November 29, 2018

Vista Work Order No. 1803615

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 13, 2018 under your Project Name '4663.3803'.

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

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

Sincerely,

Martha Maier
Laboratory Director

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

Vista Work Order No. 1803615
Case Narrative

Sample Condition on Receipt:

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

Analytical Notes:

PFAS Isotope Dilution Method

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

Quality Control

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

A Method Blank and 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 OPR recoveries were within the method acceptance criteria.

The extracts of samples "A1-MW-04-SA2", "A1-MW-05-SA2", "A1-MW-50-SA2", "A1-MW-50-SA2D", "A1-MW-51-SA2", "A1-MW-52-SA2" and "B8K0091-MSD1" were re-injected because one or more Injection Internal Standard Analyte response areas were outside of criteria. The results were similar in the second injection. The results from the original injections have been reported.

As requested, an MS/MSD was performed on sample "A1-MW-50-SA2". The MS/MSD recoveries and RPDs were within the acceptance criteria.

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

TABLE OF CONTENTS

Case Narrative..... 1

Table of Contents..... 3

Sample Inventory..... 4

Analytical Results..... 5

Qualifiers..... 18

Certifications..... 19

Sample Receipt..... 22

Receiving Airbill..... 24

Extraction Information..... 25

Sample Data - PFAS Isotope Dilution Method..... 34

IIS Areas, IBs and CCVs..... 117

ICAL with ICV and IB..... 174

Tune Checks..... 318

Standards..... 325

Sample Inventory Report

Vista Sample ID	Client Sample ID		Sampled	Received	Components/Containers
1803615-01	A1-MW-04-SA2		12-Nov-18 11:40	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-02	A1-MW-05-SA2		12-Nov-18 14:24	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-03	A1-MW-49-SA2		12-Nov-18 08:32	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-04	A1-MW-50-SA2	MS/MSD	12-Nov-18 09:25	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-05	A1-MW-50-SA2D		12-Nov-18 09:35	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-06	A1-MW-51-SA2		12-Nov-18 10:46	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-07	A1-MW-52-SA2		12-Nov-18 13:39	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-08	FRB-20181112		12-Nov-18 14:50	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1803615-09	A1-PZ-19-SA2		12-Nov-18 12:43	13-Nov-18 10:06	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

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

Laboratory Data

Lab Sample: B8K0091-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFHxA	307-24-4	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFHpA	375-85-9	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFHxS	355-46-4	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFOA	335-67-1	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFNA	375-95-1	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFOS	1763-23-1	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFDA	335-76-2	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
MeFOSAA	2355-31-9	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
EtFOSAA	2991-50-6	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFUnA	2058-94-8	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFDoA	307-55-1	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFTrDA	72629-94-8	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
PFTeDA	376-06-7	ND	0.00274	0.00400	0.00800	U	B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	80.2	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFHxA	IS	79.8	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C4-PFHpA	IS	79.6	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
18O2-PFHxS	IS	81.2	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFOA	IS	72.1	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C5-PFNA	IS	68.8	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C8-PFOS	IS	82.9	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFDA	IS	62.6	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
d3-MeFOSAA	IS	61.1	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
d5-EtFOSAA	IS	67.4	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFUnA	IS	63.1	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFDoA	IS	64.7	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	1
13C2-PFTeDA	IS	71.1	50 - 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:42	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
Matrix: Aqueous

Laboratory Data

Lab Sample: B8K0091-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	0.0900	0.0800	112	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFHxA	307-24-4	0.0984	0.0800	123	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFHpA	375-85-9	0.0962	0.0800	120	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFHxS	355-46-4	0.0843	0.0800	105	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFOA	335-67-1	0.0949	0.0800	119	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFNA	375-95-1	0.0931	0.0800	116	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFOS	1763-23-1	0.0864	0.0800	108	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFDA	335-76-2	0.0982	0.0800	123	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
MeFOSAA	2355-31-9	0.0890	0.0800	111	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
EtFOSAA	2991-50-6	0.0854	0.0800	107	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFUnA	2058-94-8	0.0949	0.0800	119	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFDoA	307-55-1	0.0934	0.0800	117	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFTrDA	72629-94-8	0.0948	0.0800	119	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
PFTeDA	376-06-7	0.0916	0.0800	114	70 - 130		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	76.3	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFHxA	IS	70.1	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C4-PFHpA	IS	73.9	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
18O2-PFHxS	IS	77.7	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFOA	IS	65.2	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C5-PFNA	IS	59.2	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C8-PFOS	IS	70.7	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFDA	IS	57.3	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
d3-MeFOSAA	IS	51.7	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
d5-EtFOSAA	IS	53.2	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFUnA	IS	52.1	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFDoA	IS	56.5	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1
13C2-PFTeDA	IS	57.3	50- 150		B8K0091	19-Nov-18	0.125 L	20-Nov-18 23:31	1

Sample ID: A1-MW-04-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 11:40

Laboratory Data

Lab Sample: 1803615-01
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.108	0.00302	0.00442	0.00881		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFHxA	307-24-4	0.344	0.00302	0.00442	0.00881		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFHpA	375-85-9	0.00952	0.00302	0.00442	0.00881		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFHxS	355-46-4	0.0342	0.00302	0.00442	0.00881		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFOA	335-67-1	0.00646	0.00302	0.00442	0.00881	J	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFNA	375-95-1	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFOS	1763-23-1	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFDA	335-76-2	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
MeFOSAA	2355-31-9	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
EtFOSAA	2991-50-6	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFUnA	2058-94-8	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFDoA	307-55-1	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFTrDA	72629-94-8	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
PFTeDA	376-06-7	ND	0.00302	0.00442	0.00881	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	81.6	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFHxA	IS	76.6	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C4-PFHpA	IS	96.3	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
18O2-PFHxS	IS	77.5	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFOA	IS	73.1	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C5-PFNA	IS	67.8	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C8-PFOS	IS	73.9	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFDA	IS	58.4	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
d3-MeFOSAA	IS	69.8	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
d5-EtFOSAA	IS	81.3	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFUnA	IS	61.4	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFDoA	IS	73.3	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	1
13C2-PFTeDA	IS	78.2	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 01:17	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-05-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 14:24

Laboratory Data

Lab Sample: 1803615-02
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0652	0.00296	0.00431	0.00864		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFHxA	307-24-4	0.168	0.00296	0.00431	0.00864		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFHpA	375-85-9	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFHxS	355-46-4	0.00359	0.00296	0.00431	0.00864	J, Q	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFOA	335-67-1	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFNA	375-95-1	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFOS	1763-23-1	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFDA	335-76-2	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
MeFOSAA	2355-31-9	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
EtFOSAA	2991-50-6	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFUnA	2058-94-8	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFDoA	307-55-1	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFTrDA	72629-94-8	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
PFTeDA	376-06-7	ND	0.00296	0.00431	0.00864	U	B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	89.3	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFHxA	IS	90.5	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C4-PFHpA	IS	93.4	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
18O2-PFHxS	IS	90.0	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFOA	IS	82.7	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C5-PFNA	IS	81.7	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C8-PFOS	IS	99.0	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFDA	IS	73.4	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
d3-MeFOSAA	IS	91.4	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
d5-EtFOSAA	IS	96.0	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFUnA	IS	68.7	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFDoA	IS	89.7	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	1
13C2-PFTeDA	IS	88.8	50 - 150		B8K0091	19-Nov-18	0.116 L	21-Nov-18 01:28	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-49-SA2

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: YUMA, AZ
Matrix: Water
Date Collected: 12-Nov-18 08:32

Laboratory Data

Lab Sample: 1803615-03
Date Received: 13-Nov-18 10:06
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.00917	0.00300	0.00439	0.00876		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFHxA	307-24-4	0.0112	0.00300	0.00439	0.00876		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFHpA	375-85-9	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFHxS	355-46-4	0.0353	0.00300	0.00439	0.00876		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFOA	335-67-1	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFNA	375-95-1	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFOS	1763-23-1	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFDA	335-76-2	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
MeFOSAA	2355-31-9	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
EtFOSAA	2991-50-6	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFUnA	2058-94-8	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFDoA	307-55-1	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFTrDA	72629-94-8	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
PFTeDA	376-06-7	ND	0.00300	0.00439	0.00876	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	90.7	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFHxA	IS	89.5	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C4-PFHpA	IS	93.6	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
18O2-PFHxS	IS	91.3	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFOA	IS	78.0	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C5-PFNA	IS	76.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C8-PFOS	IS	83.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFDA	IS	69.2	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
d3-MeFOSAA	IS	93.8	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
d5-EtFOSAA	IS	98.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFUnA	IS	68.0	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFDoA	IS	90.8	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	1
13C2-PFTeDA	IS	102	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 01:39	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-50-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 09:25

Laboratory Data

Lab Sample: 1803615-04
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0250	0.00306	0.00446	0.00894		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFHxA	307-24-4	0.0806	0.00306	0.00446	0.00894		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFHpA	375-85-9	0.00474	0.00306	0.00446	0.00894	J, Q	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFHxS	355-46-4	0.0367	0.00306	0.00446	0.00894		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFOA	335-67-1	0.00947	0.00306	0.00446	0.00894		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFNA	375-95-1	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFOS	1763-23-1	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFDA	335-76-2	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
MeFOSAA	2355-31-9	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
EtFOSAA	2991-50-6	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFUnA	2058-94-8	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFDoA	307-55-1	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFTrDA	72629-94-8	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
PFTeDA	376-06-7	ND	0.00306	0.00446	0.00894	U	B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	82.2	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFHxA	IS	86.5	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C4-PFHpA	IS	96.2	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
18O2-PFHxS	IS	80.4	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFOA	IS	79.5	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C5-PFNA	IS	72.7	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C8-PFOS	IS	90.9	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFDA	IS	64.5	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
d3-MeFOSAA	IS	102	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
d5-EtFOSAA	IS	113	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFUnA	IS	71.3	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFDoA	IS	93.6	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	1
13C2-PFTeDA	IS	105	50 - 150		B8K0091	19-Nov-18	0.112 L	21-Nov-18 01:49	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-50-SA2 **PFAS Isotope Dilution Method**

Name:	Tetra Tech EC, Inc.	Lab Sample:	B8K0091-MS1/B8K0091-MSD1	Source Lab Sample:	1803615-04
Project:	4663.3803	QC Batch:	B8K0091	Date Extracted:	19-Nov-18
Matrix:	Aqueous	Samp Size:	0.115/0.116 L	Column:	BEH C18

Analyte	CAS Number	Sample (ug/L)	MS (ug/L)	MS Spike Amt	MS % Rec	MS Quals	MSD (ug/L)	MSD Spike Amt	MSD % Rec	RPD	MSD Quals	%Rec Limits	RPD Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
PFBS	375-73-5	0.0250	0.126	0.0867	116		0.112	0.0863	101	13.8		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFHxA	307-24-4	0.0806	0.183	0.0867	118		0.166	0.0863	98.6	17.9		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFHpA	375-85-9	0.00474	0.101	0.0867	111		0.0910	0.0863	100.0	10.4		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFHxS	355-46-4	0.0367	0.120	0.0867	96.0		0.120	0.0863	96.9	0.933		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFOA	335-67-1	0.00947	0.112	0.0867	118		0.110	0.0863	116	1.71		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFNA	375-95-1	ND	0.0949	0.0867	109		0.0867	0.0863	100	8.61		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFOS	1763-23-1	ND	0.0954	0.0867	110		0.0910	0.0863	105	4.65		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFDA	335-76-2	ND	0.0989	0.0867	114		0.0931	0.0863	108	5.41		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
MeFOSAA	2355-31-9	ND	0.0958	0.0867	110		0.0932	0.0863	108	1.83		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
EtFOSAA	2991-50-6	ND	0.0834	0.0867	96.2		0.0811	0.0863	94.0	2.31		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFUnA	2058-94-8	ND	0.0938	0.0867	108		0.0893	0.0863	103	4.74		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFDoA	307-55-1	ND	0.0913	0.0867	105		0.0847	0.0863	98.1	6.79		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFTrDA	72629-94-8	ND	0.105	0.0867	122		0.0926	0.0863	107	13.1		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1
PFTeDA	376-06-7	ND	0.0904	0.0867	104		0.0852	0.0863	98.7	5.23		70-130	30	20-Nov-18 23:52	1	21-Nov-18 00:03	1

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBS	IS	72.7		88.8		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFHxA	IS	76.2		87.1		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C4-PFHpA	IS	78.0		108		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
18O2-PFHxS	IS	79.0		87.9		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFOA	IS	70.4		78.8		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C5-PFNA	IS	64.2		74.8		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C8-PFOS	IS	78.3		83.3		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFDA	IS	60.5		67.0		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
d3-MeFOSAA	IS	65.0		76.2		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
d5-EtFOSAA	IS	72.1		85.7		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFUnA	IS	57.2		69.1		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFDoA	IS	66.7		83.7		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1
13C2-PFTeDA	IS	71.9		88.8		50-150	20-Nov-18 23:52	1	21-Nov-18 00:03	1

Sample ID: A1-MW-50-SA2D

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 09:35

Laboratory Data

Lab Sample: 1803615-05
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0264	0.00299	0.00439	0.00874		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFHxA	307-24-4	0.0829	0.00299	0.00439	0.00874		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFHpA	375-85-9	0.00494	0.00299	0.00439	0.00874	J	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFHxS	355-46-4	0.0355	0.00299	0.00439	0.00874		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFOA	335-67-1	0.00878	0.00299	0.00439	0.00874		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFNA	375-95-1	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFOS	1763-23-1	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFDA	335-76-2	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
MeFOSAA	2355-31-9	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
EtFOSAA	2991-50-6	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFUnA	2058-94-8	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFDoA	307-55-1	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFTrDA	72629-94-8	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
PFTeDA	376-06-7	ND	0.00299	0.00439	0.00874	U	B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	80.4	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFHxA	IS	77.3	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C4-PFHpA	IS	83.4	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
18O2-PFHxS	IS	83.2	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFOA	IS	74.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C5-PFNA	IS	70.3	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C8-PFOS	IS	80.0	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFDA	IS	60.4	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
d3-MeFOSAA	IS	75.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
d5-EtFOSAA	IS	86.8	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFUnA	IS	61.1	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFDoA	IS	78.6	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	1
13C2-PFTeDA	IS	81.5	50 - 150		B8K0091	19-Nov-18	0.114 L	21-Nov-18 02:00	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-51-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 10:46

Laboratory Data

Lab Sample: 1803615-06
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0663	0.00293	0.00427	0.00856		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFHxA	307-24-4	0.180	0.00293	0.00427	0.00856		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFHpA	375-85-9	0.0139	0.00293	0.00427	0.00856		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFHxS	355-46-4	0.0914	0.00293	0.00427	0.00856		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFOA	335-67-1	0.0186	0.00293	0.00427	0.00856		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFNA	375-95-1	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFOS	1763-23-1	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFDA	335-76-2	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
MeFOSAA	2355-31-9	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
EtFOSAA	2991-50-6	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFUnA	2058-94-8	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFDoA	307-55-1	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFTrDA	72629-94-8	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
PFTeDA	376-06-7	ND	0.00293	0.00427	0.00856	U	B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	90.4	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFHxA	IS	86.4	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C4-PFHpA	IS	90.1	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
18O2-PFHxS	IS	90.8	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFOA	IS	87.3	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C5-PFNA	IS	79.9	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C8-PFOS	IS	89.6	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFDA	IS	74.3	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
d3-MeFOSAA	IS	109	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
d5-EtFOSAA	IS	113	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFUnA	IS	72.0	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFDoA	IS	98.2	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	1
13C2-PFTeDA	IS	103	50 - 150		B8K0091	19-Nov-18	0.117 L	21-Nov-18 02:10	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-52-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 13:39

Laboratory Data

Lab Sample: 1803615-07
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.167	0.00299	0.00435	0.00872		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFHxA	307-24-4	0.466	0.00299	0.00435	0.00872		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFHpA	375-85-9	0.0204	0.00299	0.00435	0.00872		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFHxS	355-46-4	0.106	0.00299	0.00435	0.00872		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFOA	335-67-1	0.0270	0.00299	0.00435	0.00872		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFNA	375-95-1	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFOS	1763-23-1	0.00356	0.00299	0.00435	0.00872	J	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFDA	335-76-2	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
MeFOSAA	2355-31-9	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
EtFOSAA	2991-50-6	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFUnA	2058-94-8	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFDoA	307-55-1	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFTrDA	72629-94-8	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
PFTeDA	376-06-7	ND	0.00299	0.00435	0.00872	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	82.5	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFHxA	IS	78.4	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C4-PFHpA	IS	97.8	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
18O2-PFHxS	IS	82.1	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFOA	IS	79.6	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C5-PFNA	IS	72.0	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C8-PFOS	IS	84.6	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFDA	IS	64.3	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
d3-MeFOSAA	IS	82.7	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
d5-EtFOSAA	IS	89.3	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFUnA	IS	66.3	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFDoA	IS	88.6	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	1
13C2-PFTeDA	IS	91.6	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:21	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-20181112

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 14:50

Laboratory Data

Lab Sample: 1803615-08
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFHxA	307-24-4	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFHpA	375-85-9	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFHxS	355-46-4	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFOA	335-67-1	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFNA	375-95-1	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFOS	1763-23-1	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFDA	335-76-2	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
MeFOSAA	2355-31-9	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
EtFOSAA	2991-50-6	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFUnA	2058-94-8	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFDoA	307-55-1	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFTrDA	72629-94-8	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
PFTeDA	376-06-7	ND	0.00298	0.00435	0.00869	U	B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	78.1	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFHxA	IS	71.7	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C4-PFHpA	IS	71.6	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
18O2-PFHxS	IS	80.9	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFOA	IS	69.1	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C5-PFNA	IS	63.1	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C8-PFOS	IS	72.9	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFDA	IS	55.9	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
d3-MeFOSAA	IS	61.2	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
d5-EtFOSAA	IS	71.0	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFUnA	IS	55.8	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFDoA	IS	74.1	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	1
13C2-PFTeDA	IS	68.3	50 - 150		B8K0091	19-Nov-18	0.115 L	21-Nov-18 02:32	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-PZ-19-SA2

PFAS Isotope Dilution Method

Client Data

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

Matrix: Water
Date Collected: 12-Nov-18 12:43

Laboratory Data

Lab Sample: 1803615-09
Date Received: 13-Nov-18 10:06

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0338	0.00303	0.00442	0.00884		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFHxA	307-24-4	0.103	0.00303	0.00442	0.00884		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFHpA	375-85-9	0.00548	0.00303	0.00442	0.00884	J	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFHxS	355-46-4	0.0277	0.00303	0.00442	0.00884		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFOA	335-67-1	0.0144	0.00303	0.00442	0.00884		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFNA	375-95-1	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFOS	1763-23-1	0.00321	0.00303	0.00442	0.00884	J, Q	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFDA	335-76-2	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
MeFOSAA	2355-31-9	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
EtFOSAA	2991-50-6	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFUnA	2058-94-8	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFDoA	307-55-1	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFTrDA	72629-94-8	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
PFTeDA	376-06-7	ND	0.00303	0.00442	0.00884	U	B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	87.2	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFHxA	IS	86.9	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C4-PFHpA	IS	89.2	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
18O2-PFHxS	IS	88.6	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFOA	IS	78.2	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C5-PFNA	IS	76.3	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C8-PFOS	IS	83.4	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFDA	IS	67.4	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
d3-MeFOSAA	IS	87.5	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
d5-EtFOSAA	IS	88.2	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFUnA	IS	70.3	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFDoA	IS	77.7	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	1
13C2-PFTeDA	IS	92.6	50 - 150		B8K0091	19-Nov-18	0.113 L	21-Nov-18 02:42	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.

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	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-18-8
Virginia Department of General Services	9077
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

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

NELAP Accredited Test Methods

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

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
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

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
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

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1803615 Temp: 0.0 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

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

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

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

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
MICHAEL O'MARE MSM	11.12.2018	1630	FED EX	11.12.2018	1630
FedEx	11/13/18	1006	Marissa Sparks MSparks	11/13/18	1006

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

Method of Shipment: FED EX

ATTN: SAMPLE RECEIVING

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	Full List of 26	Other: Please List Below	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
A1-MW-04-SA2	11/12/18	1140	YUMA, AZ	2	P	W			X						
A1-MW-05-SA2	11/12/18	1424	YUMA, AZ	2	P	W			X						
A1-MW-49-SA2	11/12/18	0832	YUMA, AZ	2	P	W			X						
A1-MW-50-SA2	11/12/18	0925	YUMA, AZ	6	P	W			X						RUN MS/MSD
A1-MW-50-SA2D	11/12/18	0935	YUMA, AZ	2	P	W			X						
A1-MW-51-SA2	11/12/18	1046	YUMA, AZ	2	P	W			X						
~~EB-20181112~~ A1-MW-52-SA2	11/12/18	1339	YUMA, AZ	2	P	W			X						
FRB-20181112	11/12/18	1450	YUMA, AZ	2	P	W			X						
A1-PZ-19-SA2	11/12/18	1243	Yuma, AZ	2	P	W			X		11.12.2018 MSM				

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

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1803615 TAT 14 days

Samples Arrival:	**Date/Time** 11/13/18 1006	**Initials:** MWS	**Location:** WR-2 **Shelf/Rack:** N/a
Logged In:	**Date/Time** 11/13/18 1329	**Initials:** MWS	**Location:** WR-2 **Shelf/Rack:** J-3 F-3

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

Temp °C: 0.1 (uncorrected)	**Probe used: Y / (N)**	**Thermometer ID:** IR-4
Temp °C: 0.0 (corrected)		

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill — Trk # 7837 3677 6856	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	✓

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

Comments:


ORIGIN ID:YUMA (619) 252-0460
TETRA TECH
MICHAEL O'HARE
1230 COLUMBIA ST
STE 750
SAN DIEGO, CA 92101
UNITED STATES US
SHIP DATE: 12NOV18
ACTWGT: 39.10 LB
CAD: 006995180/SSFE1922
DIMS: 24x14x13 IN
BILL THIRD PARTY
TO VISTA ANALYTICAL LAB
VISTA ANALYTICAL LAB
1104 WINDFIELD WAY
EL DORADO HILLS CA 95762
(916) 673-1520
REF:
INV:
PO:
DEPT:
FedEx
Express
TUE - 13 NOV 10:30A
PRIORITY OVERNIGHT
TRK# 0201 7837 3677 6856
WD MHRA
95762
CA-US SMF

EXTRACTION INFORMATION

Process Sheet

Workorder: 1803615

Prep Expiration: 2018-Nov-26
Client: Tetra Tech EC, Inc.

Workorder Due: 29-Nov-18 00:00

TAT: 16

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

Prep Batch: BYK0041

Prep Data Entered: HR 11/20/18
Date and Initials

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

Initial Sequence: 89K0040

LabSampID	A/B	Prep Rec	Spike Rec	ClientSampleID	Comments	Location	Container
1803615-01	"A"	☑	☑	A1-MW-04-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803615-02		☑	☑	A1-MW-05-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803615-03		☑	☑	A1-MW-49-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803615-04	"A,B,C"	☑	☑	A1-MW-50-SA2	✓ ✓ MS/MSD	WR-2 A-3	HDPE Bottle, 125 mL
1803615-05	"A"	☑	☑	A1-MW-50-SA2D		WR-2 A-3	HDPE Bottle, 125 mL
1803615-06		☑	☑	A1-MW-51-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803615-07		☑	☑	A1-MW-52-SA2		WR-2 A-3	HDPE Bottle, 125 mL
1803615-08		☑	☑	FRB-20181112		WR-2 A-3	HDPE Bottle, 125 mL
1803615-09		☑	☑	A1-PZ-19-SA2		WR-2 A-3	HDPE Bottle, 125 mL

WO Comments: **Internal COC**

Pre-Prep Check Out: AE 11/15/18
Pre-Prep Check In: AE 11/15/18

Prep Check Out: CG 11/19/18
Prep Check In: NA

Prep Reconciled Initals/Date: AE 11/15/18
Spike Reconciled Initals/Date: CG 11/19/18
VialBoxID: Jammin'

Internal Chain of Custody

1803615

Vista Analytical Laboratory

Client: Tetra Tech EC, Inc.

Project Number: 4663.3803

Received: 13-Nov-18 10:06

Received By: Marissa N. Sparks

		Sample				Extract	
Vista Sample ID	Bottle	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location
1803615-01	"A"	AE 11/15/18 15:58 Prep Lab #1	AE 11/15/18 16:56 WR 2	CR 11/19/18 13:20 PREP LAB #2	CR 11/19/18 * R-7		
1803615-02							
1803615-03							
1803615-04	"A,B,C"						
1803615-05	"A"						
1803615-06							
1803615-07							
1803615-08							
1803615-09							

See second sheet for 11/20/18

* SAMPLES PLACED IN FRIDGE AROUND 16:30
UNABLE TO CONFIRM EXACT TIME. CR 11/19/18

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

Internal Chain of Custody
1803615

Vista Analytical Laboratory

Client: Tetra Tech EC, Inc. | Project Number: 4663.3803 | Received: 13-Nov-18 10:06 | Received By: Marissa N. Sparks

		Sample				Extract	
Vista Sample ID	Bottle	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location
1803615-01	"A"	CR 11/20/18 0705 PREPLAB #1				KBF 11/20/18 1604 Instrument M	
1803615-02	"A"						
1803615-03	"A"						
1803615-04	"A,B,C"						
1803615-05	"A"						
1803615-06							
1803615-07							
1803615-08							
1803615-09							

Extracts moved to instrument KBF 11/20/18

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

Matrix: Aqueous

Method: 537M PFAS DOD (LOQ as mRL)

PREPARATION BENCH SHEET

B8K0091

Chemist: CR

Prep Date: 11/19/18

Prep Time: 13:30

Prepared using: ☐ Sonication ☐ Shaker ☒ SPE Extraction ☐ Centrifuge ID: _____

Date/Initals: QE 11/15/18 | BalanceID: HRMS-10

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
☐	B8K0091-BLK1 (10)	7	2	0	3	NA	NA	(0.125)	CR 7R 11/19/18	CR 11/19/18	CR 11/20/18	CR QE 11/20/18
☐	B8K0091-BS1	7	2	0	3	↓	↓	(0.125)	↓	↓	↓	↓
☐	B8K0091-MS1 1803615-04	6	2	0	5	142.40	27.00	0.11540				
☐	B8K0091-MSD1 1803615-04	6	2	0	5	142.93	26.99	0.11594				
☐	1803582-01	7	2	0	5	143.31	26.75	0.11656				
☐	1803582-02	7	2	0	5	143.36	26.77	0.11659				
☐	1803582-03	7	2	0	5	141.81	26.79	0.11502				
☐	1803582-04	7	2	0	5	144.08	26.64	0.11744				
☐	1803582-05	7	2	0	4	143.55	26.69	0.11686				
☐	1803582-06	7	2	0	5	139.88	26.83	0.11305				
☐	1803615-01	6	2	0	4	140.50	27.05	0.11345				
☐	1803615-02	6	2	0	5	142.82	27.03	0.11579				
☐	1803615-03	6	2	0	4	141.08	26.97	0.11411				
☐	1803615-04	6	2	0	4	138.92	27.08	0.11184				

IS: 18J1502, 10 mL (V4)

IS SUP: NA

NS: 18J1505, 10 mL (V3)

NS SUP: NA

RS: 18J1503, 10 mL (V4)

SPE Chem: X-AW 33µm 200mg 6mL

SPE Lot#: 518-004499

ENVI-Carb Lot#: 10262101

Ele SOLV: MeOH/0.5%NH4OH in MeOH

Final Volume(s) 1 mL

Notes:
(10) 11/15/18 QE

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, additioanl 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

B8K0091

Chemist: _____

Prep Date: 11/19/18

Prep Time: 13:30

Prepared using: ☐ Sonication ☐ Shaker ☐ SPE Extraction ☐ Centrifuge ID: _____

		Date/Initals:				BalanceID:						
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
☐	1803615-05	6	2	Ø	4	141.37	26.92	0.11445	11/19/18	11/19/18	11/20/18	11/20/18
☐	1803615-06	6	2	Ø	4	143.88	27.07	0.11681				
☐	1803615-07	6	2	Ø	4	141.62	26.94	0.11468				
☐	1803615-08	6	2	Ø	4	142.01	26.95	0.11506				
☐	1803615-09	6	2	Ø	4	140.09	26.99	0.11310				

IS: 18J1502, 10 mL (V4)

IS SUP: NA

NS: 18J1505, 10 mL (V3)

NS SUP: NA

RS: 18J1503, 10 mL (V4)

SPE Chem: X-AW 33 µm 200mg 6mL

SPE Lot#: 518-004499

ENVI-Carb Lot#: 10262101

Ele SOLV: MeOH/0.5%NH4OH in MeOH

Final Volume(s) 1 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, additioanl 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

B8K0091

Chemist: _____

Prep Date: _____

Prep Time: _____

Prepared using: ☐ Sonication ☐ Shaker ☐ SPE Extraction ☐ Centrifuge ID: _____

Date/Initals: AE 11/15/18 | BalanceID: HRMS-10

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
☐	B8K0091-BLK1 (10)	7	2	0	3	NA	NA	(0.125)				
☐	B8K0091-BS1	7	2	0	3	↓	↓	(0.125)				
☐	B8K0091-MS1 1803615-04	6	2	0	5			142.40				
☐	B8K0091-MSD1 1803615-04	6	2	0	5			142.93				
☐	1803582-01	7	2	0	5			143.31				
☐	1803582-02	7	2	0	5			143.36				
☐	1803582-03	7	2	0	5			141.81				
☐	1803582-04	7	2	0	5			144.08				
☐	1803582-05	7	2	0	45 (5) 11/15/18 AE			143.55				
☐	1803582-06	7	2	0	54 (5) 11/15/18 AE			139.88				
☐	1803615-01	6	2	0	4			140.50				
☐	1803615-02	6	2	0	5			142.82				
☐	1803615-03	6	2	0	4			141.08				
☐	1803615-04	6	2	0	4			138.92				

IS: _____

IS SUP: _____

NS: _____

NS SUP: _____

RS: _____

SPE Chem: _____

SPE Lot#: _____

ENVI-Carb Lot#: _____

Ele SOLV: MeOH/0.5%NH4OH in MeOH

Final Volume(s) _____ mL

Notes:
(10) 11/15/18 AE

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, additioanl 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)

*Transcribed to Other document due to error

· **Matrix: Aqueous**

Method: 537M PFAS DOD (LOQ as mRL)

PREPARATION BENCH SHEET

B8K0091

Chemist: _____

Prep Date: _____

Prep Time: _____

Prepared using: ☐ Sonication ☐ Shaker ☐ SPE Extraction ☐ Centrifuge ID: _____

Date/Initals: 11/15/18 AE | BalanceID: HRMS-10

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
☐	1803615-05	6	2	Ø	4	141.37						
☐	1803615-06	6	2	Ø	4	143.88						
☐	1803615-07	6	2	Ø	4	141.62						
☐	1803615-08	6	2	Ø	4	142.01						
☐	1803615-09	6	2	Ø	4	140.09						

IS: _____

IS SUP: _____

NS: _____

NS SUP: _____

RS: _____

SPE Chem: _____

SPE Lot#: _____

ENVI-Carb Lot#: _____

Ele SOLV: MeOH/0.5%NH4OH in MeOH

Final Volume(s) _____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, additioanl 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)

Reprocessed to obtain document that is not

Batch: B8K0091

Matrix: Aqueous

LabNumber	WetWeight (Initial)	% Solids (Extraction Solids)	DryWeight	Final	Extracted	Ext By	Spike	SpikeAmount	ClientMatrix	Analysis
1803582-01	0.11656 ✓	N/A	N/A	1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803582-02	0.11659 ✓			1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803582-03	0.11502 ✓			1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803582-04	0.11744 ✓			1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803582-05	0.11686 ✓			1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803582-06	0.11305 ✓			1000	19-Nov-18 13:30	AD			QC Water	537M PFAS DOD (LOQ as
1803615-01	0.11345 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-02	0.11579 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-03	0.11411 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-04	0.11184 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-05	0.11445 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-06	0.11681 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-07	0.11468 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-08	0.11506 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
1803615-09	0.1131 ✓			1000	19-Nov-18 13:30	AD			Water	537M PFAS DOD (LOQ as
B8K0091-BLK1	0.125			1000	19-Nov-18 13:30	AD				QC
B8K0091-BS1	0.125			1000	19-Nov-18 13:30	AD	18J1505 ✓	10 ✓		QC
B8K0091-MS1	0.1154 ✓			1000	19-Nov-18 13:30	AD	18J1505 ✓	10 ✓		QC
B8K0091-MSD1	0.11594 ✓			1000	19-Nov-18 13:30	AD	18J1505 ✓	10 ✓		QC

HR 11/20/18

Sample Data – PFAS Isotope Dilution Method

Vista Analytical Laboratory

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-62.qld

Last Altered: Monday, November 26, 2018 09:27:55 Pacific Standard Time
Printed: Monday, November 26, 2018 09:32:56 Pacific Standard Time

Name: 181120M1_62, Date: 20-Nov-2018, Time: 23:42:26, ID: B8K0091-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?	
1	1	PFBA	213.0 > 168.8		5.72e3	0.125		1.18							
2	2	PFPeA	263.1 > 218.9		7.30e3	0.125		2.44							
3	3	PFBS	299.0 > 79.7		1.03e3	0.125		2.78							
4	5	PFHxA	313 > 269		5.47e3	0.125		3.35							
5	7	PFHpA	363.0 > 318.9		6.81e3	0.125		4.02							
6	36	13C3-PFBA	216.1 > 171.8	5.72e3	9.02e3	0.125	0.780	1.18	1.18	7.93	81.3023	81.3			
7	37	13C3-PFPeA	266. > 221.8	7.30e3	1.78e4	0.125	0.523	2.38	2.44	5.14	78.5814	78.6			
8	38	13C3-PFBS	302. > 98.8	1.03e3	2.39e3	0.125	0.539	2.72	2.78	5.40	80.1896	80.2			
9	40	13C2-PFHxA	315 > 270	5.47e3	1.78e4	0.125	0.964	3.30	3.35	3.85	31.9360	79.8			
10	41	13C4-PFHpA	367.2 > 321.8	6.81e3	1.78e4	0.125	0.482	3.97	4.02	4.80	79.6117	79.6			
11	-1														
12	8	L-PFHxS	398.9 > 79.6	3.32e0	9.31e2	0.125		4.16	4.16	0.0445	0.1317		1.884	NO	
13	68	Total PFHxS	398.9 > 79.6	3.32e0	9.31e2	0.125		4.28		0.0445	0.1317				
14	11	L-PFOA	412.8 > 368.9	6.11e1	1.17e4	0.125		4.47	4.51	0.0654			22.780	YES	
15	69	Total PFOA	412.8 > 368.9	6.11e1	1.17e4	0.125		4.62		0.000					
16	15	PFOSA	497.9 > 77.9		7.06e2	0.125		4.94							
17	42	18O2-PFHxS	403.0 > 102.6	9.31e2	2.39e3	0.125	0.480	4.11	4.16	4.87	81.1622	81.2			
18	42	18O2-PFHxS	403.0 > 102.6	9.31e2	2.39e3	0.125	0.480	4.11	4.16	4.87	81.1622	81.2			
19	44	13C2-PFOA	414.9 > 369.7	1.17e4	2.15e4	0.125	0.755	4.46	4.50	6.81	72.1281	72.1			
20	44	13C2-PFOA	414.9 > 369.7	1.17e4	2.15e4	0.125	0.755	4.46	4.50	6.81	72.1281	72.1			
21	46	13C8-PFOSA	506.1 > 77.7	7.06e2	2.15e4	0.125	0.112	4.94	4.98	0.411	29.2999	29.3			H
22	-1														
23	14	PFNA	463.0 > 418.8		1.03e4	0.125		4.90							
24	16	L-PFOS	498.9 > 79.9		2.13e3	0.125		5.02							
25	70	Total PFOS	498.9 > 79.9	0.00e0	2.13e3	0.125		5.13		0.000					
26	18	PFDA	513 > 468.8		1.01e4	0.125		5.28							
27	25	PFUdA	563.0 > 518.9	4.53e1	1.26e4	0.125		5.61	5.65	0.0451			36.811	YES	
28	45	13C5-PFNA	468.2 > 422.9	1.03e4	1.51e4	0.125	0.992	4.90	4.94	8.53	68.8230	68.8			
29	47	13C8-PFOS	507.0 > 79.9	2.13e3	2.49e3	0.125	1.034	4.98	5.03	10.7	82.9050	82.9			
30	47	13C8-PFOS	507.0 > 79.9	2.13e3	2.49e3	0.125	1.034	4.98	5.03	10.7	82.9050	82.9			
31	48	13C2-PFDA	515.1 > 469.9	1.01e4	1.93e4	0.125	0.832	5.28	5.32	6.52	62.6258	62.6			
32	51	13C2-PFUdA	565 > 519.8	1.26e4	2.15e4	0.125	0.928	5.61	5.65	7.32	63.1120	63.1			
33	-1														
34	21	L-MeFOSAA	570 > 419		1.77e3	0.125		5.43							
35	71	Total N-MeFOSAA	570. > 419	0.00e0	1.77e3	0.125		5.57		0.000					
36	23	L-EtFOSAA	584.1 > 419		2.86e3	0.125		5.51							

Vista Analytical Laboratory

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-62.qld

Last Altered: Monday, November 26, 2018 09:27:55 Pacific Standard Time
Printed: Monday, November 26, 2018 09:32:56 Pacific Standard Time

Name: 181120M1_62, Date: 20-Nov-2018, Time: 23:42:26, ID: B8K0091-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	72	Total N-EtFOSAA	584.1 > 419	0.00e0	2.86e3	0.125		5.72		0.000				
38	26	PFDS	598.8 > 79.9		2.13e3	0.125		5.66						
39	50	d3-N-MeFOSAA	573.3 > 419	1.77e3	2.15e4	0.125	0.135	5.43	5.47	1.03	61.0529	61.1		
40	50	d3-N-MeFOSAA	573.3 > 419	1.77e3	2.15e4	0.125	0.135	5.43	5.47	1.03	61.0529	61.1		
41	52	d5-N-EtFOSAA	589.3 > 419	2.86e3	2.15e4	0.125	0.198	5.59	5.63	1.67	67.3619	67.4		
42	52	d5-N-EtFOSAA	589.3 > 419	2.86e3	2.15e4	0.125	0.198	5.59	5.63	1.67	67.3619	67.4		
43	47	13C8-PFOS	507.0 > 79.9	2.13e3	2.49e3	0.125	1.034	4.98	5.03	10.7	82.9050	82.9		
44	-1													
45	27	PFDoA	612.9 > 569.0		1.23e4	0.125		5.90						
46	29	PFTrDA	662.9 > 618.9		1.23e4	0.125		6.15						
47	30	PFTeDA	713.0 > 669.0		9.26e3	0.125		6.37						
48	73	TCDA	498.3>106.9			0.125		5.15						
49	60	13C4-PFBA	217. > 172	9.02e3	9.02e3	0.125	1.000	1.18	1.18	12.5	100.0000	100.0		
50	53	13C2-PFDoA	615.0 > 569.7	1.23e4	1.93e4	0.125	0.980	5.90	5.93	7.93	64.7138	64.7		
51	53	13C2-PFDoA	615.0 > 569.7	1.23e4	1.93e4	0.125	0.980	5.90	5.93	7.93	64.7138	64.7		
52	55	13C2-PFTeDA	715.1 > 669.7	9.26e3	2.15e4	0.125	0.607	6.37	6.40	5.39	71.0907	71.1		
53	47	13C8-PFOS	507.0 > 79.9	2.13e3	2.49e3	0.125	1.034	4.98	5.03	10.7	82.9050	82.9		
54	62	13C3-PFHxS	401.8 > 79.9	2.39e3	2.39e3	0.125	1.000	4.11	4.16	12.5	100.0000	100.0		
55	-1													
56	66	13C6-PFDA	519.1 > 473.7	1.93e4	1.93e4	0.125	1.000	5.28	5.32	12.5	100.0000	100.0		
57	67	13C7-PFUdA	570.1 > 524.8	2.15e4	2.15e4	0.125	1.000	5.61	5.65	12.5	100.0000	100.0		
58	65	13C4-PFOS	503 > 79.9	2.49e3	2.49e3	0.125	1.000	4.98	5.03	12.5	100.0000	100.0		
59	64	13C9-PFNA	472.2 > 426.9	1.51e4	1.51e4	0.125	1.000	4.90	4.94	12.5	100.0000	100.0		
60	61	13C5-PFHxA	318 > 272.9	1.78e4	1.78e4	0.125	1.000	3.30	3.35	12.5	100.0000	100.0		

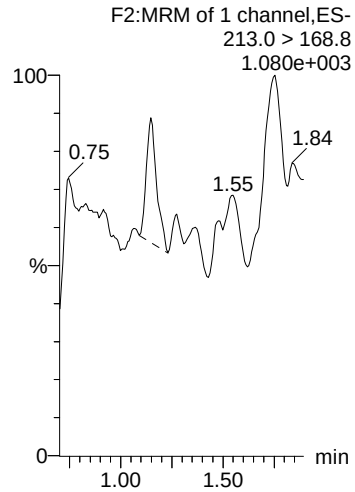
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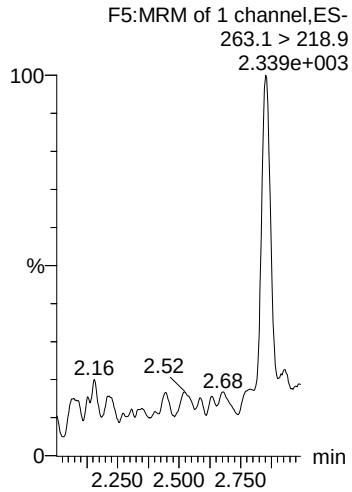
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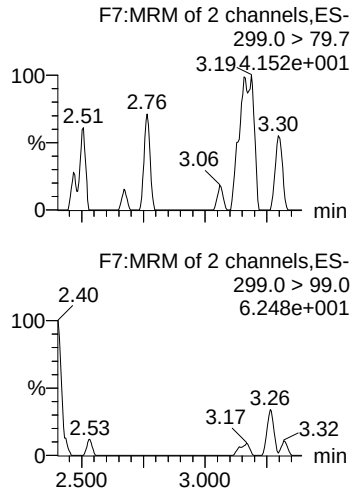
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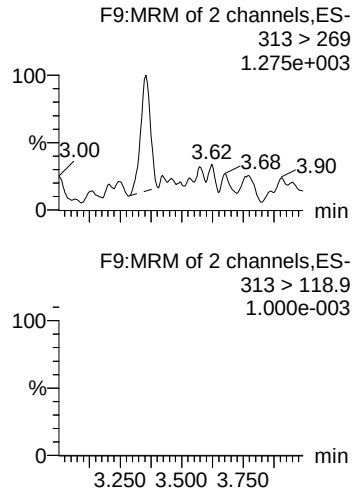
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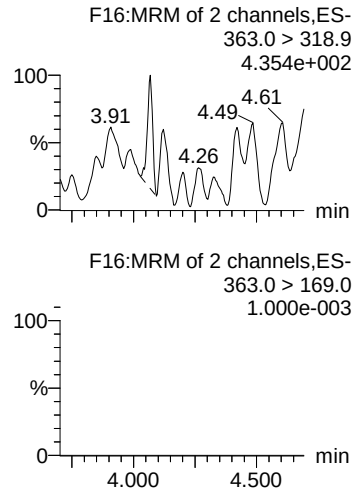
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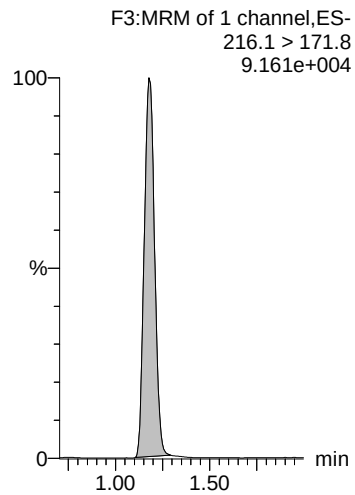
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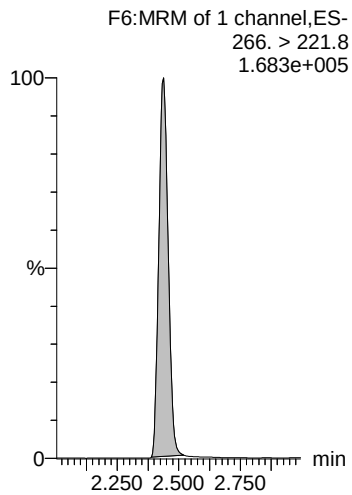
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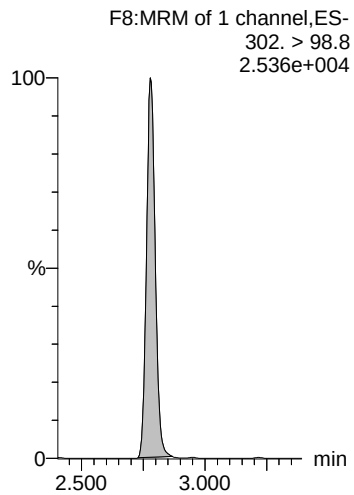
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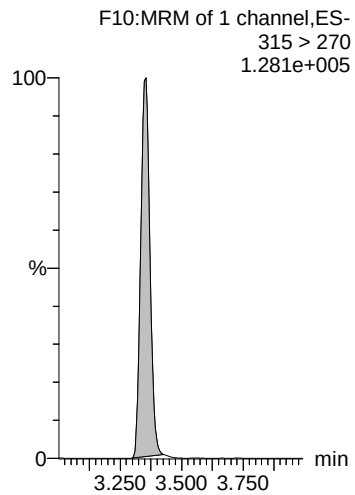
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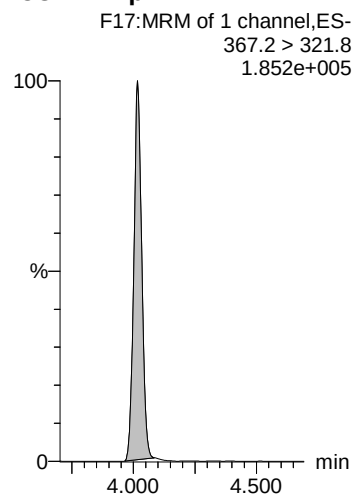
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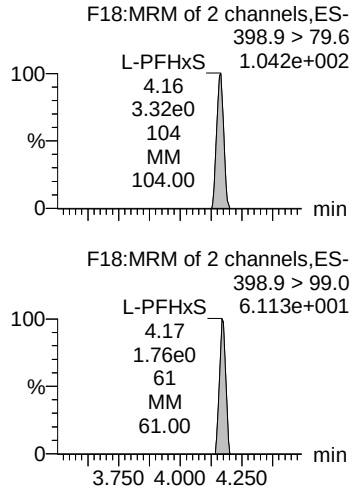


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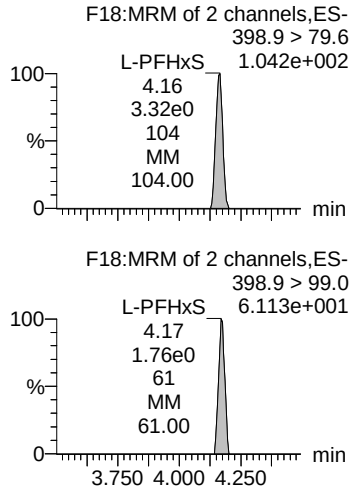
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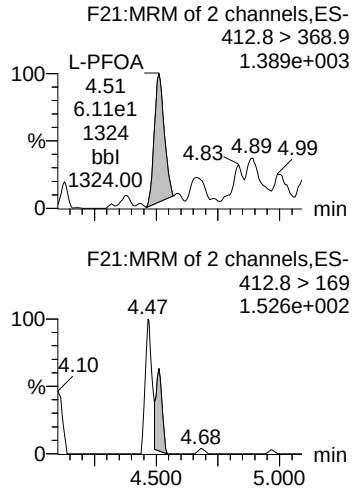
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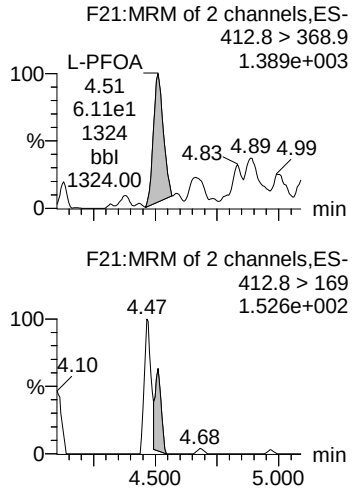
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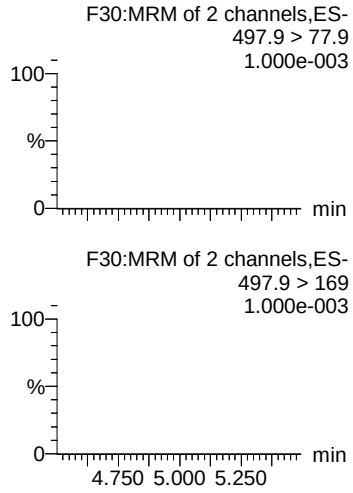
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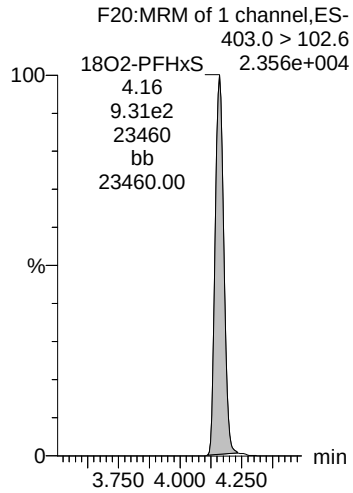
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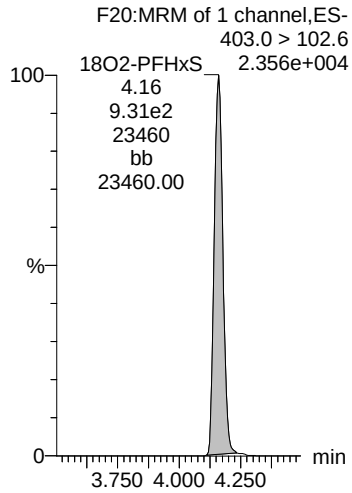
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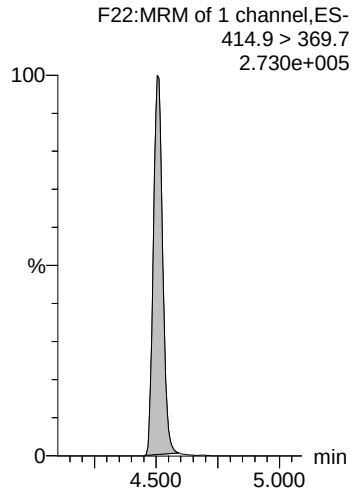
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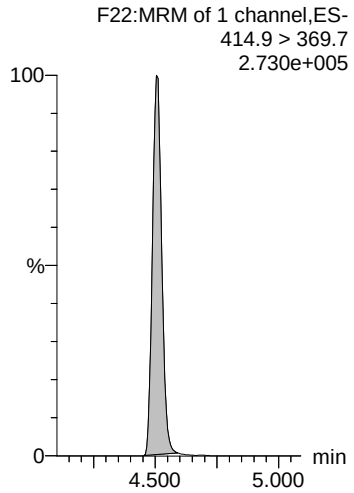
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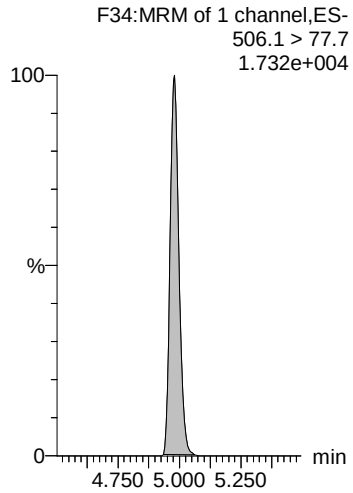
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13C2-PFOA



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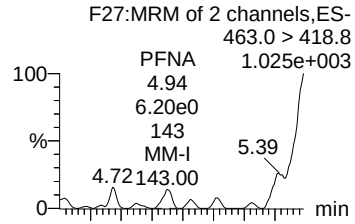


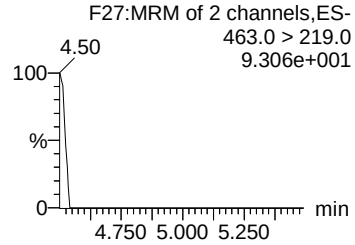
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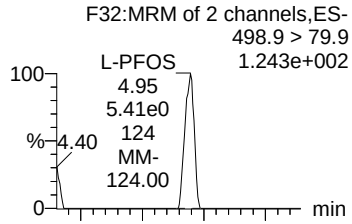
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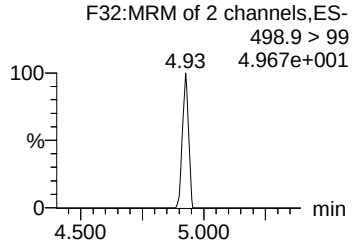
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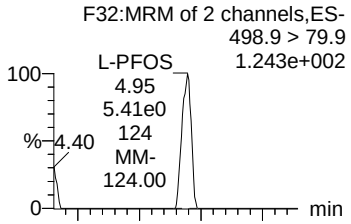


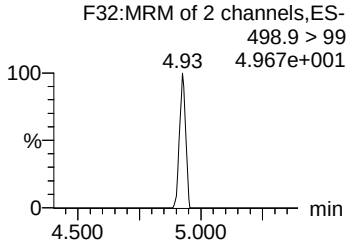
L-PFOS



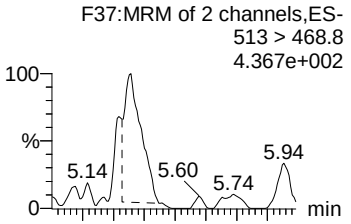


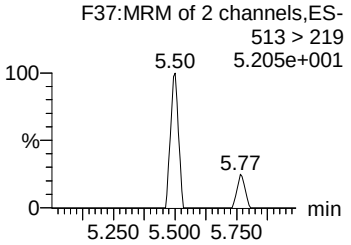
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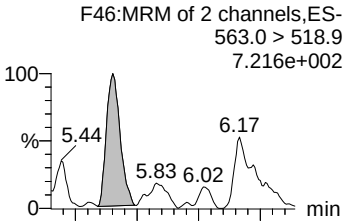


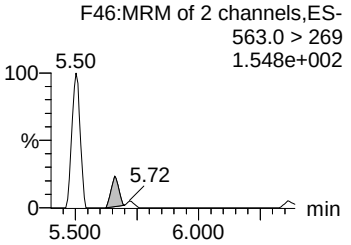
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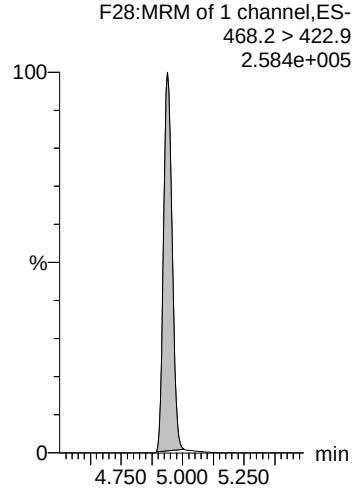


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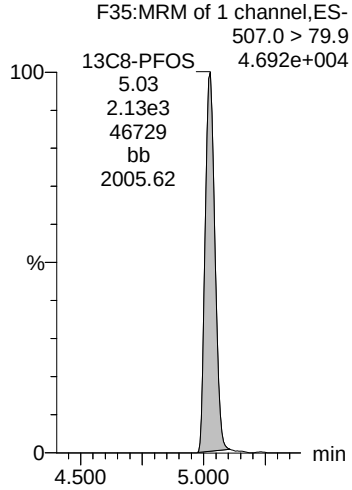




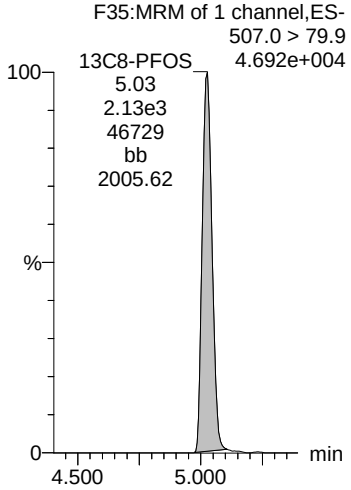
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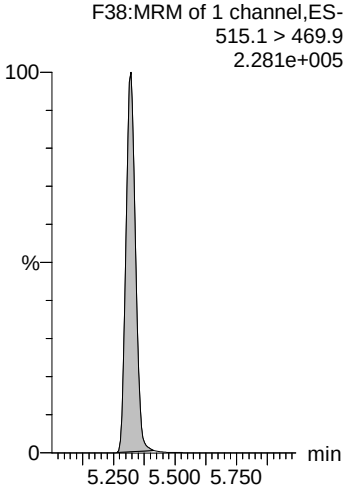
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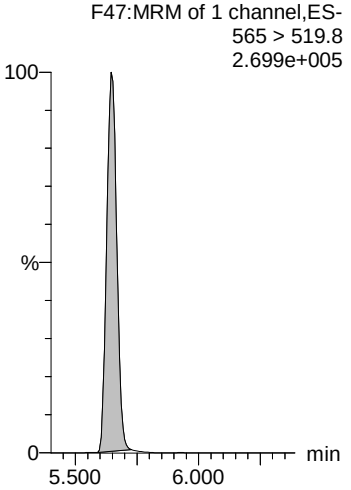
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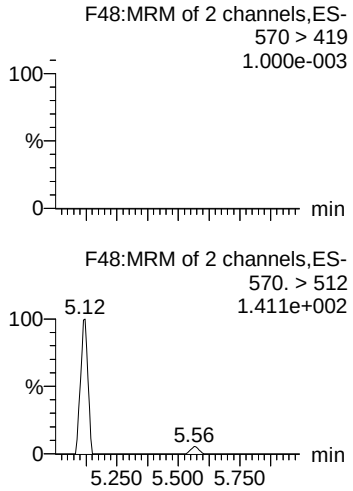


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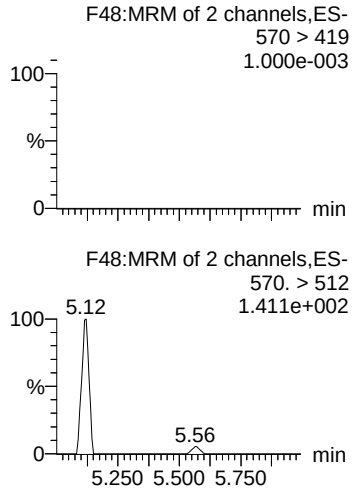
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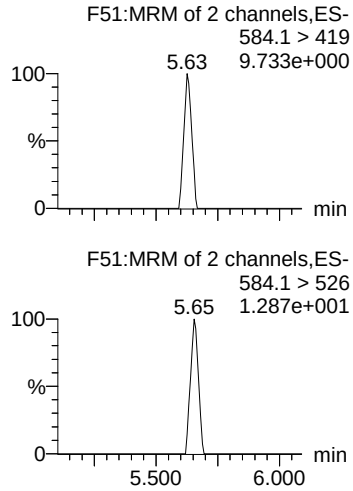
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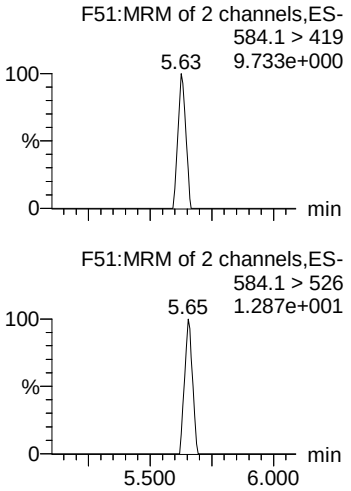
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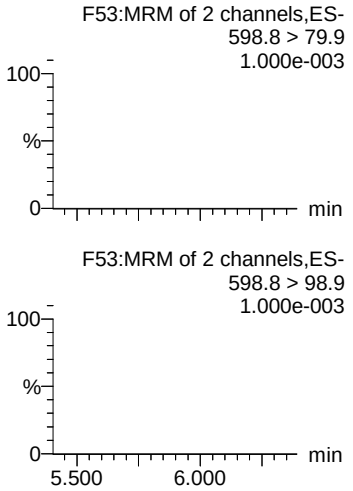
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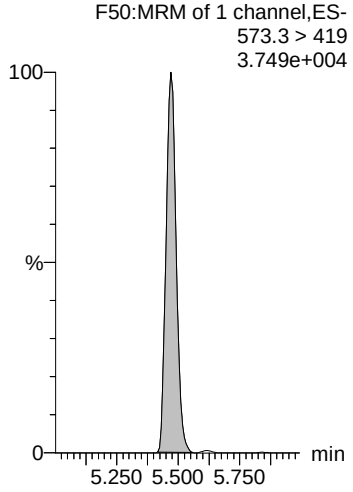
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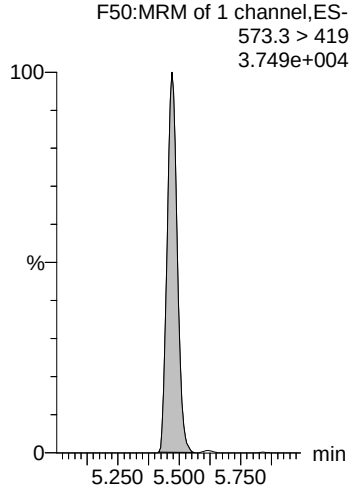
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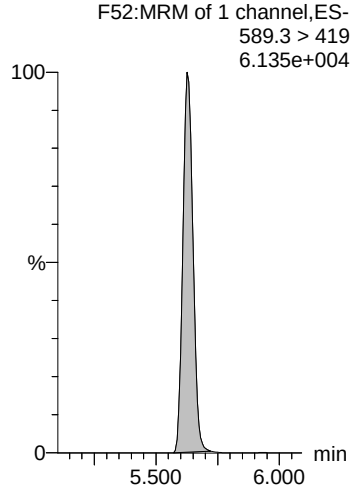
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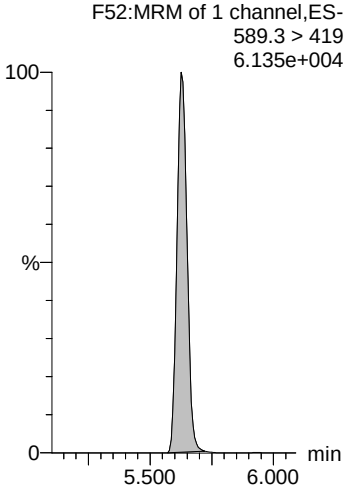
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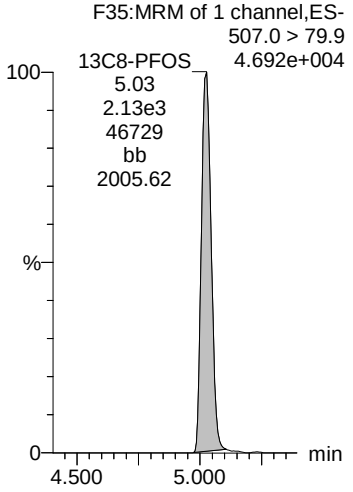
d5-N-EtFOSAA



d5-N-EtFOSAA



13C8-PFOS

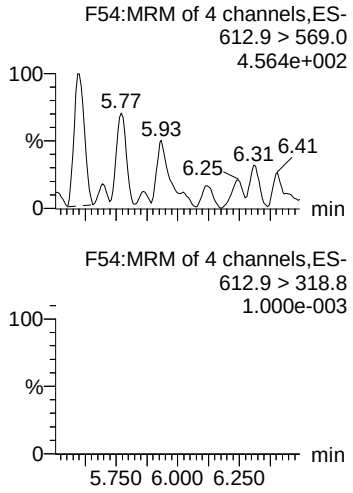


Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-62.qld

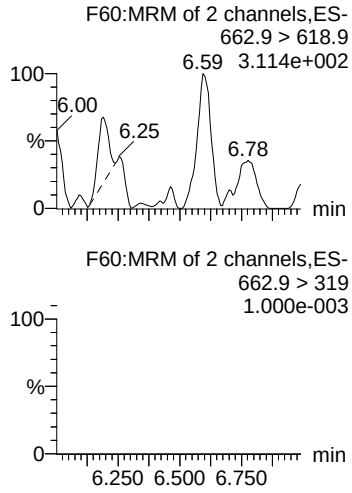
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Printed: Monday, November 26, 2018 09:32:56 Pacific Standard Time

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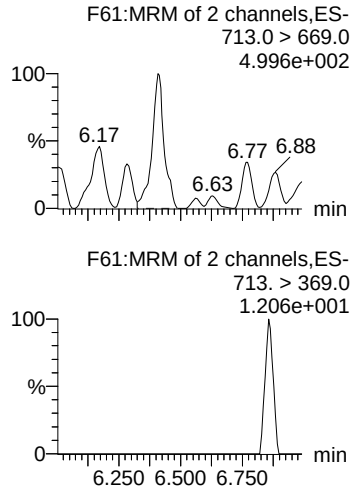
PFDoA



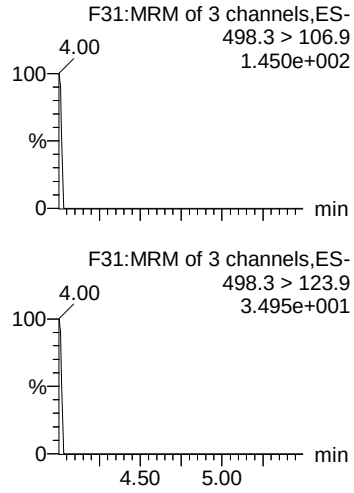
PFTrDA



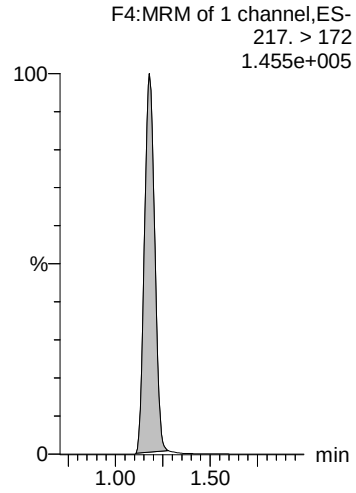
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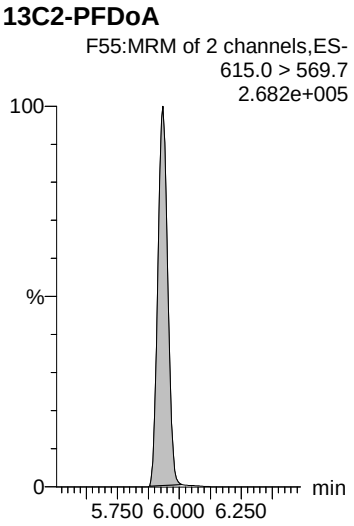
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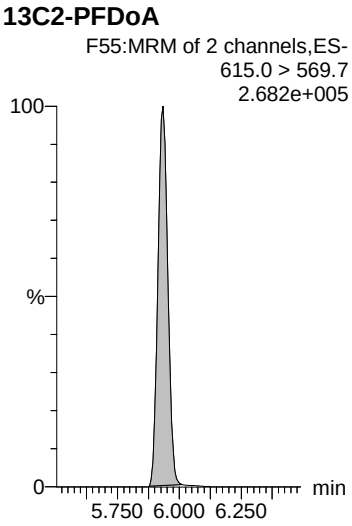
13C4-PFBA



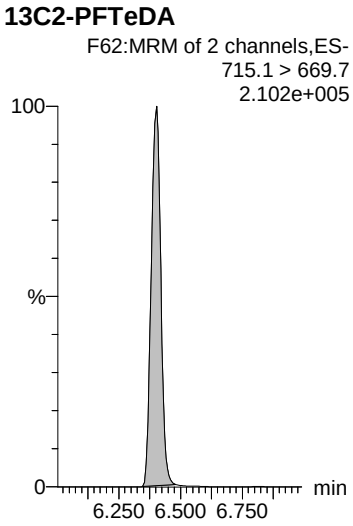
13C2-PFDoA



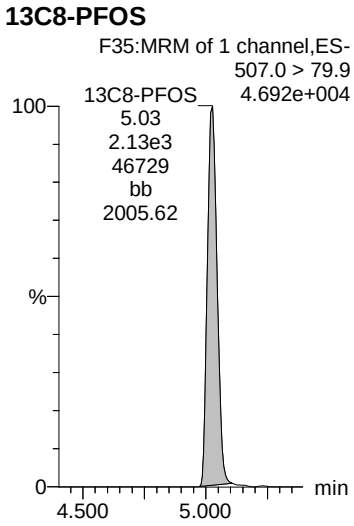
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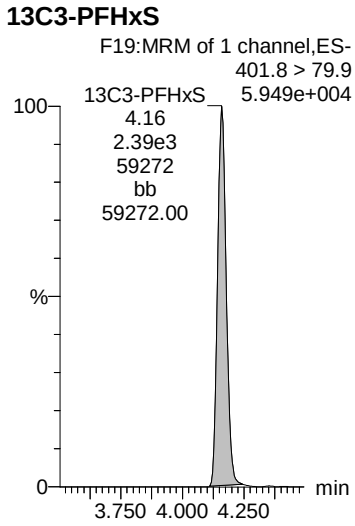
13C2-PFTeDA



13C8-PFOS



13C3-PFHxS

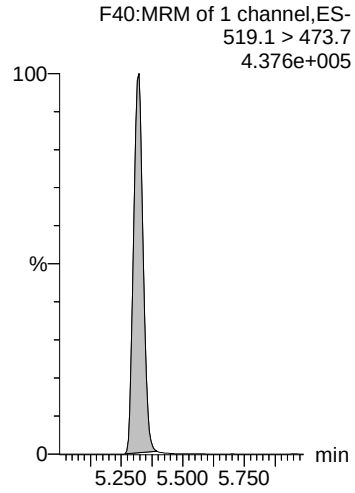


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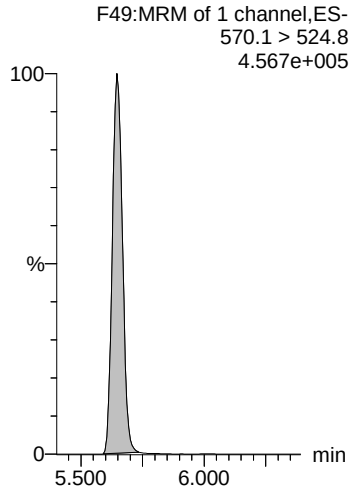
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Name: 181120M1_62, Date: 20-Nov-2018, Time: 23:42:26, ID: B8K0091-BLK1 Method Blank 0.125, Description: Method Blank

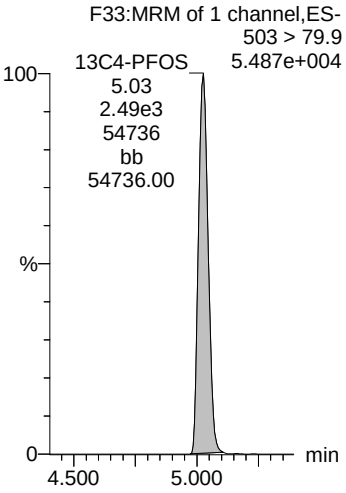
13C6-PFDA



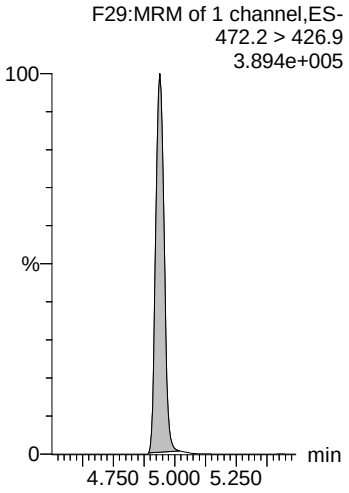
13C7-PFUdA



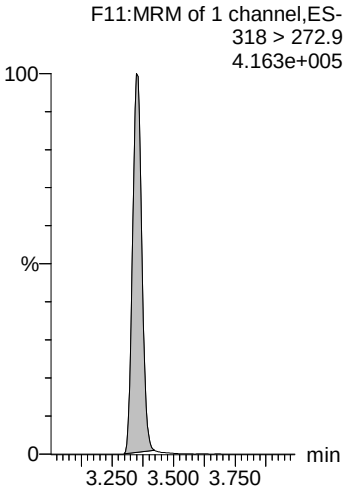
13C4-PFOS



13C9-PFNA



13C5-PFHxA



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Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-61.qld

Last Altered: Monday, November 26, 2018 09:20:52 Pacific Standard Time
Printed: Monday, November 26, 2018 09:22:11 Pacific Standard Time

Name: 181120M1_61, Date: 20-Nov-2018, Time: 23:31:48, ID: B8K0091-BS1 OPR 0.125, Description: OPR

