



**Groundwater Sample Results,
Level 4 Laboratory Report, Electronic Data Deliverable,
Data Validation Report, and the Sample Location Report,
SDG 1803676**

*Marine Corps Air Station Yuma
Yuma, Arizona*

November 2019



December 21, 2018

Vista Work Order No. 1803676

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 November 19, 2018 under your Project Name '4663.3803'. This Revision 1 is a revision to the Case Narrative to clarify the holding times

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,

A handwritten signature in black ink that reads "Martha Maier" with a stylized flourish at the end.

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. 1803676
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. The report was amended to note that extraction hold times were missed.

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). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted one day past holding times, but analyzed within the method holding times.

Quality Control

The Initial Calibration met the method acceptance criteria. The recoveries of PFTeDA were greater than 130% in the Continuing Calibration Verifications (CCV) ST181203M1-1 and ST181203M1-2. The recovery of MeFOSAA was also greater than 130% in CCV ST181203M1-2. These analytes were not detected in the samples. All other analytes met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFTeDA was greater than 130% in the OPR. This analyte was not detected in the samples. The recoveries of all other analytes were within the method acceptance criteria.

The extracts of samples "A1-MW-11-SA2" and "A1-MW-37-SA2" 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 and the results from the original injections have been reported.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1803676-01	A1-MW-11-SA2	15-Nov-18 09:06	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-02	A1-MW-13-SA2	15-Nov-18 08:20	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-03	A1-MW-14-SA2	15-Nov-18 10:53	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-04	A1-MW-15-SA2	15-Nov-18 10:07	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-05	A1-MW-37-SA2	15-Nov-18 11:54	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-06	A1-MW-37-SA2D	15-Nov-18 12:04	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-07	FRB-20181115	15-Nov-18 14:30	19-Nov-18 09:55	HDPE Bottle, 125 mL
1803676-08	A1-MW-31-SA2	15-Nov-18 14:16	19-Nov-18 09:55	HDPE Bottle, 125 mL

ANALYTICAL RESULTS

Sample ID: Method Blank	PFAS Isotope Dilution Method
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Client Data Name: Tetra Tech EC, Inc. Project: 4663.3803	Laboratory Data Lab Sample: B8K0153-BLK1 Column: BEH C18
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Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFHxA	307-24-4	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFHpA	375-85-9	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFHxS	355-46-4	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFOA	335-67-1	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFNA	375-95-1	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFOS	1763-23-1	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFDA	335-76-2	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
MeFOSAA	2355-31-9	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
EtFOSAA	2991-50-6	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFOA	2058-94-8	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFDoA	307-55-1	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFTDA	72629-94-8	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
PFTeDA	376-06-7	ND	0.00137	0.00200	0.00400	U	B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	75.9	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFHxA	IS	95.6	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C4-PFHxA	IS	72.6	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
18O2-PFHxS	IS	83.7	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFOA	IS	74.8	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C5-PFNA	IS	95.2	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C8-PFOS	IS	98.6	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFDA	IS	79.0	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
d3-MeFOSAA	IS	58.7	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
d5-EtFOSAA	IS	74.5	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFUnA	IS	75.5	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFDoA	IS	86.4	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1
13C2-PFTeDA	IS	72.4	50 - 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 15:29	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR						PFAS Isotope Dilution Method					
Client Data Name: Tetra Tech EC, Inc. Project: 4663.3803						Laboratory Data Lab Sample: B8K0153-BS1 Column: BEH C18					
Analyte	CAS Number	Amt Found (ug/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0413	0.0400	103	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFHxA	307-24-4	0.0371	0.0400	92.6	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFHpA	375-85-9	0.0455	0.0400	114	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFHxS	355-46-4	0.0428	0.0400	107	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFOA	335-67-1	0.0473	0.0400	118	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFNA	375-95-1	0.0420	0.0400	105	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFOS	1763-23-1	0.0380	0.0400	95.1	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFDA	335-76-2	0.0431	0.0400	108	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
MeFOSAA	2355-31-9	0.0452	0.0400	113	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
EtFOSAA	2991-50-6	0.0406	0.0400	101	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFOA	2058-94-8	0.0354	0.0400	88.5	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFDaA	307-55-1	0.0396	0.0400	99.1	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFTDA	72629-94-8	0.0429	0.0400	107	70 - 130		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
PFTeDA	376-06-7	0.0559	0.0400	140	70 - 130	H	B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
Labeled Standards	Type			% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS			81.5	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFHxA	IS			104	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C4-PFHpA	IS			80.3	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
18O2-PFHxS	IS			96.0	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFOA	IS			76.2	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C5-PFNA	IS			86.5	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C8-PFOS	IS			105	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFDA	IS			70.0	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
d3-MeFOSAA	IS			52.8	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
d5-EtFOSAA	IS			67.2	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFUnA	IS			68.3	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFDaA	IS			78.4	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1
13C2-PFTeDA	IS			72.9	50- 150		B8K0153	30-Nov-18	0.250 L	03-Dec-18 14:58	1

Sample ID: A1-MW-11-SA2
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Tetra Tech EC, Inc.	Matrix:	Water	Lab Sample:	1803676-01	Column:	BEH C18
Project:	4663.3803	Date Collected:	15-Nov-18 09:06	Date Received:	19-Nov-18 09:55		
Location:	YUMA, AZ						

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.184	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFHxA	307-24-4	0.460	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFHpA	375-85-9	0.0352	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFHxS	355-46-4	0.109	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFOA	335-67-1	0.0349	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFNA	375-95-1	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFOS	1763-23-1	0.00916	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFDA	335-76-2	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
MeFOSAA	2355-31-9	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
EtFOSAA	2991-50-6	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFUnA	2058-94-8	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFDoA	307-55-1	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFTTrDA	72629-94-8	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
PFTeDA	376-06-7	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
Labeled Standards	Type	% Recovery	Limits			Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	72.0	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFHxA	IS	101	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C4-PFHpA	IS	73.1	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
18O2-PFHxS	IS	89.8	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFOA	IS	72.8	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C5-PFNA	IS	82.2	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C8-PFOS	IS	113	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFDA	IS	64.7	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
d3-MeFOSAA	IS	84.5	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
d5-EtFOSAA	IS	105	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFUnA	IS	62.2	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFDoA	IS	82.2	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1
13C2-PFTeDA	IS	87.9	50 - 150				B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:22	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-13-SA2	PFAS Isotope Dilution Method
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Client Data	Laboratory Data
Name: Tetra Tech EC, Inc.	Lab Sample: 1803676-02
Project: 4663.3803	Date Received: 19-Nov-18 09:55
Location: YUMA, AZ	Column: BEH C18
Matrix: Water	Date Collected: 15-Nov-18 08:20

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.259	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFHxA	307-24-4	0.655	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFHpA	375-85-9	0.105	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFHxS	355-46-4	0.368	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFOA	335-67-1	0.0695	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFNA	375-95-1	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFOS	1763-23-1	0.107	0.00310	0.00455	0.00906		B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFDA	335-76-2	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
MeFOSAA	2355-31-9	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
EtFOSAA	2991-50-6	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFOA	2058-94-8	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFDoA	307-55-1	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFTeDA	72629-94-8	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
PFTeDA	376-06-7	ND	0.00310	0.00455	0.00906	U	B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
Labeled Standards	Type	% Recovery		Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	66.2		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFHxA	IS	97.8		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C4-PFHxA	IS	71.0		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
18O2-PFHxS	IS	82.6		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFOA	IS	74.6		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C5-PFNA	IS	79.4		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C8-PFOS	IS	97.4		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFDA	IS	63.0		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
d3-MeFOSAA	IS	60.4		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
d5-EtFOSAA	IS	84.3		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFUnA	IS	65.0		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFDoA	IS	85.0		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1
13C2-PFTeDA	IS	80.1		50 - 150			B8K0153	30-Nov-18	0.110 L	03-Dec-18 16:33	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-14-SA2	PFAS Isotope Dilution Method
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Client Data Name: Tetra Tech EC, Inc. Project: 4663.3803 Location: YUMA, AZ	Laboratory Data Matrix: Water Date Collected: 15-Nov-18 10:53 Lab Sample: 1803676-03 Date Received: 19-Nov-18 09:55 Column: BEH C18
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Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.101	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFHxA	307-24-4	0.327	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFHpA	375-85-9	0.0658	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFHxS	355-46-4	0.253	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFOA	335-67-1	0.0527	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFNA	375-95-1	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFOS	1763-23-1	0.0604	0.00295	0.00431	0.00860		B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFDA	335-76-2	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
MeFOSAA	2355-31-9	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
EtFOSAA	2991-50-6	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFOA	2058-94-8	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFDoA	307-55-1	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFTeDA	72629-94-8	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
PFTeDA	376-06-7	ND	0.00295	0.00431	0.00860	U	B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
Labeled Standards	Type	% Recovery		Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	76.6		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFHxA	IS	103		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C4-PFHpA	IS	74.6		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
18O2-PFHxS	IS	86.2		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFOA	IS	77.7		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C5-PFNA	IS	87.0		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C8-PFOS	IS	98.8		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFDA	IS	69.9		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
d3-MeFOSAA	IS	65.0		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
d5-EtFOSAA	IS	84.1		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFOA	IS	66.6		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFDoA	IS	87.4		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1
13C2-PFTeDA	IS	76.8		50 - 150			B8K0153	30-Nov-18	0.116 L	03-Dec-18 16:43	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-15-SA2
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Tetra Tech EC, Inc.	Matrix:	Water	Lab Sample:	1803676-04	Column:	BEH C18
Project:	4663.3803	Date Collected:	15-Nov-18 10:07	Date Received:	19-Nov-18 09:55		
Location:	YUMA, AZ						

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.363	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFHxA	307-24-4	0.596	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFHpA	375-85-9	0.0773	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFHxS	355-46-4	0.322	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFOA	335-67-1	0.190	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFNA	375-95-1	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFOS	1763-23-1	0.0185	0.00309	0.00450	0.00902		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFDA	335-76-2	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
MeFOSAA	2355-31-9	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
EtFOSAA	2991-50-6	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFOA	2058-94-8	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFDoA	307-55-1	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFTTrDA	72629-94-8	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
PFTeDA	376-06-7	ND	0.00309	0.00450	0.00902	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	75.2	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFHxA	IS	106	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C4-PFHpA	IS	73.7	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
18O2-PFHxS	IS	88.0	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFOA	IS	76.7	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C5-PFNA	IS	86.4	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C8-PFOS	IS	104	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFDA	IS	69.8	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
d3-MeFOSAA	IS	70.3	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
d5-EtFOSAA	IS	92.5	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFUnA	IS	71.1	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFDoA	IS	88.7	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1
13C2-PFTeDA	IS	92.4	50 - 150		B8K0153	30-Nov-18	0.111 L	03-Dec-18 16:54	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-37-SA2	PFAS Isotope Dilution Method
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Client Data Name: Tetra Tech EC, Inc. Project: 4663.3803 Location: YUMA, AZ	Laboratory Data Matrix: Water Date Collected: 15-Nov-18 11:54 Lab Sample: 1803676-05 Date Received: 19-Nov-18 09:55 Column: BEH C18
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Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.151	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFHxA	307-24-4	0.520	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFHpA	375-85-9	0.0856	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFHxS	355-46-4	0.438	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFOA	335-67-1	0.0599	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFNA	375-95-1	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFOS	1763-23-1	0.0288	0.00291	0.00424	0.00851		B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFDA	335-76-2	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
MeFOSAA	2355-31-9	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
EtFOSAA	2991-50-6	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFOA	2058-94-8	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFDoA	307-55-1	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFTeDA	72629-94-8	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
PFTeDA	376-06-7	ND	0.00291	0.00424	0.00851	U	B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
Labeled Standards	Type	% Recovery		Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	80.6		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFHxA	IS	104		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C4-PFHxA	IS	72.7		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
18O2-PFHxS	IS	92.3		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFOA	IS	70.8		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C5-PFNA	IS	85.1		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C8-PFOS	IS	112		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFDA	IS	68.0		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
d3-MeFOSAA	IS	95.5		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
d5-EtFOSAA	IS	127		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFUnA	IS	76.6		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFDoA	IS	96.4		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1
13C2-PFTeDA	IS	113		50 - 150			B8K0153	30-Nov-18	0.118 L	03-Dec-18 18:35	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-37-SA2D
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Tetra Tech EC, Inc.	Matrix:	Water	Lab Sample:	1803676-06	Column:	BEH C18
Project:	4663.3803	Date Collected:	15-Nov-18 12:04	Date Received:	19-Nov-18 09:55		
Location:	YUMA, AZ						

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.150	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFHxA	307-24-4	0.529	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFHpA	375-85-9	0.0830	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFHxS	355-46-4	0.429	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFOA	335-67-1	0.0555	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFNA	375-95-1	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFOS	1763-23-1	0.0275	0.00298	0.00435	0.00870		B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFDA	335-76-2	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
MeFOSAA	2355-31-9	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
EtFOSAA	2991-50-6	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFUnA	2058-94-8	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFDoA	307-55-1	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFTTrDA	72629-94-8	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
PFTeDA	376-06-7	ND	0.00298	0.00435	0.00870	U	B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers		Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	78.5	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFHxA	IS	104	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C4-PFHpA	IS	75.5	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
18O2-PFHxS	IS	92.6	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFOA	IS	72.9	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C5-PFNA	IS	91.4	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C8-PFOS	IS	108	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFDA	IS	68.9	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
d3-MeFOSAA	IS	69.2	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
d5-EtFOSAA	IS	89.0	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFUnA	IS	66.0	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFDoA	IS	86.5	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1
13C2-PFTeDA	IS	84.8	50 - 150				B8K0153	30-Nov-18	0.115 L	03-Dec-18 18:45	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: FRB-20181115	PFAS Isotope Dilution Method
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Client Data	Laboratory Data
Name: Tetra Tech EC, Inc.	Lab Sample: 1803676-07
Project: 4663.3803	Date Received: 19-Nov-18 09:55
Location: YUMA, AZ	Column: BEH C18
Matrix: Water	Date Collected: 15-Nov-18 14:30

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFHxA	307-24-4	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFHpA	375-85-9	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFHxS	355-46-4	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFOA	335-67-1	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFNA	375-95-1	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFOS	1763-23-1	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFDA	335-76-2	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
MeFOSAA	2355-31-9	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
EtFOSAA	2991-50-6	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFOA	2058-94-8	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFDoA	307-55-1	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFTTrDA	72629-94-8	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
PFTeDA	376-06-7	ND	0.00309	0.00450	0.00904	U	B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers		Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	70.4	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFHxA	IS	103	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C4-PFHxA	IS	72.4	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
18O2-PFHxS	IS	87.8	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFOA	IS	68.0	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C5-PFNA	IS	73.7	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C8-PFOS	IS	97.9	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFDA	IS	61.3	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
d3-MeFOSAA	IS	50.8	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
d5-EtFOSAA	IS	66.0	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFOA	IS	59.5	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFDoA	IS	74.5	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1
13C2-PFTeDA	IS	67.2	50 - 150				B8K0153	30-Nov-18	0.111 L	03-Dec-18 18:56	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-31-SA2

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Tetra Tech EC, Inc.	Matrix:	Water	Lab Sample:	1803676-08	Column:	BEH C18
Project:	4663.3803	Date Collected:	15-Nov-18 14:16	Date Received:	19-Nov-18 09:55		
Location:	YUMA, AZ						

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0235	0.00293	0.00427	0.00855		B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFHxA	307-24-4	0.0732	0.00293	0.00427	0.00855		B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFHpA	375-85-9	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFHxS	355-46-4	0.00855	0.00293	0.00427	0.00855		B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFOA	335-67-1	0.00388	0.00293	0.00427	0.00855	J	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFNA	375-95-1	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFOS	1763-23-1	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFDA	335-76-2	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
MeFOSAA	2355-31-9	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
EtFOSAA	2991-50-6	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFUnA	2058-94-8	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFDaA	307-55-1	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFTTrDA	72629-94-8	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
PFTeDA	376-06-7	ND	0.00293	0.00427	0.00855	U	B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
Labeled Standards	Type	% Recovery		Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	79.9		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFHxA	IS	99.4		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C4-PFHpA	IS	68.3		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
18O2-PFHxS	IS	92.6		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFOA	IS	75.4		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C5-PFNA	IS	83.8		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C8-PFOS	IS	106		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFDA	IS	66.3		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
d3-MeFOSAA	IS	66.2		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
d5-EtFOSAA	IS	92.5		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFUnA	IS	68.9		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFDaA	IS	77.2		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1
13C2-PFTeDA	IS	79.0		50 - 150			B8K0153	30-Nov-18	0.117 L	03-Dec-18 19:06	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA 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.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-18-9
Virginia Department of General Services	9618
Washington Department of Ecology	C584-18
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.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

CHAIN OF CUSTODY

For Laboratory Use Only
 Work Order #: 1803676 Temp: 2.8 °C
 Storage ID: WR-2 Storage Secured: Yes ☒ No ☐

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

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

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

Relinquished by (printed name and signature) _____ Date _____ Time _____ Received by (printed name and signature) _____ Date _____ Time _____

Relinquished by (printed name and signature) Garrett Belar Date 11/15/18 Time 1600 Received by (printed name and signature) FedEx
 Relinquished by (printed name and signature) FedEx Date _____ Time _____ Received by (printed name and signature) Kun Eric Date 11/19/18 Time 0955

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.: _____

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
537(DW only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOA/PFOS	UCMR3 PFAS List 8	537 List 14	Full List of 28	Other: Please List Below	PFOA/PFOS	UCMR3 PFAS List 8	537 List 14	Comments
A1-MW-11-SA2	11/15/18	0906	YUMA, AZ	2	P	W			X						
A1-MW-13-SA2	11/15/18	0820	YUMA, AZ	2	P	W			X						
A1-MW-14-SA2	11/15/18	1053	YUMA, AZ	2	P	W			X						
A1-MW-15-SA2	11/15/18	1007	YUMA, AZ	2	P	W			X						
A1-MW-37-SA2	11/15/18	1154	YUMA, AZ	2	P	W			X						
A1-MW-37-SA2D	11/15/18	1204	YUMA, AZ	2	P	W			X						
FRB-20181115	11/15/18	1430	YUMA, AZ	2	P	W			X						
EB-20181115			YUMA, AZ	2	P	W			X						
A1-MW-31-SA2	11/15/18	1416	Yuma, AZ	2	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 = Sediment,

SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: W - WATER

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1803676

 TAT 10 BUSINESS

Samples Arrival:	Date/Time 11/19/18 0955	Initials: KE	Location: WR-2
			Shelf/Rack: NA
Logged In:	Date/Time 11/19/18 1111	Initials: WWS	Location: WR-2
			Shelf/Rack: 2-3, F-4
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
	<input type="radio"/> Other		
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Dry Ice
	<input type="radio"/> None		
Temp °C: 2.9 (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N		Thermometer ID: IR-4
Temp °C: 2.8 (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill	Trk # <u>7838 0431 9525</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preservation Documented:	Na ₂ S ₂ O ₃	Trizma	None
	Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input checked="" type="radio"/> Vista	<input type="radio"/> Client	<input type="radio"/> Retain
	<input type="radio"/> Return	<input type="radio"/> Dispose	

Comments:

ORIGIN ID:YUMA (619) 518-6896
TETRA TECH

1230 COLUMBIA ST STE 750

SAN DIEGO, CA 92101
UNITED STATES US

SHIP
ACTWG.
CAD: 0
DIMS: 2
BILL THIRD

TO **VISTA ANALYTICAL LAB**

1104 WINDFIELD WAY

EL DORADO HILLS CA 95762

(916) 673-1520

INU:
PO:

REF:

DEPT:



FedEx
Express



J1821180815010V

TRK#
0201 **7838 0431 9525**

FRI - 16 NOV 10:30A
PRIORITY OVERNIGHT

WD MHRA

95762
CA-US SMF



EXTRACTION INFORMATION

Process Sheet
Workorder: **1803676**

Prep Expiration: 2018-Nov-29
Client: Tetra Tech EC, Inc.

Workorder Due: **05-Dec-18 00:00**

TAT: 16

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

Prep Batch: B8K0153

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

Prep Data Entered: ac 12/02/18
Date and Initials

Initial Sequence: 5810005

LabSampleID	A/B	Prep Rec	Spike Rec	ClientSampleID	Comments	Location	Container
1803676-01	"A"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-11-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803676-02		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-13-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803676-03		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-14-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803676-04		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-15-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803676-05		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-37-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803676-06		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-37-SA2D		WR-2 A-3	HDPE Bottle, 125 mL
1803676-07		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FRB-20181115		WR-2 A-3	HDPE Bottle, 125 mL
1803676-08		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A1-MW-31-SA2		WR-2 A-3	HDPE Bottle, 125 mL

WO Comments: **Internal COC**

Pre-Prep Check Out: HB 11/26/18 Prep Check Out: MAC 11/30/18
Pre-Prep Check In: HB 11/26/18 Prep Check In: NA

Prep Reconciled Initials/Date: HB 11/26/18
Spike Reconciled Initials/Date: ac 11/30/18
VialBoxID: Santa Cruz

Matrix: Aqueous

Method: 537M PFAS DOD (LOQ as mL)

PREPARATION BENCH SHEET

B8K0153

Chemist: AEPrep Date: 11/30/18Prep Time: 08:40Prepared using: ☐ Sonication ☐ Shaker ☒ SPE Extraction ☐ Centrifuge ID: _____

Date/Initials: <u>HB 11/20/18</u>		Balance ID: <u>HRMS-9</u>										
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	ENVI-Carb	RS CHEM/WIT DATE
<input type="checkbox"/>	B8K0153-BLK1 (A)	7	2	0	2	NA	NA	(0.250)	AE 11/30/18	AE 11/30/18	AE 11/30/18	AE 11/30/18
<input type="checkbox"/>	B8K0153-BS1	7	2	0	2	↓	↓	(0.250)	↓	↓	↓	↓
<input type="checkbox"/>	B8K0153-MS1 1803678-01	5	2	0	1	147.91 133.72	26.97	0.10680	↓	↓	↓	↓
<input type="checkbox"/>	B8K0153-MSD1 1803678-01	5	2	0	1	148.36 138.11	27.03	0.11122	↓	↓	↓	↓
<input type="checkbox"/>	1803676-01	5	2	0	2	143.23	26.97	0.11626	↓	↓	↓	↓
<input type="checkbox"/>	1803676-02	5	2	0	2	137.45	27.03	0.11042	↓	↓	↓	↓
<input type="checkbox"/>	1803676-03	5	2	0	2	147.143.23	26.94	0.11629	↓	↓	↓	↓
<input type="checkbox"/>	1803676-04	5	2	0	2	137.83	26.97	0.11086	↓	↓	↓	↓
<input type="checkbox"/>	1803676-05	5	2	0	2	144.50	26.97	0.11753	↓	↓	↓	↓
<input type="checkbox"/>	1803676-06	5	2	0	2	141.83	26.90	0.11493	↓	↓	↓	↓
<input type="checkbox"/>	1803676-07	4	2	0	2	137.59	26.92	0.11067	↓	↓	↓	↓
<input type="checkbox"/>	1803676-08	5	2	0	2	143.87	26.97	0.11690	↓	↓	↓	↓
<input type="checkbox"/>	1803678-01	5	2	0	1	138.96	27.14	0.11182	↓	↓	↓	↓
<input type="checkbox"/>	1803678-02	5	2	0	2	144.92	27.11	0.11781	↓	↓	↓	↓

IS: <u>18J1502, 10 mL (V3)</u>	SPE Chem: <u>Strata X-AW 33 µm 200 mg 6 mL</u>	Notes: (A) 10. HB 11/20/18 * 12/02/18 AE
IS SUP: <u>NA</u>	SPE Lot#: <u>S18-003692</u>	
NS: <u>18J1505, 10 mL (V3)</u>	ENVI-Carb Lot#: <u>10262101</u>	
NS SUP: <u>NA</u>	Ele SOLV: <u>MeOH/0.5%NH4OH in MeOH</u>	
RS: <u>18J1503, 10 mL (V2)</u>	Final Volume(s) <u>1</u> mL	

Comments: Assume 1 g = 1 mL
Cen = Centrifuged

- 1 = Sample centrifuged twice
- 2 = Sample deeply colored after centrifuge
- 3 = Cartridge sorbent discolored after SPE
- 4 = Sample clogged cartridge, additional cartridge(s) used
- 5 = Sample recombined at final volume

- 6 = Sample took longer to SPE, required stronger vacuum
- 7 = Required Nitrogen line to finish SPE
- 8 = Required Nitrogen line to finish elution
- 9 = Sample arrived with low volume
- 10 = Trizma added to QC (5g/L)

Matrix: Aqueous

Method: 537M PFAS DOD (LOQ as mRL)

PREPARATION BENCH SHEET

B8K0153

Chemist: AEPrep Date: 11/30/18Prep Time: 08:40Prepared using: ☐ Sonication ☐ Shaker ☒ SPE Extraction ☐ Centrifuge ID: _____

Date/Initials: <u>HB 11/26/18</u>		Balance ID: <u>HRMS-9</u>										
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	ENVI-Carb	RS CHEM/WIT DATE
<input type="checkbox"/>	1803678-03	4	2	0	1	130.64	27.04	0.10360	AE <u>ML 11/30/18</u>	AE <u>11/30/18</u>	AE <u>11/30/18</u>	AE <u>11/30/18</u>
<input type="checkbox"/>	1803678-04	4	2	0	1	144.79	27.07	0.11772	T	T	T	T
<input type="checkbox"/>	1803689-01	5	2	0	2	279.21	27.13	0.25208	T	T	T	T

IS: <u>18J1502, 10 mL</u> (V2) IS SUP: <u>NA</u> NS: <u>18J1505, 10 mL</u> (V3) NS SUP: <u>NA</u> RS: <u>18J1503, 10 mL</u> (V2)	SPE Chem: <u>Strata X-AW 33um 200 mg</u> SPE Lot#: <u>S18-003692</u> ENVI-Carb Lot#: <u>10262101</u> Ele SOLV: <u>MeOH/0.5%NH4OH in MeOH</u> Final Volume(s) <u>1</u> mL	Notes:
--	--	--------

Comments: Assume 1 g = 1 mL
Cen = Centrifuged

1 = Sample centrifuged twice
2 = Sample deeply colored after centrifuge
3 = Cartridge sorbent discolored after SPE
4 = Sample clogged cartridge, additional cartridge(s) used
5 = Sample recombined at final volume

6 = Sample took longer to SPE, required stronger vacuum
7 = Required Nitrogen line to finish SPE
8 = Required Nitrogen line to finish elution
9 = Sample arrived with low volume
10 = Trizma added to QC (5g/L)

Batch: B8K0153

Matrix: Aqueous

LabNumber	WetWeight (Initial)	% Solids (Extraction Solids)	DryWeight	Final	Extracted	Ext By	Spike	SpikeAmount	ClientMatrix	Analysis
1803676-01	0.11626 ✓	NA	N/A	1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-02	0.11042 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-03	0.11629 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-04	0.11086 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-05	0.11753 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-06	0.11493 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-07	0.11067 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803676-08	0.1169 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803678-01	0.11182 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803678-02	0.11781 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803678-03	0.1036 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803678-04	0.11772 ✓			1000	30-Nov-18 08:40	AME			Water	537M PFAS DOD (LOQ as
1803689-01	0.25208 ✓			1000	30-Nov-18 08:40	AME			Decon Water	537M PFAS DOD (LOQ as
B8K0153-BLK1	0.25 ✓			1000	30-Nov-18 08:40	AME				QC
B8K0153-BS1	0.25 ✓			1000	30-Nov-18 08:40	AME	18J1505 ✓	10 ✓		QC
B8K0153-MS1	0.1068 ✓			1000	30-Nov-18 08:40	AME	18J1505 ✓	10 ✓		QC
B8K0153-MSD1	0.11122 ✓			1000	30-Nov-18 08:40	AME	18J1505 ✓	10 ✓		QC

12/02/18
AE

Internal Chain of Custody

1803676



Client: Tetra Tech EC, Inc.

Project Number: 4663.3803

Received: 19-Nov-18 09:55

Received By: Kim Elric

Vista Sample ID	Bottle	Sample				Extract	
		Initials Date/Time	Initials Date/Time	Initials Date/Time	Initials Date/Time	Initials Date/Time	Initials Date/Time
		New Location	New Location	New Location	New Location	New Location	New Location
1803676-01	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4	HB 11/26/18 11:00 AirLab "A" bottles	HB 11/26/18 WR-2 back wall	MAC 11/30/18 0714 Prep Lab 2	AE 11/30/18 * Refrigerator #7	
1803676-02	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4	↓	↓	↓	↓	
1803676-03	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					
1803676-04	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					
1803676-05	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					
1803676-06	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					
1803676-07	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					
1803676-08	2, B	WWS 11/19/18 WR-2 2:2-3, B:F-4					

*Did not record time. Samples placed in refrigerator on 11/30/18, recorded on 12/02/18. AE 12/02/18

Internal Chain of Custody

1803676



Client: Tetra Tech EC, Inc.

Project Number: 4663.3803

Received: 19-Nov-18 09:55

Received By: Kim Elric

Vista Sample ID	Bottle	Sample				Extract	
		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
1803676-01	A/B	HR 12/03/18 8:06 prep lab 2	HR 12/03/18 10:25 Refrigerator 7			DM 12/03/18 1722 Instrument	
1803676-02	A/B						
1803676-03	A/B						
1803676-04	A/B						
1803676-05	A/B						
1803676-06	A/B						
1803676-07	A/B						
1803676-08	A/B						

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

Page 1 of 1

Sample Data – PFAS Isotope Dilution Method

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
1	1 PFBA	213.0 > 168.8		5.27e3	0.250							
2	2 PFPeA	263.1 > 218.9		6.65e3	0.250							
3	3 PFBS	299.0 > 79.7		1.12e3	0.250							
4	4 4:2 FTS	327.2>307.2		2.75e3	0.250							
5	5 PFHxA	313 > 269		4.70e3	0.250							
6	36 13C3-PFBA	216.1 > 171.8	5.27e3	6.76e3	0.250	0.861	1.41	9.74	45.2835	90.6		
7	37 13C3-PFPeA	266. > 221.8	6.65e3	1.37e4	0.250	0.604	2.68	6.09	40.3432	80.7		
8	38 13C3-PFBS	302. > 98.8	1.12e3	2.34e3	0.250	0.633	3.00	6.00	37.9389	75.9		
9	39 13C2-4:2 FTS	329.2>308.9	2.75e3	2.34e3	0.250	2.074	3.48	14.7	28.2875	56.6		
10	40 13C2-PFHxA	315 > 270	4.70e3	1.37e4	0.250	0.900	3.56	4.30	19.1137	95.6		
11	-1											
12	6 PFPeS	349.1>80.1		1.12e3	0.250							
13	7 PFHpA	363.0 > 318.9		6.88e3	0.250							
14	8 L-PFHxS	398.9 > 79.6	2.29e0	9.32e2	0.250		4.33	0.0306	0.0711		4.82	YES
15	68 Total PFHxS	398.9 > 79.6	2.29e0	9.32e2	0.250			0.0306	0.0711			
16	10 6:2 FTS	427.1 > 407		3.18e3	0.250							
17	38 13C3-PFBS	302. > 98.8	1.12e3	2.34e3	0.250	0.633	3.00	6.00	37.9389	75.9		
18	41 13C4-PFHpA	367.2 > 321.8	6.88e3	1.37e4	0.250	0.693	4.20	6.29	36.3146	72.6		
19	42 18O2-PFHxS	403.0 > 102.6	9.32e2	2.34e3	0.250	0.476	4.33	4.98	41.8420	83.7		
20	42 18O2-PFHxS	403.0 > 102.6	9.32e2	2.34e3	0.250	0.476	4.33	4.98	41.8420	83.7		
21	43 13C2-6:2 FTS	429.1 > 408.9	3.18e3	2.57e3	0.250	1.825	4.63	15.5	33.9782	68.0		
22	-1											
23	11 L-PFOA	412.8 > 368.9		1.21e4	0.250							
24	69 Total PFOA	412.8 > 368.9	0.00e0	1.21e4	0.250			0.000				
25	13 PFHpS	449 > 80.0		2.45e3	0.250							
26	16 L-PFOS	498.9 > 79.9		2.45e3	0.250							
27	70 Total PFOS	498.9 > 79.9	0.00e0	2.45e3	0.250			0.000				
28	44 13C2-PFOA	414.9 > 369.7	1.21e4	1.85e4	0.250	0.873	4.68	8.16	37.4063	74.8		
29	44 13C2-PFOA	414.9 > 369.7	1.21e4	1.85e4	0.250	0.873	4.68	8.16	37.4063	74.8		
30	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
31	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
32	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
33	-1											
34	14 PFNA	463.0 > 418.8		1.27e4	0.250							
35	15 PFOSA	497.9 > 77.9		1.10e3	0.250							

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
36	18 PFDA	513 > 468.8	5.59e0	1.32e4	0.250		5.49	0.00528	0.0832		4.46	NO
37	19 8:2 FTS	527 > 506.9		2.67e3	0.250							
38	20 PFNS	549.1 > 80.1		2.45e3	0.250							
39	45 13C5-PFNA	468.2 > 422.9	1.27e4	1.33e4	0.250	1.006	5.12	12.0	47.5785	95.2		
40	46 13C8-PFOA	506.1 > 77.7	1.10e3	1.76e4	0.250	0.202	5.15	0.785	15.5710	31.1		
41	48 13C2-PFDA	515.1 > 469.9	1.32e4	1.49e4	0.250	1.125	5.49	11.1	39.4757	79.0		
42	49 13C2-8:2 FTS	529.1 > 508.7	2.67e3	2.57e3	0.250	1.086	5.46	13.0	47.8855	95.8		
43	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
44	-1											
45	21 L-MeFOSAA	570 > 419		3.40e3	0.250							
46	71 Total N-MeFOSAA	570. > 419	0.00e0	3.40e3	0.250			0.000				
47	23 L-EtFOSAA	584.1 > 419		4.65e3	0.250							
48	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.65e3	0.250			0.000				
49	25 PFUDa	563.0 > 518.9	2.40e1	1.48e4	0.250		5.81	0.0204	0.0746		10.3	NO
50	50 d3-N-MeFOSAA	573.3 > 419	3.40e3	1.76e4	0.250	0.329	5.63	2.42	29.3713	58.7		
51	50 d3-N-MeFOSAA	573.3 > 419	3.40e3	1.76e4	0.250	0.329	5.63	2.42	29.3713	58.7		
52	52 d5-N-EtFOSAA	589.3 > 419	4.65e3	1.76e4	0.250	0.355	5.79	3.31	37.2650	74.5		
53	52 d5-N-EtFOSAA	589.3 > 419	4.65e3	1.76e4	0.250	0.355	5.79	3.31	37.2650	74.5		
54	51 13C2-PFUDa	565 > 519.8	1.48e4	1.76e4	0.250	1.111	5.81	10.5	37.7668	75.5		
55	-1											
56	26 PFDS	598.8 > 79.9		2.45e3	0.250							
57	27 PFDaA	612.9 > 569.0		1.28e4	0.250							
58	29 PFTTrDA	662.9 > 618.9		1.28e4	0.250							
59	30 PFTeDA	713.0 > 669.0		9.54e3	0.250							
60	28 N-MeFOSA	512.1 > 168.9			0.250							
61	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
62	53 13C2-PFDaA	615.0 > 569.7	1.28e4	1.49e4	0.250	0.993	6.09	10.7	43.2180	86.4		
63	53 13C2-PFDaA	615.0 > 569.7	1.28e4	1.49e4	0.250	0.993	6.09	10.7	43.2180	86.4		
64	55 13C2-PFTeDA	715.1 > 669.7	9.54e3	1.76e4	0.250	0.749	6.55	6.78	36.2184	72.4		
65	54 d3-N-MeFOSA	515.2 > 168.9		1.76e4	0.250	0.074						
66	-1											
67	31 N-EtFOSA	526.1 > 168.9			0.250							
68	32 PFHxDA	813.1 > 768.6		4.24e3	0.250							
69	33 PFODA	913.1 > 868.8	1.23e1	4.24e3	0.250		7.08	0.0145	0.0163			
70	34 N-MeFOSE	616.1 > 58.9			0.250							

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

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Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
71	35 N-EtFOSE	630.1 > 58.9			0.250							
72	56 d5-N-ETFOSA	531.1 > 168.9		1.76e4	0.250	0.097						
73	57 13C2-PFHxDA	815 > 769.7	4.24e3	1.76e4	0.250	0.714	6.86	3.01	16.8826	84.4		
74	57 13C2-PFHxDA	815 > 769.7	4.24e3	1.76e4	0.250	0.714	6.86	3.01	16.8826	84.4		
75	58 d7-N-MeFOSE	623.1 > 58.9		1.76e4	0.250	0.036						
76	59 d9-N-EtFOSE	639.2 > 58.8		1.76e4	0.250	0.036						
77	-1											
78	73 TCDA	498.3>106.9			0.250							
79	61 13C5-PFHxA	318 > 272.9	1.37e4	1.37e4	0.250	1.000	3.56	12.5	50.0000	100.0		
80	60 13C4-PFBA	217. > 172	6.76e3	6.76e3	0.250	1.000	1.41	12.5	50.0000	100.0		
81	62 13C3-PFHxS	401.8 > 79.9	2.34e3	2.34e3	0.250	1.000	4.33	12.5	50.0000	100.0		
82	63 13C8-PFOA	420.9 > 376	1.85e4	1.85e4	0.250	1.000	4.68	12.5	50.0000	100.0		
83	47 13C8-PFOS	507.0 > 79.9	2.45e3	2.57e3	0.250	0.968	5.20	11.9	49.2918	98.6		
84	64 13C9-PFNA	472.2 > 426.9	1.33e4	1.33e4	0.250	1.000	5.12	12.5	50.0000	100.0		
85	65 13C4-PFOS	503 > 79.9	2.57e3	2.57e3	0.250	1.000	5.20	12.5	50.0000	100.0		
86	66 13C6-PFDA	519.1 > 473.7	1.49e4	1.49e4	0.250	1.000	5.49	12.5	50.0000	100.0		
87	67 13C7-PFUDa	570.1 > 524.8	1.76e4	1.76e4	0.250	1.000	5.81	12.5	50.0000	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

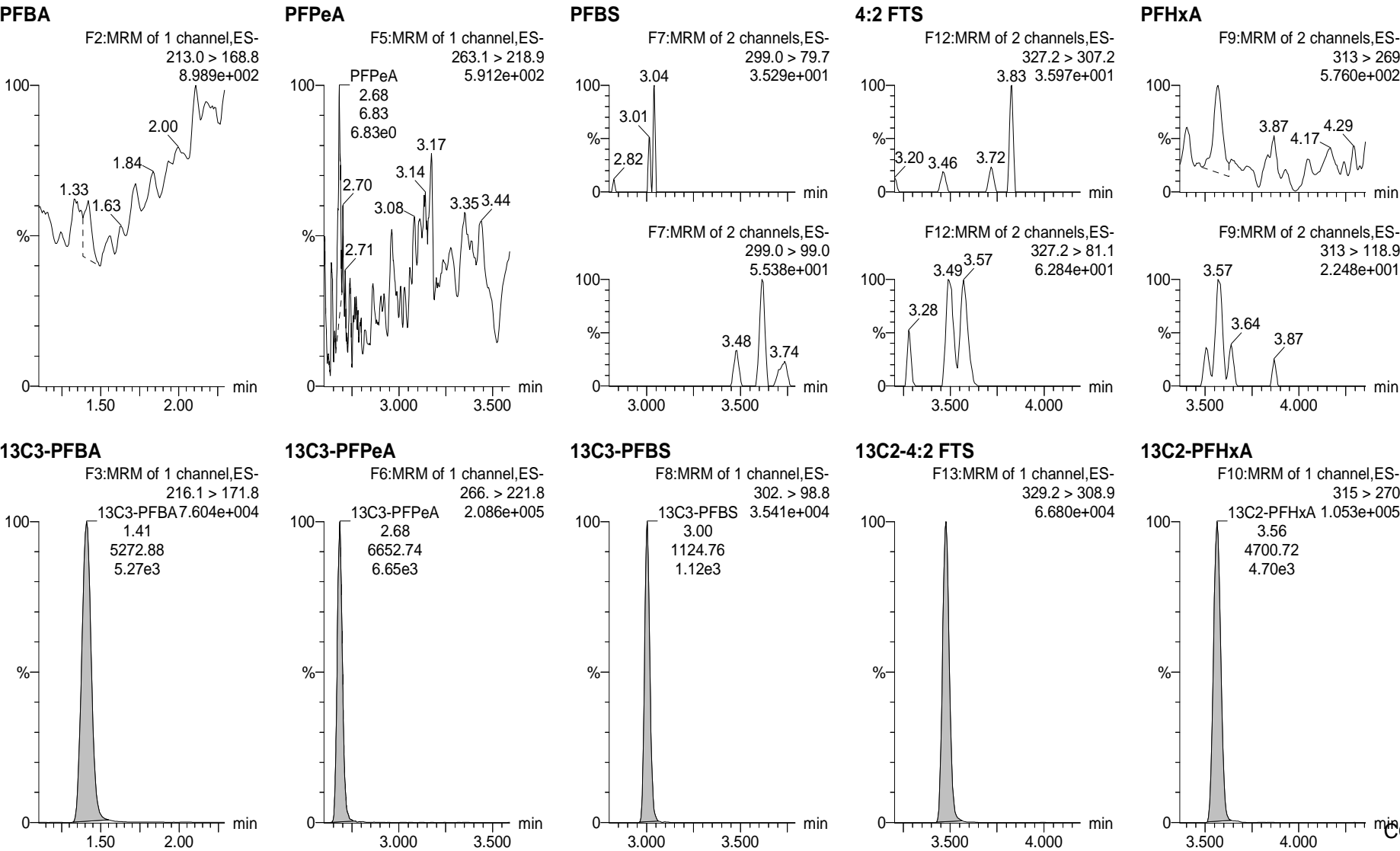
Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

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Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

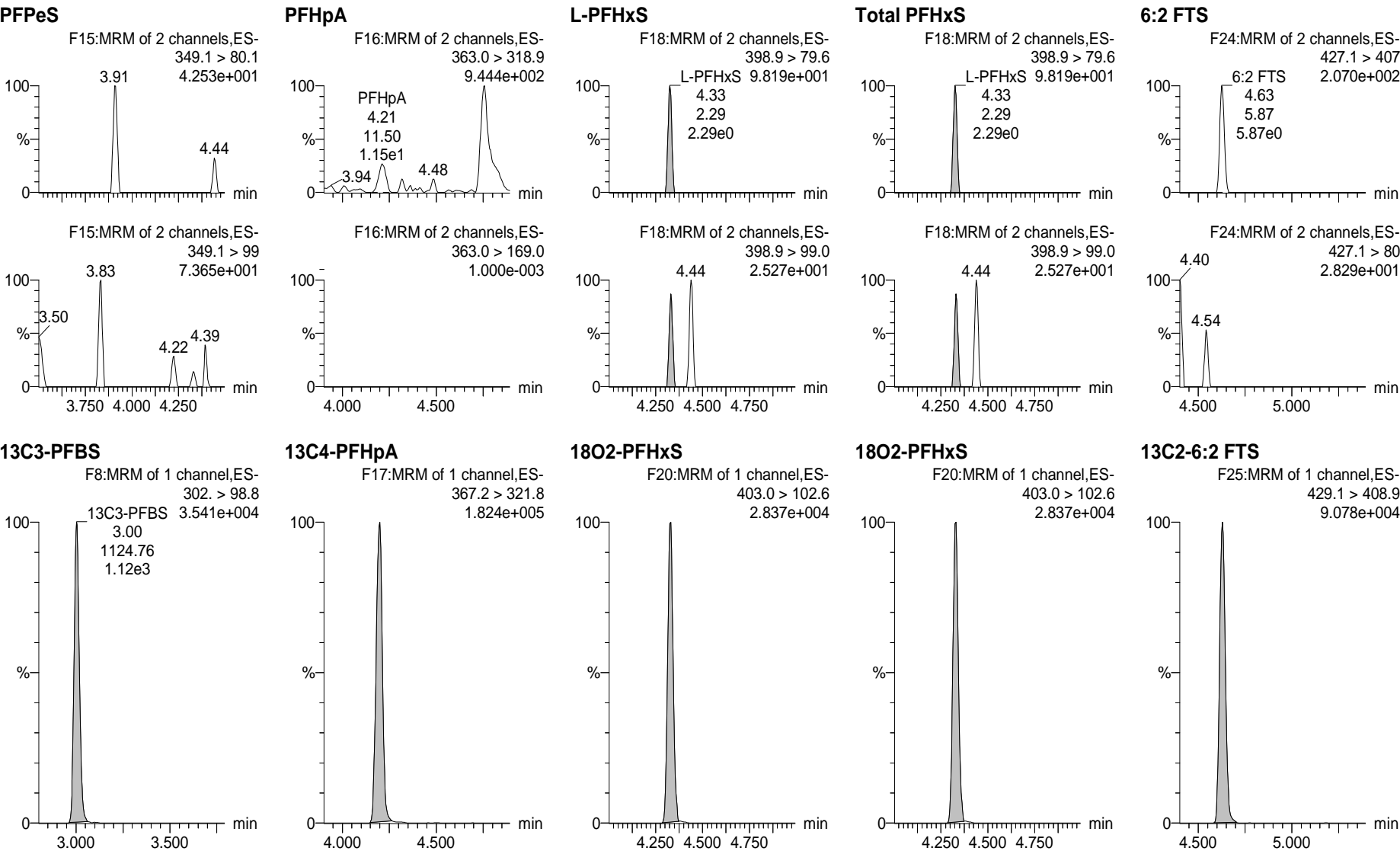


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Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

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Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

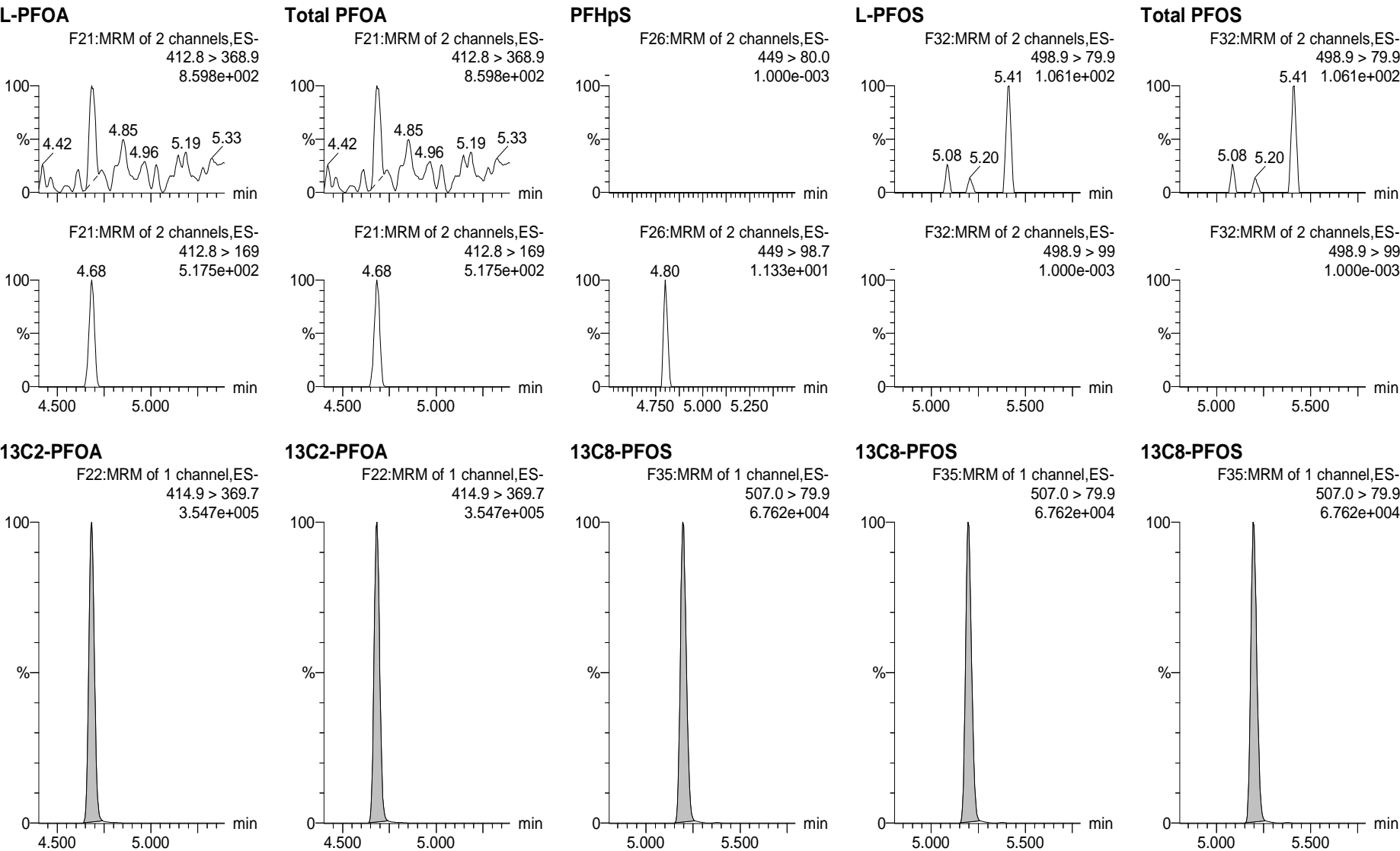


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Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

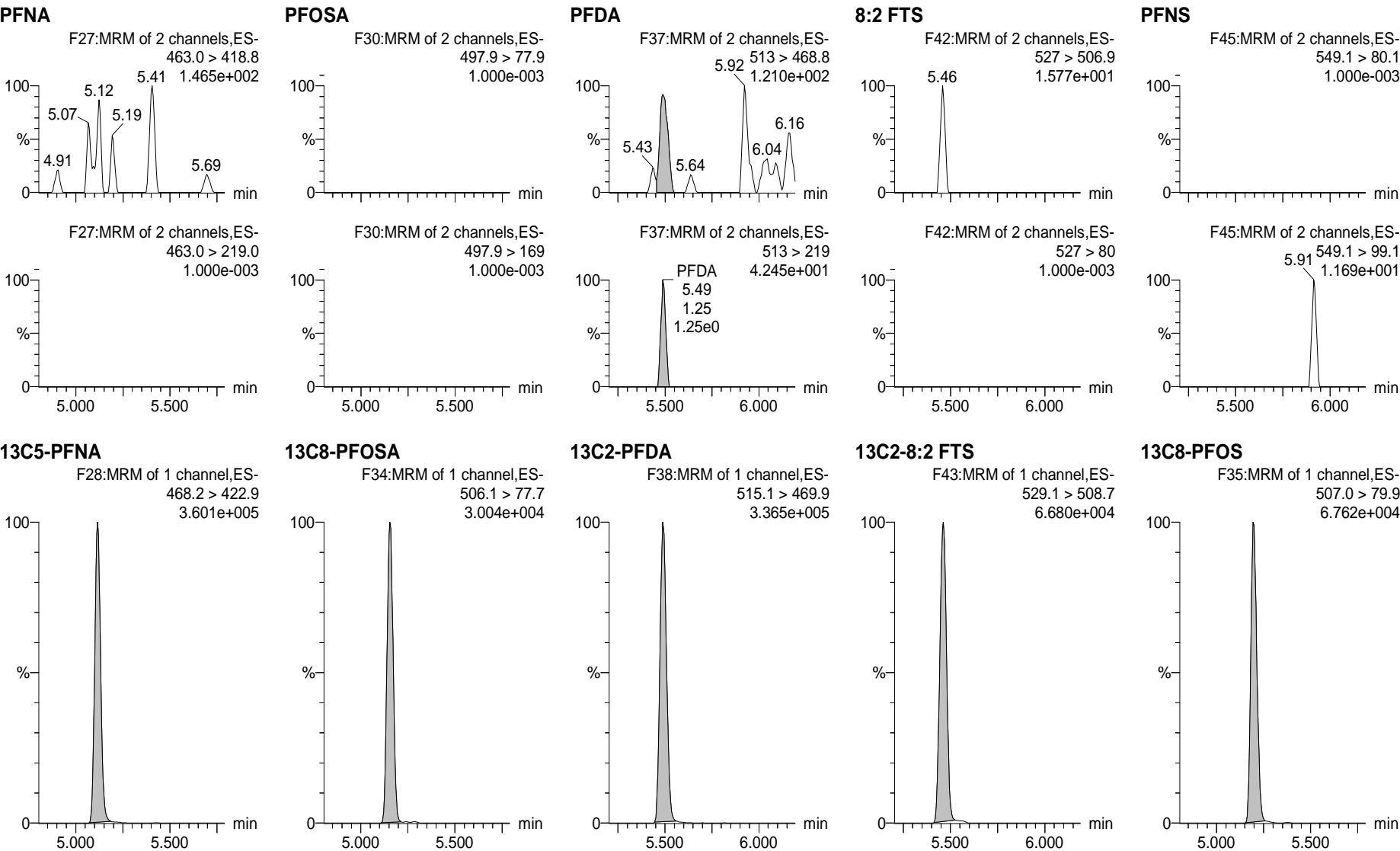


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Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

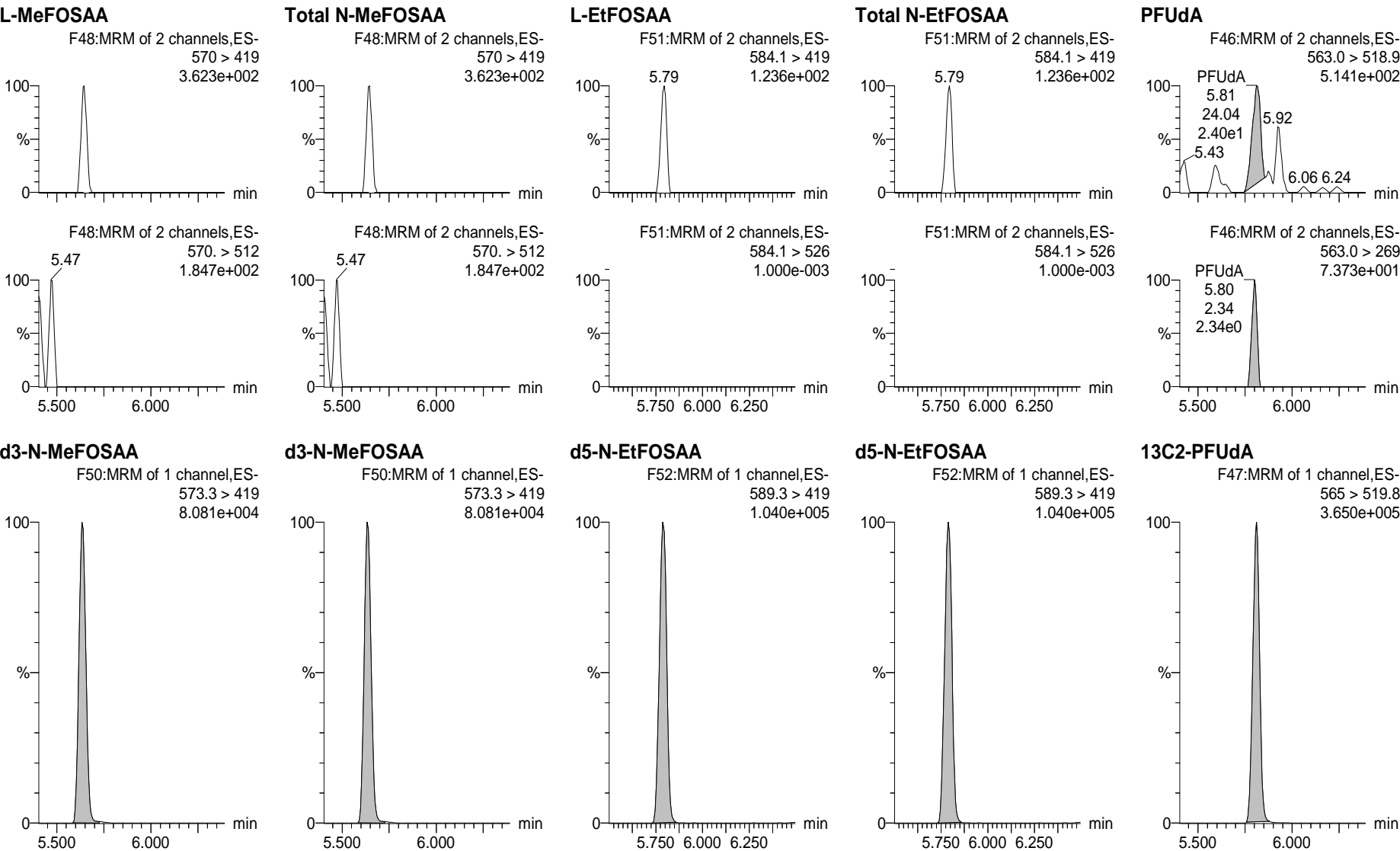


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Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

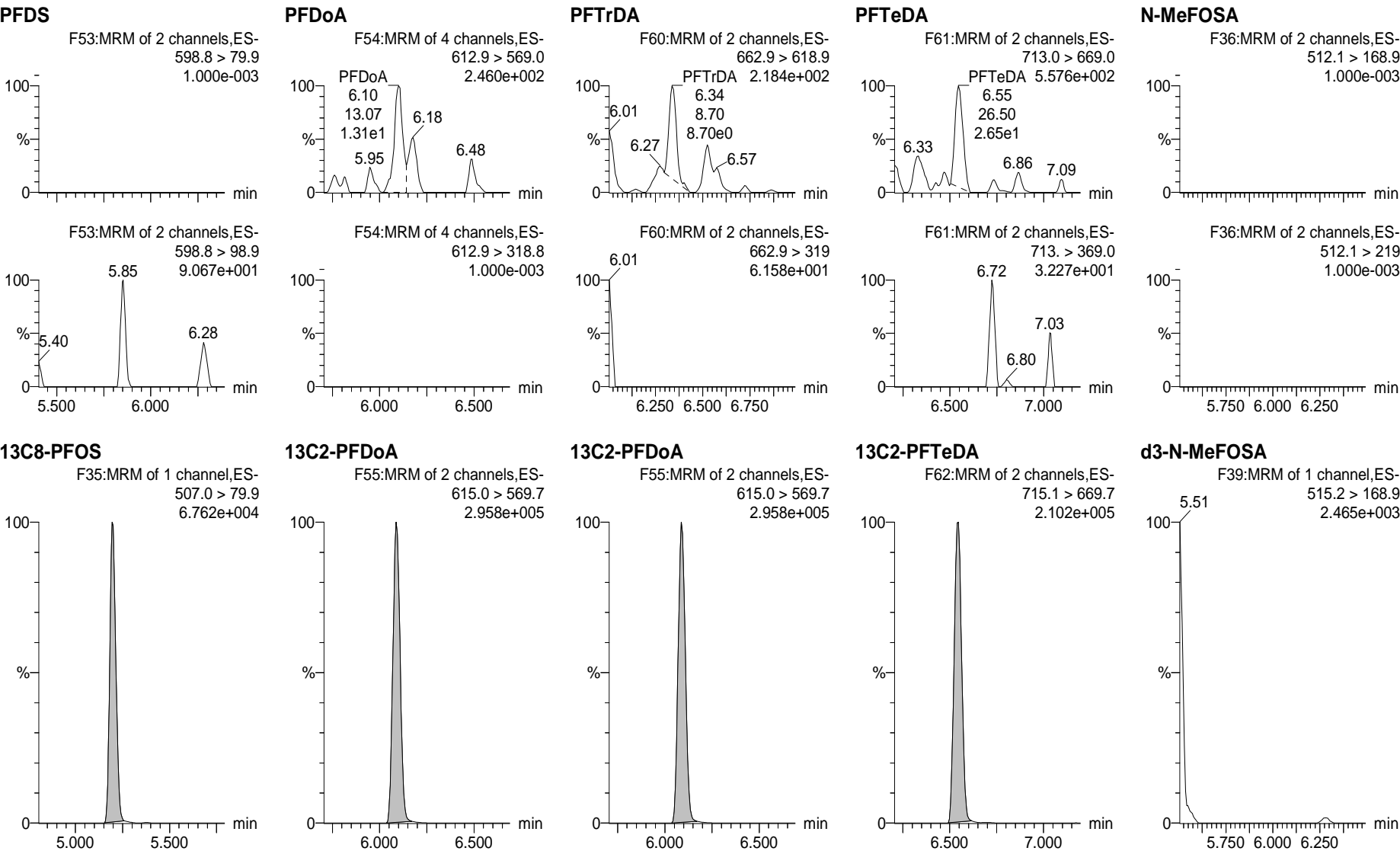


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

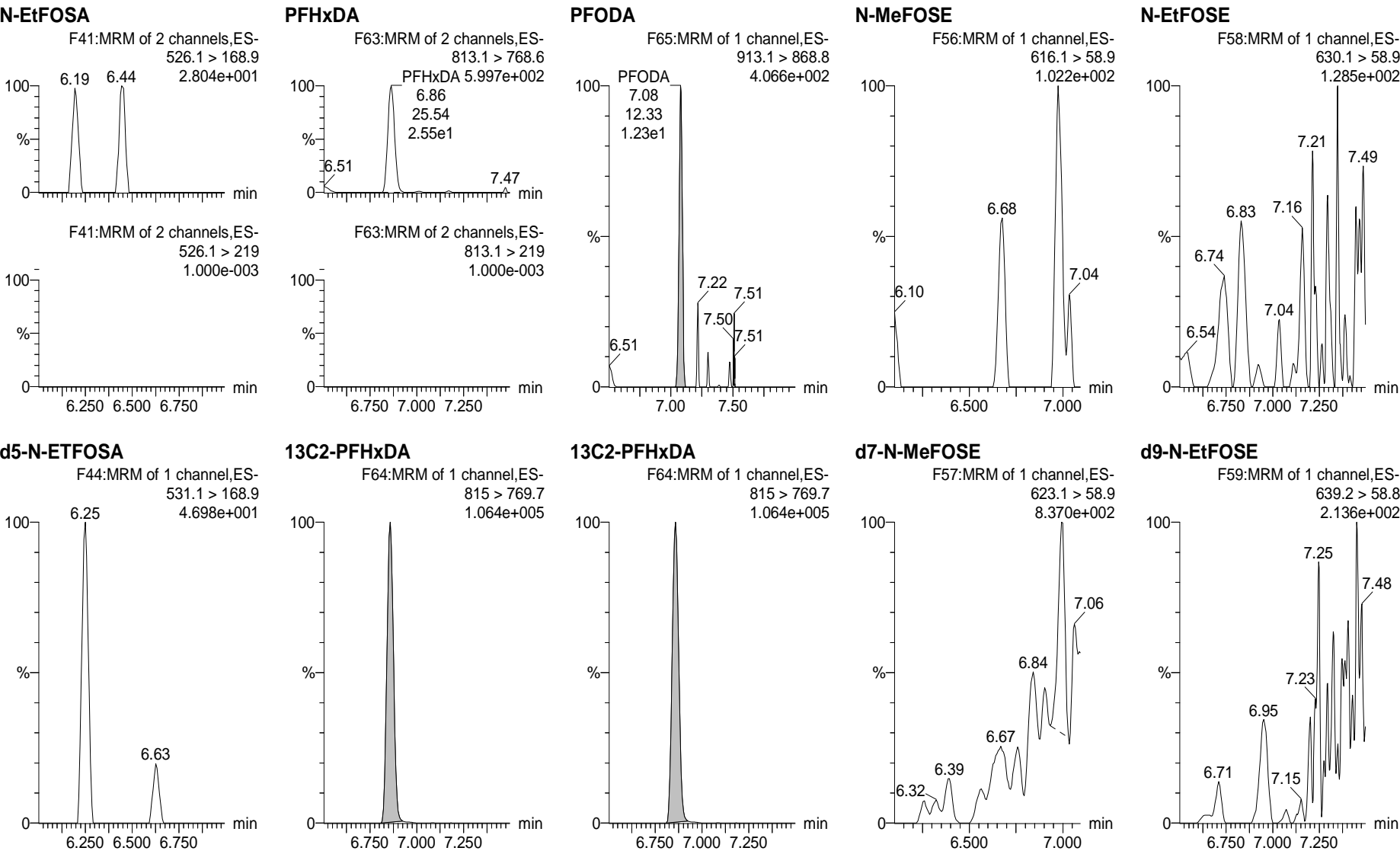


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Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

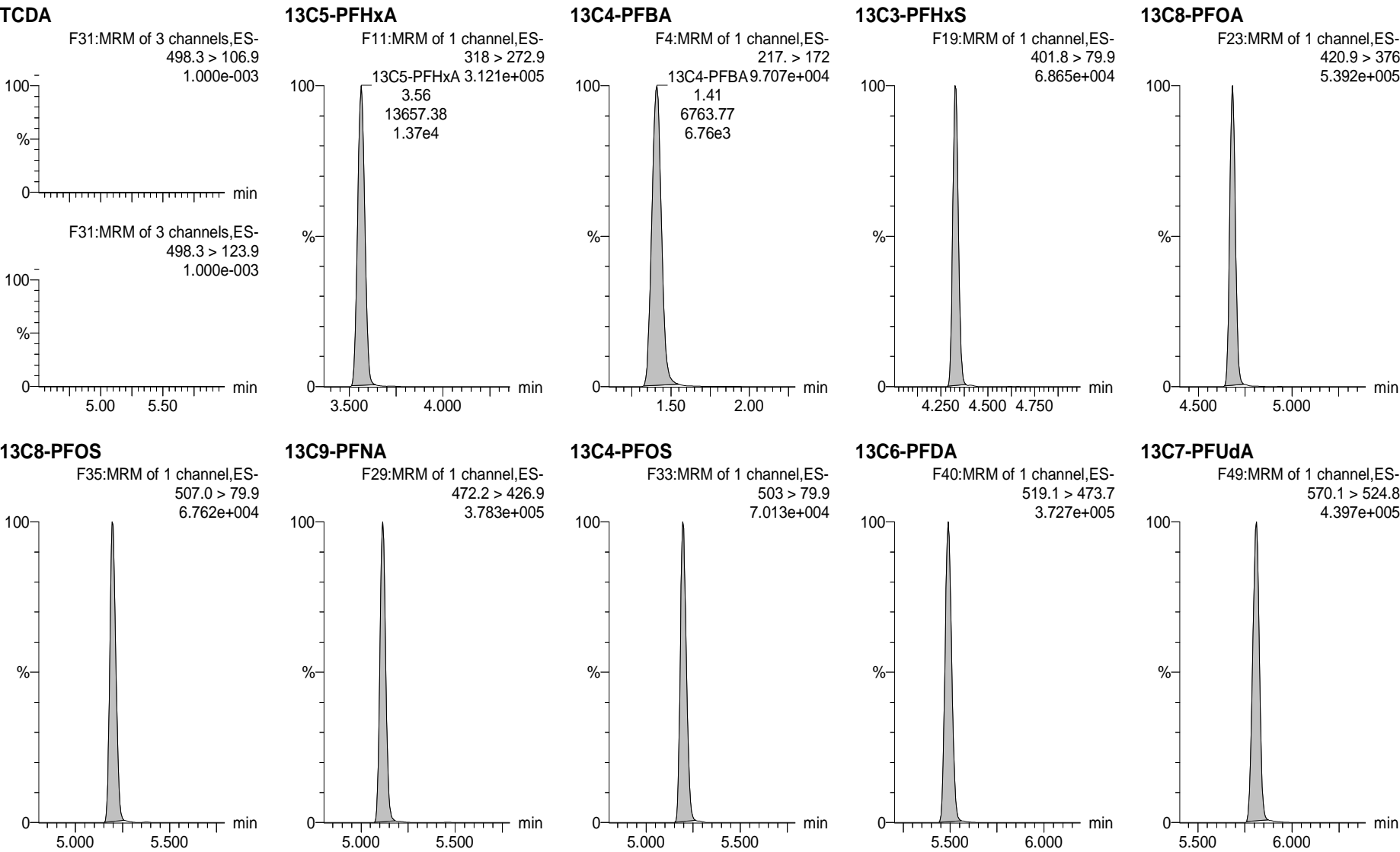


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-7.qld

Last Altered: Tuesday, December 04, 2018 12:44:00 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:52:03 Pacific Standard Time

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank



Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
1	1 PFBA	213.0 > 168.8	4.57e3	5.13e3	0.250		1.41	11.1	43.4281	108.6		
2	2 PFPeA	263.1 > 218.9	4.85e3	6.57e3	0.250		2.68	9.23	40.5799	101.4		
3	3 PFBS	299.0 > 79.7	1.89e3	1.14e3	0.250		3.00	20.8	41.3022	103.3	3.30	NO
4	4 4:2 FTS	327.2>307.2	2.45e3	2.95e3	0.250		3.48	10.4	51.1914	128.0	2.01	NO
5	5 PFHxA	313 > 269	9.28e3	4.78e3	0.250		3.56	9.70	37.0550	92.6	14.5	NO
6	36 13C3-PFBA	216.1 > 171.8	5.13e3	6.33e3	0.250	0.861	1.41	10.1	47.0582	94.1		
7	37 13C3-PFPeA	266. > 221.8	6.57e3	1.28e4	0.250	0.604	2.68	6.41	42.4725	84.9		
8	38 13C3-PFBS	302. > 98.8	1.14e3	2.20e3	0.250	0.633	3.00	6.45	40.7388	81.5		
9	39 13C2-4:2 FTS	329.2>308.9	2.95e3	2.20e3	0.250	2.074	3.47	16.8	32.3298	64.7		
10	40 13C2-PFHxA	315 > 270	4.78e3	1.28e4	0.250	0.900	3.56	4.66	20.7220	103.6		
11	-1											
12	6 PFPeS	349.1>80.1	1.27e3	1.14e3	0.250		3.77	13.9	37.7738	94.4	1.46	NO
13	7 PFHpA	363.0 > 318.9	7.55e3	7.13e3	0.250		4.20	13.2	45.5104	113.8	15.2	NO
14	8 L-PFHxS	398.9 > 79.6	1.70e3	1.01e3	0.250		4.33	21.1	42.8286	107.1	2.12	NO
15	68 Total PFHxS	398.9 > 79.6	1.70e3	1.01e3	0.250			21.1	42.8286			
16	10 6:2 FTS	427.1 > 407	3.47e3	3.30e3	0.250		4.63	13.1	55.7880	139.5	3.19	NO
17	38 13C3-PFBS	302. > 98.8	1.14e3	2.20e3	0.250	0.633	3.00	6.45	40.7388	81.5		
18	41 13C4-PFHpA	367.2 > 321.8	7.13e3	1.28e4	0.250	0.693	4.19	6.95	40.1340	80.3		
19	42 18O2-PFHxS	403.0 > 102.6	1.01e3	2.20e3	0.250	0.476	4.33	5.71	48.0073	96.0		
20	42 18O2-PFHxS	403.0 > 102.6	1.01e3	2.20e3	0.250	0.476	4.33	5.71	48.0073	96.0		
21	43 13C2-6:2 FTS	429.1 > 408.9	3.30e3	2.48e3	0.250	1.825	4.63	16.7	36.5259	73.1		
22	-1											
23	11 L-PFOA	412.8 > 368.9	1.35e4	1.17e4	0.250		4.68	14.5	47.3255	118.3	3.24	NO
24	69 Total PFOA	412.8 > 368.9	1.35e4	1.17e4	0.250			14.5	47.3255			
25	13 PFHpS	449 > 80.0	1.76e3	2.52e3	0.250		4.79	8.72	39.6499	99.1	1.81	NO
26	16 L-PFOS	498.9 > 79.9	2.11e3	2.52e3	0.250		5.19	10.5	38.0484	95.1	2.14	NO
27	70 Total PFOS	498.9 > 79.9	2.11e3	2.52e3	0.250			10.5	38.0484			
28	44 13C2-PFOA	414.9 > 369.7	1.17e4	1.75e4	0.250	0.873	4.68	8.32	38.1084	76.2		
29	44 13C2-PFOA	414.9 > 369.7	1.17e4	1.75e4	0.250	0.873	4.68	8.32	38.1084	76.2		
30	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
31	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
32	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
33	-1											
34	14 PFNA	463.0 > 418.8	1.10e4	1.18e4	0.250		5.11	11.6	42.0483	105.1	4.87	NO
35	15 PFOSA	497.9 > 77.9	1.22e3	1.43e3	0.250		5.15	10.7	37.7042	94.3	41.0	YES

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

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Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
36	18 PFDA	513 > 468.8	1.10e4	1.19e4	0.250		5.49	11.6	43.1038	107.8	6.04	NO
37	19 8:2 FTS	527 > 506.9	3.23e3	2.81e3	0.250		5.46	14.4	44.1912	110.5	2.54	NO
38	20 PFNS	549.1 > 80.1	1.27e3	2.52e3	0.250		5.55	6.28	32.4646	81.2	1.86	NO
39	45 13C5-PFNA	468.2 > 422.9	1.18e4	1.36e4	0.250	1.006	5.11	10.9	43.2691	86.5		
40	46 13C8-PFOA	506.1 > 77.7	1.43e3	1.77e4	0.250	0.202	5.15	1.01	19.9917	40.0		
41	48 13C2-PFDA	515.1 > 469.9	1.19e4	1.52e4	0.250	1.125	5.49	9.84	35.0012	70.0		
42	49 13C2-8:2 FTS	529.1 > 508.7	2.81e3	2.48e3	0.250	1.086	5.46	14.2	52.2239	104.4		
43	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
44	-1											
45	21 L-MeFOSAA	570 > 419	4.18e3	3.07e3	0.250		5.64	17.0	45.1668	112.9	2.27	NO
46	71 Total N-MeFOSAA	570. > 419	4.18e3	3.07e3	0.250			17.0	45.1668			
47	23 L-EtFOSAA	584.1 > 419	3.71e3	4.22e3	0.250		5.79	11.0	40.5764	101.4	1.28	NO
48	72 Total N-EtFOSAA	584.1 > 419	3.71e3	4.22e3	0.250			11.0	40.5764			
49	25 PFUdA	563.0 > 518.9	1.02e4	1.34e4	0.250		5.81	9.52	35.3801	88.5	9.66	NO
50	50 d3-N-MeFOSAA	573.3 > 419	3.07e3	1.77e4	0.250	0.329	5.63	2.17	26.3869	52.8		
51	50 d3-N-MeFOSAA	573.3 > 419	3.07e3	1.77e4	0.250	0.329	5.63	2.17	26.3869	52.8		
52	52 d5-N-EtFOSAA	589.3 > 419	4.22e3	1.77e4	0.250	0.355	5.79	2.98	33.6026	67.2		
53	52 d5-N-EtFOSAA	589.3 > 419	4.22e3	1.77e4	0.250	0.355	5.79	2.98	33.6026	67.2		
54	51 13C2-PFUdA	565 > 519.8	1.34e4	1.77e4	0.250	1.111	5.81	9.48	34.1373	68.3		
55	-1											
56	26 PFDS	598.8 > 79.9	1.79e3	2.52e3	0.250		5.85	8.88	43.3902	108.5	1.70	NO
57	27 PFDoA	612.9 > 569.0	1.23e4	1.18e4	0.250		6.09	13.0	39.6393	99.1	8.70	NO
58	29 PFTTrDA	662.9 > 618.9	1.23e4	1.18e4	0.250		6.33	13.0	42.8956	107.2	26.4	NO
59	30 PFTeDA	713.0 > 669.0	1.22e4	9.66e3	0.250		6.55	15.8	55.8544	139.6	14.6	NO
60	28 N-MeFOSA	512.1 > 168.9	7.31e2		0.250		6.01				1.63	NO
61	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
62	53 13C2-PFDoA	615.0 > 569.7	1.18e4	1.52e4	0.250	0.993	6.09	9.74	39.2178	78.4		
63	53 13C2-PFDoA	615.0 > 569.7	1.18e4	1.52e4	0.250	0.993	6.09	9.74	39.2178	78.4		
64	55 13C2-PFTeDA	715.1 > 669.7	9.66e3	1.77e4	0.250	0.749	6.54	6.82	36.4253	72.9		
65	54 d3-N-MeFOSA	515.2 > 168.9		1.77e4	0.250	0.074						
66	-1											
67	31 N-EtFOSA	526.1 > 168.9	9.50e2		0.250		6.45				1.66	NO
68	32 PFHxDA	813.1 > 768.6	3.55e3	3.87e3	0.250		6.86	4.58	34.2852	85.7	18.8	NO
69	33 PFODA	913.1 > 868.8	5.58e2	3.87e3	0.250		7.08	0.721	3.3092	8.3		
70	34 N-MeFOSE	616.1 > 58.9	1.13e3		0.250		6.68					

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

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Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	RT	Respo...	Conc.	%Rec	Ion Ratio	Ratio Out?
71	35 N-EtFOSE	630.1 > 58.9	1.40e3		0.250		6.82					
72	56 d5-N-ETFOSA	531.1 > 168.9		1.77e4	0.250	0.097						
73	57 13C2-PFHxDA	815 > 769.7	3.87e3	1.77e4	0.250	0.714	6.86	2.73	15.3060	76.5		
74	57 13C2-PFHxDA	815 > 769.7	3.87e3	1.77e4	0.250	0.714	6.86	2.73	15.3060	76.5		
75	58 d7-N-MeFOSE	623.1 > 58.9		1.77e4	0.250	0.036						
76	59 d9-N-EtFOSE	639.2 > 58.8		1.77e4	0.250	0.036						
77	-1											
78	73 TCDA	498.3>106.9			0.250							
79	61 13C5-PFHxA	318 > 272.9	1.28e4	1.28e4	0.250	1.000	3.56	12.5	50.0000	100.0		
80	60 13C4-PFBA	217. > 172	6.33e3	6.33e3	0.250	1.000	1.41	12.5	50.0000	100.0		
81	62 13C3-PFHxS	401.8 > 79.9	2.20e3	2.20e3	0.250	1.000	4.33	12.5	50.0000	100.0		
82	63 13C8-PFOA	420.9 > 376	1.75e4	1.75e4	0.250	1.000	4.68	12.5	50.0000	100.0		
83	47 13C8-PFOS	507.0 > 79.9	2.52e3	2.48e3	0.250	0.968	5.19	12.7	52.6695	105.3		
84	64 13C9-PFNA	472.2 > 426.9	1.36e4	1.36e4	0.250	1.000	5.11	12.5	50.0000	100.0		
85	65 13C4-PFOS	503 > 79.9	2.48e3	2.48e3	0.250	1.000	5.20	12.5	50.0000	100.0		
86	66 13C6-PFDA	519.1 > 473.7	1.52e4	1.52e4	0.250	1.000	5.49	12.5	50.0000	100.0		
87	67 13C7-PFUdA	570.1 > 524.8	1.77e4	1.77e4	0.250	1.000	5.81	12.5	50.0000	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

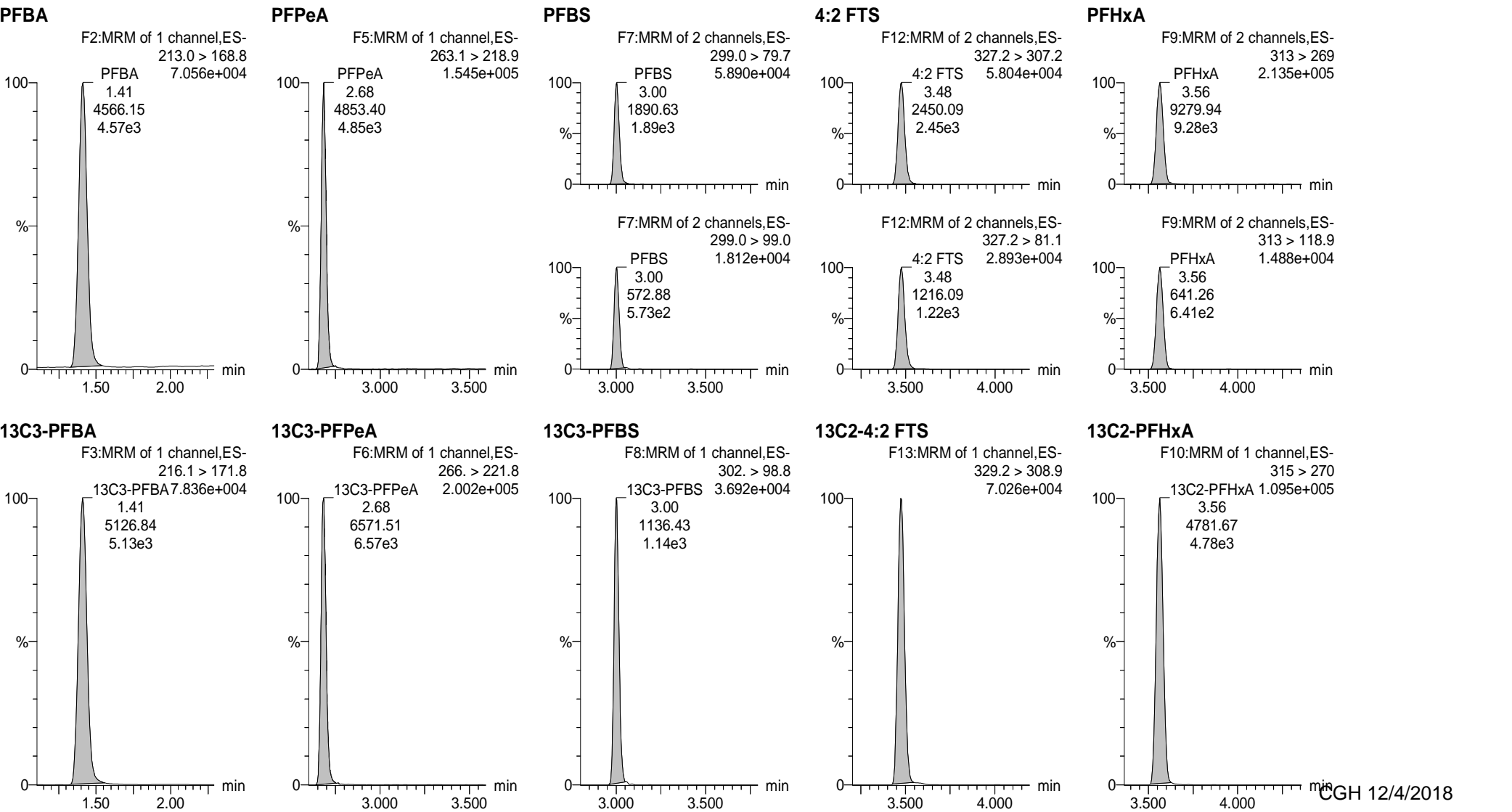
Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

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Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

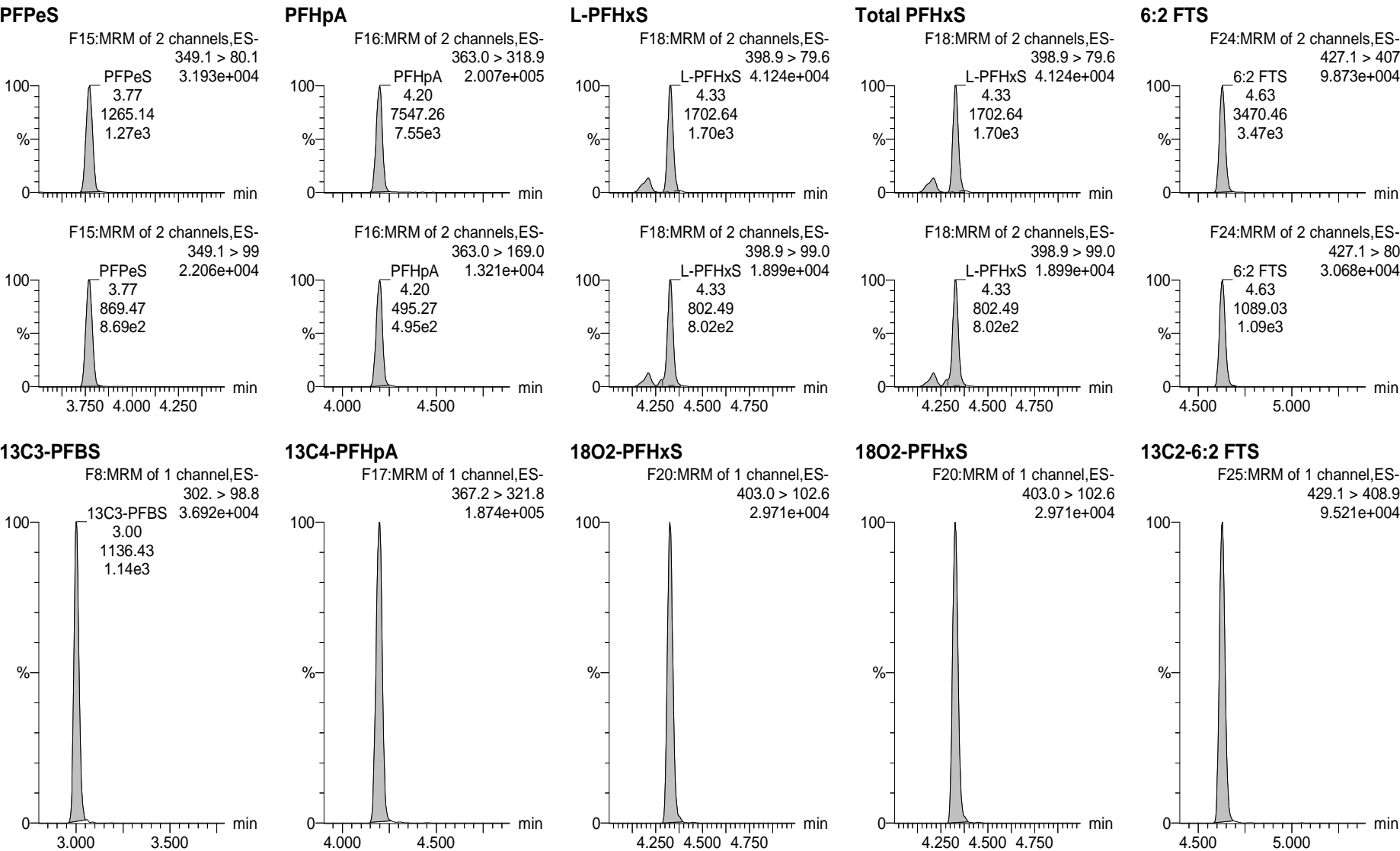


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

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Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

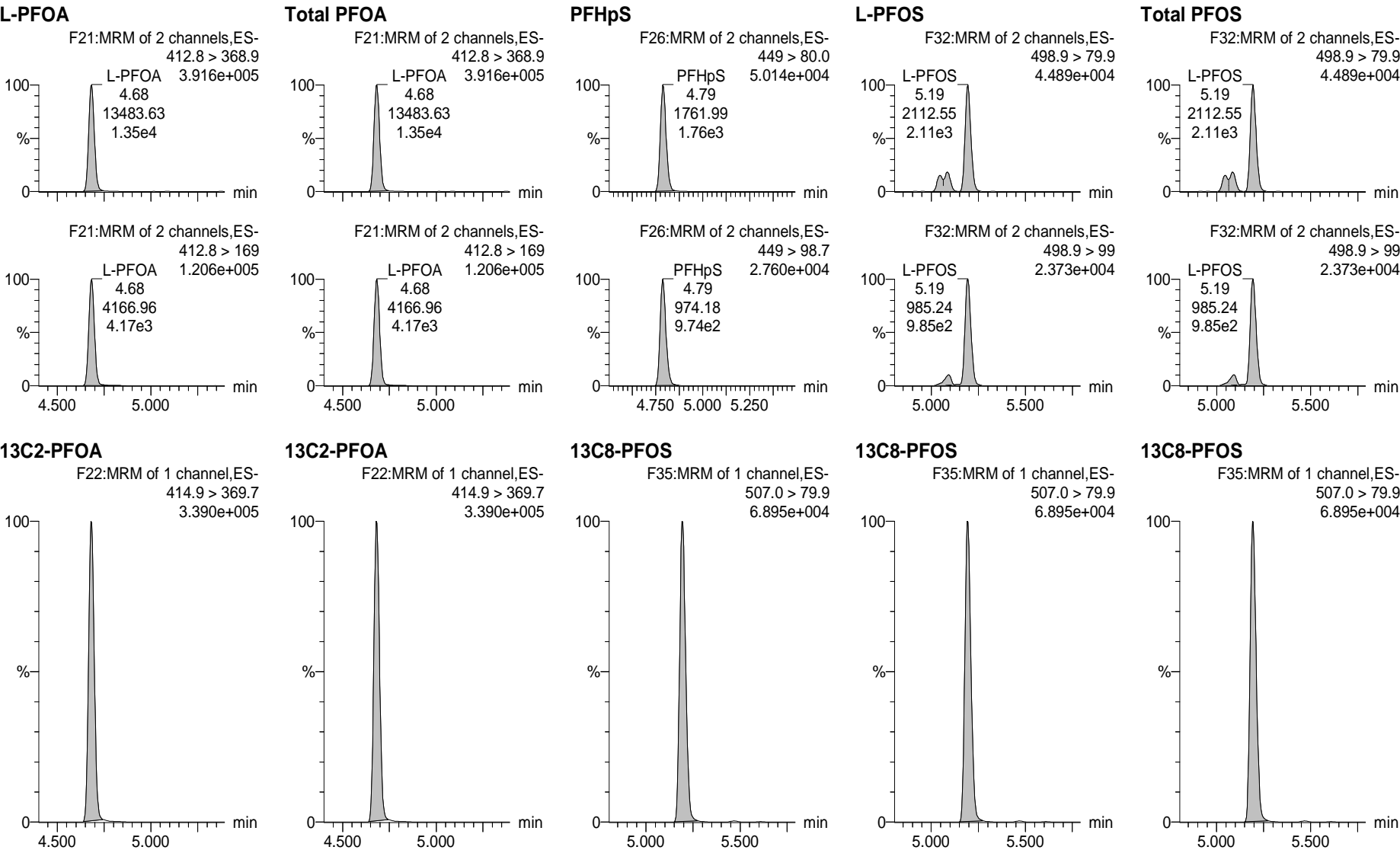


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

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Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

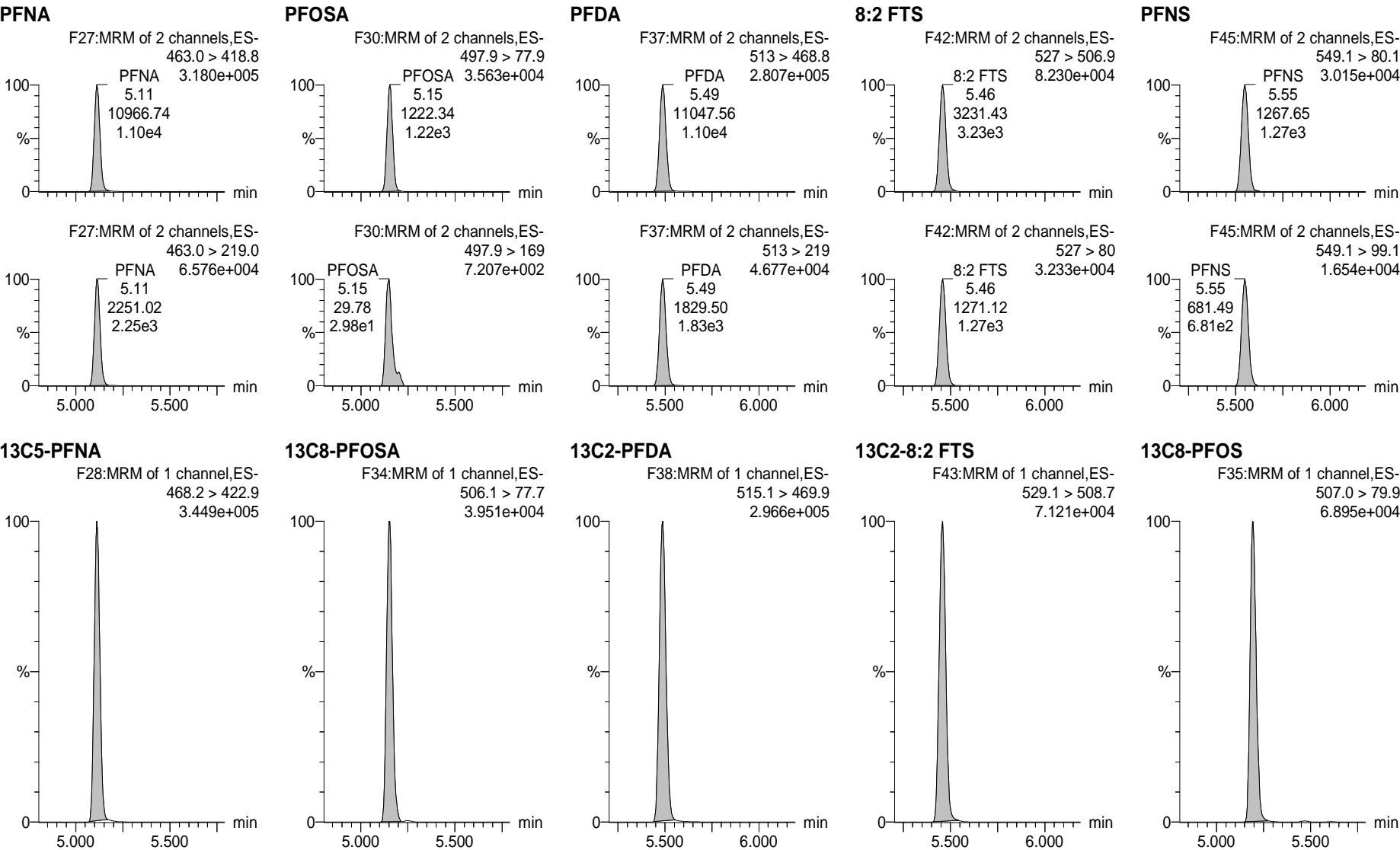


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

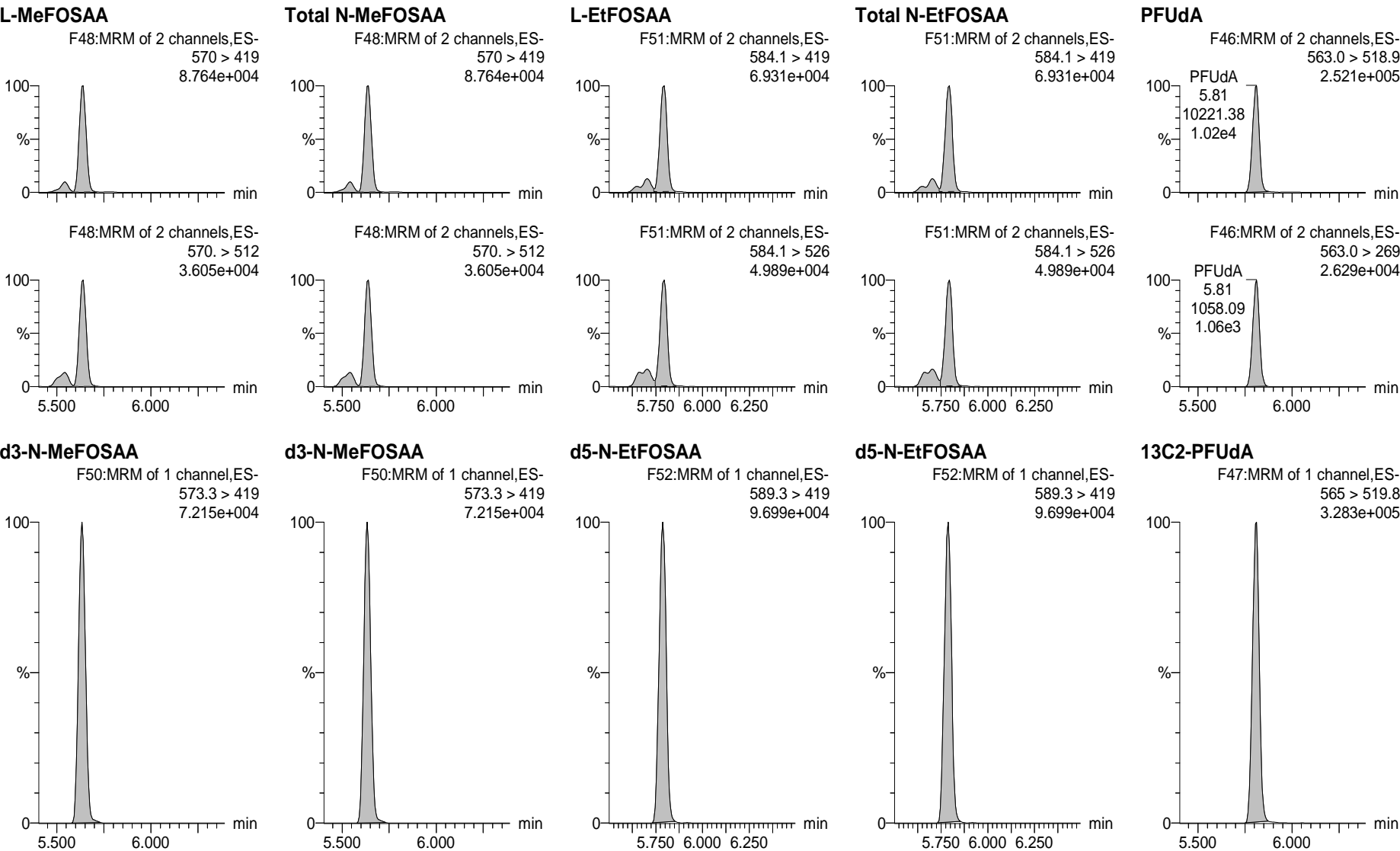


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

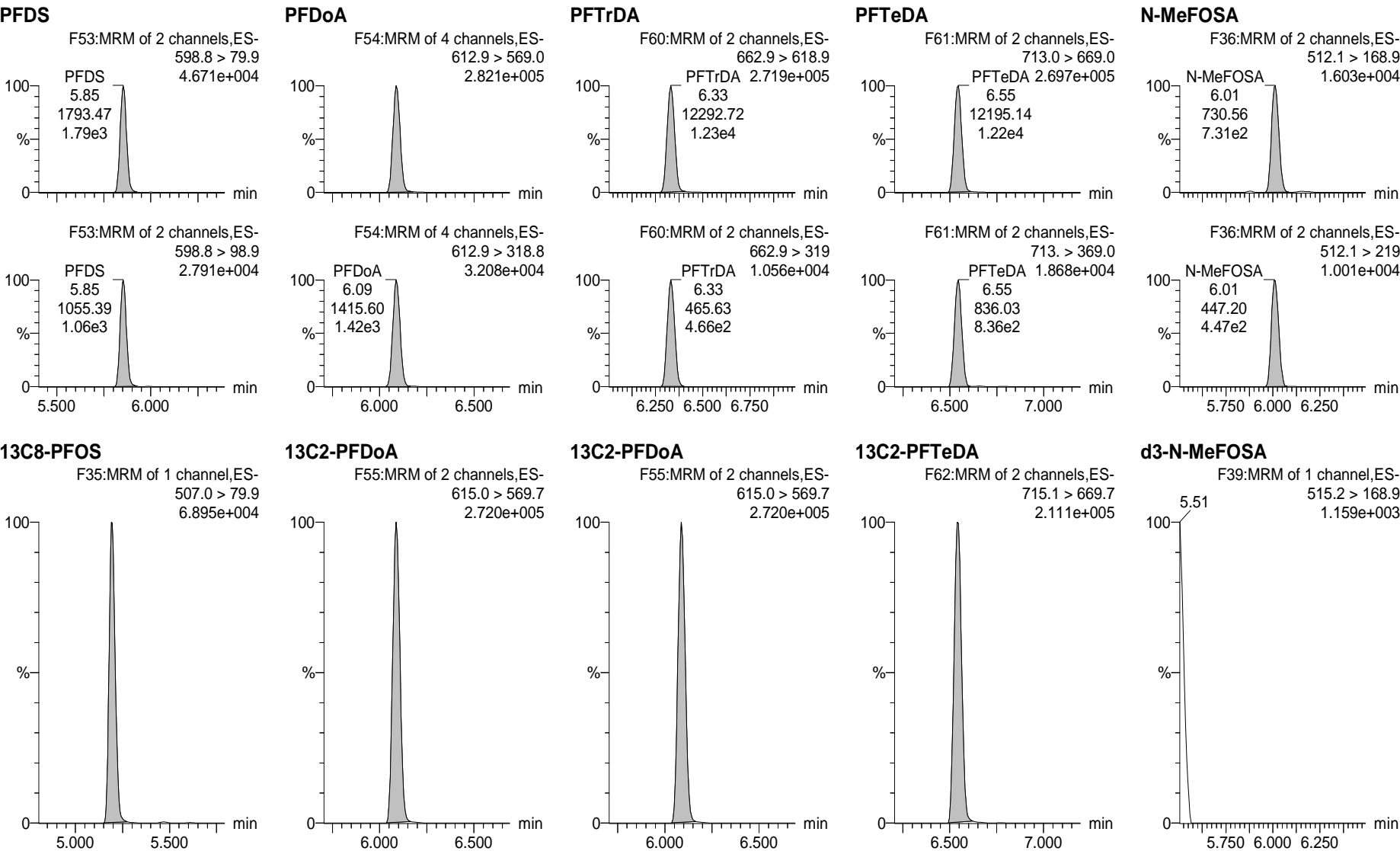


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

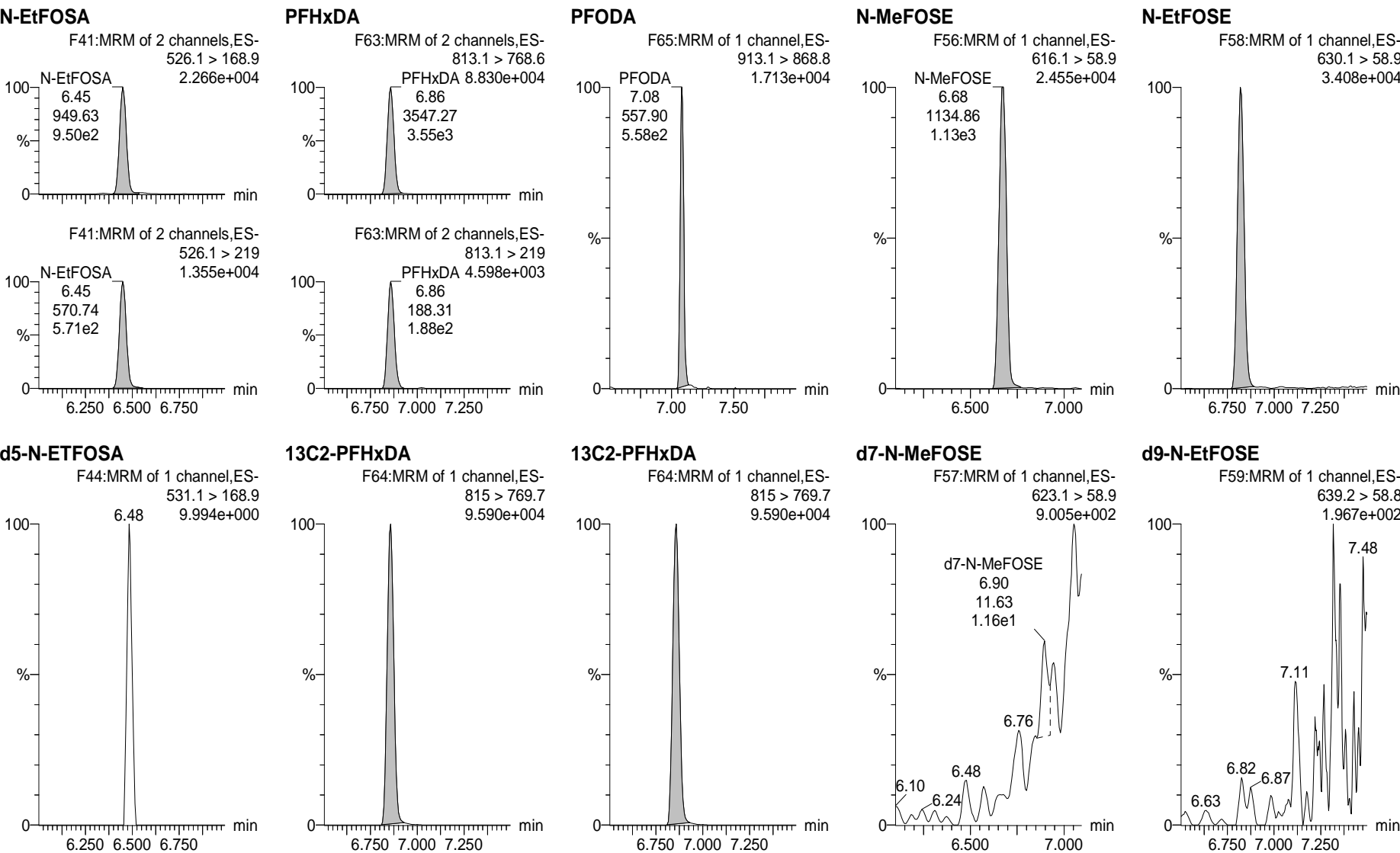


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

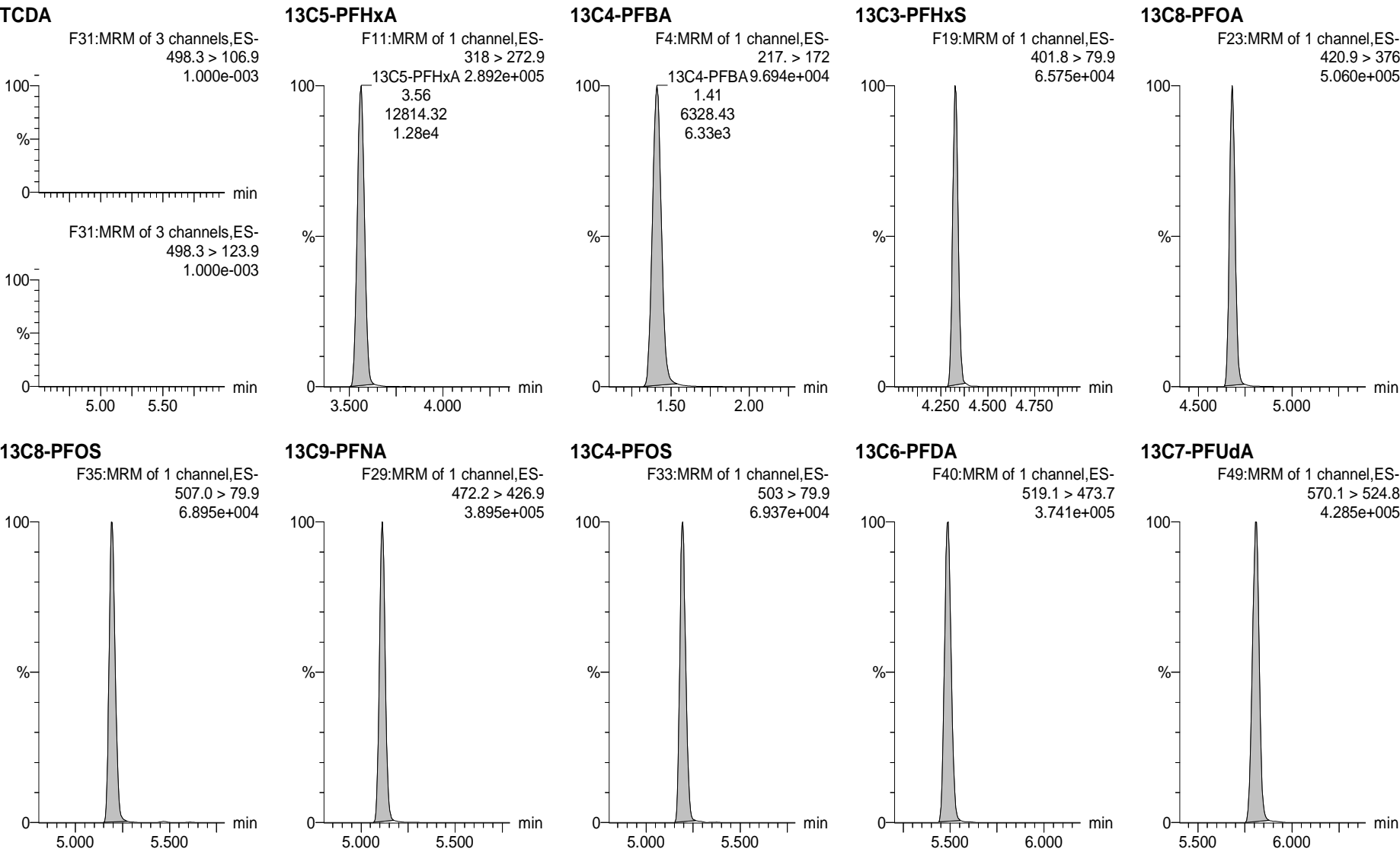


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-4.qld

Last Altered: Tuesday, December 04, 2018 12:10:04 Pacific Standard Time

Printed: Tuesday, December 04, 2018 12:19:21 Pacific Standard Time

Name: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-12.qld

Last Altered: Wednesday, December 05, 2018 10:18:26 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	4.07e3	1.18e3	0.116		3.00	3.00	43.1	184.0140		2.939	NO
2	5 PFHxA	313 > 269	3.39e4	3.06e3	0.116		3.56	3.57	55.4	459.6291		14.876	NO
3	7 PFHpA	363.0 > 318.9	1.63e3	4.28e3	0.116		4.20	4.20	4.76	35.1678		11.509	NO
4	8 L-PFHxS	398.9 > 79.6	2.22e3	1.10e3	0.116		4.33	4.33	25.1	109.2595		2.332	NO
5	68 Total PFHxS	398.9 > 79.6	2.22e3	1.10e3	0.116		4.58		25.1	109.2595			
6	11 L-PFOA	412.8 > 368.9	2.79e3	6.99e3	0.116		4.58	4.68	5.00	34.9089		3.248	NO
7	69 Total PFOA	412.8 > 368.9	2.79e3	6.99e3	0.116		4.97		5.00	34.9089			
8	38 13C3-PFBS	302. > 98.8	1.18e3	2.59e3	0.116	0.633	3.00	3.00	5.70	77.4618	72.0		
9	40 13C2-PFHxA	315 > 270	3.06e3	8.44e3	0.116	0.900	3.56	3.56	4.53	43.2757	100.6		
10	41 13C4-PFHpA	367.2 > 321.8	4.28e3	8.44e3	0.116	0.693	4.19	4.20	6.34	78.6354	73.1		
11	42 18O2-PFHxS	403.0 > 102.6	1.10e3	2.59e3	0.116	0.476	4.33	4.33	5.34	96.5546	89.8		
12	42 18O2-PFHxS	403.0 > 102.6	1.10e3	2.59e3	0.116	0.476	4.33	4.33	5.34	96.5546	89.8		
13	44 13C2-PFOA	414.9 > 369.7	6.99e3	1.10e4	0.116	0.873	4.68	4.68	7.94	78.2600	72.8		
14	44 13C2-PFOA	414.9 > 369.7	6.99e3	1.10e4	0.116	0.873	4.68	4.68	7.94	78.2600	72.8		
15	-1												
16	14 PFNA	463.0 > 418.8		6.40e3	0.116		5.11						
17	16 L-PFOS	498.9 > 79.9	2.46e2	2.76e3	0.116		5.08	5.20	1.11	9.1564		2.700	NO
18	70 Total PFOS	498.9 > 79.9	2.46e2	2.76e3	0.116		5.46		1.11	9.1564			
19	18 PFDA	513 > 468.8		6.64e3	0.116		5.48						
20	21 L-MeFOSAA	570 > 419		3.09e3	0.116		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	3.09e3	0.116		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		7.69e3	0.116		5.81						
23	45 13C5-PFNA	468.2 > 422.9	6.40e3	7.74e3	0.116	1.006	5.11	5.12	10.3	88.3352	82.2		
24	47 13C8-PFOS	507.0 > 79.9	2.76e3	2.52e3	0.116	0.968	5.19	5.20	13.7	121.8797	113.4		
25	47 13C8-PFOS	507.0 > 79.9	2.76e3	2.52e3	0.116	0.968	5.19	5.20	13.7	121.8797	113.4		
26	48 13C2-PFDA	515.1 > 469.9	6.64e3	9.12e3	0.116	1.125	5.48	5.49	9.10	69.6056	64.7		
27	50 d3-N-MeFOSAA	573.3 > 419	3.09e3	1.11e4	0.116	0.329	5.63	5.63	3.48	90.8227	84.5		
28	50 d3-N-MeFOSAA	573.3 > 419	3.09e3	1.11e4	0.116	0.329	5.63	5.63	3.48	90.8227	84.5		
29	51 13C2-PFUDa	565 > 519.8	7.69e3	1.11e4	0.116	1.111	5.81	5.81	8.64	66.8891	62.2		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.14e3	0.116		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.14e3	0.116		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		7.44e3	0.116		6.32						
34	27 PFDoA	612.9 > 569.0		7.44e3	0.116		6.08						
35	30 PFTeDA	713.0 > 669.0	1.31e1	7.33e3	0.116		6.54	6.55	0.0224	0.1597		27.487	YES
36	73 TCDA	498.3>106.9			0.116		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-12.qld

Last Altered: Wednesday, December 05, 2018 10:18:26 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	8.44e3	8.44e3	0.116	1.000	3.56	3.56	3.56	12.5	107.5176	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.14e3	1.11e4	0.116	0.355	5.78	5.79	5.79	4.65	112.7428	104.9		
39	52	d5-N-EtFOSAA	589.3 > 419	4.14e3	1.11e4	0.116	0.355	5.78	5.79	5.79	4.65	112.7428	104.9		
40	53	13C2-PFDoA	615.0 > 569.7	7.44e3	9.12e3	0.116	0.993	6.08	6.09	6.09	10.2	88.3471	82.2		
41	53	13C2-PFDoA	615.0 > 569.7	7.44e3	9.12e3	0.116	0.993	6.08	6.09	6.09	10.2	88.3471	82.2		
42	55	13C2-PFTeDA	715.1 > 669.7	7.33e3	1.11e4	0.116	0.749	6.54	6.55	6.55	8.23	94.5293	87.9		
43	47	13C8-PFOS	507.0 > 79.9	2.76e3	2.52e3	0.116	0.968	5.19	5.20	5.20	13.7	121.8797	113.4		
44	63	13C8-PFOA	420.9 > 376	1.10e4	1.10e4	0.116	1.000	4.68	4.68	4.68	12.5	107.5176	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.59e3	2.59e3	0.116	1.000	4.33	4.33	4.33	12.5	107.5176	100.0		
47	64	13C9-PFNA	472.2 > 426.9	7.74e3	7.74e3	0.116	1.000	5.11	5.12	5.12	12.5	107.5176	100.0		
48	65	13C4-PFOS	503 > 79.9	2.52e3	2.52e3	0.116	1.000	5.19	5.20	5.20	12.5	107.5176	100.0		
49	66	13C6-PFDA	519.1 > 473.7	9.12e3	9.12e3	0.116	1.000	5.48	5.49	5.49	12.5	107.5176	100.0		
50	67	13C7-PFUDa	570.1 > 524.8	1.11e4	1.11e4	0.116	1.000	5.81	5.81	5.81	12.5	107.5176	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-12.qld

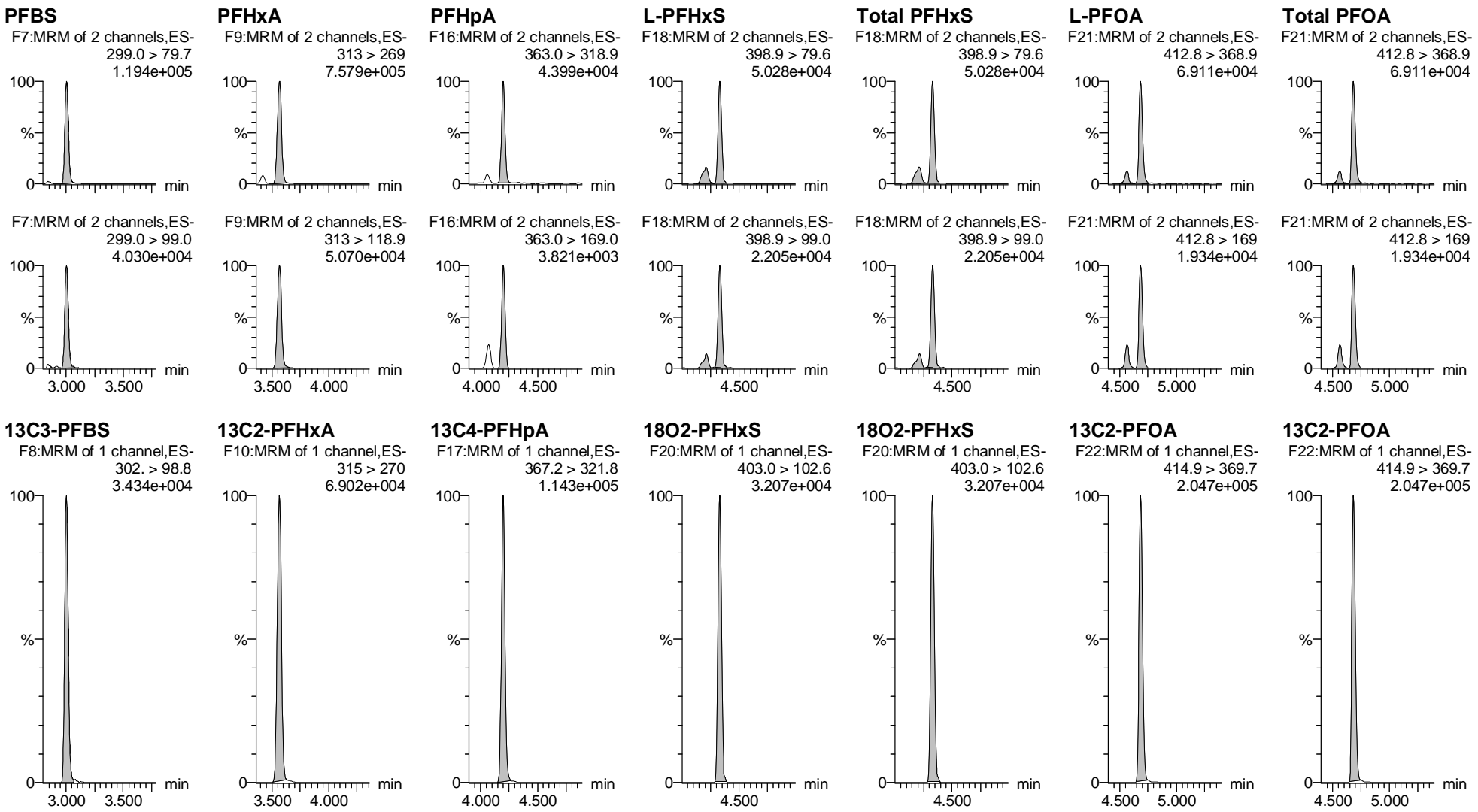
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Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

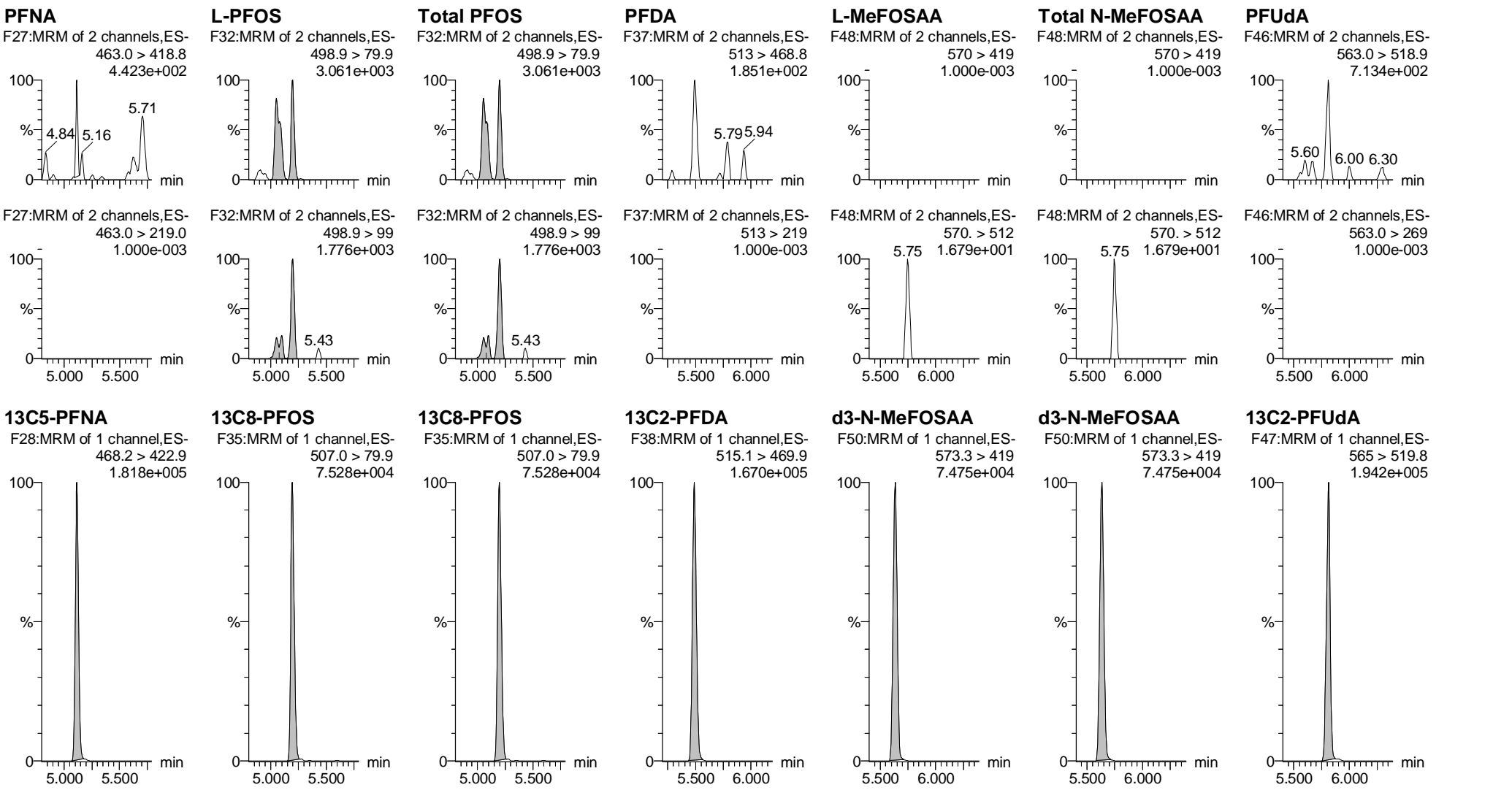


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Last Altered: Wednesday, December 05, 2018 10:18:26 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

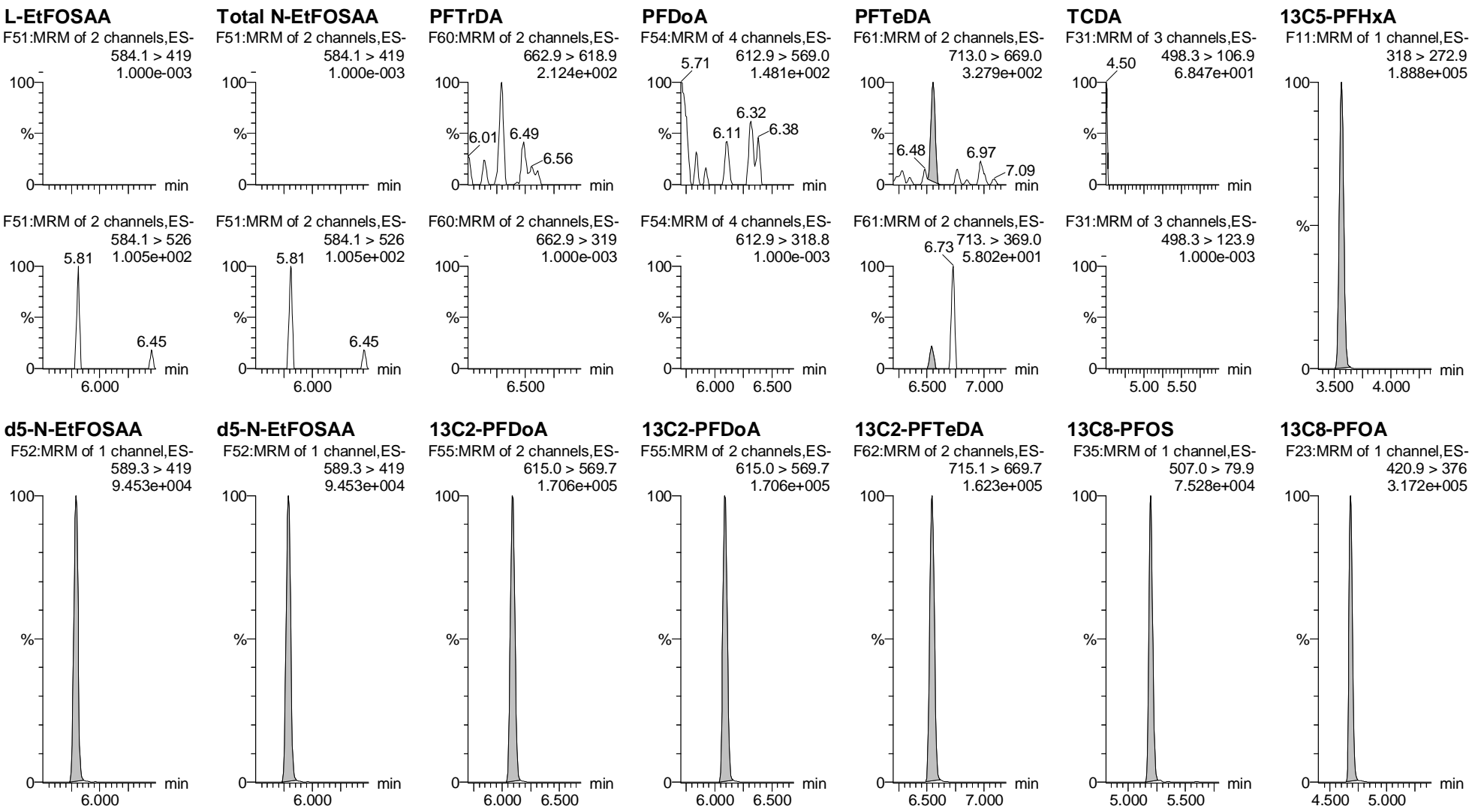


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Last Altered: Wednesday, December 05, 2018 10:18:26 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2



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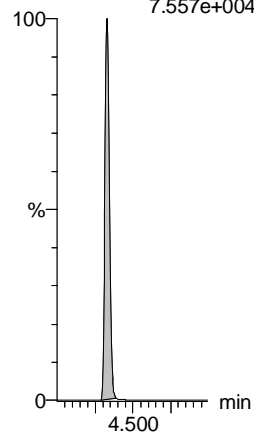
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Last Altered: Wednesday, December 05, 2018 10:18:26 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:19:54 Pacific Standard Time

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

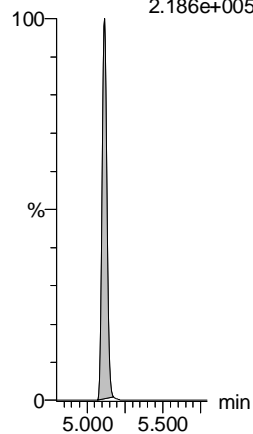
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
7.557e+004



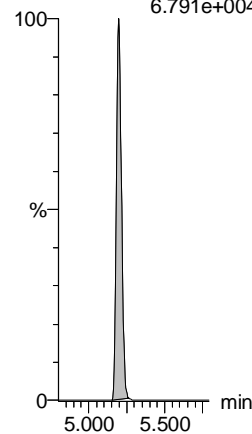
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
2.186e+005



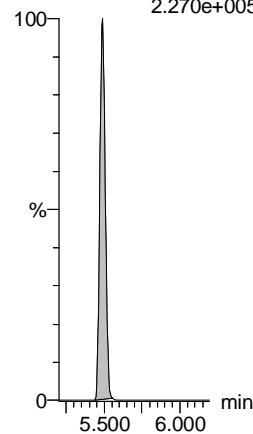
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
6.791e+004



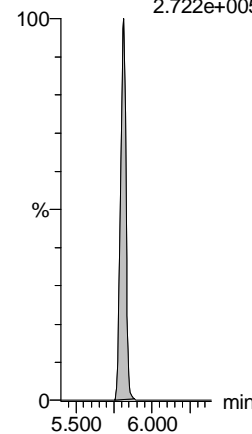
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
2.270e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
2.722e+005



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-13.qld

Last Altered: Wednesday, December 05, 2018 10:24:07 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:24:15 Pacific Standard Time

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	4.72e3	1.02e3	0.110		3.01	3.01	57.6	258.7667		3.124	NO
2	5 PFHxA	313 > 269	5.80e4	3.88e3	0.110		3.56	3.57	74.7	655.1207		14.407	NO
3	7 PFHpA	363.0 > 318.9	5.83e3	5.42e3	0.110		4.20	4.20	13.5	104.7425		14.431	NO
4	8 L-PFHxS	398.9 > 79.6	6.14e3	9.59e2	0.110		4.33	4.33	80.0	367.5226		2.201	NO
5	68 Total PFHxS	398.9 > 79.6	6.14e3	9.59e2	0.110		4.58		80.0	367.5226			
6	11 L-PFOA	412.8 > 368.9	7.08e3	9.41e3	0.110		4.58	4.68	9.40	69.4848		3.018	NO
7	69 Total PFOA	412.8 > 368.9	7.08e3	9.41e3	0.110		4.97		9.40	69.4848			
8	38 13C3-PFBS	302. > 98.8	1.02e3	2.44e3	0.110	0.633	3.00	3.00	5.24	74.9841	66.2		
9	40 13C2-PFHxA	315 > 270	3.88e3	1.10e4	0.110	0.900	3.56	3.56	4.40	44.3000	97.8		
10	41 13C4-PFHpA	367.2 > 321.8	5.42e3	1.10e4	0.110	0.693	4.19	4.20	6.15	80.3509	71.0		
11	42 18O2-PFHxS	403.0 > 102.6	9.59e2	2.44e3	0.110	0.476	4.33	4.33	4.91	93.5308	82.6		
12	42 18O2-PFHxS	403.0 > 102.6	9.59e2	2.44e3	0.110	0.476	4.33	4.33	4.91	93.5308	82.6		
13	44 13C2-PFOA	414.9 > 369.7	9.41e3	1.45e4	0.110	0.873	4.68	4.68	8.14	84.4403	74.6		
14	44 13C2-PFOA	414.9 > 369.7	9.41e3	1.45e4	0.110	0.873	4.68	4.68	8.14	84.4403	74.6		
15	-1												
16	14 PFNA	463.0 > 418.8	6.37e1	8.93e3	0.110		5.11	5.12	0.0891	1.1479		7.517	YES
17	16 L-PFOS	498.9 > 79.9	2.51e3	2.40e3	0.110		5.08	5.19	13.1	107.4974		2.503	NO
18	70 Total PFOS	498.9 > 79.9	2.51e3	2.40e3	0.110		5.46		13.1	107.4974			
19	18 PFDA	513 > 468.8	3.80e1	9.00e3	0.110		5.48	5.48	0.0528	0.5874		6.768	NO
20	21 L-MeFOSAA	570 > 419		3.00e3	0.110		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	3.00e3	0.110		5.90		0.000				
22	25 PFUDa	563.0 > 518.9	3.51e1	1.09e4	0.110		5.81	5.81	0.0402	0.3357		15.309	YES
23	45 13C5-PFNA	468.2 > 422.9	8.93e3	1.12e4	0.110	1.006	5.11	5.12	9.98	89.8341	79.4		
24	47 13C8-PFOS	507.0 > 79.9	2.40e3	2.55e3	0.110	0.968	5.19	5.20	11.8	110.2244	97.4		
25	47 13C8-PFOS	507.0 > 79.9	2.40e3	2.55e3	0.110	0.968	5.19	5.20	11.8	110.2244	97.4		
26	48 13C2-PFDA	515.1 > 469.9	9.00e3	1.27e4	0.110	1.125	5.48	5.49	8.86	71.3653	63.0		
27	50 d3-N-MeFOSAA	573.3 > 419	3.00e3	1.51e4	0.110	0.329	5.63	5.63	2.49	68.4028	60.4		
28	50 d3-N-MeFOSAA	573.3 > 419	3.00e3	1.51e4	0.110	0.329	5.63	5.63	2.49	68.4028	60.4		
29	51 13C2-PFUDa	565 > 519.8	1.09e4	1.51e4	0.110	1.111	5.81	5.81	9.03	73.5966	65.0		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.52e3	0.110		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.52e3	0.110		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		1.07e4	0.110		6.32						
34	27 PFDoA	612.9 > 569.0		1.07e4	0.110		6.08						
35	30 PFTeDA	713.0 > 669.0	2.30e1	9.06e3	0.110		6.54	6.55	0.0317	0.2419		27.888	YES
36	73 TCDA	498.3>106.9			0.110		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-13.qld

Last Altered: Wednesday, December 05, 2018 10:24:07 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:24:15 Pacific Standard Time

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	1.10e4	1.10e4	0.110	1.000	3.56	3.57	3.57	12.5	113.2041	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.52e3	1.51e4	0.110	0.355	5.78	5.79	5.79	3.74	95.4713	84.3		
39	52	d5-N-EtFOSAA	589.3 > 419	4.52e3	1.51e4	0.110	0.355	5.78	5.79	5.79	3.74	95.4713	84.3		
40	53	13C2-PFDoA	615.0 > 569.7	1.07e4	1.27e4	0.110	0.993	6.08	6.09	6.09	10.5	96.1959	85.0		
41	53	13C2-PFDoA	615.0 > 569.7	1.07e4	1.27e4	0.110	0.993	6.08	6.09	6.09	10.5	96.1959	85.0		
42	55	13C2-PFTeDA	715.1 > 669.7	9.06e3	1.51e4	0.110	0.749	6.54	6.55	6.55	7.50	90.7020	80.1		
43	47	13C8-PFOS	507.0 > 79.9	2.40e3	2.55e3	0.110	0.968	5.19	5.20	5.20	11.8	110.2244	97.4		
44	63	13C8-PFOA	420.9 > 376	1.45e4	1.45e4	0.110	1.000	4.68	4.68	4.68	12.5	113.2041	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.44e3	2.44e3	0.110	1.000	4.33	4.33	4.33	12.5	113.2041	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.12e4	1.12e4	0.110	1.000	5.11	5.12	5.12	12.5	113.2041	100.0		
48	65	13C4-PFOS	503 > 79.9	2.55e3	2.55e3	0.110	1.000	5.19	5.20	5.20	12.5	113.2041	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.27e4	1.27e4	0.110	1.000	5.48	5.49	5.49	12.5	113.2041	100.0		
50	67	13C7-PFUDa	570.1 > 524.8	1.51e4	1.51e4	0.110	1.000	5.81	5.81	5.81	12.5	113.2041	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-13.qld

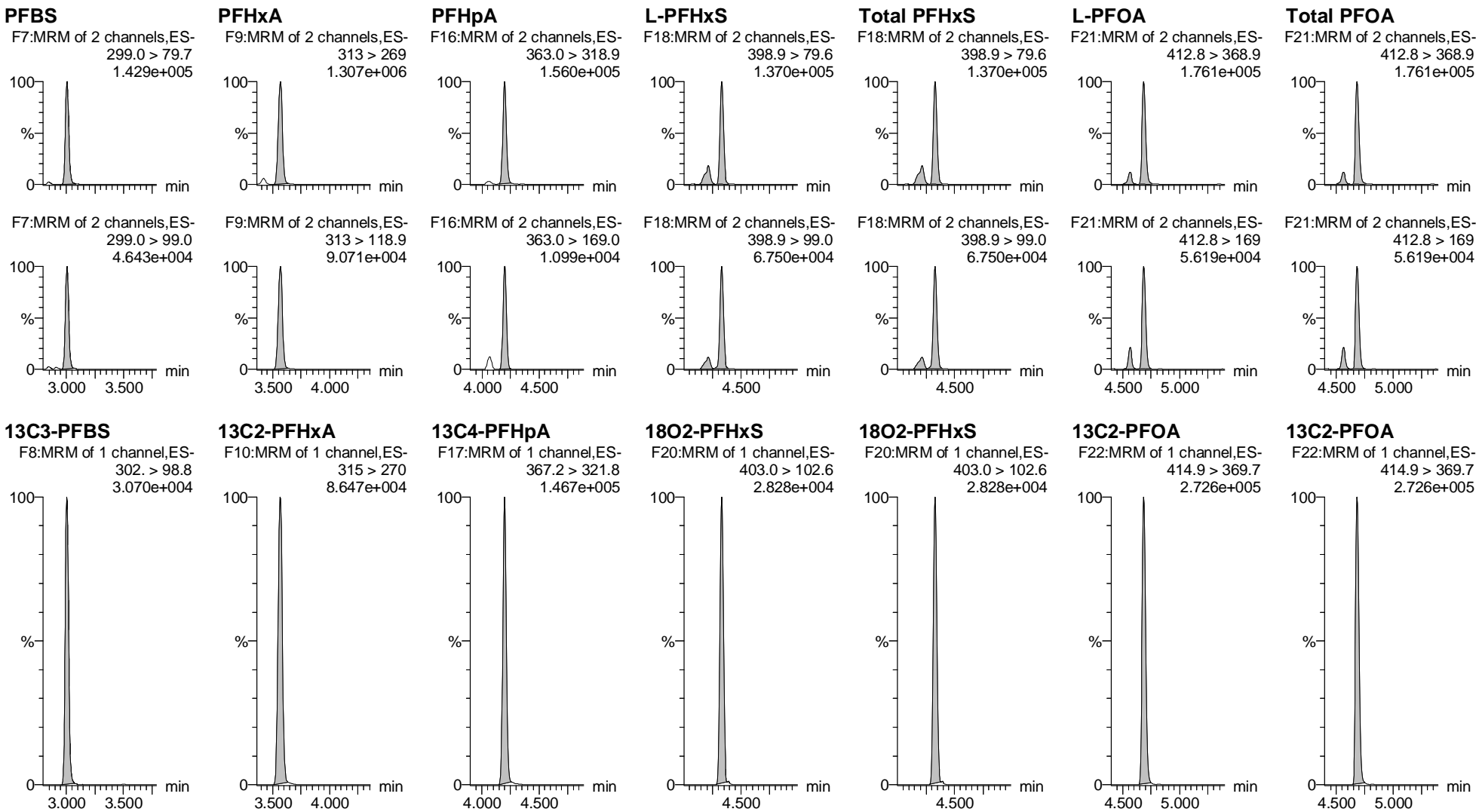
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Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2

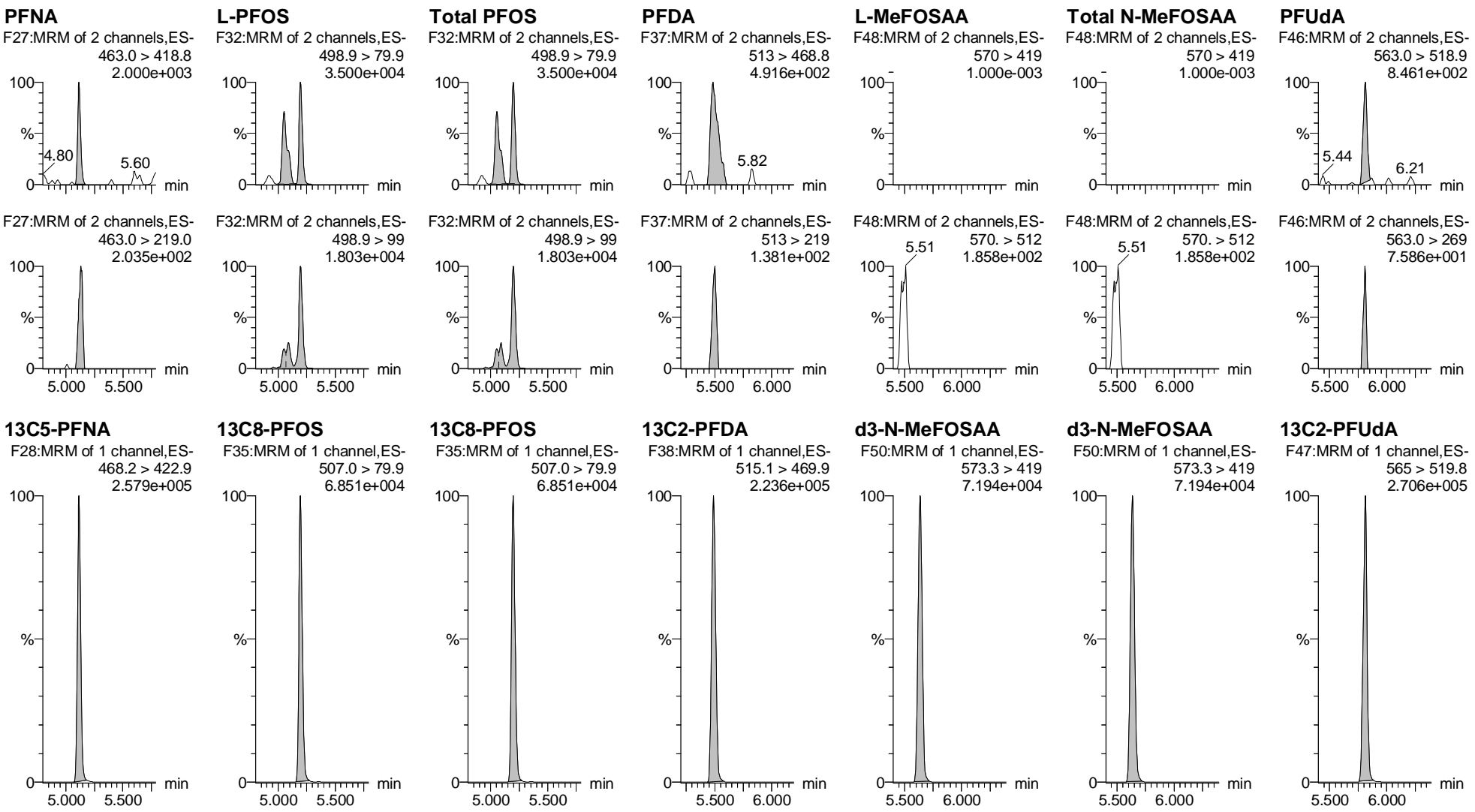


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Printed: Wednesday, December 05, 2018 10:24:15 Pacific Standard Time

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-13.qld

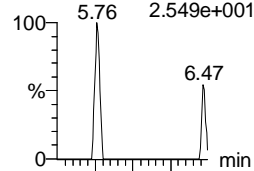
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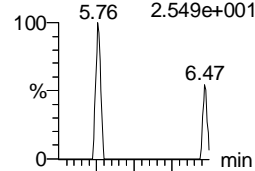
L-EtFOSAA

F51:MRM of 2 channels,ES-
584.1 > 419
2.549e+001



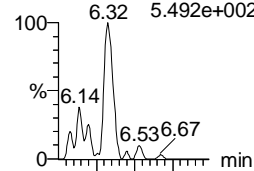
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F51:MRM of 2 channels,ES-
584.1 > 419
2.549e+001



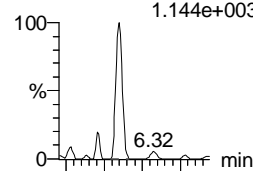
PFTrDA

F60:MRM of 2 channels,ES-
662.9 > 618.9
5.492e+002



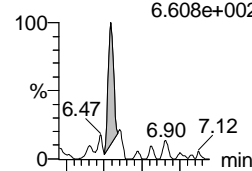
PFDoA

F54:MRM of 4 channels,ES-
612.9 > 569.0
1.144e+003



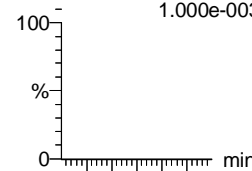
PFTeDA

F61:MRM of 2 channels,ES-
713.0 > 669.0
6.608e+002



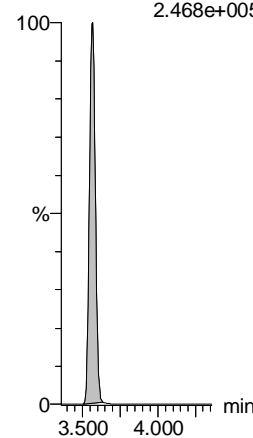
TCDA

F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003

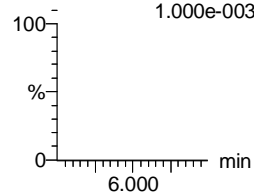


13C5-PFHxA

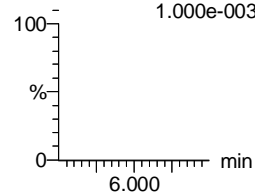
F11:MRM of 1 channel,ES-
318 > 272.9
2.468e+005



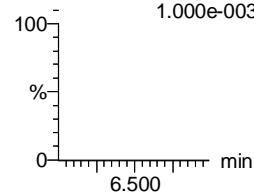
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



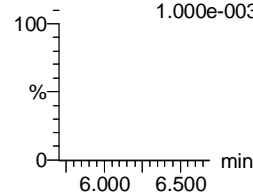
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



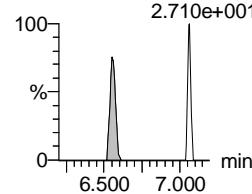
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003



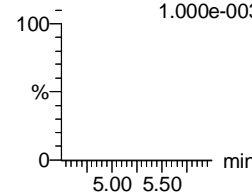
F54:MRM of 4 channels,ES-
612.9 > 318.8
1.000e-003



F61:MRM of 2 channels,ES-
713. > 369.0
2.710e+001

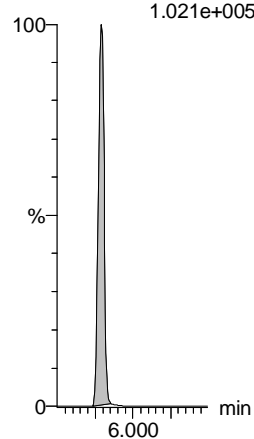


F31:MRM of 3 channels,ES-
498.3 > 123.9
1.000e-003



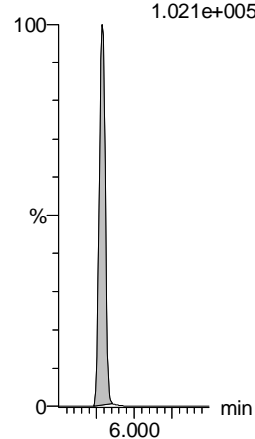
d5-N-EtFOSAA

F52:MRM of 1 channel,ES-
589.3 > 419
1.021e+005



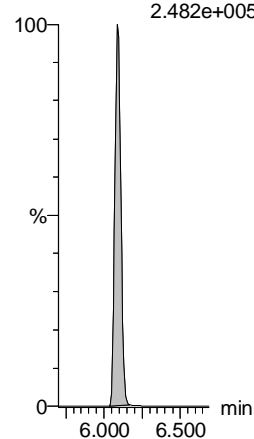
d5-N-EtFOSAA

F52:MRM of 1 channel,ES-
589.3 > 419
1.021e+005



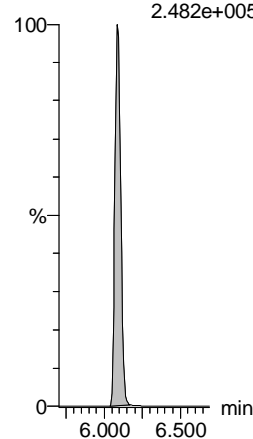
13C2-PFDoA

F55:MRM of 2 channels,ES-
615.0 > 569.7
2.482e+005



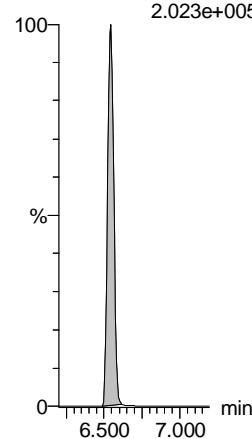
13C2-PFDoA

F55:MRM of 2 channels,ES-
615.0 > 569.7
2.482e+005



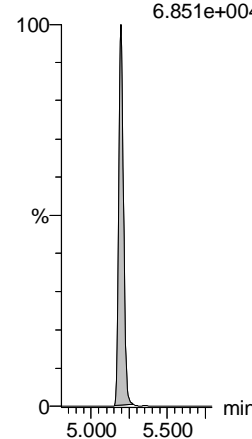
13C2-PFTeDA

F62:MRM of 2 channels,ES-
715.1 > 669.7
2.023e+005



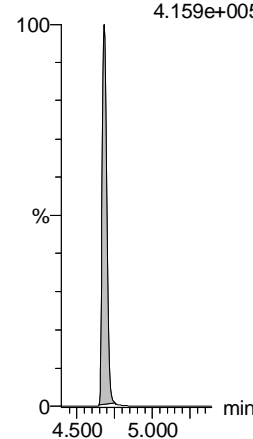
13C8-PFOS

F35:MRM of 1 channel,ES-
507.0 > 79.9
6.851e+004



13C8-PFOA

F23:MRM of 1 channel,ES-
420.9 > 376
4.159e+005



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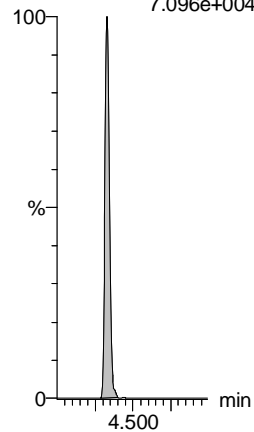
Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-13.qld

Last Altered: Wednesday, December 05, 2018 10:24:07 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:24:15 Pacific Standard Time

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2

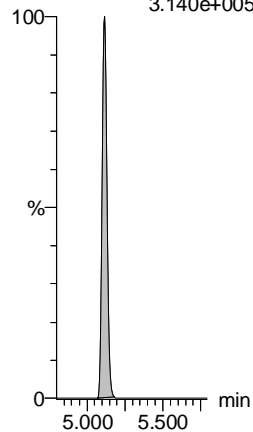
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
7.096e+004



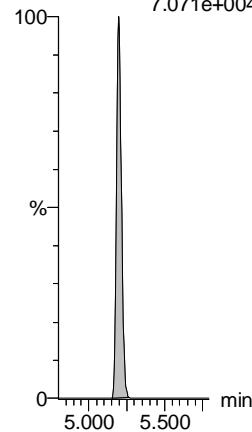
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
3.140e+005



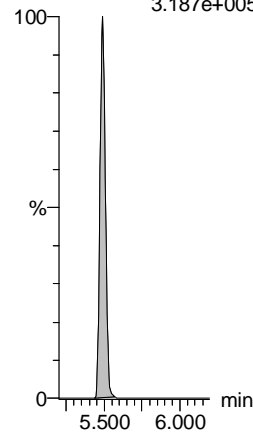
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
7.071e+004



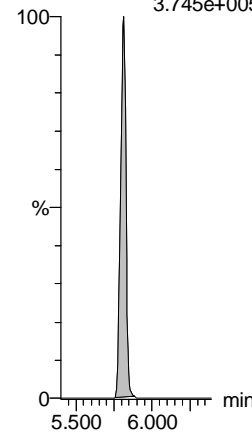
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
3.187e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
3.745e+005



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MM 12/5/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-14.qld

Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	1.96e3	1.03e3	0.116		3.00	3.00	23.8	101.4103		3.117	NO
2	5 PFHxA	313 > 269	2.91e4	3.67e3	0.116		3.56	3.56	39.6	327.4048		15.301	NO
3	7 PFHpA	363.0 > 318.9	3.62e3	5.09e3	0.116		4.20	4.20	8.90	65.7847		15.853	NO
4	8 L-PFHxS	398.9 > 79.6	4.07e3	8.74e2	0.116		4.33	4.33	58.1	253.3852		2.189	NO
5	68 Total PFHxS	398.9 > 79.6	4.07e3	8.74e2	0.116		4.58		58.1	253.3852			
6	11 L-PFOA	412.8 > 368.9	5.51e3	9.16e3	0.116		4.58	4.68	7.52	52.6877		2.984	NO
7	69 Total PFOA	412.8 > 368.9	5.51e3	9.16e3	0.116		4.97		7.52	52.6877			
8	38 13C3-PFBS	302. > 98.8	1.03e3	2.13e3	0.116	0.633	3.00	3.00	6.06	82.2922	76.6		
9	40 13C2-PFHxA	315 > 270	3.67e3	9.84e3	0.116	0.900	3.56	3.56	4.66	44.4680	103.4		
10	41 13C4-PFHpA	367.2 > 321.8	5.09e3	9.84e3	0.116	0.693	4.19	4.20	6.46	80.1626	74.6		
11	42 18O2-PFHxS	403.0 > 102.6	8.74e2	2.13e3	0.116	0.476	4.33	4.33	5.12	92.6151	86.2		
12	42 18O2-PFHxS	403.0 > 102.6	8.74e2	2.13e3	0.116	0.476	4.33	4.33	5.12	92.6151	86.2		
13	44 13C2-PFOA	414.9 > 369.7	9.16e3	1.35e4	0.116	0.873	4.68	4.68	8.48	83.4992	77.7		
14	44 13C2-PFOA	414.9 > 369.7	9.16e3	1.35e4	0.116	0.873	4.68	4.68	8.48	83.4992	77.7		
15	-1												
16	14 PFNA	463.0 > 418.8	2.82e1	8.98e3	0.116		5.11	5.12	0.0393	0.7039		9.423	YES
17	16 L-PFOS	498.9 > 79.9	1.43e3	2.32e3	0.116		5.08	5.19	7.71	60.4280		2.577	NO
18	70 Total PFOS	498.9 > 79.9	1.43e3	2.32e3	0.116		5.46		7.71	60.4280			
19	18 PFDA	513 > 468.8		9.15e3	0.116		5.48						
20	21 L-MeFOSAA	570 > 419		3.02e3	0.116		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	3.02e3	0.116		5.90		0.000				
22	25 PFUDa	563.0 > 518.9	1.19e1	1.04e4	0.116		5.81	5.82	0.0142	0.1111		8.759	NO
23	45 13C5-PFNA	468.2 > 422.9	8.98e3	1.03e4	0.116	1.006	5.11	5.12	10.9	93.4743	87.0		
24	47 13C8-PFOS	507.0 > 79.9	2.32e3	2.42e3	0.116	0.968	5.19	5.20	12.0	106.1901	98.8		
25	47 13C8-PFOS	507.0 > 79.9	2.32e3	2.42e3	0.116	0.968	5.19	5.20	12.0	106.1901	98.8		
26	48 13C2-PFDA	515.1 > 469.9	9.15e3	1.16e4	0.116	1.125	5.48	5.49	9.82	75.0828	69.9		
27	50 d3-N-MeFOSAA	573.3 > 419	3.02e3	1.41e4	0.116	0.329	5.63	5.63	2.68	69.9140	65.0		
28	50 d3-N-MeFOSAA	573.3 > 419	3.02e3	1.41e4	0.116	0.329	5.63	5.63	2.68	69.9140	65.0		
29	51 13C2-PFUDa	565 > 519.8	1.04e4	1.41e4	0.116	1.111	5.81	5.81	9.26	71.6366	66.6		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.21e3	0.116		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.21e3	0.116		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		1.01e4	0.116		6.32						
34	27 PFDoA	612.9 > 569.0		1.01e4	0.116		6.08						
35	30 PFTeDA	713.0 > 669.0		8.11e3	0.116		6.54						
36	73 TCDA	498.3>106.9			0.116		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-14.qld

Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	9.84e3	9.84e3	0.116	1.000	3.56	3.56	3.56	12.5	107.4899	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.21e3	1.41e4	0.116	0.355	5.78	5.79	5.79	3.73	90.4185	84.1		
39	52	d5-N-EtFOSAA	589.3 > 419	4.21e3	1.41e4	0.116	0.355	5.78	5.79	5.79	3.73	90.4185	84.1		
40	53	13C2-PFDoA	615.0 > 569.7	1.01e4	1.16e4	0.116	0.993	6.08	6.09	6.09	10.9	93.9996	87.4		
41	53	13C2-PFDoA	615.0 > 569.7	1.01e4	1.16e4	0.116	0.993	6.08	6.09	6.09	10.9	93.9996	87.4		
42	55	13C2-PFTeDA	715.1 > 669.7	8.11e3	1.41e4	0.116	0.749	6.54	6.54	6.54	7.19	82.5961	76.8		
43	47	13C8-PFOS	507.0 > 79.9	2.32e3	2.42e3	0.116	0.968	5.19	5.20	5.20	12.0	106.1901	98.8		
44	63	13C8-PFOA	420.9 > 376	1.35e4	1.35e4	0.116	1.000	4.68	4.68	4.68	12.5	107.4899	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.13e3	2.13e3	0.116	1.000	4.33	4.33	4.33	12.5	107.4899	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.03e4	1.03e4	0.116	1.000	5.11	5.12	5.12	12.5	107.4899	100.0		
48	65	13C4-PFOS	503 > 79.9	2.42e3	2.42e3	0.116	1.000	5.19	5.20	5.20	12.5	107.4899	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.16e4	1.16e4	0.116	1.000	5.48	5.49	5.49	12.5	107.4899	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.41e4	1.41e4	0.116	1.000	5.81	5.81	5.81	12.5	107.4899	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-14.qld

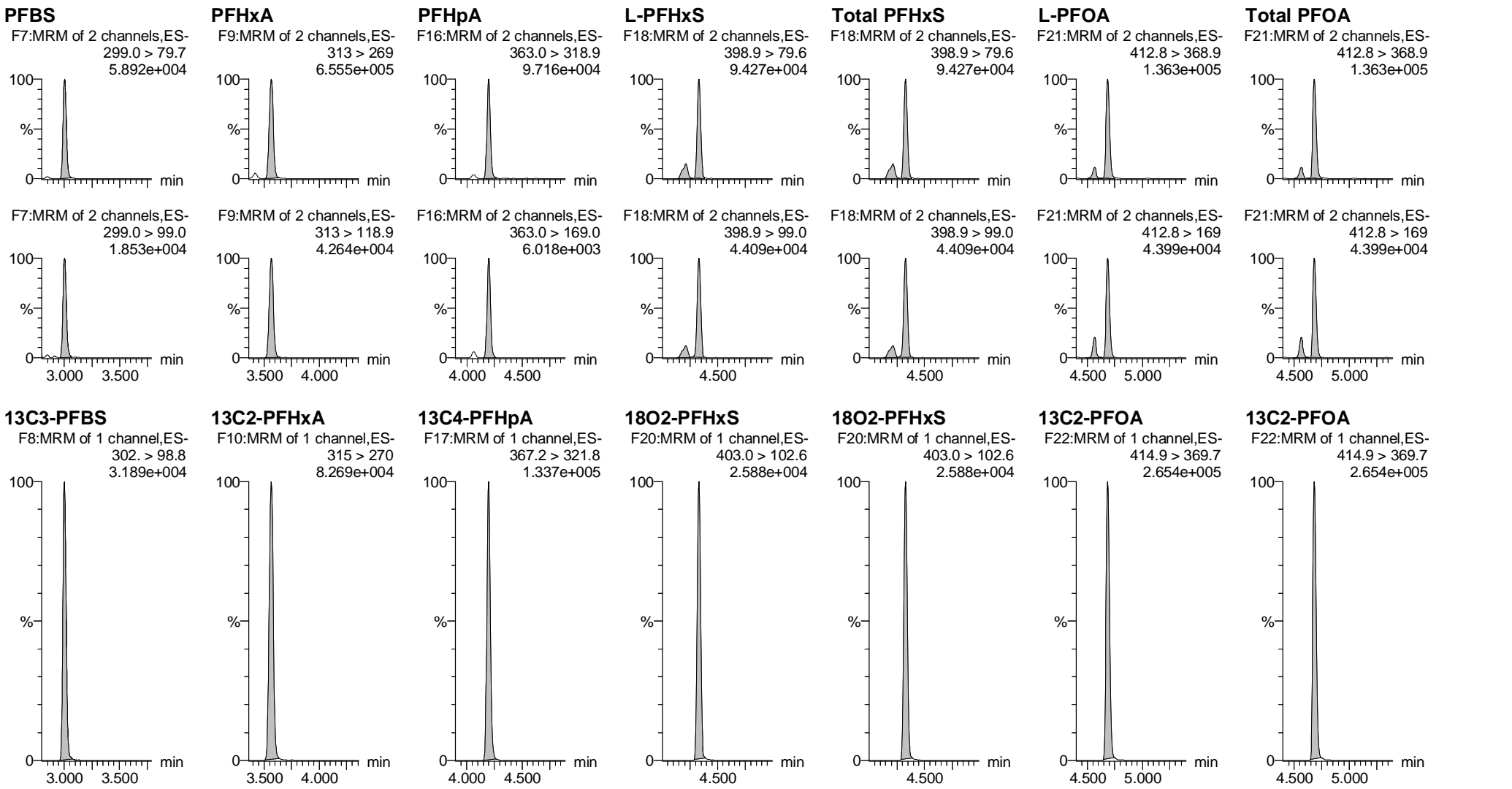
Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

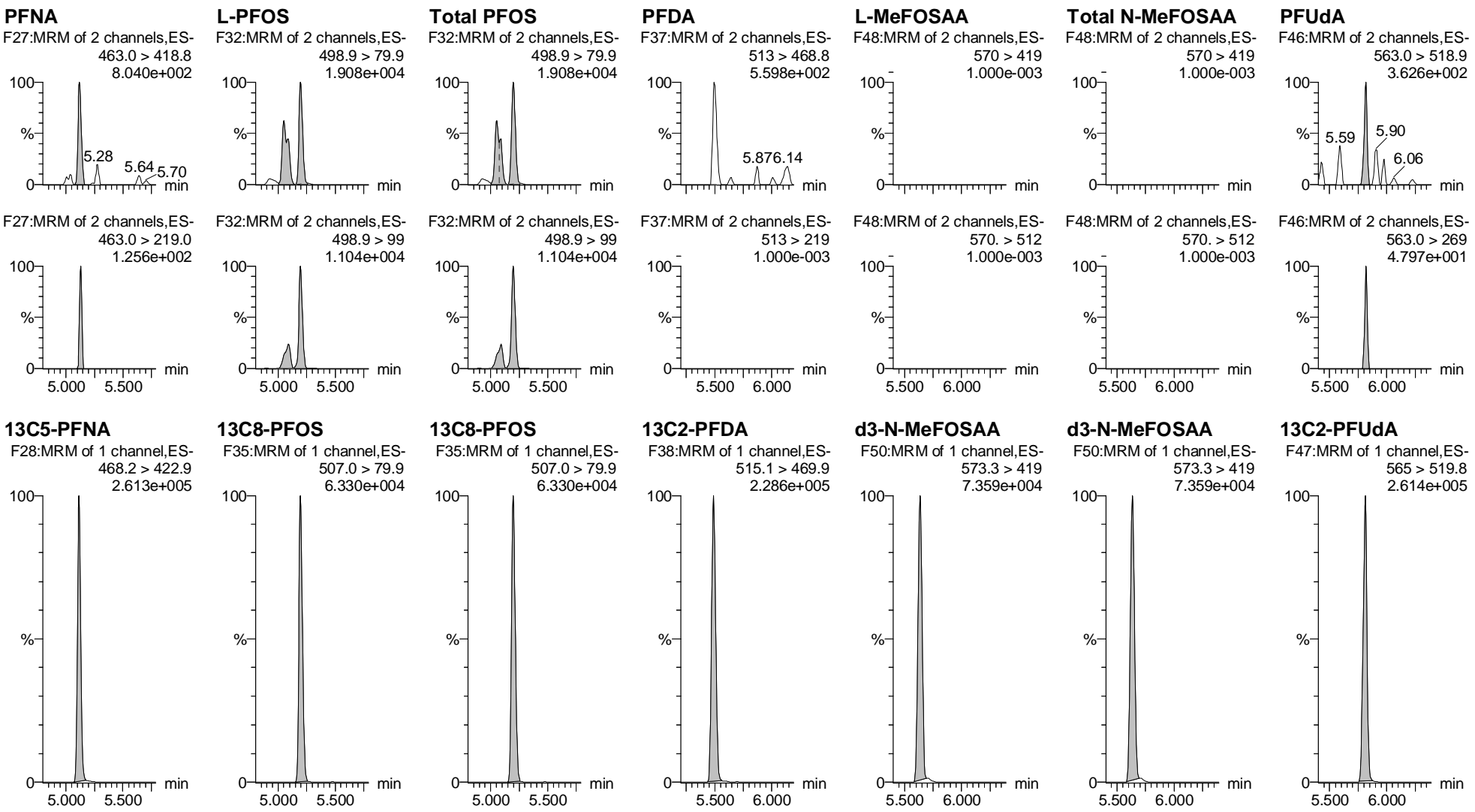


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-14.qld

Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

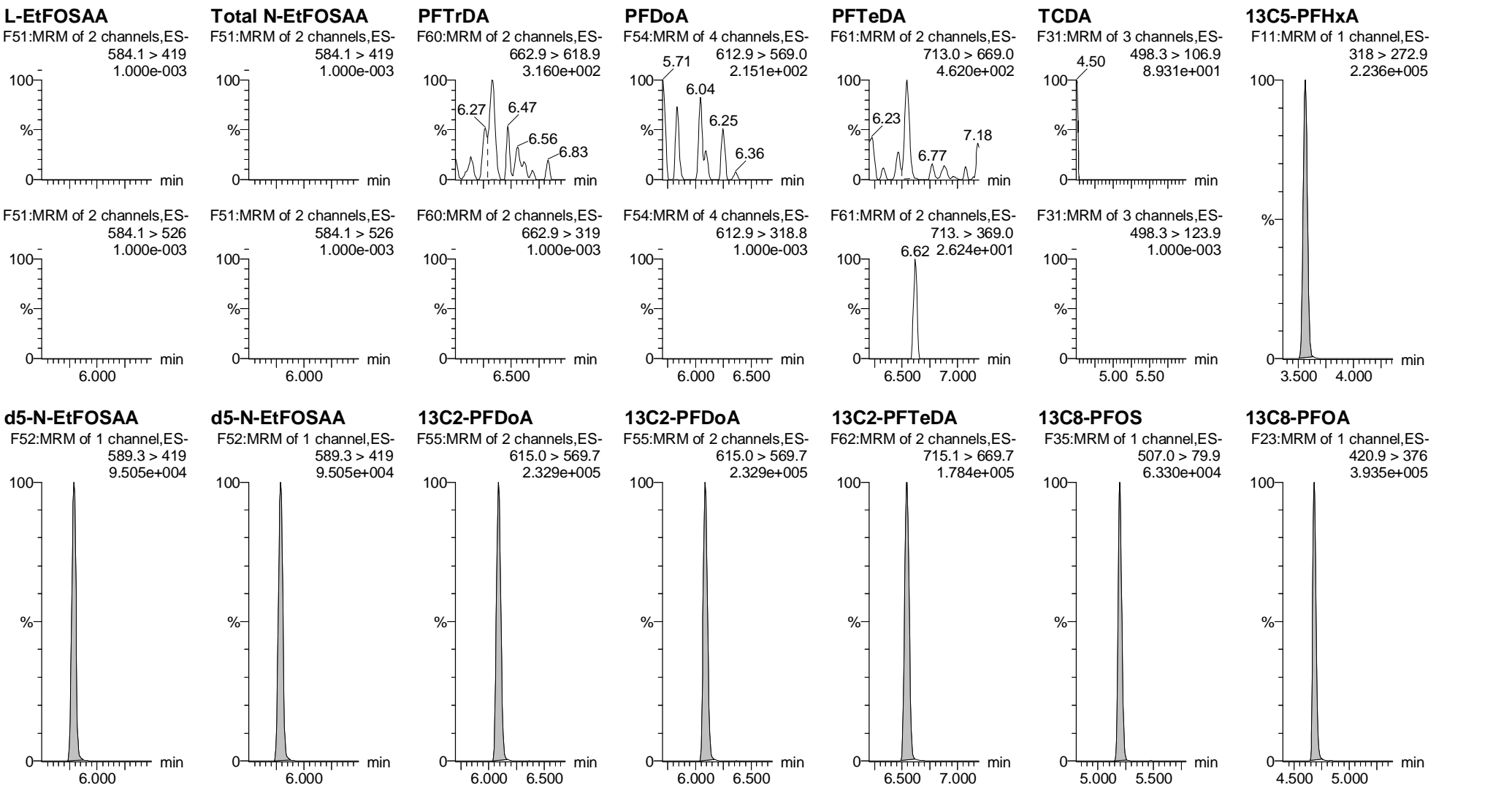


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-14.qld

Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2



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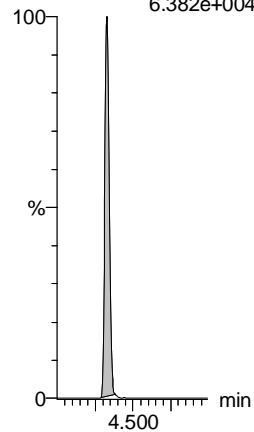
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Last Altered: Wednesday, December 05, 2018 10:26:30 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:26:48 Pacific Standard Time

Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

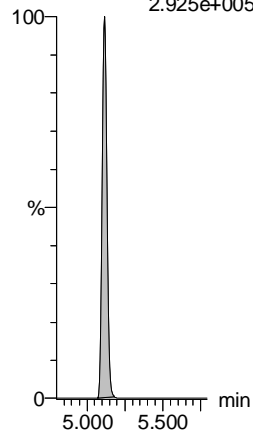
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
6.382e+004



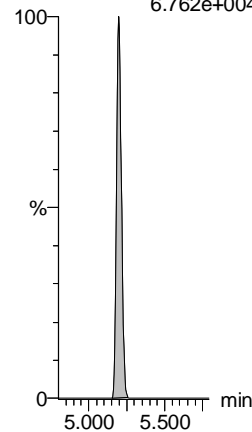
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
2.925e+005



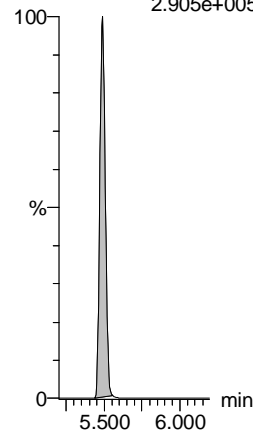
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
6.762e+004



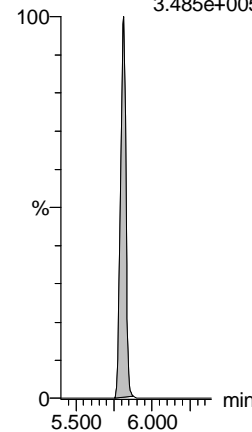
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
2.905e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
3.485e+005



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-15.qld

Last Altered: Wednesday, December 05, 2018 10:28:38 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:28:45 Pacific Standard Time

Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	6.87e3	1.06e3	0.111		3.00	3.00	81.0	362.5808		3.067	NO
2	5 PFHxA	313 > 269	5.14e4	3.76e3	0.111		3.56	3.56	68.3	595.5671		15.331	NO
3	7 PFHpA	363.0 > 318.9	4.02e3	5.04e3	0.111		4.20	4.20	9.97	77.3271		15.321	NO
4	8 L-PFHxS	398.9 > 79.6	5.25e3	9.33e2	0.111		4.33	4.33	70.4	322.2939		2.285	NO
5	68 Total PFHxS	398.9 > 79.6	5.25e3	9.33e2	0.111		4.58		70.4	322.2939			
6	11 L-PFOA	412.8 > 368.9	1.81e4	8.83e3	0.111		4.58	4.68	25.6	189.6535		2.955	NO
7	69 Total PFOA	412.8 > 368.9	1.81e4	8.83e3	0.111		4.97		25.6	189.6535			
8	38 13C3-PFBS	302. > 98.8	1.06e3	2.23e3	0.111	0.633	3.00	3.00	5.95	84.7916	75.2		
9	40 13C2-PFHxA	315 > 270	3.76e3	9.86e3	0.111	0.900	3.56	3.56	4.77	47.7928	106.0		
10	41 13C4-PFHpA	367.2 > 321.8	5.04e3	9.86e3	0.111	0.693	4.19	4.20	6.39	83.1224	73.7		
11	42 18O2-PFHxS	403.0 > 102.6	9.33e2	2.23e3	0.111	0.476	4.33	4.33	5.23	99.1714	88.0		
12	42 18O2-PFHxS	403.0 > 102.6	9.33e2	2.23e3	0.111	0.476	4.33	4.33	5.23	99.1714	88.0		
13	44 13C2-PFOA	414.9 > 369.7	8.83e3	1.32e4	0.111	0.873	4.68	4.68	8.37	86.5300	76.7		
14	44 13C2-PFOA	414.9 > 369.7	8.83e3	1.32e4	0.111	0.873	4.68	4.68	8.37	86.5300	76.7		
15	-1												
16	14 PFNA	463.0 > 418.8		8.05e3	0.111		5.11						
17	16 L-PFOS	498.9 > 79.9	4.42e2	2.51e3	0.111		5.08	5.19	2.20	18.4530		2.102	NO
18	70 Total PFOS	498.9 > 79.9	4.42e2	2.51e3	0.111		5.46		2.20	18.4530			
19	18 PFDA	513 > 468.8		8.51e3	0.111		5.48						
20	21 L-MeFOSAA	570 > 419		2.90e3	0.111		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	2.90e3	0.111		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		9.90e3	0.111		5.81						
23	45 13C5-PFNA	468.2 > 422.9	8.05e3	9.26e3	0.111	1.006	5.11	5.12	10.9	97.3832	86.4		
24	47 13C8-PFOS	507.0 > 79.9	2.51e3	2.50e3	0.111	0.968	5.19	5.20	12.6	117.2302	104.0		
25	47 13C8-PFOS	507.0 > 79.9	2.51e3	2.50e3	0.111	0.968	5.19	5.20	12.6	117.2302	104.0		
26	48 13C2-PFDA	515.1 > 469.9	8.51e3	1.08e4	0.111	1.125	5.48	5.49	9.81	78.6807	69.8		
27	50 d3-N-MeFOSAA	573.3 > 419	2.90e3	1.25e4	0.111	0.329	5.63	5.63	2.89	79.2964	70.3		
28	50 d3-N-MeFOSAA	573.3 > 419	2.90e3	1.25e4	0.111	0.329	5.63	5.63	2.89	79.2964	70.3		
29	51 13C2-PFUDa	565 > 519.8	9.90e3	1.25e4	0.111	1.111	5.81	5.81	9.88	80.1881	71.1		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.11e3	0.111		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.11e3	0.111		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		9.54e3	0.111		6.32						
34	27 PFDoA	612.9 > 569.0		9.54e3	0.111		6.08						
35	30 PFTeDA	713.0 > 669.0		8.67e3	0.111		6.54						
36	73 TCDA	498.3>106.9			0.111		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-15.qld

Last Altered: Wednesday, December 05, 2018 10:28:38 Pacific Standard Time
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Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	9.86e3	9.86e3	0.111	1.000	3.56	3.56	3.56	12.5	112.7548	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.11e3	1.25e4	0.111	0.355	5.78	5.79	5.79	4.11	104.2851	92.5		
39	52	d5-N-EtFOSAA	589.3 > 419	4.11e3	1.25e4	0.111	0.355	5.78	5.79	5.79	4.11	104.2851	92.5		
40	53	13C2-PFDoA	615.0 > 569.7	9.54e3	1.08e4	0.111	0.993	6.08	6.09	6.09	11.0	100.0144	88.7		
41	53	13C2-PFDoA	615.0 > 569.7	9.54e3	1.08e4	0.111	0.993	6.08	6.09	6.09	11.0	100.0144	88.7		
42	55	13C2-PFTeDA	715.1 > 669.7	8.67e3	1.25e4	0.111	0.749	6.54	6.54	6.54	8.65	104.2215	92.4		
43	47	13C8-PFOS	507.0 > 79.9	2.51e3	2.50e3	0.111	0.968	5.19	5.20	5.20	12.6	117.2302	104.0		
44	63	13C8-PFOA	420.9 > 376	1.32e4	1.32e4	0.111	1.000	4.68	4.68	4.68	12.5	112.7548	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.23e3	2.23e3	0.111	1.000	4.33	4.33	4.33	12.5	112.7548	100.0		
47	64	13C9-PFNA	472.2 > 426.9	9.26e3	9.26e3	0.111	1.000	5.11	5.11	5.11	12.5	112.7548	100.0		
48	65	13C4-PFOS	503 > 79.9	2.50e3	2.50e3	0.111	1.000	5.19	5.20	5.20	12.5	112.7548	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.08e4	1.08e4	0.111	1.000	5.48	5.49	5.49	12.5	112.7548	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.25e4	1.25e4	0.111	1.000	5.81	5.81	5.81	12.5	112.7548	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-15.qld

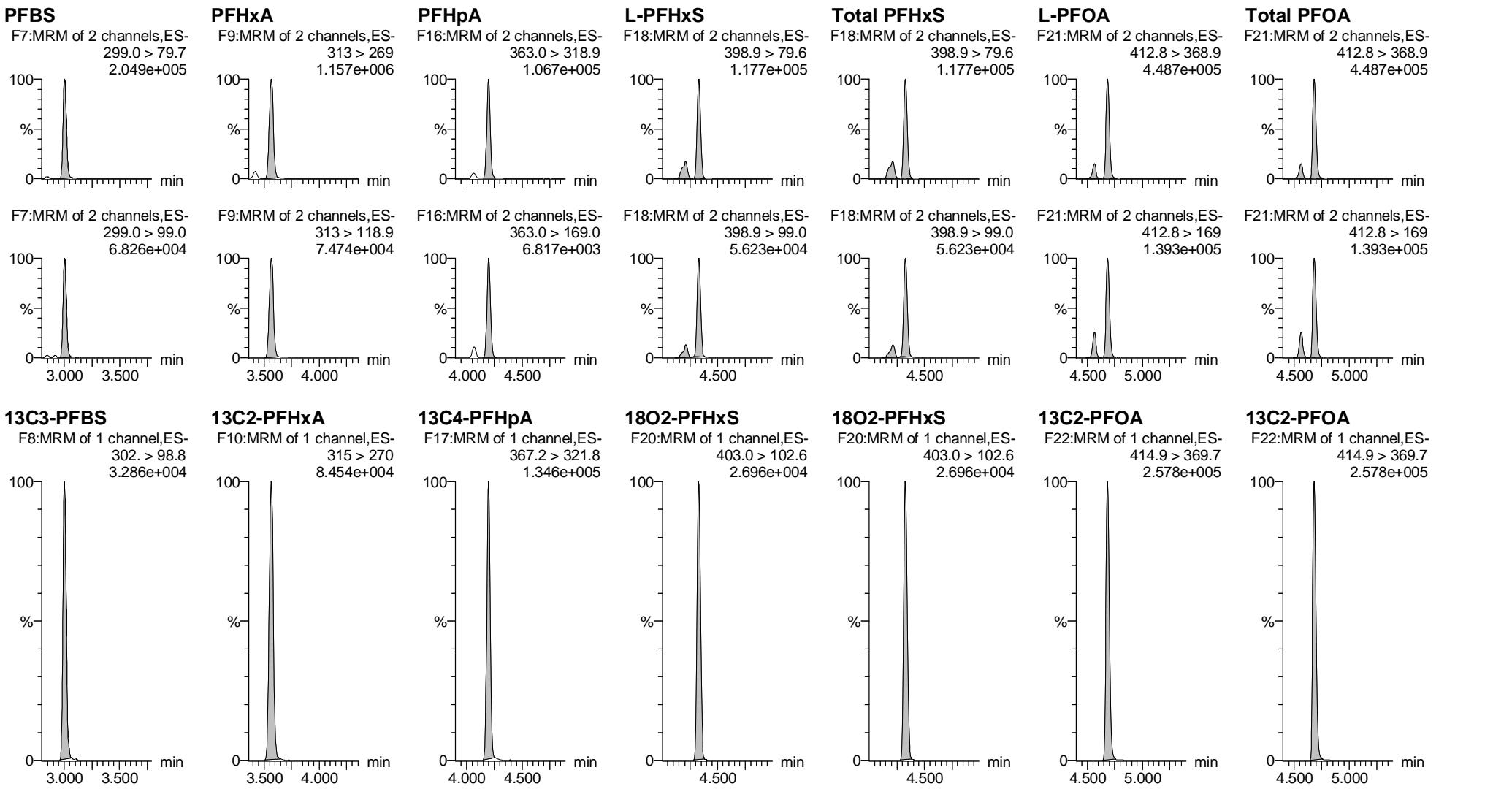
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Printed: Wednesday, December 05, 2018 10:28:45 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2

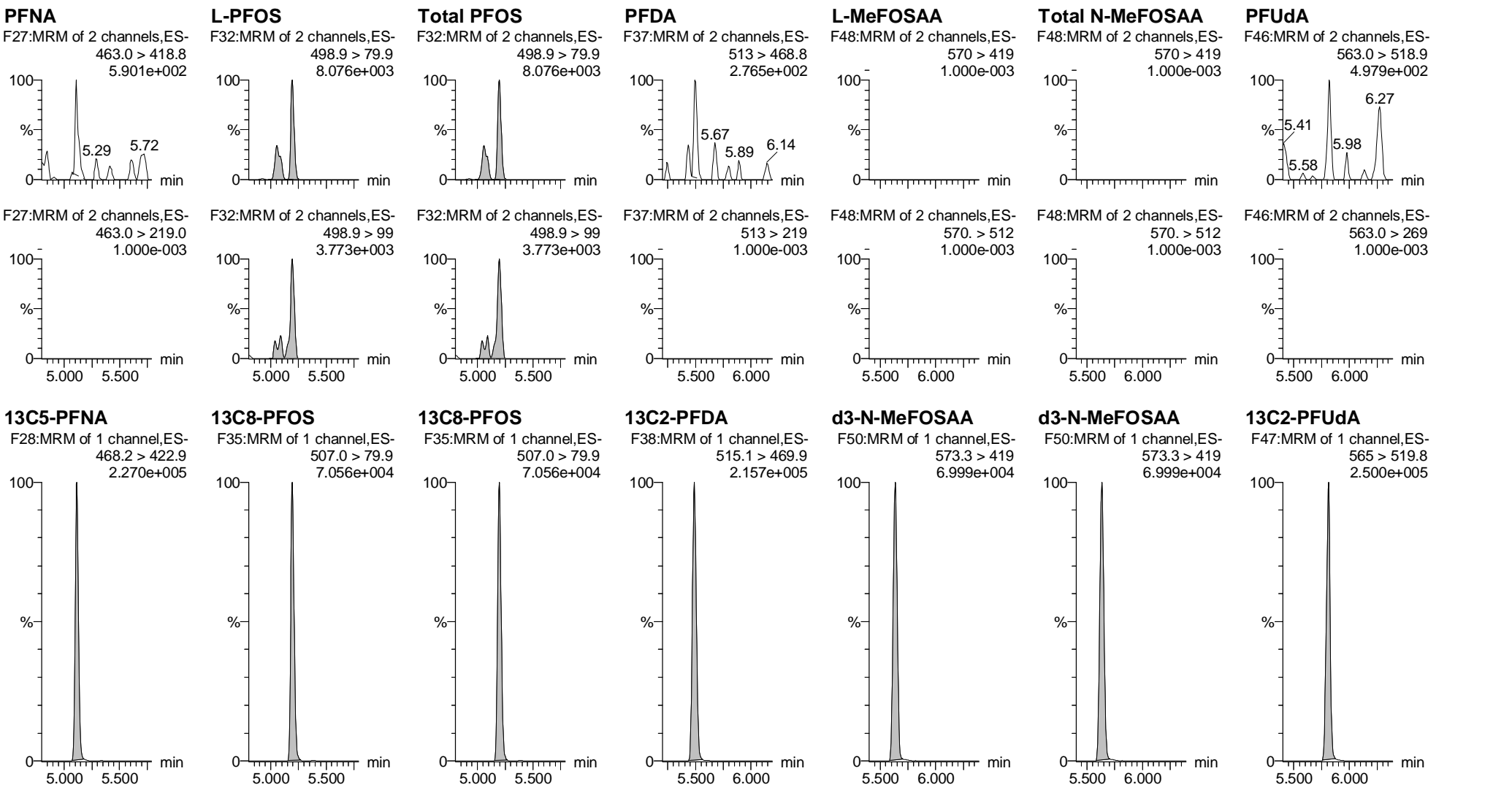


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-15.qld

Last Altered: Wednesday, December 05, 2018 10:28:38 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:28:45 Pacific Standard Time

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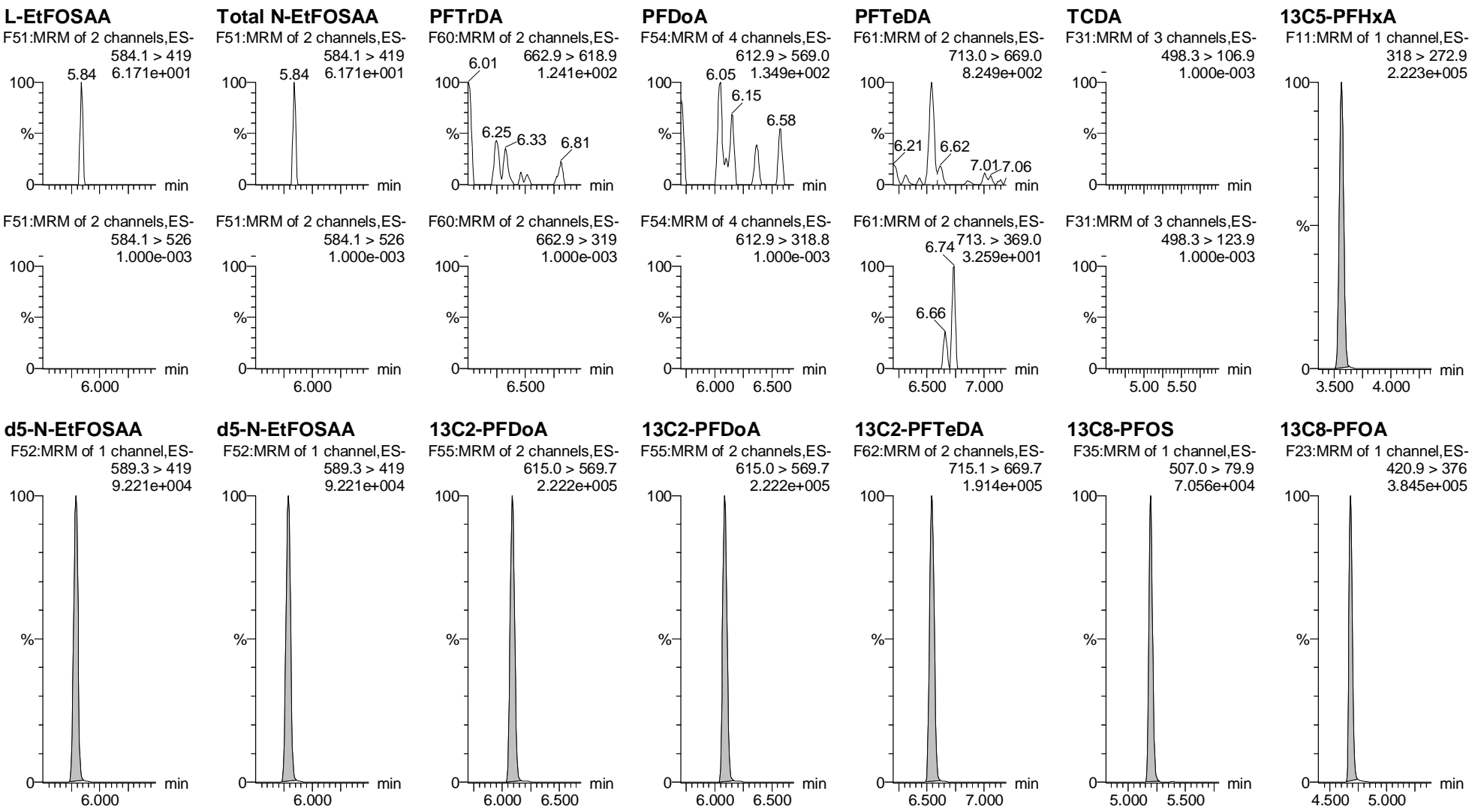


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-15.qld

Last Altered: Wednesday, December 05, 2018 10:28:38 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:28:45 Pacific Standard Time

Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2



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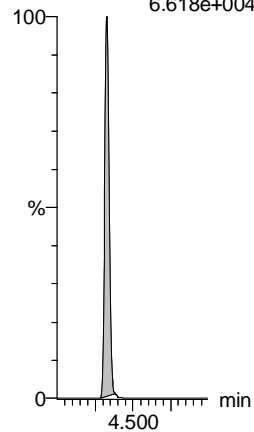
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Last Altered: Wednesday, December 05, 2018 10:28:38 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:28:45 Pacific Standard Time

Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2

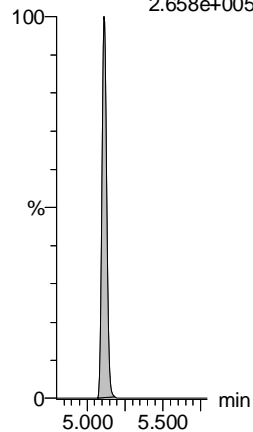
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
6.618e+004



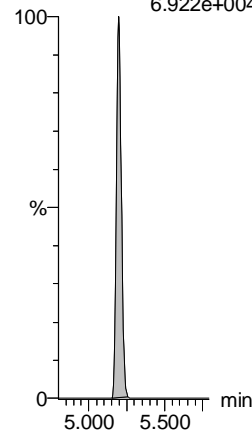
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
2.658e+005



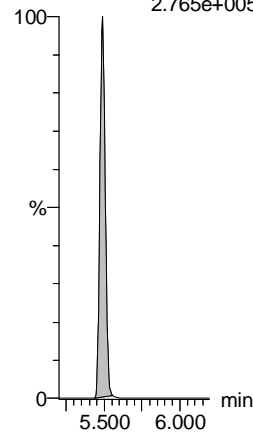
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
6.922e+004



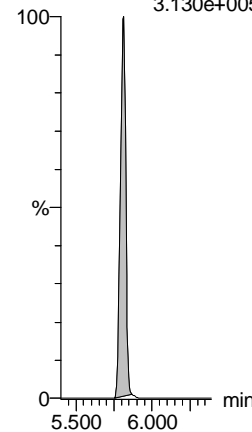
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
2.765e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
3.130e+005



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-18.qld

Last Altered: Wednesday, December 05, 2018 10:30:46 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	3.26e3	1.14e3	0.118		3.00	3.00	35.9	151.4726		3.161	NO
2	5 PFHxA	313 > 269	3.94e4	3.11e3	0.118		3.56	3.56	63.3	520.0265		14.377	NO
3	7 PFHpA	363.0 > 318.9	3.92e3	4.19e3	0.118		4.19	4.19	11.7	85.5913		12.358	NO
4	8 L-PFHxS	398.9 > 79.6	7.93e3	9.77e2	0.118		4.32	4.32	101	438.4019		2.362	NO
5	68 Total PFHxS	398.9 > 79.6	7.93e3	9.77e2	0.118		4.58		101	438.4019			
6	11 L-PFOA	412.8 > 368.9	4.86e3	7.04e3	0.118		4.58	4.68	8.63	59.8940		2.987	NO
7	69 Total PFOA	412.8 > 368.9	4.86e3	7.04e3	0.118		4.97		8.63	59.8940			
8	38 13C3-PFBS	302. > 98.8	1.14e3	2.22e3	0.118	0.633	3.00	3.00	6.38	85.7325	80.6		
9	40 13C2-PFHxA	315 > 270	3.11e3	8.32e3	0.118	0.900	3.56	3.56	4.68	44.1817	103.9		
10	41 13C4-PFHpA	367.2 > 321.8	4.19e3	8.32e3	0.118	0.693	4.19	4.19	6.30	77.3284	72.7		
11	42 18O2-PFHxS	403.0 > 102.6	9.77e2	2.22e3	0.118	0.476	4.33	4.32	5.49	98.1888	92.3		
12	42 18O2-PFHxS	403.0 > 102.6	9.77e2	2.22e3	0.118	0.476	4.33	4.32	5.49	98.1888	92.3		
13	44 13C2-PFOA	414.9 > 369.7	7.04e3	1.14e4	0.118	0.873	4.68	4.68	7.73	75.3401	70.8		
14	44 13C2-PFOA	414.9 > 369.7	7.04e3	1.14e4	0.118	0.873	4.68	4.68	7.73	75.3401	70.8		
15	-1												
16	14 PFNA	463.0 > 418.8	5.11e1	6.57e3	0.118		5.11	5.10	0.0972	1.1405		19.879	YES
17	16 L-PFOS	498.9 > 79.9	7.71e2	2.62e3	0.118		5.08	5.19	3.68	28.7625		2.370	NO
18	70 Total PFOS	498.9 > 79.9	7.71e2	2.62e3	0.118		5.46		3.68	28.7625			
19	18 PFDA	513 > 468.8		6.33e3	0.118		5.48						
20	21 L-MeFOSAA	570 > 419		2.96e3	0.118		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	2.96e3	0.118		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		8.02e3	0.118		5.81						
23	45 13C5-PFNA	468.2 > 422.9	6.57e3	7.67e3	0.118	1.006	5.11	5.11	10.7	90.4584	85.1		
24	47 13C8-PFOS	507.0 > 79.9	2.62e3	2.42e3	0.118	0.968	5.19	5.19	13.5	119.1029	112.0		
25	47 13C8-PFOS	507.0 > 79.9	2.62e3	2.42e3	0.118	0.968	5.19	5.19	13.5	119.1029	112.0		
26	48 13C2-PFDA	515.1 > 469.9	6.33e3	8.27e3	0.118	1.125	5.48	5.48	9.56	72.3069	68.0		
27	50 d3-N-MeFOSAA	573.3 > 419	2.96e3	9.42e3	0.118	0.329	5.63	5.63	3.93	101.5541	95.5		
28	50 d3-N-MeFOSAA	573.3 > 419	2.96e3	9.42e3	0.118	0.329	5.63	5.63	3.93	101.5541	95.5		
29	51 13C2-PFUDa	565 > 519.8	8.02e3	9.42e3	0.118	1.111	5.81	5.81	10.6	81.4666	76.6		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.25e3	0.118		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.25e3	0.118		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		7.92e3	0.118		6.32						
34	27 PFDoA	612.9 > 569.0		7.92e3	0.118		6.08						
35	30 PFTeDA	713.0 > 669.0	1.08e1	8.00e3	0.118		6.54	6.54	0.0169	0.1163		27.191	YES
36	73 TCDA	498.3>106.9			0.118		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-18.qld

Last Altered: Wednesday, December 05, 2018 10:30:46 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	8.32e3	8.32e3	0.118	1.000	3.56	3.56	3.56	12.5	106.3558	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.25e3	9.42e3	0.118	0.355	5.78	5.78	5.78	5.65	135.2843	127.2		
39	52	d5-N-EtFOSAA	589.3 > 419	4.25e3	9.42e3	0.118	0.355	5.78	5.78	5.78	5.65	135.2843	127.2		
40	53	13C2-PFDoA	615.0 > 569.7	7.92e3	8.27e3	0.118	0.993	6.08	6.08	6.08	12.0	102.5199	96.4		
41	53	13C2-PFDoA	615.0 > 569.7	7.92e3	8.27e3	0.118	0.993	6.08	6.08	6.08	12.0	102.5199	96.4		
42	55	13C2-PFTeDA	715.1 > 669.7	8.00e3	9.42e3	0.118	0.749	6.54	6.54	6.54	10.6	120.5907	113.4		
43	47	13C8-PFOS	507.0 > 79.9	2.62e3	2.42e3	0.118	0.968	5.19	5.19	5.19	13.5	119.1029	112.0		
44	63	13C8-PFOA	420.9 > 376	1.14e4	1.14e4	0.118	1.000	4.68	4.68	4.68	12.5	106.3558	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.22e3	2.22e3	0.118	1.000	4.33	4.32	4.32	12.5	106.3558	100.0		
47	64	13C9-PFNA	472.2 > 426.9	7.67e3	7.67e3	0.118	1.000	5.11	5.11	5.11	12.5	106.3558	100.0		
48	65	13C4-PFOS	503 > 79.9	2.42e3	2.42e3	0.118	1.000	5.19	5.19	5.19	12.5	106.3558	100.0		
49	66	13C6-PFDA	519.1 > 473.7	8.27e3	8.27e3	0.118	1.000	5.48	5.48	5.48	12.5	106.3558	100.0		
50	67	13C7-PFUDa	570.1 > 524.8	9.42e3	9.42e3	0.118	1.000	5.81	5.80	5.80	12.5	106.3558	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-18.qld

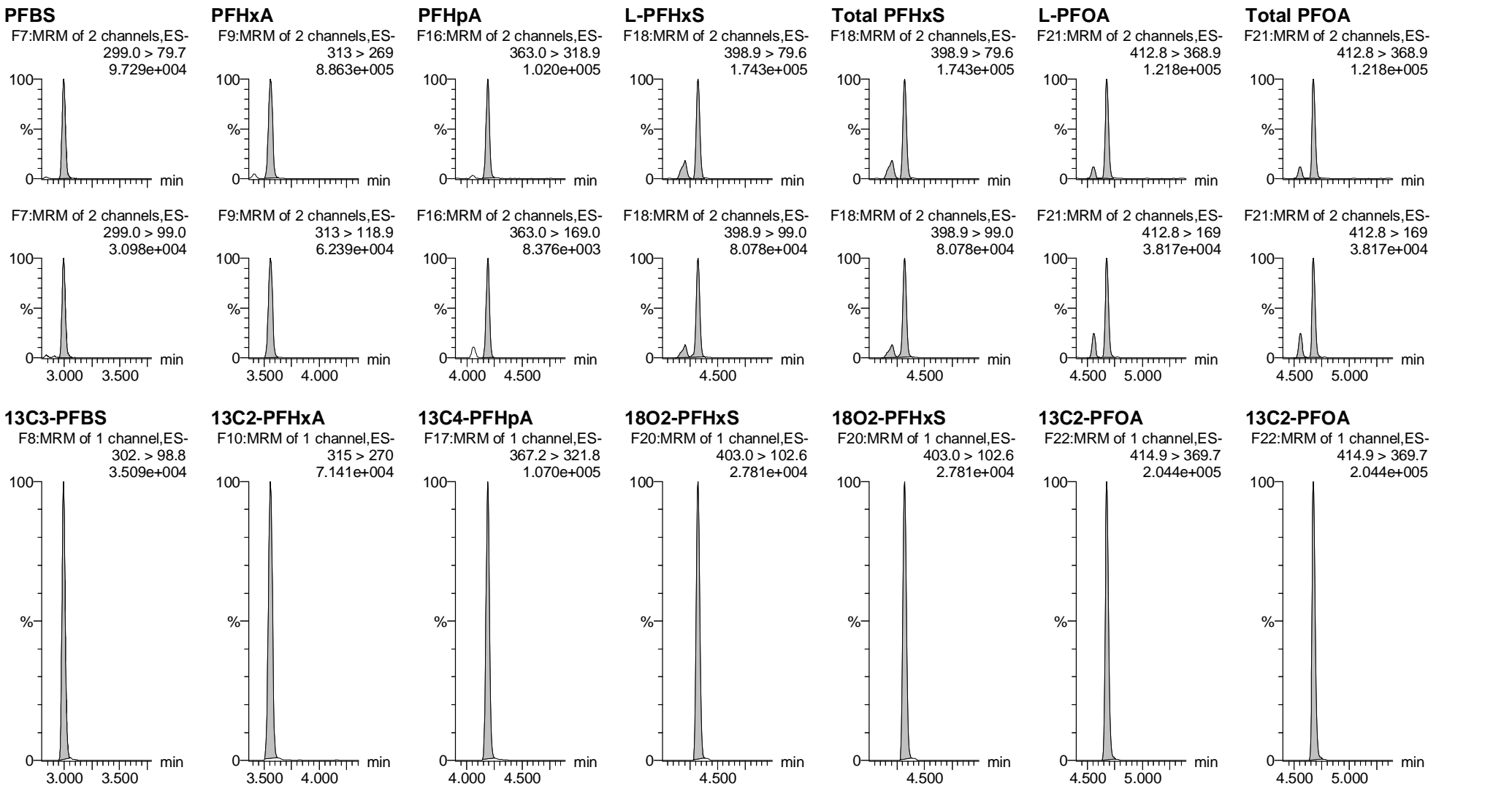
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Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

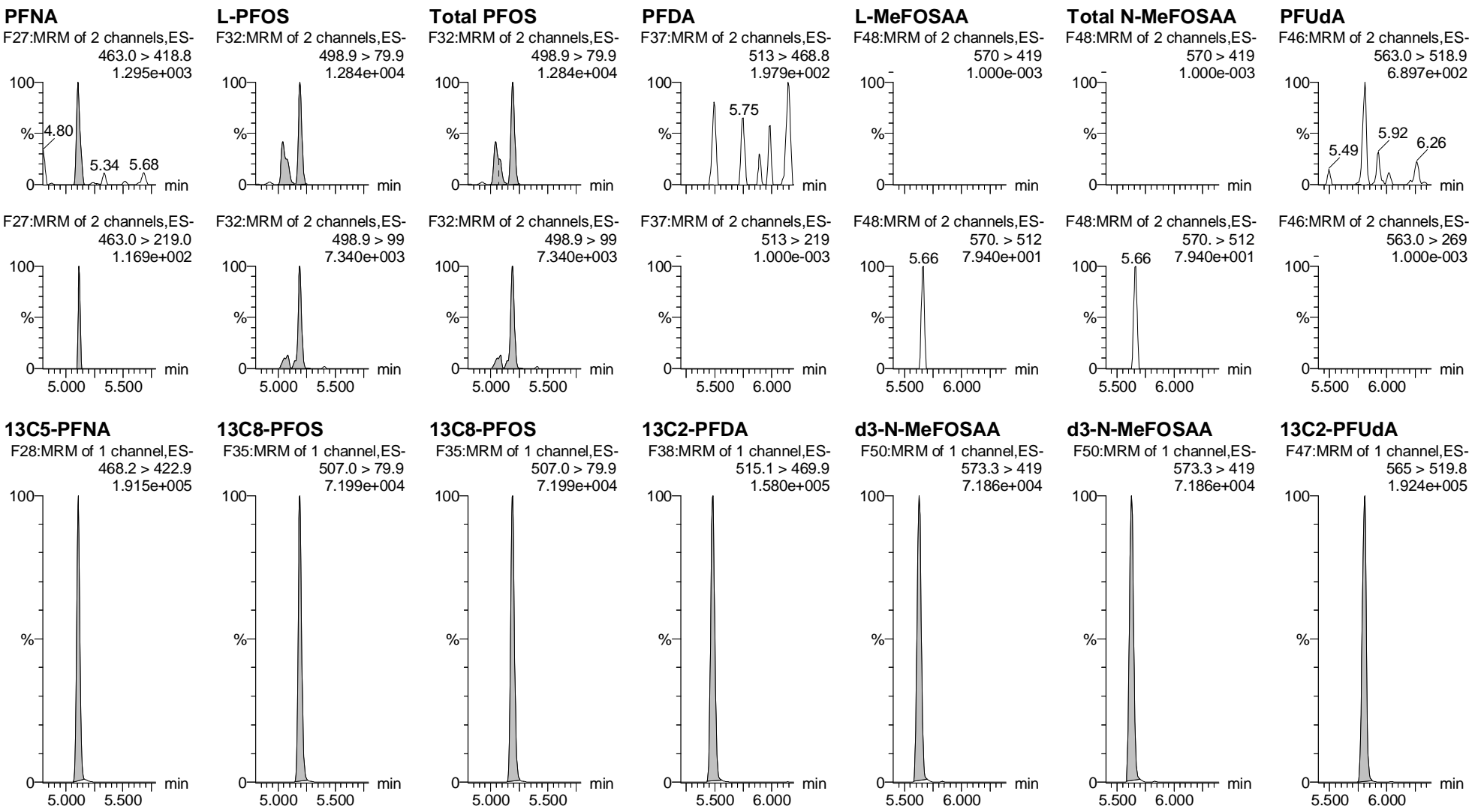


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Last Altered: Wednesday, December 05, 2018 10:30:46 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

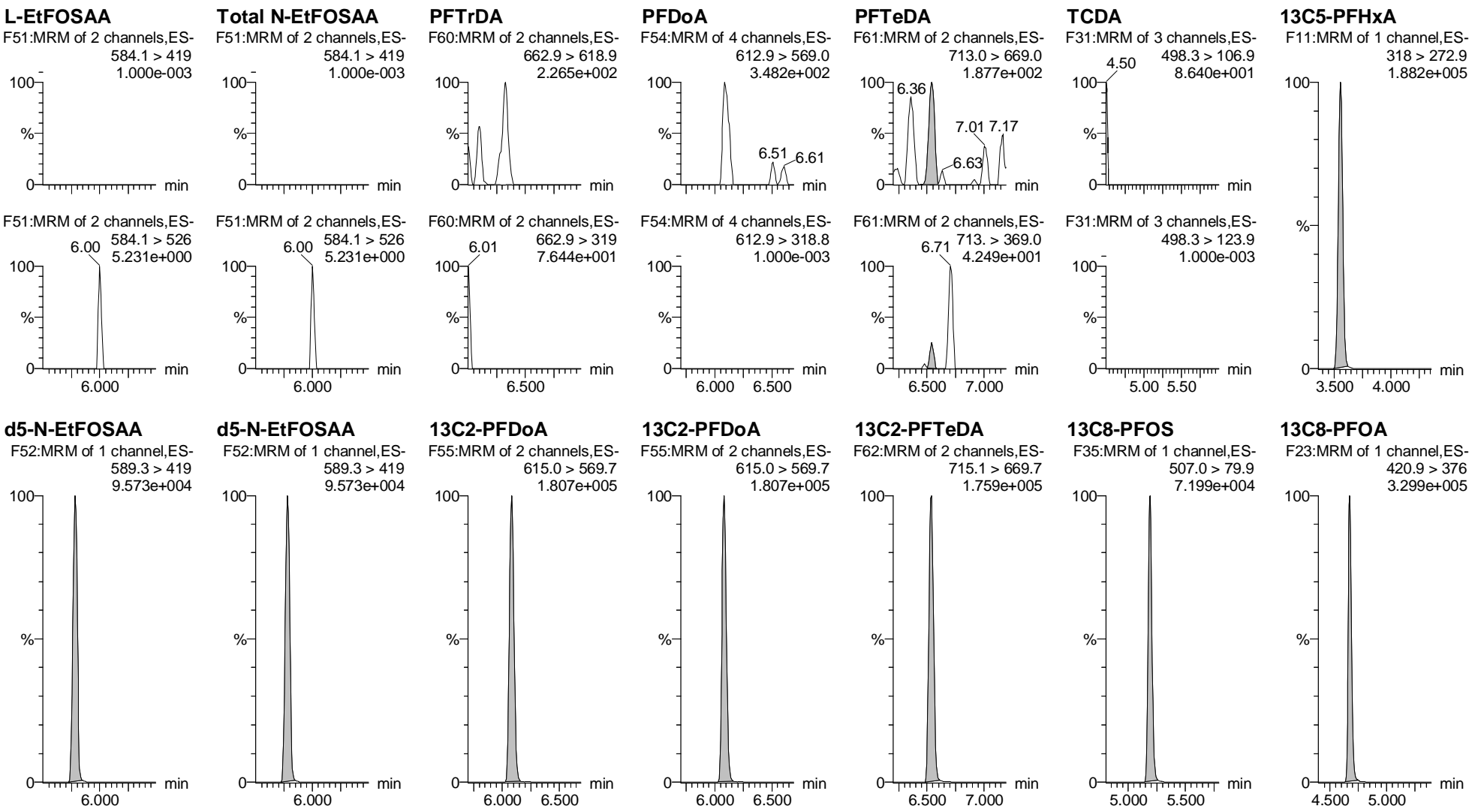


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Last Altered: Wednesday, December 05, 2018 10:30:46 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2



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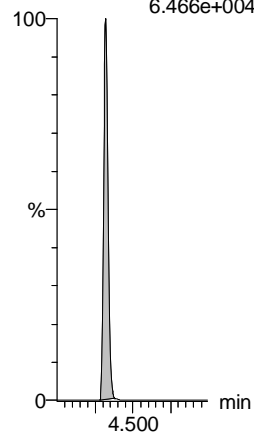
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Printed: Wednesday, December 05, 2018 10:31:03 Pacific Standard Time

Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

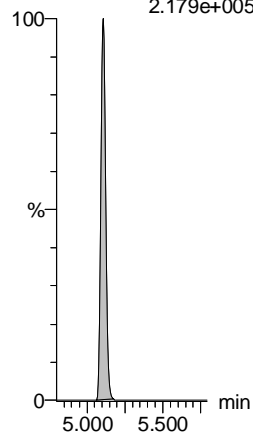
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
6.466e+004



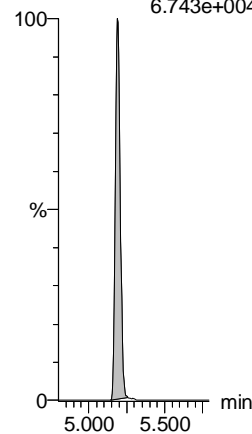
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
2.179e+005



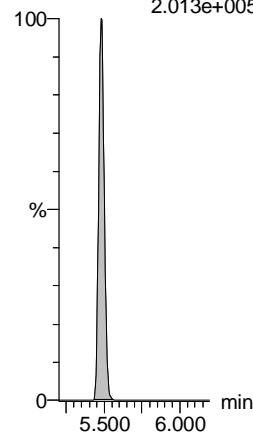
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
6.743e+004



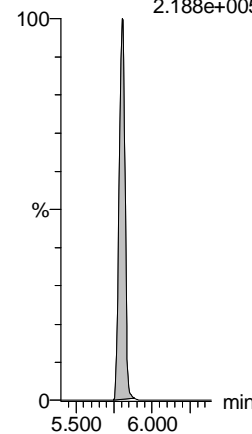
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
2.013e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
2.188e+005



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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-19.qld

Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	3.34e3	1.20e3	0.115		3.00	3.00	34.8	150.0324		3.147	NO
2	5 PFHxA	313 > 269	4.79e4	3.81e3	0.115		3.56	3.56	63.0	528.8095		15.151	NO
3	7 PFHpA	363.0 > 318.9	4.74e3	5.34e3	0.115		4.19	4.19	11.1	82.9909		15.232	NO
4	8 L-PFHxS	398.9 > 79.6	8.28e3	1.06e3	0.115		4.32	4.32	97.1	429.2396		2.133	NO
5	68 Total PFHxS	398.9 > 79.6	8.28e3	1.06e3	0.115		4.58		97.1	429.2396			
6	11 L-PFOA	412.8 > 368.9	5.67e3	9.05e3	0.115		4.58	4.68	7.83	55.4865		2.760	NO
7	69 Total PFOA	412.8 > 368.9	5.67e3	9.05e3	0.115		4.97		7.83	55.4865			
8	38 13C3-PFBS	302. > 98.8	1.20e3	2.42e3	0.115	0.633	3.00	3.00	6.21	85.4012	78.5		
9	40 13C2-PFHxA	315 > 270	3.81e3	1.02e4	0.115	0.900	3.56	3.56	4.66	45.0387	103.5		
10	41 13C4-PFHpA	367.2 > 321.8	5.34e3	1.02e4	0.115	0.693	4.19	4.19	6.54	82.0782	75.5		
11	42 18O2-PFHxS	403.0 > 102.6	1.06e3	2.42e3	0.115	0.476	4.33	4.32	5.51	100.6879	92.6		
12	42 18O2-PFHxS	403.0 > 102.6	1.06e3	2.42e3	0.115	0.476	4.33	4.32	5.51	100.6879	92.6		
13	44 13C2-PFOA	414.9 > 369.7	9.05e3	1.42e4	0.115	0.873	4.68	4.68	7.96	79.3225	72.9		
14	44 13C2-PFOA	414.9 > 369.7	9.05e3	1.42e4	0.115	0.873	4.68	4.68	7.96	79.3225	72.9		
15	-1												
16	14 PFNA	463.0 > 418.8	5.76e1	9.21e3	0.115		5.11	5.11	0.0781	1.0165		9.288	YES
17	16 L-PFOS	498.9 > 79.9	8.15e2	2.97e3	0.115		5.08	5.19	3.44	27.5147		2.490	NO
18	70 Total PFOS	498.9 > 79.9	8.15e2	2.97e3	0.115		5.46		3.44	27.5147			
19	18 PFDA	513 > 468.8	1.77e1	8.44e3	0.115		5.48	5.48	0.0263	0.3506		3.052	NO
20	21 L-MeFOSAA	570 > 419		3.07e3	0.115		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	3.07e3	0.115		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		9.91e3	0.115		5.81						
23	45 13C5-PFNA	468.2 > 422.9	9.21e3	1.00e4	0.115	1.006	5.11	5.11	11.5	99.3793	91.4		
24	47 13C8-PFOS	507.0 > 79.9	2.97e3	2.85e3	0.115	0.968	5.19	5.19	13.0	117.0414	107.6		
25	47 13C8-PFOS	507.0 > 79.9	2.97e3	2.85e3	0.115	0.968	5.19	5.19	13.0	117.0414	107.6		
26	48 13C2-PFDA	515.1 > 469.9	8.44e3	1.09e4	0.115	1.125	5.48	5.48	9.69	74.9223	68.9		
27	50 d3-N-MeFOSAA	573.3 > 419	3.07e3	1.35e4	0.115	0.329	5.63	5.63	2.85	75.2192	69.2		
28	50 d3-N-MeFOSAA	573.3 > 419	3.07e3	1.35e4	0.115	0.329	5.63	5.63	2.85	75.2192	69.2		
29	51 13C2-PFUDa	565 > 519.8	9.91e3	1.35e4	0.115	1.111	5.81	5.81	9.17	71.8299	66.0		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.27e3	0.115		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.27e3	0.115		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		9.35e3	0.115		6.32						
34	27 PFDoA	612.9 > 569.0	7.36e0	9.35e3	0.115		6.08	6.09	0.00983	0.0709		1.420	YES
35	30 PFTeDA	713.0 > 669.0		8.57e3	0.115		6.54						
36	73 TCDA	498.3>106.9			0.115		5.45						

AD 12/5/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-19.qld

Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	1.02e4	1.02e4	0.115	1.000	3.56	3.56	3.56	12.5	108.7619	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.27e3	1.35e4	0.115	0.355	5.78	5.78	5.78	3.95	96.8287	89.0		
39	52	d5-N-EtFOSAA	589.3 > 419	4.27e3	1.35e4	0.115	0.355	5.78	5.78	5.78	3.95	96.8287	89.0		
40	53	13C2-PFDoA	615.0 > 569.7	9.35e3	1.09e4	0.115	0.993	6.08	6.08	6.08	10.7	94.1136	86.5		
41	53	13C2-PFDoA	615.0 > 569.7	9.35e3	1.09e4	0.115	0.993	6.08	6.08	6.08	10.7	94.1136	86.5		
42	55	13C2-PFTeDA	715.1 > 669.7	8.57e3	1.35e4	0.115	0.749	6.54	6.54	6.54	7.94	92.1879	84.8		
43	47	13C8-PFOS	507.0 > 79.9	2.97e3	2.85e3	0.115	0.968	5.19	5.19	5.19	13.0	117.0414	107.6		
44	63	13C8-PFOA	420.9 > 376	1.42e4	1.42e4	0.115	1.000	4.68	4.68	4.68	12.5	108.7619	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.42e3	2.42e3	0.115	1.000	4.33	4.32	4.32	12.5	108.7619	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.00e4	1.00e4	0.115	1.000	5.11	5.11	5.11	12.5	108.7619	100.0		
48	65	13C4-PFOS	503 > 79.9	2.85e3	2.85e3	0.115	1.000	5.19	5.19	5.19	12.5	108.7619	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.09e4	1.09e4	0.115	1.000	5.48	5.48	5.48	12.5	108.7619	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.35e4	1.35e4	0.115	1.000	5.81	5.81	5.81	12.5	108.7619	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-19.qld

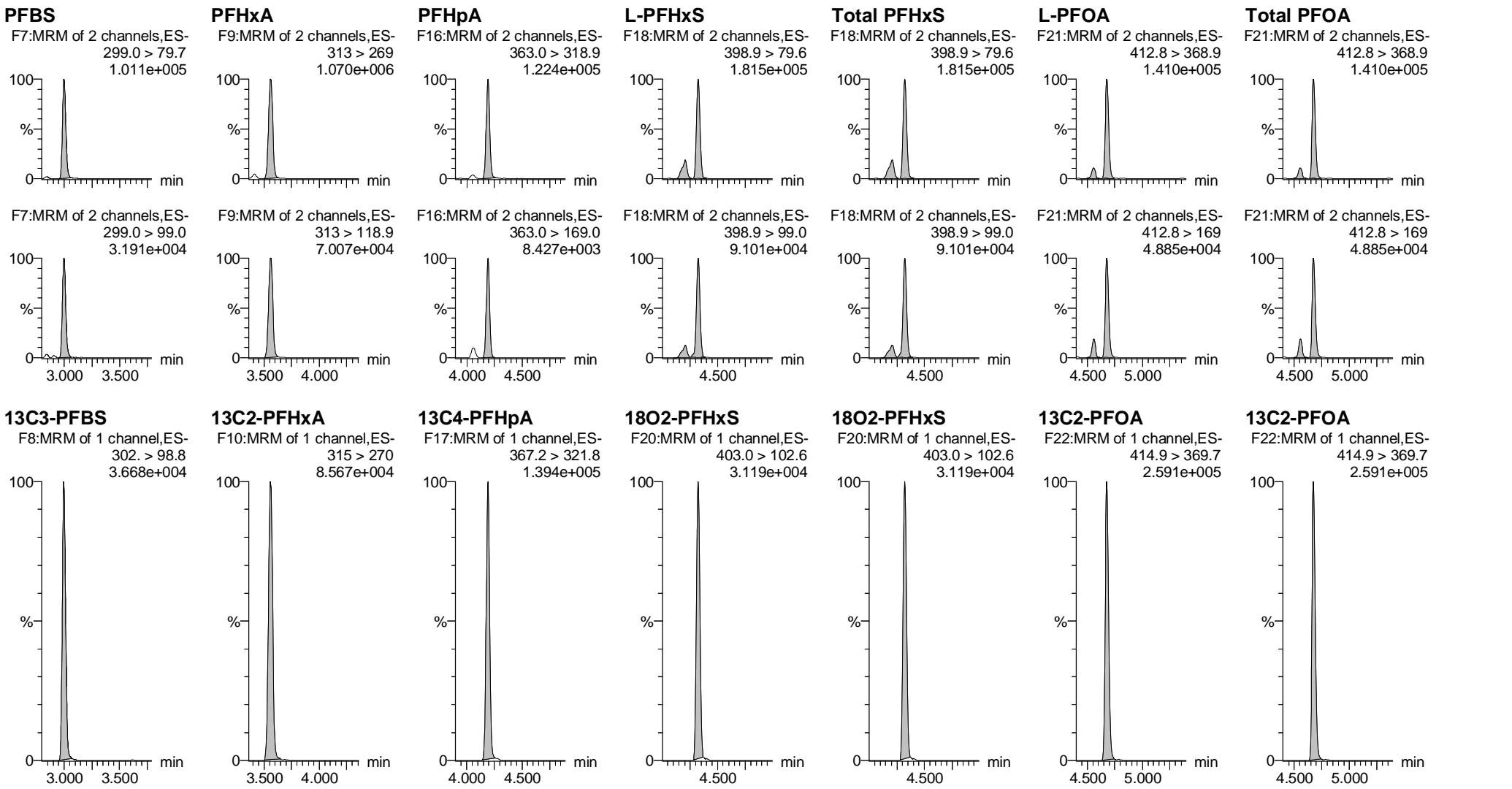
Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

