.196	NO
6	PFTeDA	12.393	NO
7	N-EtFOSA	1.446	NO
8	PFHxDA	39.327	NO
9	PFODA		
10	N-MeFOSE		
11	N-EtFOSE		

Quantify Compound Summary Report **MassLynx MassLynx V4.1 SCN945 SCN960**
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, June 04, 2018 09:10:30 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:10:49 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180603M2_1	IPA	03-Jun-18	17:55:38
2	2	180603M2_2	ST180603M2-2 PFC CS-2 18E2902	03-Jun-18	18:07:52
3	3	180603M2_3	ST180603M2-2 PFC CS-1 18E2903	03-Jun-18	18:18:22
4	4	180603M2_4	ST180603M2-3 PFC CS0 18E2904	03-Jun-18	18:28:47
5	5	180603M2_5	ST180603M2-4 PFC CS1 18E2905	03-Jun-18	18:39:17
6	6	180603M2_6	ST180603M2-5 PFC CS2 18E2906	03-Jun-18	18:49:42
7	7	180603M2_7	ST180603M2-6 PFC CS3 18E2907	03-Jun-18	19:00:12
8	8	180603M2_8	ST180603M2-7 PFC CS4 18E2908	03-Jun-18	19:10:37
9	9	180603M2_9	ST180603M2-8 PFC CS5 18E2909	03-Jun-18	19:21:07
10	10	180603M2_10	ST180603M2-9 PFC CS6 18E2910	03-Jun-18	19:31:33
11	11	180603M2_11	ST180603M2-10 PFC CS7 18E2911	03-Jun-18	19:42:03
12	12	180603M2_12	IPA	03-Jun-18	19:52:27
13	13	180603M2_13	ICV180603M2-1 PFC 537 ICV 18E2901	03-Jun-18	20:02:58
14	14	180603M2_14	IPA	03-Jun-18	20:13:28

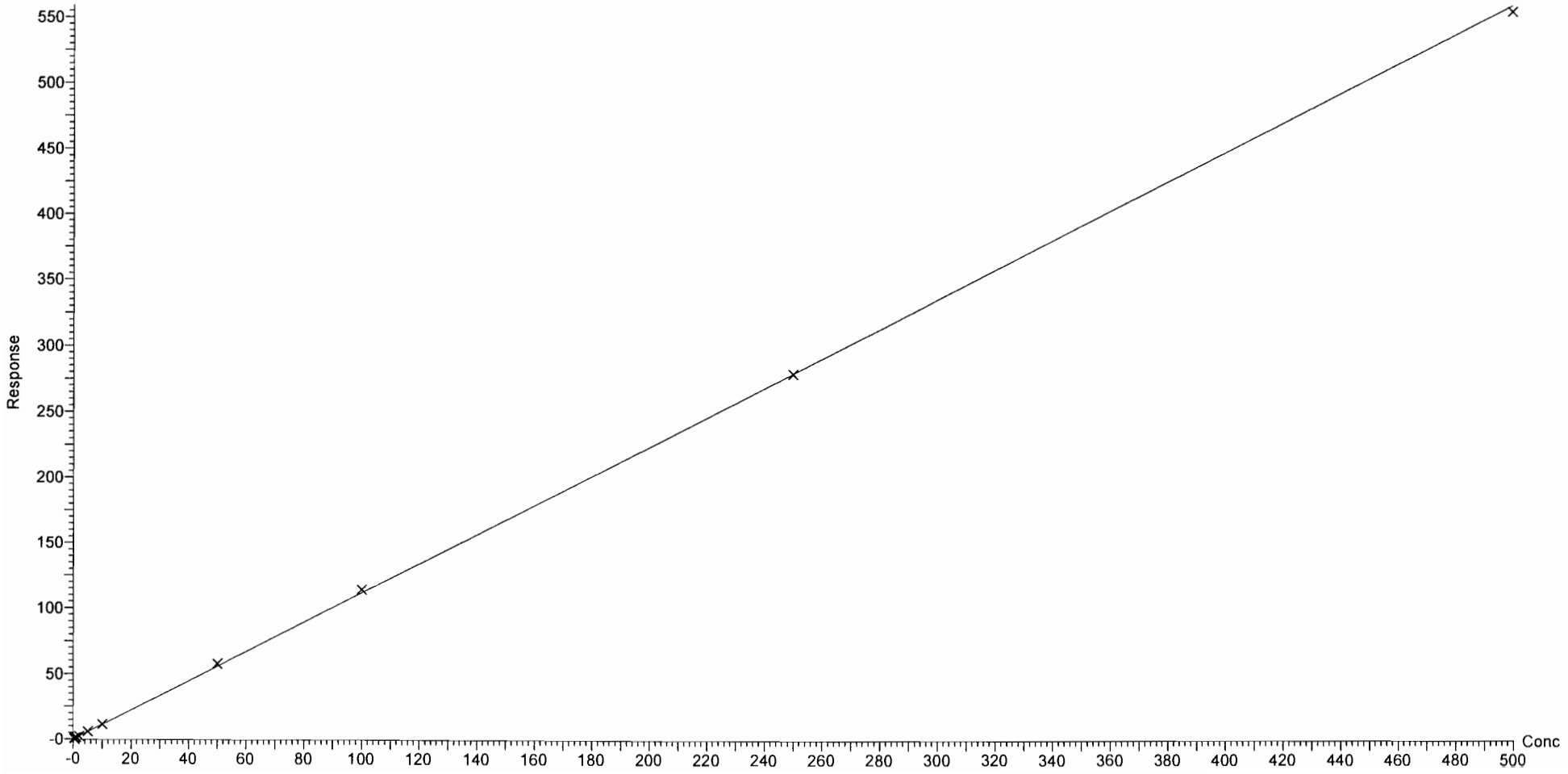
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

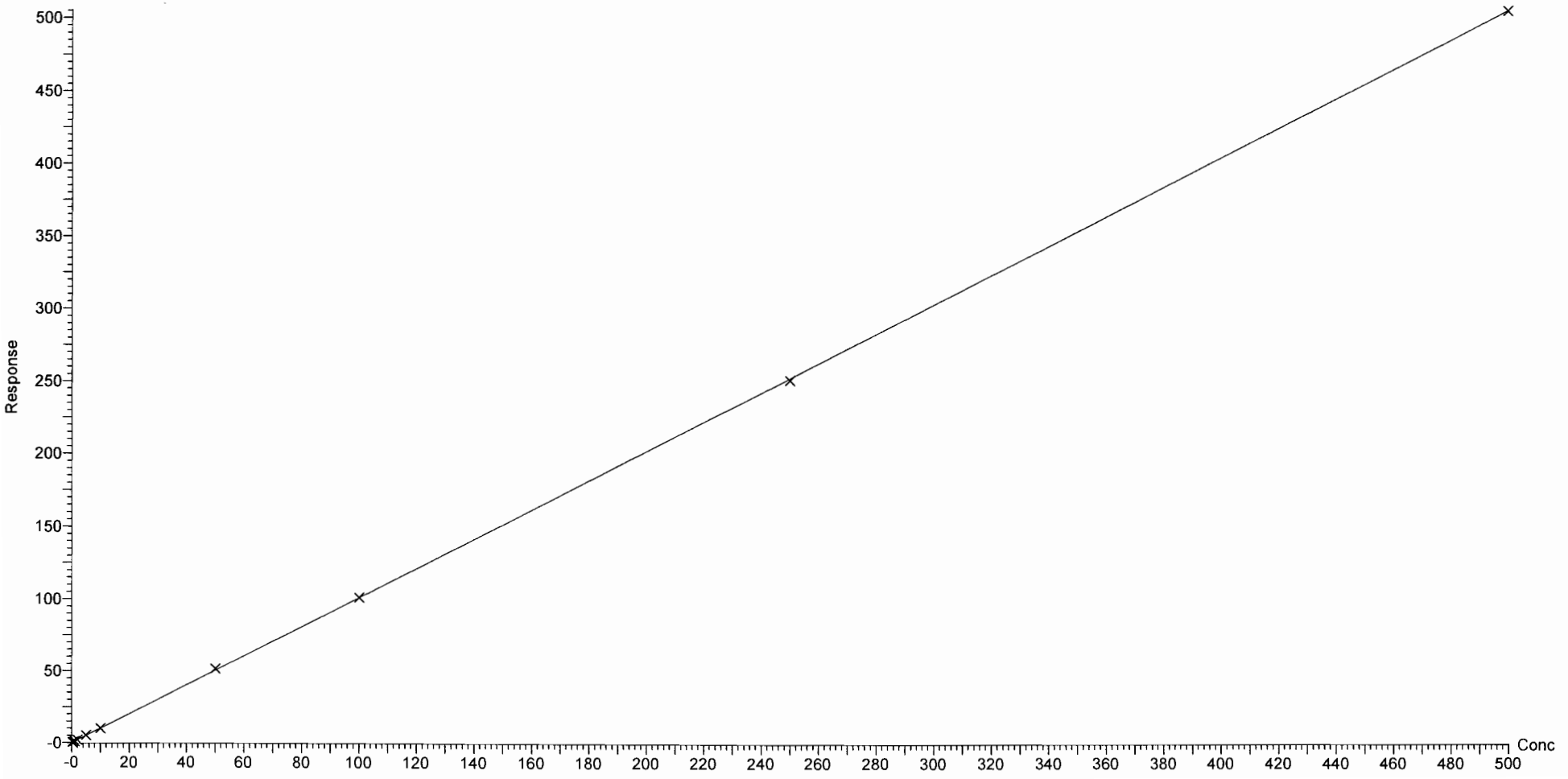
Compound name: PFBA
Correlation coefficient: r = 0.999917, r^2 = 0.999834
Calibration curve: 1.11767 * x + 0.0424299
Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

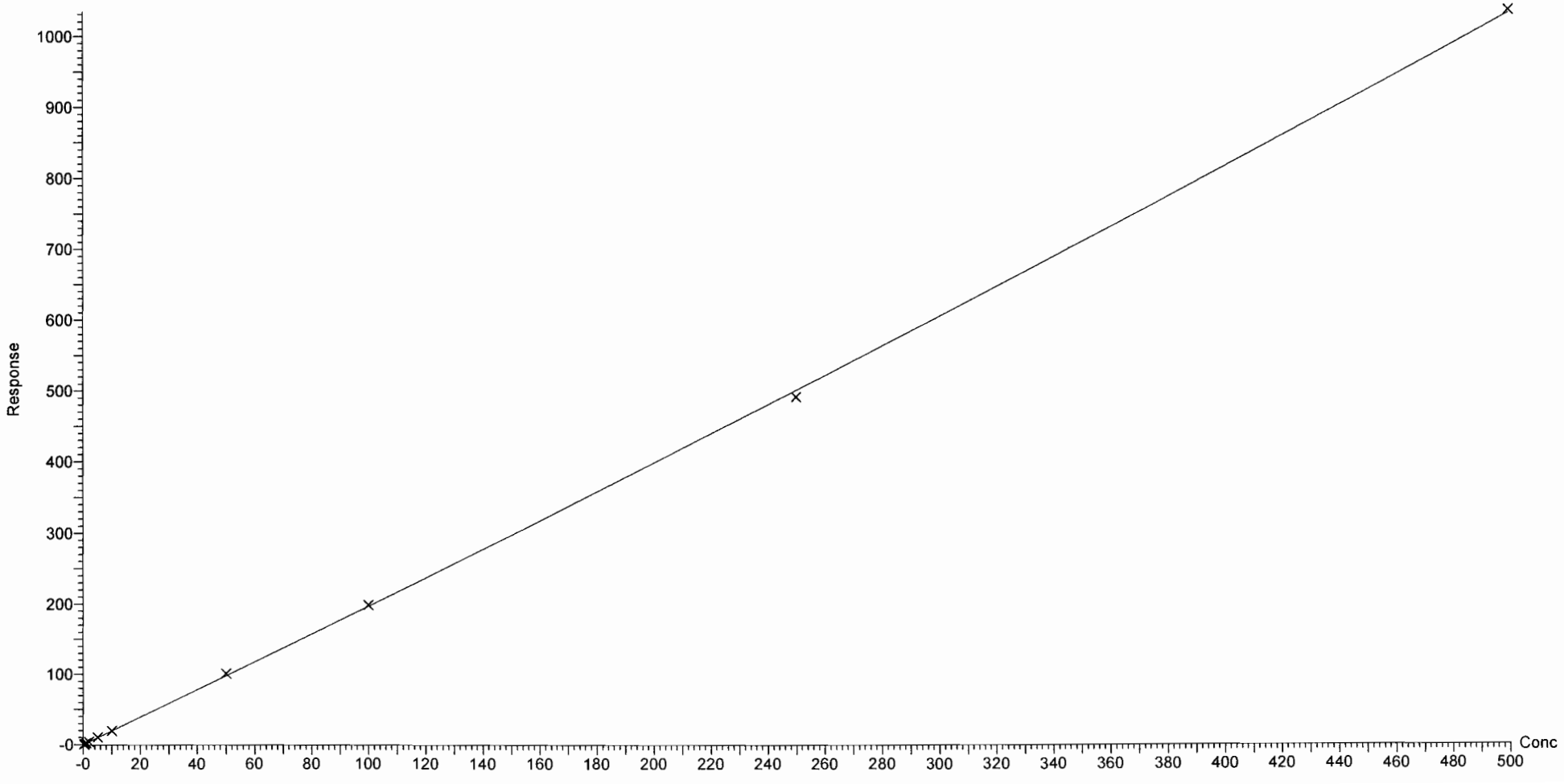
Compound name: PFPeA
Correlation coefficient: r = 0.999979, r^2 = 0.999958
Calibration curve: 1.01016 * x + 0.0157886
Response type: Internal Std (Ref 37), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

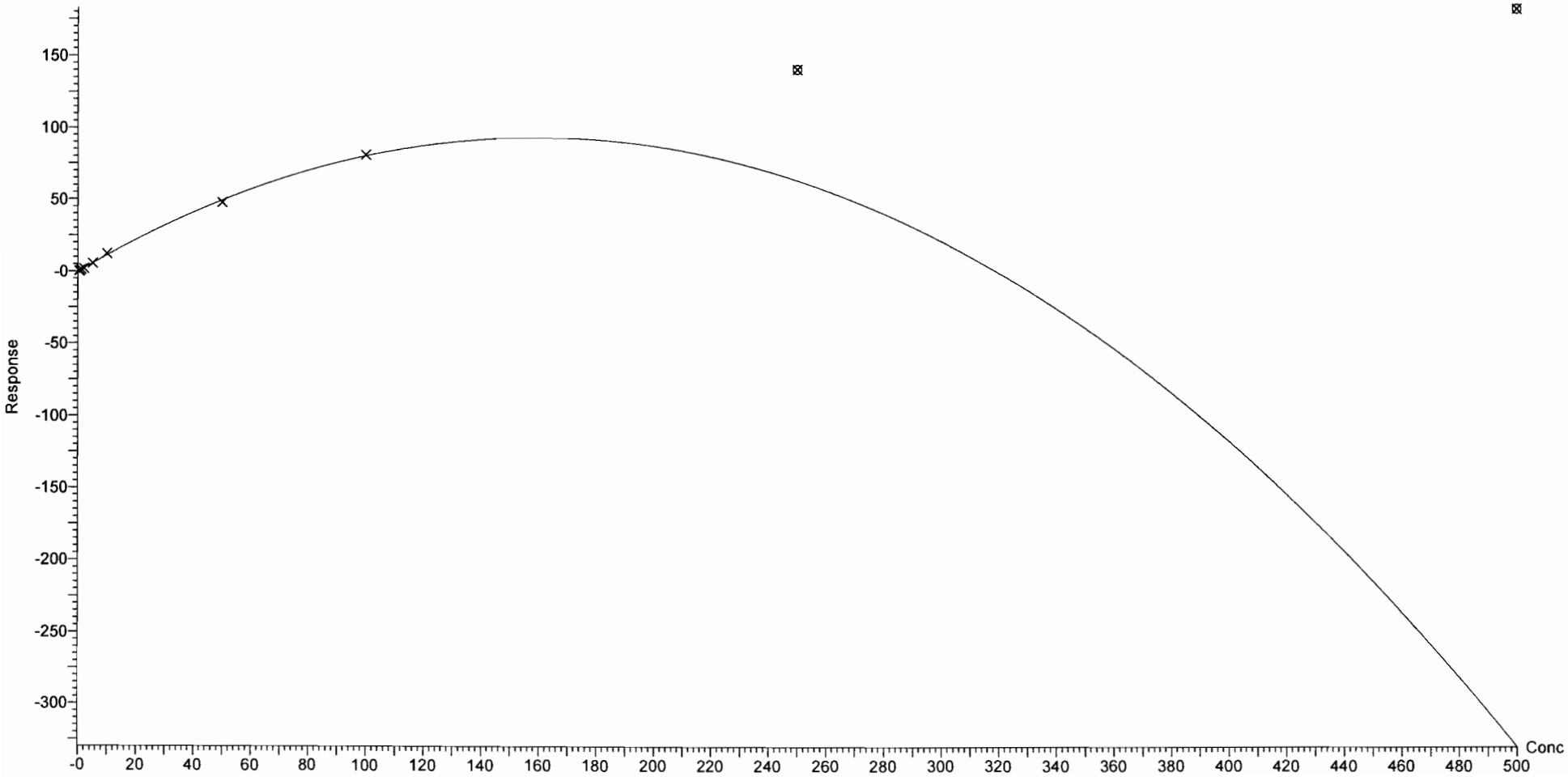
Compound name: PFBS
Coefficient of Determination: R^2 = 0.999815
Calibration curve: 0.000223532 * x^2 + 1.94727 * x + 0.0273154
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998088
Calibration curve: -0.00365524 * x^2 + 1.16824 * x + -0.00106813
Response type: Internal Std (Ref 39), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

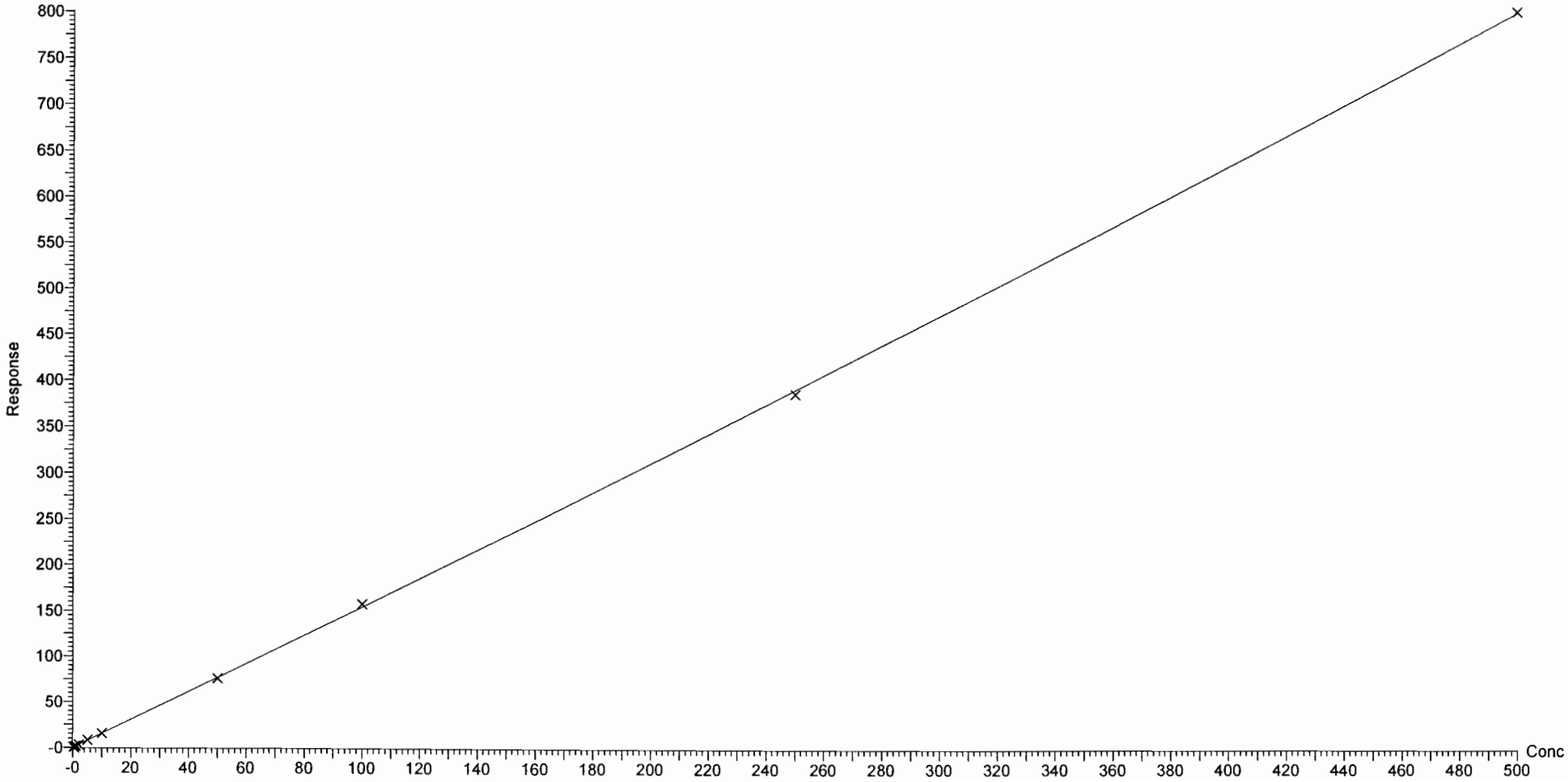


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999878
Calibration curve: 0.000139344 * x^2 + 1.52767 * x + 0.0390743
Response type: Internal Std (Ref 40), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

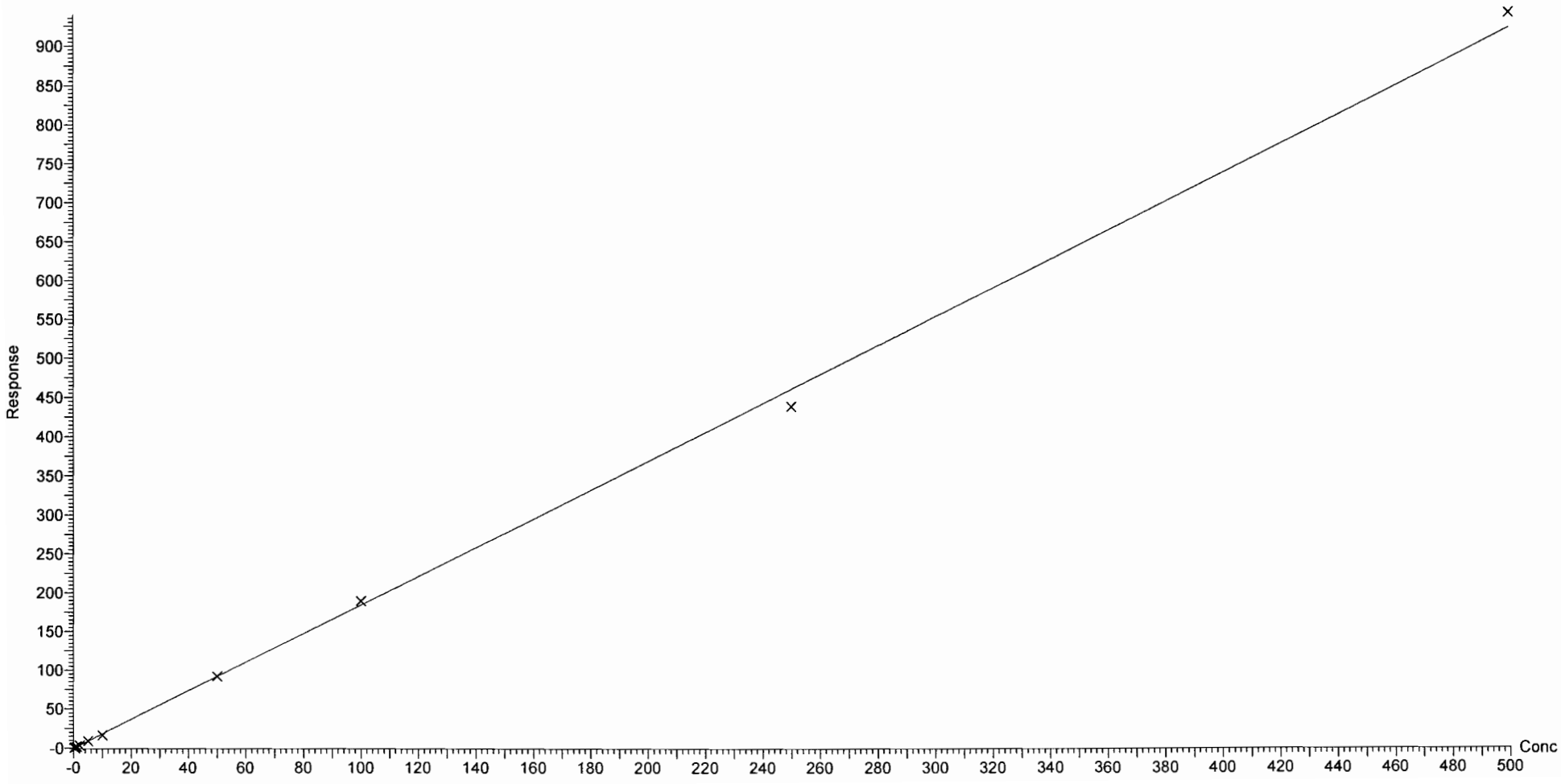


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

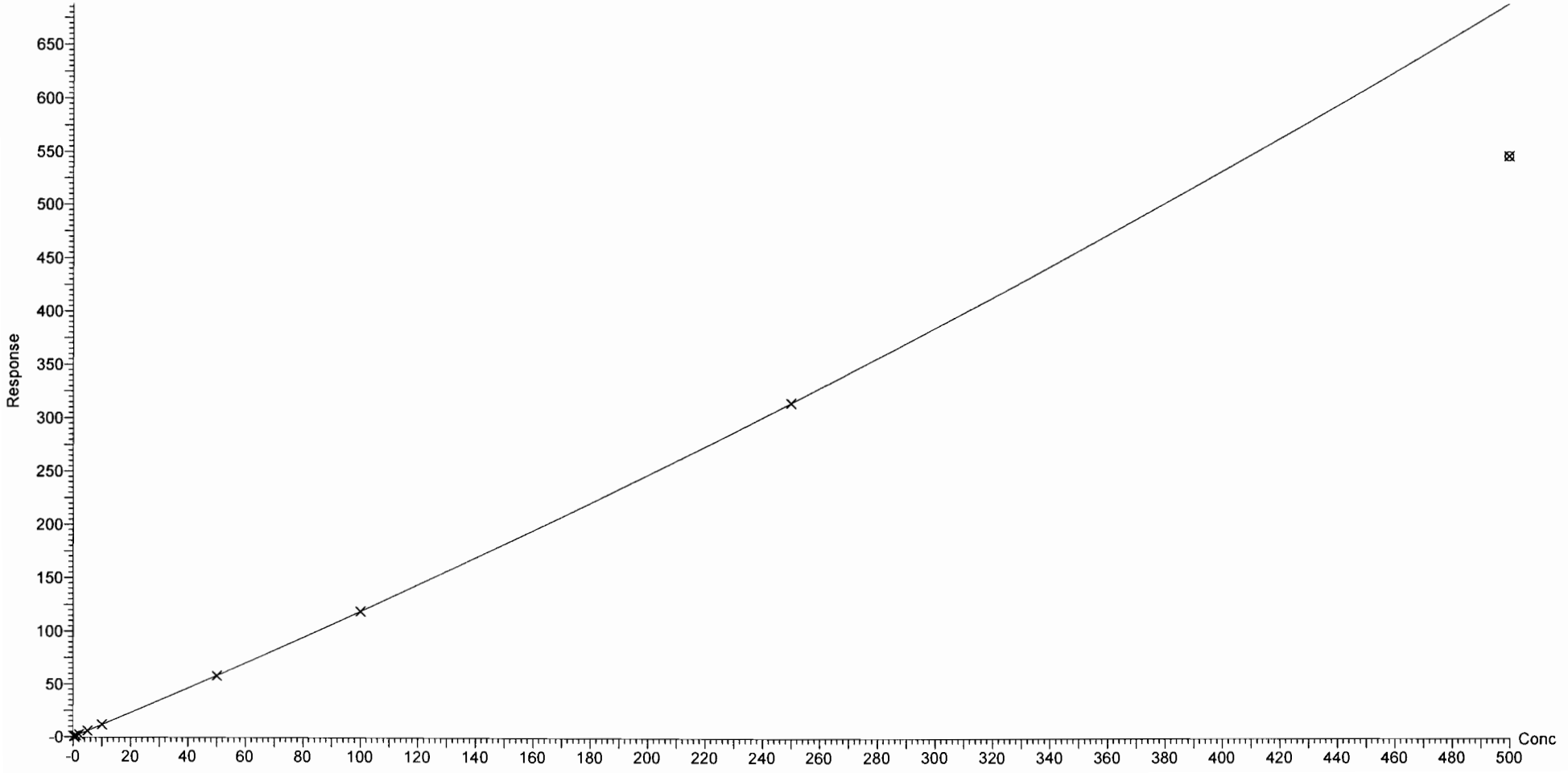
Compound name: PFPeS
Correlation coefficient: r = 0.999461, r^2 = 0.998922
Calibration curve: 1.84123 * x + -0.0692894
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: PFHpA
Coefficient of Determination: R^2 = 0.999980
Calibration curve: 0.000463938 * x^2 + 1.14345 * x + 0.0577121
Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

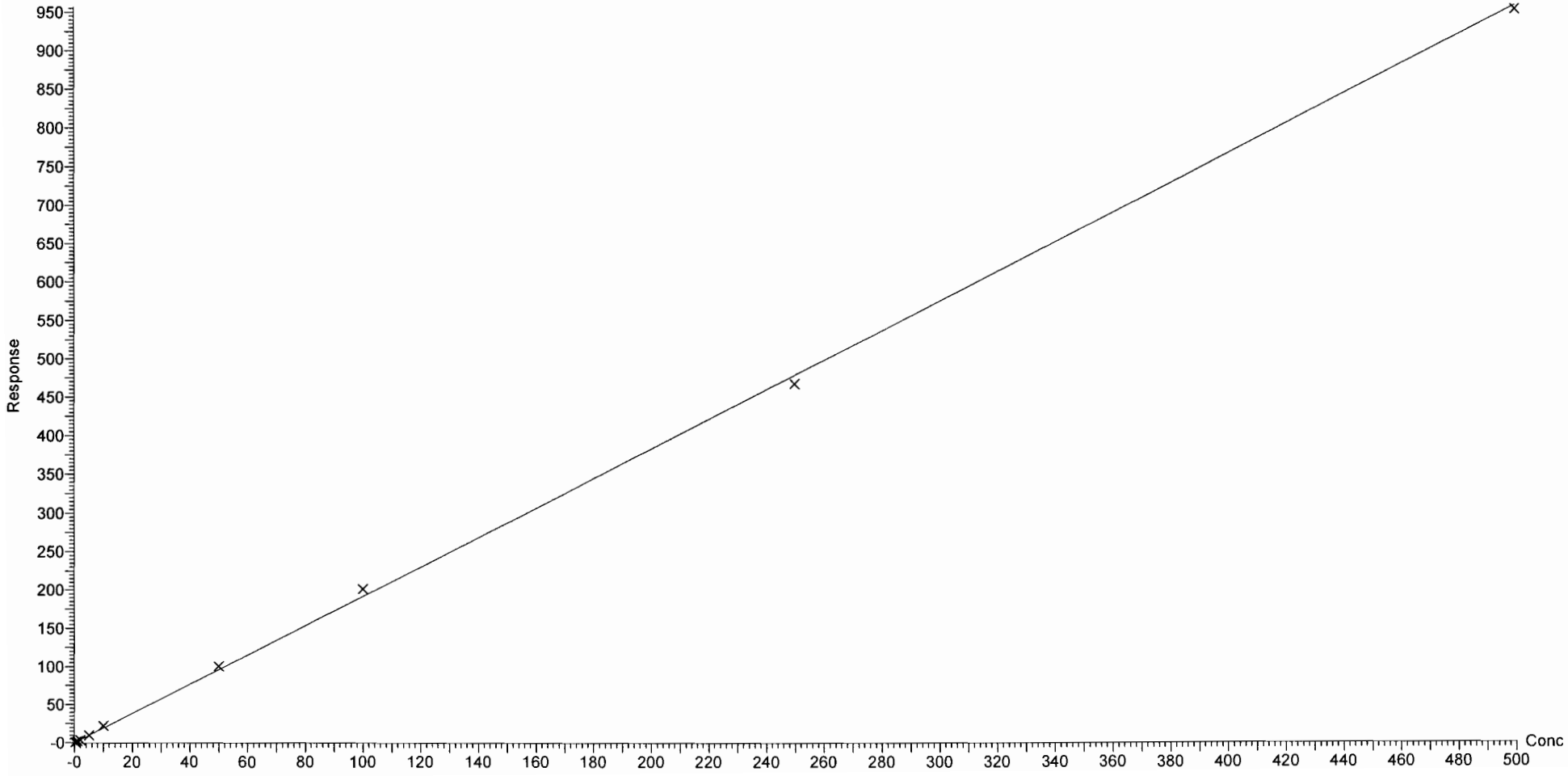


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

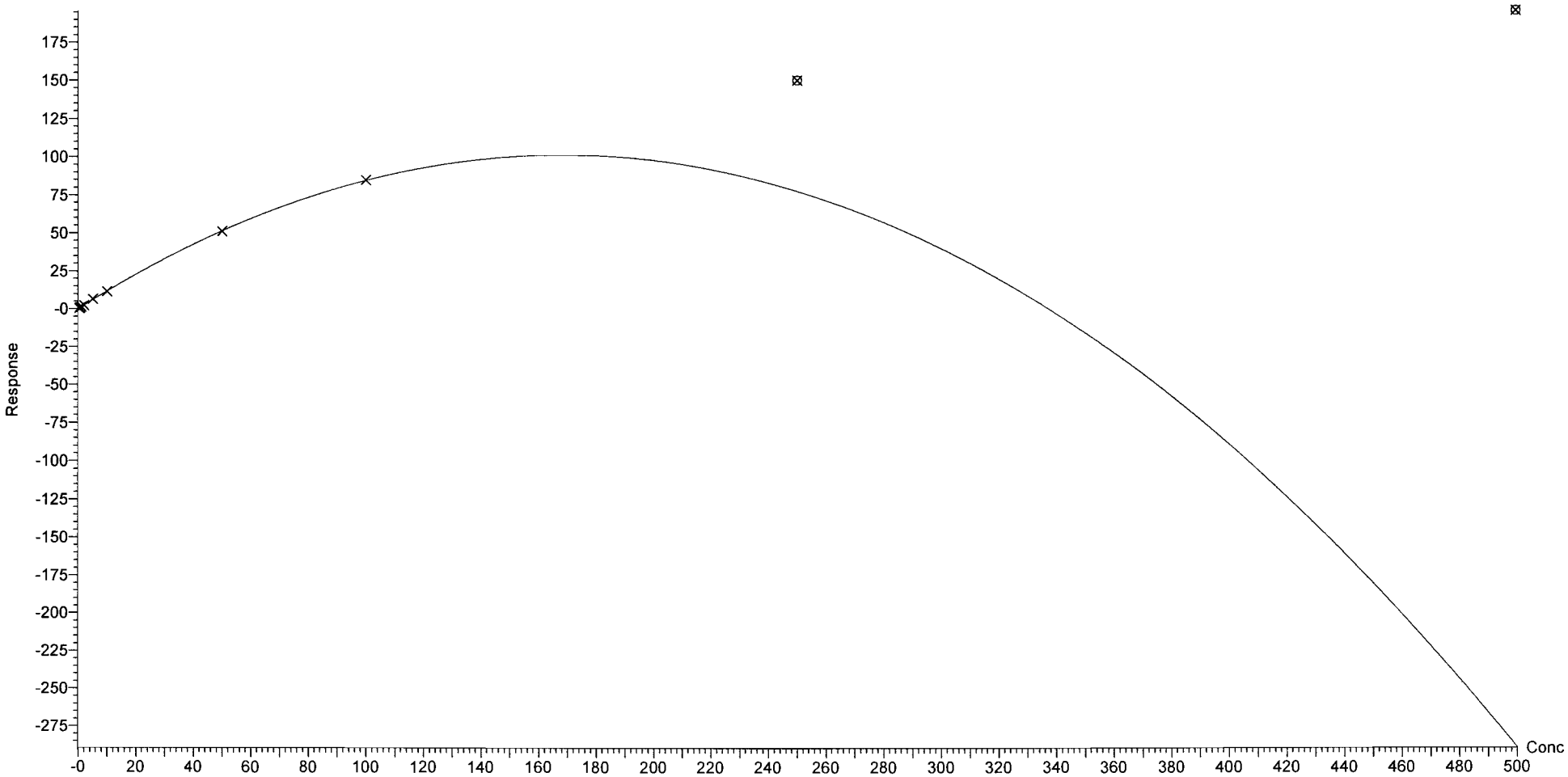
Compound name: L-PFHxS
Correlation coefficient: r = 0.999509, r^2 = 0.999018
Calibration curve: 1.91268 * x + 0.0612931
Response type: Internal Std (Ref 42), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

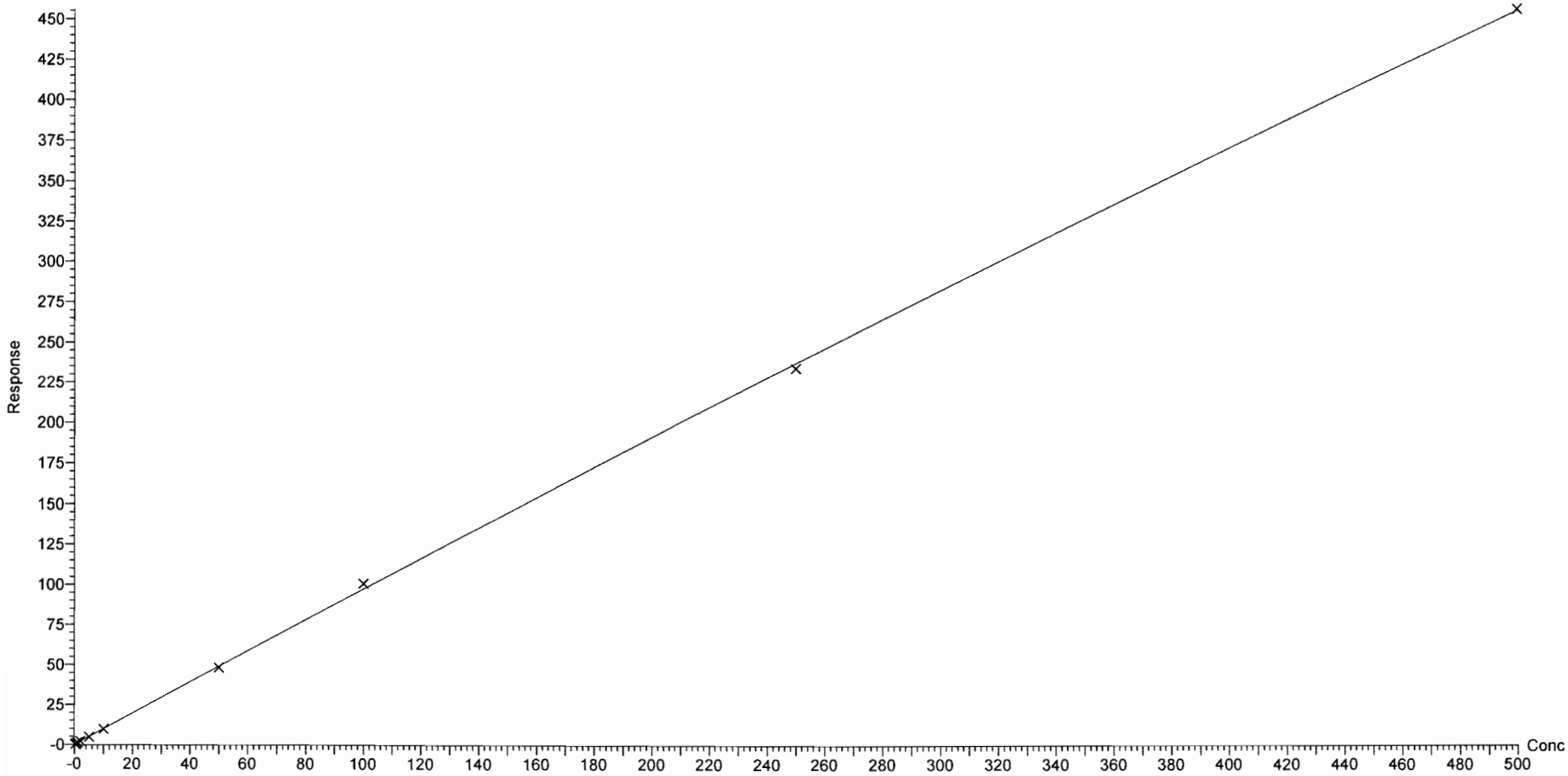
Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.999137
Calibration curve: -0.0035598 * x^2 + 1.20118 * x + 0.0541796
Response type: Internal Std (Ref 43), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

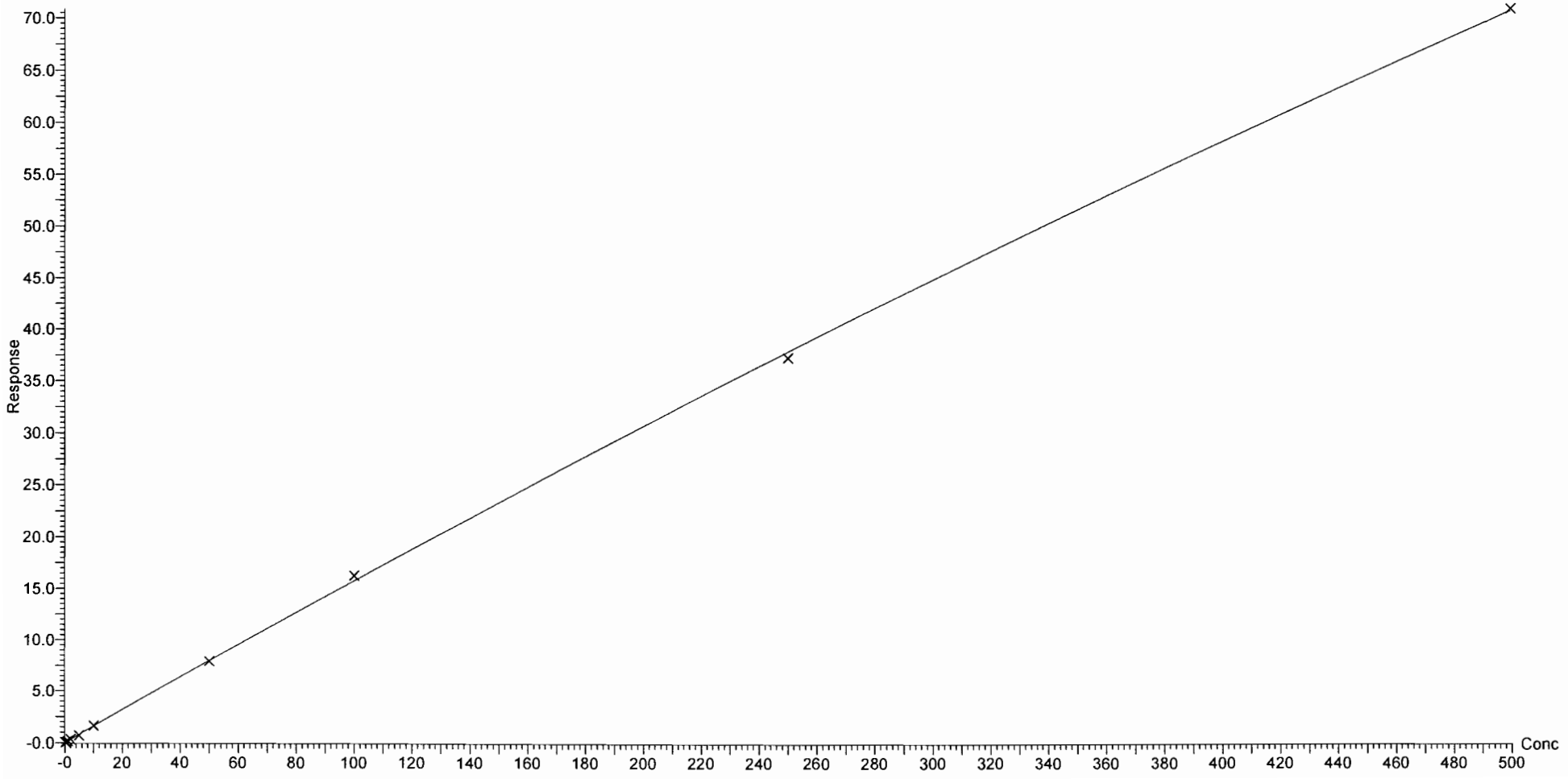
Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999677
Calibration curve: -0.000155657 * x^2 + 0.987655 * x + 0.0270012
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999582
Calibration curve: -4.10026e-005 * x^2 + 0.161763 * x + -0.00185584
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

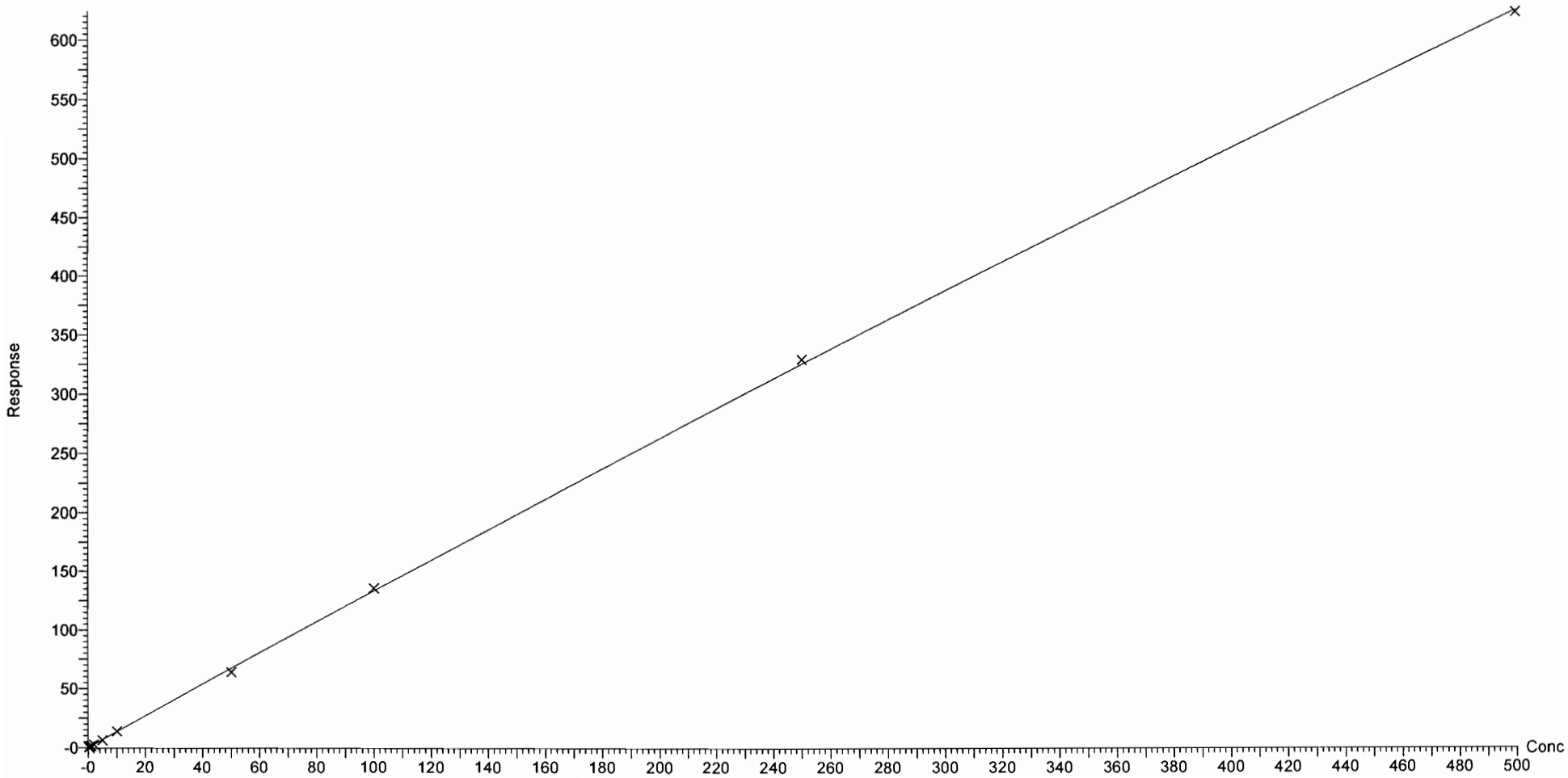


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

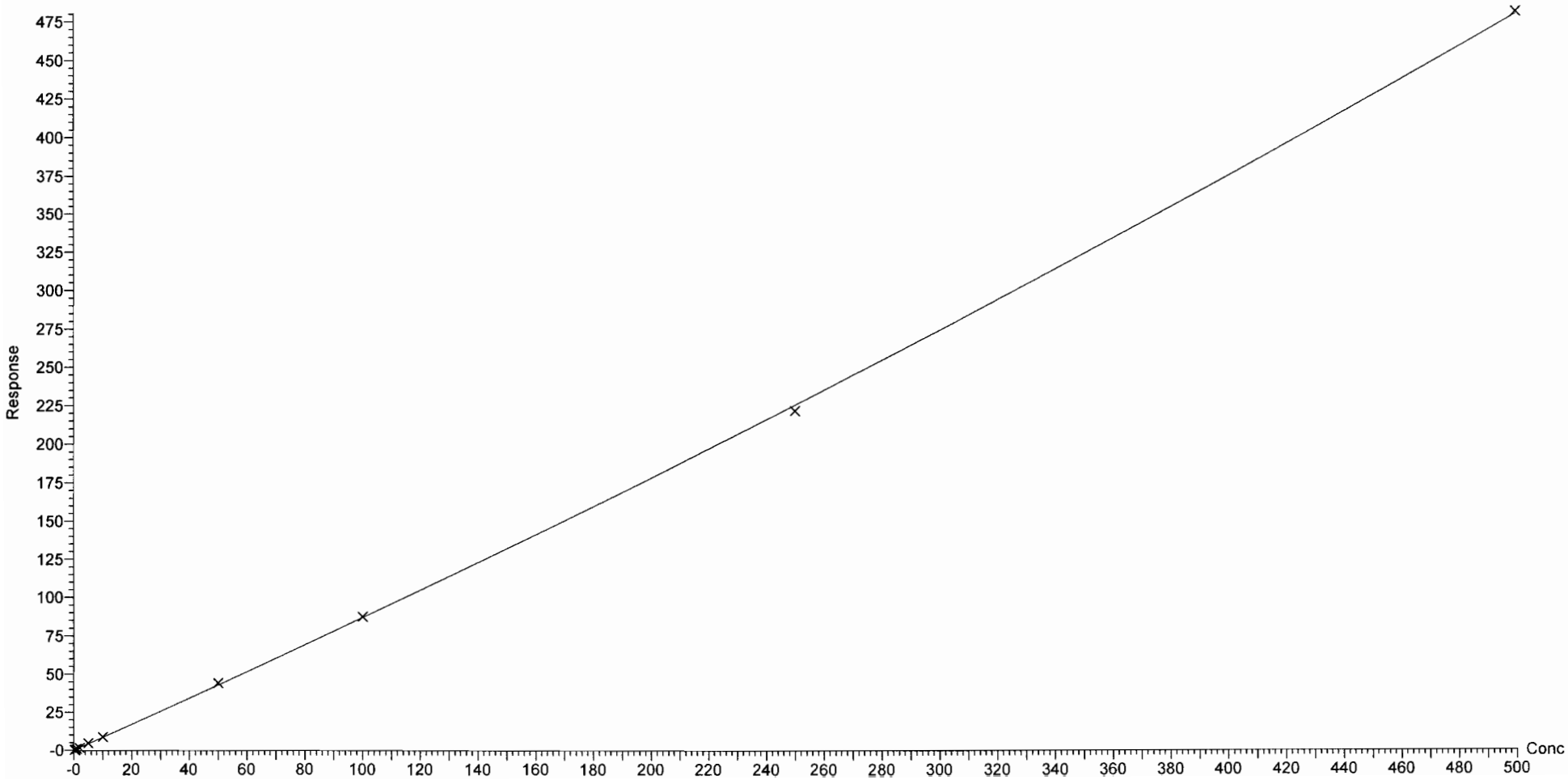
Compound name: PFNA
Coefficient of Determination: R^2 = 0.999693
Calibration curve: -0.000217884 * x^2 + 1.35711 * x + -0.0685492
Response type: Internal Std (Ref 45), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999799
Calibration curve: 0.000223926 * x^2 + 0.845984 * x + -0.00644957
Response type: Internal Std (Ref 46), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

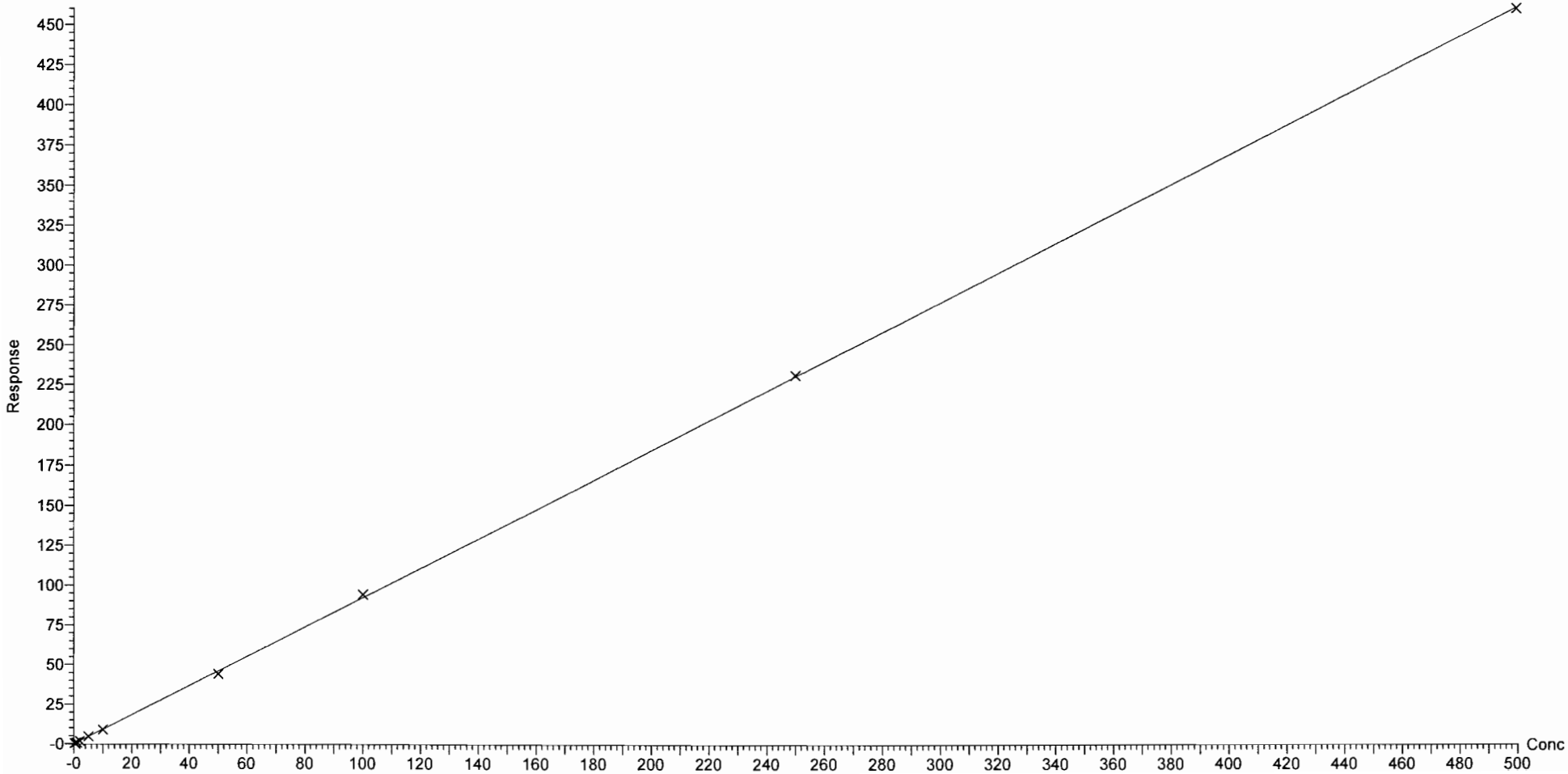


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: L-PFOS
Coefficient of Determination: R^2 = 0.999820
Calibration curve: -4.1577e-006 * x^2 + 0.922959 * x + -0.0602006
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\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: PFDA
Coefficient of Determination: R^2 = 0.999020
Calibration curve: -5.14851e-005 * x^2 + 1.0054 * x + 0.115839
Response type: Internal Std (Ref 48), Area * (IS Conc. / IS Area)
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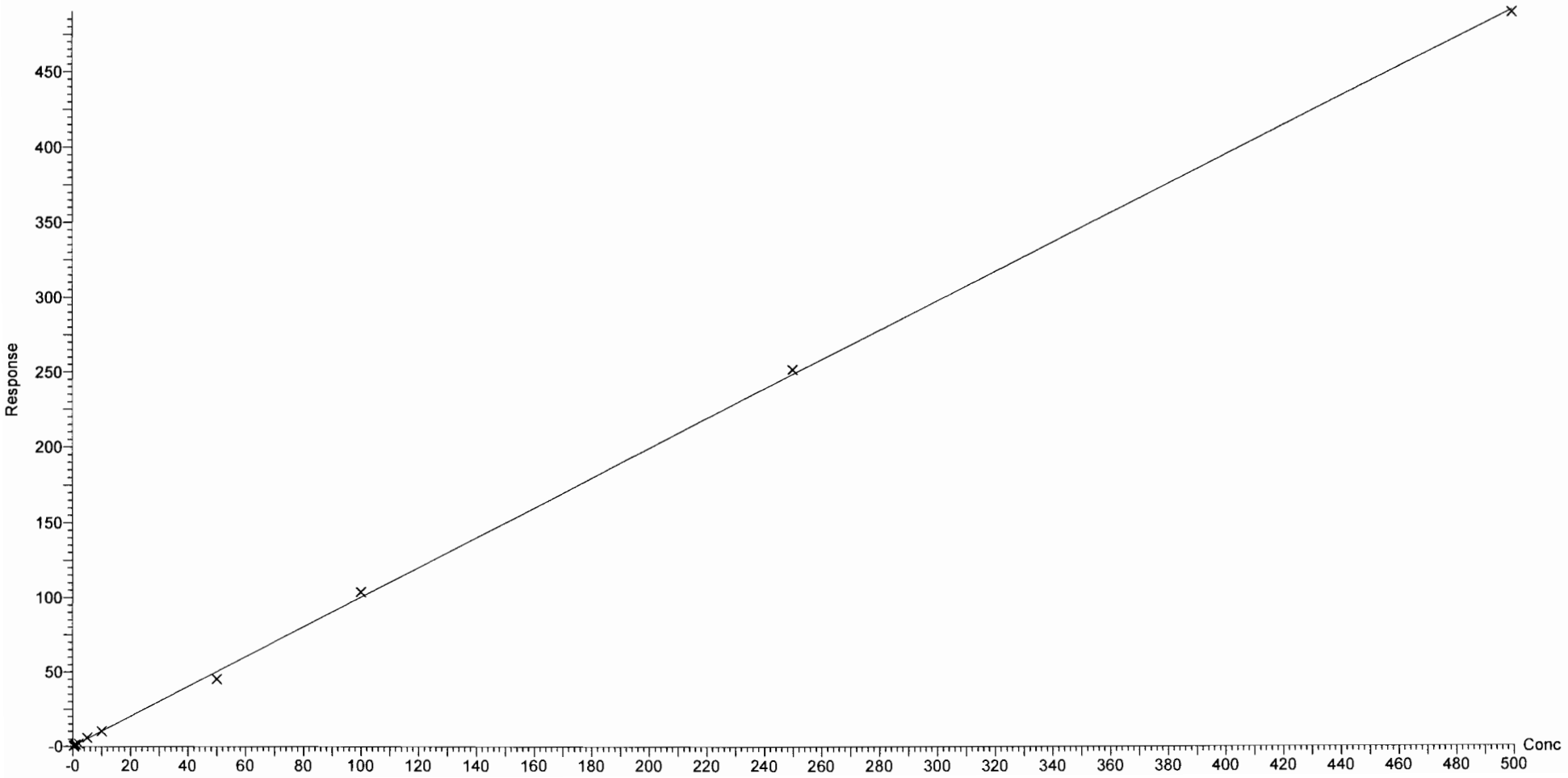
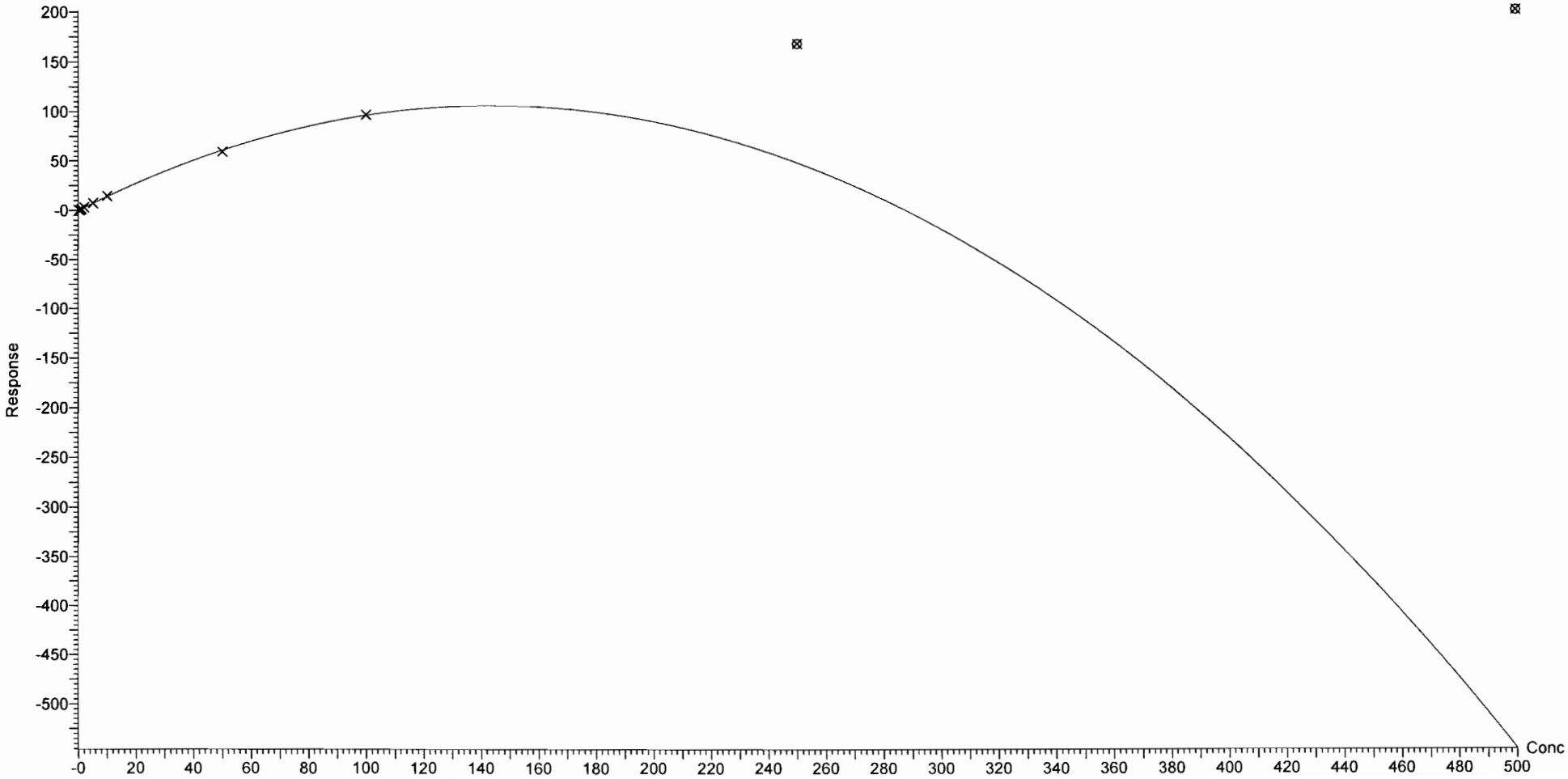


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

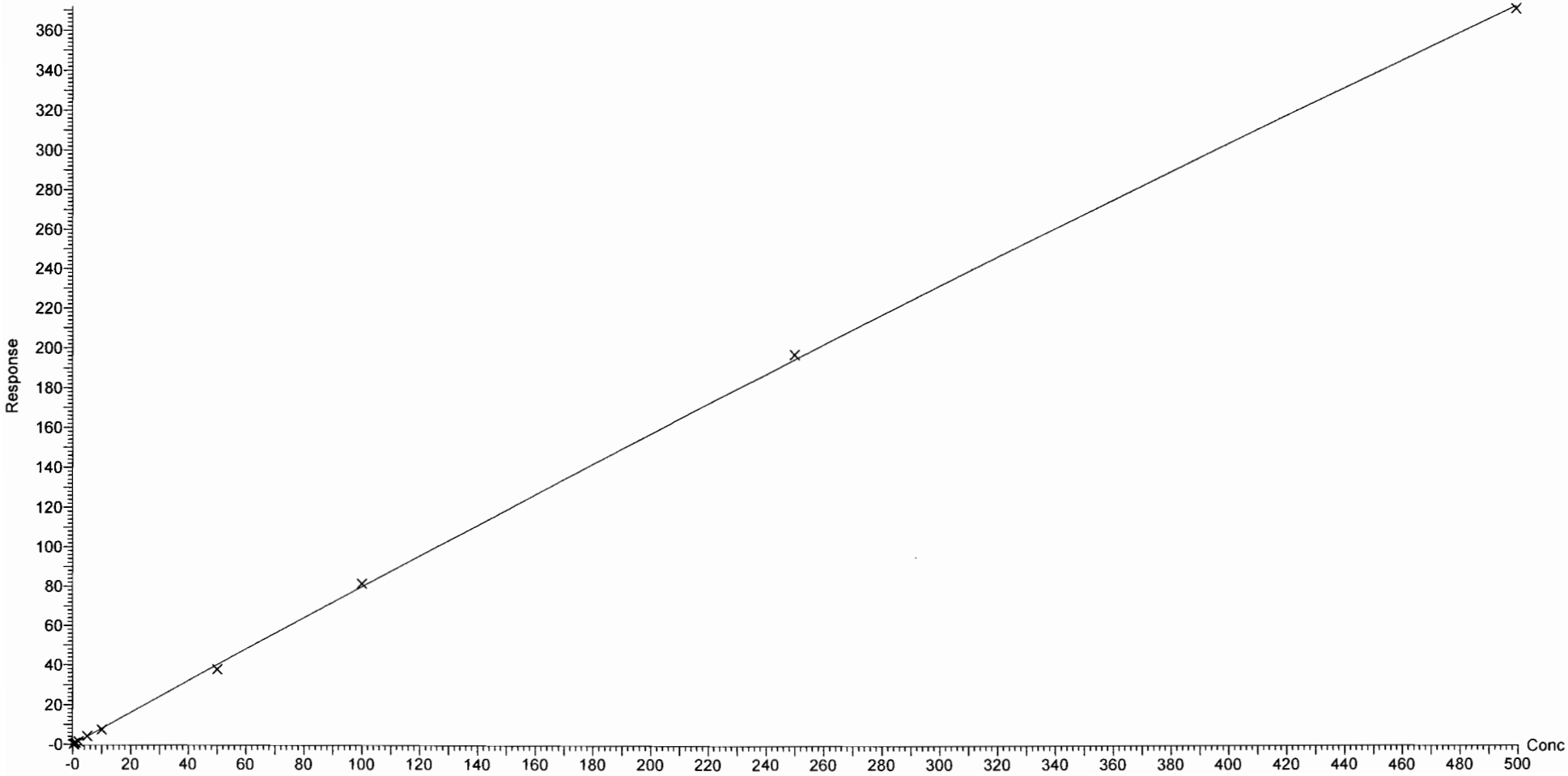
Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.999540
Calibration curve: -0.00513967 * x^2 + 1.47988 * x + -0.0800285
Response type: Internal Std (Ref 49), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

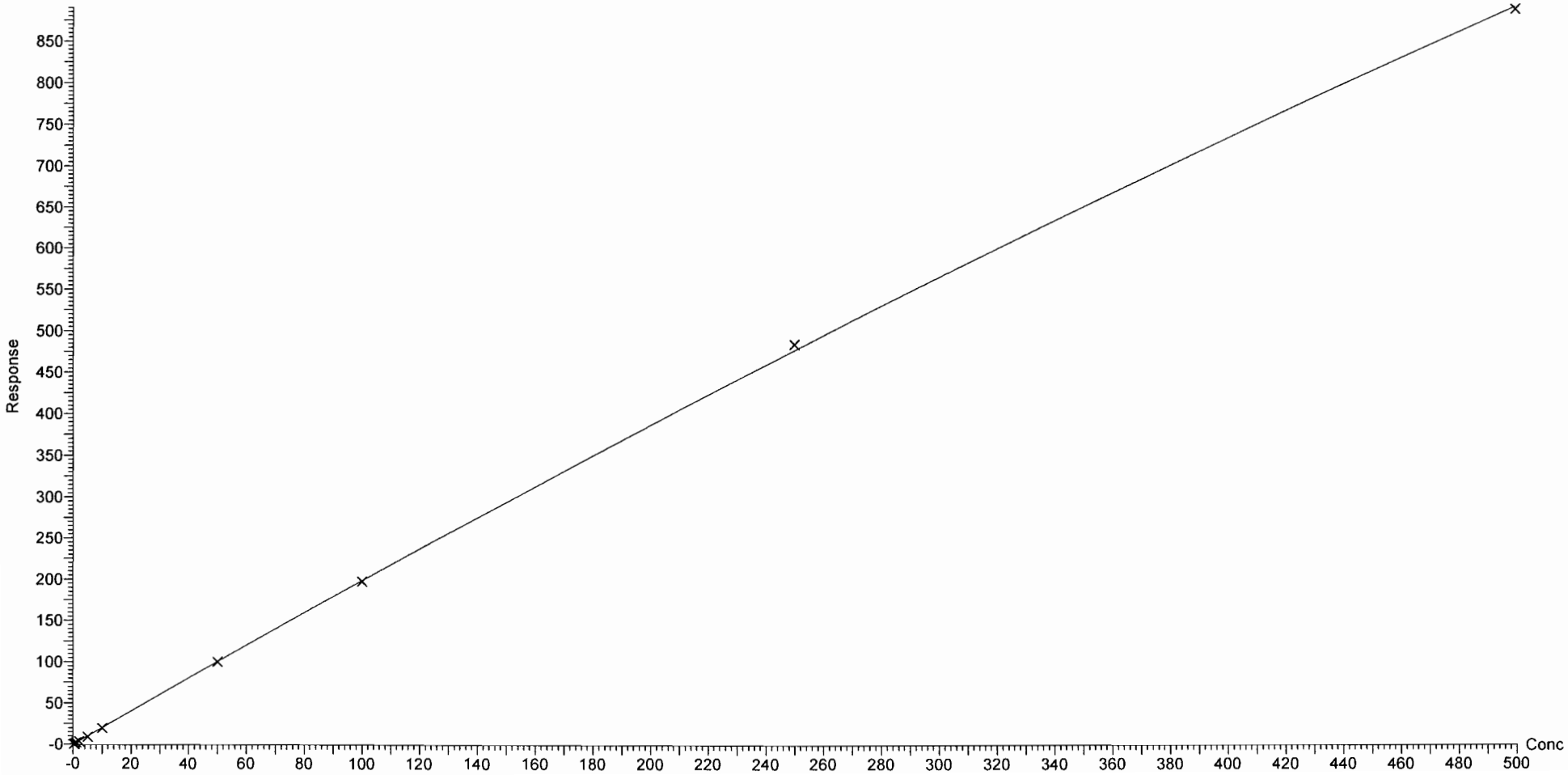
Compound name: PFNS
Coefficient of Determination: R^2 = 0.999614
Calibration curve: -0.000139909 * x^2 + 0.813563 * x + -0.0732691
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999746
Calibration curve: -0.000512206 * x^2 + 2.03689 * x + -0.180528
Response type: Internal Std (Ref 50), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

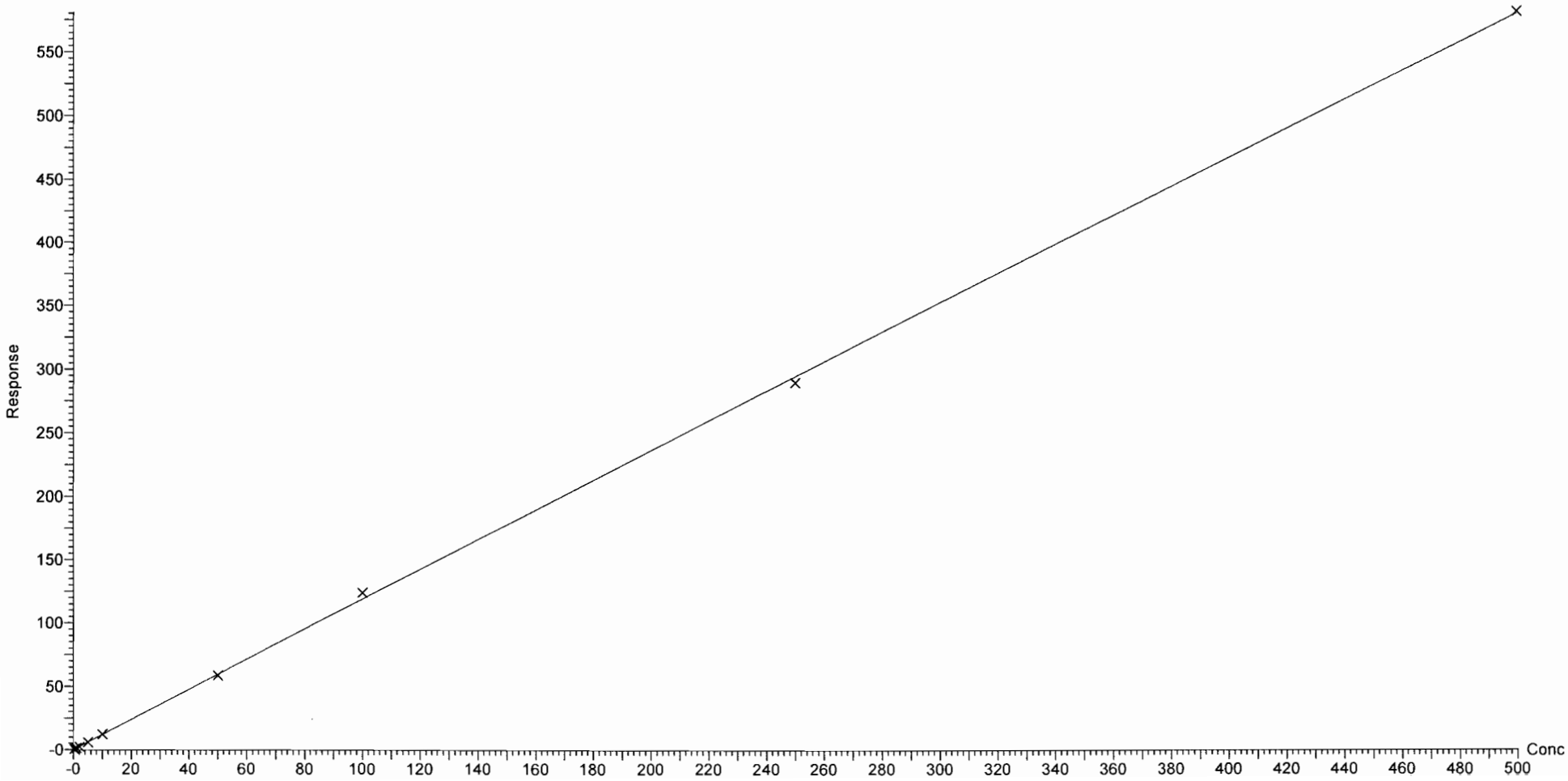


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:02 Pacific Daylight Time

Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999632
Calibration curve: -8.02336e-005 * x^2 + 1.19845 * x + -0.0686469
Response type: Internal Std (Ref 51), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



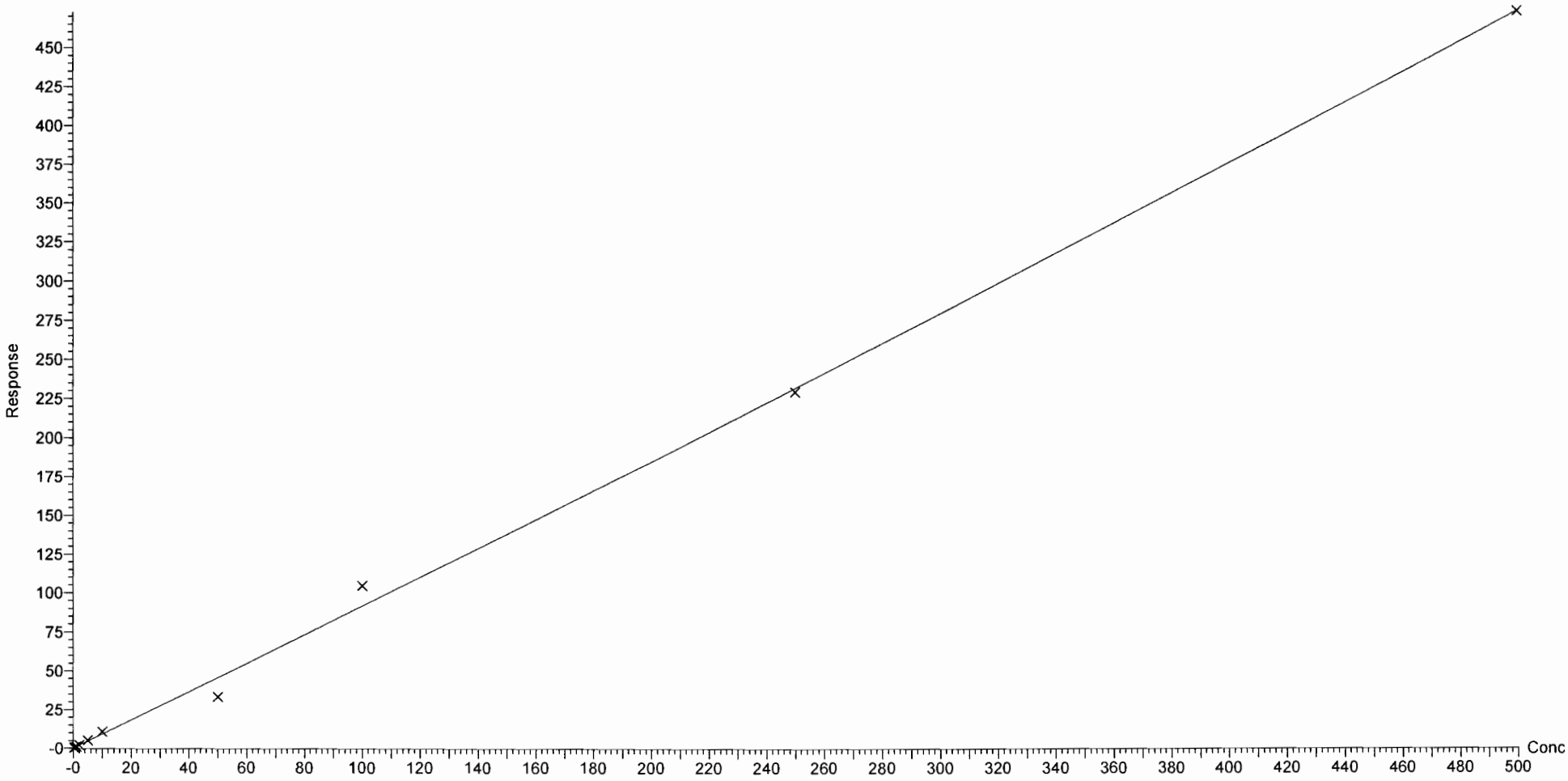
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Compound name: PFUdA
Coefficient of Determination: R^2 = 0.993431
Calibration curve: 7.49062e-005 * x^2 + 0.907352 * x + 0.092432
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

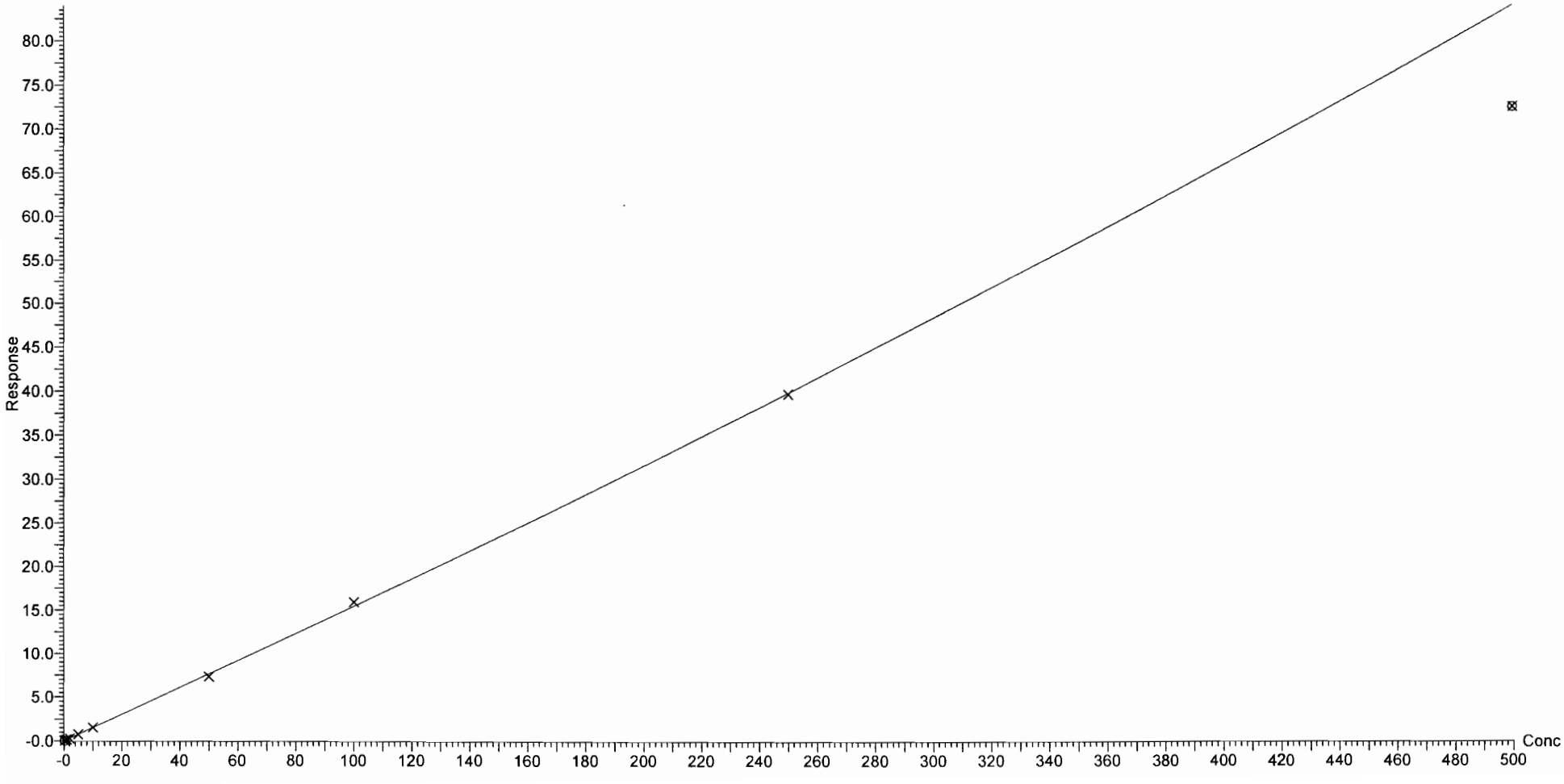


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

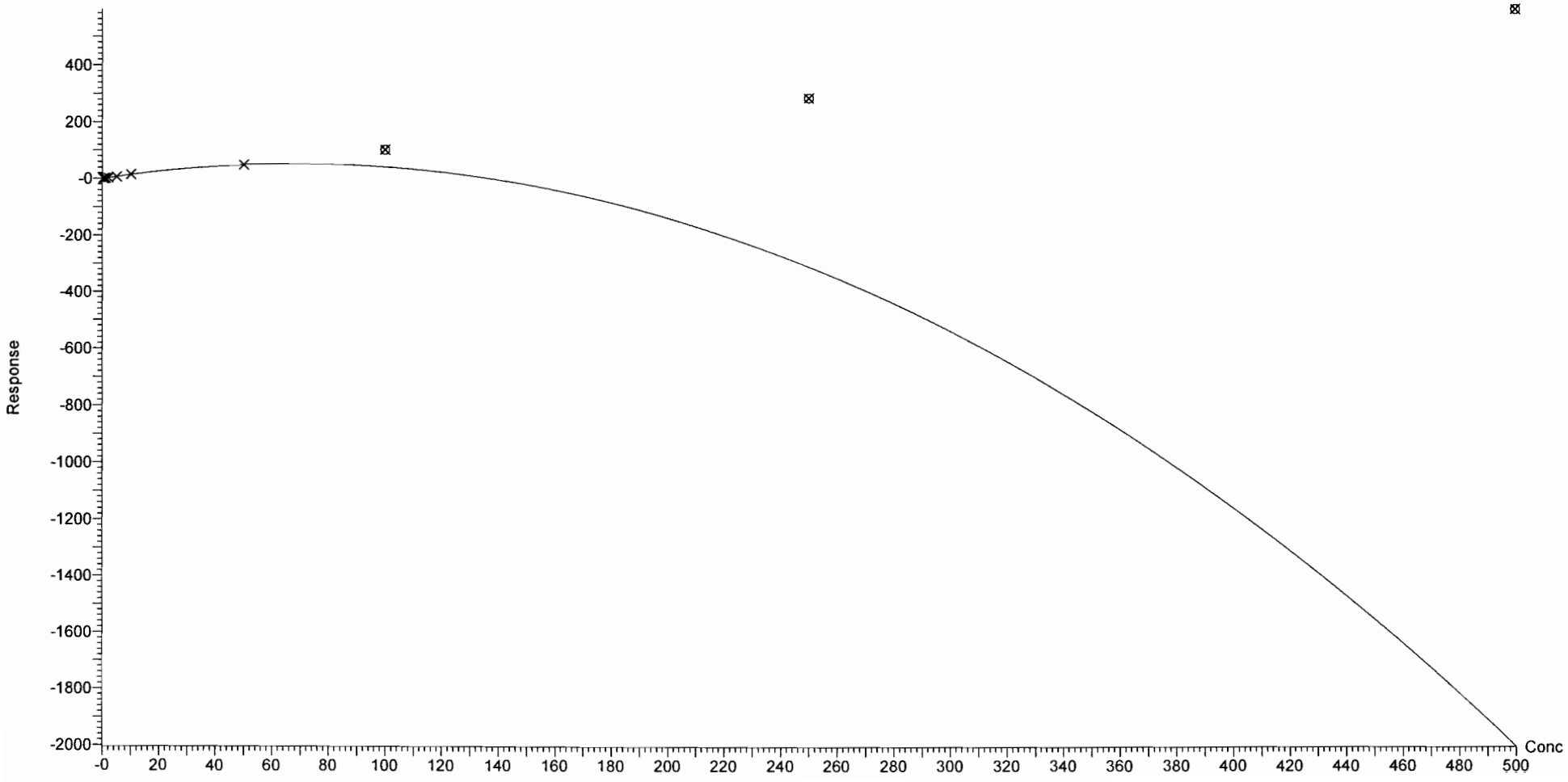
Compound name: PFDS
Coefficient of Determination: R^2 = 0.999337
Calibration curve: 3.37363e-005 * x^2 + 0.151074 * x + 0.00103366
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.997043
Calibration curve: -0.0110656 * x^2 + 1.52836 * x + -0.124406
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

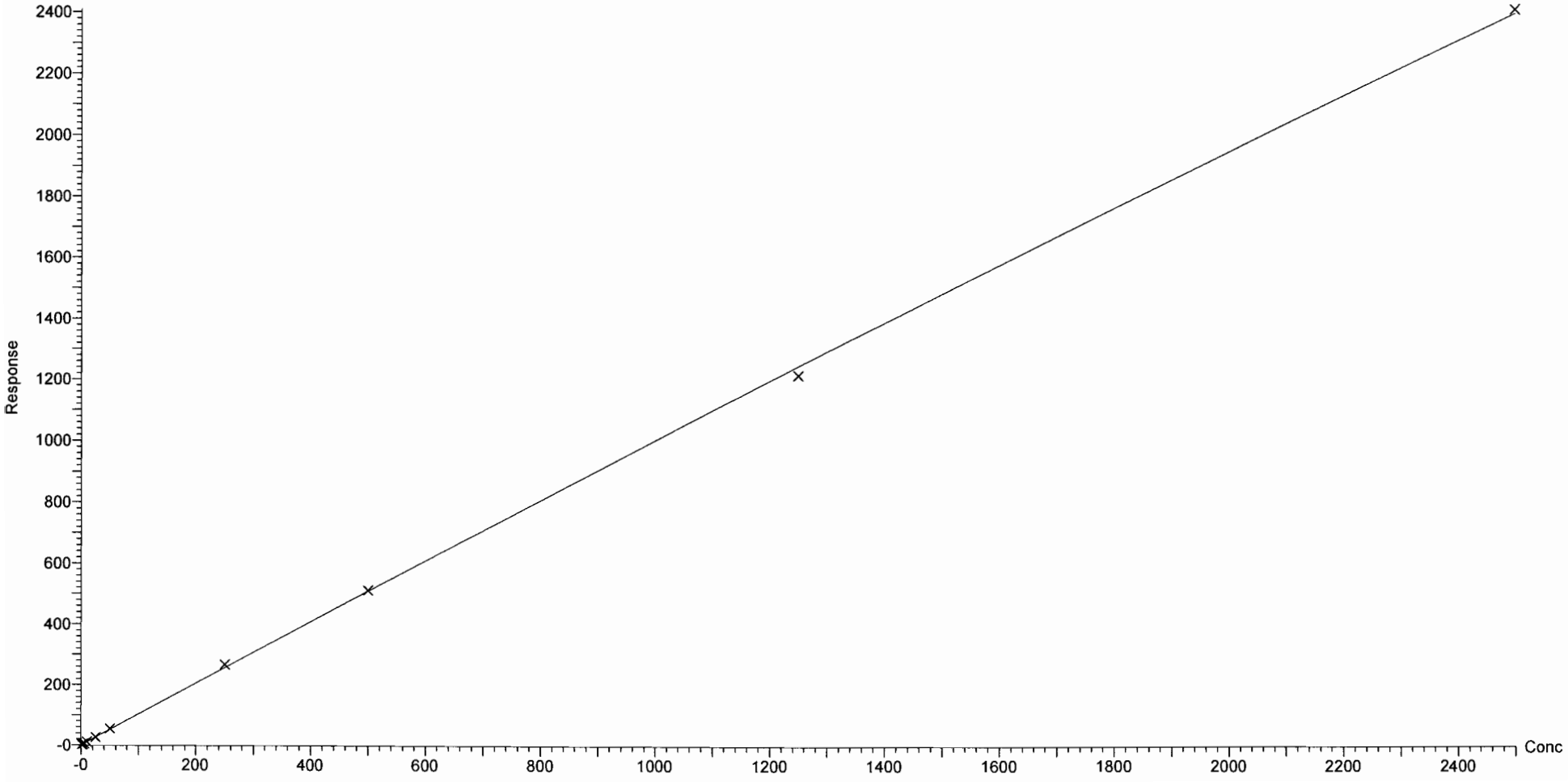


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

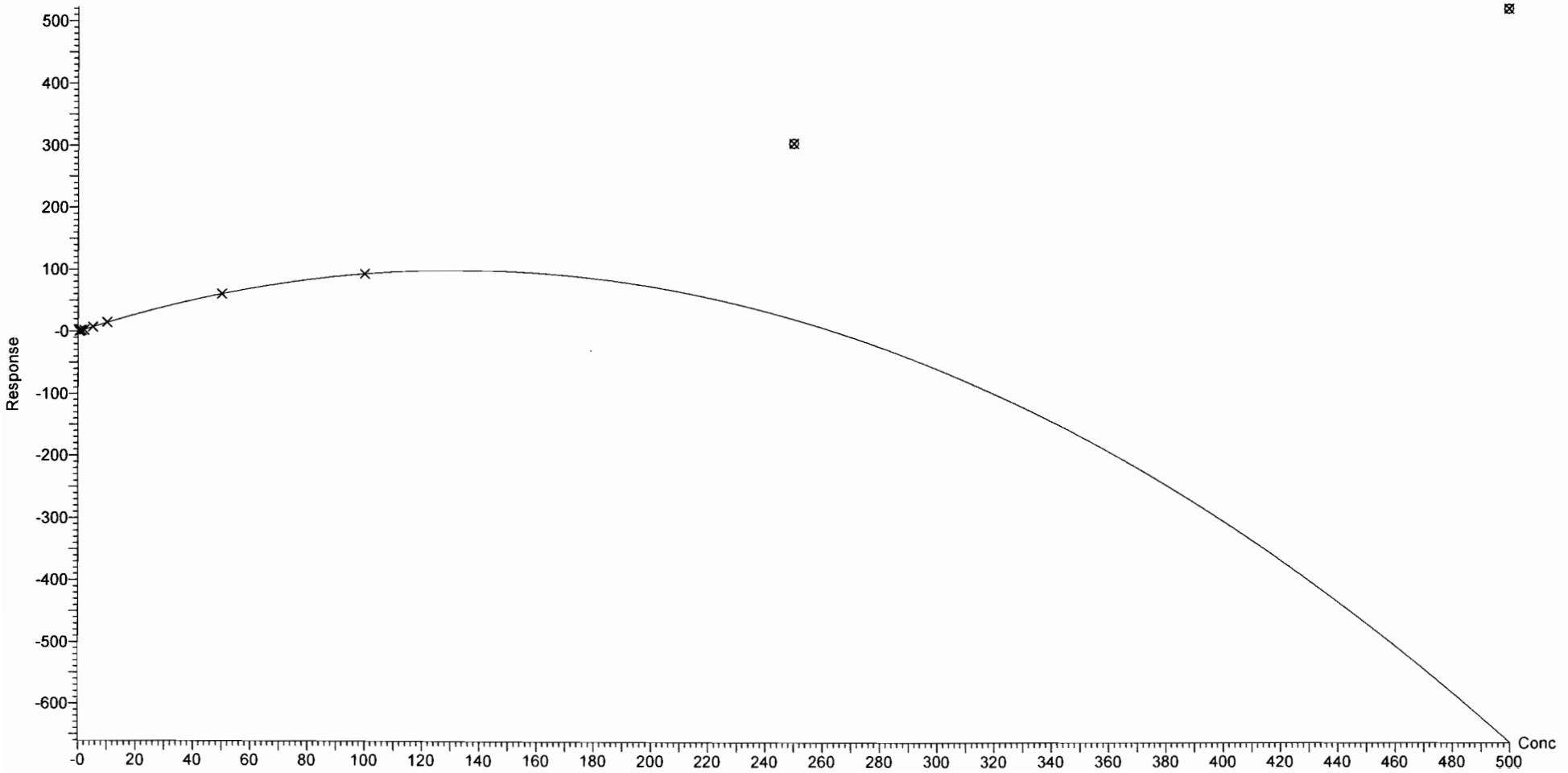
Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999650
Calibration curve: -2.95889e-005 * x^2 + 1.0319 * x + 0.180174
Response type: Internal Std (Ref 54), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.999367
Calibration curve: -0.00564413 * x^2 + 1.50166 * x + -0.0916805
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

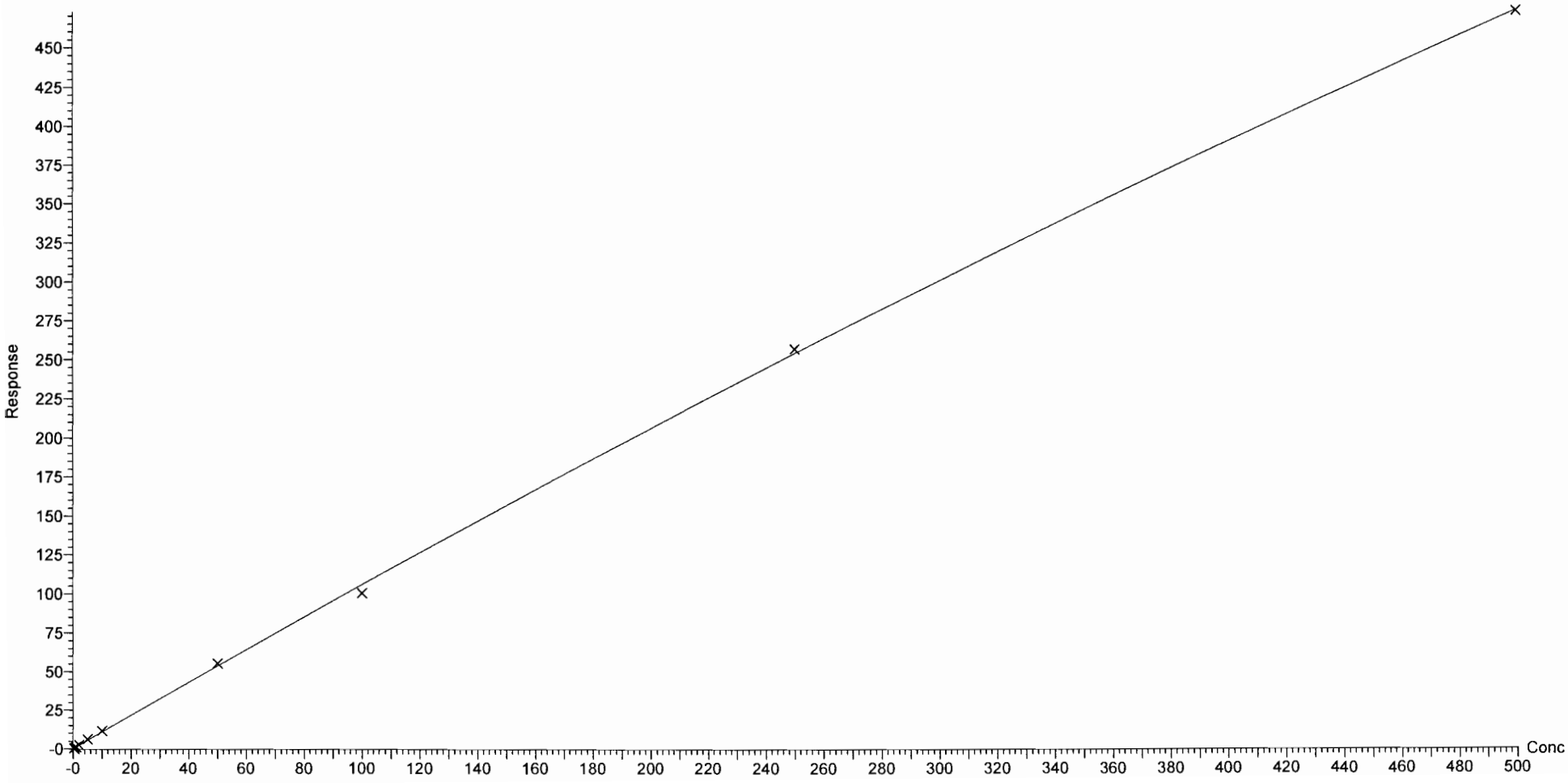


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

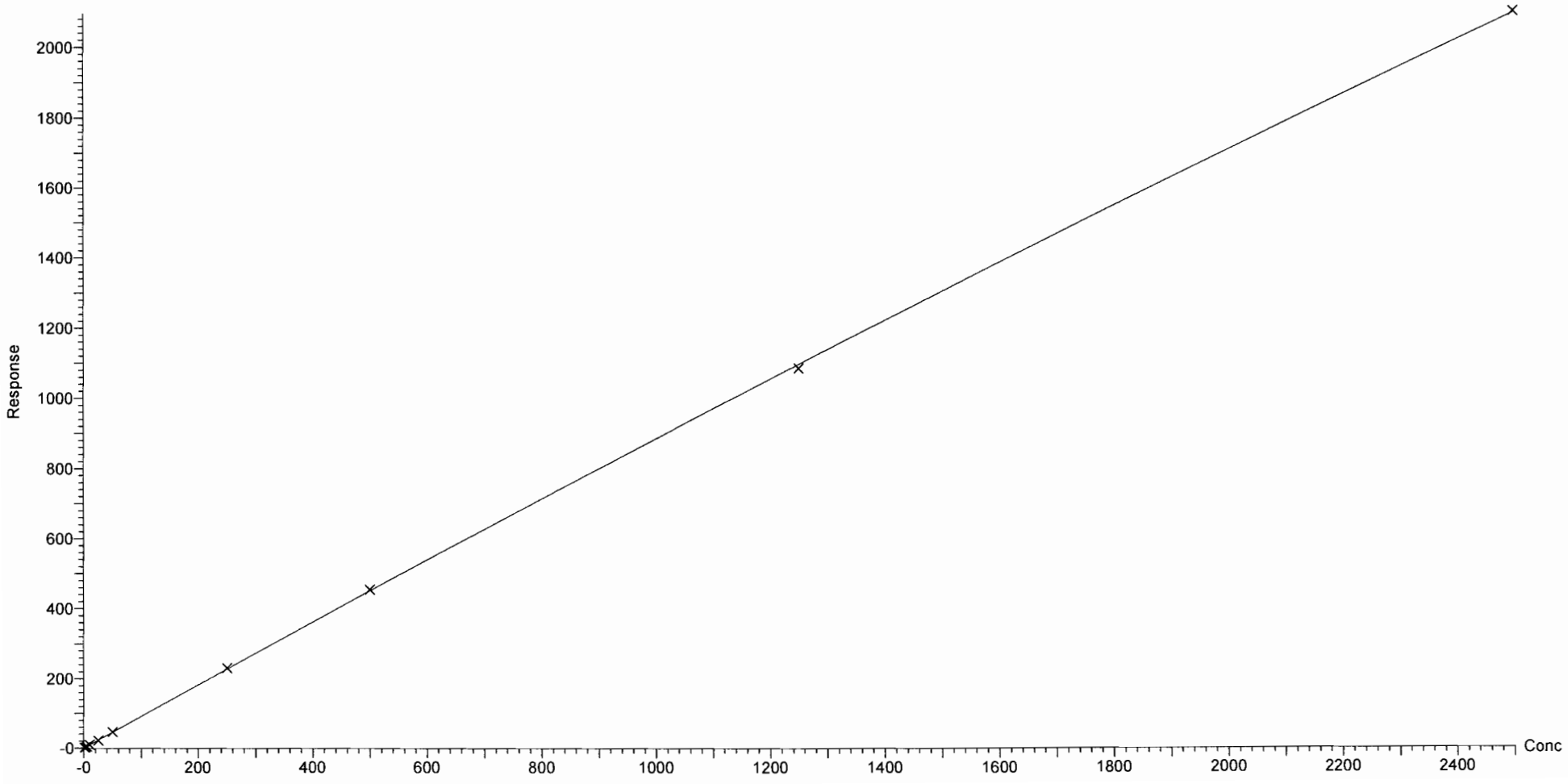
Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999342
Calibration curve: -0.000283258 * x^2 + 1.08661 * x + 0.131629
Response type: Internal Std (Ref 55), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

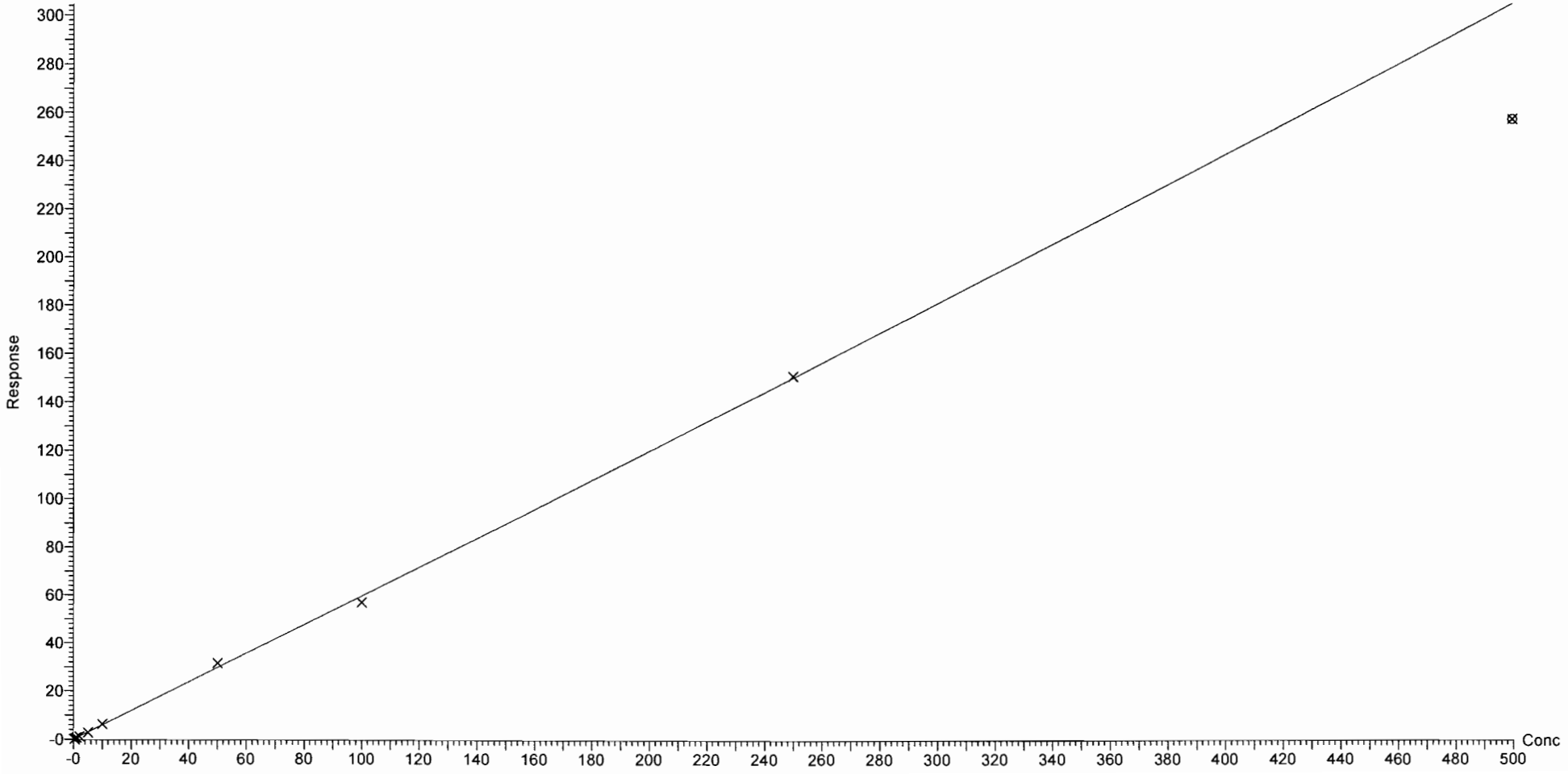
Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999923
Calibration curve: -3.23078e-005 * x^2 + 0.917289 * x + -0.023268
Response type: Internal Std (Ref 56), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.998869
Calibration curve: 3.05812e-005 * x^2 + 0.593492 * x + 0.0405458
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

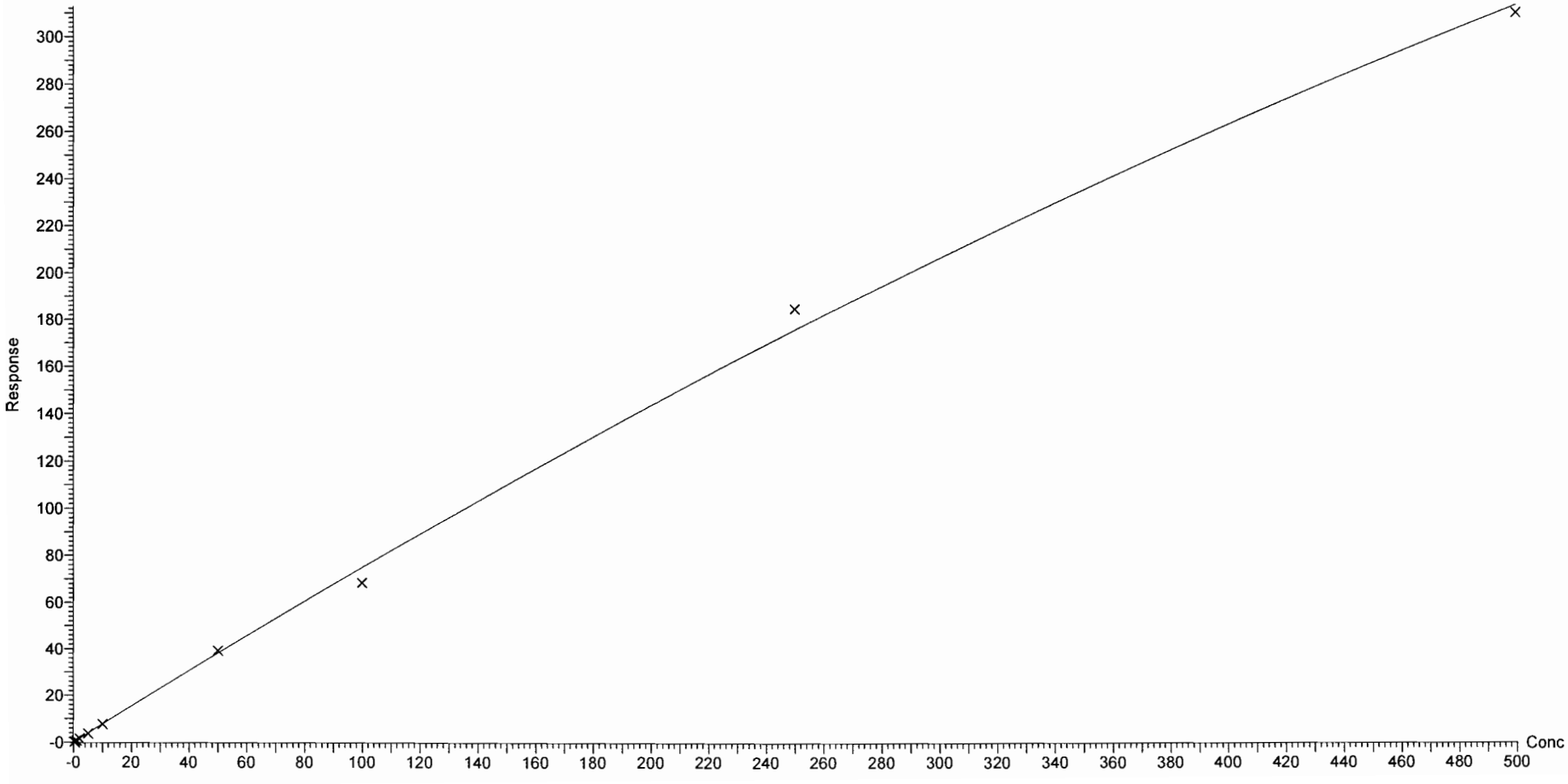


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Compound name: PFODA
Coefficient of Determination: R^2 = 0.998051
Calibration curve: -0.000306754 * x^2 + 0.779034 * x + 0.0170433
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

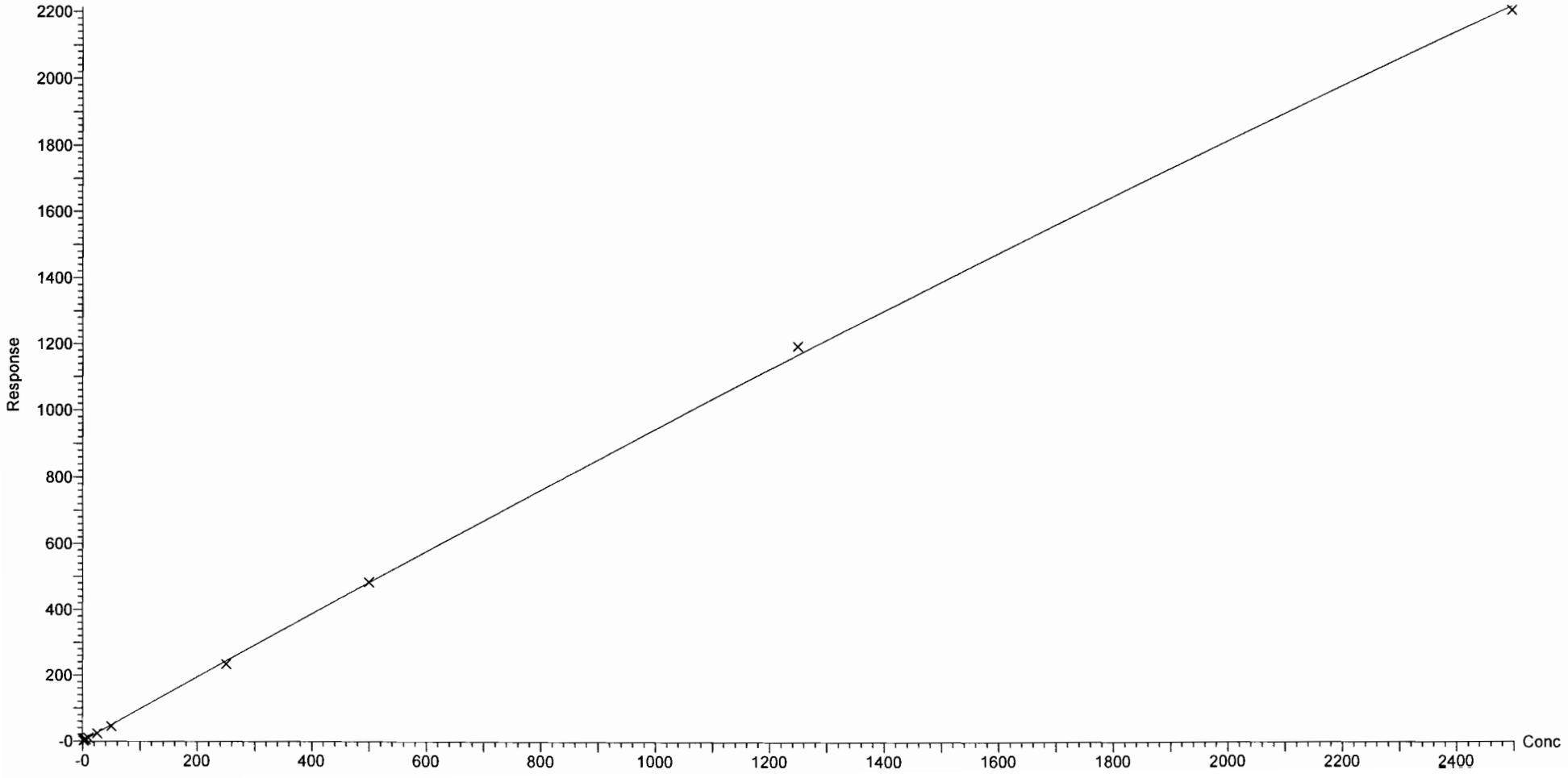


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

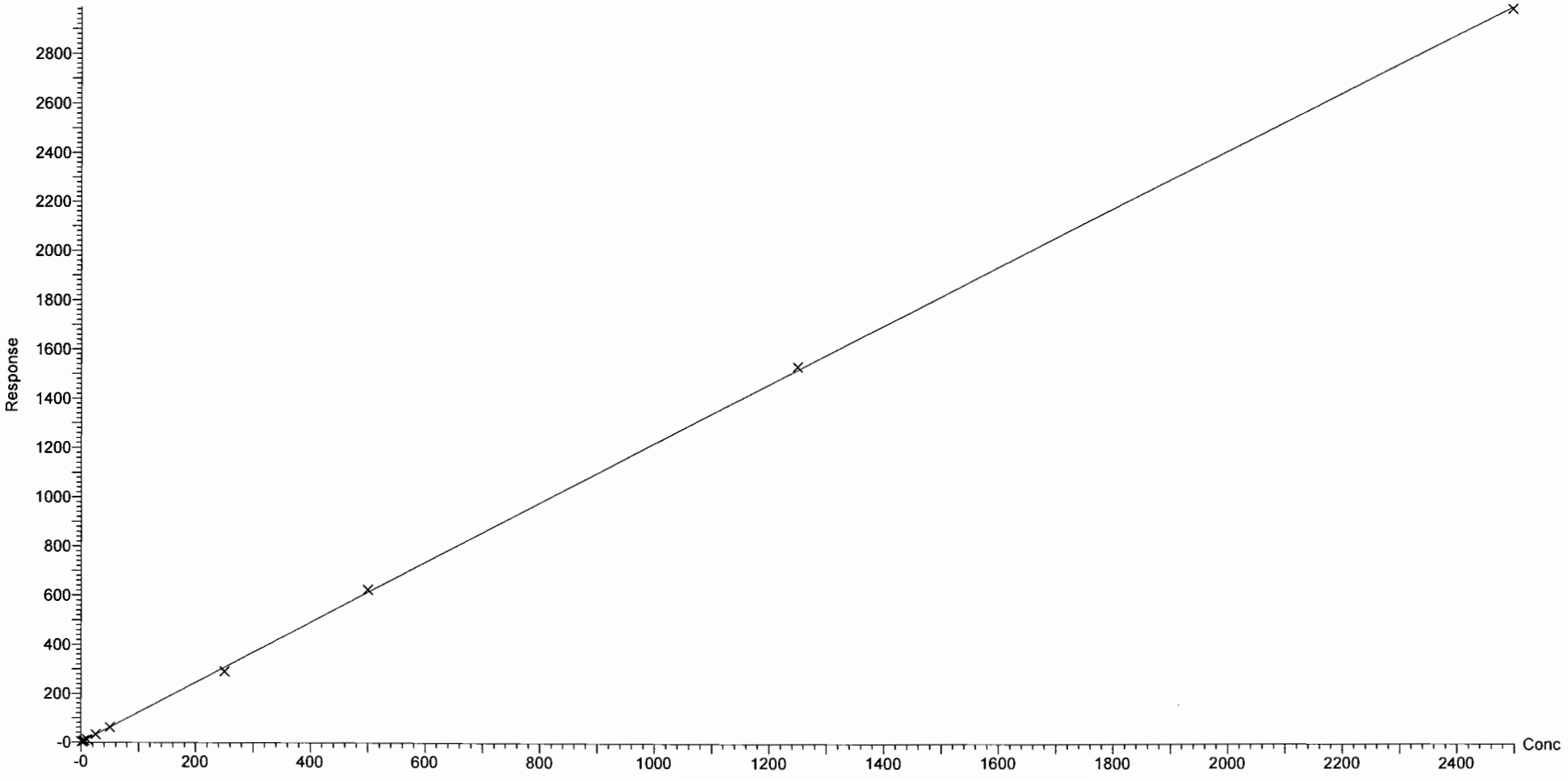
Compound name: N-MeFOSE
Coefficient of Determination: R^2 = 0.999572
Calibration curve: -3.91662e-005 * x^2 + 0.983423 * x + -0.00480812
Response type: Internal Std (Ref 58), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:00:28 Pacific Daylight Time

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999756
Calibration curve: -1.63295e-005 * x^2 + 1.23645 * x + -0.173527
Response type: Internal Std (Ref 59), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



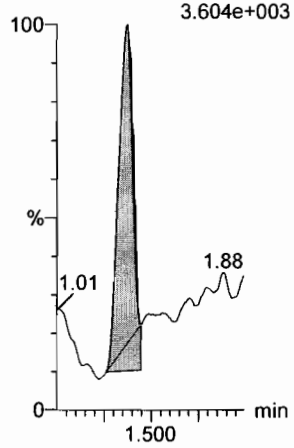
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

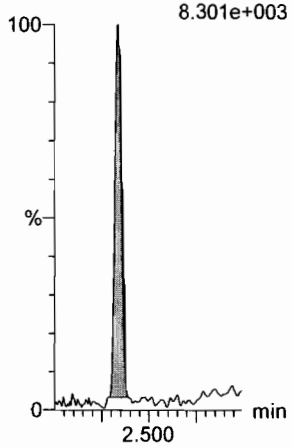
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: 04 Jun 2018 08:44:22

Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

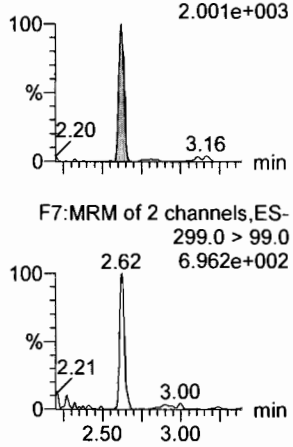
PFBA



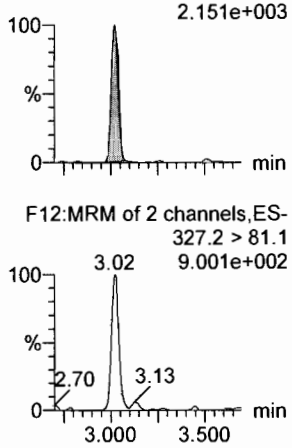
PFPeA



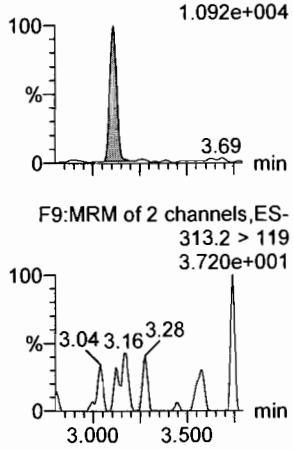
PFBS



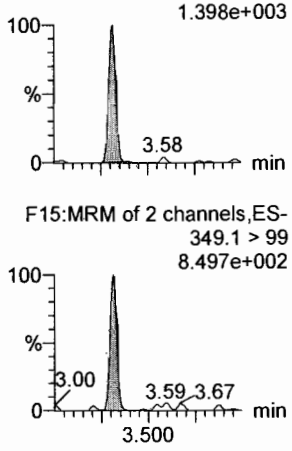
4:2 FTS



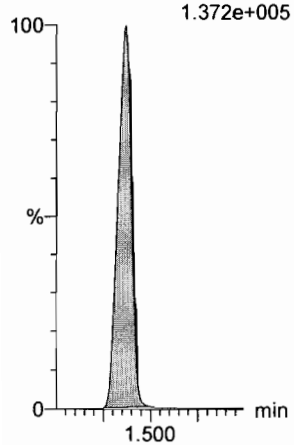
PFHxA



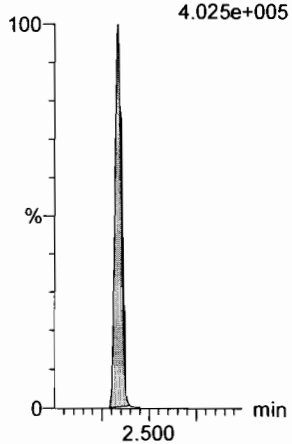
PFPeS



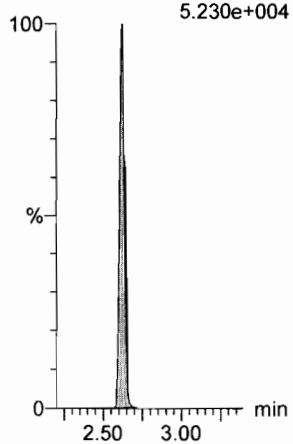
13C3-PFBA



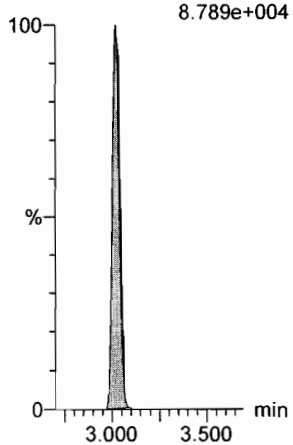
13C3-PFPeA



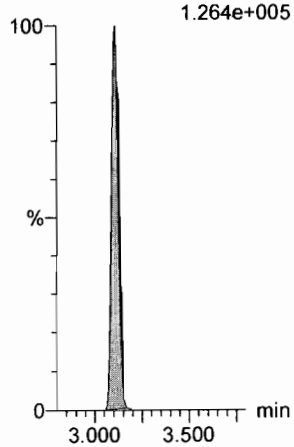
13C3-PFBS



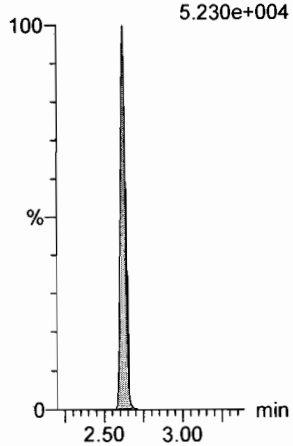
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

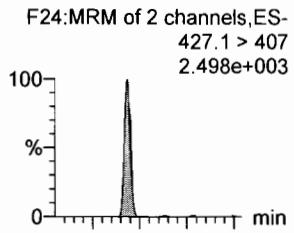


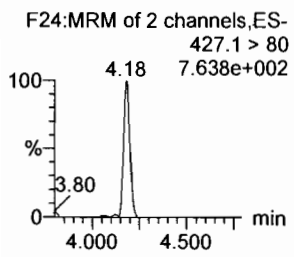
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

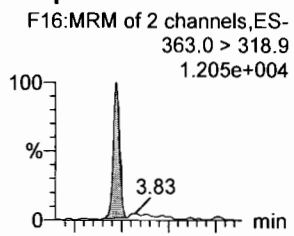
Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

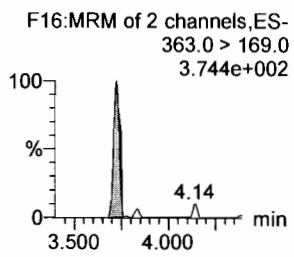
6:2 FTS



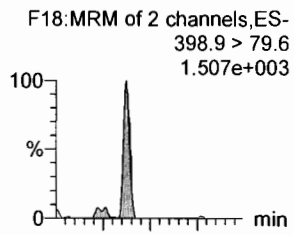


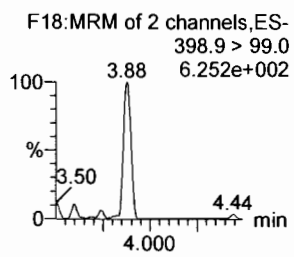
PFHpA



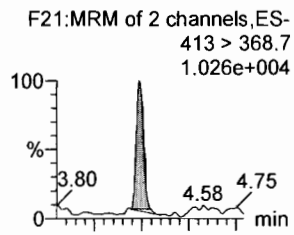


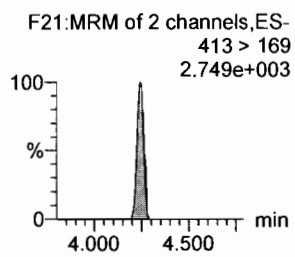
L-PFHxS



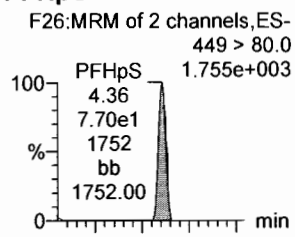


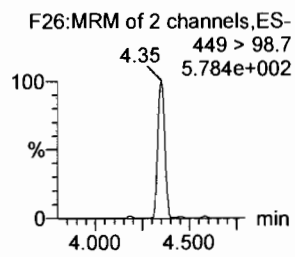
L-PFOA



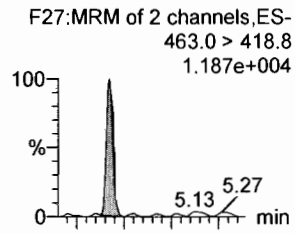


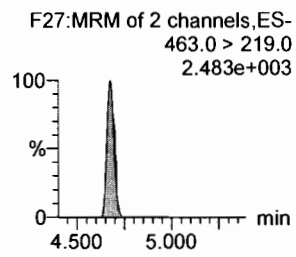
PFHpS



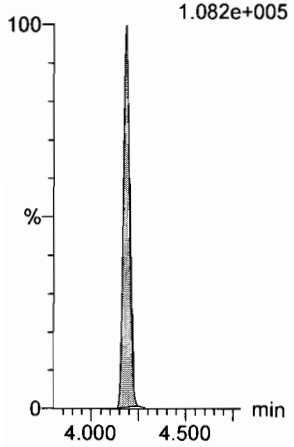


PFNA

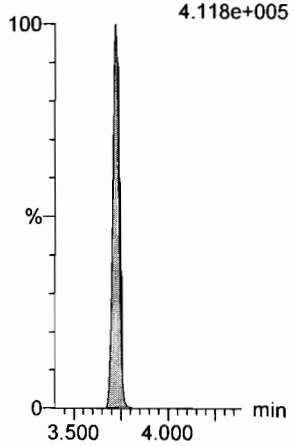




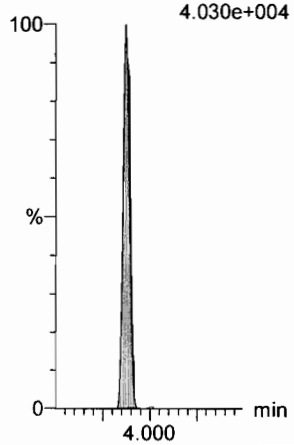
13C2-6:2 FTS



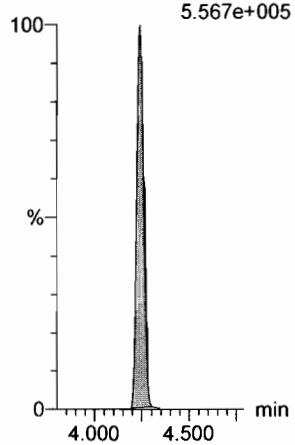
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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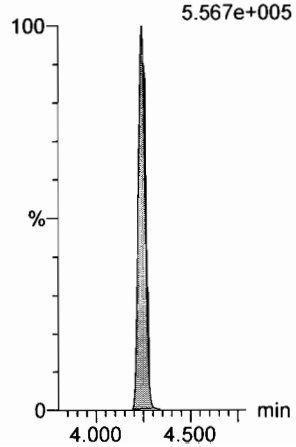
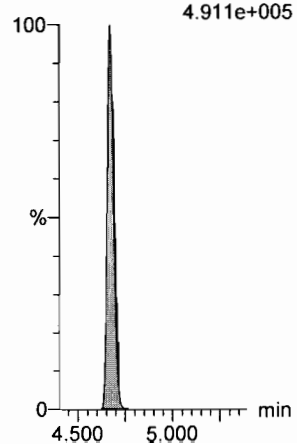


13C5-PFNA



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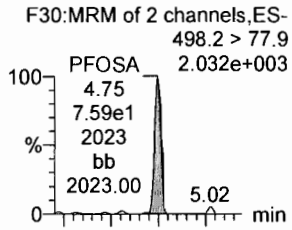
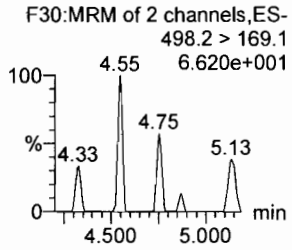
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

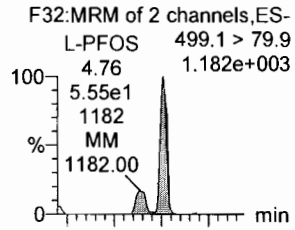
Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

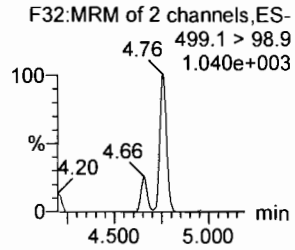
PFOSA





L-PFOS





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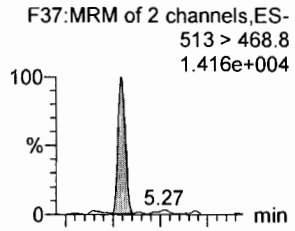
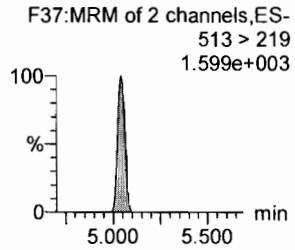
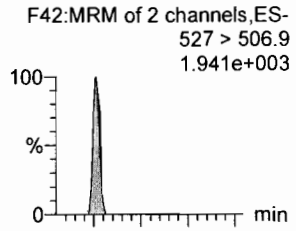
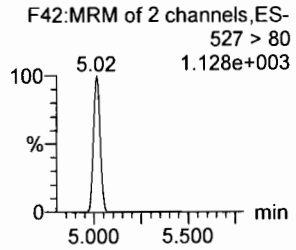




8:2 FTS





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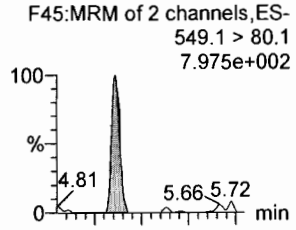

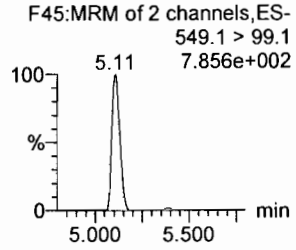

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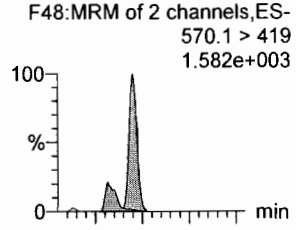
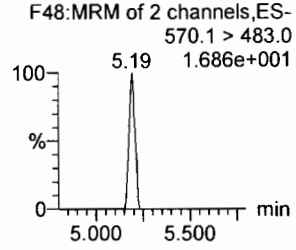
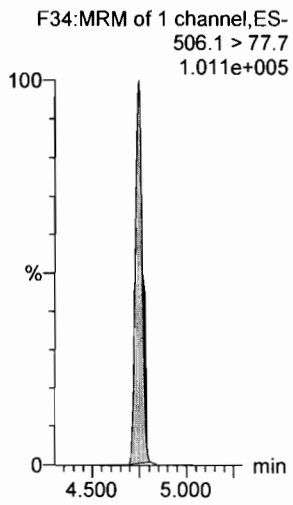




13C8-PFOSA



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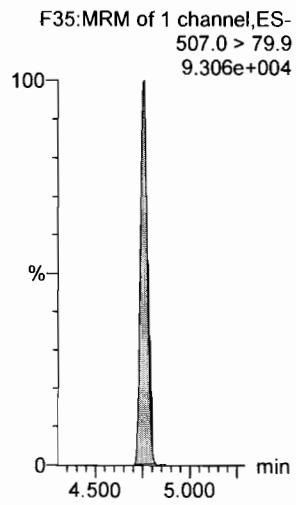

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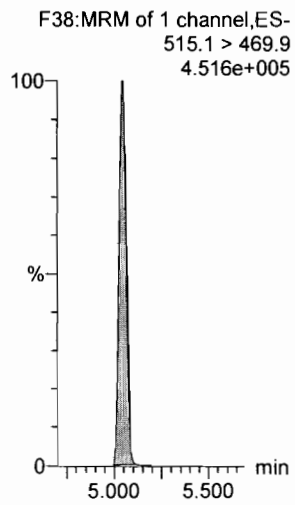
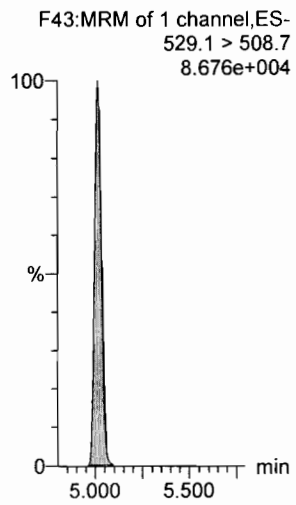


13C2-8:2 FTS



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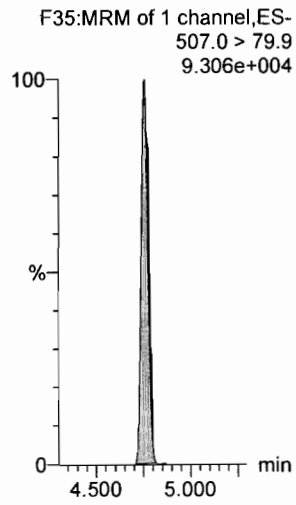
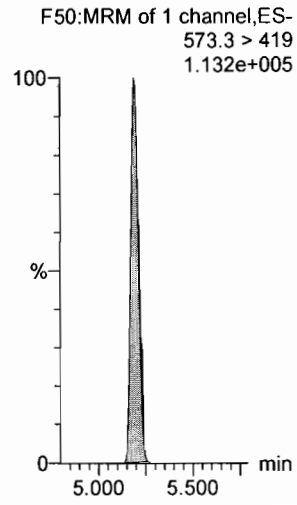


d3-N-MeFOSAA



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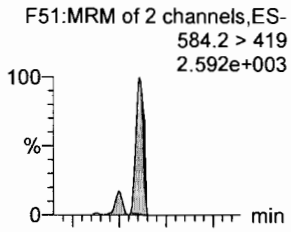
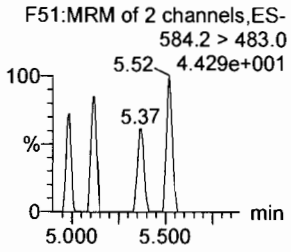
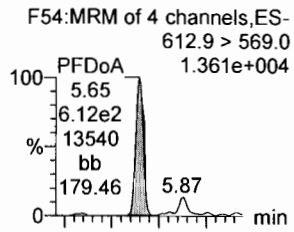
Name: 180603M2_2, Date: 03-Jun-2018, Time: 18:07:52, ID: ST180603M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

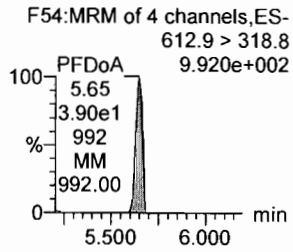
L-EtFOSAA





PFDoA





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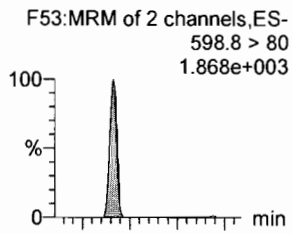

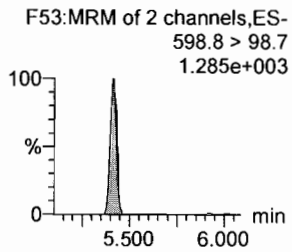

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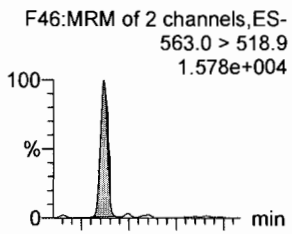

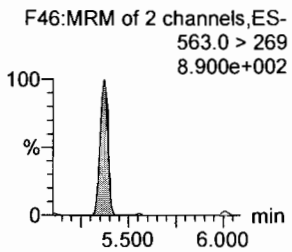

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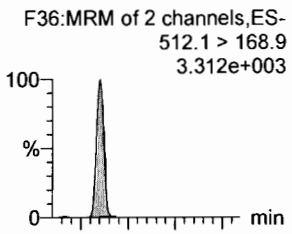

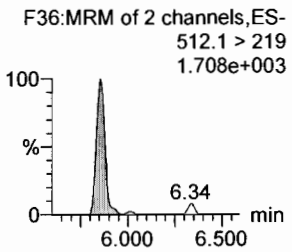

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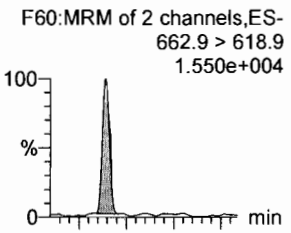
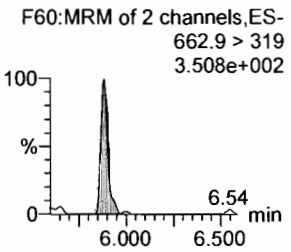
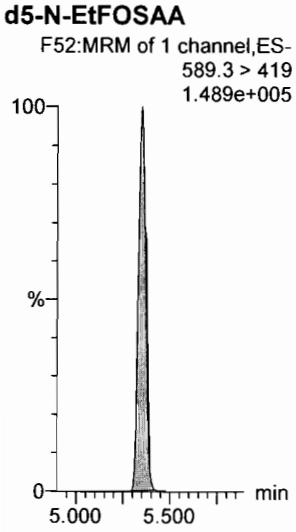




d5-N-EtFOSAA



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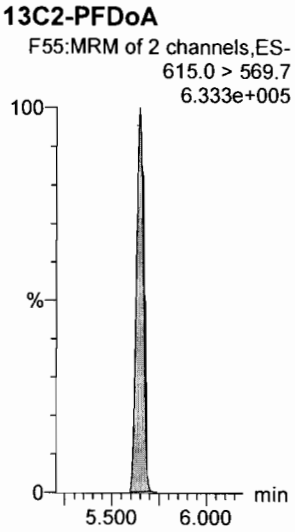

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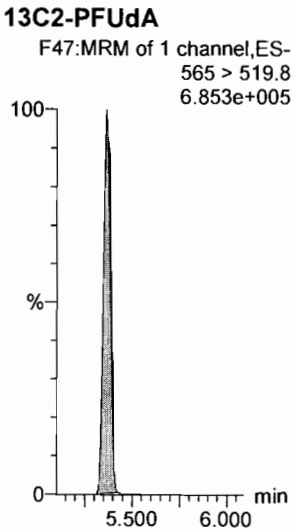

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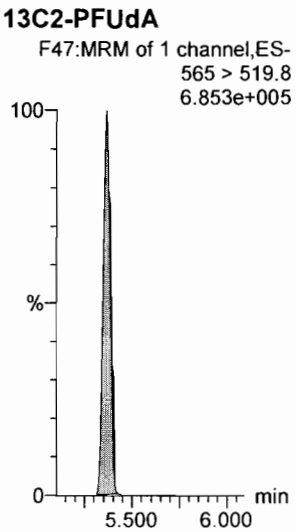

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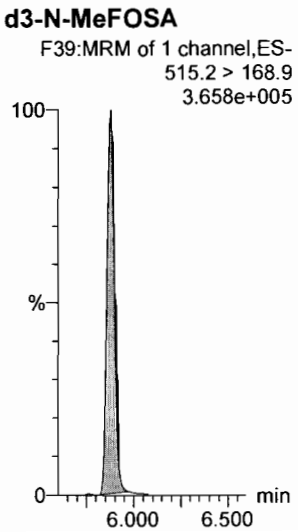

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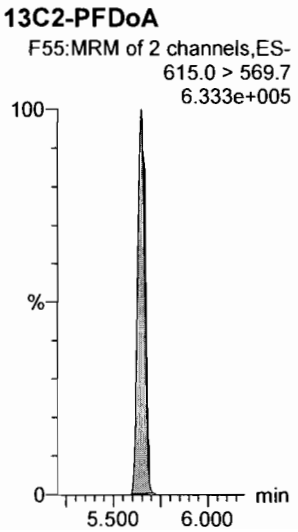

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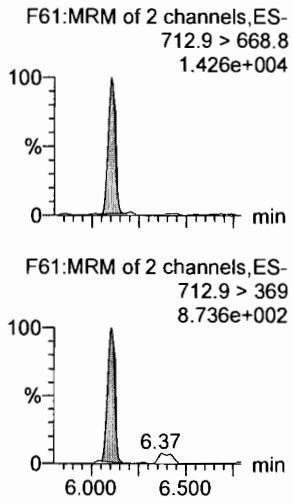

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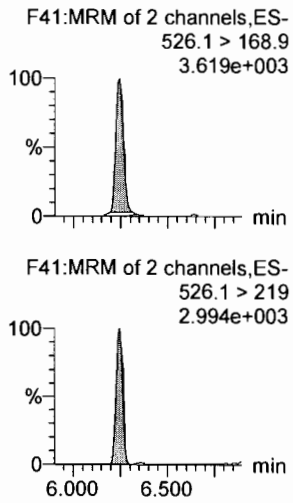

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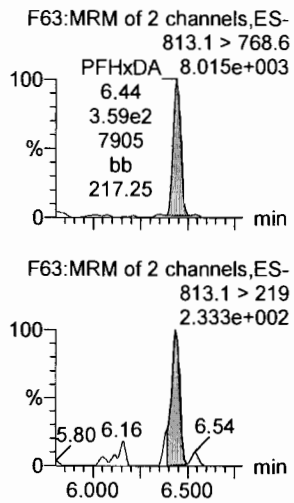

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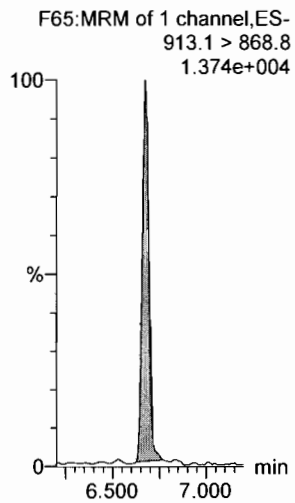
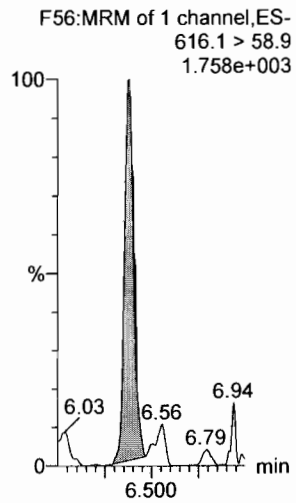
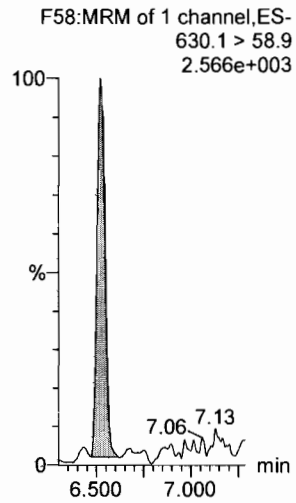