	#	Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?	
1	1	PFBA	213.0 > 168.8	5.08e3	4.60e3	0.125		1.18	1.19	13.8	94.8879	118.6			
2	2	PFPeA	263.1 > 218.9	5.25e3	6.02e3	0.125		2.44	2.44	10.9	92.6668	115.8			
3	3	PFBS	299.0 > 79.7	1.71e3	9.77e2	0.125		2.78	2.79	21.9	89.9687	112.5	2.657	NO	
4	5	PFHxA	313 > 269	1.06e4	4.57e3	0.125		3.35	3.35	11.6	98.4307	123.0	15.711	NO	
5	7	PFHpA	363.0 > 318.9	7.65e3	6.02e3	0.125		4.02	4.02	15.9	96.2024	120.3	11.836	NO	
6	36	13C3-PFBA	216.1 > 171.8	4.60e3	8.18e3	0.125	0.780	1.18	1.18	7.02	72.0103	72.0			
7	37	13C3-PFPeA	266. > 221.8	6.02e3	1.69e4	0.125	0.523	2.38	2.44	4.45	68.0500	68.0			
8	38	13C3-PFBS	302. > 98.8	9.77e2	2.38e3	0.125	0.539	2.72	2.78	5.14	76.2585	76.3			
9	40	13C2-PFHxA	315 > 270	4.57e3	1.69e4	0.125	0.964	3.30	3.35	3.38	28.0505	70.1			
10	41	13C4-PFHpA	367.2 > 321.8	6.02e3	1.69e4	0.125	0.482	3.97	4.02	4.45	73.8941	73.9			
11	-1														
12	8	L-PFHxS	398.9 > 79.6	1.42e3	8.87e2	0.125		4.16	4.16	20.0	84.3378	105.4	1.908	NO	
13	68	Total PFHxS	398.9 > 79.6	1.42e3	8.87e2	0.125		4.28		20.0	84.3378				
14	11	L-PFOA	412.8 > 368.9	1.34e4	1.09e4	0.125		4.47	4.50	15.3	94.8855	118.6	3.327	NO	
15	69	Total PFOA	412.8 > 368.9	1.34e4	1.09e4	0.125		4.62		15.3	94.8855				
16	15	PFOSA	497.9 > 77.9	5.98e2	5.24e2	0.125		4.94	4.98	14.3	107.8264	134.8	44.887	NO	H
17	42	18O2-PFHxS	403.0 > 102.6	8.87e2	2.38e3	0.125	0.480	4.11	4.16	4.66	77.6777	77.7			
18	42	18O2-PFHxS	403.0 > 102.6	8.87e2	2.38e3	0.125	0.480	4.11	4.16	4.66	77.6777	77.7			
19	44	13C2-PFOA	414.9 > 369.7	1.09e4	2.21e4	0.125	0.755	4.46	4.50	6.15	65.2046	65.2			
20	44	13C2-PFOA	414.9 > 369.7	1.09e4	2.21e4	0.125	0.755	4.46	4.50	6.15	65.2046	65.2			
21	46	13C8-PFOSA	506.1 > 77.7	5.24e2	2.30e4	0.125	0.112	4.94	4.98	0.285	20.2948	20.3			H
22	-1														
23	14	PFNA	463.0 > 418.8	1.08e4	9.22e3	0.125		4.90	4.94	14.7	93.1321	116.4	4.401	NO	
24	16	L-PFOS	498.9 > 79.9	1.74e3	1.88e3	0.125		5.02	5.03	11.5	86.4458	108.1	1.978	NO	
25	70	Total PFOS	498.9 > 79.9	1.74e3	1.88e3	0.125		5.13		11.5	86.4458				
26	18	PFDA	513 > 468.8	1.16e4	9.21e3	0.125		5.28	5.32	15.8	98.2089	122.8	5.623	NO	
27	25	PFUdA	563.0 > 518.9	9.81e3	1.11e4	0.125		5.61	5.65	11.0	94.8617	118.6	8.855	NO	
28	45	13C5-PFNA	468.2 > 422.9	9.22e3	1.57e4	0.125	0.992	4.90	4.94	7.34	59.1798	59.2			
29	47	13C8-PFOS	507.0 > 79.9	1.88e3	2.57e3	0.125	1.034	4.98	5.02	9.13	70.6726	70.7			
30	47	13C8-PFOS	507.0 > 79.9	1.88e3	2.57e3	0.125	1.034	4.98	5.02	9.13	70.6726	70.7			
31	48	13C2-PFDA	515.1 > 469.9	9.21e3	1.93e4	0.125	0.832	5.28	5.31	5.96	57.3305	57.3			
32	51	13C2-PFUdA	565 > 519.8	1.11e4	2.30e4	0.125	0.928	5.61	5.65	6.05	52.1476	52.1			
33	-1														
34	21	L-MeFOSAA	570 > 419	3.62e3	1.61e3	0.125		5.43	5.47	28.2	89.0444	111.3	2.615	NO	
35	71	Total N-MeFOSAA	570. > 419	3.62e3	1.61e3	0.125		5.57		28.2	89.0444				
36	23	L-EtFOSAA	584.1 > 419	3.04e3	2.42e3	0.125		5.51	5.63	15.7	85.3786	106.7	1.442	NO	

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Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-61.qld

Last Altered: Monday, November 26, 2018 09:20:52 Pacific Standard Time
Printed: Monday, November 26, 2018 09:22:11 Pacific Standard Time

Name: 181120M1_61, Date: 20-Nov-2018, Time: 23:31:48, ID: B8K0091-BS1 OPR 0.125, Description: OPR

	#	Name	Trace	Area	IS Area	wt/vol	RRF Mean	Pred.RT	RT	Response	Conc.	%Rec	Ion Ratio	Ratio Out?
37	72	Total N-EtFOSAA	584.1 > 419	3.04e3	2.42e3	0.125		5.72		15.7	85.3786			
38	26	PFDS	598.8 > 79.9	1.54e3	1.88e3	0.125		5.66	5.70	10.2	82.7138	103.4	1.702	NO
39	50	d3-N-MeFOSAA	573.3 > 419	1.61e3	2.30e4	0.125	0.135	5.43	5.47	0.874	51.7298	51.7		
40	50	d3-N-MeFOSAA	573.3 > 419	1.61e3	2.30e4	0.125	0.135	5.43	5.47	0.874	51.7298	51.7		
41	52	d5-N-EtFOSAA	589.3 > 419	2.42e3	2.30e4	0.125	0.198	5.59	5.63	1.32	53.1714	53.2		
42	52	d5-N-EtFOSAA	589.3 > 419	2.42e3	2.30e4	0.125	0.198	5.59	5.63	1.32	53.1714	53.2		
43	47	13C8-PFOS	507.0 > 79.9	1.88e3	2.57e3	0.125	1.034	4.98	5.02	9.13	70.6726	70.7		
44	-1													
45	27	PFDoA	612.9 > 569.0	1.12e4	1.07e4	0.125		5.90	5.93	13.1	93.3620	116.7	8.525	NO
46	29	PFTrDA	662.9 > 618.9	1.15e4	1.07e4	0.125		6.15	6.18	13.5	94.8396	118.5	24.124	NO
47	30	PFTeDA	713.0 > 669.0	1.06e4	7.99e3	0.125		6.37	6.40	16.6	91.5509	114.4	13.207	NO
48	73	TCDA	498.3>106.9			0.125		5.15						
49	60	13C4-PFBA	217. > 172	8.18e3	8.18e3	0.125	1.000	1.18	1.19	12.5	100.0000	100.0		
50	53	13C2-PFDoA	615.0 > 569.7	1.07e4	1.93e4	0.125	0.980	5.90	5.93	6.92	56.5102	56.5		
51	53	13C2-PFDoA	615.0 > 569.7	1.07e4	1.93e4	0.125	0.980	5.90	5.93	6.92	56.5102	56.5		
52	55	13C2-PFTeDA	715.1 > 669.7	7.99e3	2.30e4	0.125	0.607	6.37	6.40	4.35	57.2719	57.3		
53	47	13C8-PFOS	507.0 > 79.9	1.88e3	2.57e3	0.125	1.034	4.98	5.02	9.13	70.6726	70.7		
54	62	13C3-PFHxS	401.8 > 79.9	2.38e3	2.38e3	0.125	1.000	4.11	4.16	12.5	100.0000	100.0		
55	-1													
56	66	13C6-PFDA	519.1 > 473.7	1.93e4	1.93e4	0.125	1.000	5.28	5.32	12.5	100.0000	100.0		
57	67	13C7-PFUdA	570.1 > 524.8	2.30e4	2.30e4	0.125	1.000	5.61	5.65	12.5	100.0000	100.0		
58	65	13C4-PFOS	503 > 79.9	2.57e3	2.57e3	0.125	1.000	4.98	5.03	12.5	100.0000	100.0		
59	64	13C9-PFNA	472.2 > 426.9	1.57e4	1.57e4	0.125	1.000	4.90	4.94	12.5	100.0000	100.0		
60	61	13C5-PFHxA	318 > 272.9	1.69e4	1.69e4	0.125	1.000	3.30	3.35	12.5	100.0000	100.0		

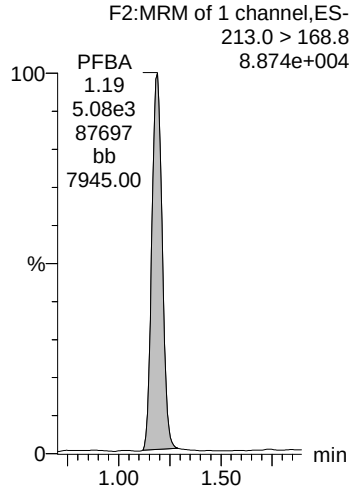
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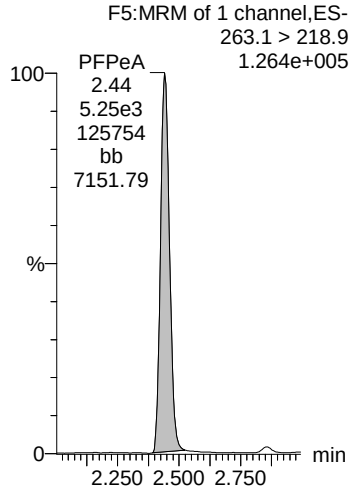
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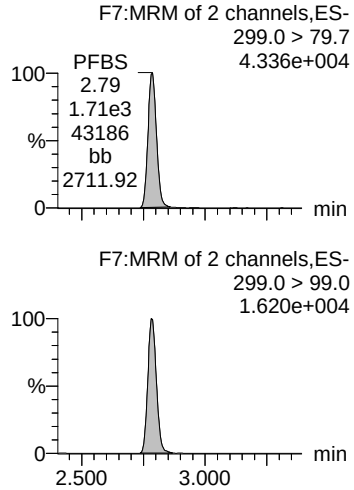
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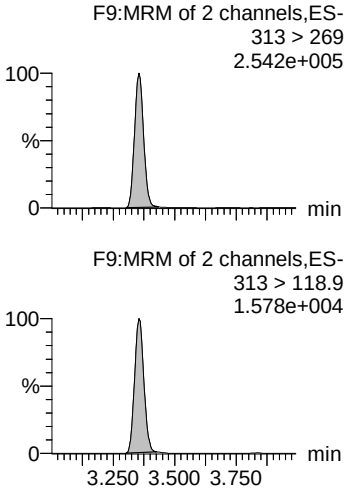
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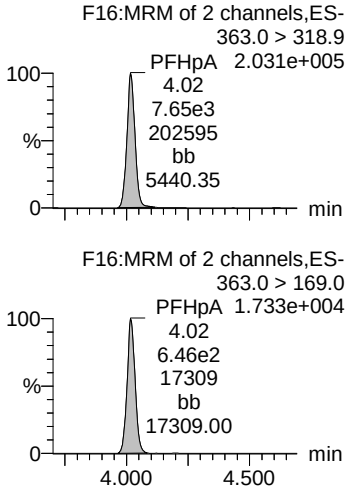
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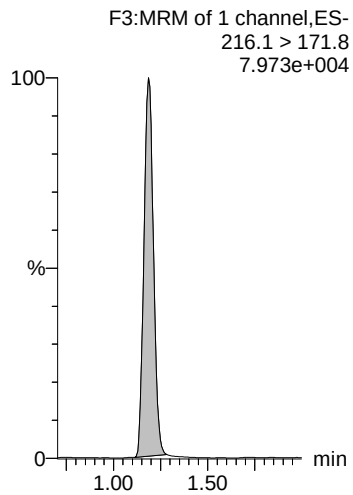
PFHxA



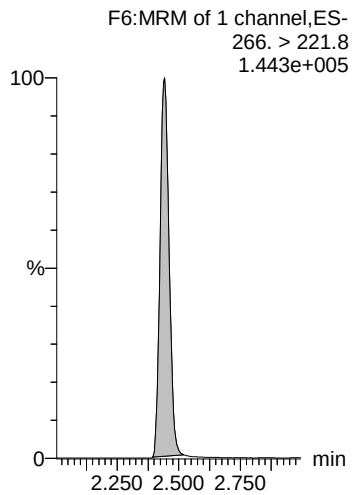
PFHpA



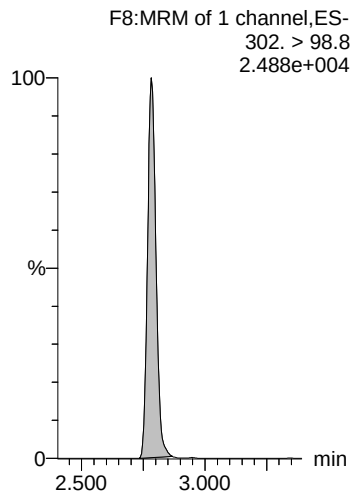
13C3-PFBA



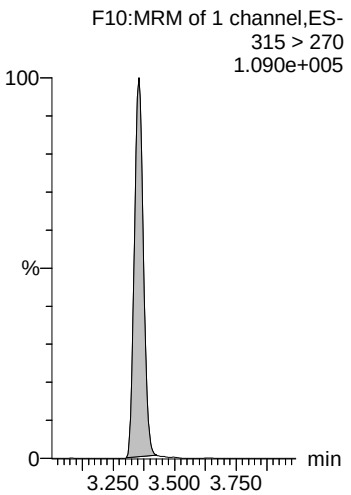
13C3-PFPeA



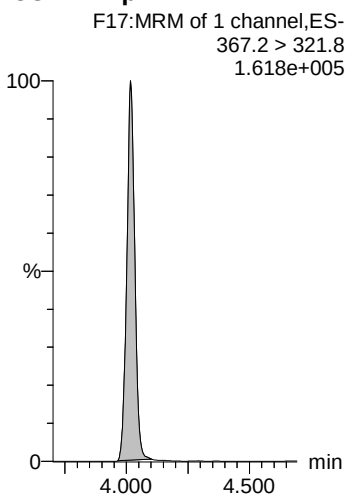
13C3-PFBS



13C2-PFHxA



13C4-PFHpA

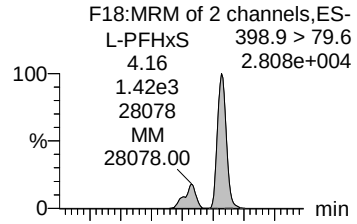


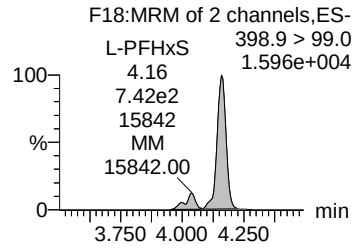
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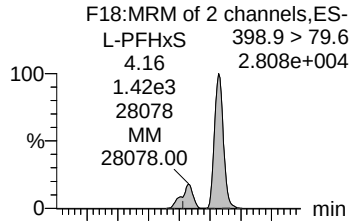
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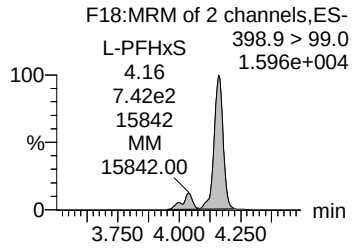
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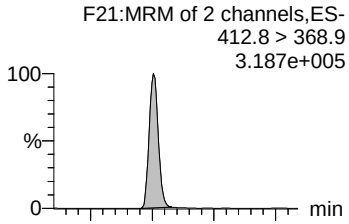


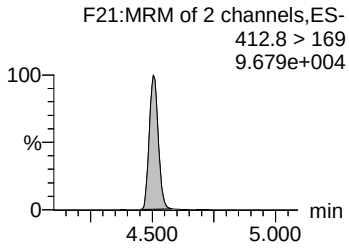
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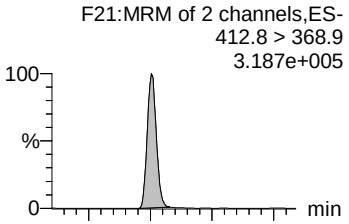


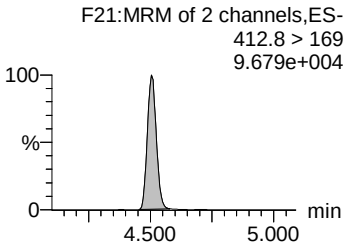
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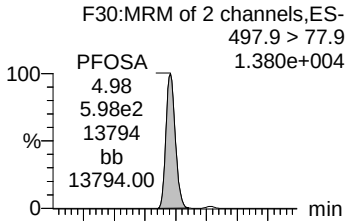


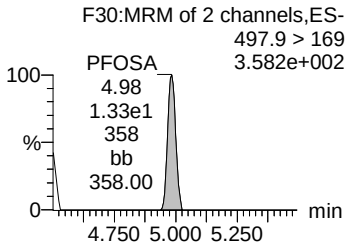
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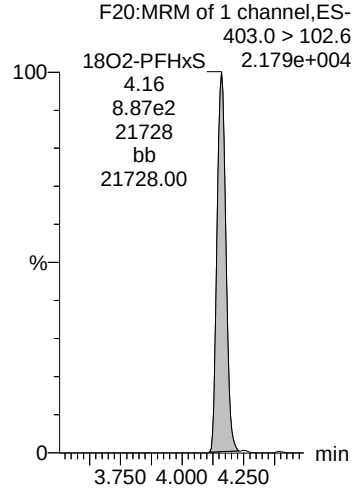


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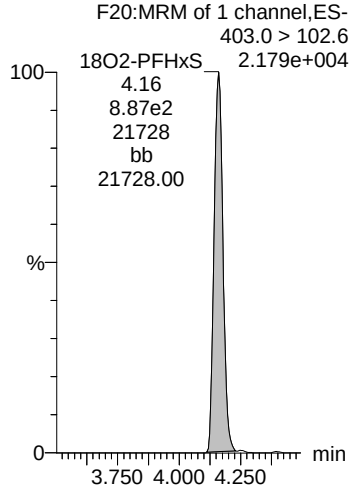




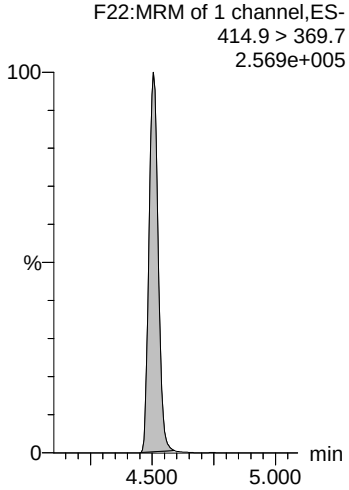
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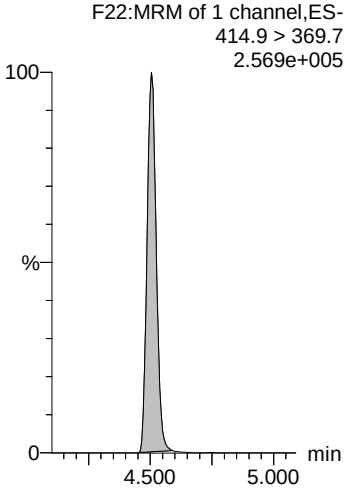
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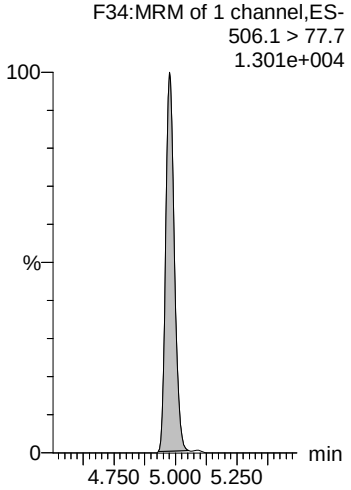
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13C2-PFOA



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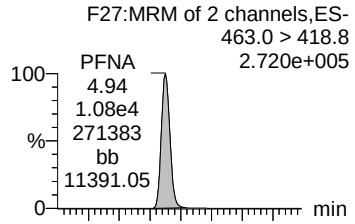


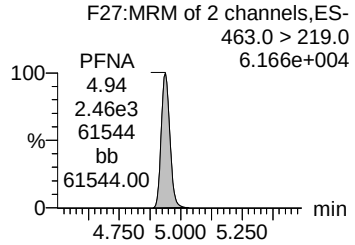
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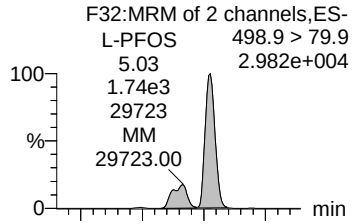
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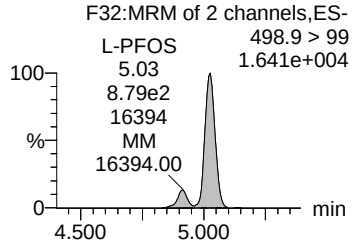
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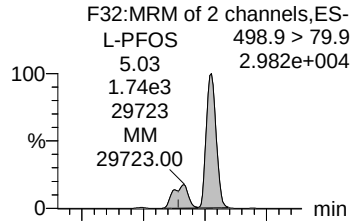


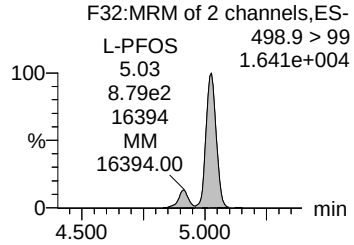
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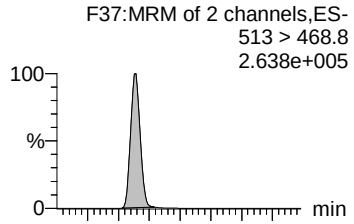


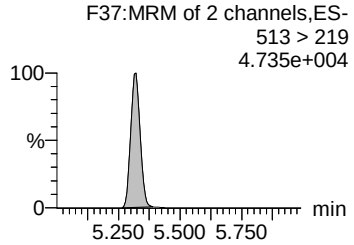
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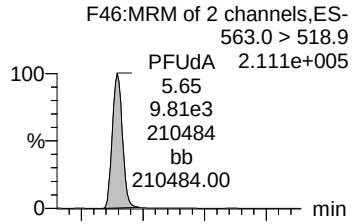


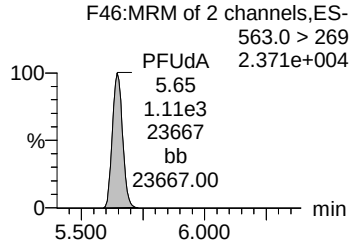
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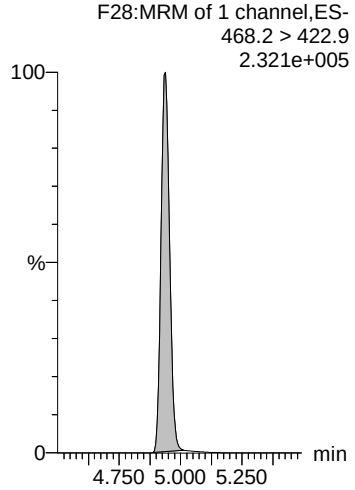


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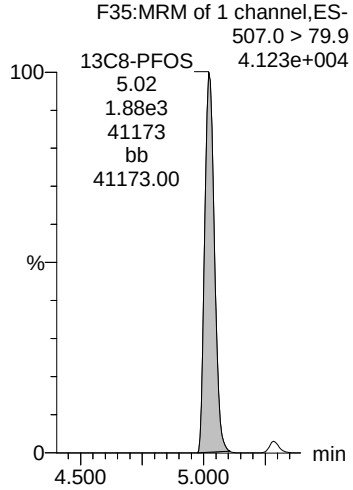




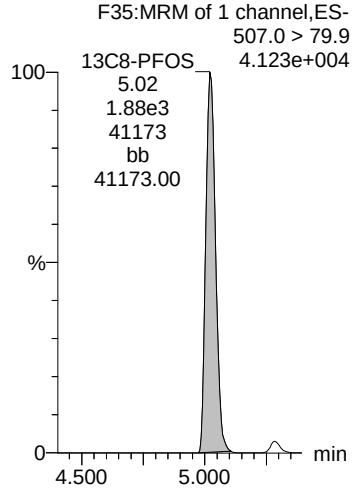
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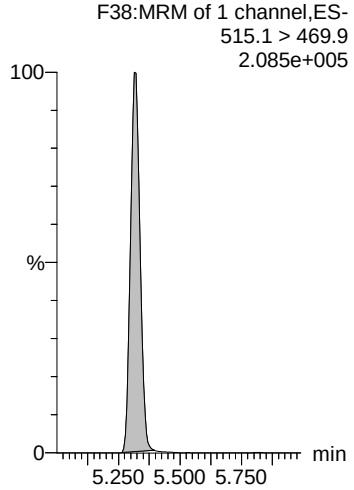
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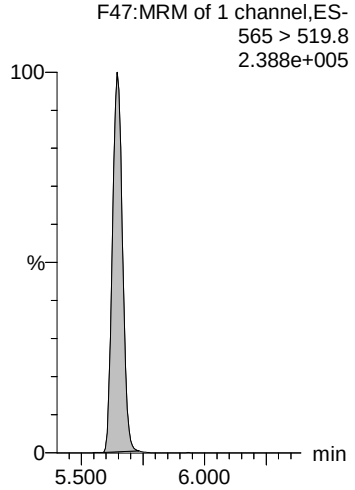
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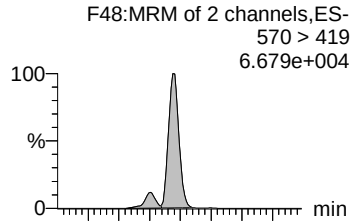


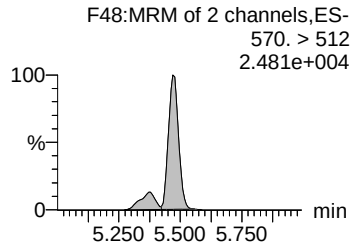
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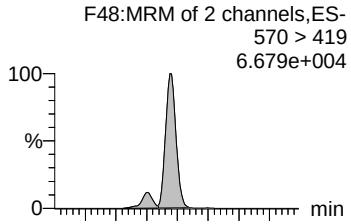
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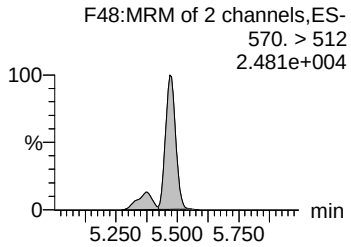
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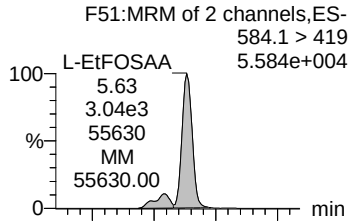


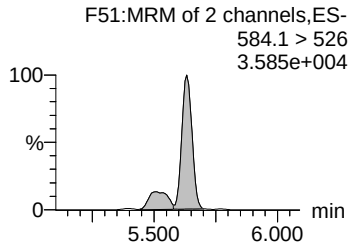
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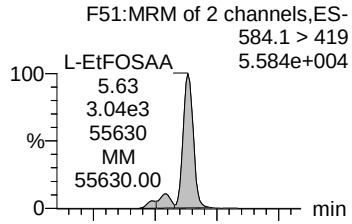


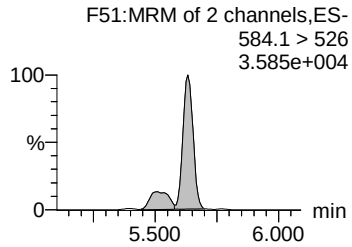
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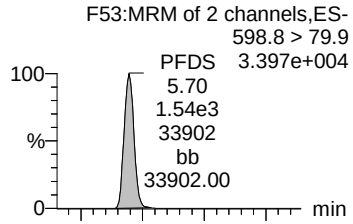


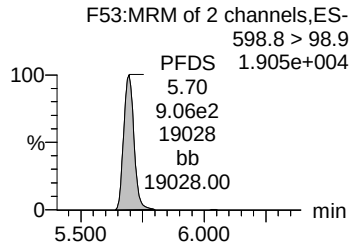
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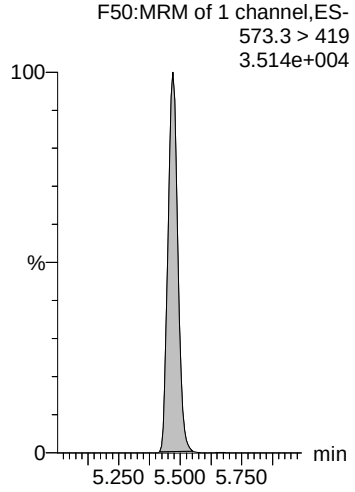


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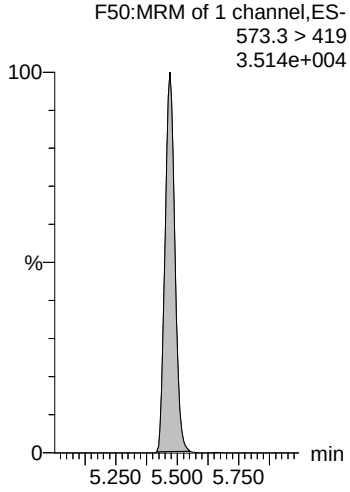




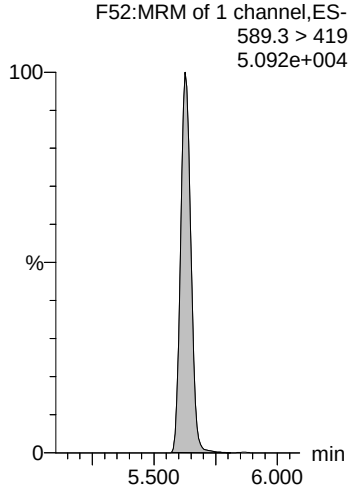
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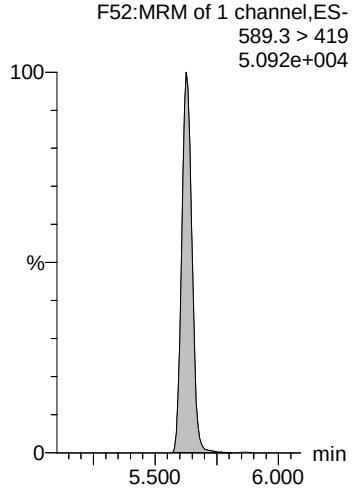
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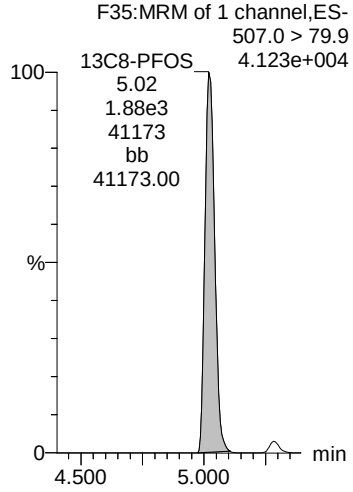
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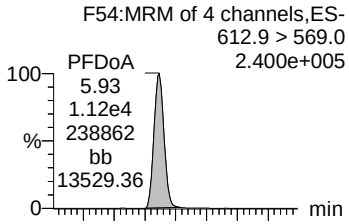


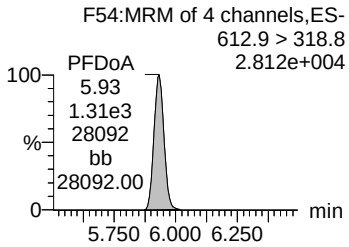
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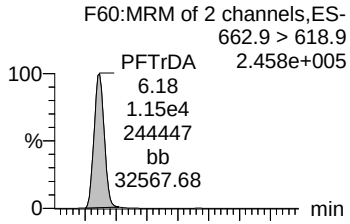
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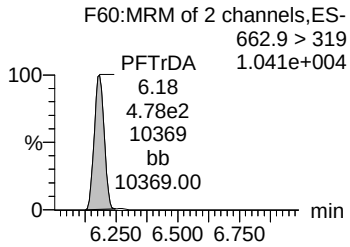
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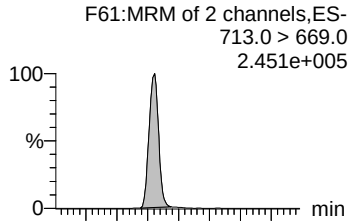


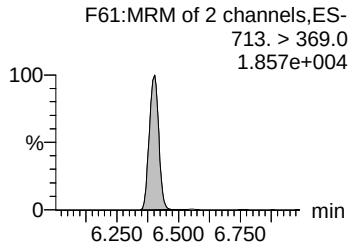
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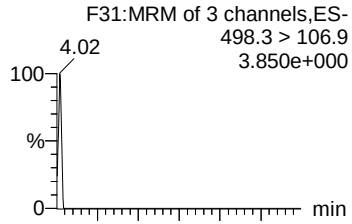


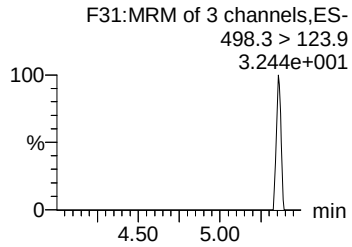
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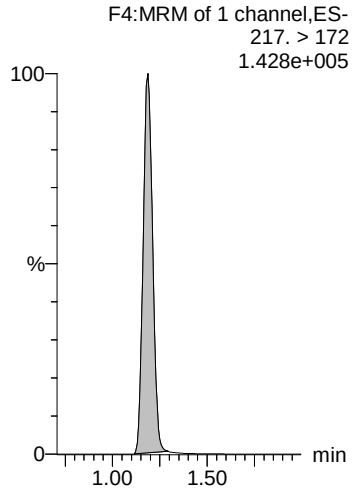


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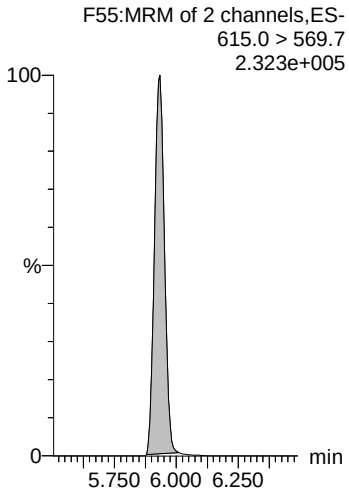




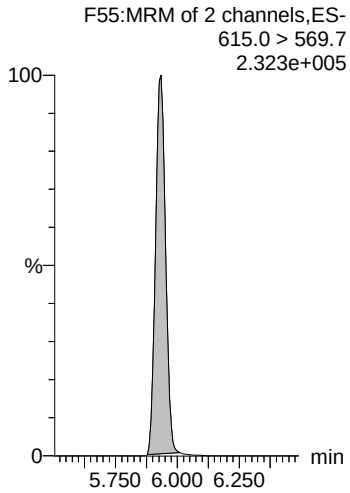
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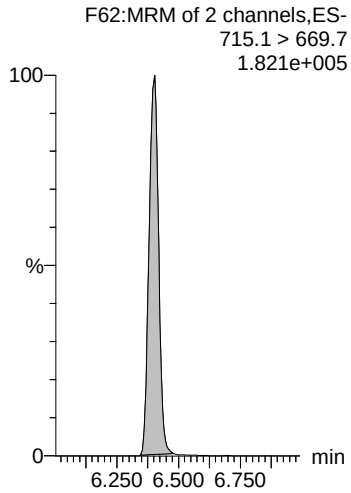
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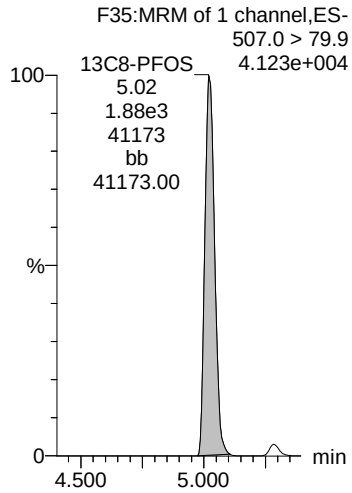
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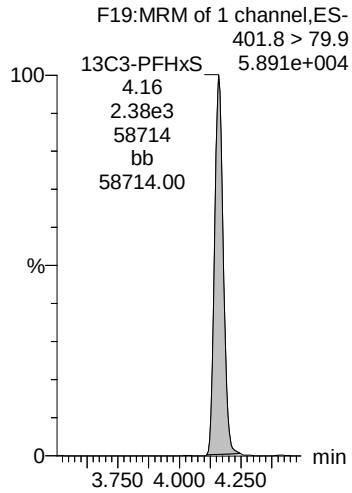
13C2-PFTeDA



13C8-PFOS



13C3-PFHxS

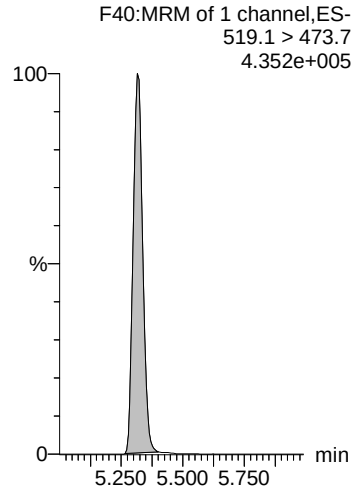


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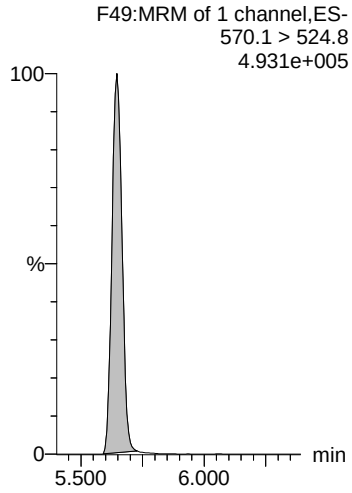
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Name: 181120M1_61, Date: 20-Nov-2018, Time: 23:31:48, ID: B8K0091-BS1 OPR 0.125, Description: OPR

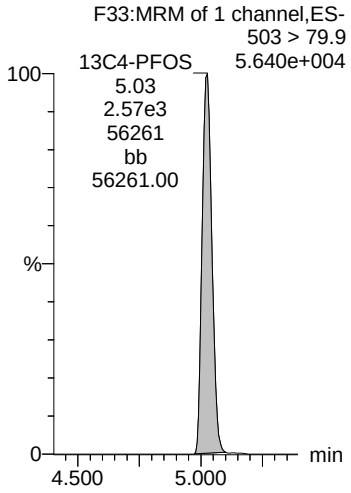
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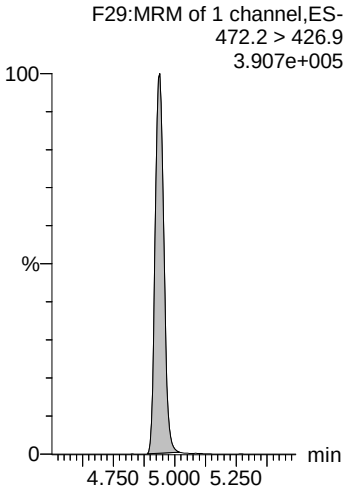
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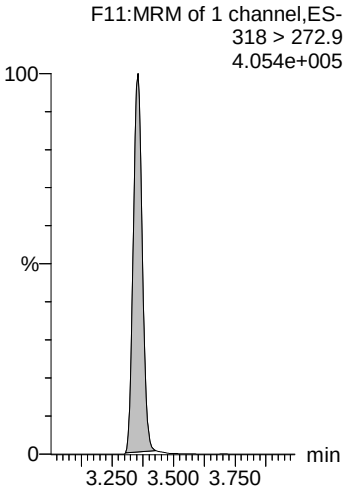
13C4-PFOS



13C9-PFNA



13C5-PFHxA



Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-71.qld

Last Altered: Monday, November 26, 2018 10:42:48 Pacific Standard Time
Printed: Monday, November 26, 2018 10:44:03 Pacific Standard Time

Name: 181120M1_71, Date: 21-Nov-2018, Time: 01:17:50, ID: 1803615-01 A1-MW-04-SA2 0.11345, Description: A1-MW-04-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	1.44e3	7.57e2	0.113		2.78	2.79	23.8	107.8777		2.762	NO
2	5	PFHxA	313 > 269	1.13e4	1.55e3	0.113		3.35	3.35	36.7	343.9183		16.114	NO
3	7	PFHpA	363.0 > 318.9	2.95e2	2.43e3	0.113		4.02	4.02	1.52	9.5227		15.114	NO
4	8	L-PFHxS	398.9 > 79.6	3.77e2	6.41e2	0.113		4.16	4.16	7.35	34.1936		2.112	NO
5	68	Total PFHxS	398.9 > 79.6	3.77e2	6.41e2	0.113		4.28		7.35	34.1936			
6	11	L-PFOA	412.8 > 368.9	4.37e2	5.07e3	0.113		4.47	4.50	1.08	6.4565		4.058	NO
7	69	Total PFOA	412.8 > 368.9	4.37e2	5.07e3	0.113		4.62		1.08	6.4565			
8	38	13C3-PFBS	302. > 98.8	7.57e2	1.72e3	0.113	0.539	2.72	2.78	5.50	89.9333	81.6		
9	40	13C2-PFHxA	315 > 270	1.55e3	5.23e3	0.113	0.964	3.30	3.35	3.69	33.7725	76.6		
10	41	13C4-PFHpA	367.2 > 321.8	2.43e3	5.23e3	0.113	0.482	3.97	4.02	5.80	106.0582	96.3		
11	42	18O2-PFHxS	403.0 > 102.6	6.41e2	1.72e3	0.113	0.480	4.11	4.16	4.65	85.4299	77.5		
12	42	18O2-PFHxS	403.0 > 102.6	6.41e2	1.72e3	0.113	0.480	4.11	4.16	4.65	85.4299	77.5		
13	44	13C2-PFOA	414.9 > 369.7	5.07e3	9.19e3	0.113	0.755	4.46	4.50	6.90	80.5476	73.1		
14	44	13C2-PFOA	414.9 > 369.7	5.07e3	9.19e3	0.113	0.755	4.46	4.50	6.90	80.5476	73.1		
15	-1													
16	14	PFNA	463.0 > 418.8		4.89e3	0.113		4.90						
17	16	L-PFOS	498.9 > 79.9		1.39e3	0.113		5.02						
18	70	Total PFOS	498.9 > 79.9	0.00e0	1.39e3	0.113		5.13		0.000				
19	18	PFDA	513 > 468.8		4.76e3	0.113		5.28						
20	21	L-MeFOSAA	570 > 419		1.14e3	0.113		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	1.14e3	0.113		5.57		0.000				
22	25	PFUdA	563.0 > 518.9		6.88e3	0.113		5.61						
23	45	13C5-PFNA	468.2 > 422.9	4.89e3	7.27e3	0.113	0.992	4.90	4.94	8.40	74.6524	67.8		
24	47	13C8-PFOS	507.0 > 79.9	1.39e3	1.82e3	0.113	1.034	4.98	5.02	9.55	81.3989	73.9		
25	47	13C8-PFOS	507.0 > 79.9	1.39e3	1.82e3	0.113	1.034	4.98	5.02	9.55	81.3989	73.9		
26	48	13C2-PFDA	515.1 > 469.9	4.76e3	9.79e3	0.113	0.832	5.28	5.31	6.08	64.3818	58.4		
27	50	d3-N-MeFOSAA	573.3 > 419	1.14e3	1.21e4	0.113	0.135	5.43	5.47	1.18	76.8854	69.8		
28	50	d3-N-MeFOSAA	573.3 > 419	1.14e3	1.21e4	0.113	0.135	5.43	5.47	1.18	76.8854	69.8		
29	51	13C2-PFUdA	565 > 519.8	6.88e3	1.21e4	0.113	0.928	5.61	5.65	7.12	67.6576	61.4		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		1.95e3	0.113		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	1.95e3	0.113		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		7.04e3	0.113		6.15						
34	27	PFDoA	612.9 > 569.0		7.04e3	0.113		5.90						
35	30	PFTeDA	713.0 > 669.0		5.73e3	0.113		6.37						
36	73	TCDA	498.3>106.9			0.113		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-71.qld

Last Altered: Monday, November 26, 2018 10:42:48 Pacific Standard Time
Printed: Monday, November 26, 2018 10:44:03 Pacific Standard Time

Name: 181120M1_71, Date: 21-Nov-2018, Time: 01:17:50, ID: 1803615-01 A1-MW-04-SA2 0.11345, Description: A1-MW-04-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	5.23e3	5.23e3	0.113	1.000	3.30	3.35	12.5	110.1807	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	1.95e3	1.21e4	0.113	0.198	5.59	5.63	2.01	89.5361	81.3		
39	52	d5-N-EtFOSAA	589.3 > 419	1.95e3	1.21e4	0.113	0.198	5.59	5.63	2.01	89.5361	81.3		
40	53	13C2-PFDoA	615.0 > 569.7	7.04e3	9.79e3	0.113	0.980	5.90	5.93	8.98	80.7581	73.3		
41	53	13C2-PFDoA	615.0 > 569.7	7.04e3	9.79e3	0.113	0.980	5.90	5.93	8.98	80.7581	73.3		
42	55	13C2-PFTeDA	715.1 > 669.7	5.73e3	1.21e4	0.113	0.607	6.37	6.40	5.93	86.1117	78.2		
43	47	13C8-PFOS	507.0 > 79.9	1.39e3	1.82e3	0.113	1.034	4.98	5.02	9.55	81.3989	73.9		
44	63	13C8-PFOA	420.9 > 376	9.19e3	9.19e3	0.113	1.000	4.46	4.50	12.5	110.1807	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	1.72e3	1.72e3	0.113	1.000	4.11	4.16	12.5	110.1807	100.0		
47	64	13C9-PFNA	472.2 > 426.9	7.27e3	7.27e3	0.113	1.000	4.90	4.94	12.5	110.1807	100.0		
48	65	13C4-PFOS	503 > 79.9	1.82e3	1.82e3	0.113	1.000	4.98	5.03	12.5	110.1807	100.0		
49	66	13C6-PFDA	519.1 > 473.7	9.79e3	9.79e3	0.113	1.000	5.28	5.32	12.5	110.1807	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.21e4	1.21e4	0.113	1.000	5.61	5.65	12.5	110.1807	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

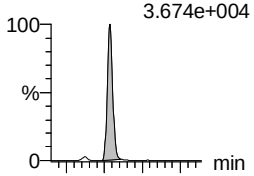
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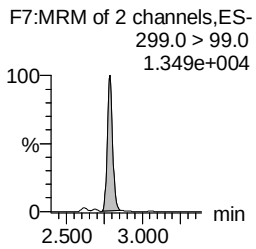
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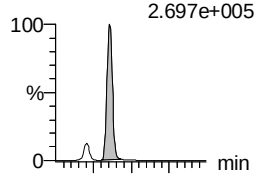
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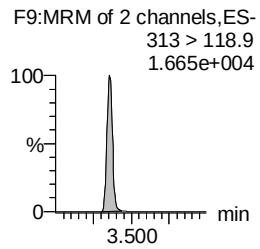
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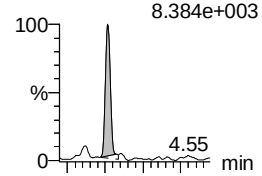


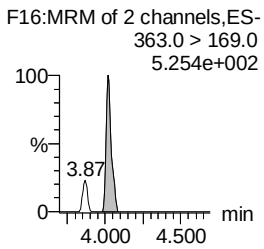
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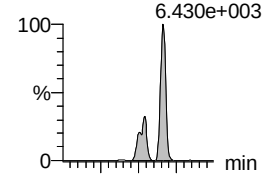


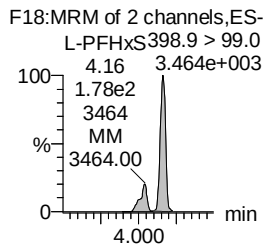
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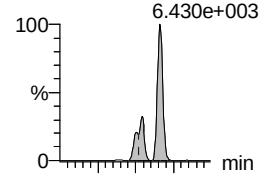


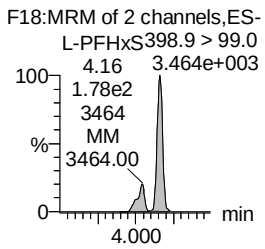
L-PFHxS



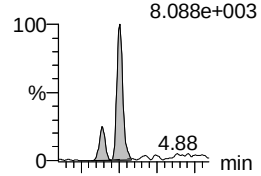


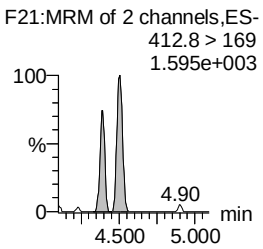
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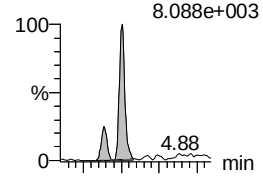


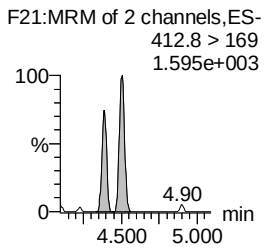
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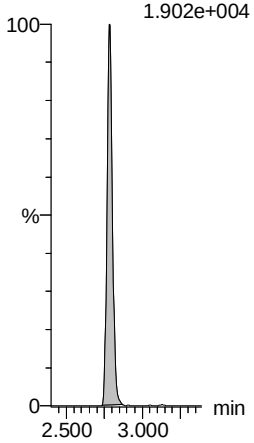


Total PFOA

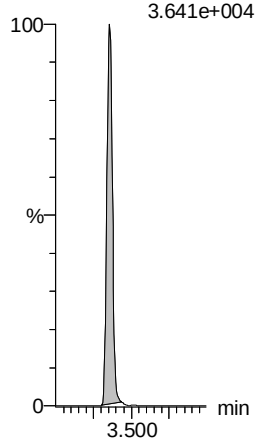




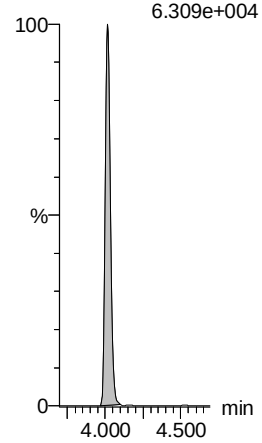
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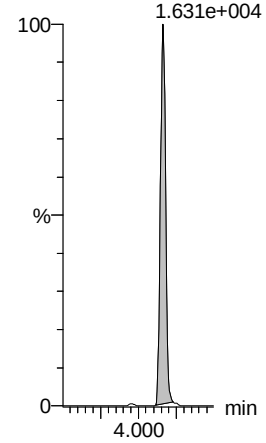
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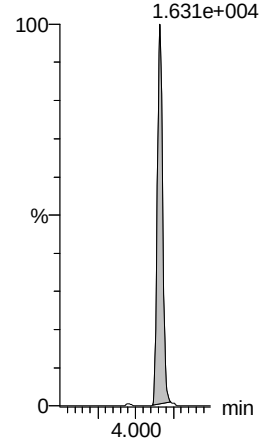
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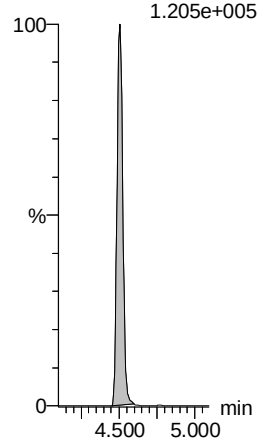
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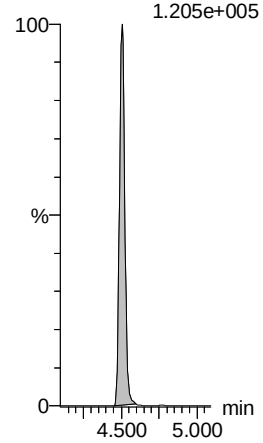
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13C2-PFOA



13C2-PFOA



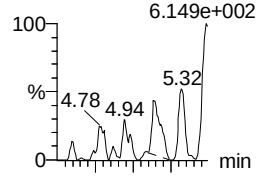
GM 11/26/2018

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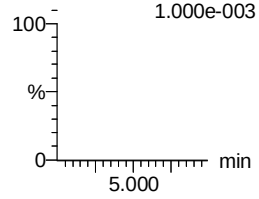
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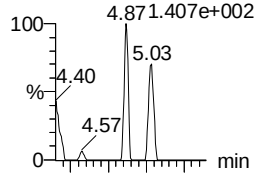
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
6.149e+002



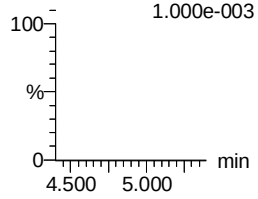
F27:MRM of 2 channels,ES-
463.0 > 219.0
1.000e-003



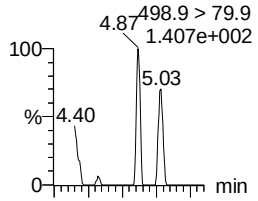
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.407e+002



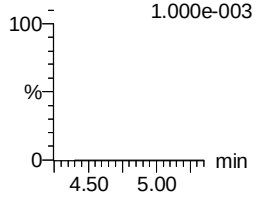
F32:MRM of 2 channels,ES-
498.9 > 99
1.000e-003



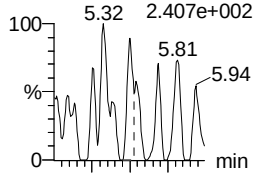
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.407e+002



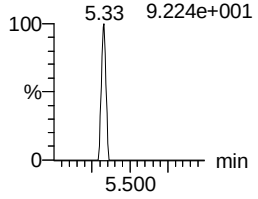
F32:MRM of 2 channels,ES-
498.9 > 99
1.000e-003



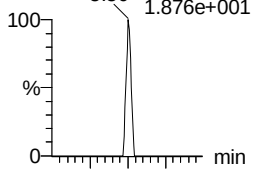
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
2.407e+002



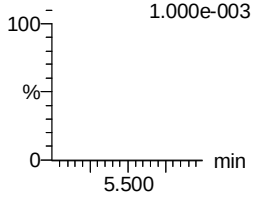
F37:MRM of 2 channels,ES-
513 > 219
9.224e+001



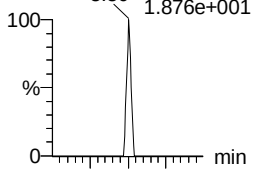
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.876e+001



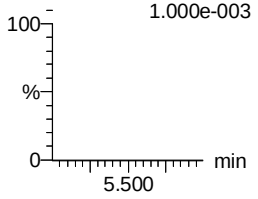
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



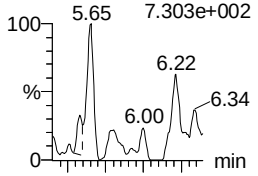
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.876e+001



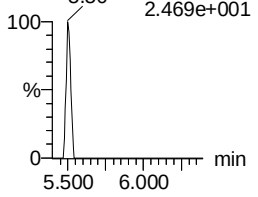
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



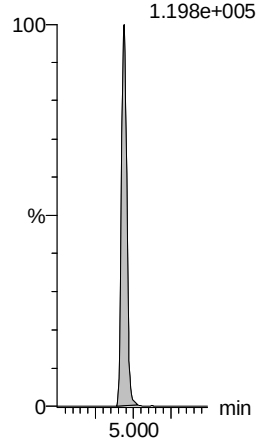
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
7.303e+002



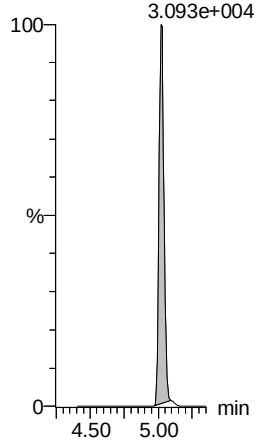
F46:MRM of 2 channels,ES-
563.0 > 269
2.469e+001



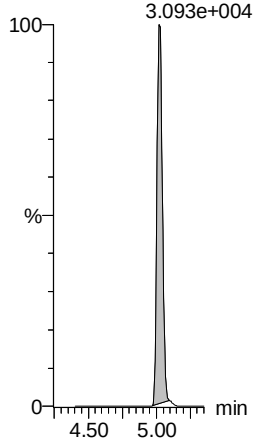
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
1.198e+005



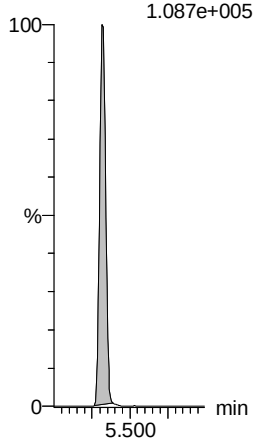
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
3.093e+004



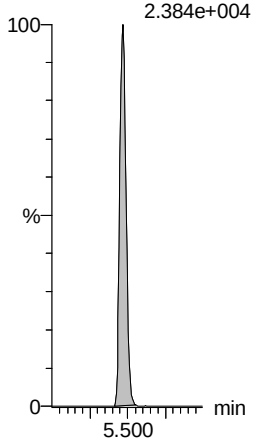
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
3.093e+004



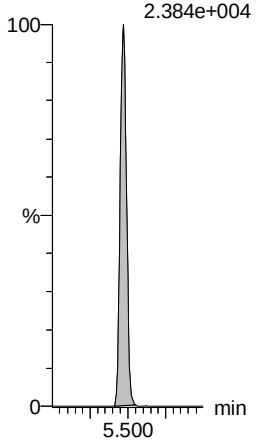
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
1.087e+005



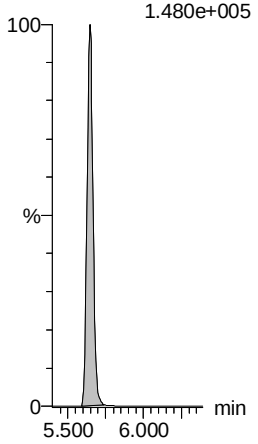
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
2.384e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
2.384e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
1.480e+005



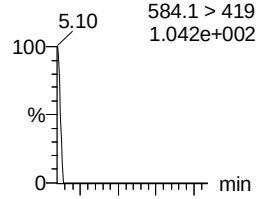
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-71.qld

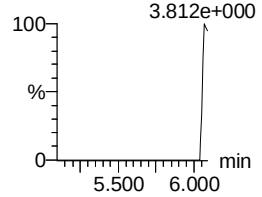
Last Altered: Monday, November 26, 2018 10:42:48 Pacific Standard Time
Printed: Monday, November 26, 2018 10:44:03 Pacific Standard Time

Name: 181120M1_71, Date: 21-Nov-2018, Time: 01:17:50, ID: 1803615-01 A1-MW-04-SA2 0.11345, Description: A1-MW-04-SA2

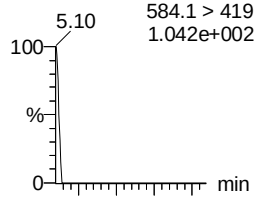
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.042e+002



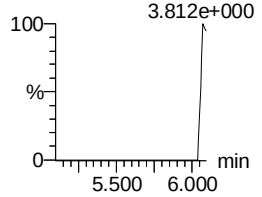
F51:MRM of 2 channels,ES-
584.1 > 526
3.812e+000



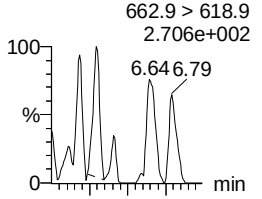
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.042e+002



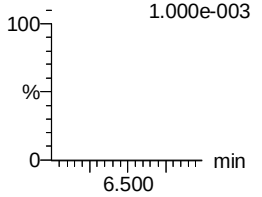
F51:MRM of 2 channels,ES-
584.1 > 526
3.812e+000



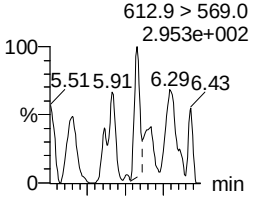
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
2.706e+002



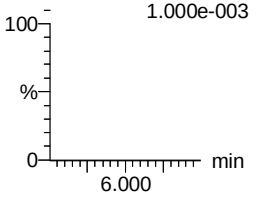
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003



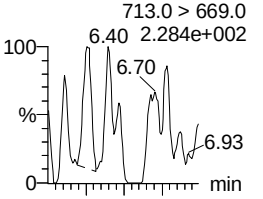
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
2.953e+002



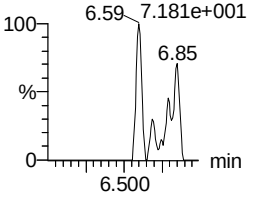
F54:MRM of 4 channels,ES-
612.9 > 318.8
1.000e-003



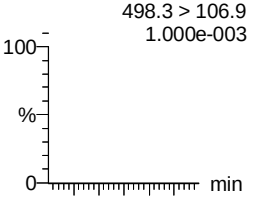
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
2.284e+002



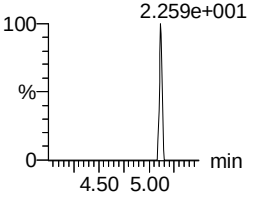
F61:MRM of 2 channels,ES-
713. > 369.0
7.181e+001



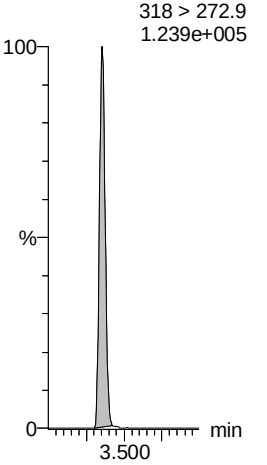
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003



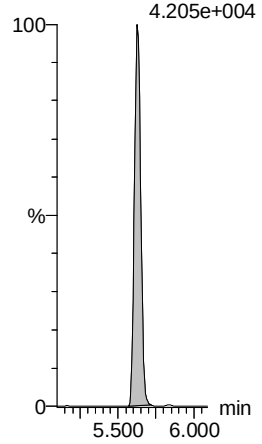
F31:MRM of 3 channels,ES-
498.3 > 123.9
2.259e+001



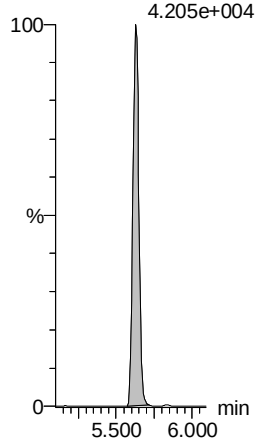
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
1.239e+005



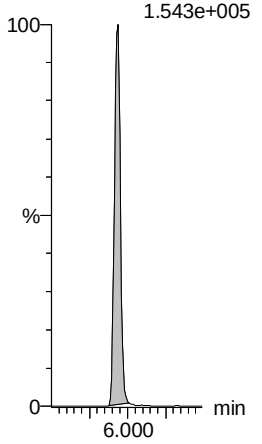
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
4.205e+004



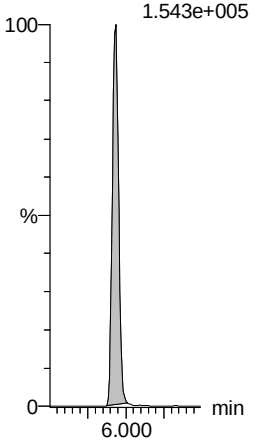
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
4.205e+004



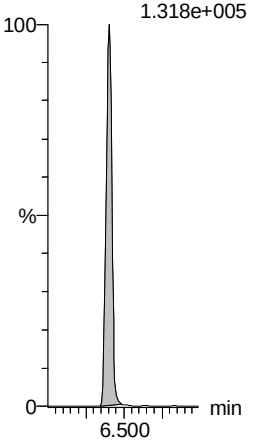
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
1.543e+005



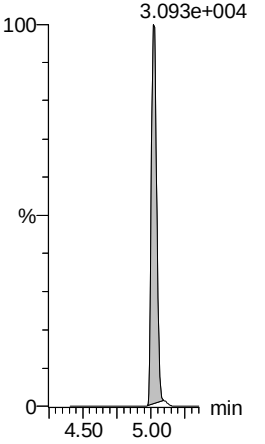
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
1.543e+005



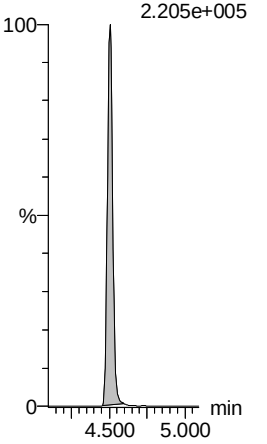
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
1.318e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
3.093e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
2.205e+005



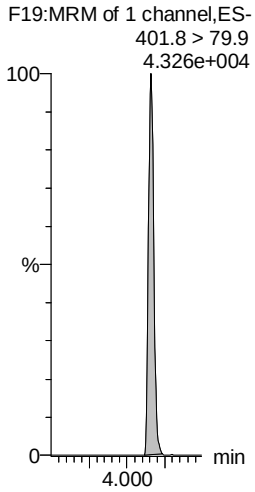
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-71.qld

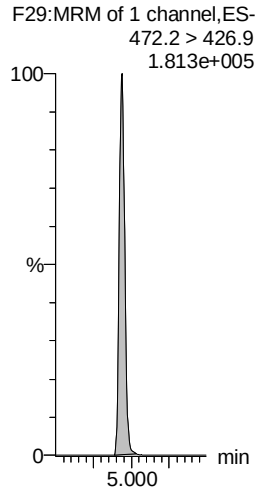
Last Altered: Monday, November 26, 2018 10:42:48 Pacific Standard Time
Printed: Monday, November 26, 2018 10:44:03 Pacific Standard Time

Name: 181120M1_71, Date: 21-Nov-2018, Time: 01:17:50, ID: 1803615-01 A1-MW-04-SA2 0.11345, Description: A1-MW-04-SA2

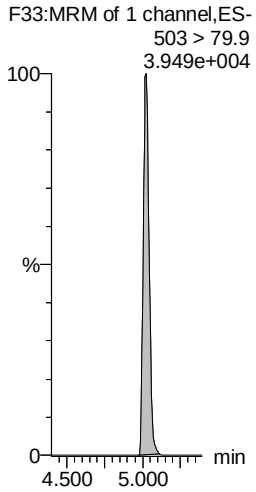
13C3-PFHxS



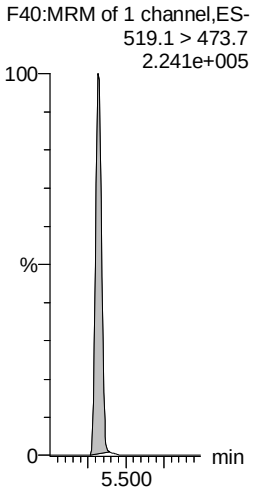
13C9-PFNA



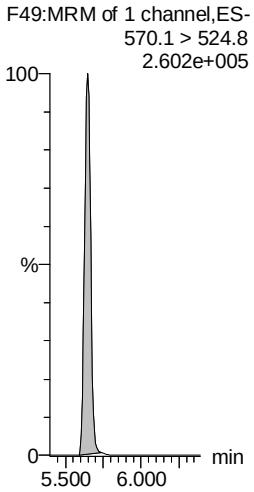
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-72.qld

Last Altered: Monday, November 26, 2018 11:11:04 Pacific Standard Time
Printed: Monday, November 26, 2018 11:11:26 Pacific Standard Time

Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-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	1.41e3	1.20e3	0.116		2.79	2.79	14.7	65.1951		2.607	NO
2	5	PFHxA	313 > 269	1.05e4	2.85e3	0.116		3.35	3.35	18.4	168.2187		14.606	NO
3	7	PFHpA	363.0 > 318.9	9.73e1	3.68e3	0.116		4.02	4.02	0.330	1.4906		15.309	NO
4	8	L-PFHxS	398.9 > 79.6	6.91e1	1.08e3	0.116		4.16	4.15	0.800	3.5929		3.562	YES
5	68	Total PFHxS	398.9 > 79.6	6.91e1	1.08e3	0.116		4.28		0.800	3.5929			
6	11	L-PFOA	412.8 > 368.9		6.86e3	0.116		4.47						
7	69	Total PFOA	412.8 > 368.9	0.00e0	6.86e3	0.116		4.62		0.000				
8	38	13C3-PFBS	302. > 98.8	1.20e3	2.50e3	0.116	0.539	2.72	2.79	6.01	96.3868	89.3		
9	40	13C2-PFHxA	315 > 270	2.85e3	8.18e3	0.116	0.964	3.30	3.35	4.36	39.0581	90.5		
10	41	13C4-PFHpA	367.2 > 321.8	3.68e3	8.18e3	0.116	0.482	3.97	4.02	5.63	100.8342	93.4		
11	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.50e3	0.116	0.480	4.11	4.16	5.40	97.2012	90.0		
12	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.50e3	0.116	0.480	4.11	4.16	5.40	97.2012	90.0		
13	44	13C2-PFOA	414.9 > 369.7	6.86e3	1.10e4	0.116	0.755	4.46	4.50	7.81	89.3089	82.7		
14	44	13C2-PFOA	414.9 > 369.7	6.86e3	1.10e4	0.116	0.755	4.46	4.50	7.81	89.3089	82.7		
15	-1													
16	14	PFNA	463.0 > 418.8		6.82e3	0.116		4.90						
17	16	L-PFOS	498.9 > 79.9		2.41e3	0.116		5.02						
18	70	Total PFOS	498.9 > 79.9	0.00e0	2.41e3	0.116		5.13		0.000				
19	18	PFDA	513 > 468.8		7.64e3	0.116		5.28						
20	21	L-MeFOSAA	570 > 419		2.03e3	0.116		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	2.03e3	0.116		5.57		0.000				
22	25	PFUdA	563.0 > 518.9	2.50e1	1.04e4	0.116		5.61	5.65	0.0299			3.882	YES
23	45	13C5-PFNA	468.2 > 422.9	6.82e3	8.42e3	0.116	0.992	4.90	4.94	10.1	88.1894	81.7		
24	47	13C8-PFOS	507.0 > 79.9	2.41e3	2.36e3	0.116	1.034	4.98	5.02	12.8	106.8382	99.0		
25	47	13C8-PFOS	507.0 > 79.9	2.41e3	2.36e3	0.116	1.034	4.98	5.02	12.8	106.8382	99.0		
26	48	13C2-PFDA	515.1 > 469.9	7.64e3	1.25e4	0.116	0.832	5.28	5.31	7.64	79.2676	73.4		
27	50	d3-N-MeFOSAA	573.3 > 419	2.03e3	1.64e4	0.116	0.135	5.43	5.47	1.54	98.6718	91.4		
28	50	d3-N-MeFOSAA	573.3 > 419	2.03e3	1.64e4	0.116	0.135	5.43	5.47	1.54	98.6718	91.4		
29	51	13C2-PFUdA	565 > 519.8	1.04e4	1.64e4	0.116	0.928	5.61	5.65	7.97	74.1565	68.7		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		3.12e3	0.116		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	3.12e3	0.116		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.10e4	0.116		6.15						
34	27	PFDoA	612.9 > 569.0		1.10e4	0.116		5.90						
35	30	PFTeDA	713.0 > 669.0		8.83e3	0.116		6.37						
36	73	TCDA	498.3>106.9			0.116		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-72.qld

Last Altered: Monday, November 26, 2018 11:11:04 Pacific Standard Time
Printed: Monday, November 26, 2018 11:11:26 Pacific Standard Time

Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-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	8.18e3	8.18e3	0.116	1.000	3.30	3.35	12.5	107.9541	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.12e3	1.64e4	0.116	0.198	5.59	5.63	2.38	103.6007	96.0		
39	52	d5-N-EtFOSAA	589.3 > 419	3.12e3	1.64e4	0.116	0.198	5.59	5.63	2.38	103.6007	96.0		
40	53	13C2-PFDoA	615.0 > 569.7	1.10e4	1.25e4	0.116	0.980	5.90	5.93	11.0	96.8136	89.7		
41	53	13C2-PFDoA	615.0 > 569.7	1.10e4	1.25e4	0.116	0.980	5.90	5.93	11.0	96.8136	89.7		
42	55	13C2-PFTeDA	715.1 > 669.7	8.83e3	1.64e4	0.116	0.607	6.37	6.40	6.73	95.8164	88.8		
43	47	13C8-PFOS	507.0 > 79.9	2.41e3	2.36e3	0.116	1.034	4.98	5.02	12.8	106.8382	99.0		
44	63	13C8-PFOA	420.9 > 376	1.10e4	1.10e4	0.116	1.000	4.46	4.50	12.5	107.9541	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.50e3	2.50e3	0.116	1.000	4.11	4.16	12.5	107.9541	100.0		
47	64	13C9-PFNA	472.2 > 426.9	8.42e3	8.42e3	0.116	1.000	4.90	4.94	12.5	107.9541	100.0		
48	65	13C4-PFOS	503 > 79.9	2.36e3	2.36e3	0.116	1.000	4.98	5.02	12.5	107.9541	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.25e4	1.25e4	0.116	1.000	5.28	5.32	12.5	107.9541	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.64e4	1.64e4	0.116	1.000	5.61	5.65	12.5	107.9541	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

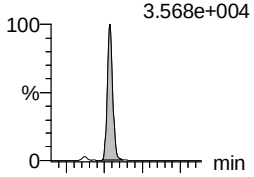
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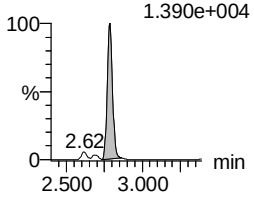
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Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-SA2