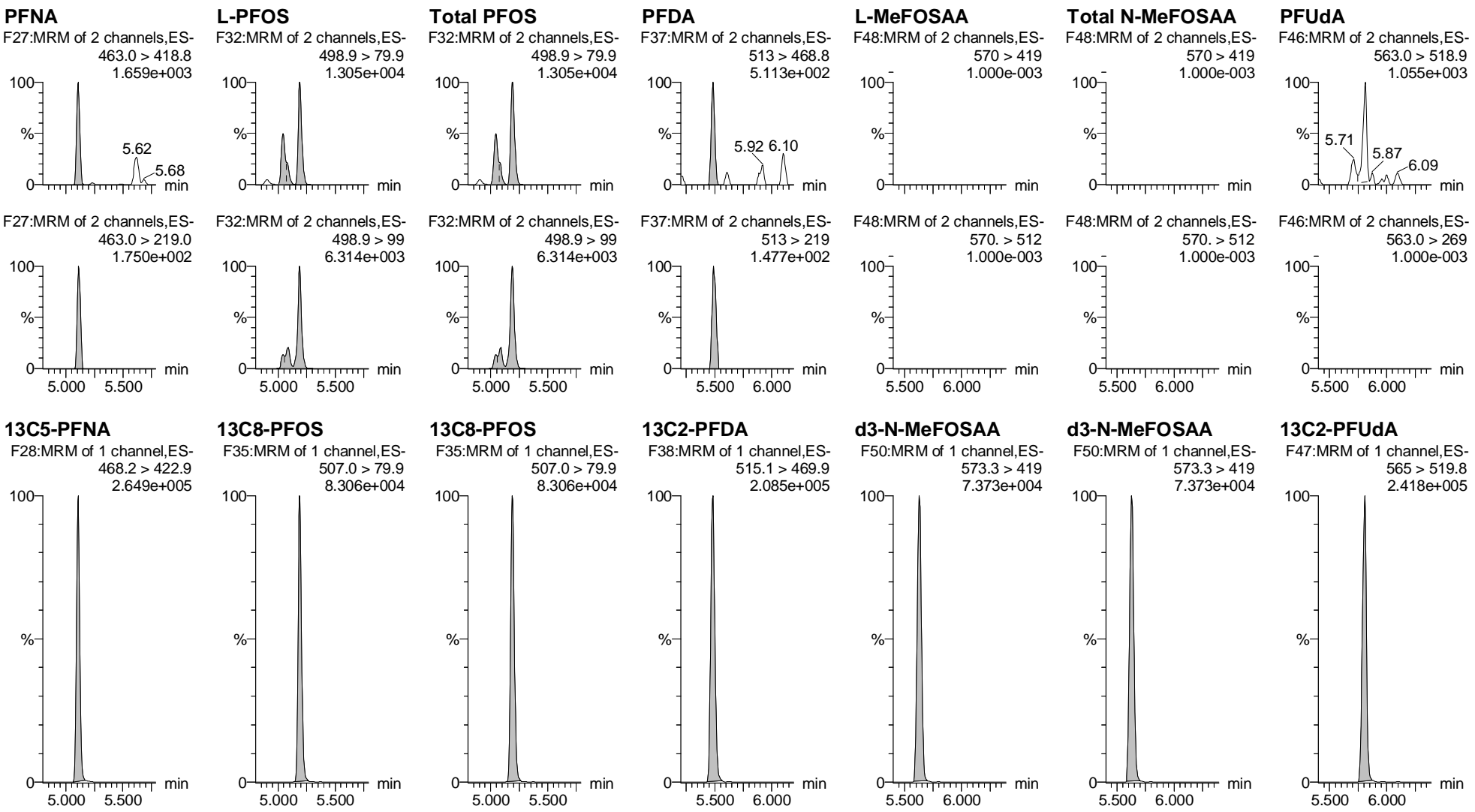


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-19.qld

Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

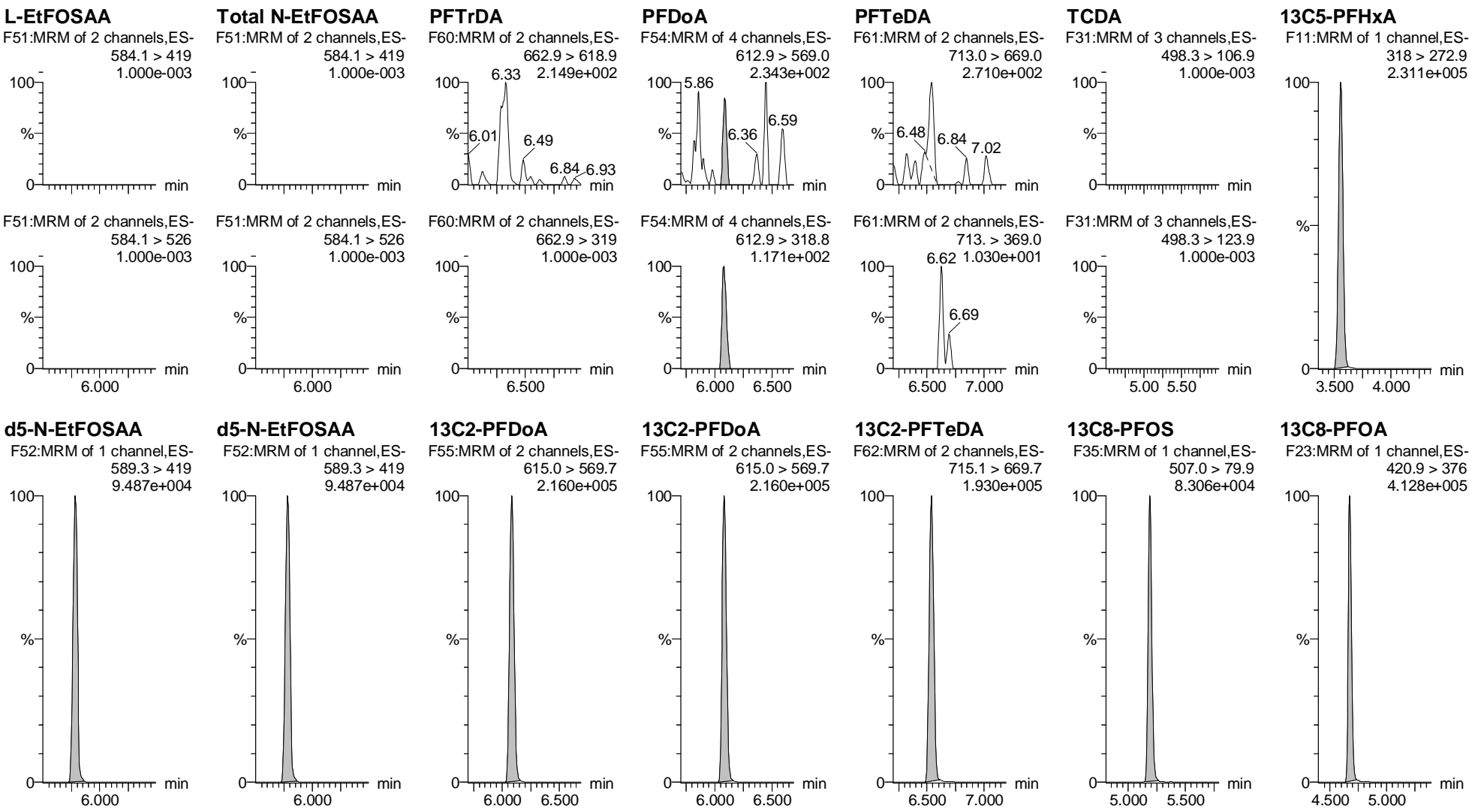


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-19.qld

Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D



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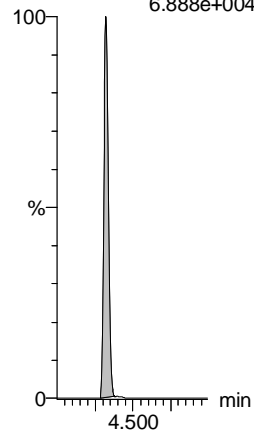
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Last Altered: Wednesday, December 05, 2018 10:33:01 Pacific Standard Time
Printed: Wednesday, December 05, 2018 10:33:09 Pacific Standard Time

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

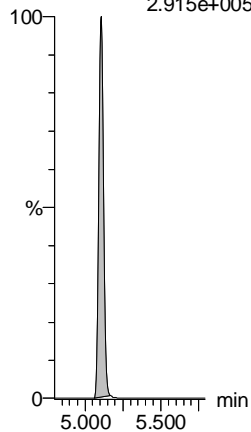
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
6.888e+004



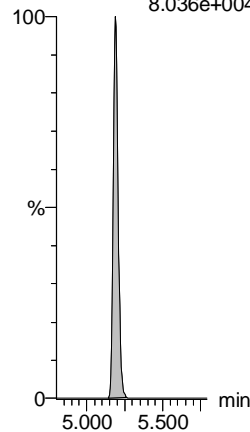
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
2.915e+005



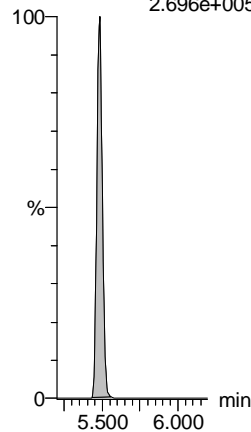
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
8.036e+004



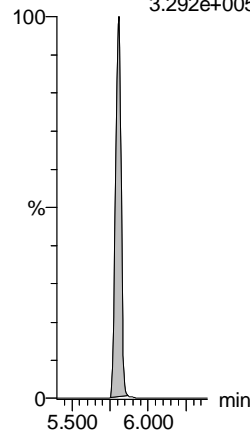
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
2.696e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
3.292e+005



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MM 12/5/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-20.qld

Last Altered: Wednesday, December 05, 2018 10:34:16 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:34:30 Pacific Standard Time

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7		1.11e3	0.111		3.00						
2	5 PFHxA	313 > 269		4.85e3	0.111		3.56						
3	7 PFHpA	363.0 > 318.9		6.56e3	0.111		4.19						
4	8 L-PFHxS	398.9 > 79.6	2.10e0	1.04e3	0.111		4.33	4.33	0.0251	0.1354		0.873	YES
5	68 Total PFHxS	398.9 > 79.6	2.10e0	1.04e3	0.111		4.58		0.0251	0.1354			
6	11 L-PFOA	412.8 > 368.9	4.22e1	1.13e4	0.111		4.58	4.68	0.0467			5.308	YES
7	69 Total PFOA	412.8 > 368.9	4.22e1	1.13e4	0.111		4.97		0.000				
8	38 13C3-PFBS	302. > 98.8	1.11e3	2.50e3	0.111	0.633	3.00	3.00	5.57	79.4901	70.4		
9	40 13C2-PFHxA	315 > 270	4.85e3	1.31e4	0.111	0.900	3.56	3.56	4.64	46.5658	103.1		
10	41 13C4-PFHpA	367.2 > 321.8	6.56e3	1.31e4	0.111	0.693	4.19	4.19	6.27	81.7878	72.4		
11	42 18O2-PFHxS	403.0 > 102.6	1.04e3	2.50e3	0.111	0.476	4.33	4.33	5.22	99.1805	87.8		
12	42 18O2-PFHxS	403.0 > 102.6	1.04e3	2.50e3	0.111	0.476	4.33	4.33	5.22	99.1805	87.8		
13	44 13C2-PFOA	414.9 > 369.7	1.13e4	1.90e4	0.111	0.873	4.68	4.68	7.42	76.8513	68.0		
14	44 13C2-PFOA	414.9 > 369.7	1.13e4	1.90e4	0.111	0.873	4.68	4.68	7.42	76.8513	68.0		
15	-1												
16	14 PFNA	463.0 > 418.8	6.33e0	1.04e4	0.111		5.11	5.11	0.00764	0.4818		15.995	YES
17	16 L-PFOS	498.9 > 79.9		2.54e3	0.111		5.08						
18	70 Total PFOS	498.9 > 79.9	0.00e0	2.54e3	0.111		5.46		0.000				
19	18 PFDA	513 > 468.8		1.06e4	0.111		5.48						
20	21 L-MeFOSAA	570 > 419		2.99e3	0.111		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	2.99e3	0.111		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		1.18e4	0.111		5.81						
23	45 13C5-PFNA	468.2 > 422.9	1.04e4	1.40e4	0.111	1.006	5.11	5.11	9.28	83.2948	73.7		
24	47 13C8-PFOS	507.0 > 79.9	2.54e3	2.68e3	0.111	0.968	5.19	5.19	11.8	110.5907	97.9		
25	47 13C8-PFOS	507.0 > 79.9	2.54e3	2.68e3	0.111	0.968	5.19	5.19	11.8	110.5907	97.9		
26	48 13C2-PFDA	515.1 > 469.9	1.06e4	1.54e4	0.111	1.125	5.48	5.48	8.61	69.1849	61.3		
27	50 d3-N-MeFOSAA	573.3 > 419	2.99e3	1.79e4	0.111	0.329	5.63	5.63	2.09	57.3341	50.8		
28	50 d3-N-MeFOSAA	573.3 > 419	2.99e3	1.79e4	0.111	0.329	5.63	5.63	2.09	57.3341	50.8		
29	51 13C2-PFUDa	565 > 519.8	1.18e4	1.79e4	0.111	1.111	5.81	5.81	8.26	67.1601	59.5		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.20e3	0.111		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.20e3	0.111		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		1.14e4	0.111		6.32						
34	27 PFDoA	612.9 > 569.0		1.14e4	0.111		6.08						
35	30 PFTeDA	713.0 > 669.0		9.01e3	0.111		6.54						
36	73 TCDA	498.3>106.9			0.111		5.45						

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-20.qld

Last Altered: Wednesday, December 05, 2018 10:34:16 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:34:30 Pacific Standard Time

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	1.31e4	1.31e4	0.111	1.000	3.56	3.56	3.56	12.5	112.9484	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.20e3	1.79e4	0.111	0.355	5.78	5.78	5.78	2.93	74.5966	66.0		
39	52	d5-N-EtFOSAA	589.3 > 419	4.20e3	1.79e4	0.111	0.355	5.78	5.78	5.78	2.93	74.5966	66.0		
40	53	13C2-PFDoA	615.0 > 569.7	1.14e4	1.54e4	0.111	0.993	6.08	6.08	6.08	9.24	84.1060	74.5		
41	53	13C2-PFDoA	615.0 > 569.7	1.14e4	1.54e4	0.111	0.993	6.08	6.08	6.08	9.24	84.1060	74.5		
42	55	13C2-PFTeDA	715.1 > 669.7	9.01e3	1.79e4	0.111	0.749	6.54	6.53	6.53	6.29	75.8815	67.2		
43	47	13C8-PFOS	507.0 > 79.9	2.54e3	2.68e3	0.111	0.968	5.19	5.19	5.19	11.8	110.5907	97.9		
44	63	13C8-PFOA	420.9 > 376	1.90e4	1.90e4	0.111	1.000	4.68	4.68	4.68	12.5	112.9484	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.50e3	2.50e3	0.111	1.000	4.33	4.33	4.33	12.5	112.9484	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.40e4	1.40e4	0.111	1.000	5.11	5.11	5.11	12.5	112.9484	100.0		
48	65	13C4-PFOS	503 > 79.9	2.68e3	2.68e3	0.111	1.000	5.19	5.19	5.19	12.5	112.9484	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.54e4	1.54e4	0.111	1.000	5.48	5.48	5.48	12.5	112.9484	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.79e4	1.79e4	0.111	1.000	5.81	5.81	5.81	12.5	112.9484	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-20.qld

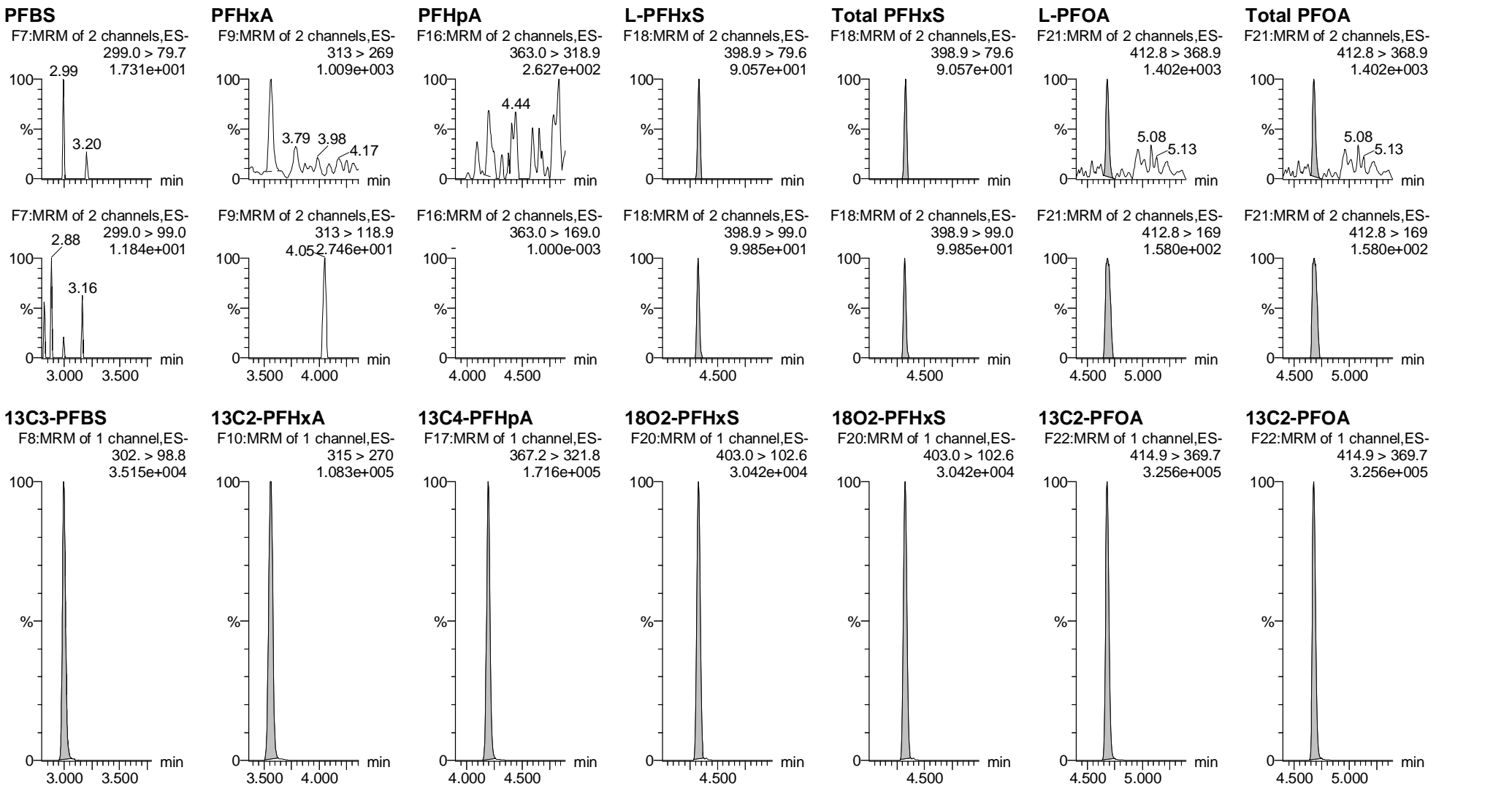
Last Altered: Wednesday, December 05, 2018 10:34:16 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:34:30 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

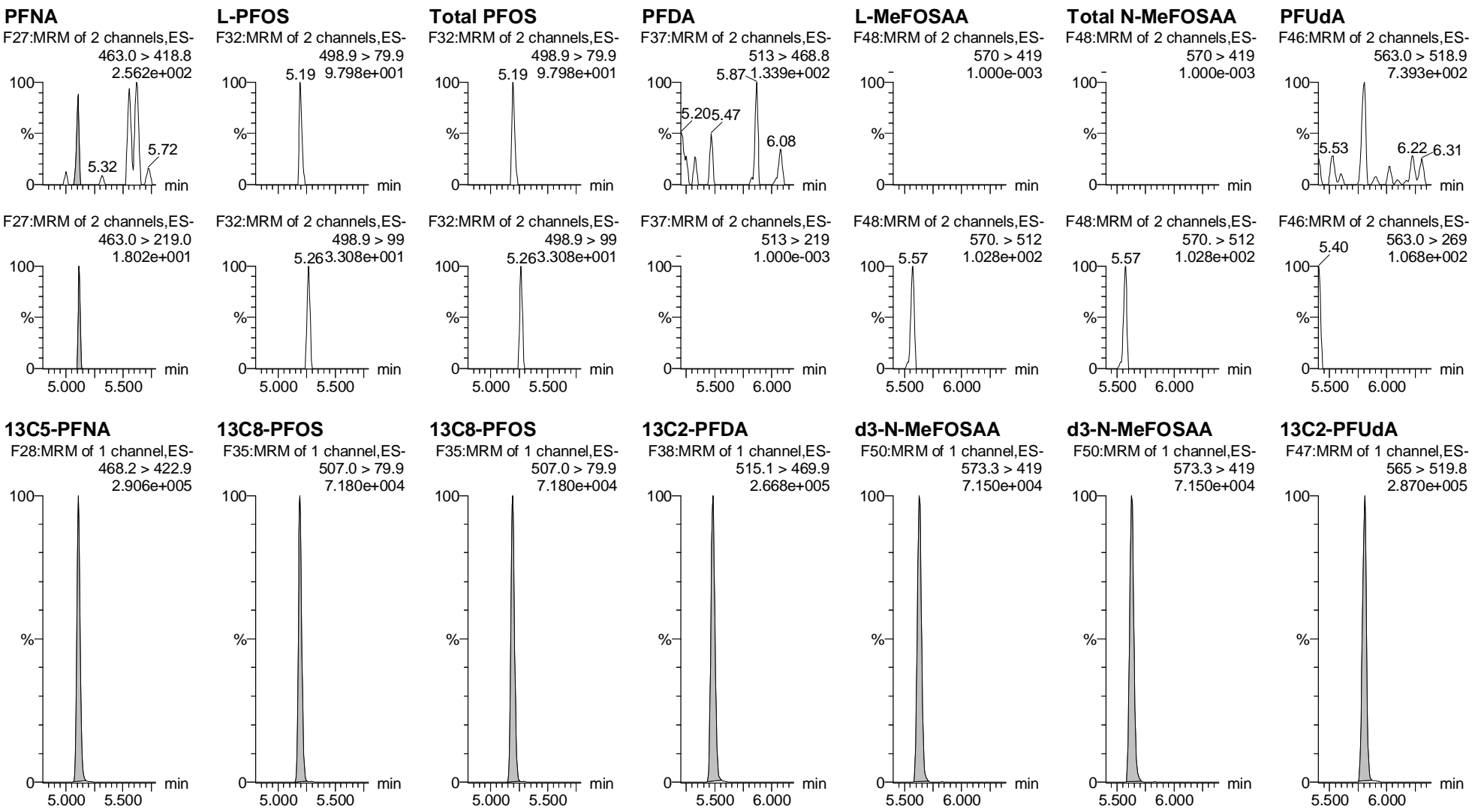


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Printed: Wednesday, December 05, 2018 10:34:30 Pacific Standard Time

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

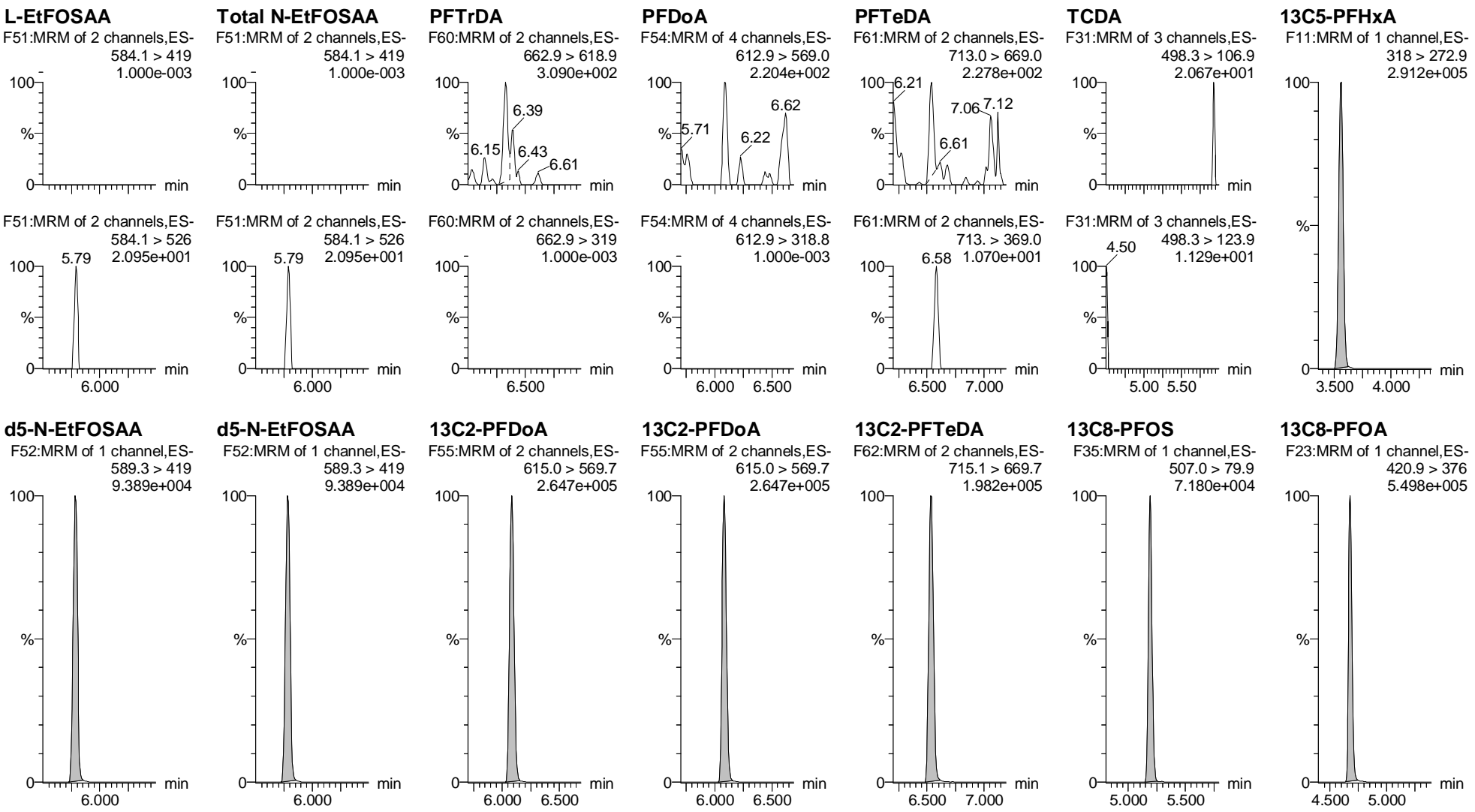


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Printed: Wednesday, December 05, 2018 10:34:30 Pacific Standard Time

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115



MM 12/5/2018

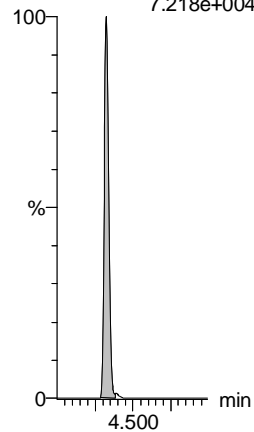
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Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

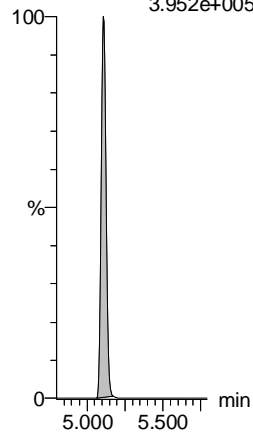
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
7.218e+004



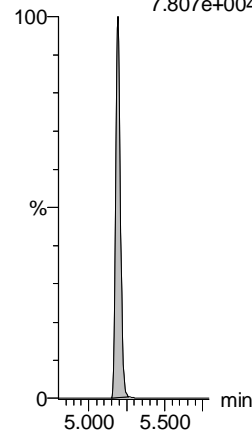
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
3.952e+005



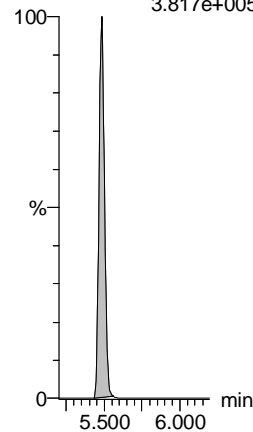
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
7.807e+004



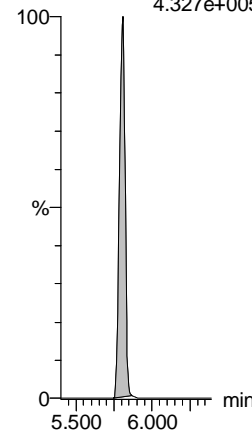
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
3.817e+005



13C7-PFUdA

F49:MRM of 1 channel,ES-
570.1 > 524.8
4.327e+005



Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:37:17 Pacific Standard Time

Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2

	# Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3 PFBS	299.0 > 79.7	5.21e2	1.19e3	0.117		3.00	3.00	5.45	23.4599		2.977	NO
2	5 PFHxA	313 > 269	6.65e3	3.71e3	0.117		3.56	3.56	8.97	73.2152		14.185	NO
3	7 PFHpA	363.0 > 318.9	8.91e1	4.90e3	0.117		4.19	4.19	0.227	1.6460		18.244	NO
4	8 L-PFHxS	398.9 > 79.6	1.64e2	1.04e3	0.117		4.32	4.32	1.97	8.5498		3.336	NO
5	68 Total PFHxS	398.9 > 79.6	1.64e2	1.04e3	0.117		4.58		1.97	8.5498			
6	11 L-PFOA	412.8 > 368.9	4.34e2	8.99e3	0.117		4.58	4.68	0.603	3.8801		3.139	NO
7	69 Total PFOA	412.8 > 368.9	4.34e2	8.99e3	0.117		4.97		0.603	3.8801			
8	38 13C3-PFBS	302. > 98.8	1.19e3	2.36e3	0.117	0.633	3.00	3.00	6.32	85.3883	79.9		
9	40 13C2-PFHxA	315 > 270	3.71e3	1.04e4	0.117	0.900	3.56	3.56	4.48	42.5202	99.4		
10	41 13C4-PFHpA	367.2 > 321.8	4.90e3	1.04e4	0.117	0.693	4.19	4.19	5.92	73.0309	68.3		
11	42 18O2-PFHxS	403.0 > 102.6	1.04e3	2.36e3	0.117	0.476	4.33	4.32	5.51	99.0229	92.6		
12	42 18O2-PFHxS	403.0 > 102.6	1.04e3	2.36e3	0.117	0.476	4.33	4.32	5.51	99.0229	92.6		
13	44 13C2-PFOA	414.9 > 369.7	8.99e3	1.37e4	0.117	0.873	4.68	4.68	8.23	80.6298	75.4		
14	44 13C2-PFOA	414.9 > 369.7	8.99e3	1.37e4	0.117	0.873	4.68	4.68	8.23	80.6298	75.4		
15	-1												
16	14 PFNA	463.0 > 418.8		8.69e3	0.117		5.11						
17	16 L-PFOS	498.9 > 79.9	1.95e1	2.79e3	0.117		5.08	5.18	0.0873	1.1606		5.312	YES
18	70 Total PFOS	498.9 > 79.9	1.95e1	2.79e3	0.117		5.46		0.0873	1.1606			
19	18 PFDA	513 > 468.8		8.51e3	0.117		5.48						
20	21 L-MeFOSAA	570 > 419		2.93e3	0.117		5.63						
21	71 Total N-MeFOSAA	570. > 419	0.00e0	2.93e3	0.117		5.90		0.000				
22	25 PFUDa	563.0 > 518.9		1.03e4	0.117		5.81						
23	45 13C5-PFNA	468.2 > 422.9	8.69e3	1.03e4	0.117	1.006	5.11	5.11	10.5	89.5856	83.8		
24	47 13C8-PFOS	507.0 > 79.9	2.79e3	2.71e3	0.117	0.968	5.19	5.19	12.9	113.6414	106.3		
25	47 13C8-PFOS	507.0 > 79.9	2.79e3	2.71e3	0.117	0.968	5.19	5.19	12.9	113.6414	106.3		
26	48 13C2-PFDA	515.1 > 469.9	8.51e3	1.14e4	0.117	1.125	5.48	5.48	9.33	70.9290	66.3		
27	50 d3-N-MeFOSAA	573.3 > 419	2.93e3	1.34e4	0.117	0.329	5.63	5.63	2.73	70.8380	66.2		
28	50 d3-N-MeFOSAA	573.3 > 419	2.93e3	1.34e4	0.117	0.329	5.63	5.63	2.73	70.8380	66.2		
29	51 13C2-PFUDa	565 > 519.8	1.03e4	1.34e4	0.117	1.111	5.81	5.81	9.57	73.6676	68.9		
30	-1												
31	23 L-EtFOSAA	584.1 > 419		4.41e3	0.117		5.79						
32	72 Total N-EtFOSAA	584.1 > 419	0.00e0	4.41e3	0.117		6.06		0.000				
33	29 PFTTrDA	662.9 > 618.9		8.74e3	0.117		6.32						
34	27 PFDoA	612.9 > 569.0		8.74e3	0.117		6.08						
35	30 PFTeDA	713.0 > 669.0		7.95e3	0.117		6.54						
36	73 TCDA	498.3>106.9			0.117		5.45						

AD 12/5/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time

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Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	61	13C5-PFHxA	318 > 272.9	1.04e4	1.04e4	0.117	1.000	3.56	3.56	3.56	12.5	106.9290	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	4.41e3	1.34e4	0.117	0.355	5.78	5.78	5.78	4.11	98.9322	92.5		
39	52	d5-N-EtFOSAA	589.3 > 419	4.41e3	1.34e4	0.117	0.355	5.78	5.78	5.78	4.11	98.9322	92.5		
40	53	13C2-PFDoA	615.0 > 569.7	8.74e3	1.14e4	0.117	0.993	6.08	6.08	6.08	9.58	82.4999	77.2		
41	53	13C2-PFDoA	615.0 > 569.7	8.74e3	1.14e4	0.117	0.993	6.08	6.08	6.08	9.58	82.4999	77.2		
42	55	13C2-PFTeDA	715.1 > 669.7	7.95e3	1.34e4	0.117	0.749	6.54	6.54	6.54	7.40	84.4581	79.0		
43	47	13C8-PFOS	507.0 > 79.9	2.79e3	2.71e3	0.117	0.968	5.19	5.19	5.19	12.9	113.6414	106.3		
44	63	13C8-PFOA	420.9 > 376	1.37e4	1.37e4	0.117	1.000	4.68	4.68	4.68	12.5	106.9290	100.0		
45	-1														
46	62	13C3-PFHxS	401.8 > 79.9	2.36e3	2.36e3	0.117	1.000	4.33	4.32	4.32	12.5	106.9290	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.03e4	1.03e4	0.117	1.000	5.11	5.11	5.11	12.5	106.9290	100.0		
48	65	13C4-PFOS	503 > 79.9	2.71e3	2.71e3	0.117	1.000	5.19	5.19	5.19	12.5	106.9290	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.14e4	1.14e4	0.117	1.000	5.48	5.48	5.48	12.5	106.9290	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.34e4	1.34e4	0.117	1.000	5.81	5.81	5.81	12.5	106.9290	100.0		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

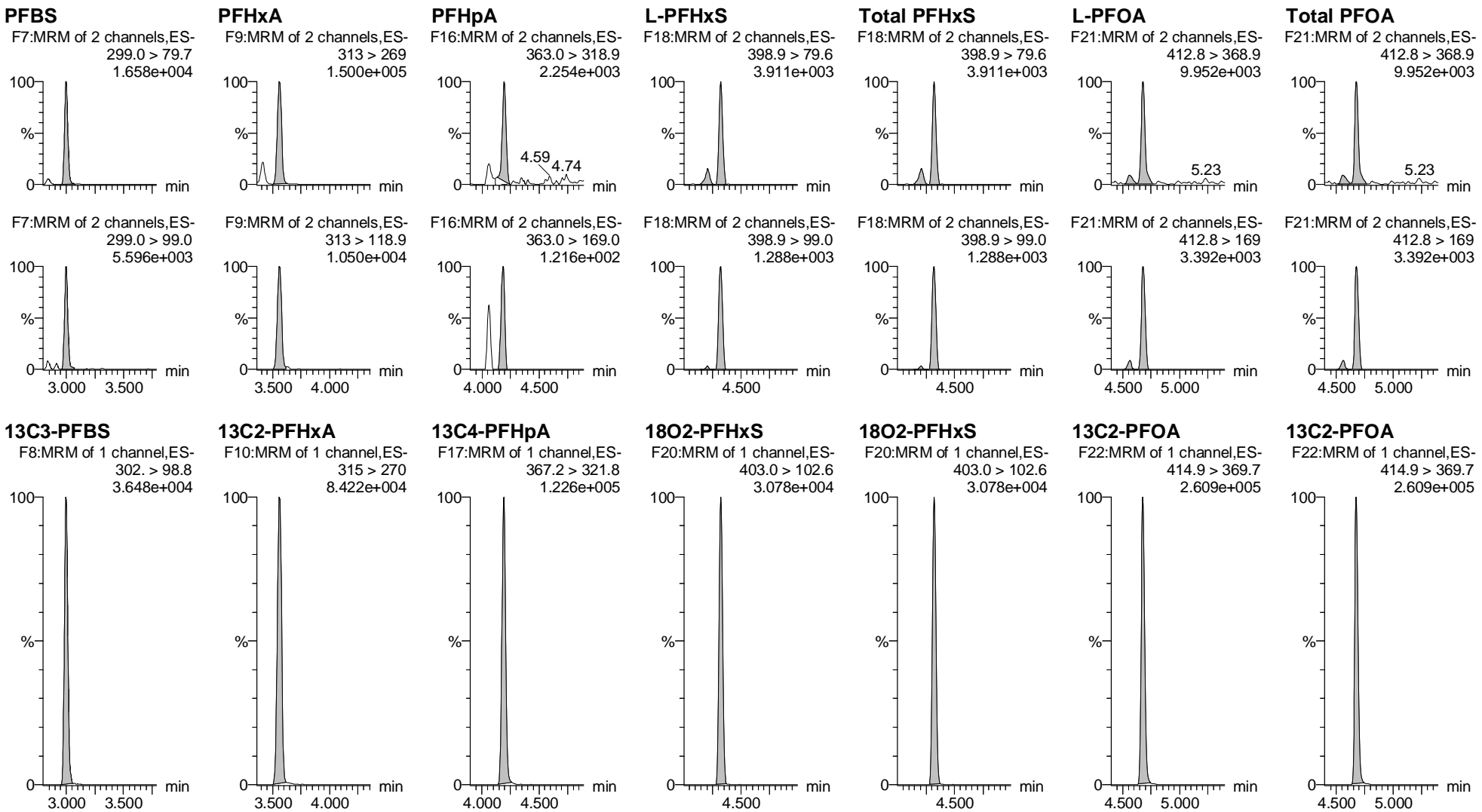
Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:37:17 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2

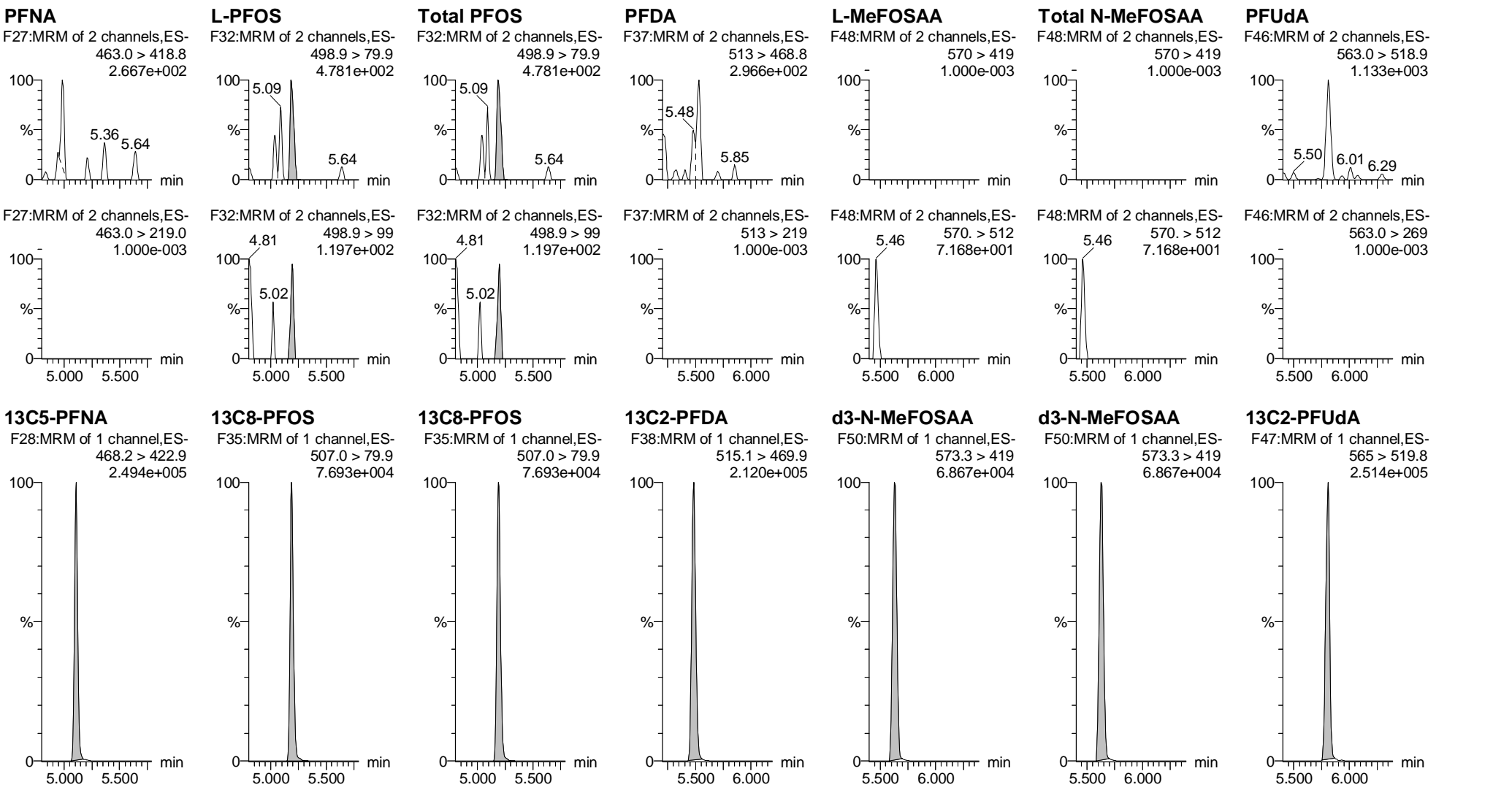


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:37:17 Pacific Standard Time

Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2

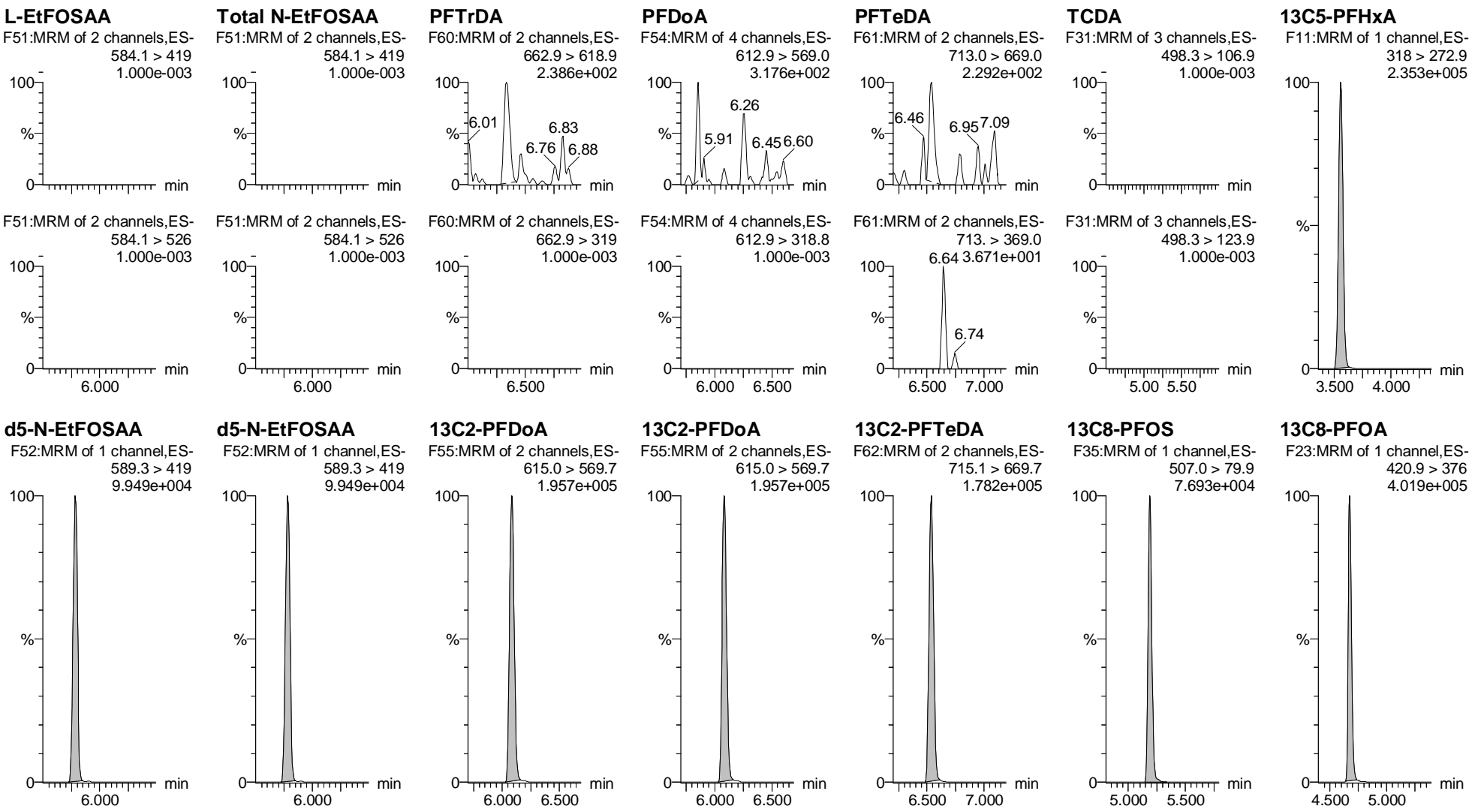


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time

Printed: Wednesday, December 05, 2018 10:37:17 Pacific Standard Time

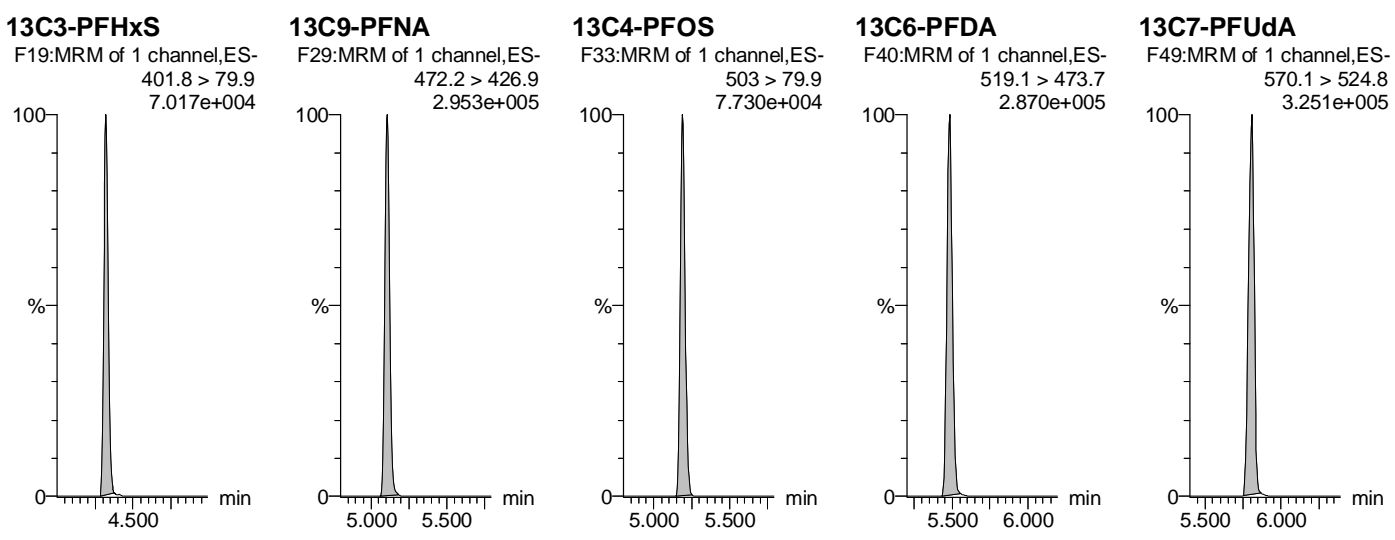
Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2



Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-21.qld

Last Altered: Wednesday, December 05, 2018 10:37:06 Pacific Standard Time
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Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2



**INJECTION INTERNAL STANDARD (IIS) AREAS,
INSTRUMENT BLANKS (IB)
AND
CONTINUING CALIBRATION VERIFICATIONS CCV)**

Dataset: F:\Projects\PFAS.PRO\Results\181203M1\181203M1-IIS.qld

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_RS-12-03-18.mdb 03 Dec 2018 12:52:41

Calibration: 04 Dec 2018 08:45:01

Name: 181203M1_2, Date: 03-Dec-2018, Time: 14:36:50, ID: ST181203M1-1 PFC CS0 18K3003, Description: PFC CS0 18K3003

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	ST181203M1-1 PFC CS0 18K3003	8.86e3	100.0	NO
2	2 13C5-PFHxA	ST181203M1-1 PFC CS0 18K3003	1.75e4	100.0	NO
3	3 13C3-PFHxS	ST181203M1-1 PFC CS0 18K3003	2.75e3	100.0	NO
4	4 13C8-PFOA	ST181203M1-1 PFC CS0 18K3003	2.30e4	100.0	NO
5	5 13C9-PFNA	ST181203M1-1 PFC CS0 18K3003	1.71e4	100.0	NO
6	6 13C4-PFOS	ST181203M1-1 PFC CS0 18K3003	3.15e3	100.0	NO
7	7 13C6-PFDA	ST181203M1-1 PFC CS0 18K3003	1.82e4	100.0	NO
8	8 13C7-PFUDa	ST181203M1-1 PFC CS0 18K3003	2.19e4	100.0	NO

Name: 181203M1_3, Date: 03-Dec-2018, Time: 14:47:29, 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: 181203M1_4, Date: 03-Dec-2018, Time: 14:58:01, ID: B8K0153-BS1 OPR 0.25, Description: OPR

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	B8K0153-BS1 OPR 0.25	6.33e3	71.4	NO
2	2 13C5-PFHxA	B8K0153-BS1 OPR 0.25	1.28e4	73.1	NO
3	3 13C3-PFHxS	B8K0153-BS1 OPR 0.25	2.20e3	80.2	NO
4	4 13C8-PFOA	B8K0153-BS1 OPR 0.25	1.75e4	76.1	NO
5	5 13C9-PFNA	B8K0153-BS1 OPR 0.25	1.35e4	79.2	NO
6	6 13C4-PFOS	B8K0153-BS1 OPR 0.25	2.48e3	78.6	NO
7	7 13C6-PFDA	B8K0153-BS1 OPR 0.25	1.52e4	83.5	NO
8	8 13C7-PFUDa	B8K0153-BS1 OPR 0.25	1.77e4	81.0	NO

Name: 181203M1_5, Date: 03-Dec-2018, Time: 15:08:39, ID: B8K0153-MS1 Matrix Spike 0.1068, Description: Matrix Spike

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	B8K0153-MS1 Matrix Spike 0.1068	6.20e3	70.0	NO
2	2 13C5-PFHxA	B8K0153-MS1 Matrix Spike 0.1068	1.20e4	68.6	NO
3	3 13C3-PFHxS	B8K0153-MS1 Matrix Spike 0.1068	2.46e3	89.6	NO
4	4 13C8-PFOA	B8K0153-MS1 Matrix Spike 0.1068	1.62e4	70.3	NO
5	5 13C9-PFNA	B8K0153-MS1 Matrix Spike 0.1068	1.17e4	68.5	NO
6	6 13C4-PFOS	B8K0153-MS1 Matrix Spike 0.1068	2.61e3	82.9	NO
7	7 13C6-PFDA	B8K0153-MS1 Matrix Spike 0.1068	1.34e4	73.5	NO
8	8 13C7-PFUDa	B8K0153-MS1 Matrix Spike 0.1068	1.63e4	74.4	NO

Dataset: F:\Projects\PFAS.PRO\Results\181203M1\181203M1-IIS.qld

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Name: 181203M1_6, Date: 03-Dec-2018, Time: 15:19:12, ID: B8K0153-MSD1 Matrix Spike Dup 0.11122, Description: Matrix Spike Dup

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0153-MSD1 Matrix Spike Dup 0.111...	4.23e3	47.8	YES
2	2	13C5-PFHxA	B8K0153-MSD1 Matrix Spike Dup 0.111...	9.19e3	52.4	NO
3	3	13C3-PFHxS	B8K0153-MSD1 Matrix Spike Dup 0.111...	2.45e3	89.0	NO
4	4	13C8-PFOA	B8K0153-MSD1 Matrix Spike Dup 0.111...	1.41e4	61.2	NO
5	5	13C9-PFNA	B8K0153-MSD1 Matrix Spike Dup 0.111...	9.97e3	58.3	NO
6	6	13C4-PFOS	B8K0153-MSD1 Matrix Spike Dup 0.111...	2.61e3	82.7	NO
7	7	13C6-PFDA	B8K0153-MSD1 Matrix Spike Dup 0.111...	1.14e4	63.0	NO
8	8	13C7-PFUDa	B8K0153-MSD1 Matrix Spike Dup 0.111...	1.42e4	65.0	NO

Name: 181203M1_7, Date: 03-Dec-2018, Time: 15:29:51, ID: B8K0153-BLK1 Method Blank 0.25, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0153-BLK1 Method Blank 0.25	6.76e3	76.4	NO
2	2	13C5-PFHxA	B8K0153-BLK1 Method Blank 0.25	1.37e4	77.9	NO
3	3	13C3-PFHxS	B8K0153-BLK1 Method Blank 0.25	2.34e3	85.2	NO
4	4	13C8-PFOA	B8K0153-BLK1 Method Blank 0.25	1.85e4	80.4	NO
5	5	13C9-PFNA	B8K0153-BLK1 Method Blank 0.25	1.33e4	77.5	NO
6	6	13C4-PFOS	B8K0153-BLK1 Method Blank 0.25	2.57e3	81.4	NO
7	7	13C6-PFDA	B8K0153-BLK1 Method Blank 0.25	1.49e4	82.1	NO
8	8	13C7-PFUDa	B8K0153-BLK1 Method Blank 0.25	1.76e4	80.4	NO

Name: 181203M1_8, Date: 03-Dec-2018, Time: 15:40:24, ID: 1803678-01 A1-MW-01-SA2 0.11182, Description: A1-MW-01-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803678-01 A1-MW-01-SA2 0.11182	4.66e3	52.6	NO
2	2	13C5-PFHxA	1803678-01 A1-MW-01-SA2 0.11182	9.22e3	52.6	NO
3	3	13C3-PFHxS	1803678-01 A1-MW-01-SA2 0.11182	2.71e3	98.7	NO
4	4	13C8-PFOA	1803678-01 A1-MW-01-SA2 0.11182	1.41e4	61.4	NO
5	5	13C9-PFNA	1803678-01 A1-MW-01-SA2 0.11182	1.14e4	66.7	NO
6	6	13C4-PFOS	1803678-01 A1-MW-01-SA2 0.11182	2.97e3	94.1	NO
7	7	13C6-PFDA	1803678-01 A1-MW-01-SA2 0.11182	1.32e4	72.8	NO
8	8	13C7-PFUDa	1803678-01 A1-MW-01-SA2 0.11182	1.62e4	74.2	NO

Name: 181203M1_9, Date: 03-Dec-2018, Time: 15:51:02, ID: 1803678-02 A1-MW-42-SA2 0.11781, Description: A1-MW-42-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803678-02 A1-MW-42-SA2 0.11781	3.93e3	44.3	YES
2	2	13C5-PFHxA	1803678-02 A1-MW-42-SA2 0.11781	7.20e3	41.1	YES
3	3	13C3-PFHxS	1803678-02 A1-MW-42-SA2 0.11781	2.35e3	85.4	NO
4	4	13C8-PFOA	1803678-02 A1-MW-42-SA2 0.11781	1.02e4	44.3	YES
5	5	13C9-PFNA	1803678-02 A1-MW-42-SA2 0.11781	7.80e3	45.6	YES
6	6	13C4-PFOS	1803678-02 A1-MW-42-SA2 0.11781	2.52e3	80.0	NO
7	7	13C6-PFDA	1803678-02 A1-MW-42-SA2 0.11781	9.69e3	53.4	NO
8	8	13C7-PFUDa	1803678-02 A1-MW-42-SA2 0.11781	1.27e4	58.0	NO

Dataset: F:\Projects\PFAS.PRO\Results\181203M1\181203M1-IIS.qld

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Name: 181203M1_10, Date: 03-Dec-2018, Time: 16:01:36, ID: 1803678-03 FRB-20181116 0.1036, Description: FRB-20181116

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803678-03 FRB-20181116 0.1036	7.24e3	81.7	NO
2	2	13C5-PFHxA	1803678-03 FRB-20181116 0.1036	1.51e4	86.0	NO
3	3	13C3-PFHxS	1803678-03 FRB-20181116 0.1036	2.42e3	88.2	NO
4	4	13C8-PFOA	1803678-03 FRB-20181116 0.1036	2.00e4	86.9	NO
5	5	13C9-PFNA	1803678-03 FRB-20181116 0.1036	1.46e4	85.3	NO
6	6	13C4-PFOS	1803678-03 FRB-20181116 0.1036	2.77e3	88.0	NO
7	7	13C6-PFDA	1803678-03 FRB-20181116 0.1036	1.54e4	84.9	NO
8	8	13C7-PFUDa	1803678-03 FRB-20181116 0.1036	1.98e4	90.5	NO

Name: 181203M1_11, Date: 03-Dec-2018, Time: 16:12:14, ID: 1803678-04 EB-20181116 0.11772, Description: EB-20181116

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803678-04 EB-20181116 0.11772	8.06e3	91.0	NO
2	2	13C5-PFHxA	1803678-04 EB-20181116 0.11772	1.56e4	89.1	NO
3	3	13C3-PFHxS	1803678-04 EB-20181116 0.11772	2.49e3	90.7	NO
4	4	13C8-PFOA	1803678-04 EB-20181116 0.11772	2.08e4	90.5	NO
5	5	13C9-PFNA	1803678-04 EB-20181116 0.11772	1.50e4	88.0	NO
6	6	13C4-PFOS	1803678-04 EB-20181116 0.11772	2.67e3	84.6	NO
7	7	13C6-PFDA	1803678-04 EB-20181116 0.11772	1.57e4	86.7	NO
8	8	13C7-PFUDa	1803678-04 EB-20181116 0.11772	1.86e4	85.2	NO

Name: 181203M1_12, Date: 03-Dec-2018, Time: 16:22:46, ID: 1803676-01 A1-MW-11-SA2 0.11626, Description: A1-MW-11-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-01 A1-MW-11-SA2 0.11626	4.43e3	50.0	NO
2	2	13C5-PFHxA	1803676-01 A1-MW-11-SA2 0.11626	8.44e3	48.1	YES
3	3	13C3-PFHxS	1803676-01 A1-MW-11-SA2 0.11626	2.59e3	94.1	NO
4	4	13C8-PFOA	1803676-01 A1-MW-11-SA2 0.11626	1.10e4	47.9	YES
5	5	13C9-PFNA	1803676-01 A1-MW-11-SA2 0.11626	7.74e3	45.3	YES
6	6	13C4-PFOS	1803676-01 A1-MW-11-SA2 0.11626	2.52e3	79.8	NO
7	7	13C6-PFDA	1803676-01 A1-MW-11-SA2 0.11626	9.12e3	50.2	NO
8	8	13C7-PFUDa	1803676-01 A1-MW-11-SA2 0.11626	1.11e4	50.9	NO

Name: 181203M1_13, Date: 03-Dec-2018, Time: 16:33:24, ID: 1803676-02 A1-MW-13-SA2 0.11042, Description: A1-MW-13-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-02 A1-MW-13-SA2 0.11042	5.56e3	62.8	NO
2	2	13C5-PFHxA	1803676-02 A1-MW-13-SA2 0.11042	1.10e4	62.8	NO
3	3	13C3-PFHxS	1803676-02 A1-MW-13-SA2 0.11042	2.44e3	88.8	NO
4	4	13C8-PFOA	1803676-02 A1-MW-13-SA2 0.11042	1.45e4	63.0	NO
5	5	13C9-PFNA	1803676-02 A1-MW-13-SA2 0.11042	1.12e4	65.4	NO
6	6	13C4-PFOS	1803676-02 A1-MW-13-SA2 0.11042	2.55e3	80.8	NO
7	7	13C6-PFDA	1803676-02 A1-MW-13-SA2 0.11042	1.27e4	69.9	NO
8	8	13C7-PFUDa	1803676-02 A1-MW-13-SA2 0.11042	1.51e4	69.1	NO

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Name: 181203M1_14, Date: 03-Dec-2018, Time: 16:43:58, ID: 1803676-03 A1-MW-14-SA2 0.11629, Description: A1-MW-14-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-03 A1-MW-14-SA2 0.11629	5.05e3	57.0	NO
2	2	13C5-PFHxA	1803676-03 A1-MW-14-SA2 0.11629	9.84e3	56.1	NO
3	3	13C3-PFHxS	1803676-03 A1-MW-14-SA2 0.11629	2.13e3	77.6	NO
4	4	13C8-PFOA	1803676-03 A1-MW-14-SA2 0.11629	1.35e4	58.8	NO
5	5	13C9-PFNA	1803676-03 A1-MW-14-SA2 0.11629	1.02e4	59.8	NO
6	6	13C4-PFOS	1803676-03 A1-MW-14-SA2 0.11629	2.42e3	76.9	NO
7	7	13C6-PFDA	1803676-03 A1-MW-14-SA2 0.11629	1.16e4	64.1	NO
8	8	13C7-PFUDa	1803676-03 A1-MW-14-SA2 0.11629	1.41e4	64.5	NO

Name: 181203M1_15, Date: 03-Dec-2018, Time: 16:54:36, ID: 1803676-04 A1-MW-15-SA2 0.11086, Description: A1-MW-15-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-04 A1-MW-15-SA2 0.11086	5.23e3	59.0	NO
2	2	13C5-PFHxA	1803676-04 A1-MW-15-SA2 0.11086	9.86e3	56.3	NO
3	3	13C3-PFHxS	1803676-04 A1-MW-15-SA2 0.11086	2.23e3	81.1	NO
4	4	13C8-PFOA	1803676-04 A1-MW-15-SA2 0.11086	1.32e4	57.4	NO
5	5	13C9-PFNA	1803676-04 A1-MW-15-SA2 0.11086	9.26e3	54.2	NO
6	6	13C4-PFOS	1803676-04 A1-MW-15-SA2 0.11086	2.50e3	79.3	NO
7	7	13C6-PFDA	1803676-04 A1-MW-15-SA2 0.11086	1.08e4	59.7	NO
8	8	13C7-PFUDa	1803676-04 A1-MW-15-SA2 0.11086	1.25e4	57.3	NO

Name: 181203M1_16, Date: 03-Dec-2018, Time: 18:13:52, 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	7.86e0	0.0	YES
8	8	13C7-PFUDa	IPA			NO

Name: 181203M1_17, Date: 03-Dec-2018, Time: 18:24:27, 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

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Name: 181203M1_18, Date: 03-Dec-2018, Time: 18:35:06, ID: 1803676-05 A1-MW-37-SA2 0.11753, Description: A1-MW-37-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-05 A1-MW-37-SA2 0.11753	4.70e3	53.1	NO
2	2	13C5-PFHxA	1803676-05 A1-MW-37-SA2 0.11753	8.32e3	47.5	YES
3	3	13C3-PFHxS	1803676-05 A1-MW-37-SA2 0.11753	2.22e3	81.0	NO
4	4	13C8-PFOA	1803676-05 A1-MW-37-SA2 0.11753	1.14e4	49.6	YES
5	5	13C9-PFNA	1803676-05 A1-MW-37-SA2 0.11753	7.65e3	44.7	YES
6	6	13C4-PFOS	1803676-05 A1-MW-37-SA2 0.11753	2.42e3	76.7	NO
7	7	13C6-PFDA	1803676-05 A1-MW-37-SA2 0.11753	8.27e3	45.6	YES
8	8	13C7-PFUDa	1803676-05 A1-MW-37-SA2 0.11753	9.42e3	43.1	YES

Name: 181203M1_19, Date: 03-Dec-2018, Time: 18:45:39, ID: 1803676-06 A1-MW-37-SA2D 0.11493, Description: A1-MW-37-SA2D

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-06 A1-MW-37-SA2D 0.11493	5.65e3	63.7	NO
2	2	13C5-PFHxA	1803676-06 A1-MW-37-SA2D 0.11493	1.02e4	58.2	NO
3	3	13C3-PFHxS	1803676-06 A1-MW-37-SA2D 0.11493	2.42e3	88.0	NO
4	4	13C8-PFOA	1803676-06 A1-MW-37-SA2D 0.11493	1.42e4	61.9	NO
5	5	13C9-PFNA	1803676-06 A1-MW-37-SA2D 0.11493	1.00e4	58.6	NO
6	6	13C4-PFOS	1803676-06 A1-MW-37-SA2D 0.11493	2.85e3	90.3	NO
7	7	13C6-PFDA	1803676-06 A1-MW-37-SA2D 0.11493	1.09e4	59.9	NO
8	8	13C7-PFUDa	1803676-06 A1-MW-37-SA2D 0.11493	1.35e4	61.8	NO

Name: 181203M1_20, Date: 03-Dec-2018, Time: 18:56:10, ID: 1803676-07 FRB-20181115 0.11067, Description: FRB-20181115

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-07 FRB-20181115 0.11067	6.27e3	70.8	NO
2	2	13C5-PFHxA	1803676-07 FRB-20181115 0.11067	1.31e4	74.5	NO
3	3	13C3-PFHxS	1803676-07 FRB-20181115 0.11067	2.50e3	90.9	NO
4	4	13C8-PFOA	1803676-07 FRB-20181115 0.11067	1.90e4	82.8	NO
5	5	13C9-PFNA	1803676-07 FRB-20181115 0.11067	1.40e4	81.7	NO
6	6	13C4-PFOS	1803676-07 FRB-20181115 0.11067	2.68e3	84.9	NO
7	7	13C6-PFDA	1803676-07 FRB-20181115 0.11067	1.54e4	84.9	NO
8	8	13C7-PFUDa	1803676-07 FRB-20181115 0.11067	1.79e4	82.0	NO

Name: 181203M1_21, Date: 03-Dec-2018, Time: 19:06:48, ID: 1803676-08 A1-MW-31-SA2 0.1169, Description: A1-MW-31-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803676-08 A1-MW-31-SA2 0.1169	5.32e3	60.0	NO
2	2	13C5-PFHxA	1803676-08 A1-MW-31-SA2 0.1169	1.04e4	59.1	NO
3	3	13C3-PFHxS	1803676-08 A1-MW-31-SA2 0.1169	2.36e3	86.0	NO
4	4	13C8-PFOA	1803676-08 A1-MW-31-SA2 0.1169	1.37e4	59.5	NO
5	5	13C9-PFNA	1803676-08 A1-MW-31-SA2 0.1169	1.03e4	60.3	NO
6	6	13C4-PFOS	1803676-08 A1-MW-31-SA2 0.1169	2.71e3	85.9	NO
7	7	13C6-PFDA	1803676-08 A1-MW-31-SA2 0.1169	1.14e4	62.8	NO
8	8	13C7-PFUDa	1803676-08 A1-MW-31-SA2 0.1169	1.34e4	61.5	NO

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Name: 181203M1_22, Date: 03-Dec-2018, Time: 19:17:20, ID: 1803689-01 Equipment Blank 1 0.25208, Description: Equipment Blank 1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803689-01 Equipment Blank 1 0.25208	7.56e3	85.3	NO
2	2	13C5-PFHxA	1803689-01 Equipment Blank 1 0.25208	1.50e4	85.6	NO
3	3	13C3-PFHxS	1803689-01 Equipment Blank 1 0.25208	2.45e3	89.1	NO
4	4	13C8-PFOA	1803689-01 Equipment Blank 1 0.25208	1.89e4	82.5	NO
5	5	13C9-PFNA	1803689-01 Equipment Blank 1 0.25208	1.30e4	76.3	NO
6	6	13C4-PFOS	1803689-01 Equipment Blank 1 0.25208	2.74e3	87.0	NO
7	7	13C6-PFDA	1803689-01 Equipment Blank 1 0.25208	1.39e4	76.5	NO
8	8	13C7-PFUDa	1803689-01 Equipment Blank 1 0.25208	1.64e4	75.1	NO

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181203M1-2 PFC CS3 18K3006	9.48e3	107.1	NO
2	2	13C5-PFHxA	ST181203M1-2 PFC CS3 18K3006	1.87e4	106.5	NO
3	3	13C3-PFHxS	ST181203M1-2 PFC CS3 18K3006	2.72e3	99.1	NO
4	4	13C8-PFOA	ST181203M1-2 PFC CS3 18K3006	2.43e4	106.0	NO
5	5	13C9-PFNA	ST181203M1-2 PFC CS3 18K3006	1.73e4	101.1	NO
6	6	13C4-PFOS	ST181203M1-2 PFC CS3 18K3006	3.21e3	101.8	NO
7	7	13C6-PFDA	ST181203M1-2 PFC CS3 18K3006	1.93e4	106.2	NO
8	8	13C7-PFUDa	ST181203M1-2 PFC CS3 18K3006	2.29e4	105.0	NO

Name: 181203M1_24, Date: 03-Dec-2018, Time: 19:38:28, ID: IPA, Description: IPA

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

Name: 181203M1_25, Date: 03-Dec-2018, Time: 19:49:07, ID: B8K0190-BSD1 LCSD 0.25, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0190-BSD1 LCSD 0.25	4.43e3	50.0	NO
2	2	13C5-PFHxA	B8K0190-BSD1 LCSD 0.25	9.72e3	55.4	NO
3	3	13C3-PFHxS	B8K0190-BSD1 LCSD 0.25	2.44e3	88.9	NO
4	4	13C8-PFOA	B8K0190-BSD1 LCSD 0.25	1.65e4	71.9	NO
5	5	13C9-PFNA	B8K0190-BSD1 LCSD 0.25	1.27e4	74.3	NO
6	6	13C4-PFOS	B8K0190-BSD1 LCSD 0.25	2.78e3	88.2	NO
7	7	13C6-PFDA	B8K0190-BSD1 LCSD 0.25	1.47e4	80.8	NO
8	8	13C7-PFUDa	B8K0190-BSD1 LCSD 0.25	1.77e4	80.9	NO

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Name: 181203M1_26, Date: 03-Dec-2018, Time: 19:59:45, ID: 1803745-03 PFC-AF-01-03-112618 0.24673,
Description: PFC-AF-01-03-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803745-03 PFC-AF-01-03-112618 0.2...	6.62e3	74.7	NO
2	2	13C5-PFHxA	1803745-03 PFC-AF-01-03-112618 0.2...	1.02e4	58.0	NO
3	3	13C3-PFHxS	1803745-03 PFC-AF-01-03-112618 0.2...	1.43e3	52.1	NO
4	4	13C8-PFOA	1803745-03 PFC-AF-01-03-112618 0.2...	1.64e4	71.5	NO
5	5	13C9-PFNA	1803745-03 PFC-AF-01-03-112618 0.2...	1.13e4	66.4	NO
6	6	13C4-PFOS	1803745-03 PFC-AF-01-03-112618 0.2...	4.78e2	15.2	YES
7	7	13C6-PFDA	1803745-03 PFC-AF-01-03-112618 0.2...	1.54e4	84.8	NO
8	8	13C7-PFUDa	1803745-03 PFC-AF-01-03-112618 0.2...	1.87e4	85.7	NO

Name: 181203M1_27, Date: 03-Dec-2018, Time: 20:10:19, ID: 1803746-01 PFC-AF-02-01-112618 0.23986,
Description: PFC-AF-02-01-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803746-01 PFC-AF-02-01-112618 0.2...	4.37e3	49.3	YES
2	2	13C5-PFHxA	1803746-01 PFC-AF-02-01-112618 0.2...	3.30e3	18.8	YES
3	3	13C3-PFHxS	1803746-01 PFC-AF-02-01-112618 0.2...	6.07e2	22.1	YES
4	4	13C8-PFOA	1803746-01 PFC-AF-02-01-112618 0.2...	3.46e3	15.1	YES
5	5	13C9-PFNA	1803746-01 PFC-AF-02-01-112618 0.2...	6.50e3	38.0	YES
6	6	13C4-PFOS	1803746-01 PFC-AF-02-01-112618 0.2...	9.13e2	29.0	YES
7	7	13C6-PFDA	1803746-01 PFC-AF-02-01-112618 0.2...	5.95e3	32.8	YES
8	8	13C7-PFUDa	1803746-01 PFC-AF-02-01-112618 0.2...	1.15e4	52.8	NO

Name: 181203M1_28, Date: 03-Dec-2018, Time: 20:20:57, ID: IPA, Description: IPA

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

Name: 181203M1_29, Date: 03-Dec-2018, Time: 20:31:30, ID: 1803746-02 PFC-AF-02-02-112618 0.2365,
Description: PFC-AF-02-02-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803746-02 PFC-AF-02-02-112618 0.2...	6.61e3	74.6	NO
2	2	13C5-PFHxA	1803746-02 PFC-AF-02-02-112618 0.2...	8.03e3	45.8	YES
3	3	13C3-PFHxS	1803746-02 PFC-AF-02-02-112618 0.2...	1.24e3	45.0	YES
4	4	13C8-PFOA	1803746-02 PFC-AF-02-02-112618 0.2...	1.11e4	48.2	YES
5	5	13C9-PFNA	1803746-02 PFC-AF-02-02-112618 0.2...	1.03e4	60.3	NO
6	6	13C4-PFOS	1803746-02 PFC-AF-02-02-112618 0.2...	1.28e3	40.6	YES
7	7	13C6-PFDA	1803746-02 PFC-AF-02-02-112618 0.2...	1.12e4	61.6	NO
8	8	13C7-PFUDa	1803746-02 PFC-AF-02-02-112618 0.2...	1.80e4	82.4	NO

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Name: 181203M1_30, Date: 03-Dec-2018, Time: 20:42:08, 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: 181203M1_31, Date: 03-Dec-2018, Time: 20:52:42, ID: 1803746-03 PFC-AF-02-03-112618 0.23672, Description: PFC-AF-02-03-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803746-03 PFC-AF-02-03-112618 0.2...	7.97e3	89.9	NO
2	2	13C5-PFHxA	1803746-03 PFC-AF-02-03-112618 0.2...	1.60e4	91.0	NO
3	3	13C3-PFHxS	1803746-03 PFC-AF-02-03-112618 0.2...	2.41e3	87.7	NO
4	4	13C8-PFOA	1803746-03 PFC-AF-02-03-112618 0.2...	2.11e4	91.7	NO
5	5	13C9-PFNA	1803746-03 PFC-AF-02-03-112618 0.2...	1.55e4	90.7	NO
6	6	13C4-PFOS	1803746-03 PFC-AF-02-03-112618 0.2...	2.25e3	71.4	NO
7	7	13C6-PFDA	1803746-03 PFC-AF-02-03-112618 0.2...	1.61e4	88.6	NO
8	8	13C7-PFUDa	1803746-03 PFC-AF-02-03-112618 0.2...	1.82e4	83.4	NO

Name: 181203M1_32, Date: 03-Dec-2018, Time: 21:03:20, 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: 181203M1_33, Date: 03-Dec-2018, Time: 21:13:54, ID: 1803762-04 PFC-AF-01-04-112718 0.24232, Description: PFC-AF-01-04-112718

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803762-04 PFC-AF-01-04-112718 0.2...	3.56e3	40.2	YES
2	2	13C5-PFHxA	1803762-04 PFC-AF-01-04-112718 0.2...	8.35e3	47.6	YES
3	3	13C3-PFHxS	1803762-04 PFC-AF-01-04-112718 0.2...	2.61e3	94.9	NO
4	4	13C8-PFOA	1803762-04 PFC-AF-01-04-112718 0.2...	1.31e4	56.8	NO
5	5	13C9-PFNA	1803762-04 PFC-AF-01-04-112718 0.2...	1.05e4	61.4	NO
6	6	13C4-PFOS	1803762-04 PFC-AF-01-04-112718 0.2...	2.97e3	94.1	NO
7	7	13C6-PFDA	1803762-04 PFC-AF-01-04-112718 0.2...	1.27e4	70.0	NO
8	8	13C7-PFUDa	1803762-04 PFC-AF-01-04-112718 0.2...	1.56e4	71.4	NO

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Name: 181203M1_34, Date: 03-Dec-2018, Time: 21:24:32, ID: 1803618-02 1811353-02A 0.2386, Description: 1811353-02A

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803618-02 1811353-02A 0.2386	6.68e3	75.4	NO
2	2 13C5-PFHxA	1803618-02 1811353-02A 0.2386	1.34e4	76.4	NO
3	3 13C3-PFHxS	1803618-02 1811353-02A 0.2386	2.36e3	85.7	NO
4	4 13C8-PFOA	1803618-02 1811353-02A 0.2386	1.86e4	81.1	NO
5	5 13C9-PFNA	1803618-02 1811353-02A 0.2386	1.33e4	77.8	NO
6	6 13C4-PFOS	1803618-02 1811353-02A 0.2386	2.60e3	82.4	NO
7	7 13C6-PFDA	1803618-02 1811353-02A 0.2386	1.45e4	79.7	NO
8	8 13C7-PFUDa	1803618-02 1811353-02A 0.2386	1.60e4	73.4	NO

Name: 181203M1_35, Date: 03-Dec-2018, Time: 21:35:10, ID: 1803618-01@10X 1811353-01A 0.23448, Description: 1811353-01A

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803618-01@10X 1811353-01A 0.23448	6.07e2	6.9	YES
2	2 13C5-PFHxA	1803618-01@10X 1811353-01A 0.23448	1.32e3	7.5	YES
3	3 13C3-PFHxS	1803618-01@10X 1811353-01A 0.23448	2.64e2	9.6	YES
4	4 13C8-PFOA	1803618-01@10X 1811353-01A 0.23448	1.89e3	8.2	YES
5	5 13C9-PFNA	1803618-01@10X 1811353-01A 0.23448	1.57e3	9.2	YES
6	6 13C4-PFOS	1803618-01@10X 1811353-01A 0.23448	2.91e2	9.2	YES
7	7 13C6-PFDA	1803618-01@10X 1811353-01A 0.23448	1.58e3	8.7	YES
8	8 13C7-PFUDa	1803618-01@10X 1811353-01A 0.23448	1.82e3	8.3	YES

Name: 181203M1_36, Date: 03-Dec-2018, Time: 21:45:43, 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: 181203M1_37, Date: 03-Dec-2018, Time: 21:56:21, ID: B8K0215-BS1 OPR 0.125, Description: OPR

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	B8K0215-BS1 OPR 0.125	6.96e3	78.5	NO
2	2 13C5-PFHxA	B8K0215-BS1 OPR 0.125	1.38e4	78.4	NO
3	3 13C3-PFHxS	B8K0215-BS1 OPR 0.125	2.16e3	78.6	NO
4	4 13C8-PFOA	B8K0215-BS1 OPR 0.125	1.70e4	73.8	NO
5	5 13C9-PFNA	B8K0215-BS1 OPR 0.125	1.21e4	70.7	NO
6	6 13C4-PFOS	B8K0215-BS1 OPR 0.125	2.57e3	81.4	NO
7	7 13C6-PFDA	B8K0215-BS1 OPR 0.125	1.31e4	72.4	NO
8	8 13C7-PFUDa	B8K0215-BS1 OPR 0.125	1.58e4	72.5	NO

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Name: 181203M1_38, Date: 03-Dec-2018, Time: 22:06:56, ID: B8K0215-BSD1 LCSD 0.125, Description: LCSD

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	B8K0215-BSD1 LCSD 0.125	7.69e3	86.8	NO
2	2 13C5-PFHxA	B8K0215-BSD1 LCSD 0.125	1.52e4	86.9	NO
3	3 13C3-PFHxS	B8K0215-BSD1 LCSD 0.125	2.33e3	84.9	NO
4	4 13C8-PFOA	B8K0215-BSD1 LCSD 0.125	1.95e4	85.0	NO
5	5 13C9-PFNA	B8K0215-BSD1 LCSD 0.125	1.44e4	84.3	NO
6	6 13C4-PFOS	B8K0215-BSD1 LCSD 0.125	2.64e3	83.9	NO
7	7 13C6-PFDA	B8K0215-BSD1 LCSD 0.125	1.56e4	85.7	NO
8	8 13C7-PFUDa	B8K0215-BSD1 LCSD 0.125	1.76e4	80.8	NO

Name: 181203M1_39, Date: 03-Dec-2018, Time: 22:17:34, ID: B8K0215-BLK1 Method Blank 0.125, Description: Method Blank

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	B8K0215-BLK1 Method Blank 0.125	7.04e3	79.5	NO
2	2 13C5-PFHxA	B8K0215-BLK1 Method Blank 0.125	1.45e4	82.5	NO
3	3 13C3-PFHxS	B8K0215-BLK1 Method Blank 0.125	2.47e3	89.8	NO
4	4 13C8-PFOA	B8K0215-BLK1 Method Blank 0.125	1.78e4	77.7	NO
5	5 13C9-PFNA	B8K0215-BLK1 Method Blank 0.125	1.33e4	77.8	NO
6	6 13C4-PFOS	B8K0215-BLK1 Method Blank 0.125	2.77e3	87.7	NO
7	7 13C6-PFDA	B8K0215-BLK1 Method Blank 0.125	1.44e4	79.3	NO
8	8 13C7-PFUDa	B8K0215-BLK1 Method Blank 0.125	1.73e4	79.3	NO

Name: 181203M1_40, Date: 03-Dec-2018, Time: 22:28:07, ID: 1803788-01 PFC-AF-01-01-112918 0.11457, Description: PFC-AF-01-01-112918

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803788-01 PFC-AF-01-01-112918 0.11..	6.61e3	74.6	NO
2	2 13C5-PFHxA	1803788-01 PFC-AF-01-01-112918 0.11..	1.34e4	76.5	NO
3	3 13C3-PFHxS	1803788-01 PFC-AF-01-01-112918 0.11..	2.18e3	79.3	NO
4	4 13C8-PFOA	1803788-01 PFC-AF-01-01-112918 0.11..	1.76e4	76.6	NO
5	5 13C9-PFNA	1803788-01 PFC-AF-01-01-112918 0.11..	1.36e4	79.4	NO
6	6 13C4-PFOS	1803788-01 PFC-AF-01-01-112918 0.11..	2.13e3	67.6	NO
7	7 13C6-PFDA	1803788-01 PFC-AF-01-01-112918 0.11..	1.55e4	85.2	NO
8	8 13C7-PFUDa	1803788-01 PFC-AF-01-01-112918 0.11..	1.70e4	77.9	NO

Name: 181203M1_41, Date: 03-Dec-2018, Time: 22:38:45, ID: 1803788-02 PFC-AF-01-02-112918 0.11773, Description: PFC-AF-01-02-112918

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803788-02 PFC-AF-01-02-112918 0.11..	7.44e3	84.0	NO
2	2 13C5-PFHxA	1803788-02 PFC-AF-01-02-112918 0.11..	1.51e4	86.4	NO
3	3 13C3-PFHxS	1803788-02 PFC-AF-01-02-112918 0.11..	2.48e3	90.1	NO
4	4 13C8-PFOA	1803788-02 PFC-AF-01-02-112918 0.11..	2.03e4	88.4	NO
5	5 13C9-PFNA	1803788-02 PFC-AF-01-02-112918 0.11..	1.47e4	86.3	NO
6	6 13C4-PFOS	1803788-02 PFC-AF-01-02-112918 0.11..	2.66e3	84.3	NO
7	7 13C6-PFDA	1803788-02 PFC-AF-01-02-112918 0.11..	1.58e4	87.1	NO
8	8 13C7-PFUDa	1803788-02 PFC-AF-01-02-112918 0.11..	1.82e4	83.1	NO

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Name: 181203M1_42, Date: 03-Dec-2018, Time: 22:49:19, ID: 1803788-03 PFC-AF-01-03-112918 0.11732, Description: PFC-AF-01-03-112918

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803788-03 PFC-AF-01-03-112918 0.11..	7.74e3	87.3	NO
2	2	13C5-PFHxA	1803788-03 PFC-AF-01-03-112918 0.11..	1.53e4	87.2	NO
3	3	13C3-PFHxS	1803788-03 PFC-AF-01-03-112918 0.11..	2.45e3	89.0	NO
4	4	13C8-PFOA	1803788-03 PFC-AF-01-03-112918 0.11..	2.00e4	87.2	NO
5	5	13C9-PFNA	1803788-03 PFC-AF-01-03-112918 0.11..	1.42e4	82.9	NO
6	6	13C4-PFOS	1803788-03 PFC-AF-01-03-112918 0.11..	2.78e3	88.1	NO
7	7	13C6-PFDA	1803788-03 PFC-AF-01-03-112918 0.11..	1.58e4	86.9	NO
8	8	13C7-PFUDa	1803788-03 PFC-AF-01-03-112918 0.11..	1.77e4	81.2	NO

Name: 181203M1_43, Date: 03-Dec-2018, Time: 22:59:57, ID: ST181203M1-3 PFC CS3 18K3006, Description: PFC CS3 18K3006

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181203M1-3 PFC CS3 18K3006	9.50e3	107.3	NO
2	2	13C5-PFHxA	ST181203M1-3 PFC CS3 18K3006	1.96e4	111.5	NO
3	3	13C3-PFHxS	ST181203M1-3 PFC CS3 18K3006	2.88e3	104.9	NO
4	4	13C8-PFOA	ST181203M1-3 PFC CS3 18K3006	2.43e4	106.0	NO
5	5	13C9-PFNA	ST181203M1-3 PFC CS3 18K3006	1.81e4	106.0	NO
6	6	13C4-PFOS	ST181203M1-3 PFC CS3 18K3006	3.25e3	103.0	NO
7	7	13C6-PFDA	ST181203M1-3 PFC CS3 18K3006	1.95e4	107.3	NO
8	8	13C7-PFUDa	ST181203M1-3 PFC CS3 18K3006	2.28e4	104.2	NO

Name: 181203M1_44, Date: 03-Dec-2018, Time: 23:10:29, 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: 181203M1_45, Date: 03-Dec-2018, Time: 23:21:08, ID: B8K0197-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0197-BS1 OPR 0.125	6.90e3	77.8	NO
2	2	13C5-PFHxA	B8K0197-BS1 OPR 0.125	1.29e4	73.8	NO
3	3	13C3-PFHxS	B8K0197-BS1 OPR 0.125	2.21e3	80.4	NO
4	4	13C8-PFOA	B8K0197-BS1 OPR 0.125	1.64e4	71.3	NO
5	5	13C9-PFNA	B8K0197-BS1 OPR 0.125	1.07e4	62.4	NO
6	6	13C4-PFOS	B8K0197-BS1 OPR 0.125	1.46e3	46.4	YES
7	7	13C6-PFDA	B8K0197-BS1 OPR 0.125	7.61e3	41.9	YES
8	8	13C7-PFUDa	B8K0197-BS1 OPR 0.125	3.03e3	13.9	YES

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Name: 181203M1_46, Date: 03-Dec-2018, Time: 23:31:46, ID: B8K0197-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0197-BLK1 Method Blank 0.125	7.18e3	81.0	NO
2	2	13C5-PFHxA	B8K0197-BLK1 Method Blank 0.125	1.39e4	79.4	NO
3	3	13C3-PFHxS	B8K0197-BLK1 Method Blank 0.125	2.28e3	82.8	NO
4	4	13C8-PFOA	B8K0197-BLK1 Method Blank 0.125	1.72e4	74.7	NO
5	5	13C9-PFNA	B8K0197-BLK1 Method Blank 0.125	1.06e4	62.3	NO
6	6	13C4-PFOS	B8K0197-BLK1 Method Blank 0.125	1.23e3	39.0	YES
7	7	13C6-PFDA	B8K0197-BLK1 Method Blank 0.125	6.64e3	36.5	YES
8	8	13C7-PFUDa	B8K0197-BLK1 Method Blank 0.125	3.04e3	13.9	YES

Name: 181203M1_47, Date: 03-Dec-2018, Time: 23:42:19, ID: 1803754-01 CMW-18-01 0.11781, Description: CMW-18-01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803754-01 CMW-18-01 0.11781	6.67e3	75.3	NO
2	2	13C5-PFHxA	1803754-01 CMW-18-01 0.11781	1.36e4	77.8	NO
3	3	13C3-PFHxS	1803754-01 CMW-18-01 0.11781	2.12e3	77.2	NO
4	4	13C8-PFOA	1803754-01 CMW-18-01 0.11781	1.84e4	80.2	NO
5	5	13C9-PFNA	1803754-01 CMW-18-01 0.11781	1.26e4	73.9	NO
6	6	13C4-PFOS	1803754-01 CMW-18-01 0.11781	2.39e3	75.7	NO
7	7	13C6-PFDA	1803754-01 CMW-18-01 0.11781	1.22e4	67.1	NO
8	8	13C7-PFUDa	1803754-01 CMW-18-01 0.11781	1.15e4	52.5	NO

Name: 181203M1_48, Date: 03-Dec-2018, Time: 23:52:57, ID: 1803754-02 CMW-101B 0.11273, Description: CMW-101B

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803754-02 CMW-101B 0.11273	6.96e3	78.5	NO
2	2	13C5-PFHxA	1803754-02 CMW-101B 0.11273	1.40e4	79.8	NO
3	3	13C3-PFHxS	1803754-02 CMW-101B 0.11273	2.47e3	89.7	NO
4	4	13C8-PFOA	1803754-02 CMW-101B 0.11273	1.91e4	83.2	NO
5	5	13C9-PFNA	1803754-02 CMW-101B 0.11273	1.23e4	71.8	NO
6	6	13C4-PFOS	1803754-02 CMW-101B 0.11273	2.25e3	71.3	NO
7	7	13C6-PFDA	1803754-02 CMW-101B 0.11273	1.11e4	61.1	NO
8	8	13C7-PFUDa	1803754-02 CMW-101B 0.11273	8.02e3	36.7	YES

Name: 181203M1_49, Date: 04-Dec-2018, Time: 00:03:30, ID: 1803754-03 MW-97701 0.11474, Description: MW-97701

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803754-03 MW-97701 0.11474	7.11e3	80.3	NO
2	2	13C5-PFHxA	1803754-03 MW-97701 0.11474	1.37e4	78.2	NO
3	3	13C3-PFHxS	1803754-03 MW-97701 0.11474	2.26e3	82.2	NO
4	4	13C8-PFOA	1803754-03 MW-97701 0.11474	1.81e4	79.0	NO
5	5	13C9-PFNA	1803754-03 MW-97701 0.11474	1.18e4	68.8	NO
6	6	13C4-PFOS	1803754-03 MW-97701 0.11474	1.56e3	49.4	YES
7	7	13C6-PFDA	1803754-03 MW-97701 0.11474	8.67e3	47.8	YES
8	8	13C7-PFUDa	1803754-03 MW-97701 0.11474	5.86e3	26.8	YES

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Name: 181203M1_50, Date: 04-Dec-2018, Time: 00:14:08, ID: 1803754-04 MW-97702 0.11219, Description: MW-97702

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-04 MW-97702 0.11219	6.98e3	78.8	NO
2	2 13C5-PFHxA	1803754-04 MW-97702 0.11219	1.40e4	80.1	NO
3	3 13C3-PFHxS	1803754-04 MW-97702 0.11219	2.33e3	84.8	NO
4	4 13C8-PFOA	1803754-04 MW-97702 0.11219	1.78e4	77.5	NO
5	5 13C9-PFNA	1803754-04 MW-97702 0.11219	1.23e4	72.1	NO
6	6 13C4-PFOS	1803754-04 MW-97702 0.11219	2.36e3	74.7	NO
7	7 13C6-PFDA	1803754-04 MW-97702 0.11219	1.18e4	65.1	NO
8	8 13C7-PFUDa	1803754-04 MW-97702 0.11219	8.64e3	39.5	YES

Name: 181203M1_51, Date: 04-Dec-2018, Time: 00:24:42, ID: 1803754-05 CSW-3 0.12087, Description: CSW-3

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-05 CSW-3 0.12087	7.35e3	83.0	NO
2	2 13C5-PFHxA	1803754-05 CSW-3 0.12087	1.41e4	80.7	NO
3	3 13C3-PFHxS	1803754-05 CSW-3 0.12087	2.53e3	92.2	NO
4	4 13C8-PFOA	1803754-05 CSW-3 0.12087	1.83e4	79.7	NO
5	5 13C9-PFNA	1803754-05 CSW-3 0.12087	1.34e4	78.6	NO
6	6 13C4-PFOS	1803754-05 CSW-3 0.12087	2.41e3	76.6	NO
7	7 13C6-PFDA	1803754-05 CSW-3 0.12087	1.19e4	65.4	NO
8	8 13C7-PFUDa	1803754-05 CSW-3 0.12087	7.81e3	35.7	YES

Name: 181203M1_52, Date: 04-Dec-2018, Time: 00:35:20, ID: 1803754-06 CSW-4 0.11744, Description: CSW-4

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-06 CSW-4 0.11744	7.99e3	90.2	NO
2	2 13C5-PFHxA	1803754-06 CSW-4 0.11744	1.61e4	92.0	NO
3	3 13C3-PFHxS	1803754-06 CSW-4 0.11744	2.51e3	91.3	NO
4	4 13C8-PFOA	1803754-06 CSW-4 0.11744	2.01e4	87.5	NO
5	5 13C9-PFNA	1803754-06 CSW-4 0.11744	1.37e4	80.4	NO
6	6 13C4-PFOS	1803754-06 CSW-4 0.11744	2.35e3	74.4	NO
7	7 13C6-PFDA	1803754-06 CSW-4 0.11744	1.19e4	65.6	NO
8	8 13C7-PFUDa	1803754-06 CSW-4 0.11744	8.78e3	40.2	YES

Name: 181203M1_53, Date: 04-Dec-2018, Time: 00:45:53, ID: 1803754-07 CUD-1 0.11598, Description: CUD-1

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-07 CUD-1 0.11598	7.92e3	89.4	NO
2	2 13C5-PFHxA	1803754-07 CUD-1 0.11598	1.55e4	88.5	NO
3	3 13C3-PFHxS	1803754-07 CUD-1 0.11598	2.52e3	91.6	NO
4	4 13C8-PFOA	1803754-07 CUD-1 0.11598	1.88e4	81.8	NO
5	5 13C9-PFNA	1803754-07 CUD-1 0.11598	1.22e4	71.4	NO
6	6 13C4-PFOS	1803754-07 CUD-1 0.11598	1.51e3	48.0	YES
7	7 13C6-PFDA	1803754-07 CUD-1 0.11598	7.80e3	43.0	YES
8	8 13C7-PFUDa	1803754-07 CUD-1 0.11598	3.72e3	17.0	YES

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Name: 181203M1_54, Date: 04-Dec-2018, Time: 00:56:31, ID: 1803754-08 CUD-2 0.1153, Description: CUD-2

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-08 CUD-2 0.1153	7.25e3	81.9	NO
2	2 13C5-PFHxA	1803754-08 CUD-2 0.1153	1.41e4	80.1	NO
3	3 13C3-PFHxS	1803754-08 CUD-2 0.1153	2.45e3	89.0	NO
4	4 13C8-PFOA	1803754-08 CUD-2 0.1153	1.84e4	80.2	NO
5	5 13C9-PFNA	1803754-08 CUD-2 0.1153	1.24e4	72.8	NO
6	6 13C4-PFOS	1803754-08 CUD-2 0.1153	2.14e3	67.9	NO
7	7 13C6-PFDA	1803754-08 CUD-2 0.1153	1.11e4	61.1	NO
8	8 13C7-PFUDa	1803754-08 CUD-2 0.1153	7.81e3	35.8	YES

Name: 181203M1_55, Date: 04-Dec-2018, Time: 01:07:05, ID: 1803754-09 CUD-3 0.11905, Description: CUD-3

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-09 CUD-3 0.11905	4.83e3	54.5	NO
2	2 13C5-PFHxA	1803754-09 CUD-3 0.11905	9.72e3	55.4	NO
3	3 13C3-PFHxS	1803754-09 CUD-3 0.11905	1.87e3	67.9	NO
4	4 13C8-PFOA	1803754-09 CUD-3 0.11905	1.24e4	53.9	NO
5	5 13C9-PFNA	1803754-09 CUD-3 0.11905	8.77e3	51.3	NO
6	6 13C4-PFOS	1803754-09 CUD-3 0.11905	1.71e3	54.3	NO
7	7 13C6-PFDA	1803754-09 CUD-3 0.11905	8.40e3	46.2	YES
8	8 13C7-PFUDa	1803754-09 CUD-3 0.11905	4.44e3	20.3	YES

Name: 181203M1_56, Date: 04-Dec-2018, Time: 01:17:43, ID: 1803754-10 CUD-4 0.11711, Description: CUD-4

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-10 CUD-4 0.11711	6.39e3	72.2	NO
2	2 13C5-PFHxA	1803754-10 CUD-4 0.11711	1.18e4	67.0	NO
3	3 13C3-PFHxS	1803754-10 CUD-4 0.11711	2.11e3	76.8	NO
4	4 13C8-PFOA	1803754-10 CUD-4 0.11711	1.44e4	62.6	NO
5	5 13C9-PFNA	1803754-10 CUD-4 0.11711	7.88e3	46.1	YES
6	6 13C4-PFOS	1803754-10 CUD-4 0.11711	1.11e3	35.1	YES
7	7 13C6-PFDA	1803754-10 CUD-4 0.11711	4.75e3	26.1	YES
8	8 13C7-PFUDa	1803754-10 CUD-4 0.11711	3.62e3	16.6	YES

Name: 181203M1_57, Date: 04-Dec-2018, Time: 01:28:16, ID: ST181203M1-4 PFC CS3 18K3006, Description: PFC CS3 18K3006

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	ST181203M1-4 PFC CS3 18K3006	9.97e3	112.6	NO
2	2 13C5-PFHxA	ST181203M1-4 PFC CS3 18K3006	1.94e4	110.5	NO
3	3 13C3-PFHxS	ST181203M1-4 PFC CS3 18K3006	2.92e3	106.2	NO
4	4 13C8-PFOA	ST181203M1-4 PFC CS3 18K3006	2.50e4	108.7	NO
5	5 13C9-PFNA	ST181203M1-4 PFC CS3 18K3006	1.81e4	105.9	NO
6	6 13C4-PFOS	ST181203M1-4 PFC CS3 18K3006	3.45e3	109.5	NO
7	7 13C6-PFDA	ST181203M1-4 PFC CS3 18K3006	2.03e4	111.8	NO
8	8 13C7-PFUDa	ST181203M1-4 PFC CS3 18K3006	2.24e4	102.4	NO

Dataset: F:\Projects\PFAS.PRO\Results\181203M1\181203M1-IIS.qld

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Name: 181203M1_58, Date: 04-Dec-2018, Time: 01:38:54, ID: IPA, Description: IPA

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

Name: 181203M1_59, Date: 04-Dec-2018, Time: 01:49:32, ID: 1803762-01 PFC-AF-01-01-112718 0.23808, Description: PFC-AF-01-01-112718

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803762-01 PFC-AF-01-01-112718 0.2...	5.52e3	62.3	NO
2	2	13C5-PFHxA	1803762-01 PFC-AF-01-01-112718 0.2...	1.08e4	61.7	NO
3	3	13C3-PFHxS	1803762-01 PFC-AF-01-01-112718 0.2...	2.32e3	84.5	NO
4	4	13C8-PFOA	1803762-01 PFC-AF-01-01-112718 0.2...	1.51e4	65.8	NO
5	5	13C9-PFNA	1803762-01 PFC-AF-01-01-112718 0.2...	1.18e4	68.8	NO
6	6	13C4-PFOS	1803762-01 PFC-AF-01-01-112718 0.2...	2.63e3	83.4	NO
7	7	13C6-PFDA	1803762-01 PFC-AF-01-01-112718 0.2...	1.30e4	71.8	NO
8	8	13C7-PFUDa	1803762-01 PFC-AF-01-01-112718 0.2...	1.58e4	72.2	NO

Name: 181203M1_60, Date: 04-Dec-2018, Time: 02:00:05, ID: 1803754-11 Sump 1 0.11876, Description: Sump 1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803754-11 Sump 1 0.11876	7.74e3	87.3	NO
2	2	13C5-PFHxA	1803754-11 Sump 1 0.11876	1.55e4	88.4	NO
3	3	13C3-PFHxS	1803754-11 Sump 1 0.11876	2.61e3	95.0	NO
4	4	13C8-PFOA	1803754-11 Sump 1 0.11876	1.98e4	86.1	NO
5	5	13C9-PFNA	1803754-11 Sump 1 0.11876	1.33e4	77.8	NO
6	6	13C4-PFOS	1803754-11 Sump 1 0.11876	2.49e3	79.0	NO
7	7	13C6-PFDA	1803754-11 Sump 1 0.11876	1.24e4	68.3	NO
8	8	13C7-PFUDa	1803754-11 Sump 1 0.11876	8.73e3	39.9	YES

Name: 181203M1_61, Date: 04-Dec-2018, Time: 02:10:44, ID: 1803754-12 Sump 2 0.11443, Description: Sump 2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803754-12 Sump 2 0.11443	7.20e3	81.3	NO
2	2	13C5-PFHxA	1803754-12 Sump 2 0.11443	1.48e4	84.3	NO
3	3	13C3-PFHxS	1803754-12 Sump 2 0.11443	2.38e3	86.5	NO
4	4	13C8-PFOA	1803754-12 Sump 2 0.11443	1.96e4	85.4	NO
5	5	13C9-PFNA	1803754-12 Sump 2 0.11443	1.31e4	76.7	NO
6	6	13C4-PFOS	1803754-12 Sump 2 0.11443	2.44e3	77.4	NO
7	7	13C6-PFDA	1803754-12 Sump 2 0.11443	1.29e4	71.2	NO
8	8	13C7-PFUDa	1803754-12 Sump 2 0.11443	1.02e4	46.8	YES

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Name: 181203M1_62, Date: 04-Dec-2018, Time: 02:21:17, ID: 1803754-13 SW-5 0.11647, Description: SW-5

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-13 SW-5 0.11647	7.32e3	82.6	NO
2	2 13C5-PFHxA	1803754-13 SW-5 0.11647	1.40e4	79.8	NO
3	3 13C3-PFHxS	1803754-13 SW-5 0.11647	2.35e3	85.5	NO
4	4 13C8-PFOA	1803754-13 SW-5 0.11647	1.59e4	69.4	NO
5	5 13C9-PFNA	1803754-13 SW-5 0.11647	1.07e4	62.7	NO
6	6 13C4-PFOS	1803754-13 SW-5 0.11647	2.16e3	68.5	NO
7	7 13C6-PFDA	1803754-13 SW-5 0.11647	9.43e3	51.9	NO
8	8 13C7-PFUDa	1803754-13 SW-5 0.11647	7.46e3	34.2	YES

Name: 181203M1_63, Date: 04-Dec-2018, Time: 02:31:56, ID: 1803754-14 Shelby St. Sump 0.11682, Description: Shelby St. Sump

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803754-14 Shelby St. Sump 0.11682	7.24e3	81.8	NO
2	2 13C5-PFHxA	1803754-14 Shelby St. Sump 0.11682	1.38e4	78.9	NO
3	3 13C3-PFHxS	1803754-14 Shelby St. Sump 0.11682	2.30e3	83.6	NO
4	4 13C8-PFOA	1803754-14 Shelby St. Sump 0.11682	1.73e4	75.4	NO
5	5 13C9-PFNA	1803754-14 Shelby St. Sump 0.11682	1.19e4	69.8	NO
6	6 13C4-PFOS	1803754-14 Shelby St. Sump 0.11682	2.38e3	75.5	NO
7	7 13C6-PFDA	1803754-14 Shelby St. Sump 0.11682	1.25e4	69.1	NO
8	8 13C7-PFUDa	1803754-14 Shelby St. Sump 0.11682	1.16e4	53.3	NO

Name: 181203M1_64, Date: 04-Dec-2018, Time: 02:42:29, ID: 1803746-01@150X PFC-AF-02-01-112618 0.23986, Description: PFC-AF-02-01-112618

	# Name	ID	Area	%Rec	Area Out
1	1 13C4-PFBA	1803746-01@150X PFC-AF-02-01-112...	7.28e1	0.8	YES
2	2 13C5-PFHxA	1803746-01@150X PFC-AF-02-01-112...	1.31e2	0.7	YES
3	3 13C3-PFHxS	1803746-01@150X PFC-AF-02-01-112...	2.54e1	0.9	YES
4	4 13C8-PFOA	1803746-01@150X PFC-AF-02-01-112...	1.59e2	0.7	YES
5	5 13C9-PFNA	1803746-01@150X PFC-AF-02-01-112...	1.31e2	0.8	YES
6	6 13C4-PFOS	1803746-01@150X PFC-AF-02-01-112...	3.64e1	1.2	YES
7	7 13C6-PFDA	1803746-01@150X PFC-AF-02-01-112...	1.76e2	1.0	YES
8	8 13C7-PFUDa	1803746-01@150X PFC-AF-02-01-112...	1.60e2	0.7	YES

Name: 181203M1_65, Date: 04-Dec-2018, Time: 02:53:07, 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: 181203M1_66, Date: 04-Dec-2018, Time: 03:03:39, ID: 1803746-02@10X PFC-AF-02-02-112618 0.2365, Description: PFC-AF-02-02-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803746-02@10X PFC-AF-02-02-1126...	9.52e2	10.8	YES
2	2	13C5-PFHxA	1803746-02@10X PFC-AF-02-02-1126...	1.66e3	9.4	YES
3	3	13C3-PFHxS	1803746-02@10X PFC-AF-02-02-1126...	2.50e2	9.1	YES
4	4	13C8-PFOA	1803746-02@10X PFC-AF-02-02-1126...	2.18e3	9.5	YES
5	5	13C9-PFNA	1803746-02@10X PFC-AF-02-02-1126...	1.83e3	10.7	YES
6	6	13C4-PFOS	1803746-02@10X PFC-AF-02-02-1126...	2.85e2	9.0	YES
7	7	13C6-PFDA	1803746-02@10X PFC-AF-02-02-1126...	1.91e3	10.5	YES
8	8	13C7-PFUDa	1803746-02@10X PFC-AF-02-02-1126...	2.35e3	10.8	YES

Name: 181203M1_67, Date: 04-Dec-2018, Time: 03:14:18, 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: 181203M1_68, Date: 04-Dec-2018, Time: 03:24:51, ID: 1803746-03@5X PFC-AF-02-03-112618 0.23672, Description: PFC-AF-02-03-112618

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803746-03@5X PFC-AF-02-03-11261...	1.65e3	18.6	YES
2	2	13C5-PFHxA	1803746-03@5X PFC-AF-02-03-11261...	3.38e3	19.3	YES
3	3	13C3-PFHxS	1803746-03@5X PFC-AF-02-03-11261...	5.52e2	20.1	YES
4	4	13C8-PFOA	1803746-03@5X PFC-AF-02-03-11261...	4.32e3	18.8	YES
5	5	13C9-PFNA	1803746-03@5X PFC-AF-02-03-11261...	3.20e3	18.7	YES
6	6	13C4-PFOS	1803746-03@5X PFC-AF-02-03-11261...	5.62e2	17.8	YES
7	7	13C6-PFDA	1803746-03@5X PFC-AF-02-03-11261...	3.53e3	19.4	YES
8	8	13C7-PFUDa	1803746-03@5X PFC-AF-02-03-11261...	3.84e3	17.6	YES

Name: 181203M1_69, Date: 04-Dec-2018, Time: 03:35:29, ID: ST181203M1-5 PFC CS3 18K3006, Description: PFC CS3 18K3006

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181203M1-5 PFC CS3 18K3006	1.01e4	114.5	NO
2	2	13C5-PFHxA	ST181203M1-5 PFC CS3 18K3006	1.95e4	111.2	NO
3	3	13C3-PFHxS	ST181203M1-5 PFC CS3 18K3006	3.02e3	109.8	NO
4	4	13C8-PFOA	ST181203M1-5 PFC CS3 18K3006	2.59e4	112.9	NO
5	5	13C9-PFNA	ST181203M1-5 PFC CS3 18K3006	1.89e4	110.6	NO
6	6	13C4-PFOS	ST181203M1-5 PFC CS3 18K3006	3.35e3	106.4	NO
7	7	13C6-PFDA	ST181203M1-5 PFC CS3 18K3006	2.04e4	112.3	NO
8	8	13C7-PFUDa	ST181203M1-5 PFC CS3 18K3006	2.27e4	104.0	NO

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Name: 181203M1_70, Date: 04-Dec-2018, Time: 03:46:02, 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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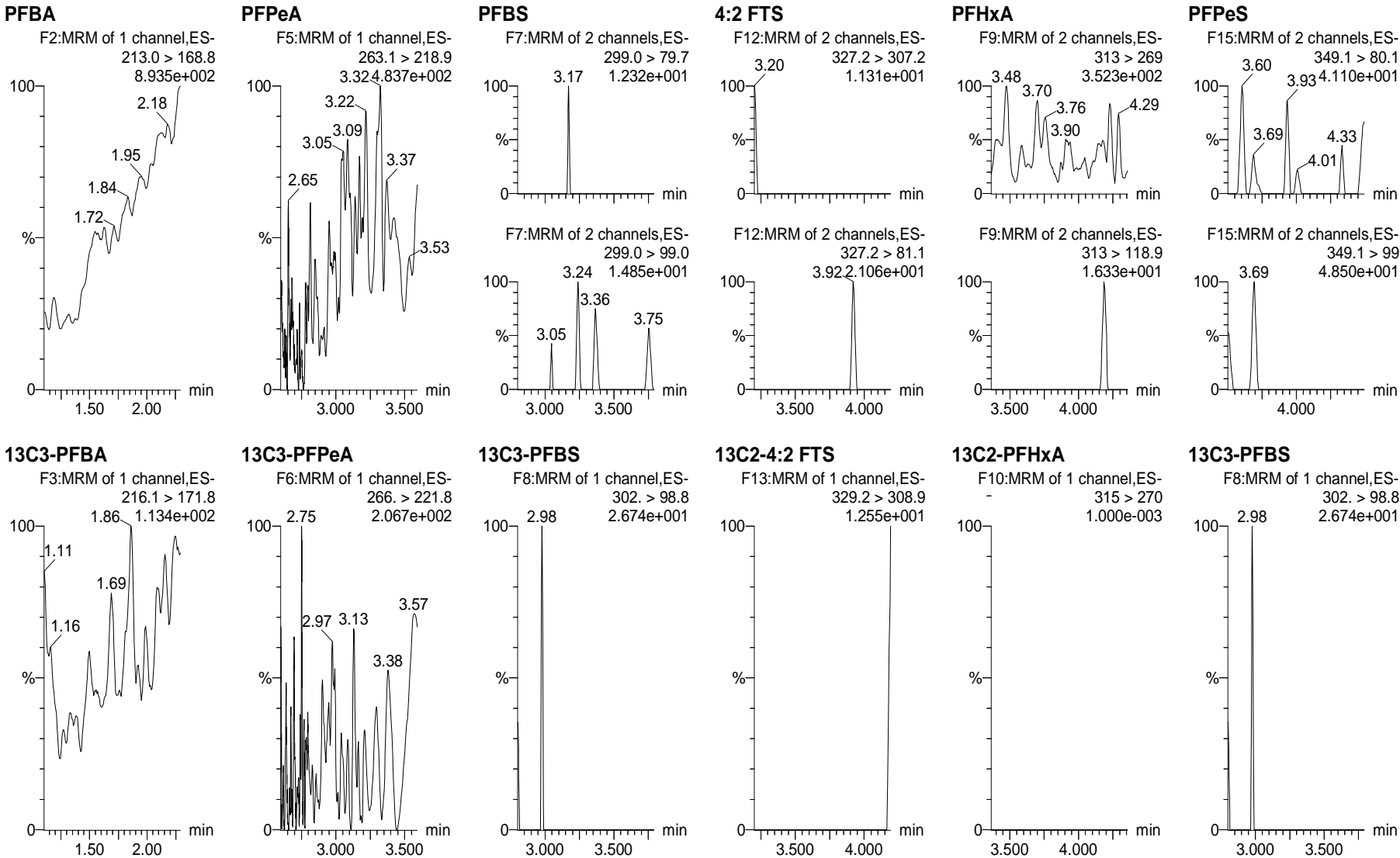
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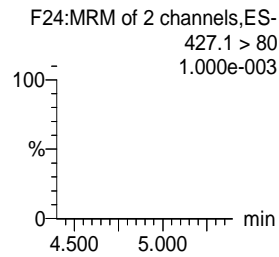
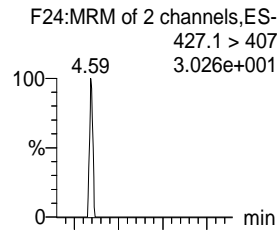


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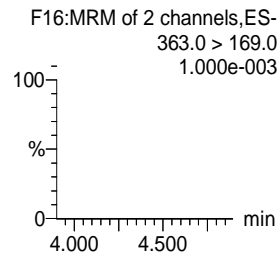
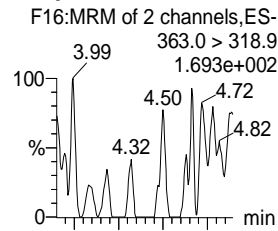
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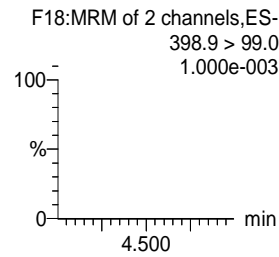
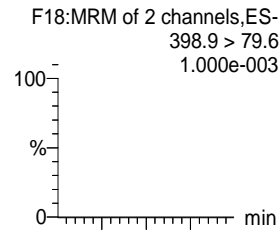
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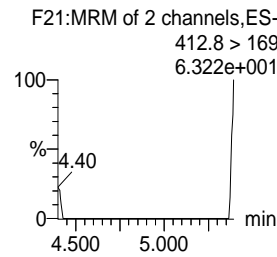
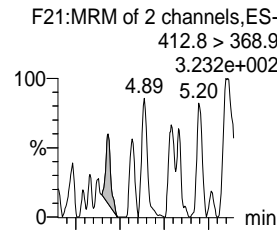
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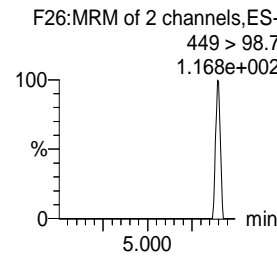
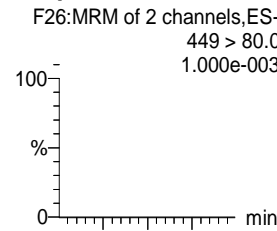
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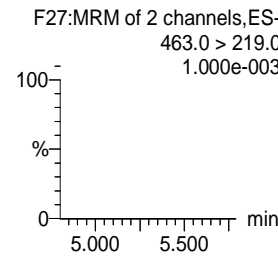
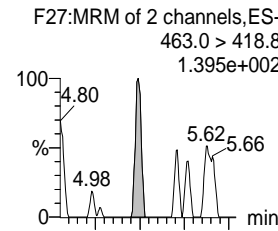
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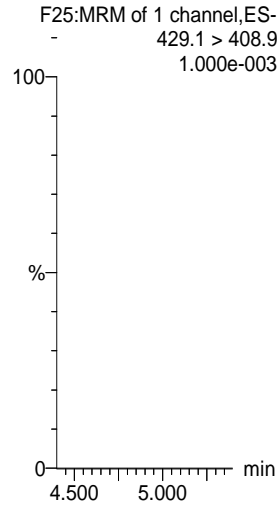
PFHpS



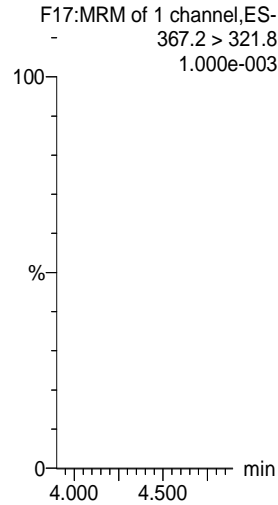
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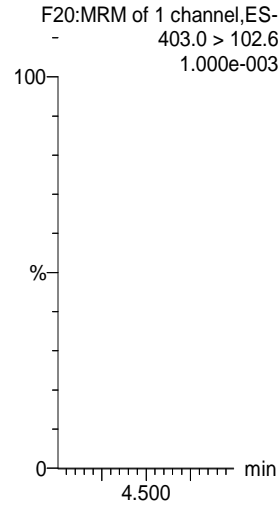
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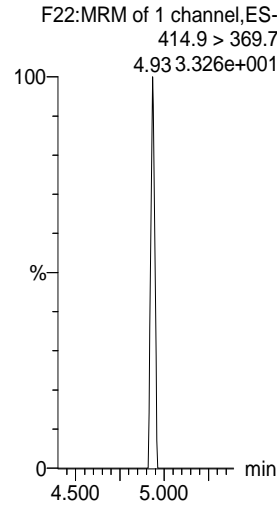
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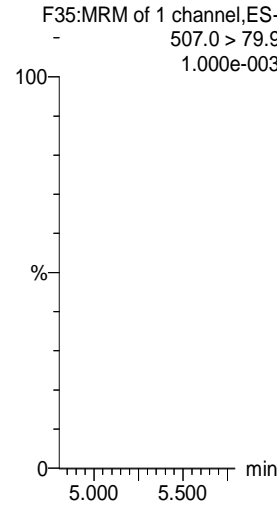
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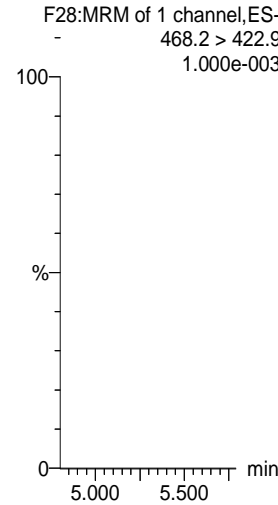
13C2-PFOA



13C8-PFOS



13C5-PFNA



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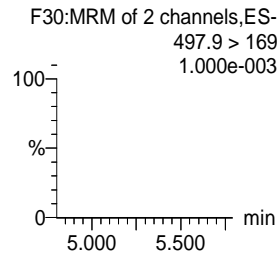
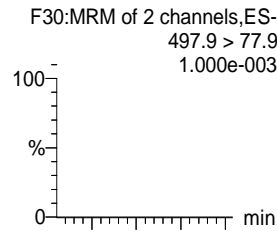
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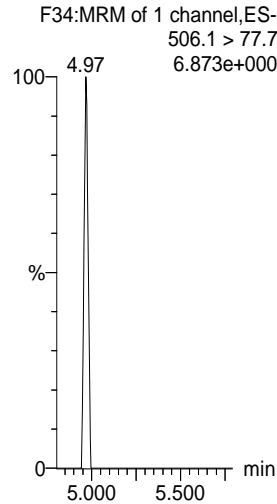
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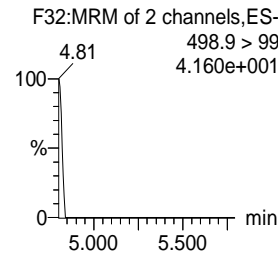
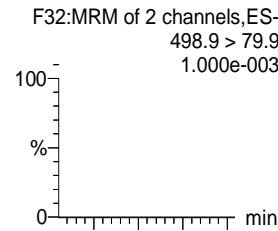
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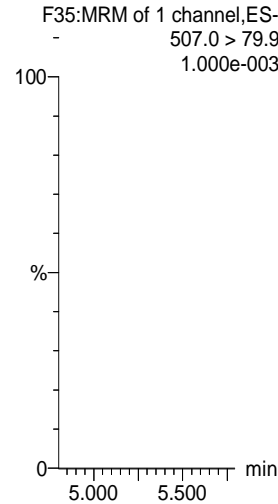
13C8-PFOSA



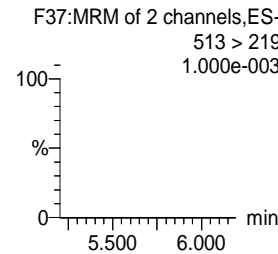
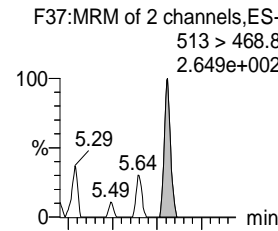
L-PFOS



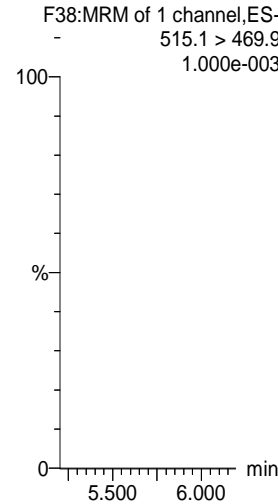
13C8-PFOS



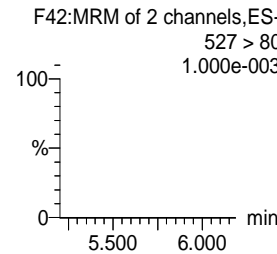
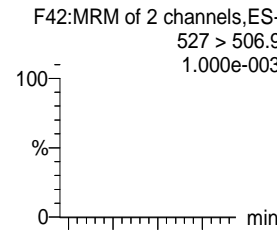
PFDA



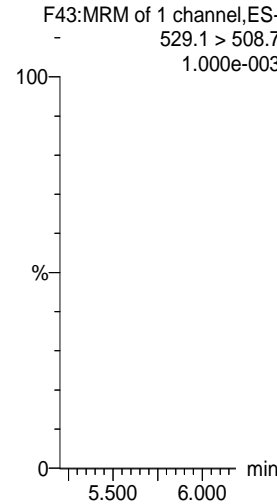
13C2-PFDA



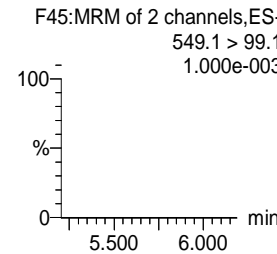
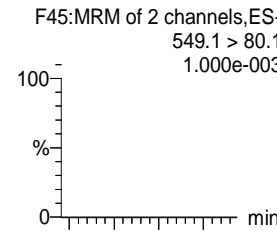
8:2 FTS



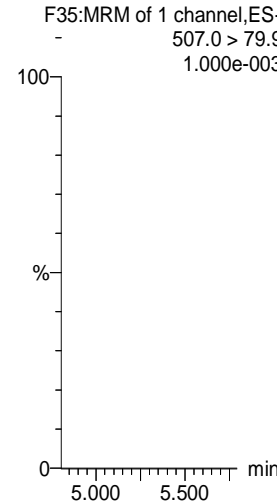
13C2-8:2 FTS



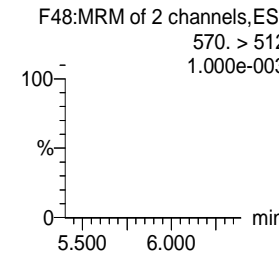
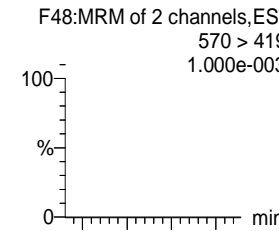
PFNS



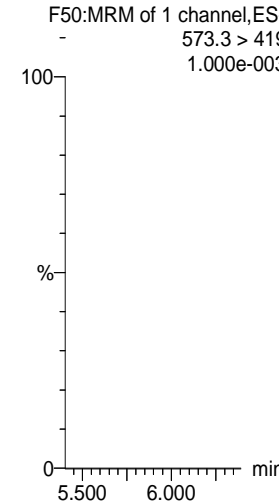
13C8-PFOS



L-MeFOSAA



d3-N-MeFOSAA

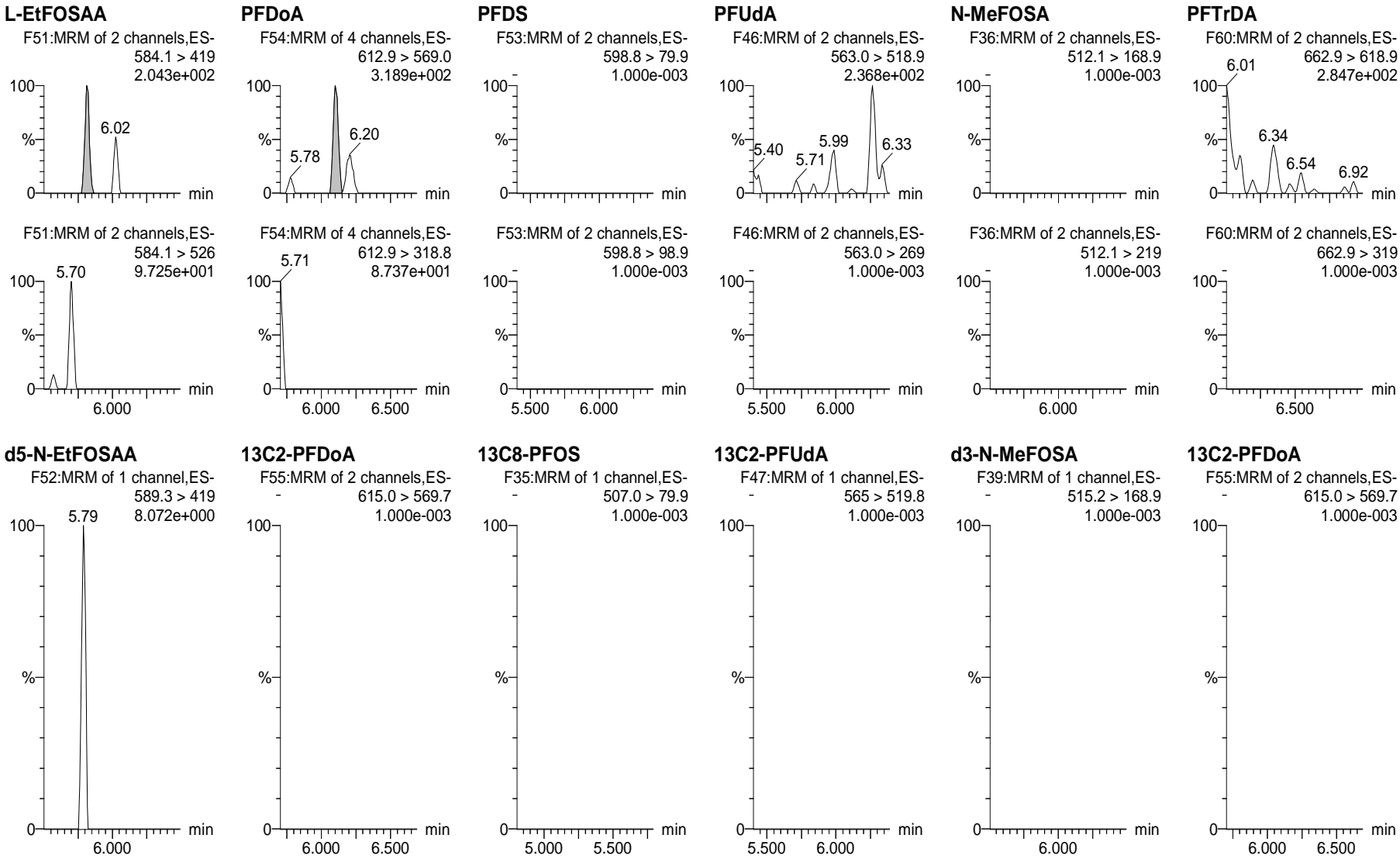


Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 10:17:20 Pacific Standard Time
Printed: Tuesday, December 04, 2018 10:18:02 Pacific Standard Time

Name: 181203M1_3, Date: 03-Dec-2018, Time: 14:47:29, ID: IPA, Description: IPA

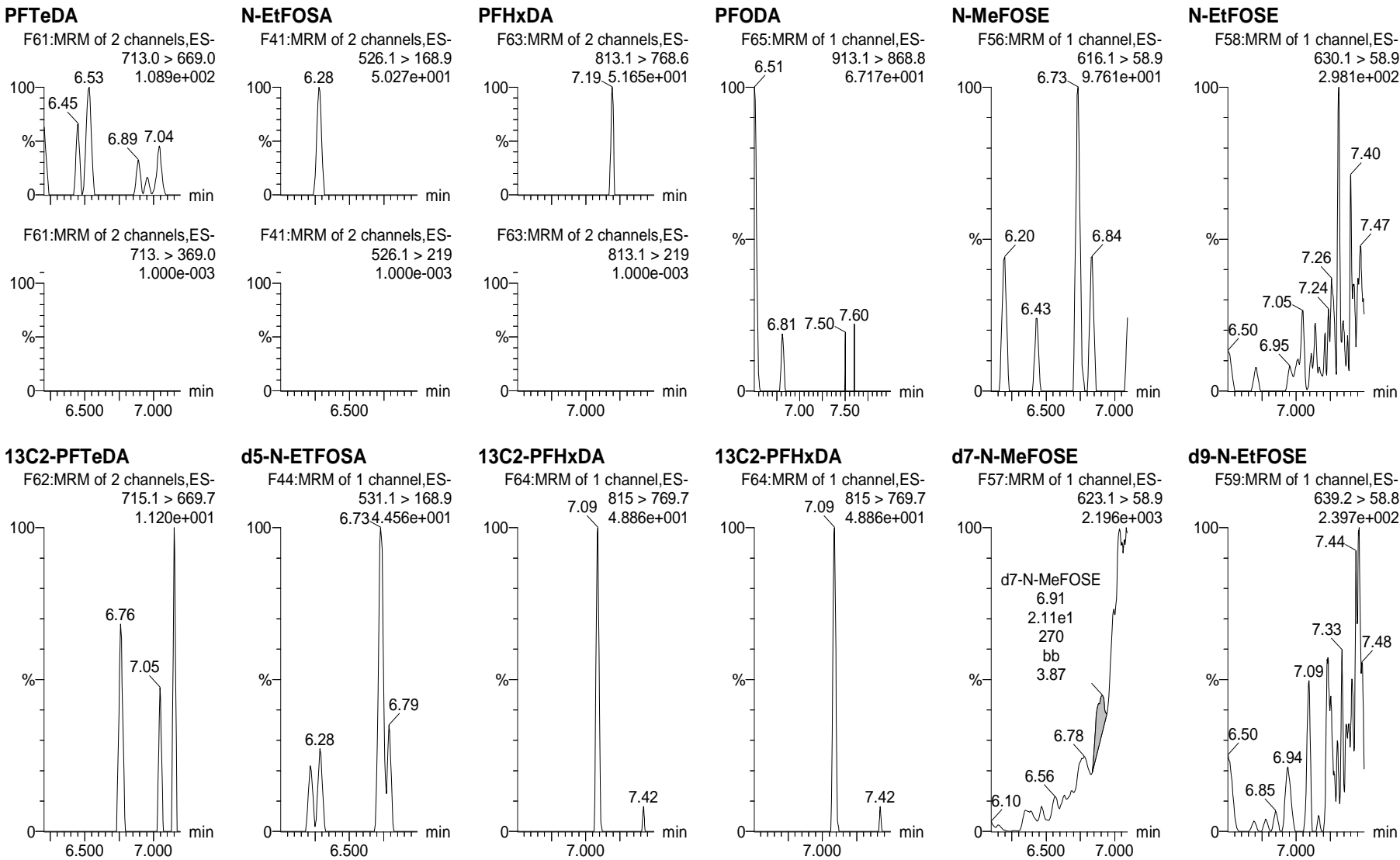


Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 10:17:20 Pacific Standard Time
Printed: Tuesday, December 04, 2018 10:18:02 Pacific Standard Time

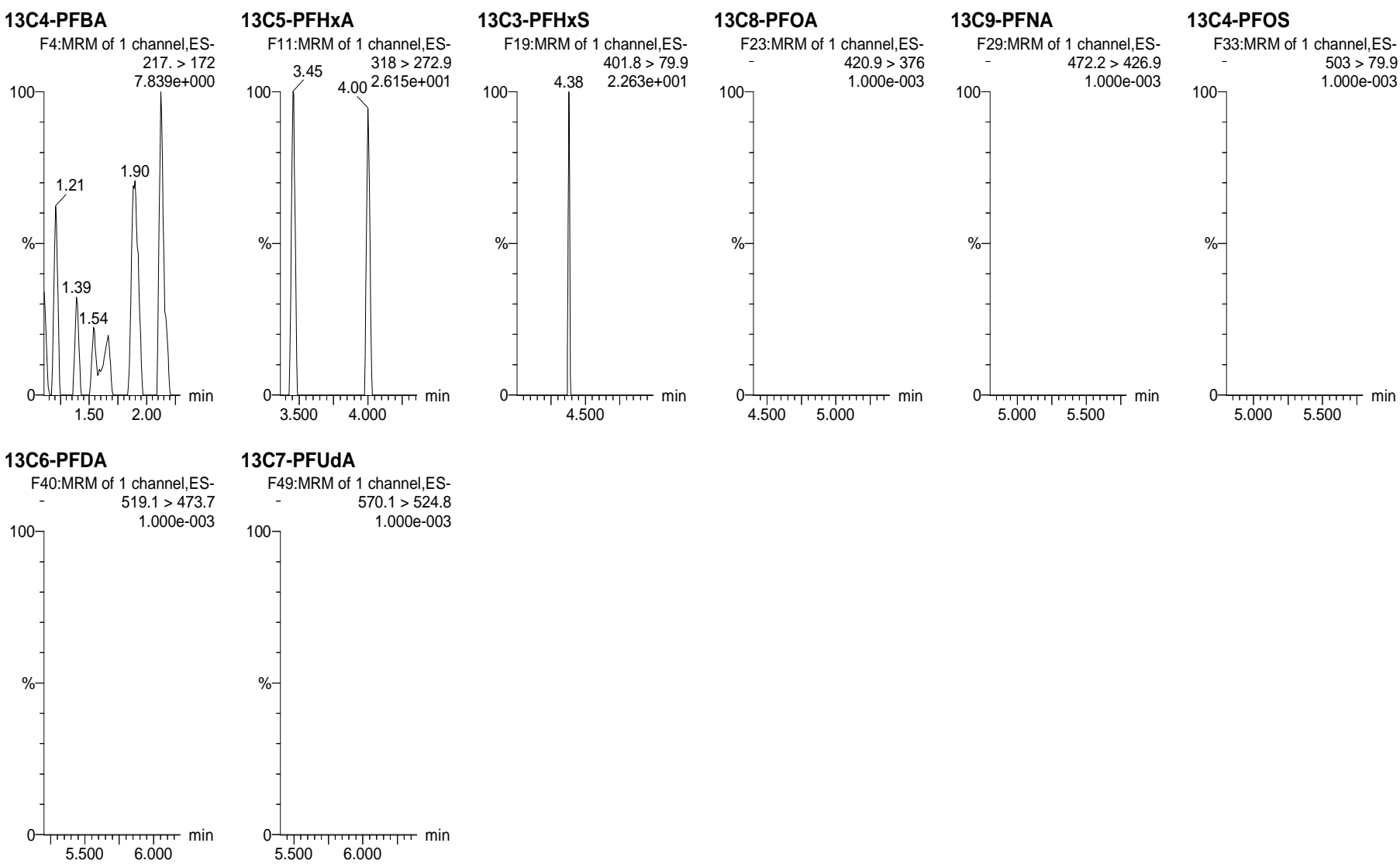
Name: 181203M1_3, Date: 03-Dec-2018, Time: 14:47:29, ID: IPA, Description: IPA



Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 10:17:20 Pacific Standard Time
Printed: Tuesday, December 04, 2018 10:18:02 Pacific Standard Time

Name: 181203M1_3, Date: 03-Dec-2018, Time: 14:47:29, ID: IPA, Description: IPA



LC Calibration Standards Review Checklist

Q24

Calibration ID:	ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manual Integrations	
ST181203MI-10 LMH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (A)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-2 LMH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (B)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-3 LMH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-4 LMH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (D)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-5 LMH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> (E)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LMH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMH	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

N/A

Full Mass Cal. Date: 12/03/18

Run Log Present: ☒

of Samples per Sequence Checked: ☒

Instrument Blank Saved: ☒

IIS Area Saved: ☒

Reviewed By: Jim 12/4/18
Initials/Date

Comments:

- (A) PFDS 65%, PFTeDA 142%
- (B) 6:2 FTS 142%, MeFOSAA 131%, PFTeDA 156%
- (C) 4:2 FTS 132%, 6:2 FTS 143%, MeFOSAA 136%, PFTeDA 149%
- (D) 6:2 FTS 150%, MeFOSAA 139%, PFTeDA 150%
- (E) 4:2 FTS 136%, 6:2 FTS 143%, 8:2 FTS 134%, PFDS 131%, PFTeDA 145%

ID: LR - LCSRC

Rev. No.: 1

Rev. Date: 02/06/2018

Page: 1 of 1

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:05:06 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	Name	Ion Ratio	Ratio out?
1	PFBA		
2	PFPeA		
3	PFBS	3.295	NO
4	4:2 FTS	1.924	NO
5	PFHxA	14.329	NO
6	PFPeS	1.425	NO
7	PFHpA	13.986	NO
8	L-PFHxS	2.298	NO
9	6:2 FTS	3.074	NO
10	L-PFOA	3.208	NO
11	PFHpS	1.959	NO
12	PFNA	4.572	NO
13	PFOSA	26.635	NO
14	L-PFOS	2.053	NO
15	PFDA	5.880	NO
16	8:2 FTS	2.741	NO
17	PFNS	1.795	NO
18	L-MeFOSAA	2.432	NO
19	L-EtFOSAA	1.270	NO

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:05:22 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	Name	Ion Ratio	Ratio out?
1	PFUdA	9.496	NO
2	PFDS	1.734	NO
3	PFDaA	9.321	NO
4	N-MeFOSA	1.532	NO
5	PFTrDA	26.710	NO
6	PFTeDA	14.120	NO
7	N-EtFOSA	1.718	NO
8	PFHxDA	20.076	NO
9	PFODA		
10	N-MeFOSE		
11	N-EtFOSE		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-2.qld

Last Altered: Tuesday, December 04, 2018 07:51:12 Pacific Standard Time

Printed: Tuesday, December 04, 2018 07:52:08 Pacific Standard Time

✓
DM
12/4/18

Name: 181203M1_2, Date: 03-Dec-2018, Time: 14:36:50, ID: ST181203M1-1 PFC CS0 18K3003, Description: PFC CS0 18K3003

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1 PFBA	213.0 > 168.8	594.103	7183.595	1.00	1.43	1.034	1.0	103.7	NO		
2	2 PFPeA	263.1 > 218.9	648.272	8275.581	1.00	2.68	0.979	1.1	108.6	NO		
3	3 PFBS	299.0 > 79.7	222.754	1320.445	1.00	3.00	2.109	1.1	109.0	NO	3.479	NO
4	4 4:2 FTS	327.2>307.2	273.948	3486.537	1.00	3.47	0.982	1.2	119.5	NO	1.804	NO
5	5 PFHxA	313 > 269	1287.676	6647.235	1.00	3.56	0.969	0.9	92.4	NO	17.720	NO
6	6 PFPeS	349.1>80.1	132.306	1320.445	1.00	3.76	1.252	0.9	89.1	NO	1.110	NO
7	36 13C3-PFBA	216.1 > 171.8	7183.595	8914.291	1.00	1.43	10.073	11.7	93.6	NO		
8	37 13C3-PFPeA	266. > 221.8	8275.581	17533.865	1.00	2.68	5.900	9.8	78.2	NO		
9	38 13C3-PFBS	302. > 98.8	1320.445	2748.223	1.00	3.00	6.006	9.5	75.9	NO		
10	39 13C2-4:2 FTS	329.2>308.9	3486.537	2748.223	1.00	3.47	15.858	7.6	61.2	NO		
11	40 13C2-PFHxA	315 > 270	6647.235	17533.865	1.00	3.56	4.739	5.3	105.3	NO		
12	38 13C3-PFBS	302. > 98.8	1320.445	2748.223	1.00	3.00	6.006	9.5	75.9	NO		
13	-1											
14	10 6:2 FTS	427.1 > 407	381.720	4173.213	1.00	4.63	1.143	1.2	117.3	NO	3.248	NO
15	7 PFHpA	363.0 > 318.9	963.224	9266.807	1.00	4.19	1.299	1.1	111.5	NO	13.235	NO
16	8 L-PFHxS	398.9 > 79.6	170.015	1138.399	1.00	4.33	1.867	0.9	94.7	NO	1.941	NO
17	11 L-PFOA	412.8 > 368.9	1968.085	16558.258	1.00	4.68	1.486	1.2	117.7	NO	3.115	NO
18	13 PFHpS	449 > 80.0	231.603	3228.403	1.00	4.78	0.897	1.1	108.3	NO	1.787	NO
19	14 PFNA	463.0 > 418.8	1600.616	16381.929	1.00	5.11	1.221	1.1	114.7	NO	4.866	NO
20	43 13C2-6:2 FTS	429.1 > 408.9	4173.213	3152.432	1.00	4.63	16.548	9.1	72.6	NO		
21	41 13C4-PFHpA	367.2 > 321.8	9266.807	17533.865	1.00	4.19	6.606	9.5	76.2	NO		
22	42 18O2-PFHxS	403.0 > 102.6	1138.399	2748.223	1.00	4.32	5.178	10.9	87.1	NO		
23	44 13C2-PFOA	414.9 > 369.7	16558.258	22963.975	1.00	4.68	9.013	10.3	82.6	NO		
24	47 13C8-PFOS	507.0 > 79.9	3228.403	3152.432	1.00	5.19	12.801	13.2	105.8	NO		
25	45 13C5-PFNA	468.2 > 422.9	16381.929	17092.428	1.00	5.11	11.980	11.9	95.2	NO		
26	-1											
27	15 PFOSA	497.9 > 77.9	251.192	3142.330	1.00	5.15	0.999	0.9	90.2	NO	89.647	YES
28	16 L-PFOS	498.9 > 79.9	291.984	3228.403	1.00	5.19	1.131	1.1	107.9	NO	2.509	NO
29	18 PFDA	513 > 468.8	1700.253	18563.361	1.00	5.49	1.145	1.1	107.9	NO	5.375	NO
30	19 8:2 FTS	527 > 506.9	414.607	3308.934	1.00	5.46	1.566	1.2	122.9	NO	2.794	NO
31	20 PFNS	549.1 > 80.1	138.970	3228.403	1.00	5.55	0.538	0.6	64.9	YES	1.736	NO
32	21 L-MeFOSAA	570 > 419	726.439	5250.850	1.00	5.64	1.729	1.2	115.9	NO	2.250	NO
33	46 13C8-PFOSA	506.1 > 77.7	3142.330	21850.656	1.00	5.15	1.798	8.9	71.3	NO		
34	47 13C8-PFOS	507.0 > 79.9	3228.403	3152.432	1.00	5.19	12.801	13.2	105.8	NO		
35	48 13C2-PFDA	515.1 > 469.9	18563.361	18159.445	1.00	5.48	12.778	11.4	90.9	NO		

① < 70%
② > 130%CCH
12/4/18

④

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-2.qld

Last Altered: Tuesday, December 04, 2018 07:51:12 Pacific Standard Time

Printed: Tuesday, December 04, 2018 07:52:08 Pacific Standard Time

Name: 181203M1_2, Date: 03-Dec-2018, Time: 14:36:50, ID: ST181203M1-1 PFC CS0 18K3003, Description: PFC CS0 18K3003

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
36	49 13C2-8:2 FTS	529.1 > 508.7	3308.934	3152.432	1.00	5.46	13.121	12.1	96.6	NO		
37	47 13C8-PFOS	507.0 > 79.9	3228.403	3152.432	1.00	5.19	12.801	13.2	105.8	NO		
38	50 d3-N-MeFOSAA	573.3 > 419	5250.850	21850.656	1.00	5.63	3.004	9.1	73.0	NO		
39	-1											
40	23 L-EiFOSAA	584.1 > 419	579.442	6965.227	1.00	5.79	1.040	1.0	103.4	NO	1.294	NO
41	27 PFDaA	612.9 > 569.0	2090.360	20266.320	1.00	6.09	1.289	1.0	97.8	NO	7.689	NO
42	26 PFDS	598.8 > 79.9	223.746	3228.403	1.00	5.85	0.866	1.0	98.7	NO	1.372	NO
43	25 PFUdA	563.0 > 518.9	1848.869	21335.264	1.00	5.81	1.083	1.0	100.5	NO	10.118	NO
44	28 N-MeFOSA	512.1 > 168.9	364.911	11082.254	1.00	6.01	4.939	4.7	94.3	NO	1.953	NO
45	29 PFTrDA	662.9 > 618.9	1906.586	20266.320	1.00	6.33	1.176	1.0	96.0	NO	25.441	NO
46	52 d5-N-EiFOSAA	589.3 > 419	6965.227	21850.656	1.00	5.79	3.985	11.2	89.8	NO		
47	53 13C2-PFDaA	615.0 > 569.7	20266.320	18159.445	1.00	6.09	13.950	14.0	112.4	NO		
48	47 13C8-PFOS	507.0 > 79.9	3228.403	3152.432	1.00	5.19	12.801	13.2	105.8	NO		
49	51 13C2-PFUdA	565 > 519.8	21335.264	21850.656	1.00	5.81	12.205	11.0	87.9	NO		
50	54 d3-N-MeFOSA	515.2 > 168.9	11082.254	21850.656	1.00	6.04	6.340	85.8	57.2	NO		
51	53 13C2-PFDaA	615.0 > 569.7	20266.320	18159.445	1.00	6.09	13.950	14.0	112.4	NO		
52	-1											
53	30 PFTeDA	713.0 > 669.0	1906.702	14739.551	1.00	6.55	1.617	1.4	142.4	YES	15.162	NO
54	31 N-EiFOSA	526.1 > 168.9	543.886	18328.141	1.00	6.45	4.451	4.6	91.7	NO	1.743	NO
55	32 PFHxDA	813.1 > 768.6	776.110	6598.428	1.00	6.86	0.588	1.0	100.4	NO	22.077	NO
56	33 PFODA	913.1 > 868.8	1331.708	6598.428	1.00	7.08	1.009	1.2	116.3	NO		
57	34 N-MeFOSE	616.1 > 58.9	277.771	9568.519	1.00	6.68	4.354	5.2	103.3	NO		
58	35 N-EiFOSE	630.1 > 58.9	342.496	10424.546	1.00	6.82	4.928	4.6	92.9	NO		
59	55 13C2-PFTeDA	715.1 > 669.7	14739.551	21850.656	1.00	6.55	8.432	11.3	90.1	NO		
60	56 d5-N-ETFOSA	531.1 > 168.9	18328.141	21850.656	1.00	6.47	10.485	108.2	72.2	NO		
61	57 13C2-PFHxDA	815 > 769.7	6598.428	21850.656	1.00	6.86	3.775	5.3	105.7	NO		
62	57 13C2-PFHxDA	815 > 769.7	6598.428	21850.656	1.00	6.86	3.775	5.3	105.7	NO		
63	58 d7-N-MeFOSE	623.1 > 58.9	9568.519	21850.656	1.00	6.66	5.474	152.1	101.4	NO		
64	59 d9-N-EiFOSE	639.2 > 58.8	10424.546	21850.656	1.00	6.81	5.964	165.1	110.1	NO		
65	-1											
66	60 13C4-PFBA	217. > 172	8914.291	8914.291	1.00	1.43	12.500	12.5	100.0	NO		
67	61 13C5-PFHxA	318 > 272.9	17533.865	17533.865	1.00	3.56	12.500	12.5	100.0	NO		
68	62 13C3-PFHxS	401.8 > 79.9	2748.223	2748.223	1.00	4.32	12.500	12.5	100.0	NO		
69	63 13C8-PFOA	420.9 > 376	22963.975	22963.975	1.00	4.68	12.500	12.5	100.0	NO		
70	64 13C9-PFNA	472.2 > 426.9	17092.428	17092.428	1.00	5.11	12.500	12.5	100.0	NO		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-2.qld

Last Altered: Tuesday, December 04, 2018 07:51:12 Pacific Standard Time

Printed: Tuesday, December 04, 2018 07:52:08 Pacific Standard Time

Name: 181203M1_2, Date: 03-Dec-2018, Time: 14:36:50, ID: ST181203M1-1 PFC CS0 18K3003, Description: PFC CS0 18K3003

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
71	65 13C4-PFOS	503 > 79.9	3152.432	3152.432	1.00	5.19	12.500	12.5	100.0	NO		
72	66 13C6-PFDA	519.1 > 473.7	18159.445	18159.445	1.00	5.48	12.500	12.5	100.0	NO		
73	67 13C7-PFUDA	570.1 > 524.8	21850.656	21850.656	1.00	5.81	12.500	12.5	100.0	NO		

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time
Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 07:50:00
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Compound name: PFBA

	# Name	ID	Acq.Date	Acq.Time
1	1 181203M1_1	IPA	03-Dec-18	14:26:17
2	2 181203M1_2	ST181203M1-1 PFC CS0 18K3003	03-Dec-18	14:36:50
3	3 181203M1_3	IPA	03-Dec-18	14:47:29
4	4 181203M1_4	B8K0153-BS1 OPR 0.25	03-Dec-18	14:58:01
5	5 181203M1_5	B8K0153-MS1 Matrix Spike 0.1068	03-Dec-18	15:08:39
6	6 181203M1_6	B8K0153-MSD1 Matrix Spike Dup 0.11122	03-Dec-18	15:19:12
7	7 181203M1_7	B8K0153-BLK1 Method Blank 0.25	03-Dec-18	15:29:51
8	8 181203M1_8	1803678-01 A1-MW-01-SA2 0.11182	03-Dec-18	15:40:24
9	9 181203M1_9	1803678-02 A1-MW-42-SA2 0.11781	03-Dec-18	15:51:02
10	10 181203M1_10	1803678-03 FRB-20181116 0.1036	03-Dec-18	16:01:36
11	11 181203M1_11	1803678-04 EB-20181116 0.11772	03-Dec-18	16:12:14
12	12 181203M1_12	1803676-01 A1-MW-11-SA2 0.11626	03-Dec-18	16:22:46
13	13 181203M1_13	1803676-02 A1-MW-13-SA2 0.11042	03-Dec-18	16:33:24
14	14 181203M1_14	1803676-03 A1-MW-14-SA2 0.11629	03-Dec-18	16:43:58
15	15 181203M1_15	1803676-04 A1-MW-15-SA2 0.11086	03-Dec-18	16:54:36
16	16 181203M1_16	IPA	03-Dec-18	18:13:52
17	17 181203M1_17	IPA	03-Dec-18	18:24:27
18	18 181203M1_18	1803676-05 A1-MW-37-SA2 0.11753	03-Dec-18	18:35:06
19	19 181203M1_19	1803676-06 A1-MW-37-SA2D 0.11493	03-Dec-18	18:45:39
20	20 181203M1_20	1803676-07 FRB-20181115 0.11067	03-Dec-18	18:56:10
21	21 181203M1_21	1803676-08 A1-MW-31-SA2 0.1169	03-Dec-18	19:06:48
22	22 181203M1_22	1803689-01 Equipment Blank 1 0.25208	03-Dec-18	19:17:20
23	23 181203M1_23	ST181203M1-2 PFC CS3 18K3006	03-Dec-18	19:27:59
24	24 181203M1_24	IPA	03-Dec-18	19:38:28
25	25 181203M1_25	B8K0190-BSD1 LCSD 0.25	03-Dec-18	19:49:07
26	26 181203M1_26	1803745-03 PFC-AF-01-03-112618 0.24673	03-Dec-18	19:59:45
27	27 181203M1_27	1803746-01 PFC-AF-02-01-112618 0.23986	03-Dec-18	20:10:19
28	28 181203M1_28	IPA	03-Dec-18	20:20:57
29	29 181203M1_29	1803746-02 PFC-AF-02-02-112618 0.2365	03-Dec-18	20:31:30
30	30 181203M1_30	IPA	03-Dec-18	20:42:08
31	31 181203M1_31	1803746-03 PFC-AF-02-03-112618 0.23672	03-Dec-18	20:52:42
32	32 181203M1_32	IPA	03-Dec-18	21:03:20

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Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time
Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Compound name: PFBA

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33	33 181203M1_33	1803762-04 PFC-AF-01-04-112718 0.24232	03-Dec-18	21:13:54
34	34 181203M1_34	1803618-02 1811353-02A 0.2386	03-Dec-18	21:24:32
35	35 181203M1_35	1803618-01@10X 1811353-01A 0.23448	03-Dec-18	21:35:10
36	36 181203M1_36	IPA	03-Dec-18	21:45:43
37	37 181203M1_37	B8K0215-BS1 OPR 0.125	03-Dec-18	21:56:21
38	38 181203M1_38	B8K0215-BSD1 LCSD 0.125	03-Dec-18	22:06:56
39	39 181203M1_39	B8K0215-BLK1 Method Blank 0.125	03-Dec-18	22:17:34
40	40 181203M1_40	1803788-01 PFC-AF-01-01-112918 0.11457	03-Dec-18	22:28:07
41	41 181203M1_41	1803788-02 PFC-AF-01-02-112918 0.11773	03-Dec-18	22:38:45
42	42 181203M1_42	1803788-03 PFC-AF-01-03-112918 0.11732	03-Dec-18	22:49:19
43	43 181203M1_43	ST181203M1-3 PFC CS3 18K3006	03-Dec-18	22:59:57
44	44 181203M1_44	IPA	03-Dec-18	23:10:29
45	45 181203M1_45	B8K0197-BS1 OPR 0.125	03-Dec-18	23:21:08
46	46 181203M1_46	B8K0197-BLK1 Method Blank 0.125	03-Dec-18	23:31:46
47	47 181203M1_47	1803754-01 CMW-18-01 0.11781	03-Dec-18	23:42:19
48	48 181203M1_48	1803754-02 CMW-101B 0.11273	03-Dec-18	23:52:57
49	49 181203M1_49	1803754-03 MW-97701 0.11474	04-Dec-18	00:03:30
50	50 181203M1_50	1803754-04 MW-97702 0.11219	04-Dec-18	00:14:08
51	51 181203M1_51	1803754-05 CSW-3 0.12087	04-Dec-18	00:24:42
52	52 181203M1_52	1803754-06 CSW-4 0.11744	04-Dec-18	00:35:20
53	53 181203M1_53	1803754-07 CUD-1 0.11598	04-Dec-18	00:45:53
54	54 181203M1_54	1803754-08 CUD-2 0.1153	04-Dec-18	00:56:31
55	55 181203M1_55	1803754-09 CUD-3 0.11905	04-Dec-18	01:07:05
56	56 181203M1_56	1803754-10 CUD-4 0.11711	04-Dec-18	01:17:43
57	57 181203M1_57	ST181203M1-4 PFC CS3 18K3006	04-Dec-18	01:28:16
58	58 181203M1_58	IPA	04-Dec-18	01:38:54
59	59 181203M1_59	1803762-01 PFC-AF-01-01-112718 0.23808	04-Dec-18	01:49:32
60	60 181203M1_60	1803754-11 Sump 1 0.11876	04-Dec-18	02:00:05
61	61 181203M1_61	1803754-12 Sump 2 0.11443	04-Dec-18	02:10:44
62	62 181203M1_62	1803754-13 SW-5 0.11647	04-Dec-18	02:21:17
63	63 181203M1_63	1803754-14 Shelby St. Sump 0.11682	04-Dec-18	02:31:56
64	64 181203M1_64	1803746-01@150X PFC-AF-02-01-112618 0.23986	04-Dec-18	02:42:29
65	65 181203M1_65	IPA	04-Dec-18	02:53:07
66	66 181203M1_66	1803746-02@10X PFC-AF-02-02-112618 0.2365	04-Dec-18	03:03:39
67	67 181203M1_67	IPA	04-Dec-18	03:14:18
68	68 181203M1_68	1803746-03@5X PFC-AF-02-03-112618 0.23672	04-Dec-18	03:24:51

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Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time

Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Compound name: PFBA

	# Name	ID	Acq.Date	Acq.Time
69	69 181203M1_69	ST181203M1-5 PFC CS3 18K3006	04-Dec-18	03:35:29
70	70 181203M1_70	IPA	04-Dec-18	03:46:02

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-2.qld

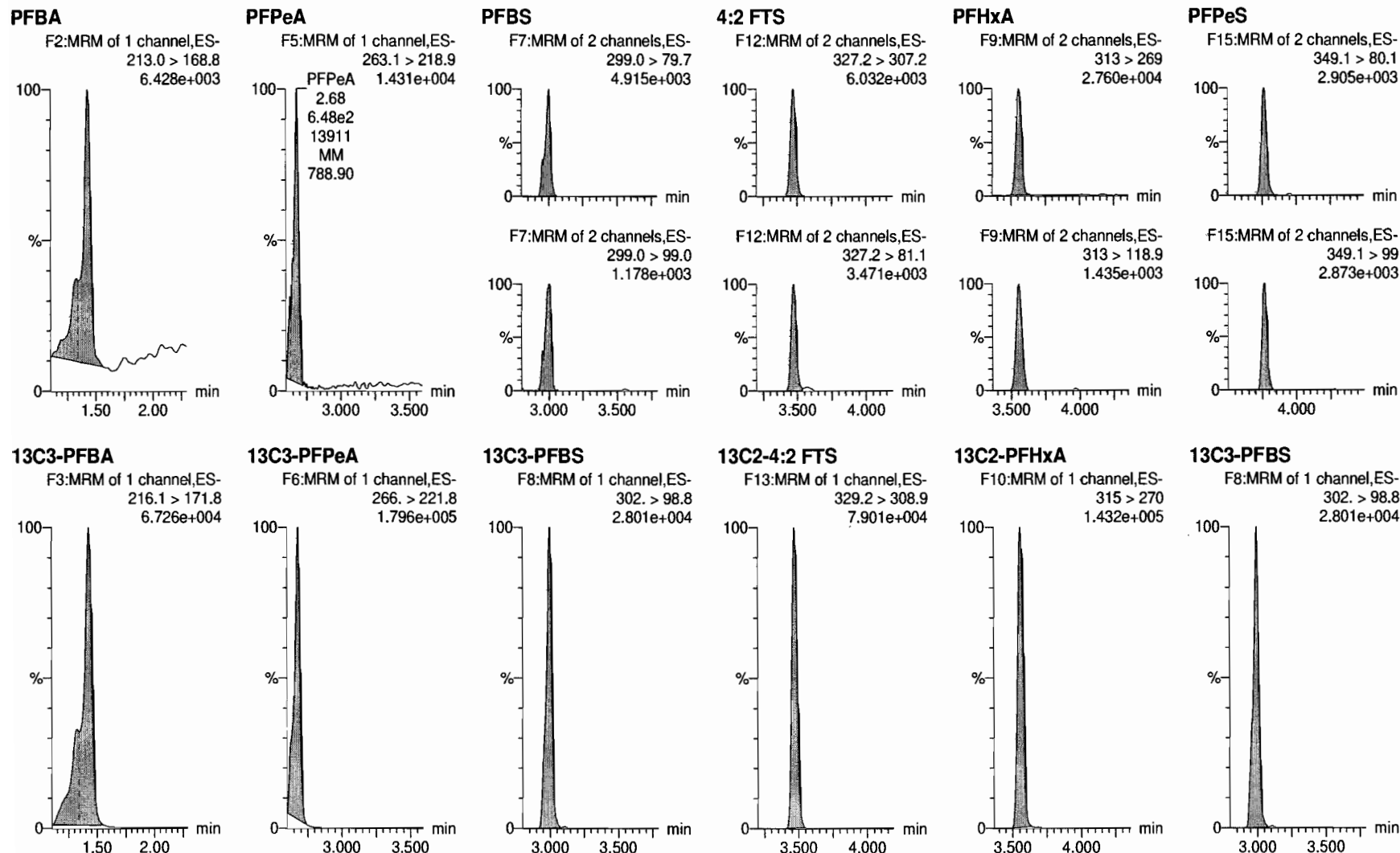
Last Altered: Tuesday, December 04, 2018 07:51:12 Pacific Standard Time

Printed: Tuesday, December 04, 2018 07:52:08 Pacific Standard Time

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Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

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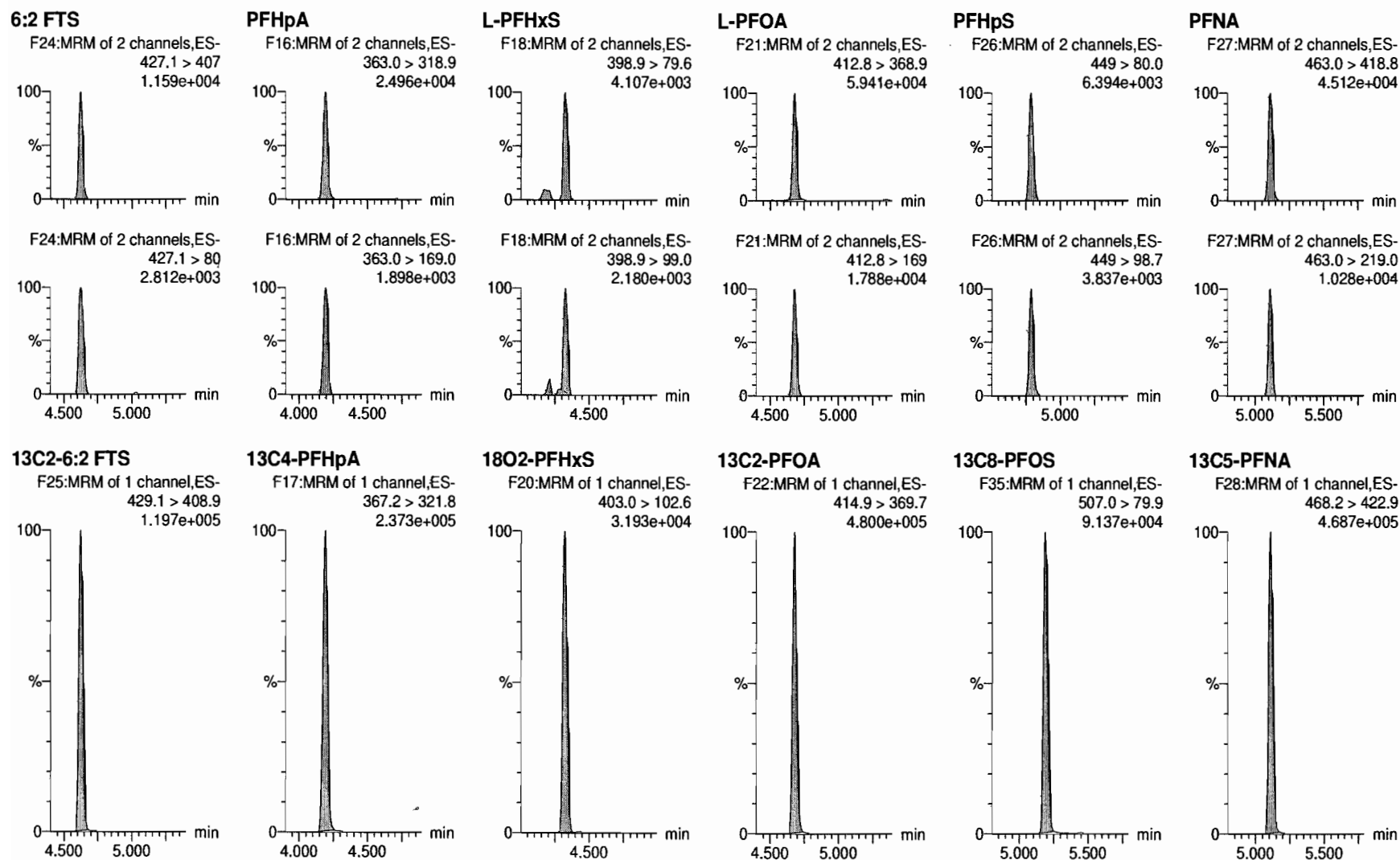


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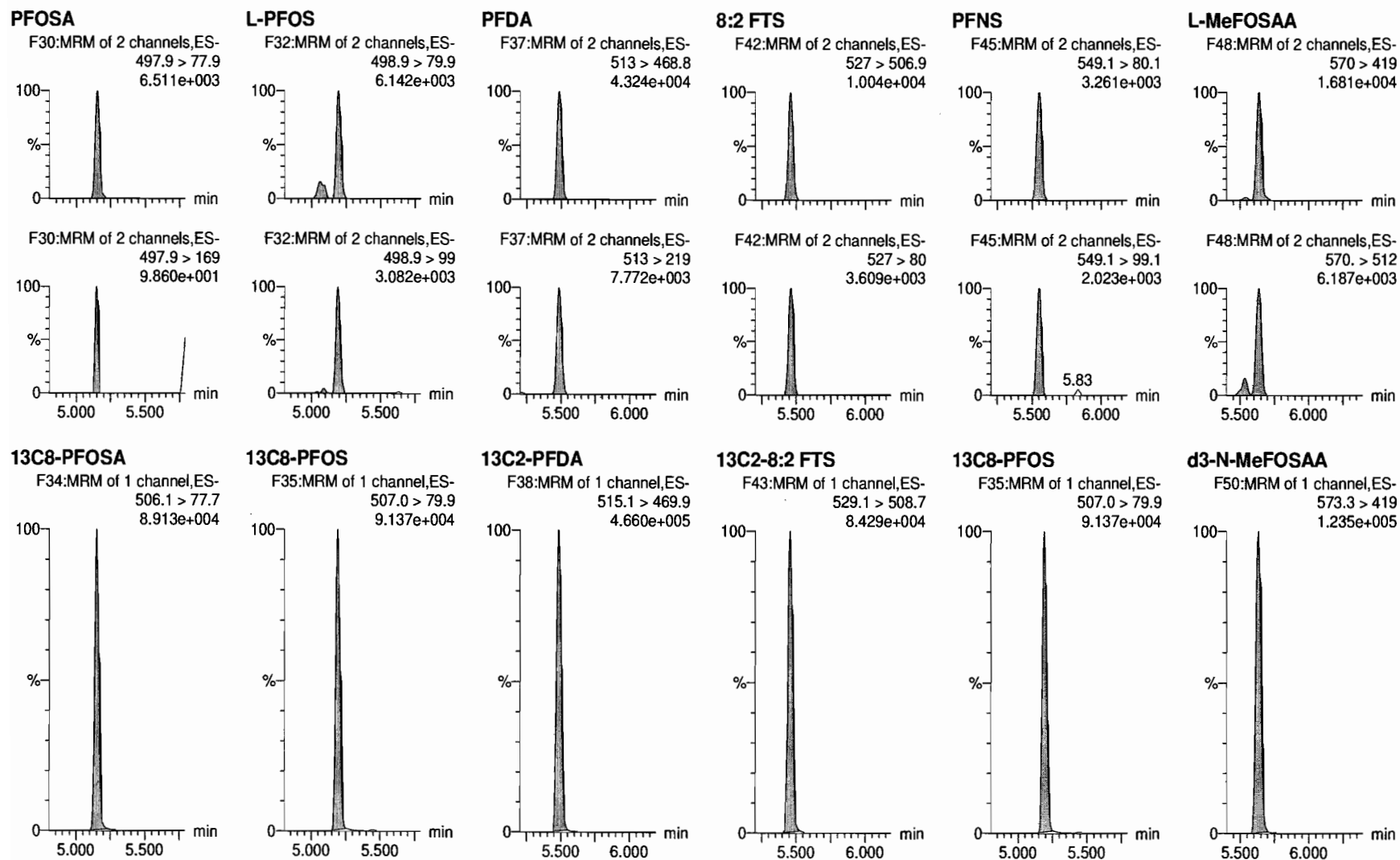


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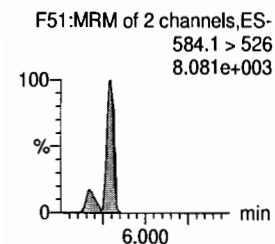
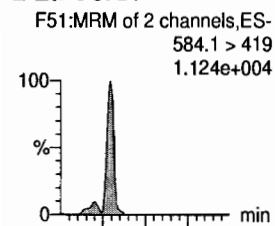
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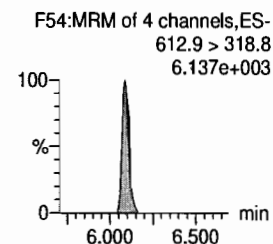
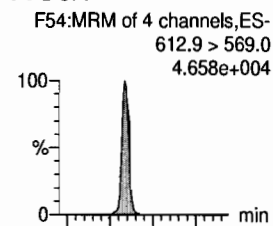
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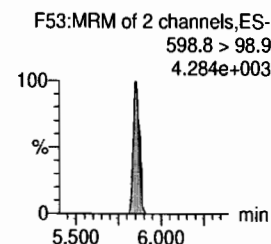
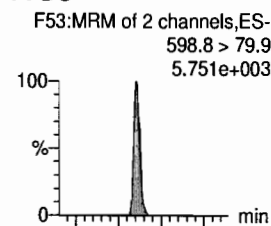
L-EtFOSAA



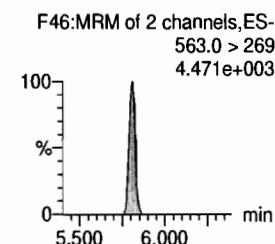
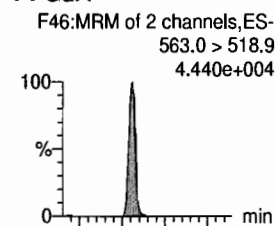
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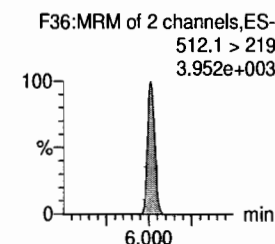
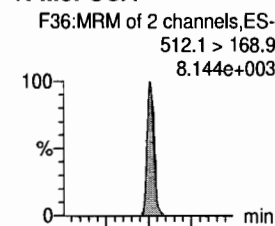
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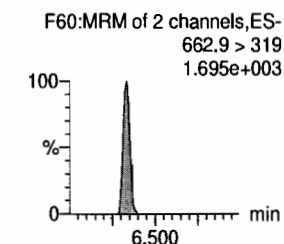
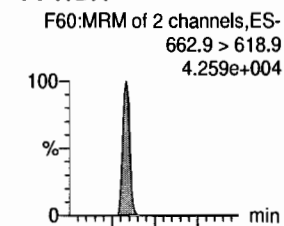
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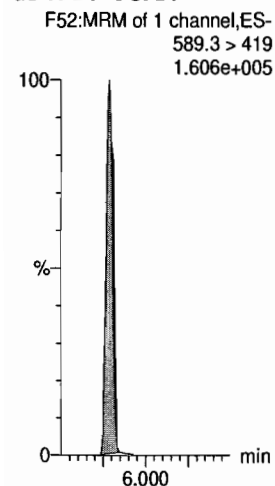
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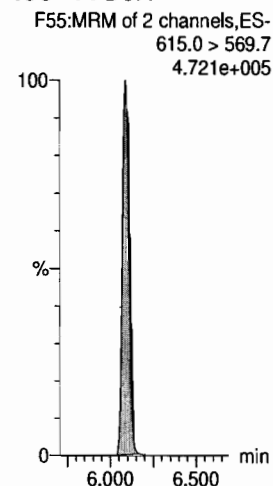
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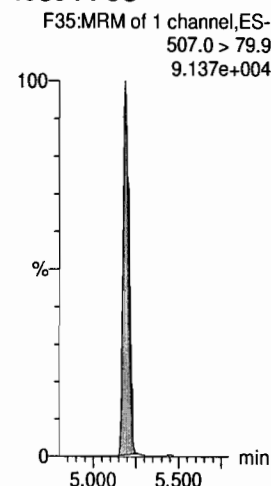
d5-N-EtFOSAA



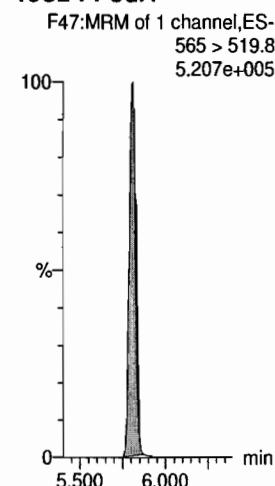
13C2-PFDaA



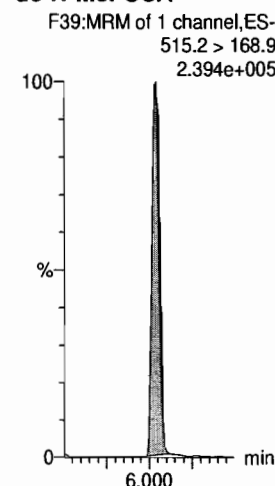
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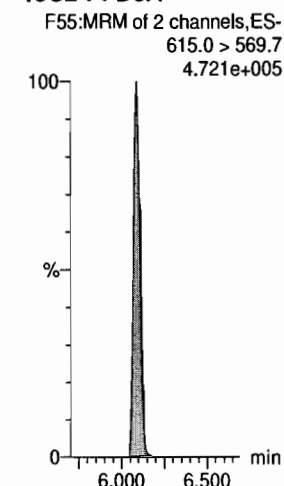
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d3-N-MeFOSA



13C2-PFDaA

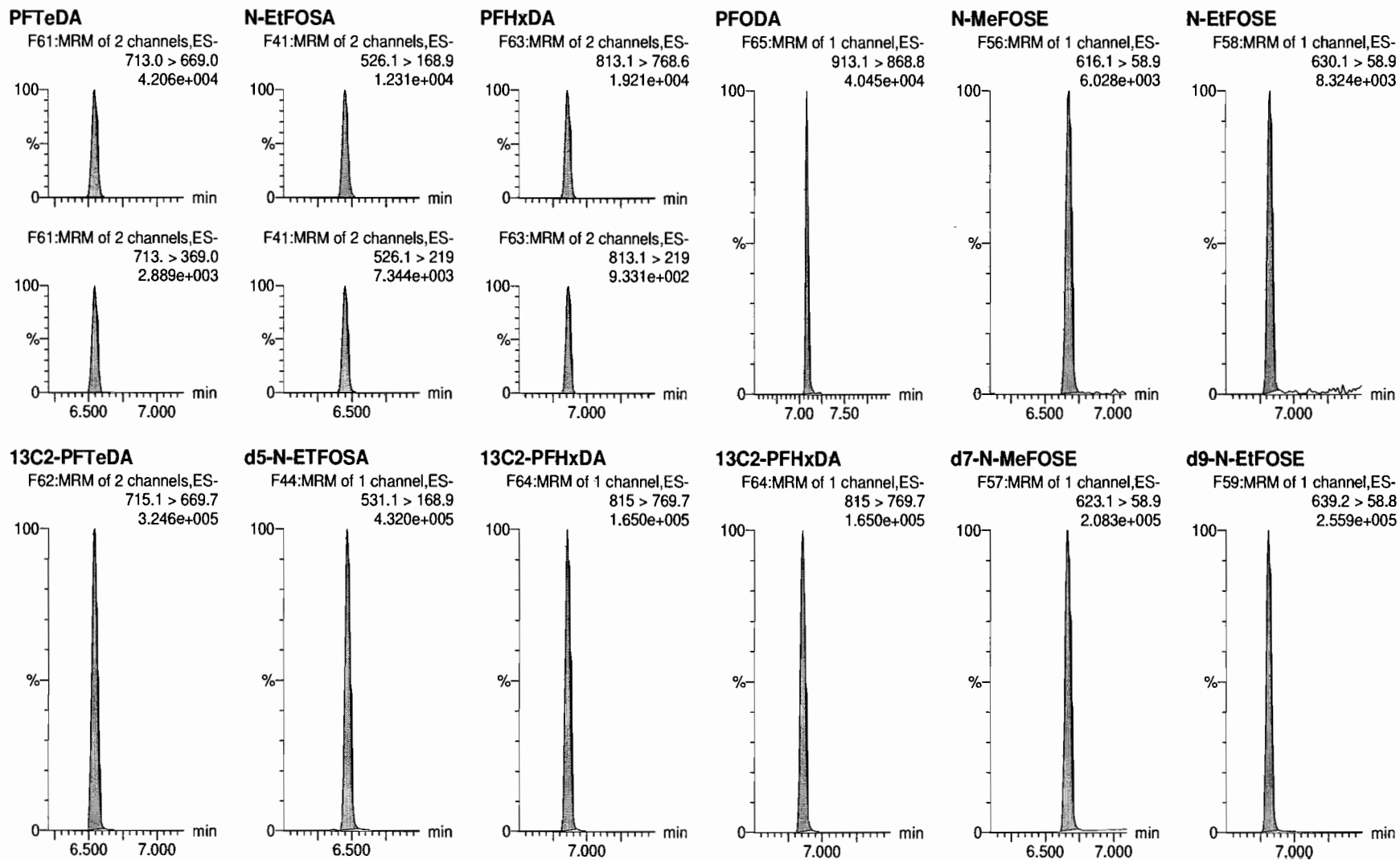


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Last Altered: Tuesday, December 04, 2018 07:51:12 Pacific Standard Time

Printed: Tuesday, December 04, 2018 07:52:08 Pacific Standard Time

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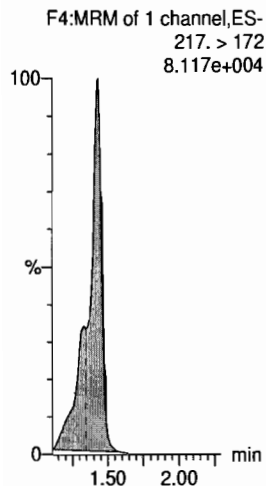
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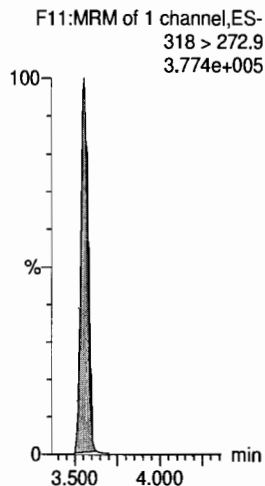
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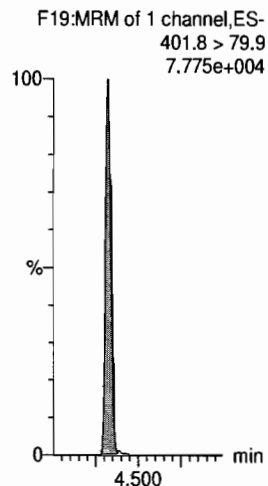
13C4-PFBA



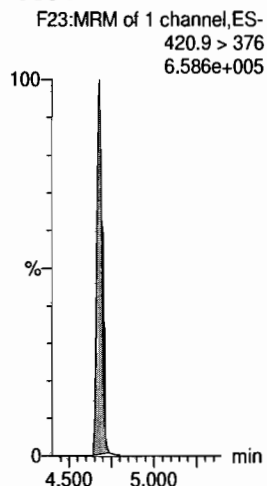
13C5-PFHxA



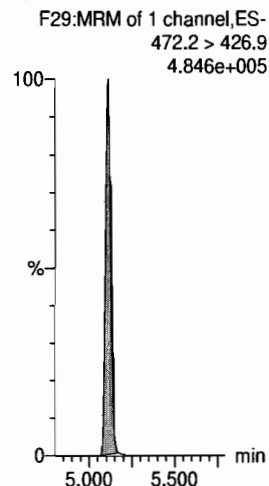
13C3-PFHxS



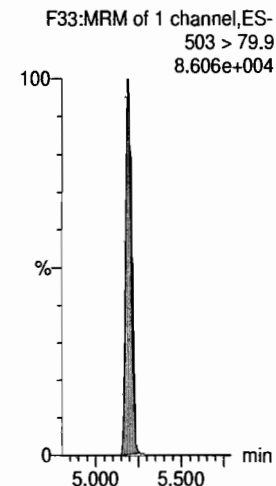
13C8-PFOA



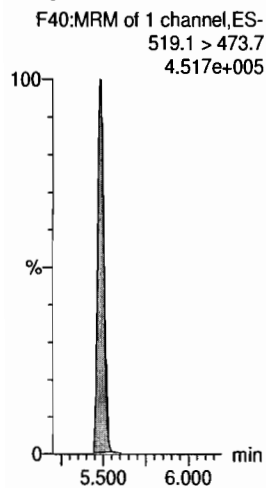
13C9-PFNA



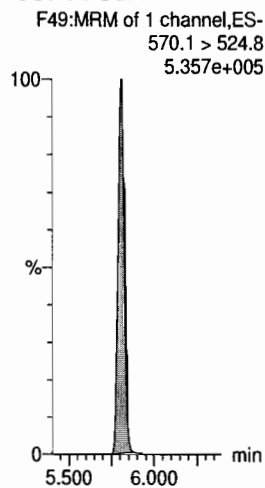
13C4-PFOS



13C6-PFDA



13C7-PFUDa



Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1 PFBA	213.0 > 168.8	7477.563	8028.523	1.00	1.43	11.642	11.4	113.5	NO		
2	2 PFPeA	263.1 > 218.9	7266.049	9364.144	1.00	2.67	9.699	10.7	106.6	NO		
3	3 PFBS	299.0 > 79.7	2526.404	1471.533	1.00	3.00	21.461	10.7	106.5	NO	3.295	NO
4	4 4:2 FTS	327.2>307.2	3111.898	3722.015	1.00	3.47	10.451	12.9	129.1	NO	1.924	NO
5	5 PFHxA	313 > 269	14792.119	7005.294	1.00	3.56	10.558	10.1	100.8	NO	14.329	NO
6	6 PFPeS	349.1>80.1	1672.569	1471.533	1.00	3.77	14.208	9.6	96.4	NO	1.425	NO
7	36 13C3-PFBA	216.1 > 171.8	8028.523	9619.407	1.00	1.43	10.433	12.1	97.0	NO		
8	37 13C3-PFPeA	266. > 221.8	9364.144	18665.287	1.00	2.68	6.271	10.4	83.1	NO		
9	38 13C3-PFBS	302. > 98.8	1471.533	2724.861	1.00	3.00	6.750	10.7	85.3	NO		
10	39 13C2-4:2 FTS	329.2>308.9	3722.015	2724.861	1.00	3.47	17.074	8.2	65.9	NO		
11	40 13C2-PFHxA	315 > 270	7005.294	18665.287	1.00	3.56	4.691	5.2	104.2	NO		
12	38 13C3-PFBS	302. > 98.8	1471.533	2724.861	1.00	3.00	6.750	10.7	85.3	NO		
13	-1											
14	10 6:2 FTS	427.1 > 407	4540.055	4235.966	1.00	4.63	13.397	14.2	142.3	YES	3.074	NO (A)
15	7 PFHpA	363.0 > 318.9	10775.200	9821.572	1.00	4.19	13.714	11.8	117.9	NO	13.986	NO
16	8 L-PFHxS	398.9 > 79.6	2420.715	1326.308	1.00	4.33	22.814	11.6	115.5	NO	2.298	NO
17	11 L-PFOA	412.8 > 368.9	19806.412	16648.301	1.00	4.68	14.871	12.2	121.6	NO	3.208	NO
18	13 PFHpS	449 > 80.0	2418.993	3391.895	1.00	4.79	8.915	10.1	101.3	NO	1.959	NO
19	14 PFNA	463.0 > 418.8	16458.914	16945.578	1.00	5.11	12.141	11.0	110.0	NO	4.572	NO
20	43 13C2-6:2 FTS	429.1 > 408.9	4235.966	3208.098	1.00	4.63	16.505	9.0	72.4	NO		
21	41 13C4-PFHpA	367.2 > 321.8	9821.572	18665.287	1.00	4.19	6.577	9.5	75.9	NO		
22	42 18O2-PFHxS	403.0 > 102.6	1326.308	2724.861	1.00	4.33	6.084	12.8	102.3	NO		
23	44 13C2-PFOA	414.9 > 369.7	16648.301	24330.898	1.00	4.68	8.553	9.8	78.4	NO		
24	47 13C8-PFOS	507.0 > 79.9	3391.895	3208.098	1.00	5.19	13.216	13.7	109.2	NO		
25	45 13C5-PFNA	468.2 > 422.9	16945.578	17279.703	1.00	5.11	12.258	12.2	97.5	NO		
26	-1											
27	15 PFOSA	497.9 > 77.9	2876.077	3250.857	1.00	5.15	11.059	9.7	97.3	NO	26.635	NO
28	16 L-PFOS	498.9 > 79.9	2788.231	3391.895	1.00	5.19	10.275	9.3	93.5	NO	2.053	NO
29	18 PFDA	513 > 468.8	18735.084	19004.143	1.00	5.48	12.323	11.5	114.8	NO	5.880	NO
30	19 8:2 FTS	527 > 506.9	4597.032	3532.716	1.00	5.46	16.266	12.6	125.6	NO	2.741	NO
31	20 PFNS	549.1 > 80.1	1788.063	3391.895	1.00	5.54	6.589	8.5	85.2	NO	1.795	NO
32	21 L-MeFOSAA	570 > 419	8387.563	5299.448	1.00	5.63	19.784	13.1	131.4	YES	2.432	NO (A)
33	46 13C8-PFOSA	506.1 > 77.7	3250.857	22940.582	1.00	5.15	1.771	8.8	70.3	NO		
34	47 13C8-PFOS	507.0 > 79.9	3391.895	3208.098	1.00	5.19	13.216	13.7	109.2	NO		
35	48 13C2-PFDA	515.1 > 469.9	19004.143	19285.031	1.00	5.48	12.318	11.0	87.6	NO		

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Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery...	Ion Ratio	Ratio Out?
36	49 13C2-8:2 FTS	529.1 > 508.7	3532.716	3208.098	1.00	5.45	13.765	12.7	101.4	NO		
37	47 13C8-PFOS	507.0 > 79.9	3391.895	3208.098	1.00	5.19	13.216	13.7	109.2	NO		
38	50 d3-N-MeFOSAA	573.3 > 419	5299.448	22940.582	1.00	5.63	2.888	8.8	70.2	NO		
39	-1											
40	23 L-EtFOSAA	584.1 > 419	7023.611	7518.429	1.00	5.79	11.677	10.8	107.7	NO	1.270	NO
41	27 PFDaA	612.9 > 569.0	22816.193	19229.492	1.00	6.08	14.832	11.3	112.8	NO	9.321	NO
42	26 PFDS	598.8 > 79.9	2750.703	3391.895	1.00	5.85	10.137	12.4	123.9	NO	1.734	NO
43	25 PFUDa	563.0 > 518.9	17930.164	22227.916	1.00	5.81	10.083	9.4	93.7	NO	9.496	NO
44	28 N-MeFOSA	512.1 > 168.9	4045.033	11135.663	1.00	6.01	54.488	51.8	103.6	NO	1.532	NO
45	29 PFTrDA	662.9 > 618.9	21435.748	19229.492	1.00	6.32	13.934	11.5	114.8	NO	26.710	NO
46	52 d5-N-EtFOSAA	589.3 > 419	7518.429	22940.582	1.00	5.78	4.097	11.5	92.3	NO		
47	53 13C2-PFDaA	615.0 > 569.7	19229.492	19285.031	1.00	6.08	12.464	12.6	100.4	NO		
48	47 13C8-PFOS	507.0 > 79.9	3391.895	3208.098	1.00	5.19	13.216	13.7	109.2	NO		
49	51 13C2-PFUDa	565 > 519.8	22227.916	22940.582	1.00	5.81	12.112	10.9	87.2	NO		
50	54 d3-N-MeFOSA	515.2 > 168.9	11135.663	22940.582	1.00	6.04	6.068	82.2	54.8	NO		
51	53 13C2-PFDaA	615.0 > 569.7	19229.492	19285.031	1.00	6.08	12.464	12.6	100.4	NO		
52	-1											
53	30 PFTeDA	713.0 > 669.0	20520.514	14602.360	1.00	6.54	17.566	15.5	155.5	YES	14.120	NO (A)
54	31 N-EtFOSA	526.1 > 168.9	5635.637	18976.705	1.00	6.45	44.546	45.9	91.8	NO	1.718	NO
55	32 PFHxDA	813.1 > 768.6	6960.091	6723.087	1.00	6.85	5.176	9.7	97.0	NO	20.076	NO
56	33 PFODA	913.1 > 868.8	12964.791	6723.087	1.00	7.08	9.642	11.3	112.6	NO		
57	34 N-MeFOSE	616.1 > 58.9	2956.312	9818.604	1.00	6.68	45.164	49.0	97.9	NO		
58	35 N-EtFOSE	630.1 > 58.9	3634.387	10124.197	1.00	6.82	53.847	51.2	102.4	NO		
59	55 13C2-PFTeDA	715.1 > 669.7	14602.360	22940.582	1.00	6.54	7.957	10.6	85.0	NO		
60	56 d5-N-ETFOSA	531.1 > 168.9	18976.705	22940.582	1.00	6.47	10.340	106.7	71.2	NO		
61	57 13C2-PFHxDA	815 > 769.7	6723.087	22940.582	1.00	6.85	3.663	5.1	102.6	NO		
62	57 13C2-PFHxDA	815 > 769.7	6723.087	22940.582	1.00	6.85	3.663	5.1	102.6	NO		
63	58 d7-N-MeFOSE	623.1 > 58.9	9818.604	22940.582	1.00	6.66	5.350	148.7	99.1	NO		
64	59 d9-N-EtFOSE	639.2 > 58.8	10124.197	22940.582	1.00	6.81	5.517	152.7	101.8	NO		
65	-1											
66	60 13C4-PFBA	217. > 172	9619.407	9619.407	1.00	1.43	12.500	12.5	100.0	NO		
67	61 13C5-PFHxA	318 > 272.9	18665.287	18665.287	1.00	3.56	12.500	12.5	100.0	NO		
68	62 13C3-PFHxS	401.8 > 79.9	2724.861	2724.861	1.00	4.33	12.500	12.5	100.0	NO		
69	63 13C8-PFOA	420.9 > 376	24330.898	24330.898	1.00	4.68	12.500	12.5	100.0	NO		
70	64 13C9-PFNA	472.2 > 426.9	17279.703	17279.703	1.00	5.11	12.500	12.5	100.0	NO		

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
71	65 13C4-PFOS	503 > 79.9	3208.098	3208.098	1.00	5.19	12.500	12.5	100.0		NO	
72	66 13C6-PFDA	519.1 > 473.7	19285.031	19285.031	1.00	5.48	12.500	12.5	100.0		NO	
73	67 13C7-PFUDA	570.1 > 524.8	22940.582	22940.582	1.00	5.81	12.500	12.5	100.0		NO	

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time
Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 07:50:00
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Compound name: PFBA

	# Name	ID	Acq.Date	Acq.Time
1	1 181203M1_1	IPA	03-Dec-18	14:26:17
2	2 181203M1_2	ST181203M1-1 PFC CS0 18K3003	03-Dec-18	14:36:50
3	3 181203M1_3	IPA	03-Dec-18	14:47:29
4	4 181203M1_4	B8K0153-BS1 OPR 0.25	03-Dec-18	14:58:01
5	5 181203M1_5	B8K0153-MS1 Matrix Spike 0.1068	03-Dec-18	15:08:39
6	6 181203M1_6	B8K0153-MSD1 Matrix Spike Dup 0.11122	03-Dec-18	15:19:12
7	7 181203M1_7	B8K0153-BLK1 Method Blank 0.25	03-Dec-18	15:29:51
8	8 181203M1_8	1803678-01 A1-MW-01-SA2 0.11182	03-Dec-18	15:40:24
9	9 181203M1_9	1803678-02 A1-MW-42-SA2 0.11781	03-Dec-18	15:51:02
10	10 181203M1_10	1803678-03 FRB-20181116 0.1036	03-Dec-18	16:01:36
11	11 181203M1_11	1803678-04 EB-20181116 0.11772	03-Dec-18	16:12:14
12	12 181203M1_12	1803676-01 A1-MW-11-SA2 0.11626	03-Dec-18	16:22:46
13	13 181203M1_13	1803676-02 A1-MW-13-SA2 0.11042	03-Dec-18	16:33:24
14	14 181203M1_14	1803676-03 A1-MW-14-SA2 0.11629	03-Dec-18	16:43:58
15	15 181203M1_15	1803676-04 A1-MW-15-SA2 0.11086	03-Dec-18	16:54:36
16	16 181203M1_16	IPA	03-Dec-18	18:13:52
17	17 181203M1_17	IPA	03-Dec-18	18:24:27
18	18 181203M1_18	1803676-05 A1-MW-37-SA2 0.11753	03-Dec-18	18:35:06
19	19 181203M1_19	1803676-06 A1-MW-37-SA2D 0.11493	03-Dec-18	18:45:39
20	20 181203M1_20	1803676-07 FRB-20181115 0.11067	03-Dec-18	18:56:10
21	21 181203M1_21	1803676-08 A1-MW-31-SA2 0.1169	03-Dec-18	19:06:48
22	22 181203M1_22	1803689-01 Equipment Blank 1 0.25208	03-Dec-18	19:17:20
23	23 181203M1_23	ST181203M1-2 PFC CS3 18K3006	03-Dec-18	19:27:59
24	24 181203M1_24	IPA	03-Dec-18	19:38:28
25	25 181203M1_25	B8K0190-BSD1 LCSD 0.25	03-Dec-18	19:49:07
26	26 181203M1_26	1803745-03 PFC-AF-01-03-112618 0.24673	03-Dec-18	19:59:45
27	27 181203M1_27	1803746-01 PFC-AF-02-01-112618 0.23986	03-Dec-18	20:10:19
28	28 181203M1_28	IPA	03-Dec-18	20:20:57
29	29 181203M1_29	1803746-02 PFC-AF-02-02-112618 0.2365	03-Dec-18	20:31:30
30	30 181203M1_30	IPA	03-Dec-18	20:42:08
31	31 181203M1_31	1803746-03 PFC-AF-02-03-112618 0.23672	03-Dec-18	20:52:42
32	32 181203M1_32	IPA	03-Dec-18	21:03:20

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time

Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Compound name: PFBA

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33	33 181203M1_33	1803762-04 PFC-AF-01-04-112718 0.24232	03-Dec-18	21:13:54
34	34 181203M1_34	1803618-02 1811353-02A 0.2386	03-Dec-18	21:24:32
35	35 181203M1_35	1803618-01@10X 1811353-01A 0.23448	03-Dec-18	21:35:10
36	36 181203M1_36	IPA	03-Dec-18	21:45:43
37	37 181203M1_37	B8K0215-BS1 OPR 0.125	03-Dec-18	21:56:21
38	38 181203M1_38	B8K0215-BSD1 LCSD 0.125	03-Dec-18	22:06:56
39	39 181203M1_39	B8K0215-BLK1 Method Blank 0.125	03-Dec-18	22:17:34
40	40 181203M1_40	1803788-01 PFC-AF-01-01-112918 0.11457	03-Dec-18	22:28:07
41	41 181203M1_41	1803788-02 PFC-AF-01-02-112918 0.11773	03-Dec-18	22:38:45
42	42 181203M1_42	1803788-03 PFC-AF-01-03-112918 0.11732	03-Dec-18	22:49:19
43	43 181203M1_43	ST181203M1-3 PFC CS3 18K3006	03-Dec-18	22:59:57
44	44 181203M1_44	IPA	03-Dec-18	23:10:29
45	45 181203M1_45	B8K0197-BS1 OPR 0.125	03-Dec-18	23:21:08
46	46 181203M1_46	B8K0197-BLK1 Method Blank 0.125	03-Dec-18	23:31:46
47	47 181203M1_47	1803754-01 CMW-18-01 0.11781	03-Dec-18	23:42:19
48	48 181203M1_48	1803754-02 CMW-101B 0.11273	03-Dec-18	23:52:57
49	49 181203M1_49	1803754-03 MW-97701 0.11474	04-Dec-18	00:03:30
50	50 181203M1_50	1803754-04 MW-97702 0.11219	04-Dec-18	00:14:08
51	51 181203M1_51	1803754-05 CSW-3 0.12087	04-Dec-18	00:24:42
52	52 181203M1_52	1803754-06 CSW-4 0.11744	04-Dec-18	00:35:20
53	53 181203M1_53	1803754-07 CUD-1 0.11598	04-Dec-18	00:45:53
54	54 181203M1_54	1803754-08 CUD-2 0.1153	04-Dec-18	00:56:31
55	55 181203M1_55	1803754-09 CUD-3 0.11905	04-Dec-18	01:07:05
56	56 181203M1_56	1803754-10 CUD-4 0.11711	04-Dec-18	01:17:43
57	57 181203M1_57	ST181203M1-4 PFC CS3 18K3006	04-Dec-18	01:28:16
58	58 181203M1_58	IPA	04-Dec-18	01:38:54
59	59 181203M1_59	1803762-01 PFC-AF-01-01-112718 0.23808	04-Dec-18	01:49:32
60	60 181203M1_60	1803754-11 Sump 1 0.11876	04-Dec-18	02:00:05
61	61 181203M1_61	1803754-12 Sump 2 0.11443	04-Dec-18	02:10:44
62	62 181203M1_62	1803754-13 SW-5 0.11647	04-Dec-18	02:21:17
63	63 181203M1_63	1803754-14 Shelby St. Sump 0.11682	04-Dec-18	02:31:56
64	64 181203M1_64	1803746-01@150X PFC-AF-02-01-112618 0.23986	04-Dec-18	02:42:29
65	65 181203M1_65	IPA	04-Dec-18	02:53:07
66	66 181203M1_66	1803746-02@10X PFC-AF-02-02-112618 0.2365	04-Dec-18	03:03:39
67	67 181203M1_67	IPA	04-Dec-18	03:14:18
68	68 181203M1_68	1803746-03@5X PFC-AF-02-03-112618 0.23672	04-Dec-18	03:24:51

Dataset: Untitled

Last Altered: Tuesday, December 04, 2018 08:03:25 Pacific Standard Time
Printed: Tuesday, December 04, 2018 08:04:05 Pacific Standard Time

Compound name: PFBA

	# Name	ID	Acq.Date	Acq.Time
69	69 181203M1_69	ST181203M1-5 PFC CS3 18K3006	04-Dec-18	03:35:29
70	70 181203M1_70	IPA	04-Dec-18	03:46:02

Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

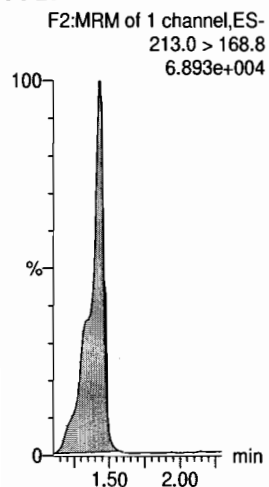
Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120318.mdb 04 Dec 2018 11:04:18

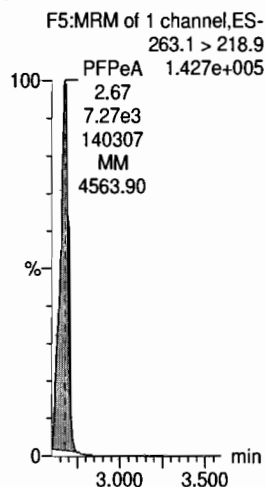
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

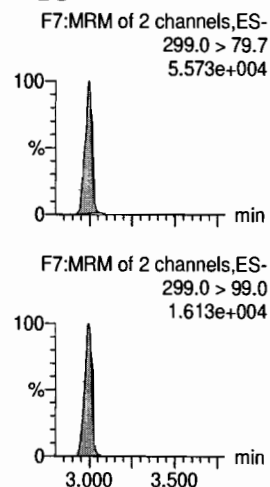
PFBA



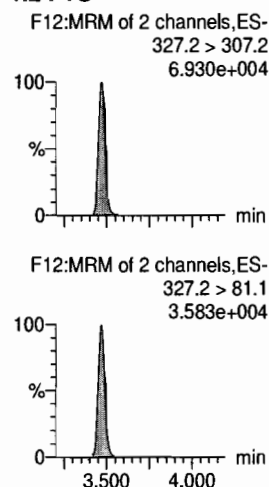
PFPeA



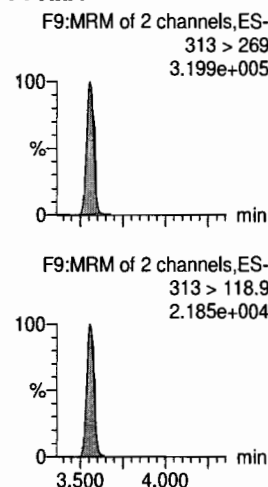
PFBS



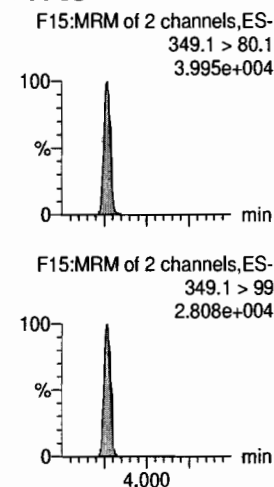
4:2 FTS



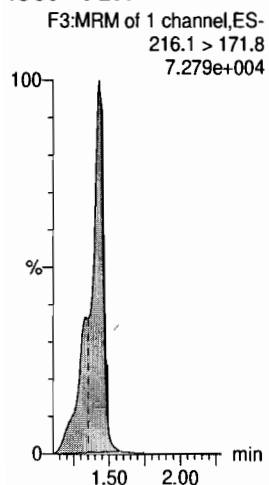
PFHxA



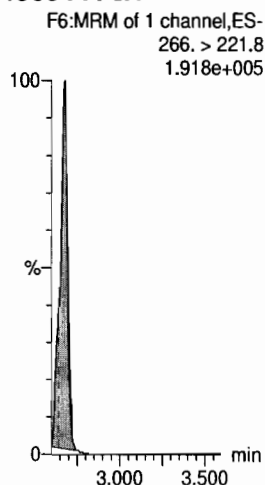
PFPeS



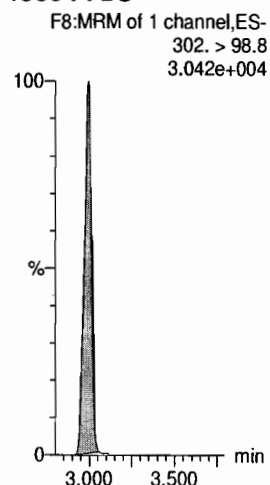
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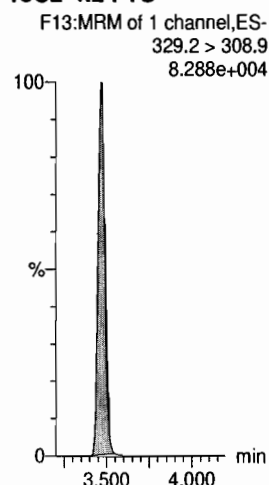
13C3-PFPeA



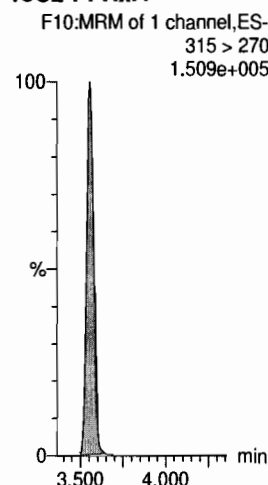
13C3-PFBS



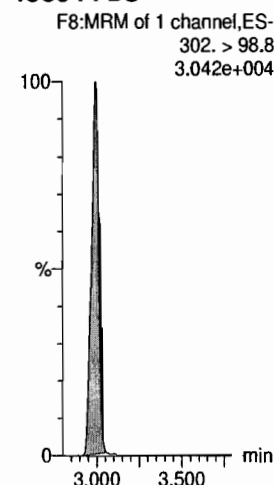
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



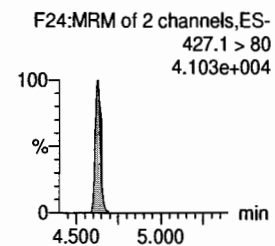
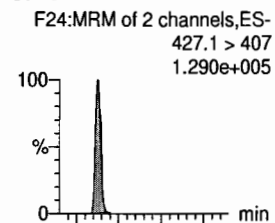
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Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

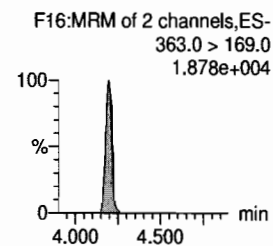
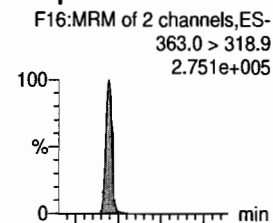
Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

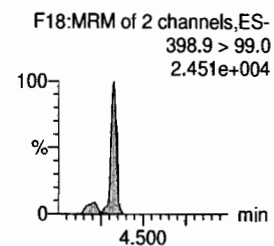
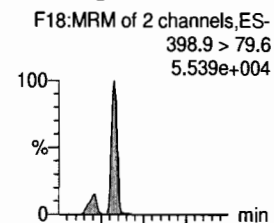
6:2 FTS



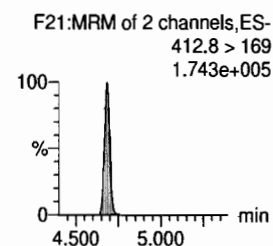
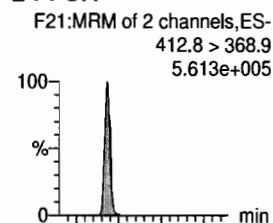
PFHpA



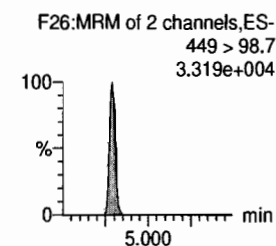
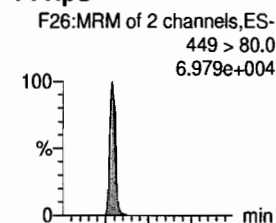
L-PFHxS



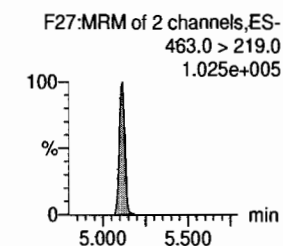
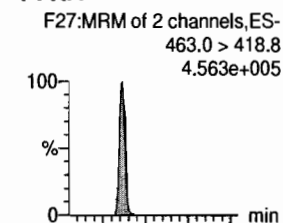
L-PFOA



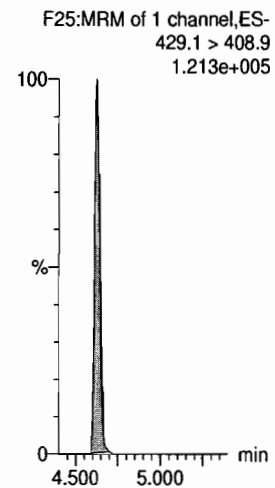
PFHpS



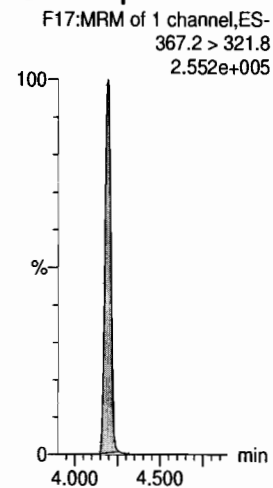
PFNA



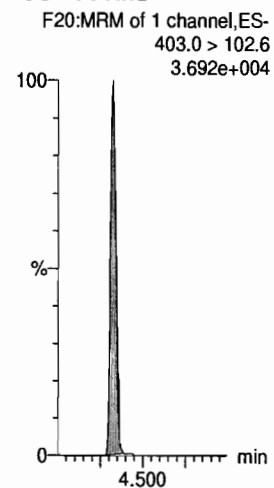
13C2-6:2 FTS



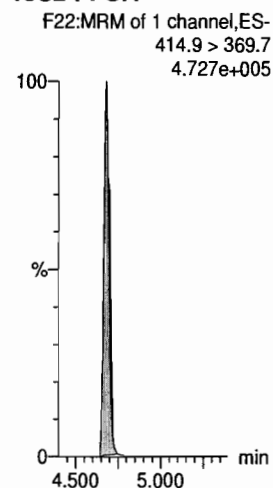
13C4-PFHpA



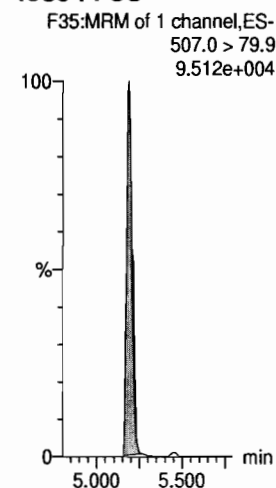
18O2-PFHxS



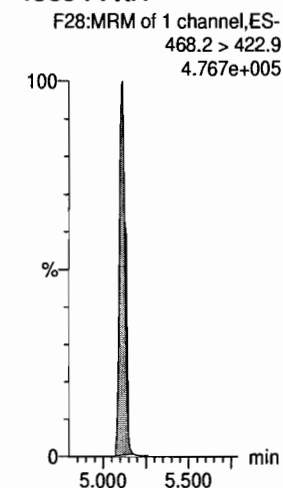
13C2-PFOA



13C8-PFOS



13C5-PFNA



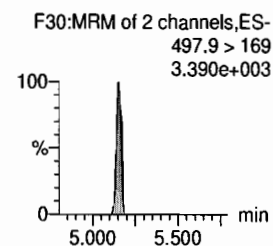
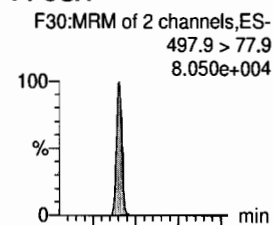
Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

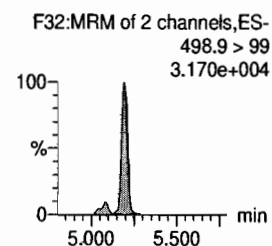
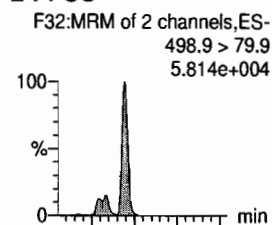
Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

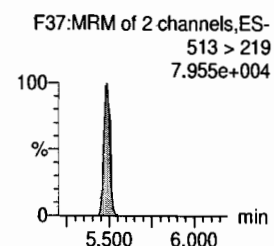
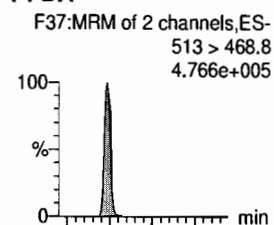
PFOSA



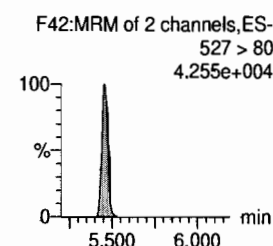
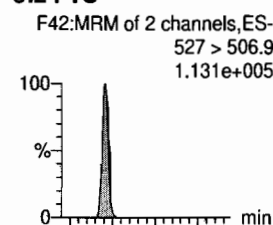
L-PFOS



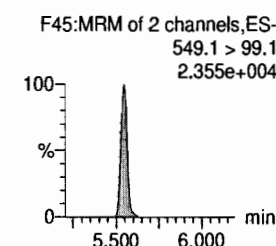
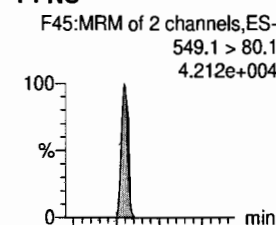
PFDA



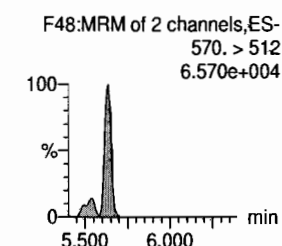
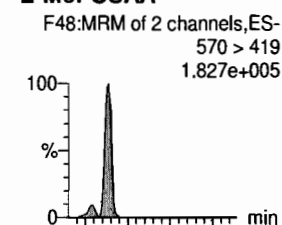
8:2 FTS



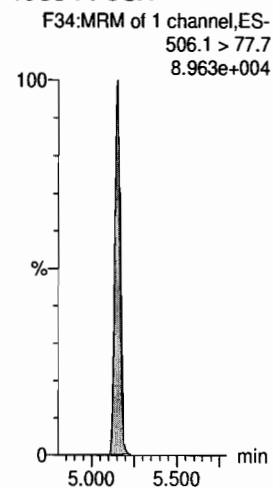
PFNS



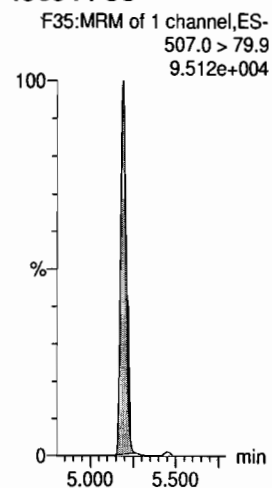
L-MeFOSAA



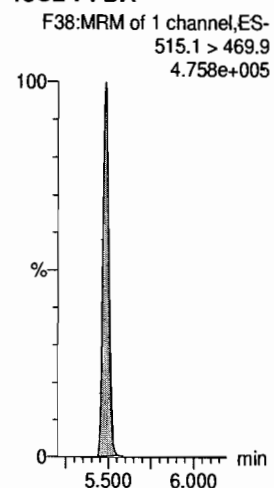
13C8-PFOSA



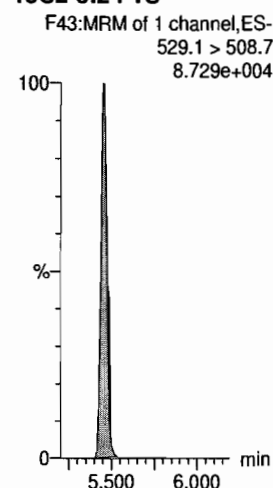
13C8-PFOS



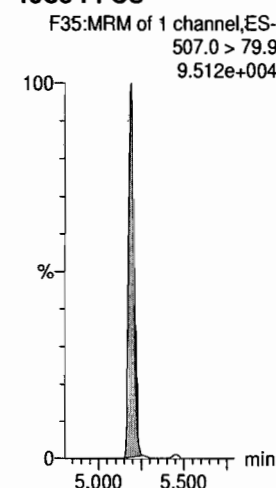
13C2-PFDA



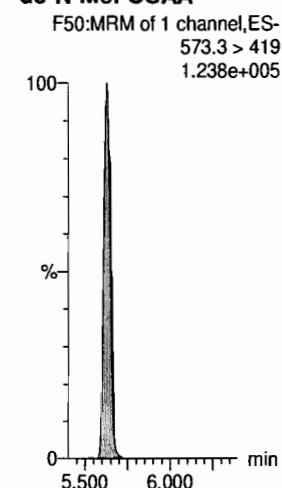
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



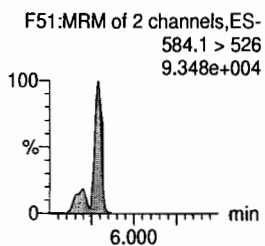
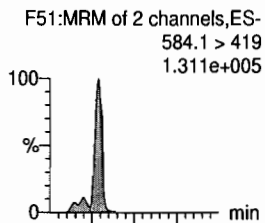
Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

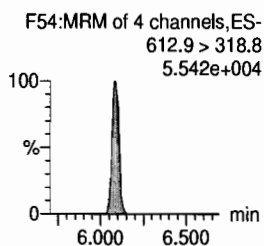
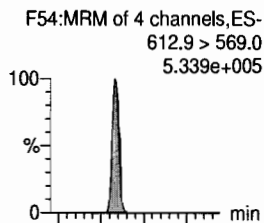
Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

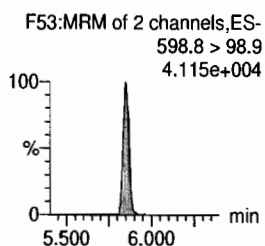
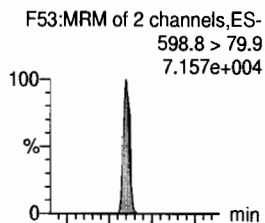
L-EtFOSAA



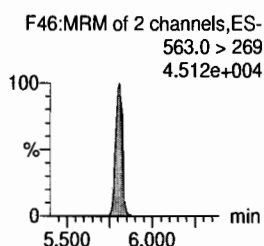
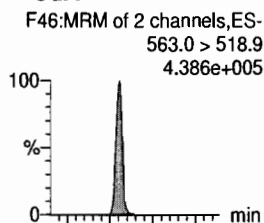
PFDaA



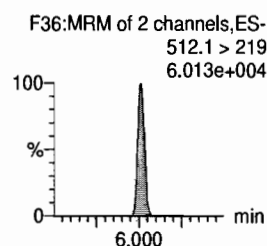
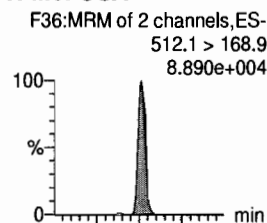
PFDS



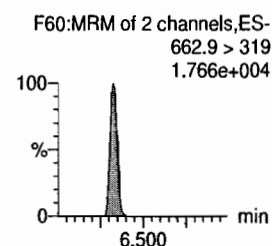
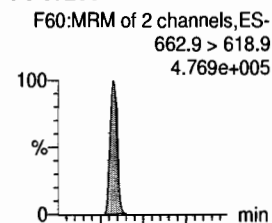
PFUdA



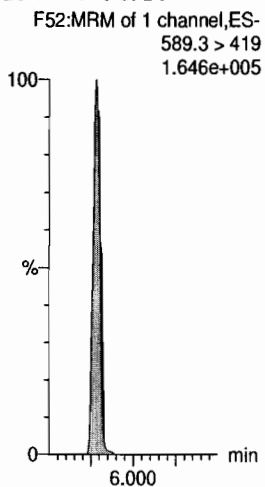
N-MeFOSA



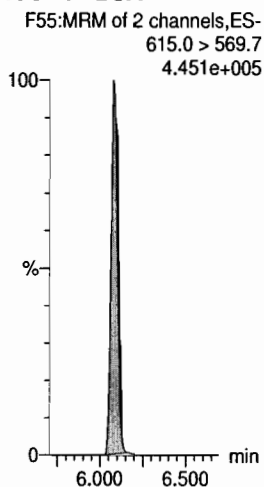
PFTTrDA



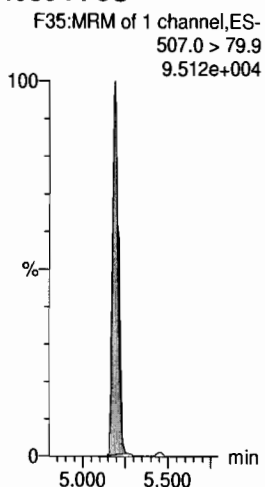
d5-N-EtFOSAA



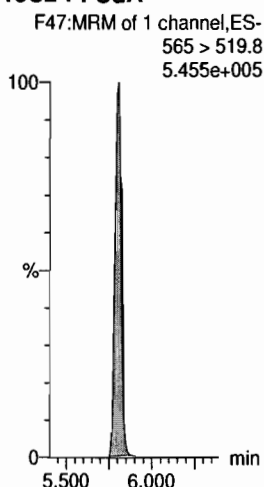
13C2-PFDaA



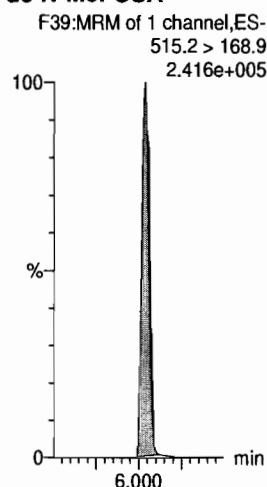
13C8-PFOS



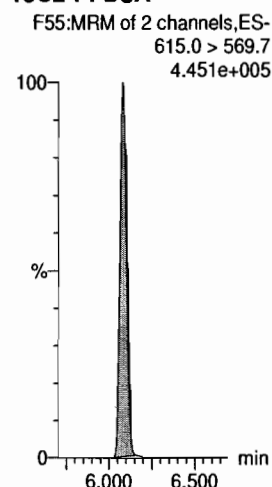
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA

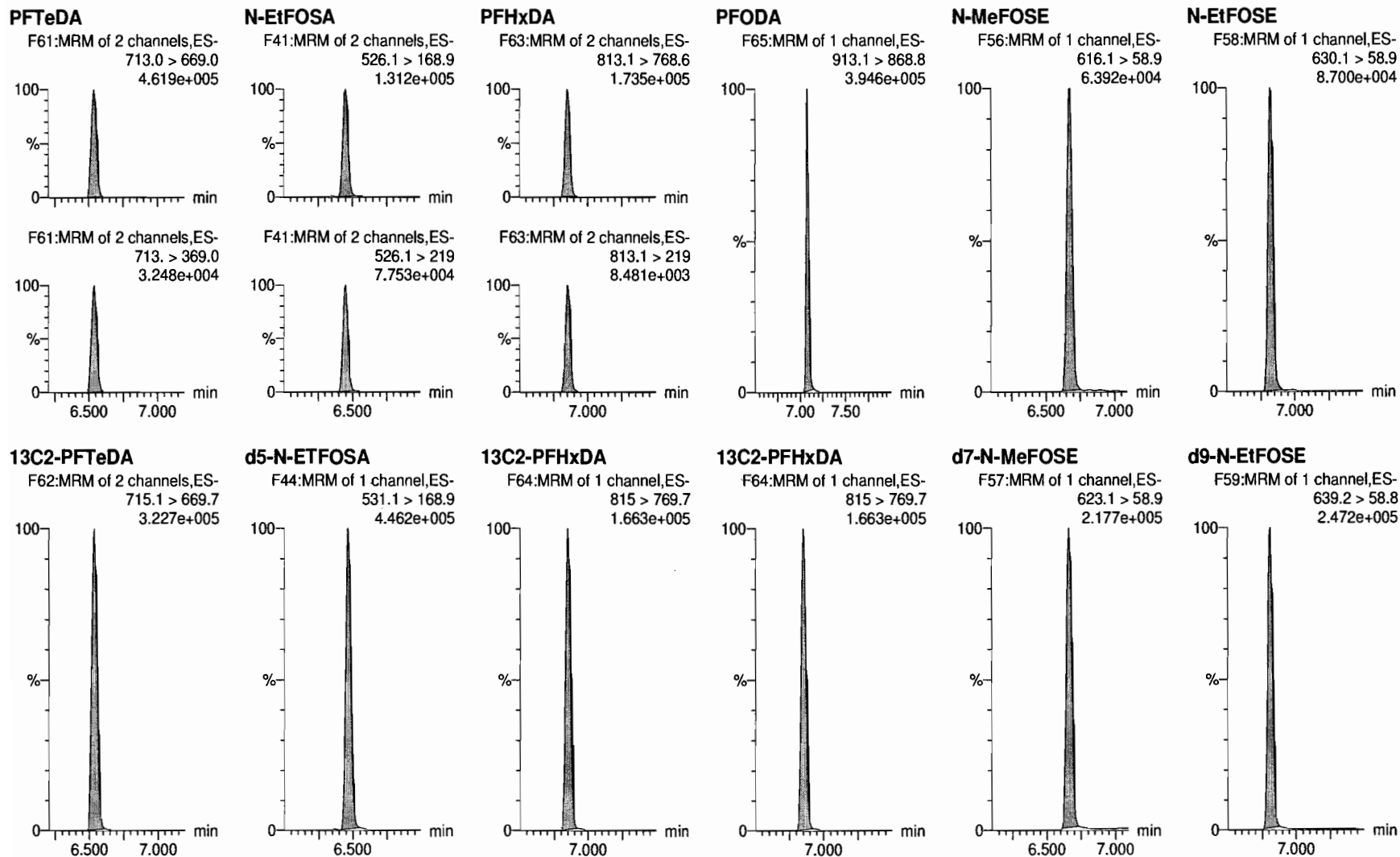


Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006



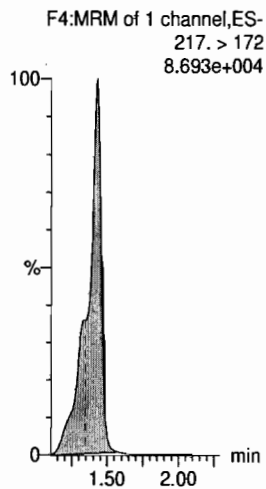
Dataset: Z:\Projects\PFAS.PRO\Results\181203M1\181203M1-23.qld