N-MeFOSE



N-EtFOSE



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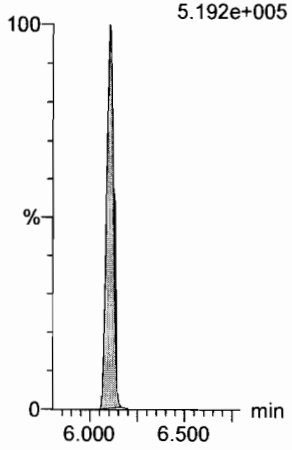
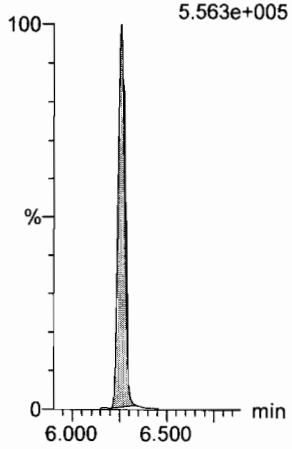


d5-N-ETFOSA



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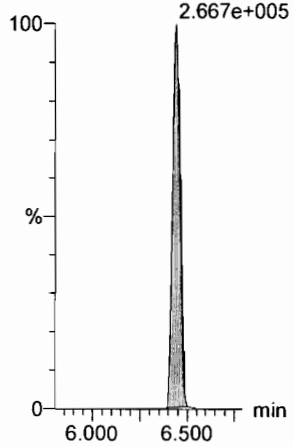

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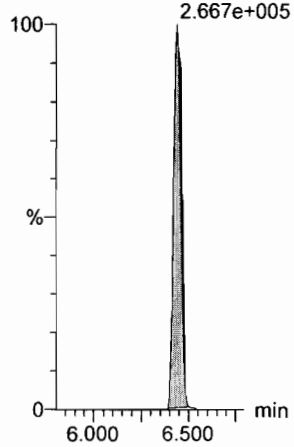
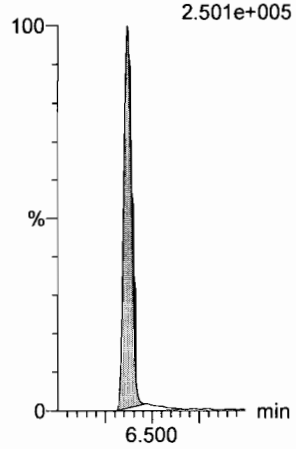


d7-N-MeFOSE



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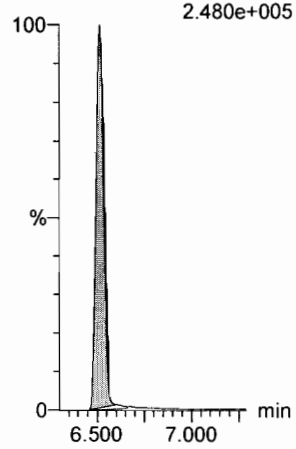

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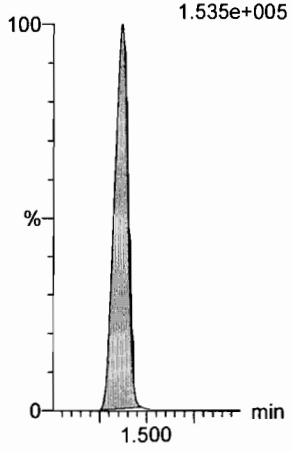
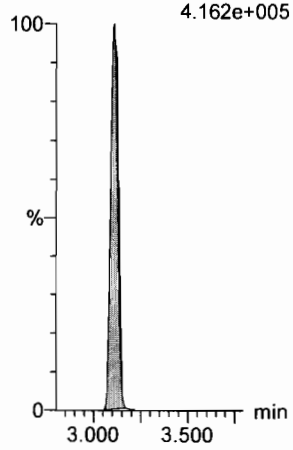
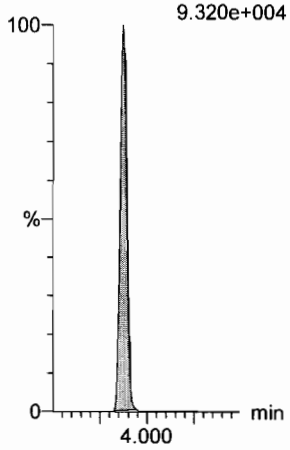
13C4-PFBA



13C5-PFHxA



13C3-PFHxS



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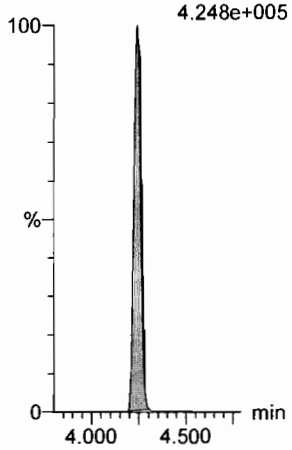
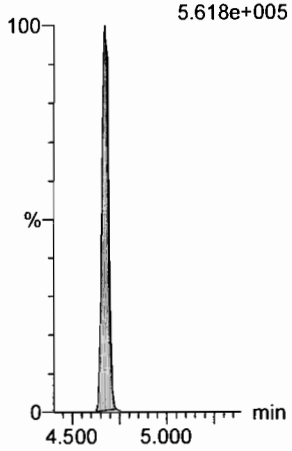
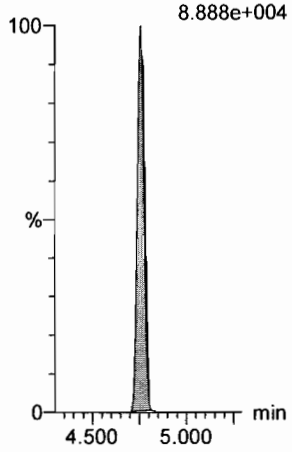


13C9-PFNA



13C4-PFOS



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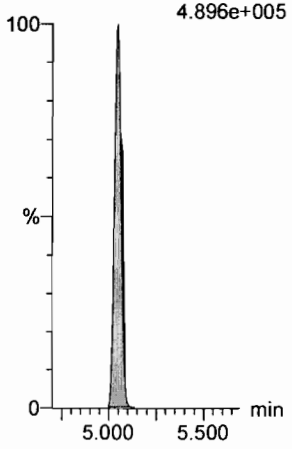
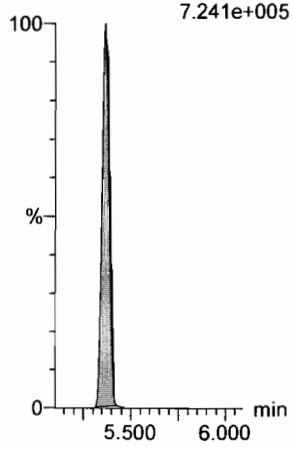


13C7-PFUdA



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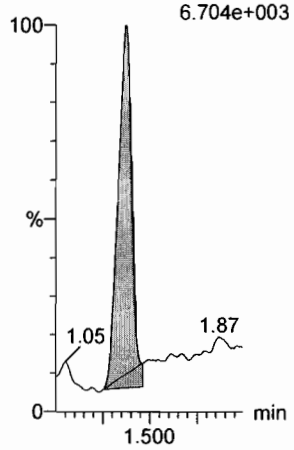
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

PFBA



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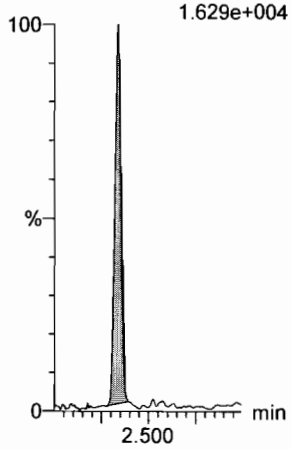

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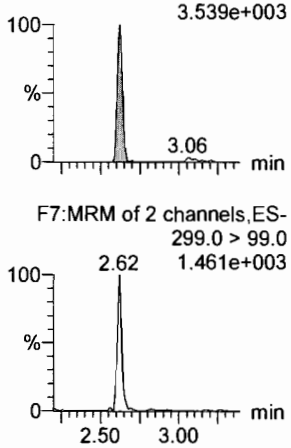
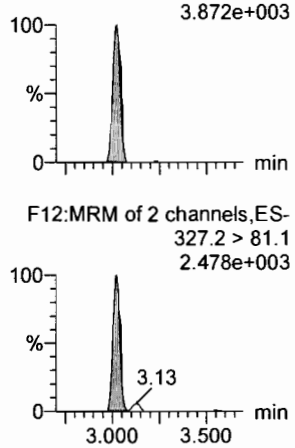


4:2 FTS



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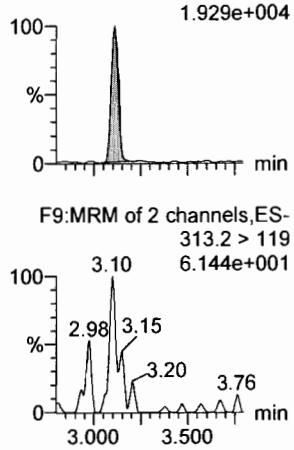

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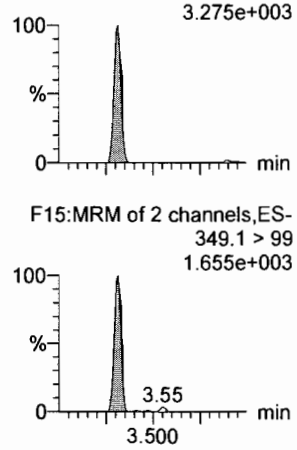
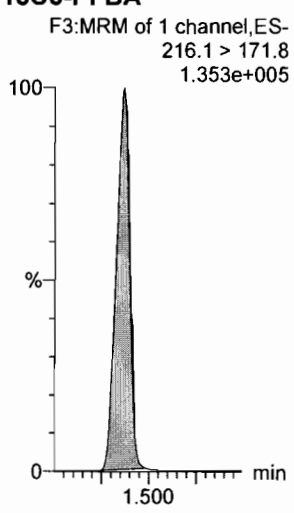


13C3-PFBA



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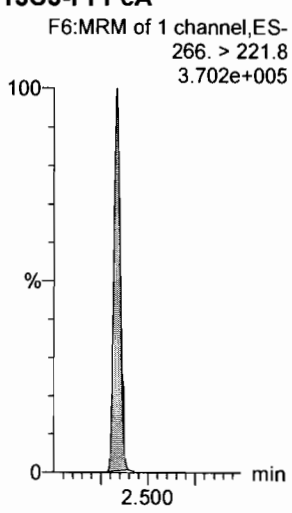

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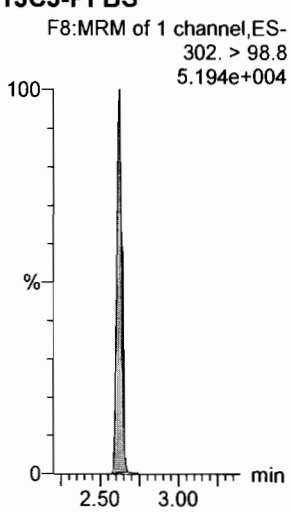
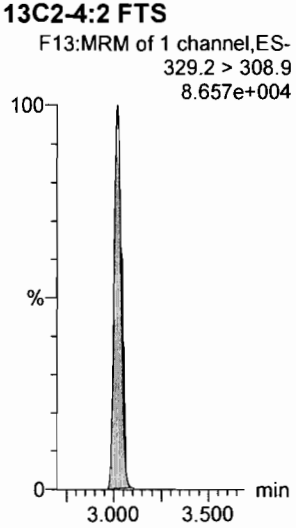


13C2-4:2 FTS



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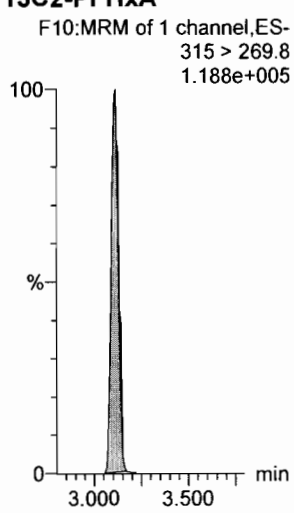

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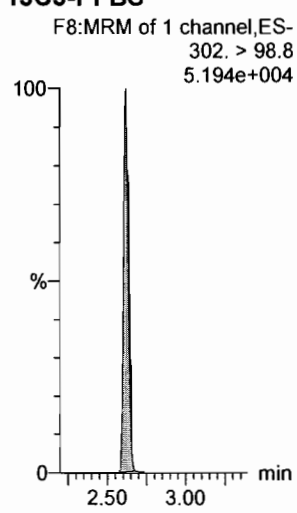

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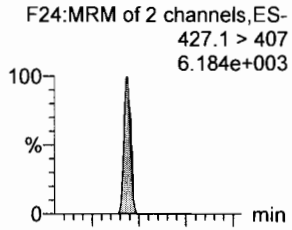
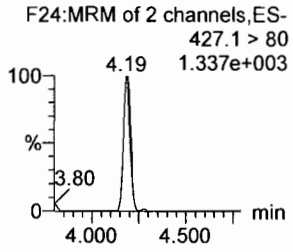
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

6:2 FTS





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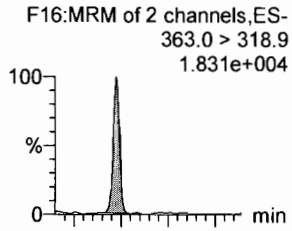
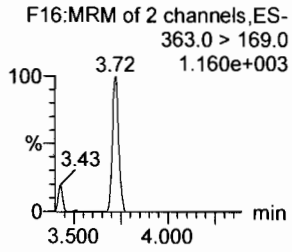
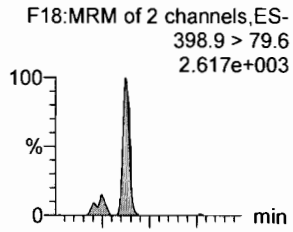
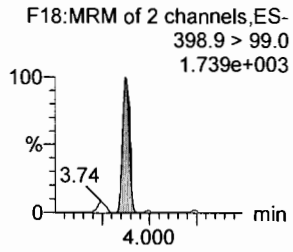


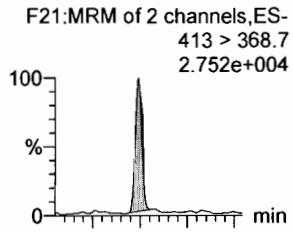


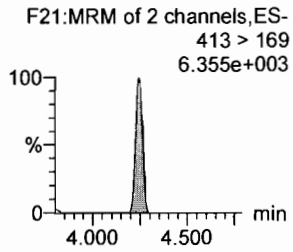
L-PFHxS





L-PFOA





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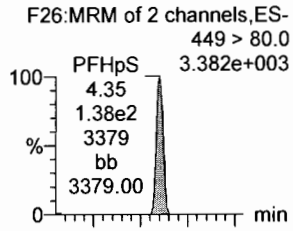

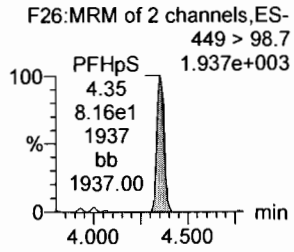

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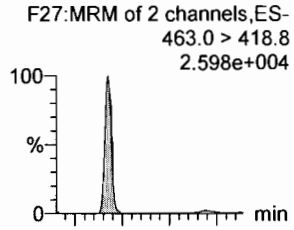
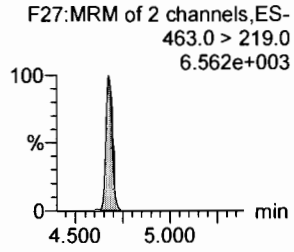
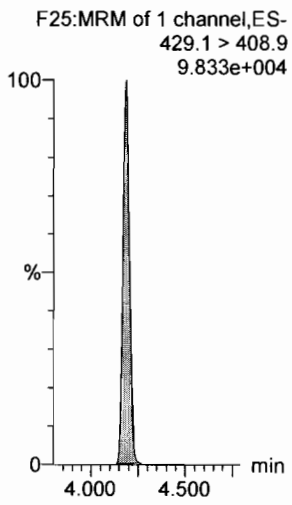
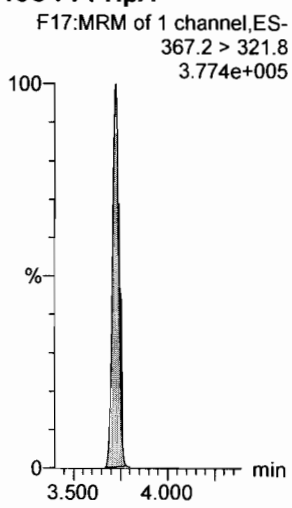




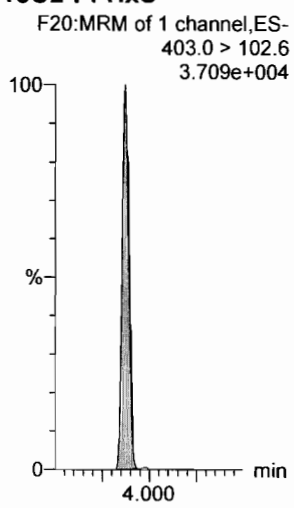
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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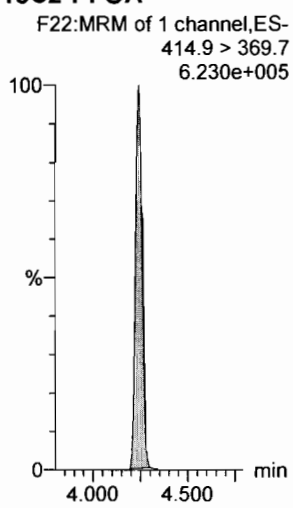

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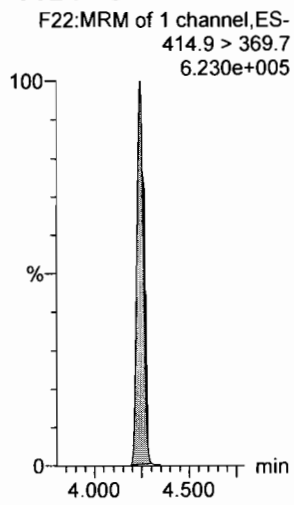
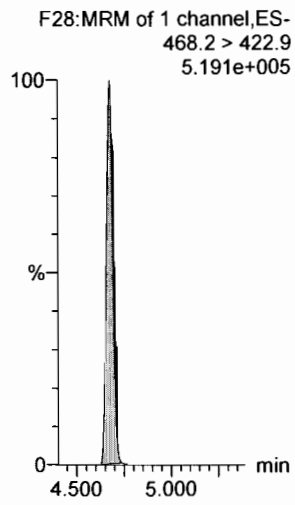


13C5-PFNA



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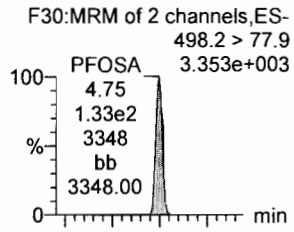
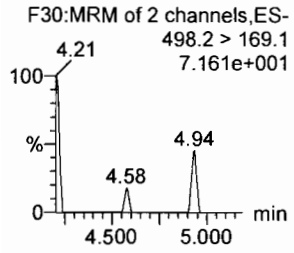
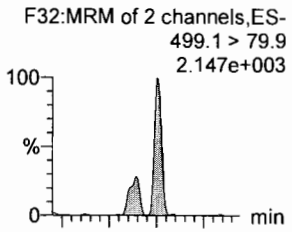
Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

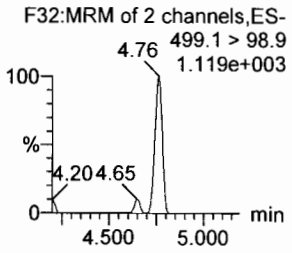
PFOSA





L-PFOS





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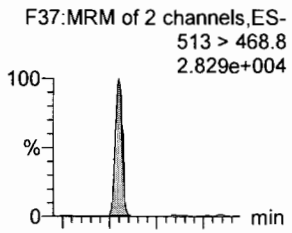
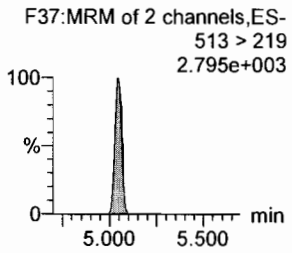
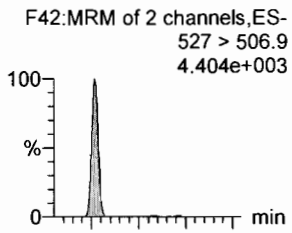
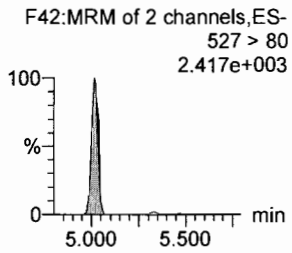




8:2 FTS





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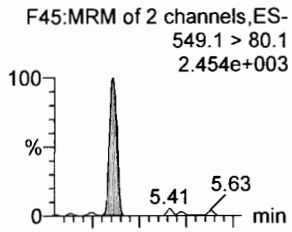

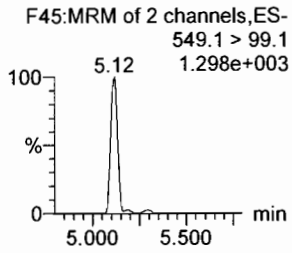

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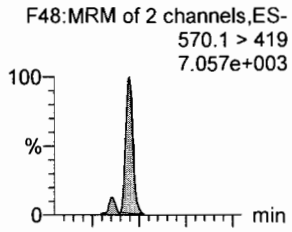

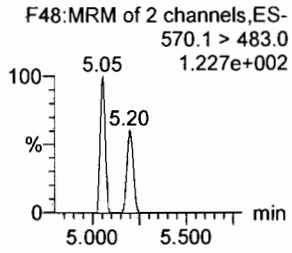

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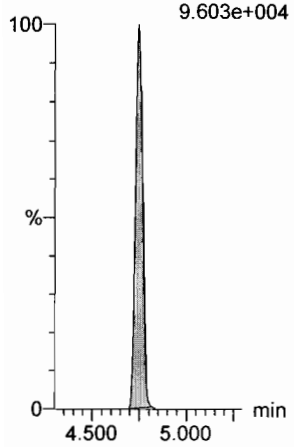

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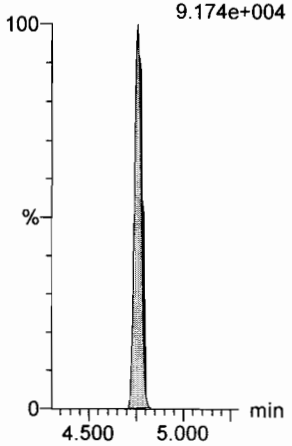
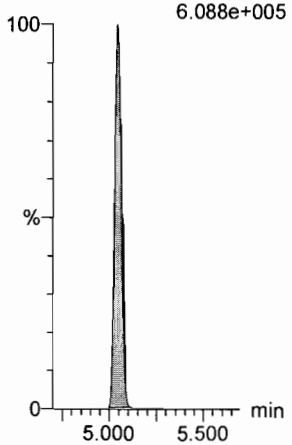
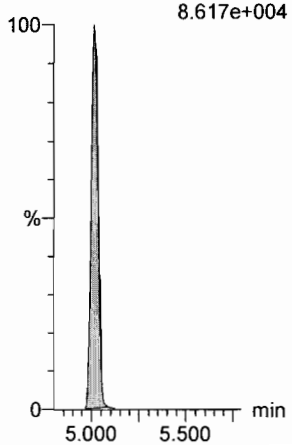


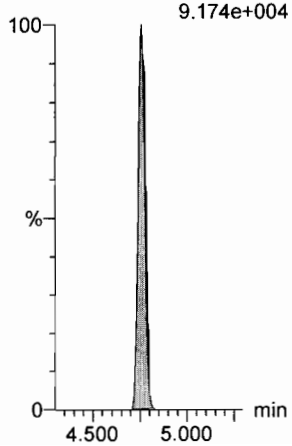
13C2-PFDA



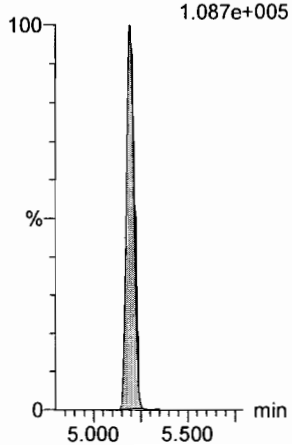
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

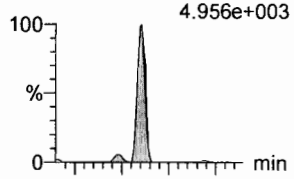


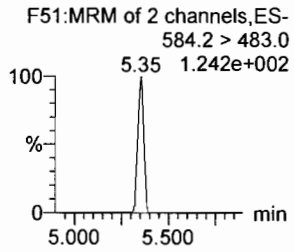
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

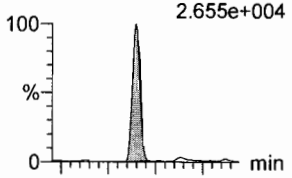
Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

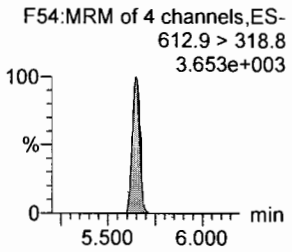
L-EtFOSAA



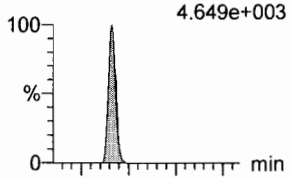


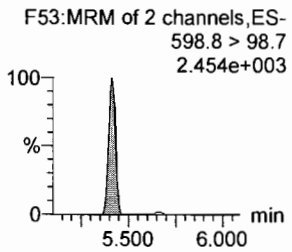
PFDoA



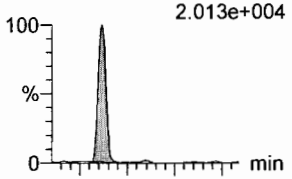


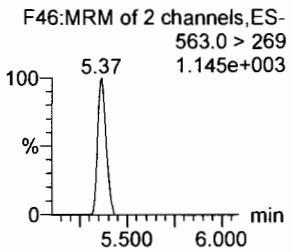
PFDS



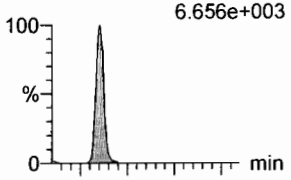


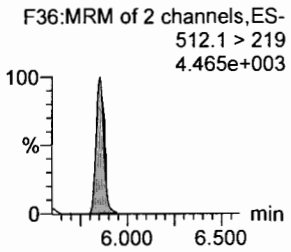
PFUdA



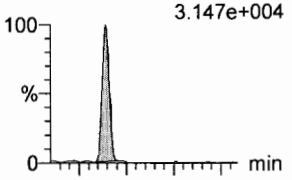


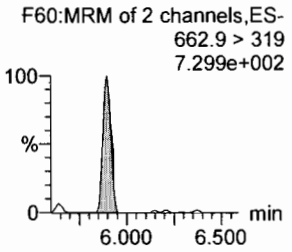
N-MeFOSA



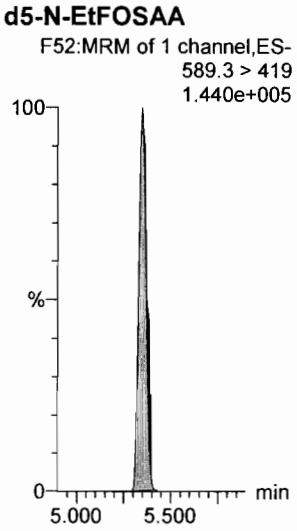


PFTrDA

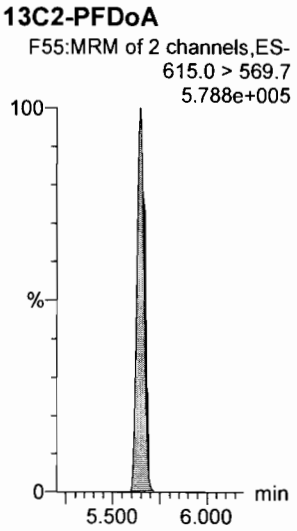




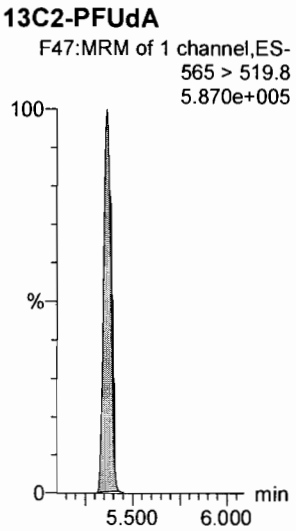
d5-N-EtFOSAA



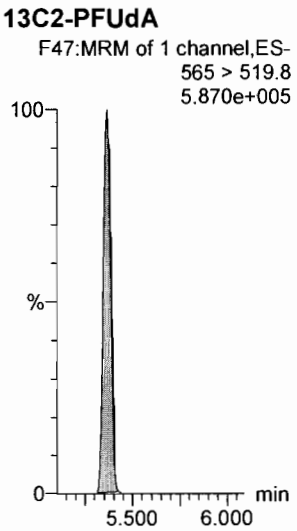
13C2-PFDoA



13C2-PFUdA



13C2-PFUdA



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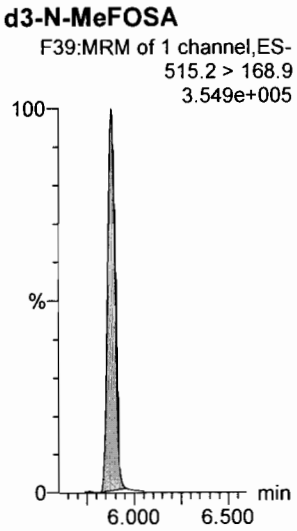
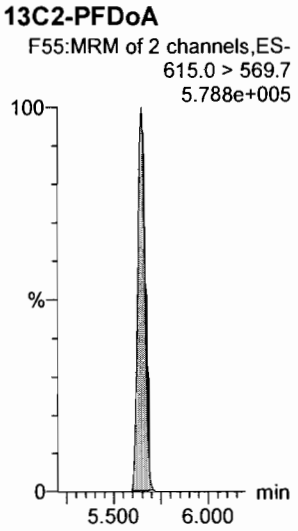


13C2-PFDoA

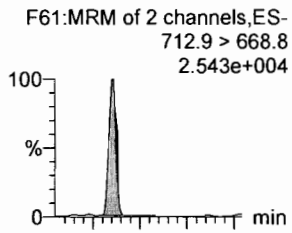


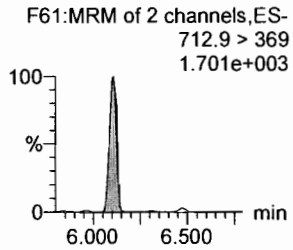
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

PFTeDA





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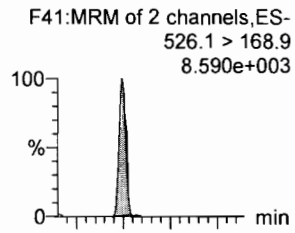
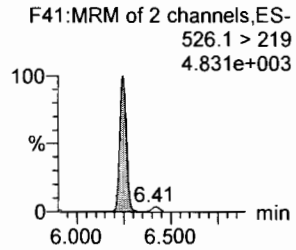
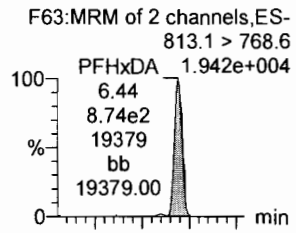
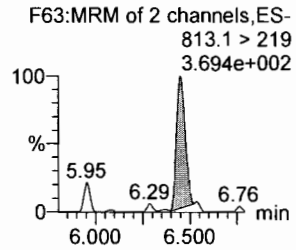


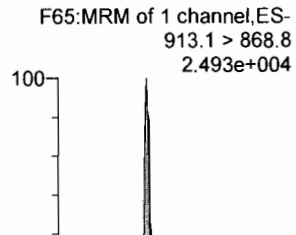


PFHxDA

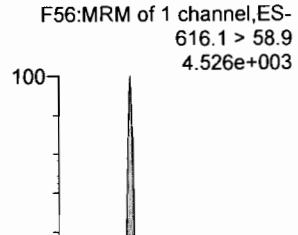




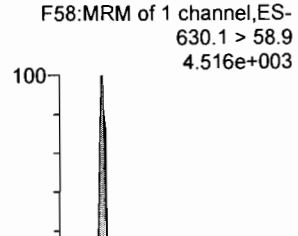
PFODA



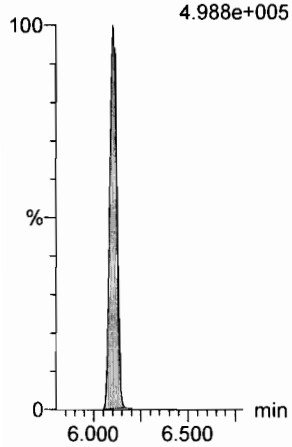
N-MeFOSE



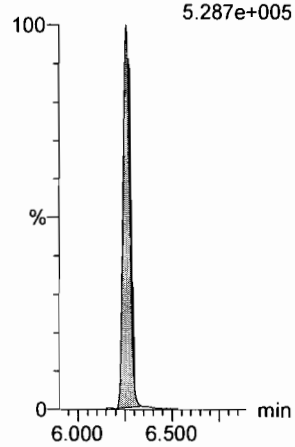
N-EtFOSE



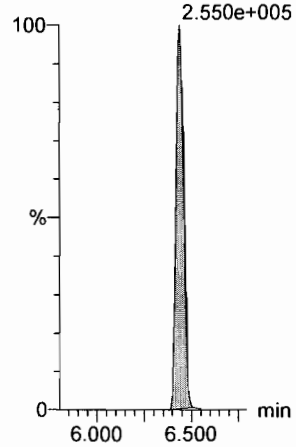
13C2-PFTeDA



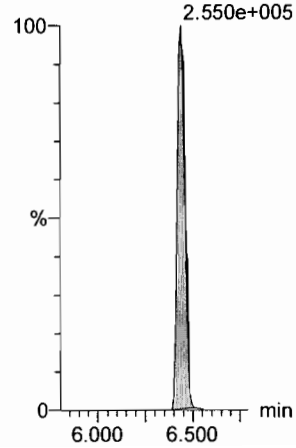
d5-N-ETFOSA



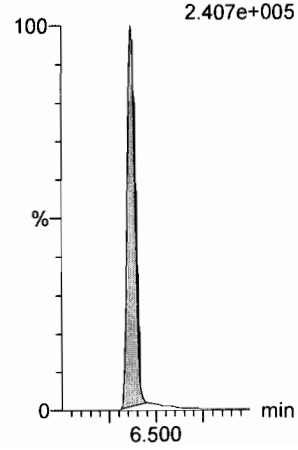
13C2-PFHxDA



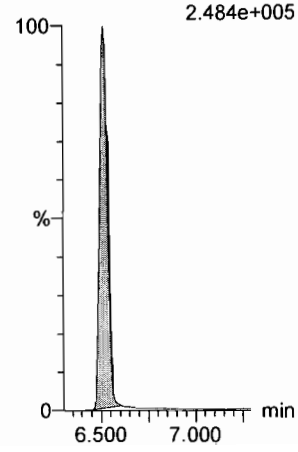
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

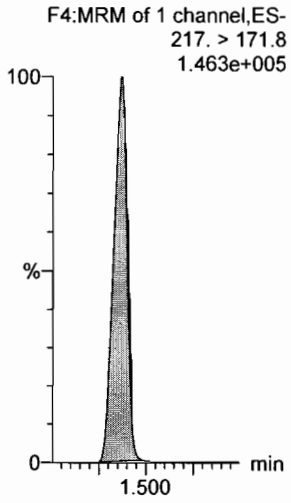


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

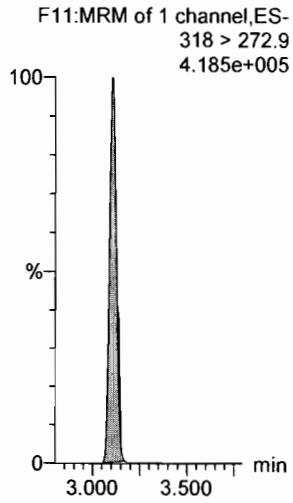
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_3, Date: 03-Jun-2018, Time: 18:18:22, ID: ST180603M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

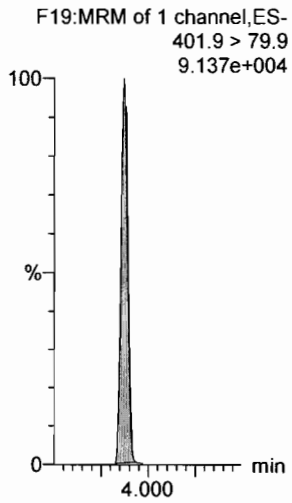
13C4-PFBA



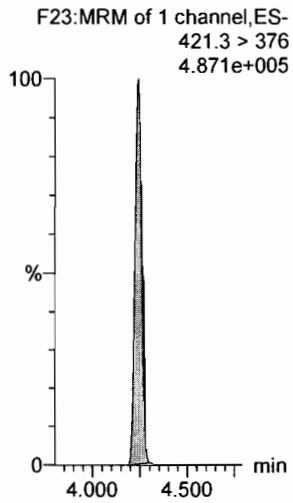
13C5-PFHxA



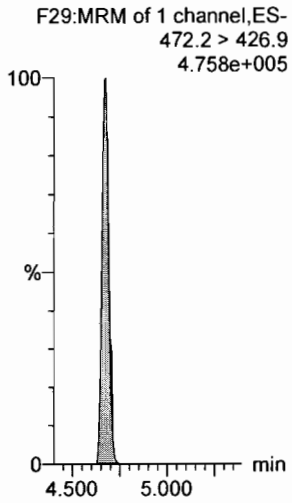
13C3-PFHxS



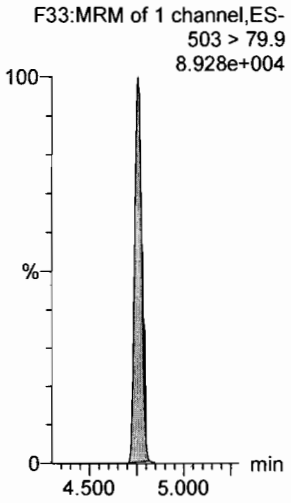
13C8-PFOA



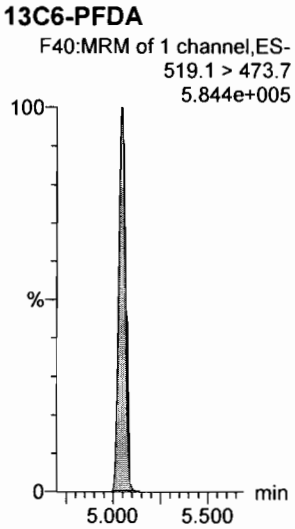
13C9-PFNA



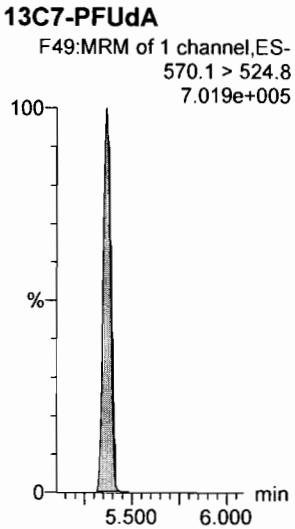
13C4-PFOS



13C6-PFDA



13C7-PFUdA

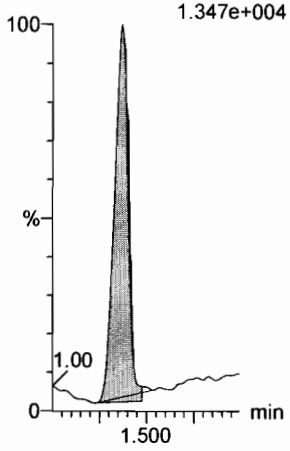


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

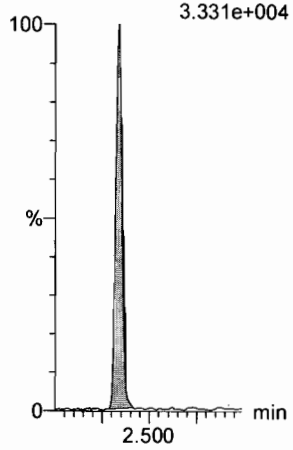
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

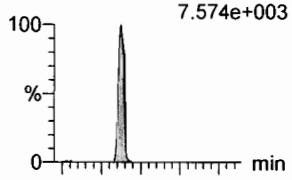
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
1.347e+004



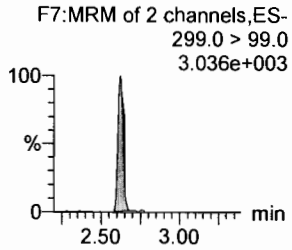
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
3.331e+004



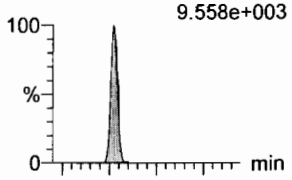
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
7.574e+003



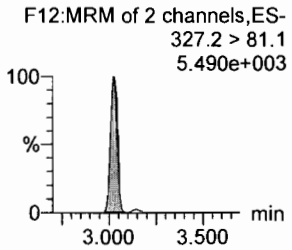
F7:MRM of 2 channels,ES-
299.0 > 99.0
3.036e+003



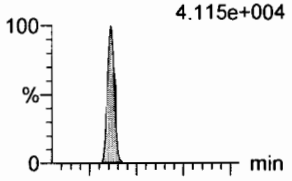
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
9.558e+003



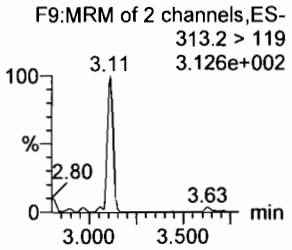
F12:MRM of 2 channels,ES-
327.2 > 81.1
5.490e+003



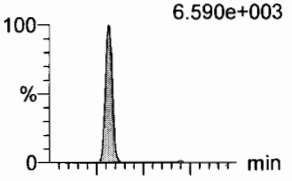
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
4.115e+004



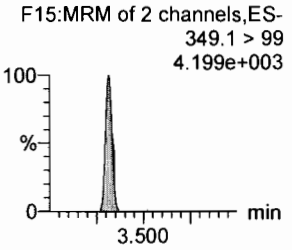
F9:MRM of 2 channels,ES-
313.2 > 119
3.126e+002



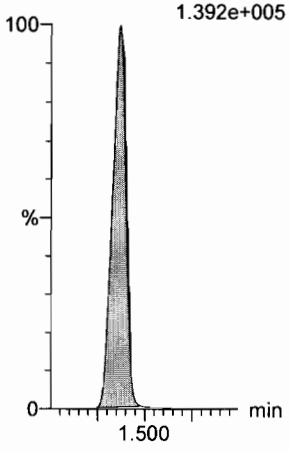
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
6.590e+003



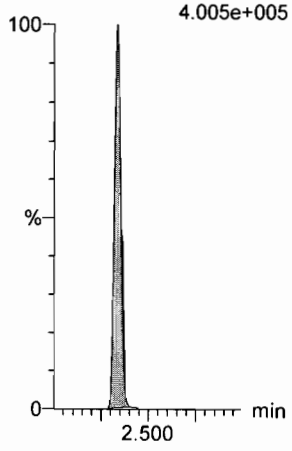
F15:MRM of 2 channels,ES-
349.1 > 99
4.199e+003



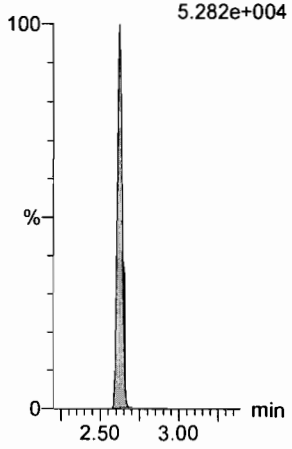
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.392e+005



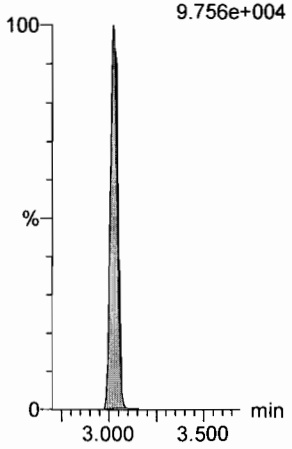
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
4.005e+005



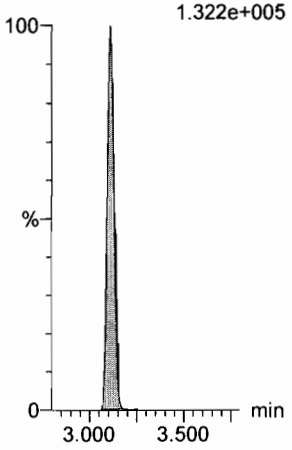
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.282e+004



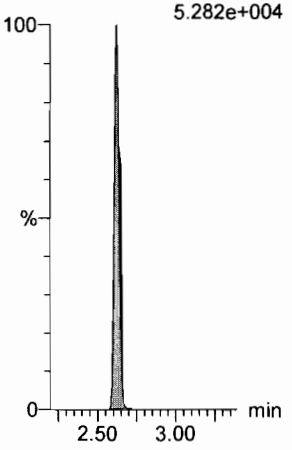
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
9.756e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.322e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.282e+004



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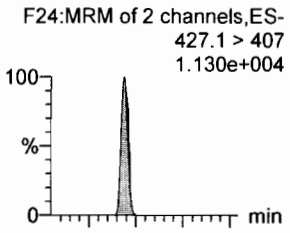
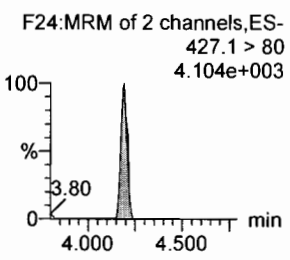
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

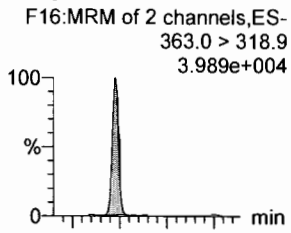
Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

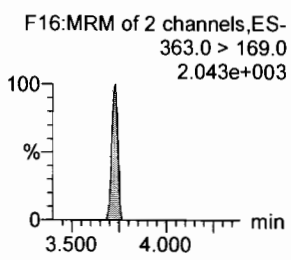
6:2 FTS



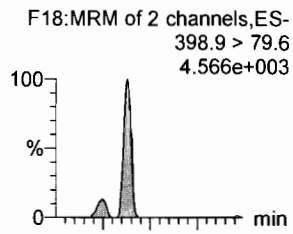


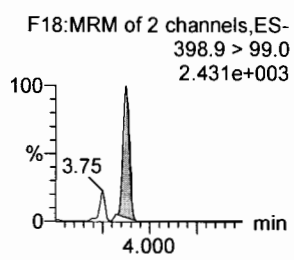
PFHpA



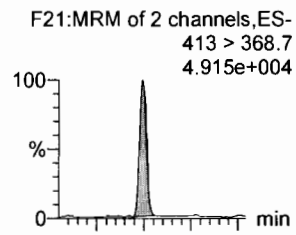


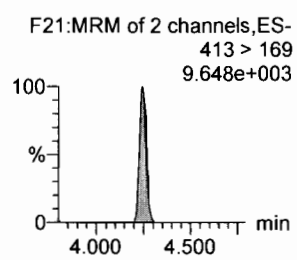
L-PFHxS





L-PFOA





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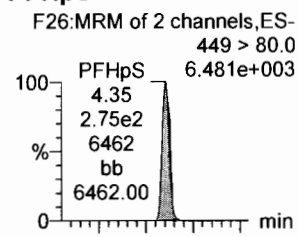

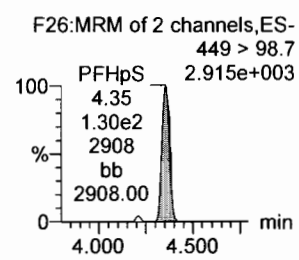

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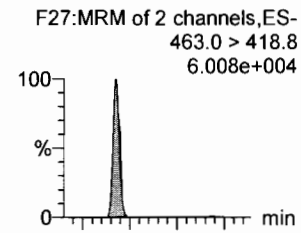
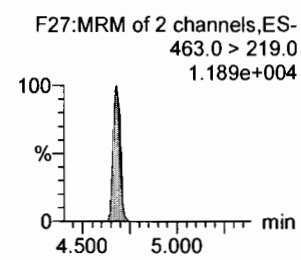
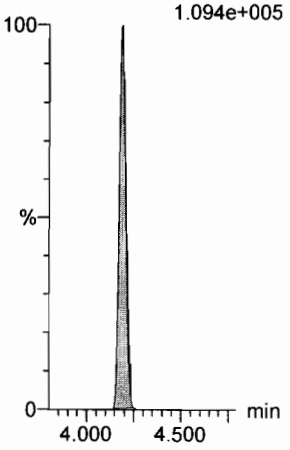
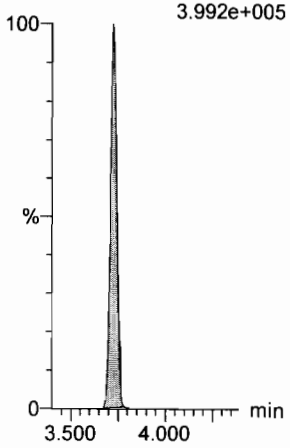




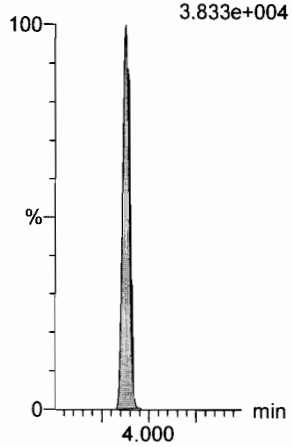
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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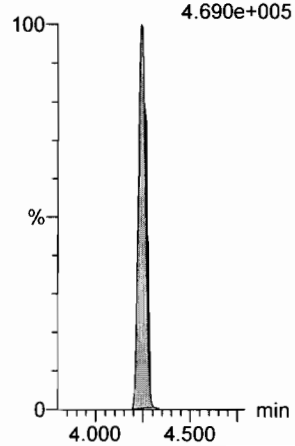

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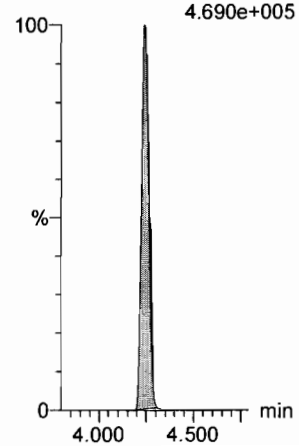
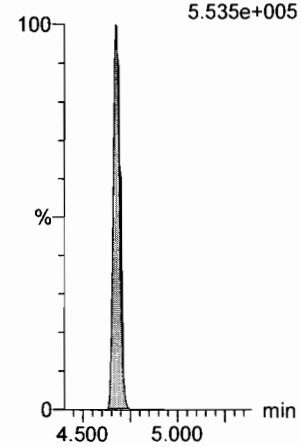


13C5-PFNA



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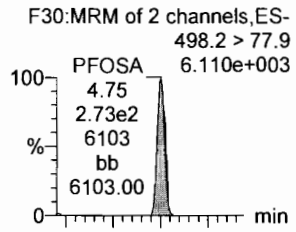
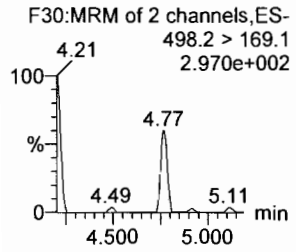
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

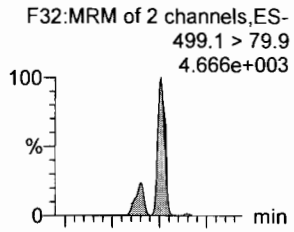
Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

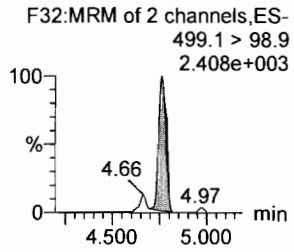
PFOSA



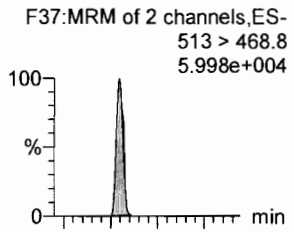


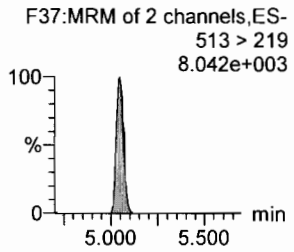
L-PFOS



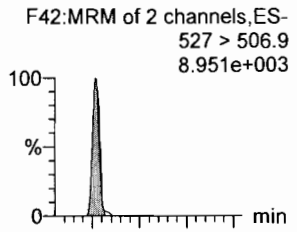


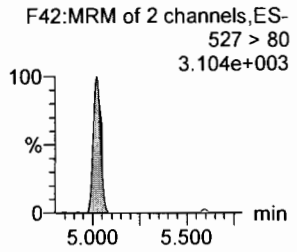
PFDA





8:2 FTS





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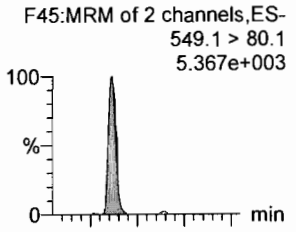

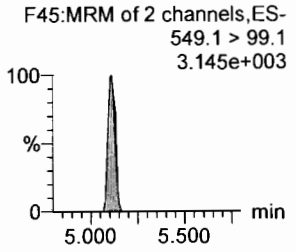

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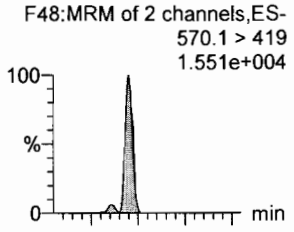
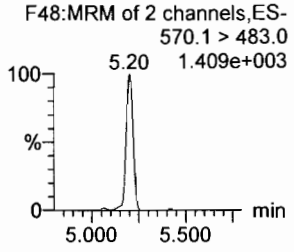
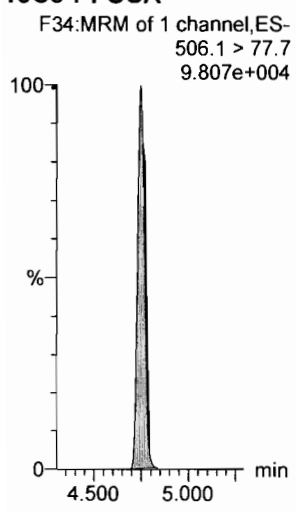
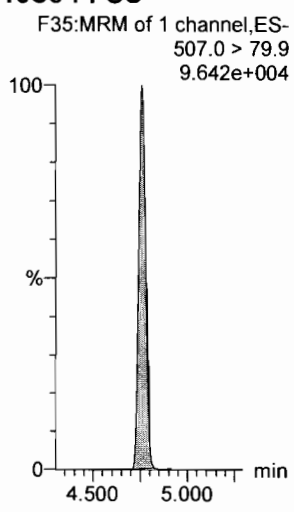




13C8-PFOSA



13C8-PFOS



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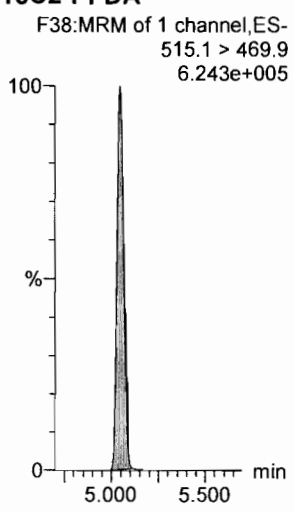
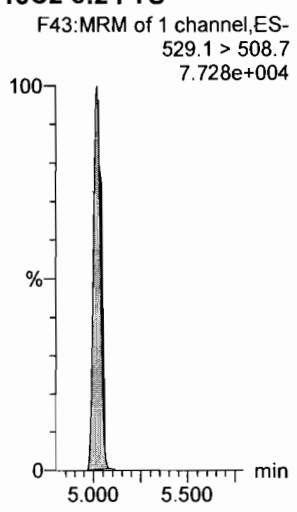


13C2-8:2 FTS



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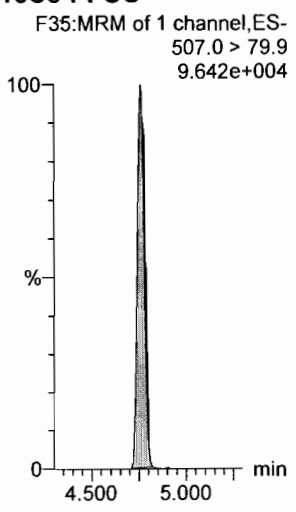
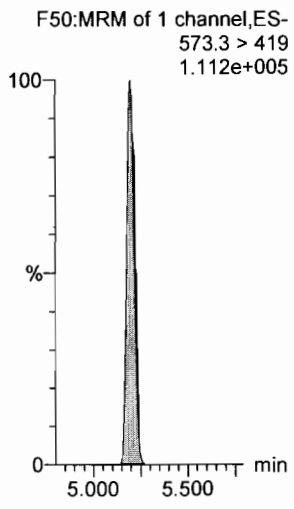


d3-N-MeFOSAA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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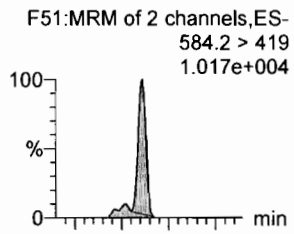
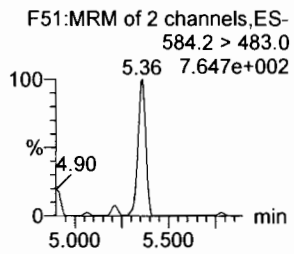
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

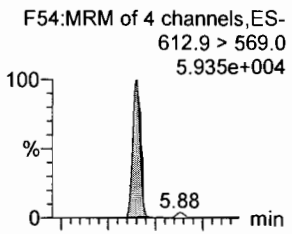
Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

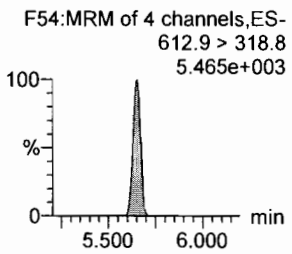
L-EtFOSAA



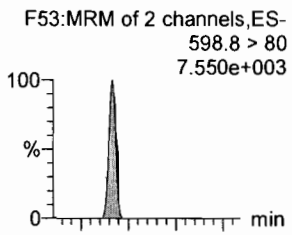


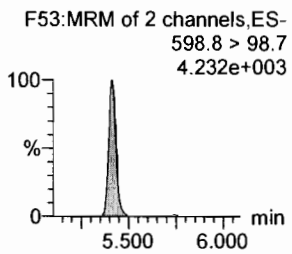
PFDoA



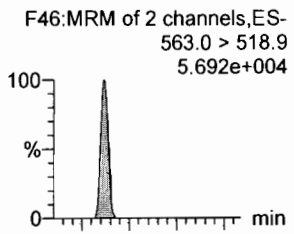


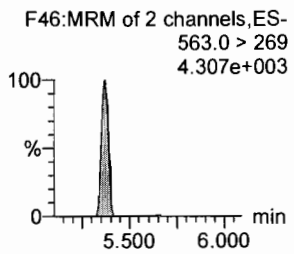
PFDS



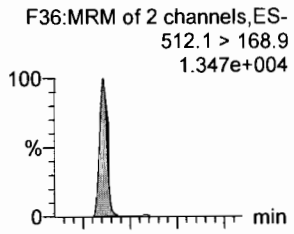


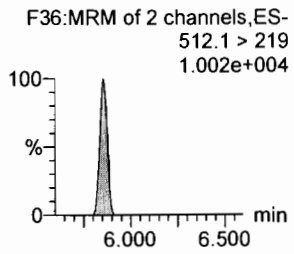
PFUdA



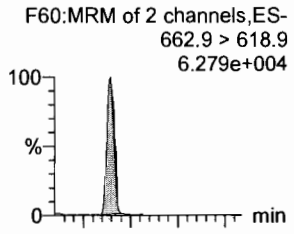


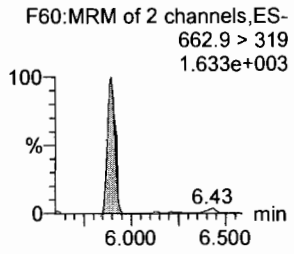
N-MeFOSA



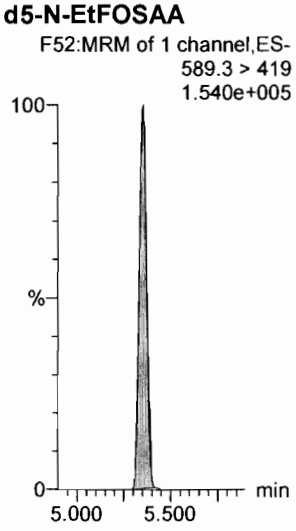


PFTrDA

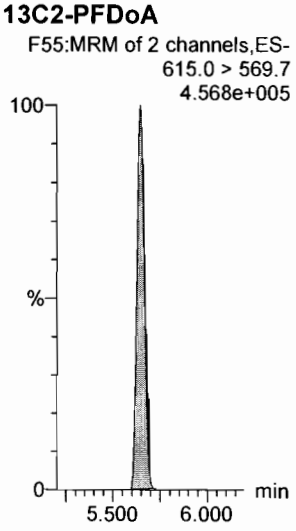




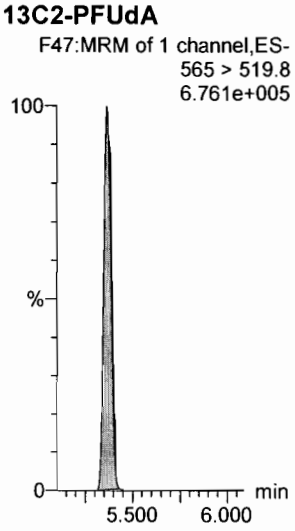
d5-N-EtFOSAA



13C2-PFDoA



13C2-PFUdA



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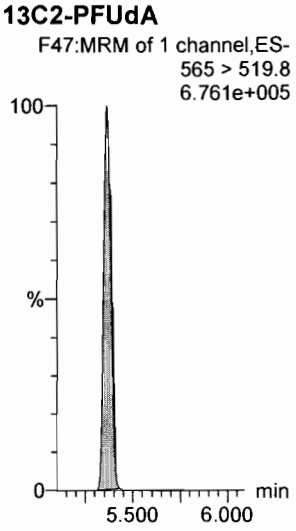
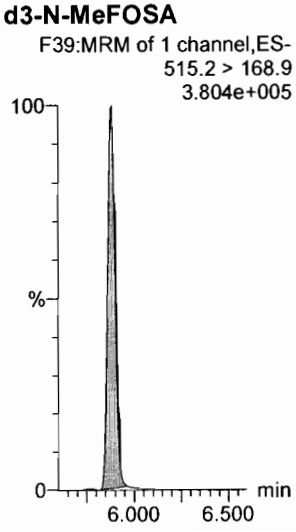


d3-N-MeFOSA



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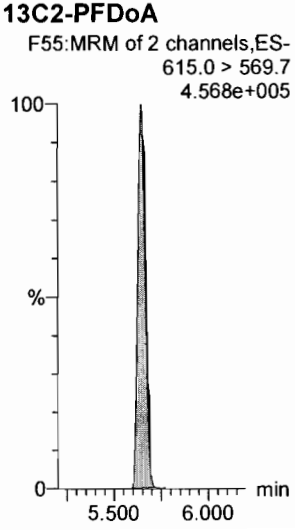
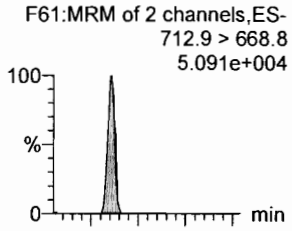


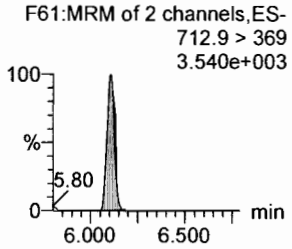
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

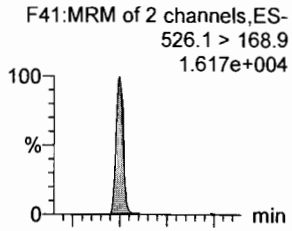
Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

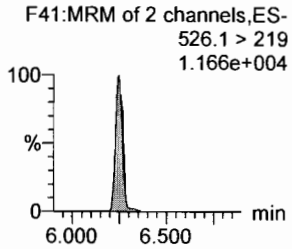
PFTeDA



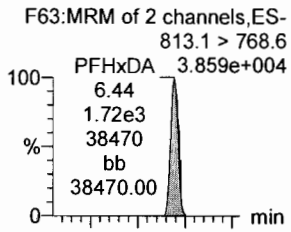


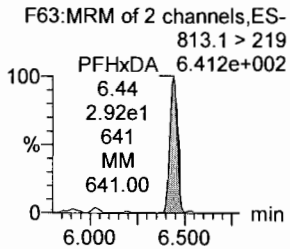
N-EtFOSA



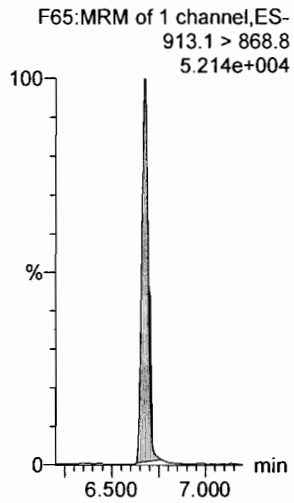


PFHxDA

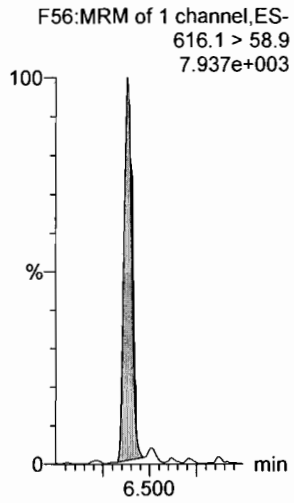




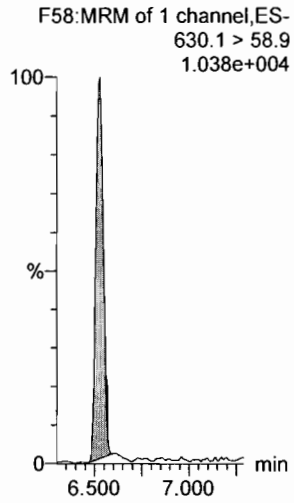
PFODA



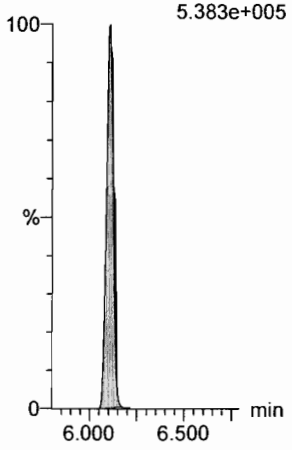
N-MeFOSE



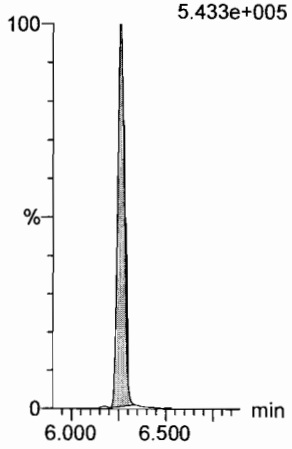
N-EtFOSE



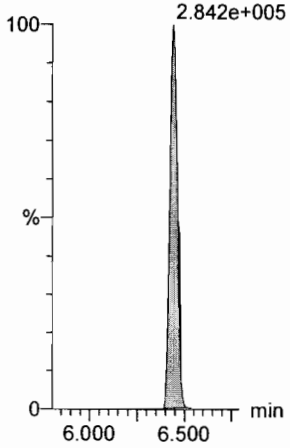
13C2-PFTeDA



d5-N-ETFOSA



13C2-PFHxDA



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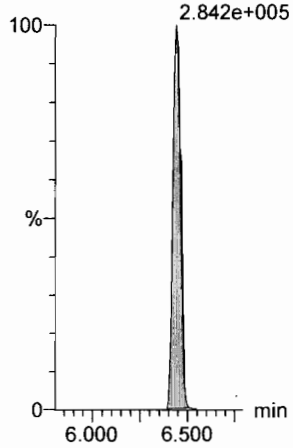
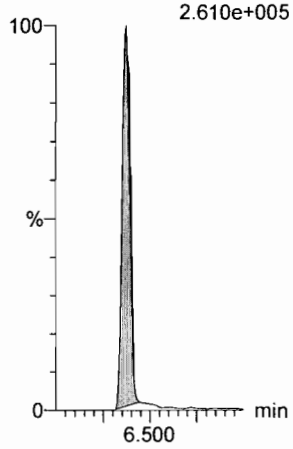
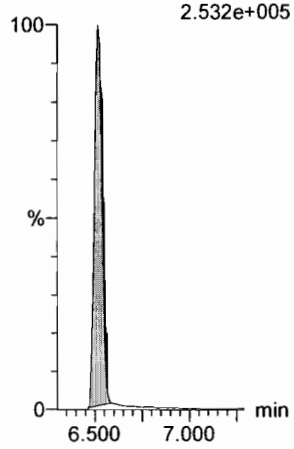


d7-N-MeFOSE



d9-N-EtFOSE

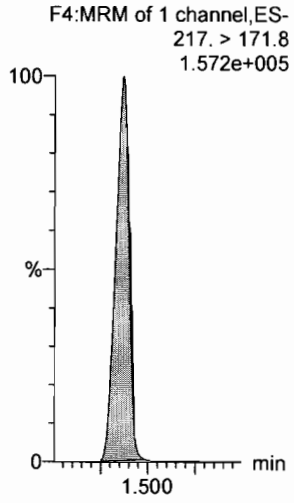


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

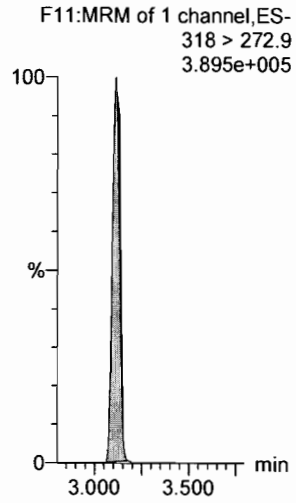
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_4, Date: 03-Jun-2018, Time: 18:28:47, ID: ST180603M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

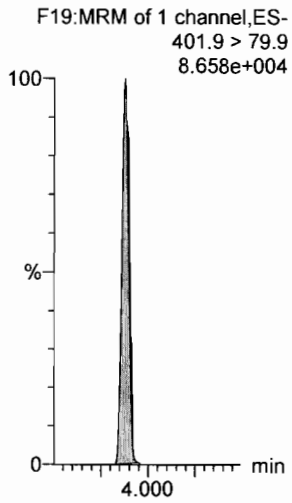
13C4-PFBA



13C5-PFHxA



13C3-PFHxS



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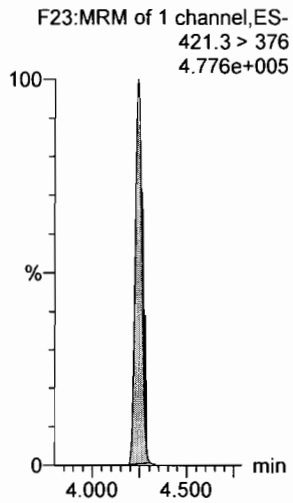
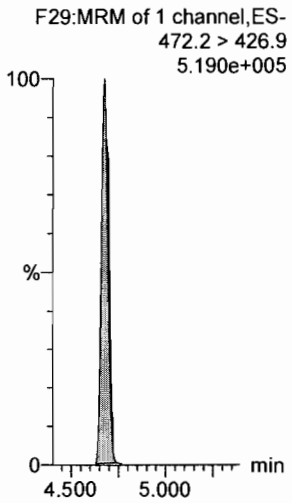
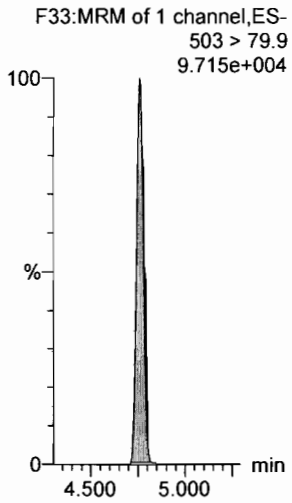


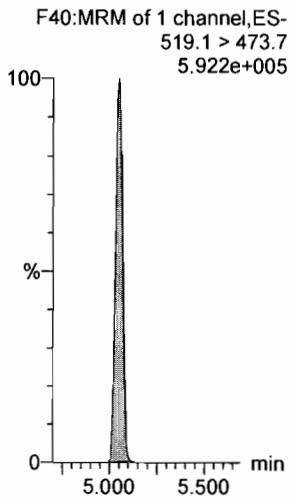
13C9-PFNA



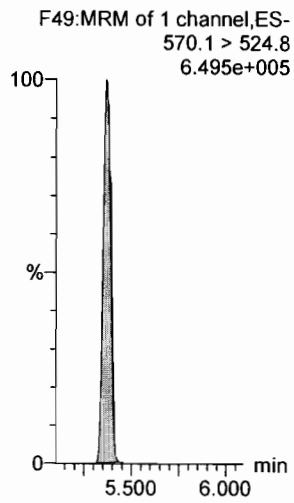
13C4-PFOS



13C6-PFDA



13C7-PFUdA

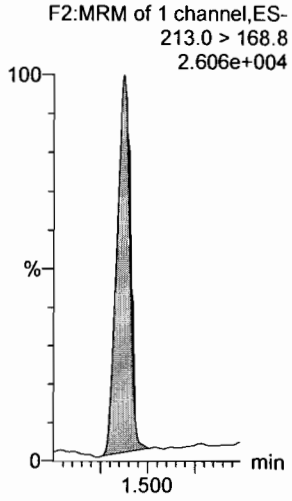


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

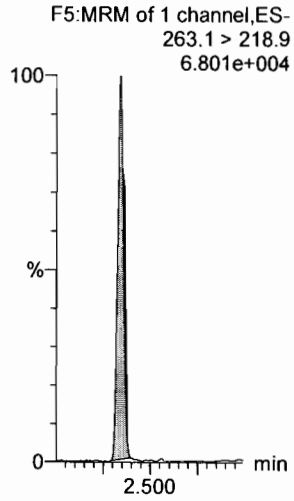
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_5, Date: 03-Jun-2018, Time: 18:39:17, ID: ST180603M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

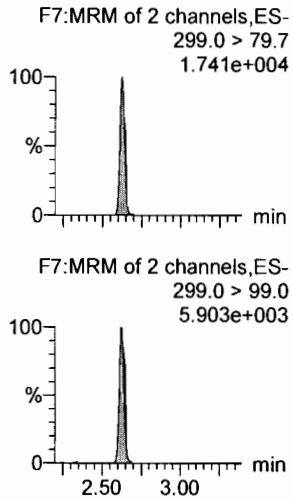
PFBA



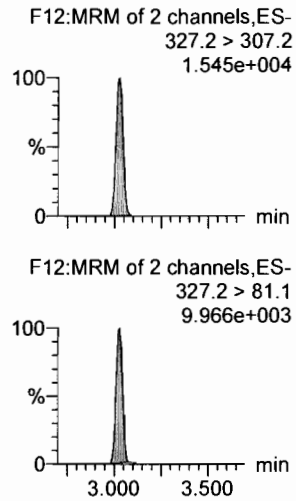
PFPeA



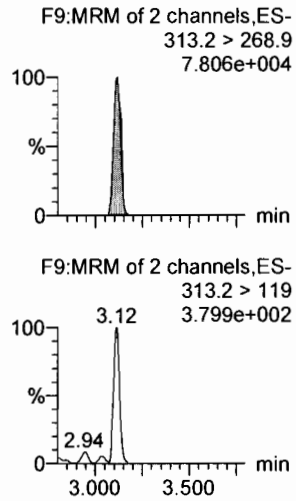
PFBS



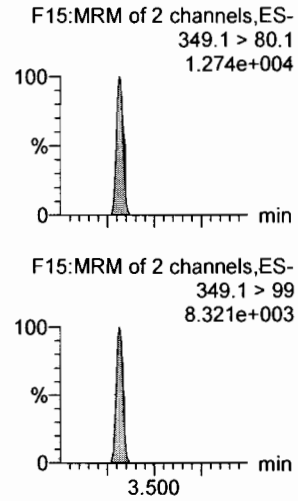
4:2 FTS



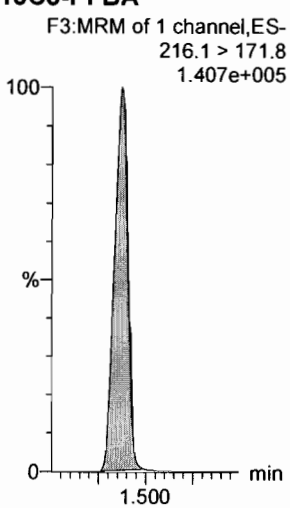
PFHxA



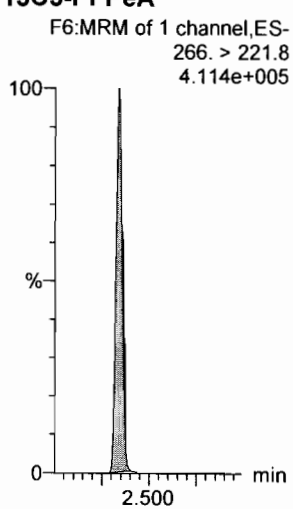
PFPeS



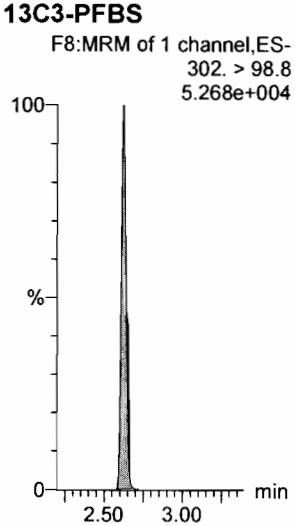
13C3-PFBA



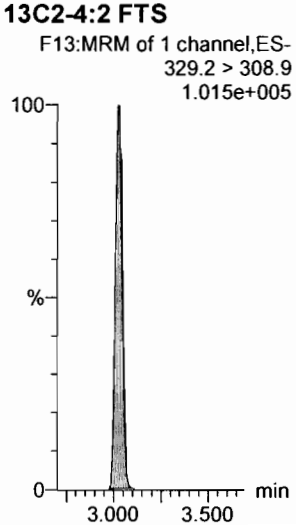
13C3-PFPeA



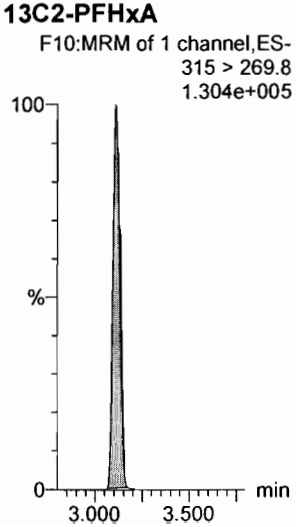
13C3-PFBS



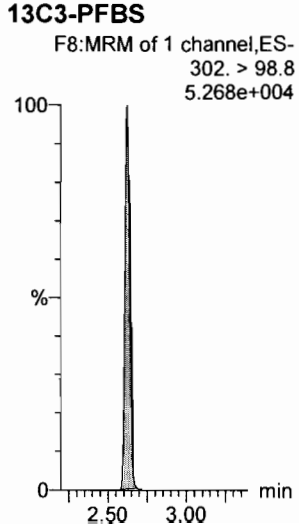
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

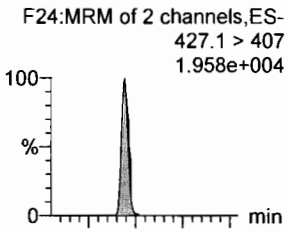


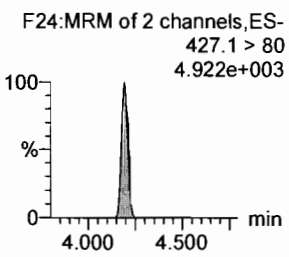
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

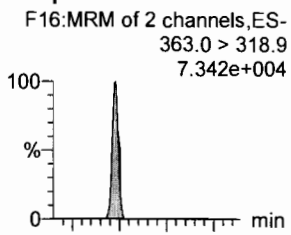
Name: 180603M2_5, Date: 03-Jun-2018, Time: 18:39:17, ID: ST180603M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

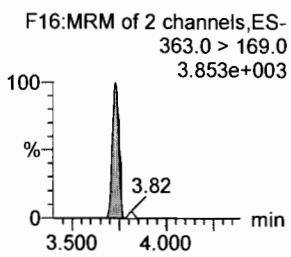
6:2 FTS



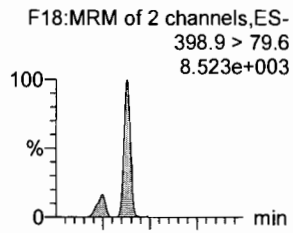


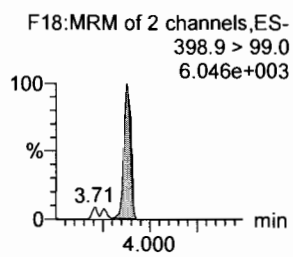
PFHpA





L-PFHxS





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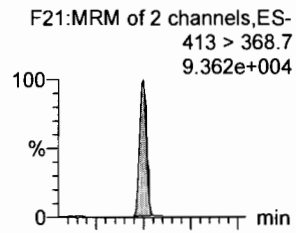

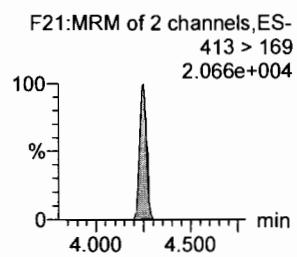

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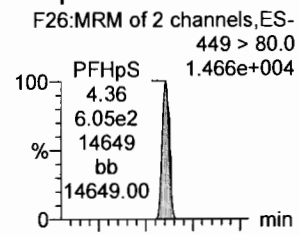

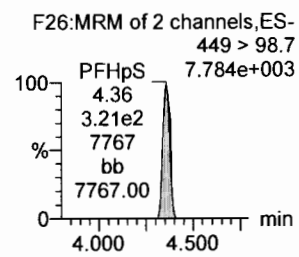

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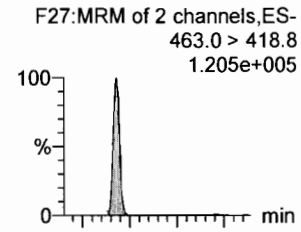
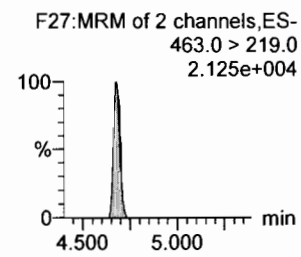
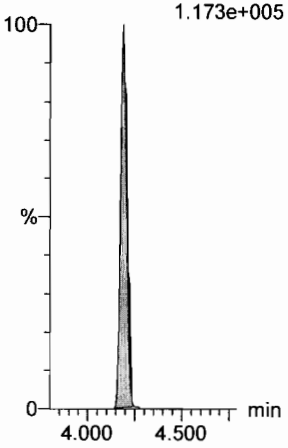
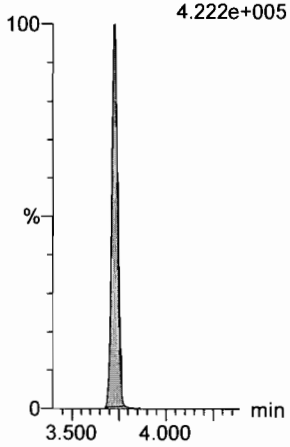




13C2-6:2 FTS



13C4-PFHpA



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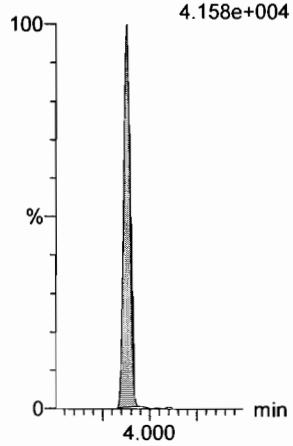

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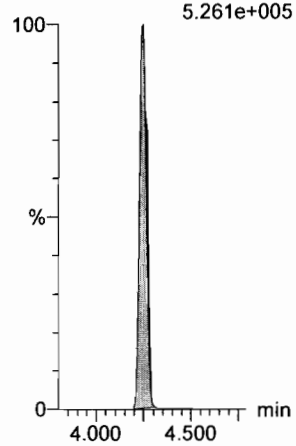

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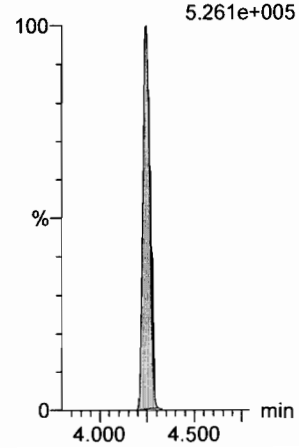

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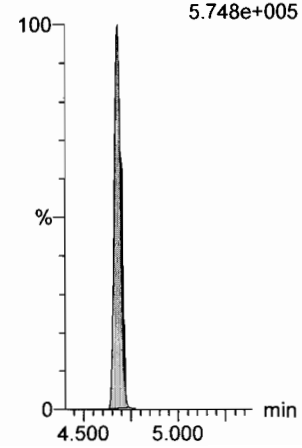

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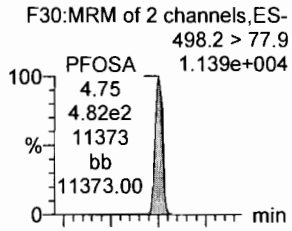
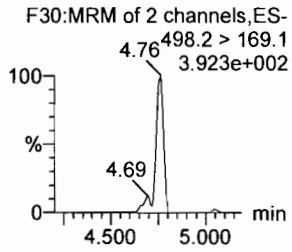
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_5, Date: 03-Jun-2018, Time: 18:39:17, ID: ST180603M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

PFOSA





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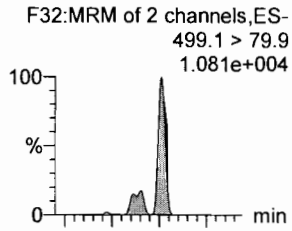

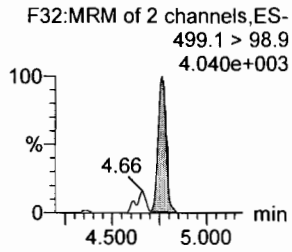

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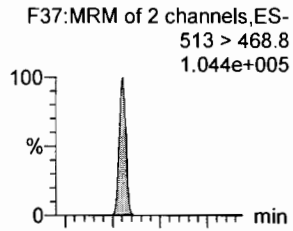
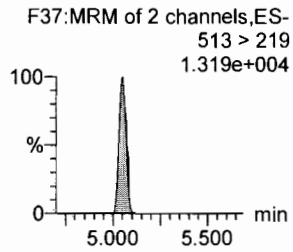
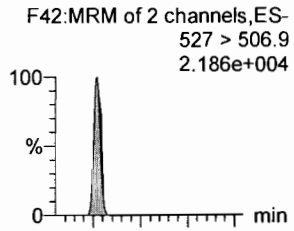
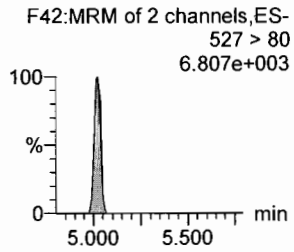




8:2 FTS





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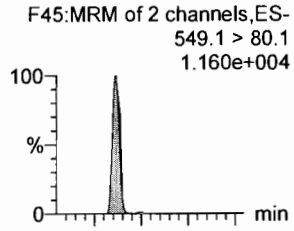

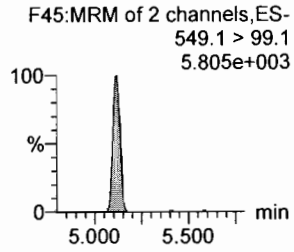

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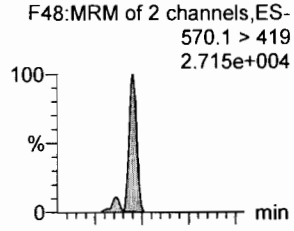

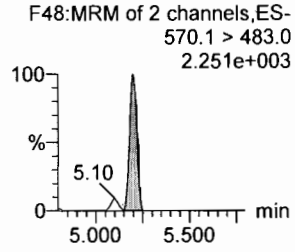

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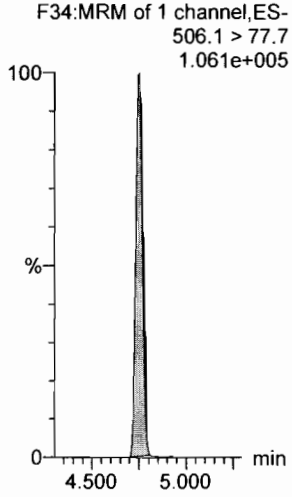

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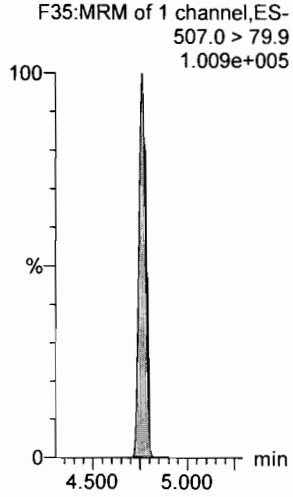

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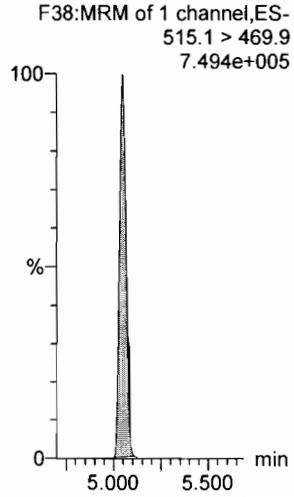
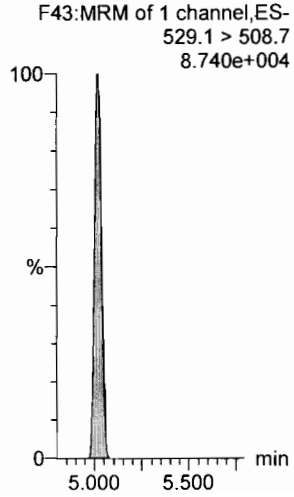


13C2-8:2 FTS



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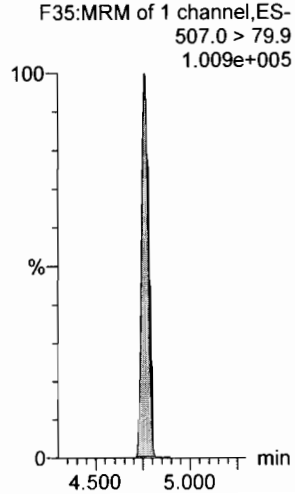

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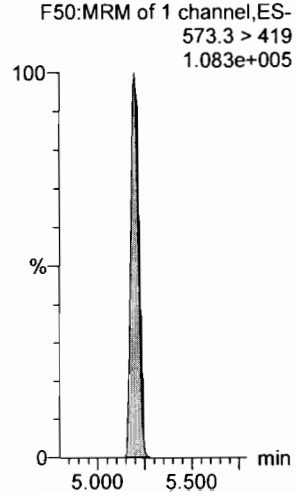

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Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_5, Date: 03-Jun-2018, Time: 18:39:17, ID: ST180603M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

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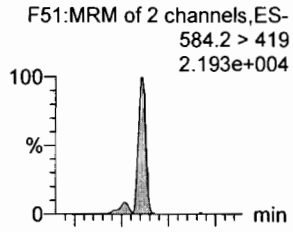
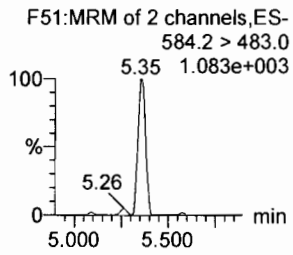
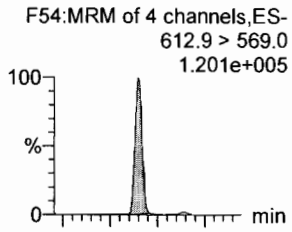
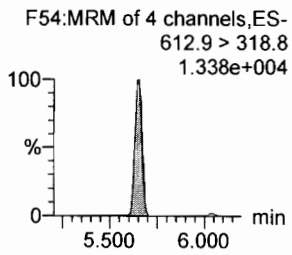




PFDoA





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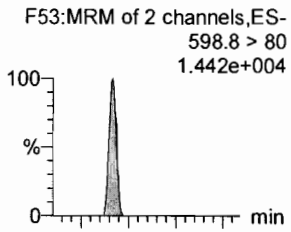
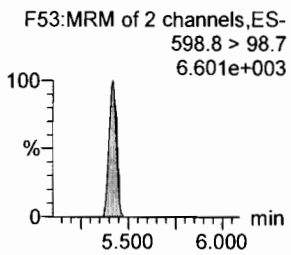
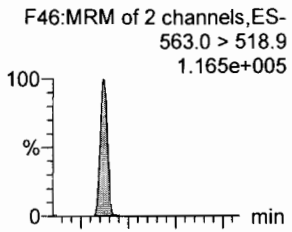
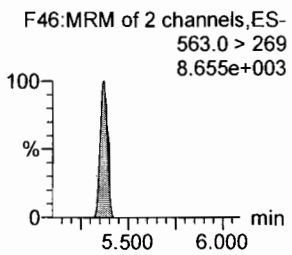




PFUdA





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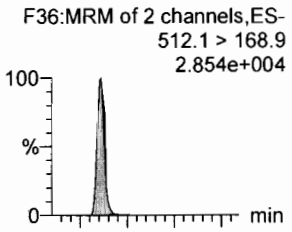

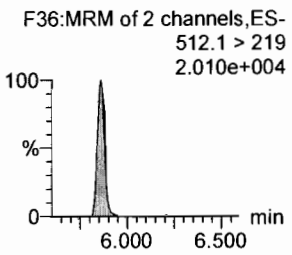

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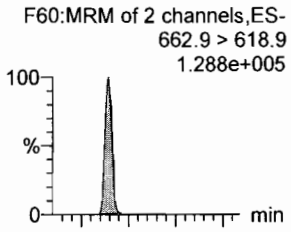
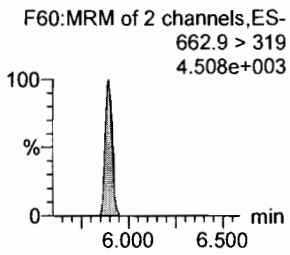
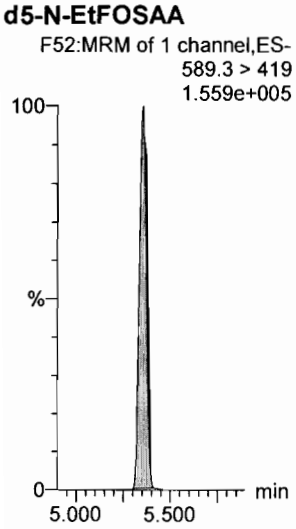




d5-N-EtFOSAA



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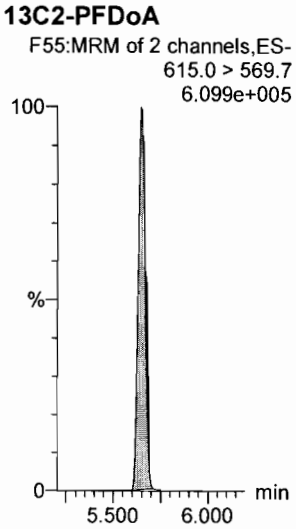

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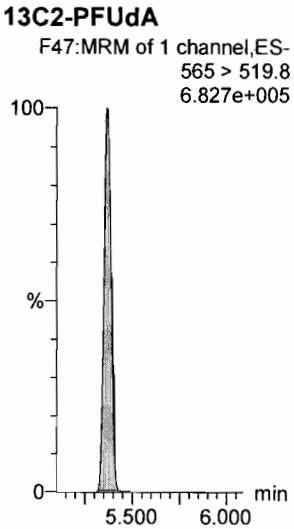

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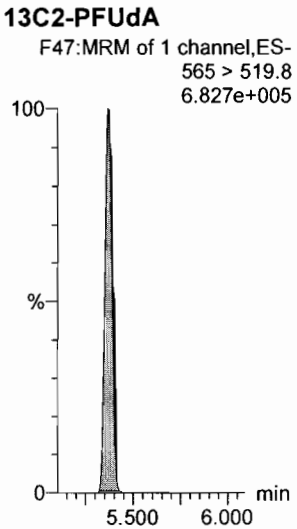

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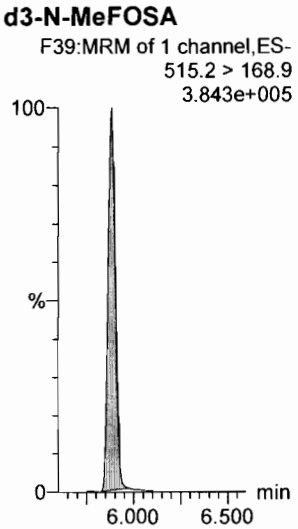

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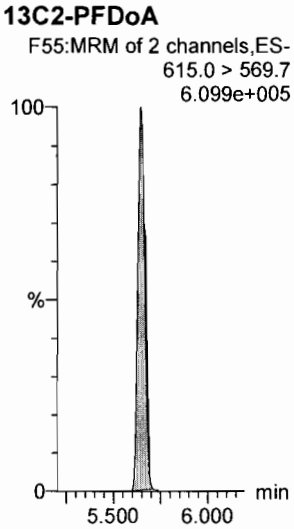

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Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

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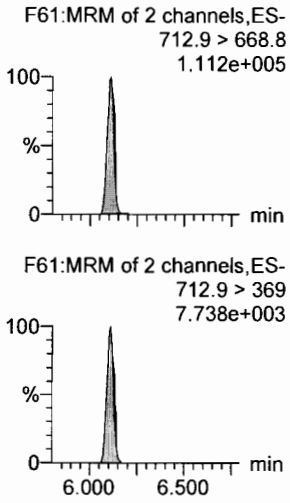

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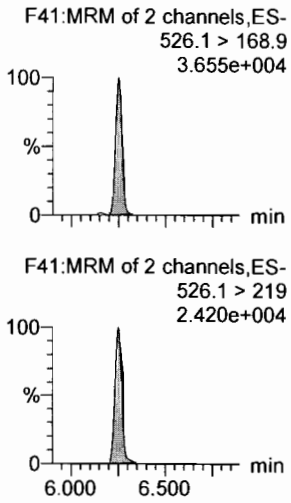

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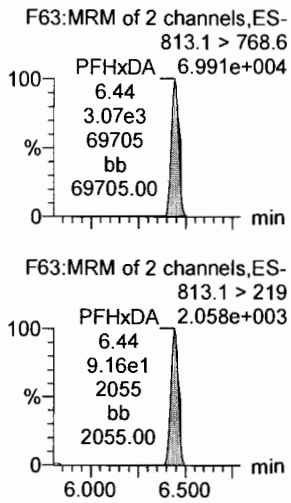
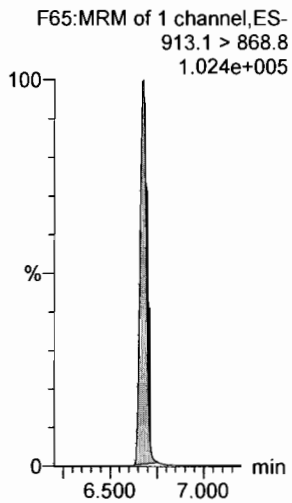
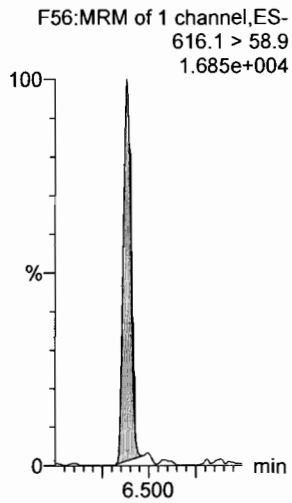


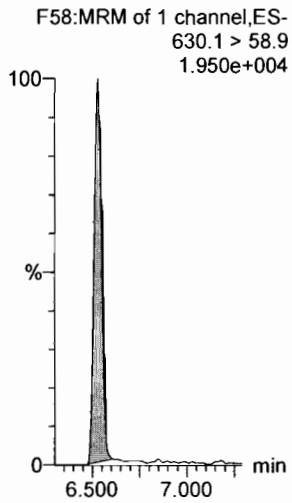
PFODA



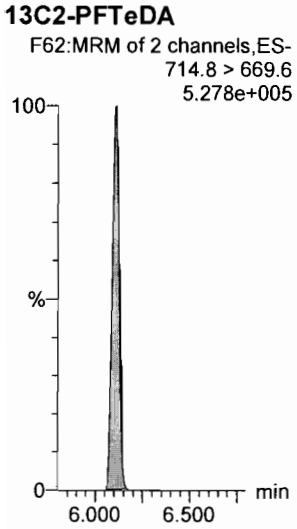
N-MeFOSE



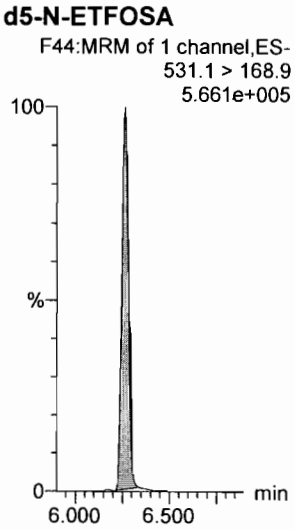
N-EtFOSE



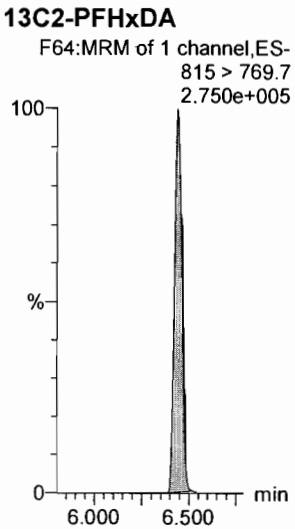
13C2-PFTeDA



d5-N-ETFOSA



13C2-PFHxDA



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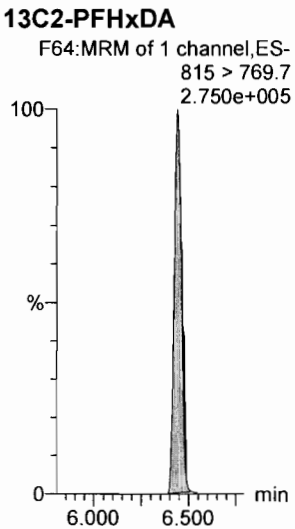
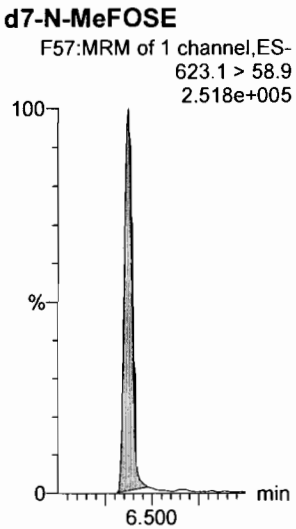
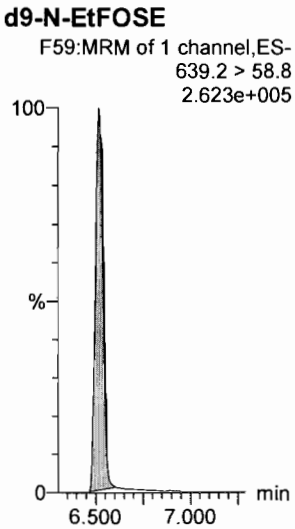


d7-N-MeFOSE



d9-N-EtFOSE

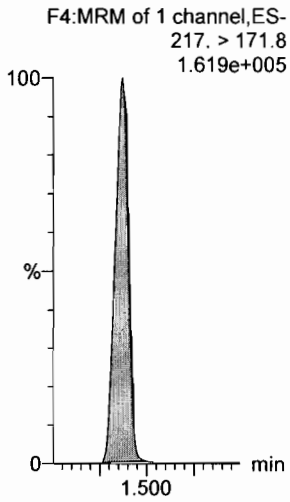


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

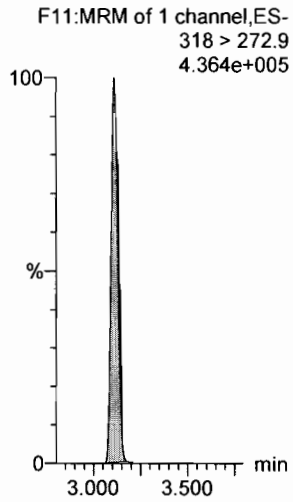
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_5, Date: 03-Jun-2018, Time: 18:39:17, ID: ST180603M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

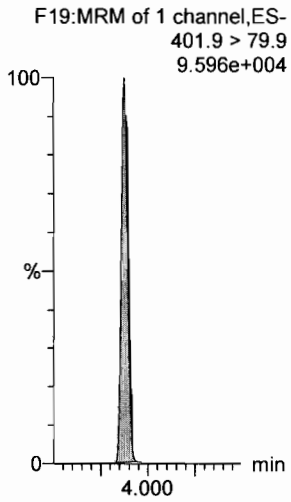
13C4-PFBA



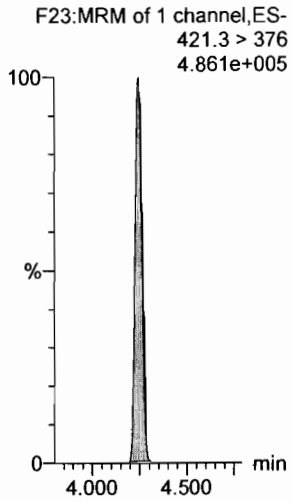
13C5-PFHxA



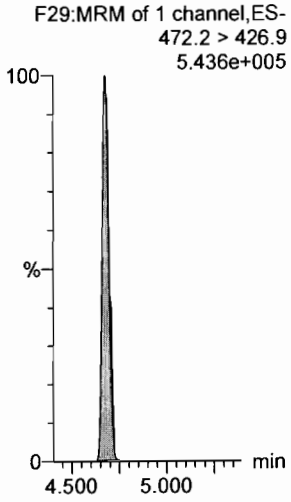
13C3-PFHxS



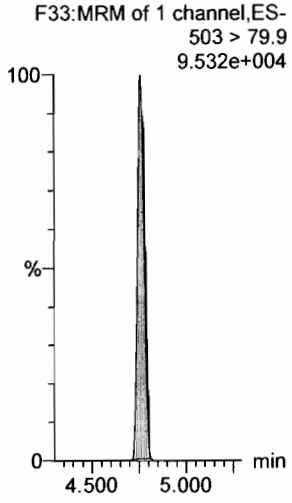
13C8-PFOA



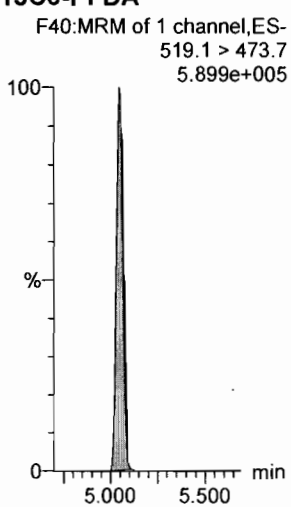
13C9-PFNA



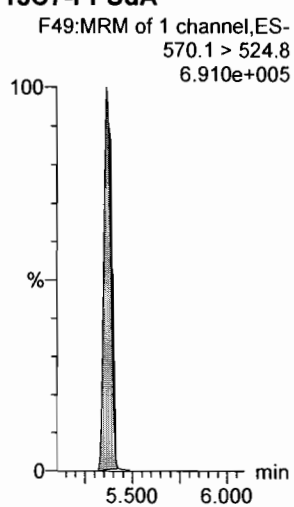
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
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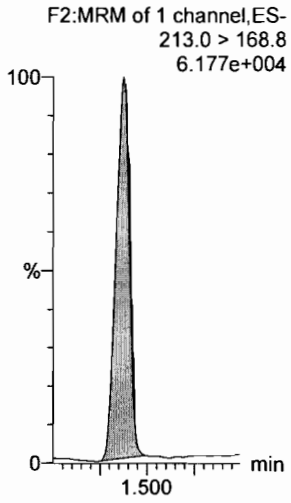
Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

PFBA



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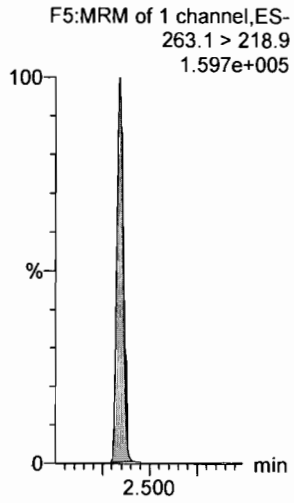
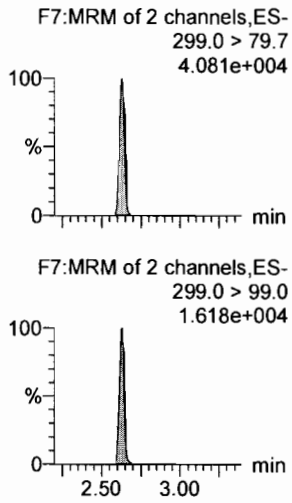
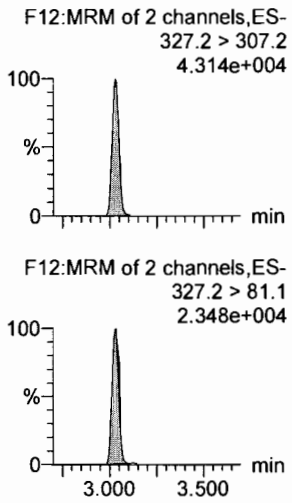


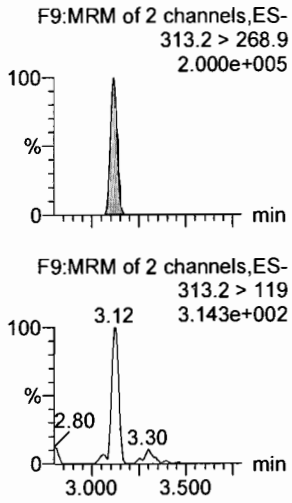
PFBS



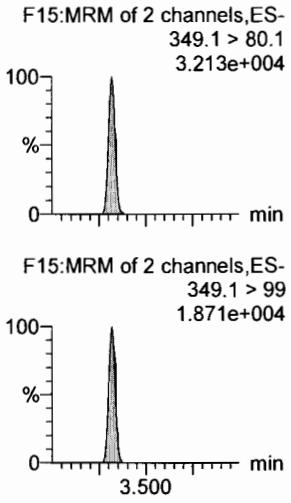
4:2 FTS



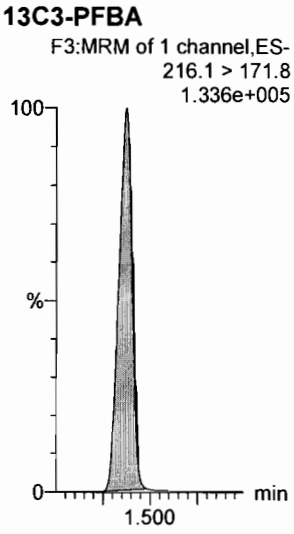
PFHxA



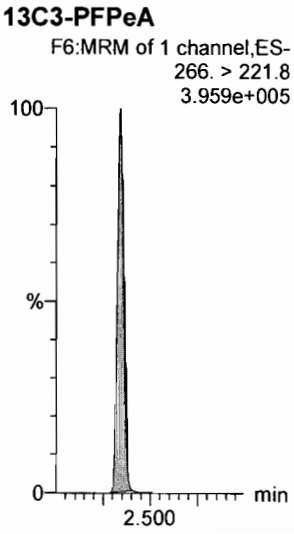
PFPeS



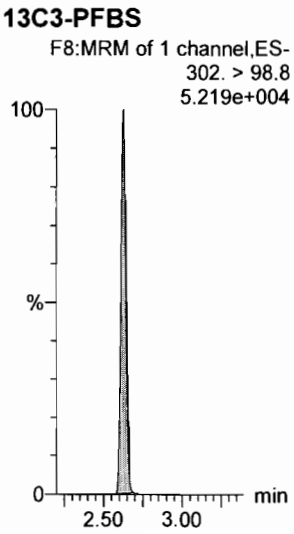
13C3-PFBA



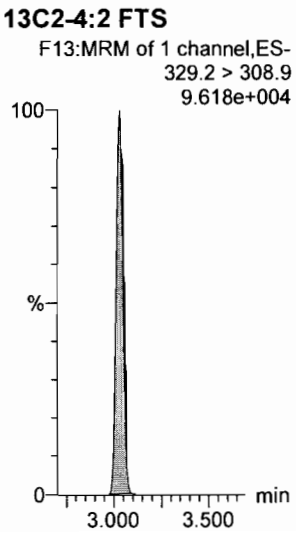
13C3-PFPeA



13C3-PFBS



13C2-4:2 FTS



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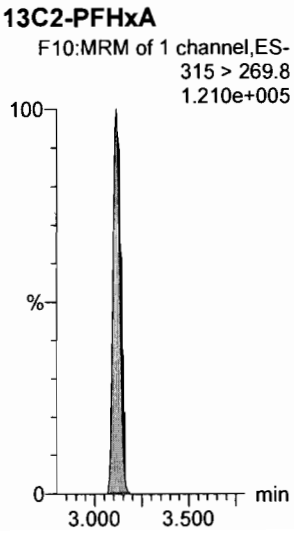

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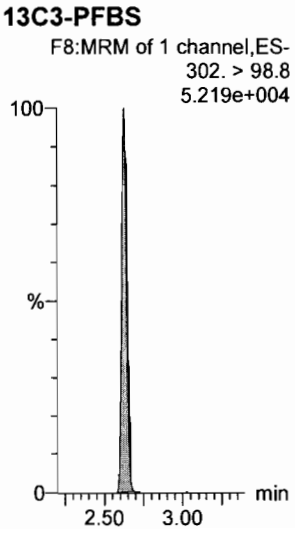
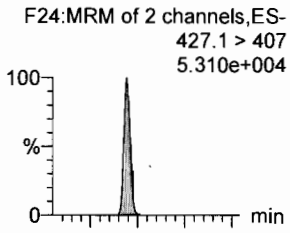


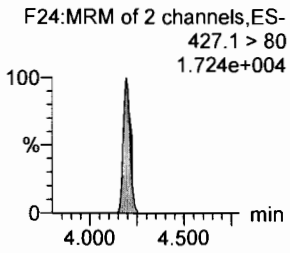
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

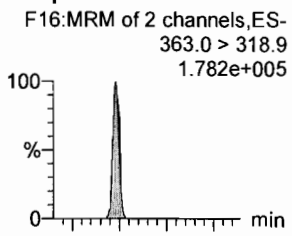
Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

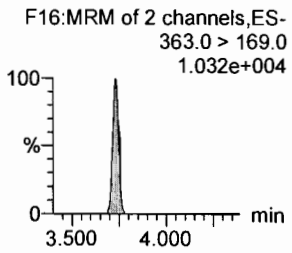
6:2 FTS



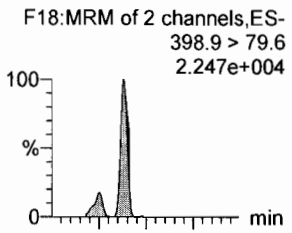


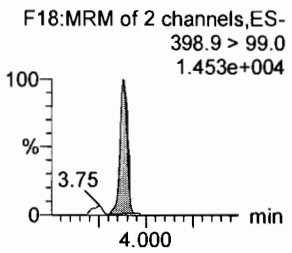
PFHpA



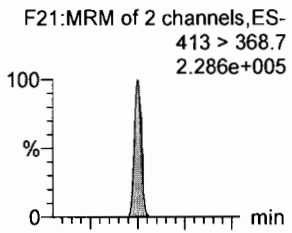


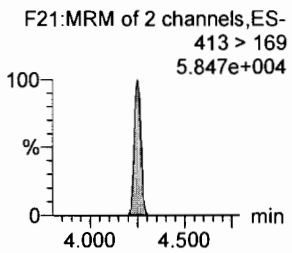
L-PFHxS



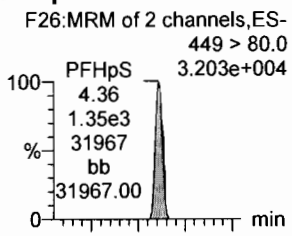


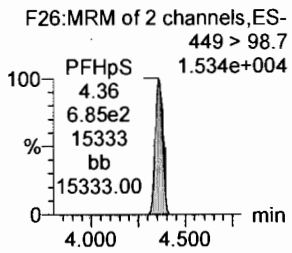
L-PFOA



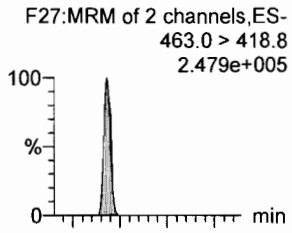


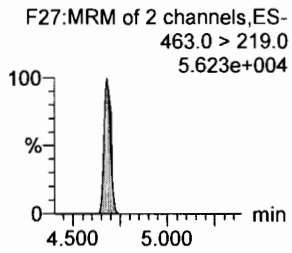
PFHpS



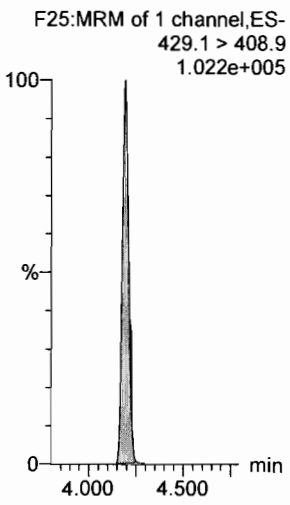


PFNA

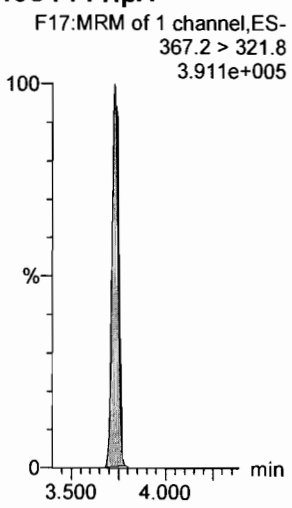




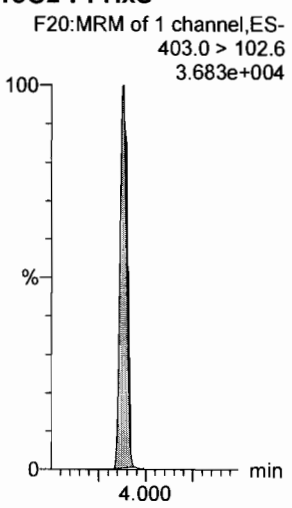
13C2-6:2 FTS



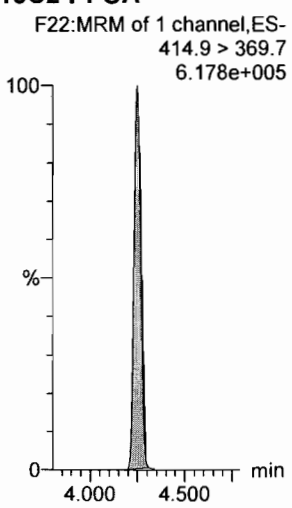
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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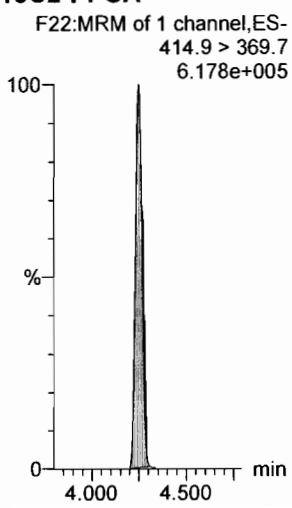
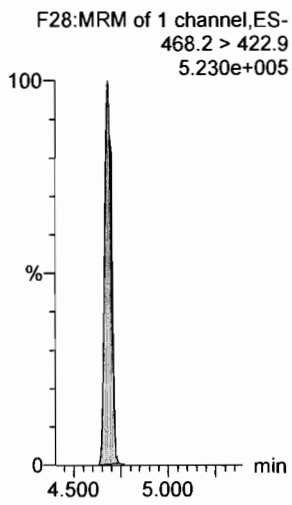


13C5-PFNA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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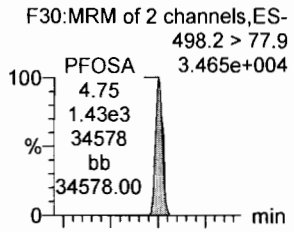
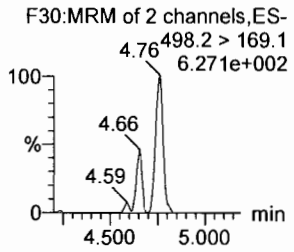
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

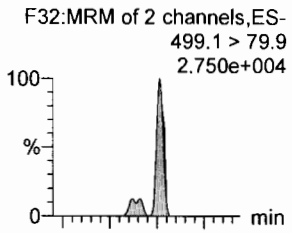
Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

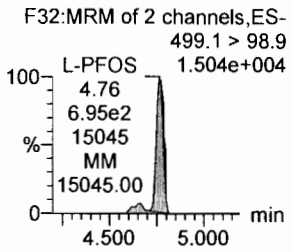
PFOSA





L-PFOS





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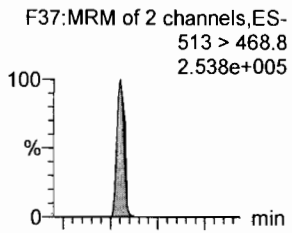
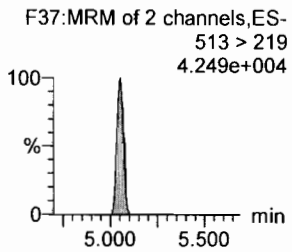
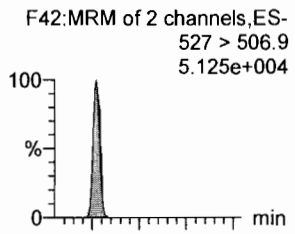
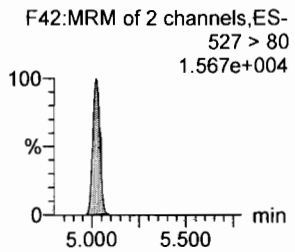


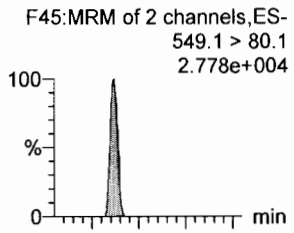


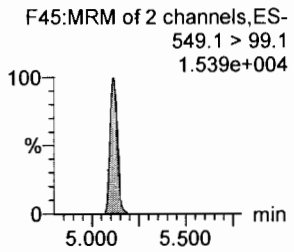
8:2 FTS



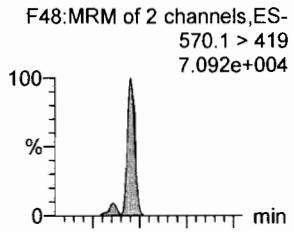


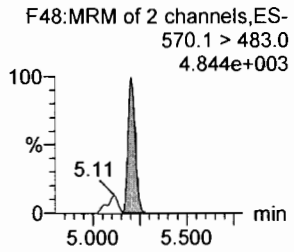
PFNS



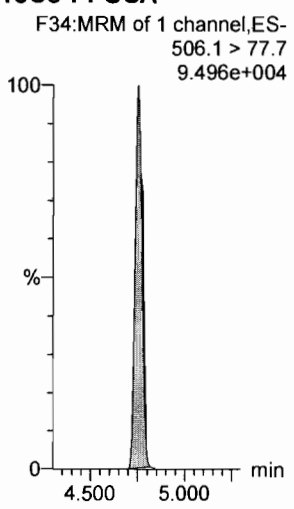


L-MeFOSAA





13C8-PFOSA



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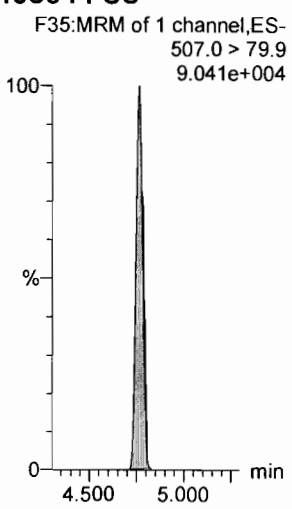

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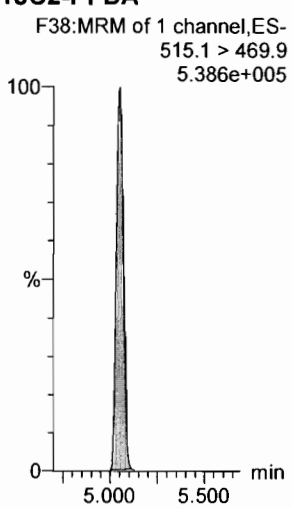

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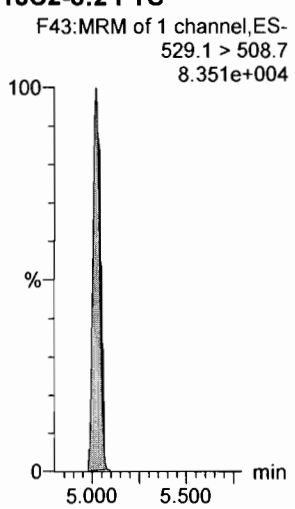

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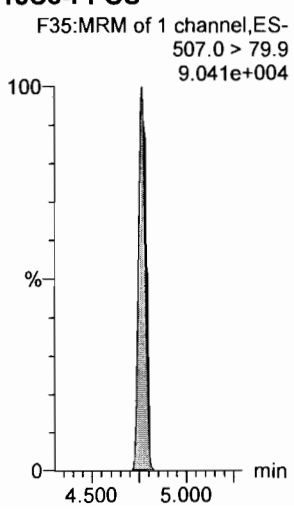
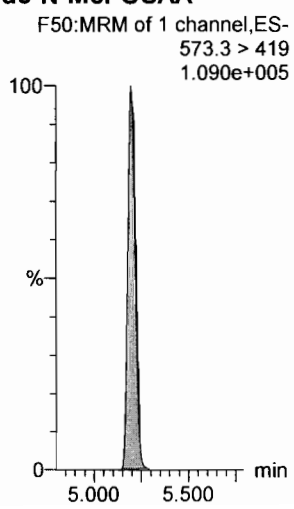


d3-N-MeFOSAA



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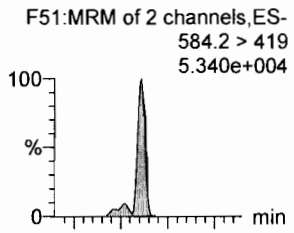
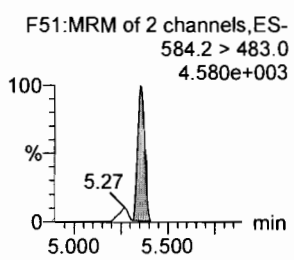
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

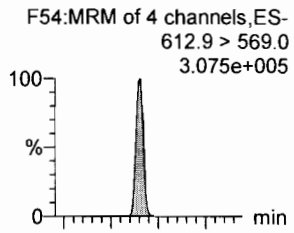
Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

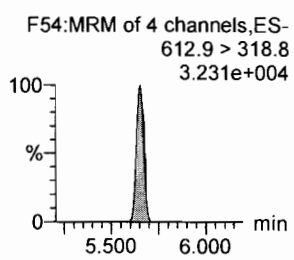
L-EtFOSAA





PFDoA





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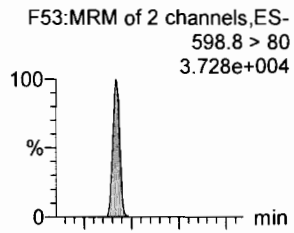

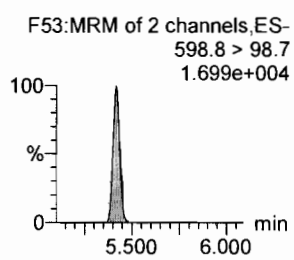

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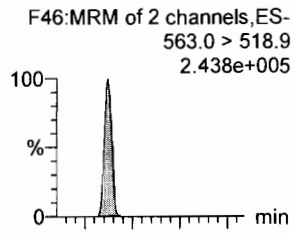
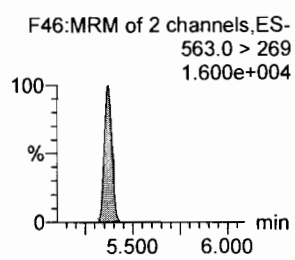
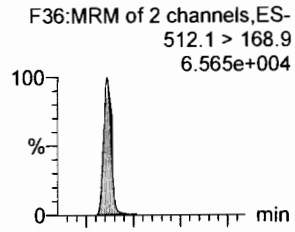
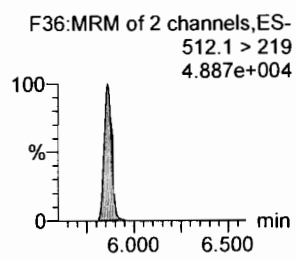




N-MeFOSA





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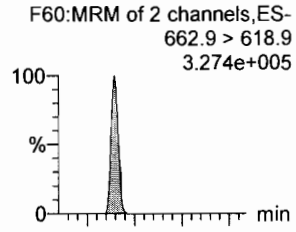
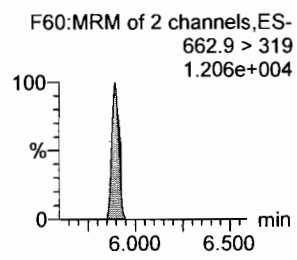
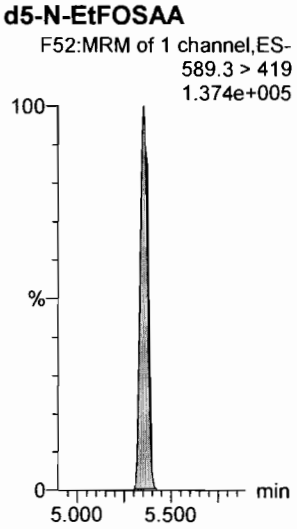




d5-N-EtFOSAA



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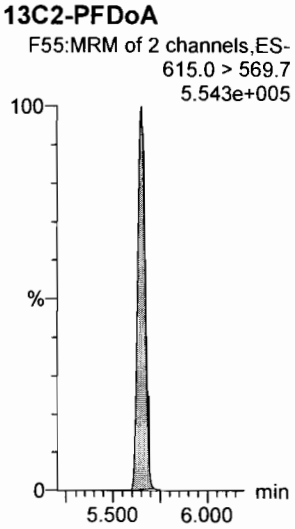

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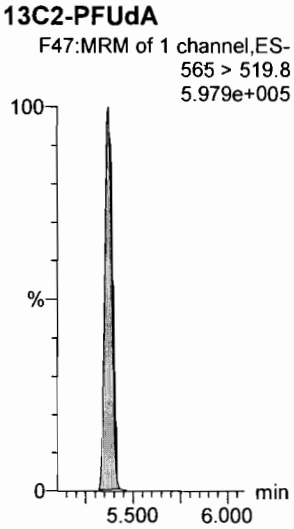

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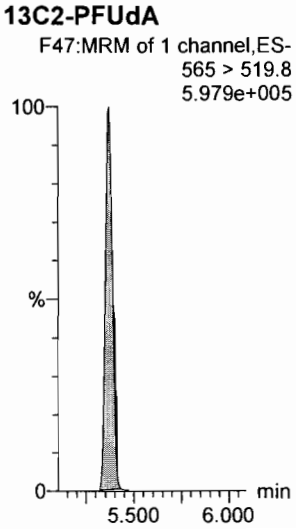

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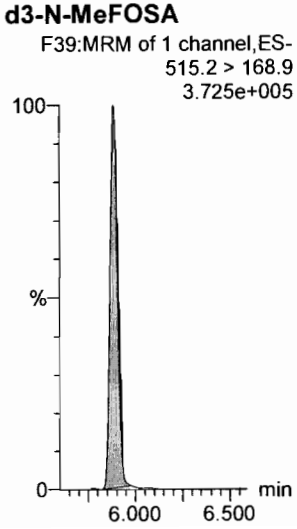

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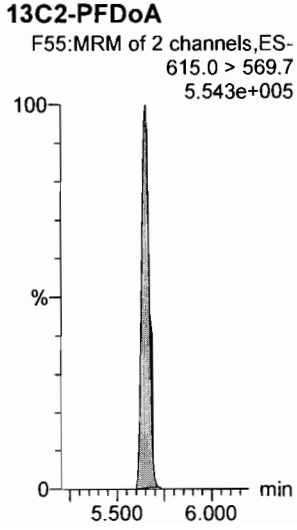

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Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

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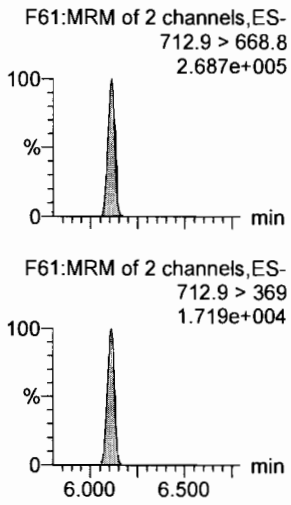

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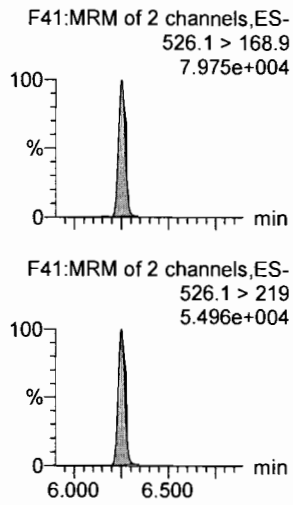

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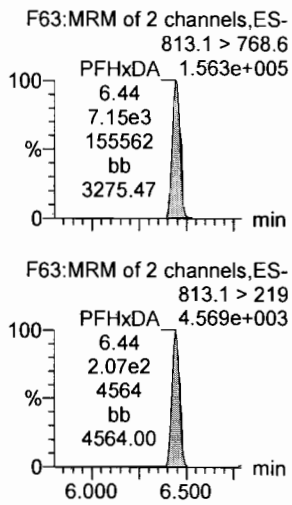

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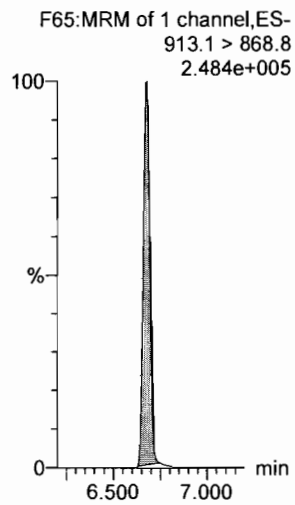
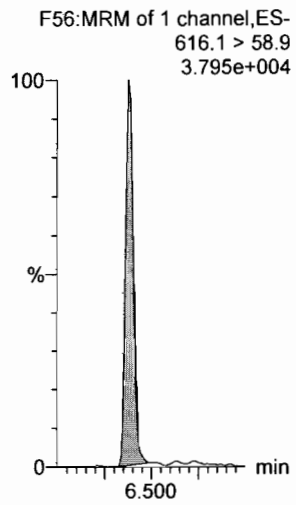


N-MeFOSE



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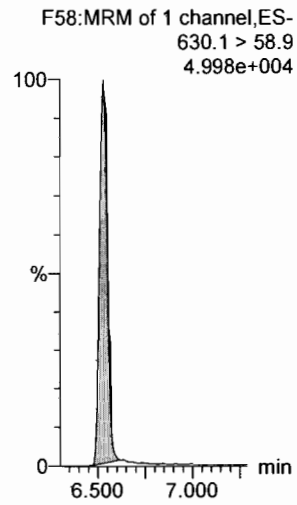

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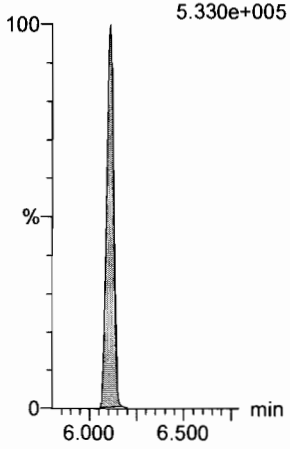
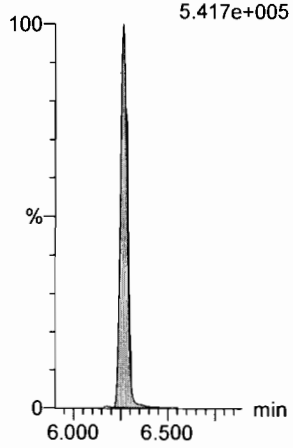


d5-N-ETFOSA



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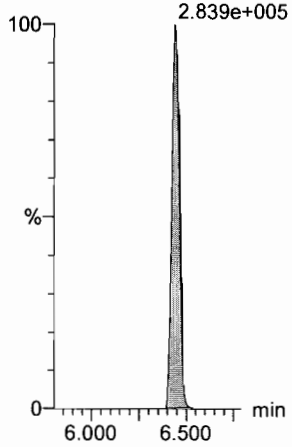

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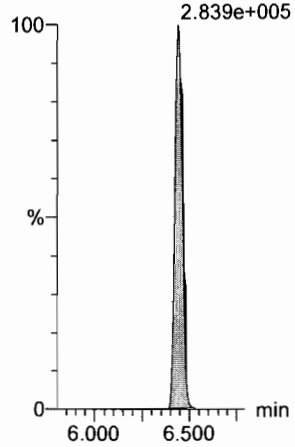

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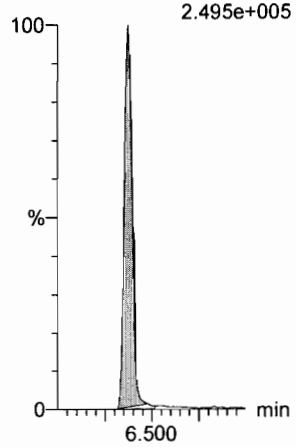

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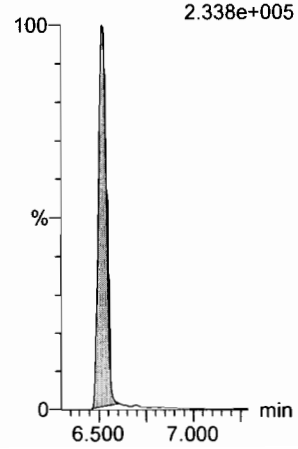

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_6, Date: 03-Jun-2018, Time: 18:49:42, ID: ST180603M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

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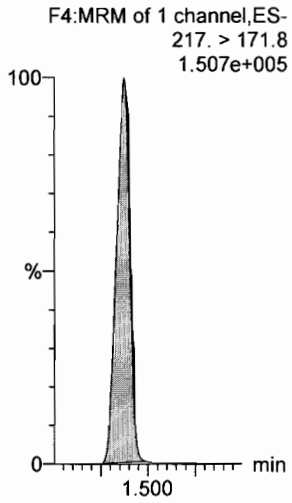
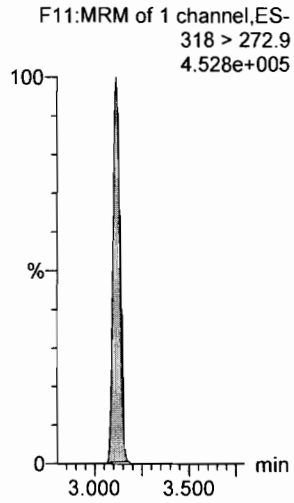


13C5-PFHxA



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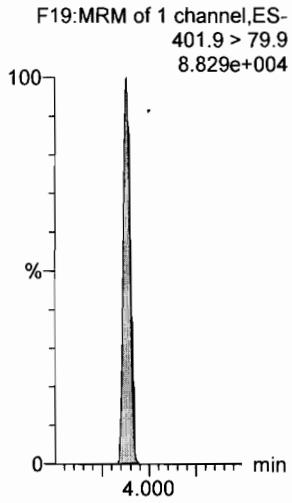

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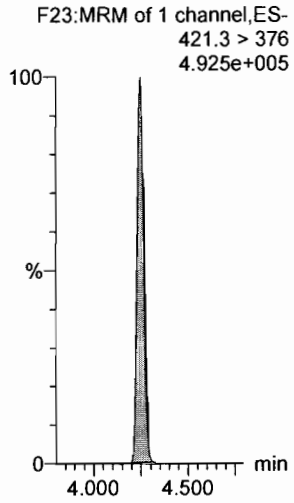

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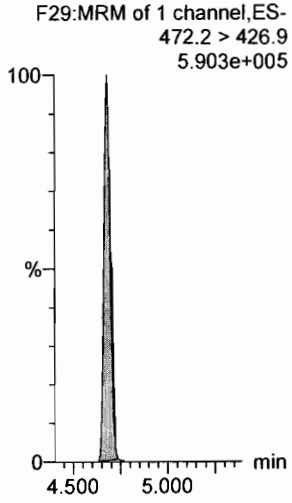
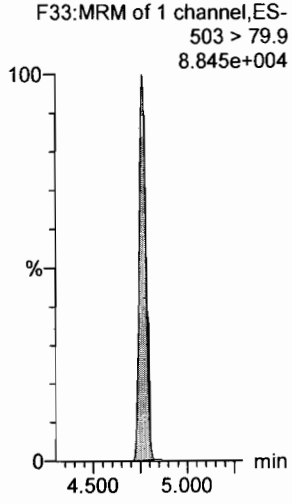


13C4-PFOS



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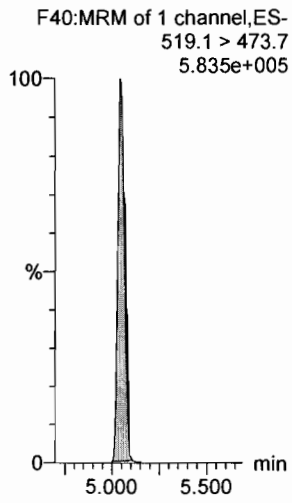
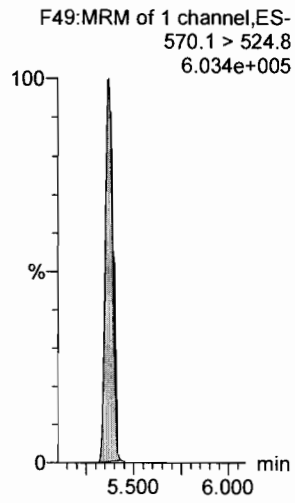


13C7-PFUdA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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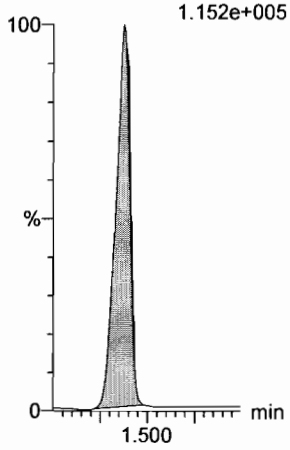
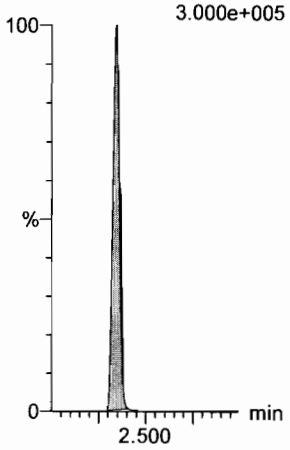
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

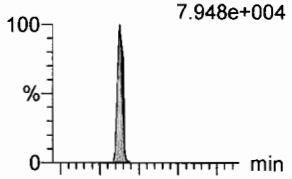
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
1.152e+005



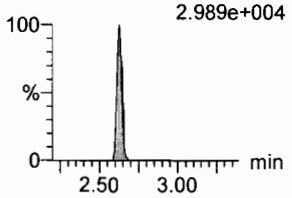
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
3.000e+005



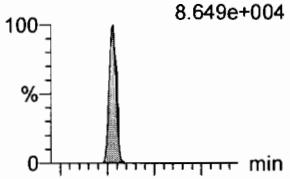
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
7.948e+004



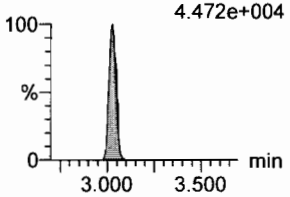
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.989e+004



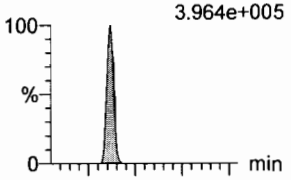
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
8.649e+004



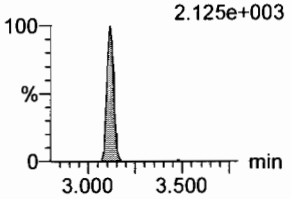
F12:MRM of 2 channels,ES-
327.2 > 81.1
4.472e+004



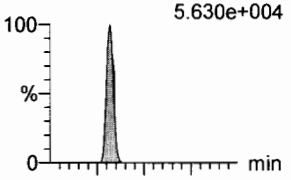
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
3.964e+005



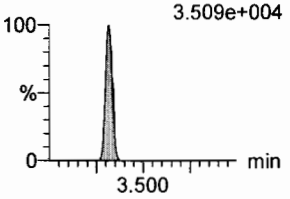
F9:MRM of 2 channels,ES-
313.2 > 119
2.125e+003