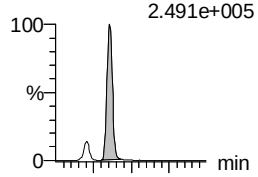
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
3.568e+004



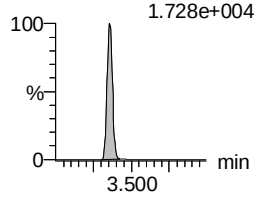
F7:MRM of 2 channels,ES-
299.0 > 99.0
1.390e+004



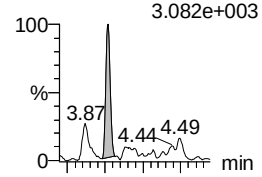
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
2.491e+005



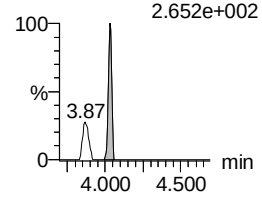
F9:MRM of 2 channels,ES-
313 > 118.9
1.728e+004



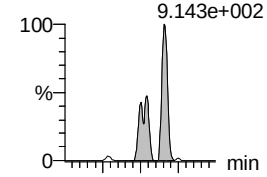
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
3.082e+003



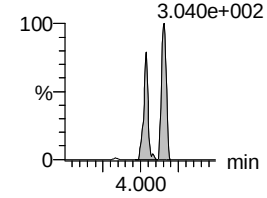
F16:MRM of 2 channels,ES-
363.0 > 169.0
2.652e+002



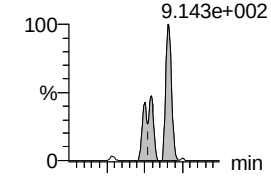
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
9.143e+002



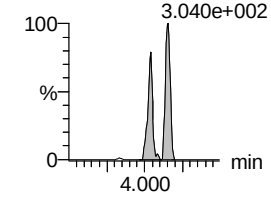
F18:MRM of 2 channels,ES-
398.9 > 99.0
3.040e+002



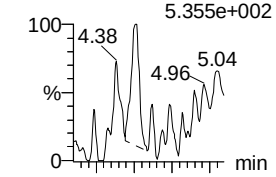
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
9.143e+002



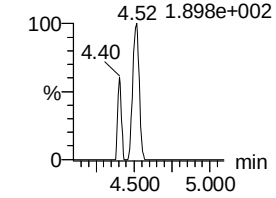
F18:MRM of 2 channels,ES-
398.9 > 99.0
3.040e+002



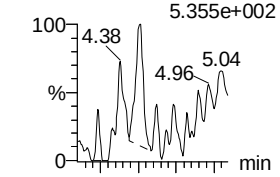
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
5.355e+002



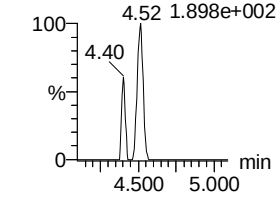
F21:MRM of 2 channels,ES-
412.8 > 169
1.898e+002



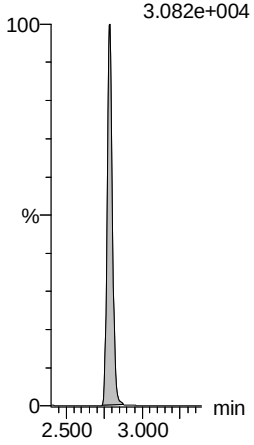
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
5.355e+002



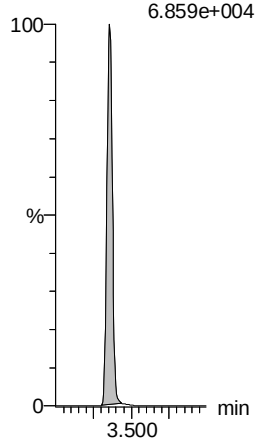
F21:MRM of 2 channels,ES-
412.8 > 169
1.898e+002



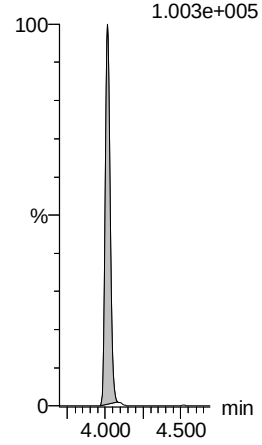
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
3.082e+004



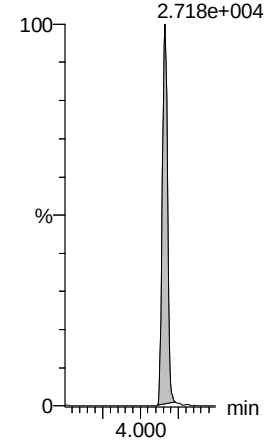
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
6.859e+004



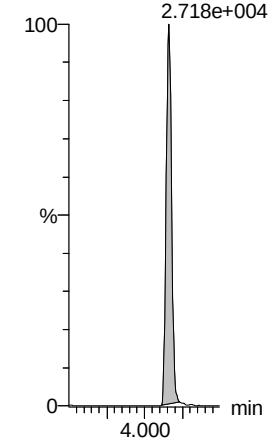
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
1.003e+005



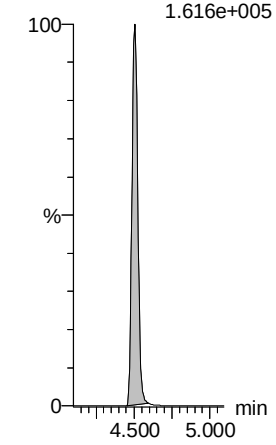
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.718e+004



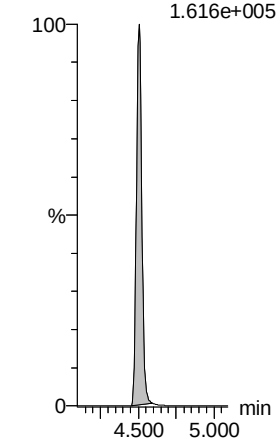
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.718e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.616e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.616e+005



GM 11/26/2018

Vista Analytical Laboratory L14

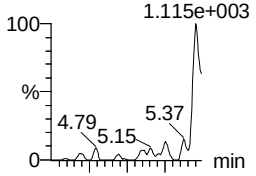
Rev: ANP 11/26/2018

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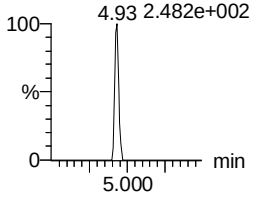
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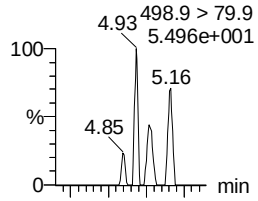
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
1.115e+003



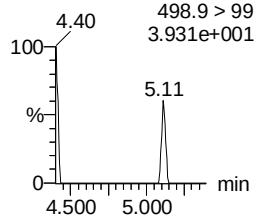
F27:MRM of 2 channels,ES-
463.0 > 219.0
4.93 2.482e+002



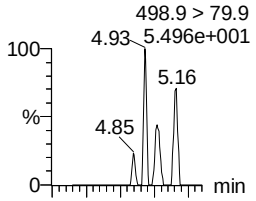
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
4.93 5.496e+001



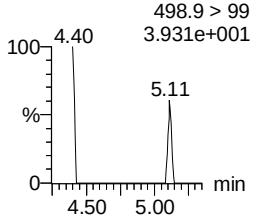
F32:MRM of 2 channels,ES-
498.9 > 99
4.40 3.931e+001



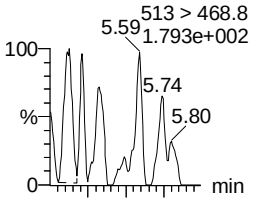
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
4.93 5.496e+001



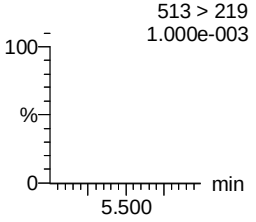
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498.9 > 99
4.40 3.931e+001



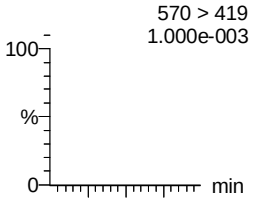
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F37:MRM of 2 channels,ES-
513 > 468.8
5.59 1.793e+002



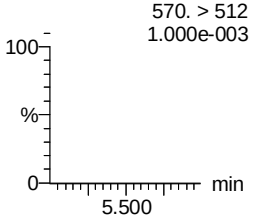
F37:MRM of 2 channels,ES-
513 > 219
1.000e-003



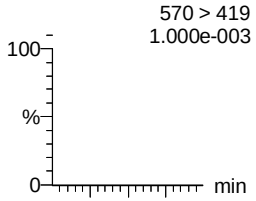
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



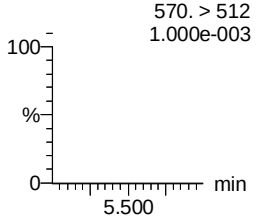
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



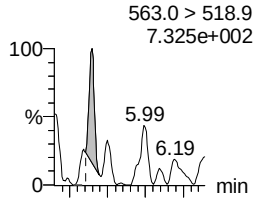
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



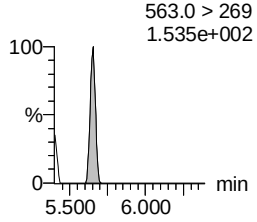
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



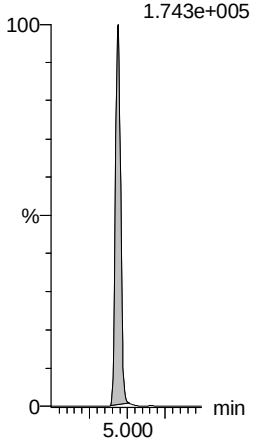
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
7.325e+002



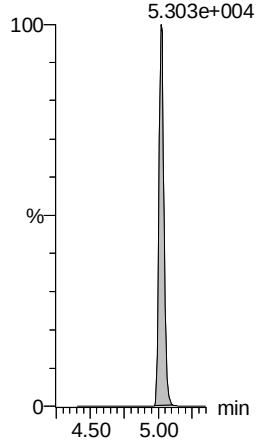
F46:MRM of 2 channels,ES-
563.0 > 269
1.535e+002



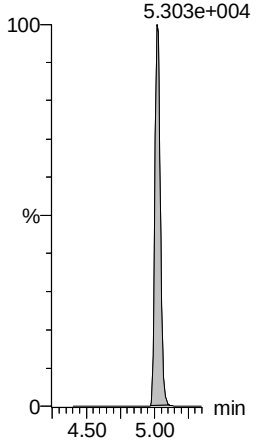
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
1.743e+005



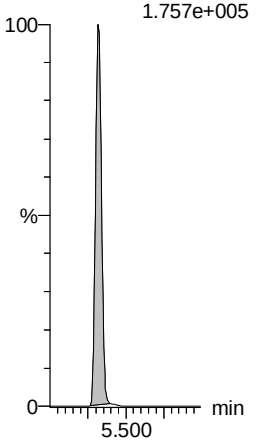
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.303e+004



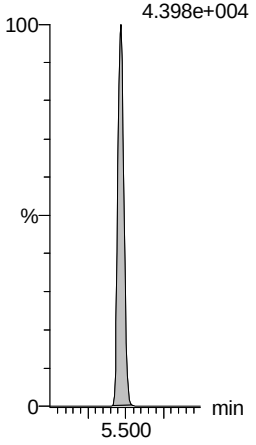
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.303e+004



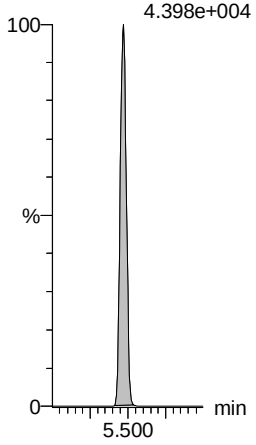
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
1.757e+005



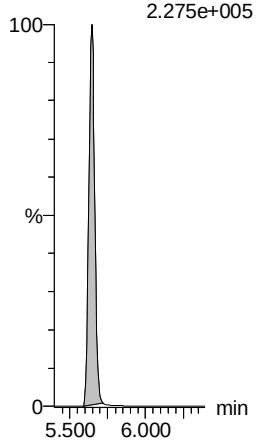
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.398e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.398e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.275e+005



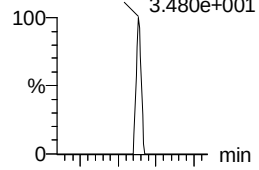
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-72.qld

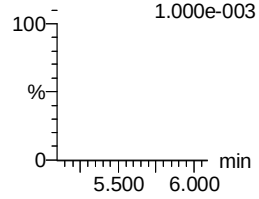
Last Altered: Monday, November 26, 2018 11:11:04 Pacific Standard Time
Printed: Monday, November 26, 2018 11:11:26 Pacific Standard Time

Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-SA2

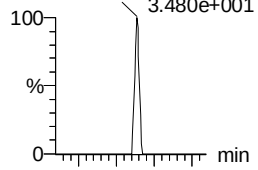
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
3.480e+001



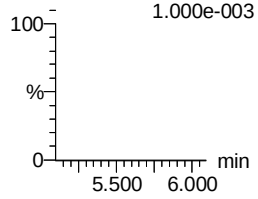
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



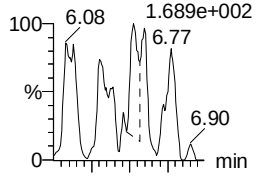
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
3.480e+001



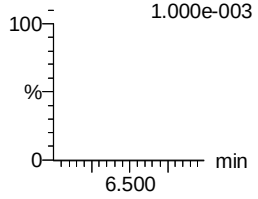
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



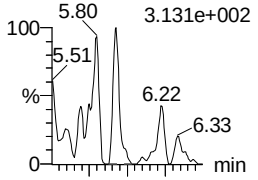
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
1.689e+002



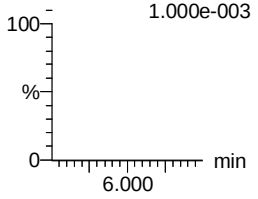
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003



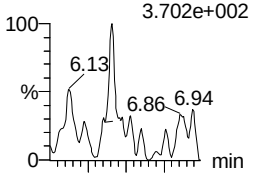
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.131e+002



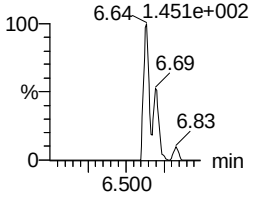
F54:MRM of 4 channels,ES-
612.9 > 318.8
1.000e-003



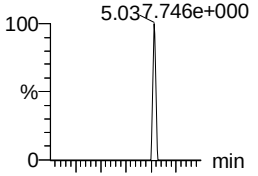
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
3.702e+002



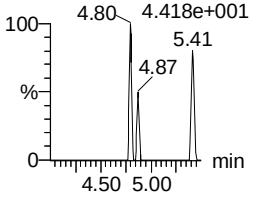
F61:MRM of 2 channels,ES-
713. > 369.0
1.451e+002



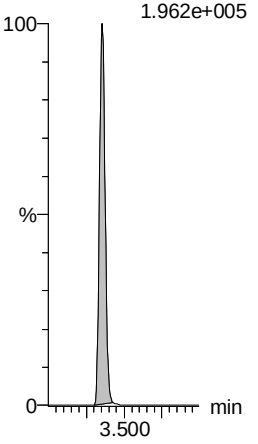
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
7.746e+000



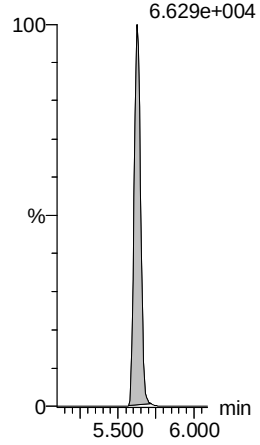
F31:MRM of 3 channels,ES-
498.3 > 123.9
4.418e+001



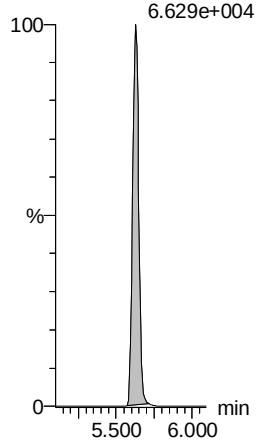
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
1.962e+005



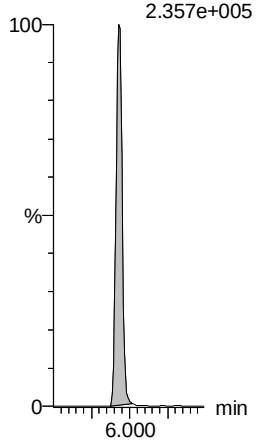
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
6.629e+004



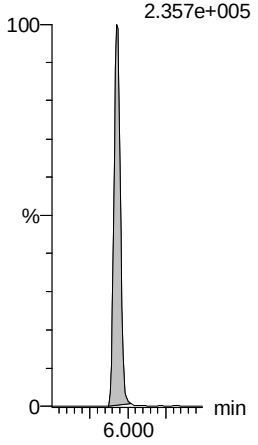
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
6.629e+004



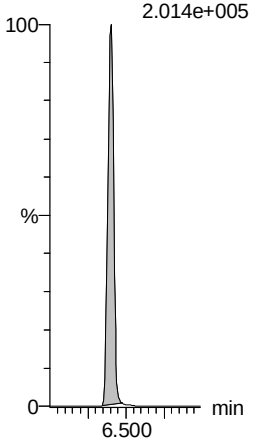
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.357e+005



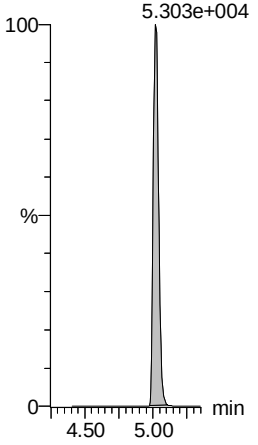
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.357e+005



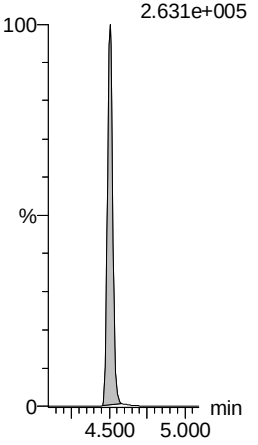
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
2.014e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.303e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
2.631e+005



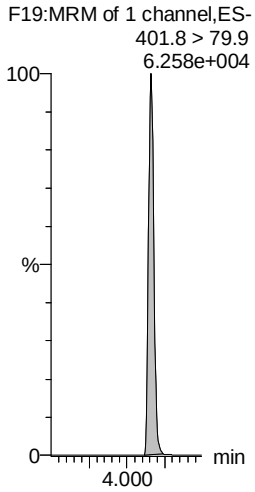
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-72.qld

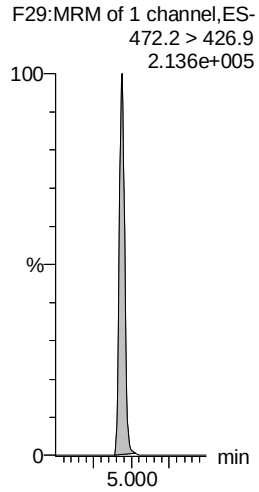
Last Altered: Monday, November 26, 2018 11:11:04 Pacific Standard Time
Printed: Monday, November 26, 2018 11:11:26 Pacific Standard Time

Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-SA2

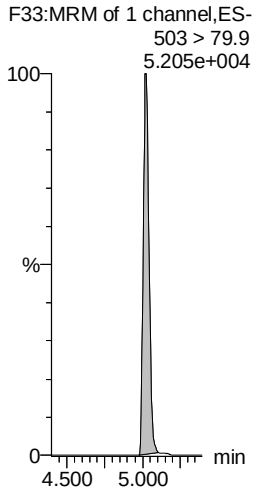
13C3-PFHxS



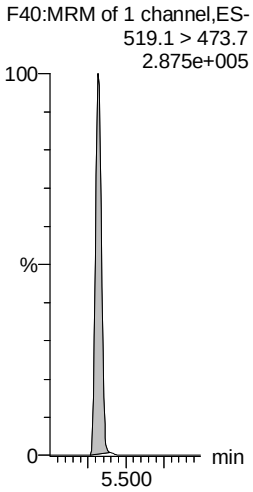
13C9-PFNA



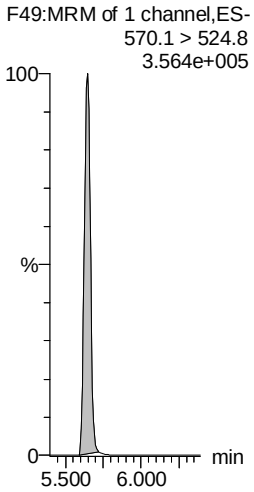
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-73.qld

Last Altered: Monday, November 26, 2018 11:14:58 Pacific Standard Time
Printed: Monday, November 26, 2018 11:15:18 Pacific Standard Time

Name: 181120M1_73, Date: 21-Nov-2018, Time: 01:39:00, ID: 1803615-03 A1-MW-49-SA2 0.11411, Description: A1-MW-49-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	2.07e2	1.26e3	0.114		2.78	2.78	2.05	9.1694		2.779	NO
2	5	PFHxA	313 > 269	1.09e3	4.38e3	0.114		3.35	3.35	1.24	11.1809		15.119	NO
3	7	PFHpA	363.0 > 318.9	2.03e2	5.72e3	0.114		4.02	4.02	0.444	2.2700		27.328	YES
4	8	L-PFHxS	398.9 > 79.6	6.91e2	1.13e3	0.114		4.16	4.16	7.63	35.2810		1.778	NO
5	68	Total PFHxS	398.9 > 79.6	6.91e2	1.13e3	0.114		4.28		7.63	35.2810			
6	11	L-PFOA	412.8 > 368.9	2.52e2	9.90e3	0.114		4.47	4.51	0.318	1.2171		3.031	NO
7	69	Total PFOA	412.8 > 368.9	2.52e2	9.90e3	0.114		4.62		0.318	1.2171			
8	38	13C3-PFBS	302. > 98.8	1.26e3	2.58e3	0.114	0.539	2.72	2.78	6.11	99.3489	90.7		
9	40	13C2-PFHxA	315 > 270	4.38e3	1.27e4	0.114	0.964	3.30	3.35	4.31	39.2053	89.5		
10	41	13C4-PFHpA	367.2 > 321.8	5.72e3	1.27e4	0.114	0.482	3.97	4.02	5.64	102.4994	93.6		
11	42	18O2-PFHxS	403.0 > 102.6	1.13e3	2.58e3	0.114	0.480	4.11	4.16	5.48	100.0011	91.3		
12	42	18O2-PFHxS	403.0 > 102.6	1.13e3	2.58e3	0.114	0.480	4.11	4.16	5.48	100.0011	91.3		
13	44	13C2-PFOA	414.9 > 369.7	9.90e3	1.68e4	0.114	0.755	4.46	4.50	7.36	85.4201	78.0		
14	44	13C2-PFOA	414.9 > 369.7	9.90e3	1.68e4	0.114	0.755	4.46	4.50	7.36	85.4201	78.0		
15	-1													
16	14	PFNA	463.0 > 418.8		8.64e3	0.114		4.90						
17	16	L-PFOS	498.9 > 79.9		2.35e3	0.114		5.02						
18	70	Total PFOS	498.9 > 79.9	0.00e0	2.35e3	0.114		5.13		0.000				
19	18	PFDA	513 > 468.8		7.87e3	0.114		5.28						
20	21	L-MeFOSAA	570 > 419		2.14e3	0.114		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	2.14e3	0.114		5.57		0.000				
22	25	PFUdA	563.0 > 518.9	3.18e1	1.06e4	0.114		5.61	5.65	0.0374			73.791	YES
23	45	13C5-PFNA	468.2 > 422.9	8.64e3	1.14e4	0.114	0.992	4.90	4.94	9.44	83.4131	76.1		
24	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.73e3	0.114	1.034	4.98	5.03	10.7	90.9871	83.1		
25	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.73e3	0.114	1.034	4.98	5.03	10.7	90.9871	83.1		
26	48	13C2-PFDA	515.1 > 469.9	7.87e3	1.37e4	0.114	0.832	5.28	5.32	7.20	75.7859	69.2		
27	50	d3-N-MeFOSAA	573.3 > 419	2.14e3	1.68e4	0.114	0.135	5.43	5.47	1.59	102.7946	93.8		
28	50	d3-N-MeFOSAA	573.3 > 419	2.14e3	1.68e4	0.114	0.135	5.43	5.47	1.59	102.7946	93.8		
29	51	13C2-PFUdA	565 > 519.8	1.06e4	1.68e4	0.114	0.928	5.61	5.65	7.89	74.5249	68.0		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		3.27e3	0.114		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	3.27e3	0.114		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.22e4	0.114		6.15						
34	27	PFDoA	612.9 > 569.0		1.22e4	0.114		5.90						
35	30	PFTeDA	713.0 > 669.0		1.04e4	0.114		6.37						
36	73	TCDA	498.3>106.9			0.114		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-73.qld

Last Altered: Monday, November 26, 2018 11:14:58 Pacific Standard Time
Printed: Monday, November 26, 2018 11:15:18 Pacific Standard Time

Name: 181120M1_73, Date: 21-Nov-2018, Time: 01:39:00, ID: 1803615-03 A1-MW-49-SA2 0.11411, Description: A1-MW-49-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	1.27e4	1.27e4	0.114	1.000	3.30	3.35	12.5	109.5434	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.27e3	1.68e4	0.114	0.198	5.59	5.63	2.43	107.4947	98.1		
39	52	d5-N-EtFOSAA	589.3 > 419	3.27e3	1.68e4	0.114	0.198	5.59	5.63	2.43	107.4947	98.1		
40	53	13C2-PFDoA	615.0 > 569.7	1.22e4	1.37e4	0.114	0.980	5.90	5.93	11.1	99.4948	90.8		
41	53	13C2-PFDoA	615.0 > 569.7	1.22e4	1.37e4	0.114	0.980	5.90	5.93	11.1	99.4948	90.8		
42	55	13C2-PFTeDA	715.1 > 669.7	1.04e4	1.68e4	0.114	0.607	6.37	6.40	7.73	111.5354	101.8		
43	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.73e3	0.114	1.034	4.98	5.03	10.7	90.9871	83.1		
44	63	13C8-PFOA	420.9 > 376	1.68e4	1.68e4	0.114	1.000	4.46	4.50	12.5	109.5434	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.58e3	2.58e3	0.114	1.000	4.11	4.16	12.5	109.5434	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.14e4	1.14e4	0.114	1.000	4.90	4.94	12.5	109.5434	100.0		
48	65	13C4-PFOS	503 > 79.9	2.73e3	2.73e3	0.114	1.000	4.98	5.03	12.5	109.5434	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.37e4	1.37e4	0.114	1.000	5.28	5.32	12.5	109.5434	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.68e4	1.68e4	0.114	1.000	5.61	5.65	12.5	109.5434	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

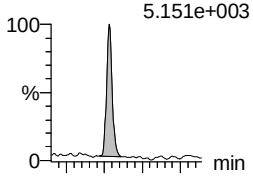
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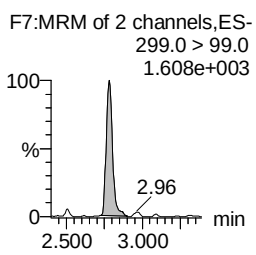
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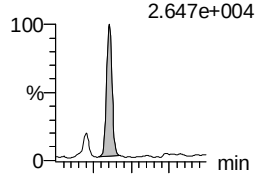
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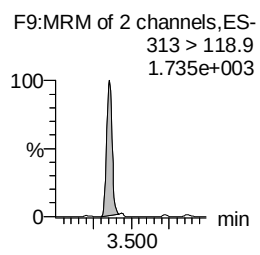
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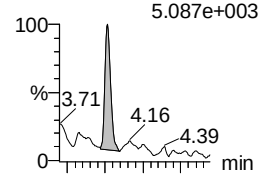


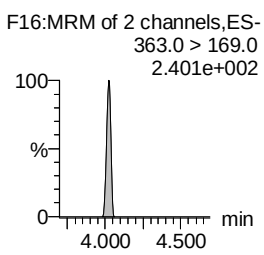
PFHxA



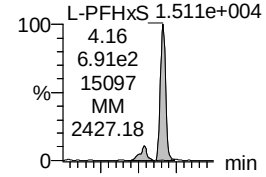


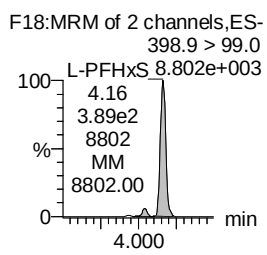
PFHpA



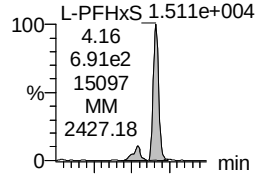


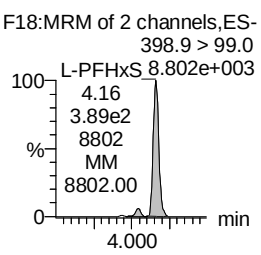
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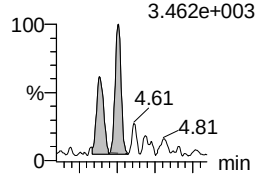


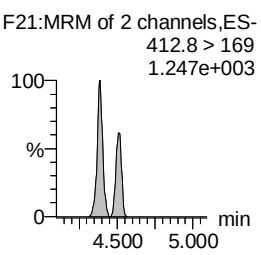
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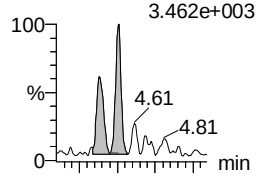


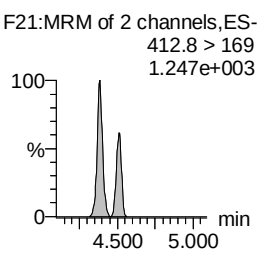
L-PFOA



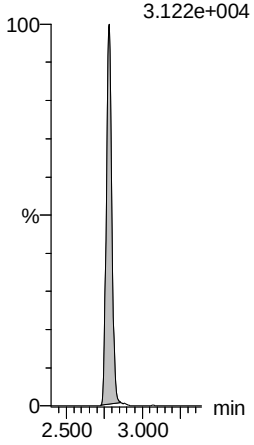


Total PFOA

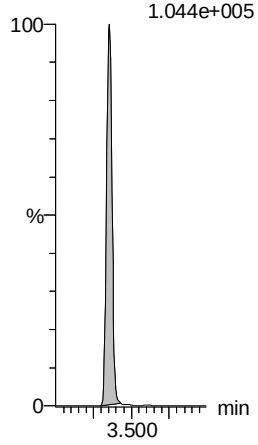




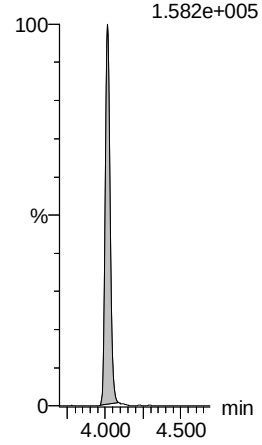
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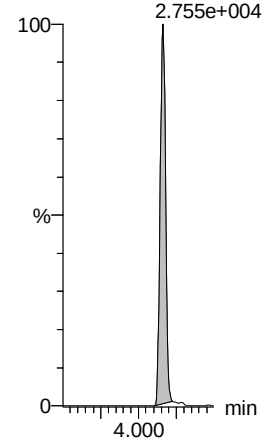
13C2-PFHxA



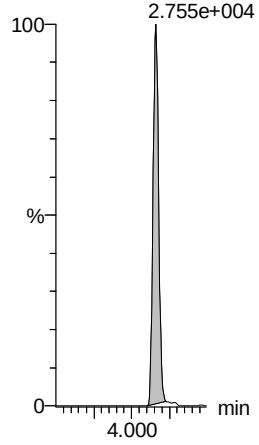
13C4-PFHpA



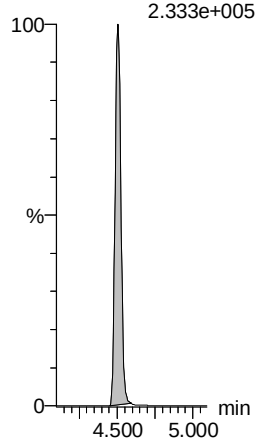
18O2-PFHxS



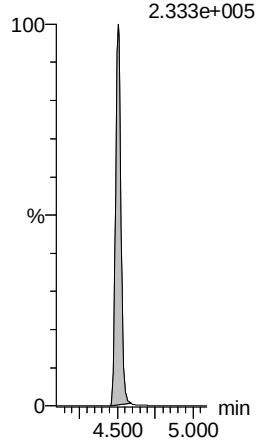
18O2-PFHxS



13C2-PFOA



13C2-PFOA



GM 11/26/2018

Vista Analytical Laboratory L14

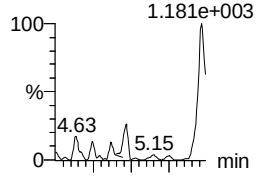
Rev: ANP 11/26/2018

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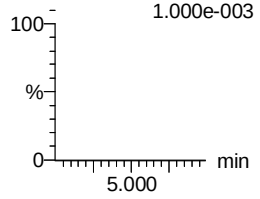
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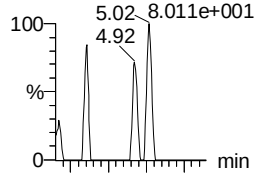
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
1.181e+003



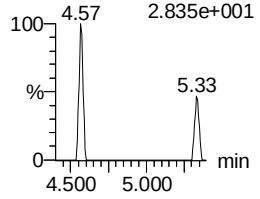
F27:MRM of 2 channels,ES-
463.0 > 219.0
1.000e-003



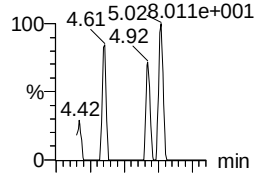
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
8.011e+001



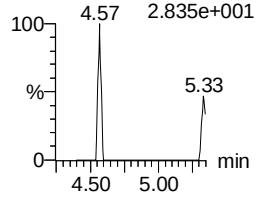
F32:MRM of 2 channels,ES-
498.9 > 99
2.835e+001



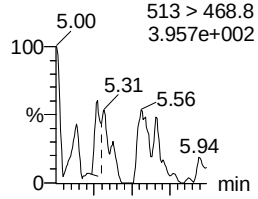
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
8.011e+001



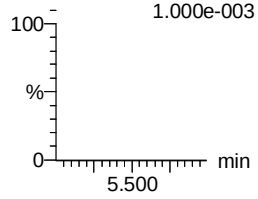
F32:MRM of 2 channels,ES-
498.9 > 99
2.835e+001



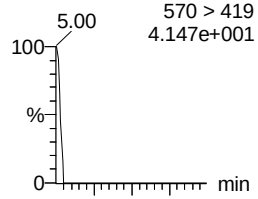
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
3.957e+002



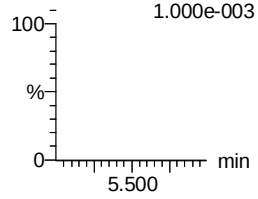
F37:MRM of 2 channels,ES-
513 > 219
1.000e-003



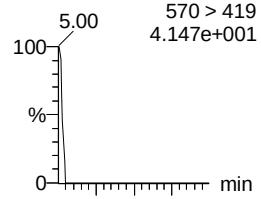
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
4.147e+001



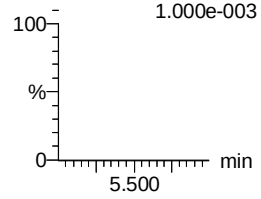
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



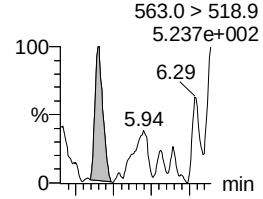
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F48:MRM of 2 channels,ES-
570 > 419
4.147e+001



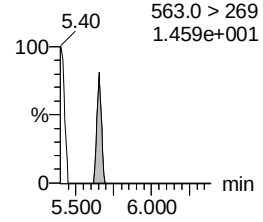
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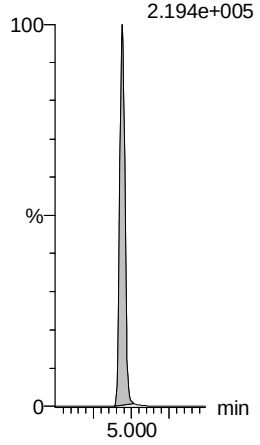
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
5.237e+002



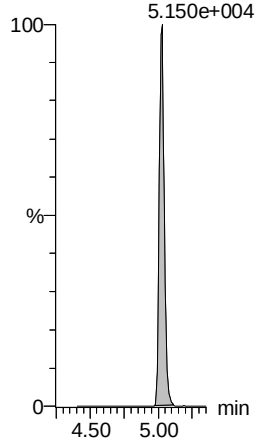
F46:MRM of 2 channels,ES-
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1.459e+001



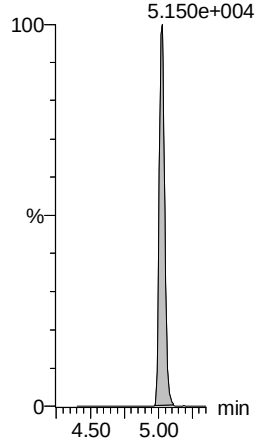
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
2.194e+005



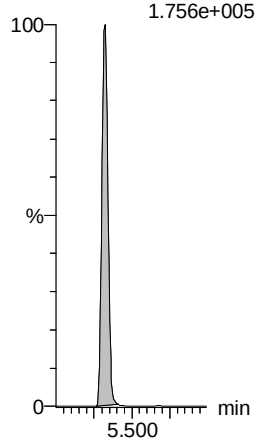
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F35:MRM of 1 channel,ES-
507.0 > 79.9
5.150e+004



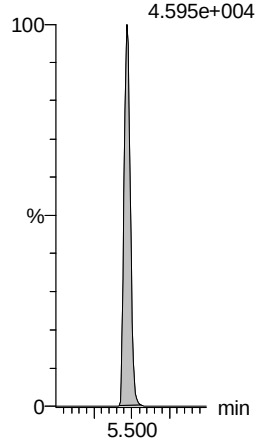
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5.150e+004



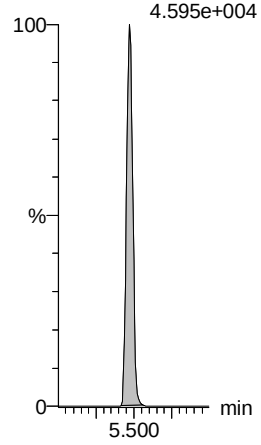
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F38:MRM of 1 channel,ES-
515.1 > 469.9
1.756e+005



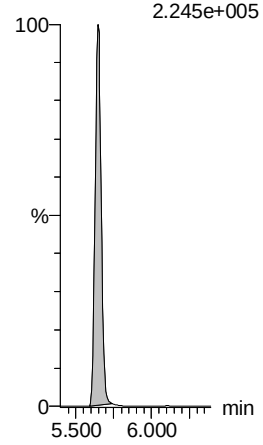
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.595e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.595e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.245e+005



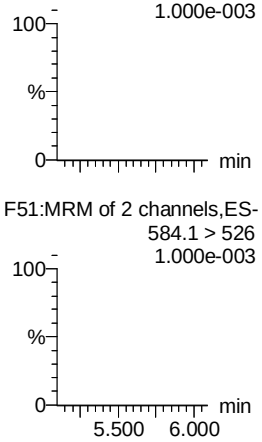
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Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-73.qld

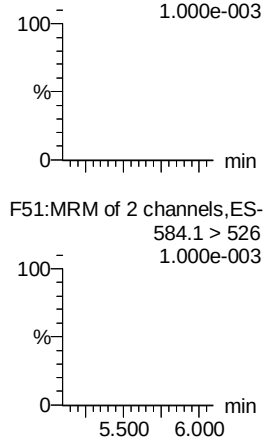
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Name: 181120M1_73, Date: 21-Nov-2018, Time: 01:39:00, ID: 1803615-03 A1-MW-49-SA2 0.11411, Description: A1-MW-49-SA2

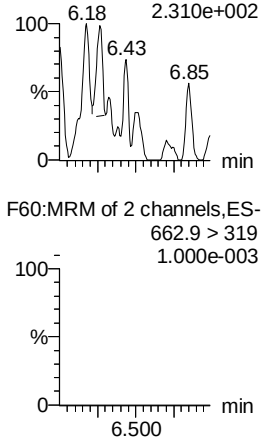
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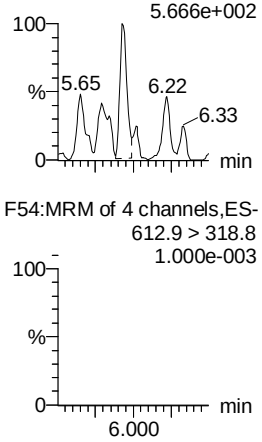
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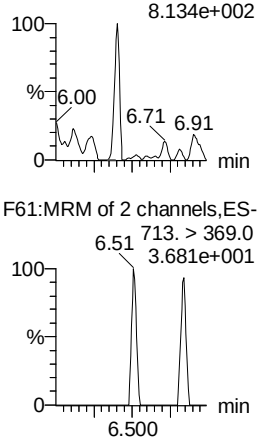
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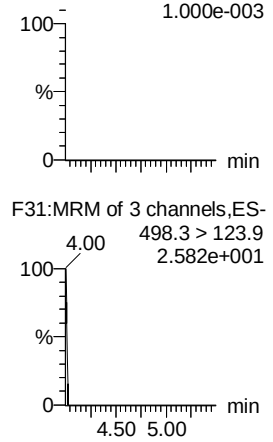
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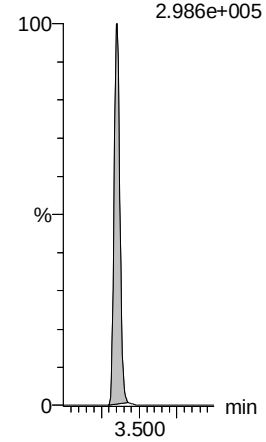
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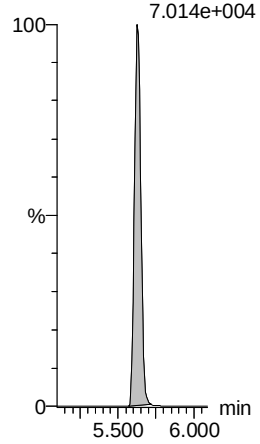
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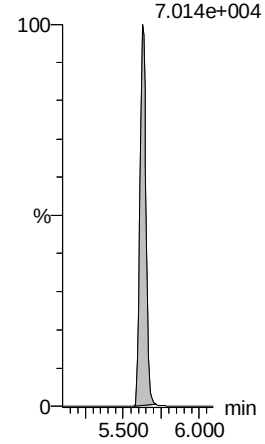
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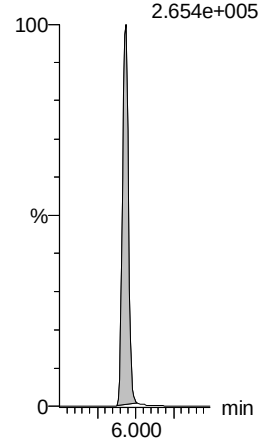
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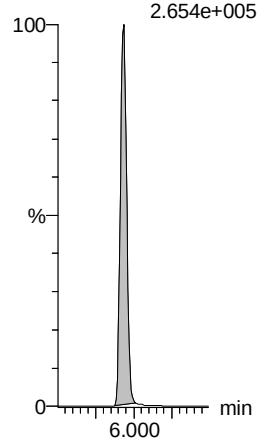
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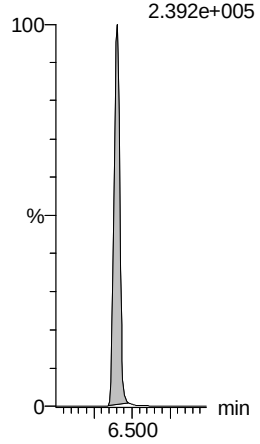
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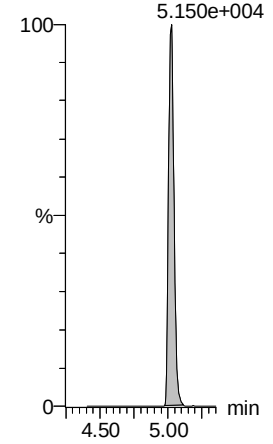
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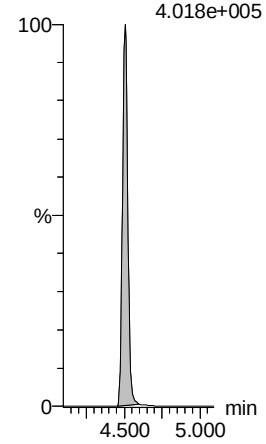
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13C8-PFOS



13C8-PFOA



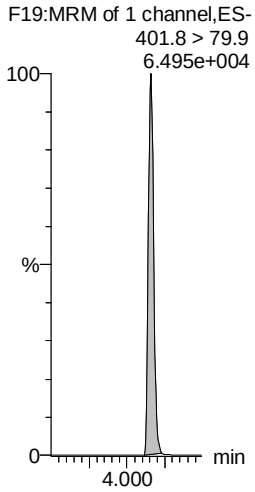
GM 11/26/2018

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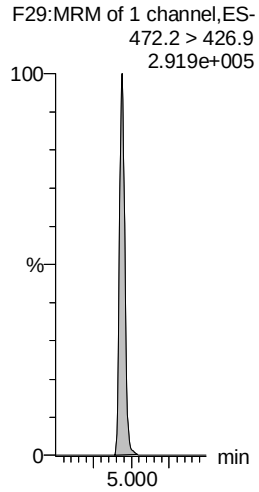
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Name: 181120M1_73, Date: 21-Nov-2018, Time: 01:39:00, ID: 1803615-03 A1-MW-49-SA2 0.11411, Description: A1-MW-49-SA2

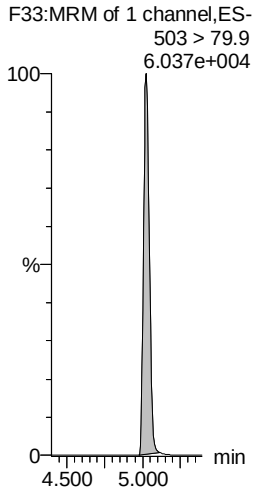
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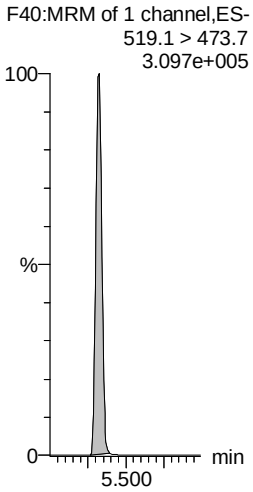
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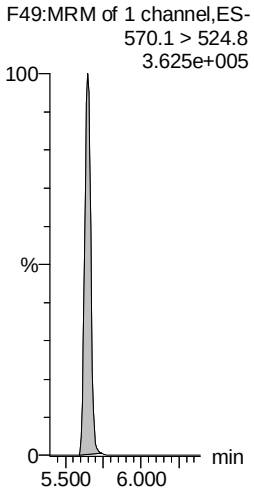
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13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-74.qld

Last Altered: Monday, November 26, 2018 11:18:47 Pacific Standard Time
Printed: Monday, November 26, 2018 11:18:55 Pacific Standard Time

Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-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	5.10e2	1.17e3	0.112		2.78	2.78	5.46	25.0259		2.756	NO
2	5	PFHxA	313 > 269	4.32e3	2.53e3	0.112		3.35	3.35	8.54	80.6286		14.994	NO
3	7	PFHpA	363.0 > 318.9	2.25e2	3.52e3	0.112		4.02	4.02	0.800	4.7449		34.382	YES
4	8	L-PFHxS	398.9 > 79.6	6.32e2	1.02e3	0.112		4.16	4.16	7.77	36.6817		1.800	NO
5	68	Total PFHxS	398.9 > 79.6	6.32e2	1.02e3	0.112		4.28		7.77	36.6817			
6	11	L-PFOA	412.8 > 368.9	7.73e2	6.45e3	0.112		4.47	4.50	1.50	9.4718		3.398	NO
7	69	Total PFOA	412.8 > 368.9	7.73e2	6.45e3	0.112		4.62		1.50	9.4718			
8	38	13C3-PFBS	302. > 98.8	1.17e3	2.63e3	0.112	0.539	2.72	2.78	5.54	91.8740	82.2		
9	40	13C2-PFHxA	315 > 270	2.53e3	7.59e3	0.112	0.964	3.30	3.35	4.17	38.6669	86.5		
10	41	13C4-PFHpA	367.2 > 321.8	3.52e3	7.59e3	0.112	0.482	3.97	4.02	5.79	107.4864	96.2		
11	42	18O2-PFHxS	403.0 > 102.6	1.02e3	2.63e3	0.112	0.480	4.11	4.16	4.82	89.8487	80.4		
12	42	18O2-PFHxS	403.0 > 102.6	1.02e3	2.63e3	0.112	0.480	4.11	4.16	4.82	89.8487	80.4		
13	44	13C2-PFOA	414.9 > 369.7	6.45e3	1.08e4	0.112	0.755	4.46	4.50	7.50	88.8475	79.5		
14	44	13C2-PFOA	414.9 > 369.7	6.45e3	1.08e4	0.112	0.755	4.46	4.50	7.50	88.8475	79.5		
15	-1													
16	14	PFNA	463.0 > 418.8		5.79e3	0.112		4.90						
17	16	L-PFOS	498.9 > 79.9		2.35e3	0.112		5.02						
18	70	Total PFOS	498.9 > 79.9	0.00e0	2.35e3	0.112		5.13		0.000				
19	18	PFDA	513 > 468.8		6.06e3	0.112		5.28						
20	21	L-MeFOSAA	570 > 419		1.92e3	0.112		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	1.92e3	0.112		5.57		0.000				
22	25	PFUdA	563.0 > 518.9		9.24e3	0.112		5.61						
23	45	13C5-PFNA	468.2 > 422.9	5.79e3	8.03e3	0.112	0.992	4.90	4.94	9.02	81.3052	72.7		
24	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.50e3	0.112	1.034	4.98	5.03	11.8	101.6111	90.9		
25	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.50e3	0.112	1.034	4.98	5.03	11.8	101.6111	90.9		
26	48	13C2-PFDA	515.1 > 469.9	6.06e3	1.13e4	0.112	0.832	5.28	5.32	6.72	72.1352	64.5		
27	50	d3-N-MeFOSAA	573.3 > 419	1.92e3	1.40e4	0.112	0.135	5.43	5.47	1.72	113.5680	101.6		
28	50	d3-N-MeFOSAA	573.3 > 419	1.92e3	1.40e4	0.112	0.135	5.43	5.47	1.72	113.5680	101.6		
29	51	13C2-PFUdA	565 > 519.8	9.24e3	1.40e4	0.112	0.928	5.61	5.65	8.27	79.6614	71.3		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		3.12e3	0.112		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	3.12e3	0.112		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.04e4	0.112		6.15						
34	27	PFDoA	612.9 > 569.0		1.04e4	0.112		5.90						
35	30	PFTeDA	713.0 > 669.0		8.92e3	0.112		6.37						
36	73	TCDA	498.3>106.9			0.112		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-74.qld

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Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-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	7.59e3	7.59e3	0.112	1.000	3.30	3.35	12.5	111.7668	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.12e3	1.40e4	0.112	0.198	5.59	5.63	2.79	125.6994	112.5		
39	52	d5-N-EtFOSAA	589.3 > 419	3.12e3	1.40e4	0.112	0.198	5.59	5.63	2.79	125.6994	112.5		
40	53	13C2-PFDoA	615.0 > 569.7	1.04e4	1.13e4	0.112	0.980	5.90	5.93	11.5	104.6477	93.6		
41	53	13C2-PFDoA	615.0 > 569.7	1.04e4	1.13e4	0.112	0.980	5.90	5.93	11.5	104.6477	93.6		
42	55	13C2-PFTeDA	715.1 > 669.7	8.92e3	1.40e4	0.112	0.607	6.37	6.40	7.98	117.5525	105.2		
43	47	13C8-PFOS	507.0 > 79.9	2.35e3	2.50e3	0.112	1.034	4.98	5.03	11.8	101.6111	90.9		
44	63	13C8-PFOA	420.9 > 376	1.08e4	1.08e4	0.112	1.000	4.46	4.50	12.5	111.7668	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.63e3	2.63e3	0.112	1.000	4.11	4.16	12.5	111.7668	100.0		
47	64	13C9-PFNA	472.2 > 426.9	8.03e3	8.03e3	0.112	1.000	4.90	4.94	12.5	111.7668	100.0		
48	65	13C4-PFOS	503 > 79.9	2.50e3	2.50e3	0.112	1.000	4.98	5.03	12.5	111.7668	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.13e4	1.13e4	0.112	1.000	5.28	5.32	12.5	111.7668	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.40e4	1.40e4	0.112	1.000	5.61	5.65	12.5	111.7668	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

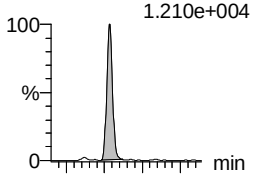
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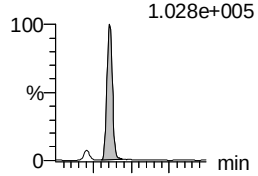
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Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-SA2

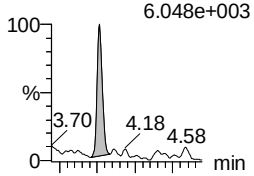
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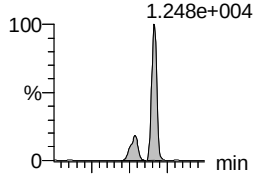
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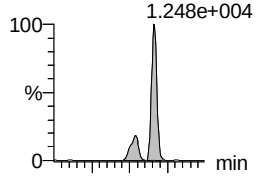
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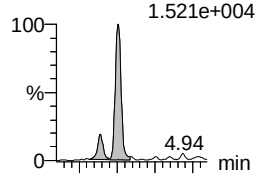
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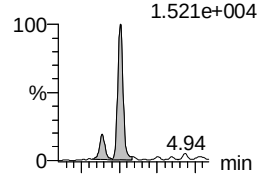
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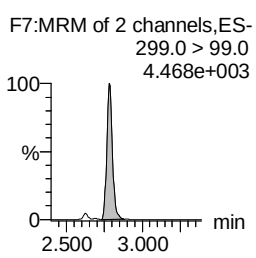


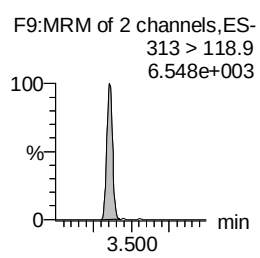
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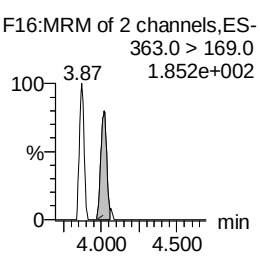


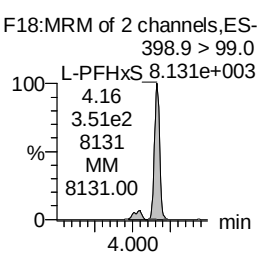
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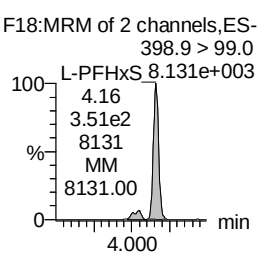


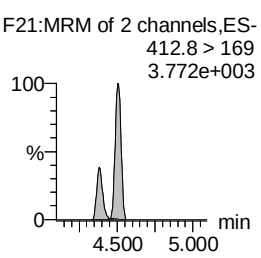


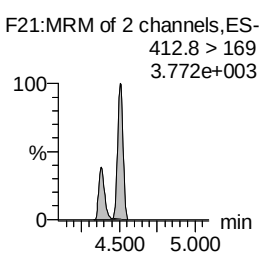




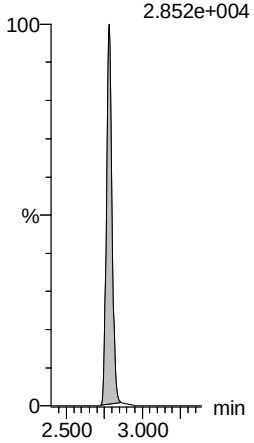




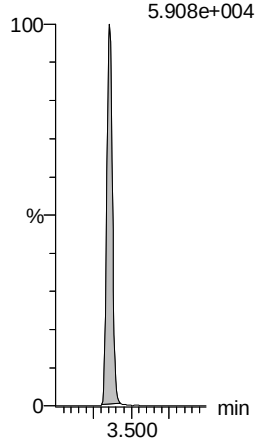




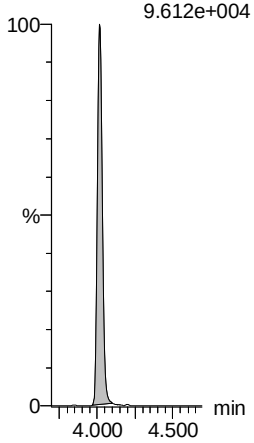
13C3-PFBS



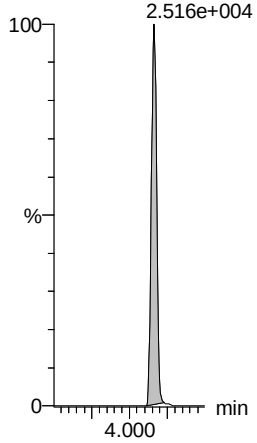
13C2-PFHxA



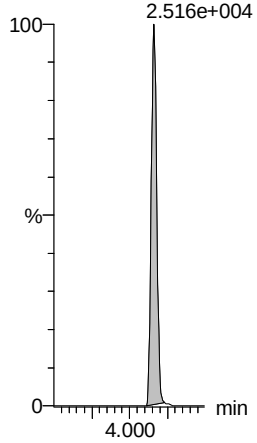
13C4-PFHpA



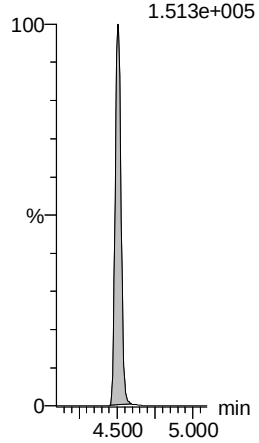
18O2-PFHxS



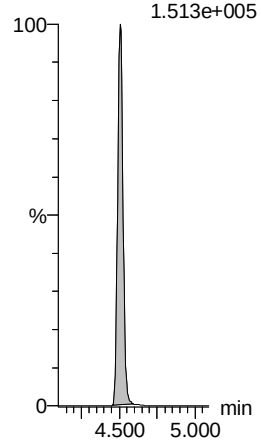
18O2-PFHxS



13C2-PFOA



13C2-PFOA



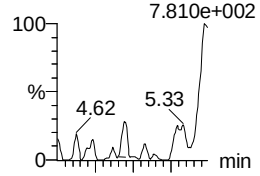
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-74.qld

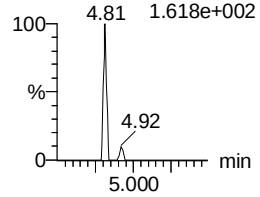
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Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-SA2

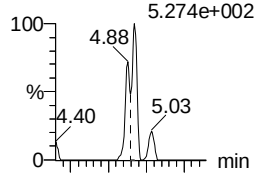
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
7.810e+002



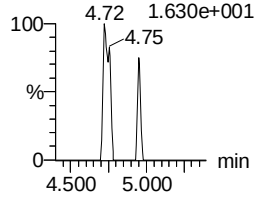
F27:MRM of 2 channels,ES-
463.0 > 219.0
1.618e+002



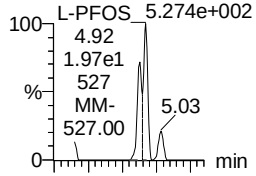
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
5.274e+002



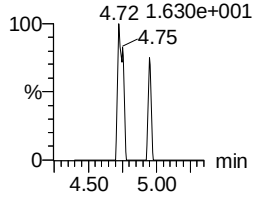
F32:MRM of 2 channels,ES-
498.9 > 99
1.630e+001



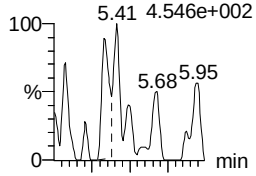
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
5.274e+002



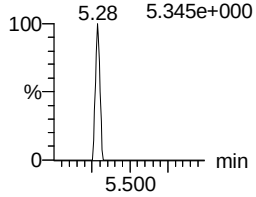
F32:MRM of 2 channels,ES-
498.9 > 99
1.630e+001



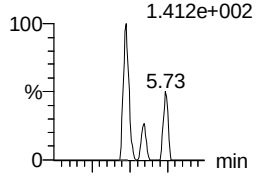
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
4.546e+002



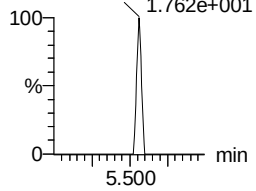
F37:MRM of 2 channels,ES-
513 > 219
5.345e+000



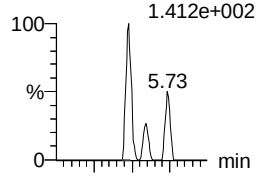
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.412e+002



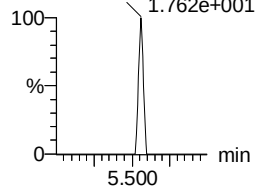
F48:MRM of 2 channels,ES-
570. > 512
1.762e+001



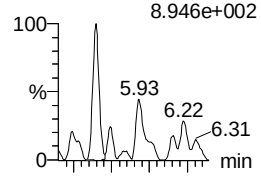
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.412e+002



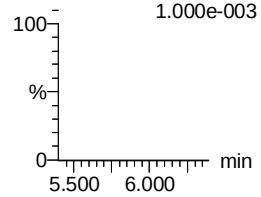
F48:MRM of 2 channels,ES-
570. > 512
1.762e+001



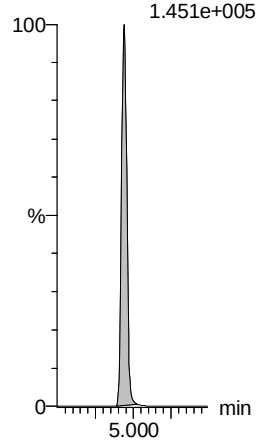
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
8.946e+002



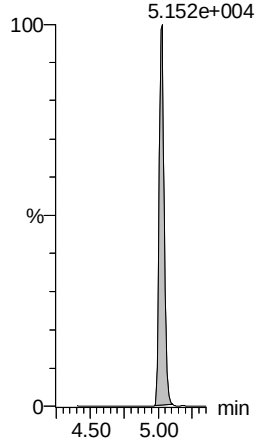
F46:MRM of 2 channels,ES-
563.0 > 269
1.000e-003



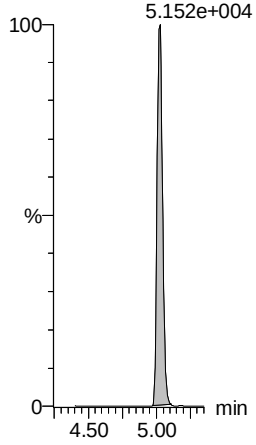
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
1.451e+005



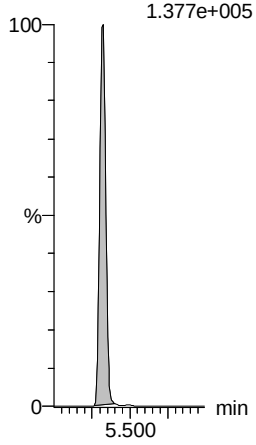
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.152e+004



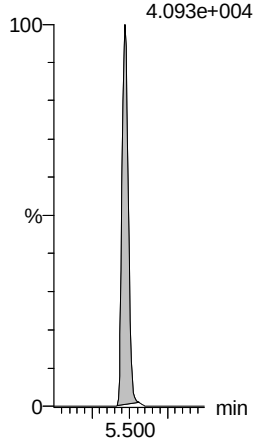
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.152e+004



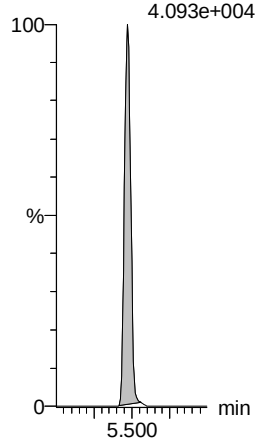
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
1.377e+005



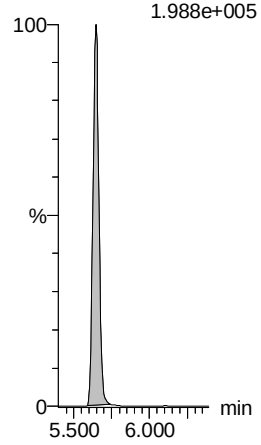
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.093e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.093e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
1.988e+005

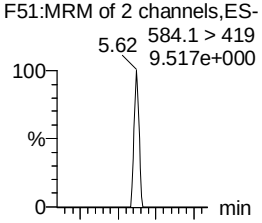


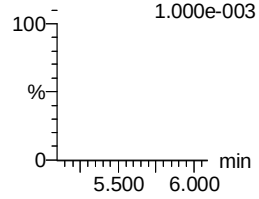
GM 11/26/2018

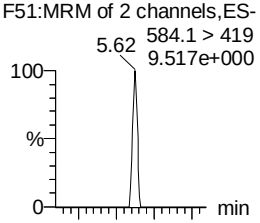
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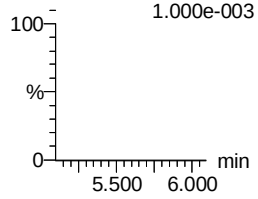
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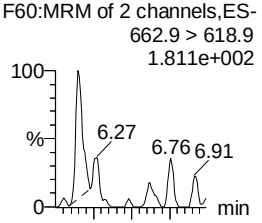
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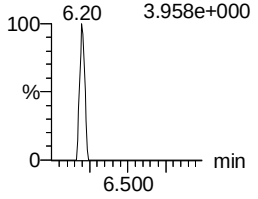
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
9.517e+000


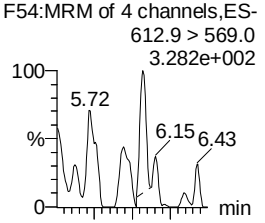
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003


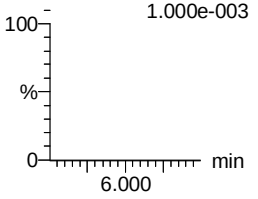
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
9.517e+000


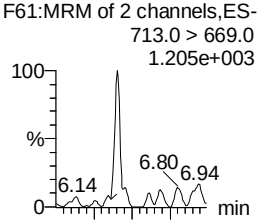
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003


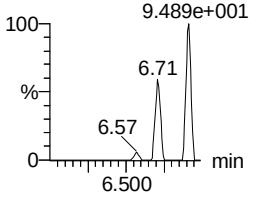
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
1.811e+002


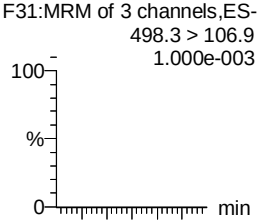
F60:MRM of 2 channels,ES-
662.9 > 319
3.958e+000


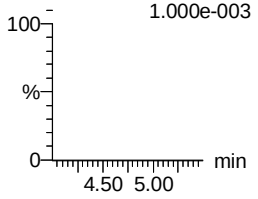
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.282e+002


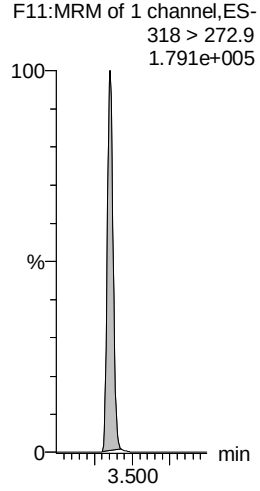
F54:MRM of 4 channels,ES-
612.9 > 318.8
1.000e-003


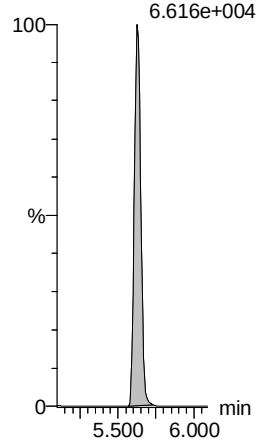
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
1.205e+003


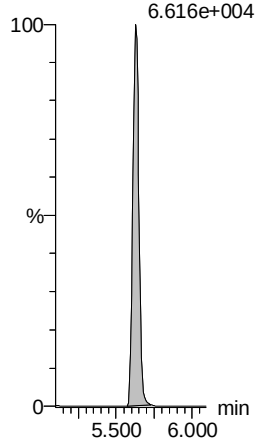
F61:MRM of 2 channels,ES-
713. > 369.0
9.489e+001


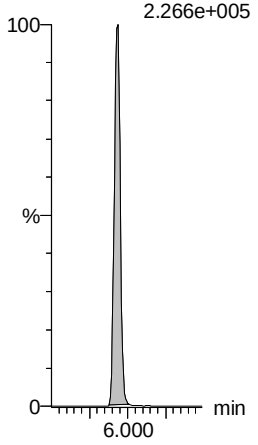
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003


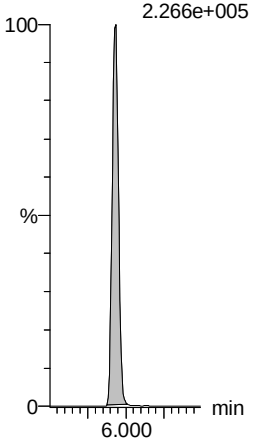
F31:MRM of 3 channels,ES-
498.3 > 123.9
1.000e-003


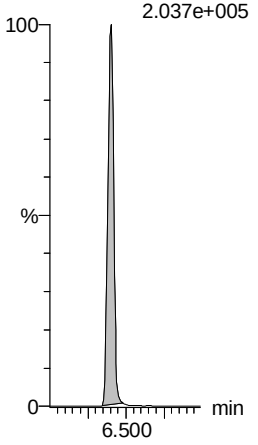
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
1.791e+005


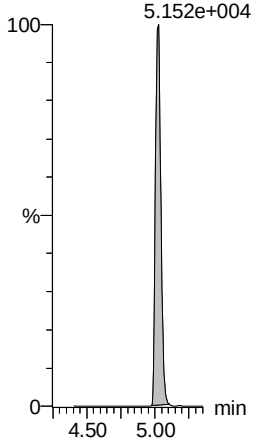
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
6.616e+004


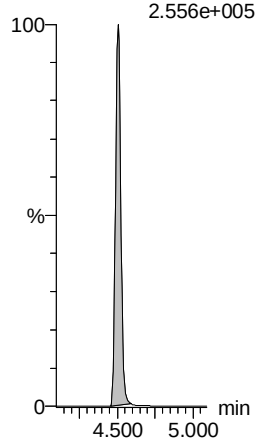
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
6.616e+004


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.266e+005


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.266e+005


13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
2.037e+005


13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.152e+004


13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
2.556e+005


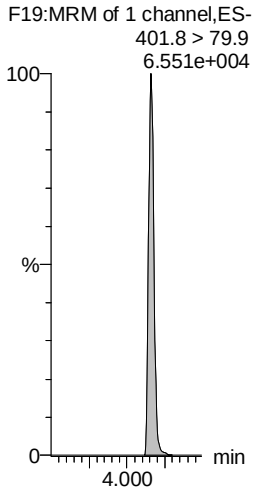
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-74.qld

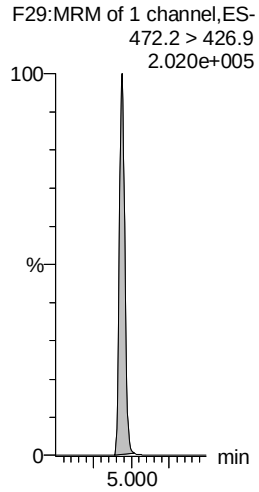
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Printed: Monday, November 26, 2018 11:18:55 Pacific Standard Time

Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-SA2

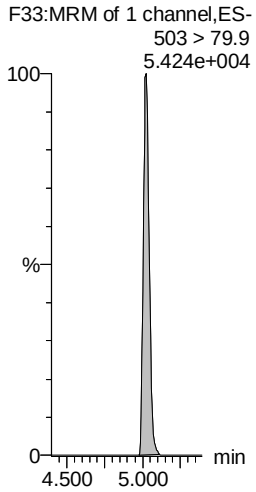
13C3-PFHxS



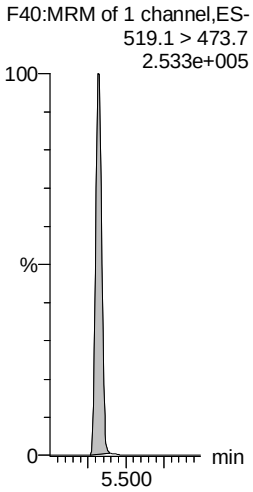
13C9-PFNA



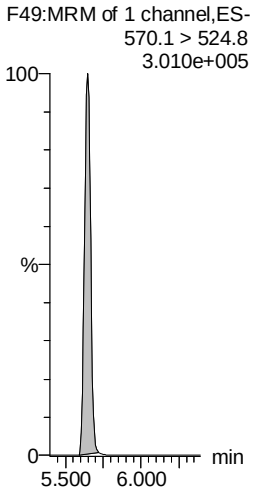
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-63.qld