Last Altered: Tuesday, December 04, 2018 11:04:20 Pacific Standard Time

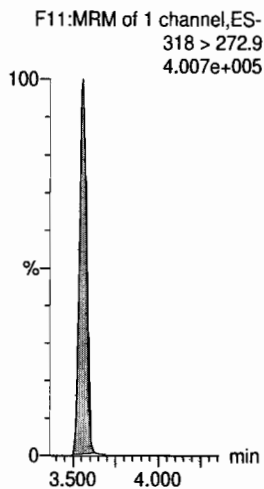
Printed: Tuesday, December 04, 2018 11:06:00 Pacific Standard Time

Name: 181203M1_23, Date: 03-Dec-2018, Time: 19:27:59, ID: ST181203M1-2 PFC CS3 18K3006, Description: PFC CS3 18K3006

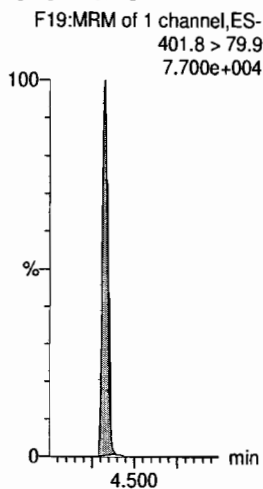
13C4-PFBA



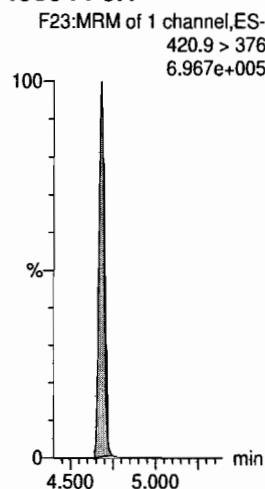
13C5-PFHxA



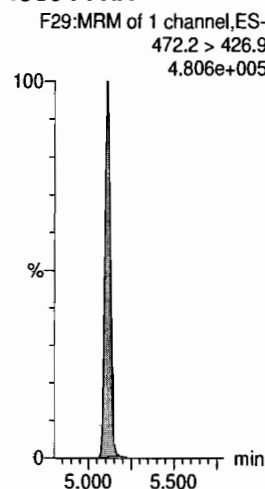
13C3-PFHxS



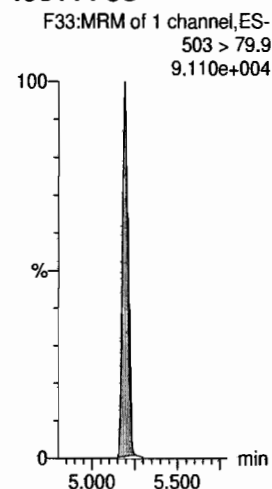
13C8-PFOA



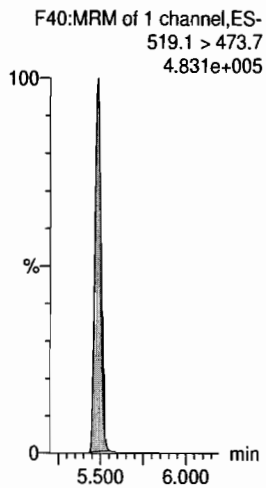
13C9-PFNA



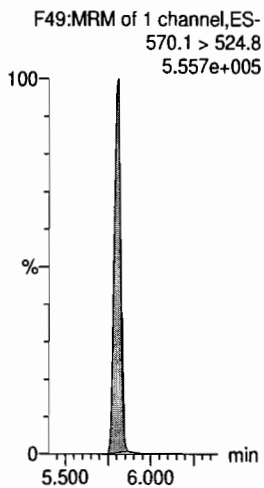
13C4-PFOS



13C6-PFDA



13C7-PFUDa



INITIAL CALIBRATION (ICAL)
INCLUDING ASSOCIATED
INITIAL CALIBRATION VERIFICATION (ICV) AND INSTRUMENT BLANK (IB)

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:34:59 Pacific Standard Time

Low PTS
PFDS 0.5
High PTS
4:2 → 100
6:2
8:2 ↓

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Compound name: PFBA

Correlation coefficient: $r = 0.999881$, $r^2 = 0.999762$

Calibration curve: $1.02847 * x + -0.0331845$

Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

AN
12/3/18

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 181202M2_2	Standard	0.250	1.48	134.913	7372.417	0.229	0.3	1.9	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	1.48	277.801	7717.044	0.450	0.5	-6.0	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	1.48	612.269	7778.471	0.984	1.0	-1.1	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	1.48	1305.605	8110.343	2.012	2.0	-0.6	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	1.47	3121.150	7882.678	4.949	4.8	-3.1	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	1.48	6878.893	8113.042	10.599	10.3	3.4	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	1.48	34354.758	8040.462	53.409	52.0	3.9	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	1.48	69451.688	8202.403	105.840	102.9	2.9	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	1.47	156900.391	7673.549	255.586	248.5	-0.6	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	1.47	308846.188	7562.084	510.518	496.4	-0.7	NO	1.000	NO	MM

Compound name: PFPeA

Coefficient of Determination: $R^2 = 0.999945$

Calibration curve: $-6.16115e-005 * x^2 + 0.911659 * x + -0.0105295$

Response type: Internal Std (Ref 37), 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 181202M2_2	Standard	0.250	2.72	239.591	12984.617	0.231	0.3	5.8	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	2.73	469.504	13346.579	0.440	0.5	-1.2	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	2.73	936.071	13256.772	0.883	1.0	-2.0	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	2.73	1947.755	13901.806	1.751	1.9	-3.4	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	2.73	4751.345	13420.939	4.425	4.9	-2.7	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	2.73	10304.199	13882.929	9.278	10.2	2.0	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	2.73	49968.262	13496.188	46.280	51.0	1.9	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	2.73	99809.484	13748.945	90.743	100.2	0.2	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	2.73	218234.500	12276.298	222.211	247.9	-0.8	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	2.73	415402.375	11768.877	441.209	500.9	0.2	NO	1.000	NO	bb

✓ CoD
12/3/18

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:34:59 Pacific Standard Time

Compound name: PFBS

Coefficient of Determination: $R^2 = 0.999925$

Calibration curve: $-0.000222114 * x^2 + 2.02594 * x + -0.0995002$

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 181202M2_2	Standard	0.250	3.04	92.827	2440.729	0.475	0.3	13.5	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	3.05	180.214	2510.799	0.897	0.5	-1.6	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	3.05	371.377	2463.662	1.884	1.0	-2.1	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	3.05	781.729	2532.149	3.859	2.0	-2.3	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	3.05	1876.691	2521.420	9.304	4.6	-7.1	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	3.05	4084.011	2565.786	19.896	9.9	-1.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	3.05	19467.154	2428.037	100.221	49.8	-0.4	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	3.05	38211.891	2348.185	203.412	101.6	1.6	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	3.05	79529.492	2027.545	490.307	248.9	-0.5	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	3.05	143781.125	1876.313	957.870	500.3	0.1	NO	1.000	NO	bb

Compound name: 4:2 FTS

Coefficient of Determination: $R^2 = 0.999815$

Calibration curve: $-0.00237929 * x^2 + 0.842016 * x + -0.0207497$

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 181202M2_2	Standard	0.250	3.51	109.529	7882.280	0.174	0.2	-7.6	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	3.52	265.894	7786.481	0.427	0.5	6.5	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	3.52	535.057	7630.461	0.877	1.1	6.9	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	3.52	1051.846	8139.889	1.615	2.0	-2.3	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	3.52	2507.162	7869.327	3.982	4.8	-3.6	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	3.52	5258.487	8095.176	8.120	9.9	-0.5	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	3.52	24169.199	8293.981	36.426	50.5	1.0	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	3.52	43472.684	9018.855	60.252	99.6	-0.4	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	3.52	81386.930	10024.722	101.483			NO	1.000	NO	bbXI
10	10 181202M2_11	Standard	500.000	3.52	137855.984	12827.324	134.338			NO	1.000	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:34:59 Pacific Standard Time

Compound name: PFHxA

Coefficient of Determination: $R^2 = 0.999961$

Calibration curve: $-0.000229785 * x^2 + 1.04977 * x + -0.00145899$

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 181202M2_2	Standard	0.250	3.61	442.024	7855.090	0.281	0.3	7.8	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	3.61	845.924	8046.591	0.526	0.5	0.4	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	3.61	1682.095	8042.113	1.046	1.0	-0.2	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	3.61	3333.822	8137.367	2.048	2.0	-2.3	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	3.61	8047.896	8193.701	4.911	4.7	-6.3	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	3.61	17726.943	8472.754	10.461	10.0	-0.1	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	3.61	83481.531	8020.125	52.045	50.1	0.3	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	3.61	165394.203	8088.322	102.243	99.6	-0.4	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	3.61	353894.375	7098.521	249.273	251.3	0.5	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	3.61	645112.438	6908.174	466.920	499.4	-0.1	NO	1.000	NO	bb

Compound name: PFPeS

Coefficient of Determination: $R^2 = 0.999956$

Calibration curve: $-0.000349257 * x^2 + 1.48431 * x + -0.0700599$

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 181202M2_2	Standard	0.250	3.81	67.457	2440.729	0.345	0.3	12.0	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	3.81	127.449	2510.799	0.635	0.5	-5.1	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	3.81	270.296	2463.662	1.371	1.0	-2.9	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	3.81	591.304	2532.149	2.919	2.0	0.7	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	3.82	1396.097	2521.420	6.921	4.7	-5.7	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	3.82	3031.126	2565.786	14.767	10.0	0.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	3.81	14253.051	2428.037	73.377	50.1	0.1	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	3.82	27454.484	2348.185	146.147	100.9	0.9	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	3.82	56405.953	2027.545	347.748	248.9	-0.4	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	3.82	98352.211	1876.313	655.223	500.4	0.1	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: PFHpA

Correlation coefficient: $r = 0.999759$, $r^2 = 0.999518$

Calibration curve: $1.16268 * x + 0.00338901$

Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 181202M2_2	Standard	0.250	4.23	352.740	15520.071	0.284	0.2	-3.4	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	4.24	701.889	16419.287	0.534	0.5	-8.7	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	4.24	1501.204	15646.633	1.199	1.0	2.9	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	4.23	3035.103	16240.967	2.336	2.0	0.3	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	4.24	7238.921	15769.080	5.738	4.9	-1.4	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	4.24	15894.581	16393.000	12.120	10.4	4.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	4.24	74308.148	15392.018	60.346	51.9	3.8	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	4.24	147457.203	15534.257	118.655	102.1	2.1	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	4.24	315836.250	13297.971	296.884	255.3	2.1	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	4.24	545762.688	11965.380	570.148	490.4	-1.9	NO	1.000	NO	bb

Compound name: L-PFHxS

Coefficient of Determination: $R^2 = 0.999870$

Calibration curve: $-0.000154579 * x^2 + 1.97668 * x + -0.00449101$

Response type: Internal Std (Ref 42), 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 181202M2_2	Standard	0.250	4.37	79.327	1732.264	0.572	0.3	16.7	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	4.37	151.142	1891.561	0.999	0.5	1.5	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	4.37	262.111	1870.489	1.752	0.9	-11.2	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	4.37	544.216	1844.360	3.688	1.9	-6.6	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	4.37	1432.781	1912.521	9.364	4.7	-5.2	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	4.37	3075.603	1921.575	20.007	10.1	1.3	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	4.37	14800.541	1820.151	101.644	51.6	3.3	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	4.37	27882.133	1781.693	195.615	99.7	-0.3	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	4.37	61512.297	1599.192	480.808	248.1	-0.8	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	4.37	109165.695	1434.401	951.318	500.9	0.2	NO	1.000	NO	MM

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Compound name: 6:2 FTS

Coefficient of Determination: $R^2 = 0.999697$

Calibration curve: $-0.00272892 * x^2 + 0.980454 * x + -0.00268433$

Response type: Internal Std (Ref 43), 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 181202M2_2	Standard	0.250	4.67	163.560	7096.761	0.288	0.3	18.7	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	4.67	263.076	7354.782	0.447	0.5	-8.1	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	4.67	501.679	6954.629	0.902	0.9	-7.5	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	4.67	1161.083	7557.635	1.920	2.0	-1.4	NO	1.000	NO	bd
5	5 181202M2_6	Standard	5.000	4.67	2739.949	7351.898	4.659	4.8	-3.6	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	4.67	5745.025	7547.463	9.515	10.0	-0.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	4.67	26027.670	7612.719	42.737	50.8	1.5	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	4.67	47348.418	8395.673	70.495	99.4	-0.6	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	4.67	95698.789	10084.581	118.620			NO	1.000	NO	bbXI
10	10 181202M2_11	Standard	500.000	4.67	153331.891	12500.775	153.322			NO	1.000	NO	bbXI

Compound name: L-PFOA

Coefficient of Determination: $R^2 = 0.999937$

Calibration curve: $-0.000202874 * x^2 + 1.22088 * x + 0.0495571$

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 181202M2_2	Standard	0.250	4.73	624.060	21531.906	0.362	0.3	2.5	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	4.73	1183.986	22078.006	0.670	0.5	1.7	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	4.73	2345.585	22869.809	1.282	1.0	1.0	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	4.72	4419.828	22788.545	2.424	1.9	-2.7	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	4.73	10718.562	22636.125	5.919	4.8	-3.8	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	4.73	22599.578	23212.086	12.170	9.9	-0.6	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	4.73	110083.523	22155.025	62.110	51.3	2.5	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	4.73	207862.688	21661.113	119.952	99.9	-0.1	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	4.73	456984.938	19646.082	290.761	248.4	-0.7	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	4.73	811261.750	18090.129	560.569	500.8	0.2	NO	1.000	NO	bb

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Compound name: PFHpS

Coefficient of Determination: $R^2 = 0.999876$

Calibration curve: $-2.31836e-006 * x^2 + 0.886394 * x + -0.0630138$

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 181202M2_2	Standard	0.250	4.83	30.641	3848.352	0.100	0.2	-26.7	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	4.83	158.264	4058.103	0.487	0.6	24.2	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	4.83	246.174	3957.430	0.778	0.9	-5.2	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	4.83	592.132	4122.399	1.795	2.1	4.8	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	4.84	1385.965	3850.568	4.499	5.1	2.9	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	4.83	2909.841	4052.094	8.976	10.2	2.0	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	4.84	14353.539	4143.248	43.304	48.9	-2.1	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	4.83	27870.904	3963.002	87.910	99.3	-0.7	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	4.84	59138.934	3309.822	223.346	252.2	0.9	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	4.84	103228.875	2920.727	441.794	499.1	-0.2	NO	1.000	NO	MM

Compound name: PFNA

Coefficient of Determination: $R^2 = 0.999876$

Calibration curve: $-0.000138455 * x^2 + 1.1098 * x + -0.0515303$

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 181202M2_2	Standard	0.250	5.16	464.966	24777.965	0.235	0.3	3.1	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	5.16	1028.071	24973.412	0.515	0.5	2.0	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	5.16	2087.109	26408.809	0.988	0.9	-6.3	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	5.16	4605.668	25880.568	2.224	2.1	2.6	NO	1.000	NO	bd
5	5 181202M2_6	Standard	5.000	5.16	10490.705	24584.580	5.334	4.9	-2.9	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	5.16	22218.369	25443.154	10.916	9.9	-1.1	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	5.16	110190.852	24294.938	56.694	51.5	2.9	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	5.16	213279.766	24169.063	110.306	100.7	0.7	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	5.16	459635.125	21666.674	265.174	246.6	-1.4	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	5.16	790862.750	18948.793	521.711	501.5	0.3	NO	1.000	NO	bb

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Compound name: PFOSA

Coefficient of Determination: $R^2 = 0.999647$

Calibration curve: $-0.000143866 * x^2 + 1.1409 * x + -0.0296806$

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 181202M2_2	Standard	0.250	5.19	113.305	4397.858	0.322	0.3	23.3	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	5.20	184.815	4324.078	0.534	0.5	-1.1	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	5.20	339.186	4570.558	0.928	0.8	-16.1	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	5.19	784.108	4762.950	2.058	1.8	-8.5	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	5.20	2061.741	4488.806	5.741	5.1	1.2	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	5.20	4164.114	4699.447	11.076	9.7	-2.5	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	5.20	20300.318	4335.578	58.528	51.7	3.3	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	5.19	40275.316	4374.077	115.097	102.2	2.2	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	5.20	87737.117	4062.946	269.931	244.1	-2.3	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	5.20	159040.094	3702.655	536.912	502.5	0.5	NO	1.000	NO	bb

Compound name: L-PFOS

Correlation coefficient: $r = 0.999643$, $r^2 = 0.999286$

Calibration curve: $1.10611 * x + -0.0627829$

Response type: Internal Std (Ref 47), 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 181202M2_2	Standard	0.250	5.24	54.325	3848.352	0.176	0.2	-13.5	NO	0.999	NO	MM
2	2 181202M2_3	Standard	0.500	5.24	153.804	4058.103	0.474	0.5	-3.0	NO	0.999	NO	MM
3	3 181202M2_4	Standard	1.000	5.24	326.463	3957.430	1.031	1.0	-1.1	NO	0.999	NO	MM
4	4 181202M2_5	Standard	2.000	5.24	729.285	4122.399	2.211	2.1	2.8	NO	0.999	NO	MM
5	5 181202M2_6	Standard	5.000	5.24	1705.774	3850.568	5.537	5.1	1.3	NO	0.999	NO	MM
6	6 181202M2_7	Standard	10.000	5.24	3557.934	4052.094	10.976	10.0	-0.2	NO	0.999	NO	MM
7	7 181202M2_8	Standard	50.000	5.24	17478.543	4143.248	52.732	47.7	-4.5	NO	0.999	NO	MM
8	8 181202M2_9	Standard	100.000	5.24	32802.598	3963.002	103.465	93.6	-6.4	NO	0.999	NO	MM
9	9 181202M2_10	Standard	250.000	5.24	73542.945	3309.822	277.745	251.2	0.5	NO	0.999	NO	MM
10	10 181202M2_11	Standard	500.000	5.24	131144.078	2920.727	561.265	507.5	1.5	NO	0.999	NO	MM

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Compound name: PFDA

Coefficient of Determination: $R^2 = 0.999864$

Calibration curve: $-0.000210024 * x^2 + 1.07747 * x - 0.0171268$

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 181202M2_2	Standard	0.250	5.54	476.896	24467.730	0.244	0.2	-3.2	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	5.54	1112.093	24309.102	0.572	0.5	9.3	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	5.54	1945.086	24717.902	0.984	0.9	-7.1	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	5.54	4308.328	24989.855	2.155	2.0	0.8	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	5.54	10124.850	23998.639	5.274	4.9	-1.7	NO	1.000	NO	bb
6	6 181202M2_7	Standard	10.000	5.54	21993.205	24552.750	11.197	10.4	4.3	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	5.54	100961.906	24327.094	51.877	48.6	-2.8	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	5.54	189927.125	22632.824	104.896	99.3	-0.7	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	5.54	427641.781	20613.098	259.326	253.2	1.3	NO	1.000	NO	bb
10	10 181202M2_11	Standard	500.000	5.54	743248.250	19158.104	484.944	498.5	-0.3	NO	1.000	NO	bb

Compound name: 8:2 FTS

Coefficient of Determination: $R^2 = 0.999875$

Calibration curve: $-0.00465207 * x^2 + 1.3615 * x - 0.0995875$

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 181202M2_2	Standard	0.250	5.51	91.714	4317.192	0.266	0.3	7.4	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	5.51	174.261	4216.907	0.517	0.5	-9.4	NO	1.000	NO	bb
3	3 181202M2_4	Standard	1.000	5.51	425.100	4281.343	1.241	1.0	-1.2	NO	1.000	NO	bb
4	4 181202M2_5	Standard	2.000	5.50	890.316	4195.490	2.653	2.0	1.8	NO	1.000	NO	bb
5	5 181202M2_6	Standard	5.000	5.51	2200.972	4163.019	6.609	5.0	0.3	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	5.51	4771.327	4494.608	13.270	10.2	1.7	NO	1.000	NO	bb
7	7 181202M2_8	Standard	50.000	5.51	21008.926	4695.126	55.933	49.5	-0.9	NO	1.000	NO	bb
8	8 181202M2_9	Standard	100.000	5.50	37810.566	5268.254	89.713	100.4	0.4	NO	1.000	NO	bb
9	9 181202M2_10	Standard	250.000	5.51	78947.742	6419.179	153.734			NO	1.000	NO	bbXI
10	10 181202M2_11	Standard	500.000	5.51	126751.523	7875.880	201.170			NO	1.000	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: PFNS

Coefficient of Determination: $R^2 = 0.999902$

Calibration curve: $-2.99188e-005 * x^2 + 0.768689 * x + 0.0389701$

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 181202M2_2	Standard	0.250	5.60	80.589	3848.352	0.262	0.3	15.9	NO	1.000	NO	bb
2	2 181202M2_3	Standard	0.500	5.60	143.434	4058.103	0.442	0.5	4.8	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	5.60	224.090	3957.430	0.708	0.9	-13.0	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	5.60	494.860	4122.399	1.501	1.9	-4.9	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	5.60	1158.318	3850.568	3.760	4.8	-3.2	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	5.60	2549.596	4052.094	7.865	10.2	1.9	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	5.60	12411.925	4143.248	37.446	48.8	-2.5	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	5.59	24374.139	3963.002	76.880	100.4	0.4	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	5.60	50795.039	3309.822	191.834	252.0	0.8	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	5.60	87901.438	2920.727	376.197	499.0	-0.2	NO	1.000	NO	MM

Compound name: L-MeFOSAA

Coefficient of Determination: $R^2 = 0.999677$

Calibration curve: $-0.000422706 * x^2 + 1.51286 * x + -0.0237577$

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 181202M2_2	Standard	0.250	5.68	195.147	6993.818	0.349	0.2	-1.5	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	5.69	452.242	7633.335	0.741	0.5	1.1	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	5.68	883.719	7294.871	1.514	1.0	1.7	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	5.68	1878.539	7797.862	3.011	2.0	0.4	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	5.68	3940.500	7624.316	6.460	4.3	-14.2	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	5.69	9250.802	7415.011	15.595	10.4	3.5	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	5.68	45700.629	7329.583	77.939	52.3	4.6	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	5.68	85030.906	7337.996	144.847	98.5	-1.5	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	5.68	176891.984	6314.114	350.192	248.8	-0.5	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	5.68	304241.375	5836.267	651.618	500.8	0.2	NO	1.000	NO	MM

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Compound name: L-EtFOSAA

Coefficient of Determination: $R^2 = 0.995820$

Calibration curve: $-0.000217066 * x^2 + 1.09478 * x + -0.0924104$

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 181202M2_2	Standard	0.250	5.84	121.103	7616.977	0.199	0.3	6.4	NO	0.996	NO	MM
2	2 181202M2_3	Standard	0.500	5.84	308.076	8626.343	0.446	0.5	-1.6	NO	0.996	NO	MM
3	3 181202M2_4	Standard	1.000	5.84	647.943	8022.006	1.010	1.0	0.7	NO	0.996	NO	MM
4	4 181202M2_5	Standard	2.000	5.84	1422.383	8299.833	2.142	2.0	2.1	NO	0.996	NO	MM
5	5 181202M2_6	Standard	5.000	5.84	3294.604	8433.072	4.883	4.5	-9.0	NO	0.996	NO	MM
6	6 181202M2_7	Standard	10.000	5.84	7358.653	8903.206	10.331	9.5	-4.6	NO	0.996	NO	MM
7	7 181202M2_8	Standard	50.000	5.84	34889.617	8164.931	53.414	49.4	-1.3	NO	0.996	NO	MM
8	8 181202M2_9	Standard	100.000	5.83	67239.109	6902.745	121.762	113.9	13.9	NO	0.996	NO	MM
9	9 181202M2_10	Standard	250.000	5.84	131691.859	6863.628	239.836	229.6	-8.2	NO	0.996	NO	MM
10	10 181202M2_11	Standard	500.000	5.84	230774.703	5765.883	500.302	508.3	1.7	NO	0.996	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Compound name: PFUDa

Coefficient of Determination: $R^2 = 0.999432$

Calibration curve: $-0.000244716 * x^2 + 1.07792 * x + 0.000271046$

Response type: Internal Std (Ref 51), 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 181202M2_2	Standard	0.250	5.86	596.648	26235.537	0.284	0.3	5.4	NO	0.999	NO	bb
2	2 181202M2_3	Standard	0.500	5.85	1103.887	26476.957	0.521	0.5	-3.3	NO	0.999	NO	MM
3	3 181202M2_4	Standard	1.000	5.86	2192.150	25791.709	1.062	1.0	-1.4	NO	0.999	NO	bb
4	4 181202M2_5	Standard	2.000	5.85	4368.989	25476.654	2.144	2.0	-0.5	NO	0.999	NO	bb
5	5 181202M2_6	Standard	5.000	5.85	10175.933	24894.002	5.110	4.7	-5.1	NO	0.999	NO	bb
6	6 181202M2_7	Standard	10.000	5.86	22308.275	25793.707	10.811	10.1	0.5	NO	0.999	NO	bb
7	7 181202M2_8	Standard	50.000	5.86	107501.234	24187.443	55.556	52.2	4.3	NO	0.999	NO	bb
8	8 181202M2_9	Standard	100.000	5.85	206746.500	23864.383	108.292	102.9	2.9	NO	0.999	NO	MM
9	9 181202M2_10	Standard	250.000	5.86	417923.656	21247.000	245.872	241.3	-3.5	NO	0.999	NO	bb
10	10 181202M2_11	Standard	500.000	5.86	708042.438	18395.674	481.120	504.0	0.8	NO	0.999	NO	bb

Compound name: PFDS

Coefficient of Determination: $R^2 = 0.999683$

Calibration curve: $7.56593e-005 * x^2 + 0.811719 * x + 0.0648879$

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 181202M2_2	Standard	0.250	5.91	22.895	3848.352	0.074	0.0	-95.3	YES	1.000	NO	bbX
2	2 181202M2_3	Standard	0.500	5.90	133.028	4058.103	0.410	0.4	-15.0	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	5.90	265.385	3957.430	0.838	1.0	-4.7	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	5.90	547.126	4122.399	1.659	2.0	-1.8	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	5.90	1374.966	3850.568	4.464	5.4	8.3	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	5.90	3055.824	4052.094	9.427	11.5	15.2	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	5.90	13406.321	4143.248	40.446	49.5	-1.0	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	5.90	25873.787	3963.002	81.610	99.5	-0.5	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	5.90	54601.043	3309.822	206.208	248.2	-0.7	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	5.91	99464.773	2920.727	425.685	501.0	0.2	NO	1.000	NO	MM

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Compound name: PFDoA

Coefficient of Determination: $R^2 = 0.999795$

Calibration curve: $-0.000443961 * x^2 + 1.32023 * x + -0.000921135$

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 181202M2_2	Standard	0.250	6.13	567.557	20802.365	0.341	0.3	3.6	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	6.13	1145.301	21481.756	0.666	0.5	1.1	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	6.13	2227.856	21130.402	1.318	1.0	-0.1	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	6.13	4570.521	22323.697	2.559	1.9	-3.0	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	6.13	10652.516	20750.785	6.417	4.9	-2.6	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	6.13	23303.625	21839.953	13.338	10.1	1.4	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	6.13	113419.266	21577.500	65.705	50.6	1.3	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	6.13	203830.203	20567.094	123.881	97.0	-3.0	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	6.13	455812.531	18565.805	306.890	254.2	1.7	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	6.13	750169.125	17127.432	547.491	498.1	-0.4	NO	1.000	NO	MM

Compound name: N-MeFOSA

Coefficient of Determination: $R^2 = 0.998909$

Calibration curve: $-7.79408e-005 * x^2 + 1.05657 * x + -0.0424732$

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 181202M2_2	Standard	1.250	6.03	142.449	18144.518	1.178	1.2	-7.6	NO	0.999	NO	bb
2	2 181202M2_3	Standard	2.500	6.03	322.419	18786.895	2.574	2.5	-0.9	NO	0.999	NO	bb
3	3 181202M2_4	Standard	5.000	6.03	660.706	19011.893	5.213	5.0	-0.5	NO	0.999	NO	bb
4	4 181202M2_5	Standard	10.000	6.03	1414.699	19580.543	10.838	10.3	3.1	NO	0.999	NO	bb
5	5 181202M2_6	Standard	25.000	6.03	3263.745	19617.758	24.955	23.7	-5.2	NO	0.999	NO	MM
6	6 181202M2_7	Standard	50.000	6.03	7168.061	19978.711	53.818	51.2	2.3	NO	0.999	NO	MM
7	7 181202M2_8	Standard	250.000	6.03	35243.977	19302.840	273.877	264.4	5.8	NO	0.999	NO	MM
8	8 181202M2_9	Standard	500.000	6.03	68360.344	19476.980	526.470	518.1	3.6	NO	0.999	NO	MM
9	9 181202M2_10	Standard	1250.000	6.03	144932.484	19001.152	1144.134	1186.8	-5.1	NO	0.999	NO	MM
10	10 181202M2_11	Standard	2500.000	6.03	262093.094	18062.113	2176.598	2533.7	1.3	NO	0.999	NO	MM

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Compound name: PFTrDA

Coefficient of Determination: $R^2 = 0.999656$

Calibration curve: $-0.000291719 * x^2 + 1.21601 * x + 0.00941256$

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 181202M2_2	Standard	0.250	6.37	512.233	20802.365	0.308	0.2	-1.8	NO	1.000	NO	MM
2	2 181202M2_3	Standard	0.500	6.38	1023.942	21481.756	0.596	0.5	-3.5	NO	1.000	NO	MM
3	3 181202M2_4	Standard	1.000	6.38	2138.060	21130.402	1.265	1.0	3.3	NO	1.000	NO	MM
4	4 181202M2_5	Standard	2.000	6.38	4198.660	22323.697	2.351	1.9	-3.7	NO	1.000	NO	MM
5	5 181202M2_6	Standard	5.000	6.38	10261.721	20750.785	6.182	5.1	1.6	NO	1.000	NO	MM
6	6 181202M2_7	Standard	10.000	6.38	21745.299	21839.953	12.446	10.3	2.5	NO	1.000	NO	MM
7	7 181202M2_8	Standard	50.000	6.38	104147.984	21577.500	60.334	50.2	0.4	NO	1.000	NO	MM
8	8 181202M2_9	Standard	100.000	6.38	201551.844	20567.094	122.497	103.3	3.3	NO	1.000	NO	MM
9	9 181202M2_10	Standard	250.000	6.37	413785.844	18565.805	278.594	243.3	-2.7	NO	1.000	NO	MM
10	10 181202M2_11	Standard	500.000	6.38	737003.313	17127.432	537.882	503.0	0.6	NO	1.000	NO	MM

Compound name: PFTeDA

Coefficient of Determination: $R^2 = 0.999493$

Calibration curve: $-0.000343362 * x^2 + 1.13504 * x + 0.00135132$

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 181202M2_2	Standard	0.250	6.59	374.614	17269.939	0.271	0.2	-4.9	NO	0.999	NO	bb
2	2 181202M2_3	Standard	0.500	6.59	795.705	16950.785	0.587	0.5	3.2	NO	0.999	NO	bb
3	3 181202M2_4	Standard	1.000	6.59	1443.209	16748.422	1.077	0.9	-5.2	NO	0.999	NO	bb
4	4 181202M2_5	Standard	2.000	6.59	3178.300	17107.322	2.322	2.0	2.3	NO	0.999	NO	bb
5	5 181202M2_6	Standard	5.000	6.59	7282.958	16784.055	5.424	4.8	-4.3	NO	0.999	NO	bb
6	6 181202M2_7	Standard	10.000	6.59	16042.385	16552.861	12.115	10.7	7.1	NO	0.999	NO	bb
7	7 181202M2_8	Standard	50.000	6.59	75015.461	16613.039	56.443	50.5	1.0	NO	0.999	NO	bb
8	8 181202M2_9	Standard	100.000	6.59	144170.828	15860.967	113.621	103.3	3.3	NO	0.999	NO	bb
9	9 181202M2_10	Standard	250.000	6.58	303503.594	14903.161	254.563	242.0	-3.2	NO	0.999	NO	bb
10	10 181202M2_11	Standard	500.000	6.59	533941.000	13767.813	484.773	503.9	0.8	NO	0.999	NO	bb

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Compound name: N-EtFOSA

Coefficient of Determination: $R^2 = 0.999912$

Calibration curve: $-4.97469e-005 * x^2 + 0.973269 * x + -0.0114563$

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 181202M2_2	Standard	1.250	6.46	214.610	24911.125	1.292	1.3	7.2	NO	1.000	NO	bb
2	2 181202M2_3	Standard	2.500	6.46	403.697	25905.633	2.338	2.4	-3.4	NO	1.000	NO	bb
3	3 181202M2_4	Standard	5.000	6.46	854.446	26066.096	4.917	5.1	1.3	NO	1.000	NO	bb
4	4 181202M2_5	Standard	10.000	6.46	1711.752	26996.768	9.511	9.8	-2.1	NO	1.000	NO	bb
5	5 181202M2_6	Standard	25.000	6.46	3978.940	26445.541	22.569	23.2	-7.1	NO	1.000	NO	bb
6	6 181202M2_7	Standard	50.000	6.46	8912.416	26195.615	51.034	52.6	5.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	250.000	6.46	41638.492	26339.674	237.124	246.8	-1.3	NO	1.000	NO	bb
8	8 181202M2_9	Standard	500.000	6.46	79929.930	25286.291	474.150	500.0	-0.0	NO	1.000	NO	bb
9	9 181202M2_10	Standard	1250.000	6.46	172285.000	22605.516	1143.205	1255.1	0.4	NO	1.000	NO	bb
10	10 181202M2_11	Standard	2500.000	6.47	303937.313	21501.488	2120.346	2497.4	-0.1	NO	1.000	NO	bb

Compound name: PFHxDA

Coefficient of Determination: $R^2 = 0.998811$

Calibration curve: $-0.000210664 * x^2 + 0.529999 * x + 0.0560111$

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 181202M2_2	Standard	0.250	6.89	224.867	6306.773	0.178	0.2	-7.7	NO	0.999	NO	bb
2	2 181202M2_3	Standard	0.500	6.89	396.255	6244.700	0.317	0.5	-1.4	NO	0.999	NO	bb
3	3 181202M2_4	Standard	1.000	6.89	751.150	6307.689	0.595	1.0	1.8	NO	0.999	NO	bb
4	4 181202M2_5	Standard	2.000	6.89	1497.283	6361.806	1.177	2.1	5.8	NO	0.999	NO	bb
5	5 181202M2_6	Standard	5.000	6.89	3143.157	6326.135	2.484	4.6	-8.2	NO	0.999	NO	bb
6	6 181202M2_7	Standard	10.000	6.89	7028.938	6280.527	5.596	10.5	5.0	NO	0.999	NO	bb
7	7 181202M2_8	Standard	50.000	6.89	33421.703	6171.491	27.077	52.1	4.1	NO	0.999	NO	bb
8	8 181202M2_9	Standard	100.000	6.89	65299.973	6143.526	53.145	104.5	4.5	NO	0.999	NO	bb
9	9 181202M2_10	Standard	250.000	6.89	134449.172	5907.690	113.792	236.9	-5.2	NO	0.999	NO	bb
10	10 181202M2_11	Standard	500.000	6.90	243506.438	5672.422	214.641	507.1	1.4	NO	0.999	NO	bb

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Compound name: PFODA

Coefficient of Determination: $R^2 = 0.998954$

Calibration curve: $-0.000288047 * x^2 + 0.858197 * x + 0.0110406$

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 181202M2_2	Standard	0.250	7.12	285.334	6306.773	0.226	0.3	0.3	NO	0.999	NO	bb
2	2 181202M2_3	Standard	0.500	7.12	523.242	6244.700	0.419	0.5	-4.9	NO	0.999	NO	bb
3	3 181202M2_4	Standard	1.000	7.12	1137.734	6307.689	0.902	1.0	3.8	NO	0.999	NO	bb
4	4 181202M2_5	Standard	2.000	7.12	2230.814	6361.806	1.753	2.0	1.6	NO	0.999	NO	bb
5	5 181202M2_6	Standard	5.000	7.12	5189.763	6326.135	4.102	4.8	-4.5	NO	0.999	NO	bb
6	6 181202M2_7	Standard	10.000	7.12	11181.271	6280.527	8.902	10.4	4.0	NO	0.999	NO	bb
7	7 181202M2_8	Standard	50.000	7.12	54498.063	6171.491	44.153	52.4	4.7	NO	0.999	NO	bb
8	8 181202M2_9	Standard	100.000	7.12	105825.469	6143.526	86.128	104.0	4.0	NO	0.999	NO	bb
9	9 181202M2_10	Standard	250.000	7.12	221658.438	5907.690	187.602	237.5	-5.0	NO	0.999	NO	bb
10	10 181202M2_11	Standard	500.000	7.12	409253.719	5672.422	360.740	506.4	1.3	NO	0.999	NO	bb

Compound name: N-MeFOSE

Coefficient of Determination: $R^2 = 0.999899$

Calibration curve: $-2.49953e-005 * x^2 + 0.933355 * x + -0.466455$

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 181202M2_2	Standard	1.250	6.68	45.843	8924.660	0.770	1.3	6.0	NO	1.000	NO	bb
2	2 181202M2_3	Standard	2.500	6.68	117.142	9346.182	1.880	2.5	0.6	NO	1.000	NO	bb
3	3 181202M2_4	Standard	5.000	6.68	257.799	9089.852	4.254	5.1	1.2	NO	1.000	NO	bb
4	4 181202M2_5	Standard	10.000	6.68	549.323	9784.962	8.421	9.5	-4.8	NO	1.000	NO	bb
5	5 181202M2_6	Standard	25.000	6.68	1393.514	9258.698	22.576	24.7	-1.2	NO	1.000	NO	bb
6	6 181202M2_7	Standard	50.000	6.68	2876.454	9389.959	45.950	49.8	-0.4	NO	1.000	NO	bb
7	7 181202M2_8	Standard	250.000	6.68	14698.902	9656.651	228.323	246.8	-1.3	NO	1.000	NO	MM
8	8 181202M2_9	Standard	500.000	6.68	28662.500	9467.294	454.129	493.6	-1.3	NO	1.000	NO	bb
9	9 181202M2_10	Standard	1250.000	6.68	67421.727	8844.866	1143.404	1268.6	1.5	NO	1.000	NO	bb
10	10 181202M2_11	Standard	2500.000	6.68	133156.828	9204.148	2170.057	2491.8	-0.3	NO	1.000	NO	bb

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Compound name: N-EtFOSE

Coefficient of Determination: $R^2 = 0.999728$

Calibration curve: $-8.31447e-006 * x^2 + 1.05163 * x + 0.0451426$

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 181202M2_2	Standard	1.250	6.83	85.578	9267.479	1.385	1.3	1.9	NO	1.000	NO	bb
2	2 181202M2_3	Standard	2.500	6.82	153.289	9417.438	2.442	2.3	-8.8	NO	1.000	NO	bb
3	3 181202M2_4	Standard	5.000	6.82	329.378	9367.441	5.274	5.0	-0.5	NO	1.000	NO	bb
4	4 181202M2_5	Standard	10.000	6.82	714.828	9831.002	10.907	10.3	3.3	NO	1.000	NO	MM
5	5 181202M2_6	Standard	25.000	6.82	1549.766	9178.014	25.328	24.0	-3.8	NO	1.000	NO	bb
6	6 181202M2_7	Standard	50.000	6.82	3544.875	9518.834	55.861	53.1	6.2	NO	1.000	NO	bb
7	7 181202M2_8	Standard	250.000	6.82	16633.693	9371.340	266.243	253.6	1.5	NO	1.000	NO	bb
8	8 181202M2_9	Standard	500.000	6.82	33654.199	9438.916	534.821	510.6	2.1	NO	1.000	NO	bb
9	9 181202M2_10	Standard	1250.000	6.82	77595.289	9147.148	1272.451	1221.7	-2.3	NO	1.000	NO	bb
10	10 181202M2_11	Standard	2500.000	6.83	153648.516	8901.749	2589.073	2511.8	0.5	NO	1.000	NO	bb

Compound name: 13C3-PFBA

Response Factor: 0.860773

RRF SD: 0.0131021, Relative SD: 1.52213

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 181202M2_2	Standard	12.500	1.47	7372.417	8755.424	10.525	12.2	-2.2	NO		NO	MM
2	2 181202M2_3	Standard	12.500	1.47	7717.044	8985.498	10.735	12.5	-0.2	NO		NO	MM
3	3 181202M2_4	Standard	12.500	1.47	7778.471	9024.967	10.774	12.5	0.1	NO		NO	MM
4	4 181202M2_5	Standard	12.500	1.47	8110.343	9577.717	10.585	12.3	-1.6	NO		NO	MM
5	5 181202M2_6	Standard	12.500	1.47	7882.678	9216.354	10.691	12.4	-0.6	NO		NO	MM
6	6 181202M2_7	Standard	12.500	1.47	8113.042	9417.552	10.769	12.5	0.1	NO		NO	MM
7	7 181202M2_8	Standard	12.500	1.47	8040.462	9412.593	10.678	12.4	-0.8	NO		NO	MM
8	8 181202M2_9	Standard	12.500	1.47	8202.403	9230.500	11.108	12.9	3.2	NO		NO	MM
9	9 181202M2_10	Standard	12.500	1.47	7673.549	8827.580	10.866	12.6	1.0	NO		NO	MM
10	10 181202M2_11	Standard	12.500	1.47	7562.084	8699.136	10.866	12.6	1.0	NO		NO	MM

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Compound name: 13C3-PFPeA

Response Factor: 0.603715

RRF SD: 0.0227005, Relative SD: 3.76013

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 181202M2_2	Standard	12.500	2.72	12984.617	21884.557	7.417	12.3	-1.7	NO		NO	MM
2	2 181202M2_3	Standard	12.500	2.73	13346.579	22519.205	7.408	12.3	-1.8	NO		NO	bb
3	3 181202M2_4	Standard	12.500	2.73	13256.772	22580.148	7.339	12.2	-2.8	NO		NO	bb
4	4 181202M2_5	Standard	12.500	2.73	13901.806	23437.223	7.414	12.3	-1.7	NO		NO	bb
5	5 181202M2_6	Standard	12.500	2.73	13420.939	23364.684	7.180	11.9	-4.9	NO		NO	bb
6	6 181202M2_7	Standard	12.500	2.73	13882.929	23122.318	7.505	12.4	-0.5	NO		NO	bb
7	7 181202M2_8	Standard	12.500	2.73	13496.188	22645.541	7.450	12.3	-1.3	NO		NO	bb
8	8 181202M2_9	Standard	12.500	2.73	13748.945	22215.309	7.736	12.8	2.5	NO		NO	bb
9	9 181202M2_10	Standard	12.500	2.73	12276.298	19415.918	7.904	13.1	4.7	NO		NO	bb
10	10 181202M2_11	Standard	12.500	2.73	11768.877	18135.842	8.112	13.4	7.5	NO		NO	bb

Compound name: 13C3-PFBS

Response Factor: 0.632921

RRF SD: 0.0159996, Relative SD: 2.5279

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 181202M2_2	Standard	12.500	3.04	2440.729	3754.038	8.127	12.8	2.7	NO		NO	bb
2	2 181202M2_3	Standard	12.500	3.05	2510.799	3915.824	8.015	12.7	1.3	NO		NO	bb
3	3 181202M2_4	Standard	12.500	3.04	2463.662	4004.437	7.690	12.2	-2.8	NO		NO	bb
4	4 181202M2_5	Standard	12.500	3.04	2532.149	3967.956	7.977	12.6	0.8	NO		NO	bb
5	5 181202M2_6	Standard	12.500	3.05	2521.420	4000.192	7.879	12.4	-0.4	NO		NO	bb
6	6 181202M2_7	Standard	12.500	3.05	2565.786	3978.497	8.061	12.7	1.9	NO		NO	bb
7	7 181202M2_8	Standard	12.500	3.05	2428.037	3909.020	7.764	12.3	-1.9	NO		NO	bb
8	8 181202M2_9	Standard	12.500	3.05	2348.185	3727.478	7.875	12.4	-0.5	NO		NO	bb
9	9 181202M2_10	Standard	12.500	3.05	2027.545	3357.620	7.548	11.9	-4.6	NO		NO	bb
10	10 181202M2_11	Standard	12.500	3.05	1876.313	2867.818	8.178	12.9	3.4	NO		NO	bb

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Compound name: 13C2-4:2 FTS

Response Factor: 2.07354

RRF SD: 0.156529, Relative SD: 7.54885

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 181202M2_2	Standard	12.500	3.51	7882.280	3754.038	26.246	12.7	1.3	NO		NO	bb
2	2 181202M2_3	Standard	12.500	3.52	7786.481	3915.824	24.856	12.0	-4.1	NO		NO	bb
3	3 181202M2_4	Standard	12.500	3.52	7630.461	4004.437	23.819	11.5	-8.1	NO		NO	bb
4	4 181202M2_5	Standard	12.500	3.52	8139.889	3967.956	25.643	12.4	-1.1	NO		NO	bb
5	5 181202M2_6	Standard	12.500	3.52	7869.327	4000.192	24.590	11.9	-5.1	NO		NO	bb
6	6 181202M2_7	Standard	12.500	3.52	8095.176	3978.497	25.434	12.3	-1.9	NO		NO	bb
7	7 181202M2_8	Standard	12.500	3.52	8293.981	3909.020	26.522	12.8	2.3	NO		NO	bb
8	8 181202M2_9	Standard	12.500	3.52	9018.855	3727.478	30.244	14.6	16.7	NO		NO	bb
9	9 181202M2_10	Standard	12.500	3.52	10024.722	3357.620	37.321	18.0	44.0	NO		NO	bbX
10	10 181202M2_11	Standard	12.500	3.52	12827.324	2867.818	55.911	27.0	115.7	NO		NO	bbX

Compound name: 13C2-PFHxA

Response Factor: 0.900373

RRF SD: 0.0240715, Relative SD: 2.6735

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 181202M2_2	Standard	5.000	3.61	7855.090	21884.557	4.487	5.0	-0.3	NO		NO	bb
2	2 181202M2_3	Standard	5.000	3.61	8046.591	22519.205	4.467	5.0	-0.8	NO		NO	bb
3	3 181202M2_4	Standard	5.000	3.61	8042.113	22580.148	4.452	4.9	-1.1	NO		NO	bb
4	4 181202M2_5	Standard	5.000	3.61	8137.367	23437.223	4.340	4.8	-3.6	NO		NO	bb
5	5 181202M2_6	Standard	5.000	3.61	8193.701	23364.684	4.384	4.9	-2.6	NO		NO	bb
6	6 181202M2_7	Standard	5.000	3.61	8472.754	23122.318	4.580	5.1	1.7	NO		NO	bb
7	7 181202M2_8	Standard	5.000	3.61	8020.125	22645.541	4.427	4.9	-1.7	NO		NO	bb
8	8 181202M2_9	Standard	5.000	3.61	8088.322	22215.309	4.551	5.1	1.1	NO		NO	bb
9	9 181202M2_10	Standard	5.000	3.61	7098.521	19415.918	4.570	5.1	1.5	NO		NO	bb
10	10 181202M2_11	Standard	5.000	3.61	6908.174	18135.842	4.761	5.3	5.8	NO		NO	bb

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Compound name: 13C4-PFHpA

Response Factor: 0.693169

RRF SD: 0.0198189, Relative SD: 2.85917

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 181202M2_2	Standard	12.500	4.23	15520.071	21884.557	8.865	12.8	2.3	NO		NO	MM
2	2 181202M2_3	Standard	12.500	4.24	16419.287	22519.205	9.114	13.1	5.2	NO		NO	bb
3	3 181202M2_4	Standard	12.500	4.24	15646.633	22580.148	8.662	12.5	-0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	4.23	16240.967	23437.223	8.662	12.5	-0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	4.24	15769.080	23364.684	8.436	12.2	-2.6	NO		NO	bb
6	6 181202M2_7	Standard	12.500	4.24	16393.000	23122.318	8.862	12.8	2.3	NO		NO	bb
7	7 181202M2_8	Standard	12.500	4.24	15392.018	22645.541	8.496	12.3	-1.9	NO		NO	bb
8	8 181202M2_9	Standard	12.500	4.24	15534.257	22215.309	8.741	12.6	0.9	NO		NO	bb
9	9 181202M2_10	Standard	12.500	4.24	13297.971	19415.918	8.561	12.4	-1.2	NO		NO	bb
10	10 181202M2_11	Standard	12.500	4.24	11965.380	18135.842	8.247	11.9	-4.8	NO		NO	bb

Compound name: 18O2-PFHxS

Response Factor: 0.475759

RRF SD: 0.0116172, Relative SD: 2.44183

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 181202M2_2	Standard	12.500	4.37	1732.264	3754.038	5.768	12.1	-3.0	NO		NO	MM
2	2 181202M2_3	Standard	12.500	4.37	1891.561	3915.824	6.038	12.7	1.5	NO		NO	MM
3	3 181202M2_4	Standard	12.500	4.37	1870.489	4004.437	5.839	12.3	-1.8	NO		NO	MM
4	4 181202M2_5	Standard	12.500	4.37	1844.360	3967.956	5.810	12.2	-2.3	NO		NO	MM
5	5 181202M2_6	Standard	12.500	4.37	1912.521	4000.192	5.976	12.6	0.5	NO		NO	MM
6	6 181202M2_7	Standard	12.500	4.37	1921.575	3978.497	6.037	12.7	1.5	NO		NO	MM
7	7 181202M2_8	Standard	12.500	4.37	1820.151	3909.020	5.820	12.2	-2.1	NO		NO	MM
8	8 181202M2_9	Standard	12.500	4.37	1781.693	3727.478	5.975	12.6	0.5	NO		NO	MM
9	9 181202M2_10	Standard	12.500	4.37	1599.192	3357.620	5.954	12.5	0.1	NO		NO	MM
10	10 181202M2_11	Standard	12.500	4.37	1434.401	2867.818	6.252	13.1	5.1	NO		NO	MM

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Compound name: 13C2-6:2 FTS

Response Factor: 1.82458

RRF SD: 0.102913, Relative SD: 5.64038

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 181202M2_2	Standard	12.500	4.67	7096.761	4124.125	21.510	11.8	-5.7	NO		NO	bb
2	2 181202M2_3	Standard	12.500	4.67	7354.782	4043.074	22.739	12.5	-0.3	NO		NO	bb
3	3 181202M2_4	Standard	12.500	4.67	6954.629	3968.353	21.907	12.0	-3.9	NO		NO	bb
4	4 181202M2_5	Standard	12.500	4.67	7557.635	4217.781	22.398	12.3	-1.8	NO		NO	bb
5	5 181202M2_6	Standard	12.500	4.67	7351.898	4195.018	21.907	12.0	-3.9	NO		NO	bb
6	6 181202M2_7	Standard	12.500	4.67	7547.463	4019.653	23.471	12.9	2.9	NO		NO	bb
7	7 181202M2_8	Standard	12.500	4.67	7612.719	4145.392	22.955	12.6	0.6	NO		NO	bb
8	8 181202M2_9	Standard	12.500	4.67	8395.673	4103.915	25.572	14.0	12.1	NO		NO	bb
9	9 181202M2_10	Standard	12.500	4.67	10084.581	3697.286	34.095	18.7	49.5	NO		NO	bbX
10	10 181202M2_11	Standard	12.500	4.67	12500.775	2980.433	52.429	28.7	129.9	NO		NO	bbX

Compound name: 13C2-PFOA

Response Factor: 0.872857

RRF SD: 0.0293638, Relative SD: 3.3641

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 181202M2_2	Standard	12.500	4.72	21531.906	25427.918	10.585	12.1	-3.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	4.73	22078.006	26231.518	10.521	12.1	-3.6	NO		NO	bb
3	3 181202M2_4	Standard	12.500	4.73	22869.809	26898.668	10.628	12.2	-2.6	NO		NO	bb
4	4 181202M2_5	Standard	12.500	4.72	22788.545	27182.742	10.479	12.0	-4.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	4.73	22636.125	25823.834	10.957	12.6	0.4	NO		NO	bb
6	6 181202M2_7	Standard	12.500	4.73	23212.086	26537.365	10.934	12.5	0.2	NO		NO	bb
7	7 181202M2_8	Standard	12.500	4.73	22155.025	25198.629	10.990	12.6	0.7	NO		NO	bb
8	8 181202M2_9	Standard	12.500	4.73	21661.113	24351.957	11.115	12.7	1.9	NO		NO	bb
9	9 181202M2_10	Standard	12.500	4.73	19646.082	21780.797	11.275	12.9	3.3	NO		NO	bb
10	10 181202M2_11	Standard	12.500	4.73	18090.129	19460.047	11.620	13.3	6.5	NO		NO	bb

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Compound name: 13C5-PFNA

Response Factor: 1.00625

RRF SD: 0.0258214, Relative SD: 2.56611

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 181202M2_2	Standard	12.500	5.16	24777.965	24645.154	12.567	12.5	-0.1	NO		NO	MM
2	2 181202M2_3	Standard	12.500	5.16	24973.412	24770.145	12.603	12.5	0.2	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.16	26408.809	25069.092	13.168	13.1	4.7	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.16	25880.568	26512.268	12.202	12.1	-3.0	NO		NO	MM
5	5 181202M2_6	Standard	12.500	5.16	24584.580	25536.010	12.034	12.0	-4.3	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.16	25443.154	25328.764	12.556	12.5	-0.2	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.16	24294.938	24528.369	12.381	12.3	-1.6	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.16	24169.063	23726.076	12.733	12.7	1.2	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.16	21666.674	21062.650	12.858	12.8	2.2	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.16	18948.793	18684.068	12.677	12.6	0.8	NO		NO	bb

Compound name: 13C8-PFOSA

Response Factor: 0.201574

RRF SD: 0.0168727, Relative SD: 8.37044

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 181202M2_2	Standard	12.500	5.20	4397.858	23137.404	2.376	11.8	-5.7	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.20	4324.078	24411.752	2.214	11.0	-12.1	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.20	4570.558	23006.633	2.483	12.3	-1.4	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.20	4762.950	24286.953	2.451	12.2	-2.7	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.20	4488.806	23607.182	2.377	11.8	-5.7	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.20	4699.447	23511.537	2.498	12.4	-0.8	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.20	4335.578	22404.008	2.419	12.0	-4.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.20	4374.077	20433.953	2.676	13.3	6.2	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.20	4062.946	18144.816	2.799	13.9	11.1	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.20	3702.655	15942.904	2.903	14.4	15.2	NO		NO	bb

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Compound name: 13C8-PFOS

Response Factor: 0.967776

RRF SD: 0.0394269, Relative SD: 4.07397

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 181202M2_2	Standard	12.500	5.24	3848.352	4124.125	11.664	12.1	-3.6	NO		NO	MM
2	2 181202M2_3	Standard	12.500	5.24	4058.103	4043.074	12.546	13.0	3.7	NO		NO	MM
3	3 181202M2_4	Standard	12.500	5.24	3957.430	3968.353	12.466	12.9	3.0	NO		NO	MM
4	4 181202M2_5	Standard	12.500	5.24	4122.399	4217.781	12.217	12.6	1.0	NO		NO	MM
5	5 181202M2_6	Standard	12.500	5.24	3850.568	4195.018	11.474	11.9	-5.2	NO		NO	MM
6	6 181202M2_7	Standard	12.500	5.24	4052.094	4019.653	12.601	13.0	4.2	NO		NO	MM
7	7 181202M2_8	Standard	12.500	5.24	4143.248	4145.392	12.494	12.9	3.3	NO		NO	MM
8	8 181202M2_9	Standard	12.500	5.24	3963.002	4103.915	12.071	12.5	-0.2	NO		NO	MM
9	9 181202M2_10	Standard	12.500	5.24	3309.822	3697.286	11.190	11.6	-7.5	NO		NO	MM
10	10 181202M2_11	Standard	12.500	5.24	2920.727	2980.433	12.250	12.7	1.3	NO		NO	MM

Compound name: 13C2-PFDA

Response Factor: 1.12491

RRF SD: 0.0372448, Relative SD: 3.31091

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 181202M2_2	Standard	12.500	5.54	24467.730	21716.037	14.084	12.5	0.2	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.54	24309.102	21340.531	14.239	12.7	1.3	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.54	24717.902	21966.305	14.066	12.5	0.0	NO		NO	MM
4	4 181202M2_5	Standard	12.500	5.54	24989.855	23800.488	13.125	11.7	-6.7	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.54	23998.639	21413.693	14.009	12.5	-0.4	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.54	24552.750	22298.768	13.764	12.2	-2.1	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.54	24327.094	21747.414	13.983	12.4	-0.6	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.53	22632.824	20217.711	13.993	12.4	-0.5	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.54	20613.098	17926.432	14.373	12.8	2.2	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.54	19158.104	15987.726	14.979	13.3	6.5	NO		NO	bb

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Compound name: 13C2-8:2 FTS

Response Factor: 1.08628

RRF SD: 0.0947418, Relative SD: 8.72166

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 181202M2_2	Standard	12.500	5.51	4317.192	4124.125	13.085	12.0	-3.6	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.51	4216.907	4043.074	13.037	12.0	-4.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.51	4281.343	3968.353	13.486	12.4	-0.7	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.50	4195.490	4217.781	12.434	11.4	-8.4	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.51	4163.019	4195.018	12.405	11.4	-8.6	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.51	4494.608	4019.653	13.977	12.9	2.9	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.51	4695.126	4145.392	14.158	13.0	4.3	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.50	5268.254	4103.915	16.046	14.8	18.2	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.51	6419.179	3697.286	21.702	20.0	59.8	NO		NO	bbX
10	10 181202M2_11	Standard	12.500	5.51	7875.880	2980.433	33.032	30.4	143.3	NO		NO	bbX

Compound name: d3-N-MeFOSAA

Response Factor: 0.329178

RRF SD: 0.0212176, Relative SD: 6.44565

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 181202M2_2	Standard	12.500	5.67	6993.818	23137.404	3.778	11.5	-8.2	NO		NO	MM
2	2 181202M2_3	Standard	12.500	5.68	7633.335	24411.752	3.909	11.9	-5.0	NO		NO	MM
3	3 181202M2_4	Standard	12.500	5.68	7294.871	23006.633	3.963	12.0	-3.7	NO		NO	MM
4	4 181202M2_5	Standard	12.500	5.67	7797.862	24286.953	4.013	12.2	-2.5	NO		NO	MM
5	5 181202M2_6	Standard	12.500	5.68	7624.316	23607.182	4.037	12.3	-1.9	NO		NO	MM
6	6 181202M2_7	Standard	12.500	5.68	7415.011	23511.537	3.942	12.0	-4.2	NO		NO	MM
7	7 181202M2_8	Standard	12.500	5.68	7329.583	22404.008	4.089	12.4	-0.6	NO		NO	MM
8	8 181202M2_9	Standard	12.500	5.67	7337.996	20433.953	4.489	13.6	9.1	NO		NO	MM
9	9 181202M2_10	Standard	12.500	5.68	6314.114	18144.816	4.350	13.2	5.7	NO		NO	MM
10	10 181202M2_11	Standard	12.500	5.68	5836.267	15942.904	4.576	13.9	11.2	NO		NO	MM

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Compound name: 13C2-PFUDa

Response Factor: 1.11124

RRF SD: 0.0449768, Relative SD: 4.04743

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 181202M2_2	Standard	12.500	5.85	26235.537	23137.404	14.174	12.8	2.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.86	26476.957	24411.752	13.557	12.2	-2.4	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.86	25791.709	23006.633	14.013	12.6	0.9	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.85	25476.654	24286.953	13.112	11.8	-5.6	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.85	24894.002	23607.182	13.181	11.9	-5.1	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.86	25793.707	23511.537	13.713	12.3	-1.3	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.86	24187.443	22404.008	13.495	12.1	-2.8	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.85	23864.383	20433.953	14.598	13.1	5.1	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.85	21247.000	18144.816	14.637	13.2	5.4	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.86	18395.674	15942.904	14.423	13.0	3.8	NO		NO	bb

Compound name: d5-N-EtFOSAA

Response Factor: 0.355107

RRF SD: 0.0163961, Relative SD: 4.61724

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 181202M2_2	Standard	12.500	5.83	7616.977	23137.404	4.115	11.6	-7.3	NO		NO	MM
2	2 181202M2_3	Standard	12.500	5.83	8626.343	24411.752	4.417	12.4	-0.5	NO		NO	MM
3	3 181202M2_4	Standard	12.500	5.83	8022.006	23006.633	4.359	12.3	-1.8	NO		NO	MM
4	4 181202M2_5	Standard	12.500	5.83	8299.833	24286.953	4.272	12.0	-3.8	NO		NO	MM
5	5 181202M2_6	Standard	12.500	5.83	8433.072	23607.182	4.465	12.6	0.6	NO		NO	MM
6	6 181202M2_7	Standard	12.500	5.83	8903.206	23511.537	4.733	13.3	6.6	NO		NO	MM
7	7 181202M2_8	Standard	12.500	5.83	8164.931	22404.008	4.556	12.8	2.6	NO		NO	MM
8	8 181202M2_9	Standard	12.500	5.83	6902.745	20433.953	4.223	11.9	-4.9	NO		NO	MM
9	9 181202M2_10	Standard	12.500	5.83	6863.628	18144.816	4.728	13.3	6.5	NO		NO	MM
10	10 181202M2_11	Standard	12.500	5.83	5765.883	15942.904	4.521	12.7	1.8	NO		NO	MM

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Compound name: 13C2-PFDoA

Response Factor: 0.992933

RRF SD: 0.0404254, Relative SD: 4.07131

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 181202M2_2	Standard	12.500	6.14	20802.365	21716.037	11.974	12.1	-3.5	NO		NO	MM
2	2 181202M2_3	Standard	12.500	6.14	21481.756	21340.531	12.583	12.7	1.4	NO		NO	MM
3	3 181202M2_4	Standard	12.500	6.13	21130.402	21966.305	12.024	12.1	-3.1	NO		NO	MM
4	4 181202M2_5	Standard	12.500	6.13	22323.697	23800.488	11.724	11.8	-5.5	NO		NO	MM
5	5 181202M2_6	Standard	12.500	6.14	20750.785	21413.693	12.113	12.2	-2.4	NO		NO	MM
6	6 181202M2_7	Standard	12.500	6.13	21839.953	22298.768	12.243	12.3	-1.4	NO		NO	MM
7	7 181202M2_8	Standard	12.500	6.14	21577.500	21747.414	12.402	12.5	-0.1	NO		NO	MM
8	8 181202M2_9	Standard	12.500	6.13	20567.094	20217.711	12.716	12.8	2.5	NO		NO	MM
9	9 181202M2_10	Standard	12.500	6.14	18565.805	17926.432	12.946	13.0	4.3	NO		NO	MM
10	10 181202M2_11	Standard	12.500	6.13	17127.432	15987.726	13.391	13.5	7.9	NO		NO	MM

Compound name: d3-N-MeFOSA

Response Factor: 0.0738499

RRF SD: 0.0100246, Relative SD: 13.5743

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 181202M2_2	Standard	150.000	6.06	18144.518	23137.404	9.803	132.7	-11.5	NO		NO	bb
2	2 181202M2_3	Standard	150.000	6.06	18786.895	24411.752	9.620	130.3	-13.2	NO		NO	MM
3	3 181202M2_4	Standard	150.000	6.06	19011.893	23006.633	10.330	139.9	-6.8	NO		NO	MM
4	4 181202M2_5	Standard	150.000	6.05	19580.543	24286.953	10.078	136.5	-9.0	NO		NO	MM
5	5 181202M2_6	Standard	150.000	6.06	19617.758	23607.182	10.388	140.7	-6.2	NO		NO	MM
6	6 181202M2_7	Standard	150.000	6.06	19978.711	23511.537	10.622	143.8	-4.1	NO		NO	MM
7	7 181202M2_8	Standard	150.000	6.06	19302.840	22404.008	10.770	145.8	-2.8	NO		NO	MM
8	8 181202M2_9	Standard	150.000	6.05	19476.980	20433.953	11.915	161.3	7.6	NO		NO	MM
9	9 181202M2_10	Standard	150.000	6.06	19001.152	18144.816	13.090	177.3	18.2	NO		NO	MM
10	10 181202M2_11	Standard	150.000	6.06	18062.113	15942.904	14.162	191.8	27.8	NO		NO	MM

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Compound name: 13C2-PFTeDA

Response Factor: 0.749079

RRF SD: 0.0558252, Relative SD: 7.45251

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 181202M2_2	Standard	12.500	6.59	17269.939	23137.404	9.330	12.5	-0.4	NO		NO	bb
2	2 181202M2_3	Standard	12.500	6.59	16950.785	24411.752	8.680	11.6	-7.3	NO		NO	bb
3	3 181202M2_4	Standard	12.500	6.59	16748.422	23006.633	9.100	12.1	-2.8	NO		NO	bb
4	4 181202M2_5	Standard	12.500	6.59	17107.322	24286.953	8.805	11.8	-6.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	6.59	16784.055	23607.182	8.887	11.9	-5.1	NO		NO	bb
6	6 181202M2_7	Standard	12.500	6.59	16552.861	23511.537	8.800	11.7	-6.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	6.59	16613.039	22404.008	9.269	12.4	-1.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	6.59	15860.967	20433.953	9.703	13.0	3.6	NO		NO	bb
9	9 181202M2_10	Standard	12.500	6.58	14903.161	18144.816	10.267	13.7	9.6	NO		NO	bb
10	10 181202M2_11	Standard	12.500	6.59	13767.813	15942.904	10.795	14.4	15.3	NO		NO	bb

Compound name: d5-N-ETFOSA

Response Factor: 0.0968703

RRF SD: 0.00748514, Relative SD: 7.72697

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 181202M2_2	Standard	150.000	6.48	24911.125	23137.404	13.458	138.9	-7.4	NO		NO	bb
2	2 181202M2_3	Standard	150.000	6.48	25905.633	24411.752	13.265	136.9	-8.7	NO		NO	bb
3	3 181202M2_4	Standard	150.000	6.48	26066.096	23006.633	14.162	146.2	-2.5	NO		NO	bb
4	4 181202M2_5	Standard	150.000	6.48	26996.768	24286.953	13.895	143.4	-4.4	NO		NO	bb
5	5 181202M2_6	Standard	150.000	6.48	26445.541	23607.182	14.003	144.6	-3.6	NO		NO	bb
6	6 181202M2_7	Standard	150.000	6.48	26195.615	23511.537	13.927	143.8	-4.2	NO		NO	bb
7	7 181202M2_8	Standard	150.000	6.48	26339.674	22404.008	14.696	151.7	1.1	NO		NO	bb
8	8 181202M2_9	Standard	150.000	6.48	25286.291	20433.953	15.468	159.7	6.5	NO		NO	bb
9	9 181202M2_10	Standard	150.000	6.48	22605.516	18144.816	15.573	160.8	7.2	NO		NO	bb
10	10 181202M2_11	Standard	150.000	6.48	21501.488	15942.904	16.858	174.0	16.0	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: 13C2-PFHxDA

Response Factor: 0.714274

RRF SD: 0.080169, Relative SD: 11.2238

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 181202M2_2	Standard	5.000	6.89	6306.773	23137.404	3.407	4.8	-4.6	NO		NO	bb
2	2 181202M2_3	Standard	5.000	6.89	6244.700	24411.752	3.198	4.5	-10.5	NO		NO	bb
3	3 181202M2_4	Standard	5.000	6.89	6307.689	23006.633	3.427	4.8	-4.0	NO		NO	bb
4	4 181202M2_5	Standard	5.000	6.89	6361.806	24286.953	3.274	4.6	-8.3	NO		NO	bb
5	5 181202M2_6	Standard	5.000	6.89	6326.135	23607.182	3.350	4.7	-6.2	NO		NO	bb
6	6 181202M2_7	Standard	5.000	6.89	6280.527	23511.537	3.339	4.7	-6.5	NO		NO	bb
7	7 181202M2_8	Standard	5.000	6.89	6171.491	22404.008	3.443	4.8	-3.6	NO		NO	bb
8	8 181202M2_9	Standard	5.000	6.89	6143.526	20433.953	3.758	5.3	5.2	NO		NO	bb
9	9 181202M2_10	Standard	5.000	6.89	5907.690	18144.816	4.070	5.7	14.0	NO		NO	bb
10	10 181202M2_11	Standard	5.000	6.89	5672.422	15942.904	4.447	6.2	24.5	NO		NO	MM

Compound name: d7-N-MeFOSE

Response Factor: 0.0359771

RRF SD: 0.0051661, Relative SD: 14.3594

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 181202M2_2	Standard	150.000	6.67	8924.660	23137.404	4.822	134.0	-10.7	NO		NO	bb
2	2 181202M2_3	Standard	150.000	6.67	9346.182	24411.752	4.786	133.0	-11.3	NO		NO	bb
3	3 181202M2_4	Standard	150.000	6.67	9089.852	23006.633	4.939	137.3	-8.5	NO		NO	bb
4	4 181202M2_5	Standard	150.000	6.67	9784.962	24286.953	5.036	140.0	-6.7	NO		NO	bb
5	5 181202M2_6	Standard	150.000	6.67	9258.698	23607.182	4.902	136.3	-9.2	NO		NO	bb
6	6 181202M2_7	Standard	150.000	6.67	9389.959	23511.537	4.992	138.8	-7.5	NO		NO	bb
7	7 181202M2_8	Standard	150.000	6.67	9656.651	22404.008	5.388	149.8	-0.2	NO		NO	MM
8	8 181202M2_9	Standard	150.000	6.67	9467.294	20433.953	5.791	161.0	7.3	NO		NO	bb
9	9 181202M2_10	Standard	150.000	6.67	8844.866	18144.816	6.093	169.4	12.9	NO		NO	bb
10	10 181202M2_11	Standard	150.000	6.67	9204.148	15942.904	7.216	200.6	33.7	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: d9-N-EtFOSE

Response Factor: 0.0361215

RRF SD: 0.00475614, Relative SD: 13.167

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 181202M2_2	Standard	150.000	6.82	9267.479	23137.404	5.007	138.6	-7.6	NO		NO	bb
2	2 181202M2_3	Standard	150.000	6.82	9417.438	24411.752	4.822	133.5	-11.0	NO		NO	bb
3	3 181202M2_4	Standard	150.000	6.82	9367.441	23006.633	5.090	140.9	-6.1	NO		NO	MM
4	4 181202M2_5	Standard	150.000	6.82	9831.002	24286.953	5.060	140.1	-6.6	NO		NO	MM
5	5 181202M2_6	Standard	150.000	6.82	9178.014	23607.182	4.860	134.5	-10.3	NO		NO	bb
6	6 181202M2_7	Standard	150.000	6.82	9518.834	23511.537	5.061	140.1	-6.6	NO		NO	bb
7	7 181202M2_8	Standard	150.000	6.82	9371.340	22404.008	5.229	144.8	-3.5	NO		NO	bb
8	8 181202M2_9	Standard	150.000	6.82	9438.916	20433.953	5.774	159.9	6.6	NO		NO	bb
9	9 181202M2_10	Standard	150.000	6.81	9147.148	18144.816	6.301	174.5	16.3	NO		NO	bb
10	10 181202M2_11	Standard	150.000	6.82	8901.749	15942.904	6.979	193.2	28.8	NO		NO	bb

Compound name: 13C4-PFBA

Response Factor: 1

RRF SD: 5.23364e-017, Relative SD: 5.23364e-015

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 181202M2_2	Standard	12.500	1.47	8755.424	8755.424	12.500	12.5	0.0	NO		NO	MM
2	2 181202M2_3	Standard	12.500	1.47	8985.498	8985.498	12.500	12.5	0.0	NO		NO	MM
3	3 181202M2_4	Standard	12.500	1.47	9024.967	9024.967	12.500	12.5	0.0	NO		NO	MM
4	4 181202M2_5	Standard	12.500	1.47	9577.717	9577.717	12.500	12.5	0.0	NO		NO	MM
5	5 181202M2_6	Standard	12.500	1.47	9216.354	9216.354	12.500	12.5	0.0	NO		NO	MM
6	6 181202M2_7	Standard	12.500	1.47	9417.552	9417.552	12.500	12.5	0.0	NO		NO	MM
7	7 181202M2_8	Standard	12.500	1.47	9412.593	9412.593	12.500	12.5	0.0	NO		NO	MM
8	8 181202M2_9	Standard	12.500	1.47	9230.500	9230.500	12.500	12.5	0.0	NO		NO	MM
9	9 181202M2_10	Standard	12.500	1.47	8827.580	8827.580	12.500	12.5	0.0	NO		NO	MM
10	10 181202M2_11	Standard	12.500	1.47	8699.136	8699.136	12.500	12.5	0.0	NO		NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: 13C5-PFHxA

Response Factor: 1

RRF SD: 0, Relative SD: 0

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 181202M2_2	Standard	12.500	3.60	21884.557	21884.557	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	3.61	22519.205	22519.205	12.500	12.5	0.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	3.61	22580.148	22580.148	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	3.61	23437.223	23437.223	12.500	12.5	0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	3.61	23364.684	23364.684	12.500	12.5	0.0	NO		NO	bb
6	6 181202M2_7	Standard	12.500	3.61	23122.318	23122.318	12.500	12.5	0.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	3.61	22645.541	22645.541	12.500	12.5	0.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	3.61	22215.309	22215.309	12.500	12.5	0.0	NO		NO	bb
9	9 181202M2_10	Standard	12.500	3.61	19415.918	19415.918	12.500	12.5	0.0	NO		NO	bb
10	10 181202M2_11	Standard	12.500	3.61	18135.842	18135.842	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C3-PFHxS

Response Factor: 1

RRF SD: 5.23364e-017, Relative SD: 5.23364e-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 181202M2_2	Standard	12.500	4.37	3754.038	3754.038	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	4.37	3915.824	3915.824	12.500	12.5	0.0	NO		NO	MM
3	3 181202M2_4	Standard	12.500	4.37	4004.437	4004.437	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	4.37	3967.956	3967.956	12.500	12.5	0.0	NO		NO	MM
5	5 181202M2_6	Standard	12.500	4.37	4000.192	4000.192	12.500	12.5	0.0	NO		NO	MM
6	6 181202M2_7	Standard	12.500	4.37	3978.497	3978.497	12.500	12.5	0.0	NO		NO	MM
7	7 181202M2_8	Standard	12.500	4.37	3909.020	3909.020	12.500	12.5	0.0	NO		NO	MM
8	8 181202M2_9	Standard	12.500	4.37	3727.478	3727.478	12.500	12.5	0.0	NO		NO	MM
9	9 181202M2_10	Standard	12.500	4.37	3357.620	3357.620	12.500	12.5	0.0	NO		NO	MM
10	10 181202M2_11	Standard	12.500	4.37	2867.818	2867.818	12.500	12.5	0.0	NO		NO	MM

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Compound name: 13C8-PFOA

Response Factor: 1

RRF SD: 8.27511e-017, Relative SD: 8.27511e-015

Response type: Internal Std (Ref 63), Area * (IS Conc. / IS Area)

Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 181202M2_2	Standard	12.500	4.72	25427.918	25427.918	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	4.73	26231.518	26231.518	12.500	12.5	0.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	4.73	26898.668	26898.668	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	4.72	27182.742	27182.742	12.500	12.5	0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	4.73	25823.834	25823.834	12.500	12.5	0.0	NO		NO	bb
6	6 181202M2_7	Standard	12.500	4.73	26537.365	26537.365	12.500	12.5	0.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	4.73	25198.629	25198.629	12.500	12.5	0.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	4.72	24351.957	24351.957	12.500	12.5	0.0	NO		NO	bb
9	9 181202M2_10	Standard	12.500	4.73	21780.797	21780.797	12.500	12.5	0.0	NO		NO	bb
10	10 181202M2_11	Standard	12.500	4.73	19460.047	19460.047	12.500	12.5	0.0	NO		NO	bb

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 181202M2_2	Standard	12.500	5.16	24645.154	24645.154	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.16	24770.145	24770.145	12.500	12.5	0.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.16	25069.092	25069.092	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.16	26512.268	26512.268	12.500	12.5	0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.16	25536.010	25536.010	12.500	12.5	0.0	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.16	25328.764	25328.764	12.500	12.5	0.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.16	24528.369	24528.369	12.500	12.5	0.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.16	23726.076	23726.076	12.500	12.5	0.0	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.16	21062.650	21062.650	12.500	12.5	0.0	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.16	18684.068	18684.068	12.500	12.5	0.0	NO		NO	bb

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Compound name: 13C4-PFOS

Response Factor: 1

RRF SD: 1.04673e-016, Relative SD: 1.04673e-014

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 181202M2_2	Standard	12.500	5.24	4124.125	4124.125	12.500	12.5	0.0	NO		NO	MM
2	2 181202M2_3	Standard	12.500	5.24	4043.074	4043.074	12.500	12.5	0.0	NO		NO	MM
3	3 181202M2_4	Standard	12.500	5.24	3968.353	3968.353	12.500	12.5	0.0	NO		NO	MM
4	4 181202M2_5	Standard	12.500	5.24	4217.781	4217.781	12.500	12.5	0.0	NO		NO	MM
5	5 181202M2_6	Standard	12.500	5.24	4195.018	4195.018	12.500	12.5	0.0	NO		NO	MM
6	6 181202M2_7	Standard	12.500	5.24	4019.653	4019.653	12.500	12.5	0.0	NO		NO	MM
7	7 181202M2_8	Standard	12.500	5.24	4145.392	4145.392	12.500	12.5	0.0	NO		NO	MM
8	8 181202M2_9	Standard	12.500	5.24	4103.915	4103.915	12.500	12.5	0.0	NO		NO	MM
9	9 181202M2_10	Standard	12.500	5.24	3697.286	3697.286	12.500	12.5	0.0	NO		NO	MM
10	10 181202M2_11	Standard	12.500	5.24	2980.433	2980.433	12.500	12.5	0.0	NO		NO	MM

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 181202M2_2	Standard	12.500	5.54	21716.037	21716.037	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.54	21340.531	21340.531	12.500	12.5	0.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.54	21966.305	21966.305	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.53	23800.488	23800.488	12.500	12.5	0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.54	21413.693	21413.693	12.500	12.5	0.0	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.54	22298.768	22298.768	12.500	12.5	0.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.54	21747.414	21747.414	12.500	12.5	0.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.53	20217.711	20217.711	12.500	12.5	0.0	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.54	17926.432	17926.432	12.500	12.5	0.0	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.54	15987.726	15987.726	12.500	12.5	0.0	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Compound name: 13C7-PFUdA

Response Factor: 1

RRF SD: 0, Relative SD: 0

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 181202M2_2	Standard	12.500	5.85	23137.404	23137.404	12.500	12.5	0.0	NO		NO	bb
2	2 181202M2_3	Standard	12.500	5.86	24411.752	24411.752	12.500	12.5	0.0	NO		NO	bb
3	3 181202M2_4	Standard	12.500	5.86	23006.633	23006.633	12.500	12.5	0.0	NO		NO	bb
4	4 181202M2_5	Standard	12.500	5.85	24286.953	24286.953	12.500	12.5	0.0	NO		NO	bb
5	5 181202M2_6	Standard	12.500	5.85	23607.182	23607.182	12.500	12.5	0.0	NO		NO	bb
6	6 181202M2_7	Standard	12.500	5.86	23511.537	23511.537	12.500	12.5	0.0	NO		NO	bb
7	7 181202M2_8	Standard	12.500	5.85	22404.008	22404.008	12.500	12.5	0.0	NO		NO	bb
8	8 181202M2_9	Standard	12.500	5.85	20433.953	20433.953	12.500	12.5	0.0	NO		NO	bb
9	9 181202M2_10	Standard	12.500	5.85	18144.816	18144.816	12.500	12.5	0.0	NO		NO	bb
10	10 181202M2_11	Standard	12.500	5.86	15942.904	15942.904	12.500	12.5	0.0	NO		NO	bb

Dataset: Untitled

Last Altered: Monday, December 03, 2018 10:44:14 Pacific Standard Time

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	181202M2_1	IPA	02-Dec-18	18:24:21
2	2	181202M2_2	ST181202M2-1 PFC CS-2 18K3001	02-Dec-18	18:34:57
3	3	181202M2_3	ST181202M2-2 PFC CS-1 18K3002	02-Dec-18	18:45:35
4	4	181202M2_4	ST181202M2-3 PFC CS0 18K3003	02-Dec-18	18:56:07
5	5	181202M2_5	ST181202M2-4 PFC CS1 18K3004	02-Dec-18	19:06:45
6	6	181202M2_6	ST181202M2-5 PFC CS2 18K3005	02-Dec-18	19:17:17
7	7	181202M2_7	ST181202M2-6 PFC CS3 18K3006	02-Dec-18	19:27:56
8	8	181202M2_8	ST181202M2-7 PFC CS4 18K3007	02-Dec-18	19:38:29
9	9	181202M2_9	ST181202M2-8 PFC CS5 18K3008	02-Dec-18	19:49:07
10	10	181202M2_10	ST181202M2-9 PFC CS6 18K3009	02-Dec-18	19:59:40
11	11	181202M2_11	ST181202M2-10 PFC CS6 18K3009	02-Dec-18	20:10:18
12	12	181202M2_12	IPA	02-Dec-18	20:20:57
13	13	181202M2_13	ICV181202M2-1 PFC ICV 18K3011	02-Dec-18	20:31:29
14	14	181202M2_14	IPA	02-Dec-18	20:42:08

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:34:59 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

	# Name	IS#	CoD	CoD Flag	%RSD
1	1 PFBA	36	0.9998	NO	
2	2 PFPeA	37	0.9999	NO	
3	3 PFBS	38	0.9999	NO	
4	4 4:2 FTS	39	0.9998	NO	
5	5 PFHxA	40	1.0000	NO	
6	6 PFPeS	38	1.0000	NO	
7	7 PFHpA	41	0.9995	NO	
8	8 L-PFHxS	42	0.9999	NO	
9	10 6:2 FTS	43	0.9997	NO	
10	11 L-PFOA	44	0.9999	NO	
11	13 PFHpS	47	0.9999	NO	
12	14 PFNA	45	0.9999	NO	
13	15 PFOSA	46	0.9996	NO	
14	16 L-PFOS	47	0.9993	NO	
15	18 PFDA	48	0.9999	NO	
16	19 8:2 FTS	49	0.9999	NO	
17	20 PFNS	47	0.9999	NO	
18	21 L-MeFOSAA	50	0.9997	NO	
19	23 L-EtFOSAA	52	0.9958	NO	

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:35:13 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

#	Name	IS#	CoD	CoD Flag	%RSD
1	25 PFUdA	51	0.9994	NO	
2	26 PFDS	47	0.9997	NO	
3	27 PFDoA	53	0.9998	NO	
4	28 N-MeFOSA	54	0.9989	NO	
5	29 PFTrDA	53	0.9997	NO	
6	30 PFTeDA	55	0.9995	NO	
7	31 N-EtFOSA	56	0.9999	NO	
8	32 PFHxDA	57	0.9988	NO	
9	33 PFODA	57	0.9990	NO	
10	34 N-MeFOSE	58	0.9999	NO	
11	35 N-EtFOSE	59	0.9997	NO	
12	36 13C3-PFBA	60		NO	1.522
13	37 13C3-PFPeA	61		NO	3.760
14	38 13C3-PFBS	62		NO	2.528
15	39 13C2-4:2 FTS	62		NO	7.549
16	40 13C2-PFHxA	61		NO	2.673
17	41 13C4-PFHpA	61		NO	2.859
18	42 18O2-PFHxS	62		NO	2.442
19	43 13C2-6:2 FTS	65		NO	5.640
20	44 13C2-PFOA	63		NO	3.364
21	45 13C5-PFNA	64		NO	2.566
22	46 13C8-PFOSA	67		NO	8.370
23	47 13C8-PFOS	65		NO	4.074
24	48 13C2-PFDA	66		NO	3.311
25	49 13C2-8:2 FTS	65		NO	8.722
26	50 d3-N-MeFOSAA	67		NO	6.446
27	51 13C2-PFUdA	67		NO	4.047
28	52 d5-N-EtFOSAA	67		NO	4.617
29	53 13C2-PFDoA	66		NO	4.071
30	54 d3-N-MeFOSA	67		NO	13.574
31	55 13C2-PFTeDA	67		NO	7.453
32	56 d5-N-ETFOSA	67		NO	7.727

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:35:13 Pacific Standard Time

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

	# Name	IS#	CoD	CoD Flag	%RSD
33	57 13C2-PFHxDA	67		NO	11.224
34	58 d7-N-MeFOSE	67		NO	14.359
35	59 d9-N-EtFOSE	67		NO	13.167
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

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:33:55 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

	Name	Ion Ratio	Ratio out?
1	PFBA		
2	PFPeA		
3	PFBS	2.553	NO
4	4:2 FTS	1.732	NO
5	PFHxA	15.761	NO
6	PFPeS	1.535	NO
7	PFHpA	52.646	NO
8	L-PFHxS	1.723	NO
9	6:2 FTS	2.895	NO
10	L-PFOA	3.277	NO
11	PFHpS	1.648	NO
12	PFNA	7.039	NO
13	PFOSA	39.000	NO
14	L-PFOS	1.863	NO
15	PFDA	8.175	NO
16	8:2 FTS	2.252	NO
17	PFNS	1.614	NO
18	L-MeFOSAA	2.443	NO
19	L-EtFOSAA	1.294	NO

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:34:11 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

	Name	Ion Ratio	Ratio out?
1	PFUdA	18.285	NO
2	PFDS	1.799	NO
3	PFDoA	9.726	NO
4	N-MeFOSA	1.522	NO
5	PFTTrDA	43.805	NO
6	PFTeDA	11.853	NO
7	N-EtFOSA	1.474	NO
8	PFHxDA	36.004	NO
9	PFODA		
10	N-MeFOSE		
11	N-EtFOSE		

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

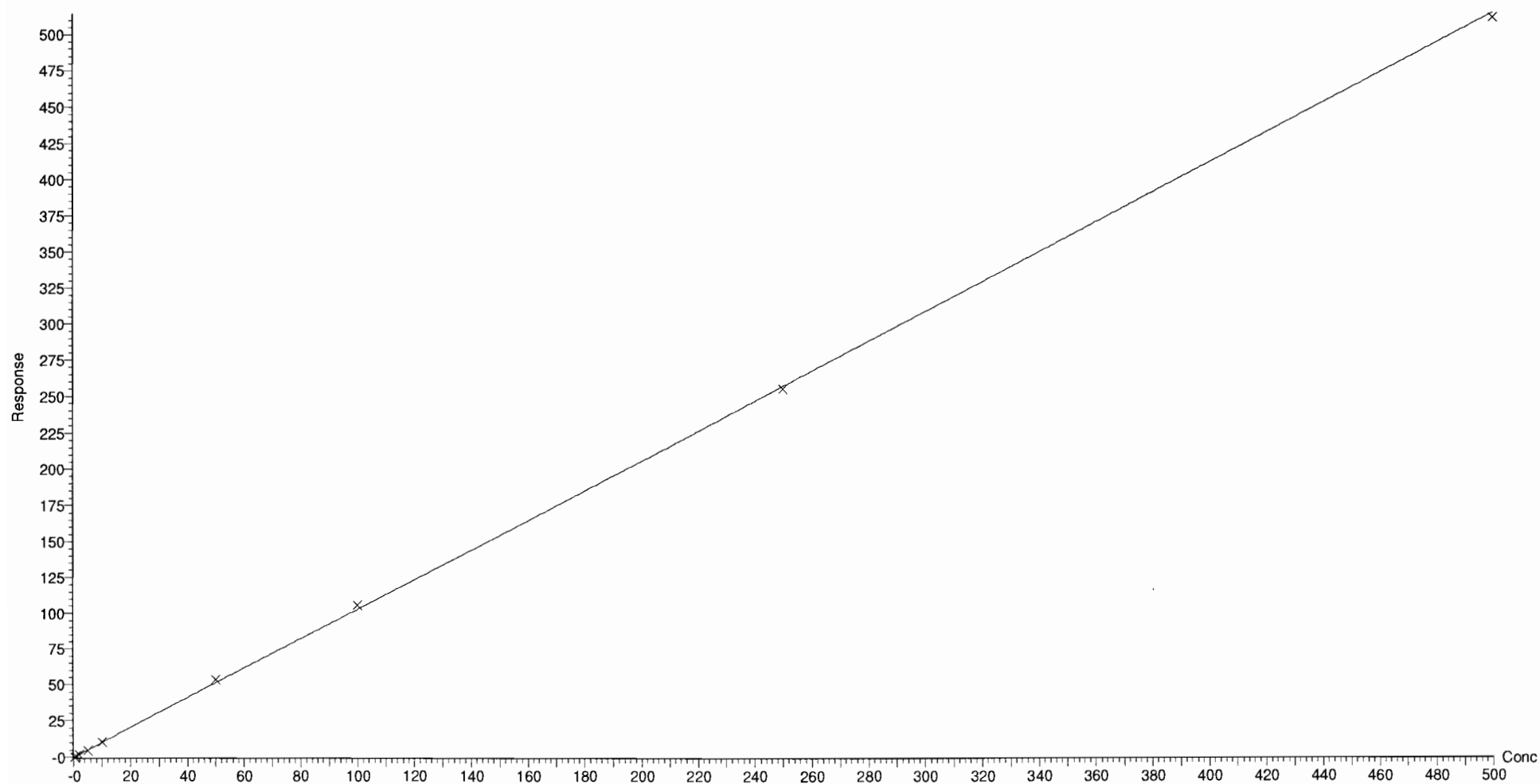
Compound name: PFBA

Correlation coefficient: $r = 0.999881$, $r^2 = 0.999762$

Calibration curve: $1.02847 * x + -0.0331845$

Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

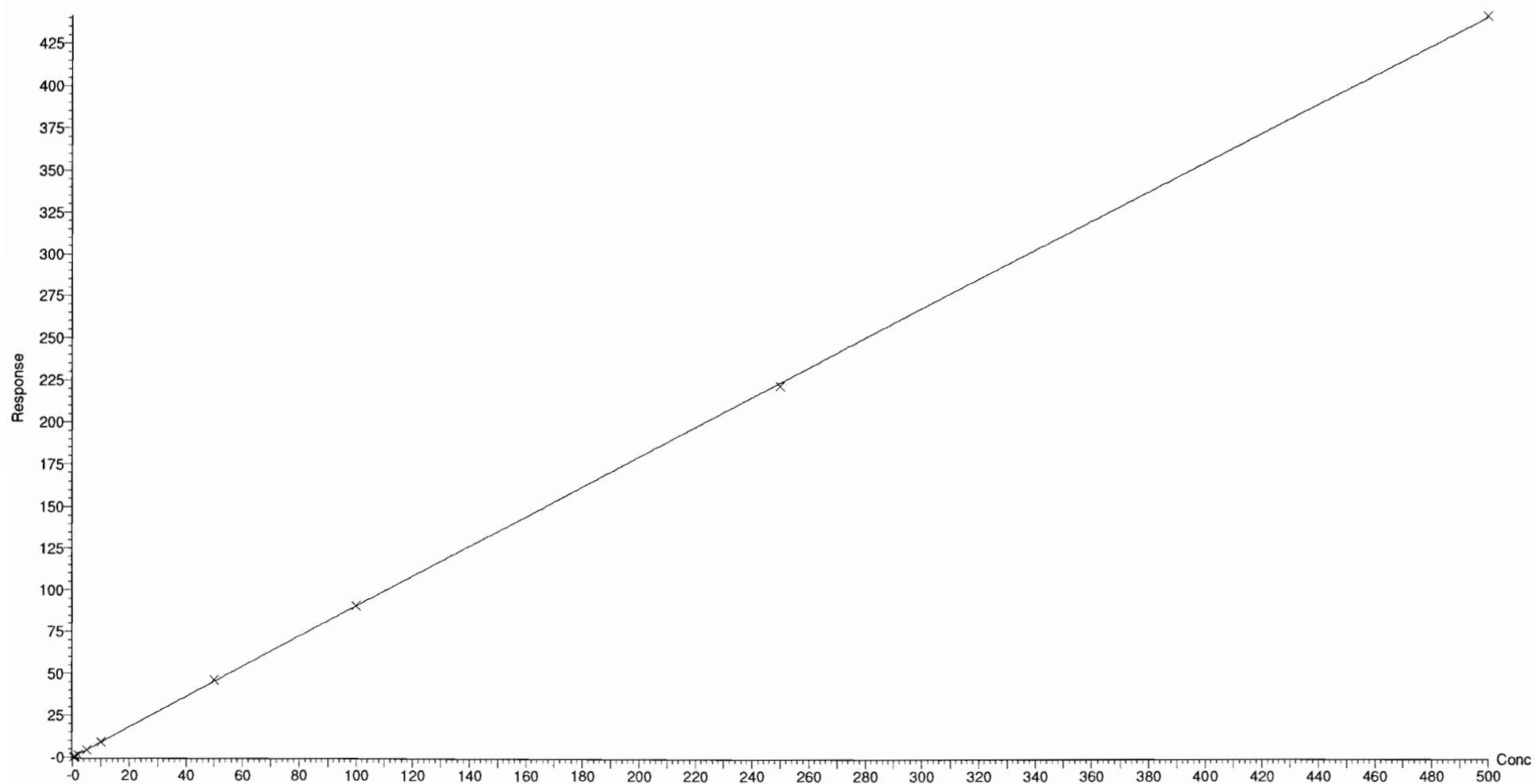
Compound name: PFPeA

Coefficient of Determination: $R^2 = 0.999945$

Calibration curve: $-6.16115e-005 * x^2 + 0.911659 * x + -0.0105295$

Response type: Internal Std (Ref 37), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

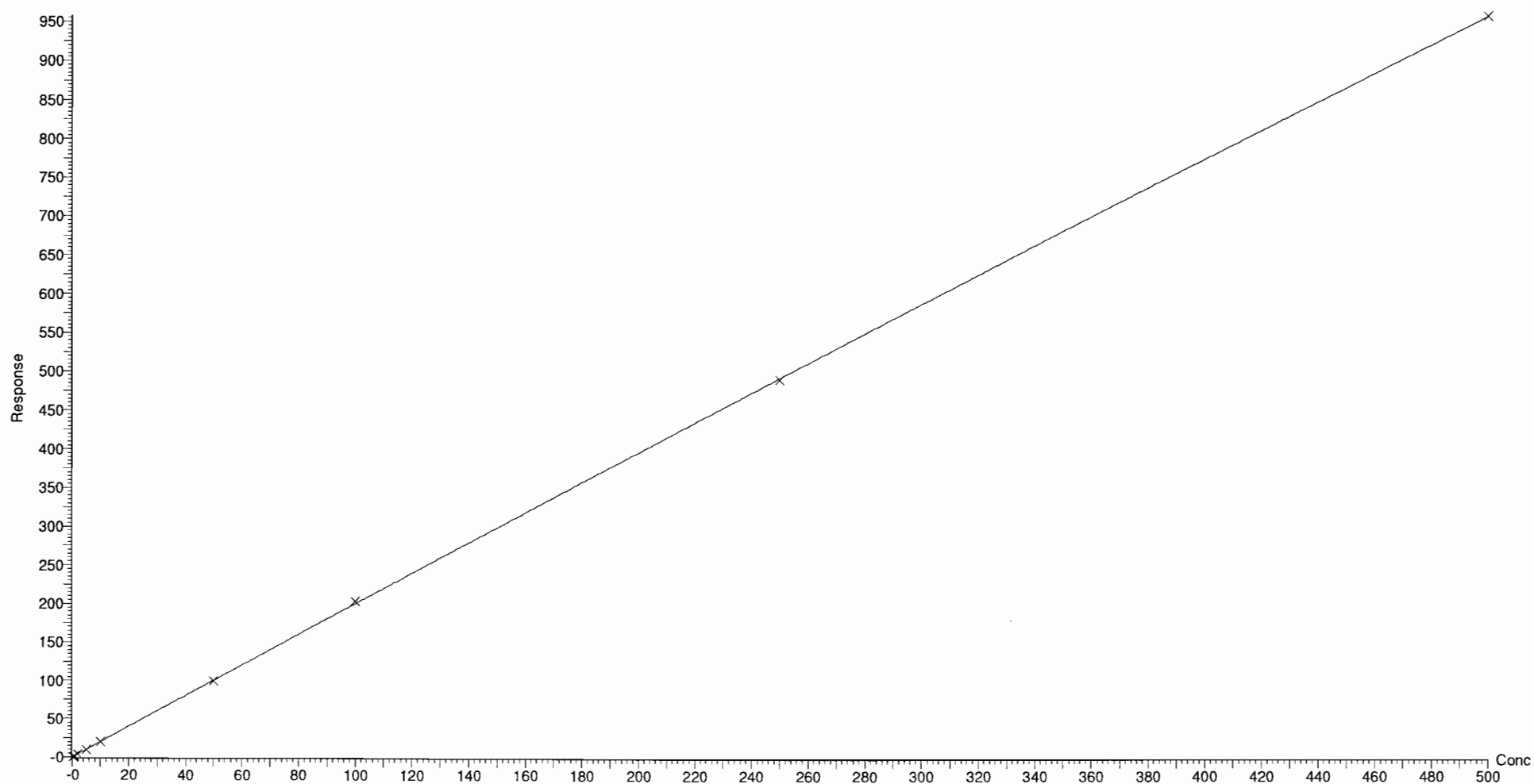
Compound name: PFBS

Coefficient of Determination: $R^2 = 0.999925$

Calibration curve: $-0.000222114 * x^2 + 2.02594 * x + -0.0995002$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

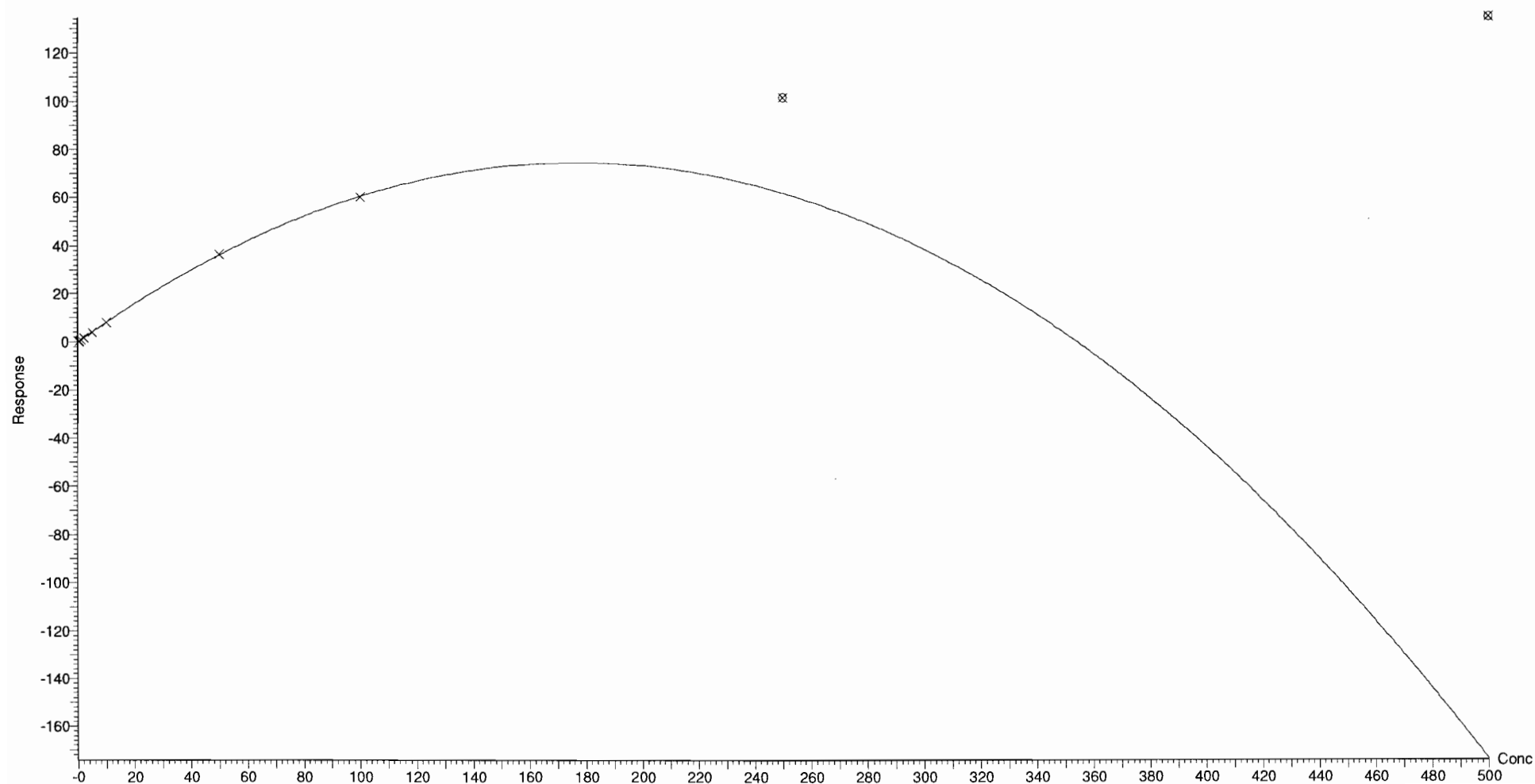
Compound name: 4:2 FTS

Coefficient of Determination: $R^2 = 0.999815$

Calibration curve: $-0.00237929 * x^2 + 0.842016 * x + -0.0207497$

Response type: Internal Std (Ref 39), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

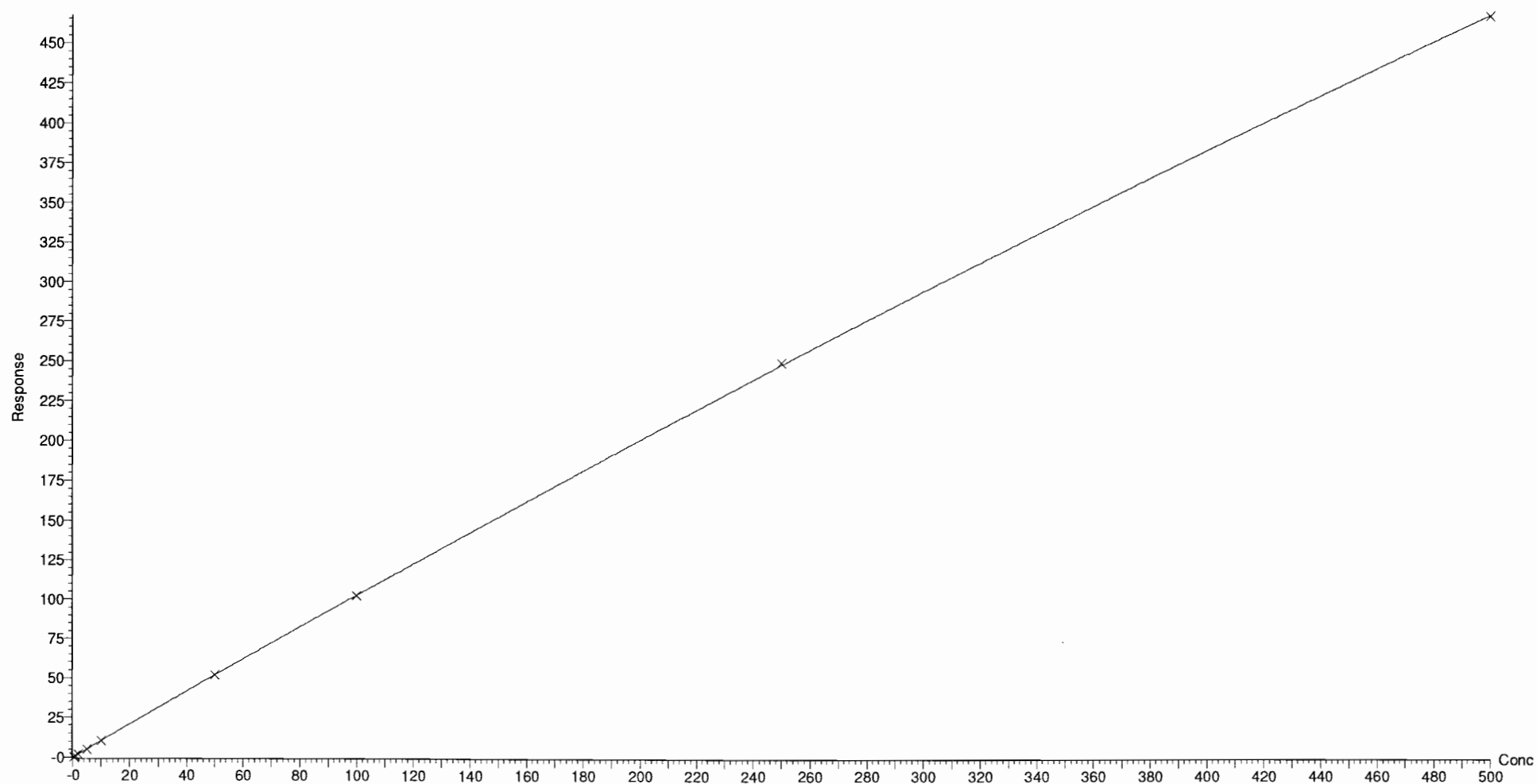
Compound name: PFHxA

Coefficient of Determination: $R^2 = 0.999961$

Calibration curve: $-0.000229785 * x^2 + 1.04977 * x + -0.00145899$

Response type: Internal Std (Ref 40), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

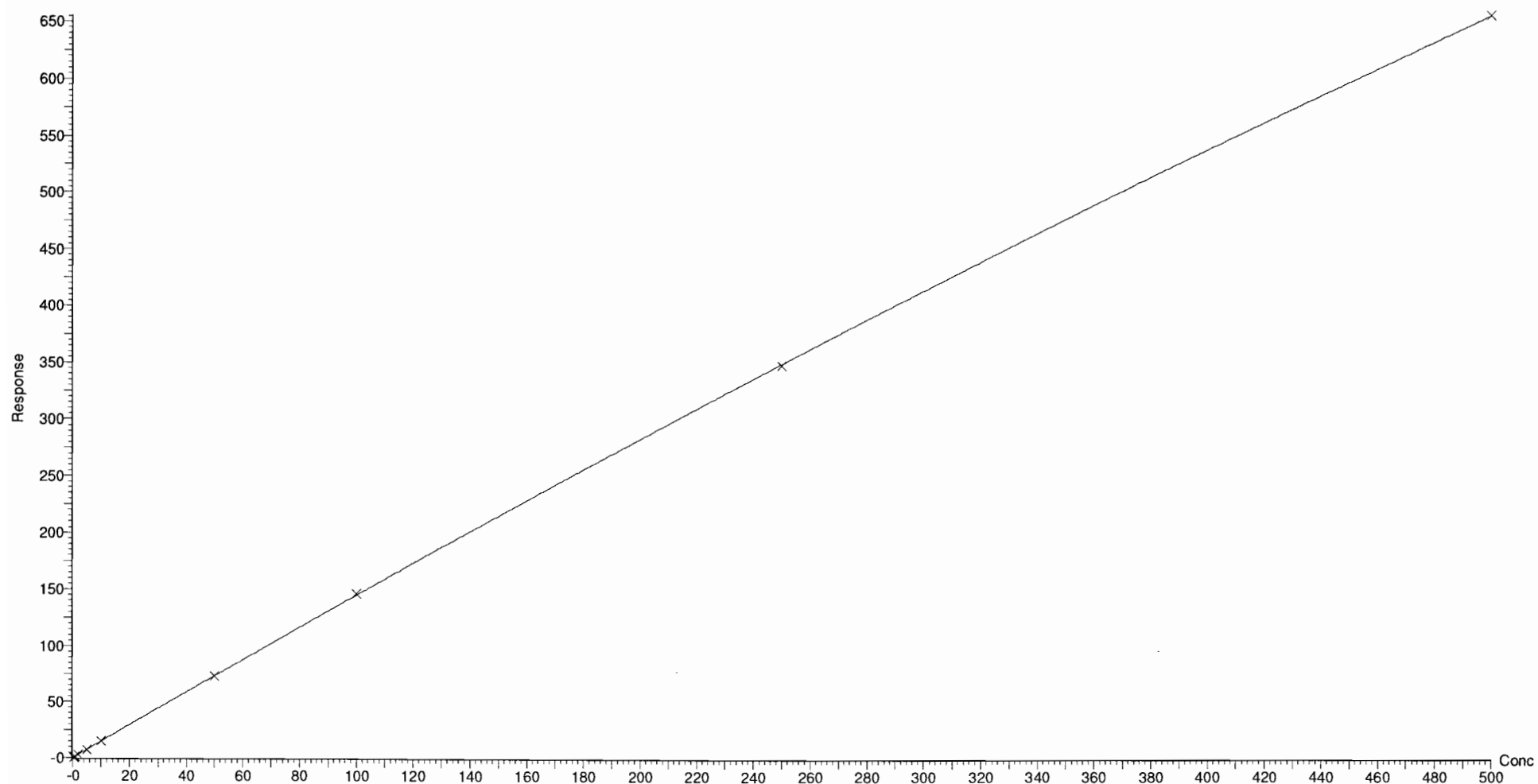
Compound name: PFPeS

Coefficient of Determination: $R^2 = 0.999956$

Calibration curve: $-0.000349257 * x^2 + 1.48431 * x + -0.0700599$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

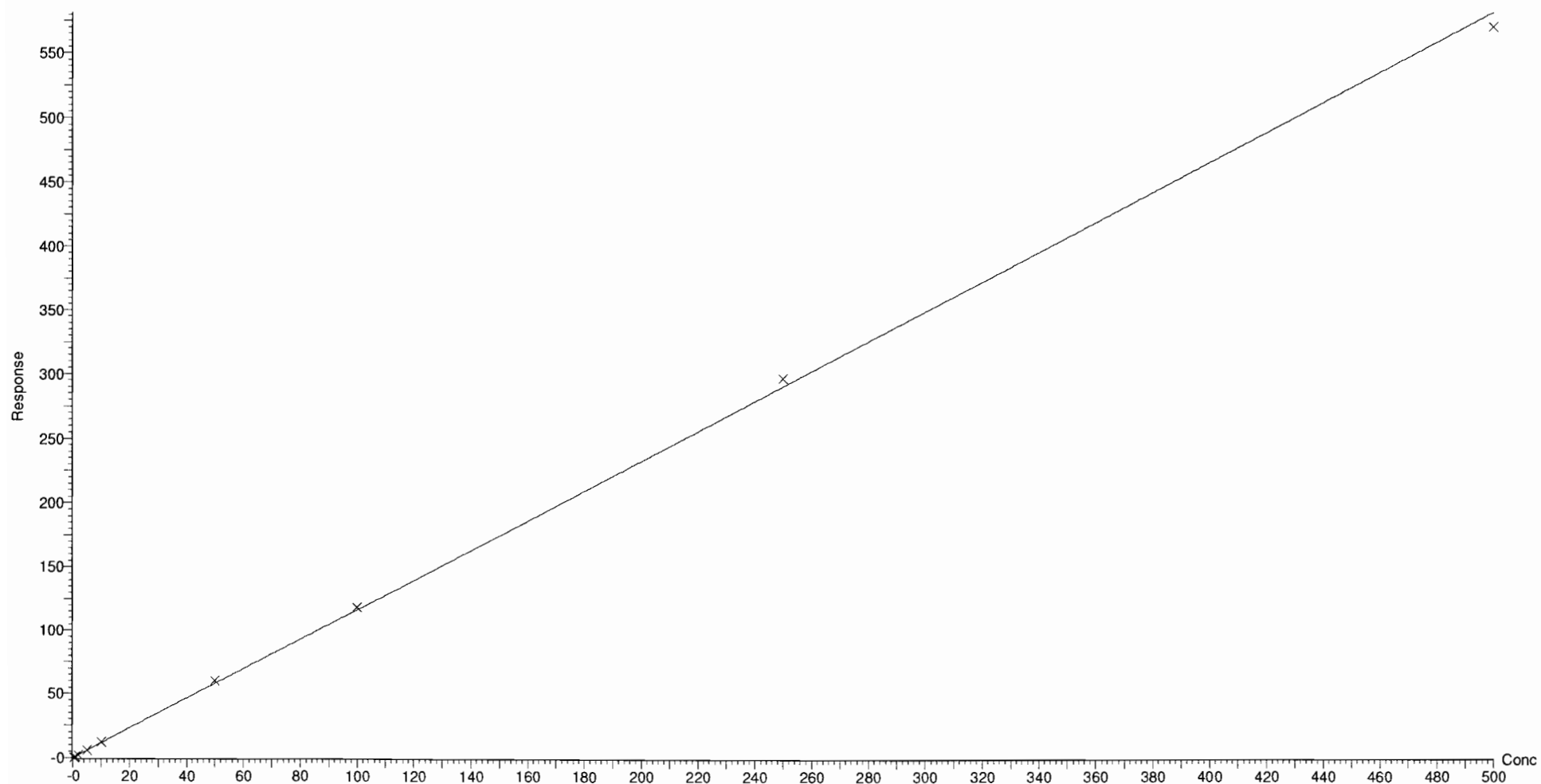
Compound name: PFHpA

Correlation coefficient: $r = 0.999759$, $r^2 = 0.999518$

Calibration curve: $1.16268 * x + 0.00338901$

Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

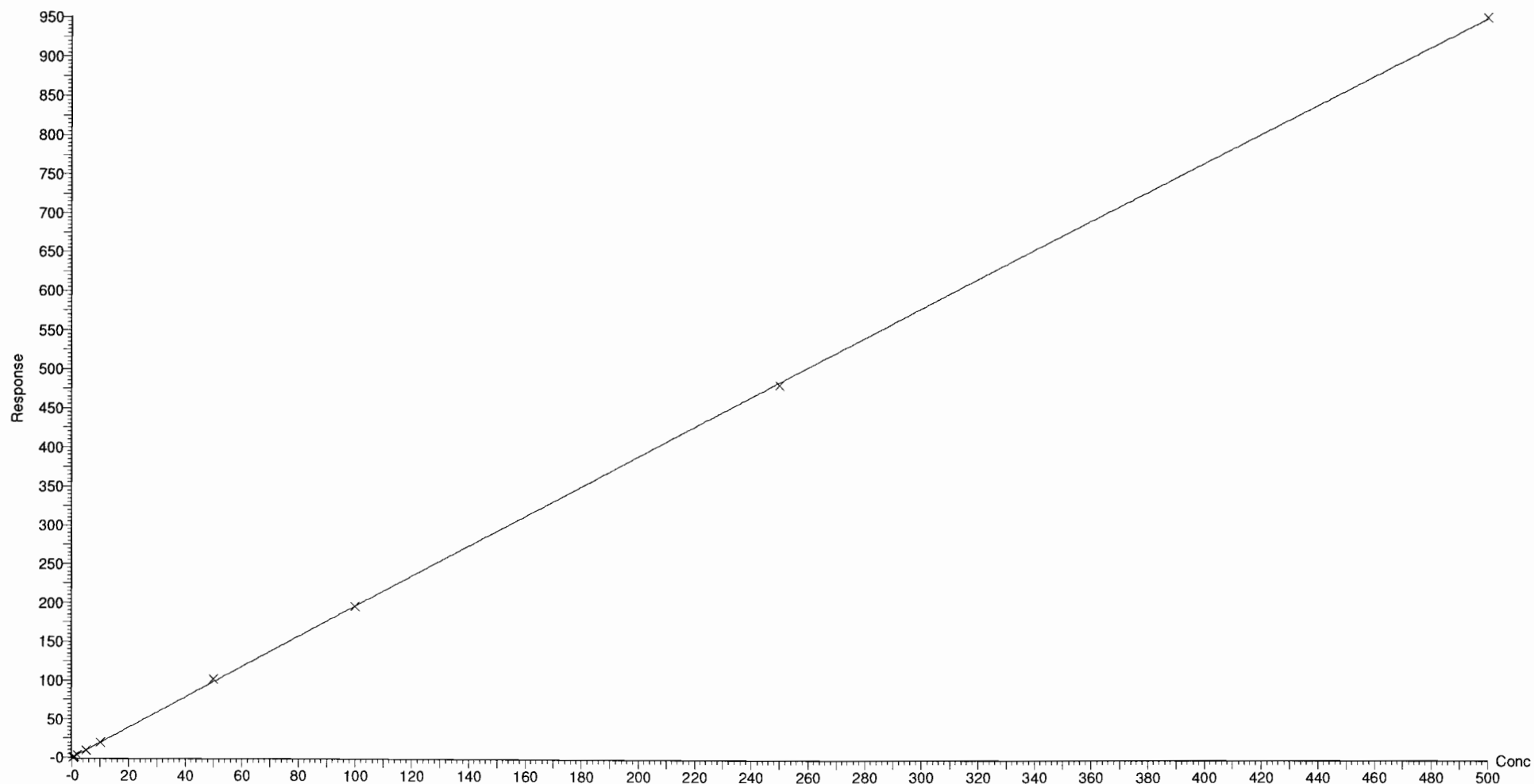
Compound name: L-PFHxS

Coefficient of Determination: $R^2 = 0.999870$

Calibration curve: $-0.000154579 * x^2 + 1.97668 * x + -0.00449101$

Response type: Internal Std (Ref 42), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

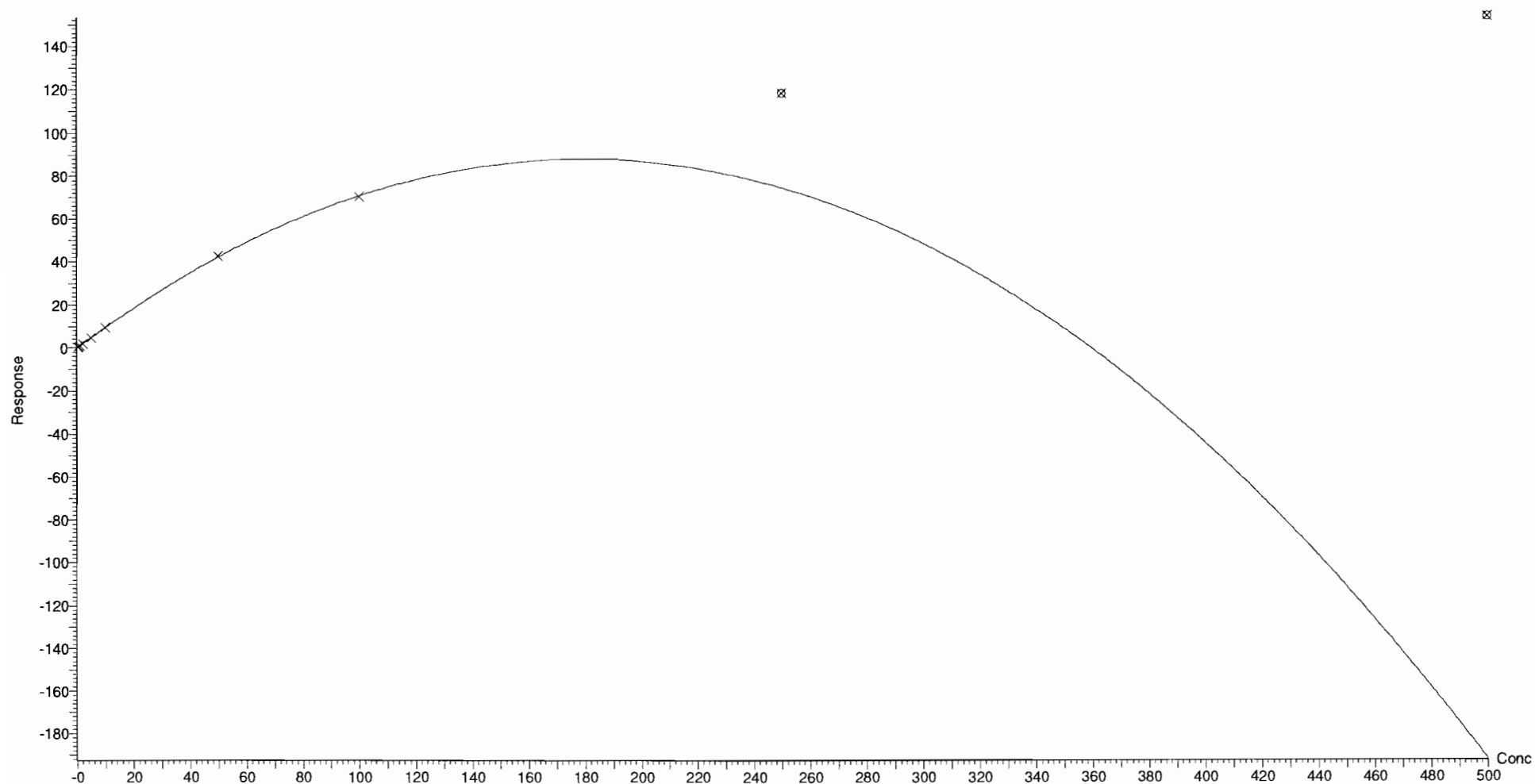
Compound name: 6:2 FTS

Coefficient of Determination: $R^2 = 0.999697$

Calibration curve: $-0.00272892 * x^2 + 0.980454 * x + -0.00268433$

Response type: Internal Std (Ref 43), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

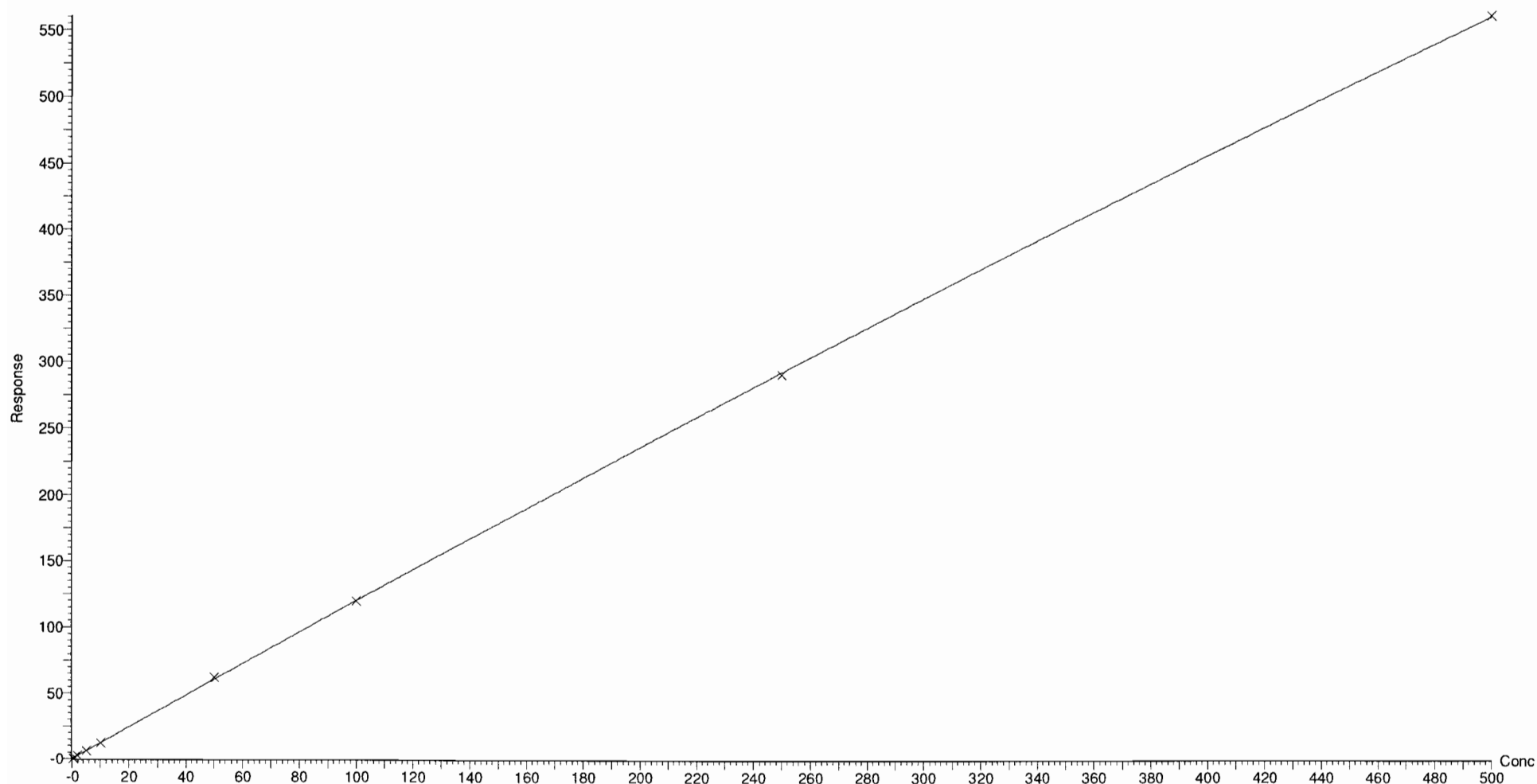
Compound name: L-PFOA

Coefficient of Determination: $R^2 = 0.999937$

Calibration curve: $-0.000202874 \cdot x^2 + 1.22088 \cdot x + 0.0495571$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

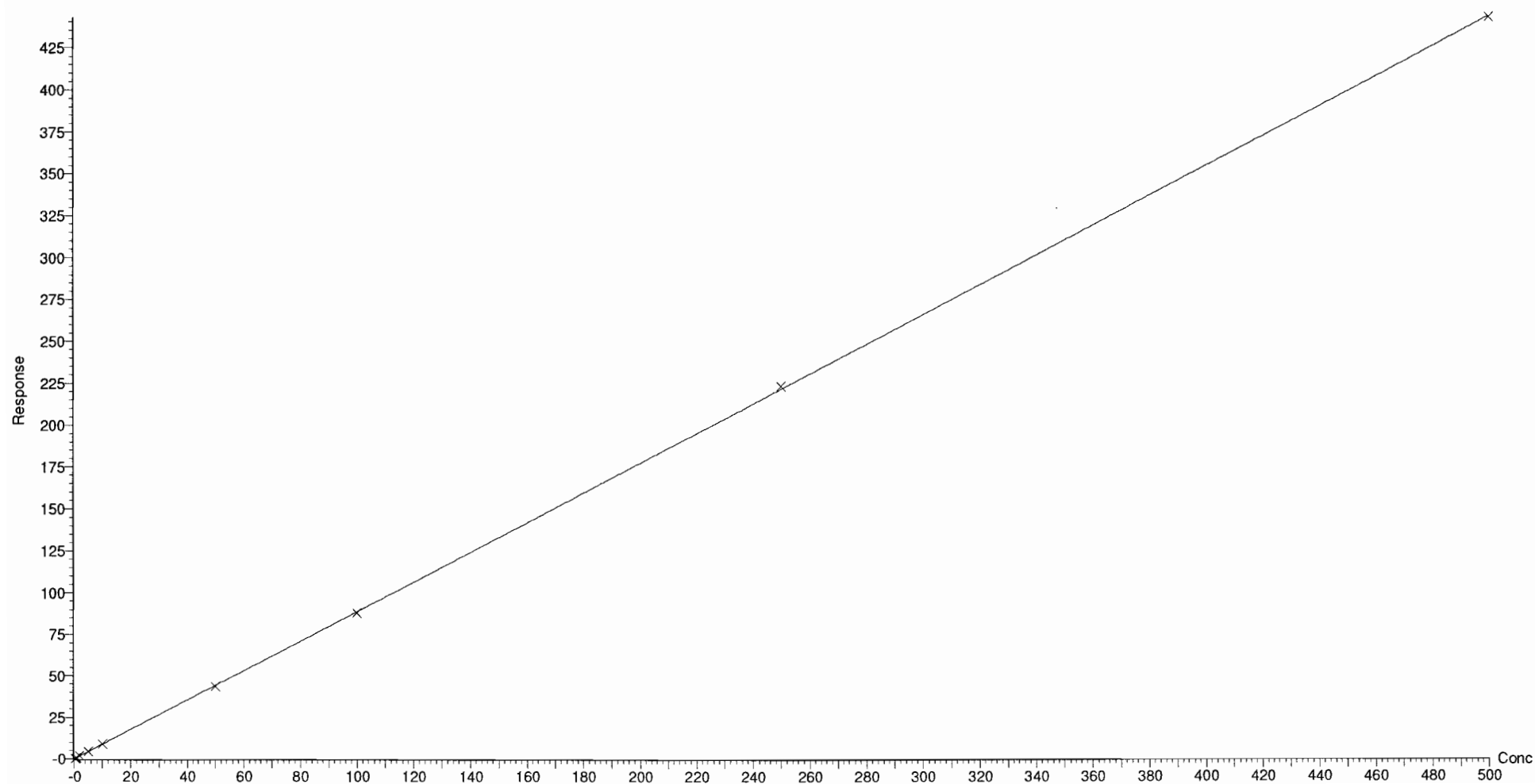
Compound name: PFHpS

Coefficient of Determination: $R^2 = 0.999876$

Calibration curve: $-2.31836e-006 * x^2 + 0.886394 * x + -0.0630138$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

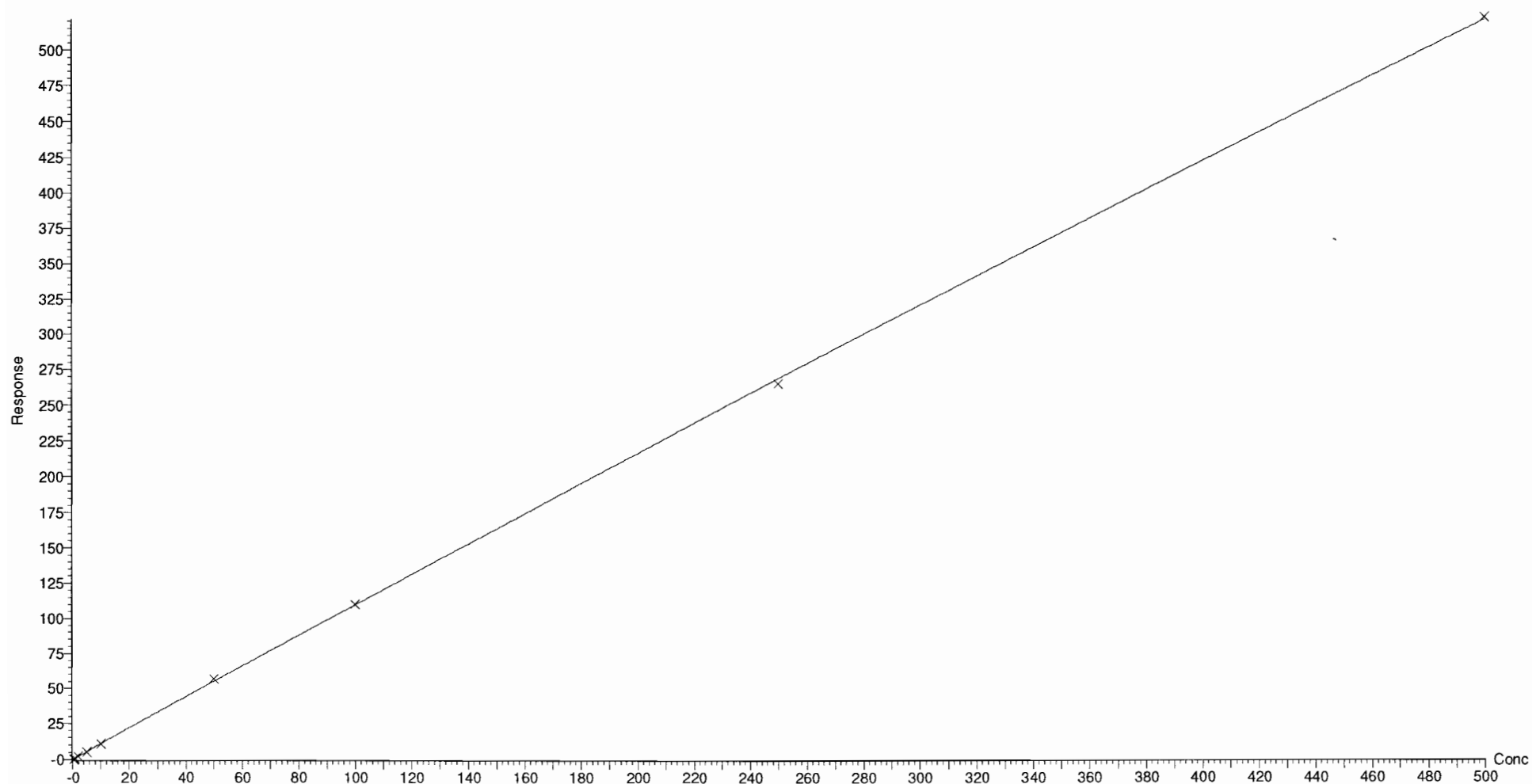
Compound name: PFNA

Coefficient of Determination: $R^2 = 0.999876$

Calibration curve: $-0.000138455 * x^2 + 1.1098 * x + -0.0515303$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

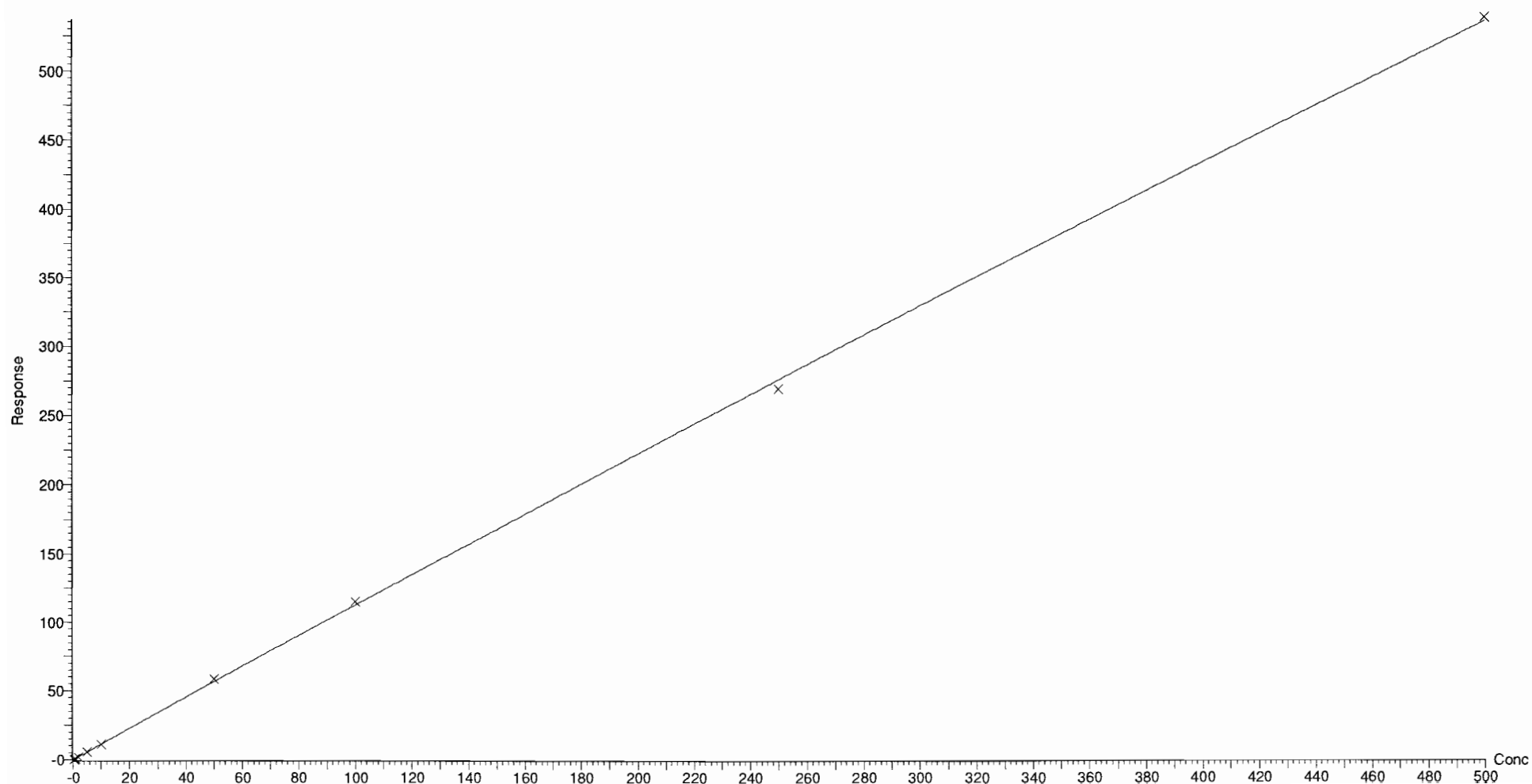
Compound name: PFOSA

Coefficient of Determination: $R^2 = 0.999647$

Calibration curve: $-0.000143866 * x^2 + 1.1409 * x + -0.0296806$

Response type: Internal Std (Ref 46), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

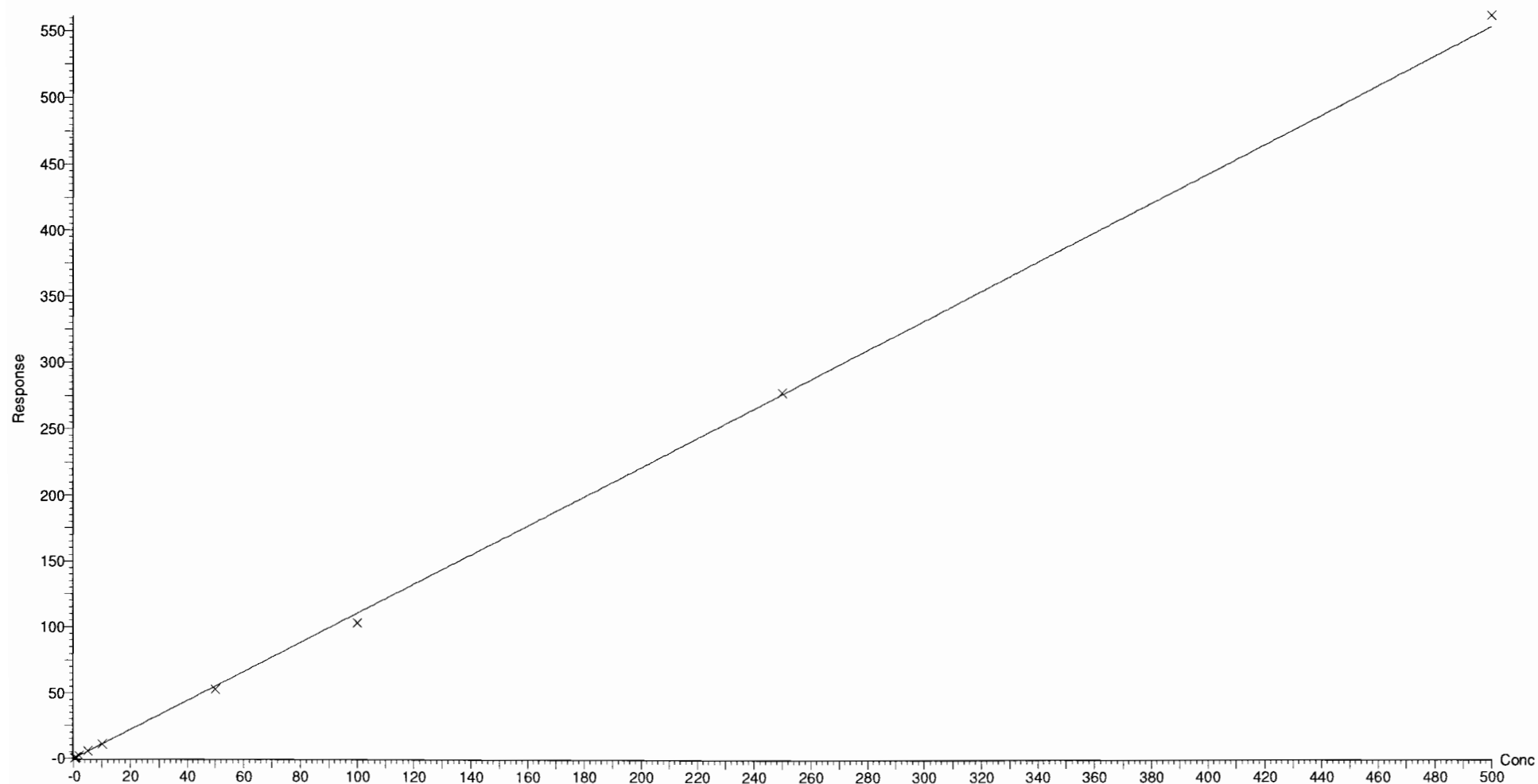
Compound name: L-PFOS

Correlation coefficient: $r = 0.999643$, $r^2 = 0.999286$

Calibration curve: $1.10611 * x + -0.0627829$

Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)

Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

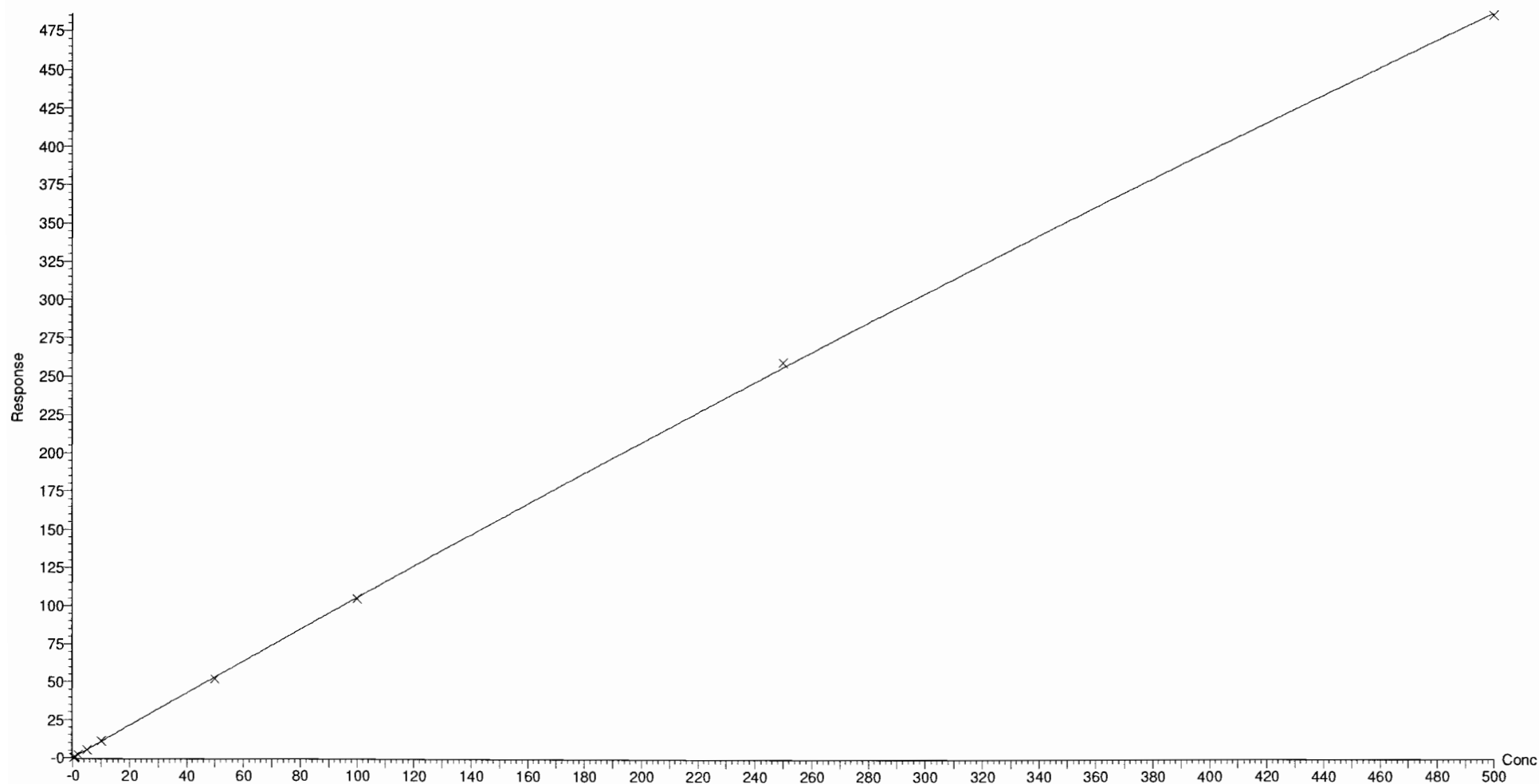
Compound name: PFDA

Coefficient of Determination: $R^2 = 0.999864$

Calibration curve: $-0.000210024 * x^2 + 1.07747 * x + -0.0171268$

Response type: Internal Std (Ref 48), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

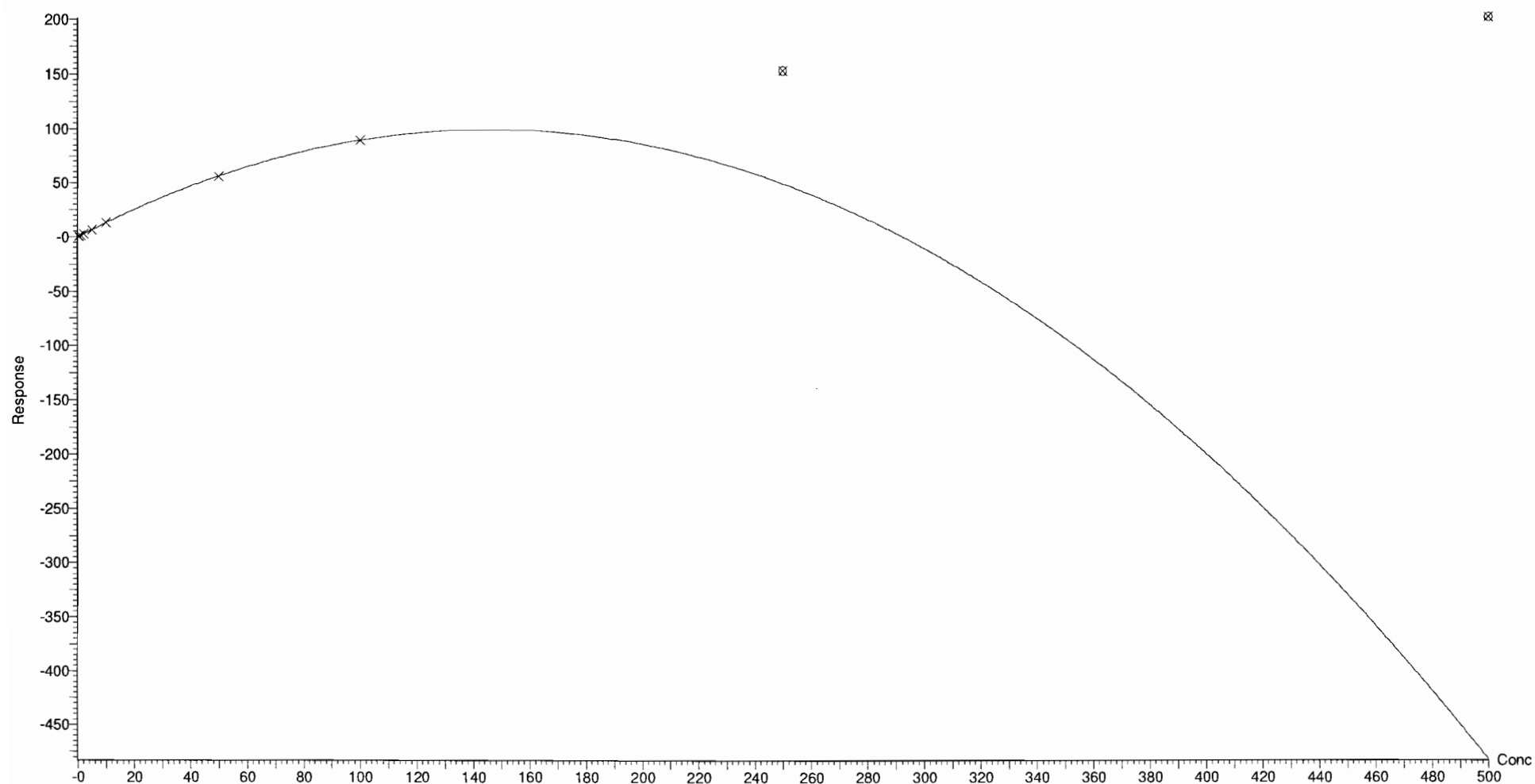
Compound name: 8:2 FTS

Coefficient of Determination: $R^2 = 0.999875$

Calibration curve: $-0.00465207 * x^2 + 1.3615 * x + -0.0995875$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

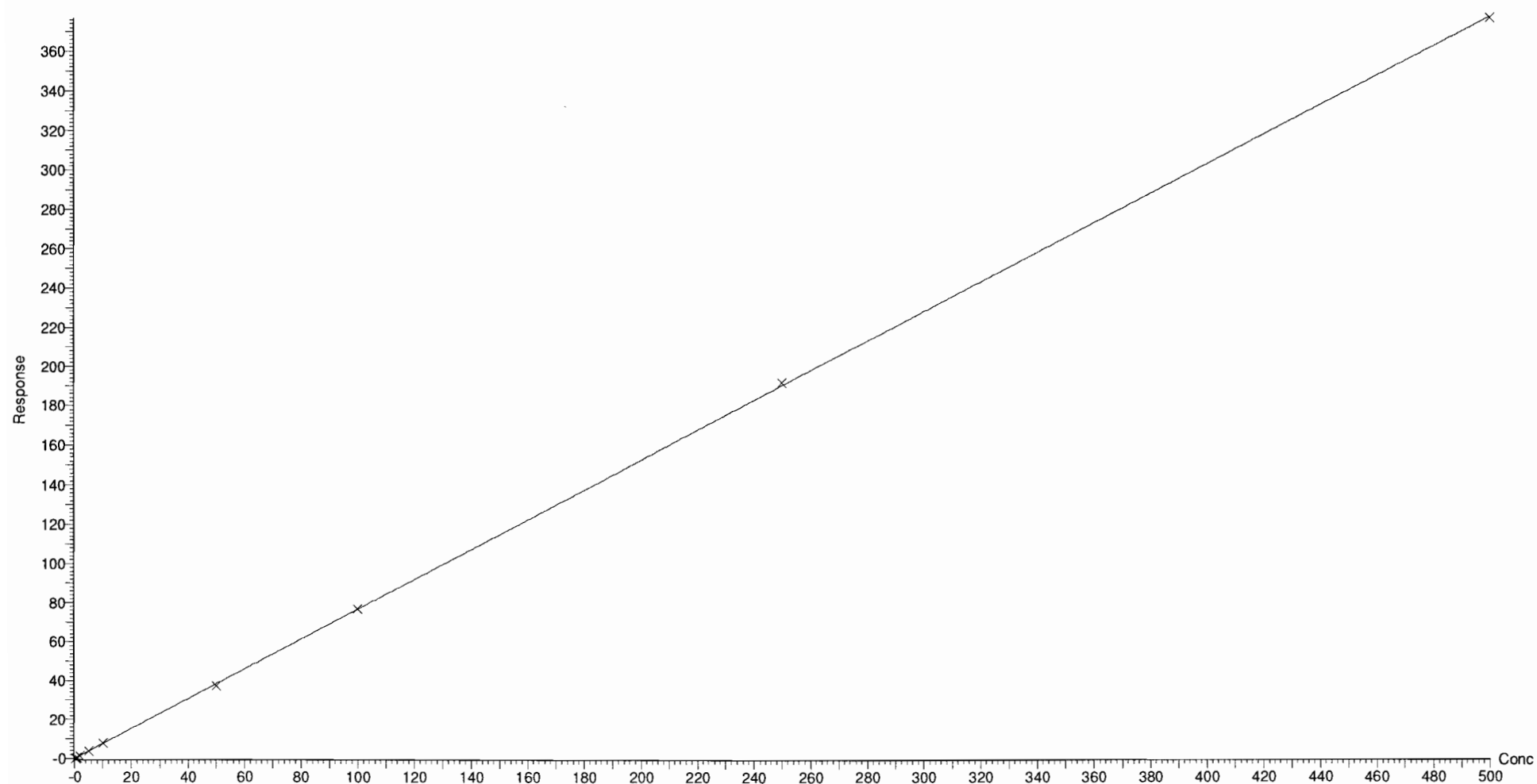
Compound name: PFNS

Coefficient of Determination: $R^2 = 0.999902$

Calibration curve: $-2.99188e-005 * x^2 + 0.768689 * x + 0.0389701$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

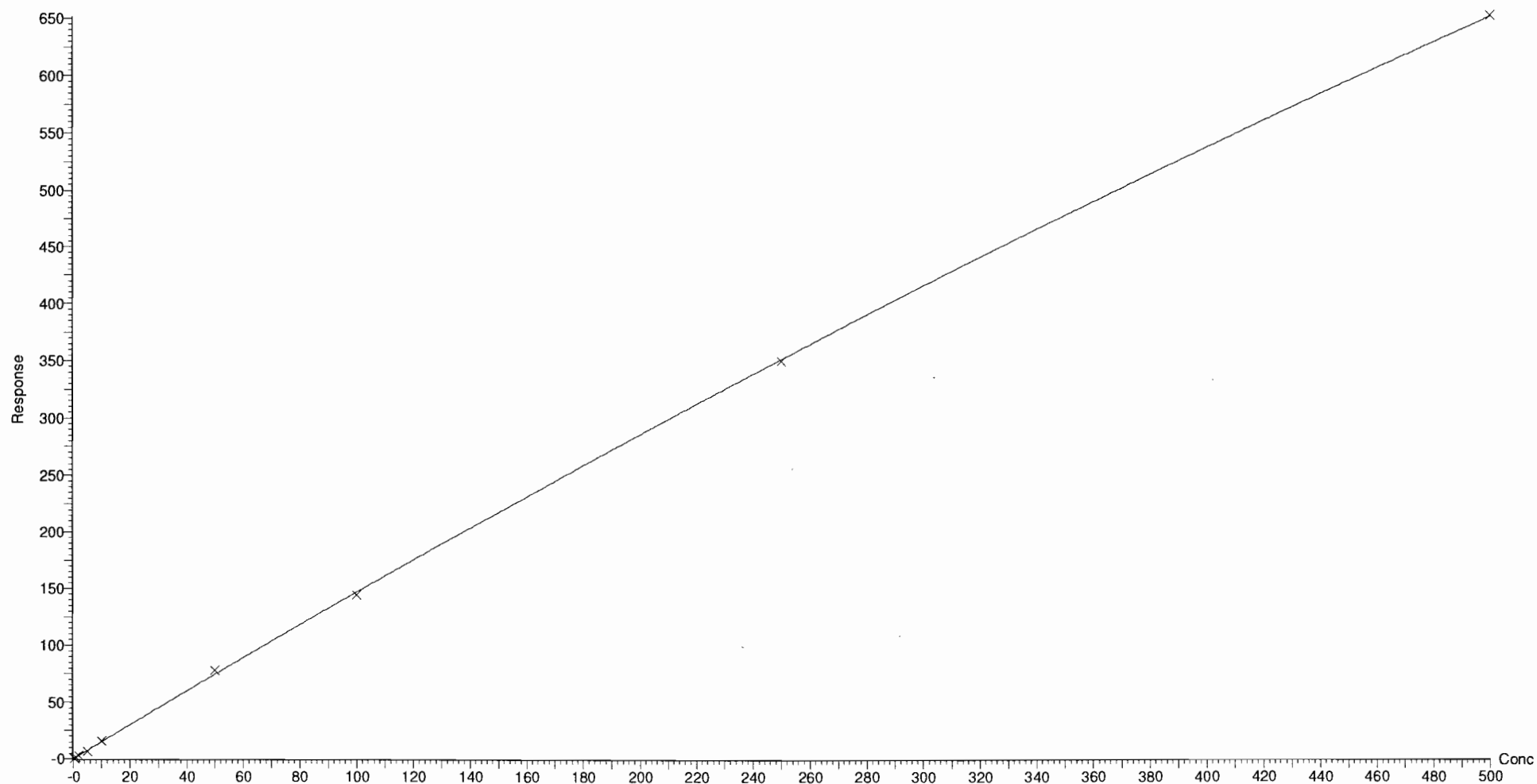
Compound name: L-MeFOSAA

Coefficient of Determination: $R^2 = 0.999677$

Calibration curve: $-0.000422706 * x^2 + 1.51286 * x + -0.0237577$

Response type: Internal Std (Ref 50), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:06 Pacific Standard Time

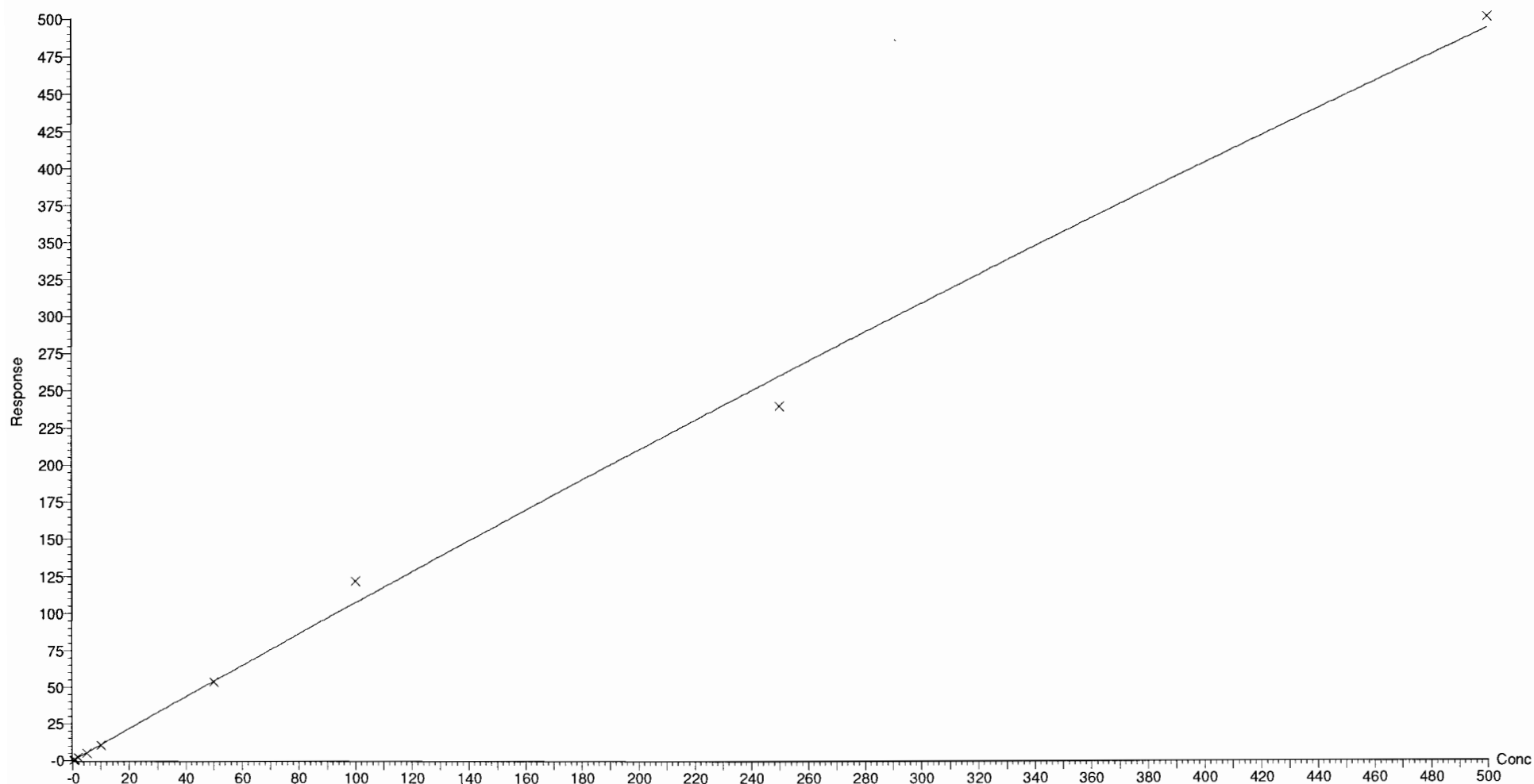
Compound name: L-EtFOSAA

Coefficient of Determination: $R^2 = 0.995820$

Calibration curve: $-0.000217066 * x^2 + 1.09478 * x + -0.0924104$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

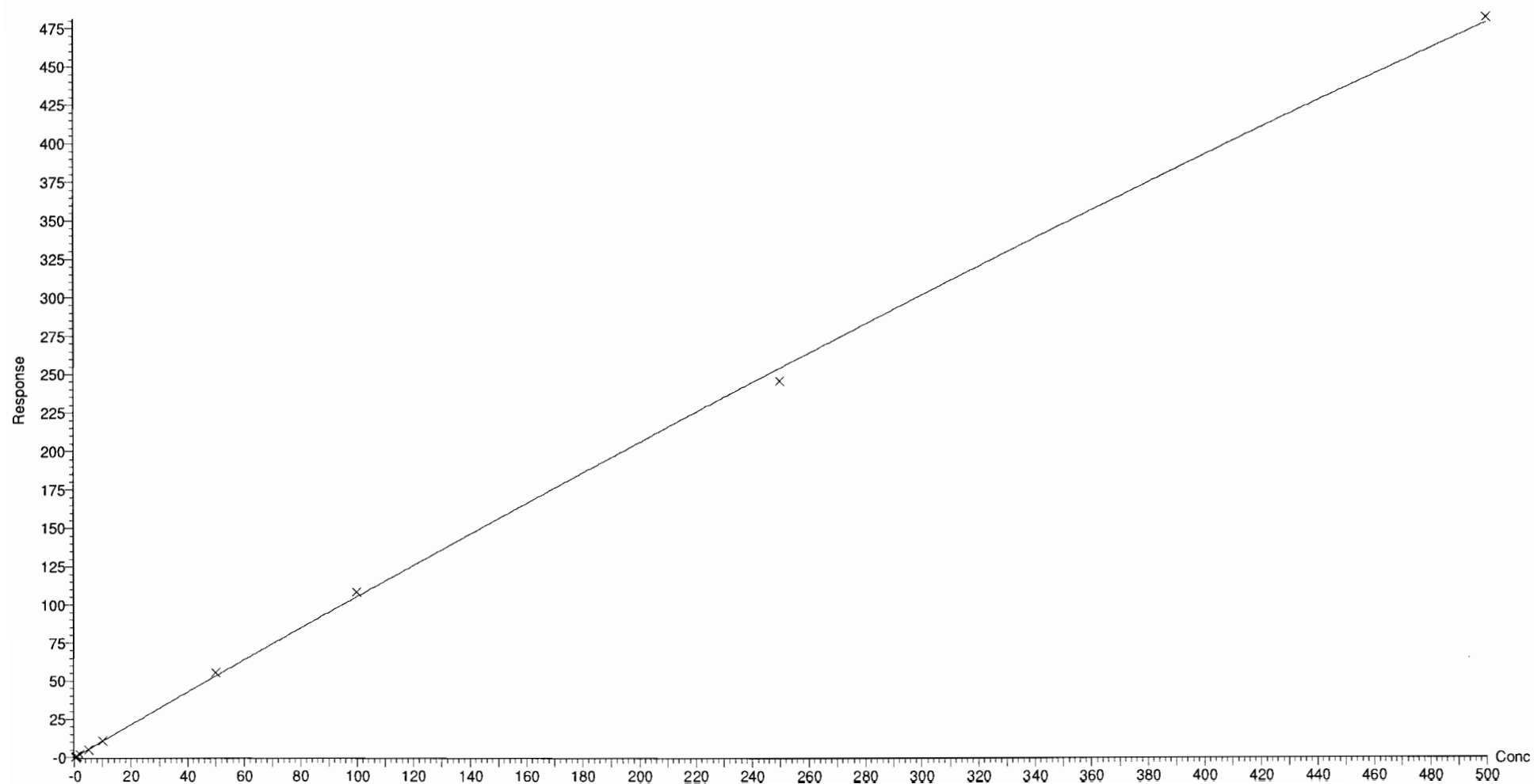
Compound name: PFUdA

Coefficient of Determination: $R^2 = 0.999432$

Calibration curve: $-0.000244716 * x^2 + 1.07792 * x + 0.000271046$

Response type: Internal Std (Ref 51), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

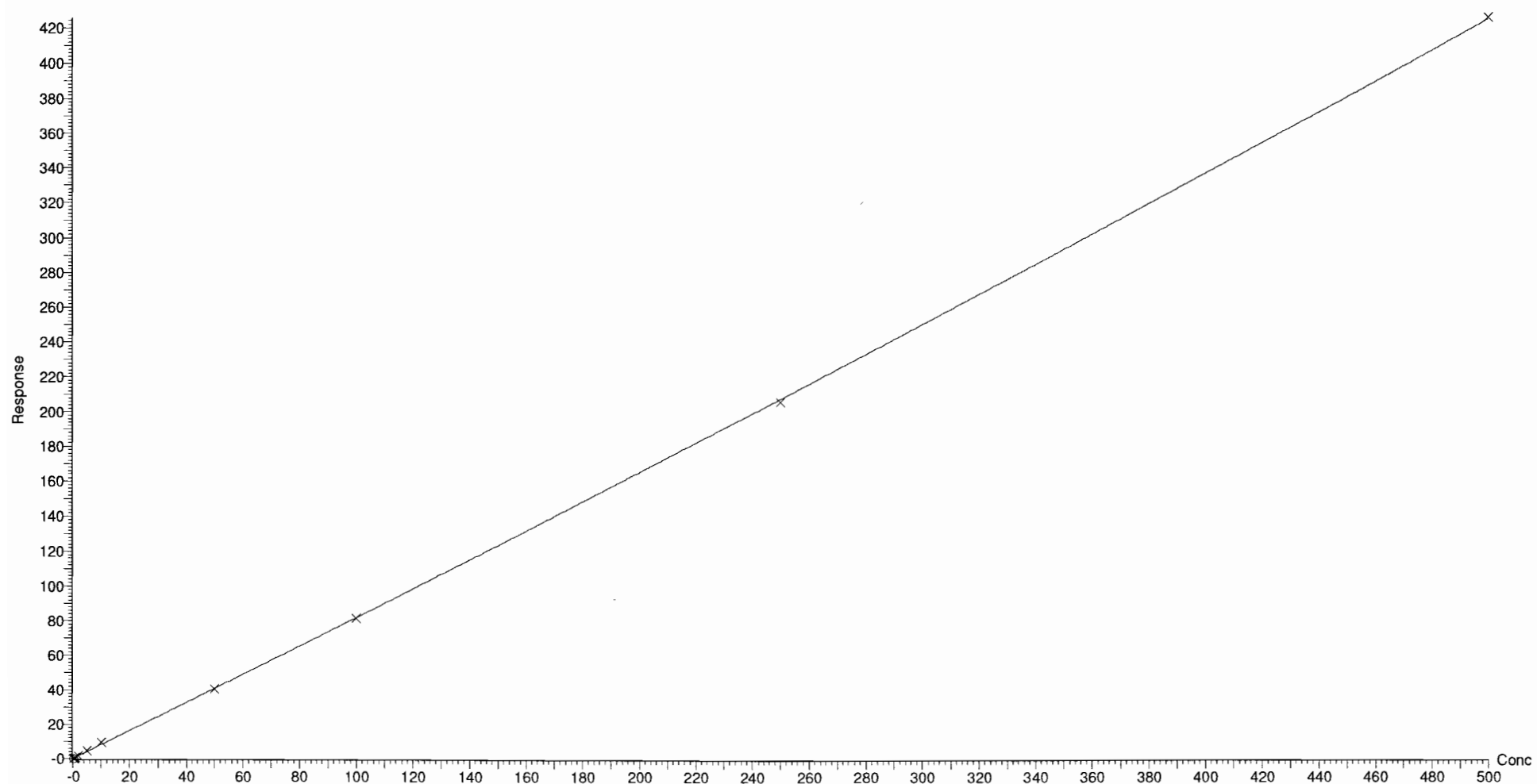
Compound name: PFDS

Coefficient of Determination: $R^2 = 0.999683$

Calibration curve: $7.56593e-005 * x^2 + 0.811719 * x + 0.0648879$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

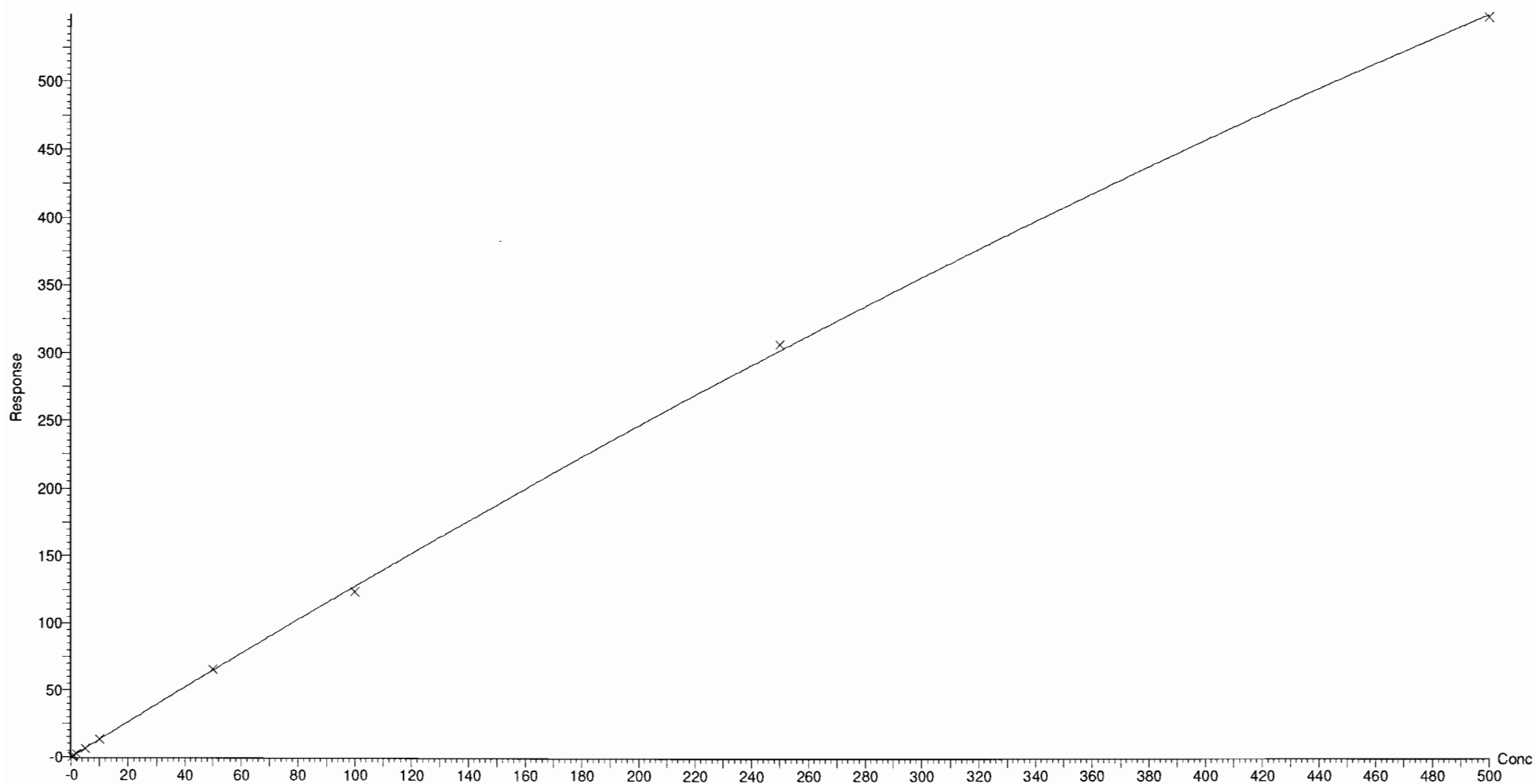
Compound name: PFDoA

Coefficient of Determination: $R^2 = 0.999795$

Calibration curve: $-0.000443961 * x^2 + 1.32023 * x + -0.000921135$

Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

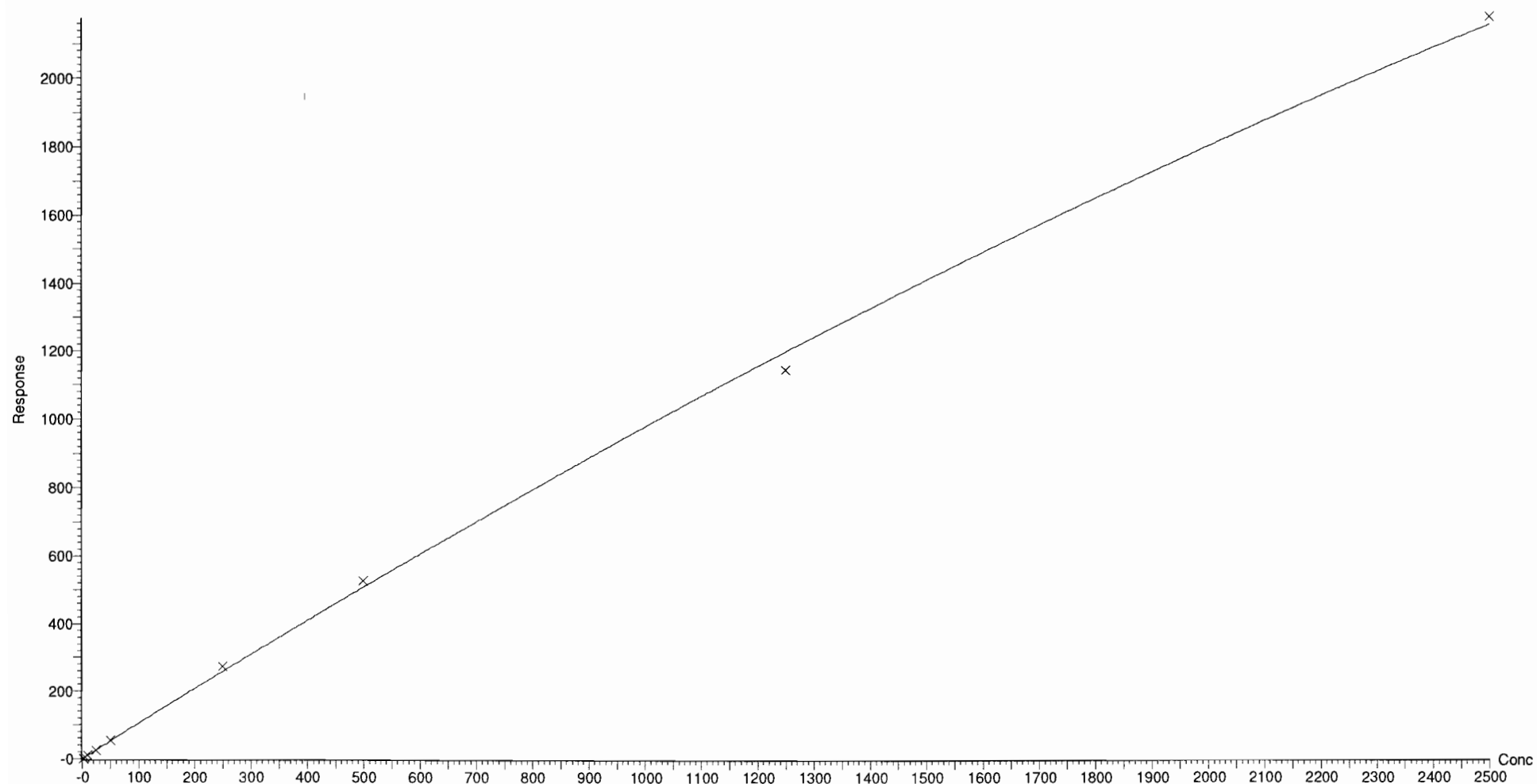
Compound name: N-MeFOSA

Coefficient of Determination: $R^2 = 0.998909$

Calibration curve: $-7.79408e-005 * x^2 + 1.05657 * x + -0.0424732$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

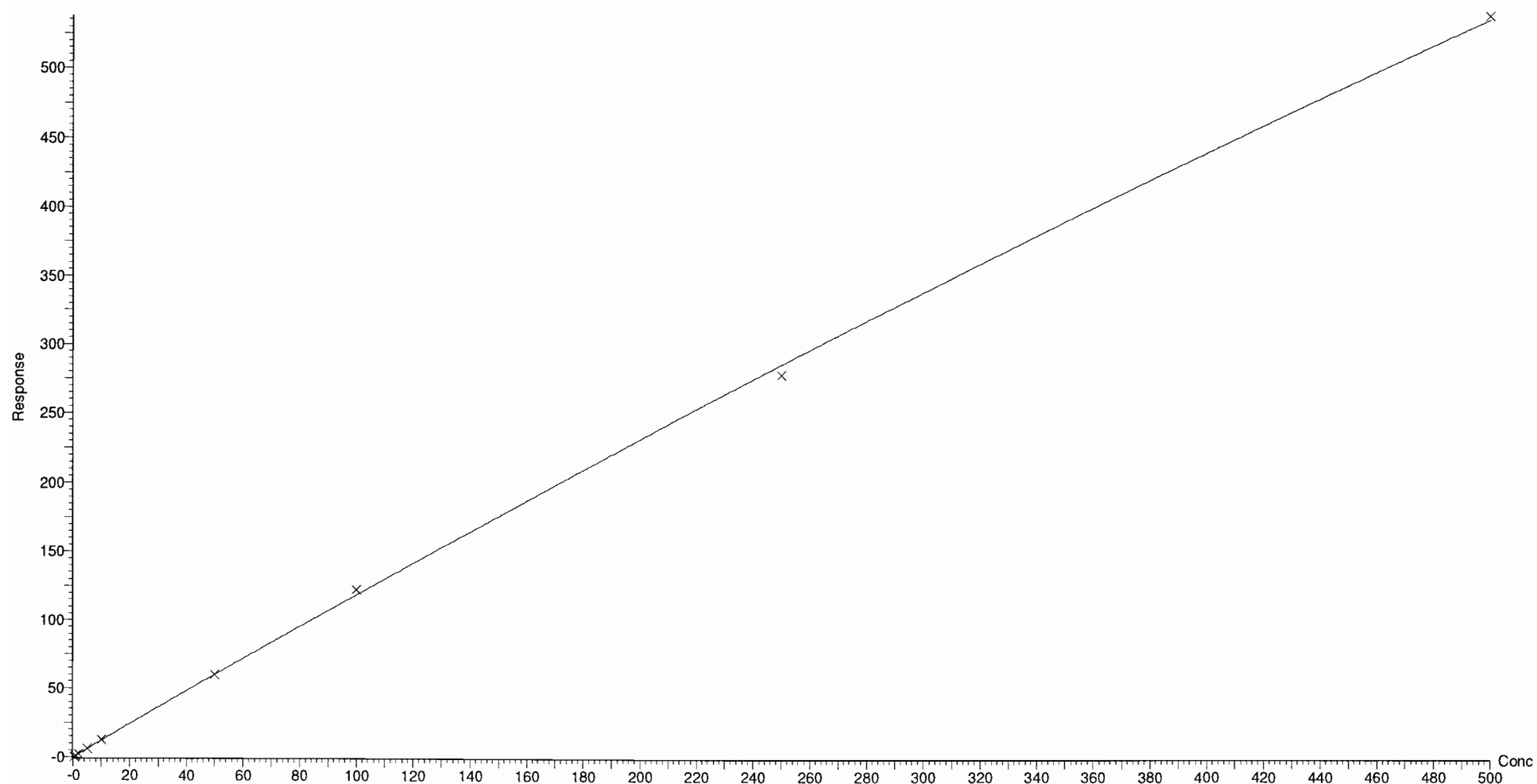
Compound name: PFTTrDA

Coefficient of Determination: $R^2 = 0.999656$

Calibration curve: $-0.000291719 * x^2 + 1.21601 * x + 0.00941256$

Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

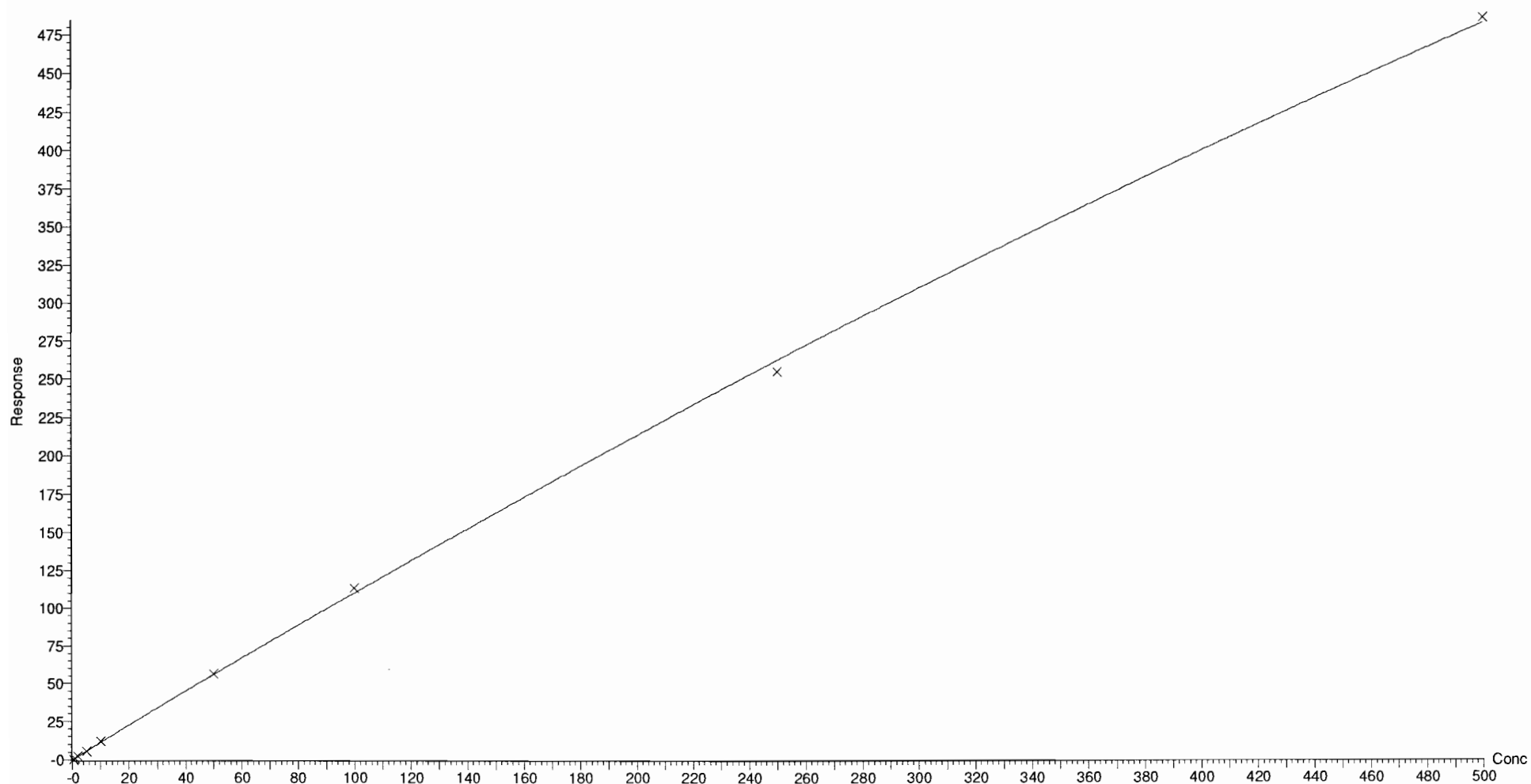
Compound name: PFTeDA

Coefficient of Determination: $R^2 = 0.999493$

Calibration curve: $-0.000343362 * x^2 + 1.13504 * x + 0.00135132$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

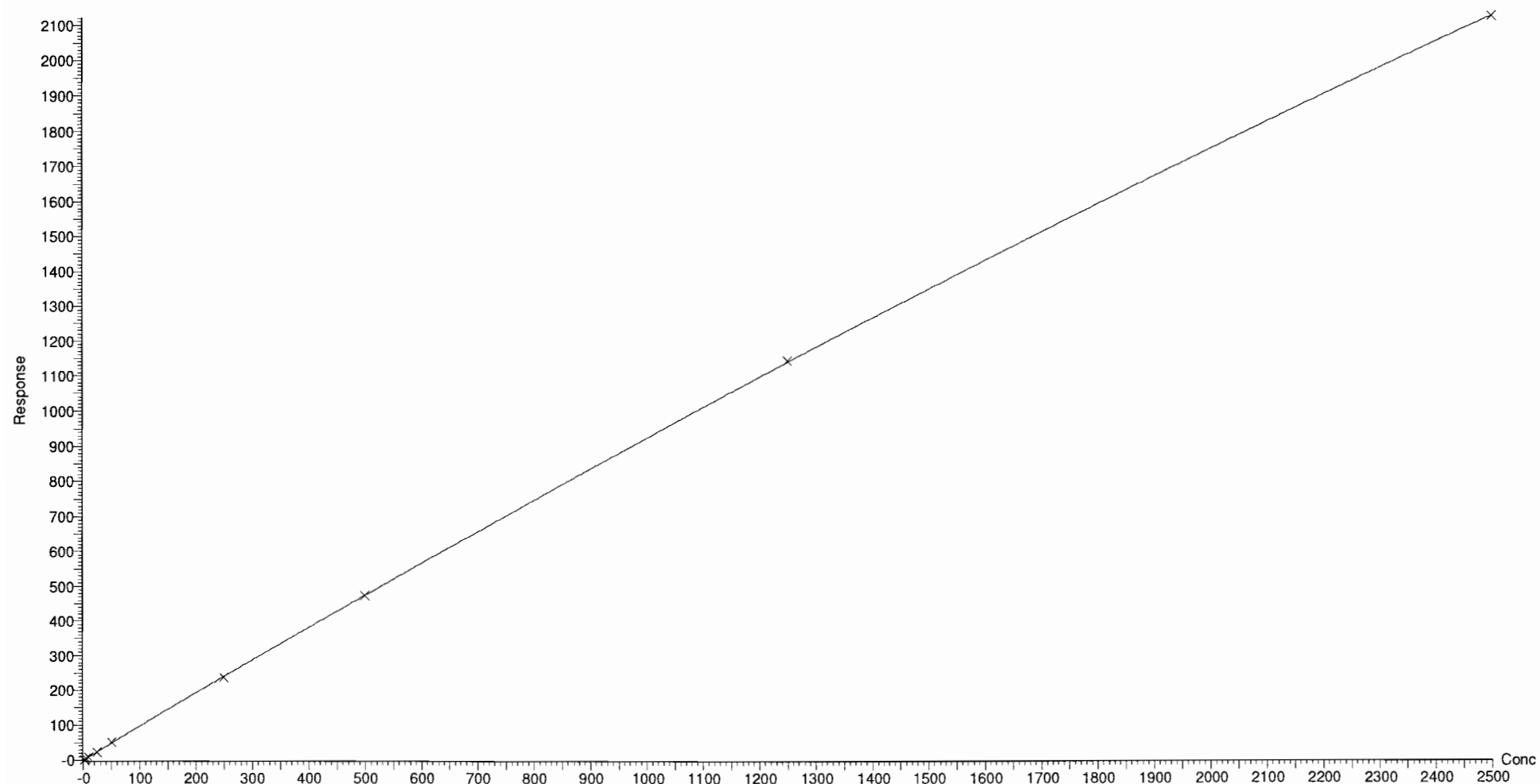
Compound name: N-EtFOSA

Coefficient of Determination: $R^2 = 0.999912$

Calibration curve: $-4.97469e-005 * x^2 + 0.973269 * x + -0.0114563$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

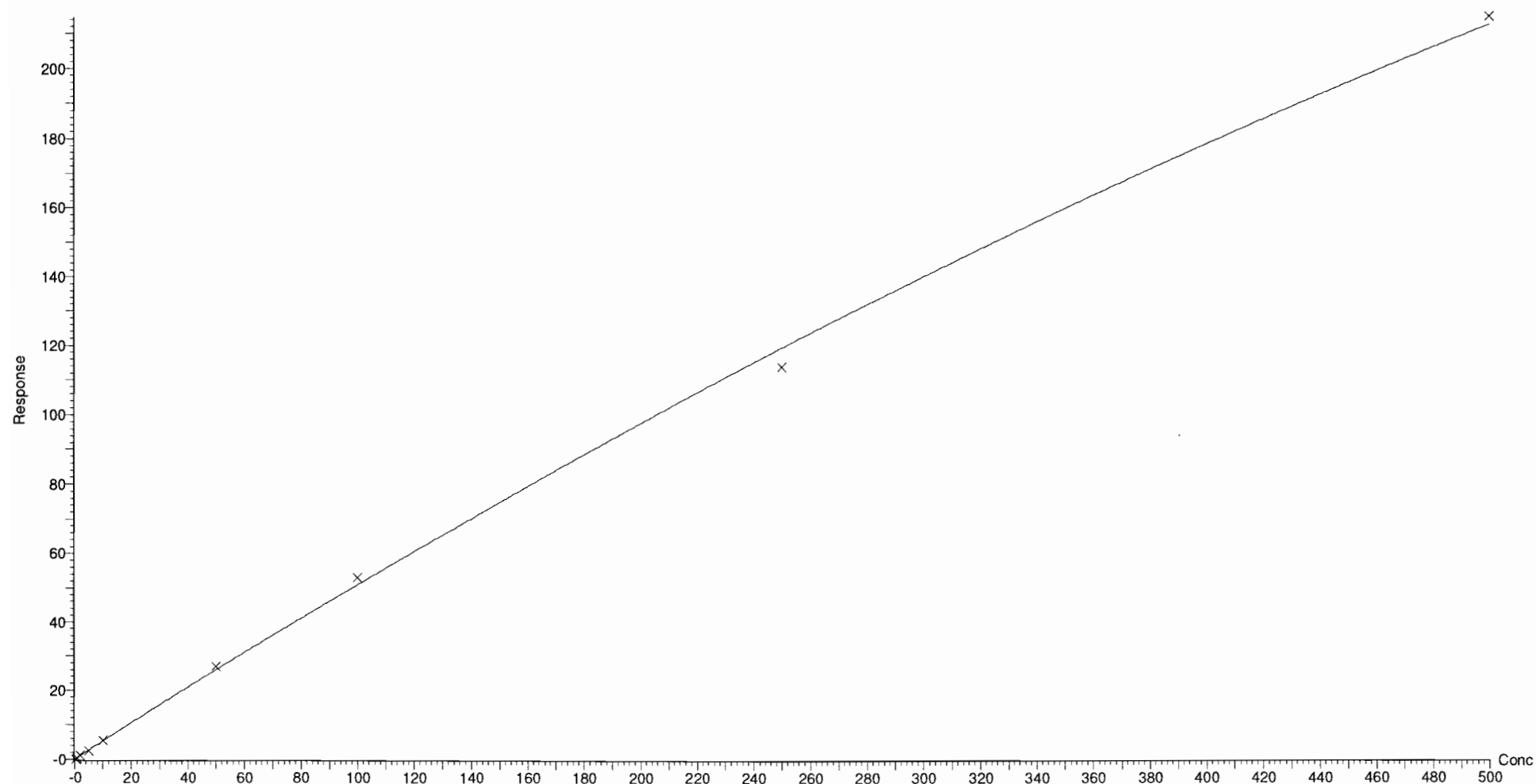
Compound name: PFHxDA

Coefficient of Determination: $R^2 = 0.998811$

Calibration curve: $-0.000210664 * x^2 + 0.529999 * x + 0.0560111$

Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

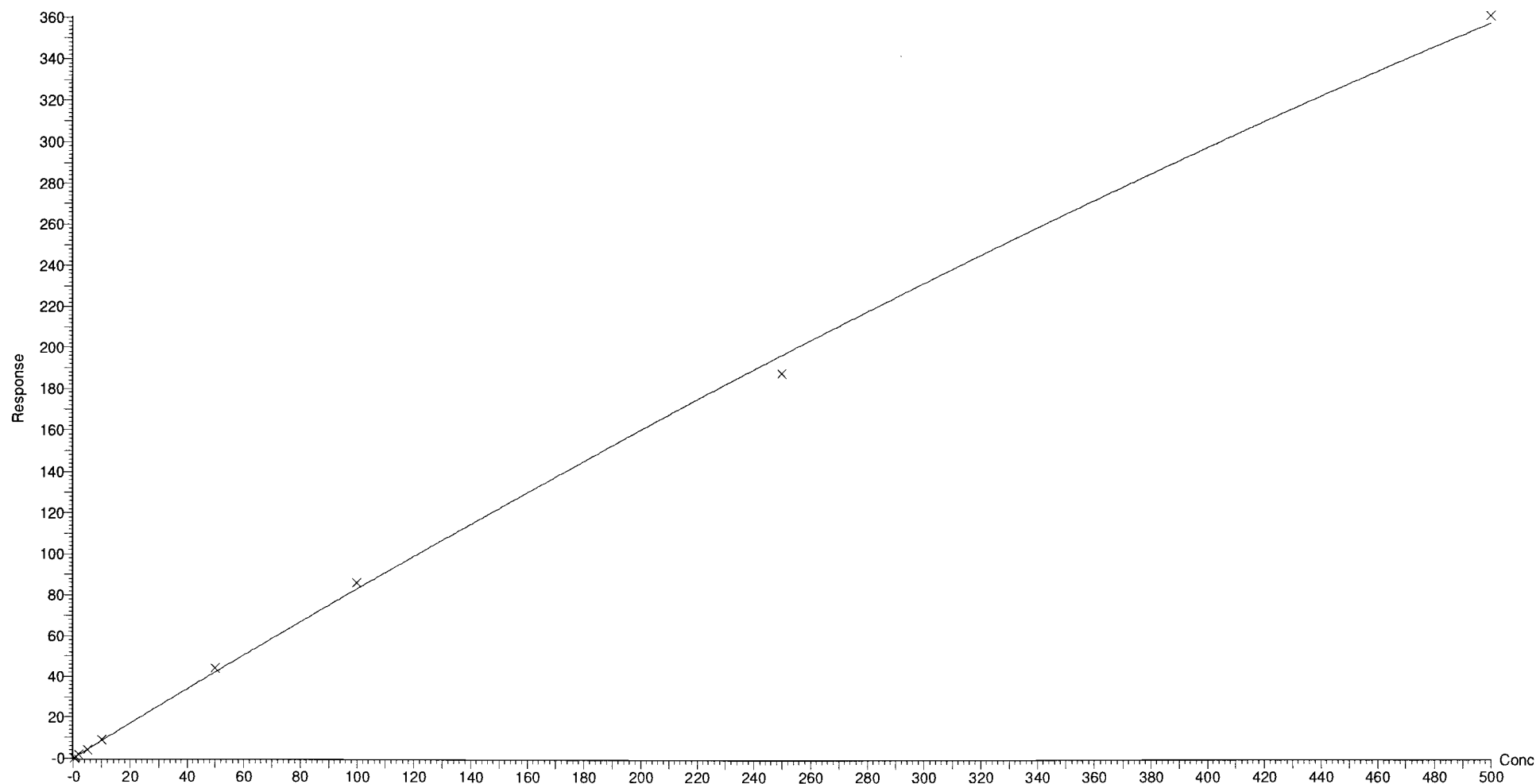
Compound name: PFODA

Coefficient of Determination: $R^2 = 0.998954$

Calibration curve: $-0.000288047 * x^2 + 0.858197 * x + 0.0110406$

Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)

Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

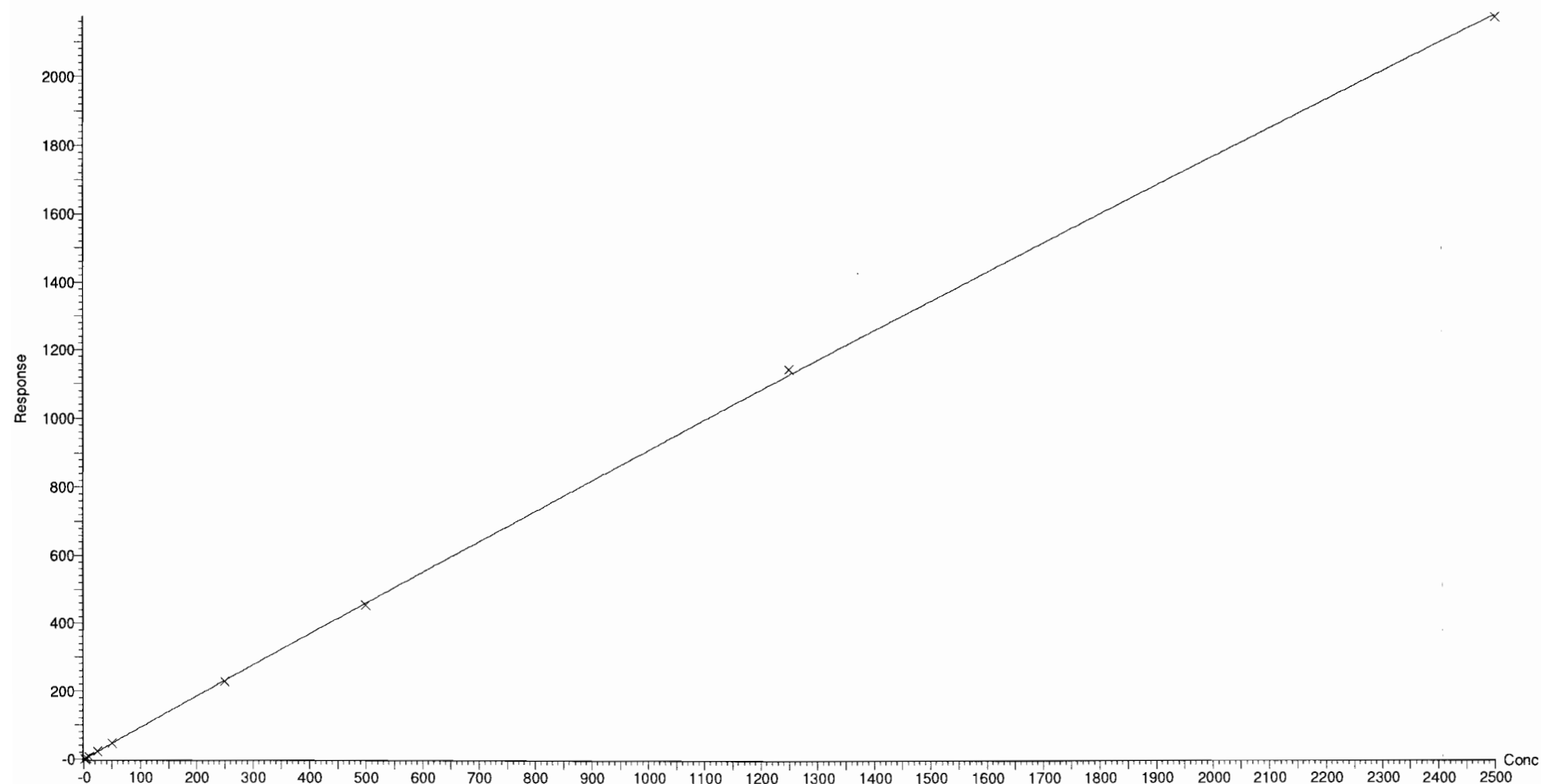
Compound name: N-MeFOSE

Coefficient of Determination: $R^2 = 0.999899$

Calibration curve: $-2.49953e-005 * x^2 + 0.933355 * x + -0.466455$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 11:43:24 Pacific Standard Time

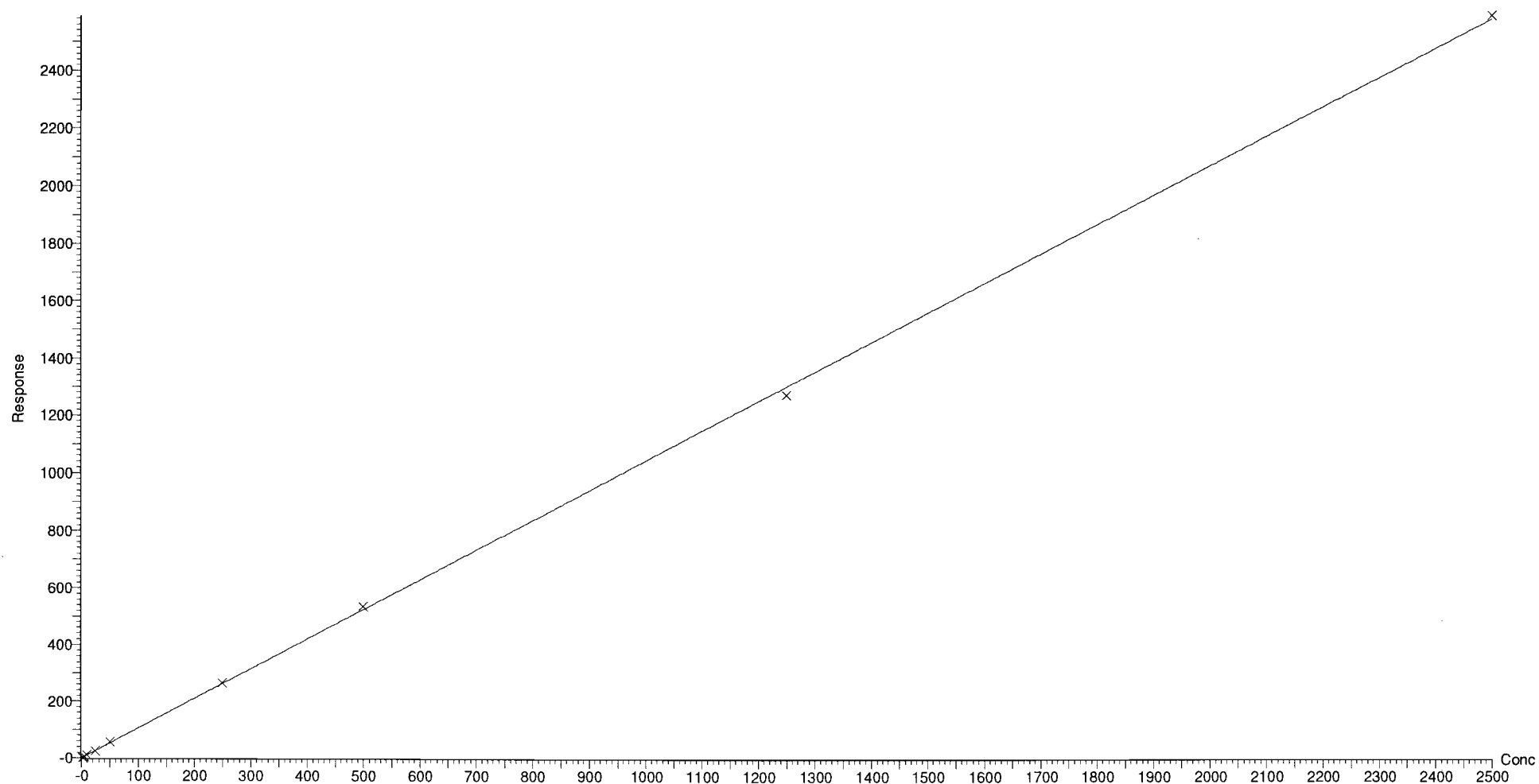
Compound name: N-EtFOSE

Coefficient of Determination: $R^2 = 0.999728$

Calibration curve: $-8.31447e-006 * x^2 + 1.05163 * x + 0.0451426$

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\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

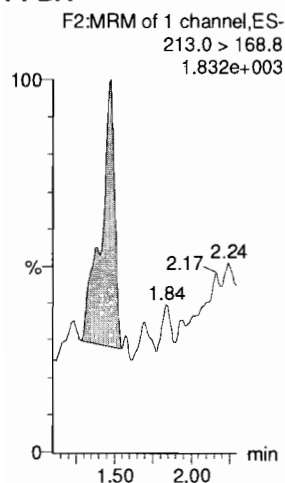
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\Results\181202M2\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

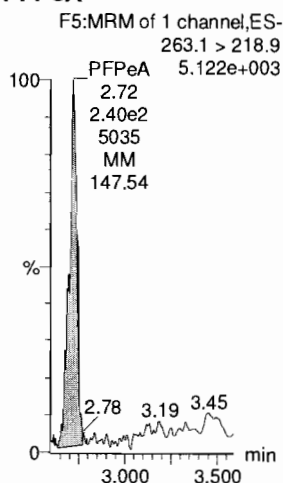
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

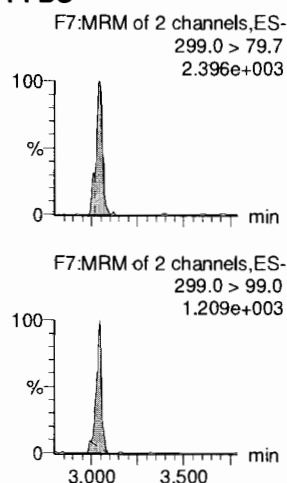
PFBA



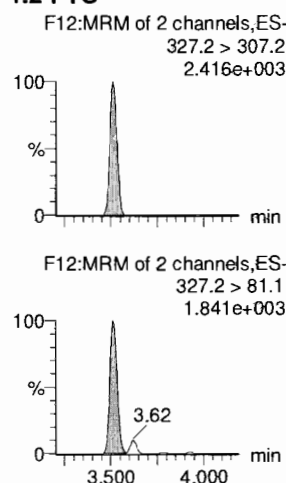
PFPeA



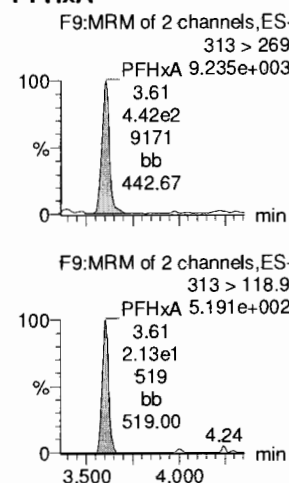
PFBS



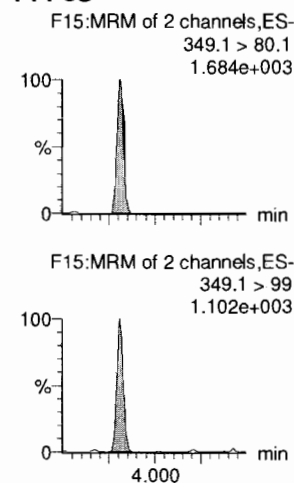
4:2 FTS



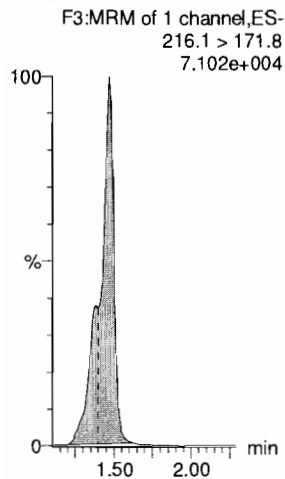
PFHxA



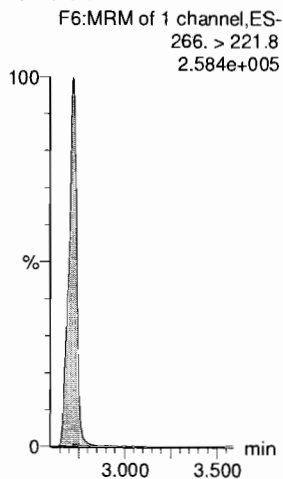
PFPeS



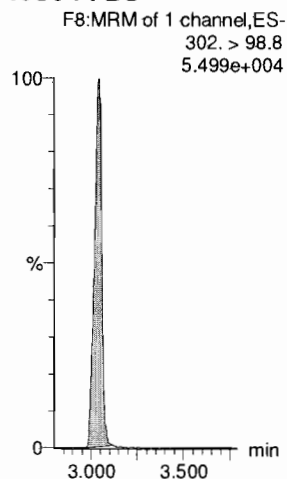
13C3-PFBA



13C3-PFPeA



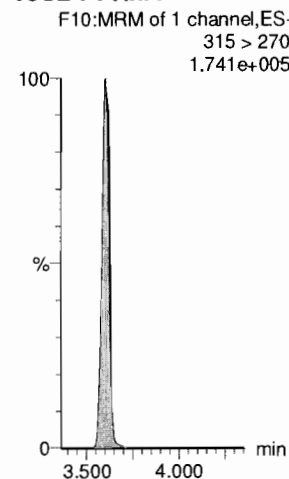
13C3-PFBS



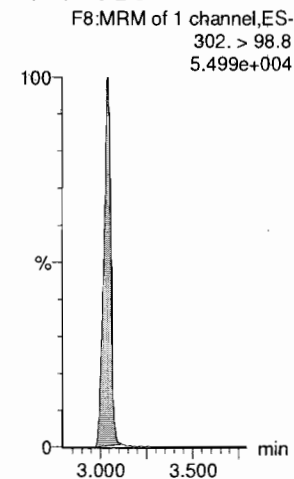
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



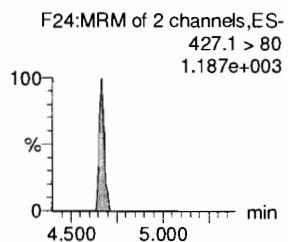
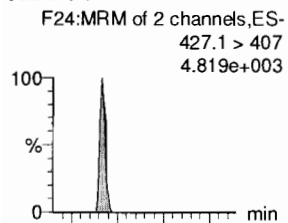
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

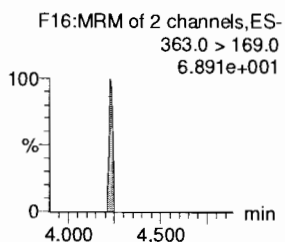
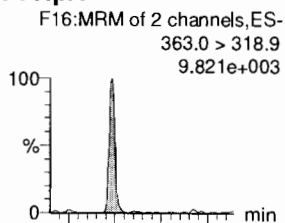
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

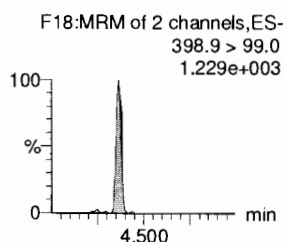
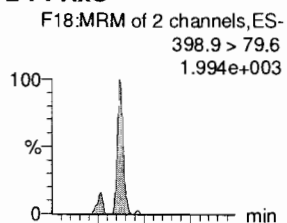
6:2 FTS



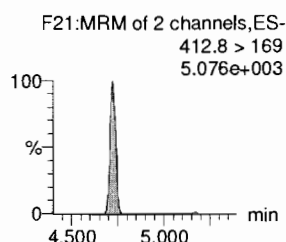
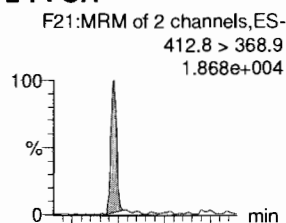
PFHpA



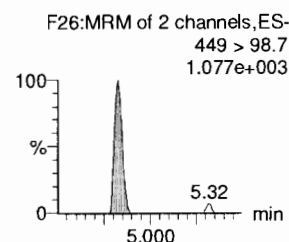
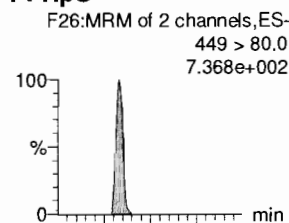
L-PFHxS



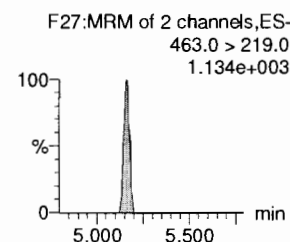
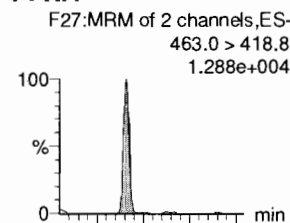
L-PFOA



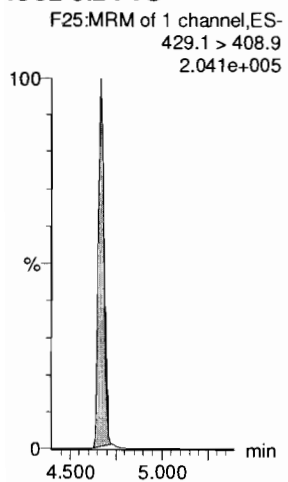
PFHpS



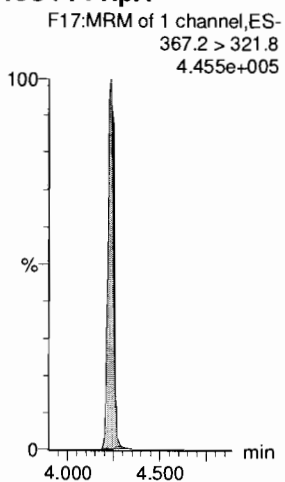
PFNA



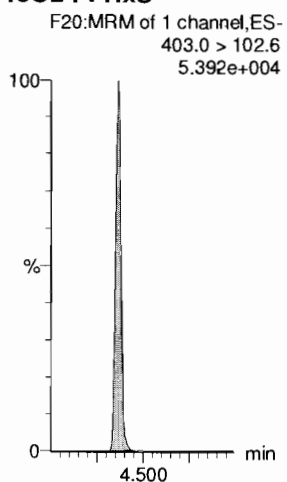
13C2-6:2 FTS



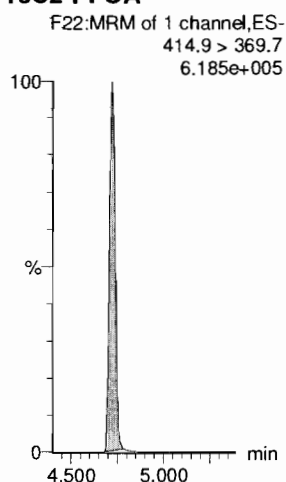
13C4-PFHpA



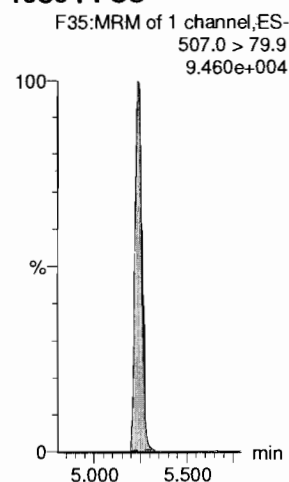
18O2-PFHxS



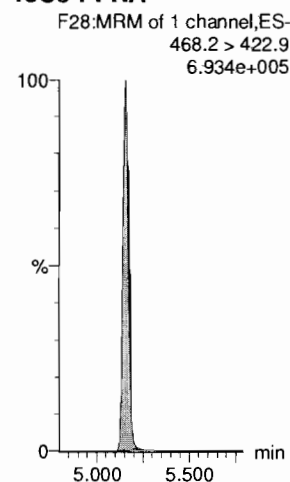
13C2-PFOA



13C8-PFOS



13C5-PFNA



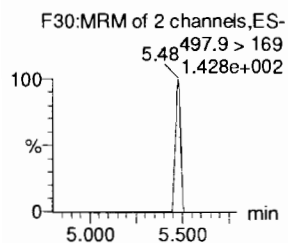
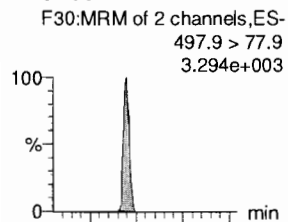
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

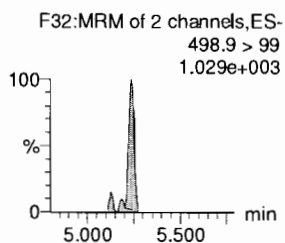
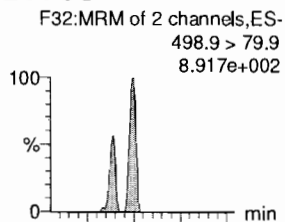
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

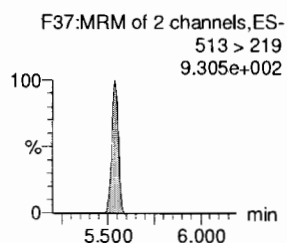
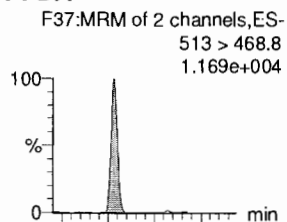
PFOSA



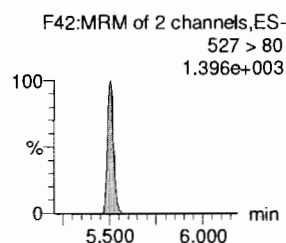
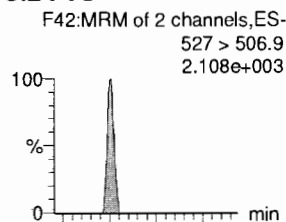
L-PFOS



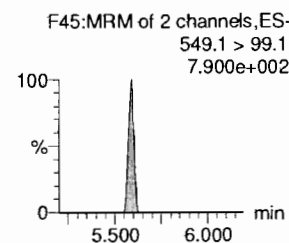
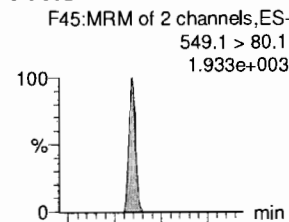
PFDA



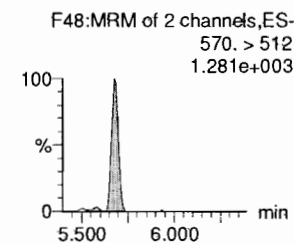
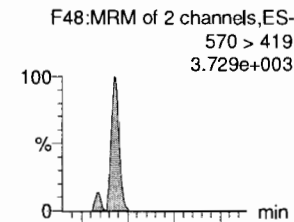
8:2 FTS



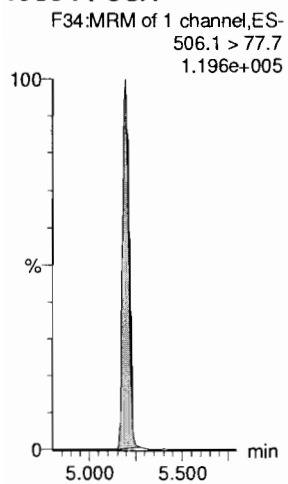
PFNS



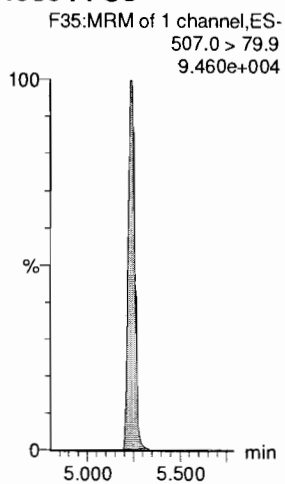
L-MeFOSAA



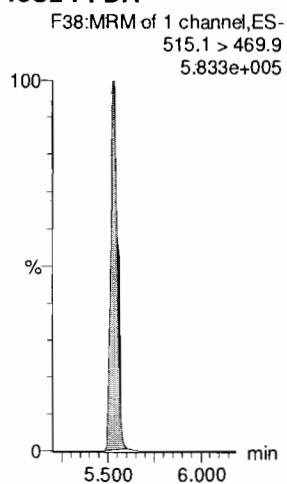
13C8-PFOSA



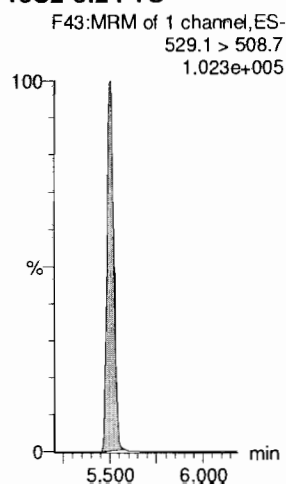
13C8-PFOS



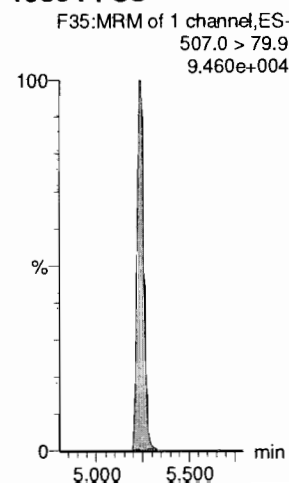
13C2-PFDA



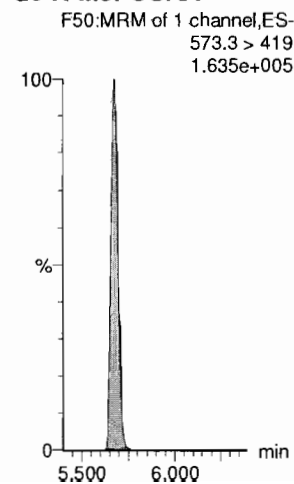
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

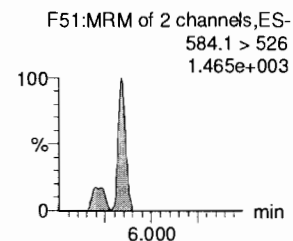
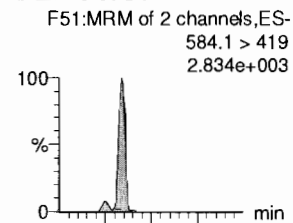


Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

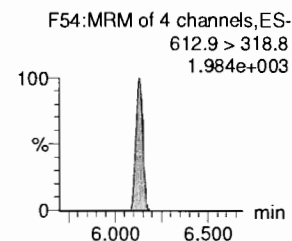
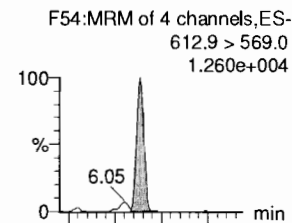
Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001