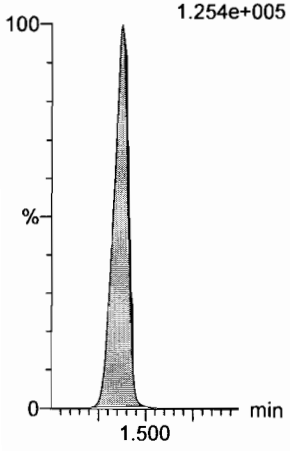
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
5.630e+004



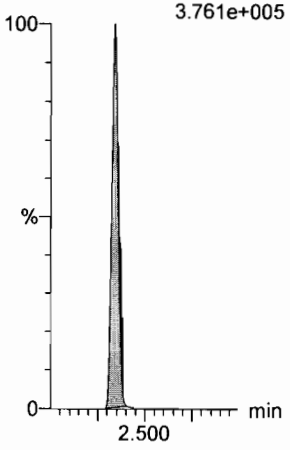
F15:MRM of 2 channels,ES-
349.1 > 99
3.509e+004



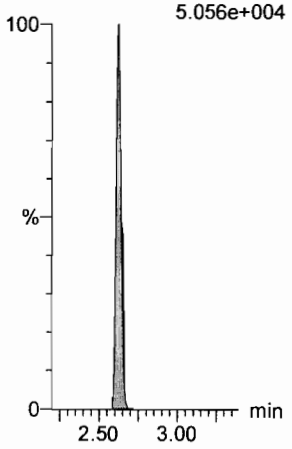
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.254e+005



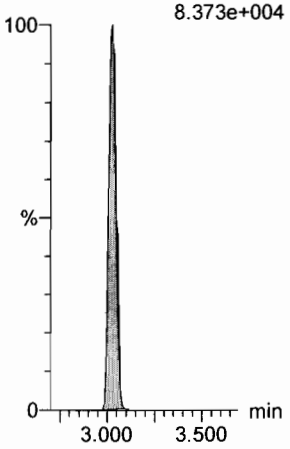
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.761e+005



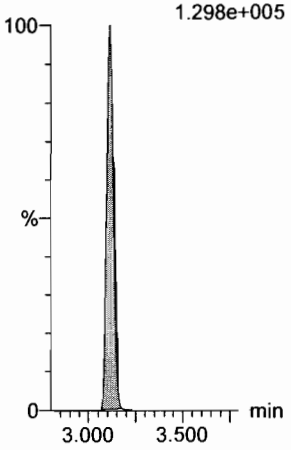
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.056e+004



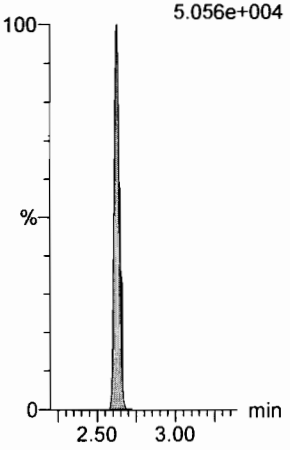
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
8.373e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.298e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.056e+004



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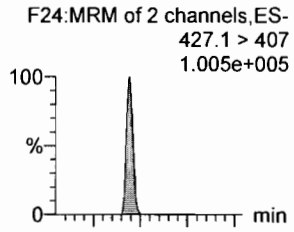
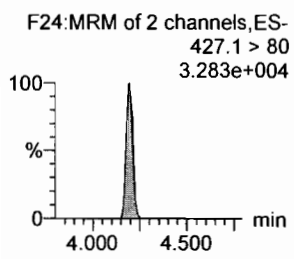
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

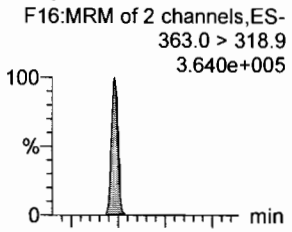
Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

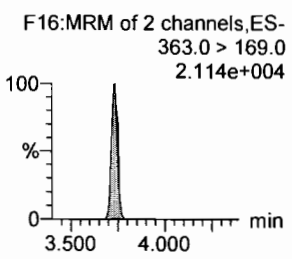
6:2 FTS



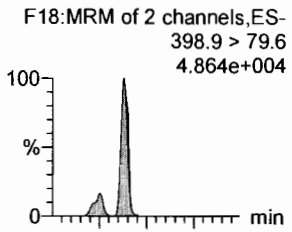


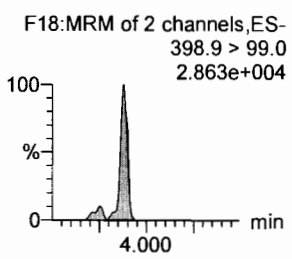
PFHpA



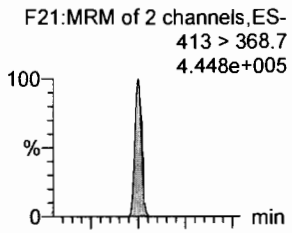


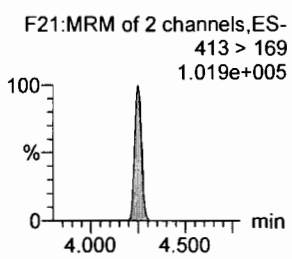
L-PFHxS





L-PFOA





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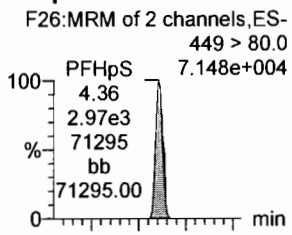

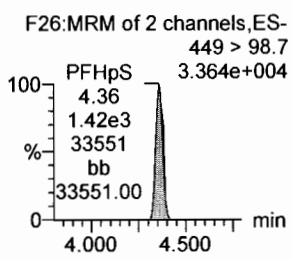

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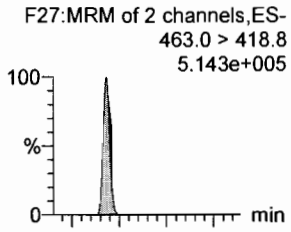
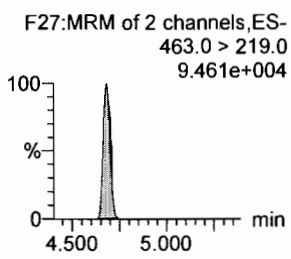
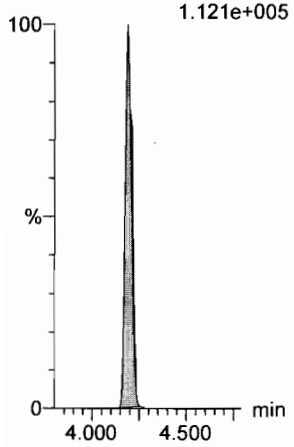
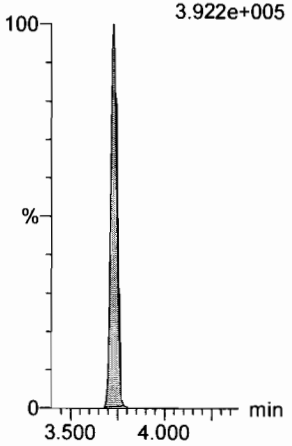




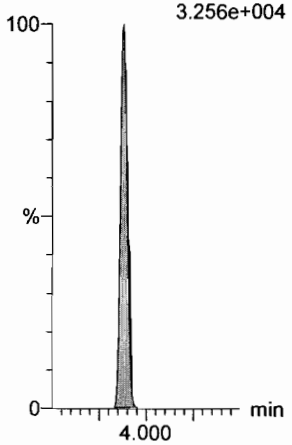
13C2-6:2 FTS



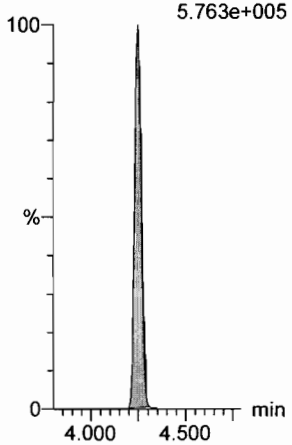
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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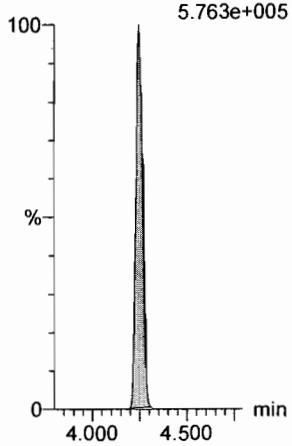
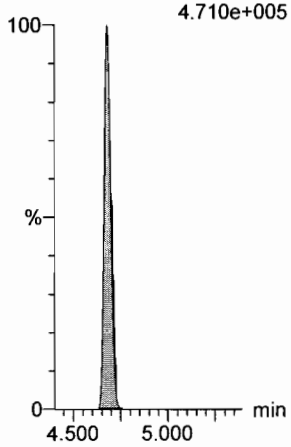


13C5-PFNA



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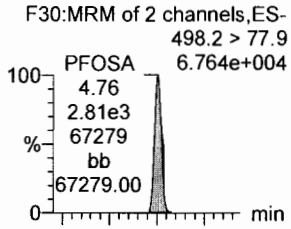
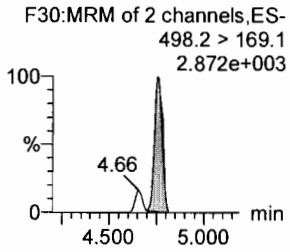
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

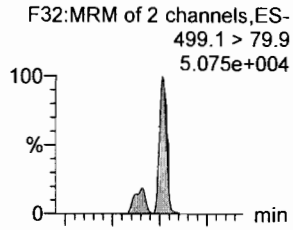
Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

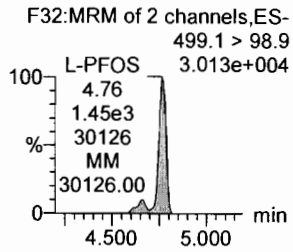
PFOSA



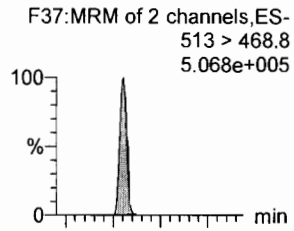


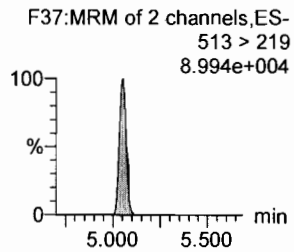
L-PFOS



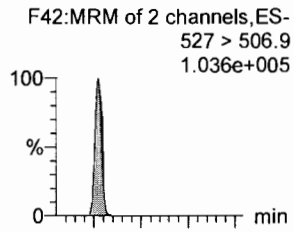


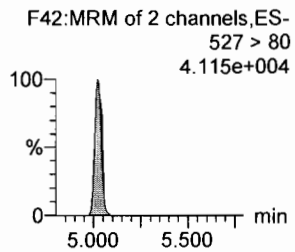
PFDA





8:2 FTS





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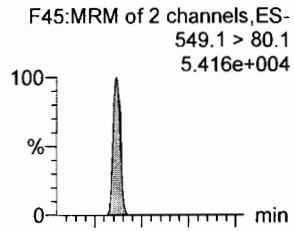

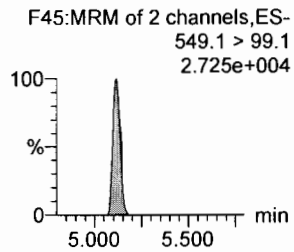

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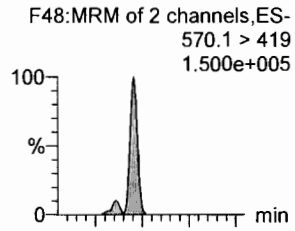
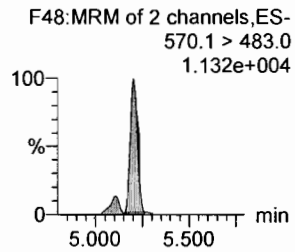
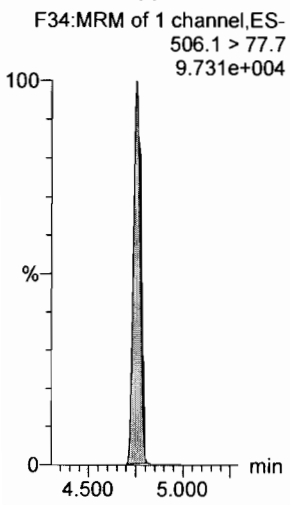
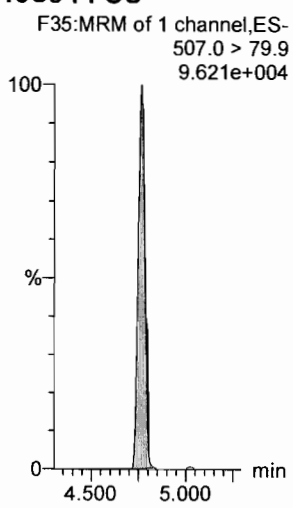




13C8-PFOSA



13C8-PFOS



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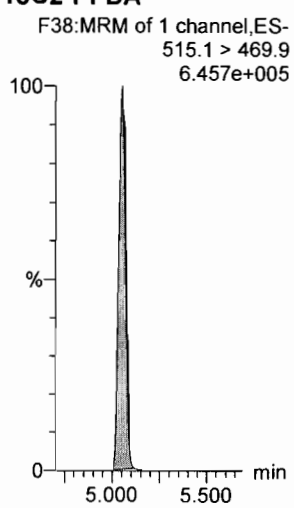
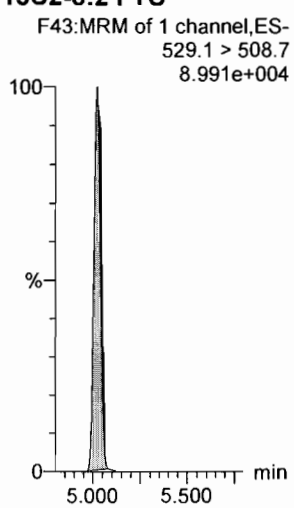


13C2-8:2 FTS



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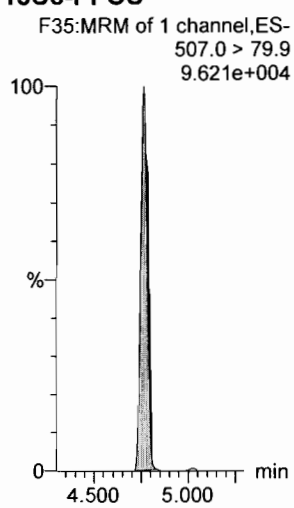

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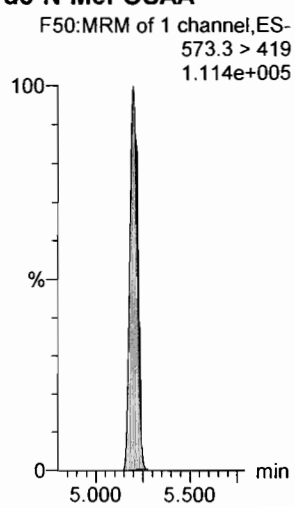
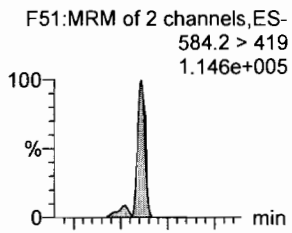


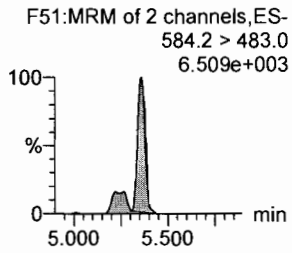
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

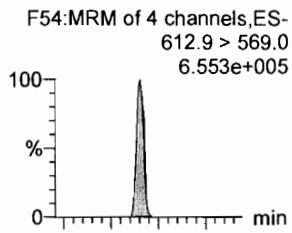
Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

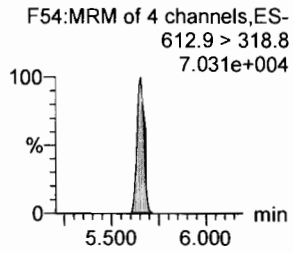
L-EtFOSAA



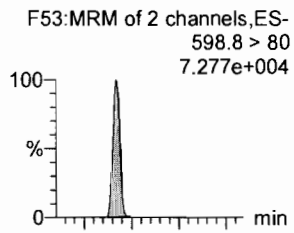


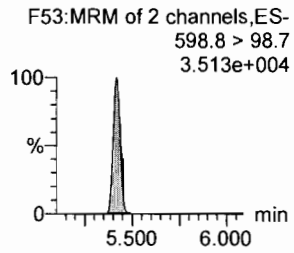
PFDoA



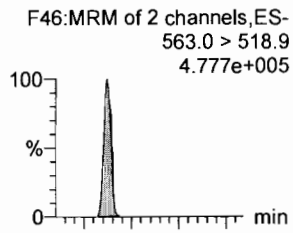


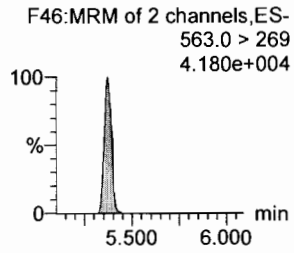
PFDS



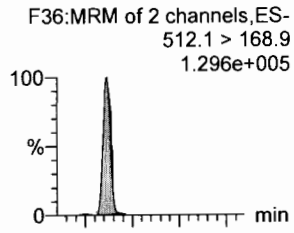


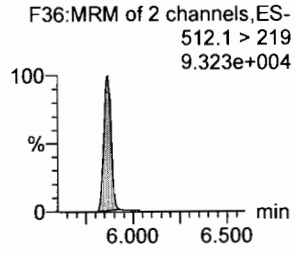
PFUdA



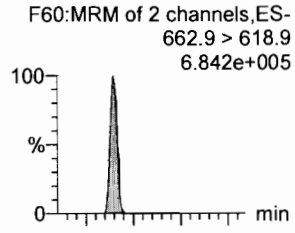


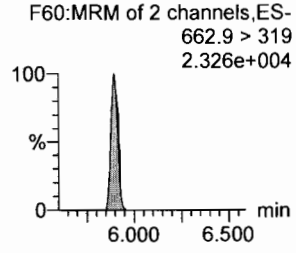
N-MeFOSA



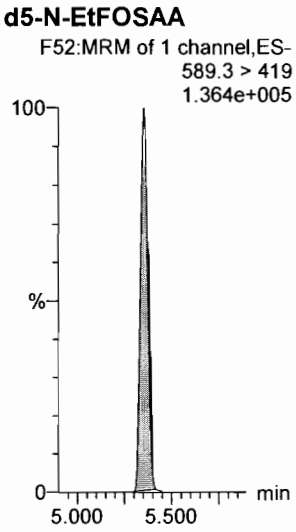


PFTrDA

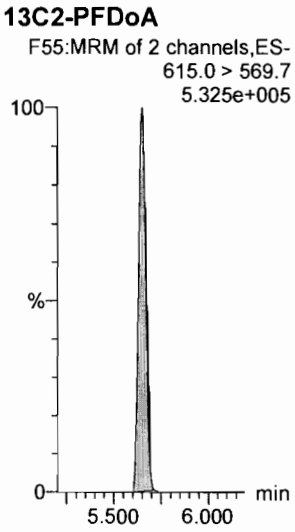




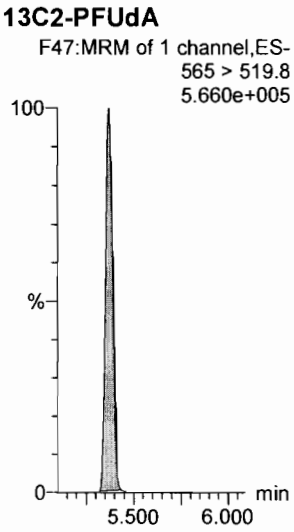
d5-N-EtFOSAA



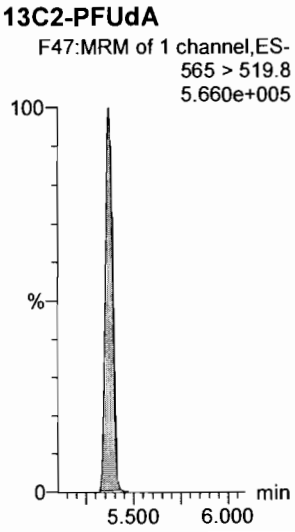
13C2-PFDoA



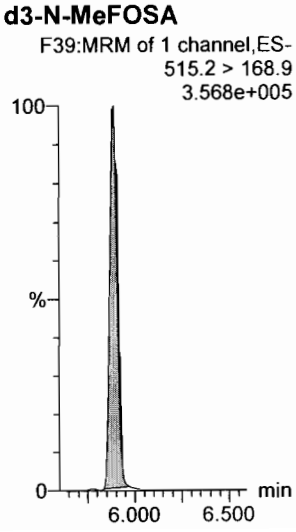
13C2-PFUdA



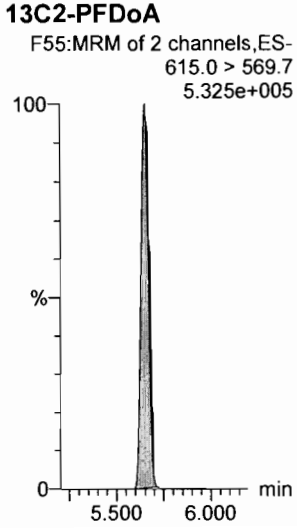
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
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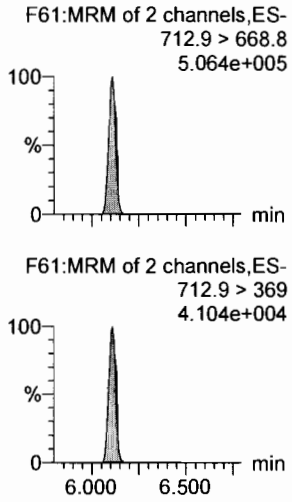
Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

PFTeDA



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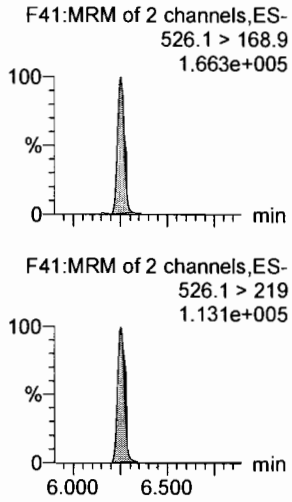
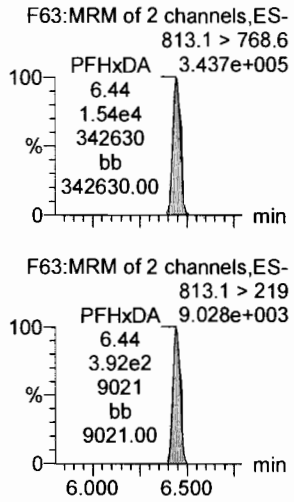
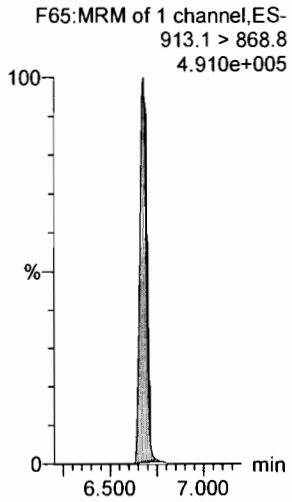


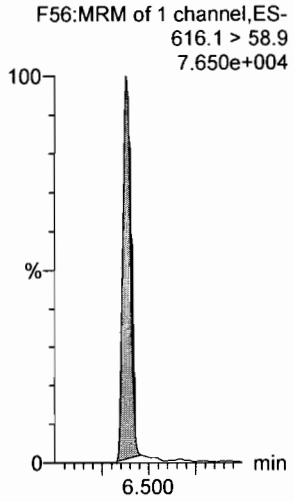
PFHxDA



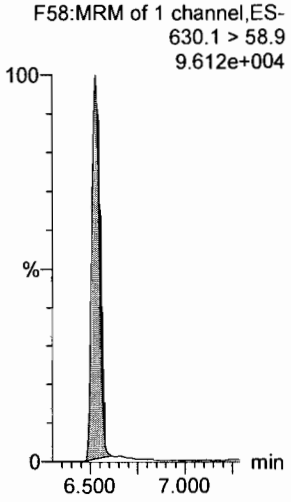
PFODA



N-MeFOSE



N-EtFOSE



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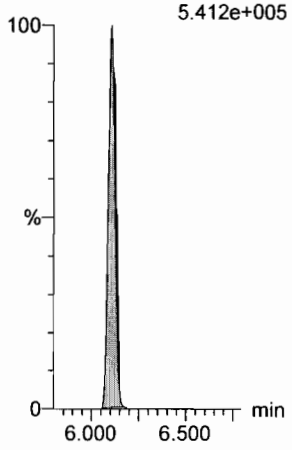
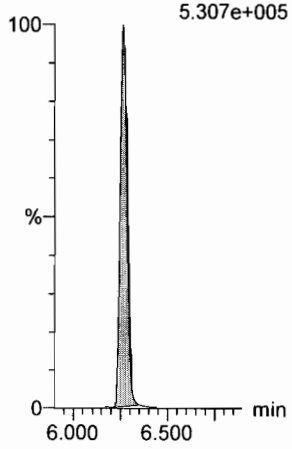


d5-N-ETFOSA



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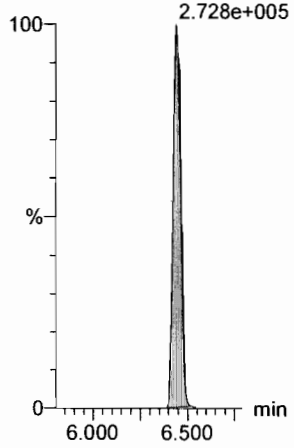
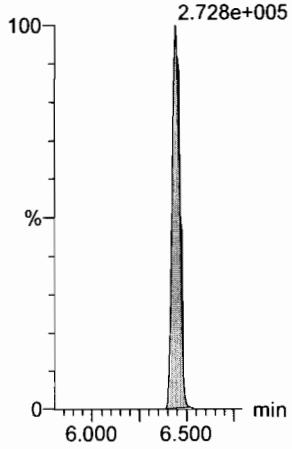
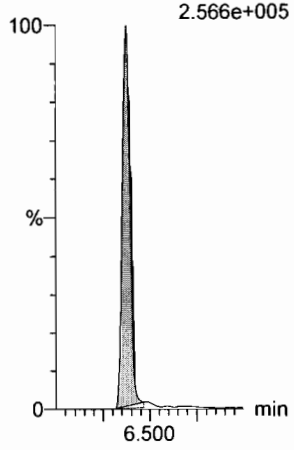


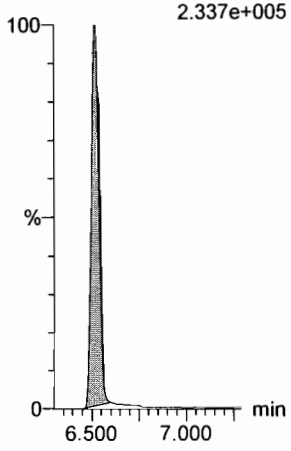
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

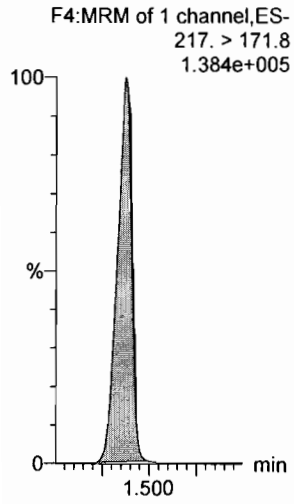


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

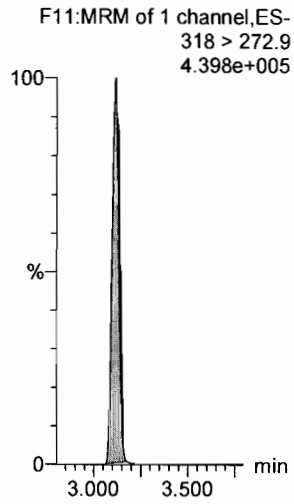
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_7, Date: 03-Jun-2018, Time: 19:00:12, ID: ST180603M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

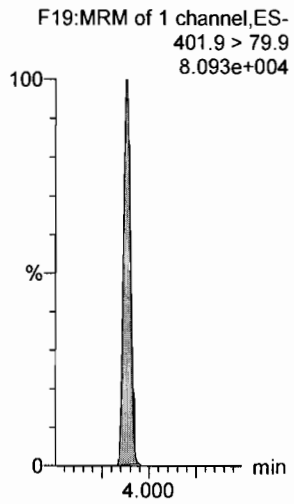
13C4-PFBA



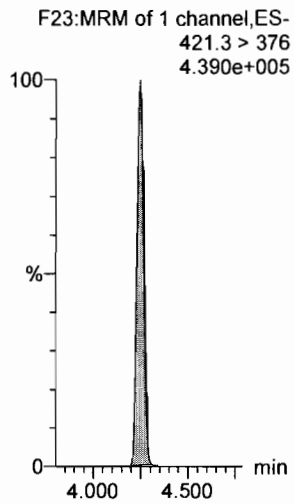
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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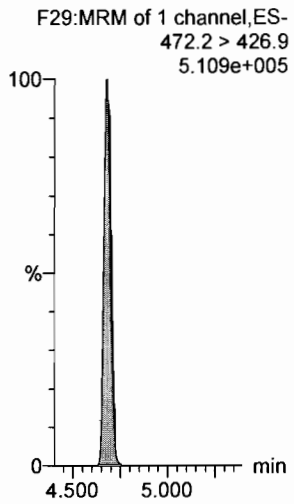
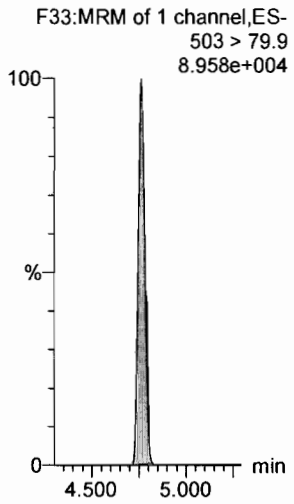


13C4-PFOS



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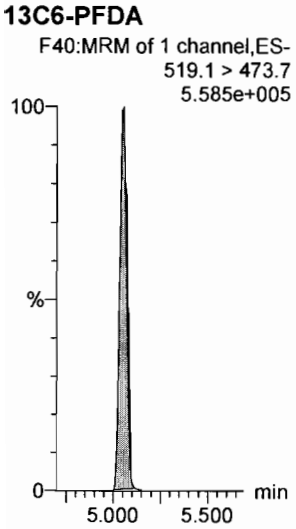
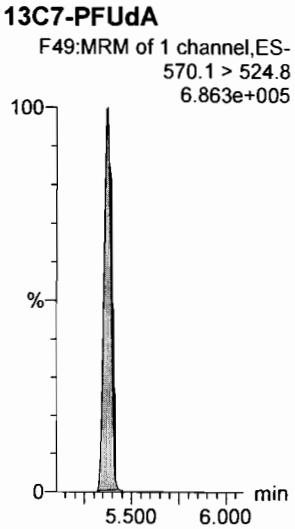


13C7-PFUdA

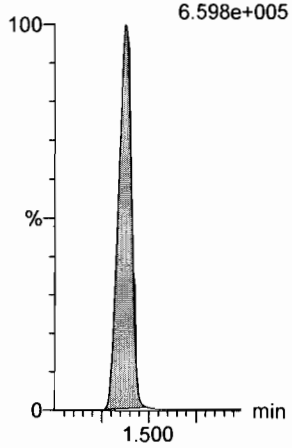


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

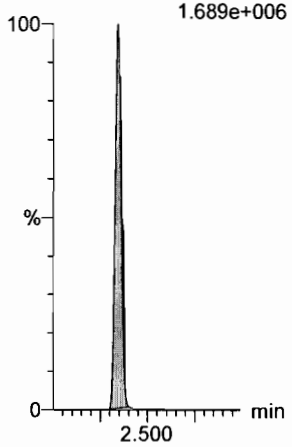
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

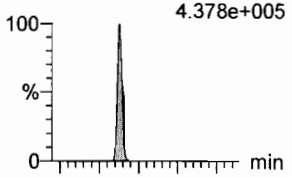
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
6.598e+005



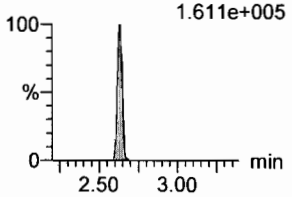
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
1.689e+006



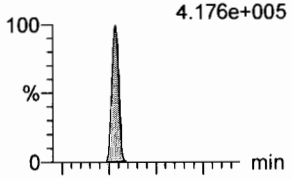
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
4.378e+005



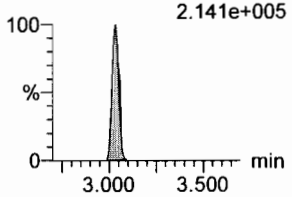
F7:MRM of 2 channels,ES-
299.0 > 99.0
1.611e+005



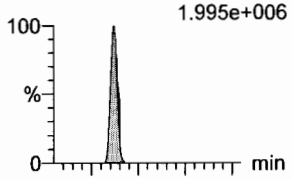
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
4.176e+005



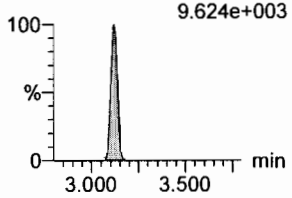
F12:MRM of 2 channels,ES-
327.2 > 81.1
2.141e+005



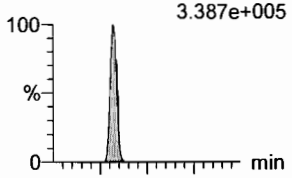
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
1.995e+006



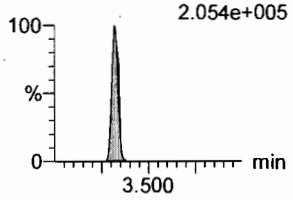
F9:MRM of 2 channels,ES-
313.2 > 119
9.624e+003



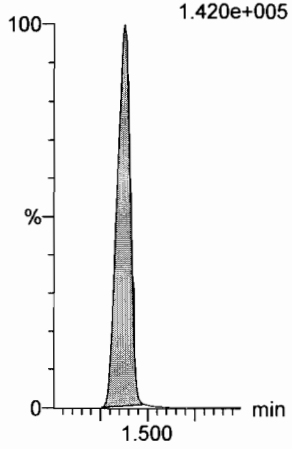
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
3.387e+005



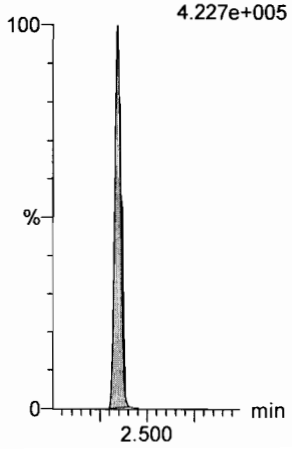
F15:MRM of 2 channels,ES-
349.1 > 99
2.054e+005



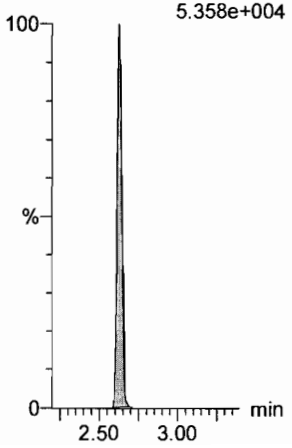
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.420e+005



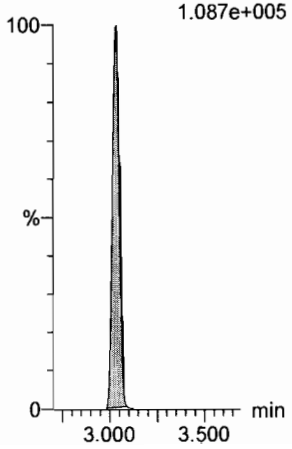
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
4.227e+005



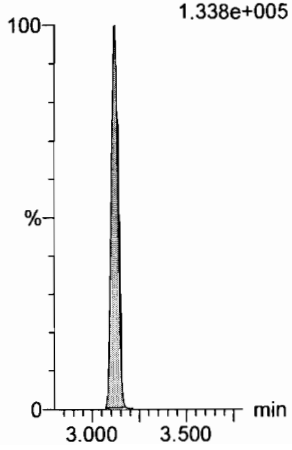
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.358e+004



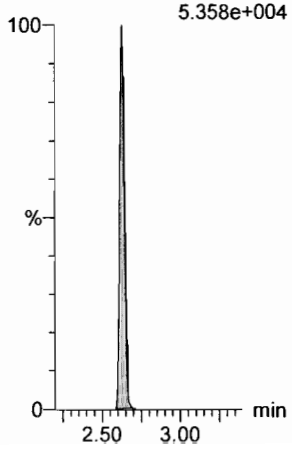
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.087e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.338e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
5.358e+004



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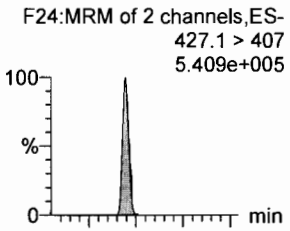
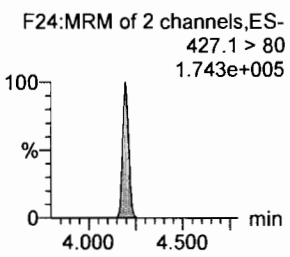
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

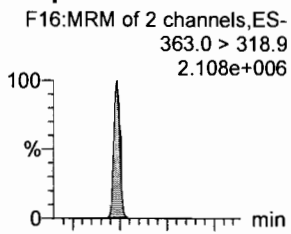
Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

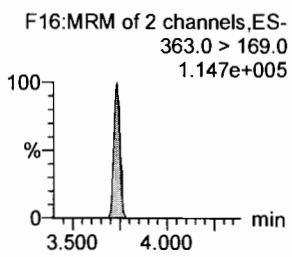
6:2 FTS



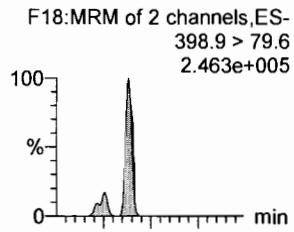


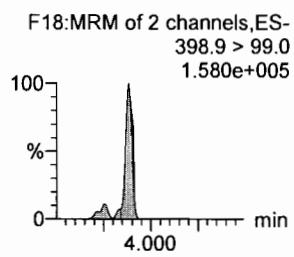
PFHpA





L-PFHxS





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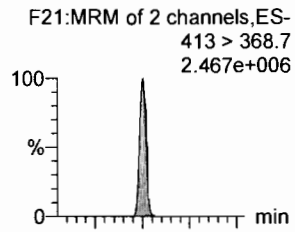

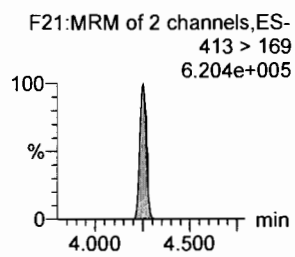

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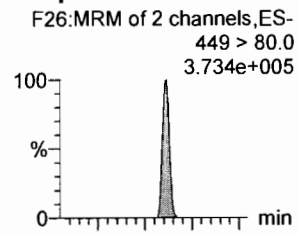

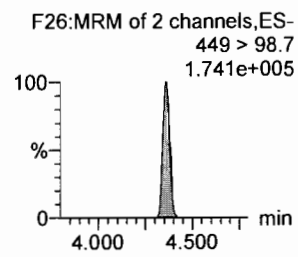

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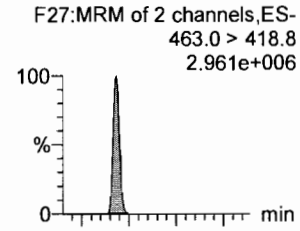
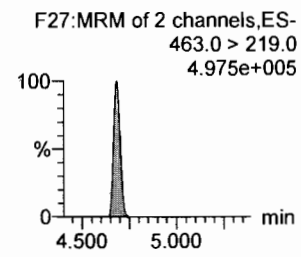
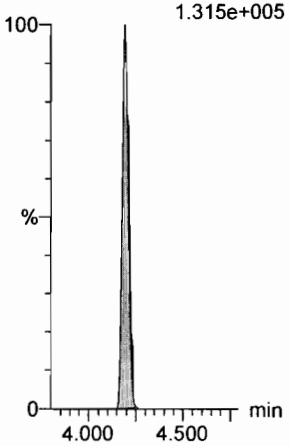
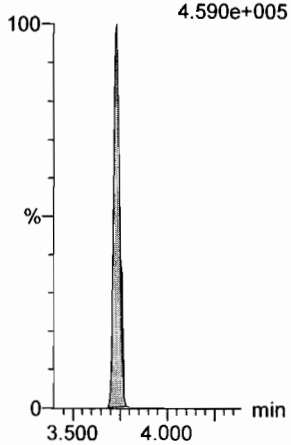




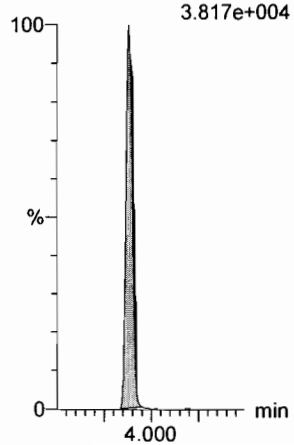
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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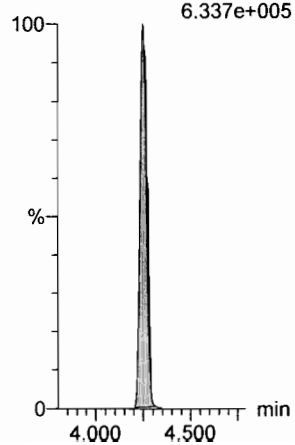

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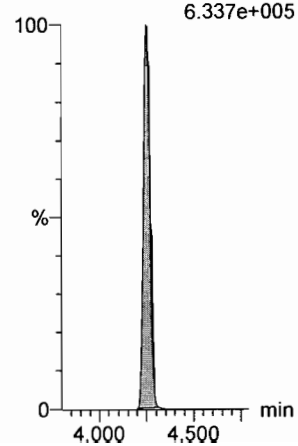

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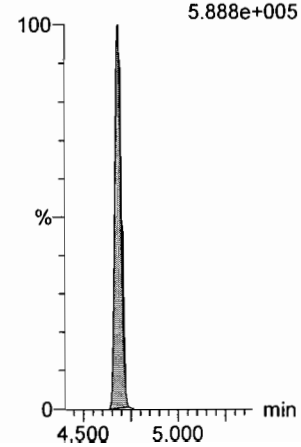

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Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
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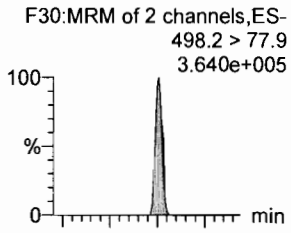
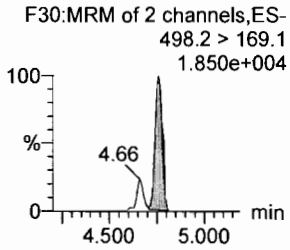
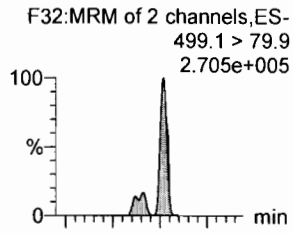
Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

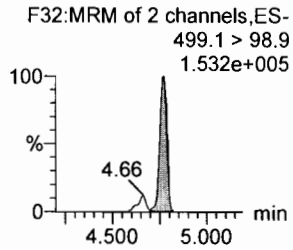
PFOSA





L-PFOS





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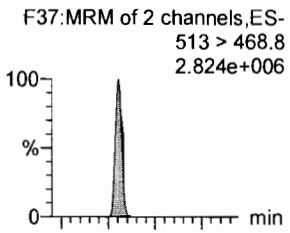
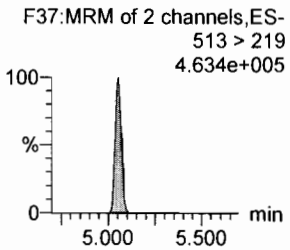
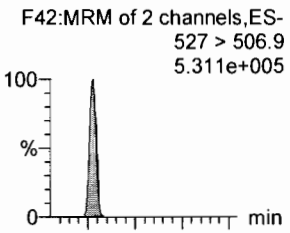
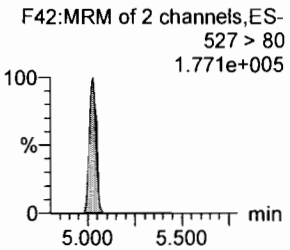




8:2 FTS





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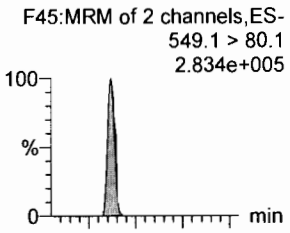

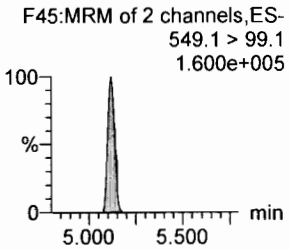

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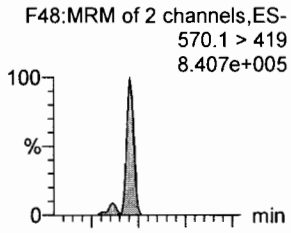
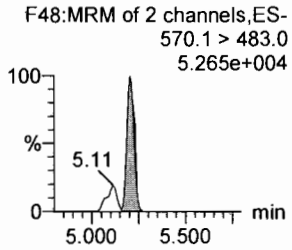
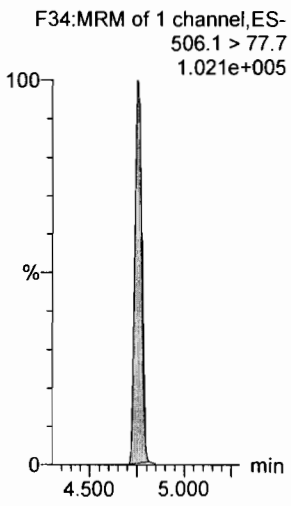
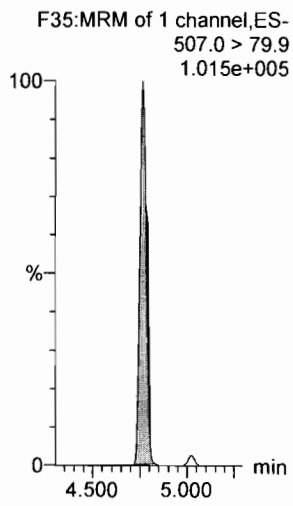




13C8-PFOSA



13C8-PFOS



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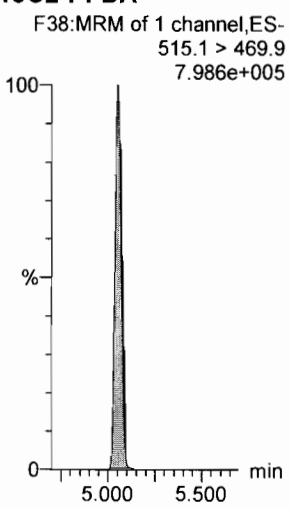
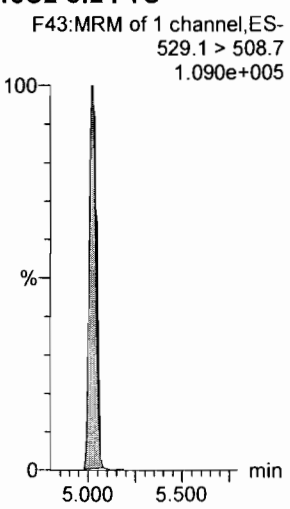


13C2-8:2 FTS



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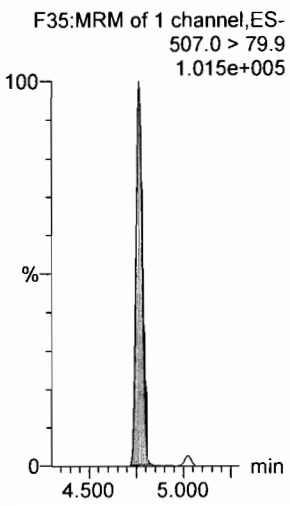
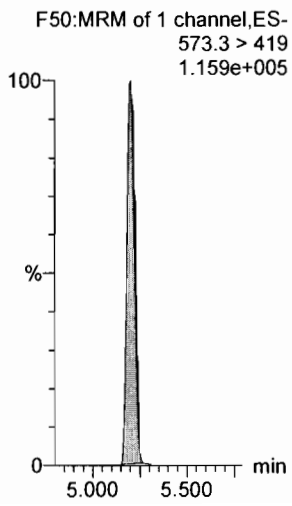


d3-N-MeFOSAA



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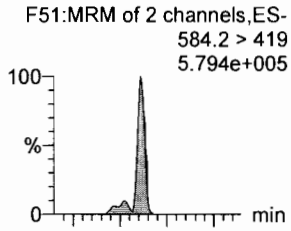
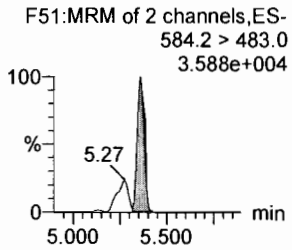
Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

L-EtFOSAA





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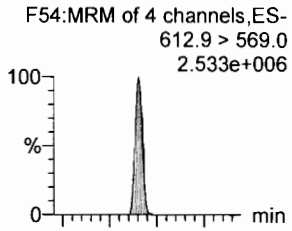
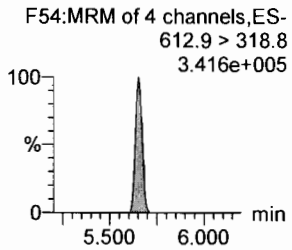
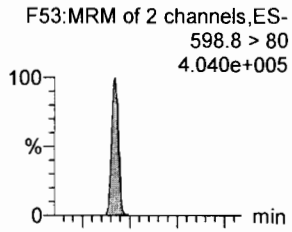
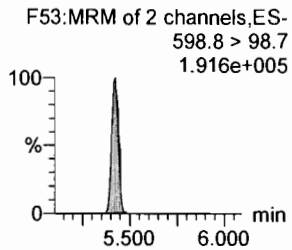




PFDS





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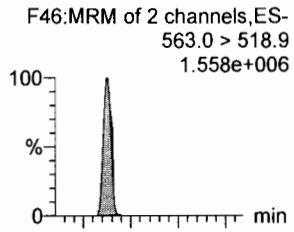
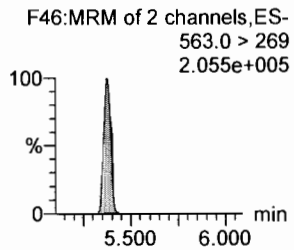
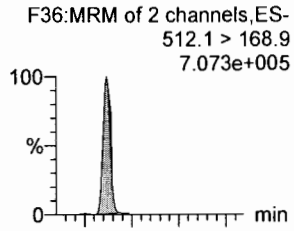
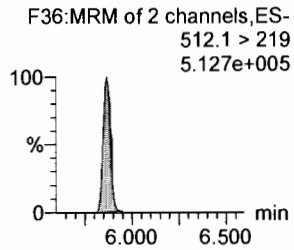




N-MeFOSA





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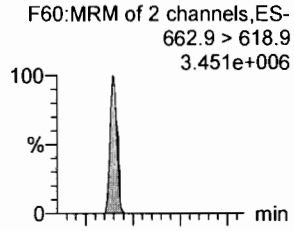

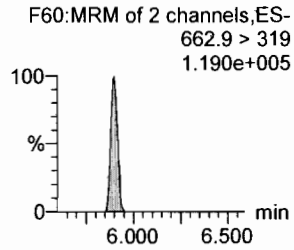

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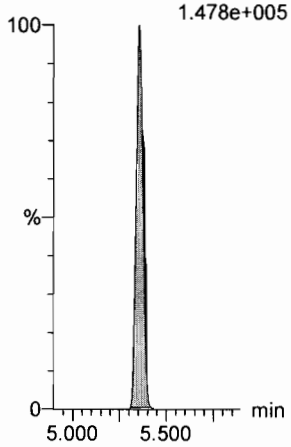
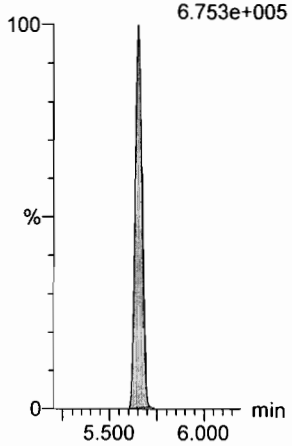
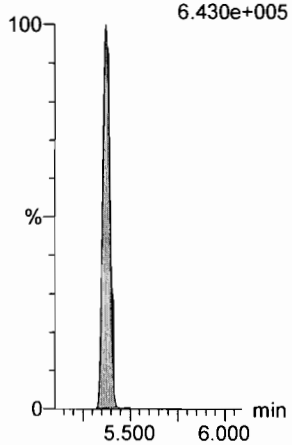


13C2-PFDoA



13C2-PFUdA



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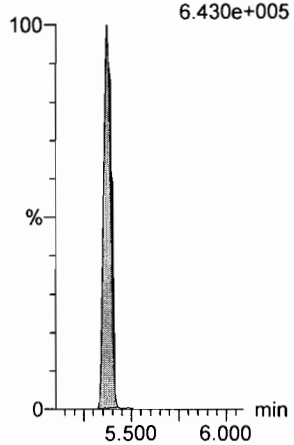
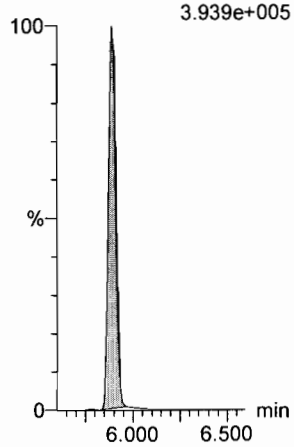
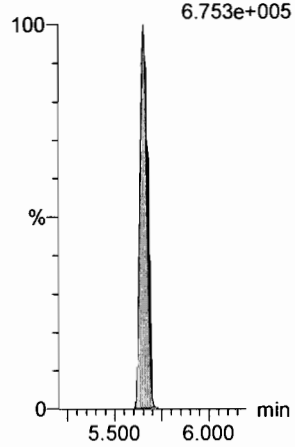


d3-N-MeFOSA



13C2-PFDoA



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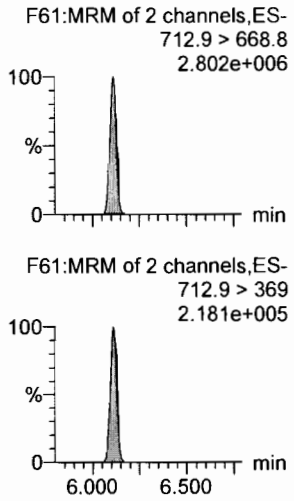
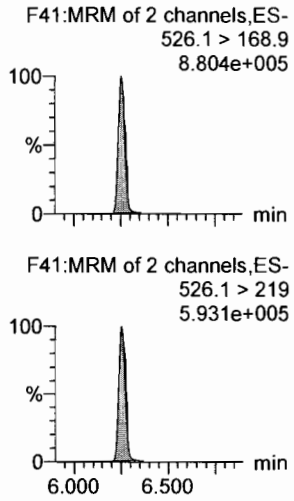
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

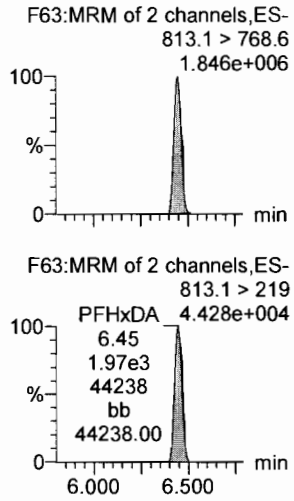
PFTeDA



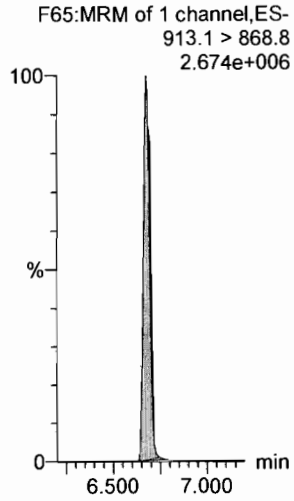
N-EtFOSA



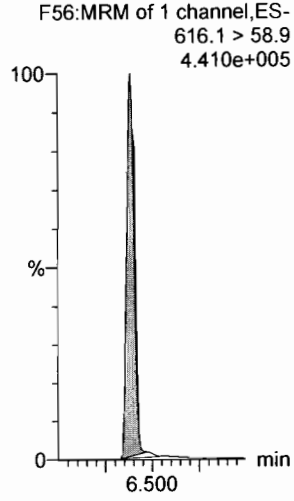
PFHxDA



PFODA



N-MeFOSE



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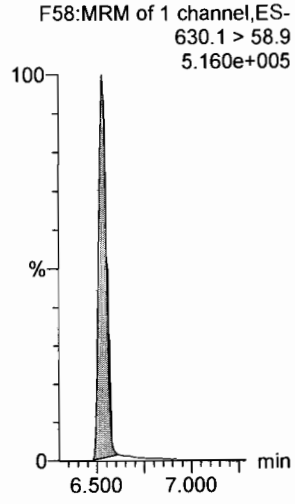

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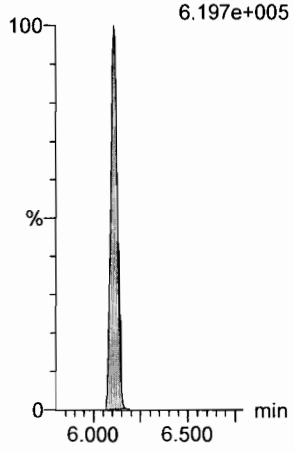
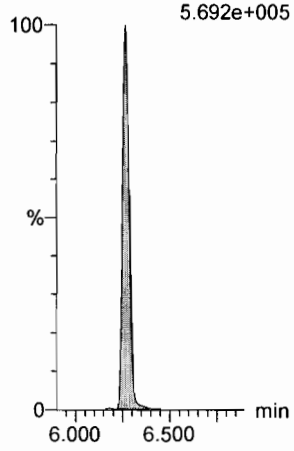


d5-N-ETFOSA



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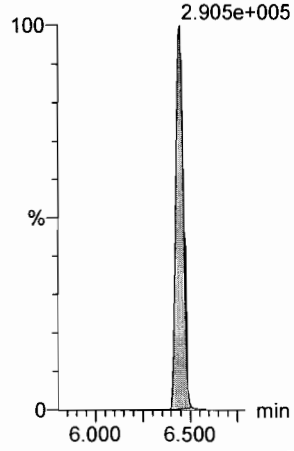
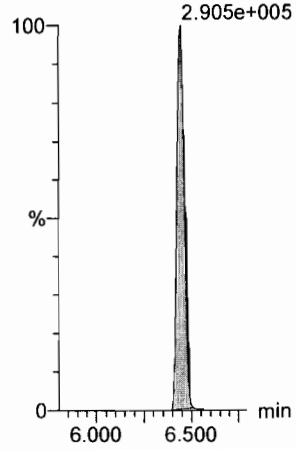
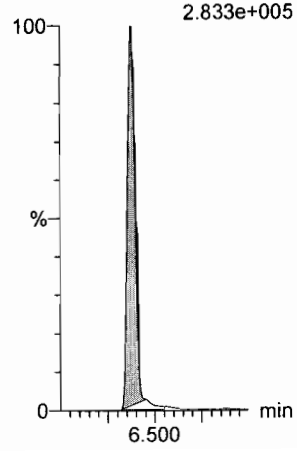


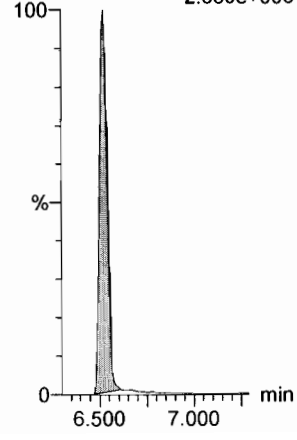
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



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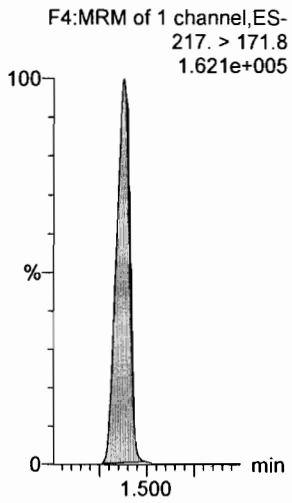
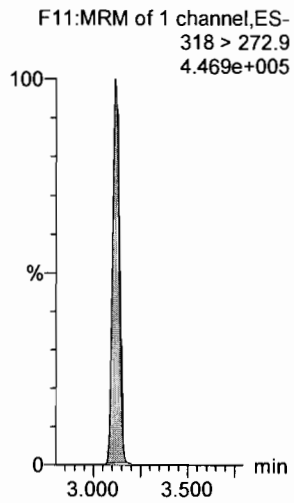
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_8, Date: 03-Jun-2018, Time: 19:10:37, ID: ST180603M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

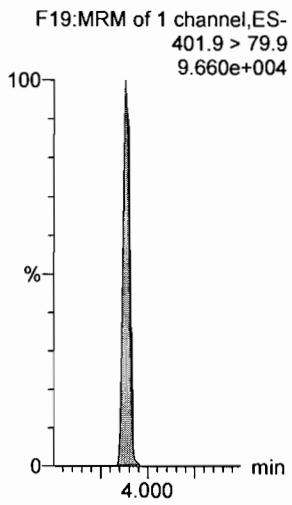
13C4-PFBA



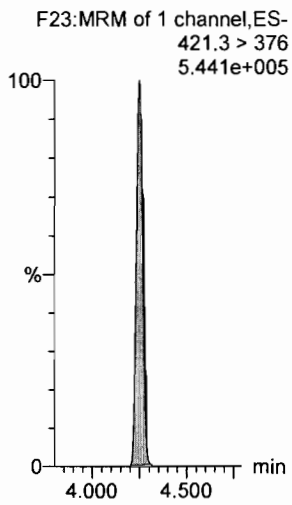
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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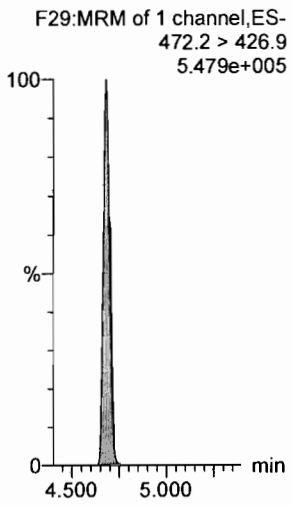
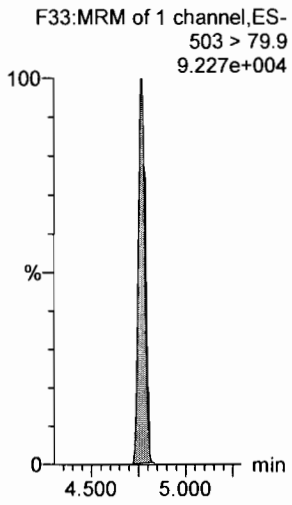
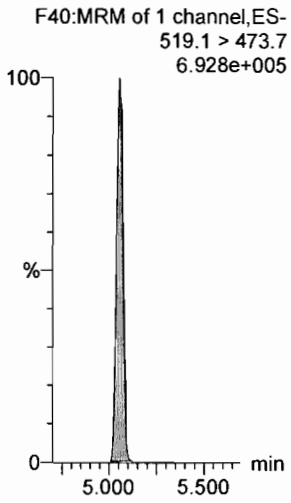


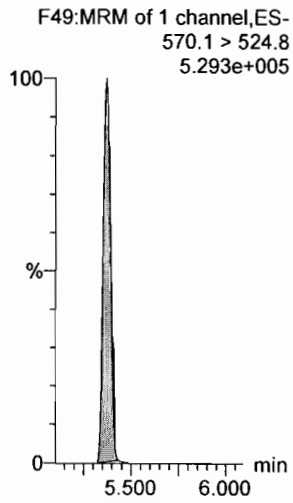
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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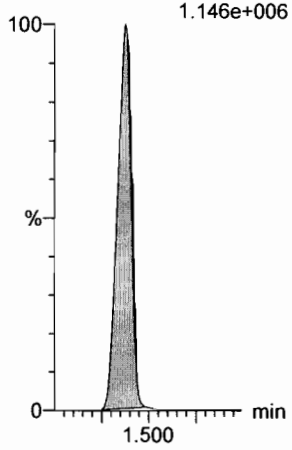
Name: 180603M2_9, Date: 03-Jun-2018, Time: 19:21:07, ID: ST180603M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

PFBA



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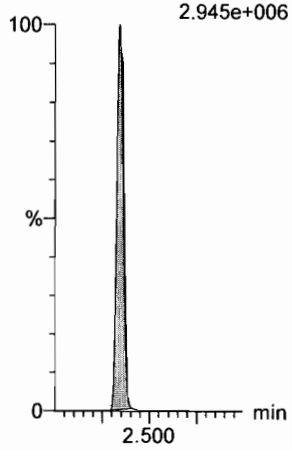
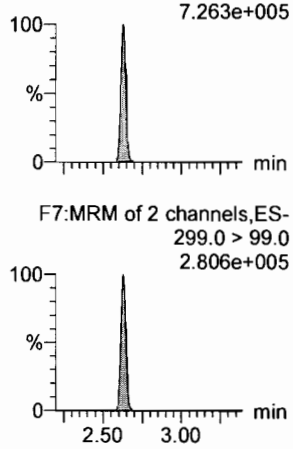
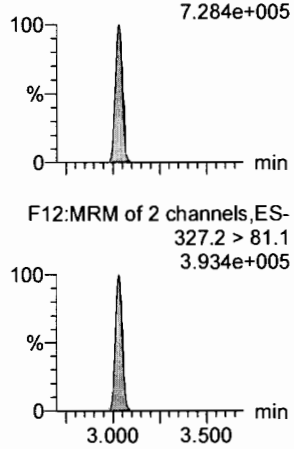


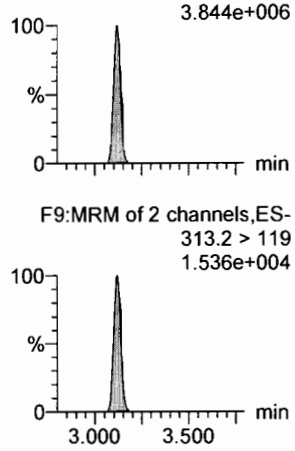
PFBS



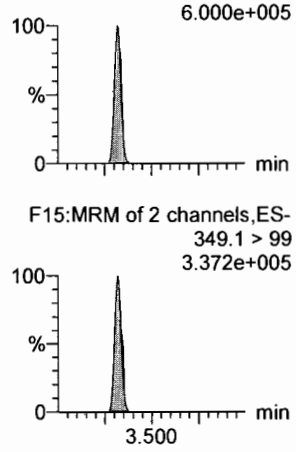
4:2 FTS



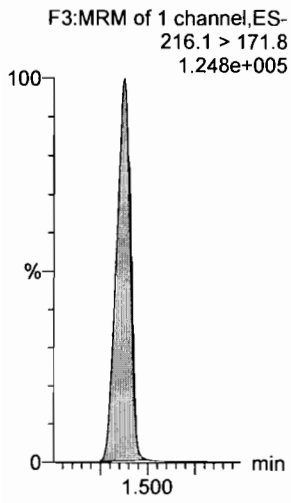
PFHxA



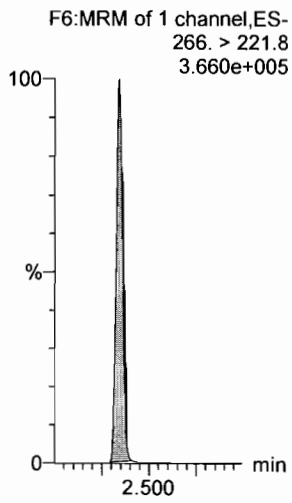
PFPeS



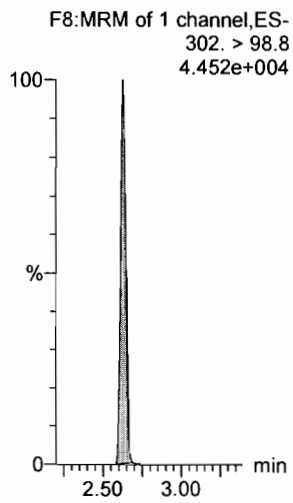
13C3-PFBA



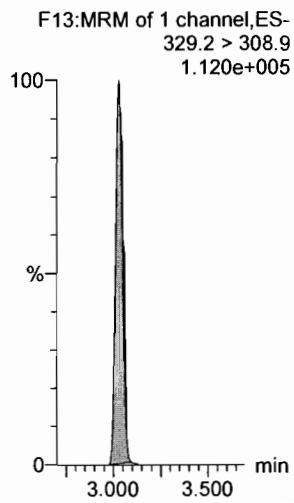
13C3-PFPeA



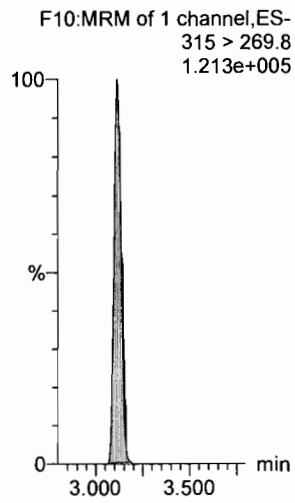
13C3-PFBS



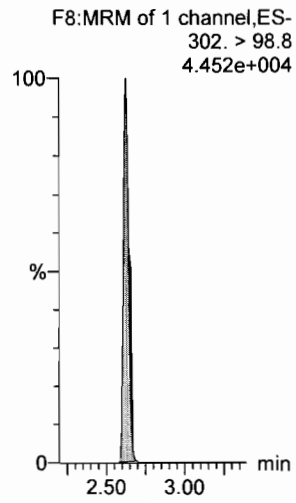
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

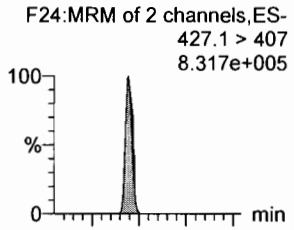


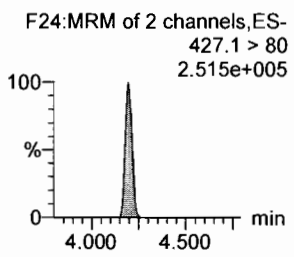
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

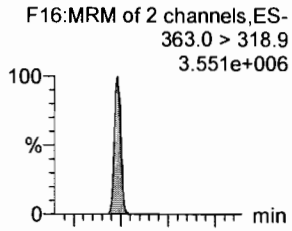
Name: 180603M2_9, Date: 03-Jun-2018, Time: 19:21:07, ID: ST180603M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

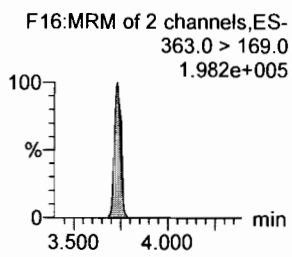
6:2 FTS



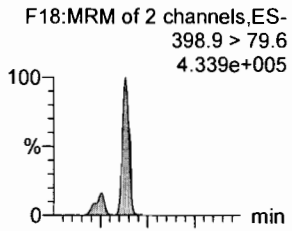


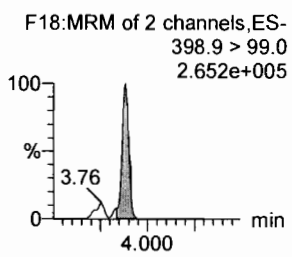
PFHpA



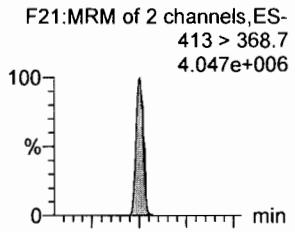


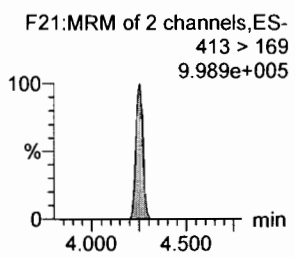
L-PFHxS





L-PFOA





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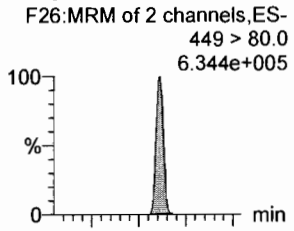

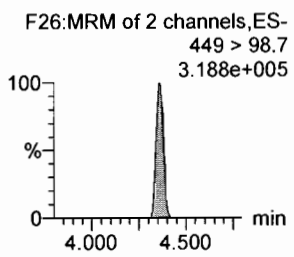

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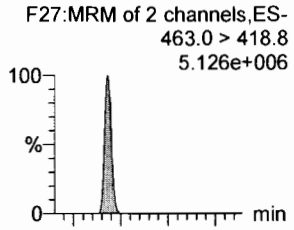
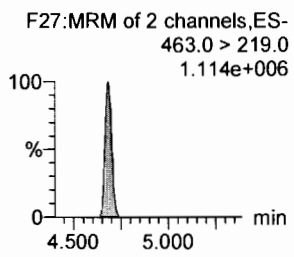
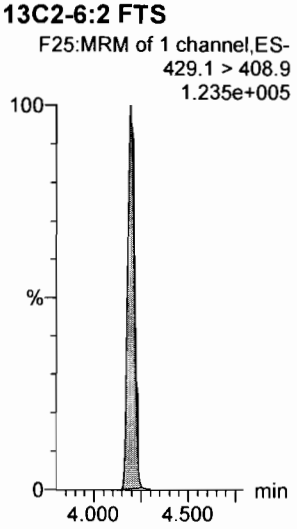
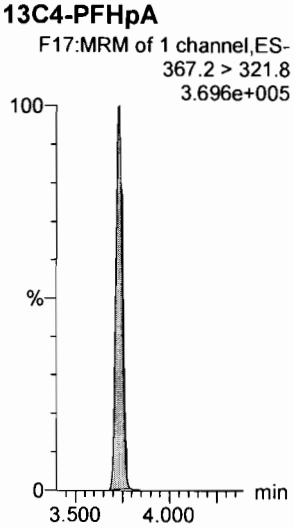




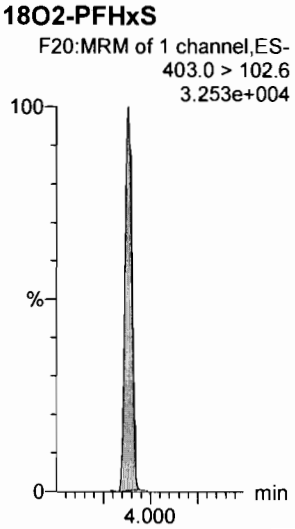
13C2-6:2 FTS



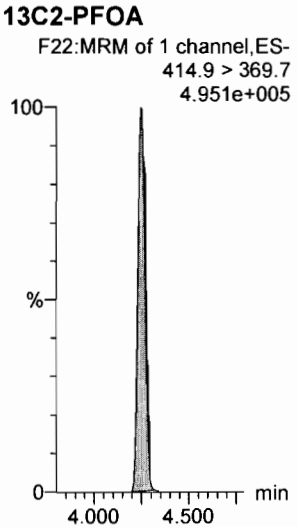
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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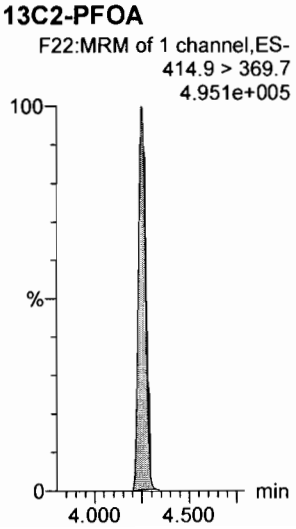

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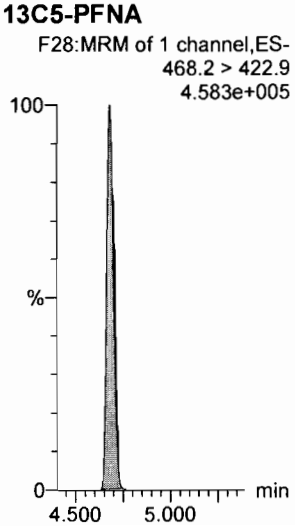

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Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_9, Date: 03-Jun-2018, Time: 19:21:07, ID: ST180603M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

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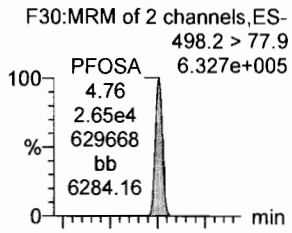

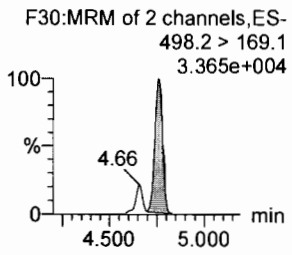

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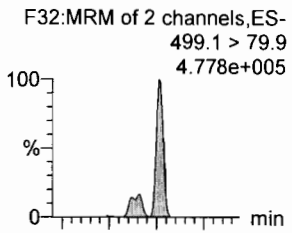

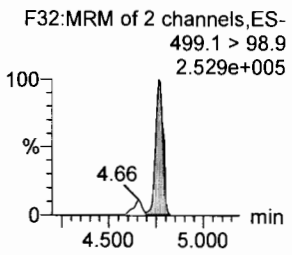

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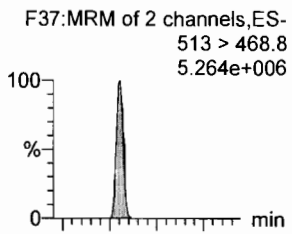
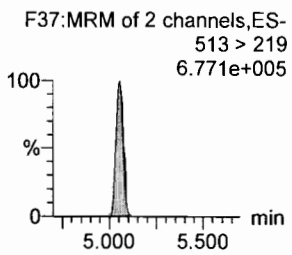
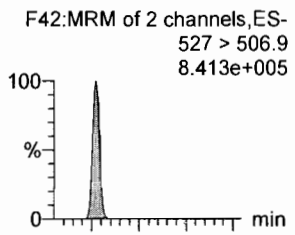
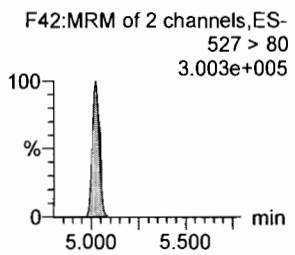




8:2 FTS





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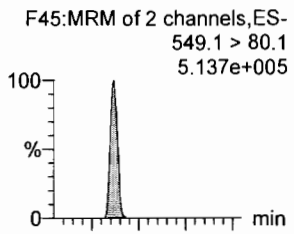

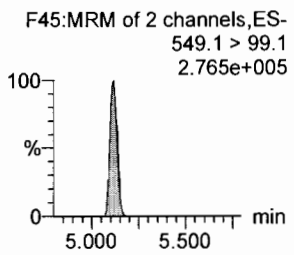

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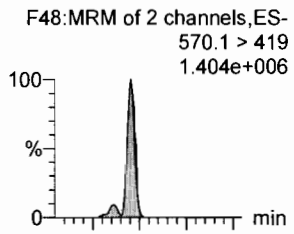

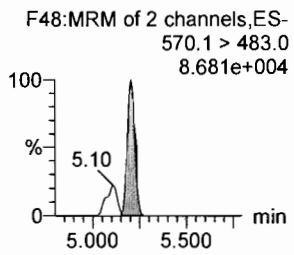

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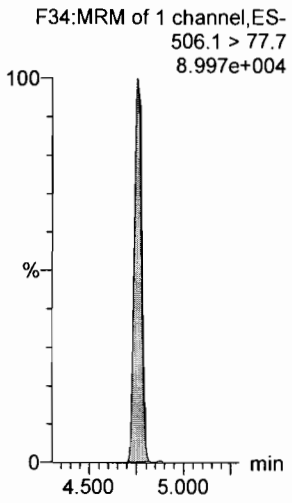
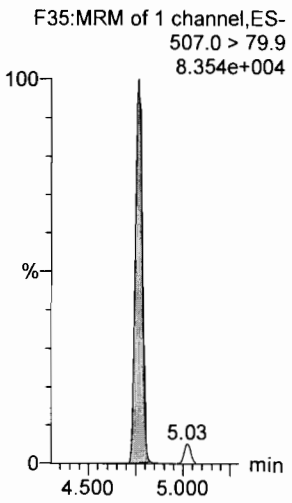


13C8-PFOS



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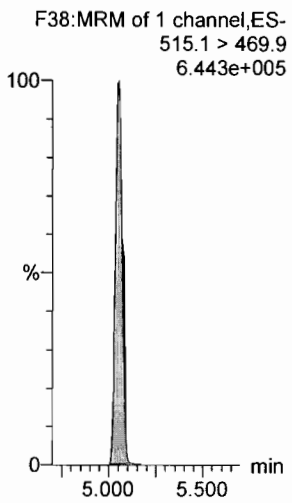

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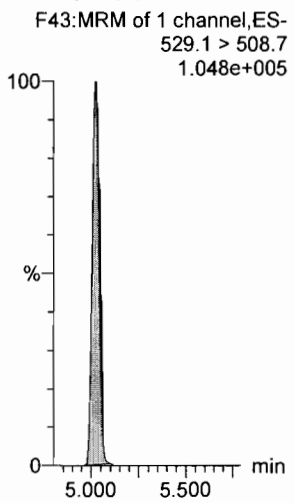

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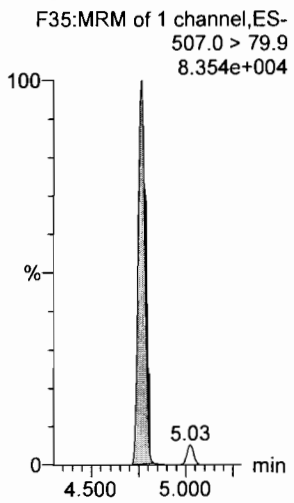
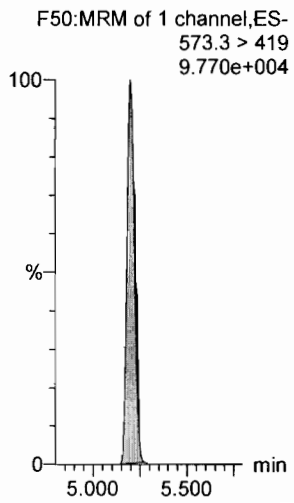


d3-N-MeFOSAA



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Name: 180603M2_9, Date: 03-Jun-2018, Time: 19:21:07, ID: ST180603M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

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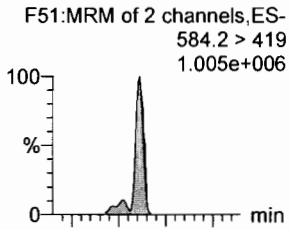
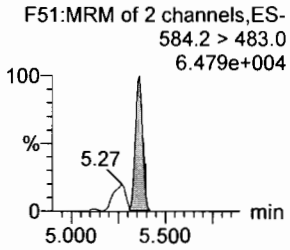
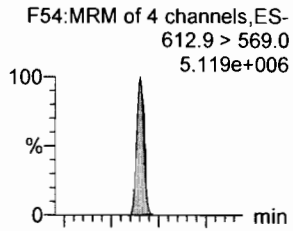
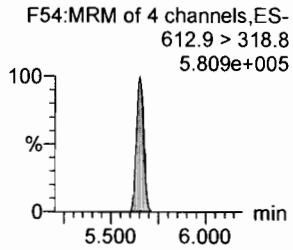




PFDoA





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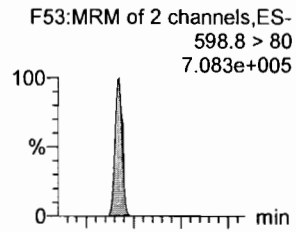

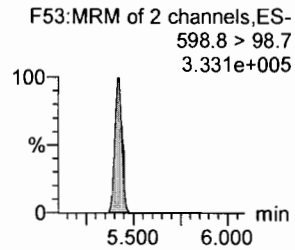

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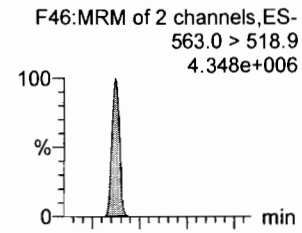

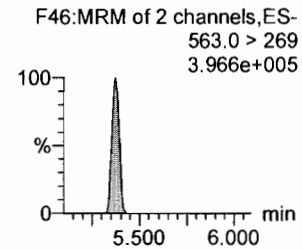

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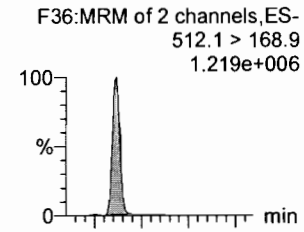

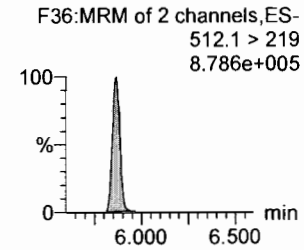

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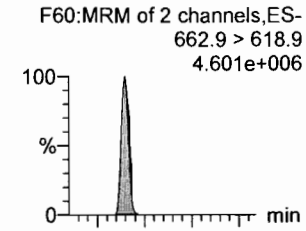
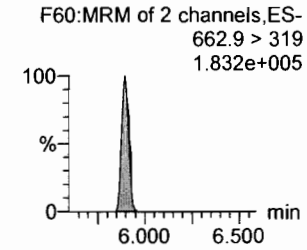
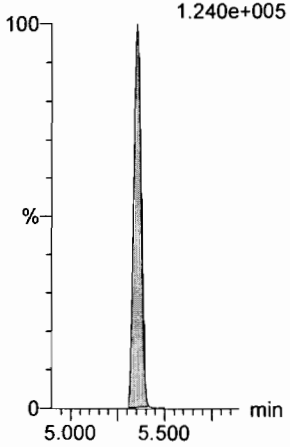
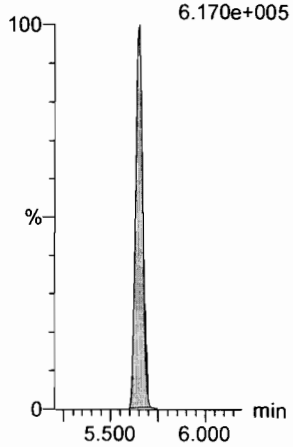




d5-N-EtFOSAA



13C2-PFDoA



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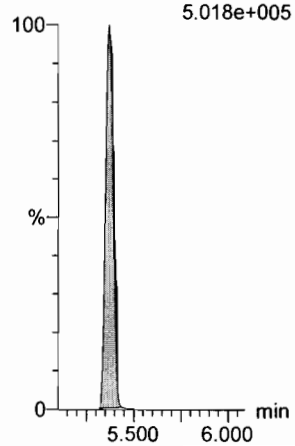

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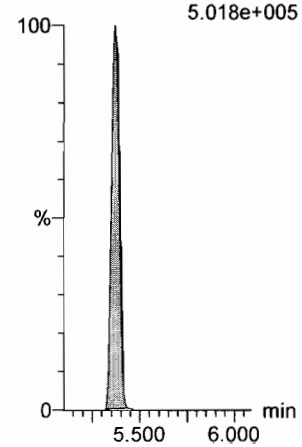

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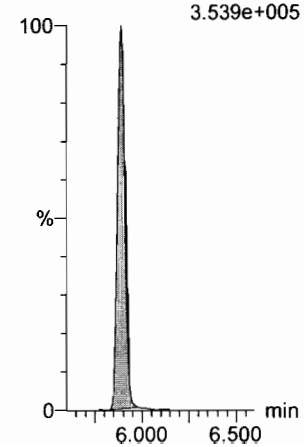

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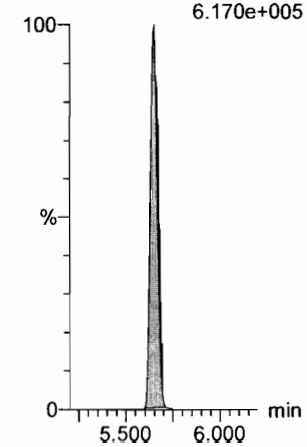

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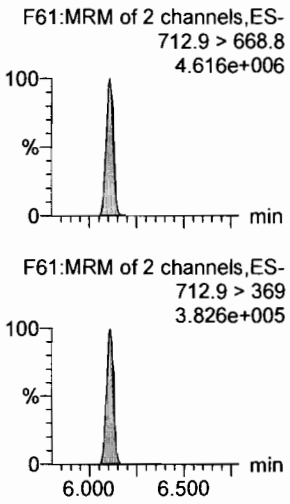
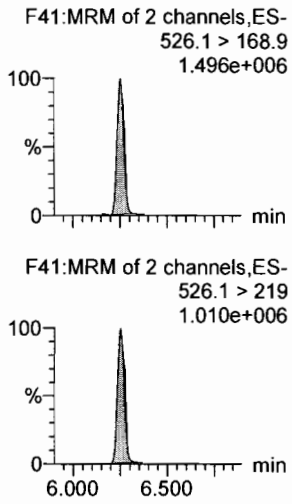


N-EtFOSA



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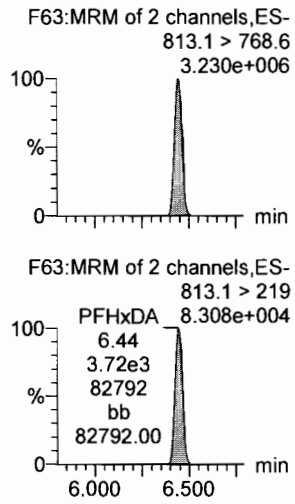
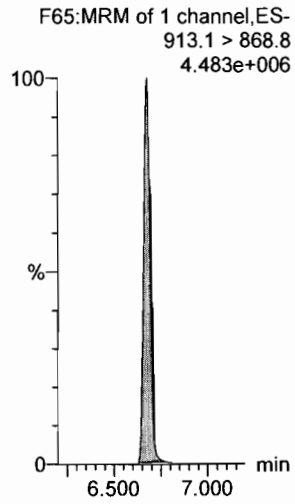


PFODA



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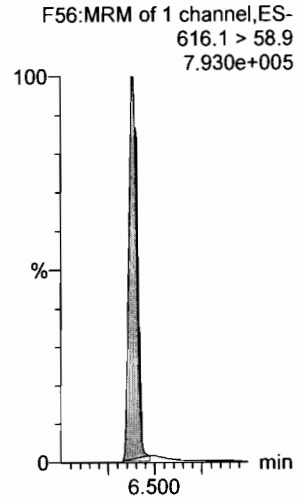

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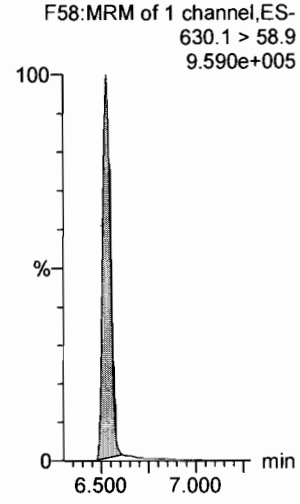

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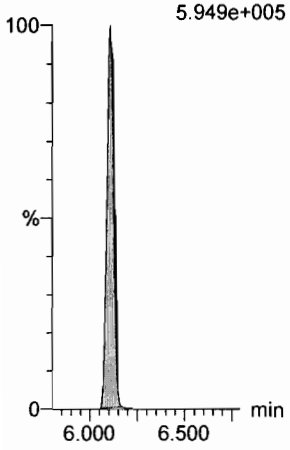
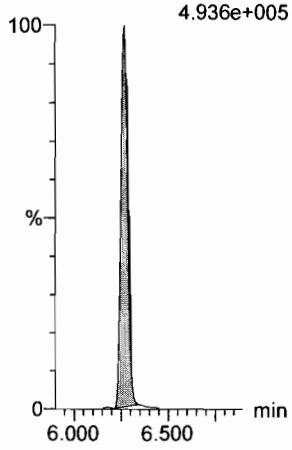


d5-N-ETFOSA



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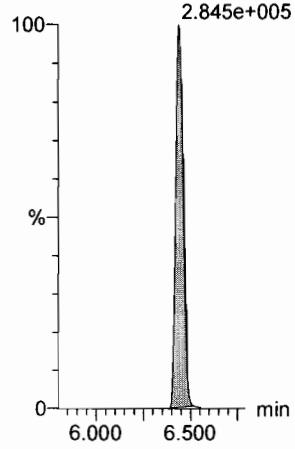

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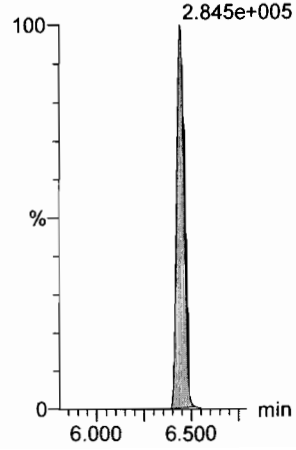
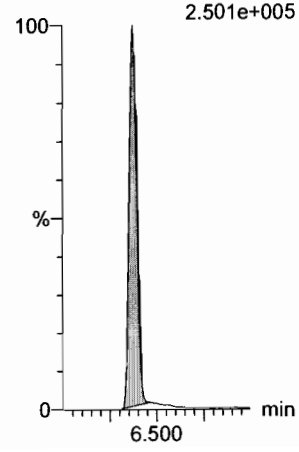


d7-N-MeFOSE



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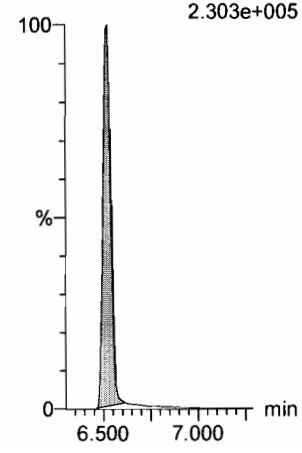

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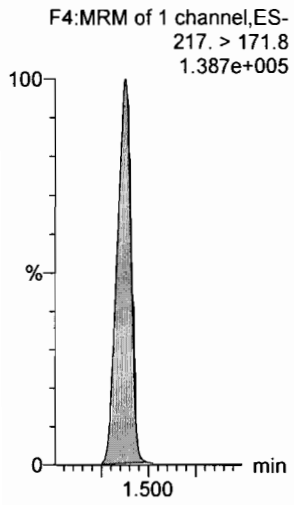
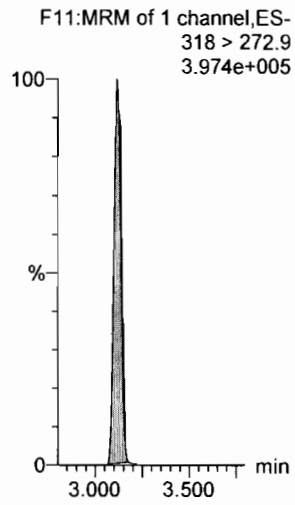
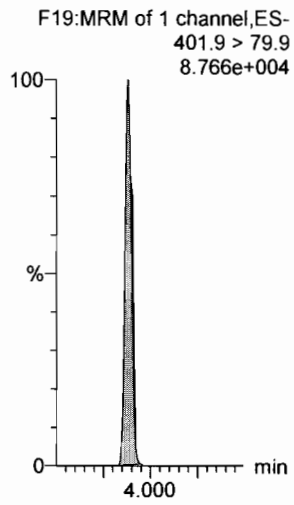
13C4-PFBA



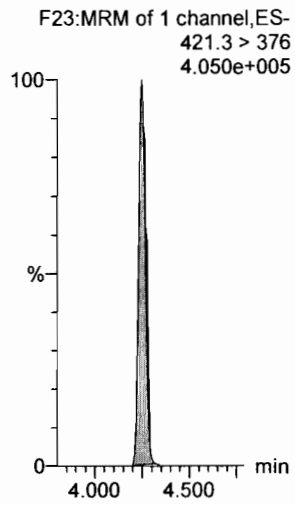
13C5-PFHxA



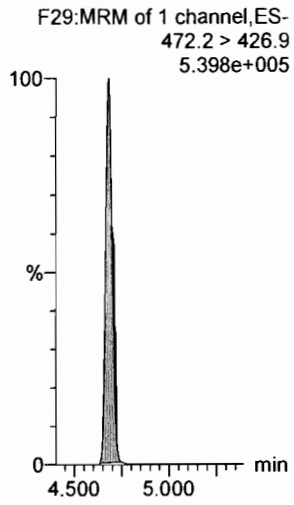
13C3-PFHxS



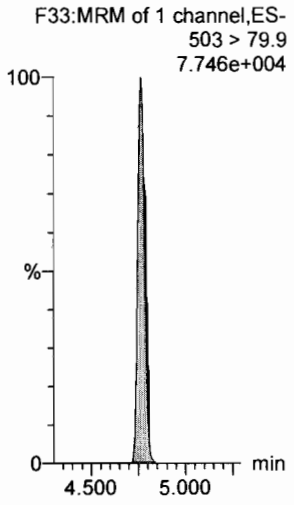
13C8-PFOA



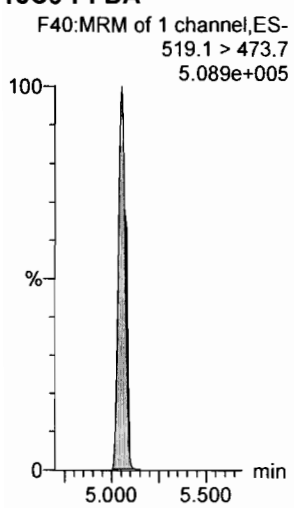
13C9-PFNA



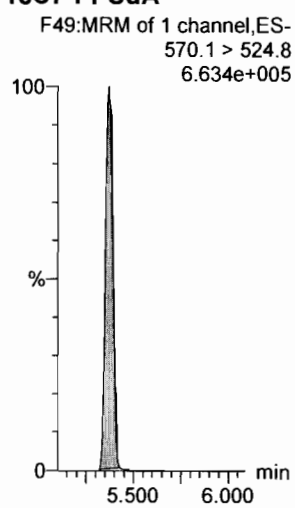
13C4-PFOS



13C6-PFDA



13C7-PFUdA

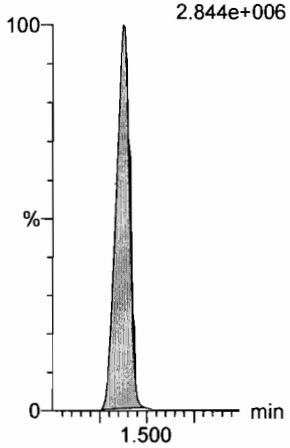


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

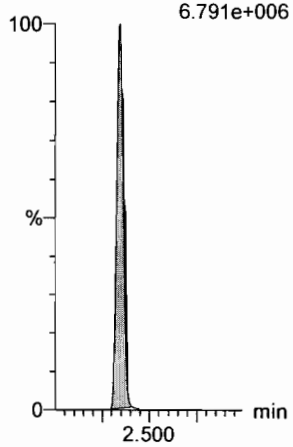
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

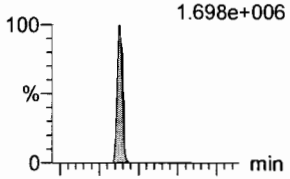
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
2.844e+006



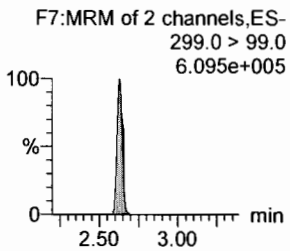
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
6.791e+006



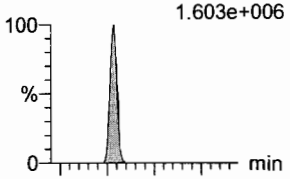
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
1.698e+006



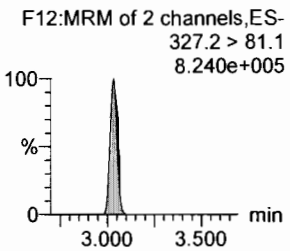
F7:MRM of 2 channels,ES-
299.0 > 99.0
6.095e+005



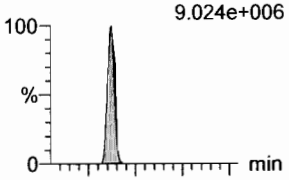
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
1.603e+006



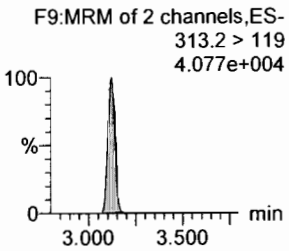
F12:MRM of 2 channels,ES-
327.2 > 81.1
8.240e+005



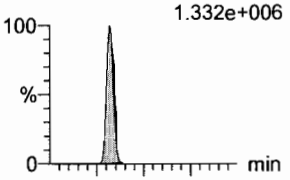
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
9.024e+006



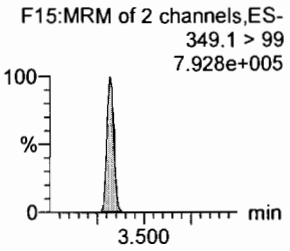
F9:MRM of 2 channels,ES-
313.2 > 119
4.077e+004



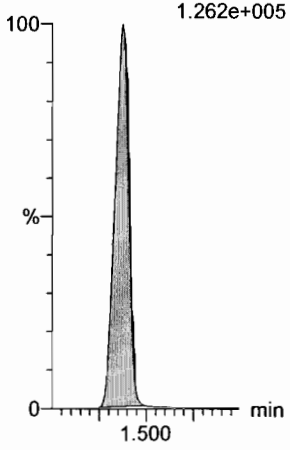
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
1.332e+006



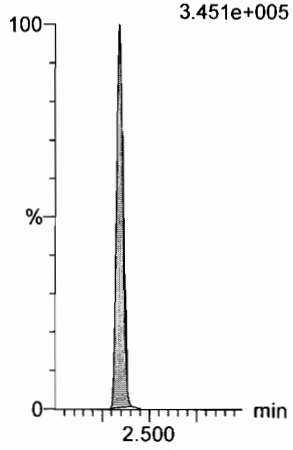
F15:MRM of 2 channels,ES-
349.1 > 99
7.928e+005



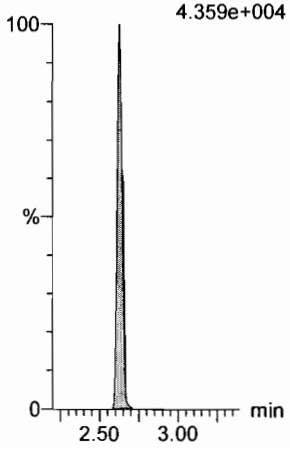
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.262e+005



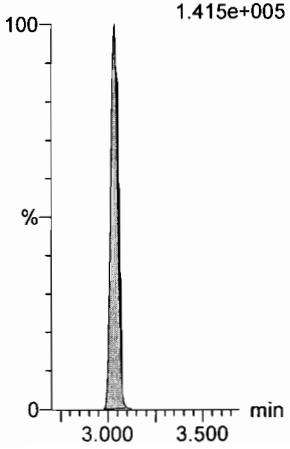
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.451e+005



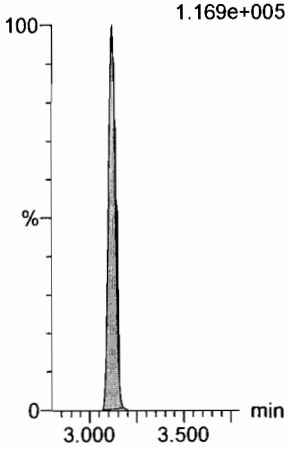
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.359e+004



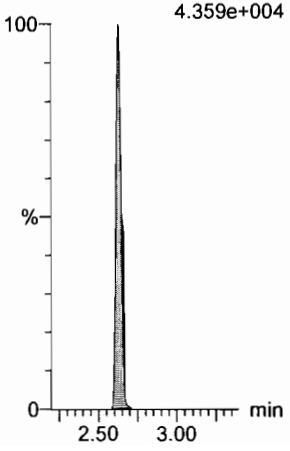
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.415e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.169e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.359e+004

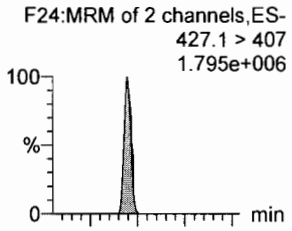


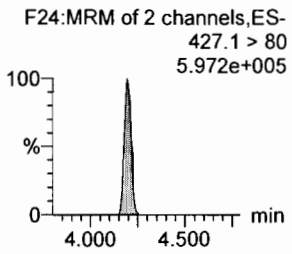
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

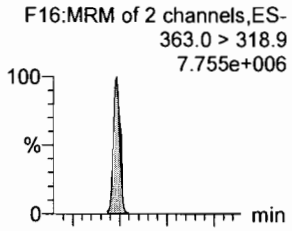
Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

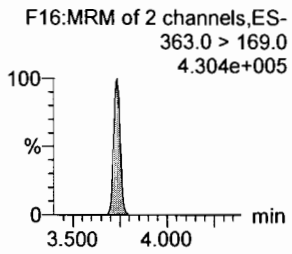
6:2 FTS



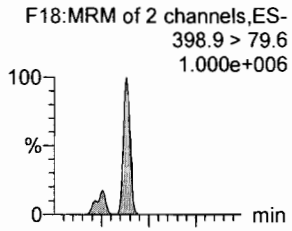


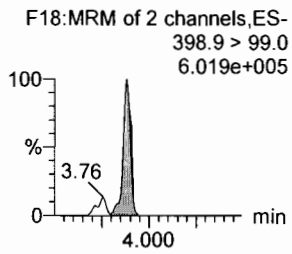
PFHpA



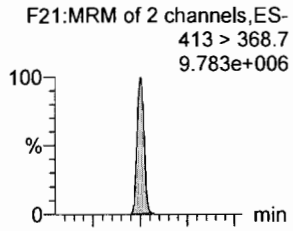


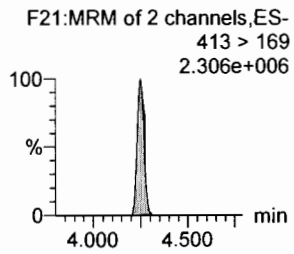
L-PFHxS



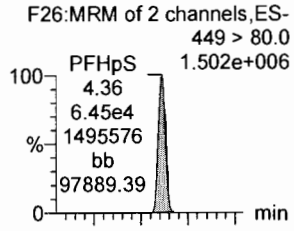


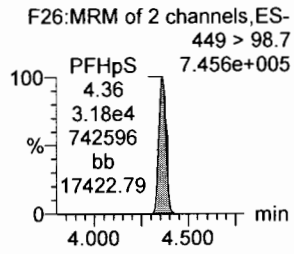
L-PFOA



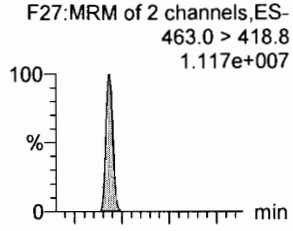


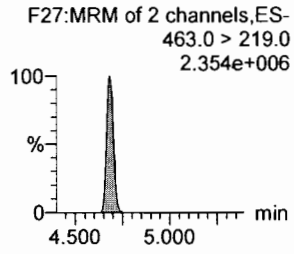
PFHpS



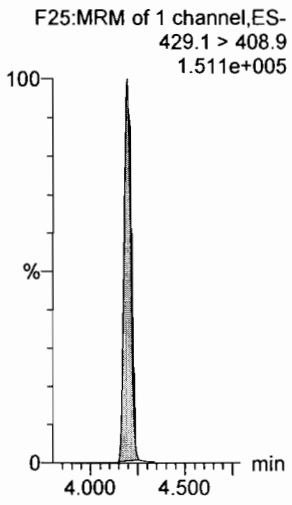


PFNA

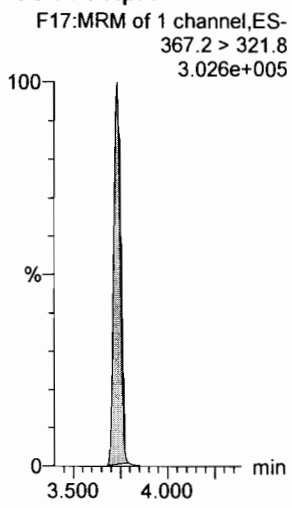




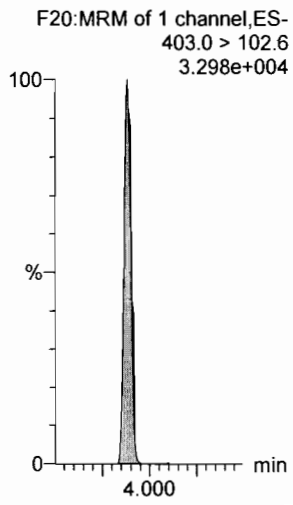
13C2-6:2 FTS



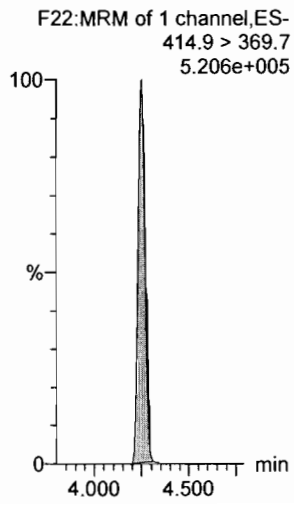
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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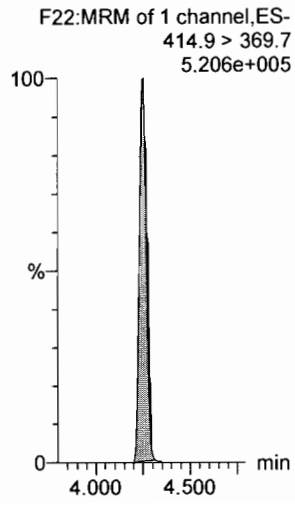
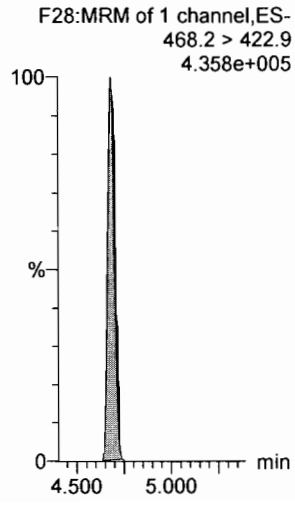


13C5-PFNA

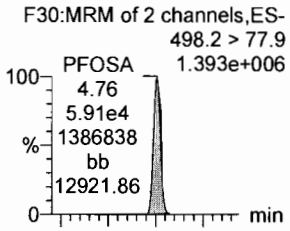


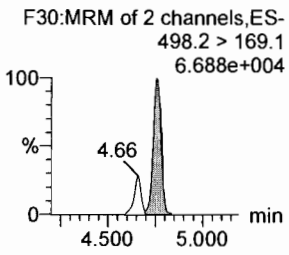
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

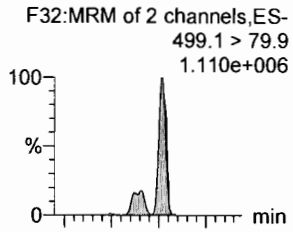
Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

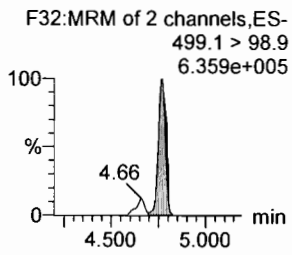
PFOSA



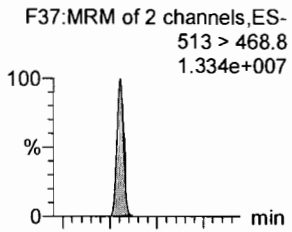


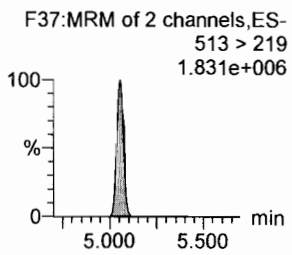
L-PFOS



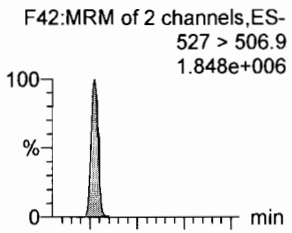


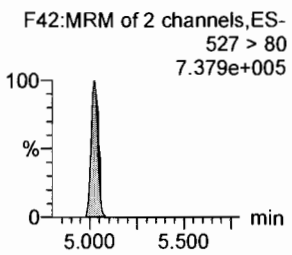
PFDA



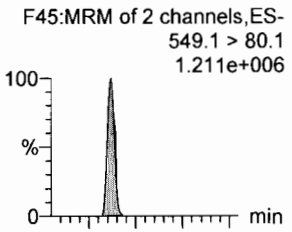


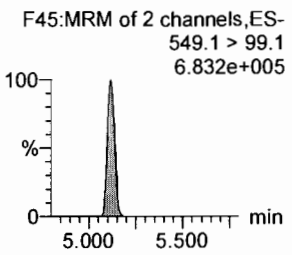
8:2 FTS



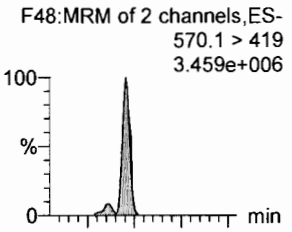


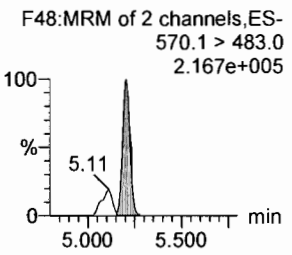
PFNS



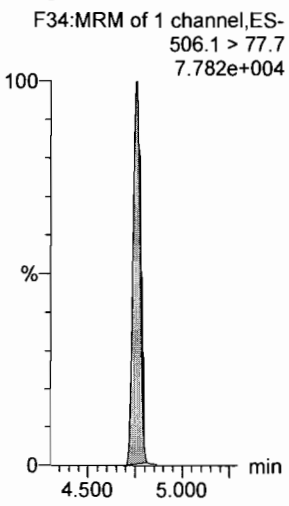


L-MeFOSAA

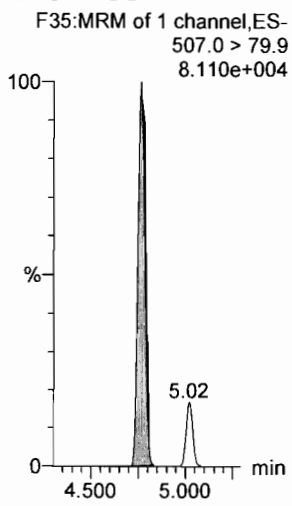




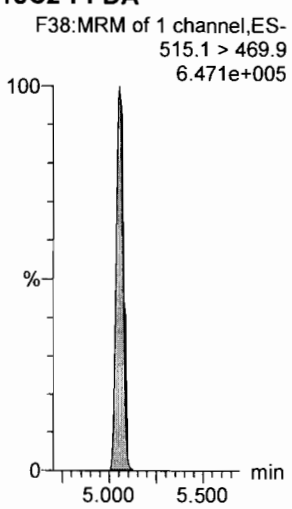
13C8-PFOSA



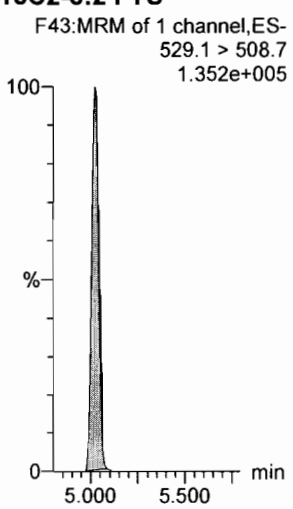
13C8-PFOS



13C2-PFDA



13C2-8:2 FTS



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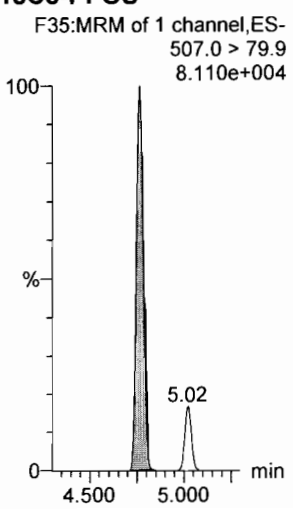
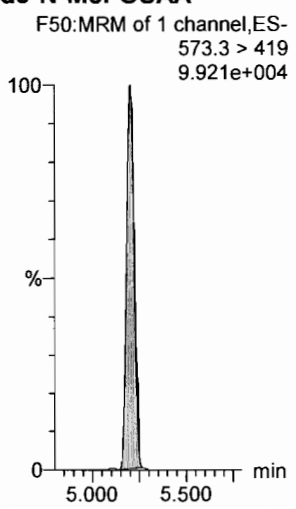


d3-N-MeFOSAA



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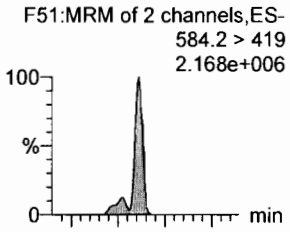
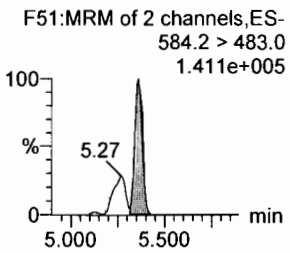
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

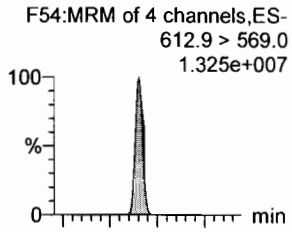
Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

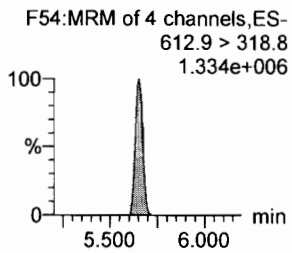
L-EtFOSAA





PFDoA





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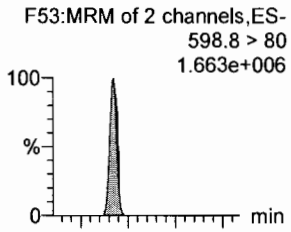
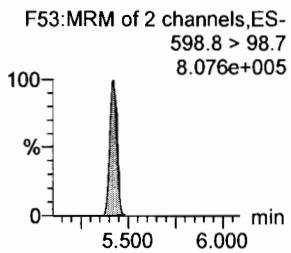
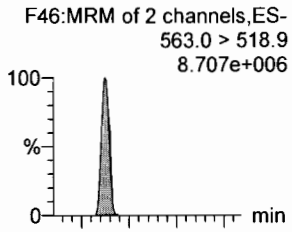
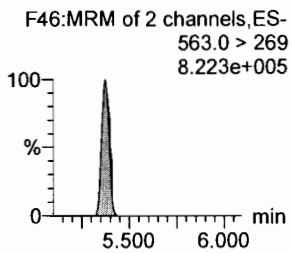


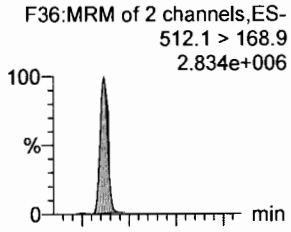


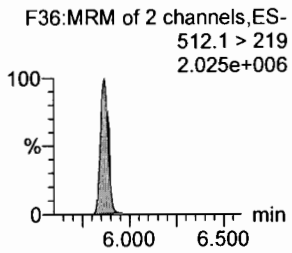
PFUdA



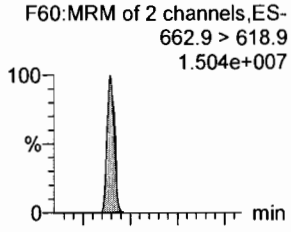


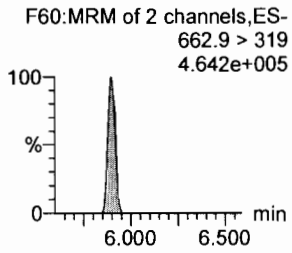
N-MeFOSA



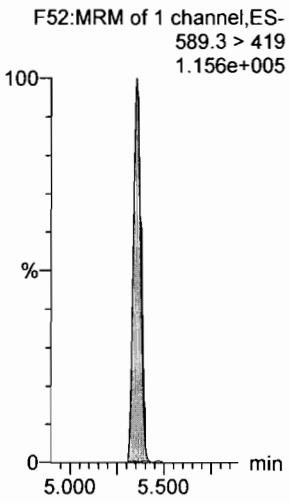


PFTrDA

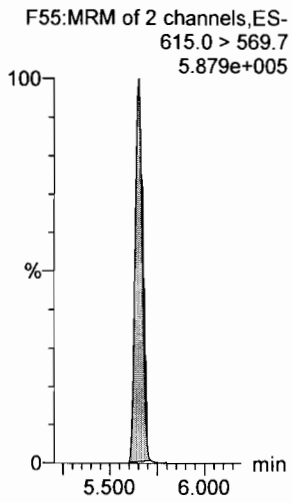




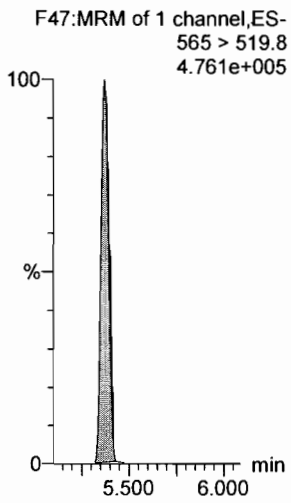
d5-N-EtFOSAA



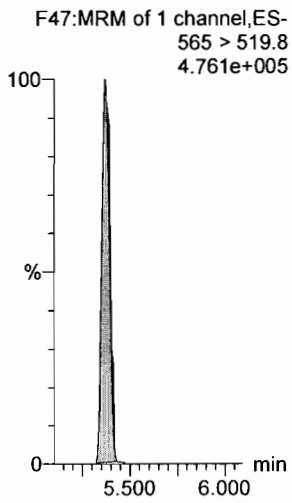
13C2-PFDoA



13C2-PFUdA



13C2-PFUdA



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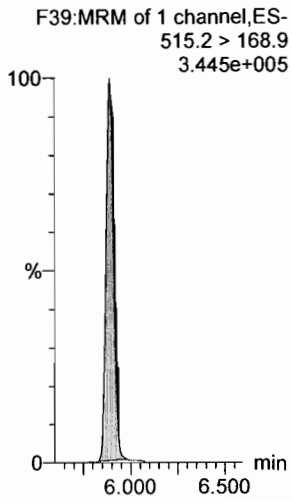

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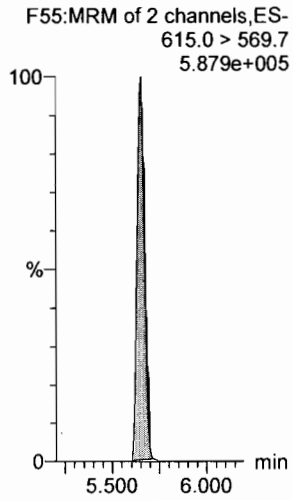
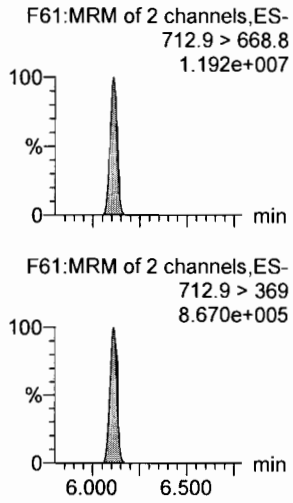


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

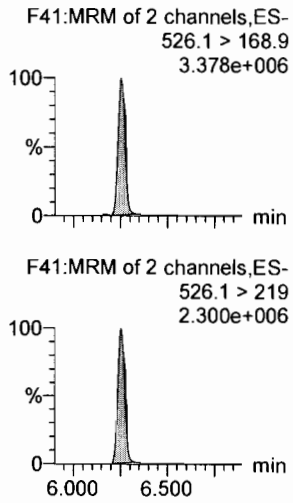
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

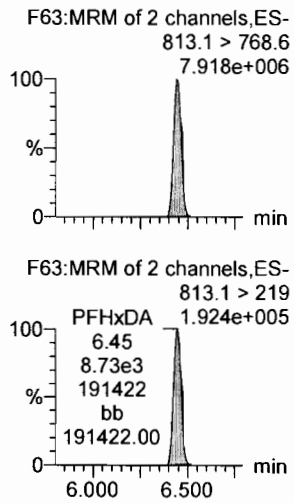
PFTeDA



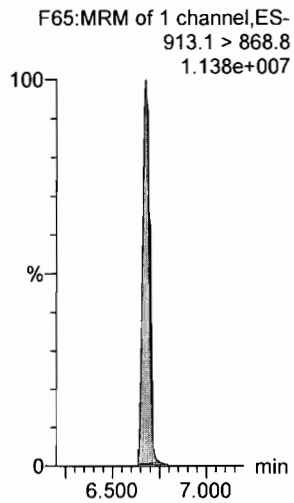
N-EtFOSA



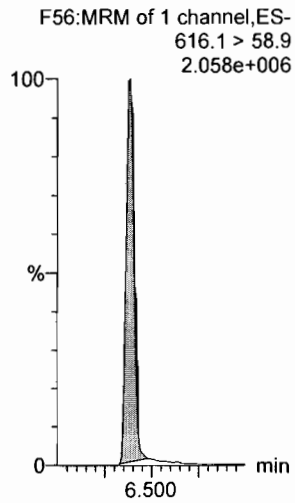
PFHxDA



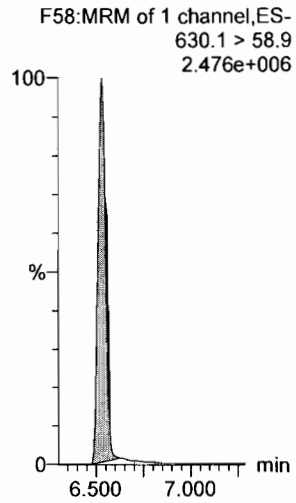
PFODA



N-MeFOSE



N-EtFOSE



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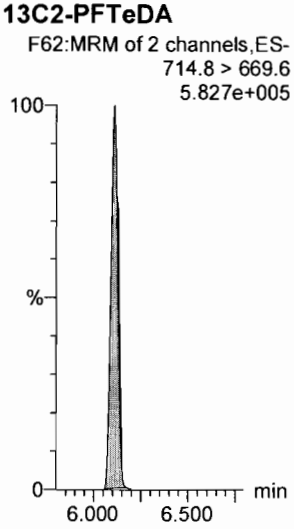
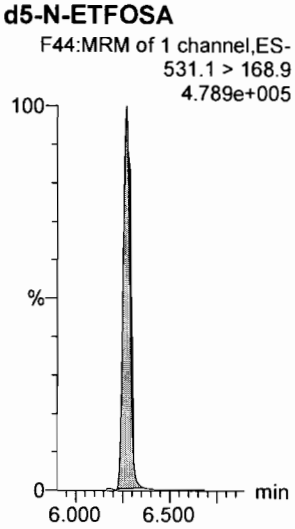


d5-N-ETFOSA



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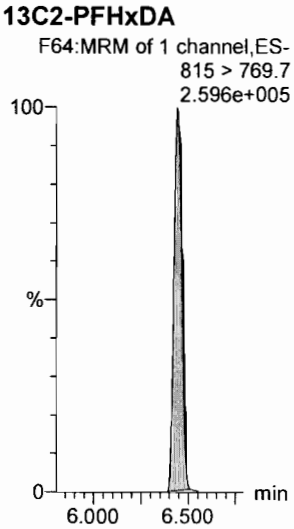
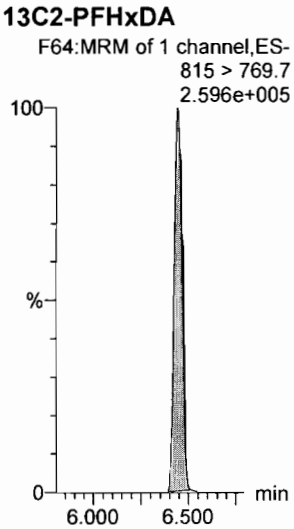
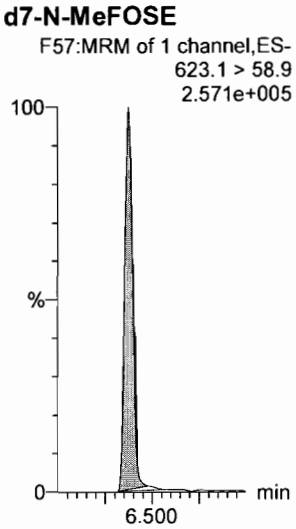


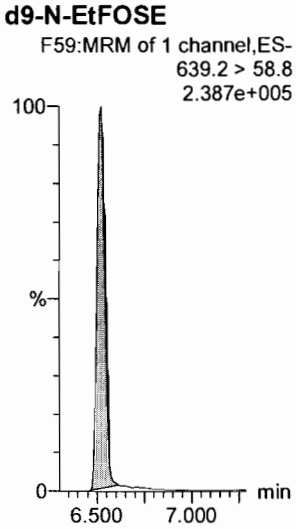
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

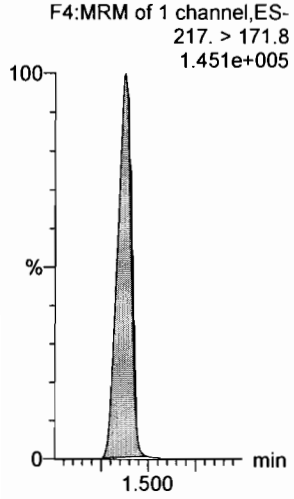


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

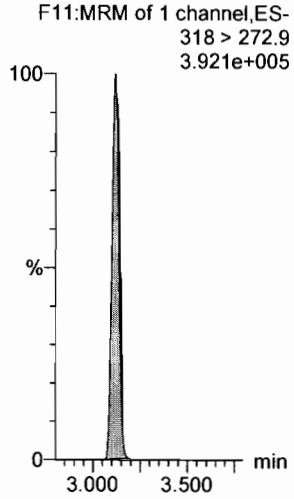
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_10, Date: 03-Jun-2018, Time: 19:31:33, ID: ST180603M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

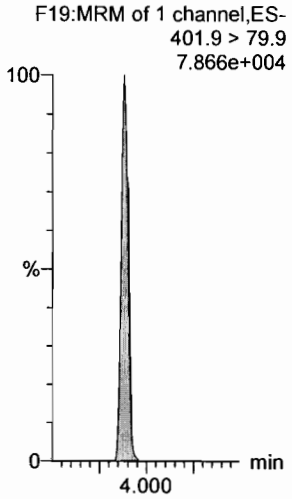
13C4-PFBA



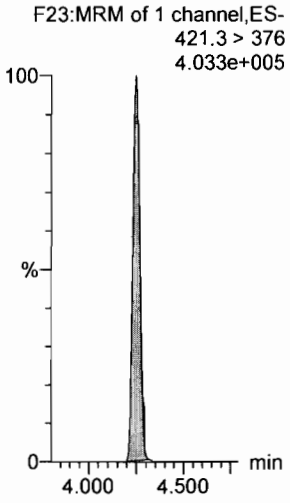
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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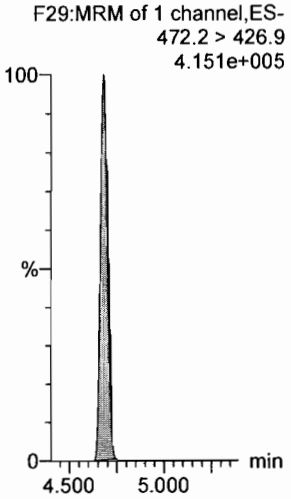
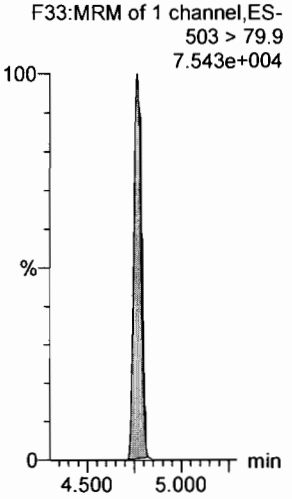
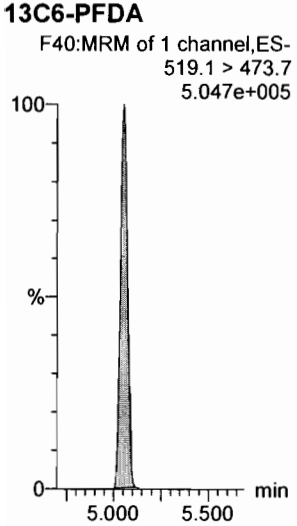


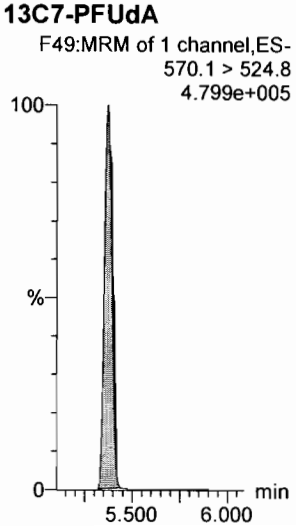
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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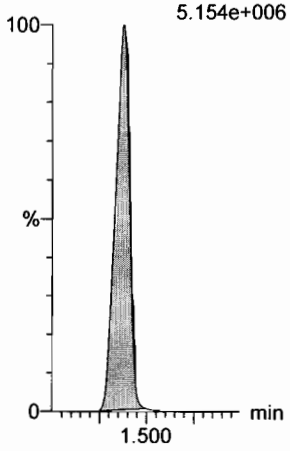
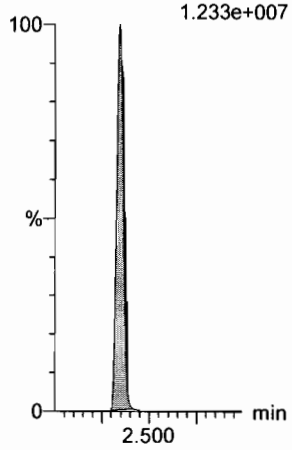
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

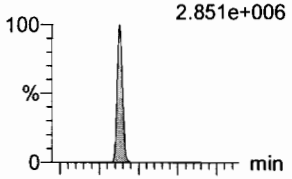
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
5.154e+006



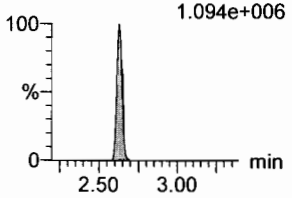
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
1.233e+007



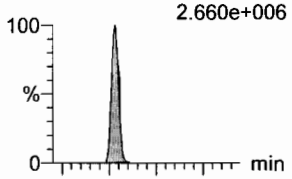
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
2.851e+006



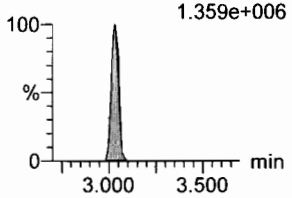
F7:MRM of 2 channels,ES-
299.0 > 99.0
1.094e+006



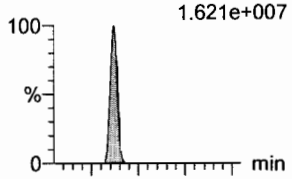
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
2.660e+006



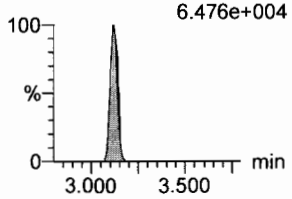
F12:MRM of 2 channels,ES-
327.2 > 81.1
1.359e+006



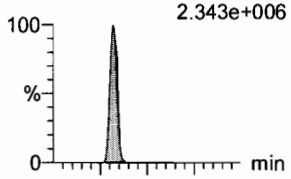
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
1.621e+007



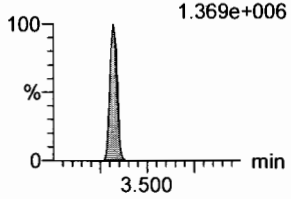
F9:MRM of 2 channels,ES-
313.2 > 119
6.476e+004



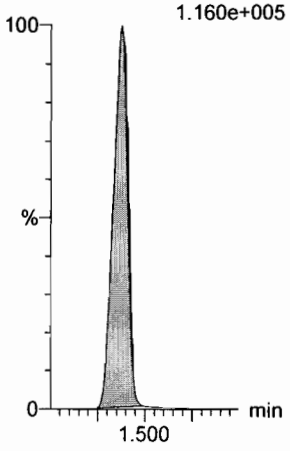
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
2.343e+006



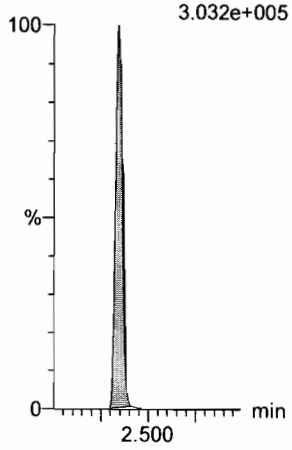
F15:MRM of 2 channels,ES-
349.1 > 99
1.369e+006



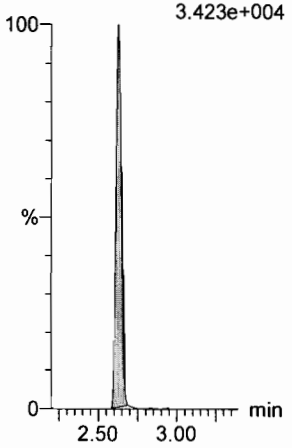
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.160e+005



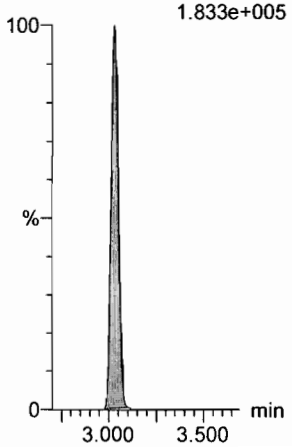
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.032e+005



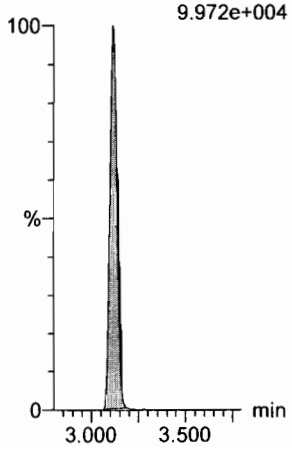
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
3.423e+004



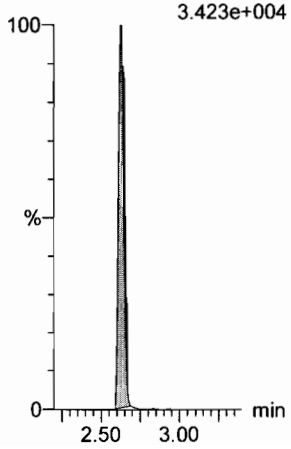
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.833e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
9.972e+004



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
3.423e+004



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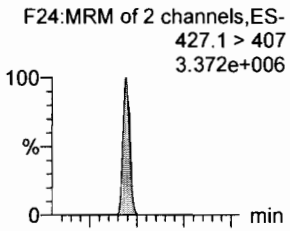
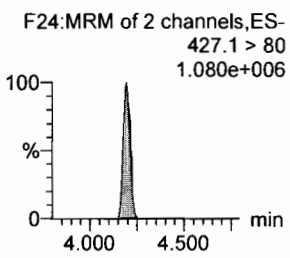
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

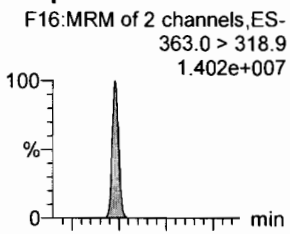
Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

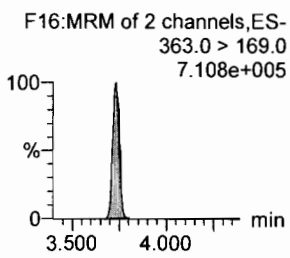
6:2 FTS



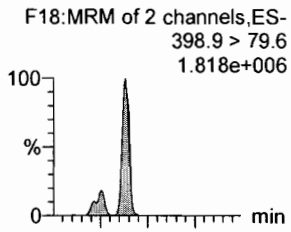


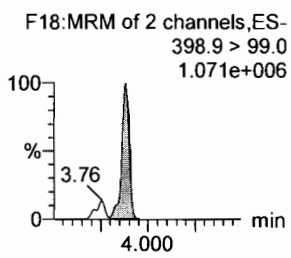
PFHpA



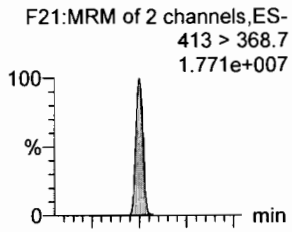


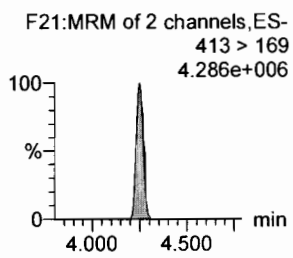
L-PFHxS





L-PFOA





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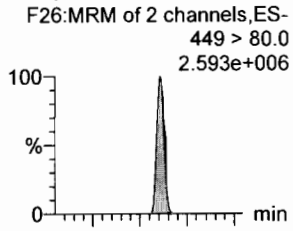

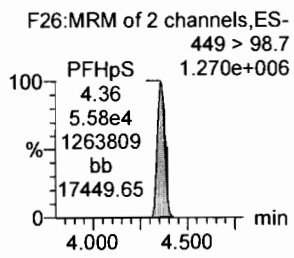

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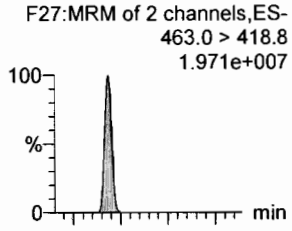
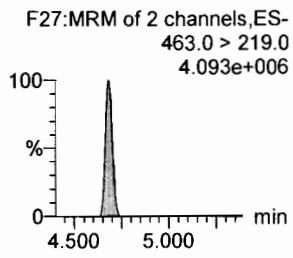
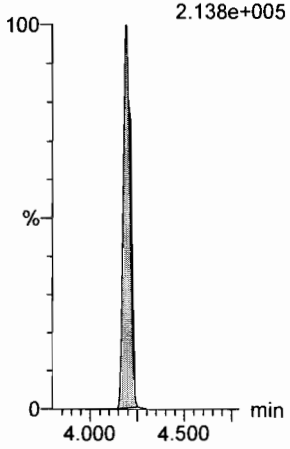
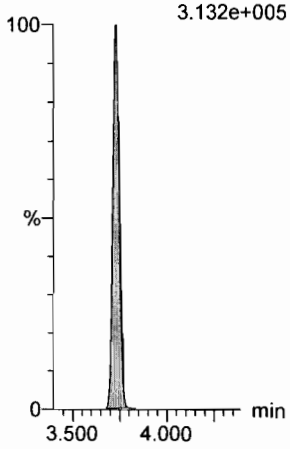




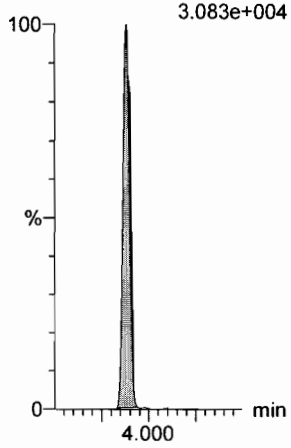
13C2-6:2 FTS



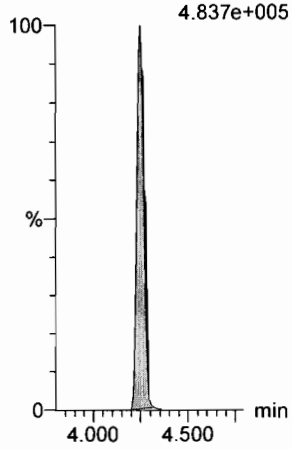
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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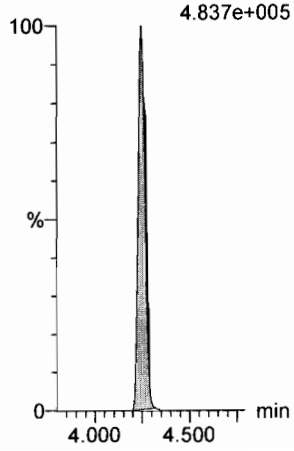
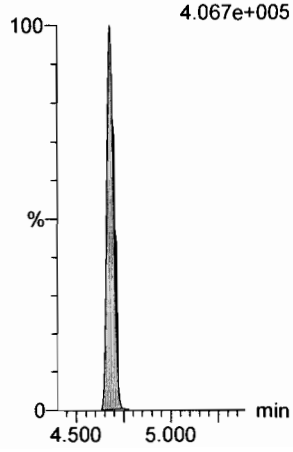


13C5-PFNA



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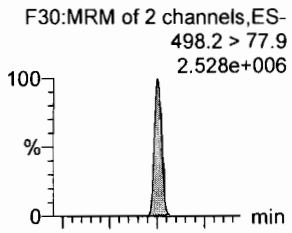
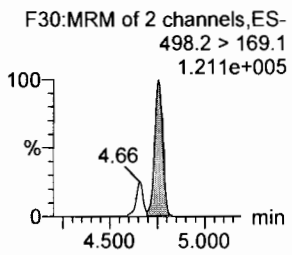
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

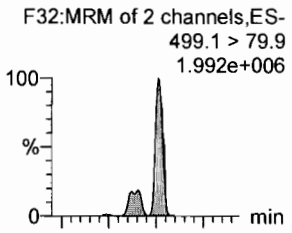
Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