Last Altered: Monday, November 26, 2018 10:58:25 Pacific Standard Time
Printed: Monday, November 26, 2018 10:59:11 Pacific Standard Time

Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

	#	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	2.52e3	1.11e3	0.115		2.78	2.78	28.3	126.0097		2.712	NO
2	5	PFHxA	313 > 269	2.11e4	5.30e3	0.115		3.35	3.35	19.9	182.7144		15.082	NO
3	7	PFHpA	363.0 > 318.9	8.32e3	6.78e3	0.115		4.02	4.02	15.3	100.6031		11.445	NO
4	8	L-PFHxS	398.9 > 79.6	2.26e3	1.08e3	0.115		4.16	4.16	26.2	119.8771		1.736	NO
5	68	Total PFHxS	398.9 > 79.6	2.26e3	1.08e3	0.115		4.28		26.2	119.8771			
6	11	L-PFOA	412.8 > 368.9	1.62e4	1.21e4	0.115		4.47	4.50	16.7	112.0389		3.343	NO
7	69	Total PFOA	412.8 > 368.9	1.62e4	1.21e4	0.115		4.62		16.7	112.0389			
8	38	13C3-PFBS	302. > 98.8	1.11e3	2.85e3	0.115	0.539	2.72	2.78	4.89	78.7164	72.7		
9	40	13C2-PFHxA	315 > 270	5.30e3	1.80e4	0.115	0.964	3.30	3.35	3.67	33.0002	76.2		
10	41	13C4-PFHpA	367.2 > 321.8	6.78e3	1.80e4	0.115	0.482	3.97	4.02	4.70	84.4702	78.0		
11	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.85e3	0.115	0.480	4.11	4.16	4.74	85.5411	79.0		
12	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.85e3	0.115	0.480	4.11	4.16	4.74	85.5411	79.0		
13	44	13C2-PFOA	414.9 > 369.7	1.21e4	2.27e4	0.115	0.755	4.46	4.50	6.64	76.2492	70.4		
14	44	13C2-PFOA	414.9 > 369.7	1.21e4	2.27e4	0.115	0.755	4.46	4.50	6.64	76.2492	70.4		
15	-1													
16	14	PFNA	463.0 > 418.8	1.16e4	1.05e4	0.115		4.90	4.94	13.8	94.9041		4.424	NO
17	16	L-PFOS	498.9 > 79.9	2.15e3	2.28e3	0.115		5.02	5.03	11.8	95.3546		2.007	NO
18	70	Total PFOS	498.9 > 79.9	2.15e3	2.28e3	0.115		5.13		11.8	95.3546			
19	18	PFDA	513 > 468.8	1.16e4	9.84e3	0.115		5.28	5.31	14.7	98.9095		5.235	NO
20	21	L-MeFOSAA	570 > 419	4.67e3	2.09e3	0.115		5.43	5.47	27.9	95.7550		2.603	NO
21	71	Total N-MeFOSAA	570. > 419	4.67e3	2.09e3	0.115		5.57		27.9	95.7550			
22	25	PFUdA	563.0 > 518.9	1.02e4	1.26e4	0.115		5.61	5.65	10.1	93.8192		9.536	NO
23	45	13C5-PFNA	468.2 > 422.9	1.05e4	1.65e4	0.115	0.992	4.90	4.94	7.96	69.5185	64.2		
24	47	13C8-PFOS	507.0 > 79.9	2.28e3	2.82e3	0.115	1.034	4.98	5.03	10.1	84.8116	78.3		
25	47	13C8-PFOS	507.0 > 79.9	2.28e3	2.82e3	0.115	1.034	4.98	5.03	10.1	84.8116	78.3		
26	48	13C2-PFDA	515.1 > 469.9	9.84e3	1.96e4	0.115	0.832	5.28	5.31	6.29	65.4925	60.5		
27	50	d3-N-MeFOSAA	573.3 > 419	2.09e3	2.38e4	0.115	0.135	5.43	5.47	1.10	70.4065	65.0		
28	50	d3-N-MeFOSAA	573.3 > 419	2.09e3	2.38e4	0.115	0.135	5.43	5.47	1.10	70.4065	65.0		
29	51	13C2-PFUdA	565 > 519.8	1.26e4	2.38e4	0.115	0.928	5.61	5.65	6.63	61.9412	57.2		
30	-1													
31	23	L-EtFOSAA	584.1 > 419	3.84e3	3.40e3	0.115		5.51	5.63	14.1	83.4191		1.422	NO
32	72	Total N-EtFOSAA	584.1 > 419	3.84e3	3.40e3	0.115		5.72		14.1	83.4191			
33	29	PFTrDA	662.9 > 618.9	1.42e4	1.28e4	0.115		6.15	6.18	13.8	105.4344		26.231	NO
34	27	PFDoA	612.9 > 569.0	1.21e4	1.28e4	0.115		5.90	5.93	11.8	91.3195		8.245	NO
35	30	PFTeDA	713.0 > 669.0	1.26e4	1.04e4	0.115		6.37	6.40	15.2	90.4260		12.604	NO
36	73	TCDA	498.3>106.9			0.115		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-63.qld

Last Altered: Monday, November 26, 2018 10:58:25 Pacific Standard Time
Printed: Monday, November 26, 2018 10:59:11 Pacific Standard Time

Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

	#	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	1.80e4	1.80e4	0.115	1.000	3.30	3.35	12.5	108.3189	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.40e3	2.38e4	0.115	0.198	5.59	5.63	1.79	78.1283	72.1		
39	52	d5-N-EtFOSAA	589.3 > 419	3.40e3	2.38e4	0.115	0.198	5.59	5.63	1.79	78.1283	72.1		
40	53	13C2-PFDoA	615.0 > 569.7	1.28e4	1.96e4	0.115	0.980	5.90	5.93	8.17	72.2565	66.7		
41	53	13C2-PFDoA	615.0 > 569.7	1.28e4	1.96e4	0.115	0.980	5.90	5.93	8.17	72.2565	66.7		
42	55	13C2-PFTeDA	715.1 > 669.7	1.04e4	2.38e4	0.115	0.607	6.37	6.40	5.46	77.9185	71.9		
43	47	13C8-PFOS	507.0 > 79.9	2.28e3	2.82e3	0.115	1.034	4.98	5.03	10.1	84.8116	78.3		
44	63	13C8-PFOA	420.9 > 376	2.27e4	2.27e4	0.115	1.000	4.46	4.50	12.5	108.3189	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.85e3	2.85e3	0.115	1.000	4.11	4.16	12.5	108.3189	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.65e4	1.65e4	0.115	1.000	4.90	4.93	12.5	108.3189	100.0		
48	65	13C4-PFOS	503 > 79.9	2.82e3	2.82e3	0.115	1.000	4.98	5.03	12.5	108.3189	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.96e4	1.96e4	0.115	1.000	5.28	5.32	12.5	108.3189	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	2.38e4	2.38e4	0.115	1.000	5.61	5.65	12.5	108.3189	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

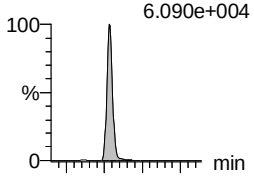
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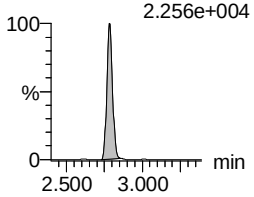
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Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

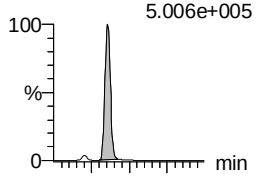
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
6.090e+004



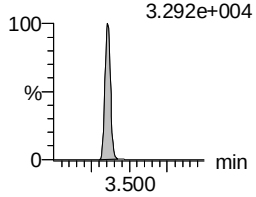
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.256e+004



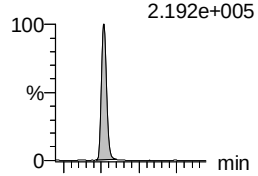
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
5.006e+005



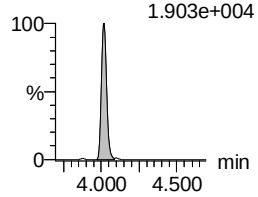
F9:MRM of 2 channels,ES-
313 > 118.9
3.292e+004



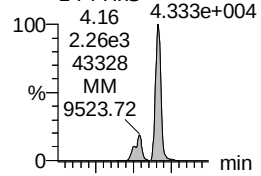
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
2.192e+005



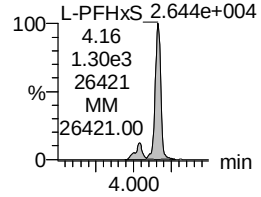
F16:MRM of 2 channels,ES-
363.0 > 169.0
1.903e+004



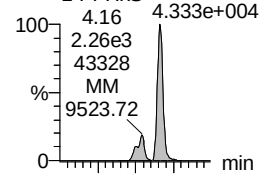
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
4.333e+004
L-PFHxS
4.16
2.26e3
43328
MM
9523.72



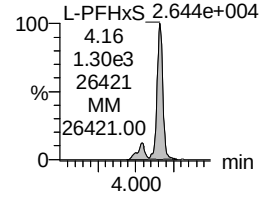
F18:MRM of 2 channels,ES-
398.9 > 99.0
2.644e+004
L-PFHxS
4.16
1.30e3
26421
MM
26421.00



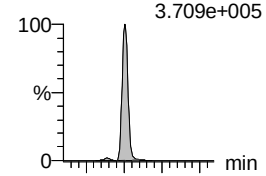
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
4.333e+004
L-PFHxS
4.16
2.26e3
43328
MM
9523.72



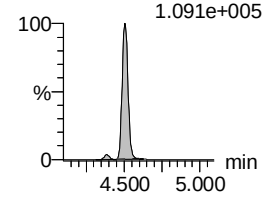
F18:MRM of 2 channels,ES-
398.9 > 99.0
2.644e+004
L-PFHxS
4.16
1.30e3
26421
MM
26421.00



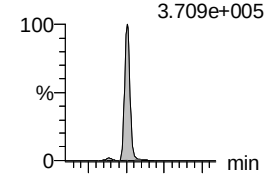
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
3.709e+005



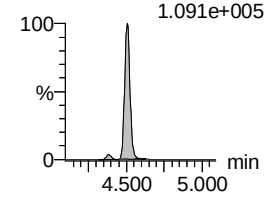
F21:MRM of 2 channels,ES-
412.8 > 169
1.091e+005



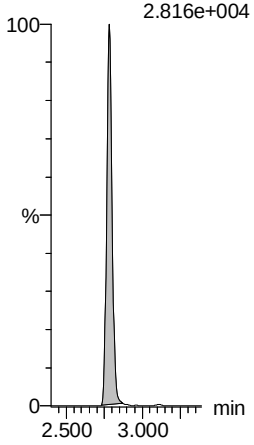
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
3.709e+005



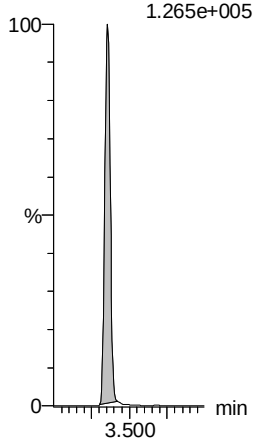
F21:MRM of 2 channels,ES-
412.8 > 169
1.091e+005



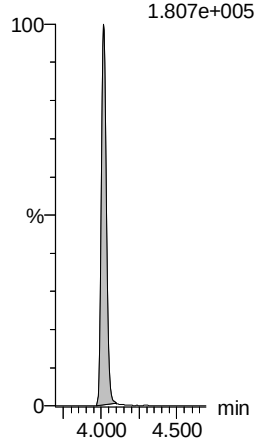
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.816e+004



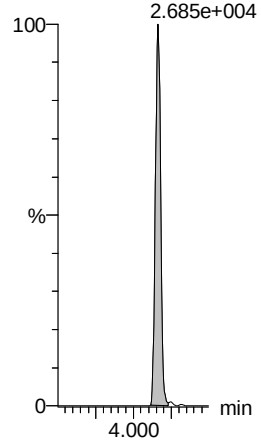
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
1.265e+005



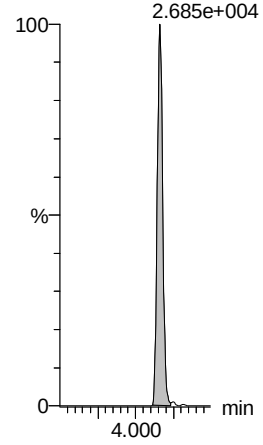
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
1.807e+005



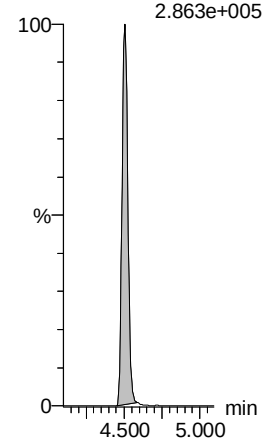
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.685e+004



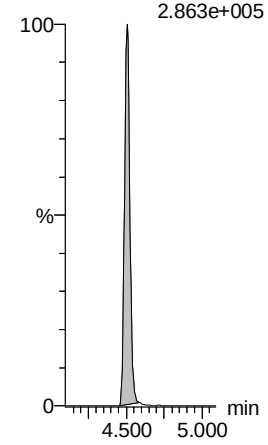
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.685e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.863e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.863e+005



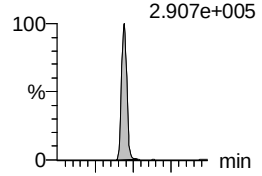
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-63.qld

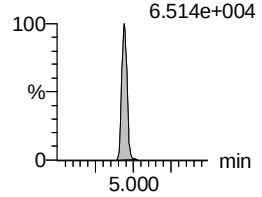
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Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

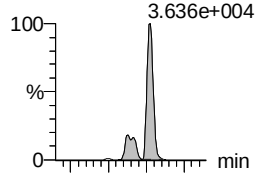
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
2.907e+005



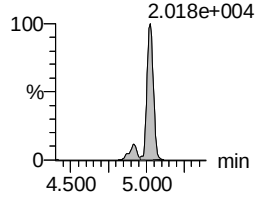
F27:MRM of 2 channels,ES-
463.0 > 219.0
6.514e+004



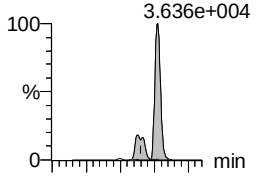
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
3.636e+004



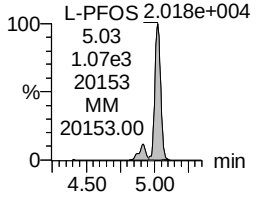
F32:MRM of 2 channels,ES-
498.9 > 99
2.018e+004



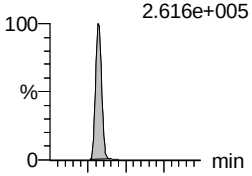
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
3.636e+004



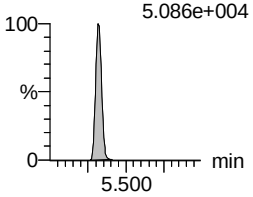
F32:MRM of 2 channels,ES-
498.9 > 99
2.018e+004
L-PFOS
5.03
1.07e3
20153
MM
20153.00



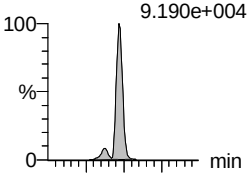
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
2.616e+005



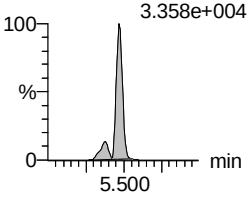
F37:MRM of 2 channels,ES-
513 > 219
5.086e+004



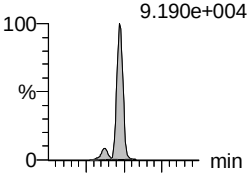
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
9.190e+004



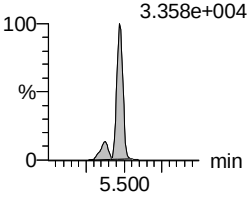
F48:MRM of 2 channels,ES-
570. > 512
3.358e+004



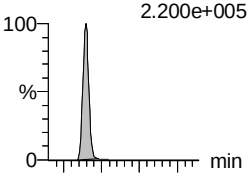
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
9.190e+004



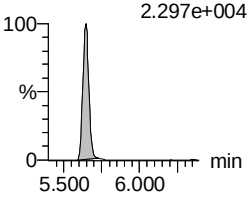
F48:MRM of 2 channels,ES-
570. > 512
3.358e+004



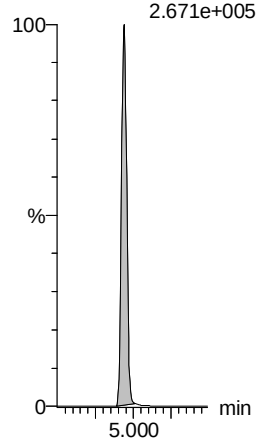
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
2.200e+005



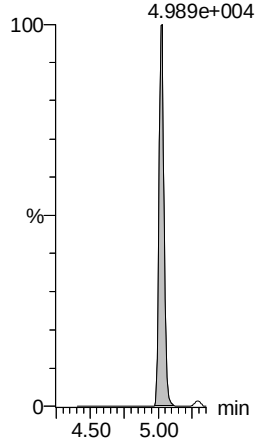
F46:MRM of 2 channels,ES-
563.0 > 269
2.297e+004



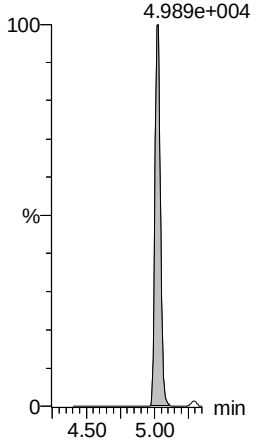
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
2.671e+005



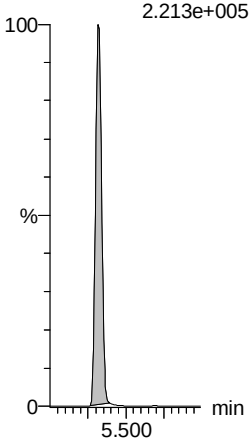
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.989e+004



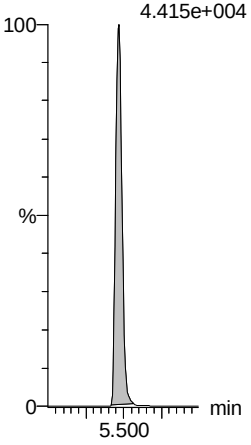
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.989e+004



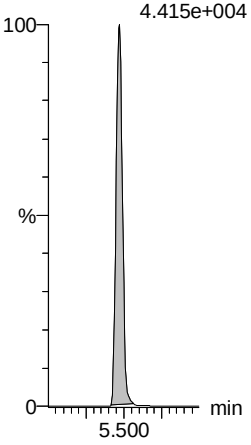
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
2.213e+005



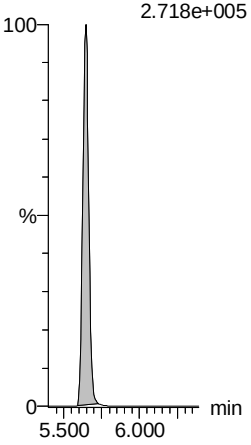
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.415e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.415e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.718e+005



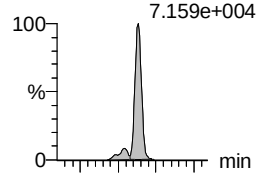
GM 11/26/2018

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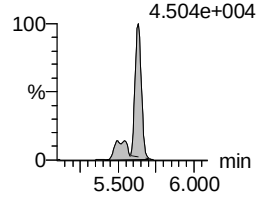
Last Altered: Monday, November 26, 2018 10:58:25 Pacific Standard Time
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Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

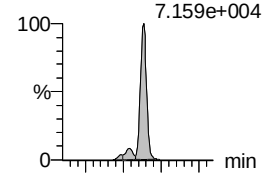
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
7.159e+004



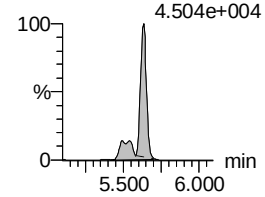
F51:MRM of 2 channels,ES-
584.1 > 526
4.504e+004



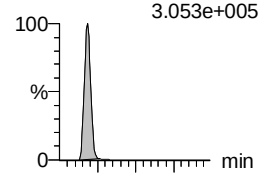
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
7.159e+004



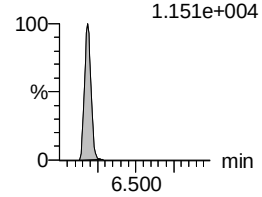
F51:MRM of 2 channels,ES-
584.1 > 526
4.504e+004



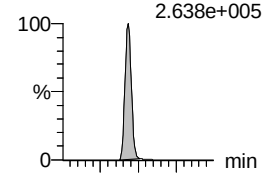
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
3.053e+005



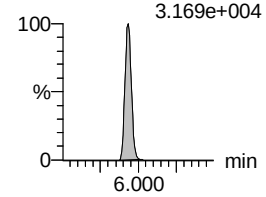
F60:MRM of 2 channels,ES-
662.9 > 319
1.151e+004



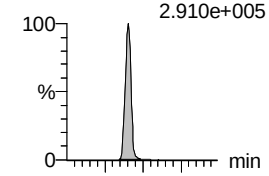
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
2.638e+005



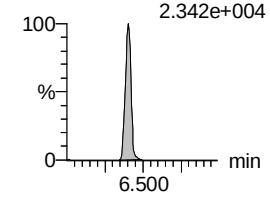
F54:MRM of 4 channels,ES-
612.9 > 318.8
3.169e+004



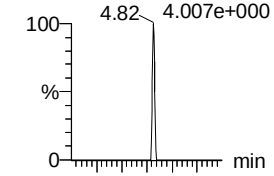
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
2.910e+005



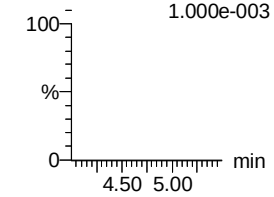
F61:MRM of 2 channels,ES-
713. > 369.0
2.342e+004



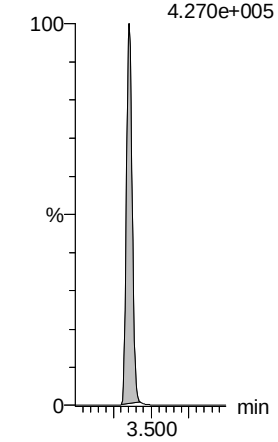
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
4.007e+000



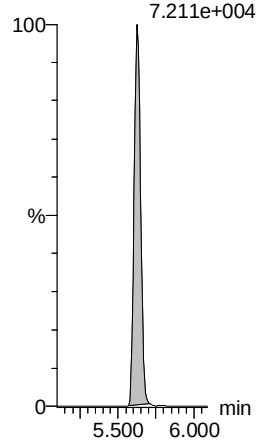
F31:MRM of 3 channels,ES-
498.3 > 123.9
1.000e-003



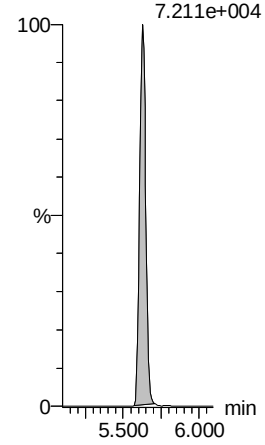
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
4.270e+005



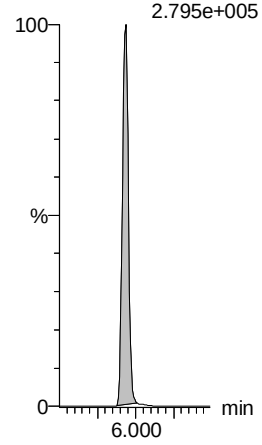
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.211e+004



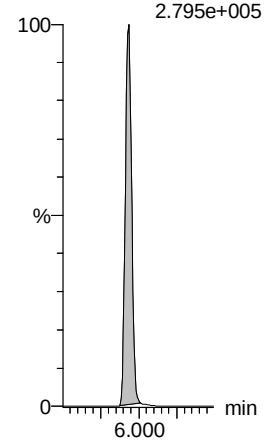
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.211e+004



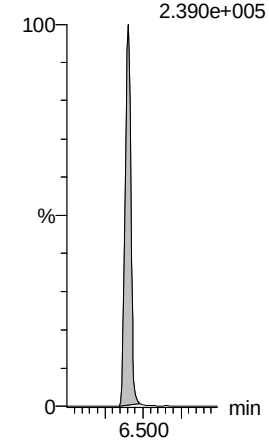
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.795e+005



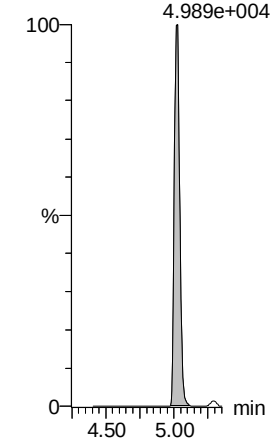
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.795e+005



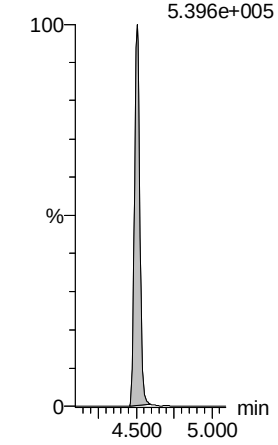
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
2.390e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.989e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
5.396e+005



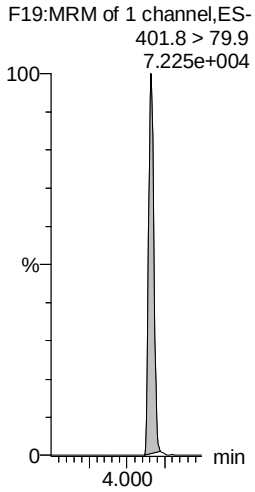
GM 11/26/2018

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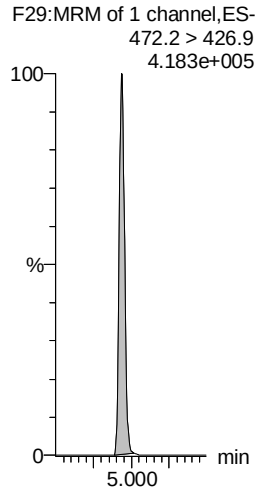
Last Altered: Monday, November 26, 2018 10:58:25 Pacific Standard Time
Printed: Monday, November 26, 2018 10:59:11 Pacific Standard Time

Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

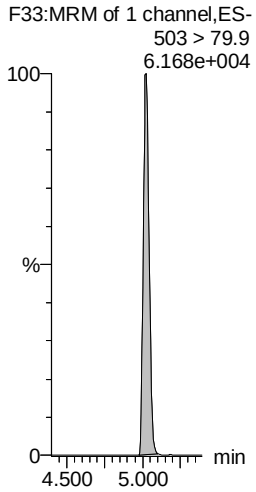
13C3-PFHxS



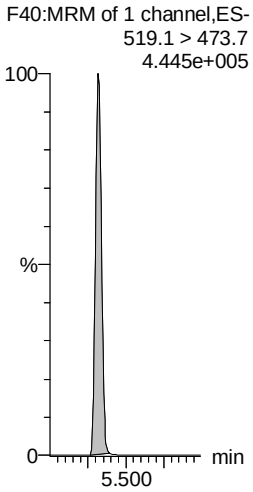
13C9-PFNA



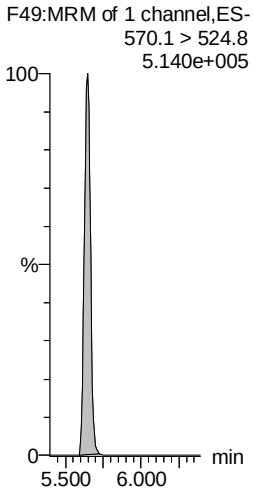
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-64.qld

Last Altered: Monday, November 26, 2018 11:06:39 Pacific Standard Time
Printed: Monday, November 26, 2018 11:07:11 Pacific Standard Time

Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

	#	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	2.42e3	1.20e3	0.116		2.78	2.78	25.2	111.7880		2.661	NO
2	5	PFHxA	313 > 269	1.24e4	3.43e3	0.116		3.35	3.35	18.1	165.7227		15.184	NO
3	7	PFHpA	363.0 > 318.9	5.91e3	5.30e3	0.116		4.02	4.02	13.9	91.0043		12.080	NO
4	8	L-PFHxS	398.9 > 79.6	2.23e3	1.06e3	0.116		4.16	4.16	26.4	120.3242		1.900	NO
5	68	Total PFHxS	398.9 > 79.6	2.23e3	1.06e3	0.116		4.28		26.4	120.3242			
6	11	L-PFOA	412.8 > 368.9	1.31e4	9.97e3	0.116		4.47	4.50	16.4	109.5094		3.373	NO
7	69	Total PFOA	412.8 > 368.9	1.31e4	9.97e3	0.116		4.62		16.4	109.5094			
8	38	13C3-PFBS	302. > 98.8	1.20e3	2.50e3	0.116	0.539	2.72	2.78	5.98	95.7656	88.8		
9	40	13C2-PFHxA	315 > 270	3.43e3	1.02e4	0.116	0.964	3.30	3.35	4.20	37.5470	87.1		
10	41	13C4-PFHpA	367.2 > 321.8	5.30e3	1.02e4	0.116	0.482	3.97	4.02	6.49	116.0768	107.7		
11	42	18O2-PFHxS	403.0 > 102.6	1.06e3	2.50e3	0.116	0.480	4.11	4.16	5.28	94.8198	87.9		
12	42	18O2-PFHxS	403.0 > 102.6	1.06e3	2.50e3	0.116	0.480	4.11	4.16	5.28	94.8198	87.9		
13	44	13C2-PFOA	414.9 > 369.7	9.97e3	1.68e4	0.116	0.755	4.46	4.50	7.43	84.9287	78.8		
14	44	13C2-PFOA	414.9 > 369.7	9.97e3	1.68e4	0.116	0.755	4.46	4.50	7.43	84.9287	78.8		
15	-1													
16	14	PFNA	463.0 > 418.8	9.65e3	9.52e3	0.116		4.90	4.94	12.7	86.7081		4.404	NO
17	16	L-PFOS	498.9 > 79.9	2.10e3	2.33e3	0.116		5.02	5.03	11.3	90.9536		2.016	NO
18	70	Total PFOS	498.9 > 79.9	2.10e3	2.33e3	0.116		5.13		11.3	90.9536			
19	18	PFDA	513 > 468.8	1.05e4	9.48e3	0.116		5.28	5.32	13.9	93.0770		5.659	NO
20	21	L-MeFOSAA	570 > 419	4.58e3	2.09e3	0.116		5.43	5.48	27.3	93.1539		2.626	NO
21	71	Total N-MeFOSAA	570. > 419	4.58e3	2.09e3	0.116		5.57		27.3	93.1539			
22	25	PFUdA	563.0 > 518.9	1.01e4	1.30e4	0.116		5.61	5.65	9.64	89.2833		9.682	NO
23	45	13C5-PFNA	468.2 > 422.9	9.52e3	1.28e4	0.116	0.992	4.90	4.94	9.27	80.5999	74.8		
24	47	13C8-PFOS	507.0 > 79.9	2.33e3	2.71e3	0.116	1.034	4.98	5.03	10.8	89.7839	83.3		
25	47	13C8-PFOS	507.0 > 79.9	2.33e3	2.71e3	0.116	1.034	4.98	5.03	10.8	89.7839	83.3		
26	48	13C2-PFDA	515.1 > 469.9	9.48e3	1.70e4	0.116	0.832	5.28	5.32	6.97	72.2047	67.0		
27	50	d3-N-MeFOSAA	573.3 > 419	2.09e3	2.03e4	0.116	0.135	5.43	5.47	1.29	82.1609	76.2		
28	50	d3-N-MeFOSAA	573.3 > 419	2.09e3	2.03e4	0.116	0.135	5.43	5.47	1.29	82.1609	76.2		
29	51	13C2-PFUdA	565 > 519.8	1.30e4	2.03e4	0.116	0.928	5.61	5.65	8.01	74.4759	69.1		
30	-1													
31	23	L-EtFOSAA	584.1 > 419	3.81e3	3.46e3	0.116		5.51	5.63	13.8	81.1285		1.470	NO
32	72	Total N-EtFOSAA	584.1 > 419	3.81e3	3.46e3	0.116		5.72		13.8	81.1285			
33	29	PFTrDA	662.9 > 618.9	1.37e4	1.39e4	0.116		6.15	6.18	12.2	92.6224		24.335	NO
34	27	PFDoA	612.9 > 569.0	1.23e4	1.39e4	0.116		5.90	5.93	11.0	84.7022		8.680	NO
35	30	PFTeDA	713.0 > 669.0	1.26e4	1.10e4	0.116		6.37	6.40	14.4	85.2138		13.483	NO
36	73	TCDA	498.3>106.9			0.116		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-64.qld

Last Altered: Monday, November 26, 2018 11:06:39 Pacific Standard Time
Printed: Monday, November 26, 2018 11:07:11 Pacific Standard Time

Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

	#	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	0.116	1.000	3.30	3.35	12.5	107.8144	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.46e3	2.03e4	0.116	0.198	5.59	5.63	2.12	92.4243	85.7		
39	52	d5-N-EtFOSAA	589.3 > 419	3.46e3	2.03e4	0.116	0.198	5.59	5.63	2.12	92.4243	85.7		
40	53	13C2-PFDoA	615.0 > 569.7	1.39e4	1.70e4	0.116	0.980	5.90	5.93	10.3	90.2204	83.7		
41	53	13C2-PFDoA	615.0 > 569.7	1.39e4	1.70e4	0.116	0.980	5.90	5.93	10.3	90.2204	83.7		
42	55	13C2-PFTeDA	715.1 > 669.7	1.10e4	2.03e4	0.116	0.607	6.37	6.40	6.74	95.7368	88.8		
43	47	13C8-PFOS	507.0 > 79.9	2.33e3	2.71e3	0.116	1.034	4.98	5.03	10.8	89.7839	83.3		
44	63	13C8-PFOA	420.9 > 376	1.68e4	1.68e4	0.116	1.000	4.46	4.50	12.5	107.8144	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.50e3	2.50e3	0.116	1.000	4.11	4.16	12.5	107.8144	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.28e4	1.28e4	0.116	1.000	4.90	4.94	12.5	107.8144	100.0		
48	65	13C4-PFOS	503 > 79.9	2.71e3	2.71e3	0.116	1.000	4.98	5.03	12.5	107.8144	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.70e4	1.70e4	0.116	1.000	5.28	5.32	12.5	107.8144	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	2.03e4	2.03e4	0.116	1.000	5.61	5.65	12.5	107.8144	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

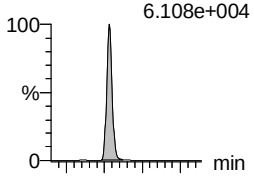
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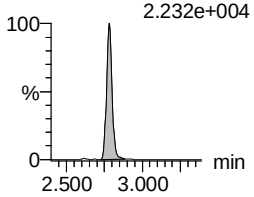
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Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

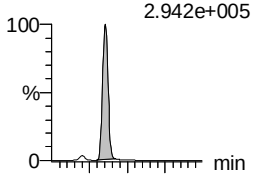
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
6.108e+004



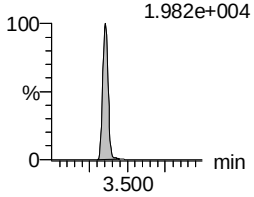
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.232e+004



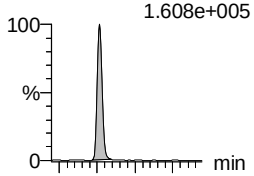
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
2.942e+005



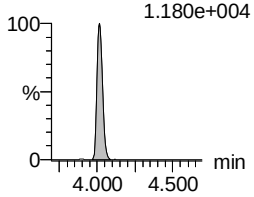
F9:MRM of 2 channels,ES-
313 > 118.9
1.982e+004



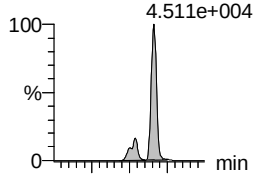
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
1.608e+005



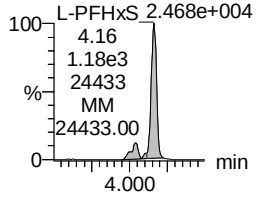
F16:MRM of 2 channels,ES-
363.0 > 169.0
1.180e+004



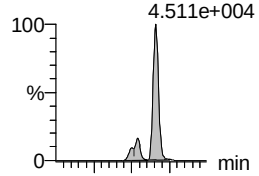
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
4.511e+004



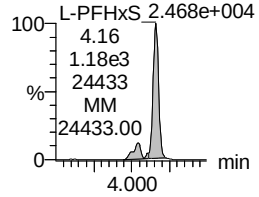
F18:MRM of 2 channels,ES-
398.9 > 99.0
L-PFHxS 2.468e+004
4.16
1.18e3
24433
MM
24433.00



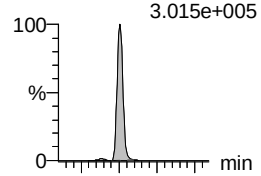
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
4.511e+004



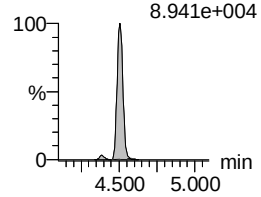
F18:MRM of 2 channels,ES-
398.9 > 99.0
L-PFHxS 2.468e+004
4.16
1.18e3
24433
MM
24433.00



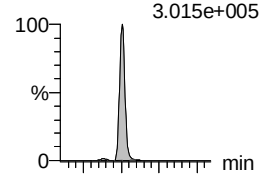
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
3.015e+005



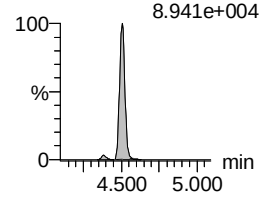
F21:MRM of 2 channels,ES-
412.8 > 169
8.941e+004



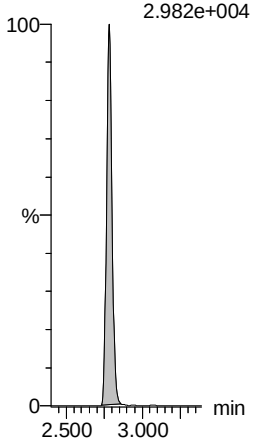
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
3.015e+005



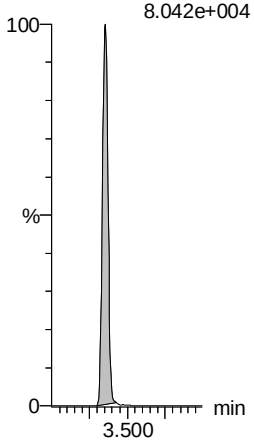
F21:MRM of 2 channels,ES-
412.8 > 169
8.941e+004



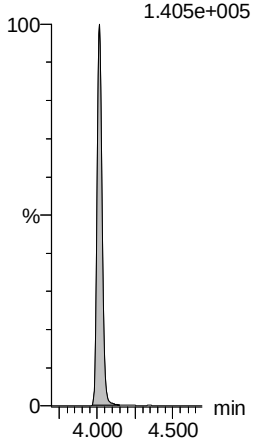
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.982e+004



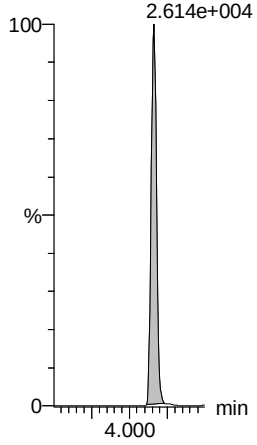
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
8.042e+004



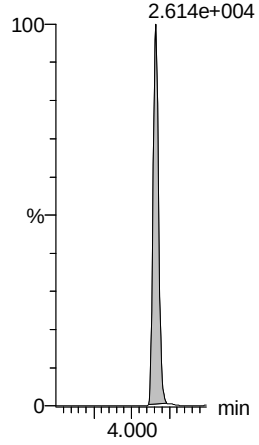
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
1.405e+005



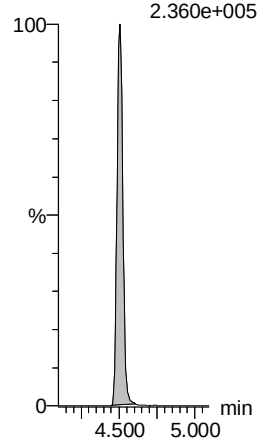
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.614e+004



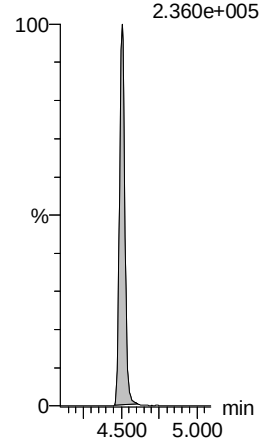
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.614e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.360e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.360e+005



GM 11/26/2018

Vista Analytical Laboratory L14

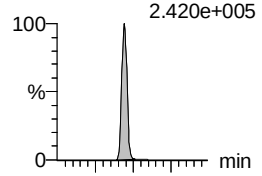
Rev: ANP 11/26/2018

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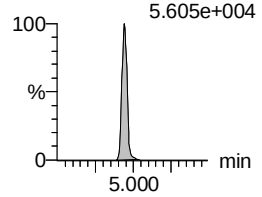
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Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

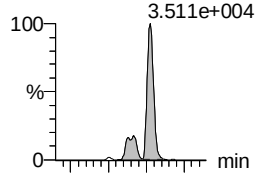
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
2.420e+005



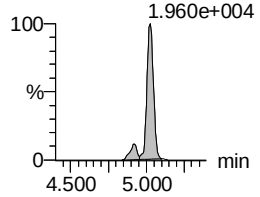
F27:MRM of 2 channels,ES-
463.0 > 219.0
5.605e+004



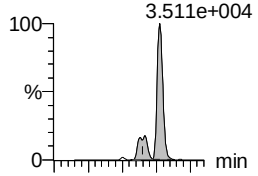
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
3.511e+004



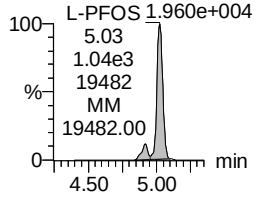
F32:MRM of 2 channels,ES-
498.9 > 99
1.960e+004



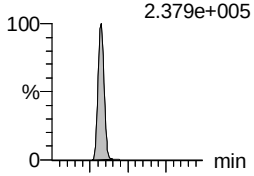
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
3.511e+004



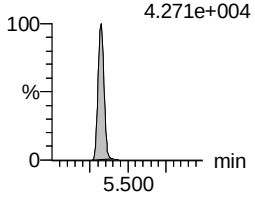
F32:MRM of 2 channels,ES-
498.9 > 99
1.960e+004
L-PFOS
5.03
1.04e3
19482
MM
19482.00



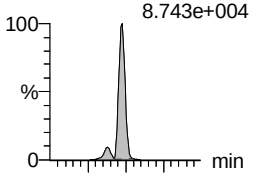
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
2.379e+005



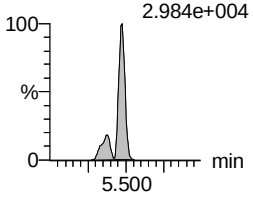
F37:MRM of 2 channels,ES-
513 > 219
4.271e+004



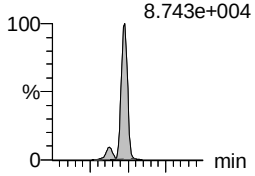
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
8.743e+004



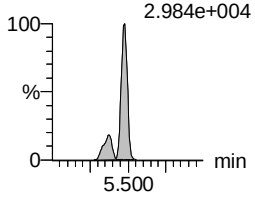
F48:MRM of 2 channels,ES-
570. > 512
2.984e+004



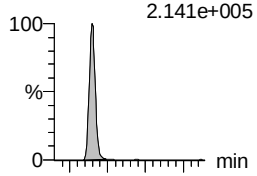
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
8.743e+004



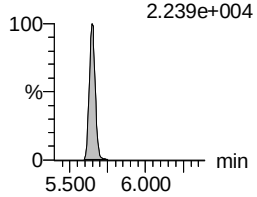
F48:MRM of 2 channels,ES-
570. > 512
2.984e+004



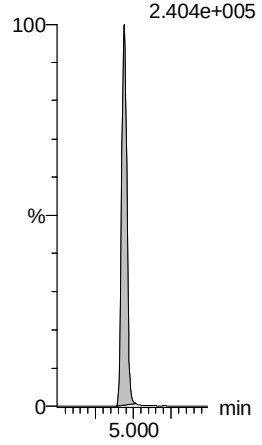
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
2.141e+005



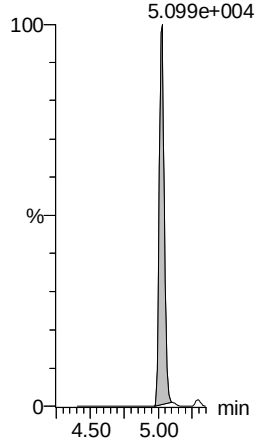
F46:MRM of 2 channels,ES-
563.0 > 269
2.239e+004



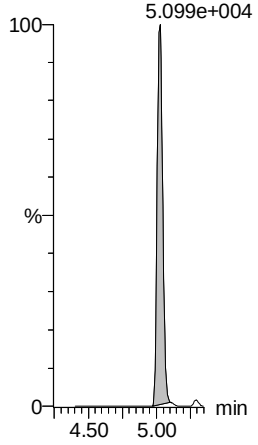
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
2.404e+005



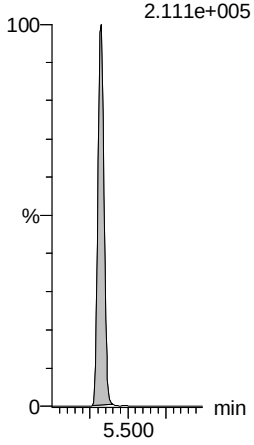
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.099e+004



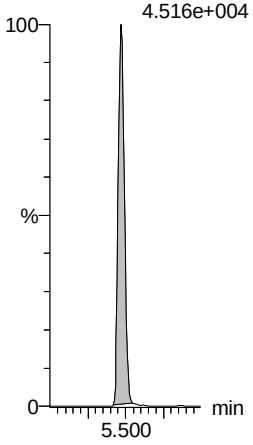
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.099e+004



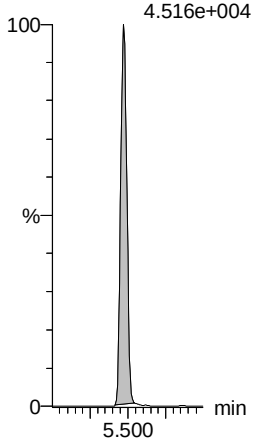
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
2.111e+005



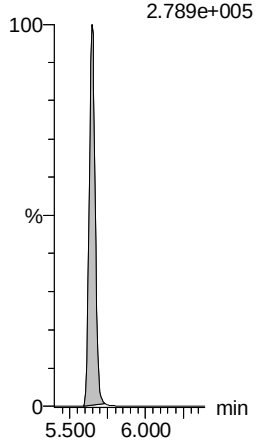
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.516e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.516e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.789e+005

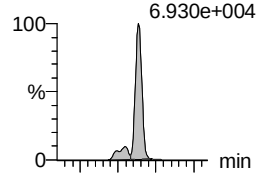
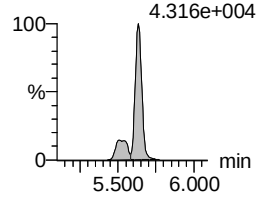


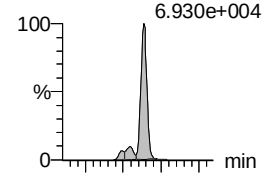
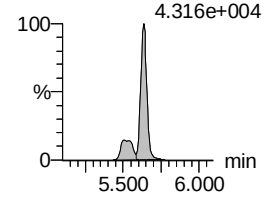
GM 11/26/2018

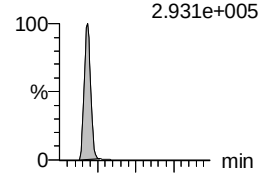
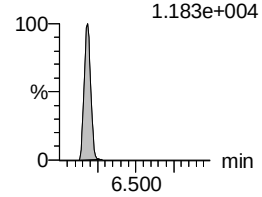
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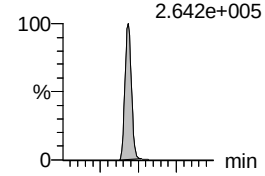
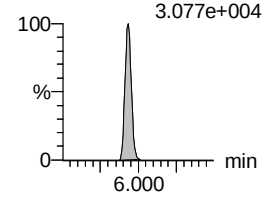
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Printed: Monday, November 26, 2018 11:07:11 Pacific Standard Time

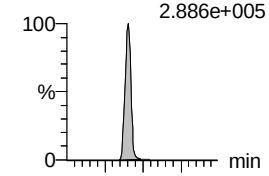
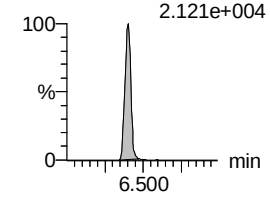
Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

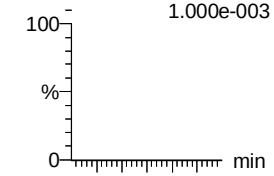
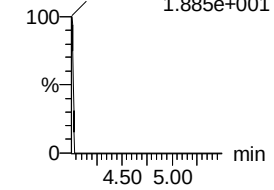
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
6.930e+004

F51:MRM of 2 channels,ES-
584.1 > 526
4.316e+004


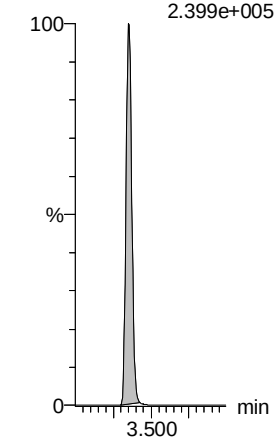
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
6.930e+004

F51:MRM of 2 channels,ES-
584.1 > 526
4.316e+004


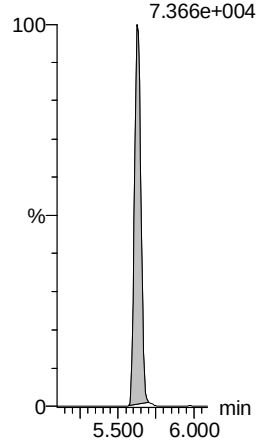
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
2.931e+005

F60:MRM of 2 channels,ES-
662.9 > 319
1.183e+004


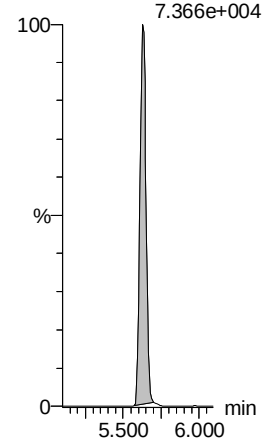
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
2.642e+005

F54:MRM of 4 channels,ES-
612.9 > 318.8
3.077e+004


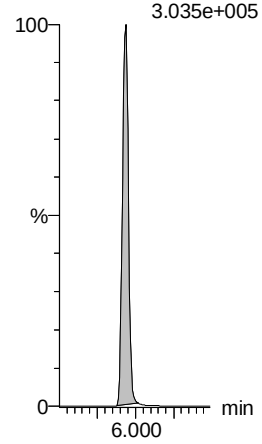
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
2.886e+005

F61:MRM of 2 channels,ES-
713. > 369.0
2.121e+004


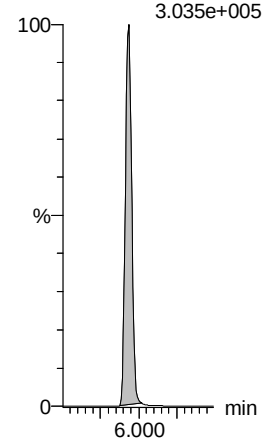
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003

F31:MRM of 3 channels,ES-
498.3 > 123.9
1.885e+001


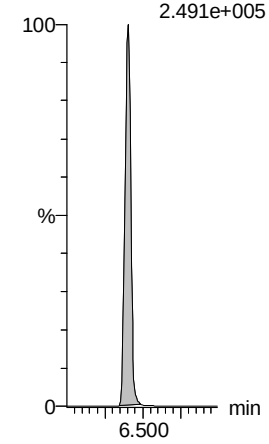
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
2.399e+005


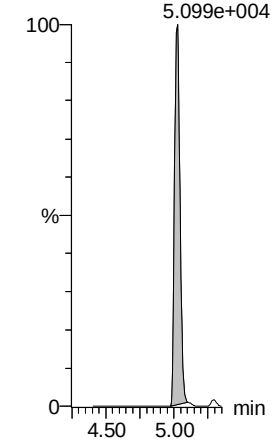
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.366e+004


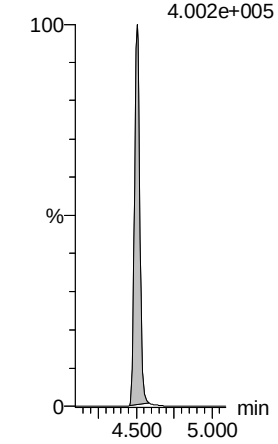
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.366e+004


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
3.035e+005


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
3.035e+005


13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
2.491e+005


13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
5.099e+004


13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
4.002e+005


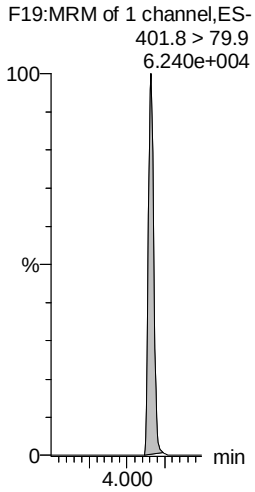
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-64.qld

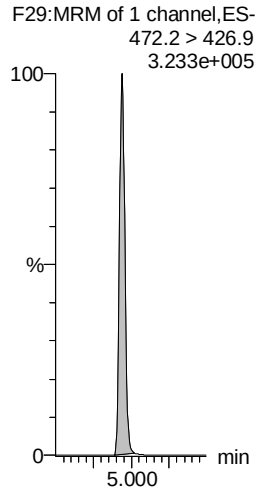
Last Altered: Monday, November 26, 2018 11:06:39 Pacific Standard Time
Printed: Monday, November 26, 2018 11:07:11 Pacific Standard Time

Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

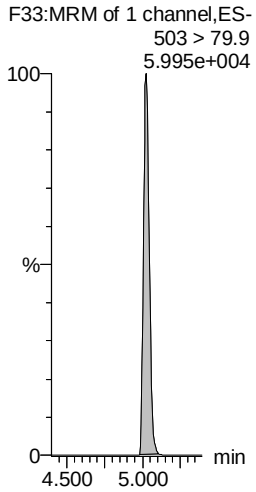
13C3-PFHxS



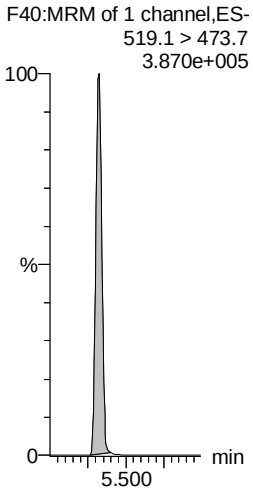
13C9-PFNA



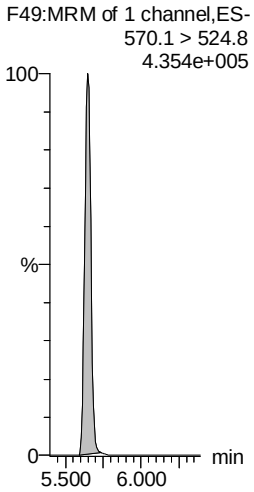
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-75.qld

Last Altered: Monday, November 26, 2018 11:21:24 Pacific Standard Time
Printed: Monday, November 26, 2018 11:22:36 Pacific Standard Time

Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-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	4.61e2	9.78e2	0.114		2.79	2.79	5.89	26.3644		2.467	NO
2	5	PFHxA	313 > 269	4.10e3	2.28e3	0.114		3.35	3.35	8.98	82.9469		15.881	NO
3	7	PFHpA	363.0 > 318.9	2.08e2	3.08e3	0.114		4.02	4.02	0.845	4.9375		11.533	NO
4	8	L-PFHxS	398.9 > 79.6	5.55e2	9.01e2	0.114		4.16	4.16	7.70	35.4943		1.740	NO
5	68	Total PFHxS	398.9 > 79.6	5.55e2	9.01e2	0.114		4.28		7.70	35.4943			
6	11	L-PFOA	412.8 > 368.9	7.07e2	6.19e3	0.114		4.47	4.50	1.43	8.7826		2.705	NO
7	69	Total PFOA	412.8 > 368.9	7.07e2	6.19e3	0.114		4.62		1.43	8.7826			
8	38	13C3-PFBS	302. > 98.8	9.78e2	2.26e3	0.114	0.539	2.72	2.79	5.41	87.8069	80.4		
9	40	13C2-PFHxA	315 > 270	2.28e3	7.65e3	0.114	0.964	3.30	3.35	3.73	33.7804	77.3		
10	41	13C4-PFHpA	367.2 > 321.8	3.08e3	7.65e3	0.114	0.482	3.97	4.02	5.03	91.1194	83.4		
11	42	18O2-PFHxS	403.0 > 102.6	9.01e2	2.26e3	0.114	0.480	4.11	4.16	4.99	90.8225	83.2		
12	42	18O2-PFHxS	403.0 > 102.6	9.01e2	2.26e3	0.114	0.480	4.11	4.16	4.99	90.8225	83.2		
13	44	13C2-PFOA	414.9 > 369.7	6.19e3	1.11e4	0.114	0.755	4.46	4.50	6.99	80.8813	74.1		
14	44	13C2-PFOA	414.9 > 369.7	6.19e3	1.11e4	0.114	0.755	4.46	4.50	6.99	80.8813	74.1		
15	-1													
16	14	PFNA	463.0 > 418.8		6.07e3	0.114		4.90						
17	16	L-PFOS	498.9 > 79.9		1.98e3	0.114		5.02						
18	70	Total PFOS	498.9 > 79.9	0.00e0	1.98e3	0.114		5.13		0.000				
19	18	PFDA	513 > 468.8	1.61e1	5.84e3	0.114		5.28	5.33	0.0344			3.842	NO
20	21	L-MeFOSAA	570 > 419		1.55e3	0.114		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	1.55e3	0.114		5.57		0.000				
22	25	PFUdA	563.0 > 518.9	5.85e1	8.68e3	0.114		5.61	5.65	0.0842			8.295	NO
23	45	13C5-PFNA	468.2 > 422.9	6.07e3	8.71e3	0.114	0.992	4.90	4.94	8.72	76.8185	70.3		
24	47	13C8-PFOS	507.0 > 79.9	1.98e3	2.39e3	0.114	1.034	4.98	5.03	10.3	87.3790	80.0		
25	47	13C8-PFOS	507.0 > 79.9	1.98e3	2.39e3	0.114	1.034	4.98	5.03	10.3	87.3790	80.0		
26	48	13C2-PFDA	515.1 > 469.9	5.84e3	1.16e4	0.114	0.832	5.28	5.32	6.29	65.9965	60.4		
27	50	d3-N-MeFOSAA	573.3 > 419	1.55e3	1.53e4	0.114	0.135	5.43	5.47	1.27	82.0747	75.1		
28	50	d3-N-MeFOSAA	573.3 > 419	1.55e3	1.53e4	0.114	0.135	5.43	5.47	1.27	82.0747	75.1		
29	51	13C2-PFUdA	565 > 519.8	8.68e3	1.53e4	0.114	0.928	5.61	5.65	7.09	66.7374	61.1		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		2.63e3	0.114		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	2.63e3	0.114		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		8.96e3	0.114		6.15						
34	27	PFDoA	612.9 > 569.0		8.96e3	0.114		5.90						
35	30	PFTeDA	713.0 > 669.0		7.57e3	0.114		6.37						
36	73	TCDA	498.3>106.9			0.114		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-75.qld

Last Altered: Monday, November 26, 2018 11:21:24 Pacific Standard Time
Printed: Monday, November 26, 2018 11:22:36 Pacific Standard Time

Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-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	7.65e3	7.65e3	0.114	1.000	3.30	3.35	12.5	109.2180	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	2.63e3	1.53e4	0.114	0.198	5.59	5.63	2.15	94.7562	86.8		
39	52	d5-N-EtFOSAA	589.3 > 419	2.63e3	1.53e4	0.114	0.198	5.59	5.63	2.15	94.7562	86.8		
40	53	13C2-PFDoA	615.0 > 569.7	8.96e3	1.16e4	0.114	0.980	5.90	5.93	9.63	85.8682	78.6		
41	53	13C2-PFDoA	615.0 > 569.7	8.96e3	1.16e4	0.114	0.980	5.90	5.93	9.63	85.8682	78.6		
42	55	13C2-PFTeDA	715.1 > 669.7	7.57e3	1.53e4	0.114	0.607	6.37	6.40	6.18	89.0141	81.5		
43	47	13C8-PFOS	507.0 > 79.9	1.98e3	2.39e3	0.114	1.034	4.98	5.03	10.3	87.3790	80.0		
44	63	13C8-PFOA	420.9 > 376	1.11e4	1.11e4	0.114	1.000	4.46	4.50	12.5	109.2180	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.26e3	2.26e3	0.114	1.000	4.11	4.16	12.5	109.2180	100.0		
47	64	13C9-PFNA	472.2 > 426.9	8.71e3	8.71e3	0.114	1.000	4.90	4.94	12.5	109.2180	100.0		
48	65	13C4-PFOS	503 > 79.9	2.39e3	2.39e3	0.114	1.000	4.98	5.03	12.5	109.2180	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.16e4	1.16e4	0.114	1.000	5.28	5.32	12.5	109.2180	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.53e4	1.53e4	0.114	1.000	5.61	5.65	12.5	109.2180	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

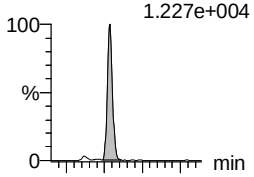
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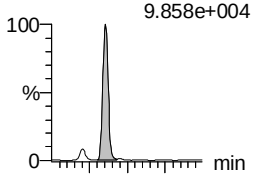
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Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-SA2D

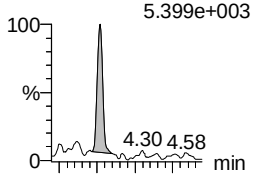
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
1.227e+004



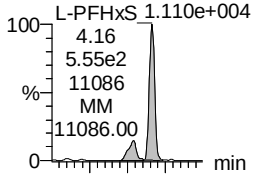
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
9.858e+004



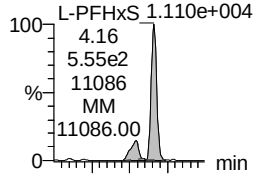
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
5.399e+003



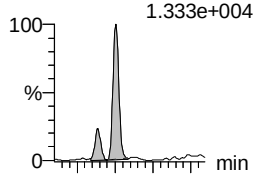
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
1.110e+004



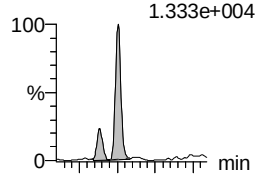
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
1.110e+004



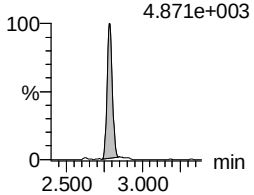
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
1.333e+004



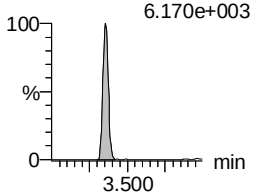
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
1.333e+004



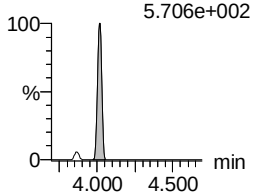
F7:MRM of 2 channels,ES-
299.0 > 99.0
4.871e+003



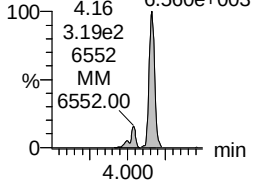
F9:MRM of 2 channels,ES-
313 > 118.9
6.170e+003



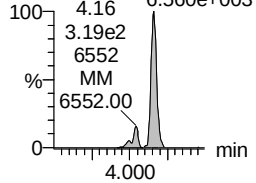
F16:MRM of 2 channels,ES-
363.0 > 169.0
5.706e+002



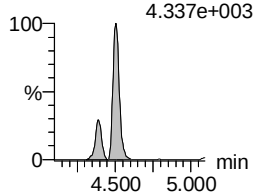
F18:MRM of 2 channels,ES-
398.9 > 99.0
6.560e+003



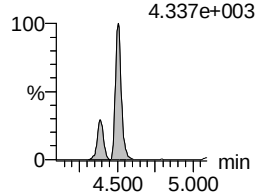
F18:MRM of 2 channels,ES-
398.9 > 99.0
6.560e+003



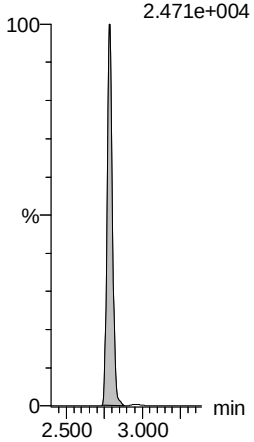
F21:MRM of 2 channels,ES-
412.8 > 169
4.337e+003



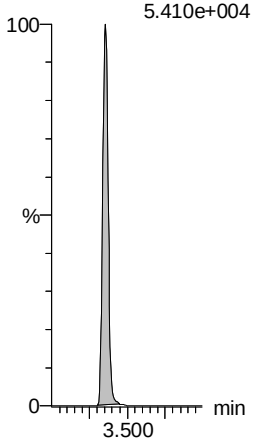
F21:MRM of 2 channels,ES-
412.8 > 169
4.337e+003



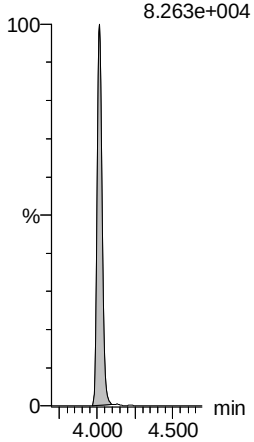
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.471e+004



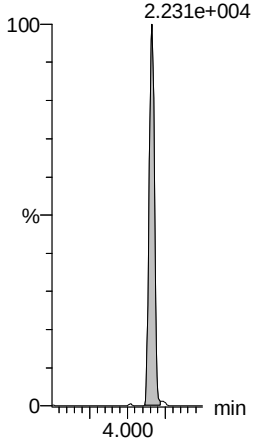
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
5.410e+004



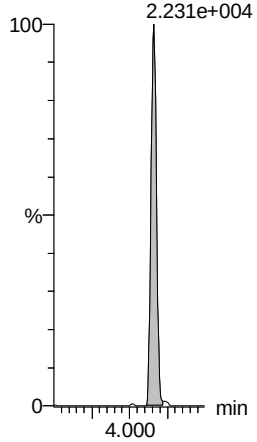
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
8.263e+004



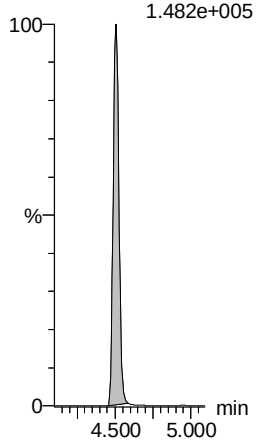
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.231e+004



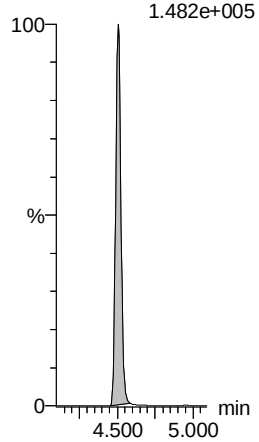
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.231e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.482e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.482e+005



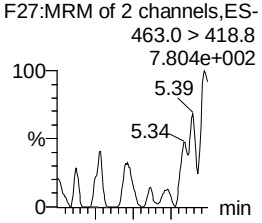
GM 11/26/2018

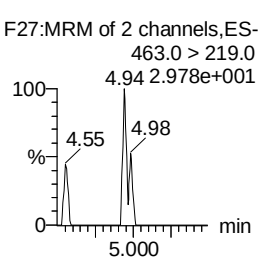
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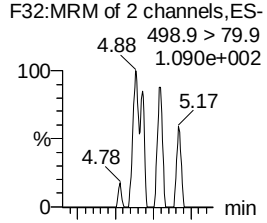
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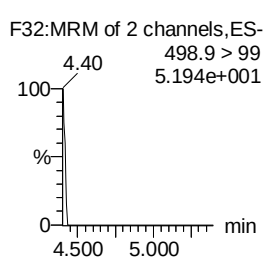
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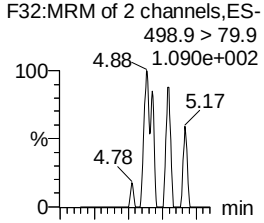


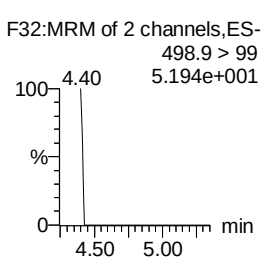
L-PFOS



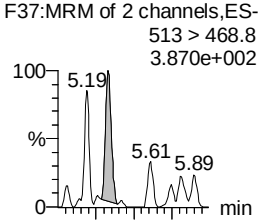


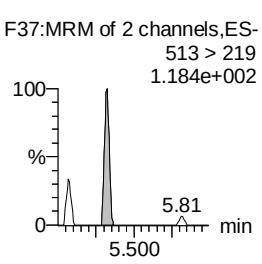
Total PFOS



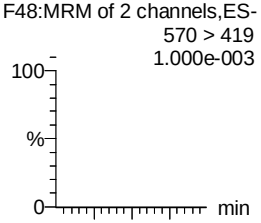


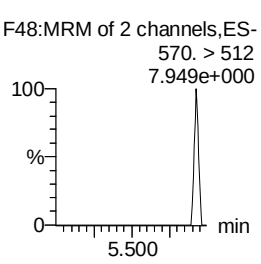
PFDA



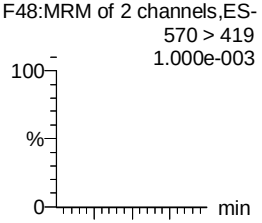


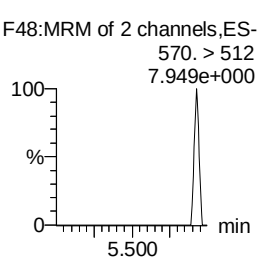
L-MeFOSAA



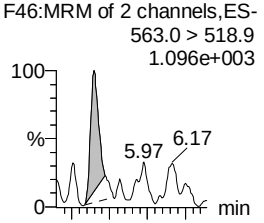


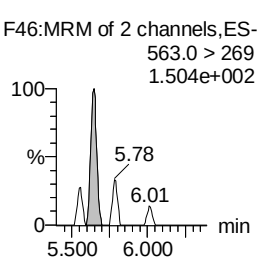
Total N-MeFOSAA



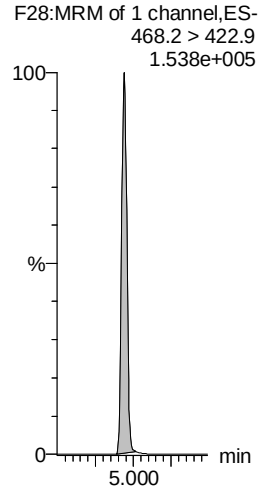


PFUdA

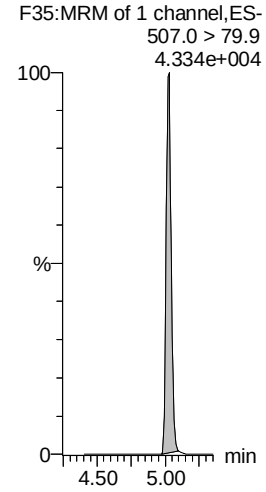




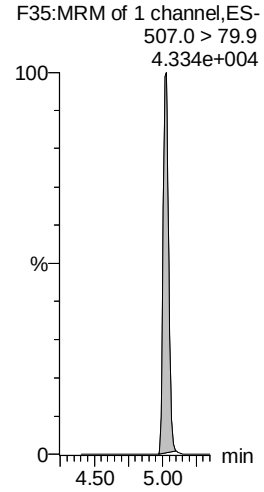
13C5-PFNA



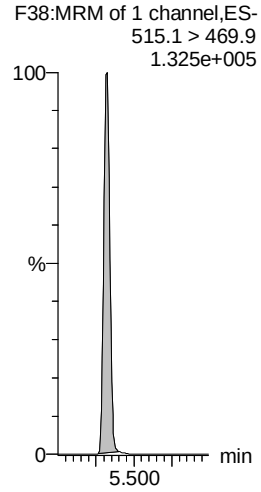
13C8-PFOS



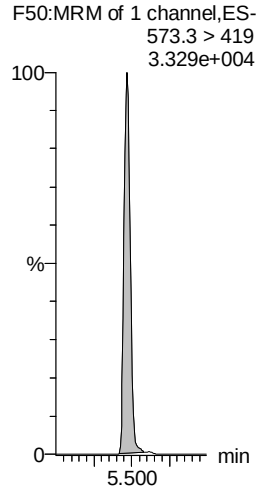
13C8-PFOS



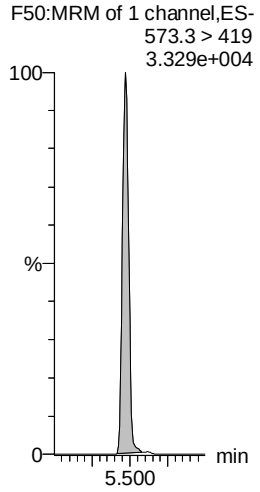
13C2-PFDA



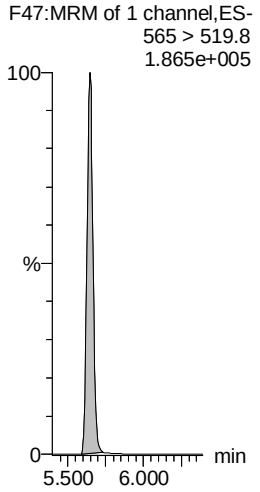
d3-N-MeFOSAA



d3-N-MeFOSAA



13C2-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

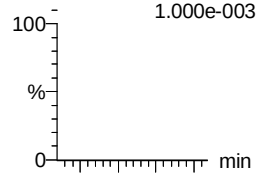
Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-75.qld