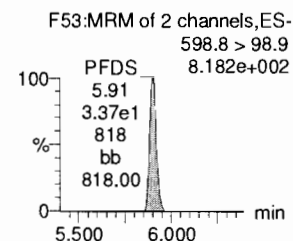
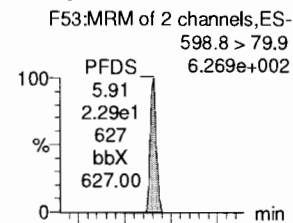
L-EtFOSAA



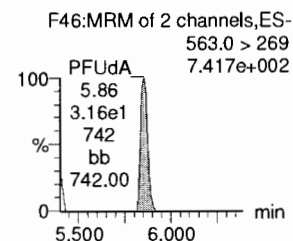
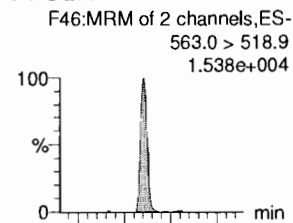
PFDaA



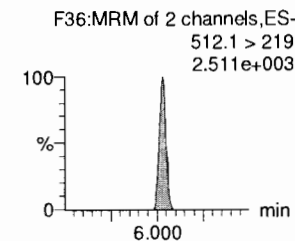
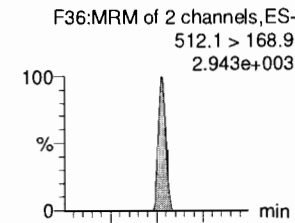
PFDS



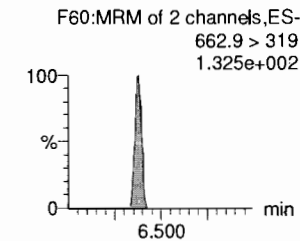
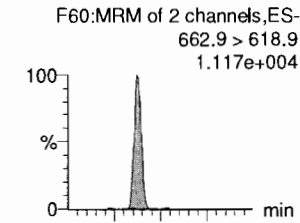
PFUdA



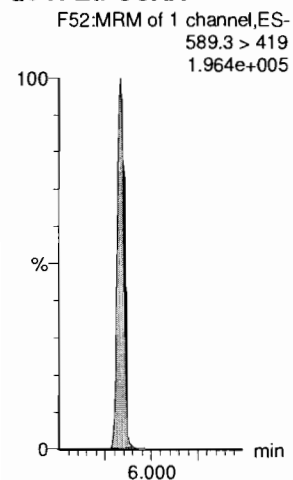
N-MeFOSA



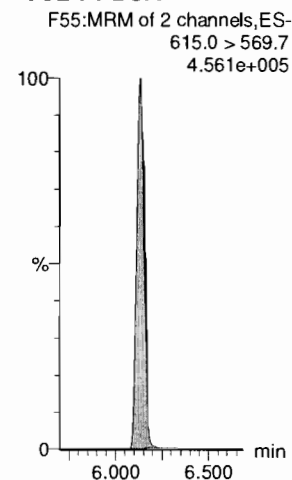
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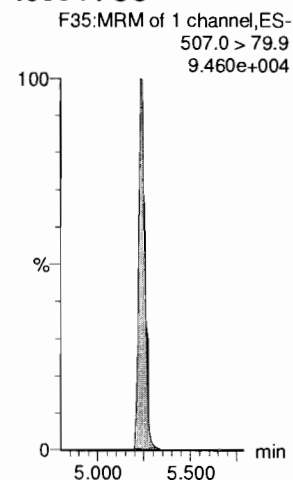
d5-N-EtFOSAA



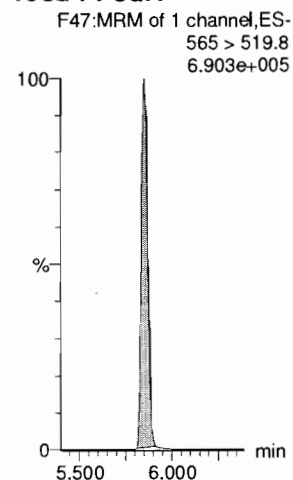
13C2-PFDaA



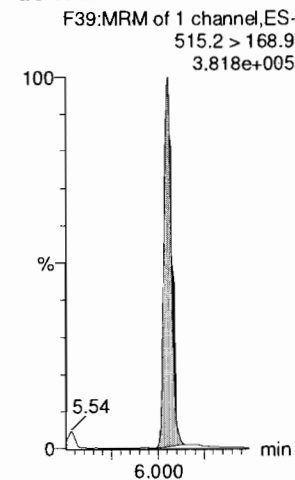
13C8-PFOS



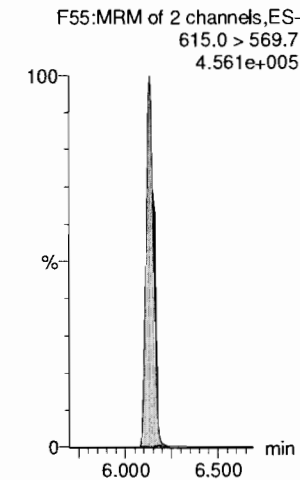
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13C2-PFDaA

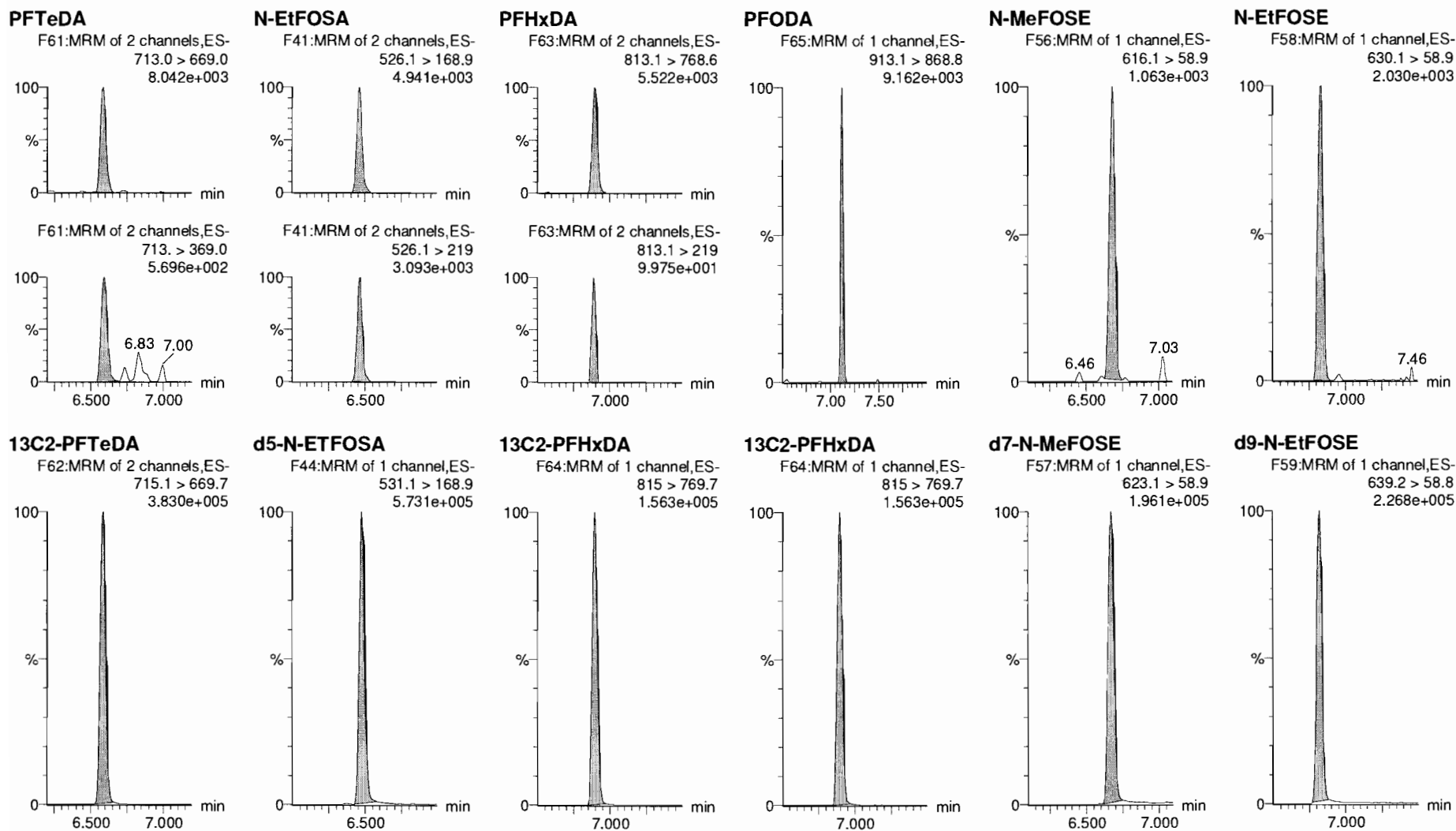


Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

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Name: 181202M2_2, Date: 02-Dec-2018, Time: 18:34:57, ID: ST181202M2-1 PFC CS-2 18K3001, Description: PFC CS-2 18K3001



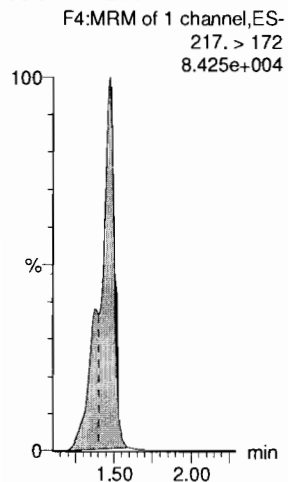
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

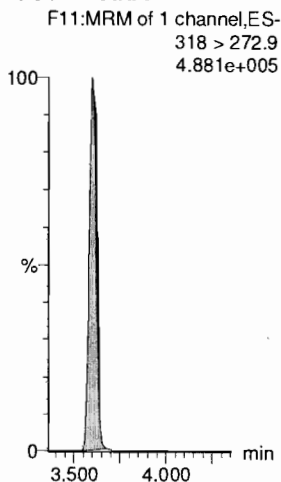
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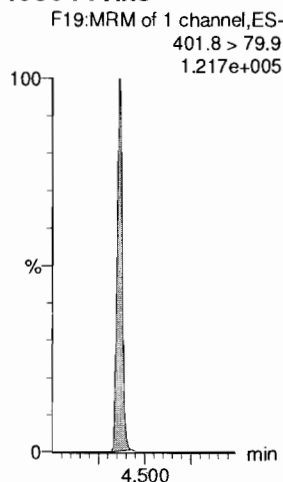
13C4-PFBA



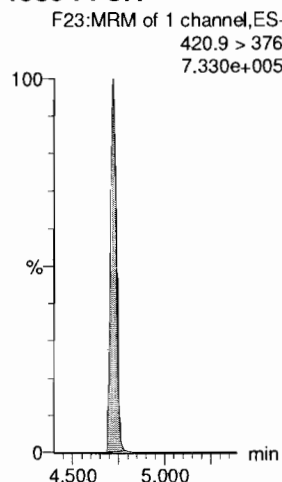
13C5-PFHxA



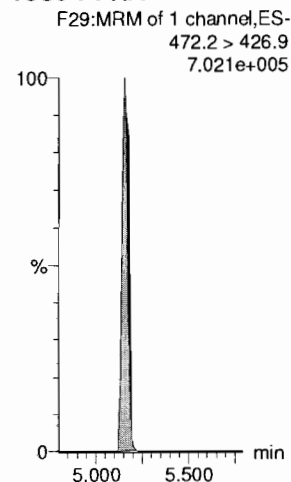
13C3-PFHxS



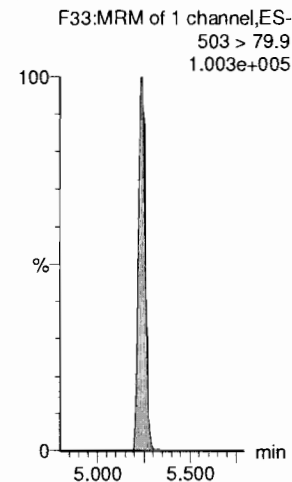
13C8-PFOA



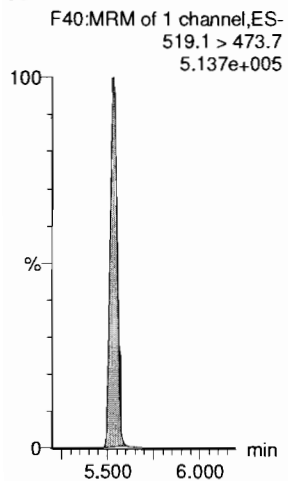
13C9-PFNA



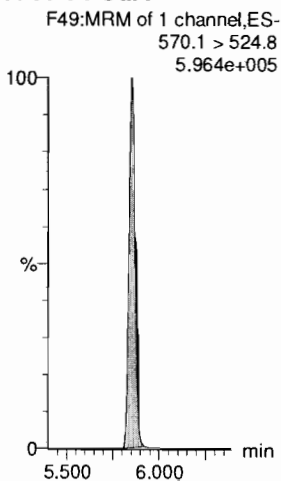
13C4-PFOS



13C6-PFDA



13C7-PFUdA



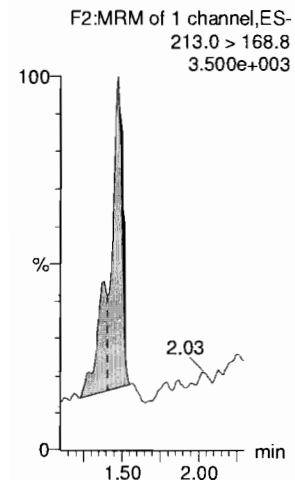
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

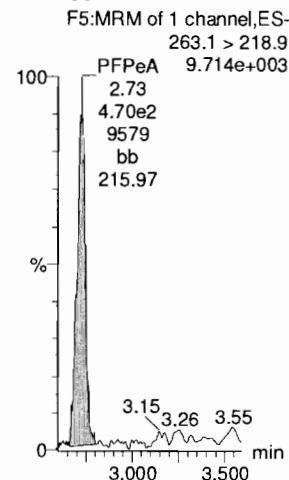
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

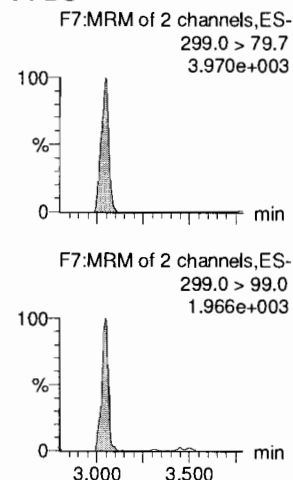
PFBA



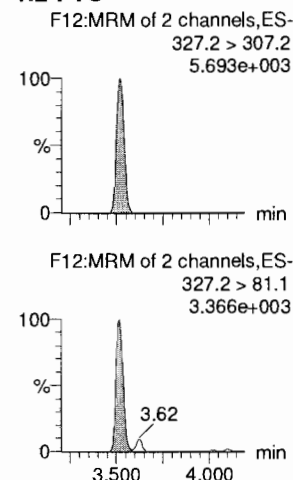
PFPeA



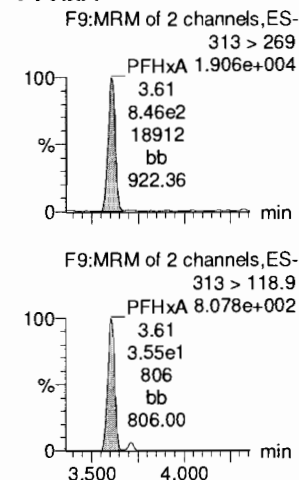
PFBS



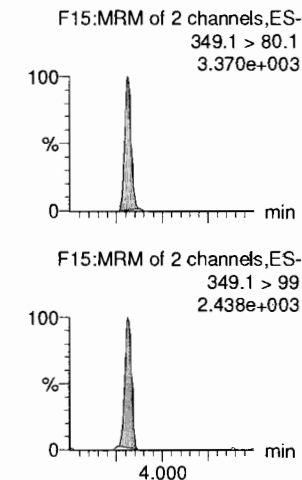
4:2 FTS



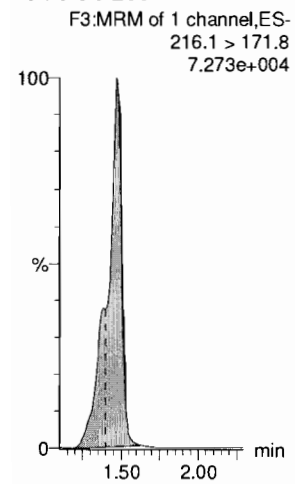
PFHxA



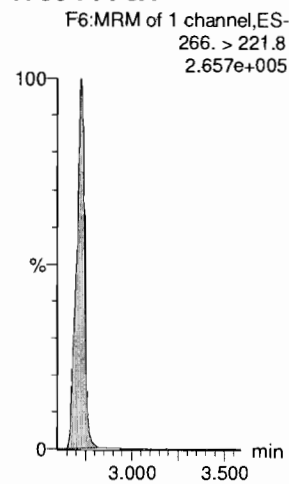
PFPeS



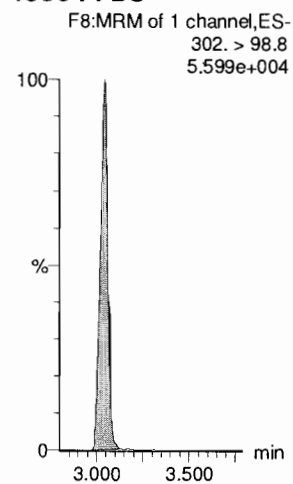
13C3-PFBA



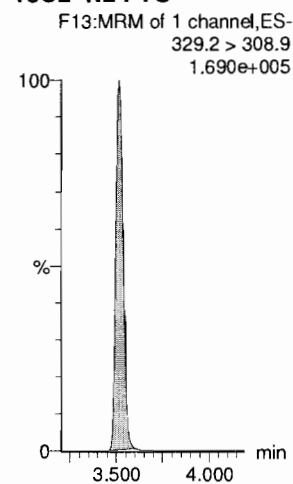
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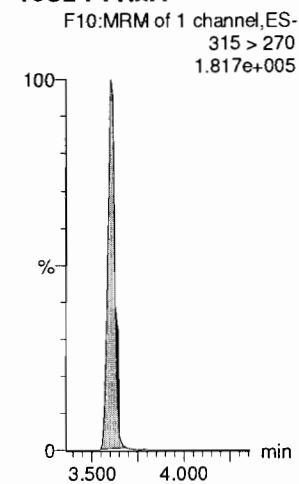
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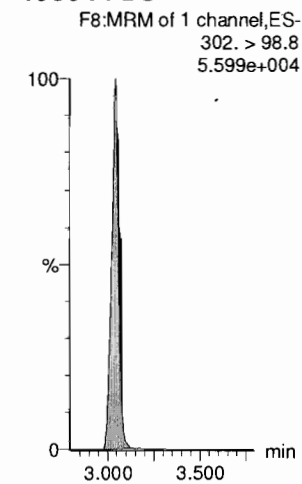
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



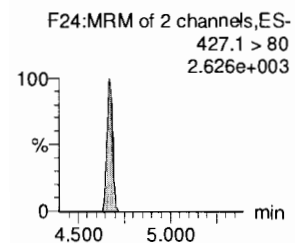
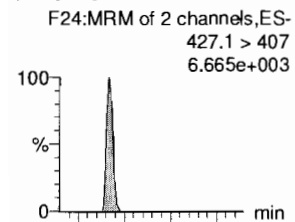
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

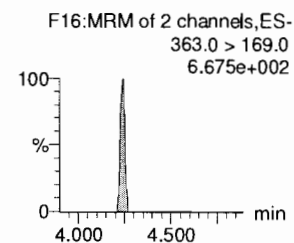
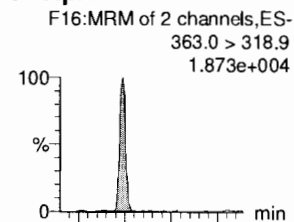
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Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

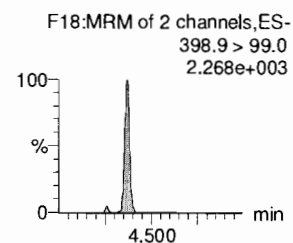
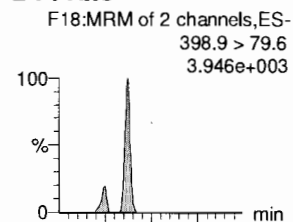
6:2 FTS



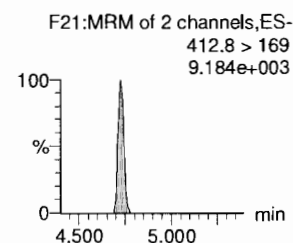
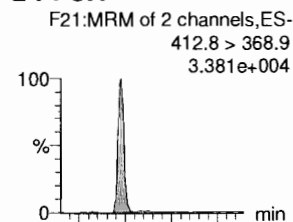
PFHpA



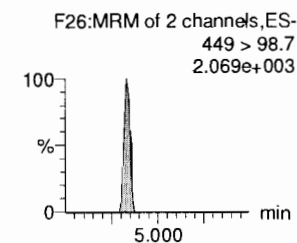
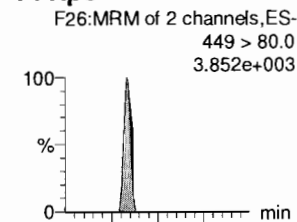
L-PFHxS



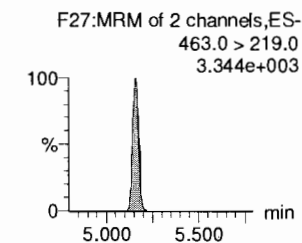
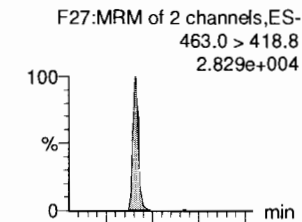
L-PFOA



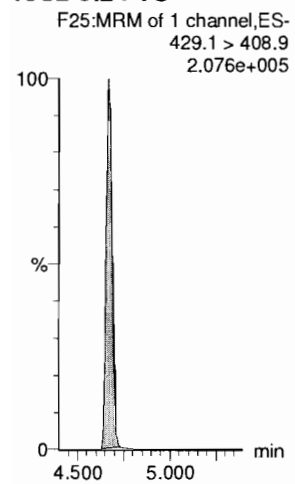
PFHpS



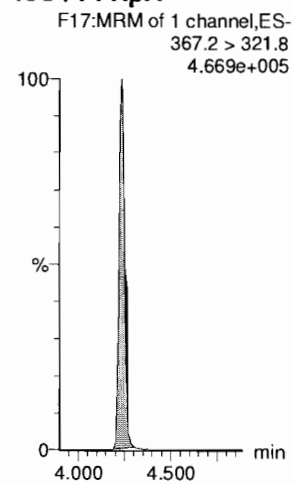
PFNA



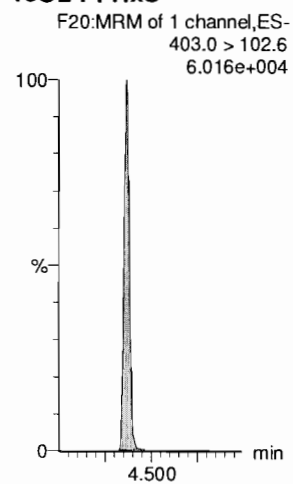
13C2-6:2 FTS



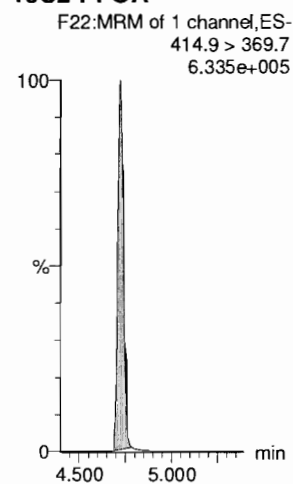
13C4-PFHpA



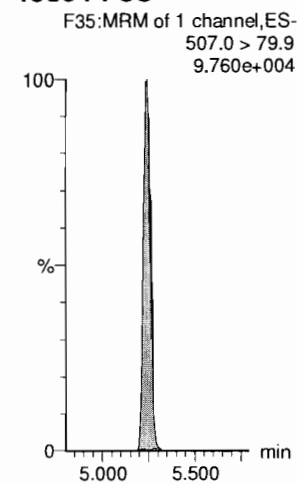
18O2-PFHxS



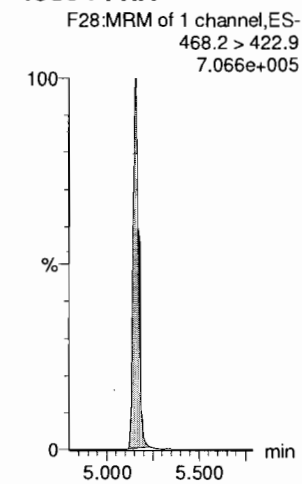
13C2-PFOA



13C8-PFOS



13C5-PFNA



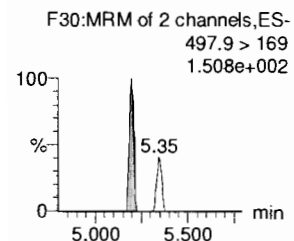
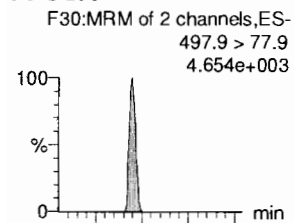
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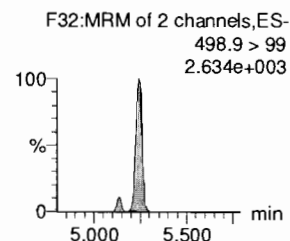
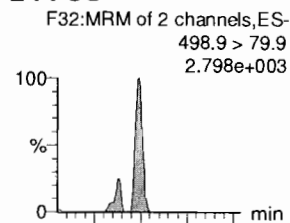
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Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

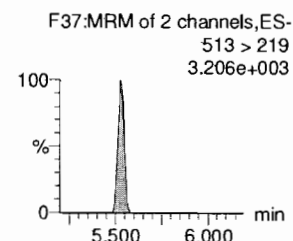
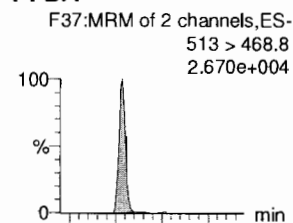
PFOSA



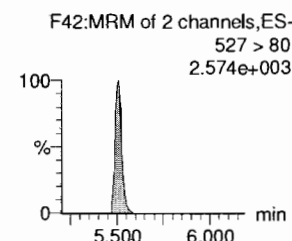
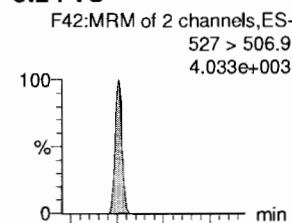
L-PFOS



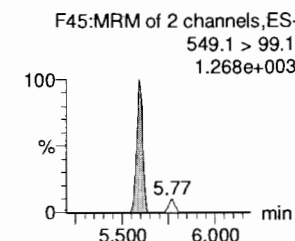
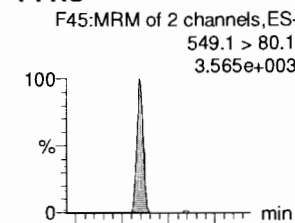
PFDA



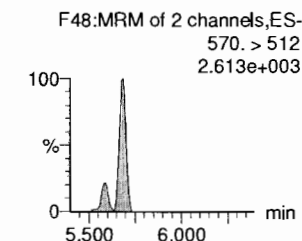
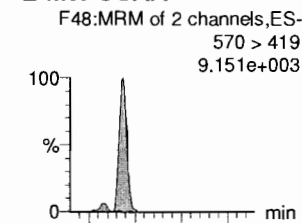
8:2 FTS



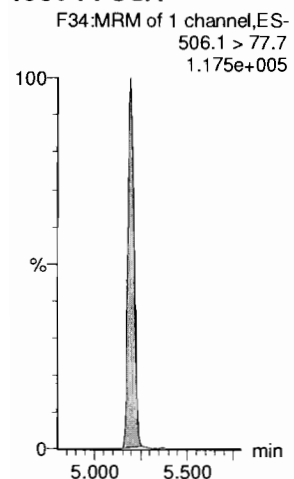
PFNS



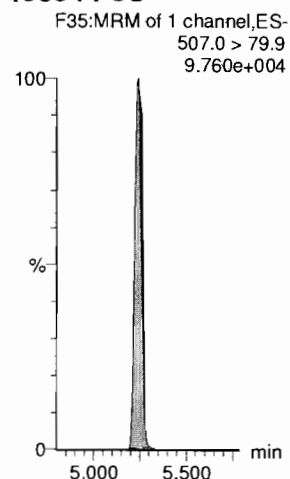
L-MeFOSAA



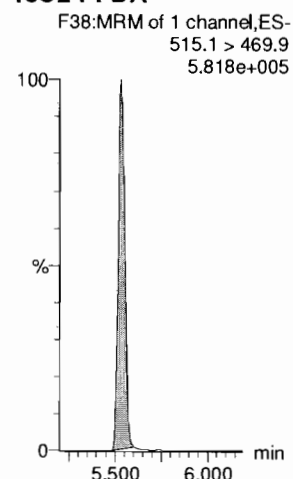
13C8-PFOSA



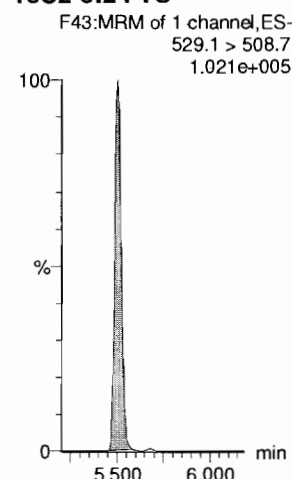
13C8-PFOS



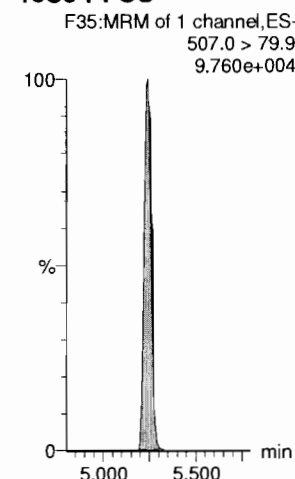
13C2-PFDA



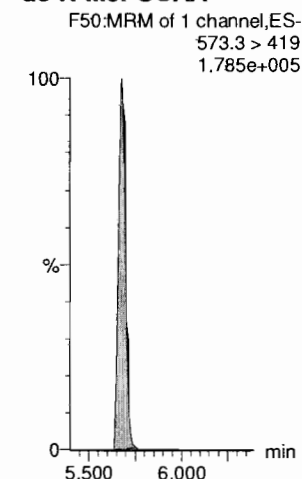
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13C8-PFOS



d3-N-MeFOSAA



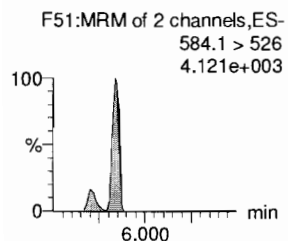
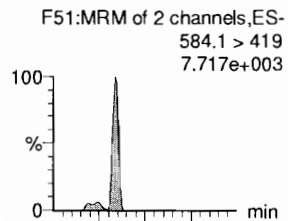
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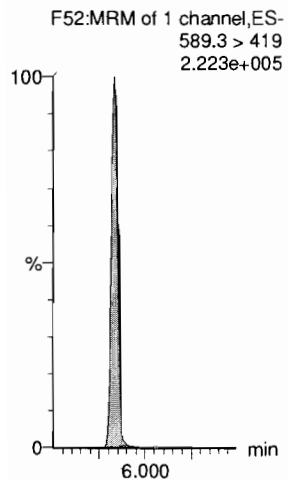
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

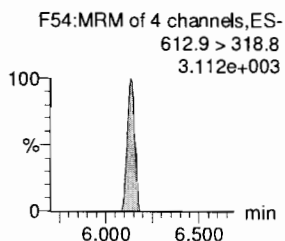
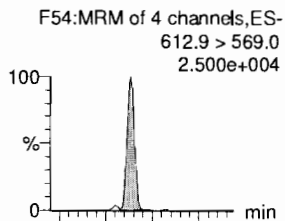
L-EtFOSAA



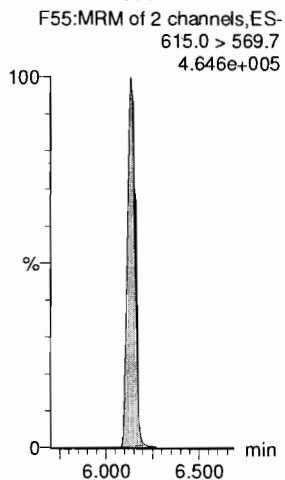
d5-N-EtFOSAA



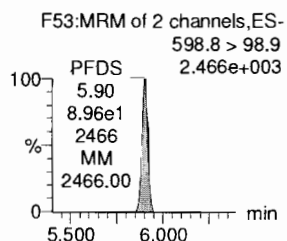
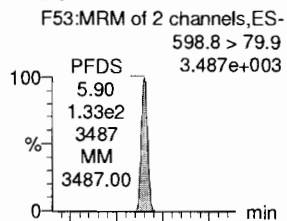
PFDaA



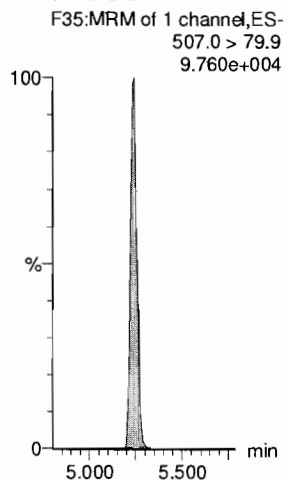
13C2-PFDaA



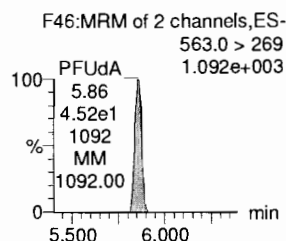
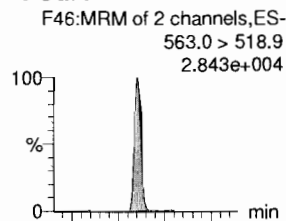
PFDS



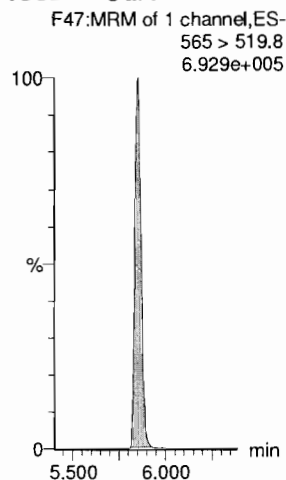
13C8-PFOS



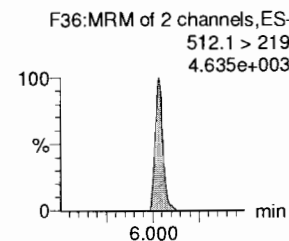
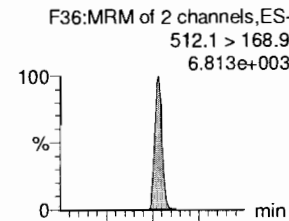
PFUdA



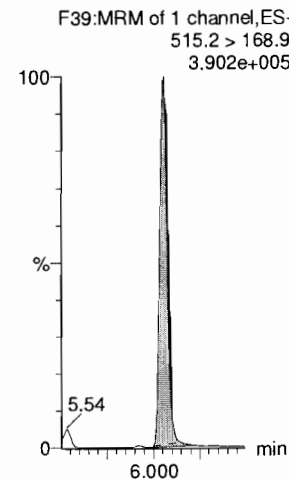
13C2-PFUdA



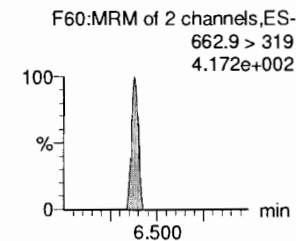
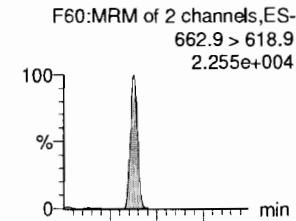
N-MeFOSA



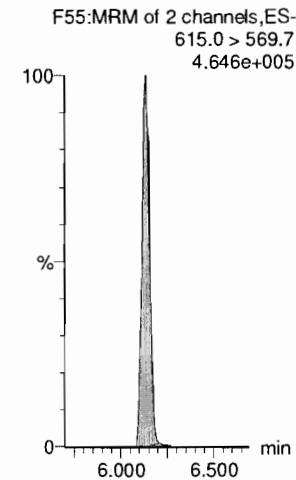
d3-N-MeFOSA



PFTrDA



13C2-PFDaA



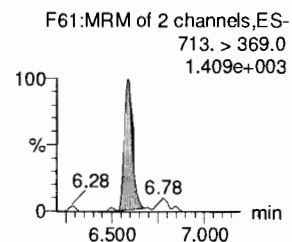
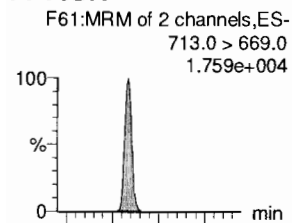
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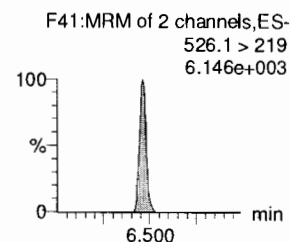
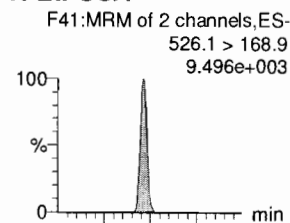
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Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

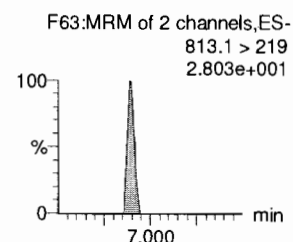
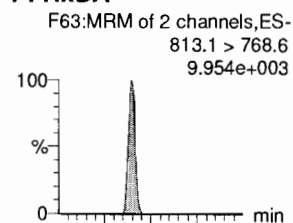
PFTeDA



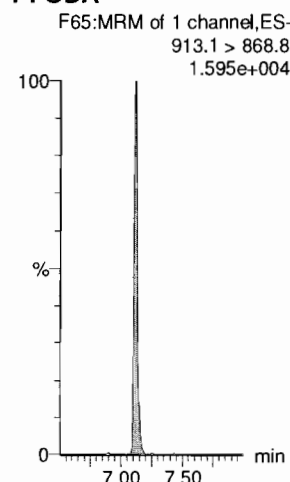
N-EtFOSA



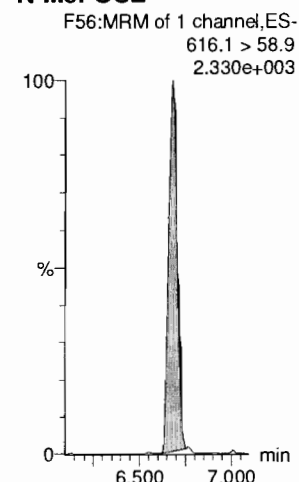
PFHxDA



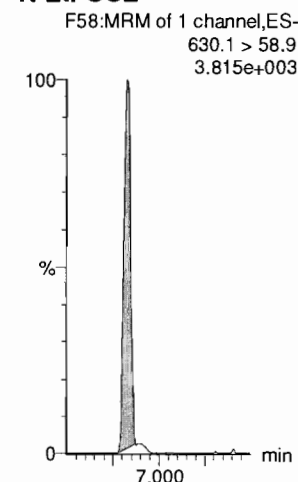
PFODA



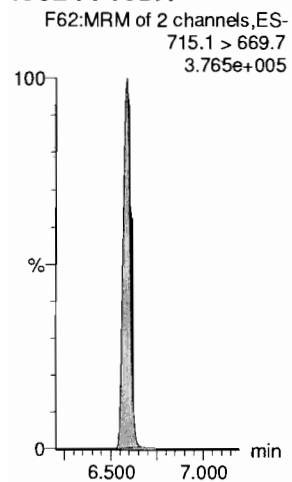
N-MeFOSE



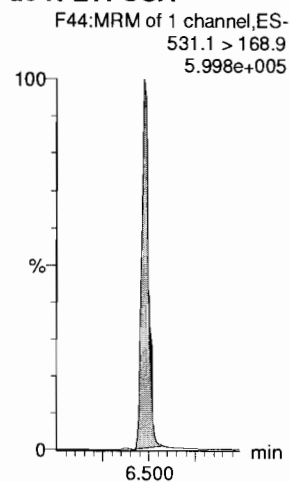
N-EtFOSE



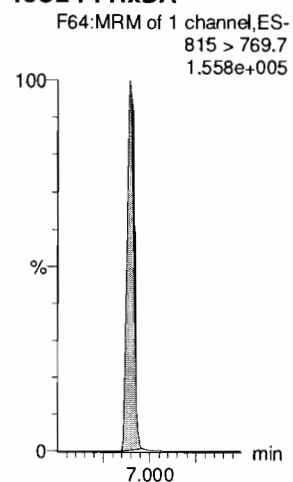
13C2-PFTeDA



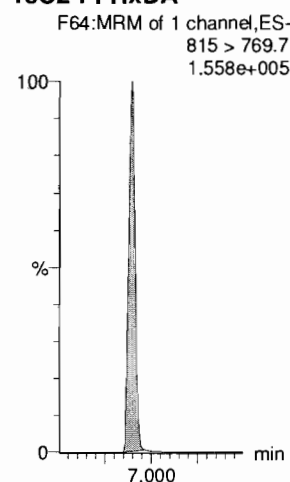
d5-N-ETFOSA



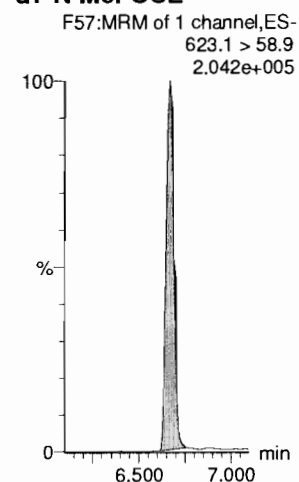
13C2-PFHxDA



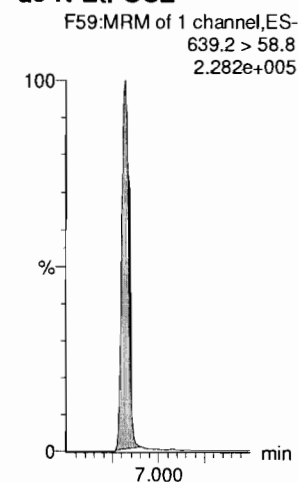
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



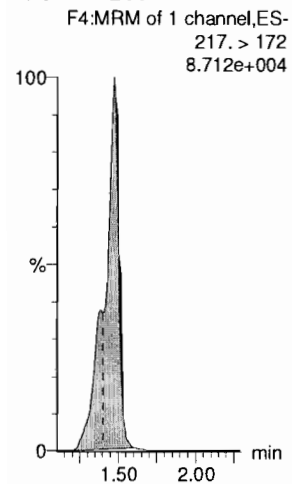
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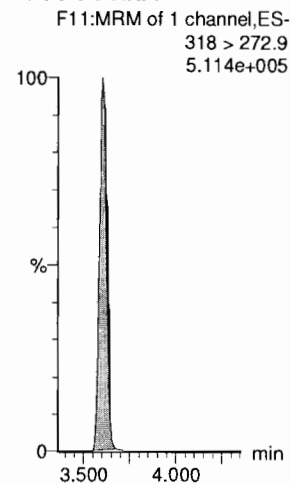
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Name: 181202M2_3, Date: 02-Dec-2018, Time: 18:45:35, ID: ST181202M2-2 PFC CS-1 18K3002, Description: PFC CS-1 18K3002

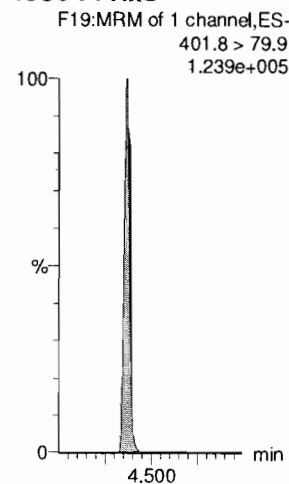
13C4-PFBA



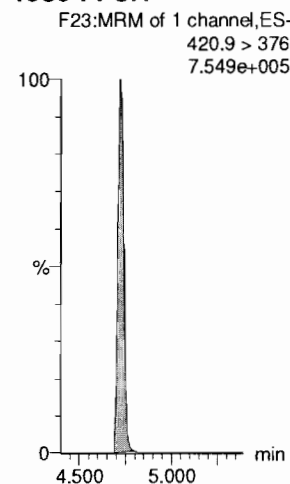
13C5-PFHxA



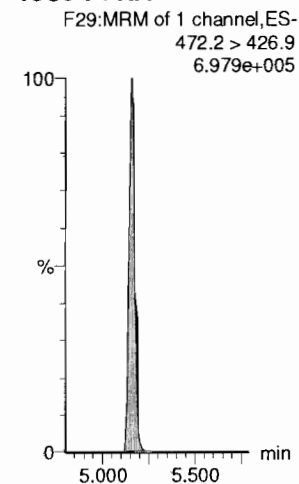
13C3-PFHxS



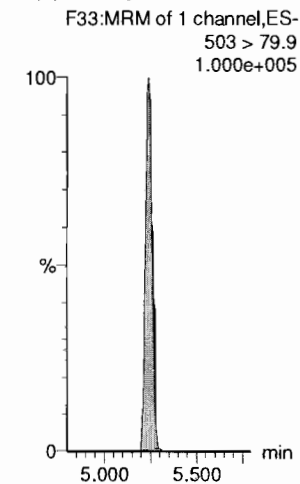
13C8-PFOA



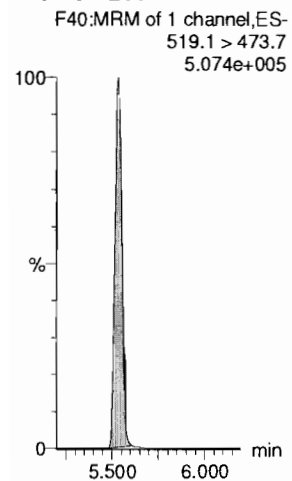
13C9-PFNA



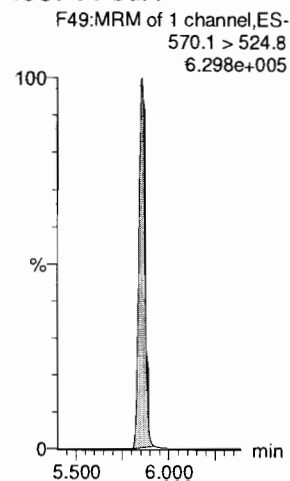
13C4-PFOS



13C6-PFDA



13C7-PFudA



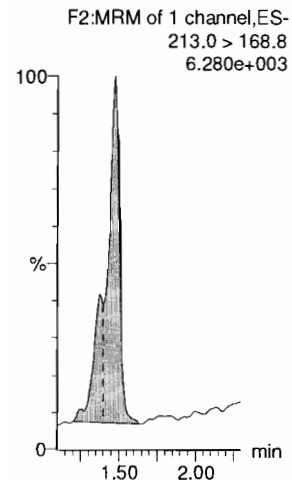
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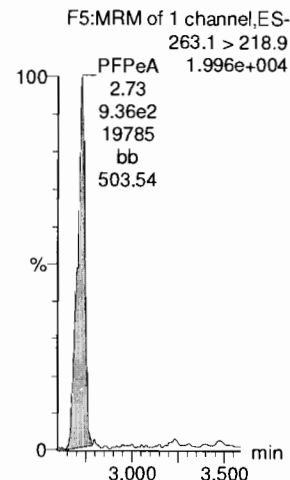
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_4, Date: 02-Dec-2018, Time: 18:56:07, ID: ST181202M2-3 PFC CS0 18K3003, Description: PFC CS0 18K3003

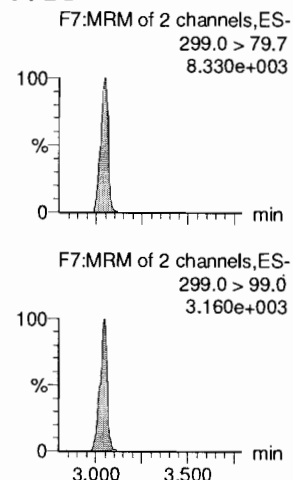
PFBA



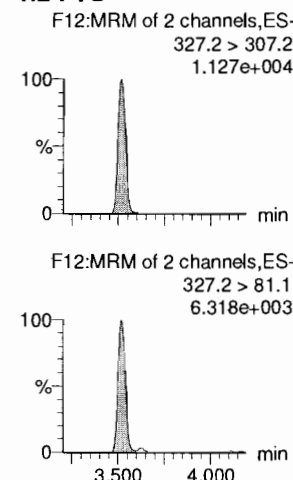
PFPeA



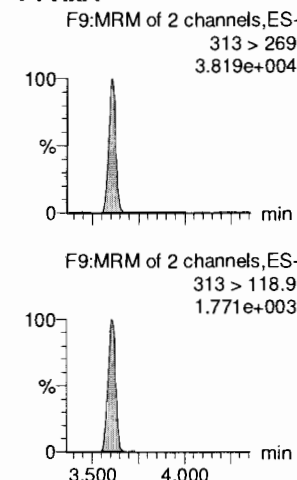
PFBS



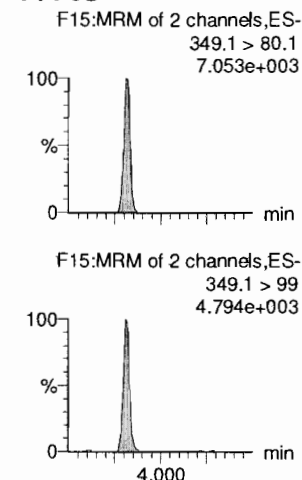
4:2 FTS



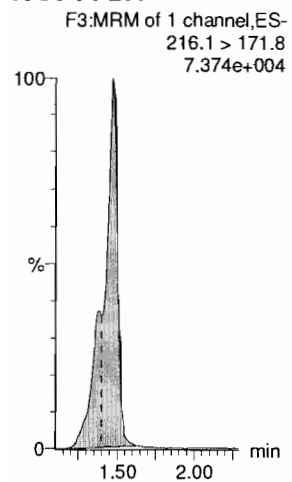
PFHxA



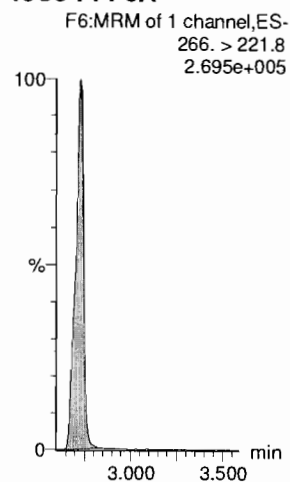
PFPeS



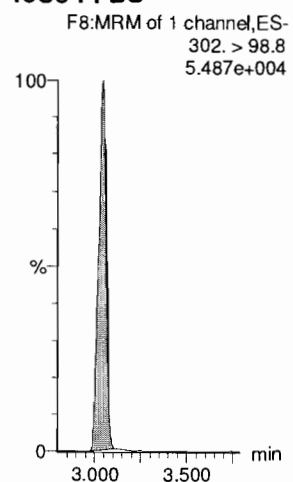
13C3-PFBA



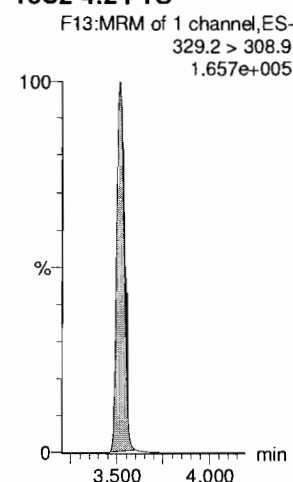
13C3-PFPeA



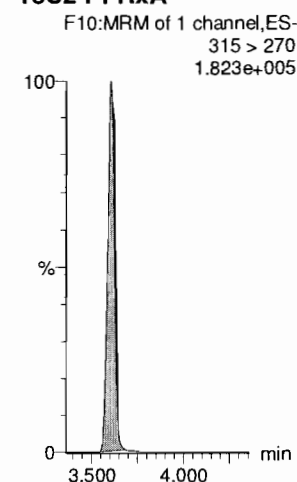
13C3-PFBS



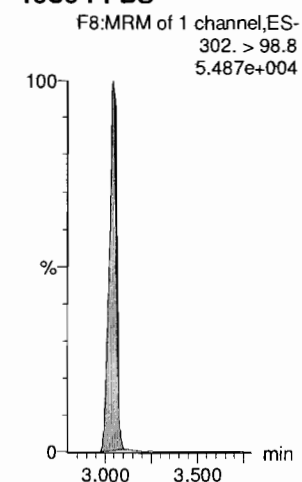
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



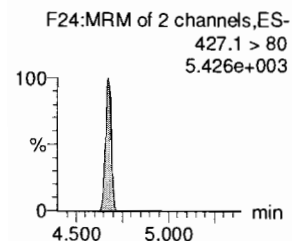
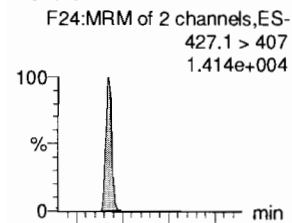
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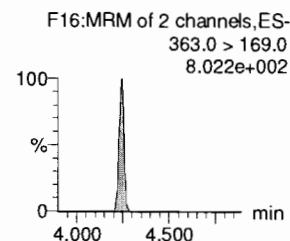
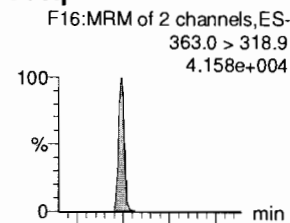
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Name: 181202M2_4, Date: 02-Dec-2018, Time: 18:56:07, ID: ST181202M2-3 PFC CS0 18K3003, Description: PFC CS0 18K3003

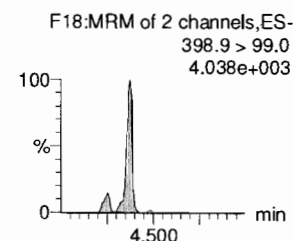
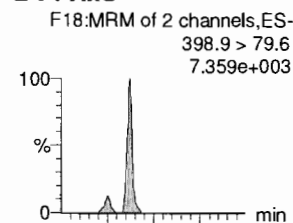
6:2 FTS



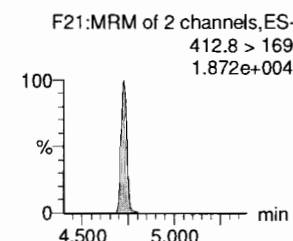
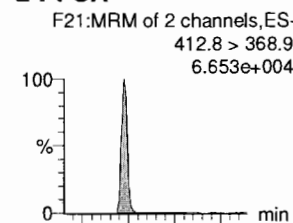
PFHpA



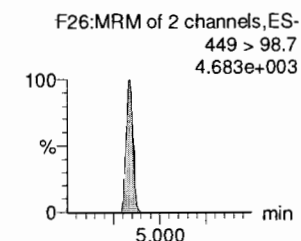
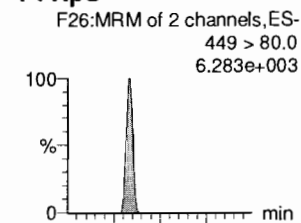
L-PFHxS



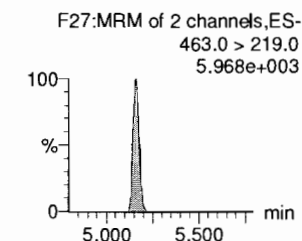
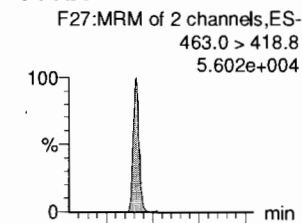
L-PFOA



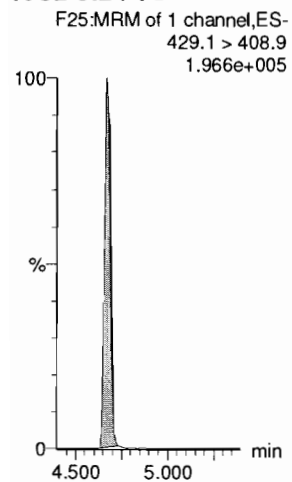
PFHpS



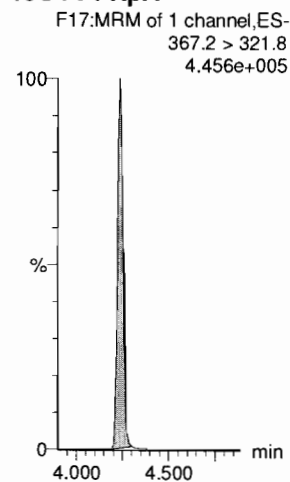
PFNA



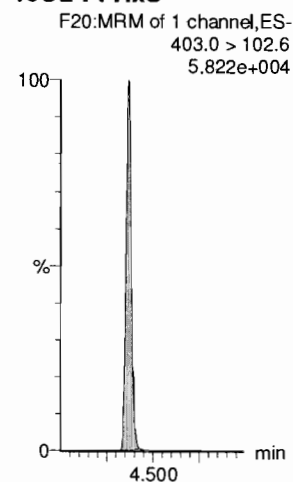
13C2-6:2 FTS



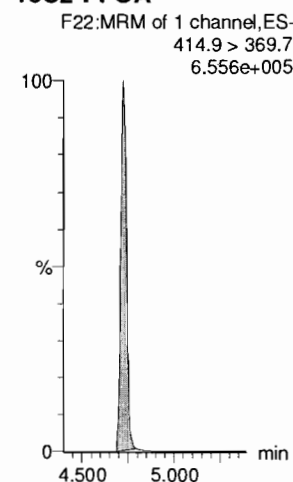
13C4-PFHpA



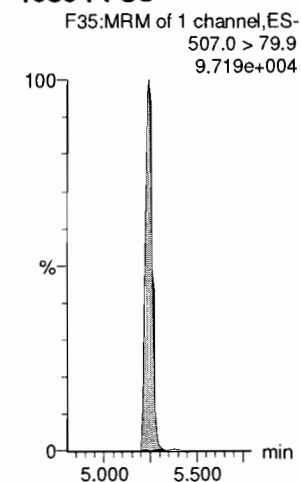
18O2-PFHxS



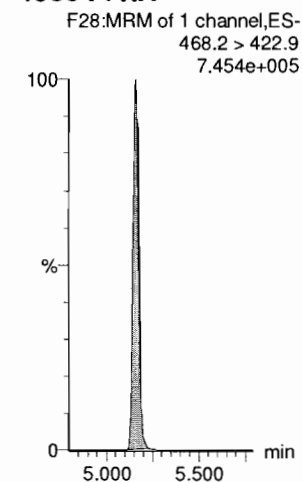
13C2-PFOA



13C8-PFOS



13C5-PFNA



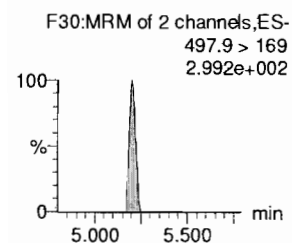
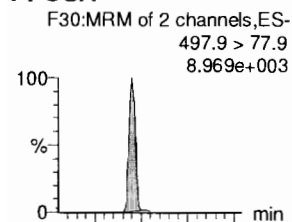
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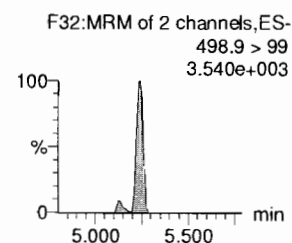
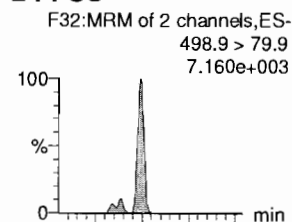
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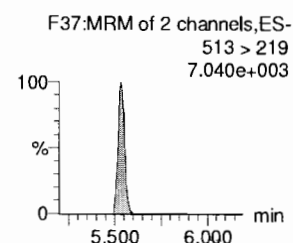
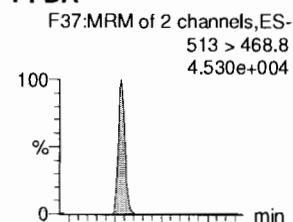
PFOSA



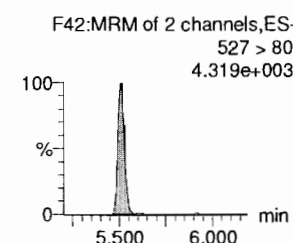
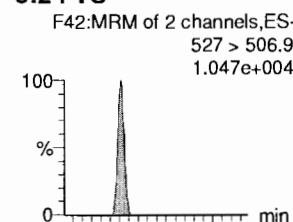
L-PFOS



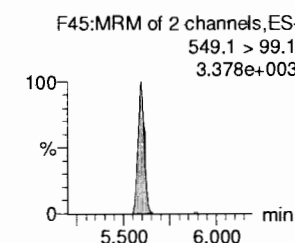
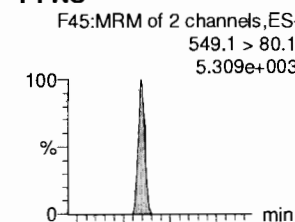
PFDA



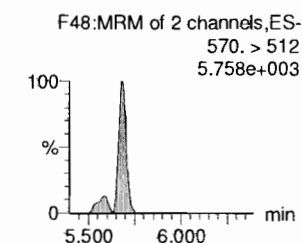
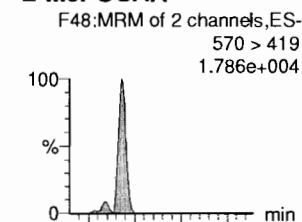
8:2 FTS



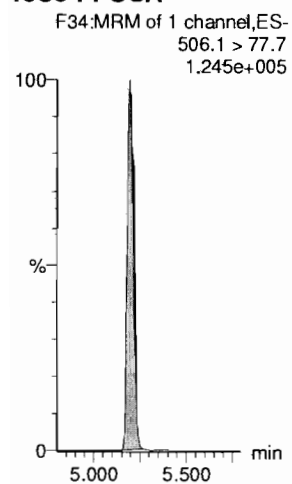
PFNS



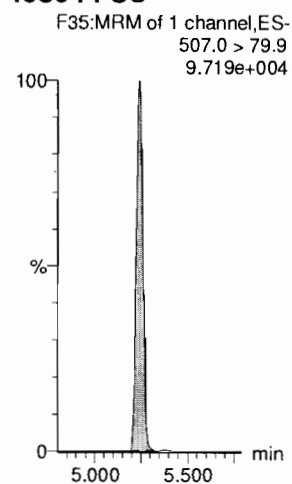
L-MeFOSAA



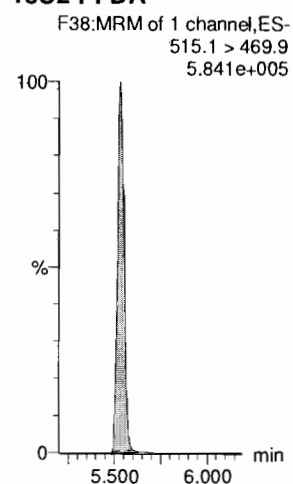
13C8-PFOSA



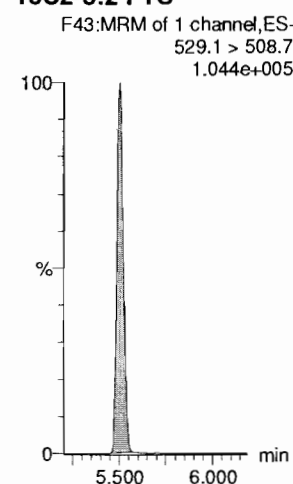
13C8-PFOS



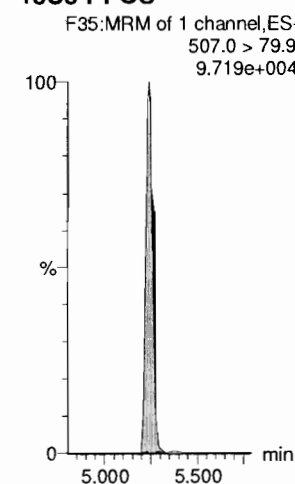
13C2-PFDA



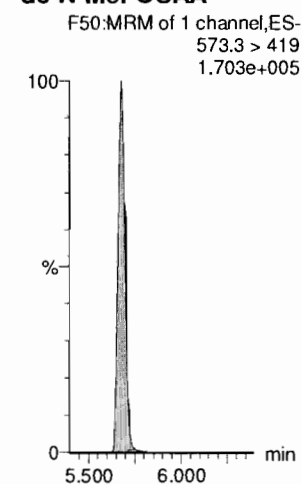
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

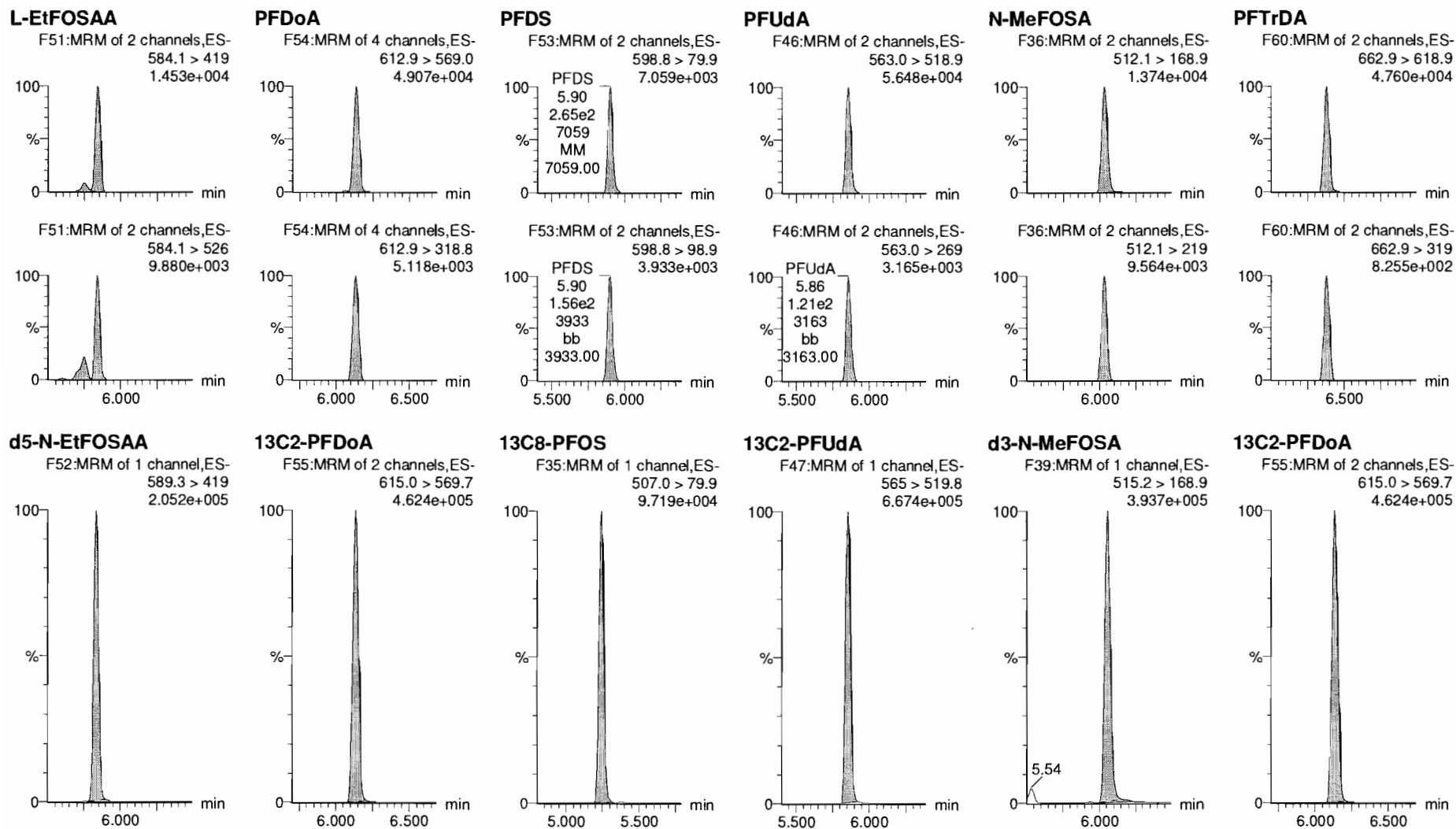


Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Name: 181202M2_4, Date: 02-Dec-2018, Time: 18:56:07, ID: ST181202M2-3 PFC CS0 18K3003, Description: PFC CS0 18K3003



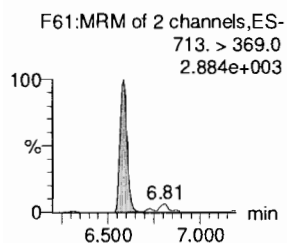
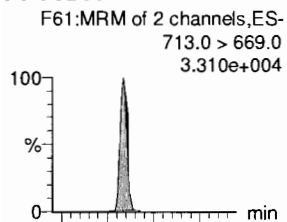
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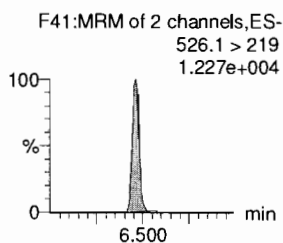
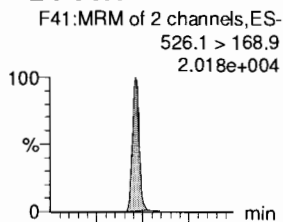
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Name: 181202M2_4, Date: 02-Dec-2018, Time: 18:56:07, ID: ST181202M2-3 PFC CS0 18K3003, Description: PFC CS0 18K3003

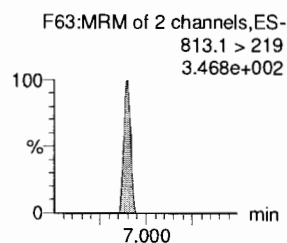
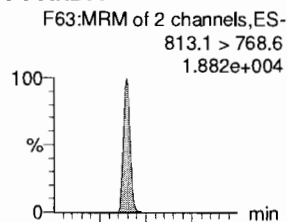
PFTeDA



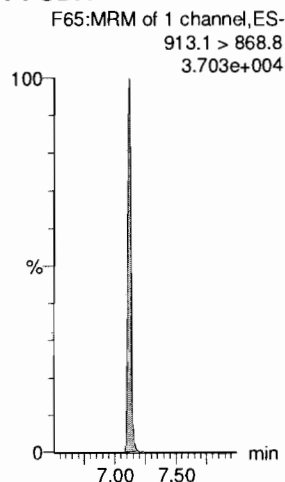
N-EtFOSA



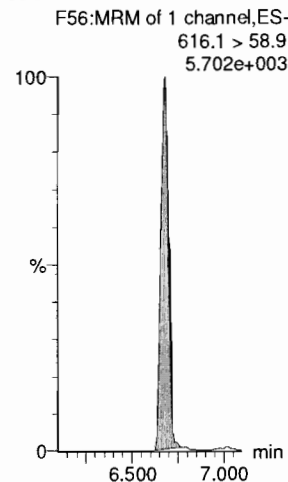
PFHxDA



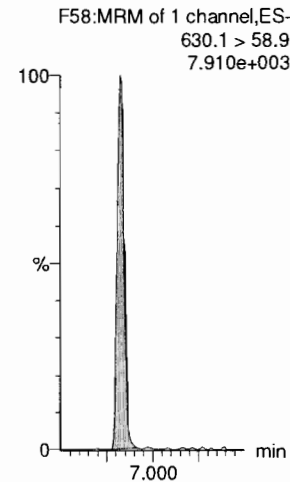
PFODA



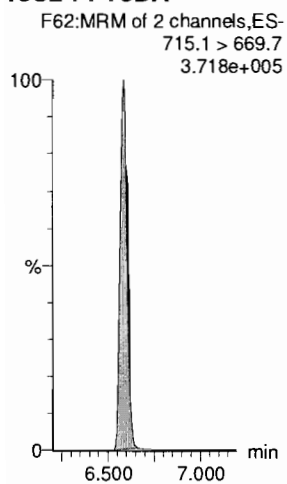
N-MeFOSE



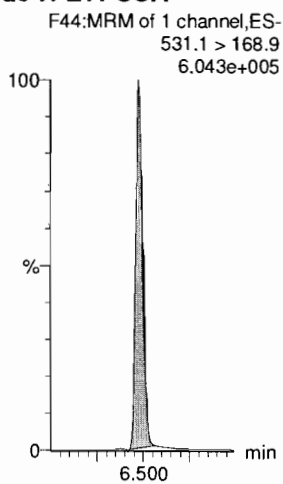
N-EtFOSE



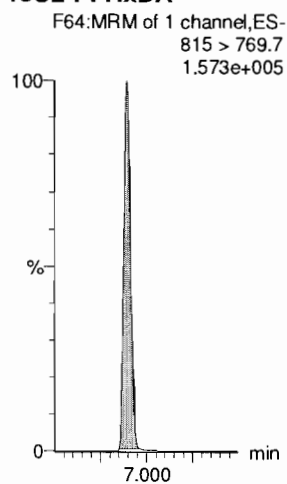
13C2-PFTeDA



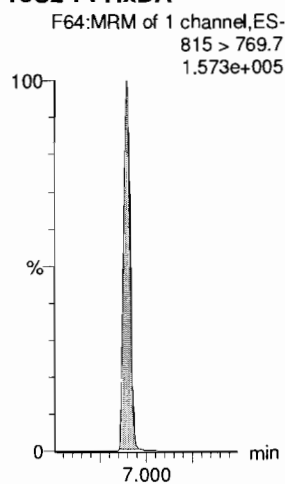
d5-N-ETFOSA



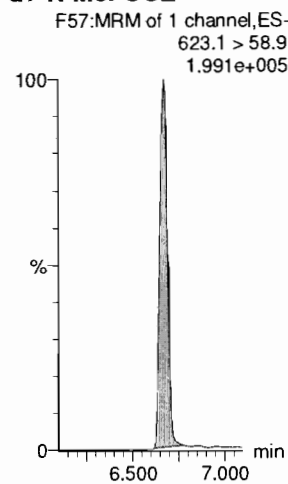
13C2-PFHxDA



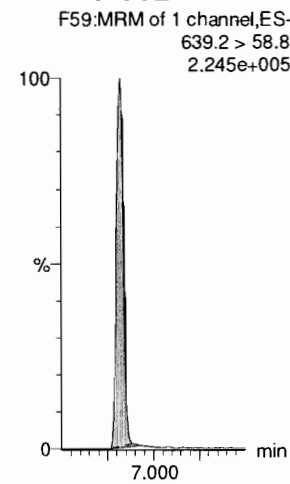
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



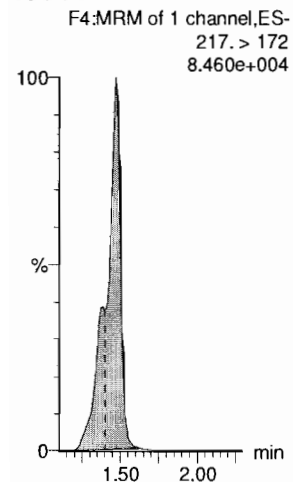
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

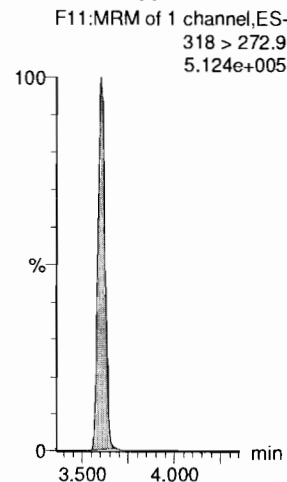
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Name: 181202M2_4, Date: 02-Dec-2018, Time: 18:56:07, ID: ST181202M2-3 PFC CS0 18K3003, Description: PFC CS0 18K3003

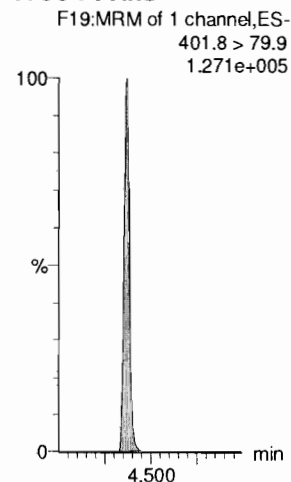
13C4-PFBA



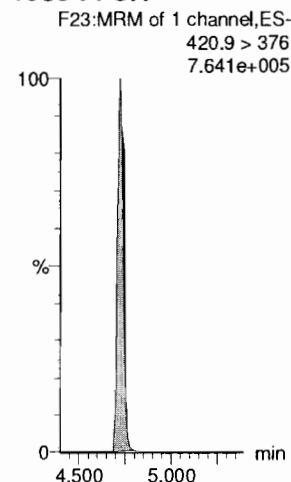
13C5-PFHxA



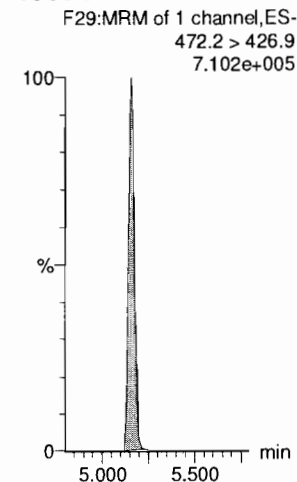
13C3-PFHxS



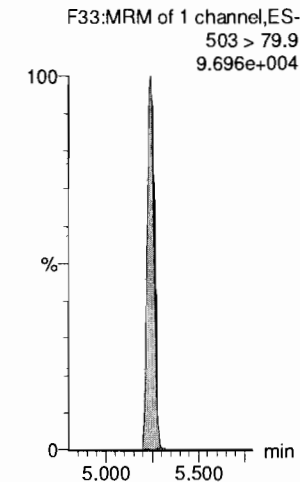
13C8-PFOA



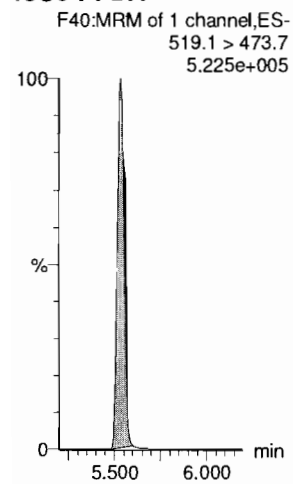
13C9-PFNA



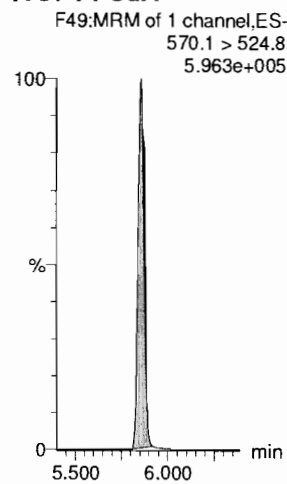
13C4-PFOS



13C6-PFDA



13C7-PFUDa



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

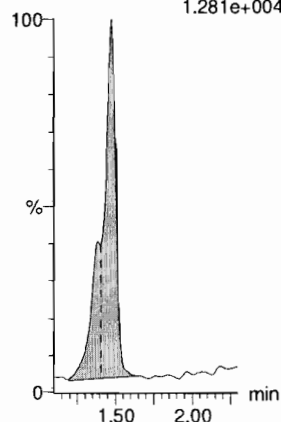
Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

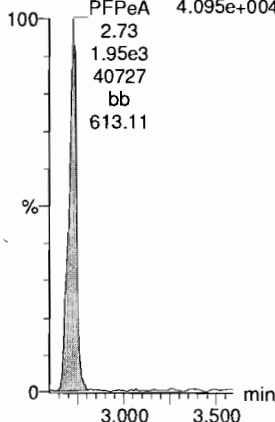
PFBA

F2:MRM of 1 channel,ES-
213.0 > 168.8
1.281e+004



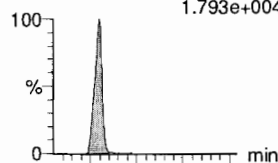
PFPeA

F5:MRM of 1 channel,ES-
263.1 > 218.9
4.095e+004

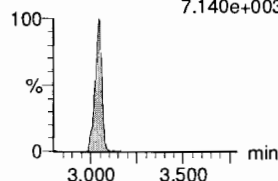


PFBS

F7:MRM of 2 channels,ES-
299.0 > 79.7
1.793e+004

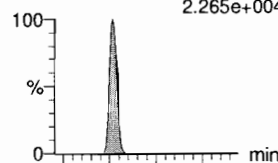


F7:MRM of 2 channels,ES-
299.0 > 99.0
7.140e+003

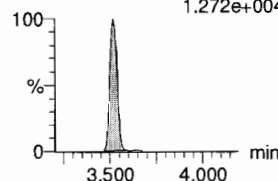


4:2 FTS

F12:MRM of 2 channels,ES-
327.2 > 307.2
2.265e+004

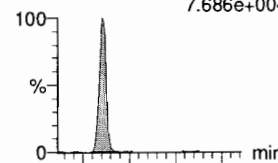


F12:MRM of 2 channels,ES-
327.2 > 81.1
1.272e+004

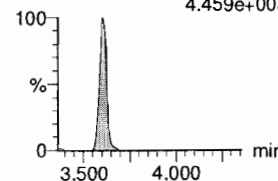


PFHxA

F9:MRM of 2 channels,ES-
313 > 269
7.686e+004

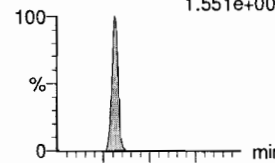


F9:MRM of 2 channels,ES-
313 > 118.9
4.459e+003

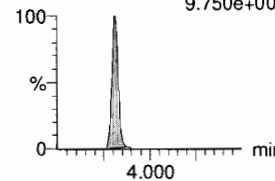


PFPeS

F15:MRM of 2 channels,ES-
349.1 > 80.1
1.551e+004

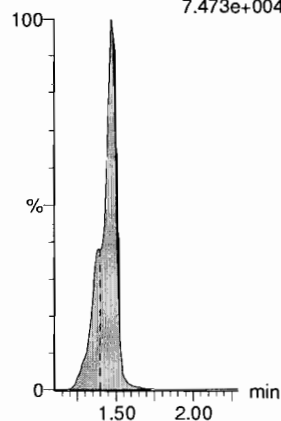


F15:MRM of 2 channels,ES-
349.1 > 99
9.750e+003



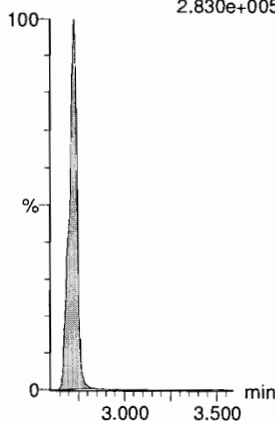
13C3-PFBA

F3:MRM of 1 channel,ES-
216.1 > 171.8
7.473e+004



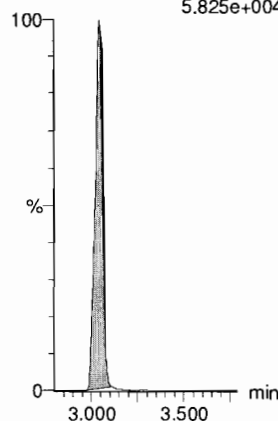
13C3-PFPeA

F6:MRM of 1 channel,ES-
266. > 221.8
2.830e+005



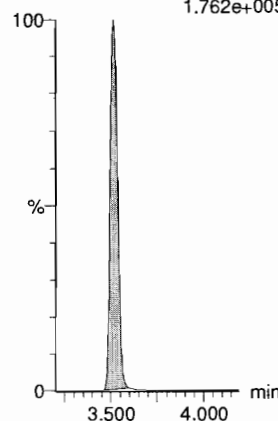
13C3-PFBS

F8:MRM of 1 channel,ES-
302. > 98.8
5.825e+004



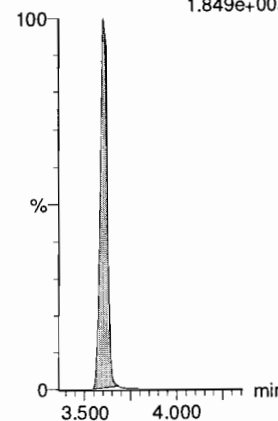
13C2-4:2 FTS

F13:MRM of 1 channel,ES-
329.2 > 308.9
1.762e+005



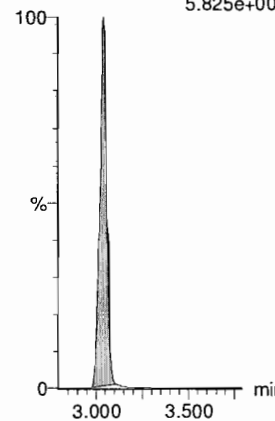
13C2-PFHxA

F10:MRM of 1 channel,ES-
315 > 270
1.849e+005



13C3-PFBS

F8:MRM of 1 channel,ES-
302. > 98.8
5.825e+004



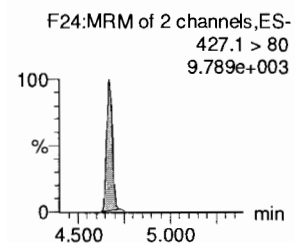
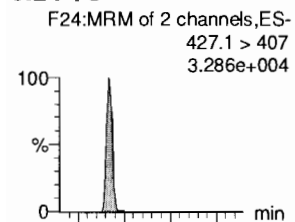
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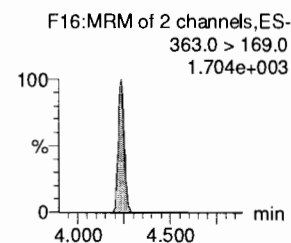
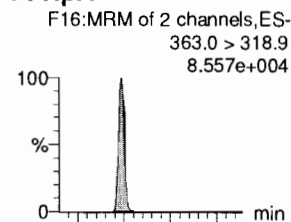
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Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

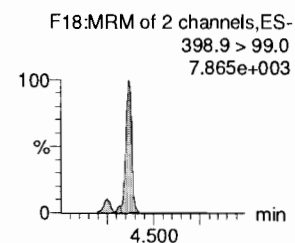
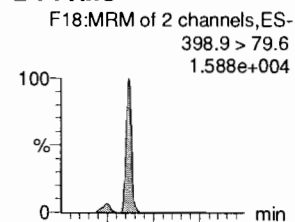
6:2 FTS



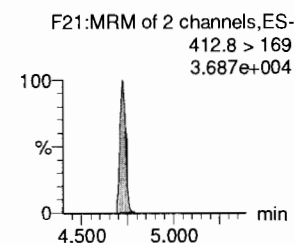
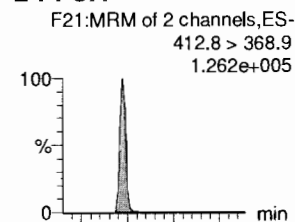
PFHpA



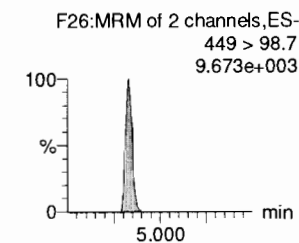
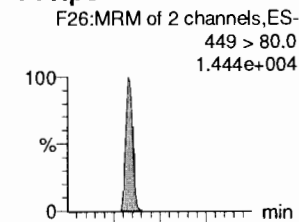
L-PFHxS



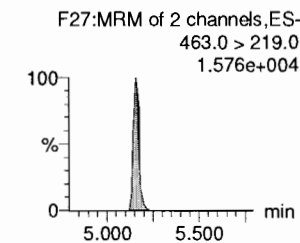
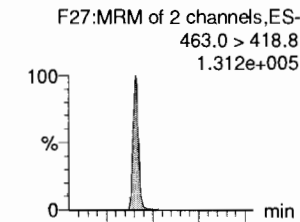
L-PFOA



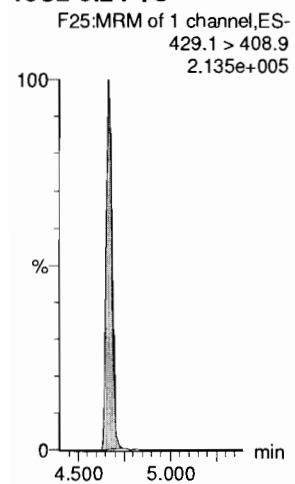
PFHpS



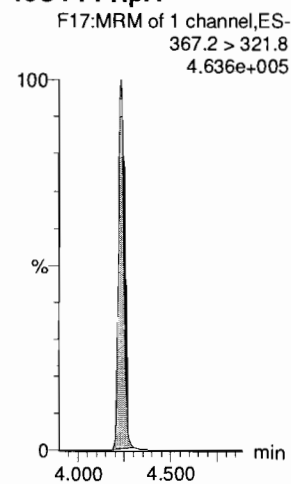
PFNA



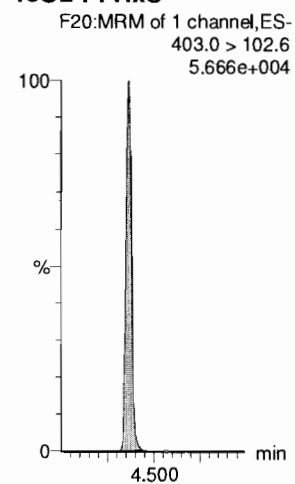
13C2-6:2 FTS



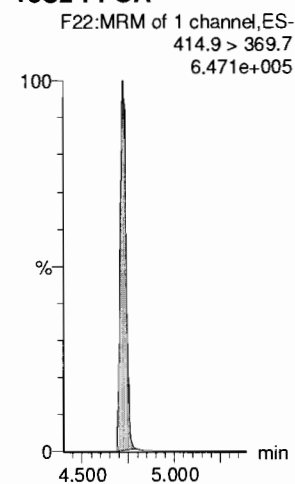
13C4-PFHpA



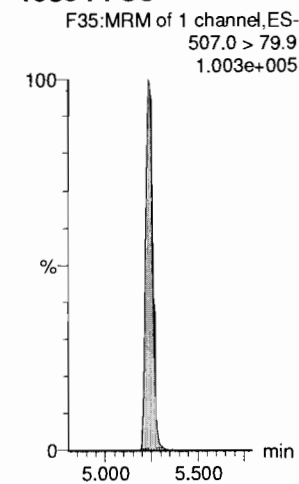
18O2-PFHxS



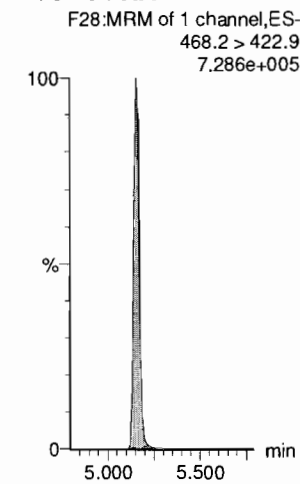
13C2-PFOA



13C8-PFOS



13C5-PFNA



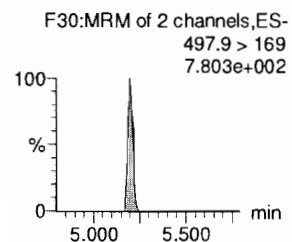
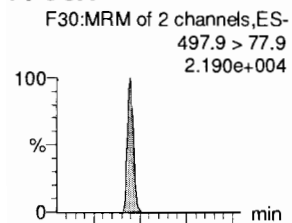
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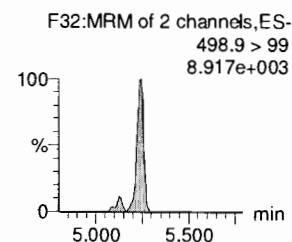
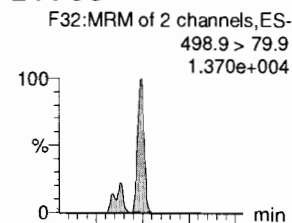
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Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

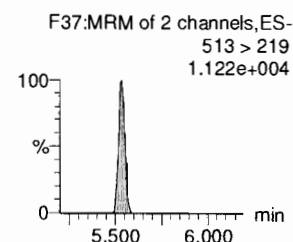
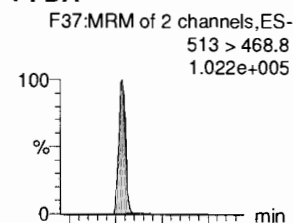
PFOSA



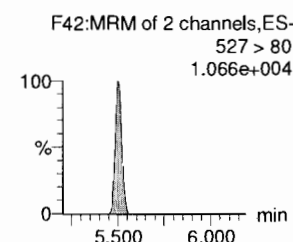
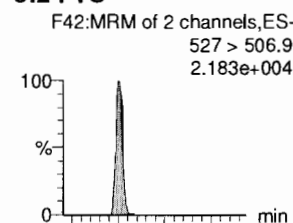
L-PFOS



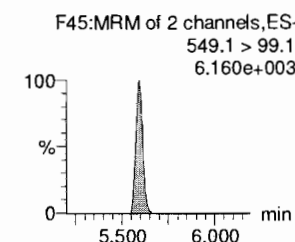
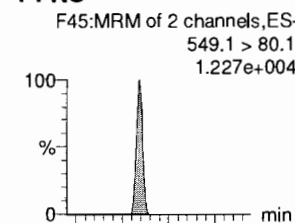
PFDA



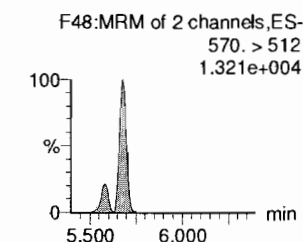
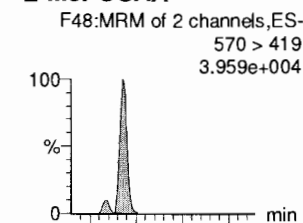
8:2 FTS



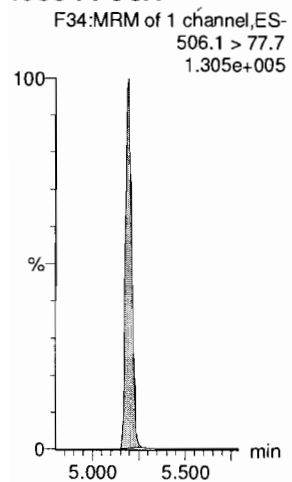
PFNS



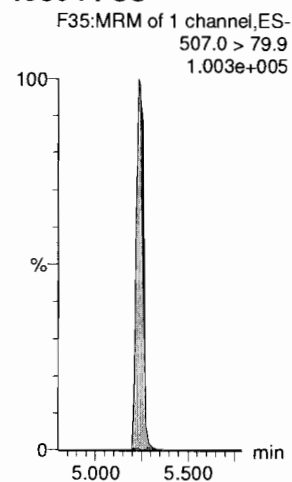
L-MeFOSAA



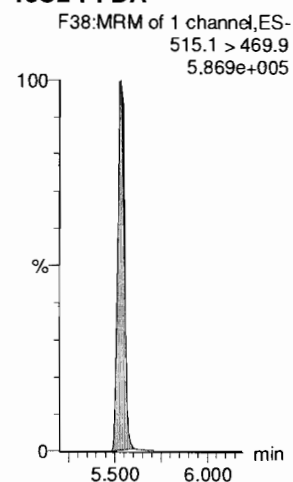
13C8-PFOSA



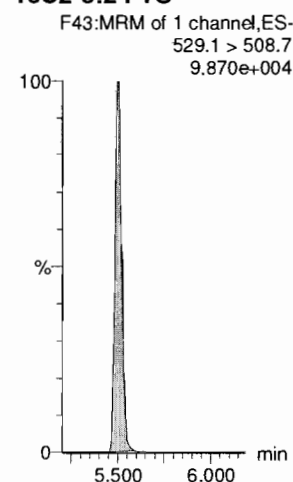
13C8-PFOS



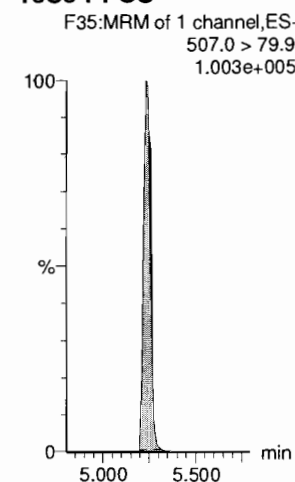
13C2-PFDA



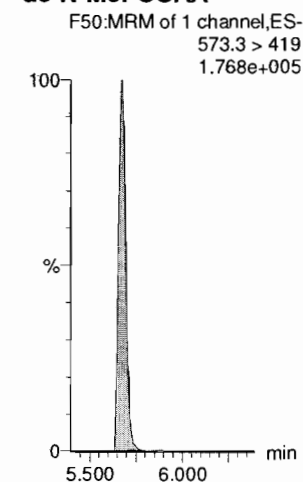
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



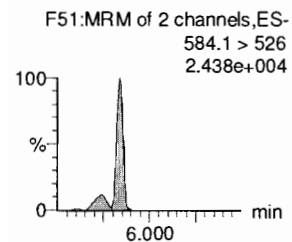
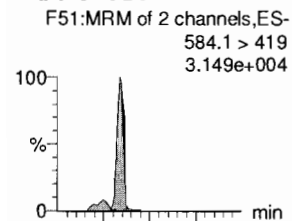
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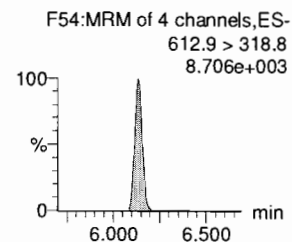
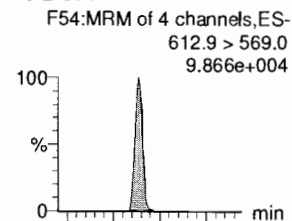
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

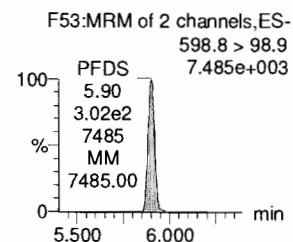
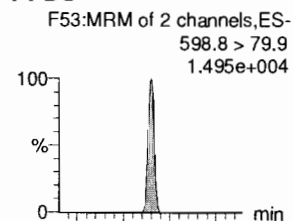
L-EtFOSAA



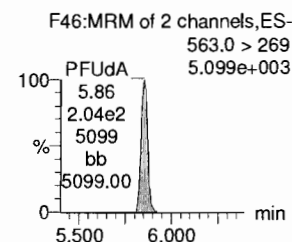
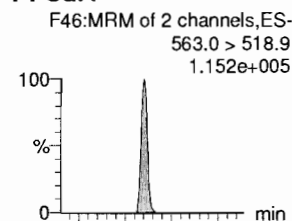
PFDaA



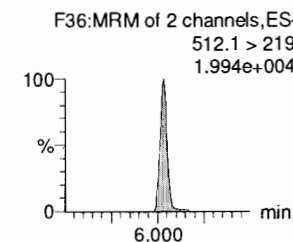
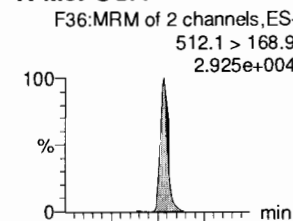
PFDS



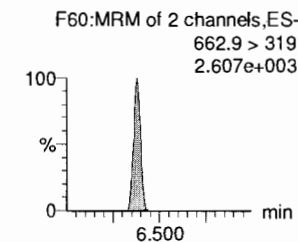
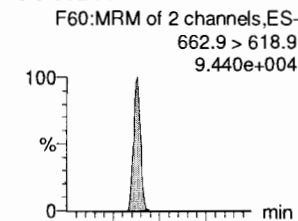
PFUdA



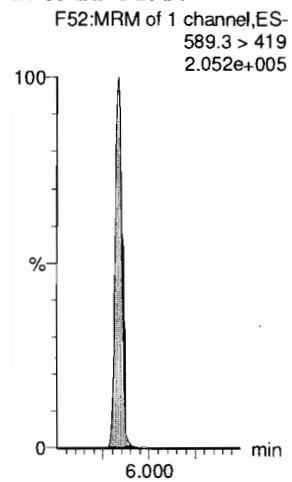
N-MeFOSA



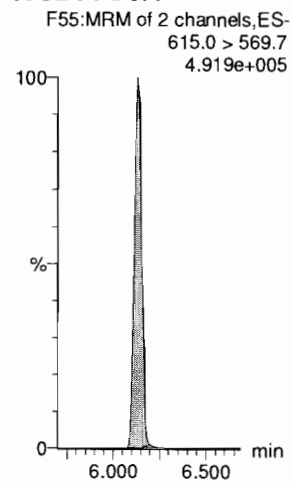
PFTrDA



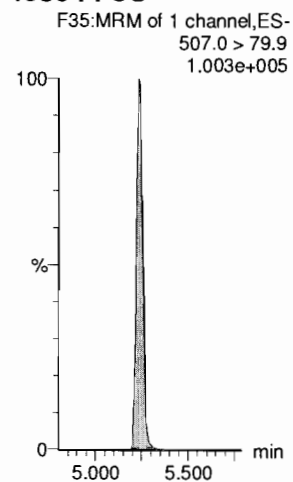
d5-N-EtFOSAA



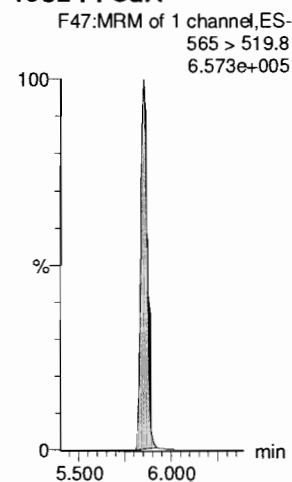
13C2-PFDaA



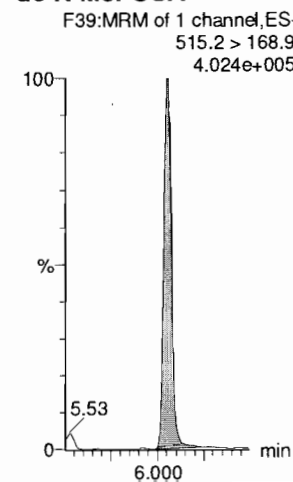
13C8-PFOS



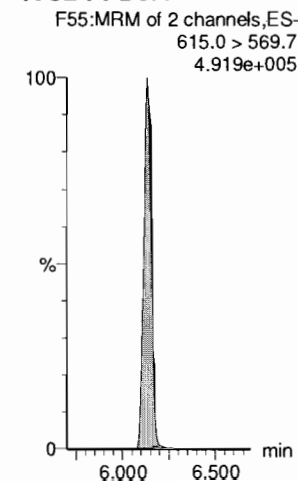
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

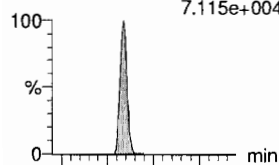
Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

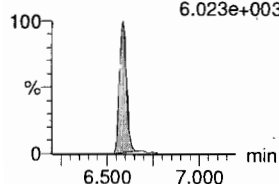
Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

PFTeDA

F61:MRM of 2 channels,ES-
713.0 > 669.0
7.115e+004

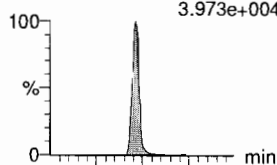


F61:MRM of 2 channels,ES-
713.0 > 369.0
6.023e+003

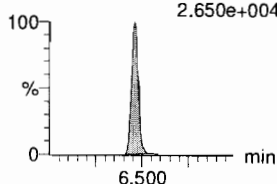


N-EtFOSA

F41:MRM of 2 channels,ES-
526.1 > 168.9
3.973e+004

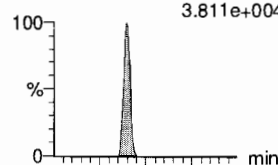


F41:MRM of 2 channels,ES-
526.1 > 219
2.650e+004

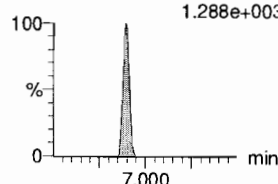


PFHxDA

F63:MRM of 2 channels,ES-
813.1 > 768.6
3.811e+004

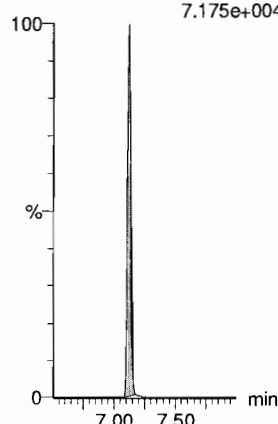


F63:MRM of 2 channels,ES-
813.1 > 219
1.288e+003



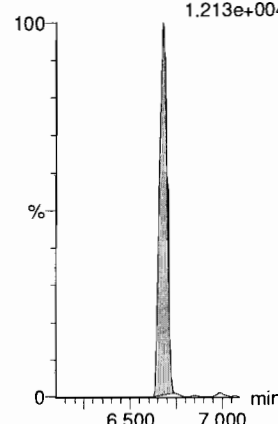
PFODA

F65:MRM of 1 channel,ES-
913.1 > 868.8
7.175e+004



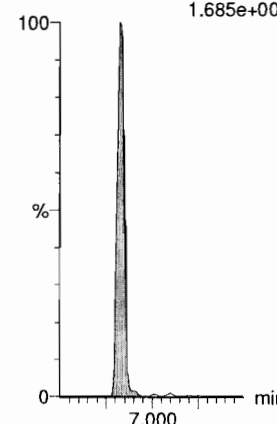
N-MeFOSE

F56:MRM of 1 channel,ES-
616.1 > 58.9
1.213e+004



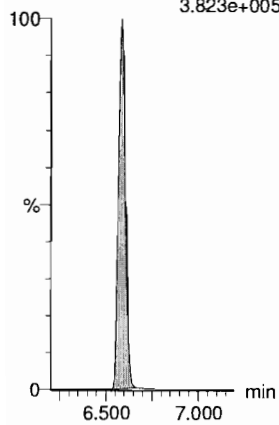
N-EtFOSE

F58:MRM of 1 channel,ES-
630.1 > 58.9
1.685e+004



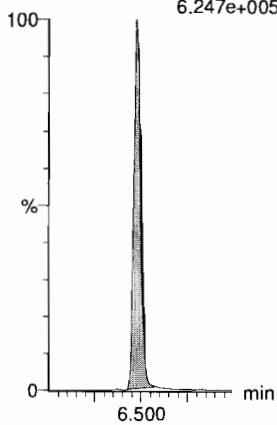
13C2-PFTeDA

F62:MRM of 2 channels,ES-
715.1 > 669.7
3.823e+005



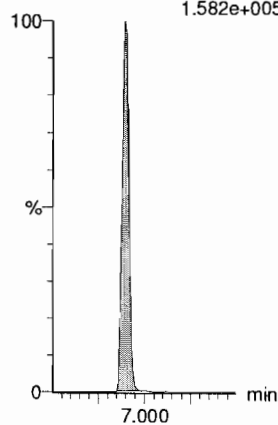
d5-N-ETFOSE

F44:MRM of 1 channel,ES-
531.1 > 168.9
6.247e+005



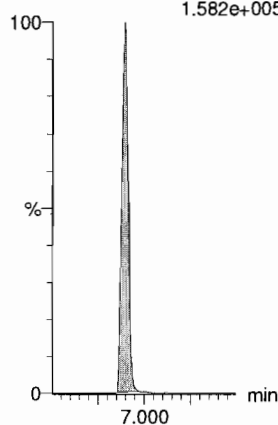
13C2-PFHxDA

F64:MRM of 1 channel,ES-
815 > 769.7
1.582e+005



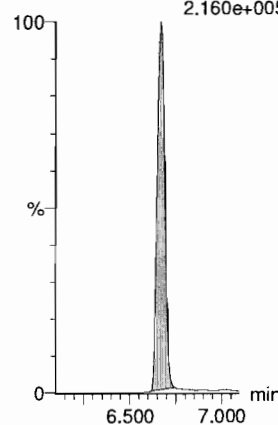
13C2-PFHxDA

F64:MRM of 1 channel,ES-
815 > 769.7
1.582e+005



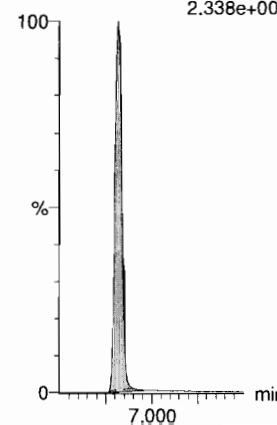
d7-N-MeFOSE

F57:MRM of 1 channel,ES-
623.1 > 58.9
2.160e+005



d9-N-EtFOSE

F59:MRM of 1 channel,ES-
639.2 > 58.8
2.338e+005



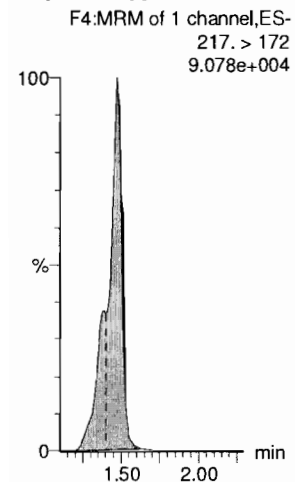
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

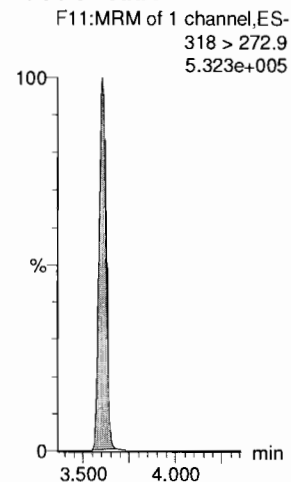
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_5, Date: 02-Dec-2018, Time: 19:06:45, ID: ST181202M2-4 PFC CS1 18K3004, Description: PFC CS1 18K3004

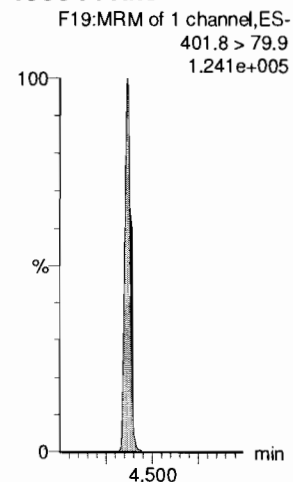
13C4-PFBA



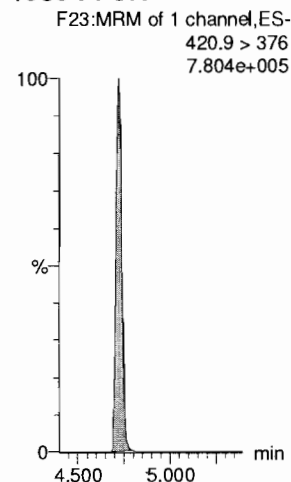
13C5-PFHxA



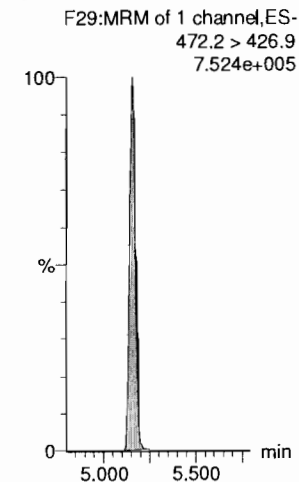
13C3-PFHxS



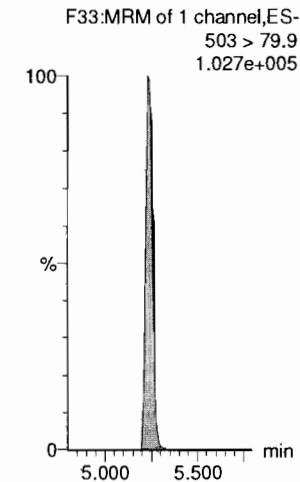
13C8-PFOA



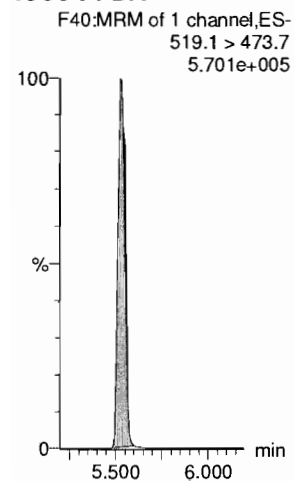
13C9-PFNA



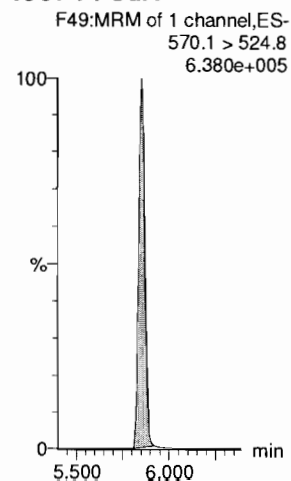
13C4-PFOS



13C6-PFDA



13C7-PFUdA



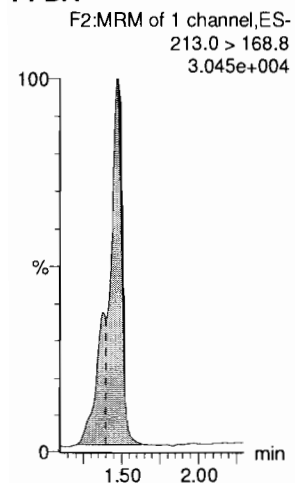
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

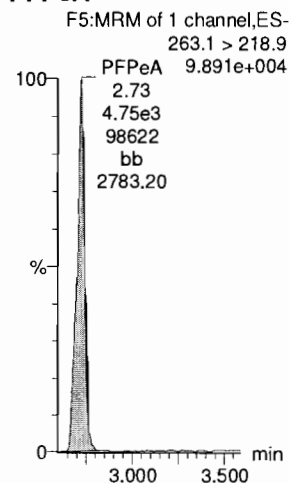
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

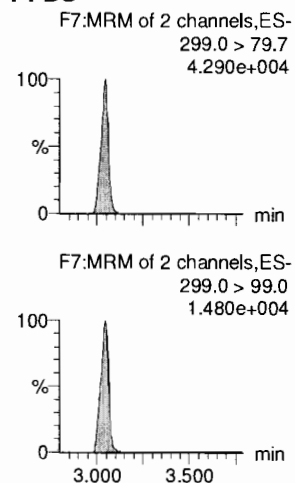
PFBA



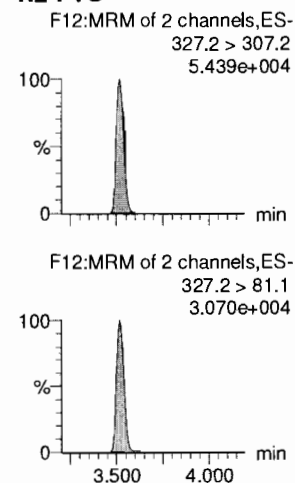
PFPeA



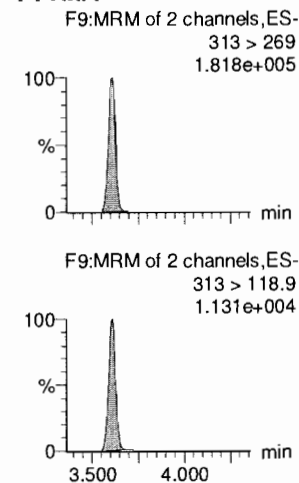
PFBS



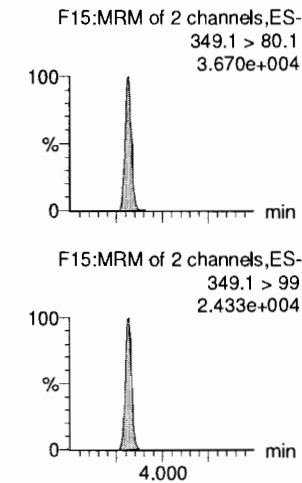
4:2 FTS



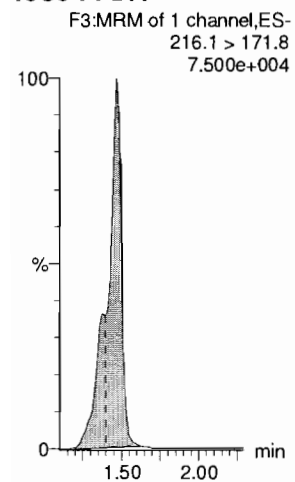
PFHxA



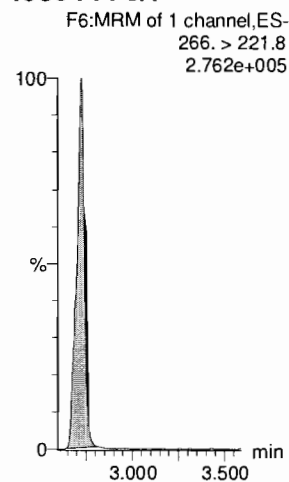
PFPeS



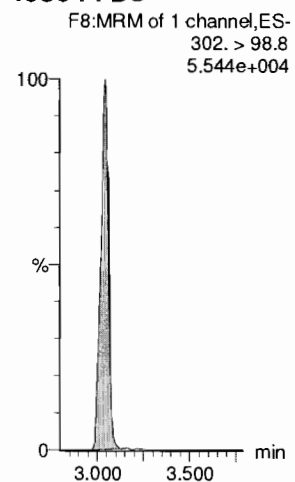
13C3-PFBA



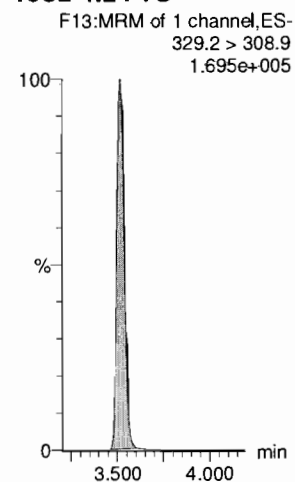
13C3-PFPeA



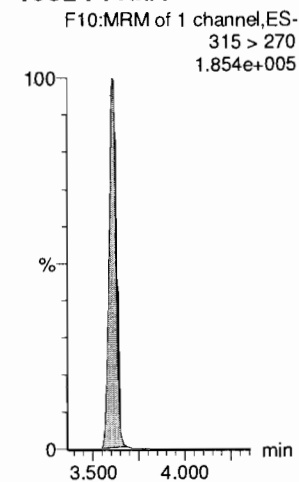
13C3-PFBS



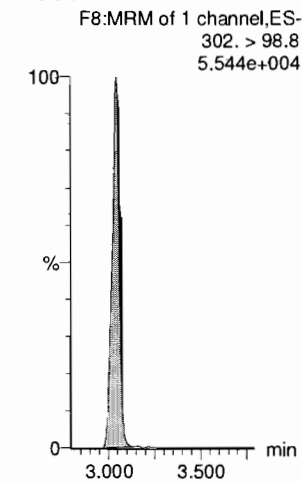
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



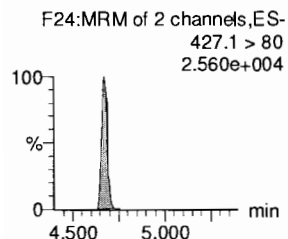
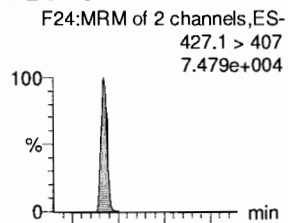
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

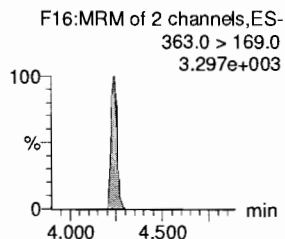
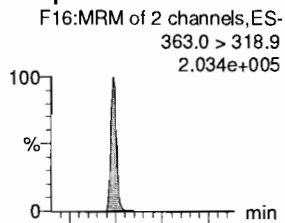
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Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

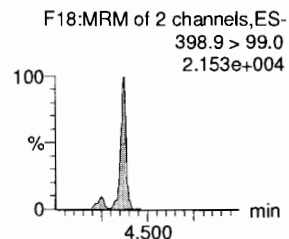
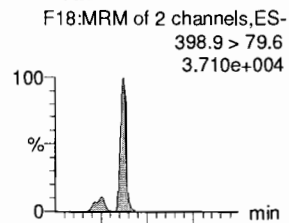
6:2 FTS



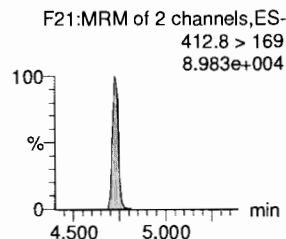
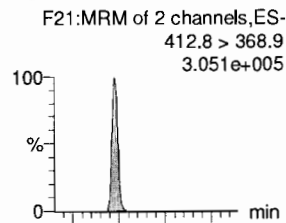
PFHpA



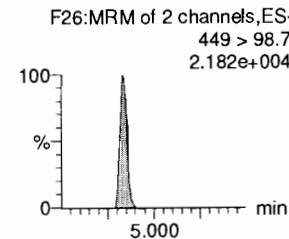
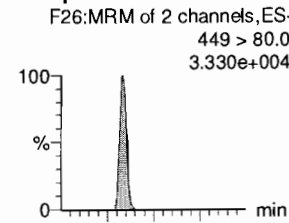
L-PFHxS



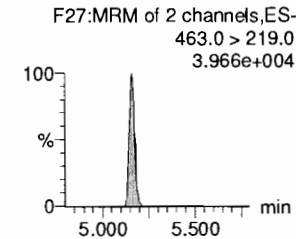
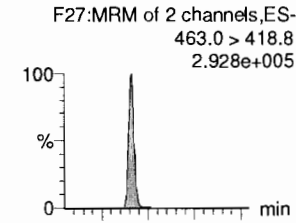
L-PFOA



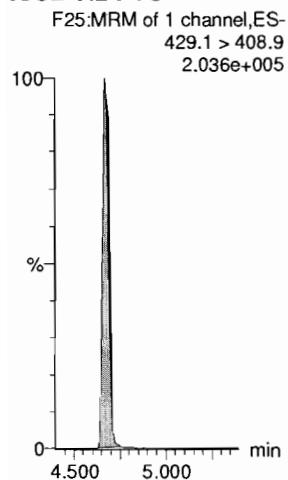
PFHpS



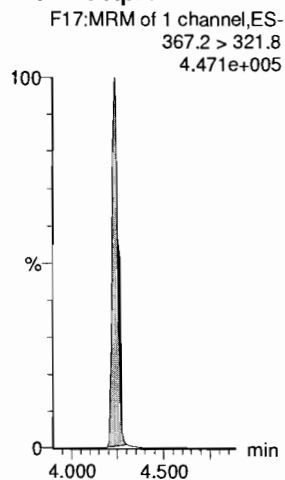
PFNA



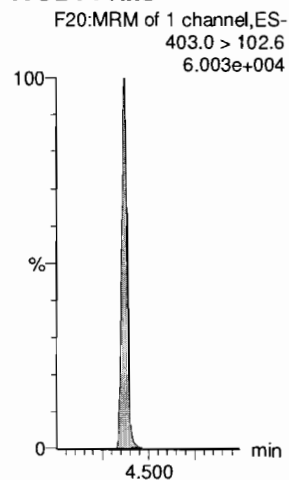
13C2-6:2 FTS



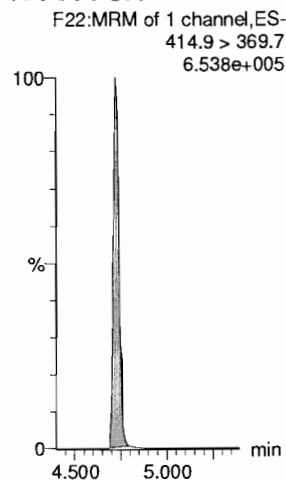
13C4-PFHpA



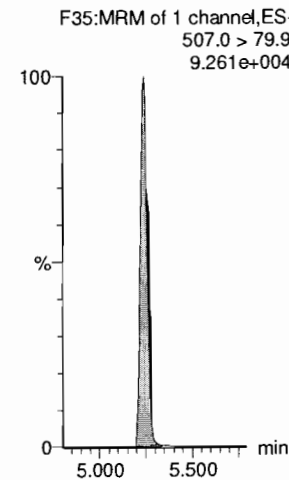
18O2-PFHxS



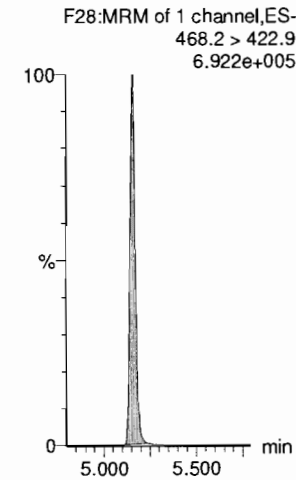
13C2-PFOA



13C8-PFOS



13C5-PFNA



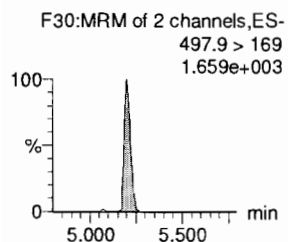
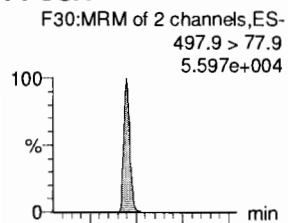
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

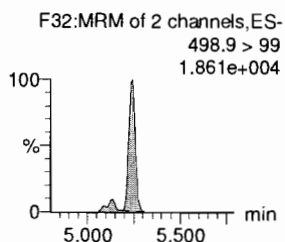
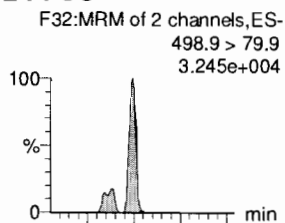
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Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

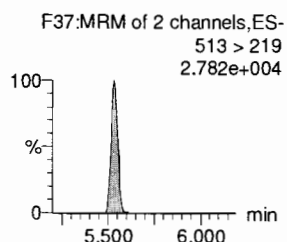
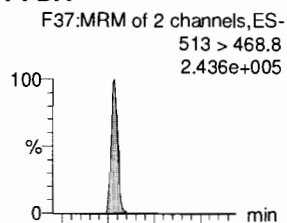
PFOSA



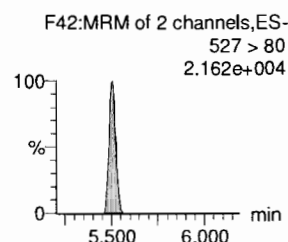
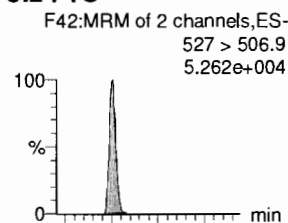
L-PFOS



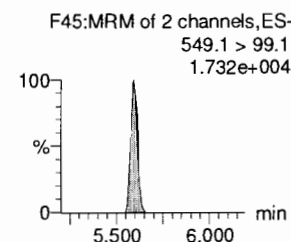
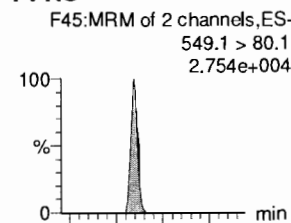
PFDA



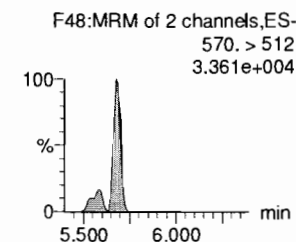
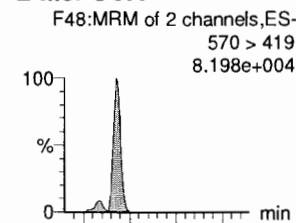
8:2 FTS



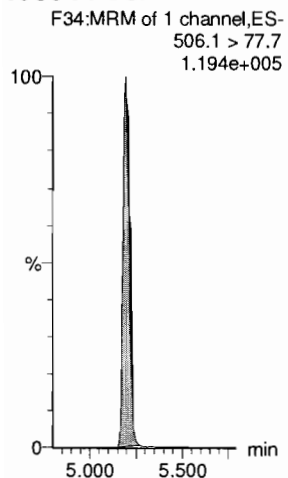
PFNS



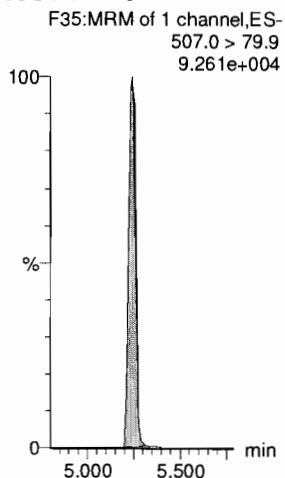
L-MeFOSAA



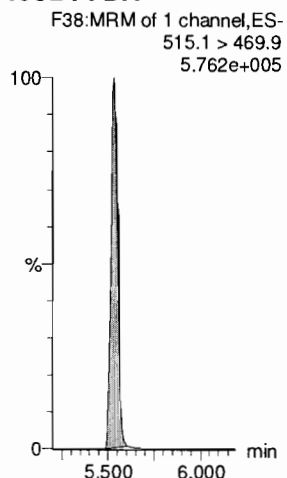
13C8-PFOSA



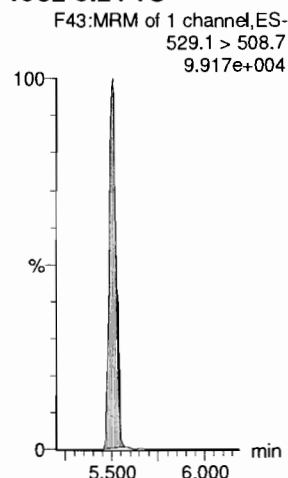
13C8-PFOS



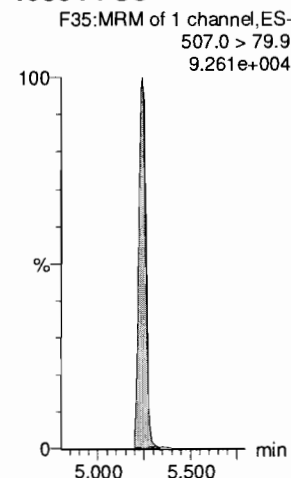
13C2-PFDA



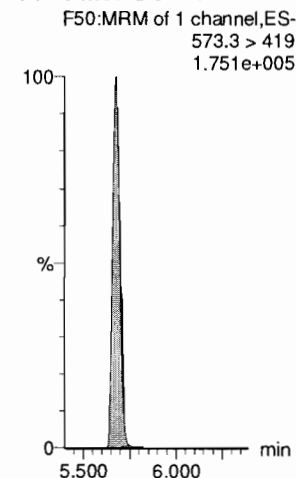
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



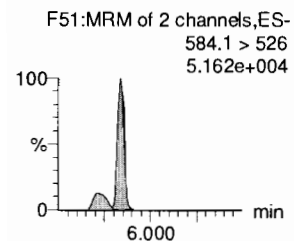
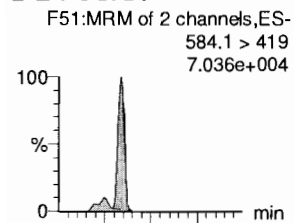
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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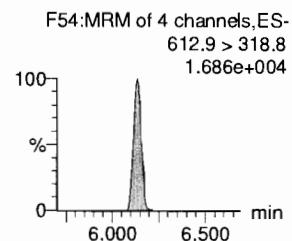
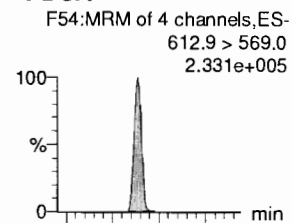
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Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

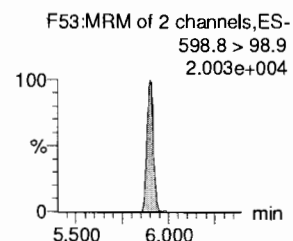
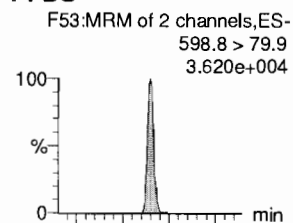
L-EtFOSAA



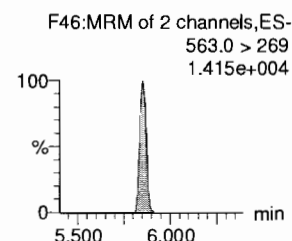
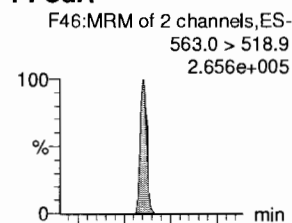
PFDaA



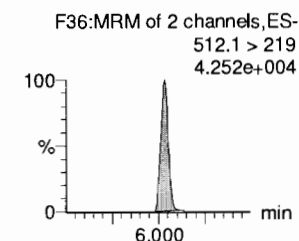
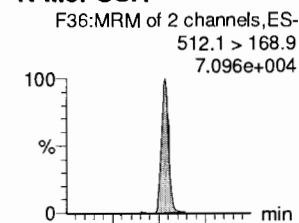
PFDS



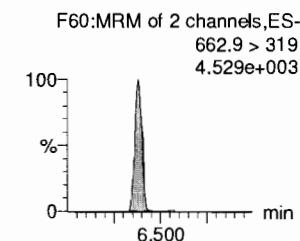
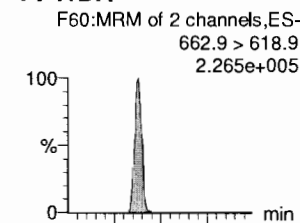
PFUdA



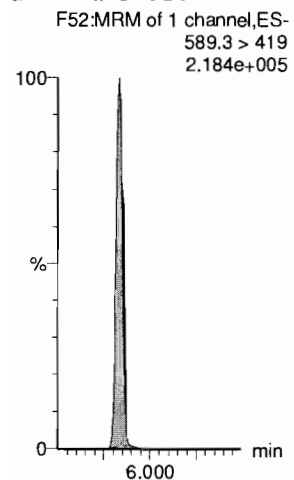
N-MeFOSA



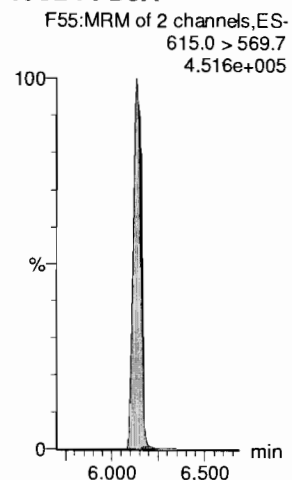
PFTrDA



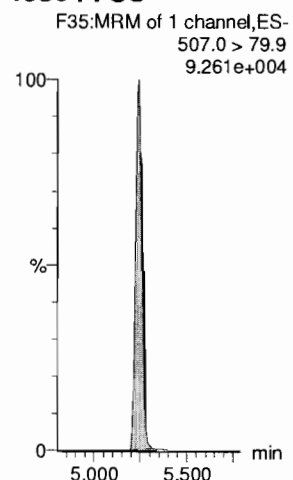
d5-N-EtFOSAA



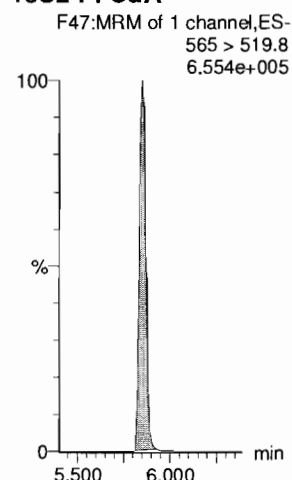
13C2-PFDaA



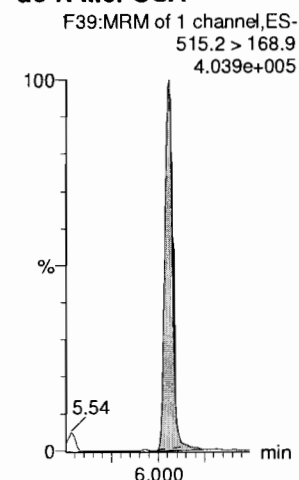
13C8-PFOS



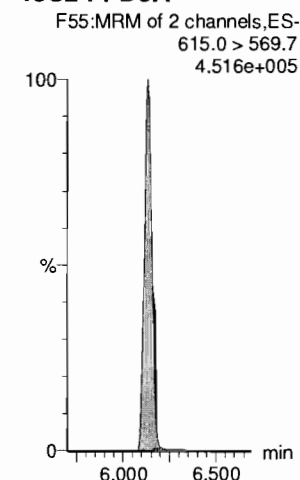
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



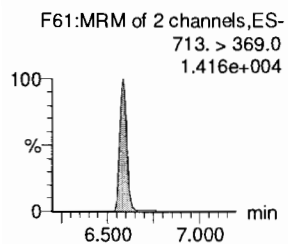
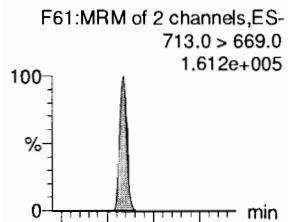
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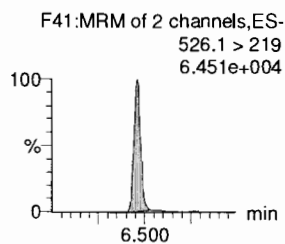
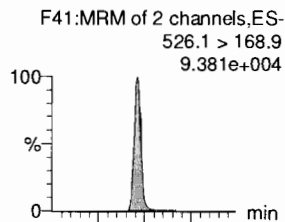
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Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

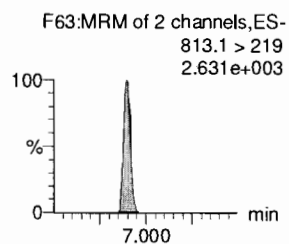
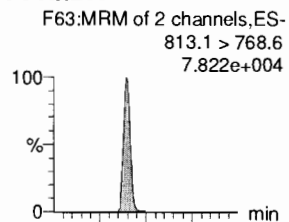
PFTeDA



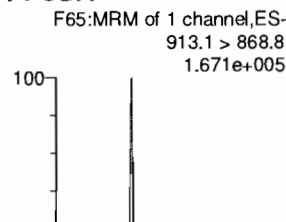
N-EtFOSA



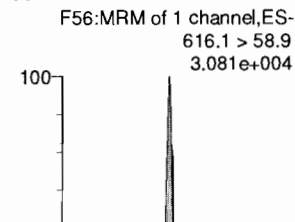
PFHxDA



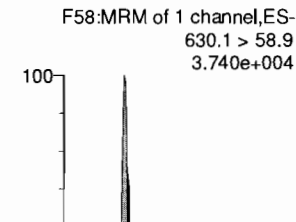
PFODA



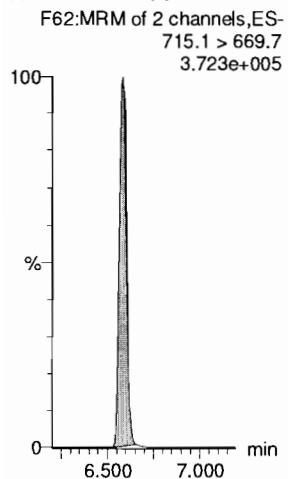
N-MeFOSE



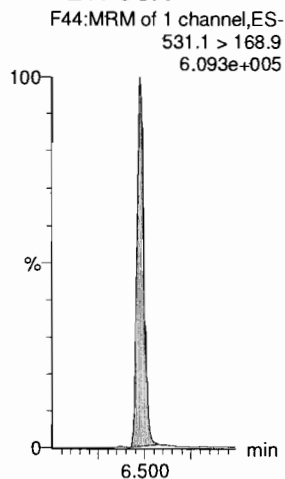
N-EtFOSE



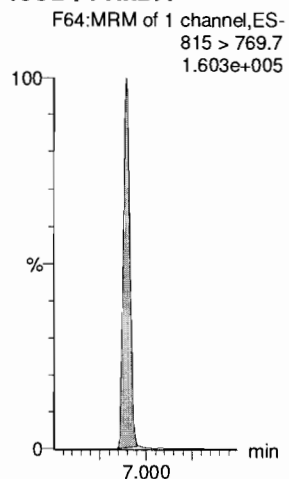
13C2-PFTeDA



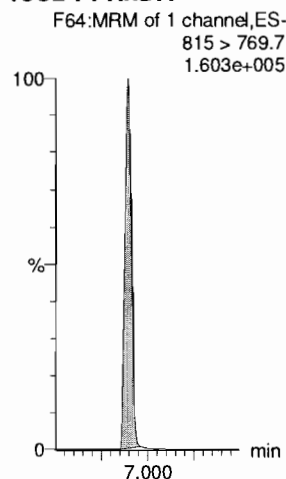
d5-N-ETFOSA



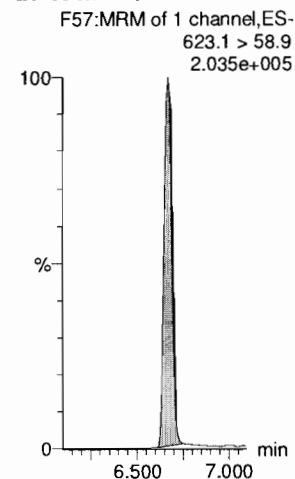
13C2-PFHxDA



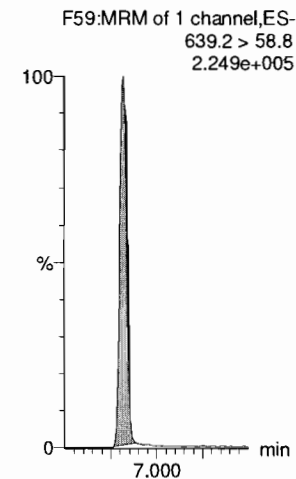
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

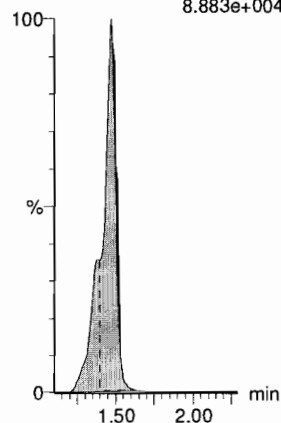
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Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_6, Date: 02-Dec-2018, Time: 19:17:17, ID: ST181202M2-5 PFC CS2 18K3005, Description: PFC CS2 18K3005

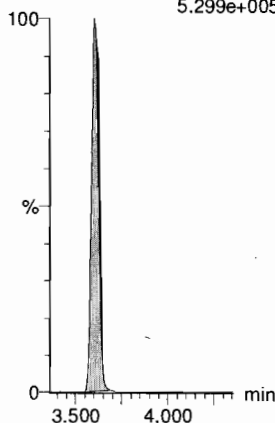
13C4-PFBA

F4:MRM of 1 channel,ES-
217. > 172
8.883e+004



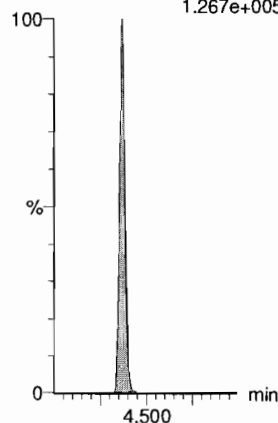
13C5-PFHxA

F11:MRM of 1 channel,ES-
318 > 272.9
5.299e+005



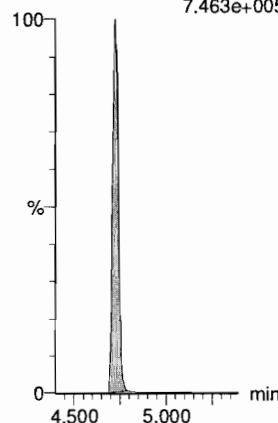
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
1.267e+005



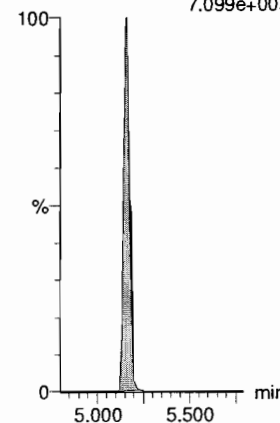
13C8-PFOA

F23:MRM of 1 channel,ES-
420.9 > 376
7.463e+005



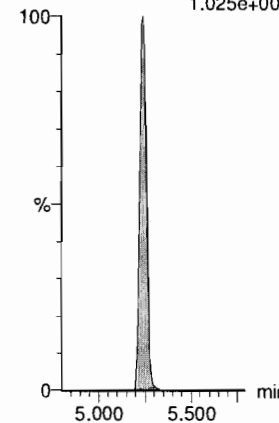
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
7.099e+005



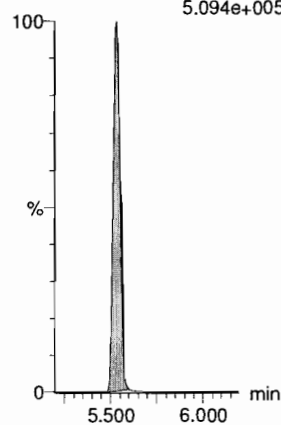
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
1.025e+005



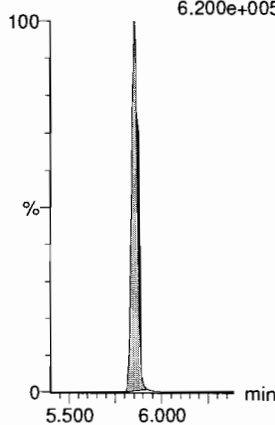
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
5.094e+005



13C7-PFUDa

F49:MRM of 1 channel,ES-
570.1 > 524.8
6.200e+005



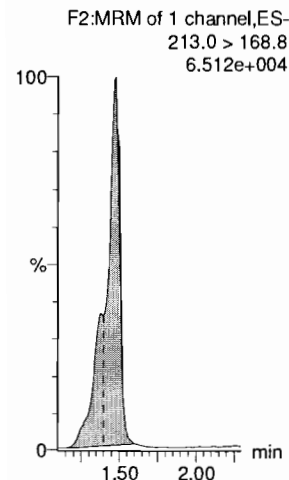
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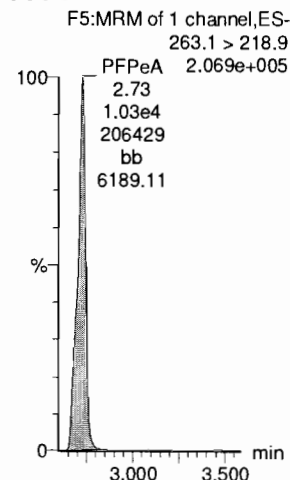
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

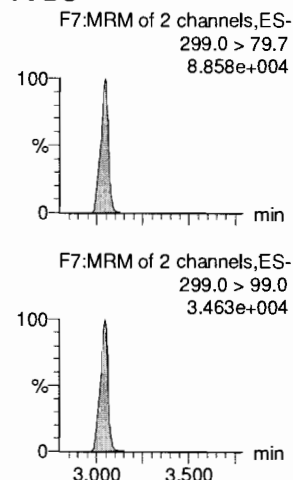
PFBA



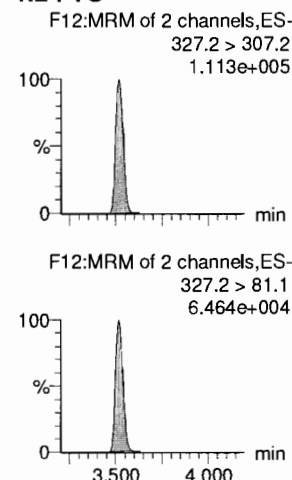
PFPeA



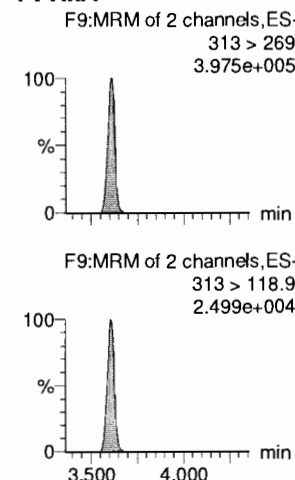
PFBS



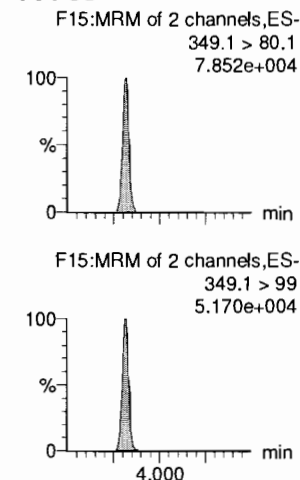
4:2 FTS



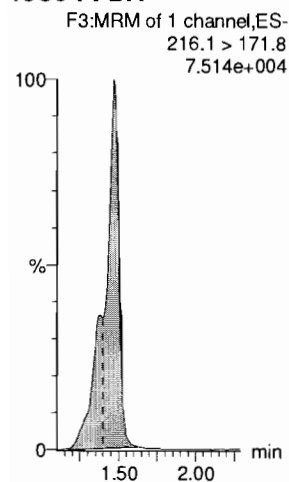
PFHxA



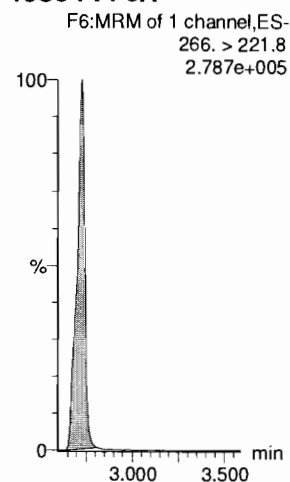
PFPeS



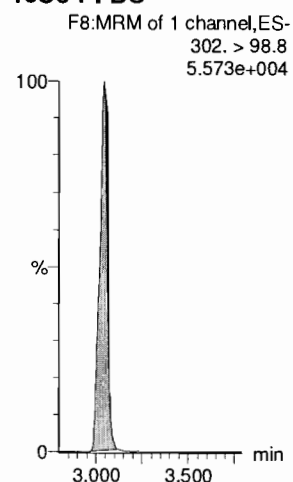
13C3-PFBA



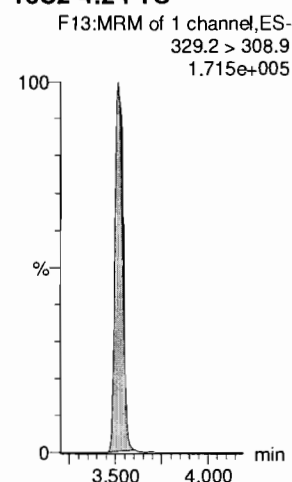
13C3-PFPeA



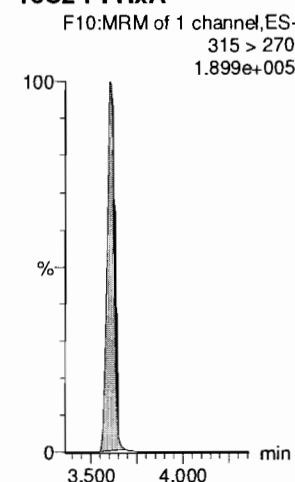
13C3-PFBS



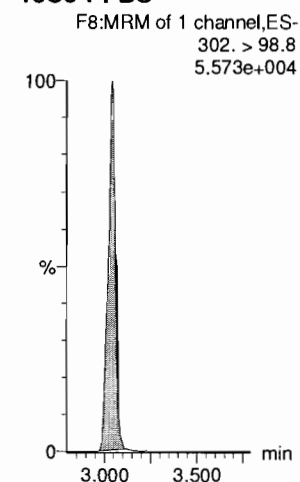
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



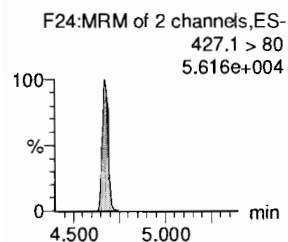
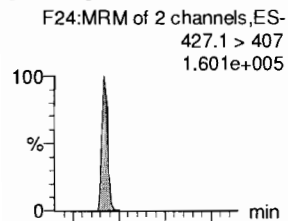
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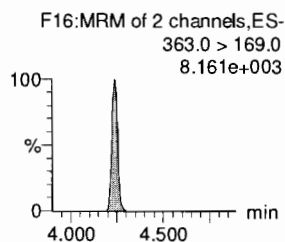
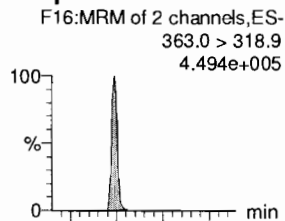
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

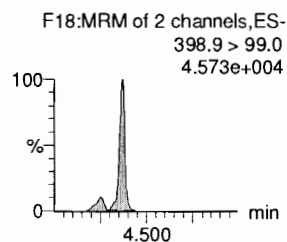
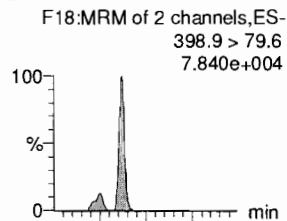
6:2 FTS



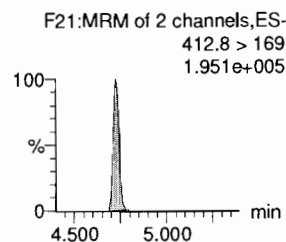
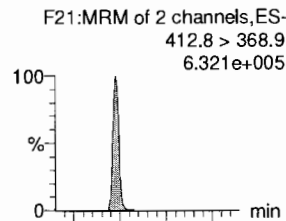
PFHpA



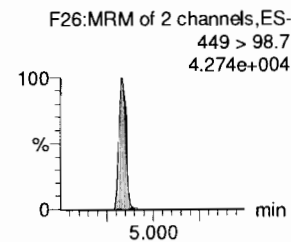
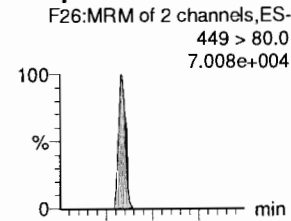
L-PFHxS



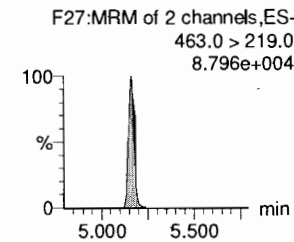
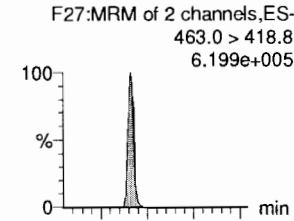
L-PFOA



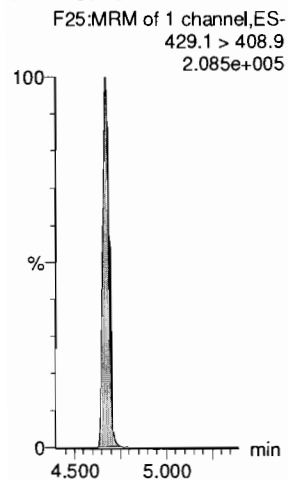
PFHpS



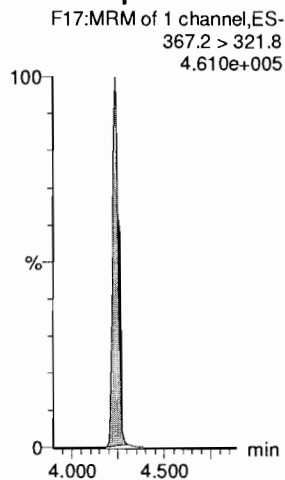
PFNA



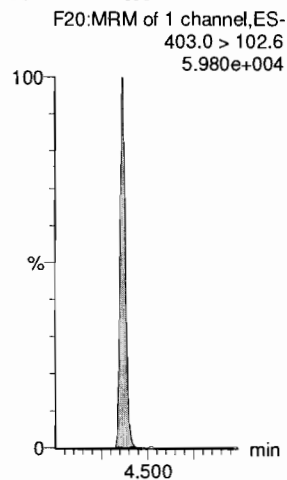
13C2-6:2 FTS



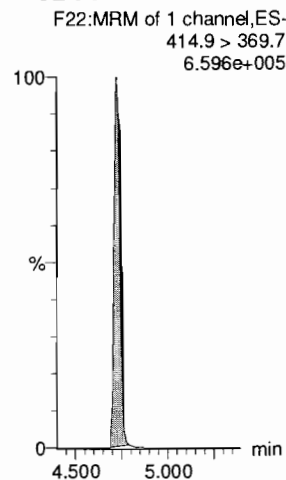
13C4-PFHpA



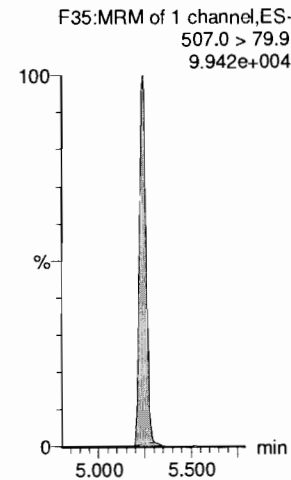
18O2-PFHxS



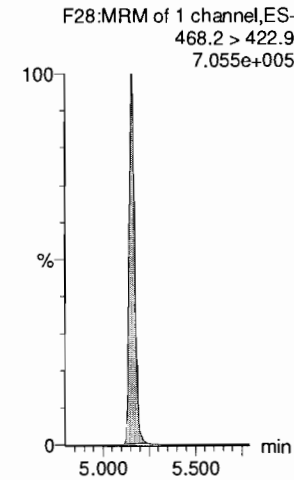
13C2-PFOA



13C8-PFOS



13C5-PFNA



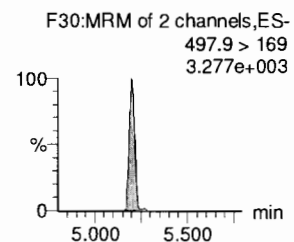
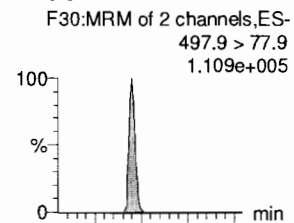
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

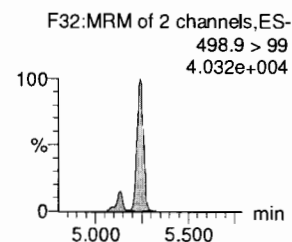
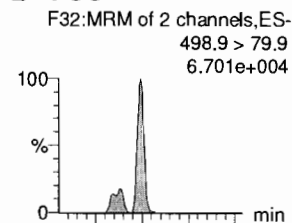
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

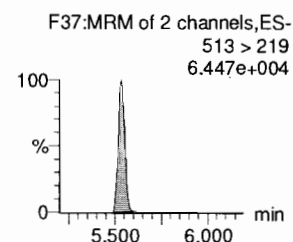
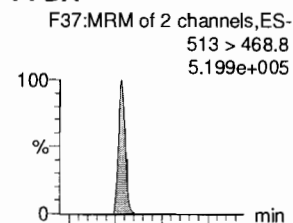
PFOSA



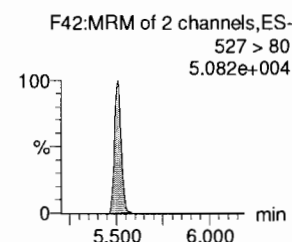
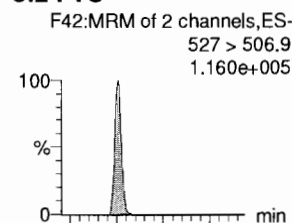
L-PFOS



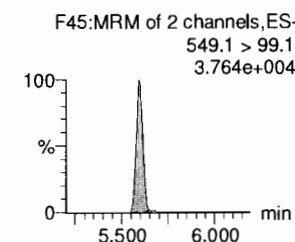
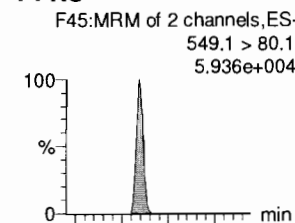
PFDA



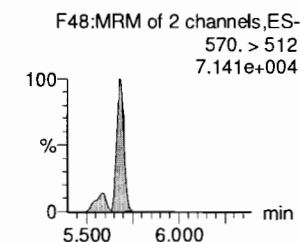
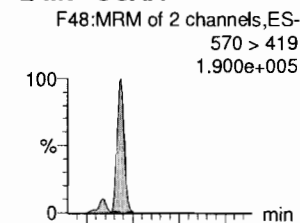
8:2 FTS



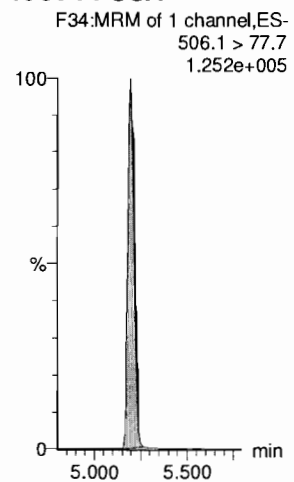
PFNS



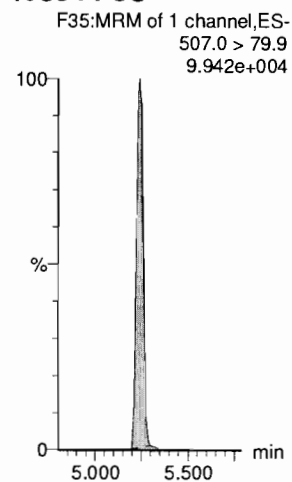
L-MeFOSAA



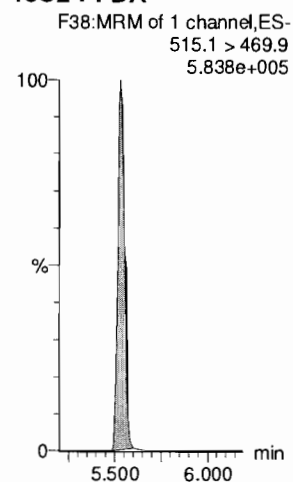
13C8-PFOSA



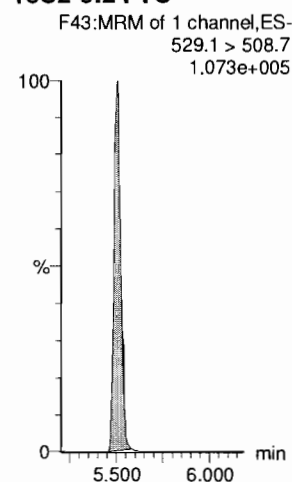
13C8-PFOS



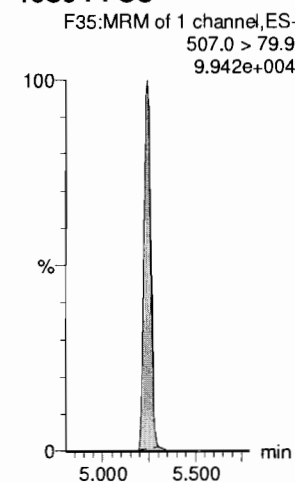
13C2-PFDA



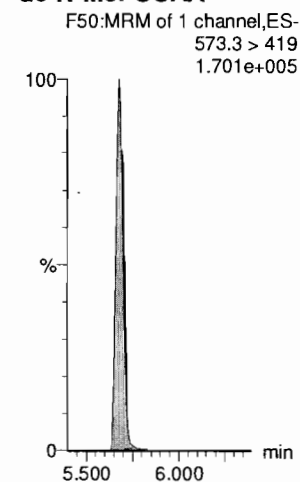
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



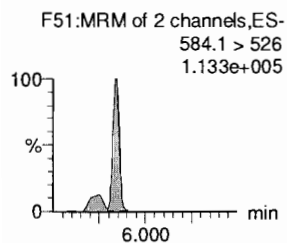
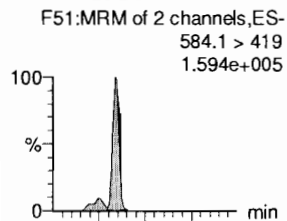
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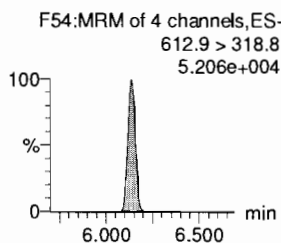
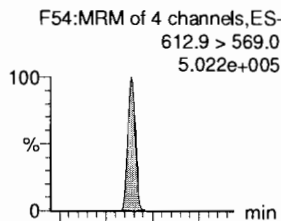
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

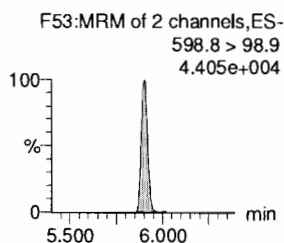
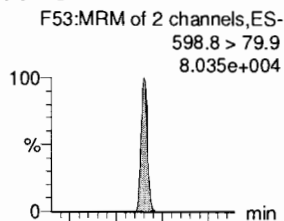
L-EtFOSAA



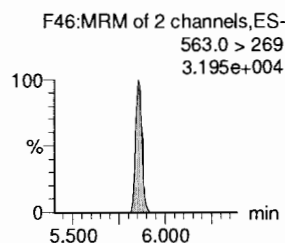
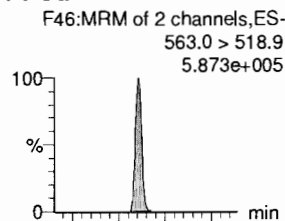
PFDaA



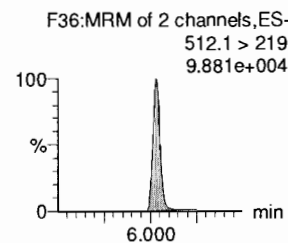
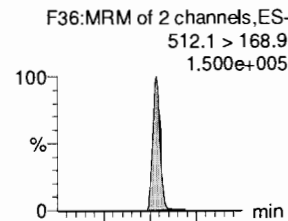
PFDS



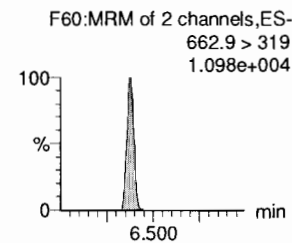
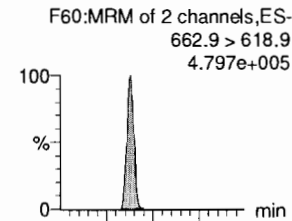
PFUdA



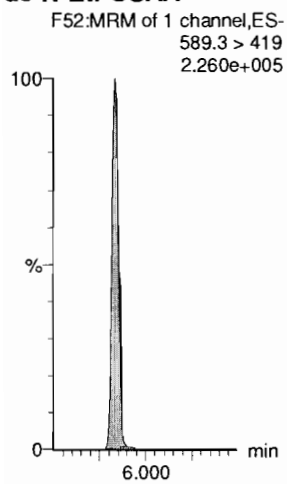
N-MeFOSA



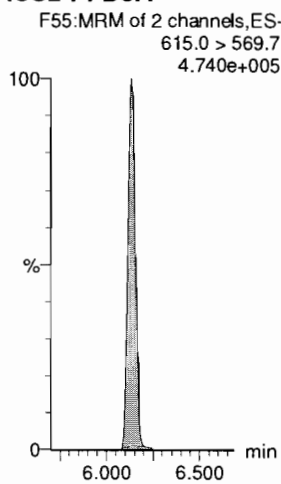
PFTrDA



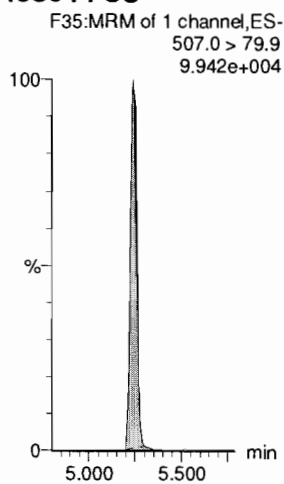
d5-N-EtFOSAA



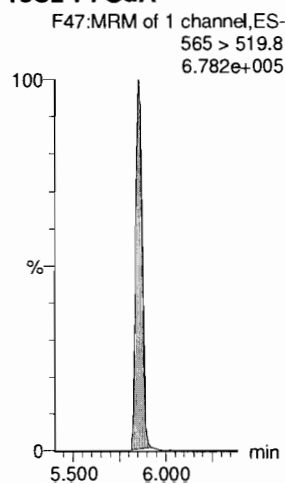
13C2-PFDaA



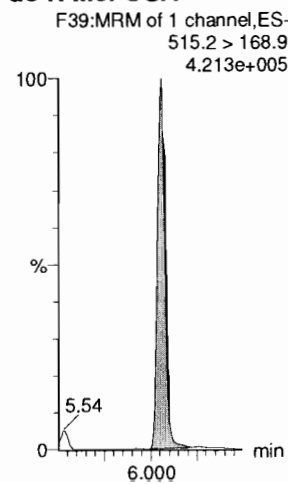
13C8-PFOS



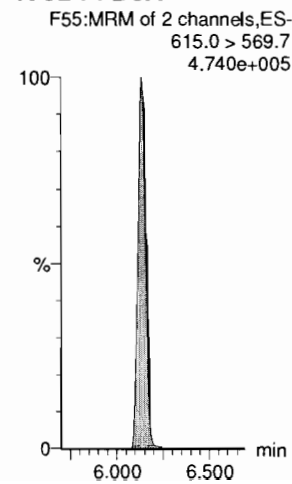
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



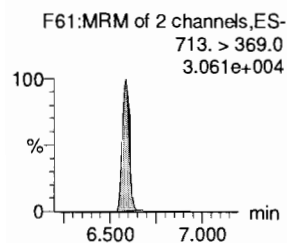
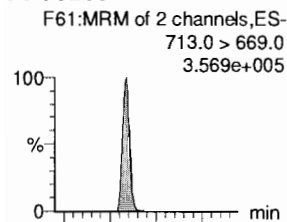
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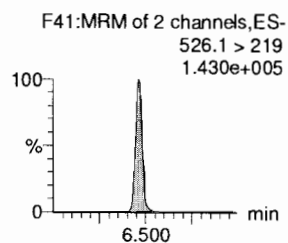
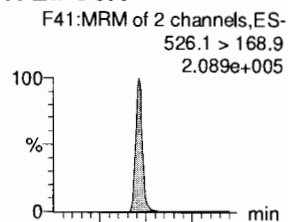
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

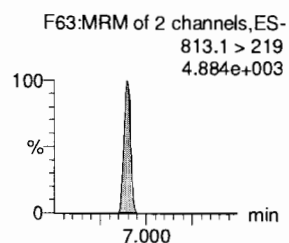
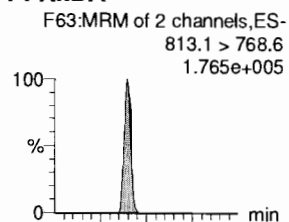
PFTeDA



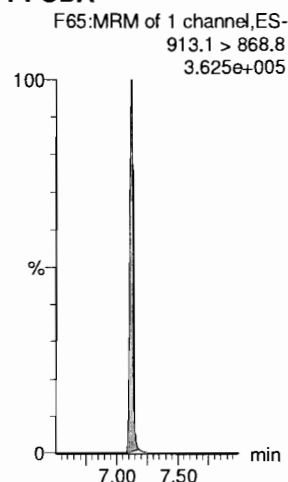
N-EtFOSA



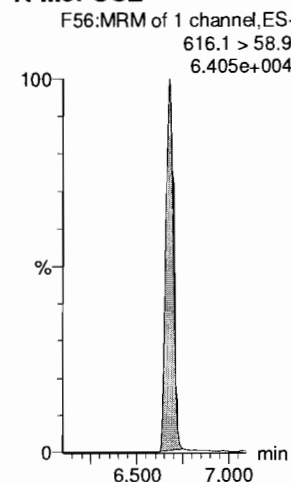
PFHxDA



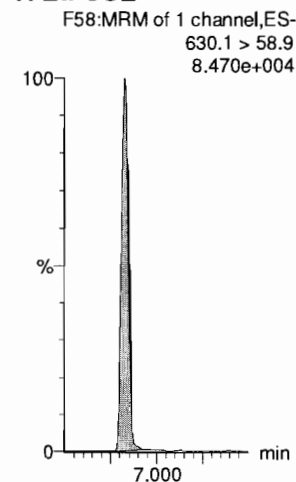
PFODA



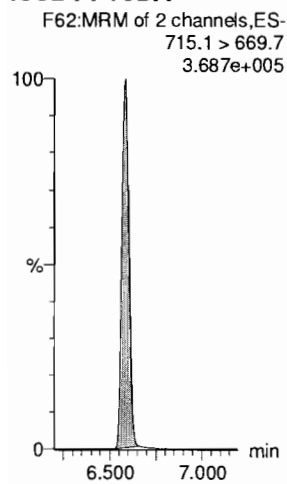
N-MeFOSE



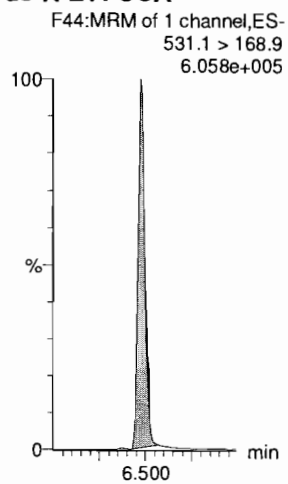
N-EtFOSE



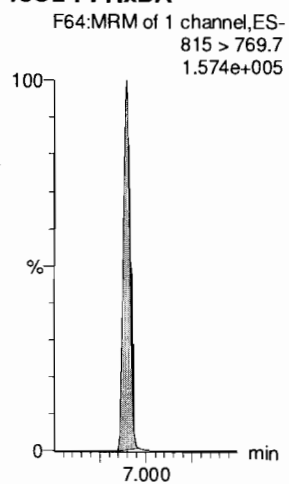
13C2-PFTeDA



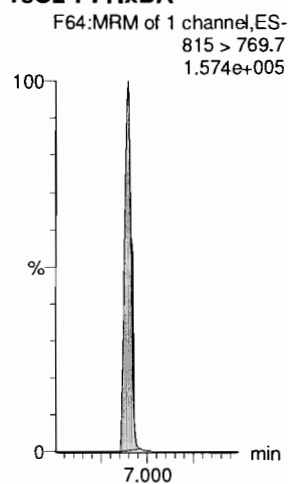
d5-N-ETFOSA



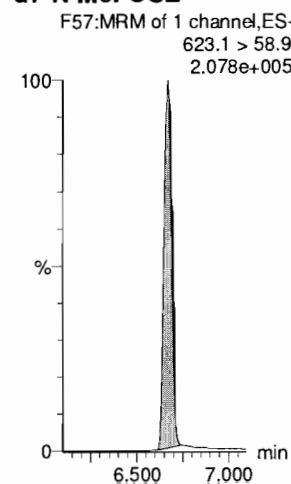
13C2-PFHxDA



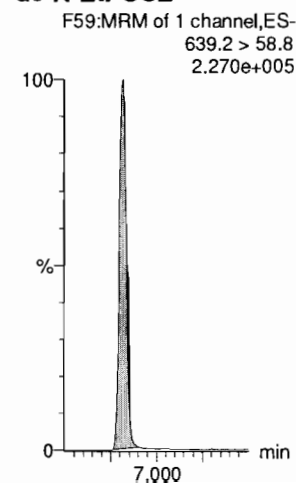
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



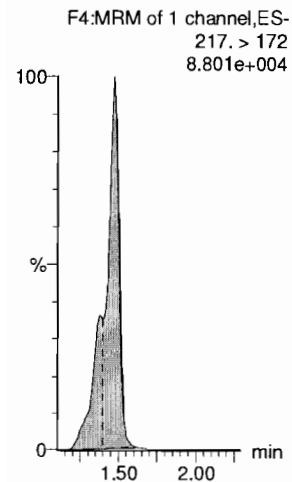
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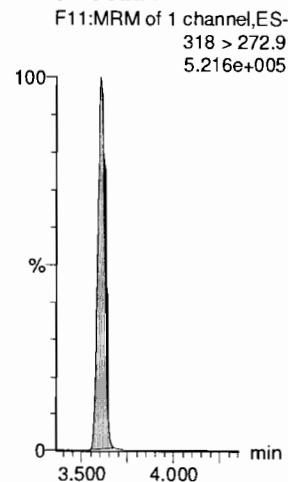
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Name: 181202M2_7, Date: 02-Dec-2018, Time: 19:27:56, ID: ST181202M2-6 PFC CS3 18K3006, Description: PFC CS3 18K3006

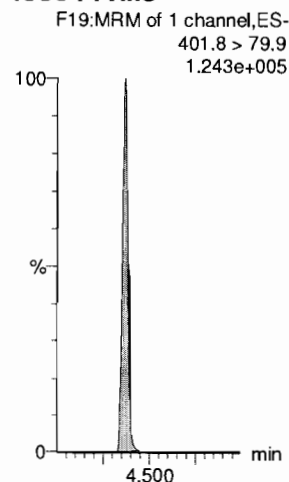
13C4-PFBA



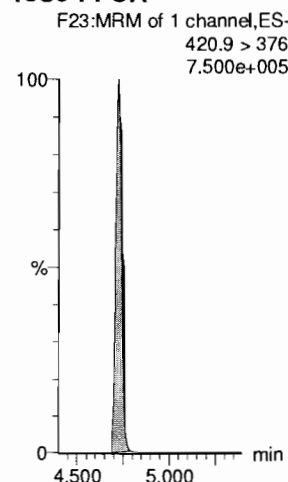
13C5-PFHxA



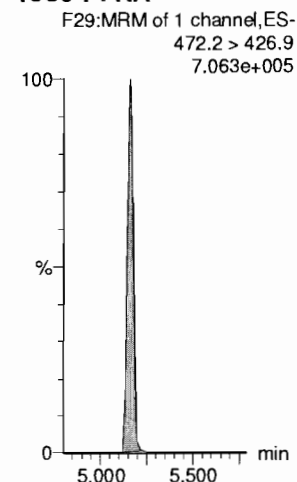
13C3-PFHxS



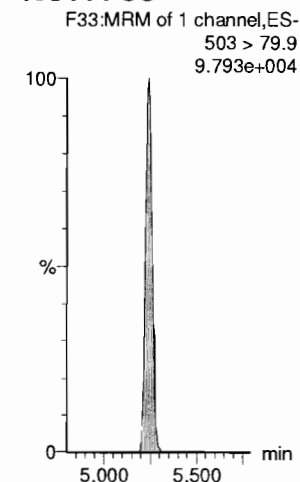
13C8-PFOA



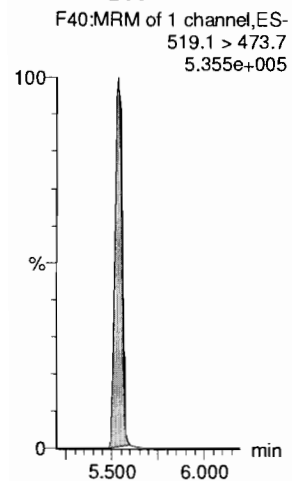
13C9-PFNA



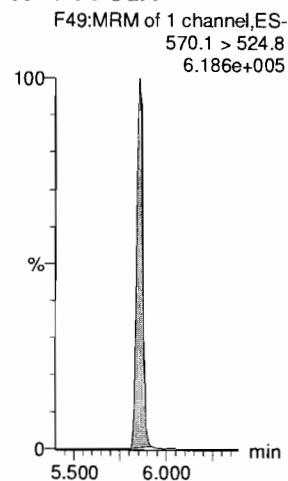
13C4-PFOS



13C6-PFDA



13C7-PFUdA



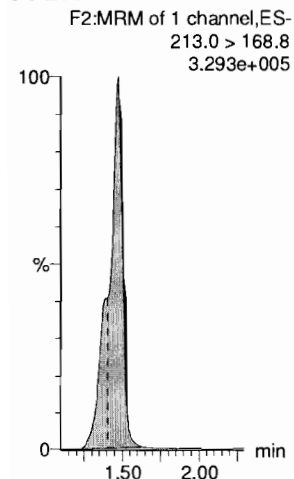
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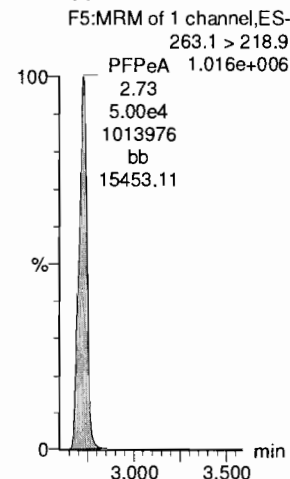
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Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

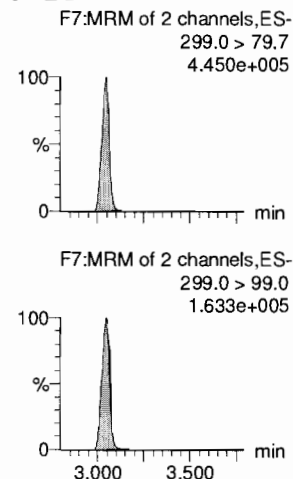
PFBA



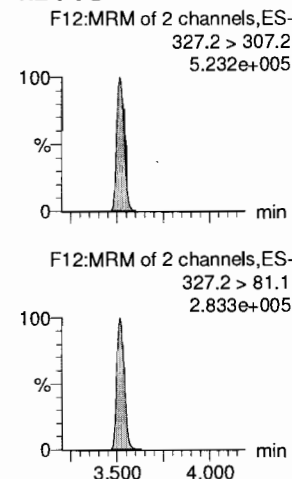
PFPeA



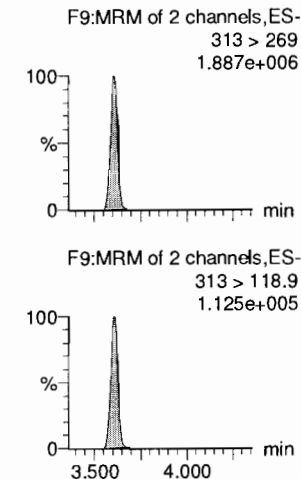
PFBS



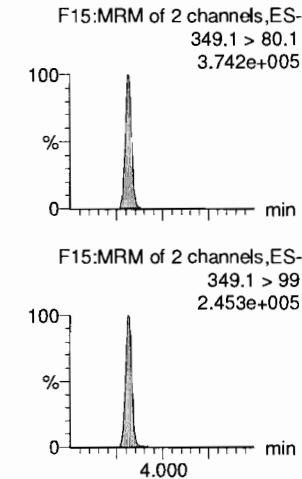
4:2 FTS



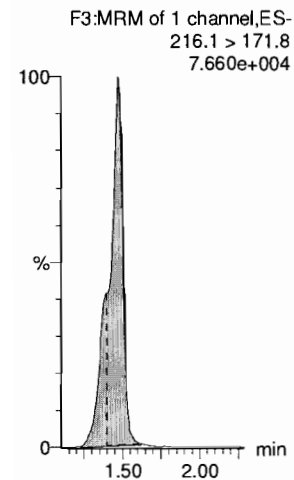
PFHxA



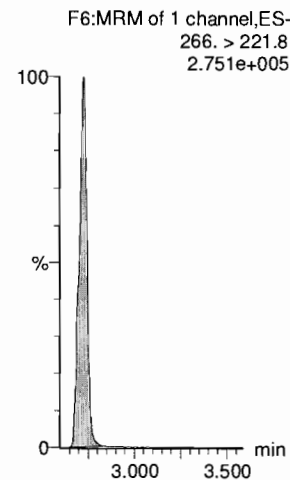
PFPeS



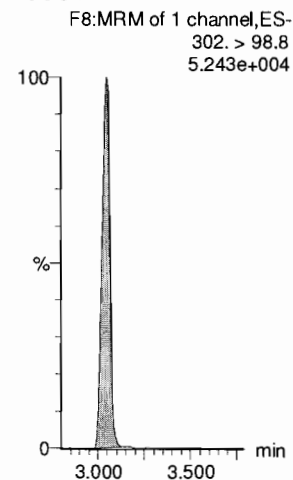
13C3-PFBA



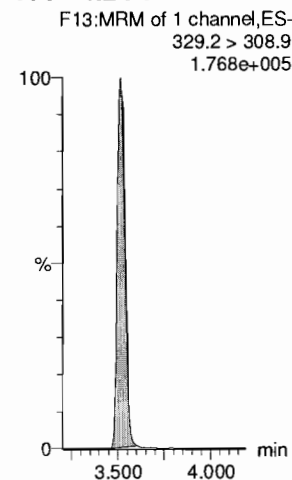
13C3-PFPeA



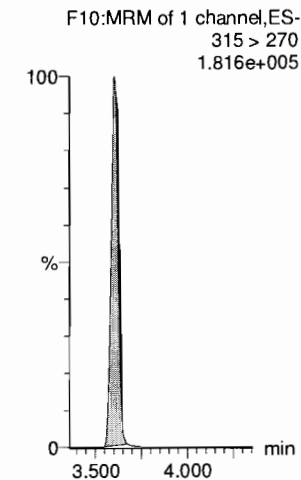
13C3-PFBS



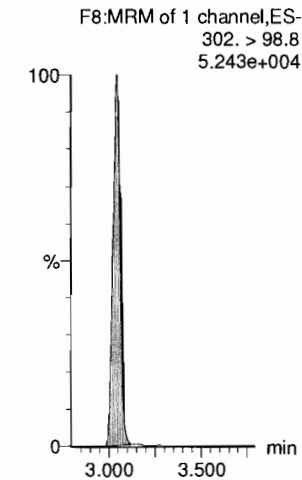
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



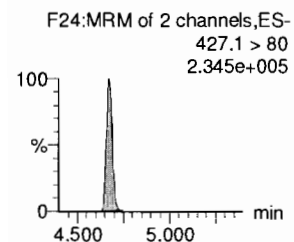
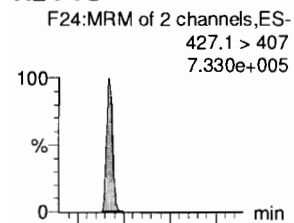
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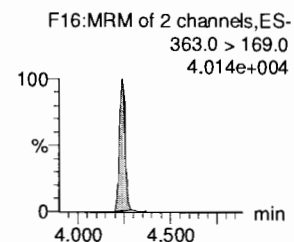
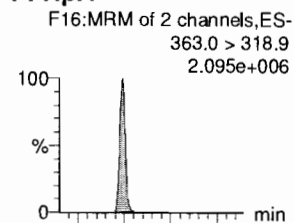
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Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

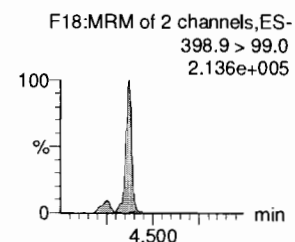
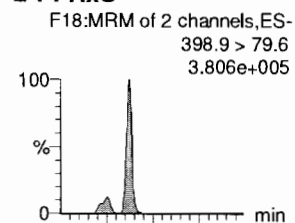
6:2 FTS



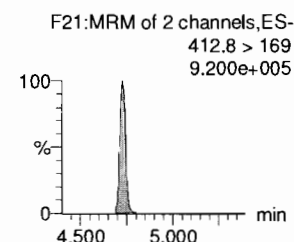
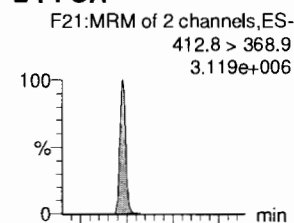
PFHpA



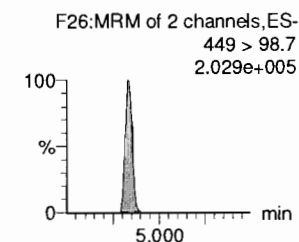
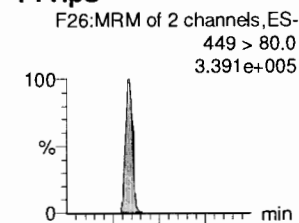
L-PFHxS



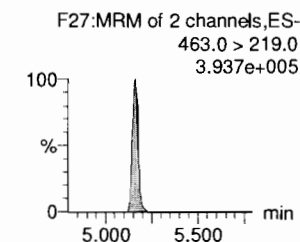
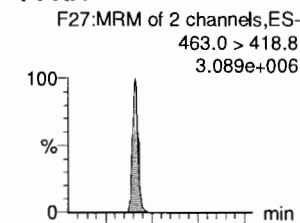
L-PFOA



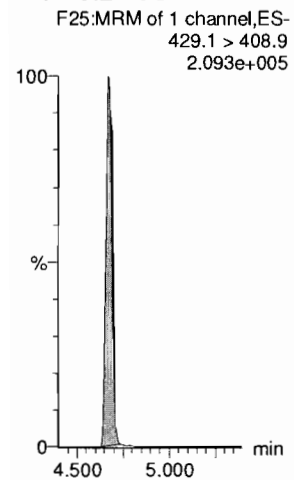
PFHpS



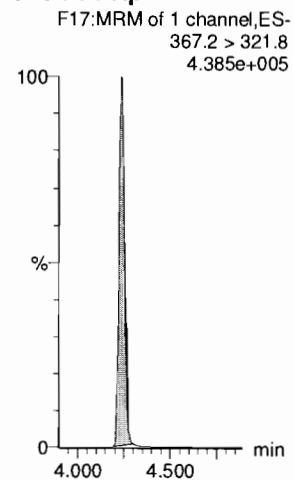
PFNA



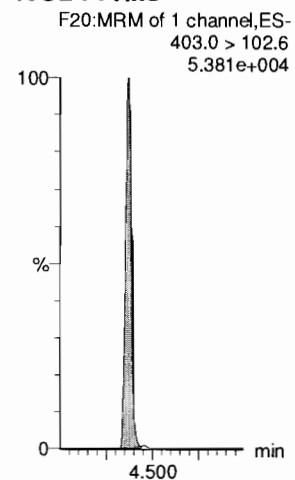
13C2-6:2 FTS



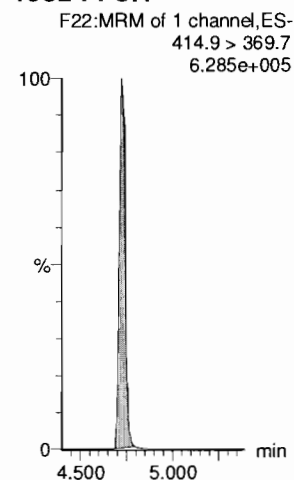
13C4-PFHpA



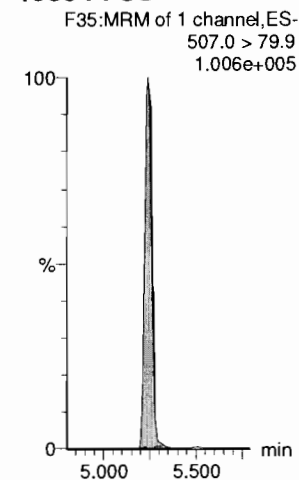
18O2-PFHxS



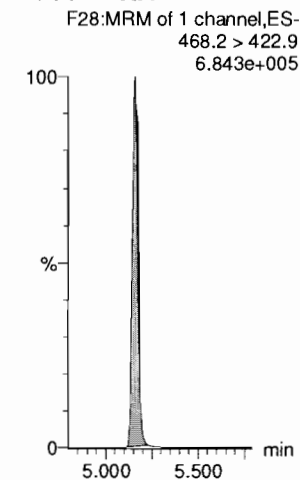
13C2-PFOA



13C8-PFOS



13C5-PFNA



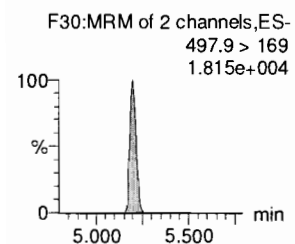
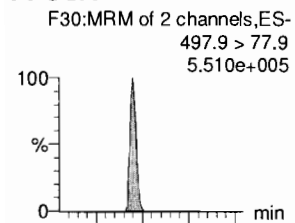
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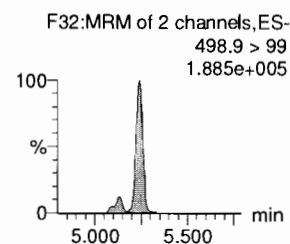
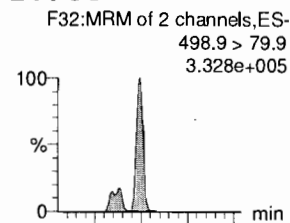
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Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

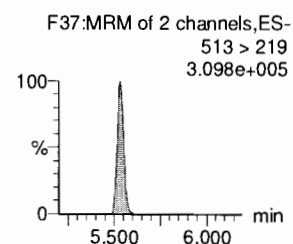
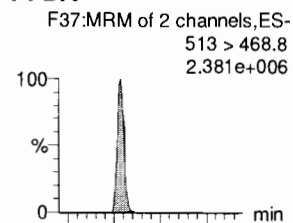
PFOSA



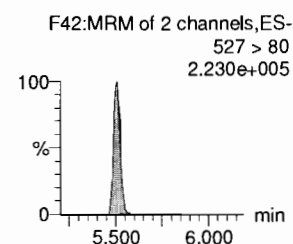
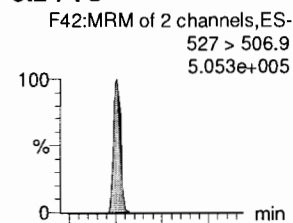
L-PFOS



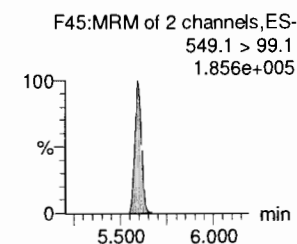
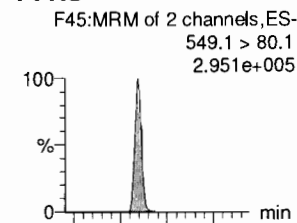
PFDA



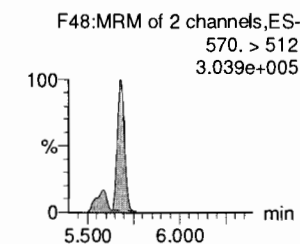
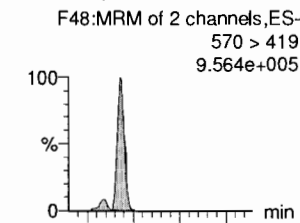
8:2 FTS



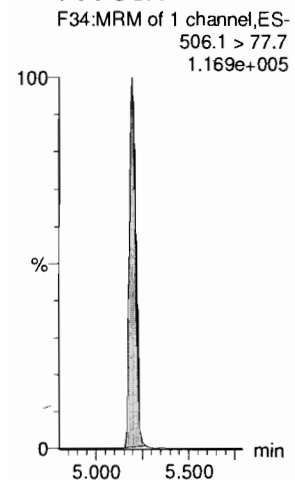
PFNS



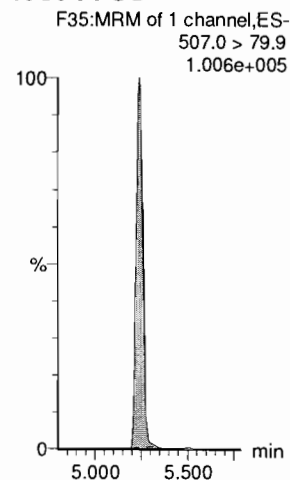
L-MeFOSAA



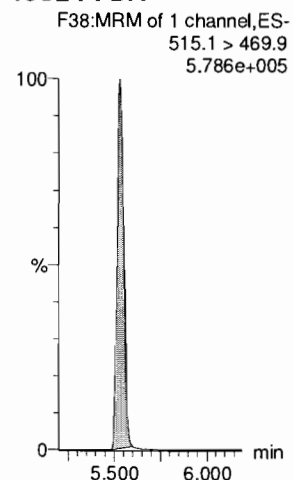
13C8-PFOSA



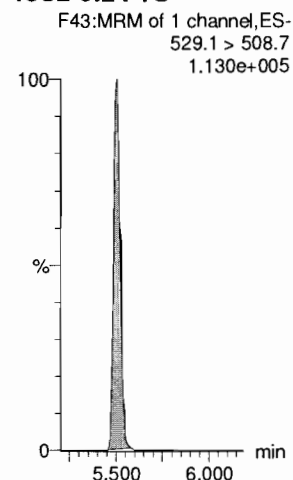
13C8-PFOS



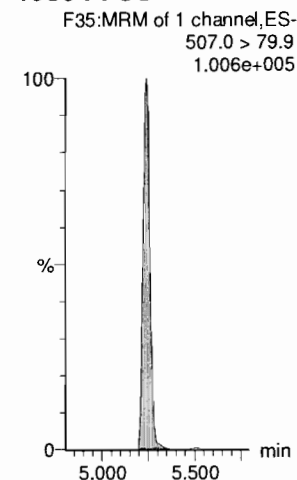
13C2-PFDA



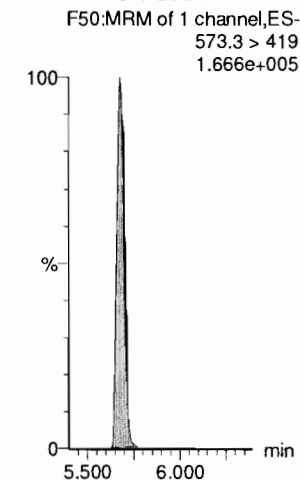
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

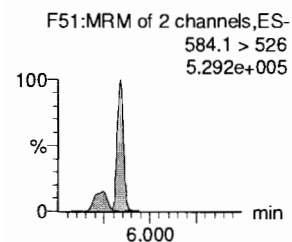
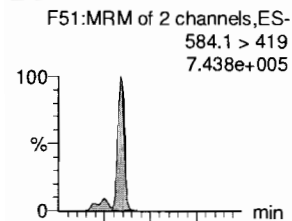


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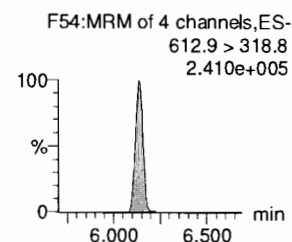
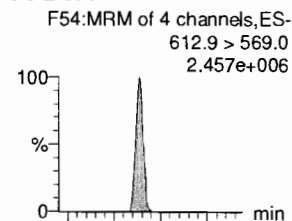
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Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

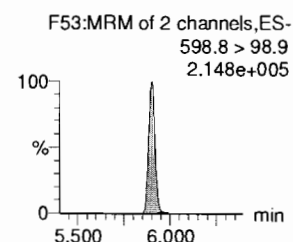
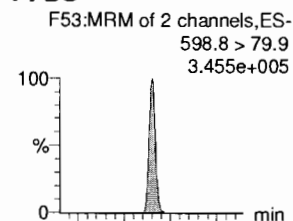
L-EtFOSAA



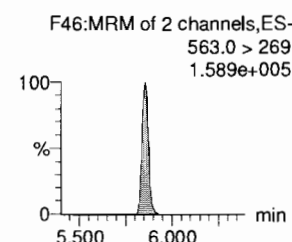
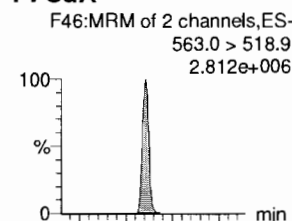
PFDaA



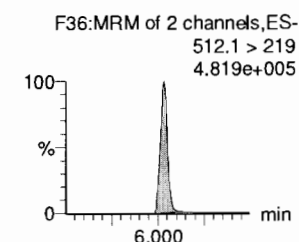
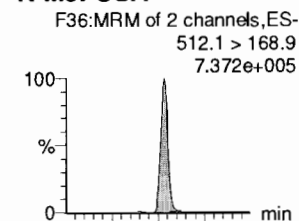
PFDS



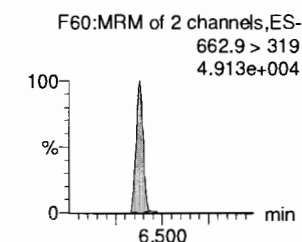
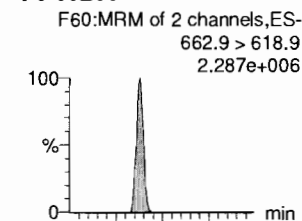
PFUdA



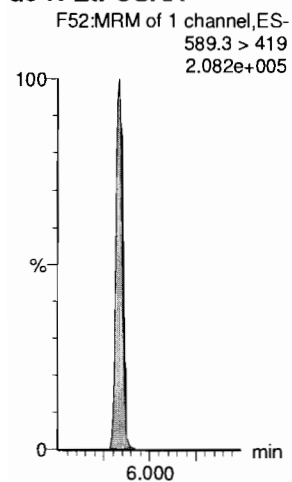
N-MeFOSA



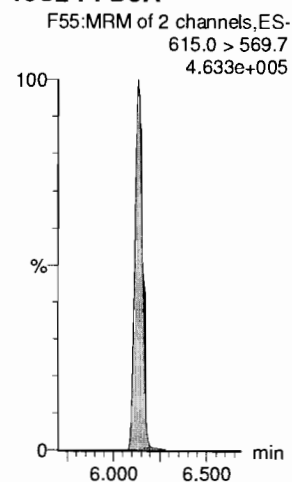
PFTrDA



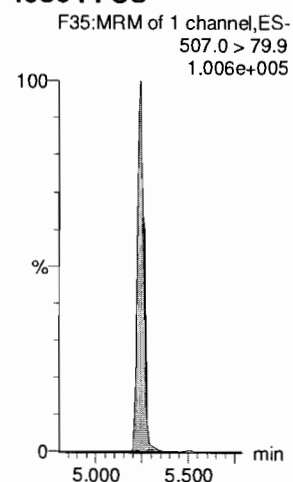
d5-N-EtFOSAA



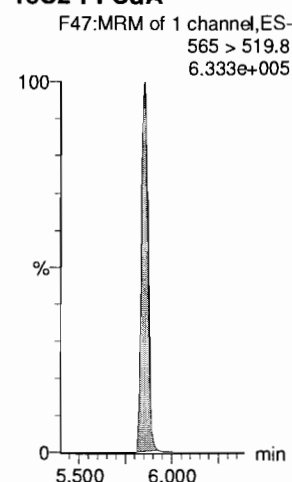
13C2-PFDaA



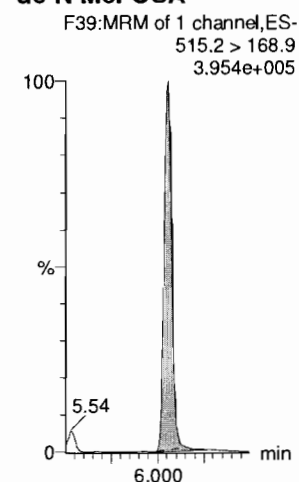
13C8-PFOS



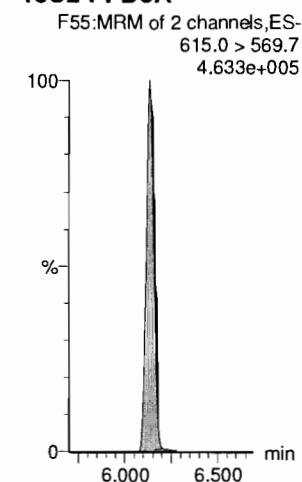
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



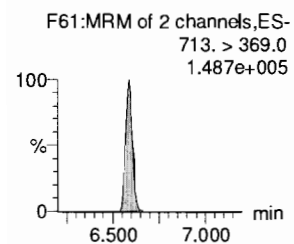
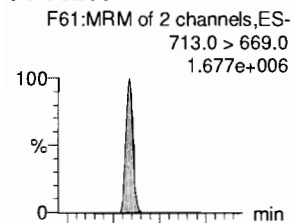
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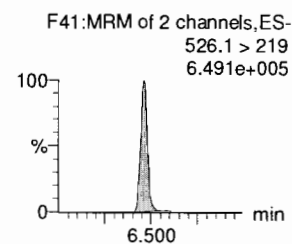
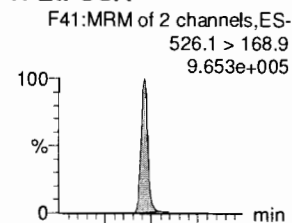
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Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

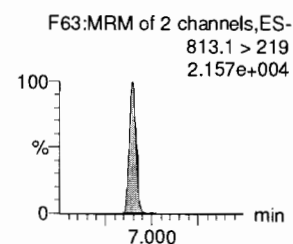
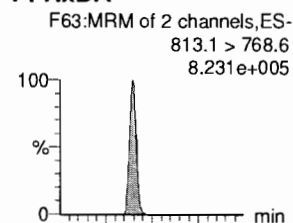
PFTeDA



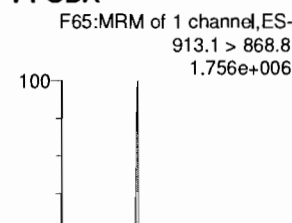
N-EtFOFA



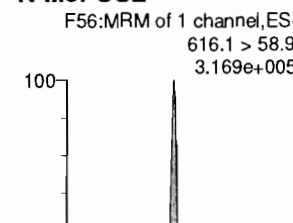
PFHxDA



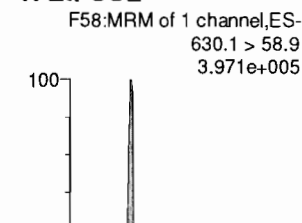
PFODA



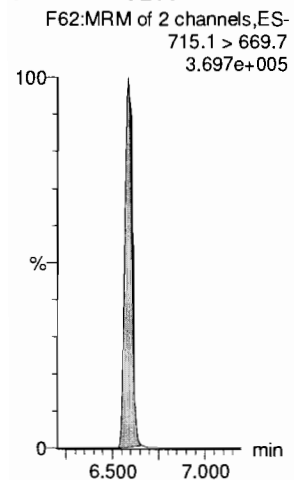
N-MeFOSE



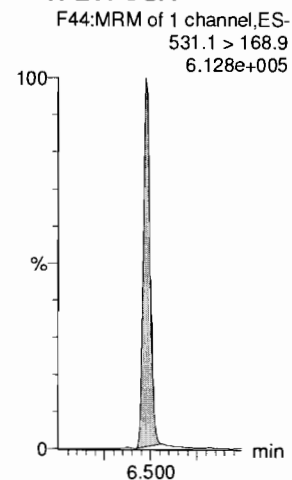
N-EtFOSE



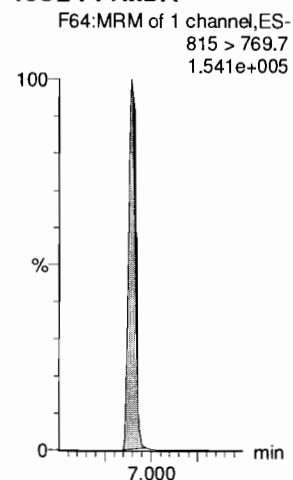
13C2-PFTeDA



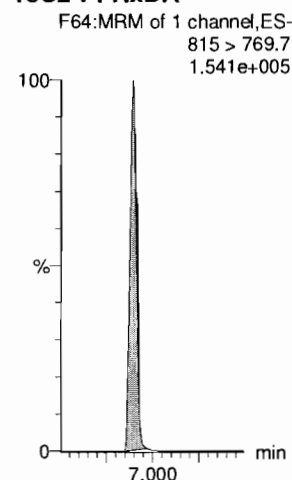
d5-N-ETFOFA



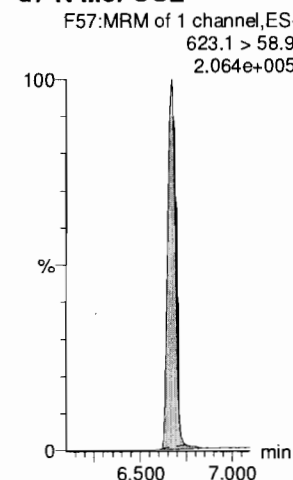
13C2-PFHxDA



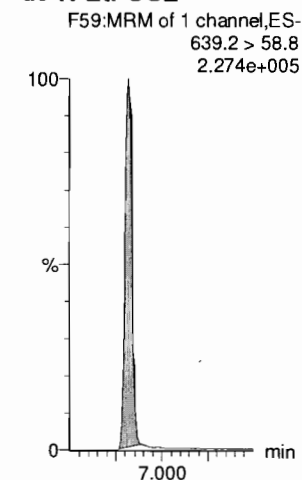
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



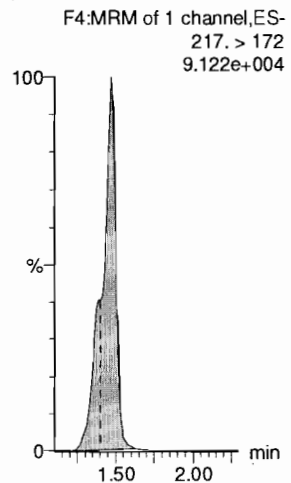
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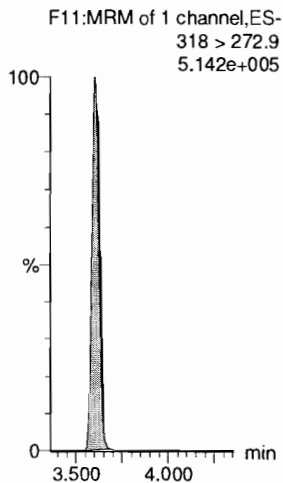
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_8, Date: 02-Dec-2018, Time: 19:38:29, ID: ST181202M2-7 PFC CS4 18K3007, Description: PFC CS4 18K3007

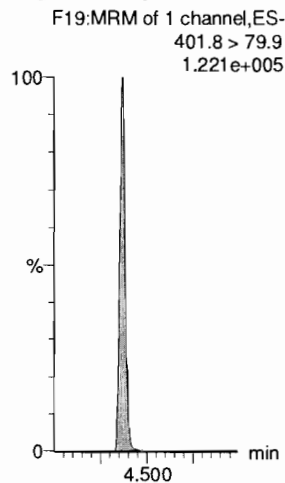
13C4-PFBA



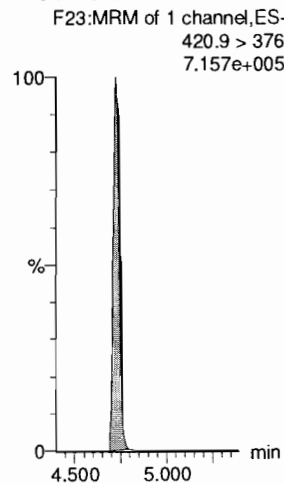
13C5-PFHxA



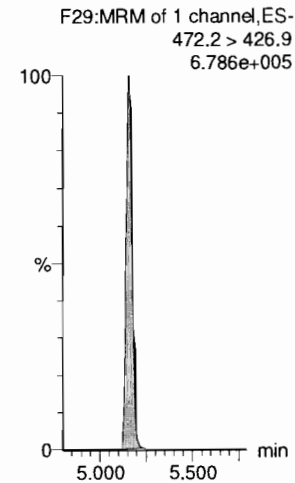
13C3-PFHxS



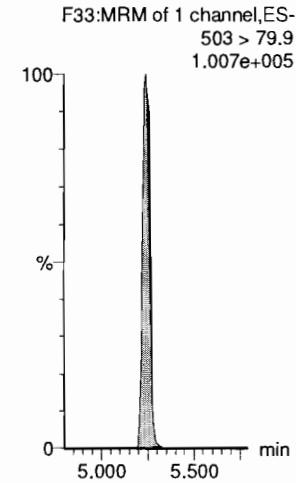
13C8-PFOA



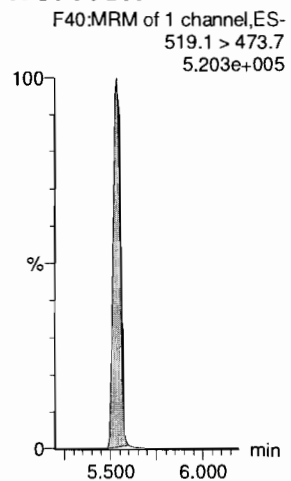
13C9-PFNA



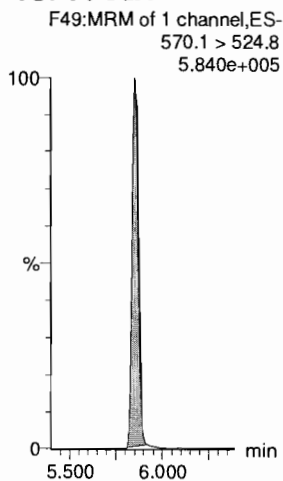
13C4-PFOS



13C6-PFDA



13C7-PFUdA

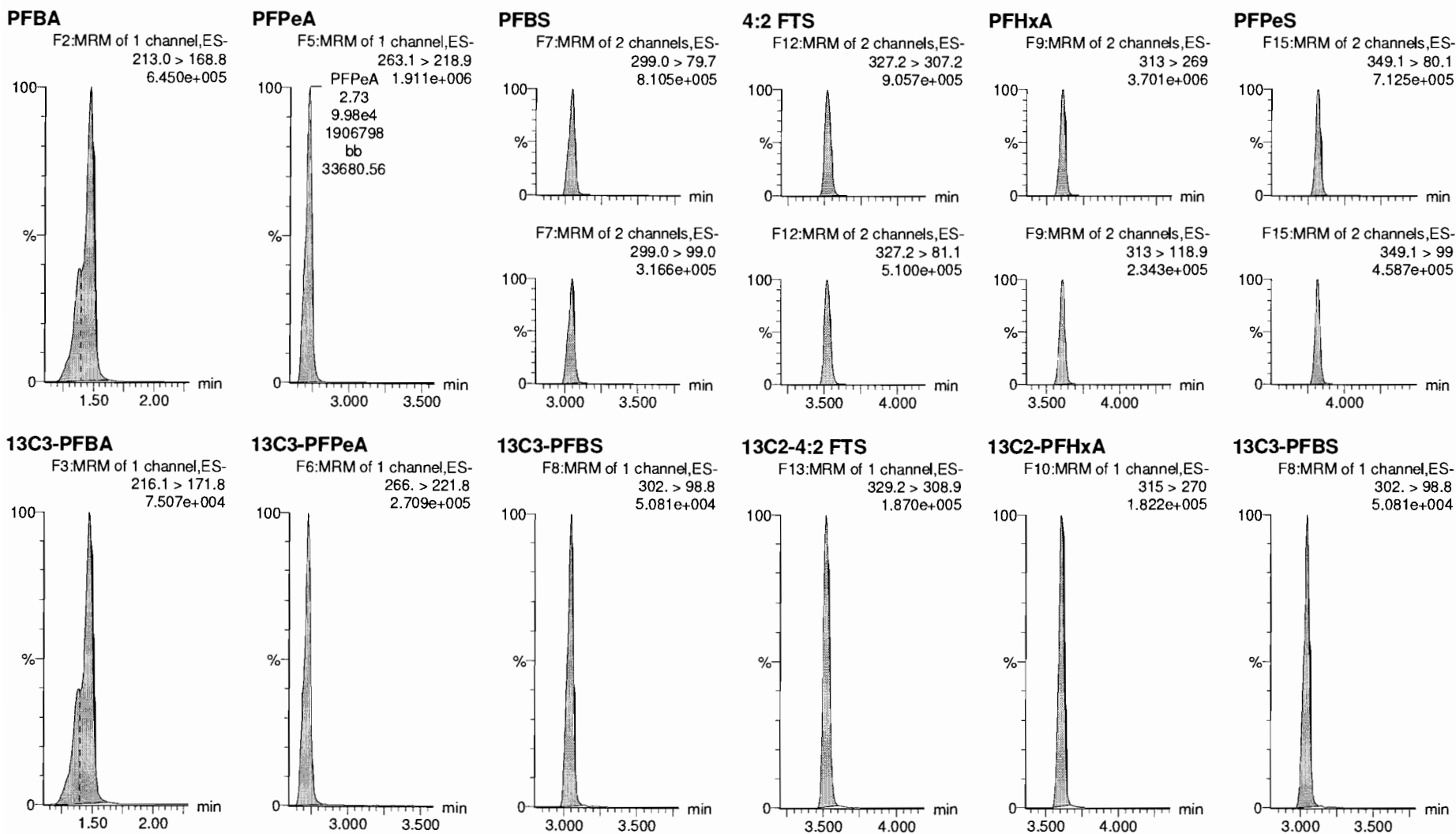


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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008



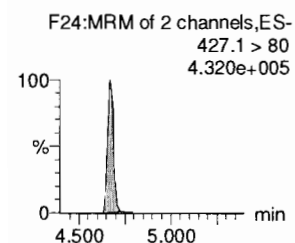
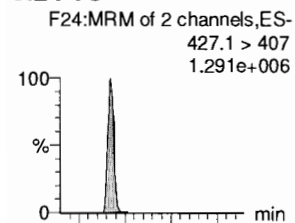
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

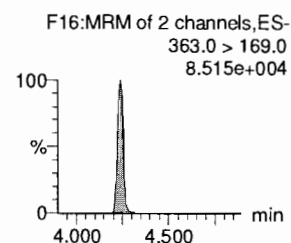
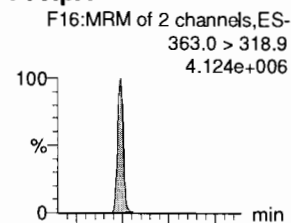
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Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008

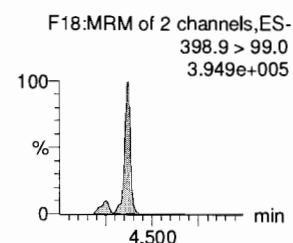
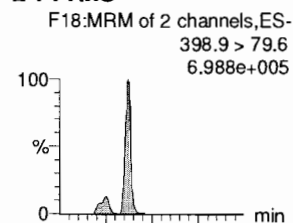
6:2 FTS



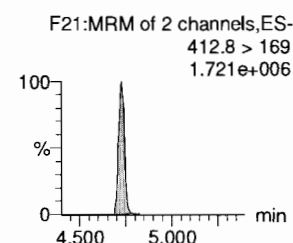
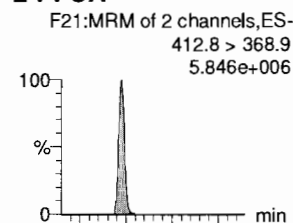
PFHpA



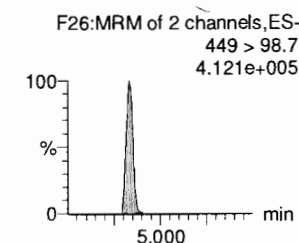
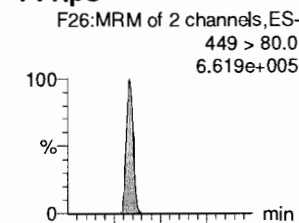
L-PFHxS



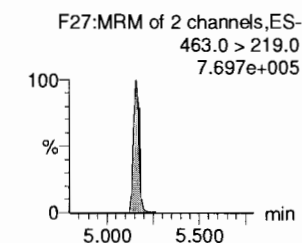
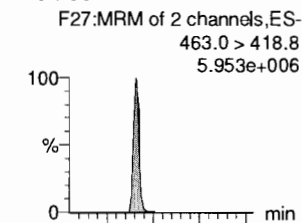
L-PFOA



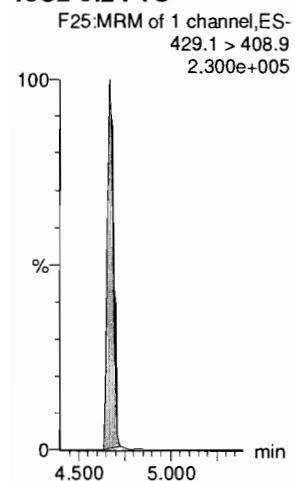
PFHpS



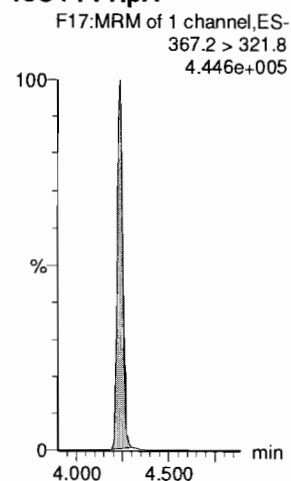
PFNA



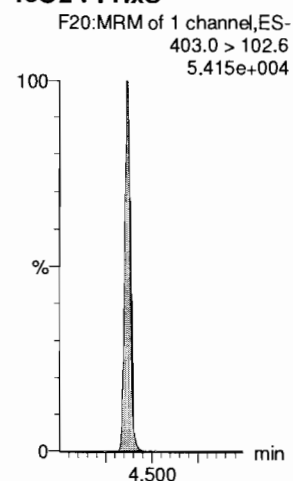
13C2-6:2 FTS



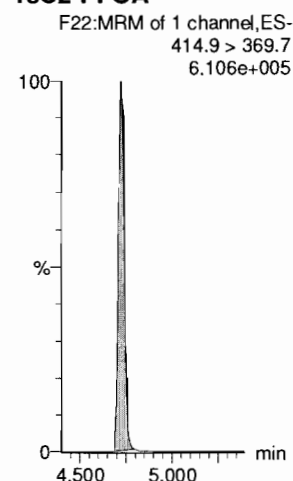
13C4-PFHpA



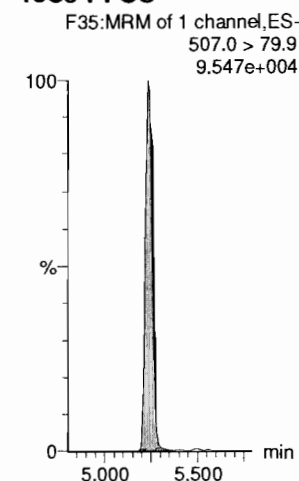
18O2-PFHxS



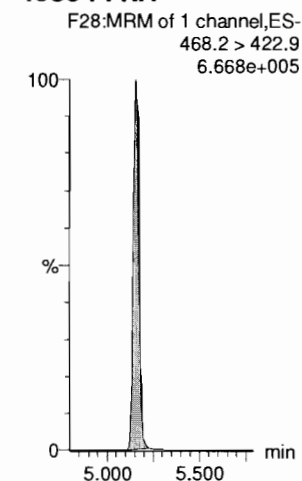
13C2-PFOA



13C8-PFOS



13C5-PFNA



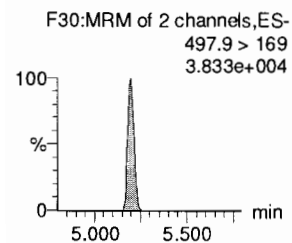
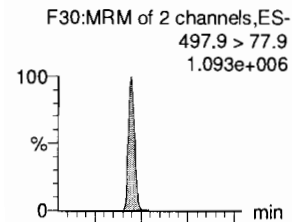
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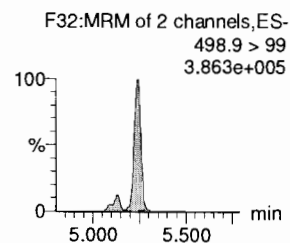
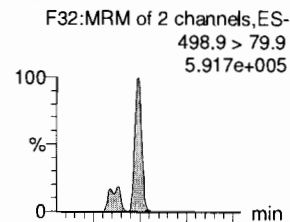
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008