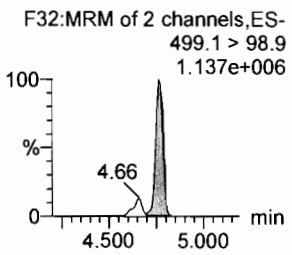
PFOSA



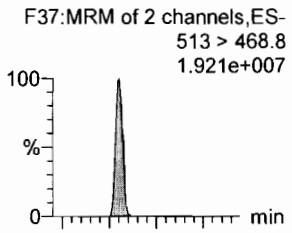


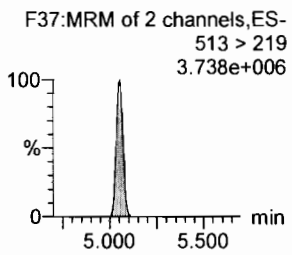
L-PFOS



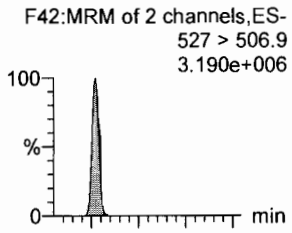


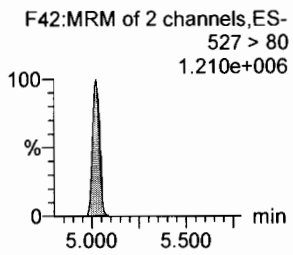
PFDA



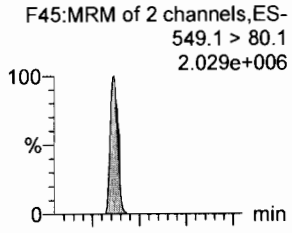


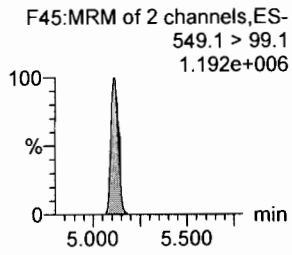
8:2 FTS





PFNS





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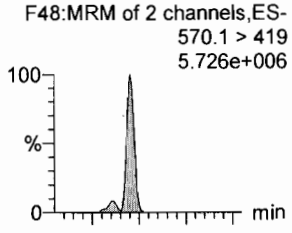
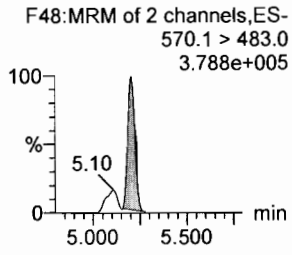
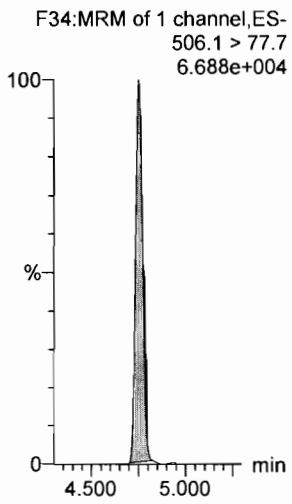
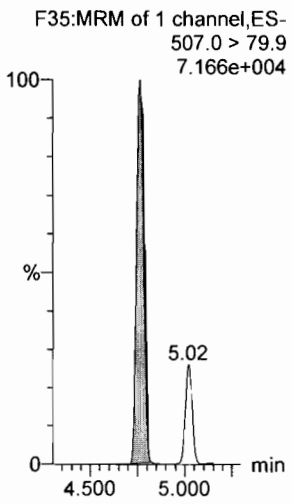




13C8-PFOSA



13C8-PFOS



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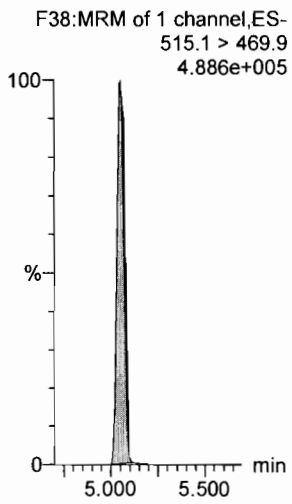
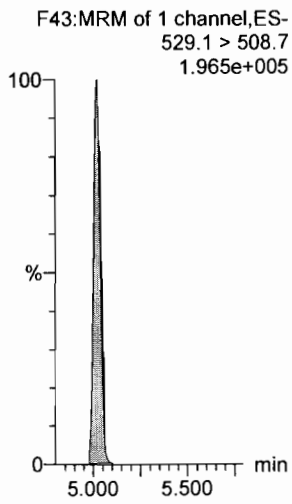
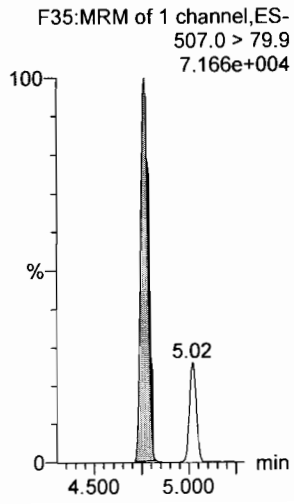


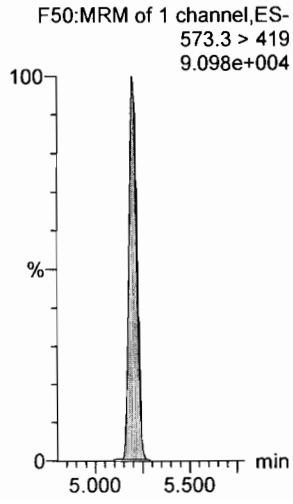
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

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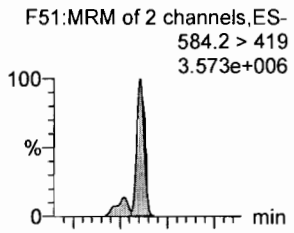
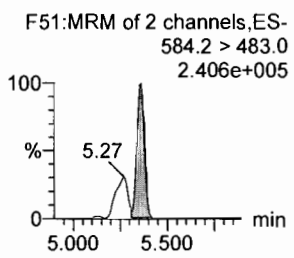
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

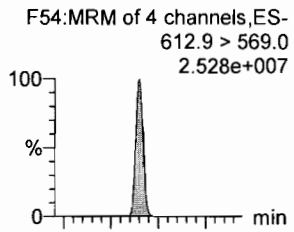
Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

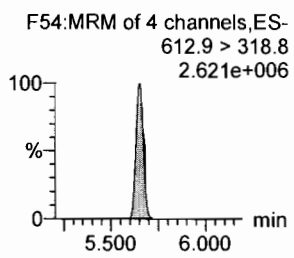
L-EtFOSAA



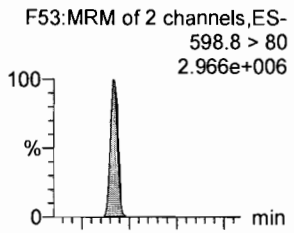


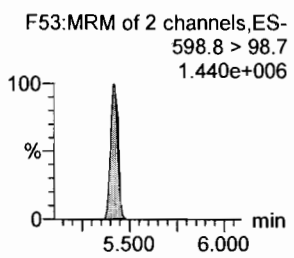
PFDoA



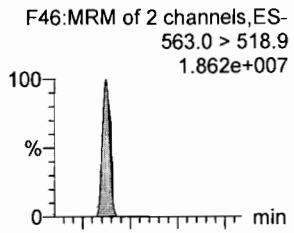


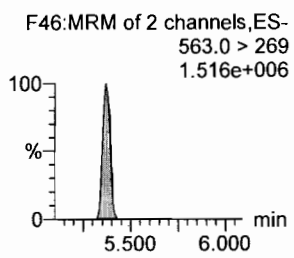
PFDS



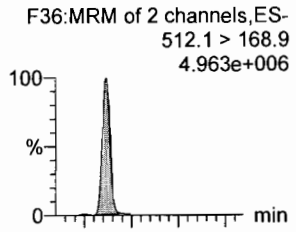


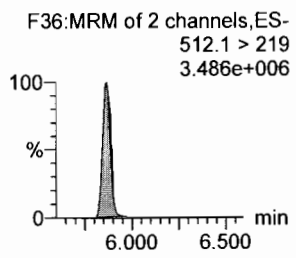
PFUdA



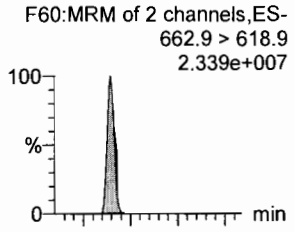


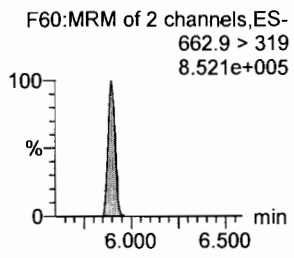
N-MeFOSA



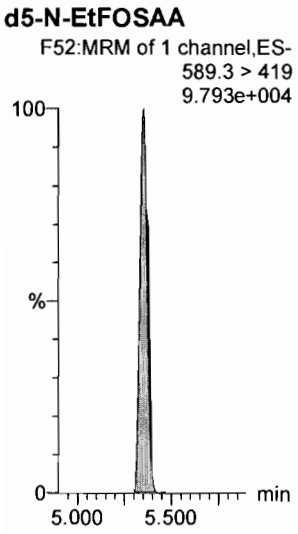


PFTrDA

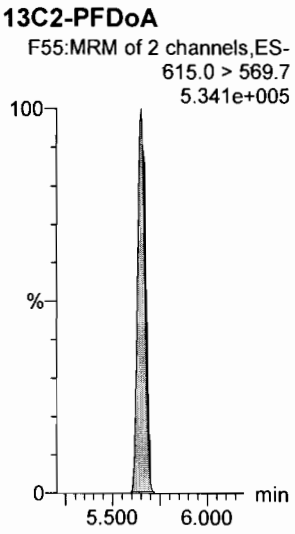




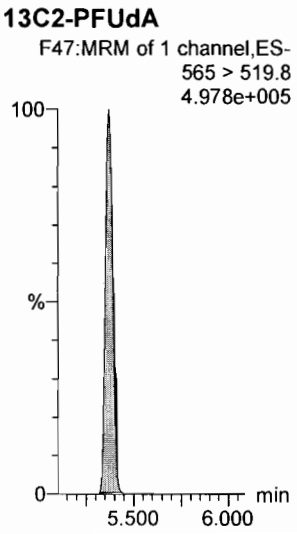
d5-N-EtFOSAA



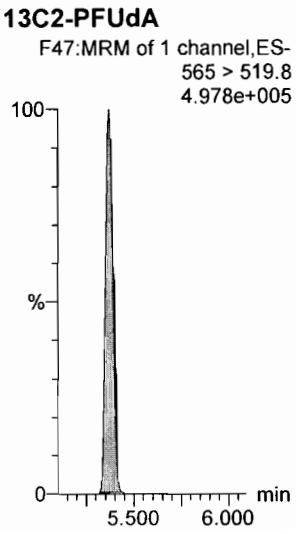
13C2-PFDoA



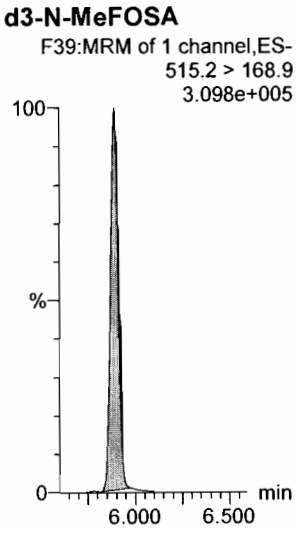
13C2-PFUdA



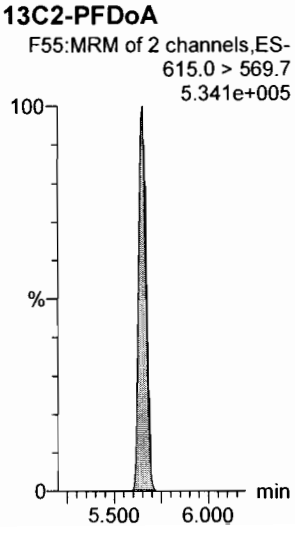
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

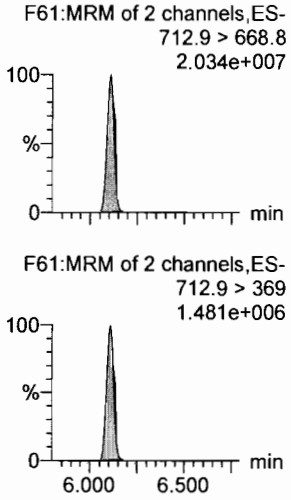


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

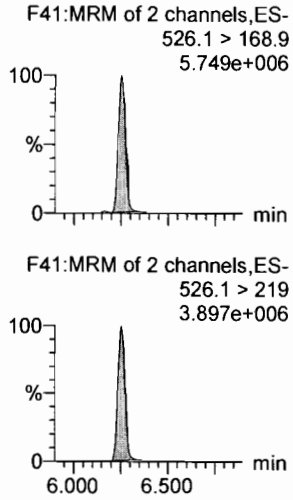
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

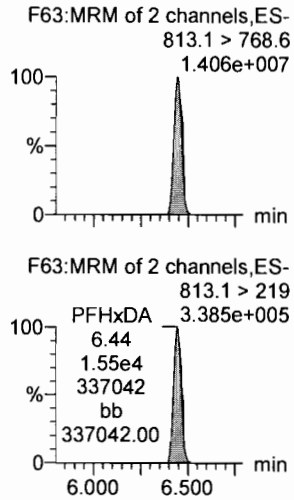
PFTeDA



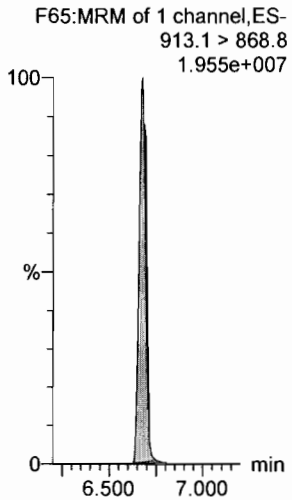
N-EtFOSA



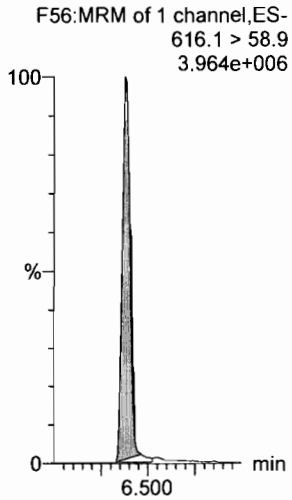
PFHxDA



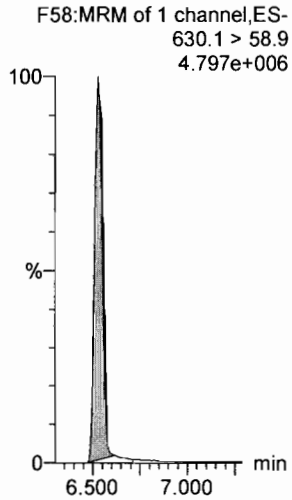
PFODA



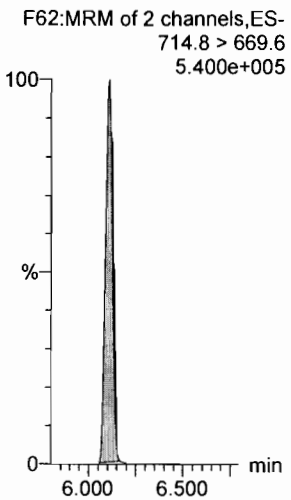
N-MeFOSE



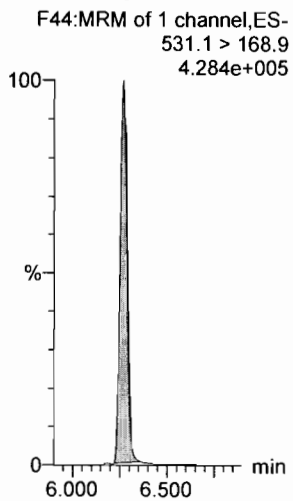
N-EtFOSE



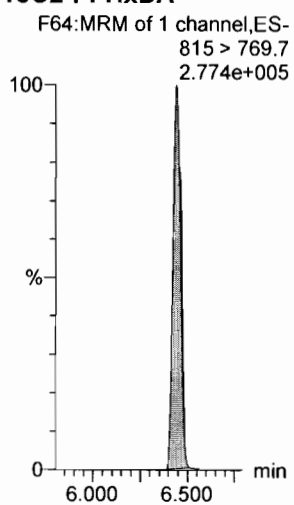
13C2-PFTeDA



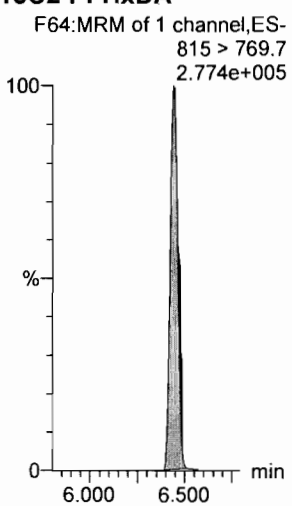
d5-N-ETFOSA



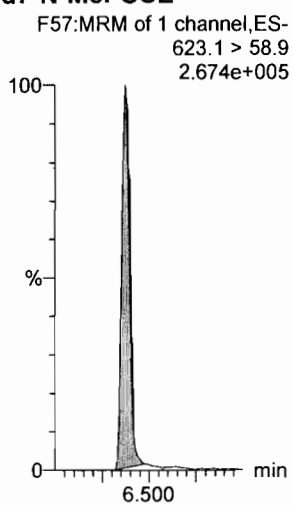
13C2-PFHxDA



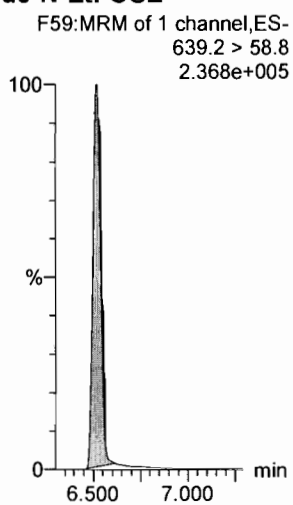
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

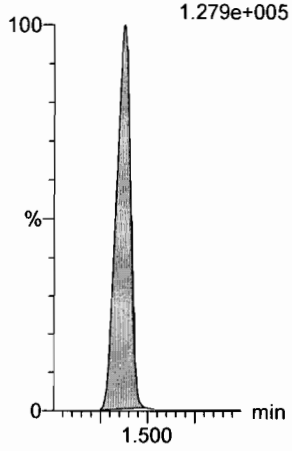


Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-CRV.qld

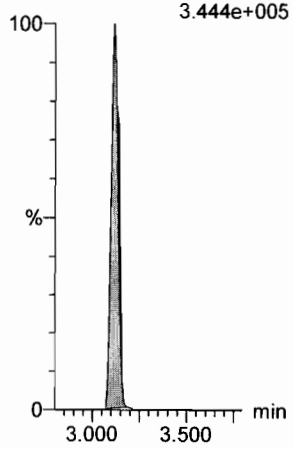
Last Altered: Monday, June 04, 2018 08:44:22 Pacific Daylight Time
Printed: Monday, June 04, 2018 08:45:41 Pacific Daylight Time

Name: 180603M2_11, Date: 03-Jun-2018, Time: 19:42:03, ID: ST180603M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

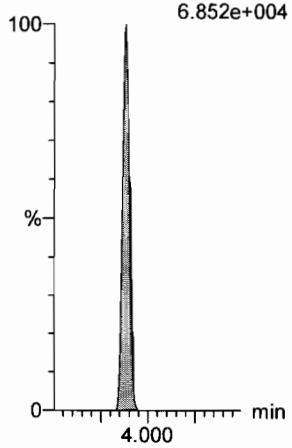
13C4-PFBA



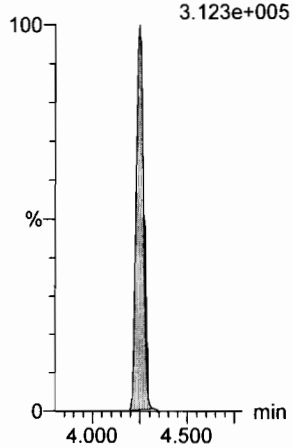
13C5-PFHxA



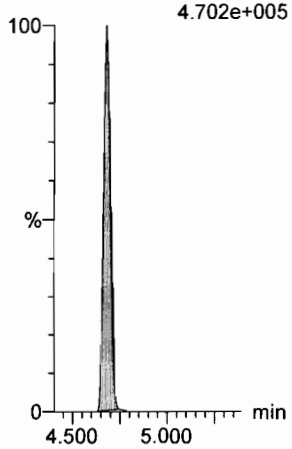
13C3-PFHxS



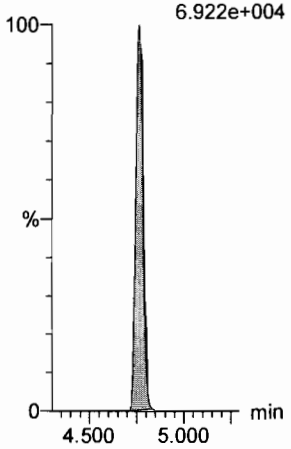
13C8-PFOA



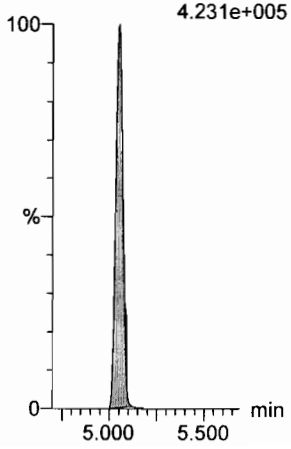
13C9-PFNA



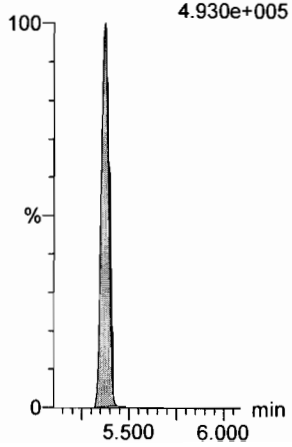
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:44 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 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...	8.78e3	1.02e4		1.38	1.38	10.7	9.57	95.7	NO		
2	2	PFPeA	263.1 > 21...	1.10e4	1.48e4		2.35	2.35	9.31	9.20	92.0	NO		
3	3	PFBS	299.0 > 79.7	2.21e3	1.67e3		2.63	2.63	16.5	8.46	84.6	NO	2.570	NO
4	4	4:2 FTS	327.2>307.2	3.07e3	3.70e3		3.03	3.03	10.4	9.14	91.4	NO	2.069	NO
5	5	PFHxA	313.2 > 26...	1.51e4	4.94e3		3.12	3.12	15.2	9.94	99.4	NO	309.838	YES
6	6	PFPeS	349.1>80.1	2.27e3	1.67e3		3.33	3.32	17.0	9.25	92.5	NO	1.774	NO
7	7	PFHpA	363.0 > 31...	1.24e4	1.42e4		3.73	3.73	10.9	9.47	94.7	NO	19.128	NO
8	8	L-PFHxS	398.9 > 79.6	1.73e3	1.42e3		3.88	3.88	15.2	7.93	79.3	NO	1.552	NO
9	10	6:2 FTS	427.1 > 407	3.62e3	3.95e3		4.19	4.19	11.4	9.76	97.6	NO	3.037	NO
10	11	L-PFOA	413 > 368.7	1.73e4	2.24e4		4.25	4.25	9.68	9.78	97.8	NO	4.742	NO
11	13	PFHpS	449 > 80.0	2.43e3	2.24e4		4.36	4.36	1.36	8.43	84.3	NO	1.959	NO
12	14	PFNA	463.0 > 41...	2.03e4	2.14e4		4.68	4.68	11.8	8.79	87.9	NO	4.942	NO
13	15	PFOSA	498.2 > 77.9	2.61e3	3.67e3		4.75	4.76	8.91	10.5	105.1	NO	18.450	NO
14	16	L-PFOS	499.1 > 79.9	2.39e3	3.45e3		4.77	4.76	8.65	9.43	94.3	NO	2.074	NO
15	18	PFDA	513 > 468.8	2.01e4	2.69e4		5.06	5.05	9.37	9.21	92.1	NO	7.441	NO
16	19	8:2 FTS	527 > 506.9	3.56e3	3.54e3		5.03	5.02	12.6	8.83	88.3	NO	2.681	NO
17	20	PFNS	549.1>80.1	2.03e3	3.45e3		5.13	5.12	7.34	9.13	91.3	NO	1.522	NO
18	21	L-MeFOSAA	570.1 > 419	7.96e3	4.39e3		5.22	5.20	22.6	11.2	112.3	NO	14.998	NO
19	23	L-EtFOSAA	584.2 > 419	6.19e3	5.50e3		5.37	5.36	14.1	11.8	118.2	NO	17.602	NO

√ KBF 6/4/18

GM 6/4/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

(A) Compounds not present in ICV

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 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	25	PFUdA	563.0 > 51...	1.75e4	2.54e4		5.39	5.37	8.60	9.37	93.7	NO	11.328	NO
2	26	PFDS	598.8 > 80	2.81e3	2.54e4		5.44	5.42	1.38	9.11	91.1	NO	2.274	NO
3	27	PFDoA	612.9 > 56...	2.36e4	2.57e4		5.67	5.65	11.5	8.07	80.7	NO	10.975	NO
4	28	N-MeFOSA	512.1 > 16...		1.57e4		5.83				(A)	NO		
5	29	PFTrDA	662.9 > 61...	2.44e4	2.57e4		5.92	5.89	11.8	8.20	82.0	NO	28.584	NO
6	30	PFTeDA	712.9 > 66...	2.06e4	2.62e4		6.14	6.11	9.85	8.96	89.6	NO	15.271	NO
7	31	N-EtFOSA	526.1 > 16...		2.10e4		6.24				(A)	NO		
8	32	PFHxDA	813.1 > 76...		1.28e4		6.48					NO		
9	33	PFODA	913.1 > 86...		1.28e4		6.71					NO		
10	34	N-MeFOSE	616.1 > 58.9		1.11e4		6.41					NO		
11	35	N-EtFOSE	630.1 > 58.9		1.04e4		6.56					NO		
12	36	13C3-PFBA	216.1 > 17...	1.02e4	1.14e4	0.892	1.33	1.38	11.2	12.5	100.2	NO		
13	37	13C3-PFPeA	266. > 221.8	1.48e4	1.66e4	0.848	2.32	2.35	11.1	13.1	105.0	NO		
14	38	13C3-PFBS	302. > 98.8	1.67e3	1.66e4	0.102	2.61	2.63	1.26	12.3	98.4	NO		
15	39	13C2-4:2 FTS	329.2>308.9	3.70e3	1.66e4	0.231	3.02	3.03	2.78	12.0	96.2	NO		
16	40	13C2-PFHxA	315 > 269.8	4.94e3	1.66e4	0.744	3.10	3.12	3.71	4.99	99.7	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.42e4	1.66e4	0.841	3.72	3.73	10.7	12.7	101.3	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.42e3	3.55e3	0.415	3.87	3.88	5.00	12.1	96.5	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	3.95e3	1.87e4	0.232	4.19	4.19	2.64	11.4	91.3	NO		
20	44	13C2-PFOA	414.9 > 36...	2.24e4	1.87e4	1.256	4.25	4.25	15.0	11.9	95.3	NO		
21	45	13C5-PFNA	468.2 > 42...	2.14e4	2.10e4	0.960	4.69	4.69	12.7	13.3	106.3	NO		
22	46	13C8-PFOSA	506.1 > 77.7	3.67e3	2.83e4	0.145	4.75	4.76	1.62	11.2	89.2	NO		
23	47	13C8-PFOS	507.0 > 79.9	3.45e3	3.48e3	1.047	4.77	4.76	12.4	11.9	94.8	NO		
24	48	13C2-PFDA	515.1 > 46...	2.69e4	2.33e4	1.118	5.06	5.05	14.4	12.9	103.1	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.54e3	1.66e4	0.211	5.03	5.02	2.66	12.6	100.8	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	4.39e3	2.83e4	0.182	5.21	5.20	1.94	10.6	85.0	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	5.50e3	2.83e4	0.223	5.37	5.35	2.43	10.9	87.2	NO		
28	52	13C2-PFUdA	565 > 519.8	2.54e4	2.83e4	0.958	5.39	5.37	11.2	11.7	93.7	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.57e4	2.33e4	1.138	5.67	5.65	13.8	12.1	96.9	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.57e4	2.83e4	0.051	5.85	5.89	6.91	136	90.7	NO		
31	55	13C2-PFTeDA	714.8 > 66...	2.62e4	2.83e4	0.862	6.14	6.11	11.6	13.4	107.3	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	2.10e4	2.83e4	0.066	6.26	6.27	9.26	140	93.2	NO		

GM 6/4/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 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	57	13C2-PFHxDA	815 > 769.7	1.28e4	2.83e4	1.173	6.48	6.44	5.63	4.80	96.0	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.11e4	2.83e4	0.038	6.40	6.37	4.89	130	86.7	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	1.04e4	2.83e4	0.035	6.54	6.52	4.60	130	86.7	NO		
36	60	13C4-PFBA	217. > 171.8	1.14e4	1.14e4	1.000	1.33	1.38	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.66e4	1.66e4	1.000	3.10	3.12	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	3.55e3	3.55e3	1.000	3.87	3.88	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	1.87e4	1.87e4	1.000	4.25	4.25	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	2.10e4	2.10e4	1.000	4.69	4.68	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	3.48e3	3.48e3	1.000	4.77	4.76	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.33e4	2.33e4	1.000	5.06	5.05	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.83e4	2.83e4	1.000	5.39	5.37	12.5	12.5	100.0	NO		

GM 6/4/2018

Vista Analytical Laboratory

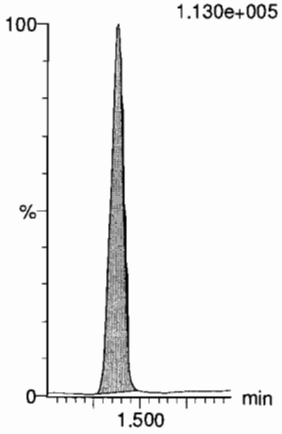
Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

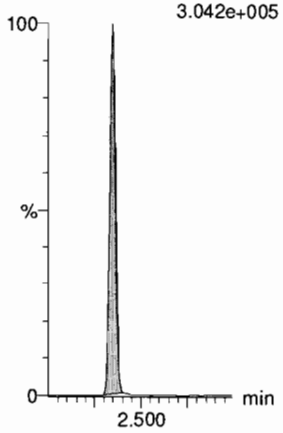
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060318.mdb 04 Jun 2018 08:21:34
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

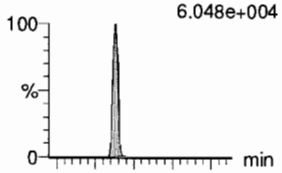
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
1.130e+005



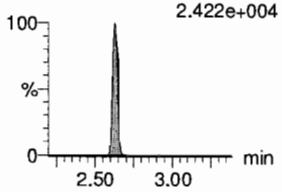
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
3.042e+005



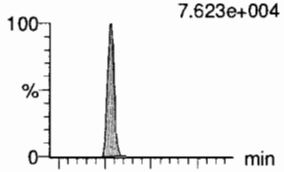
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
6.048e+004



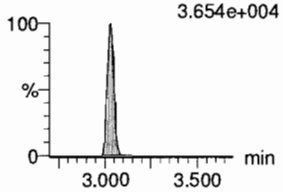
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.422e+004



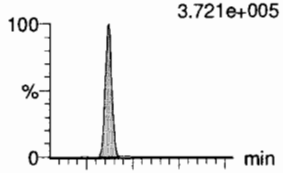
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
7.623e+004



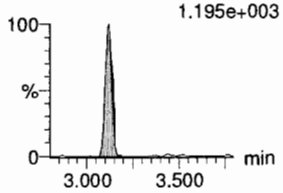
F12:MRM of 2 channels,ES-
327.2 > 81.1
3.654e+004



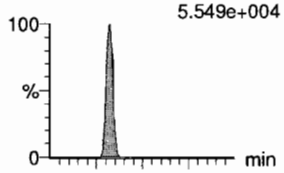
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
3.721e+005



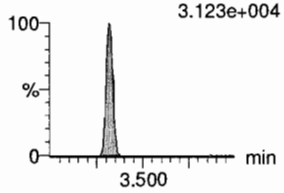
F9:MRM of 2 channels,ES-
313.2 > 119
1.195e+003



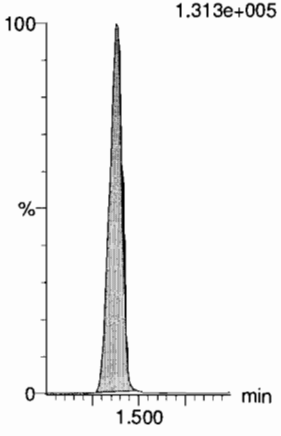
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
5.549e+004



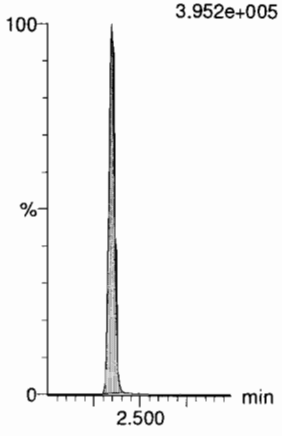
F15:MRM of 2 channels,ES-
349.1 > 99
3.123e+004



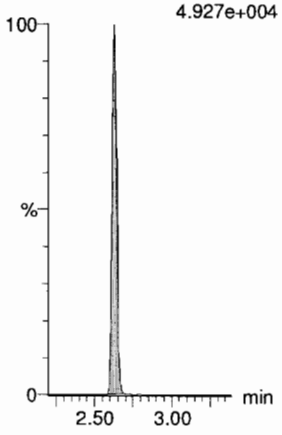
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.313e+005



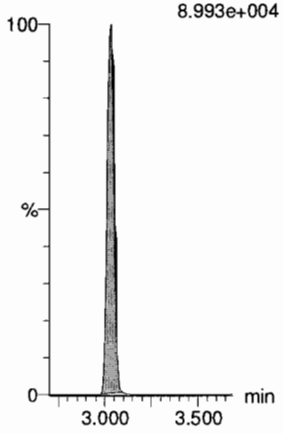
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.952e+005



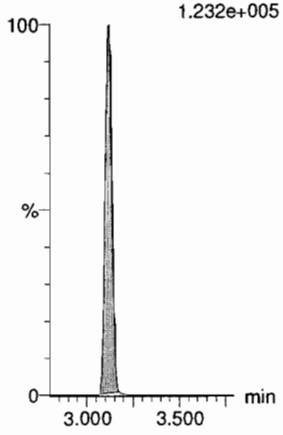
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.927e+004



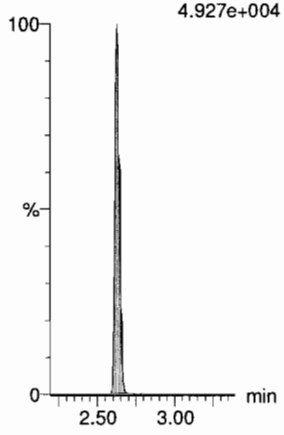
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
8.993e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.232e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.927e+004



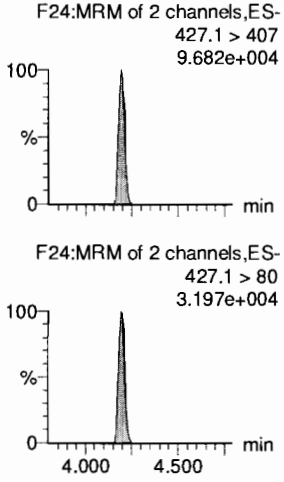
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

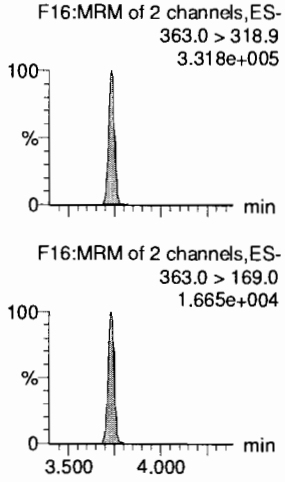
Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

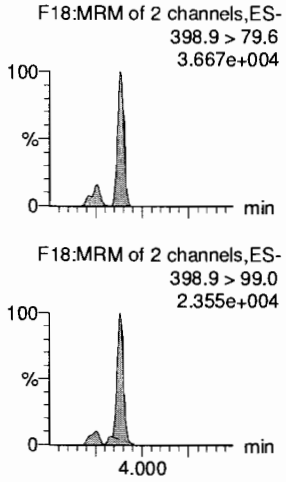
6:2 FTS



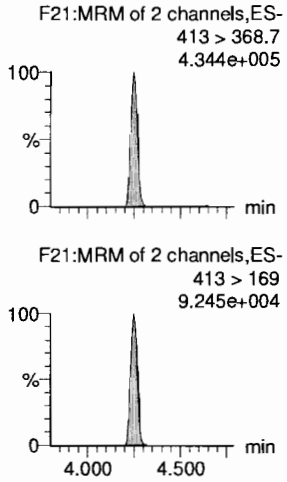
PFHpA



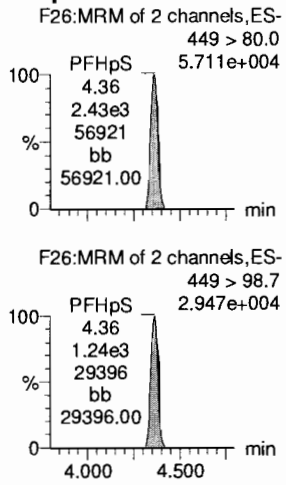
L-PFHxS



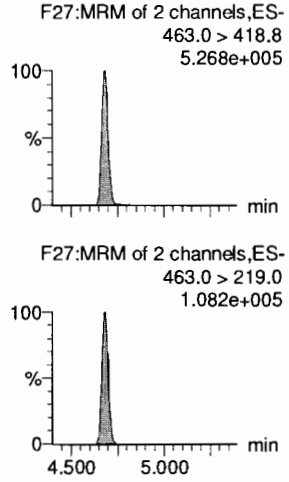
L-PFOA



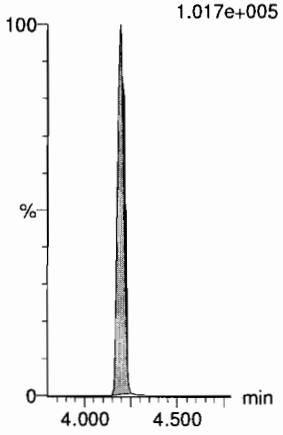
PFHpS



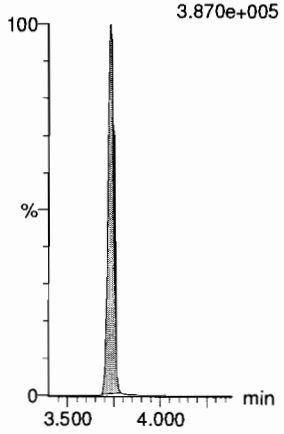
PFNA



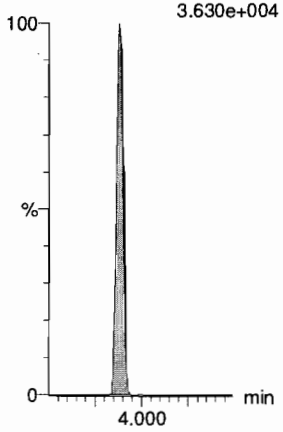
13C2-6:2 FTS



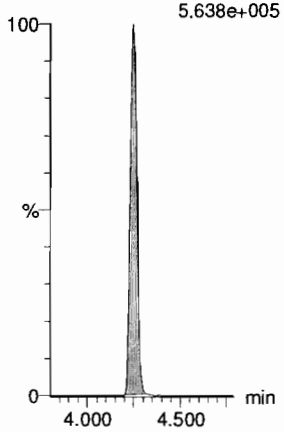
13C4-PFHpA



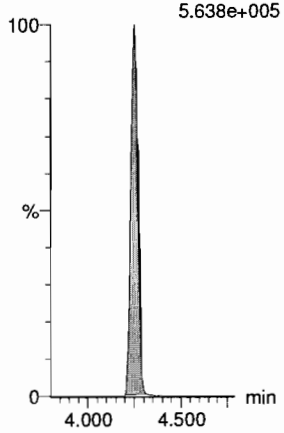
18O2-PFHxS



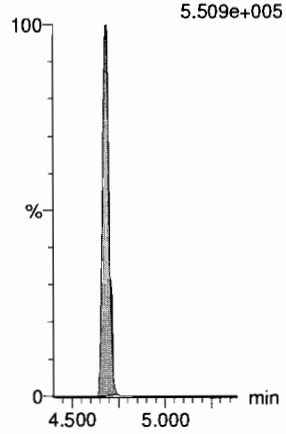
13C2-PFOA



13C2-PFOA



13C5-PFNA



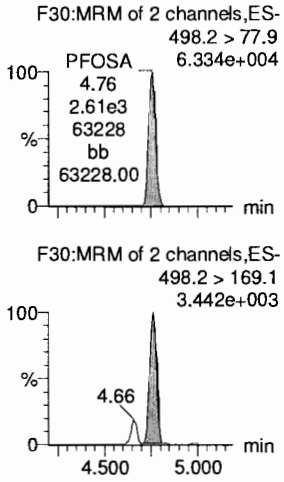
GM 6/4/2018

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

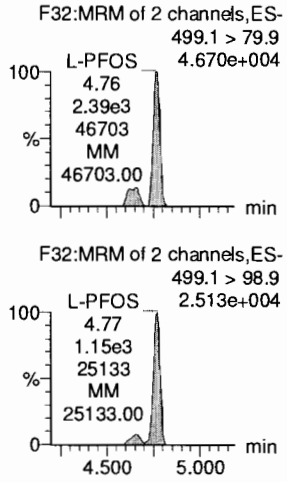
Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

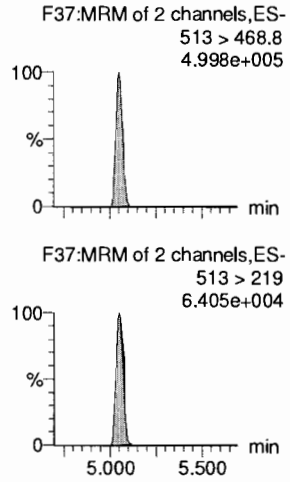
PFOSA



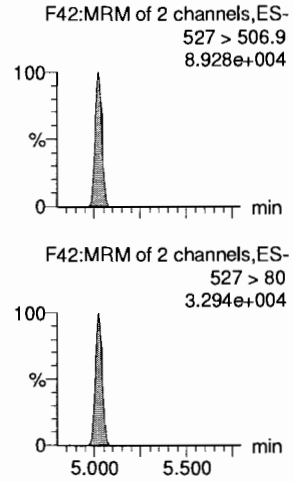
L-PFOS



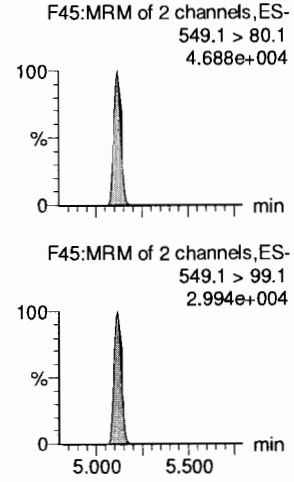
PFDA



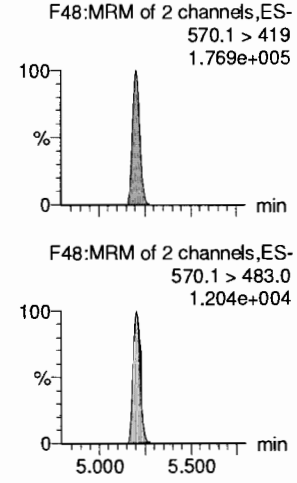
8:2 FTS



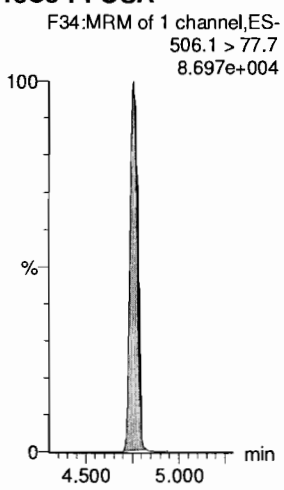
PFNS



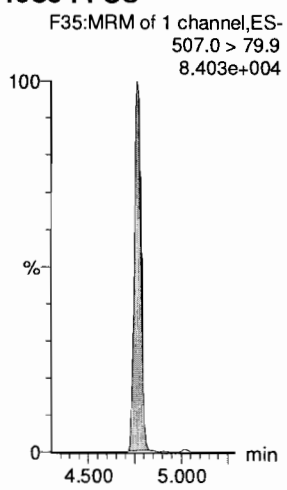
L-MeFOSAA



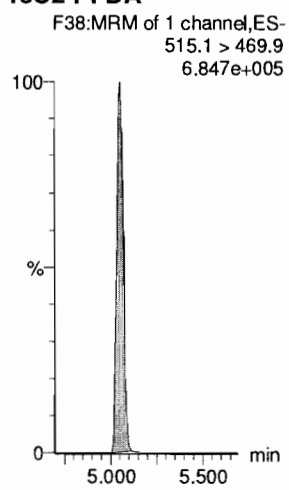
13C8-PFOSA



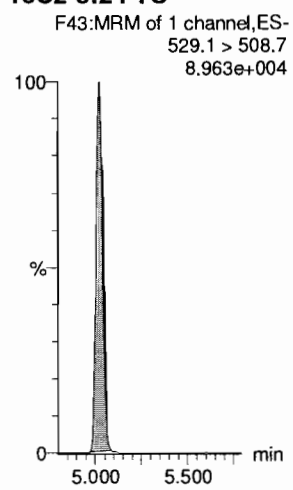
13C8-PFOS



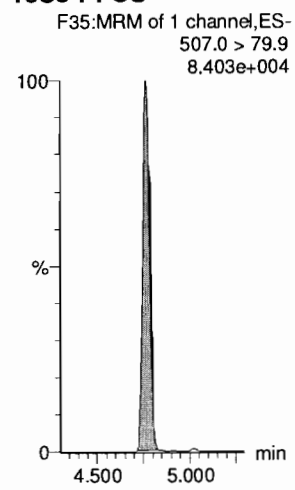
13C2-PFDA



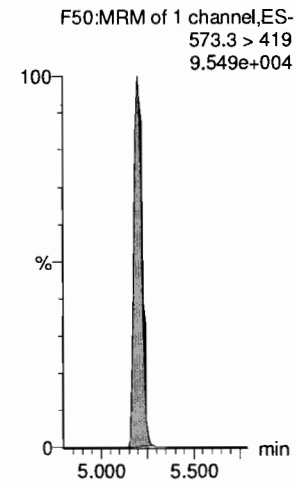
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



GM 6/4/2018

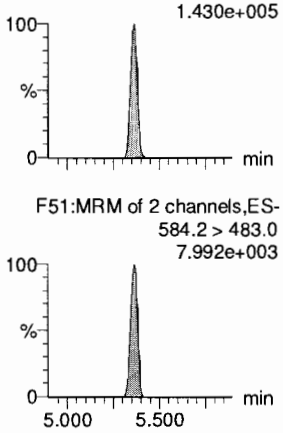
Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

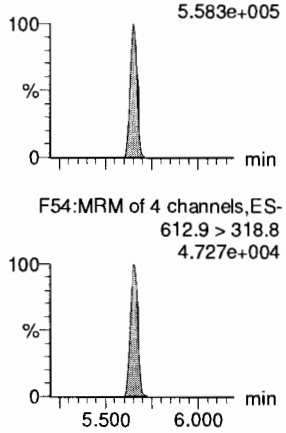
Last Altered: Monday, June 04, 2018 09:09:21 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

L-EtFOSAA



PFDoA



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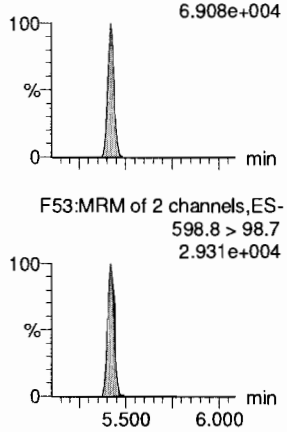
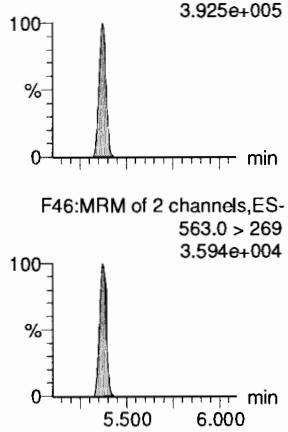


PFUdA



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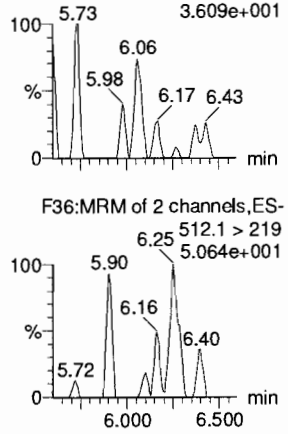

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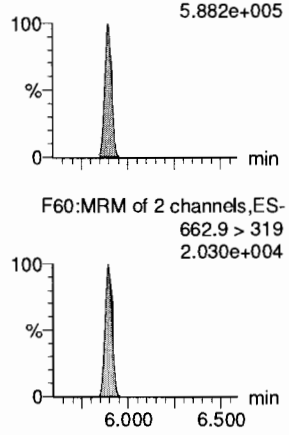
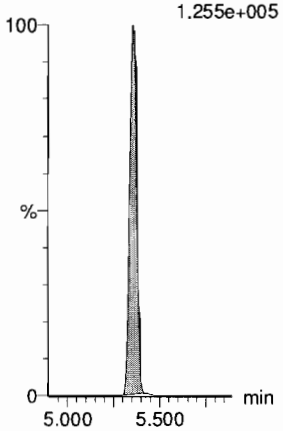
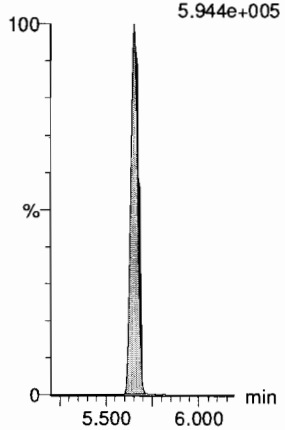


d5-N-EtFOSAA



13C2-PFDoA



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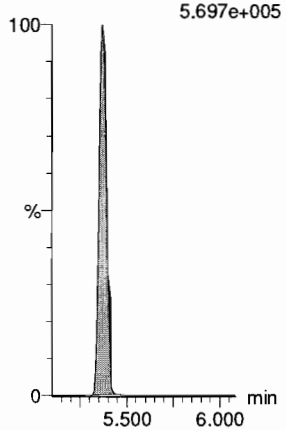
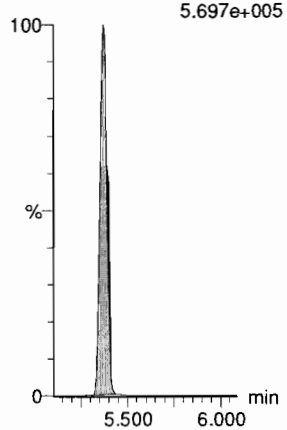


13C2-PFUdA



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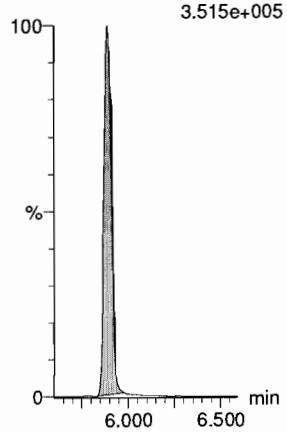

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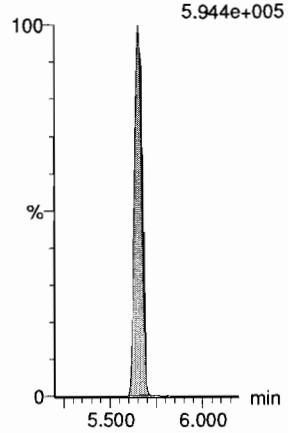

GM 6/4/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

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Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

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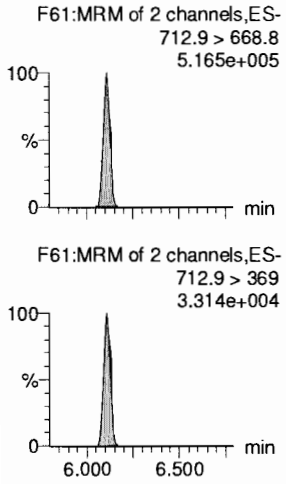
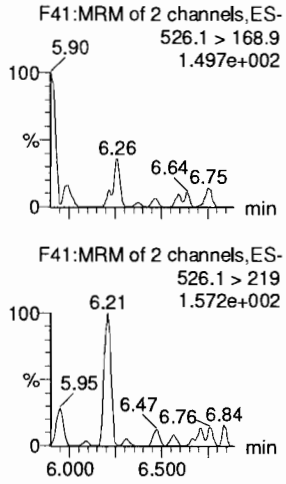
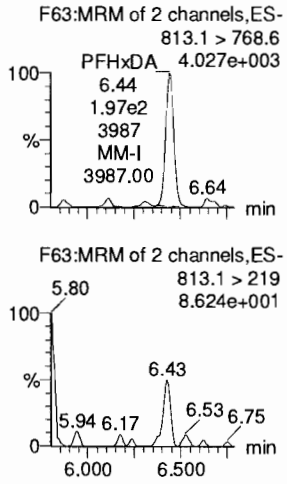


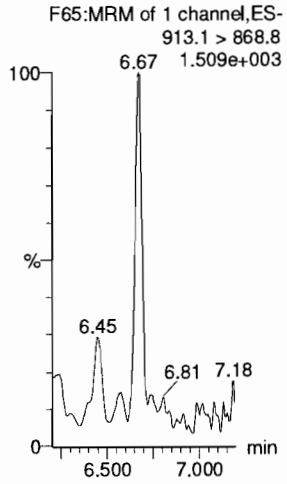
N-EtFOSA



PFHxDA



PFODA



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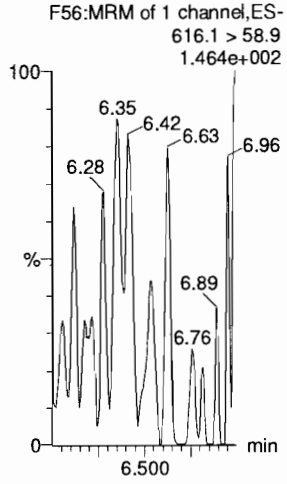

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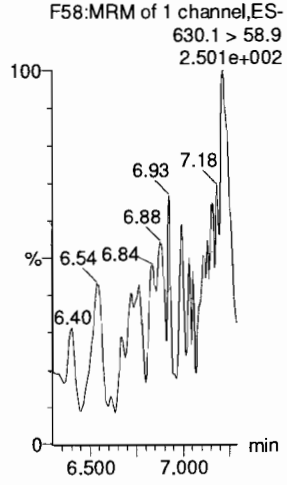

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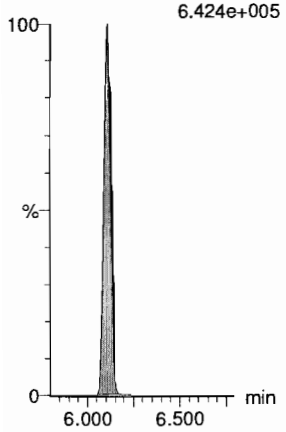
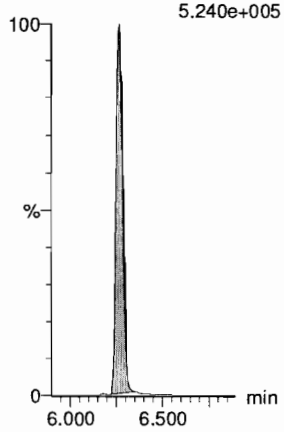


d5-N-ETFOSA



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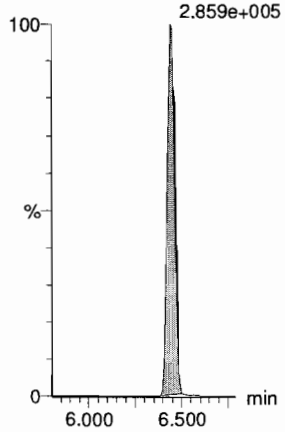

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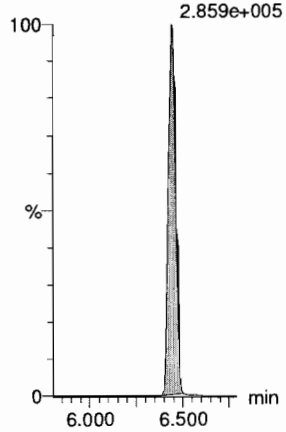

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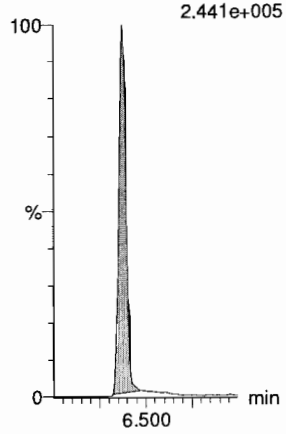

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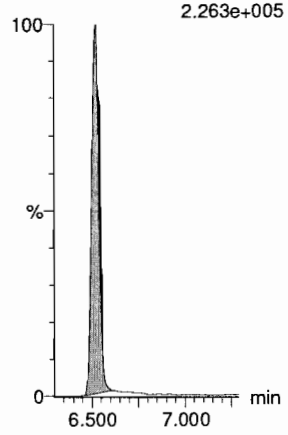

GM 6/4/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180603M2\180603M2-ICV.qld

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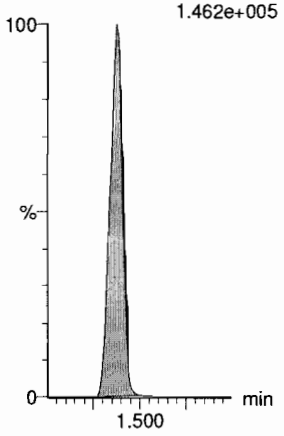
Printed: Monday, June 04, 2018 09:09:52 Pacific Daylight Time

Name: 180603M2_13, Date: 03-Jun-2018, Time: 20:02:58, ID: ICV180603M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

13C4-PFBA



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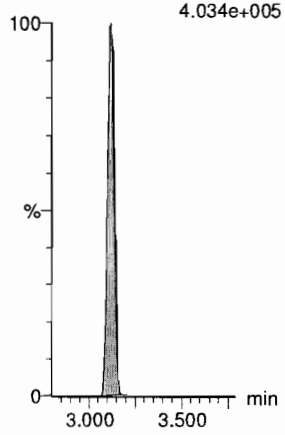

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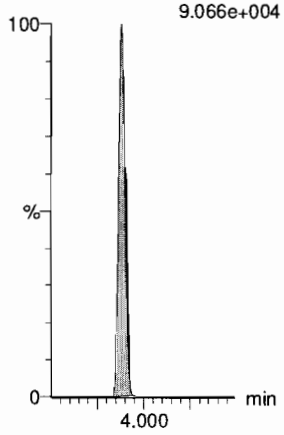

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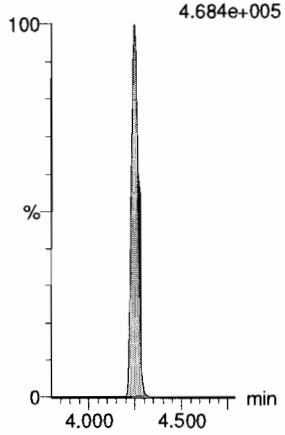

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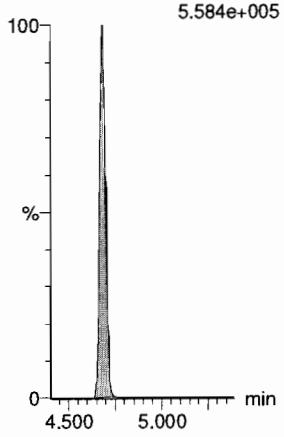
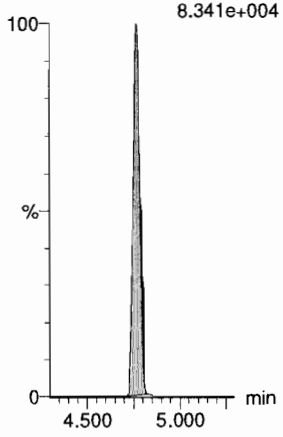


13C4-PFOS



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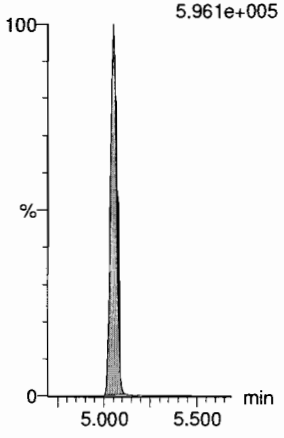

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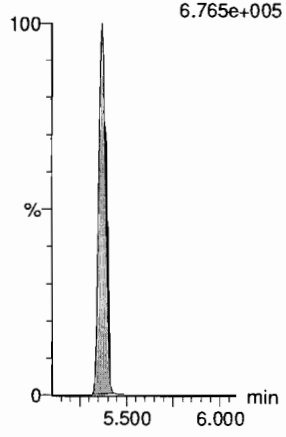

GM 6/4/2018

Vista Analytical Laboratory

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Last Altered: Monday, June 04, 2018 09:11:19 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:11:28 Pacific Daylight Time

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Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-03-18.cdb 04 Jun 2018 08:44:22

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

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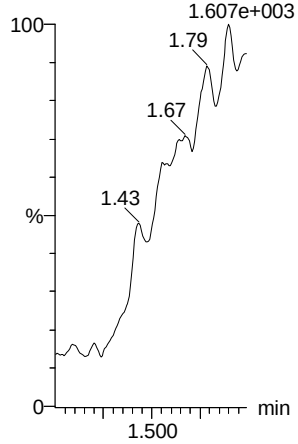

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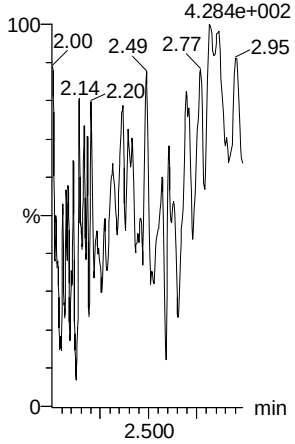

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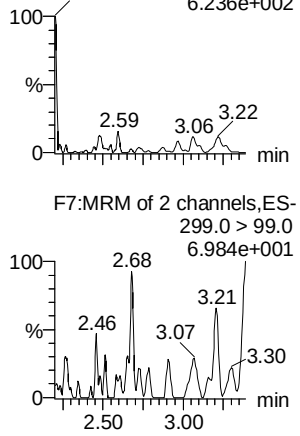

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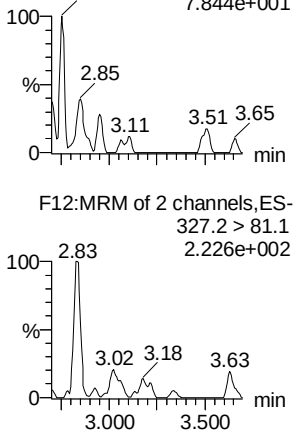
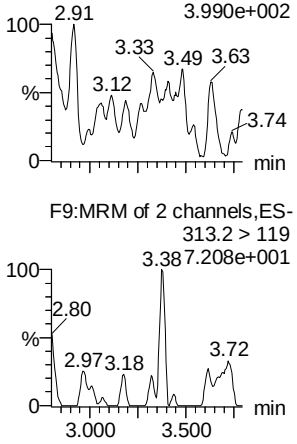
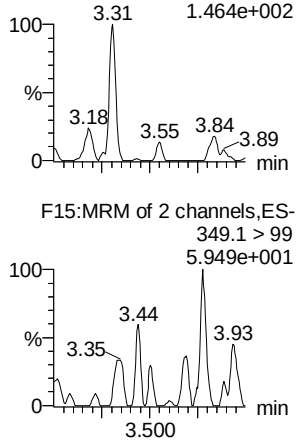


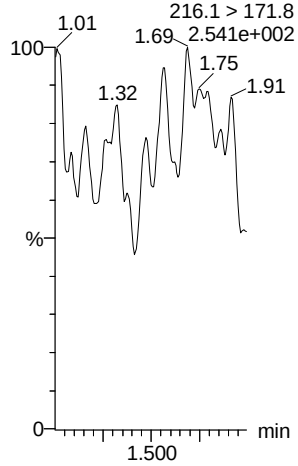
PFHxA



PFPeS



13C3-PFBA



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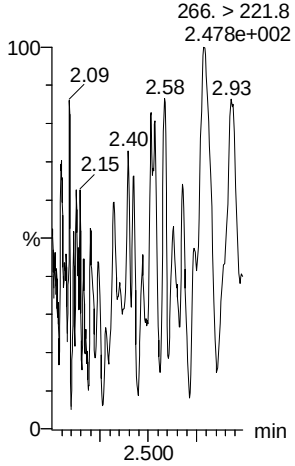

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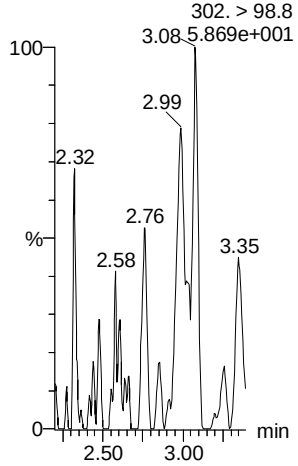
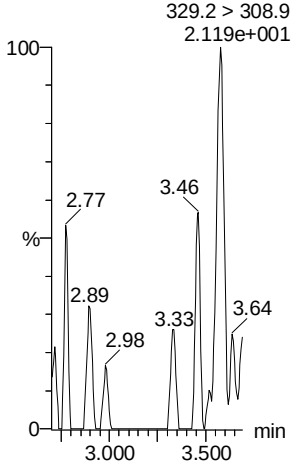


13C2-4:2 FTS



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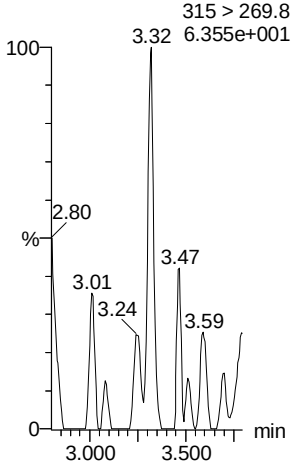

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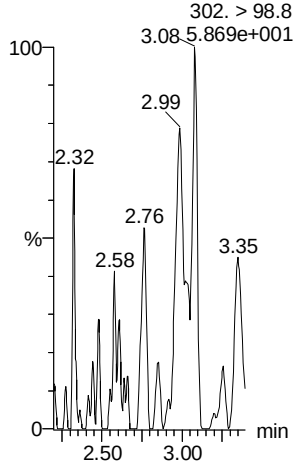


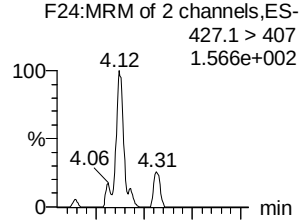
Vista Analytical Laboratory

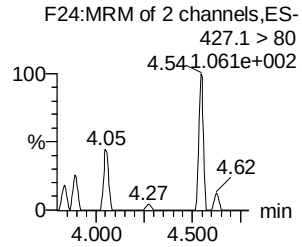
Dataset: Untitled

Last Altered: Monday, June 04, 2018 09:11:19 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:11:28 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

6:2 FTS





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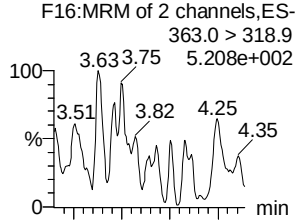

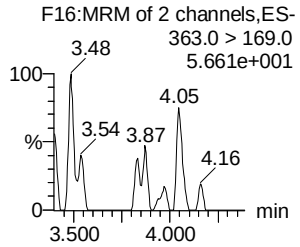

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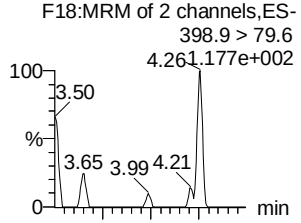

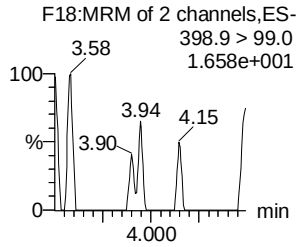

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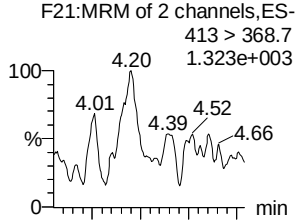

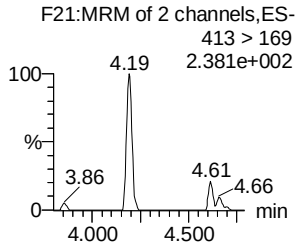

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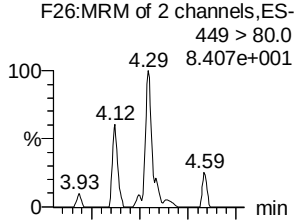

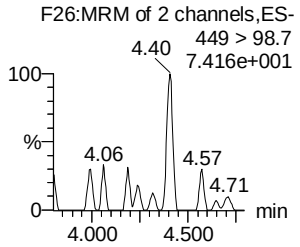

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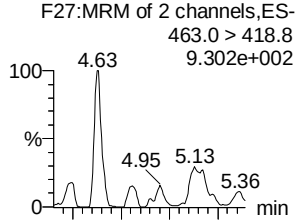

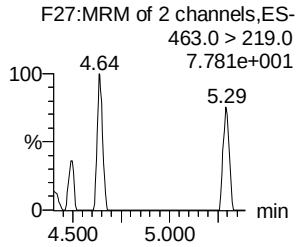

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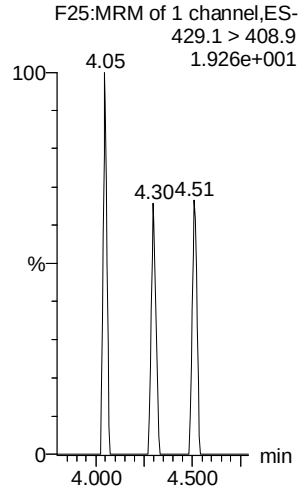

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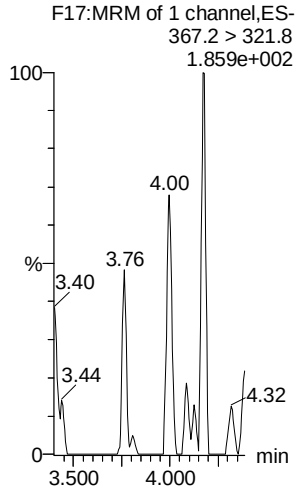

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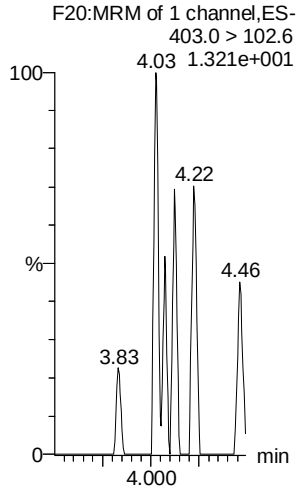

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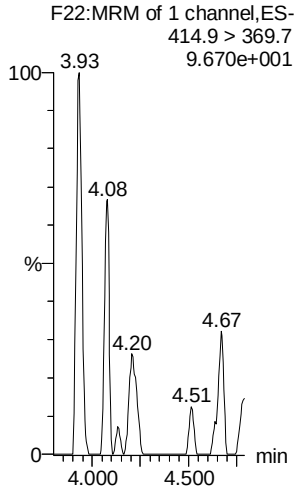

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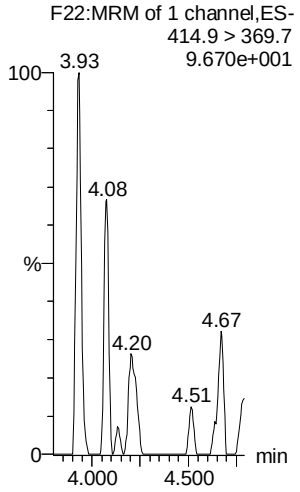

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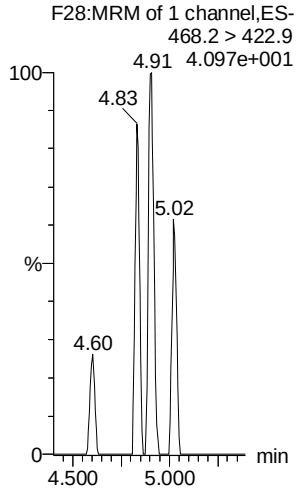

Vista Analytical Laboratory

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Printed: Monday, June 04, 2018 09:11:28 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

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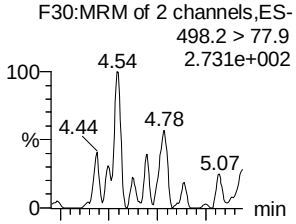

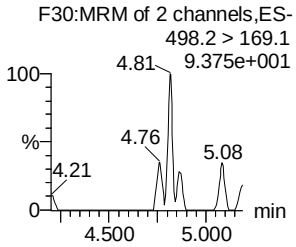

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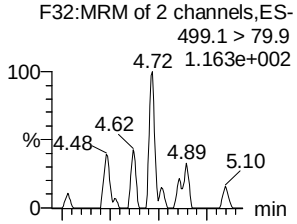

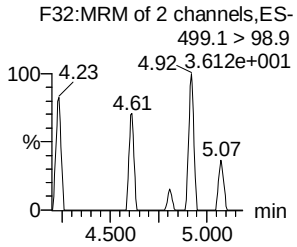

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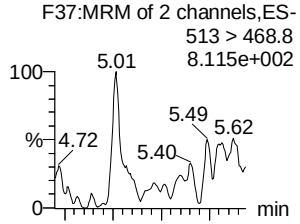

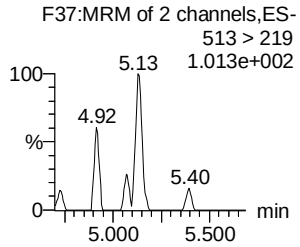

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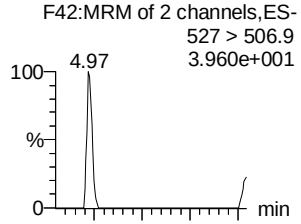

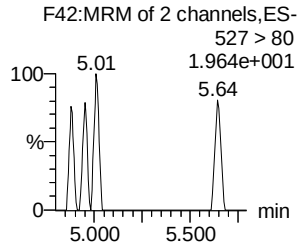

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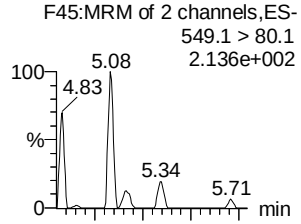

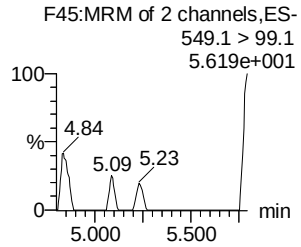

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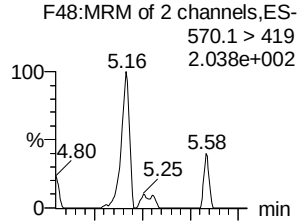

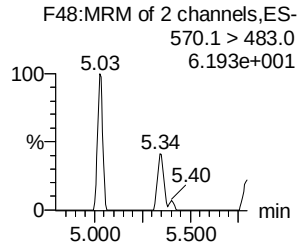

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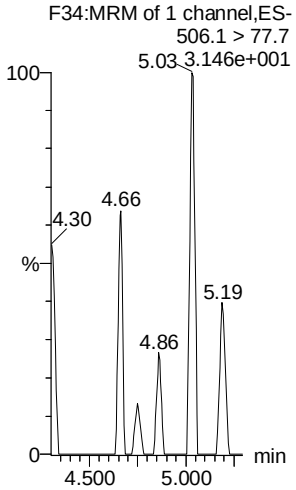

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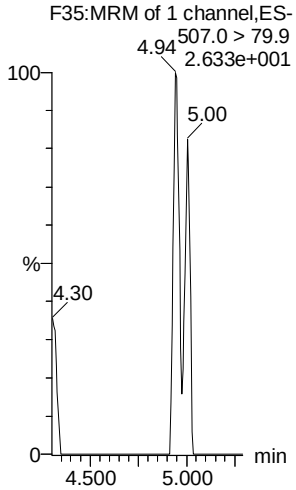

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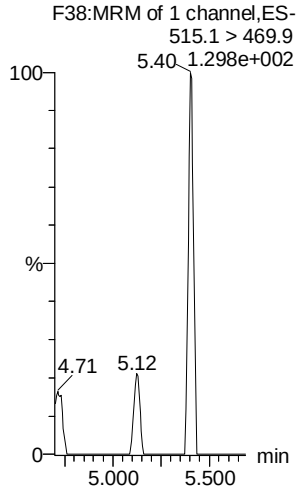

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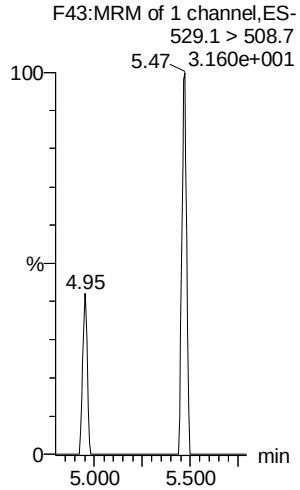

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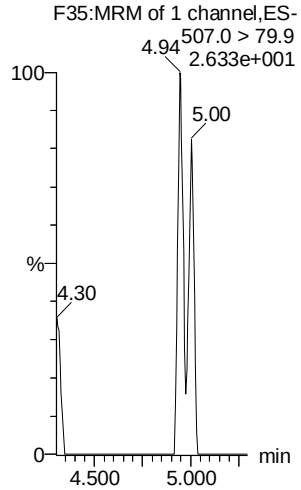

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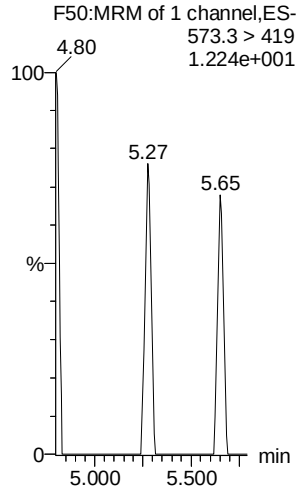

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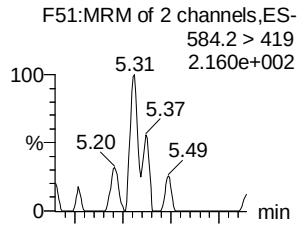

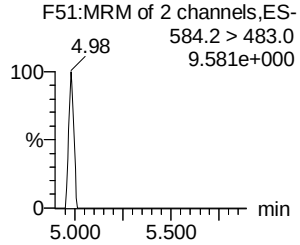

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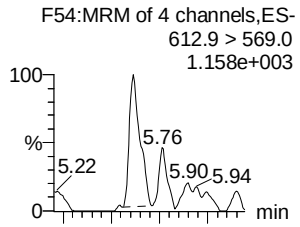

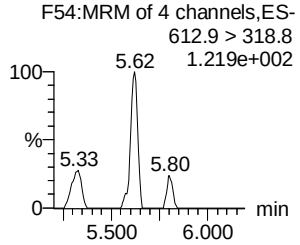

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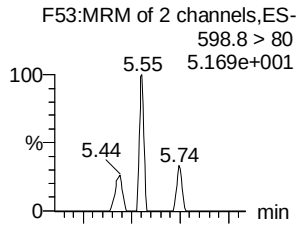

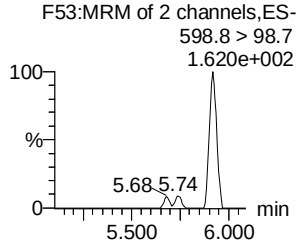

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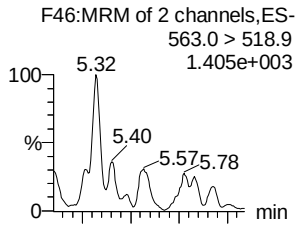

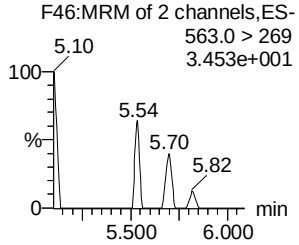

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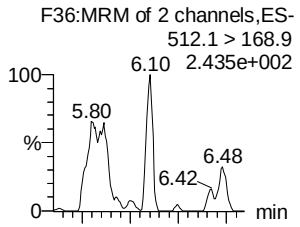

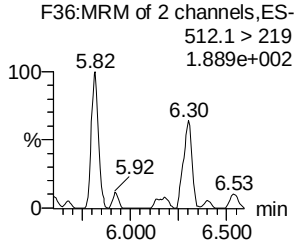

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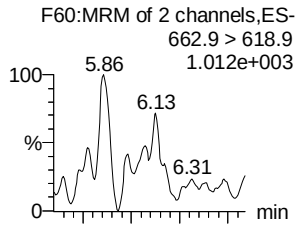

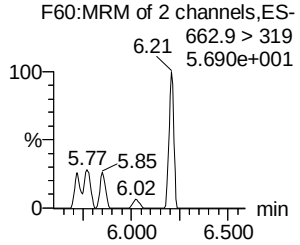

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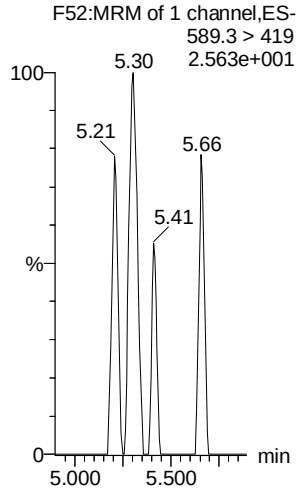

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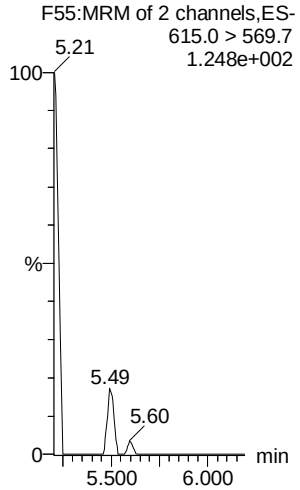

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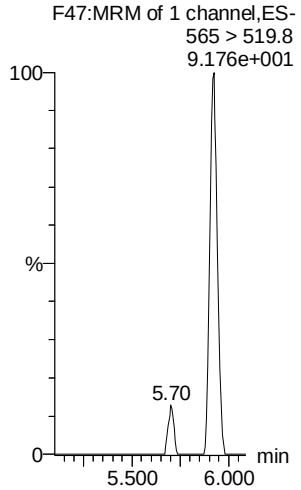

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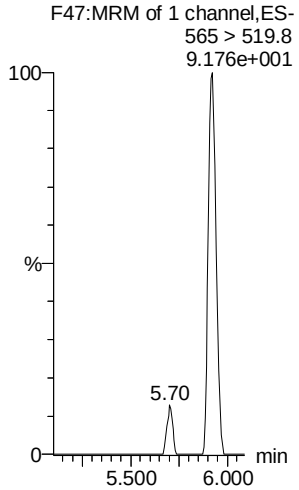

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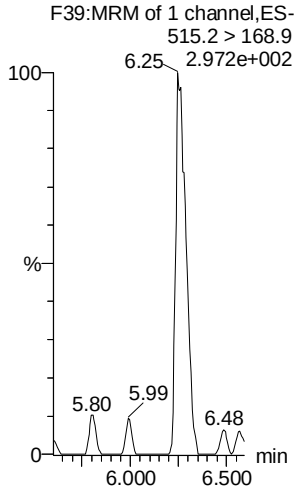

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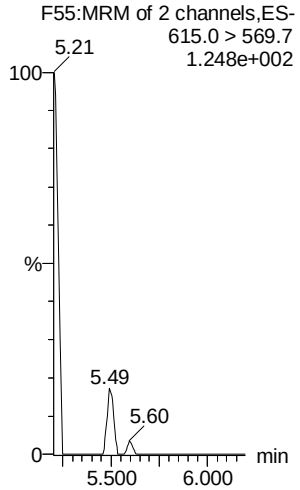

Vista Analytical Laboratory

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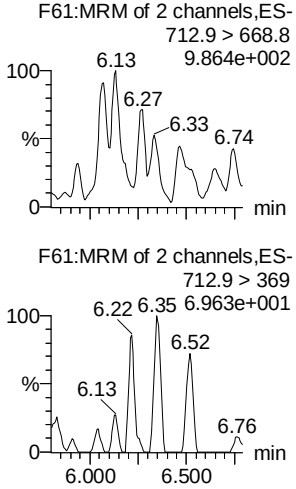

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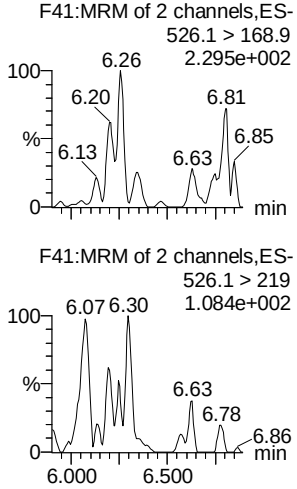

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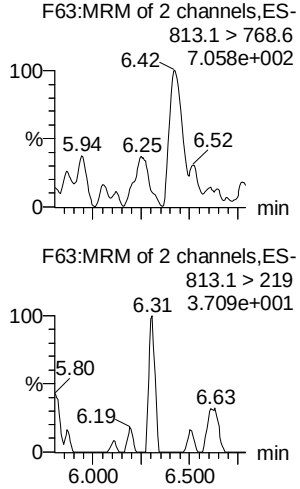

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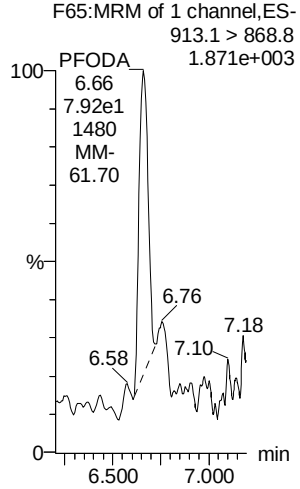

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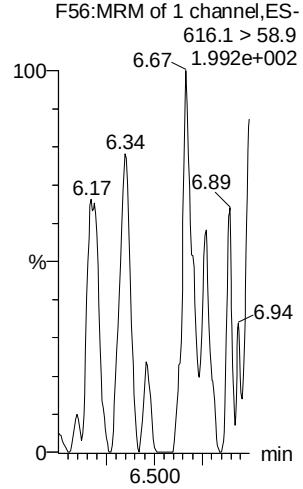
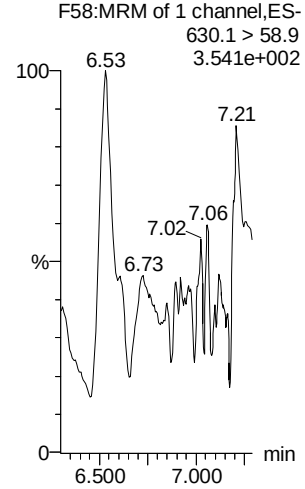
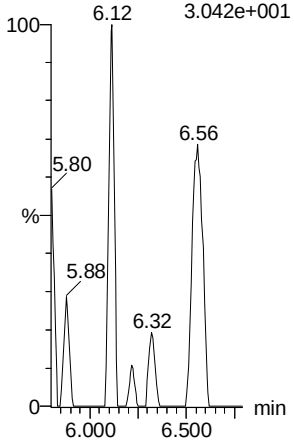


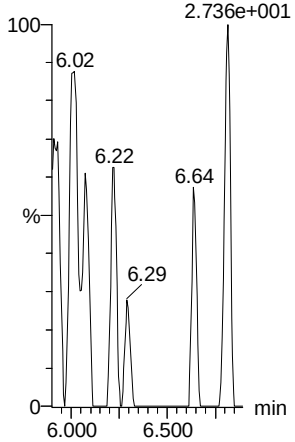
N-EtFOSE



13C2-PFTeDA



d5-N-ETFOSA



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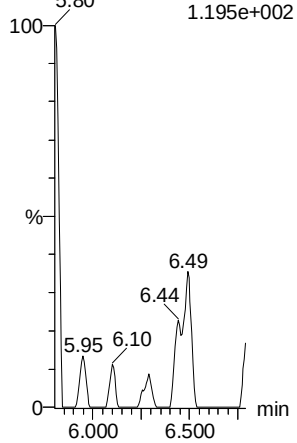

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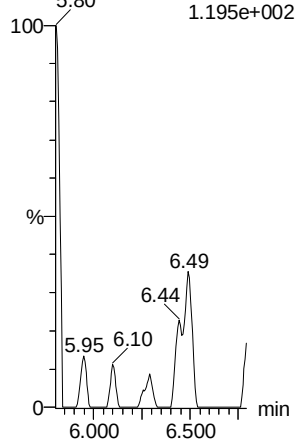

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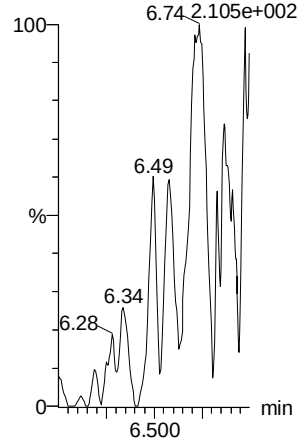
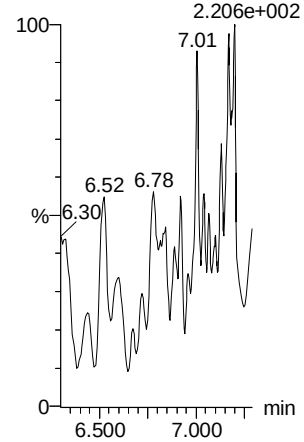


d9-N-EtFOSE



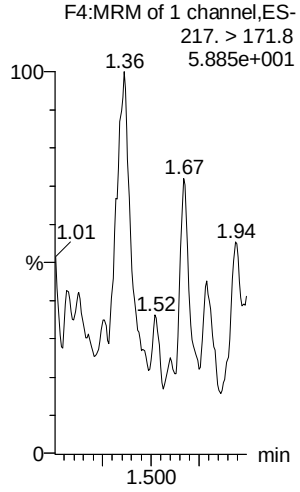
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, June 04, 2018 09:11:19 Pacific Daylight Time
Printed: Monday, June 04, 2018 09:11:28 Pacific Daylight Time

Name: 180603M2_12, Date: 03-Jun-2018, Time: 19:52:27, ID: IPA, Description: IPA

13C4-PFBA



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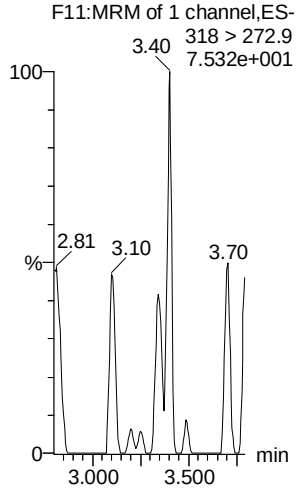
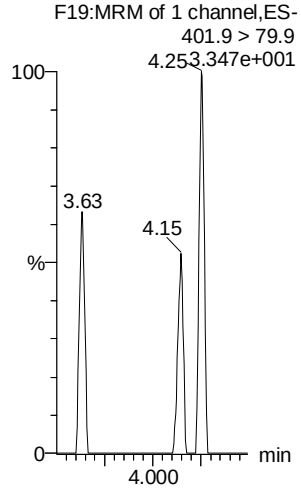
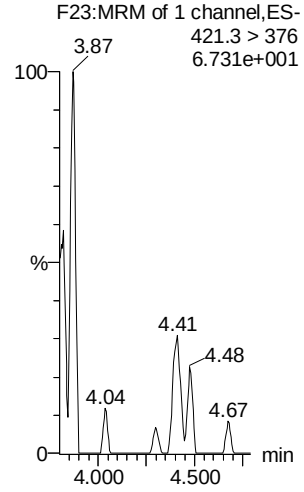


13C3-PFHxS



13C8-PFOA



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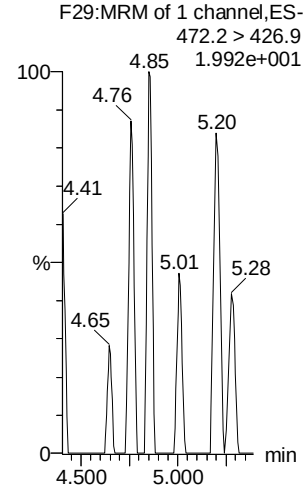

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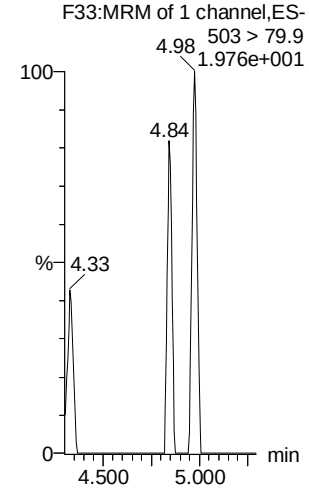
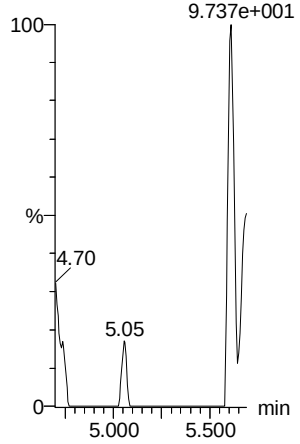
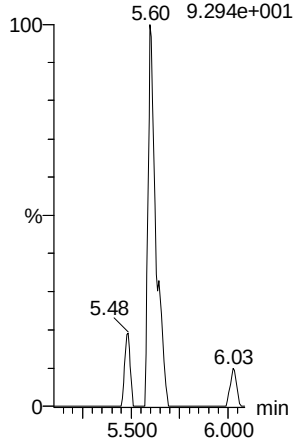


13C6-PFDA



13C7-PFUdA



Tune Checks

Mass Calibration Q4(M) 05-30-2018

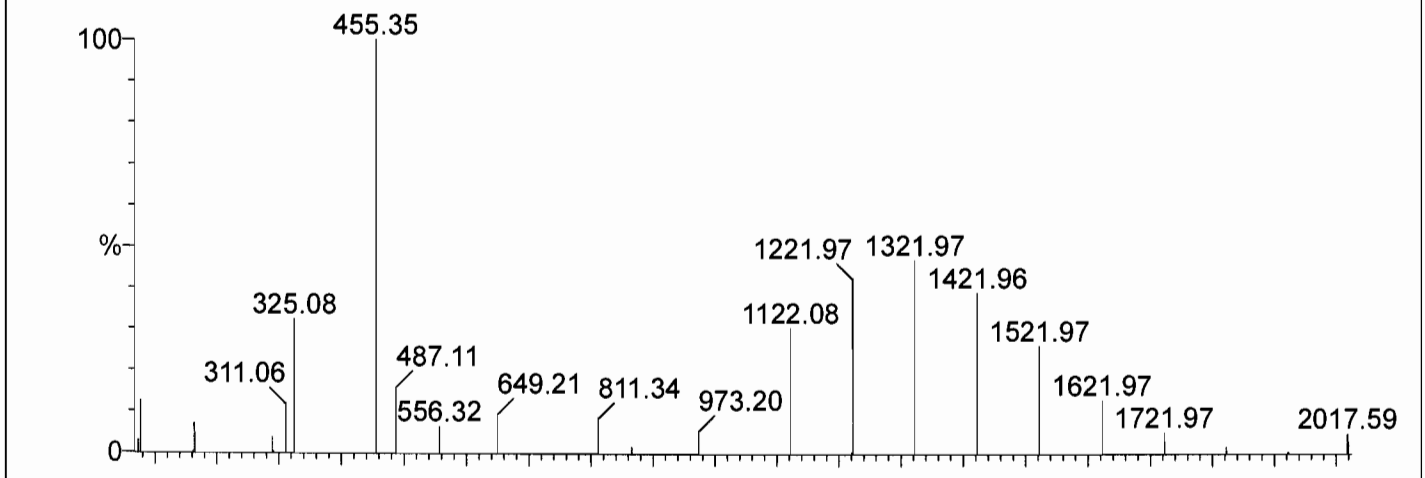
Calibration Report - MS1 Static

20180530

Printed: **Wed May 30 17:00:26 2018**

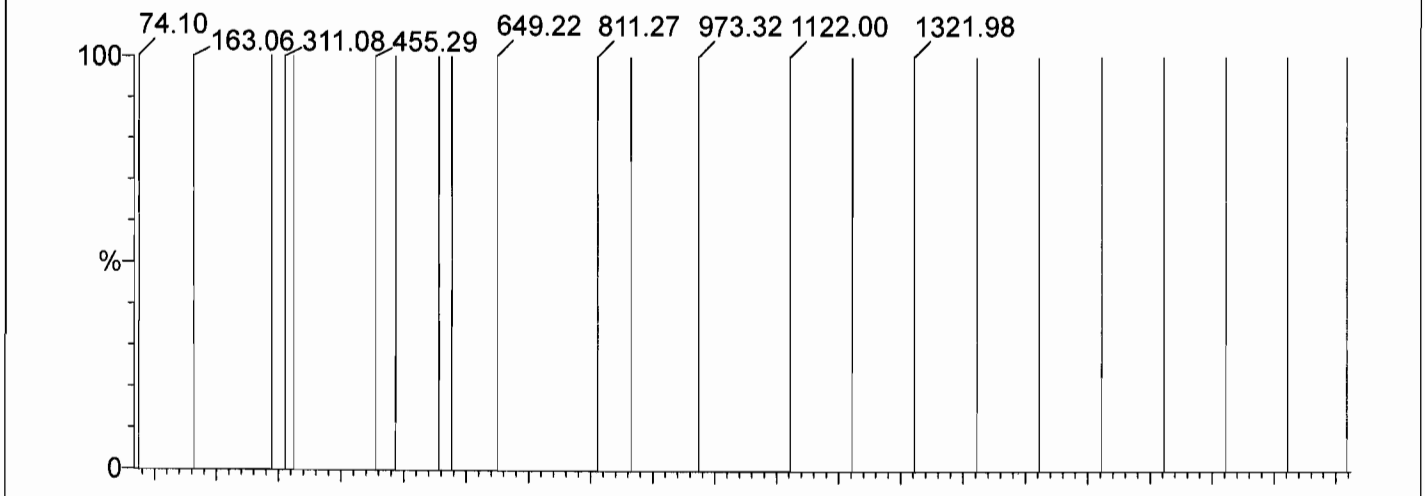
Data file: STATMS1 - Calibrated

21 matches of 23 tested references



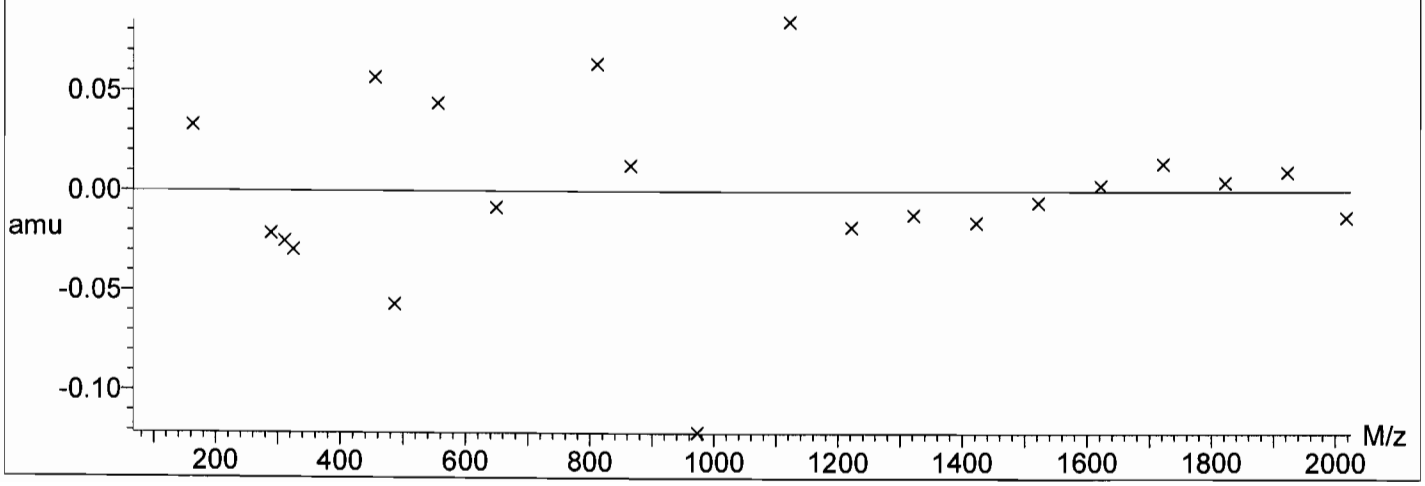
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref

Mean residual = 0.0309 amu

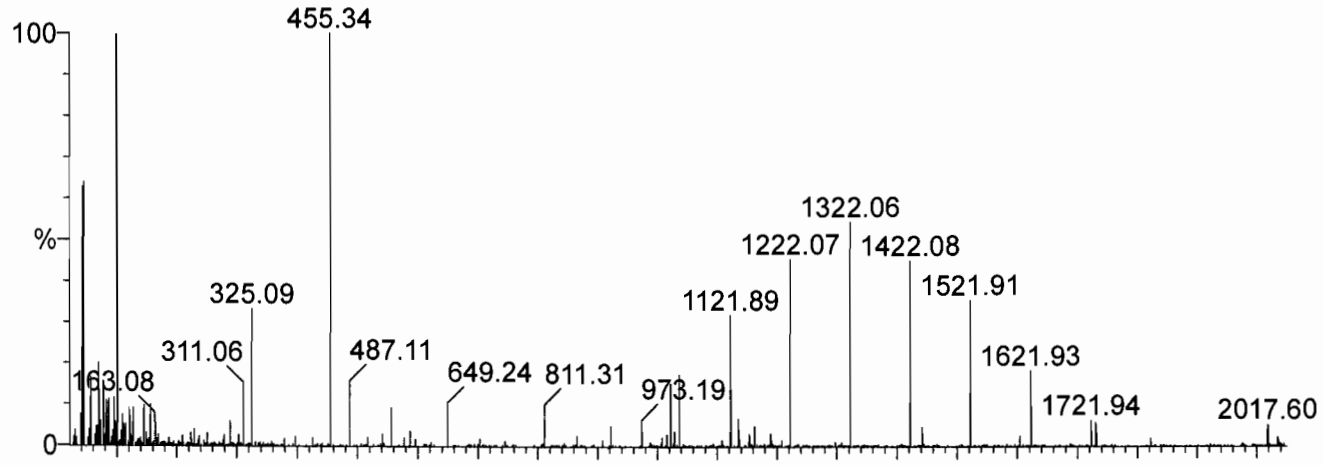


Residual Polynomial order = 4

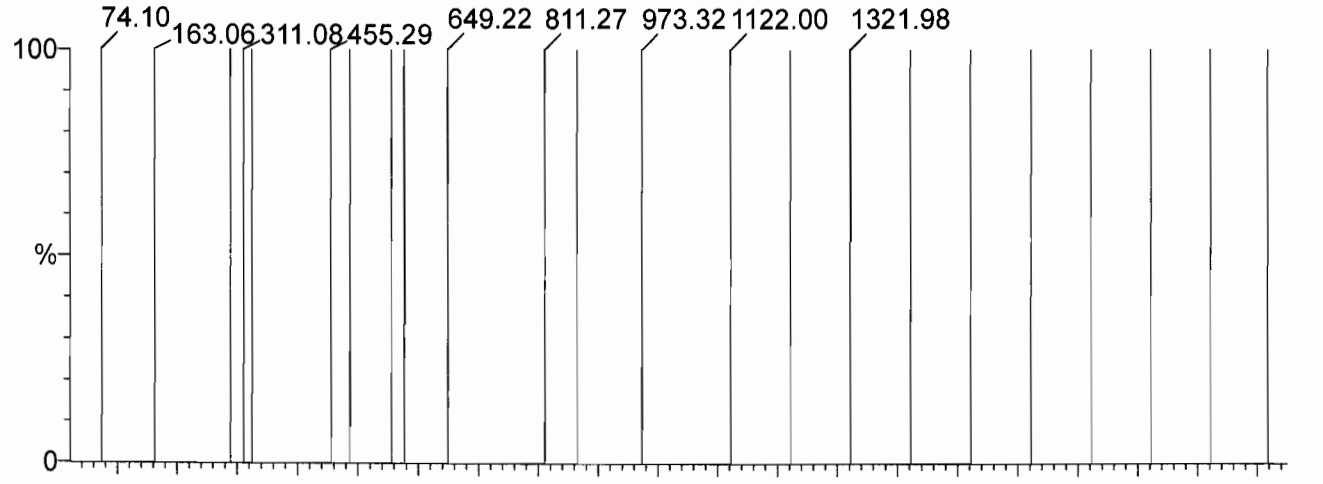
RMS residual = 0.0428 amu



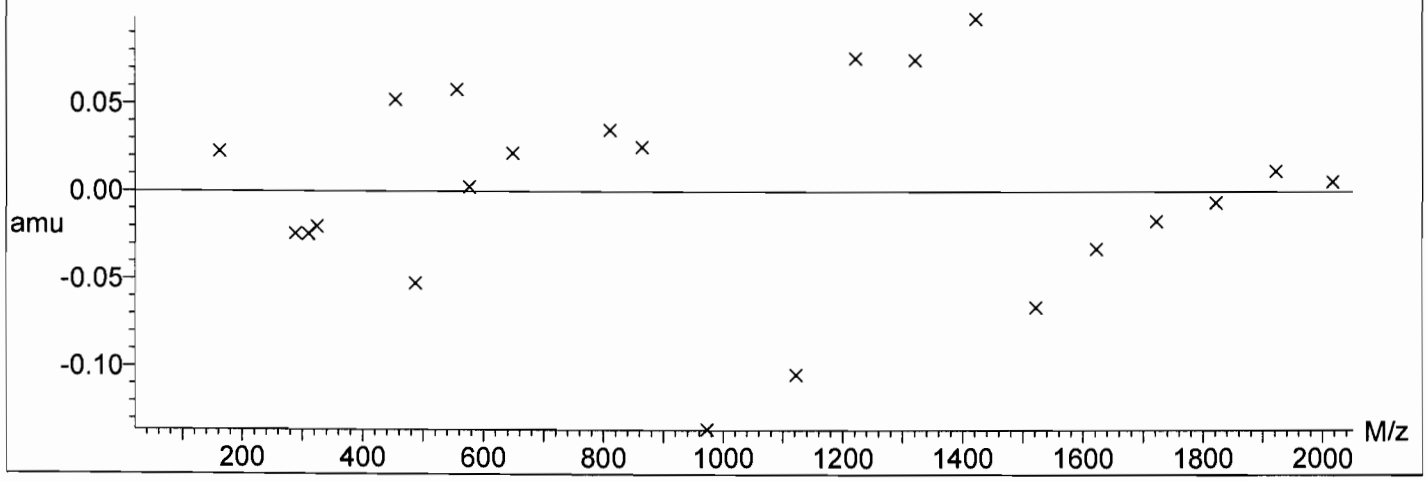
Data file: SCNMS1 - Calibrated 22 matches of 23 tested references



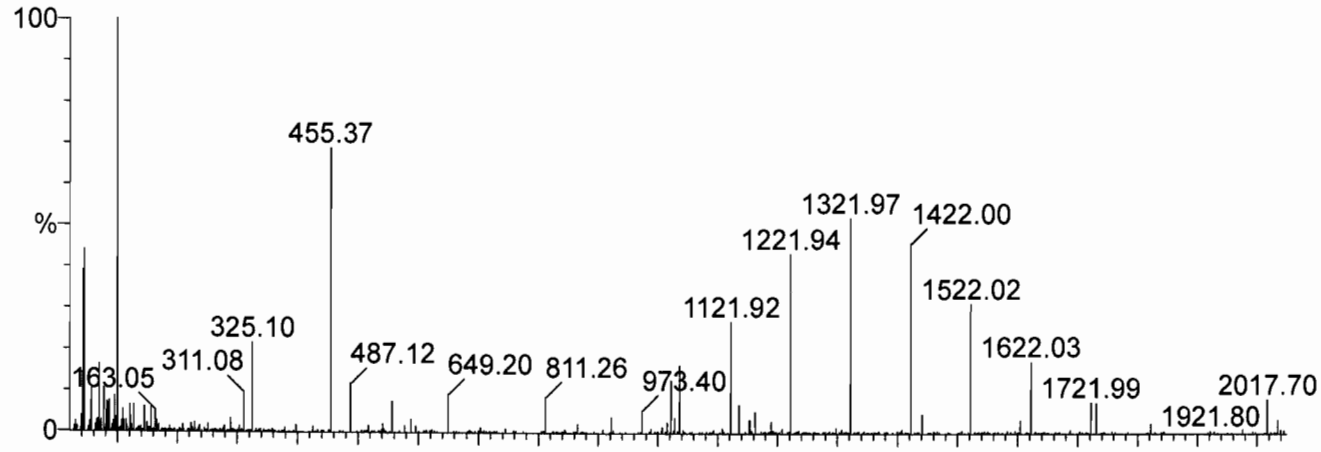
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.044 amu



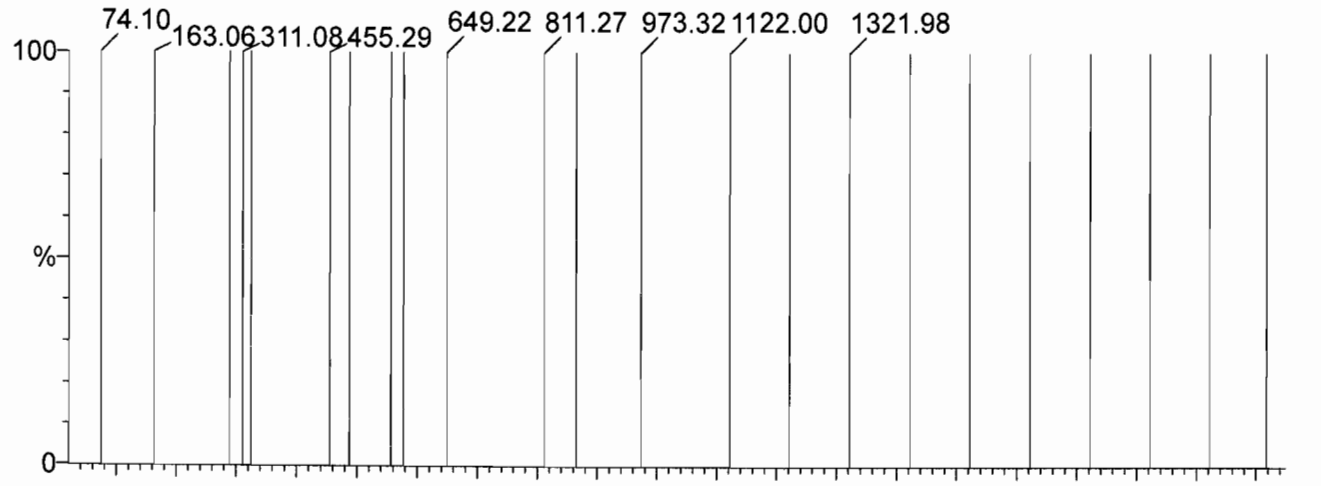
Residual Polynomial order = 4 RMS residual = 0.0563 amu



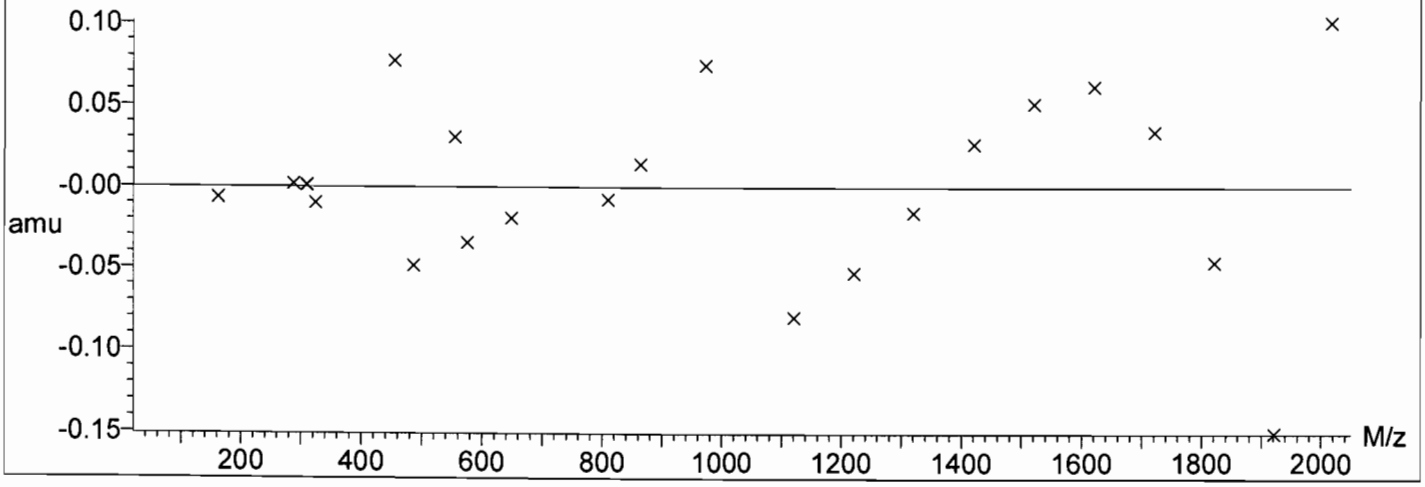
Data file: FASTMS1 - Calibrated 22 matches of 23 tested references



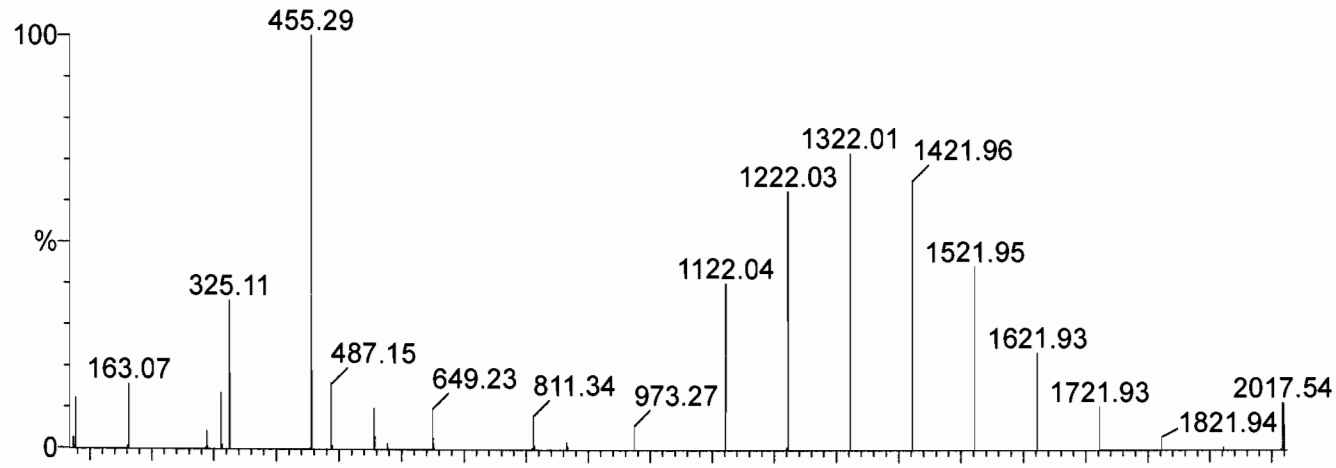
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.043 amu



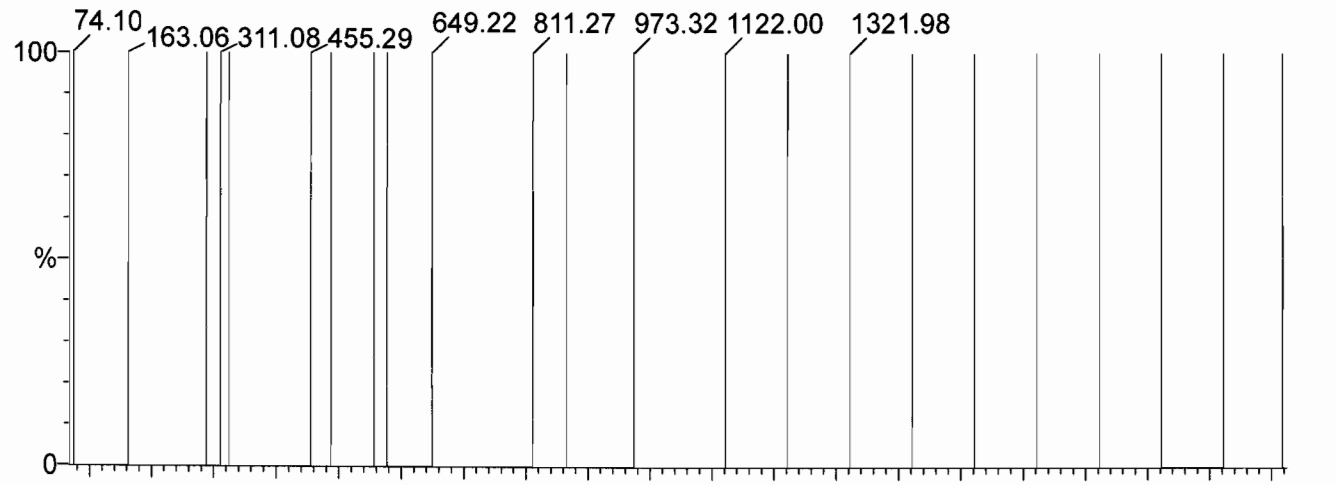
Residual Polynomial order = 4 RMS residual = 0.0563 amu



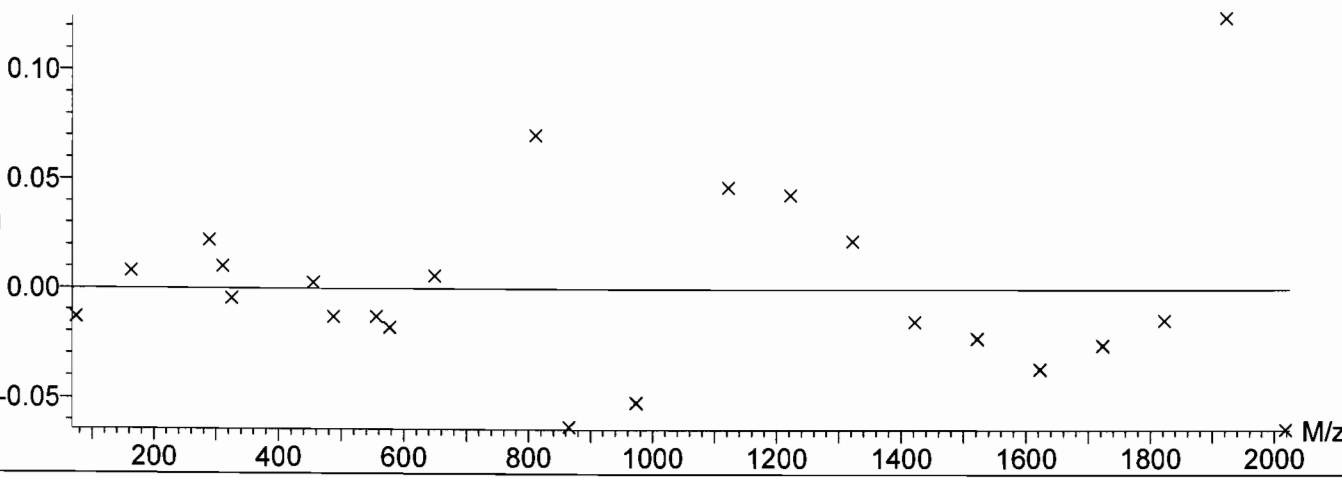
Data file: STATMS2 - Calibrated 23 matches of 23 tested references



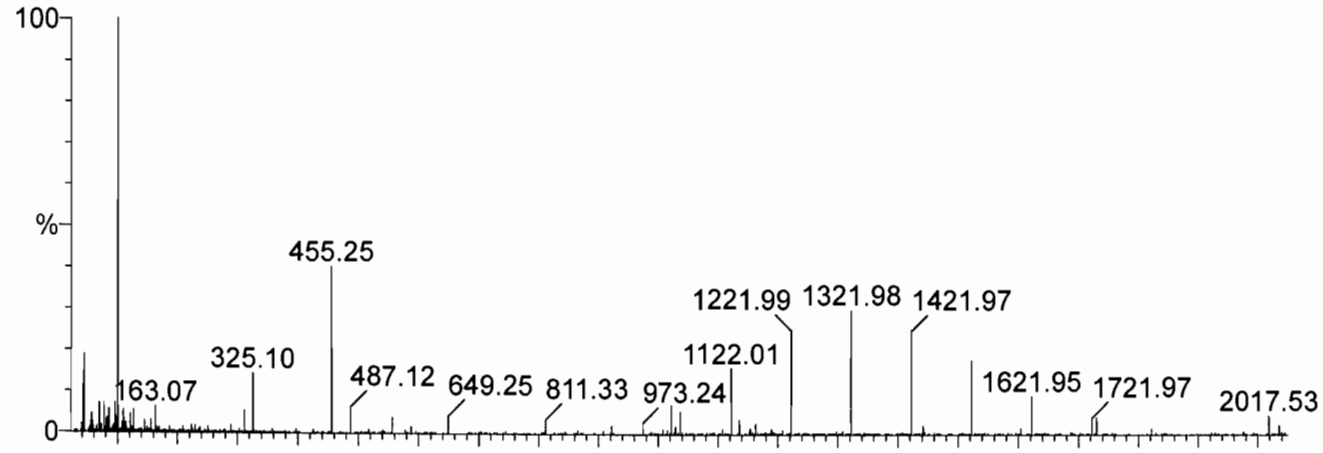
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.0309 amu



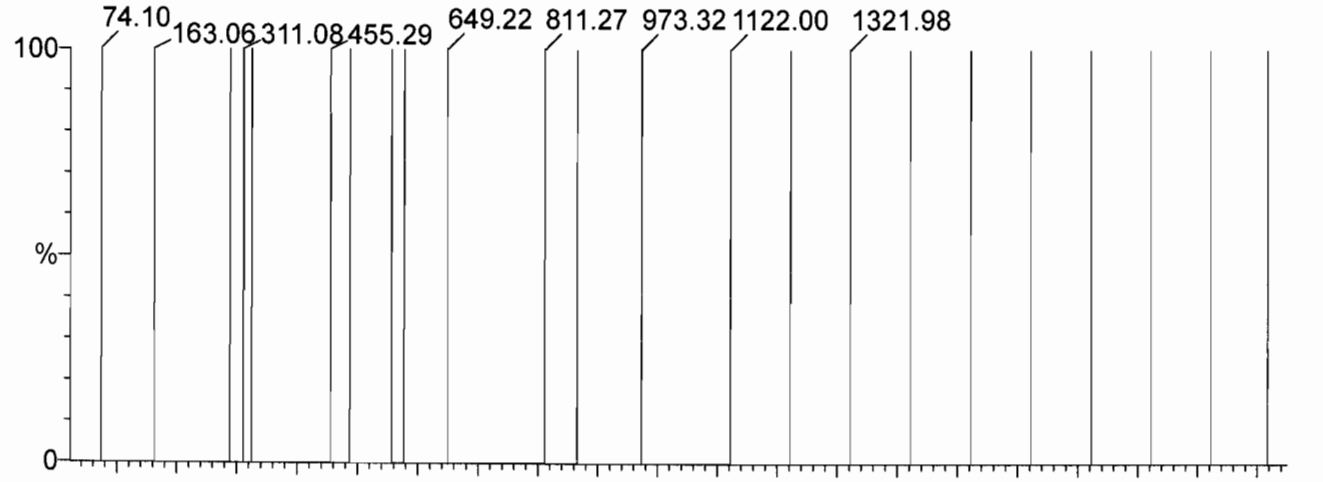
Residual Polynomial order = 4 RMS residual = 0.0418 amu



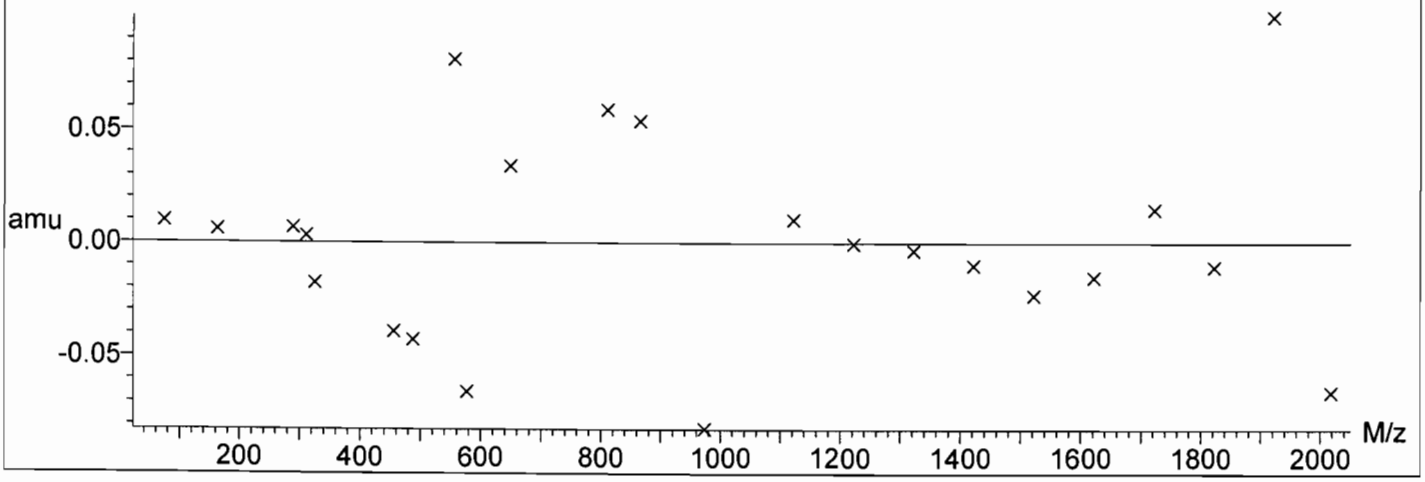
Data file: SCNMS2 - Calibrated 23 matches of 23 tested references



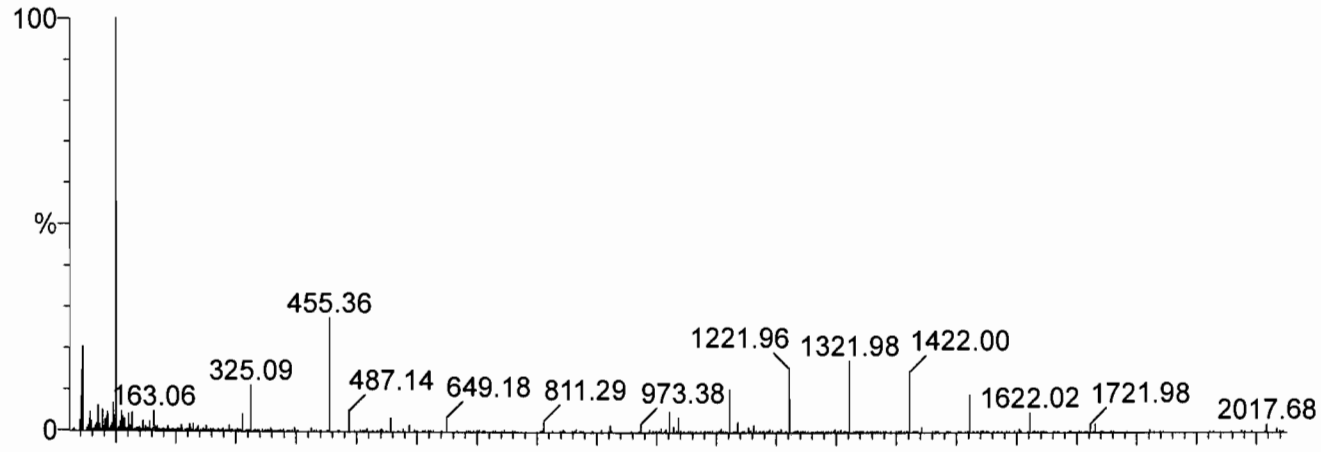
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.0327 amu



Residual Polynomial order = 4 RMS residual = 0.044 amu



Data file: FASTMS2 - Calibrated 23 matches of 23 tested references



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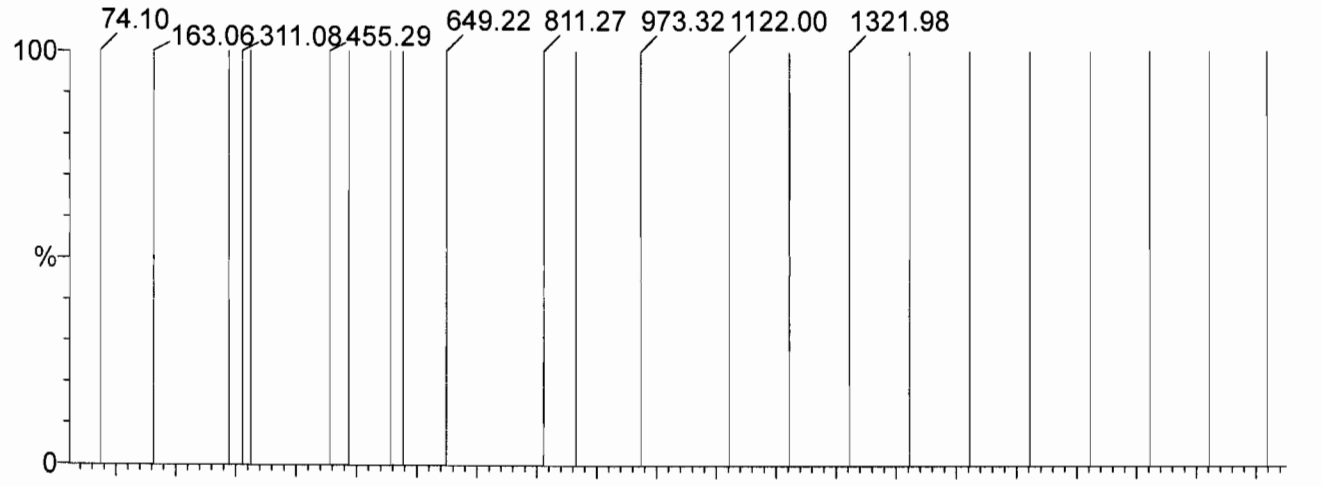
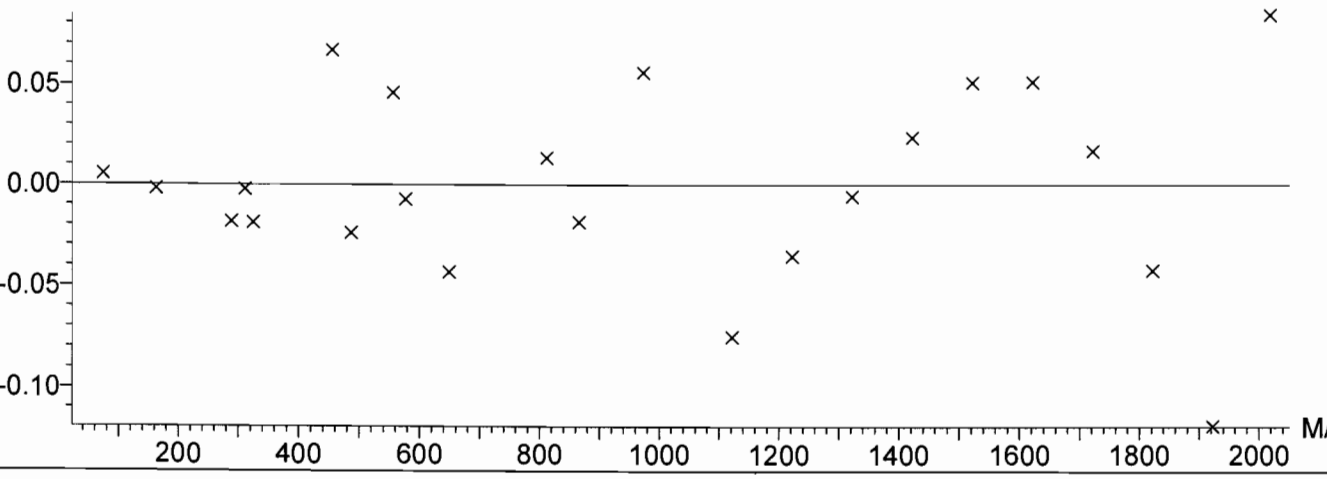


Residual Polynomial order = 4 RMS residual = 0.0464 amu



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

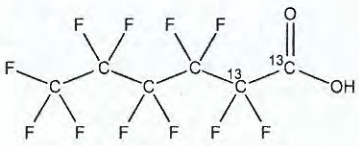
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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).

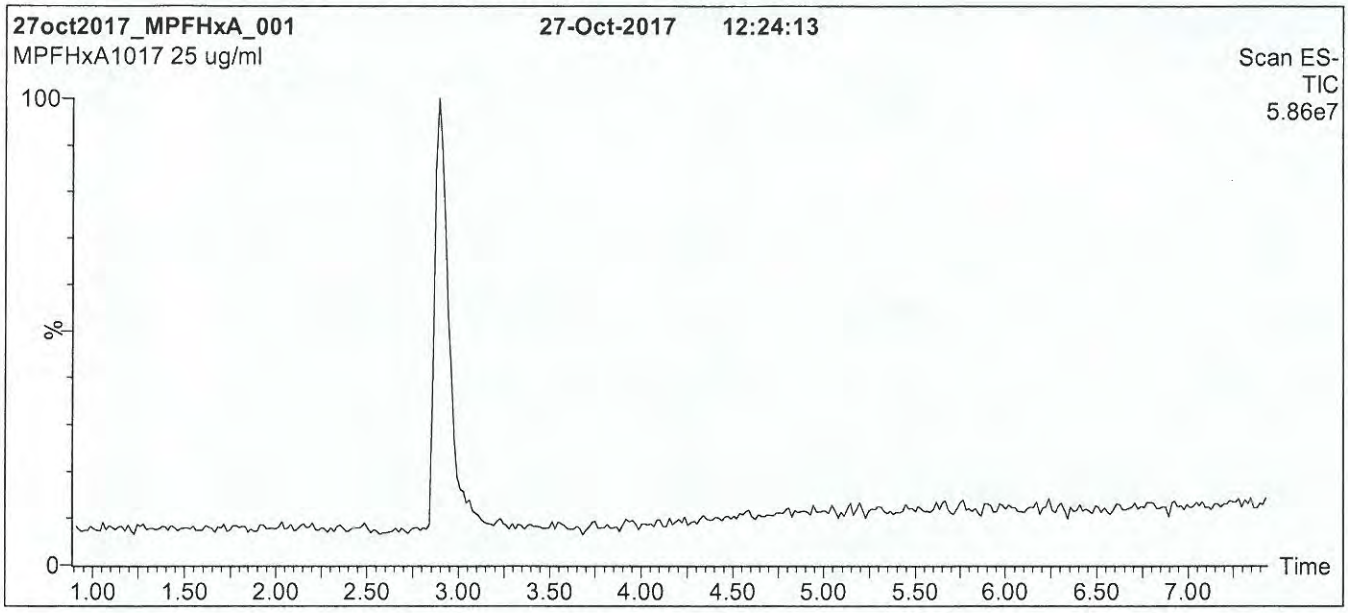
CALA Testing Accreditation No. A 1226

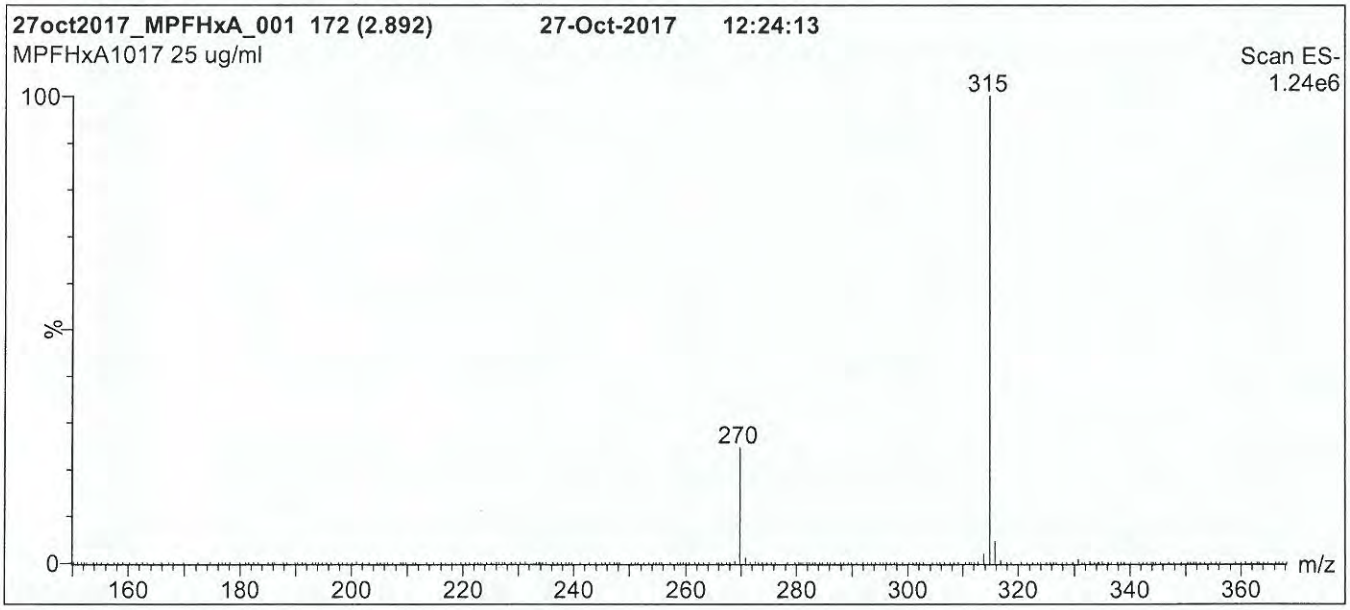
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

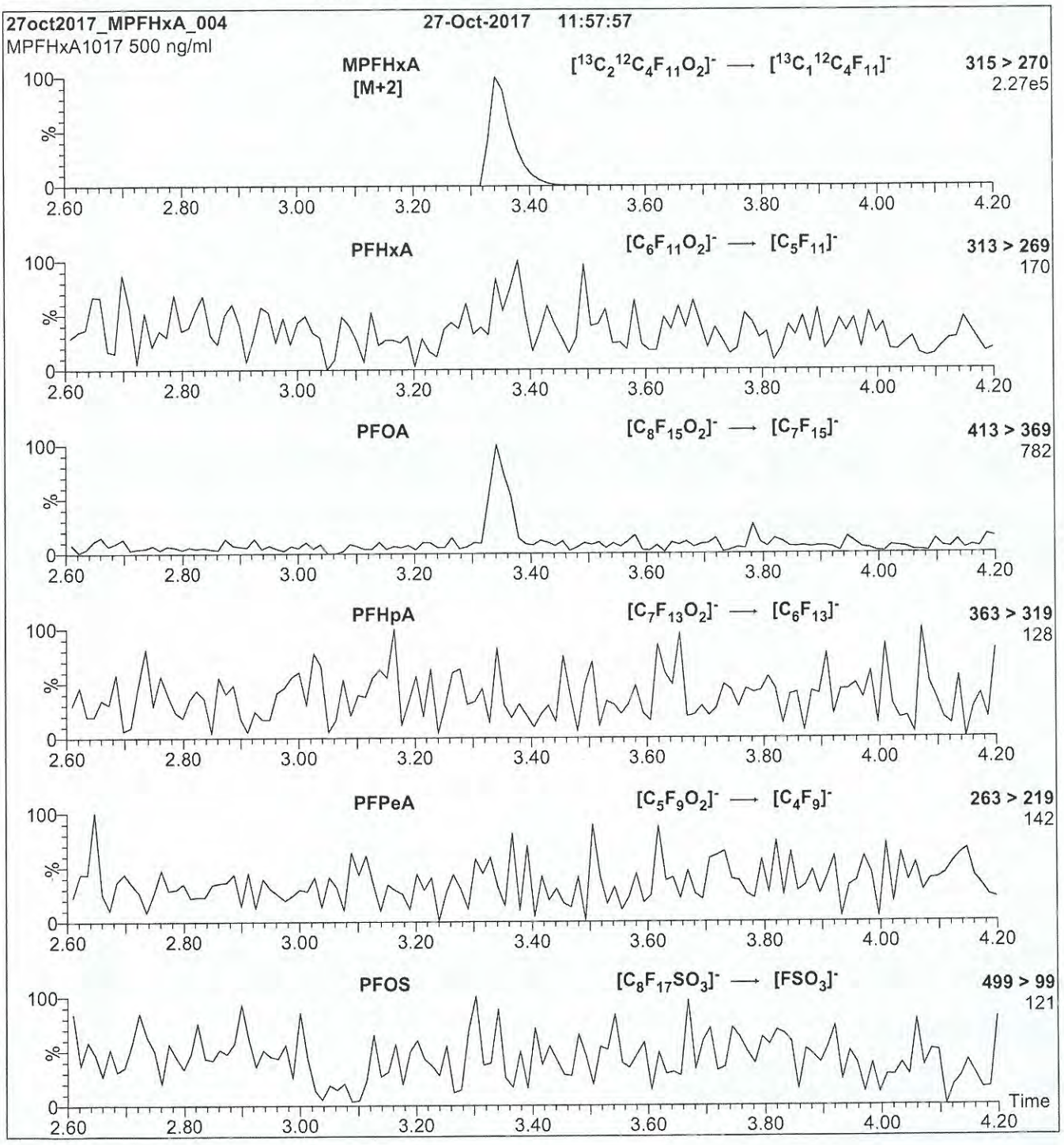
MS Parameters

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

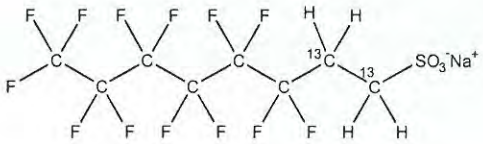
WELLINGTON LABORATORIES

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.