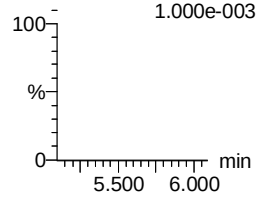
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Printed: Monday, November 26, 2018 11:22:36 Pacific Standard Time

Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-SA2D

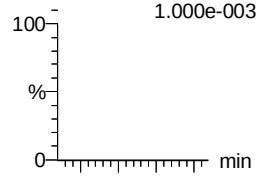
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



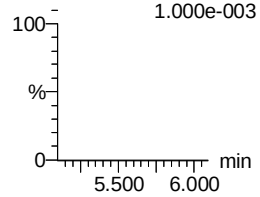
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



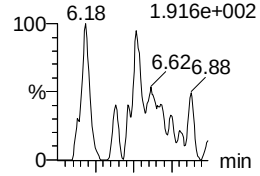
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



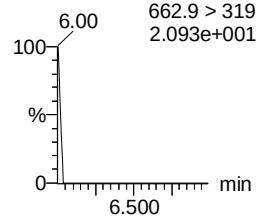
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



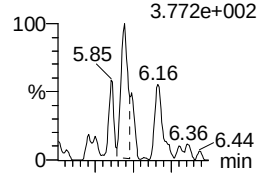
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
1.916e+002



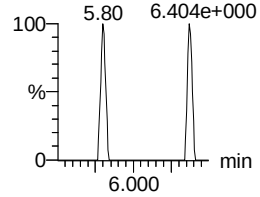
F60:MRM of 2 channels,ES-
662.9 > 319
2.093e+001



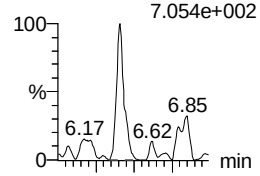
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.772e+002



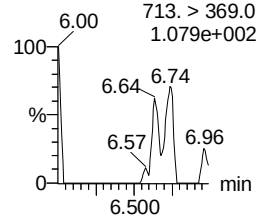
F54:MRM of 4 channels,ES-
612.9 > 318.8
6.404e+000



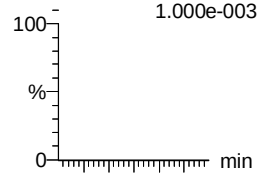
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
7.054e+002



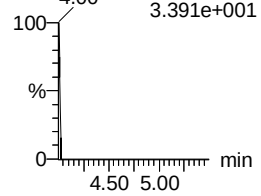
F61:MRM of 2 channels,ES-
713. > 369.0
1.079e+002



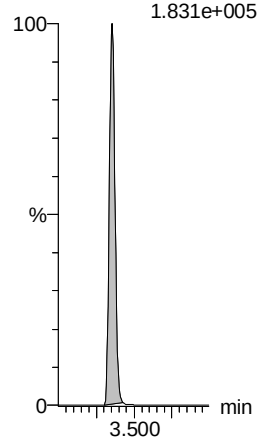
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003



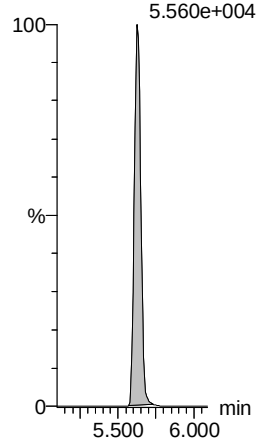
F31:MRM of 3 channels,ES-
498.3 > 123.9
3.391e+001



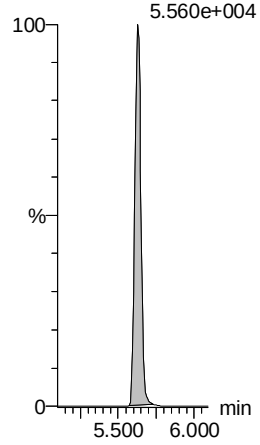
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
1.831e+005



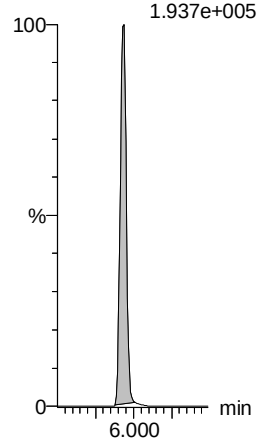
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.560e+004



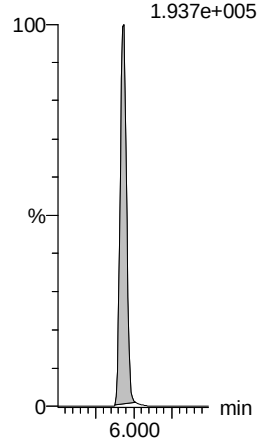
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.560e+004



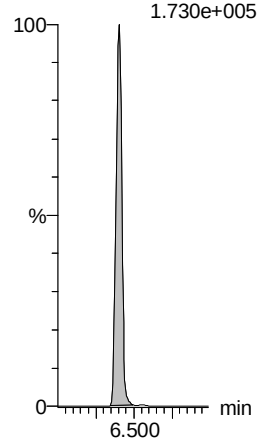
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
1.937e+005



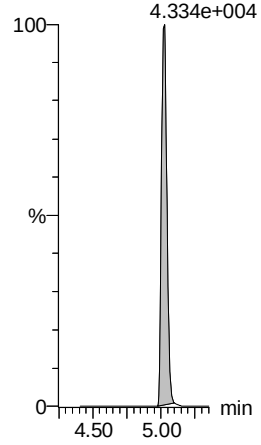
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
1.937e+005



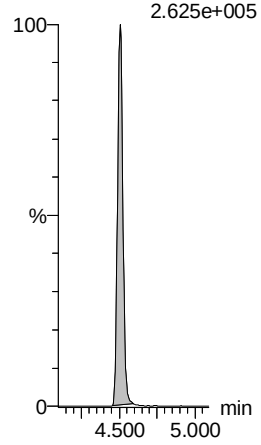
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
1.730e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.334e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
2.625e+005



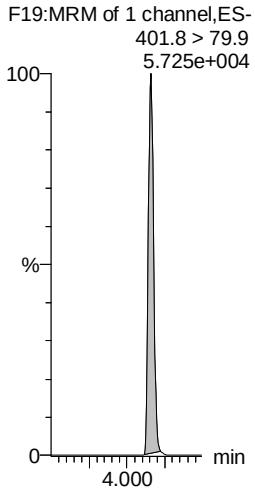
GM 11/26/2018

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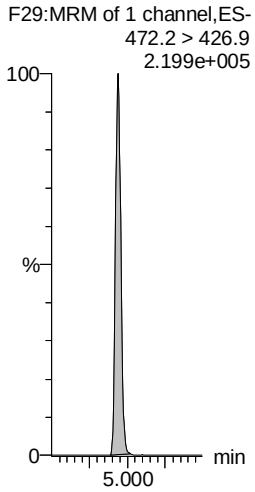
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Printed: Monday, November 26, 2018 11:22:36 Pacific Standard Time

Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-SA2D

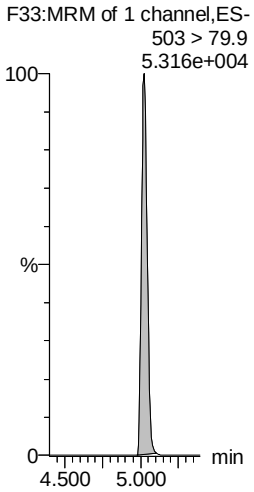
13C3-PFHxS



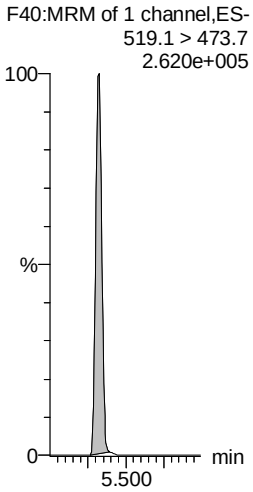
13C9-PFNA



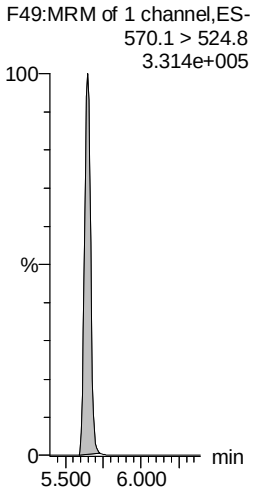
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-76.qld

Last Altered: Monday, November 26, 2018 11:26:21 Pacific Standard Time
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Name: 181120M1_76, Date: 21-Nov-2018, Time: 02:10:50, ID: 1803615-06 A1-MW-51-SA2 0.11681, Description: A1-MW-51-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	1.36e3	1.13e3	0.117		2.78	2.79	15.1	66.2713		2.706	NO
2	5	PFHxA	313 > 269	1.12e4	2.81e3	0.117		3.35	3.35	19.8	180.1388		14.884	NO
3	7	PFHpA	363.0 > 318.9	6.54e2	3.66e3	0.117		4.02	4.02	2.23	13.9044		9.420	NO
4	8	L-PFHxS	398.9 > 79.6	1.64e3	1.01e3	0.117		4.16	4.16	20.2	91.3855		1.742	NO
5	68	Total PFHxS	398.9 > 79.6	1.64e3	1.01e3	0.117		4.28		20.2	91.3855			
6	11	L-PFOA	412.8 > 368.9	1.62e3	6.92e3	0.117		4.47	4.50	2.92	18.5659		3.186	NO
7	69	Total PFOA	412.8 > 368.9	1.62e3	6.92e3	0.117		4.62		2.92	18.5659			
8	38	13C3-PFBS	302. > 98.8	1.13e3	2.32e3	0.117	0.539	2.72	2.78	6.09	96.7256	90.4		
9	40	13C2-PFHxA	315 > 270	2.81e3	8.43e3	0.117	0.964	3.30	3.35	4.17	36.9975	86.4		
10	41	13C4-PFHpA	367.2 > 321.8	3.66e3	8.43e3	0.117	0.482	3.97	4.02	5.43	96.4337	90.1		
11	42	18O2-PFHxS	403.0 > 102.6	1.01e3	2.32e3	0.117	0.480	4.11	4.16	5.45	97.1344	90.8		
12	42	18O2-PFHxS	403.0 > 102.6	1.01e3	2.32e3	0.117	0.480	4.11	4.16	5.45	97.1344	90.8		
13	44	13C2-PFOA	414.9 > 369.7	6.92e3	1.05e4	0.117	0.755	4.46	4.50	8.24	93.4722	87.3		
14	44	13C2-PFOA	414.9 > 369.7	6.92e3	1.05e4	0.117	0.755	4.46	4.50	8.24	93.4722	87.3		
15	-1													
16	14	PFNA	463.0 > 418.8		6.31e3	0.117		4.90						
17	16	L-PFOS	498.9 > 79.9	5.78e1	2.24e3	0.117		5.02	4.92	0.323	2.6797		3.302	YES
18	70	Total PFOS	498.9 > 79.9	5.78e1	2.24e3	0.117		5.13		0.323	2.6797			
19	18	PFDA	513 > 468.8		6.31e3	0.117		5.28						
20	21	L-MeFOSAA	570 > 419		2.01e3	0.117		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	2.01e3	0.117		5.57		0.000				
22	25	PFUdA	563.0 > 518.9		9.13e3	0.117		5.61						
23	45	13C5-PFNA	468.2 > 422.9	6.31e3	7.97e3	0.117	0.992	4.90	4.94	9.90	85.4512	79.9		
24	47	13C8-PFOS	507.0 > 79.9	2.24e3	2.42e3	0.117	1.034	4.98	5.03	11.6	95.8359	89.6		
25	47	13C8-PFOS	507.0 > 79.9	2.24e3	2.42e3	0.117	1.034	4.98	5.03	11.6	95.8359	89.6		
26	48	13C2-PFDA	515.1 > 469.9	6.31e3	1.02e4	0.117	0.832	5.28	5.32	7.73	79.5110	74.3		
27	50	d3-N-MeFOSAA	573.3 > 419	2.01e3	1.37e4	0.117	0.135	5.43	5.47	1.83	116.0841	108.5		
28	50	d3-N-MeFOSAA	573.3 > 419	2.01e3	1.37e4	0.117	0.135	5.43	5.47	1.83	116.0841	108.5		
29	51	13C2-PFUdA	565 > 519.8	9.13e3	1.37e4	0.117	0.928	5.61	5.65	8.35	77.0142	72.0		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		3.05e3	0.117		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	3.05e3	0.117		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		9.82e3	0.117		6.15						
34	27	PFDoA	612.9 > 569.0		9.82e3	0.117		5.90						
35	30	PFTeDA	713.0 > 669.0		8.53e3	0.117		6.37						
36	73	TCDA	498.3>106.9			0.117		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-76.qld

Last Altered: Monday, November 26, 2018 11:26:21 Pacific Standard Time
Printed: Monday, November 26, 2018 11:26:25 Pacific Standard Time

Name: 181120M1_76, Date: 21-Nov-2018, Time: 02:10:50, ID: 1803615-06 A1-MW-51-SA2 0.11681, Description: A1-MW-51-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	8.43e3	8.43e3	0.117	1.000	3.30	3.35	12.5	107.0114	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.05e3	1.37e4	0.117	0.198	5.59	5.63	2.79	120.4858	112.6		
39	52	d5-N-EtFOSAA	589.3 > 419	3.05e3	1.37e4	0.117	0.198	5.59	5.63	2.79	120.4858	112.6		
40	53	13C2-PFDoA	615.0 > 569.7	9.82e3	1.02e4	0.117	0.980	5.90	5.93	12.0	105.1113	98.2		
41	53	13C2-PFDoA	615.0 > 569.7	9.82e3	1.02e4	0.117	0.980	5.90	5.93	12.0	105.1113	98.2		
42	55	13C2-PFTeDA	715.1 > 669.7	8.53e3	1.37e4	0.117	0.607	6.37	6.40	7.79	109.8782	102.7		
43	47	13C8-PFOS	507.0 > 79.9	2.24e3	2.42e3	0.117	1.034	4.98	5.03	11.6	95.8359	89.6		
44	63	13C8-PFOA	420.9 > 376	1.05e4	1.05e4	0.117	1.000	4.46	4.50	12.5	107.0114	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.32e3	2.32e3	0.117	1.000	4.11	4.16	12.5	107.0114	100.0		
47	64	13C9-PFNA	472.2 > 426.9	7.97e3	7.97e3	0.117	1.000	4.90	4.94	12.5	107.0114	100.0		
48	65	13C4-PFOS	503 > 79.9	2.42e3	2.42e3	0.117	1.000	4.98	5.03	12.5	107.0114	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.02e4	1.02e4	0.117	1.000	5.28	5.32	12.5	107.0114	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.37e4	1.37e4	0.117	1.000	5.61	5.65	12.5	107.0114	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

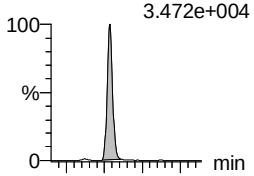
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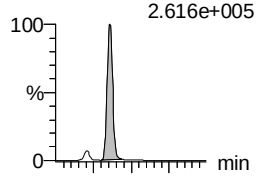
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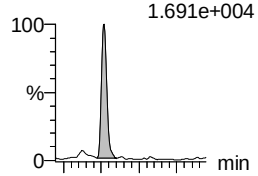
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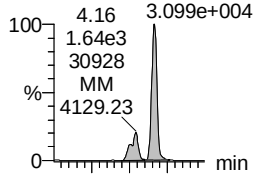
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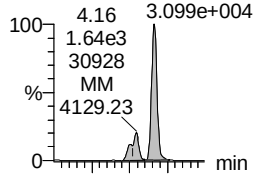
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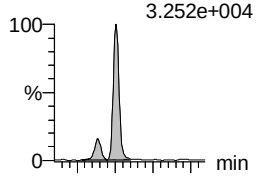
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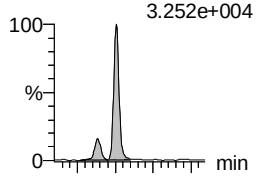
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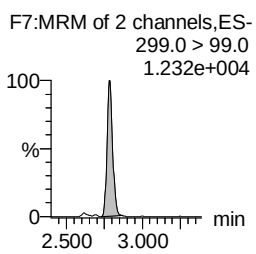


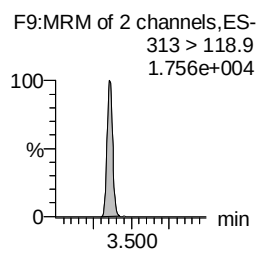
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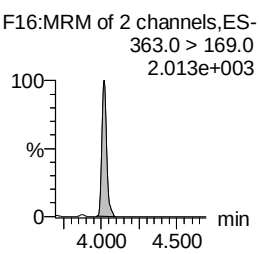


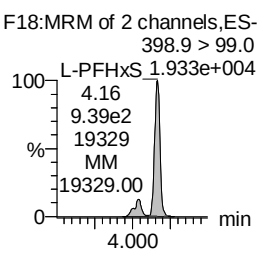
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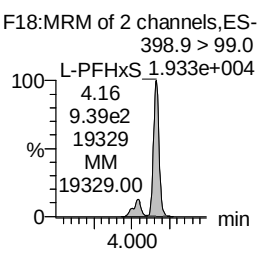


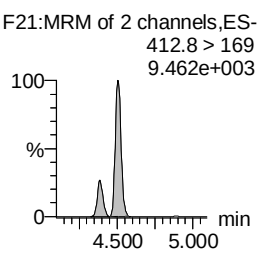


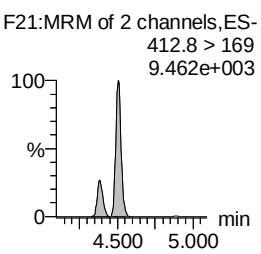




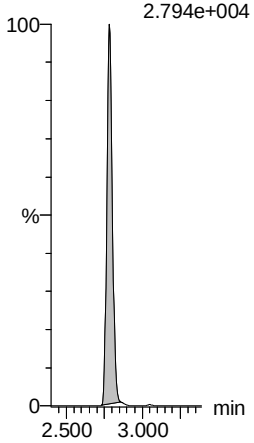




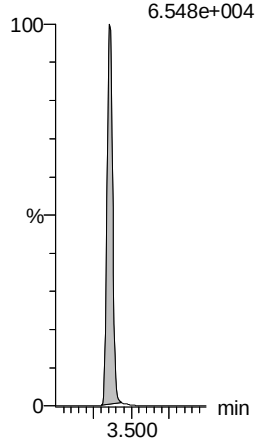




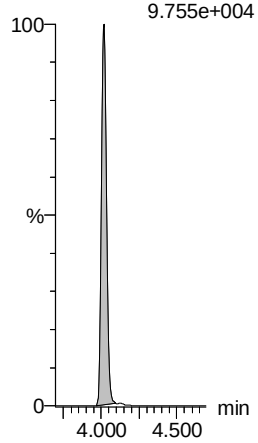
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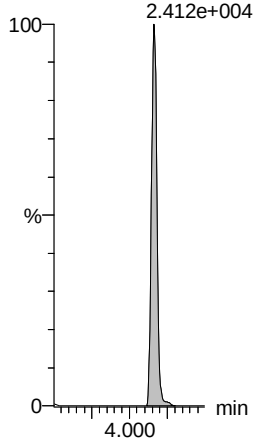
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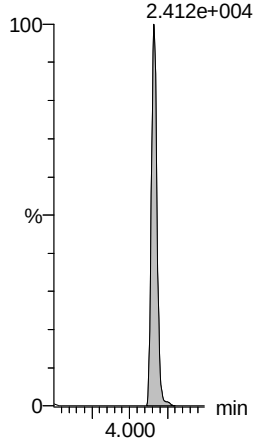
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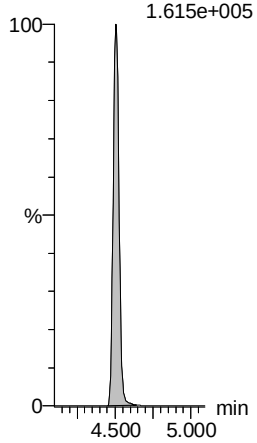
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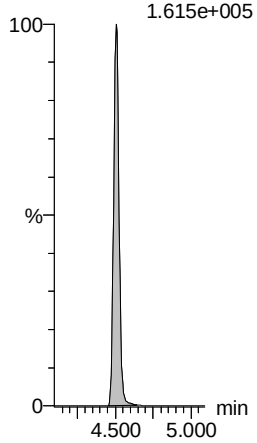
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13C2-PFOA



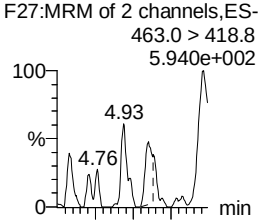
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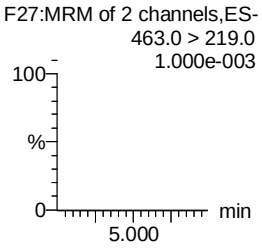
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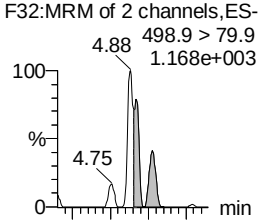
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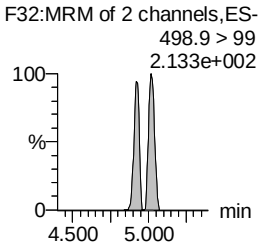
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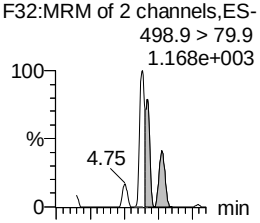


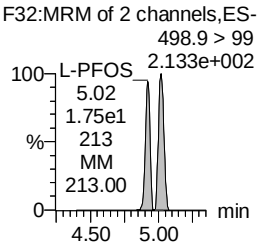
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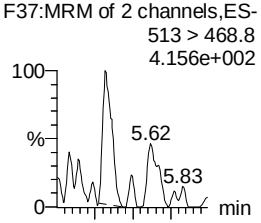


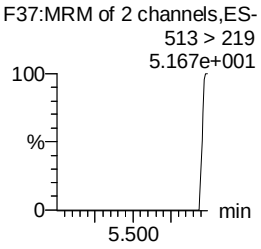
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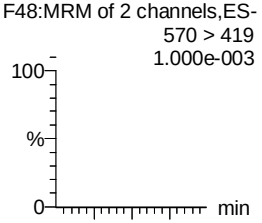


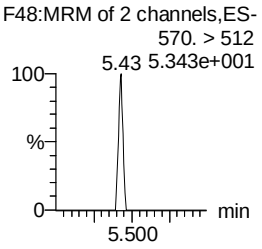
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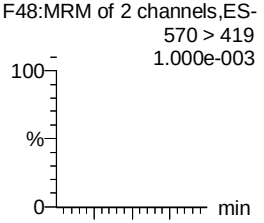


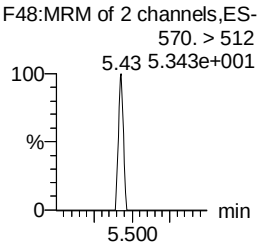
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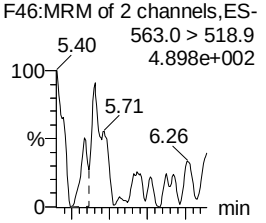


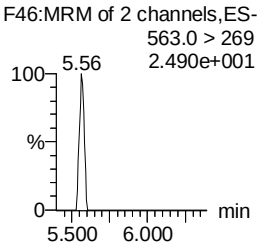
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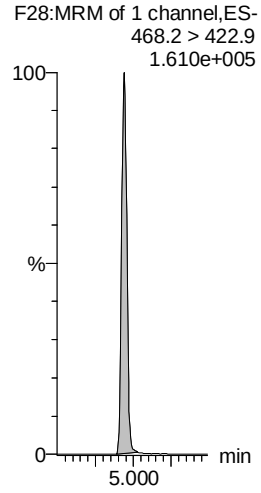


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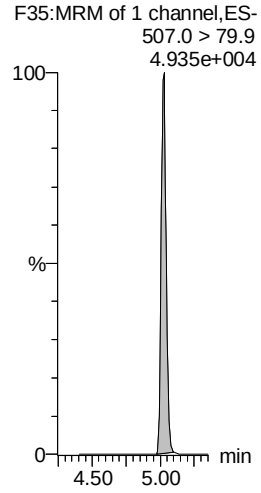




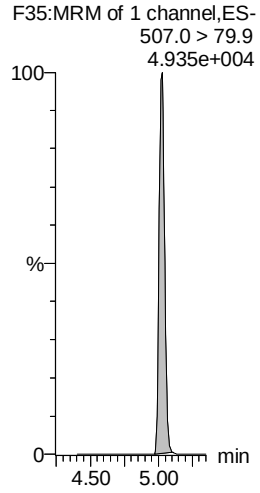
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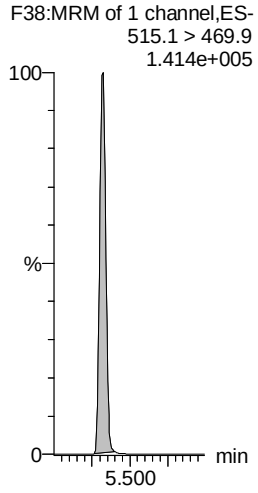
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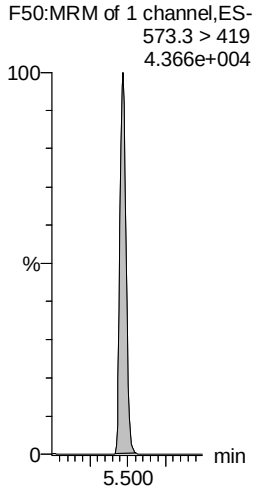
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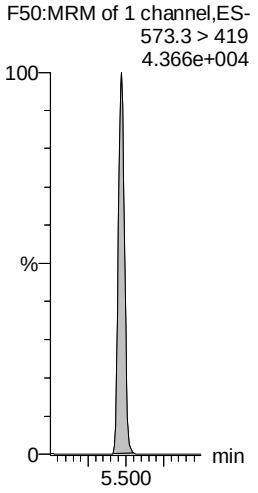
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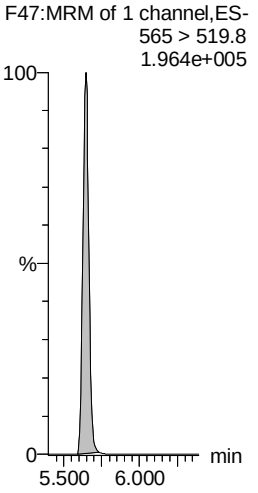
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d3-N-MeFOSAA



13C2-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

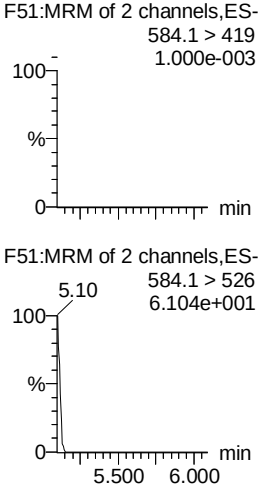
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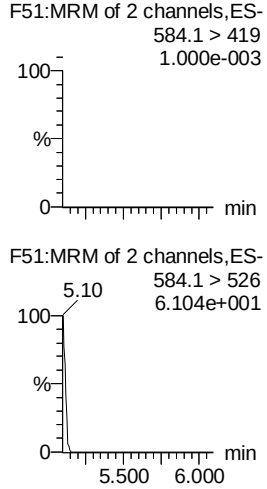
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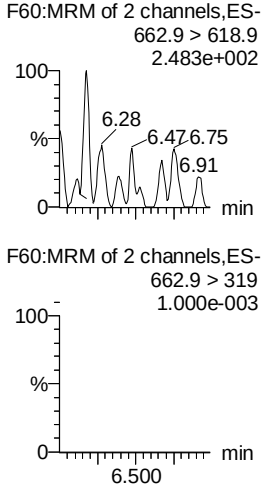
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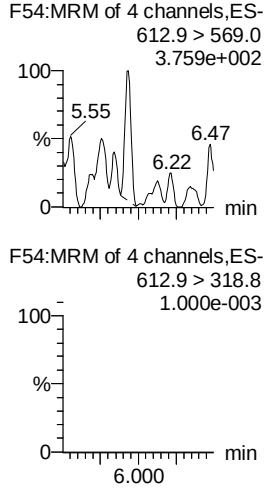
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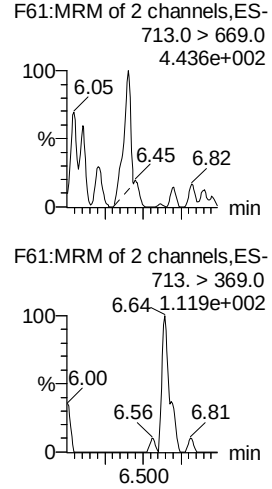
PFTrDA



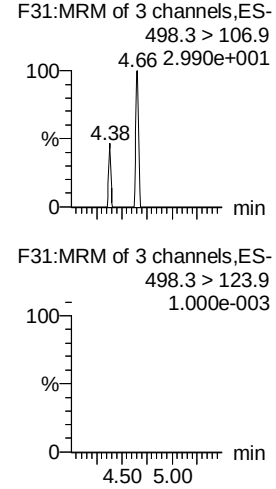
PFDoA



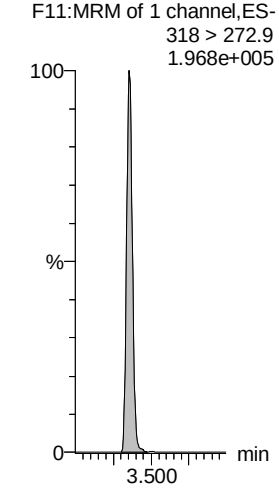
PFTeDA



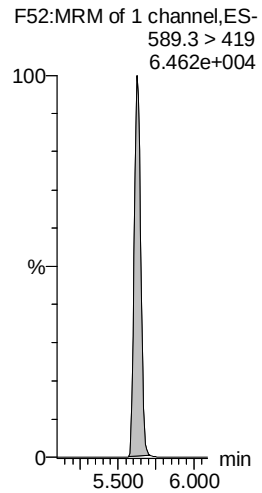
TCDA



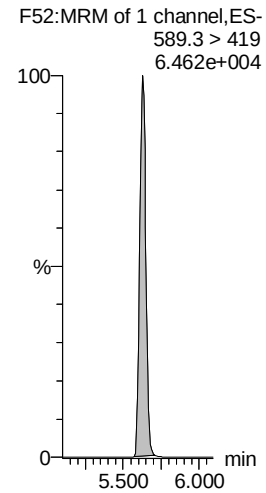
13C5-PFHxA



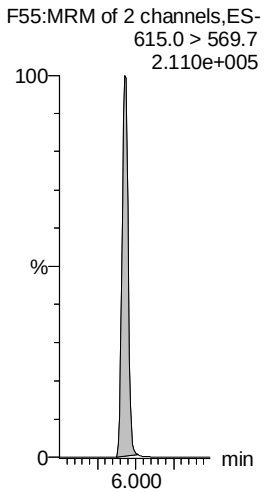
d5-N-EtFOSAA



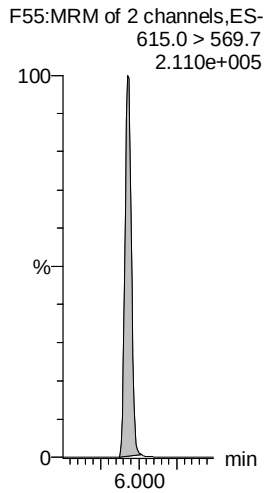
d5-N-EtFOSAA



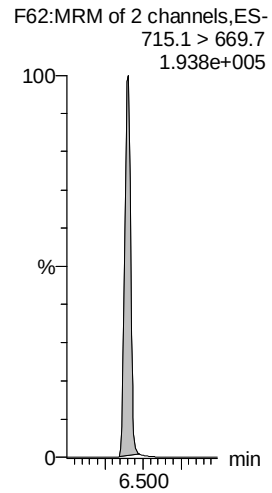
13C2-PFDoA



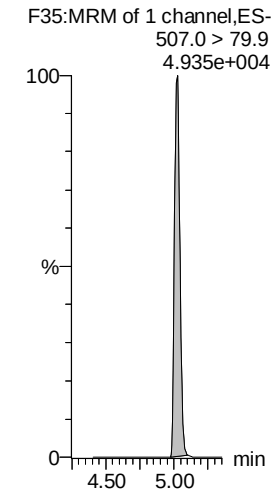
13C2-PFDoA



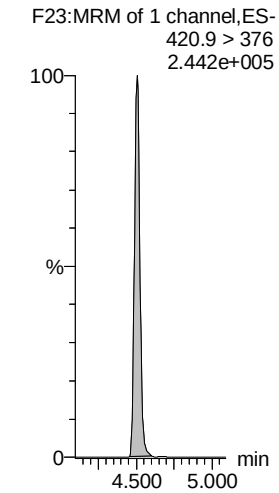
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



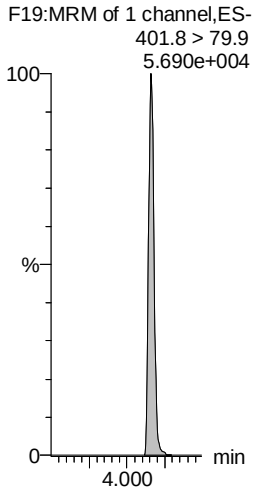
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-76.qld

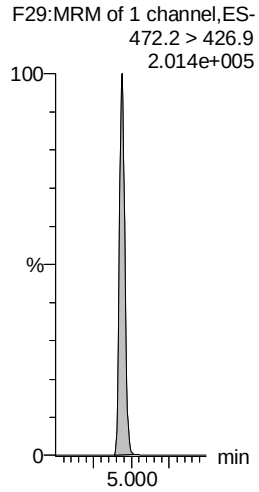
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Printed: Monday, November 26, 2018 11:26:25 Pacific Standard Time

Name: 181120M1_76, Date: 21-Nov-2018, Time: 02:10:50, ID: 1803615-06 A1-MW-51-SA2 0.11681, Description: A1-MW-51-SA2

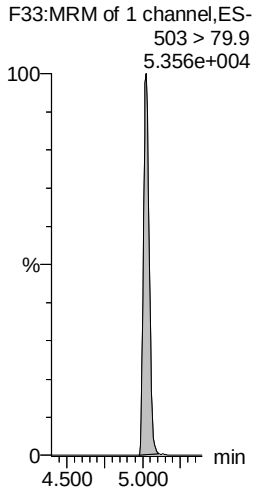
13C3-PFHxS



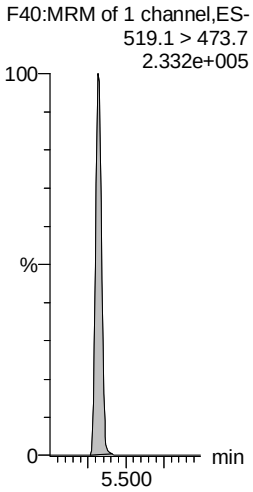
13C9-PFNA



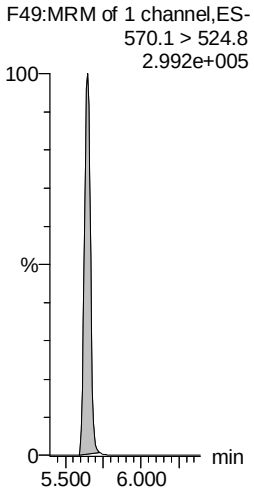
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-77.qld

Last Altered: Monday, November 26, 2018 11:31:53 Pacific Standard Time
Printed: Monday, November 26, 2018 11:32:13 Pacific Standard Time

Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-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	3.33e3	1.11e3	0.115		2.78	2.78	37.3	167.1204		2.715	NO
2	5	PFHxA	313 > 269	2.01e4	2.00e3	0.115		3.35	3.35	50.2	466.4661		14.570	NO
3	7	PFHpA	363.0 > 318.9	7.92e2	3.12e3	0.115		4.02	4.02	3.17	20.4045		13.489	NO
4	8	L-PFHxS	398.9 > 79.6	1.82e3	9.88e2	0.115		4.16	4.16	23.1	106.2101		1.824	NO
5	68	Total PFHxS	398.9 > 79.6	1.82e3	9.88e2	0.115		4.28		23.1	106.2101			
6	11	L-PFOA	412.8 > 368.9	2.20e3	6.67e3	0.115		4.47	4.50	4.11	27.0338		2.897	NO
7	69	Total PFOA	412.8 > 368.9	2.20e3	6.67e3	0.115		4.62		4.11	27.0338			
8	38	13C3-PFBS	302. > 98.8	1.11e3	2.51e3	0.115	0.539	2.72	2.78	5.56	89.9648	82.5		
9	40	13C2-PFHxA	315 > 270	2.00e3	6.62e3	0.115	0.964	3.30	3.35	3.78	34.1935	78.4		
10	41	13C4-PFHpA	367.2 > 321.8	3.12e3	6.62e3	0.115	0.482	3.97	4.02	5.89	106.5891	97.8		
11	42	18O2-PFHxS	403.0 > 102.6	9.88e2	2.51e3	0.115	0.480	4.11	4.16	4.93	89.4986	82.1		
12	42	18O2-PFHxS	403.0 > 102.6	9.88e2	2.51e3	0.115	0.480	4.11	4.16	4.93	89.4986	82.1		
13	44	13C2-PFOA	414.9 > 369.7	6.67e3	1.11e4	0.115	0.755	4.46	4.50	7.51	86.8056	79.6		
14	44	13C2-PFOA	414.9 > 369.7	6.67e3	1.11e4	0.115	0.755	4.46	4.50	7.51	86.8056	79.6		
15	-1													
16	14	PFNA	463.0 > 418.8		6.46e3	0.115		4.90						
17	16	L-PFOS	498.9 > 79.9	7.54e1	2.22e3	0.115		5.02	4.89	0.424	3.5560		2.720	NO
18	70	Total PFOS	498.9 > 79.9	7.54e1	2.22e3	0.115		5.13		0.424	3.5560			
19	18	PFDA	513 > 468.8		6.52e3	0.115		5.28						
20	21	L-MeFOSAA	570 > 419		1.75e3	0.115		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	1.75e3	0.115		5.57		0.000				
22	25	PFUdA	563.0 > 518.9		9.60e3	0.115		5.61						
23	45	13C5-PFNA	468.2 > 422.9	6.46e3	9.05e3	0.115	0.992	4.90	4.94	8.93	78.5126	72.0		
24	47	13C8-PFOS	507.0 > 79.9	2.22e3	2.54e3	0.115	1.034	4.98	5.02	10.9	92.2298	84.6		
25	47	13C8-PFOS	507.0 > 79.9	2.22e3	2.54e3	0.115	1.034	4.98	5.02	10.9	92.2298	84.6		
26	48	13C2-PFDA	515.1 > 469.9	6.52e3	1.22e4	0.115	0.832	5.28	5.31	6.69	70.0818	64.3		
27	50	d3-N-MeFOSAA	573.3 > 419	1.75e3	1.56e4	0.115	0.135	5.43	5.47	1.40	90.1125	82.7		
28	50	d3-N-MeFOSAA	573.3 > 419	1.75e3	1.56e4	0.115	0.135	5.43	5.47	1.40	90.1125	82.7		
29	51	13C2-PFUdA	565 > 519.8	9.60e3	1.56e4	0.115	0.928	5.61	5.65	7.69	72.2259	66.3		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		2.77e3	0.115		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	2.77e3	0.115		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.06e4	0.115		6.15						
34	27	PFDoA	612.9 > 569.0		1.06e4	0.115		5.90						
35	30	PFTeDA	713.0 > 669.0		8.68e3	0.115		6.37						
36	73	TCDA	498.3>106.9			0.115		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-77.qld

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Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-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	6.62e3	6.62e3	0.115	1.000	3.30	3.35	12.5	108.9990	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	2.77e3	1.56e4	0.115	0.198	5.59	5.63	2.21	97.3599	89.3		
39	52	d5-N-EtFOSAA	589.3 > 419	2.77e3	1.56e4	0.115	0.198	5.59	5.63	2.21	97.3599	89.3		
40	53	13C2-PFDoA	615.0 > 569.7	1.06e4	1.22e4	0.115	0.980	5.90	5.93	10.9	96.5247	88.6		
41	53	13C2-PFDoA	615.0 > 569.7	1.06e4	1.22e4	0.115	0.980	5.90	5.93	10.9	96.5247	88.6		
42	55	13C2-PFTeDA	715.1 > 669.7	8.68e3	1.56e4	0.115	0.607	6.37	6.40	6.95	99.8151	91.6		
43	47	13C8-PFOS	507.0 > 79.9	2.22e3	2.54e3	0.115	1.034	4.98	5.02	10.9	92.2298	84.6		
44	63	13C8-PFOA	420.9 > 376	1.11e4	1.11e4	0.115	1.000	4.46	4.50	12.5	108.9990	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.51e3	2.51e3	0.115	1.000	4.11	4.15	12.5	108.9990	100.0		
47	64	13C9-PFNA	472.2 > 426.9	9.05e3	9.05e3	0.115	1.000	4.90	4.94	12.5	108.9990	100.0		
48	65	13C4-PFOS	503 > 79.9	2.54e3	2.54e3	0.115	1.000	4.98	5.03	12.5	108.9990	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.22e4	1.22e4	0.115	1.000	5.28	5.32	12.5	108.9990	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.56e4	1.56e4	0.115	1.000	5.61	5.65	12.5	108.9990	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

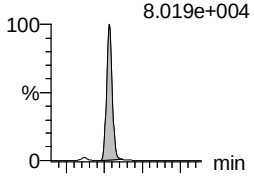
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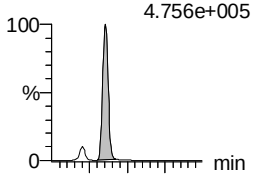
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Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-SA2

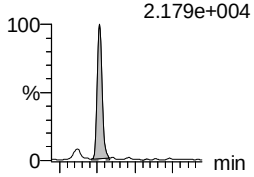
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
8.019e+004



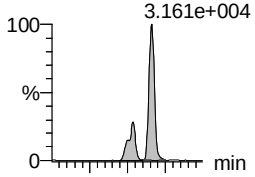
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
4.756e+005



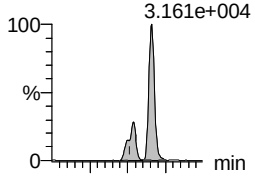
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
2.179e+004



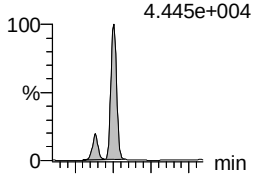
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
3.161e+004



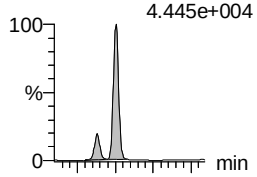
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
3.161e+004



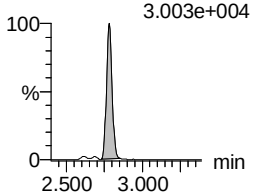
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
4.445e+004



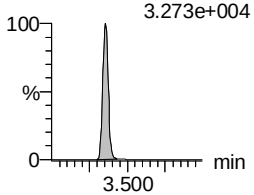
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
4.445e+004



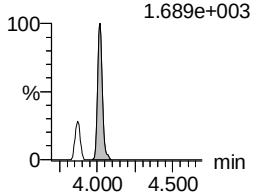
F7:MRM of 2 channels,ES-
299.0 > 99.0
3.003e+004



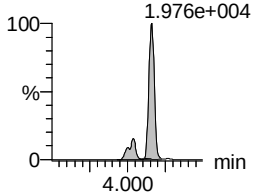
F9:MRM of 2 channels,ES-
313 > 118.9
3.273e+004



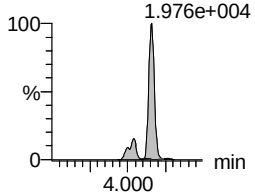
F16:MRM of 2 channels,ES-
363.0 > 169.0
1.689e+003



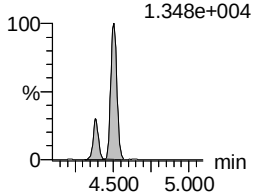
F18:MRM of 2 channels,ES-
398.9 > 99.0
1.976e+004



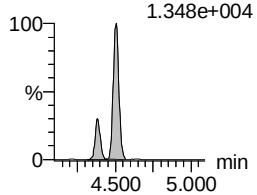
F18:MRM of 2 channels,ES-
398.9 > 99.0
1.976e+004



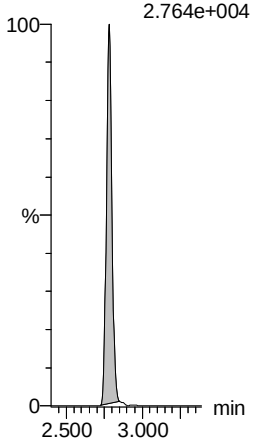
F21:MRM of 2 channels,ES-
412.8 > 169
1.348e+004



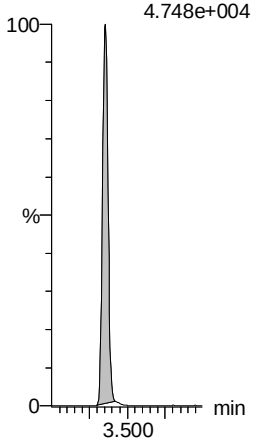
F21:MRM of 2 channels,ES-
412.8 > 169
1.348e+004



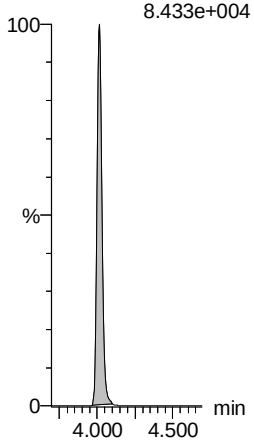
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.764e+004



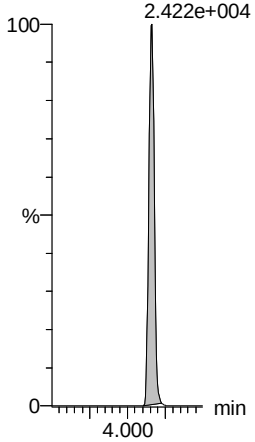
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
4.748e+004



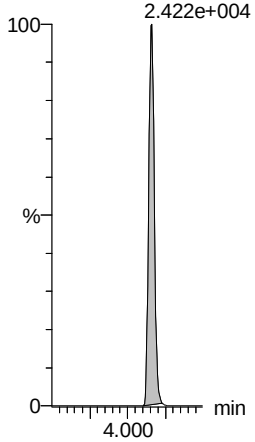
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
8.433e+004



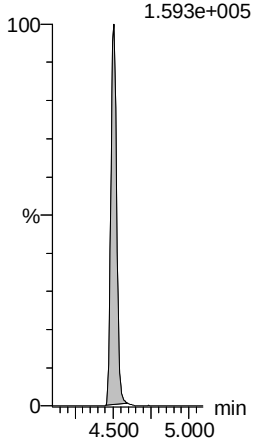
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.422e+004



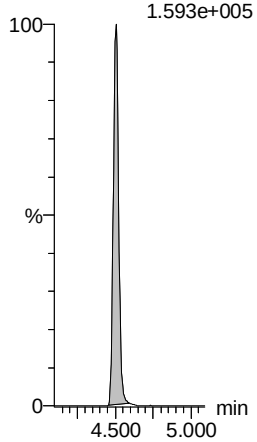
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.422e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.593e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
1.593e+005



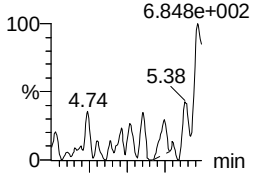
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-77.qld

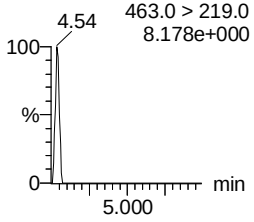
Last Altered: Monday, November 26, 2018 11:31:53 Pacific Standard Time
Printed: Monday, November 26, 2018 11:32:13 Pacific Standard Time

Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-SA2

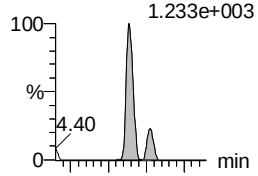
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
6.848e+002



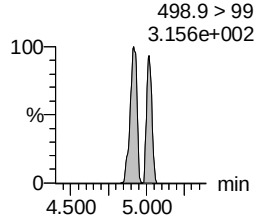
F27:MRM of 2 channels,ES-
463.0 > 219.0
8.178e+000



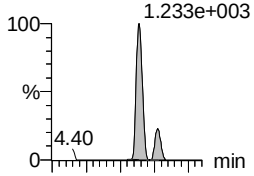
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.233e+003



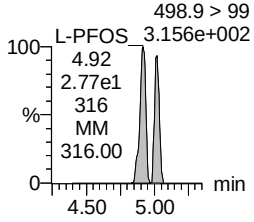
F32:MRM of 2 channels,ES-
498.9 > 99
3.156e+002



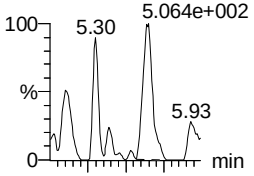
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.233e+003



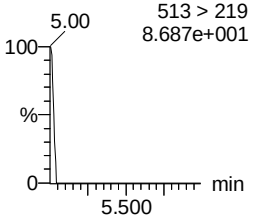
F32:MRM of 2 channels,ES-
498.9 > 99
3.156e+002



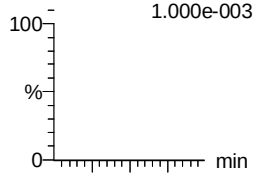
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
5.064e+002



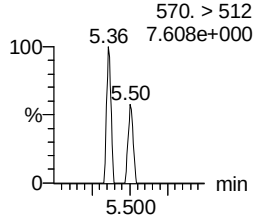
F37:MRM of 2 channels,ES-
513 > 219
8.687e+001



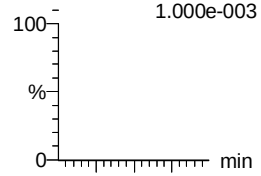
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



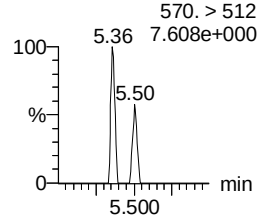
F48:MRM of 2 channels,ES-
570. > 512
7.608e+000



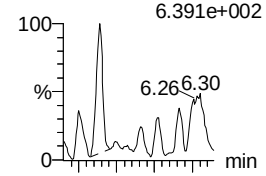
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



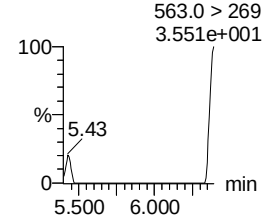
F48:MRM of 2 channels,ES-
570. > 512
7.608e+000



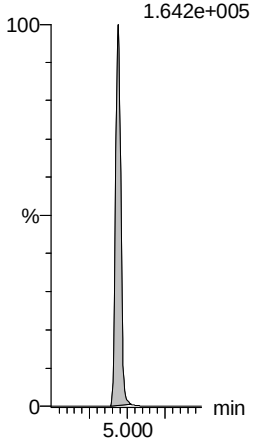
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
6.391e+002



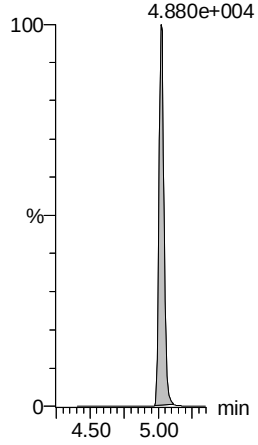
F46:MRM of 2 channels,ES-
563.0 > 269
3.551e+001



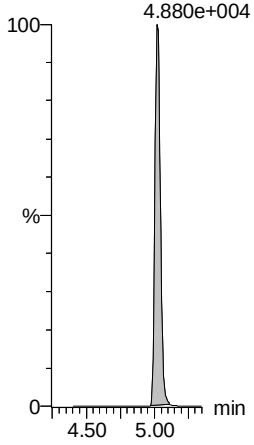
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
1.642e+005



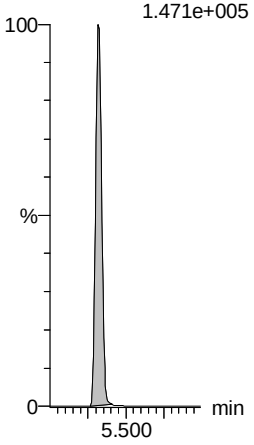
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.880e+004



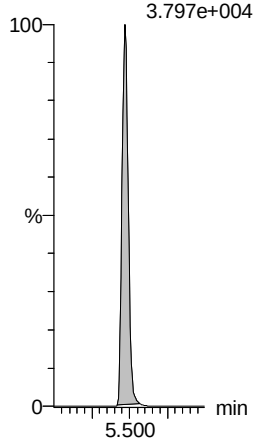
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.880e+004



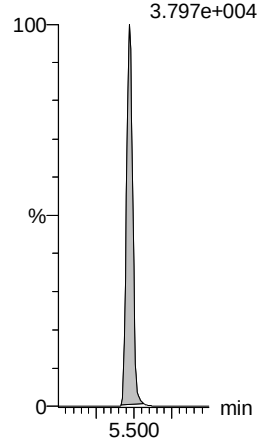
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
1.471e+005



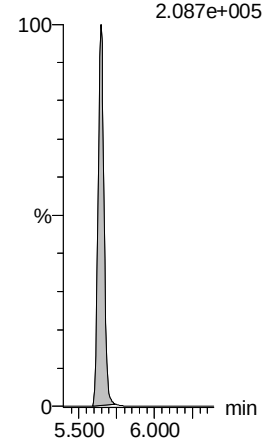
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
3.797e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
3.797e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.087e+005



GM 11/26/2018

Vista Analytical Laboratory L14

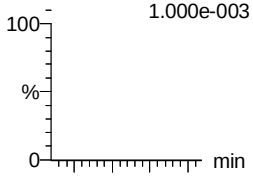
Rev: ANP 11/26/2018

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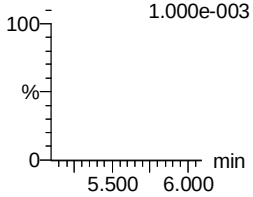
Last Altered: Monday, November 26, 2018 11:31:53 Pacific Standard Time
Printed: Monday, November 26, 2018 11:32:13 Pacific Standard Time

Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-SA2

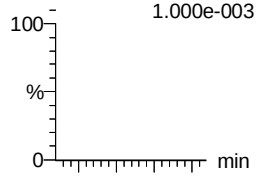
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



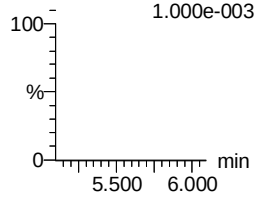
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



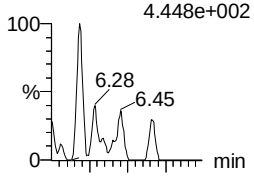
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



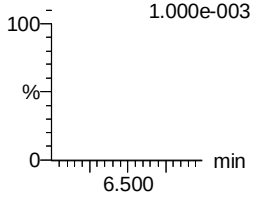
F51:MRM of 2 channels,ES-
584.1 > 526
1.000e-003



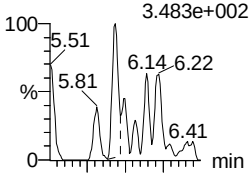
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
4.448e+002



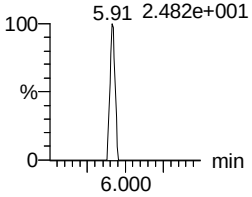
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003



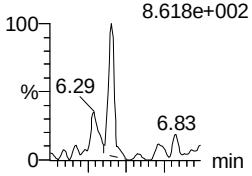
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.483e+002



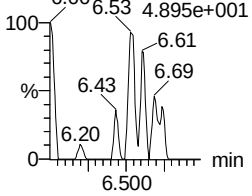
F54:MRM of 4 channels,ES-
612.9 > 318.8
2.482e+001



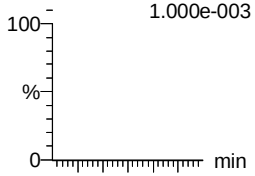
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
8.618e+002



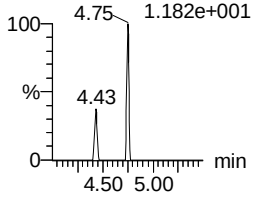
F61:MRM of 2 channels,ES-
713. > 369.0
4.895e+001



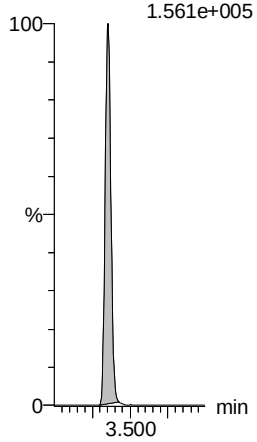
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003



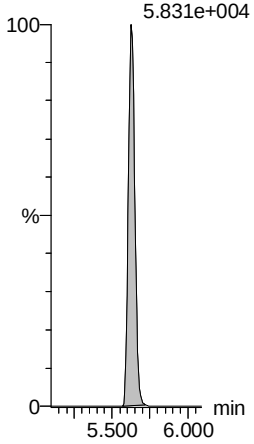
F31:MRM of 3 channels,ES-
498.3 > 123.9
1.182e+001



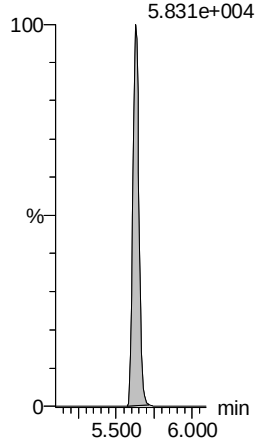
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
1.561e+005



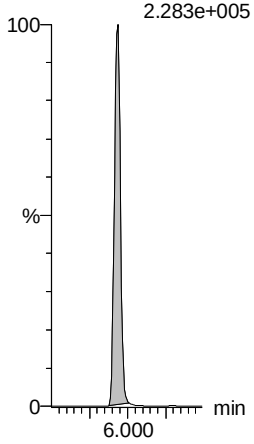
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.831e+004



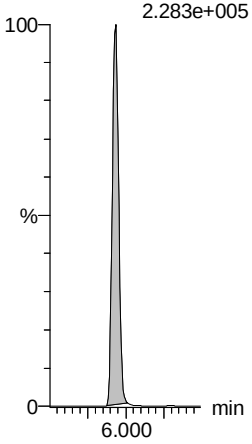
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.831e+004



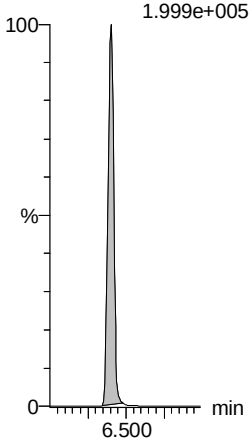
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.283e+005



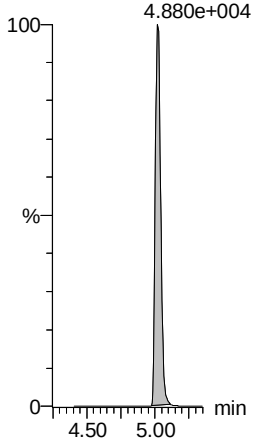
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.283e+005



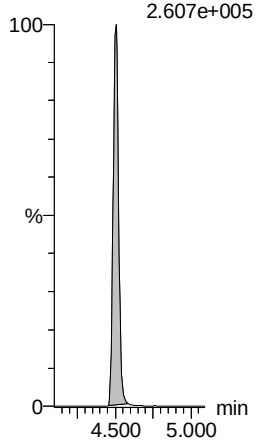
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
1.999e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.880e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
2.607e+005



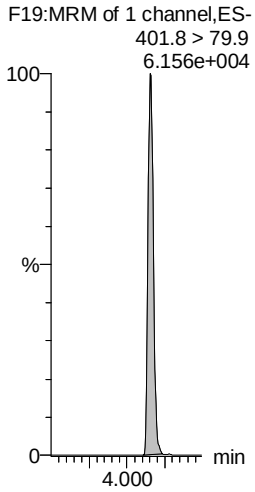
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-77.qld

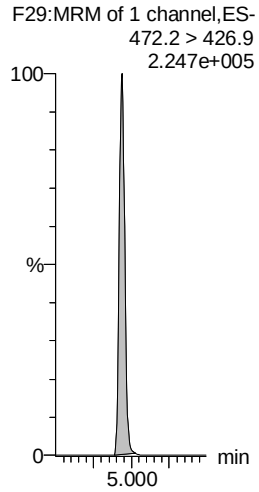
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Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-SA2

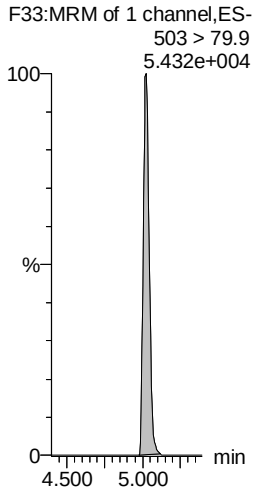
13C3-PFHxS



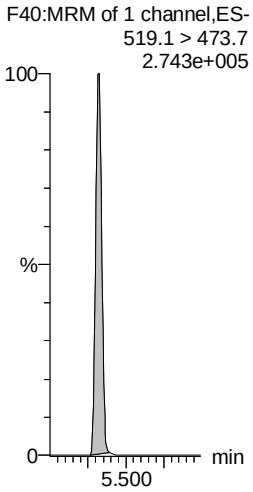
13C9-PFNA



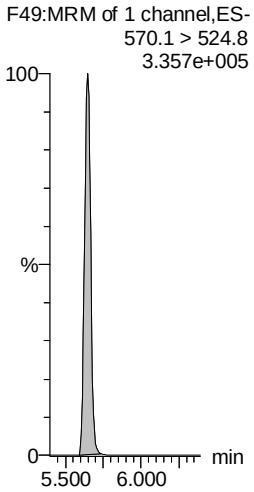
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-78.qld

Last Altered: Monday, November 26, 2018 11:33:45 Pacific Standard Time
Printed: Monday, November 26, 2018 11:34:03 Pacific Standard Time

Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

	#	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		1.00e3	0.115		2.79						
2	5	PFHxA	313 > 269		4.76e3	0.115		3.36						
3	7	PFHpA	363.0 > 318.9		5.95e3	0.115		4.02						
4	8	L-PFHxS	398.9 > 79.6		9.28e2	0.115		4.16						
5	68	Total PFHxS	398.9 > 79.6	0.00e0	9.28e2	0.115		4.28		0.000				
6	11	L-PFOA	412.8 > 368.9	3.48e1	9.40e3	0.115		4.47	4.51	0.0463			3.868	NO
7	69	Total PFOA	412.8 > 368.9	3.48e1	9.40e3	0.115		4.62		0.000				
8	38	13C3-PFBS	302. > 98.8	1.00e3	2.39e3	0.115	0.539	2.72	2.79	5.26	84.8593	78.1		
9	40	13C2-PFHxA	315 > 270	4.76e3	1.72e4	0.115	0.964	3.30	3.36	3.46	31.1592	71.7		
10	41	13C4-PFHpA	367.2 > 321.8	5.95e3	1.72e4	0.115	0.482	3.97	4.02	4.32	77.8238	71.6		
11	42	18O2-PFHxS	403.0 > 102.6	9.28e2	2.39e3	0.115	0.480	4.11	4.16	4.86	87.9178	80.9		
12	42	18O2-PFHxS	403.0 > 102.6	9.28e2	2.39e3	0.115	0.480	4.11	4.16	4.86	87.9178	80.9		
13	44	13C2-PFOA	414.9 > 369.7	9.40e3	1.80e4	0.115	0.755	4.46	4.51	6.52	75.0233	69.1		
14	44	13C2-PFOA	414.9 > 369.7	9.40e3	1.80e4	0.115	0.755	4.46	4.51	6.52	75.0233	69.1		
15	-1													
16	14	PFNA	463.0 > 418.8		7.72e3	0.115		4.90						
17	16	L-PFOS	498.9 > 79.9	1.43e0	1.89e3	0.115		5.02	4.92	0.00947	0.1735		1.295	NO
18	70	Total PFOS	498.9 > 79.9	1.43e0	1.89e3	0.115		5.13		0.00947	0.1735			
19	18	PFDA	513 > 468.8		7.21e3	0.115		5.28						
20	21	L-MeFOSAA	570 > 419		1.65e3	0.115		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	1.65e3	0.115		5.57		0.000				
22	25	PFUdA	563.0 > 518.9		1.03e4	0.115		5.61						
23	45	13C5-PFNA	468.2 > 422.9	7.72e3	1.23e4	0.115	0.992	4.90	4.94	7.82	68.5488	63.1		
24	47	13C8-PFOS	507.0 > 79.9	1.89e3	2.50e3	0.115	1.034	4.98	5.03	9.43	79.2295	72.9		
25	47	13C8-PFOS	507.0 > 79.9	1.89e3	2.50e3	0.115	1.034	4.98	5.03	9.43	79.2295	72.9		
26	48	13C2-PFDA	515.1 > 469.9	7.21e3	1.55e4	0.115	0.832	5.28	5.32	5.82	60.7632	55.9		
27	50	d3-N-MeFOSAA	573.3 > 419	1.65e3	1.99e4	0.115	0.135	5.43	5.47	1.03	66.5285	61.2		
28	50	d3-N-MeFOSAA	573.3 > 419	1.65e3	1.99e4	0.115	0.135	5.43	5.47	1.03	66.5285	61.2		
29	51	13C2-PFUdA	565 > 519.8	1.03e4	1.99e4	0.115	0.928	5.61	5.65	6.48	60.6596	55.8		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		2.80e3	0.115		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	2.80e3	0.115		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.12e4	0.115		6.15						
34	27	PFDoA	612.9 > 569.0		1.12e4	0.115		5.90						
35	30	PFTeDA	713.0 > 669.0	1.26e1	8.24e3	0.115		6.37	6.40	0.0191			4.532	YES
36	73	TCDA	498.3>106.9			0.115		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-78.qld

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Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

	#	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	1.72e4	1.72e4	0.115	1.000	3.30	3.35	12.5	108.6390	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	2.80e3	1.99e4	0.115	0.198	5.59	5.63	1.76	77.1636	71.0		
39	52	d5-N-EtFOSAA	589.3 > 419	2.80e3	1.99e4	0.115	0.198	5.59	5.63	1.76	77.1636	71.0		
40	53	13C2-PFDoA	615.0 > 569.7	1.12e4	1.55e4	0.115	0.980	5.90	5.93	9.07	80.4519	74.1		
41	53	13C2-PFDoA	615.0 > 569.7	1.12e4	1.55e4	0.115	0.980	5.90	5.93	9.07	80.4519	74.1		
42	55	13C2-PFTeDA	715.1 > 669.7	8.24e3	1.99e4	0.115	0.607	6.37	6.40	5.18	74.2261	68.3		
43	47	13C8-PFOS	507.0 > 79.9	1.89e3	2.50e3	0.115	1.034	4.98	5.03	9.43	79.2295	72.9		
44	63	13C8-PFOA	420.9 > 376	1.80e4	1.80e4	0.115	1.000	4.46	4.51	12.5	108.6390	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.39e3	2.39e3	0.115	1.000	4.11	4.16	12.5	108.6390	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.23e4	1.23e4	0.115	1.000	4.90	4.94	12.5	108.6390	100.0		
48	65	13C4-PFOS	503 > 79.9	2.50e3	2.50e3	0.115	1.000	4.98	5.03	12.5	108.6390	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.55e4	1.55e4	0.115	1.000	5.28	5.32	12.5	108.6390	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.99e4	1.99e4	0.115	1.000	5.61	5.65	12.5	108.6390	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

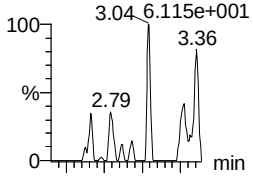
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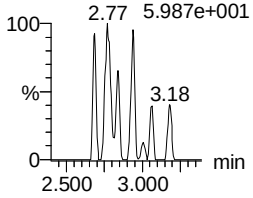
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Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

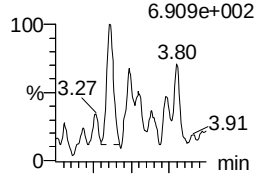
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
6.115e+001



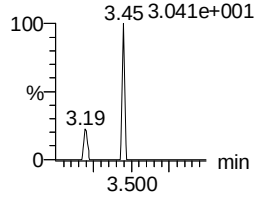
F7:MRM of 2 channels,ES-
299.0 > 99.0
5.987e+001



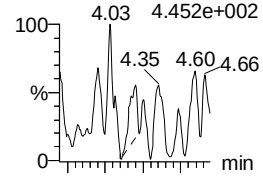
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
6.909e+002



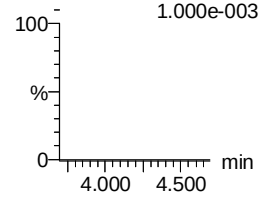
F9:MRM of 2 channels,ES-
313 > 118.9
3.041e+001



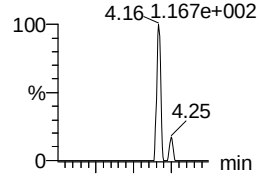
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
4.452e+002



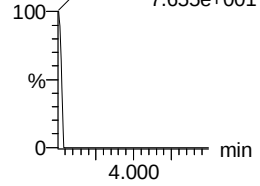
F16:MRM of 2 channels,ES-
363.0 > 169.0
1.000e-003



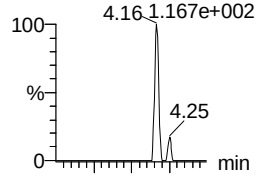
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
1.167e+002



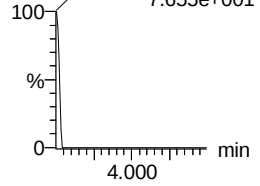
F18:MRM of 2 channels,ES-
398.9 > 99.0
7.655e+001



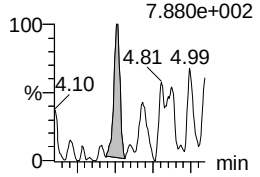
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
1.167e+002



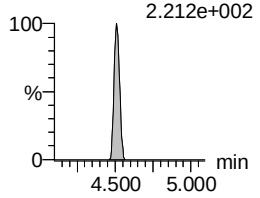
F18:MRM of 2 channels,ES-
398.9 > 99.0
7.655e+001



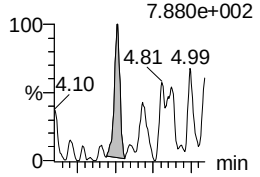
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
7.880e+002



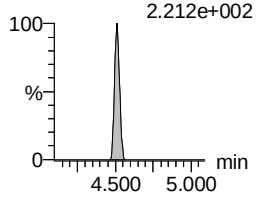
F21:MRM of 2 channels,ES-
412.8 > 169
2.212e+002



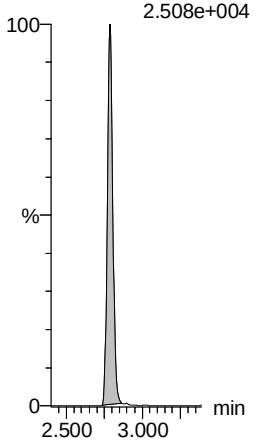
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
7.880e+002



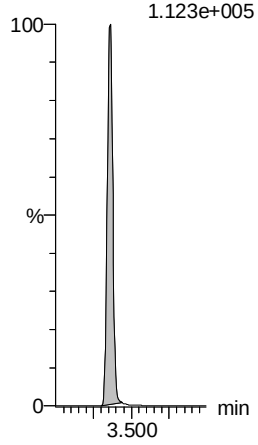
F21:MRM of 2 channels,ES-
412.8 > 169
2.212e+002