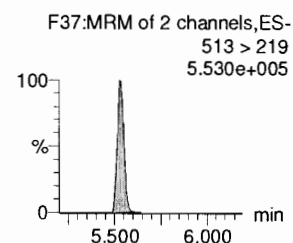
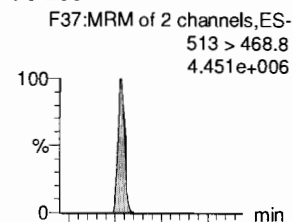
PFOSA



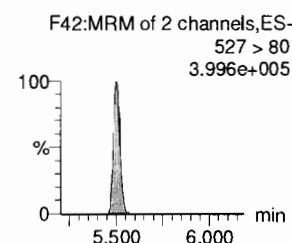
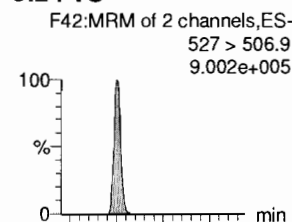
L-PFOS



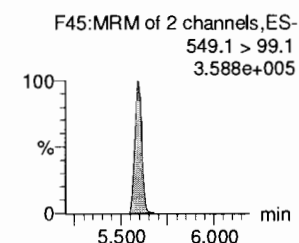
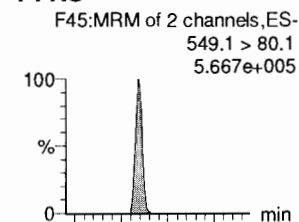
PFDA



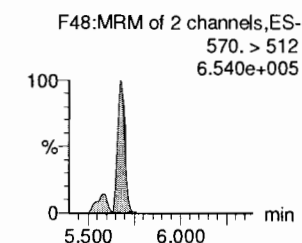
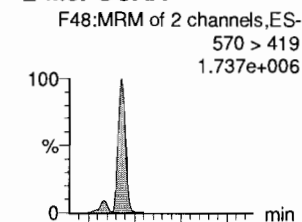
8:2 FTS



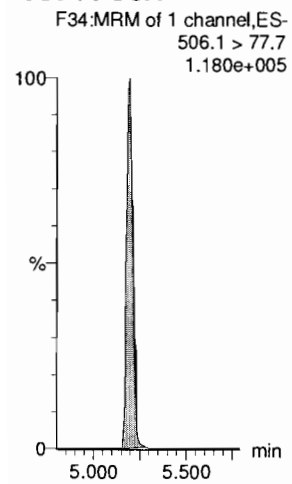
PFNS



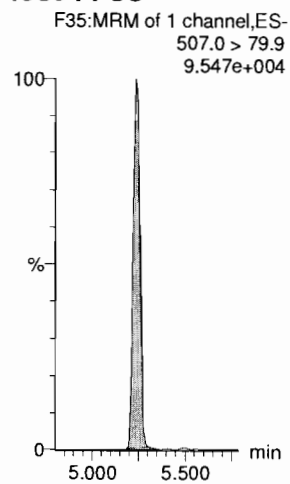
L-MeFOSAA



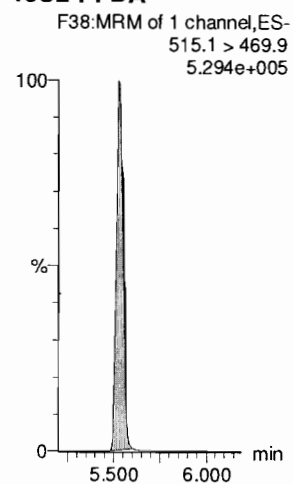
13C8-PFOSA



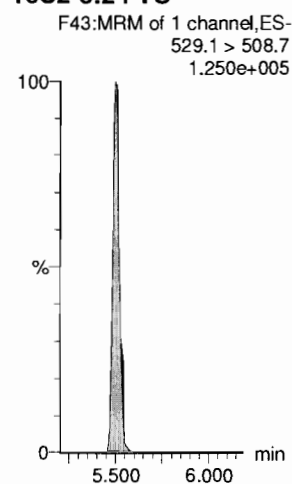
13C8-PFOS



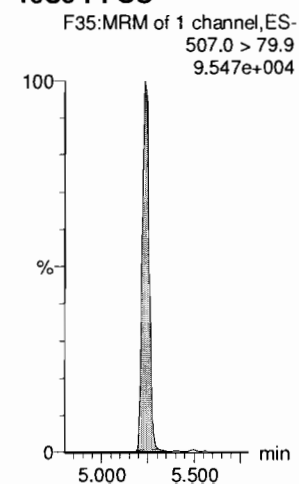
13C2-PFDA



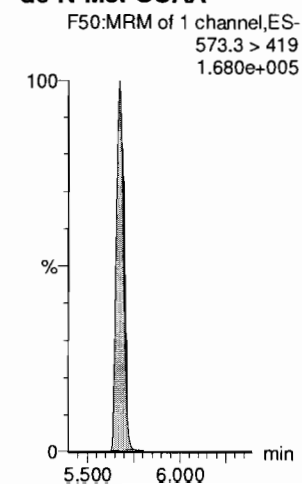
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



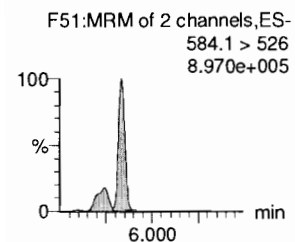
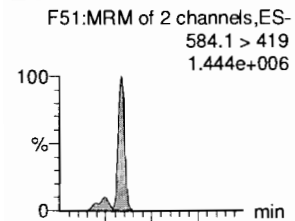
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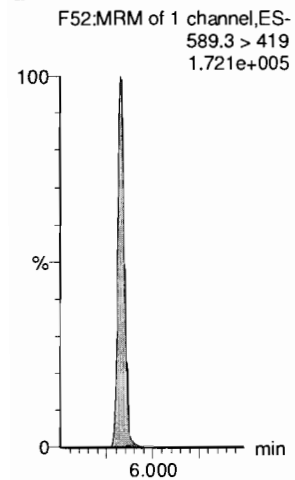
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Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008

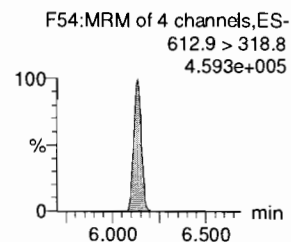
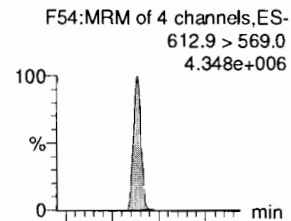
L-EtFOSAA



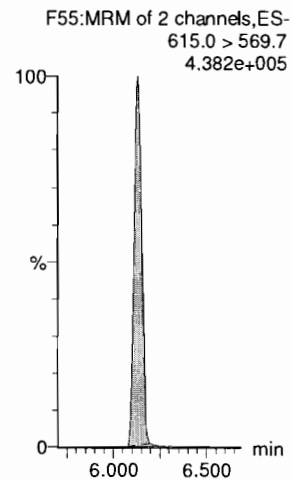
d5-N-EtFOSAA



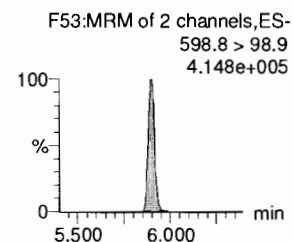
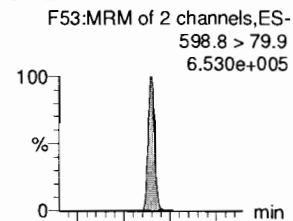
PFDaA



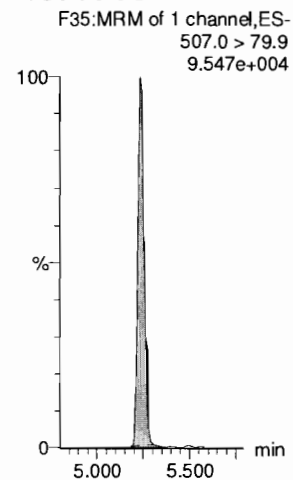
13C2-PFDaA



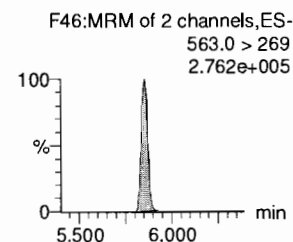
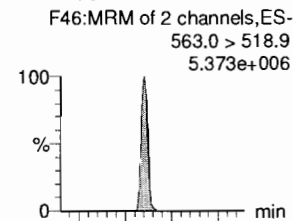
PFDS



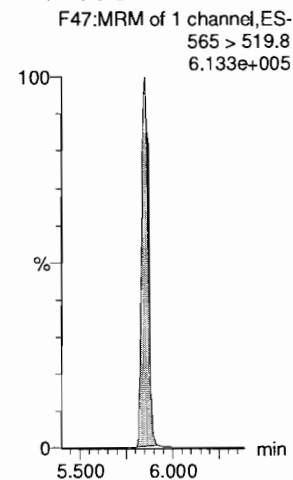
13C8-PFOS



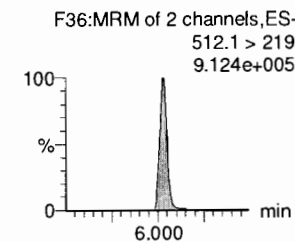
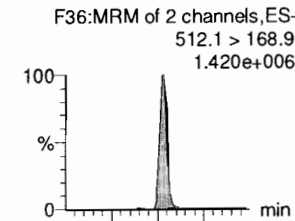
PFUdA



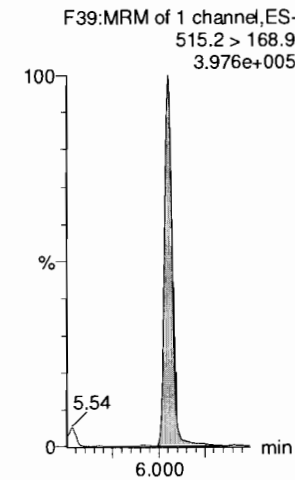
13C2-PFUdA



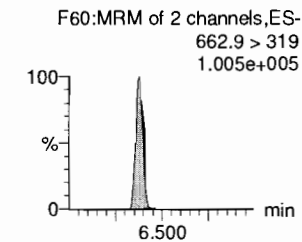
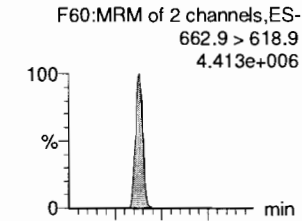
N-MeFOSA



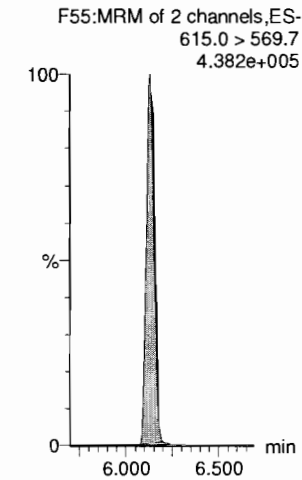
d3-N-MeFOSA



PFTTrDA



13C2-PFDaA



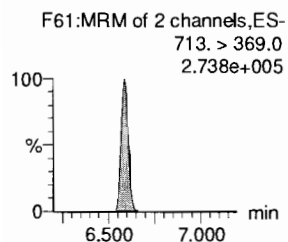
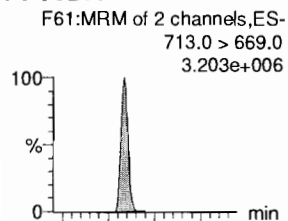
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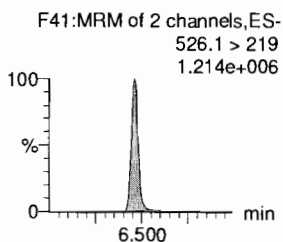
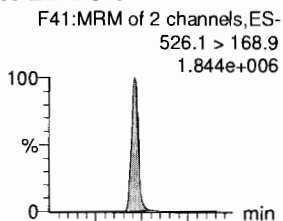
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Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008

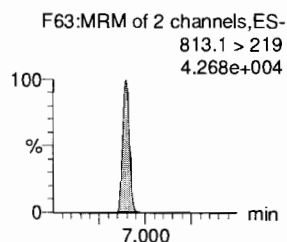
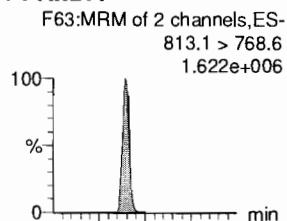
PFTeDA



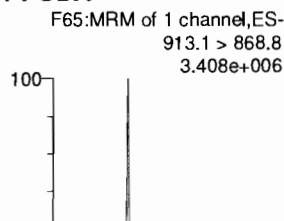
N-EtFOSA



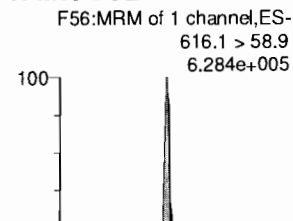
PFHxDA



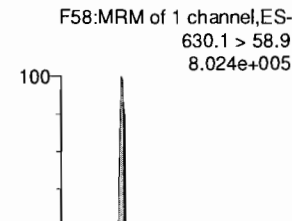
PFODA



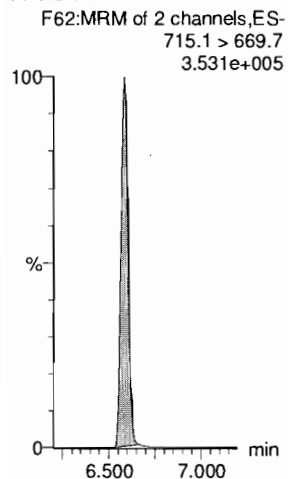
N-MeFOSE



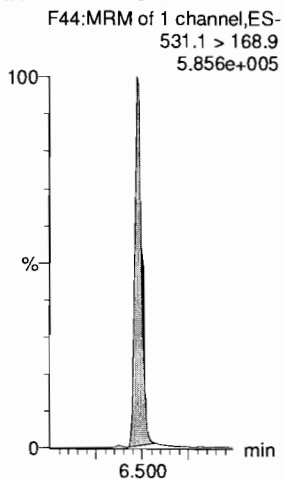
N-EtFOSE



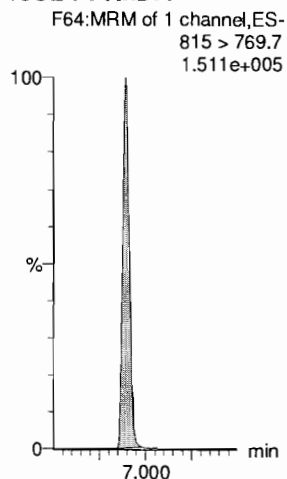
13C2-PFTeDA



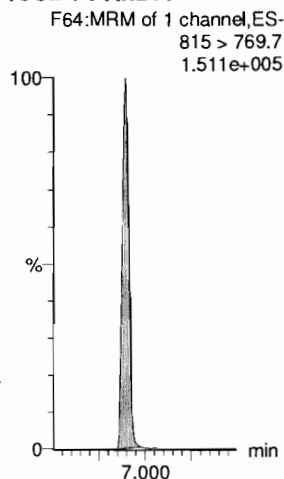
d5-N-ETFOSA



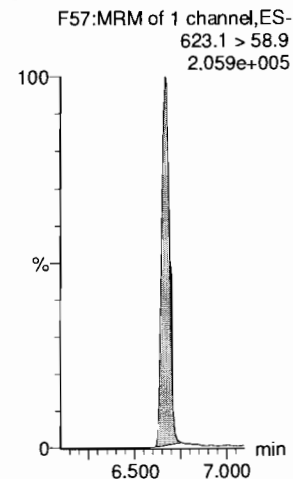
13C2-PFHxDA



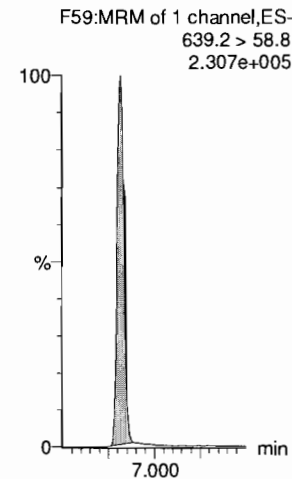
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



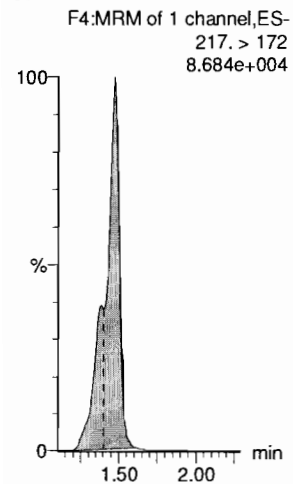
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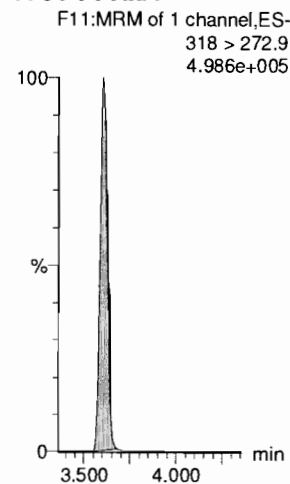
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_9, Date: 02-Dec-2018, Time: 19:49:07, ID: ST181202M2-8 PFC CS5 18K3008, Description: PFC CS5 18K3008

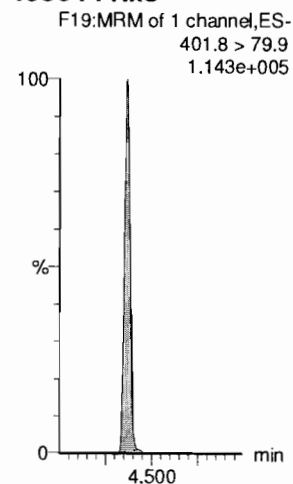
13C4-PFBA



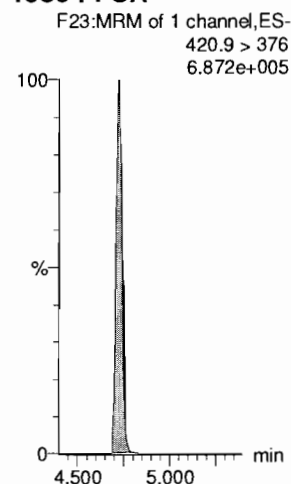
13C5-PFHxA



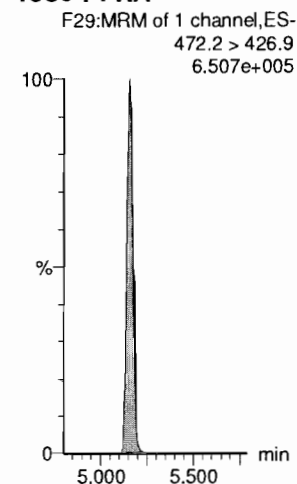
13C3-PFHxS



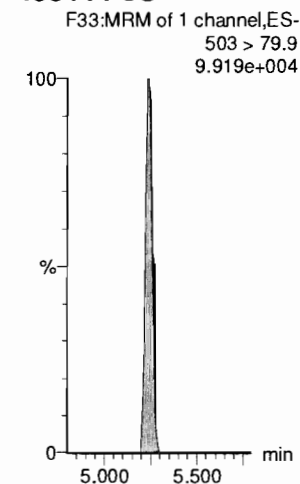
13C8-PFOA



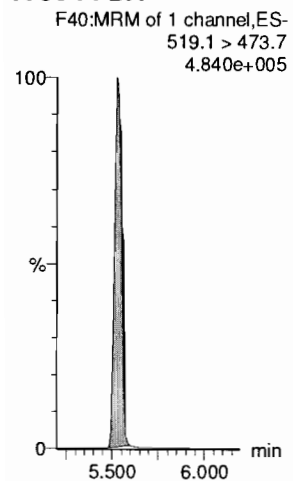
13C9-PFNA



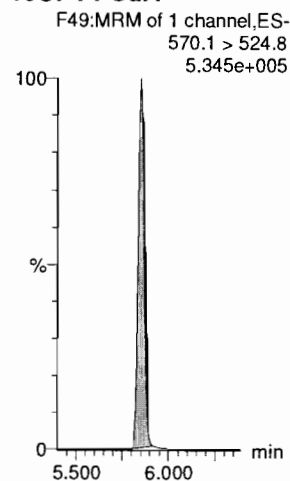
13C4-PFOS



13C6-PFDA



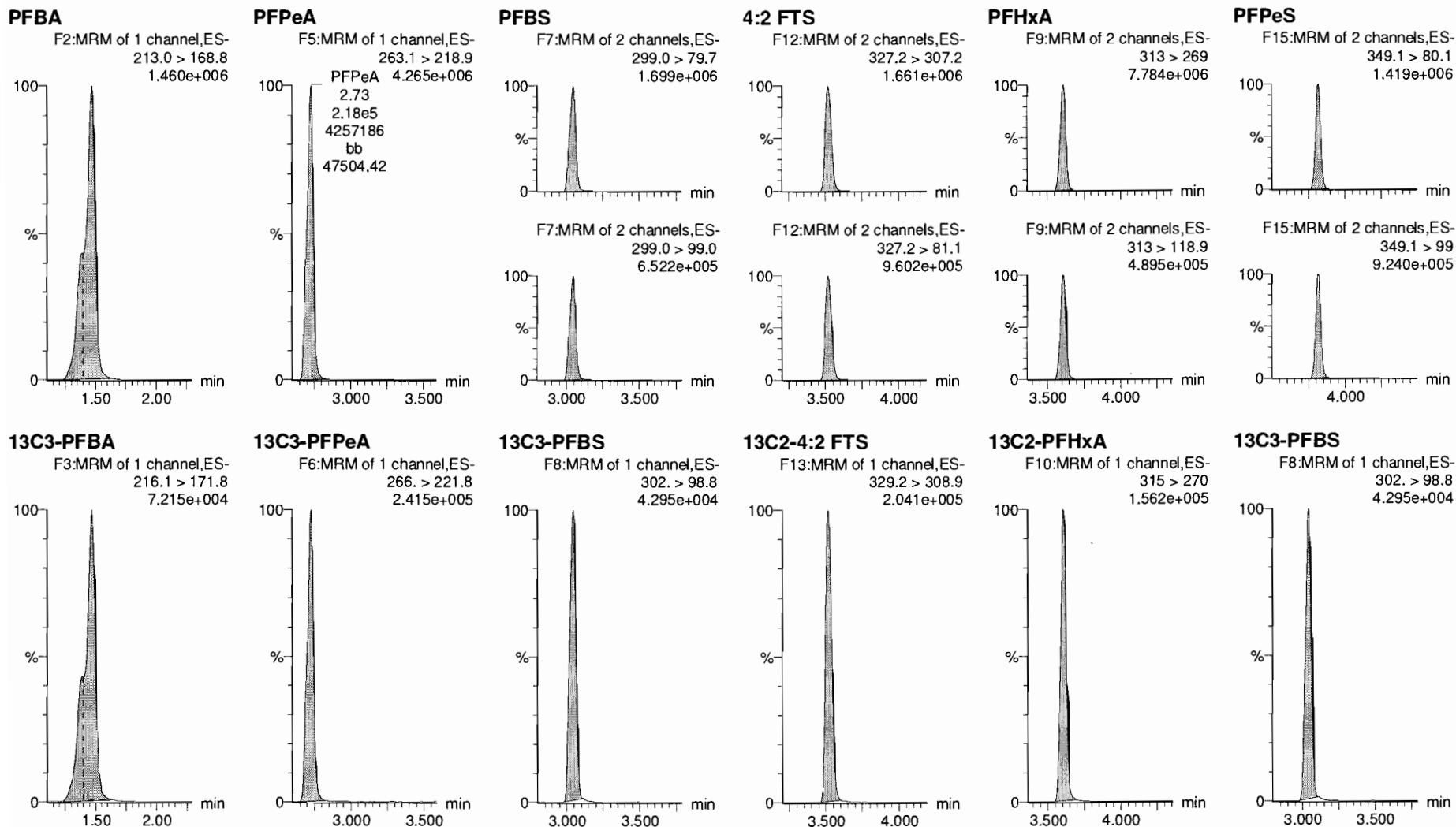
13C7-PFUDa



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

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Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009



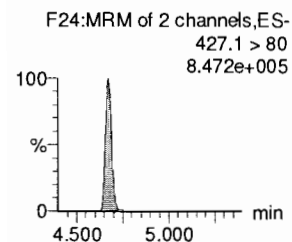
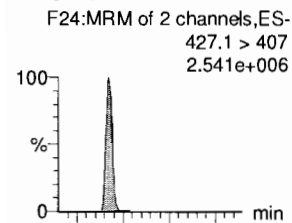
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

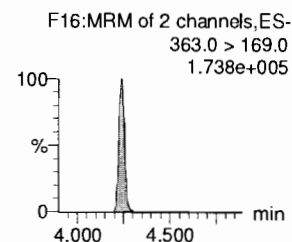
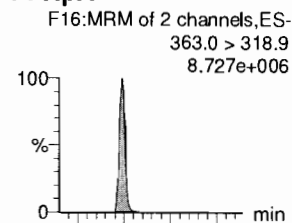
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Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009

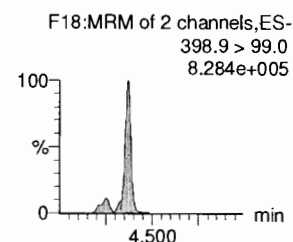
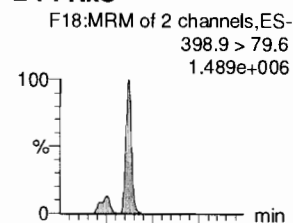
6:2 FTS



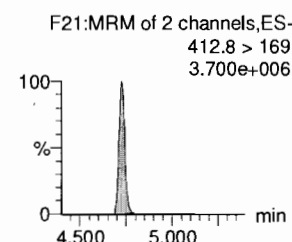
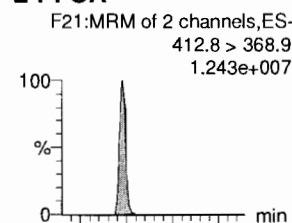
PFHpA



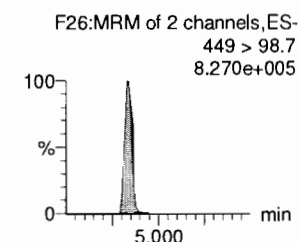
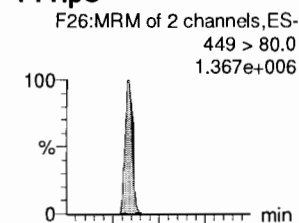
L-PFHxS



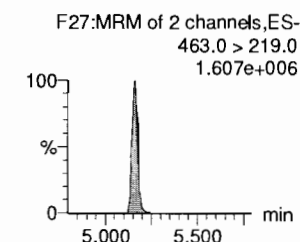
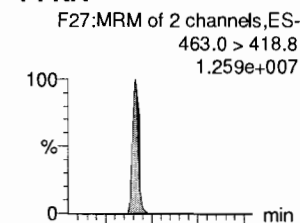
L-PFOA



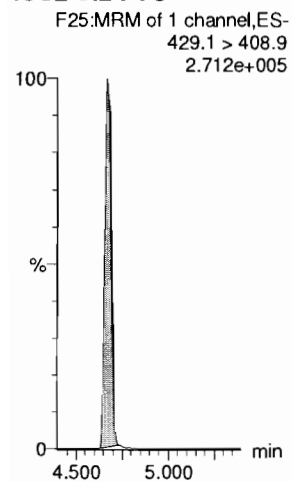
PFHpS



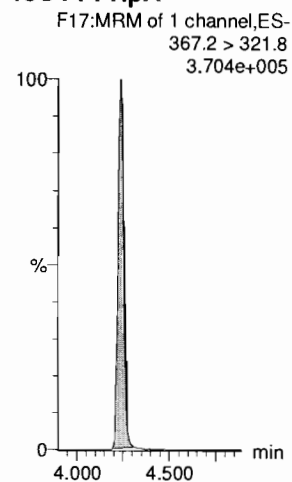
PFNA



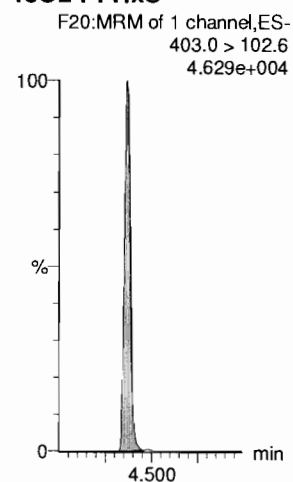
13C2-6:2 FTS



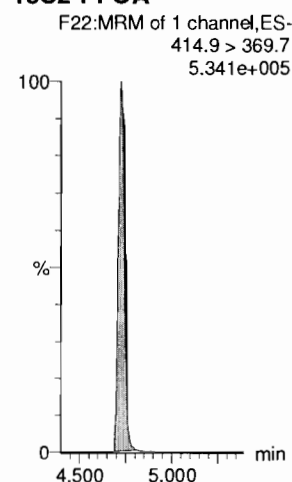
13C4-PFHpA



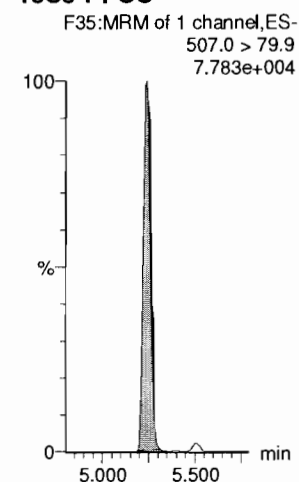
18O2-PFHxS



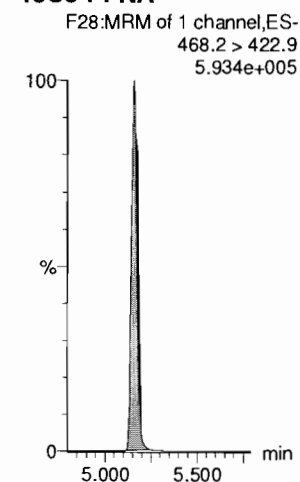
13C2-PFOA



13C8-PFOS



13C5-PFNA



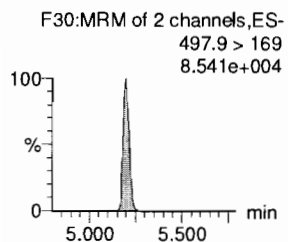
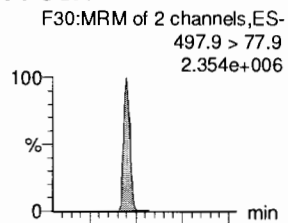
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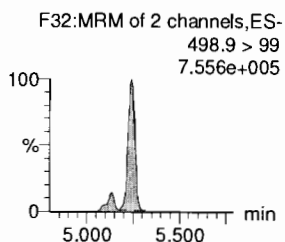
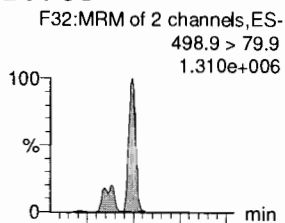
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Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009

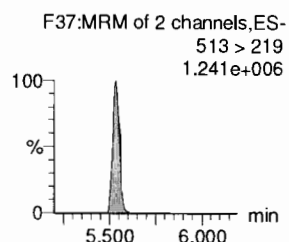
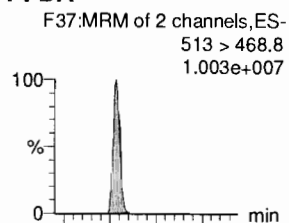
PFOSA



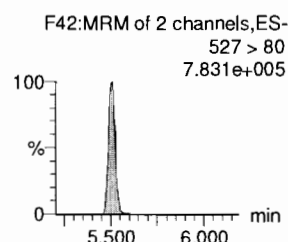
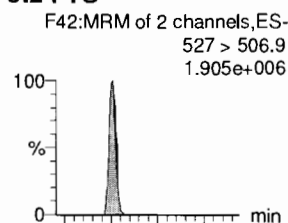
L-PFOS



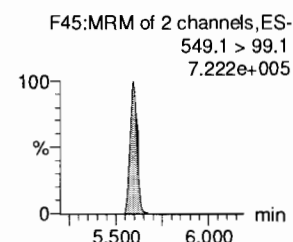
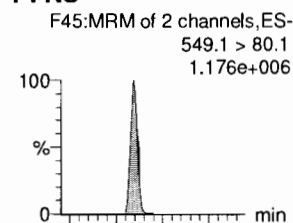
PFDA



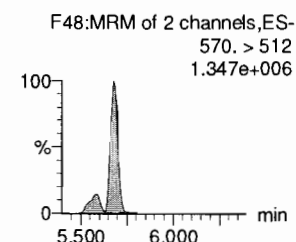
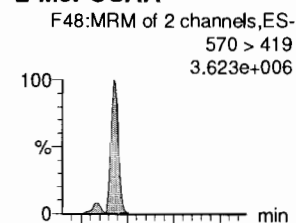
8:2 FTS



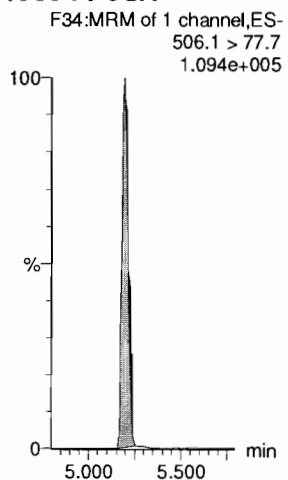
PFNS



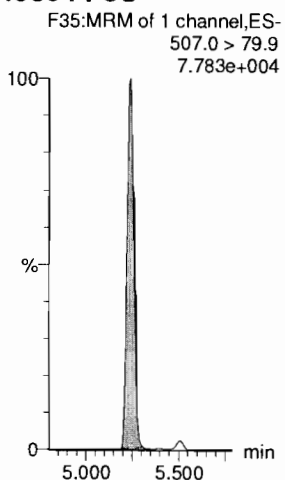
L-MeFOSAA



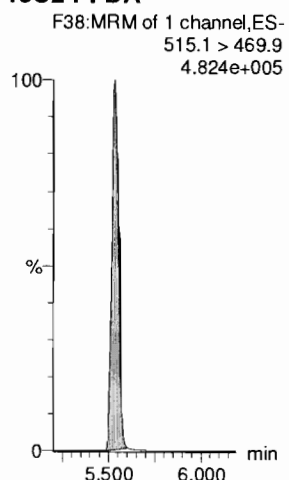
13C8-PFOSA



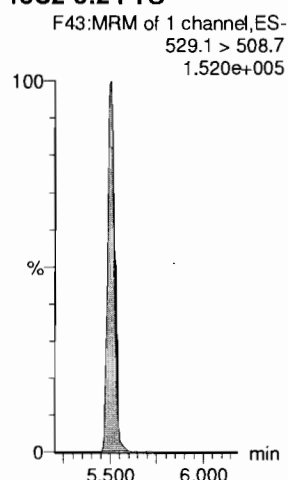
13C8-PFOS



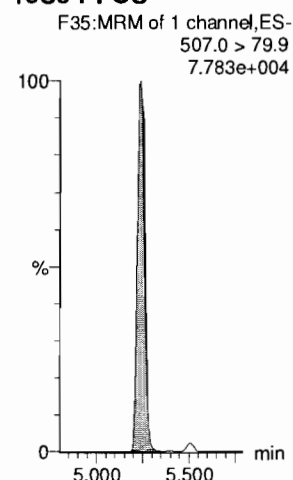
13C2-PFDA



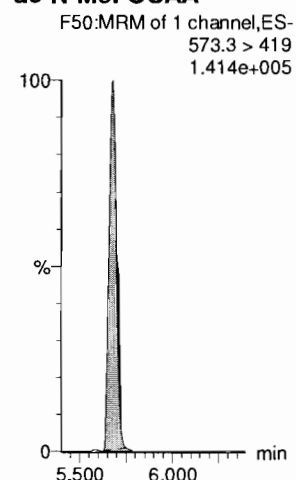
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



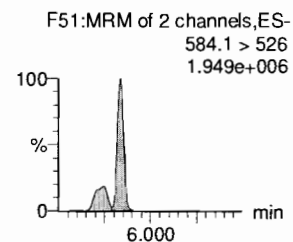
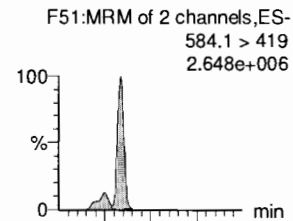
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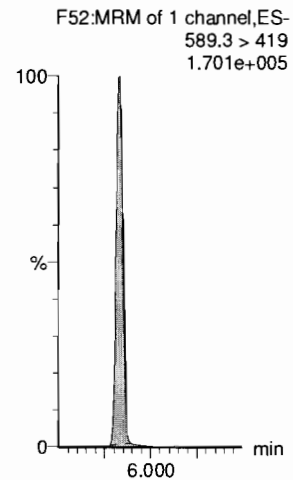
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Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009

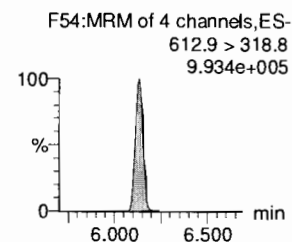
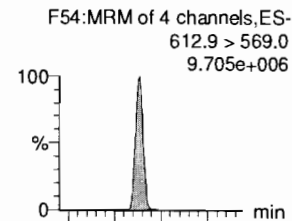
L-EtFOSAA



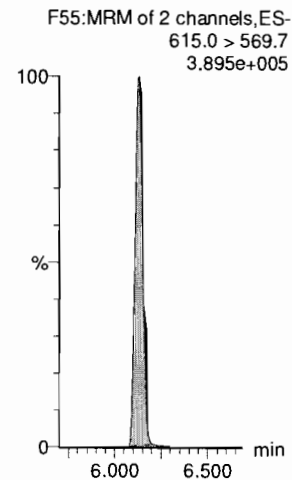
d5-N-EtFOSAA



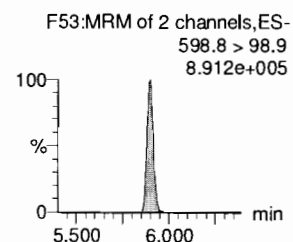
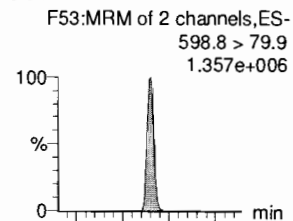
PFDaA



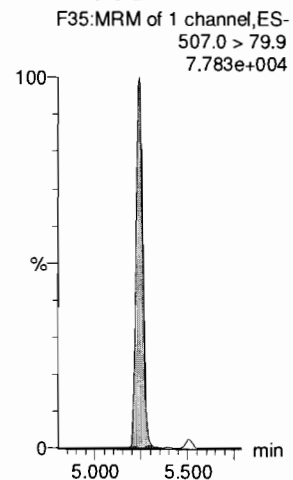
13C2-PFDaA



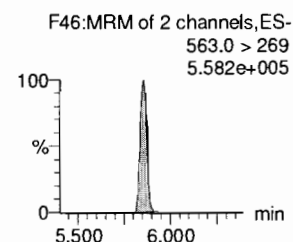
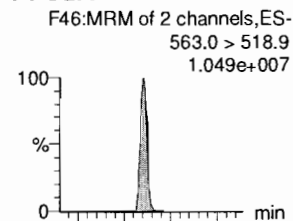
PFDS



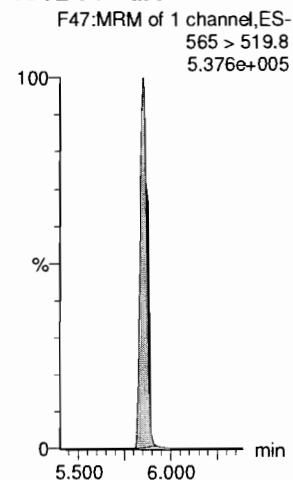
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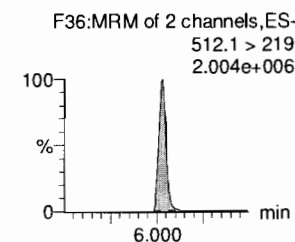
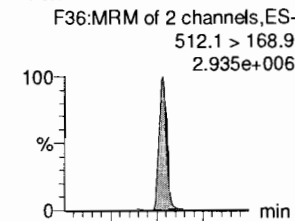
PFUdA



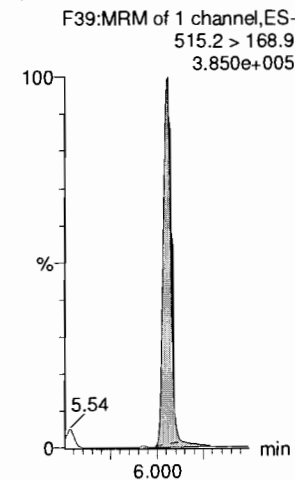
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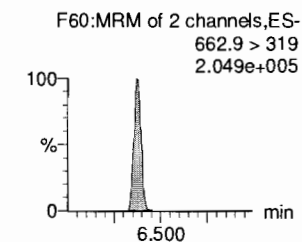
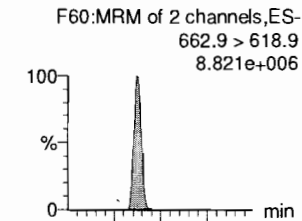
N-MeFOSA



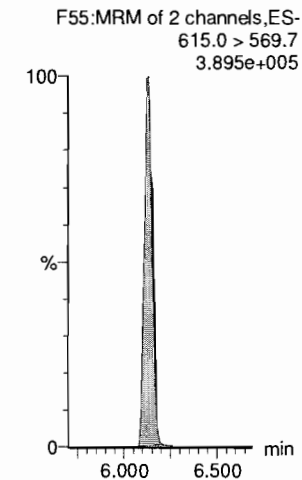
d3-N-MeFOSA



PFTTrDA



13C2-PFDaA



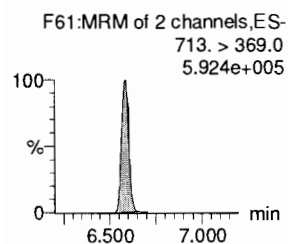
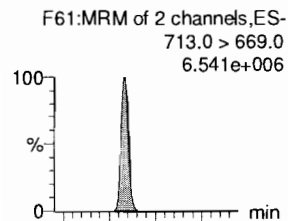
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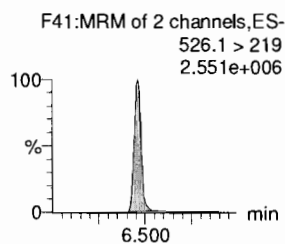
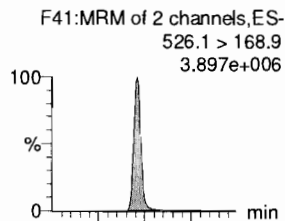
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Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009

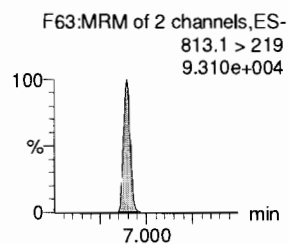
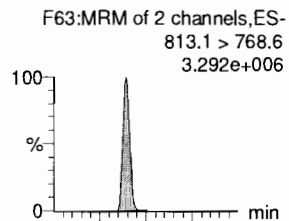
PFTeDA



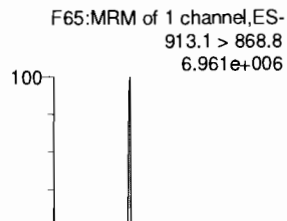
N-EtFOSA



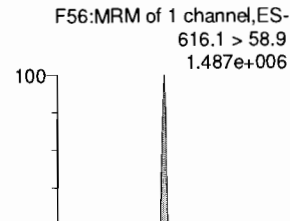
PFHxDA



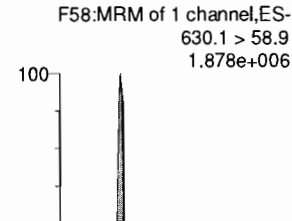
PFODA



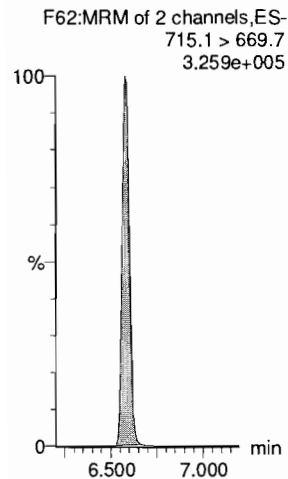
N-MeFOSE



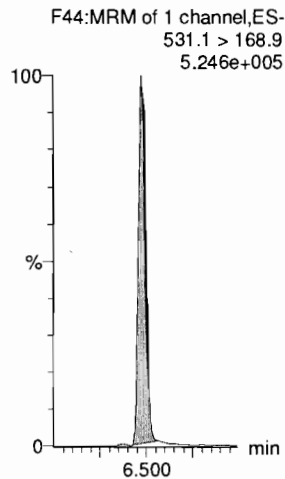
N-EtFOSE



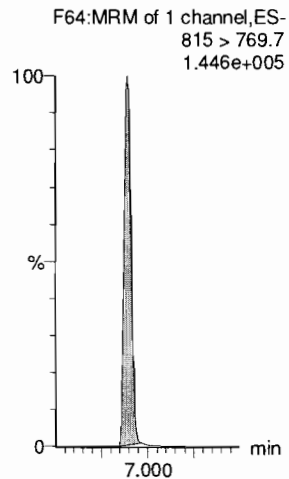
13C2-PFTeDA



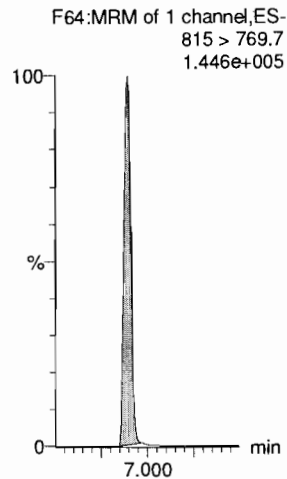
d5-N-ETFOSE



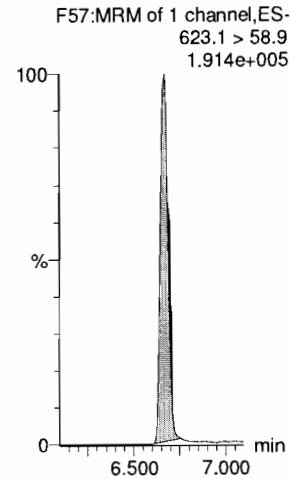
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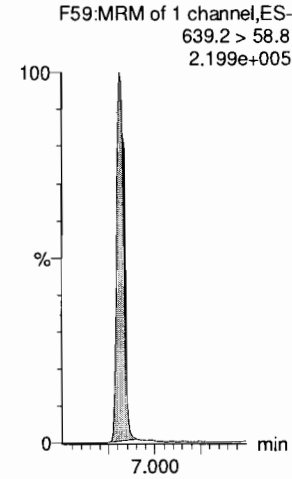
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



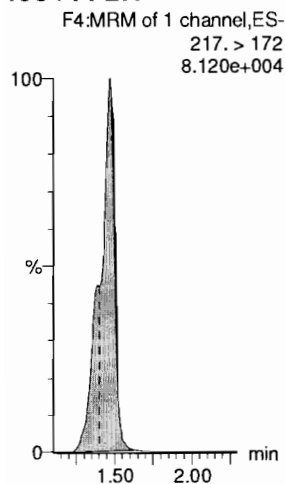
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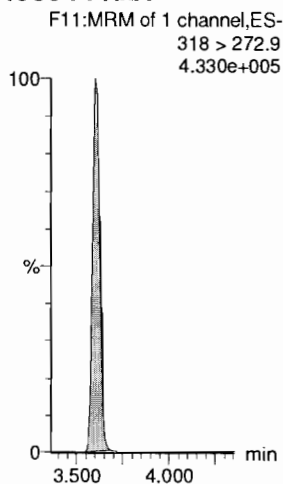
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Name: 181202M2_10, Date: 02-Dec-2018, Time: 19:59:40, ID: ST181202M2-9 PFC CS6 18K3009, Description: PFC CS6 18K3009

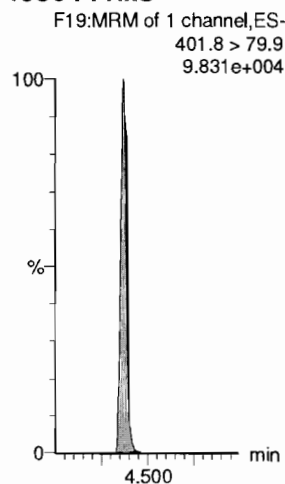
13C4-PFBA



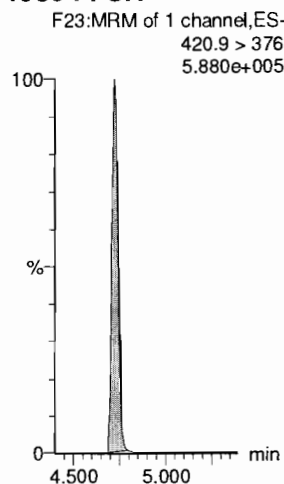
13C5-PFHxA



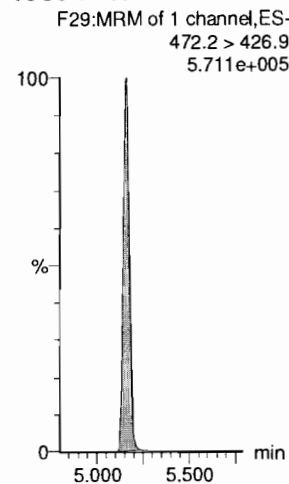
13C3-PFHxS



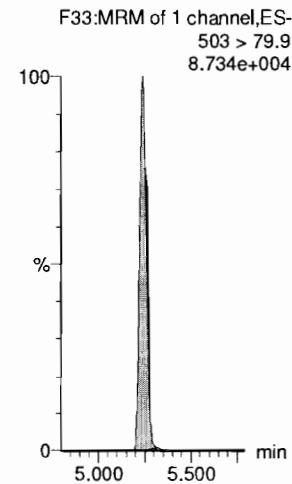
13C8-PFOA



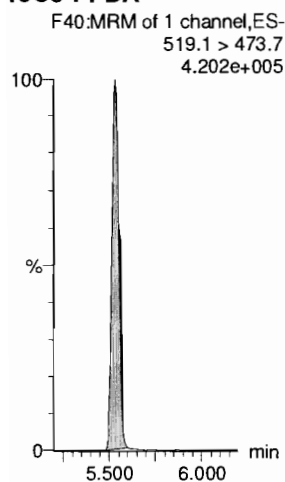
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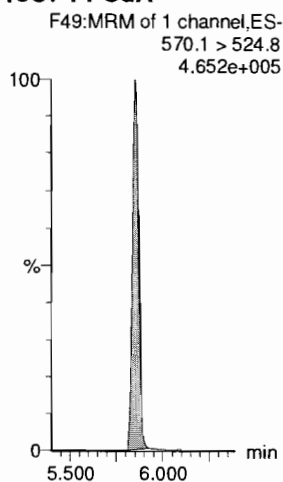
13C4-PFOS



13C6-PFDA



13C7-PFUDa



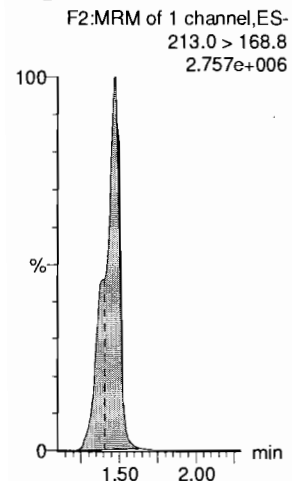
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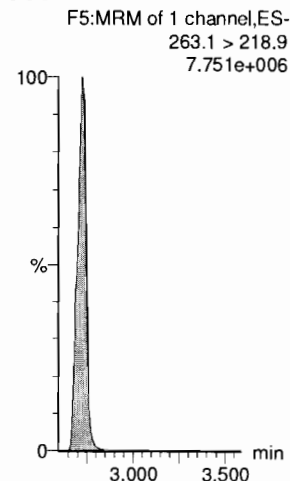
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Name: 181202M2_11, Date: 02-Dec-2018, Time: 20:10:18, ID: ST181202M2-10 PFC CS6 18K3009, Description: PFC CS7 18K3010

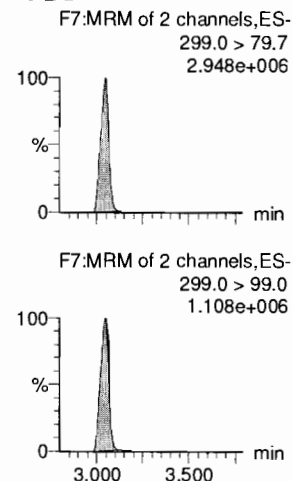
PFBA



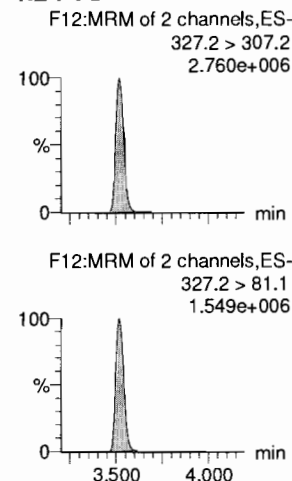
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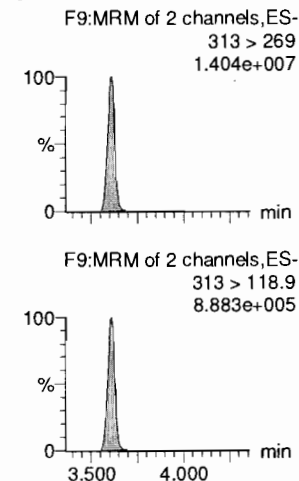
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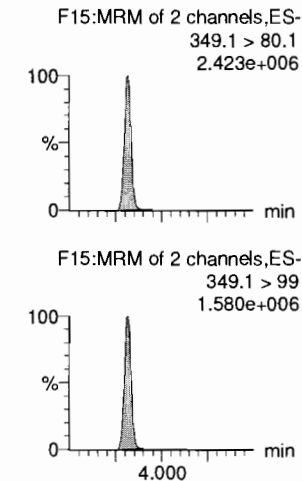
4:2 FTS



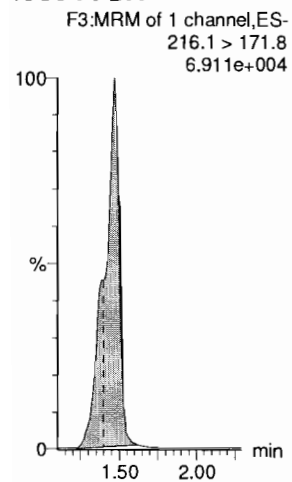
PFHxA



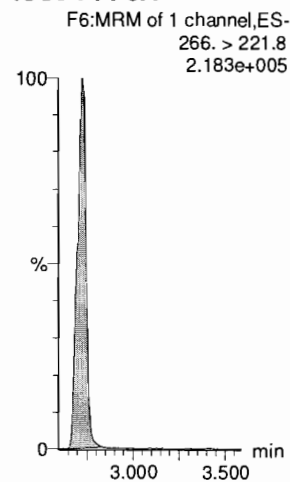
PFPeS



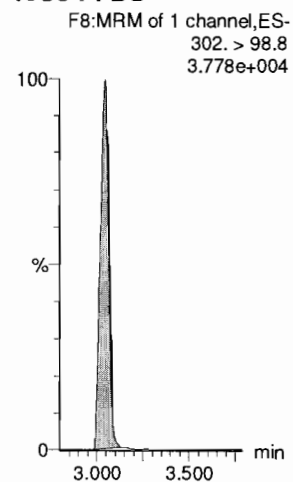
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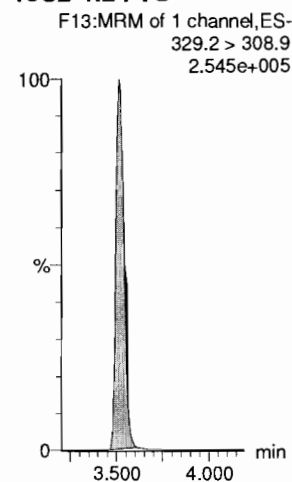
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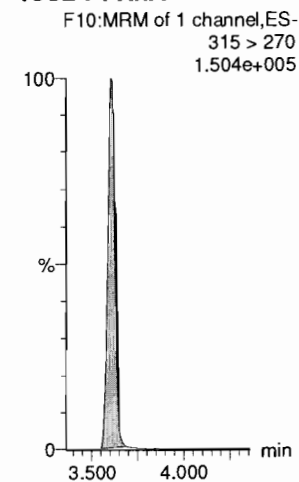
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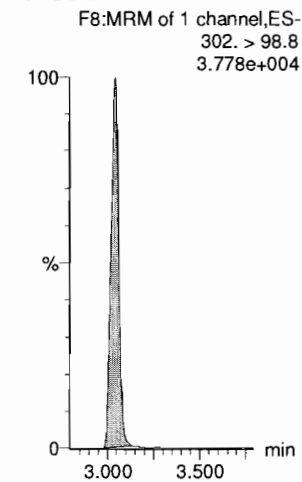
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13C2-PFHxA



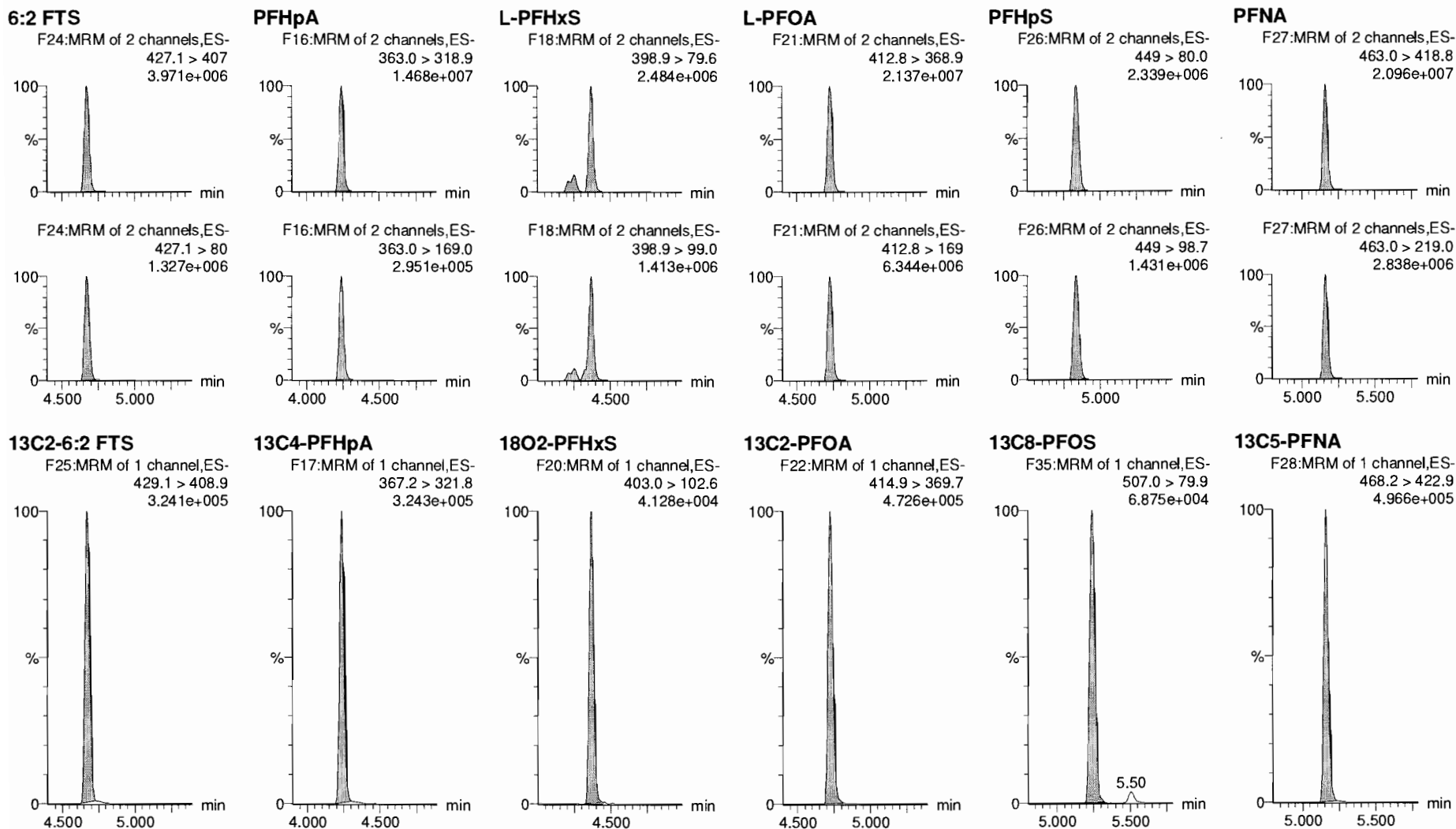
13C3-PFBS



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time
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Name: 181202M2_11, Date: 02-Dec-2018, Time: 20:10:18, ID: ST181202M2-10 PFC CS6 18K3009, Description: PFC CS7 18K3010

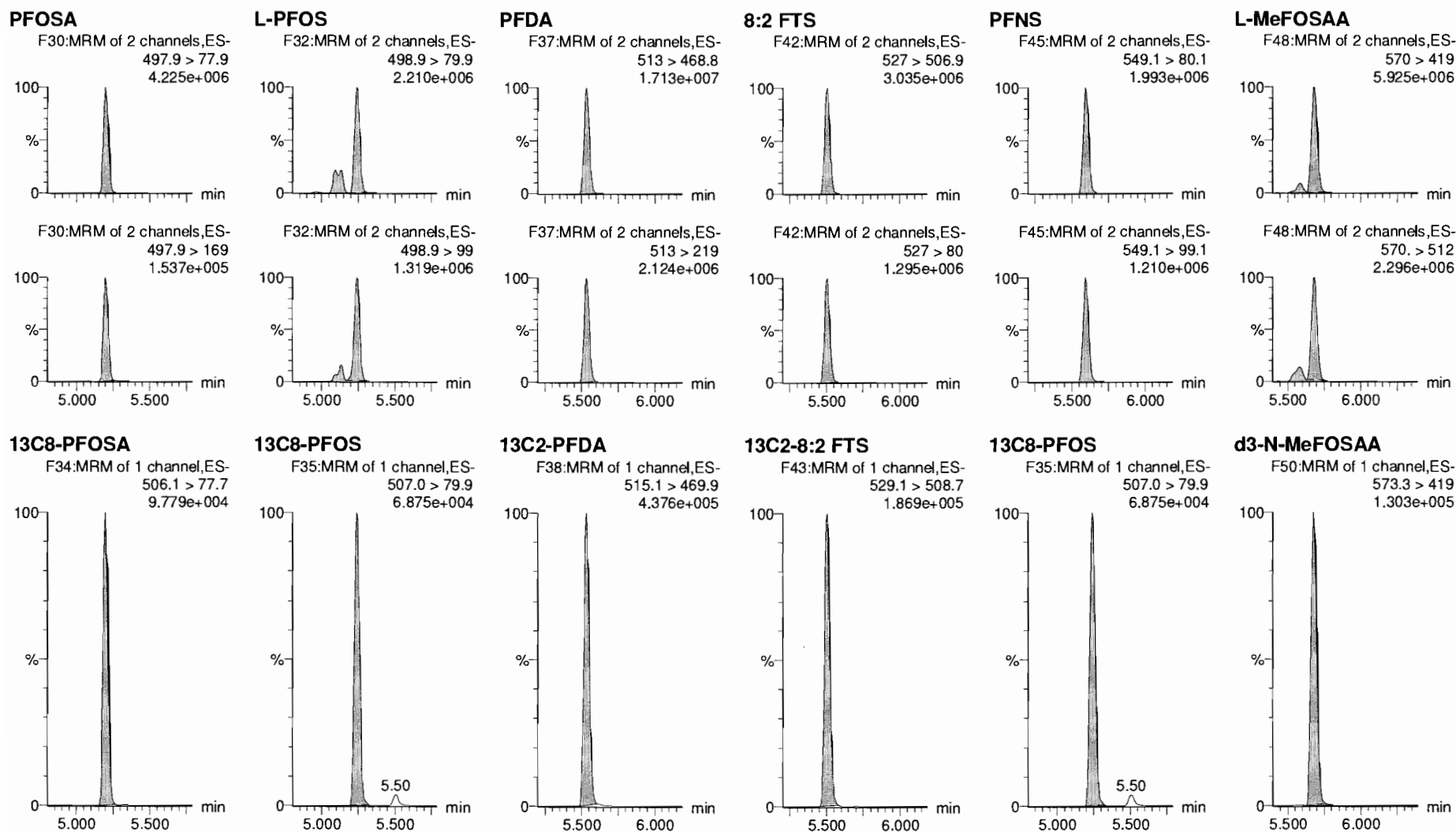


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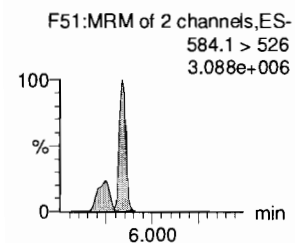
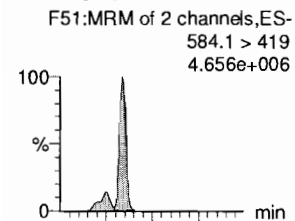
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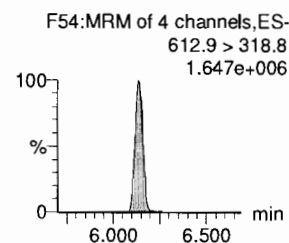
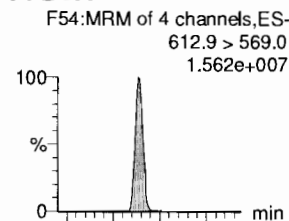
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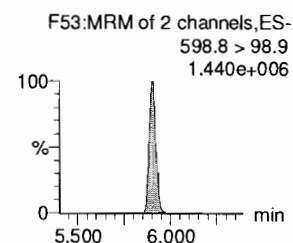
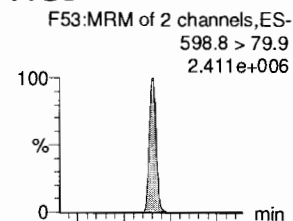
L-EtFOSAA



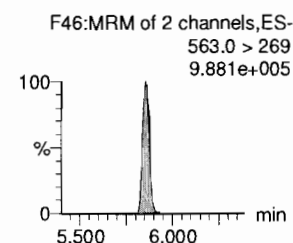
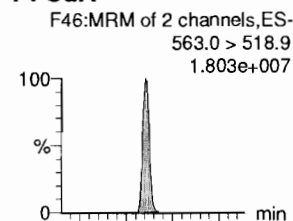
PFDaA



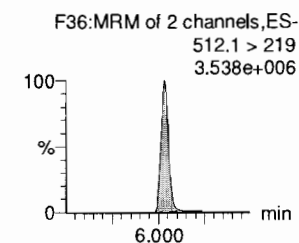
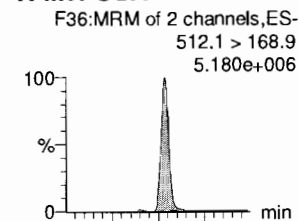
PFDS



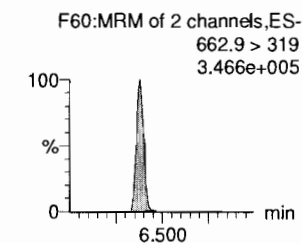
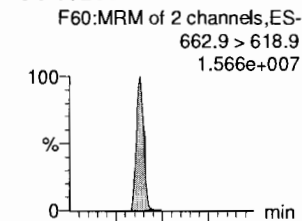
PFUdA



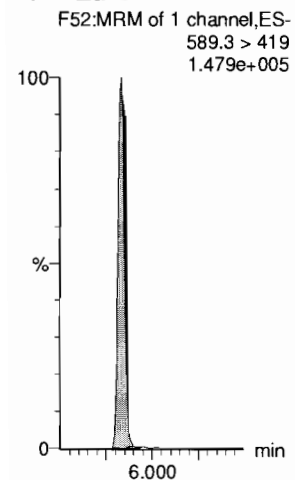
N-MeFOSA



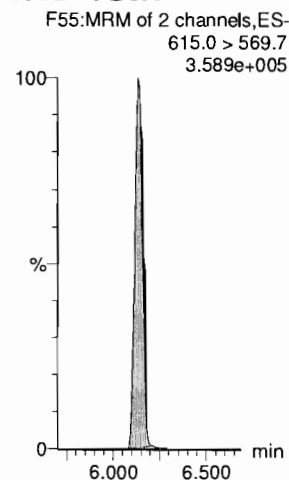
PFTTrDA



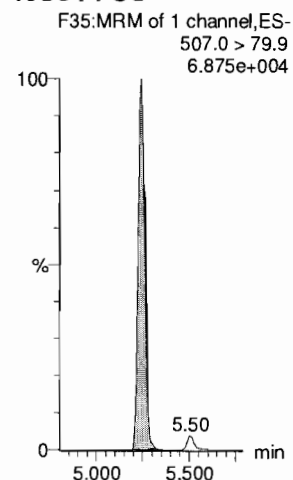
d5-N-EtFOSAA



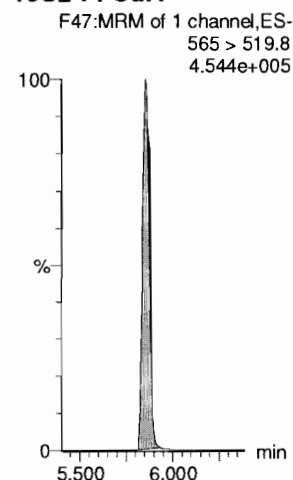
13C2-PFDaA



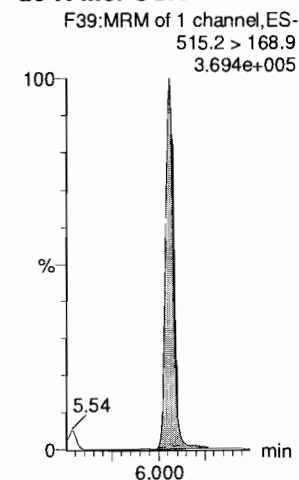
13C8-PFOS



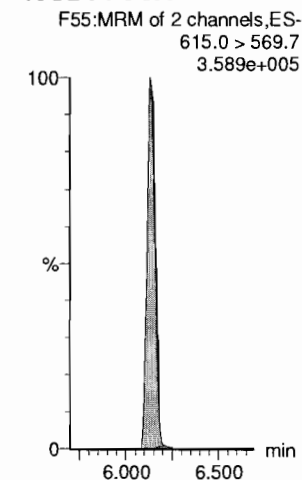
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



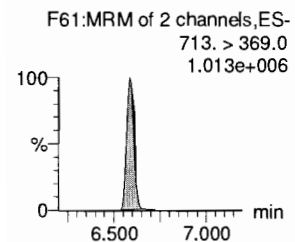
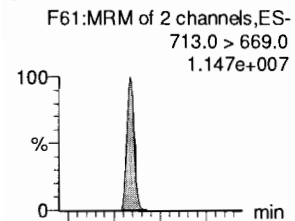
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Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

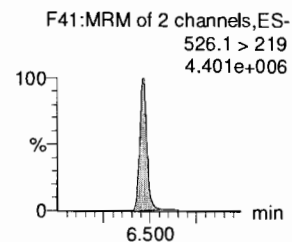
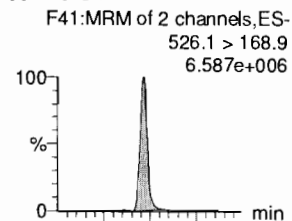
Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_11, Date: 02-Dec-2018, Time: 20:10:18, ID: ST181202M2-10 PFC CS6 18K3009, Description: PFC CS7 18K3010

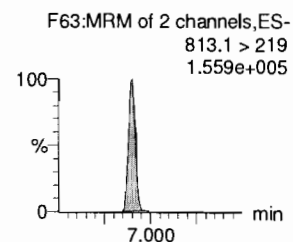
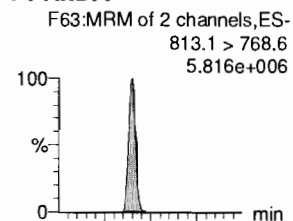
PFTeDA



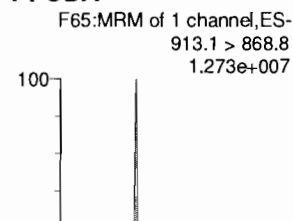
N-EtFOSA



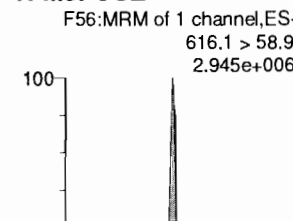
PFHxDA



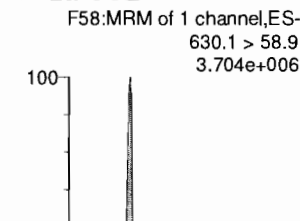
PFODA



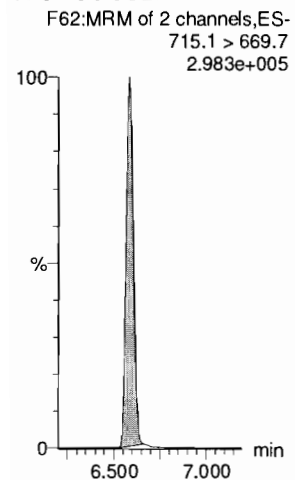
N-MeFOSE



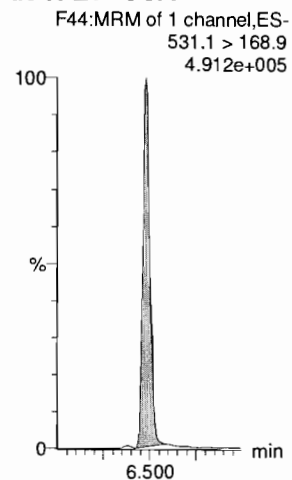
N-EtFOSE



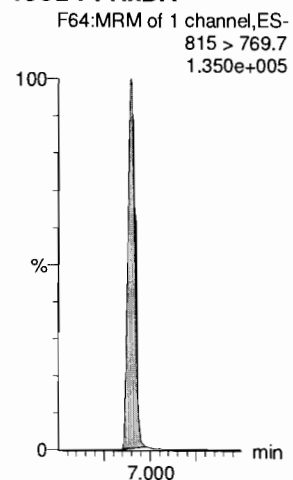
13C2-PFTeDA



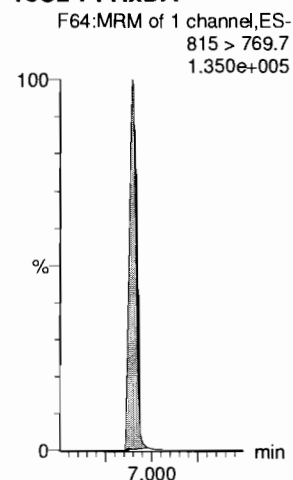
d5-N-ETFOSE



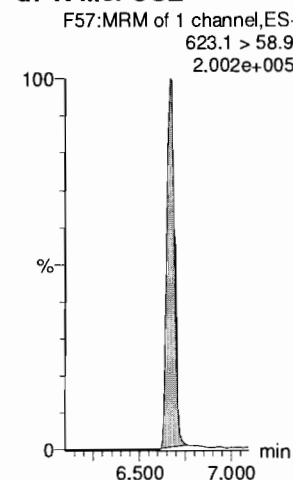
13C2-PFHxDA



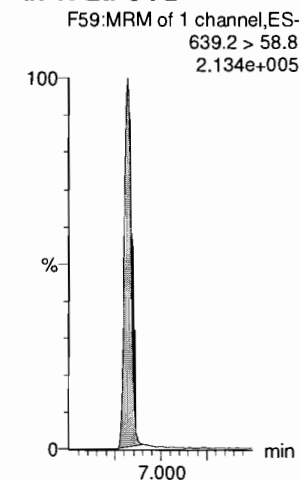
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-CRV.qld

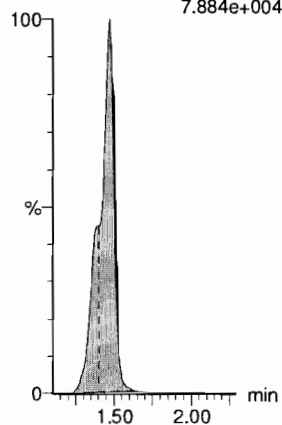
Last Altered: Monday, December 03, 2018 10:27:10 Pacific Standard Time

Printed: Monday, December 03, 2018 10:27:36 Pacific Standard Time

Name: 181202M2_11, Date: 02-Dec-2018, Time: 20:10:18, ID: ST181202M2-10 PFC CS6 18K3009, Description: PFC CS7 18K3010

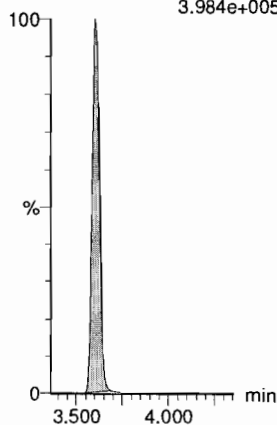
13C4-PFBA

F4:MRM of 1 channel,ES-
217. > 172
7.884e+004



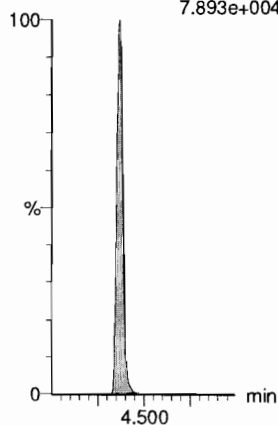
13C5-PFHxA

F11:MRM of 1 channel,ES-
318 > 272.9
3.984e+005



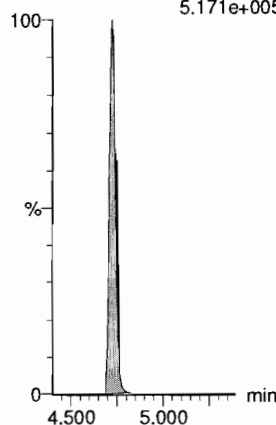
13C3-PFHxS

F19:MRM of 1 channel,ES-
401.8 > 79.9
7.893e+004



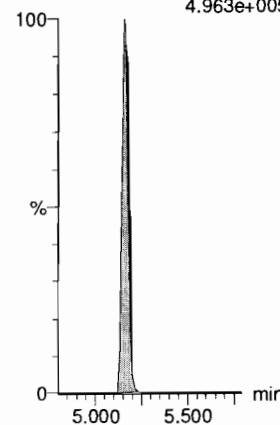
13C8-PFOA

F23:MRM of 1 channel,ES-
420.9 > 376
5.171e+005



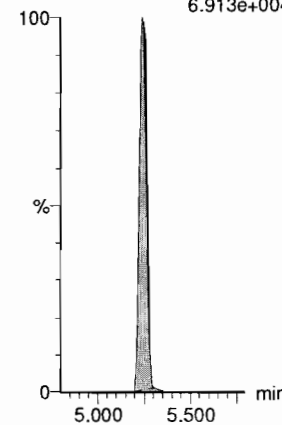
13C9-PFNA

F29:MRM of 1 channel,ES-
472.2 > 426.9
4.963e+005



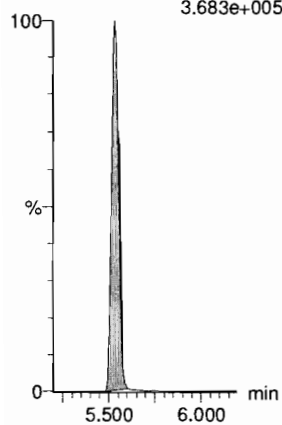
13C4-PFOS

F33:MRM of 1 channel,ES-
503 > 79.9
6.913e+004



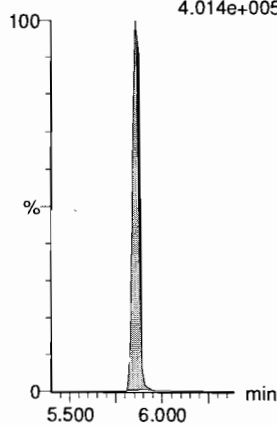
13C6-PFDA

F40:MRM of 1 channel,ES-
519.1 > 473.7
3.683e+005



13C7-PFUDa

F49:MRM of 1 channel,ES-
570.1 > 524.8
4.014e+005



Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time

Printed: Monday, December 03, 2018 10:58:27 Pacific Standard Time

Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1 PFBA	213.0 > 168.8	6140.405	7883.377	1.00	1.47	9.736	9.5	95.0	NO		
2	2 PFPeA	263.1 > 218.9	9020.201	13594.861	1.00	2.73	8.294	9.1	91.1	NO		
3	3 PFBS	299.0 > 79.7	3115.221	2497.661	1.00	3.05	15.591	7.8	77.5	NO	2.577	NO
4	4 4:2 FTS	327.2>307.2	4357.904	7872.859	1.00	3.52	6.919	8.4	84.4	NO	1.689	NO
5	5 PFHxA	313 > 269	15517.643	8090.420	1.00	3.61	9.590	9.2	91.6	NO	16.075	NO
6	6 PFPeS	349.1>80.1	2413.071	2497.661	1.00	3.82	12.077	8.2	82.0	NO	1.481	NO
7	36 13C3-PFBA	216.1 > 171.8	7883.377	9233.056	1.00	1.47	10.673	12.4	99.2	NO		
8	37 13C3-PFPeA	266. > 221.8	13594.861	22850.570	1.00	2.73	7.437	12.3	98.5	NO		
9	38 13C3-PFBS	302. > 98.8	2497.661	4034.381	1.00	3.05	7.739	12.2	97.8	NO		
10	39 13C2-4:2 FTS	329.2>308.9	7872.859	4034.381	1.00	3.52	24.393	11.8	94.1	NO		
11	40 13C2-PFHxA	315 > 270	8090.420	22850.570	1.00	3.61	4.426	4.9	98.3	NO		
12	38 13C3-PFBS	302. > 98.8	2497.661	4034.381	1.00	3.05	7.739	12.2	97.8	NO		
13	-1											
14	10 6:2 FTS	427.1 > 407	4946.854	7317.706	1.00	4.67	8.450	8.8	88.4	NO	3.162	NO
15	7 PFHpA	363.0 > 318.9	14006.358	15581.168	1.00	4.24	11.237	9.7	96.6	NO	56.596	NO
16	8 L-PFHxS	398.9 > 79.6	2397.661	1760.062	1.00	4.37	17.028	8.6	86.2	NO	1.699	NO
17	11 L-PFOA	412.8 > 368.9	19962.924	22960.176	1.00	4.73	10.868	8.9	88.7	NO	3.291	NO
18	13 PFHpS	449 > 80.0	2535.390	4001.654	1.00	4.84	7.920	9.0	90.1	NO	1.639	NO
19	14 PFNA	463.0 > 418.8	20263.572	25965.410	1.00	5.16	9.755	8.8	88.5	NO	7.594	NO
20	43 13C2-6:2 FTS	429.1 > 408.9	7317.706	4113.747	1.00	4.67	22.236	12.2	97.5	NO		
21	41 13C4-PFHpA	367.2 > 321.8	15581.168	22850.570	1.00	4.24	8.523	12.3	98.4	NO		
22	42 18O2-PFHxS	403.0 > 102.6	1760.062	4034.381	1.00	4.37	5.453	11.5	91.7	NO		
23	44 13C2-PFOA	414.9 > 369.7	22960.176	25120.416	1.00	4.73	11.425	13.1	104.7	NO		
24	47 13C8-PFOS	507.0 > 79.9	4001.654	4113.747	1.00	5.24	12.159	12.6	100.5	NO		
25	45 13C5-PFNA	468.2 > 422.9	25965.410	24353.928	1.00	5.16	13.327	13.2	106.0	NO		
26	-1											
27	15 PFOSA	497.9 > 77.9	3759.528	4451.726	1.00	5.20	10.556	9.3	92.9	NO	31.998	NO
28	16 L-PFOS	498.9 > 79.9	2800.970	4001.654	1.00	5.24	8.749	8.0	79.7	NO	1.789	NO
29	18 PFDA	513 > 468.8	18661.449	24121.828	1.00	5.54	9.670	9.0	90.1	NO	8.733	NO
30	19 8:2 FTS	527 > 506.9	4210.729	4017.639	1.00	5.51	13.101	10.0	100.4	NO	2.486	NO
31	20 PFNS	549.1 > 80.1	2107.343	4001.654	1.00	5.60	6.583	8.5	85.2	NO	1.583	NO
32	21 L-MeFOSAA	570 > 419	9752.607	8318.344	1.00	5.68	14.655	9.7	97.3	NO	2.887	NO
33	46 13C8-PFOSA	506.1 > 77.7	4451.726	22712.641	1.00	5.20	2.450	12.2	97.2	NO		
34	47 13C8-PFOS	507.0 > 79.9	4001.654	4113.747	1.00	5.24	12.159	12.6	100.5	NO		
35	48 13C2-PFDA	515.1 > 469.9	24121.828	22907.691	1.00	5.54	13.163	11.7	93.6	NO		
36	49 13C2-8:2 FTS	529.1 > 508.7	4017.639	4113.747	1.00	5.51	12.208	11.2	89.9	NO		

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12/3/18✓
12/3/18

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time
Printed: Monday, December 03, 2018 10:58:27 Pacific Standard Time

Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

Ⓐ NOT IN ICV
AN 12/3/18

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
37	47 13C8-PFOS	507.0 > 79.9	4001.654	4113.747	1.00	5.24	12.159	12.6	100.5	NO		
38	50 d3-N-MeFOSAA	573.3 > 419	8318.344	22712.641	1.00	5.68	4.578	13.9	111.3	NO		
39	-1											
40	23 L-EtFOSAA	584.1 > 419	7838.116	8216.018	1.00	5.84	11.925	11.0	110.0	NO	1.522	NO
41	27 PFDaA	612.9 > 569.0	21371.295	19717.238	1.00	6.13	13.549	10.3	103.0	NO	10.832	NO
42	26 PFDS	598.8 > 79.9	2304.488	4001.654	1.00	5.90	7.199	8.8	87.8	NO	1.663	NO
43	25 PFUdA	563.0 > 518.9	19848.904	24738.699	1.00	5.86	10.029	9.3	93.2	NO	19.696	NO
44	28 N-MeFOSA	512.1 > 168.9		19386.414	1.00				Ⓐ	NO		
45	29 PFTTrDA	662.9 > 618.9	19942.900	19717.238	1.00	6.37	12.643	10.4	104.2	NO	50.720	NO
46	52 d5-N-EtFOSAA	589.3 > 419	8216.018	22712.641	1.00	5.83	4.522	12.7	101.9	NO		
47	53 13C2-PFDaA	615.0 > 569.7	19717.238	22907.691	1.00	6.13	10.759	10.8	86.7	NO		
48	47 13C8-PFOS	507.0 > 79.9	4001.654	4113.747	1.00	5.24	12.159	12.6	100.5	NO		
49	51 13C2-PFUdA	565 > 519.8	24738.699	22712.641	1.00	5.85	13.615	12.3	98.0	NO		
50	54 d3-N-MeFOSA	515.2 > 168.9	19386.414	22712.641	1.00	6.06	10.669	144.5	96.3	NO		
51	53 13C2-PFDaA	615.0 > 569.7	19717.238	22907.691	1.00	6.13	10.759	10.8	86.7	NO		
52	-1											
53	30 PFTeDA	713.0 > 669.0	14206.638	16409.135	1.00	6.59	10.822	9.6	95.6	NO	12.177	NO
54	31 N-EtFOSA	526.1 > 168.9		25249.637	1.00				Ⓐ	NO		
55	32 PFHxDA	813.1 > 768.6		6116.390	1.00					NO		
56	33 PFODA	913.1 > 868.8		6116.390	1.00					NO		
57	34 N-MeFOSE	616.1 > 58.9		8805.960	1.00					NO		
58	35 N-EtFOSE	630.1 > 58.9		9315.738	1.00					NO		
59	55 13C2-PFTeDA	715.1 > 669.7	16409.135	22712.641	1.00	6.59	9.031	12.1	96.4	NO		
60	56 d5-N-ETFOSE	531.1 > 168.9	25249.637	22712.641	1.00	6.48	13.896	143.5	95.6	NO		
61	57 13C2-PFHxDA	815 > 769.7	6116.390	22712.641	1.00	6.89	3.366	4.7	94.3	NO		
62	57 13C2-PFHxDA	815 > 769.7	6116.390	22712.641	1.00	6.89	3.366	4.7	94.3	NO		
63	58 d7-N-MeFOSE	623.1 > 58.9	8805.960	22712.641	1.00	6.67	4.846	134.7	89.8	NO		
64	59 d9-N-EtFOSE	639.2 > 58.8	9315.738	22712.641	1.00	6.82	5.127	141.9	94.6	NO		
65	-1											
66	60 13C4-PFBA	217. > 172	9233.056	9233.056	1.00	1.47	12.500	12.5	100.0	NO		
67	61 13C5-PFHxA	318 > 272.9	22850.570	22850.570	1.00	3.61	12.500	12.5	100.0	NO		
68	62 13C3-PFHxS	401.8 > 79.9	4034.381	4034.381	1.00	4.37	12.500	12.5	100.0	NO		
69	63 13C8-PFOA	420.9 > 376	25120.416	25120.416	1.00	4.73	12.500	12.5	100.0	NO		
70	64 13C9-PFNA	472.2 > 426.9	24353.928	24353.928	1.00	5.16	12.500	12.5	100.0	NO		
71	65 13C4-PFOS	503 > 79.9	4113.747	4113.747	1.00	5.24	12.500	12.5	100.0	NO		
72	66 13C6-PFDA	519.1 > 473.7	22907.691	22907.691	1.00	5.54	12.500	12.5	100.0	NO		

Ⓐ
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Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time

Printed: Monday, December 03, 2018 10:58:27 Pacific Standard Time

Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

	# Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
73	67 13C7-PFUDa	570.1 > 524.8	22712.641	22712.641	1.00	5.85	12.500	12.5	100.0		NO	

Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time

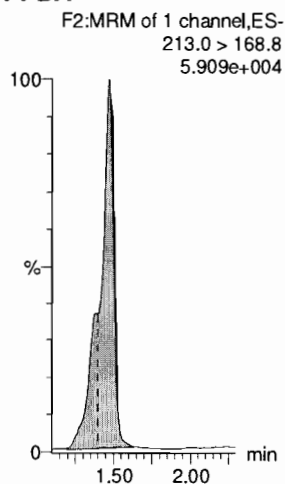
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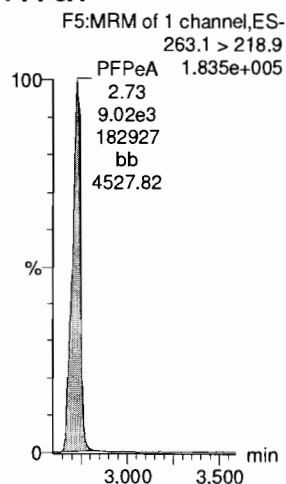
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Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

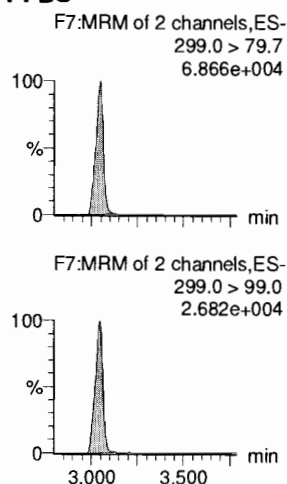
PFBA



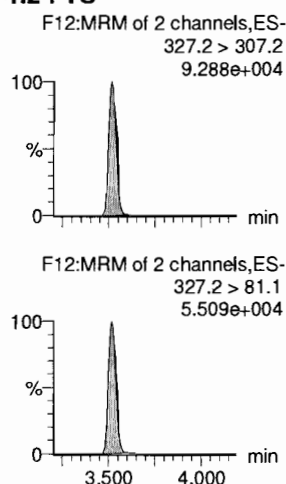
PFPeA



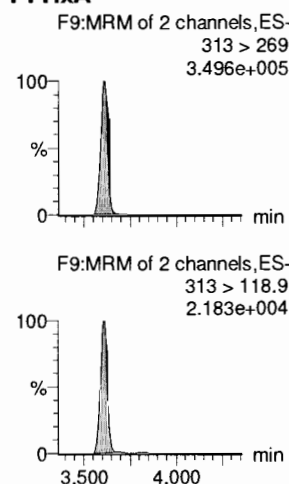
PFBS



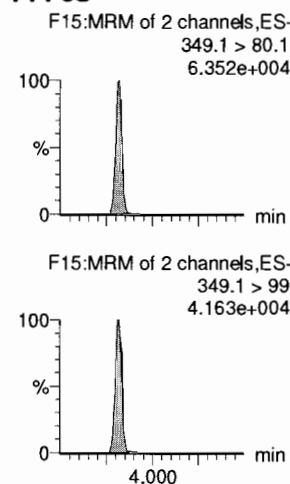
4:2 FTS



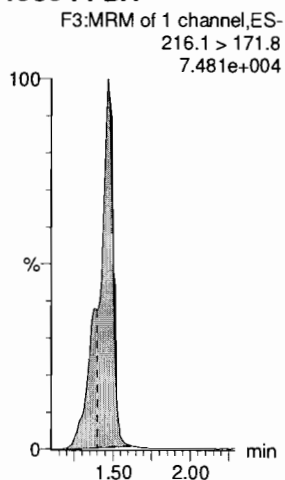
PFHxA



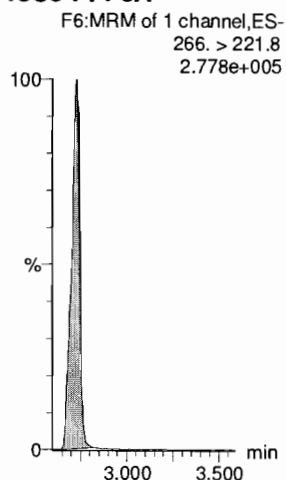
PFPeS



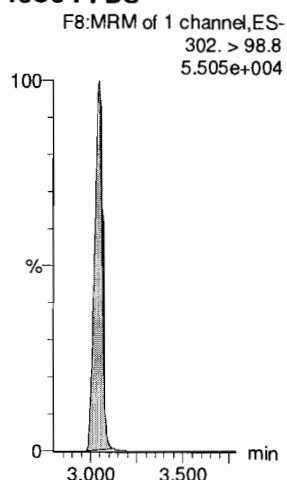
13C3-PFBA



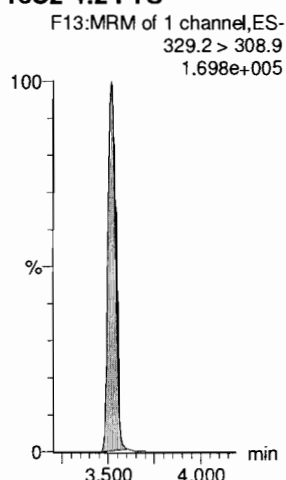
13C3-PFPeA



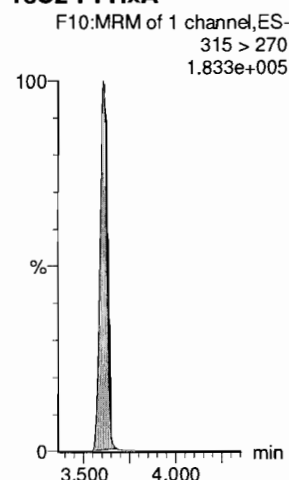
13C3-PFBS



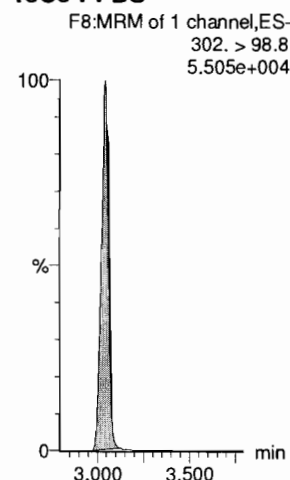
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

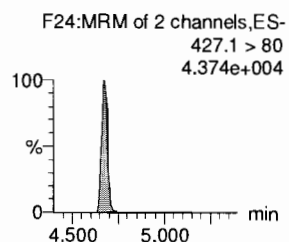
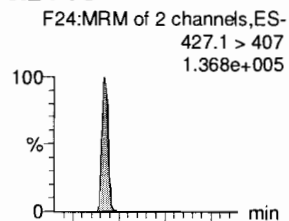


Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

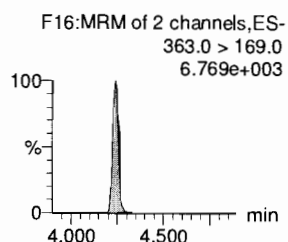
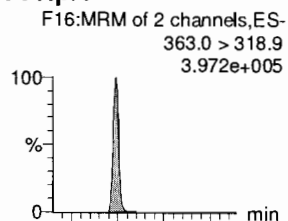
Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time
Printed: Monday, December 03, 2018 10:58:27 Pacific Standard Time

Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

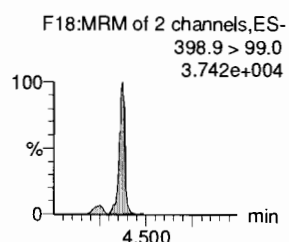
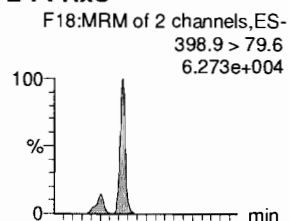
6:2 FTS



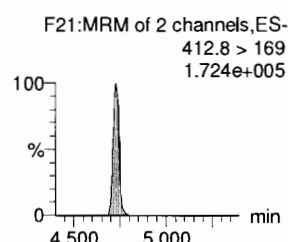
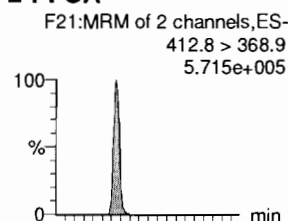
PFHpA



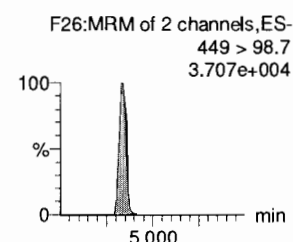
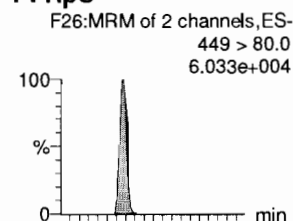
L-PFHxS



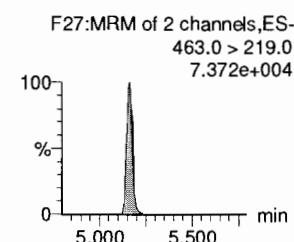
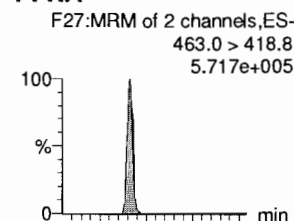
L-PFOA



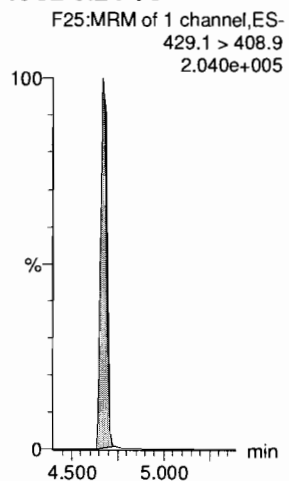
PFHpS



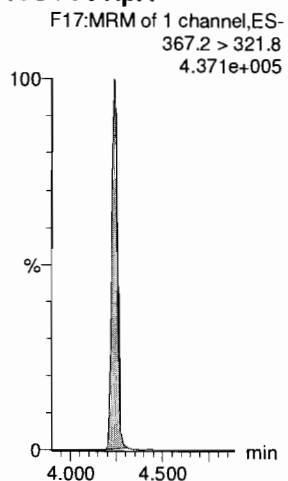
PFNA



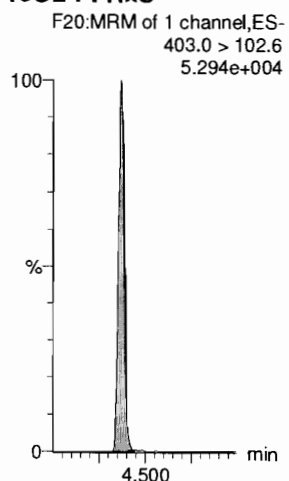
13C2-6:2 FTS



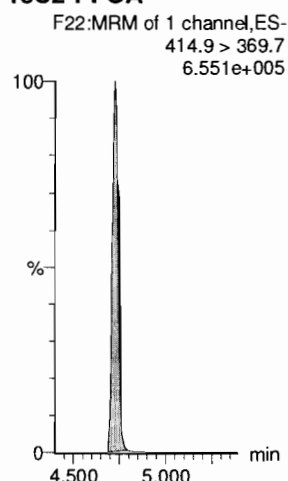
13C4-PFHpA



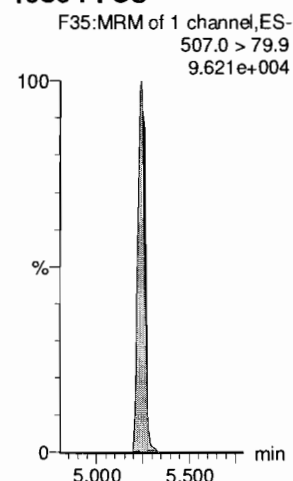
18O2-PFHxS



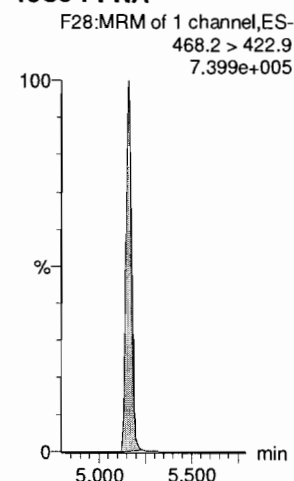
13C2-PFOA



13C8-PFOS



13C5-PFNA



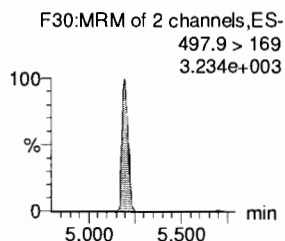
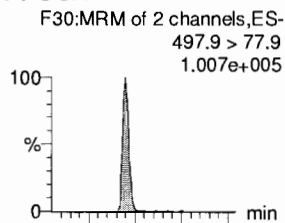
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

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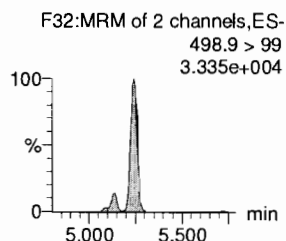
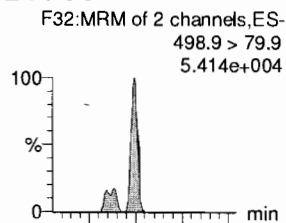
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Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

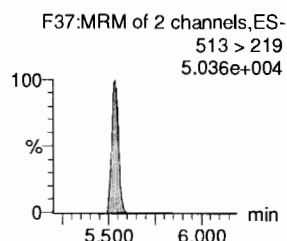
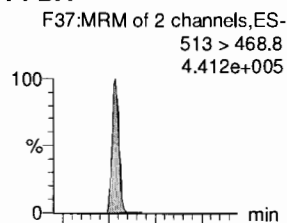
PFOSA



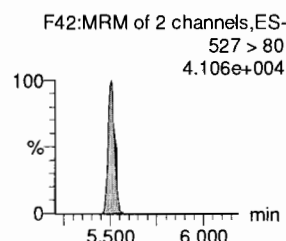
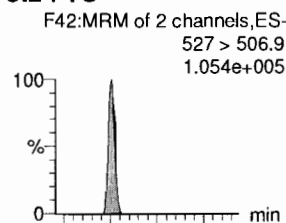
L-PFOS



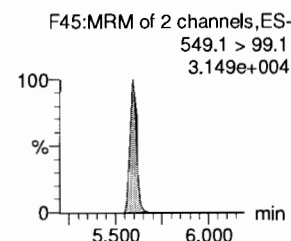
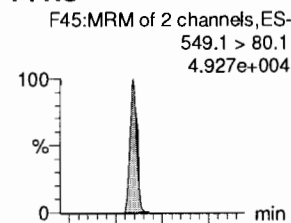
PFDA



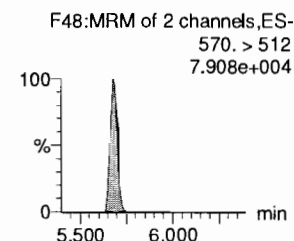
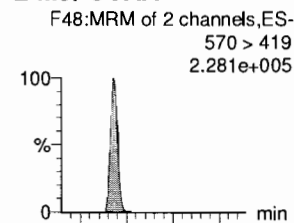
8:2 FTS



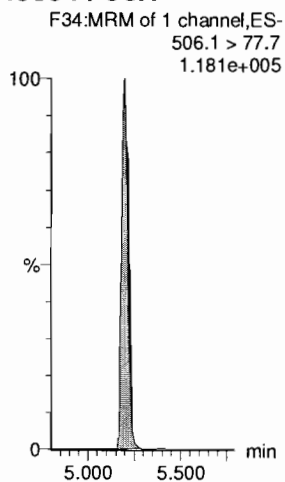
PFNS



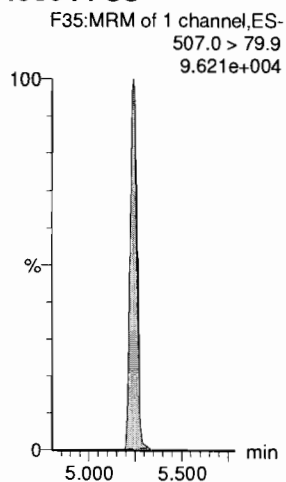
L-MeFOSAA



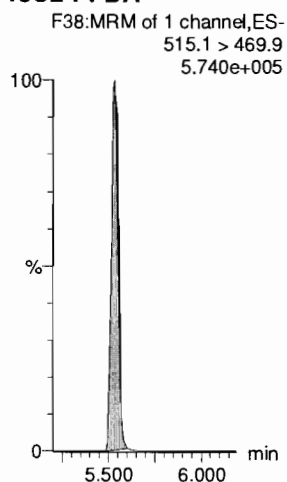
13C8-PFOSA



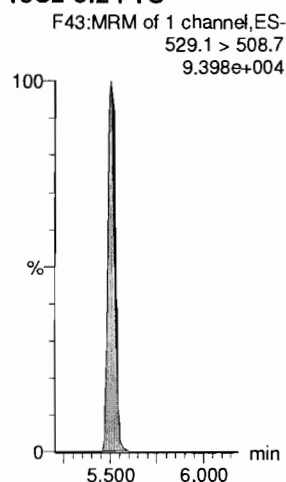
13C8-PFOS



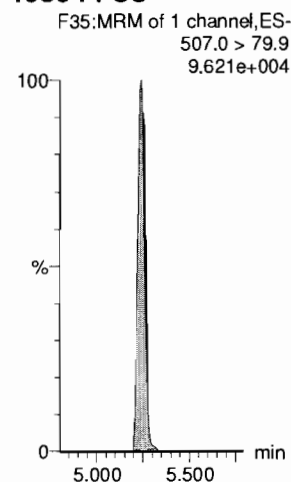
13C2-PFDA



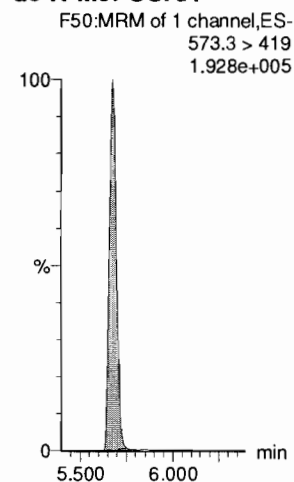
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



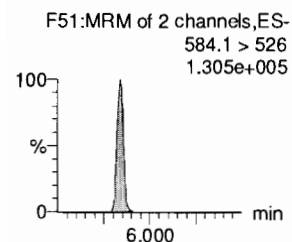
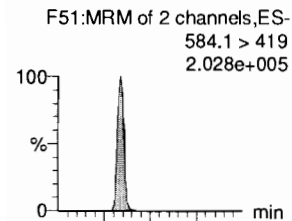
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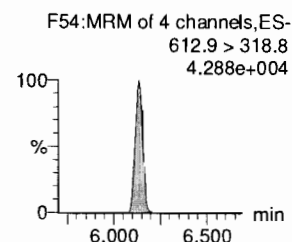
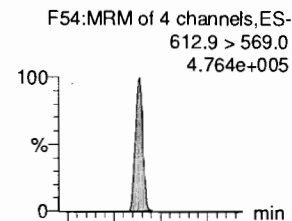
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Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

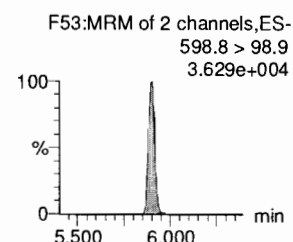
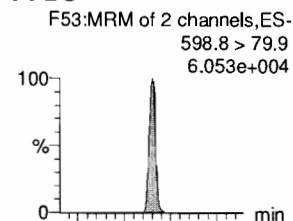
L-EtFOSAA



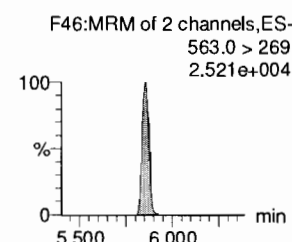
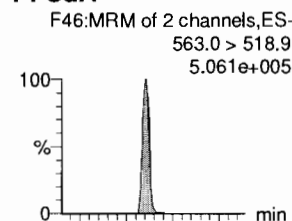
PFDaA



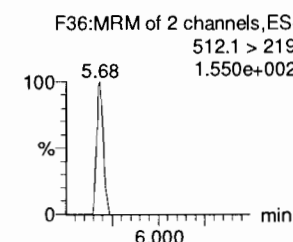
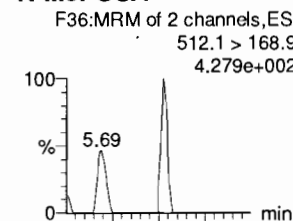
PFDS



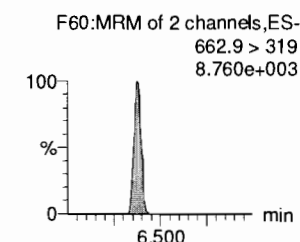
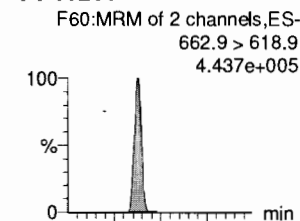
PFUdA



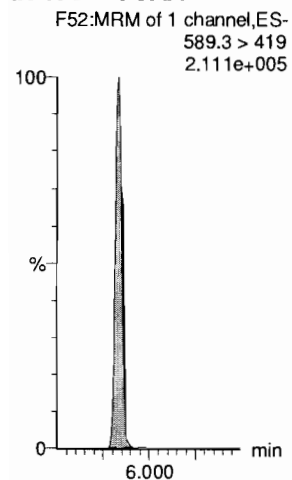
N-MeFOSA



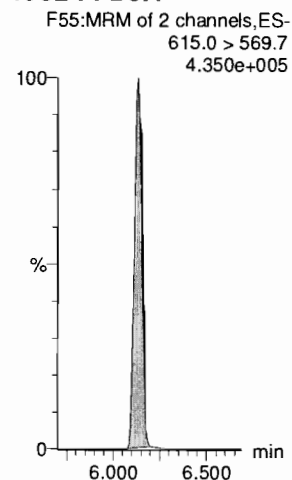
PFTTrDA



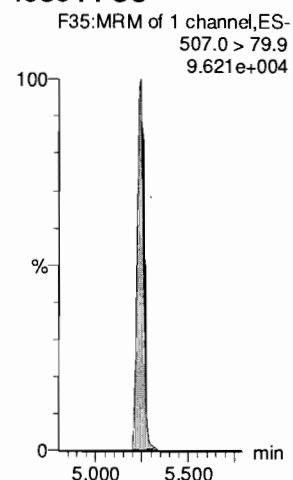
d5-N-EtFOSAA



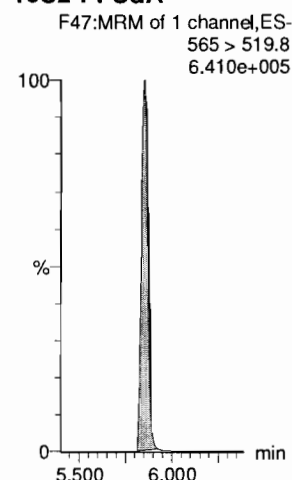
13C2-PFDaA



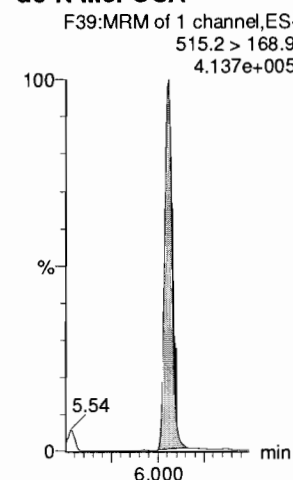
13C8-PFOS



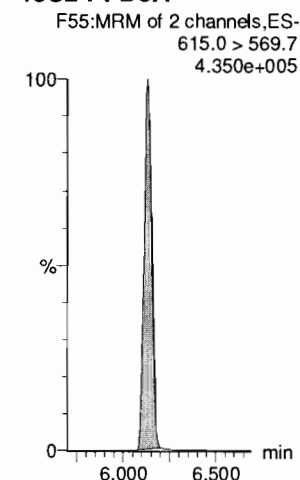
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDaA



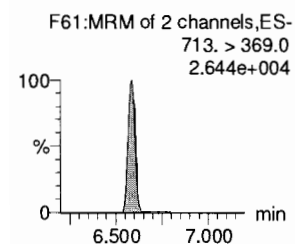
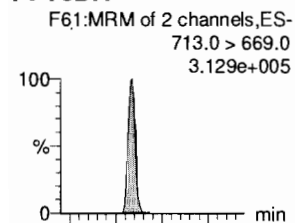
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Last Altered: Monday, December 03, 2018 10:56:51 Pacific Standard Time

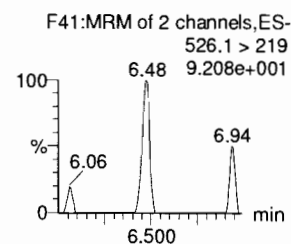
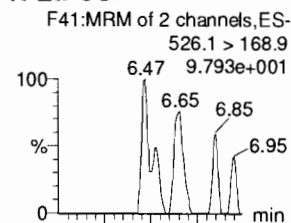
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Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

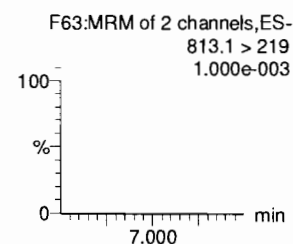
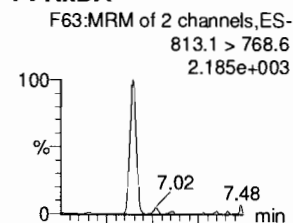
PFTeDA



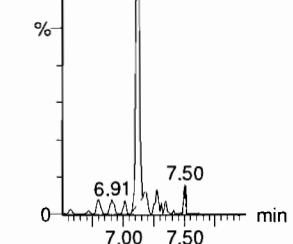
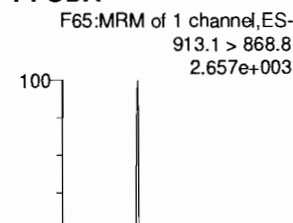
N-EtFOSA



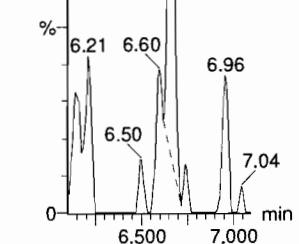
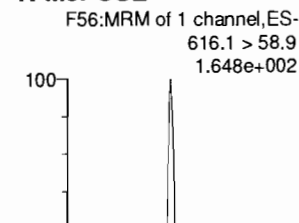
PFHxDA



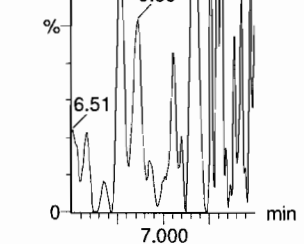
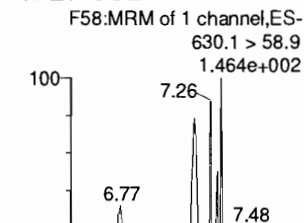
PFODA



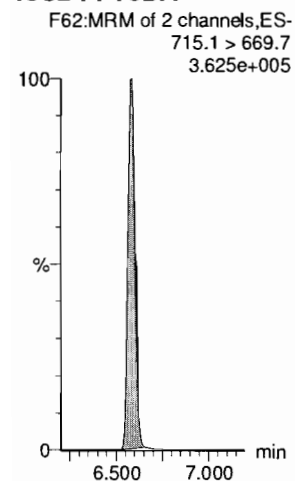
N-MeFOSE



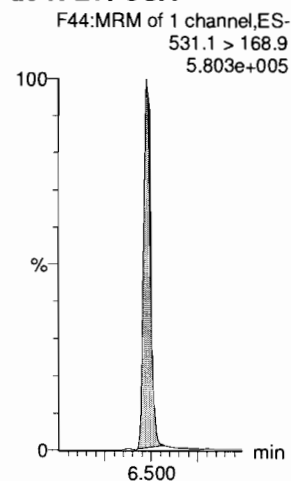
N-EtFOSE



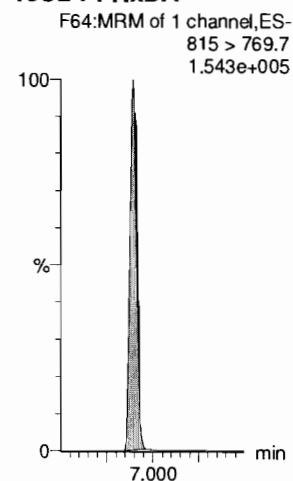
13C2-PFTeDA



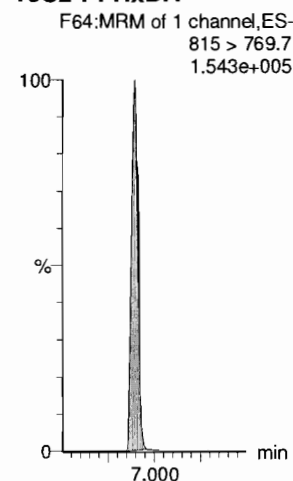
d5-N-ETFOSE



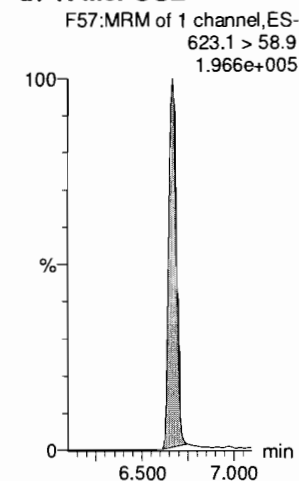
13C2-PFHxDA



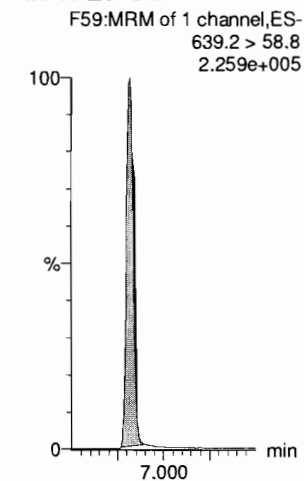
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



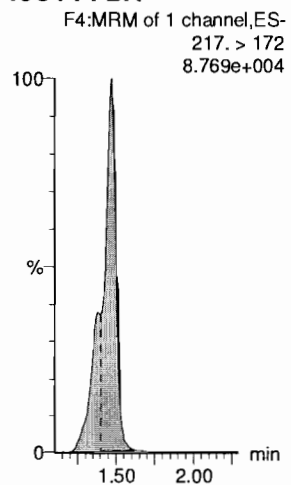
Dataset: F:\Projects\PFAS.PRO\Results\181202M2\181202M2-ICV.qld

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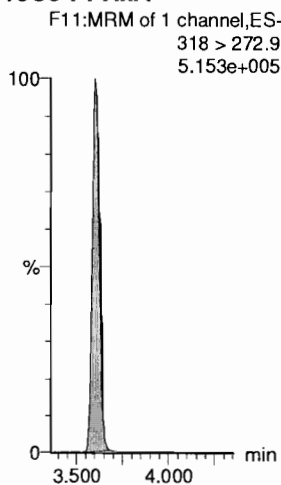
Printed: Monday, December 03, 2018 10:58:27 Pacific Standard Time

Name: 181202M2_13, Date: 02-Dec-2018, Time: 20:31:29, ID: ICV181202M2-1 PFC ICV 18K3011, Description: PFC ICV 18K3011

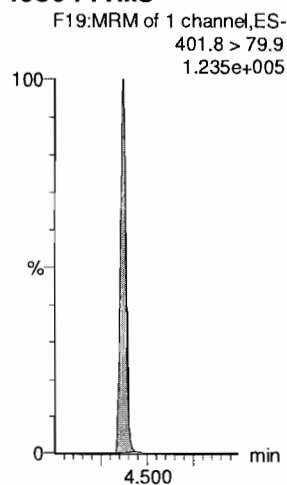
13C4-PFBA



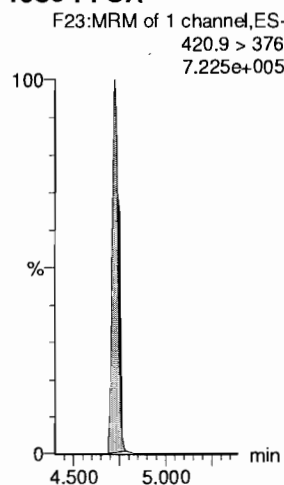
13C5-PFHxA



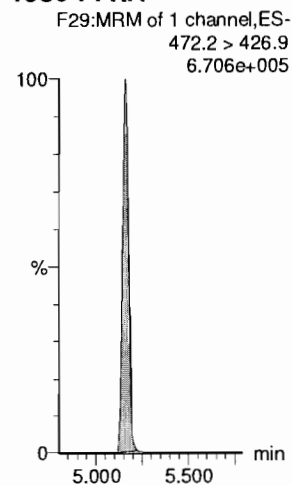
13C3-PFHxS



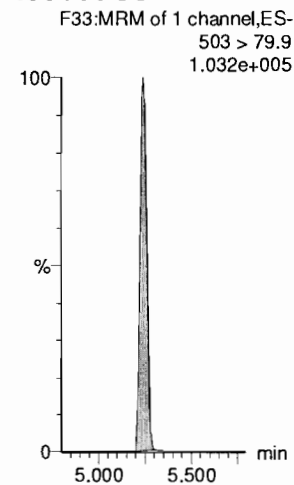
13C8-PFOA



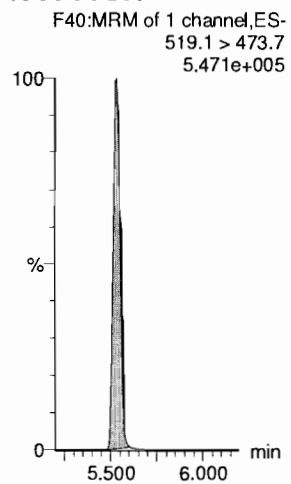
13C9-PFNA



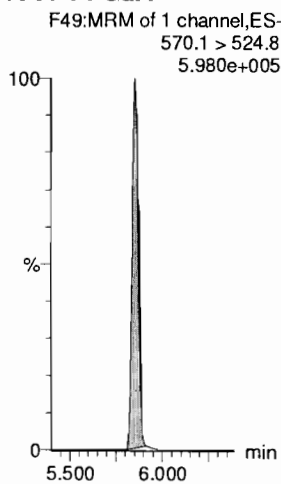
13C4-PFOS



13C6-PFDA



13C7-PFUDA



Dataset: Untitled

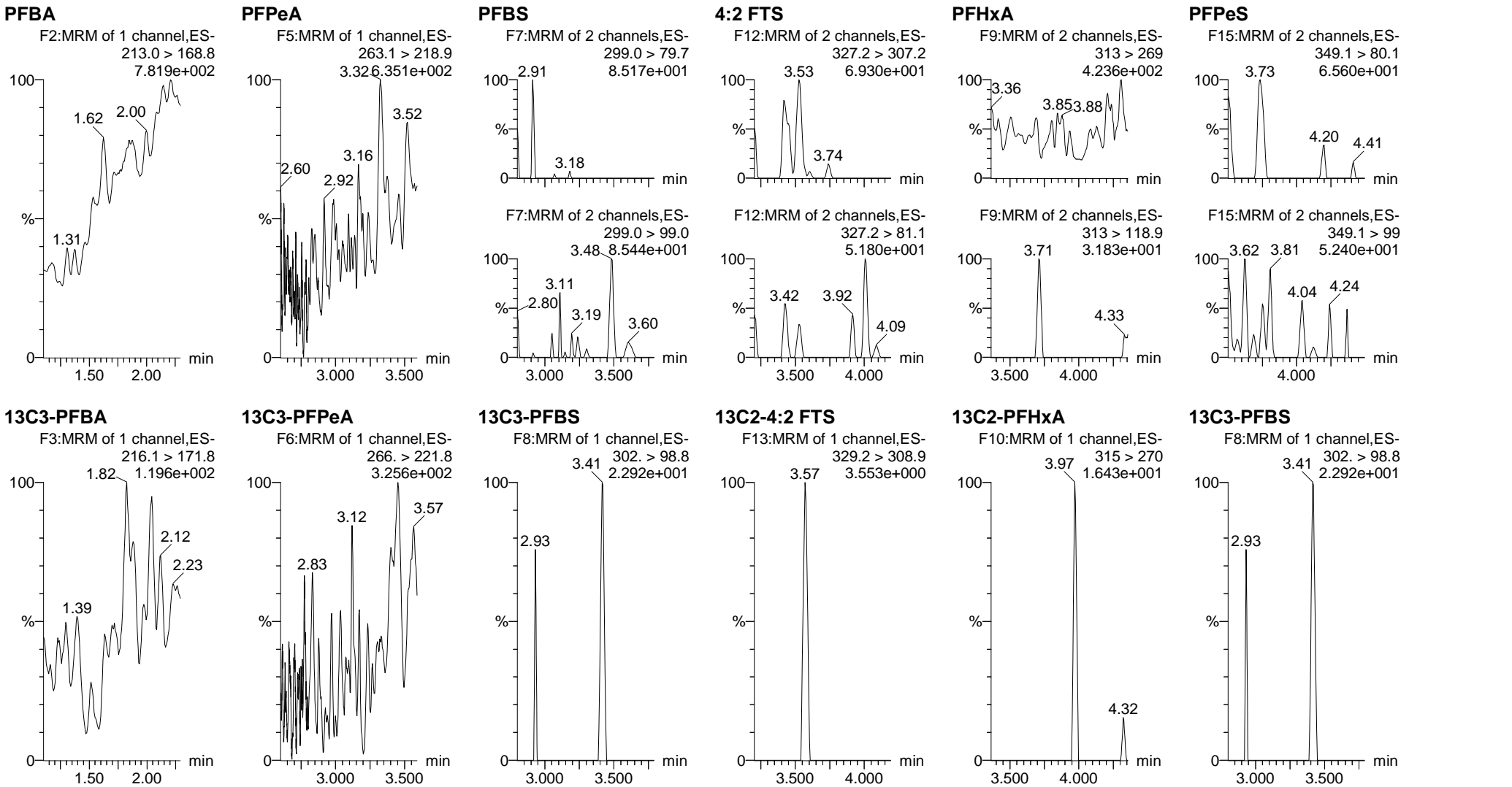
Last Altered: Monday, December 03, 2018 12:05:26 Pacific Standard Time

Printed: Monday, December 03, 2018 12:05:53 Pacific Standard Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_120218.mdb 03 Dec 2018 10:27:08

Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_12-02-18.cdb 03 Dec 2018 10:25:29

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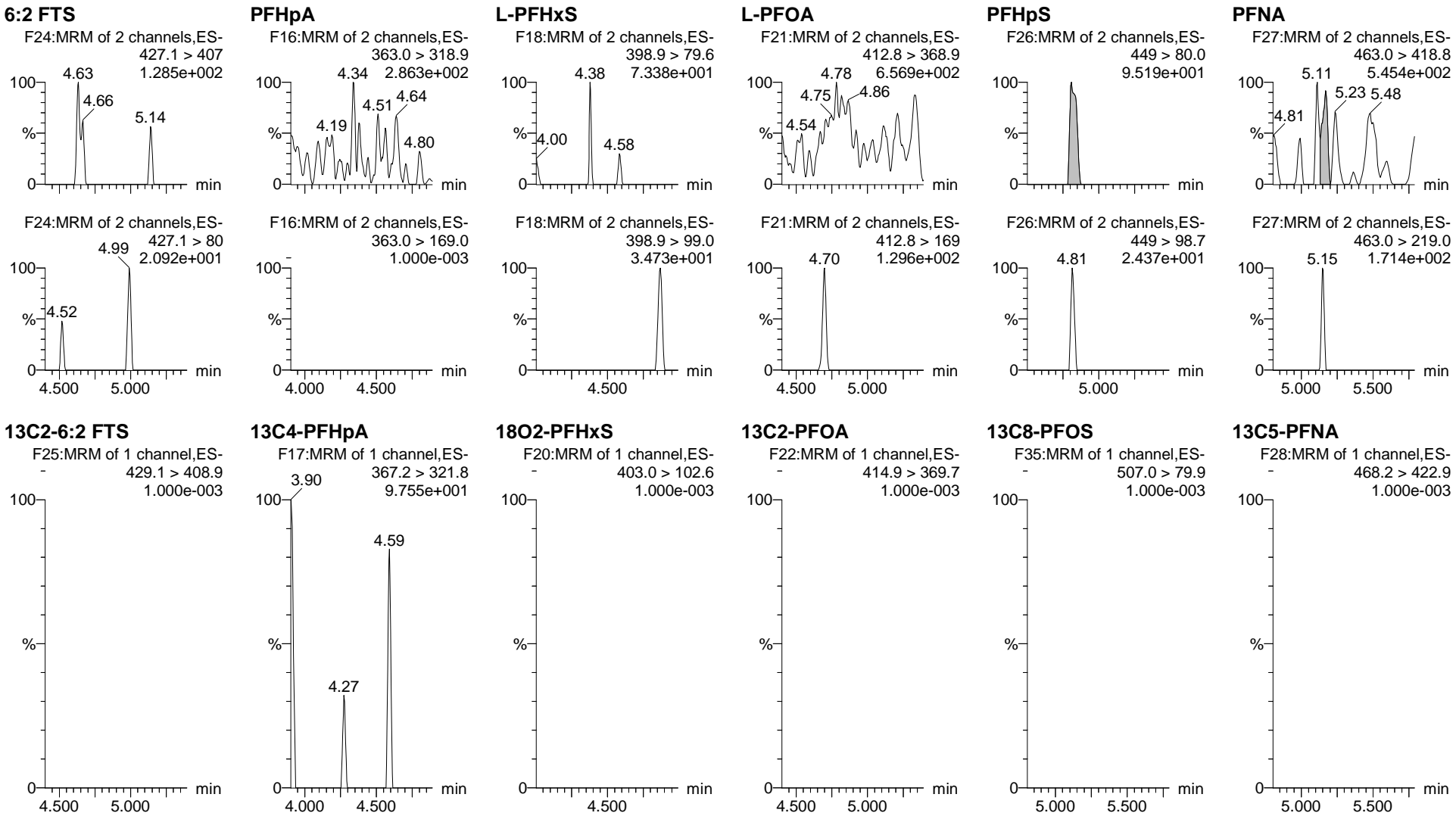
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, December 03, 2018 12:05:26 Pacific Standard Time

Printed: Monday, December 03, 2018 12:05:53 Pacific Standard Time

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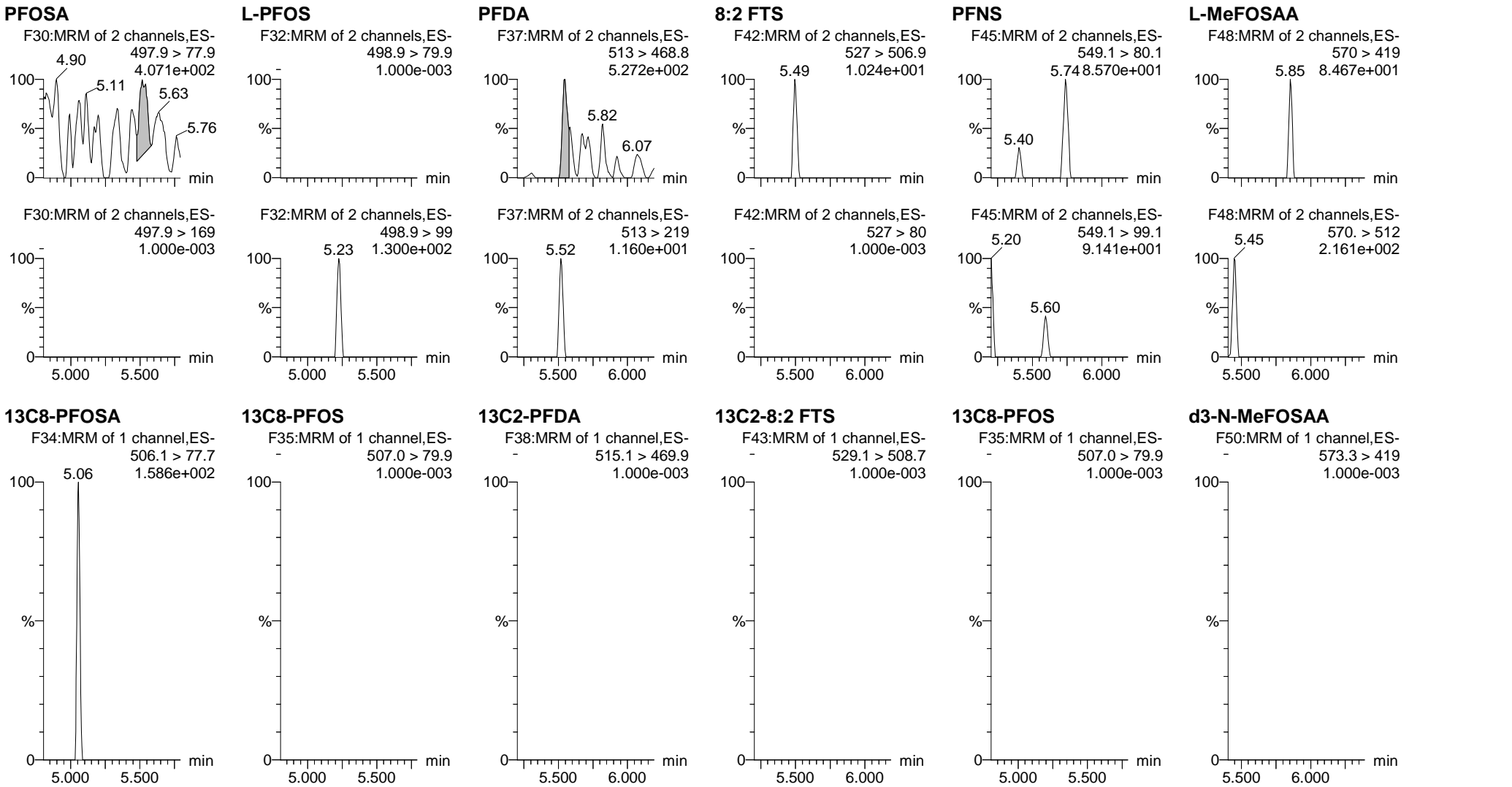


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Last Altered: Monday, December 03, 2018 12:05:26 Pacific Standard Time

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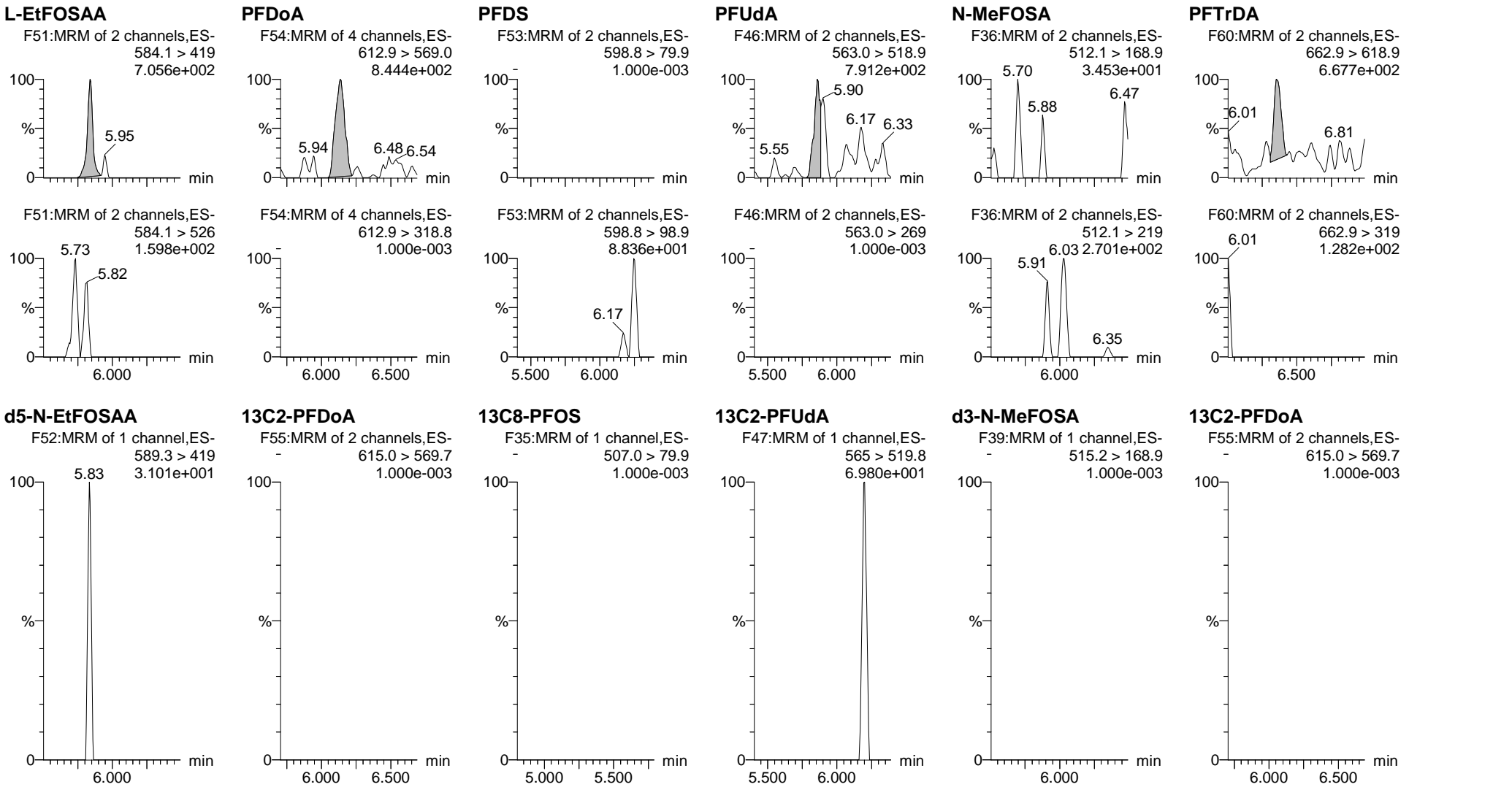
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Dataset: Untitled

Last Altered: Monday, December 03, 2018 12:05:26 Pacific Standard Time
Printed: Monday, December 03, 2018 12:05:53 Pacific Standard Time

Name: 181202M2_12, Date: 02-Dec-2018, Time: 20:20:57, ID: IPA, Description: IPA



Vista Analytical Laboratory

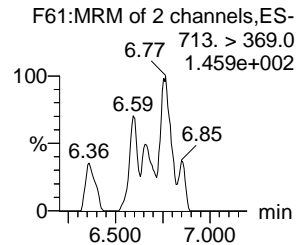
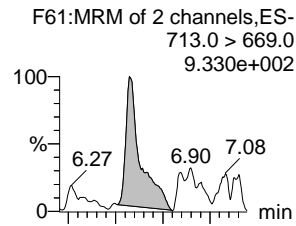
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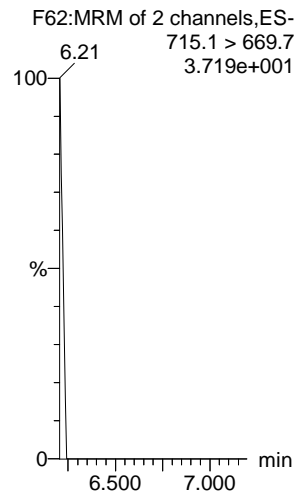
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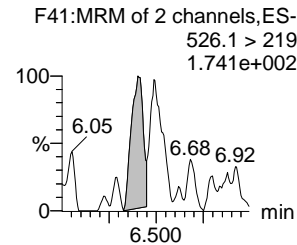
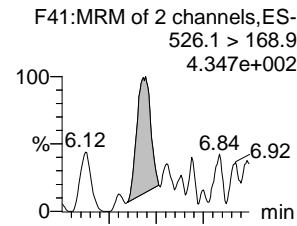
PFTeDA



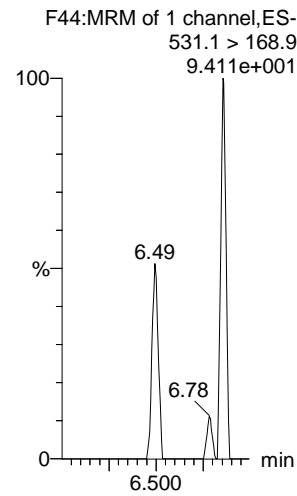
13C2-PFTeDA



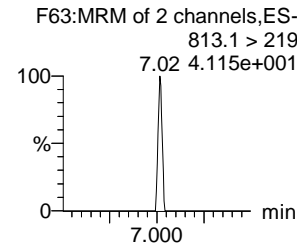
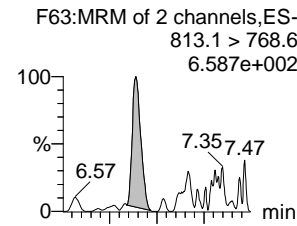
N-EtFOSEA



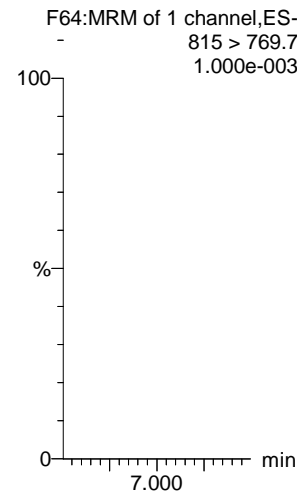
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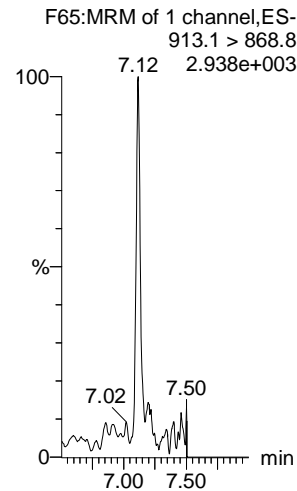
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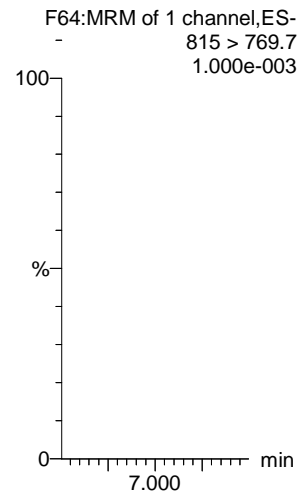
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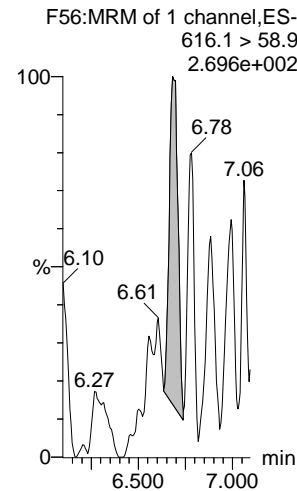
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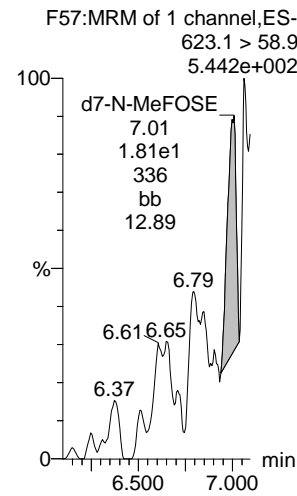
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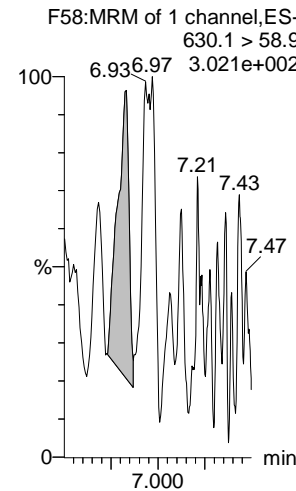
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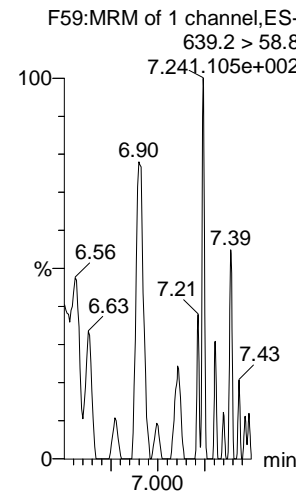
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N-EtFOSEA



d9-N-EtFOSEA



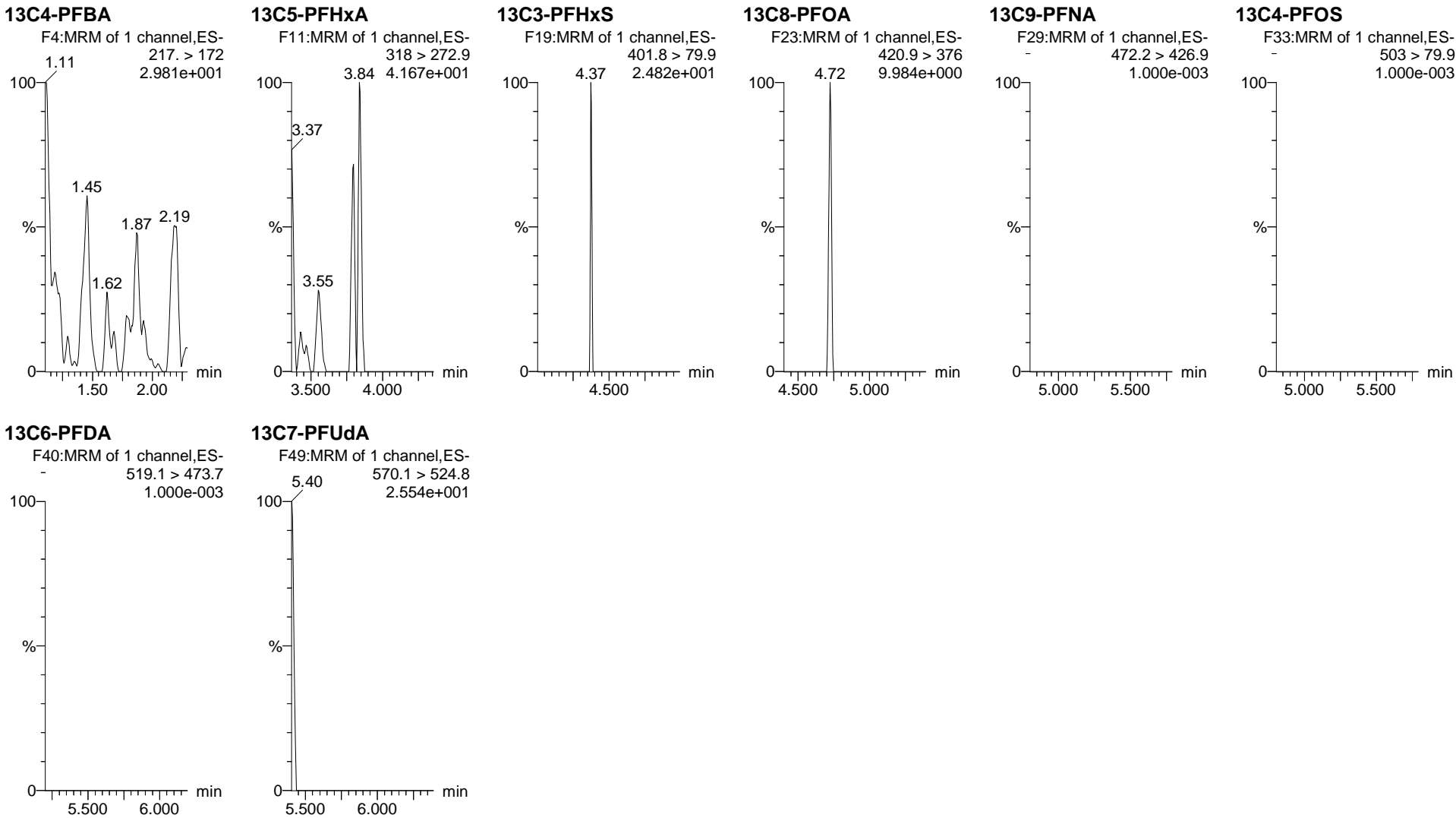
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, December 03, 2018 12:05:26 Pacific Standard Time

Printed: Monday, December 03, 2018 12:05:53 Pacific Standard Time

Name: 181202M2_12, Date: 02-Dec-2018, Time: 20:20:57, ID: IPA, Description: IPA



TUNE CHECKS

TUNE CHECK Q4(m)

Calibration Report - MS1 Static

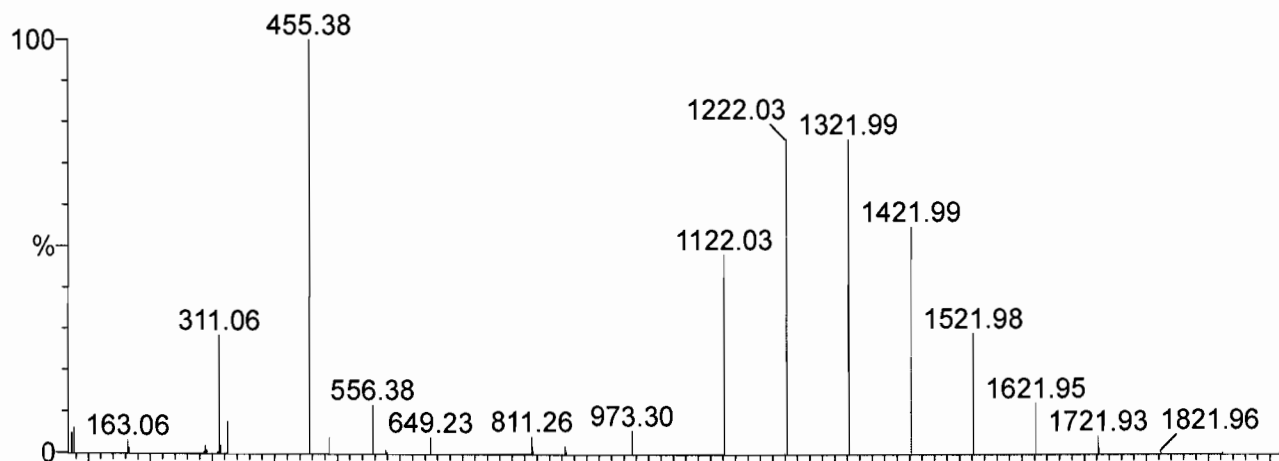
Page 1 of 6

20181203

Printed: Mon Dec 03 13:46:15 2018

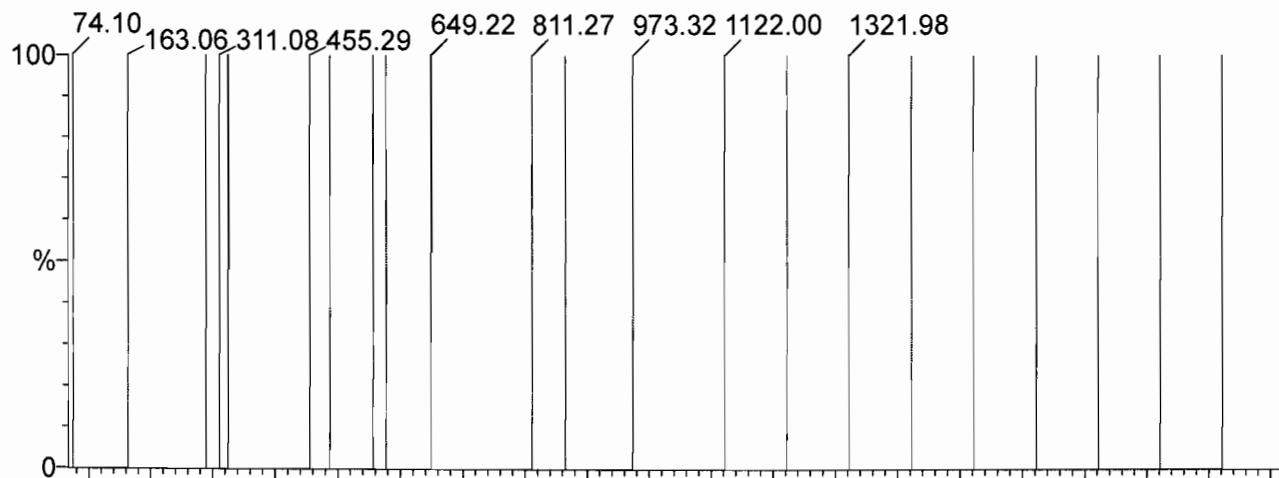
Data file: STATMS1 - Calibrated

22 matches of 23 tested references



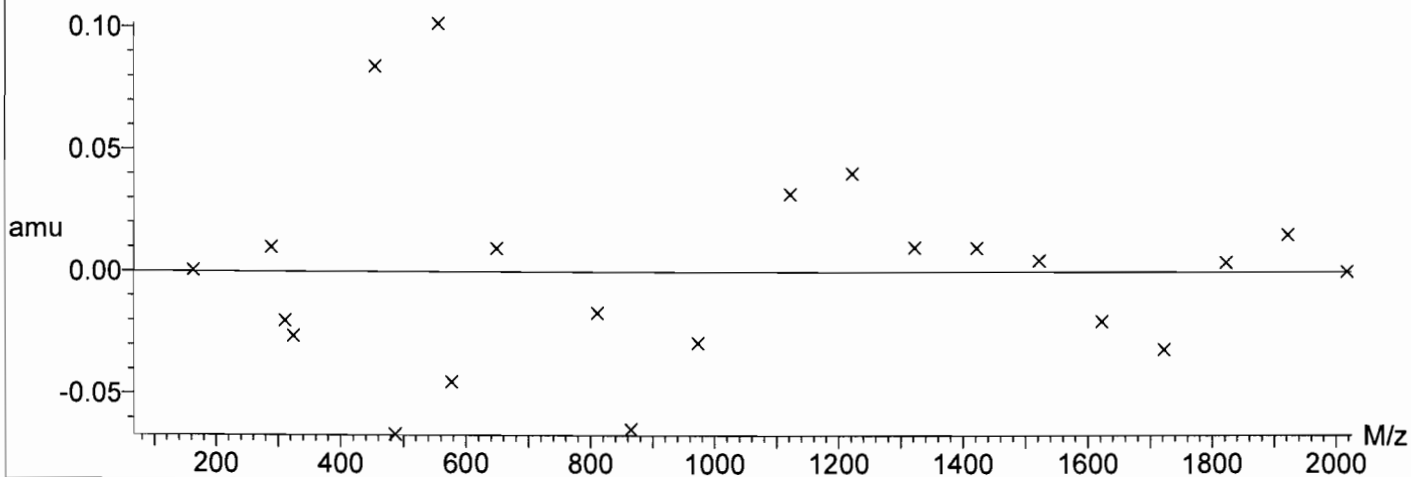
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref

Mean residual = 0.0292 amu



Residual Polynomial order = 4

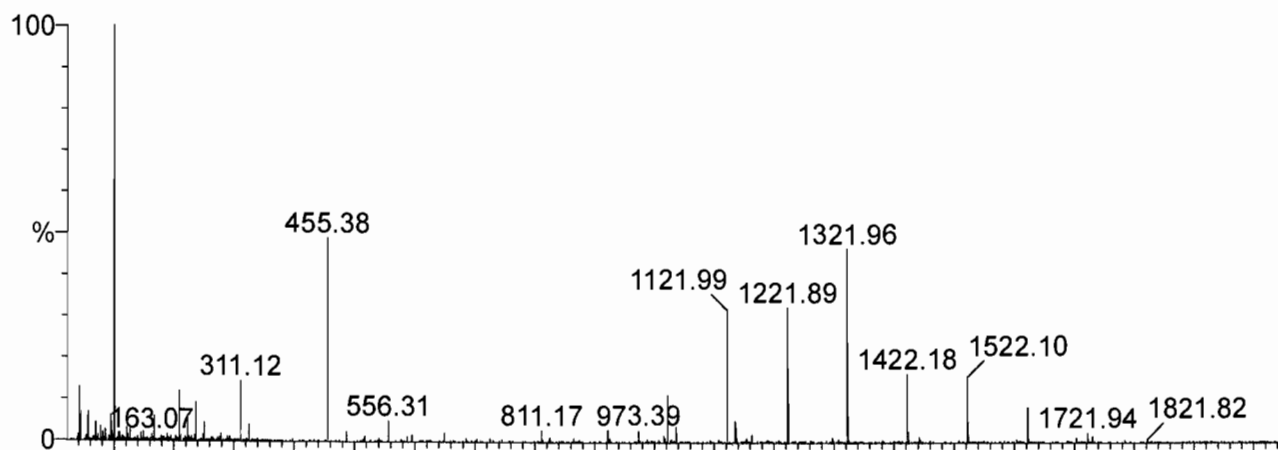
RMS residual = 0.0398 amu



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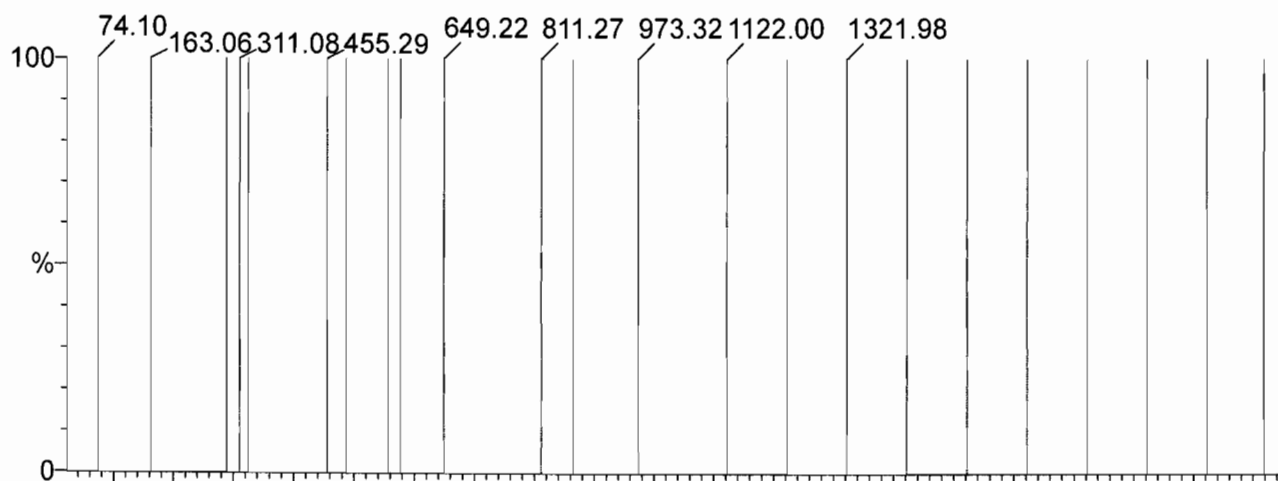
Data file: SCNMS1 - Calibrated

23 matches of 23 tested references



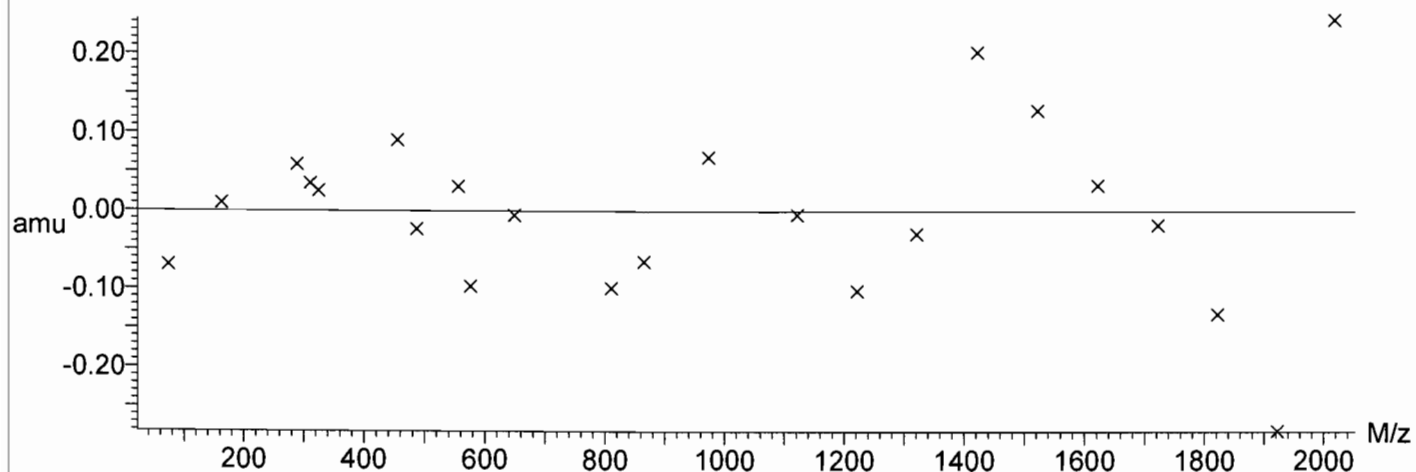
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Mean residual = 0.0806 amu



Residual Polynomial order = 4

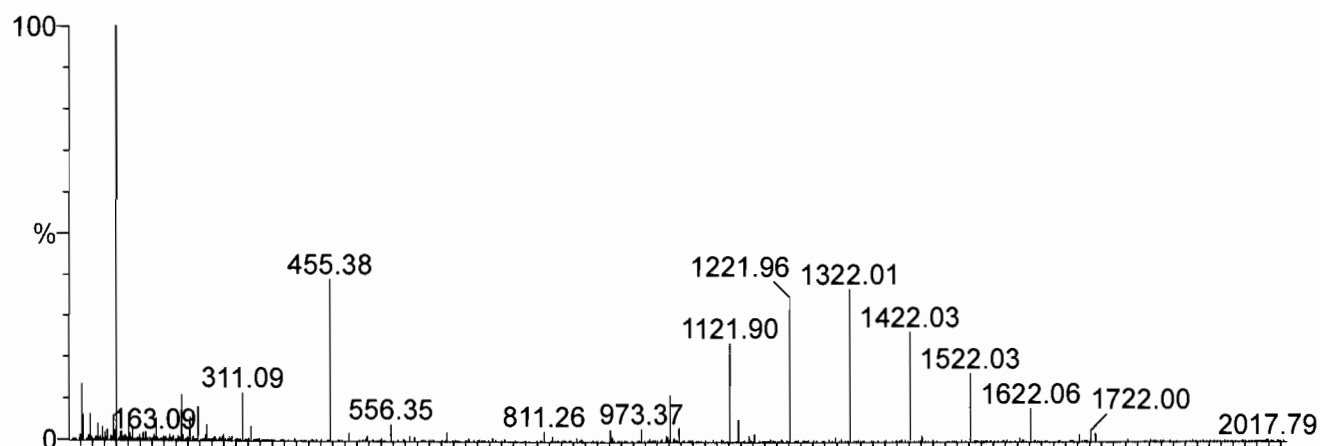
RMS residual = 0.109 amu



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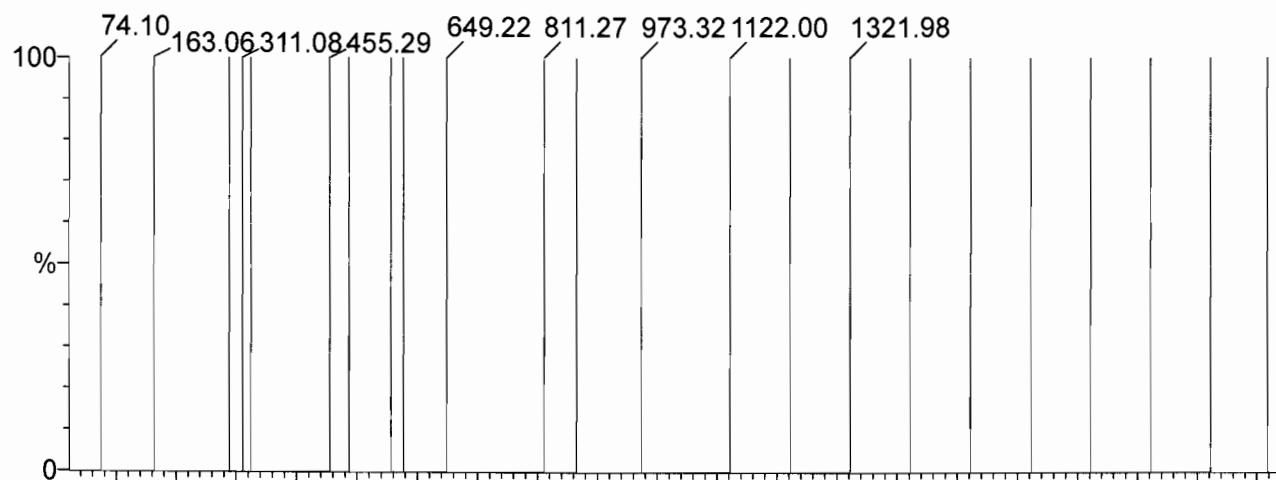
Data file: FASTMS1 - Calibrated

23 matches of 23 tested references



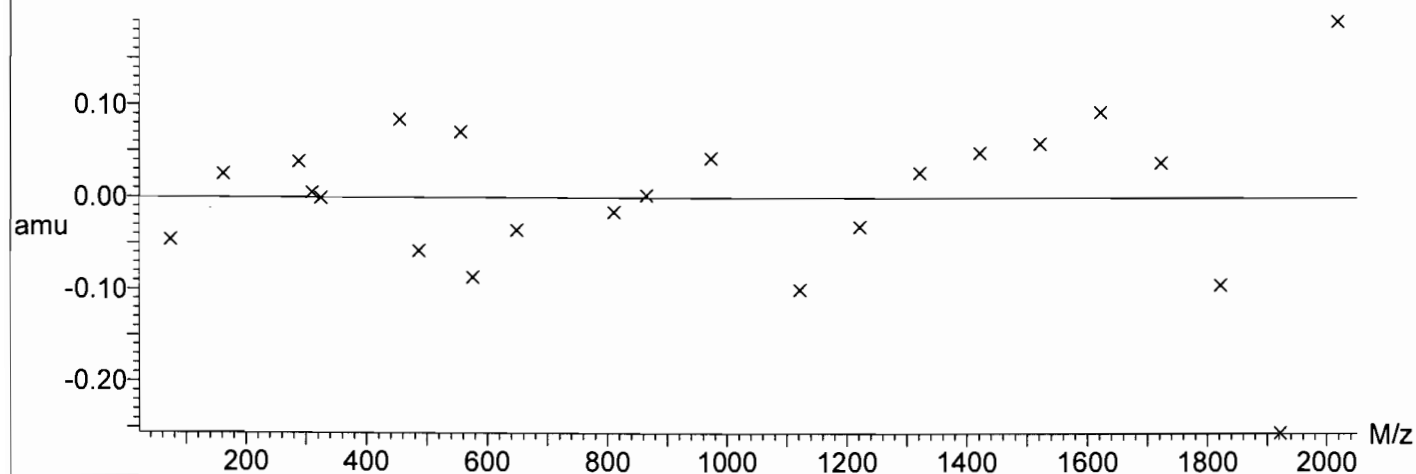
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Mean residual = 0.063 amu



Residual Polynomial order = 4

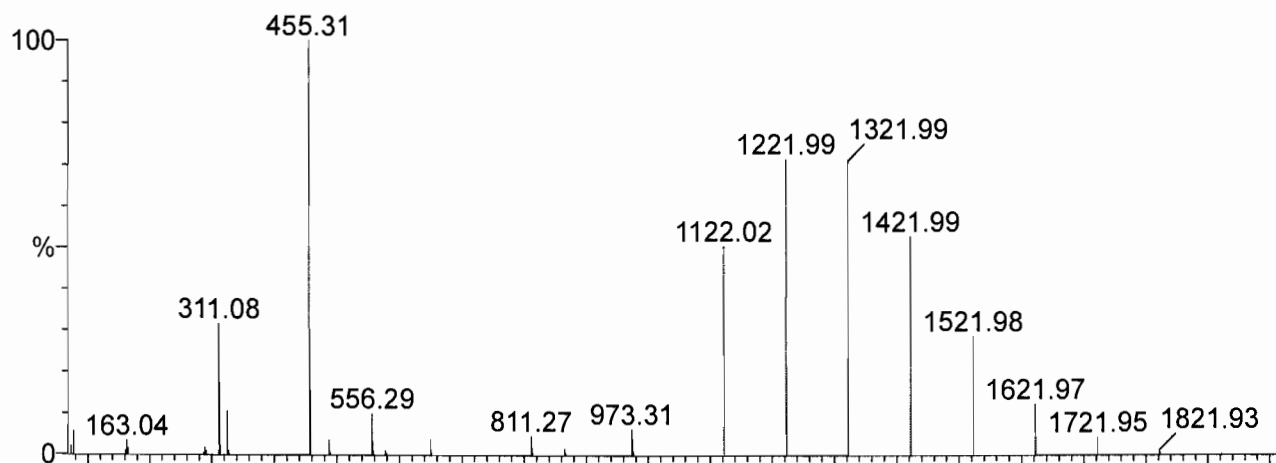
RMS residual = 0.0855 amu



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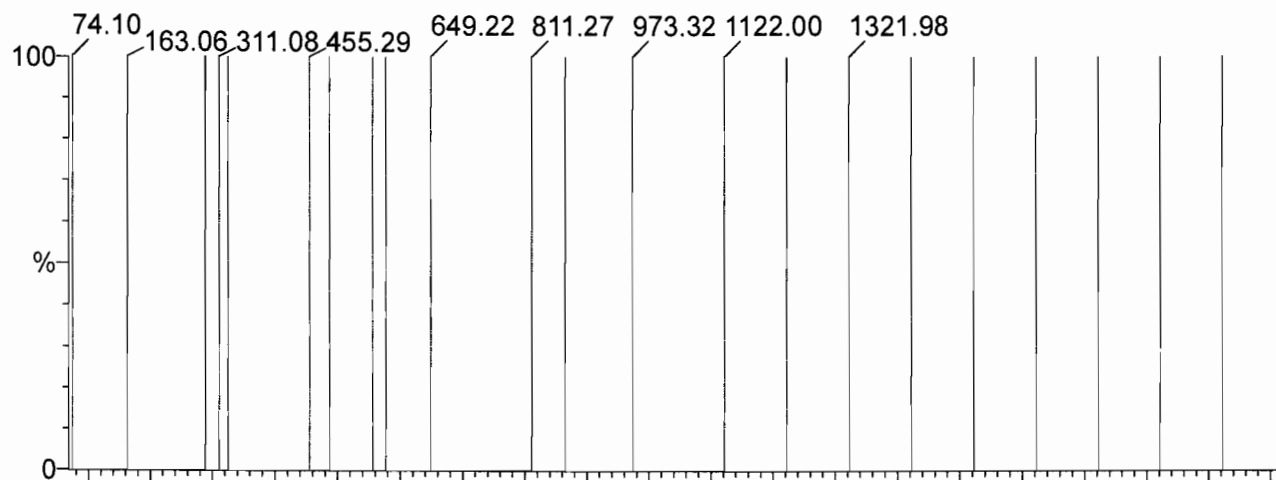
Data file: STATMS2 - Calibrated

22 matches of 23 tested references



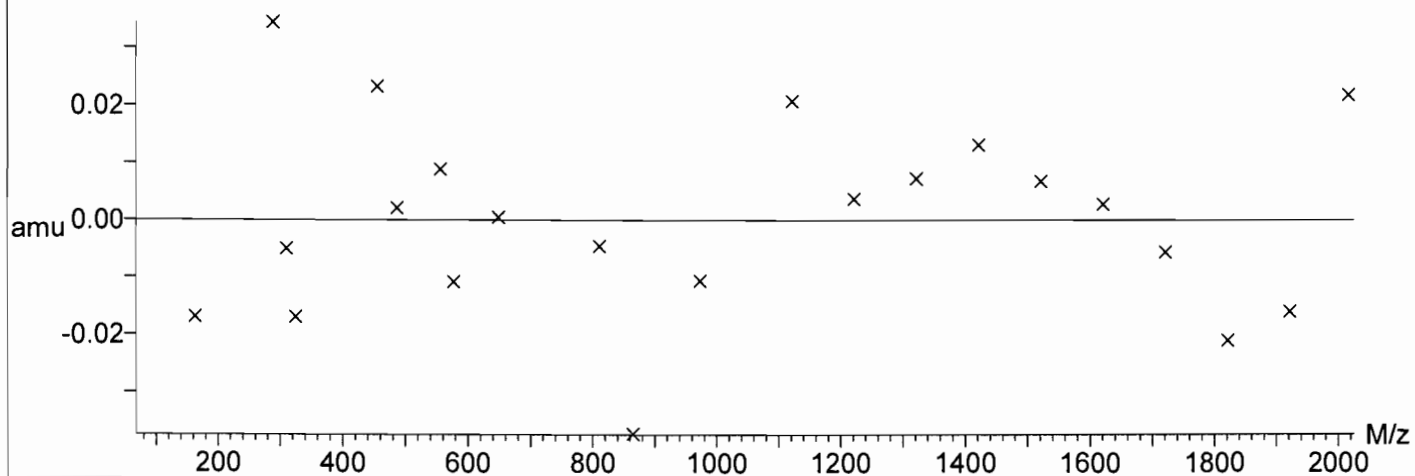
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Mean residual = 0.0132 amu



Residual Polynomial order = 4

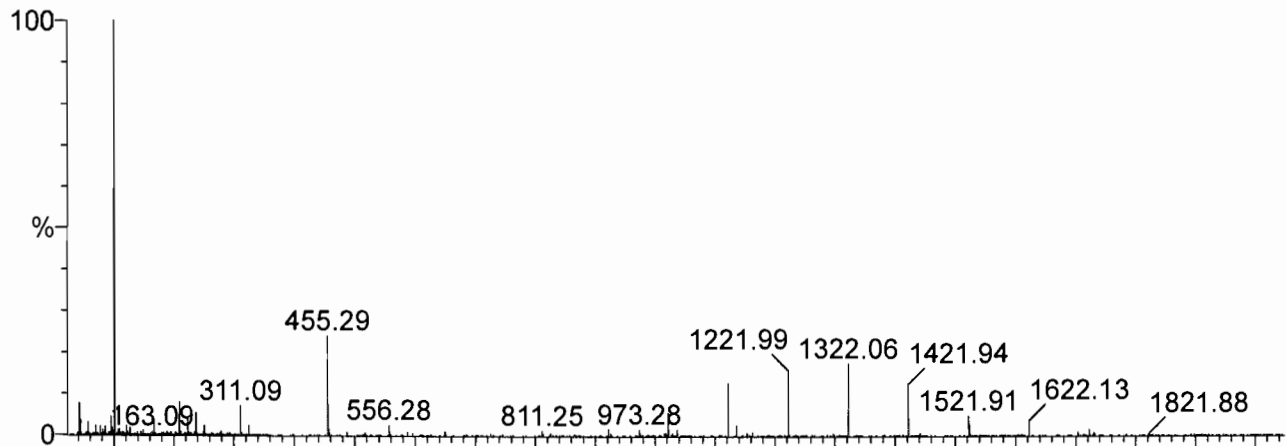
RMS residual = 0.0165 amu



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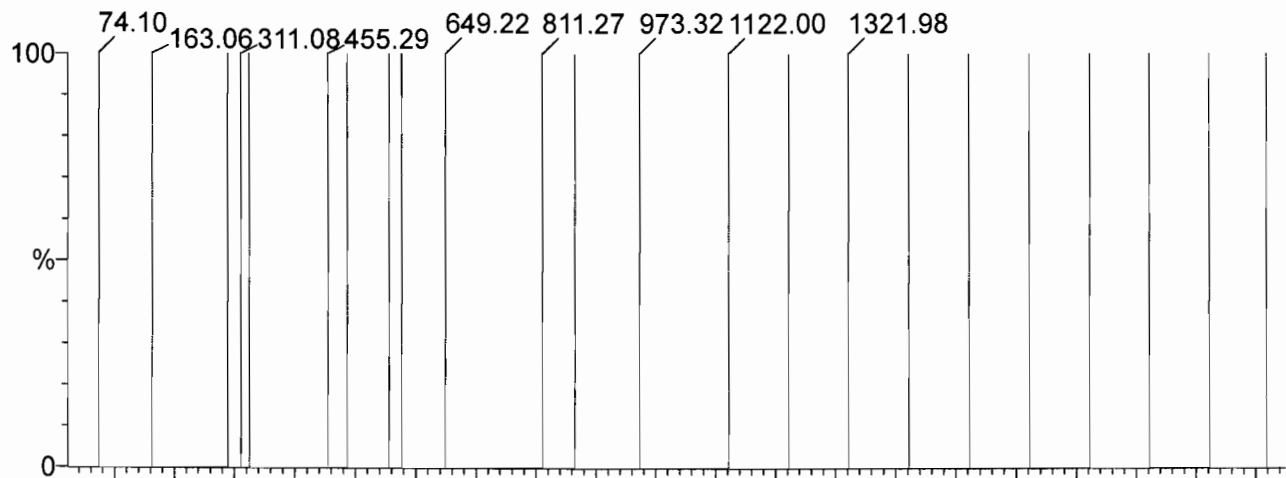
Data file: SCNMS2 - Calibrated

23 matches of 23 tested references



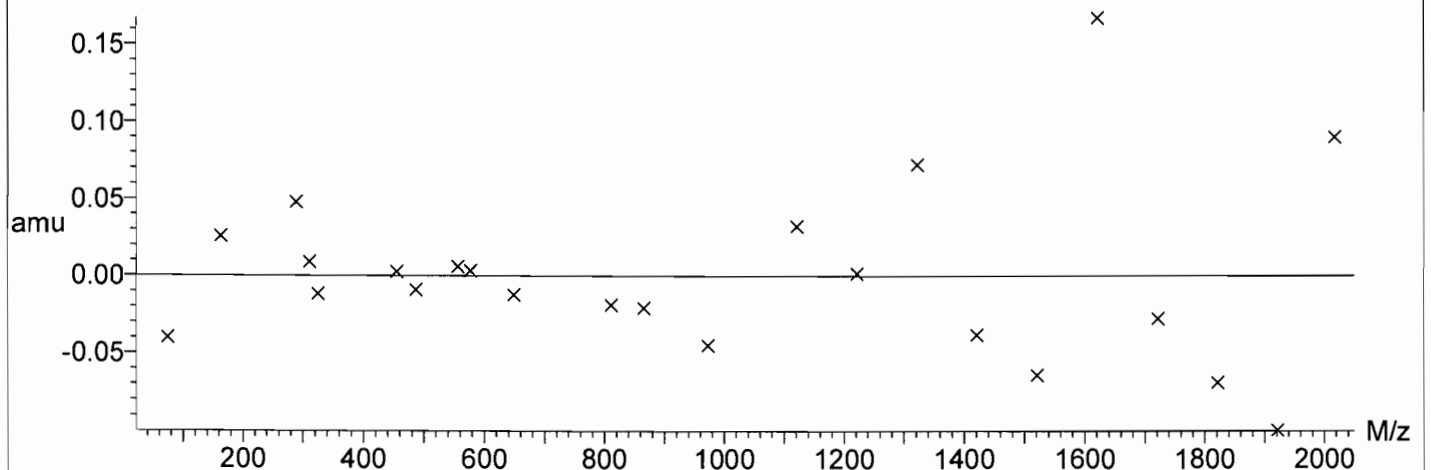
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Mean residual = 0.0397 amu



Residual Polynomial order = 4

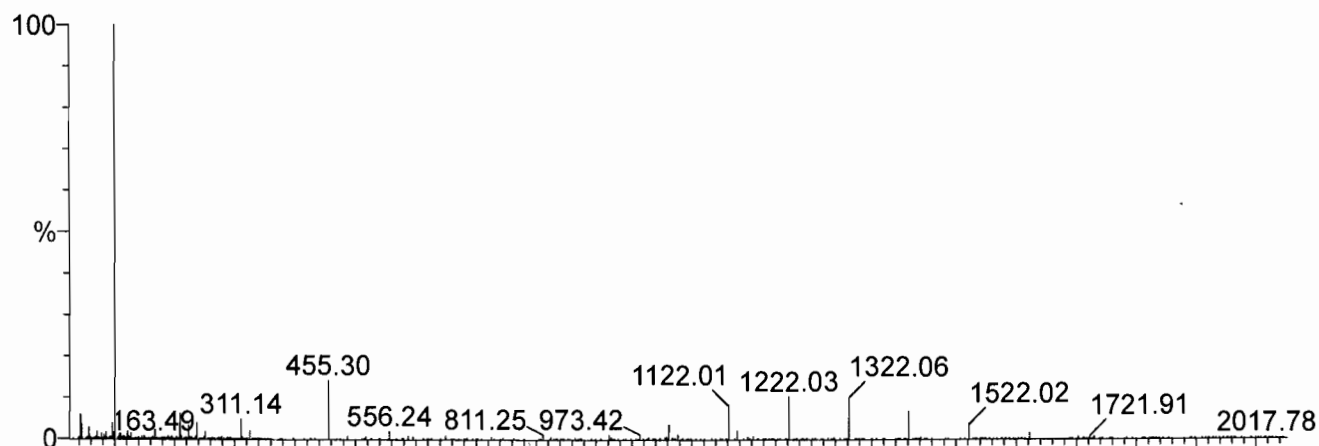
RMS residual = 0.0556 amu



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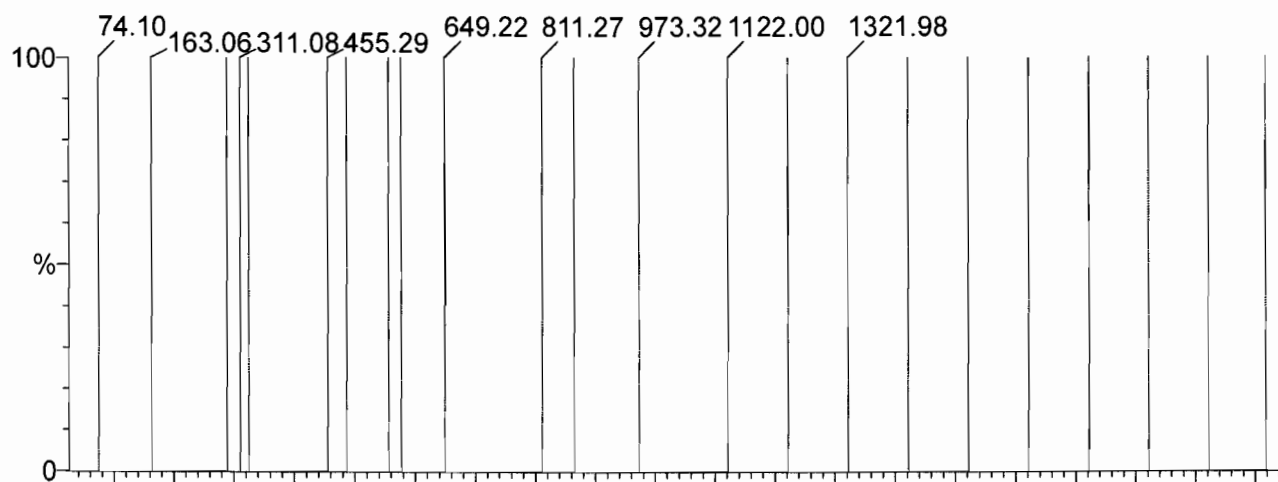
Data file: FASTMS2 - Calibrated

23 matches of 23 tested references



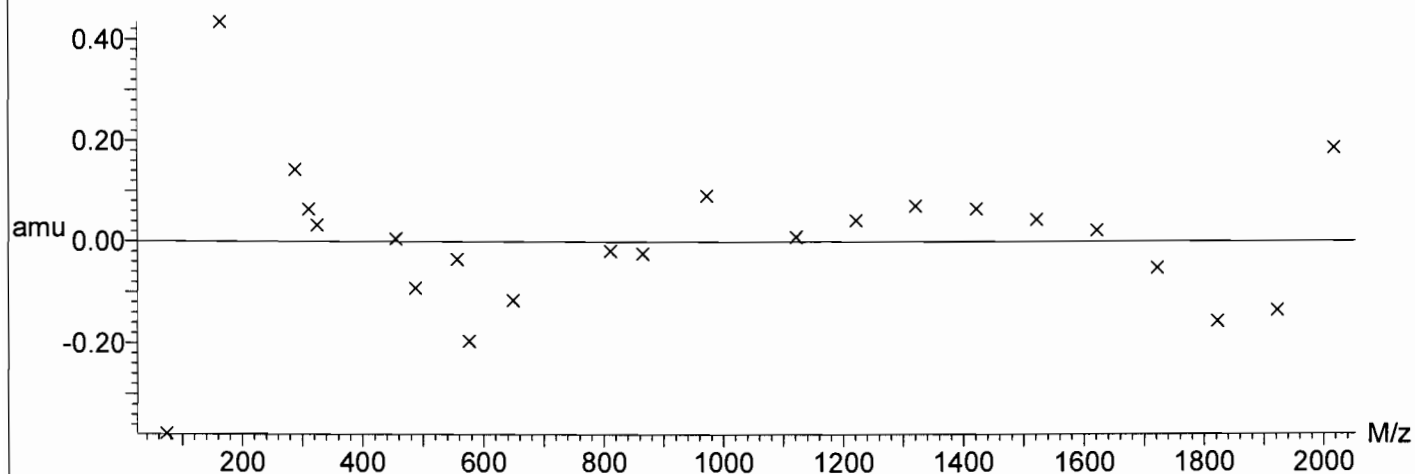
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref

Mean residual = 0.105 amu



Residual Polynomial order = 4

RMS residual = 0.15 amu



STANDARDS

Analytical Standard Record
Vista Analytical Laboratory
18J1502

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18F2208	13C2-4:2 FTS	22-Jun-18	** Vendor **	01-Sep-22	1.07
18F2209	13C2-6:2 FTS	22-Jun-18	** Vendor **	16-Feb-23	1.05
18F2210	13C2-8:2 FTS	22-Jun-18	** Vendor **	24-Jan-23	1.04
18F2211	13C3-PFBA	22-Jun-18	** Vendor **	14-Dec-22	1
18F2212	13C2-PFDA	22-Jun-18	** Vendor **	16-Feb-23	1
18F2213	13C2-PFUDa	22-Jun-18	** Vendor **	22-Nov-21	1
18F2214	13C2-PFTeDA	22-Jun-18	** Vendor **	30-Nov-22	1
18F2215	13C5-PFNA	22-Jun-18	** Vendor **	14-Dec-22	1
18F2216	13C2-PFDoA	22-Jun-18	** Vendor **	16-Feb-23	1
18F2217	13C4-PFHpA	22-Jun-18	** Vendor **	03-May-22	1
18F2218	13C2-PFOA	22-Jun-18	** Vendor **	26-Oct-22	1
18F2219	13C3-PFPeA	22-Jun-18	** Vendor **	20-Mar-22	1
18F2220	13C8-FOSA-I	22-Jun-18	** Vendor **	11-Oct-22	1
18F2221	d3-N-Me-FOSAA	22-Jun-18	** Vendor **	08-Nov-22	1
18F2222	d5-N-EtFOSAA	22-Jun-18	** Vendor **	08-Nov-22	1
18F2223	13C3-PFBS	22-Jun-18	** Vendor **	15-Feb-23	1.076
18F2224	13C8-PFOS	22-Jun-18	** Vendor **	08-Nov-22	1.05
18F2225	18O2-PFHxS	22-Jun-18	** Vendor **	22-Mar-23	1.058
18F2226	13C2-PFHxDA	22-Jun-18	** Vendor **	13-Jul-22	0.4
18F2227	13C2-PFHxA	22-Jun-18	** Vendor **	27-Oct-22	0.4

Description:	PFC - IS	Expires:	15-Oct-20
Standard Type:	Reagent	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 08:57 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****18J1502**

Description:	PFC - IS	Expires:	15-Oct-20
Standard Type:	Reagent	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 08:57 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

18F2103

18F2208

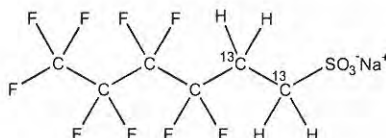


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-4:2FTS **LOT NUMBER:** M242FTS0817
COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-¹³C₂]hexane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₄H₄F₉SO₃Na **MOLECULAR WEIGHT:** 352.12
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
 46.7 ± 2.3 µg/ml (M2-4:2FTS anion)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 09/01/2017 (1,2-¹³C₂)
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 ³⁴S (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: 
 B.G. Chittim, General Manager

Date: 09/29/2017
 (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

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

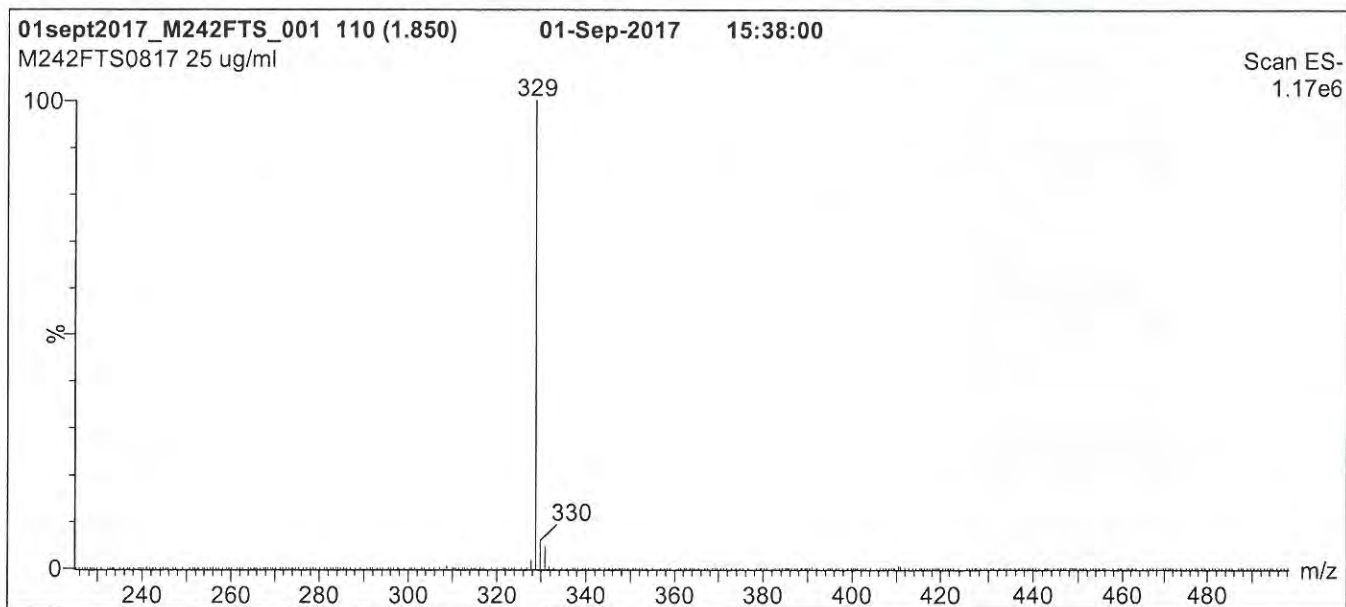
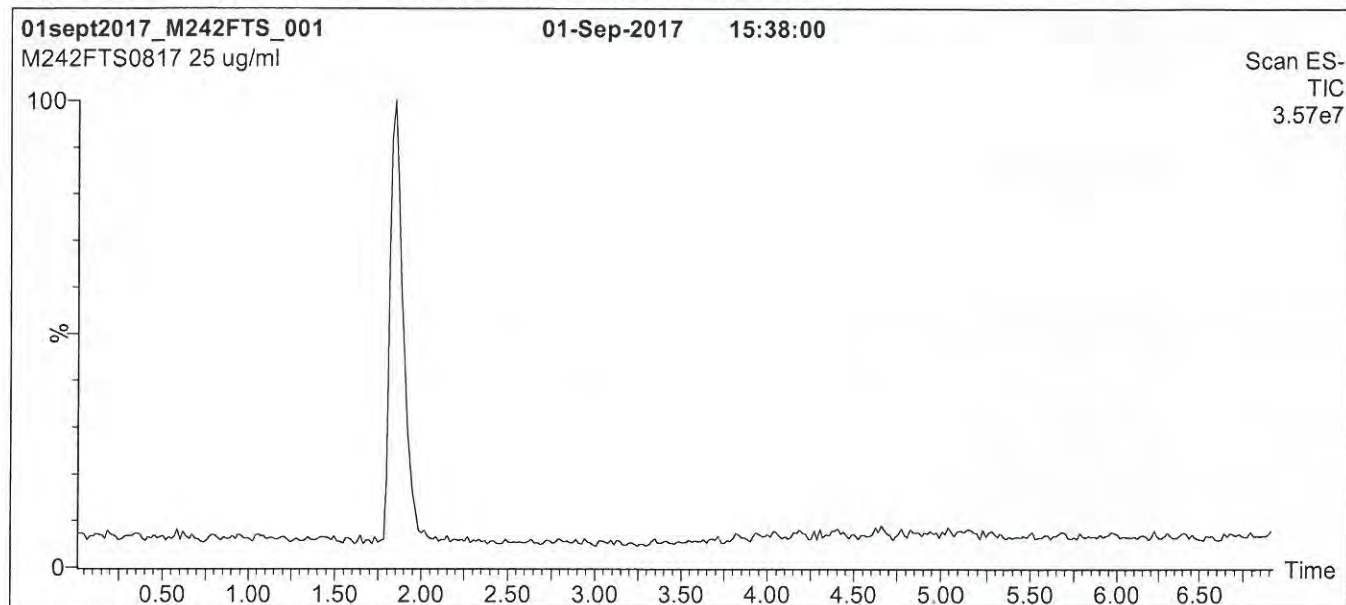
QUALITY MANAGEMENT:

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).



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

18F2208

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

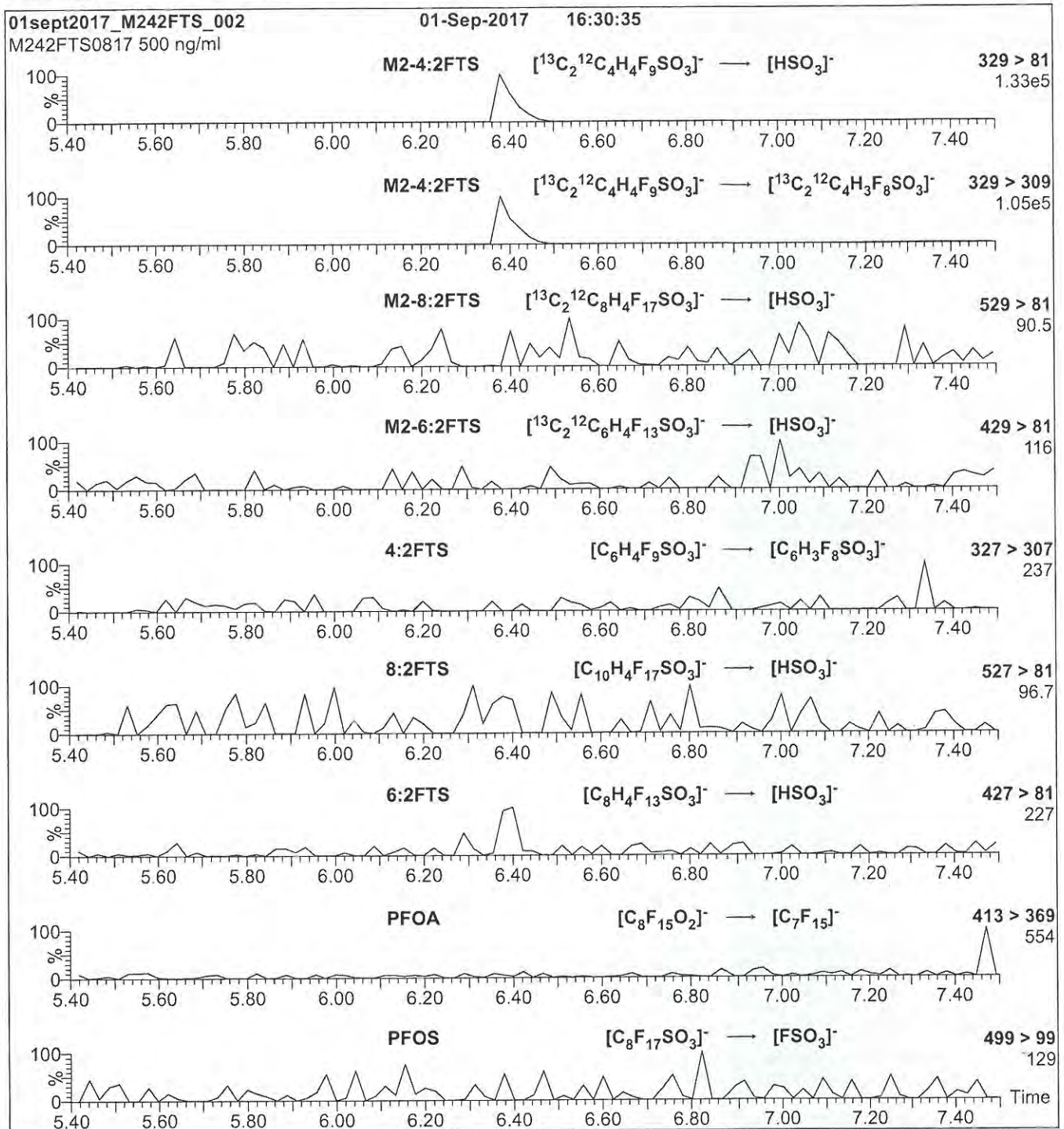
Flow: 300 μ l/min

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

18F2208

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 25

18F2104

18F2209

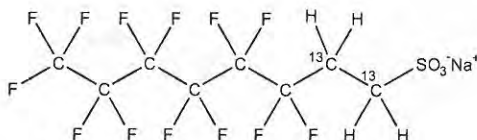


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0218
COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-¹³C₂]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₆H₄F₁₃SO₃Na **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% ¹³C
LAST TESTED: (mm/dd/yyyy) 02/16/2018 (1,2-¹³C₂)
EXPIRY DATE: (mm/dd/yyyy) 02/16/2023
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 6:2FTS contains 4.22% of ³⁴S (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, General Manager

Date: 03/07/2018
 (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

18F2209

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

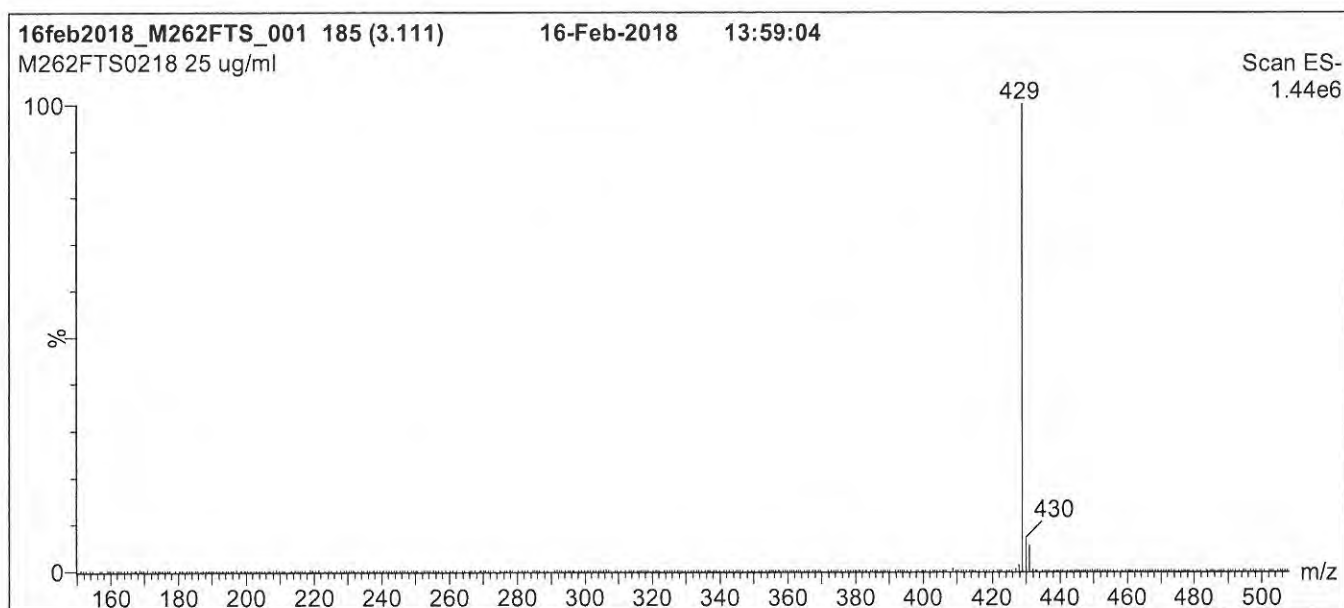
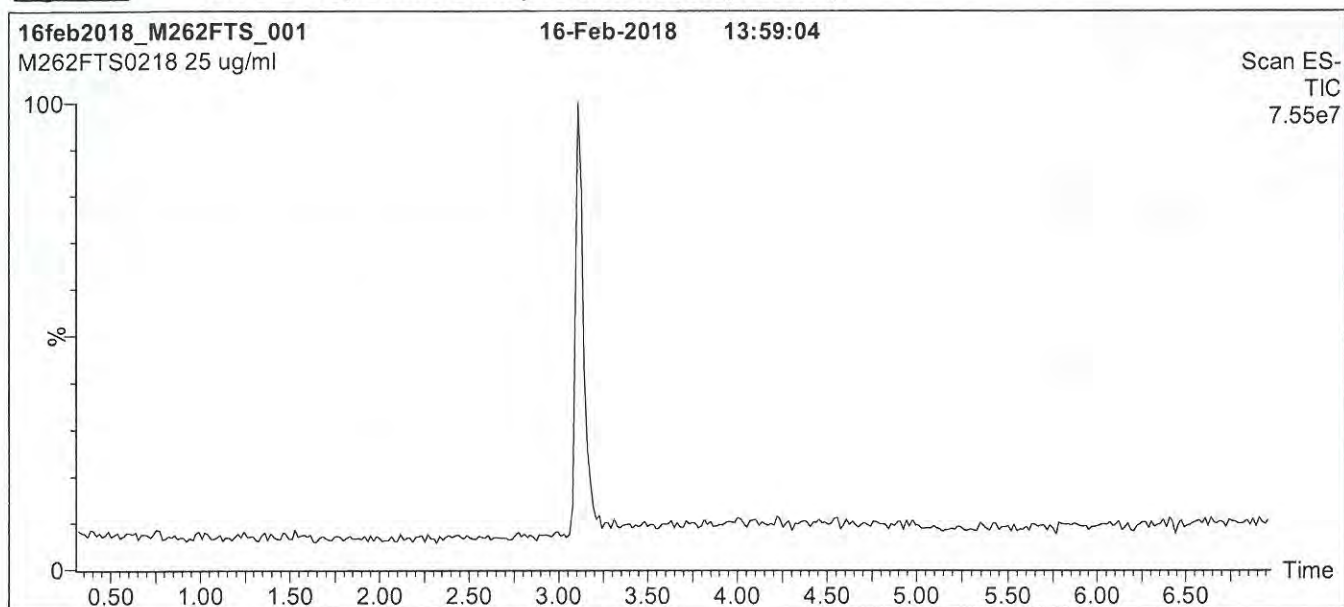
QUALITY MANAGEMENT:

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).



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

18F2209

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

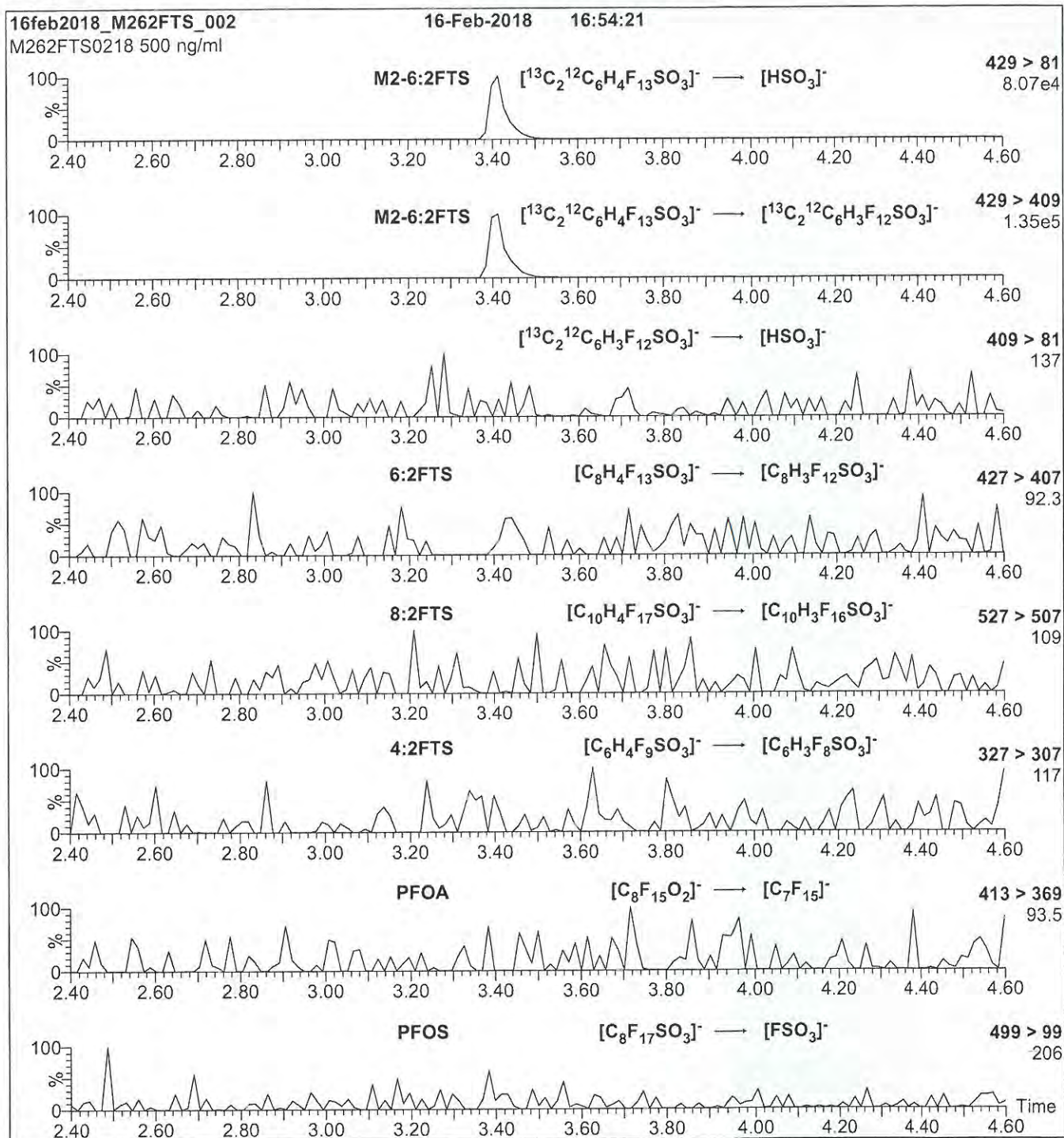
Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7 min and hold for 2 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

Flow: 300 μ l/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

18F2209

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

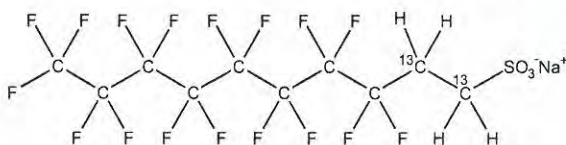
18F2210



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0118
COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-¹³C₂]decane sulfonate
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₈H₄F₁₇SO₃Na **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% ¹³C
LAST TESTED: (mm/dd/yyyy) 01/24/2018 (1,2-¹³C₂)
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 ³⁴S (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: 
 B.G. Chittim, General Manager

Date: 01/26/2018
 (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

18F2210

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:

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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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

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LIMITED WARRANTY:

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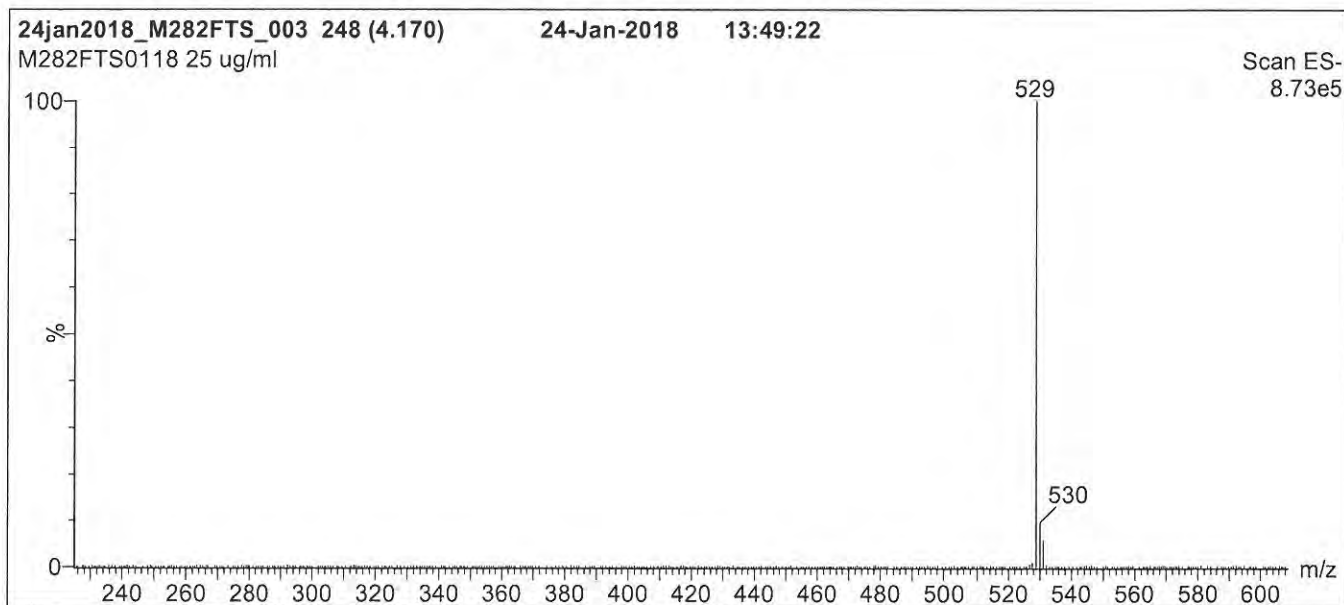
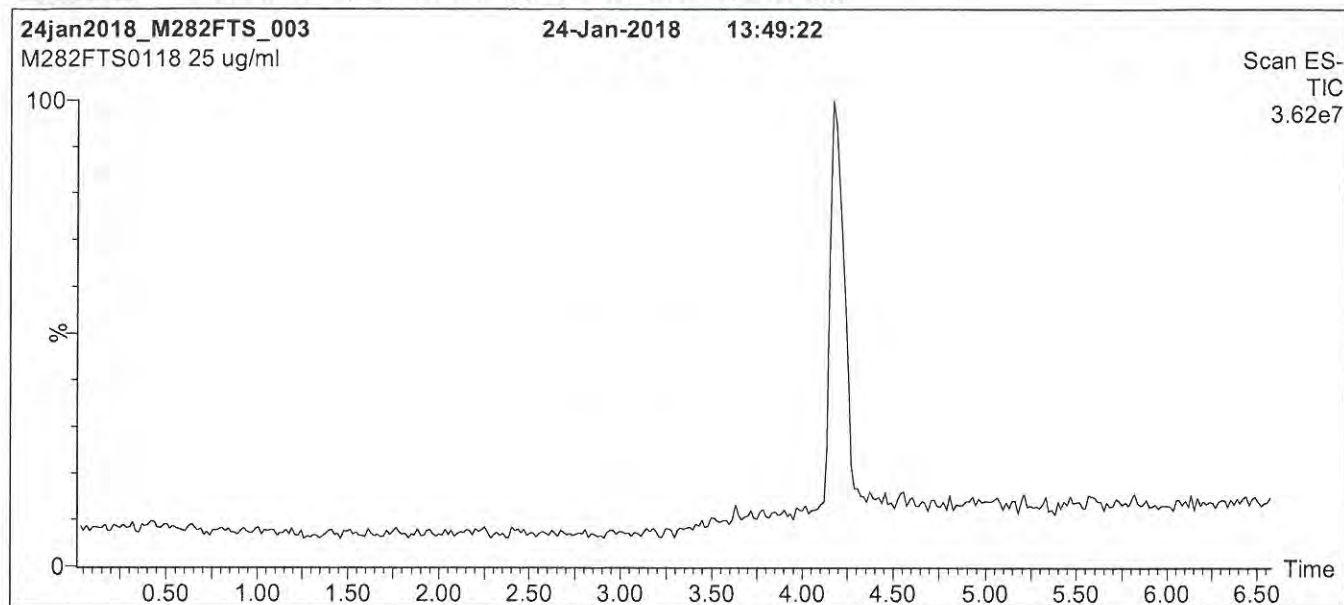
QUALITY MANAGEMENT:

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 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18F2210

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

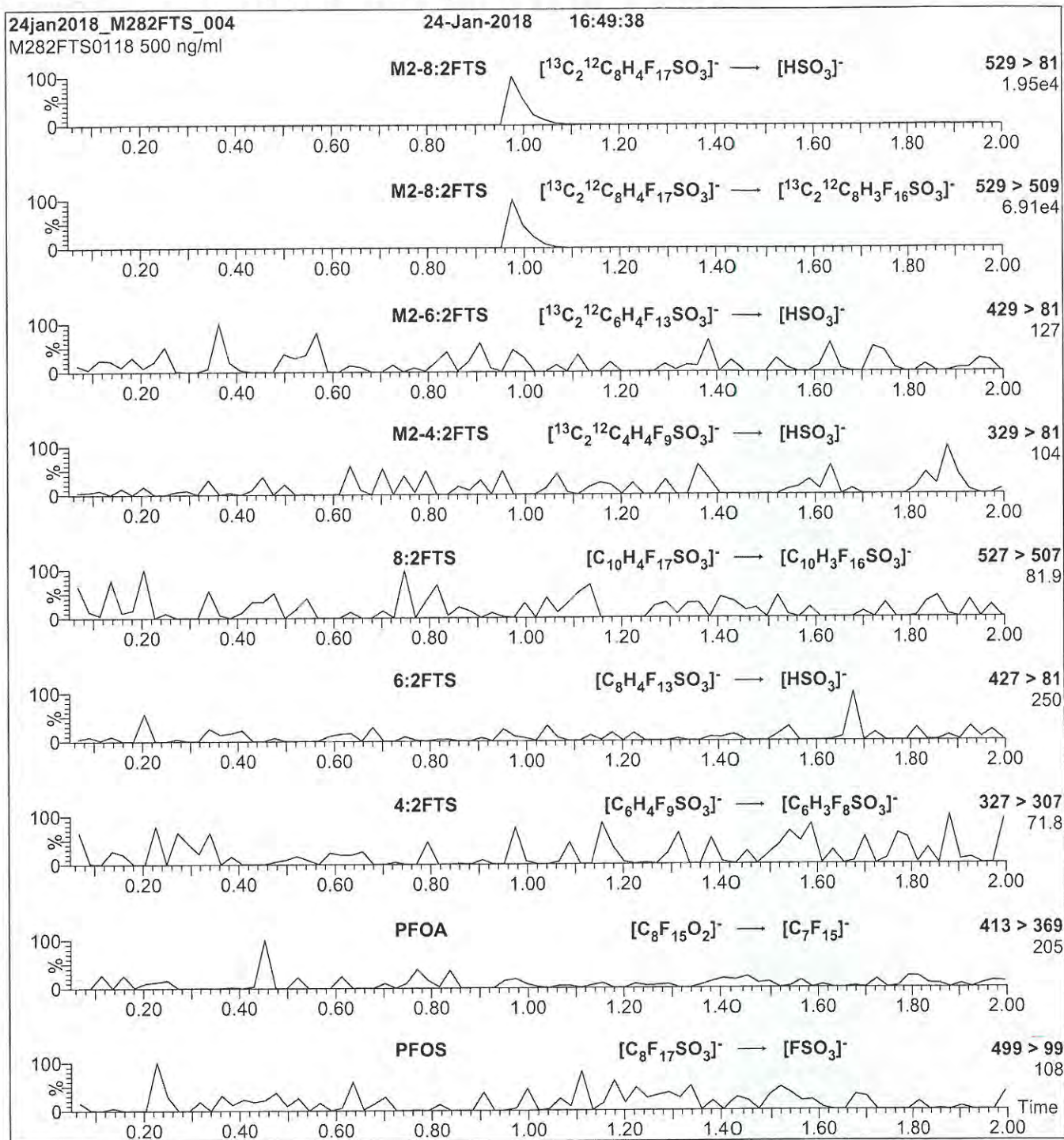
Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7 min and hold for 2 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

Flow: 300 μ l/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

18F2210

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 25

18F2211



WELLINGTON LABORATORIES

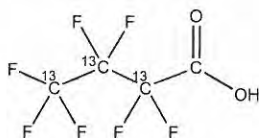
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFBA
COMPOUND: Perfluoro-n-[2,3,4- $^{13}\text{C}_3$]butanoic acid

LOT NUMBER: M3PFBA1217

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}\text{C}_3^{12}\text{CHF}_7\text{O}_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 217.02
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

ISOTOPIC PURITY: $\geq 99\% ^{13}\text{C}$
(2,3,4- $^{13}\text{C}_3$)

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-[$^{13}\text{C}_3$]propanoic acid and also contains ~ 1.0% of perfluoro-n-[1,2,3,4- $^{13}\text{C}_4$]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, General Manager

Date: 12/22/2017
(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

18F2211

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:

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UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 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.