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CALA

ANAB ACCREDITED

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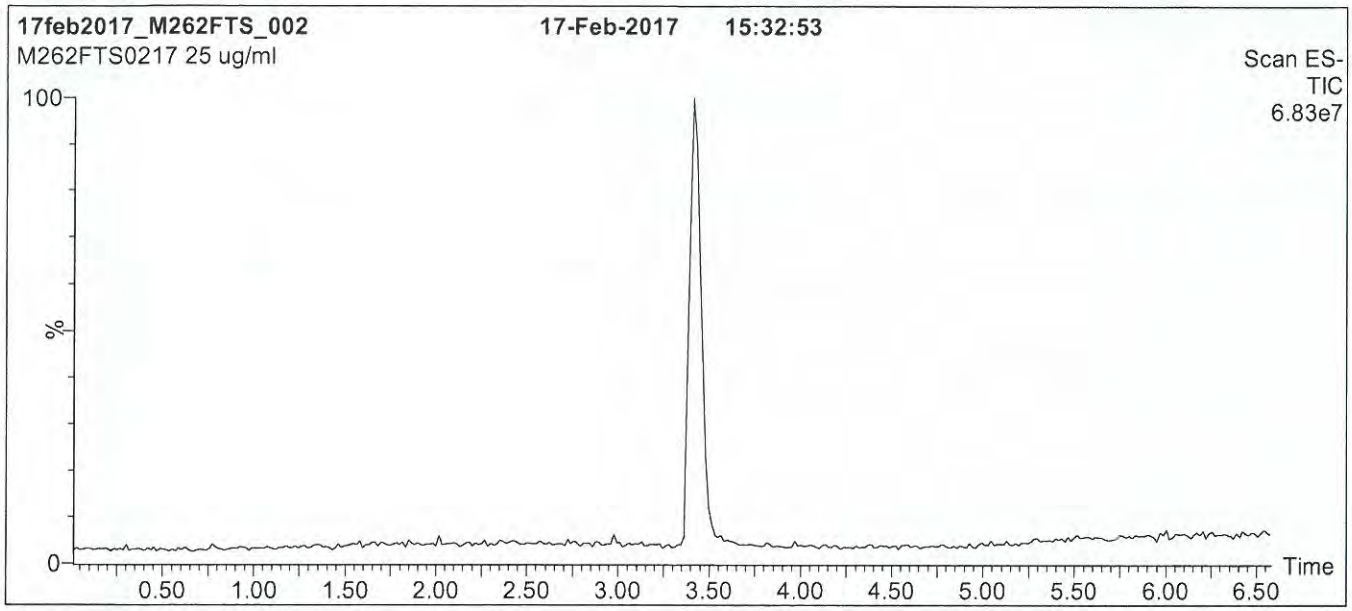
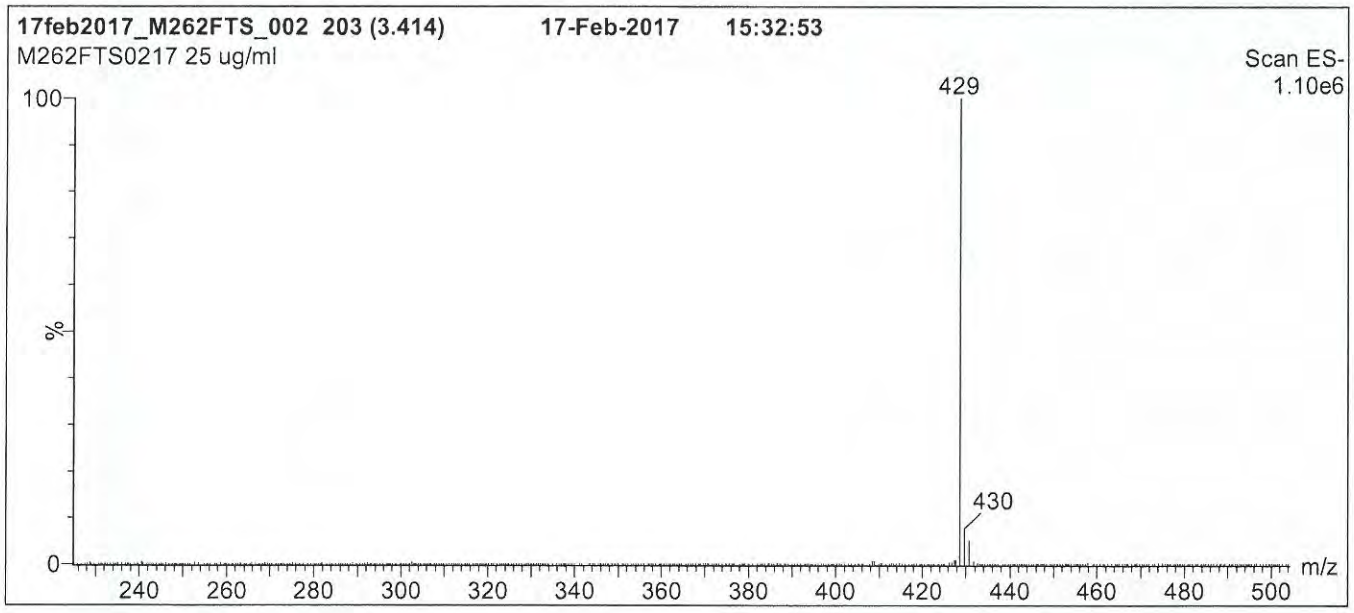
18B1503

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

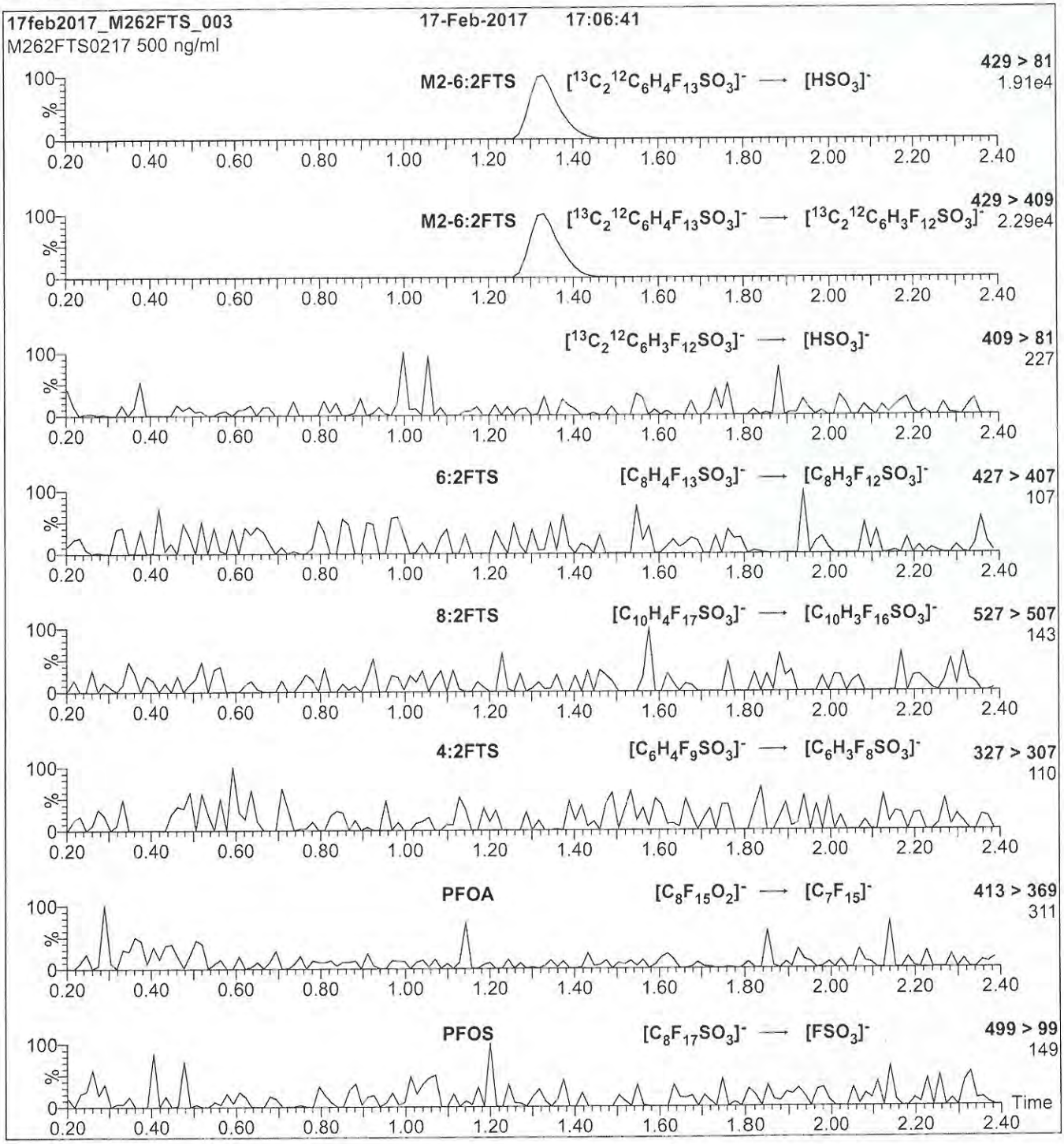
MS Parameters

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

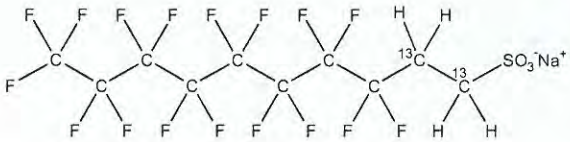
WELLINGTON LABORATORIES

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:

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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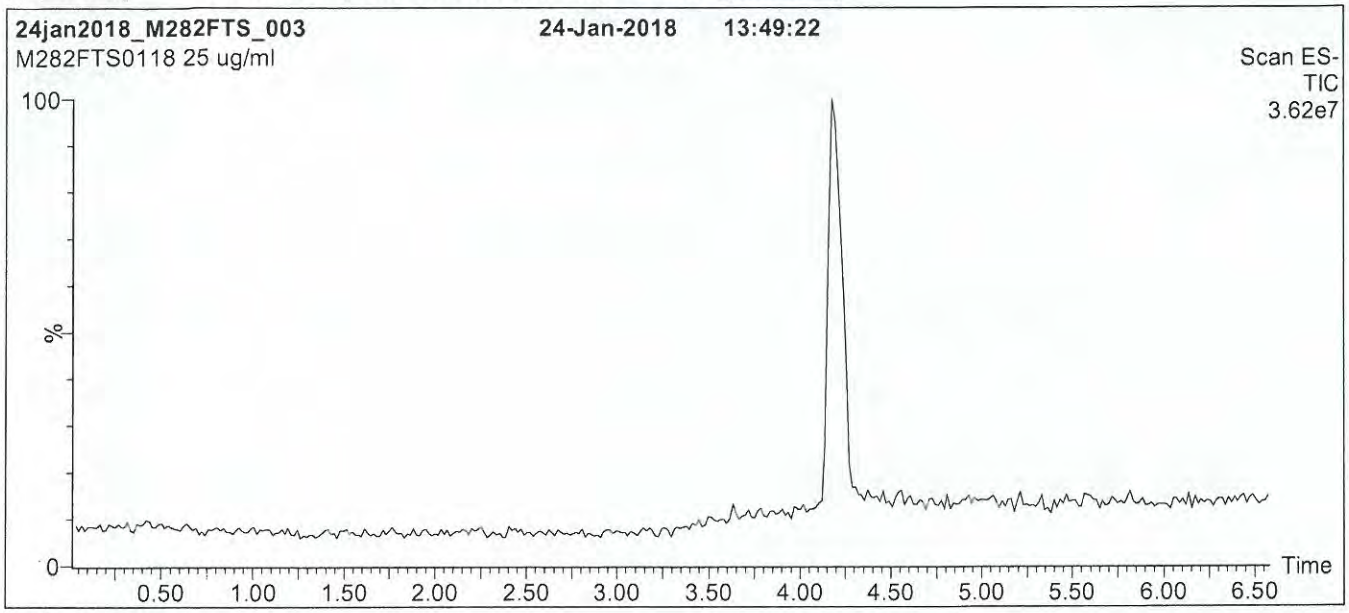
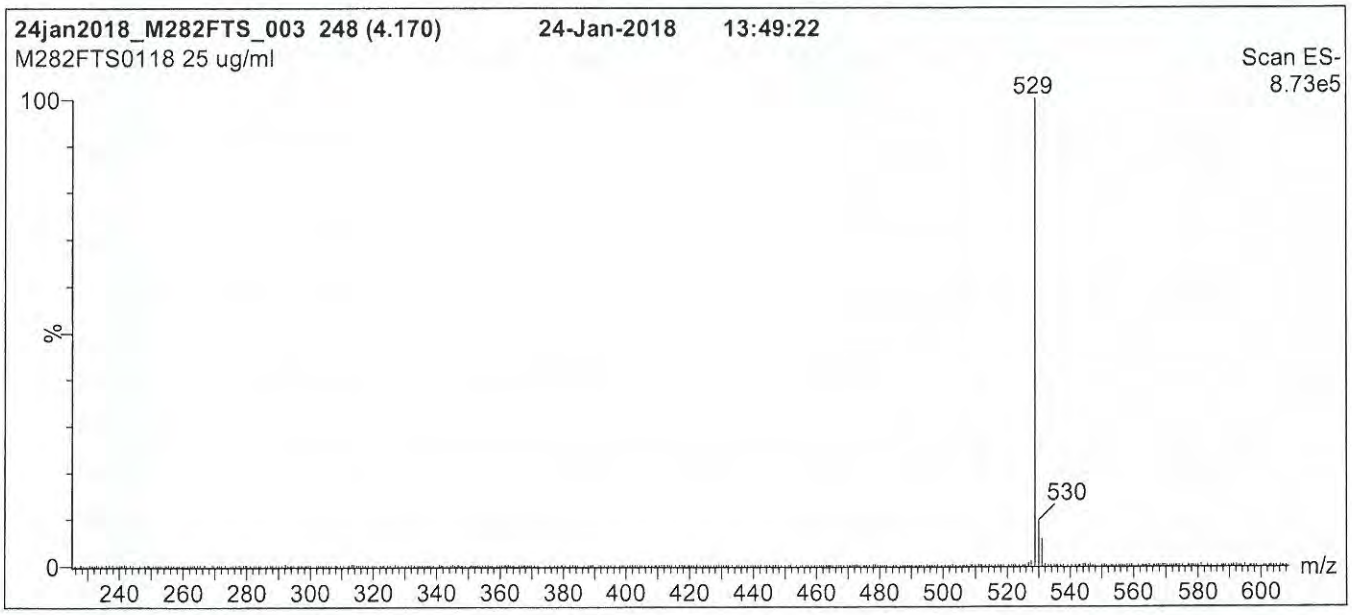
18B1504

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

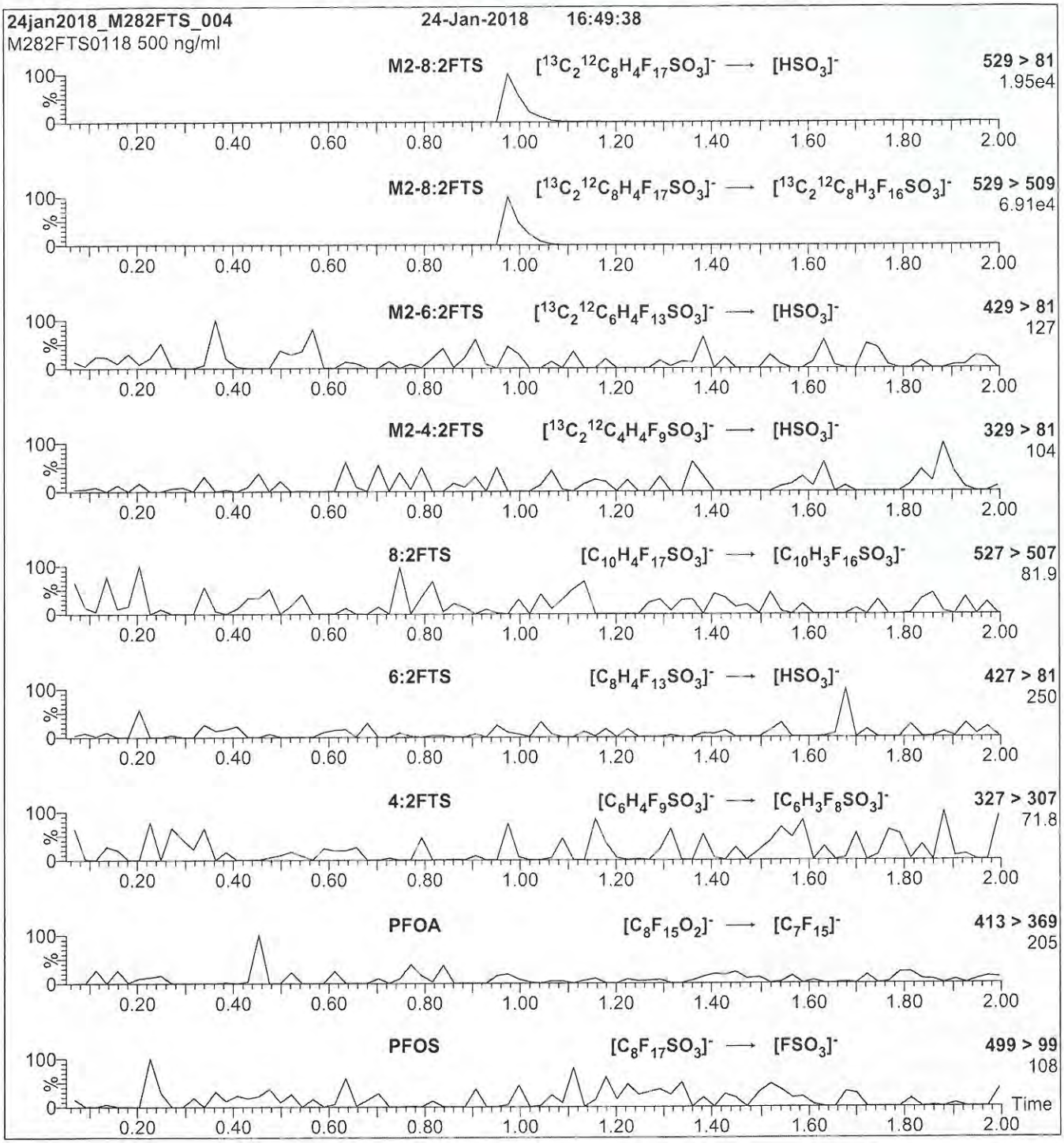
MS Parameters

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

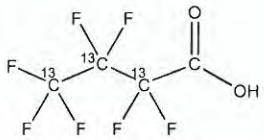
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 25

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-$^{13}C_3$)
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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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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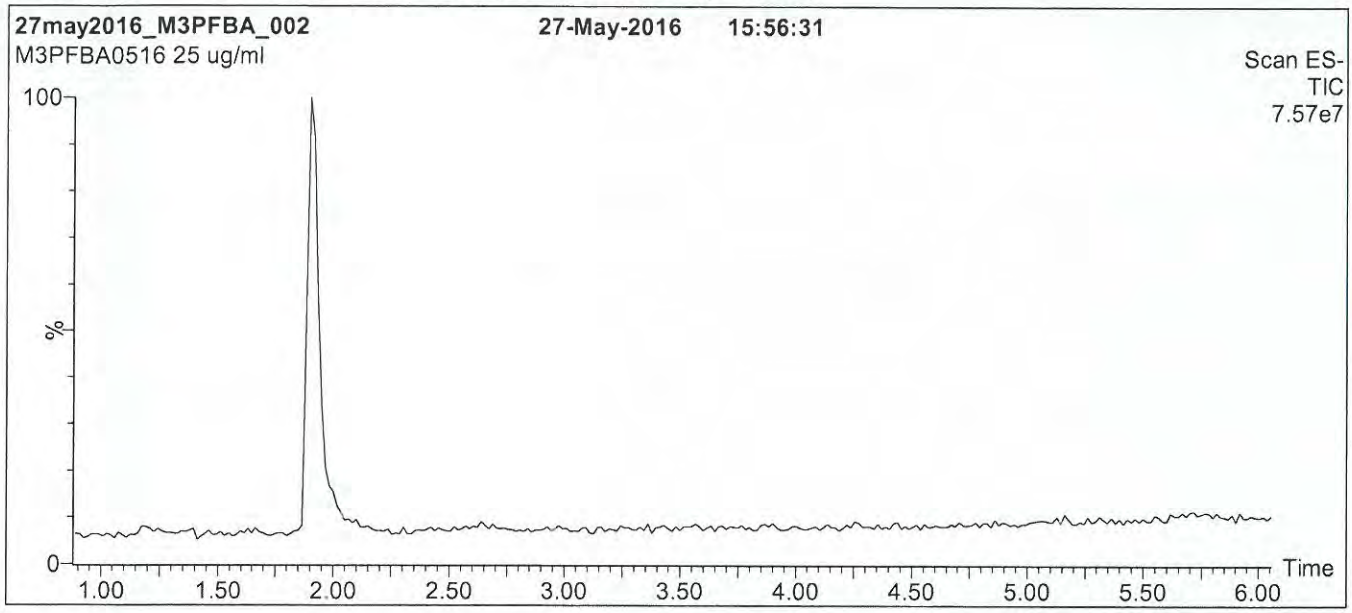
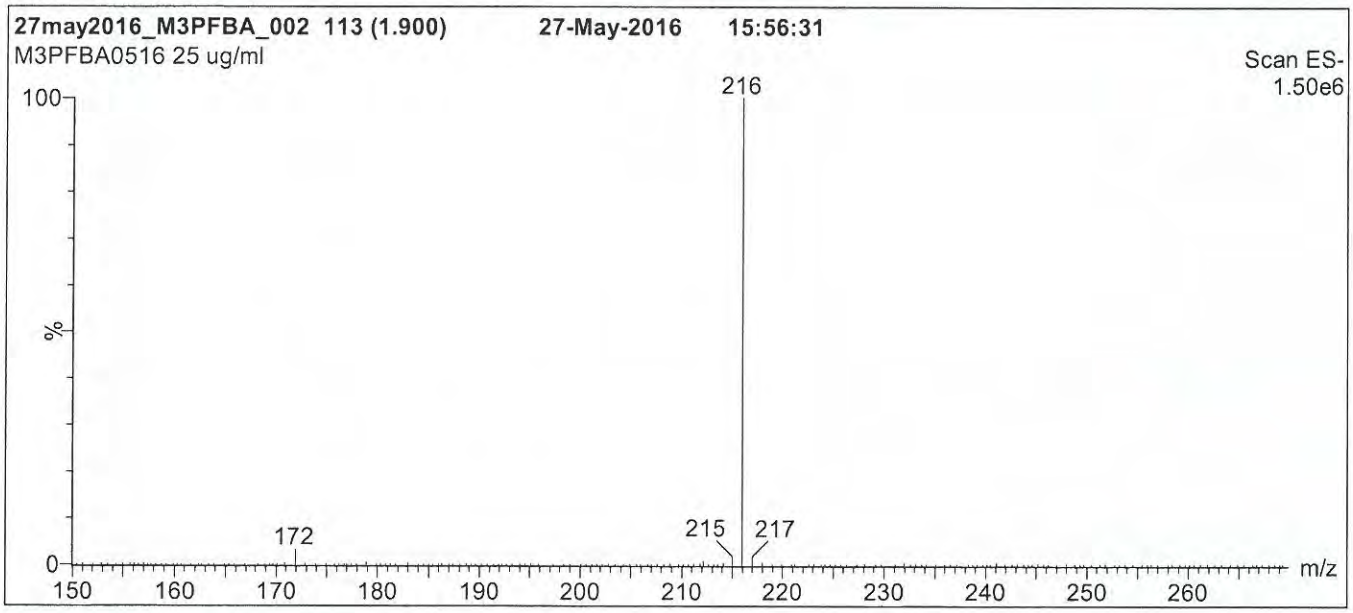
18B1505

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

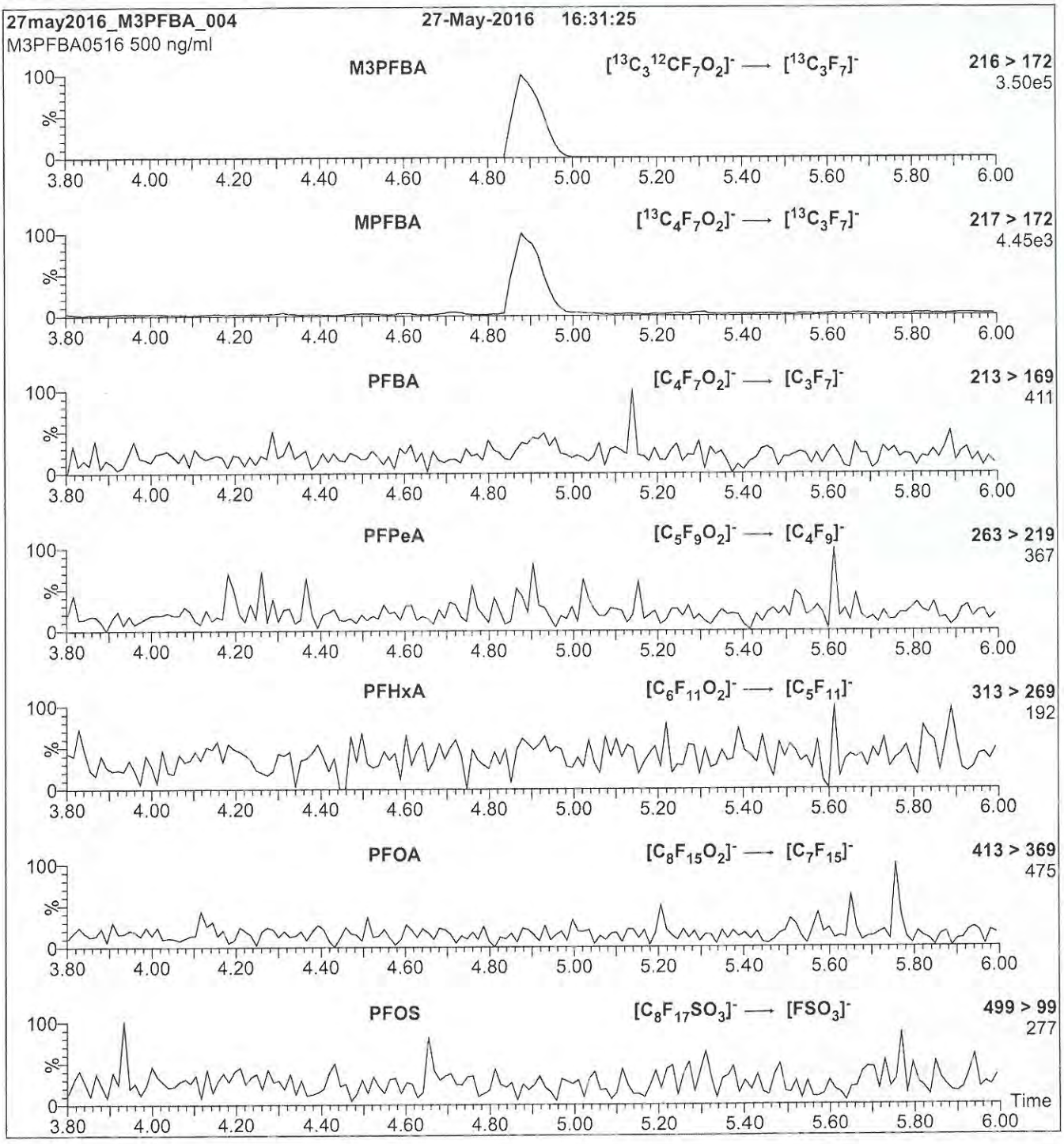
MS Parameters

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

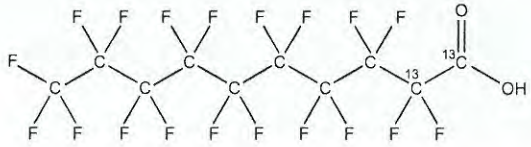
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

LOT NUMBER: MPFDA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_8HF_{19}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

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

MOLECULAR WEIGHT: 516.07
SOLVENT(S): Methanol
Water (<1%)
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)

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:

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).

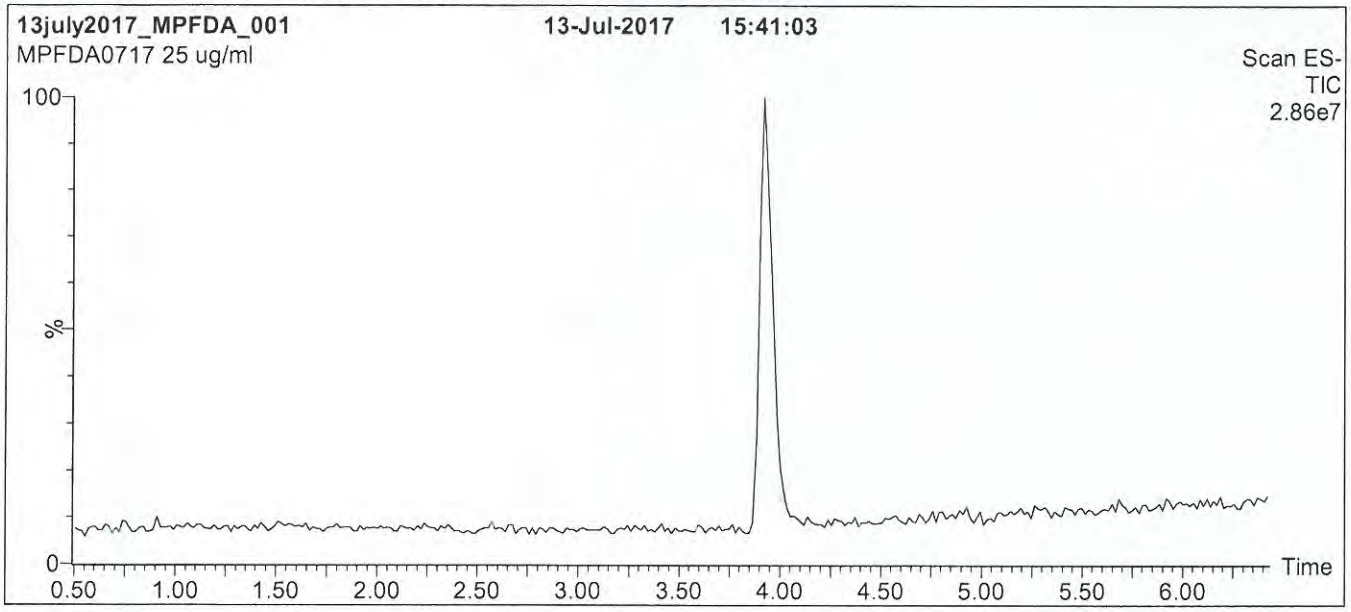
CALA

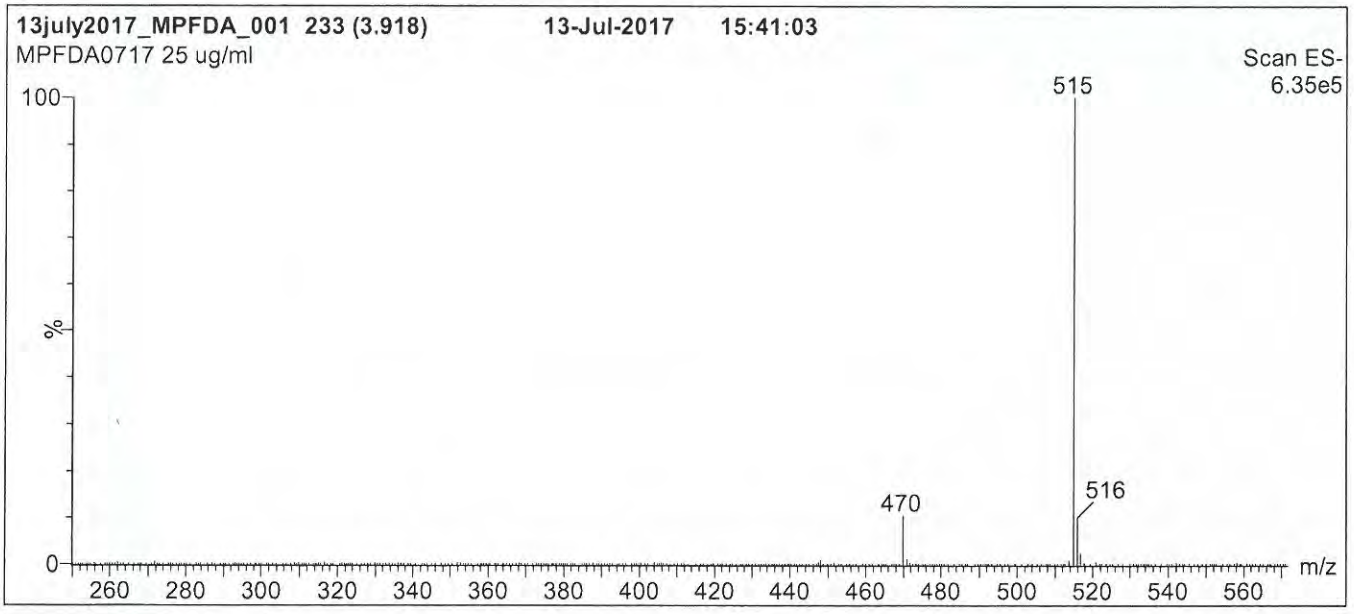
ANAB ACCREDITED

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

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

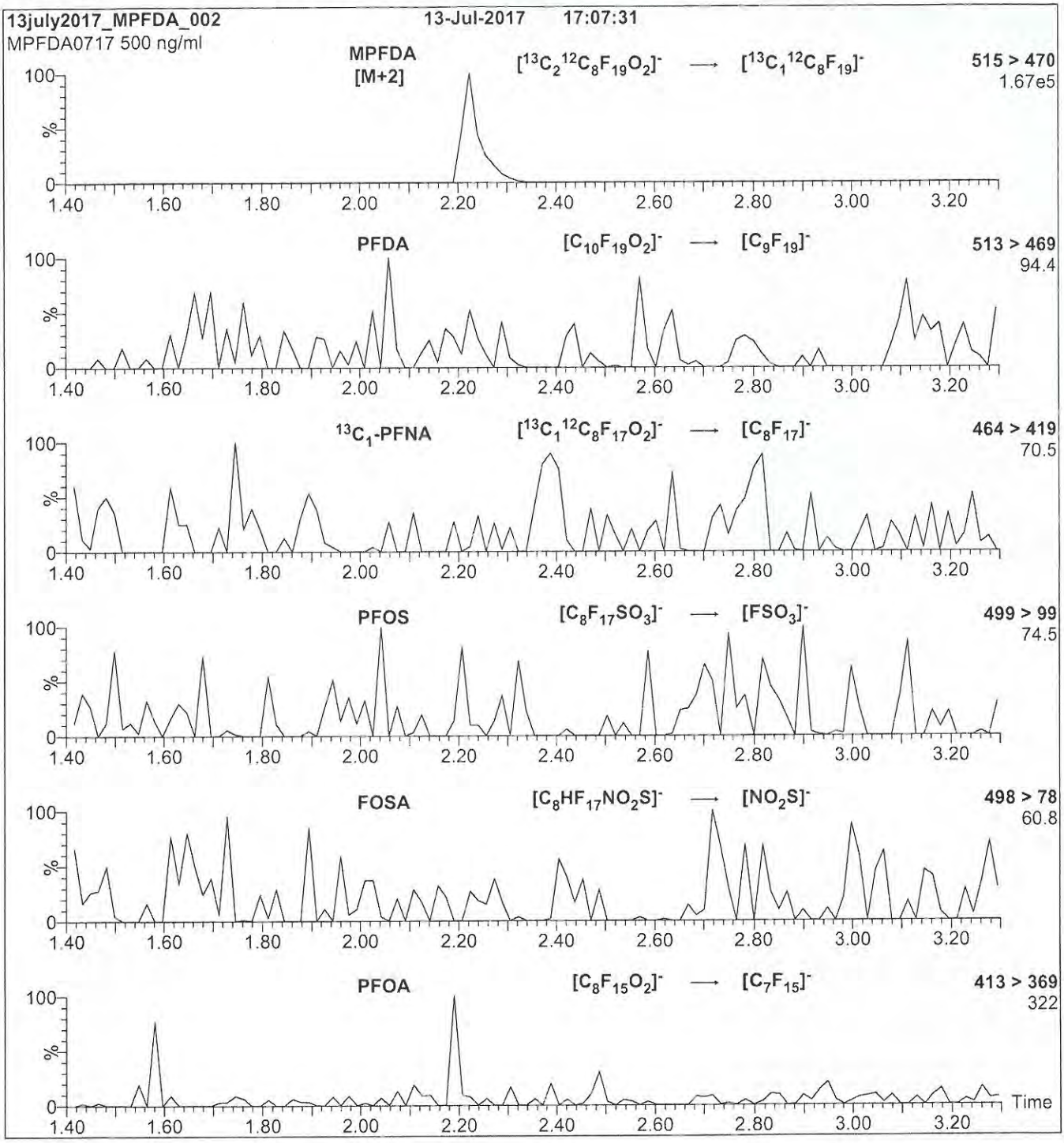
MS Parameters

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

1801506

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

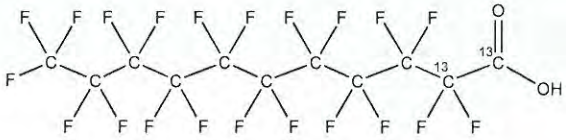
Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 13

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

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:

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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:

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CALA

ANAB ACCREDITED

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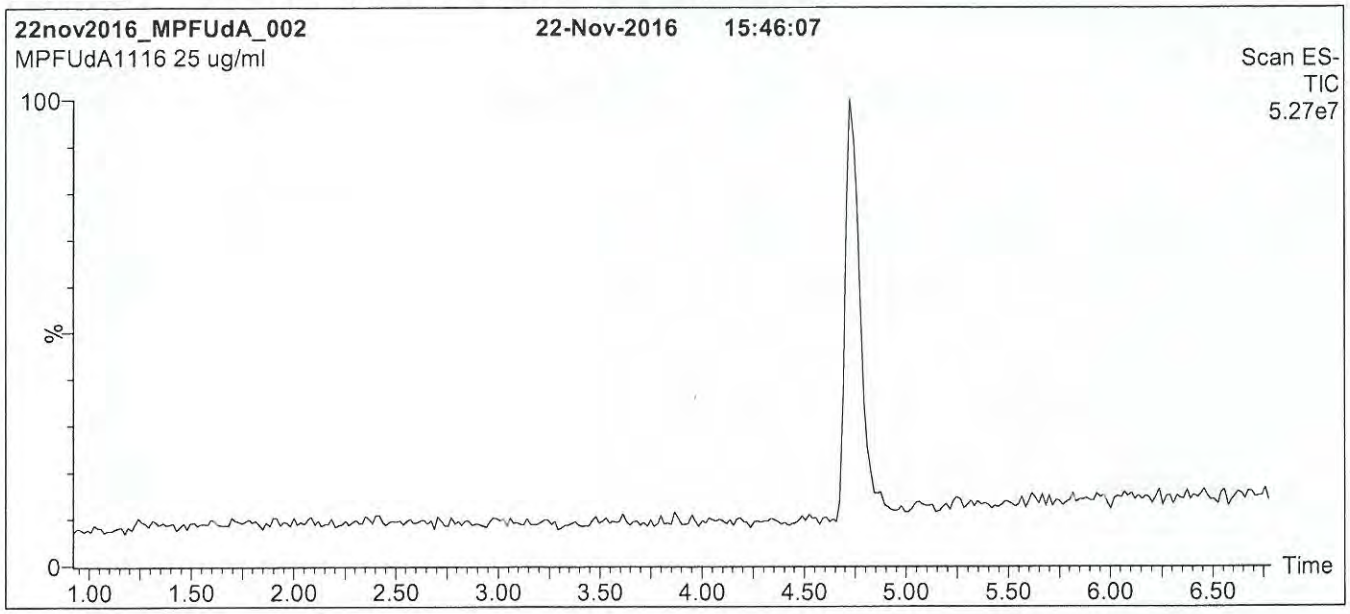
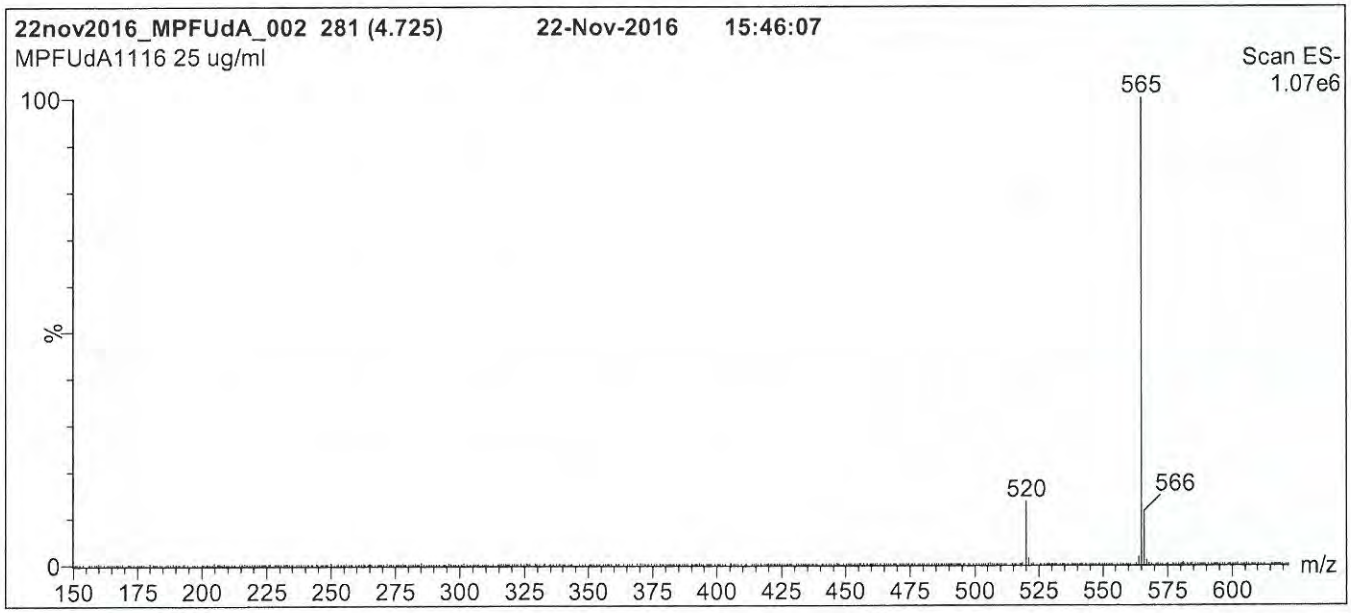
18B1507

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

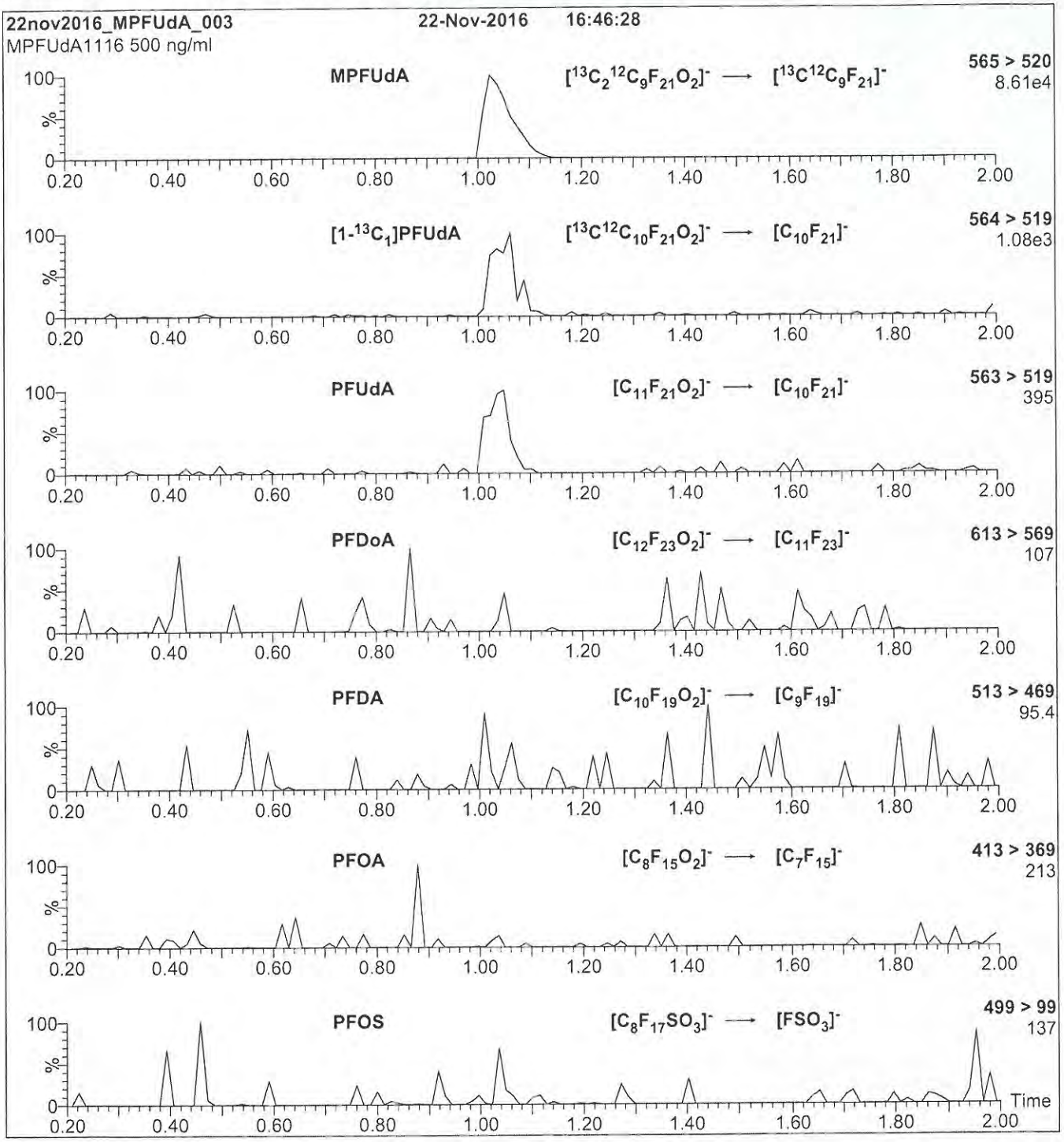
MS Parameters

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

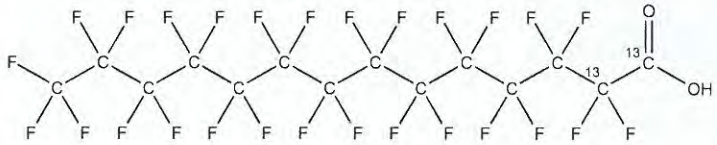
Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

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

181508

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CALA

ANAB ACCREDITED

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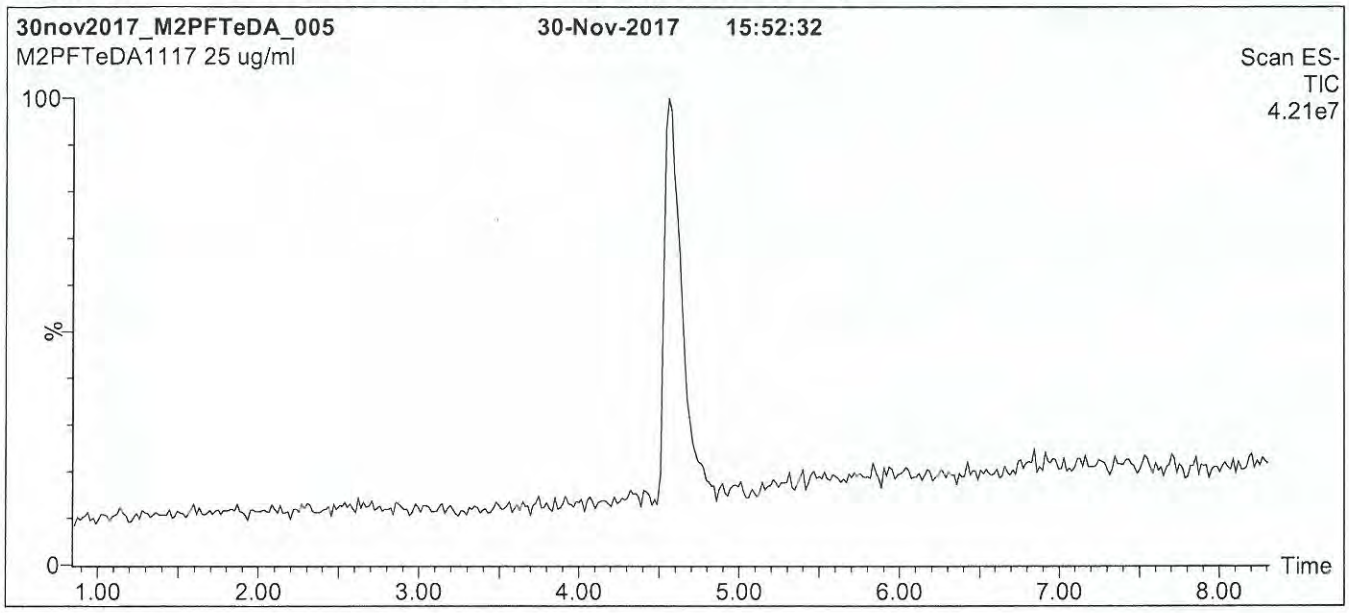
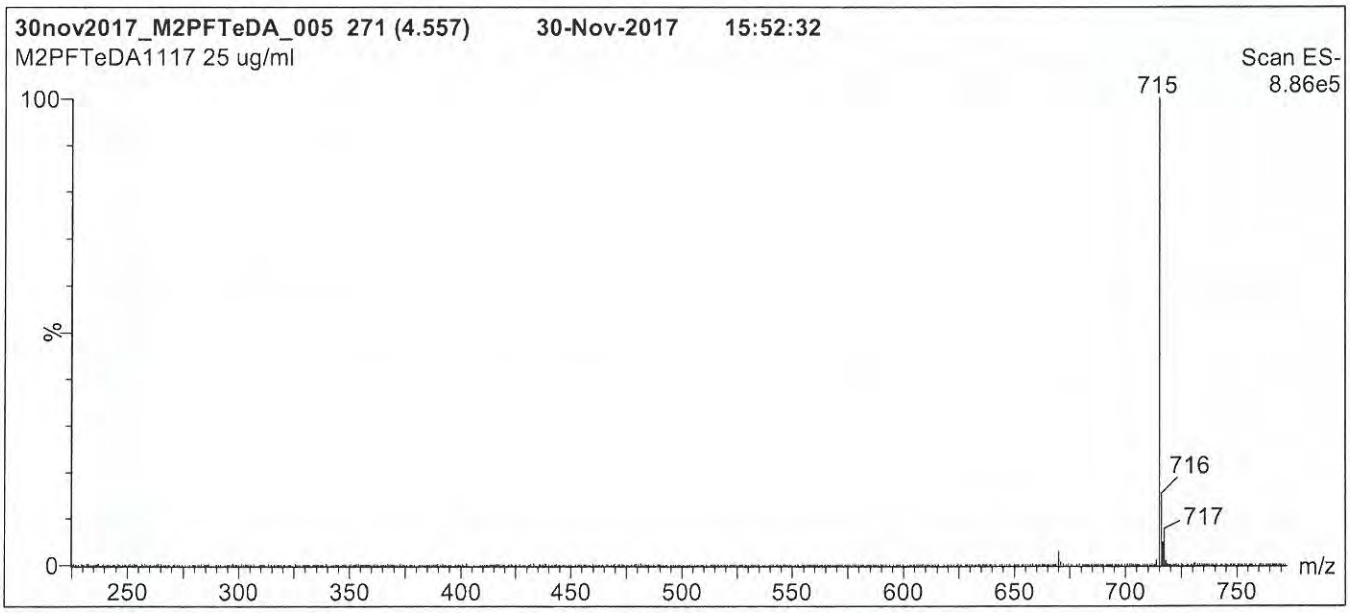
18B1508

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

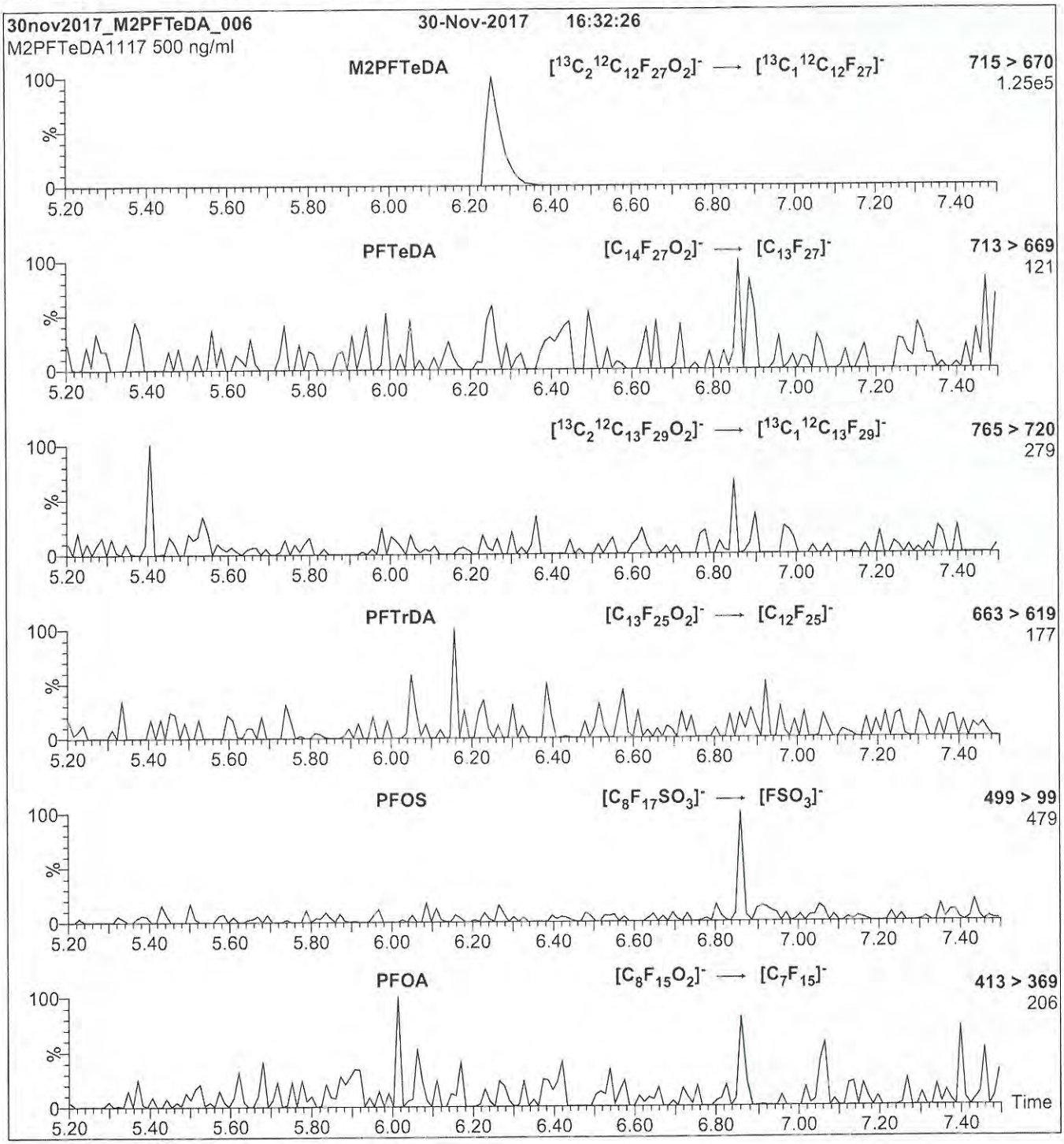
MS Parameters

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

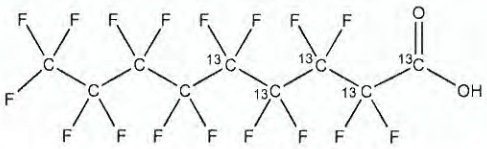
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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).

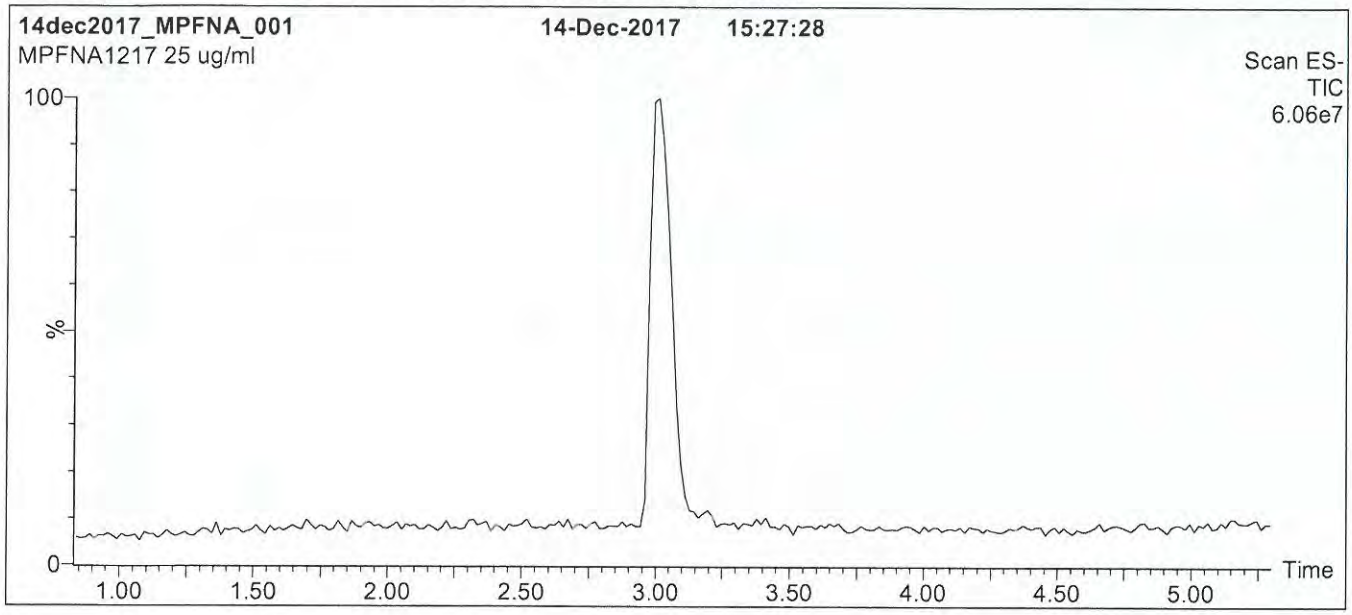
CALA

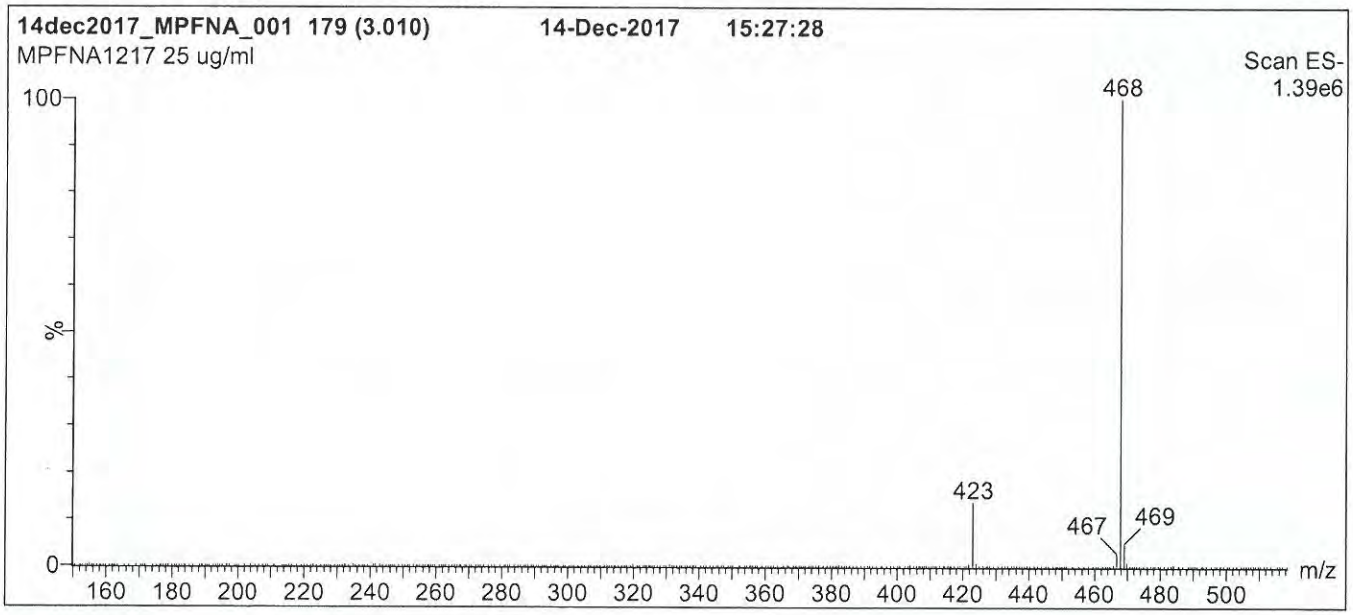
ANAB ACCREDITED

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

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

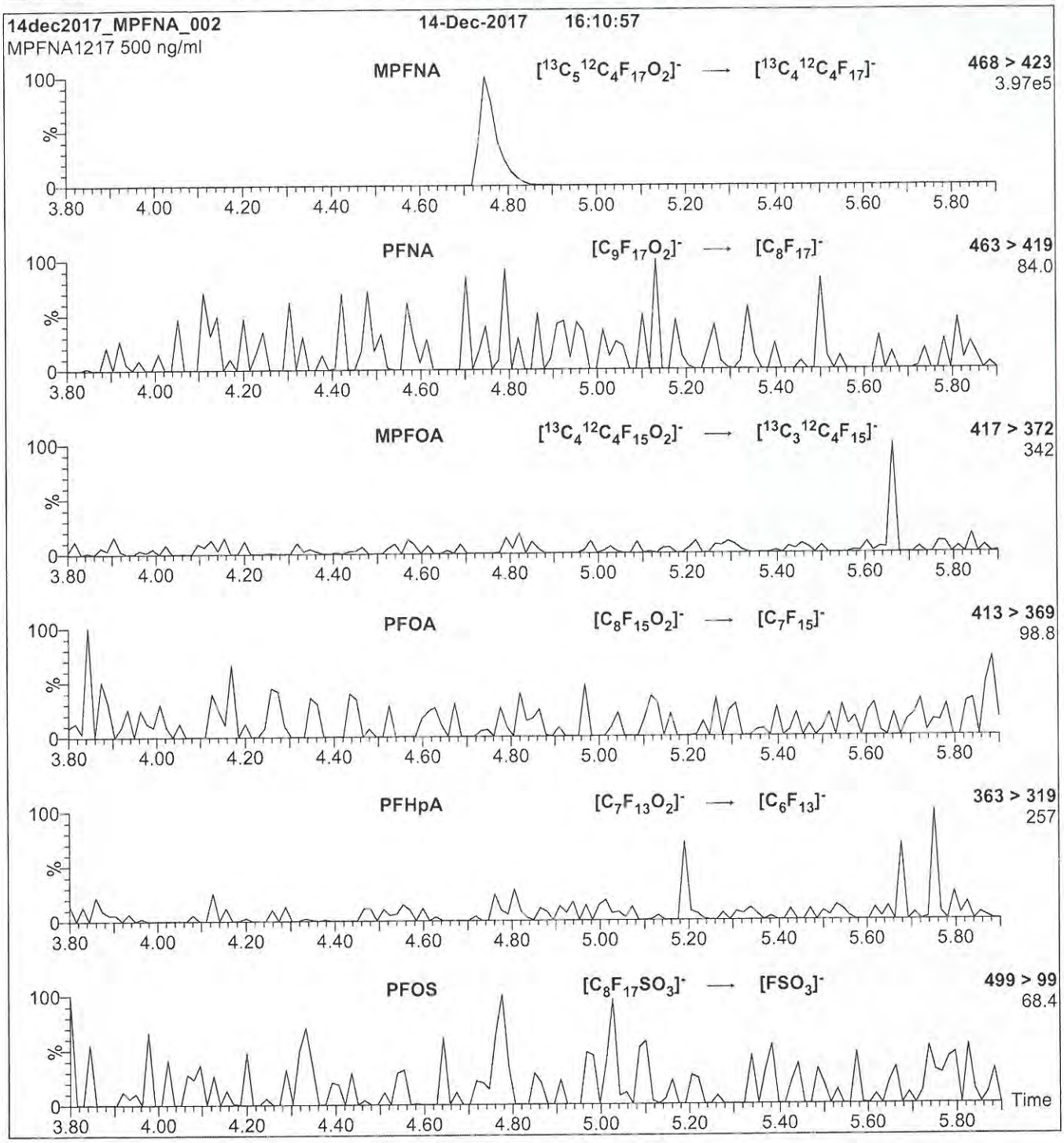
MS Parameters

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

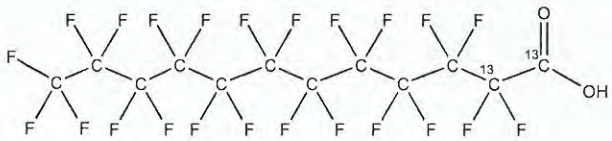
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

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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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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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

ANAB ACCREDITED

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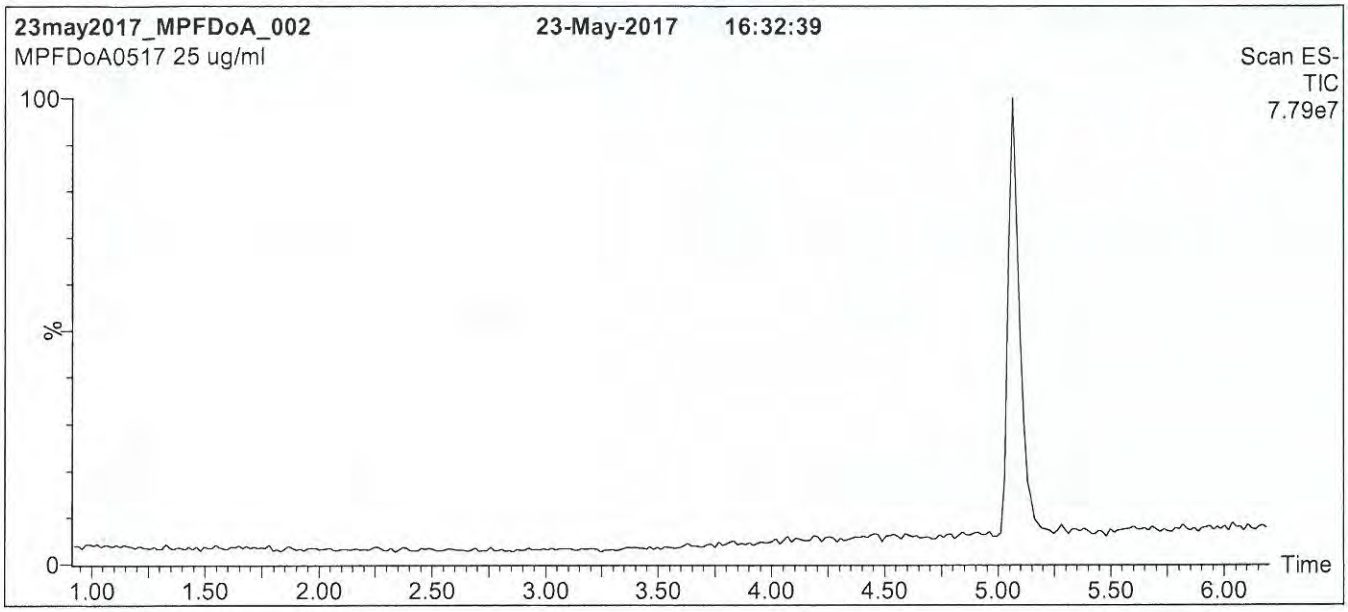
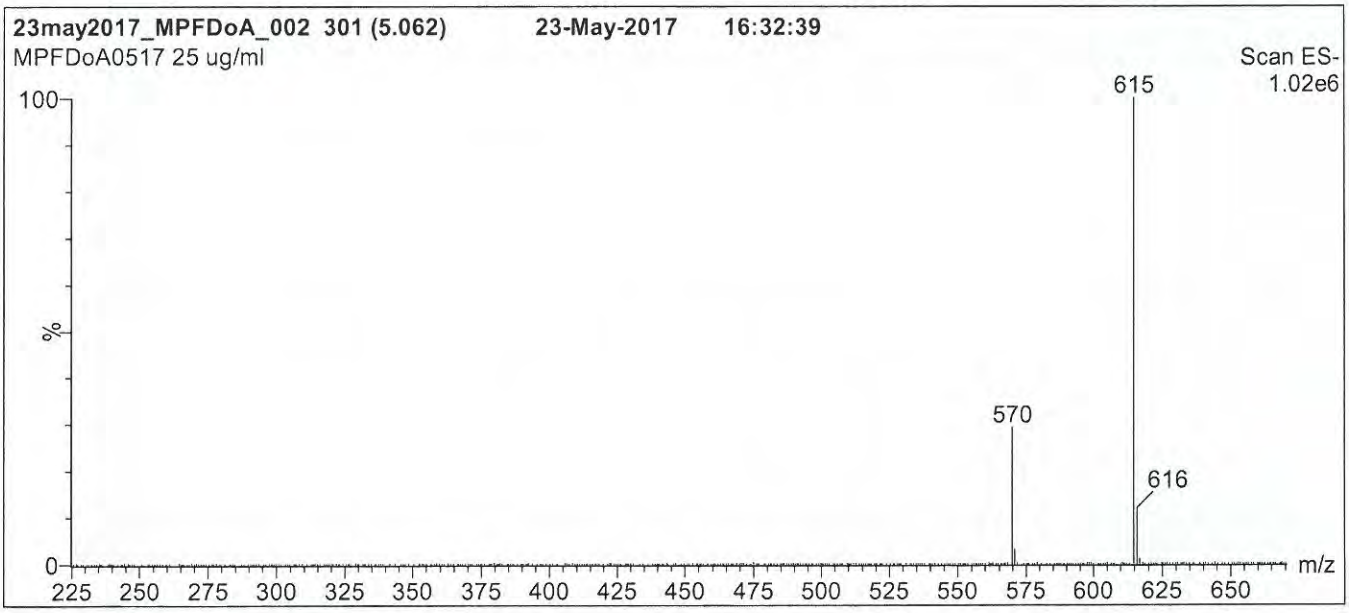
18B1510

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

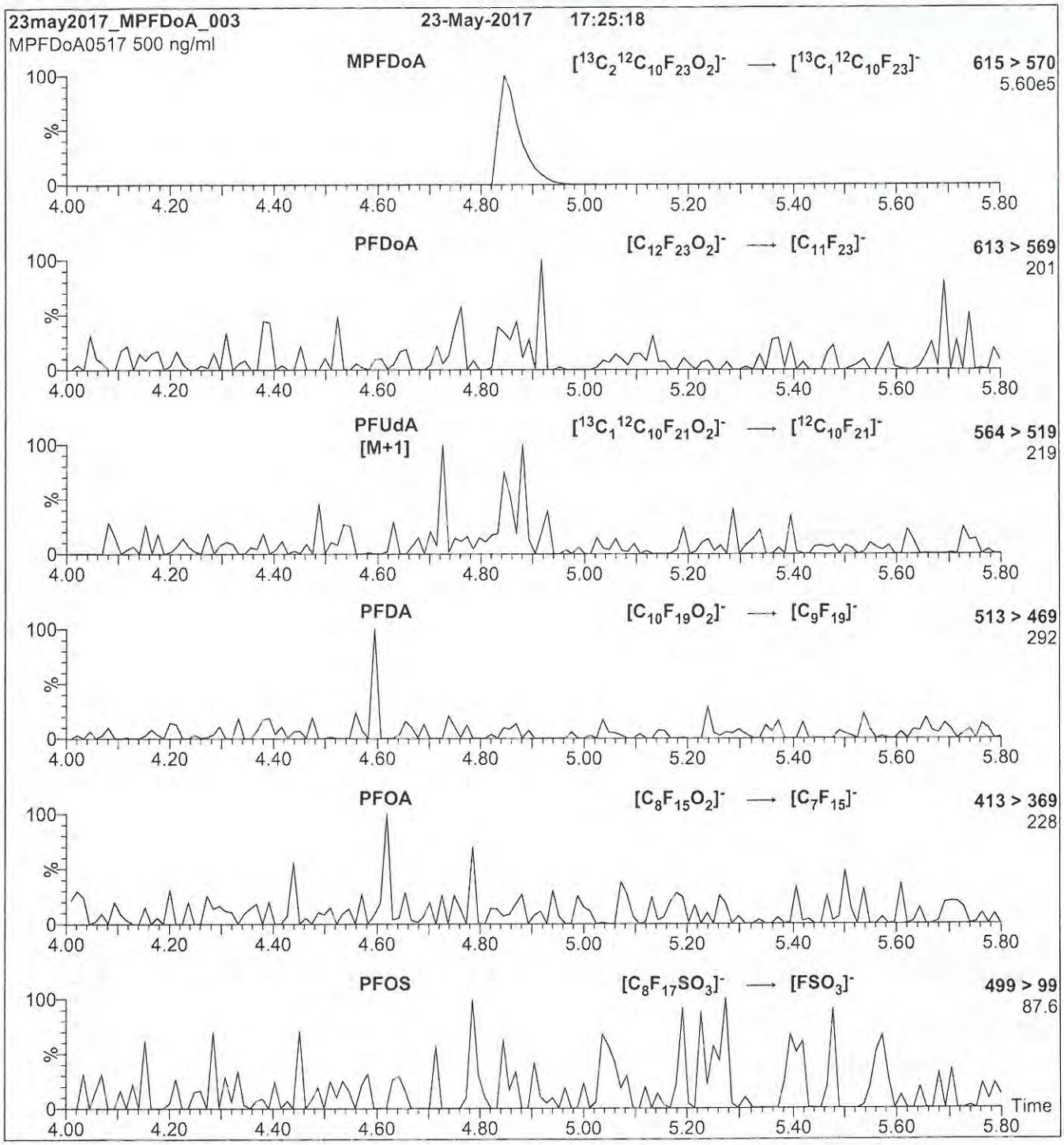
MS Parameters

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

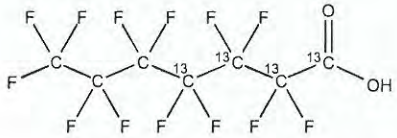
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

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 ($1,2,3,4\text{-}^{13}C_4$)
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

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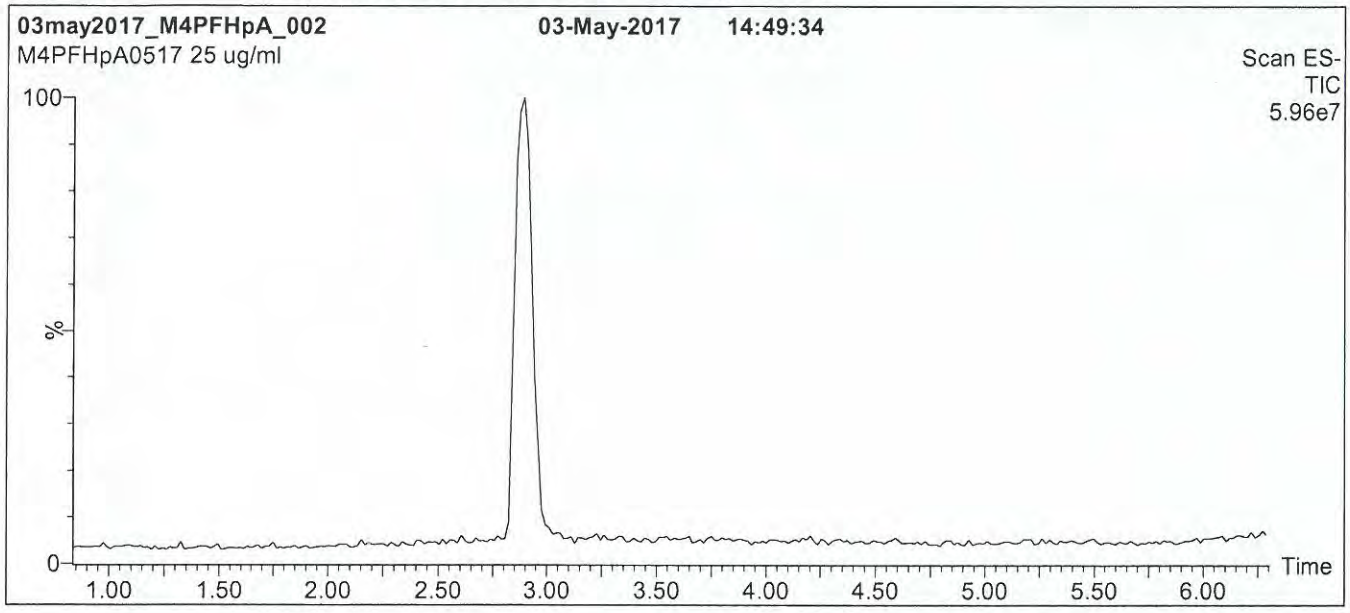
CALA

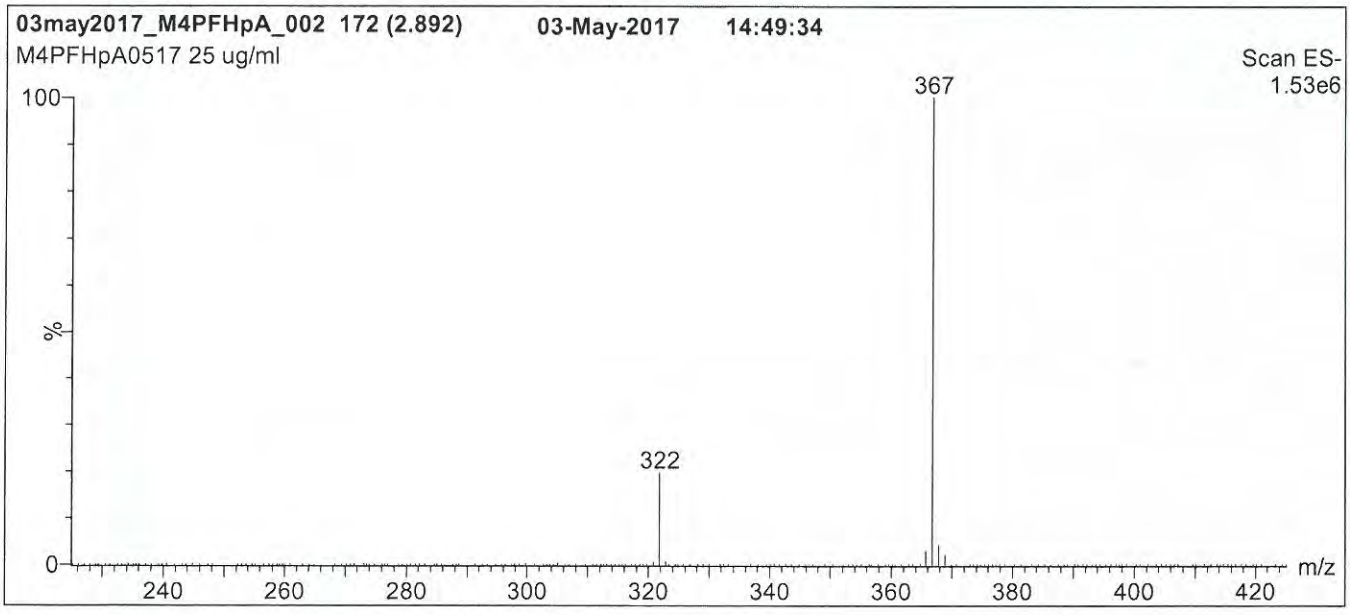
ANAB ACCREDITED

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

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

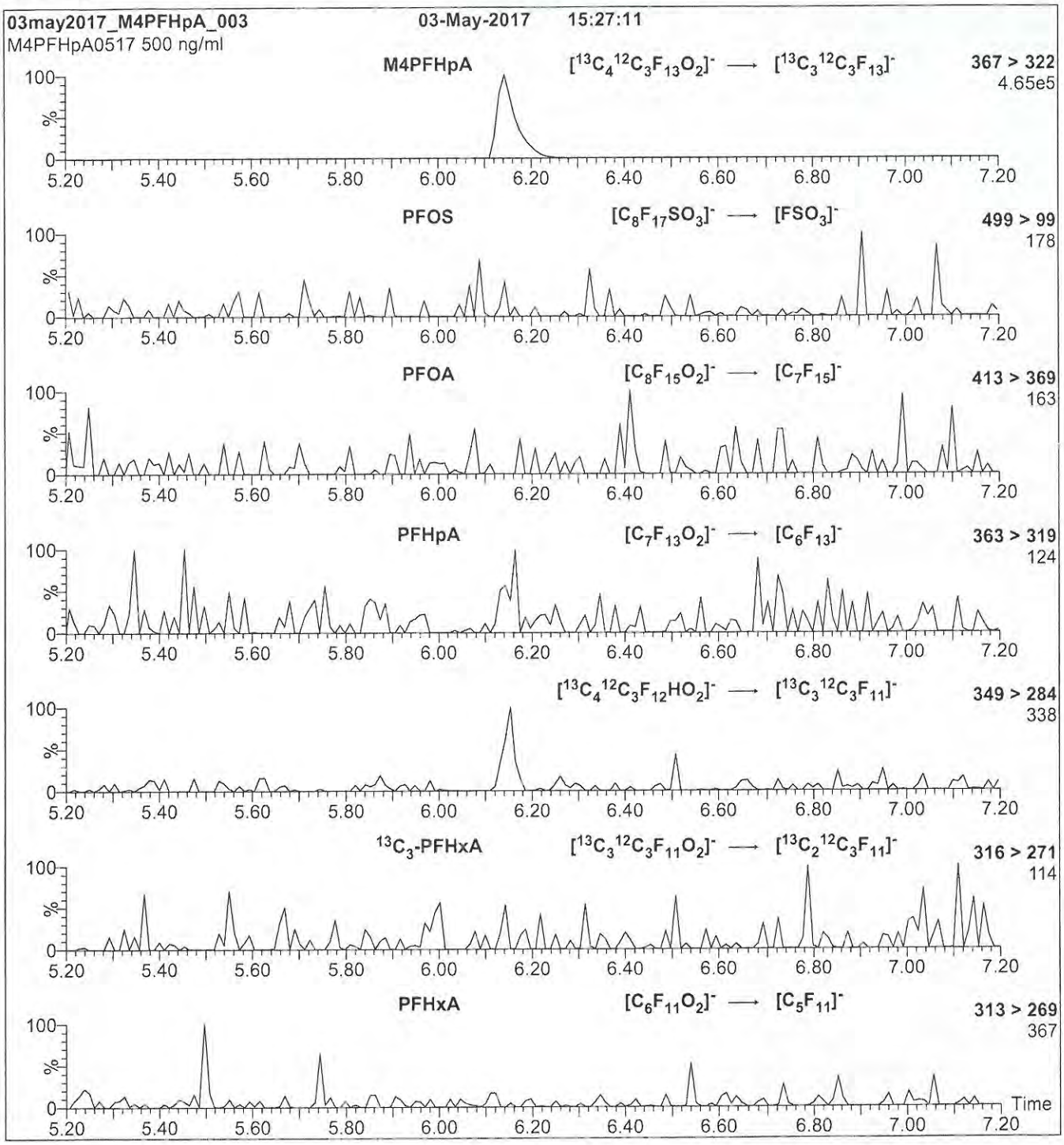
MS Parameters

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

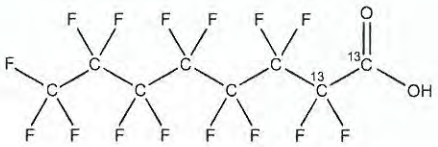
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid

LOT NUMBER: M2PFOA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_6HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 416.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
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

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)

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:

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).

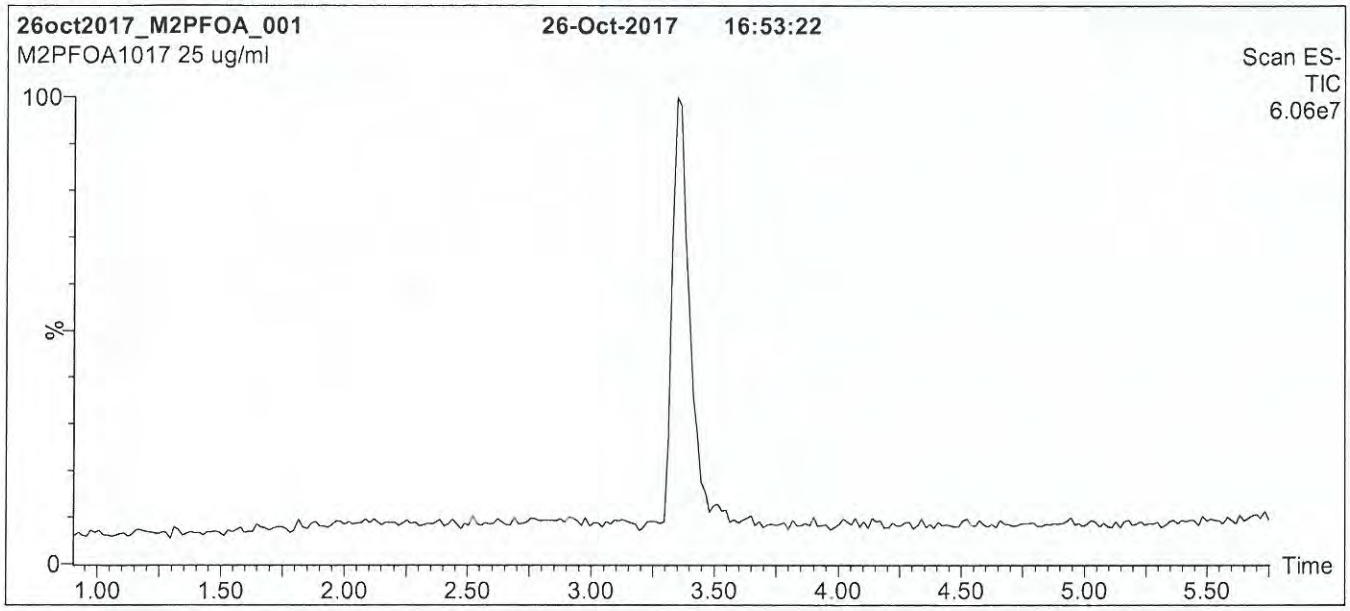
CALA

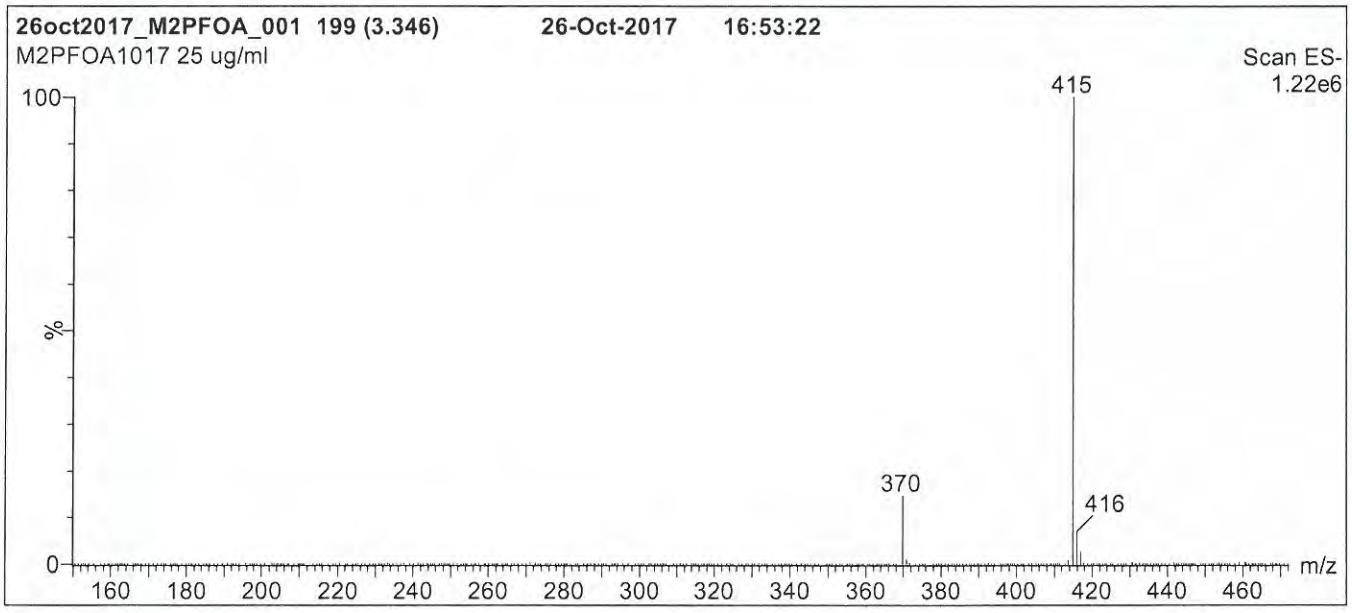
ANAB ACCREDITED

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

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

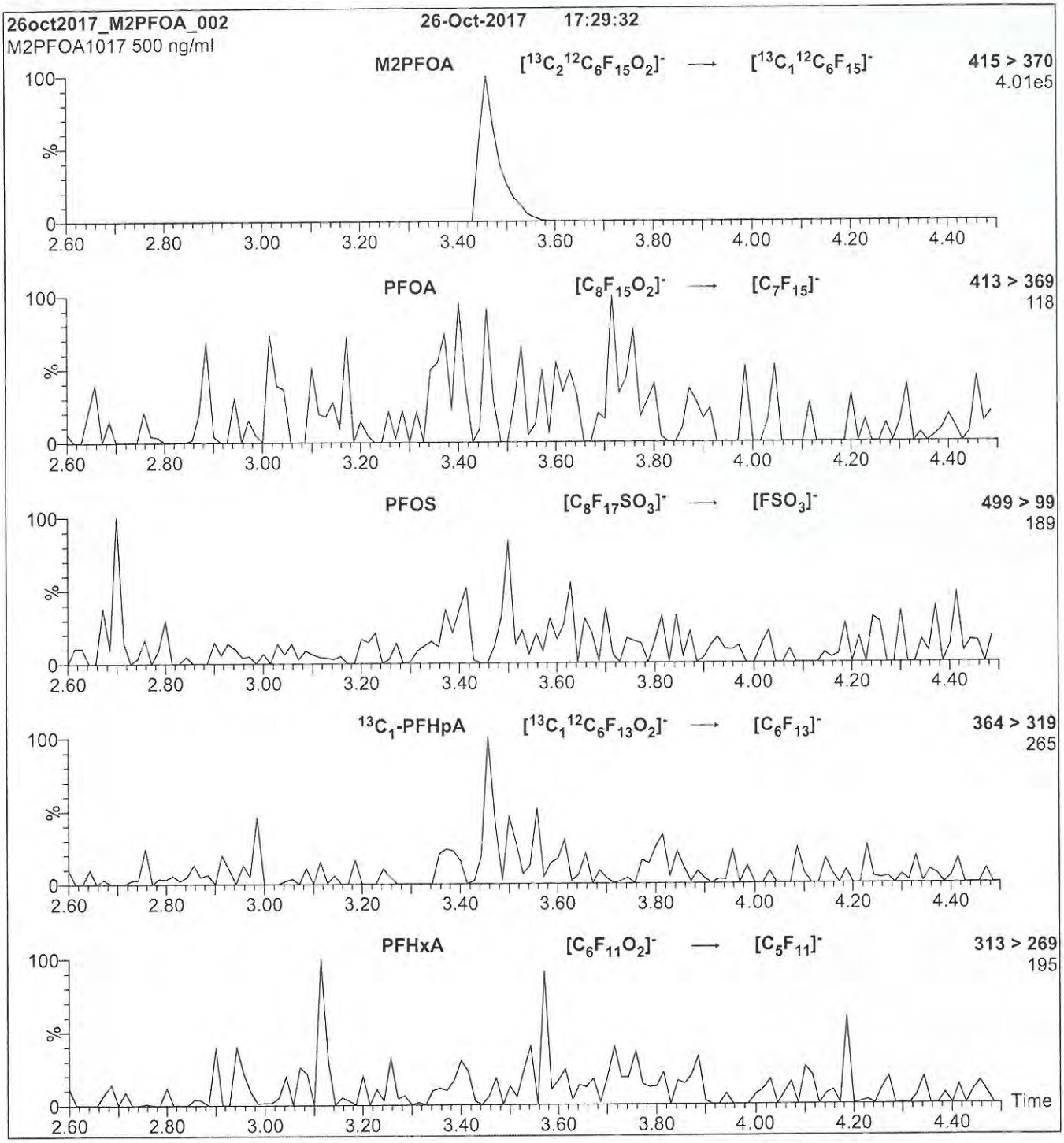
MS Parameters

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

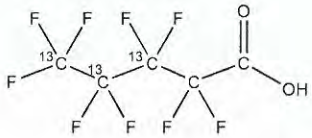
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

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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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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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.

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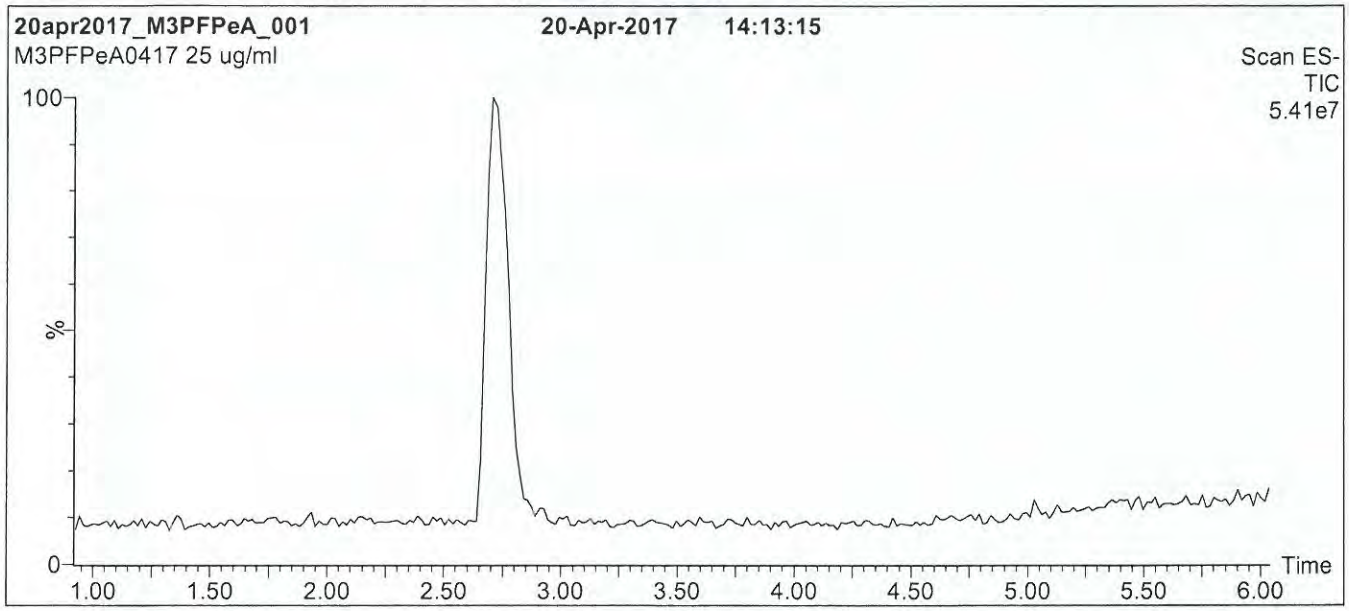
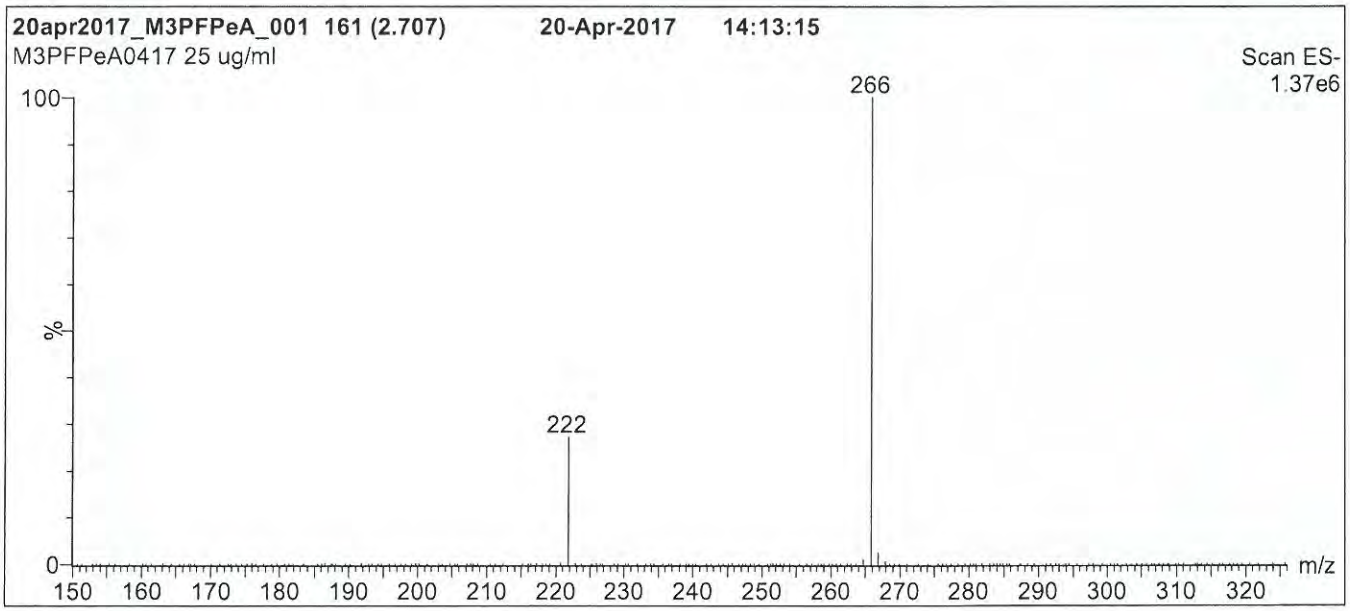
ANAB ACCREDITED

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

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

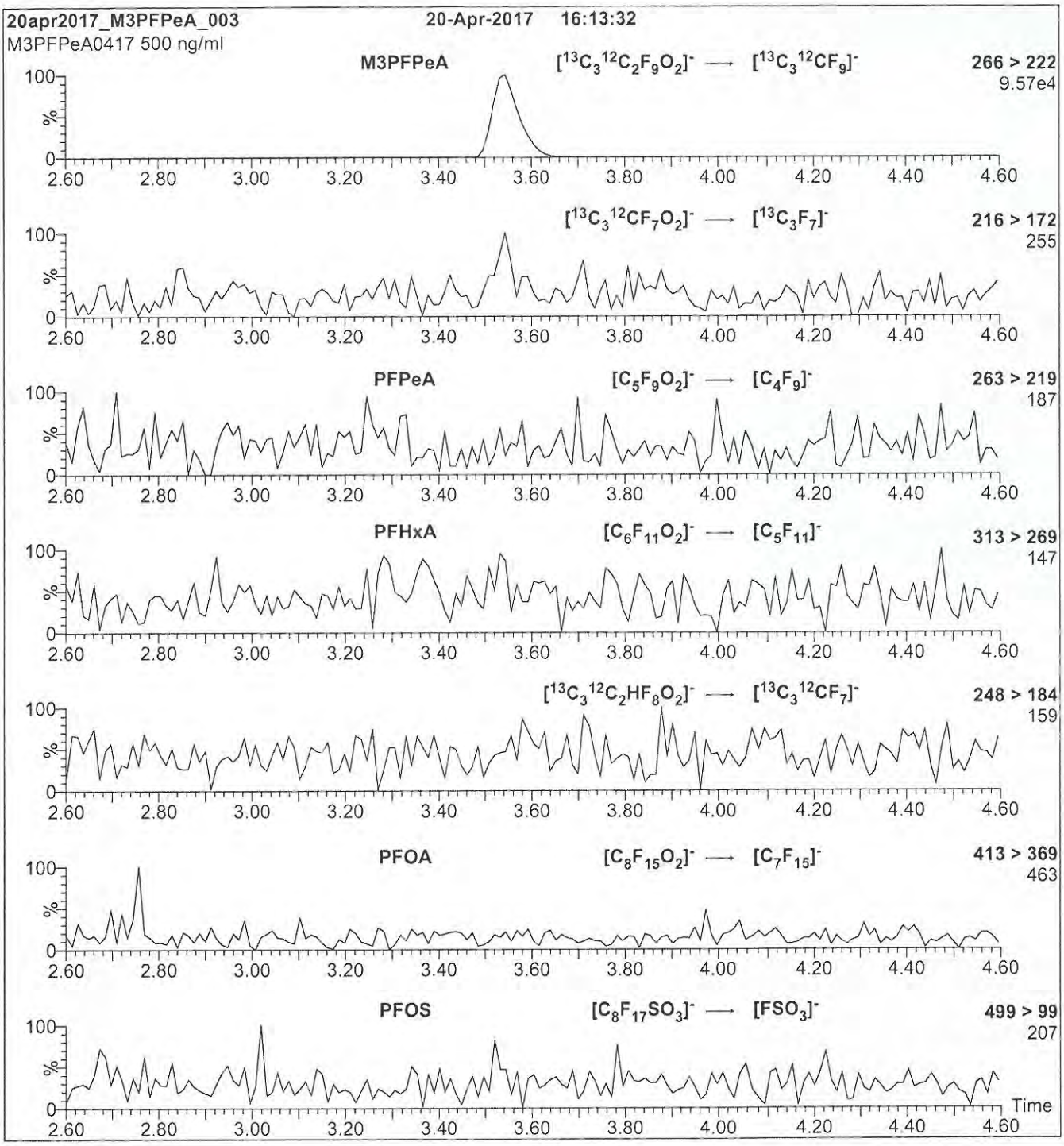
MS Parameters

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

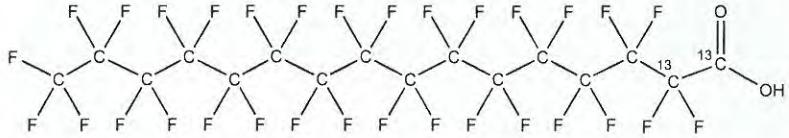
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18B1514

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M2PFHxDA	**LOT NUMBER:**	M2PFHxDA0717
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid		
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 ($1,2\text{-}^{13}C_2$)
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 ~ 0.3% 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

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CALA

ANAB ACCREDITED

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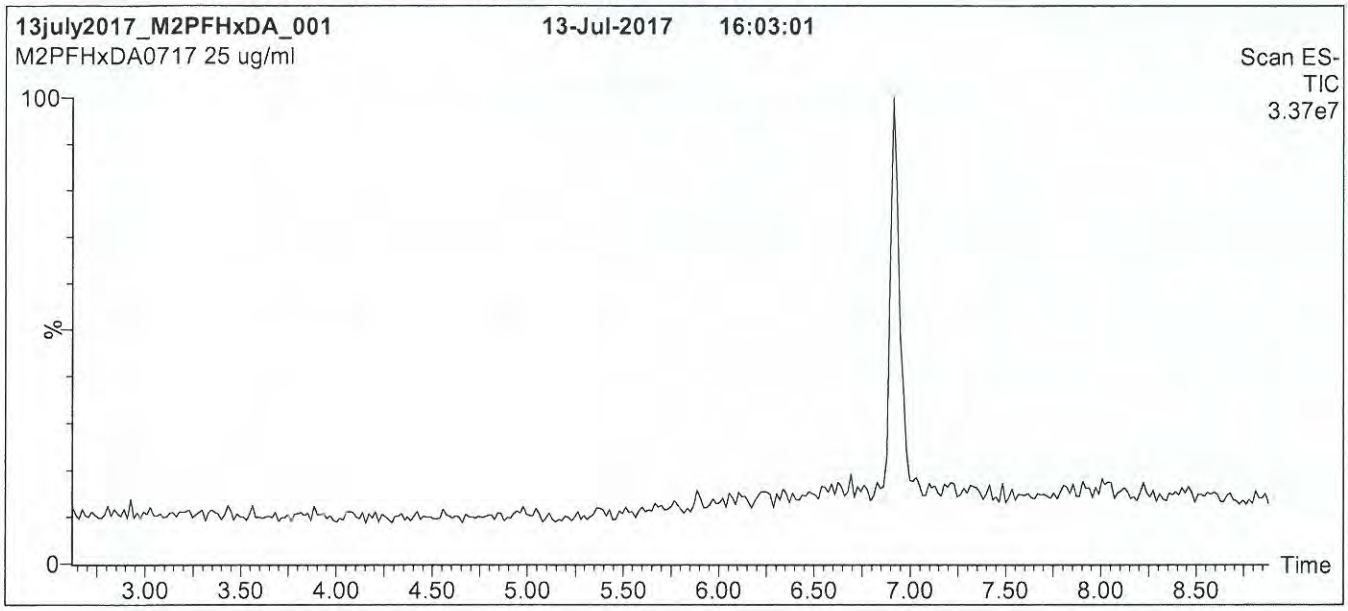
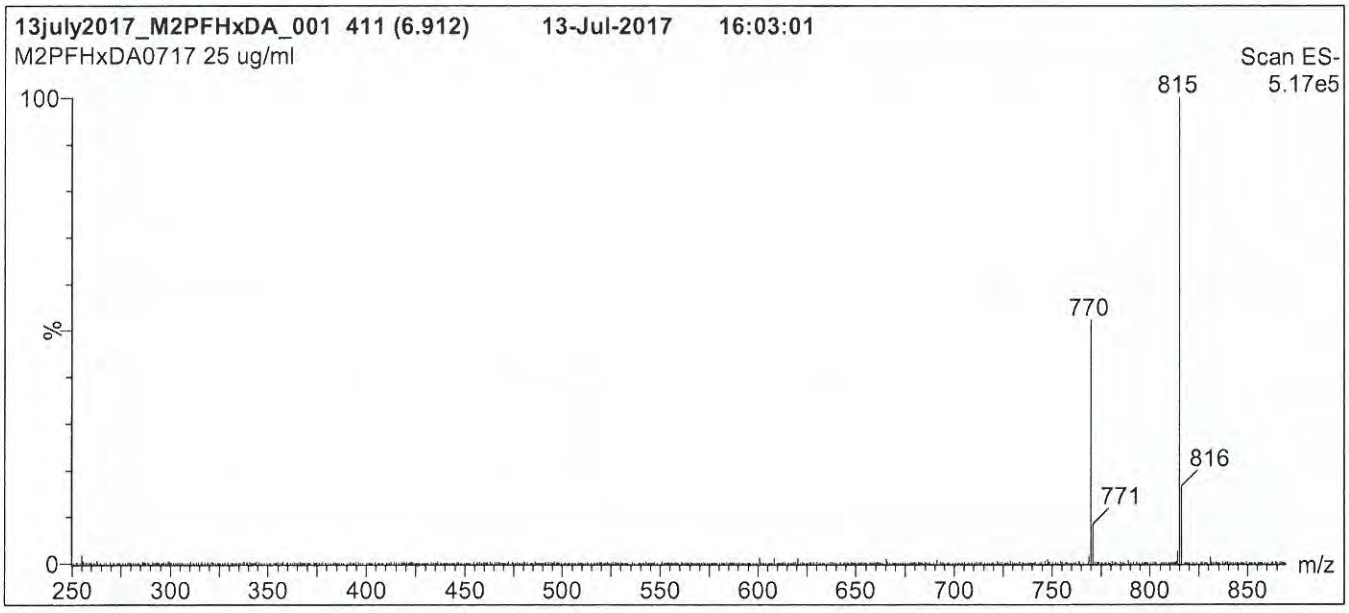
188514

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

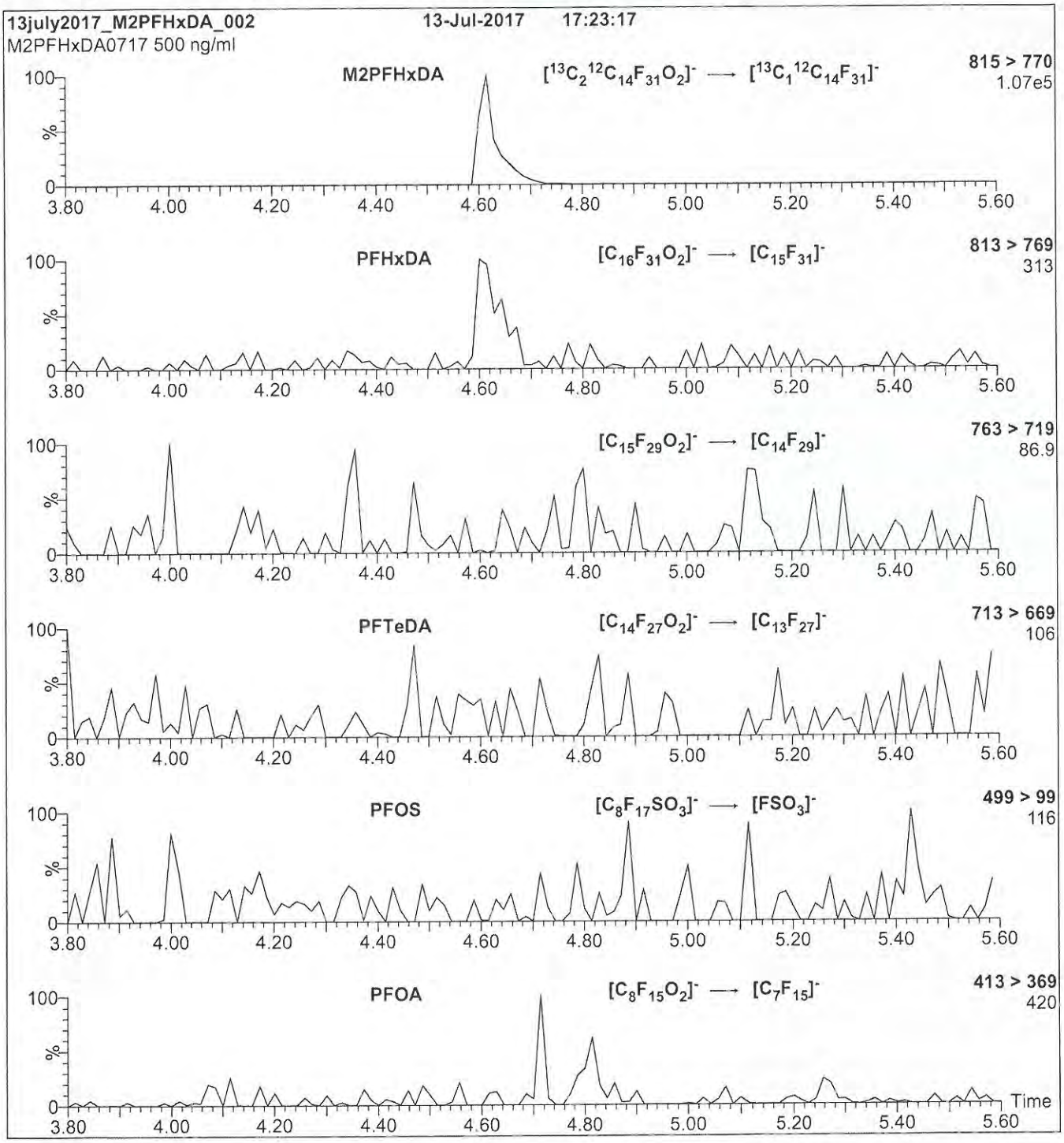
MS Parameters

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

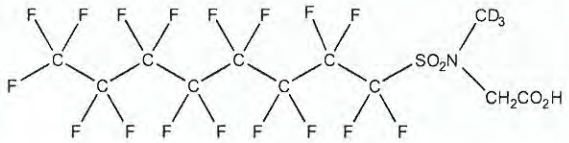
WELLINGTON LABORATORIES

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
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1801515

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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.

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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

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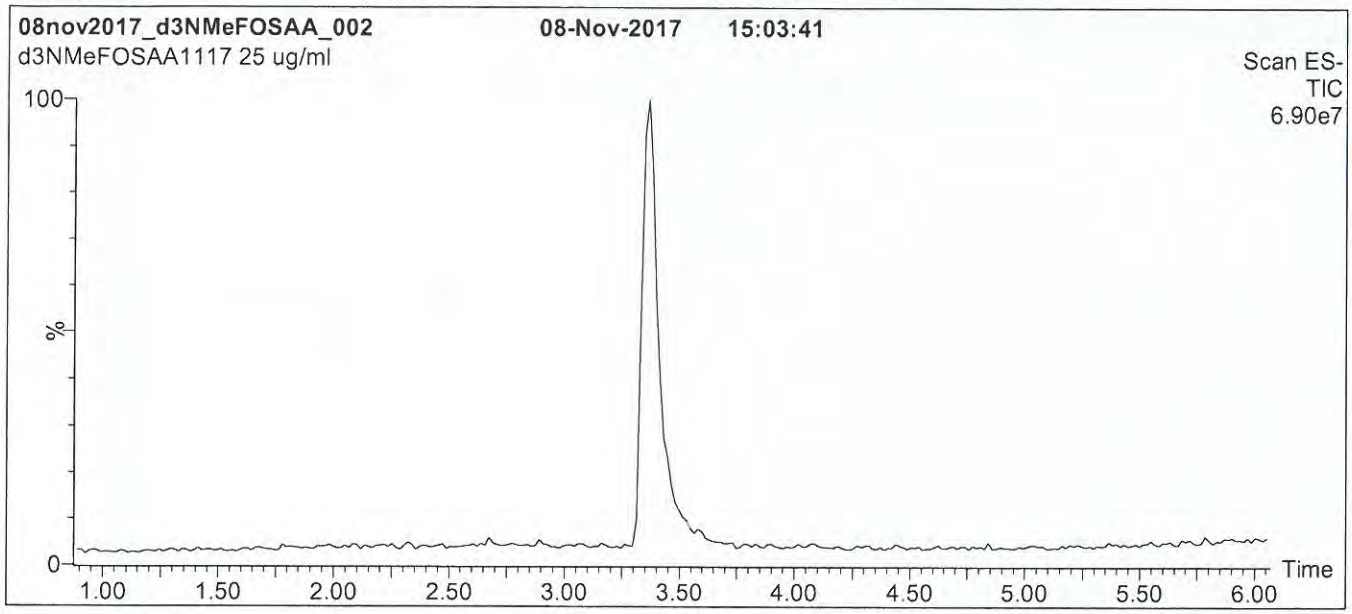
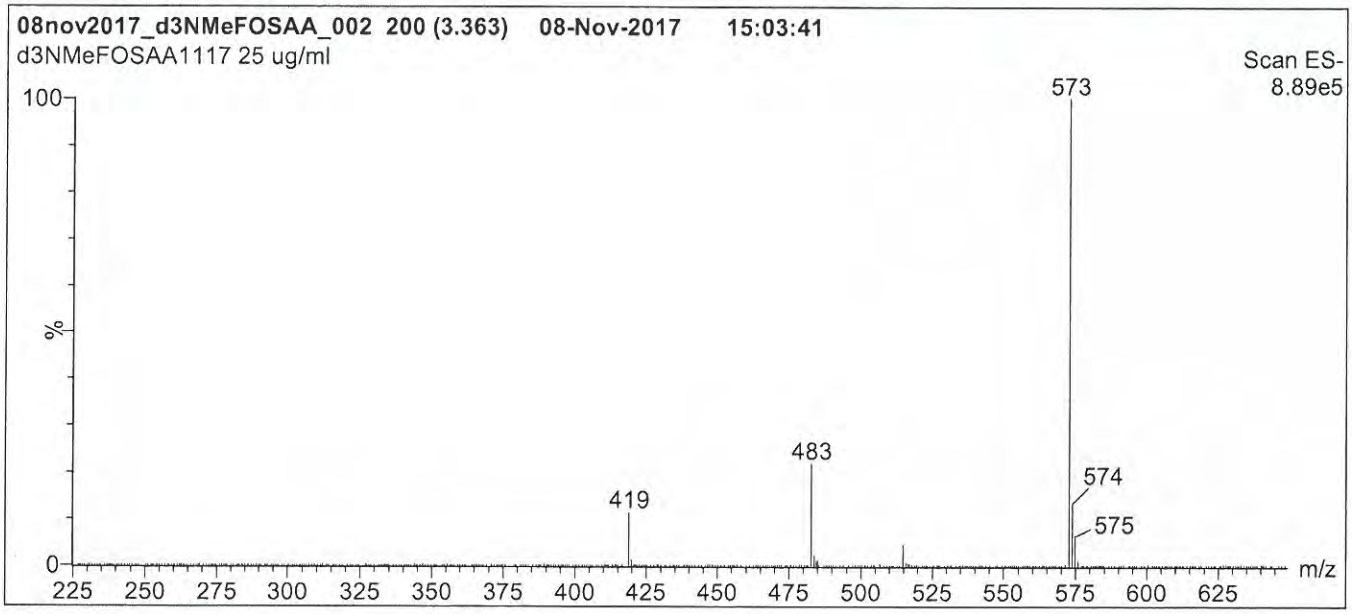
18B1515

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

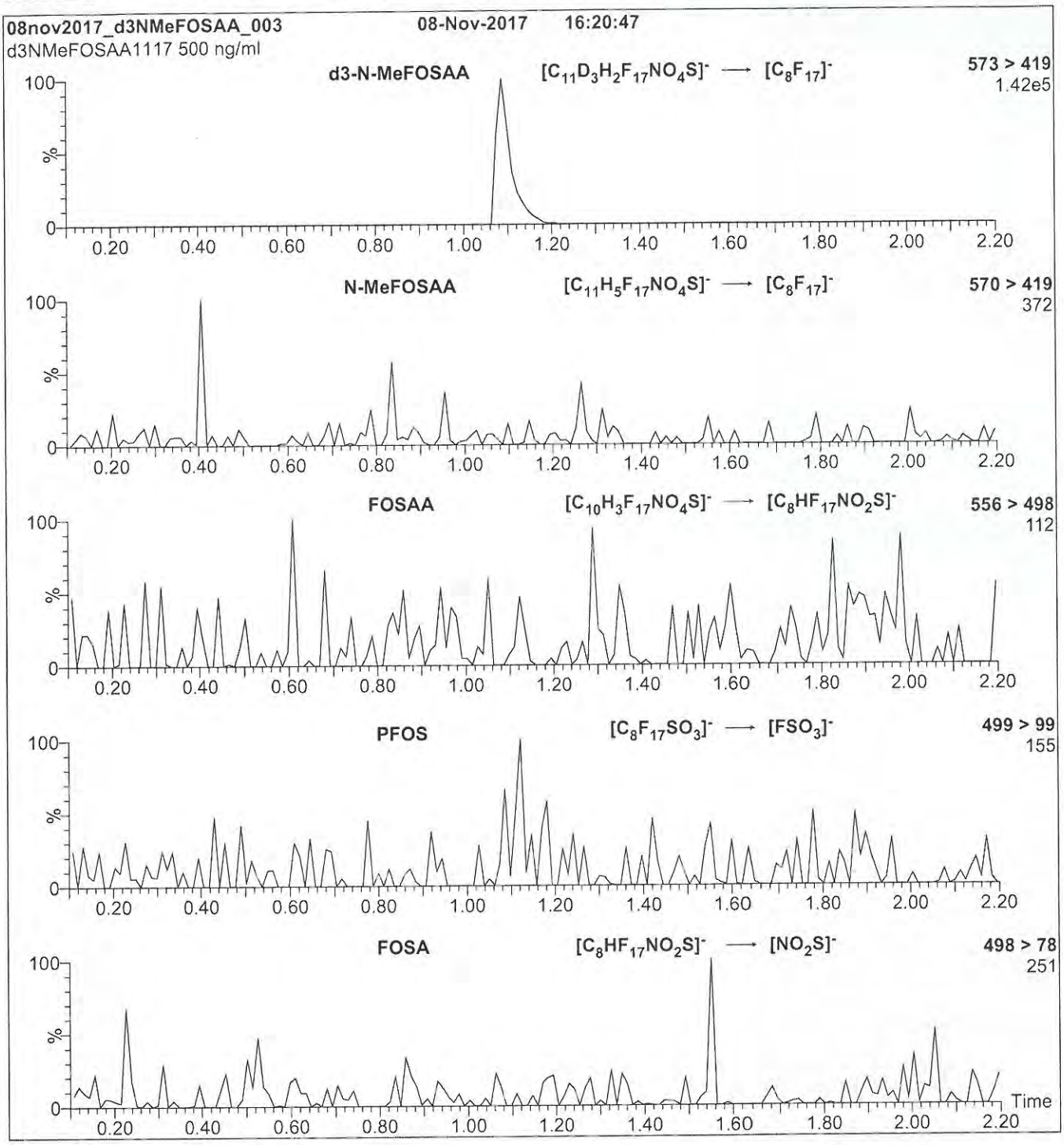
MS Parameters

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

1801515

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

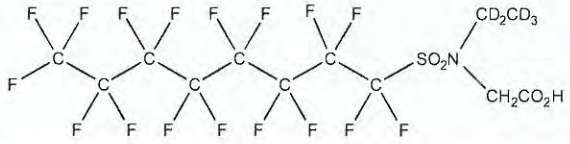
WELLINGTON LABORATORIES

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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CALA

ANAB ACCREDITED

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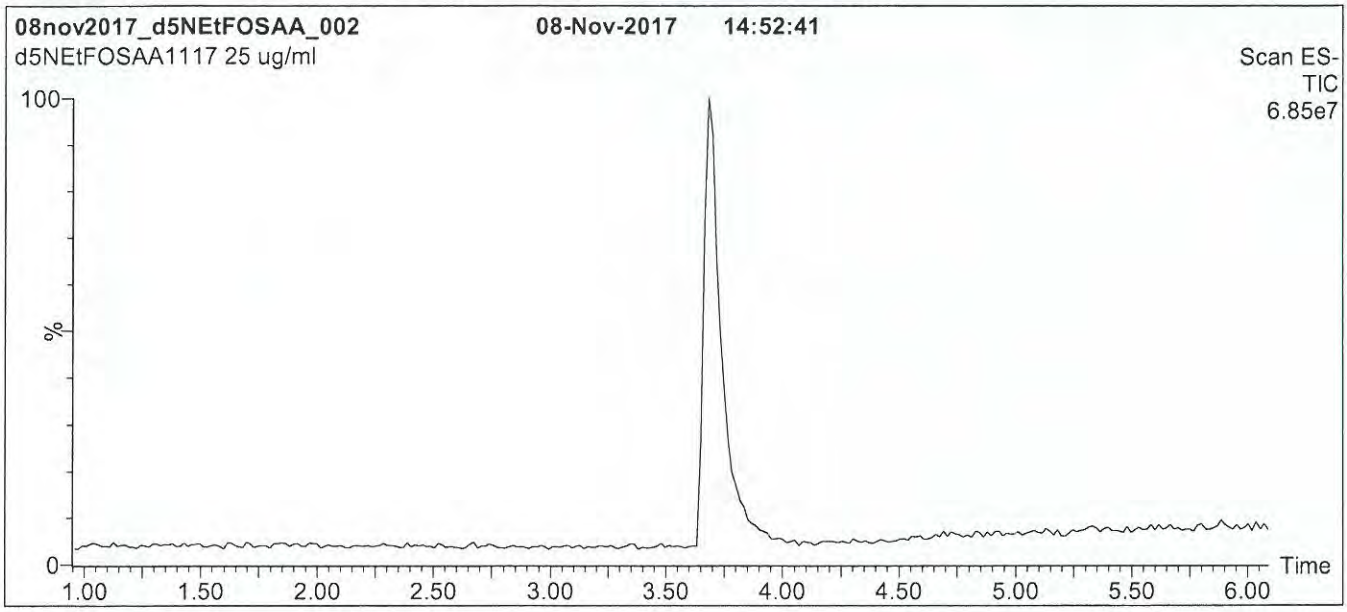
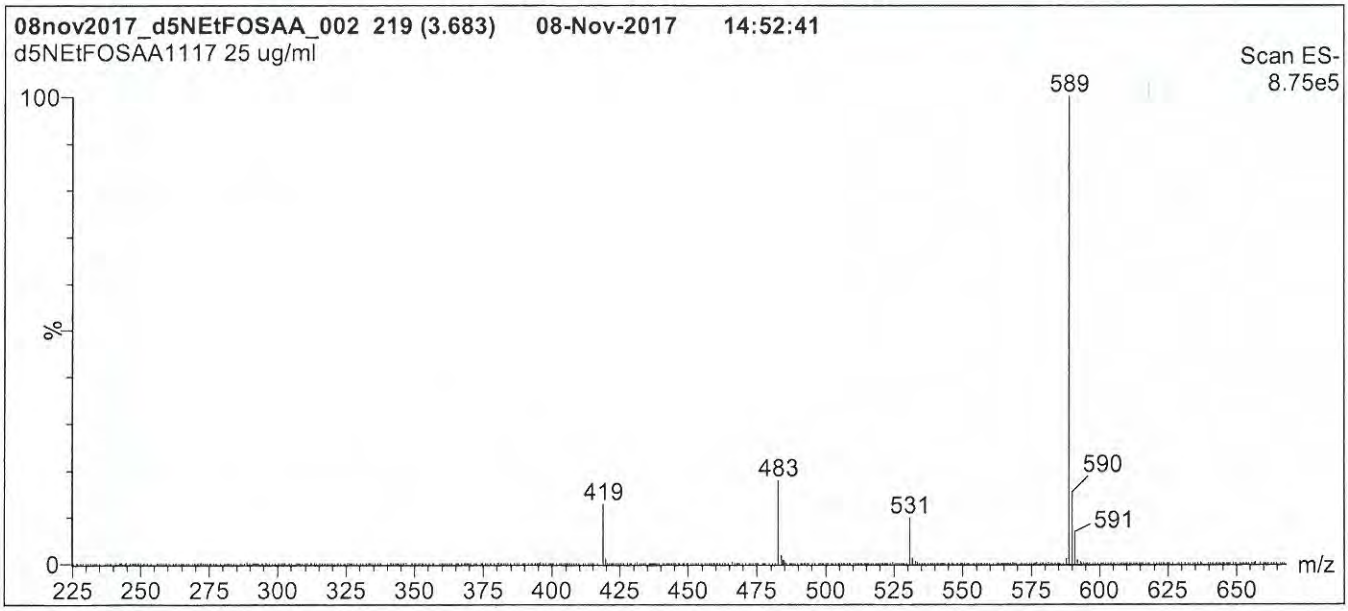
18B1516

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

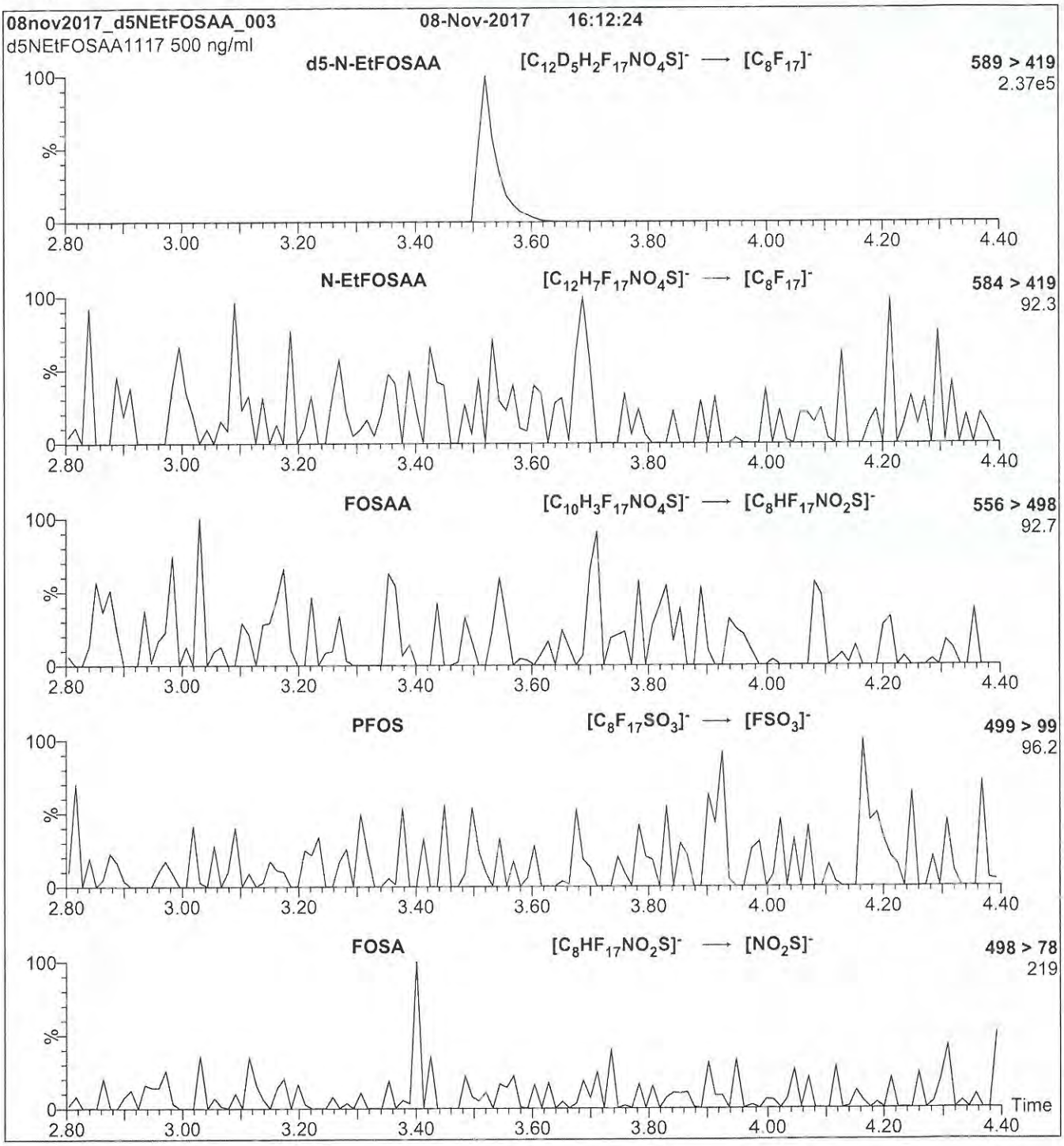
MS Parameters

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

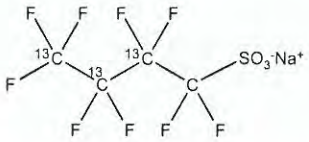
WELLINGTON LABORATORIES

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

181517

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CALA

ANAB ACCREDITED

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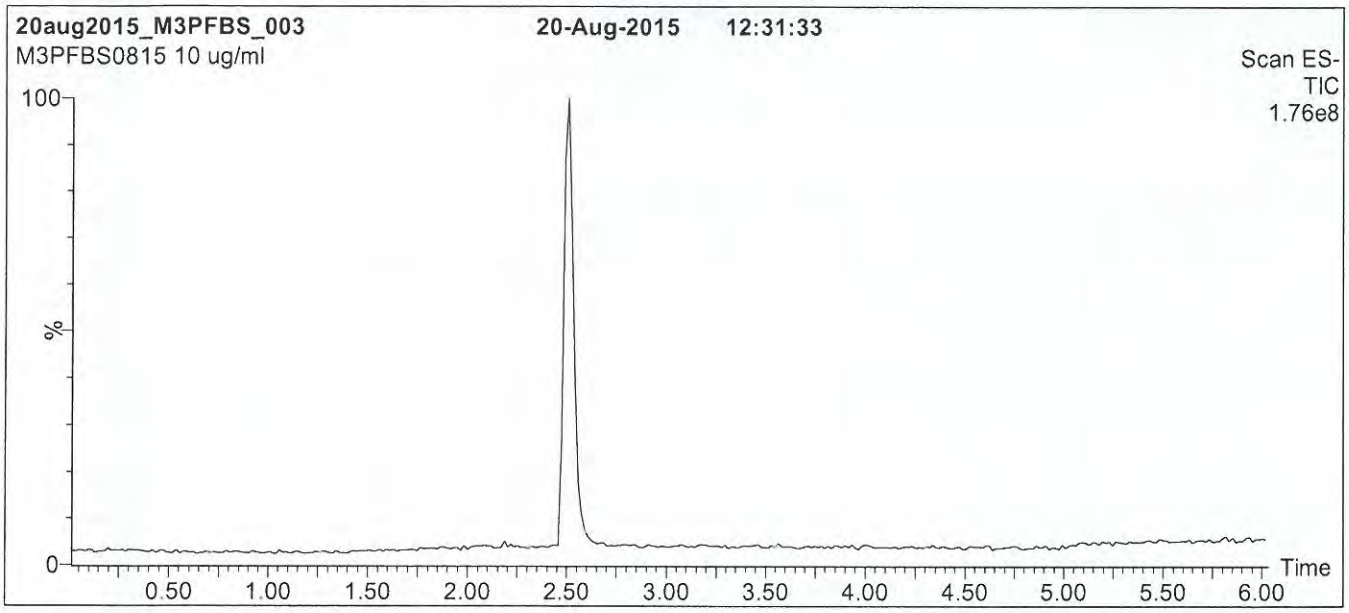
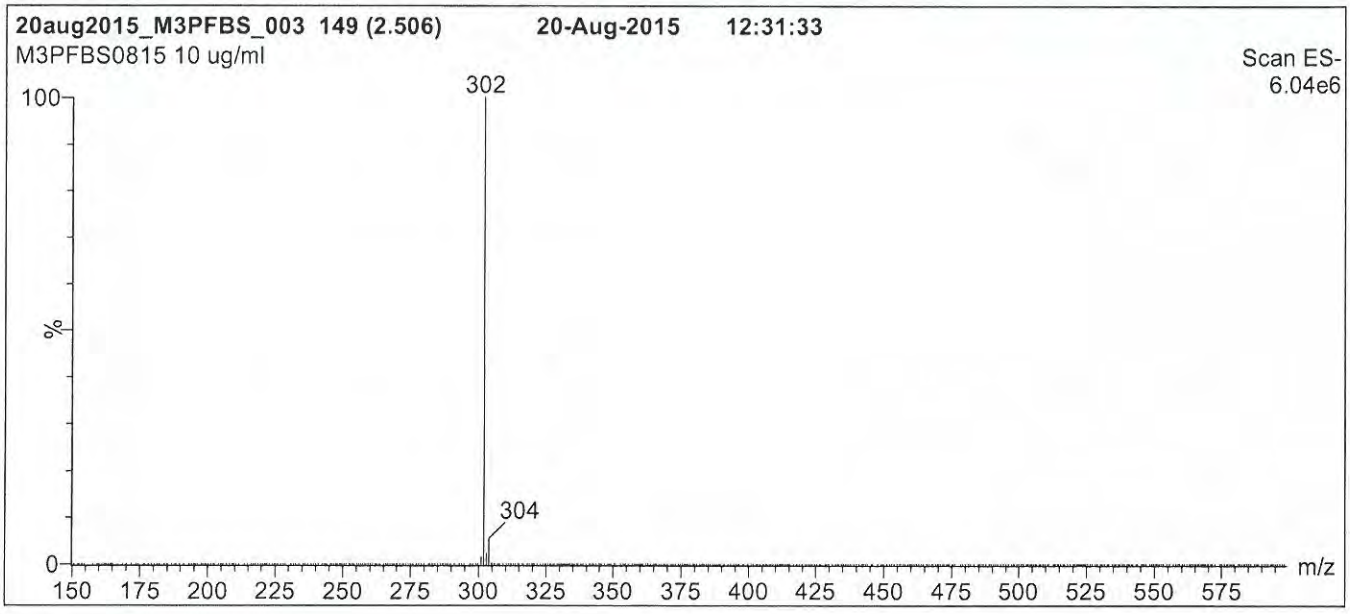
18B1517

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

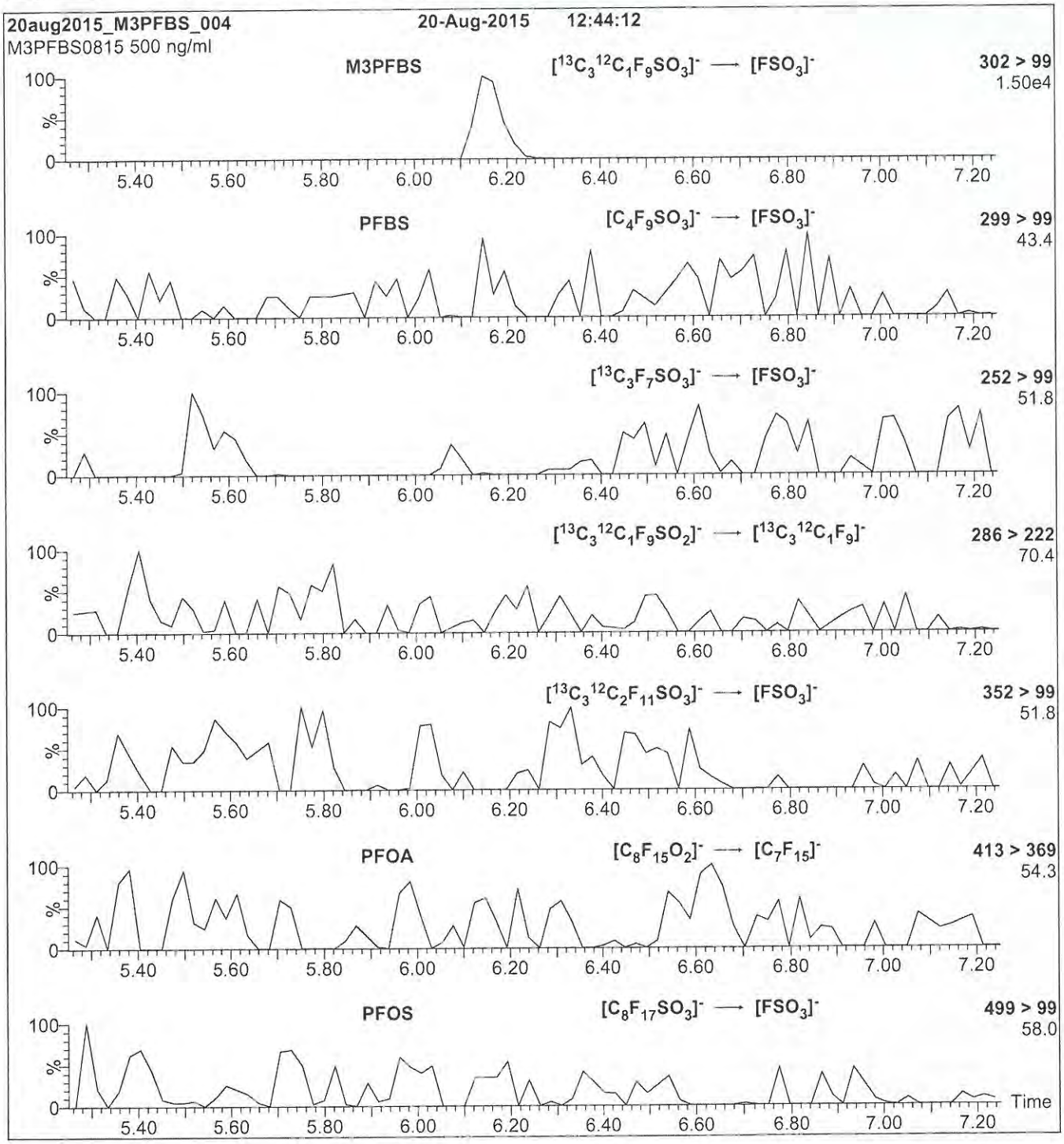
MS Parameters

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

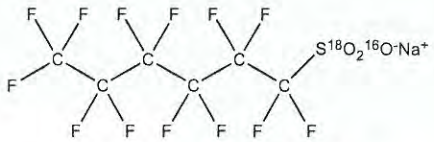
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

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
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18B1518

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EXPIRY DATE / PERIOD OF VALIDITY:

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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).