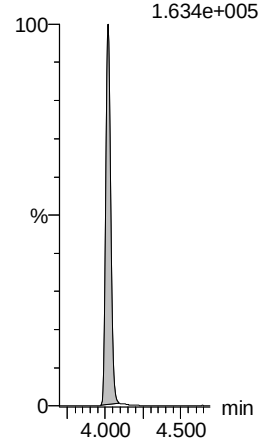
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.508e+004



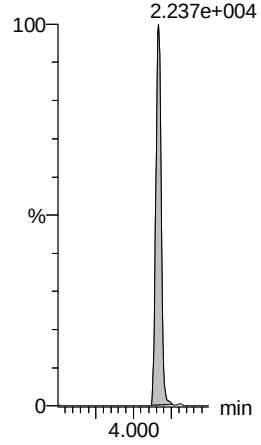
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
1.123e+005



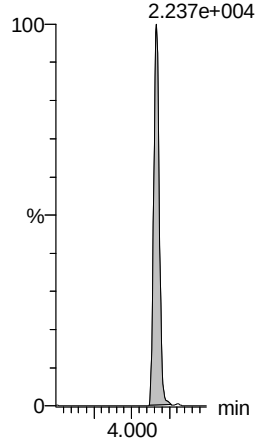
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
1.634e+005



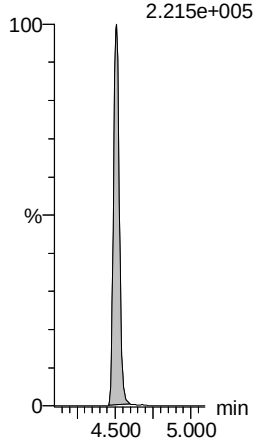
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.237e+004



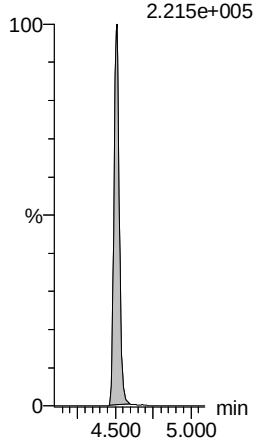
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.237e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.215e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.215e+005



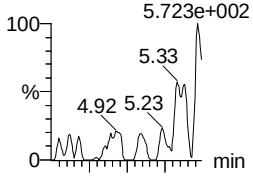
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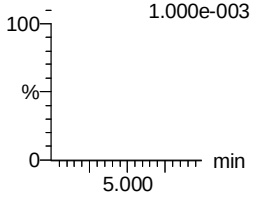
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Printed: Monday, November 26, 2018 11:34:03 Pacific Standard Time

Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

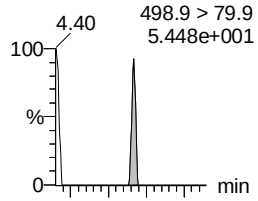
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
5.723e+002



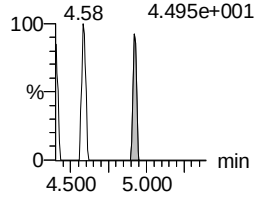
F27:MRM of 2 channels,ES-
463.0 > 219.0
1.000e-003



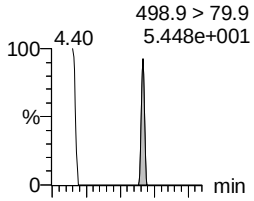
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
5.448e+001



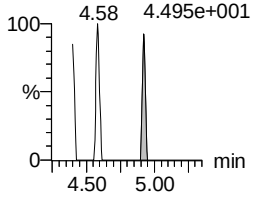
F32:MRM of 2 channels,ES-
498.9 > 99
4.495e+001



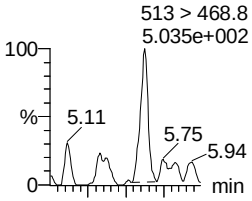
Total PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
5.448e+001



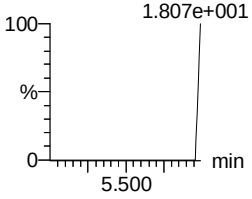
F32:MRM of 2 channels,ES-
498.9 > 99
4.495e+001



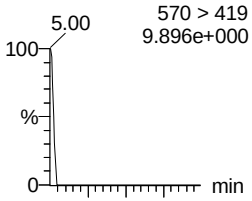
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
5.035e+002



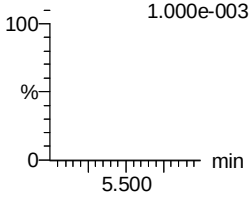
F37:MRM of 2 channels,ES-
513 > 219
1.807e+001



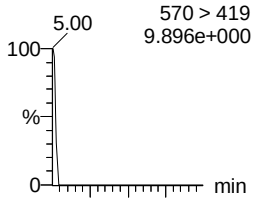
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
9.896e+000



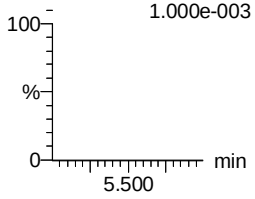
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



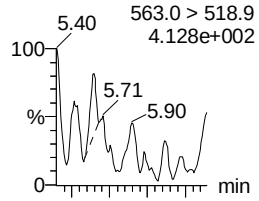
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
9.896e+000



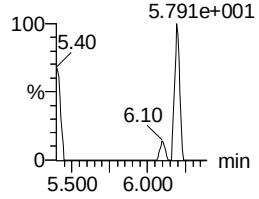
F48:MRM of 2 channels,ES-
570. > 512
1.000e-003



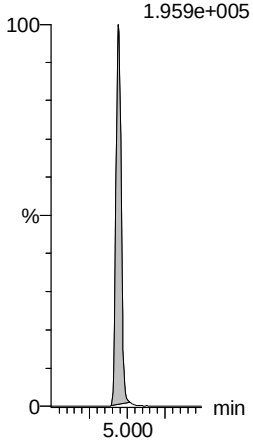
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
4.128e+002



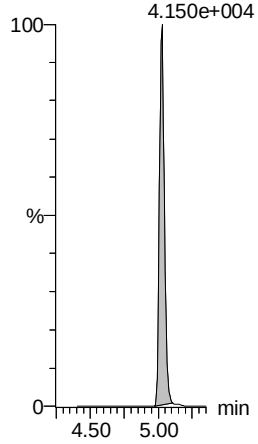
F46:MRM of 2 channels,ES-
563.0 > 269
5.791e+001



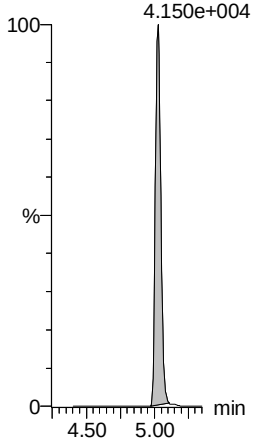
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
1.959e+005



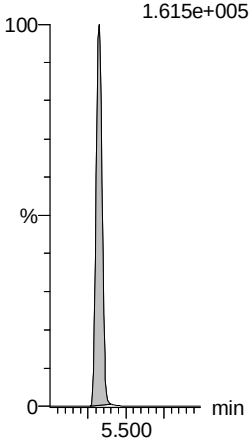
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.150e+004



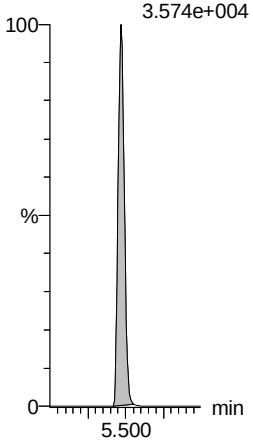
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.150e+004



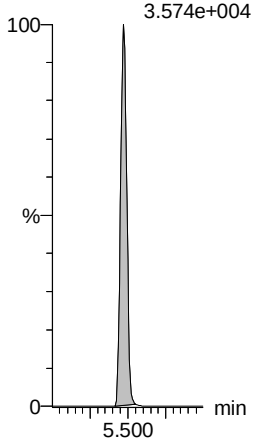
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
1.615e+005



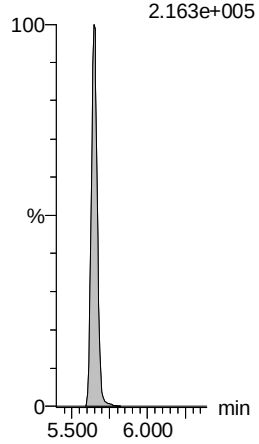
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
3.574e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
3.574e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.163e+005

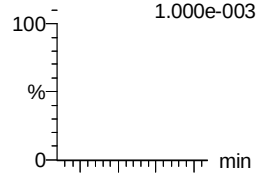
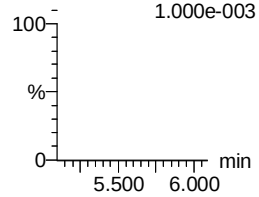


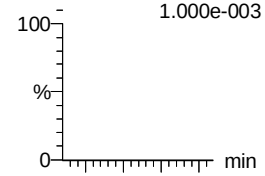
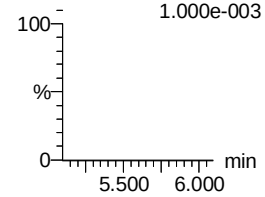
GM 11/26/2018

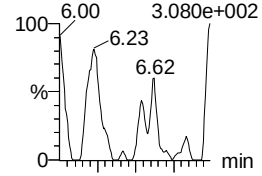
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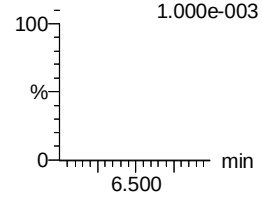
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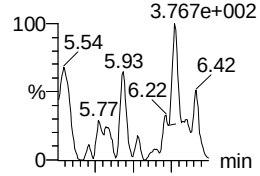
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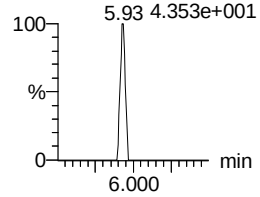
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003

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


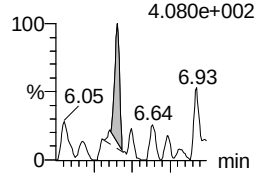
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003

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


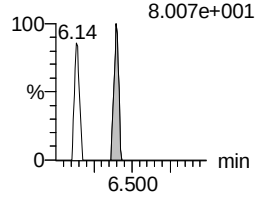
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
3.080e+002


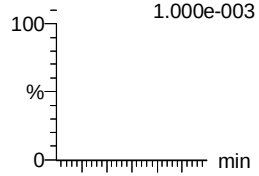
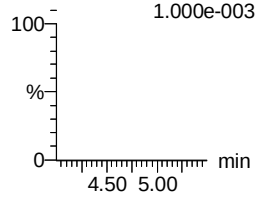
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003


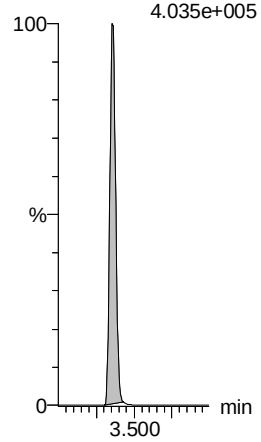
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.767e+002


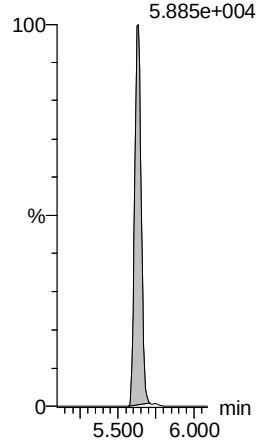
F54:MRM of 4 channels,ES-
612.9 > 318.8
5.93 4.353e+001


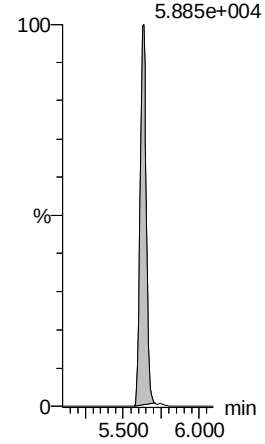
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
4.080e+002


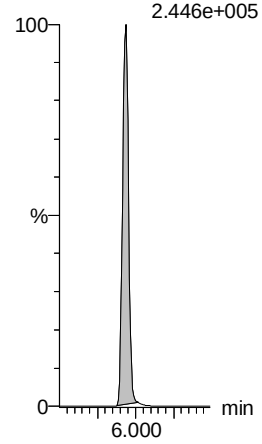
F61:MRM of 2 channels,ES-
713. > 369.0
8.007e+001


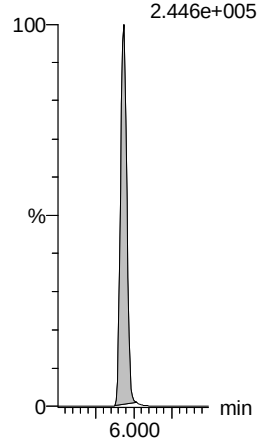
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
1.000e-003

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


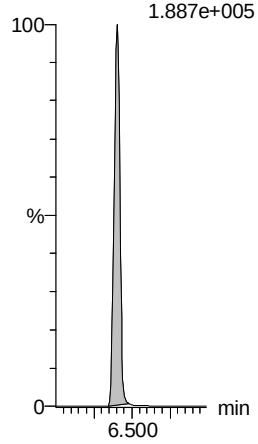
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
4.035e+005


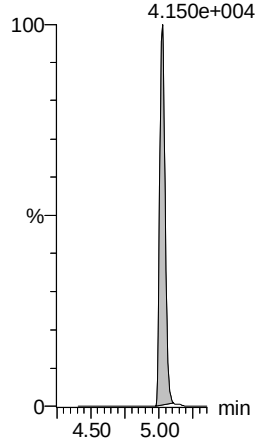
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.885e+004


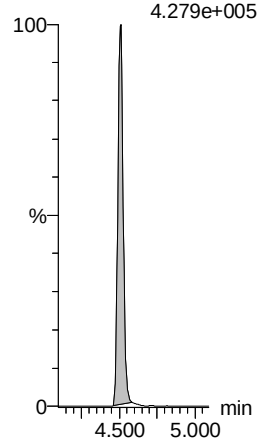
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
5.885e+004


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.446e+005


13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.446e+005


13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
1.887e+005


13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.150e+004


13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
4.279e+005


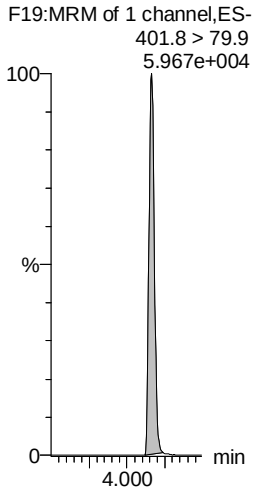
GM 11/26/2018

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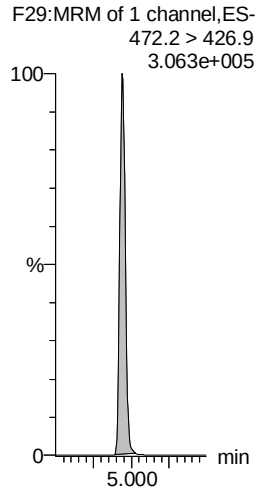
Last Altered: Monday, November 26, 2018 11:33:45 Pacific Standard Time
Printed: Monday, November 26, 2018 11:34:03 Pacific Standard Time

Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

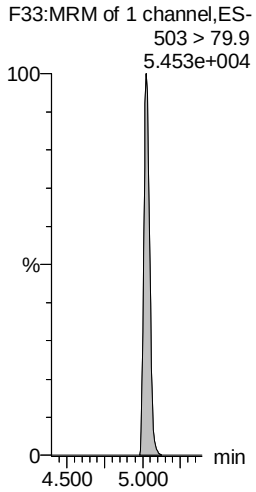
13C3-PFHxS



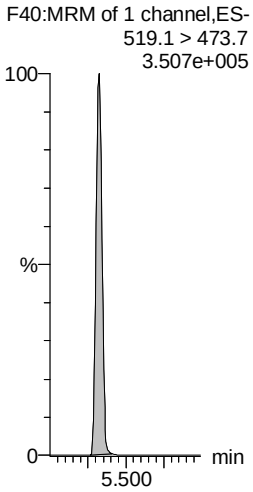
13C9-PFNA



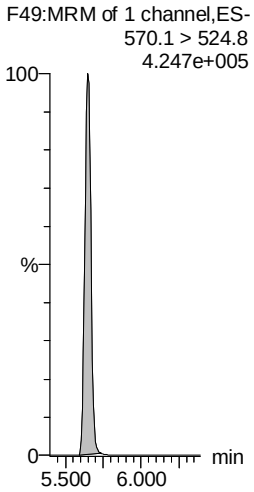
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

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Rev: ANP 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-79.qld

Last Altered: Monday, November 26, 2018 11:38:01 Pacific Standard Time
Printed: Monday, November 26, 2018 11:38:20 Pacific Standard Time

Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-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	7.11e2	1.19e3	0.113		2.79	2.79	7.45	33.7781		2.565	NO
2	5	PFHxA	313 > 269	1.07e4	4.85e3	0.113		3.35	3.35	11.1	103.4705		16.948	NO
3	7	PFHpA	363.0 > 318.9	4.56e2	6.22e3	0.113		4.02	4.02	0.917	5.4837		13.573	NO
4	8	L-PFHxS	398.9 > 79.6	5.13e2	1.08e3	0.113		4.16	4.16	5.95	27.7371		1.993	NO
5	68	Total PFHxS	398.9 > 79.6	5.13e2	1.08e3	0.113		4.28		5.95	27.7371			
6	11	L-PFOA	412.8 > 368.9	2.00e3	1.12e4	0.113		4.47	4.50	2.23	14.3905		3.421	NO
7	69	Total PFOA	412.8 > 368.9	2.00e3	1.12e4	0.113		4.62		2.23	14.3905			
8	38	13C3-PFBS	302. > 98.8	1.19e3	2.54e3	0.113	0.539	2.72	2.79	5.87	96.3938	87.2		
9	40	13C2-PFHxA	315 > 270	4.85e3	1.45e4	0.113	0.964	3.30	3.35	4.19	38.3999	86.9		
10	41	13C4-PFHpA	367.2 > 321.8	6.22e3	1.45e4	0.113	0.482	3.97	4.02	5.37	98.5976	89.2		
11	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.54e3	0.113	0.480	4.11	4.16	5.31	97.8729	88.6		
12	42	18O2-PFHxS	403.0 > 102.6	1.08e3	2.54e3	0.113	0.480	4.11	4.16	5.31	97.8729	88.6		
13	44	13C2-PFOA	414.9 > 369.7	1.12e4	1.90e4	0.113	0.755	4.46	4.50	7.37	86.3815	78.2		
14	44	13C2-PFOA	414.9 > 369.7	1.12e4	1.90e4	0.113	0.755	4.46	4.50	7.37	86.3815	78.2		
15	-1													
16	14	PFNA	463.0 > 418.8	2.27e1	9.80e3	0.113		4.90	4.92	0.0290			2.477	NO
17	16	L-PFOS	498.9 > 79.9	6.83e1	2.27e3	0.113		5.02	4.88	0.377	3.2111		3.525	YES
18	70	Total PFOS	498.9 > 79.9	6.83e1	2.27e3	0.113		5.13		0.377	3.2111			
19	18	PFDA	513 > 468.8		9.34e3	0.113		5.28						
20	21	L-MeFOSAA	570 > 419		2.30e3	0.113		5.43						
21	71	Total N-MeFOSAA	570. > 419	0.00e0	2.30e3	0.113		5.57		0.000				
22	25	PFUdA	563.0 > 518.9	2.93e1	1.27e4	0.113		5.61	5.65	0.0289			7.140	NO
23	45	13C5-PFNA	468.2 > 422.9	9.80e3	1.29e4	0.113	0.992	4.90	4.94	9.46	84.3421	76.3		
24	47	13C8-PFOS	507.0 > 79.9	2.27e3	2.63e3	0.113	1.034	4.98	5.03	10.8	92.2144	83.4		
25	47	13C8-PFOS	507.0 > 79.9	2.27e3	2.63e3	0.113	1.034	4.98	5.03	10.8	92.2144	83.4		
26	48	13C2-PFDA	515.1 > 469.9	9.34e3	1.66e4	0.113	0.832	5.28	5.32	7.01	74.4639	67.4		
27	50	d3-N-MeFOSAA	573.3 > 419	2.30e3	1.94e4	0.113	0.135	5.43	5.47	1.48	96.7216	87.5		
28	50	d3-N-MeFOSAA	573.3 > 419	2.30e3	1.94e4	0.113	0.135	5.43	5.47	1.48	96.7216	87.5		
29	51	13C2-PFUdA	565 > 519.8	1.27e4	1.94e4	0.113	0.928	5.61	5.65	8.15	77.6431	70.3		
30	-1													
31	23	L-EtFOSAA	584.1 > 419		3.40e3	0.113		5.51						
32	72	Total N-EtFOSAA	584.1 > 419	0.00e0	3.40e3	0.113		5.72		0.000				
33	29	PFTrDA	662.9 > 618.9		1.27e4	0.113		6.15						
34	27	PFDoA	612.9 > 569.0		1.27e4	0.113		5.90						
35	30	PFTeDA	713.0 > 669.0		1.09e4	0.113		6.37						
36	73	TCDA	498.3>106.9			0.113		5.15						

GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-79.qld

Last Altered: Monday, November 26, 2018 11:38:01 Pacific Standard Time
Printed: Monday, November 26, 2018 11:38:20 Pacific Standard Time

Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-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	1.45e4	1.45e4	0.113	1.000	3.30	3.35	12.5	110.5217	100.0		
38	52	d5-N-EtFOSAA	589.3 > 419	3.40e3	1.94e4	0.113	0.198	5.59	5.63	2.19	97.4874	88.2		
39	52	d5-N-EtFOSAA	589.3 > 419	3.40e3	1.94e4	0.113	0.198	5.59	5.63	2.19	97.4874	88.2		
40	53	13C2-PFDoA	615.0 > 569.7	1.27e4	1.66e4	0.113	0.980	5.90	5.93	9.52	85.8461	77.7		
41	53	13C2-PFDoA	615.0 > 569.7	1.27e4	1.66e4	0.113	0.980	5.90	5.93	9.52	85.8461	77.7		
42	55	13C2-PFTeDA	715.1 > 669.7	1.09e4	1.94e4	0.113	0.607	6.37	6.40	7.02	102.3060	92.6		
43	47	13C8-PFOS	507.0 > 79.9	2.27e3	2.63e3	0.113	1.034	4.98	5.03	10.8	92.2144	83.4		
44	63	13C8-PFOA	420.9 > 376	1.90e4	1.90e4	0.113	1.000	4.46	4.50	12.5	110.5217	100.0		
45	-1													
46	62	13C3-PFHxS	401.8 > 79.9	2.54e3	2.54e3	0.113	1.000	4.11	4.16	12.5	110.5217	100.0		
47	64	13C9-PFNA	472.2 > 426.9	1.29e4	1.29e4	0.113	1.000	4.90	4.94	12.5	110.5217	100.0		
48	65	13C4-PFOS	503 > 79.9	2.63e3	2.63e3	0.113	1.000	4.98	5.03	12.5	110.5217	100.0		
49	66	13C6-PFDA	519.1 > 473.7	1.66e4	1.66e4	0.113	1.000	5.28	5.32	12.5	110.5217	100.0		
50	67	13C7-PFUdA	570.1 > 524.8	1.94e4	1.94e4	0.113	1.000	5.61	5.65	12.5	110.5217	100.0		

GM 11/26/2018

Vista Analytical Laboratory L14

Rev: ANP 11/26/2018

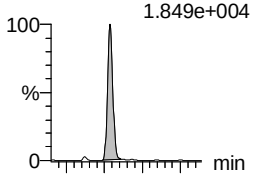
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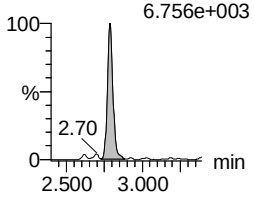
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Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-SA2

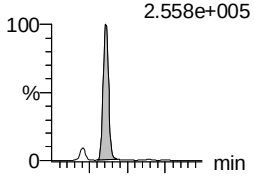
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
1.849e+004



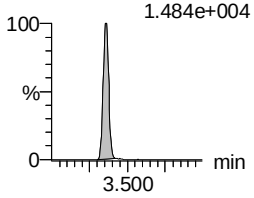
F7:MRM of 2 channels,ES-
299.0 > 99.0
6.756e+003



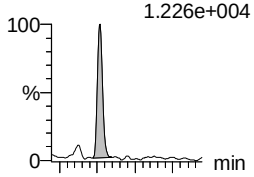
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
2.558e+005



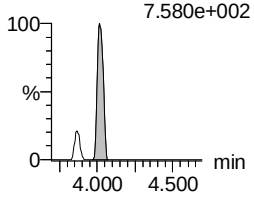
F9:MRM of 2 channels,ES-
313 > 118.9
1.484e+004



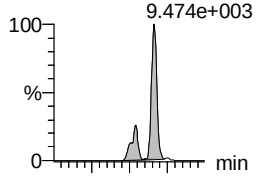
PFHpA
F16:MRM of 2 channels,ES-
363.0 > 318.9
1.226e+004



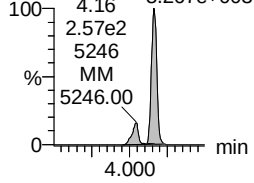
F16:MRM of 2 channels,ES-
363.0 > 169.0
7.580e+002



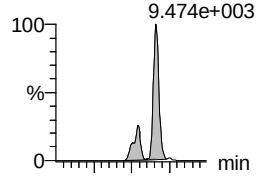
L-PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
9.474e+003



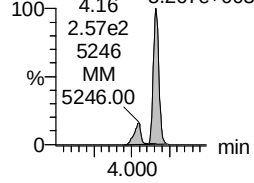
F18:MRM of 2 channels,ES-
398.9 > 99.0
5.267e+003



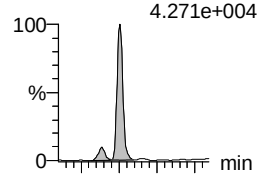
Total PFHxS
F18:MRM of 2 channels,ES-
398.9 > 79.6
9.474e+003



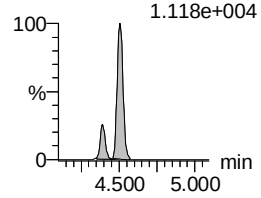
F18:MRM of 2 channels,ES-
398.9 > 99.0
5.267e+003



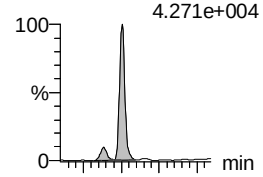
L-PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
4.271e+004



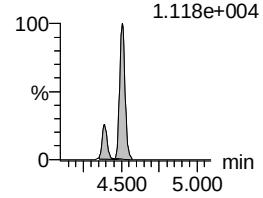
F21:MRM of 2 channels,ES-
412.8 > 169
1.118e+004



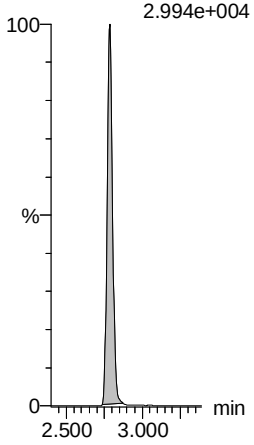
Total PFOA
F21:MRM of 2 channels,ES-
412.8 > 368.9
4.271e+004



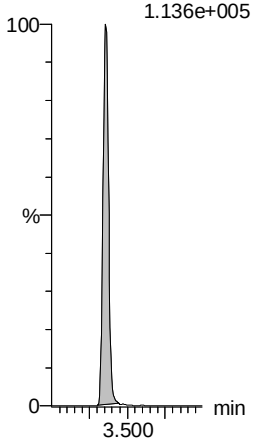
F21:MRM of 2 channels,ES-
412.8 > 169
1.118e+004



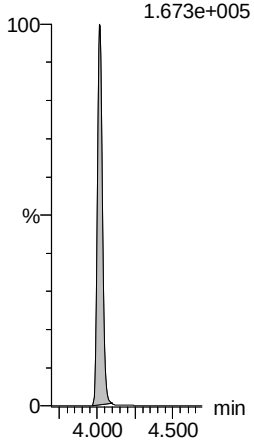
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.994e+004



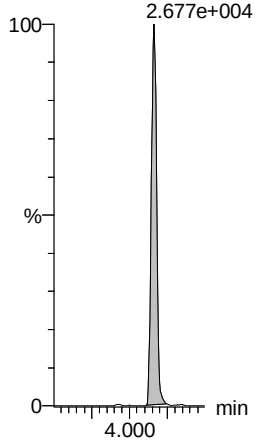
13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
1.136e+005



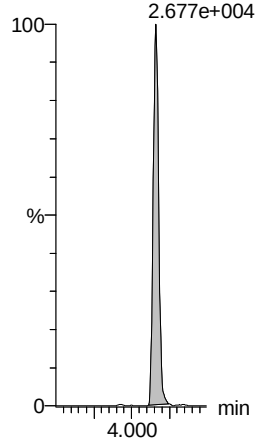
13C4-PFHpA
F17:MRM of 1 channel,ES-
367.2 > 321.8
1.673e+005



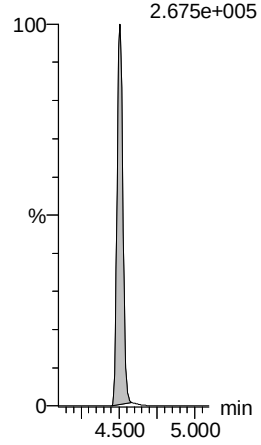
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.677e+004



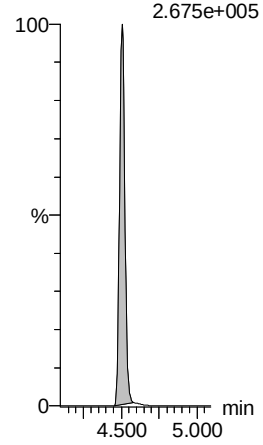
18O2-PFHxS
F20:MRM of 1 channel,ES-
403.0 > 102.6
2.677e+004



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.675e+005



13C2-PFOA
F22:MRM of 1 channel,ES-
414.9 > 369.7
2.675e+005



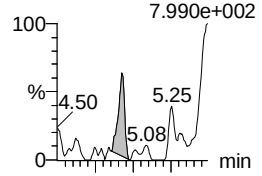
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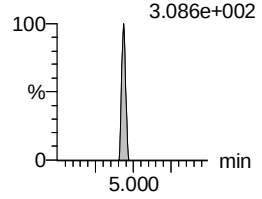
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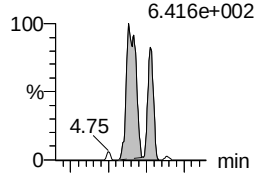
PFNA
F27:MRM of 2 channels,ES-
463.0 > 418.8
7.990e+002



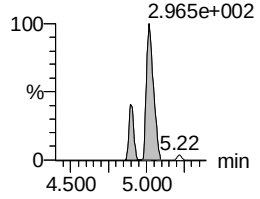
F27:MRM of 2 channels,ES-
463.0 > 219.0
3.086e+002



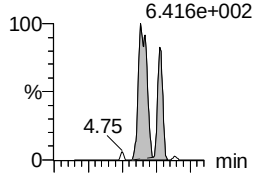
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
6.416e+002



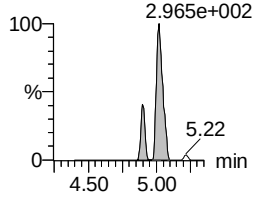
F32:MRM of 2 channels,ES-
498.9 > 99
2.965e+002



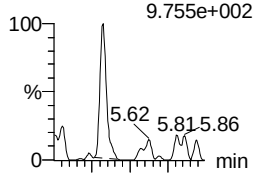
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F32:MRM of 2 channels,ES-
498.9 > 79.9
6.416e+002



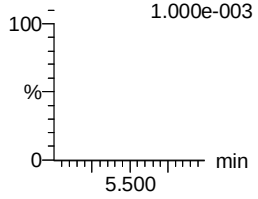
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498.9 > 99
2.965e+002



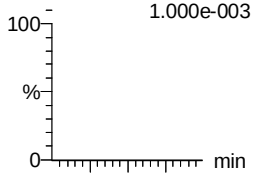
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
9.755e+002



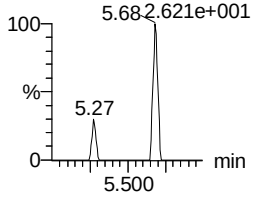
F37:MRM of 2 channels,ES-
513 > 219
1.000e-003



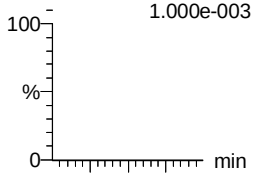
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



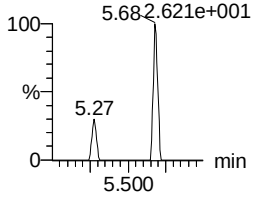
F48:MRM of 2 channels,ES-
570. > 512
2.621e+001



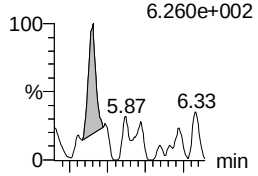
Total N-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
1.000e-003



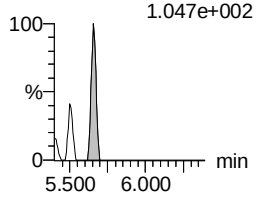
F48:MRM of 2 channels,ES-
570. > 512
2.621e+001



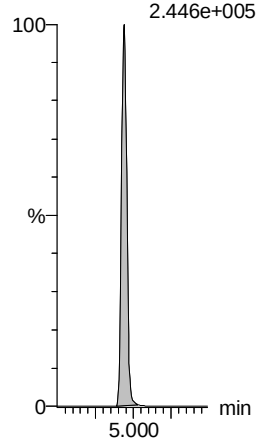
PFUdA
F46:MRM of 2 channels,ES-
563.0 > 518.9
6.260e+002



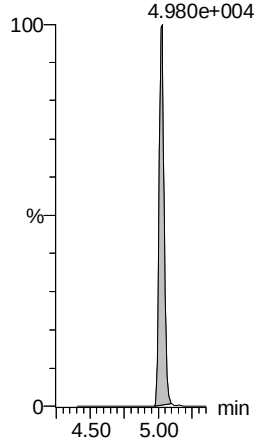
F46:MRM of 2 channels,ES-
563.0 > 269
1.047e+002



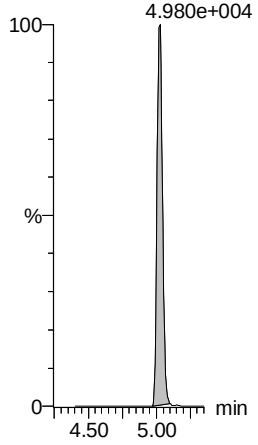
13C5-PFNA
F28:MRM of 1 channel,ES-
468.2 > 422.9
2.446e+005



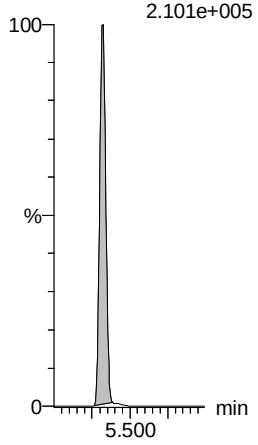
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.980e+004



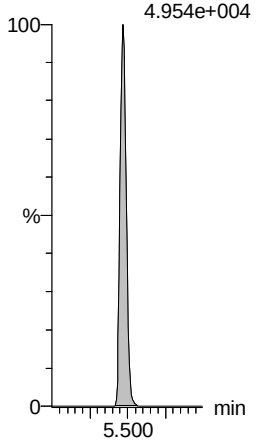
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.980e+004



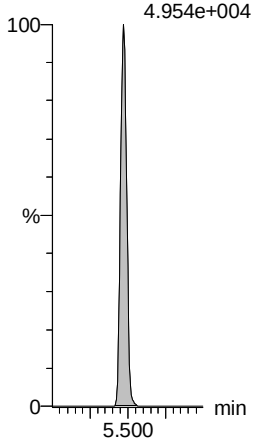
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
2.101e+005



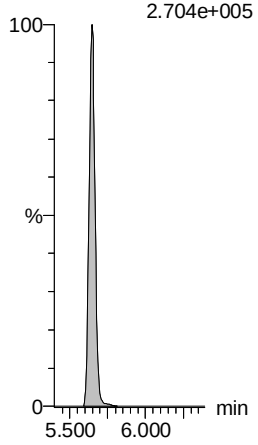
d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.954e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
4.954e+004



13C2-PFUdA
F47:MRM of 1 channel,ES-
565 > 519.8
2.704e+005



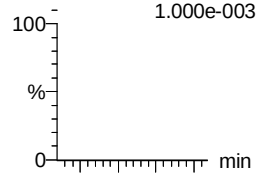
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-79.qld

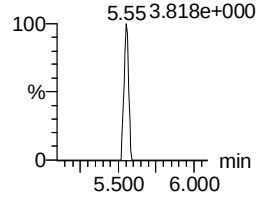
Last Altered: Monday, November 26, 2018 11:38:01 Pacific Standard Time
Printed: Monday, November 26, 2018 11:38:20 Pacific Standard Time

Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-SA2

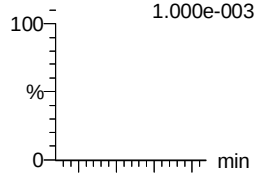
L-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



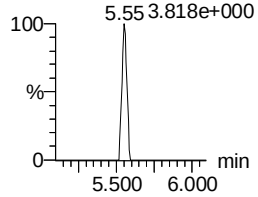
F51:MRM of 2 channels,ES-
584.1 > 526
3.818e+000



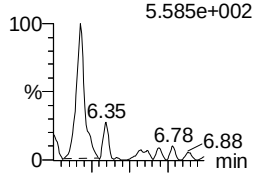
Total N-EtFOSAA
F51:MRM of 2 channels,ES-
584.1 > 419
1.000e-003



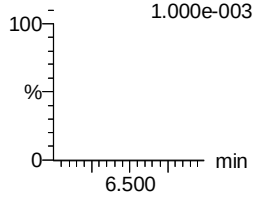
F51:MRM of 2 channels,ES-
584.1 > 526
3.818e+000



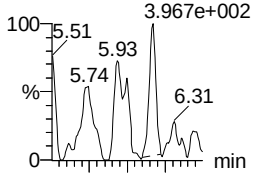
PFTrDA
F60:MRM of 2 channels,ES-
662.9 > 618.9
5.585e+002



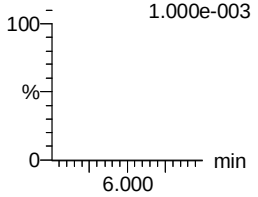
F60:MRM of 2 channels,ES-
662.9 > 319
1.000e-003



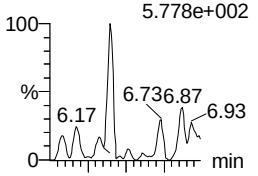
PFDoA
F54:MRM of 4 channels,ES-
612.9 > 569.0
3.967e+002



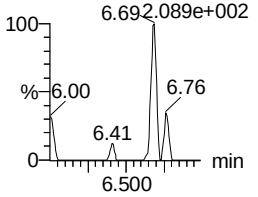
F54:MRM of 4 channels,ES-
612.9 > 318.8
1.000e-003



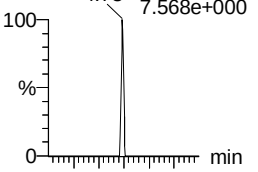
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
5.778e+002



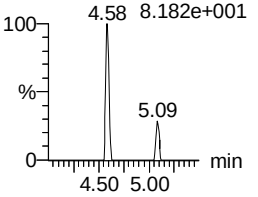
F61:MRM of 2 channels,ES-
713. > 369.0
2.089e+002



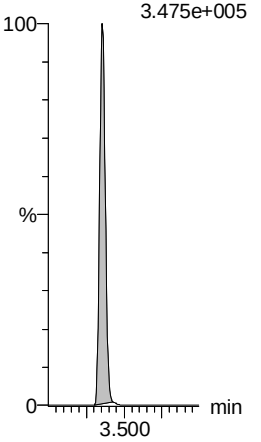
TCDA
F31:MRM of 3 channels,ES-
498.3 > 106.9
7.568e+000



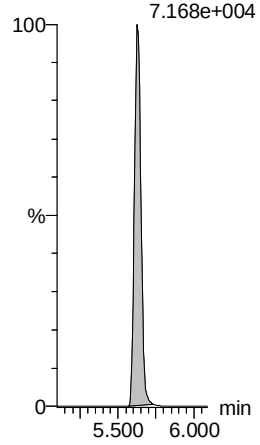
F31:MRM of 3 channels,ES-
498.3 > 123.9
8.182e+001



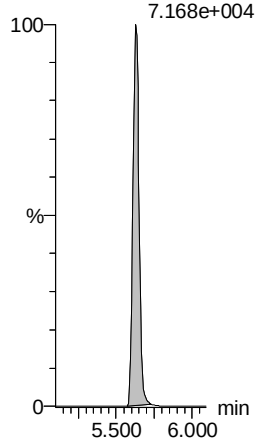
13C5-PFHxA
F11:MRM of 1 channel,ES-
318 > 272.9
3.475e+005



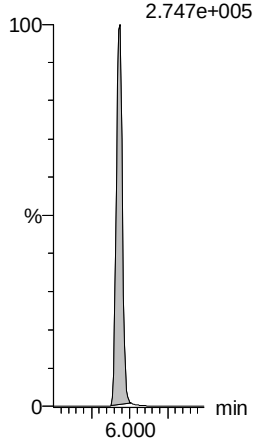
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.168e+004



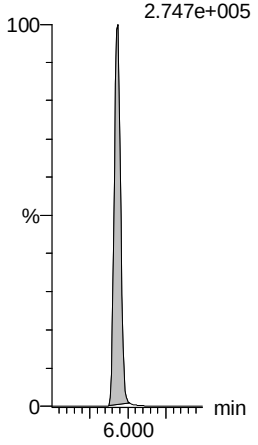
d5-N-EtFOSAA
F52:MRM of 1 channel,ES-
589.3 > 419
7.168e+004



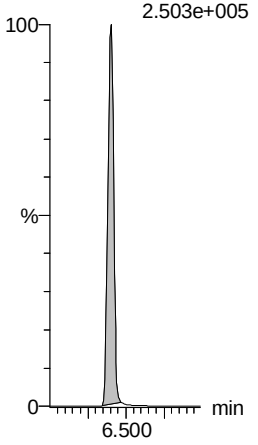
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.747e+005



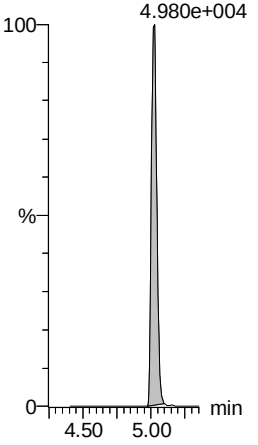
13C2-PFDoA
F55:MRM of 2 channels,ES-
615.0 > 569.7
2.747e+005



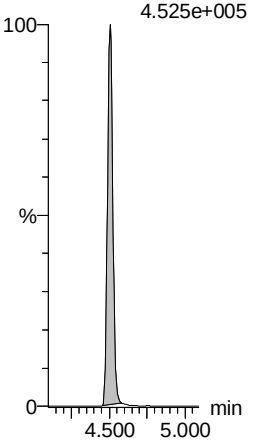
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
2.503e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
4.980e+004



13C8-PFOA
F23:MRM of 1 channel,ES-
420.9 > 376
4.525e+005



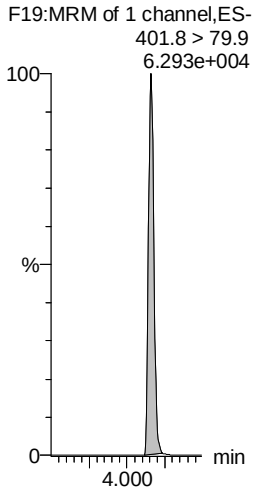
GM 11/26/2018

Dataset: Z:\Projects\PFAS.PRO\Results\181120M1\181120M1-79.qld

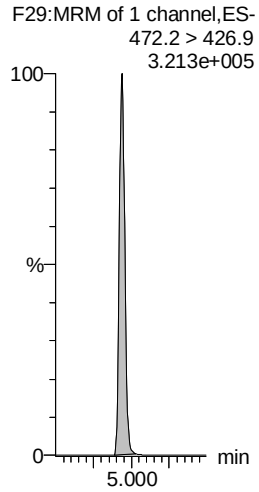
Last Altered: Monday, November 26, 2018 11:38:01 Pacific Standard Time
Printed: Monday, November 26, 2018 11:38:20 Pacific Standard Time

Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-SA2

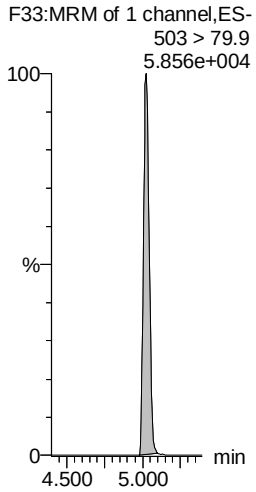
13C3-PFHxS



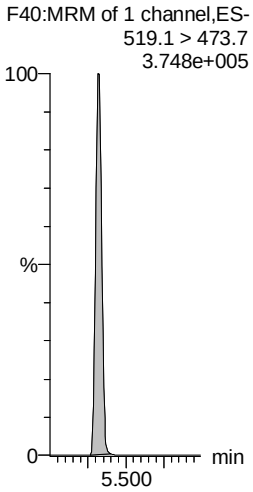
13C9-PFNA



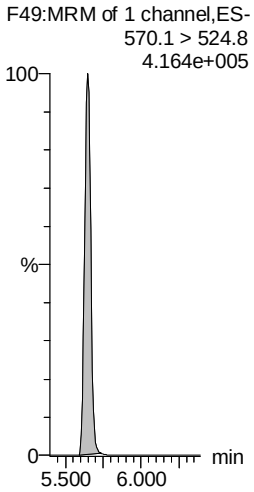
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 11/26/2018

INJECTION INTERNAL STANDARD (IIS) AREAS,

INSTRUMENT BLANKS (IB)

AND

CONTINUTING CALIBRATION VERIFICATIONS CCV)

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_RS-11-14-18.mdb 14 Nov 2018 11:37:25
Calibration: 21 Nov 2018 09:46:45

Name: 181120M1_2, Date: 20-Nov-2018, Time: 13:00:47, ID: ST181120M1-1 PFC CS0 18K0903, Description: PFC CS0 18K0903

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-1 PFC CS0 18K0903	1.19e4	100.0	NO
2	2	13C5-PFHxA	ST181120M1-1 PFC CS0 18K0903	2.12e4	100.0	NO
3	3	13C3-PFHxS	ST181120M1-1 PFC CS0 18K0903	2.67e3	100.0	NO
4	4	13C8-PFOA	ST181120M1-1 PFC CS0 18K0903	2.64e4	100.0	NO
5	5	13C9-PFNA	ST181120M1-1 PFC CS0 18K0903	1.79e4	100.0	NO
6	6	13C4-PFOS	ST181120M1-1 PFC CS0 18K0903	2.68e3	100.0	NO
7	7	13C6-PFDA	ST181120M1-1 PFC CS0 18K0903	2.29e4	100.0	NO
8	8	13C7-PFUdA	ST181120M1-1 PFC CS0 18K0903	2.42e4	100.0	NO

Name: 181120M1_3, Date: 20-Nov-2018, Time: 13:11:26, ID: IPA, Description: IPA

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

Name: 181120M1_4, Date: 20-Nov-2018, Time: 13:22:02, ID: 1803558-01 REEPDW1354 0.11837, Description: REEPDW1354

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803558-01 REEPDW1354 0.11837	4.72e3	39.6	YES
2	2	13C5-PFHxA	1803558-01 REEPDW1354 0.11837	6.73e3	31.7	YES
3	3	13C3-PFHxS	1803558-01 REEPDW1354 0.11837	2.30e3	86.1	NO
4	4	13C8-PFOA	1803558-01 REEPDW1354 0.11837	9.49e3	35.9	YES
5	5	13C9-PFNA	1803558-01 REEPDW1354 0.11837	7.18e3	40.1	YES
6	6	13C4-PFOS	1803558-01 REEPDW1354 0.11837	2.29e3	85.4	NO
7	7	13C6-PFDA	1803558-01 REEPDW1354 0.11837	1.10e4	48.1	YES
8	8	13C7-PFUdA	1803558-01 REEPDW1354 0.11837	1.48e4	60.9	NO

Name: 181120M1_5, Date: 20-Nov-2018, Time: 13:32:38, ID: 1803558-02 REEPDW1355 0.1102, Description: REEPDW1355

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803558-02 REEPDW1355 0.1102	3.54e3	29.7	YES
2	2	13C5-PFHxA	1803558-02 REEPDW1355 0.1102	4.94e3	23.3	YES
3	3	13C3-PFHxS	1803558-02 REEPDW1355 0.1102	2.25e3	84.4	NO
4	4	13C8-PFOA	1803558-02 REEPDW1355 0.1102	8.50e3	32.2	YES
5	5	13C9-PFNA	1803558-02 REEPDW1355 0.1102	7.41e3	41.4	YES
6	6	13C4-PFOS	1803558-02 REEPDW1355 0.1102	2.43e3	90.7	NO
7	7	13C6-PFDA	1803558-02 REEPDW1355 0.1102	1.13e4	49.2	YES
8	8	13C7-PFUdA	1803558-02 REEPDW1355 0.1102	1.54e4	63.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_6, Date: 20-Nov-2018, Time: 13:43:16, ID: 1803558-03 REEPDW1356 0.12099, Description: REEPDW1356

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803558-03 REEPDW1356 0.12099	5.67e3	47.5	YES
2	2	13C5-PFHxA	1803558-03 REEPDW1356 0.12099	6.66e3	31.4	YES
3	3	13C3-PFHxS	1803558-03 REEPDW1356 0.12099	2.45e3	92.0	NO
4	4	13C8-PFOA	1803558-03 REEPDW1356 0.12099	7.65e3	28.9	YES
5	5	13C9-PFNA	1803558-03 REEPDW1356 0.12099	5.82e3	32.5	YES
6	6	13C4-PFOS	1803558-03 REEPDW1356 0.12099	2.52e3	94.1	NO
7	7	13C6-PFDA	1803558-03 REEPDW1356 0.12099	8.91e3	39.0	YES
8	8	13C7-PFUdA	1803558-03 REEPDW1356 0.12099	1.32e4	54.6	NO

Name: 181120M1_7, Date: 20-Nov-2018, Time: 13:53:50, ID: 1803558-04 REEPDW1357 0.11567, Description: REEPDW1357

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803558-04 REEPDW1357 0.11567	8.33e3	69.8	NO
2	2	13C5-PFHxA	1803558-04 REEPDW1357 0.11567	1.18e4	55.6	NO
3	3	13C3-PFHxS	1803558-04 REEPDW1357 0.11567	2.42e3	90.9	NO
4	4	13C8-PFOA	1803558-04 REEPDW1357 0.11567	1.49e4	56.5	NO
5	5	13C9-PFNA	1803558-04 REEPDW1357 0.11567	1.08e4	60.5	NO
6	6	13C4-PFOS	1803558-04 REEPDW1357 0.11567	2.52e3	94.2	NO
7	7	13C6-PFDA	1803558-04 REEPDW1357 0.11567	1.55e4	67.7	NO
8	8	13C7-PFUdA	1803558-04 REEPDW1357 0.11567	2.06e4	84.8	NO

Name: 181120M1_8, Date: 20-Nov-2018, Time: 14:04:29, ID: 1803562-01 REEPDW1358 0.12032, Description: REEPDW1358

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803562-01 REEPDW1358 0.12032	5.71e3	47.9	YES
2	2	13C5-PFHxA	1803562-01 REEPDW1358 0.12032	7.77e3	36.6	YES
3	3	13C3-PFHxS	1803562-01 REEPDW1358 0.12032	1.82e3	68.2	NO
4	4	13C8-PFOA	1803562-01 REEPDW1358 0.12032	1.00e4	37.9	YES
5	5	13C9-PFNA	1803562-01 REEPDW1358 0.12032	6.75e3	37.7	YES
6	6	13C4-PFOS	1803562-01 REEPDW1358 0.12032	1.68e3	62.7	NO
7	7	13C6-PFDA	1803562-01 REEPDW1358 0.12032	9.24e3	40.4	YES
8	8	13C7-PFUdA	1803562-01 REEPDW1358 0.12032	1.17e4	48.4	YES

Name: 181120M1_9, Date: 20-Nov-2018, Time: 14:15:02, ID: 1803562-02 REEPDW1359 0.11552, Description: REEPDW1359

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803562-02 REEPDW1359 0.11552	7.71e3	64.7	NO
2	2	13C5-PFHxA	1803562-02 REEPDW1359 0.11552	1.05e4	49.4	YES
3	3	13C3-PFHxS	1803562-02 REEPDW1359 0.11552	2.30e3	86.0	NO
4	4	13C8-PFOA	1803562-02 REEPDW1359 0.11552	1.32e4	49.8	YES
5	5	13C9-PFNA	1803562-02 REEPDW1359 0.11552	8.63e3	48.3	YES
6	6	13C4-PFOS	1803562-02 REEPDW1359 0.11552	2.28e3	85.3	NO
7	7	13C6-PFDA	1803562-02 REEPDW1359 0.11552	1.11e4	48.4	YES
8	8	13C7-PFUdA	1803562-02 REEPDW1359 0.11552	1.34e4	55.3	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_10, Date: 20-Nov-2018, Time: 14:25:40, ID: B8K0078-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0078-BS1 OPR 0.125	1.11e4	93.5	NO
2	2	13C5-PFHxA	B8K0078-BS1 OPR 0.125	2.00e4	94.1	NO
3	3	13C3-PFHxS	B8K0078-BS1 OPR 0.125	2.50e3	93.8	NO
4	4	13C8-PFOA	B8K0078-BS1 OPR 0.125	2.45e4	92.9	NO
5	5	13C9-PFNA	B8K0078-BS1 OPR 0.125	1.68e4	94.1	NO
6	6	13C4-PFOS	B8K0078-BS1 OPR 0.125	2.40e3	89.6	NO
7	7	13C6-PFDA	B8K0078-BS1 OPR 0.125	2.11e4	92.1	NO
8	8	13C7-PFUdA	B8K0078-BS1 OPR 0.125	2.50e4	103.2	NO

Name: 181120M1_11, Date: 20-Nov-2018, Time: 14:36:12, ID: B8K0078-MS1 Matrix Spike 0.11906, Description: Matrix Spike

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0078-MS1 Matrix Spike 0.11906	1.15e4	96.6	NO
2	2	13C5-PFHxA	B8K0078-MS1 Matrix Spike 0.11906	1.99e4	93.7	NO
3	3	13C3-PFHxS	B8K0078-MS1 Matrix Spike 0.11906	2.86e3	107.1	NO
4	4	13C8-PFOA	B8K0078-MS1 Matrix Spike 0.11906	2.27e4	85.7	NO
5	5	13C9-PFNA	B8K0078-MS1 Matrix Spike 0.11906	1.62e4	90.5	NO
6	6	13C4-PFOS	B8K0078-MS1 Matrix Spike 0.11906	2.60e3	97.3	NO
7	7	13C6-PFDA	B8K0078-MS1 Matrix Spike 0.11906	1.96e4	85.5	NO
8	8	13C7-PFUdA	B8K0078-MS1 Matrix Spike 0.11906	2.57e4	106.2	NO

Name: 181120M1_12, Date: 20-Nov-2018, Time: 14:46:51, ID: B8K0078-MSD1 Matrix Spike Dup 0.11906, Description: Matrix Spike Dup

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0078-MSD1 Matrix Spike Dup 0.119...	9.89e3	83.0	NO
2	2	13C5-PFHxA	B8K0078-MSD1 Matrix Spike Dup 0.119...	1.46e4	68.6	NO
3	3	13C3-PFHxS	B8K0078-MSD1 Matrix Spike Dup 0.119...	2.82e3	105.7	NO
4	4	13C8-PFOA	B8K0078-MSD1 Matrix Spike Dup 0.119...	1.91e4	72.3	NO
5	5	13C9-PFNA	B8K0078-MSD1 Matrix Spike Dup 0.119...	1.39e4	77.6	NO
6	6	13C4-PFOS	B8K0078-MSD1 Matrix Spike Dup 0.119...	2.86e3	106.7	NO
7	7	13C6-PFDA	B8K0078-MSD1 Matrix Spike Dup 0.119...	1.89e4	82.6	NO
8	8	13C7-PFUdA	B8K0078-MSD1 Matrix Spike Dup 0.119...	2.31e4	95.5	NO

Name: 181120M1_13, Date: 20-Nov-2018, Time: 14:57:29, ID: B8K0078-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0078-BLK1 Method Blank 0.125	1.12e4	94.3	NO
2	2	13C5-PFHxA	B8K0078-BLK1 Method Blank 0.125	2.10e4	99.2	NO
3	3	13C3-PFHxS	B8K0078-BLK1 Method Blank 0.125	2.75e3	103.0	NO
4	4	13C8-PFOA	B8K0078-BLK1 Method Blank 0.125	2.46e4	93.2	NO
5	5	13C9-PFNA	B8K0078-BLK1 Method Blank 0.125	1.67e4	93.3	NO
6	6	13C4-PFOS	B8K0078-BLK1 Method Blank 0.125	2.87e3	107.0	NO
7	7	13C6-PFDA	B8K0078-BLK1 Method Blank 0.125	2.17e4	94.6	NO
8	8	13C7-PFUdA	B8K0078-BLK1 Method Blank 0.125	2.66e4	109.8	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_14, Date: 20-Nov-2018, Time: 15:08:02, ID: 1803579-01 REEPEF1070 0.11883, Description: REEPEF1070

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-01 REEPEF1070 0.11883	1.09e4	91.2	NO
2	2	13C5-PFHxA	1803579-01 REEPEF1070 0.11883	2.00e4	94.3	NO
3	3	13C3-PFHxS	1803579-01 REEPEF1070 0.11883	2.99e3	112.1	NO
4	4	13C8-PFOA	1803579-01 REEPEF1070 0.11883	2.56e4	96.6	NO
5	5	13C9-PFNA	1803579-01 REEPEF1070 0.11883	1.78e4	99.3	NO
6	6	13C4-PFOS	1803579-01 REEPEF1070 0.11883	2.87e3	107.2	NO
7	7	13C6-PFDA	1803579-01 REEPEF1070 0.11883	2.13e4	93.2	NO
8	8	13C7-PFUdA	1803579-01 REEPEF1070 0.11883	2.65e4	109.3	NO

Name: 181120M1_15, Date: 20-Nov-2018, Time: 15:18:40, ID: 1803579-02 REEPAR1070 0.11985, Description: REEPAR1070

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-02 REEPAR1070 0.11985	8.24e3	69.1	NO
2	2	13C5-PFHxA	1803579-02 REEPAR1070 0.11985	1.41e4	66.3	NO
3	3	13C3-PFHxS	1803579-02 REEPAR1070 0.11985	2.57e3	96.3	NO
4	4	13C8-PFOA	1803579-02 REEPAR1070 0.11985	1.71e4	64.5	NO
5	5	13C9-PFNA	1803579-02 REEPAR1070 0.11985	1.29e4	72.3	NO
6	6	13C4-PFOS	1803579-02 REEPAR1070 0.11985	2.50e3	93.4	NO
7	7	13C6-PFDA	1803579-02 REEPAR1070 0.11985	1.71e4	74.8	NO
8	8	13C7-PFUdA	1803579-02 REEPAR1070 0.11985	2.25e4	92.8	NO

Name: 181120M1_16, Date: 20-Nov-2018, Time: 15:29:19, ID: 1803579-03 REEPAC1070 0.12082, Description: REEPAC1070

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-03 REEPAC1070 0.12082	1.15e4	96.3	NO
2	2	13C5-PFHxA	1803579-03 REEPAC1070 0.12082	2.02e4	95.1	NO
3	3	13C3-PFHxS	1803579-03 REEPAC1070 0.12082	3.15e3	118.1	NO
4	4	13C8-PFOA	1803579-03 REEPAC1070 0.12082	2.43e4	92.1	NO
5	5	13C9-PFNA	1803579-03 REEPAC1070 0.12082	1.75e4	97.8	NO
6	6	13C4-PFOS	1803579-03 REEPAC1070 0.12082	3.29e3	122.9	NO
7	7	13C6-PFDA	1803579-03 REEPAC1070 0.12082	2.33e4	101.6	NO
8	8	13C7-PFUdA	1803579-03 REEPAC1070 0.12082	2.78e4	114.6	NO

Name: 181120M1_17, Date: 20-Nov-2018, Time: 15:39:52, ID: 1803579-04 REEPEF1071 0.11958, Description: REEPEF1071

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-04 REEPEF1071 0.11958	1.12e4	93.9	NO
2	2	13C5-PFHxA	1803579-04 REEPEF1071 0.11958	2.04e4	96.1	NO
3	3	13C3-PFHxS	1803579-04 REEPEF1071 0.11958	2.76e3	103.3	NO
4	4	13C8-PFOA	1803579-04 REEPEF1071 0.11958	2.46e4	93.2	NO
5	5	13C9-PFNA	1803579-04 REEPEF1071 0.11958	1.64e4	91.9	NO
6	6	13C4-PFOS	1803579-04 REEPEF1071 0.11958	2.66e3	99.5	NO
7	7	13C6-PFDA	1803579-04 REEPEF1071 0.11958	2.14e4	93.4	NO
8	8	13C7-PFUdA	1803579-04 REEPEF1071 0.11958	2.48e4	102.3	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_18, Date: 20-Nov-2018, Time: 15:50:30, 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: 181120M1_19, Date: 20-Nov-2018, Time: 16:01:03, ID: ST181120M1-2 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-2 PFC CS3 18K0906	1.17e4	98.3	NO
2	2	13C5-PFHxA	ST181120M1-2 PFC CS3 18K0906	2.22e4	104.7	NO
3	3	13C3-PFHxS	ST181120M1-2 PFC CS3 18K0906	2.79e3	104.7	NO
4	4	13C8-PFOA	ST181120M1-2 PFC CS3 18K0906	2.84e4	107.3	NO
5	5	13C9-PFNA	ST181120M1-2 PFC CS3 18K0906	1.94e4	108.5	NO
6	6	13C4-PFOS	ST181120M1-2 PFC CS3 18K0906	2.90e3	108.5	NO
7	7	13C6-PFDA	ST181120M1-2 PFC CS3 18K0906	2.35e4	102.6	NO
8	8	13C7-PFUdA	ST181120M1-2 PFC CS3 18K0906	2.76e4	113.8	NO

Name: 181120M1_20, Date: 20-Nov-2018, Time: 16:11:45, ID: 1803579-05 REEPEF5031 0.11969, Description: REEPEF5031

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-05 REEPEF5031 0.11969	9.83e3	82.4	NO
2	2	13C5-PFHxA	1803579-05 REEPEF5031 0.11969	1.74e4	82.1	NO
3	3	13C3-PFHxS	1803579-05 REEPEF5031 0.11969	2.30e3	86.1	NO
4	4	13C8-PFOA	1803579-05 REEPEF5031 0.11969	2.25e4	85.1	NO
5	5	13C9-PFNA	1803579-05 REEPEF5031 0.11969	1.49e4	83.2	NO
6	6	13C4-PFOS	1803579-05 REEPEF5031 0.11969	2.40e3	89.8	NO
7	7	13C6-PFDA	1803579-05 REEPEF5031 0.11969	1.95e4	85.0	NO
8	8	13C7-PFUdA	1803579-05 REEPEF5031 0.11969	2.29e4	94.4	NO

Name: 181120M1_21, Date: 20-Nov-2018, Time: 16:22:20, ID: 1803579-06 REEPAR1071 0.11398, Description: REEPAR1071

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-06 REEPAR1071 0.11398	1.14e4	95.6	NO
2	2	13C5-PFHxA	1803579-06 REEPAR1071 0.11398	2.06e4	97.3	NO
3	3	13C3-PFHxS	1803579-06 REEPAR1071 0.11398	2.92e3	109.5	NO
4	4	13C8-PFOA	1803579-06 REEPAR1071 0.11398	2.51e4	95.0	NO
5	5	13C9-PFNA	1803579-06 REEPAR1071 0.11398	1.67e4	93.4	NO
6	6	13C4-PFOS	1803579-06 REEPAR1071 0.11398	2.83e3	105.9	NO
7	7	13C6-PFDA	1803579-06 REEPAR1071 0.11398	2.17e4	95.0	NO
8	8	13C7-PFUdA	1803579-06 REEPAR1071 0.11398	2.52e4	103.9	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_22, Date: 20-Nov-2018, Time: 16:32:58, ID: 1803579-07 REEPAC1071 0.11944, Description: REEPAC1071

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-07 REEPAC1071 0.11944	9.21e3	77.2	NO
2	2	13C5-PFHxA	1803579-07 REEPAC1071 0.11944	1.40e4	66.2	NO
3	3	13C3-PFHxS	1803579-07 REEPAC1071 0.11944	2.70e3	101.2	NO
4	4	13C8-PFOA	1803579-07 REEPAC1071 0.11944	1.72e4	65.2	NO
5	5	13C9-PFNA	1803579-07 REEPAC1071 0.11944	1.27e4	71.0	NO
6	6	13C4-PFOS	1803579-07 REEPAC1071 0.11944	2.79e3	104.4	NO
7	7	13C6-PFDA	1803579-07 REEPAC1071 0.11944	1.74e4	76.1	NO
8	8	13C7-PFUdA	1803579-07 REEPAC1071 0.11944	2.34e4	96.5	NO

Name: 181120M1_23, Date: 20-Nov-2018, Time: 16:43:31, ID: 1803579-08 REEPIN1071 0.12134, Description: REEPIN1071

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803579-08 REEPIN1071 0.12134	7.84e3	65.8	NO
2	2	13C5-PFHxA	1803579-08 REEPIN1071 0.12134	1.18e4	55.5	NO
3	3	13C3-PFHxS	1803579-08 REEPIN1071 0.12134	2.44e3	91.3	NO
4	4	13C8-PFOA	1803579-08 REEPIN1071 0.12134	1.51e4	57.1	NO
5	5	13C9-PFNA	1803579-08 REEPIN1071 0.12134	1.12e4	62.5	NO
6	6	13C4-PFOS	1803579-08 REEPIN1071 0.12134	2.57e3	96.2	NO
7	7	13C6-PFDA	1803579-08 REEPIN1071 0.12134	1.58e4	69.2	NO
8	8	13C7-PFUdA	1803579-08 REEPIN1071 0.12134	1.99e4	82.3	NO

Name: 181120M1_24, Date: 20-Nov-2018, Time: 16:54:10, ID: 1803580-01 REEPDW1360 0.12021, Description: REEPDW1360

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-01 REEPDW1360 0.12021	9.12e3	76.5	NO
2	2	13C5-PFHxA	1803580-01 REEPDW1360 0.12021	1.63e4	76.9	NO
3	3	13C3-PFHxS	1803580-01 REEPDW1360 0.12021	2.36e3	88.4	NO
4	4	13C8-PFOA	1803580-01 REEPDW1360 0.12021	2.04e4	77.3	NO
5	5	13C9-PFNA	1803580-01 REEPDW1360 0.12021	1.41e4	78.7	NO
6	6	13C4-PFOS	1803580-01 REEPDW1360 0.12021	2.47e3	92.4	NO
7	7	13C6-PFDA	1803580-01 REEPDW1360 0.12021	1.78e4	77.7	NO
8	8	13C7-PFUdA	1803580-01 REEPDW1360 0.12021	2.19e4	90.3	NO

Name: 181120M1_25, Date: 20-Nov-2018, Time: 17:04:48, ID: 1803580-02 REEPDW584 0.12201, Description: REEPDW584

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-02 REEPDW584 0.12201	7.79e3	65.3	NO
2	2	13C5-PFHxA	1803580-02 REEPDW584 0.12201	1.32e4	62.4	NO
3	3	13C3-PFHxS	1803580-02 REEPDW584 0.12201	2.47e3	92.7	NO
4	4	13C8-PFOA	1803580-02 REEPDW584 0.12201	1.51e4	57.1	NO
5	5	13C9-PFNA	1803580-02 REEPDW584 0.12201	1.05e4	58.8	NO
6	6	13C4-PFOS	1803580-02 REEPDW584 0.12201	2.47e3	92.3	NO
7	7	13C6-PFDA	1803580-02 REEPDW584 0.12201	1.44e4	62.8	NO
8	8	13C7-PFUdA	1803580-02 REEPDW584 0.12201	1.81e4	74.9	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_26, Date: 20-Nov-2018, Time: 17:15:29, ID: 1803580-03 REEPDW1361 0.1193, Description: REEPDW1361

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-03 REEPDW1361 0.1193	9.27e3	77.7	NO
2	2	13C5-PFHxA	1803580-03 REEPDW1361 0.1193	1.66e4	78.5	NO
3	3	13C3-PFHxS	1803580-03 REEPDW1361 0.1193	2.61e3	97.7	NO
4	4	13C8-PFOA	1803580-03 REEPDW1361 0.1193	2.06e4	77.9	NO
5	5	13C9-PFNA	1803580-03 REEPDW1361 0.1193	1.49e4	83.4	NO
6	6	13C4-PFOS	1803580-03 REEPDW1361 0.1193	2.63e3	98.2	NO
7	7	13C6-PFDA	1803580-03 REEPDW1361 0.1193	1.96e4	85.5	NO
8	8	13C7-PFUdA	1803580-03 REEPDW1361 0.1193	2.28e4	94.2	NO

Name: 181120M1_27, Date: 20-Nov-2018, Time: 17:26:02, ID: 1803580-04 REEPDW1362 0.12126, Description: REEPDW1362

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-04 REEPDW1362 0.12126	8.05e3	67.5	NO
2	2	13C5-PFHxA	1803580-04 REEPDW1362 0.12126	1.48e4	69.6	NO
3	3	13C3-PFHxS	1803580-04 REEPDW1362 0.12126	2.25e3	84.4	NO
4	4	13C8-PFOA	1803580-04 REEPDW1362 0.12126	1.68e4	63.5	NO
5	5	13C9-PFNA	1803580-04 REEPDW1362 0.12126	1.21e4	67.9	NO
6	6	13C4-PFOS	1803580-04 REEPDW1362 0.12126	2.47e3	92.2	NO
7	7	13C6-PFDA	1803580-04 REEPDW1362 0.12126	1.63e4	71.4	NO
8	8	13C7-PFUdA	1803580-04 REEPDW1362 0.12126	2.15e4	88.6	NO

Name: 181120M1_28, Date: 20-Nov-2018, Time: 17:42:02, ID: 1803580-05 REEPDW1363 0.1186, Description: REEPDW1363

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-05 REEPDW1363 0.1186	9.11e3	76.4	NO
2	2	13C5-PFHxA	1803580-05 REEPDW1363 0.1186	1.59e4	75.1	NO
3	3	13C3-PFHxS	1803580-05 REEPDW1363 0.1186	2.41e3	90.3	NO
4	4	13C8-PFOA	1803580-05 REEPDW1363 0.1186	1.87e4	70.8	NO
5	5	13C9-PFNA	1803580-05 REEPDW1363 0.1186	1.31e4	73.2	NO
6	6	13C4-PFOS	1803580-05 REEPDW1363 0.1186	2.47e3	92.3	NO
7	7	13C6-PFDA	1803580-05 REEPDW1363 0.1186	1.78e4	77.9	NO
8	8	13C7-PFUdA	1803580-05 REEPDW1363 0.1186	2.23e4	92.1	NO

Name: 181120M1_29, Date: 20-Nov-2018, Time: 17:52:36, ID: 1803580-06 REEPDW1364 0.11593, Description: REEPDW1364

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-06 REEPDW1364 0.11593	1.03e4	86.3	NO
2	2	13C5-PFHxA	1803580-06 REEPDW1364 0.11593	1.86e4	87.5	NO
3	3	13C3-PFHxS	1803580-06 REEPDW1364 0.11593	2.75e3	103.1	NO
4	4	13C8-PFOA	1803580-06 REEPDW1364 0.11593	2.19e4	82.9	NO
5	5	13C9-PFNA	1803580-06 REEPDW1364 0.11593	1.58e4	88.4	NO
6	6	13C4-PFOS	1803580-06 REEPDW1364 0.11593	2.82e3	105.2	NO
7	7	13C6-PFDA	1803580-06 REEPDW1364 0.11593	1.99e4	87.0	NO
8	8	13C7-PFUdA	1803580-06 REEPDW1364 0.11593	2.49e4	102.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_30, Date: 20-Nov-2018, Time: 18:03:14, 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: 181120M1_31, Date: 20-Nov-2018, Time: 18:13:52, ID: ST181120M1-3 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-3 PFC CS3 18K0906	1.04e4	87.0	NO
2	2	13C5-PFHxA	ST181120M1-3 PFC CS3 18K0906	2.41e4	113.6	NO
3	3	13C3-PFHxS	ST181120M1-3 PFC CS3 18K0906	3.07e3	115.1	NO
4	4	13C8-PFOA	ST181120M1-3 PFC CS3 18K0906	3.05e4	115.5	NO
5	5	13C9-PFNA	ST181120M1-3 PFC CS3 18K0906	2.06e4	115.3	NO
6	6	13C4-PFOS	ST181120M1-3 PFC CS3 18K0906	3.11e3	116.4	NO
7	7	13C6-PFDA	ST181120M1-3 PFC CS3 18K0906	2.61e4	114.0	NO
8	8	13C7-PFUdA	ST181120M1-3 PFC CS3 18K0906	2.97e4	122.5	NO