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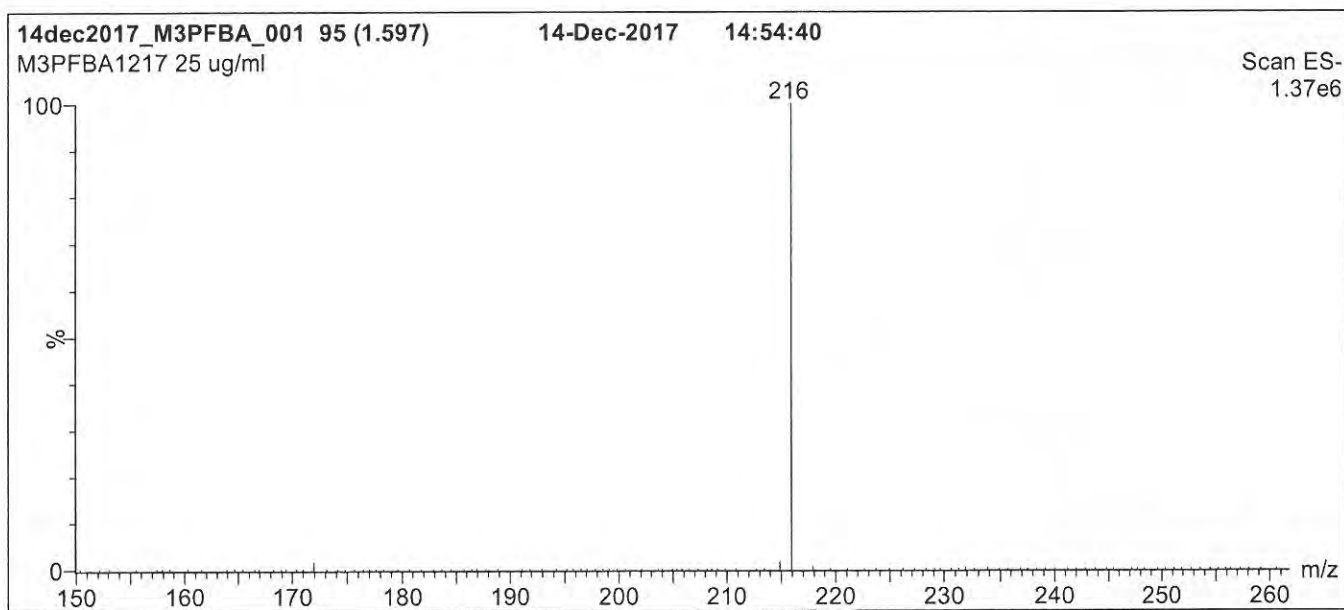
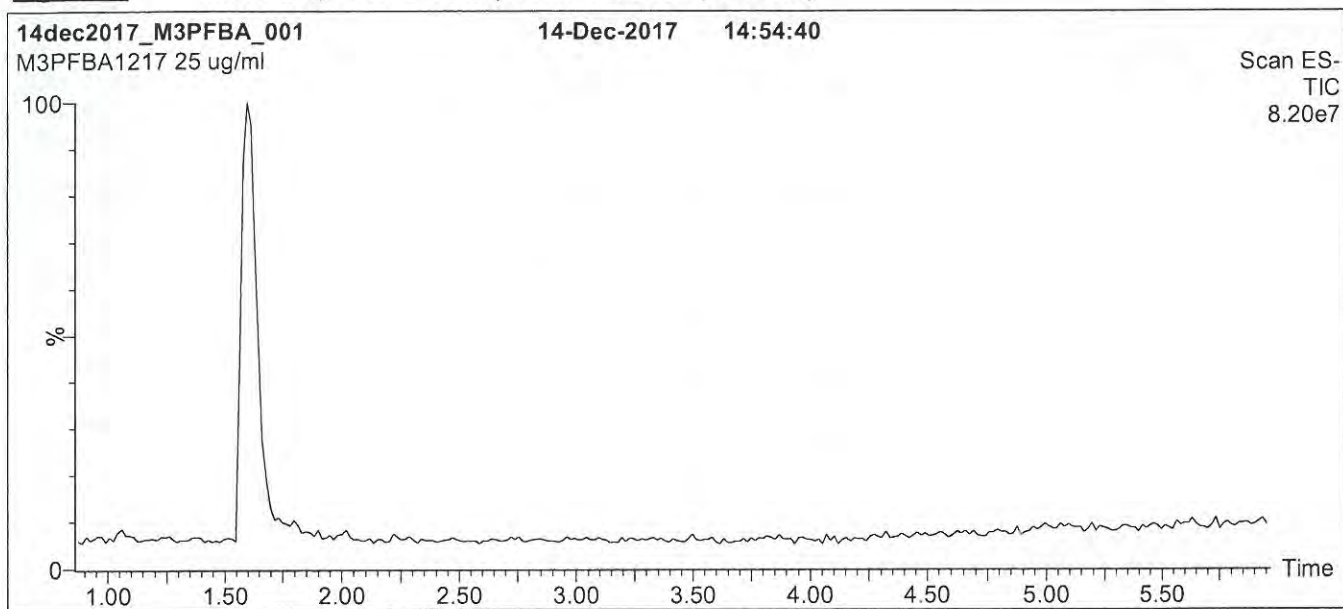
QUALITY MANAGEMENT:

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18F2211

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H₂O
(both with 10 mM NH₄OAc 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

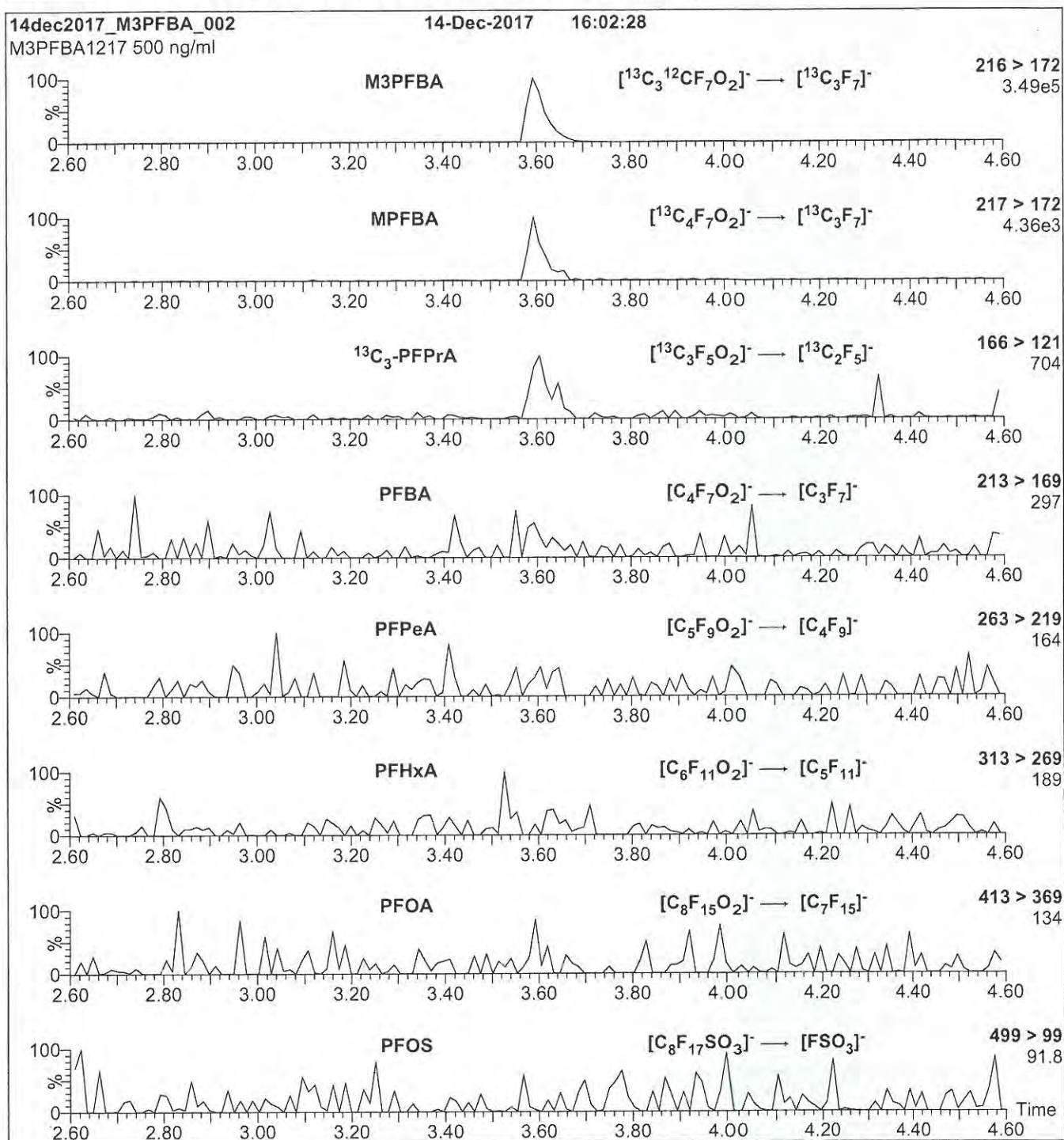
Flow: 300 μ l/min

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

18F2211

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 10

18F2212



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

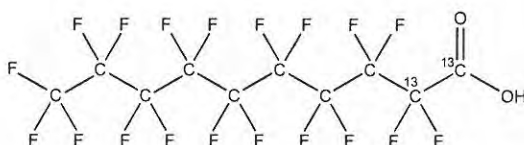
MPFDA

LOT NUMBER:

MPFDA0218

COMPOUND:Perfluoro-n-[1,2-¹³C₂]decanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₈H₁₉O₂**MOLECULAR WEIGHT:**

516.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

02/16/2018

(1,2-¹³C₂)**EXPIRY DATE:** (mm/dd/yyyy)

02/16/2023

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 ¹³C₁-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 03/07/2018

(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

INTENDED USE:

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EXPIRY DATE / PERIOD OF VALIDITY:

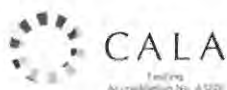
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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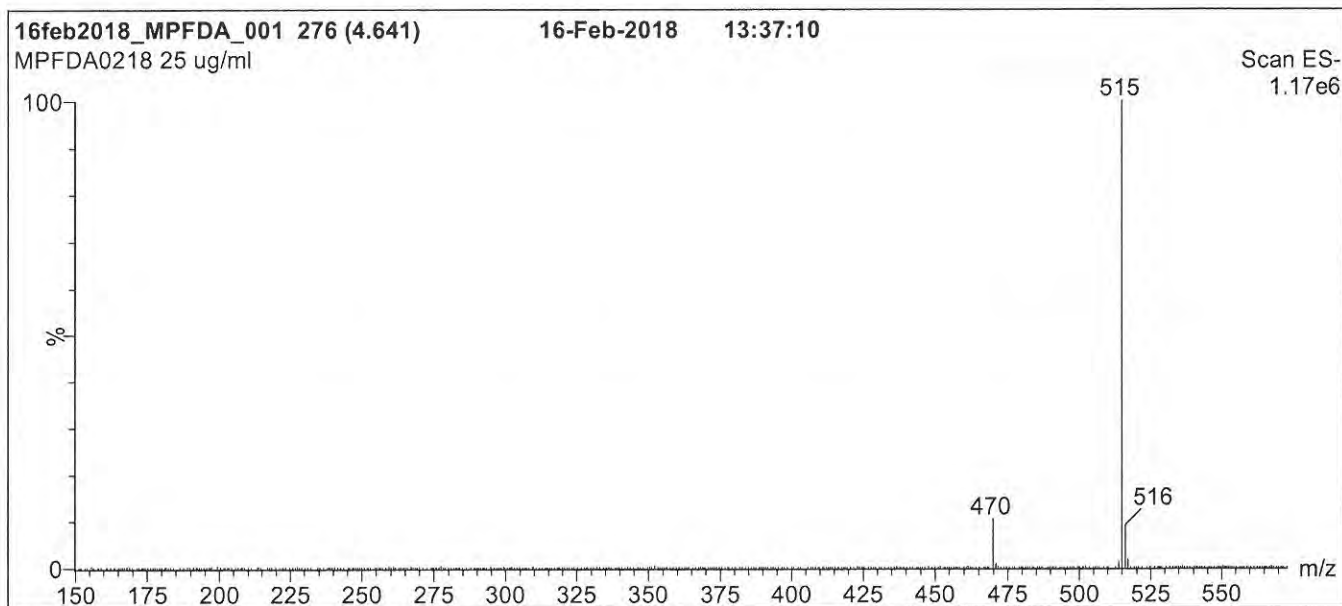
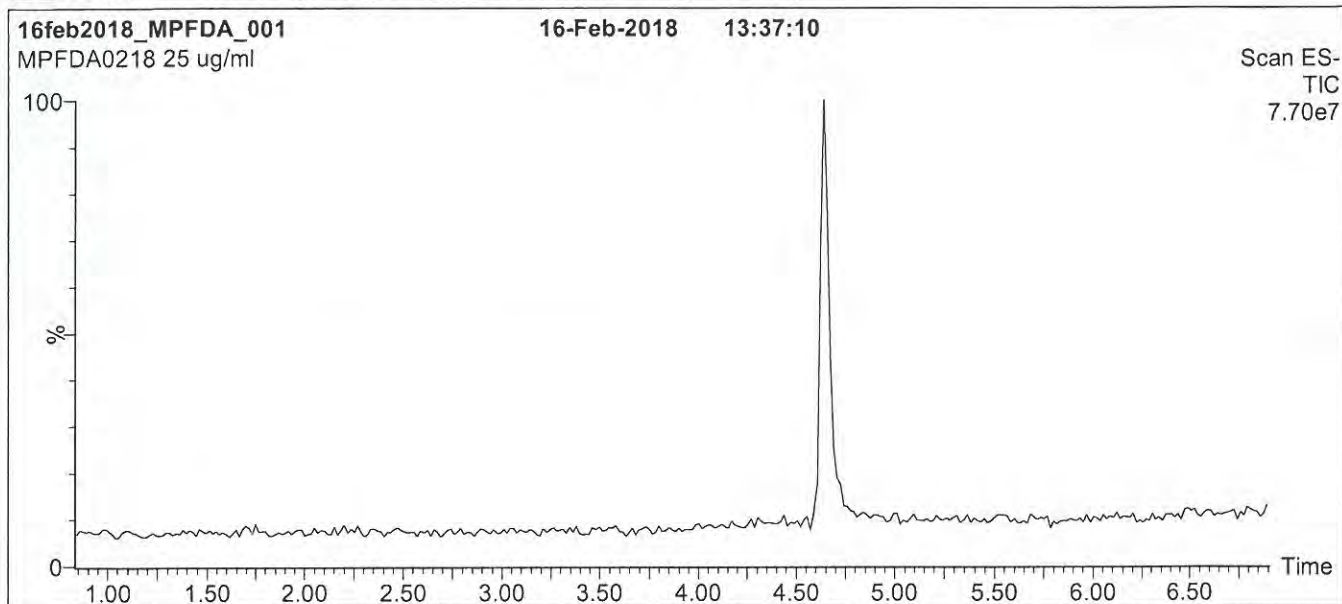
QUALITY MANAGEMENT:

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18F2212

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

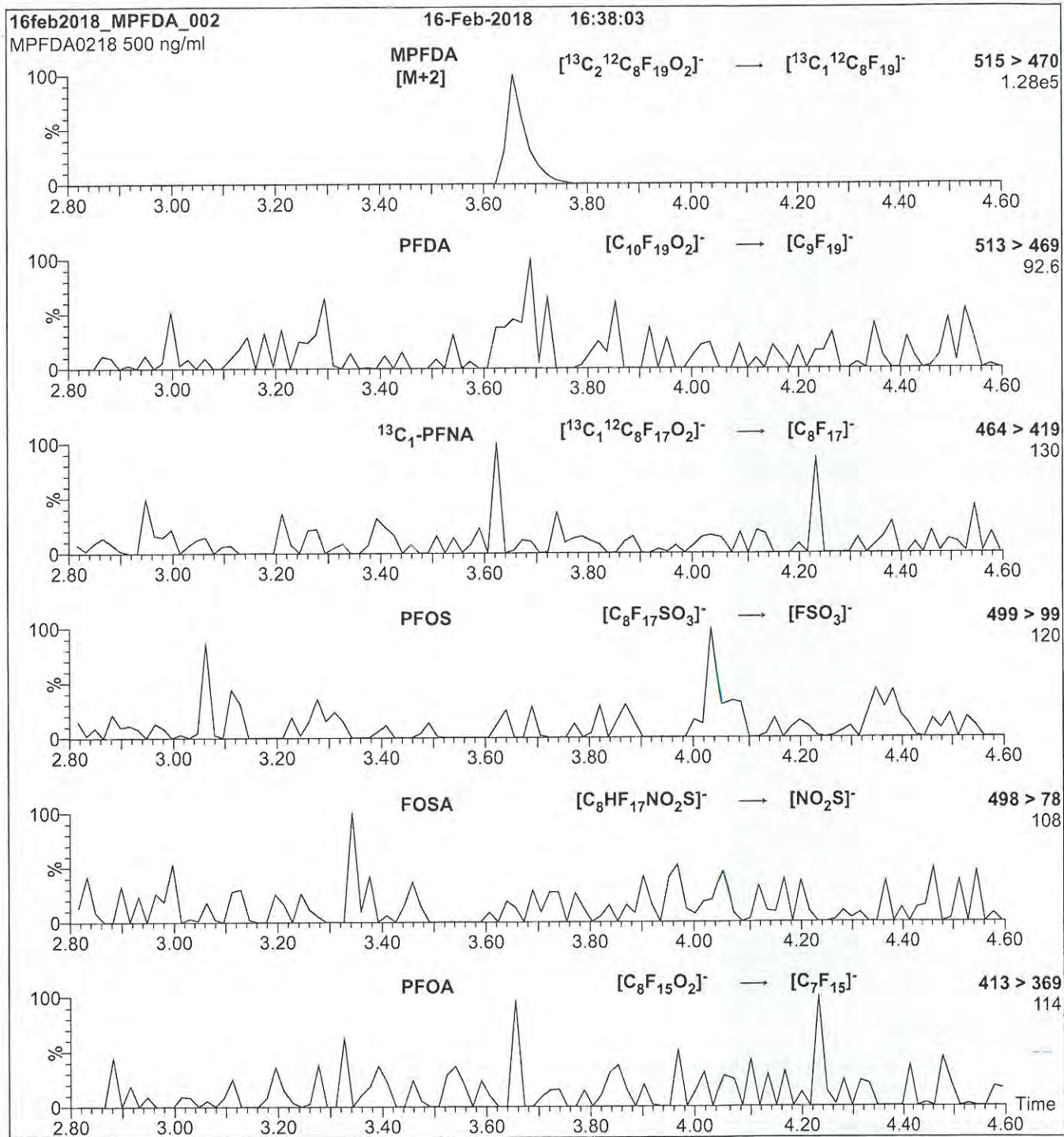
Flow: 300 μ l/min

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

18F2212

Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

18F2213



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

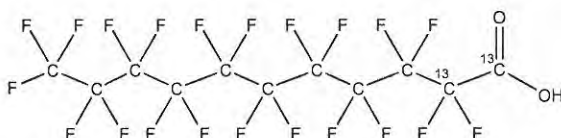
MPFUdA

LOT NUMBER:

MPFUdA1116

COMPOUND:Perfluoro-n-[1,2-¹³C₂]undecanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₉H₂₁O₂**MOLECULAR WEIGHT:**

566.08

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

11/22/2016

(1,2-¹³C₂)**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 1-¹³C₁-PFUdA (~1%; see Figure 2), 2-¹³C₁-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ¹³C-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

18F2213

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

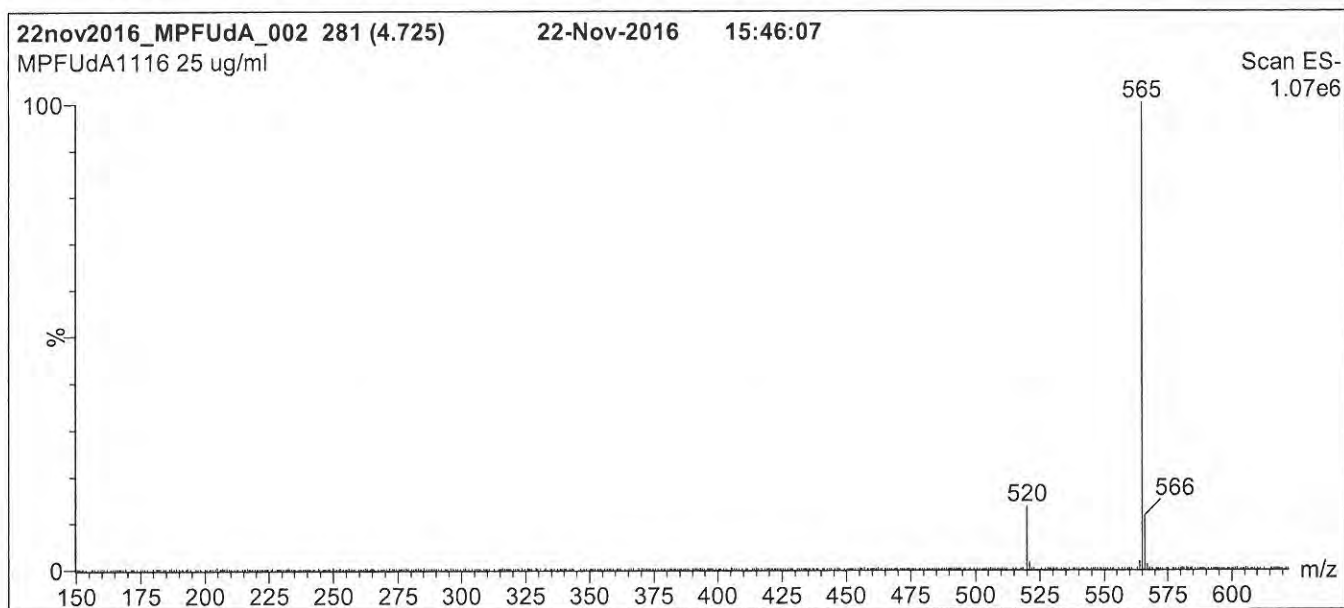
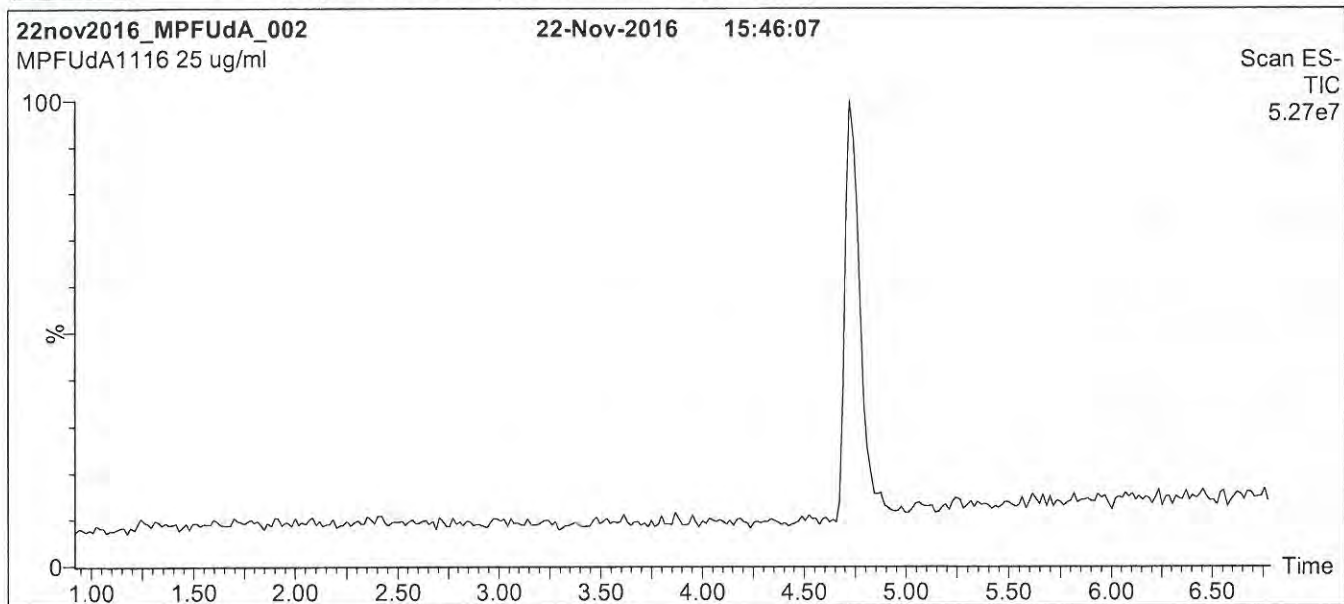
QUALITY MANAGEMENT:

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).



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

18F2213

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 60% (80:20 MeOH:ACN) / 40% H₂O
 (both with 10 mM NH₄OAc 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

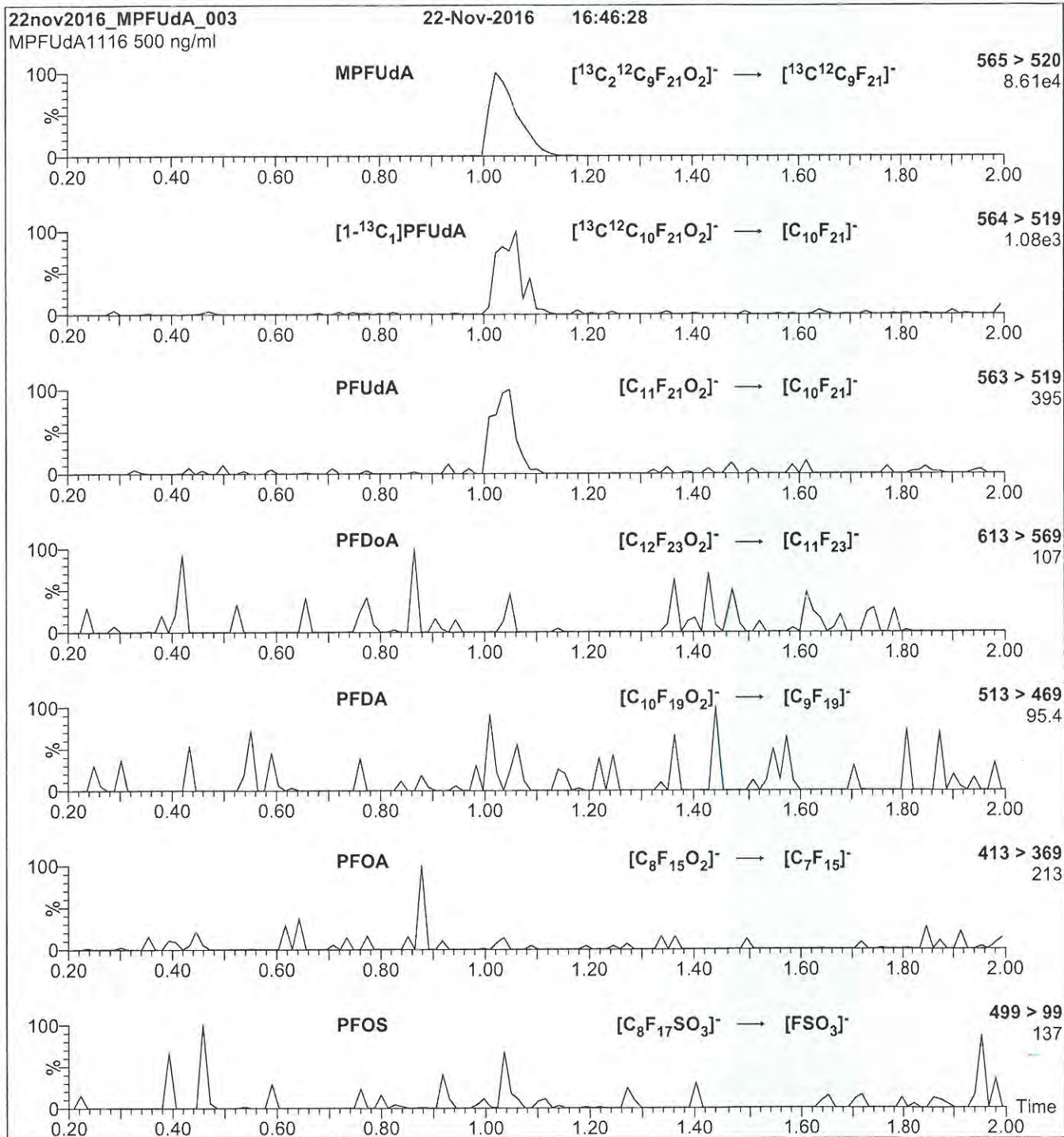
Flow: 300 μ l/min

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

18F2213

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

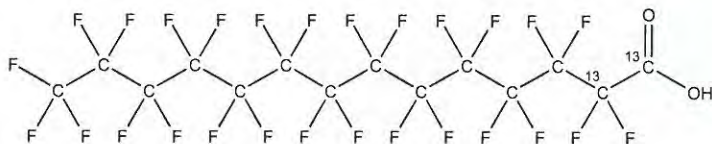
18F2214



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFTeDA **LOT NUMBER:** M2PFTeDA1117
COMPOUND: Perfluoro-n-[1,2-¹³C₂]tetradecanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₂HF₂₇O₂ **MOLECULAR WEIGHT:** 716.10
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
 Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
 (1,2-¹³C₂)
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:
 B.G. Chittim, General Manager

Date: 12/01/2017
 (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

18F2214

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.

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UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 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.

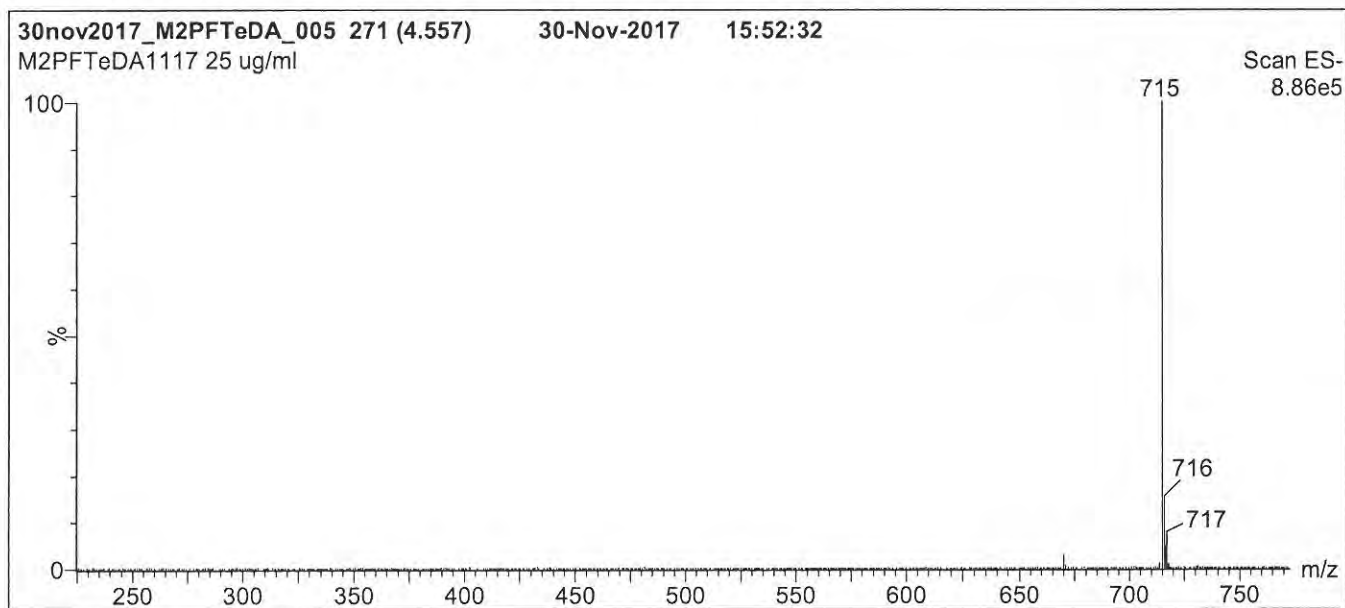
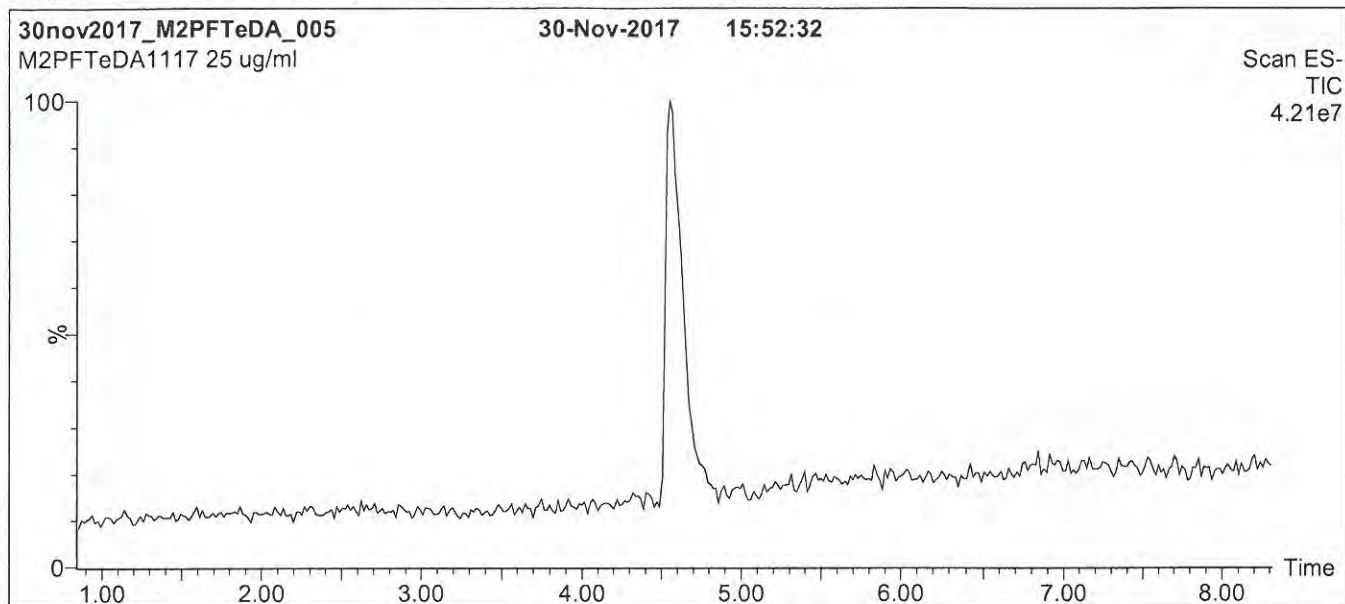
QUALITY MANAGEMENT:

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).



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

18F2214

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H₂O
(both with 10 mM NH₄OAc 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 μ l/min

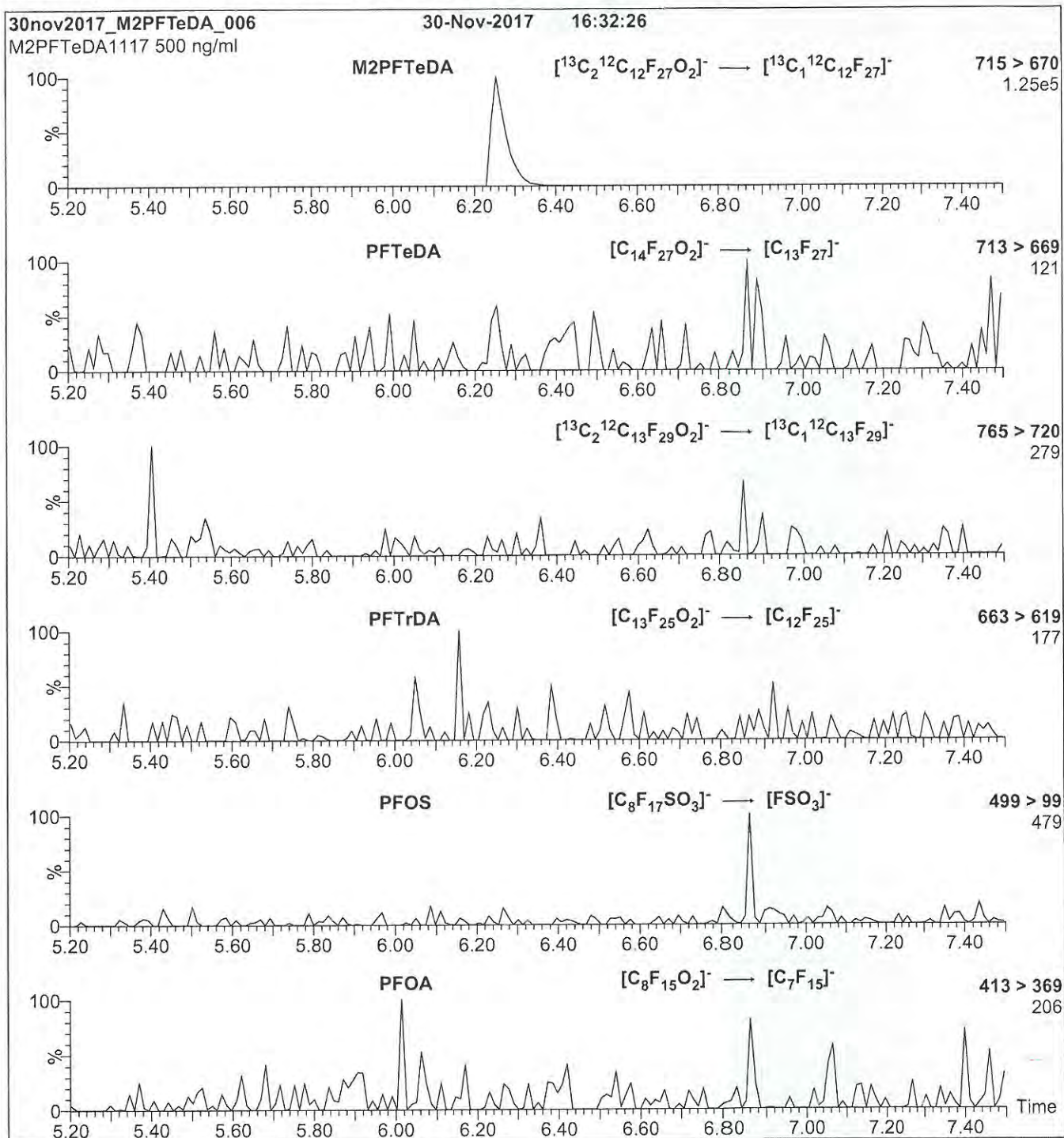
MS Parameters

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

18F2214

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.31\text{e-}3$
Collision Energy (eV) = 14

18F2215



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

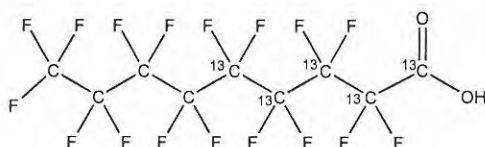
MPFNA

LOT NUMBER:

MPFNA1217

COMPOUND:Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₅¹²C₄HF₁₇O₂**MOLECULAR WEIGHT:**

469.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99%¹³C**LAST TESTED:** (mm/dd/yyyy)

12/14/2017

(1,2,3,4,5-¹³C₅)**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:**

B.G. Chittim, General Manager
Date:12/19/2017
(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

18F2215

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:

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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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x_1, x_2, \dots, x_n on which it depends is:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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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.

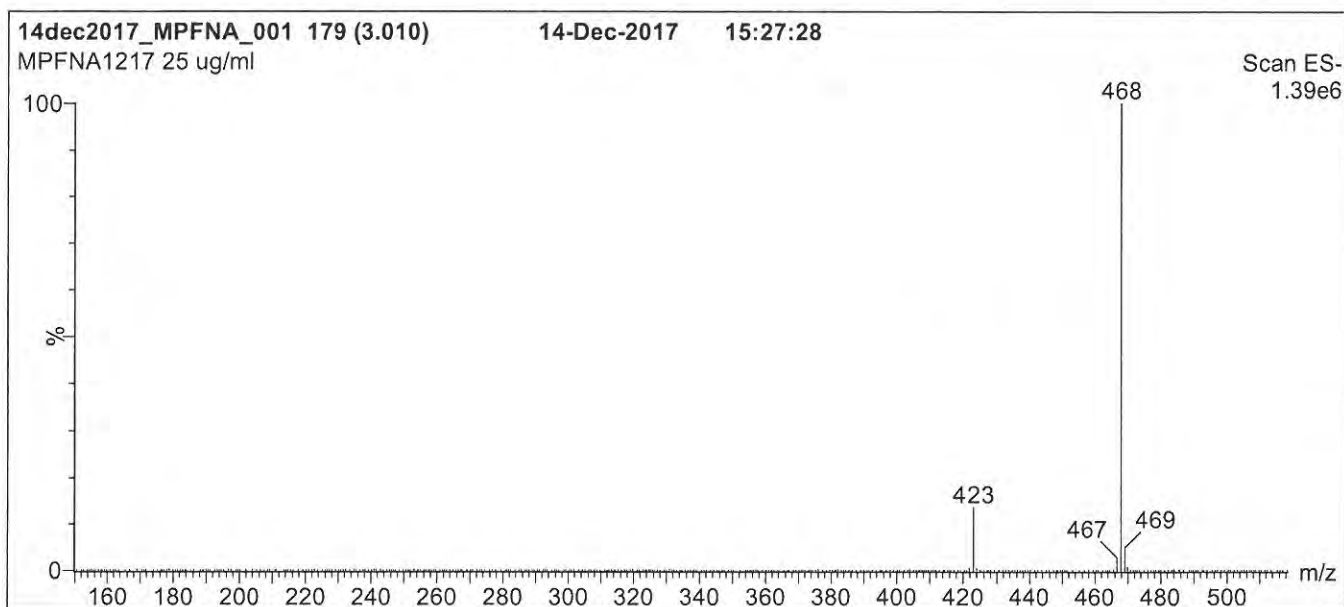
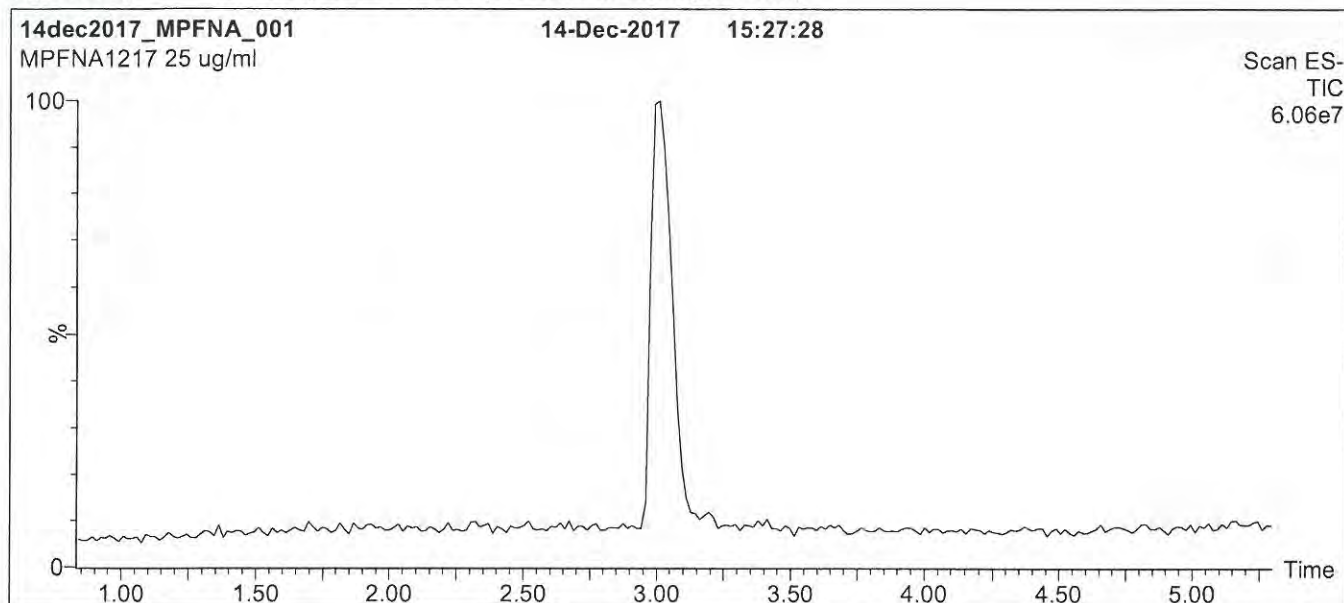
QUALITY MANAGEMENT:

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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18F2215

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

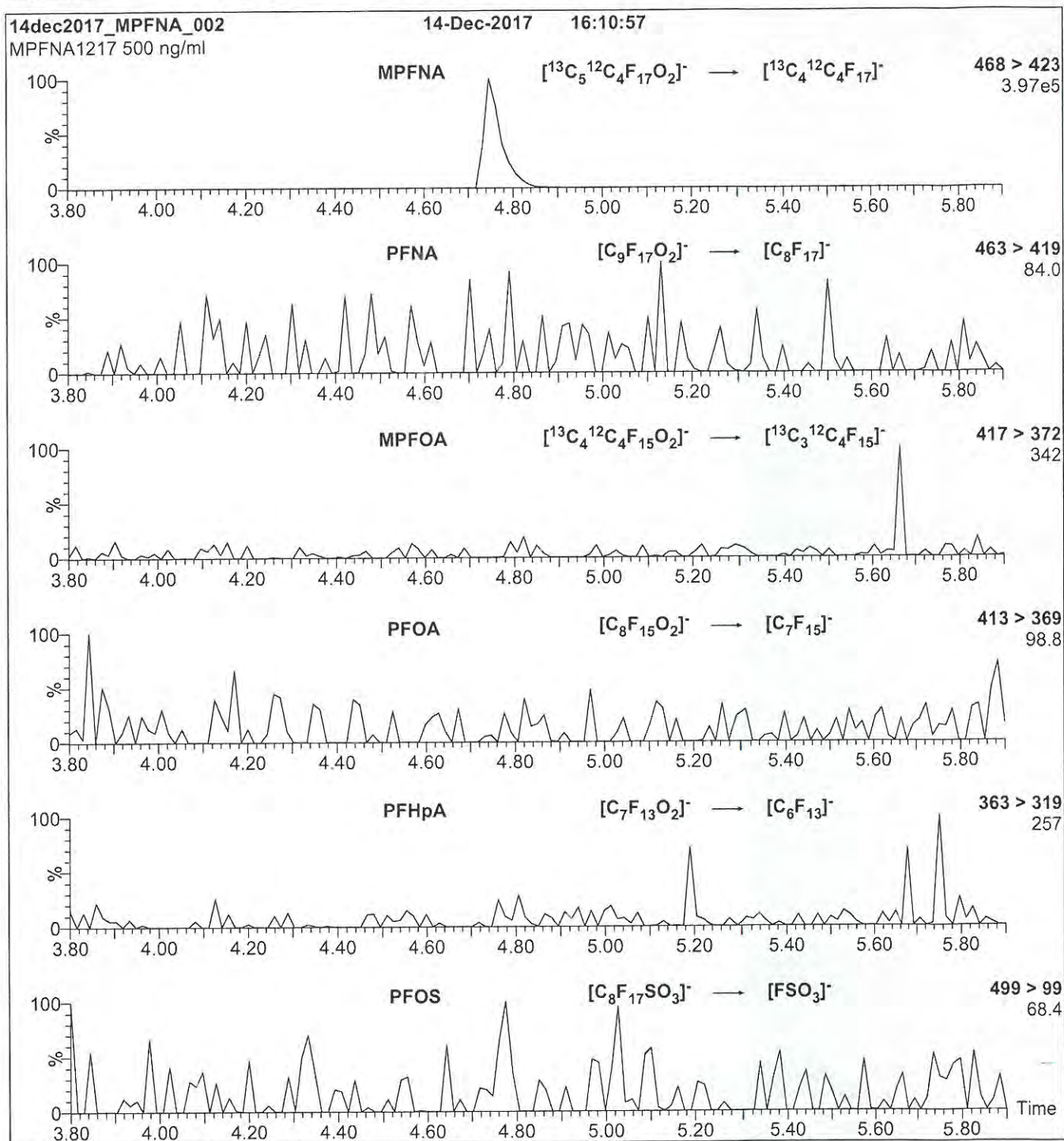
Flow: 300 μ l/min

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

18F2215

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

18F2216



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

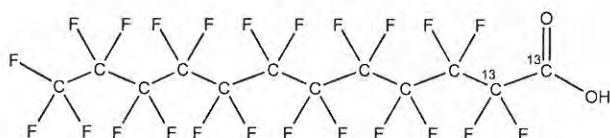
MPFDoA

LOT NUMBER:

MPFDoA0218

COMPOUND:Perfluoro-n-[1,2-¹³C₂]dodecanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:** $^{13}\text{C}_2^{12}\text{C}_{10}\text{HF}_{23}\text{O}_2$ **CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

616.08

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

02/16/2018

EXPIRY DATE: (mm/dd/yyyy)

02/16/2023

(1,2-¹³C₂)**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:

B.G. Chittim, General Manager

Date: 02/23/2018

(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

18F2216

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.

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TRACEABILITY:

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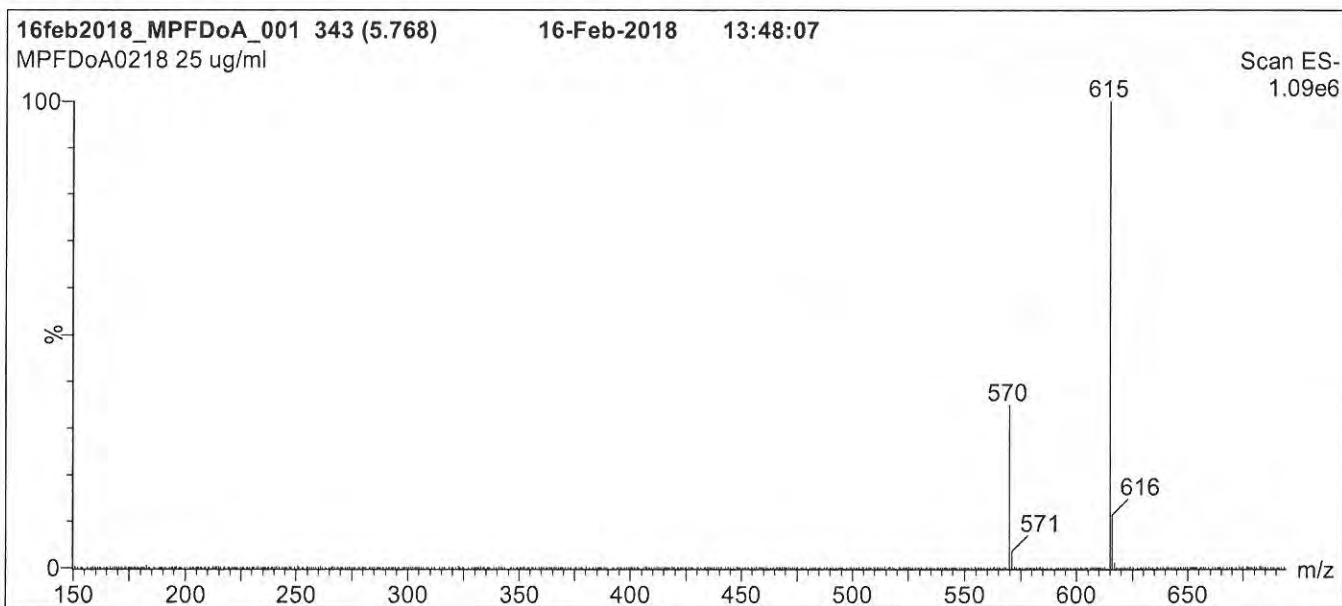
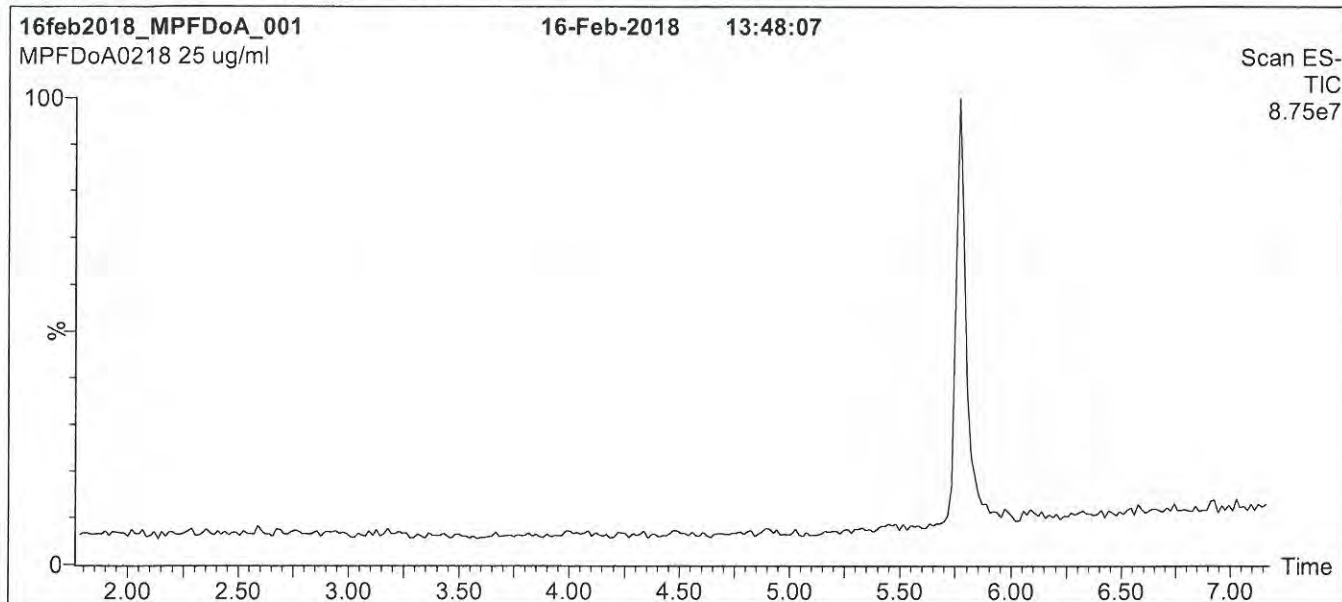
QUALITY MANAGEMENT:

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 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18F2216

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

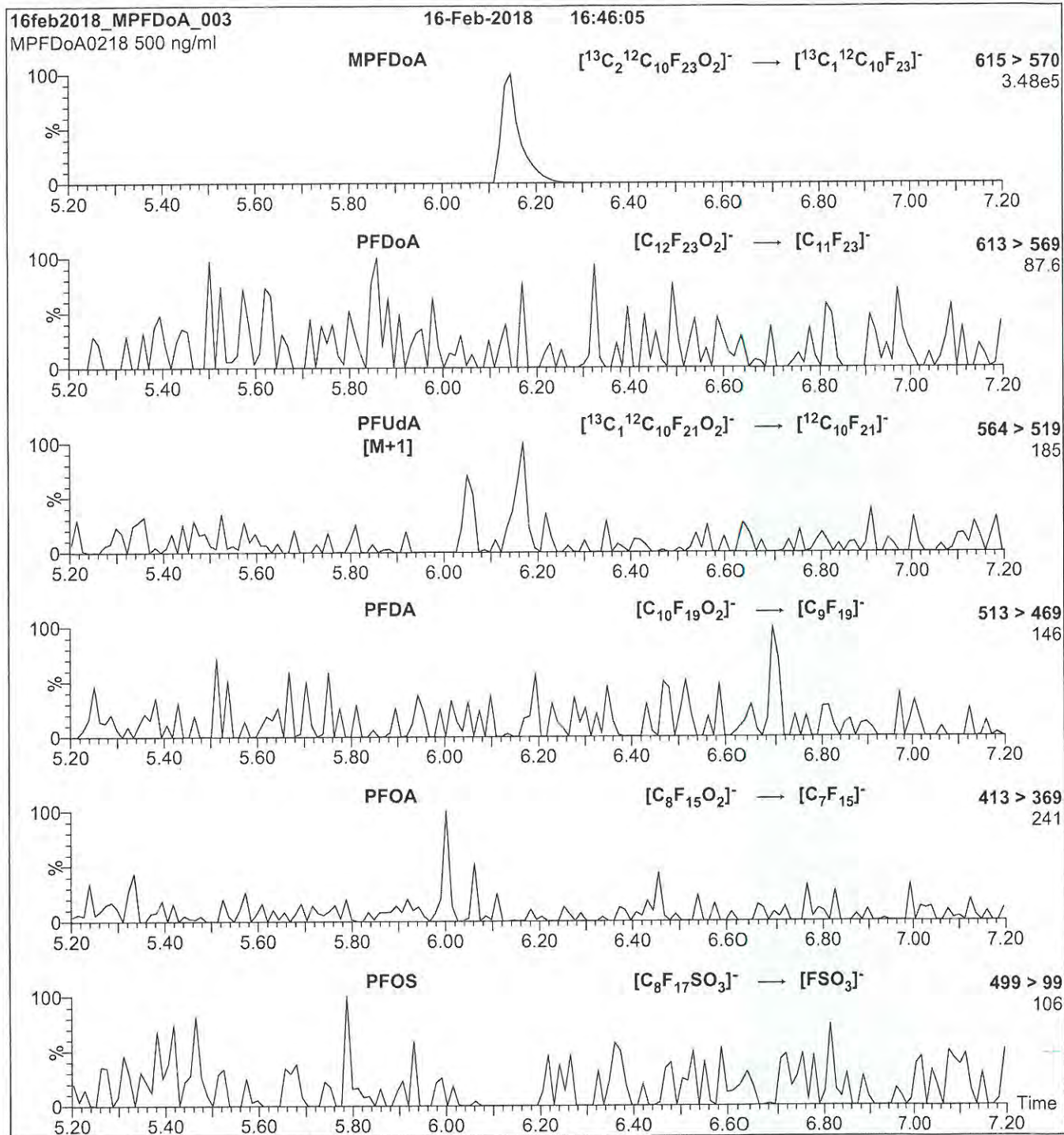
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18F2216

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 13

18F2217



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

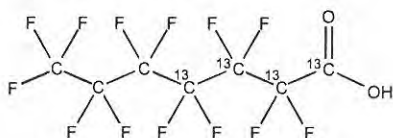
M4PFHpA

LOT NUMBER:

M4PFHpA0517

COMPOUND:Perfluoro-n-[1,2,3,4-¹³C₄]heptanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₄¹²C₃HF₁₃O₂**MOLECULAR WEIGHT:**

368.03

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

05/03/2017

(1,2,3,4-¹³C₄)**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:

B.G. Chittim, General Manager

Date: 05/11/2017

(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

18F2217

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

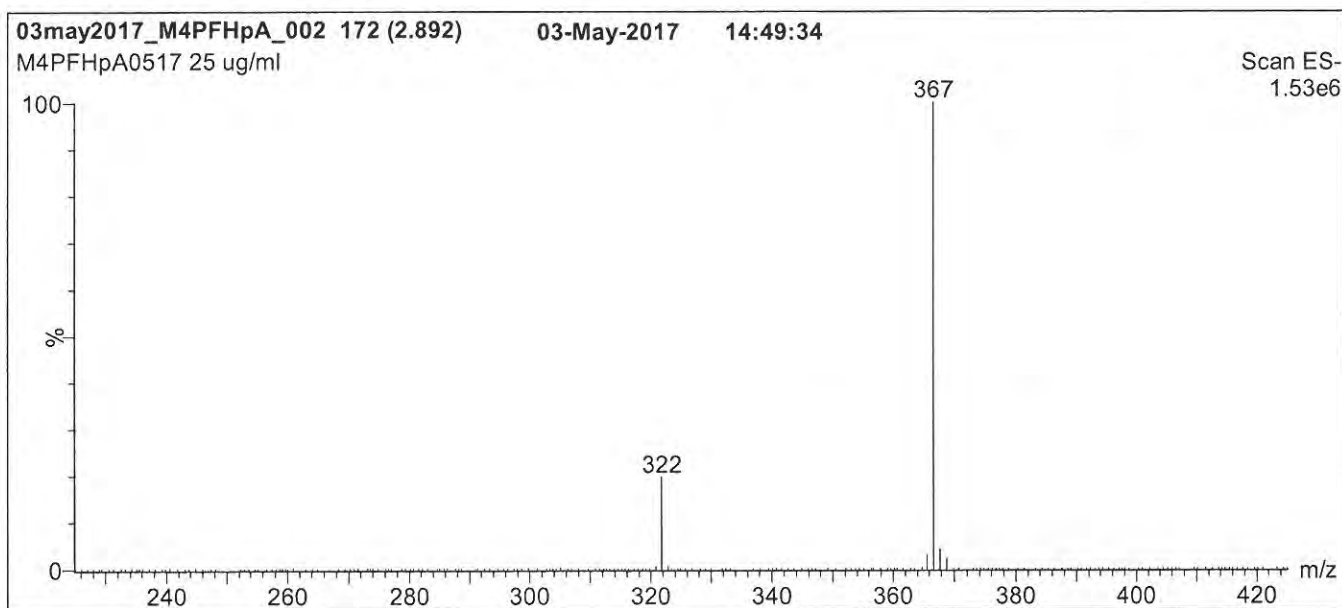
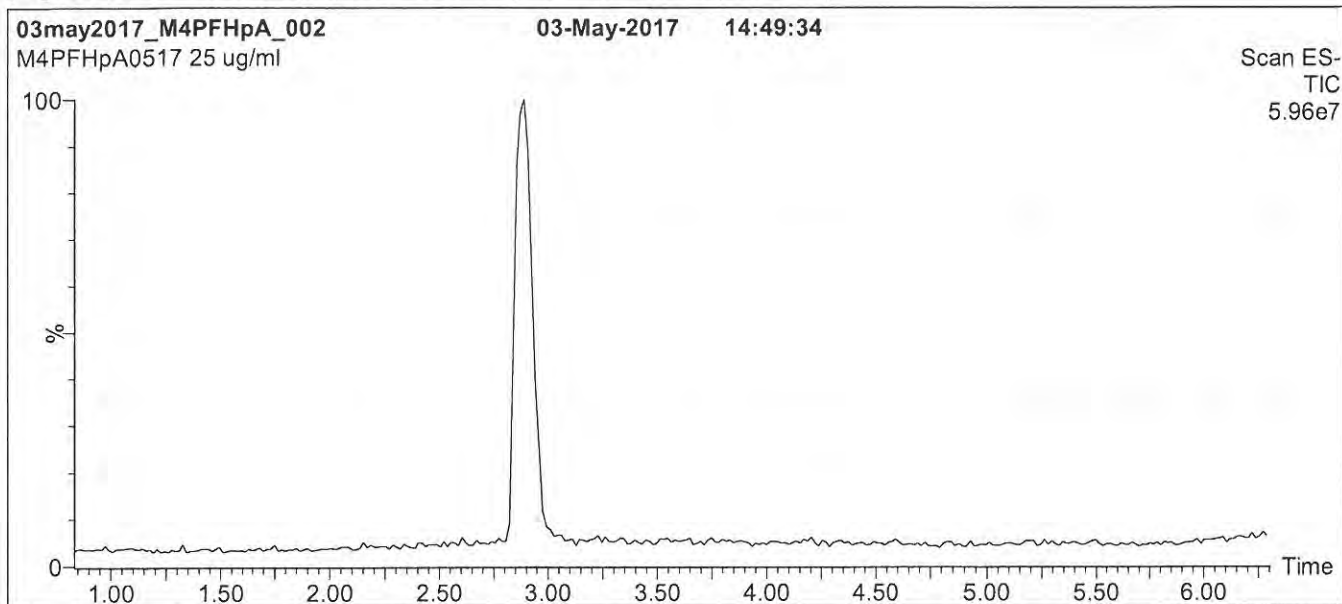
QUALITY MANAGEMENT:

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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18F2217

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

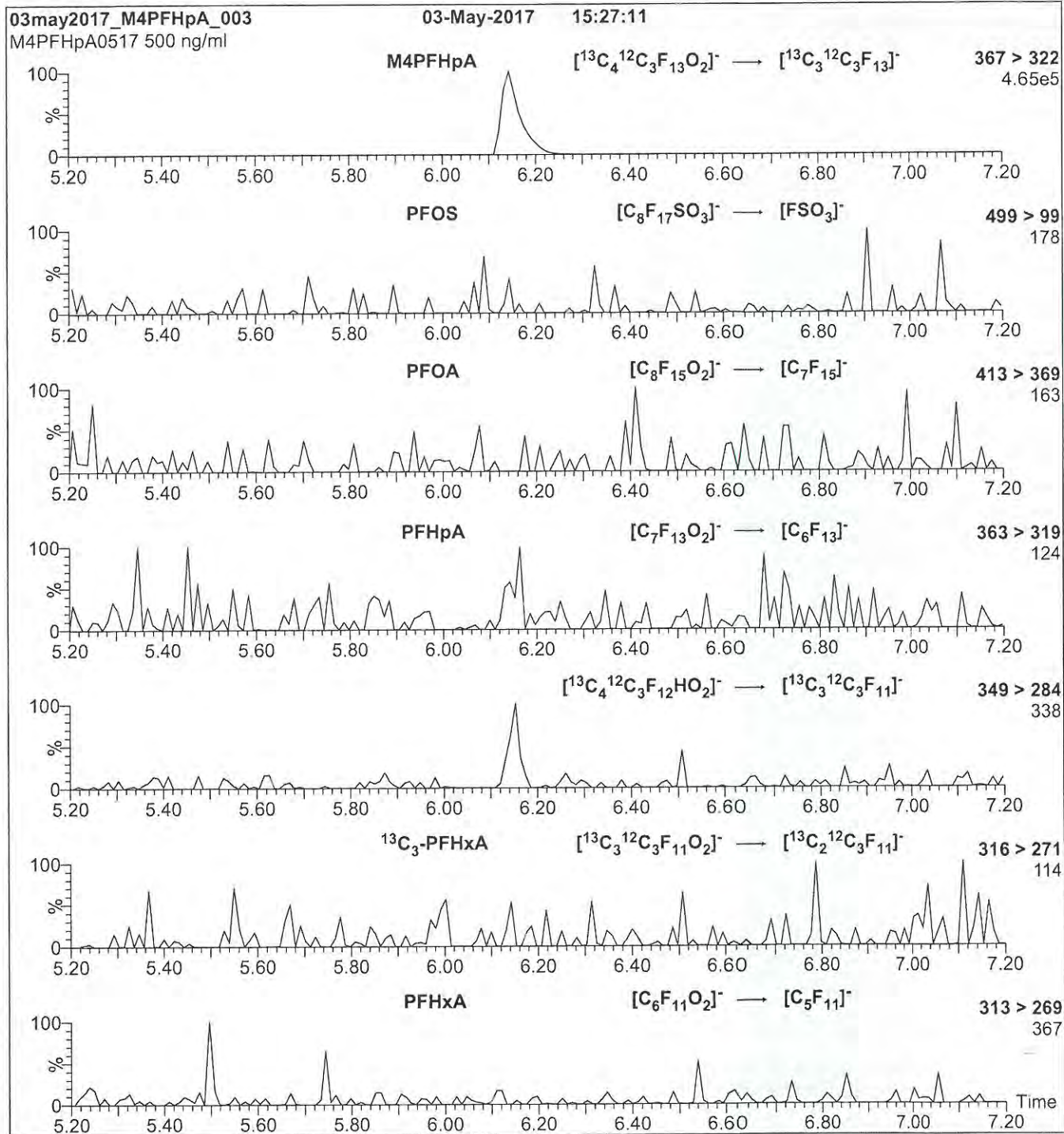
Flow: 300 μ l/min

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

185217

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.46\text{e-}3$
Collision Energy (eV) = 9

18F2218



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

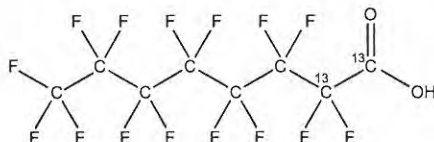
M2PFOA

LOT NUMBER:

M2PFOA1017

COMPOUND:Perfluoro-n-[1,2-¹³C₂]octanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₆HF₁₅O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

416.05

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**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

(1,2-¹³C₂)**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:

B.G. Chittim, General Manager

Date:

10/30/2017

(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

18F2218

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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$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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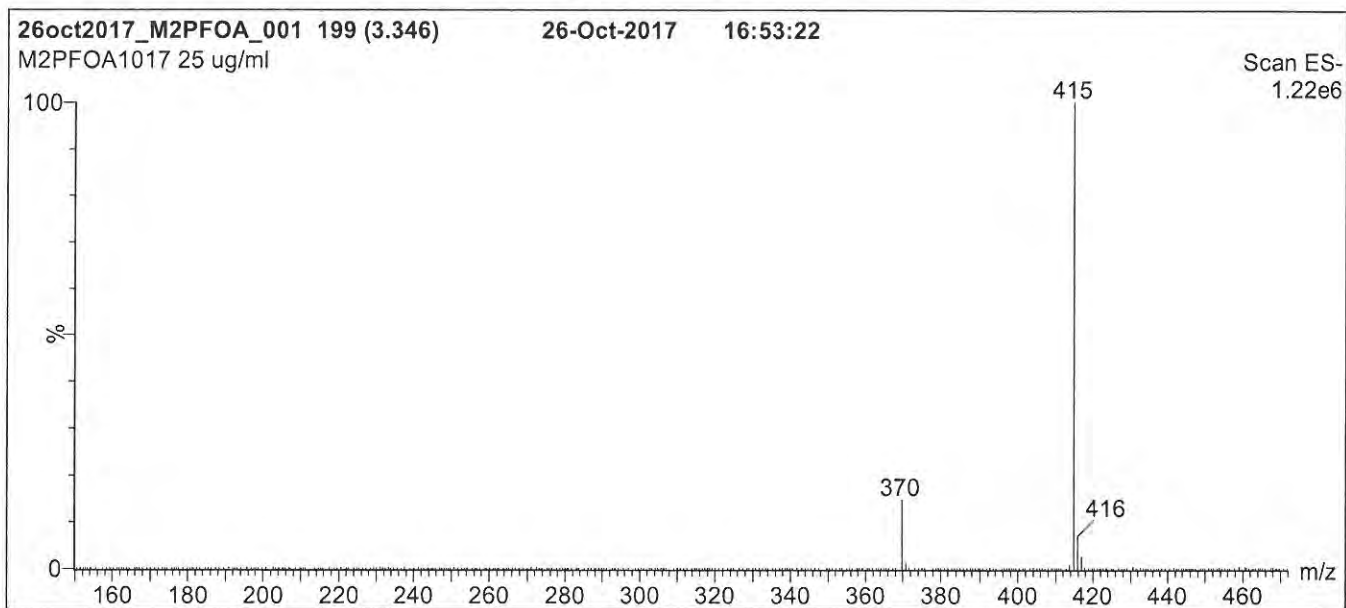
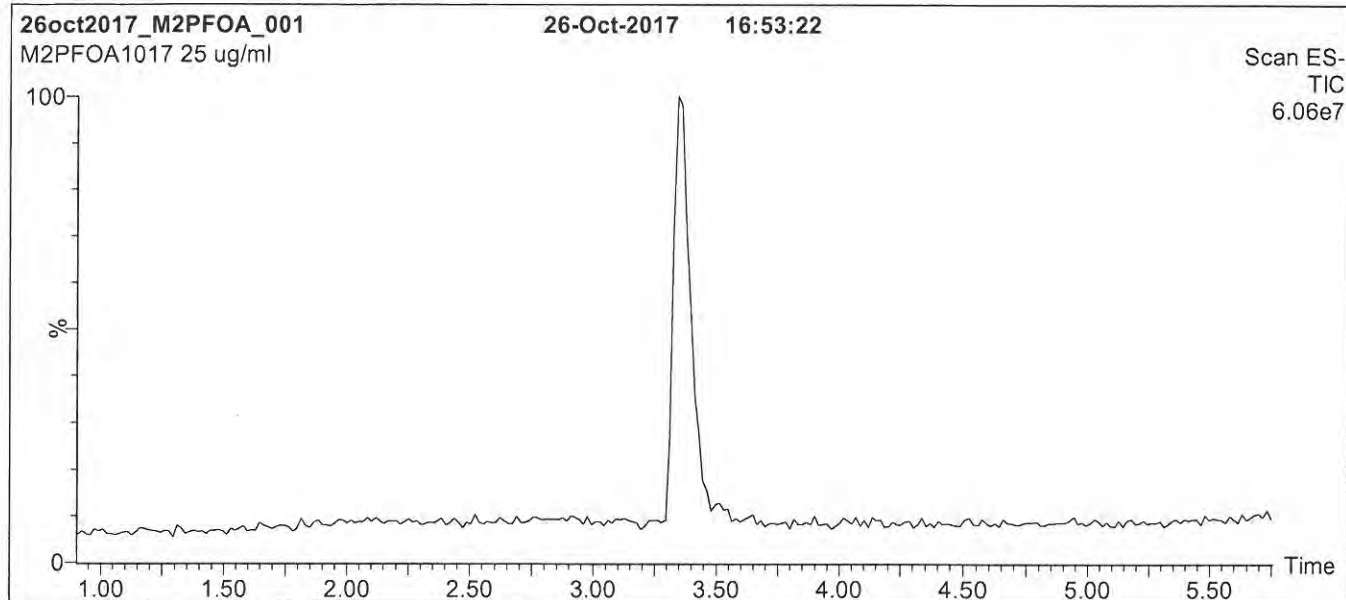
QUALITY MANAGEMENT:

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18F2218

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

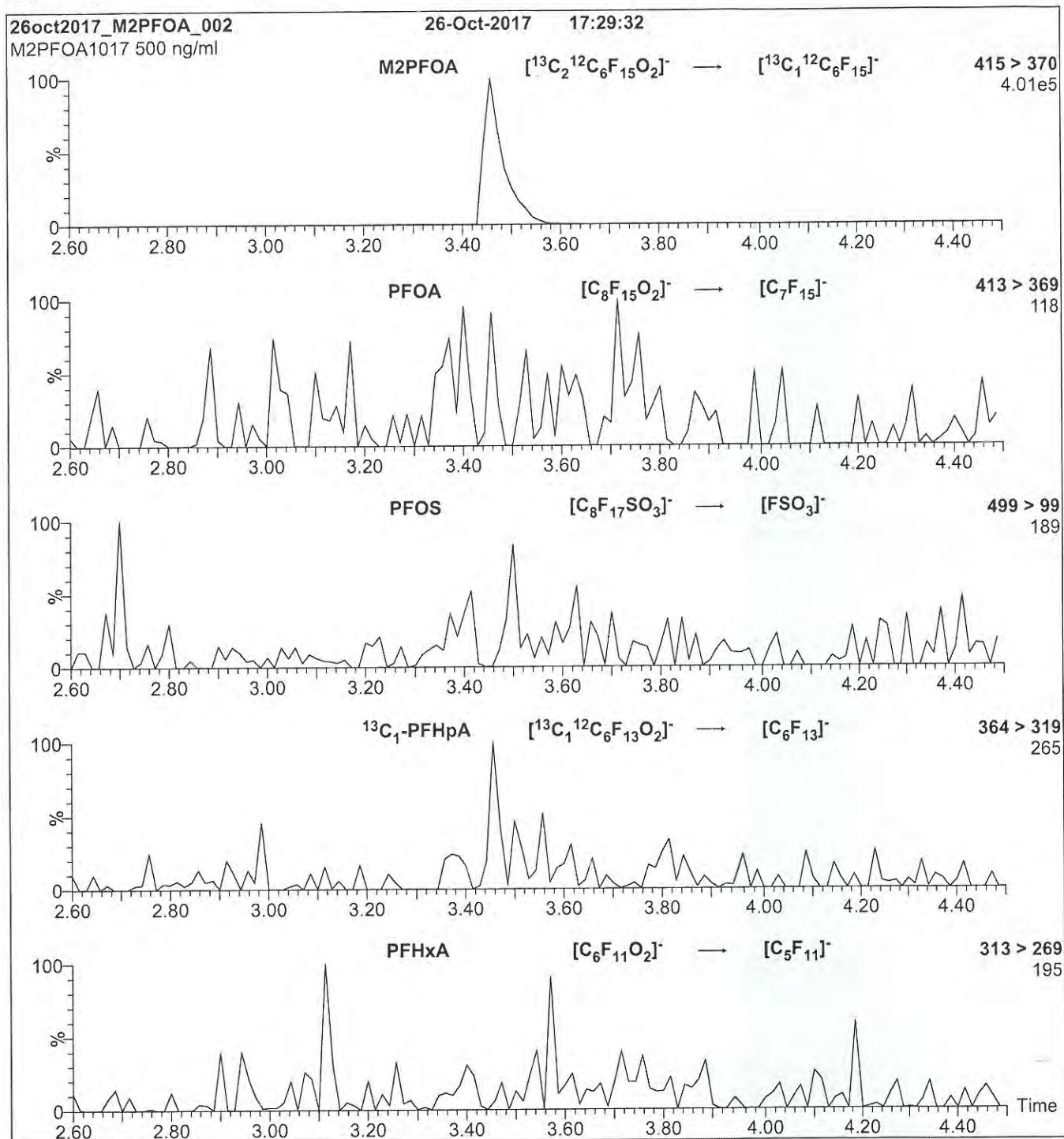
Flow: 300 μ l/min

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

18F2218

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.28\text{e-}3$

Collision Energy (eV) = 10

18F2219



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

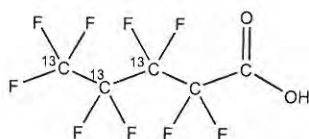
M3PFPeA

LOT NUMBER:

M3PFPeA0417

COMPOUND:Perfluoro-n-[3,4,5-¹³C₃]pentanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₃¹²C₂HF₉O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

267.02

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C(3,4,5-¹³C₃)**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-[¹³C₃]butanoic acid and 0.05% of perfluoro-1-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 04/24/2017

(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

18F2219

INTENDED USE:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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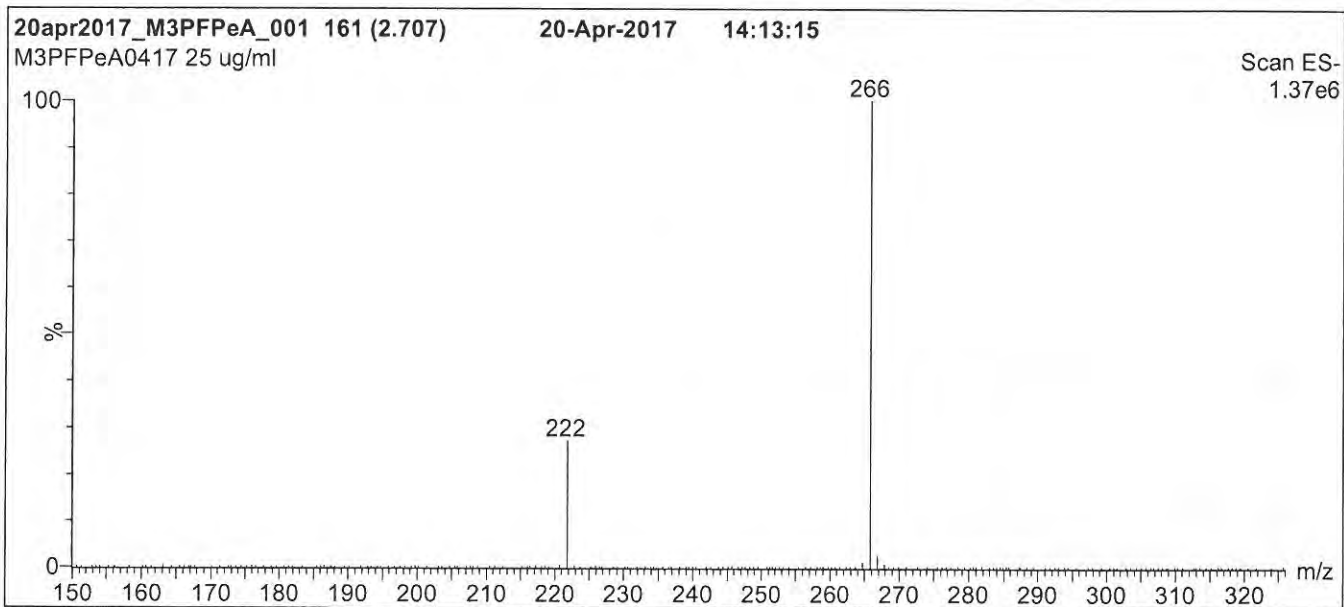
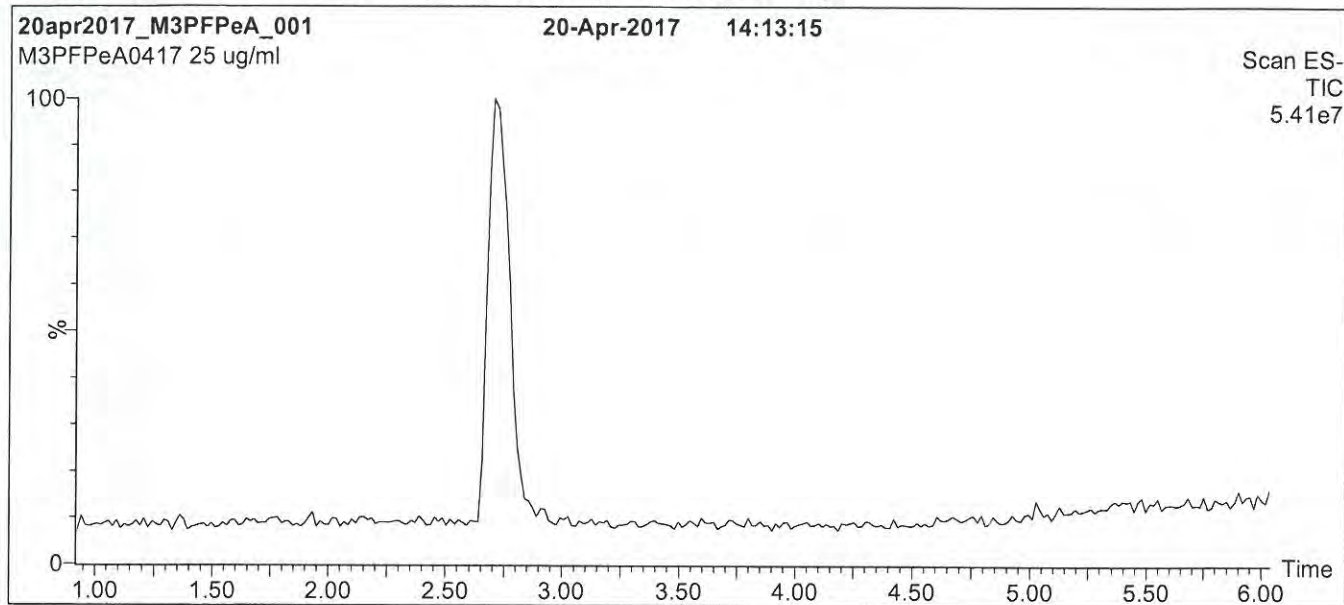
QUALITY MANAGEMENT:

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18F2219

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

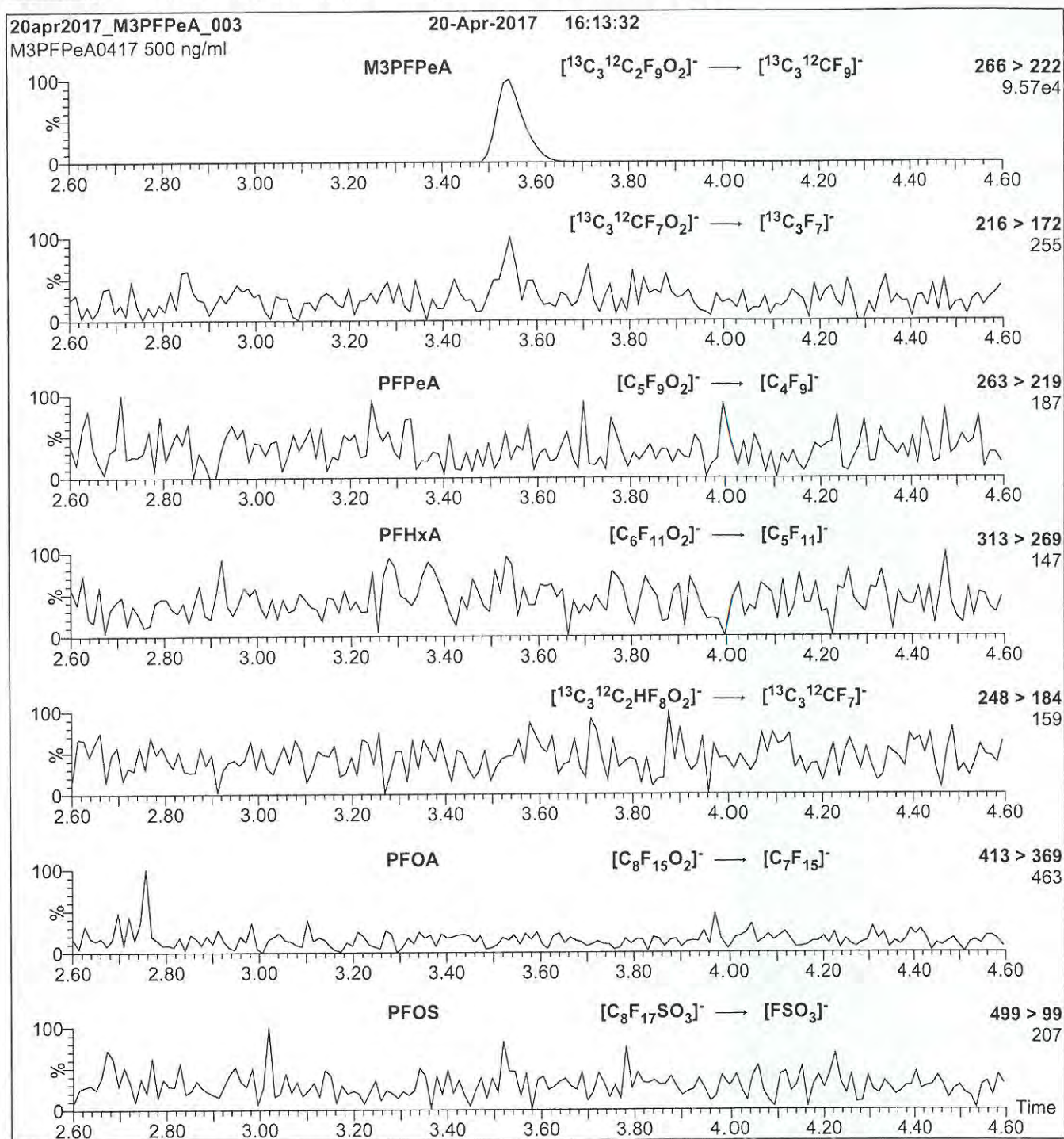
Flow: 300 μ l/min

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

18F2219

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18F2220



WELLINGTON LABORATORIES

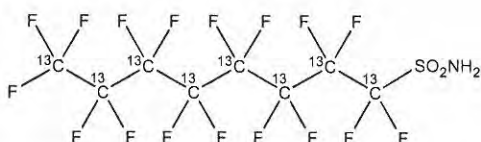
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[$^{13}\text{C}_8$]octanesulfonamide

LOT NUMBER: M8FOSA1017I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}\text{C}_8\text{H}_2\text{F}_{17}\text{NO}_2\text{S}$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/11/2017
EXPIRY DATE: (mm/dd/yyyy) 10/11/2022
RECOMMENDED STORAGE: Refrigerate ampoule

MOLECULAR WEIGHT: 507.09
SOLVENT(S): Isopropanol
ISOTOPIC PURITY: $\geq 99\%$ ^{13}C
($^{13}\text{C}_8$)

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-[$^{13}\text{C}_4$]octanesulfonamide and ~ 0.01% of perfluoro-1-[$^{13}\text{C}_7$]heptanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim, General Manager

Date: 10/20/2017
(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

18F2220

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

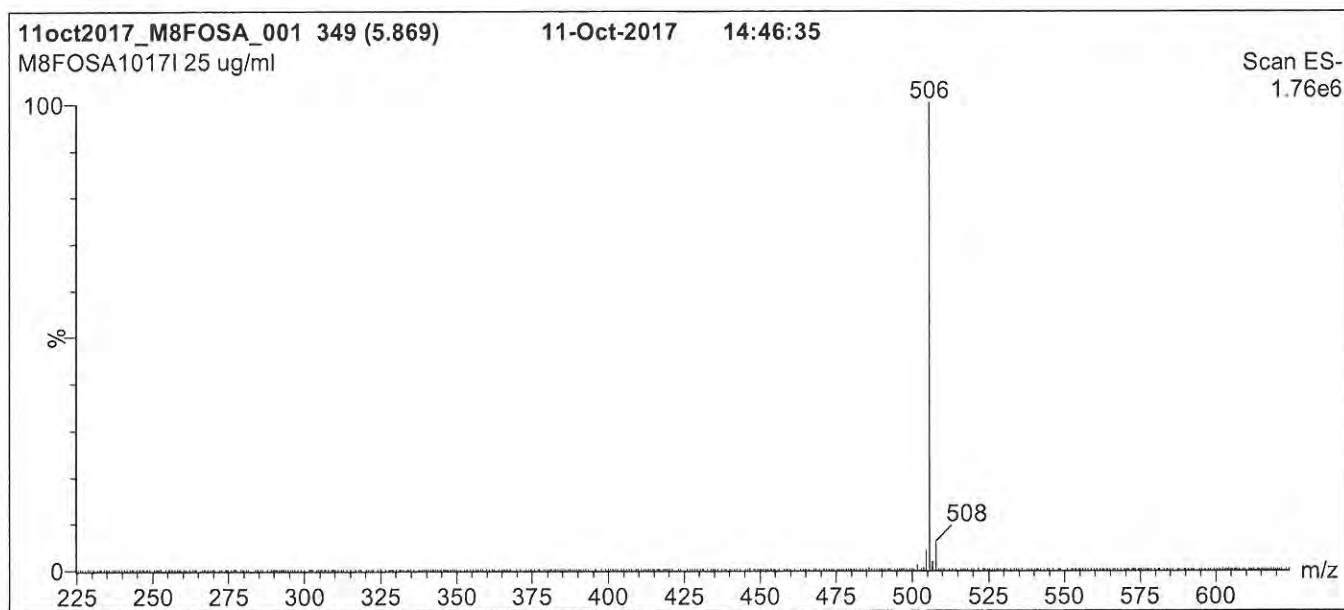
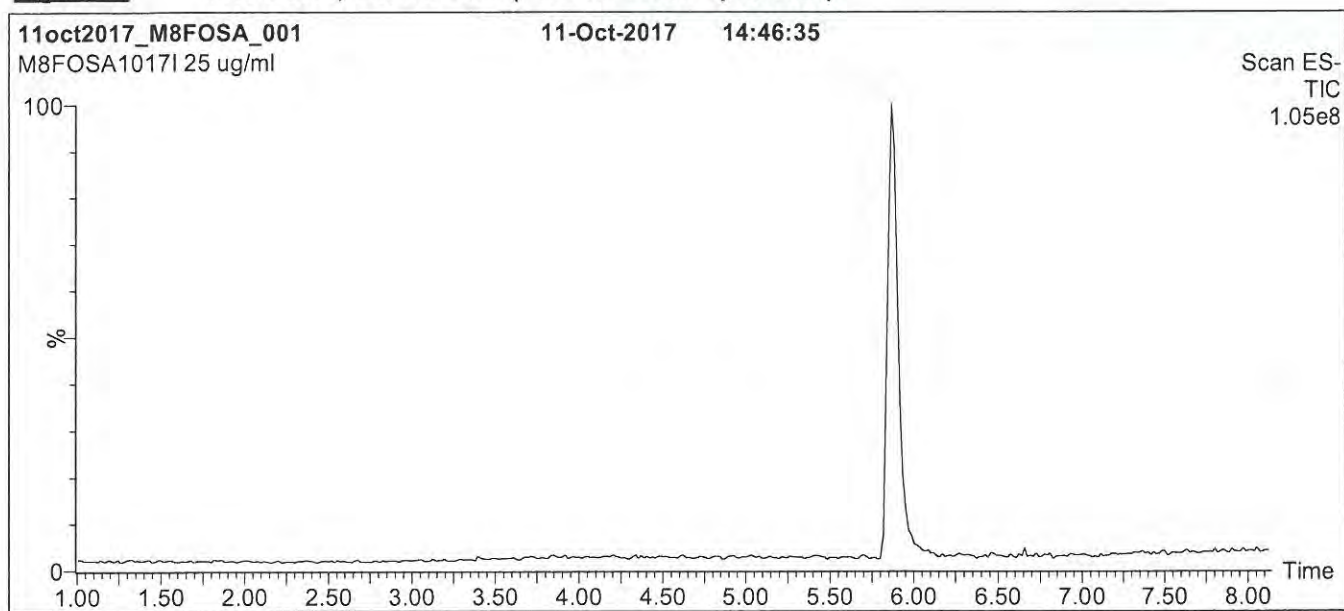
QUALITY MANAGEMENT:

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).



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

18F2220

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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 μ l/min

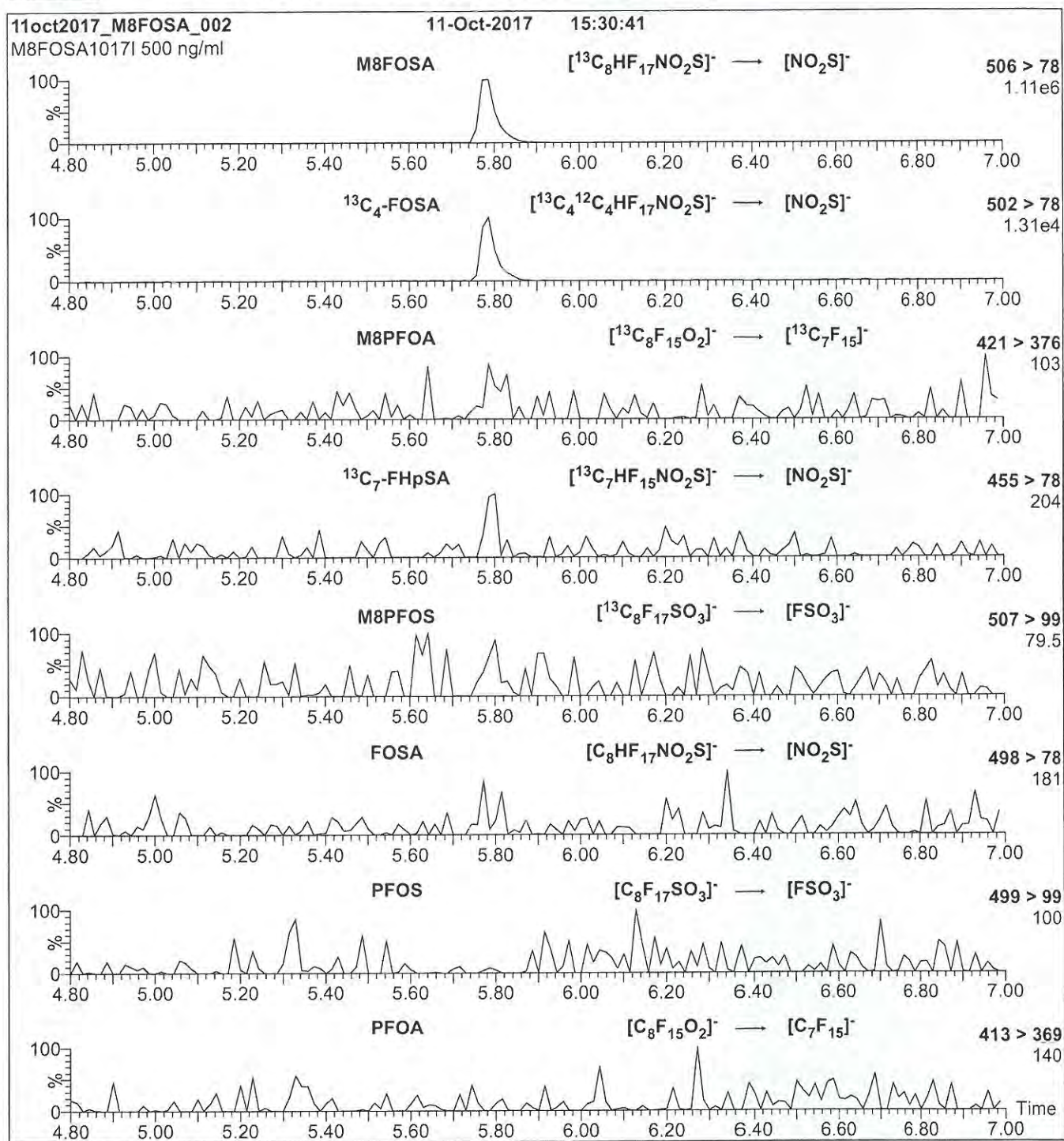
MS Parameters

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

18F2220

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18F2221

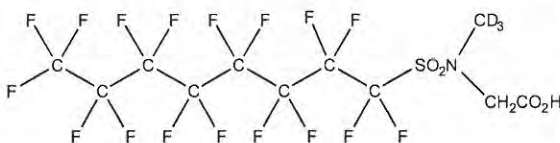


WELLINGTON LABORATORIES

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: $C_{11}D_3H_3F_{17}NO_4S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 574.23
SOLVENT(S): Methanol
 Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 11/08/2017
EXPIRY DATE: (mm/dd/yyyy) 11/08/2022
RECOMMENDED STORAGE: Refrigerate ampoule

ISOTOPIC PURITY: $\geq 98\% \text{ } ^2\text{H}_3$

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: 
 B.G. Chittim, General Manager

Date: 11/16/2017
 (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

18F2221

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.

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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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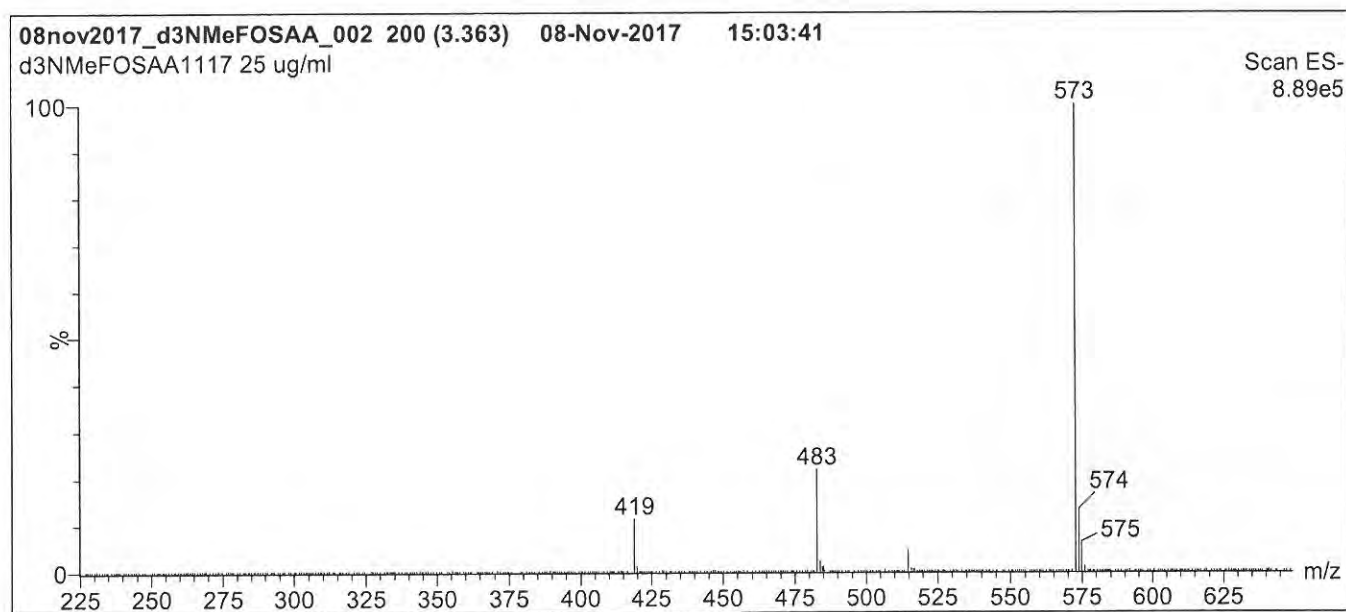
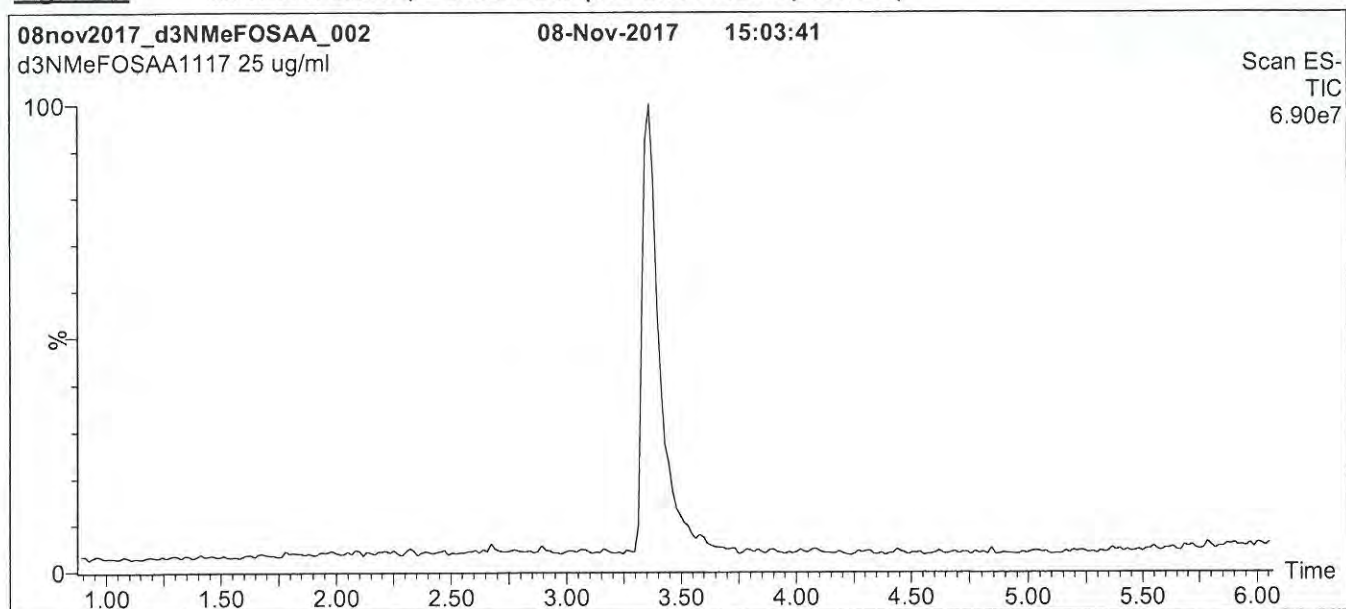
QUALITY MANAGEMENT:

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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18F2221

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 60% (80:20 MeOH:ACN) / 40% H₂O
 (both with 10 mM NH₄OAc 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

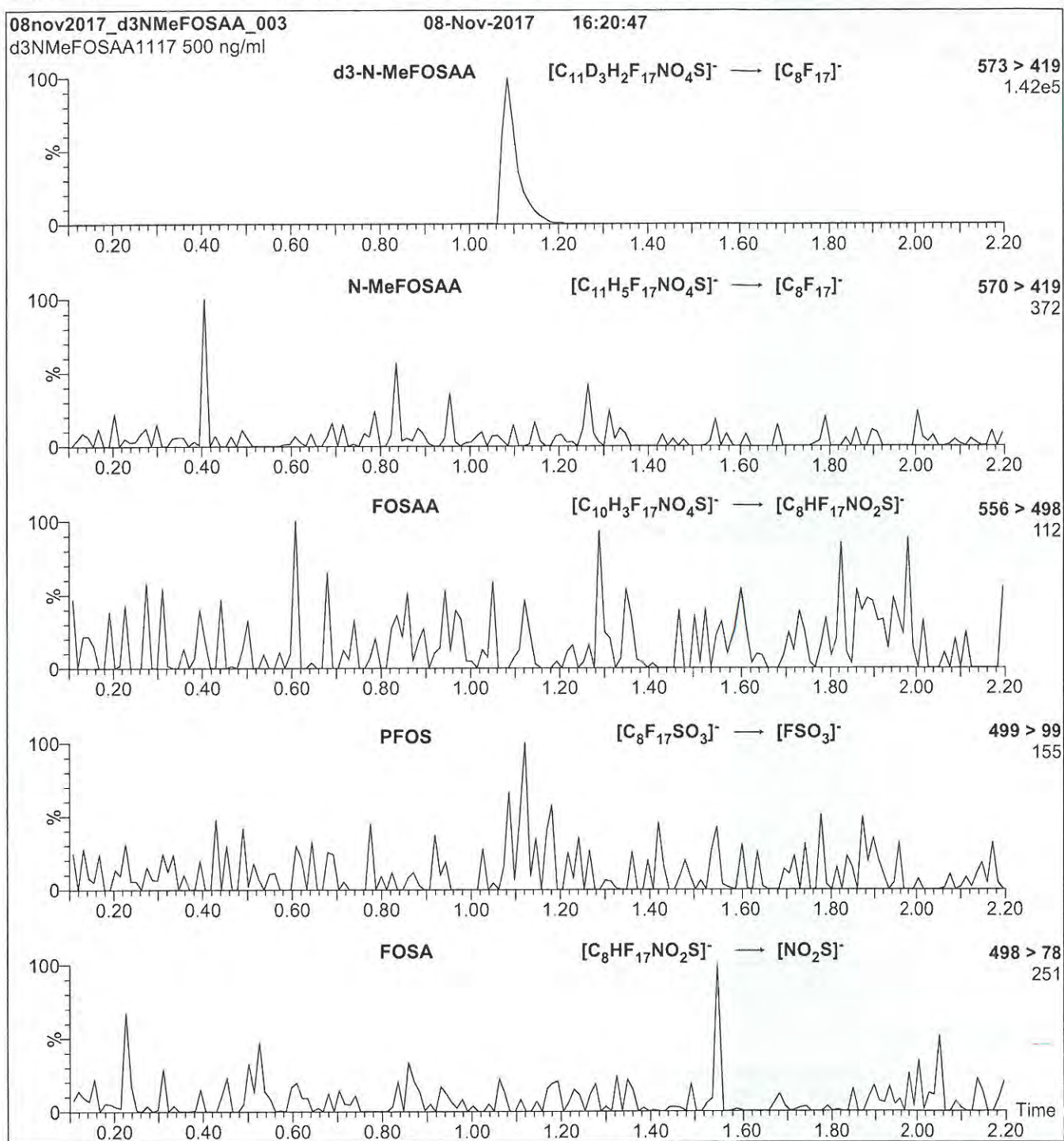
Flow: 300 μ l/min

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

18F2221

Figure 2: d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml d3-N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 20

18F2222

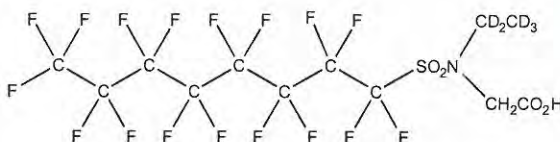


WELLINGTON LABORATORIES

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: $C_{12}D_5H_3F_{17}NO_4S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 590.26
SOLVENT(S): Methanol
 Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 11/08/2017
EXPIRY DATE: (mm/dd/yyyy) 11/08/2022
RECOMMENDED STORAGE: Refrigerate ampoule

ISOTOPIC PURITY: $\geq 98\% \text{ } ^2\text{H}_5$

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:
 B.G. Chittim, General Manager

Date: 11/16/2017
 (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

18F2222

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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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:

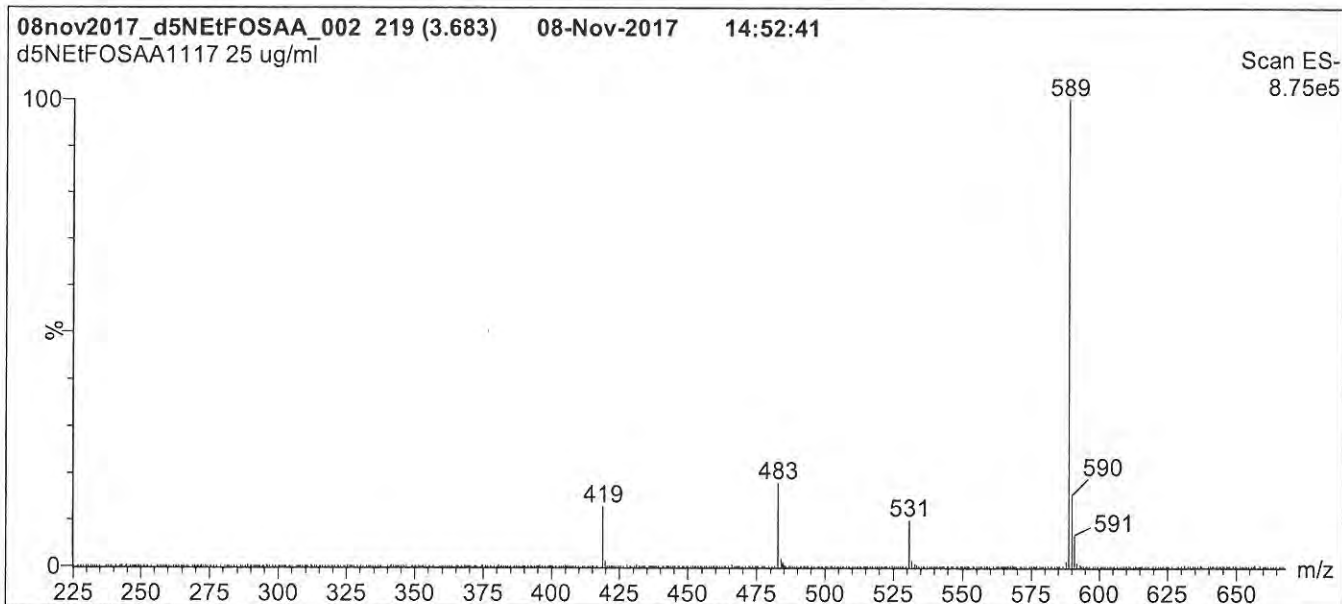
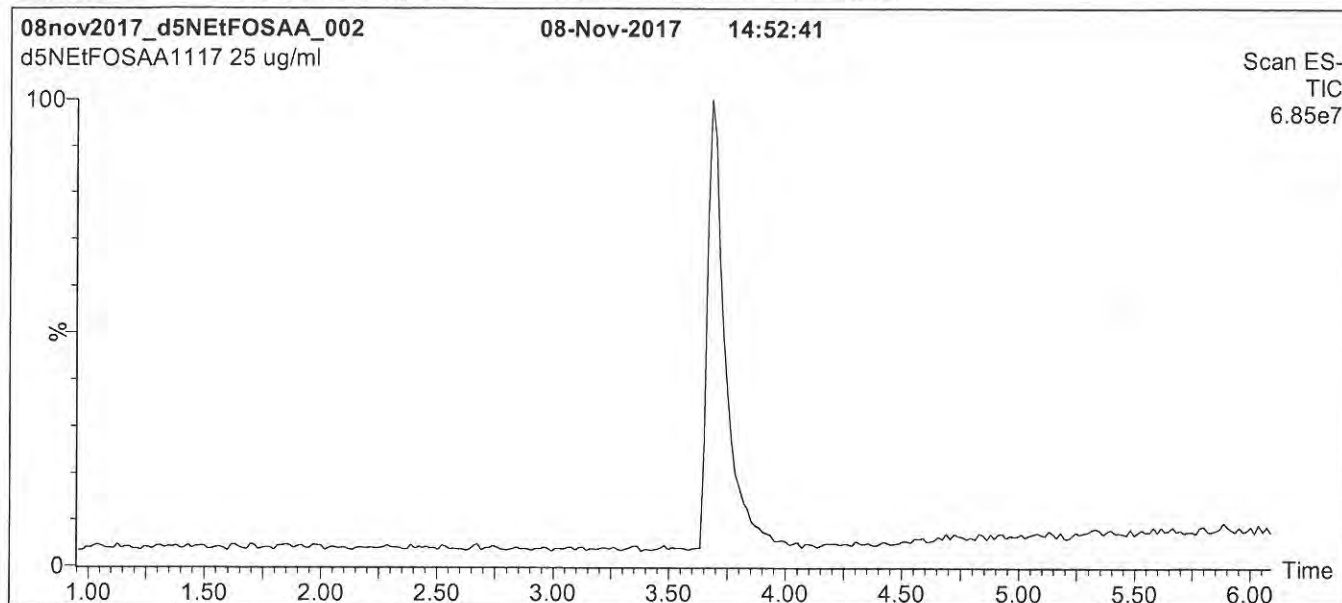
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18F2222

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)

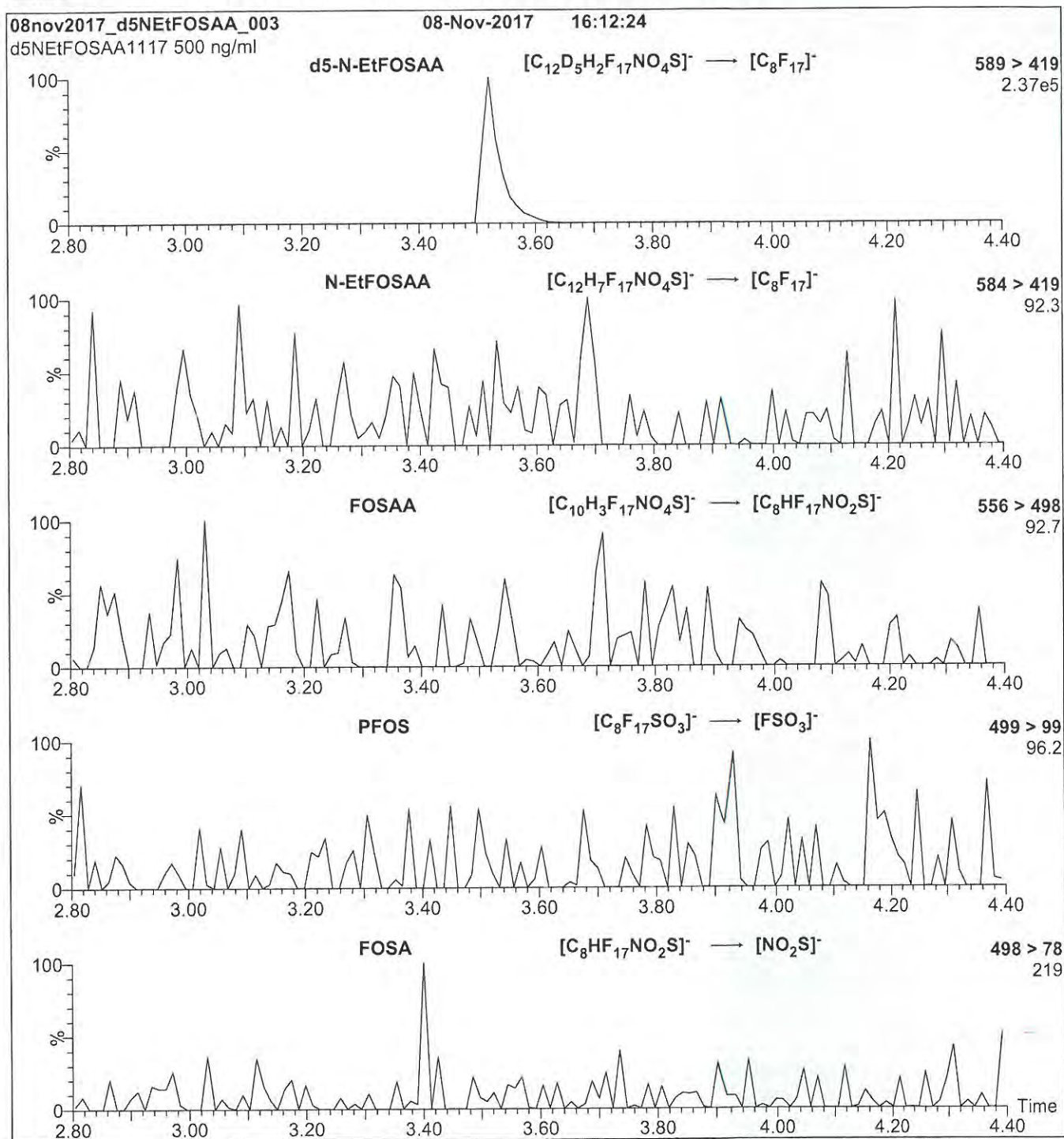
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 35.00

Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (l/hr) = 750

18F2222

Figure 2: d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (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 μ l/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 20

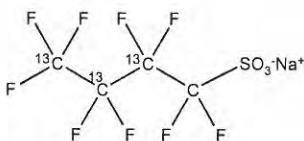
18F2223



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFBS **LOT NUMBER:** M3PFBS0218
COMPOUND: Sodium perfluoro-1-[2,3,4-¹³C₃]butanesulfonate
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₃¹²CF₉SO₃Na
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
 46.5 ± 2.3 µg/ml (M3PFBS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 02/15/2018
EXPIRY DATE: (mm/dd/yyyy) 02/15/2023
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 325.06
SOLVENT(S): Methanol
ISOTOPIC PURITY: ≥99% ¹³C
 (2,3,4-¹³C₃)

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, General Manager

Date: 02/16/2018
 (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

18F2223

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:

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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 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:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

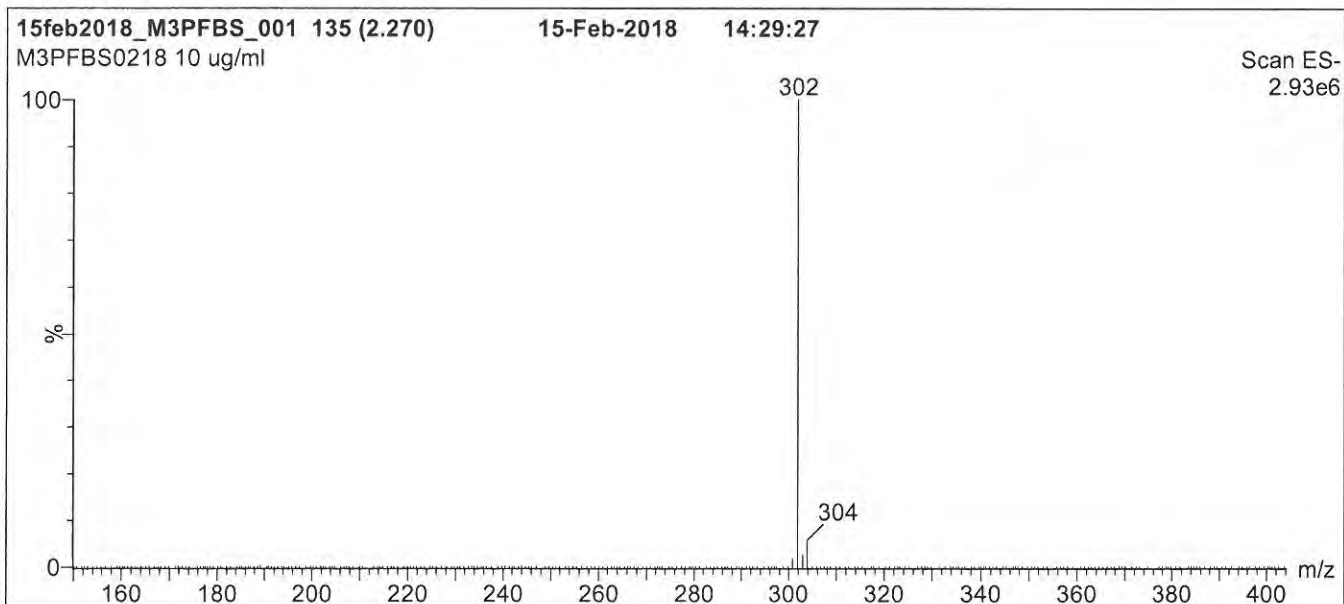
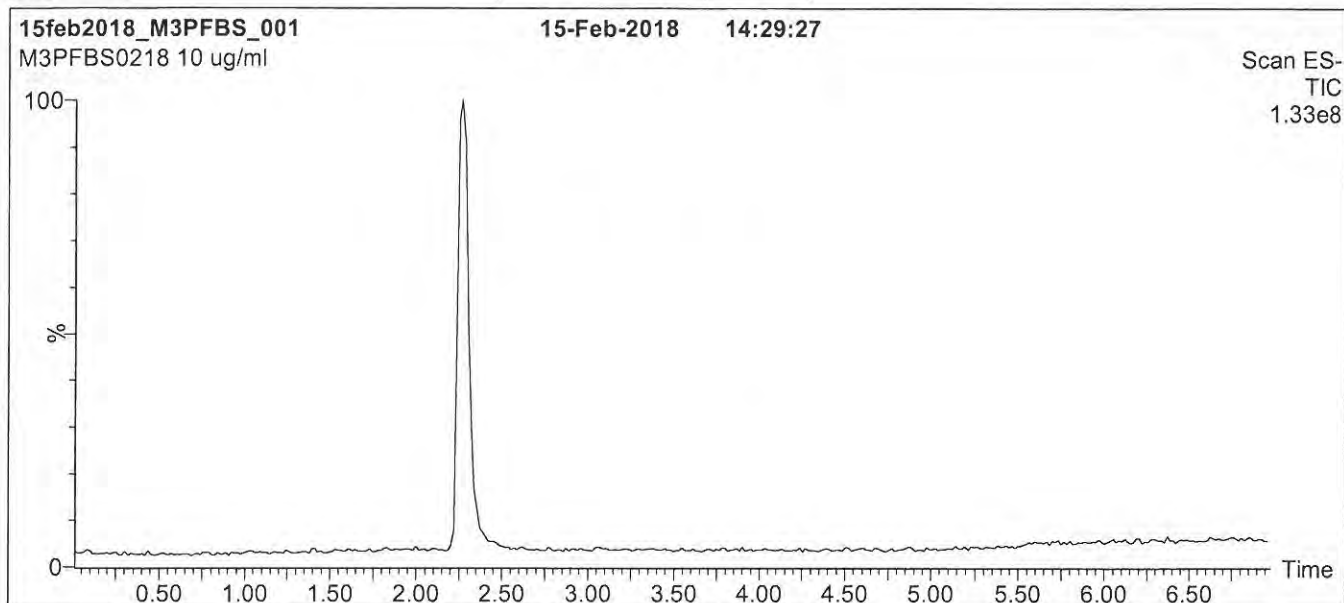
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18F2223

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

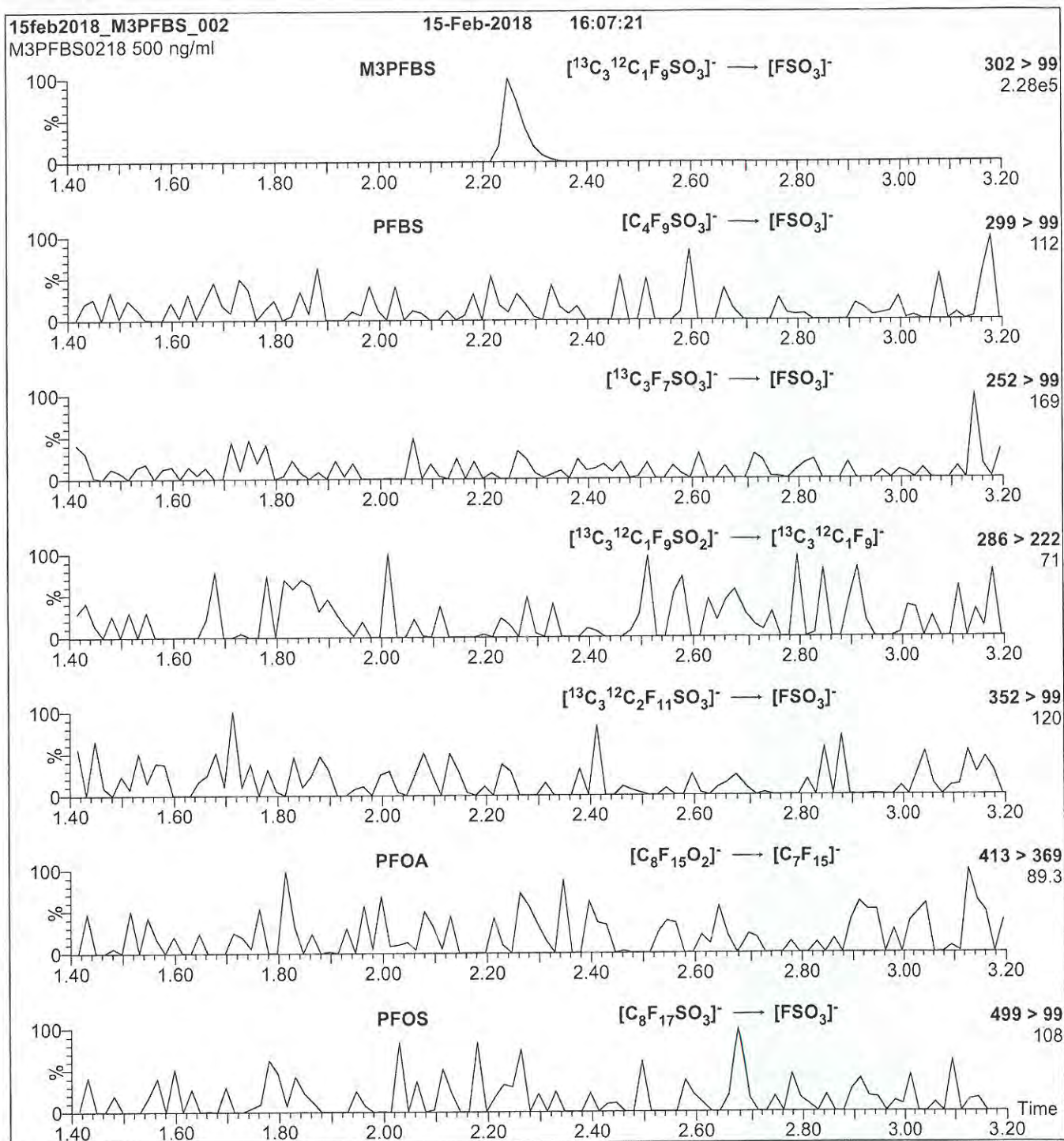
Flow: 300 μ l/min

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

18F2223

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.17\text{e-}3$
Collision Energy (eV) = 25

18F2224



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

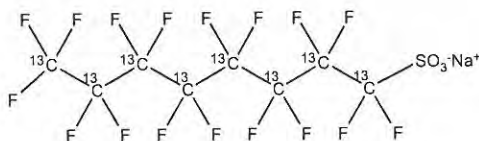
M8PFOS

LOT NUMBER:

M8PFOS1117

COMPOUND:Sodium perfluoro-1-[$^{13}\text{C}_8$]octanesulfonate**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:** $^{13}\text{C}_8\text{F}_{17}\text{SO}_3\text{Na}$ **MOLECULAR WEIGHT:**

530.05

CONCENTRATION:50.0 \pm 2.5 $\mu\text{g/ml}$ (Na salt)**SOLVENT(S):**

Methanol

47.8 \pm 2.4 $\mu\text{g/ml}$ (M8PFOS anion)**CHEMICAL PURITY:**

>98%

ISOTOPIC PURITY:>99% ^{13}C **LAST TESTED:** (mm/dd/yyyy)

11/08/2017

($^{13}\text{C}_8$)**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-[$^{13}\text{C}_7$]heptanesulfonate ($^{13}\text{C}_7$ -PFHpS) and ~ 0.8% of sodium perfluoro-1-[$^{13}\text{C}_4$]octanesulfonate (MPFOS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 11/22/2017

(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

18F2224

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

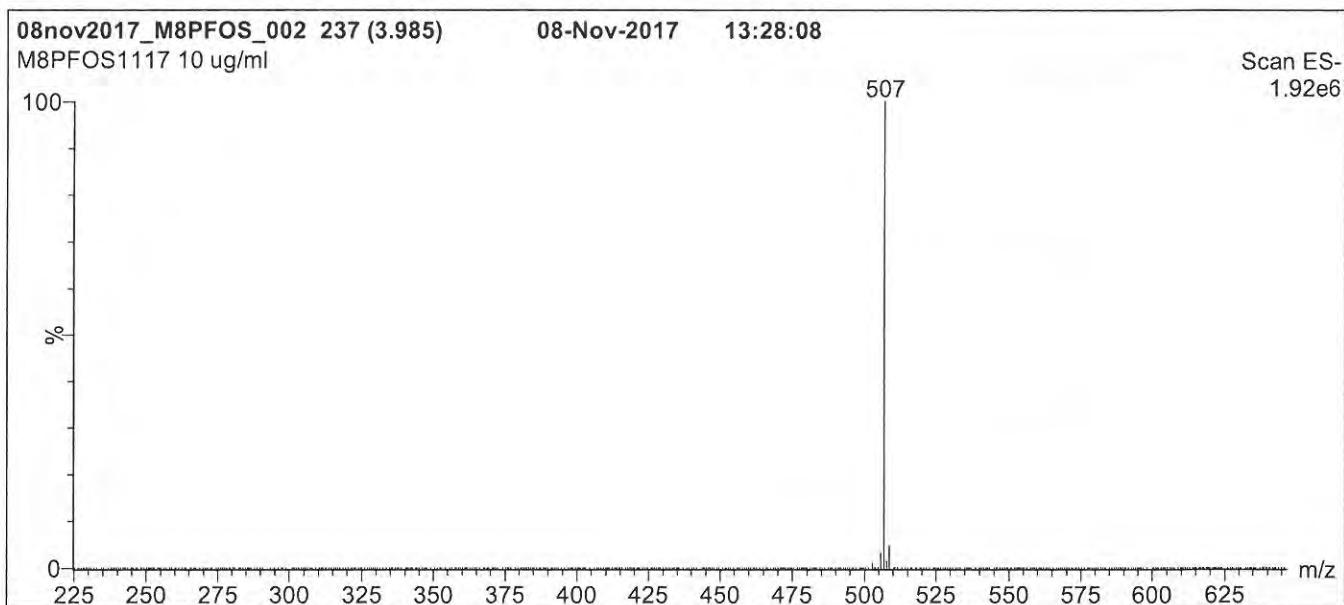
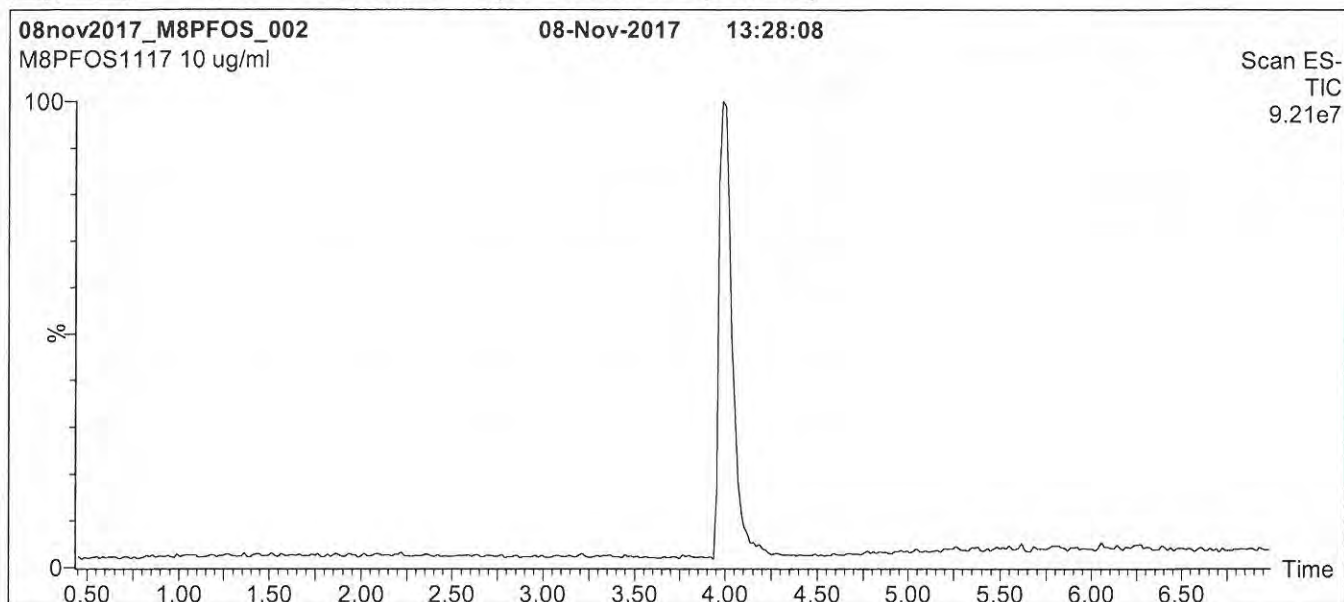
QUALITY MANAGEMENT:

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).



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

18F2224

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

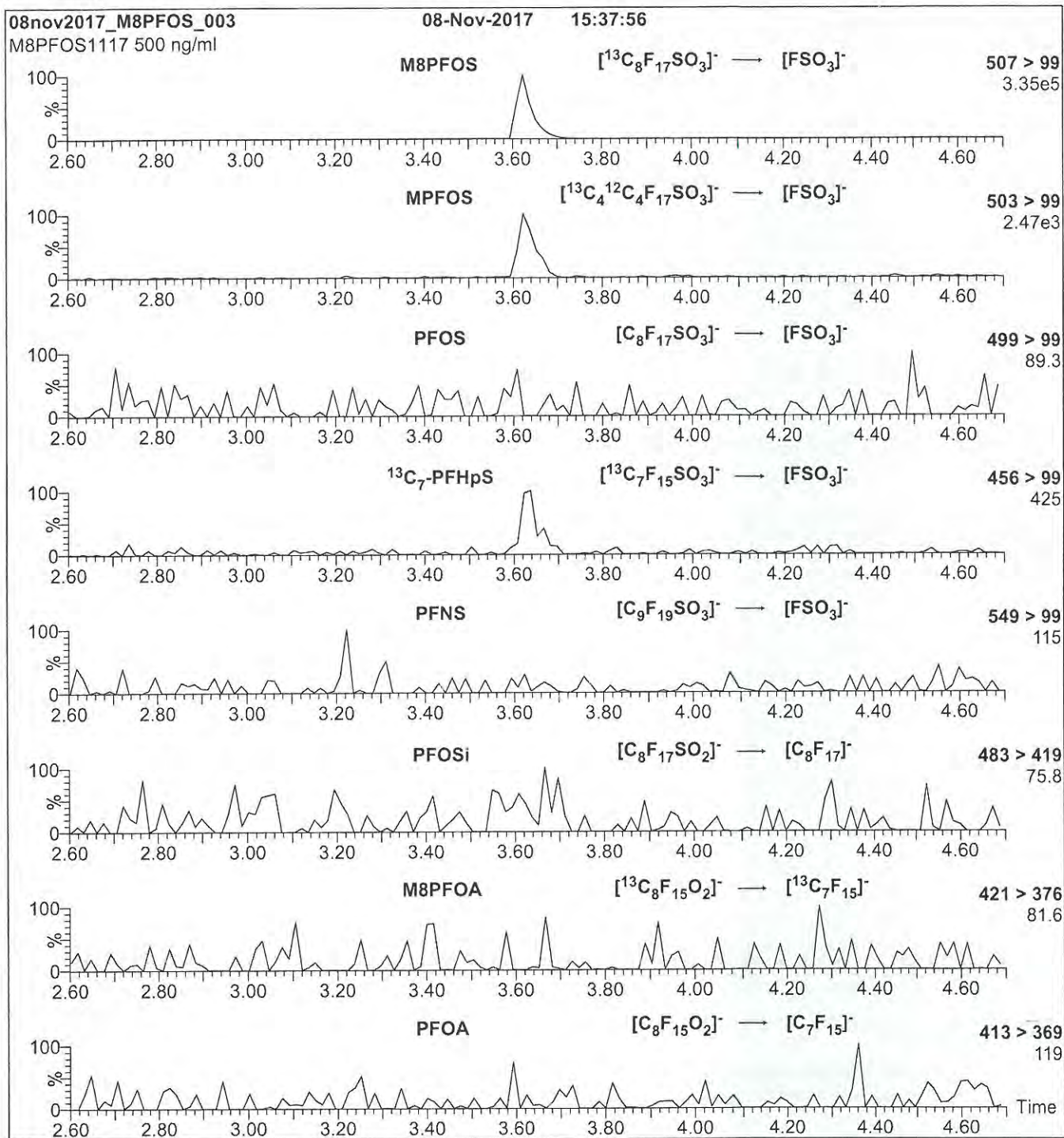
Flow: 300 μ l/min

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

18F2224

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 40

18F2225



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

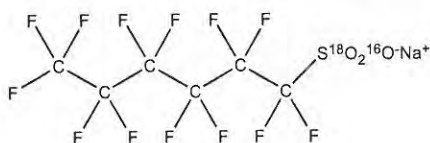
MPFHxS

COMPOUND:Sodium perfluoro-1-hexane[¹⁸O₂]sulfonate**LOT NUMBER:**

MPFHxS0318

STRUCTURE:**CAS #:**

1585941-14-5

**MOLECULAR FORMULA:**C₆F₁₃S¹⁸O₂¹⁶ONa**MOLECULAR WEIGHT:**

426.10

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

47.3 ± 2.4 µg/ml (MPFHxS anion)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:>94% (¹⁸O₂)**LAST TESTED:** (mm/dd/yyyy)

03/22/2018

EXPIRY DATE: (mm/dd/yyyy)

03/22/2023

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 (C₆F₁₃S¹⁸O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C₆F₁₃S¹⁶O₃⁻) when both compounds are injected together. This difference may vary between instruments.
- Contains ~ 1.0% of sodium perfluoro-1-octane[¹⁸O₂]sulfonate (¹⁸O₂-PFOS) and ~ 0.3% of sodium perfluoro-1-heptane[¹⁸O₂]sulfonate (¹⁸O₂-PFHpS).
- Due to the isotopic purity of the starting material (¹⁸O₂ >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, General Manager

Date: 06/07/2018

(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

18F2225

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:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

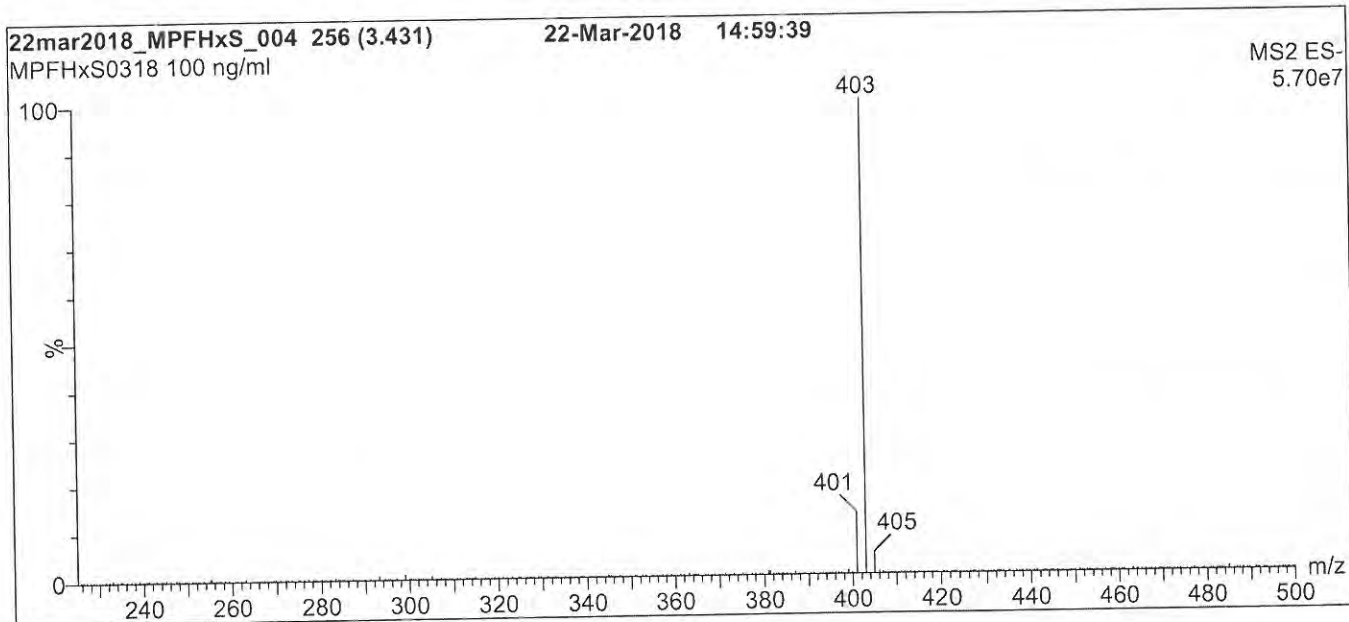
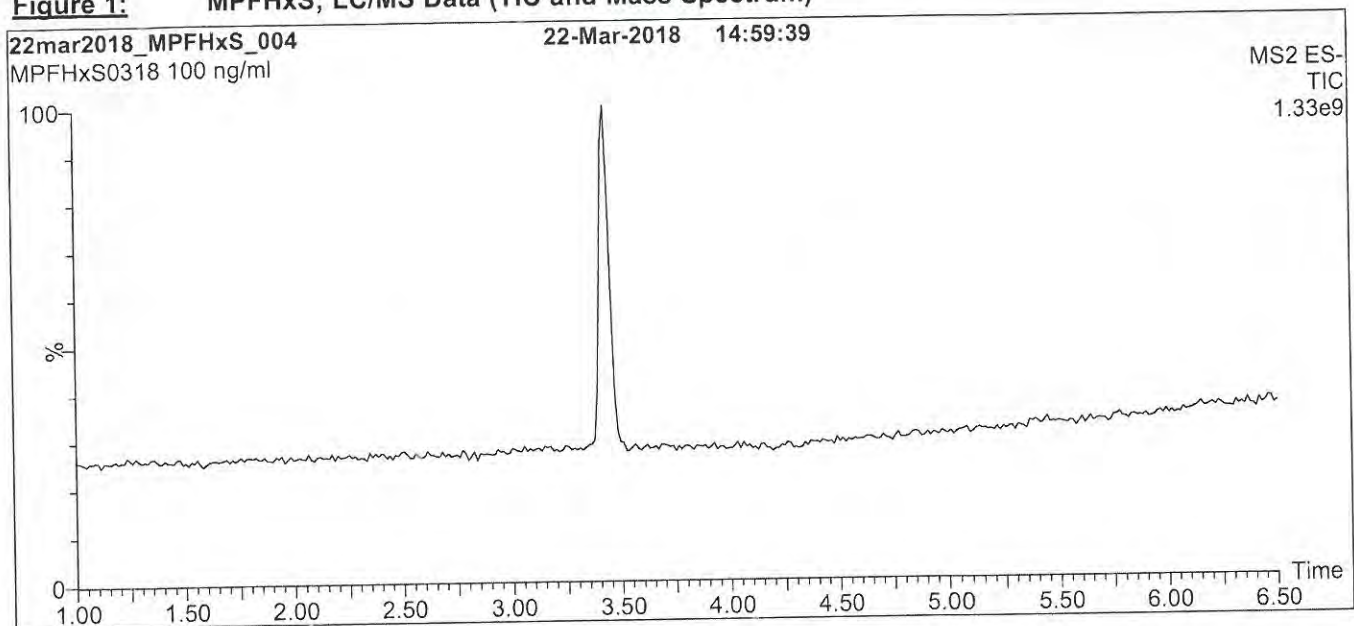
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18F2225

Figure 1: MPFHxS; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 80% organic over 7 min and hold for 3 min
before returning to initial conditions in 0.75 min.
Time: 12 min

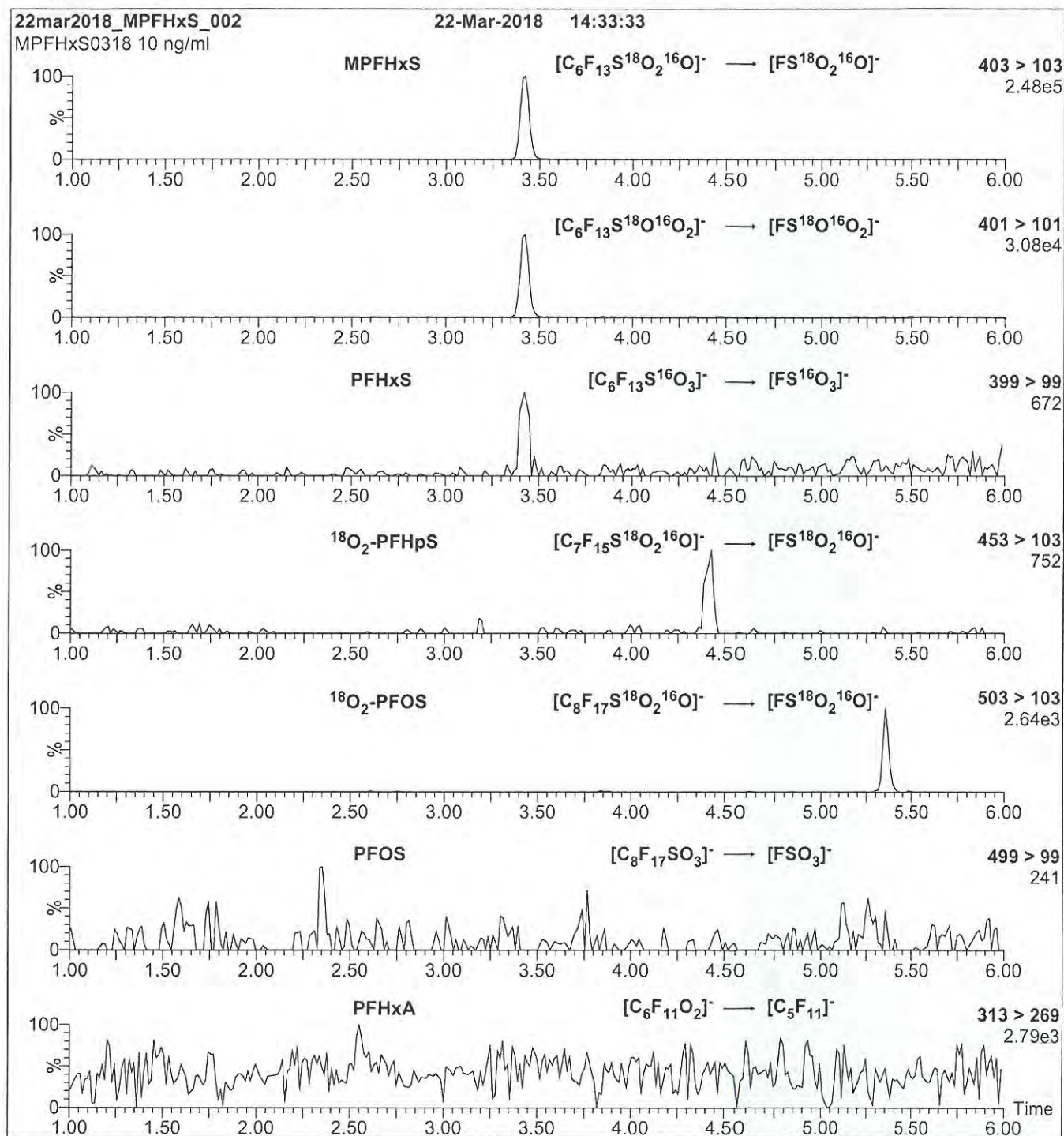
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 0.50
Cone Voltage (V) = 5.00
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (l/hr) = 750

18F2225

Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: On-column (MPFHxS)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.64e-3

Collision Energy (eV) = 32

18F2226



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

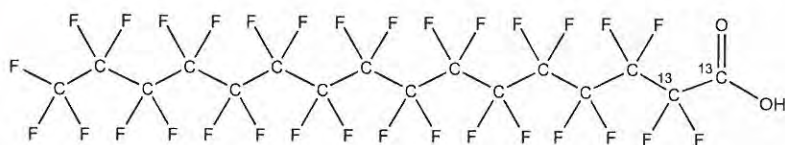
M2PFHxDA

LOT NUMBER:

M2PFHxDA0717

COMPOUND:Perfluoro-n-[1,2-¹³C₂]hexadecanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:** $^{13}\text{C}_2^{12}\text{C}_{14}\text{HF}_{31}\text{O}_2$ **MOLECULAR WEIGHT:**

816.11

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**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

(1,2-¹³C₂)**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:

B.G. Chittim, General Manager

Date: 07/14/2017

(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

18F2226

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

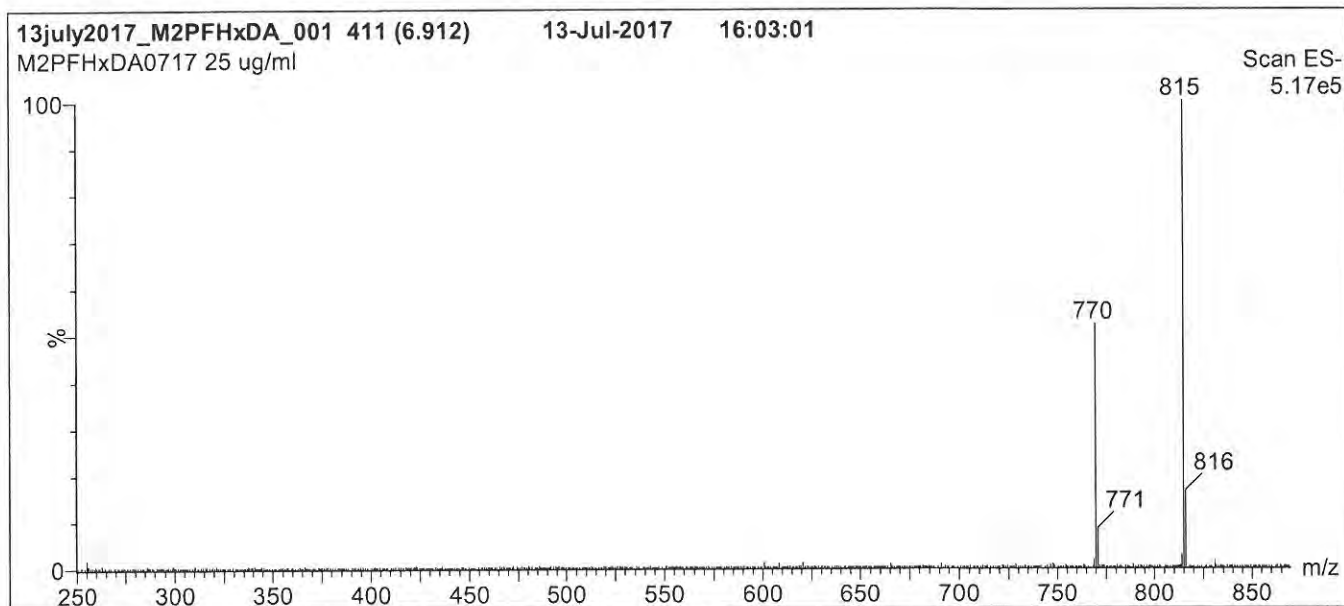
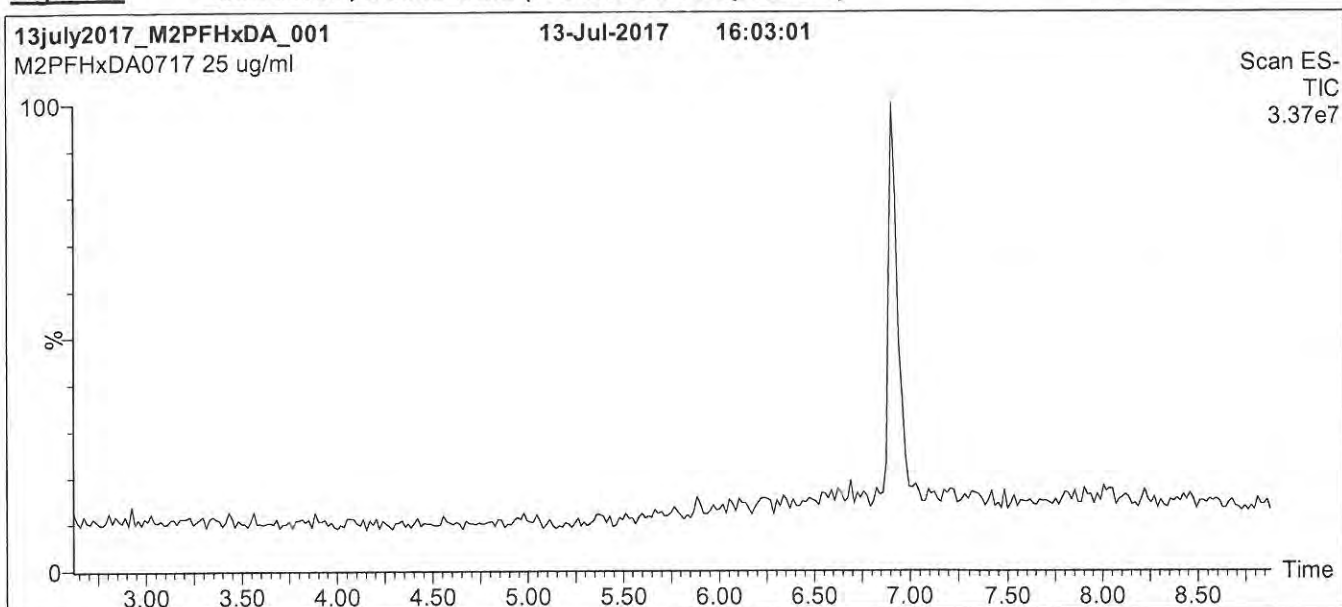
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18F2226

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

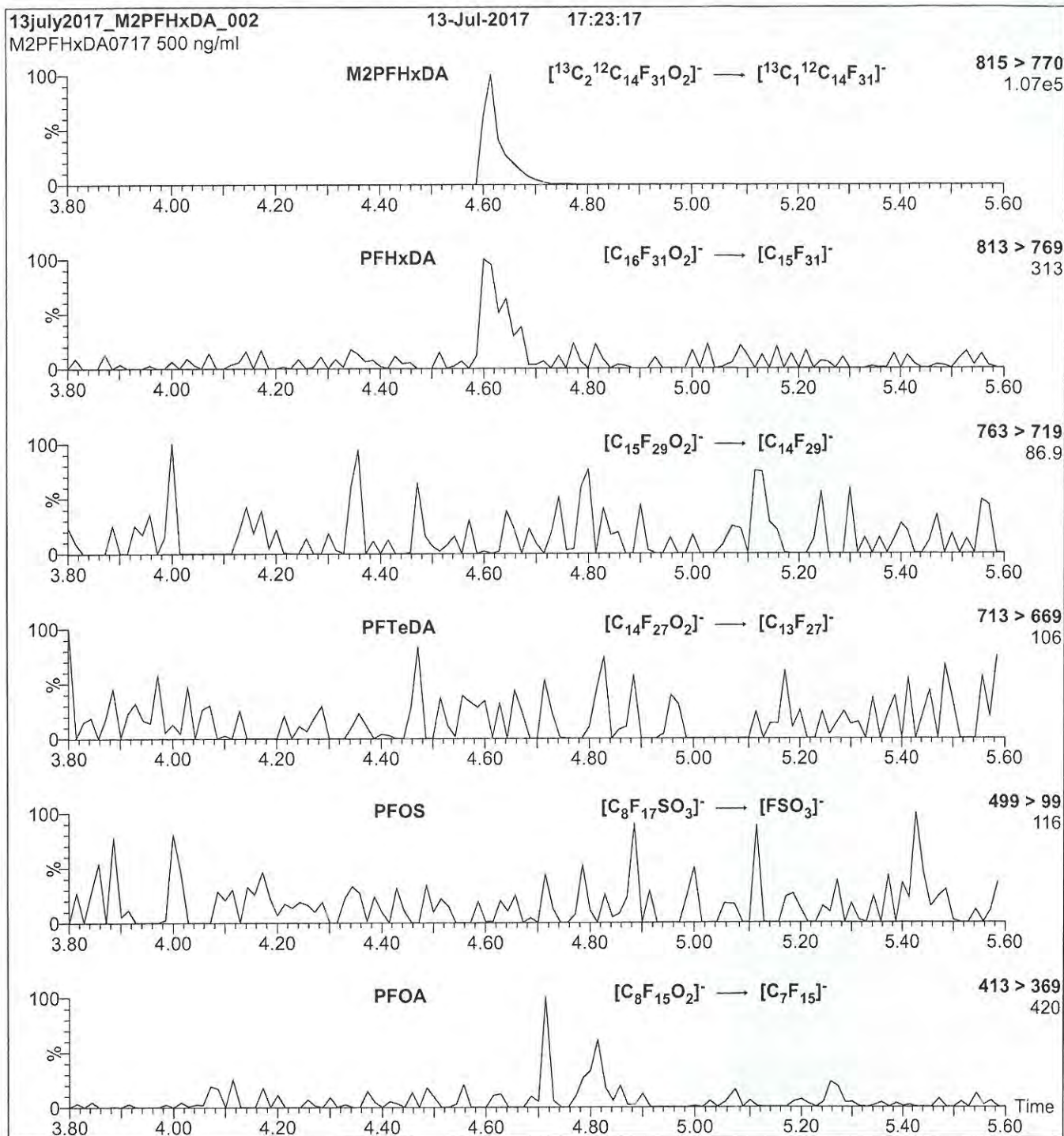
Flow: 300 μ l/min

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

18F2226

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.28\text{e-}3$
Collision Energy (eV) = 15

18F2227



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

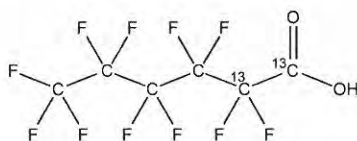
MPFHxA

LOT NUMBER:

MPFHxA1017

COMPOUND:Perfluoro-n-[1,2-¹³C₂]hexanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₄H₁₁O₂**MOLECULAR WEIGHT:**

316.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

10/27/2017

(1,2-¹³C₂)**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:**

B.G. Chittim, General Manager
Date:10/30/2017
(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

18F2227

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:

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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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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.

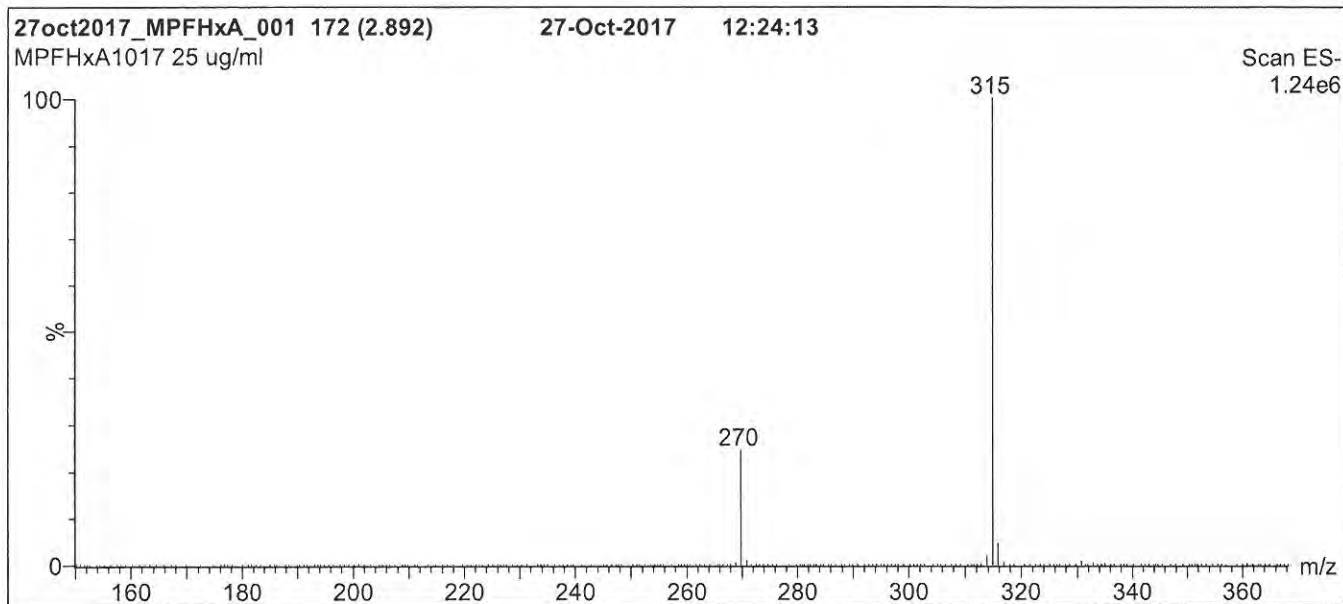
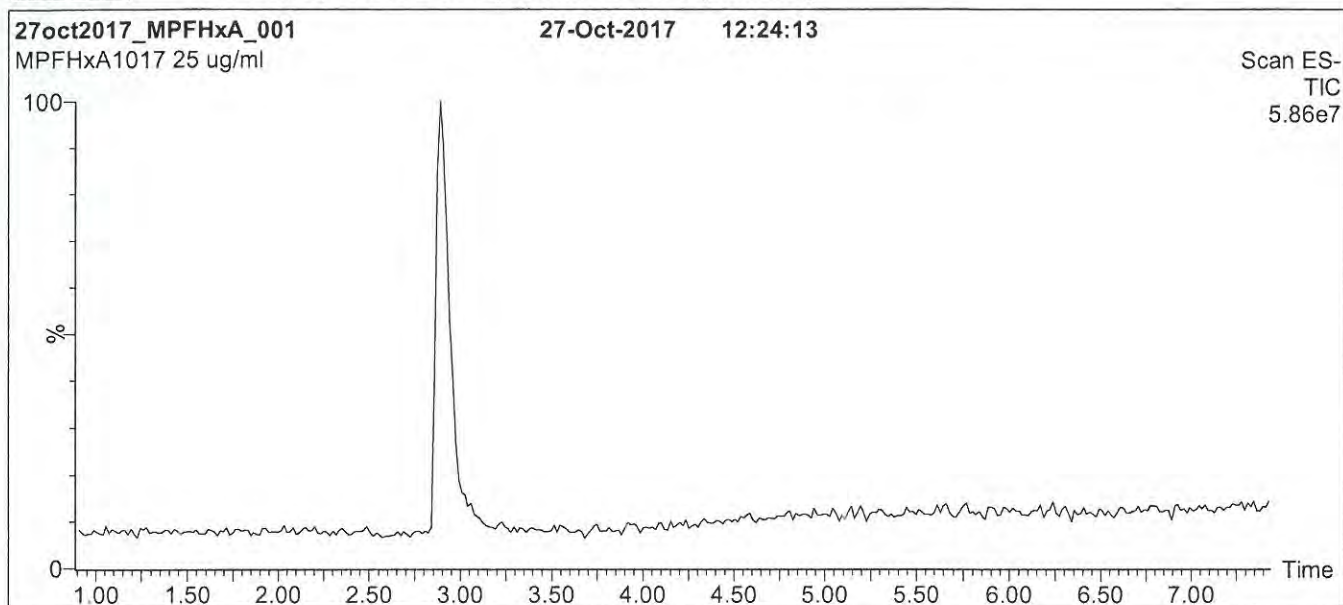
QUALITY MANAGEMENT:

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).



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

18F2227

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

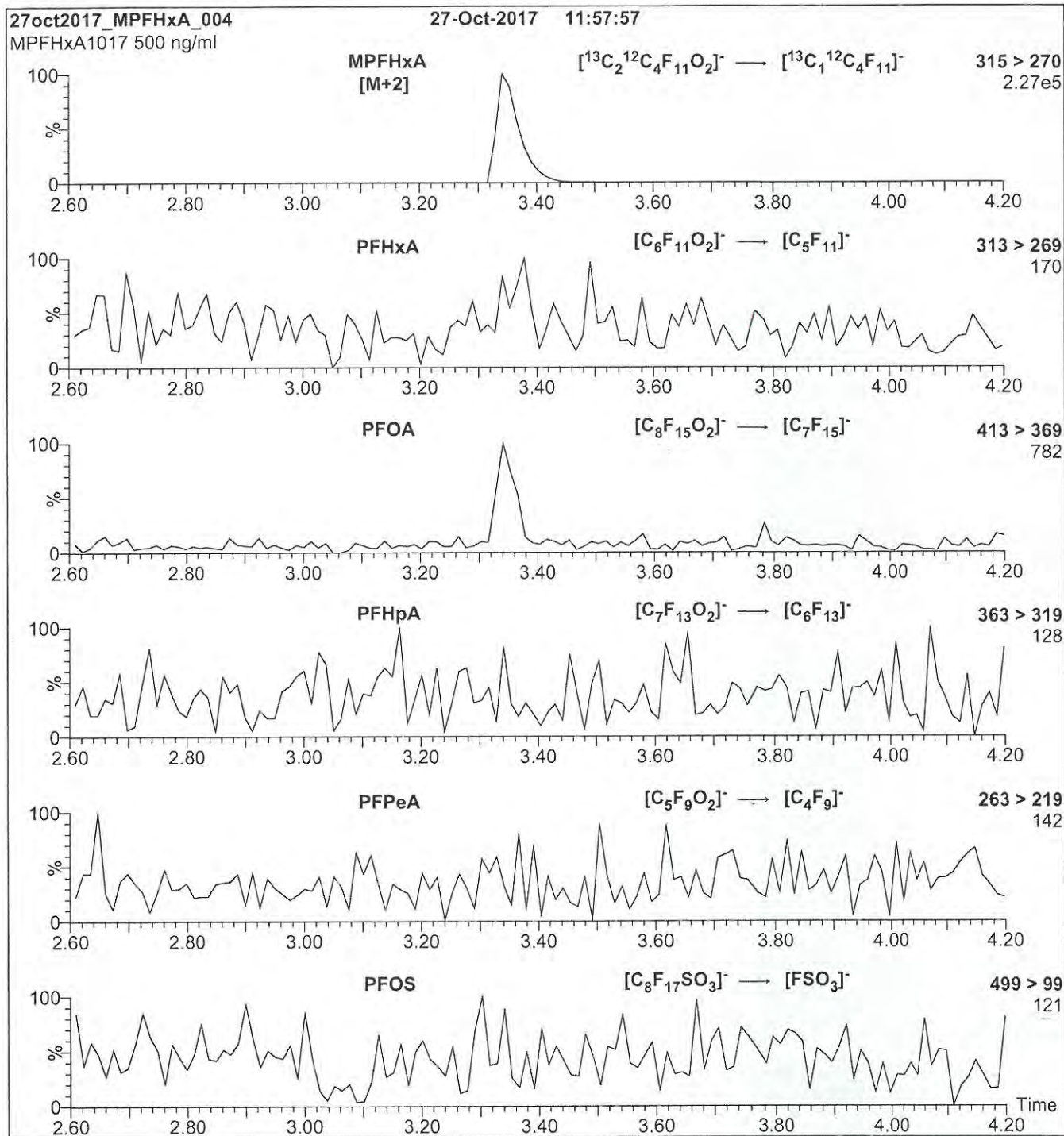
Flow: 300 μ l/min

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

18F2227

Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.58e-3

Collision Energy (eV) = 10

Analytical Standard Record
Vista Analytical Laboratory
18J1505

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18E0707	PFD0A	07-May-18	** Vendor **	18-Apr-23	0.4
18E0708	PFBA	07-May-18	** Vendor **	14-Dec-22	0.4
18E0709	PFPeA	07-May-18	** Vendor **	16-Feb-23	0.4
18E0710	PFHxA	07-May-18	** Vendor **	27-Sep-22	0.4
18E0711	PFDA	07-May-18	** Vendor **	14-Dec-22	0.4
18E0712	PFUDa	07-May-18	** Vendor **	21-Sep-22	0.4
18E0713	PFTTrDA	07-May-18	** Vendor **	02-May-22	0.4
18E0714	PFHpA	07-May-18	** Vendor **	27-Sep-22	0.4
18E0715	PFOA	07-May-18	** Vendor **	16-Feb-23	0.4
18E0716	PFNA	07-May-18	** Vendor **	20-Jul-22	0.4
18E0717	PFTeDA	07-May-18	** Vendor **	21-Sep-22	0.4
18E0718	PFHxDA	07-May-18	** Vendor **	13-Jul-22	0.4
18E0719	PFODA	07-May-18	** Vendor **	13-Jul-22	0.4
18E0720	L-PFBS	07-May-18	** Vendor **	21-Sep-22	0.454
18E0721	L-PFPeS	07-May-18	** Vendor **	11-Jan-22	0.428
18E0722	L-PFHpS	07-May-18	** Vendor **	01-Sep-22	0.42
18E0723	L-PFNS	07-May-18	** Vendor **	27-Sep-22	0.418
18E0724	L-PFDS	07-May-18	** Vendor **	08-Nov-22	0.415
18E0725	br-PFHxSK	07-May-18	** Vendor **	04-Jan-22	0.44
18E0726	br-PFOSK anion	07-May-18	** Vendor **	12-Jan-22	0.431
18E0727	4:2 FTS	07-May-18	** Vendor **	12-Dec-21	0.43
18E0728	6:2FTS	07-May-18	** Vendor **	03-Apr-23	0.422
18E0729	8:2FTS	07-May-18	** Vendor **	24-Jan-23	0.418
18E0730	FOSA-I	07-May-18	** Vendor **	01-Sep-22	0.4
18E0731	br-NMeFOSAA	07-May-18	** Vendor **	17-Jan-23	0.4
18E0732	br-NEtFOSAA	07-May-18	** Vendor **	17-Jan-23	0.4
18I0762	N-MeFOSA-M	07-Sep-18	** Vendor **	07-May-23	2
18I0763	N-EtFOSA-M	07-Sep-18	** Vendor **	07-May-23	2
18I0764	N-MeFOSE-M	07-Sep-18	** Vendor **	04-Jun-23	2
18I0765	N-EtFOSE-M	07-Sep-18	** Vendor **	14-Dec-22	2

Description:	PFC NS Stock	Expires:	15-Oct-20
Standard Type:	Analyte Spike	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 14:52 by GRB

PFOS and PFHxS linear and branched components
As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.

Analyte	CAS Number	Concentration	Units
L-PFOA		1	ug/mL
L-PFTTrDA		1	ug/mL
L-PFHpA		1	ug/mL
L-PFHpS		1	ug/mL

Analytical Standard Record

Vista Analytical Laboratory

18J1505

Description:	PFC NS Stock	Expires:	15-Oct-20
Standard Type:	Analyte Spike	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 14:52 by GRB

PFOS and PFHxS linear and branched components

As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.

Analyte	CAS Number	Concentration	Units
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	0.776	ug/mL
L-MeFOSAA	2355-31-9	0.76	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
PFOSA	754-91-6	1	ug/mL
PFPeA	2706-90-3	1	ug/mL

Analytical Standard Record

Vista Analytical Laboratory

18J1505

Description:	PFC NS Stock	Expires:	15-Oct-20
Standard Type:	Analyte Spike	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 14:52 by GRB

PFOS and PFHxS linear and branched components

As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.

Analyte	CAS Number	Concentration	Units
PFPeS	2706-91-4	1	ug/mL
PFTeDA	376-06-7	1	ug/mL
PFTTrDA	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

18E0707



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFD0A

LOT NUMBER:

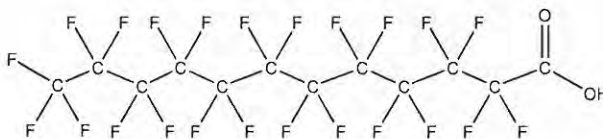
PFD0A0418

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:**CAS #:**

307-55-1

**MOLECULAR FORMULA:** $C_{12}H_{23}O_2$ **MOLECULAR WEIGHT:**

614.10

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

04/18/2018

EXPIRY DATE: (mm/dd/yyyy)

04/18/2023

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (SIR)

Figure 2: LC/MS Data (Mass Spectrum)

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 carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

 04/24/2018
 (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

18E0707

17

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.

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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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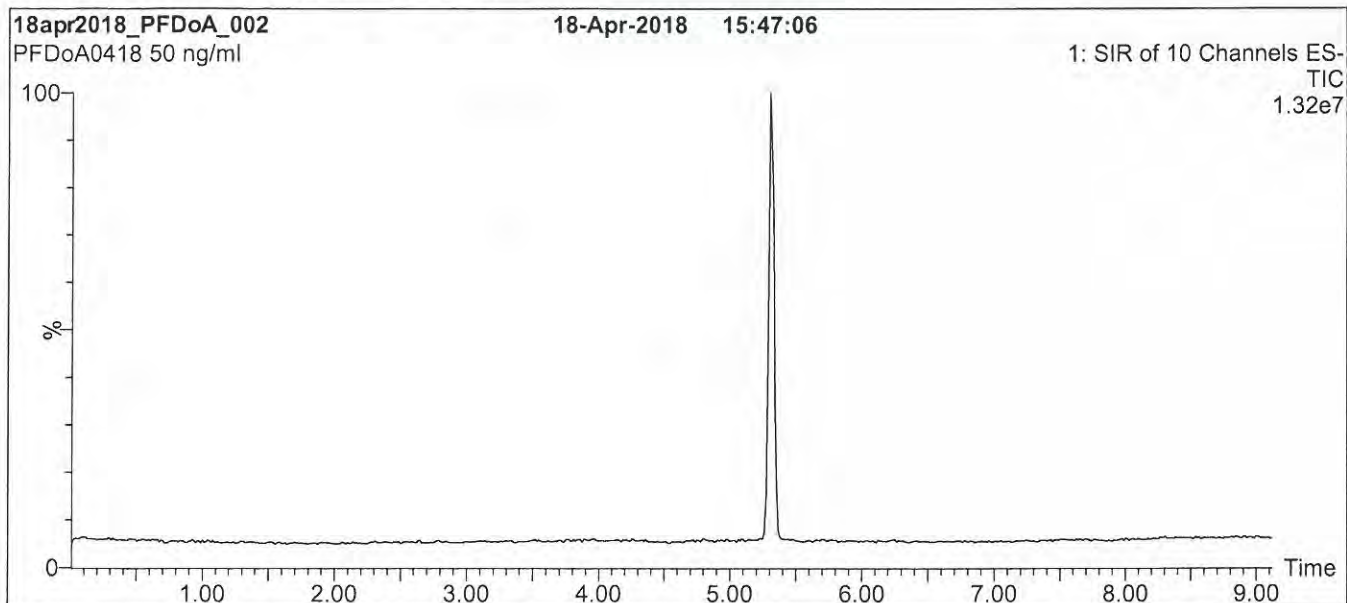
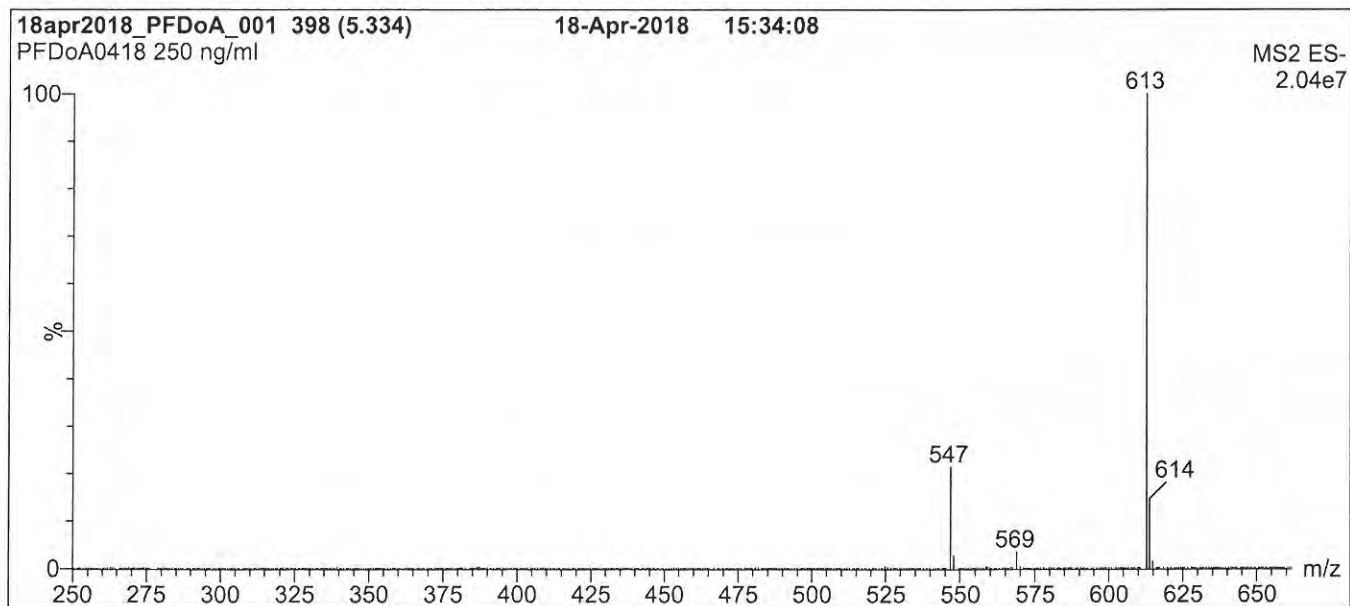
QUALITY MANAGEMENT:

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18E0707

Figure 1: PFD0A; LC/MS Data (SIR)**Figure 2: PFD0A; LC/MS Data (Mass Spectrum)****Conditions for Figures 1 & 2:**

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

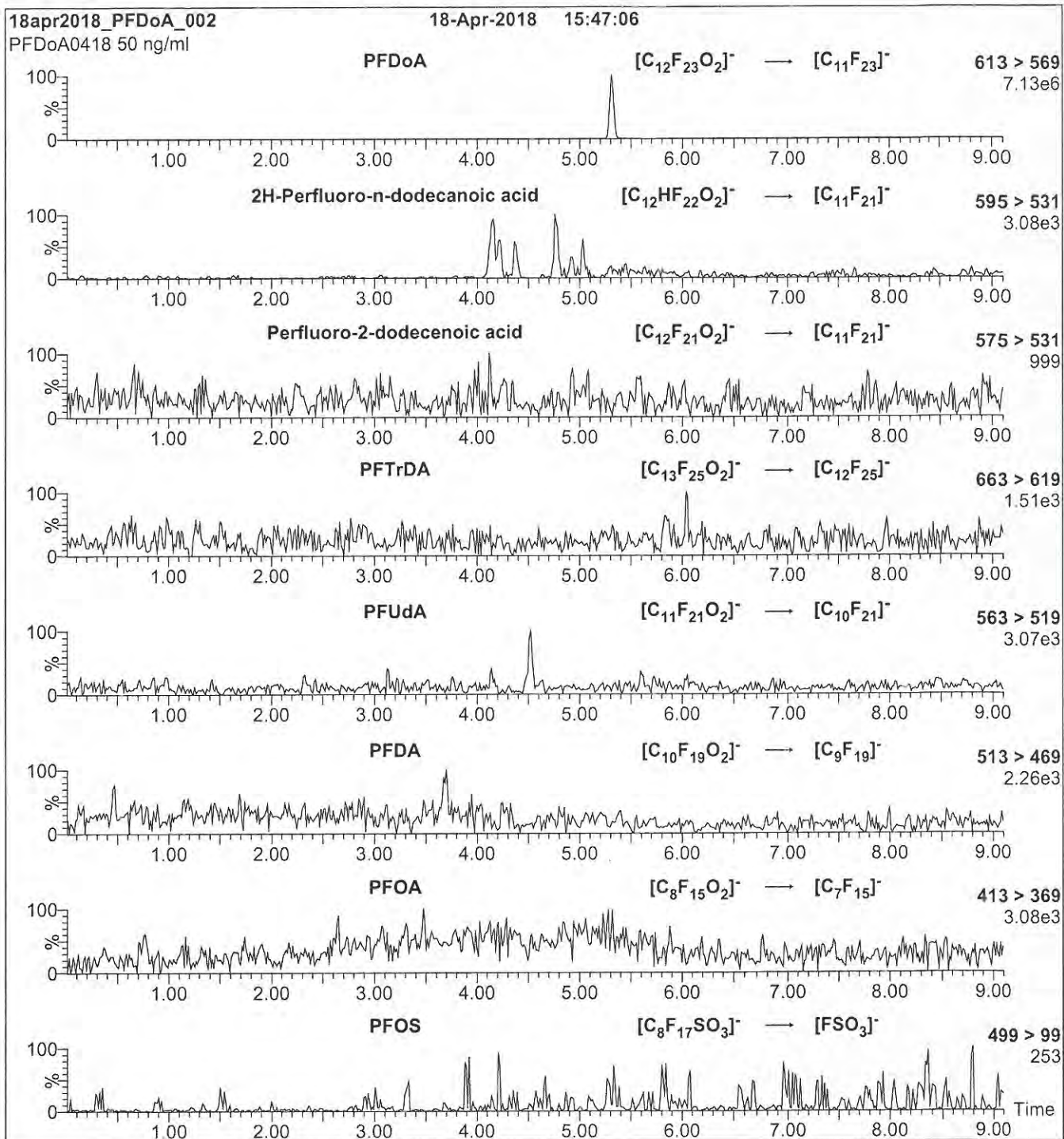
Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 μ l/min

MS Parameters

Experiments: SIR of 10 channels
Full Scan (250 - 850 amu)
Source: Electrospray (negative)
Capillary Voltage (kV) = 0.50
Cone Voltage (V) = 5 (variable for SIR (2-12))
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (l/hr) = 750

18E0707

Figure 3: PFDoA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: On-column (PFDoA)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.47e-3

Collision Energy (eV) = 12

18E0708



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFBA

LOT NUMBER:

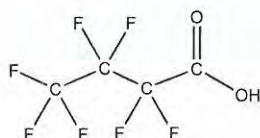
PFBA1217

COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:**CAS #:**

375-22-4

**MOLECULAR FORMULA:** $C_4HF_7O_2$ **MOLECULAR WEIGHT:**

214.04

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**

B.G. Chittim, General Manager
Date:12/18/2017
(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

INTENDED USE:

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HAZARDS:

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$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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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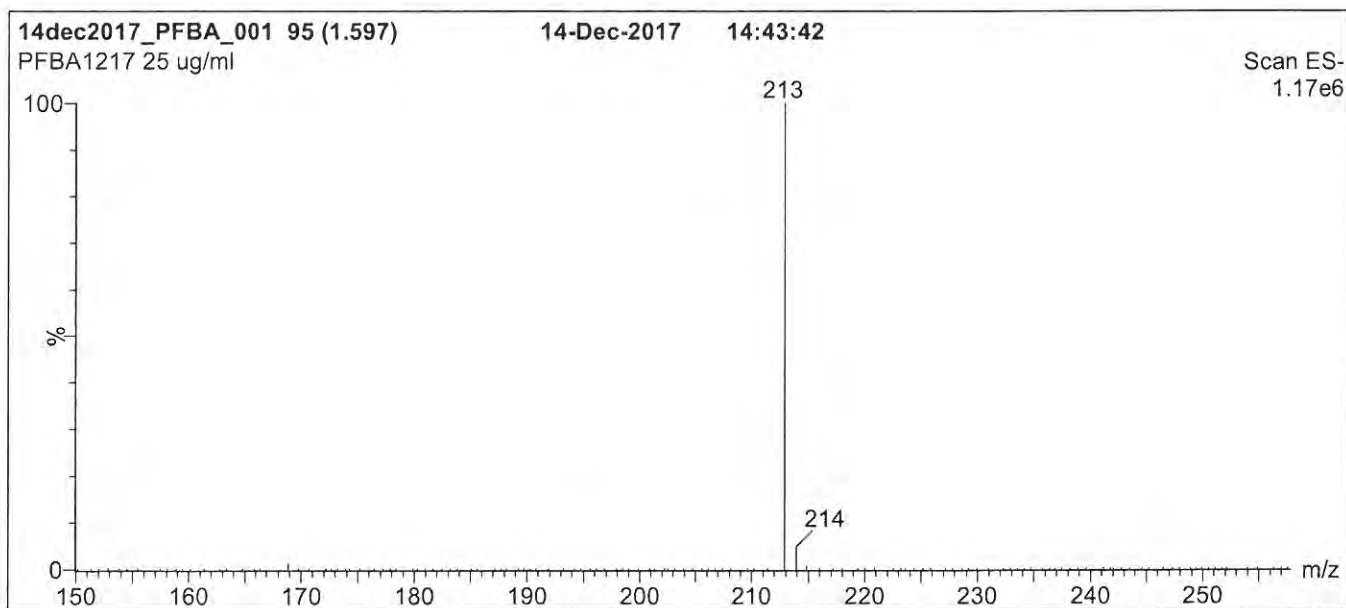
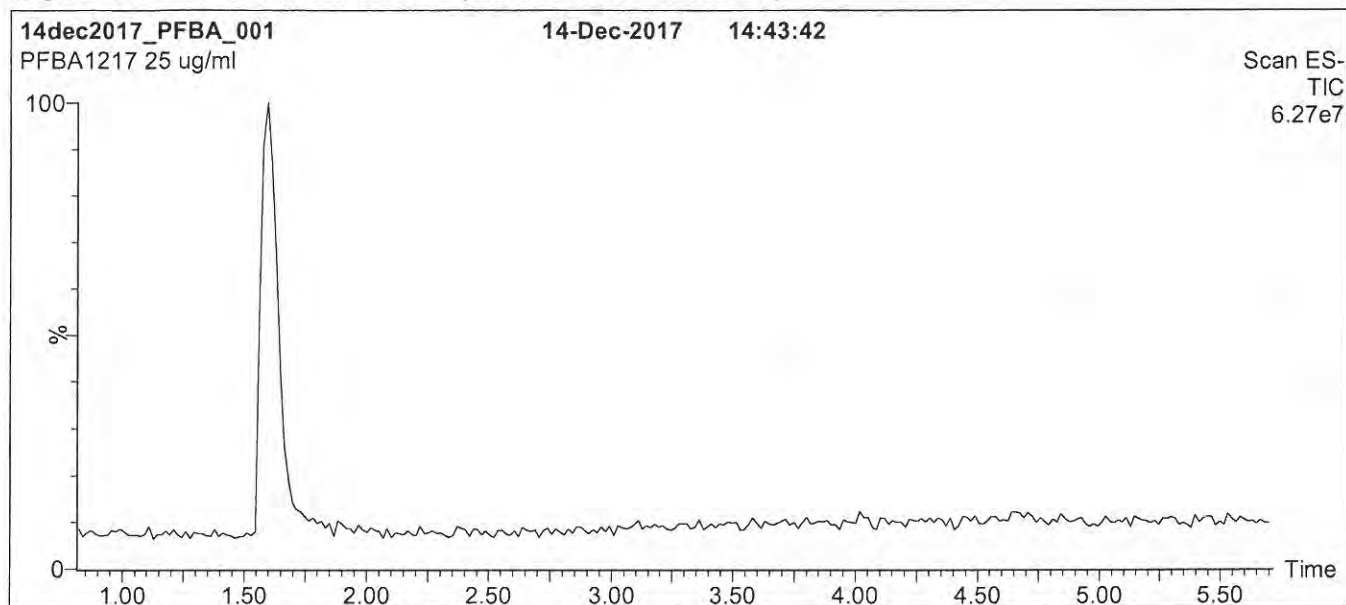
QUALITY MANAGEMENT:

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18E0708

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 30% (80:20 MeOH:ACN) / 70% H₂O
 (both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

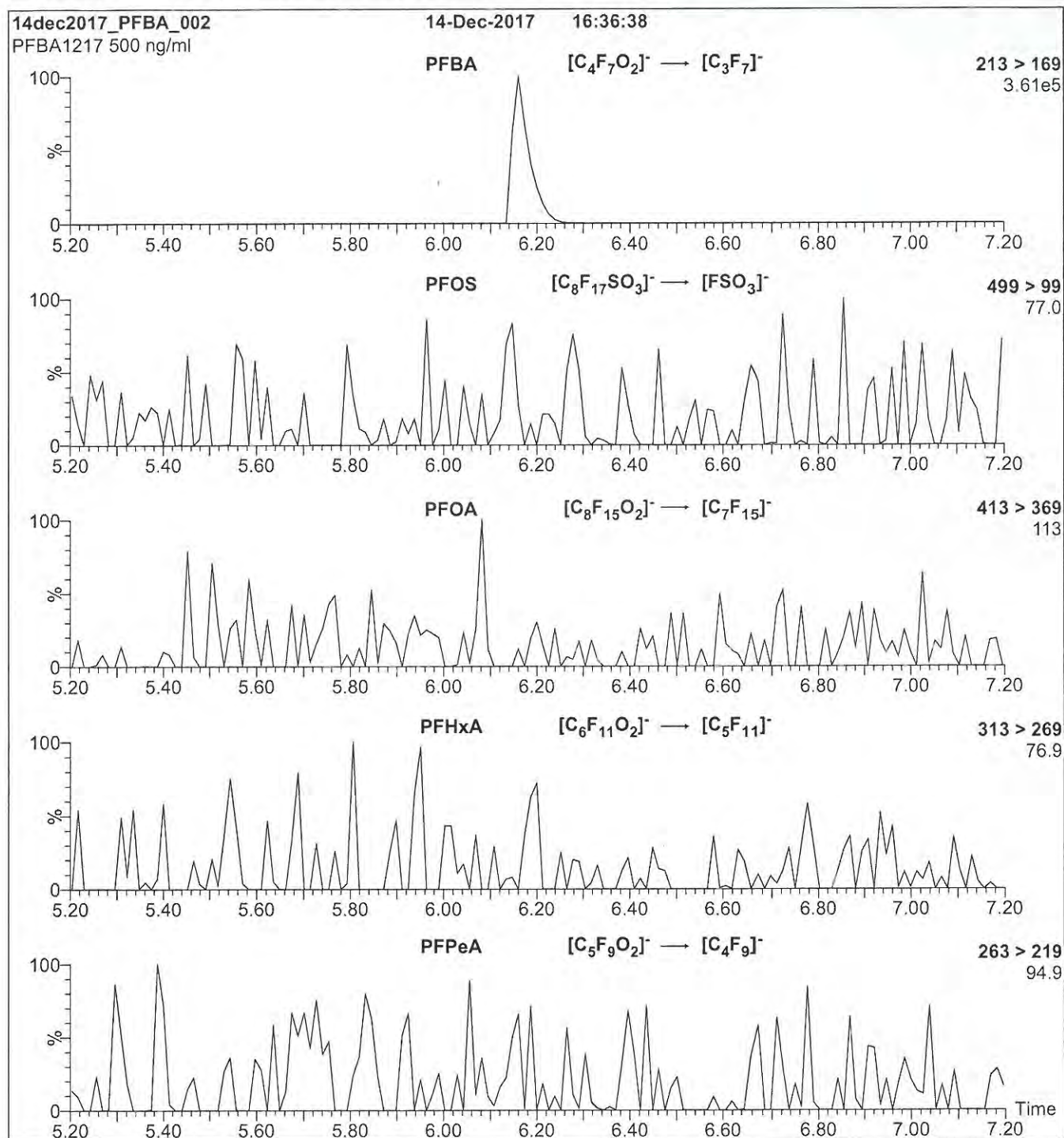
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 10.00

Cone Gas Flow (l/hr) = 100

Desolvation Gas Flow (l/hr) = 750

18E0708

Figure 2: PFBA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3

Collision Energy (eV) = 10

18E0709



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFPeA

LOT NUMBER:

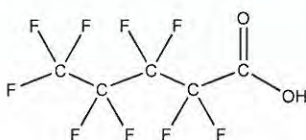
PFPeA0218

COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:**CAS #:**

2706-90-3

**MOLECULAR FORMULA:** $C_5HF_9O_2$ **MOLECULAR WEIGHT:**

264.05

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

02/16/2018

EXPIRY DATE: (mm/dd/yyyy)

02/16/2023

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:**

B.G. Chittim, General Manager
Date:02/20/2018
(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

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

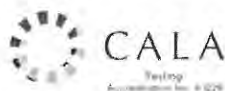
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

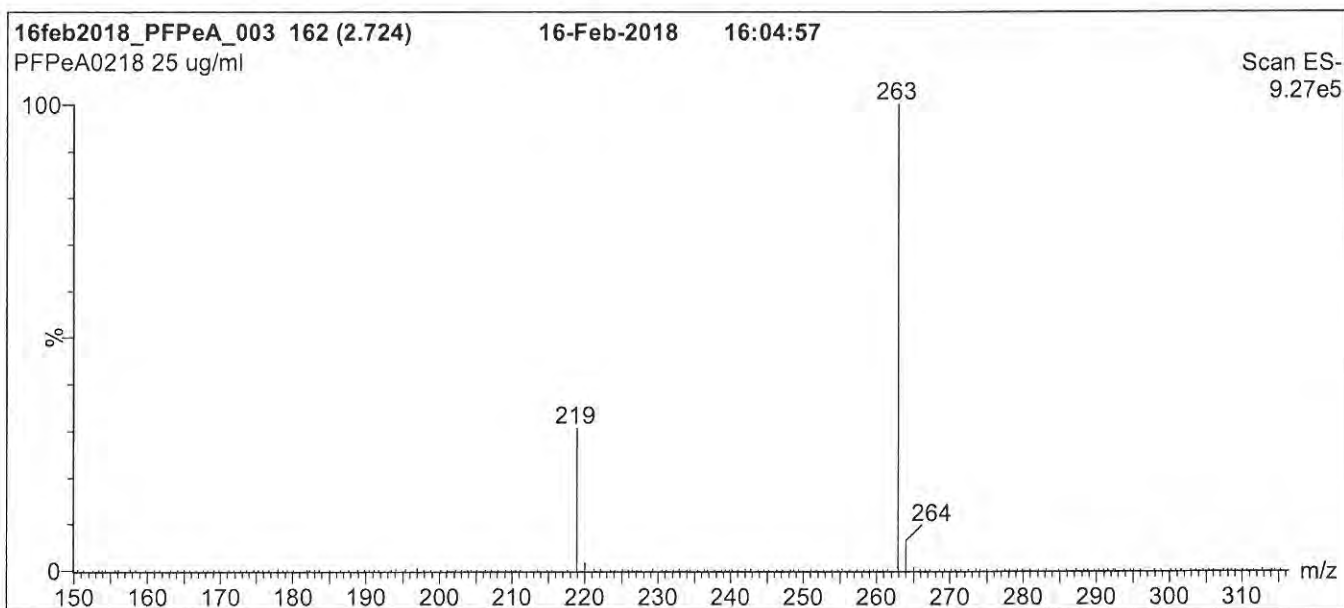
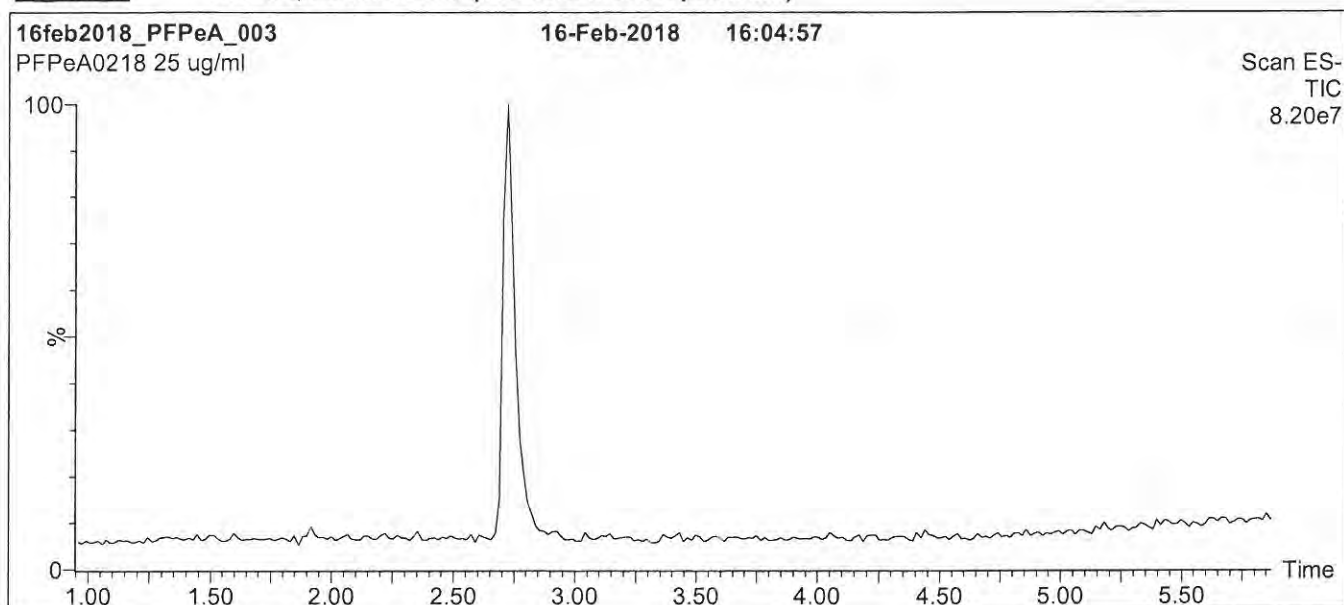
QUALITY MANAGEMENT:

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).



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

18E0709

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 30% (80:20 MeOH:ACN) / 70% H₂O
 (both with 10 mM NH₄OAc 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

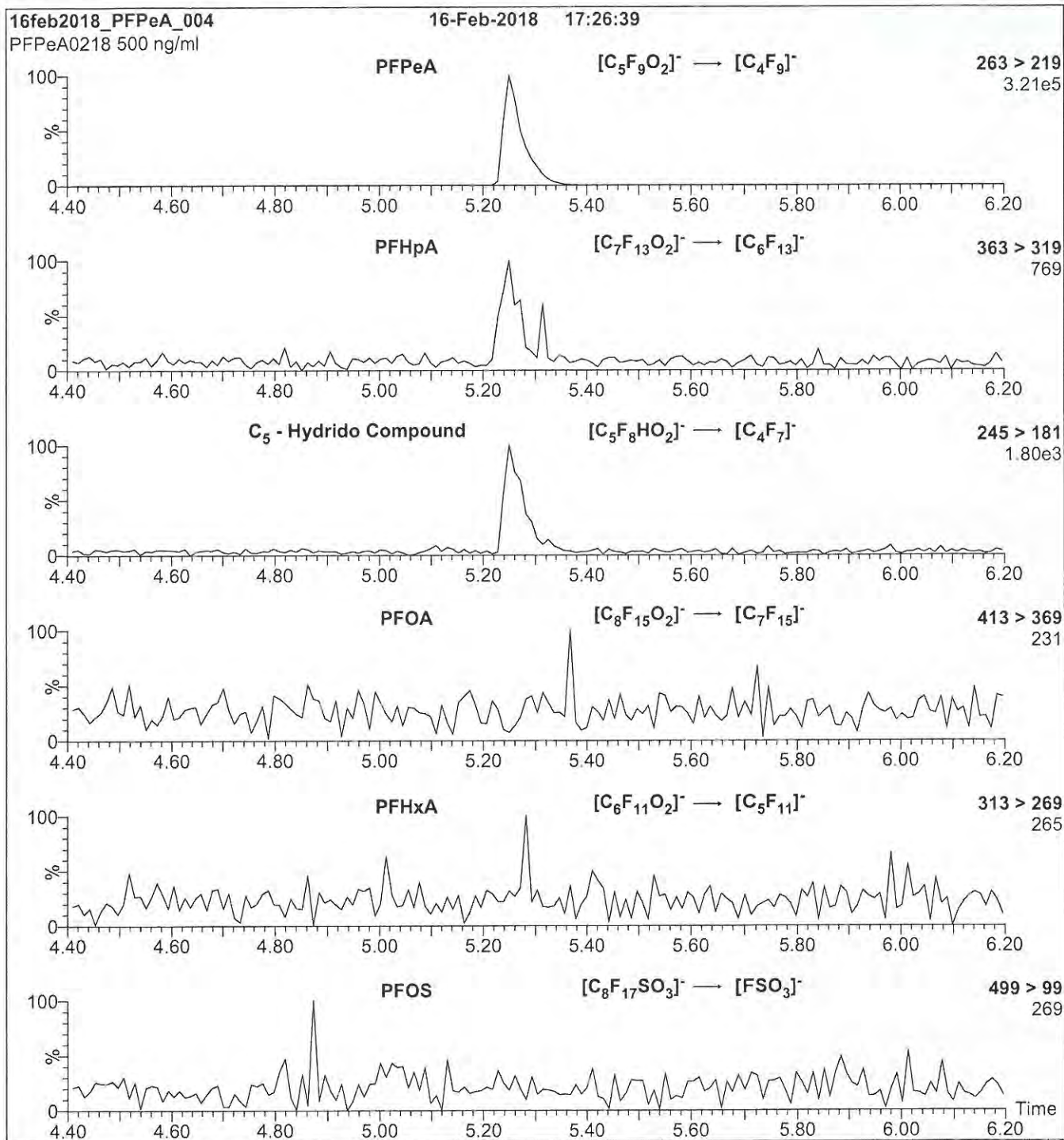
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 2.50
 Cone Voltage (V) = 15.00
 Cone Gas Flow (l/hr) = 100
 Desolvation Gas Flow (l/hr) = 750

18E0709

Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 9

18E0710



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHxA

LOT NUMBER:

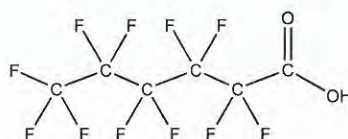
PFHxA0917

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:**CAS #:**

307-24-4

**MOLECULAR FORMULA:** $C_6H_{11}F_{11}O_2$ **MOLECULAR WEIGHT:**

314.05

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/27/2017

EXPIRY DATE: (mm/dd/yyyy)

09/27/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 1.0% of branched isomers.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**

B.G. Chittim, General Manager
Date:11/01/2017
(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

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:

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UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

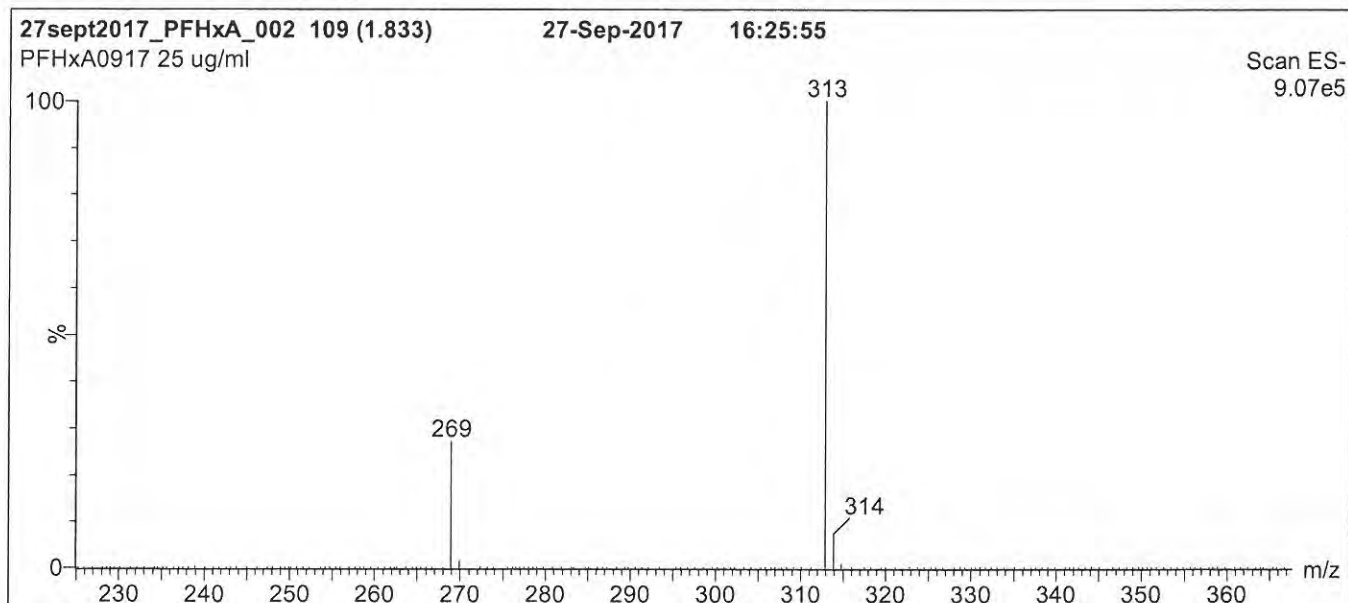
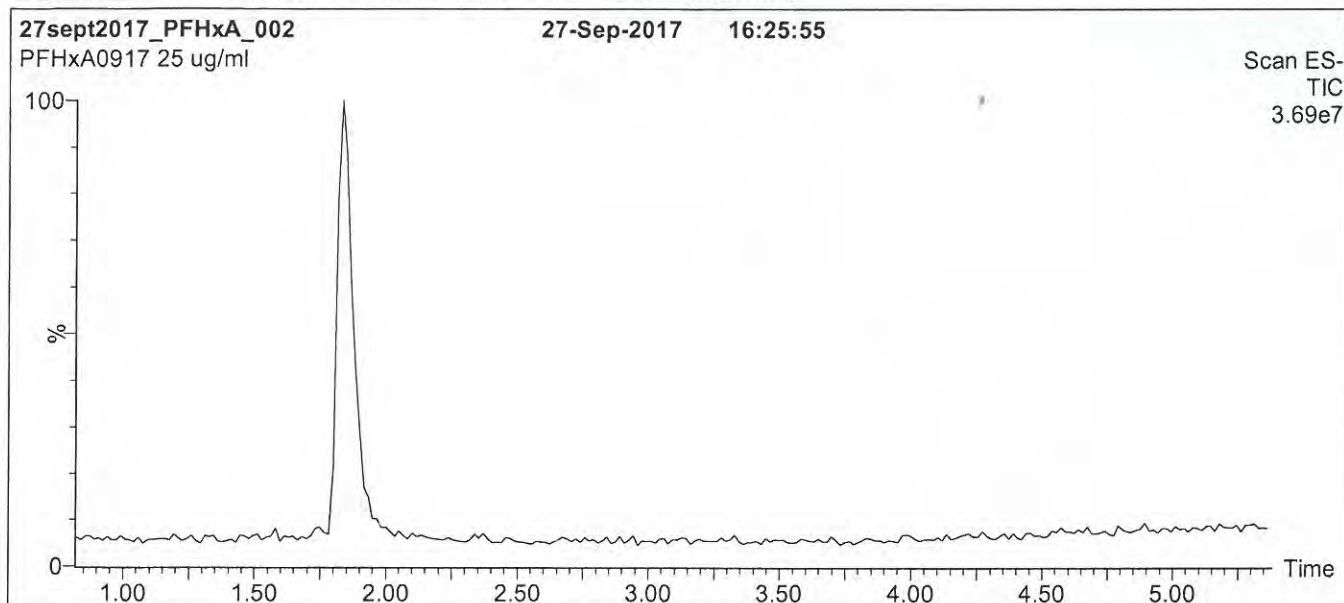
QUALITY MANAGEMENT:

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).



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

18E0710

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

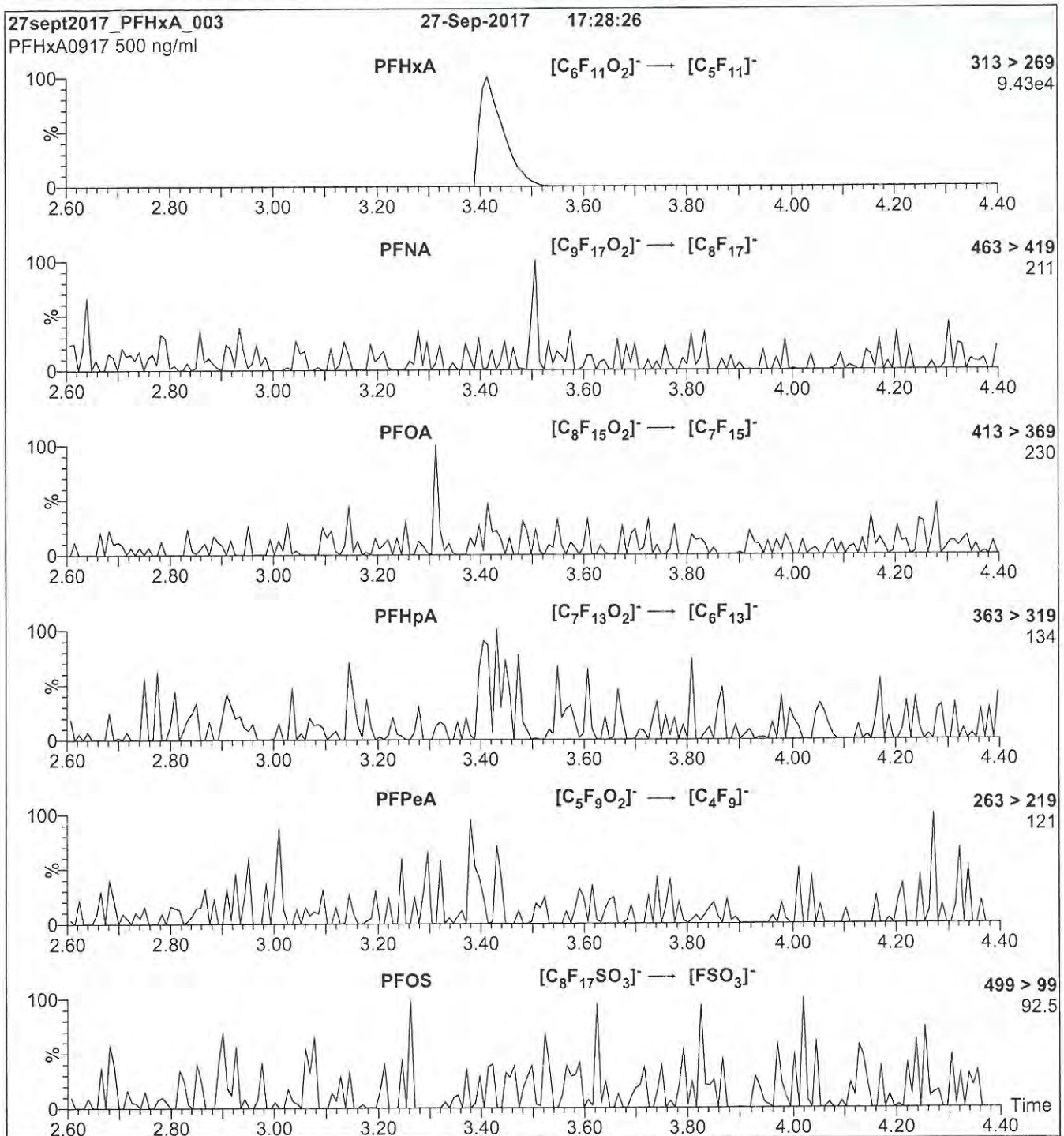
Flow: 300 μ l/min

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

18E0710

Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 10

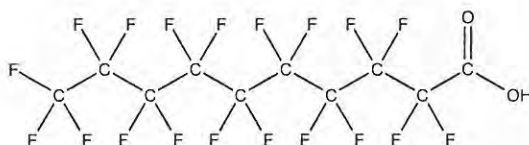
18E0711



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFDA **LOT NUMBER:** PFDA1217
COMPOUND: Perfluoro-n-decanoic acid
STRUCTURE: **CAS #:** 335-76-2



MOLECULAR FORMULA: $C_{10}H_{19}F_{19}O_2$ **MOLECULAR WEIGHT:** 514.08
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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: 
 B.G. Chittim, General Manager

Date: 12/18/2017
 (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

18E0711

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

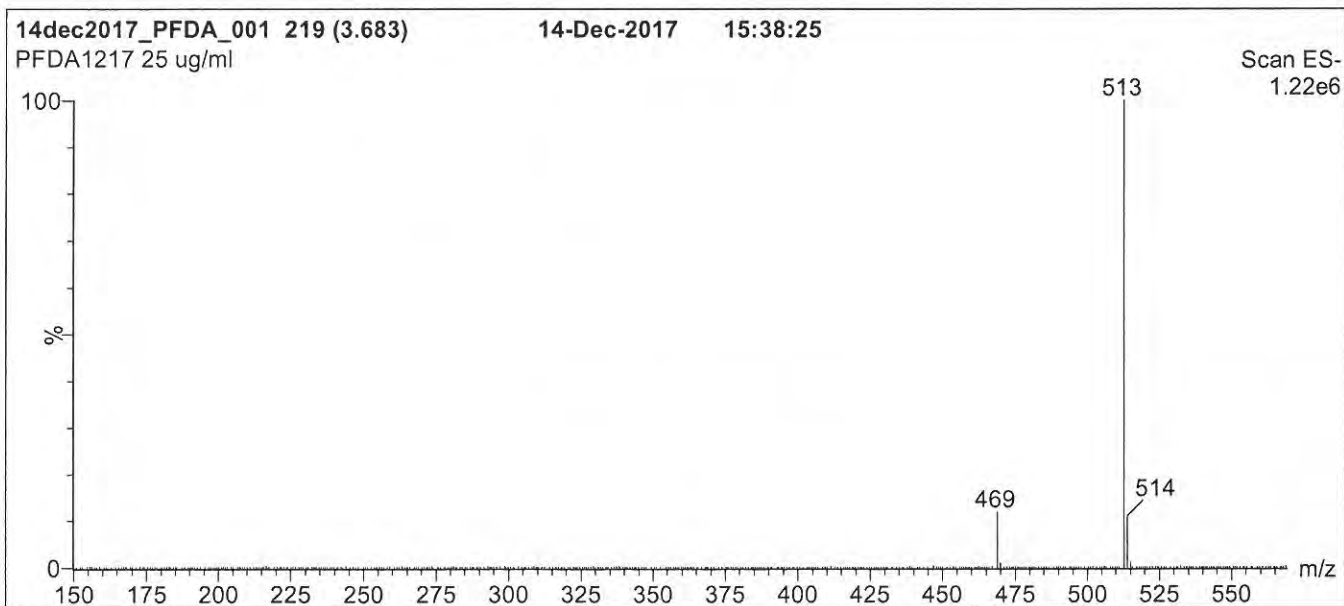
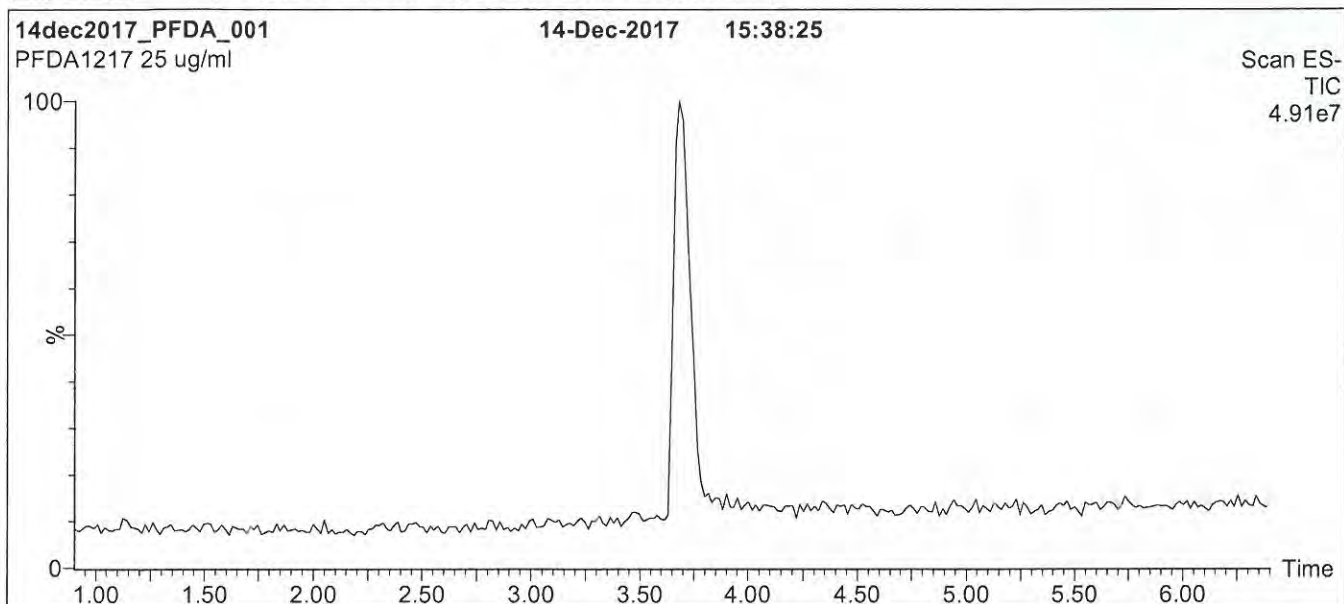
QUALITY MANAGEMENT:

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).



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

18E0711

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

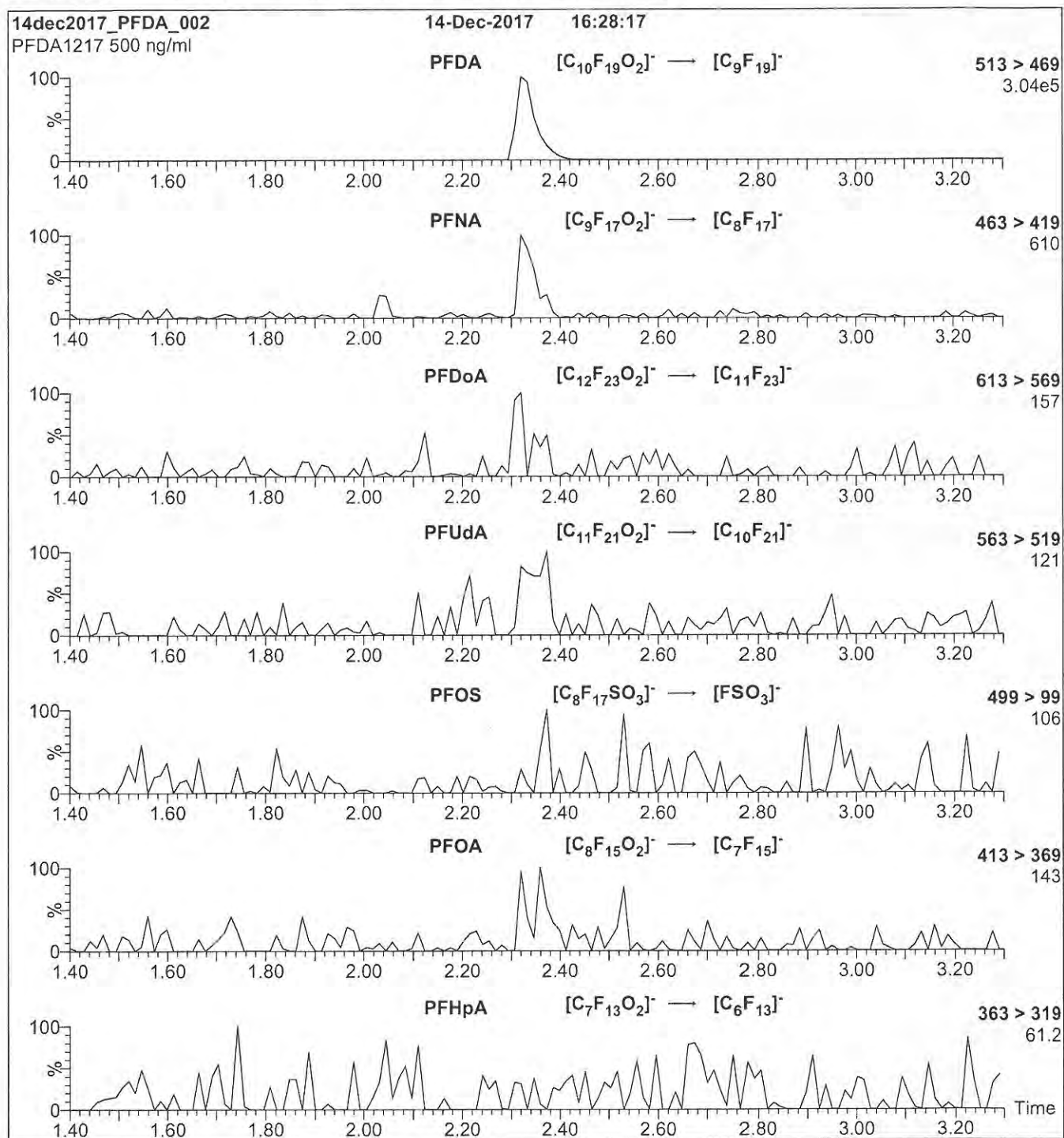
Flow: 300 μ l/min

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

18E0711

Figure 2: PFDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 13

18E0712



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFUdA

LOT NUMBER:

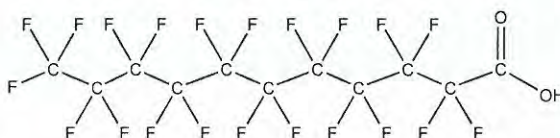
PFUdA0917

COMPOUND:

Perfluoro-n-undecanoic acid

STRUCTURE:**CAS #:**

2058-94-8

**MOLECULAR FORMULA:** $C_{11}HF_{21}O_2$ **MOLECULAR WEIGHT:**

564.09

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:**

B.G. Chittim, General Manager
Date:09/22/2017
(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

18E0712

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

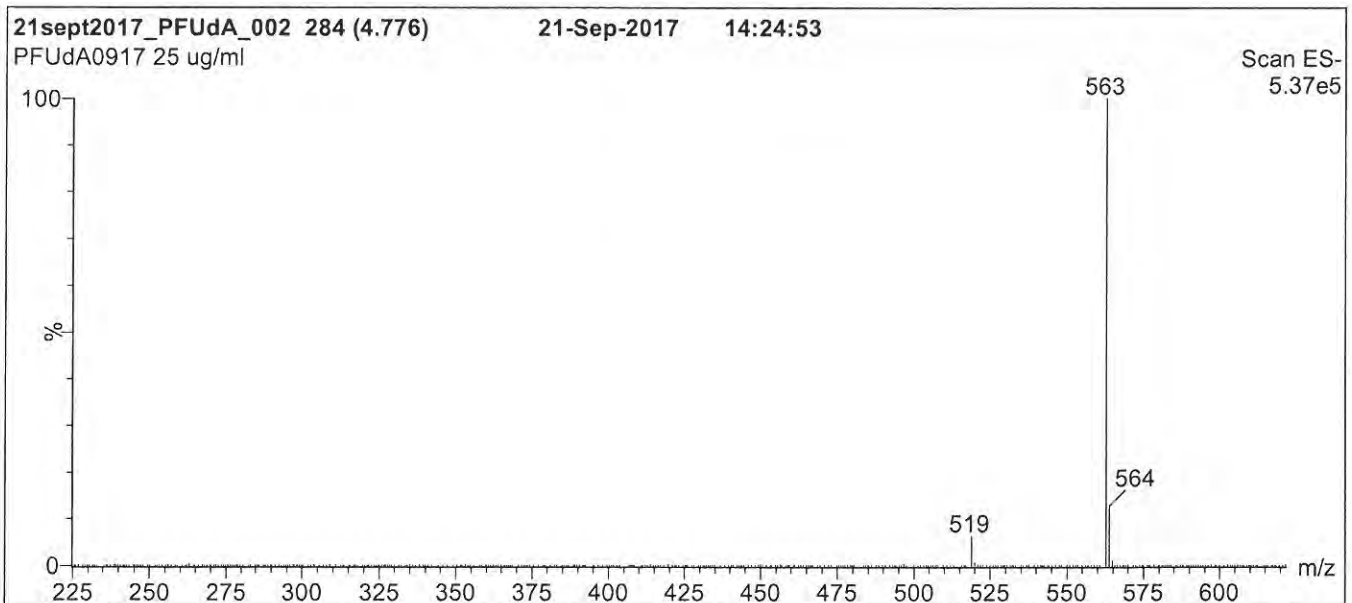
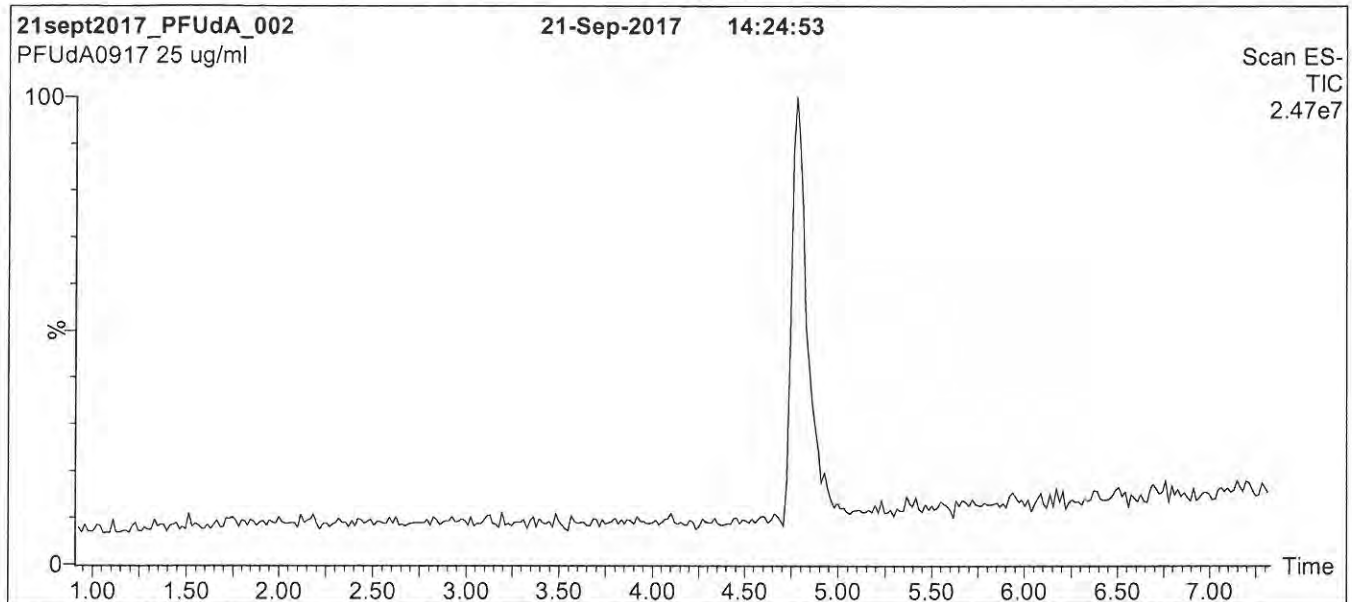
QUALITY MANAGEMENT:

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).