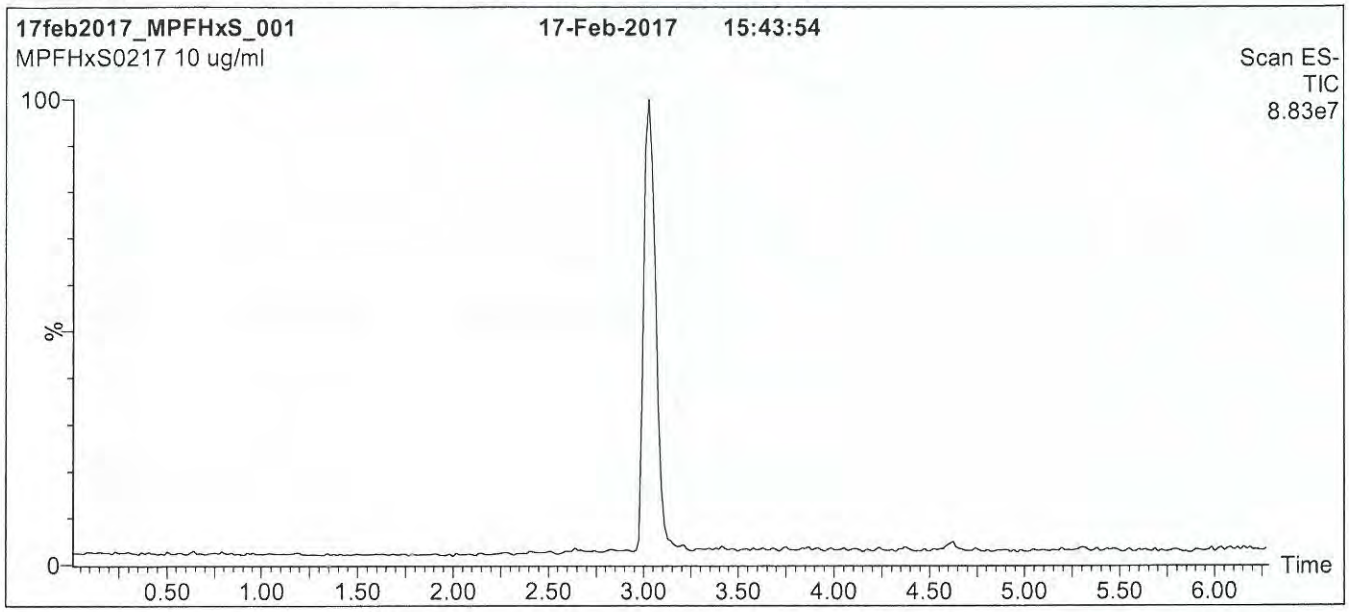
CALA

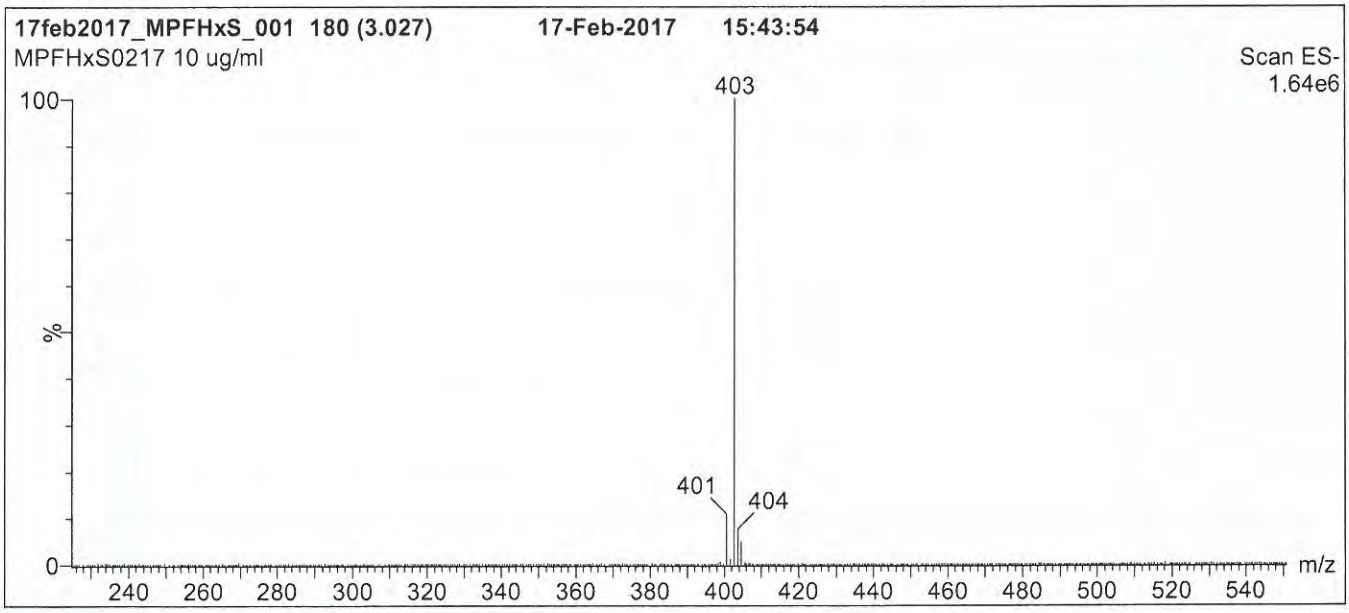
ANAB ACCREDITED

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

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

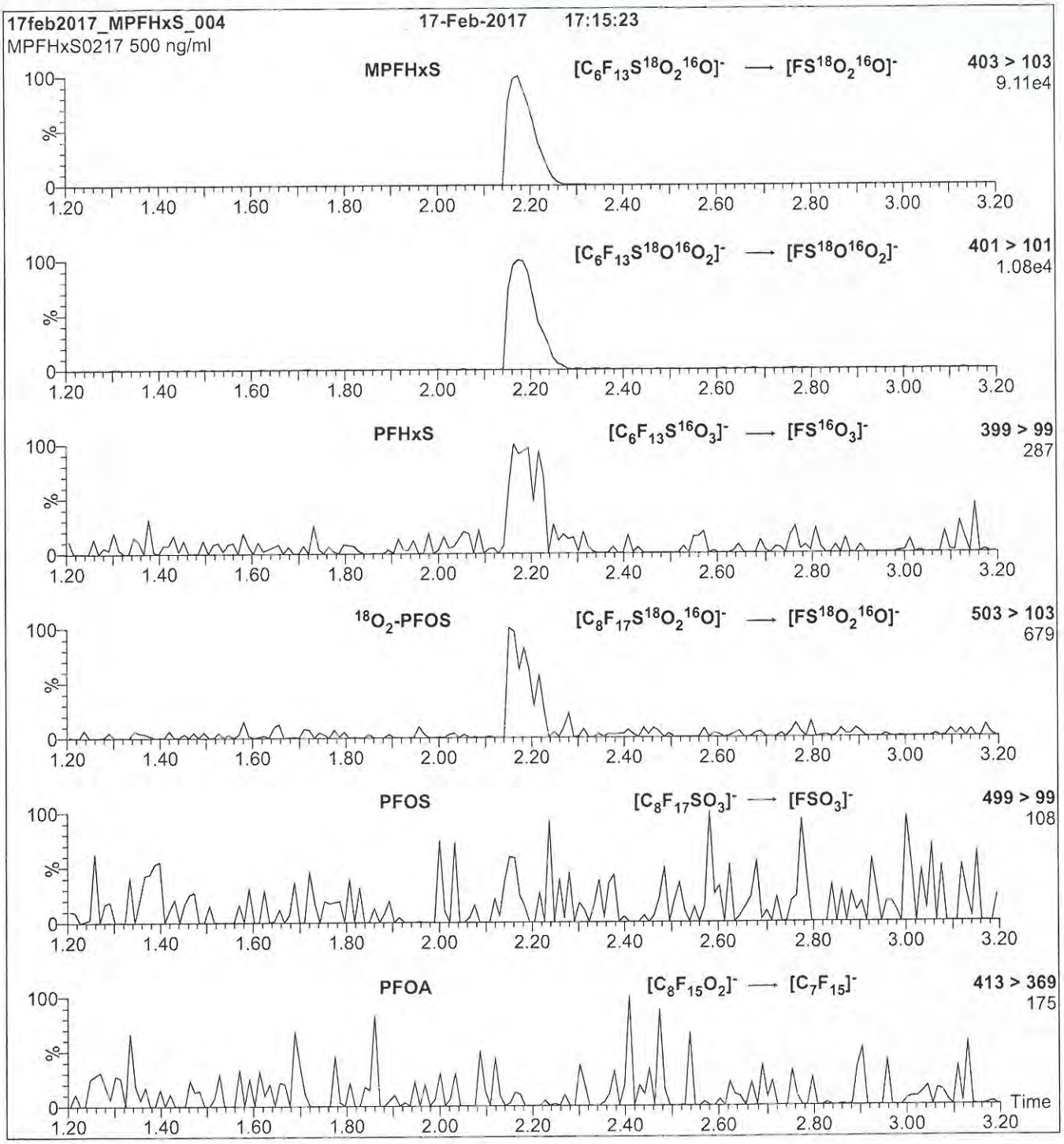
MS Parameters

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

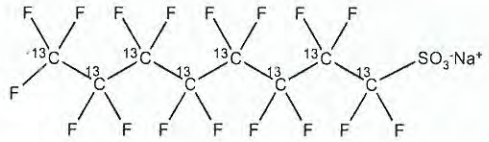
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

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

1881520

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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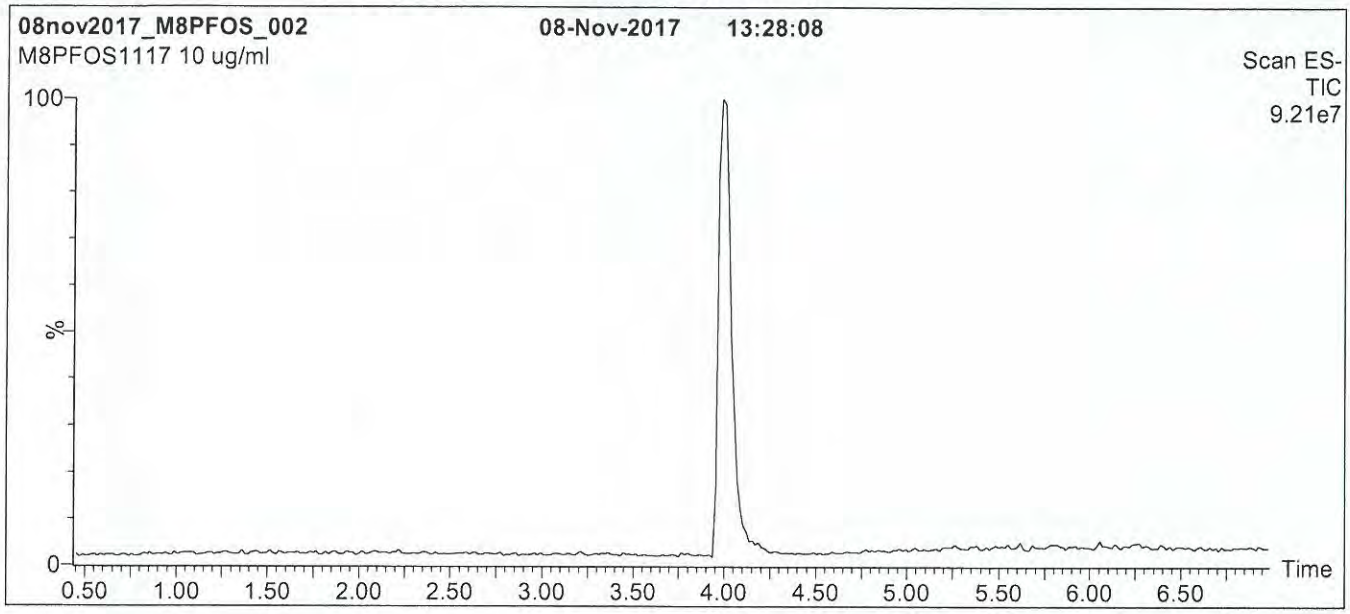
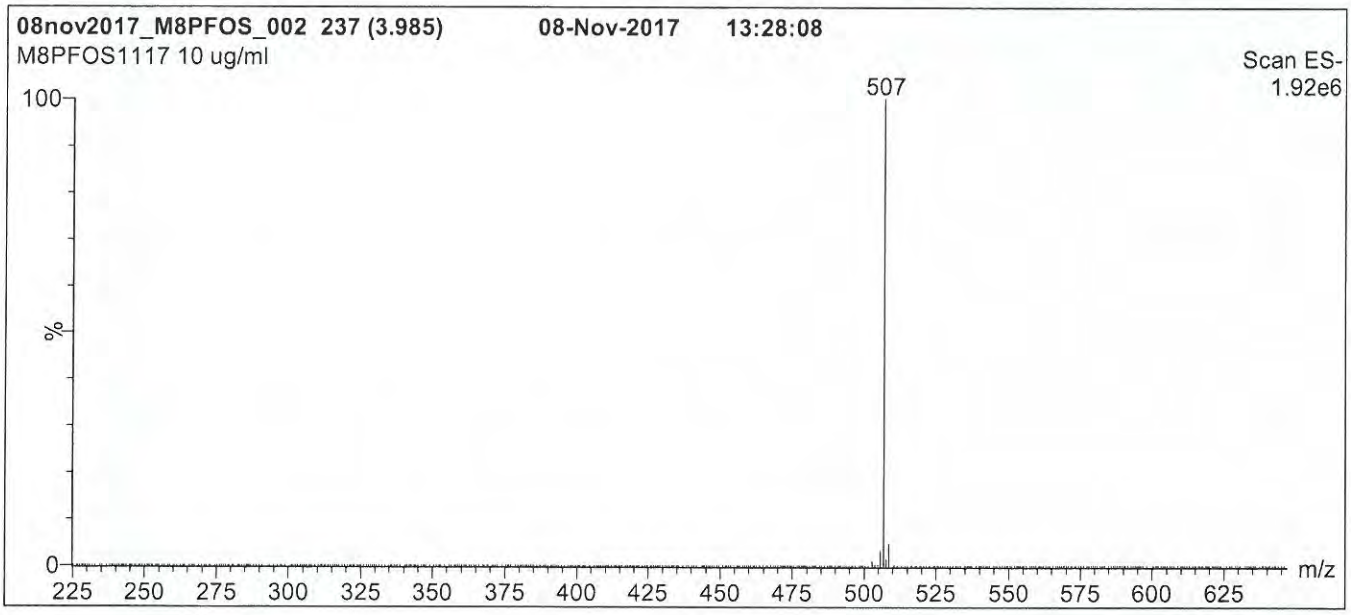
18B1520

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

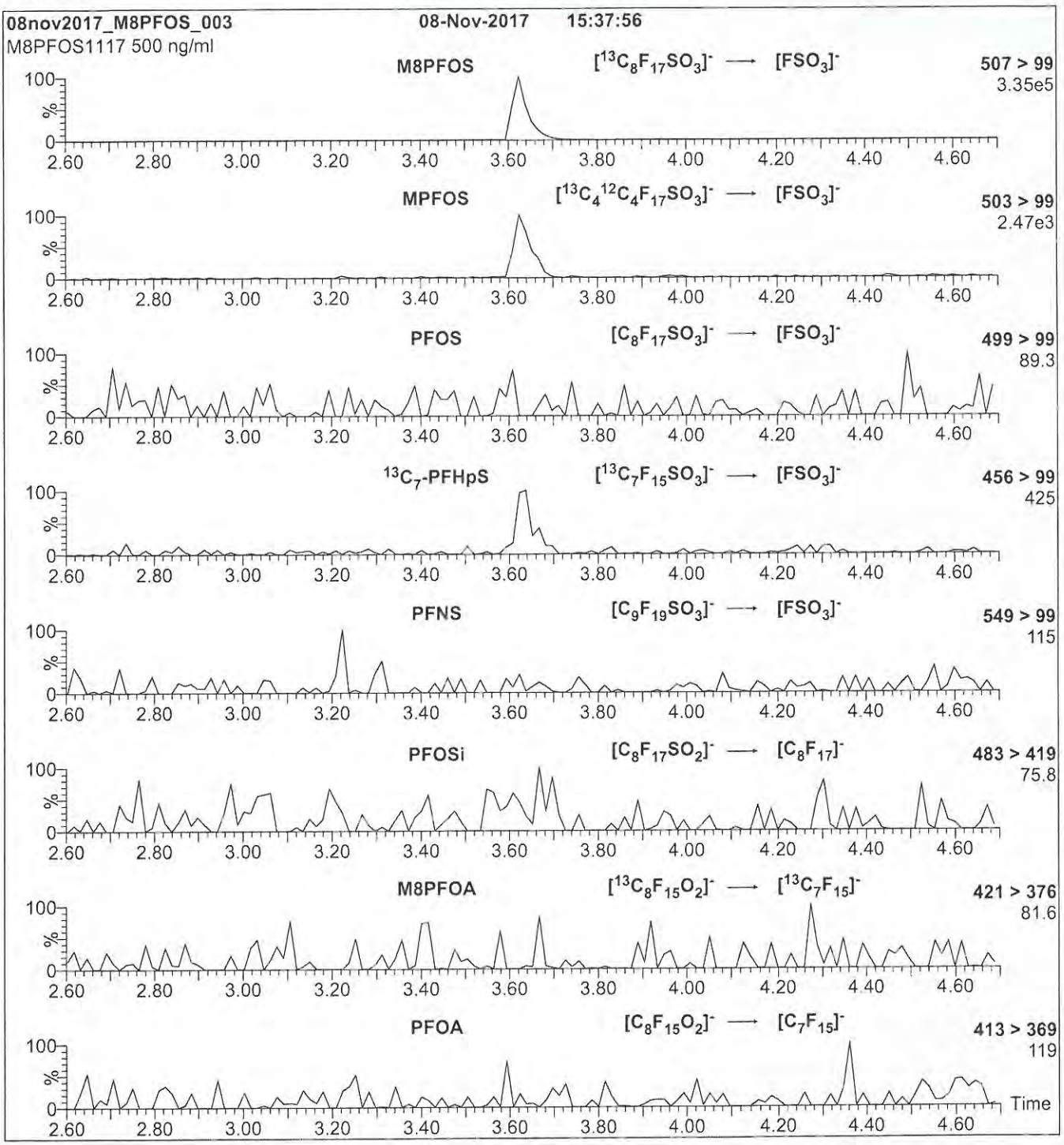
MS Parameters

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

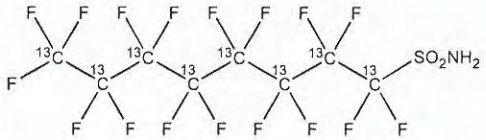
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

INTENDED USE:

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HAZARDS:

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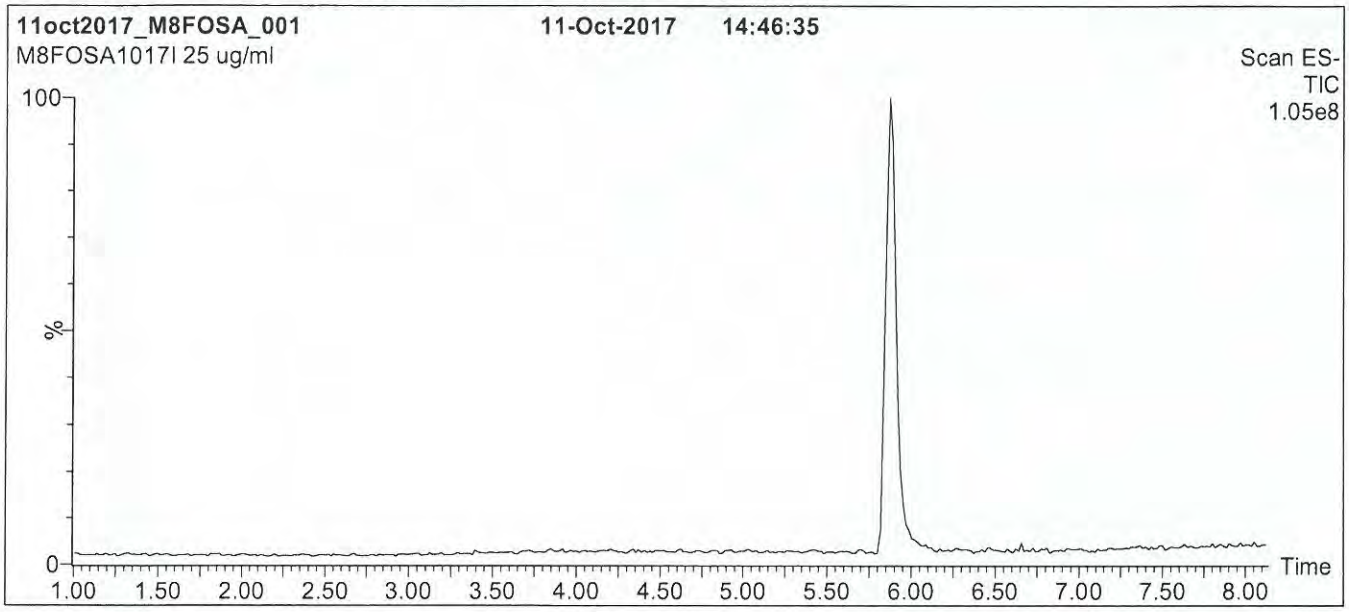
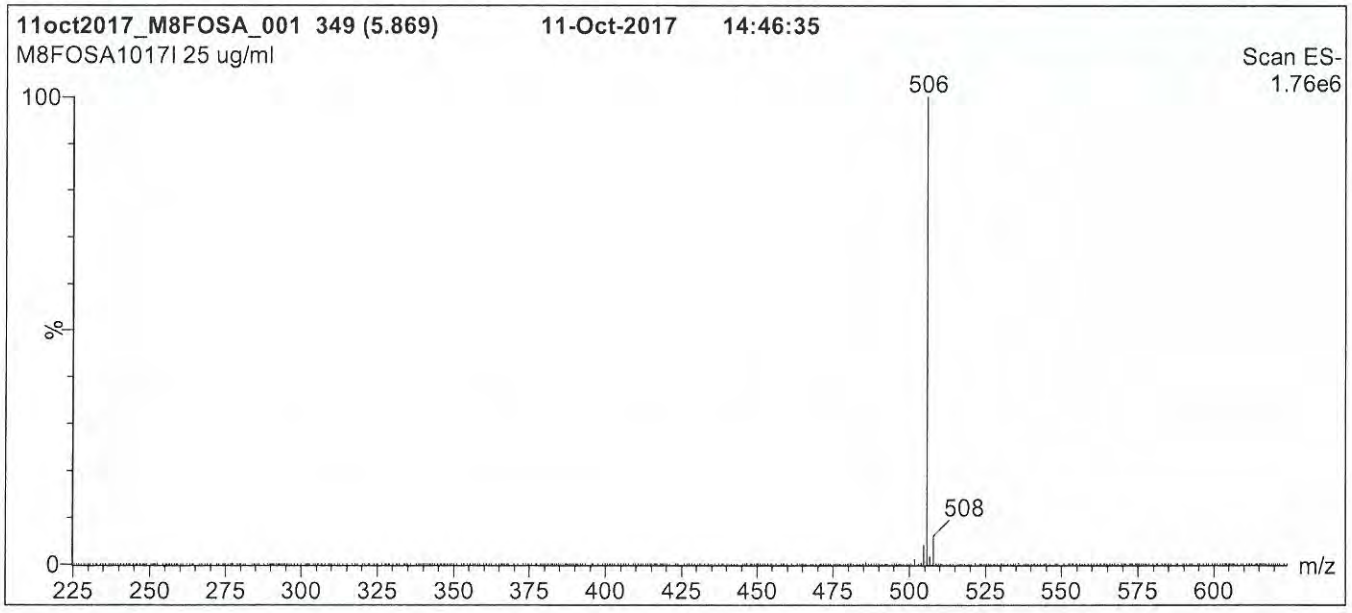
18B1525

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

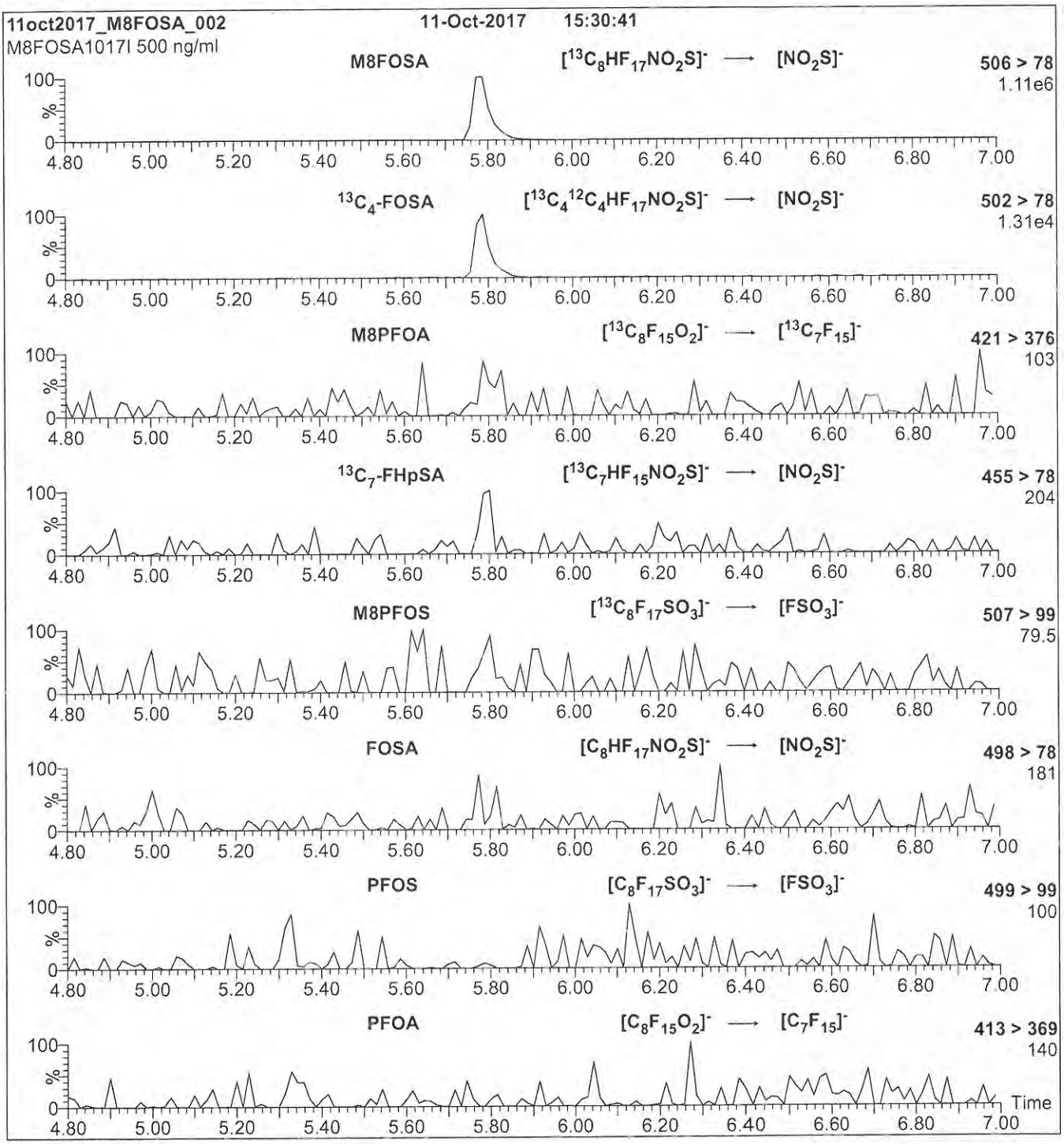
MS Parameters

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

1881525

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

1801090

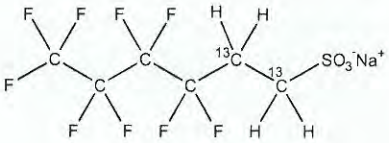
WELLINGTON LABORATORIES

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) 46.7 ± 2.3 µg/ml (M2-4:2FTS anion)	**SOLVENT(S):**	Methanol
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

180910

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CALA

ANAB ACCREDITED

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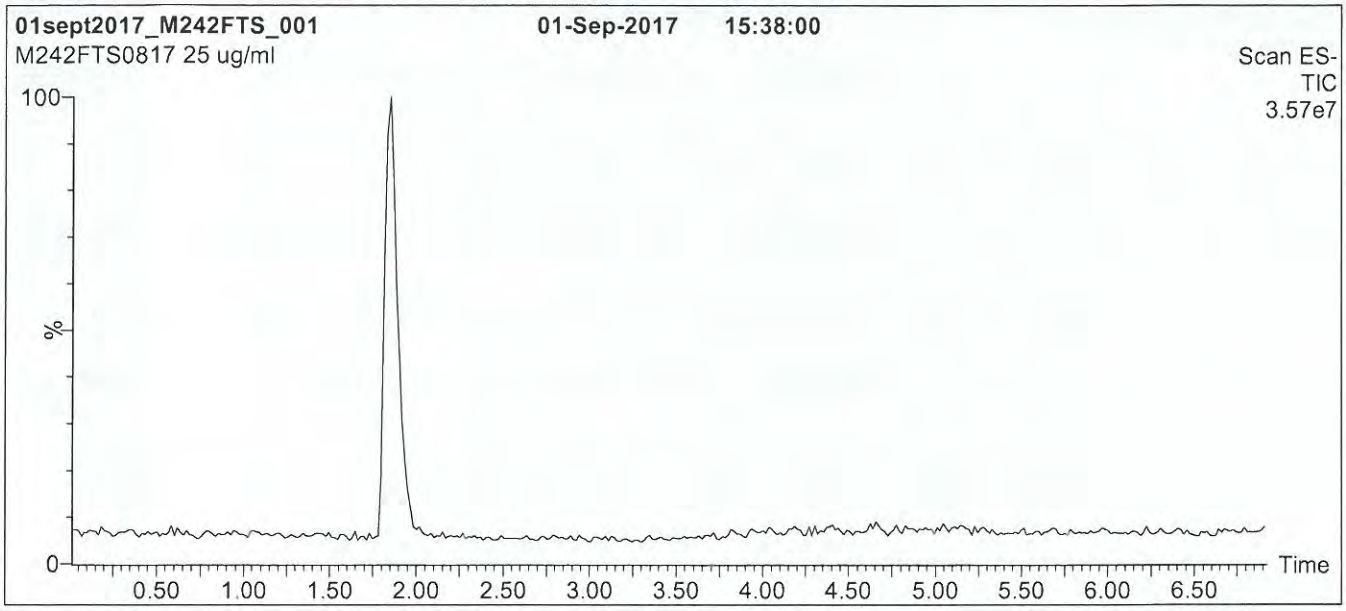
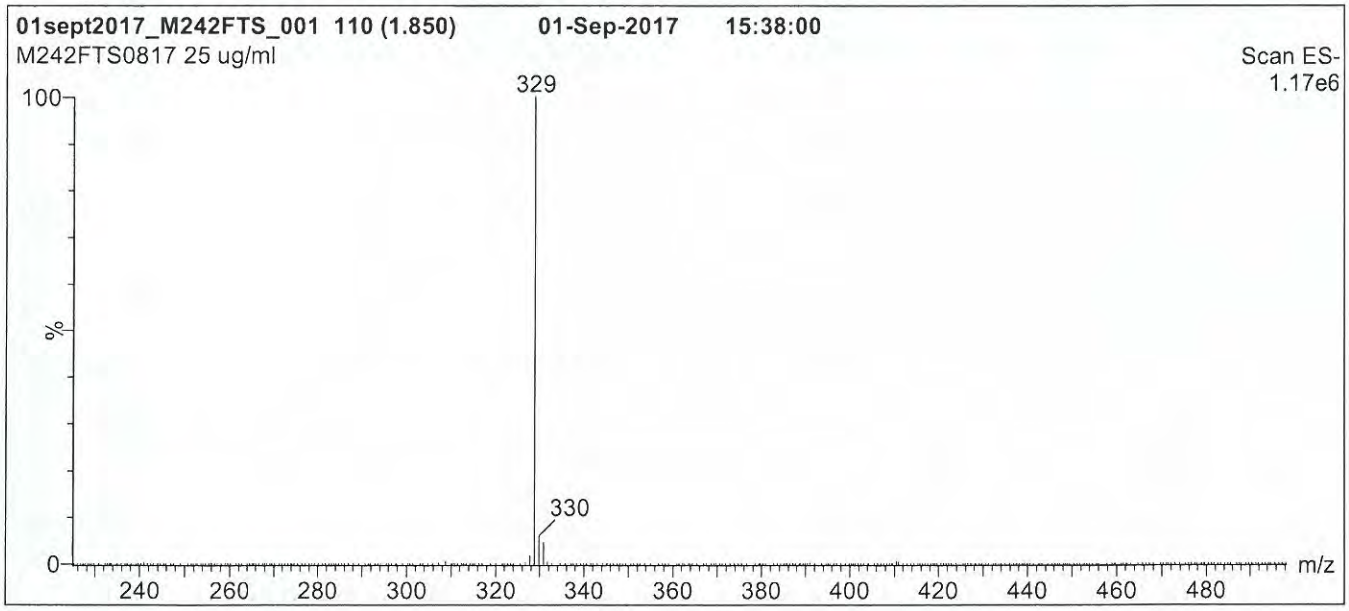
18C0910

Figure 1: **M2-4:2FTS; 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 8 min
and hold for 1 min before returning
to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

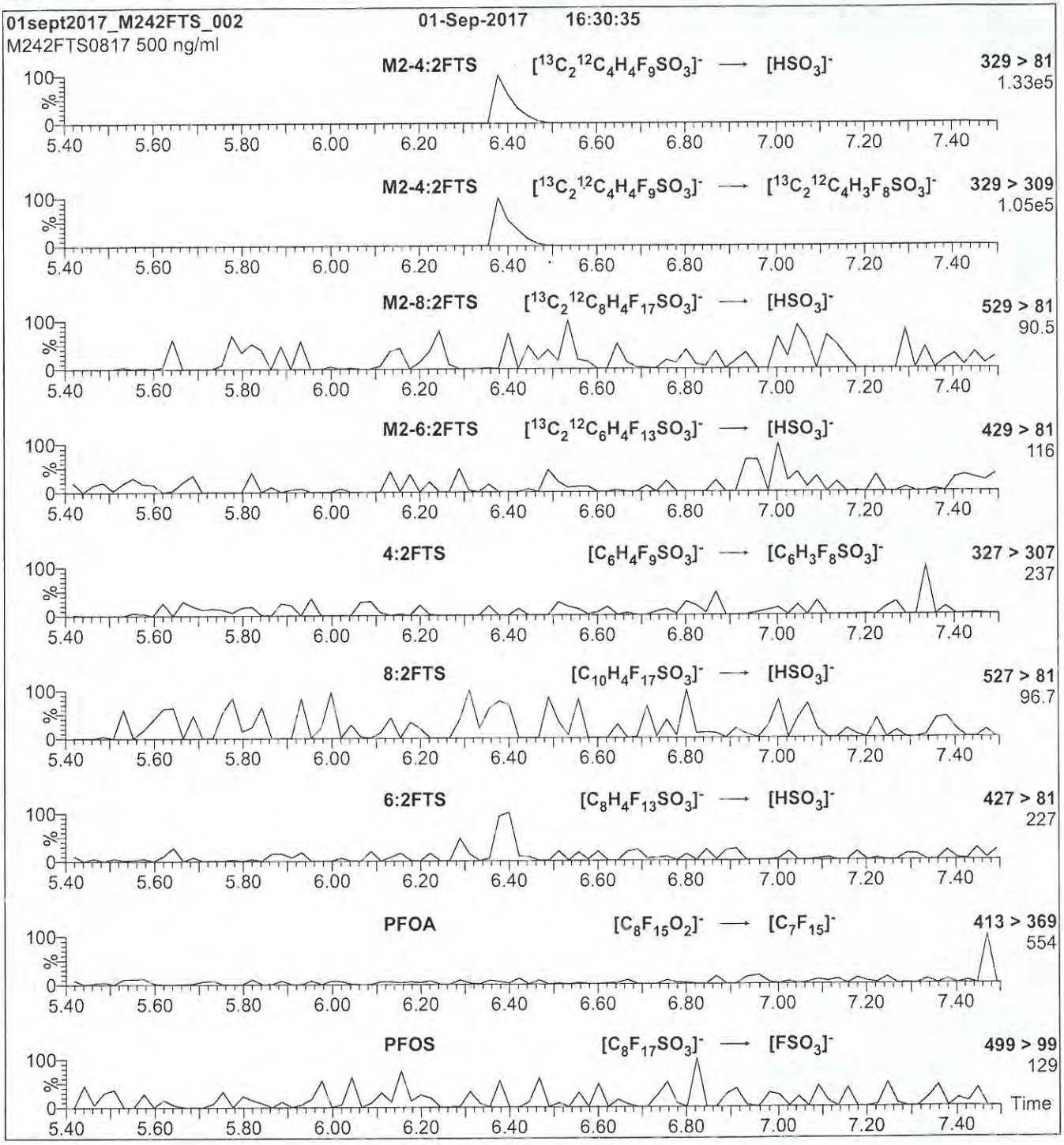
MS Parameters

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

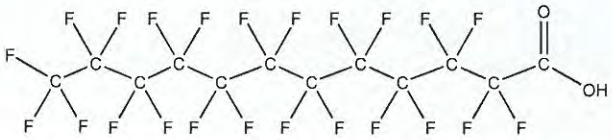
WELLINGTON LABORATORIES

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

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).

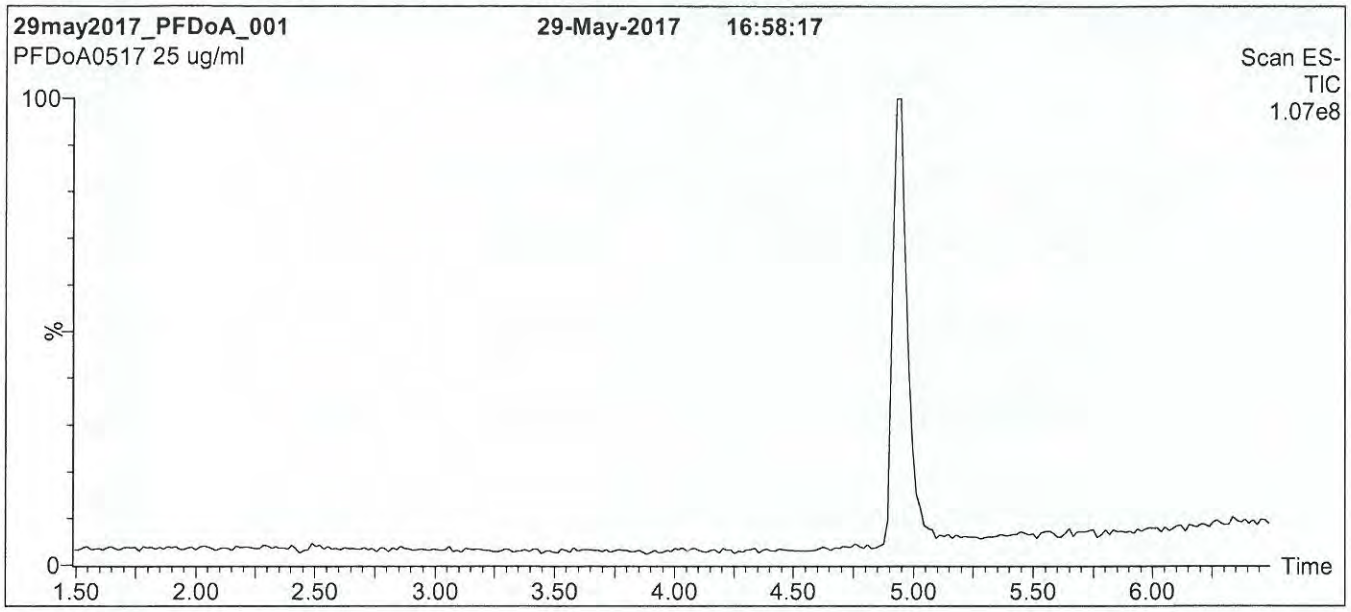
CALA Testing Accreditation No. A 1226

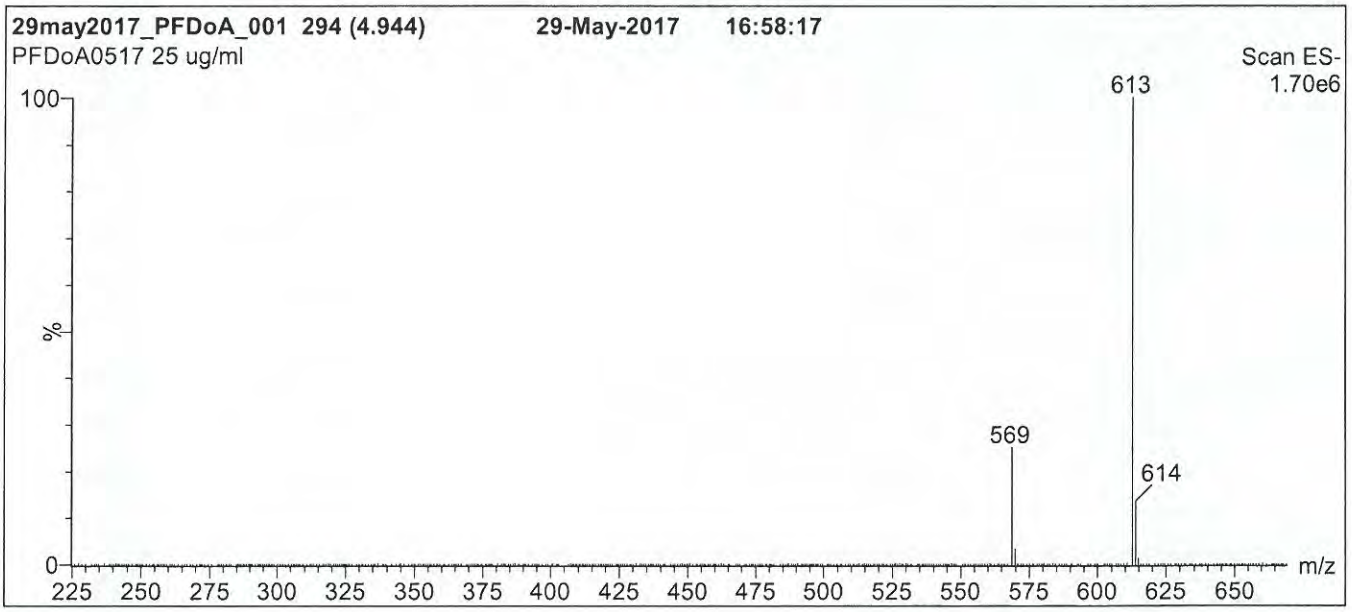
ANAB ACCREDITED Reference Material Producer

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

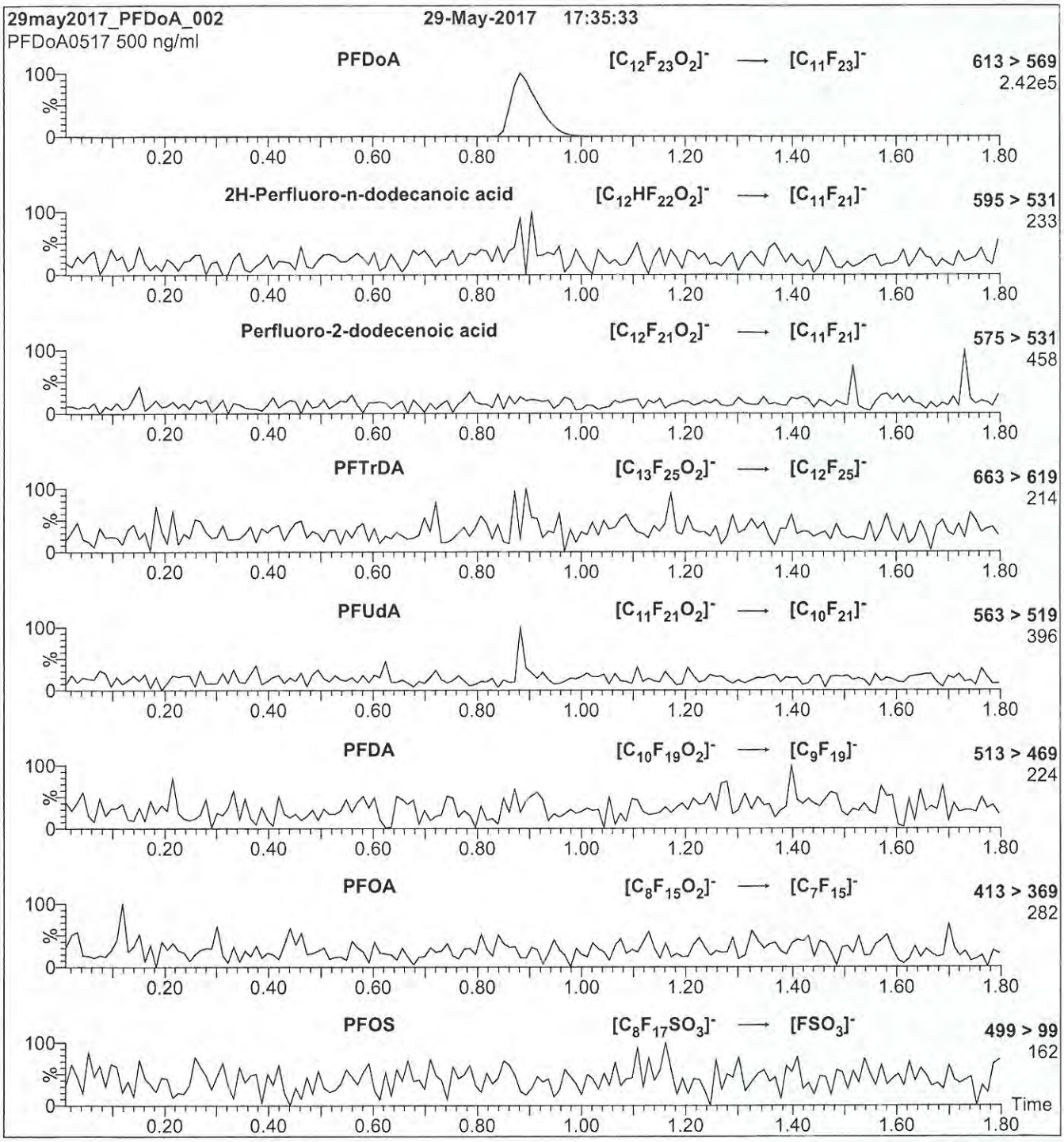
MS Parameters

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

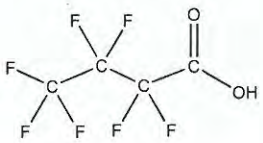
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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).

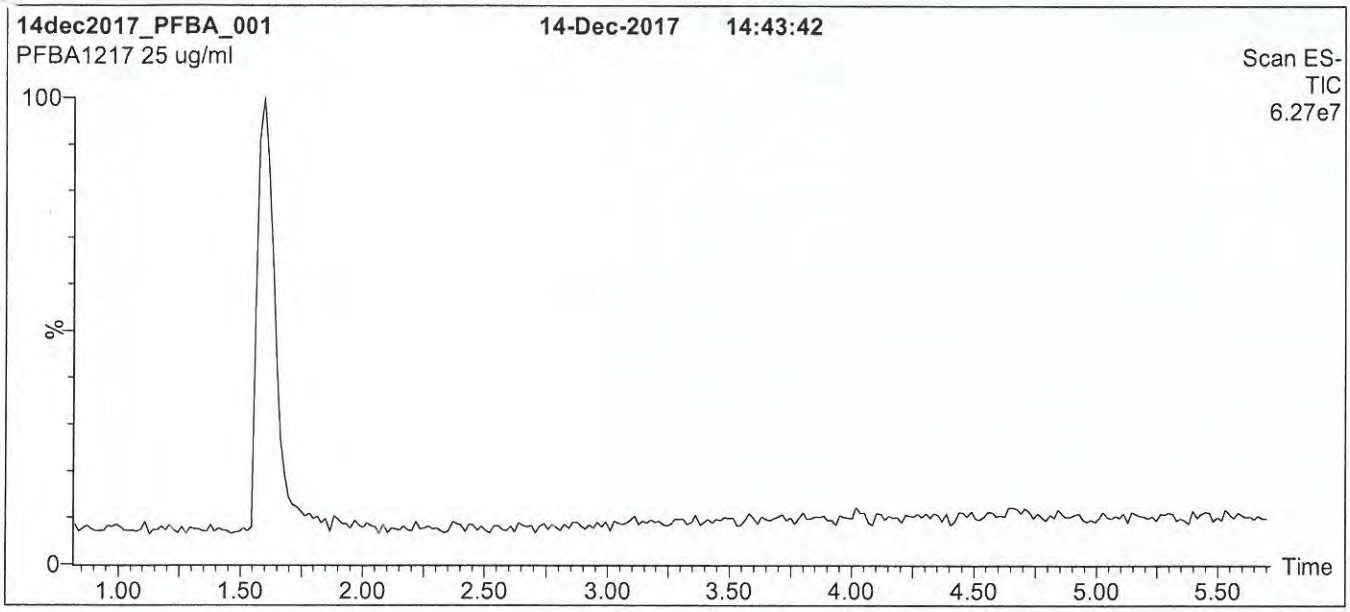
CALA Testing

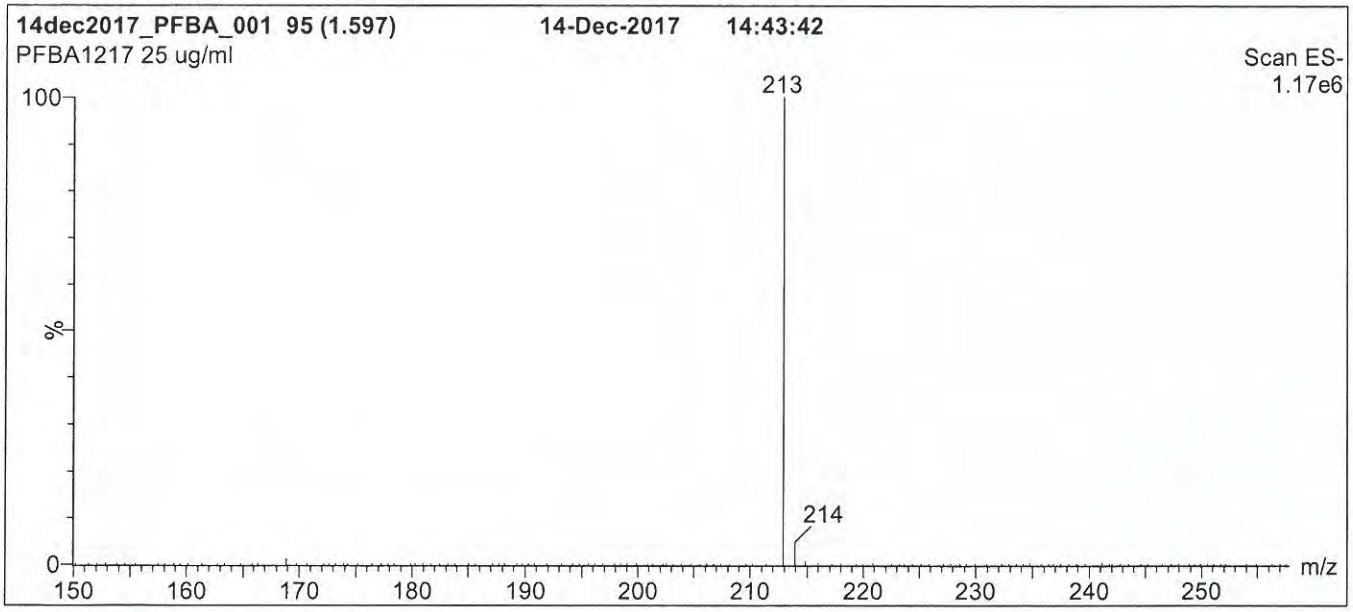
ANAB ACCREDITED Reference Material Producer

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

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

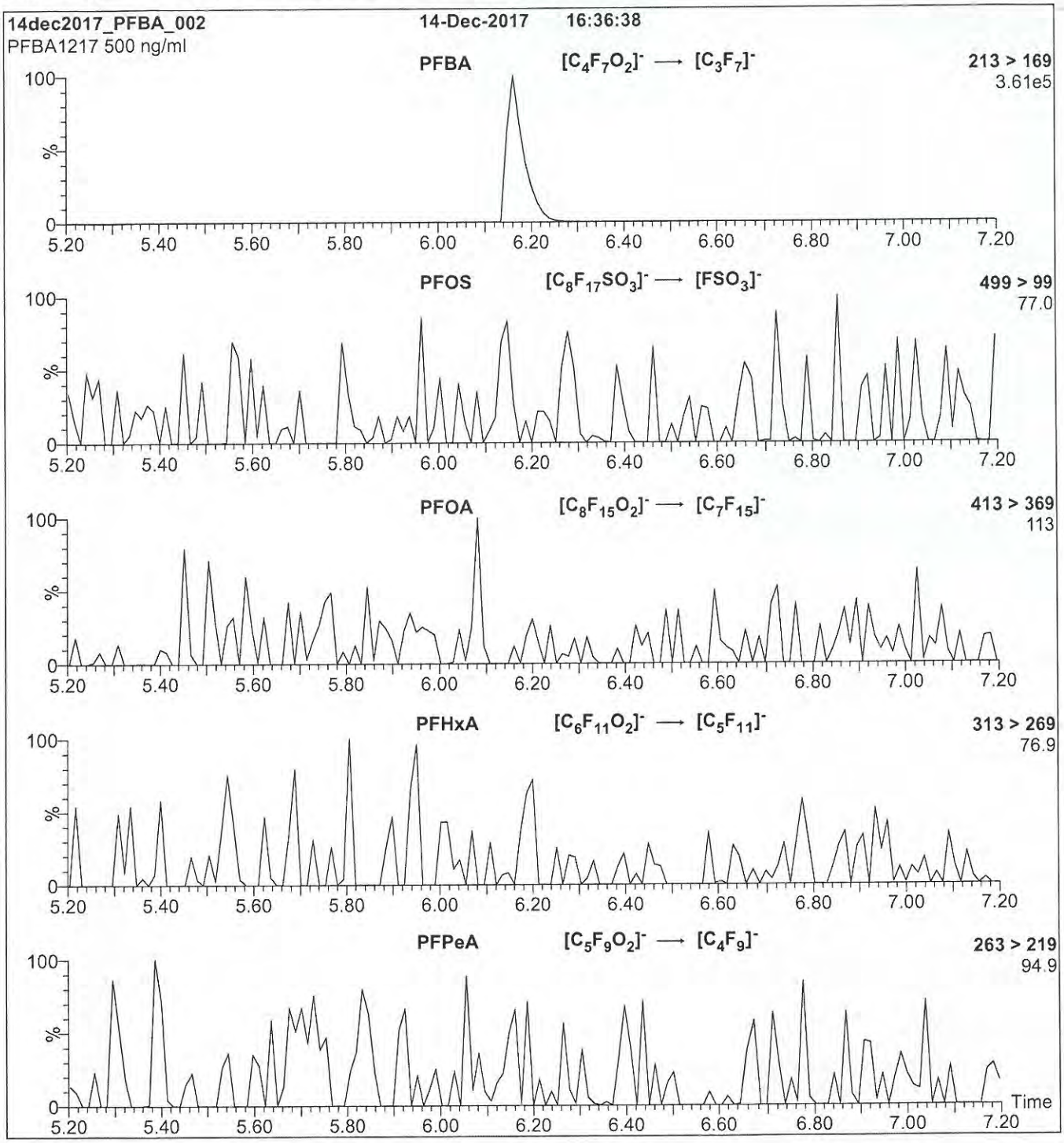
MS Parameters

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

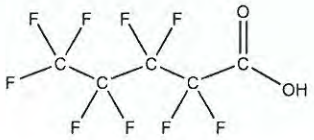
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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).

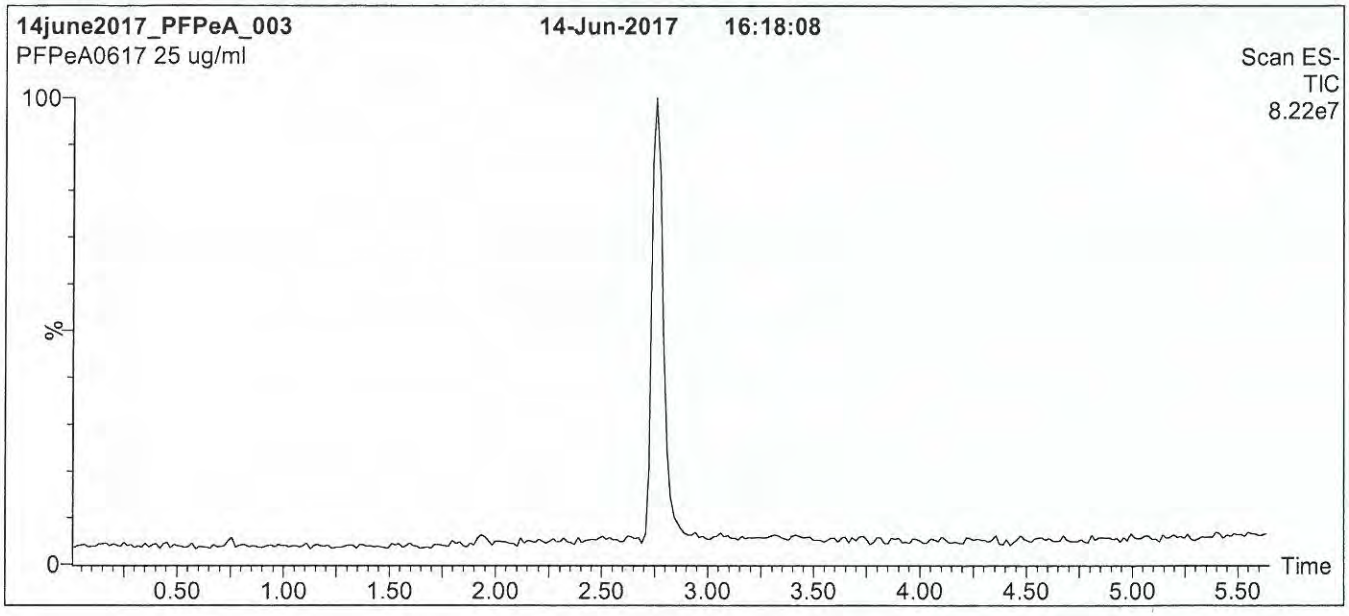
CALA Testing

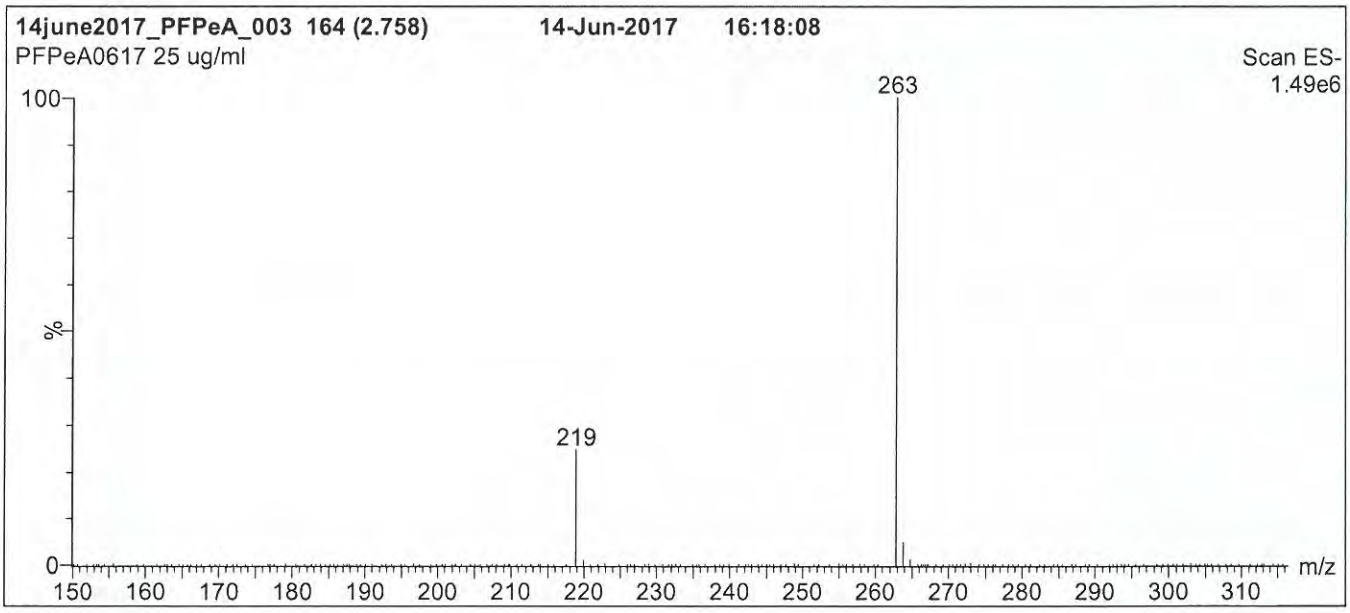
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

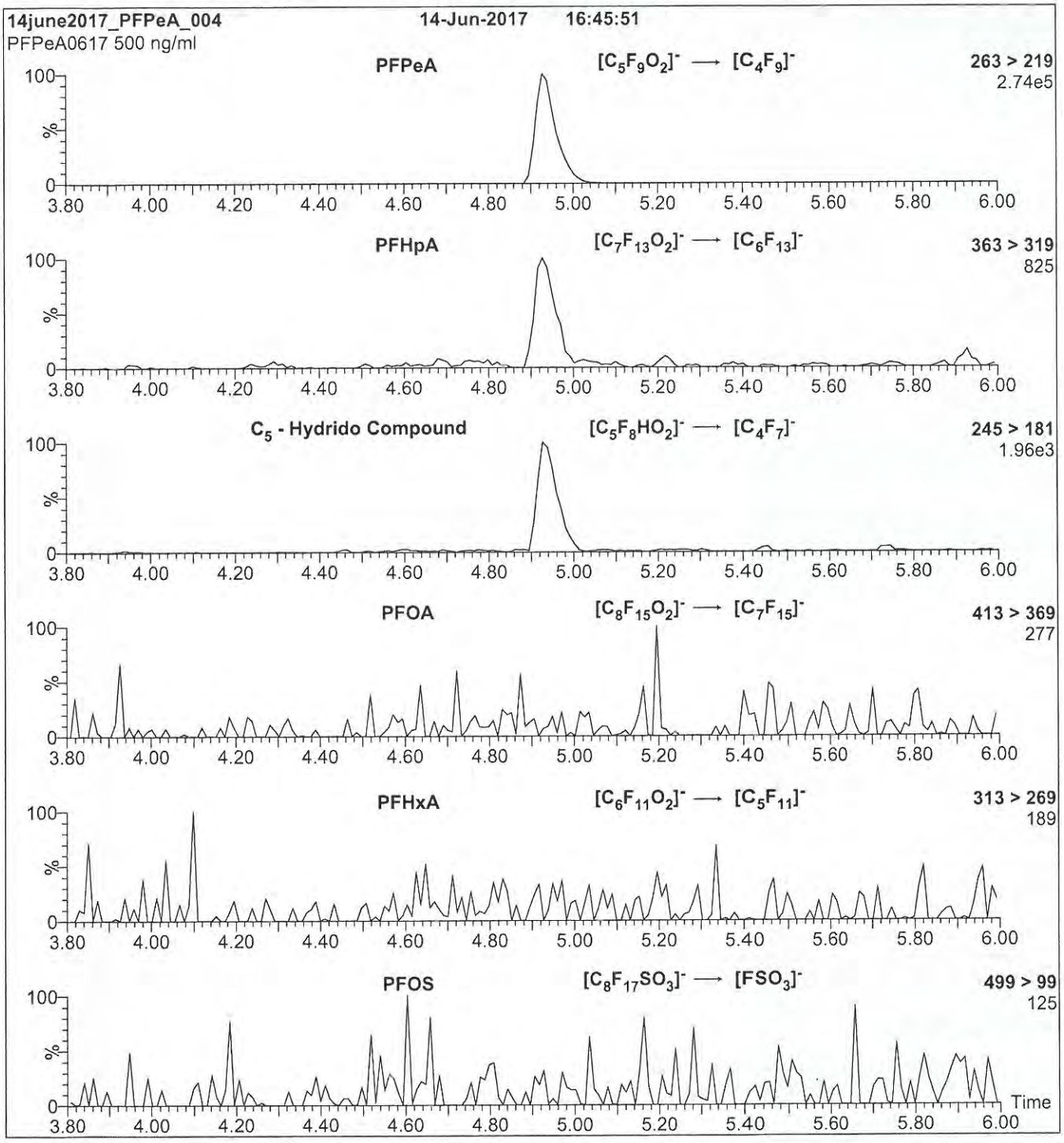
MS Parameters

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

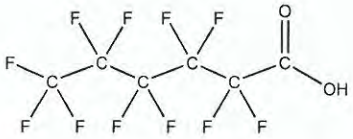
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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).

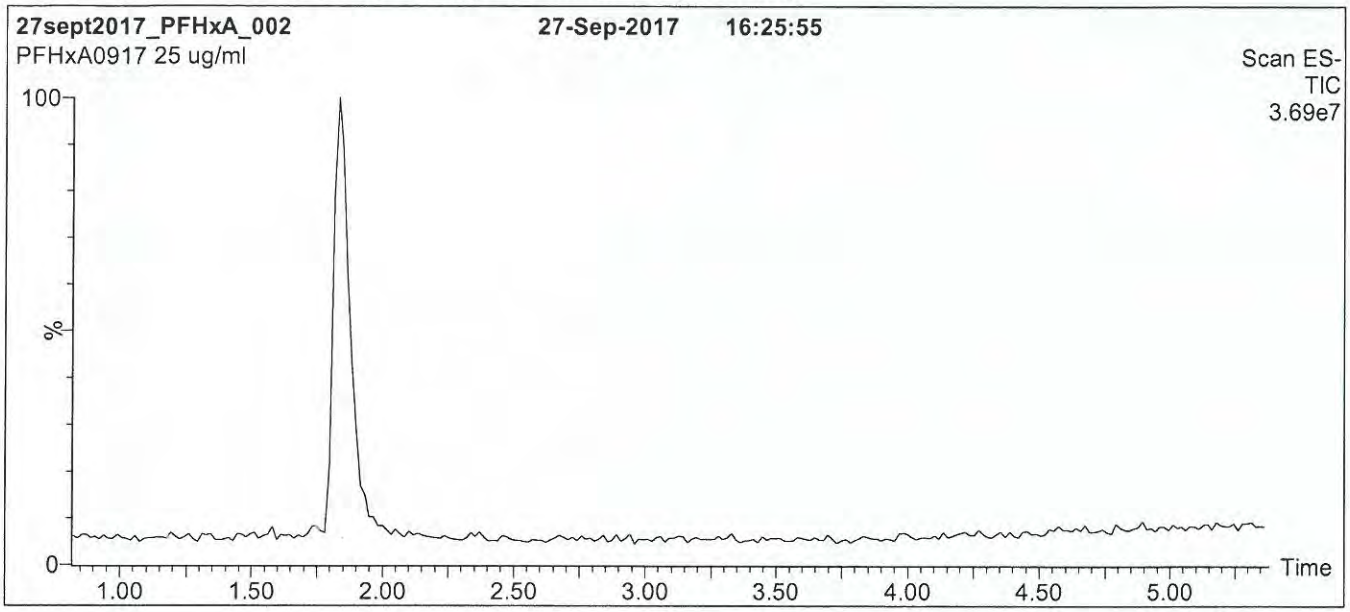
CALA Testing Accreditation No. A1226

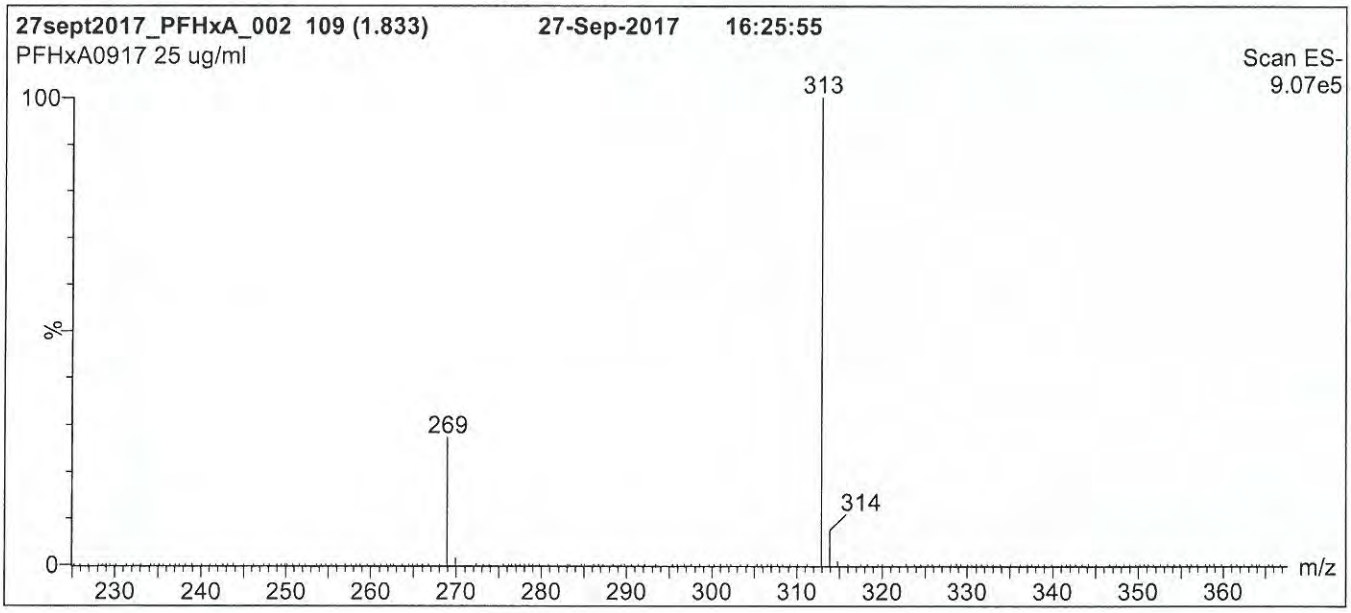
ANAB ACCREDITED Reference Material Producer

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

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

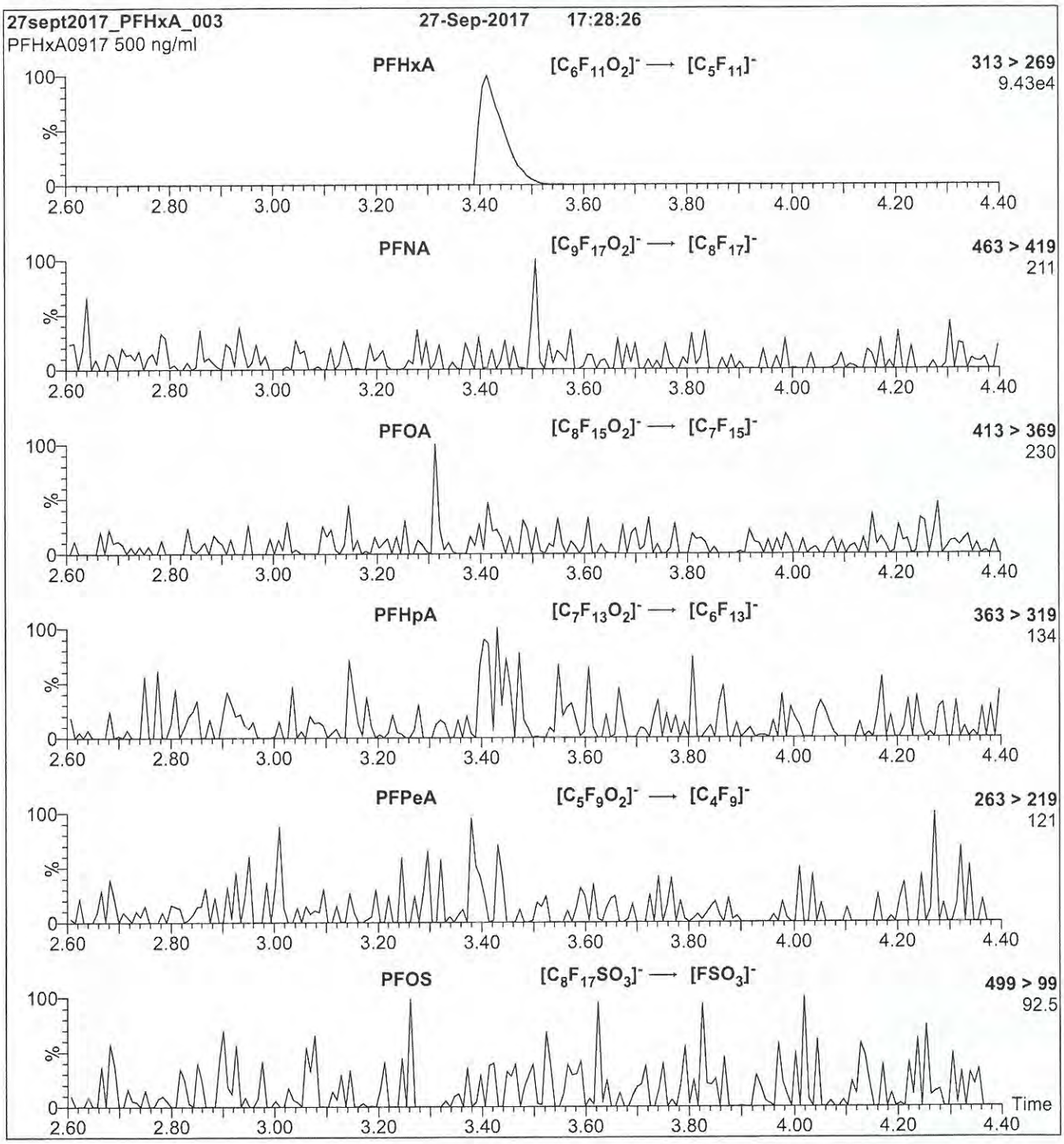
MS Parameters

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

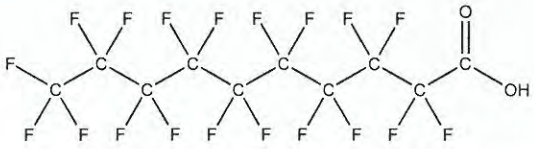
WELLINGTON LABORATORIES

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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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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).

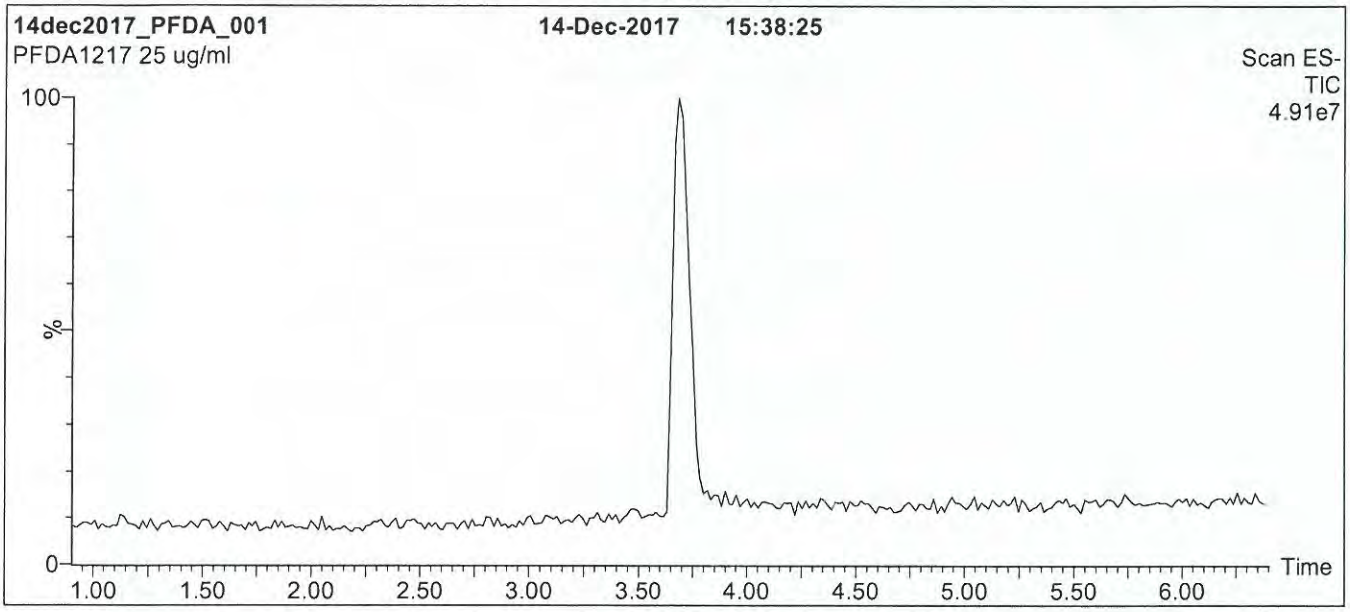
CALA Testing Accreditation No. A 1226

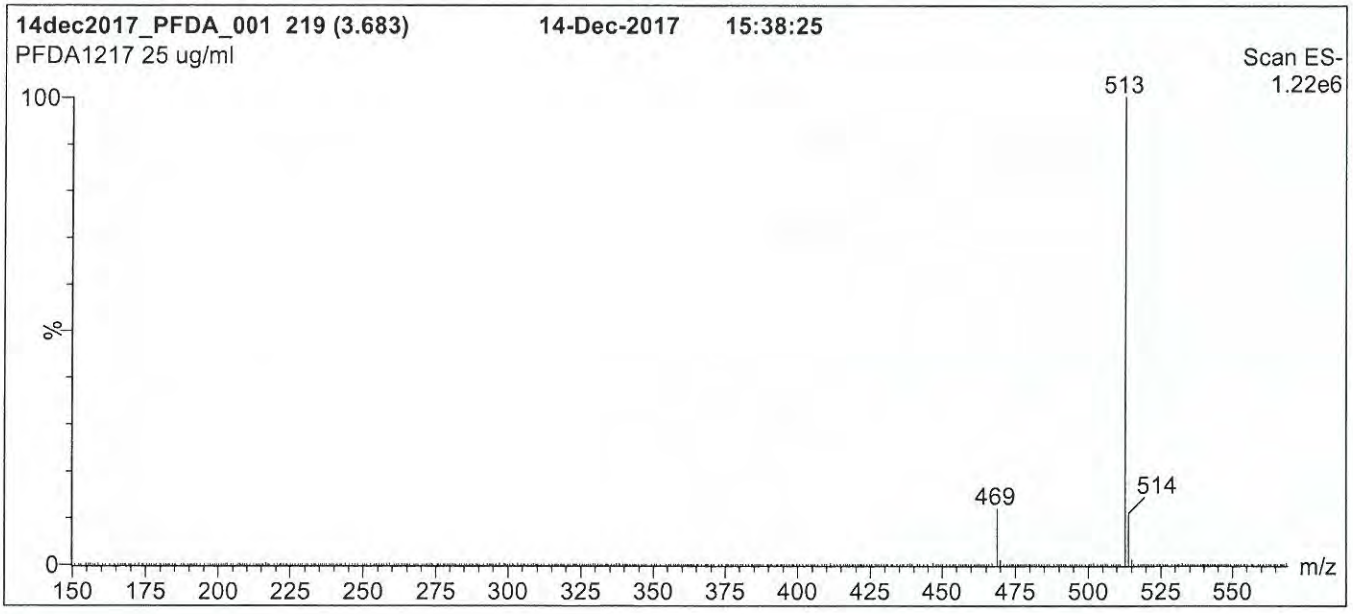
ANAB ACCREDITED Reference Material Producer

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

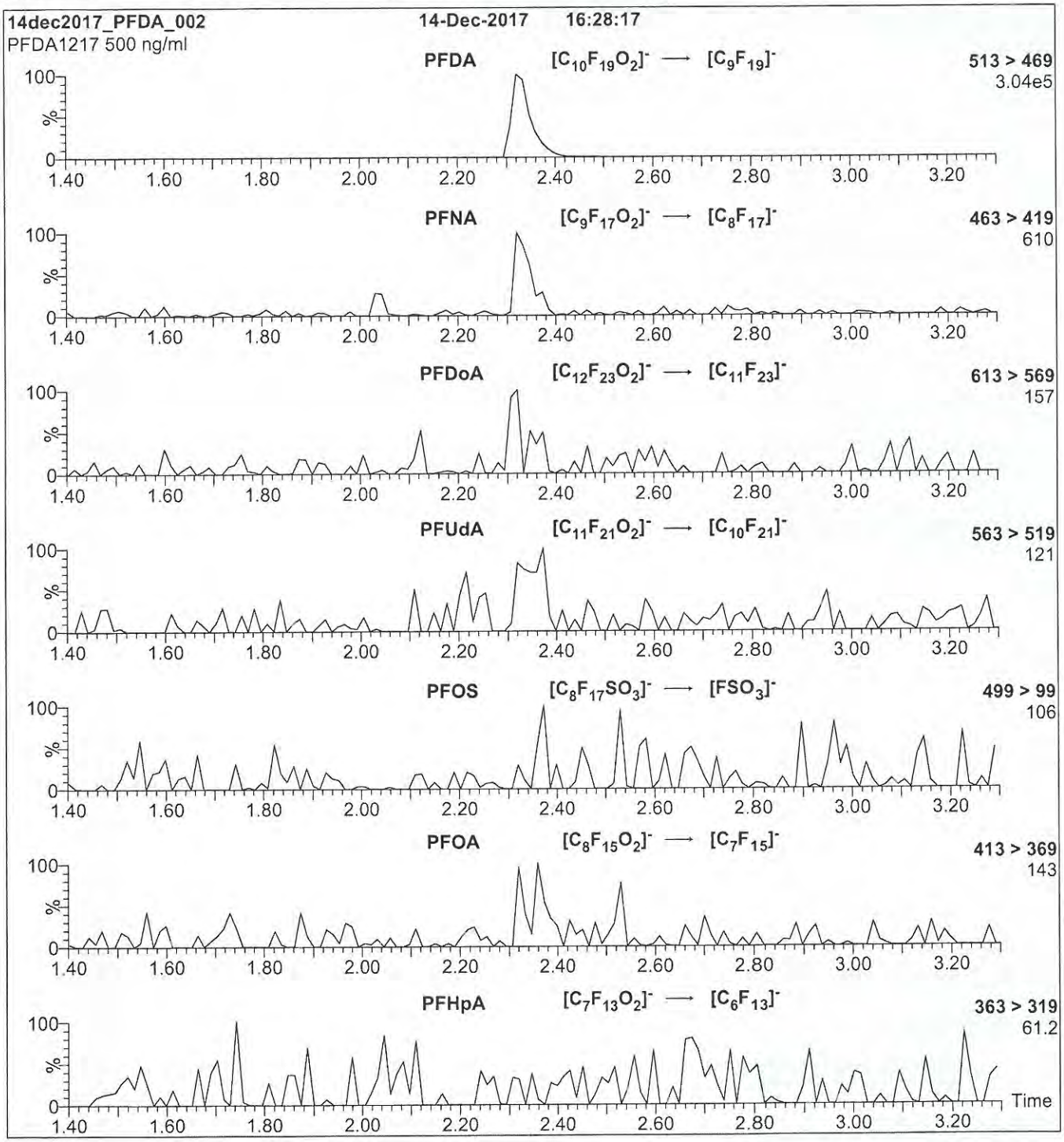
MS Parameters

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

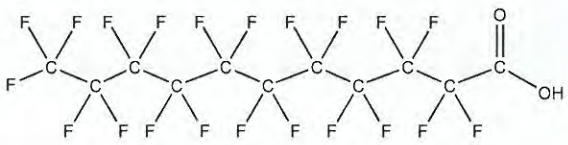
WELLINGTON LABORATORIES

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:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation Inc. A1226

ANAB ACCREDITED Reference Material Producer

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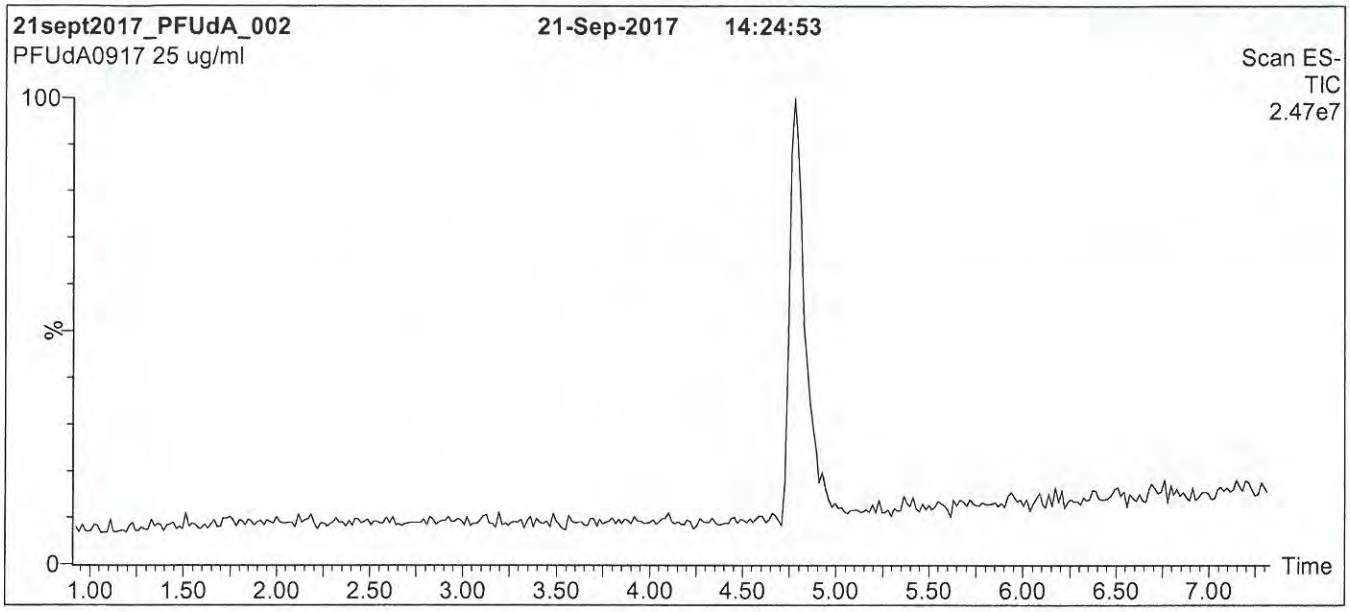
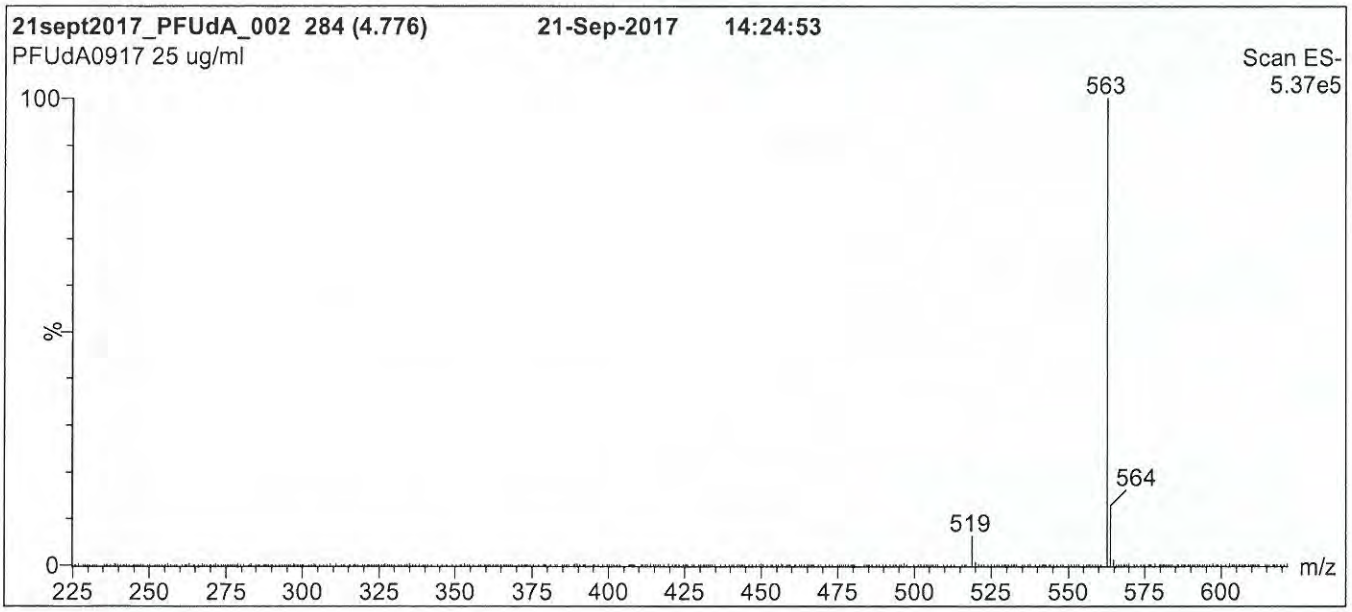
18C2716

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

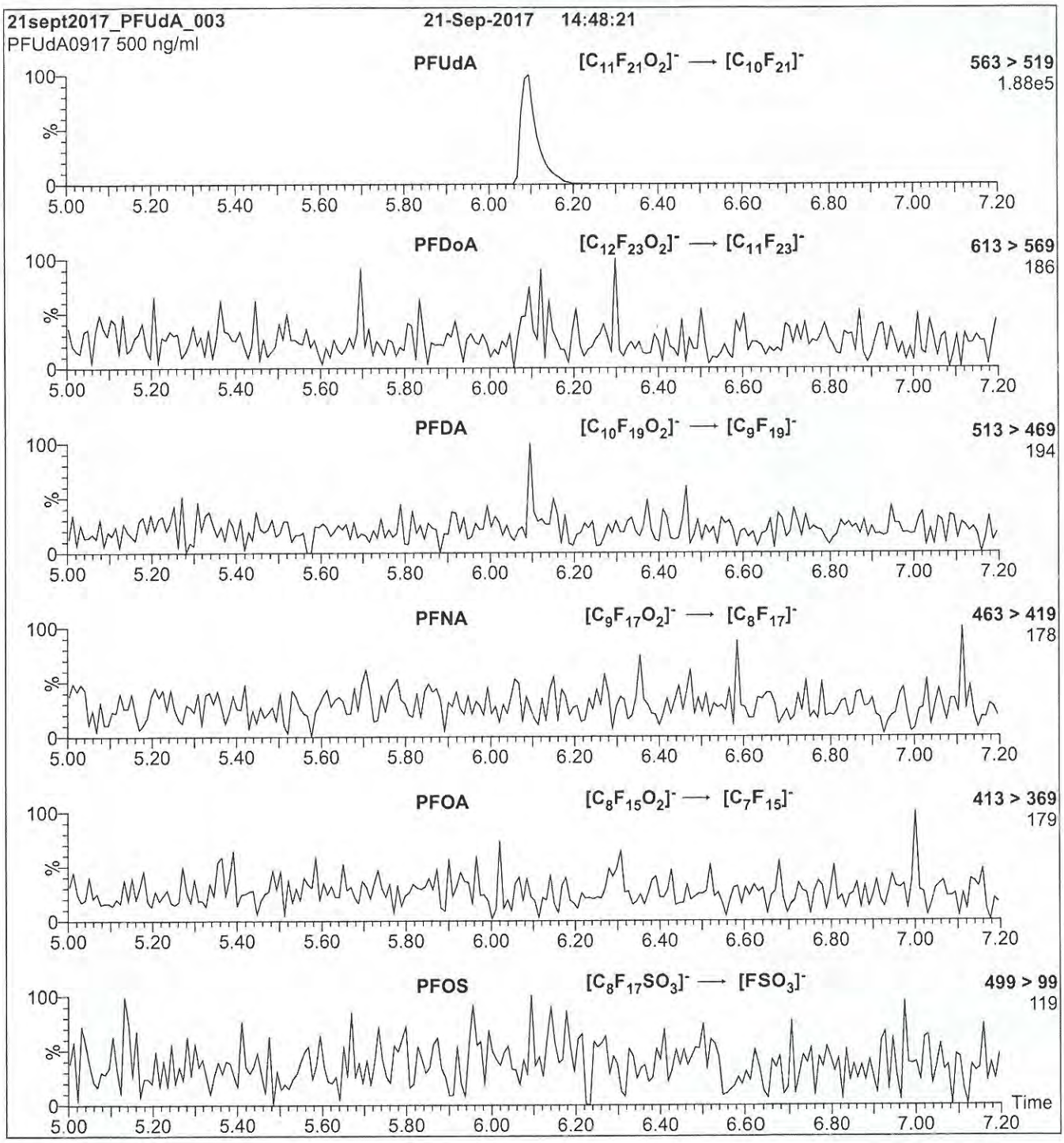
MS Parameters

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

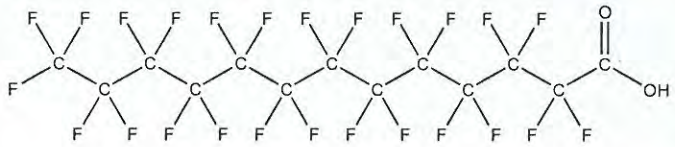
WELLINGTON LABORATORIES

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 ($C_{14}HF_{27}O_2$).

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Certified By: _____ **Date:** 05/04/2017 (mm/dd/yyyy)
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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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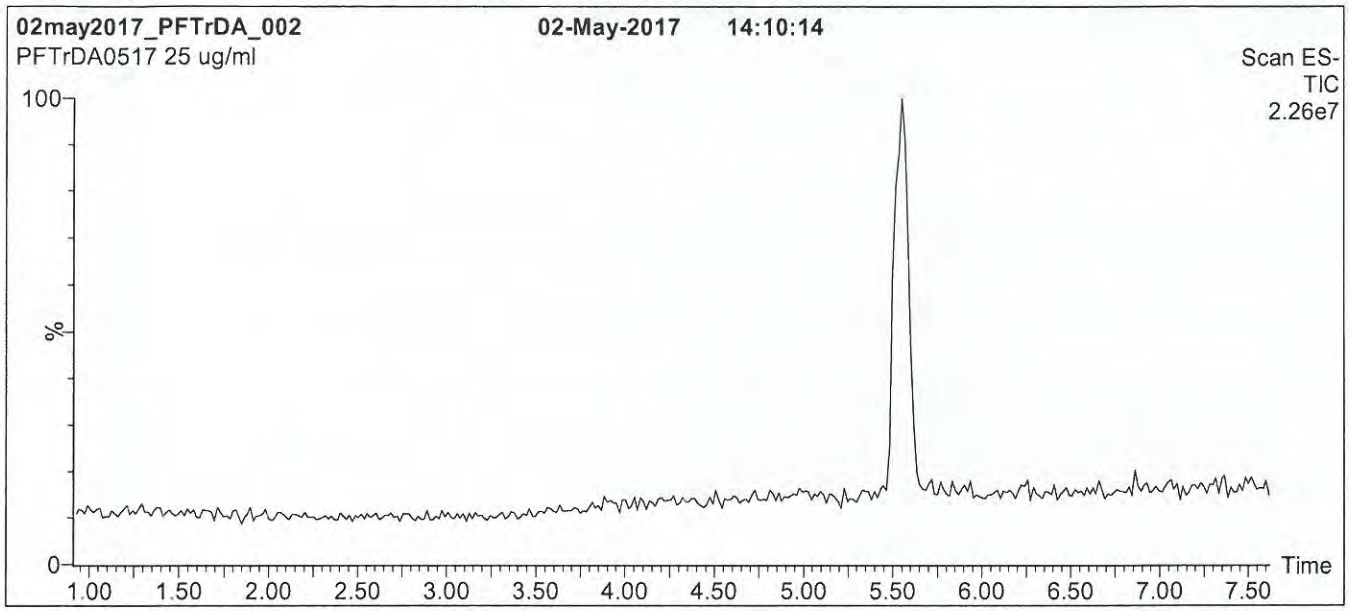
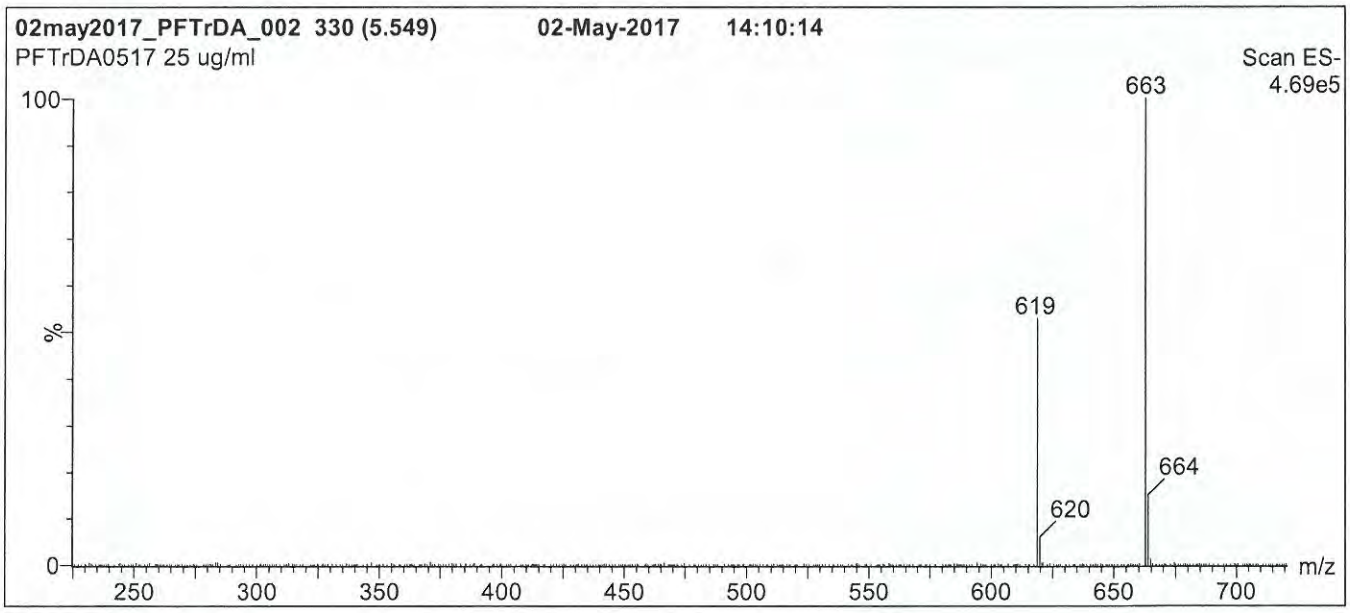
18C2717

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

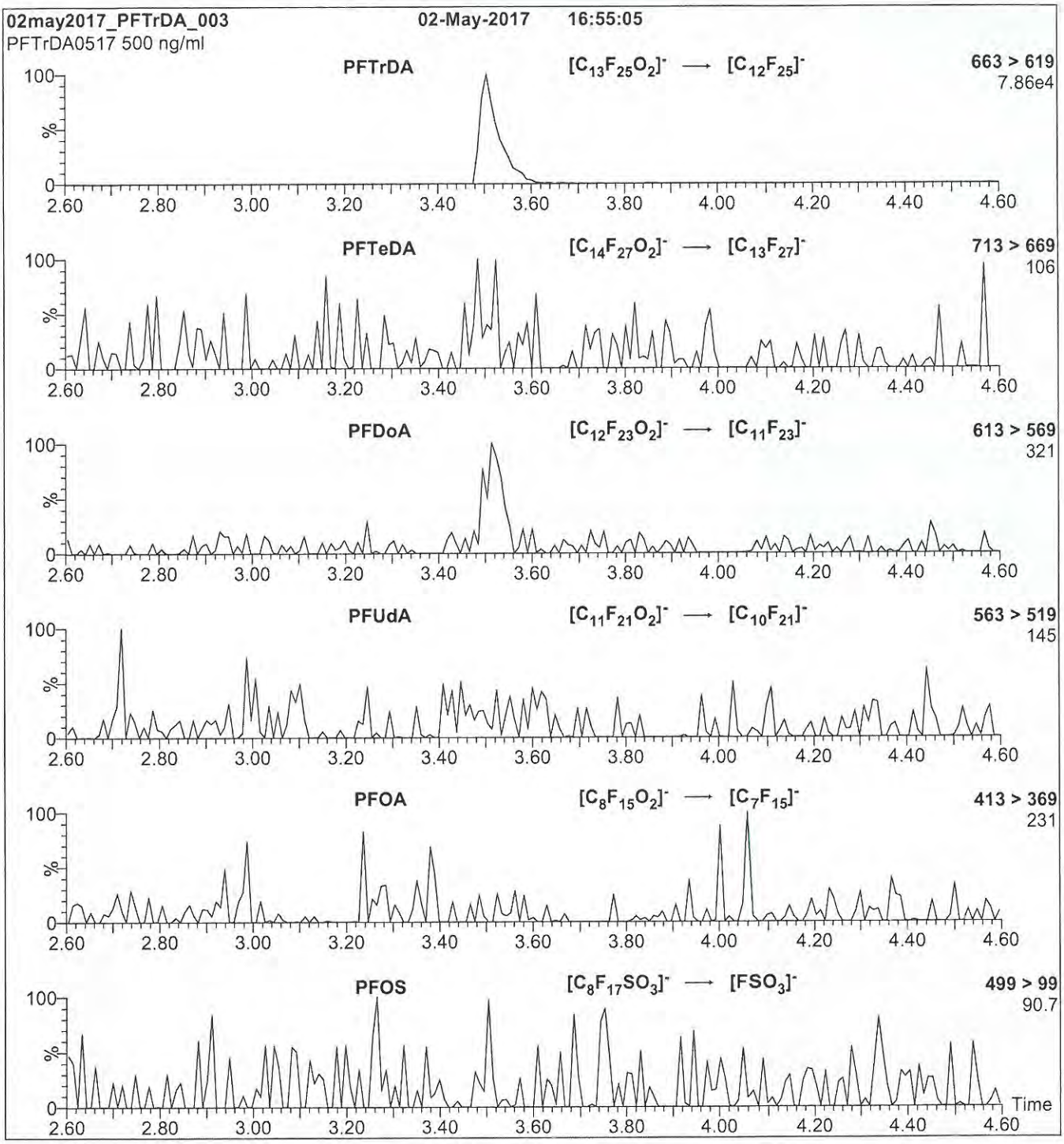
MS Parameters

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

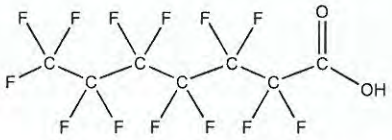
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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
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CALA Testing Accreditation No. A 1226

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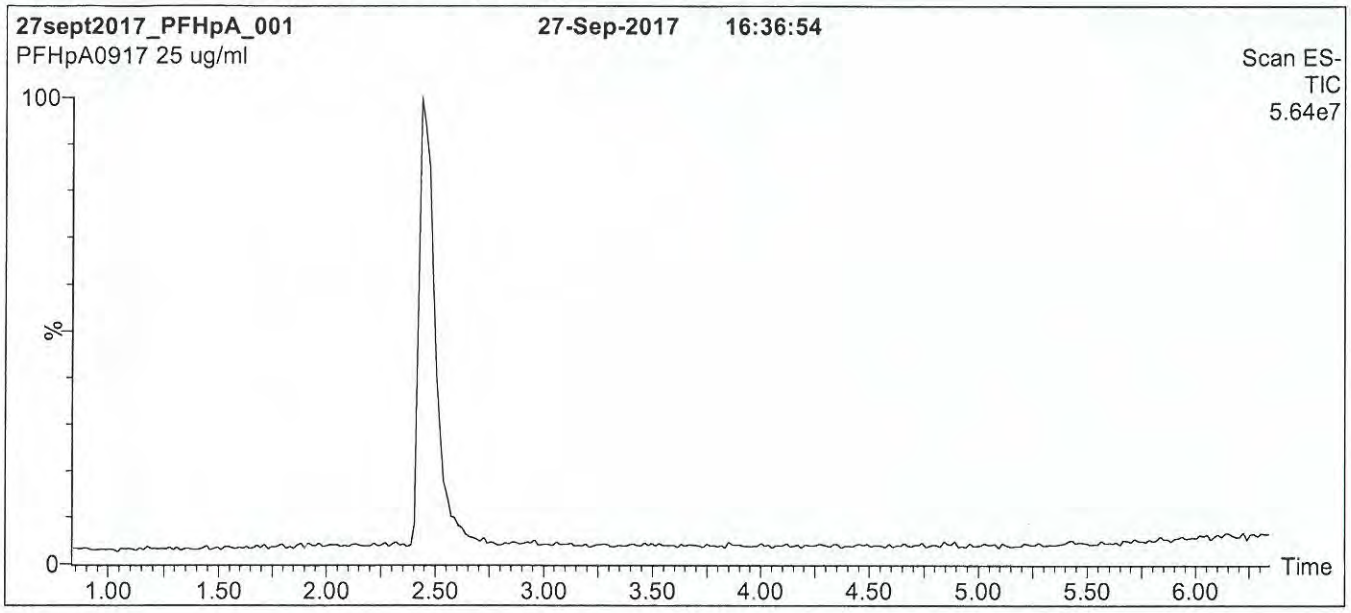
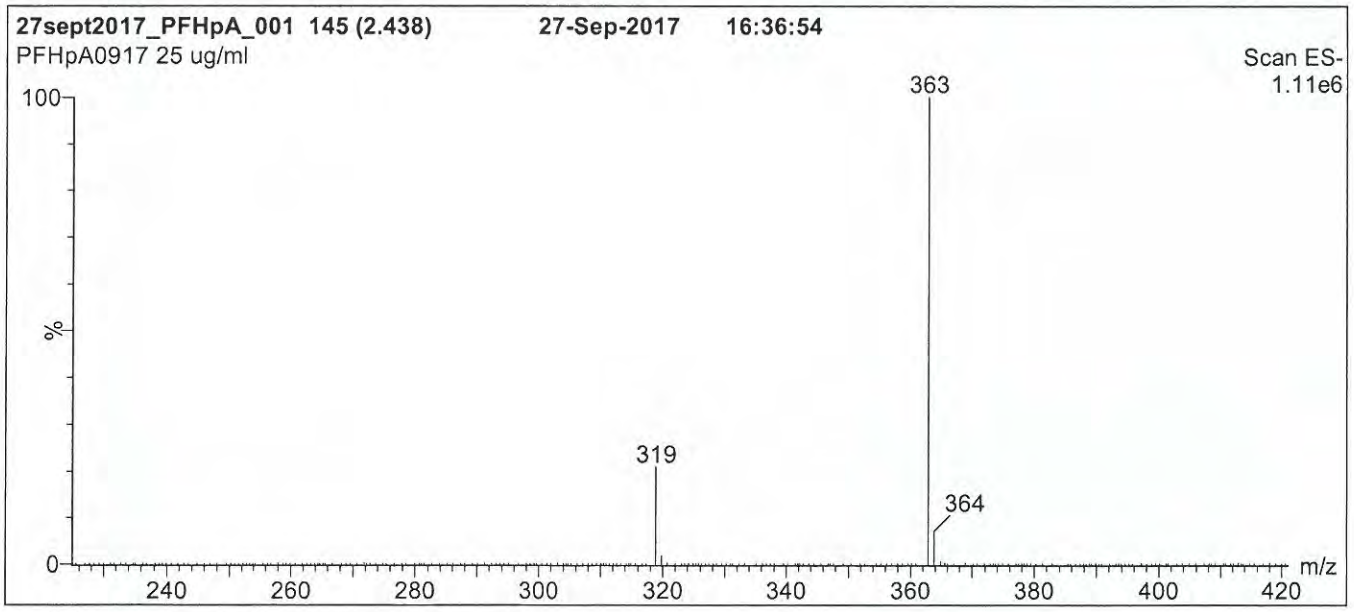
18C2718

Figure 1: **PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

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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

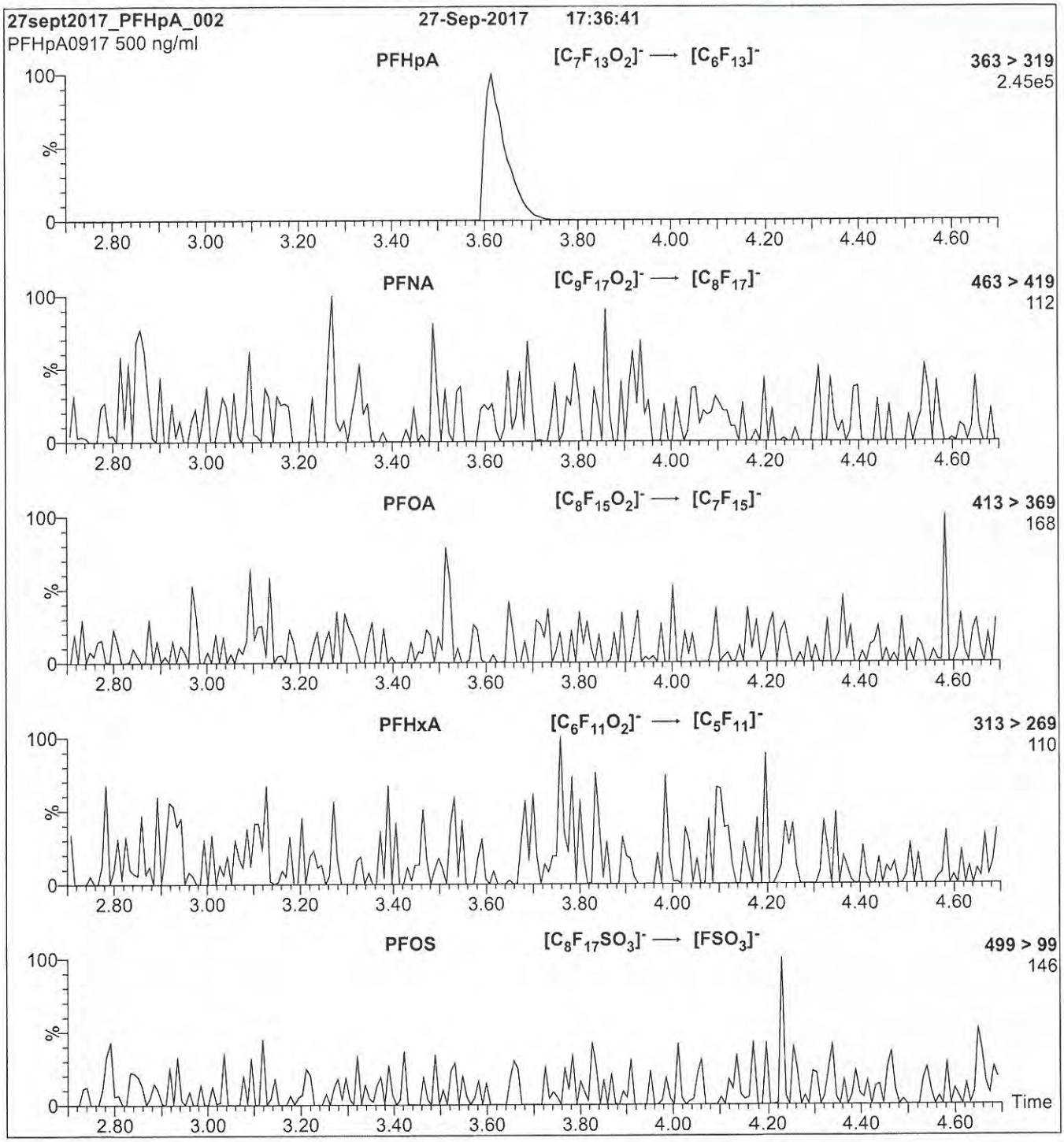
MS Parameters

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

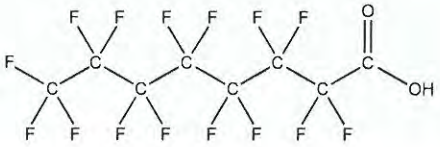
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid

LOT NUMBER: PFOA0917

STRUCTURE:

CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 414.07
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/27/2017
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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).

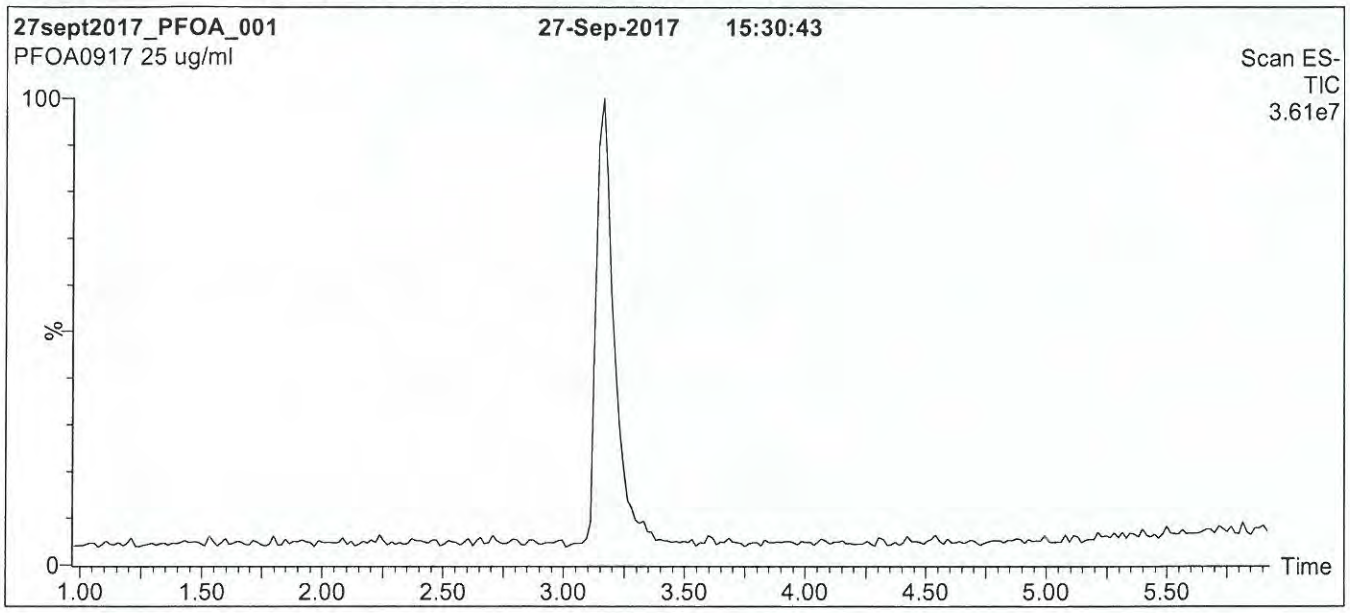
CALA Testing Accreditation No. A1226

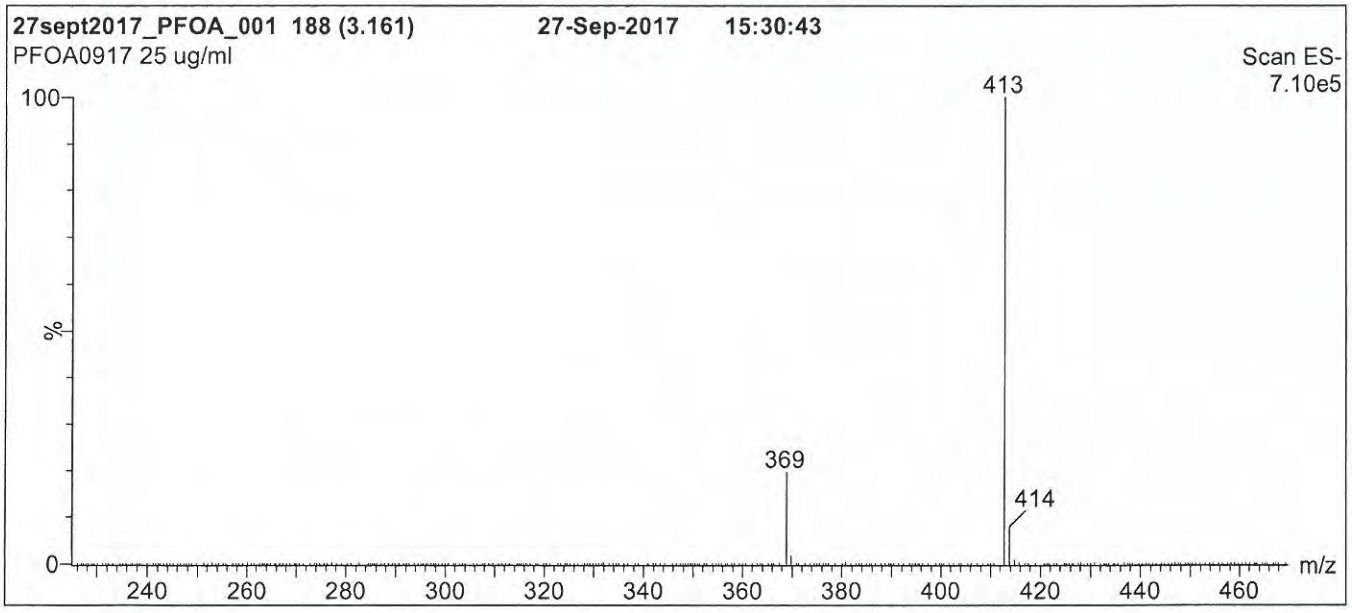
ANAB ACCREDITED Reference Material Producer

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

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

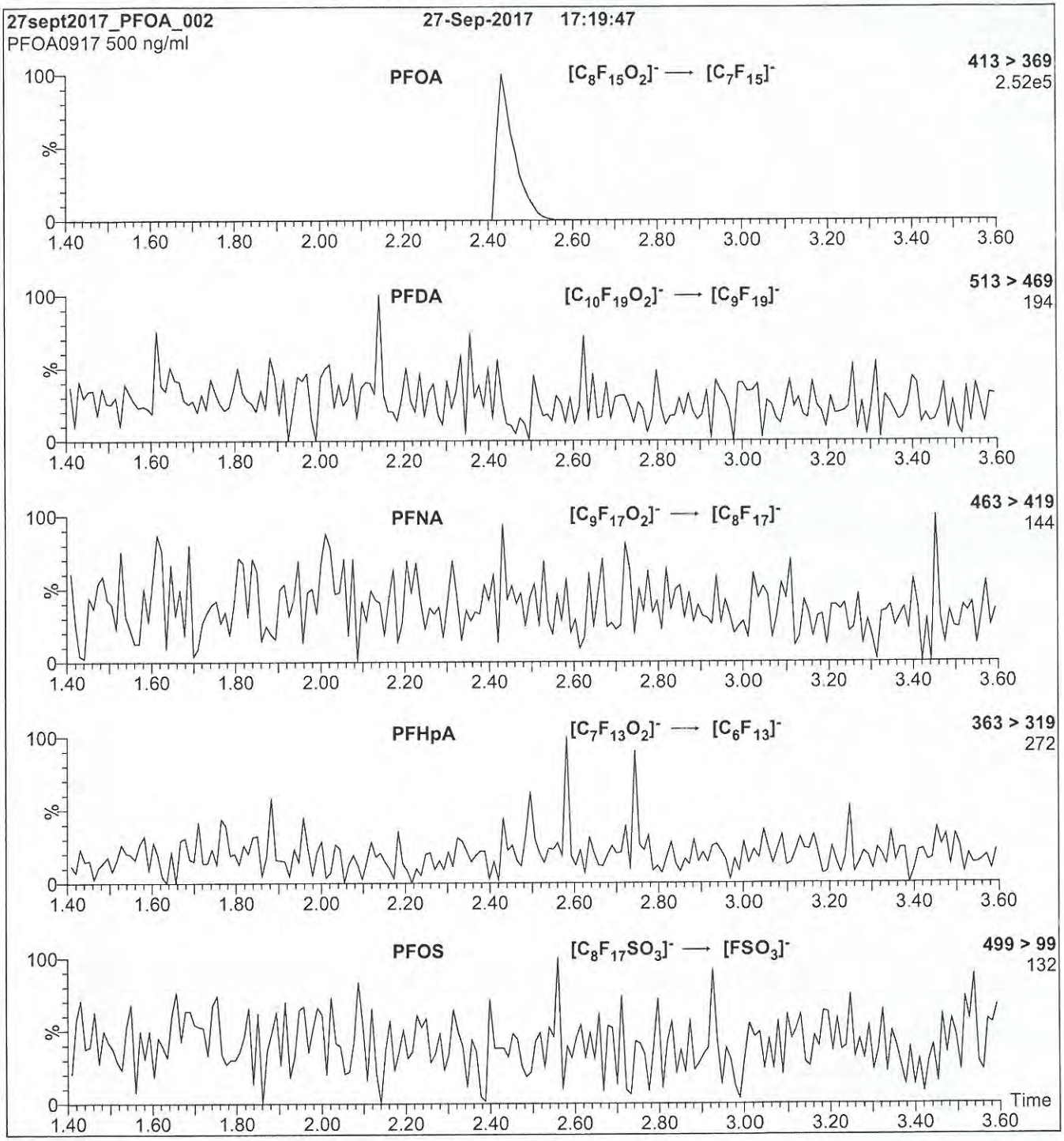
MS Parameters

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

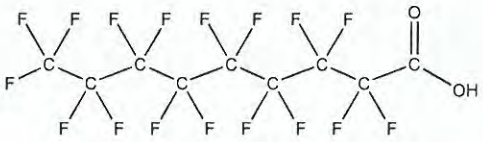
18C2720

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

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:

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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).

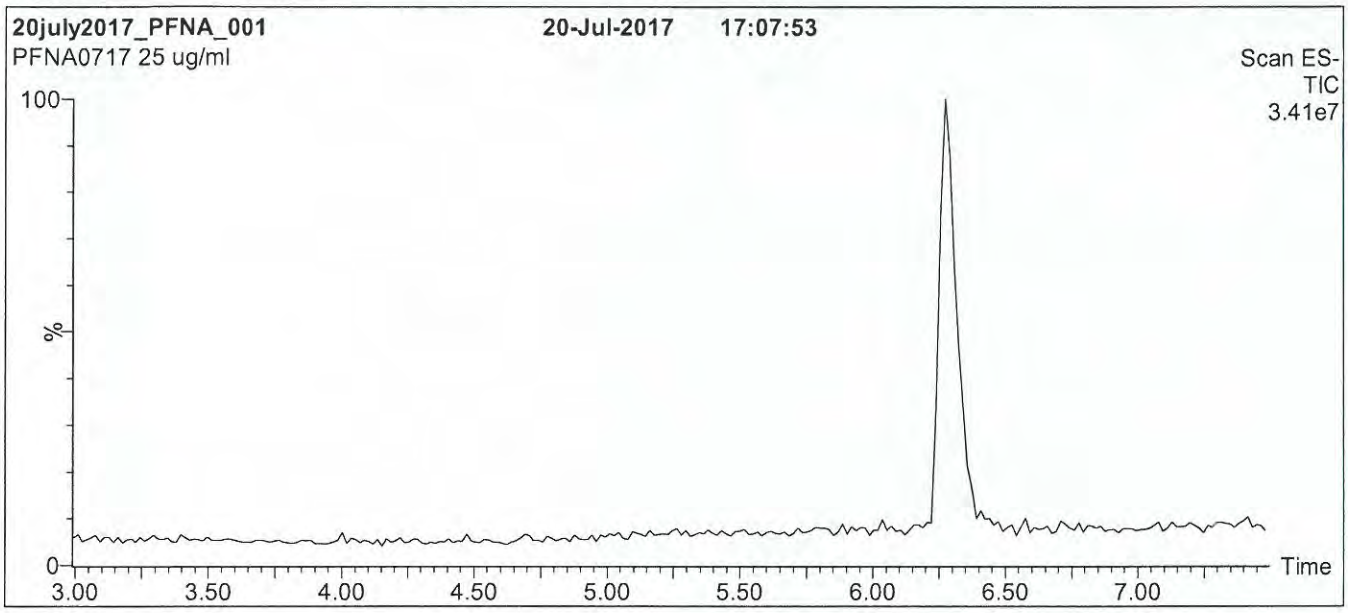
CALA Testing

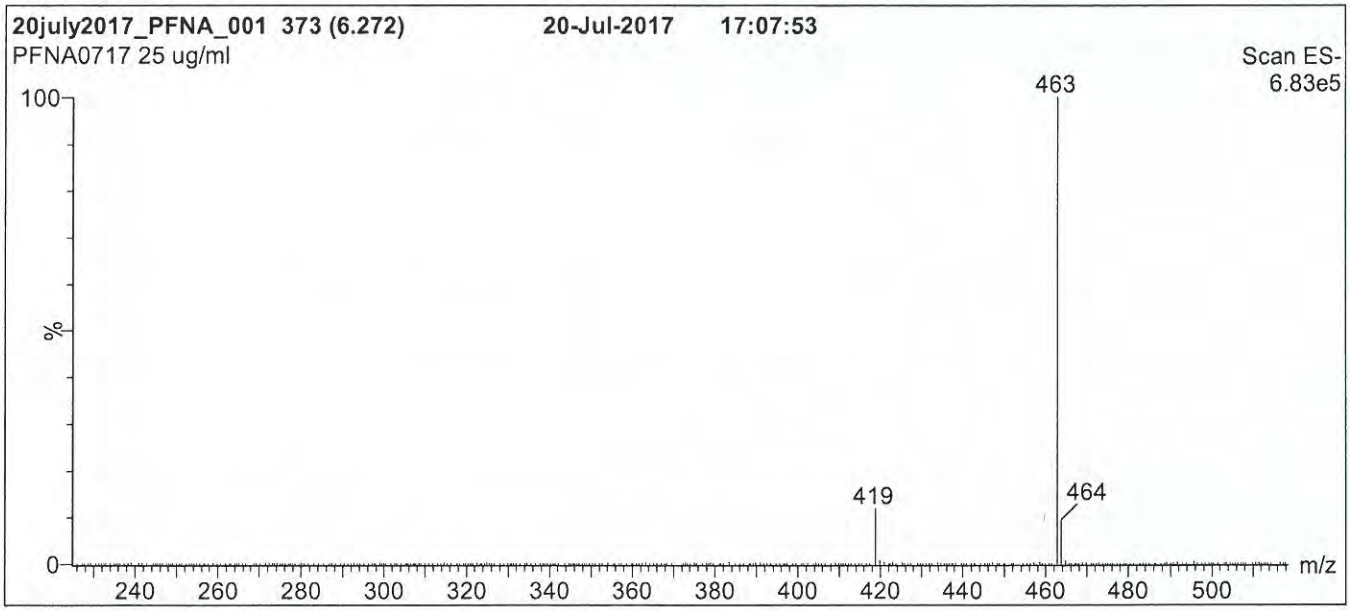
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

1801720

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

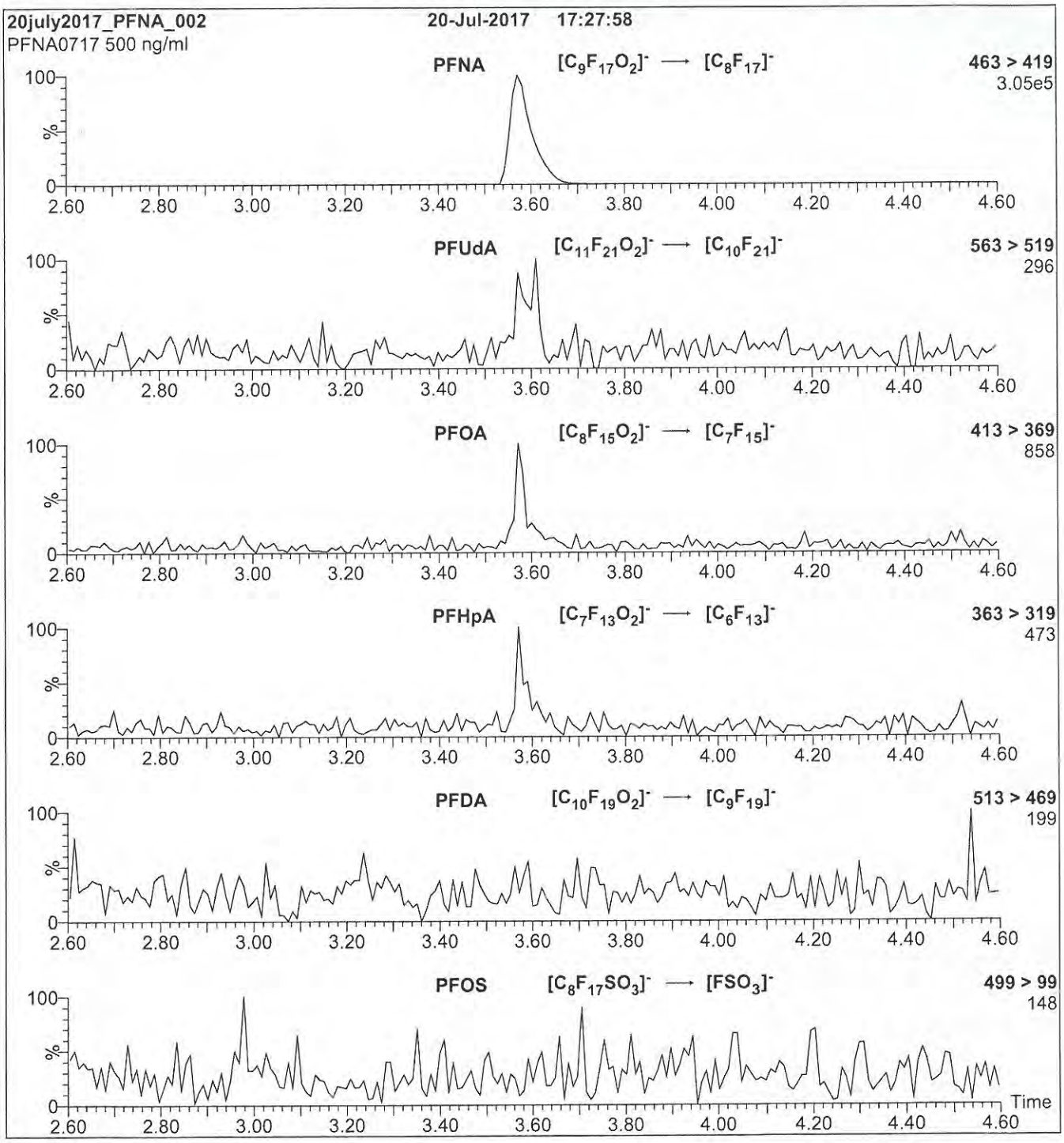
MS Parameters

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

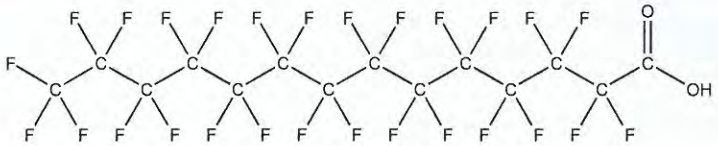
18C2721

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
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2721

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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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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.

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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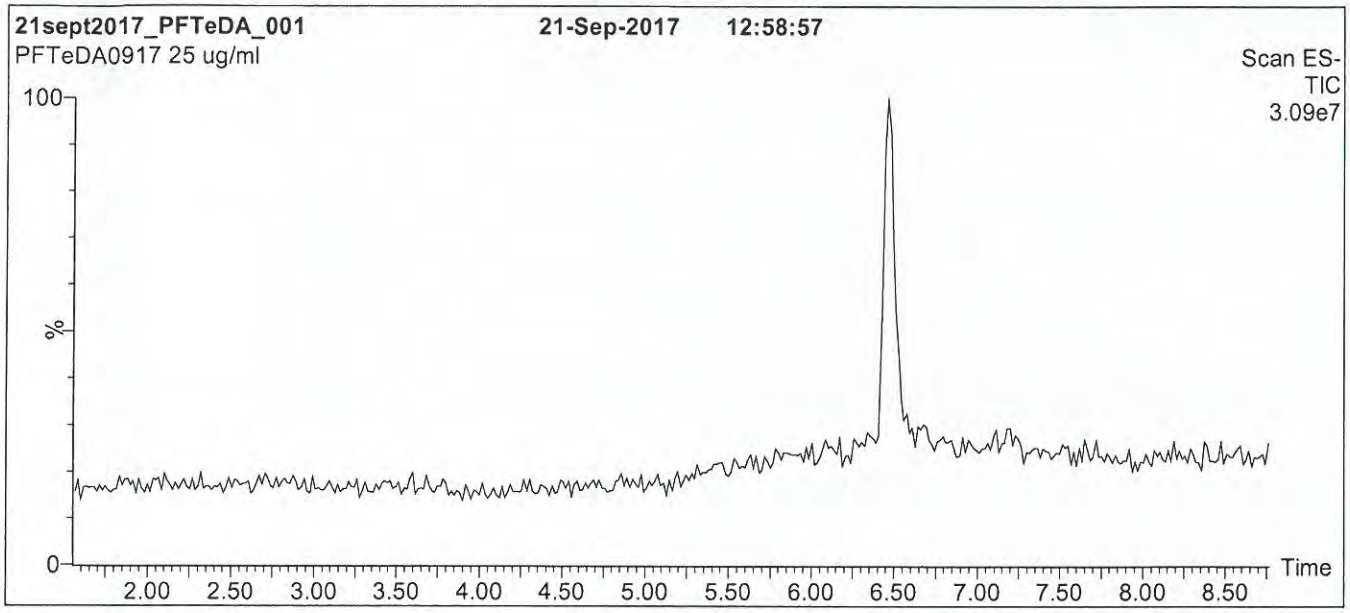
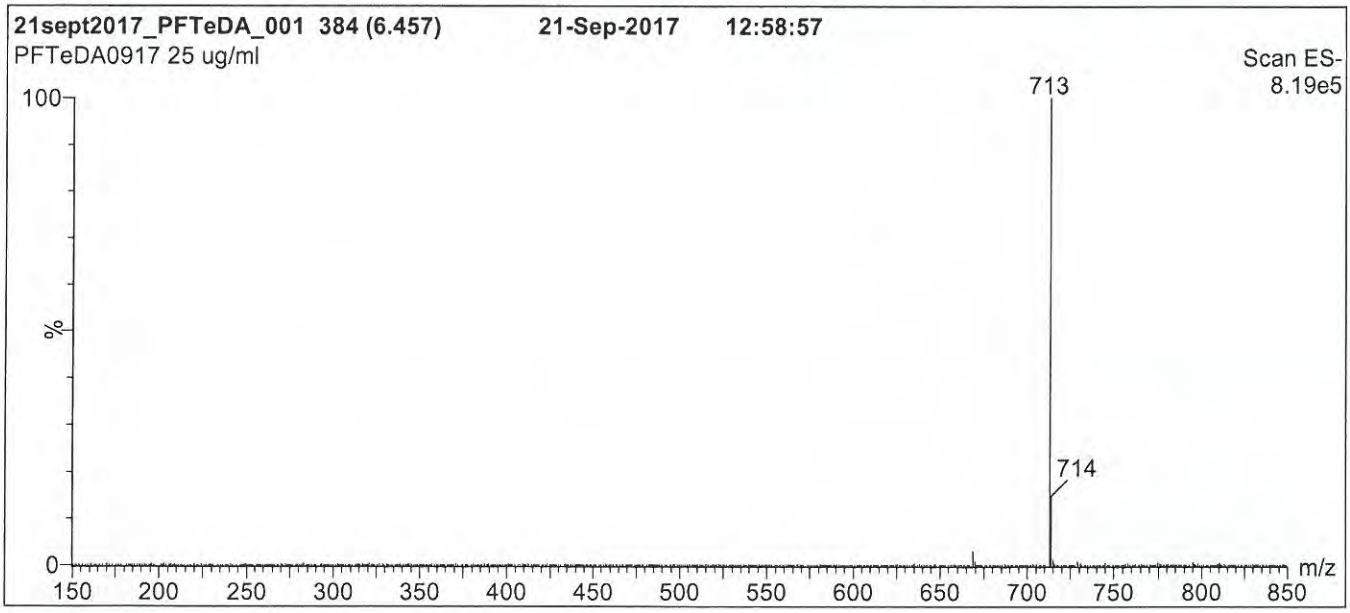
18C2721

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

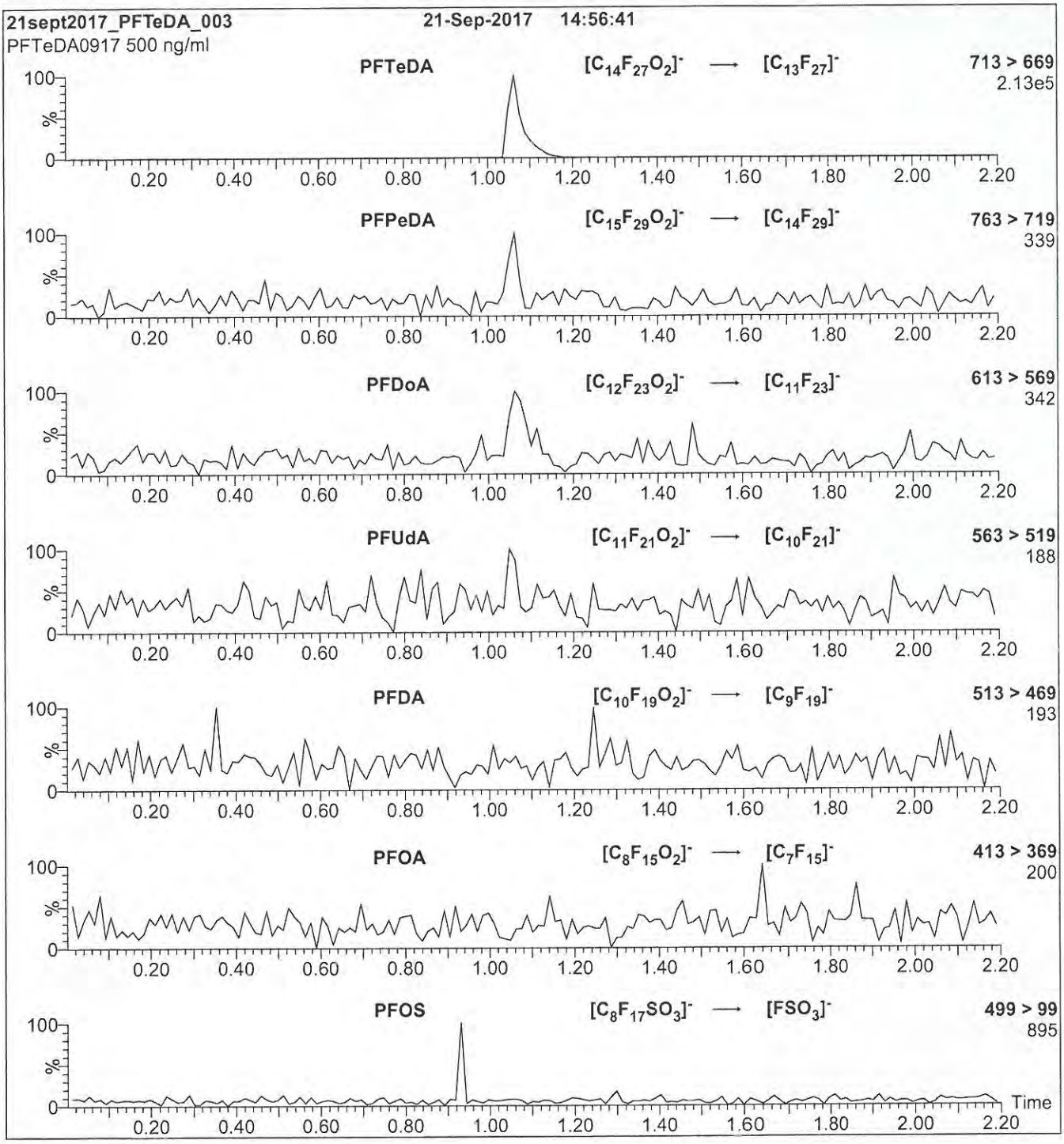
MS Parameters

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

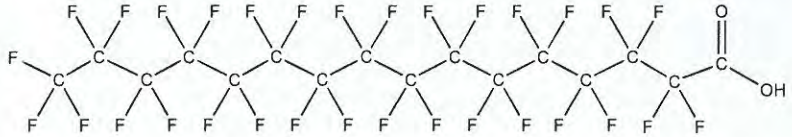
18C2722

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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HAZARDS:

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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

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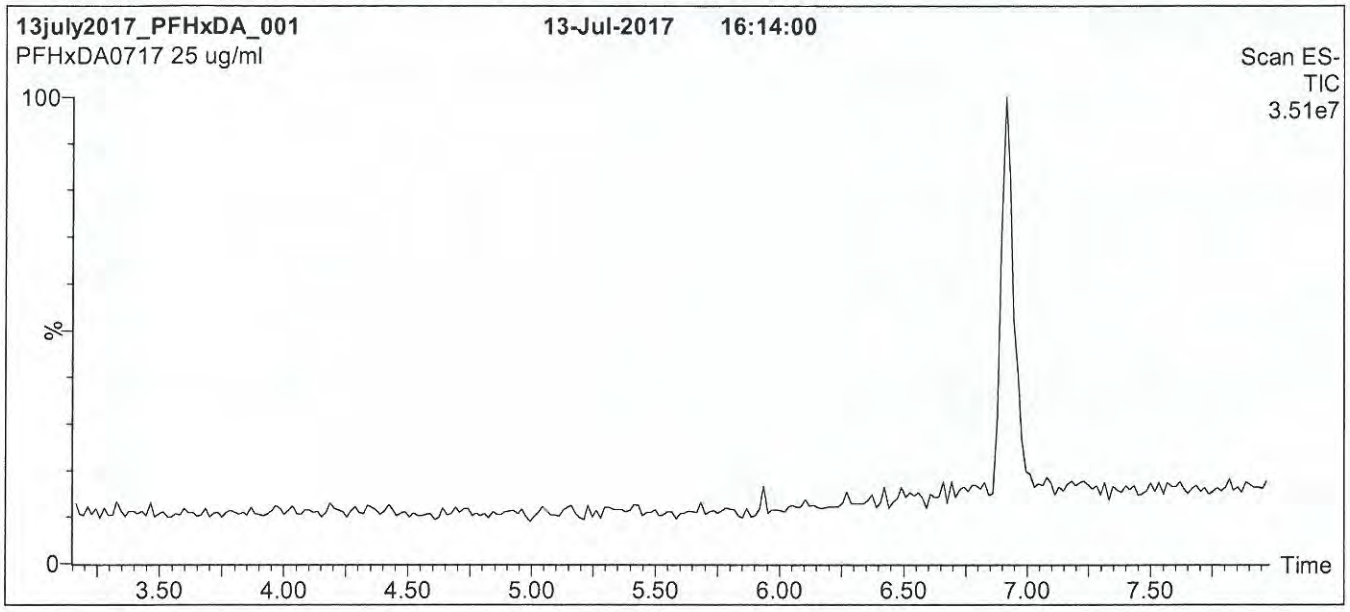
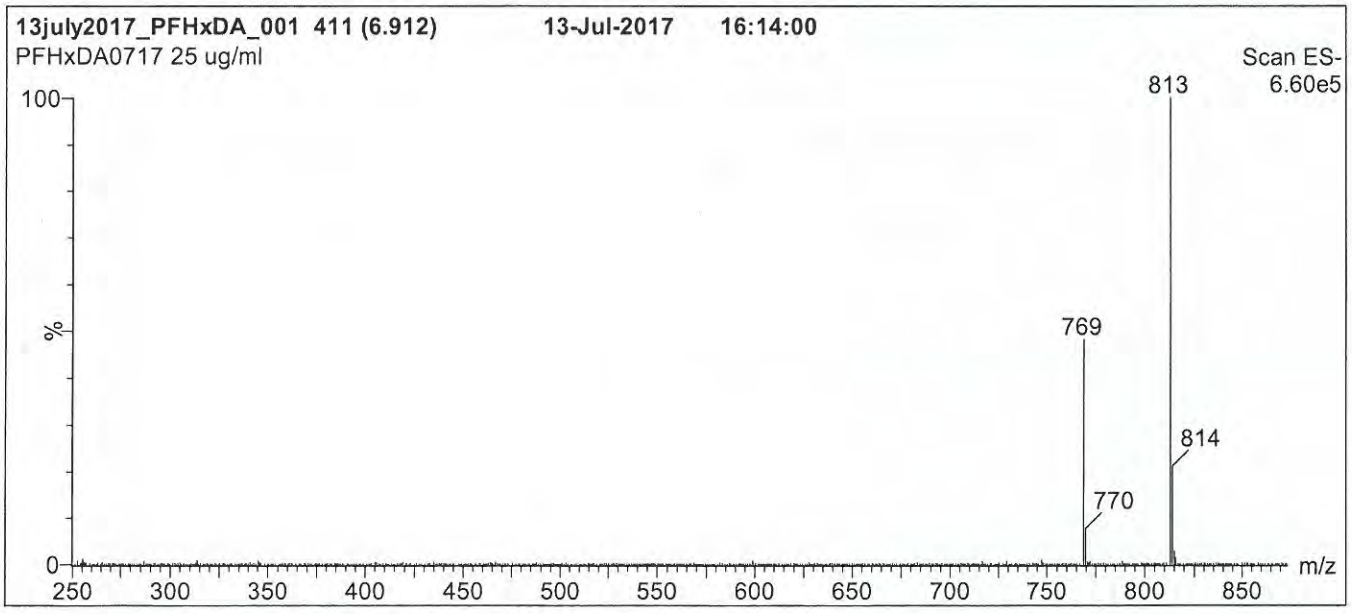
18C2722

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

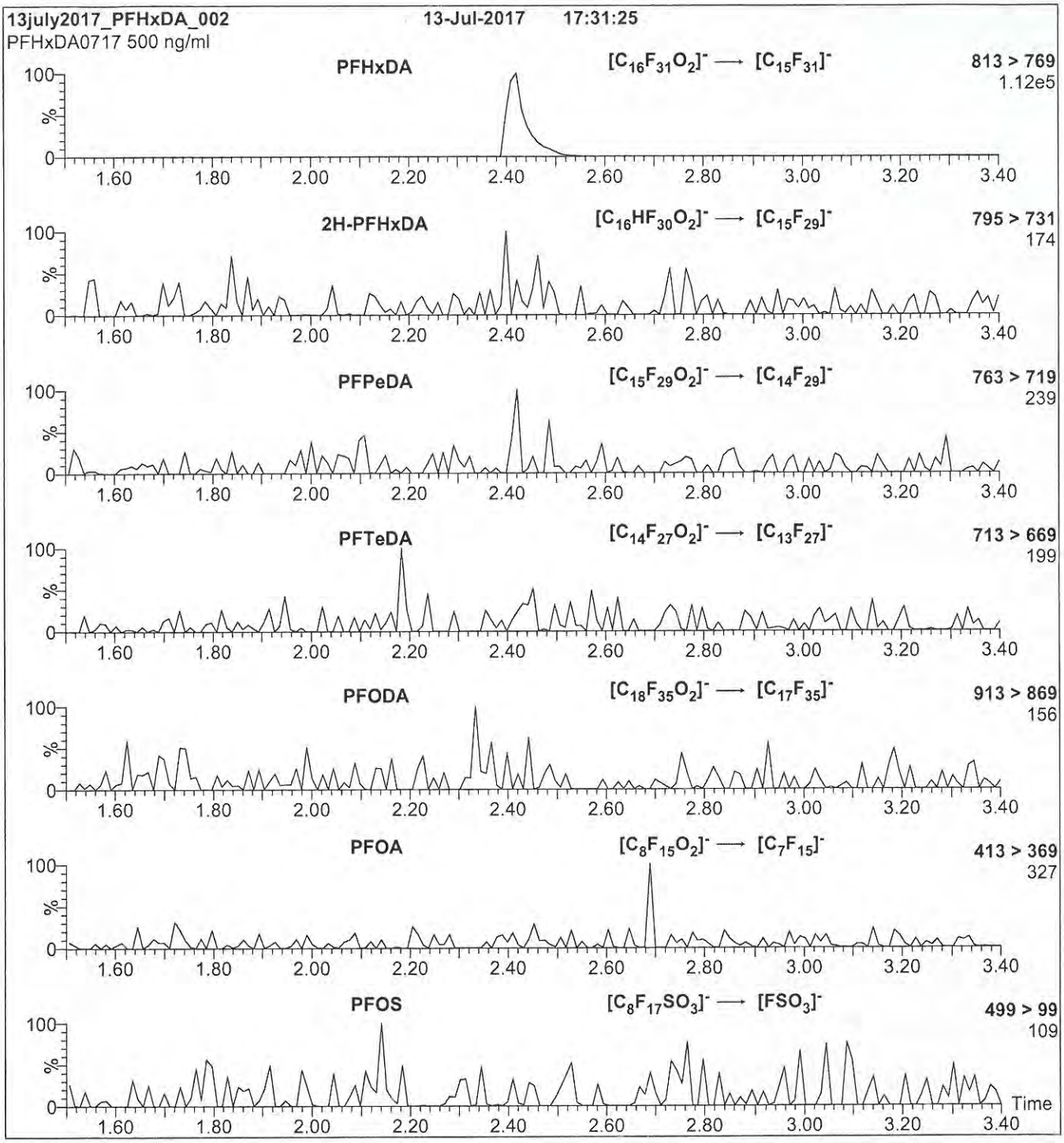
MS Parameters

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

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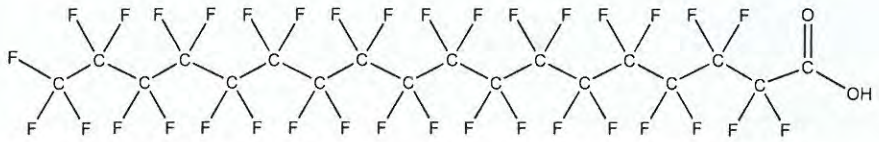
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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18C2723

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).