Name: 181120M1_32, Date: 20-Nov-2018, Time: 18:24:31, ID: 1803580-07 REEPDW1365 0.12097, Description: REEPDW1365

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803580-07 REEPDW1365 0.12097	9.61e3	80.6	NO
2	2	13C5-PFHxA	1803580-07 REEPDW1365 0.12097	1.73e4	81.7	NO
3	3	13C3-PFHxS	1803580-07 REEPDW1365 0.12097	2.51e3	94.1	NO
4	4	13C8-PFOA	1803580-07 REEPDW1365 0.12097	2.10e4	79.3	NO
5	5	13C9-PFNA	1803580-07 REEPDW1365 0.12097	1.40e4	78.3	NO
6	6	13C4-PFOS	1803580-07 REEPDW1365 0.12097	2.45e3	91.5	NO
7	7	13C6-PFDA	1803580-07 REEPDW1365 0.12097	1.87e4	81.8	NO
8	8	13C7-PFUdA	1803580-07 REEPDW1365 0.12097	2.31e4	95.2	NO

Name: 181120M1_33, Date: 20-Nov-2018, Time: 18:35:04, ID: 1803552-02@10X WW1810291045GC 0.24014, Description: WW1810291045GC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803552-02@10X WW1810291045GC ...	1.08e3	9.1	YES
2	2	13C5-PFHxA	1803552-02@10X WW1810291045GC ...	1.93e3	9.1	YES
3	3	13C3-PFHxS	1803552-02@10X WW1810291045GC ...	2.37e2	8.9	YES
4	4	13C8-PFOA	1803552-02@10X WW1810291045GC ...	2.55e3	9.6	YES
5	5	13C9-PFNA	1803552-02@10X WW1810291045GC ...	1.77e3	9.9	YES
6	6	13C4-PFOS	1803552-02@10X WW1810291045GC ...	2.62e2	9.8	YES
7	7	13C6-PFDA	1803552-02@10X WW1810291045GC ...	2.18e3	9.5	YES
8	8	13C7-PFUdA	1803552-02@10X WW1810291045GC ...	2.56e3	10.6	YES

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_34, Date: 20-Nov-2018, Time: 18:45:42, ID: 1803551-01 WW1810290900GC 0.23689, Description: WW1810290900GC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803551-01 WW1810290900GC 0.23689	8.83e3	74.0	NO
2	2	13C5-PFHxA	1803551-01 WW1810290900GC 0.23689	1.59e4	74.8	NO
3	3	13C3-PFHxS	1803551-01 WW1810290900GC 0.23689	2.24e3	84.1	NO
4	4	13C8-PFOA	1803551-01 WW1810290900GC 0.23689	2.09e4	79.1	NO
5	5	13C9-PFNA	1803551-01 WW1810290900GC 0.23689	1.24e4	69.2	NO
6	6	13C4-PFOS	1803551-01 WW1810290900GC 0.23689	2.27e3	84.9	NO
7	7	13C6-PFDA	1803551-01 WW1810290900GC 0.23689	1.72e4	75.0	NO
8	8	13C7-PFUdA	1803551-01 WW1810290900GC 0.23689	1.70e4	70.1	NO

Name: 181120M1_35, Date: 20-Nov-2018, Time: 18:56:15, ID: 1803553-01 WW1810291400GC 0.23805, Description: WW1810291400GC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803553-01 WW1810291400GC 0.23805	8.31e3	69.7	NO
2	2	13C5-PFHxA	1803553-01 WW1810291400GC 0.23805	1.29e4	60.6	NO
3	3	13C3-PFHxS	1803553-01 WW1810291400GC 0.23805	2.07e3	77.7	NO
4	4	13C8-PFOA	1803553-01 WW1810291400GC 0.23805	1.97e4	74.5	NO
5	5	13C9-PFNA	1803553-01 WW1810291400GC 0.23805	1.17e4	65.6	NO
6	6	13C4-PFOS	1803553-01 WW1810291400GC 0.23805	2.12e3	79.3	NO
7	7	13C6-PFDA	1803553-01 WW1810291400GC 0.23805	1.64e4	71.9	NO
8	8	13C7-PFUdA	1803553-01 WW1810291400GC 0.23805	1.59e4	65.6	NO

Name: 181120M1_36, Date: 20-Nov-2018, Time: 19:06:54, ID: 1803553-03 WW1810291500GC 0.23488, Description: WW1810291500GC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803553-03 WW1810291500GC 0.23488	6.98e3	58.5	NO
2	2	13C5-PFHxA	1803553-03 WW1810291500GC 0.23488	1.27e4	59.9	NO
3	3	13C3-PFHxS	1803553-03 WW1810291500GC 0.23488	2.01e3	75.2	NO
4	4	13C8-PFOA	1803553-03 WW1810291500GC 0.23488	1.84e4	69.7	NO
5	5	13C9-PFNA	1803553-03 WW1810291500GC 0.23488	1.21e4	67.7	NO
6	6	13C4-PFOS	1803553-03 WW1810291500GC 0.23488	1.85e3	69.0	NO
7	7	13C6-PFDA	1803553-03 WW1810291500GC 0.23488	1.58e4	68.8	NO
8	8	13C7-PFUdA	1803553-03 WW1810291500GC 0.23488	1.69e4	69.9	NO

Name: 181120M1_37, Date: 20-Nov-2018, Time: 19:17:32, ID: B8K0059-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0059-BS1 OPR 0.125	9.32e3	78.2	NO
2	2	13C5-PFHxA	B8K0059-BS1 OPR 0.125	1.86e4	87.8	NO
3	3	13C3-PFHxS	B8K0059-BS1 OPR 0.125	2.47e3	92.5	NO
4	4	13C8-PFOA	B8K0059-BS1 OPR 0.125	2.34e4	88.6	NO
5	5	13C9-PFNA	B8K0059-BS1 OPR 0.125	1.63e4	91.3	NO
6	6	13C4-PFOS	B8K0059-BS1 OPR 0.125	2.60e3	97.3	NO
7	7	13C6-PFDA	B8K0059-BS1 OPR 0.125	2.05e4	89.7	NO
8	8	13C7-PFUdA	B8K0059-BS1 OPR 0.125	2.38e4	98.1	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_38, Date: 20-Nov-2018, Time: 19:28:05, ID: B8K0059-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0059-BSD1 LCSD 0.125	9.29e3	77.9	NO
2	2	13C5-PFHxA	B8K0059-BSD1 LCSD 0.125	1.76e4	82.9	NO
3	3	13C3-PFHxS	B8K0059-BSD1 LCSD 0.125	2.40e3	89.8	NO
4	4	13C8-PFOA	B8K0059-BSD1 LCSD 0.125	2.28e4	86.4	NO
5	5	13C9-PFNA	B8K0059-BSD1 LCSD 0.125	1.58e4	88.4	NO
6	6	13C4-PFOS	B8K0059-BSD1 LCSD 0.125	2.47e3	92.2	NO
7	7	13C6-PFDA	B8K0059-BSD1 LCSD 0.125	1.92e4	84.1	NO
8	8	13C7-PFUdA	B8K0059-BSD1 LCSD 0.125	2.25e4	92.8	NO

Name: 181120M1_39, Date: 20-Nov-2018, Time: 19:38:44, ID: B8K0059-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0059-BLK1 Method Blank 0.125	9.42e3	79.0	NO
2	2	13C5-PFHxA	B8K0059-BLK1 Method Blank 0.125	1.73e4	81.7	NO
3	3	13C3-PFHxS	B8K0059-BLK1 Method Blank 0.125	2.29e3	85.9	NO
4	4	13C8-PFOA	B8K0059-BLK1 Method Blank 0.125	2.03e4	76.7	NO
5	5	13C9-PFNA	B8K0059-BLK1 Method Blank 0.125	1.37e4	76.7	NO
6	6	13C4-PFOS	B8K0059-BLK1 Method Blank 0.125	2.47e3	92.1	NO
7	7	13C6-PFDA	B8K0059-BLK1 Method Blank 0.125	1.65e4	72.0	NO
8	8	13C7-PFUdA	B8K0059-BLK1 Method Blank 0.125	2.04e4	84.0	NO

Name: 181120M1_40, Date: 20-Nov-2018, Time: 19:49:17, ID: 1803560-01 REEPEF1061 0.11502, Description: REEPEF1061

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-01 REEPEF1061 0.11502	7.87e3	66.0	NO
2	2	13C5-PFHxA	1803560-01 REEPEF1061 0.11502	1.40e4	65.9	NO
3	3	13C3-PFHxS	1803560-01 REEPEF1061 0.11502	2.28e3	85.6	NO
4	4	13C8-PFOA	1803560-01 REEPEF1061 0.11502	1.56e4	59.0	NO
5	5	13C9-PFNA	1803560-01 REEPEF1061 0.11502	1.10e4	61.6	NO
6	6	13C4-PFOS	1803560-01 REEPEF1061 0.11502	2.23e3	83.2	NO
7	7	13C6-PFDA	1803560-01 REEPEF1061 0.11502	1.38e4	60.3	NO
8	8	13C7-PFUdA	1803560-01 REEPEF1061 0.11502	1.72e4	71.1	NO

Name: 181120M1_41, Date: 20-Nov-2018, Time: 19:59:55, ID: 1803560-02 REEPAR1061 0.11512, Description: REEPAR1061

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-02 REEPAR1061 0.11512	7.72e3	64.7	NO
2	2	13C5-PFHxA	1803560-02 REEPAR1061 0.11512	1.39e4	65.8	NO
3	3	13C3-PFHxS	1803560-02 REEPAR1061 0.11512	2.22e3	83.2	NO
4	4	13C8-PFOA	1803560-02 REEPAR1061 0.11512	1.78e4	67.3	NO
5	5	13C9-PFNA	1803560-02 REEPAR1061 0.11512	1.24e4	69.1	NO
6	6	13C4-PFOS	1803560-02 REEPAR1061 0.11512	2.34e3	87.5	NO
7	7	13C6-PFDA	1803560-02 REEPAR1061 0.11512	1.67e4	72.9	NO
8	8	13C7-PFUdA	1803560-02 REEPAR1061 0.11512	1.90e4	78.2	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_42, Date: 20-Nov-2018, Time: 20:10:28, ID: 1803560-03 REEPAC1061 0.11751, Description: REEPAC1061

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-03 REEPAC1061 0.11751	9.32e3	78.2	NO
2	2	13C5-PFHxA	1803560-03 REEPAC1061 0.11751	1.85e4	87.2	NO
3	3	13C3-PFHxS	1803560-03 REEPAC1061 0.11751	2.71e3	101.6	NO
4	4	13C8-PFOA	1803560-03 REEPAC1061 0.11751	2.34e4	88.4	NO
5	5	13C9-PFNA	1803560-03 REEPAC1061 0.11751	1.66e4	92.6	NO
6	6	13C4-PFOS	1803560-03 REEPAC1061 0.11751	2.79e3	104.4	NO
7	7	13C6-PFDA	1803560-03 REEPAC1061 0.11751	2.06e4	90.2	NO
8	8	13C7-PFUdA	1803560-03 REEPAC1061 0.11751	2.47e4	102.1	NO

Name: 181120M1_43, Date: 20-Nov-2018, Time: 20:21:07, ID: 1803560-04 REEPEF1064 0.11641, Description: REEPEF1064

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-04 REEPEF1064 0.11641	7.94e3	66.6	NO
2	2	13C5-PFHxA	1803560-04 REEPEF1064 0.11641	1.26e4	59.6	NO
3	3	13C3-PFHxS	1803560-04 REEPEF1064 0.11641	2.20e3	82.3	NO
4	4	13C8-PFOA	1803560-04 REEPEF1064 0.11641	1.51e4	57.0	NO
5	5	13C9-PFNA	1803560-04 REEPEF1064 0.11641	1.09e4	61.2	NO
6	6	13C4-PFOS	1803560-04 REEPEF1064 0.11641	2.34e3	87.4	NO
7	7	13C6-PFDA	1803560-04 REEPEF1064 0.11641	1.36e4	59.5	NO
8	8	13C7-PFUdA	1803560-04 REEPEF1064 0.11641	1.78e4	73.3	NO

Name: 181120M1_44, Date: 20-Nov-2018, Time: 20:31:47, ID: 1803560-05 REEPAR1064 0.10776, Description: REEPAR1064

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-05 REEPAR1064 0.10776	7.62e3	63.9	NO
2	2	13C5-PFHxA	1803560-05 REEPAR1064 0.10776	1.38e4	65.1	NO
3	3	13C3-PFHxS	1803560-05 REEPAR1064 0.10776	2.13e3	79.7	NO
4	4	13C8-PFOA	1803560-05 REEPAR1064 0.10776	1.64e4	62.0	NO
5	5	13C9-PFNA	1803560-05 REEPAR1064 0.10776	1.17e4	65.2	NO
6	6	13C4-PFOS	1803560-05 REEPAR1064 0.10776	2.10e3	78.5	NO
7	7	13C6-PFDA	1803560-05 REEPAR1064 0.10776	1.51e4	66.2	NO
8	8	13C7-PFUdA	1803560-05 REEPAR1064 0.10776	1.82e4	74.9	NO

Name: 181120M1_45, Date: 20-Nov-2018, Time: 20:42:20, 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

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_46, Date: 20-Nov-2018, Time: 20:52:58, ID: ST181120M1-4 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-4 PFC CS3 18K0906	1.06e4	89.2	NO
2	2	13C5-PFHxA	ST181120M1-4 PFC CS3 18K0906	2.60e4	122.5	NO
3	3	13C3-PFHxS	ST181120M1-4 PFC CS3 18K0906	3.15e3	118.1	NO
4	4	13C8-PFOA	ST181120M1-4 PFC CS3 18K0906	3.05e4	115.3	NO
5	5	13C9-PFNA	ST181120M1-4 PFC CS3 18K0906	2.18e4	121.9	NO
6	6	13C4-PFOS	ST181120M1-4 PFC CS3 18K0906	3.31e3	123.7	NO
7	7	13C6-PFDA	ST181120M1-4 PFC CS3 18K0906	2.77e4	121.0	NO
8	8	13C7-PFUdA	ST181120M1-4 PFC CS3 18K0906	3.15e4	129.9	NO

Name: 181120M1_47, Date: 20-Nov-2018, Time: 21:03:31, ID: 1803560-06 REEPAC1064 0.11777, Description: REEPAC1064

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-06 REEPAC1064 0.11777	1.05e4	87.8	NO
2	2	13C5-PFHxA	1803560-06 REEPAC1064 0.11777	1.92e4	90.5	NO
3	3	13C3-PFHxS	1803560-06 REEPAC1064 0.11777	2.55e3	95.6	NO
4	4	13C8-PFOA	1803560-06 REEPAC1064 0.11777	2.32e4	87.7	NO
5	5	13C9-PFNA	1803560-06 REEPAC1064 0.11777	1.66e4	92.9	NO
6	6	13C4-PFOS	1803560-06 REEPAC1064 0.11777	2.69e3	100.5	NO
7	7	13C6-PFDA	1803560-06 REEPAC1064 0.11777	1.86e4	81.2	NO
8	8	13C7-PFUdA	1803560-06 REEPAC1064 0.11777	2.46e4	101.7	NO

Name: 181120M1_48, Date: 20-Nov-2018, Time: 21:14:10, ID: 1803560-07 REEPEF1065 0.11651, Description: REEPEF1065

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-07 REEPEF1065 0.11651	9.60e3	80.5	NO
2	2	13C5-PFHxA	1803560-07 REEPEF1065 0.11651	1.54e4	72.6	NO
3	3	13C3-PFHxS	1803560-07 REEPEF1065 0.11651	2.75e3	103.1	NO
4	4	13C8-PFOA	1803560-07 REEPEF1065 0.11651	1.95e4	73.6	NO
5	5	13C9-PFNA	1803560-07 REEPEF1065 0.11651	1.40e4	78.4	NO
6	6	13C4-PFOS	1803560-07 REEPEF1065 0.11651	2.69e3	100.3	NO
7	7	13C6-PFDA	1803560-07 REEPEF1065 0.11651	1.74e4	75.8	NO
8	8	13C7-PFUdA	1803560-07 REEPEF1065 0.11651	2.16e4	89.2	NO

Name: 181120M1_49, Date: 20-Nov-2018, Time: 21:24:42, ID: 1803560-08 REEPAR1065 0.11979, Description: REEPAR1065

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-08 REEPAR1065 0.11979	9.92e3	83.1	NO
2	2	13C5-PFHxA	1803560-08 REEPAR1065 0.11979	1.65e4	77.6	NO
3	3	13C3-PFHxS	1803560-08 REEPAR1065 0.11979	2.54e3	95.1	NO
4	4	13C8-PFOA	1803560-08 REEPAR1065 0.11979	1.95e4	73.6	NO
5	5	13C9-PFNA	1803560-08 REEPAR1065 0.11979	1.40e4	78.6	NO
6	6	13C4-PFOS	1803560-08 REEPAR1065 0.11979	2.69e3	100.4	NO
7	7	13C6-PFDA	1803560-08 REEPAR1065 0.11979	1.82e4	79.6	NO
8	8	13C7-PFUdA	1803560-08 REEPAR1065 0.11979	2.19e4	90.2	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_50, Date: 20-Nov-2018, Time: 21:35:20, ID: 1803560-09 REEPAC1065 0.11635, Description: REEPAC1065

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-09 REEPAC1065 0.11635	9.23e3	77.4	NO
2	2	13C5-PFHxA	1803560-09 REEPAC1065 0.11635	1.77e4	83.3	NO
3	3	13C3-PFHxS	1803560-09 REEPAC1065 0.11635	2.61e3	98.0	NO
4	4	13C8-PFOA	1803560-09 REEPAC1065 0.11635	2.25e4	84.9	NO
5	5	13C9-PFNA	1803560-09 REEPAC1065 0.11635	1.58e4	88.4	NO
6	6	13C4-PFOS	1803560-09 REEPAC1065 0.11635	2.54e3	95.1	NO
7	7	13C6-PFDA	1803560-09 REEPAC1065 0.11635	2.03e4	88.6	NO
8	8	13C7-PFUdA	1803560-09 REEPAC1065 0.11635	2.30e4	95.0	NO

Name: 181120M1_51, Date: 20-Nov-2018, Time: 21:45:53, ID: 1803560-10 REEPEF1066 0.11571, Description: REEPEF1066

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-10 REEPEF1066 0.11571	1.02e4	85.4	NO
2	2	13C5-PFHxA	1803560-10 REEPEF1066 0.11571	1.90e4	89.4	NO
3	3	13C3-PFHxS	1803560-10 REEPEF1066 0.11571	2.53e3	95.0	NO
4	4	13C8-PFOA	1803560-10 REEPEF1066 0.11571	2.31e4	87.2	NO
5	5	13C9-PFNA	1803560-10 REEPEF1066 0.11571	1.52e4	85.0	NO
6	6	13C4-PFOS	1803560-10 REEPEF1066 0.11571	2.51e3	94.0	NO
7	7	13C6-PFDA	1803560-10 REEPEF1066 0.11571	1.94e4	84.9	NO
8	8	13C7-PFUdA	1803560-10 REEPEF1066 0.11571	2.26e4	93.1	NO

Name: 181120M1_52, Date: 20-Nov-2018, Time: 21:56:32, ID: 1803560-11 REEPAR1066 0.11617, Description: REEPAR1066

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-11 REEPAR1066 0.11617	1.08e4	90.3	NO
2	2	13C5-PFHxA	1803560-11 REEPAR1066 0.11617	1.75e4	82.7	NO
3	3	13C3-PFHxS	1803560-11 REEPAR1066 0.11617	2.80e3	105.0	NO
4	4	13C8-PFOA	1803560-11 REEPAR1066 0.11617	1.97e4	74.4	NO
5	5	13C9-PFNA	1803560-11 REEPAR1066 0.11617	1.44e4	80.5	NO
6	6	13C4-PFOS	1803560-11 REEPAR1066 0.11617	2.84e3	106.1	NO
7	7	13C6-PFDA	1803560-11 REEPAR1066 0.11617	1.89e4	82.6	NO
8	8	13C7-PFUdA	1803560-11 REEPAR1066 0.11617	2.45e4	101.0	NO

Name: 181120M1_53, Date: 20-Nov-2018, Time: 22:07:05, ID: 1803560-12 REEPAC1066 0.11943, Description: REEPAC1066

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-12 REEPAC1066 0.11943	8.83e3	74.1	NO
2	2	13C5-PFHxA	1803560-12 REEPAC1066 0.11943	1.70e4	80.3	NO
3	3	13C3-PFHxS	1803560-12 REEPAC1066 0.11943	2.33e3	87.3	NO
4	4	13C8-PFOA	1803560-12 REEPAC1066 0.11943	2.13e4	80.5	NO
5	5	13C9-PFNA	1803560-12 REEPAC1066 0.11943	1.52e4	84.9	NO
6	6	13C4-PFOS	1803560-12 REEPAC1066 0.11943	2.33e3	87.1	NO
7	7	13C6-PFDA	1803560-12 REEPAC1066 0.11943	1.96e4	85.5	NO
8	8	13C7-PFUdA	1803560-12 REEPAC1066 0.11943	2.24e4	92.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_54, Date: 20-Nov-2018, Time: 22:17:43, ID: 1803560-13 REEPEF1067 0.11797, Description: REEPEF1067

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-13 REEPEF1067 0.11797	1.03e4	86.1	NO
2	2	13C5-PFHxA	1803560-13 REEPEF1067 0.11797	1.93e4	90.9	NO
3	3	13C3-PFHxS	1803560-13 REEPEF1067 0.11797	2.45e3	91.7	NO
4	4	13C8-PFOA	1803560-13 REEPEF1067 0.11797	2.31e4	87.5	NO
5	5	13C9-PFNA	1803560-13 REEPEF1067 0.11797	1.65e4	92.1	NO
6	6	13C4-PFOS	1803560-13 REEPEF1067 0.11797	2.57e3	95.8	NO
7	7	13C6-PFDA	1803560-13 REEPEF1067 0.11797	2.04e4	89.3	NO
8	8	13C7-PFUdA	1803560-13 REEPEF1067 0.11797	2.43e4	100.3	NO

Name: 181120M1_55, Date: 20-Nov-2018, Time: 22:28:16, ID: 1803560-14 REEPAR1067 0.11772, Description: REEPAR1067

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-14 REEPAR1067 0.11772	8.64e3	72.4	NO
2	2	13C5-PFHxA	1803560-14 REEPAR1067 0.11772	1.65e4	77.9	NO
3	3	13C3-PFHxS	1803560-14 REEPAR1067 0.11772	2.43e3	91.0	NO
4	4	13C8-PFOA	1803560-14 REEPAR1067 0.11772	2.02e4	76.5	NO
5	5	13C9-PFNA	1803560-14 REEPAR1067 0.11772	1.38e4	77.2	NO
6	6	13C4-PFOS	1803560-14 REEPAR1067 0.11772	2.42e3	90.5	NO
7	7	13C6-PFDA	1803560-14 REEPAR1067 0.11772	1.71e4	74.7	NO
8	8	13C7-PFUdA	1803560-14 REEPAR1067 0.11772	2.12e4	87.4	NO

Name: 181120M1_56, Date: 20-Nov-2018, Time: 22:38:54, ID: 1803560-15 REEPAC1067 0.12134, Description: REEPAC1067

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-15 REEPAC1067 0.12134	9.23e3	77.4	NO
2	2	13C5-PFHxA	1803560-15 REEPAC1067 0.12134	1.59e4	75.0	NO
3	3	13C3-PFHxS	1803560-15 REEPAC1067 0.12134	2.47e3	92.4	NO
4	4	13C8-PFOA	1803560-15 REEPAC1067 0.12134	1.88e4	71.1	NO
5	5	13C9-PFNA	1803560-15 REEPAC1067 0.12134	1.39e4	77.9	NO
6	6	13C4-PFOS	1803560-15 REEPAC1067 0.12134	2.60e3	97.1	NO
7	7	13C6-PFDA	1803560-15 REEPAC1067 0.12134	1.73e4	75.5	NO
8	8	13C7-PFUdA	1803560-15 REEPAC1067 0.12134	2.12e4	87.5	NO

Name: 181120M1_57, Date: 20-Nov-2018, Time: 22:49:27, 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

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_58, Date: 20-Nov-2018, Time: 23:00:05, ID: ST181120M1-5 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-5 PFC CS3 18K0906	1.09e4	91.2	NO
2	2	13C5-PFHxA	ST181120M1-5 PFC CS3 18K0906	2.80e4	132.2	NO
3	3	13C3-PFHxS	ST181120M1-5 PFC CS3 18K0906	3.58e3	134.2	NO
4	4	13C8-PFOA	ST181120M1-5 PFC CS3 18K0906	3.33e4	126.0	NO
5	5	13C9-PFNA	ST181120M1-5 PFC CS3 18K0906	2.28e4	127.8	NO
6	6	13C4-PFOS	ST181120M1-5 PFC CS3 18K0906	3.54e3	132.4	NO
7	7	13C6-PFDA	ST181120M1-5 PFC CS3 18K0906	2.84e4	124.0	NO
8	8	13C7-PFUdA	ST181120M1-5 PFC CS3 18K0906	3.39e4	140.1	NO

Name: 181120M1_59, Date: 20-Nov-2018, Time: 23:10:38, ID: ST181120M1-6 PFC CS0 18K0903, Description: PFC CS0 18K0903

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-6 PFC CS0 18K0903	9.99e3	83.8	NO
2	2	13C5-PFHxA	ST181120M1-6 PFC CS0 18K0903	2.58e4	121.8	NO
3	3	13C3-PFHxS	ST181120M1-6 PFC CS0 18K0903	3.23e3	121.1	NO
4	4	13C8-PFOA	ST181120M1-6 PFC CS0 18K0903	3.10e4	117.1	NO
5	5	13C9-PFNA	ST181120M1-6 PFC CS0 18K0903	2.20e4	122.9	NO
6	6	13C4-PFOS	ST181120M1-6 PFC CS0 18K0903	3.01e3	112.5	NO
7	7	13C6-PFDA	ST181120M1-6 PFC CS0 18K0903	2.82e4	123.2	NO
8	8	13C7-PFUdA	ST181120M1-6 PFC CS0 18K0903	3.22e4	133.0	NO

Name: 181120M1_60, Date: 20-Nov-2018, Time: 23:21:16, ID: 1803560-16 REEPAC5029 0.12085, Description: REEPAC5029

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803560-16 REEPAC5029 0.12085	8.82e3	74.0	NO
2	2	13C5-PFHxA	1803560-16 REEPAC5029 0.12085	1.61e4	75.7	NO
3	3	13C3-PFHxS	1803560-16 REEPAC5029 0.12085	2.17e3	81.3	NO
4	4	13C8-PFOA	1803560-16 REEPAC5029 0.12085	1.76e4	66.5	NO
5	5	13C9-PFNA	1803560-16 REEPAC5029 0.12085	1.28e4	71.6	NO
6	6	13C4-PFOS	1803560-16 REEPAC5029 0.12085	2.28e3	85.3	NO
7	7	13C6-PFDA	1803560-16 REEPAC5029 0.12085	1.60e4	70.1	NO
8	8	13C7-PFUdA	1803560-16 REEPAC5029 0.12085	1.96e4	80.9	NO

Name: 181120M1_61, Date: 20-Nov-2018, Time: 23:31:48, ID: B8K0091-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0091-BS1 OPR 0.125	8.18e3	68.6	NO
2	2	13C5-PFHxA	B8K0091-BS1 OPR 0.125	1.69e4	79.7	NO
3	3	13C3-PFHxS	B8K0091-BS1 OPR 0.125	2.38e3	89.2	NO
4	4	13C8-PFOA	B8K0091-BS1 OPR 0.125	2.21e4	83.6	NO
5	5	13C9-PFNA	B8K0091-BS1 OPR 0.125	1.57e4	87.8	NO
6	6	13C4-PFOS	B8K0091-BS1 OPR 0.125	2.57e3	96.2	NO
7	7	13C6-PFDA	B8K0091-BS1 OPR 0.125	1.93e4	84.3	NO
8	8	13C7-PFUdA	B8K0091-BS1 OPR 0.125	2.30e4	94.9	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_62, Date: 20-Nov-2018, Time: 23:42:26, ID: B8K0091-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0091-BLK1 Method Blank 0.125	9.02e3	75.6	NO
2	2	13C5-PFHxA	B8K0091-BLK1 Method Blank 0.125	1.78e4	83.7	NO
3	3	13C3-PFHxS	B8K0091-BLK1 Method Blank 0.125	2.39e3	89.6	NO
4	4	13C8-PFOA	B8K0091-BLK1 Method Blank 0.125	2.15e4	81.2	NO
5	5	13C9-PFNA	B8K0091-BLK1 Method Blank 0.125	1.51e4	84.4	NO
6	6	13C4-PFOS	B8K0091-BLK1 Method Blank 0.125	2.49e3	93.0	NO
7	7	13C6-PFDA	B8K0091-BLK1 Method Blank 0.125	1.93e4	84.4	NO
8	8	13C7-PFUdA	B8K0091-BLK1 Method Blank 0.125	2.15e4	88.5	NO

Name: 181120M1_63, Date: 20-Nov-2018, Time: 23:52:59, ID: B8K0091-MS1 Matrix Spike 0.1154, Description: Matrix Spike

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0091-MS1 Matrix Spike 0.1154	9.41e3	78.9	NO
2	2	13C5-PFHxA	B8K0091-MS1 Matrix Spike 0.1154	1.80e4	85.1	NO
3	3	13C3-PFHxS	B8K0091-MS1 Matrix Spike 0.1154	2.85e3	106.7	NO
4	4	13C8-PFOA	B8K0091-MS1 Matrix Spike 0.1154	2.27e4	86.0	NO
5	5	13C9-PFNA	B8K0091-MS1 Matrix Spike 0.1154	1.65e4	92.3	NO
6	6	13C4-PFOS	B8K0091-MS1 Matrix Spike 0.1154	2.82e3	105.3	NO
7	7	13C6-PFDA	B8K0091-MS1 Matrix Spike 0.1154	1.96e4	85.5	NO
8	8	13C7-PFUdA	B8K0091-MS1 Matrix Spike 0.1154	2.38e4	98.2	NO

Name: 181120M1_64, Date: 21-Nov-2018, Time: 00:03:37, ID: B8K0091-MSD1 Matrix Spike Dup 0.11594, Description: Matrix Spike Dup

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0091-MSD1 Matrix Spike Dup 0.115...	4.68e3	39.3	YES
2	2	13C5-PFHxA	B8K0091-MSD1 Matrix Spike Dup 0.115...	1.02e4	48.1	YES
3	3	13C3-PFHxS	B8K0091-MSD1 Matrix Spike Dup 0.115...	2.50e3	93.8	NO
4	4	13C8-PFOA	B8K0091-MSD1 Matrix Spike Dup 0.115...	1.68e4	63.4	NO
5	5	13C9-PFNA	B8K0091-MSD1 Matrix Spike Dup 0.115...	1.28e4	71.8	NO
6	6	13C4-PFOS	B8K0091-MSD1 Matrix Spike Dup 0.115...	2.71e3	101.1	NO
7	7	13C6-PFDA	B8K0091-MSD1 Matrix Spike Dup 0.115...	1.70e4	74.3	NO
8	8	13C7-PFUdA	B8K0091-MSD1 Matrix Spike Dup 0.115...	2.03e4	83.9	NO

Name: 181120M1_65, Date: 21-Nov-2018, Time: 00:14:15, ID: 1803582-01 REEPDW1360FRB 0.11656, Description: REEPDW1360FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-01 REEPDW1360FRB 0.11656	9.49e3	79.6	NO
2	2	13C5-PFHxA	1803582-01 REEPDW1360FRB 0.11656	1.73e4	81.7	NO
3	3	13C3-PFHxS	1803582-01 REEPDW1360FRB 0.11656	2.36e3	88.3	NO
4	4	13C8-PFOA	1803582-01 REEPDW1360FRB 0.11656	2.00e4	75.7	NO
5	5	13C9-PFNA	1803582-01 REEPDW1360FRB 0.11656	1.37e4	76.6	NO
6	6	13C4-PFOS	1803582-01 REEPDW1360FRB 0.11656	2.33e3	87.2	NO
7	7	13C6-PFDA	1803582-01 REEPDW1360FRB 0.11656	1.74e4	75.9	NO
8	8	13C7-PFUdA	1803582-01 REEPDW1360FRB 0.11656	2.11e4	87.2	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_66, Date: 21-Nov-2018, Time: 00:24:49, ID: 1803582-02 REEPDW1361FRB 0.11659, Description: REEPDW1361FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-02 REEPDW1361FRB 0.11659	9.24e3	77.4	NO
2	2	13C5-PFHxA	1803582-02 REEPDW1361FRB 0.11659	1.72e4	81.2	NO
3	3	13C3-PFHxS	1803582-02 REEPDW1361FRB 0.11659	2.19e3	82.0	NO
4	4	13C8-PFOA	1803582-02 REEPDW1361FRB 0.11659	1.96e4	74.1	NO
5	5	13C9-PFNA	1803582-02 REEPDW1361FRB 0.11659	1.35e4	75.4	NO
6	6	13C4-PFOS	1803582-02 REEPDW1361FRB 0.11659	2.18e3	81.4	NO
7	7	13C6-PFDA	1803582-02 REEPDW1361FRB 0.11659	1.62e4	71.0	NO
8	8	13C7-PFUdA	1803582-02 REEPDW1361FRB 0.11659	2.02e4	83.5	NO

Name: 181120M1_67, Date: 21-Nov-2018, Time: 00:35:27, ID: 1803582-03 REEPDW1362FRB 0.11502, Description: REEPDW1362FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-03 REEPDW1362FRB 0.11502	8.06e3	67.6	NO
2	2	13C5-PFHxA	1803582-03 REEPDW1362FRB 0.11502	1.48e4	69.6	NO
3	3	13C3-PFHxS	1803582-03 REEPDW1362FRB 0.11502	2.07e3	77.5	NO
4	4	13C8-PFOA	1803582-03 REEPDW1362FRB 0.11502	1.76e4	66.5	NO
5	5	13C9-PFNA	1803582-03 REEPDW1362FRB 0.11502	1.25e4	70.0	NO
6	6	13C4-PFOS	1803582-03 REEPDW1362FRB 0.11502	2.10e3	78.6	NO
7	7	13C6-PFDA	1803582-03 REEPDW1362FRB 0.11502	1.46e4	63.9	NO
8	8	13C7-PFUdA	1803582-03 REEPDW1362FRB 0.11502	1.83e4	75.6	NO

Name: 181120M1_68, Date: 21-Nov-2018, Time: 00:46:01, ID: 1803582-04 REEPDW1363FRB 0.11744, Description: REEPDW1363FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-04 REEPDW1363FRB 0.11744	9.09e3	76.2	NO
2	2	13C5-PFHxA	1803582-04 REEPDW1363FRB 0.11744	1.71e4	80.8	NO
3	3	13C3-PFHxS	1803582-04 REEPDW1363FRB 0.11744	2.34e3	87.6	NO
4	4	13C8-PFOA	1803582-04 REEPDW1363FRB 0.11744	1.98e4	74.8	NO
5	5	13C9-PFNA	1803582-04 REEPDW1363FRB 0.11744	1.34e4	75.0	NO
6	6	13C4-PFOS	1803582-04 REEPDW1363FRB 0.11744	2.34e3	87.3	NO
7	7	13C6-PFDA	1803582-04 REEPDW1363FRB 0.11744	1.70e4	74.3	NO
8	8	13C7-PFUdA	1803582-04 REEPDW1363FRB 0.11744	2.04e4	84.1	NO

Name: 181120M1_69, Date: 21-Nov-2018, Time: 00:56:39, ID: 1803582-05 REEPDW1364FRB 0.11686, Description: REEPDW1364FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-05 REEPDW1364FRB 0.11686	9.04e3	75.8	NO
2	2	13C5-PFHxA	1803582-05 REEPDW1364FRB 0.11686	1.71e4	80.4	NO
3	3	13C3-PFHxS	1803582-05 REEPDW1364FRB 0.11686	2.26e3	84.5	NO
4	4	13C8-PFOA	1803582-05 REEPDW1364FRB 0.11686	1.92e4	72.5	NO
5	5	13C9-PFNA	1803582-05 REEPDW1364FRB 0.11686	1.25e4	70.1	NO
6	6	13C4-PFOS	1803582-05 REEPDW1364FRB 0.11686	2.29e3	85.7	NO
7	7	13C6-PFDA	1803582-05 REEPDW1364FRB 0.11686	1.59e4	69.7	NO
8	8	13C7-PFUdA	1803582-05 REEPDW1364FRB 0.11686	2.01e4	83.1	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_70, Date: 21-Nov-2018, Time: 01:07:12, ID: 1803582-06 REEPDW1365FRB 0.11305, Description: REEPDW1365FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803582-06 REEPDW1365FRB 0.11305	9.25e3	77.5	NO
2	2	13C5-PFHxA	1803582-06 REEPDW1365FRB 0.11305	1.74e4	82.3	NO
3	3	13C3-PFHxS	1803582-06 REEPDW1365FRB 0.11305	2.29e3	85.8	NO
4	4	13C8-PFOA	1803582-06 REEPDW1365FRB 0.11305	2.09e4	78.9	NO
5	5	13C9-PFNA	1803582-06 REEPDW1365FRB 0.11305	1.30e4	72.5	NO
6	6	13C4-PFOS	1803582-06 REEPDW1365FRB 0.11305	2.30e3	86.0	NO
7	7	13C6-PFDA	1803582-06 REEPDW1365FRB 0.11305	1.64e4	71.5	NO
8	8	13C7-PFUdA	1803582-06 REEPDW1365FRB 0.11305	2.02e4	83.5	NO

Name: 181120M1_71, Date: 21-Nov-2018, Time: 01:17:50, ID: 1803615-01 A1-MW-04-SA2 0.11345, Description: A1-MW-04-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-01 A1-MW-04-SA2 0.11345	2.83e3	23.7	YES
2	2	13C5-PFHxA	1803615-01 A1-MW-04-SA2 0.11345	5.23e3	24.7	YES
3	3	13C3-PFHxS	1803615-01 A1-MW-04-SA2 0.11345	1.72e3	64.5	NO
4	4	13C8-PFOA	1803615-01 A1-MW-04-SA2 0.11345	9.19e3	34.7	YES
5	5	13C9-PFNA	1803615-01 A1-MW-04-SA2 0.11345	7.27e3	40.7	YES
6	6	13C4-PFOS	1803615-01 A1-MW-04-SA2 0.11345	1.82e3	67.9	NO
7	7	13C6-PFDA	1803615-01 A1-MW-04-SA2 0.11345	9.79e3	42.8	YES
8	8	13C7-PFUdA	1803615-01 A1-MW-04-SA2 0.11345	1.21e4	49.8	YES

Name: 181120M1_72, Date: 21-Nov-2018, Time: 01:28:22, ID: 1803615-02 A1-MW-05-SA2 0.11579, Description: A1-MW-05-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-02 A1-MW-05-SA2 0.11579	4.94e3	41.4	YES
2	2	13C5-PFHxA	1803615-02 A1-MW-05-SA2 0.11579	8.18e3	38.6	YES
3	3	13C3-PFHxS	1803615-02 A1-MW-05-SA2 0.11579	2.50e3	93.6	NO
4	4	13C8-PFOA	1803615-02 A1-MW-05-SA2 0.11579	1.10e4	41.6	YES
5	5	13C9-PFNA	1803615-02 A1-MW-05-SA2 0.11579	8.42e3	47.1	YES
6	6	13C4-PFOS	1803615-02 A1-MW-05-SA2 0.11579	2.36e3	88.0	NO
7	7	13C6-PFDA	1803615-02 A1-MW-05-SA2 0.11579	1.25e4	54.6	NO
8	8	13C7-PFUdA	1803615-02 A1-MW-05-SA2 0.11579	1.64e4	67.7	NO

Name: 181120M1_73, Date: 21-Nov-2018, Time: 01:39:00, ID: 1803615-03 A1-MW-49-SA2 0.11411, Description: A1-MW-49-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-03 A1-MW-49-SA2 0.11411	7.69e3	64.5	NO
2	2	13C5-PFHxA	1803615-03 A1-MW-49-SA2 0.11411	1.27e4	59.8	NO
3	3	13C3-PFHxS	1803615-03 A1-MW-49-SA2 0.11411	2.58e3	96.8	NO
4	4	13C8-PFOA	1803615-03 A1-MW-49-SA2 0.11411	1.68e4	63.6	NO
5	5	13C9-PFNA	1803615-03 A1-MW-49-SA2 0.11411	1.14e4	64.0	NO
6	6	13C4-PFOS	1803615-03 A1-MW-49-SA2 0.11411	2.73e3	102.1	NO
7	7	13C6-PFDA	1803615-03 A1-MW-49-SA2 0.11411	1.37e4	59.7	NO
8	8	13C7-PFUdA	1803615-03 A1-MW-49-SA2 0.11411	1.68e4	69.5	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_74, Date: 21-Nov-2018, Time: 01:49:33, ID: 1803615-04 A1-MW-50-SA2 0.11184, Description: A1-MW-50-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-04 A1-MW-50-SA2 0.11184	5.03e3	42.1	YES
2	2	13C5-PFHxA	1803615-04 A1-MW-50-SA2 0.11184	7.59e3	35.8	YES
3	3	13C3-PFHxS	1803615-04 A1-MW-50-SA2 0.11184	2.63e3	98.7	NO
4	4	13C8-PFOA	1803615-04 A1-MW-50-SA2 0.11184	1.08e4	40.7	YES
5	5	13C9-PFNA	1803615-04 A1-MW-50-SA2 0.11184	8.03e3	44.9	YES
6	6	13C4-PFOS	1803615-04 A1-MW-50-SA2 0.11184	2.50e3	93.5	NO
7	7	13C6-PFDA	1803615-04 A1-MW-50-SA2 0.11184	1.13e4	49.3	YES
8	8	13C7-PFUdA	1803615-04 A1-MW-50-SA2 0.11184	1.40e4	57.7	NO

Name: 181120M1_75, Date: 21-Nov-2018, Time: 02:00:11, ID: 1803615-05 A1-MW-50-SA2D 0.11445, Description: A1-MW-50-SA2D

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-05 A1-MW-50-SA2D 0.11445	4.68e3	39.2	YES
2	2	13C5-PFHxA	1803615-05 A1-MW-50-SA2D 0.11445	7.65e3	36.1	YES
3	3	13C3-PFHxS	1803615-05 A1-MW-50-SA2D 0.11445	2.26e3	84.6	NO
4	4	13C8-PFOA	1803615-05 A1-MW-50-SA2D 0.11445	1.11e4	41.9	YES
5	5	13C9-PFNA	1803615-05 A1-MW-50-SA2D 0.11445	8.71e3	48.7	YES
6	6	13C4-PFOS	1803615-05 A1-MW-50-SA2D 0.11445	2.39e3	89.2	NO
7	7	13C6-PFDA	1803615-05 A1-MW-50-SA2D 0.11445	1.16e4	50.8	NO
8	8	13C7-PFUdA	1803615-05 A1-MW-50-SA2D 0.11445	1.53e4	63.2	NO

Name: 181120M1_76, Date: 21-Nov-2018, Time: 02:10:50, ID: 1803615-06 A1-MW-51-SA2 0.11681, Description: A1-MW-51-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-06 A1-MW-51-SA2 0.11681	5.54e3	46.5	YES
2	2	13C5-PFHxA	1803615-06 A1-MW-51-SA2 0.11681	8.43e3	39.7	YES
3	3	13C3-PFHxS	1803615-06 A1-MW-51-SA2 0.11681	2.32e3	87.0	NO
4	4	13C8-PFOA	1803615-06 A1-MW-51-SA2 0.11681	1.05e4	39.7	YES
5	5	13C9-PFNA	1803615-06 A1-MW-51-SA2 0.11681	7.97e3	44.6	YES
6	6	13C4-PFOS	1803615-06 A1-MW-51-SA2 0.11681	2.42e3	90.3	NO
7	7	13C6-PFDA	1803615-06 A1-MW-51-SA2 0.11681	1.02e4	44.6	YES
8	8	13C7-PFUdA	1803615-06 A1-MW-51-SA2 0.11681	1.37e4	56.4	NO

Name: 181120M1_77, Date: 21-Nov-2018, Time: 02:21:30, ID: 1803615-07 A1-MW-52-SA2 0.11468, Description: A1-MW-52-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-07 A1-MW-52-SA2 0.11468	4.34e3	36.4	YES
2	2	13C5-PFHxA	1803615-07 A1-MW-52-SA2 0.11468	6.62e3	31.2	YES
3	3	13C3-PFHxS	1803615-07 A1-MW-52-SA2 0.11468	2.51e3	94.0	NO
4	4	13C8-PFOA	1803615-07 A1-MW-52-SA2 0.11468	1.11e4	42.0	YES
5	5	13C9-PFNA	1803615-07 A1-MW-52-SA2 0.11468	9.05e3	50.6	NO
6	6	13C4-PFOS	1803615-07 A1-MW-52-SA2 0.11468	2.54e3	94.9	NO
7	7	13C6-PFDA	1803615-07 A1-MW-52-SA2 0.11468	1.22e4	53.2	NO
8	8	13C7-PFUdA	1803615-07 A1-MW-52-SA2 0.11468	1.56e4	64.5	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_78, Date: 21-Nov-2018, Time: 02:32:03, ID: 1803615-08 FRB-20181112 0.11506, Description: FRB-20181112

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-08 FRB-20181112 0.11506	8.93e3	74.9	NO
2	2	13C5-PFHxA	1803615-08 FRB-20181112 0.11506	1.72e4	81.2	NO
3	3	13C3-PFHxS	1803615-08 FRB-20181112 0.11506	2.39e3	89.5	NO
4	4	13C8-PFOA	1803615-08 FRB-20181112 0.11506	1.80e4	68.2	NO
5	5	13C9-PFNA	1803615-08 FRB-20181112 0.11506	1.23e4	69.0	NO
6	6	13C4-PFOS	1803615-08 FRB-20181112 0.11506	2.50e3	93.4	NO
7	7	13C6-PFDA	1803615-08 FRB-20181112 0.11506	1.55e4	67.6	NO
8	8	13C7-PFUdA	1803615-08 FRB-20181112 0.11506	1.99e4	82.0	NO

Name: 181120M1_79, Date: 21-Nov-2018, Time: 02:42:42, ID: 1803615-09 A1-PZ-19-SA2 0.1131, Description: A1-PZ-19-SA2

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803615-09 A1-PZ-19-SA2 0.1131	6.11e3	51.3	NO
2	2	13C5-PFHxA	1803615-09 A1-PZ-19-SA2 0.1131	1.45e4	68.2	NO
3	3	13C3-PFHxS	1803615-09 A1-PZ-19-SA2 0.1131	2.54e3	95.1	NO
4	4	13C8-PFOA	1803615-09 A1-PZ-19-SA2 0.1131	1.90e4	71.9	NO
5	5	13C9-PFNA	1803615-09 A1-PZ-19-SA2 0.1131	1.29e4	72.4	NO
6	6	13C4-PFOS	1803615-09 A1-PZ-19-SA2 0.1131	2.63e3	98.1	NO
7	7	13C6-PFDA	1803615-09 A1-PZ-19-SA2 0.1131	1.66e4	72.8	NO
8	8	13C7-PFUdA	1803615-09 A1-PZ-19-SA2 0.1131	1.94e4	80.2	NO

Name: 181120M1_80, Date: 21-Nov-2018, Time: 02:53:20, ID: B8K0075-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0075-BS1 OPR 0.125	1.23e4	102.7	NO
2	2	13C5-PFHxA	B8K0075-BS1 OPR 0.125	2.22e4	104.8	NO
3	3	13C3-PFHxS	B8K0075-BS1 OPR 0.125	2.82e3	105.5	NO
4	4	13C8-PFOA	B8K0075-BS1 OPR 0.125	2.82e4	106.7	NO
5	5	13C9-PFNA	B8K0075-BS1 OPR 0.125	1.91e4	106.6	NO
6	6	13C4-PFOS	B8K0075-BS1 OPR 0.125	2.94e3	109.7	NO
7	7	13C6-PFDA	B8K0075-BS1 OPR 0.125	2.41e4	105.3	NO
8	8	13C7-PFUdA	B8K0075-BS1 OPR 0.125	2.78e4	114.7	NO

Name: 181120M1_81, Date: 21-Nov-2018, Time: 03:03:53, ID: B8K0075-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8K0075-BLK1 Method Blank 0.125	1.06e4	89.1	NO
2	2	13C5-PFHxA	B8K0075-BLK1 Method Blank 0.125	2.05e4	96.8	NO
3	3	13C3-PFHxS	B8K0075-BLK1 Method Blank 0.125	2.67e3	100.0	NO
4	4	13C8-PFOA	B8K0075-BLK1 Method Blank 0.125	2.53e4	95.6	NO
5	5	13C9-PFNA	B8K0075-BLK1 Method Blank 0.125	1.80e4	100.5	NO
6	6	13C4-PFOS	B8K0075-BLK1 Method Blank 0.125	2.69e3	100.6	NO
7	7	13C6-PFDA	B8K0075-BLK1 Method Blank 0.125	2.21e4	96.7	NO
8	8	13C7-PFUdA	B8K0075-BLK1 Method Blank 0.125	2.54e4	104.9	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_82, Date: 21-Nov-2018, Time: 03:14:32, ID: 1803590-01 Winn WTP 731 0.1117, Description: Winn WTP 731

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-01 Winn WTP 731 0.1117	1.21e4	101.2	NO
2	2	13C5-PFHxA	1803590-01 Winn WTP 731 0.1117	2.24e4	105.8	NO
3	3	13C3-PFHxS	1803590-01 Winn WTP 731 0.1117	2.93e3	109.6	NO
4	4	13C8-PFOA	1803590-01 Winn WTP 731 0.1117	2.86e4	108.1	NO
5	5	13C9-PFNA	1803590-01 Winn WTP 731 0.1117	1.91e4	106.7	NO
6	6	13C4-PFOS	1803590-01 Winn WTP 731 0.1117	3.10e3	116.0	NO
7	7	13C6-PFDA	1803590-01 Winn WTP 731 0.1117	2.41e4	105.5	NO
8	8	13C7-PFUdA	1803590-01 Winn WTP 731 0.1117	2.89e4	119.3	NO

Name: 181120M1_83, Date: 21-Nov-2018, Time: 03:25:10, 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: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-7 PFC CS3 18K0906	1.05e4	88.4	NO
2	2	13C5-PFHxA	ST181120M1-7 PFC CS3 18K0906	2.61e4	123.1	NO
3	3	13C3-PFHxS	ST181120M1-7 PFC CS3 18K0906	3.24e3	121.4	NO
4	4	13C8-PFOA	ST181120M1-7 PFC CS3 18K0906	3.25e4	122.9	NO
5	5	13C9-PFNA	ST181120M1-7 PFC CS3 18K0906	2.15e4	120.1	NO
6	6	13C4-PFOS	ST181120M1-7 PFC CS3 18K0906	3.33e3	124.4	NO
7	7	13C6-PFDA	ST181120M1-7 PFC CS3 18K0906	2.86e4	124.9	NO
8	8	13C7-PFUdA	ST181120M1-7 PFC CS3 18K0906	3.22e4	133.0	NO

Name: 181120M1_85, Date: 21-Nov-2018, Time: 03:46:21, ID: 1803590-02 Mill Tank 781 0.11436, Description: Mill Tank 781

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-02 Mill Tank 781 0.11436	9.99e3	83.8	NO
2	2	13C5-PFHxA	1803590-02 Mill Tank 781 0.11436	1.91e4	90.2	NO
3	3	13C3-PFHxS	1803590-02 Mill Tank 781 0.11436	2.74e3	102.8	NO
4	4	13C8-PFOA	1803590-02 Mill Tank 781 0.11436	2.39e4	90.6	NO
5	5	13C9-PFNA	1803590-02 Mill Tank 781 0.11436	1.71e4	95.9	NO
6	6	13C4-PFOS	1803590-02 Mill Tank 781 0.11436	2.68e3	100.0	NO
7	7	13C6-PFDA	1803590-02 Mill Tank 781 0.11436	2.19e4	95.8	NO
8	8	13C7-PFUdA	1803590-02 Mill Tank 781 0.11436	2.61e4	107.5	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_86, Date: 21-Nov-2018, Time: 03:56:54, ID: 1803590-03 Ex Tank 710 0.10366, Description: Ex Tank 710

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-03 Ex Tank 710 0.10366	1.23e4	102.8	NO
2	2	13C5-PFHxA	1803590-03 Ex Tank 710 0.10366	2.21e4	104.4	NO
3	3	13C3-PFHxS	1803590-03 Ex Tank 710 0.10366	3.01e3	112.7	NO
4	4	13C8-PFOA	1803590-03 Ex Tank 710 0.10366	2.80e4	105.9	NO
5	5	13C9-PFNA	1803590-03 Ex Tank 710 0.10366	1.86e4	104.0	NO
6	6	13C4-PFOS	1803590-03 Ex Tank 710 0.10366	3.01e3	112.4	NO
7	7	13C6-PFDA	1803590-03 Ex Tank 710 0.10366	2.35e4	102.7	NO
8	8	13C7-PFUdA	1803590-03 Ex Tank 710 0.10366	2.80e4	115.4	NO

Name: 181120M1_87, Date: 21-Nov-2018, Time: 04:07:32, ID: 1803590-04 Tide Mill PRV 789 0.11523, Description: Tide Mill PRV 789

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-04 Tide Mill PRV 789 0.11523	9.92e3	83.2	NO
2	2	13C5-PFHxA	1803590-04 Tide Mill PRV 789 0.11523	1.85e4	87.3	NO
3	3	13C3-PFHxS	1803590-04 Tide Mill PRV 789 0.11523	2.58e3	96.9	NO
4	4	13C8-PFOA	1803590-04 Tide Mill PRV 789 0.11523	2.19e4	82.7	NO
5	5	13C9-PFNA	1803590-04 Tide Mill PRV 789 0.11523	1.53e4	85.5	NO
6	6	13C4-PFOS	1803590-04 Tide Mill PRV 789 0.11523	2.59e3	96.7	NO
7	7	13C6-PFDA	1803590-04 Tide Mill PRV 789 0.11523	1.91e4	83.5	NO
8	8	13C7-PFUdA	1803590-04 Tide Mill PRV 789 0.11523	2.35e4	97.0	NO

Name: 181120M1_88, Date: 21-Nov-2018, Time: 04:18:05, ID: 1803590-05 Maple Rd PRV 783 0.11149, Description: Maple Rd PRV 783

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-05 Maple Rd PRV 783 0.11149	1.06e4	88.5	NO
2	2	13C5-PFHxA	1803590-05 Maple Rd PRV 783 0.11149	1.97e4	92.8	NO
3	3	13C3-PFHxS	1803590-05 Maple Rd PRV 783 0.11149	2.63e3	98.7	NO
4	4	13C8-PFOA	1803590-05 Maple Rd PRV 783 0.11149	2.48e4	93.7	NO
5	5	13C9-PFNA	1803590-05 Maple Rd PRV 783 0.11149	1.71e4	95.7	NO
6	6	13C4-PFOS	1803590-05 Maple Rd PRV 783 0.11149	2.84e3	106.1	NO
7	7	13C6-PFDA	1803590-05 Maple Rd PRV 783 0.11149	2.25e4	98.2	NO
8	8	13C7-PFUdA	1803590-05 Maple Rd PRV 783 0.11149	2.52e4	104.2	NO

Name: 181120M1_89, Date: 21-Nov-2018, Time: 04:28:43, ID: 1803590-06 N.H. Fire 702 0.1114, Description: N.H. Fire 702

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-06 N.H. Fire 702 0.1114	1.16e4	97.3	NO
2	2	13C5-PFHxA	1803590-06 N.H. Fire 702 0.1114	2.09e4	98.5	NO
3	3	13C3-PFHxS	1803590-06 N.H. Fire 702 0.1114	2.88e3	108.0	NO
4	4	13C8-PFOA	1803590-06 N.H. Fire 702 0.1114	2.50e4	94.7	NO
5	5	13C9-PFNA	1803590-06 N.H. Fire 702 0.1114	1.66e4	92.6	NO
6	6	13C4-PFOS	1803590-06 N.H. Fire 702 0.1114	2.98e3	111.4	NO
7	7	13C6-PFDA	1803590-06 N.H. Fire 702 0.1114	2.23e4	97.5	NO
8	8	13C7-PFUdA	1803590-06 N.H. Fire 702 0.1114	2.52e4	104.0	NO

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Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_90, Date: 21-Nov-2018, Time: 04:39:21, ID: 1803590-07 Rye Store 709 0.11121, Description: Rye Store 709

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-07 Rye Store 709 0.11121	1.26e4	105.9	NO
2	2	13C5-PFHxA	1803590-07 Rye Store 709 0.11121	2.34e4	110.3	NO
3	3	13C3-PFHxS	1803590-07 Rye Store 709 0.11121	2.95e3	110.6	NO
4	4	13C8-PFOA	1803590-07 Rye Store 709 0.11121	2.74e4	103.7	NO
5	5	13C9-PFNA	1803590-07 Rye Store 709 0.11121	1.90e4	106.5	NO
6	6	13C4-PFOS	1803590-07 Rye Store 709 0.11121	3.08e3	115.2	NO
7	7	13C6-PFDA	1803590-07 Rye Store 709 0.11121	2.44e4	106.6	NO
8	8	13C7-PFUdA	1803590-07 Rye Store 709 0.11121	2.86e4	118.2	NO

Name: 181120M1_91, Date: 21-Nov-2018, Time: 04:49:55, ID: 1803590-08 Mill WTP 777 0.11514, Description: Mill WTP 777

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-08 Mill WTP 777 0.11514	1.25e4	104.4	NO
2	2	13C5-PFHxA	1803590-08 Mill WTP 777 0.11514	2.28e4	107.4	NO
3	3	13C3-PFHxS	1803590-08 Mill WTP 777 0.11514	3.13e3	117.3	NO
4	4	13C8-PFOA	1803590-08 Mill WTP 777 0.11514	2.61e4	98.9	NO
5	5	13C9-PFNA	1803590-08 Mill WTP 777 0.11514	1.74e4	97.5	NO
6	6	13C4-PFOS	1803590-08 Mill WTP 777 0.11514	3.03e3	113.4	NO
7	7	13C6-PFDA	1803590-08 Mill WTP 777 0.11514	2.32e4	101.4	NO
8	8	13C7-PFUdA	1803590-08 Mill WTP 777 0.11514	2.76e4	114.0	NO

Name: 181120M1_92, Date: 21-Nov-2018, Time: 05:00:33, ID: 1803590-09 Field Blank 0.11371, Description: Field Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-09 Field Blank 0.11371	1.43e4	120.2	NO
2	2	13C5-PFHxA	1803590-09 Field Blank 0.11371	2.68e4	126.5	NO
3	3	13C3-PFHxS	1803590-09 Field Blank 0.11371	3.34e3	125.4	NO
4	4	13C8-PFOA	1803590-09 Field Blank 0.11371	3.08e4	116.5	NO
5	5	13C9-PFNA	1803590-09 Field Blank 0.11371	2.19e4	122.4	NO
6	6	13C4-PFOS	1803590-09 Field Blank 0.11371	3.22e3	120.5	NO
7	7	13C6-PFDA	1803590-09 Field Blank 0.11371	2.77e4	120.9	NO
8	8	13C7-PFUdA	1803590-09 Field Blank 0.11371	3.20e4	132.1	NO

Name: 181120M1_93, Date: 21-Nov-2018, Time: 05:11:06, ID: 1803590-10 Well 8A - 908 0.11388, Description: Well 8A - 908

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-10 Well 8A - 908 0.11388	1.25e4	104.7	NO
2	2	13C5-PFHxA	1803590-10 Well 8A - 908 0.11388	2.36e4	111.4	NO
3	3	13C3-PFHxS	1803590-10 Well 8A - 908 0.11388	3.21e3	120.3	NO
4	4	13C8-PFOA	1803590-10 Well 8A - 908 0.11388	2.65e4	100.2	NO
5	5	13C9-PFNA	1803590-10 Well 8A - 908 0.11388	1.91e4	106.7	NO
6	6	13C4-PFOS	1803590-10 Well 8A - 908 0.11388	3.39e3	126.5	NO
7	7	13C6-PFDA	1803590-10 Well 8A - 908 0.11388	2.47e4	108.0	NO
8	8	13C7-PFUdA	1803590-10 Well 8A - 908 0.11388	2.75e4	113.3	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_94, Date: 21-Nov-2018, Time: 05:21:45, ID: 1803590-11 Well 9 - 909 0.11139, Description: Well 9 - 909

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-11 Well 9 - 909 0.11139	1.33e4	111.6	NO
2	2	13C5-PFHxA	1803590-11 Well 9 - 909 0.11139	2.43e4	114.3	NO
3	3	13C3-PFHxS	1803590-11 Well 9 - 909 0.11139	3.15e3	118.0	NO
4	4	13C8-PFOA	1803590-11 Well 9 - 909 0.11139	2.89e4	109.4	NO
5	5	13C9-PFNA	1803590-11 Well 9 - 909 0.11139	2.00e4	111.7	NO
6	6	13C4-PFOS	1803590-11 Well 9 - 909 0.11139	3.42e3	127.7	NO
7	7	13C6-PFDA	1803590-11 Well 9 - 909 0.11139	2.60e4	113.5	NO
8	8	13C7-PFUdA	1803590-11 Well 9 - 909 0.11139	3.02e4	124.7	NO

Name: 181120M1_95, Date: 21-Nov-2018, Time: 05:32:17, ID: 1803590-12 Well 11 - 911 0.11267, Description: Well 11 - 911

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-12 Well 11 - 911 0.11267	1.19e4	99.6	NO
2	2	13C5-PFHxA	1803590-12 Well 11 - 911 0.11267	2.21e4	104.1	NO
3	3	13C3-PFHxS	1803590-12 Well 11 - 911 0.11267	2.88e3	108.0	NO
4	4	13C8-PFOA	1803590-12 Well 11 - 911 0.11267	2.67e4	101.1	NO
5	5	13C9-PFNA	1803590-12 Well 11 - 911 0.11267	1.93e4	107.9	NO
6	6	13C4-PFOS	1803590-12 Well 11 - 911 0.11267	3.04e3	113.5	NO
7	7	13C6-PFDA	1803590-12 Well 11 - 911 0.11267	2.35e4	102.8	NO
8	8	13C7-PFUdA	1803590-12 Well 11 - 911 0.11267	2.70e4	111.6	NO

Name: 181120M1_96, Date: 21-Nov-2018, Time: 05:42:55, 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: 181120M1_97, Date: 21-Nov-2018, Time: 05:53:28, ID: ST181120M1-8 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-8 PFC CS3 18K0906	1.11e4	92.8	NO
2	2	13C5-PFHxA	ST181120M1-8 PFC CS3 18K0906	2.87e4	135.1	NO
3	3	13C3-PFHxS	ST181120M1-8 PFC CS3 18K0906	3.47e3	130.0	NO
4	4	13C8-PFOA	ST181120M1-8 PFC CS3 18K0906	3.51e4	132.8	NO
5	5	13C9-PFNA	ST181120M1-8 PFC CS3 18K0906	2.48e4	138.8	NO
6	6	13C4-PFOS	ST181120M1-8 PFC CS3 18K0906	3.52e3	131.3	NO
7	7	13C6-PFDA	ST181120M1-8 PFC CS3 18K0906	3.06e4	133.7	NO
8	8	13C7-PFUdA	ST181120M1-8 PFC CS3 18K0906	3.38e4	139.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_98, Date: 21-Nov-2018, Time: 06:04:07, ID: 1803590-13 Well 12 - 912 0.10946, Description: Well 12 - 912

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-13 Well 12 - 912 0.10946	1.15e4	96.0	NO
2	2	13C5-PFHxA	1803590-13 Well 12 - 912 0.10946	2.13e4	100.4	NO
3	3	13C3-PFHxS	1803590-13 Well 12 - 912 0.10946	2.98e3	111.9	NO
4	4	13C8-PFOA	1803590-13 Well 12 - 912 0.10946	2.41e4	91.3	NO
5	5	13C9-PFNA	1803590-13 Well 12 - 912 0.10946	1.69e4	94.3	NO
6	6	13C4-PFOS	1803590-13 Well 12 - 912 0.10946	3.00e3	112.0	NO
7	7	13C6-PFDA	1803590-13 Well 12 - 912 0.10946	2.18e4	95.4	NO
8	8	13C7-PFUdA	1803590-13 Well 12 - 912 0.10946	2.53e4	104.3	NO

Name: 181120M1_99, Date: 21-Nov-2018, Time: 06:14:40, ID: 1803590-14 Well 16 - 916 0.11055, Description: Well 16 - 916

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-14 Well 16 - 916 0.11055	1.14e4	95.4	NO
2	2	13C5-PFHxA	1803590-14 Well 16 - 916 0.11055	2.12e4	100.0	NO
3	3	13C3-PFHxS	1803590-14 Well 16 - 916 0.11055	2.96e3	110.8	NO
4	4	13C8-PFOA	1803590-14 Well 16 - 916 0.11055	2.48e4	93.9	NO
5	5	13C9-PFNA	1803590-14 Well 16 - 916 0.11055	1.71e4	95.9	NO
6	6	13C4-PFOS	1803590-14 Well 16 - 916 0.11055	2.99e3	111.6	NO
7	7	13C6-PFDA	1803590-14 Well 16 - 916 0.11055	2.23e4	97.3	NO
8	8	13C7-PFUdA	1803590-14 Well 16 - 916 0.11055	2.55e4	105.2	NO

Name: 181120M1_100, Date: 21-Nov-2018, Time: 06:25:18, ID: 1803590-15 Well 17 - 917 0.11521, Description: Well 17 - 917

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-15 Well 17 - 917 0.11521	9.52e3	79.9	NO
2	2	13C5-PFHxA	1803590-15 Well 17 - 917 0.11521	1.83e4	86.1	NO
3	3	13C3-PFHxS	1803590-15 Well 17 - 917 0.11521	2.82e3	105.6	NO
4	4	13C8-PFOA	1803590-15 Well 17 - 917 0.11521	2.19e4	82.7	NO
5	5	13C9-PFNA	1803590-15 Well 17 - 917 0.11521	1.51e4	84.6	NO
6	6	13C4-PFOS	1803590-15 Well 17 - 917 0.11521	3.02e3	112.7	NO
7	7	13C6-PFDA	1803590-15 Well 17 - 917 0.11521	1.96e4	85.5	NO
8	8	13C7-PFUdA	1803590-15 Well 17 - 917 0.11521	2.43e4	100.2	NO

Name: 181120M1_101, Date: 21-Nov-2018, Time: 06:35:51, ID: 1803590-16 Well 20 - 920 0.10875, Description: Well 20 - 920

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1803590-16 Well 20 - 920 0.10875	1.10e4	92.4	NO
2	2	13C5-PFHxA	1803590-16 Well 20 - 920 0.10875	2.07e4	97.5	NO
3	3	13C3-PFHxS	1803590-16 Well 20 - 920 0.10875	2.87e3	107.6	NO
4	4	13C8-PFOA	1803590-16 Well 20 - 920 0.10875	2.43e4	92.0	NO
5	5	13C9-PFNA	1803590-16 Well 20 - 920 0.10875	1.64e4	91.6	NO
6	6	13C4-PFOS	1803590-16 Well 20 - 920 0.10875	3.02e3	112.9	NO
7	7	13C6-PFDA	1803590-16 Well 20 - 920 0.10875	2.14e4	93.4	NO
8	8	13C7-PFUdA	1803590-16 Well 20 - 920 0.10875	2.52e4	103.8	NO

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-IIS.qld

Last Altered: Wednesday, November 21, 2018 09:46:46 Pacific Standard Time
Printed: Wednesday, November 21, 2018 09:48:33 Pacific Standard Time

Name: 181120M1_102, Date: 21-Nov-2018, Time: 06:46:29, 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: 181120M1_103, Date: 21-Nov-2018, Time: 06:57:02, ID: ST181120M1-9 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST181120M1-9 PFC CS3 18K0906	1.12e4	93.9	NO
2	2	13C5-PFHxA	ST181120M1-9 PFC CS3 18K0906	2.79e4	131.7	NO
3	3	13C3-PFHxS	ST181120M1-9 PFC CS3 18K0906	3.31e3	124.1	NO
4	4	13C8-PFOA	ST181120M1-9 PFC CS3 18K0906	3.39e4	128.4	NO
5	5	13C9-PFNA	ST181120M1-9 PFC CS3 18K0906	2.33e4	130.3	NO
6	6	13C4-PFOS	ST181120M1-9 PFC CS3 18K0906	3.59e3	134.3	NO
7	7	13C6-PFDA	ST181120M1-9 PFC CS3 18K0906	2.98e4	130.2	NO
8	8	13C7-PFUdA	ST181120M1-9 PFC CS3 18K0906	3.39e4	139.7	NO

Vista Analytical Laboratory

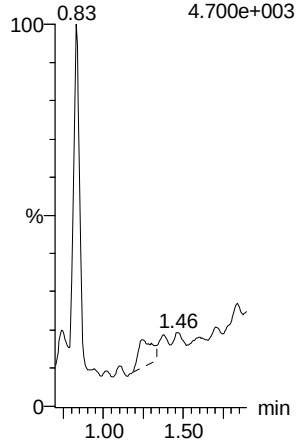
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Last Altered: Wednesday, November 21, 2018 11:15:33 Pacific Standard Time
Printed: Wednesday, November 21, 2018 11:15:45 Pacific Standard Time

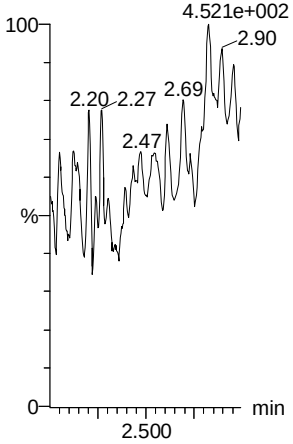
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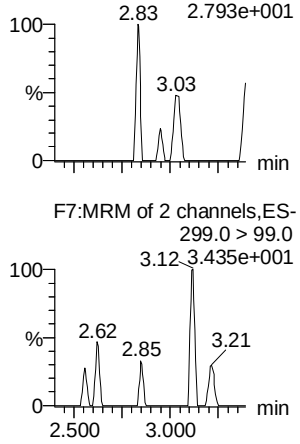
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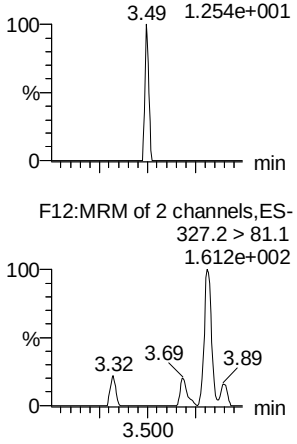
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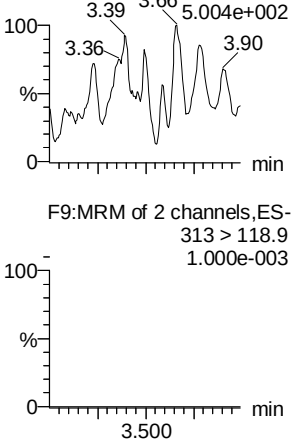
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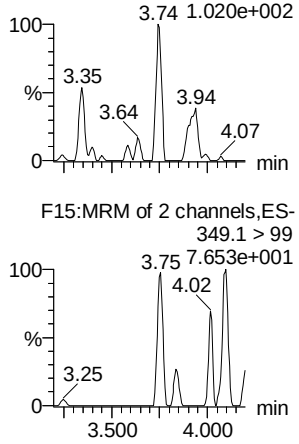
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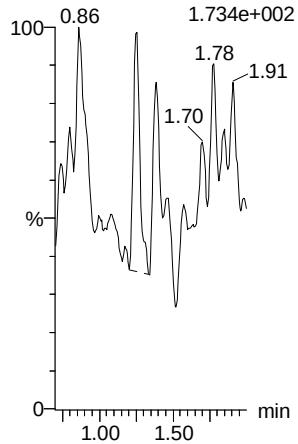
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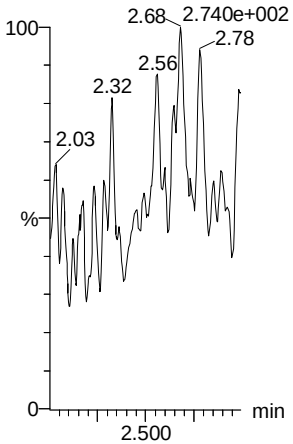
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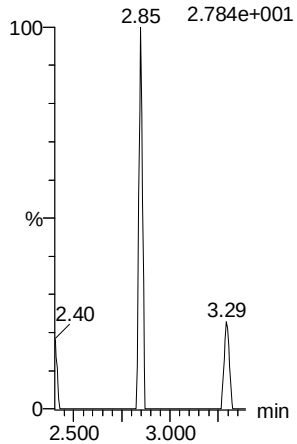
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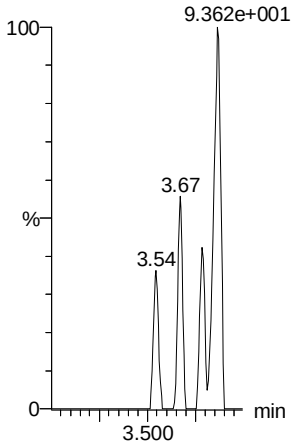
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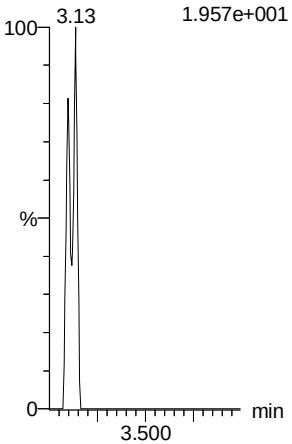
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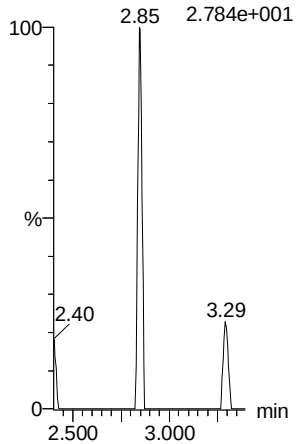
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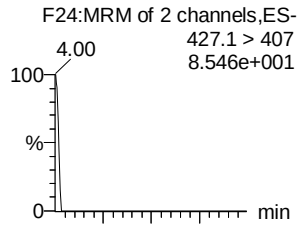