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

18E0712

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

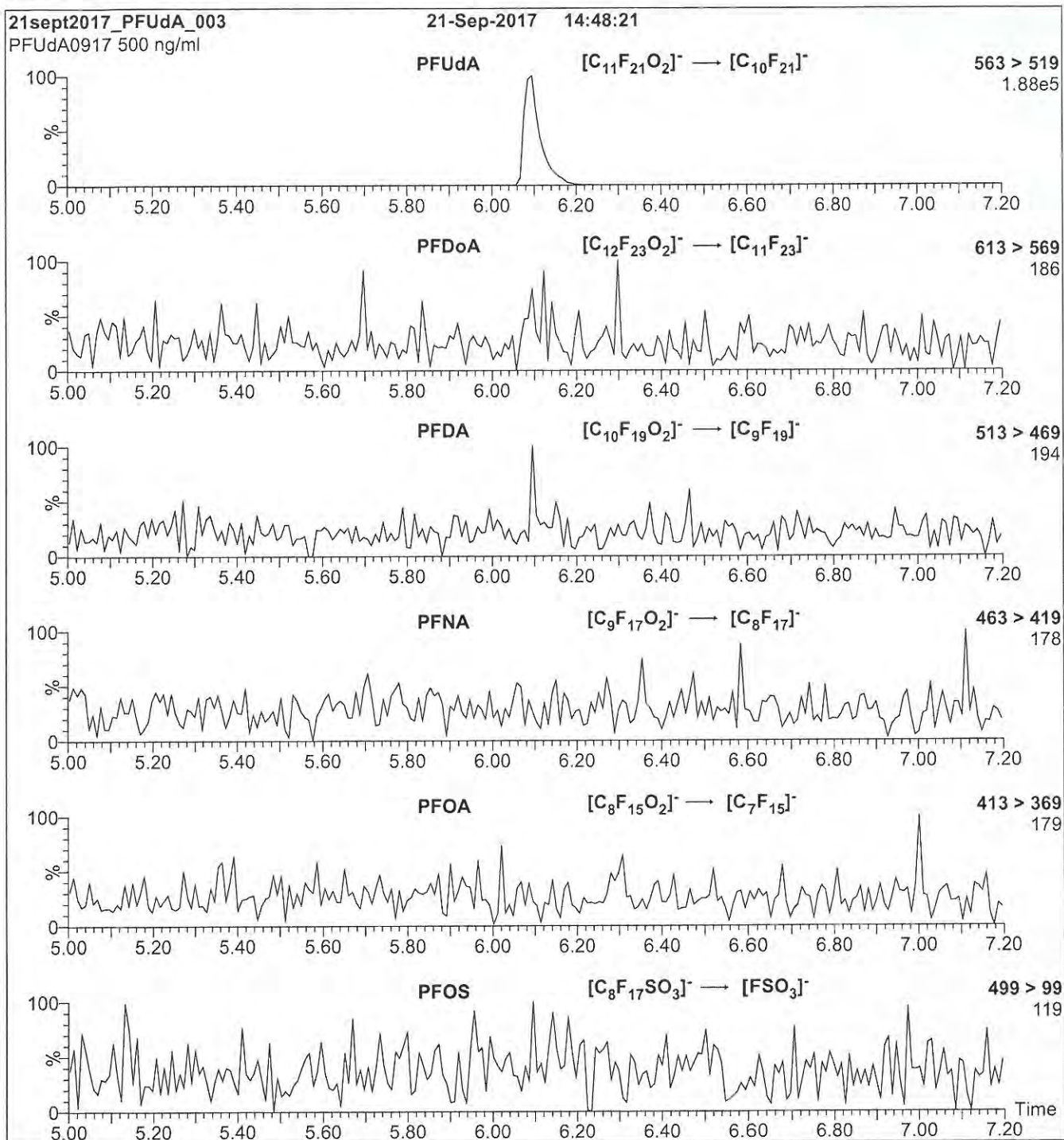
Flow: 300 μ l/min

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

18E0712

Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

18E0713



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTTrDA

LOT NUMBER:

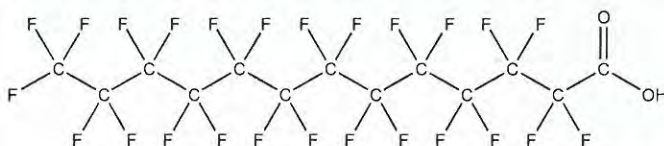
PFTTrDA0517

COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:**CAS #:**

72629-94-8

**MOLECULAR FORMULA:** $C_{13}H_{25}F_{27}O_2$ **MOLECULAR WEIGHT:**

664.11

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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 ($C_{11}H_{21}F_{23}O_2$), ~ 0.4% of PFDaA ($C_{12}H_{23}F_{25}O_2$), and ~ 0.1% of PFTeDA ($C_{14}H_{27}F_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

05/04/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

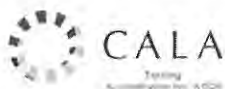
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

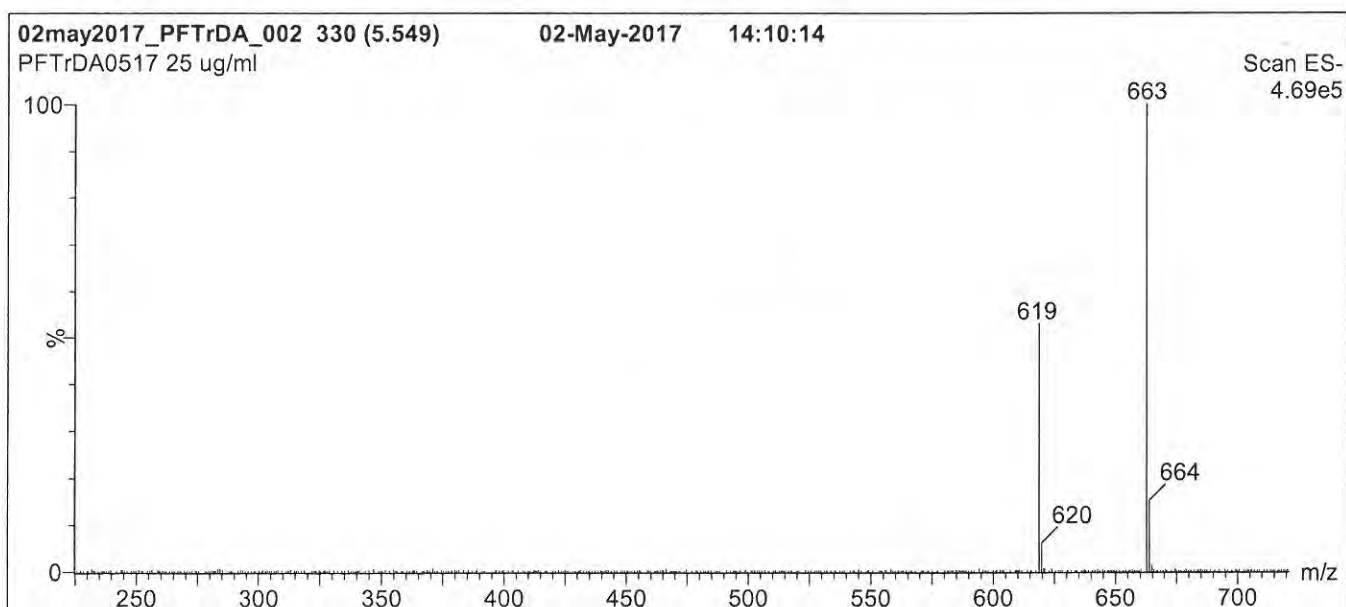
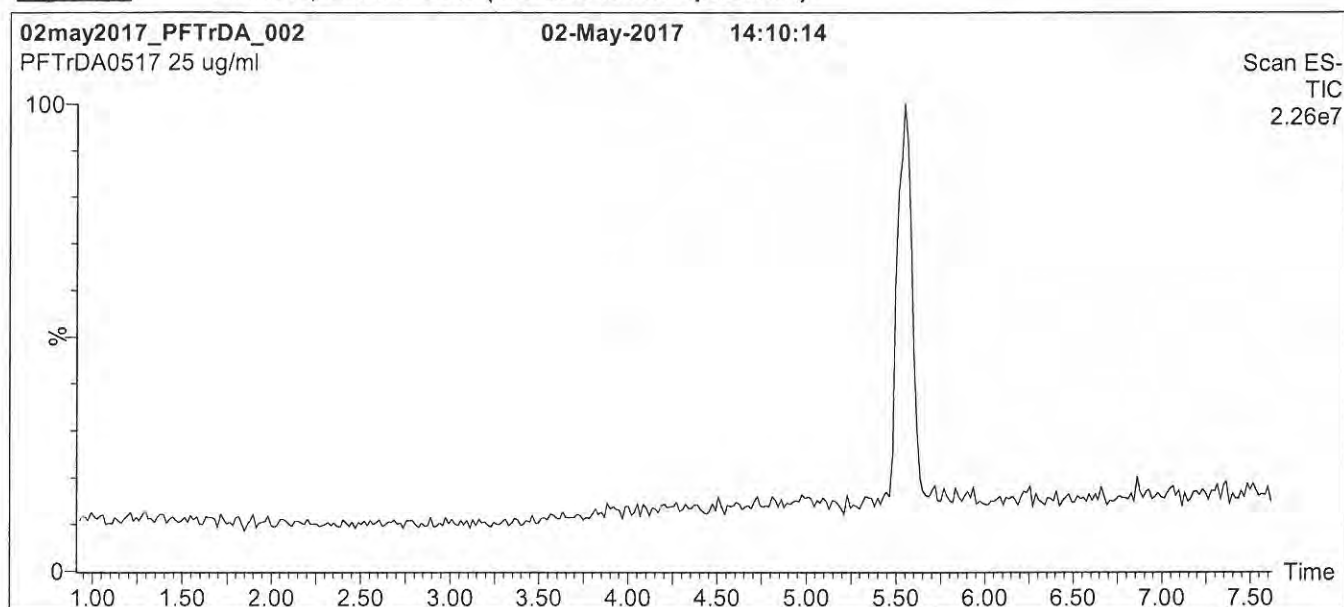
QUALITY MANAGEMENT:

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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18E0713

Figure 1: PFTTrDA; 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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 60% (80:20 MeOH:ACN) / 40% H₂O
 (both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)

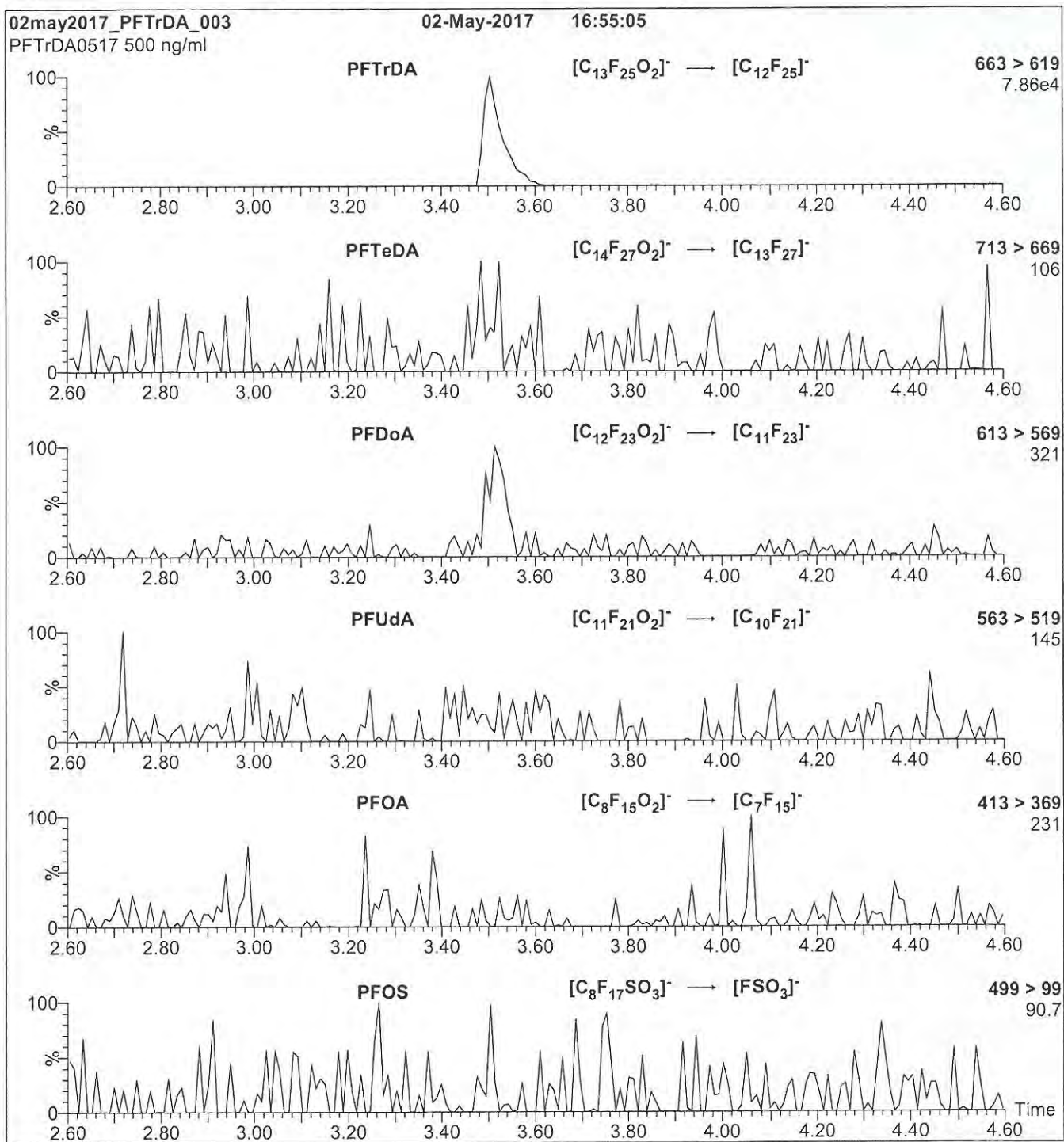
Capillary Voltage (kV) = 2.00

Cone Voltage (V) = 22.00

Cone Gas Flow (l/hr) = 60

Desolvation Gas Flow (l/hr) = 650

18E0713

Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 15

18E0714



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHpA

LOT NUMBER:

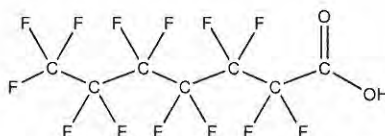
PFHpA0917

COMPOUND:

Perfluoro-n-heptanoic acid

STRUCTURE:**CAS #:**

375-85-9

**MOLECULAR FORMULA:** $C_7H_{13}F_{13}O_2$ **MOLECULAR WEIGHT:**

364.06

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/27/2017

EXPIRY DATE: (mm/dd/yyyy)

09/27/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

 09/29/2017
 (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

18E0714

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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.

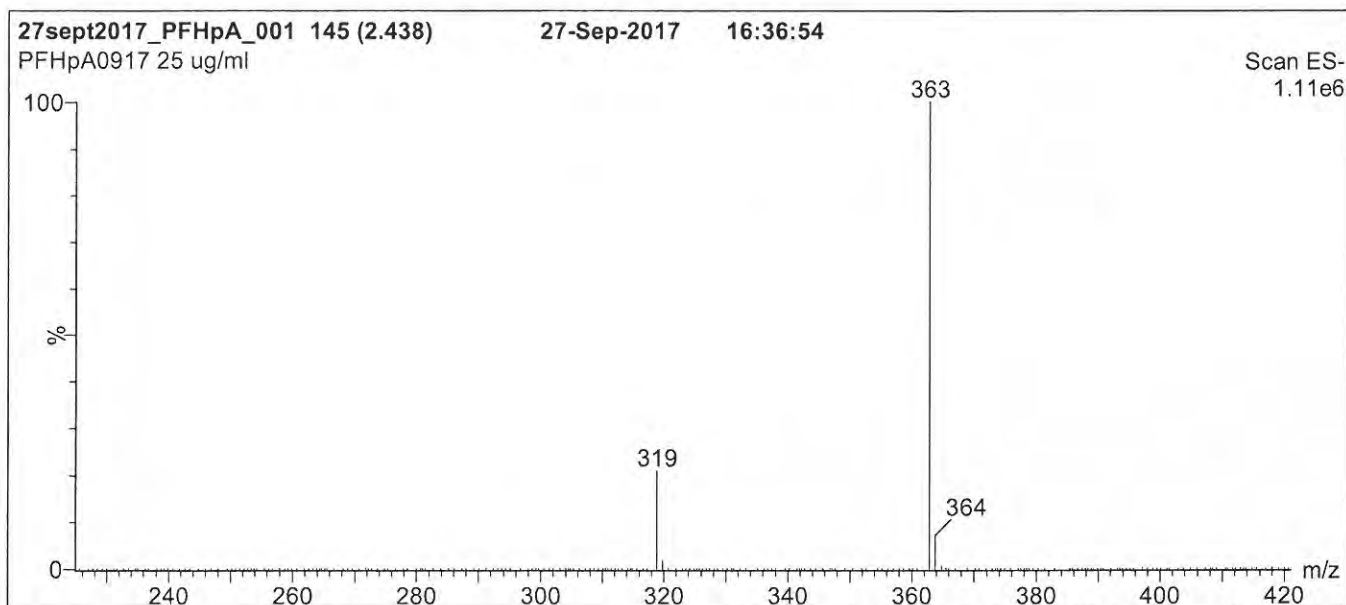
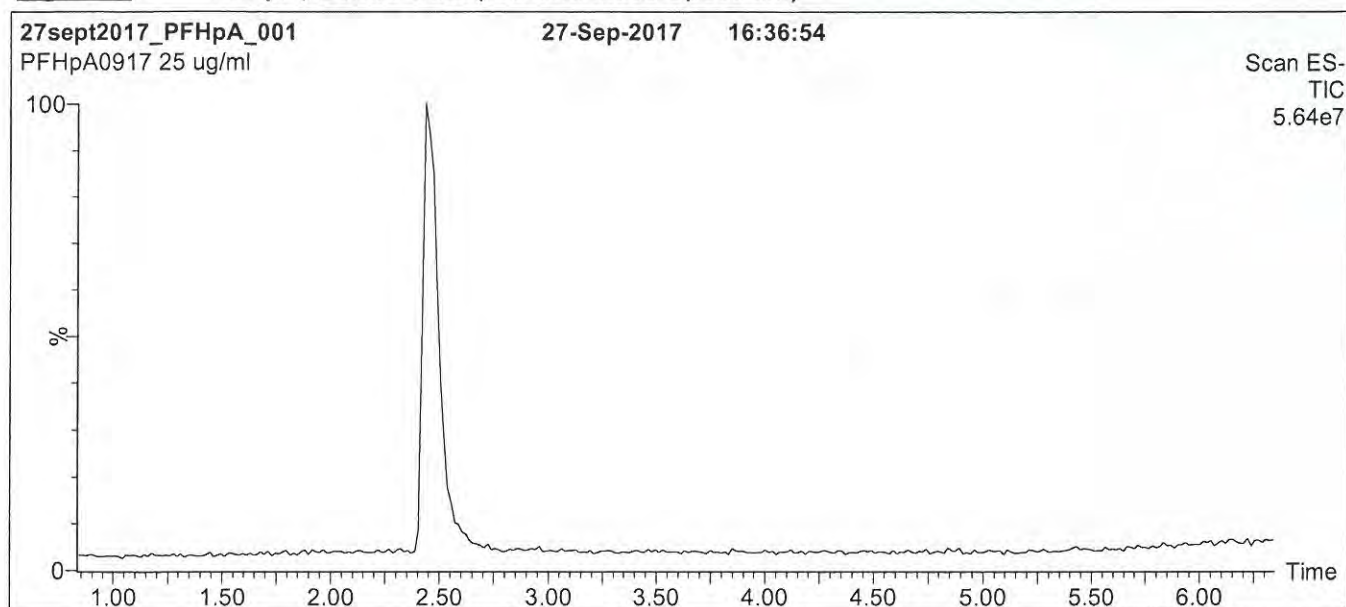
QUALITY MANAGEMENT:

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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18E0714

Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

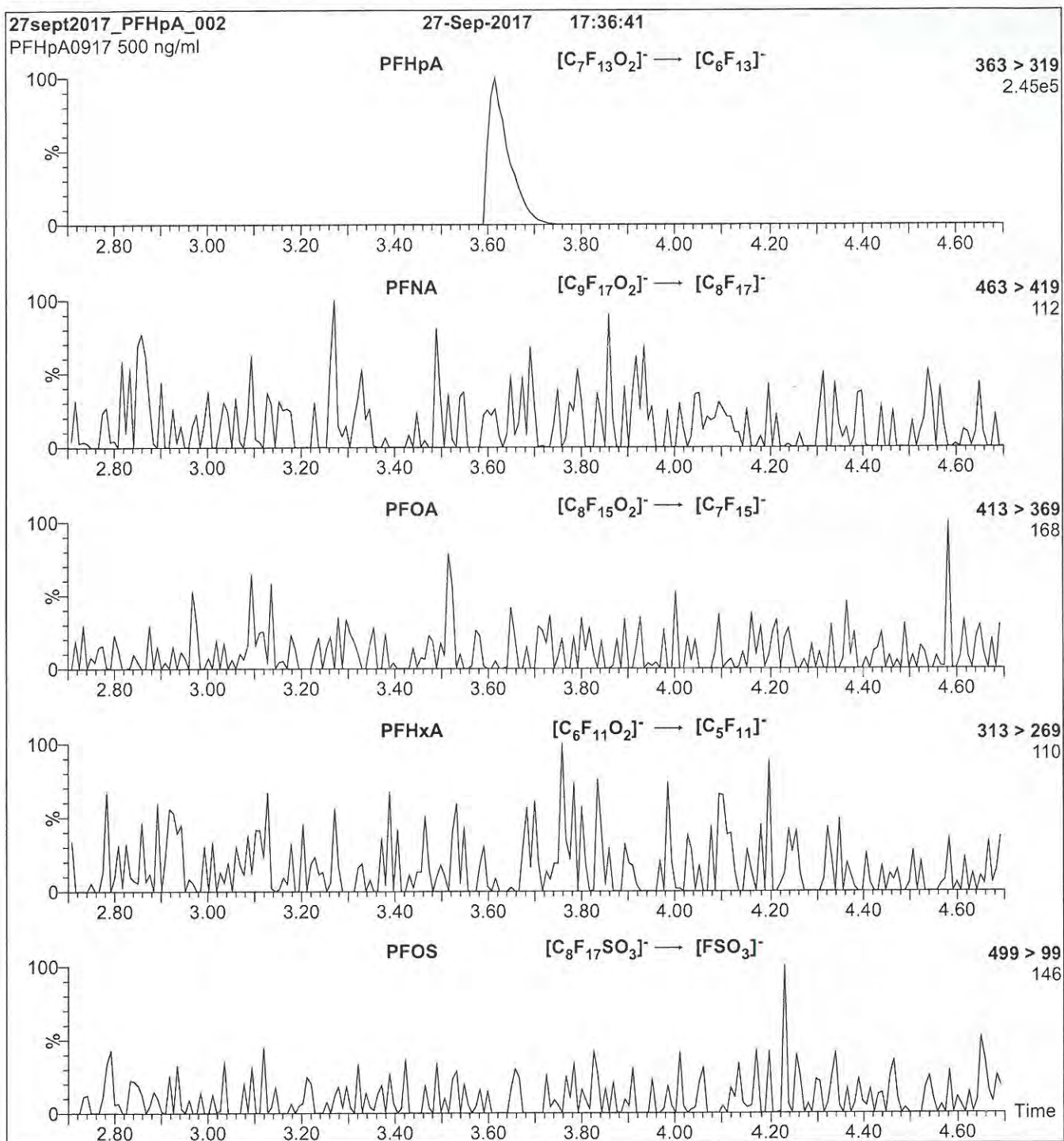
Flow: 300 μ l/min

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

18E0714

Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

18E0715



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFOA

LOT NUMBER:

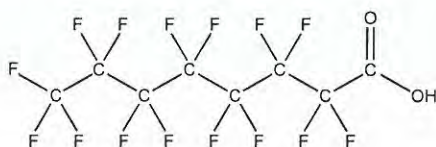
PFOA0218

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:**CAS #:**

335-67-1

**MOLECULAR FORMULA:** $C_8H_{15}O_2$ **MOLECULAR WEIGHT:**

414.07

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

02/16/2018

EXPIRY DATE: (mm/dd/yyyy)

02/16/2023

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:**

B.G. Chittim, General Manager
Date:02/20/2018
(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

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:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

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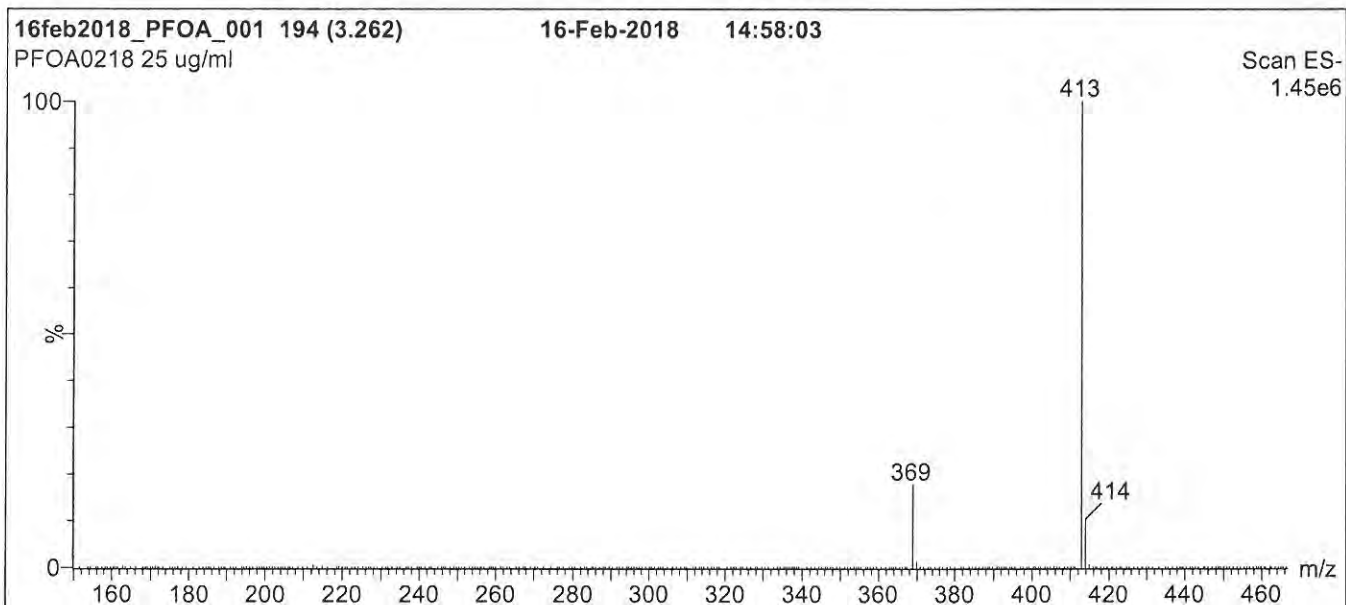
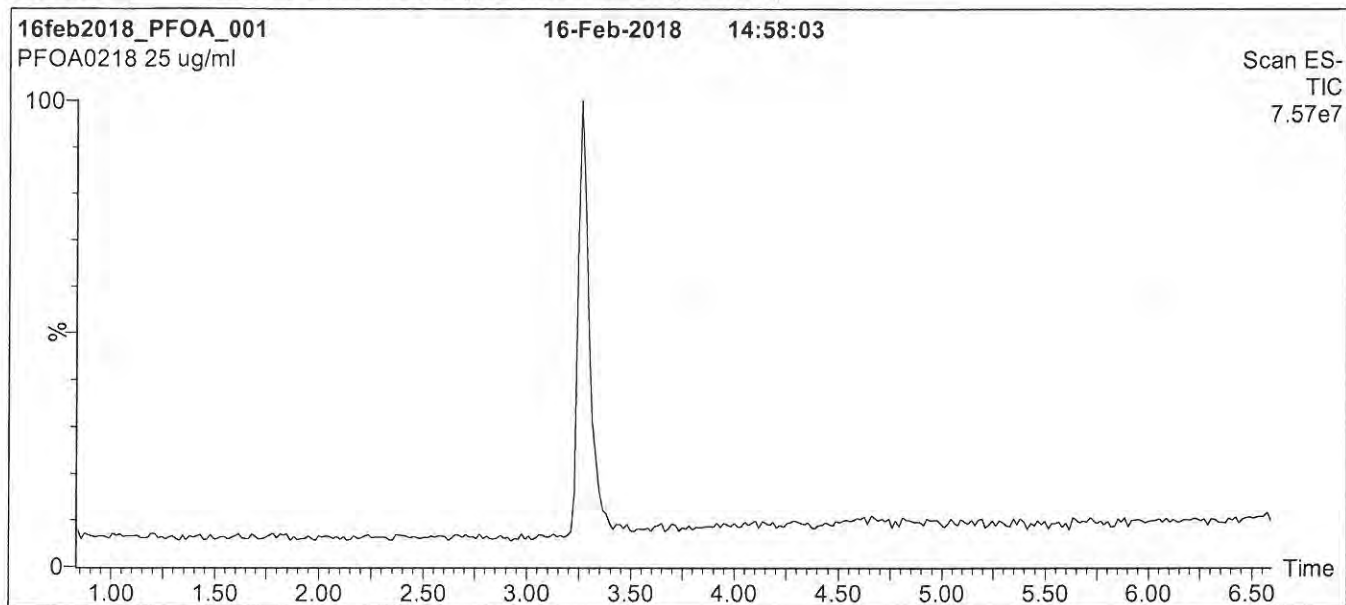
QUALITY MANAGEMENT:

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 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18E0715

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

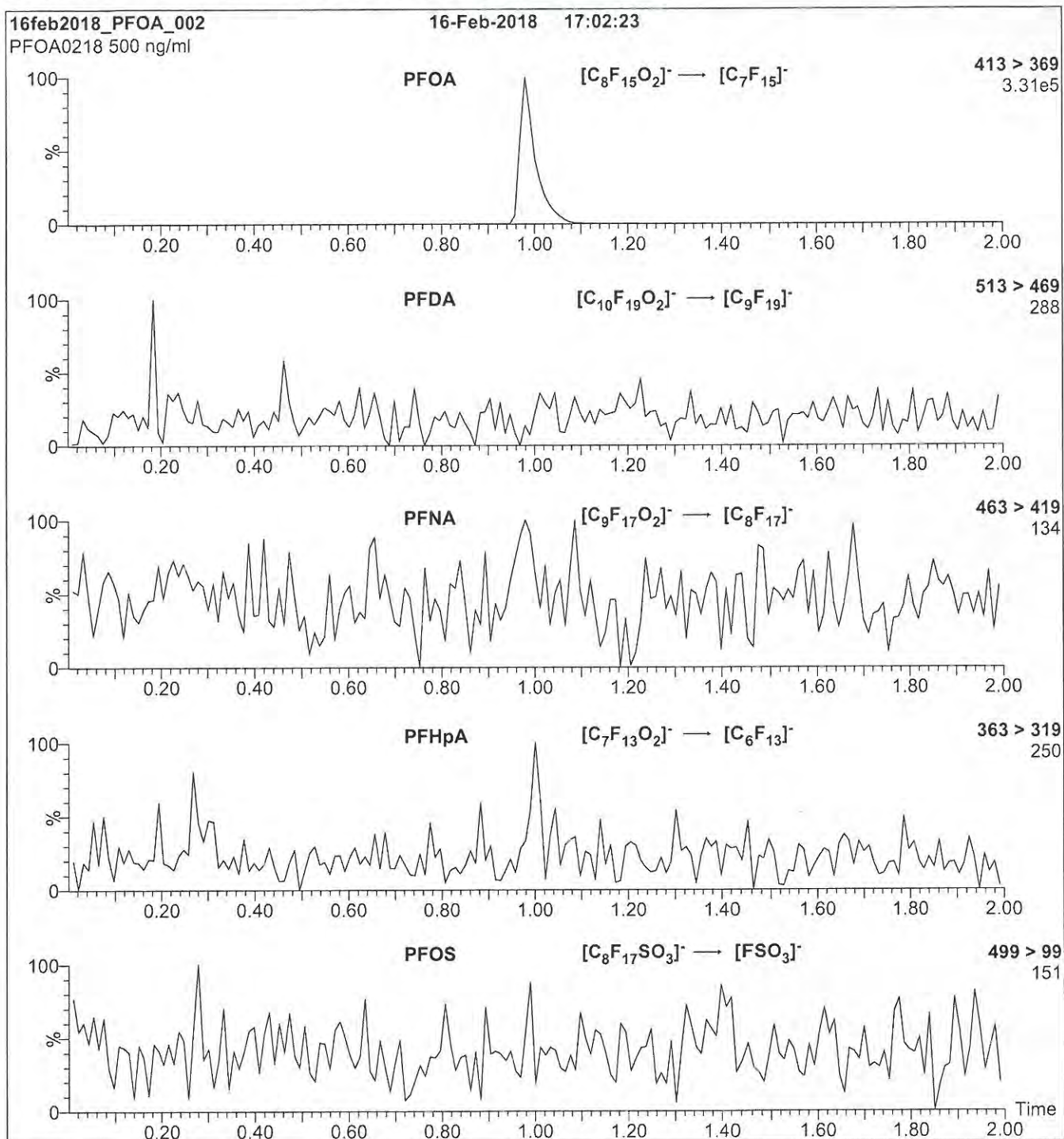
Flow: 300 μ l/min

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

(18E0715

Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

18E0716



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

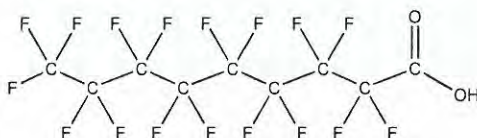
PFNA0717

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:**CAS #:**

375-95-1

**MOLECULAR FORMULA:** $C_9H_{17}O_2$ **MOLECULAR WEIGHT:**

464.08

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:**

B.G. Chittim, General Manager
Date:07/24/2017
(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

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

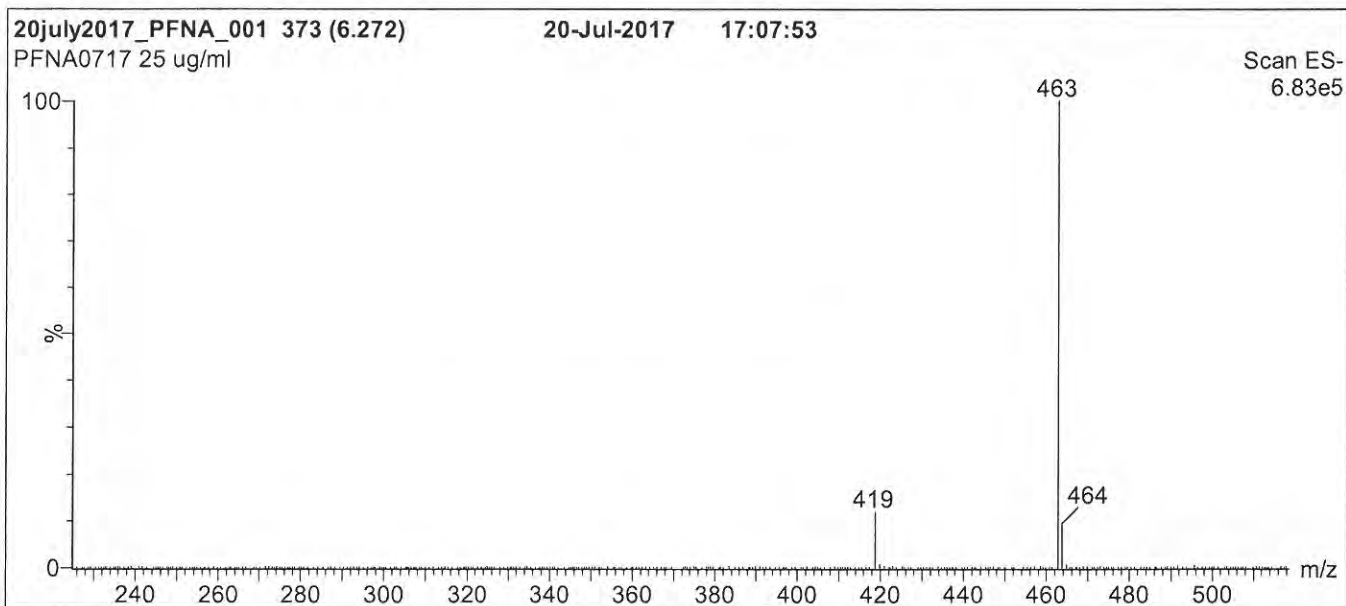
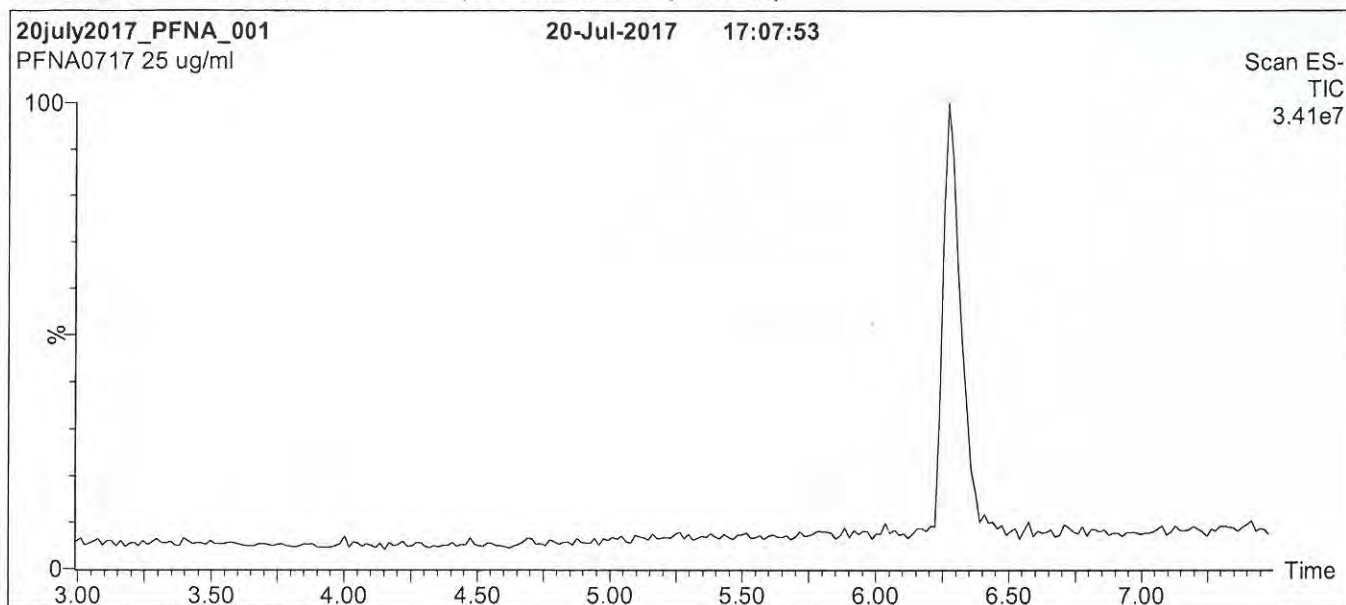
QUALITY MANAGEMENT:

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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1850716

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

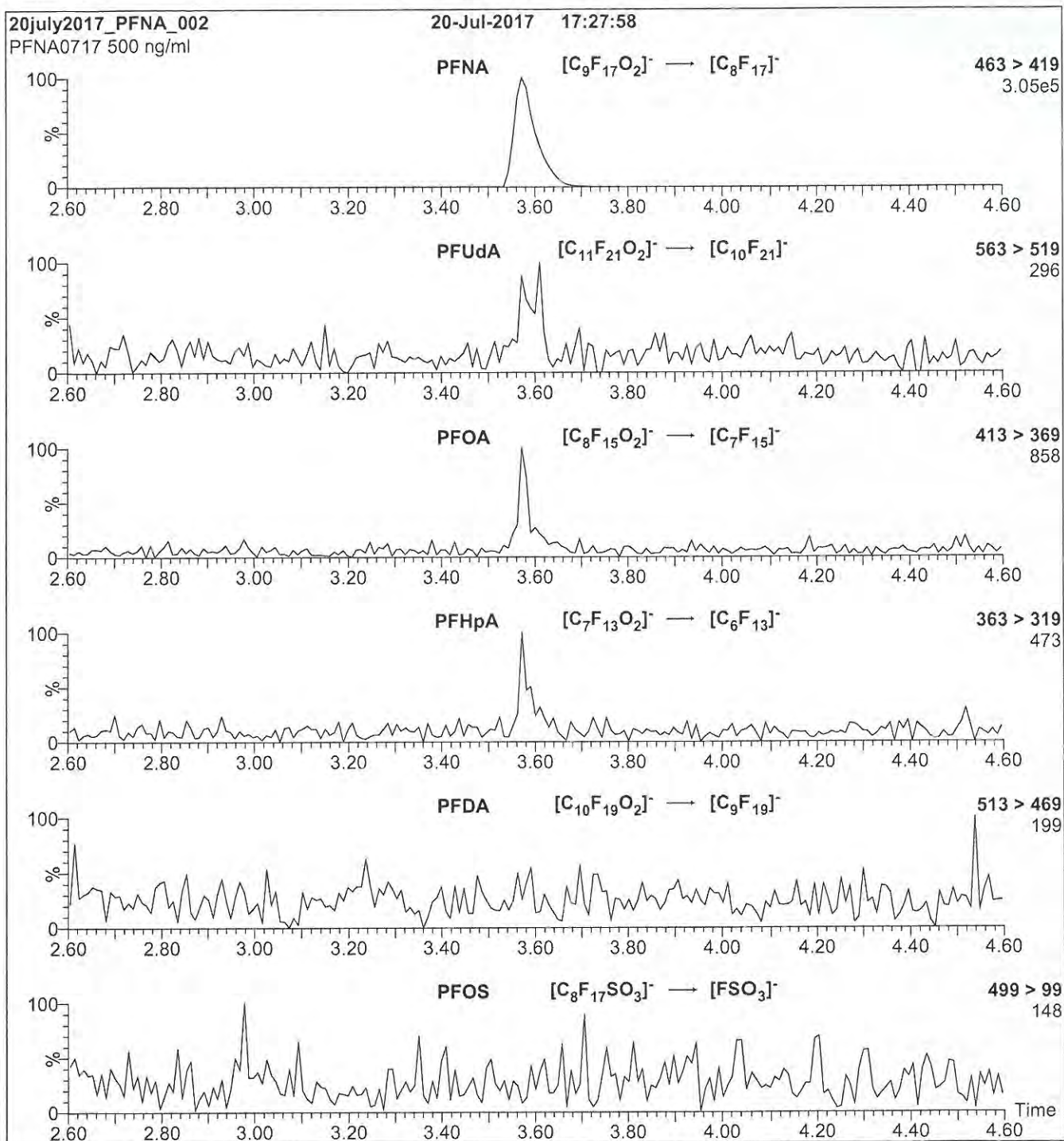
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Hold for 1 min. Ramp to 90% organic over 7 min and hold
for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/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

Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 11

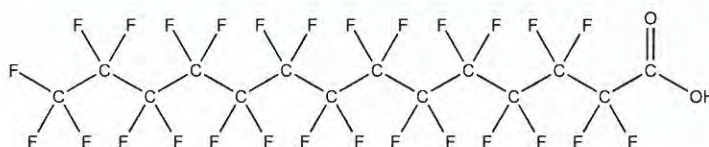
18E0717



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA **LOT NUMBER:** PFTeDA0917
COMPOUND: Perfluoro-n-tetradecanoic acid
STRUCTURE: **CAS #:** 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$ **MOLECULAR WEIGHT:** 714.11
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:

B.G. Chittim, General Manager

Date: 09/21/2017
 (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

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$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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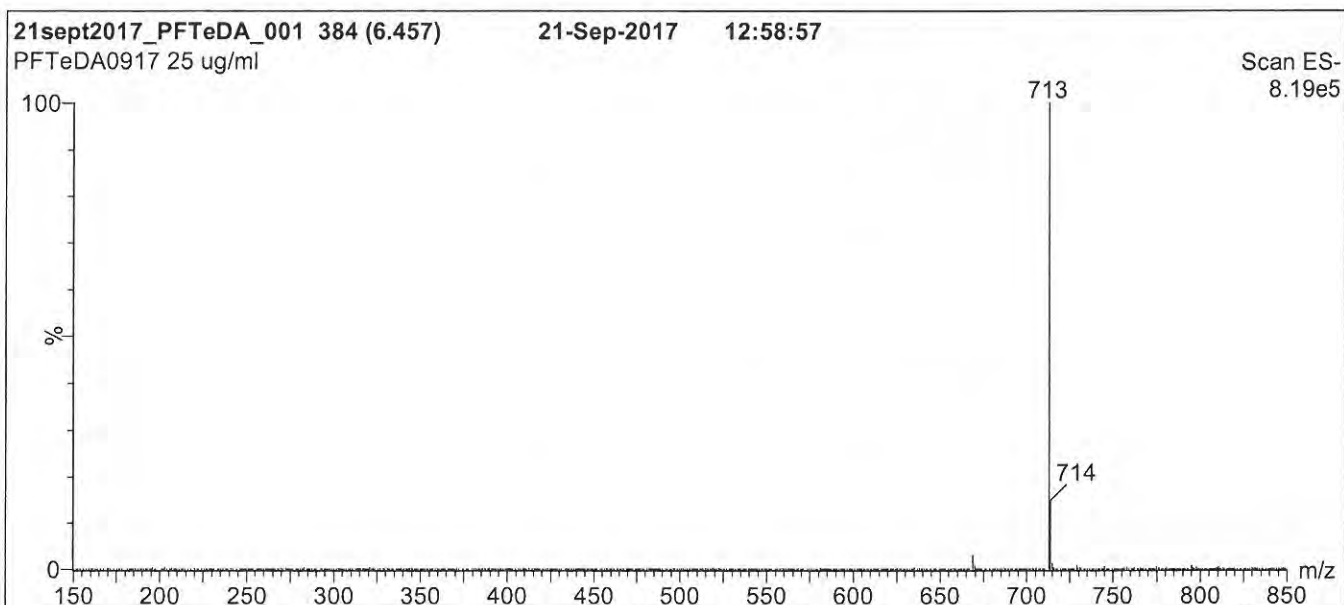
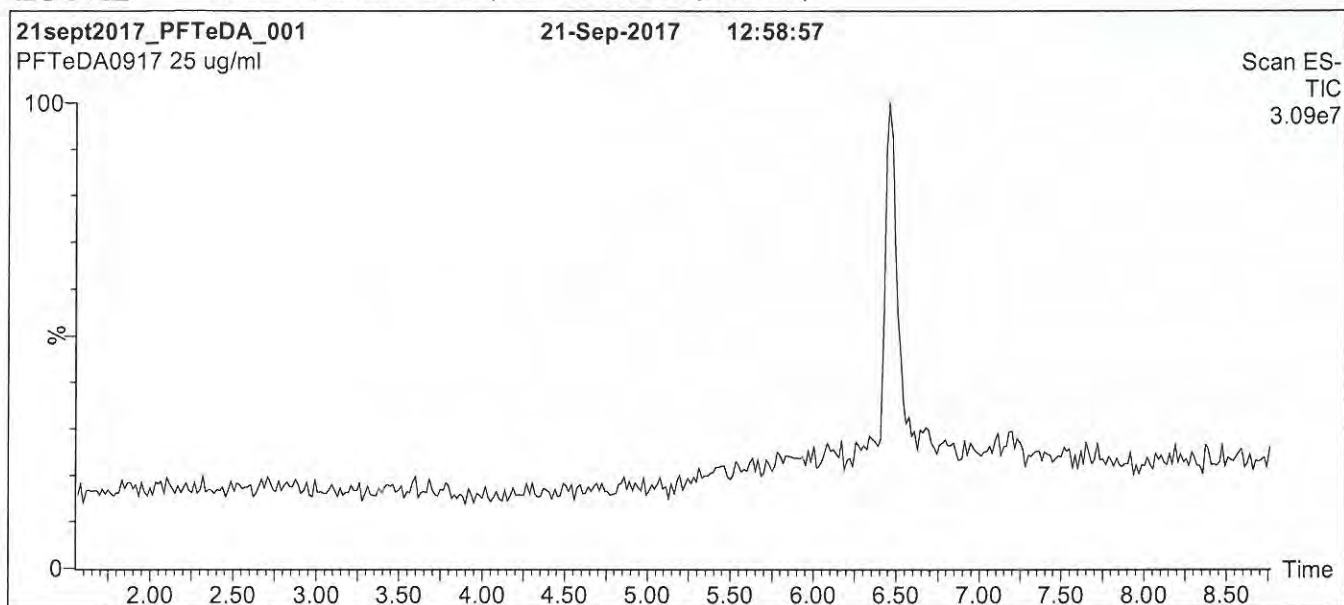
QUALITY MANAGEMENT:

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).



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

18E0717

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

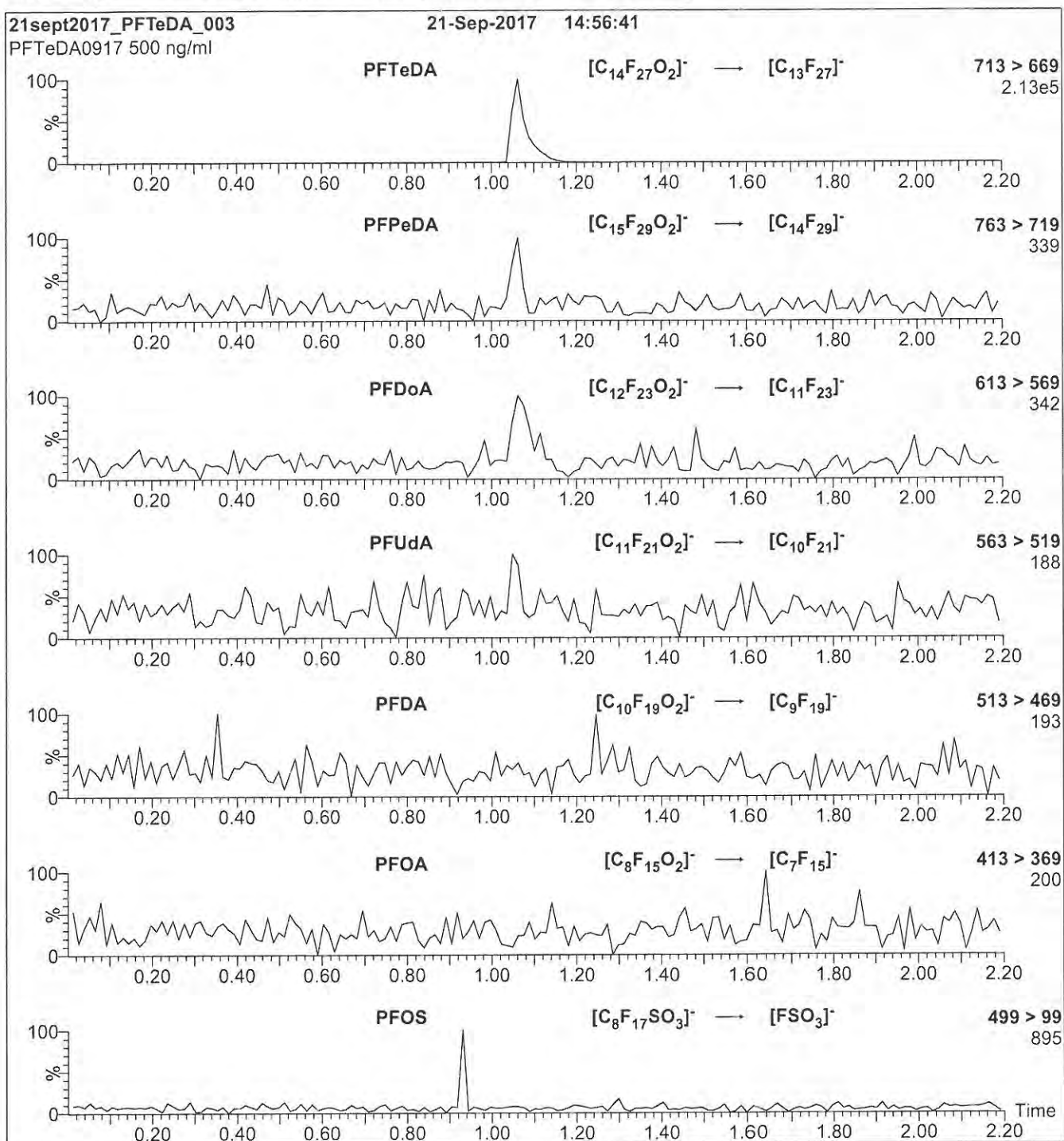
Flow: 300 μ l/min

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

18E0717

Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 14

18E0718

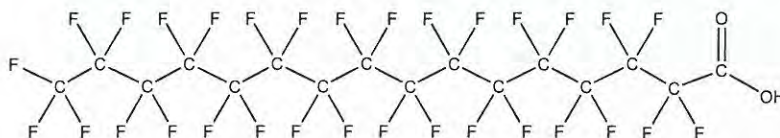


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxDA **LOT NUMBER:** PFHxDA0717
COMPOUND: Perfluoro-n-hexadecanoic acid

STRUCTURE: **CAS #:** 67905-19-5



MOLECULAR FORMULA: $C_{16}H_{31}O_2$ **MOLECULAR WEIGHT:** 814.13
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:
 B.G. Chittim, General Manager

Date: 08/04/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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 $\pm 5\%$ (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:

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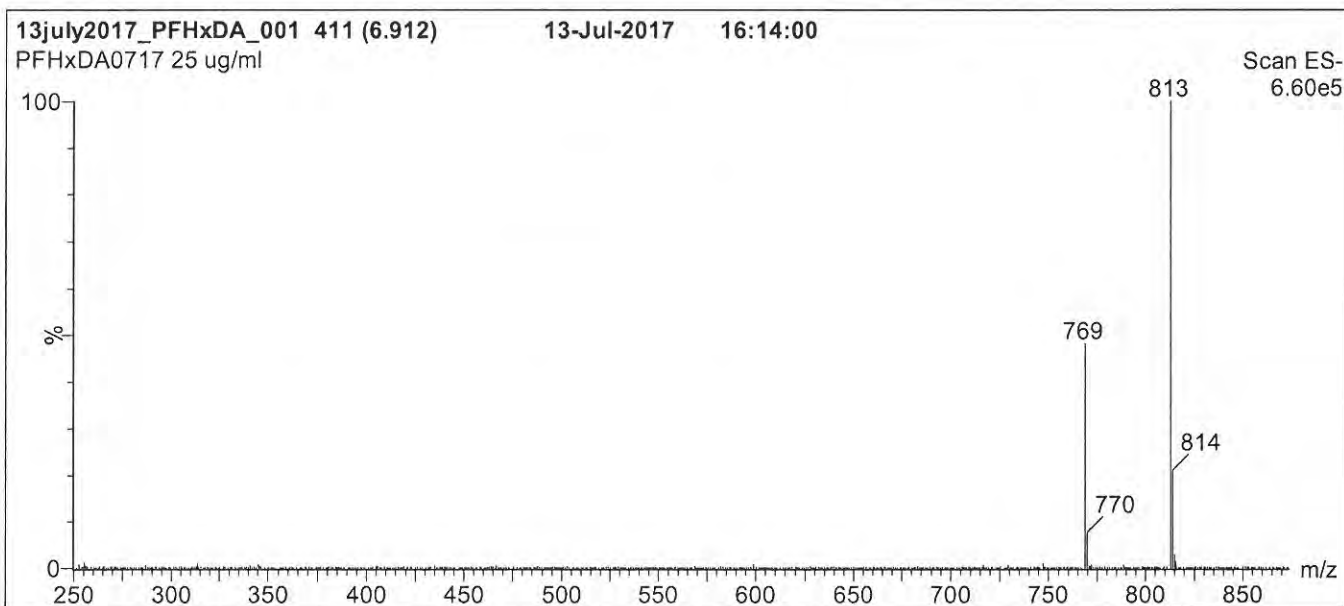
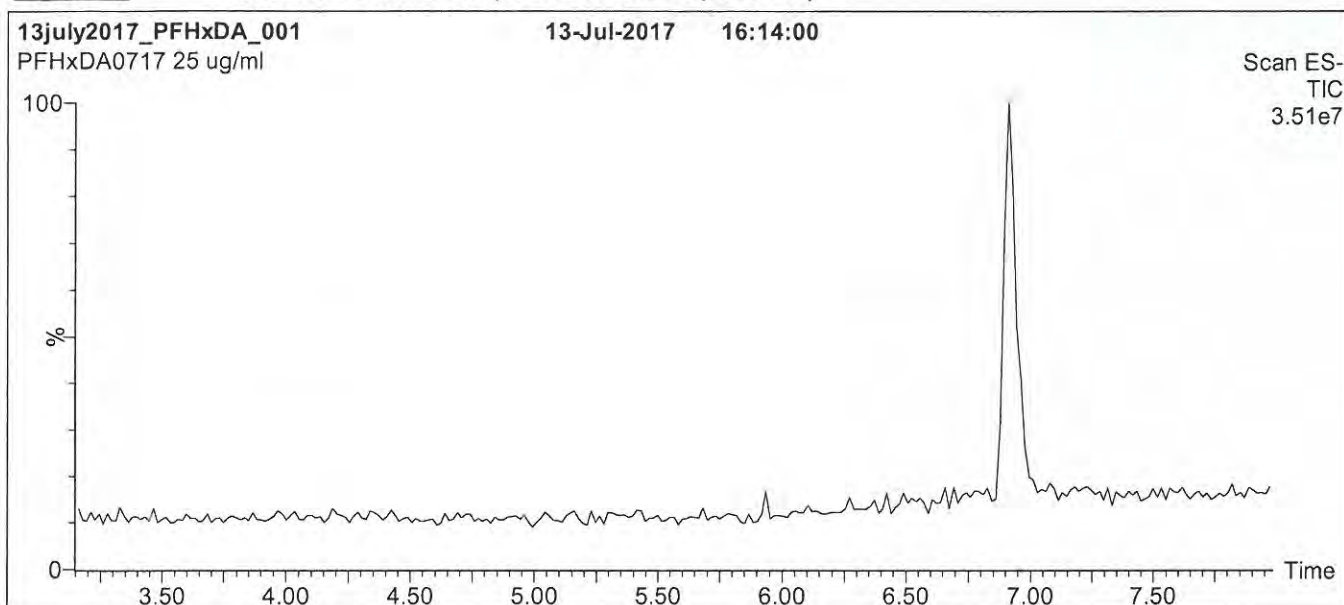
QUALITY MANAGEMENT:

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18E0718

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

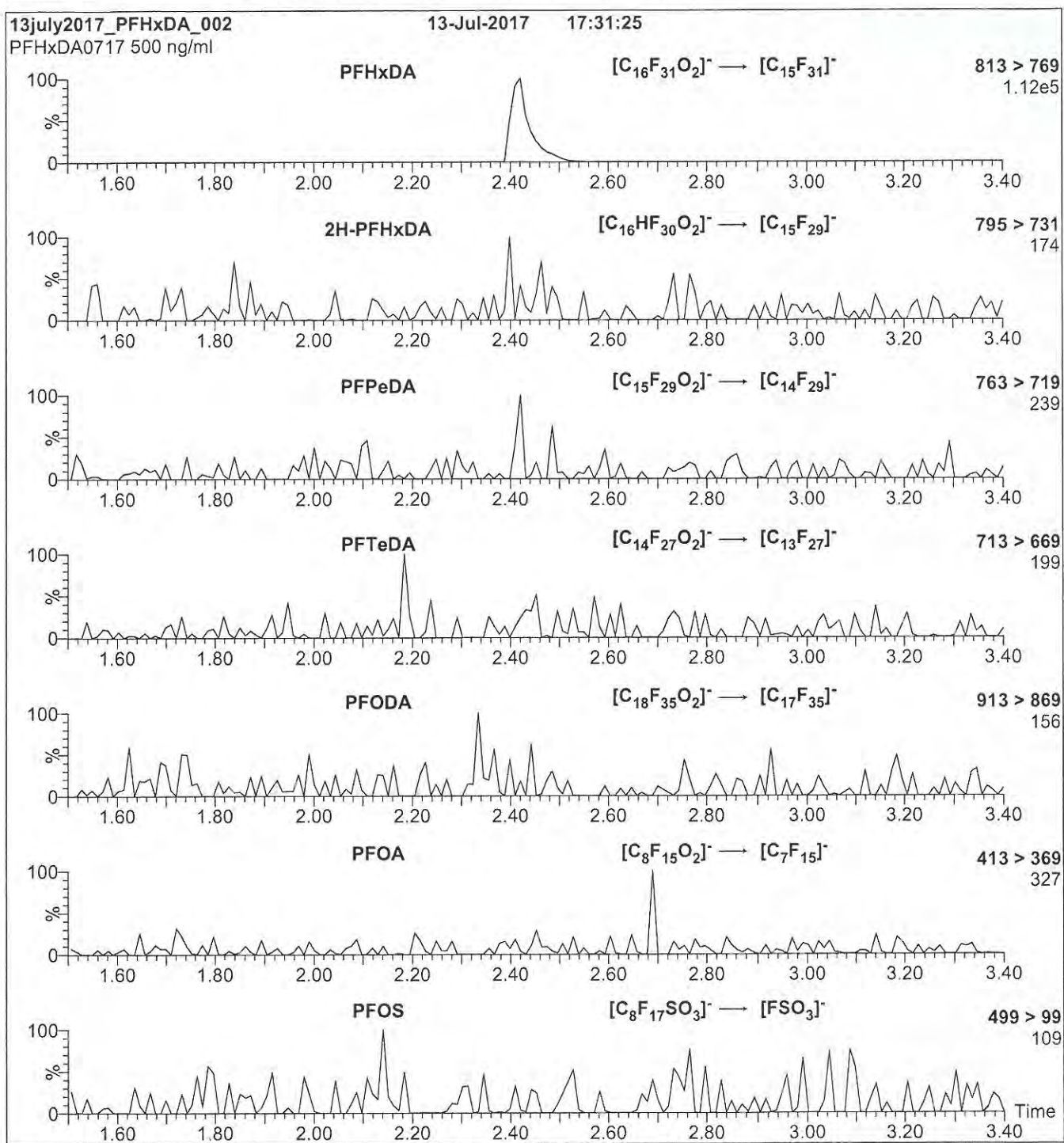
Flow: 300 μ l/min

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

18E0718

Figure 2: PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.13e-3
Collision Energy (eV) = 15

18E0719



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFODA

LOT NUMBER:

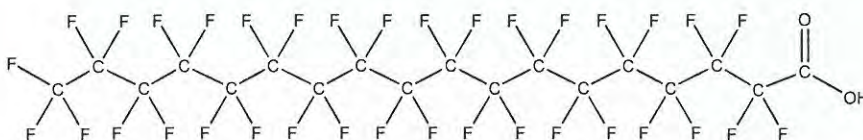
PFODA0717

COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:**CAS #:**

16517-11-6

**MOLECULAR FORMULA:** $C_{18}H_{35}O_2$ **MOLECULAR WEIGHT:**

914.14

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:**

B.G. Chittim, General Manager
Date: 07/14/2017

(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

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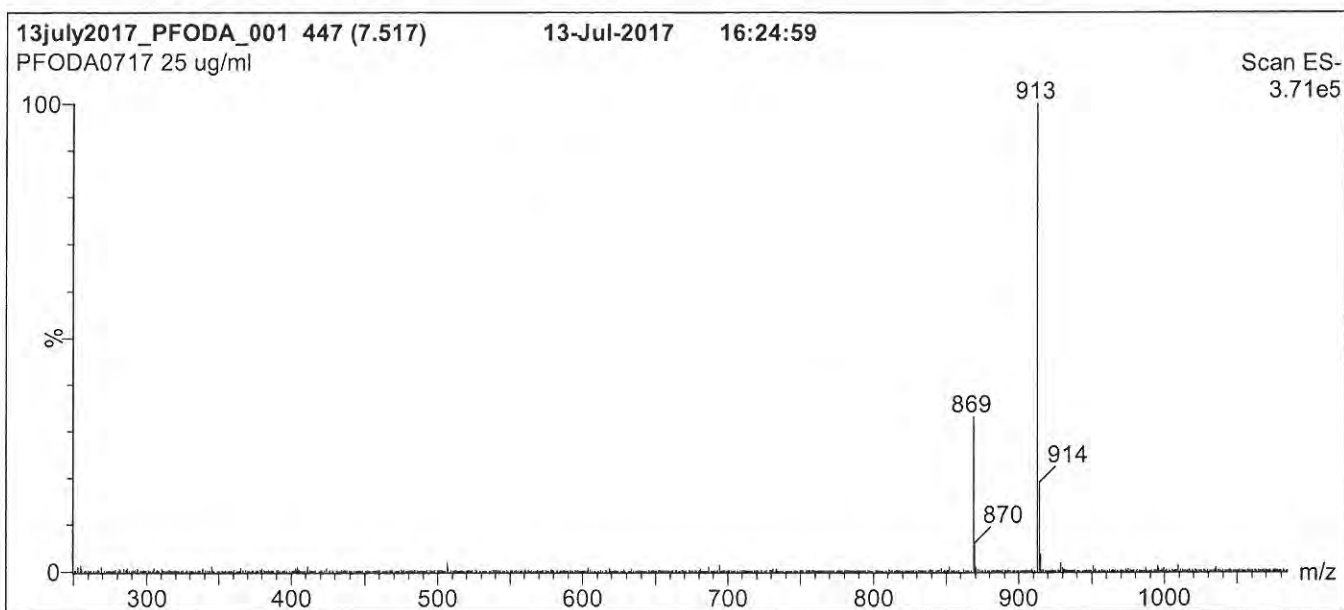
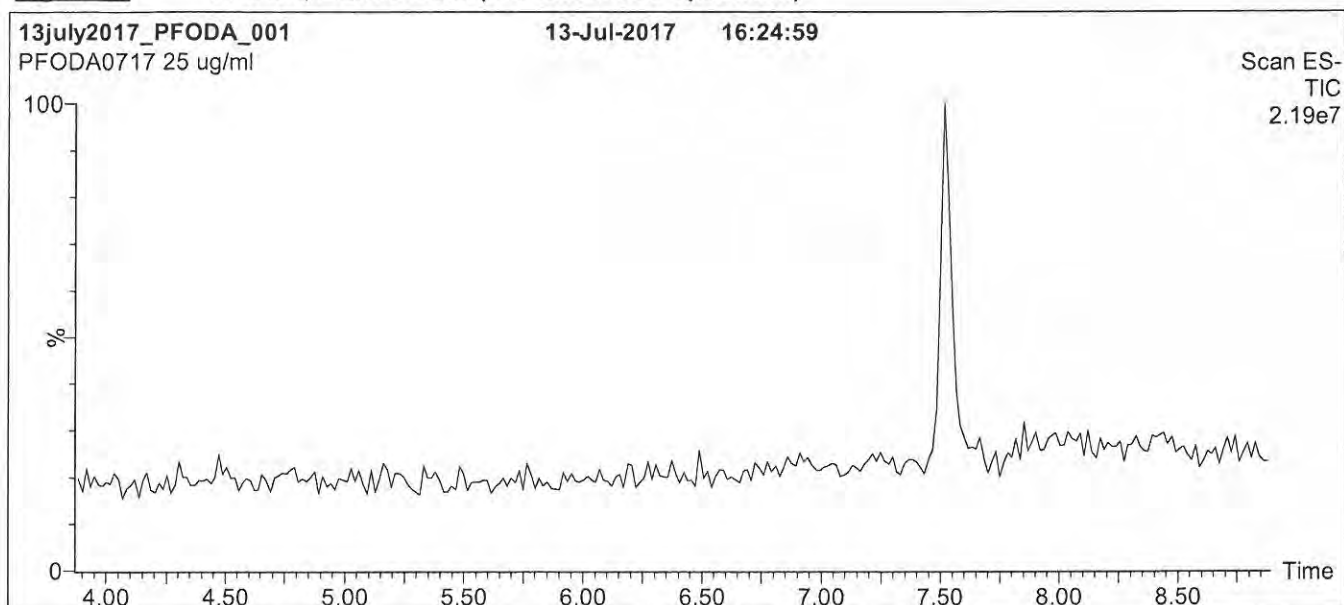
QUALITY MANAGEMENT:

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).



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18E0719

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

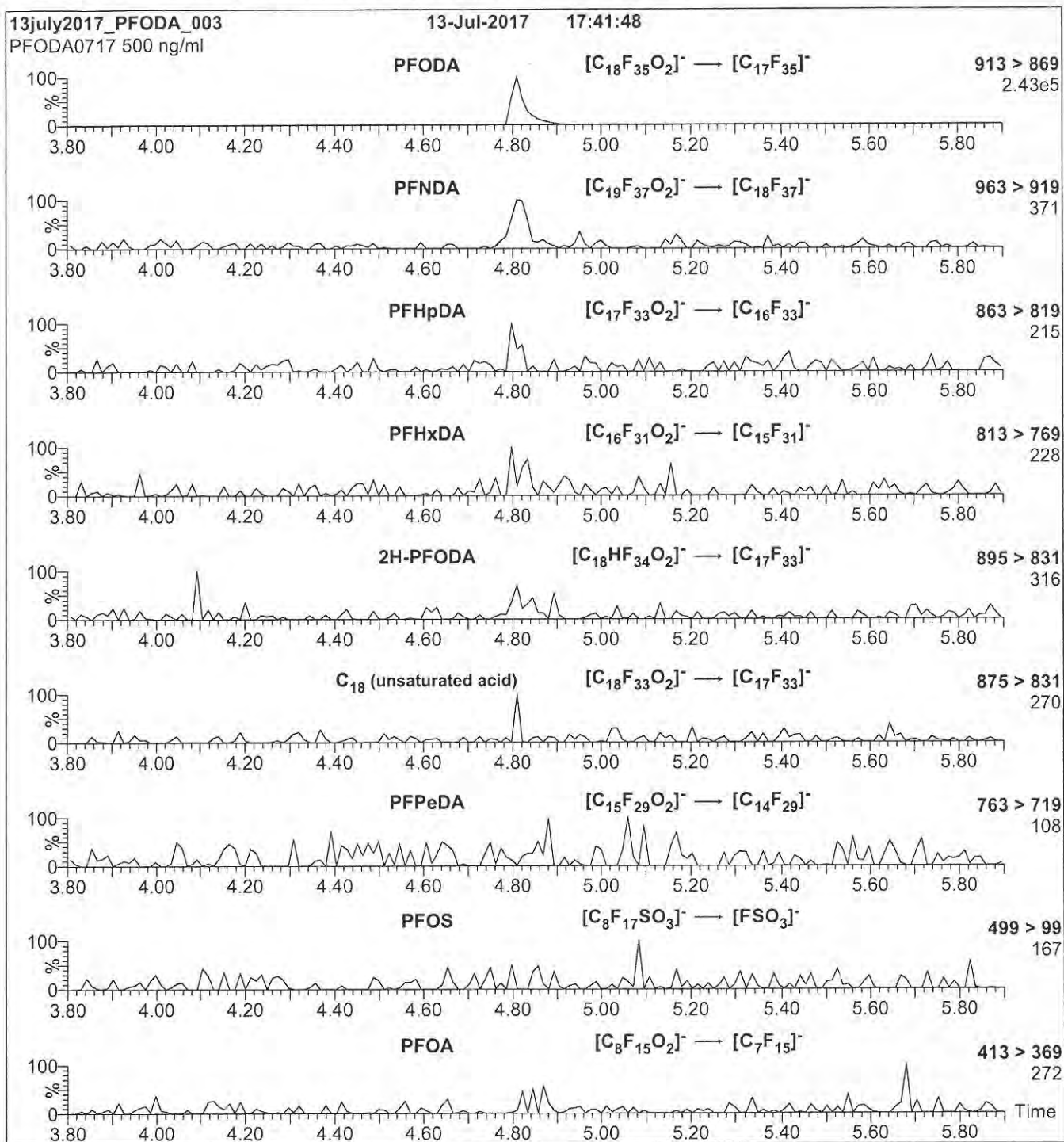
Flow: 300 μ l/min

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

18E0719

Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml PFODA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 15

18E0720



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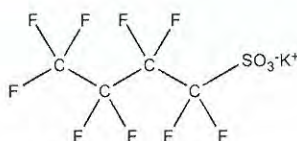
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate

LOT NUMBER: LPFBS0917

STRUCTURE:

CAS #: 29420-49-3



MOLECULAR FORMULA: $C_4F_9SO_3K$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (K salt)
 $44.2 \pm 2.2 \mu\text{g/ml}$ (PFBS anion)
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

MOLECULAR WEIGHT: 338.19
SOLVENT(S): Methanol

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, General Manager

Date: 09/22/2017
(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

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

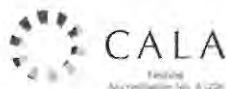
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

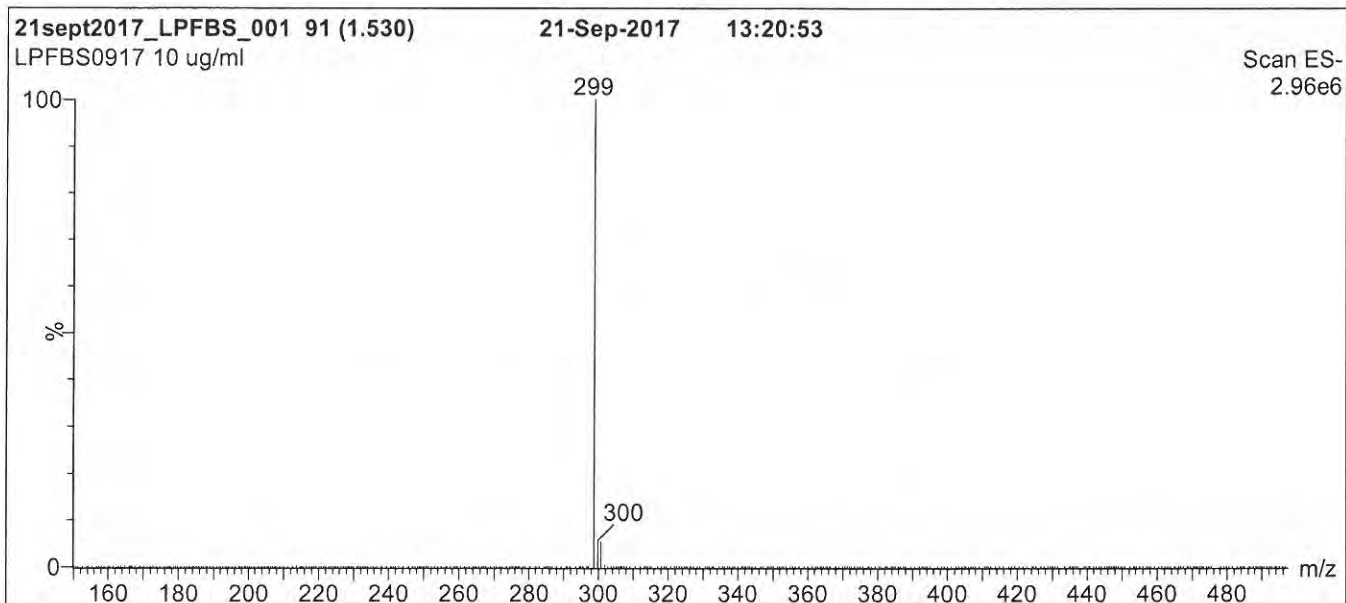
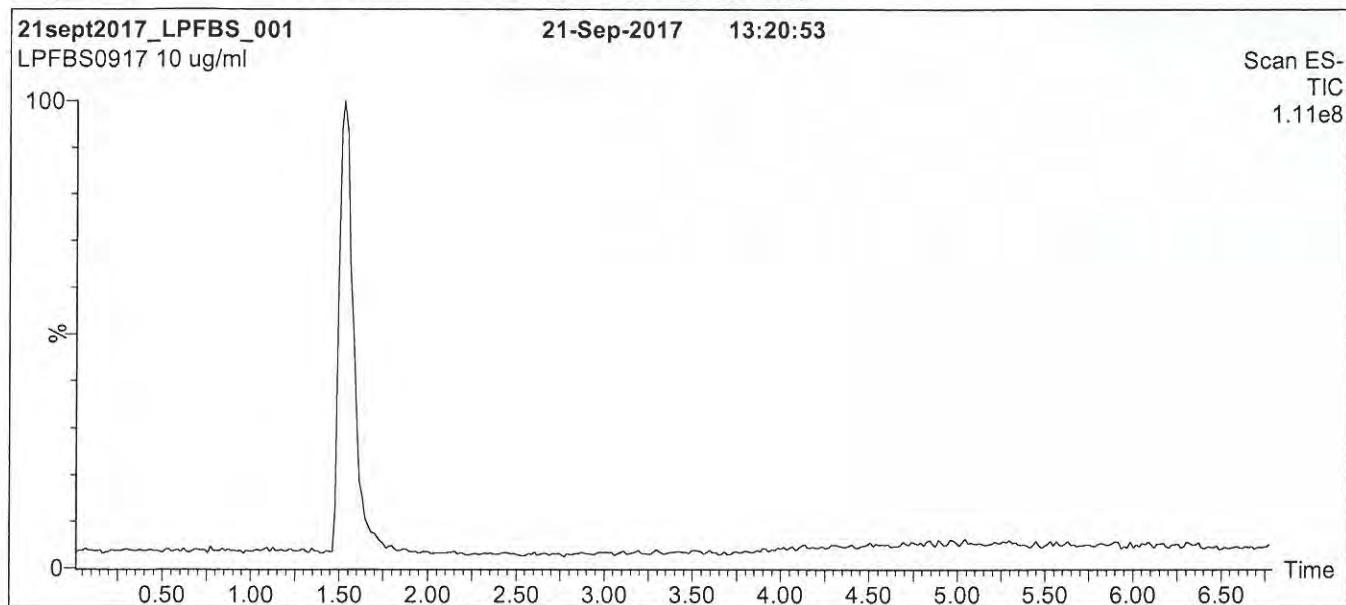
QUALITY MANAGEMENT:

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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18E0720

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

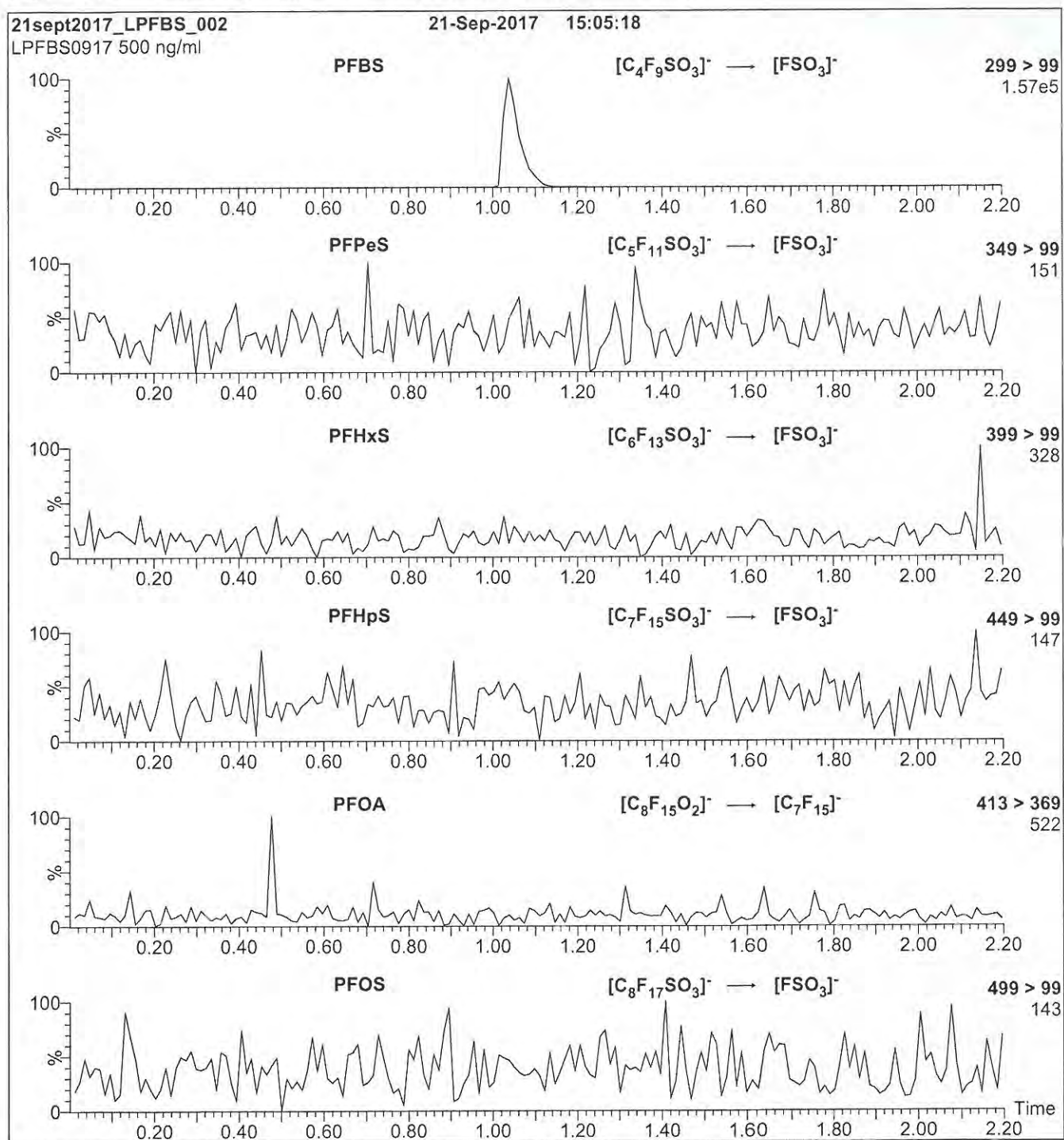
Flow: 300 μ l/min

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

18E0720

Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18E0721



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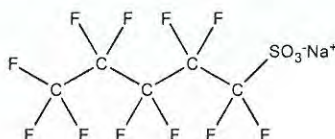
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFPeS
COMPOUND: Sodium perfluoro-1-pentanesulfonate

LOT NUMBER: LPFPeS0117

STRUCTURE:

CAS #: 630402-22-1



MOLECULAR FORMULA: $C_5F_{11}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $46.9 \pm 2.3 \mu\text{g/ml}$ (PFPeS anion)
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

MOLECULAR WEIGHT: 372.09
SOLVENT(S): Methanol

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, General Manager

Date: 09/06/2017
(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

18E0721

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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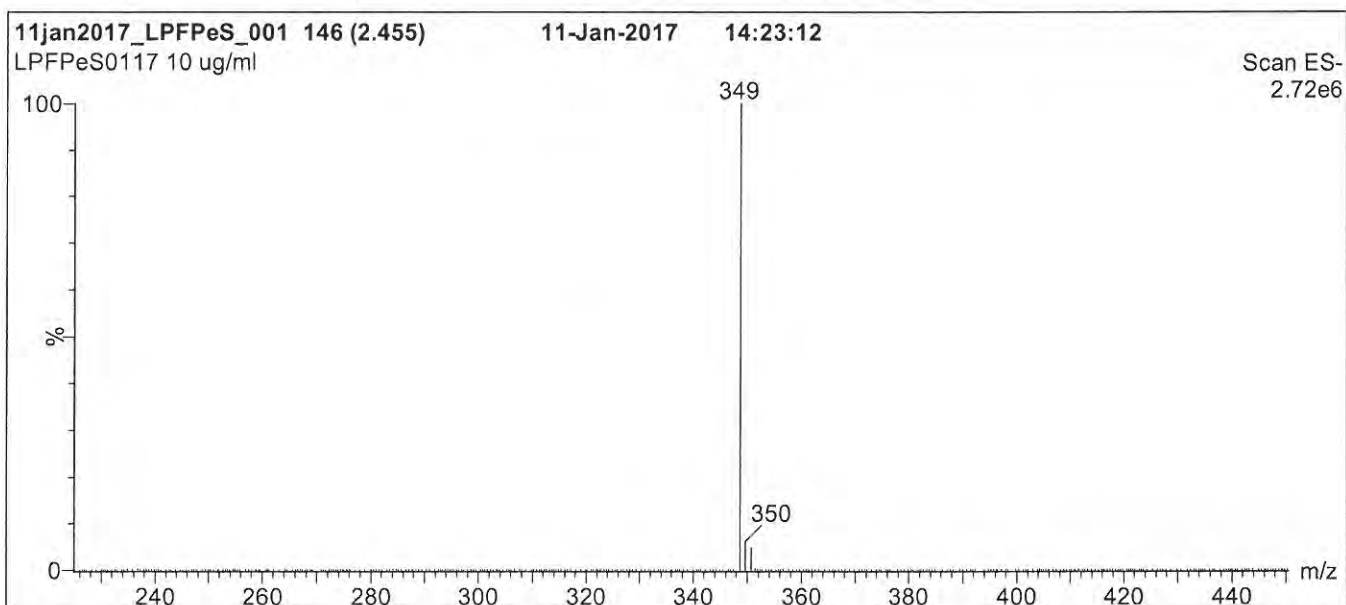
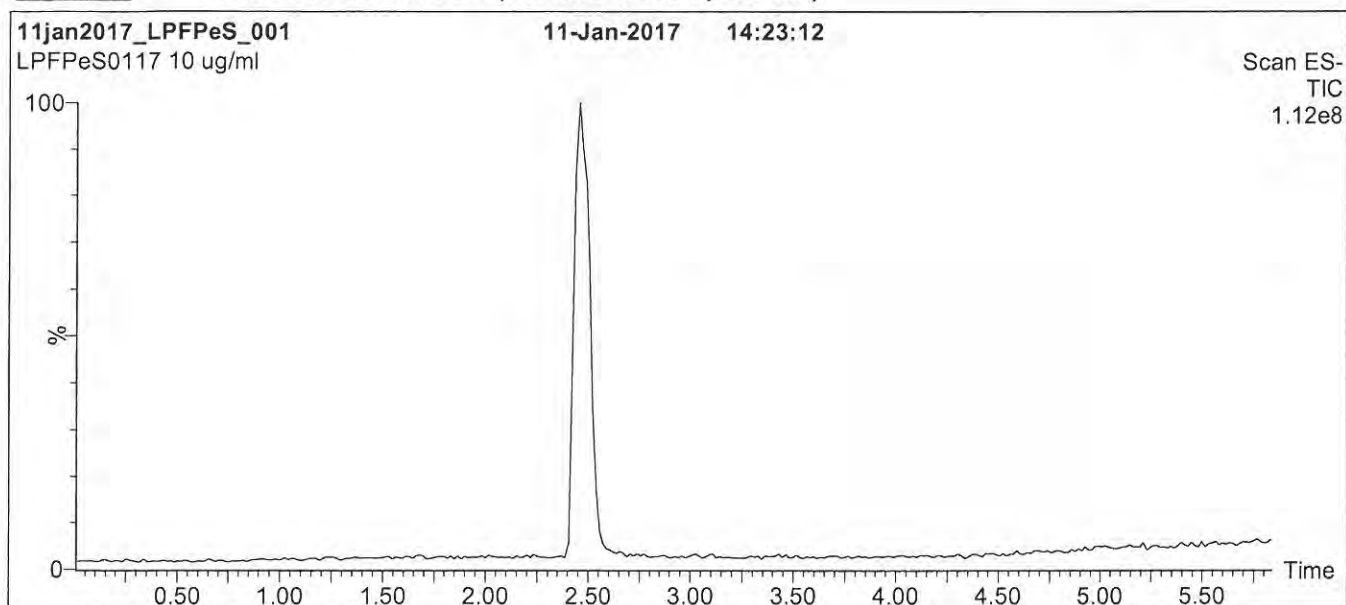
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18E0721

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

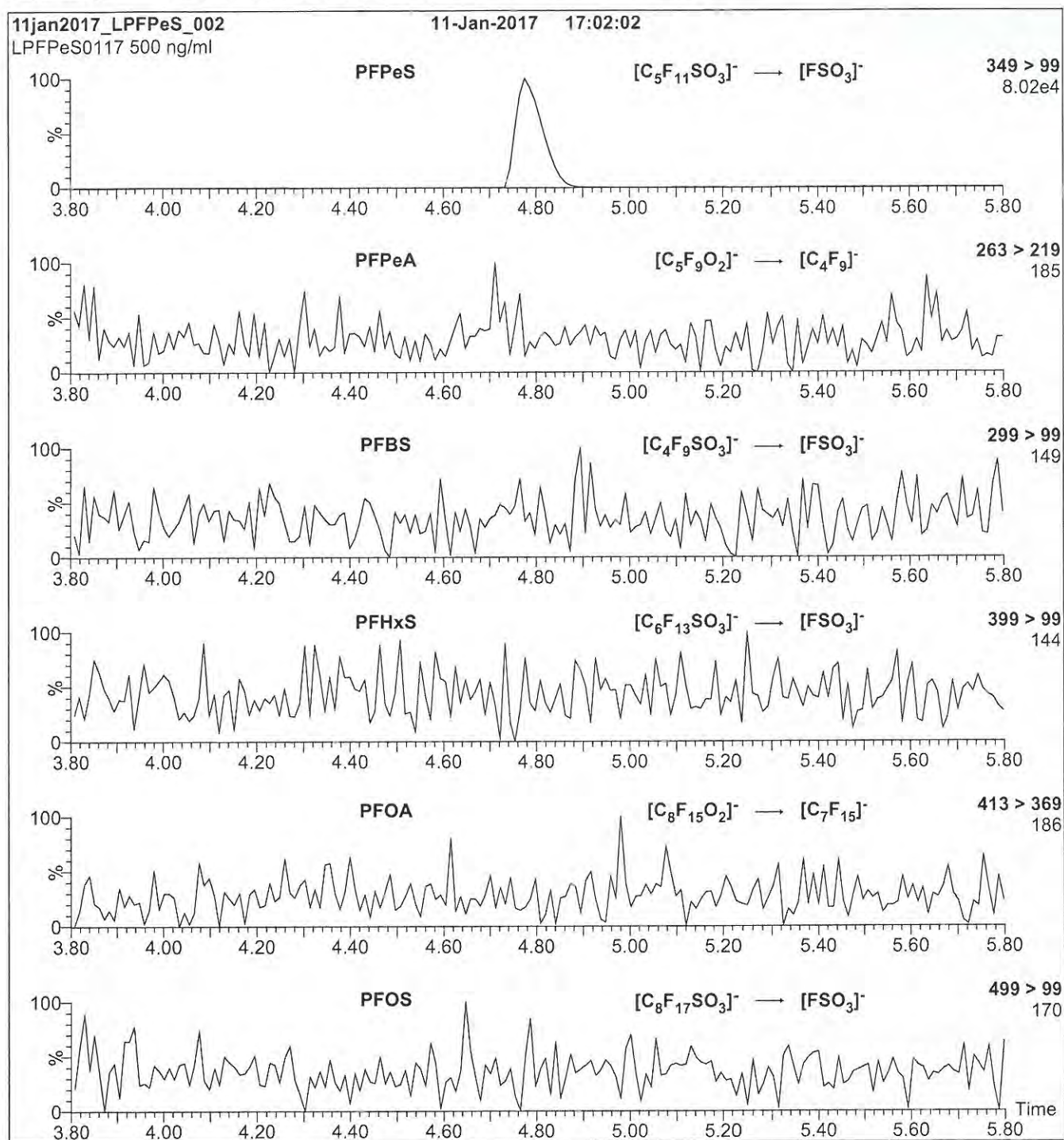
Flow: 300 μ l/min

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

18E0721

Figure 2: L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 30

18E0722



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFHpS

LOT NUMBER:

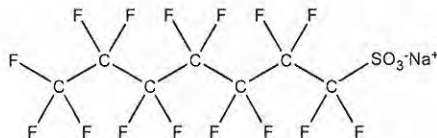
LPFHpS0817

COMPOUND:

Sodium perfluoro-1-heptanesulfonate

STRUCTURE:**CAS #:**

Not available

**MOLECULAR FORMULA:** $C_7F_{15}SO_3Na$ **MOLECULAR WEIGHT:**

472.10

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

47.6 ± 2.4 µg/ml (PFHpS anion)

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:**

B.G. Chittim, General Manager
Date:09/07/2017
(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

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.

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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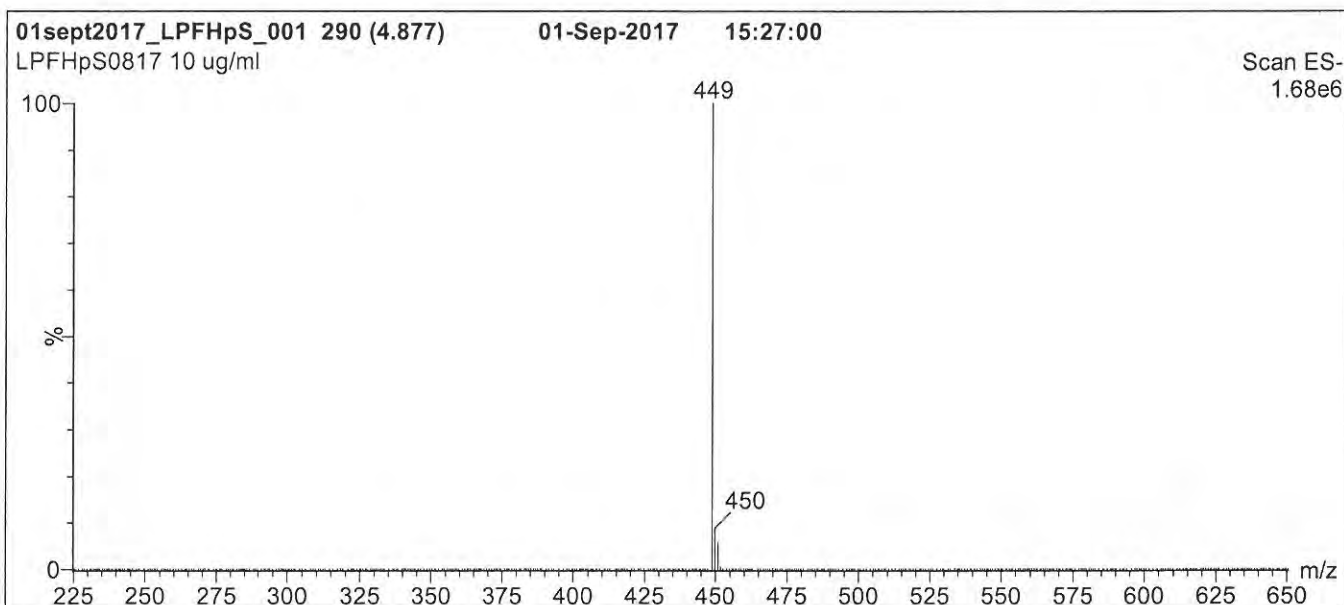
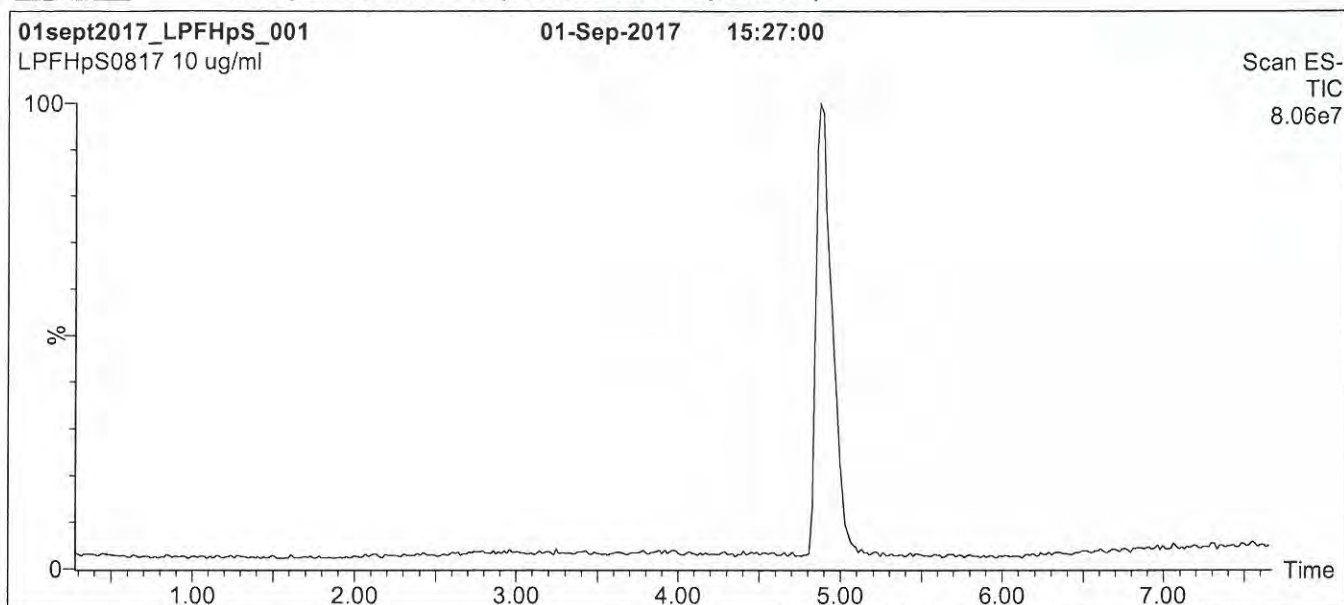
QUALITY MANAGEMENT:

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18E0722

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

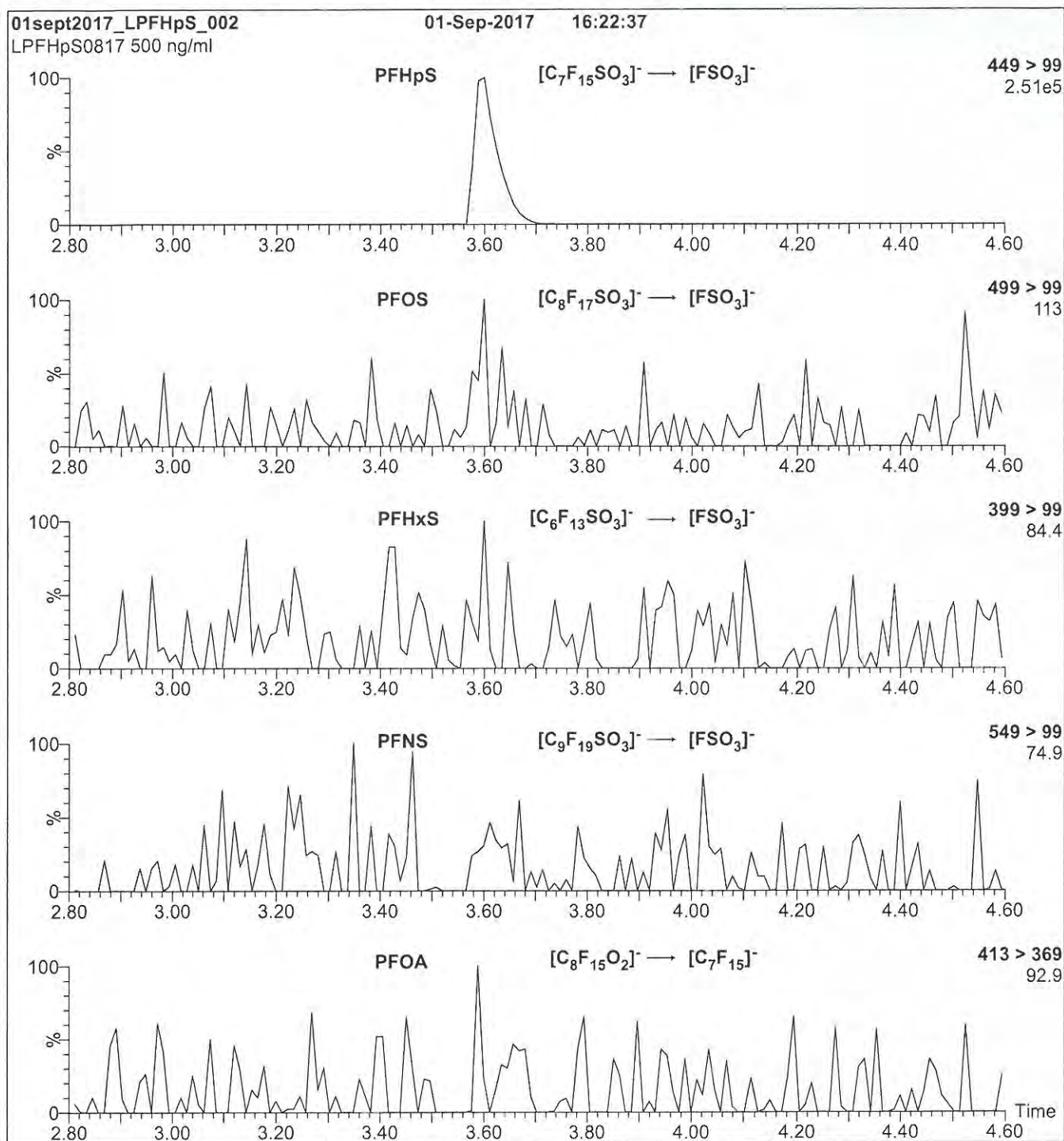
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 8 min and hold
for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/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

Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (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 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 35

18E0723



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFNS

LOT NUMBER:

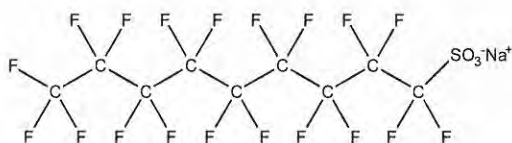
LPFNS0917

COMPOUND:

Sodium perfluoro-1-nonanesulfonate

STRUCTURE:**CAS #:**

98789-57-2

**MOLECULAR FORMULA:** $C_9F_{19}SO_3Na$ **MOLECULAR WEIGHT:**

572.12

CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)**SOLVENT(S):**

Methanol

 $48.0 \pm 2.4 \mu\text{g/ml}$ (PFNS anion)**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:

B.G. Chittim, General Manager

Date:

 09/28/2017
 (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

18E0723

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

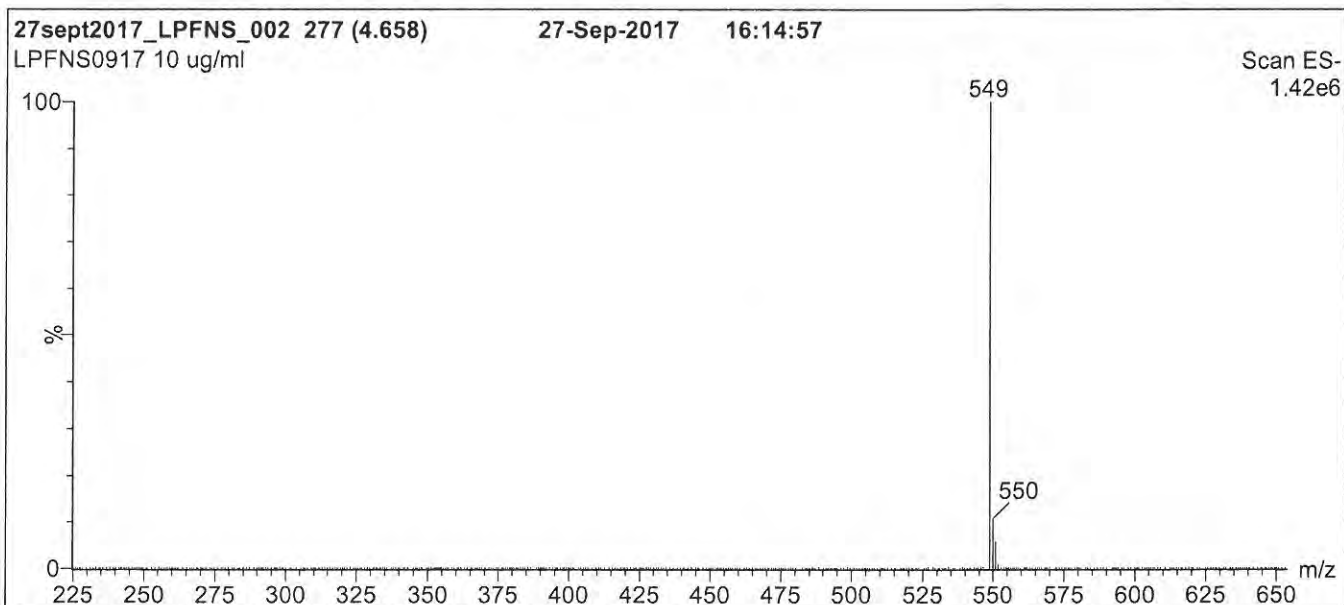
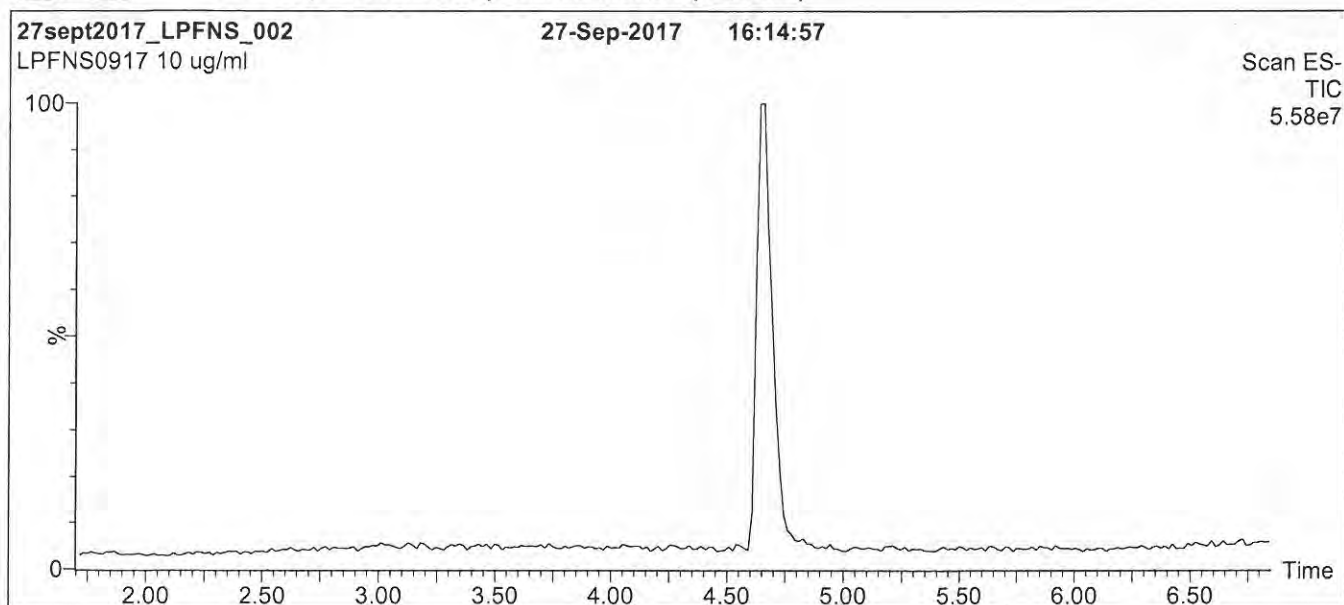
QUALITY MANAGEMENT:

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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18E0723

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

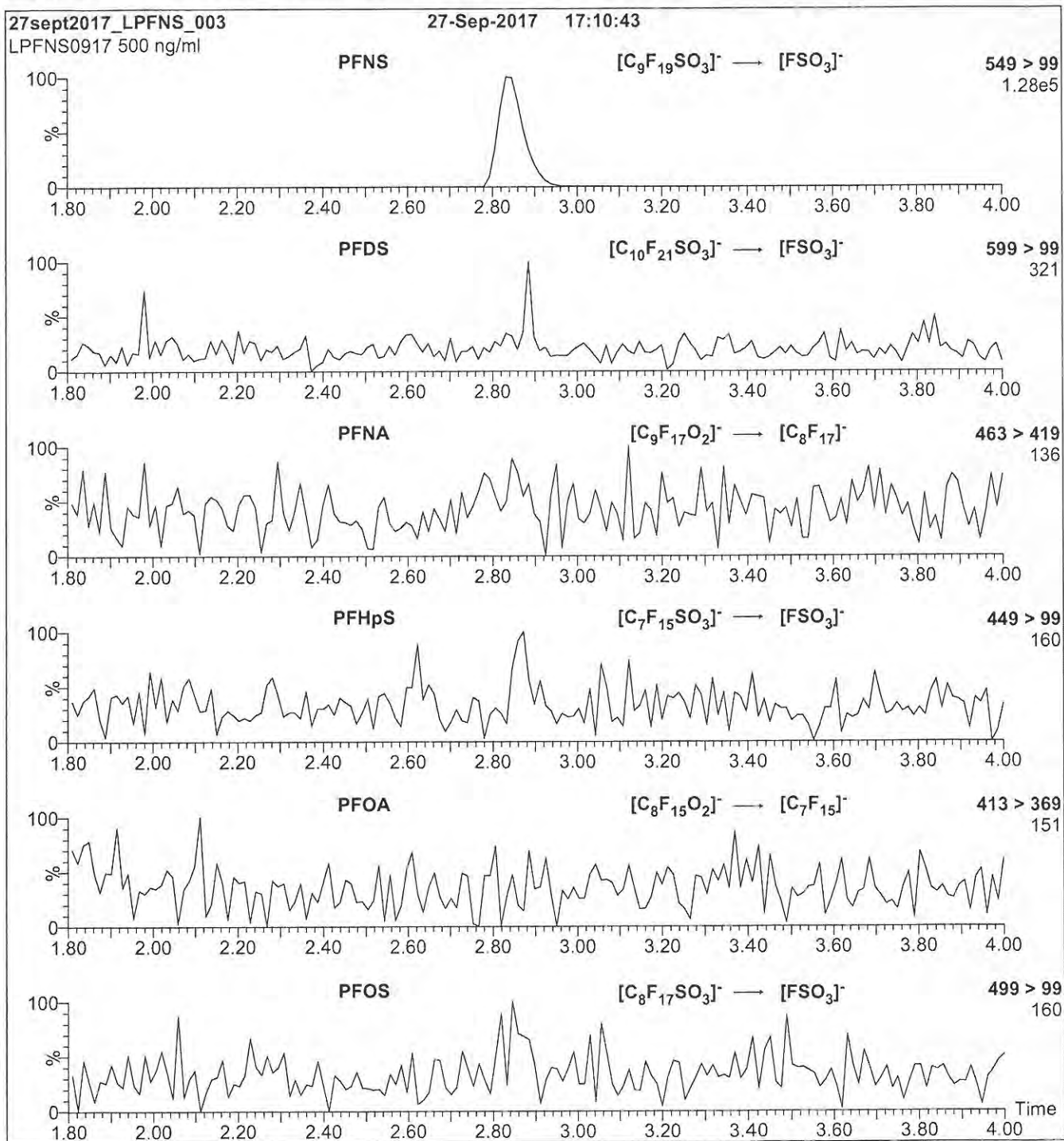
Flow: 300 μ l/min

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

18E0723

Figure 2: L-PFNS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFNS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 45

18E0724



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFDS

LOT NUMBER:

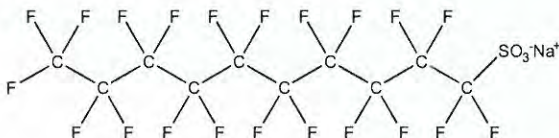
LPFDS1117

COMPOUND:

Sodium perfluoro-1-decanesulfonate

STRUCTURE:**CAS #:**

2806-15-7

**MOLECULAR FORMULA:** $C_{10}F_{21}SO_3Na$ **MOLECULAR WEIGHT:**

622.13

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

48.2 ± 2.4 µg/ml (PFDS anion)

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:

B.G. Chittim, General Manager

Date:

 11/16/2017
 (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

18E0724

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

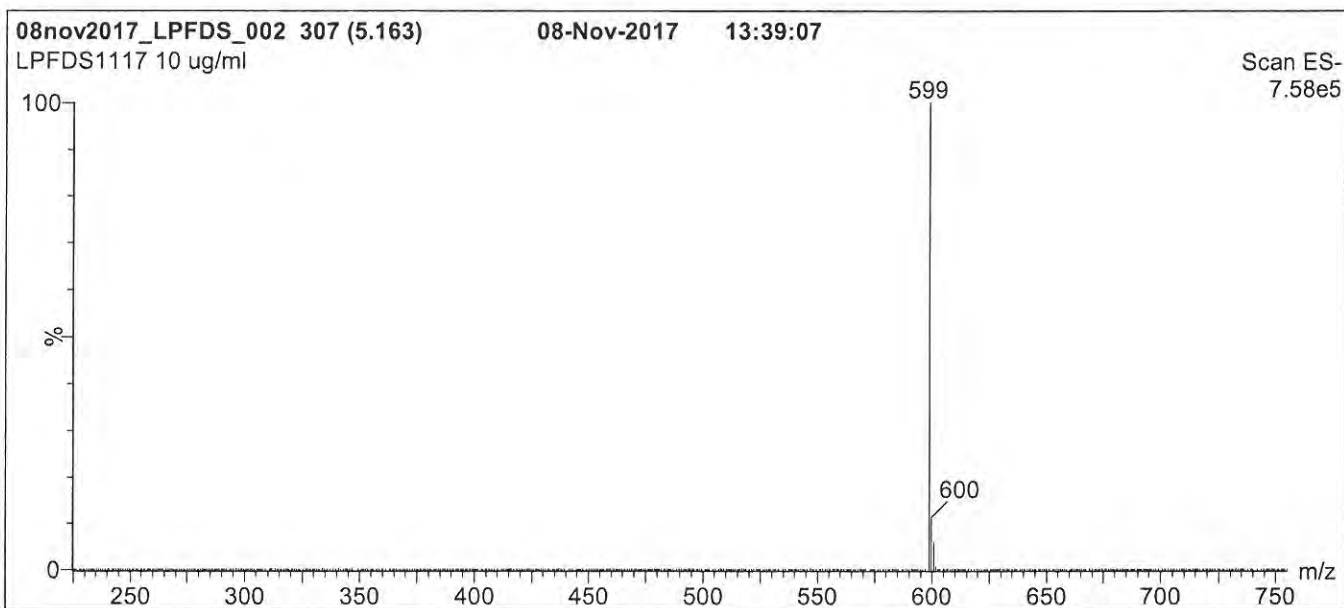
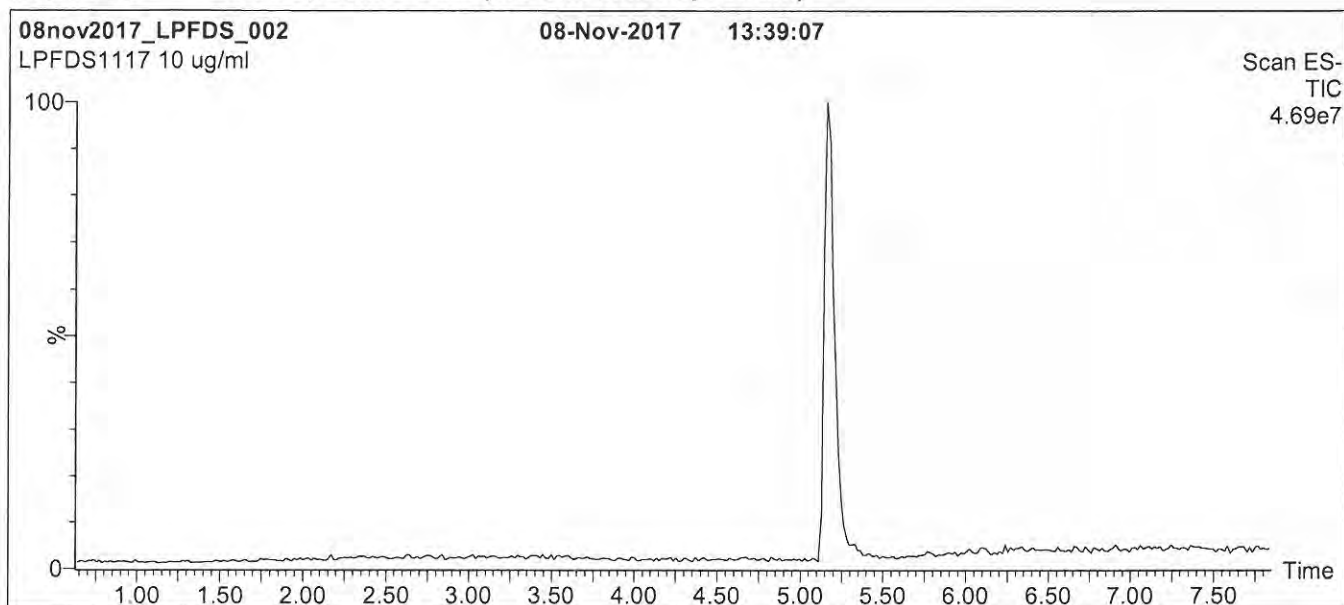
QUALITY MANAGEMENT:

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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18E0724

Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

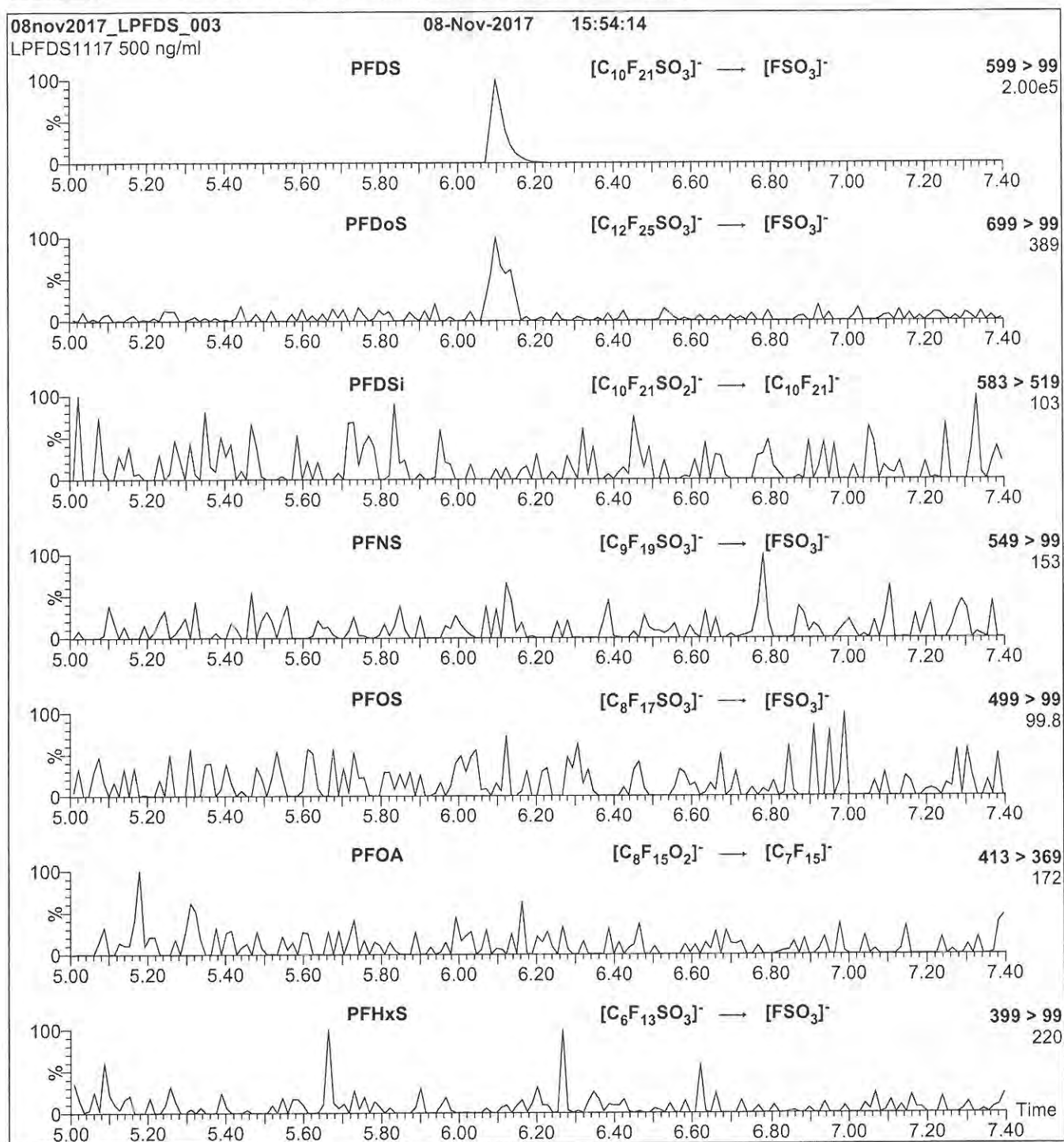
Flow: 300 μ l/min

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

18E0724

Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 50

18E0725

**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 ¹⁹F-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).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com**

18E0725

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

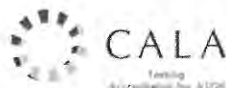
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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).



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18E0725

Table A: br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F -NMR)*

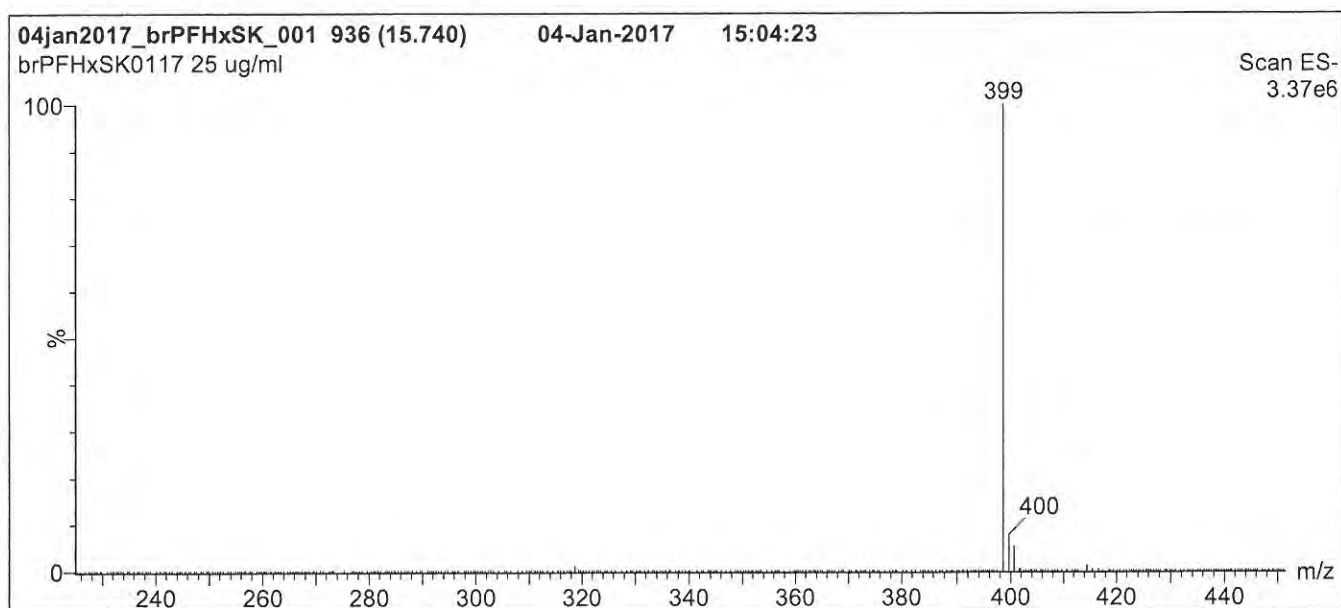
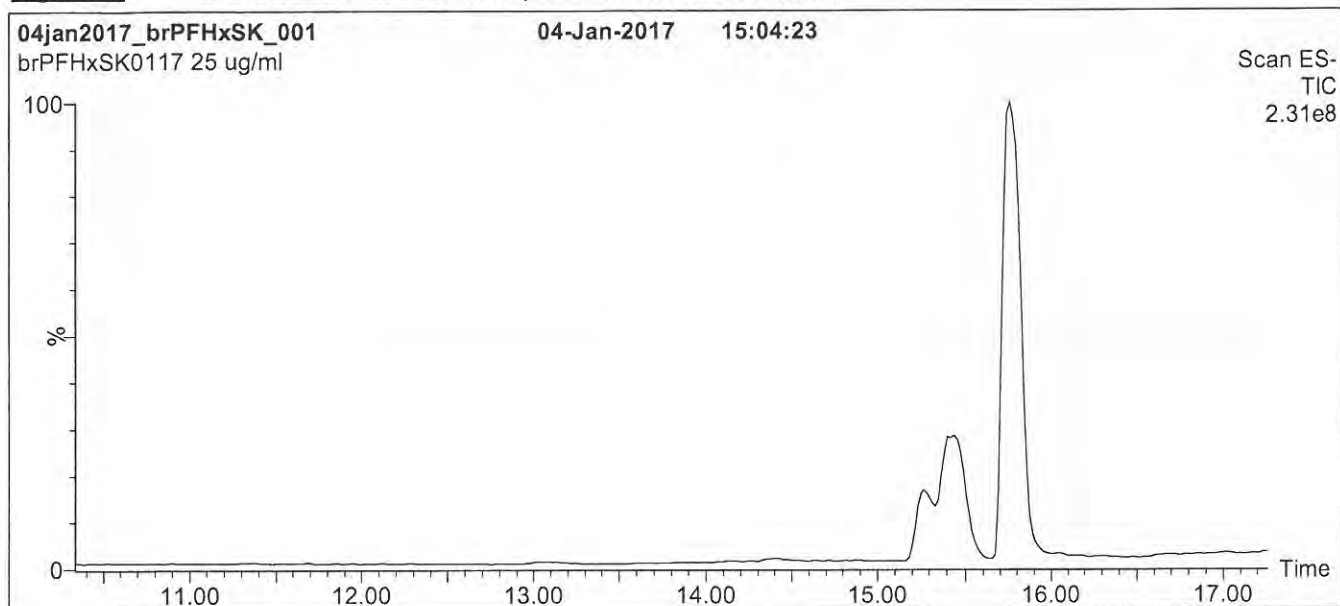
Isomer	Name	Structure	Percent Composition by ^{19}F -NMR
1	Potassium perfluoro-1-hexanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\underset{\text{CF}_3}{\text{C}}\text{SO}_3^-\text{K}^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$\text{CF}_3\text{CF}_2\underset{\text{CF}_3}{\text{C}}\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$\text{CF}_3\text{CF}_2\underset{\text{CF}_3}{\text{C}}\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$\text{CF}_3\underset{\text{CF}_3}{\text{C}}\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$\underset{\text{CF}_3}{\overset{\text{CF}_3}{\text{C}}}\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	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)

18E0725

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 20% (80:20 MeOH:ACN) / 80% H₂O
 (both with 10 mM NH₄OAc 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

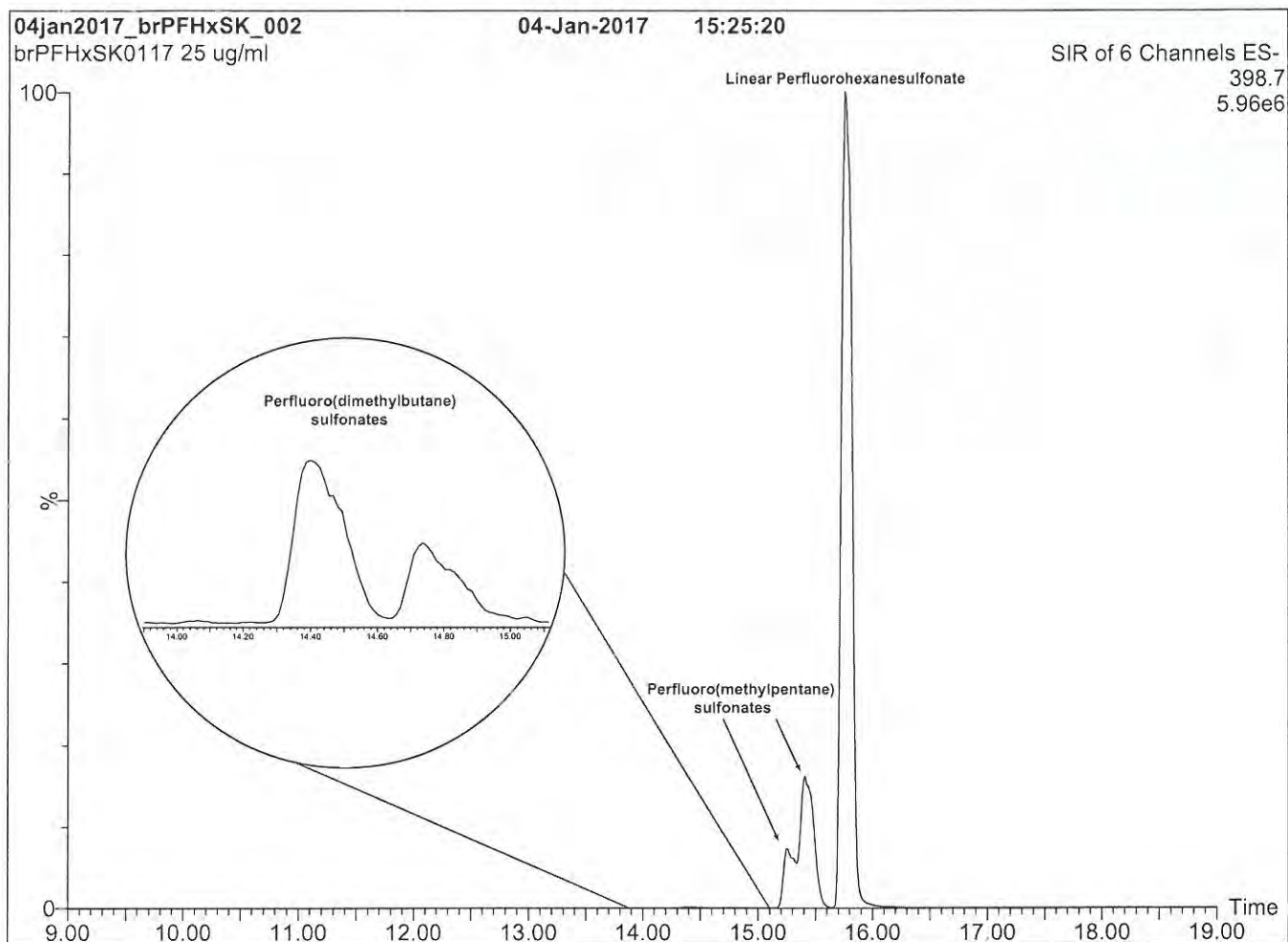
Flow: 300 μ l/min

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

18E0725

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 20% (80:20 MeOH:ACN) / 80% H₂O
 (both with 10 mM NH₄OAc 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

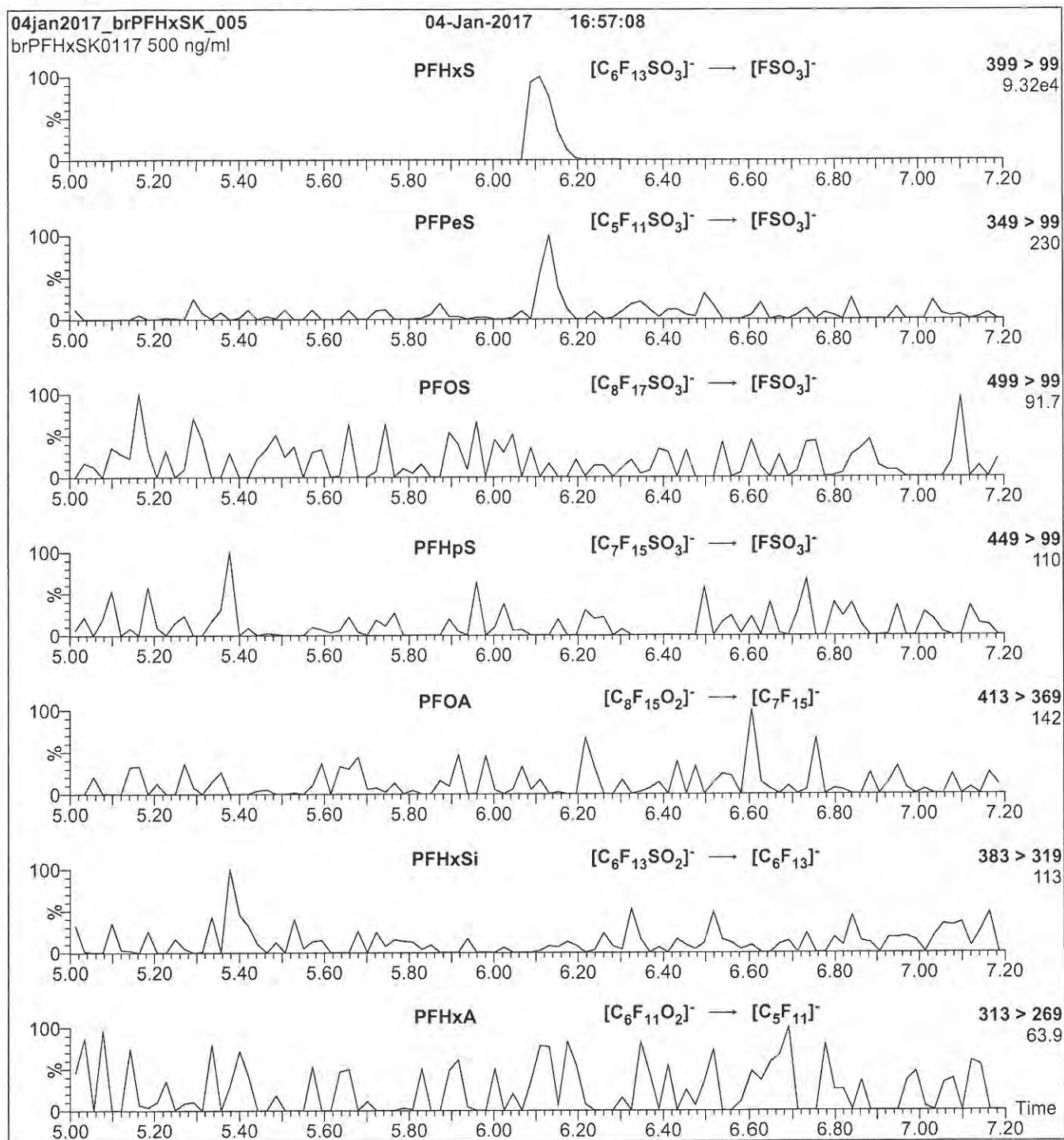
Flow: 300 μ l/min

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

18E0725

Figure 3: br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: Direct loop injection
10 μ l (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

18E0726

**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 ¹⁹F-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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18E0726

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:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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).



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

18E0726

Table A: br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F -NMR)*

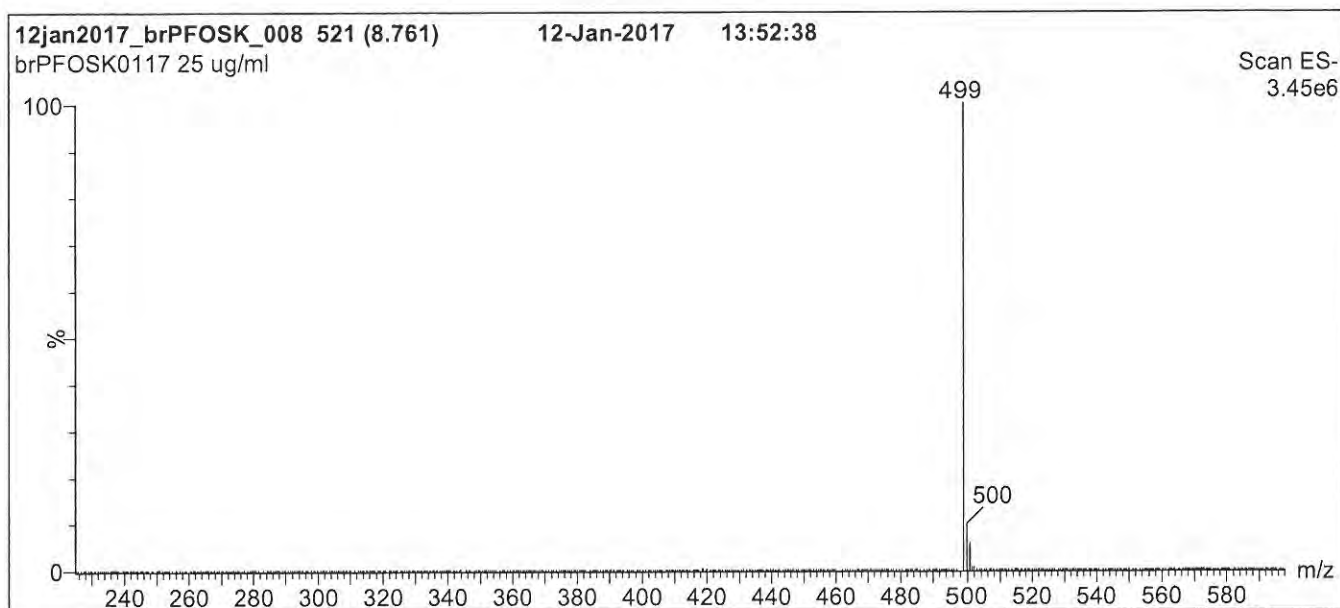
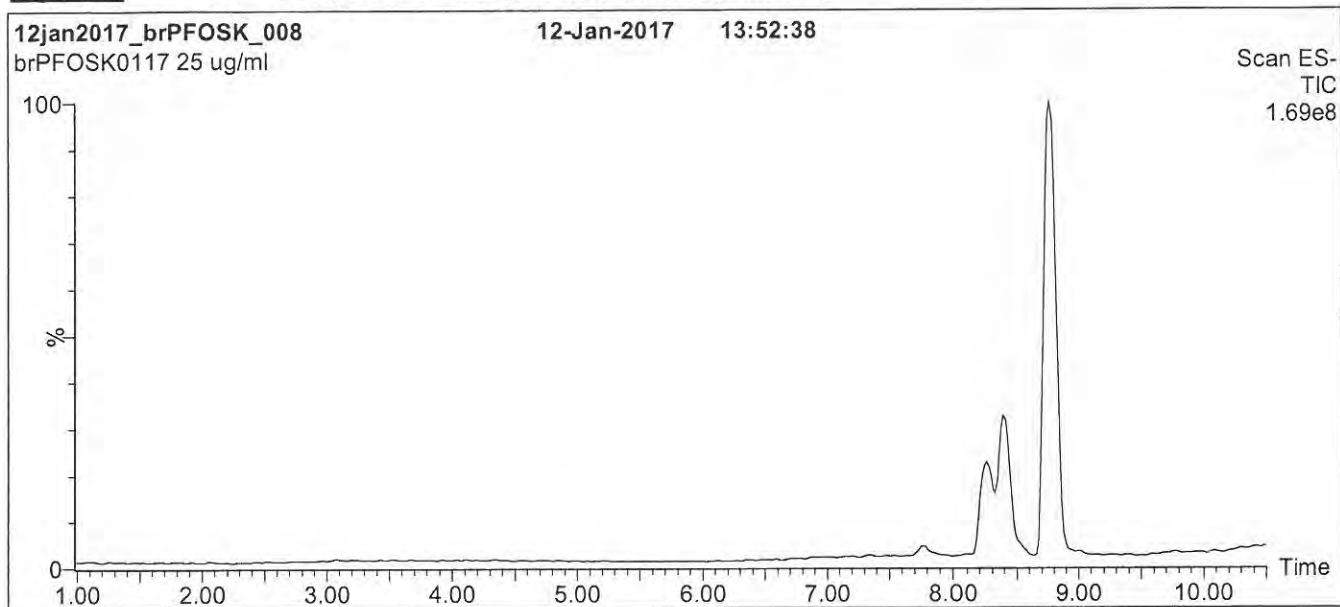
Isomer	Name	Structure	Percent Composition by ^{19}F -NMR
1	Potassium perfluoro-1-octanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}(\text{CF}_3)\text{SO}_3^-\text{K}^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{SO}_3^-\text{K}^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{CF}(\text{CF}_3)\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+$	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)

18E0726

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 45% (80:20 MeOH:ACN) / 55% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 12 min and hold for 2 min.
 Return to initial conditions over 0.5 min.
 Time: 16 min

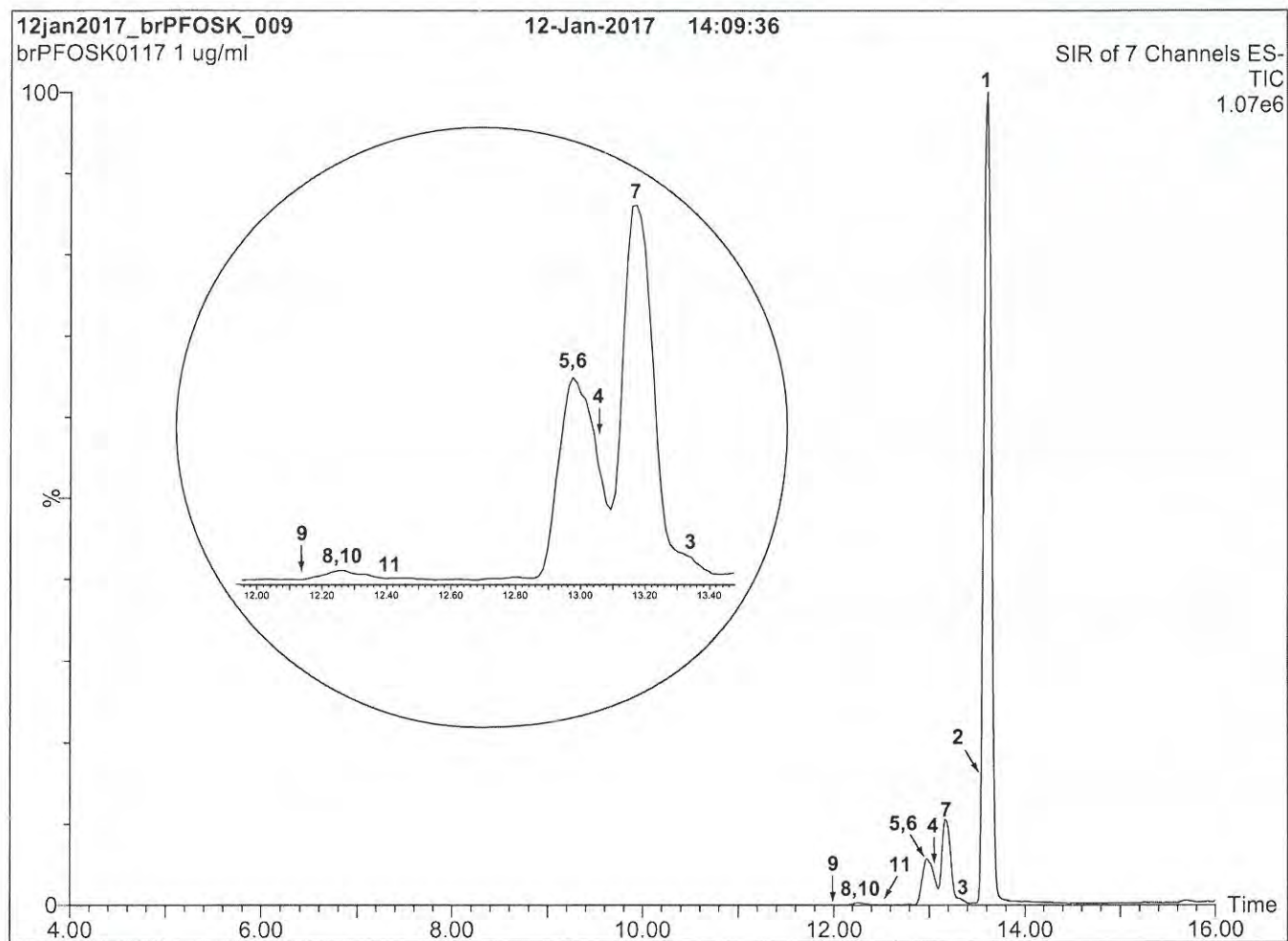
Flow: 300 μ l/min

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

18E0726

Figure 2: br-PFOSK; LC/MS Data (SIR)**Conditions for Figure 2:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro micro API MS

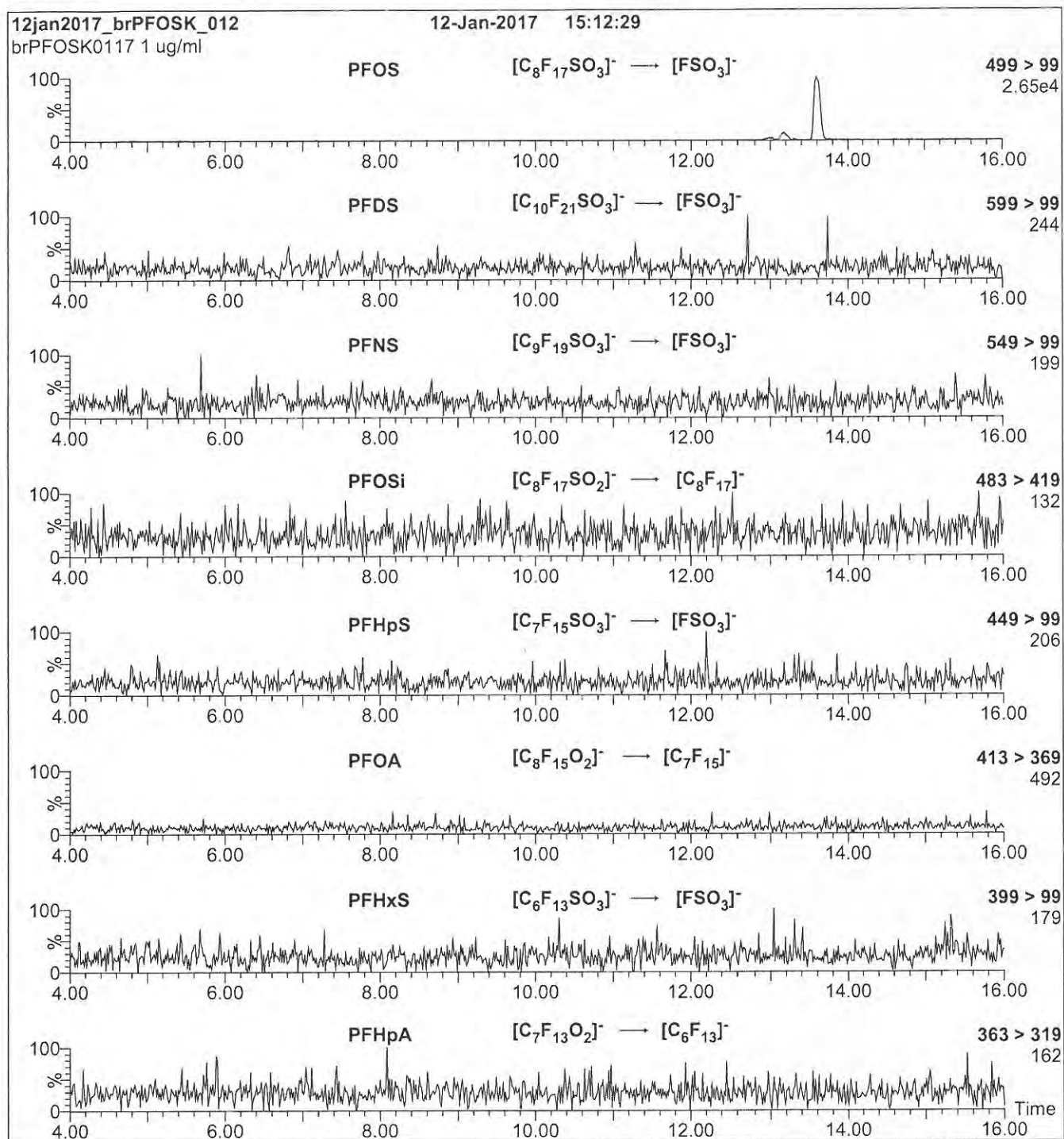
Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP₁₈ (1.7 μ m, 2.1 x 100 mm)
Injection: 1.0 μ g/ml of br-PFOSK
Mobile Phase: Gradient
 45% (80:20 MeOH:ACN) / 55% H₂O (both with 10 mM NH₄OAc 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 μ l/min

MS Conditions:

SIR (ES⁻)
 Source = 110 °C
 Desolvation = 325 °C
 Cone Voltage = 60V

18E0726

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 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.31e-3

Collision Energy (eV) = 11-50 (variable)

18E0727



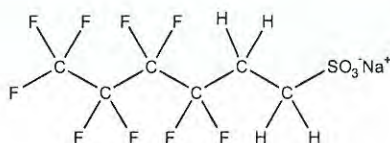
WELLINGTON LABORATORIES

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: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt) **SOLVENT(S):** Methanol

$46.7 \pm 2.3 \mu\text{g/ml}$ (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

18E0727

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

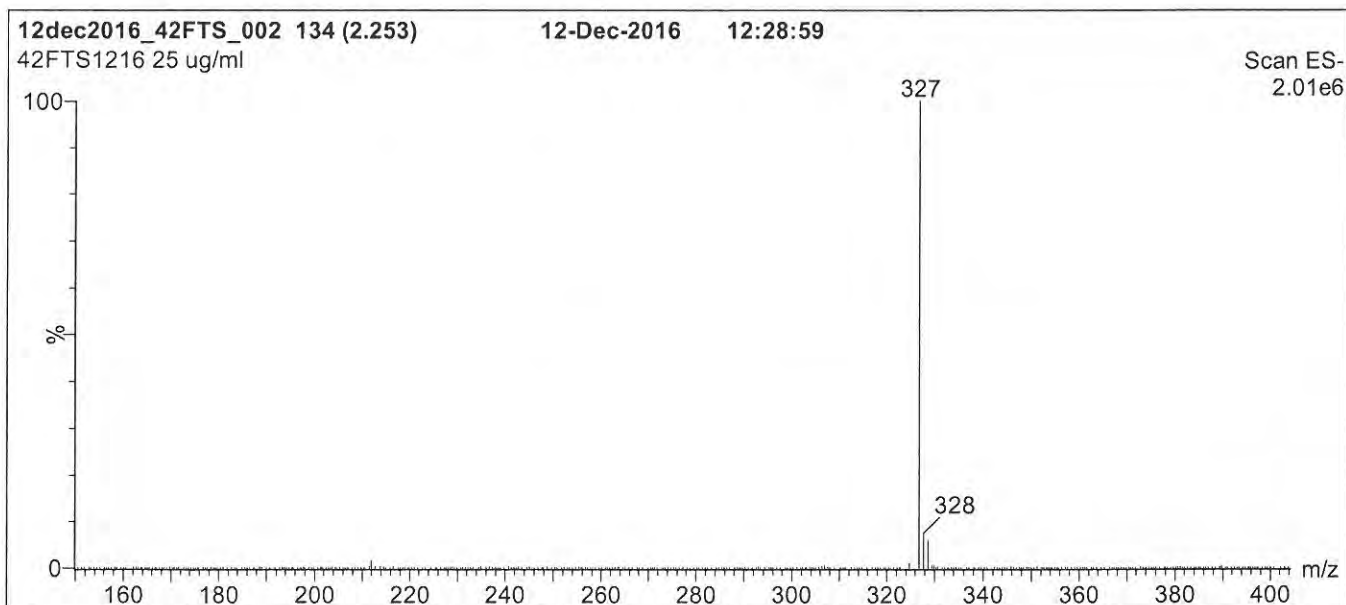
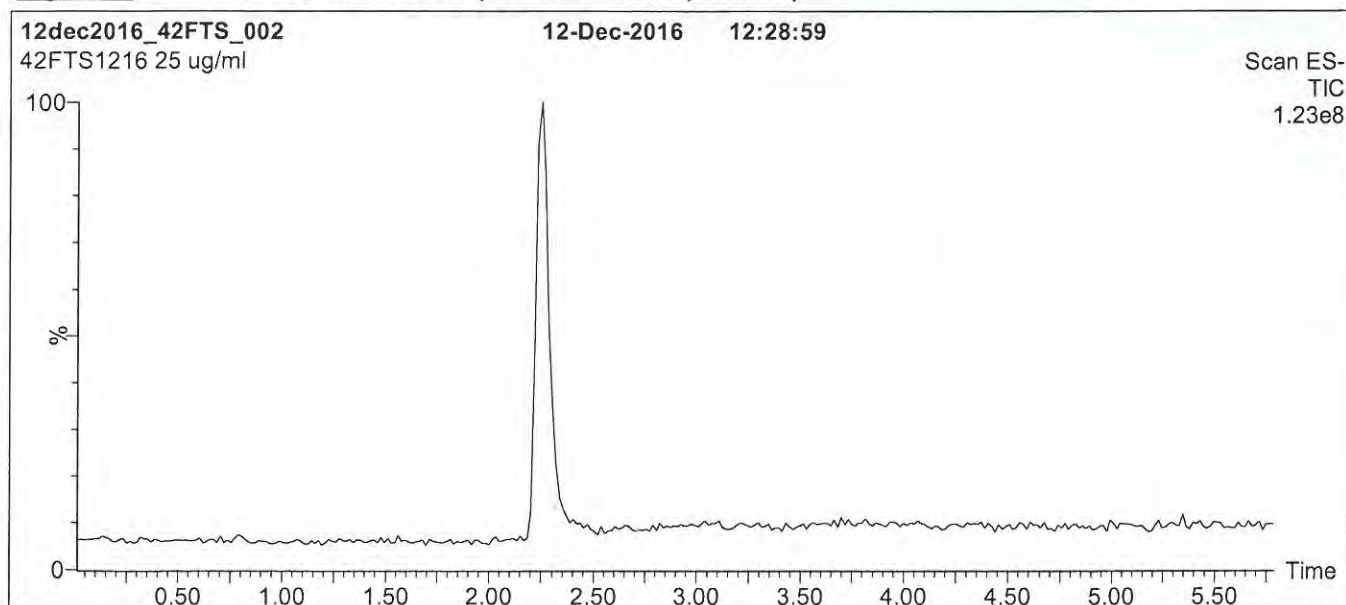
QUALITY MANAGEMENT:

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).



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18E0727

Figure 1: 4:2FTS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

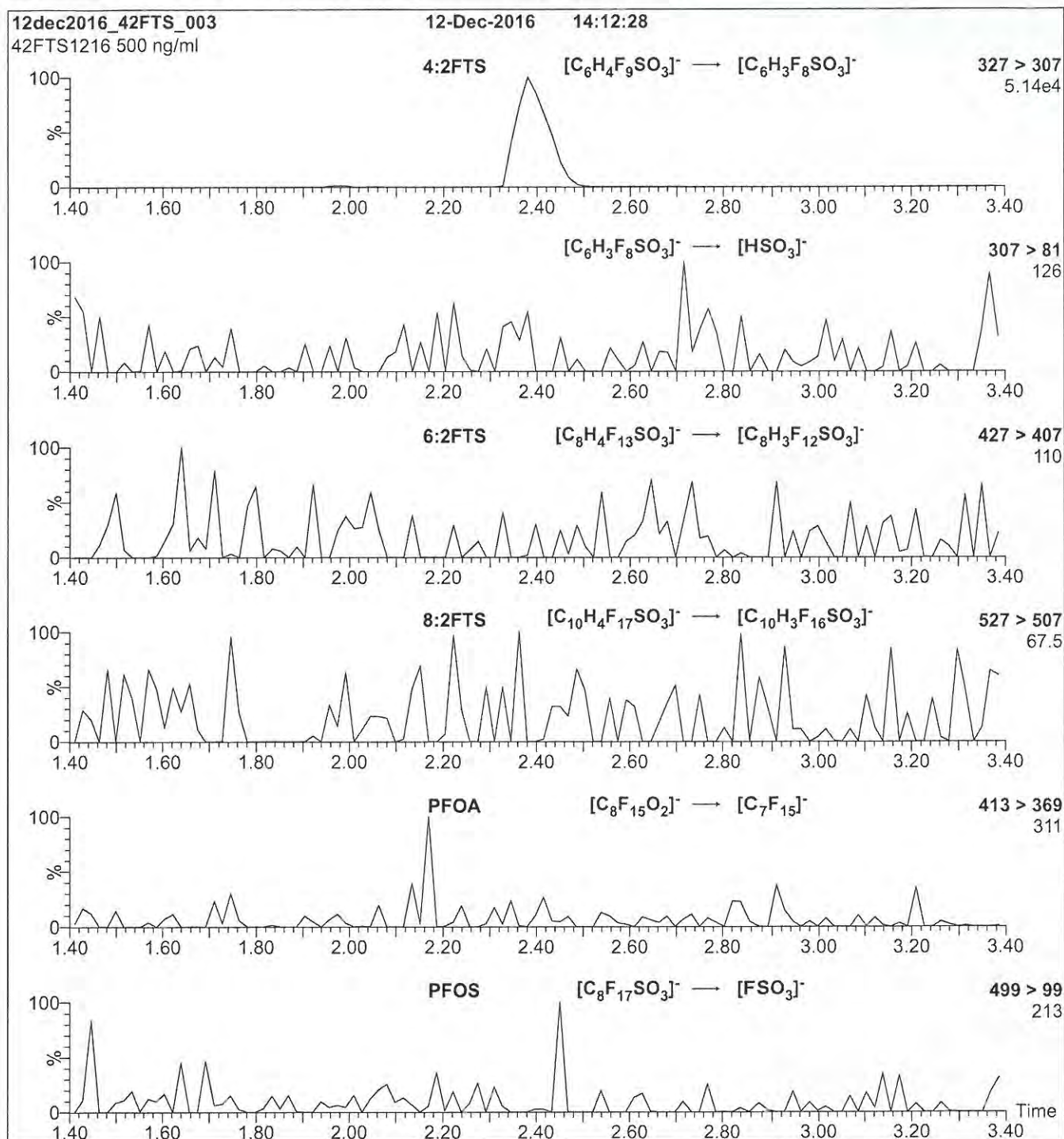
Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7.5 min and hold for 1.5 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

Flow: 300 μ l/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

18E0727

Figure 2: 4:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml 4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

18E0728



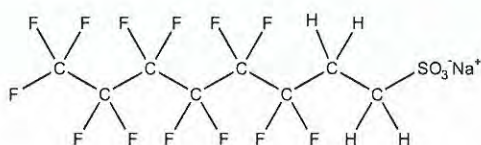
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS0418

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: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt) **SOLVENT(S):** Methanol
 $47.4 \pm 2.4 \mu\text{g/ml}$ (6:2FTS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/03/2018
EXPIRY DATE: (mm/dd/yyyy) 04/03/2023
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.
- Contains ~ 0.3% of sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2FTS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 04/09/2018
 (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

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:

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UNCERTAINTY:

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$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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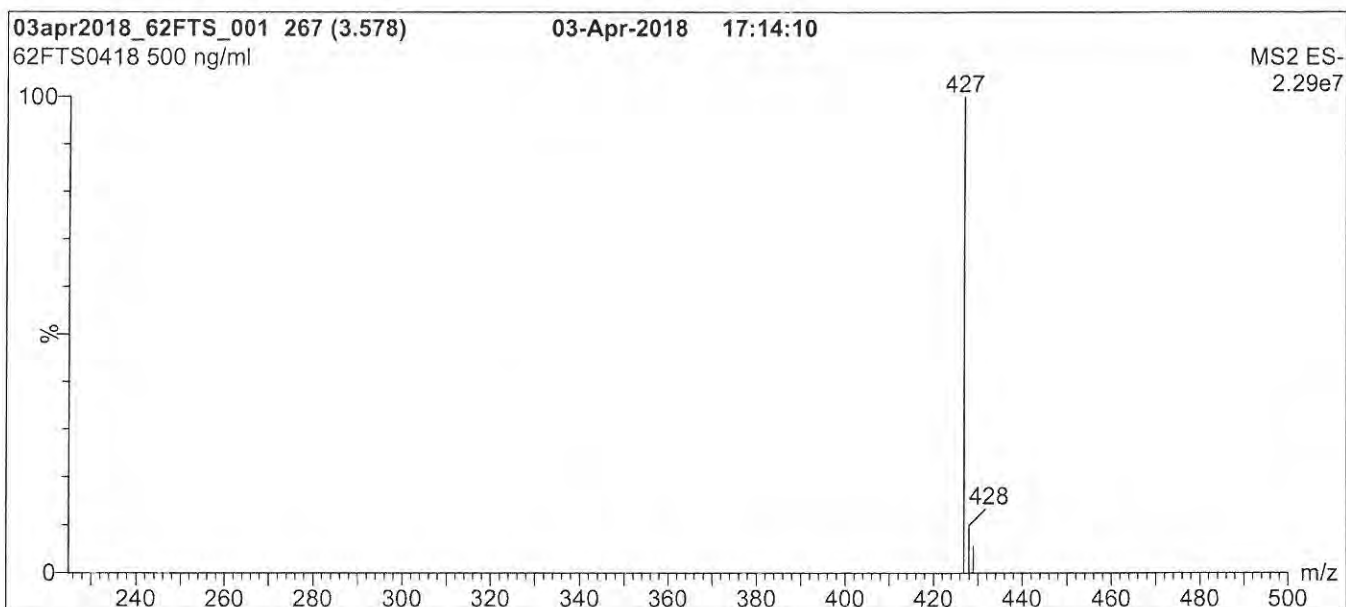
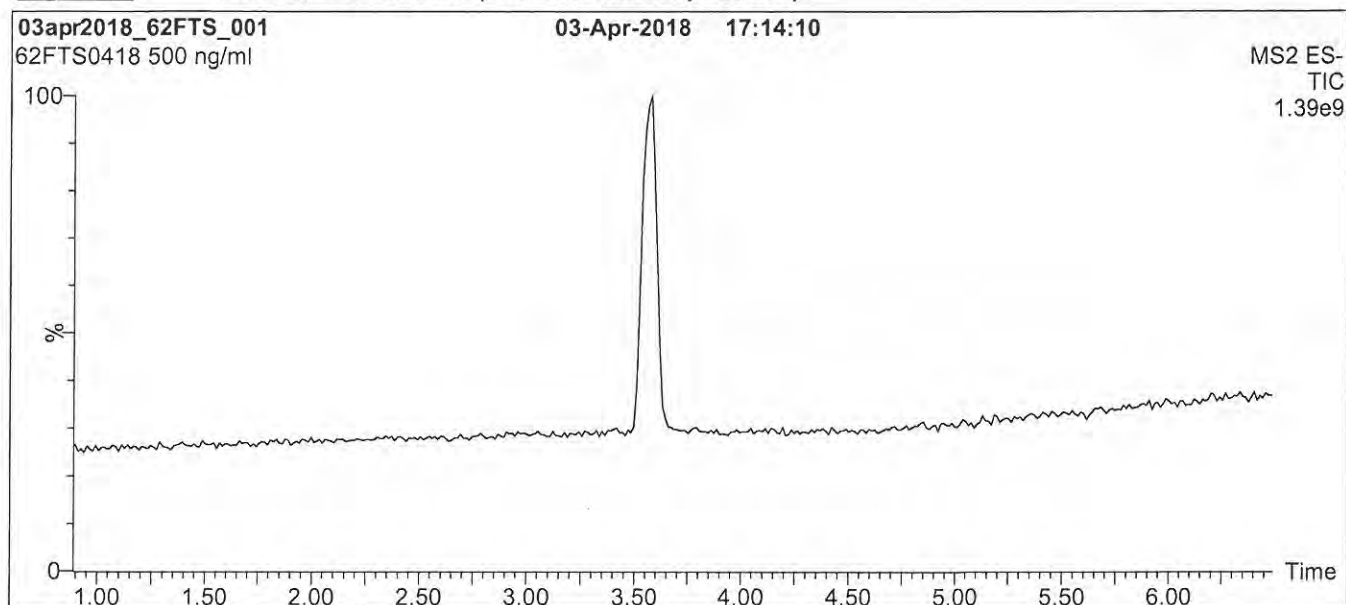
QUALITY MANAGEMENT:

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).



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

18E0728

Figure 1: 6:2FTS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 80% organic over 7 min and hold for
 3 min before returning to initial conditions in 0.75 min.
 Time: 12 min

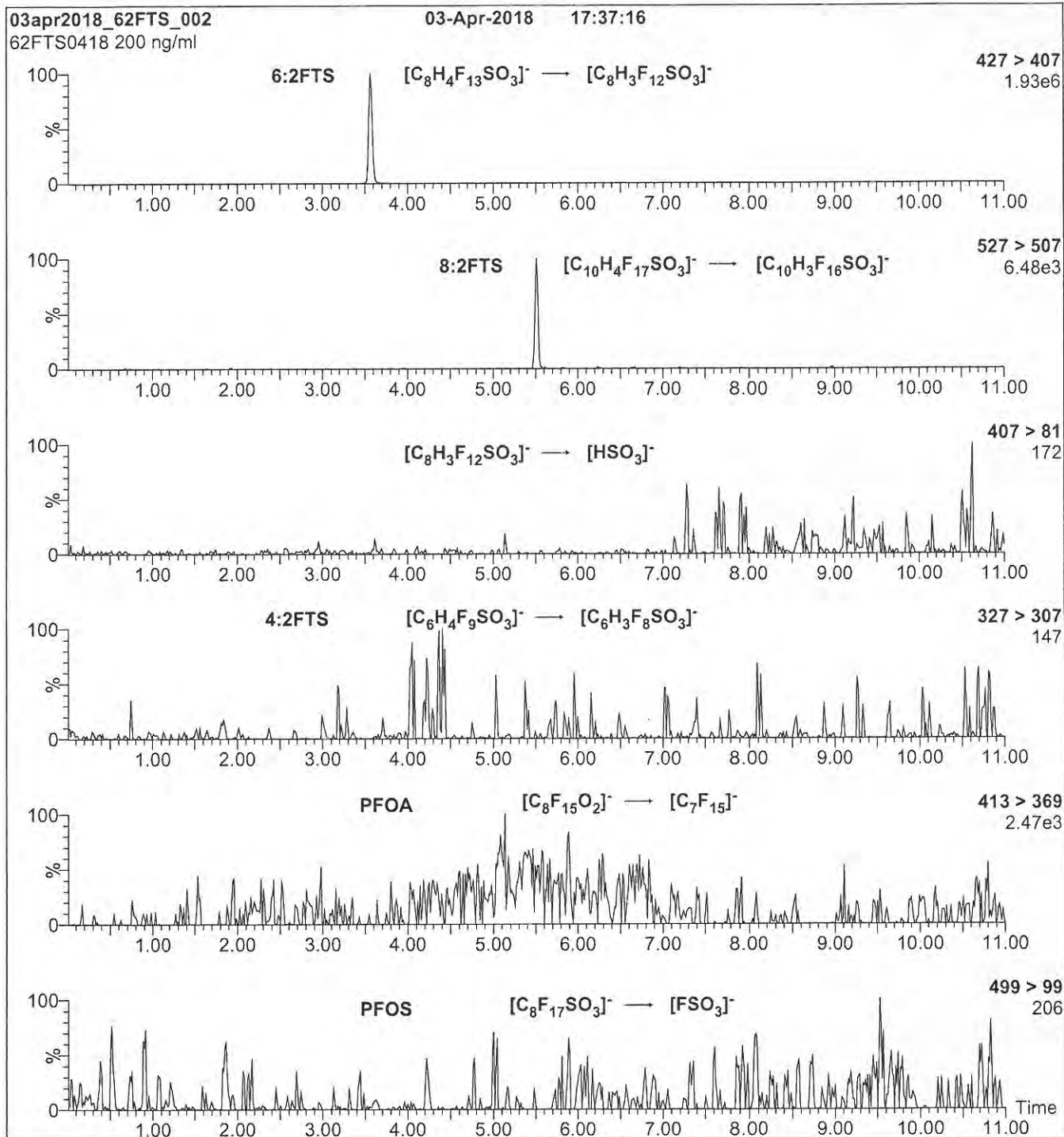
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 0.50
 Cone Voltage (V) = 25.00
 Desolvation Temperature (°C) = 500
 Desolvation Gas Flow (l/hr) = 750

18E0728

Figure 2: 6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: On-column (6:2FTS)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.39e-3

Collision Energy (eV) = 20

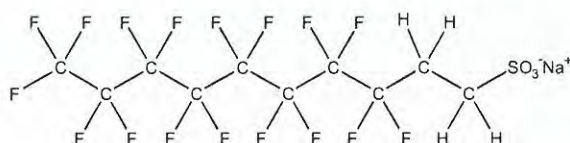
18E0729



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: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt) **SOLVENT(S):** Methanol
 $47.9 \pm 2.4 \mu\text{g/ml}$ (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: 
 B.G. Chittim, General Manager

Date: 01/31/2018
 (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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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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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

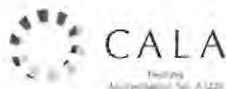
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

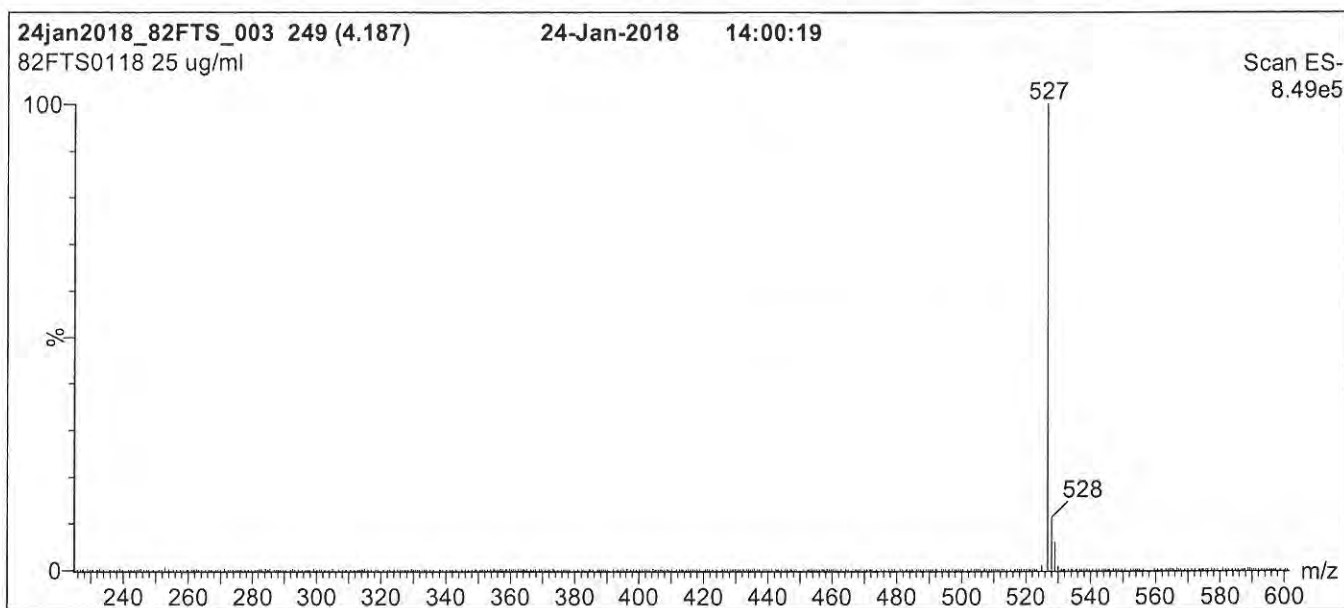
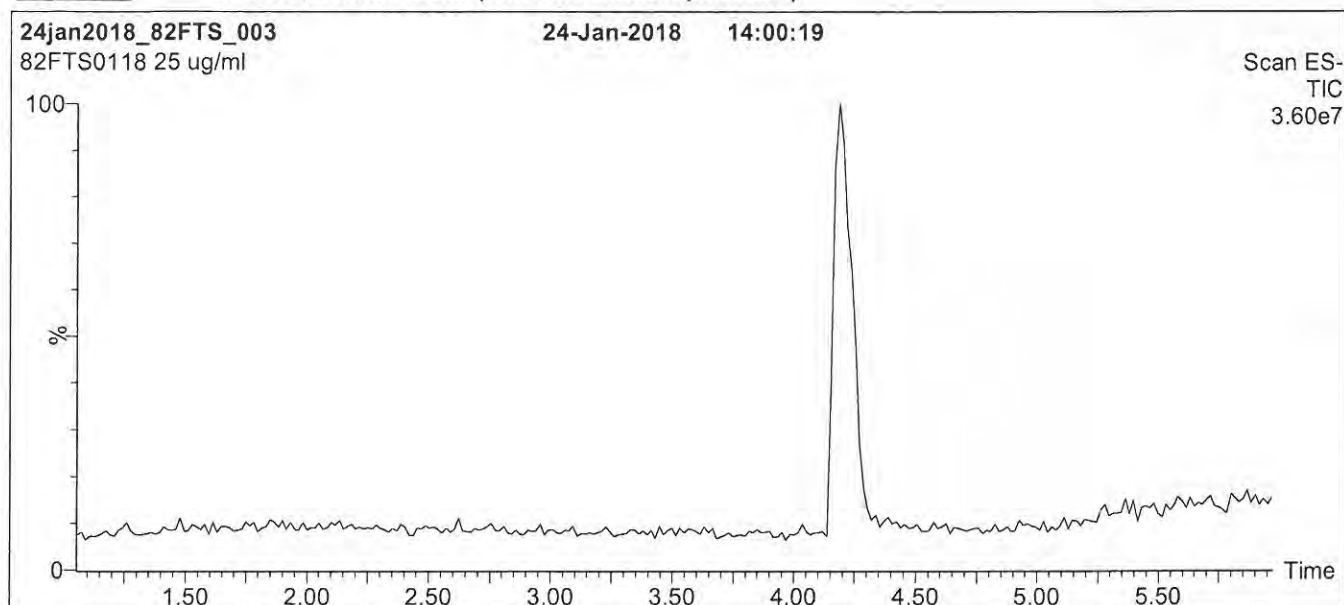
QUALITY MANAGEMENT:

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 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18E0729

Figure 1: 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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

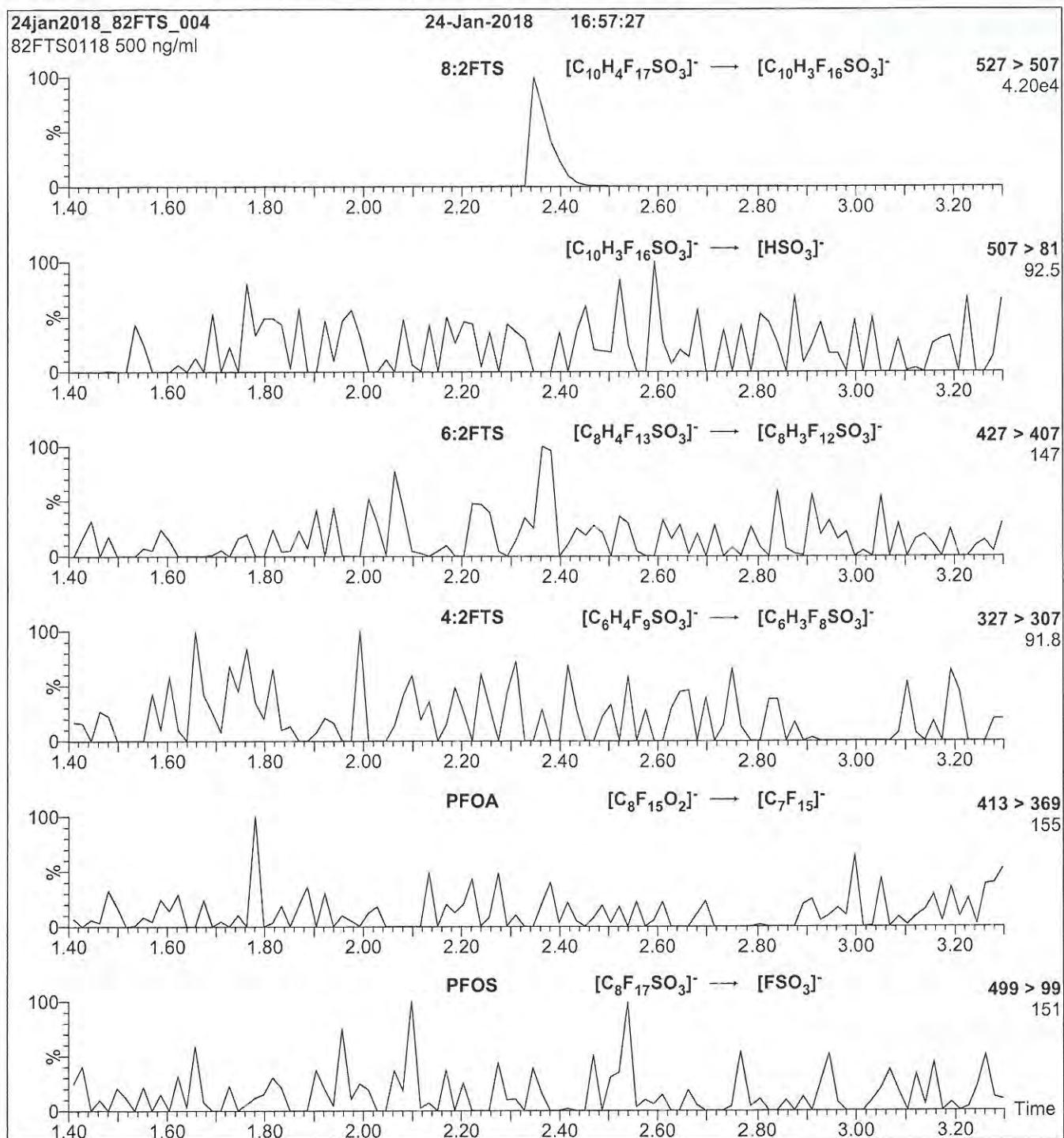
Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7 min and hold for 2 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

Flow: 300 μ l/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

18E0729

Figure 2: 8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (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 μ l/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18E0730



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

FOSA-I

LOT NUMBER:

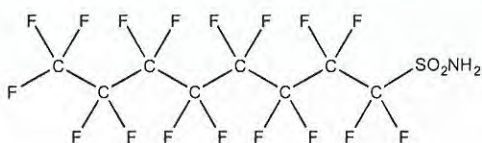
FOSA0817I

COMPOUND:

Perfluoro-1-octanesulfonamide

STRUCTURE:**CAS #:**

754-91-6

**MOLECULAR FORMULA:** $C_8H_2F_{17}NO_2S$ **MOLECULAR WEIGHT:**

499.14

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:

B.G. Chittim, General Manager

Date:

 09/14/2017
 (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

18E0730

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

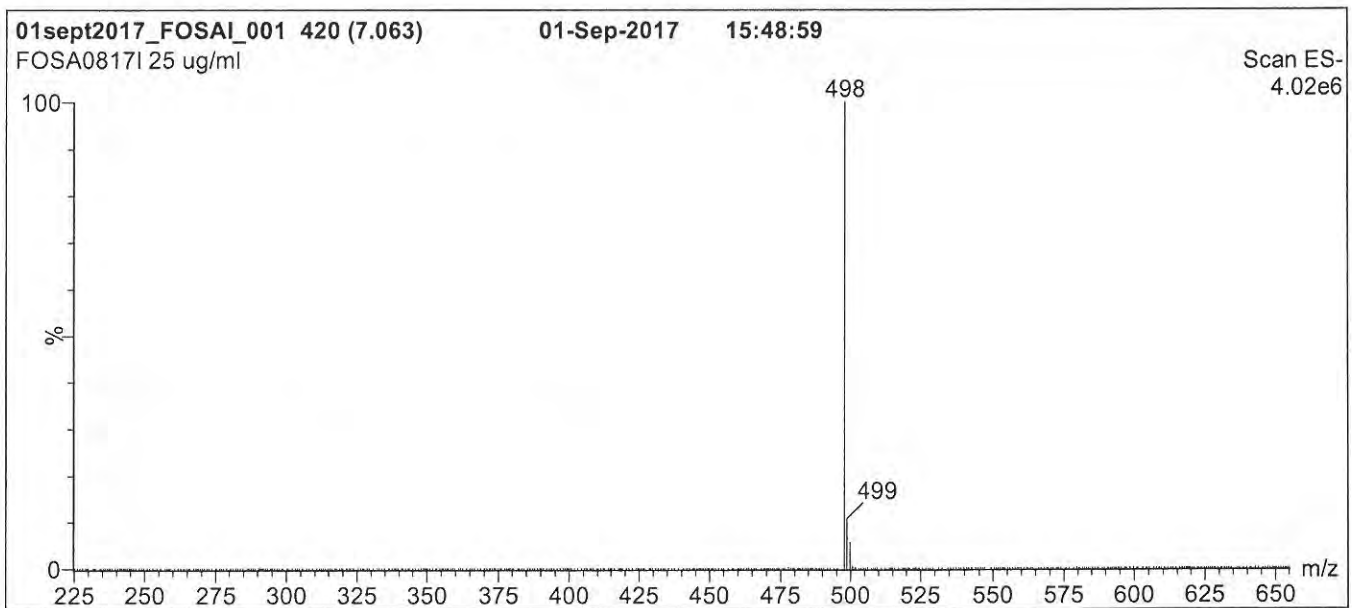
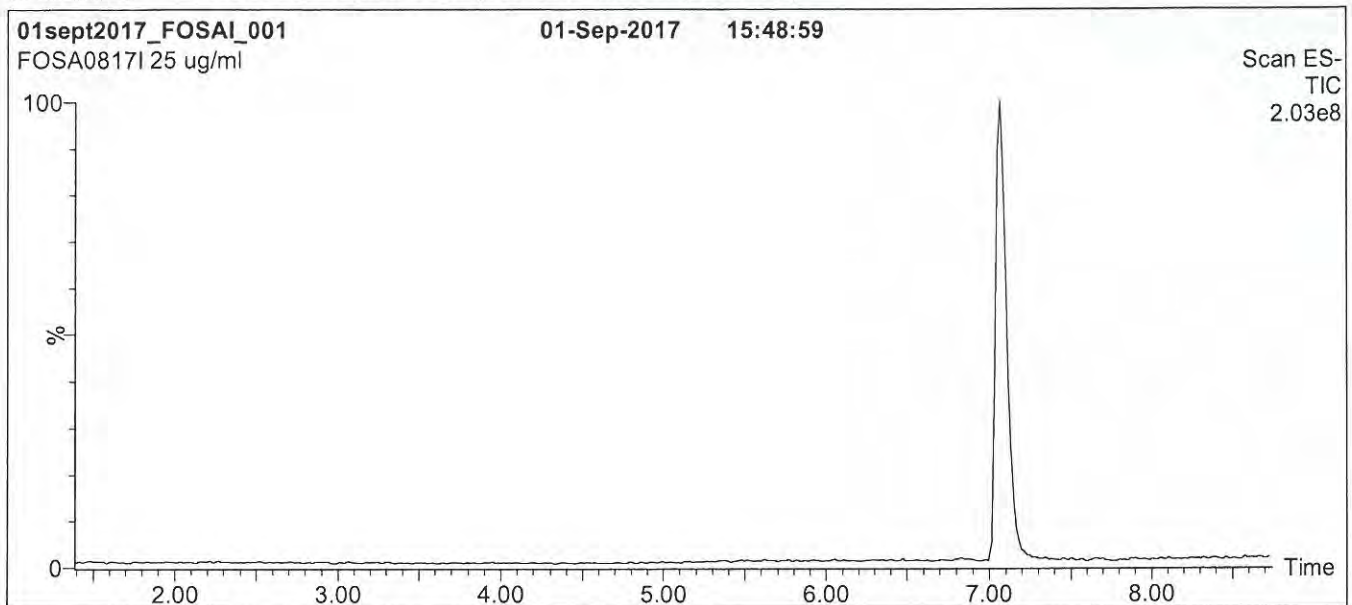
QUALITY MANAGEMENT:

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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18E0730

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

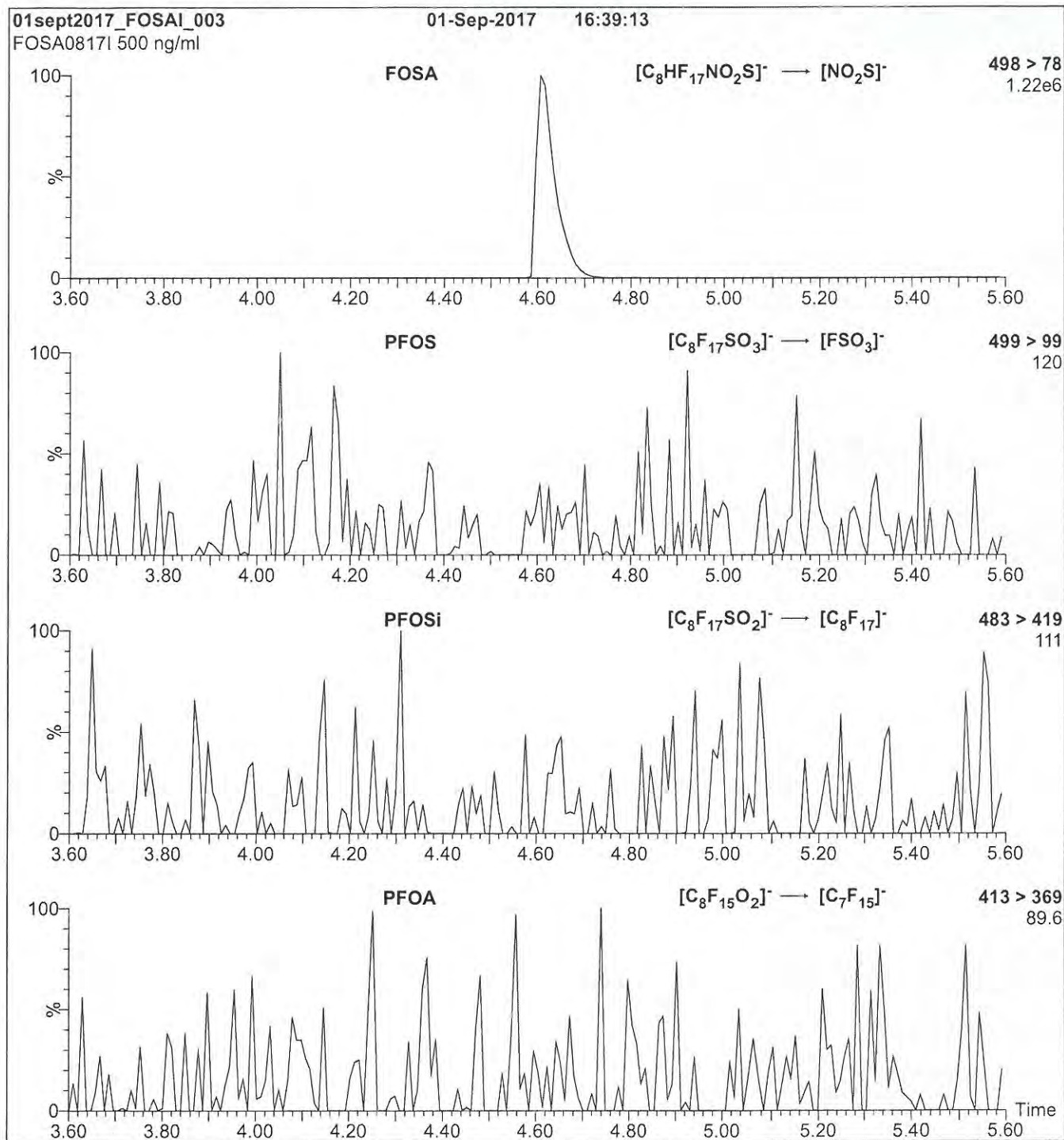
Flow: 300 μ l/min

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

18E0730

Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (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 μ l/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 30

18E0731

**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 ¹⁹F-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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com**

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

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QUALITY MANAGEMENT:

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18E0731

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	$\text{CF}_3(\text{CF}_2)_7\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	76.0
2	N-methylperfluoro-3-methylheptanesulfonamidoacetic acid	$\text{CF}_3(\text{CF}_2)_3\text{CF}(\text{CF}_3)\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	0.7
3	N-methylperfluoro-4-methylheptanesulfonamidoacetic acid	$\text{CF}_3(\text{CF}_2)_2\text{CF}(\text{CF}_3)\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	2.0
4	N-methylperfluoro-5-methylheptanesulfonamidoacetic acid	$\text{CF}_3\text{CF}_2\text{CF}(\text{CF}_3)\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	6.0
5	N-methylperfluoro-6-methylheptanesulfonamidoacetic acid	$\text{CF}_3\text{CF}(\text{CF}_3)\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	14.0
6	N-methylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$\text{CF}_3\text{C}(\text{CF}_3)_2\text{SO}_2\text{N}(\text{CH}_3)\text{CH}_2\text{CO}_2\text{H}$	0.2
7	Other Unidentified Isomers		1.1

* Percent of total N-methylperfluorooctanesulfonamidoacetic acid isomers only.

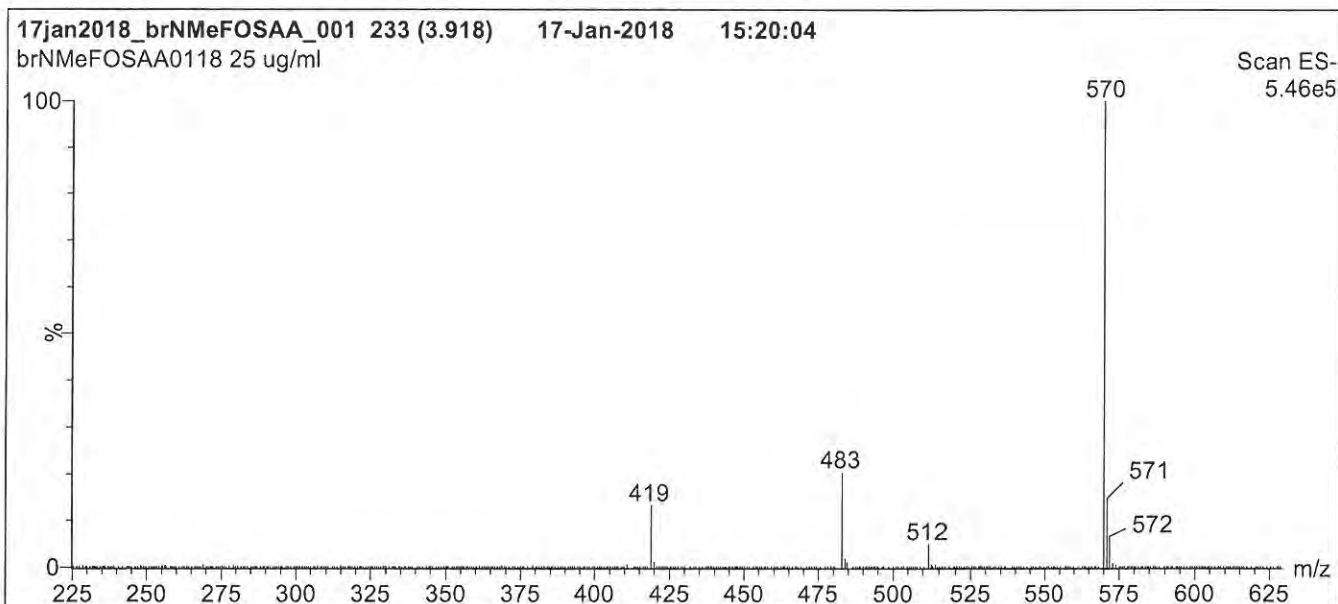
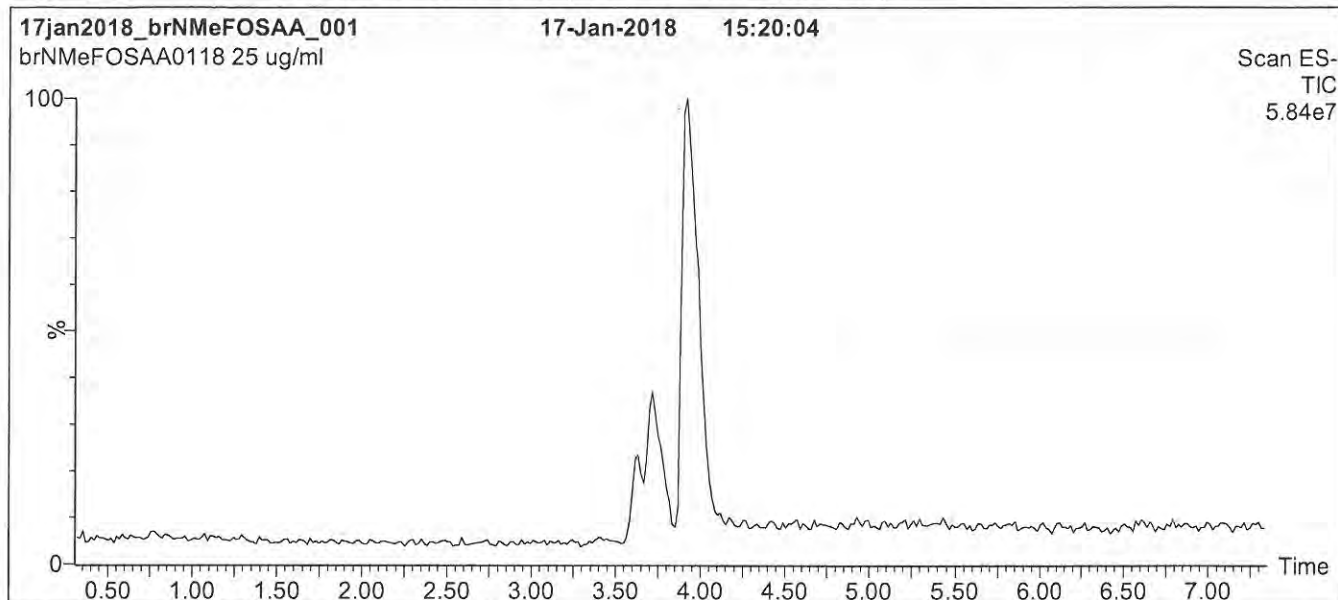
Certified By: _____

B.G. Chittim, General Manager

Date: 03/22/2018

(mm/dd/yyyy)

18E0731

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

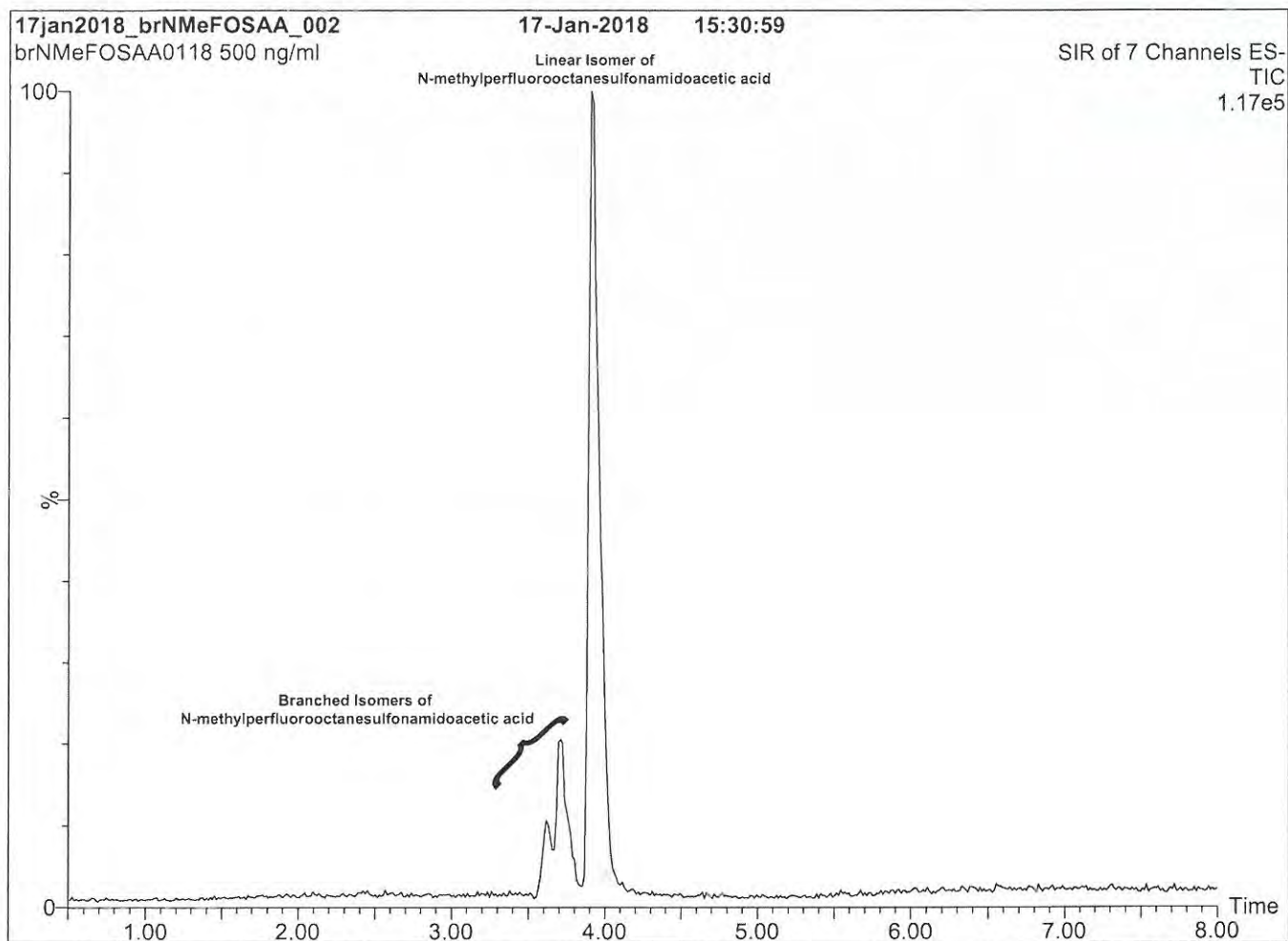
Flow: 300 μ l/min

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

18E0731

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)

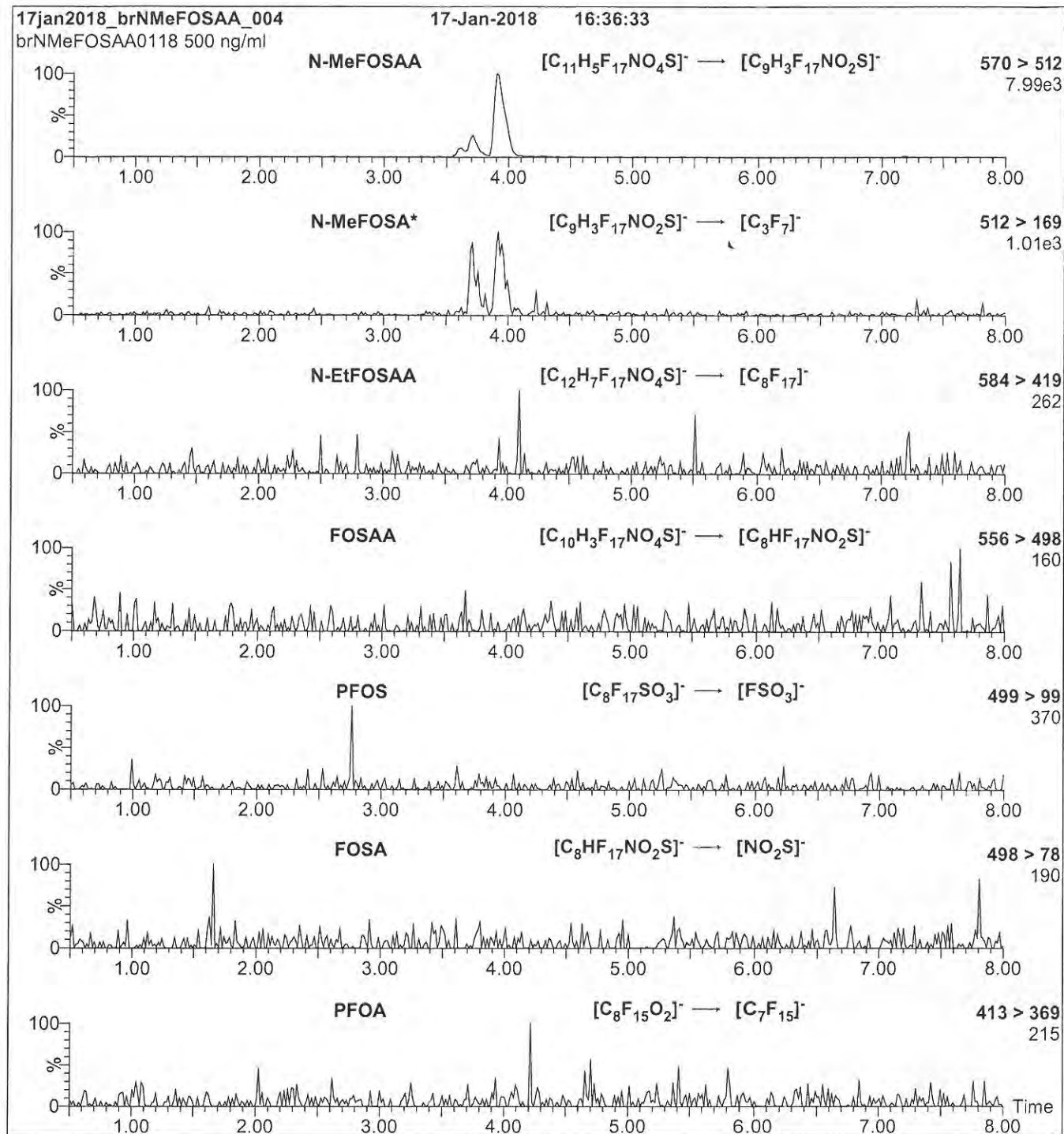
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 15-60

Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (l/hr) = 750

18E0731

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

MS Parameters

Mobile phase: Same as Figure 2

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

Flow: 300 μ l/min

18E0732

**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 ¹⁹F-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

18E0732

INTENDED USE:

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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:

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HOMOGENEITY:

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UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 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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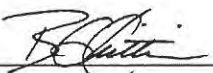
18E0732

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	$\text{CF}_3(\text{CF}_2)_7\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ C_2H_5	77.5
2	N-ethylperfluoro-3-methylheptanesulfonamidoacetic acid	$\text{CF}_3(\text{CF}_2)_3\text{CF}(\text{CF}_2)_2\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	2.3
3	N-ethylperfluoro-4-methylheptanesulfonamidoacetic acid	$\text{CF}_3(\text{CF}_2)_2\text{CF}(\text{CF}_2)_3\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	2.2
4	N-ethylperfluoro-5-methylheptanesulfonamidoacetic acid	$\text{CF}_3\text{CF}_2\text{CF}(\text{CF}_2)_4\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	5.4
5	N-ethylperfluoro-6-methylheptanesulfonamidoacetic acid	$\text{CF}_3\text{CF}(\text{CF}_2)_5\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	10.4
6	N-ethylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	CF_3 $\text{CF}_3\text{C}(\text{CF}_2)_4\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	0.3
7	N-ethylperfluoro-4,5-dimethylhexanesulfonamidoacetic acid	CF_3 $\text{CF}_3\text{CFCF}(\text{CF}_2)_3\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	0.3
8	N-ethylperfluoro-3,5-dimethylhexanesulfonamidoacetic acid	CF_3 $\text{CF}_3\text{CFCF}_2\text{CF}(\text{CF}_2)_2\text{SO}_2\text{NCH}_2\text{CO}_2\text{H}$ CF_3 C_2H_5	0.3
9	Other Unidentified Isomers		1.3

* Percent of total N-ethylperfluorooctanesulfonamidoacetic acid isomers only.