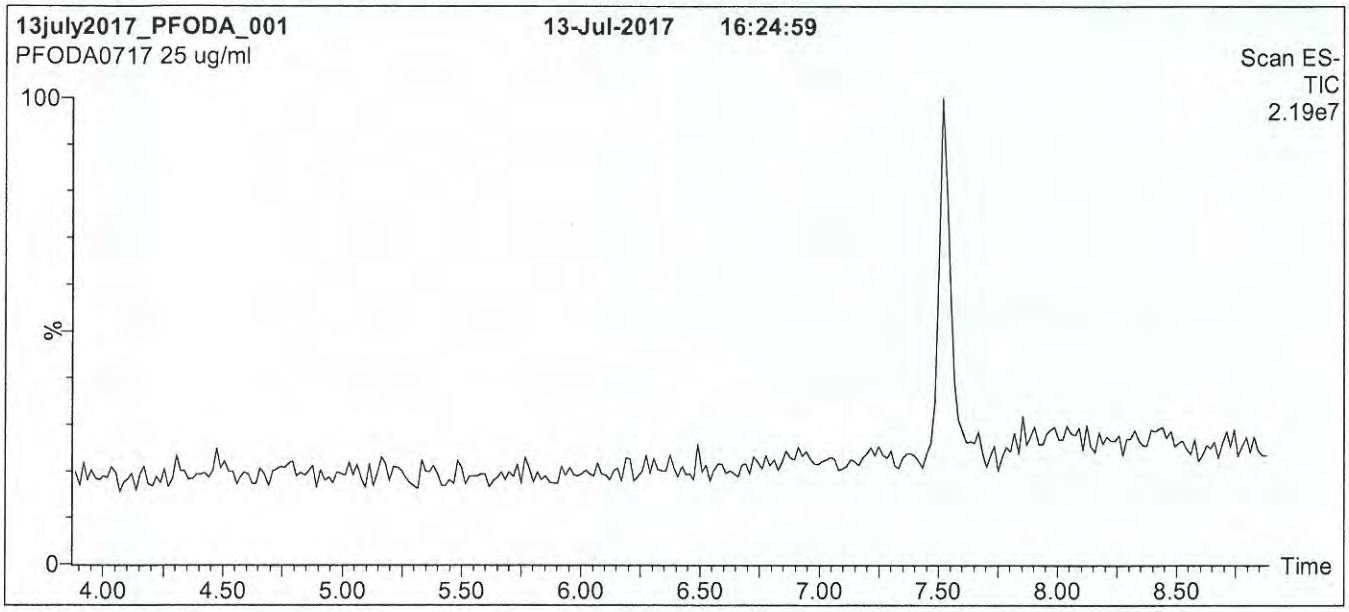
CALA Testing Accreditation No. A1226

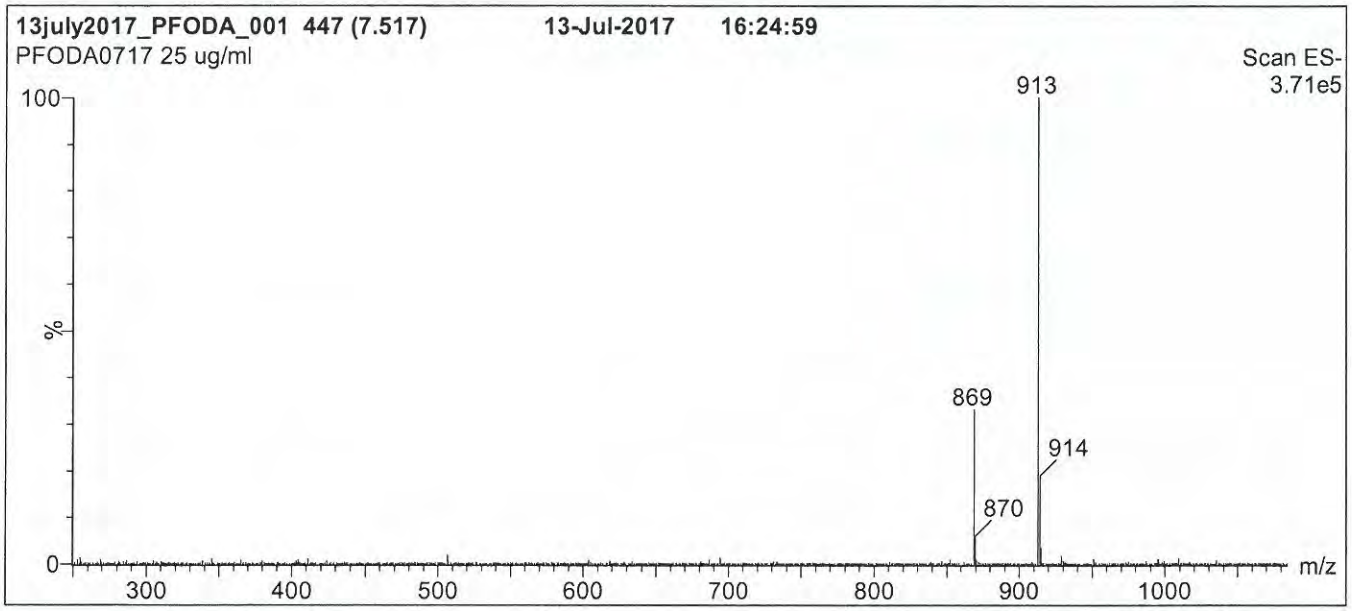
ANAB ACCREDITED Reference Material Producer

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

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

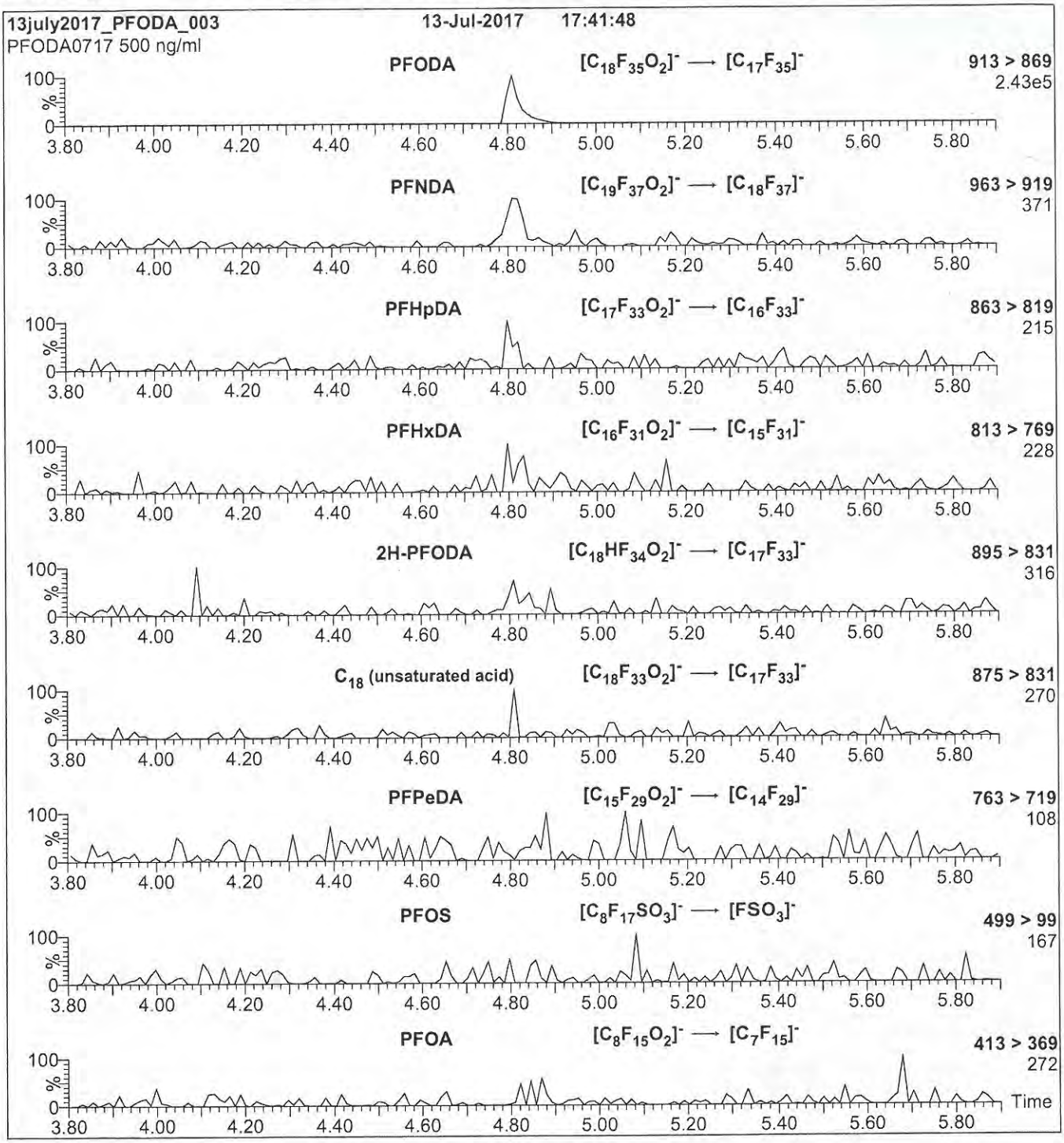
MS Parameters

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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18C2724

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

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1802724

Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

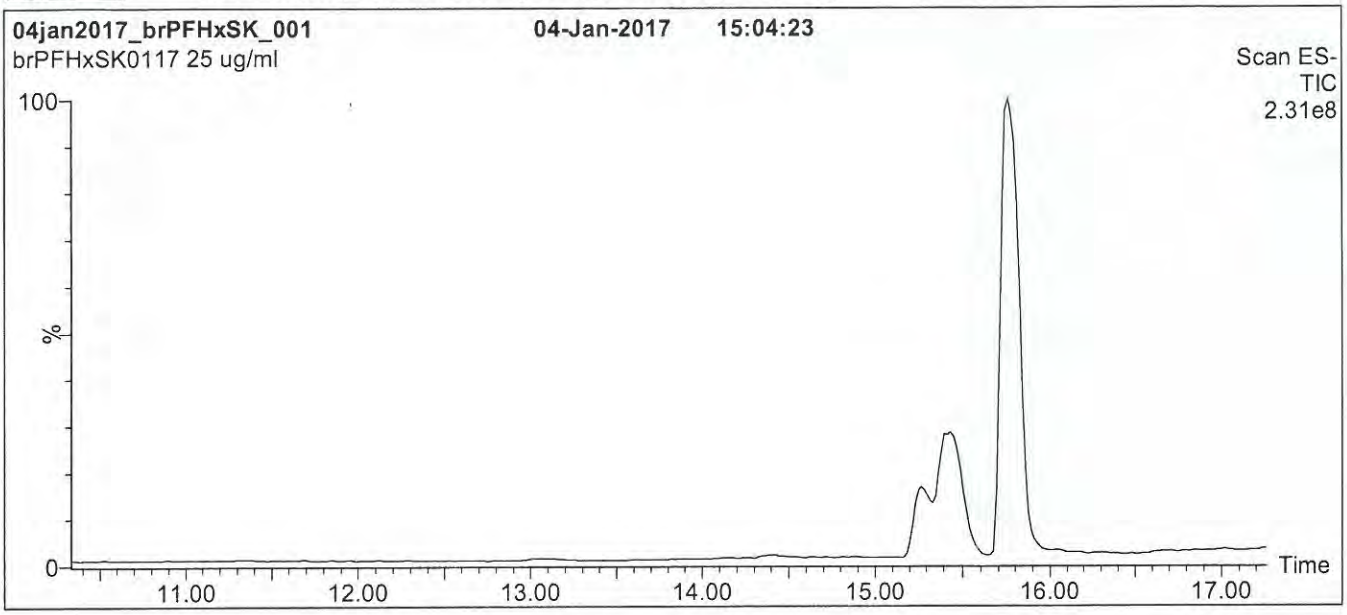
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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

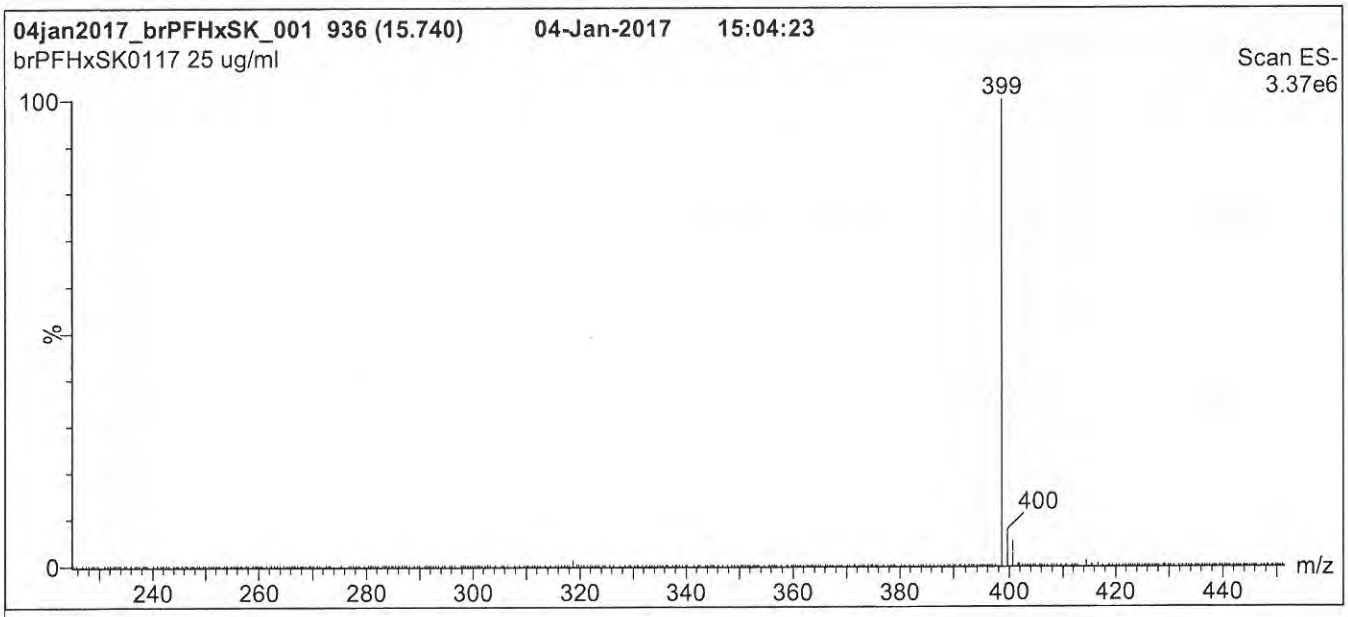
* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

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

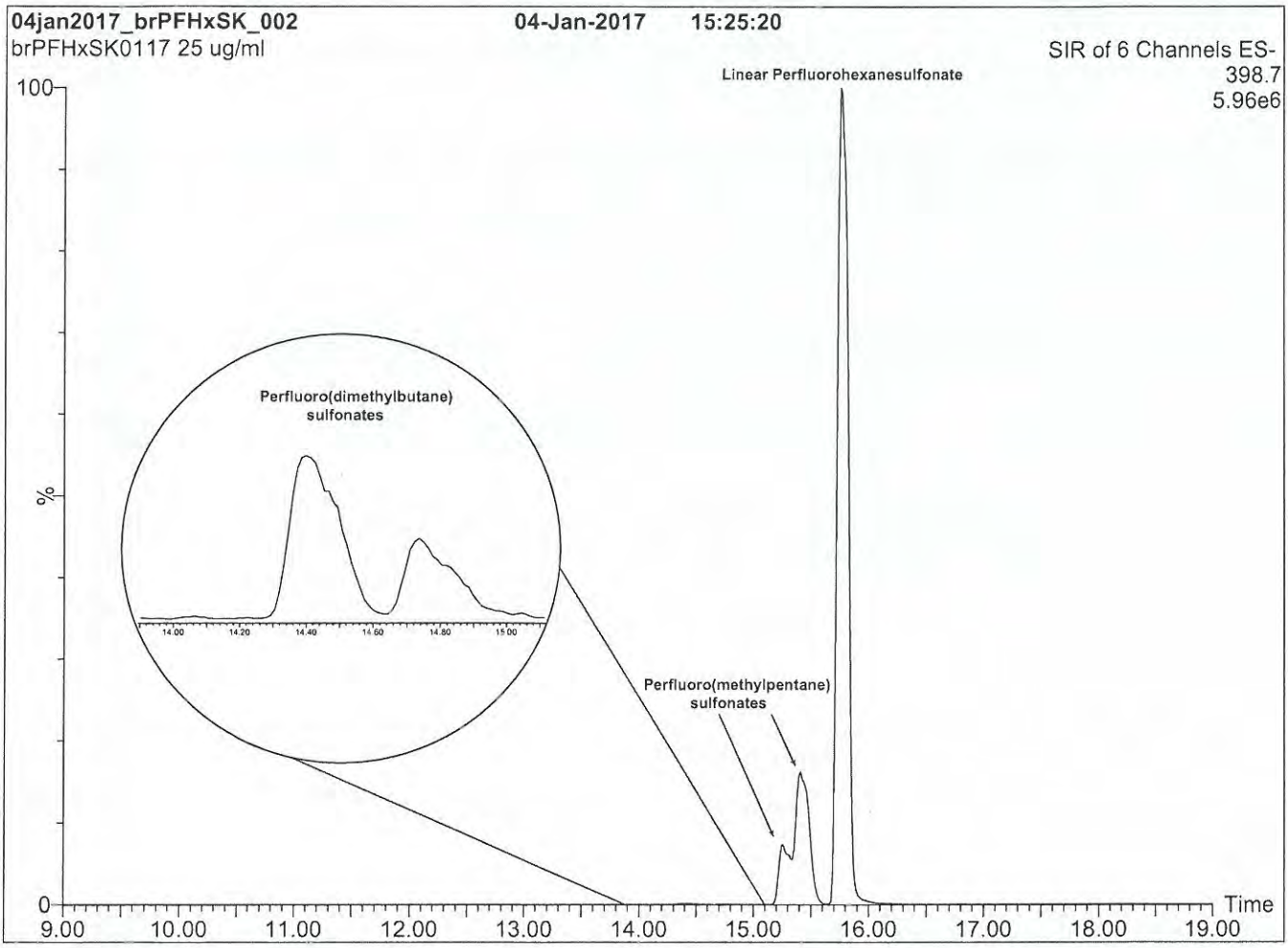
MS Parameters

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

1802724

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

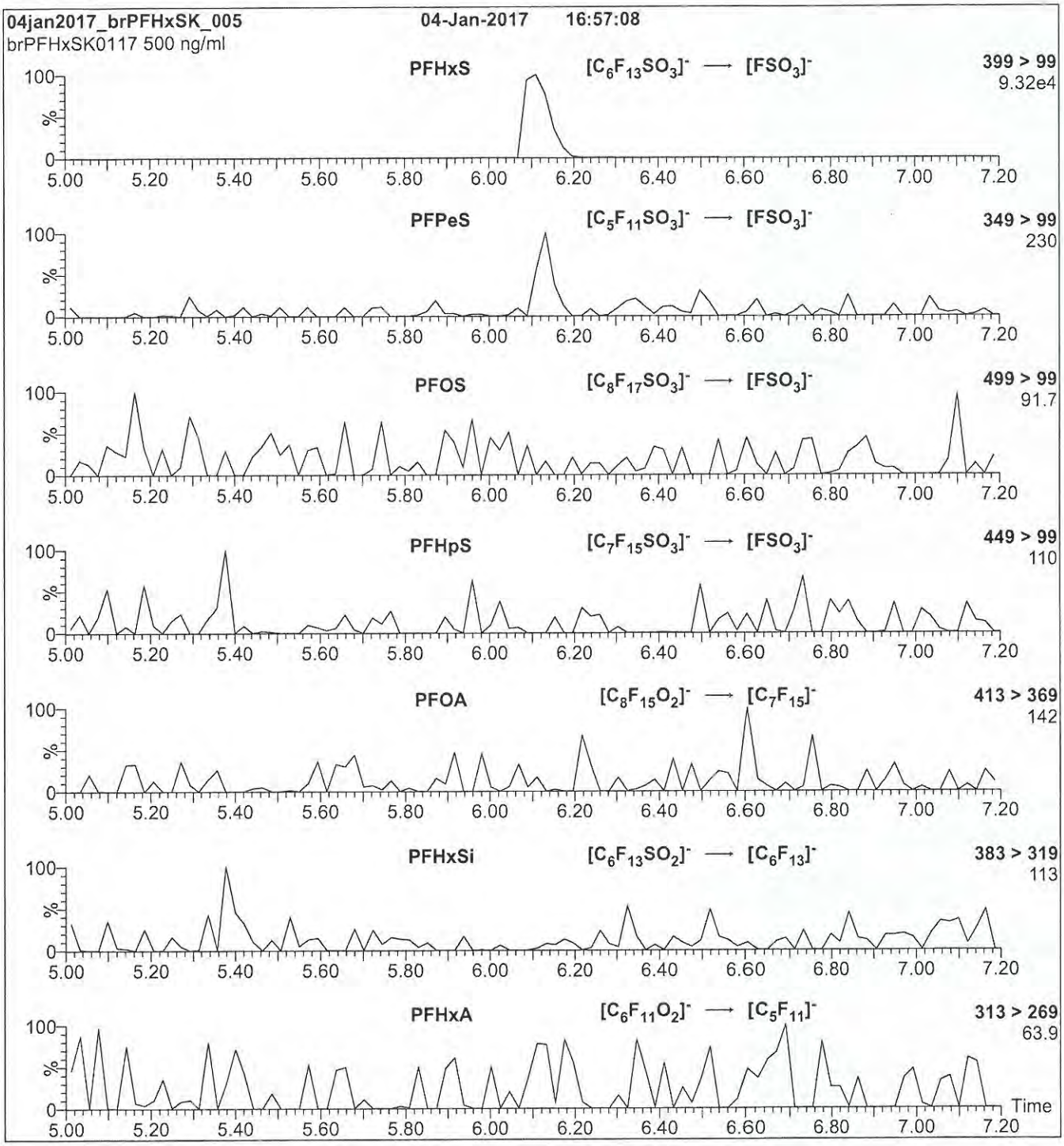
MS Parameters

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

18C2724

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).

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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.

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.

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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:

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CALA Testing

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18C2725

Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

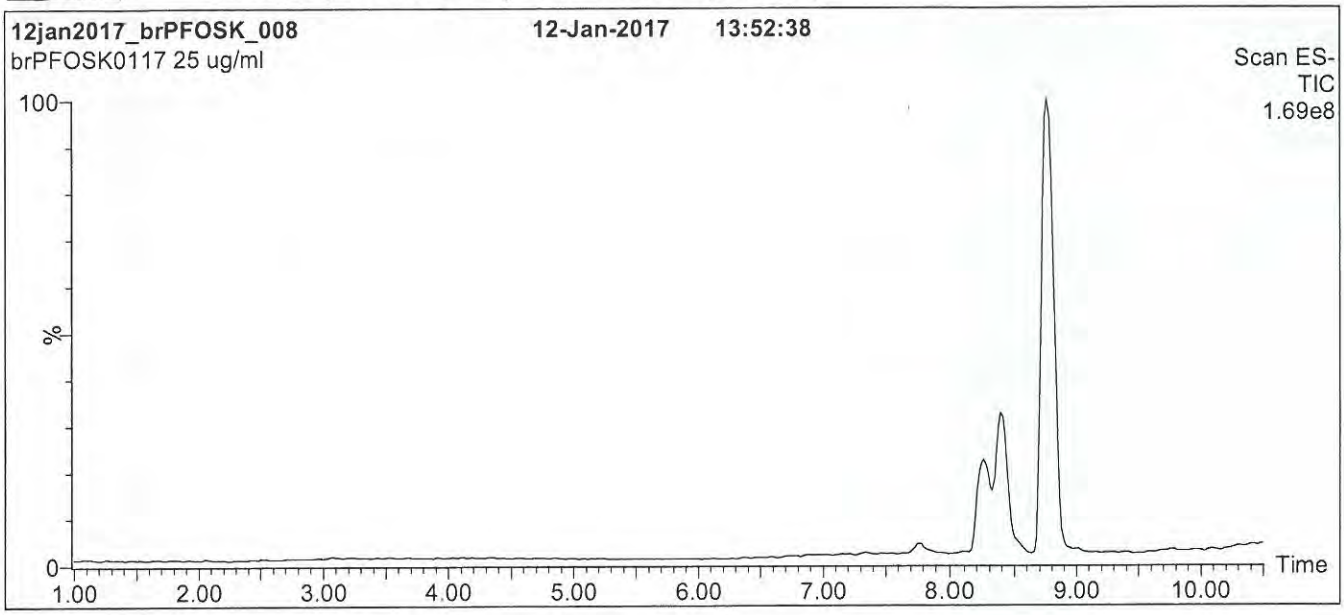
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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

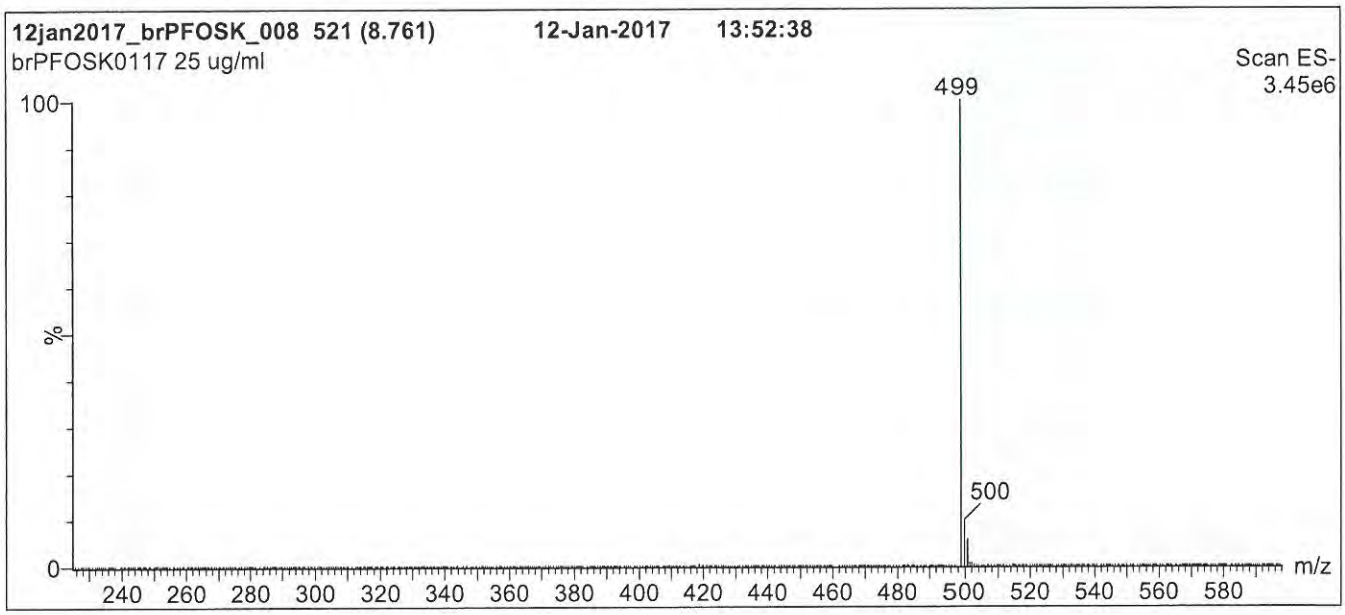
* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

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

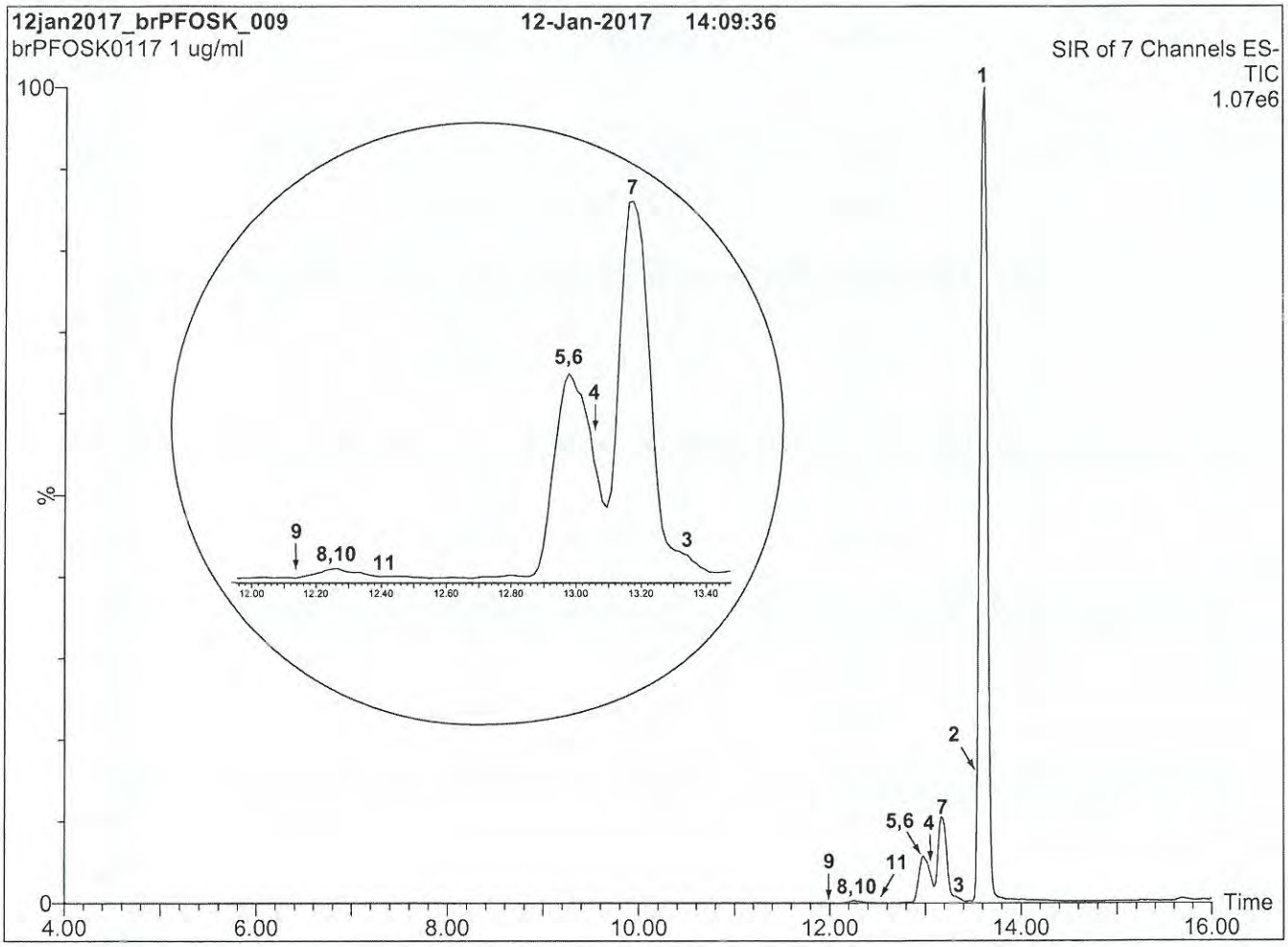
MS Parameters

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

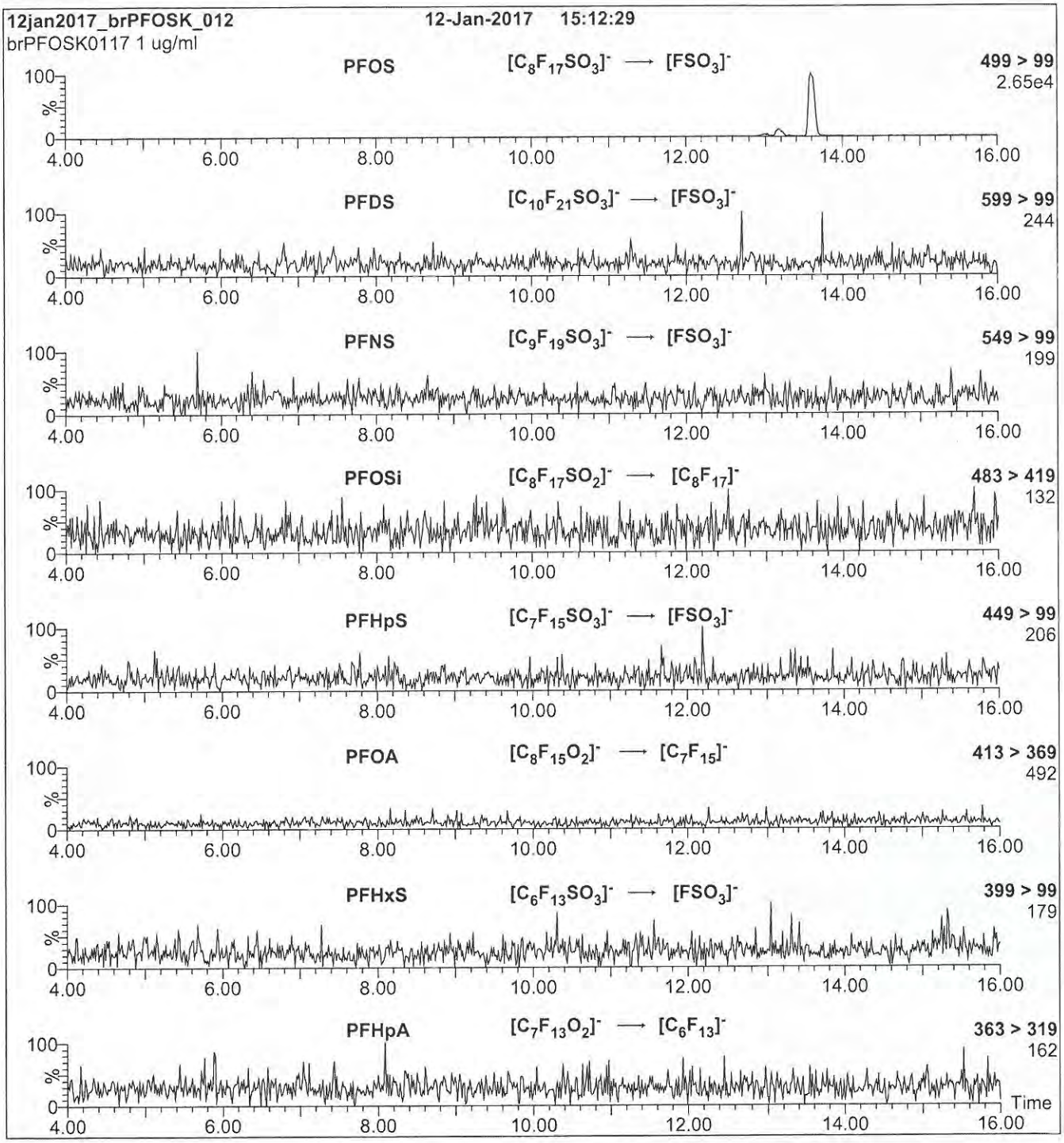
Flow: 300 µl/min

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

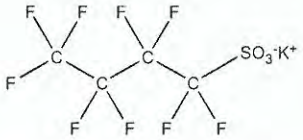
WELLINGTON LABORATORIES

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

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1802726

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).

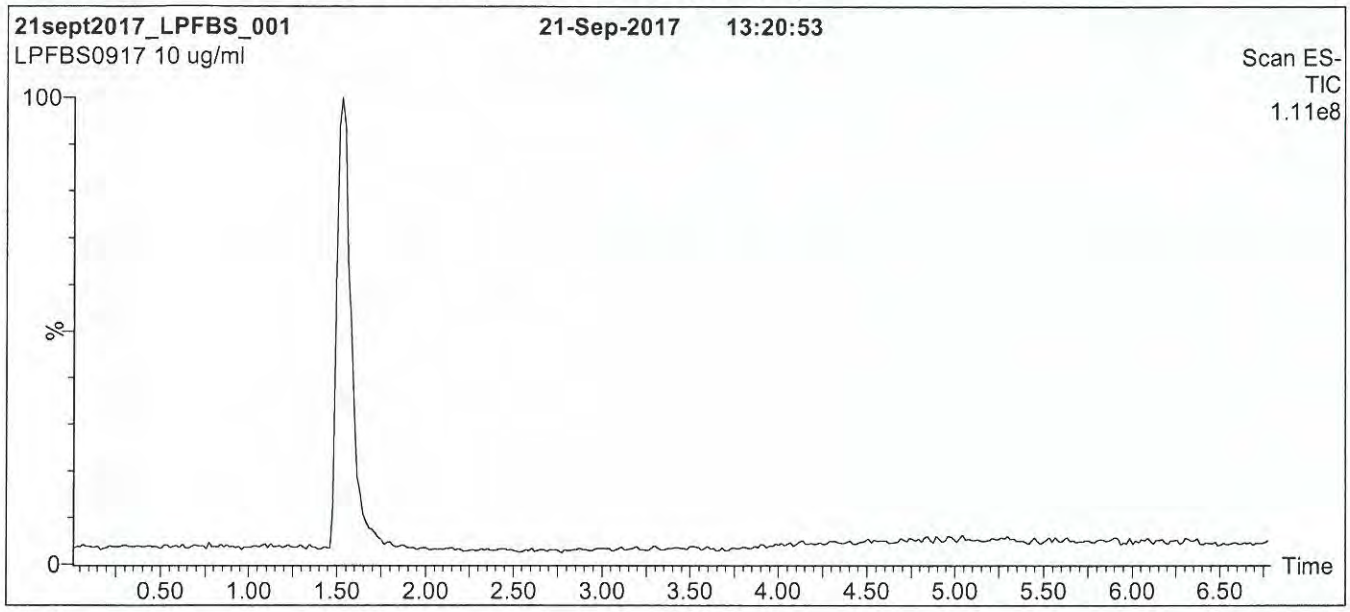
CALA

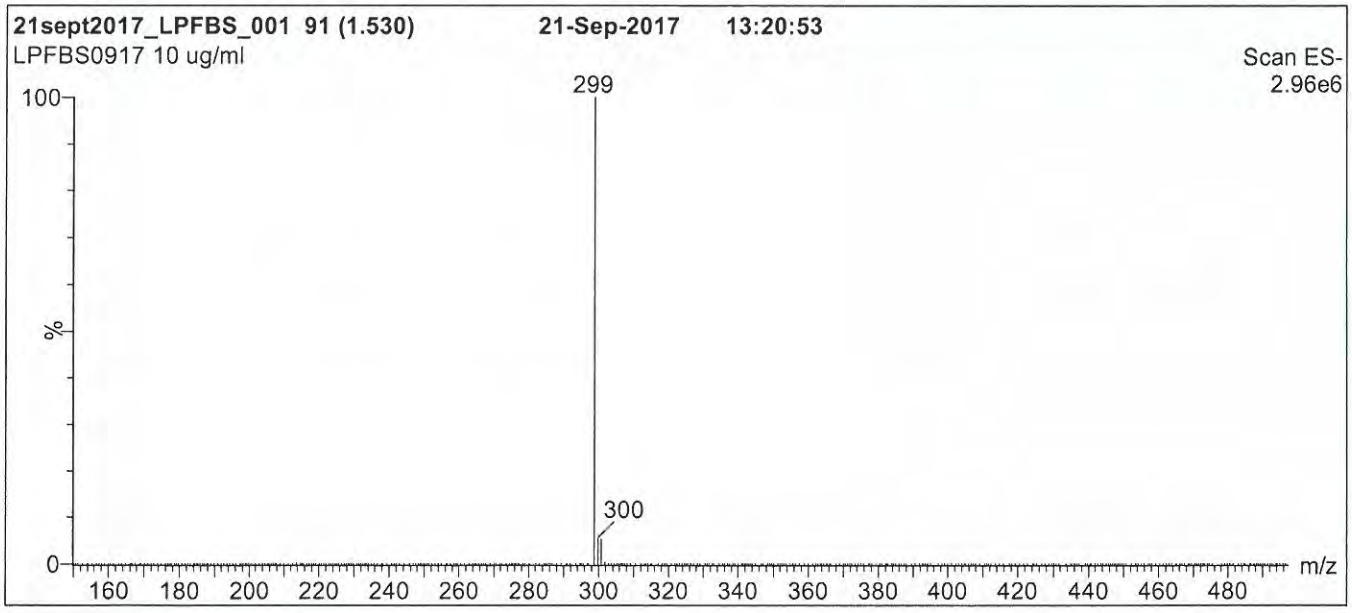
ANAB ACCREDITED

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

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

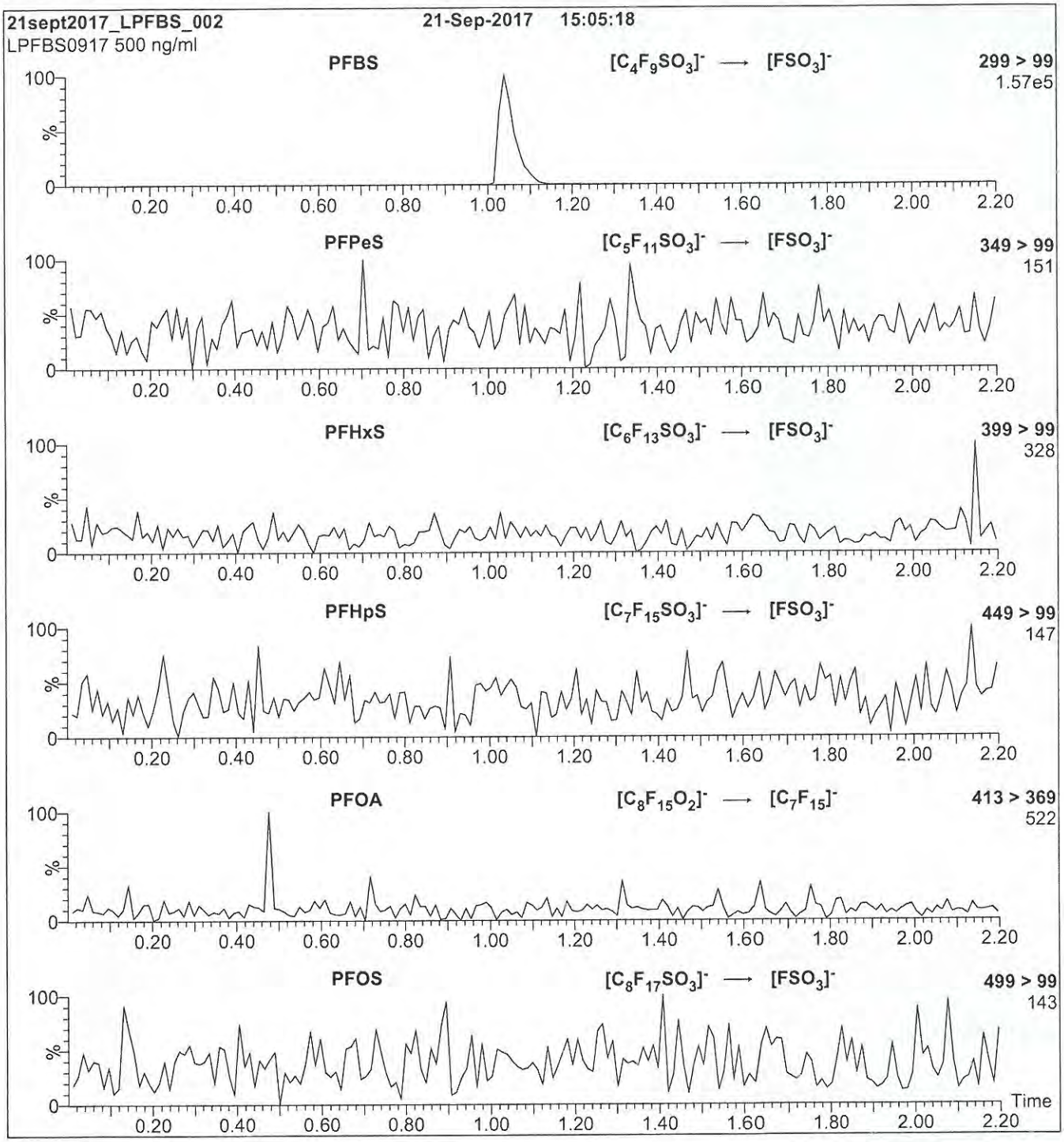
MS Parameters

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

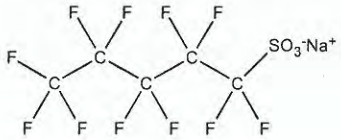
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

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QUALITY MANAGEMENT:

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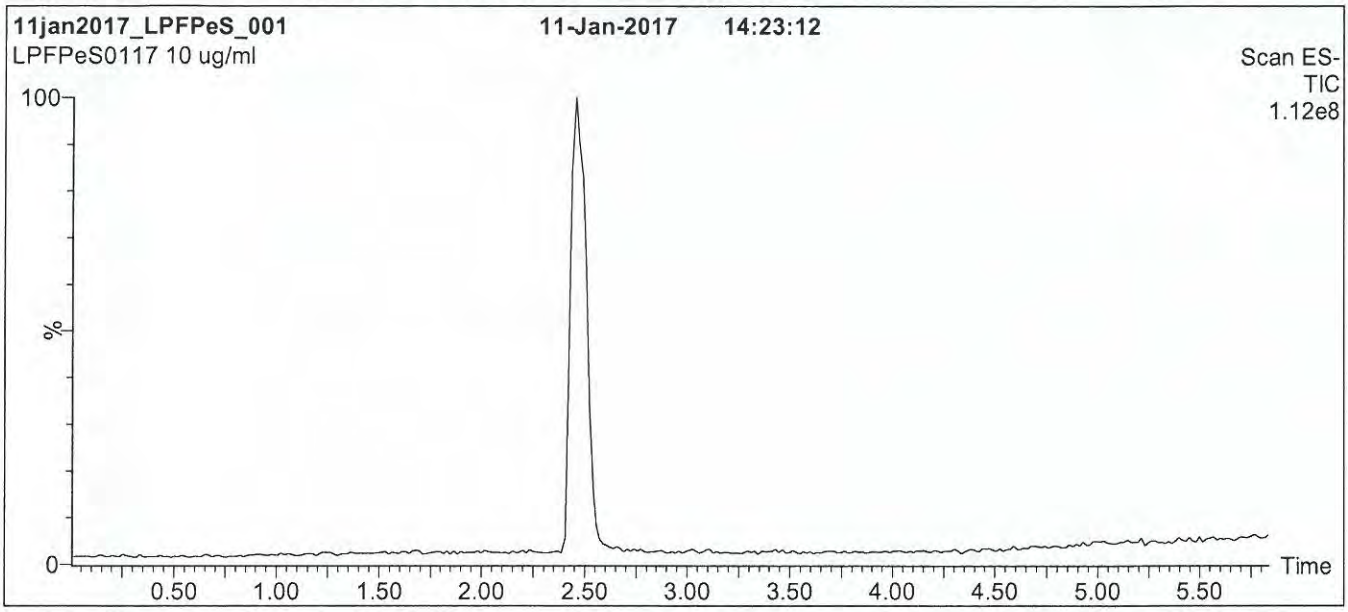
CALA

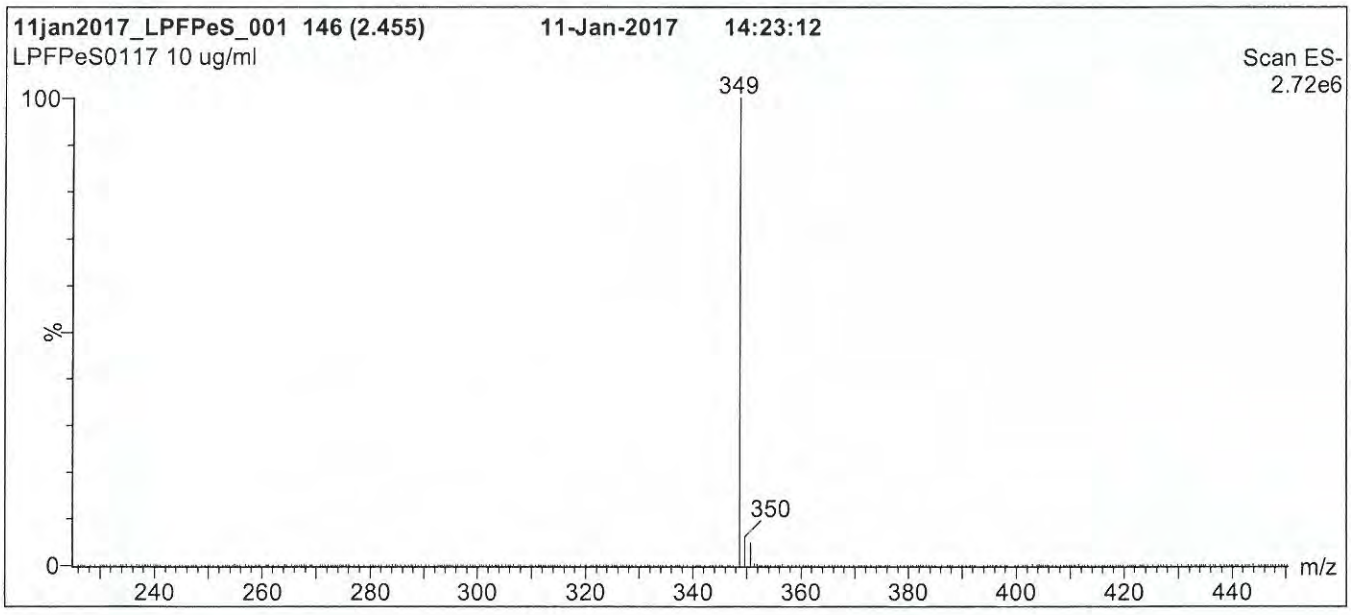
ANAB ACCREDITED

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

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

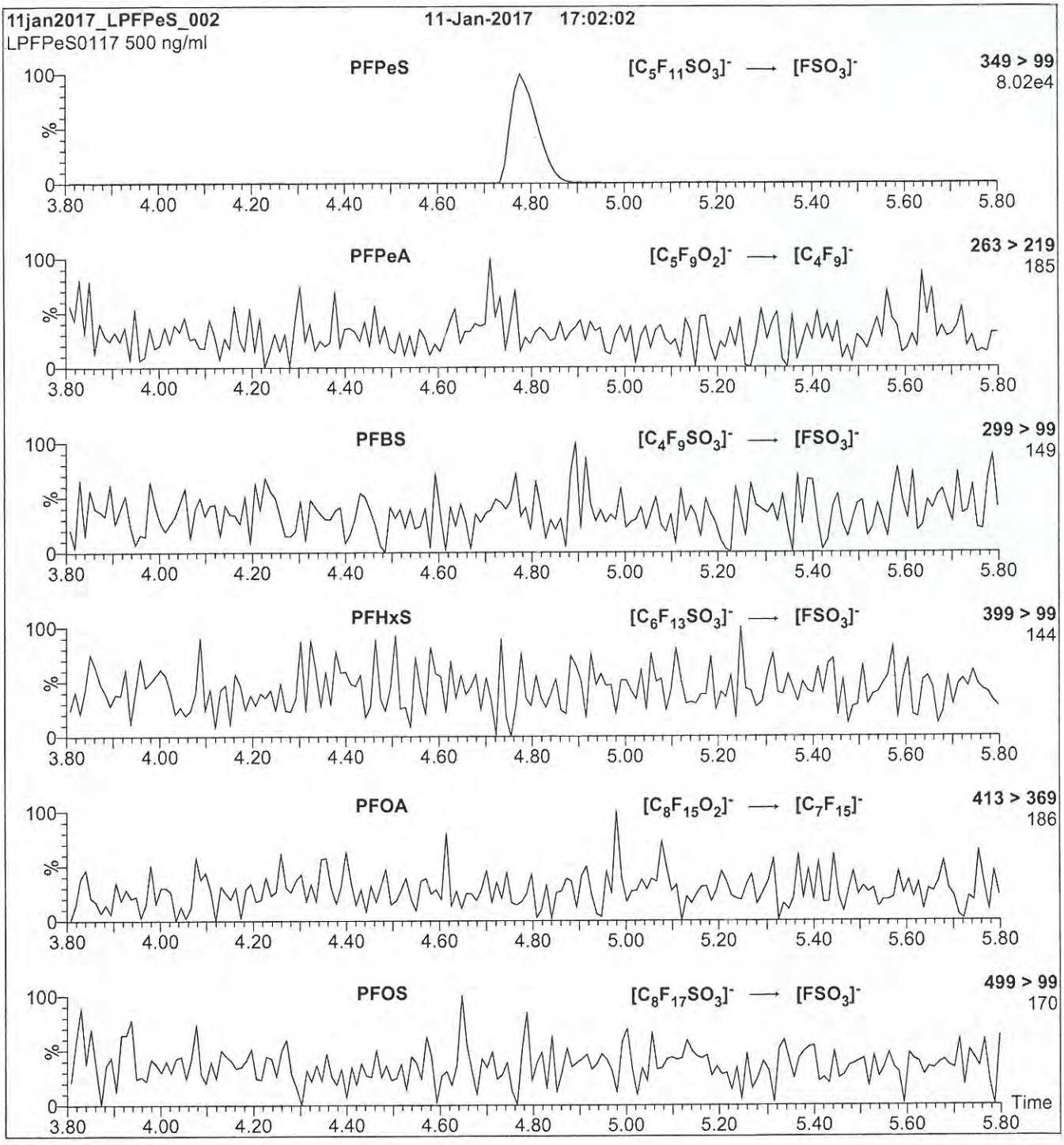
MS Parameters

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

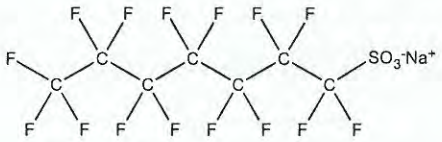
WELLINGTON LABORATORIES

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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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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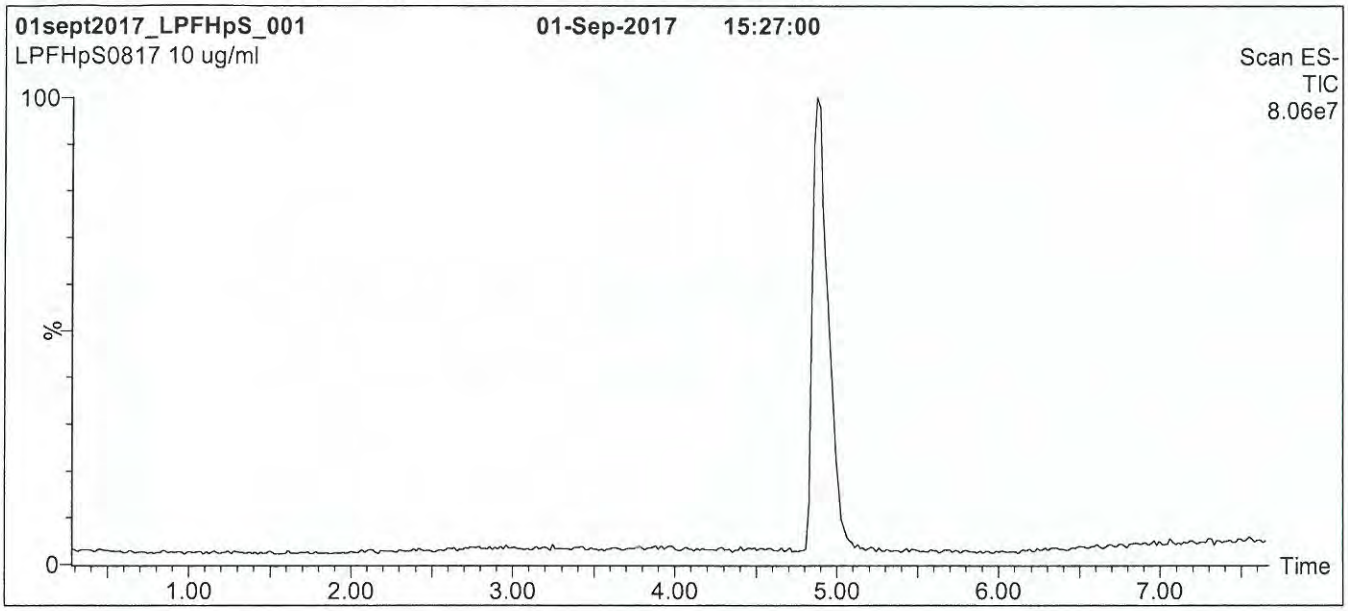
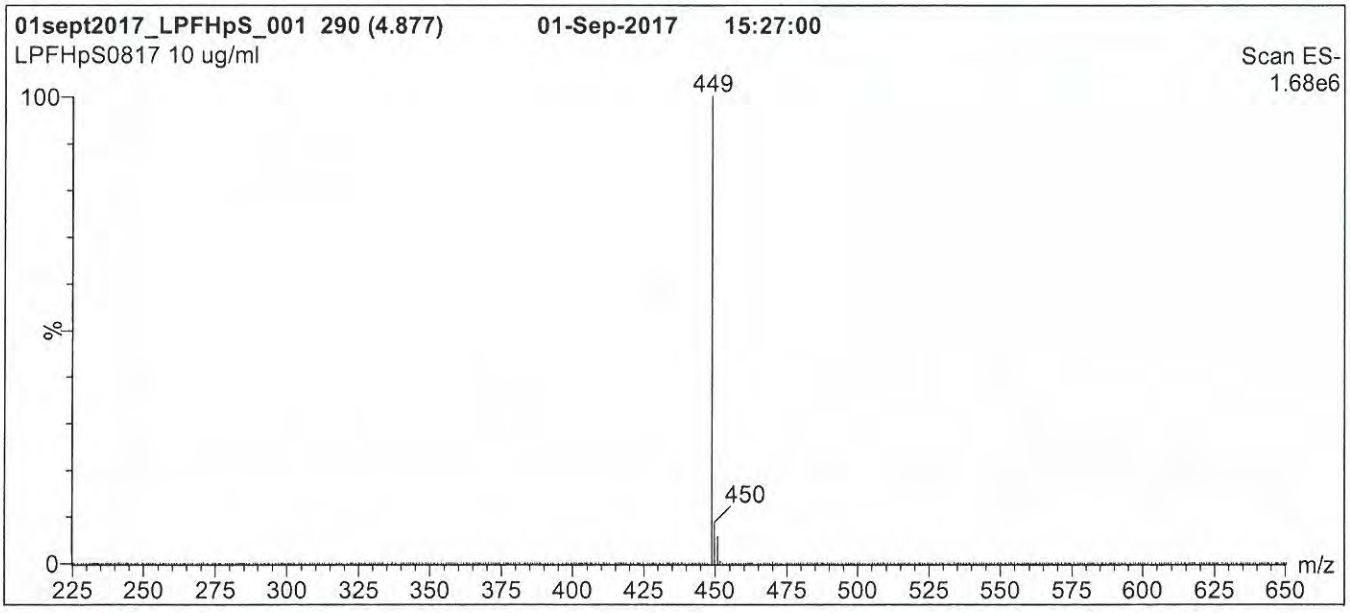
18C2728

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

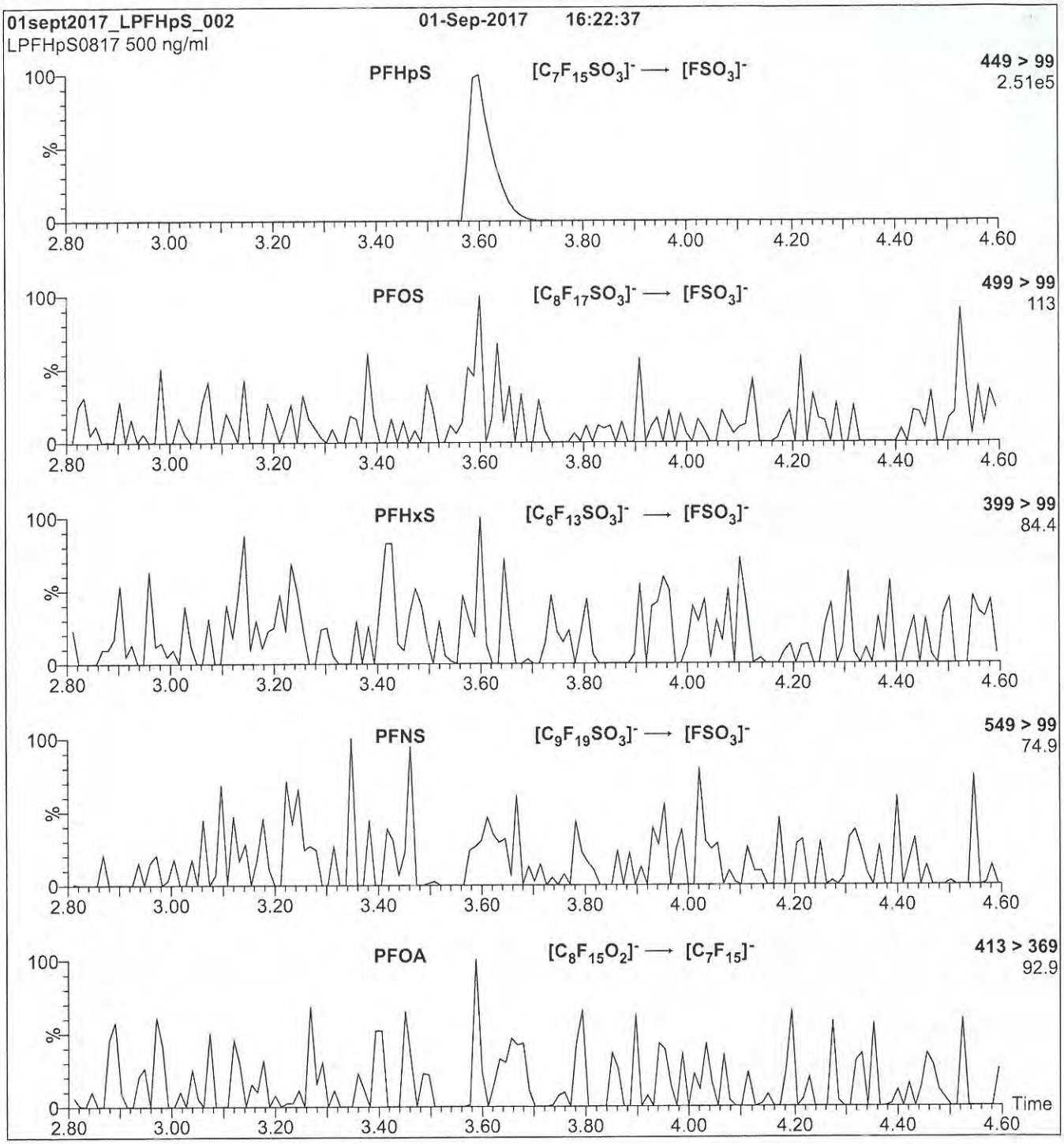
MS Parameters

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

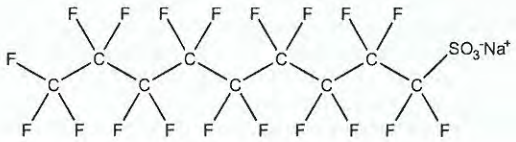
Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 35

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

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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:

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).

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ANAB ACCREDITED

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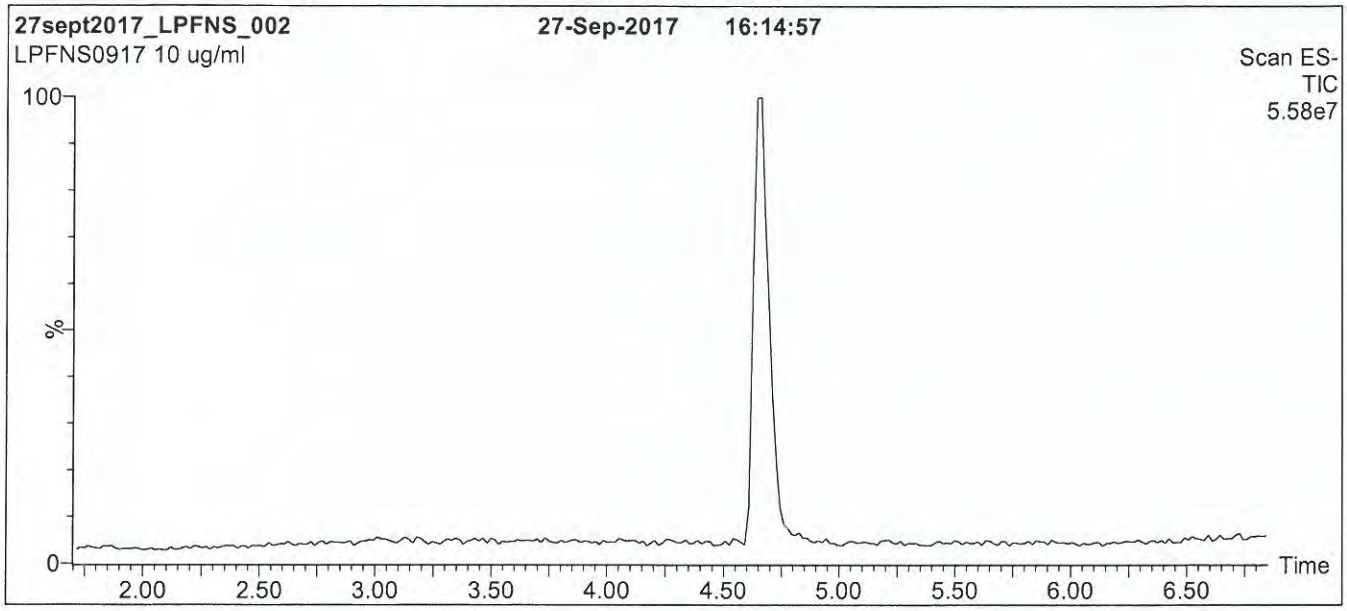
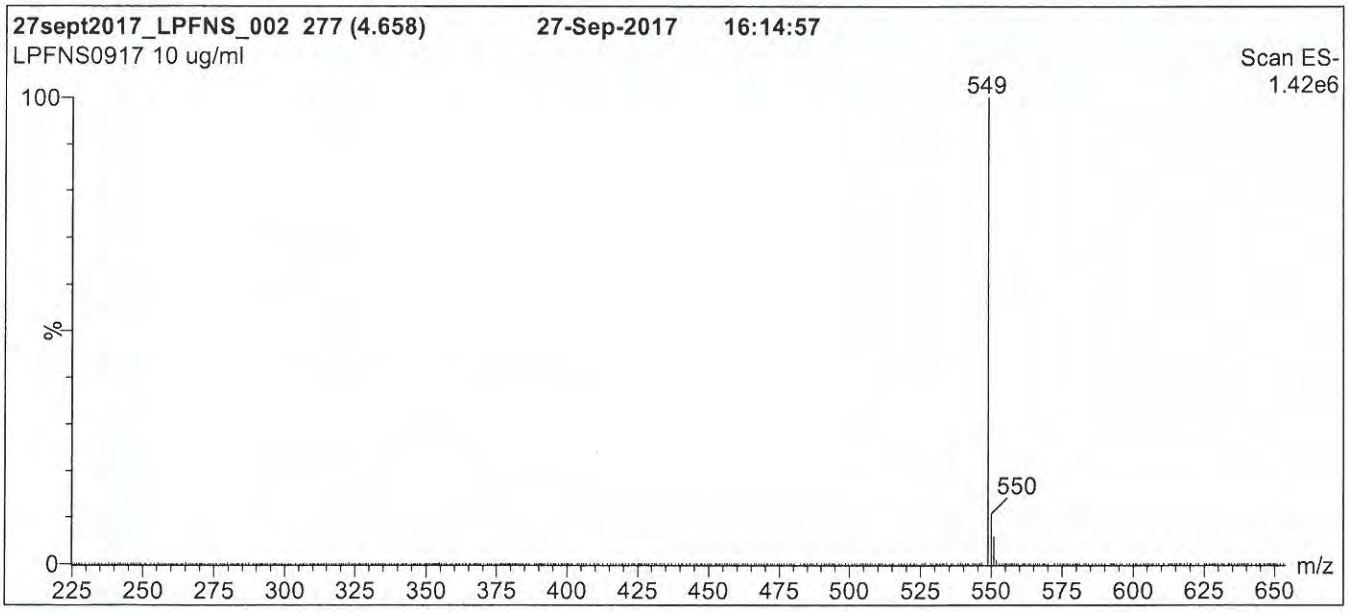
18C2729

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

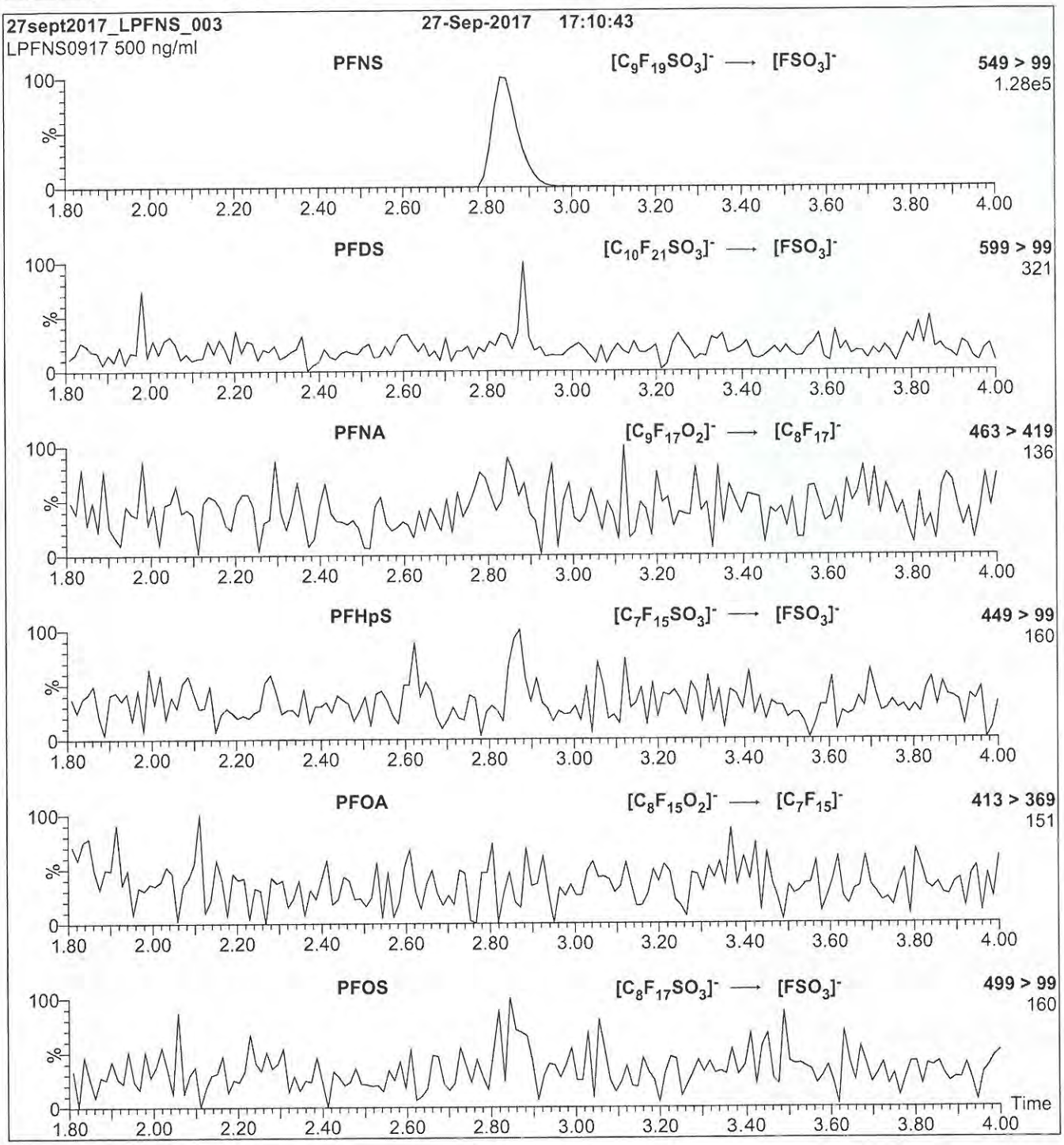
MS Parameters

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

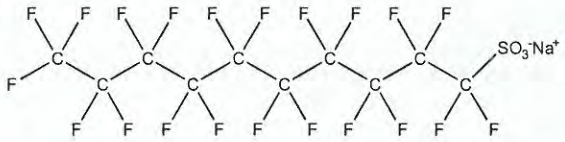
1802730

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
COMPOUND: Sodium perfluoro-1-decanesulfonate
LOT NUMBER: LPFDS1117

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		

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 ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

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

18C2730

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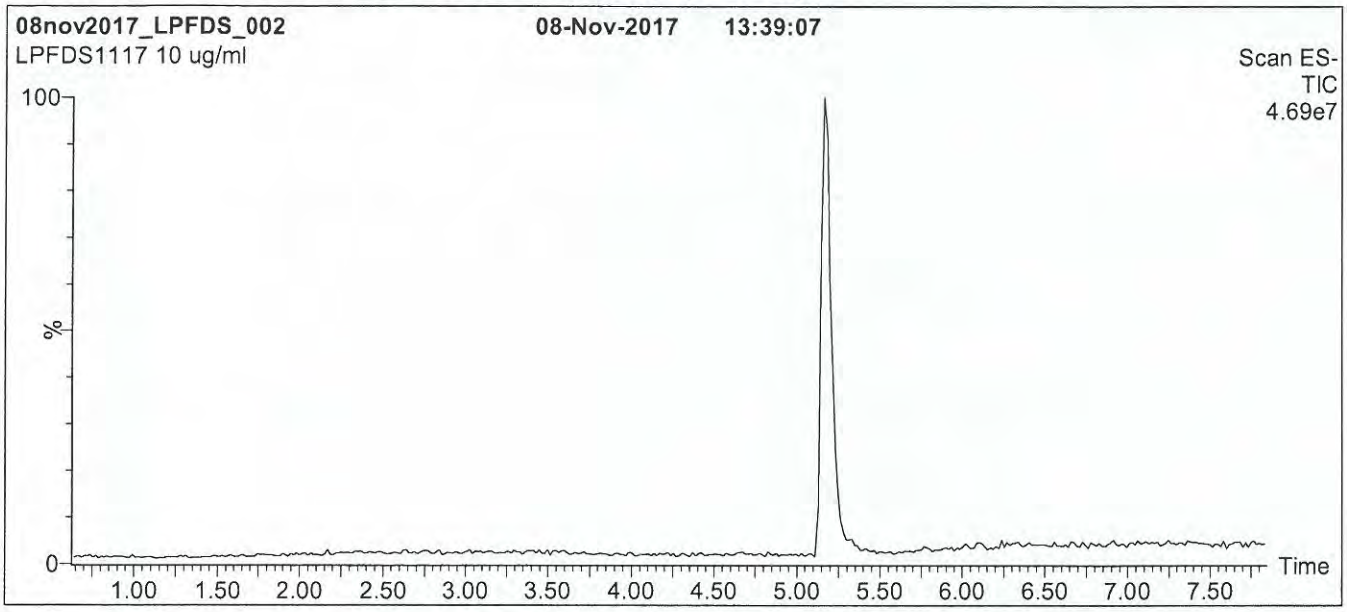
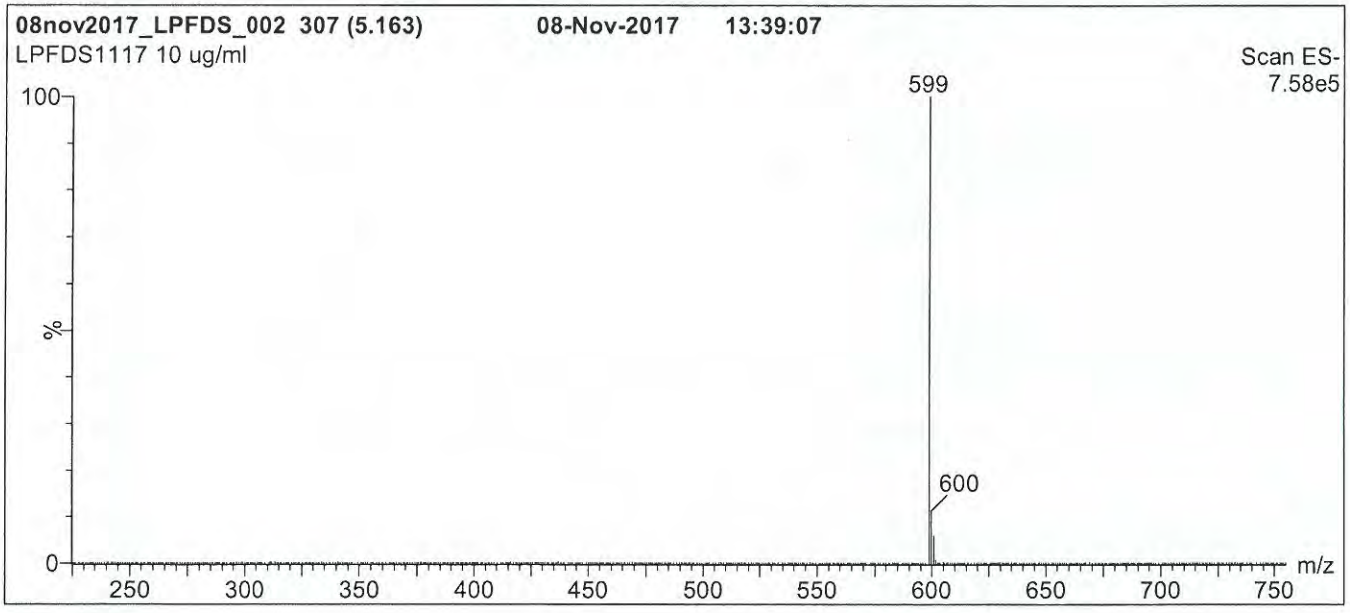
18C2730

Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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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

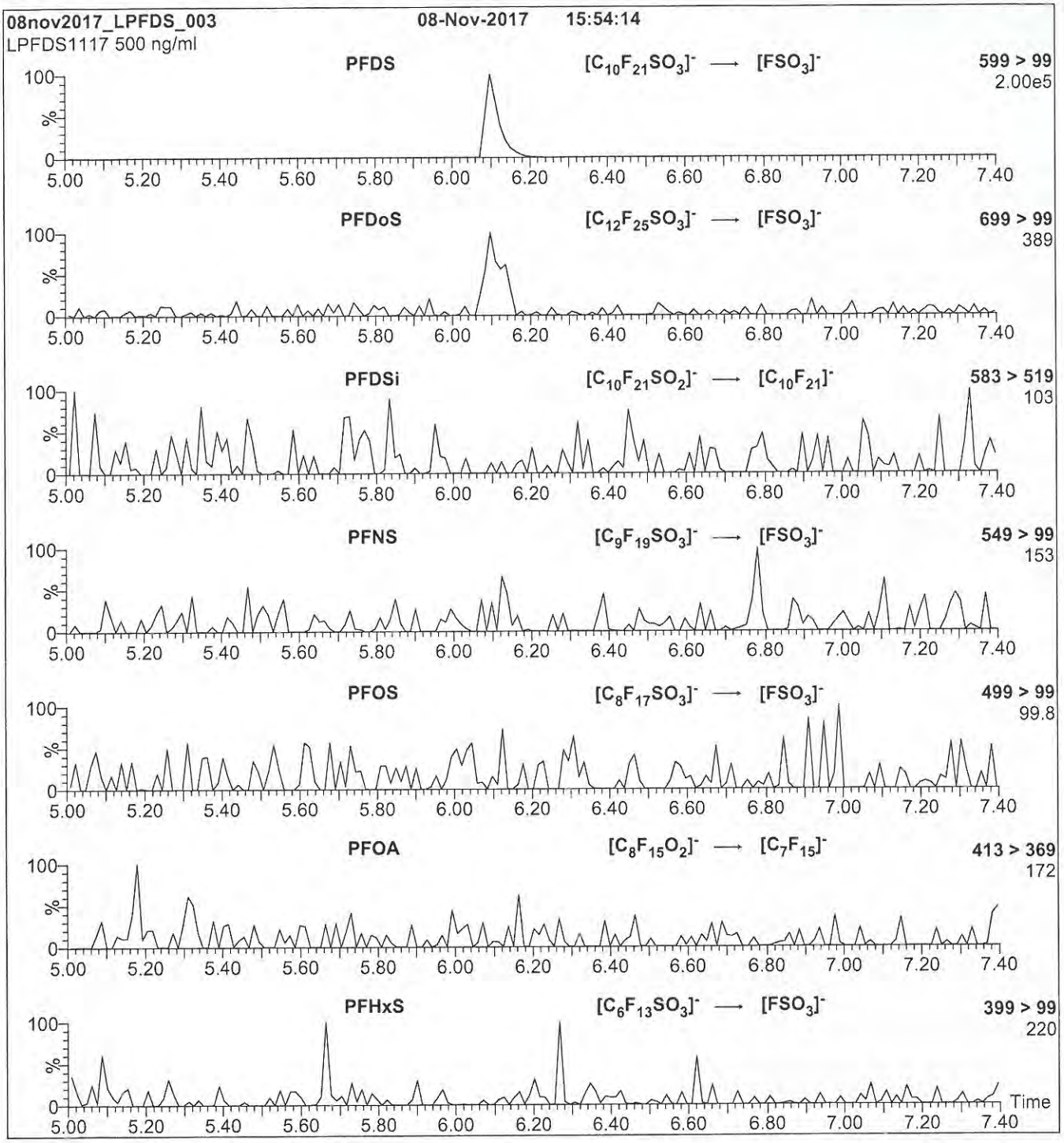
MS Parameters

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

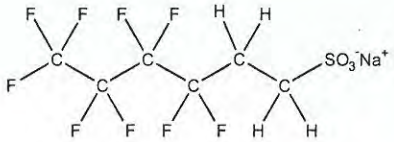
WELLINGTON LABORATORIES

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

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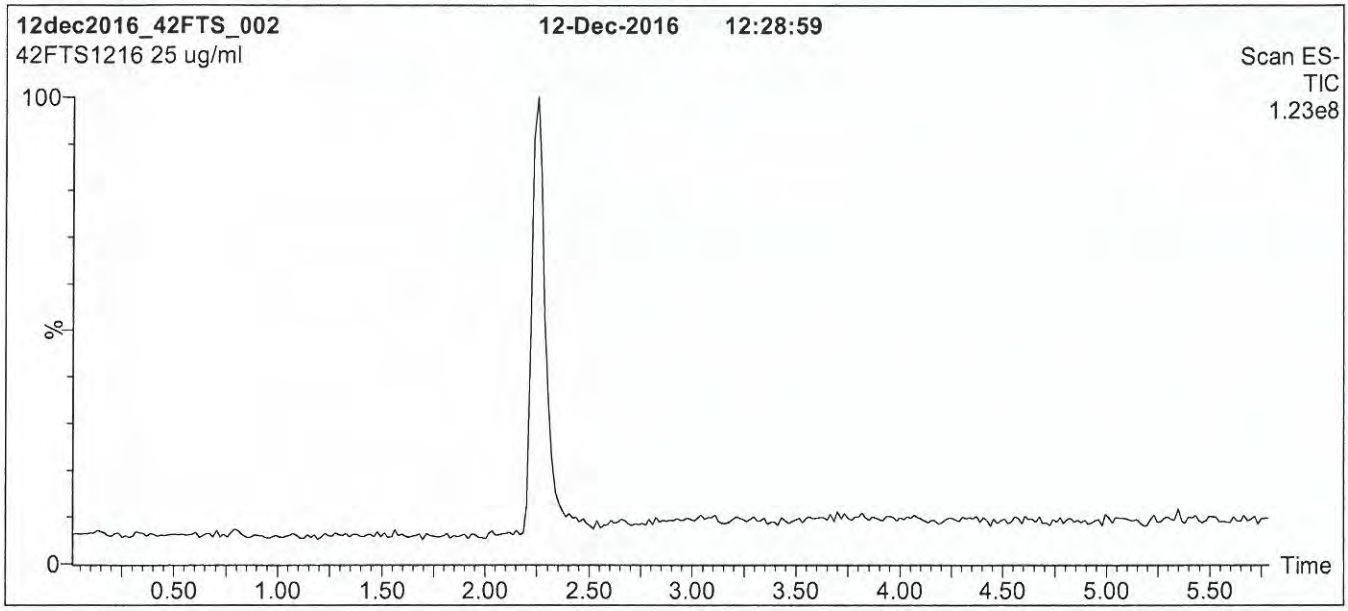
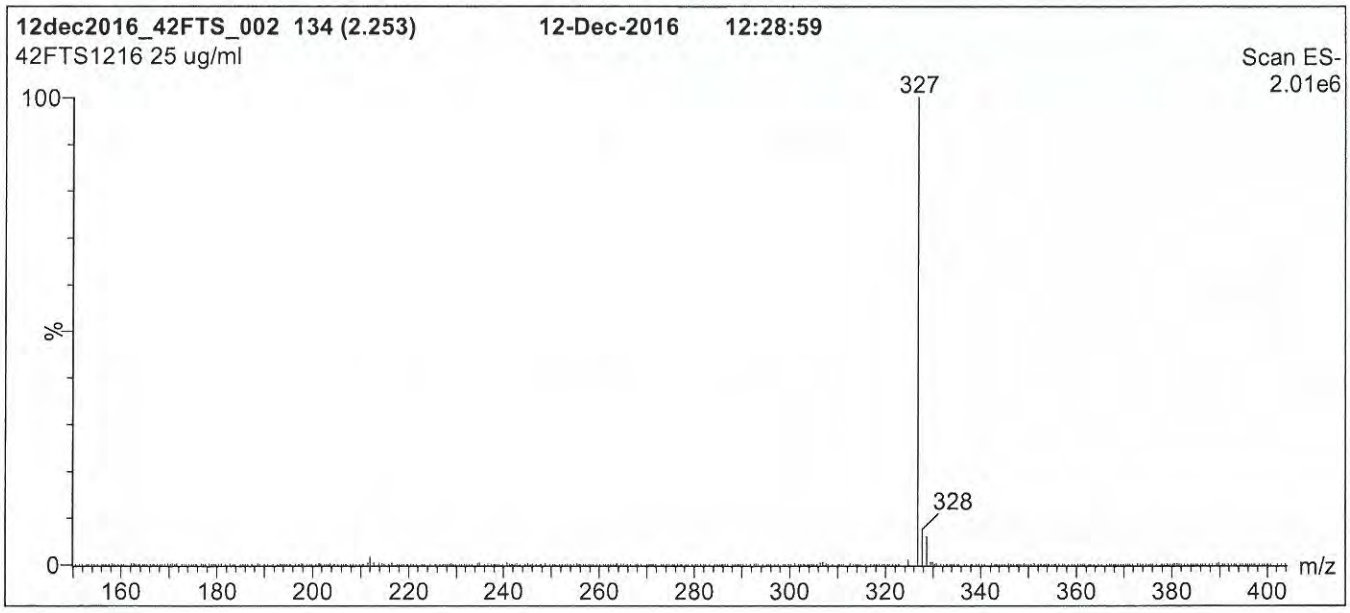
18C2731

Figure 1: **4:2FTS; LC/MS Data (TIC and Mass Spectrum)**





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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
(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

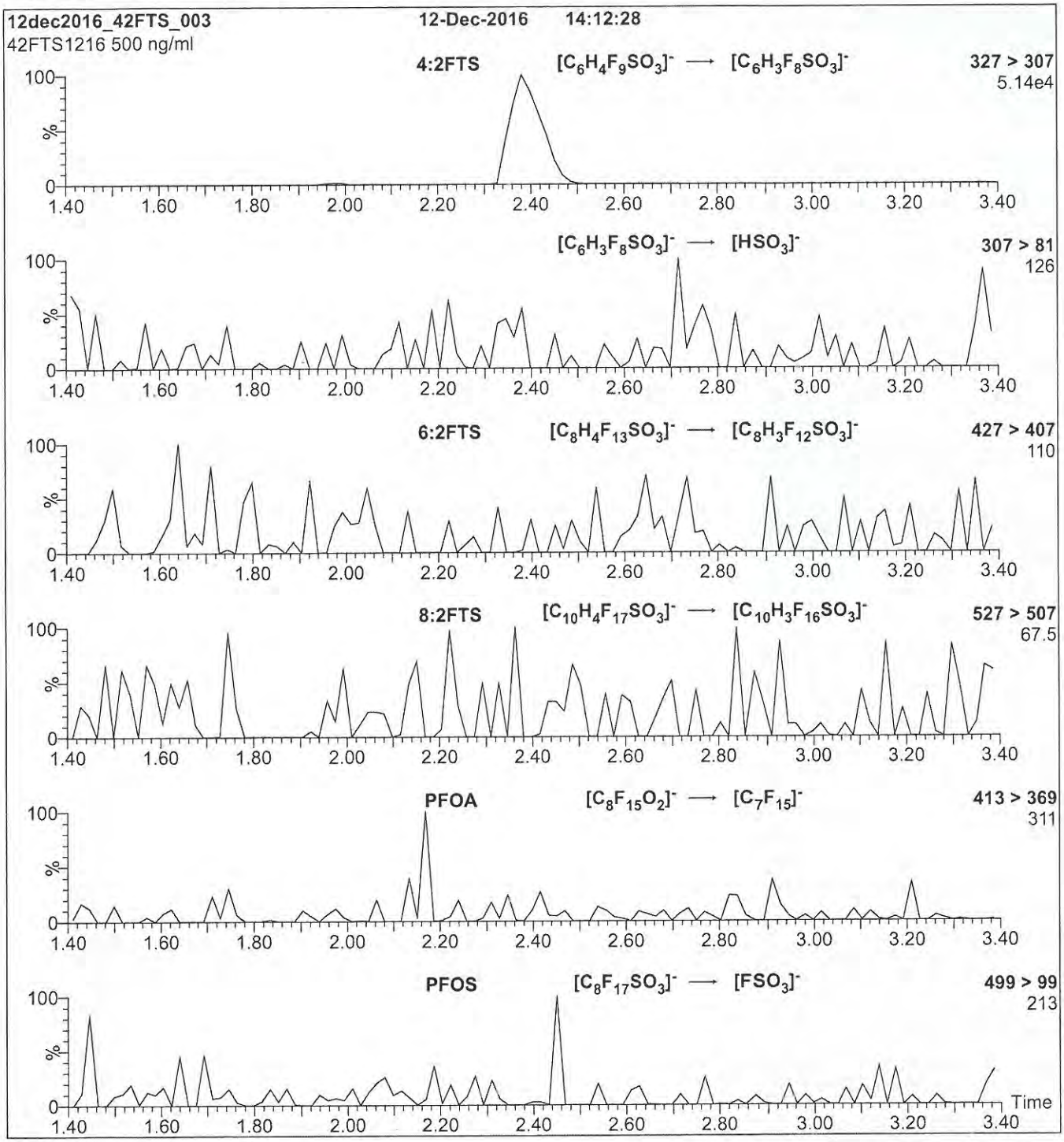
MS Parameters

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

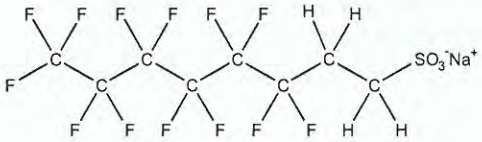
WELLINGTON LABORATORIES

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

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).

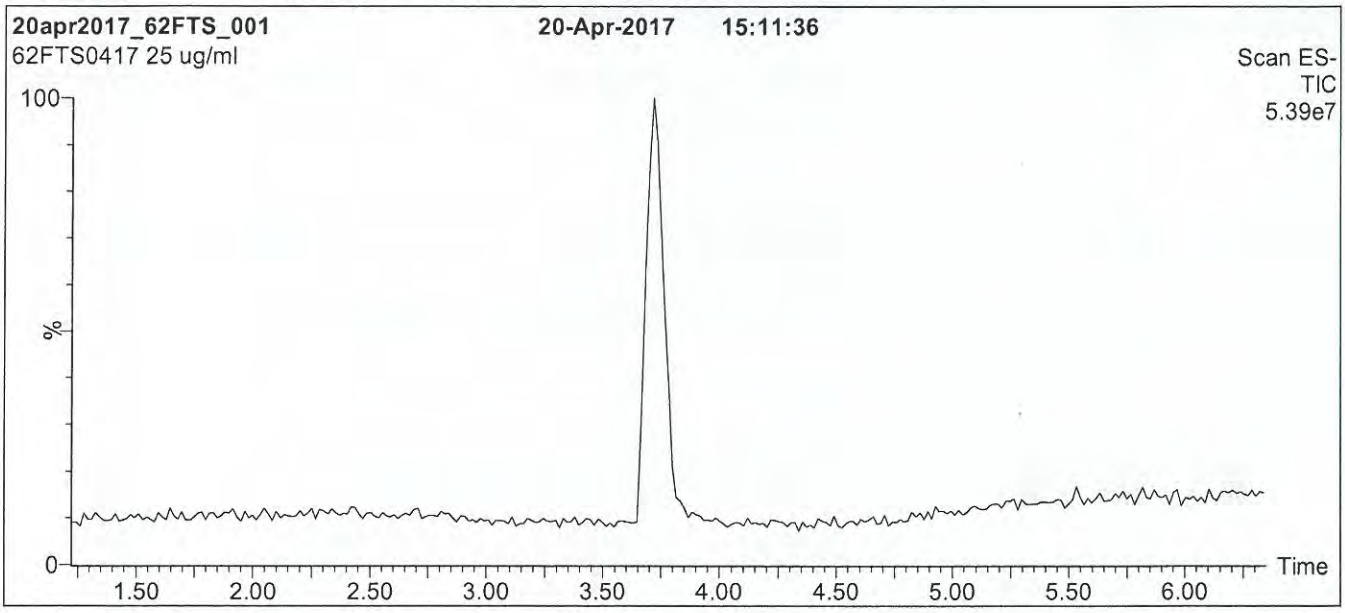
CALA

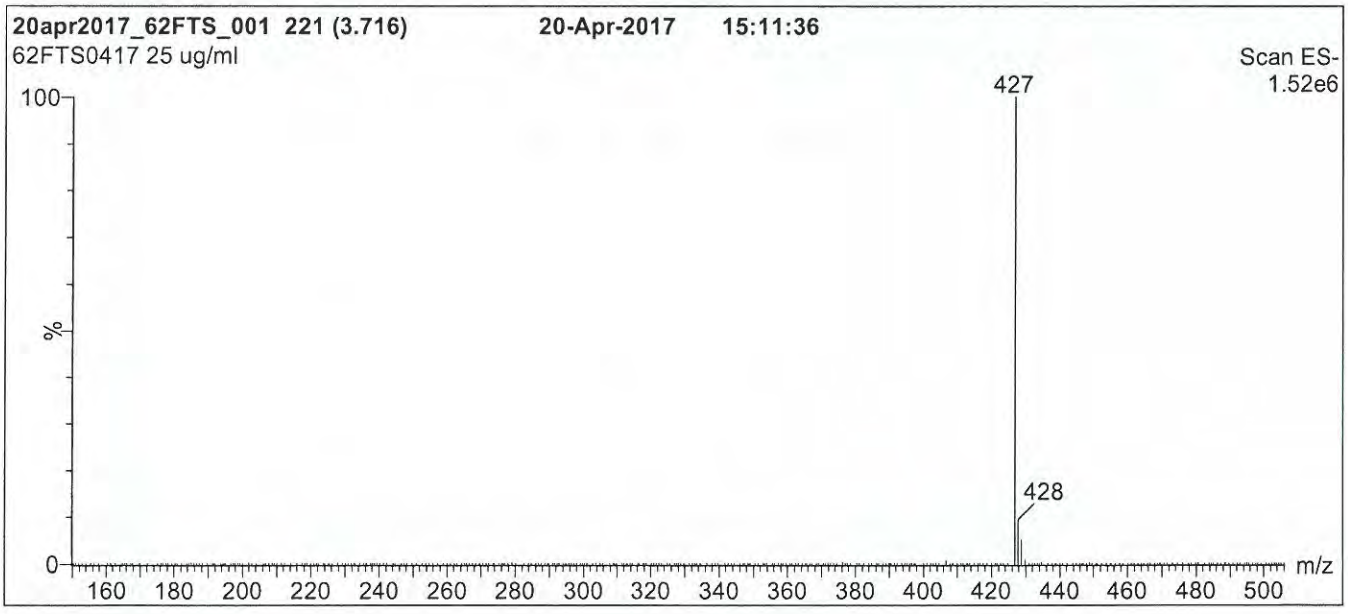
ANAB ACCREDITED

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

18C2732

Figure 1: **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 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

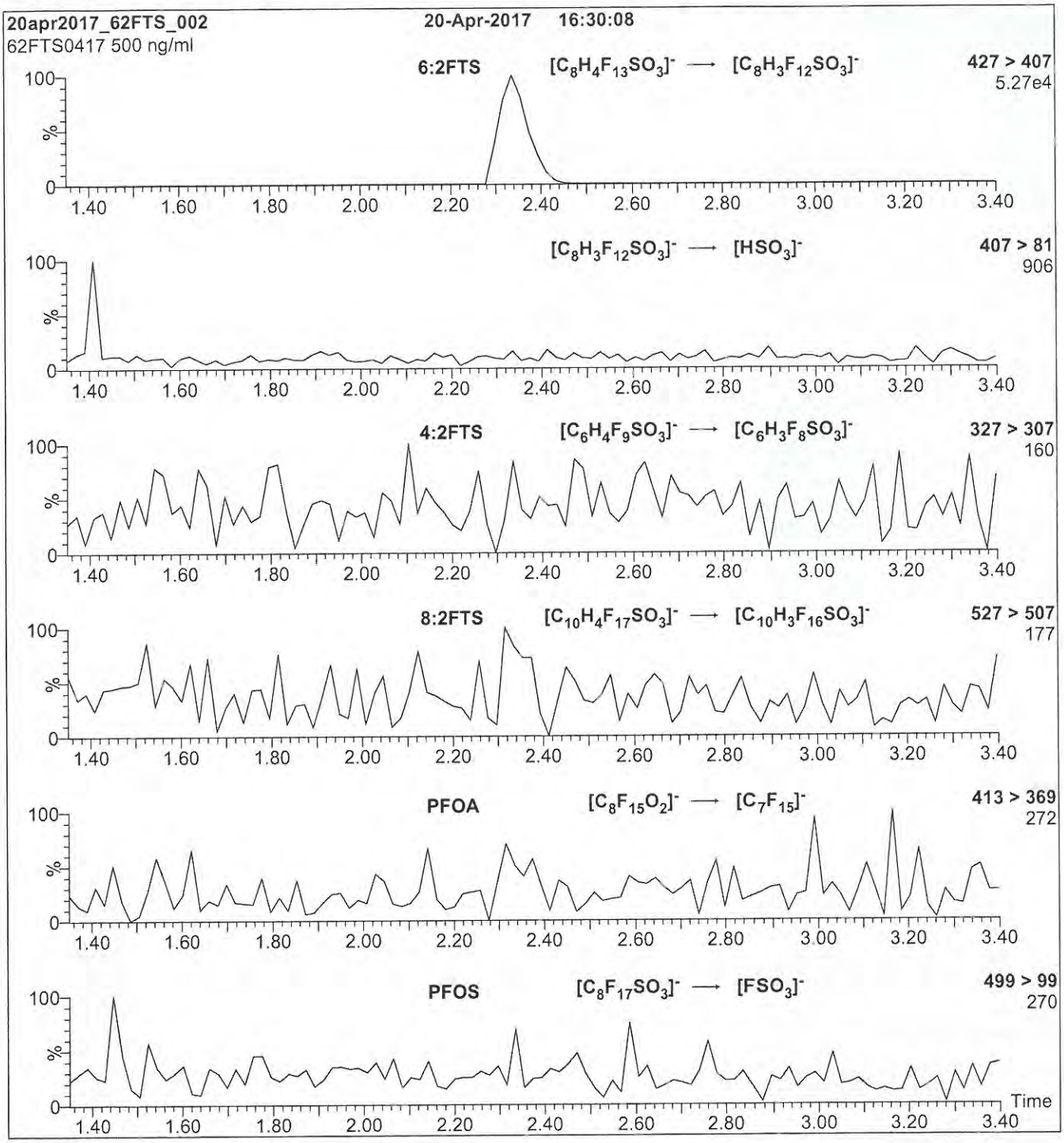
MS Parameters

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

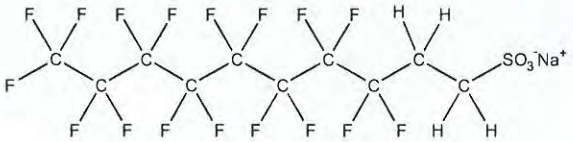
WELLINGTON LABORATORIES

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
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2733

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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:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED 20705 REFERENCE MATERIAL PRODUCER

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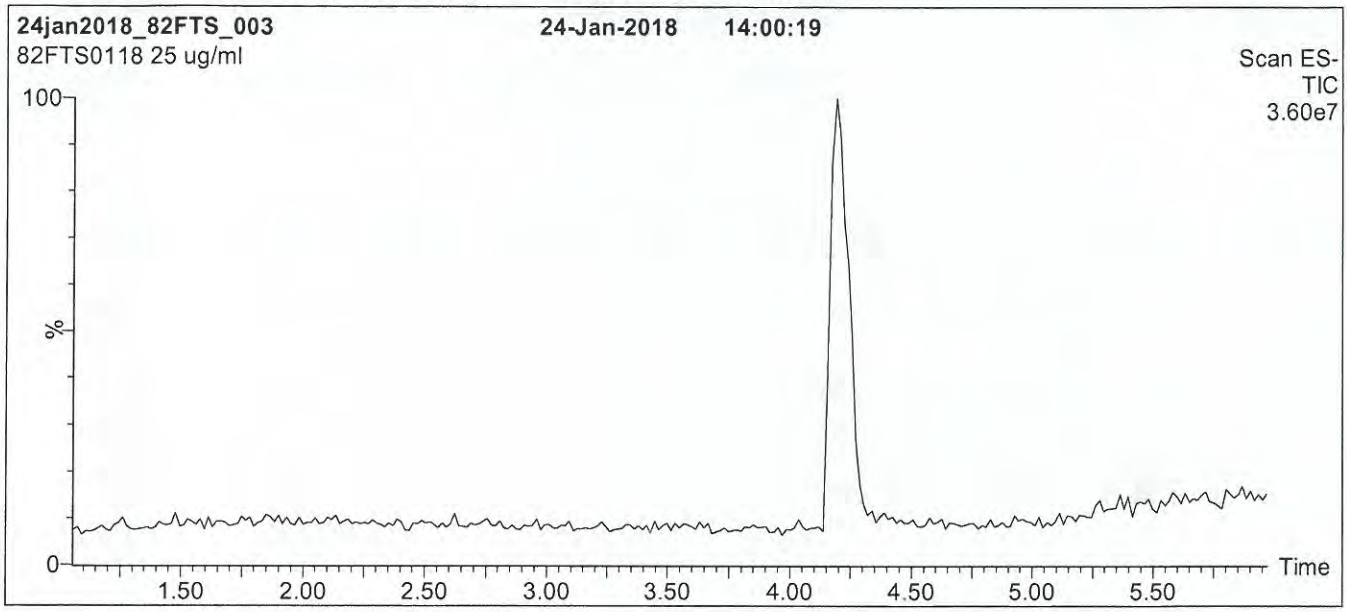
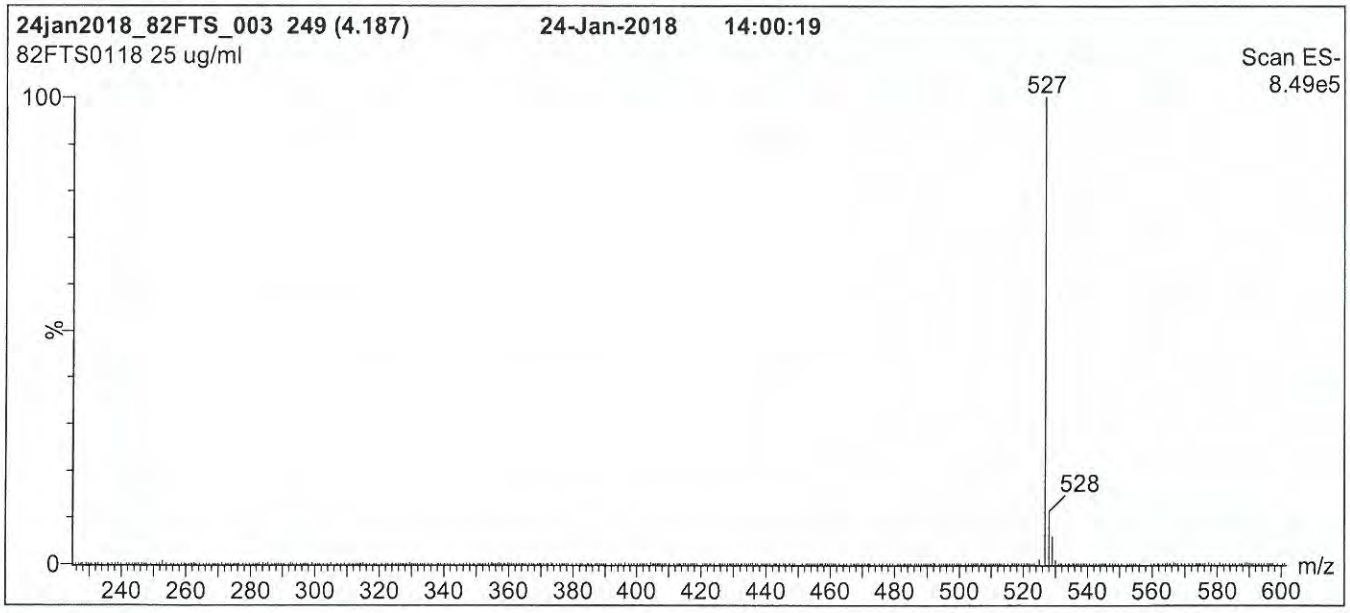
18C2733

Figure 1: **8:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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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

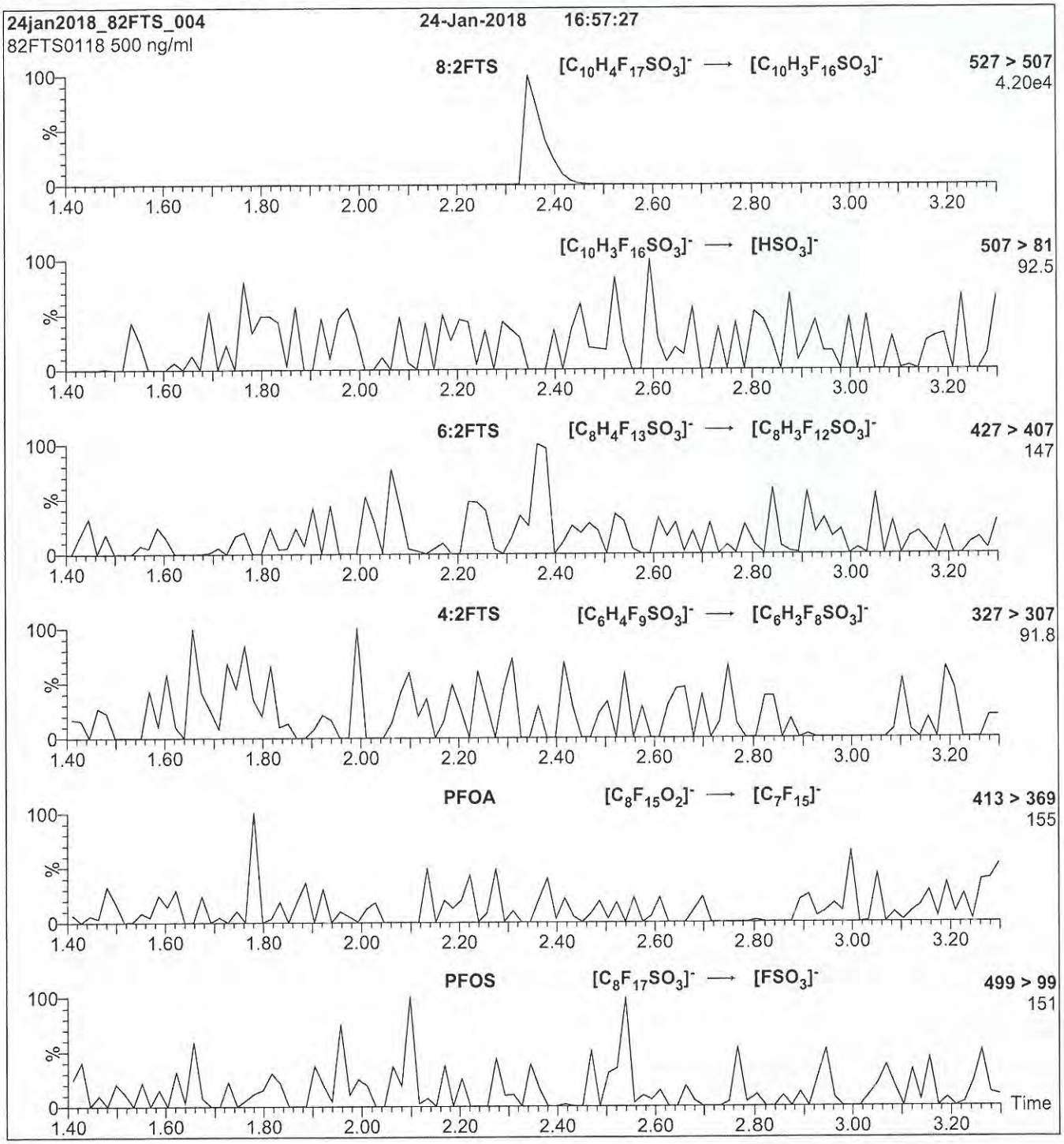
MS Parameters

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

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

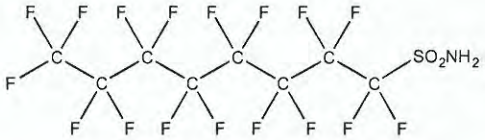
WELLINGTON LABORATORIES

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

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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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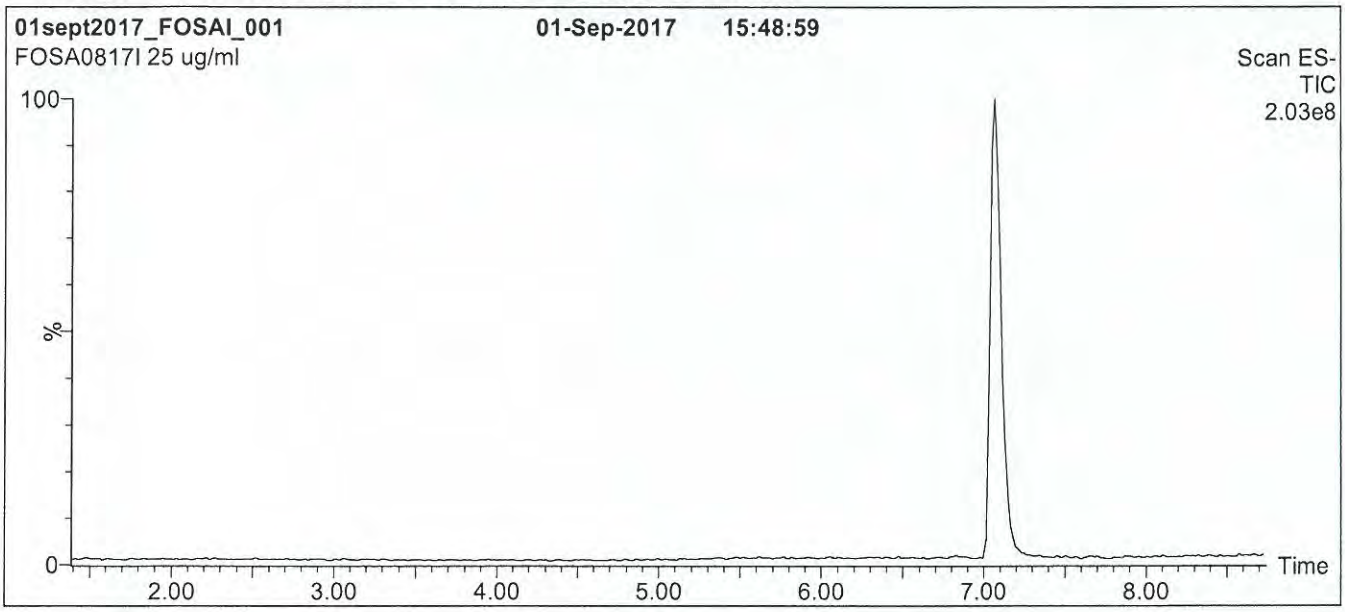
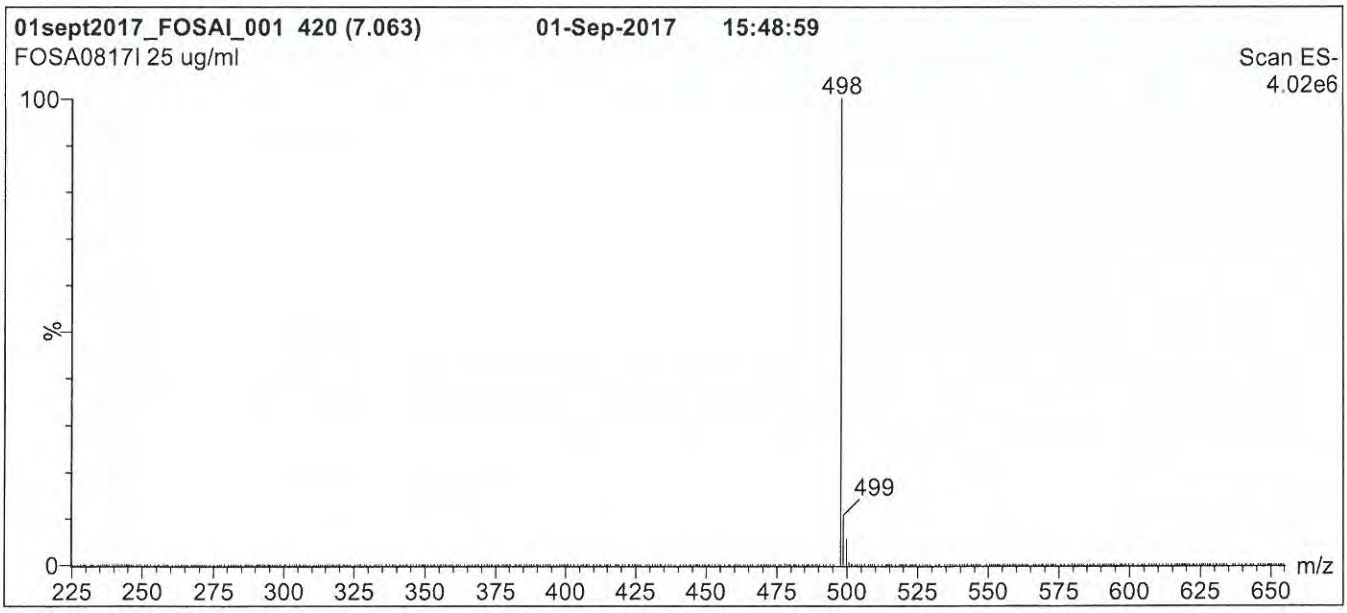
18C2734

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

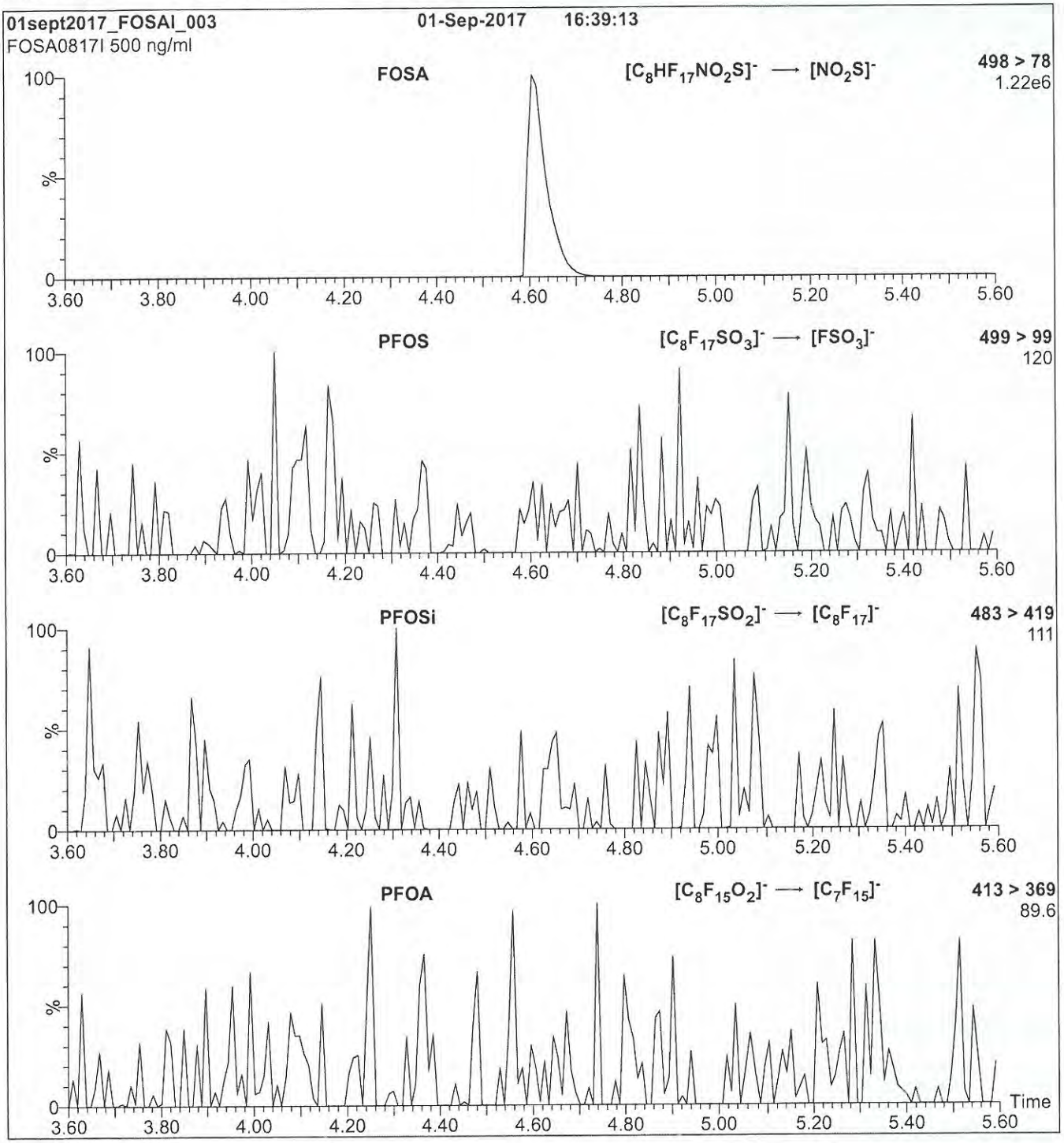
MS Parameters

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

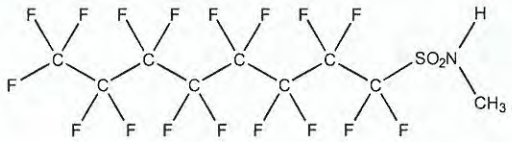
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSA-M
COMPOUND: N-methylperfluoro-1-octanesulfonamide
LOT NUMBER: NMeFOSA0717M

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
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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.

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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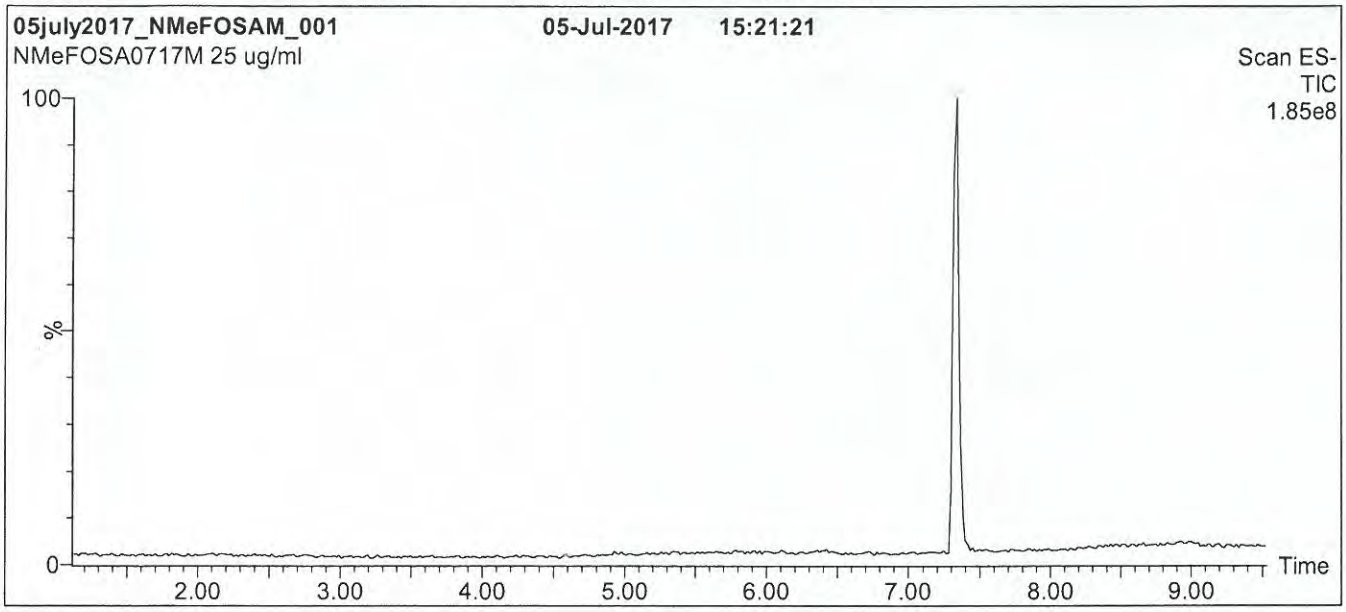
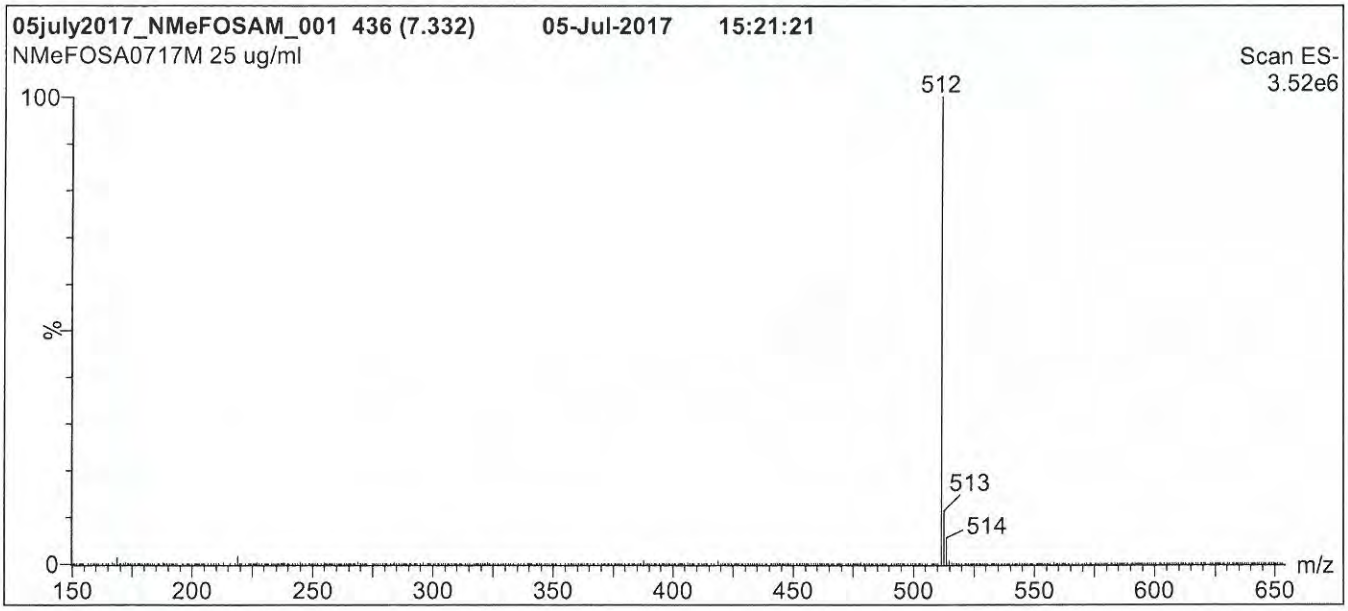
18C2737

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

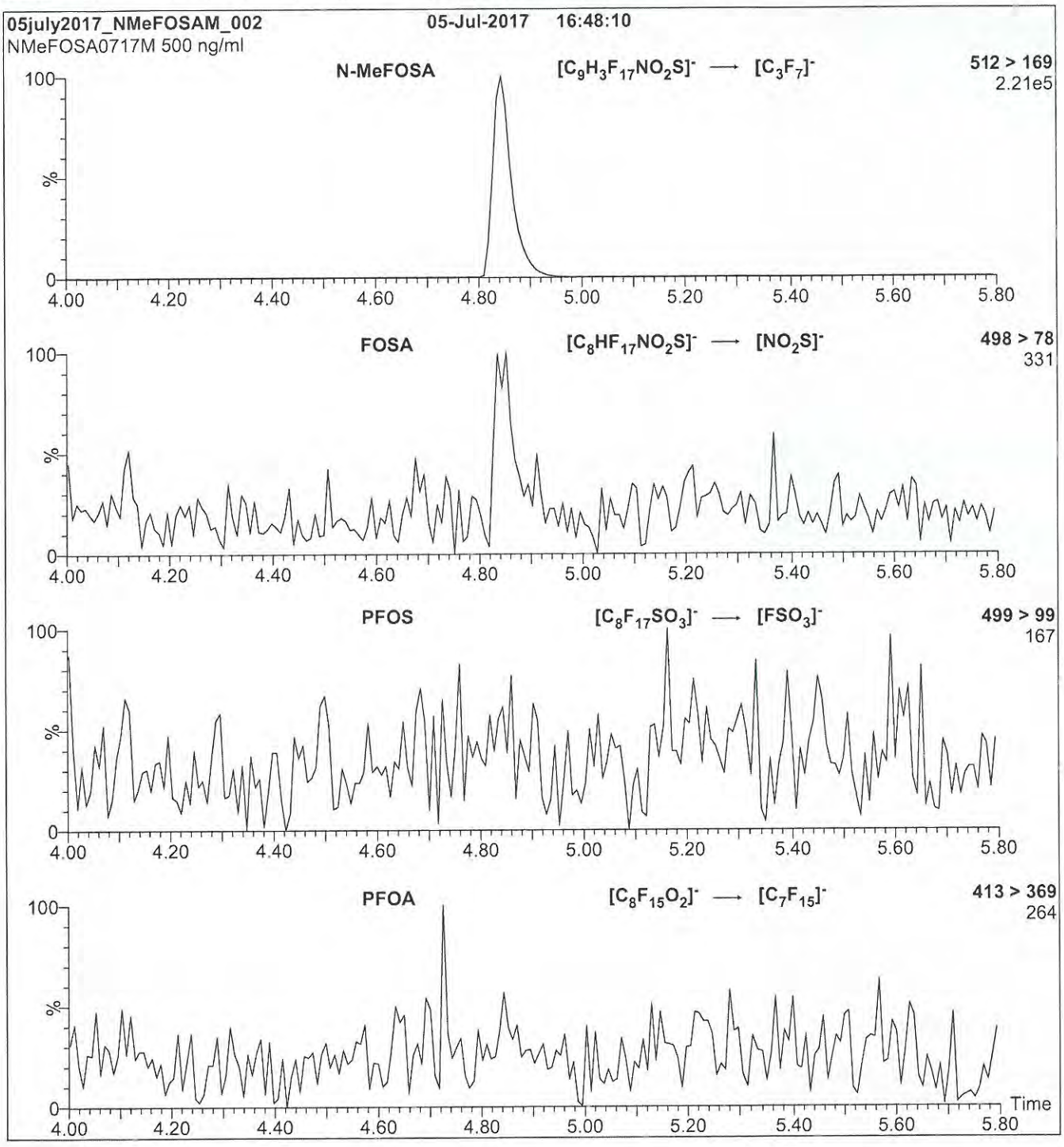
MS Parameters

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

1802737

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

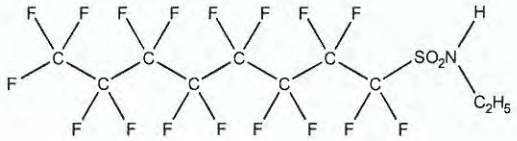
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 30

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

1802738

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CALA Testing Accreditation No. A 0226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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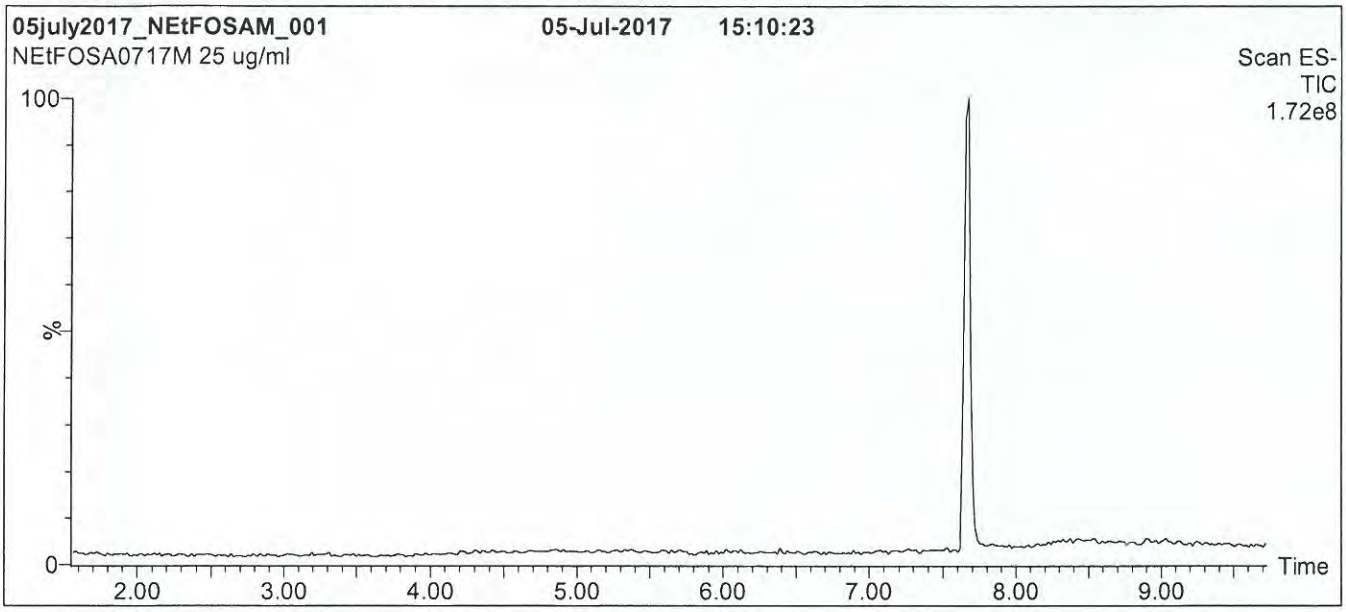
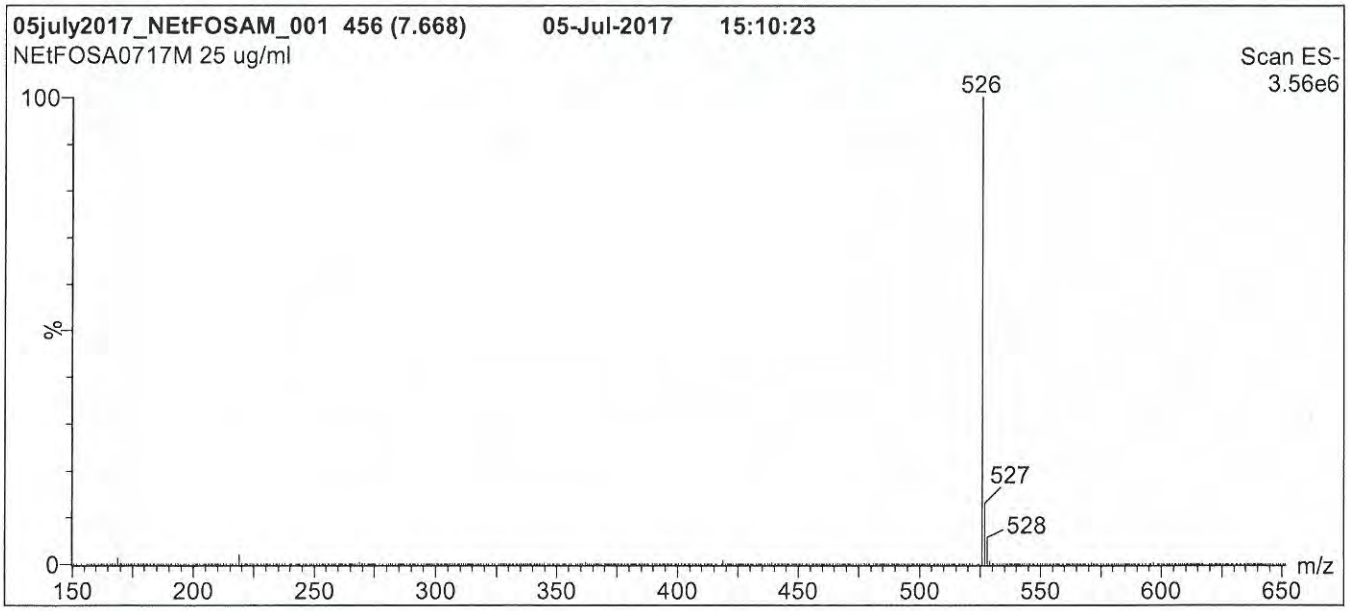
18C2738

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

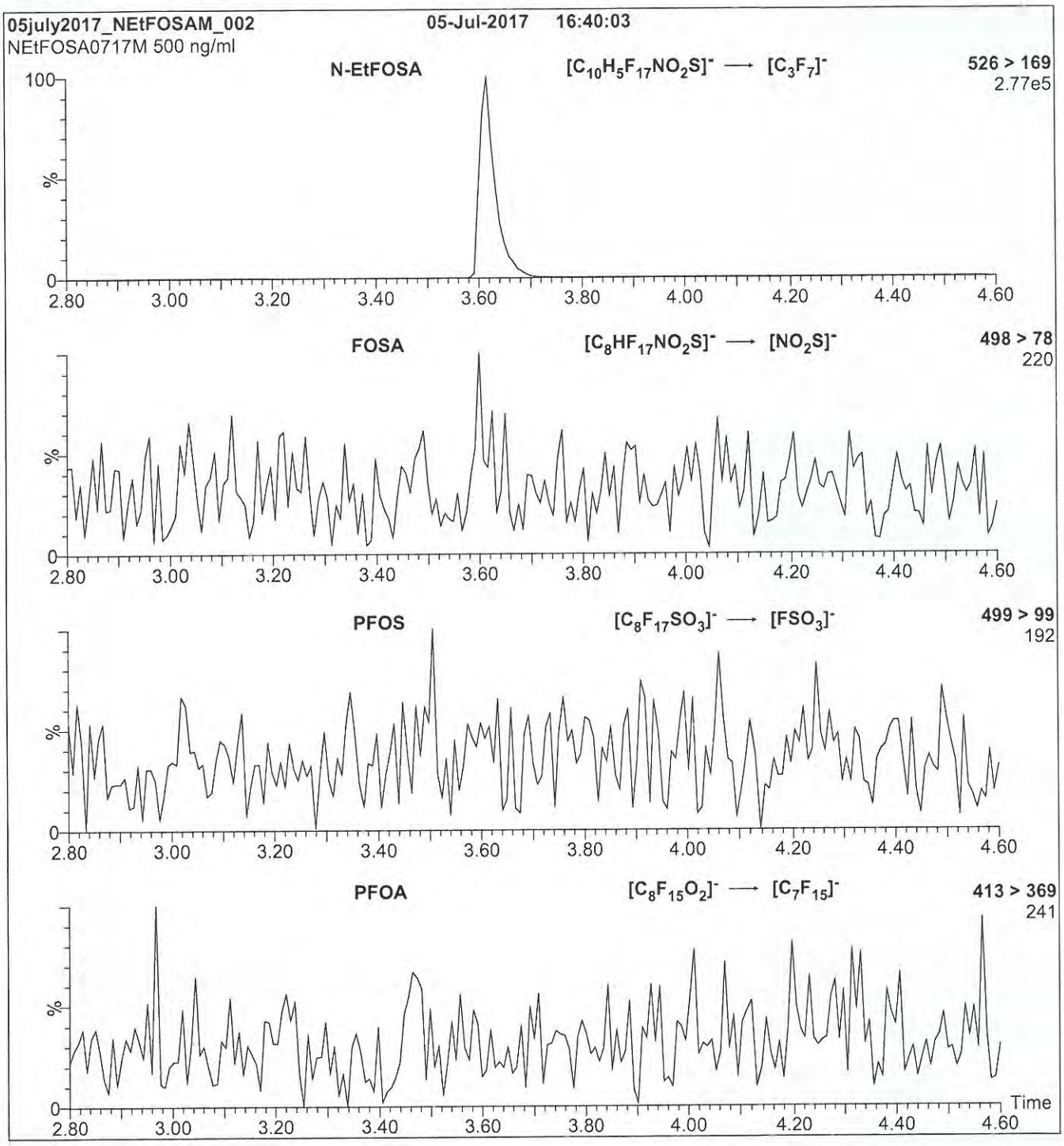
MS Parameters

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

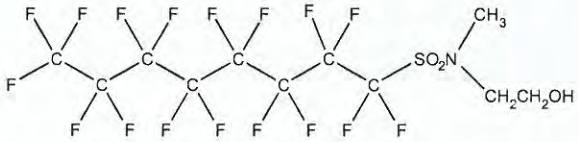
WELLINGTON LABORATORIES

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

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CALA Testing Accreditation No. A1226

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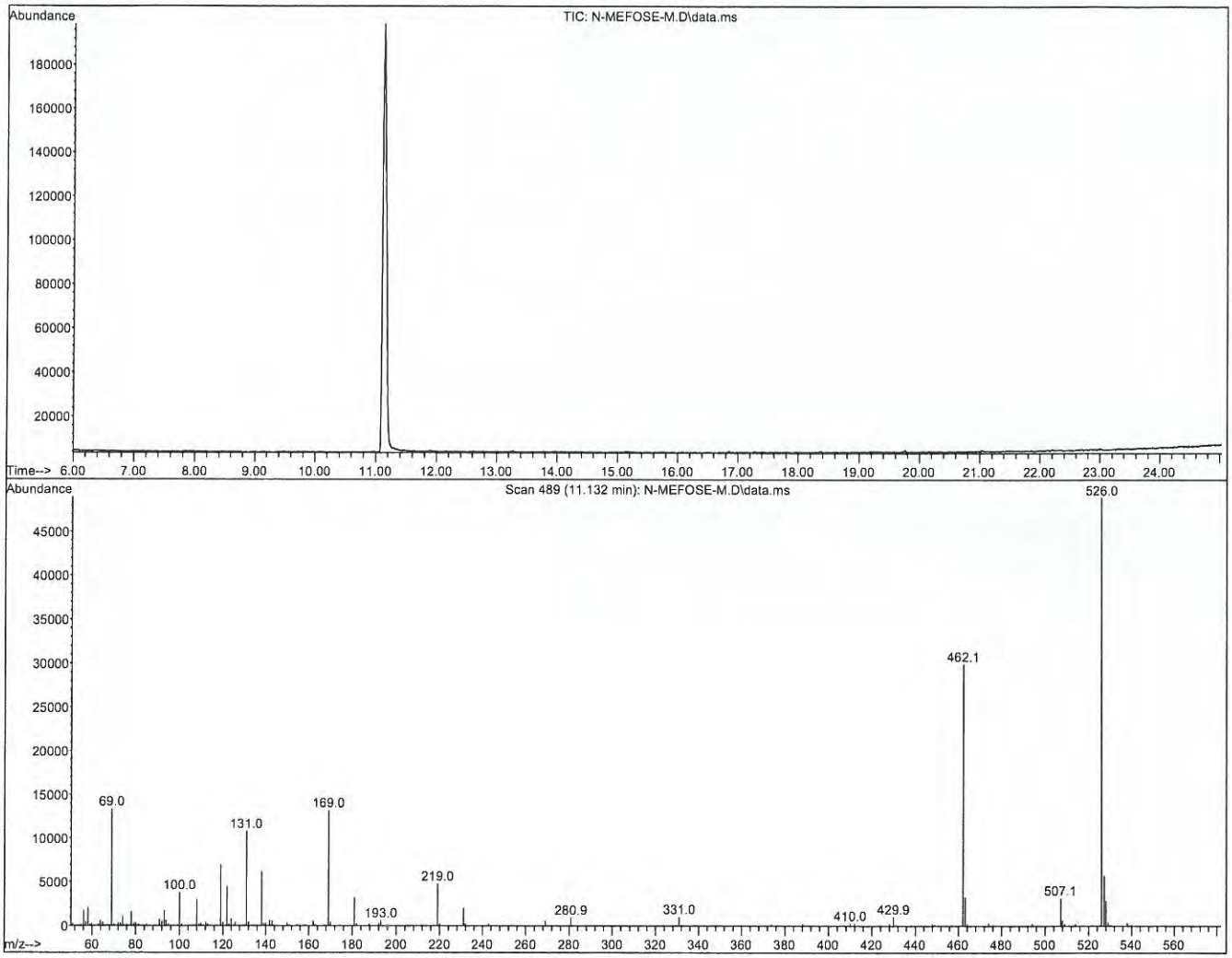
18C2739

Figure 1: **N-MeFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

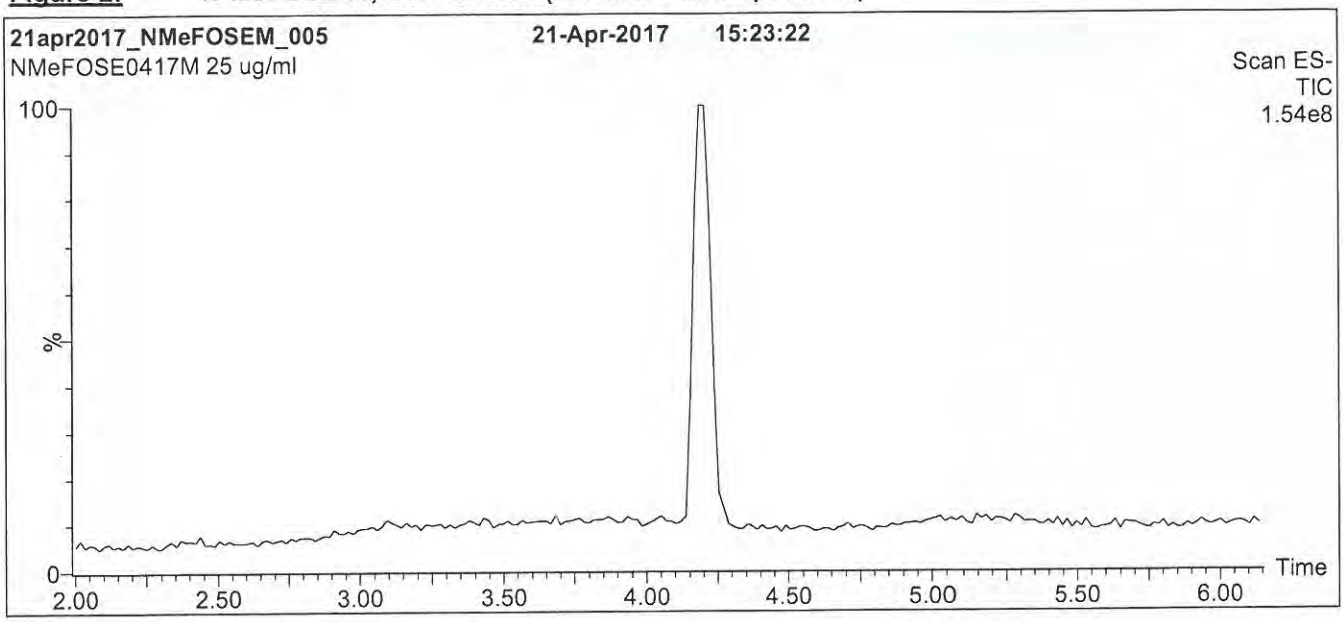
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

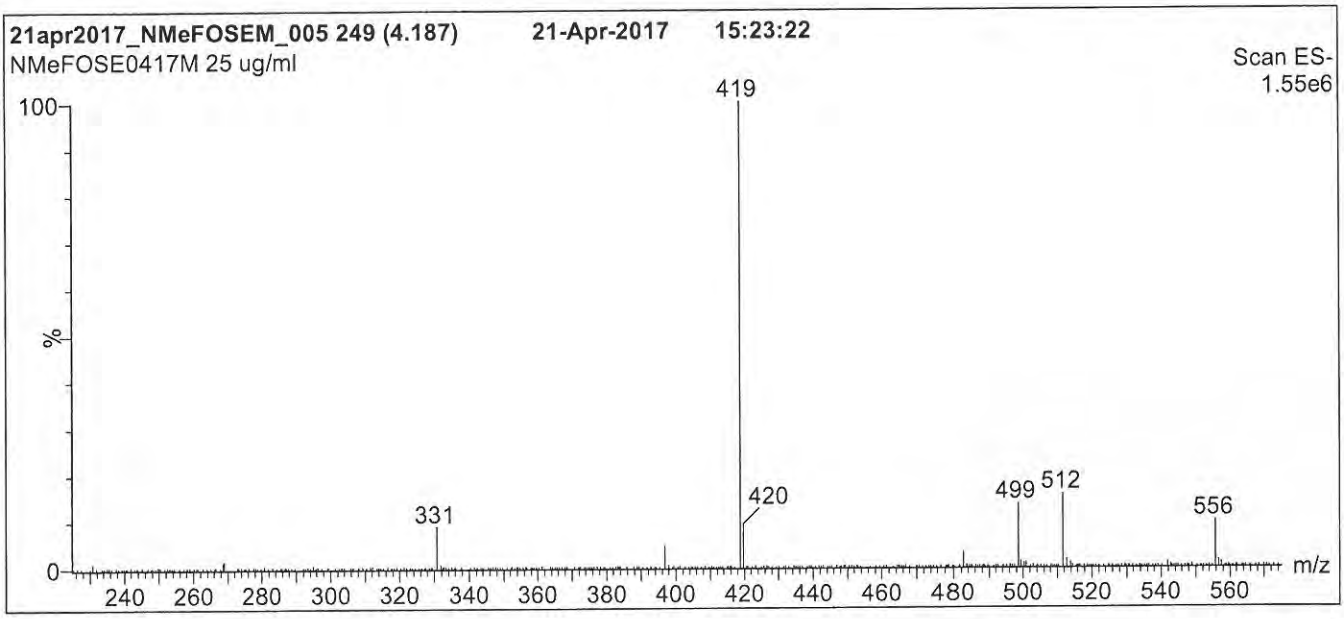
Chromatographic Conditions:

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

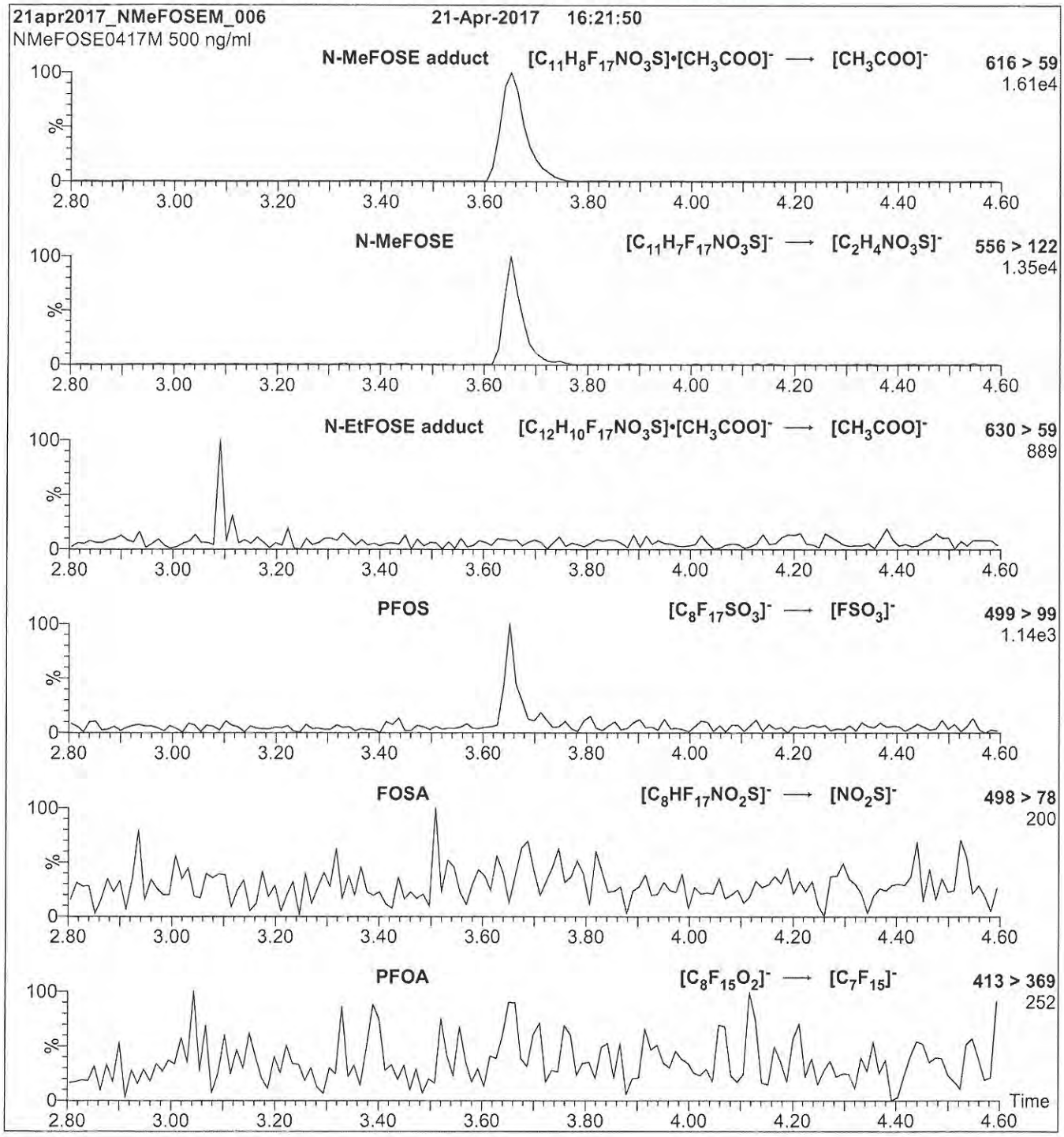
MS Parameters

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

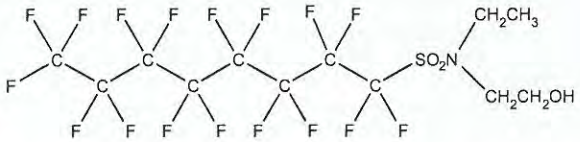
WELLINGTON LABORATORIES

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)		
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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:

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).

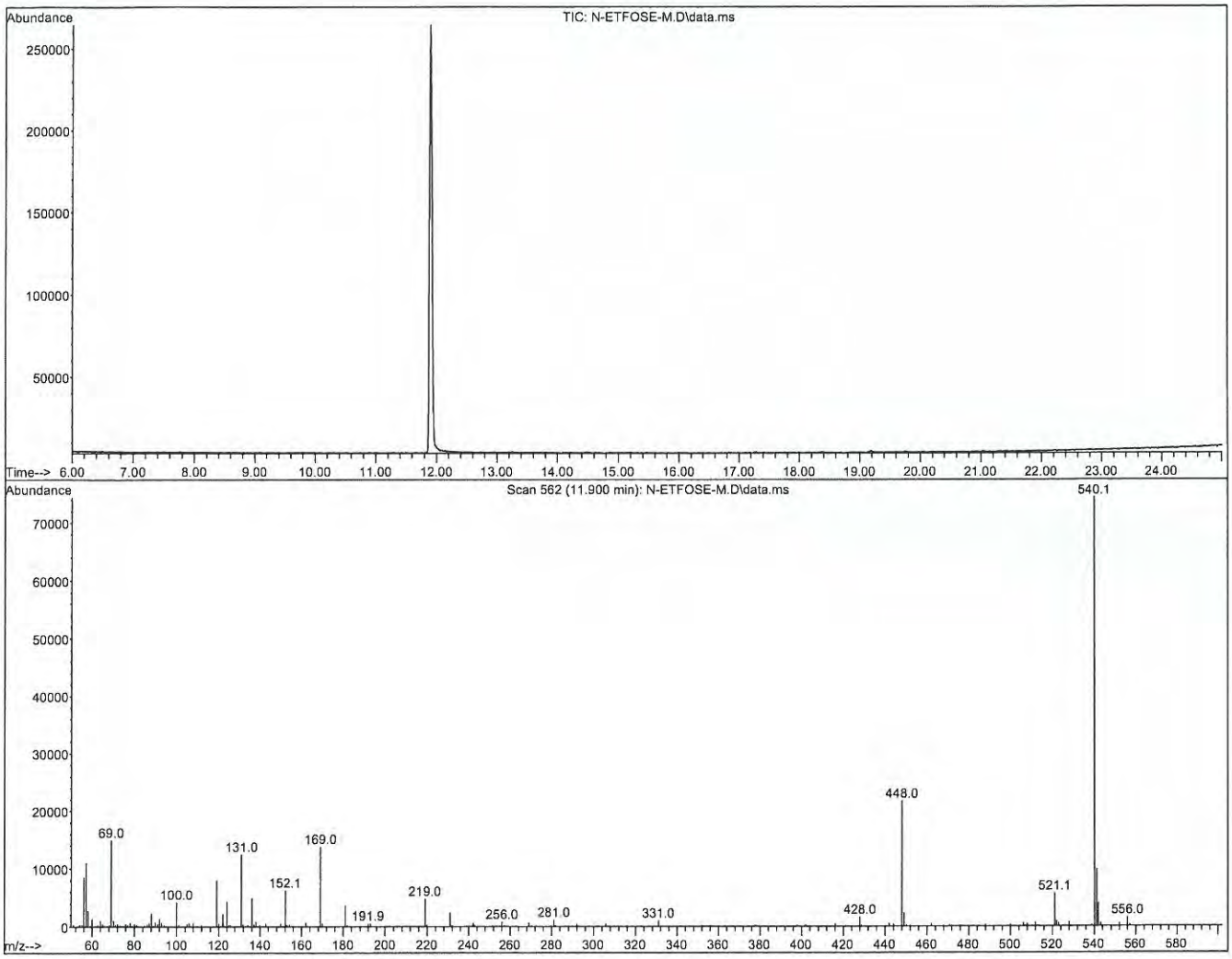
CALA

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

18C2740

Figure 1: **N-EtFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

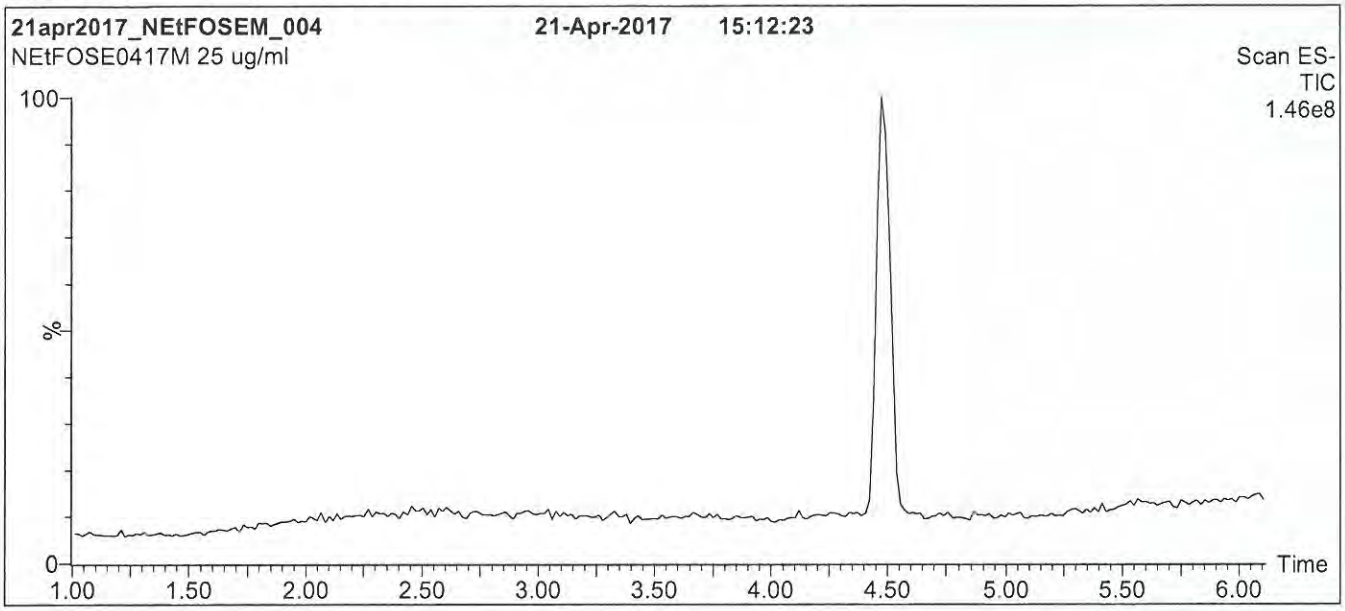
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

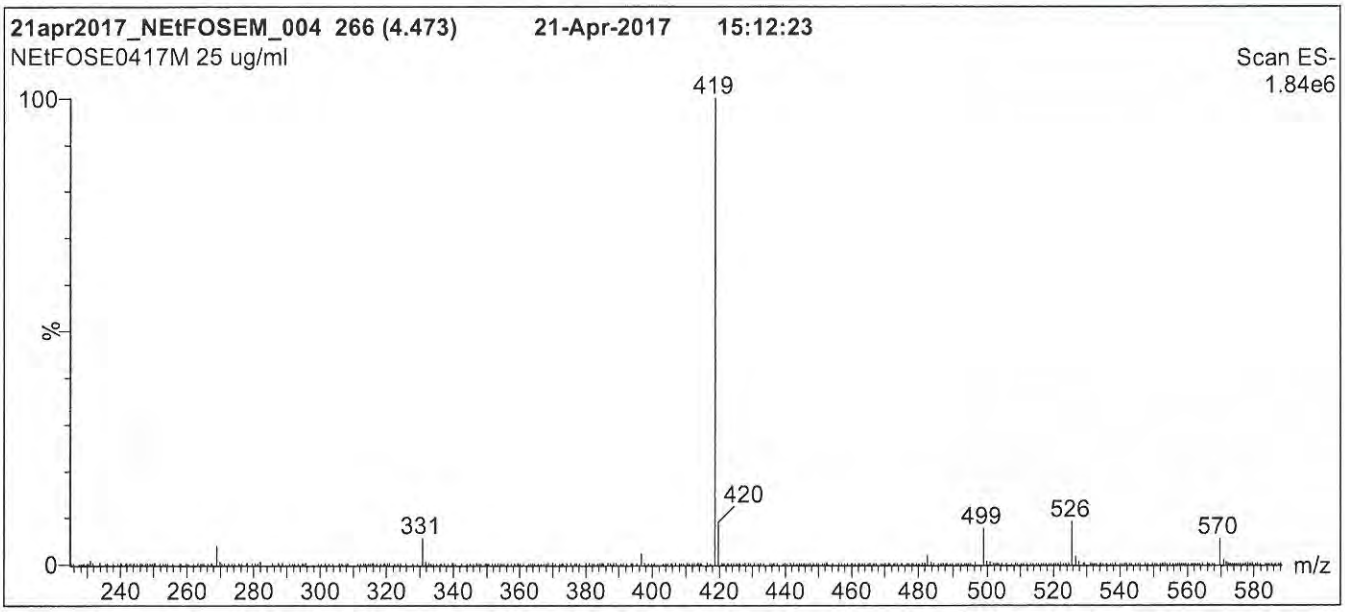
Chromatographic Conditions:

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

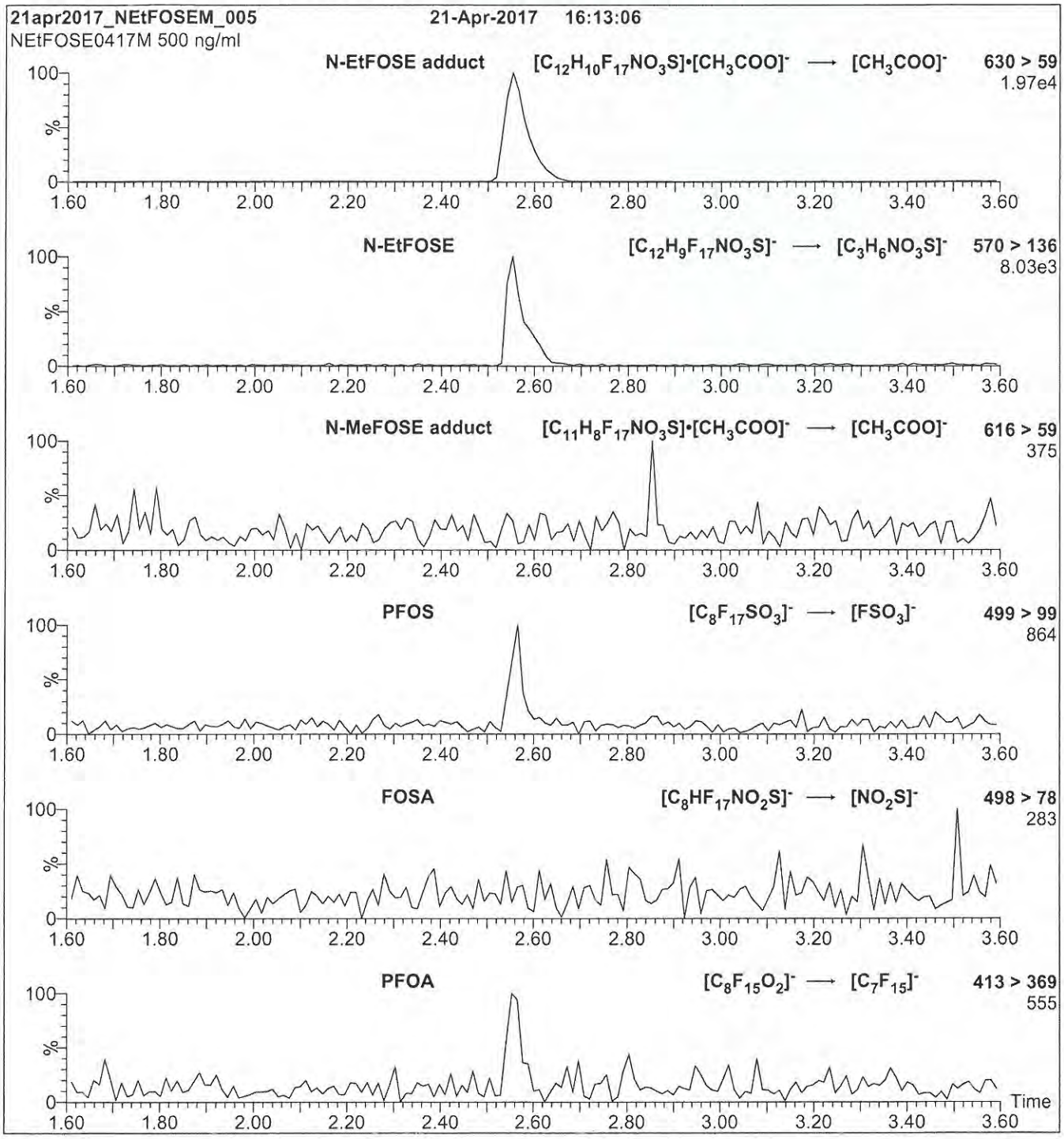
MS Parameters

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

1802740

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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Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801306

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

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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

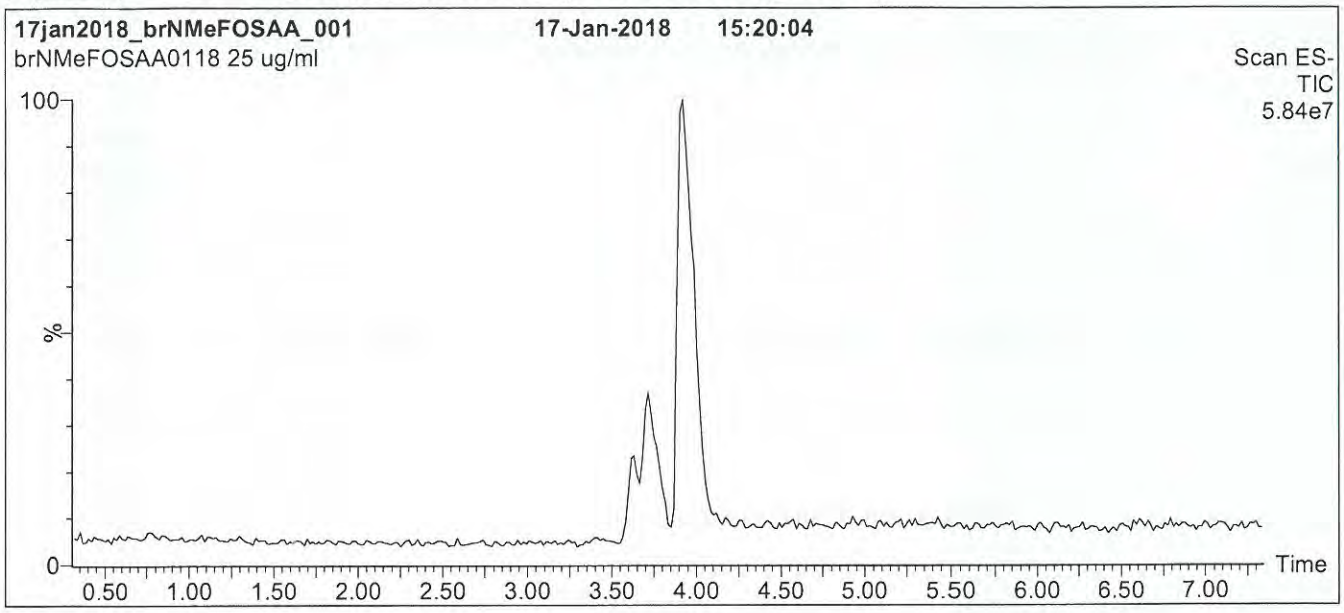
* Percent of total N-methylperfluorooctanesulfonamidoacetic acid isomers only.

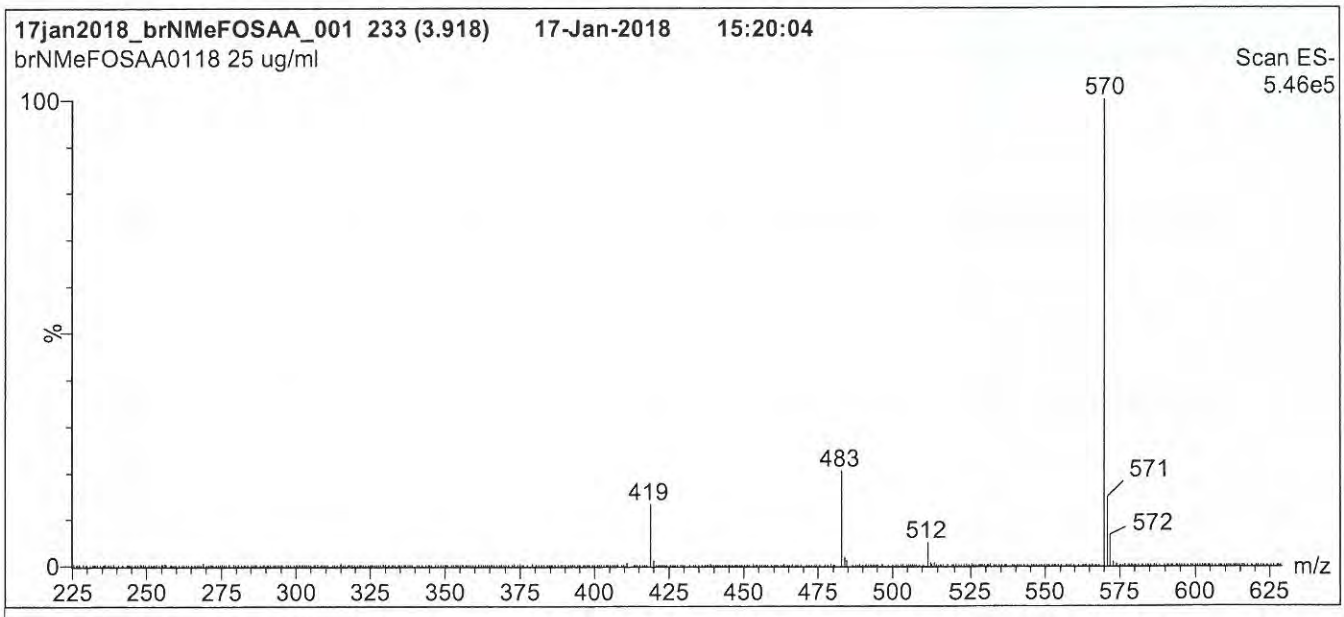
Certified By: _____ **Date:** 03/22/2018 (mm/dd/yyyy)

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

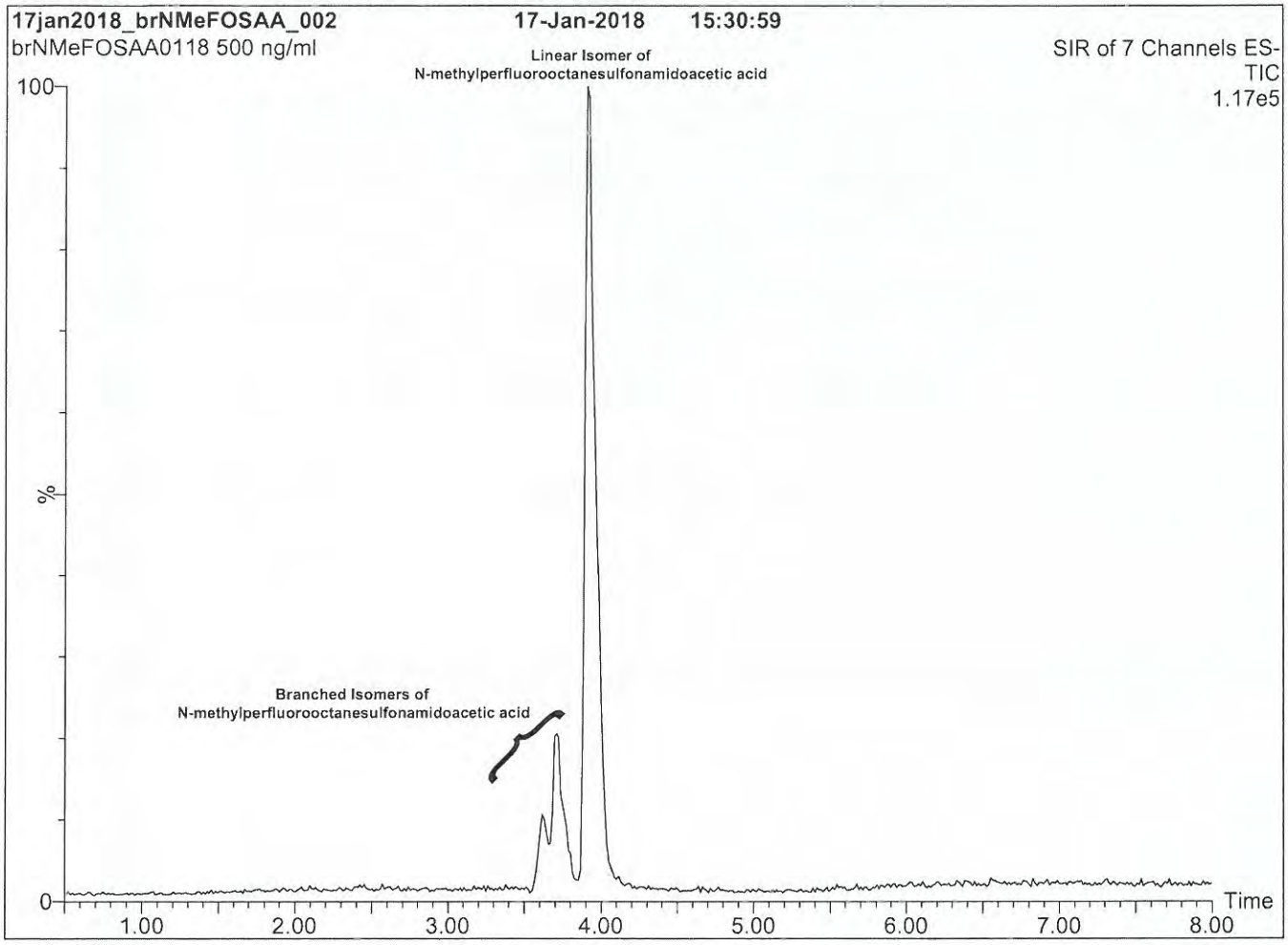
MS Parameters

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)**



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

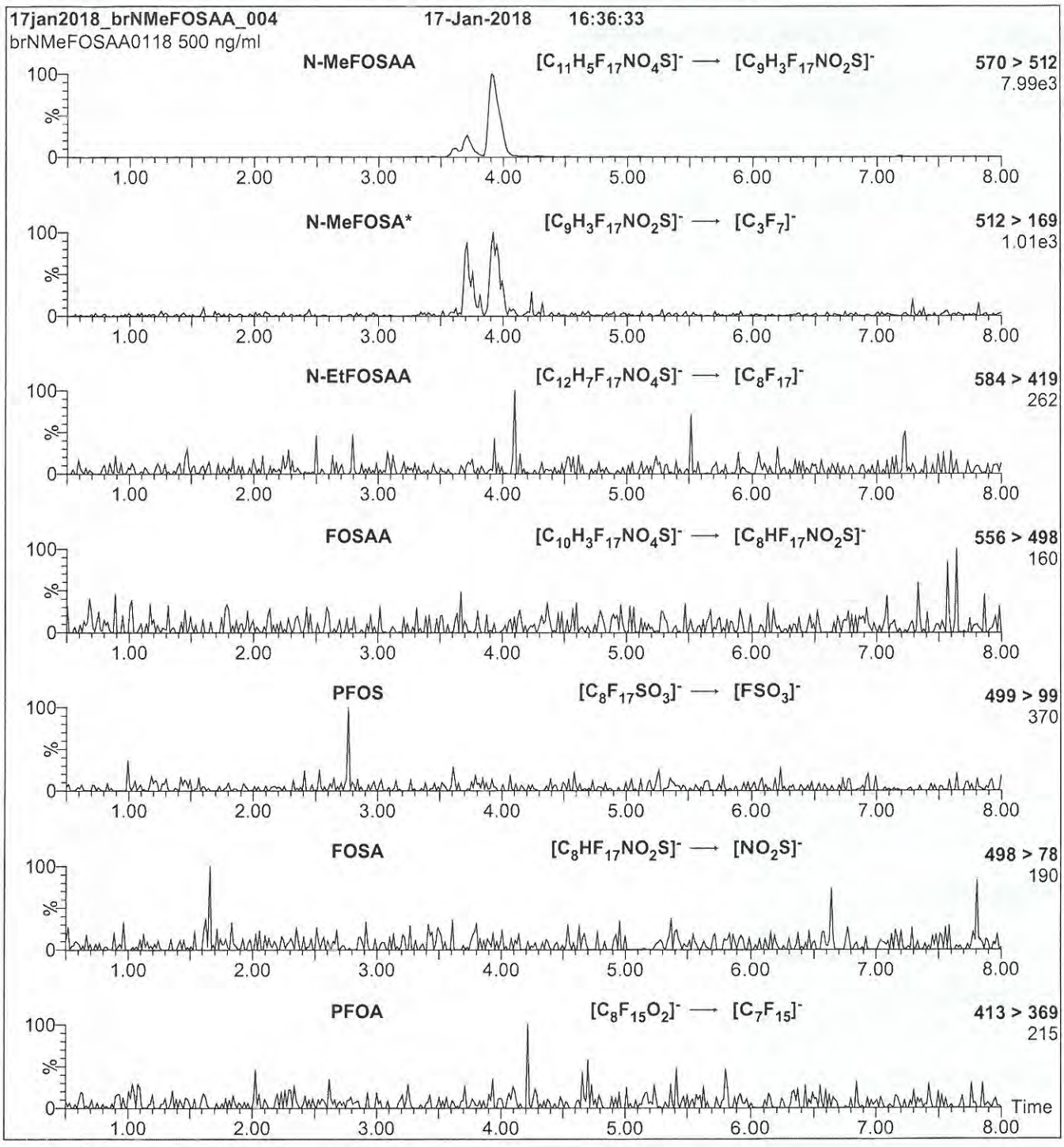
MS Parameters

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

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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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

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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

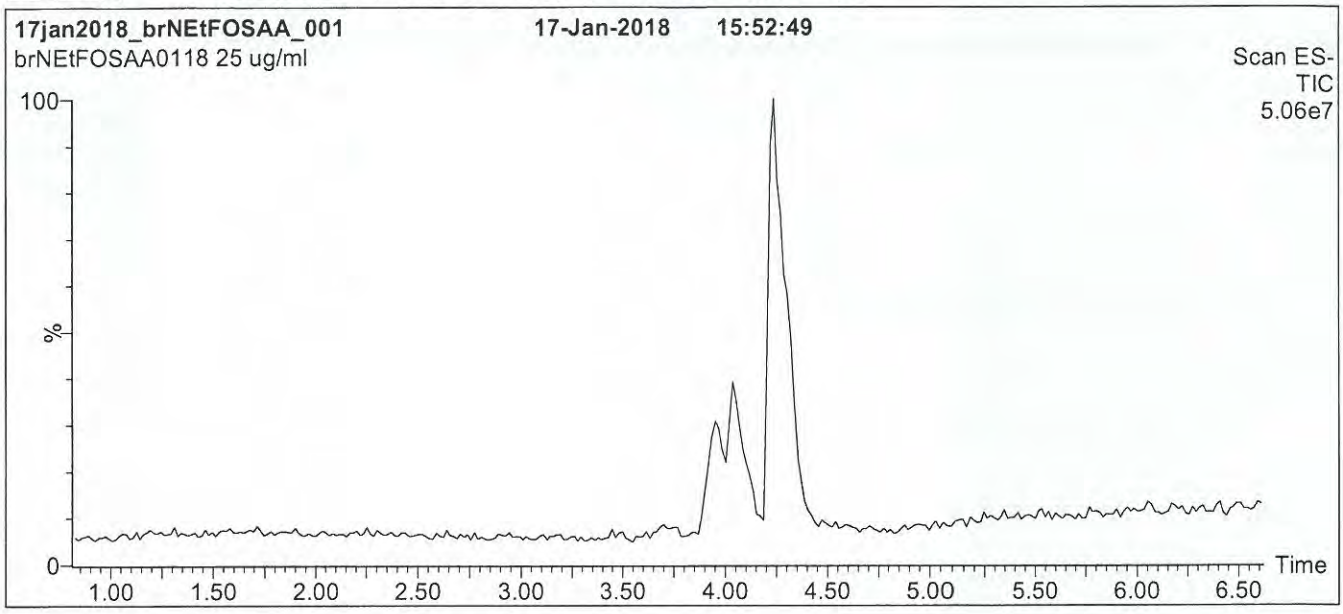
* Percent of total N-ethylperfluorooctanesulfonamidoacetic acid isomers only.

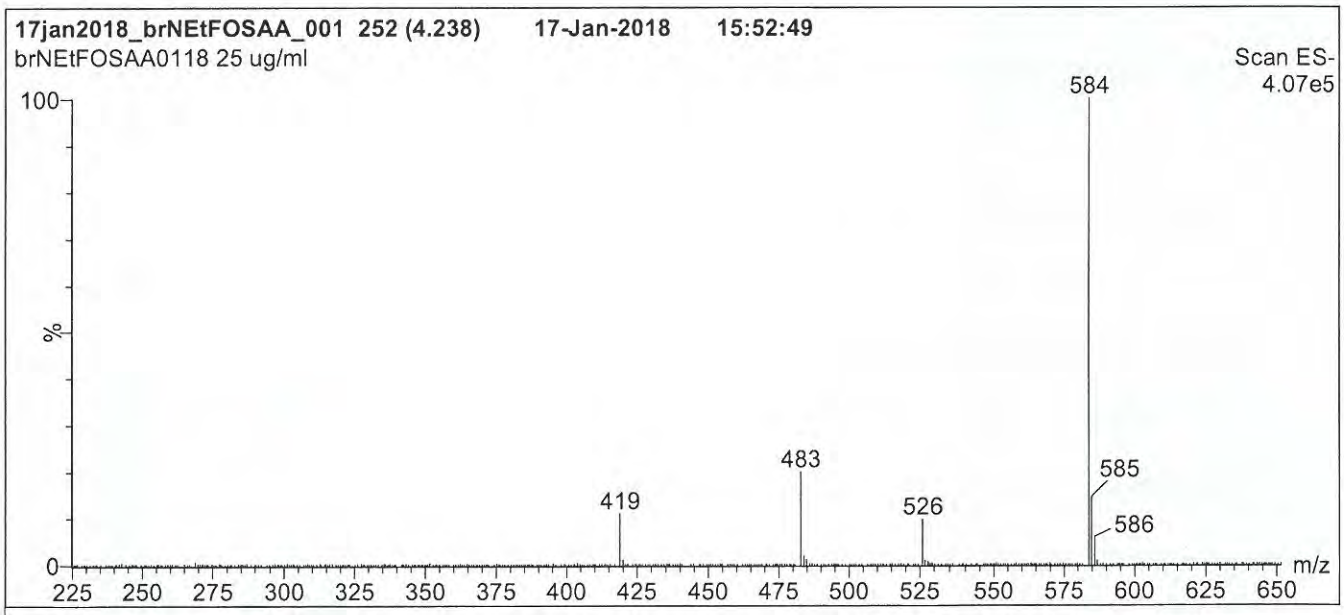
Certified By: _____ **Date:** 03/22/2018
(mm/dd/yyyy)

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

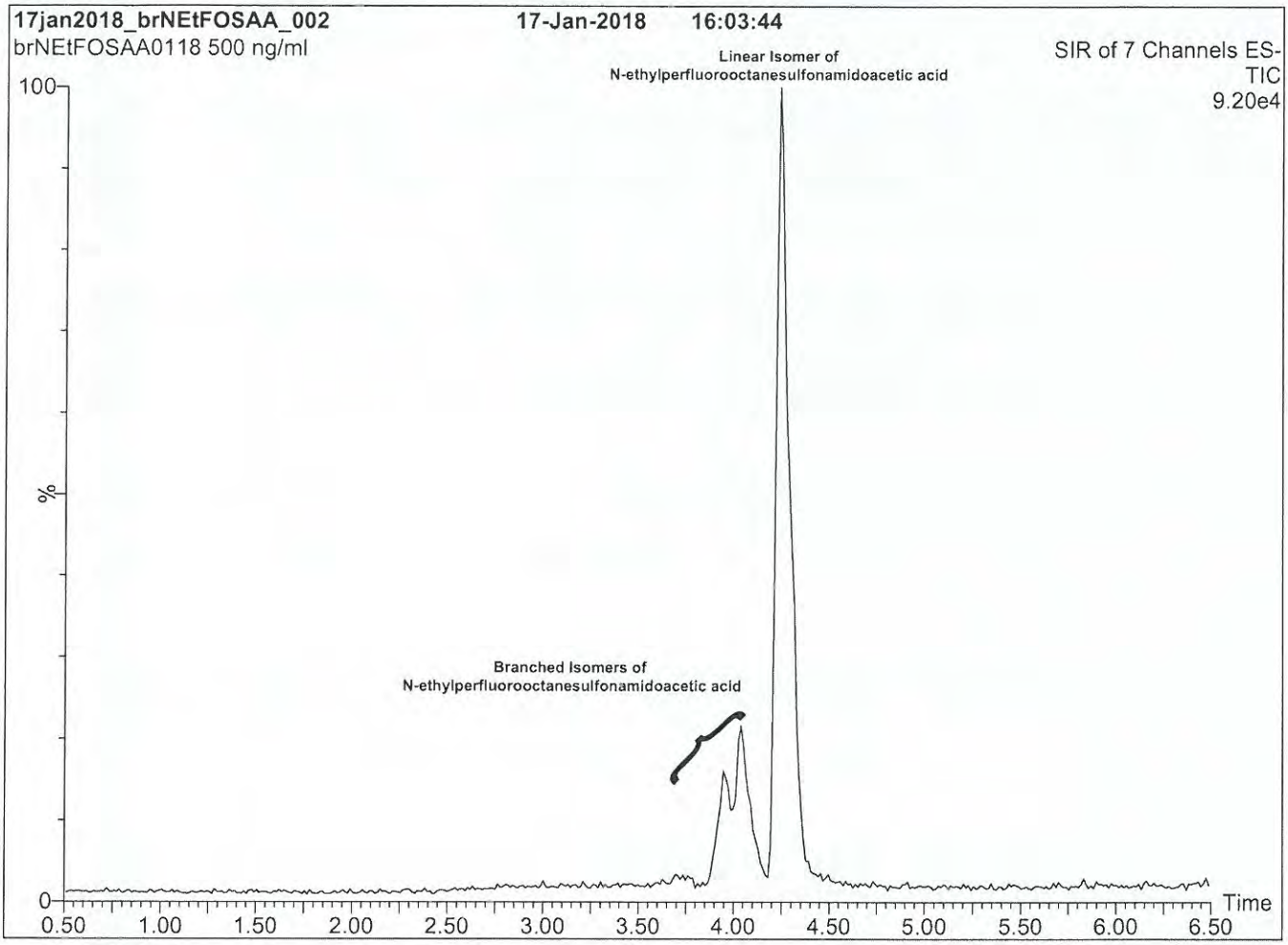
Flow: 300 µl/min

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

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

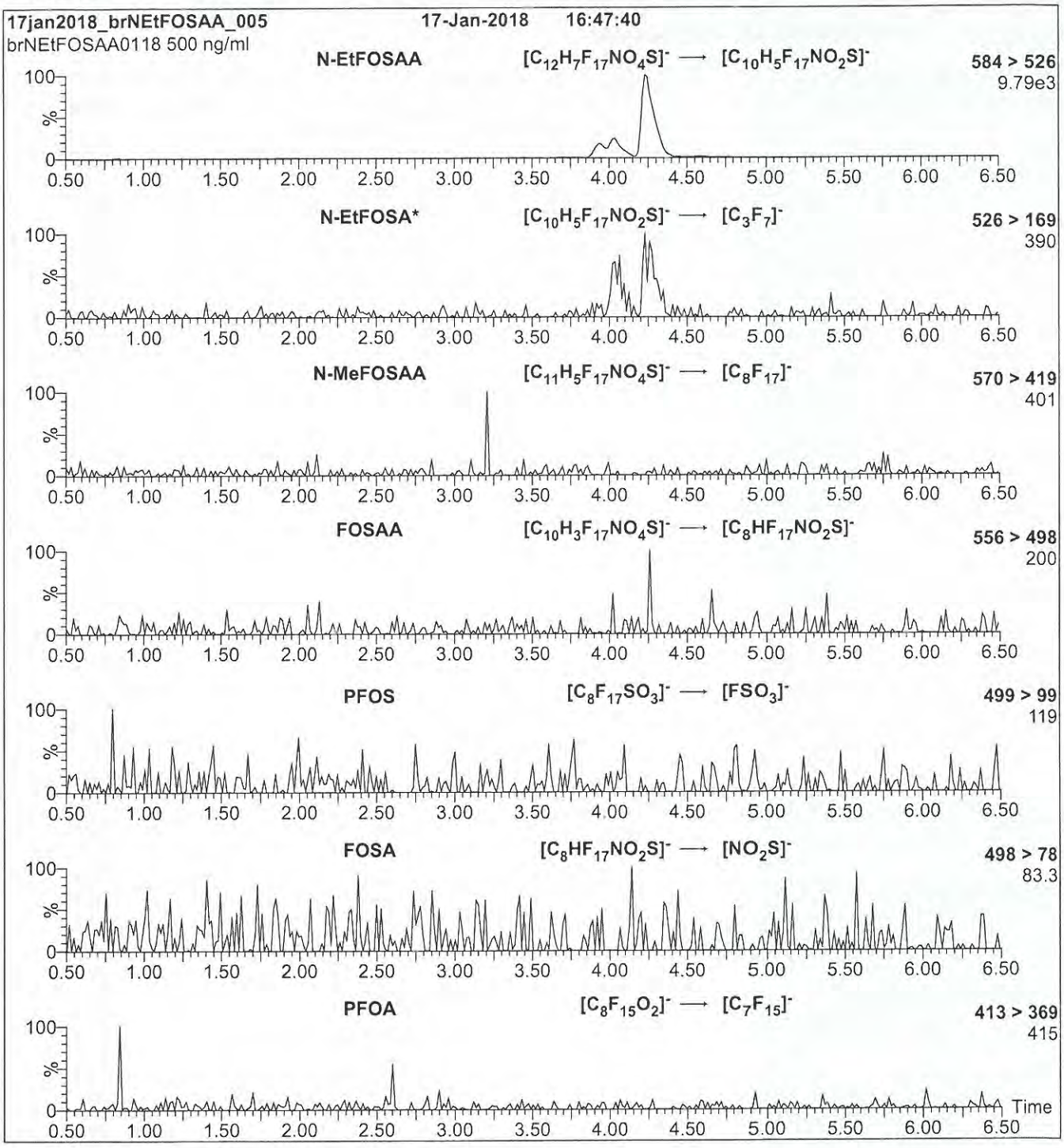
MS Parameters

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

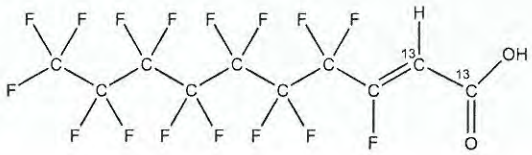
Analyte	CAS Number	Concentration	Units
13C9-PFNA		1.25	ug/mL
13C8-PFOA		1.25	ug/mL
13C7-PFUnA		1.25	ug/mL
13C6-PFDA		1.25	ug/mL
13C5-PFHxA		1.25	ug/mL
13C4-PFOS		1.25	ug/mL
13C4-PFBA		1.25	ug/mL
13C3-PFHxS		1.25	ug/mL
13C2-FOUEA		1.25	ug/mL

1881530

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MFOUEA	**LOT NUMBER:**	MFOUEA1117
COMPOUND:	2H-Perfluoro-[1,2-$^{13}C_2$]-2-decenoic acid		
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
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1530

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).

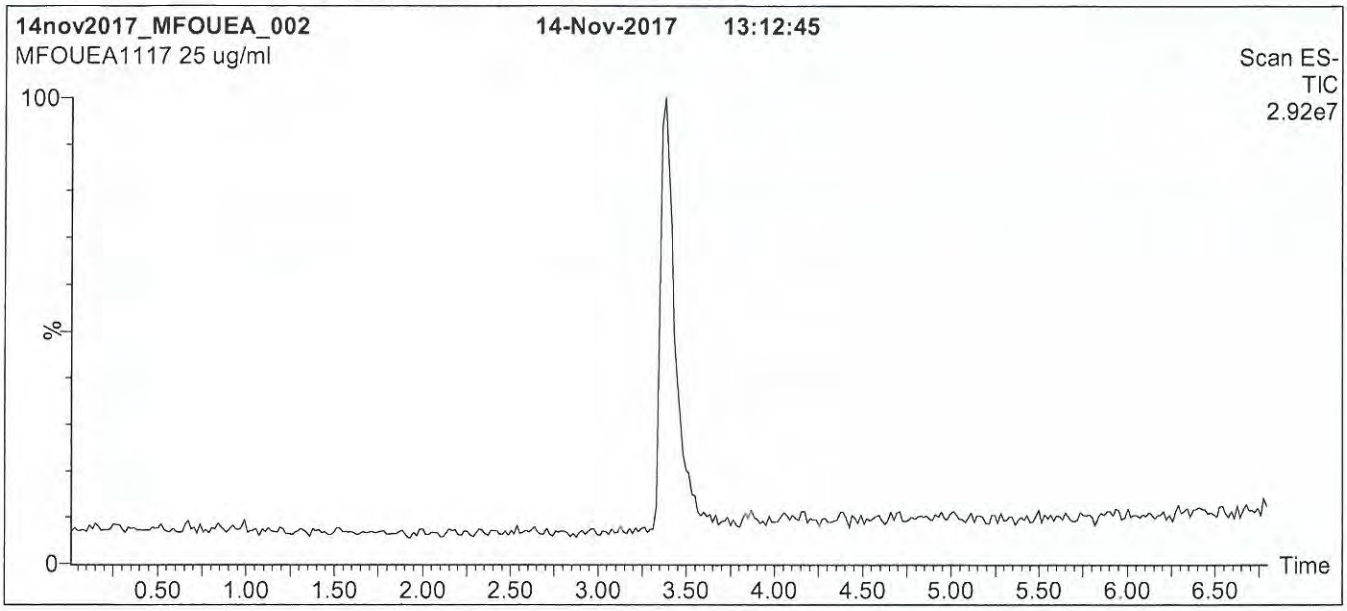
CALA

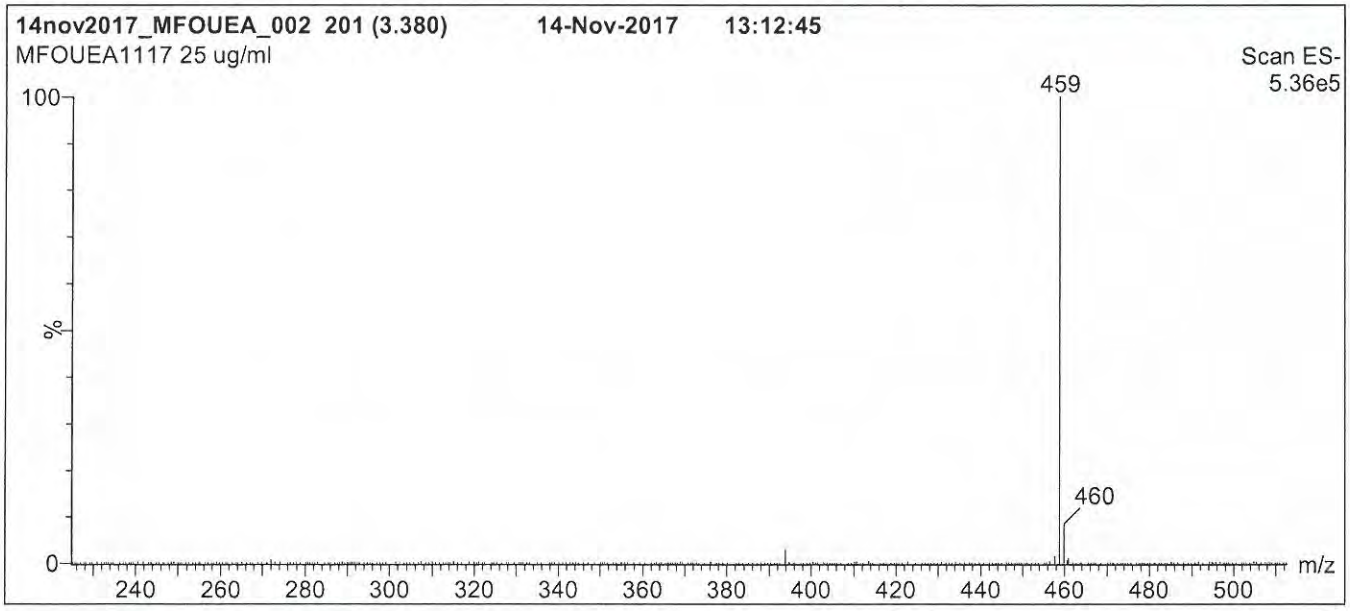
ANAB ACCREDITED

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

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

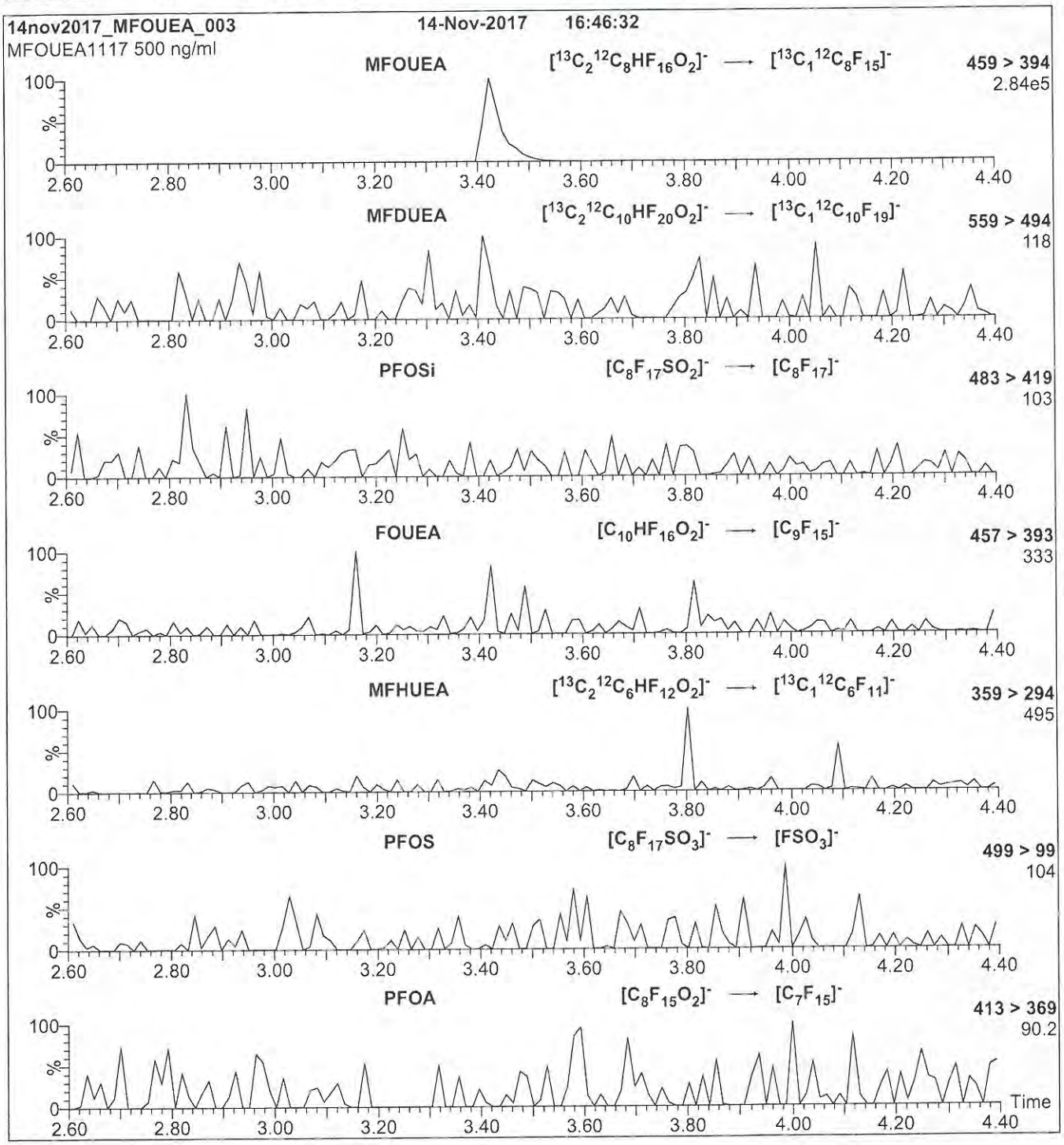
MS Parameters

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

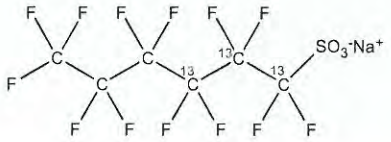
WELLINGTON LABORATORIES

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

1801531

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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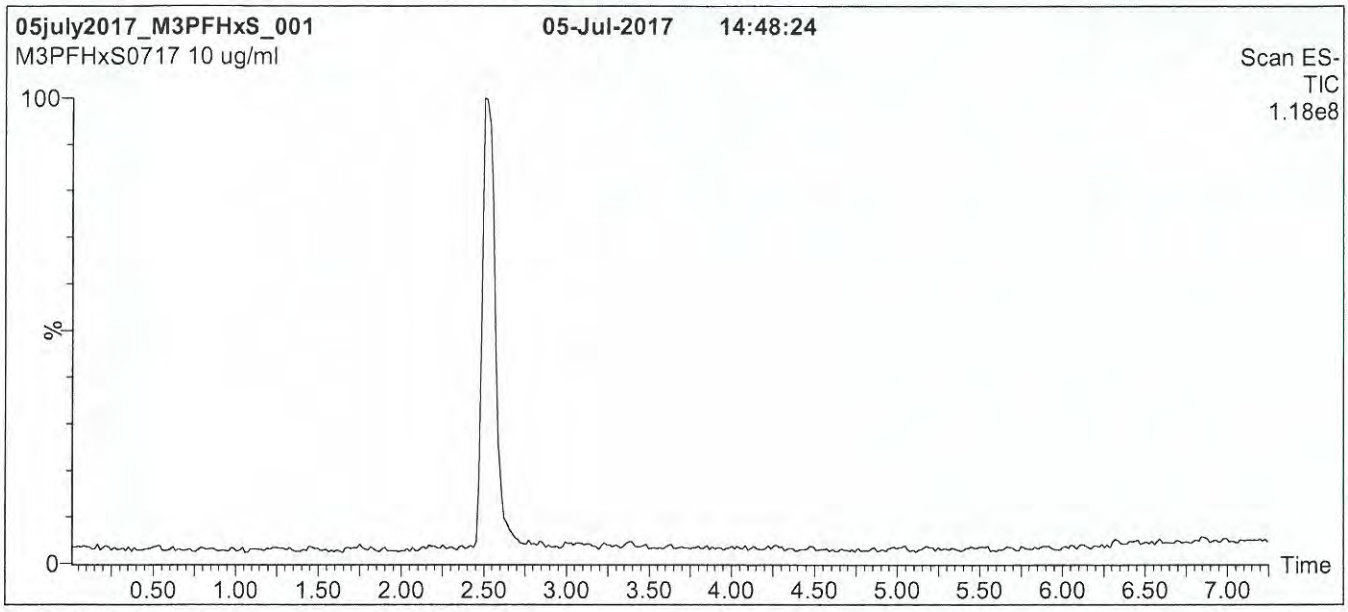
CALA

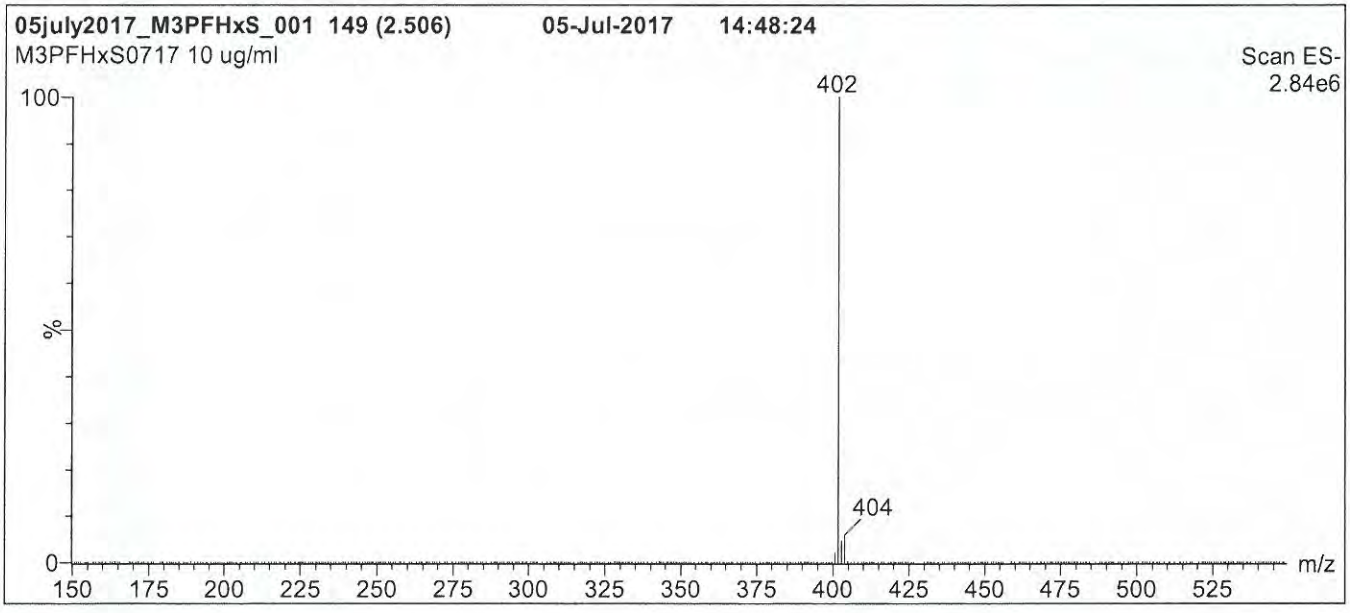
ANAB ACCREDITED

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

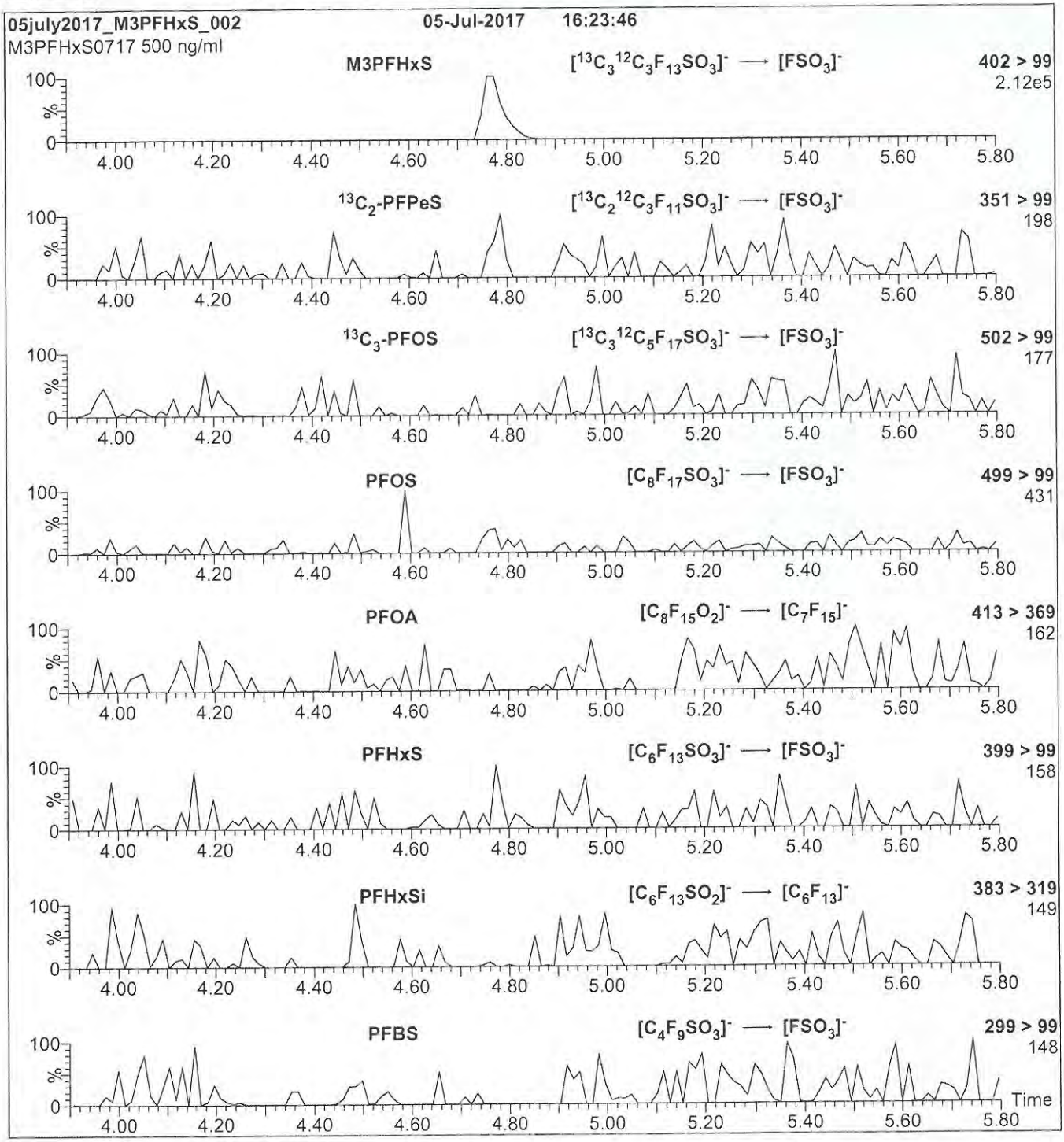
MS Parameters

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

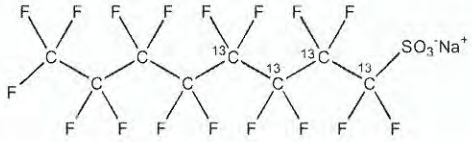
WELLINGTON LABORATORIES

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

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CALA

ANAB ACCREDITED

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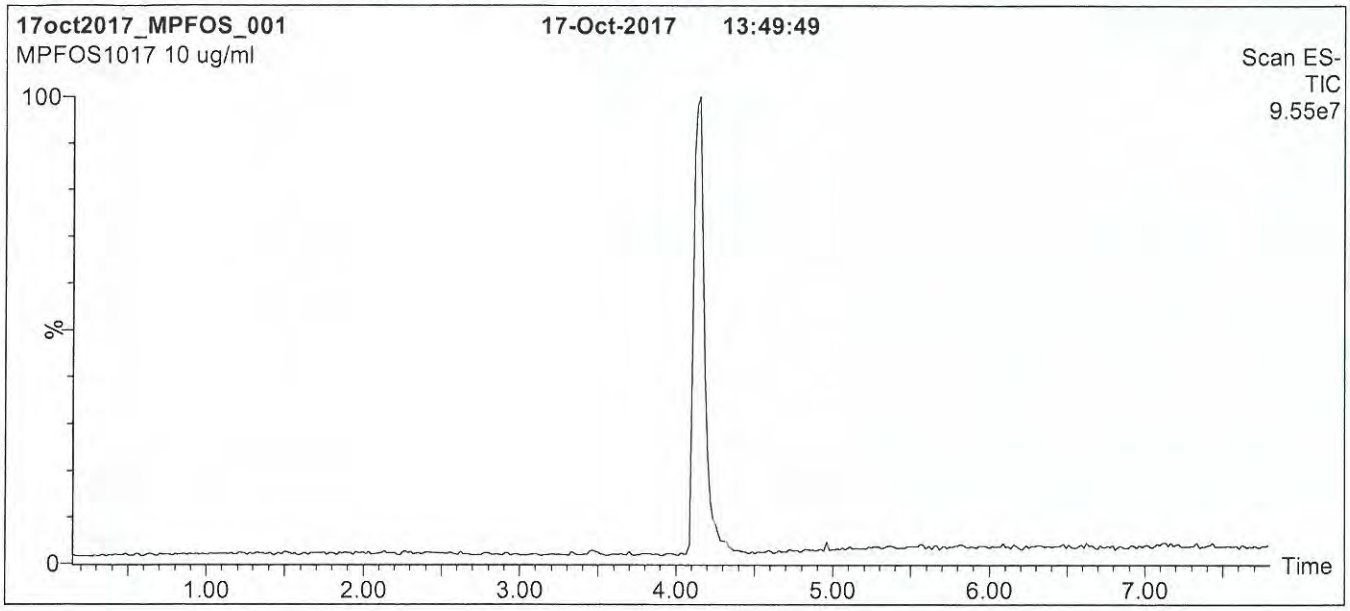
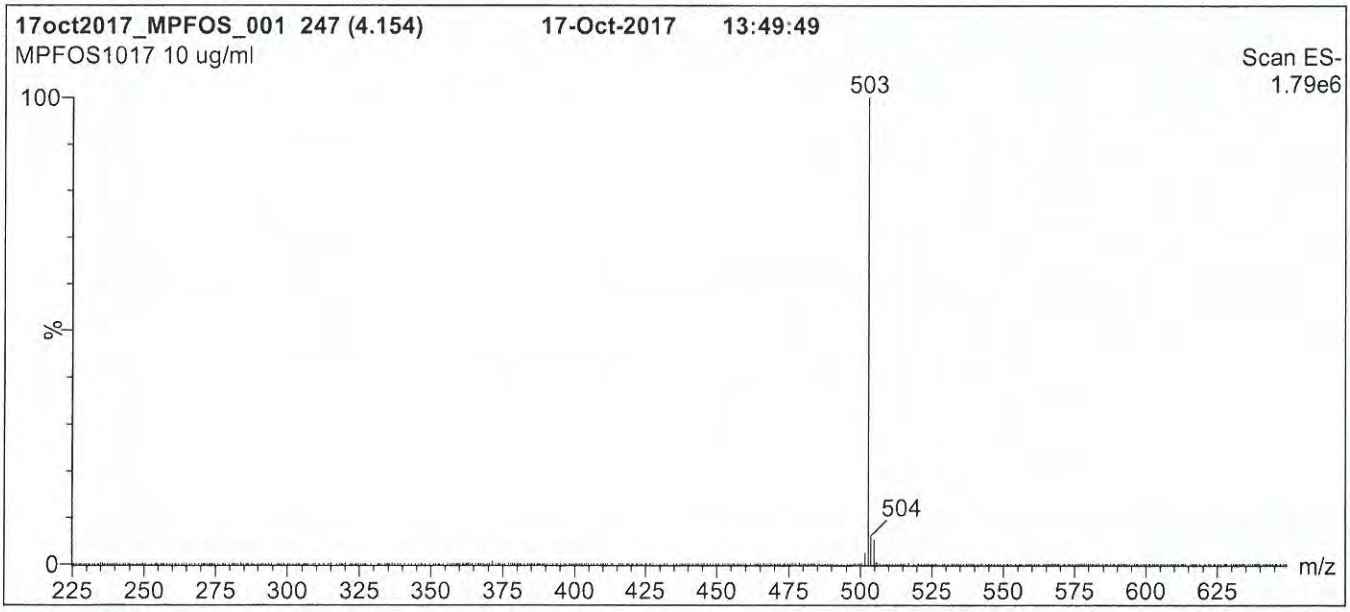
18B1532

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

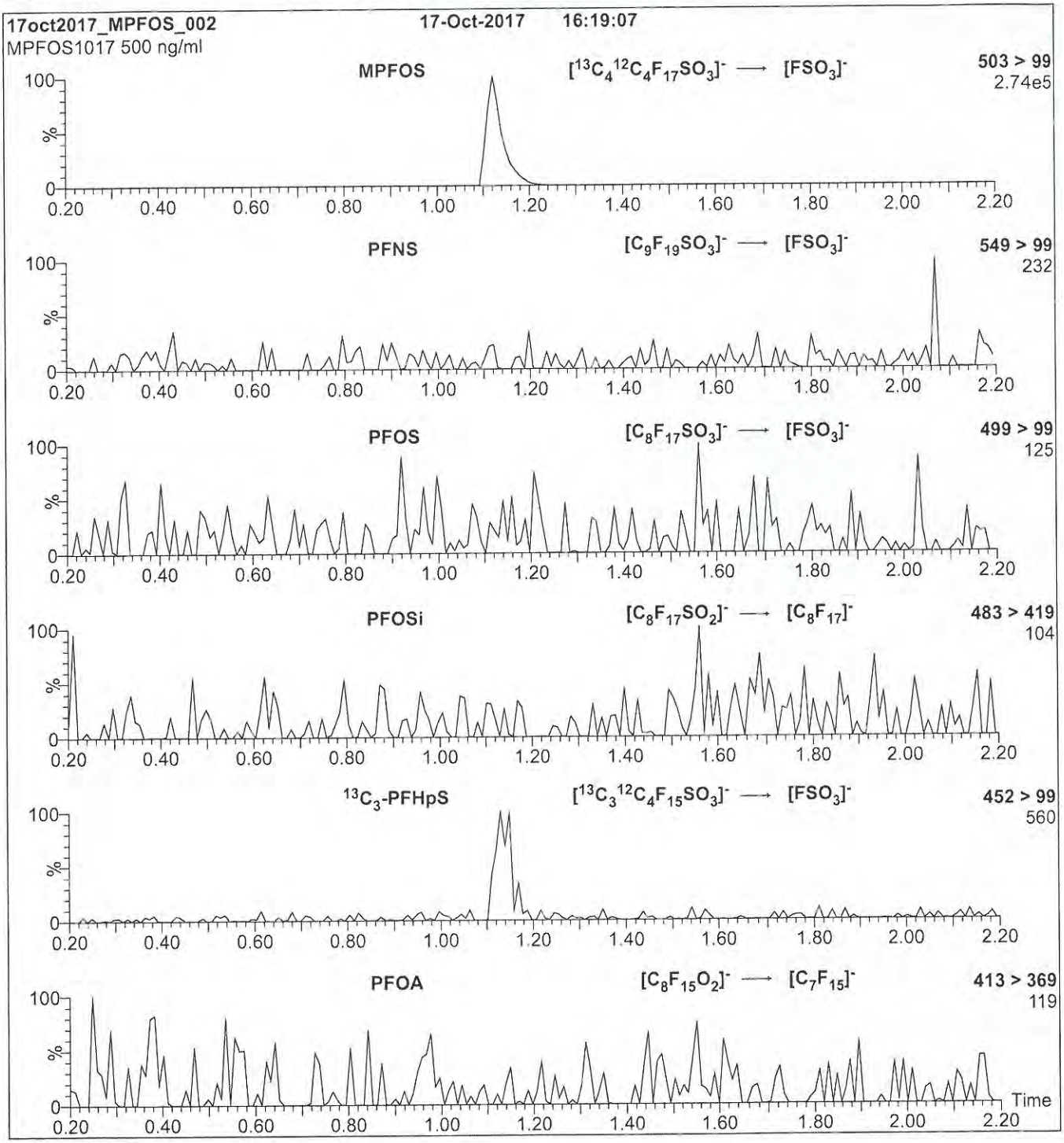
MS Parameters

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

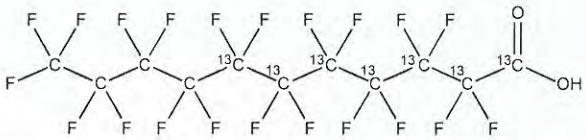
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 40

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:

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).

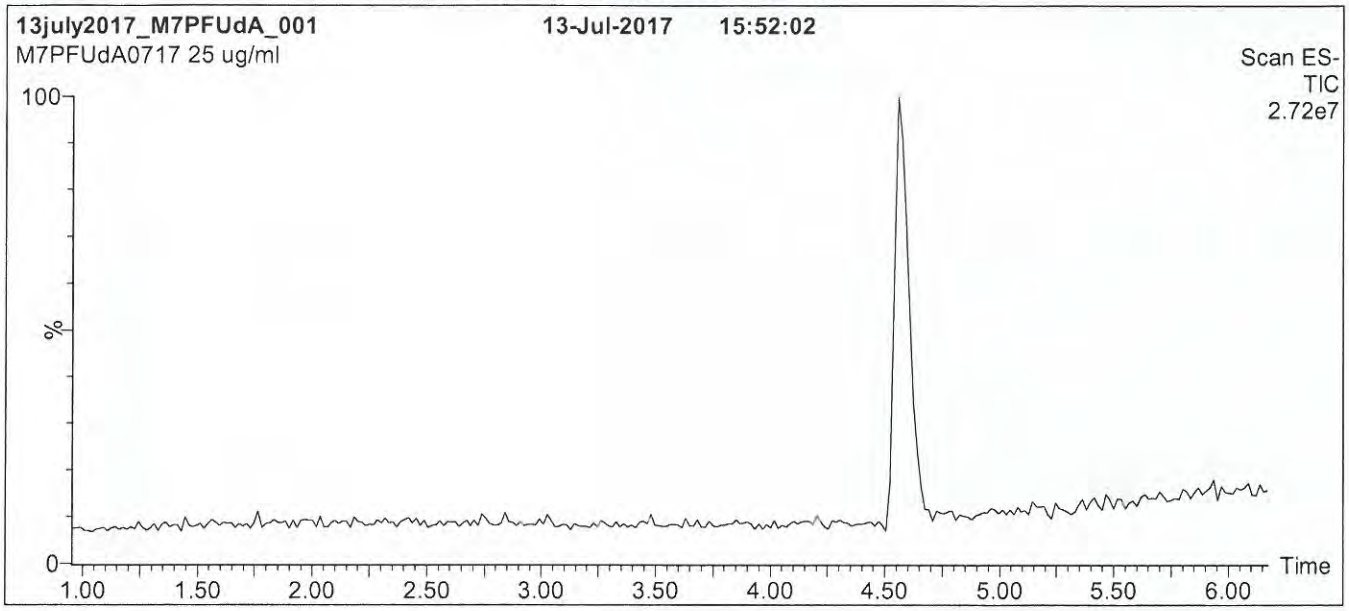
CALA

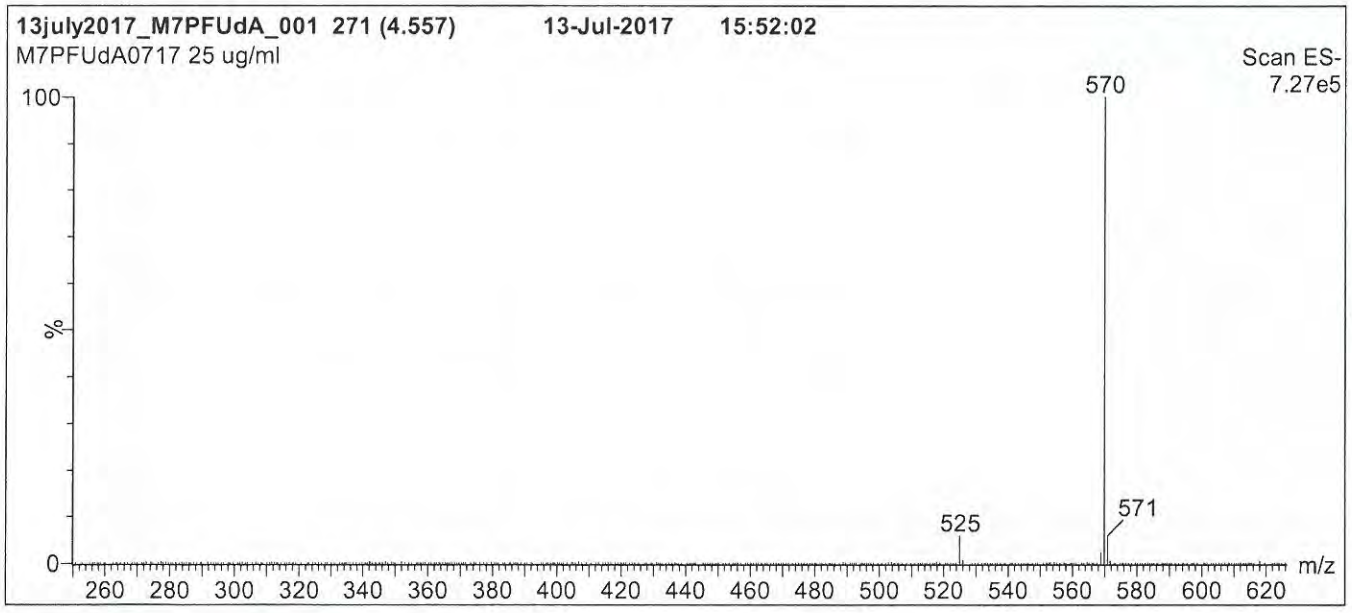
ANAB ACCREDITED

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

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

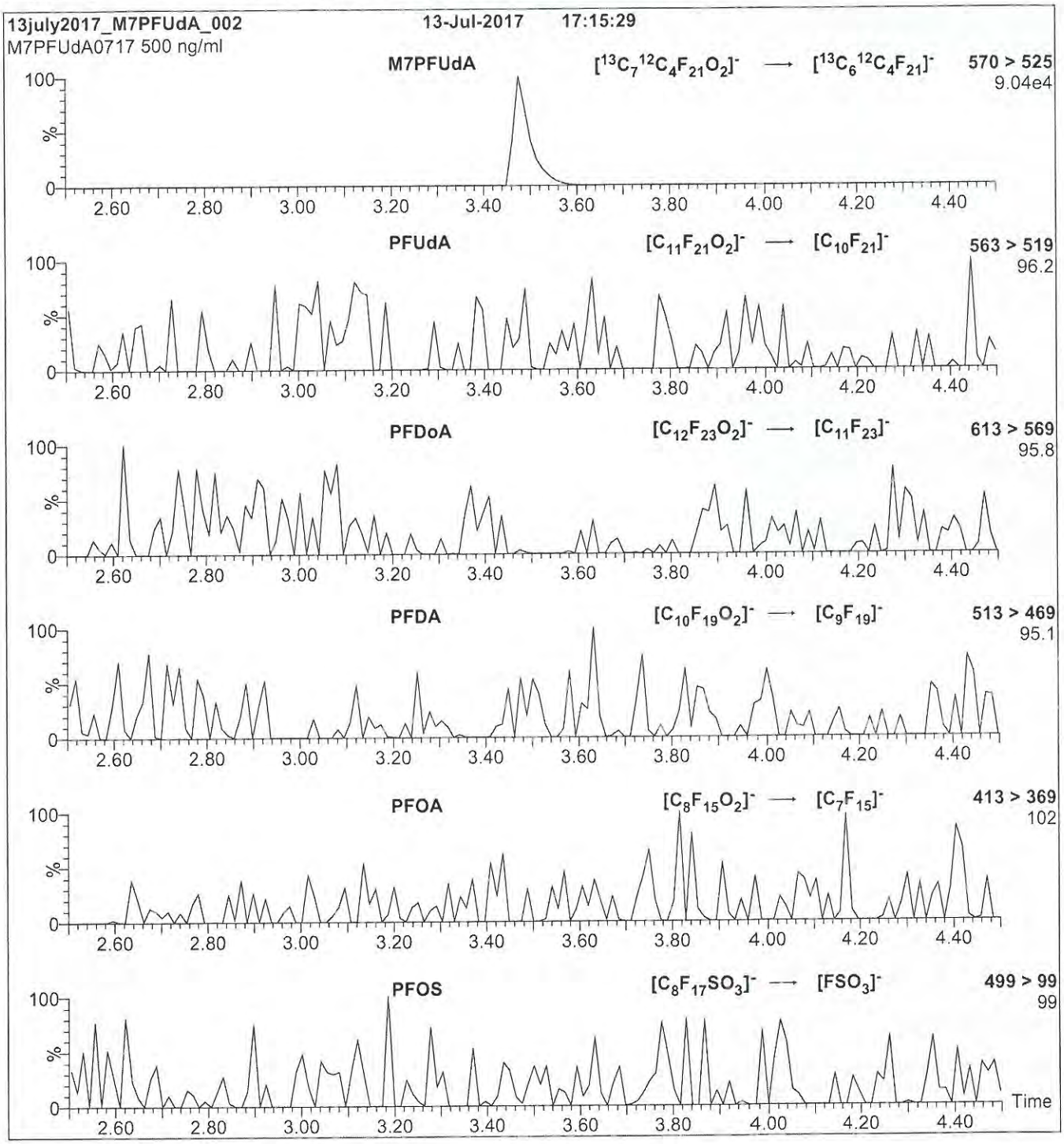
MS Parameters

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

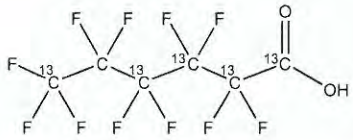
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

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 ($1,2,3,4,6\text{-}^{13}C_5$)
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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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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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:

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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 Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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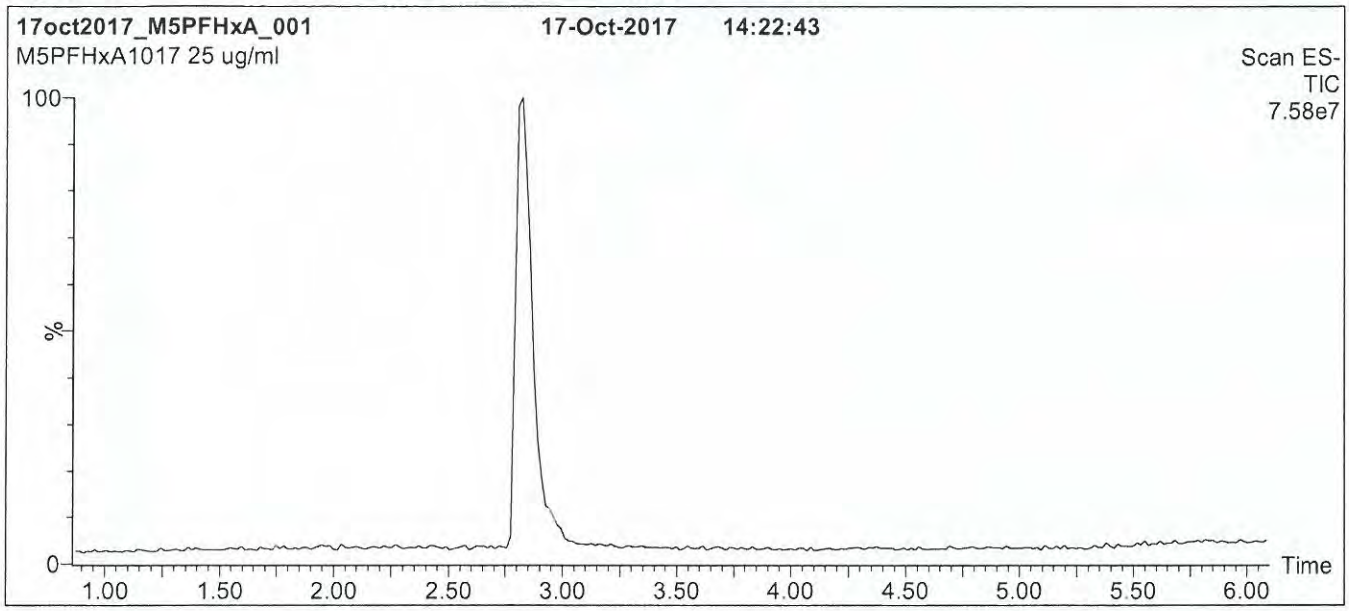
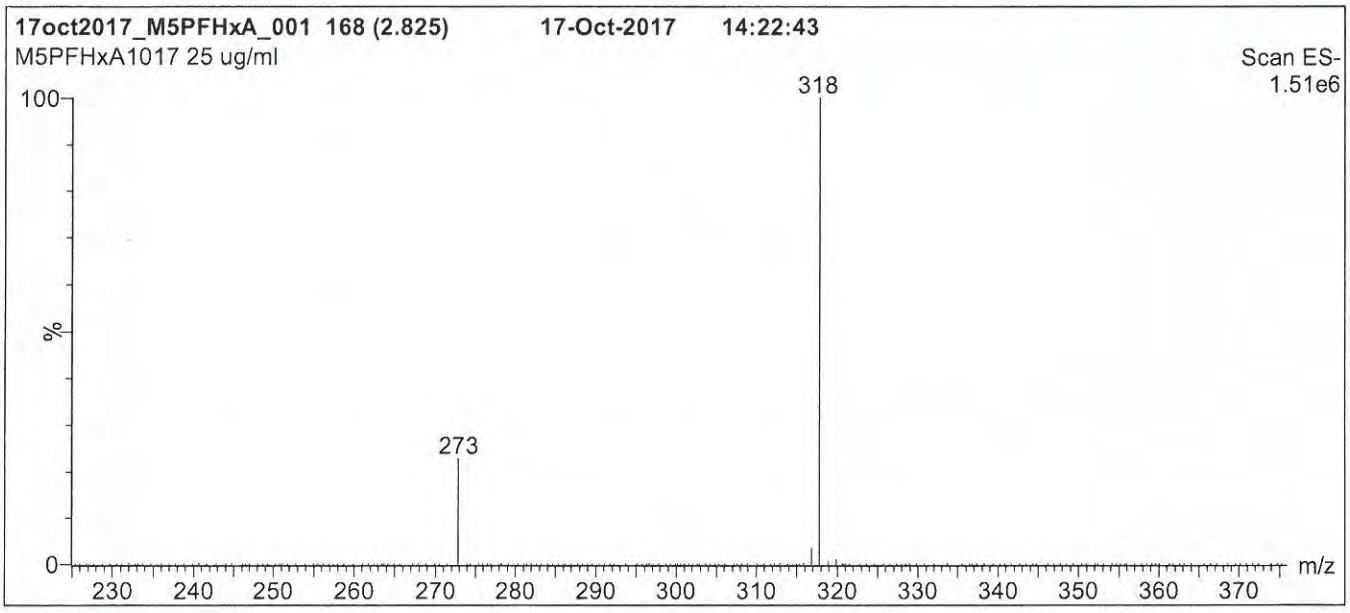
18B1534

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

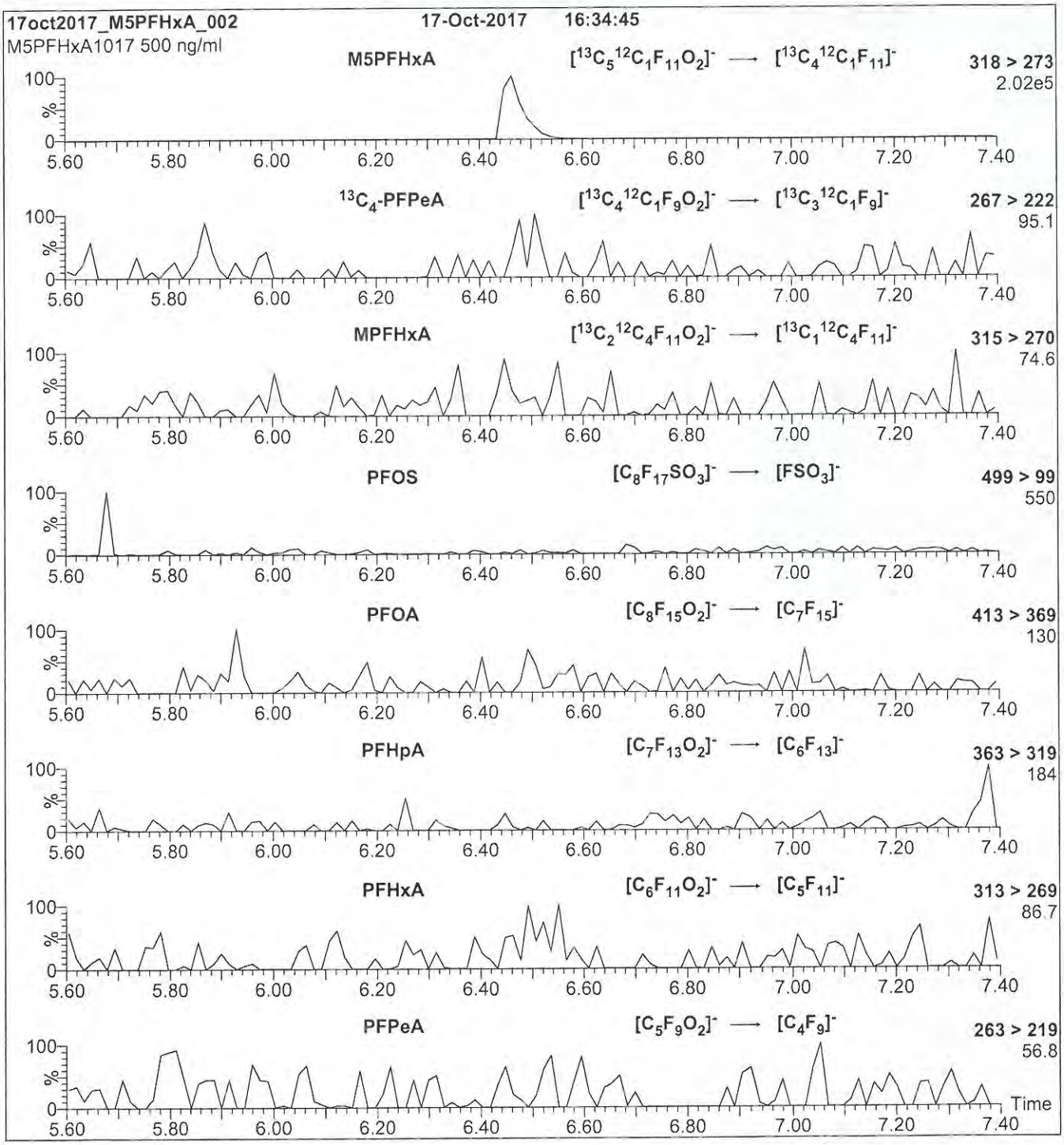
MS Parameters

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

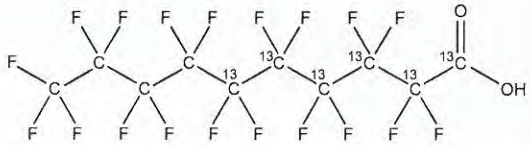
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

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.

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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
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18B1535

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CALA

ANAB ACCREDITED

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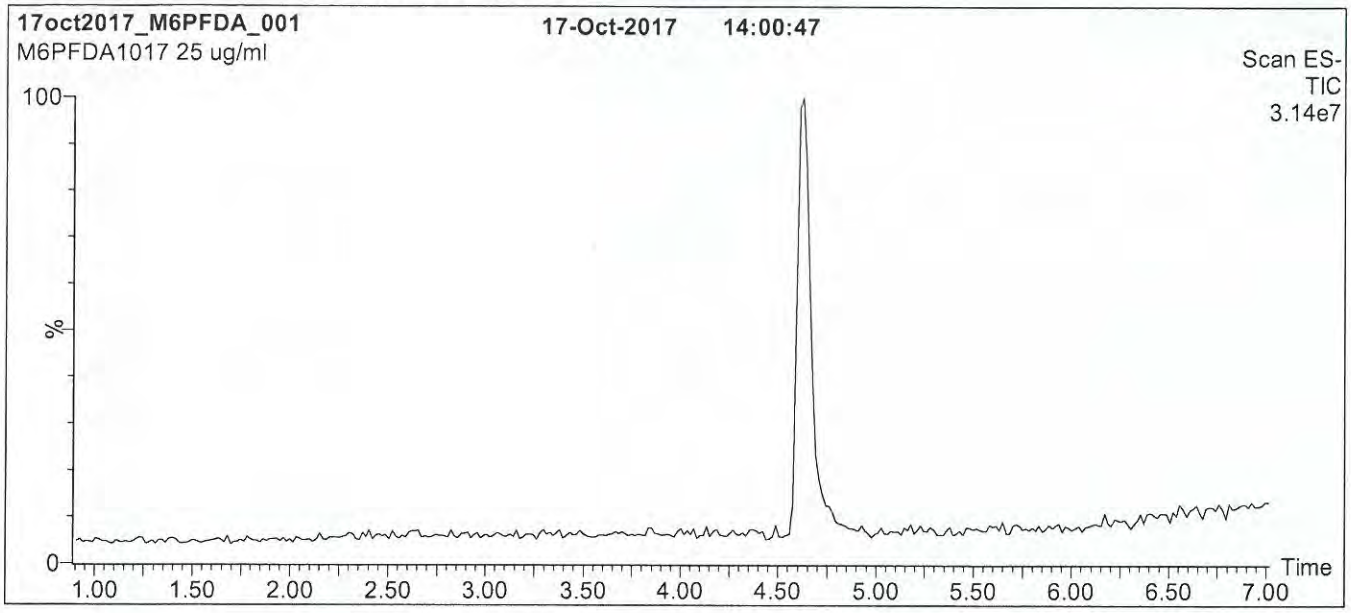
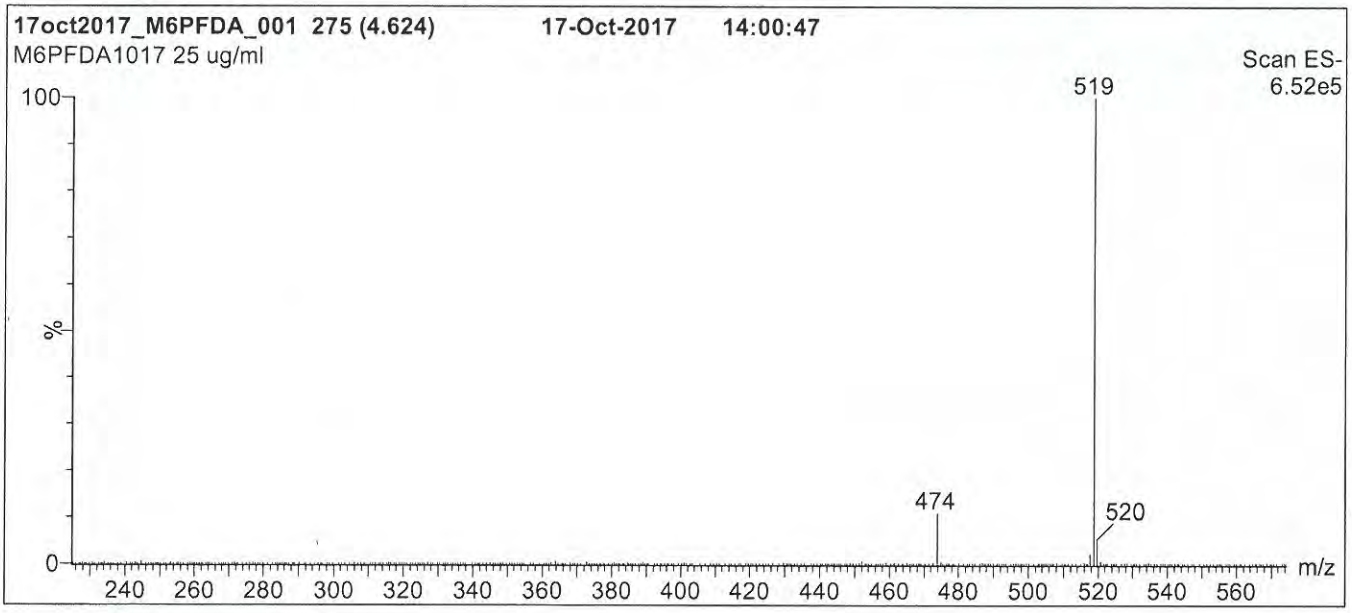
18B1535

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

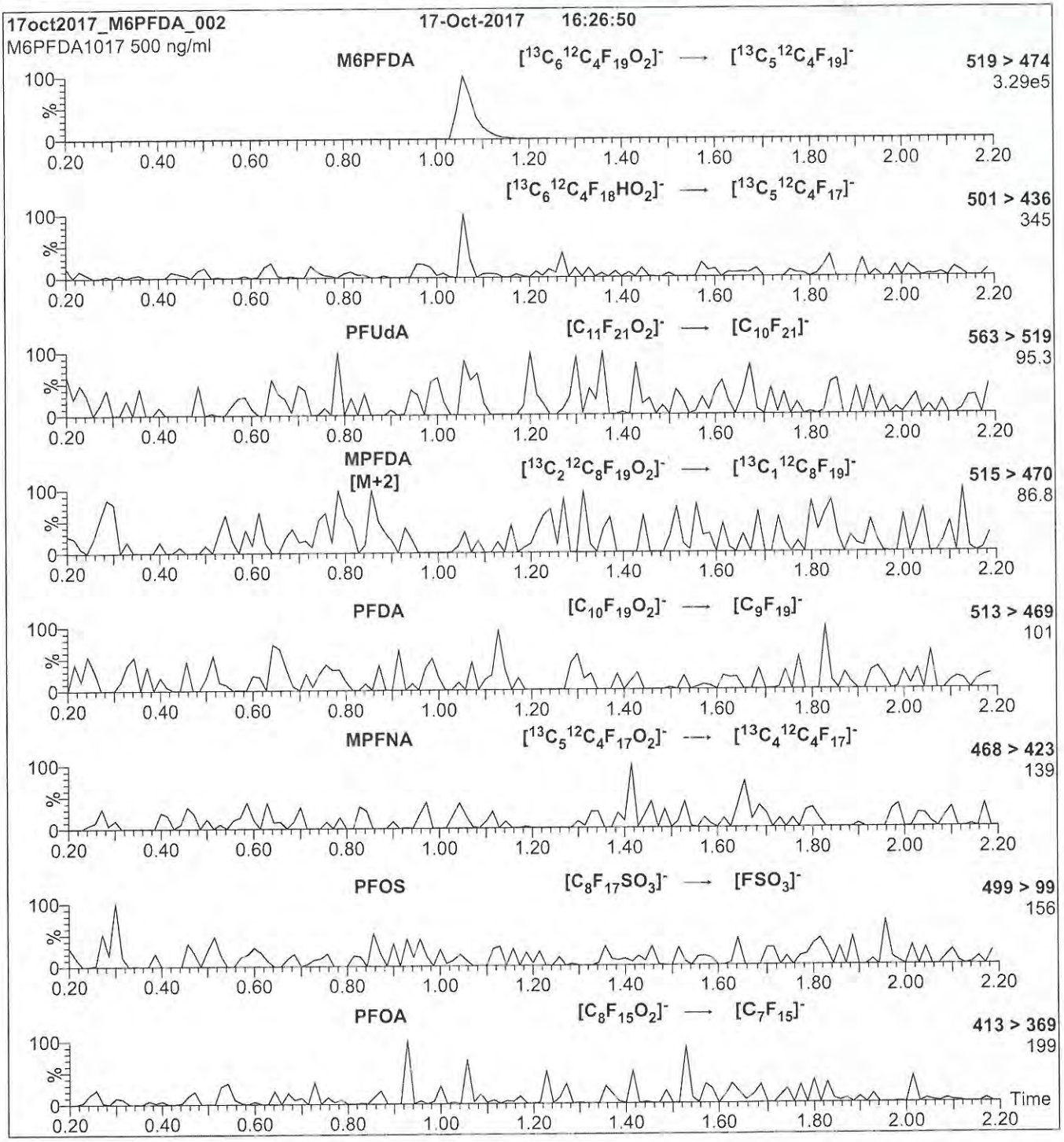
MS Parameters

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

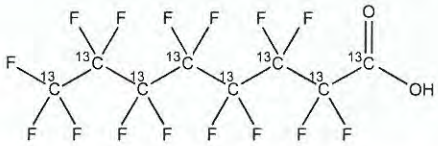
Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 13

18B1536

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M8PFOA	**LOT NUMBER:**	M8PFOA0717
COMPOUND:	Perfluoro-n-[$^{13}C_8$]octanoic acid		
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:

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).

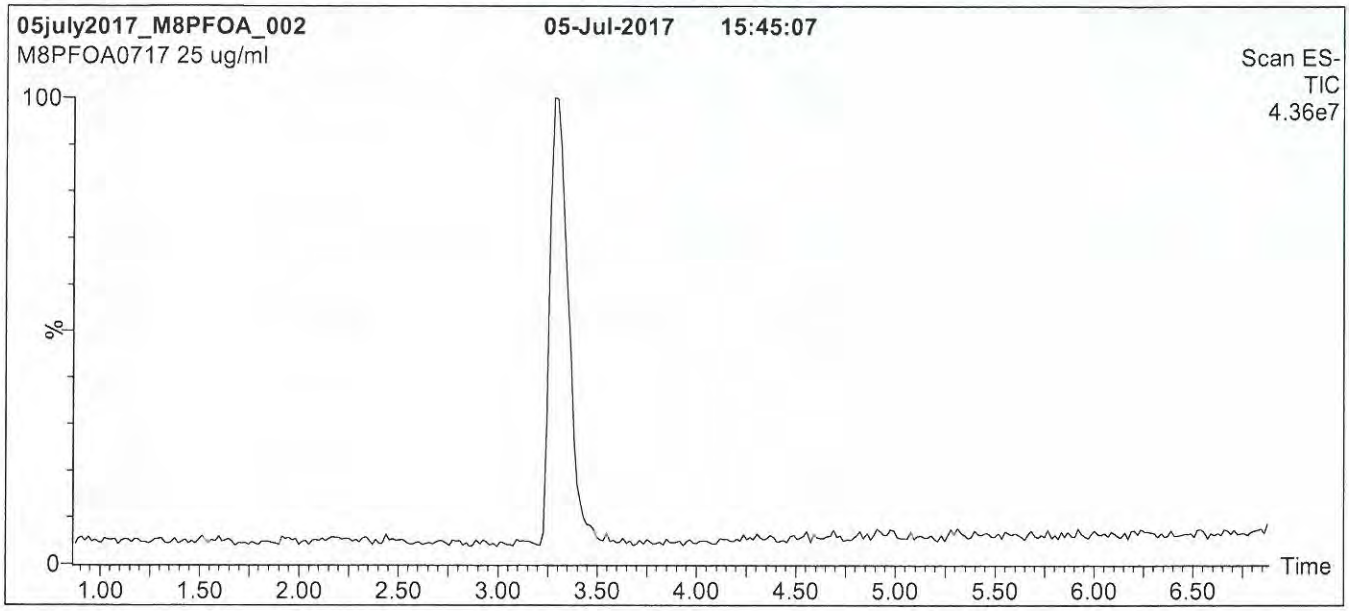
CALA

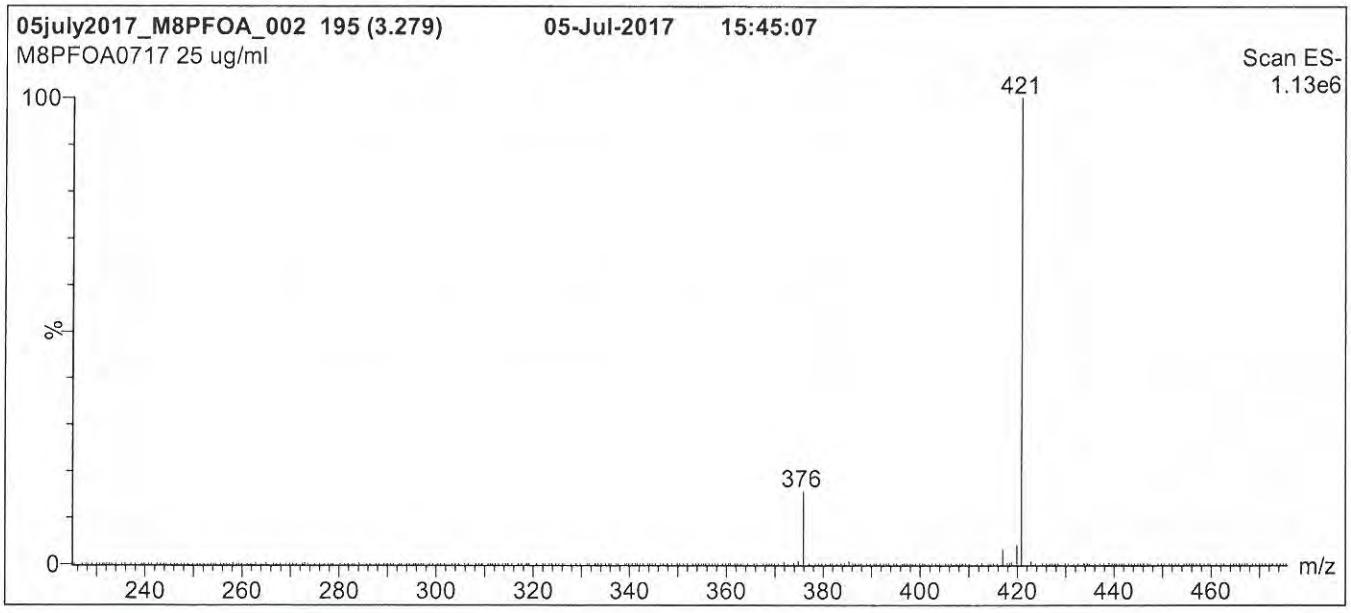
ANAB ACCREDITED

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

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

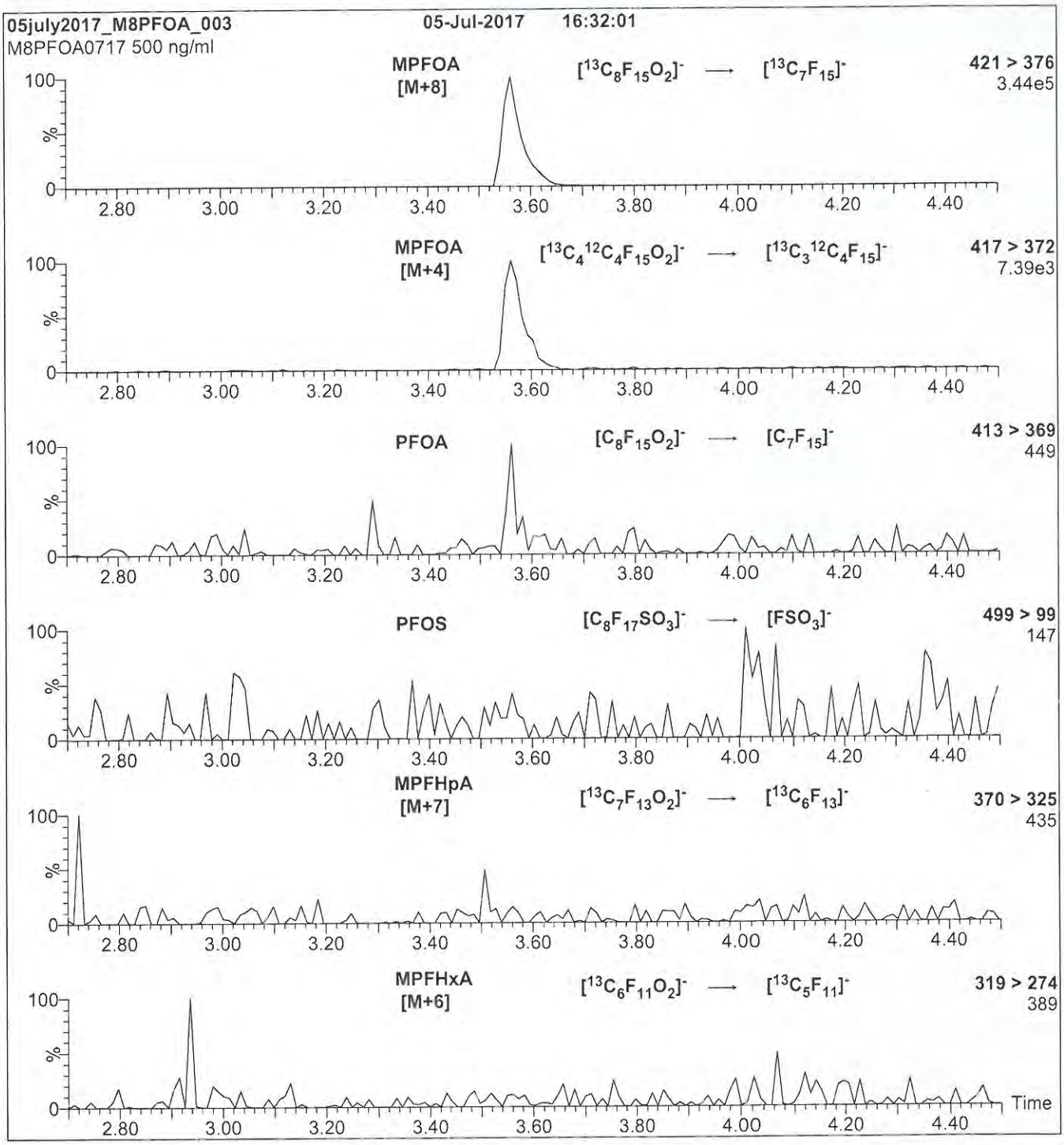
MS Parameters

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

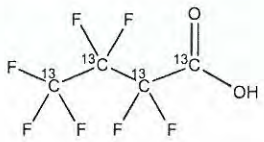
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

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

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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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:

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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:

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

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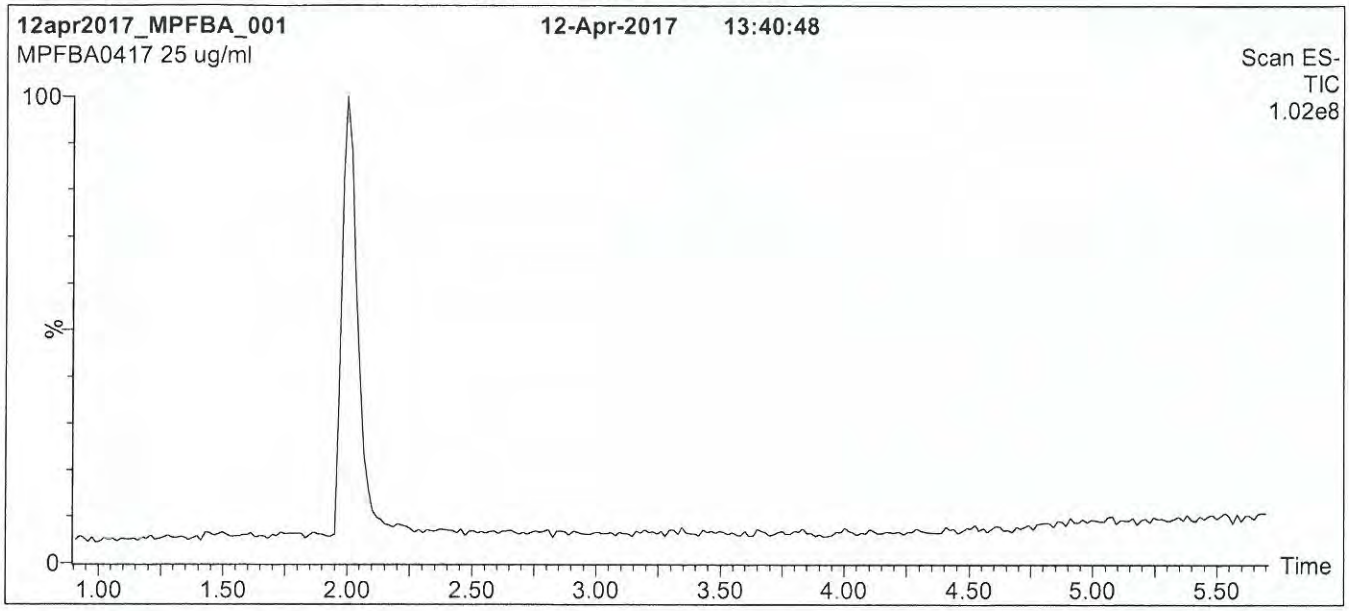
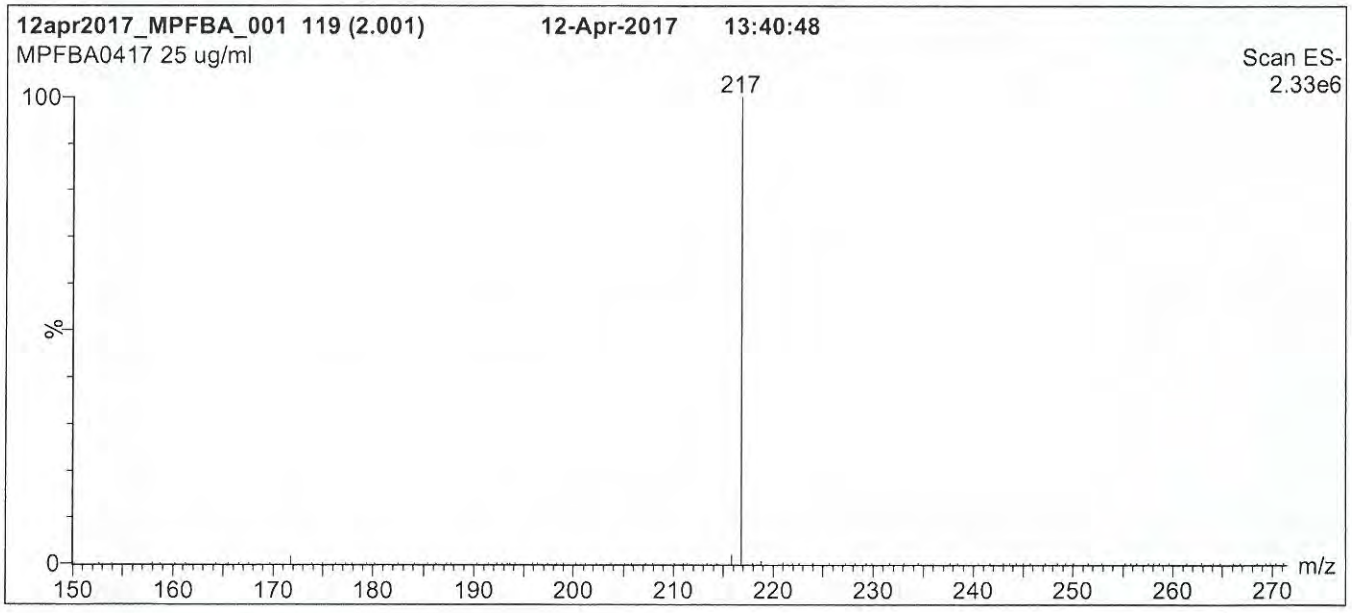
18B1537

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

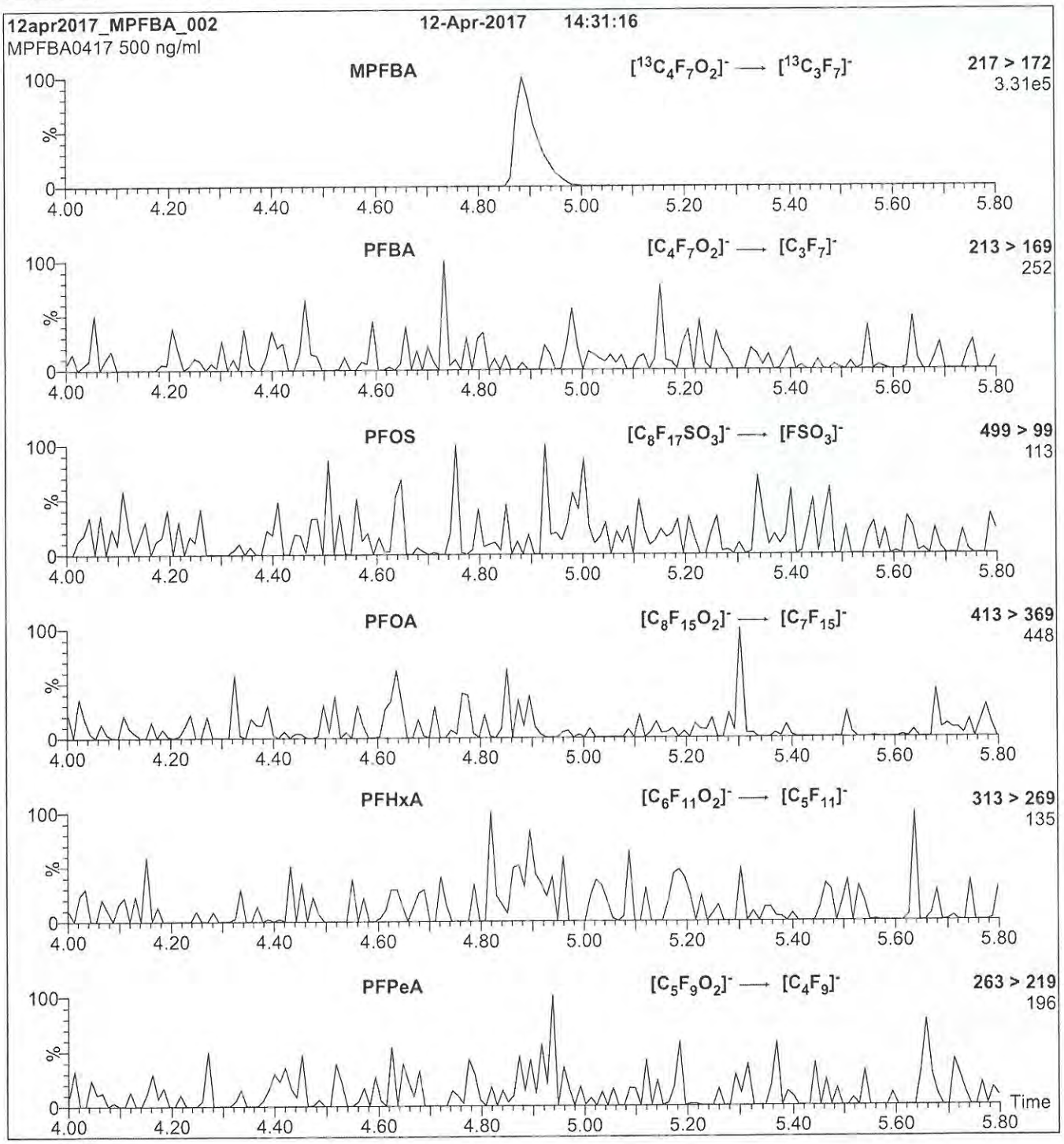
MS Parameters

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

18B1538

WELLINGTON LABORATORIES

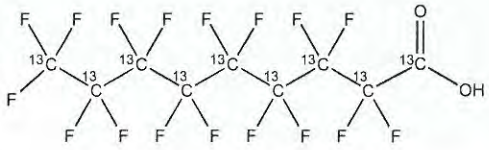
CERTIFICATE OF ANALYSIS DOCUMENTATION

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
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18B1538

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ANAB ACCREDITED

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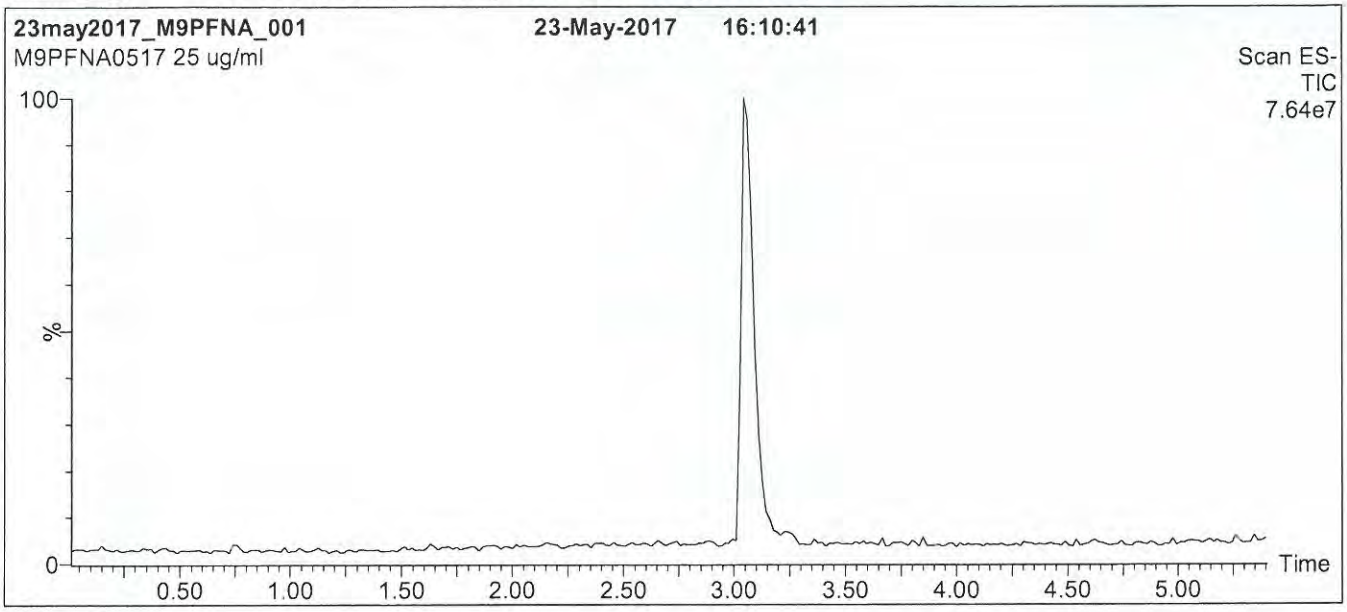
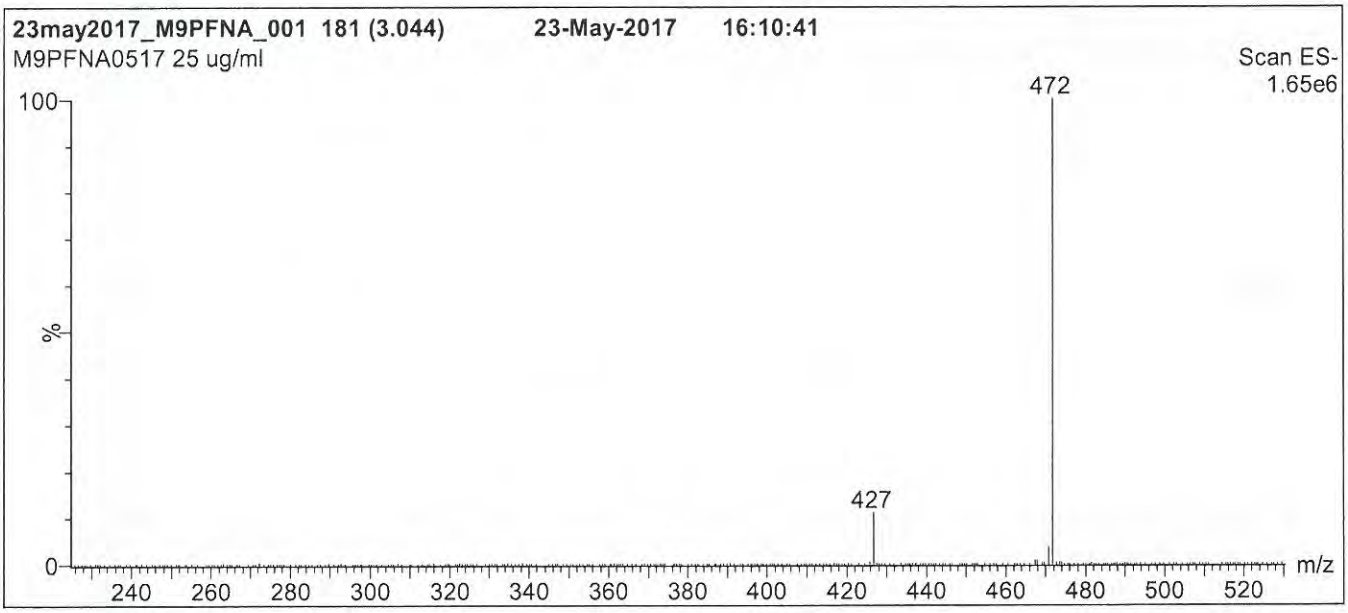
18B1538

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

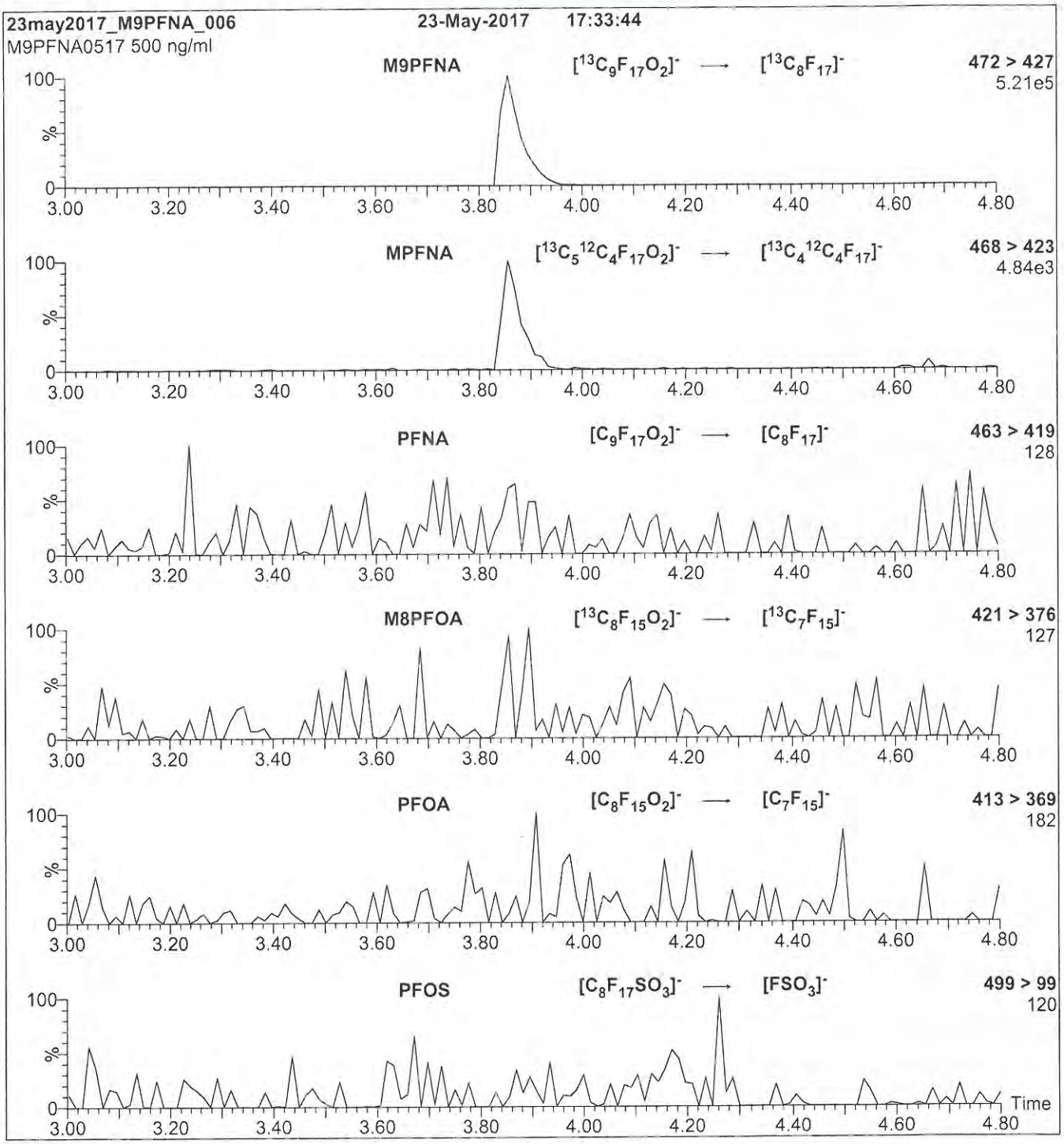
MS Parameters

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

18B1538

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-13-SA1","537 MOD","RES","1801039-01","Vista","375-73-
5","PFBS","0.318","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00204"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","307-24-
4","PFHxA","0.878","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00248"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","375-85-
9","PFHpA","0.0795","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000674"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","355-46-
4","PFHxS","0.240","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00108"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","335-67-
1","PFOA","0.0423","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000742"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","375-95-
1","PFNA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000923"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","1763-23-
1","PFOS","0.0405","ug/L","","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000920"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","335-76-
2","PFDA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00170"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","2355-31-
9","NMeFOSAA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00188"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","2991-50-
6","NEtFOSAA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00156"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","2058-94-
8","PFUnA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.00120"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","307-55-
1","PFDoA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000903"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","72629-94-
8","PFTrDA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000563"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","376-06-
7","PFTeDA","0.00912","ug/L","U","0.00568","CRDL","","TRG","","","0.00912","CRDL","YES","0.000861"
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C3-PFBS","13C3-
PFBS","419","%R","H","","CRDL","","IS","419","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFHxA","13C2-
PFHxA","88.8","%R","","","CRDL","","IS","88.8","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C4-PFHpA","13C4-
PFHpA","101","%R","","","CRDL","","IS","101","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","18O2-PFHxS","18O2-
PFHxS","104","%R","","","CRDL","","IS","104","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFOA","13C2-
PFOA","103","%R","","","CRDL","","IS","103","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C5-PFNA","13C5-
PFNA","80.9","%R","","","CRDL","","IS","80.9","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C8-PFOS","13C8-
PFOS","86.8","%R","","","CRDL","","IS","86.8","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFDA","13C2-
PFDA","73.6","%R","","","CRDL","","IS","73.6","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","d3-MeFOSAA","d3-
MeFOSAA","106","%R","","","CRDL","","IS","106","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","d5-EtFOSAA","d5-
EtFOSAA","110","%R","","","CRDL","","IS","110","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFUnA","13C2-
PFUnA","69.2","%R","","","CRDL","","IS","69.2","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFDoA","13C2-
PFDoA","87.1","%R","","","CRDL","","IS","87.1","","","CRDL","",""
"A1-MW-13-SA1","537 MOD","RES","1801039-01","Vista","13C2-PFTeDA","13C2-

PFTeDA","85.2","%R","","","CRDL","","IS","85.2","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","375-73-
5","PFBS","0.109","ug/L","","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00192"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","307-24-
4","PFHxA","0.294","ug/L","","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00234"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","375-85-
9","PFHpA","0.0201","ug/L","","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000636"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","355-46-
4","PFHxS","0.0643","ug/L","","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00102"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","335-67-
1","PFOA","0.0220","ug/L","","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000700"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","375-95-
1","PFNA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000871"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","1763-23-
1","PFOS","0.00359","ug/L","J","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000868"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","335-76-
2","PFDA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00160"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","2355-31-
9","NMeFOSAA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00177"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","2991-50-
6","NEtFOSAA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00147"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","2058-94-
8","PFUnA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.00113"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","307-55-
1","PFDoA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000852"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","72629-94-
8","PFTrDA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000531"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","376-06-
7","PFTeDA","0.00860","ug/L","U","0.00539","CRDL","","TRG","","","0.00860","CRDL","YES","0.000812"
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C3-PFBS","13C3-
PFBS","271","%R","H","","CRDL","","IS","271","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFHxA","13C2-
PFHxA","92.1","%R","","","CRDL","","IS","92.1","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C4-PFHpA","13C4-
PFHpA","102","%R","","","CRDL","","IS","102","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","18O2-PFHxS","18O2-
PFHxS","100","%R","","","CRDL","","IS","100","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFOA","13C2-
PFOA","89.5","%R","","","CRDL","","IS","89.5","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C5-PFNA","13C5-
PFNA","93.5","%R","","","CRDL","","IS","93.5","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C8-PFOS","13C8-
PFOS","94.3","%R","","","CRDL","","IS","94.3","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFDA","13C2-
PFDA","80.2","%R","","","CRDL","","IS","80.2","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","d3-MeFOSAA","d3-
MeFOSAA","104","%R","","","CRDL","","IS","104","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","d5-EtFOSAA","d5-
EtFOSAA","102","%R","","","CRDL","","IS","102","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFUnA","13C2-
PFUnA","71.8","%R","","","CRDL","","IS","71.8","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFDoA","13C2-
PFDoA","68.2","%R","","","CRDL","","IS","68.2","","","CRDL","",""
"A1-MW-11-SA1","537 MOD","RES","1801039-02","Vista","13C2-PFTeDA","13C2-

PFTeDA","87.0","%R","","","CRDL","","IS","87.0","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","375-73-
5","PFBS","0.118","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00200"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","307-24-
4","PFHxA","0.495","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00243"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","375-85-
9","PFHpA","0.0633","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000660"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","355-46-
4","PFHxS","0.250","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00106"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","335-67-
1","PFOA","0.0506","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000727"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","375-95-
1","PFNA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000905"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","1763-23-
1","PFOS","0.0709","ug/L","","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000901"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","335-76-
2","PFDA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00166"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","2355-31-
9","NMeFOSAA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00184"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","2991-50-
6","NEtFOSAA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00153"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","2058-94-
8","PFUnA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.00117"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","307-55-
1","PFDoA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000884"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","72629-94-
8","PFTrDA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000552"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","376-06-
7","PFTeDA","0.00893","ug/L","U","0.00558","CRDL","","TRG","","","0.00893","CRDL","YES","0.000843"
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C3-PFBS","13C3-
PFBS","527","%R","H","","CRDL","","IS","527","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFHxA","13C2-
PFHxA","86.8","%R","","","CRDL","","IS","86.8","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C4-PFHpA","13C4-
PFHpA","111","%R","","","CRDL","","IS","111","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","18O2-PFHxS","18O2-
PFHxS","97.4","%R","","","CRDL","","IS","97.4","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFOA","13C2-
PFOA","88.7","%R","","","CRDL","","IS","88.7","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C5-PFNA","13C5-
PFNA","76.6","%R","","","CRDL","","IS","76.6","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C8-PFOS","13C8-
PFOS","99.5","%R","","","CRDL","","IS","99.5","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFDA","13C2-
PFDA","77.4","%R","","","CRDL","","IS","77.4","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","d3-MeFOSAA","d3-
MeFOSAA","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","d5-EtFOSAA","d5-
EtFOSAA","109","%R","","","CRDL","","IS","109","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFUnA","13C2-
PFUnA","50.1","%R","","","CRDL","","IS","50.1","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFDoA","13C2-
PFDoA","91.5","%R","","","CRDL","","IS","91.5","","","CRDL","",""
"A1-MW-14-SA1","537 MOD","RES","1801039-03","Vista","13C2-PFTeDA","13C2-

PFTeDA","84.9","%R","","","CRDL","","IS","84.9","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","375-73-
5","PFBS","0.523","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00199"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","307-24-
4","PFHxA","0.951","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00242"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","375-85-
9","PFHpA","0.188","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000657"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","355-46-
4","PFHxS","0.733","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00105"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","335-67-
1","PFOA","0.245","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000723"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","375-95-
1","PFNA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000900"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","1763-23-
1","PFOS","0.0236","ug/L","","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000897"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","335-76-
2","PFDA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00166"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","2355-31-
9","NMeFOSAA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00183"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","2991-50-
6","NEtFOSAA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00152"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","2058-94-
8","PFUnA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.00117"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","307-55-
1","PFDoA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000880"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","72629-94-
8","PFTrDA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000549"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","376-06-
7","PFTeDA","0.00889","ug/L","U","0.00558","CRDL","","TRG","","","0.00889","CRDL","YES","0.000839"
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C3-PFBS","13C3-
PFBS","235","%R","H","","CRDL","","IS","235","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFHxA","13C2-
PFHxA","99.4","%R","","","CRDL","","IS","99.4","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C4-PFHpA","13C4-
PFHpA","117","%R","","","CRDL","","IS","117","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","18O2-PFHxS","18O2-
PFHxS","95.2","%R","","","CRDL","","IS","95.2","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFOA","13C2-
PFOA","95.0","%R","","","CRDL","","IS","95.0","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C5-PFNA","13C5-
PFNA","84.9","%R","","","CRDL","","IS","84.9","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C8-PFOS","13C8-
PFOS","103","%R","","","CRDL","","IS","103","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFDA","13C2-
PFDA","66.1","%R","","","CRDL","","IS","66.1","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","d3-MeFOSAA","d3-
MeFOSAA","73.9","%R","","","CRDL","","IS","73.9","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","d5-EtFOSAA","d5-
EtFOSAA","80.8","%R","","","CRDL","","IS","80.8","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFUnA","13C2-
PFUnA","71.6","%R","","","CRDL","","IS","71.6","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFDoA","13C2-
PFDoA","58.1","%R","","","CRDL","","IS","58.1","","","CRDL","",""
"A1-MW-15-SA1","537 MOD","RES","1801039-04","Vista","13C2-PFTeDA","13C2-

PFTeDA","68.8","%R","","","CRDL","","IS","68.8","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","375-73-
5","PFBS","0.355","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00199"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","307-24-
4","PFHxA","1.23","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00242"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","375-85-
9","PFHpA","0.0797","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000657"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","355-46-
4","PFHxS","0.419","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00105"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","335-67-
1","PFOA","0.0578","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000723"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","375-95-
1","PFNA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000900"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","1763-23-
1","PFOS","0.0172","ug/L","","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000897"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","335-76-
2","PFDA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00166"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","2355-31-
9","NMeFOSAA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00183"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","2991-50-
6","NEtFOSAA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00152"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","2058-94-
8","PFUnA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.00117"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","307-55-
1","PFDoA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000880"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","72629-94-
8","PFTrDA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000549"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","376-06-
7","PFTeDA","0.00889","ug/L","U","0.00553","CRDL","","TRG","","","0.00889","CRDL","YES","0.000839"
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C3-PFBS","13C3-
PFBS","428","%R","H","","CRDL","","IS","428","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFHxA","13C2-
PFHxA","93.9","%R","","","CRDL","","IS","93.9","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C4-PFHpA","13C4-
PFHpA","106","%R","","","CRDL","","IS","106","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","18O2-PFHxS","18O2-
PFHxS","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFOA","13C2-
PFOA","96.6","%R","","","CRDL","","IS","96.6","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C5-PFNA","13C5-
PFNA","82.2","%R","","","CRDL","","IS","82.2","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C8-PFOS","13C8-
PFOS","92.1","%R","","","CRDL","","IS","92.1","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFDA","13C2-
PFDA","72.9","%R","","","CRDL","","IS","72.9","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","d3-MeFOSAA","d3-
MeFOSAA","131","%R","","","CRDL","","IS","131","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","d5-EtFOSAA","d5-
EtFOSAA","145","%R","","","CRDL","","IS","145","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFUnA","13C2-
PFUnA","73.8","%R","","","CRDL","","IS","73.8","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFDoA","13C2-
PFDoA","102","%R","","","CRDL","","IS","102","","","CRDL","",""
"A1-MW-25-SA1","537 MOD","RES","1801039-07","Vista","13C2-PFTeDA","13C2-

PFTeDA","110","%R","","","CRDL","","IS","110","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","375-73-
5","PFBS","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00191"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","307-24-
4","PFHxA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00233"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","375-85-
9","PFHpA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000632"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","355-46-
4","PFHxS","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00101"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","335-67-
1","PFOA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000696"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","375-95-
1","PFNA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000866"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","1763-23-
1","PFOS","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000863"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","335-76-
2","PFDA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00159"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","2355-31-
9","NMeFOSAA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00176"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","2991-50-
6","NEtFOSAA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00146"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","2058-94-
8","PFUnA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.00112"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","307-55-
1","PFDoA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000847"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","72629-94-
8","PFTrDA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000528"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","376-06-
7","PFTeDA","0.00855","ug/L","U","0.00534","CRDL","","TRG","","","0.00855","CRDL","YES","0.000807"
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C3-PFBS","13C3-
PFBS","117","%R","","","CRDL","","IS","117","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFHxA","13C2-
PFHxA","97.3","%R","","","CRDL","","IS","97.3","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C4-PFHpA","13C4-
PFHpA","94.5","%R","","","CRDL","","IS","94.5","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","18O2-PFHxS","18O2-
PFHxS","95.0","%R","","","CRDL","","IS","95.0","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFOA","13C2-
PFOA","111","%R","","","CRDL","","IS","111","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C5-PFNA","13C5-
PFNA","82.7","%R","","","CRDL","","IS","82.7","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C8-PFOS","13C8-
PFOS","91.1","%R","","","CRDL","","IS","91.1","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFDA","13C2-
PFDA","74.3","%R","","","CRDL","","IS","74.3","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","d3-MeFOSAA","d3-
MeFOSAA","71.7","%R","","","CRDL","","IS","71.7","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","d5-EtFOSAA","d5-
EtFOSAA","71.6","%R","","","CRDL","","IS","71.6","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFUnA","13C2-
PFUnA","56.6","%R","","","CRDL","","IS","56.6","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFDoA","13C2-
PFDoA","64.3","%R","","","CRDL","","IS","64.3","","","CRDL","",""
"FRB-20180524","537 MOD","RES","1801039-08","Vista","13C2-PFTeDA","13C2-

PFTeDA","69.8","%R","","","CRDL","","IS","69.8","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","375-73-
5","PFBS","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000448"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","307-24-
4","PFHxA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000545"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","375-85-
9","PFHpA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000148"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","355-46-
4","PFHxS","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000237"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","335-67-
1","PFOA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000163"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","375-95-
1","PFNA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000203"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","1763-23-
1","PFOS","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000202"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","335-76-
2","PFDA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000373"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","2355-31-
9","NMeFOSAA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000413"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","2991-50-
6","NEtFOSAA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000343"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","2058-94-
8","PFUnA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000263"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","307-55-
1","PFDoA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000198"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","72629-94-
8","PFTrDA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000124"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","376-06-
7","PFTeDA","0.00200","ug/L","U","0.00125","CRDL","","TRG","","","0.00200","CRDL","YES","0.000189"
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C3-PFBS","13C3-
PFBS","141","%R","","","CRDL","","IS","141","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFHxA","13C2-
PFHxA","92.9","%R","","","CRDL","","IS","92.9","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C4-PFHpA","13C4-
PFHpA","106","%R","","","CRDL","","IS","106","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","18O2-PFHxS","18O2-
PFHxS","98.3","%R","","","CRDL","","IS","98.3","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFOA","13C2-
PFOA","89.3","%R","","","CRDL","","IS","89.3","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C5-PFNA","13C5-
PFNA","97.0","%R","","","CRDL","","IS","97.0","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C8-PFOS","13C8-
PFOS","94.6","%R","","","CRDL","","IS","94.6","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFDA","13C2-
PFDA","89.2","%R","","","CRDL","","IS","89.2","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","d3-MeFOSAA","d3-
MeFOSAA","71.3","%R","","","CRDL","","IS","71.3","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","d5-EtFOSAA","d5-
EtFOSAA","75.0","%R","","","CRDL","","IS","75.0","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFUnA","13C2-
PFUnA","75.0","%R","","","CRDL","","IS","75.0","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFDoA","13C2-
PFDoA","74.6","%R","","","CRDL","","IS","74.6","","","CRDL","",""
"B8F0004-BLK1","537 MOD","RES","B8F0004-BLK1","Vista","13C2-PFTeDA","13C2-

PFTeDA","66.4","%R","","","CRDL","","IS","66.4","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","375-73-
5","PFBS","0.0212","ug/L","","0.00125","CRDL","","SPK","106","","0.00200","CRDL","YES","0.000448"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","307-24-
4","PFHxA","0.0227","ug/L","","0.00125","CRDL","","SPK","114","","0.00200","CRDL","YES","0.000545"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","375-85-
9","PFHpA","0.0217","ug/L","","0.00125","CRDL","","SPK","108","","0.00200","CRDL","YES","0.000148"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","355-46-
4","PFHxS","0.0205","ug/L","","0.00125","CRDL","","SPK","102","","0.00200","CRDL","YES","0.000237"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","335-67-
1","PFOA","0.0202","ug/L","","0.00125","CRDL","","SPK","101","","0.00200","CRDL","YES","0.000163"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","375-95-
1","PFNA","0.0190","ug/L","","0.00125","CRDL","","SPK","94.8","","0.00200","CRDL","YES","0.000203"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","1763-23-
1","PFOS","0.0208","ug/L","","0.00125","CRDL","","SPK","104","","0.00200","CRDL","YES","0.000202"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","335-76-
2","PFDA","0.0214","ug/L","","0.00125","CRDL","","SPK","107","","0.00200","CRDL","YES","0.000373"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","2355-31-
9","NMeFOSAA","0.0182","ug/L","","0.00125","CRDL","","SPK","90.8","","0.00200","CRDL","YES","0.000413"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","2991-50-
6","NEtFOSAA","0.0182","ug/L","","0.00125","CRDL","","SPK","90.9","","0.00200","CRDL","YES","0.000343"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","2058-94-
8","PFUnA","0.0240","ug/L","","0.00125","CRDL","","SPK","120","","0.00200","CRDL","YES","0.000263"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","307-55-
1","PFDoA","0.0186","ug/L","","0.00125","CRDL","","SPK","93.1","","0.00200","CRDL","YES","0.000198"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","72629-94-
8","PFTrDA","0.0171","ug/L","","0.00125","CRDL","","SPK","85.4","","0.00200","CRDL","YES","0.000124"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","376-06-
7","PFTeDA","0.0237","ug/L","","0.00125","CRDL","","SPK","118","","0.00200","CRDL","YES","0.000189"
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C3-PFBS","13C3-
PFBS","112","%R","","","CRDL","","IS","112","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFHxA","13C2-
PFHxA","94.2","%R","","","CRDL","","IS","94.2","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C4-PFHpA","13C4-
PFHpA","88.1","%R","","","CRDL","","IS","88.1","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","18O2-PFHxS","18O2-
PFHxS","110","%R","","","CRDL","","IS","110","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFOA","13C2-
PFOA","97.7","%R","","","CRDL","","IS","97.7","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C5-PFNA","13C5-
PFNA","90.1","%R","","","CRDL","","IS","90.1","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C8-PFOS","13C8-
PFOS","95.7","%R","","","CRDL","","IS","95.7","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFDA","13C2-
PFDA","97.9","%R","","","CRDL","","IS","97.9","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","d3-MeFOSAA","d3-
MeFOSAA","88.0","%R","","","CRDL","","IS","88.0","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","d5-EtFOSAA","d5-
EtFOSAA","92.2","%R","","","CRDL","","IS","92.2","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFUnA","13C2-
PFUnA","80.7","%R","","","CRDL","","IS","80.7","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFDoA","13C2-
PFDoA","82.2","%R","","","CRDL","","IS","82.2","","","CRDL","",""
"B8F0004-BS1","537 MOD","RES","B8F0004-BS1","Vista","13C2-PFTeDA","13C2-

PFTeDA","80.5","%R","","","CRDL","","IS","80.5","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","375-73-
5","PFBS","0.0210","ug/L","","0.00125","CRDL","","SPK","105","1.25","0.00200","CRDL","YES","0.000448"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","307-24-
4","PFHxA","0.0218","ug/L","","0.00125","CRDL","","SPK","109","4.00","0.00200","CRDL","YES","0.000545"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","375-85-
9","PFHpA","0.0221","ug/L","","0.00125","CRDL","","SPK","111","2.03","0.00200","CRDL","YES","0.000148"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","355-46-
4","PFHxS","0.0207","ug/L","","0.00125","CRDL","","SPK","103","0.969","0.00200","CRDL","YES","0.000237"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","335-67-
1","PFOA","0.0199","ug/L","","0.00125","CRDL","","SPK","99.5","1.54","0.00200","CRDL","YES","0.000163"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","375-95-
1","PFNA","0.0190","ug/L","","0.00125","CRDL","","SPK","95.0","0.272","0.00200","CRDL","YES","0.000203"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","1763-23-
1","PFOS","0.0218","ug/L","","0.00125","CRDL","","SPK","109","4.90","0.00200","CRDL","YES","0.000202"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","335-76-
2","PFDA","0.0218","ug/L","","0.00125","CRDL","","SPK","109","1.74","0.00200","CRDL","YES","0.000373"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","2355-31-
9","NMeFOSAA","0.0191","ug/L","","0.00125","CRDL","","SPK","95.6","5.15","0.00200","CRDL","YES","0.000413
"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","2991-50-
6","NEtFOSAA","0.0195","ug/L","","0.00125","CRDL","","SPK","97.7","7.23","0.00200","CRDL","YES","0.000343"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","2058-94-
8","PFUnA","0.0228","ug/L","","0.00125","CRDL","","SPK","114","4.84","0.00200","CRDL","YES","0.000263"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","307-55-
1","PFDoA","0.0146","ug/L","","0.00125","CRDL","","SPK","72.8","24.4","0.00200","CRDL","YES","0.000198"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","72629-94-
8","PFTrDA","0.0169","ug/L","","0.00125","CRDL","","SPK","84.3","1.30","0.00200","CRDL","YES","0.000124"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","376-06-
7","PFTeDA","0.0253","ug/L","","0.00125","CRDL","","SPK","127","6.83","0.00200","CRDL","YES","0.000189"
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C3-PFBS","13C3-
PFBS","139","%R","","","CRDL","","IS","139","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFHxA","13C2-
PFHxA","91.9","%R","","","CRDL","","IS","91.9","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C4-PFHpA","13C4-
PFHpA","97.1","%R","","","CRDL","","IS","97.1","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","18O2-PFHxS","18O2-
PFHxS","98.5","%R","","","CRDL","","IS","98.5","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFOA","13C2-
PFOA","92.7","%R","","","CRDL","","IS","92.7","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C5-PFNA","13C5-
PFNA","86.4","%R","","","CRDL","","IS","86.4","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C8-PFOS","13C8-
PFOS","91.4","%R","","","CRDL","","IS","91.4","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFDA","13C2-
PFDA","91.2","%R","","","CRDL","","IS","91.2","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","d3-MeFOSAA","d3-
MeFOSAA","71.9","%R","","","CRDL","","IS","71.9","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","d5-EtFOSAA","d5-
EtFOSAA","71.4","%R","","","CRDL","","IS","71.4","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFUnA","13C2-
PFUnA","56.8","%R","","","CRDL","","IS","56.8","","","CRDL","",""
"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFDoA","13C2-
PFDoA","87.3","%R","","","CRDL","","IS","87.3","","","CRDL","",""

"B8F0004-BSD1","537 MOD","RES","B8F0004-BSD1","Vista","13C2-PFTeDA","13C2-PFTeDA","66.9","%R","","","CRDL","","IS","66.9","","","CRDL","",""
"4663.3803","CTO 17F3803 Yuma","A1-MW-13-SA1","05/24/2018 07:44","AQ","1801039-01","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:27","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-11-SA1","05/24/2018 08:51","AQ","1801039-02","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:38","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-14-SA1","05/24/2018 10:05","AQ","1801039-03","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:48","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-15-SA1","05/24/2018 11:11","AQ","1801039-04","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:59","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-25-SA1","05/24/2018 14:18","AQ","1801039-07","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 01:09","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","FRB-20180524","05/24/2018 15:30","AQ","1801039-08","","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 01:19","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","05/25/2018 09:34","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","B8F0004-BLK1","","AQ","B8F0004-BLK1","MB","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:17","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","B8F0004-BS1","","AQ","B8F0004-BS1","LCS","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/03/2018 23:56","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","","07/03/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","B8F0004-BSD1","","AQ","B8F0004-BSD1","LCSD","","","537 MOD","Gen Prep","RES","06/01/2018 12:00","06/04/2018 00:06","Vista","COA","","","1","","","","","B8F0004","B8F0004","S8F0007","S8F0007","1801039","","07/03/2018 00:00"

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
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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
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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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
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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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
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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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

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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
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

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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

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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)

Privileged and Confidential

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		

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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			

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	

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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		↓

Privileged and Confidential

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

Page: 1 of 1
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)	↓

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 = | MSC - MSC | * 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.

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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.

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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

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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-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

N = Normal Sample *MS = Matrix Spike* *DUP = Laboratory Duplicate*
FD = Field Duplicate *MSD = Matrix Spike Duplicate*
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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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MSD = Matrix Spike Duplicate
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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
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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MSD = Matrix Spike Duplicate
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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
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

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
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

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
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

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: 280-116898-1, 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:

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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:

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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:

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(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	

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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:

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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-11	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801039	440624.2445	605800.5662	Perfluoroalkyl Compounds	A1-MW-11-SA1	WG	GROUNDWATER	5/24/2018
A1-MW-13	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801039	441121.7924	605643.0455	Perfluoroalkyl Compounds	A1-MW-13-SA1	WG	GROUNDWATER	5/24/2018
A1-MW-14	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801039	440162.9948	605871.6126	Perfluoroalkyl Compounds	A1-MW-14-SA1	WG	GROUNDWATER	5/24/2018
A1-MW-15	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801039	440468.355	606147.1626	Perfluoroalkyl Compounds	A1-MW-15-SA1	WG	GROUNDWATER	5/24/2018
A1-MW-25	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801039	437848.2796	606352.9876	Perfluoroalkyl Compounds	A1-MW-25-SA1	WG	GROUNDWATER	5/24/2018