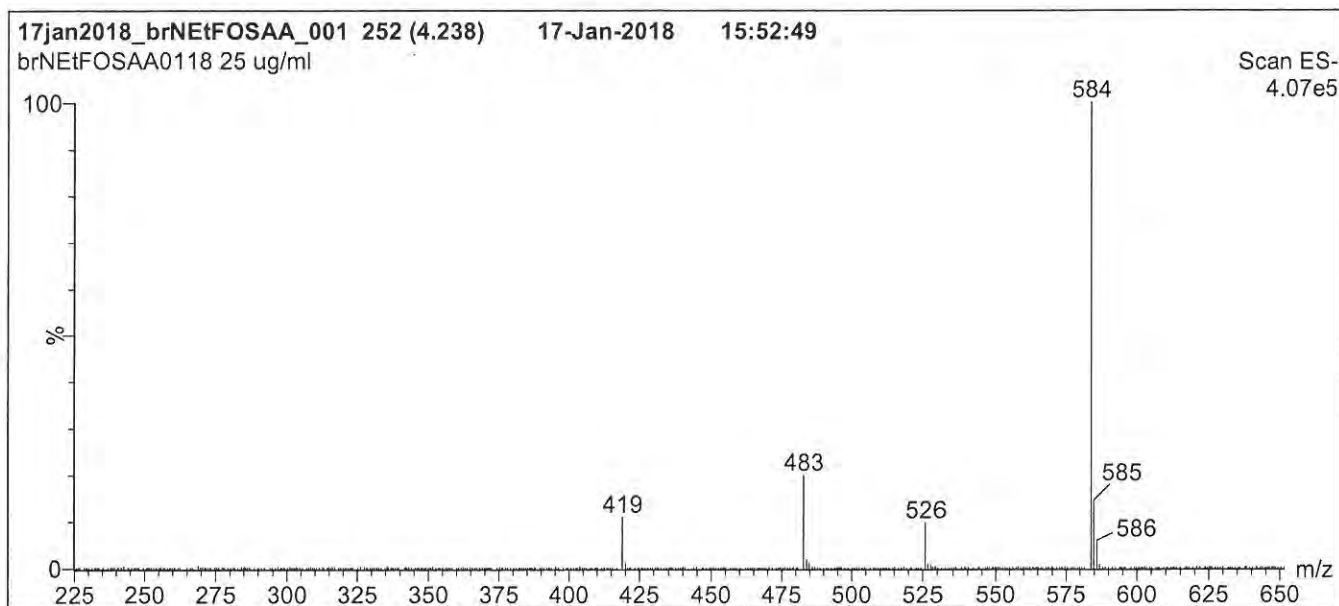
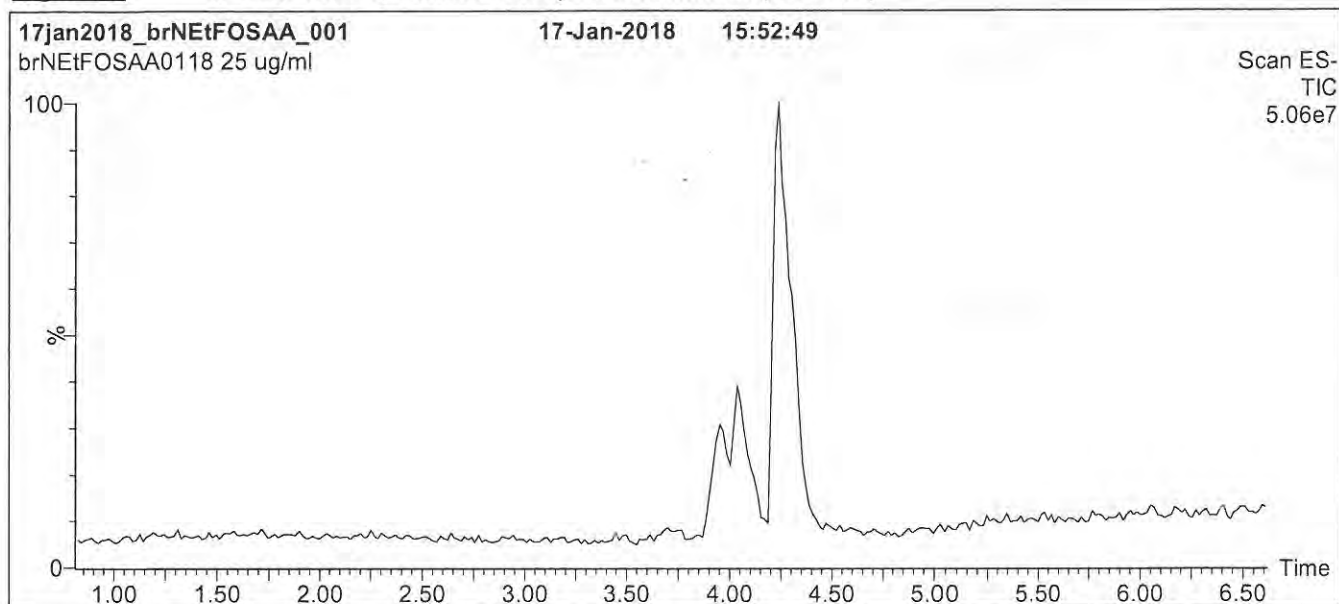
Certified By:


 B.G. Chittim, General Manager

Date: 03/22/2018

(mm/dd/yyyy)

18E0732

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

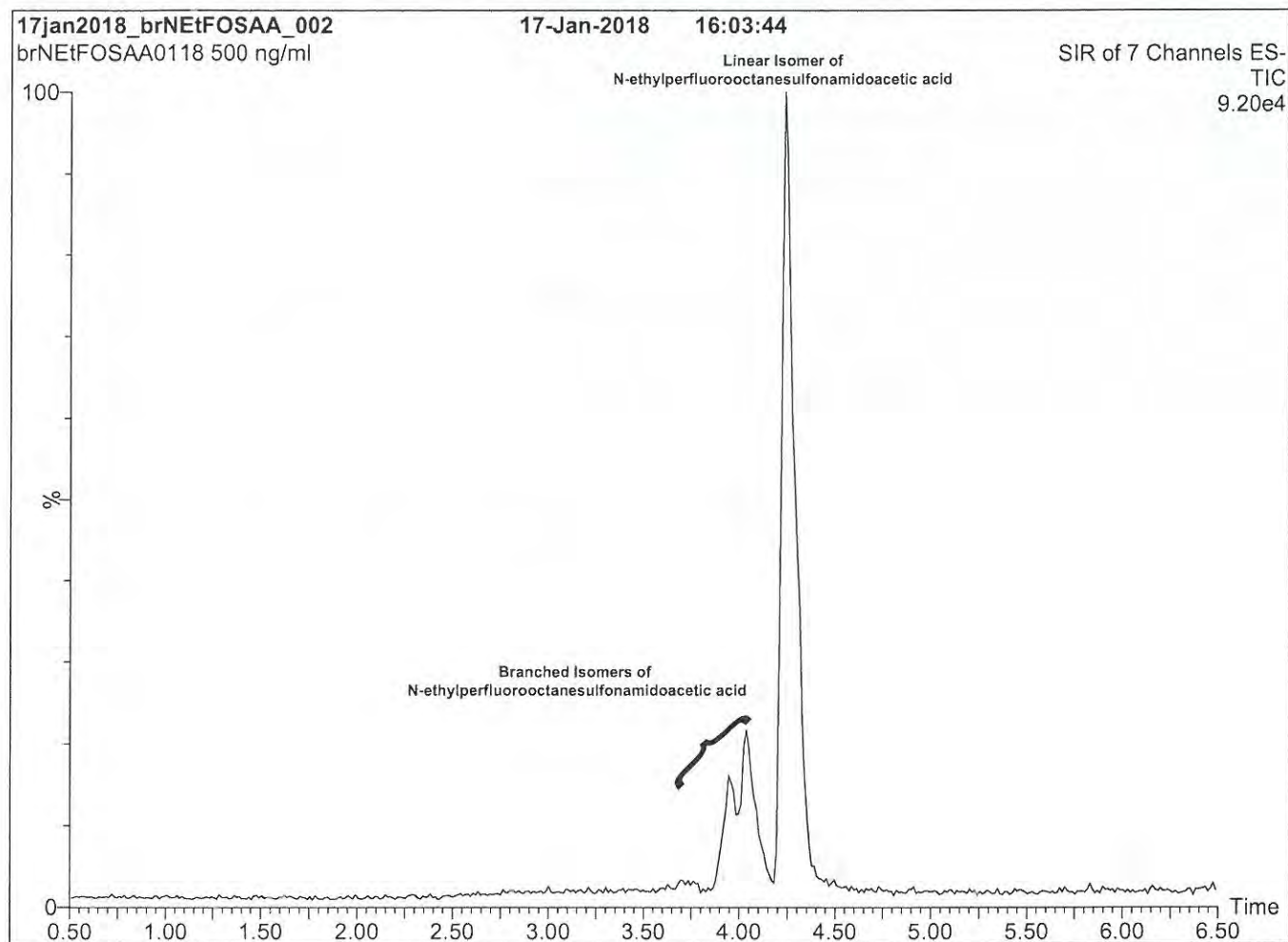
Flow: 300 μ l/min

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

180732

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 55% (80:20 MeOH:ACN) / 45% H₂O
 (both with 10 mM NH₄OAc 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

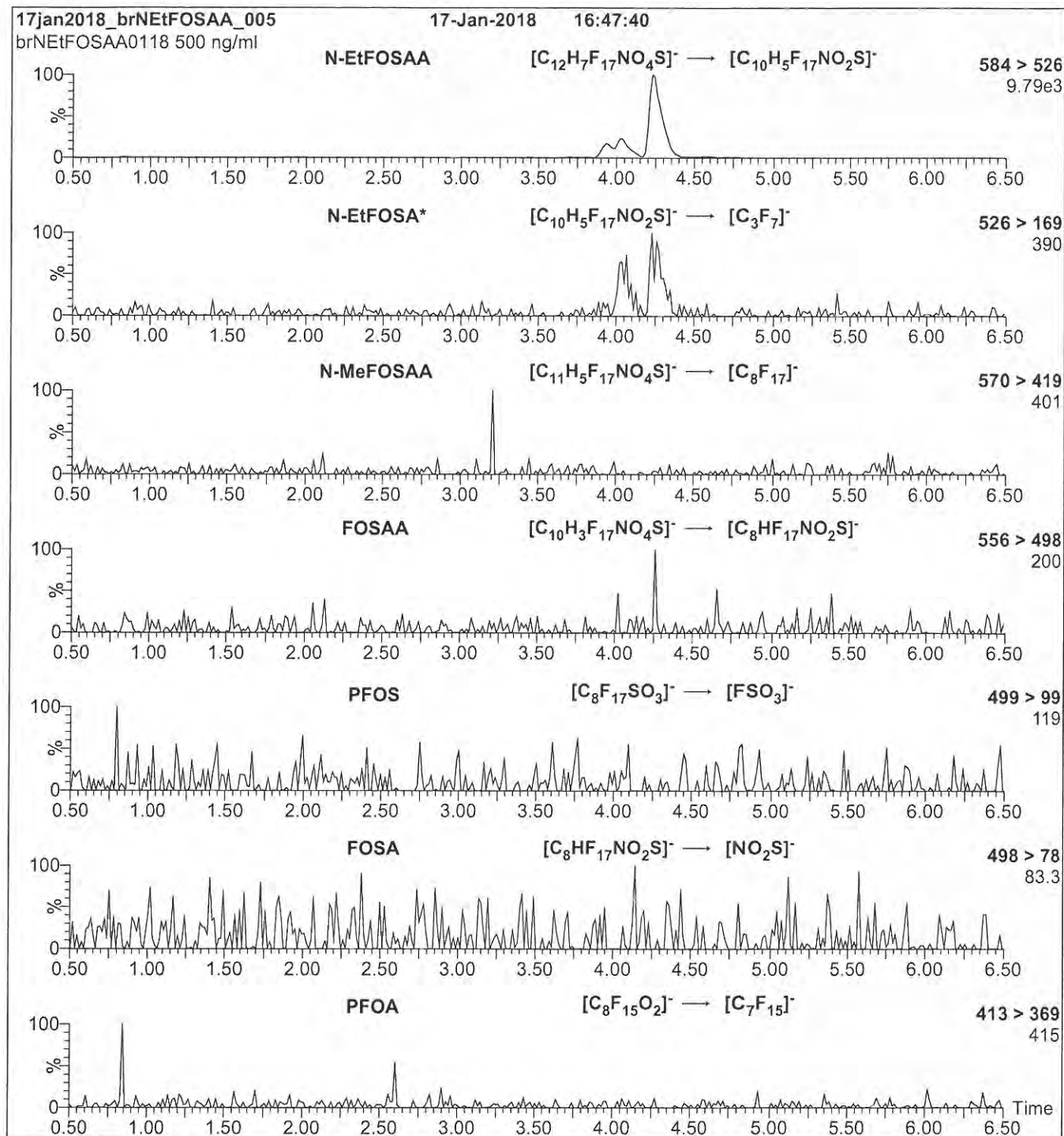
Flow: 300 μ l/min

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

18E0732

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

MS Parameters

Collision Gas (mbar) = 3.39e-3

Mobile phase: Same as Figure 2

Collision Energy (eV) = 11-40 (variable)

Flow: 300 µl/min

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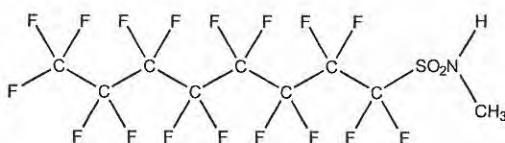
**WELLINGTON**
LABORATORIES**CERTIFICATE OF ANALYSIS**
DOCUMENTATION

PRODUCT CODE: N-MeFOSA-M
COMPOUND: N-methylperfluoro-1-octanesulfonamide

LOT NUMBER: NMeFOSA0518M

STRUCTURE:

CAS #: 31506-32-8



MOLECULAR FORMULA: $C_9H_4F_{17}NO_2S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/31/2018
EXPIRY DATE: (mm/dd/yyyy) 05/31/2023
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 513.17
SOLVENT(S): Methanol

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, General Manager

Date: 06/07/2018
(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

18I0762

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

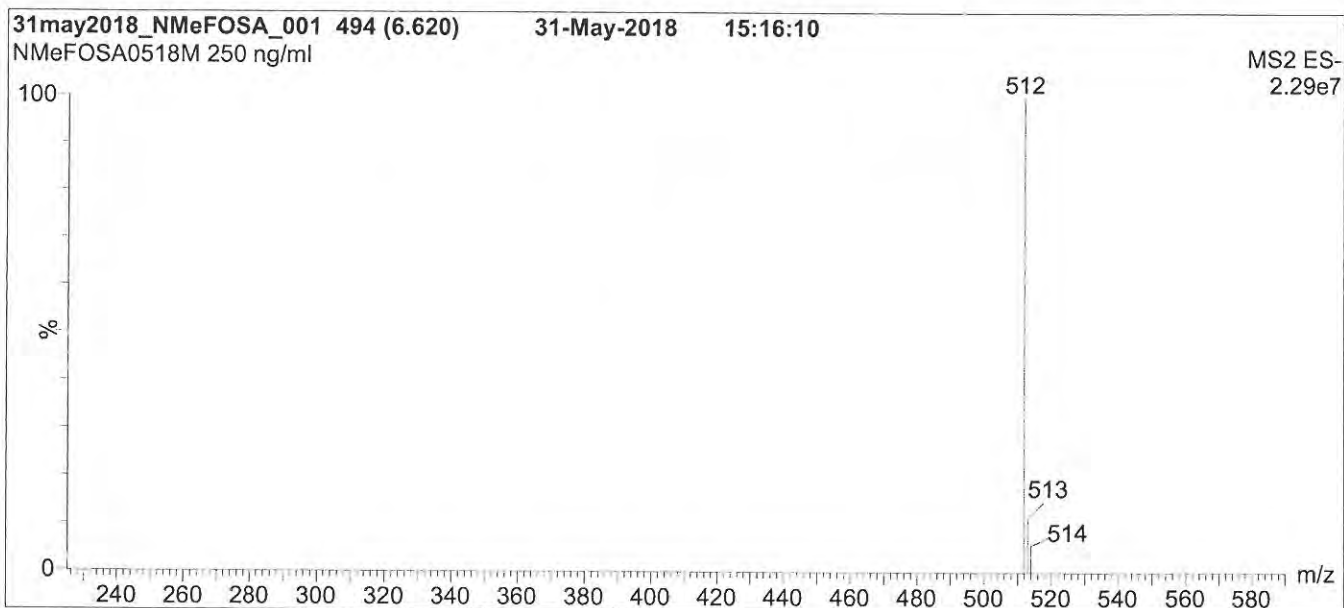
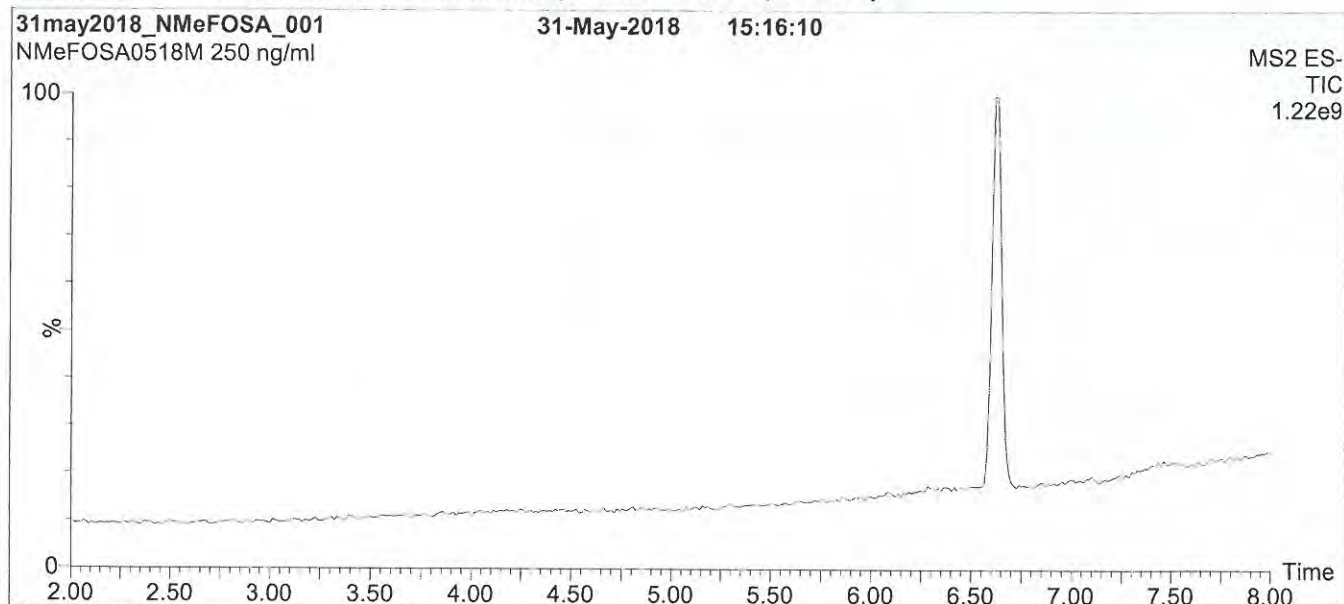
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18I0762

Figure 1: N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

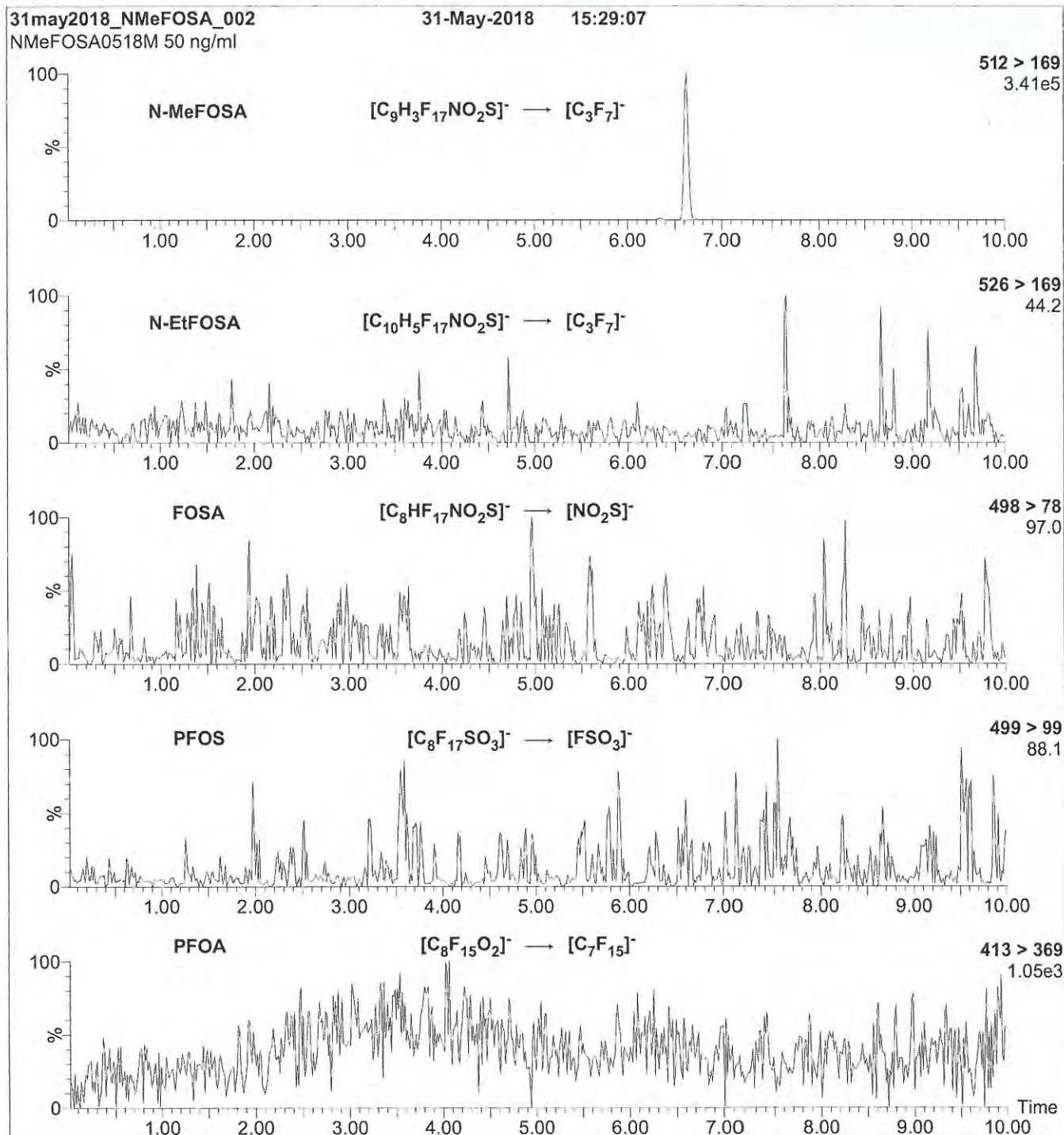
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 1.00
Cone Voltage (V) = 44.00
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (l/hr) = 750

18I076Z

Figure 2: N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: On-column (N-MeFOSA-M)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.37e-3

Collision Energy (eV) = 24

10I 0763

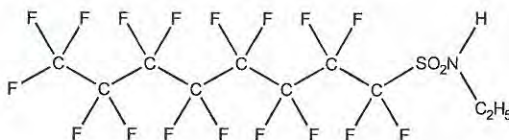
**WELLINGTON
LABORATORIES****CERTIFICATE OF ANALYSIS
DOCUMENTATION**

PRODUCT CODE: N-EtFOSA-M
COMPOUND: N-ethylperfluoro-1-octanesulfonamide

LOT NUMBER: NEtFOSA0518M

STRUCTURE:

CAS #: 4151-50-2



MOLECULAR FORMULA: $C_{10}H_6F_{17}NO_2S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/31/2018
EXPIRY DATE: (mm/dd/yyyy) 05/31/2023
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 527.20
SOLVENT(S): Methanol

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 ~ 0.5% branched isomers of N-ethylperfluorooctanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 06/12/2018
(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

18I0763

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

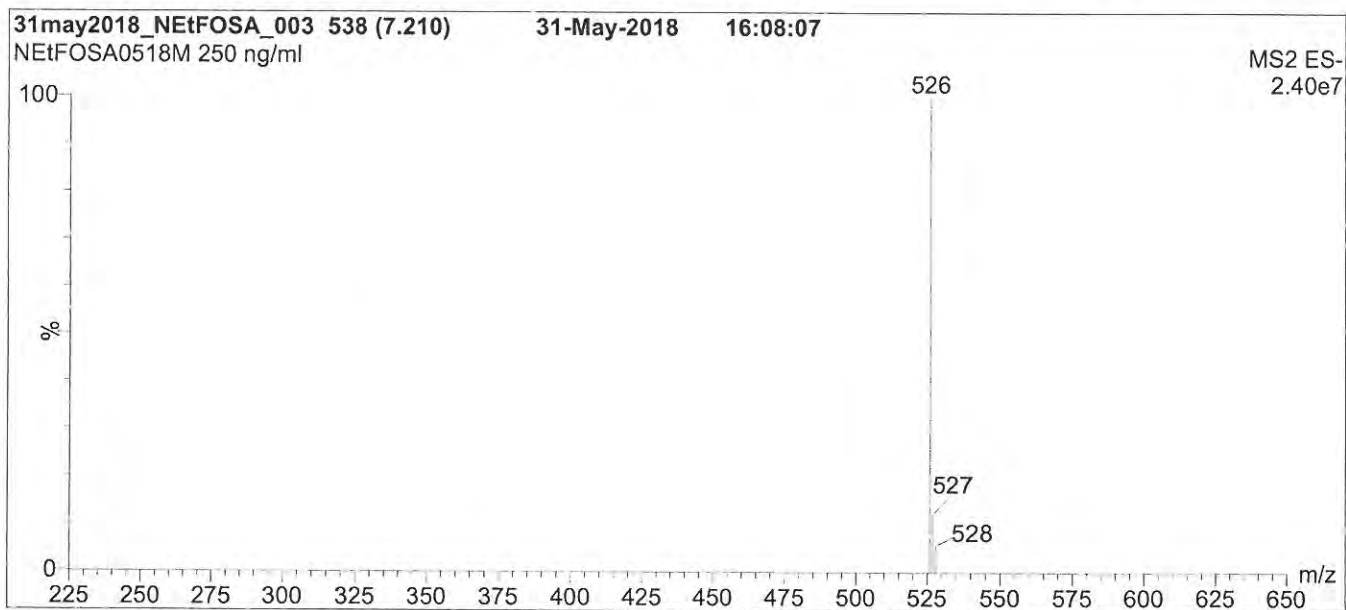
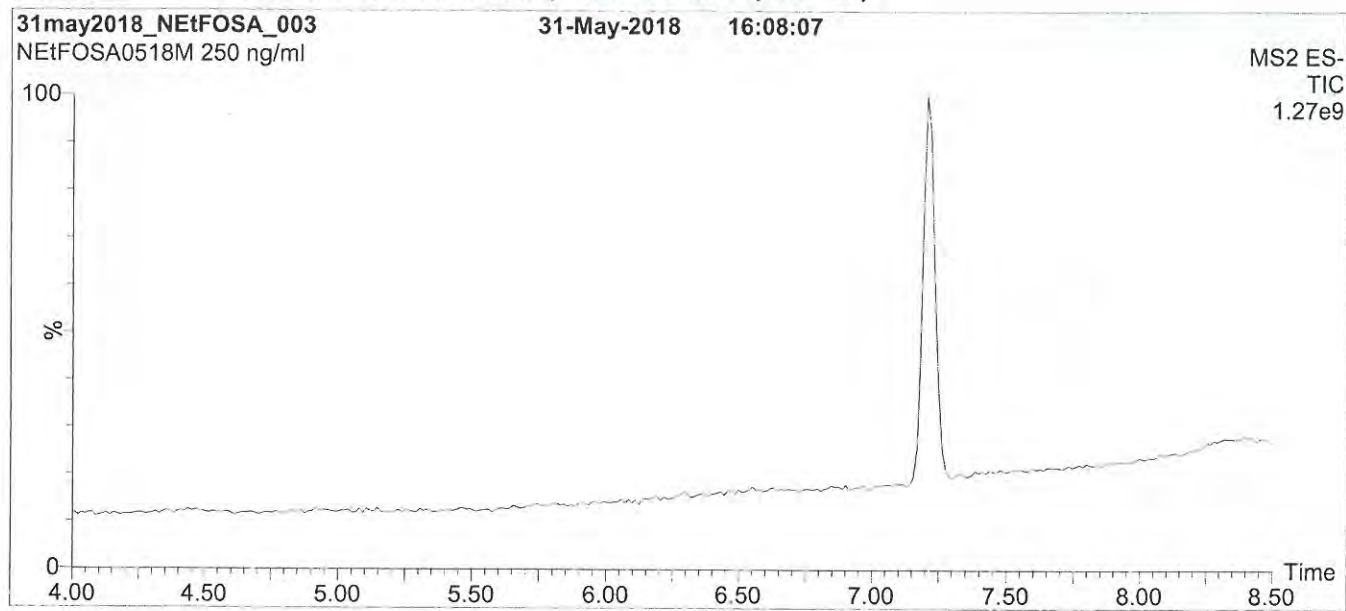
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18I0763

Figure 1: N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

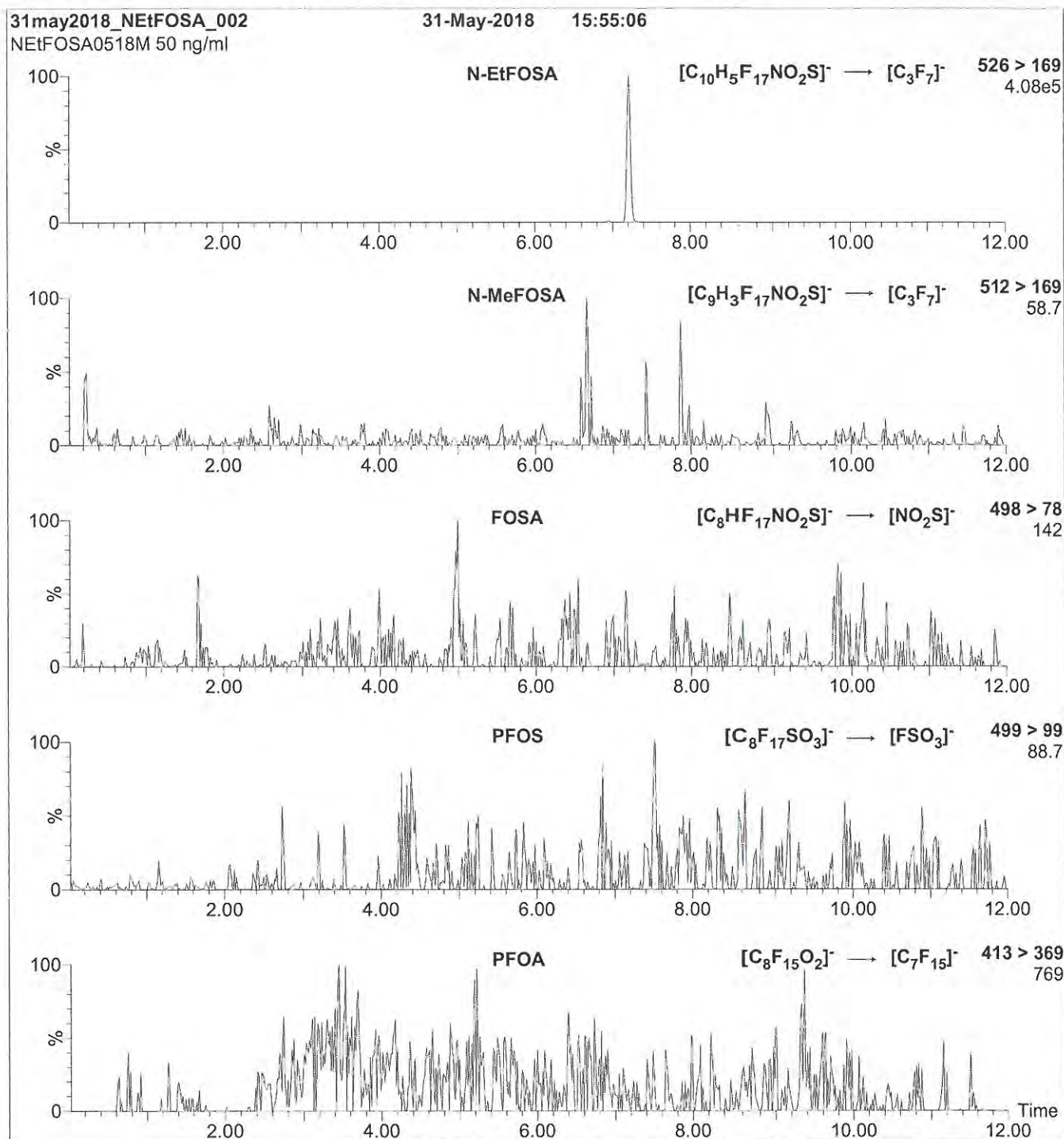
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 1.00
Cone Voltage (V) = 44.00
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (l/hr) = 750

18I0763

Figure 2: N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: On-column (N-EtFOSA-M)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.37e-3

Collision Energy (eV) = 24

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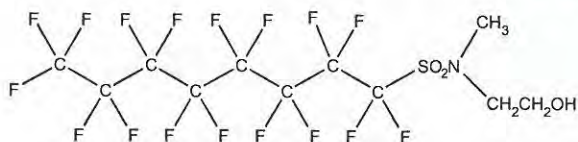


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSE-M **LOT NUMBER:** NMeFOSE0418M
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: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):** Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/17/2018 (HRGC/LRMS)
 05/03/2018 (LC/MS)
EXPIRY DATE: (mm/dd/yyyy) 05/17/2023
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:
 B.G. Chittim, General Manager

Date: 05/25/2018
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18I0764

INTENDED USE:

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HANDLING:

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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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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

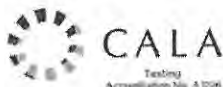
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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:

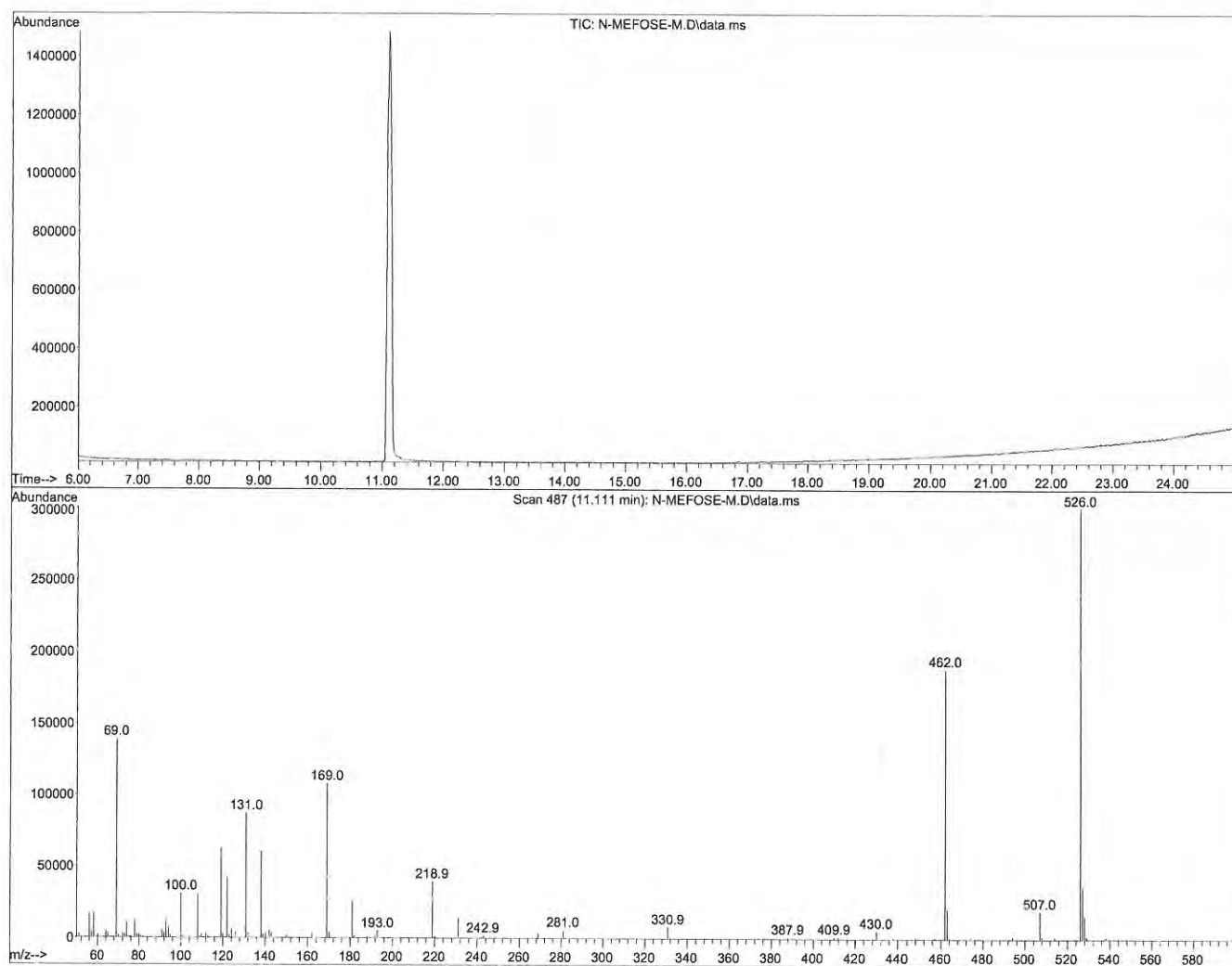
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18I0764

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)

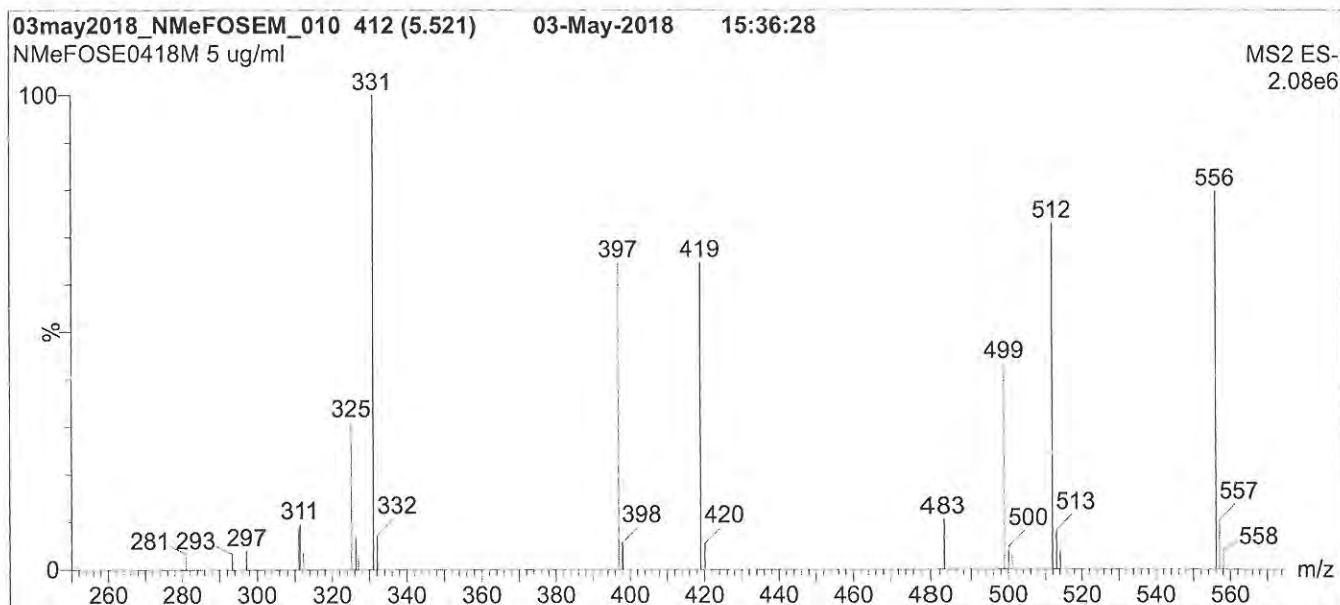
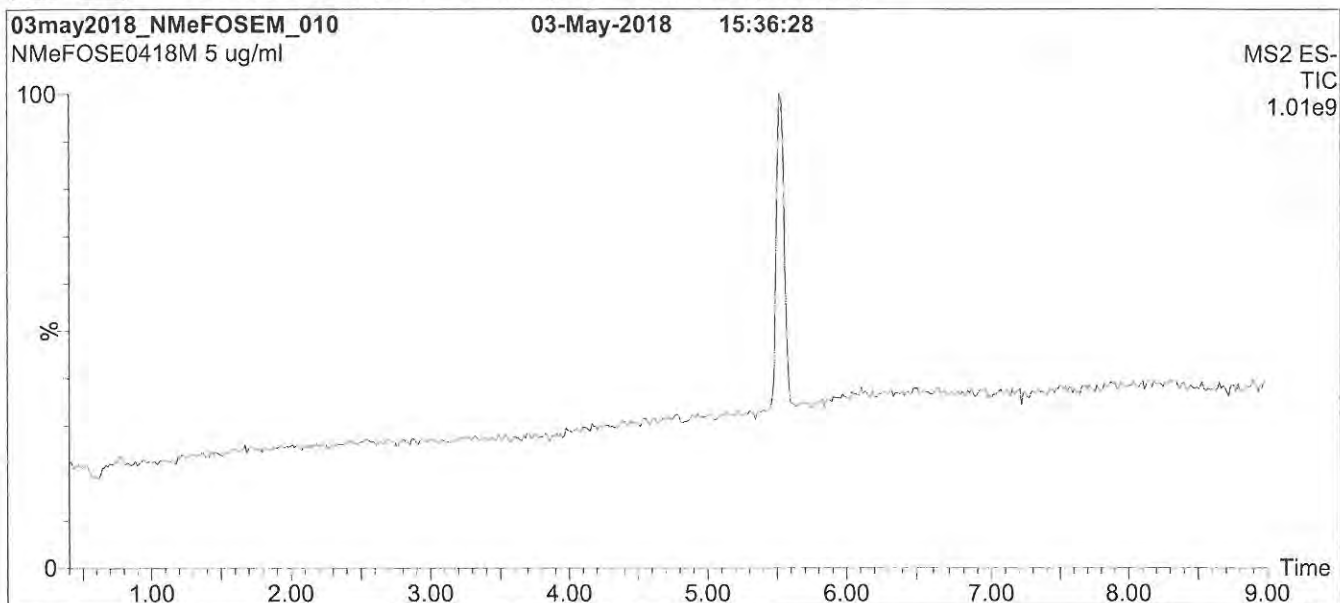
Oven: 100 °C (5 min)
10 °C/min to 325 °C
325 °C (20 min)

Ionization: EI+

Detector: 250 °C
Full Scan (50-1000 amu)

18I0764

Figure 2: N-MeFOSE-M; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 2:

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% MeOH / 35% H₂O
Ramp to 85% organic over 8 min and hold for
2 min before returning to initial conditions in 0.75 min.
Time: 12 min

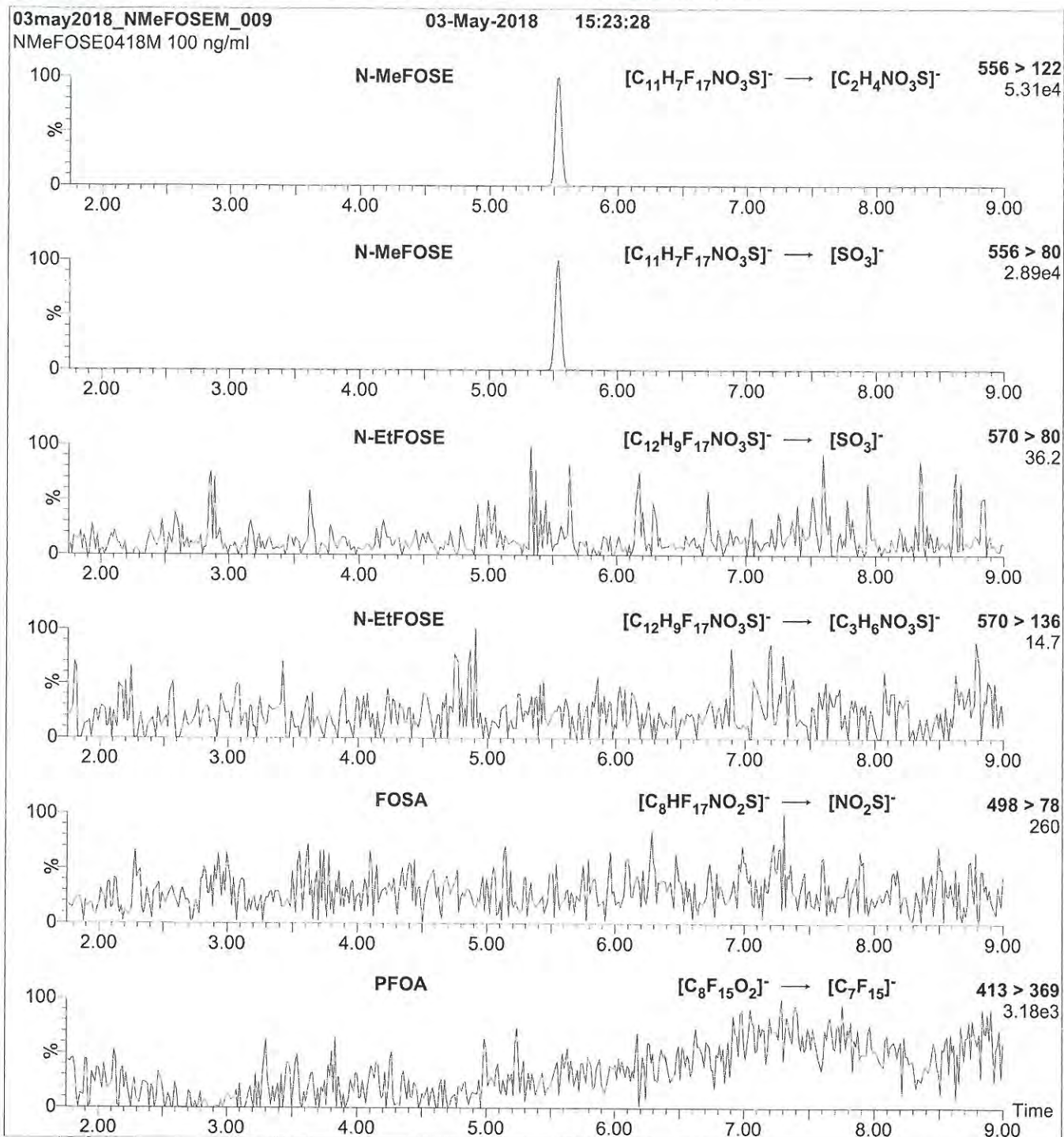
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Desolvation Temperature (°C) = 450
Desolvation Gas Flow (l/hr) = 750

1810764

Figure 3: N-MeFOSE-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: On-column (N-MeFOSE-M)

Mobile phase: Same as Figure 2

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.47e-3

Collision Energy (eV) = 36

18I0764 18I0765
GRB 9/12/18

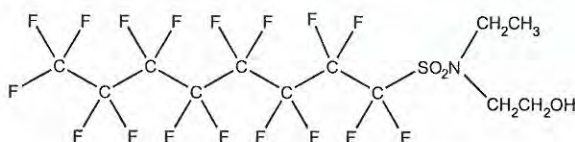


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-EtFOSE-M **LOT NUMBER:** NEtFOSE0518M
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: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):** Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/04/2018 (HRGC/LRMS)
05/30/2018 (LC/MS)
EXPIRY DATE: (mm/dd/yyyy) 06/04/2023
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:

B.G. Chittim, General Manager

Date: 06/04/2018
(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

18I0765

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.

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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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

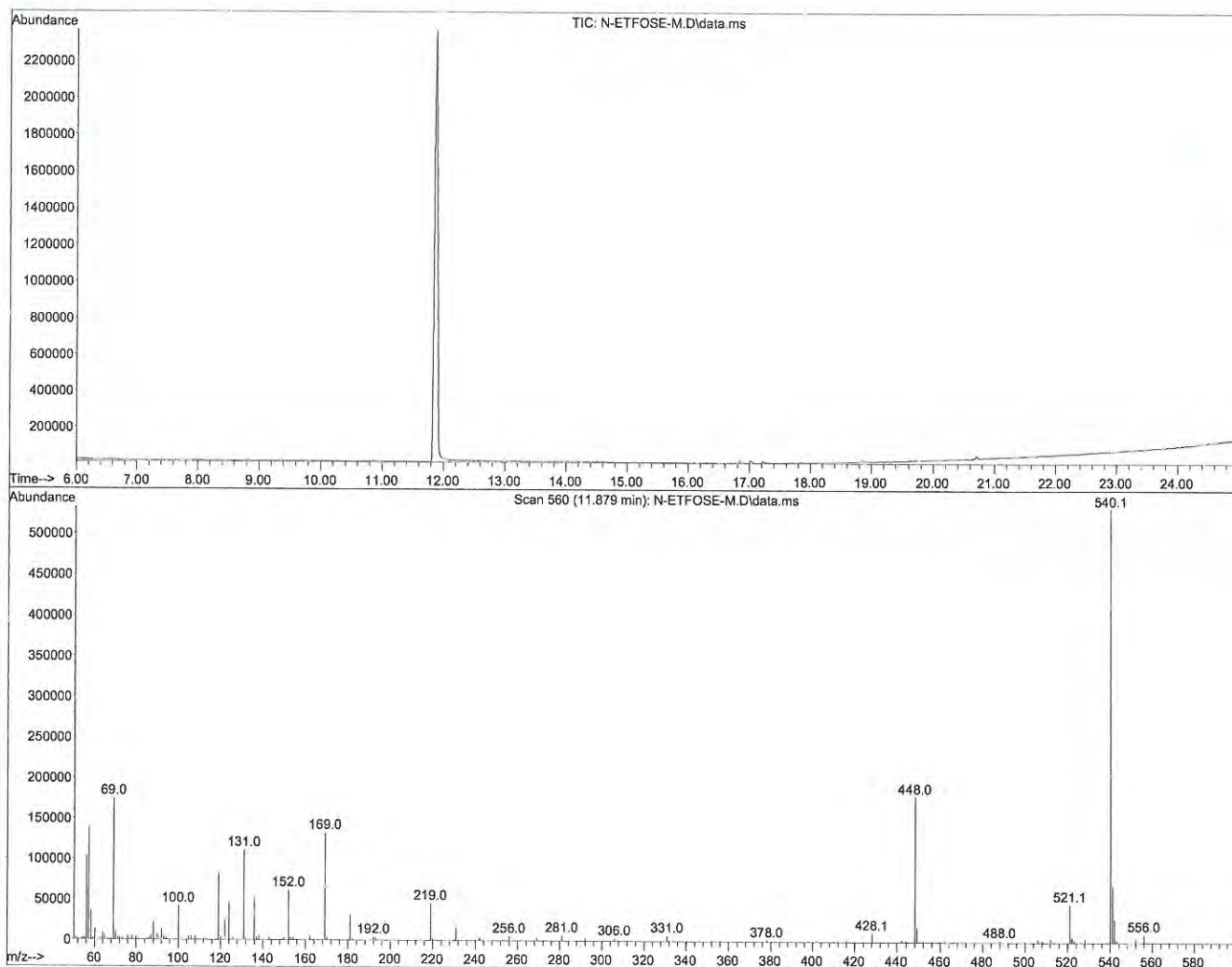
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18I0765

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)

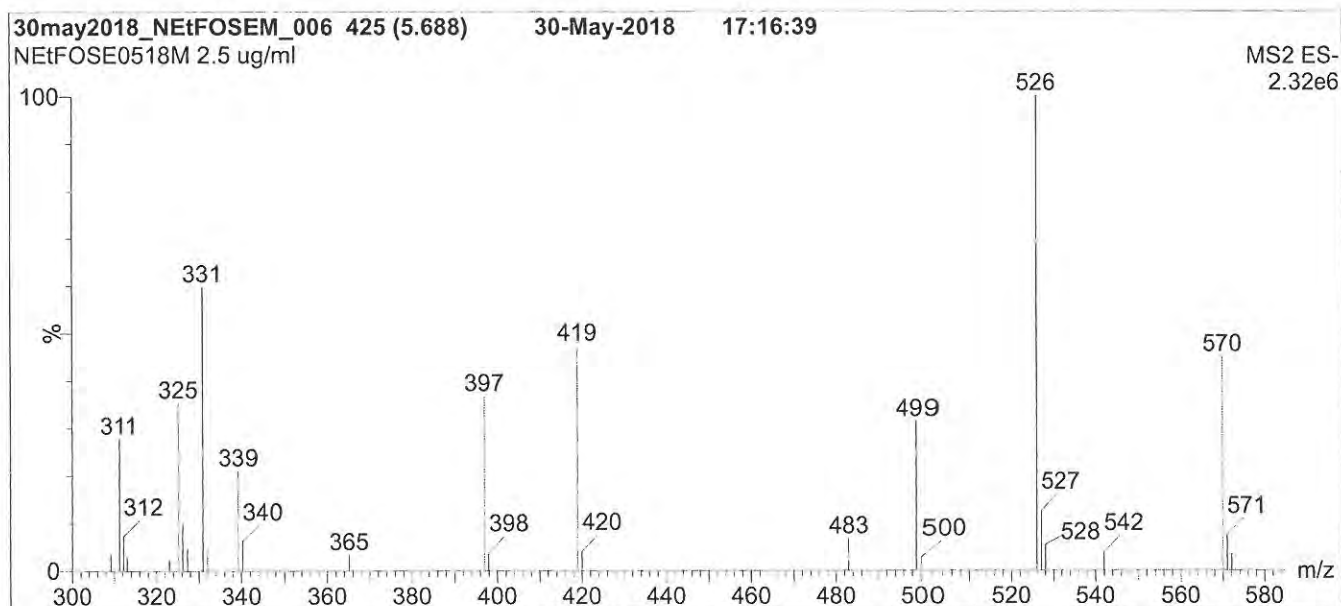
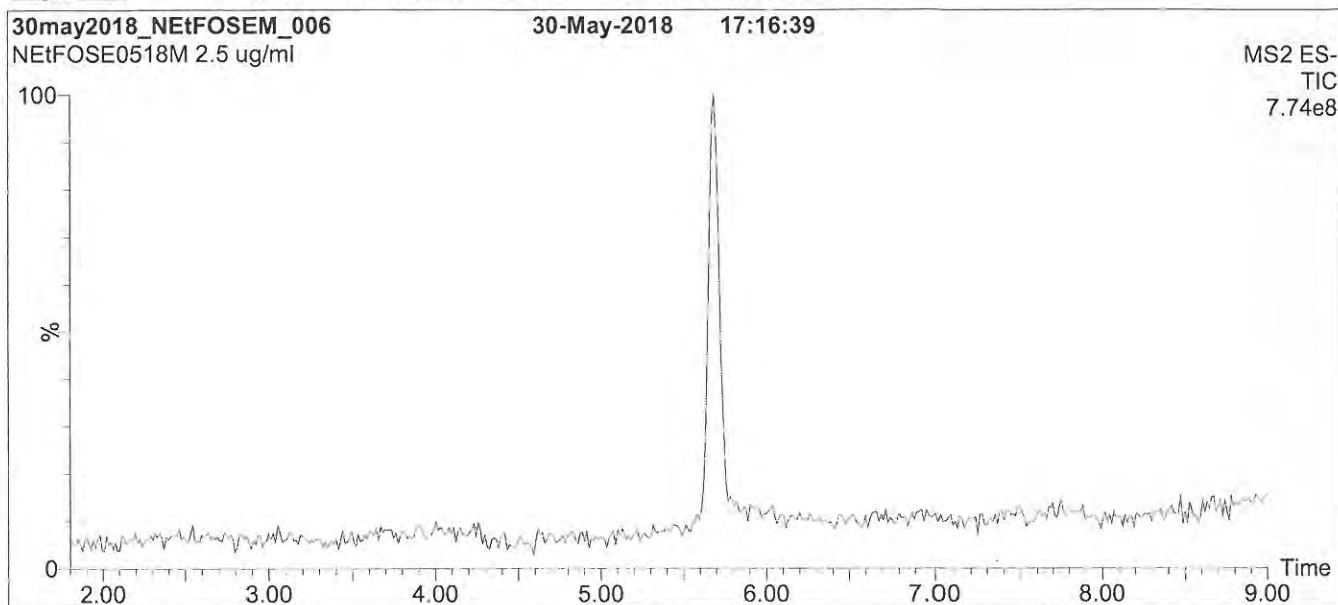
Ionization: EI+

Detector: 250 °C

Full Scan (50-1000 amu)

18I0765

Figure 2: N-EtFOSE-M; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 2:

LC: Waters Acquity Ultra Performance LC
MS: Waters Xevo TQ-S micro MS

Chromatographic Conditions

Column: Acquity UPLC BEH C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 70% MeOH / 30% H₂O
Ramp to 85% organic over 8 min and hold for
2 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 μ l/min

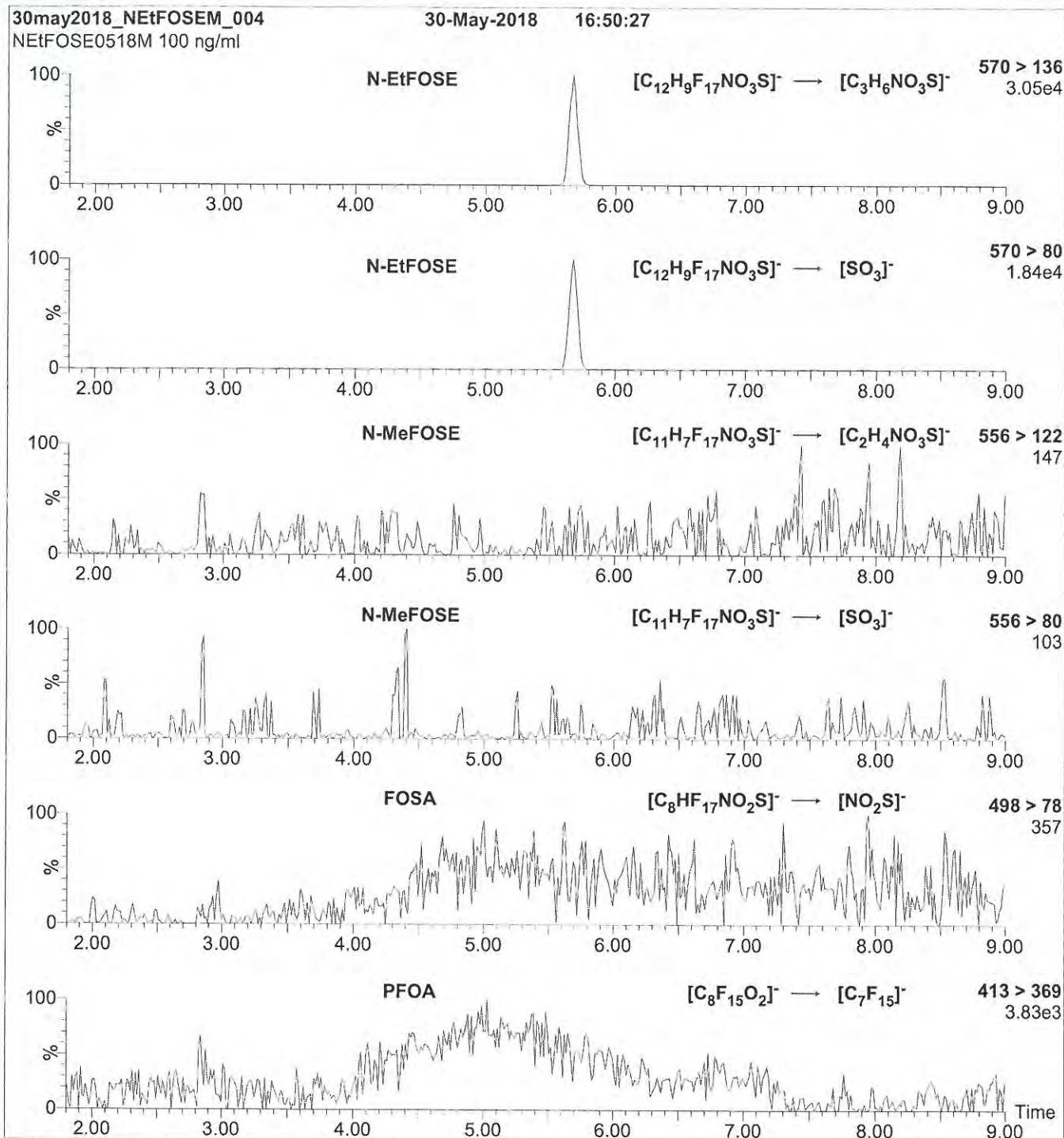
MS Parameters

Experiment: Full Scan (300 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Desolvation Temperature (°C) = 450
Desolvation Gas Flow (l/hr) = 750

18I0765

Figure 3: N-EtFOSE-M; LC/MS/MS Data (Selected MRM Transitions)



Conditions for Figure 3:

Injection: On-column (N-EtFOSE-M)

Mobile phase: Same as Figure 2

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.45e-3

Collision Energy (eV) = 32

Analytical Standard Record
Vista Analytical Laboratory
18J1503

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18F2228	13C2-FOUEA	22-Jun-18	** Vendor **	14-Nov-19	1
18F2229	13C4-PFBA	22-Jun-18	** Vendor **	16-Feb-23	1
18F2230	13C6-PFDA	22-Jun-18	** Vendor **	17-Oct-22	1
18F2231	13C9-PFNA	22-Jun-18	** Vendor **	23-May-22	1
18F2232	13C7-PFUDa	22-Jun-18	** Vendor **	13-Jul-22	1
18F2233	13C5-PFHxA	22-Jun-18	** Vendor **	17-Oct-22	1
18F2234	13C3-PFHxS	22-Jun-18	** Vendor **	05-Jul-22	1.06
18F2235	13C4-PFOS	22-Jun-18	** Vendor **	15-Feb-23	1.05
18F2236	13C8-PFOA	22-Jun-18	** Vendor **	05-Jul-22	1.02

Description:	PFC-RS	Expires:	15-Oct-20
Standard Type:	Reagent	Prepared:	15-Oct-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	15-Oct-18 08:57 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

18F2228



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

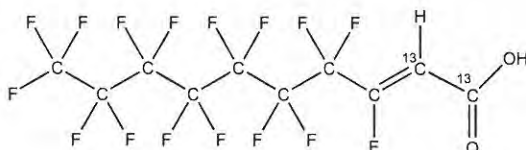
MFOUEA

LOT NUMBER:

MFOUEA1117

COMPOUND:2H-Perfluoro-[1,2-¹³C₂]-2-decenoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₈H₂F₁₆O₂**MOLECULAR WEIGHT:**

460.08

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):Anhydrous
Isopropanol**CHEMICAL PURITY:**

>98%

ISOTOPIC PURITY:≥99% ¹³C
(1,2-¹³C₂)**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-[1,2-¹³C₂]-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:**

B.G. Chittim, General Manager
Date:11/15/2017
(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

18F2228

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

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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 calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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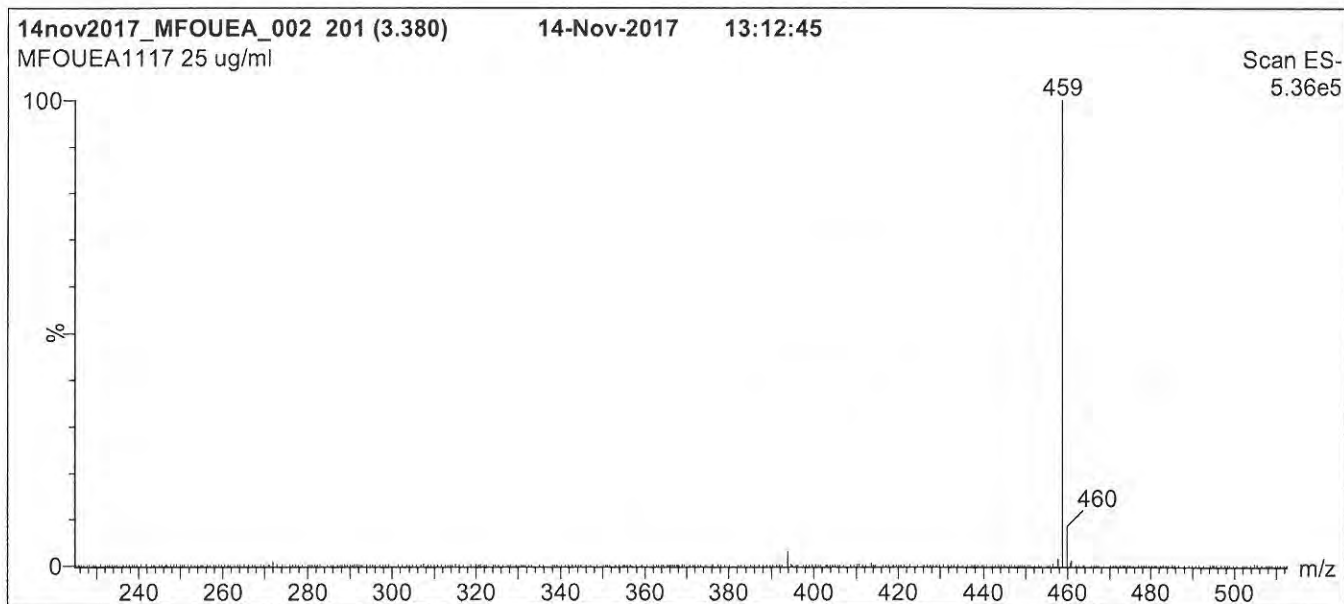
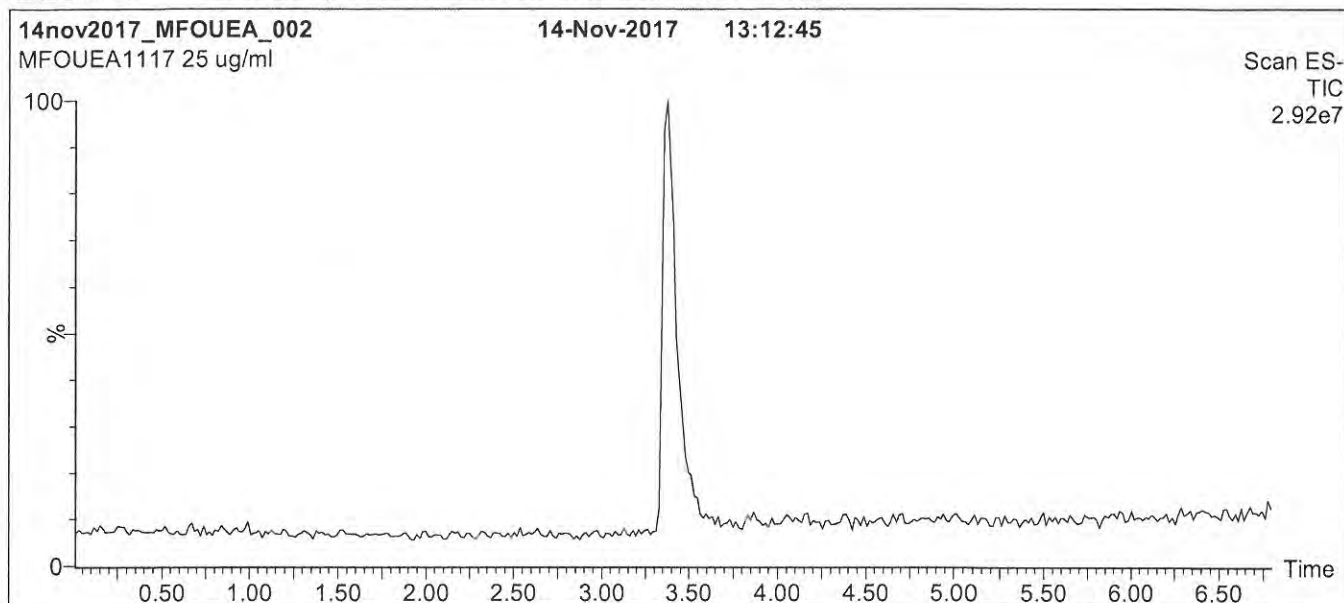
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18F2228

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

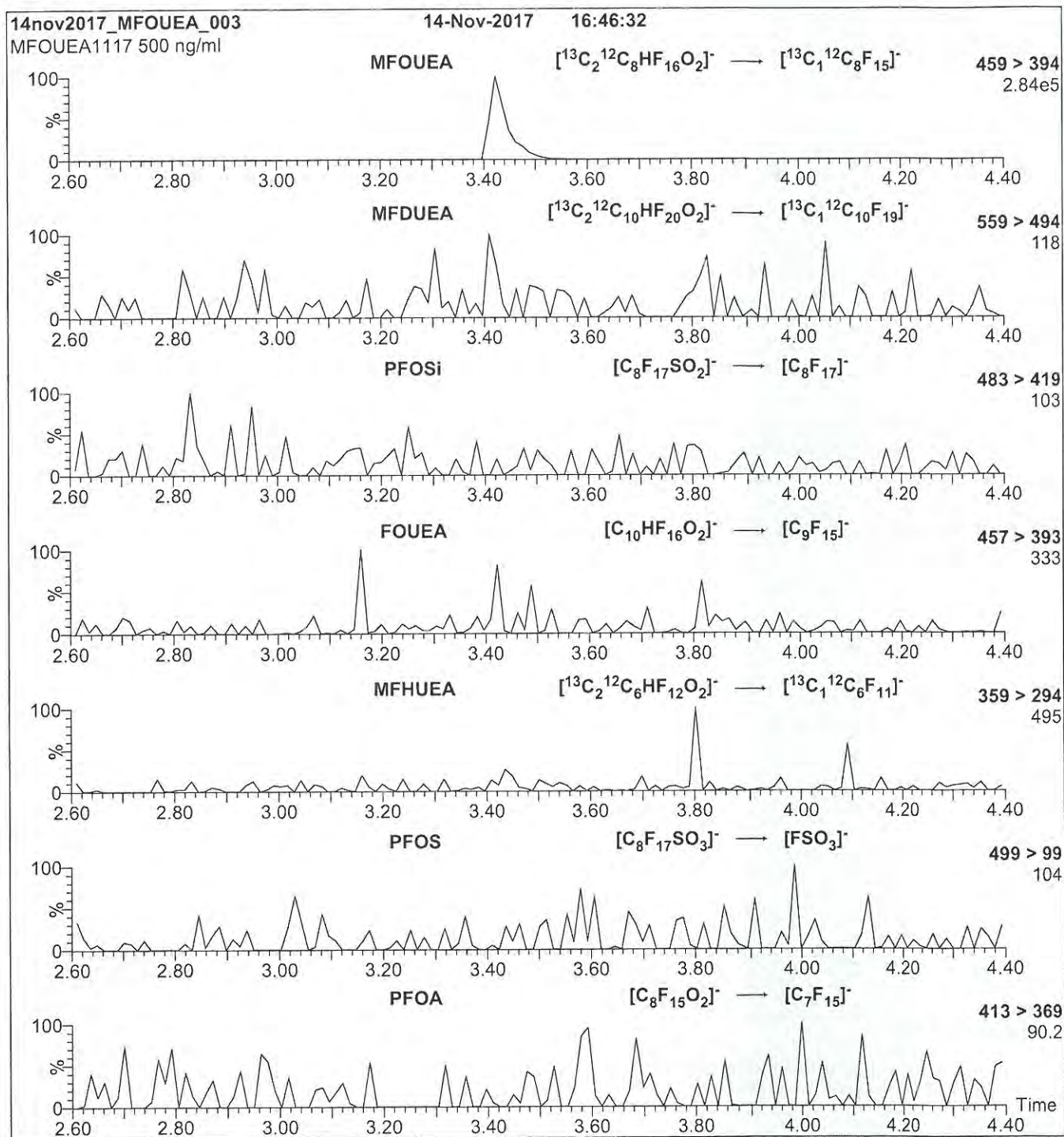
Flow: 300 μ l/min

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

18F2228

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 21

18F2229



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

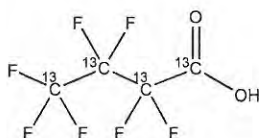
MPFBA

LOT NUMBER:

MPFBA0218

COMPOUND:Perfluoro-n-[1,2,3,4-¹³C₄]butanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₄HF₇O₂**MOLECULAR WEIGHT:**

218.01

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

02/16/2018

(1,2,3,4-¹³C₄)**EXPIRY DATE:** (mm/dd/yyyy)

02/16/2023

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:**

B.G. Chittim, General Manager
Date:02/22/2018
(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

18F2229

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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QUALITY MANAGEMENT:

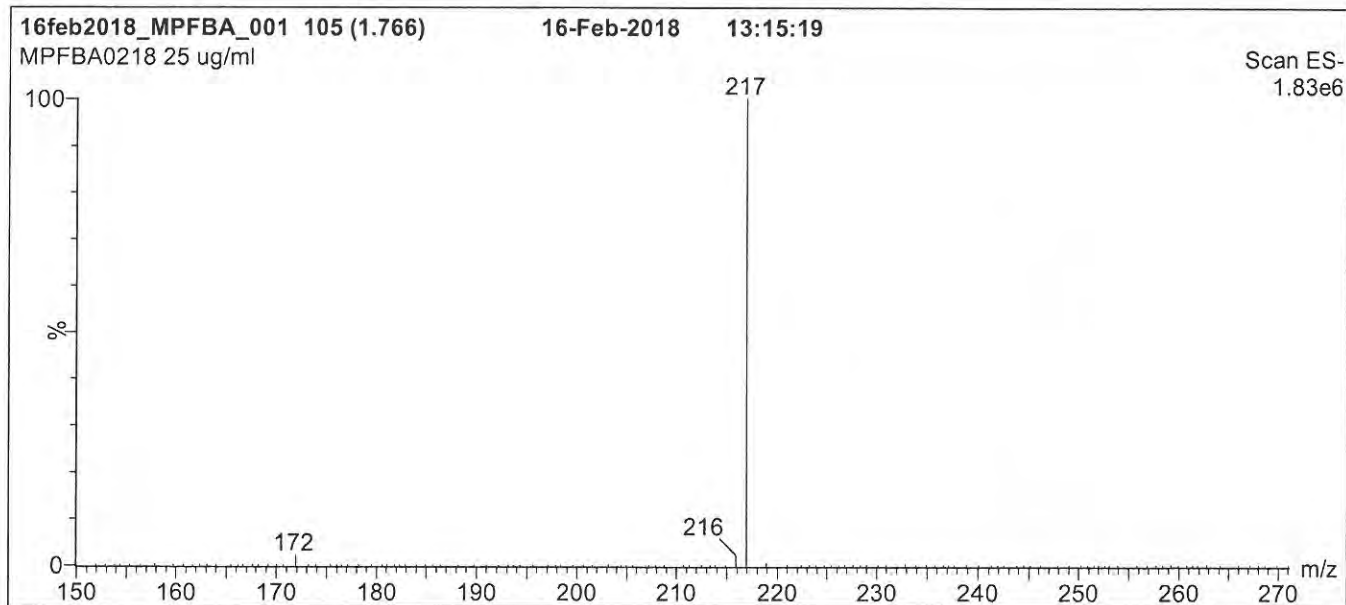
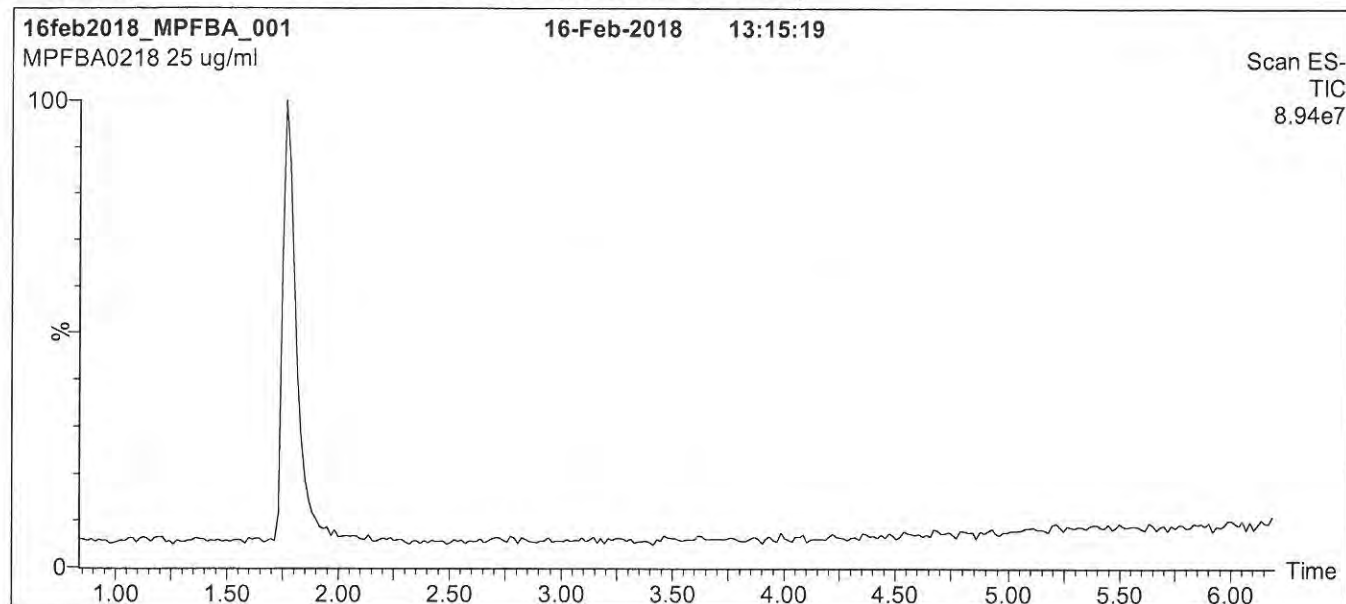
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18F2229

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H₂O
(both with 10 mM NH₄OAc 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

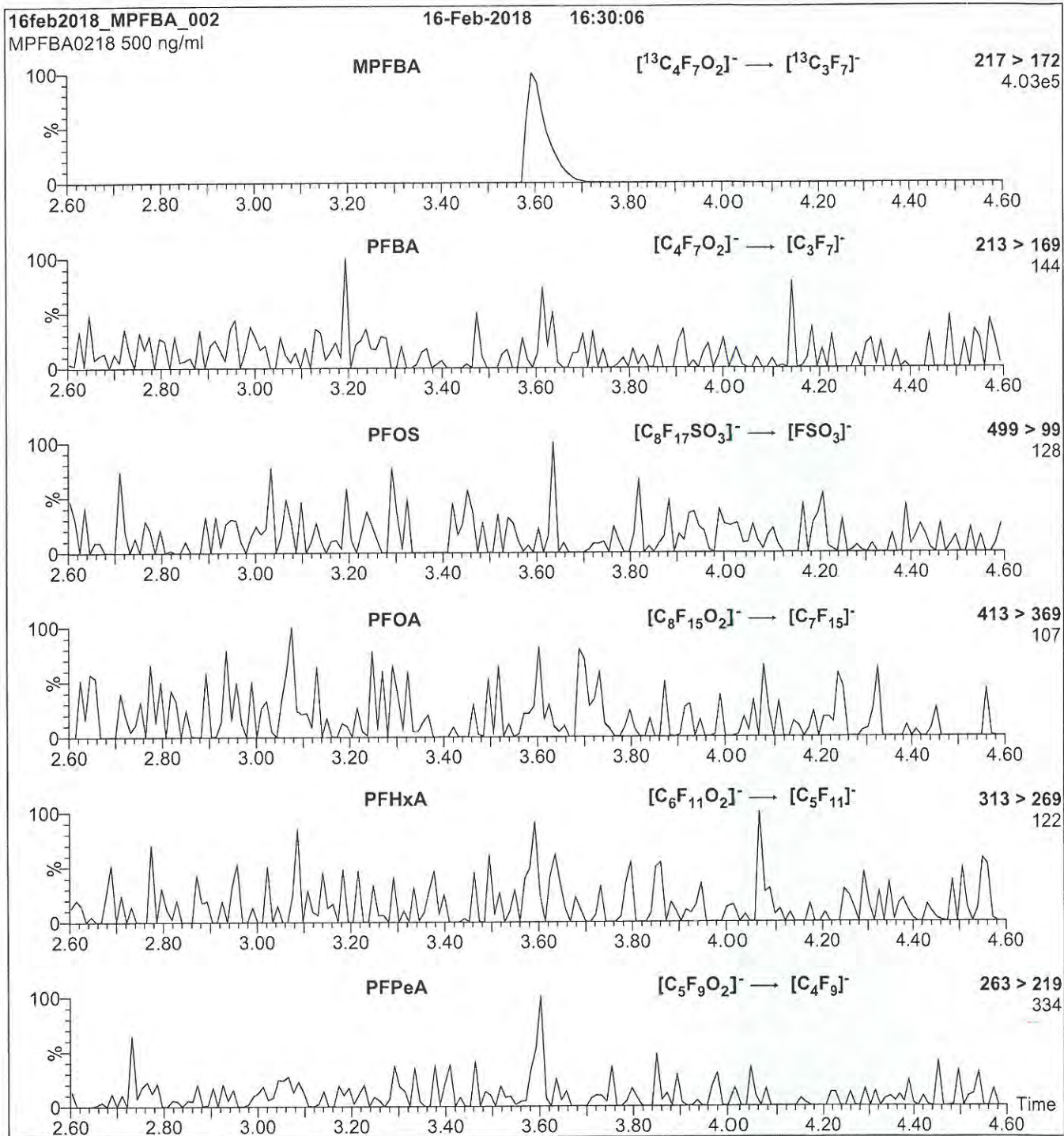
Flow: 300 μ l/min

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

18F2229

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 10

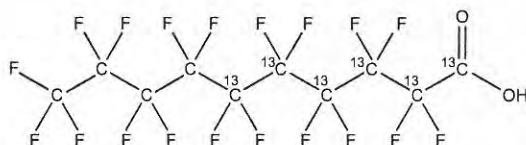
18F2230



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M6PFDA **LOT NUMBER:** M6PFDA1017
COMPOUND: Perfluoro-n-[1,2,3,4,5,6-¹³C₆]decanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₆¹²C₄HF₁₉O₂ **MOLECULAR WEIGHT:** 520.04
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
 Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
 (1,2,3,4,5,6-¹³C₆)
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: 
 B.G. Chittim, General Manager

Date: 10/20/2017
 (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

18F2230

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

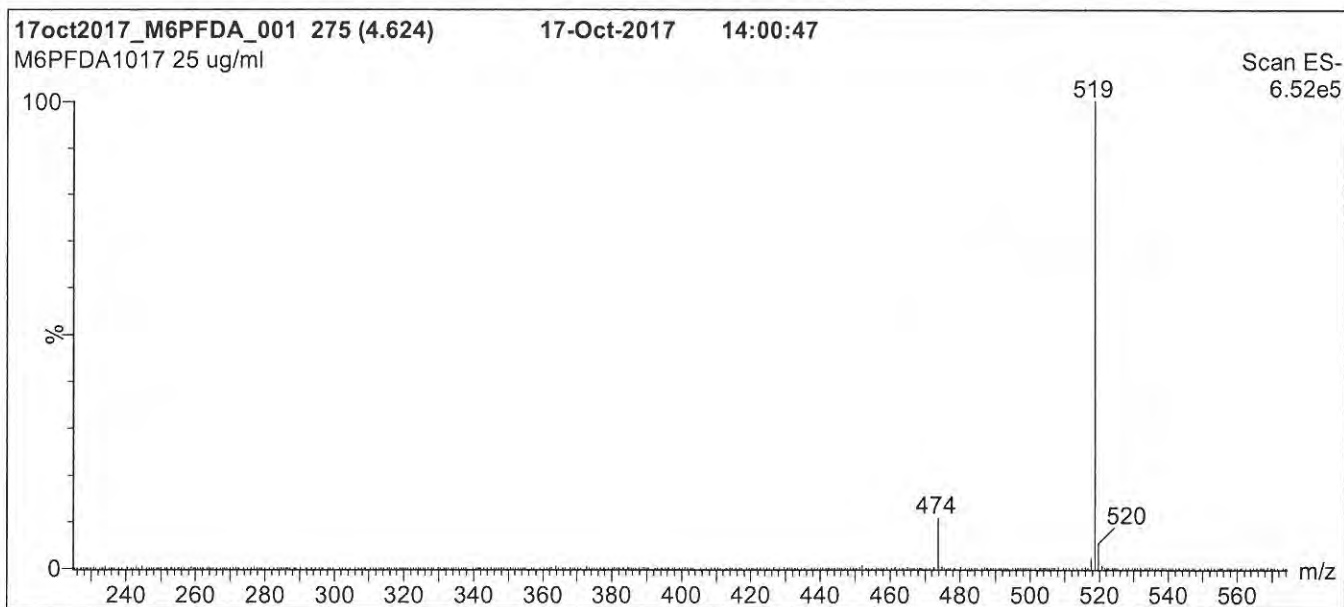
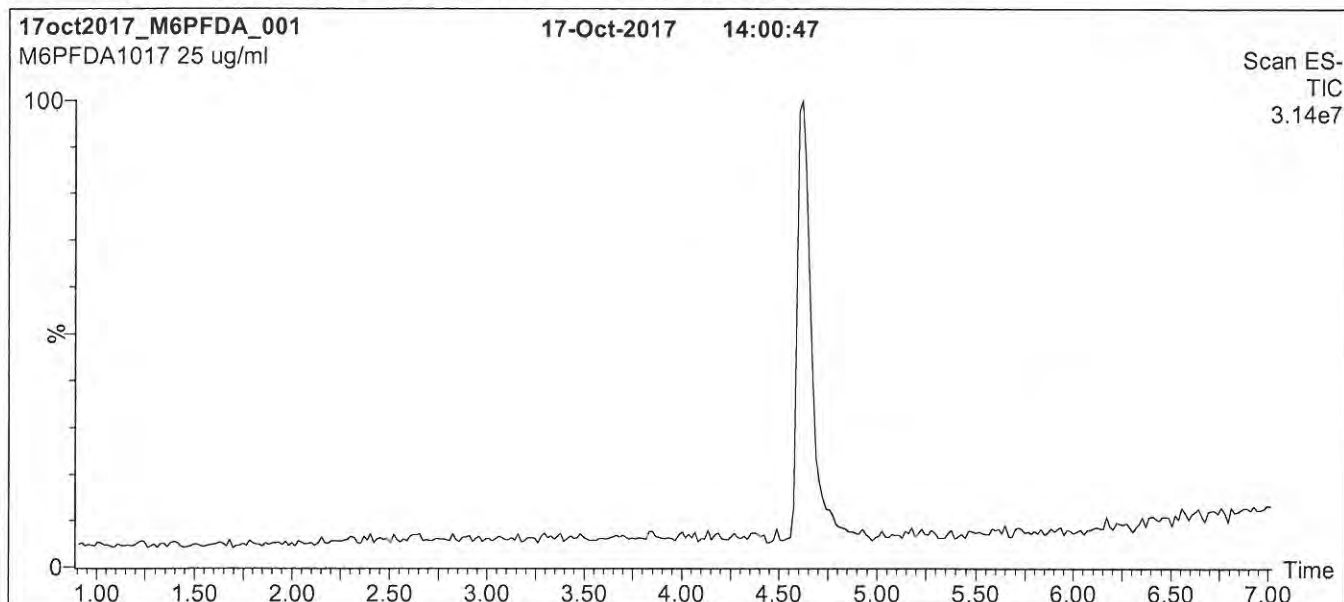
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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 μ l/min

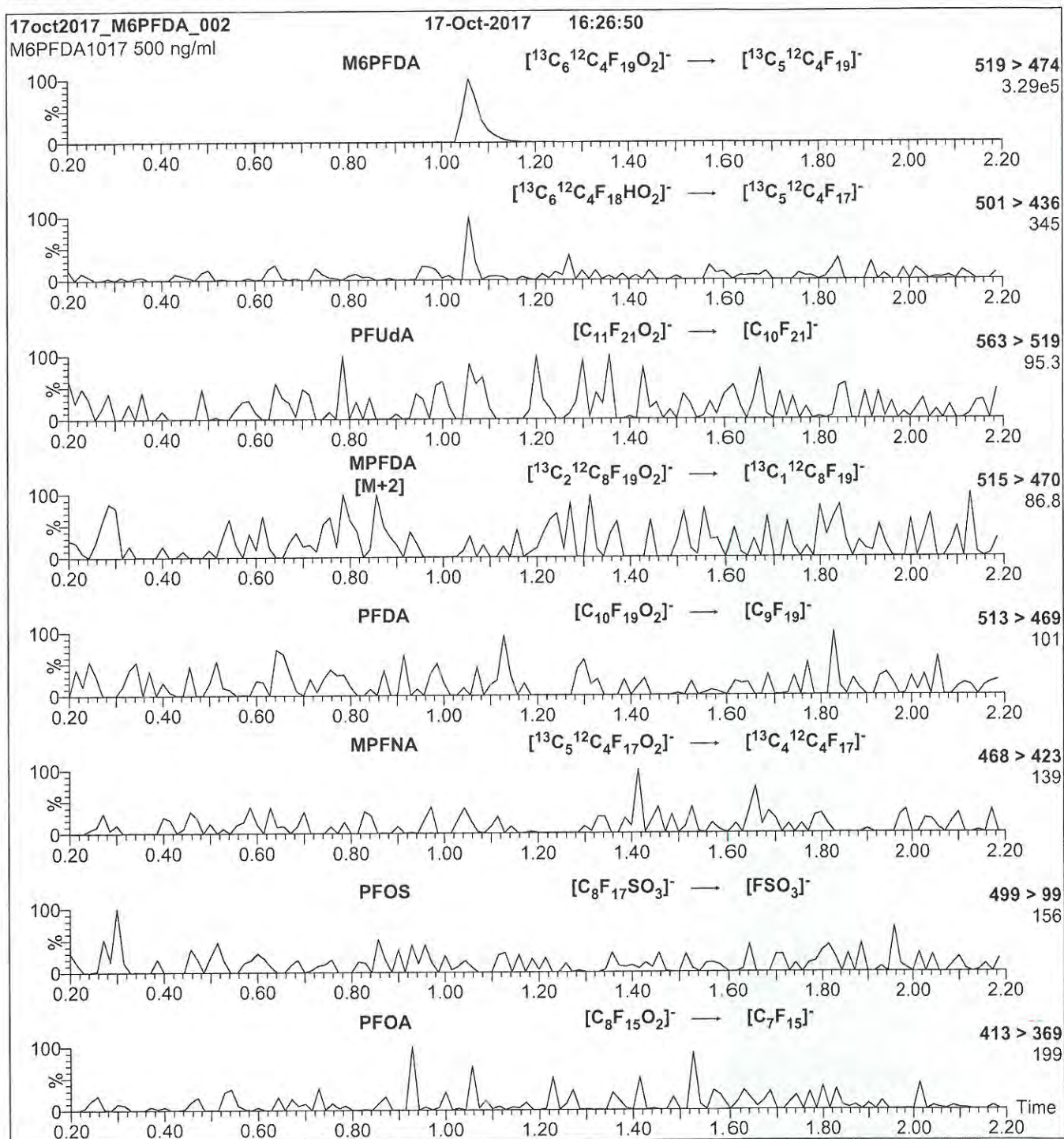
MS Parameters

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

18F2230

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 13

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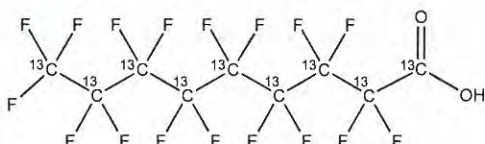
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M9PFNA
COMPOUND: Perfluoro-n-[$^{13}\text{C}_9$]nonanoic acid

LOT NUMBER: M9PFNA0517

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}\text{C}_9\text{HF}_{17}\text{O}_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 473.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/23/2017
EXPIRY DATE: (mm/dd/yyyy) 05/23/2022

ISOTOPIC PURITY: $\geq 99\%$ ^{13}C
($^{13}\text{C}_9$)

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 $^{13}\text{C}_5^{12}\text{C}_4\text{HF}_{17}\text{O}_2$ (MPFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim, General Manager

Date: 05/25/2017
(mm/dd/yyyy)

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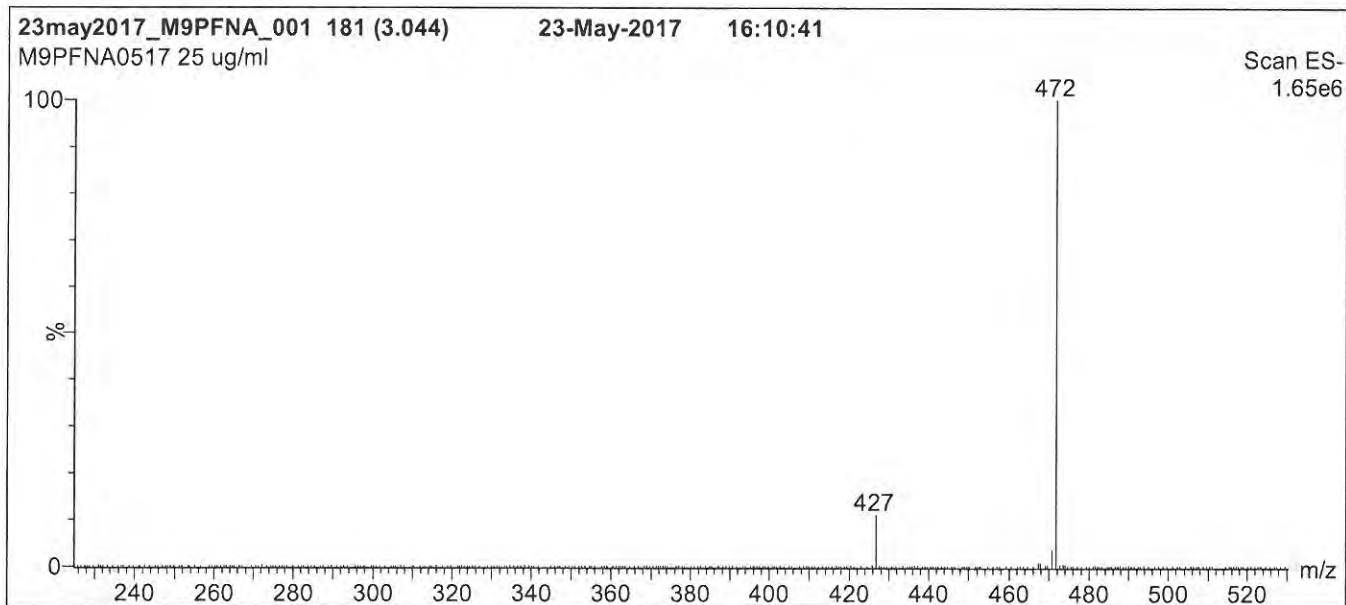
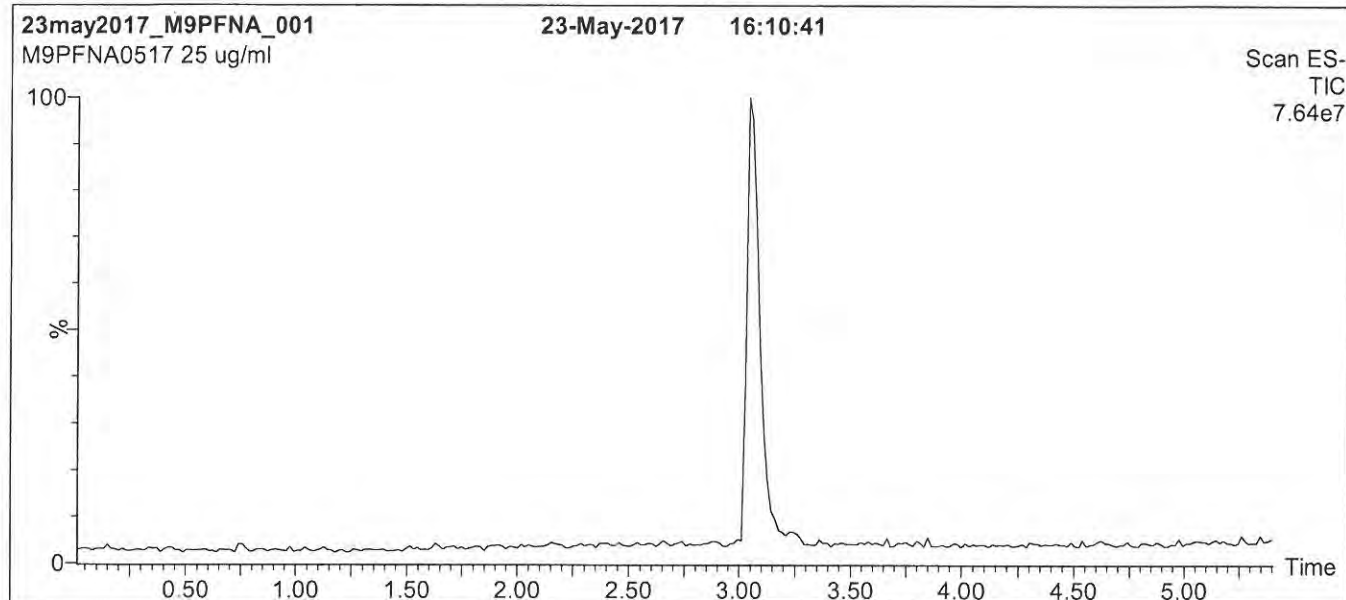
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18F2231

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

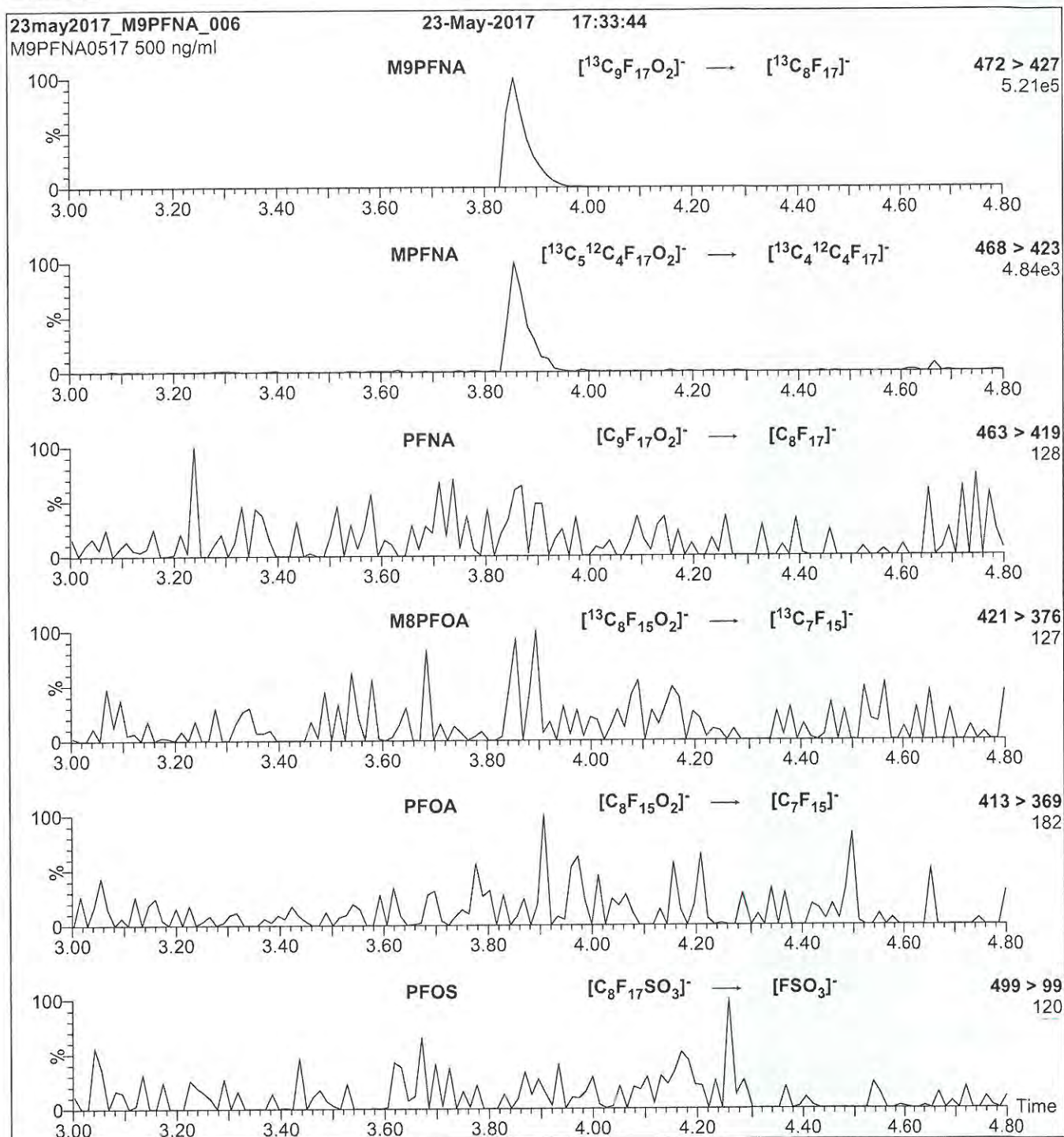
Flow: 300 μ l/min

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

18F2231

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 11

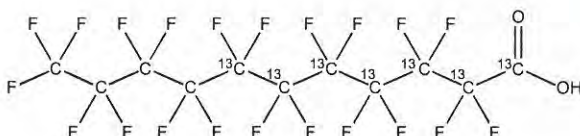
18F2232



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M7PFUdA **LOT NUMBER:** M7PFUdA0717
COMPOUND: Perfluoro-n-[1,2,3,4,5,6,7-¹³C₇]undecanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₇¹²C₄HF₂₁O₂ **MOLECULAR WEIGHT:** 571.04
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
 Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
 (1,2,3,4,5,6,7-¹³C₇)
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:

B.G. Chittim, General Manager

Date: 07/14/2017
 (mm/dd/yyyy)

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QUALITY MANAGEMENT:

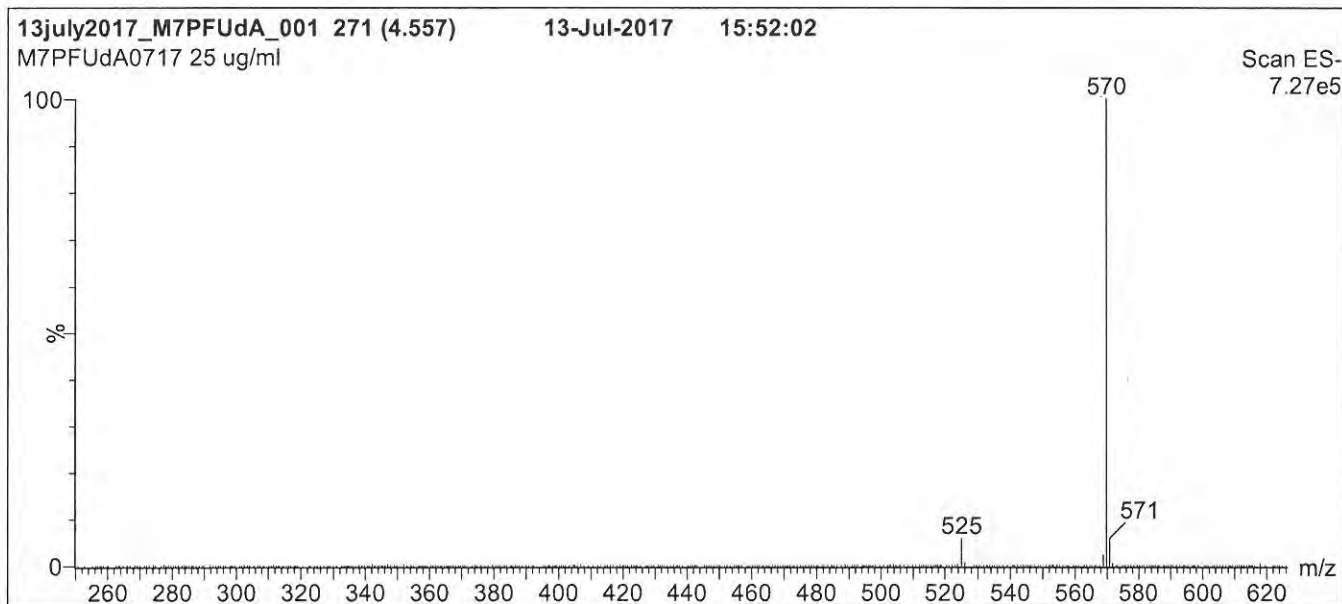
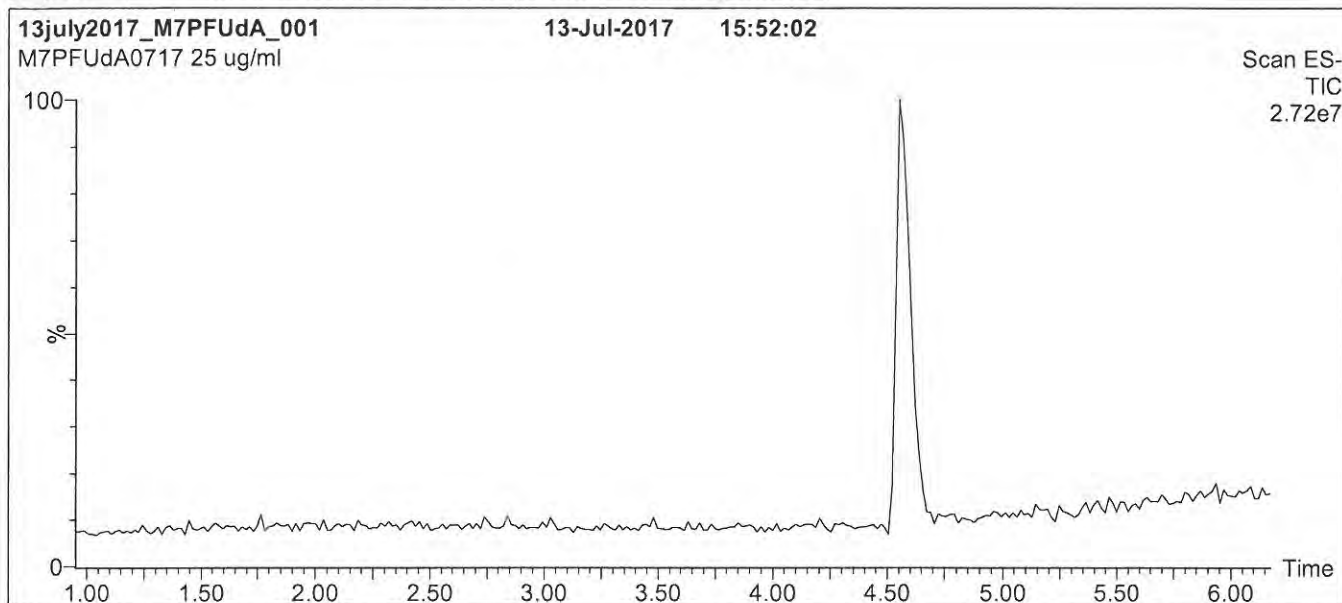
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18F2232

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

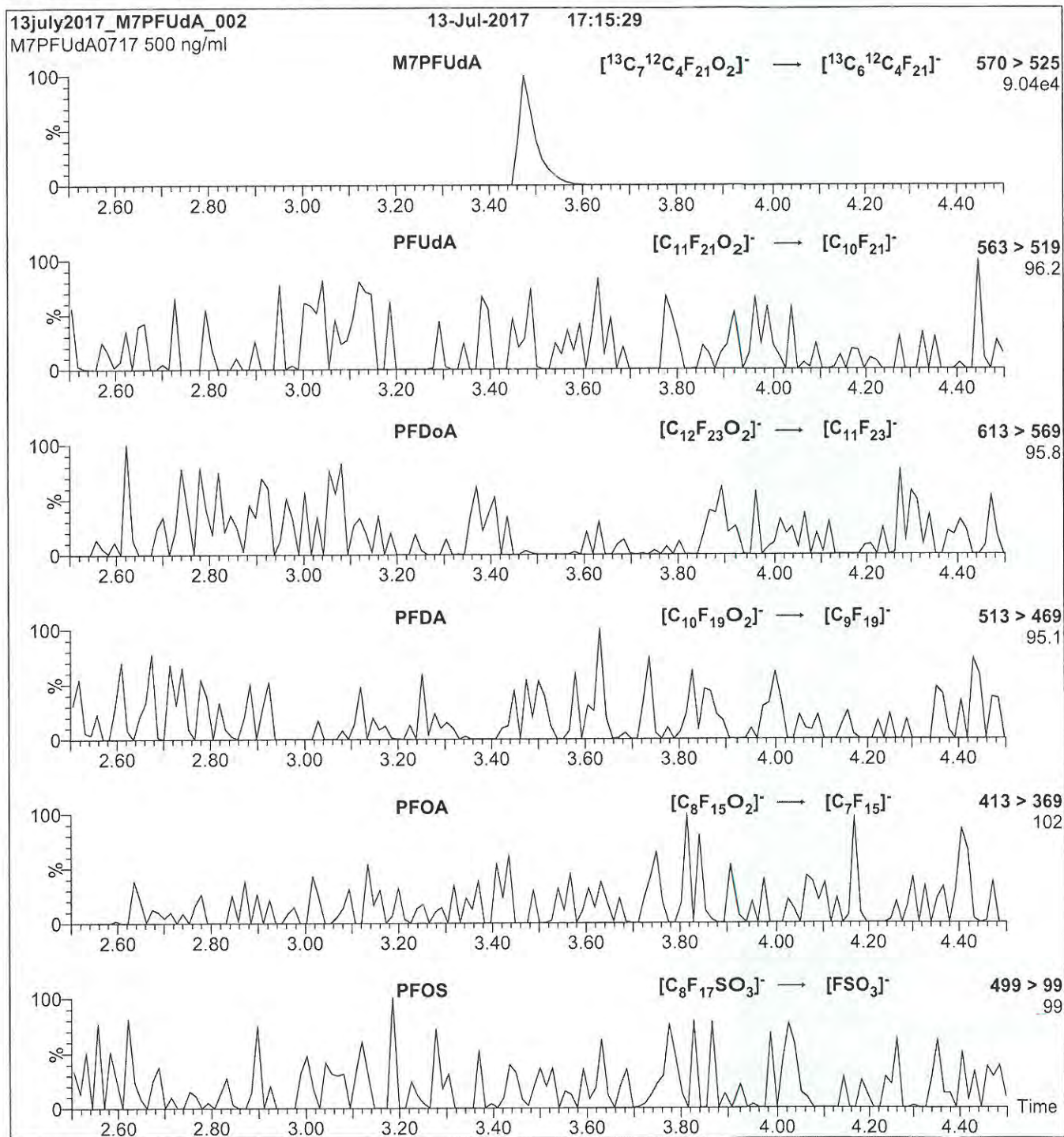
Flow: 300 μ l/min

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

18F2232

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.28\text{e-}3$
Collision Energy (eV) = 11

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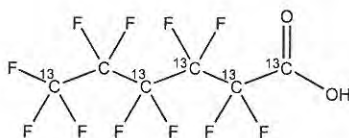
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M5PFHxA
COMPOUND: Perfluoro-n-[1,2,3,4,6-¹³C₅]hexanoic acid

LOT NUMBER: M5PFHxA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₅¹²C₁H₁F₁₁O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 319.02

SOLVENT(S): Methanol

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ¹³C

LAST TESTED: (mm/dd/yyyy) 10/17/2017

(1,2,3,4,6-¹³C₅)

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:


B.G. Chittim, General Manager

Date: 10/18/2017
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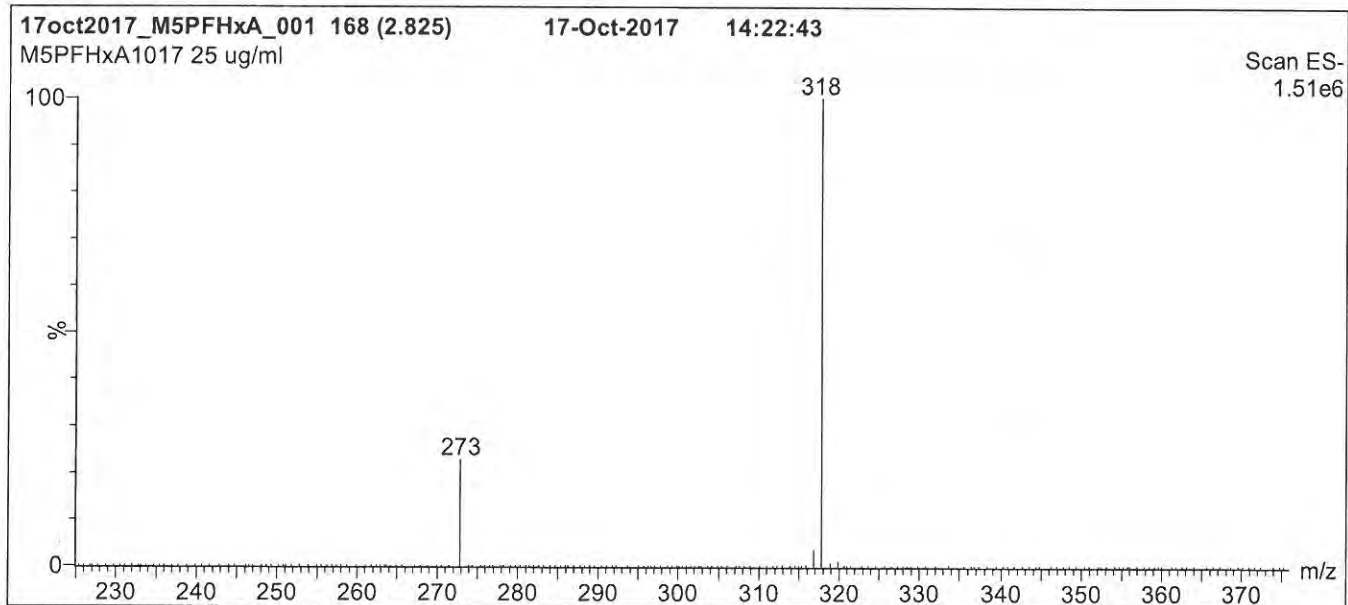
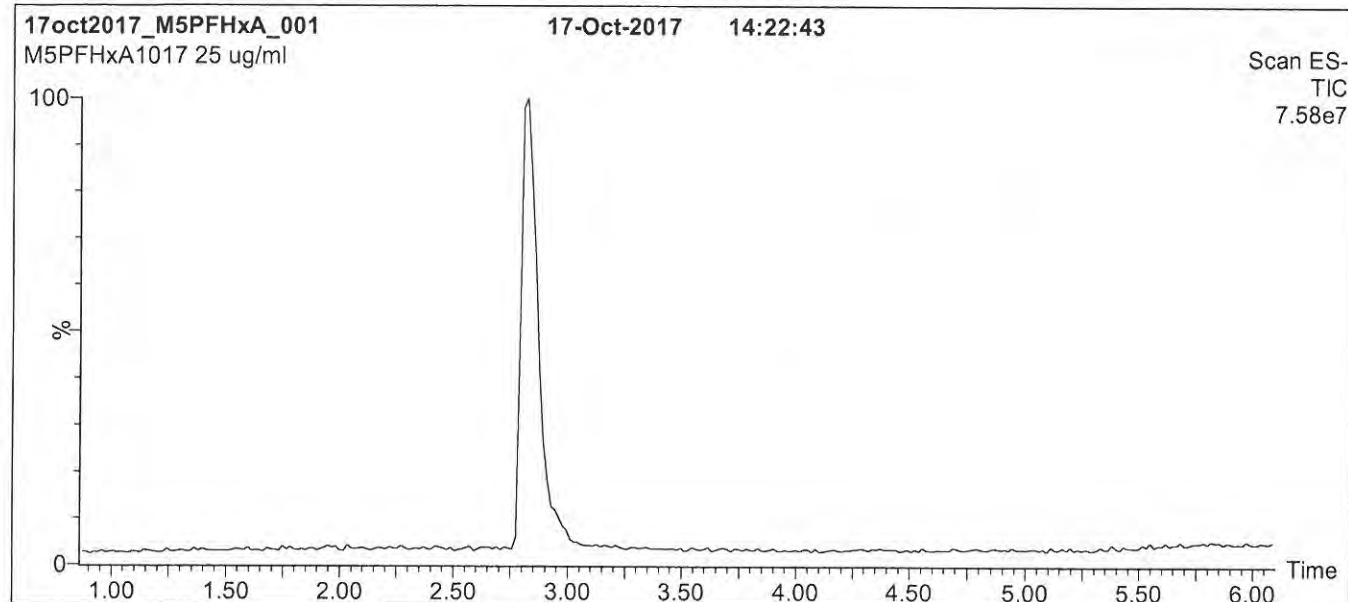
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MS: Micromass Quattro micro API MS

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1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

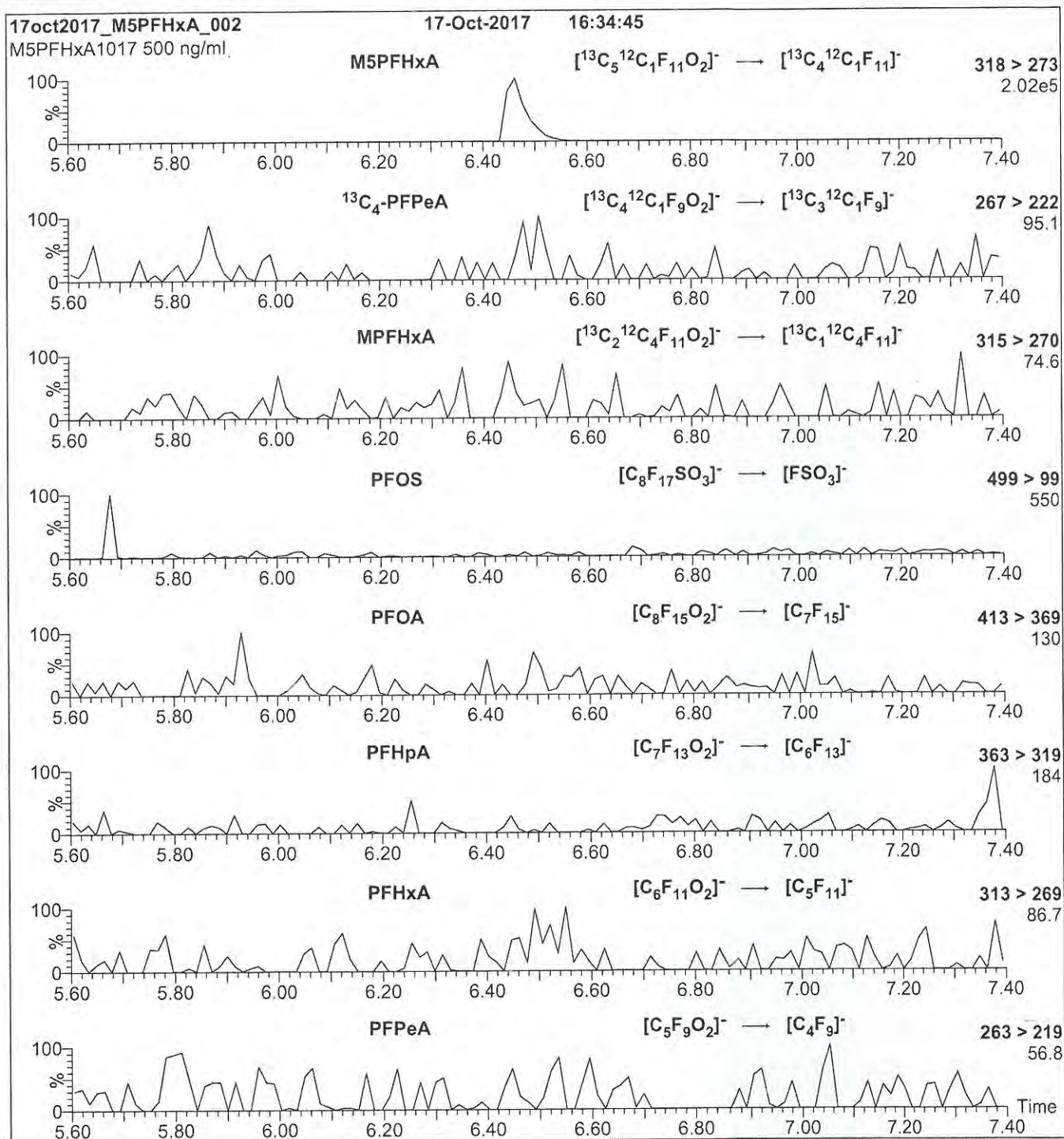
Flow: 300 μ l/min

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

18F2233

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.31\text{e-}3$
Collision Energy (eV) = 9

18F2234



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

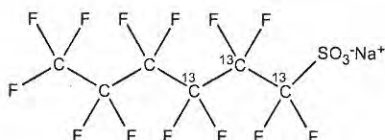
M3PFHxS

LOT NUMBER:

M3PFHxS0717

COMPOUND:Sodium perfluoro-1-[1,2,3-¹³C₃]hexanesulfonate**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₃¹²C₃F₁₃SO₃Na**MOLECULAR WEIGHT:**

425.07

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

47.3 ± 2.4 µg/ml (M3PFHxS anion)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C
(1,2,3-¹³C₃)**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:

B.G. Chittim, General Manager

Date: 07/14/2017

(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

18F2234

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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:

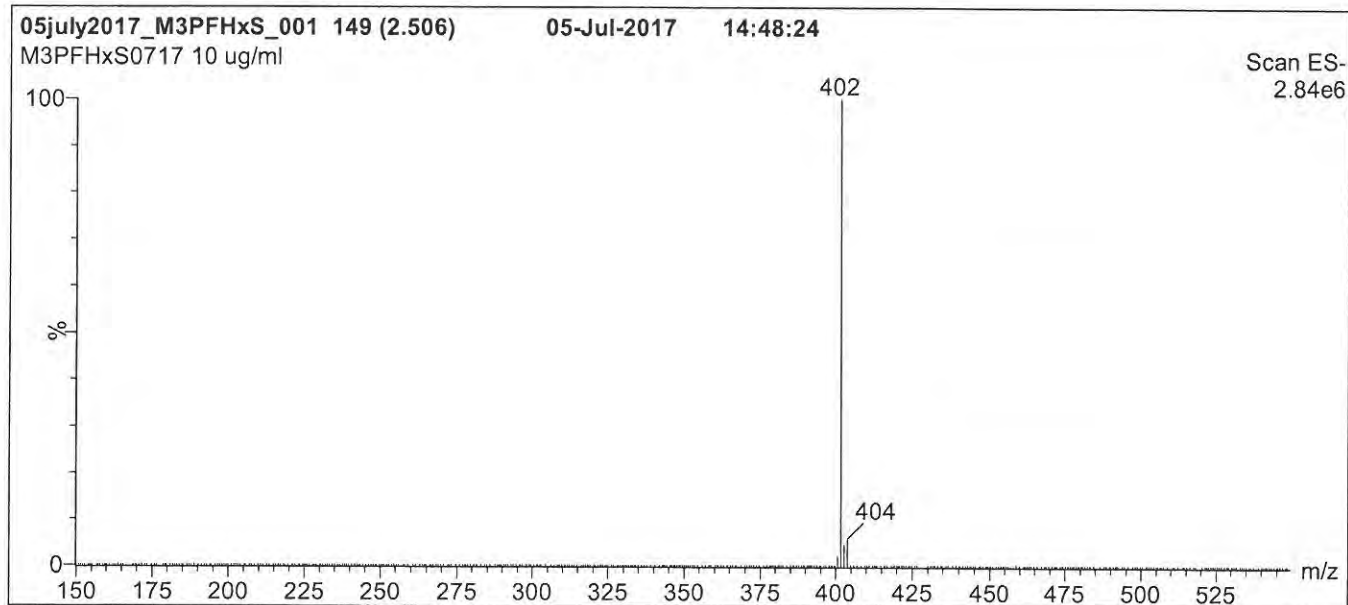
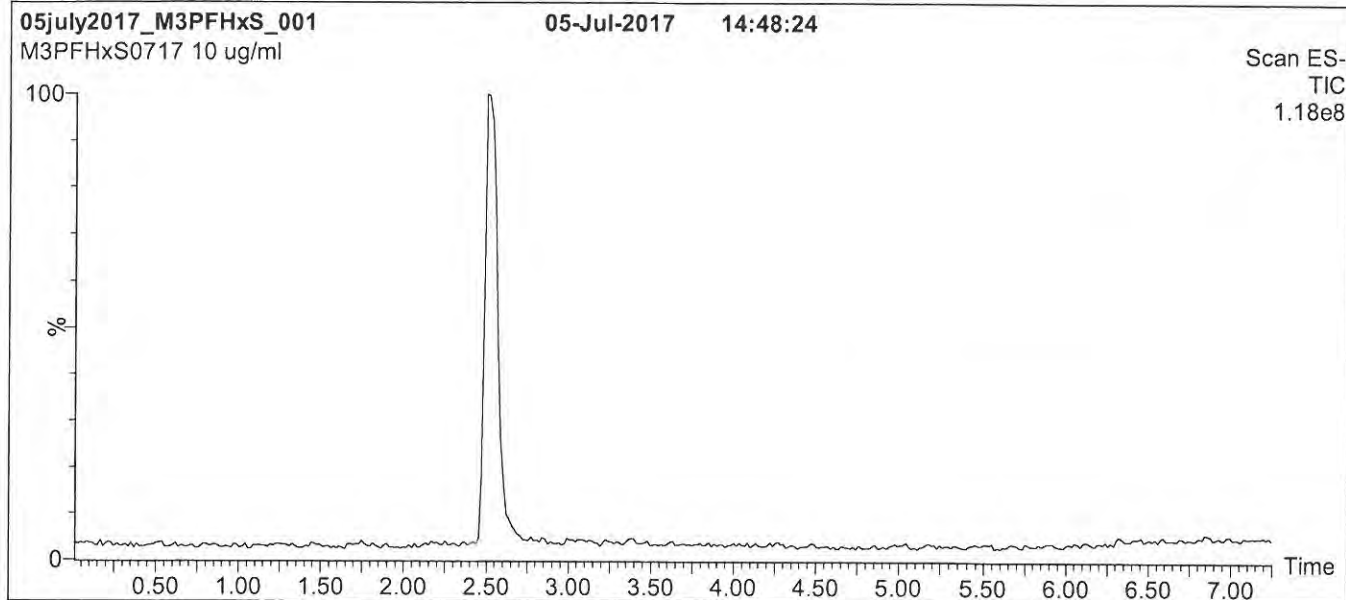
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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

18F2234

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

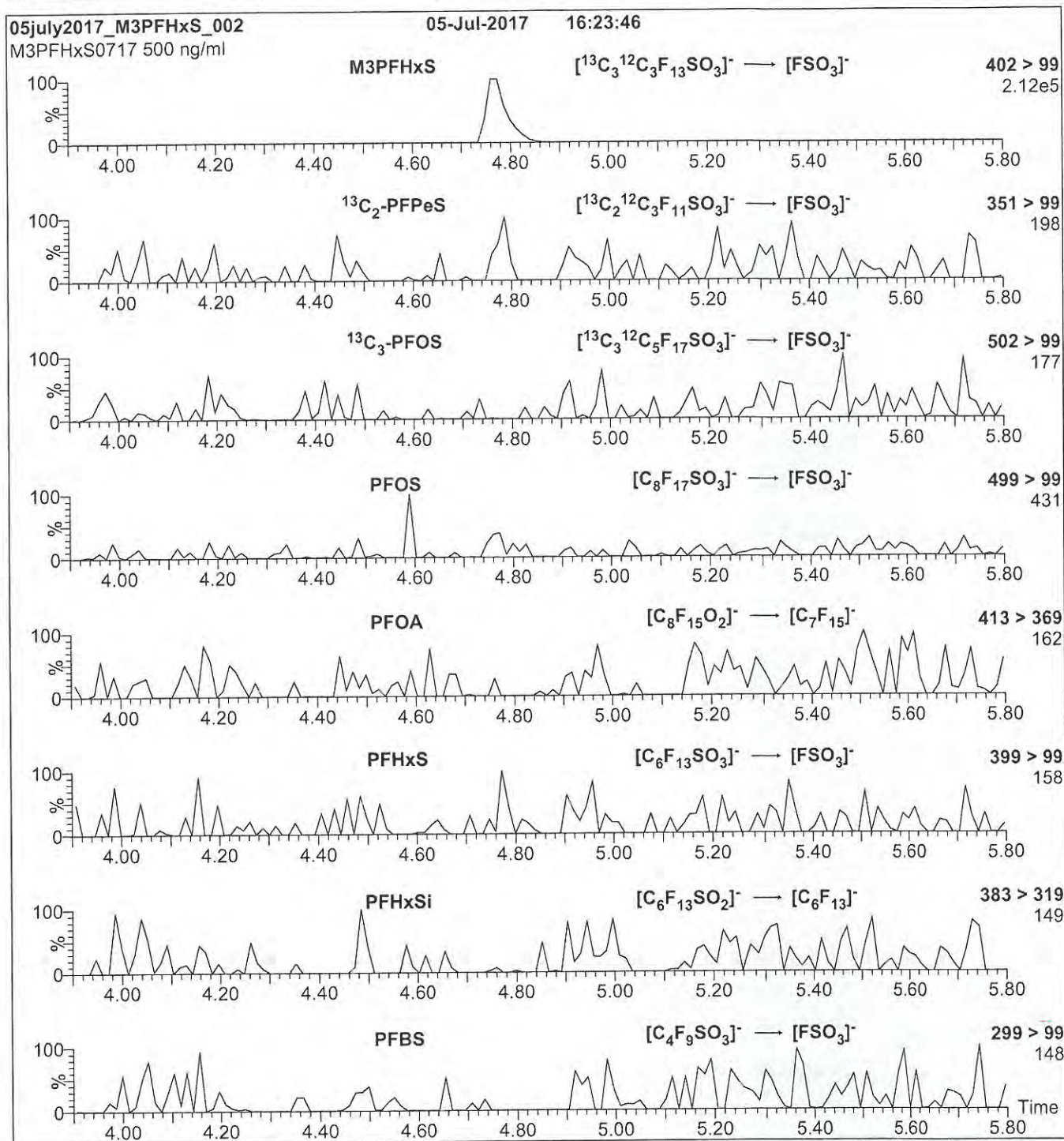
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 50.00

Cone Gas Flow (l/hr) = 60

Desolvation Gas Flow (l/hr) = 750

18F2234

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18F2235

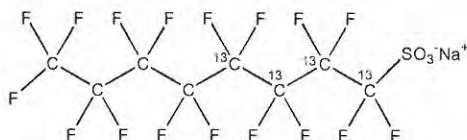


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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0218
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}\text{C}_4^{12}\text{C}_4\text{F}_{17}\text{SO}_3\text{Na}$	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- ¹³ C ₄)
LAST TESTED: (mm/dd/yyyy)	02/15/2018		
EXPIRY DATE: (mm/dd/yyyy)	02/15/2023		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

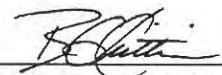
Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.6% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:


 B.G. Chittim, General Manager

Date: 02/20/2018
 (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

18F2235

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, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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 $\pm 5\%$ (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.

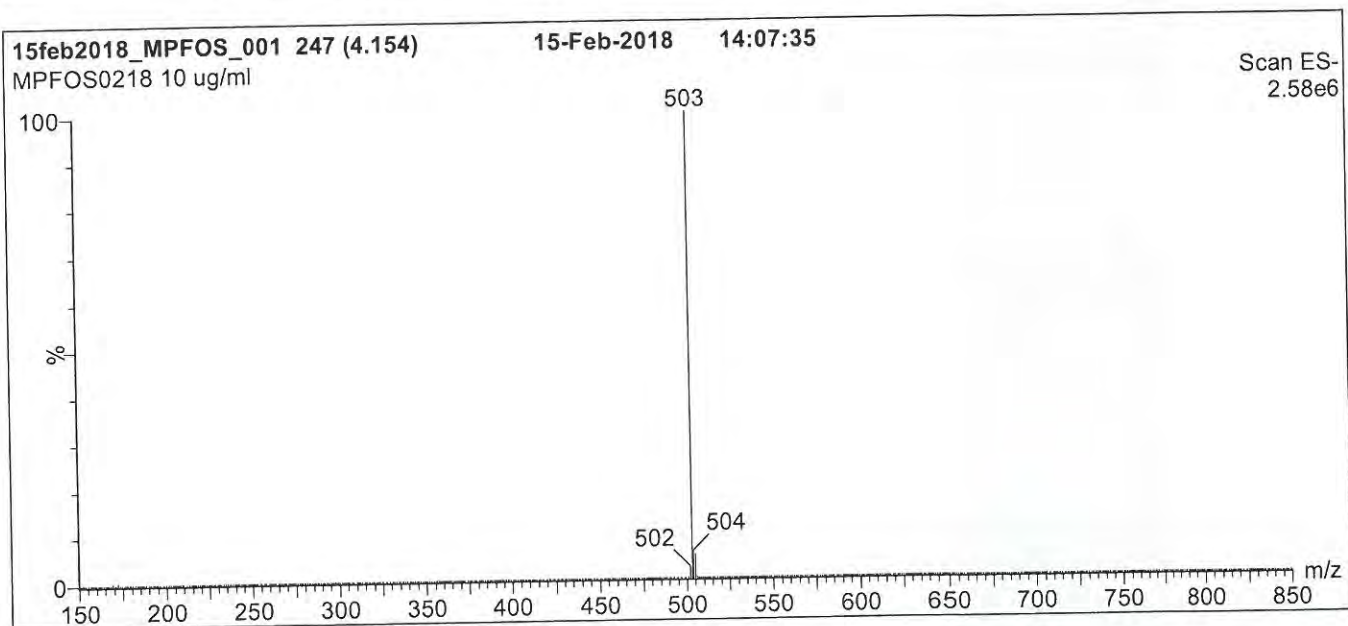
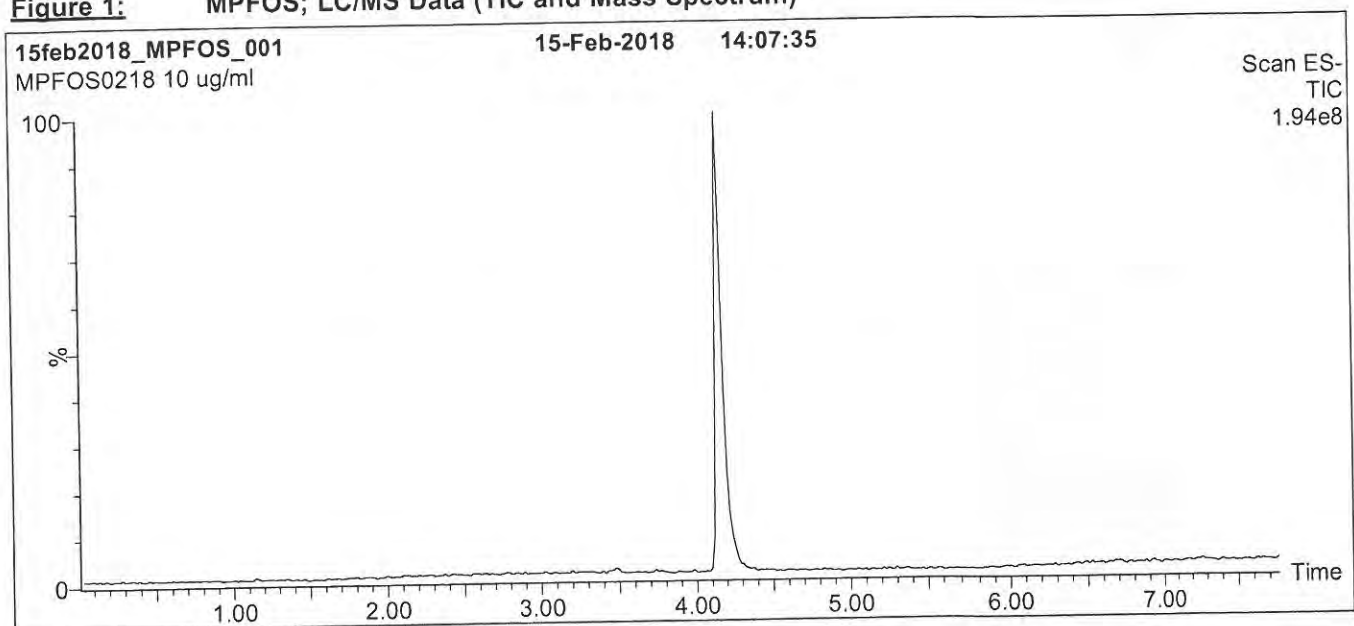
QUALITY MANAGEMENT:

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).



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

18F2235

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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

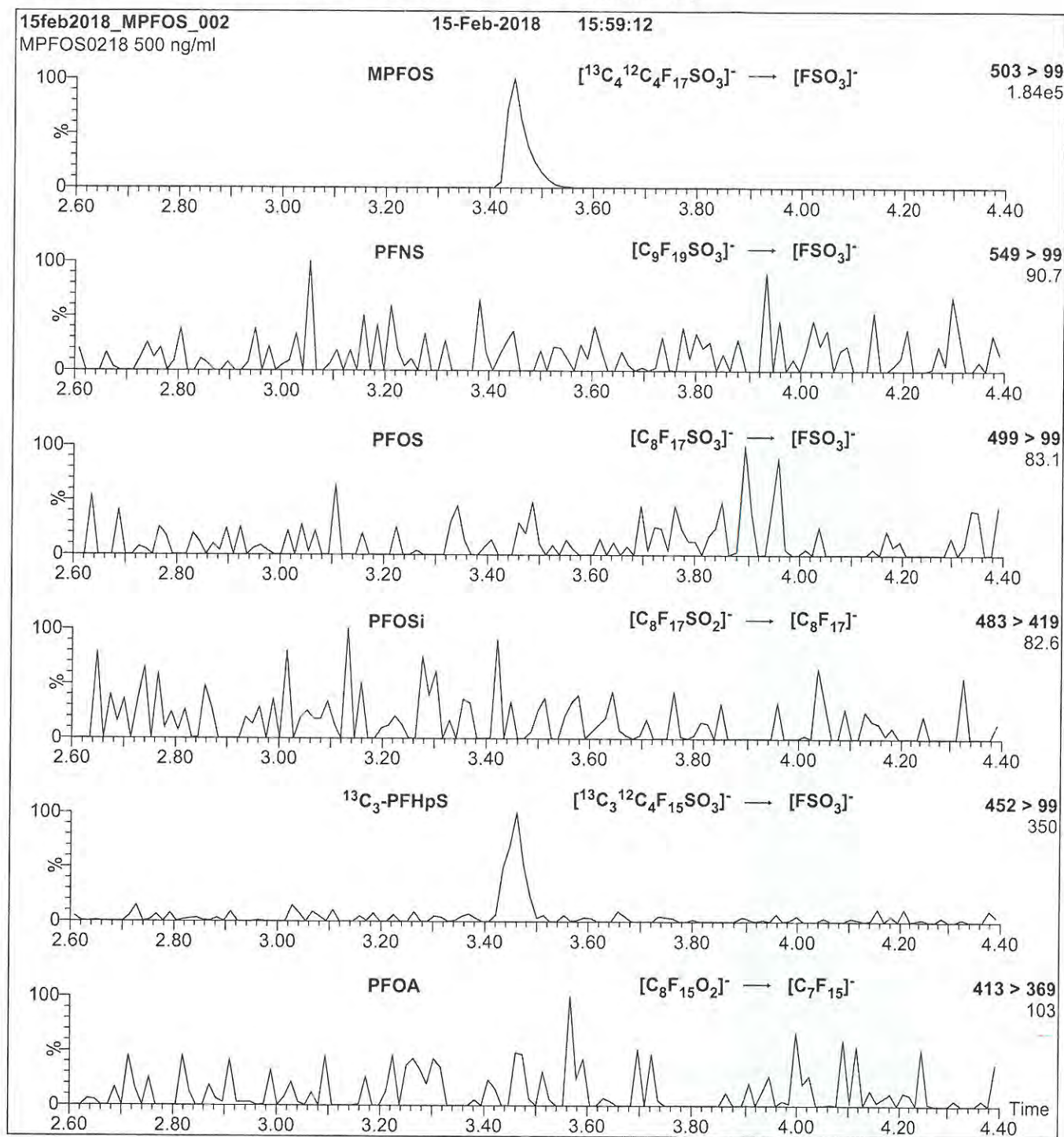
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 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

18F2235

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 40

18F2236



WELLINGTON LABORATORIES

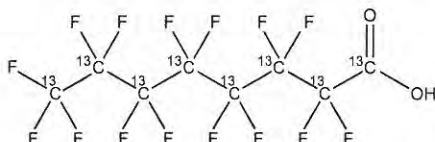
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8PFOA
COMPOUND: Perfluoro-n-[¹³C₈]octanoic acid

LOT NUMBER: M8PFOA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₈H₁₅O₂
CONCENTRATION: 49 ± 2.45 µg/ml

MOLECULAR WEIGHT: 422.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: 97.9% (M8PFOA)
2.1% (MPFOA [M+4])

ISOTOPIC PURITY: ≥99% ¹³C
(¹³C₈)

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:

B.G. Chittim, General Manager

Date: 07/14/2017
(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

18F2236

INTENDED USE:

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

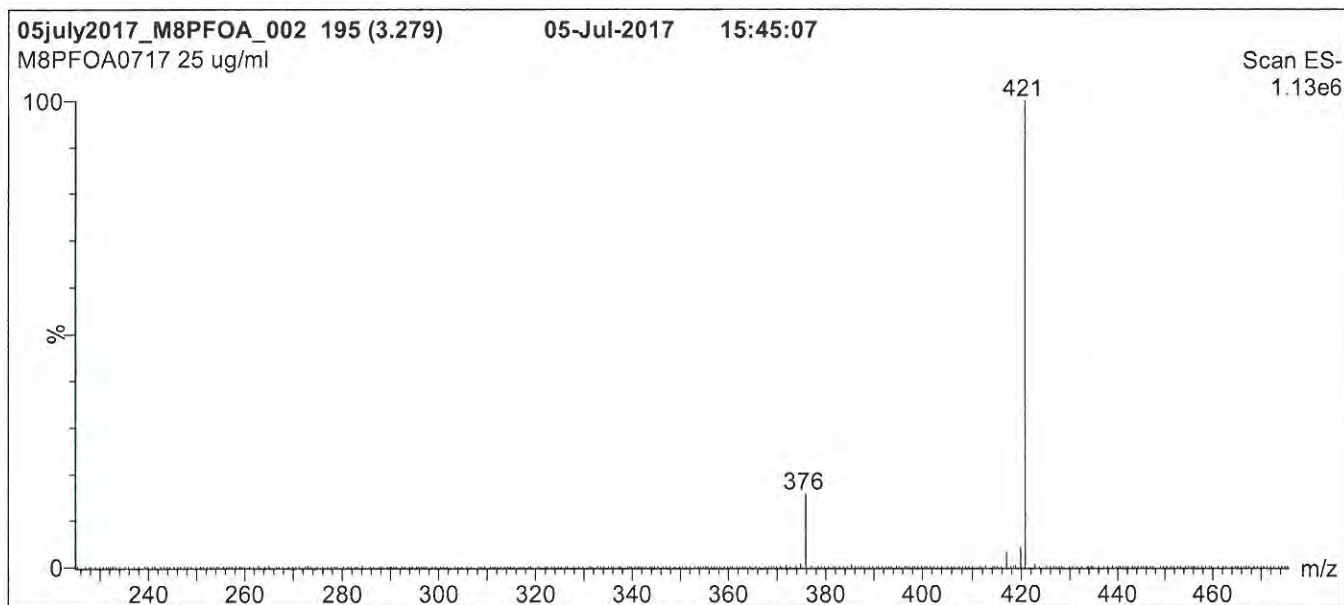
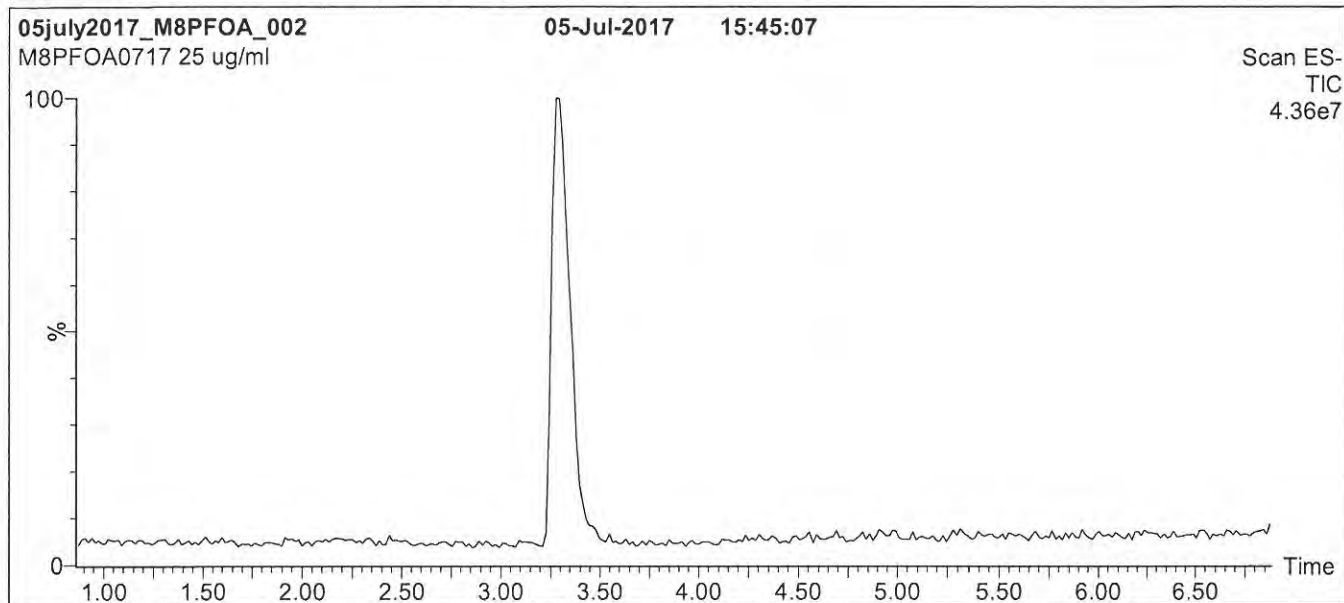
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18F2236

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

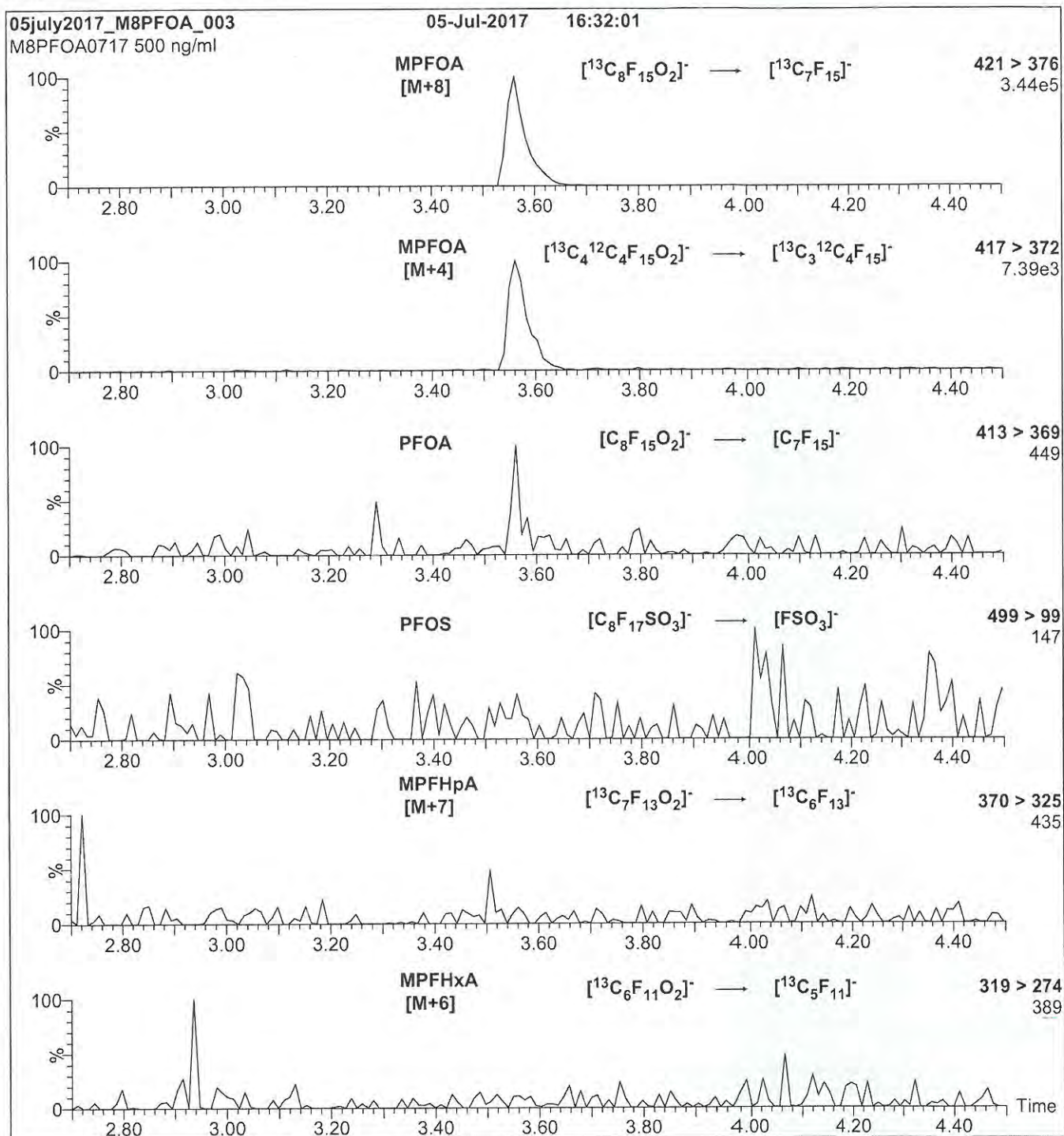
Flow: 300 μ l/min

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

18F2236

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

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"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","2991-50-6","NEtFOSAA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","2058-94-8","PFUnA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","307-55-1","PFDaA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","72629-94-8","PFTTrDA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","376-06-7","PFTeDA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C3-PFBS","13C3-PFBS","72.0","%R","","","CRDL","","IS","72.0","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFHxA","13C2-PFHxA","101","%R","","","CRDL","","IS","101","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C4-PFHpA","13C4-PFHpA","73.1","%R","","","CRDL","","IS","73.1","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","18O2-PFHxS","18O2-PFHxS","89.8","%R","","","CRDL","","IS","89.8","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFOA","13C2-PFOA","72.8","%R","","","CRDL","","IS","72.8","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C5-PFNA","13C5-PFNA","82.2","%R","","","CRDL","","IS","82.2","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C8-PFOS","13C8-PFOS","113","%R","","","CRDL","","IS","113","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFDA","13C2-PFDA","64.7","%R","","","CRDL","","IS","64.7","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","d3-MeFOSAA","d3-MeFOSAA","84.5","%R","","","CRDL","","IS","84.5","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","d5-EtFOSAA","d5-EtFOSAA","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFUnA","13C2-PFUnA","62.2","%R","","","CRDL","","IS","62.2","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFDoA","13C2-PFDoA","82.2","%R","","","CRDL","","IS","82.2","","","CRDL","",""
"A1-MW-11-SA2","537 MOD","RES","1803676-01","Vista","13C2-PFTeDA","13C2-

PFTeDA","87.9","%R","","","CRDL","","IS","87.9","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","375-73-
5","PFBS","0.259","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","307-24-
4","PFHxA","0.655","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","375-85-
9","PFHpA","0.105","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","355-46-
4","PFHxS","0.368","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","335-67-
1","PFOA","0.0695","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","375-95-
1","PFNA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","1763-23-
1","PFOS","0.107","ug/L","","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","335-76-
2","PFDA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","2355-31-
9","NMeFOSAA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","2991-50-
6","NEtFOSAA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","2058-94-
8","PFUnA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","307-55-
1","PFDaA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","72629-94-
8","PFTeDA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","376-06-
7","PFTeDA","0.00455","ug/L","U","0.00455","CRDL","","TRG","","","0.00906","CRDL","YES","0.00310"
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C3-PFBS","13C3-
PFBS","66.2","%R","","","CRDL","","IS","66.2","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFHxA","13C2-
PFHxA","97.8","%R","","","CRDL","","IS","97.8","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C4-PFHpA","13C4-
PFHpA","71.0","%R","","","CRDL","","IS","71.0","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","18O2-PFHxS","18O2-
PFHxS","82.6","%R","","","CRDL","","IS","82.6","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFOA","13C2-
PFOA","74.6","%R","","","CRDL","","IS","74.6","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C5-PFNA","13C5-
PFNA","79.4","%R","","","CRDL","","IS","79.4","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C8-PFOS","13C8-
PFOS","97.4","%R","","","CRDL","","IS","97.4","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFDA","13C2-
PFDA","63.0","%R","","","CRDL","","IS","63.0","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","d3-MeFOSAA","d3-
MeFOSAA","60.4","%R","","","CRDL","","IS","60.4","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","d5-EtFOSAA","d5-
EtFOSAA","84.3","%R","","","CRDL","","IS","84.3","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFUnA","13C2-
PFUnA","65.0","%R","","","CRDL","","IS","65.0","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFDaA","13C2-
PFDaA","85.0","%R","","","CRDL","","IS","85.0","","","CRDL","",""
"A1-MW-13-SA2","537 MOD","RES","1803676-02","Vista","13C2-PFTeDA","13C2-

PFTeDA","80.1","%R","","","CRDL","","IS","80.1","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","375-73-
5","PFBS","0.101","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","307-24-
4","PFHxA","0.327","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","375-85-
9","PFHpA","0.0658","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","355-46-
4","PFHxS","0.253","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","335-67-
1","PFOA","0.0527","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","375-95-
1","PFNA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","1763-23-
1","PFOS","0.0604","ug/L","","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","335-76-
2","PFDA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","2355-31-
9","NMeFOSAA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","2991-50-
6","NEtFOSAA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","2058-94-
8","PFUnA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","307-55-
1","PFDaA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","72629-94-
8","PFTeDA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","376-06-
7","PFTeDA","0.00431","ug/L","U","0.00431","CRDL","","TRG","","","0.00860","CRDL","YES","0.00295"
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C3-PFBS","13C3-
PFBS","76.6","%R","","","CRDL","","IS","76.6","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFHxA","13C2-
PFHxA","103","%R","","","CRDL","","IS","103","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C4-PFHpA","13C4-
PFHpA","74.6","%R","","","CRDL","","IS","74.6","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","18O2-PFHxS","18O2-
PFHxS","86.2","%R","","","CRDL","","IS","86.2","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFOA","13C2-
PFOA","77.7","%R","","","CRDL","","IS","77.7","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C5-PFNA","13C5-
PFNA","87.0","%R","","","CRDL","","IS","87.0","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C8-PFOS","13C8-
PFOS","98.8","%R","","","CRDL","","IS","98.8","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFDA","13C2-
PFDA","69.9","%R","","","CRDL","","IS","69.9","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","d3-MeFOSAA","d3-
MeFOSAA","65.0","%R","","","CRDL","","IS","65.0","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","d5-EtFOSAA","d5-
EtFOSAA","84.1","%R","","","CRDL","","IS","84.1","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFUnA","13C2-
PFUnA","66.6","%R","","","CRDL","","IS","66.6","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFDaA","13C2-
PFDaA","87.4","%R","","","CRDL","","IS","87.4","","","CRDL","",""
"A1-MW-14-SA2","537 MOD","RES","1803676-03","Vista","13C2-PFTeDA","13C2-

PFTeDA","76.8","%R","","","CRDL","","IS","76.8","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","375-73-
5","PFBS","0.363","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","307-24-
4","PFHxA","0.596","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","375-85-
9","PFHpA","0.0773","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","355-46-
4","PFHxS","0.322","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","335-67-
1","PFOA","0.190","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","375-95-
1","PFNA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","1763-23-
1","PFOS","0.0185","ug/L","","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","335-76-
2","PFDA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","2355-31-
9","NMeFOSAA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","2991-50-
6","NEtFOSAA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","2058-94-
8","PFUnA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","307-55-
1","PFDaA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","72629-94-
8","PFTeDA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","376-06-
7","PFTeDA","0.00450","ug/L","U","0.00450","CRDL","","TRG","","","0.00902","CRDL","YES","0.00309"
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C3-PFBS","13C3-
PFBS","75.2","%R","","","CRDL","","IS","75.2","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFHxA","13C2-
PFHxA","106","%R","","","CRDL","","IS","106","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C4-PFHpA","13C4-
PFHpA","73.7","%R","","","CRDL","","IS","73.7","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","18O2-PFHxS","18O2-
PFHxS","88.0","%R","","","CRDL","","IS","88.0","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFOA","13C2-
PFOA","76.7","%R","","","CRDL","","IS","76.7","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C5-PFNA","13C5-
PFNA","86.4","%R","","","CRDL","","IS","86.4","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C8-PFOS","13C8-
PFOS","104","%R","","","CRDL","","IS","104","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFDA","13C2-
PFDA","69.8","%R","","","CRDL","","IS","69.8","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","d3-MeFOSAA","d3-
MeFOSAA","70.3","%R","","","CRDL","","IS","70.3","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","d5-EtFOSAA","d5-
EtFOSAA","92.5","%R","","","CRDL","","IS","92.5","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFUnA","13C2-
PFUnA","71.1","%R","","","CRDL","","IS","71.1","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFDaA","13C2-
PFDaA","88.7","%R","","","CRDL","","IS","88.7","","","CRDL","",""
"A1-MW-15-SA2","537 MOD","RES","1803676-04","Vista","13C2-PFTeDA","13C2-

PFTeDA", "92.4", "%R", "", "", "CRDL", "", "IS", "92.4", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "375-73-
5", "PFBS", "0.151", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "307-24-
4", "PFHxA", "0.520", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "375-85-
9", "PFHpA", "0.0856", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "355-46-
4", "PFHxS", "0.438", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "335-67-
1", "PFOA", "0.0599", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "375-95-
1", "PFNA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "1763-23-
1", "PFOS", "0.0288", "ug/L", "", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "335-76-
2", "PFDA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "2355-31-
9", "NMeFOSAA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "2991-50-
6", "NEtFOSAA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "2058-94-
8", "PFUnA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "307-55-
1", "PFDaA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "72629-94-
8", "PFTeDA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "376-06-
7", "PFTeDA", "0.00424", "ug/L", "U", "0.00424", "CRDL", "", "TRG", "", "", "0.00851", "CRDL", "YES", "0.00291"
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C3-PFBS", "13C3-
PFBS", "80.6", "%R", "", "", "CRDL", "", "IS", "80.6", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFHxA", "13C2-
PFHxA", "104", "%R", "", "", "CRDL", "", "IS", "104", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C4-PFHpA", "13C4-
PFHpA", "72.7", "%R", "", "", "CRDL", "", "IS", "72.7", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "18O2-PFHxS", "18O2-
PFHxS", "92.3", "%R", "", "", "CRDL", "", "IS", "92.3", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFOA", "13C2-
PFOA", "70.8", "%R", "", "", "CRDL", "", "IS", "70.8", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C5-PFNA", "13C5-
PFNA", "85.1", "%R", "", "", "CRDL", "", "IS", "85.1", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C8-PFOS", "13C8-
PFOS", "112", "%R", "", "", "CRDL", "", "IS", "112", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFDA", "13C2-
PFDA", "68.0", "%R", "", "", "CRDL", "", "IS", "68.0", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "d3-MeFOSAA", "d3-
MeFOSAA", "95.5", "%R", "", "", "CRDL", "", "IS", "95.5", "", "", "CRDL", "", ""
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EtFOSAA", "127", "%R", "", "", "CRDL", "", "IS", "127", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFUnA", "13C2-
PFUnA", "76.6", "%R", "", "", "CRDL", "", "IS", "76.6", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFDaA", "13C2-
PFDaA", "96.4", "%R", "", "", "CRDL", "", "IS", "96.4", "", "", "CRDL", "", ""
"A1-MW-37-SA2", "537 MOD", "RES", "1803676-05", "Vista", "13C2-PFTeDA", "13C2-

PFTeDA","113","%R","","","CRDL","","IS","113","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","375-73-
5","PFBS","0.150","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","307-24-
4","PFHxA","0.529","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","375-85-
9","PFHpA","0.0830","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","355-46-
4","PFHxS","0.429","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","335-67-
1","PFOA","0.0555","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","375-95-
1","PFNA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","1763-23-
1","PFOS","0.0275","ug/L","","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","335-76-
2","PFDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","2355-31-
9","NMeFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","2991-50-
6","NEtFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","2058-94-
8","PFUnA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","307-55-
1","PFDaA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","72629-94-
8","PFTTrDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","376-06-
7","PFTeDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00870","CRDL","YES","0.00298"
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C3-PFBS","13C3-
PFBS","78.5","%R","","","CRDL","","IS","78.5","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFHxA","13C2-
PFHxA","104","%R","","","CRDL","","IS","104","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C4-PFHpA","13C4-
PFHpA","75.5","%R","","","CRDL","","IS","75.5","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","18O2-PFHxS","18O2-
PFHxS","92.6","%R","","","CRDL","","IS","92.6","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFOA","13C2-
PFOA","72.9","%R","","","CRDL","","IS","72.9","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C5-PFNA","13C5-
PFNA","91.4","%R","","","CRDL","","IS","91.4","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C8-PFOS","13C8-
PFOS","108","%R","","","CRDL","","IS","108","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFDA","13C2-
PFDA","68.9","%R","","","CRDL","","IS","68.9","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","d3-MeFOSAA","d3-
MeFOSAA","69.2","%R","","","CRDL","","IS","69.2","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","d5-EtFOSAA","d5-
EtFOSAA","89.0","%R","","","CRDL","","IS","89.0","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFUnA","13C2-
PFUnA","66.0","%R","","","CRDL","","IS","66.0","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFDaA","13C2-
PFDaA","86.5","%R","","","CRDL","","IS","86.5","","","CRDL","",""
"A1-MW-37-SA2D","537 MOD","RES","1803676-06","Vista","13C2-PFTeDA","13C2-

PFTeDA", "84.8", "%R", "", "", "CRDL", "", "IS", "84.8", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "375-73-
5", "PFBS", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "307-24-
4", "PFHxA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "375-85-
9", "PFHpA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "355-46-
4", "PFHxS", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "335-67-
1", "PFOA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "375-95-
1", "PFNA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "1763-23-
1", "PFOS", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "335-76-
2", "PFDA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "2355-31-
9", "NMeFOSAA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "2991-50-
6", "NEtFOSAA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "2058-94-
8", "PFUnA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "307-55-
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"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "72629-94-
8", "PFTeDA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "376-06-
7", "PFTeDA", "0.00450", "ug/L", "U", "0.00450", "CRDL", "", "TRG", "", "", "0.00904", "CRDL", "YES", "0.00309"
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C3-PFBS", "13C3-
PFBS", "70.4", "%R", "", "", "CRDL", "", "IS", "70.4", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFHxA", "13C2-
PFHxA", "103", "%R", "", "", "CRDL", "", "IS", "103", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C4-PFHpA", "13C4-
PFHpA", "72.4", "%R", "", "", "CRDL", "", "IS", "72.4", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "18O2-PFHxS", "18O2-
PFHxS", "87.8", "%R", "", "", "CRDL", "", "IS", "87.8", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFOA", "13C2-
PFOA", "68.0", "%R", "", "", "CRDL", "", "IS", "68.0", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C5-PFNA", "13C5-
PFNA", "73.7", "%R", "", "", "CRDL", "", "IS", "73.7", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C8-PFOS", "13C8-
PFOS", "97.9", "%R", "", "", "CRDL", "", "IS", "97.9", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFDA", "13C2-
PFDA", "61.3", "%R", "", "", "CRDL", "", "IS", "61.3", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "d3-MeFOSAA", "d3-
MeFOSAA", "50.8", "%R", "", "", "CRDL", "", "IS", "50.8", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "d5-EtFOSAA", "d5-
EtFOSAA", "66.0", "%R", "", "", "CRDL", "", "IS", "66.0", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFUnA", "13C2-
PFUnA", "59.5", "%R", "", "", "CRDL", "", "IS", "59.5", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFDoA", "13C2-
PFDoA", "74.5", "%R", "", "", "CRDL", "", "IS", "74.5", "", "", "CRDL", "", ""
"FRB-20181115", "537 MOD", "RES", "1803676-07", "Vista", "13C2-PFTeDA", "13C2-

PFTeDA","67.2","%R","","","CRDL","","","IS","67.2","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","375-73-
5","PFBS","0.0235","ug/L","","","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","307-24-
4","PFHxA","0.0732","ug/L","","","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","375-85-
9","PFHpA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","355-46-
4","PFHxS","0.00855","ug/L","","","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","335-67-
1","PFOA","0.00388","ug/L","J","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","375-95-
1","PFNA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","1763-23-
1","PFOS","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","335-76-
2","PFDA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","2355-31-
9","NMeFOSAA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","2991-50-
6","NEtFOSAA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","2058-94-
8","PFUnA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","307-55-
1","PFDaA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","72629-94-
8","PFTeDA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","376-06-
7","PFTeDA","0.00427","ug/L","U","0.00427","CRDL","","","TRG","","","0.00855","CRDL","YES","0.00293"
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C3-PFBS","13C3-
PFBS","79.9","%R","","","CRDL","","","IS","79.9","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFHxA","13C2-
PFHxA","99.4","%R","","","CRDL","","","IS","99.4","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C4-PFHpA","13C4-
PFHpA","68.3","%R","","","CRDL","","","IS","68.3","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","18O2-PFHxS","18O2-
PFHxS","92.6","%R","","","CRDL","","","IS","92.6","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFOA","13C2-
PFOA","75.4","%R","","","CRDL","","","IS","75.4","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C5-PFNA","13C5-
PFNA","83.8","%R","","","CRDL","","","IS","83.8","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C8-PFOS","13C8-
PFOS","106","%R","","","CRDL","","","IS","106","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFDA","13C2-
PFDA","66.3","%R","","","CRDL","","","IS","66.3","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","d3-MeFOSAA","d3-
MeFOSAA","66.2","%R","","","CRDL","","","IS","66.2","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","d5-EtFOSAA","d5-
EtFOSAA","92.5","%R","","","CRDL","","","IS","92.5","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFUnA","13C2-
PFUnA","68.9","%R","","","CRDL","","","IS","68.9","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFDaA","13C2-
PFDaA","77.2","%R","","","CRDL","","","IS","77.2","","","CRDL","","","
"A1-MW-31-SA2","537 MOD","RES","1803676-08","Vista","13C2-PFTeDA","13C2-

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MOD","Gen Prep","RES","11/30/2018 08:40","12/03/2018
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MOD","Gen Prep","RES","11/30/2018 08:40","12/03/2018
19:06","Vista","COA","","","1","","","","","B8K0153","B8K0153","S8L0005","S8L0005","1803676","11/19/2018
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Prep","RES","11/30/2018 08:40","12/03/2018
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00:00"



LABORATORY DATA CONSULTANTS, INC.

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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 #

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

Fraction

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

L:\TTEMI-Irvine\Yuma\42613ST-3803.wpd

**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., $\leq 30\%$). 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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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	9056A	Stage 4
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-37-SA1	1801037-04	N	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	8260B	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	9040C	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	9056A	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-37-SA1D	1801037-05	FD	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-37-SA1D	280-110112-5	FD	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1	1801037-06	N	Gen Prep	537 MOD	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	9040C	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1DUP	280-110112-7DUP	DUP	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1DUP	280-110112-7DUP	DUP	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	FRB-20180523	1801037-09	FRB	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-13-SA1	1801039-01	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-11-SA1	1801039-02	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-14-SA1	1801039-03	N	Gen Prep	537 MOD	Stage 2B

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
24-May-2018	A1-MW-15-SA1	1801039-04	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-25-SA1	1801039-07	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	FRB-20180524	1801039-08	FRB	Gen Prep	537 MOD	Stage 2B
25-May-2018	TB-20180525	280-110226-12	TB	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-42-SA1	1801054-01	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-54-SA1	1801054-02	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-53-SA1	1801054-03	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-53-SA1	280-110226-3	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-53-SA1MS	280-110226-3MS	MS	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-53-SA1MSD	280-110226-3MSD	MSD	METHOD	8260B	Stage 2B
25-May-2018	A1-PZ-19-SA1	1801054-04	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	8260B	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	9040C	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	9056A	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-52-SA1	1801054-05	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	9040C	Stage 2B

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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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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-55-SA1	1801071-02	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-23-SA1	1801071-03	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-07-SA1	1801071-04	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1DUP	280-110291-2DUP	DUP	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1MS	280-110291-2MS	MS	METHOD	9056A	Stage 2B

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank

MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank

DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-14-SA1MSD	280-110291-2MSD	MSD	METHOD	9056A	Stage 2B
30-May-2018	FRB-20180530	1801071-05	FRB	Gen Prep	537 MOD	Stage 2B
31-May-2018	TB-20180531	280-110353-1	TB	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1DUP	280-110353-3DUP	DUP	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	EB-20180531	1801084-01	EB	Gen Prep	537 MOD	Stage 2B
31-May-2018	EB-20180531	280-110353-5	EB	METHOD	8260B	Stage 2B
31-May-2018	16-HS-03-SA1MS	B8E0244-MS1	MS	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MS	B8E0244-MS2	MS	Gen Prep	537 MOD	Stage 2B
31-May-2018	16-HS-03-SA1MSD	B8E0244-MSD1	MSD	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MSD	B8E0244-MSD2	MSD	Gen Prep	537 MOD	Stage 2B

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank

MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank

DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1,
Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110058-1

Method Category: EM

Method: 9040C

Matrix: AQ

Sample ID:A1-MW-04-SA1			5/22/2018 2:06:00			Analysis Type:RES/TOT			Dilution: 1	
			Collected:PM							
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			5/22/2018 1:19:00		Analysis Type:RES/TOT			Dilution: 1		
			Collected:PM							
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			5/22/2018 12:20:00			Analysis Type:RES/TOT			Dilution: 1		
			Collected:PM								
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			5/22/2018 11:30:00		Analysis Type:RES/TOT			Dilution: 1		
			Collected:AM							
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			5/22/2018 10:14:00		Analysis Type:RES/TOT			Dilution: 1		
			Collected:AM							
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		5/22/2018 12:20:00		Analysis Type:RE/TOT				Dilution: 10	
		Collected:PM							
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

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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		5/22/2018 2:06:00 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	0.0751	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID:A1-MW-05-SA1		5/22/2018 1:19:00 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	0.0617	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID:A1-MW-49-SA1		5/22/2018 12:20:00 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	UJ	StoA

Sample ID:A1-MW-50-SA1		5/22/2018 11:30:00 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

Sample ID:A1-MW-51-SA1		5/22/2018 10:14:00 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	0.0563	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		5/22/2018 11:30:00 Collected: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

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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: 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: 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: 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: 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: 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

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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		5/23/2018 1:16:00 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	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A

Matrix: AQ

Sample ID:16-HS-03-SA1		5/23/2018 2:19:00 Collected: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		5/23/2018 2:19:00 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	Ms

Sample ID:16-MW-08-SA1		5/23/2018 11:09:00 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	0.0403	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI

Sample ID:A1-MW-18-SA1		5/23/2018 9:00:00 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	0.0215	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

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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: 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: 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: 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: 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: 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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

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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: PM		Analysis Type: RES				Dilution: 1	
5/23/2018 1:16:00									
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: PM		Analysis Type: RES				Dilution: 1	
5/23/2018 1:26:00									
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: PM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 1:56:00									
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: PM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 2:49:00									
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: AM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 7:56:00									
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: PM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 1:00:00									
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

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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: AM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 9:09:00									
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: AM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 11:59:00									
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: PM		Analysis Type: RE/TOT				Dilution: 5	
5/25/2018 1:00:00									
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: AM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 9:09:00									
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: PM		Analysis Type: RES/TOT				Dilution: 1	
5/25/2018 1:56:00									
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

7/24/2018 8:01:24 AM

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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		5/25/2018 2:49:00 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	Ms, StoA

Sample ID:A1-MW-42-SA1		5/25/2018 7:56:00		Analysis Type: RES/TOT				Dilution: 1	
		Collected: AM							
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			5/25/2018 1:00:00		Analysis Type: RES/TOT			Dilution: 1	
Collected: PM									
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			5/25/2018 9:09:00		Analysis Type: RES/TOT			Dilution: 1	
Collected: AM									
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		5/25/2018 11:59:00		Analysis Type: RES/TOT				Dilution: 1	
Collected: AM									
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		5/25/2018 2:49:00		Analysis Type:RES				Dilution: 1	
		Collected:PM							
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

7/24/2018 8:01:24 AM

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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: 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: 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: 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: 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: 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

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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		5/30/2018 11:10:00 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

Sample ID:A1-MW-25-SA1		5/30/2018 9:12:00 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

Sample ID:A1-MW-27-SA1		5/30/2018 8:18:00 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

Sample ID:A1-MW-55-SA1		5/30/2018 10:16:00 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

Method Category: GENCHEM

Method: SM3500 Fe B D

Matrix: AQ

Sample ID:A1-MW-07-SA1		5/30/2018 12:06:00 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

Sample ID:A1-MW-14-SA1		5/30/2018 1:38:00 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

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

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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		5/30/2018 11:10:00		Analysis Type:RES/TOT				Dilution: 1	
		Collected:AM							
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		5/30/2018 9:12:00		Analysis Type:RES/TOT				Dilution: 1	
		Collected:AM							
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		5/30/2018 8:18:00		Analysis Type:RES/TOT				Dilution: 1	
Collected:AM									
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

5/30/2018 10:16:00									
Sample ID:A1-MW-55-SA1		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

Method Category: VOA

Method: 8260B

Matrix: AQ

Sample ID:A1-MW-07-SA1			5/30/2018 12:06:00		Analysis Type:RES			Dilution: 1	
			Collected:PM						
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			5/30/2018 1:38:00		Analysis Type:RES			Dilution: 1		
			Collected:PM							
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

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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

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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			5/31/2018 9:16:00		Analysis Type:RES/TOT			Dilution: 1	
			Collected:AM						
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		5/31/2018 8:24:00		Analysis Type:RES/TOT				Dilution: 1	
Collected:AM									
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		5/31/2018 7:43:00		Analysis Type:RES/TOT				Dilution: 1	
		Collected:AM							
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		5/31/2018 9:16:00		Analysis Type:RES/TOT				Dilution: 1	
		Collected:AM							
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			5/31/2018 9:16:00			Analysis Type:RES			Dilution: 1	
Collected:AM										
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

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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

<i>Reason Code</i>	<i>Description</i>
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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

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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

5/22/2018 2:06:00									
Sample ID:A1-MW-04-SA1			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	0.00333	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

5/22/2018 1:19:00									
Sample ID:A1-MW-05-SA1			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	0.000917	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

5/22/2018 12:20:00									
Sample ID:A1-MW-49-SA1			Collected: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

5/22/2018 10:14:00									
Sample ID:A1-MW-51-SA1			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	0.00521	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

5/23/2018 2:19:00									
Sample ID:16-HS-03-SA1			Collected: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

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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

5/23/2018 2:19:00									
Sample ID:16-HS-03-SA1			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	0.0218		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms
PFHpA	0.198		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms, Ms

5/23/2018 9:50:00									
Sample ID:16-MW-06-SA1			Collected: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

5/23/2018 11:09:00									
Sample ID:16-MW-08-SA1			Collected: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

5/23/2018 10:15:00									
Sample ID:16-MW-09-SA1			Collected: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

5/23/2018 9:00:00									
Sample ID:A1-MW-18-SA1			Collected: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

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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

5/23/2018 12:03:00									
Sample ID:A1-MW-19-SA1			Collected: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

5/23/2018 1:16:00									
Sample ID:A1-MW-37-SA1			Collected: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

5/23/2018 1:26:00									
Sample ID:A1-MW-37-SA1D			Collected: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

5/24/2018 8:51:00									
Sample ID:A1-MW-11-SA1			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	0.00359	J	0.00539	LOD	0.00860	LOQ	ug/L	J	RI
PFBS	0.109		0.00539	LOD	0.00860	LOQ	ug/L	J	Is

5/24/2018 7:44:00									
Sample ID:A1-MW-13-SA1			Collected: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

7/19/2018 12:54:59 PM

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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

5/24/2018 10:05:00									
Sample ID:A1-MW-14-SA1		Collected: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

5/24/2018 11:11:00									
Sample ID:A1-MW-15-SA1		Collected: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

5/24/2018 2:18:00									
Sample ID:A1-MW-25-SA1		Collected: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

5/25/2018 1:56:00									
Sample ID:A1-MW-01-SA1		Collected: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

5/25/2018 2:06:00									
Sample ID:A1-MW-01-SA1D		Collected: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

7/19/2018 12:54:59 PM

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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

5/25/2018 2:49:00									
Sample ID:A1-MW-31-SA1			Collected: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

5/25/2018 7:56:00									
Sample ID:A1-MW-42-SA1			Collected: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

5/25/2018 1:00:00									
Sample ID:A1-MW-52-SA1			Collected: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

5/25/2018 10:14:00									
Sample ID:A1-MW-53-SA1			Collected: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

5/25/2018 9:09:00									
Sample ID:A1-MW-54-SA1			Collected: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

5/25/2018 11:59:00									
Sample ID:A1-PZ-19-SA1			Collected: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

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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: 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: 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: 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: 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: 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

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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

<i>Reason Code</i>	<i>Description</i>
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

7/19/2018 12:54:59 PM

ADR version 1.9.0.325

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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) R(all non-detects)
A1-MW-51-SA1 (RES/TOT)		49.50	24.00	HOURS	
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)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

7/19/2018 7:25:35 AM

ADR version 1.9.0.325

Page 1 of 1

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	J	0.643	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.903	1.00	LOQ	ug/L	
A1-MW-51-SA1	1,1-DICHLOROETHENE	J	0.629	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.571	1.00	LOQ	ug/L	

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

VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-110058-1

ADR

Laboratory: Test America, Inc.

Date: 7/13/18

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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	RS0 ≤ 1570. 10V ≤ 2070
IV.	Continuing calibration <i>pending</i>	A	20V ≤ 20/5070
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: [Signature]
2nd Reviewer: [Signature]

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 #: 92613

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: CR

2nd reviewer: *KV*

All circled methods are applicable to each sample.

[illegible]

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

<i>Sample ID (Analysis Type)</i>	<i>Surrogate</i>	<i>Sample % Recovery</i>	<i>% Recovery Limits</i>	<i>Affected Compounds</i>	<i>Flag</i>
16-HS-03-SA1	TOLUENE-D8	75	89.00-112.00	All Target Analytes	J (all detects) UJ (all non-detects)

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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
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

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) R(all non-detects)
A1-MW-31-SA1 (RES/TOT)		451.25	24.00	HOURS	
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	J	0.298	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.415	1.00	LOQ	ug/L	J (all detects)
A1-MW-52-SA1	1,1-DICHLOROETHENE	J	0.507	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.627	1.00	LOQ	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

VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-110226-1

ADR

Laboratory: Test America, Inc.

Date: 7/13/18

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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 / ending	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 - FS aut)
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: GAE
2nd Reviewer: RAE

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	A1-	
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	ASW	
V.	Field blanks	-	
VI.	Matrix Spike/Matrix Spike Duplicates	N	7/18:50474x
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 #: 510011

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: CR

2nd reviewer: KVK

All circled methods are applicable to each sample.

[illegible]

Comments:

LDC #: 42613C6

VALIDATION FINDINGS WORKSHEET

BlanksPage: 1 of 1Reviewer: [Signature]2nd Reviewer: KKMETHOD: Inorganics, Method See CoverConc. units: mg/LAssociated 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) R(all non-detects)
A1-MW-14-SA1 (RES/TOT)		332.50	24.00	HOURS	
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	J	0.405	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.797	1.00	LOQ	ug/L	
A1-MW-14-SA1	1,1-DICHLOROETHENE	J	0.898	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.876	1.00	LOQ	ug/L	
A1-MW-25-SA1	1,1-DICHLOROETHENE	J	0.204	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.418	1.00	LOQ	ug/L	

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)

LDC #: 42613D1

VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-110291-1

ADR

Laboratory: Test America, Inc.

Date: 1/18/18

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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	W/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15% . ICV ≤ 20%
IV.	Continuing calibration / ending	A	CV ≤ 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:

VALIDATION FINDINGS WORKSHEET

Technical Holding Times

Page: 1 of 1

Reviewer: 9

2nd Reviewer: KK

Uncircled dates have exceeded the technical holding times.

~~Q~~ 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?

[illegible]

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:

Water preserved:

Soil:

Aromatic within 7 days, non-aromatic within 14 days of sample collection.

Within 14 days of sample collection.

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: [Signature]
2nd Reviewer: [Signature]

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 #: 4261306

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: CR

2nd reviewer: RUE

All circled methods are applicable to each sample.

[illegible]

Comments: _____

LDC #: 42613D6**VALIDATION FINDINGS WORKSHEET**
BlanksPage: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]**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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

7/19/2018 8:22:42 AM

ADR version 1.9.0.325

Page 1 of 1

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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
A1-MW-15-SA1	TRICHLOROETHENE	J	0.321	1.00	LOQ	ug/L	J (all detects)

LDC #: 42613E1

VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-110353-1

ADR

Laboratory: Test America, Inc.

Date: 7/12/18

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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	ICV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 1. ZB = 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: 7/18/15
Page: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]

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 #: 99615EX

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: CR

2nd reviewer: RV

All circled methods are applicable to each sample.

[illegible]

Comments: _____

LDC #: 42613E6**VALIDATION FINDINGS WORKSHEET**
BlanksPage: 1 of 1Reviewer: CK2nd Reviewer: CK**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)	PFTTrDA	138	-	70.00-130.00	-	PFTTrDA	J (all detects)

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	J	0.00333	0.00812	LOQ	ug/L	J (all detects)
	PFOS	J	0.00161	0.00812	LOQ	ug/L	
A1-MW-05-SA1	PFHpA	J	0.000917	0.00842	LOQ	ug/L	J (all detects)
	PFHxS	J	0.00278	0.00842	LOQ	ug/L	
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)

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	AA	RSO = 26%. True / ICV = 30%
IV.	Continuing calibration	A	CCV = 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	NO	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	1/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 ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinstate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	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:

B8E075D-B41				

VALIDATION FINDINGS WORKSHEET

Internal Standards

Reviewer: Q

2nd Reviewer:

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?

[illegible]

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 PFDA PFDoA PFHpA PFHxS PFOA PFTrDA	- 132 136 140 146 131 136	- - - - - - 133	70.00-130.00 70.00-130.00 70.00-130.00 70.00-130.00 70.00-130.00 70.00-130.00 70.00-130.00	41.1 (30.00) - - 49.6 (30.00) - - -	NMeFOSAA PFDA PFDoA PFHpA PFHxS PFOA PFTrDA	J (all detects)
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	PFHxA PFBS	-21 182	- -	70.00-130.00 70.00-130.00	329 (30.00) 45.9 (30.00)	PFHxA PFBS	No Qual, >4x

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)	PFTTrDA	153	-	70.00-130.00	-	PFTTrDA	J (all detects)

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	J	0.00440	0.00871	LOQ	ug/L	J (all detects)
	PFNA	J	0.00326	0.00871	LOQ	ug/L	
A1-MW-18-SA1	PFOA	J	0.00187	0.00888	LOQ	ug/L	J (all detects)
	PFOS	J	0.00437	0.00888	LOQ	ug/L	
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	J	0.00210	0.00862	LOQ	ug/L	J (all detects)
	PFUnA	J	0.00135	0.00862	LOQ	ug/L	

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	

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	TW	D = 4 + 5
XI.	Internal standards	TW	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 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-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	B820 244-BK1			
14				

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y ☒ N/A Were all internal standard area counts within 50-150% limits?Y ☒ 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 (det B)	13C3-PFBS	170 (50-150)		✓ 11/11 P (PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8 ✓		214		↓
		10 (MS)		167		No Qual
		11 (MSD) ↓	↓	165 ↓		↓

LDC#: 42613M96**VALIDATION FINDINGS WORKSHEET**
Field DuplicatesPage: 1 of 1
Reviewer: 9
2nd Reviewer: RLK**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	24 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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
A1-MW-11-SA1	PFOS	J	0.00359	0.00860	LOQ	ug/L	J (all detects)

LDC #: 42613N96 **VALIDATION COMPLETENESS WORKSHEET**
SDG #: 1801039 ADR
Laboratory: Vista Analytical Laboratory

Date: 7/13/18
Page: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]

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	NO	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 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-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:

BB Food Bk1					

VALIDATION FINDINGS WORKSHEET

Internal Standards

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?

[illegible]

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)	PFTTrDA	153	-	70.00-130.00	-	PFTTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

7/19/2018 12:33:48 PM

ADR version 1.9.0.325

Page 1 of 1

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	

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	250 = 20% . Y ² Two / ICV = 30%
IV.	Continuing calibration	A	CEV = 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB = 9
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	SW	B = 6 + 7
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-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	B8E024A-BK			

LDC#: 42613096**VALIDATION FINDINGS WORKSHEET**
Field DuplicatesPage: 1 of 1
Reviewer: [Signature]
2nd Reviewer: [Signature]**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	10 NC	
PFHxS	0.0230	0.0238	2 NC	

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VALIDATION FINDINGS WORKSHEET

Internal Standards

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?

[illegible]

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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
A1-MW-23-SA1	PFHxS	J	0.00581	0.00874	LOQ	ug/L	J (all detects)

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	NO	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	SN	
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-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 acid (PFPeA)			
R. 6:2 FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

VALIDATION FINDINGS WORKSHEET

Internal Standards

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?

[illegible]

Quality Control Outlier Reports

1801084

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	$RSD \leq 20\%$ Y^2 $TMO/ICV \leq 30\%$
IV.	Continuing calibration	M	$CCV \leq 30\%$ 52%
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 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	EB-20180531	1801084-01	Water	05/31/18
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

EB-20180531					

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 acid (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)			

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

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".

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) $\leq 30\%$?

[illegible]

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).
- UU (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

SDG #: 280-110112-1

Stage 4

Laboratory: Test America, Inc.

Date: 7/13/18

Page: 1 of 1

Reviewer: Q

2nd Reviewer: KLE

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	ISO ≤ 15% ICV ≤ 20%
IV.	Continuing calibration <i>1 end g</i>	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	D	

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				

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) $\leq 30\%/15\%$ 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) $\leq 20\%$ 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) $\leq 20\%$ 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 #: 12613B1

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
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 chloride	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.

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?

[illegible]

(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene

(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates

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".

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?

Y/N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

[illegible]

LDC#: 42613B

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	<u>NC</u>	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613B1.wpd

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification**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	Recalculated	Reported	Recalculated	Reported	Recalculated
				RRF (/ 0 std)	RRF (/ 0 std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
1	10A2 (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.

VALIDATION FINDINGS WORKSHEET **Continuing Calibration Results Verification**

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:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (A_x)(C_{is}) / (A_{is})(C_x)$$

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

A_x = Area of compound,

C_x = Concentration of compound,

A_{is} = Area of associated internal standard

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	R1-275	6/4/18	H (1st internal standard)	0.3149	0.3312	0.3312	5.2	5.2
			AA (2nd internal standard)	1.3251	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.

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

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 SpikedSample 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	100	↓

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					

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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:

$$\% \text{ Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$$

Where: SSC = Spiked sample concentration
SA = Spike added

SC = Sample concentration

$$\text{RPD} = | \text{MSC} - \text{MSDC} | * 2 / (\text{MSC} + \text{MSDC})$$

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD sample: 8/9

Compound	Spike Added (1.64)		Sample Concentration (1.64)	Spiked Sample Concentration (1.64)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
				Percent Recovery		Percent Recovery		RPD			
	MS	MSD		-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported
1,1-Dichloroethene	5.00	5.00	ND	2.795	1.629	56	56	33	33	53	53
Trichloroethene	✓	✓	✓	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 #: 4243B

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
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 laboratory 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 = $100 * (LCS - LCSD) / (LCS + LCSD)$

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: 280-417198/4

Compound	Spike Added (<u>NA</u>)		Spiked Sample Concentration (<u>NA</u>)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	<u>5.00</u>	<u>NA</u>	<u>5.615</u>	<u>NA</u>	<u>112</u>	<u>112</u>				
Trichloroethene	<u>✓</u>	<u>✓</u>	<u>5.111</u>	<u>✓</u>	<u>102</u>	<u>102</u>				
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.

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?

$$\text{Concentration} = \frac{(A_s)(I_s)(DF)}{(A_{fs})(RRF)(V_o)(\%S)}$$

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_0 = 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:

$$\text{Conc.} = \frac{(2988)(12.5)(1)}{(201704)(0.3149)} = 0.452 \mu\text{C}$$

[illegible]

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: 7/18/16
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: KIC

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	10/11/18, 504: 7/18 74x
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
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	60 LMS			
14	↓ MSD			
15	↓ DUP			

Notes:

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		<input checked="" type="checkbox"/>		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>			
Were the proper number of standards used?	<input checked="" type="checkbox"/>			
Were all initial calibration correlation coefficients ≥ 0.995 ?	<input checked="" type="checkbox"/>			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	<input checked="" type="checkbox"/>			
Were titrant checks performed as required? (Level IV only)			<input checked="" type="checkbox"/>	
Were balance checks performed as required? (Level IV only)			<input checked="" type="checkbox"/>	
III. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		<input checked="" type="checkbox"/>		
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.	<input checked="" type="checkbox"/>			
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.		<input checked="" type="checkbox"/>		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $\leq 5\text{X}$ the CRDL.	<input checked="" type="checkbox"/>			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>			
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	<input checked="" type="checkbox"/>			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		<input checked="" type="checkbox"/>		
Were the performance evaluation (PE) samples within the acceptance limits?			<input checked="" type="checkbox"/>	

LDC #: 426 BBL

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: OR
2nd Reviewer: KIK

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 #: 92613536

VALIDATION FINDINGS WORKSHEET

Technical Holding Times

Page: 1 of 1

Reviewer: a

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?

[illegible]

METHOD: Inorganics, EPA Method 502 over

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y</u> N N/A	Was a matrix spike analyzed for each matrix in this SDG?
<u>Y</u> <u>N</u> 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.
<u>Y</u> N N/A	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ 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.

[illegible]

Comments: 7/8: Cl, SO₄ 74X

LDC #: 426386

Validation Findings Worksheet **Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1Reviewer: AKK2nd Reviewer: AKKMethod: Inorganics, Method See CoverThe 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:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

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	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
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 ₃ N	ICV	4	3.93	98	98	Y
Calibration verification	SO ₄	CCV	100	102.1	102	102	Y
Calibration verification	Fe ²⁺	CCV	1.0	10686	107	107	Y

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 #: 42613 B6**VALIDATION FINDINGS WORKSHEET**
Level IV Recalculation WorksheetPage: 1 of 1
Reviewer: OR
2nd Reviewer: KIK**METHOD:** Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ 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:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Ferrous Iron	2,2416	200	112	112	Y
10	Matrix spike sample	NO ₃ -N	(SSR-SR) 10.0	10	100	100	
12	Duplicate sample	SO ₄	42.4	38.4	10	10	↓

Comments: _____

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

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1818881

Stage 2B

Laboratory: Alpha Analytical, Inc.

Date: 7/13/18

Page: 1

Reviewer: KJ

2nd Reviewer: KJ

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	RSD ≤ 15% . 1CV ≤ 20%
IV.	Continuing calibration / 2nd day	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	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:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA1	A1-MW-37-SA1D			
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

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	ECV ≤ 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	LC9/D
X.	Field duplicates	W	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:

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) \leq 15% and relative response factors (RRF) \geq 0.05?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of > 0.990 ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) \leq 20% or percent recoveries (%R) 80-120%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) \leq 20% and relative response factors (RRF) \geq 0.05?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Were field blanks identified in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

VALIDATION FINDINGS CHECKLIST

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

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

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	Recalculated	Reported	Recalculated	Reported	Recalculated
				RRF (500 std)	RRF (500 std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
1	<u>10A2</u>	<u>5/29/18</u>	<u>1111</u> (1st internal standard)	<u>1.618</u>	<u>1.618</u>	<u>1.686</u>	<u>1.686</u>	<u>7.57</u>	<u>7.57</u>
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2	<u>10A2</u>	<u>6/1/18</u>	<u>1111</u> (1st internal standard)	<u>1.471</u>	<u>1.471</u>	<u>1.437</u>	<u>1.437</u>	<u>4.02</u>	<u>4.02</u>
			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 #: 126135-6**VALIDATION FINDINGS WORKSHEET**
Continuing Calibration Results VerificationPage: 1 of 1
Reviewer: Q
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 = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$
 $\text{RRF} = (A_x)(C_{is}) / (A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
 A_x = Area of compound,
 C_x = Concentration of compound,

A_{is} = Area of associated internal standard
 C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported	Recalculated	Reported	Recalculated
					RRF (CC)	RRF (CC)	%D	%D
1	<u>F606011802</u>	<u>6/1/18</u>	<u>1111</u> (1st internal standard)	<u>1.686</u>	<u>1.767</u>	<u>1.767</u>	<u>4.8</u>	<u>4.8</u>
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2	<u>F160605087</u>	<u>6/5/18</u>	<u>1111</u> (1st internal standard)	<u>1.437</u>	<u>1.538</u>	<u>1.538</u>	<u>7</u>	<u>7</u>
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3	<u>X</u>		(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 #: ALBFB**VALIDATION FINDINGS WORKSHEET**
Surrogate Results VerificationPage: 1 of 1Reviewer: Q2nd reviewer: KIK**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 SpikedSample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
<u>1,4-Dioxane-d8</u>	<u>500</u>	<u>98.325</u>	<u>20</u>	<u>20</u>	<u>0</u>

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					

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:

$$\% \text{ Recovery} = 100 * (\text{SSC} - \text{SC})/\text{SA}$$

Where: SSC = Spiked sample concentration
SA = Spike added

SC = Sample concentration

$$RPD = |MSC - MSC| * 2 / (MSC + MSDC)$$

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: 7/8

[illegible]

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.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification**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:

$$\% \text{ Recovery} = 100 * (\text{SC}/\text{SA})$$

Where: SSC = Spike concentration
SA = Spike added

$$\text{RPD} = | \text{LCSC} - \text{LCSDC} | * 2 / (\text{LCSC} + \text{LCSDC})$$

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: NA 1120650-2-3

Compound	Spike Added (113/4)		Spike Concentration (113/4)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		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 #:

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
Y	N	N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_v)(I_s)(V_i)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

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.

$$\text{Conc.} = \frac{(2376)(500)(5)(1)}{(5587)(1.686)(0.5)} =$$

$$= 1261.1 \text{ ns}/\mu$$

[illegible]

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

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1819352

Stage 2B

Laboratory: Alpha Analytical, Inc.

Date: 7/2/18

Page: 1 of 1

Reviewer: KK

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 <i>/ending</i>	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/B
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:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-01-SA1	A1-MW-01-SA1D			
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 #: 4261312b

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1819562

Stage 2B

Laboratory: Alpha Analytical, Inc.

Date: 7/12/18

Page: 1 of 1

Reviewer: KK

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	RSO ≤ 1570. 1CV ≤ 20%
IV.	Continuing calibration <i>100%</i>	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	LC5/0
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#: 426131-6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [Signature]
2nd Reviewer: KK

METHOD: GCMS SVOA 8270D-SIM

Compound	Concentration (ng/L)		(≤30) RPD	Qual
	6	7		
1,4-Dioxane	1840	1880	2	

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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

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1820050

Stage 2B

Laboratory: Alpha Analytical, Inc.

Date: 7/12/18

Page: 1 of 1

Reviewer: [Signature]

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	ECV ≤ 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	LCV/2
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

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1820175

Stage 2B

Laboratory: Alpha Analytical, Inc.

Date: 7/13/18

Page: 1 of 1

Reviewer: RK

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	PSD = 1570. ICV = 20%
IV.	Continuing calibration / ending	A	CCV = 25/50%
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	1CS/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)	PFTTrDA	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

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	$RSR \leq 20\%$ Y^2 True value/ICV $\leq 30\%$
IV.	Continuing calibration	A	$CV \leq 30\%$
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	DPR
X.	Field duplicates	SW	$\sigma = 4.5$
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				

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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) $\leq 20\%$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the S/N ratio for all compounds within validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all analytes within 70-130% or percent differences (%D) $\leq 30\%$ of their true value for each calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 30\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 30\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the S/N ratio for all compounds within validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VIII. Matrix spike/Matrix spike duplicates				

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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Internal standards				
Were internal standard area counts within acceptance limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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 acid (PFPeA)			
R. 6:2 FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

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?

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?

[illegible]

VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples (LCS)

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?
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[illegible]

LDC#: 42613M96**VALIDATION FINDINGS WORKSHEET**
Field DuplicatesPage: 1 of 1
Reviewer: [Signature]
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	1 NC	
PFNA	0.00170	0.00210	2 NC	
PFOS	0.0458	0.0416	10 NC	
PFUnA	0.00525U	0.00135	NC	

VALIDATION FINDINGS WORKSHEET
Internal Standards**METHOD:** LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

☒ N N/A Were all internal standard area counts within 50-150% limits?☒ 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 (detb)	13C3-PFBS	170 (50-150)		✓ 174 s (PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8 ✓		214		↓
		10 (MS)		167		No Qual
		11 (MSD)	↓	165 ↓		↓

LDC #: 6613N 96

Validation Findings Worksheet Initial Calibration Calculation Verification

Page: 1 of 3
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		

LDC #: 42613M96**Validation Findings Worksheet**
Initial Calibration Calculation VerificationPage: 2 of 3
Reviewer: QZ
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	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		

LDC #: 426BM96

Validation Findings Worksheet
Initial Calibration Calculation Verification

Page: 3 of 3
 Reviewer: 9
 2nd Reviewer: KK

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		

VALIDATION FINDINGS WORKSHEET **Continuing Calibration Results Verification**

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 = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$ 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	Recalculated	Reported	Recalculated
					RRF (CC)	RRF (CC)	%D	%D
1	180607M2-3	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 internal standard)					
2	180607M2-8	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 internal standard)					
3	180607M2-45	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 internal standard)					
4	180612M2-40	6/13/18	PFHxA (1st internal standard)	10.0	10.4	10.4	4.2	4.5
			(2nd internal standard)					
			(3rd 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

VALIDATION FINDINGS WORKSHEET I
Matrix Spike/Matrix Spike Duplicates Results Verification

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:

$$\% \text{ Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$$

Where: SSC = Spiked sample concentration
 SA = Spike added

SC = Sample concentration

$$\text{RPD} = | \text{MSC} - \text{MSD} | * 2 / (\text{MSC} + \text{MSDC})$$

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added (<i>µg/L</i>)		Sample Concentration (<i>µg/L</i>)	Spiked Sample Concentration (<i>µg/L</i>)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
						Percent Recovery		Percent Recovery		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.

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 = $100 * |LCS - LCSD| / (LCS + LCSD)$

LCS = Laboratory control sample concentration LCSD = Laboratory control sample duplicate concentration

LCS/LCSD samples: B3E0244-B51

Compound	Spike Added (<u>μg/L</u>)		Spike Concentration (<u>μg/L</u>)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
<u>PFBS</u>	<u>0.0800</u>	<u>NA</u>	<u>0.0918</u>	<u>NA</u>	<u>115</u>	<u>115</u>				
<u>PFOA</u>	<u>↓</u>	<u>↓</u>	<u>0.0941</u>	<u>↓</u>	<u>118</u>	<u>118</u>				

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.

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1

Reviewer: 9

2nd reviewer: K/K

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y	N	N/A
Y	N	N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

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:

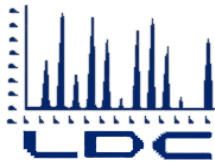
Sample I.D. 1, PFDA

$$\text{Conc.} = \frac{0.964706}{2} + \frac{(0.964706)^2}{-0.00013212} + \frac{(-180 \times 10^{-5})}{(0.113)} + 0.0448$$

$$= 1.87 \text{ ns/k}$$

$$= 0.00187 \text{ m/s}$$

[illegible]



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

L:\TTEMI-Irvine\Yuma\43888ST-3803.wpd

**Data Validation Report
MCAS Yuma, CTO 3803**

**SDGs: 280-116898-1, 280-116942-1, 280-117007-1,
280-117103-1, 280-117110-1, L1846366, L1846592,
L1846856, L1847243, L1847316, 1803615, 1803626,
1803659, 1803676, and 1803678**

Prepared for

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

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

January 2, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2B and Stage 4 data validation results for samples collected during the November 2018 sampling period. Data validation was performed in accordance with the Final Sampling and Analysis Plan (SAP) for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), a modified outline of the US EPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017), and a modified outline of the US EPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

1,4-Dioxane by EPA SW 846 Method 8270D utilizing Selective Ion Monitoring (SIM)

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by EPA Method 537 Modified

Wet Chemistry:

Chloride, Nitrate as Nitrogen, and Sulfate by EPA SW 846 Method 9056A

Ferrous Iron by Standard Method 3500-Fe B

pH by EPA SW 846 Method 9040C

For samples reviewed by automated data review, the sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2B Automated Data Review outliers are presented in Enclosure I. DVRs for samples on which Stage 4 validation was performed are presented in Enclosure II. Validation for 1,4-Dioxane was performed manually and DVRs for Stage 2B and Stage 4 manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, initial and continuing calibrations, laboratory blanks, initial and continuing calibration blanks (ICB/CCBs), surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), ongoing precision recovery (OPR), internal standards, trip blanks, equipment blanks, field rinsate blanks, and field duplicates. Approximately 20 percent of samples were subjected to Stage 4 evaluation as indicated in Attachment 1, which comprises a review of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of the calibrations, ICB/CCBs, and internal standards, and all QC for 1,4-Dioxane, which were validated manually. Quality assurance (QA)/QC criteria specified in the SAP, DoD QSM, and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the exception of eight samples for PFAs, twenty-eight samples for pH, one sample for nitrate as N, and twenty-eight samples for ferrous iron. Due to grossly exceeded holding times (e.g., >2x recommended holding time), 23 ferrous iron results were qualified as rejected (R). The remainder of the data were qualified as detected estimated (J) and non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

II. Instrument Performance Check

A tune was performed at 12 hour intervals as required by the methods.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

All criteria for the initial calibration and initial calibration verifications of each method were met.

IV. Continuing Calibration

All criteria for the continuing calibration verifications of each method were met with the following exceptions:

SDG/ Method	Date	Compound	%D (Limits)	Associated Samples	Flag	A or P
1803676/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-37-SA2D FRB-20181115 A1-MW-31-SA2	UJ (all non-detects)	A
1803678/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-01-SA2 A1-MW-42-SA2 FRB-20181116 EB-20181116	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program with the exception of several blanks for chloride, nitrate as N, and sulfate. The associated sample results were not detected or were significantly greater than the concentrations found in the blanks, therefore no data were qualified. The details are presented in Enclosures I and II.

No contaminant concentrations were detected in the initial or continuing calibration blanks with the following exceptions:

SDG/ Method	Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
280-116898-1/ 9056A	ICB/CCB	Nitrate as Nitrogen Sulfate	0.04526 mg/L 0.3841 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2
280-116942-1/ 9056A	ICB/CCB	Sulfate	0.6931 mg/L	16-HS-03-SA2 16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-19-SA2
280-116942-1/ 9056A	ICB/CCB	Chloride	0.3086 mg/L	16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-53-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2558 mg/L	A1-MW-07-SA2 A1-MW-23-SA2 A1-MW-25-SA2 A1-MW-27-SA2 A1-MW-55-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2618 mg/L	A1-MW-54-SA2
280-117103-1/ 9056A	ICB/CCB	Chloride Sulfate	0.2982 mg/L 0.4094 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-31-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04805 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04749 mg/L	A1-MW-31-SA2
280-117110-1/ 9056A	ICB/CCB	Chloride Sulfate	0.6147 mg/L 0.3987 mg/L	A1-MW-42-SA2

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were not detected or were significantly greater than the concentrations found in the associated blanks.

VI. Field Blank Samples

Five trip blanks were collected and analyzed for VOCs. No contaminants were found. One equipment blank was collected and analyzed for VOCs and PFAs. No contaminants were found.

Five field rinsate blanks were collected and analyzed for PFAs. No contaminants were found.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the exception of sample EB-20181116 in SDG 280-117110-1 for VOCs. No data were qualified due to high %Rs since the associated results were non-detected.

IX. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for 1,1-dichloroethene, one MS/MSD pair for PFTeDA, one MS/MSD pair for sulfate, three MS/MSD pairs for ferrous iron. The ferrous iron results in sample A1-MW-42-SA2 was qualified as rejected (R) due to MS/MSD %Rs grossly outside QC limits (i.e., < 30%). The remainder of the associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

X. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

XII. Laboratory Control Samples/Ongoing Precision Recovery

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Ongoing precision recovery (OPR) samples were analyzed as required by Method 537 Mod. Percent recoveries (%R) were within QC limits with the exception of two OPR samples for PFTeDA. No data were qualified due to high %Rs since the associated results were non-detected. The details are presented in Enclosure I.

XIII. Field Duplicate Samples

Three field duplicate pairs were collected and analyzed for all methods. All RPDs were within QC limits. RPDs were not calculated when sample results in one or both samples were less than 5X the limit of quantitation (LOQ). The field duplicate result comparisons are provided in Enclosures I and II.

XIV. Internal Standards/Labeled Compounds

All internal standard areas and retention times were within QC limits. All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XV. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

SDG/Method	Sample	Compound	Finding
1803615/537M	A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803626/537M	A1-MW-53-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803659/537M	A1-MW-25-SA2 A1-MW-54-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803678/537M	A1-MW-01-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosures I and II.

XVI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to severe holding time exceedances, data were qualified as rejected in twenty-three samples.

Due to gross MS/MSD %R exceedance, data were qualified as rejected in one sample.

Due to holding time exceedances, data were qualified as estimated in thirty samples.

Due to CCV %D, data were qualified as estimated in twelve samples.

Due to MS/MSD %R, data were qualified as estimated in one sample.

Due to results below the LOQ, data were qualified as estimated in twenty-two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	TB-20181112	280-116898-7	TB	METHOD	8260B	Stage 2B
12-Nov-2018	A1-MW-49-SA2	1803615-03	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2	1803615-04	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2DUP	280-116898-4DUP	DUP	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2D	1803615-05	FD	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2D	280-116898-5	FD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	1803615-06	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9040C	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9056A	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	SM3500 Fe B D	Stage 2B
12-Nov-2018	A1-MW-04-SA2	1803615-01	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9040C	Stage 4

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank

MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank

DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-PZ-19-SA2	1803615-09	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-52-SA2	1803615-07	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-05-SA2	1803615-02	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	FRB-20181112	1803615-08	FRB	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	TB-20181113	280-116942-7	TB	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	1803626-02	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-06-SA2DUP	280-116942-2DUP	DUP	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2MS	280-116942-2MS	MS	METHOD	9056A	Stage 2B

N = Normal Sample
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
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
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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
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
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
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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EB = Equipment Blank

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
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-11-SA2	1803676-01	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-15-SA2	1803676-04	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2	1803676-03	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2DUP	280-117103-3DUP	DUP	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	1803676-05	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	1803676-06	FD	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	280-117103-6	FD	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-31-SA2	1803676-08	N	Gen Prep	537 MOD	Stage 2B

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EB = Equipment Blank

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
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	FRB-20181115	1803676-07	FRB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	TB-20181116	280-117110-3	TB	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2	1803678-01	N	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	9040C	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	9056A	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-01-SA2MS	280-117110-1MS	MS	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2MSD	280-117110-1MSD	MSD	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-42-SA2	1803678-02	N	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	9040C	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	9056A	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2DUP	280-117110-2DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2MS	280-117110-2MS	MS	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2MSD	280-117110-2MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	FRB-20181116	1803678-03	FRB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	EB-20181116	1803678-04	EB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	EB-20181116	280-117110-4	EB	METHOD	8260B	Stage 2B
19-Nov-2018	A1-MW-50-SA2MS	B8K0091-MS1	MS	Gen Prep	537 MOD	Stage 4
19-Nov-2018	A1-MW-50-SA2MSD	B8K0091-MSD1	MSD	Gen Prep	537 MOD	Stage 4

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MSD = Matrix Spike Duplicate
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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-Nov-2018	A1-MW-01-SA2MS	B8K0153-MS1	MS	Gen Prep	537 MOD	Stage 2B
30-Nov-2018	A1-MW-01-SA2MSD	B8K0153-MSD1	MSD	Gen Prep	537 MOD	Stage 2B

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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

12/21/2018 9:21:17 AM

ADR version 1.9.0.325

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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: PM

11/12/2018 12:43:00

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: PM

11/12/2018 12:43:00

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: AM

11/12/2018 11:40:00

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: PM

11/12/2018 2:24:00

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: AM

11/12/2018 8:32:00

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

12/21/2018 9:21:17 AM

ADR version 1.9.0.325

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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

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
Ferrous Iron	0.380	HF	0.0500	LOD	0.200	LOQ	mg/L	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
Ferrous Iron	0.0278	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, 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
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/12/2018 12:43:00									
Sample ID:A1-PZ-19-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	0.0591	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: VOA

Method: 8260B

Matrix: AQ

11/12/2018 9:25:00									
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
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

11/12/2018 9:35:00									
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
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

12/21/2018 9:21:17 AM

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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

11/12/2018 9:35:00									
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
TRICHLOROETHENE	0.949	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

11/12/2018 1:39:00									
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
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

11/12/2018 12:43:00									
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
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

11/13/2018 12:00:00									
Sample ID:16-HS-03-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	8.4	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/13/2018 9:38:00									
Sample ID:16-MW-06-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	8.2	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

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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

11/13/2018 1:00:00									
Sample ID:16-MW-08-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

11/13/2018 1:44:00									
Sample ID:16-MW-09-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

11/13/2018 10:31:00									
Sample ID:A1-MW-18-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

11/13/2018 11:15:00									
Sample ID:A1-MW-19-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

11/13/2018 2:54:00									
Sample ID:A1-MW-53-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

Method Category: GENCHEM

Method: 9056A

Matrix: AQ

11/13/2018 9:38:00									
Sample ID:16-MW-06-SA2		Collected: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

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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		11/13/2018 10:31:00 Collected: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		11/13/2018 12:00:00 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

Sample ID:16-MW-06-SA2		11/13/2018 9:38:00 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

Sample ID:16-MW-08-SA2		11/13/2018 1:00:00 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

Sample ID:16-MW-09-SA2		11/13/2018 1:44:00 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

Sample ID:A1-MW-18-SA2		11/13/2018 10:31:00 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

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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

11/13/2018 11:15:00									
Sample ID:A1-MW-19-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

11/13/2018 2:54:00									
Sample ID:A1-MW-53-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

Method Category: VOA

Method: 8260B

Matrix: AQ

11/13/2018 9:38:00									
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
TRICHLOROETHENE	0.195	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

11/13/2018 1:00:00									
Sample ID:16-MW-08-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
TETRACHLOROETHENE	0.538	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

11/13/2018 1:44:00									
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
TETRACHLOROETHENE	0.271	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

11/13/2018 11:15:00									
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
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

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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

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
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	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
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	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
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	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
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	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
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	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
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

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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

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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

11/14/2018 9:07:00									
Sample ID:A1-MW-07-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
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

11/14/2018 12:15:00									
Sample ID:A1-MW-25-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
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

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
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	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
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	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
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

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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

Sample ID:A1-MW-15-SA2		11/15/2018 10:07:00 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

Sample ID:A1-MW-31-SA2		11/15/2018 2:16:00 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

Sample ID:A1-MW-37-SA2		11/15/2018 11:54:00 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

Sample ID:A1-MW-11-SA2		11/15/2018 9:06:00 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

Sample ID:A1-MW-13-SA2		11/15/2018 8:20:00 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

Sample ID:A1-MW-14-SA2		11/15/2018 10:53:00 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

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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

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
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	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
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	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
Ferrous Iron	0.156	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: VOA

Method: 8260B

Matrix: AQ

11/15/2018 10:53:00									
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
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

11/15/2018 10:07:00									
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
TRICHLOROETHENE	0.426	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

11/15/2018 11:54:00									
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
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

12/21/2018 9:21:17 AM

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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: AM

11/15/2018 11:54:00

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: PM

11/15/2018 12:04:00

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: AM

11/16/2018 8:12:00

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: AM

11/16/2018 9:17:00

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: AM

11/16/2018 8:12:00

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

12/21/2018 9:21:17 AM

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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			11/16/2018 9:17:00		Analysis Type:RES/TOT			Dilution: 1		
			Collected:AM							
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			11/16/2018 9:17:00		Analysis Type:RES			Dilution: 1	
			Collected:AM						
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

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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

<i>Reason Code</i>	<i>Description</i>
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

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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

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

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

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

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

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

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

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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

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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
PFDaA	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
PFTTrDA	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
PFDaA	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
PFTTrDA	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

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Data Qualifier Summary

1803676, 1803678
 EDD Filename: Prep1803615, Prep1803626, Prep1803659,
 Prep1803676, Prep1803678
 SDG: 1803676

Laboratory: Vista
 eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

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
PFDaA	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
PFTTrDA	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
PFDaA	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
PFTTrDA	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

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Data Qualifier Summary

1803676, 1803678
 EDD Filename: Prep1803615, Prep1803626, Prep1803659,
 Prep1803676, Prep1803678
 SDG: 1803676

Laboratory: Vista
 eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

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
PFDaA	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
PFTTrDA	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
PFDaA	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
PFTTrDA	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

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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
PFDaA	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
PFTTrDA	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
PFDaA	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
PFTTrDA	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

12/28/2018 11:47:26 AM

ADR version 1.9.0.325

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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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

12/28/2018 11:47:26 AM

ADR version 1.9.0.325

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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

<i>Reason Code</i>	<i>Description</i>
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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

12/28/2018 11:47:26 AM

ADR version 1.9.0.325

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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) R(all non-detects)
A1-MW-05-SA2 (RES/TOT)		220.00	24.00	HOURS	
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

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

12/21/2018 9:03:39 AM

ADR version 1.9.0.325

Page 1 of 1

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	J	0.564	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.780	1.00	LOQ	ug/L	
A1-MW-50-SA2D	1,1-DICHLOROETHENE	J	0.630	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.949	1.00	LOQ	ug/L	
A1-MW-52-SA2	1,1-DICHLOROETHENE	J	0.458	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.811	1.00	LOQ	ug/L	
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	

LDC #: 43888A1a
SDG #: 280-116898-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

ADR/Stage 2B 4

Date: 12/18/18
Page: 1 of 1
Reviewer: JY
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 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-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
SDG #: 280-116898-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR/Stage-4

Date: 12-20-18
Page: 1 of 1
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 #: 4381

VALIDATION FINDINGS WORKSHEET

Reviewer: MG

2nd reviewer:

All circled methods are applicable to each sample.

[illegible]

Comments: _____

VALIDATION FINDINGS WORKSHEET

Technical Holding Times

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?

[illegible]

VALIDATION FINDINGS WORKSHEET
BlanksMETHOD: Inorganics, Method See CoverConc. units: mg/LAssociated 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) R(all non-detects)
16-MW-06-SA2 (RES/TOT)		200.75	24.00	HOURS	
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)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

12/21/2018 9:07:56 AM

ADR version 1.9.0.325

Page 1 of 1

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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
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

SDG #: 280-116942-1

ADR

Laboratory: Test America, Inc.

Date: 12/19/18

Page: 1 of 1

Reviewer: *NY*2nd Reviewer: *[Signature]***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 $\leq 15\%$ ICV $\leq 20\%$
IV.	Continuing calibration	A	CCV $\leq 20/50\%$
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
 SDG #: 280-116942-1
 Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR

Date: 12-20-18
 Page: 1 of 1
 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 ; NO ₃ 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: SO ₄ 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	PBW 1			
15	PBW 2			

Notes:

All circled methods are applicable to each sample.

[illegible]

Comments:

VALIDATION FINDINGS WORKSHEET

BlanksMETHOD: Inorganics, Method See CoverConc. units: mg/LAssociated 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/LAssociated 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) R(all non-detects)
A1-MW-23-SA2 (RES/TOT)		176.50	24.00	HOURS	
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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
A1-MW-07-SA2	1,1-DICHLOROETHENE	J	0.357	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.826	1.00	LOQ	ug/L	
A1-MW-25-SA2	1,1-DICHLOROETHENE	J	0.273	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.539	1.00	LOQ	ug/L	

LDC #: 43888C1a

VALIDATION COMPLETENESS WORKSHEET

SDG #: 280-117007-1

ADR

Laboratory: Test America, Inc.

Date: 12/19/18

Page: 1 of 1

Reviewer: *QV*2nd Reviewer: *[Signature]***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	ICV ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CV ≤ 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	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
SDG #: 280-117007-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR

Date: 12-20-18
Page: 1 of 1
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

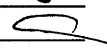
D = Duplicate
TB = Trip blank
EB = Equipment blank

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:

VALIDATION FINDINGS WORKSHEET Blanks

Page: 1 of 1
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) R(all non-detects)
A1-MW-13-SA2 (RES/TOT)		154.25	24.00	HOURS	
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	J	0.635	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.728	1.00	LOQ	ug/L	
A1-MW-15-SA2	TRICHLOROETHENE	J	0.426	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA2	1,1-DICHLOROETHENE	J	0.379	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.914	1.00	LOQ	ug/L	
A1-MW-37-SA2D	1,1-DICHLOROETHENE	J	0.373	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.909	1.00	LOQ	ug/L	

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**
SDG #: 280-117103-1 ADR
Laboratory: Test America, Inc.

Date: 12/19/18
Page: 1 of 1
Reviewer: SVK
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	1 CAL = 15? 1 CV = 20?
IV.	Continuing calibration	A	CV = 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
SDG #: 280-117103-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR

Date: 12-20-18
Page: 1 of 1
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:

VALIDATION FINDINGS WORKSHEET

BlanksMETHOD: Inorganics, Method See CoverConc. units: mg/LAssociated 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/LAssociated 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/LAssociated 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) R(all non-detects)
A1-MW-42-SA2 (RES/TOT)		129.25	24.00	HOURS	
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

<i>Sample ID (Analysis Type)</i>	<i>Surrogate</i>	<i>Sample % Recovery</i>	<i>% Recovery Limits</i>	<i>Affected Compounds</i>	<i>Flag</i>
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

12/21/2018 9:19:11 AM

ADR version 1.9.0.325

Page 1 of 1

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)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

12/21/2018 9:19:13 AM

ADR version 1.9.0.325

Page 1 of 1

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	

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
SDG #: 280-117110-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR

Date: 12-20-18
Page: 1 of 1
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:

VALIDATION FINDINGS WORKSHEET

BlanksMETHOD: Inorganics, Method See CoverConc. units: mg/LAssociated 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	J	0.00548	0.00884	LOQ	ug/L	J (all detects)
	PFOS	J, Q	0.00321	0.00884	LOQ	ug/L	

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	No Qualifiers Applied
PFHpA	0.00474	0.00494	NC	30.00	
PFHxA	0.0806	0.0829	3	30.00	
PFHxS	0.0367	0.0355	3	30.00	
PFOA	0.00947	0.00878	8	30.00	

LDC #: 43888K96
 SDG #: 1803615
 Laboratory: Vista Analytical Laboratory

VALIDATION COMPLETENESS WORKSHEET

ADR/Stage 4

Date: 12/19/18
 Page: 1 of 1
 Reviewer: JVL
 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	1 CAL ≤ 20% Individual ≤ 30% 1 CV ≤ 30% true conc.
IV.	Continuing calibration/ISC	A	CV ≤ 30%
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-19-SA2** PZ	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	pg 80091- bk 1			
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	J	0.00449	0.00852	LOQ	ug/L	J (all detects)
	PFOS	J	0.00503	0.00852	LOQ	ug/L	
A1-MW-18-SA2	PFOA	J	0.00309	0.00856	LOQ	ug/L	J (all detects)
A1-MW-19-SA2	PFDA	J	0.00721	0.00861	LOQ	ug/L	J (all detects)
	PFNA	J	0.00398	0.00861	LOQ	ug/L	
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	No Qualifiers Applied
PFHpA	0.405	0.412	2	30.00	
PFHxA	10.3	11.7	13	30.00	
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

12/20/2018 1:48:42 PM

ADR version 1.9.0.325

Page 1 of 1

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	rv Individual $\leq 30\%$ true value 100 $\leq 30\%$
IV.	Continuing calibration/ISC	A	CV $\leq 30\%$
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	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)

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	to rr Individual $\leq 30\%$
IV.	Continuing calibration/ISC	A	COV $\leq 30\%$ True value
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	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 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-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:

B8K0144-B1k4				

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

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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

<i>SampleID</i>	<i>Analyte</i>	<i>Lab Qual</i>	<i>Result</i>	<i>Reporting Limit</i>	<i>RL Type</i>	<i>Units</i>	<i>Flag</i>
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

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ADR version 1.9.0.325

Page 1 of 1

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, ASW	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	rv Individual $\leq 30\%$ ICV $\leq 30\%$
IV.	Continuing calibration/ISC	SW	CV $\leq 30\%$ true value
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	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 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-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:

	88 K0153-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 #: 43888 N96

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Page: 1 of 1

Reviewer: Mo

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 %?

[illegible]

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

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ADR version 1.9.0.325

Page 1 of 1

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)

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	to r ^r Individual $\leq 30\%$ 10V $\leq 30\%$
IV.	Continuing calibration/ISC	SW	COV $\leq 30\%$ True value
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	A/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 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	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 BUKI					

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 #: 438880096

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Page: 1 of 1

Reviewer: MC

2nd Reviewer:

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 %?
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[illegible]

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:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-50-SA2	A1-MW-50-SA2D			
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

SDG #: 280-116898-1

Laboratory: Test America, Inc.

ADR/Stage 2B 4

Date: 12/19/18

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

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. UCS
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**	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	MB 280-438700/6			
13	L - 438747/4			

(H, AA, S only)

LDC #: 43888A1A

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [Signature]

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990 ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were all percent relative standard deviations (%RSD) $\leq 30\%/15\%$ and relative response factors (RRF) > 0.05 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 20\%$ or percent recoveries (%R) 80-120%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 20\%$ and relative response factors (RRF) ≥ 0.05 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Were field blanks were identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

LDC #: 43888A1a

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per analytical batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field duplicates?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were retention times within + 30 seconds of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were chromatogram peaks verified and accounted for?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

TARGET COMPOUND WORKSHEET

METHOD: VOA

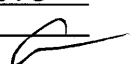
A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl chloride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	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	WWWWW. 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 ($\leq 30\%$)	Qualifications (Parent only)
	4	5		
H	0.564	0.630	NC	
S	0.780	0.949	NC	

V:\Josephine\FIELD DUPLICATES\43888A1a ttech yuma.wpd

LDC #: 43888A1a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
 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:

$$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$$

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 (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

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$$

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 VerificationPage: 1 of 1
Reviewer: JVG
2nd reviewer: [Signature]**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 SpikedSample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	10.0	10.1	101	101	9
1,2-Dichloroethane-d4	1	9.22	92	92	1
Toluene-d8	1	10.3	103	103	1
Bromofluorobenzene	1	10.1	101	101	1

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 #: 42888 A1a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [Signature]

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:

 $\% \text{ Recovery} = 100 * (\text{SSC} - \text{SC}) / \text{SA}$

Where: SSC = Spiked sample concentration
SA = Spike added

SC = Sample concentration

 $\text{RPD} = | \text{MSC} - \text{MSC} | * 2 / (\text{MSC} + \text{MSDC})$

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD sample: 60 / 11

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
						Percent Recovery		Percent Recovery		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 #: 93 888 A1a

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
 Reviewer: JVG
 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory 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 = $| \text{LCSC} - \text{LCSDC} | * 2 / (\text{LCSC} + \text{LCSDC})$

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: LCS 280-498700/4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		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 #: 43888 A1a

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [Signature]

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?

$$\text{Concentration} = \frac{(A_s)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

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.

$$\text{Conc.} = \frac{(13951)(12,5)}{(560722)(0,3989)} = 0.780 \text{ ug/L}$$

[illegible]

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
SDG #: 280-116898-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET ADR/Stage 4

Date: 12-20-18
Page: 1 of 1
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:

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) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $\leq 5\text{X}$ the CRDL.	✓			
V. 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 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 #: 43888A6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: [Signature]

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were detection limits < RL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
X. Field blanks				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

VALIDATION FINDINGS WORKSHEET

Technical Holding Times

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?

[illegible]

VALIDATION FINDINGS WORKSHEET
Blanks**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: C

METHOD: Inorganics, Method See coverThe correlation coefficient (r) for the calibration of CI 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:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

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	Reported	Acceptable (Y/N)
					r or %R	r or %R	
Initial calibration	CI	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 WorksheetPage: 1 of 1
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:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ 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:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
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	↓
1734/1743 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: [Signature]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y</u>	<u>N</u>	<u>N/A</u>	Have results been reported and calculated correctly?
<u>Y</u>	<u>N</u>	<u>N/A</u>	Are results within the calibrated range of the instruments?
<u>Y</u>	<u>N</u>	<u>N/A</u>	Are all detection limits below the CRQL?

Compound (analyte) results for #1, SO₄ reported with a positive detect were recalculated and verified using the following equation:

Concentration =

Recalculation:

$$y = mx + b$$

where

m = 14253830

$$b = -272056$$

$$d_1 = 20 \times$$

Recalculation:

$$601084316 = 14253830 \left(\frac{x}{20} \right) - 272056$$
$$843.78 \text{ mg/L} = x$$

[illegible]

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:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	A1-MW-50-SA2**	A1-MW-50-SA2D			
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

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1846366

ADR/Stage 4 *BP*

Laboratory: Alpha Analytical, Inc.

Date: 12/19/18

Page: 1 of 1

Reviewer: *SL*2nd Reviewer: *SL***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 $\leq 15\%$ ICV $\leq 20\%$
IV.	Continuing calibration	A	CV $\leq 20/50\%$
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**	L1846366-04**	Water	11/12/18
5	A1-MW-50-SA2D	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	NG 1180911-1 BLANK			

LDC #: 4388 F2b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [Signature]

SvOA

Method: PAH (EPA SW 846 Method 8270D-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) $\leq 20\%$ and relative response factors (RRF) ≥ 0.05 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of > 0.990 ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 30\%$ or percent recoveries (%R) 70-130%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 20\%$ and relative response factors (RRF) ≥ 0.05 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Were field blanks identified in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

LDC #: 43888 F 2b

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: [Signature]

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
Initial Calibration Calculation Verification

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:

$$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$$

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 (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 #: 42888 F26**VALIDATION FINDINGS WORKSHEET**
Surrogate Results VerificationPage: 1 of 1Reviewer: JVG2nd reviewer: [Signature]METHOD: GC/MS-^{SVOA}PAH (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 SpikedSample 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 #: 43 888 F26

VALIDATION FINDINGS WORKSHEET **Matrix Spike/Matrix Spike Duplicates Results Verification**

Page: 1 of 1
 Reviewer: JVG
 2nd Reviewer: [Signature]

METHOD: GC/MS ^{SVA}PAH (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 concentration

RPD = $|MSC - MSC| * 2 / (MSC + MSDC)$

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		Matrix Spike Duplicate		MS/MSD	
						Percent Recovery		Percent Recovery		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 #: 43868 F26

VALIDATION FINDINGS WORKSHEET

Page: 1 of 1Laboratory Control Sample/Laboratory Control Sample Duplicates Results VerificationReviewer: JVG2nd Reviewer: CMETHOD: GC/MS ^{SVA} ~~PAH~~ (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: WG1180911-2/3

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene										
Pyrene										
<u>1,4-Dioxane</u>	<u>5000</u>	<u>5000</u>	<u>5780</u>	<u>5890</u>	<u>116</u>	<u>116</u>	<u>118</u>	<u>118</u>	<u>2</u>	<u>2</u>

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

Page: 1 of 1

Reviewer: JVG

2nd reviewer: _____

METHOD: GC/MS ~~PAH~~ (EPA SW 846 Method 8270D-SIM)

Y	N	N/A
Y	N	N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_v)(I_s)(V_t)(DF)(2.0)}{(A_s)(RRF)(V_o)(V_i)(\%S)}$$

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

$$\text{Conc.} = \frac{(9071) \times (500) \times (5 \text{ ml})}{(7476) \times (1.407) \times (0.5 \text{ L})}$$

$$= 4311 \text{ ng/L}$$

[illegible]

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

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	NA	
VI.	Field blanks	N	
VII.	Surrogate spikes	NA	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	NA	LCS D
X.	Field duplicates	SW	D = 1/8
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	NA	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

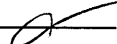
	Client ID	Lab ID	Matrix	Date
1 ⁺	16-HS-03-SA2 D	L1846592-01	Water	11/13/18
2 ⁻	16-MW-06-SA2	L1846592-02	Water	11/13/18
3 ⁺	16-MW-08-SA2	L1846592-03	Water	11/13/18
4 ⁺	16-MW-09-SA2	L1846592-04	Water	11/13/18
5 ⁺	A1-MW-18-SA2	L1846592-05	Water	11/13/18
6 ⁺	A1-MW-19-SA2	L1846592-06	Water	11/13/18
7 ⁺	A1-MW-53-SA2	L1846592-07	Water	11/13/18
8 ⁺	16-HS-03-SA2D D	L1846592-08	Water	11/13/18
9				
10				

Notes:

WG 11809A-1 BLANK				

LDC#: 43888G2b

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 ($\leq 30\%$)	Qualifications (Parent only)
	1	8		
1,4-Dioxane	5330	6120	14	

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**
 SDG #: L1846856
 Laboratory: Alpha Analytical, Inc.

ADR Stage 2B

Date: 12/19/18
 Page: 1 of 1
 Reviewer: SV6
 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 = 20.2
IV.	Continuing calibration	A	CN = 20/50%
V.	Laboratory Blanks	NA	
VI.	Field blanks	N	
VII.	Surrogate spikes	NA	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	NA	LCS 10
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	NA	

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-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:

1	UG1181575-1 BLANK				

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847243

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-11-SA2	L1847243-01	Water	11/15/18
A1-MW-13-SA2	L1847243-02	Water	11/15/18
A1-MW-14-SA2	L1847243-03	Water	11/15/18
A1-MW-15-SA2	L1847243-04	Water	11/15/18
A1-MW-37-SA2	L1847243-05	Water	11/15/18
A1-MW-37-SA2D	L1847243-06	Water	11/15/18
A1-MW-31-SA2	L1847243-07	Water	11/15/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA2 and A1-MW-37-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA2	A1-MW-37-SA2D			
1,4-Dioxane	13100	13200	1 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

LDC #: 43888I2b

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1847243

Laboratory: Alpha Analytical, Inc.

ADR Stage 2P

Date: 12/14/18

Page: 1 of 1

Reviewer: *SV*2nd Reviewer: *[Signature]***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 $\leq 15\%$ ICV $\leq 20\%$
IV.	Continuing calibration	A	CCV $\leq 20/50\%$
V.	Laboratory Blanks	\times A	
VI.	Field blanks	N	
VII.	Surrogate spikes	\times A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	\times A	LCS/D
X.	Field duplicates	SW	D = 5/6
XI.	Internal standards	\times A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	\times 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 <i>D</i>	L1847243-05	Water	11/15/18
6	A1-MW-37-SA2D <i>D</i>	L1847243-06	Water	11/15/18
7	A1-MW-31-SA2	L1847243-07	Water	11/15/18
8				
9				

Notes:

<i>✓</i>	WG 1181805-1 BLANK				

(EB - on hold)

LDC#: 43888I2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1

Reviewer: JVG

2nd Reviewer: 

METHOD: GCMS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

Y N NA Were field duplicate pairs identified in this SDG?

Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD ($\leq 30\%$)	Qualifications (Parent only)
	5	6		
1,4-Dioxane	13100	13200	1	

V:\Josephine\FIELD DUPLICATES\43888I2b ttech yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847316

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-01-SA2	L1847316-01	Water	11/16/18
A1-MW-42-SA2	L1847316-02	Water	11/16/18
EB-20181116	L1847316-03	Water	11/16/18
A1-MW-01-SA2MS	L1847316-01MS	Water	11/16/18
A1-MW-01-SA2MSD	L1847316-01MSD	Water	11/16/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-20181116 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803

1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

LDC #: 43888J2b

VALIDATION COMPLETENESS WORKSHEET

SDG #: L1847316

Laboratory: Alpha Analytical, Inc.

ADR Stage 2B

Date: 2/19/18

Page: 1 of 1

Reviewer: JVL

2nd Reviewer: [Signature]

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	CV ≤ 20% / 50%
V.	Laboratory Blanks	NA	
VI.	Field blanks	ND	EB = 3
VII.	Surrogate spikes	NA	
VIII.	Matrix spike/Matrix spike duplicates	NA	
IX.	Laboratory control samples	NA	LCS
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	NA	

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:

1	WG1181887-1 BLANK				

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: January 2, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1803615

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	1803615-01	Water	11/12/18
A1-MW-05-SA2	1803615-02	Water	11/12/18
A1-MW-49-SA2	1803615-03	Water	11/12/18
A1-MW-50-SA2	1803615-04	Water	11/12/18
A1-MW-50-SA2D	1803615-05	Water	11/12/18
A1-MW-51-SA2	1803615-06	Water	11/12/18
A1-MW-52-SA2	1803615-07	Water	11/12/18
FRB-20181112	1803615-08	Water	11/12/18
A1-PZ-19-SA2	1803615-09	Water	11/12/18
A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were less than or equal to 30% of their true value.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample FRB-20181112 was identified as a field rinsate blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples A1-MW-50-SA2 and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-50-SA2	A1-MW-50-SA2D			
PFTeDA	0.0250	0.0264	5 (≤ 30)	-	-
PFHxA	0.0806	0.0829	3 (≤ 30)	-	-
PFHpA	0.00474	0.00494	Not calculable	-	-
PFHxS	0.0367	0.0355	3 (≤ 30)	-	-
PFOA	0.00947	0.00878	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

Sample	Compound	Finding
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803

Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG 1803615

Sample	Compound	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803

Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803

Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

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	ICV $\leq 30\%$ Individual $\leq 30\%$ $10V \leq 30\%$ true value
IV.	Continuing calibration/ISC	A	
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 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 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 - Blk 1			
15				

LDC #: 43888 K96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7
Reviewer: SK
2nd Reviewer: 2**Method:** LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) \leq 20%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of \geq 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all analytes within 70-130% or percent differences (%D) \leq 30% of their true value for each calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) \leq 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the continuing calibration \leq 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the Instrument Sensitivity Check \leq 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Were field blanks identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: p3888K96

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SL
2nd Reviewer: R

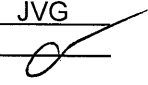
Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field duplicates?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did reported results include both branched and linear isomers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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 DuplicatesPage: 1 of 1
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	

V:\Josephine\FIELD DUPLICATES\43888K96 ttech yuma.wpd

LDC #: 43888 K96**VALIDATION FINDINGS WORKSHEET**
Compound Quantitation and Reported RLsPage: 1 of 1Reviewer: JVG2nd Reviewer: *[Signature]***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

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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 13C2-PFOA	1	0.0327	0.02	0.00040
			2	0.0593	0.04	0.0016
			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		

LDC#: 43888K96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 2 of 2
 Reviewer: JVG
 2nd Reviewer: [Signature]

METHOD: LC/MS PFCs (EPA Method 537Mod)

Calibration Date	System	Compound	Standard	(Y) Area ratio	(X) Conc ratio
11/19/2018	SCN960	PFOS 13C8-PFOS	1	0.02405	0.020
			2	0.04028	0.040
			3	0.00828	0.080
			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

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

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:

Where:
% Difference = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$
ave. RRF = initial calibration average RRF
 $\text{RRF} = (\text{Ax})(\text{Cis}) / (\text{Ais})(\text{Cx})$
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 #: 43888196

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [Signature]

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 concentration

RPD = $|MSC - MSC| * 2 / (MSC + MSDC)$

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added ($\mu\text{g/L}$)		Sample Conc ($\mu\text{g/L}$)	Spiked Sample Concentration ($\mu\text{g/L}$)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
						Percent Recovery		Percent Recovery		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	9.72

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: [Signature]

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 = $|LCSC - LCSDC| * 2 / (LCSC + LCSDC)$

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: B8K0091- B31

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS		LCSD		LCS/LCSD	
					Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
PFOs	0.0800	NA	0.0864	NA	108	168				
PFOA	L	L	0.0949	L	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.

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_i)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

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

$$\text{Conc.} = \frac{[(437)(12.5)]}{(5070)} = 3.24421e-5X^2 + 1.28147X + 0.39843$$

$$X = 0.73163$$

$$\text{find conc.} = \frac{(0.73163)(1L)}{(0.113459)(1000)} = 0.00645 \text{ ug/L}$$

#	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	1803676	440624.2445	605800.5662	Perfluoroalkyl Compounds	A1-MW-11-SA2	WG	GROUNDWATER	11/15/2018
A1-MW-13	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803676	441121.7924	605643.0455	Perfluoroalkyl Compounds	A1-MW-13-SA2	WG	GROUNDWATER	11/15/2018
A1-MW-14	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803676	440162.9948	605871.6126	Perfluoroalkyl Compounds	A1-MW-14-SA2	WG	GROUNDWATER	11/15/2018
A1-MW-15	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803676	440468.355	606147.1626	Perfluoroalkyl Compounds	A1-MW-15-SA2	WG	GROUNDWATER	11/15/2018
A1-MW-31	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803676	436610.1639	607254.3576	Perfluoroalkyl Compounds	A1-MW-31-SA2	WG	GROUNDWATER	11/15/2018
A1-MW-37	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803676	441675.7197	605691.9325	Perfluoroalkyl Compounds	A1-MW-37-SA2	WG	GROUNDWATER	11/15/2018