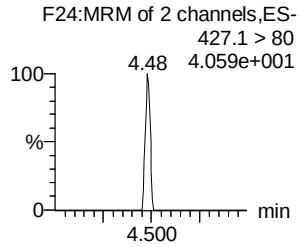
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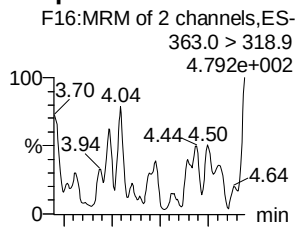
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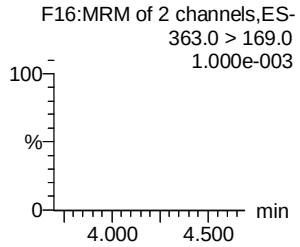
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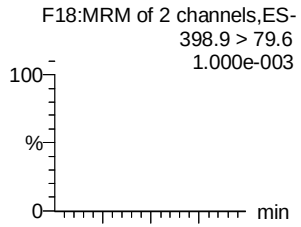


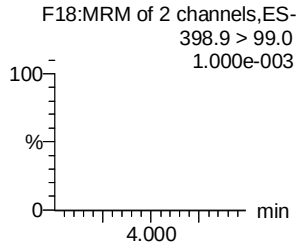
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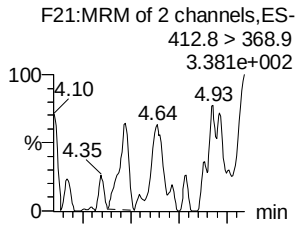


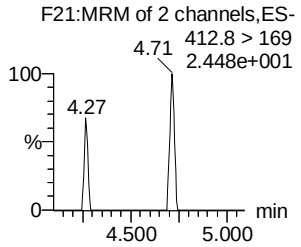
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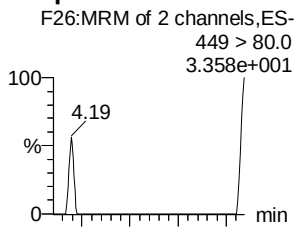


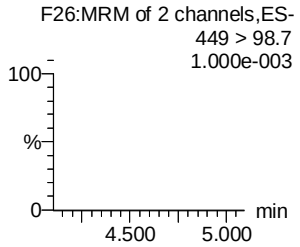
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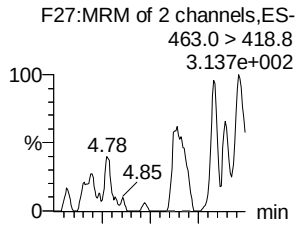


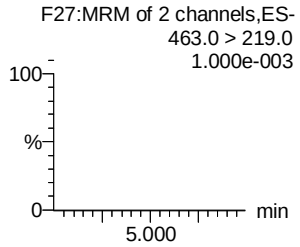
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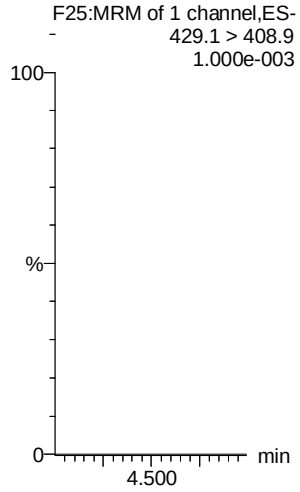


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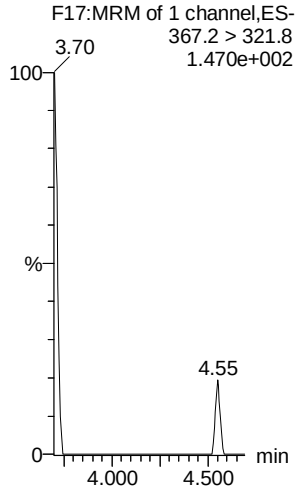




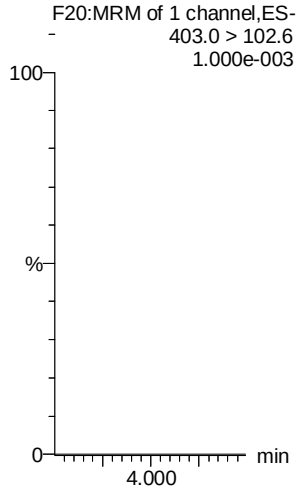
13C2-6:2 FTS



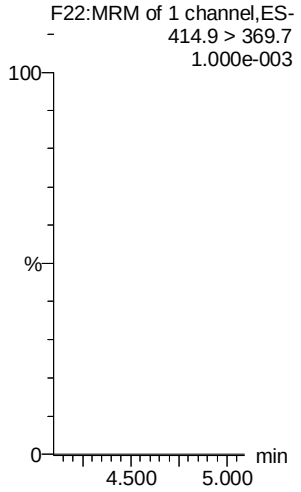
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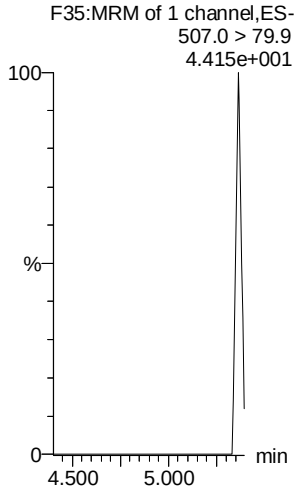
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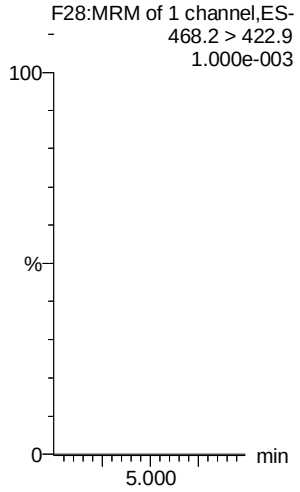
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13C8-PFOS



13C5-PFNA



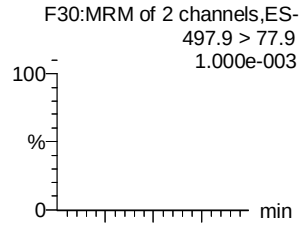
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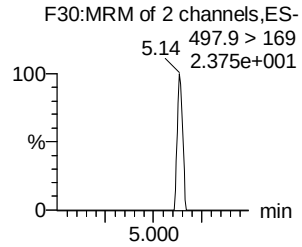
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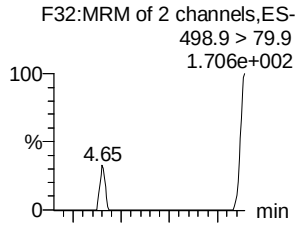
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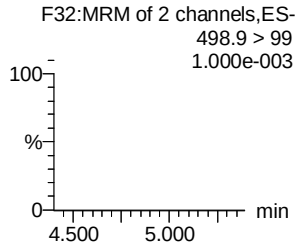
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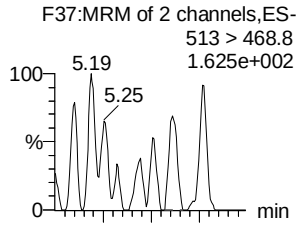


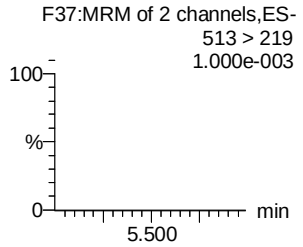
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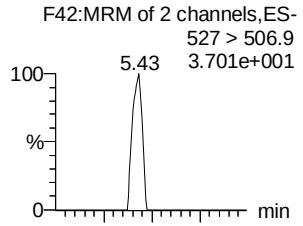


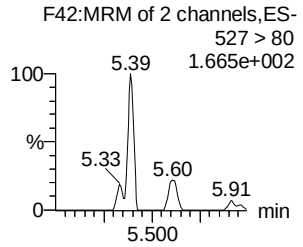
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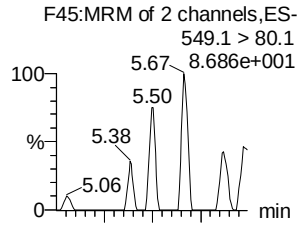


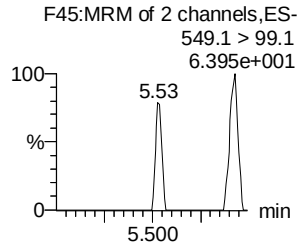
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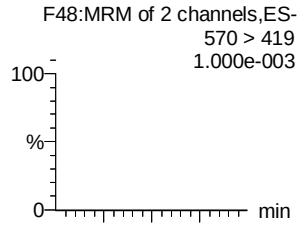


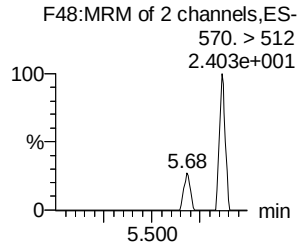
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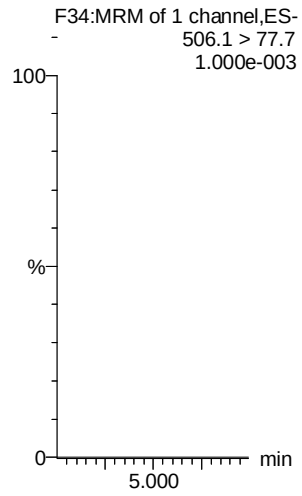


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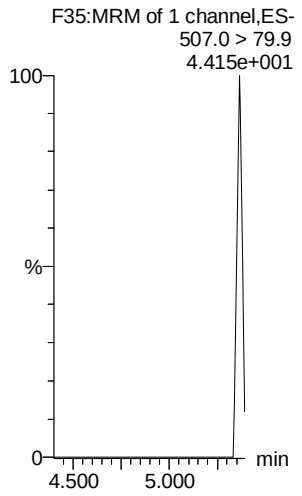




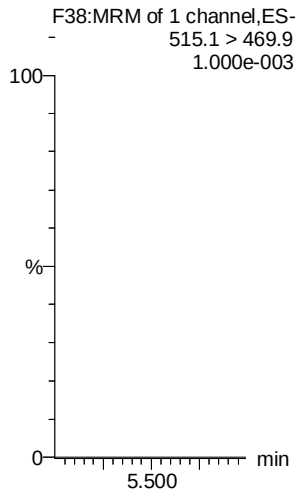
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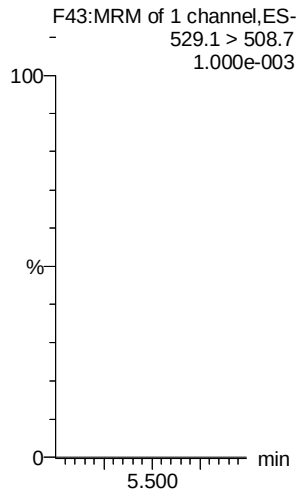
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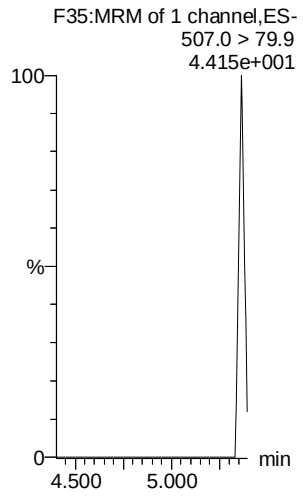
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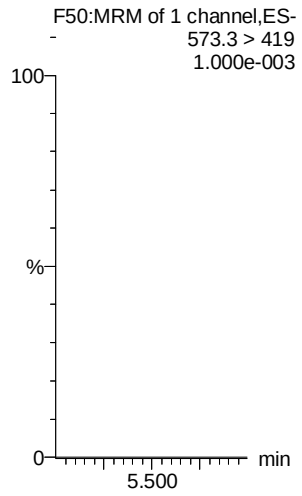
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13C8-PFOS



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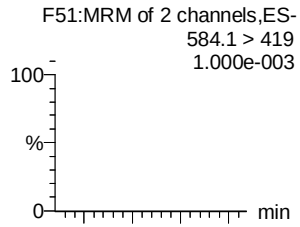


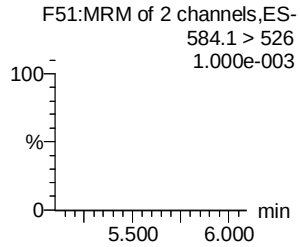
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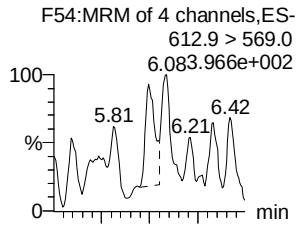
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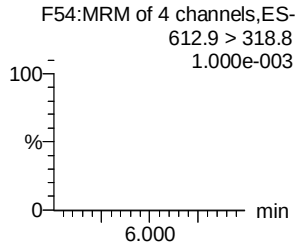
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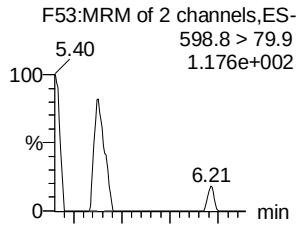


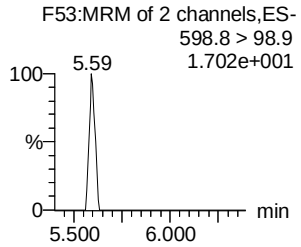
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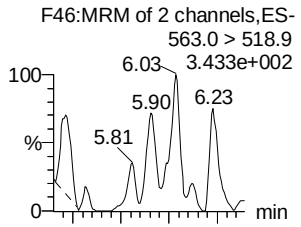


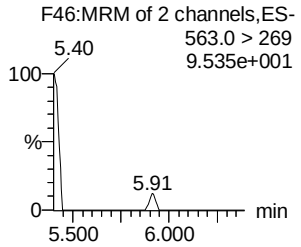
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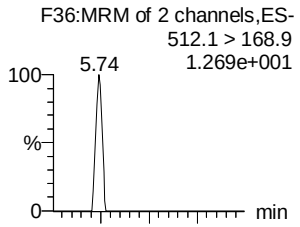


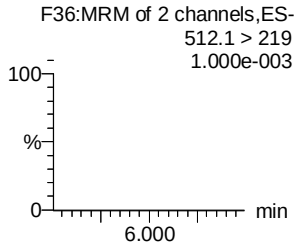
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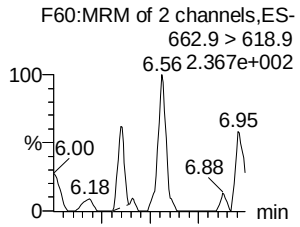


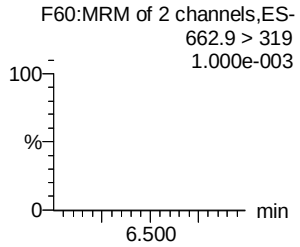
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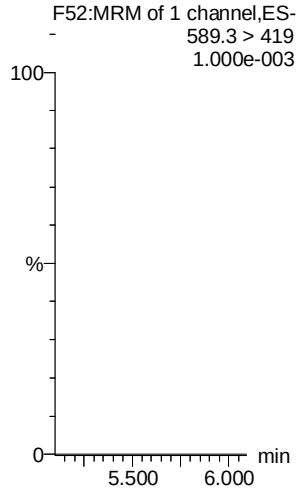


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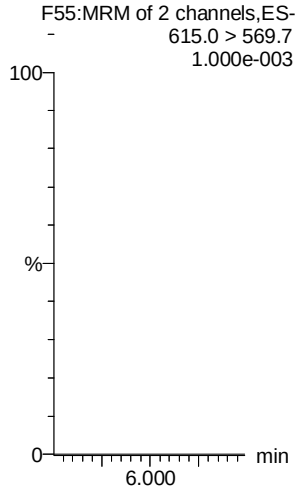




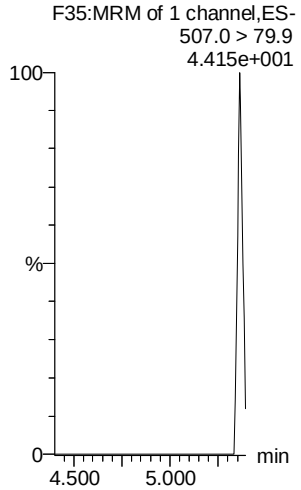
d5-N-EtFOSAA



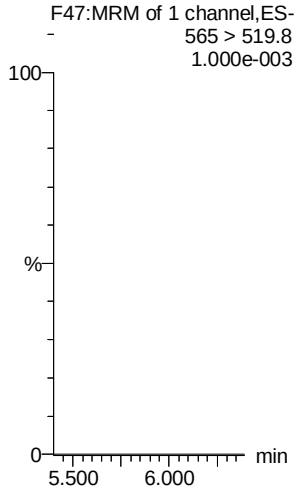
13C2-PFDoA



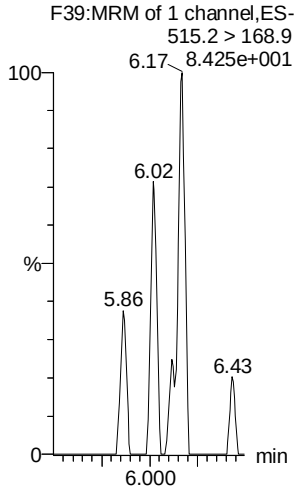
13C8-PFOS



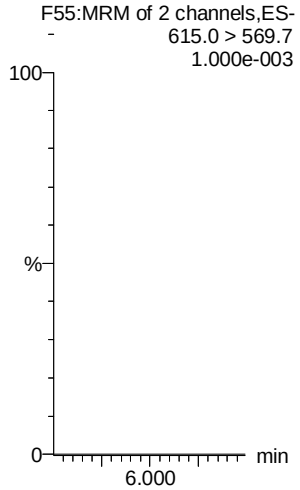
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



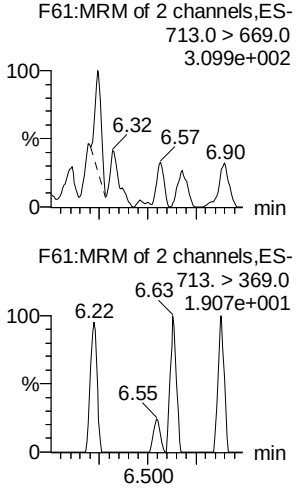
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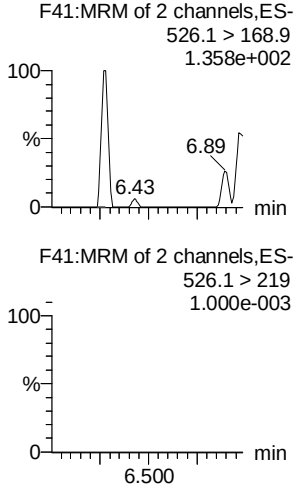
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Printed: Wednesday, November 21, 2018 11:15:45 Pacific Standard Time

Name: 181120M1_3, Date: 20-Nov-2018, Time: 13:11:26, ID: IPA, Description: IPA

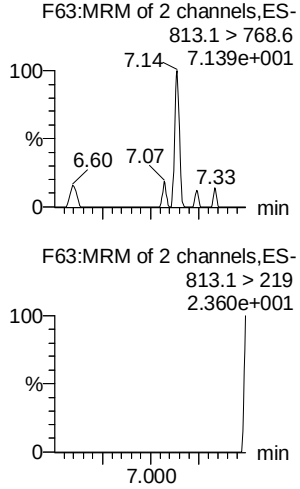
PFTeDA



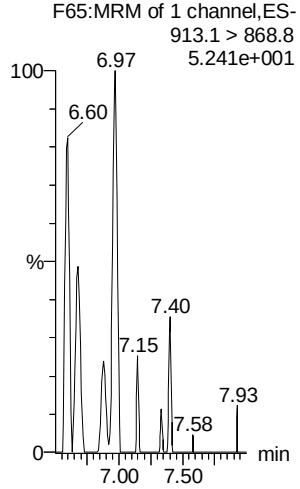
N-EtFOSA



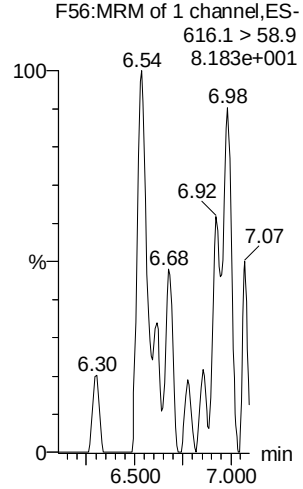
PFHxDA



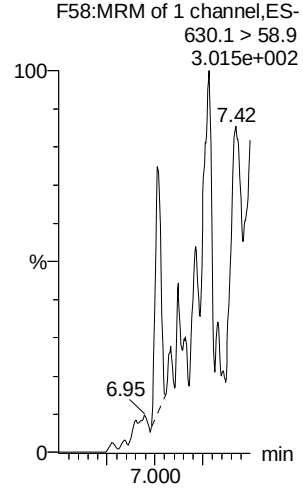
PFODA



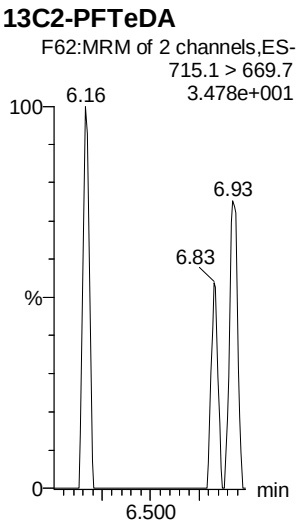
N-MeFOSE



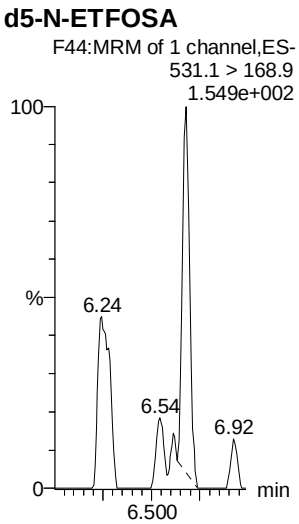
N-EtFOSE



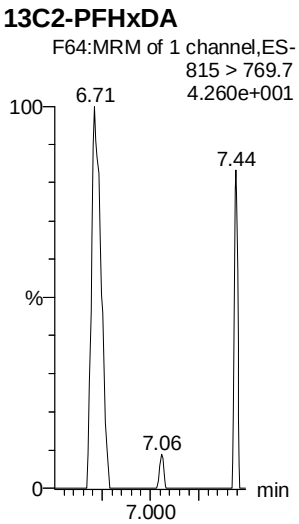
13C2-PFTeDA



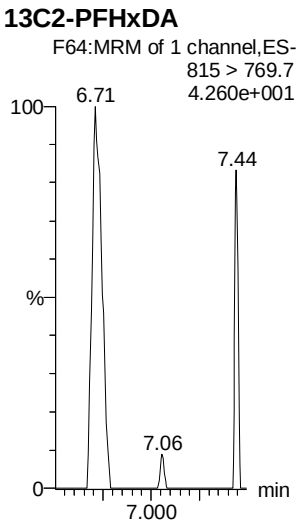
d5-N-ETFOSA



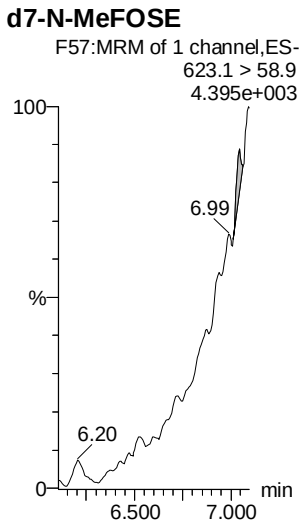
13C2-PFHxDA



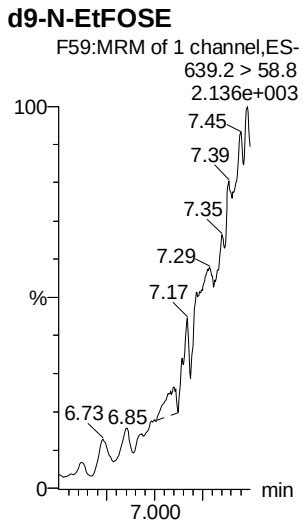
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



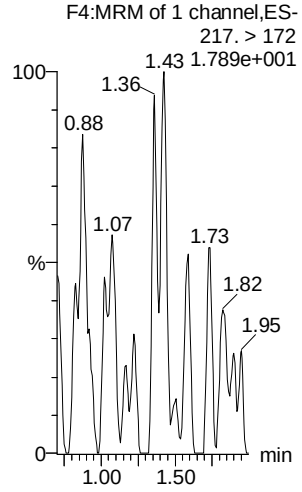
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Dataset: Untitled

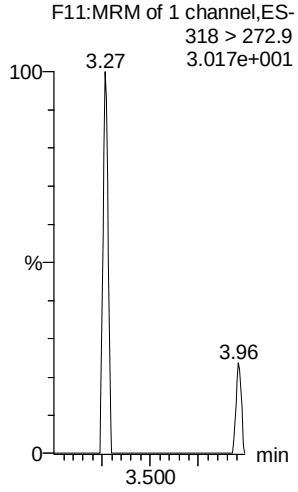
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Printed: Wednesday, November 21, 2018 11:15:45 Pacific Standard Time

Name: 181120M1_3, Date: 20-Nov-2018, Time: 13:11:26, ID: IPA, Description: IPA

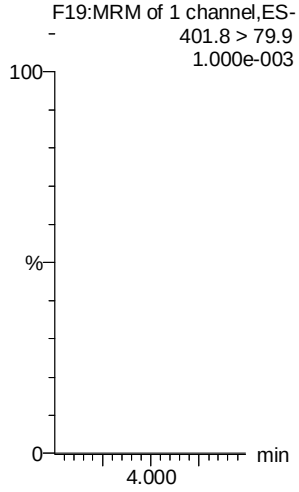
13C4-PFBA



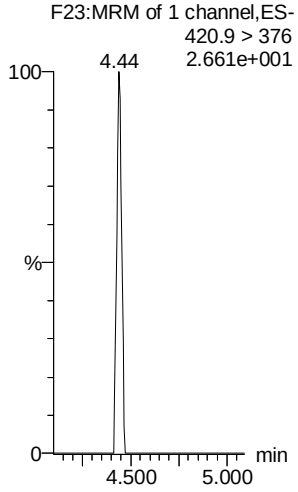
13C5-PFHxA



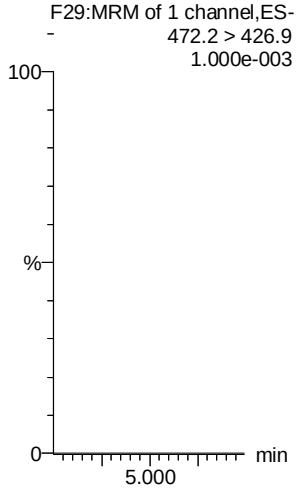
13C3-PFHxS



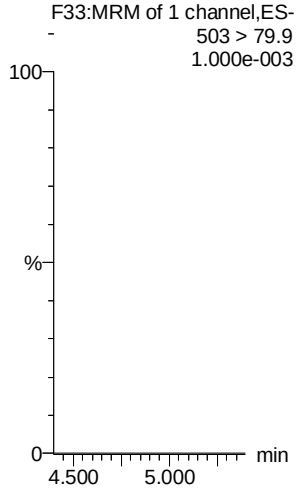
13C8-PFOA



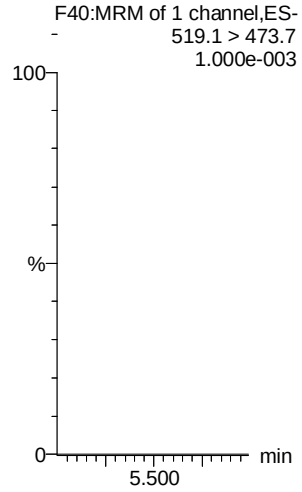
13C9-PFNA



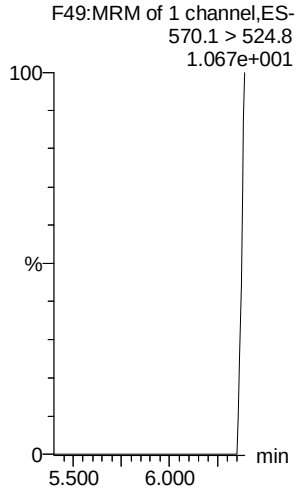
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-59.qld

Last Altered: Wednesday, November 21, 2018 10:52:09 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:52:24 Pacific Standard Time

Name: 181120M1_59, Date: 20-Nov-2018, Time: 23:10:38, ID: ST181120M1-6 PFC CS0 18K0903, Description: PFC CS0 18K0903

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1	PFBA	213.0 > 168.8	768.139	7799.495	1.00	1.21	1.231	1.0	100.5	NO		
2	2	PFPeA	263.1 > 218.9	1110.109	13812.479	1.00	2.44	1.005	1.0	103.3	NO		
3	3	PFBS	299.0 > 79.7	271.194	1770.554	1.00	2.78	1.915	1.0	97.6	NO	2.267	NO
4	4	4:2 FTS	327.2>307.2	452.165	4314.492	1.00	3.26	1.310	1.2	116.1	NO	1.621	NO
5	5	PFHxA	313 > 269	2021.583	10047.380	1.00	3.35	1.006	1.0	102.3	NO	15.593	NO
6	6	PFPeS	349.1>80.1	232.787	1770.554	1.00	3.57	1.643	0.9	94.4	NO	1.488	NO
7	36	13C3-PFBA	216.1 > 171.8	7799.495	9994.925	1.00	1.21	9.754	12.5	100.0	NO		
8	37	13C3-PFPeA	266. > 221.8	13812.479	25826.070	1.00	2.44	6.685	12.8	102.2	NO		
9	38	13C3-PFBS	302. > 98.8	1770.554	3231.820	1.00	2.78	6.848	12.7	101.7	NO		
10	39	13C2-4:2 FTS	329.2>308.9	4314.492	3231.820	1.00	3.26	16.688	10.9	87.0	NO		
11	40	13C2-PFHxA	315 > 270	10047.380	25826.070	1.00	3.35	4.863	5.0	100.9	NO		
12	38	13C3-PFBS	302. > 98.8	1770.554	3231.820	1.00	2.78	6.848	12.7	101.7	NO		
13	-1												
14	10	6:2 FTS	427.1 > 407	517.035	4539.430	1.00	4.45	1.424	1.1	111.3	NO	2.509	NO
15	7	PFHpA	363.0 > 318.9	1426.302	12269.723	1.00	4.01	1.453	1.0	102.8	NO	11.234	NO
16	8	L-PFHxS	398.9 > 79.6	227.639	1489.490	1.00	4.15	1.910	1.0	100.3	NO	1.852	NO
17	11	L-PFOA	412.8 > 368.9	2871.759	22451.533	1.00	4.50	1.599	1.1	113.9	NO	3.415	NO
18	13	PFHpS	449 > 80.0	259.153	3367.686	1.00	4.61	0.962	1.1	106.9	NO	1.891	NO
19	14	PFNA	463.0 > 418.8	2340.424	21573.197	1.00	4.93	1.356	1.0	102.8	NO	4.357	NO
20	43	13C2-6:2 FTS	429.1 > 408.9	4539.430	3011.690	1.00	4.45	18.841	12.3	98.1	NO		
21	41	13C4-PFHpA	367.2 > 321.8	12269.723	25826.070	1.00	4.01	5.939	12.3	98.6	NO		
22	42	18O2-PFHxS	403.0 > 102.6	1489.490	3231.820	1.00	4.15	5.761	12.0	96.0	NO		
23	44	13C2-PFOA	414.9 > 369.7	22451.533	30955.076	1.00	4.50	9.066	12.0	96.1	NO		
24	47	13C8-PFOS	507.0 > 79.9	3367.686	3011.690	1.00	5.02	13.978	13.5	108.1	NO		
25	45	13C5-PFNA	468.2 > 422.9	21573.197	21977.850	1.00	4.93	12.270	12.4	99.0	NO		
26	-1												
27	15	PFOSA	497.9 > 77.9	275.398	3040.223	1.00	4.97	1.132	1.0	97.3	NO	27.795	NO
28	16	L-PFOS	498.9 > 79.9	311.368	3367.686	1.00	5.02	1.156	1.1	109.2	NO	1.707	NO
29	18	PFDA	513 > 468.8	2512.302	22442.324	1.00	5.31	1.399	1.0	100.3	NO	5.462	NO
30	19	8:2 FTS	527 > 506.9	490.097	3654.045	1.00	5.28	1.677	1.1	112.7	NO	2.192	NO
31	20	PFNS	549.1 > 80.1	267.884	3367.686	1.00	5.38	0.994	1.3	129.7	NO	2.128	NO
32	21	L-MeFOSAA	570 > 419	835.692	3731.210	1.00	5.47	2.800	1.1	107.7	NO	2.466	NO
33	46	13C8-PFOSA	506.1 > 77.7	3040.223	32239.156	1.00	4.98	1.179	10.5	84.0	NO		
34	47	13C8-PFOS	507.0 > 79.9	3367.686	3011.690	1.00	5.02	13.978	13.5	108.1	NO		

11/21/18

11/20/18

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-59.qld

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Printed: Wednesday, November 21, 2018 10:52:24 Pacific Standard Time

Name: 181120M1_59, Date: 20-Nov-2018, Time: 23:10:38, ID: ST181120M1-6 PFC CS0 18K0903, Description: PFC CS0 18K0903

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
35	48	13C2-PFDA	515.1 > 469.9	22442.324	28188.104	1.00	5.31	9.952	12.0	95.7	NO		
36	49	13C2-8:2 FTS	529.1 > 508.7	3654.045	3011.690	1.00	5.29	15.166	12.0	95.7	NO		
37	47	13C8-PFOS	507.0 > 79.9	3367.686	3011.690	1.00	5.02	13.978	13.5	108.1	NO		
38	50	d3-N-MeFOSAA	573.3 > 419	3731.210	32239.156	1.00	5.47	1.447	10.7	85.6	NO		
39	-1												
40	23	L-EtFOSAA	584.1 > 419	664.551	6313.829	1.00	5.63	1.316	0.9	92.9	NO	1.492	NO
41	27	PFDoA	612.9 > 569.0	2518.578	27259.893	1.00	5.93	1.155	1.0	95.4	NO	8.278	NO
42	26	PFDS	598.8 > 79.9	297.577	3367.686	1.00	5.70	1.105	1.1	107.9	NO	1.477	NO
43	25	PFUdA	563.0 > 518.9	2412.901	27679.074	1.00	5.65	1.090	1.1	105.2	NO	9.555	NO
44	28	N-MeFOSA	512.1 > 168.9	443.679	11194.882	1.00	5.89	5.945	5.2	103.4	NO	1.456	NO
45	29	PFTrDA	662.9 > 618.9	2668.011	27259.893	1.00	6.18	1.223	1.0	98.5	NO	22.022	NO
46	52	d5-N-EtFOSAA	589.3 > 419	6313.829	32239.156	1.00	5.63	2.448	12.4	98.8	NO		
47	53	13C2-PFDoA	615.0 > 569.7	27259.893	28188.104	1.00	5.93	12.088	12.3	98.6	NO		
48	47	13C8-PFOS	507.0 > 79.9	3367.686	3011.690	1.00	5.02	13.978	13.5	108.1	NO		
49	51	13C2-PFUdA	565 > 519.8	27679.074	32239.156	1.00	5.65	10.732	11.6	92.5	NO		
50	54	d3-N-MeFOSA	515.2 > 168.9	11194.882	32239.156	1.00	5.94	4.341	125.1	83.4	NO		
51	53	13C2-PFDoA	615.0 > 569.7	27259.893	28188.104	1.00	5.93	12.088	12.3	98.6	NO		
52	-1												
53	30	PFTeDA	713.0 > 669.0	2493.372	18377.740	1.00	6.40	1.696	1.1	105.9	NO	15.627	NO
54	31	N-EtFOSA	526.1 > 168.9	597.391	20121.635	1.00	6.40	4.453	5.0	99.8	NO	1.709	NO
55	32	PFHxDA	813.1 > 768.6	1398.790	9569.419	1.00	6.74	0.731	1.3	128.9	NO	30.008	NO
56	33	PFODA	913.1 > 868.8	1447.100	9569.419	1.00	6.98	0.756	1.0	95.7	NO		
57	34	N-MeFOSE	616.1 > 58.9	337.153	10929.248	1.00	6.69	4.627	5.0	99.3	NO		
58	35	N-EtFOSE	630.1 > 58.9	404.421	10232.136	1.00	6.84	5.929	5.2	104.1	NO		
59	55	13C2-PFTeDA	715.1 > 669.7	18377.740	32239.156	1.00	6.40	7.126	11.7	93.9	NO		
60	56	d5-N-ETFOSA	531.1 > 168.9	20121.635	32239.156	1.00	6.43	7.802	129.9	86.6	NO		
61	57	13C2-PFHxDA	815 > 769.7	9569.419	32239.156	1.00	6.75	3.710	4.6	92.2	NO		
62	57	13C2-PFHxDA	815 > 769.7	9569.419	32239.156	1.00	6.75	3.710	4.6	92.2	NO		
63	58	d7-N-MeFOSE	623.1 > 58.9	10929.248	32239.156	1.00	6.68	4.238	130.3	86.9	NO		
64	59	d9-N-EtFOSE	639.2 > 58.8	10232.136	32239.156	1.00	6.83	3.967	124.1	82.7	NO		
65	-1												
66	60	13C4-PFBA	217. > 172	9994.925	9994.925	1.00	1.21	12.500	12.5	100.0	NO		
67	61	13C5-PFHxA	318 > 272.9	25826.070	25826.070	1.00	3.35	12.500	12.5	100.0	NO		
68	62	13C3-PFHxS	401.8 > 79.9	3231.820	3231.820	1.00	4.15	12.500	12.5	100.0	NO		

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-59.qld

Last Altered: Wednesday, November 21, 2018 10:52:09 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:52:24 Pacific Standard Time

Name: 181120M1_59, Date: 20-Nov-2018, Time: 23:10:38, ID: ST181120M1-6 PFC CS0 18K0903, Description: PFC CS0 18K0903

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
69	63	13C8-PFOA	420.9 > 376	30955.076	30955.076	1.00	4.50	12.500	12.5	100.0	NO		
70	64	13C9-PFNA	472.2 > 426.9	21977.850	21977.850	1.00	4.93	12.500	12.5	100.0	NO		
71	65	13C4-PFOS	503 > 79.9	3011.690	3011.690	1.00	5.02	12.500	12.5	100.0	NO		
72	66	13C6-PFDA	519.1 > 473.7	28188.104	28188.104	1.00	5.32	12.500	12.5	100.0	NO		
73	67	13C7-PFUdA	570.1 > 524.8	32239.156	32239.156	1.00	5.65	12.500	12.5	100.0	NO		

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Dataset: Untitled

Last Altered: Wednesday, November 21, 2018 11:08:22 Pacific Standard Time
Printed: Wednesday, November 21, 2018 11:09:09 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_112018.mdb 21 Nov 2018 10:29:17
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Compound name: PFBA

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1	1	181120M1_1	IPA	20-Nov-18	12:50:12
2	2	181120M1_2	ST181120M1-1 PFC CS0 18K0903	20-Nov-18	13:00:47
3	3	181120M1_3	IPA	20-Nov-18	13:11:26
4	4	181120M1_4	1803558-01 REEPDW1354 0.11837	20-Nov-18	13:22:02
5	5	181120M1_5	1803558-02 REEPDW1355 0.1102	20-Nov-18	13:32:38
6	6	181120M1_6	1803558-03 REEPDW1356 0.12099	20-Nov-18	13:43:16
7	7	181120M1_7	1803558-04 REEPDW1357 0.11567	20-Nov-18	13:53:50
8	8	181120M1_8	1803562-01 REEPDW1358 0.12032	20-Nov-18	14:04:29
9	9	181120M1_9	1803562-02 REEPDW1359 0.11552	20-Nov-18	14:15:02
10	10	181120M1_10	B8K0078-BS1 OPR 0.125	20-Nov-18	14:25:40
11	11	181120M1_11	B8K0078-MS1 Matrix Spike 0.11906	20-Nov-18	14:36:12
12	12	181120M1_12	B8K0078-MSD1 Matrix Spike Dup 0.11906	20-Nov-18	14:46:51
13	13	181120M1_13	B8K0078-BLK1 Method Blank 0.125	20-Nov-18	14:57:29
14	14	181120M1_14	1803579-01 REEPEF1070 0.11883	20-Nov-18	15:08:02
15	15	181120M1_15	1803579-02 REEPAR1070 0.11985	20-Nov-18	15:18:40
16	16	181120M1_16	1803579-03 REEPAC1070 0.12082	20-Nov-18	15:29:19
17	17	181120M1_17	1803579-04 REEPEF1071 0.11958	20-Nov-18	15:39:52
18	18	181120M1_18	IPA	20-Nov-18	15:50:30
19	19	181120M1_19	ST181120M1-2 PFC CS3 18K0906	20-Nov-18	16:01:03
20	20	181120M1_20	1803579-05 REEPEF5031 0.11969	20-Nov-18	16:11:45
21	21	181120M1_21	1803579-06 REEPAR1071 0.11398	20-Nov-18	16:22:20
22	22	181120M1_22	1803579-07 REEPAC1071 0.11944	20-Nov-18	16:32:58
23	23	181120M1_23	1803579-08 REEPIN1071 0.12134	20-Nov-18	16:43:31
24	24	181120M1_24	1803580-01 REEPDW1360 0.12021	20-Nov-18	16:54:10
25	25	181120M1_25	1803580-02 REEPDW584 0.12201	20-Nov-18	17:04:48
26	26	181120M1_26	1803580-03 REEPDW1361 0.1193	20-Nov-18	17:15:29
27	27	181120M1_27	1803580-04 REEPDW1362 0.12126	20-Nov-18	17:26:02
28	28	181120M1_28	1803580-05 REEPDW1363 0.1186	20-Nov-18	17:42:02
29	29	181120M1_29	1803580-06 REEPDW1364 0.11593	20-Nov-18	17:52:36
30	30	181120M1_30	IPA	20-Nov-18	18:03:14
31	31	181120M1_31	ST181120M1-3 PFC CS3 18K0906	20-Nov-18	18:13:52
32	32	181120M1_32	1803580-07 REEPDW1365 0.12097	20-Nov-18	18:24:31

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Dataset: Untitled

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Printed: Wednesday, November 21, 2018 11:09:09 Pacific Standard Time

Compound name: PFBA

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33	33	181120M1_33	1803552-02@10X WW1810291045GC 0.24014	20-Nov-18	18:35:04
34	34	181120M1_34	1803551-01 WW1810290900GC 0.23689	20-Nov-18	18:45:42
35	35	181120M1_35	1803553-01 WW1810291400GC 0.23805	20-Nov-18	18:56:15
36	36	181120M1_36	1803553-03 WW1810291500GC 0.23488	20-Nov-18	19:06:54
37	37	181120M1_37	B8K0059-BS1 OPR 0.125	20-Nov-18	19:17:32
38	38	181120M1_38	B8K0059-BSD1 LCSD 0.125	20-Nov-18	19:28:05
39	39	181120M1_39	B8K0059-BLK1 Method Blank 0.125	20-Nov-18	19:38:44
40	40	181120M1_40	1803560-01 REEPEF1061 0.11502	20-Nov-18	19:49:17
41	41	181120M1_41	1803560-02 REEPAR1061 0.11512	20-Nov-18	19:59:55
42	42	181120M1_42	1803560-03 REEPAC1061 0.11751	20-Nov-18	20:10:28
43	43	181120M1_43	1803560-04 REEPEF1064 0.11641	20-Nov-18	20:21:07
44	44	181120M1_44	1803560-05 REEPAR1064 0.10776	20-Nov-18	20:31:47
45	45	181120M1_45	IPA	20-Nov-18	20:42:20
46	46	181120M1_46	ST181120M1-4 PFC CS3 18K0906	20-Nov-18	20:52:58
47	47	181120M1_47	1803560-06 REEPAC1064 0.11777	20-Nov-18	21:03:31
48	48	181120M1_48	1803560-07 REEPEF1065 0.11651	20-Nov-18	21:14:10
49	49	181120M1_49	1803560-08 REEPAR1065 0.11979	20-Nov-18	21:24:42
50	50	181120M1_50	1803560-09 REEPAC1065 0.11635	20-Nov-18	21:35:20
51	51	181120M1_51	1803560-10 REEPEF1066 0.11571	20-Nov-18	21:45:53
52	52	181120M1_52	1803560-11 REEPAR1066 0.11617	20-Nov-18	21:56:32
53	53	181120M1_53	1803560-12 REEPAC1066 0.11943	20-Nov-18	22:07:05
54	54	181120M1_54	1803560-13 REEPEF1067 0.11797	20-Nov-18	22:17:43
55	55	181120M1_55	1803560-14 REEPAR1067 0.11772	20-Nov-18	22:28:16
56	56	181120M1_56	1803560-15 REEPAC1067 0.12134	20-Nov-18	22:38:54
57	57	181120M1_57	IPA	20-Nov-18	22:49:27
58	58	181120M1_58	ST181120M1-5 PFC CS3 18K0906	20-Nov-18	23:00:05
59	59	181120M1_59	ST181120M1-6 PFC CS0 18K0903	20-Nov-18	23:10:38
60	60	181120M1_60	1803560-16 REEPAC5029 0.12085	20-Nov-18	23:21:16
61	61	181120M1_61	B8K0091-BS1 OPR 0.125	20-Nov-18	23:31:48
62	62	181120M1_62	B8K0091-BLK1 Method Blank 0.125	20-Nov-18	23:42:26
63	63	181120M1_63	B8K0091-MS1 Matrix Spike 0.1154	20-Nov-18	23:52:59
64	64	181120M1_64	B8K0091-MSD1 Matrix Spike Dup 0.11594	21-Nov-18	00:03:37
65	65	181120M1_65	1803582-01 REEPDW1360FRB 0.11656	21-Nov-18	00:14:15
66	66	181120M1_66	1803582-02 REEPDW1361FRB 0.11659	21-Nov-18	00:24:49
67	67	181120M1_67	1803582-03 REEPDW1362FRB 0.11502	21-Nov-18	00:35:27
68	68	181120M1_68	1803582-04 REEPDW1363FRB 0.11744	21-Nov-18	00:46:01

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Printed: Wednesday, November 21, 2018 11:09:09 Pacific Standard Time

Compound name: PFBA

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70	70	181120M1_70	1803582-06 REEPDW1365FRB 0.11305	21-Nov-18	01:07:12
71	71	181120M1_71	1803615-01 A1-MW-04-SA2 0.11345	21-Nov-18	01:17:50
72	72	181120M1_72	1803615-02 A1-MW-05-SA2 0.11579	21-Nov-18	01:28:22
73	73	181120M1_73	1803615-03 A1-MW-49-SA2 0.11411	21-Nov-18	01:39:00
74	74	181120M1_74	1803615-04 A1-MW-50-SA2 0.11184	21-Nov-18	01:49:33
75	75	181120M1_75	1803615-05 A1-MW-50-SA2D 0.11445	21-Nov-18	02:00:11
76	76	181120M1_76	1803615-06 A1-MW-51-SA2 0.11681	21-Nov-18	02:10:50
77	77	181120M1_77	1803615-07 A1-MW-52-SA2 0.11468	21-Nov-18	02:21:30
78	78	181120M1_78	1803615-08 FRB-20181112 0.11506	21-Nov-18	02:32:03
79	79	181120M1_79	1803615-09 A1-PZ-19-SA2 0.1131	21-Nov-18	02:42:42
80	80	181120M1_80	B8K0075-BS1 OPR 0.125	21-Nov-18	02:53:20
81	81	181120M1_81	B8K0075-BLK1 Method Blank 0.125	21-Nov-18	03:03:53
82	82	181120M1_82	1803590-01 Winn WTP 731 0.1117	21-Nov-18	03:14:32
83	83	181120M1_83	IPA	21-Nov-18	03:25:10
84	84	181120M1_84	ST181120M1-7 PFC CS3 18K0906	21-Nov-18	03:35:42
85	85	181120M1_85	1803590-02 Mill Tank 781 0.11436	21-Nov-18	03:46:21
86	86	181120M1_86	1803590-03 Ex Tank 710 0.10366	21-Nov-18	03:56:54
87	87	181120M1_87	1803590-04 Tide Mill PRV 789 0.11523	21-Nov-18	04:07:32
88	88	181120M1_88	1803590-05 Maple Rd PRV 783 0.11149	21-Nov-18	04:18:05
89	89	181120M1_89	1803590-06 N.H. Fire 702 0.1114	21-Nov-18	04:28:43
90	90	181120M1_90	1803590-07 Rye Store 709 0.11121	21-Nov-18	04:39:21
91	91	181120M1_91	1803590-08 Mill WTP 777 0.11514	21-Nov-18	04:49:55
92	92	181120M1_92	1803590-09 Field Blank 0.11371	21-Nov-18	05:00:33
93	93	181120M1_93	1803590-10 Well 8A - 908 0.11388	21-Nov-18	05:11:06
94	94	181120M1_94	1803590-11 Well 9 - 909 0.11139	21-Nov-18	05:21:45
95	95	181120M1_95	1803590-12 Well 11 - 911 0.11267	21-Nov-18	05:32:17
96	96	181120M1_96	IPA	21-Nov-18	05:42:55
97	97	181120M1_97	ST181120M1-8 PFC CS3 18K0906	21-Nov-18	05:53:28
98	98	181120M1_98	1803590-13 Well 12 - 912 0.10946	21-Nov-18	06:04:07
99	99	181120M1_99	1803590-14 Well 16 - 916 0.11055	21-Nov-18	06:14:40
100	1...	181120M1_100	1803590-15 Well 17 - 917 0.11521	21-Nov-18	06:25:18
101	1...	181120M1_101	1803590-16 Well 20 - 920 0.10875	21-Nov-18	06:35:51
102	1...	181120M1_102	IPA	21-Nov-18	06:46:29
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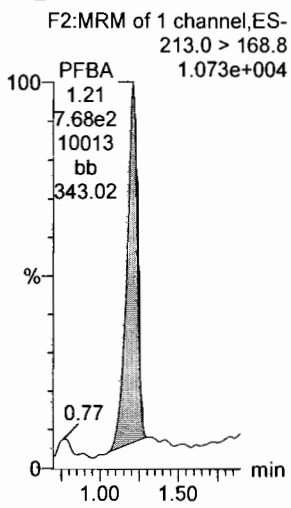
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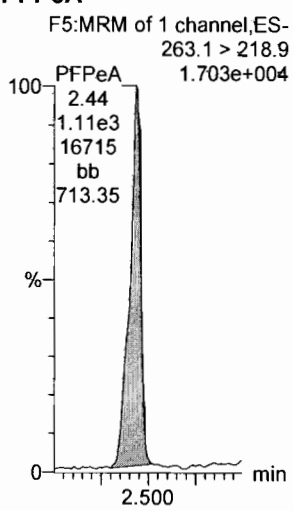
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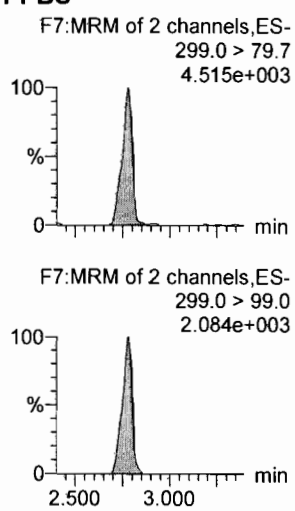
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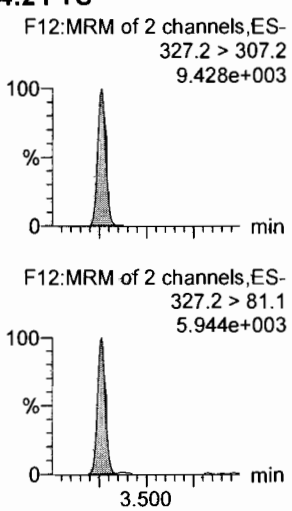
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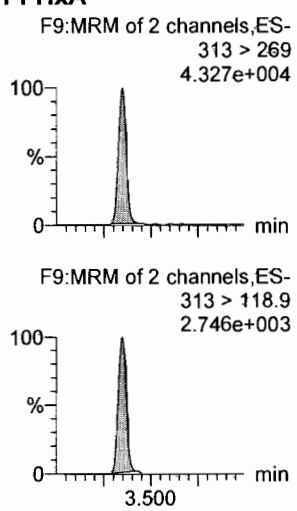
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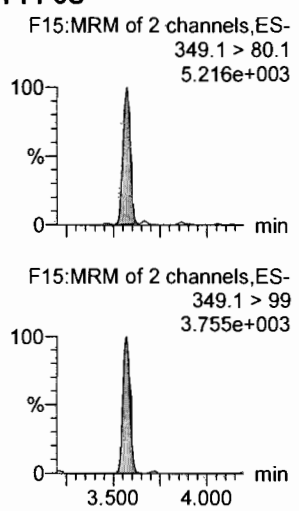
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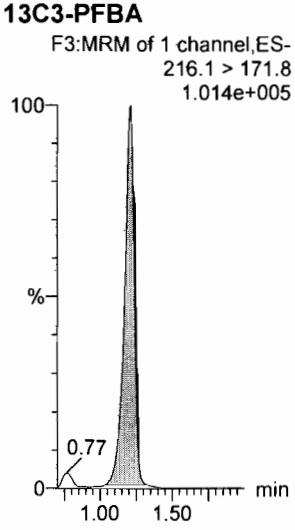
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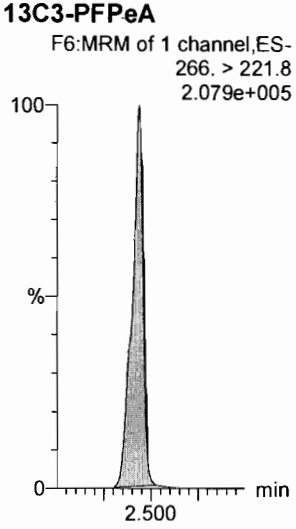
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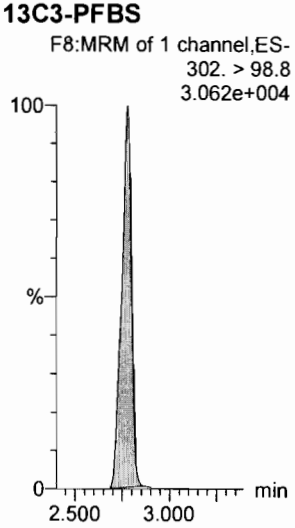
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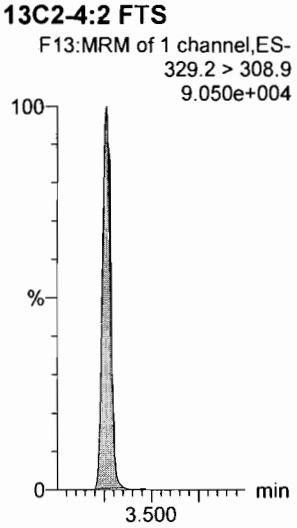
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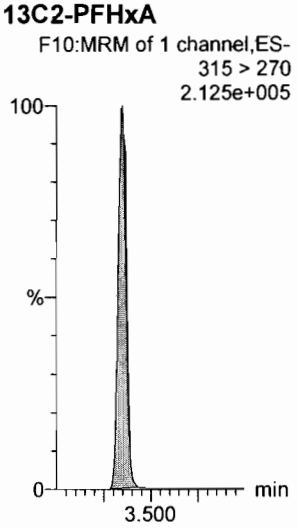
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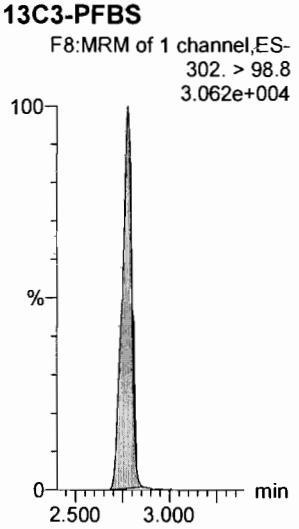
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

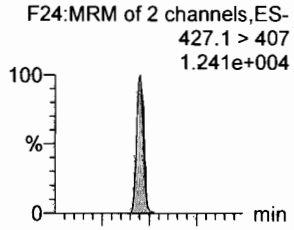


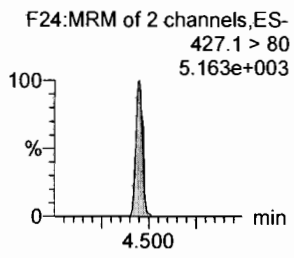
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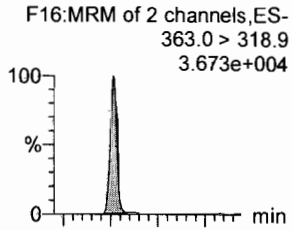
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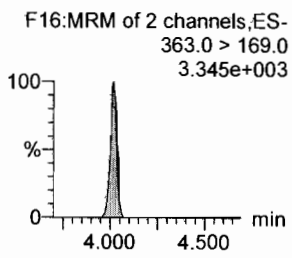
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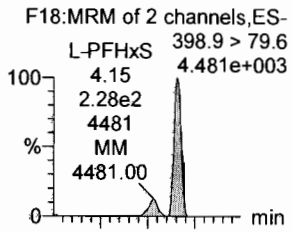


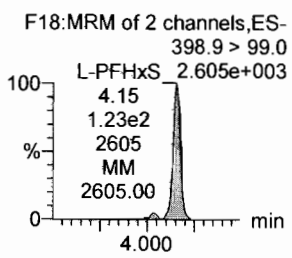
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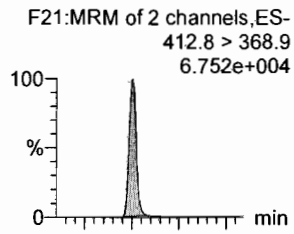


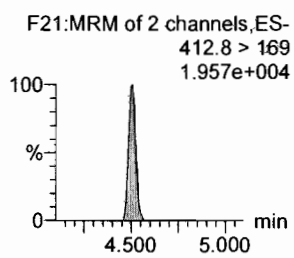
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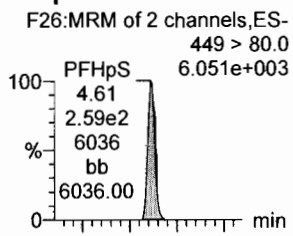


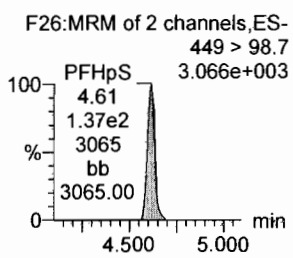
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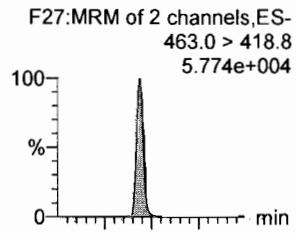


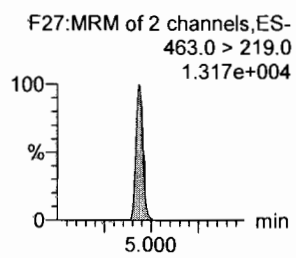
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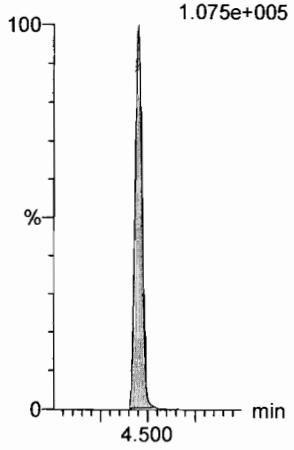


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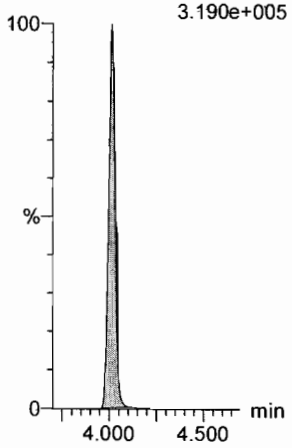




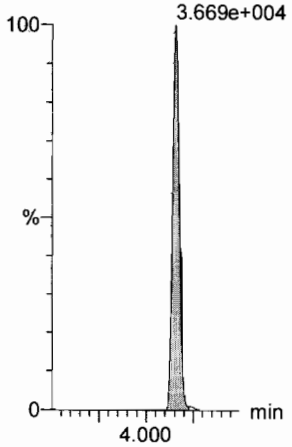
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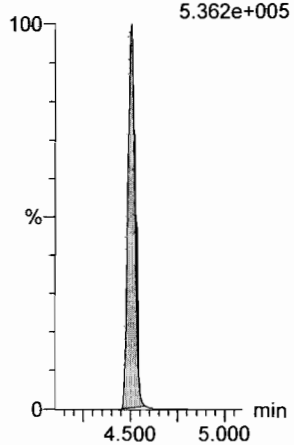
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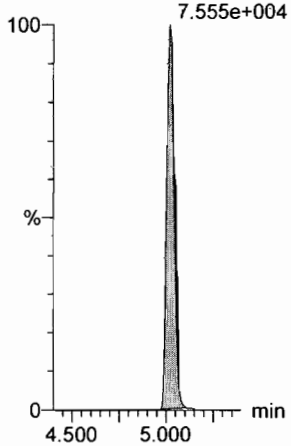
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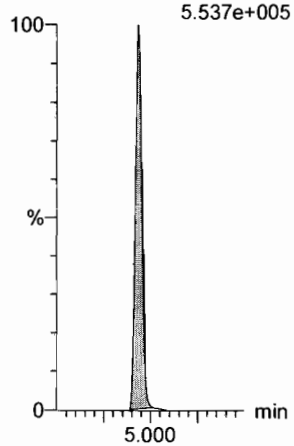
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13C8-PFOS



13C5-PFNA

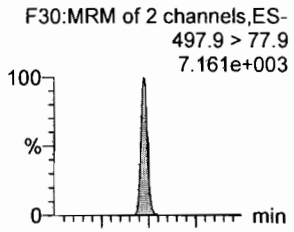


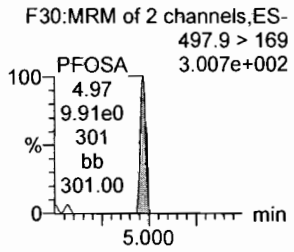
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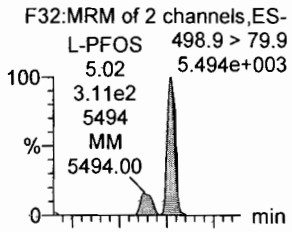
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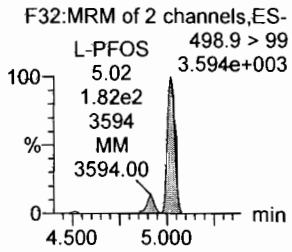
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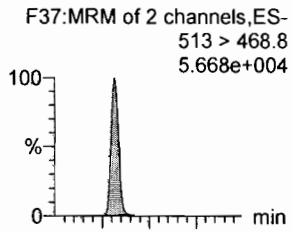


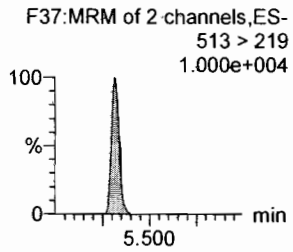
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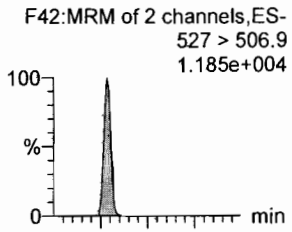


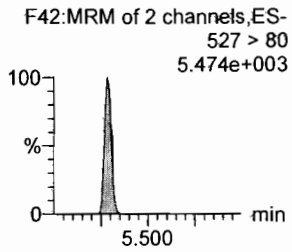
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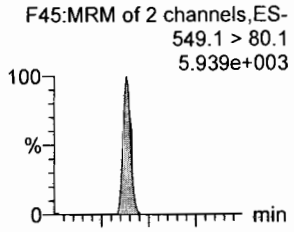


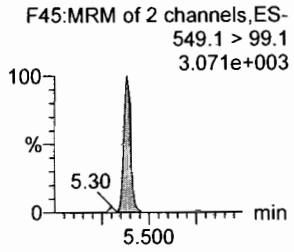
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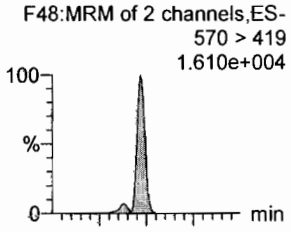


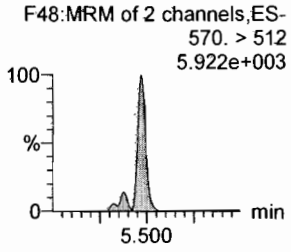
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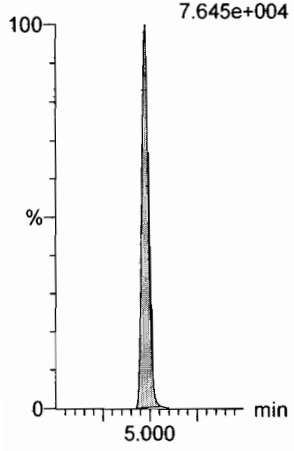


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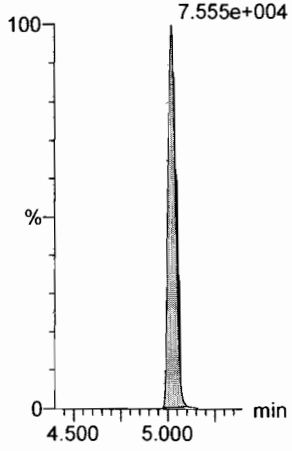




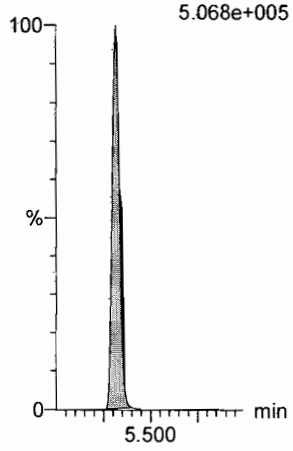
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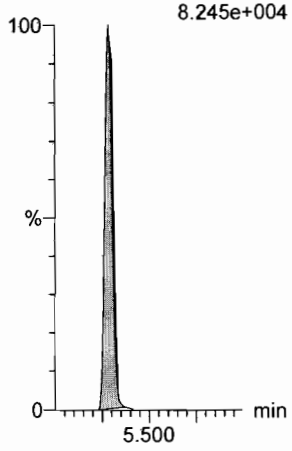
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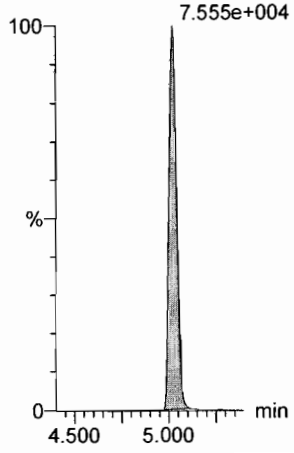
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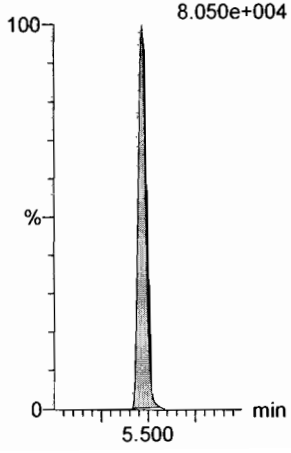
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

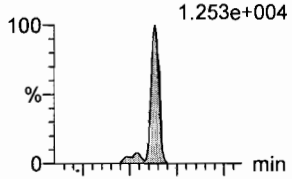


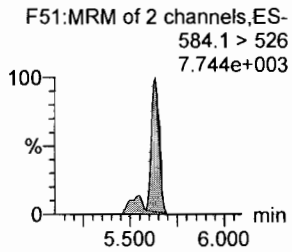
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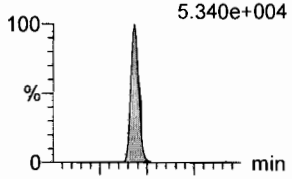
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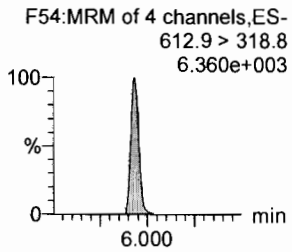
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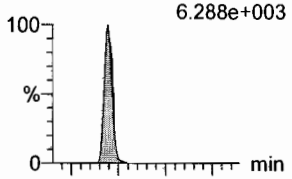


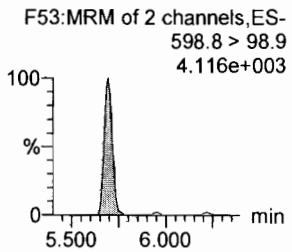
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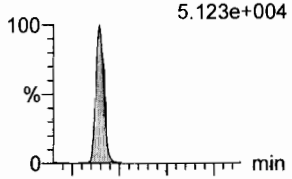


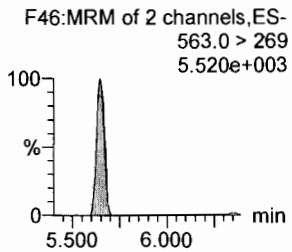
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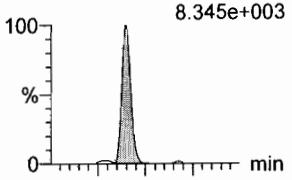


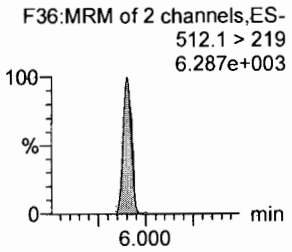
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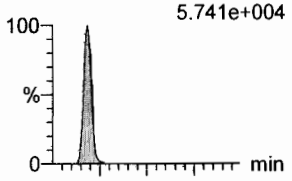


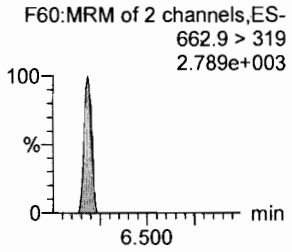
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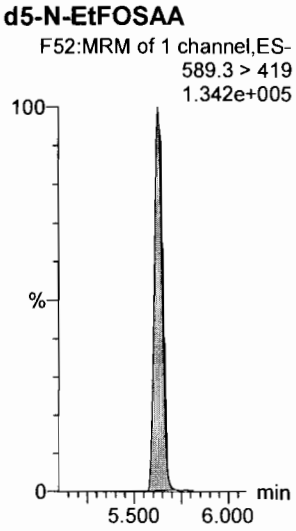


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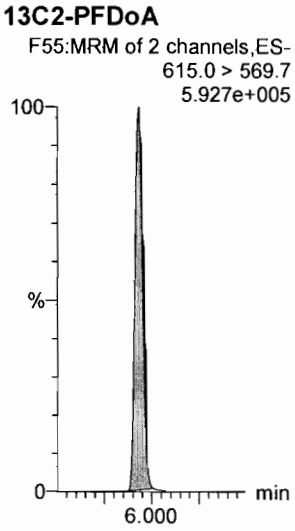




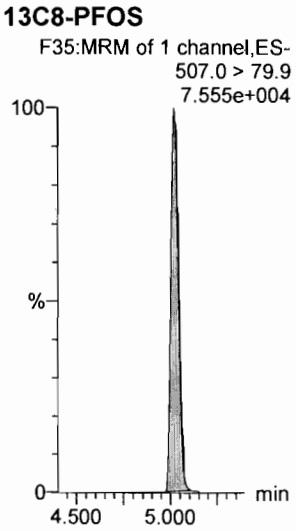
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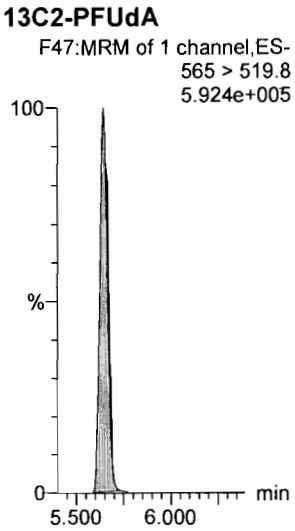
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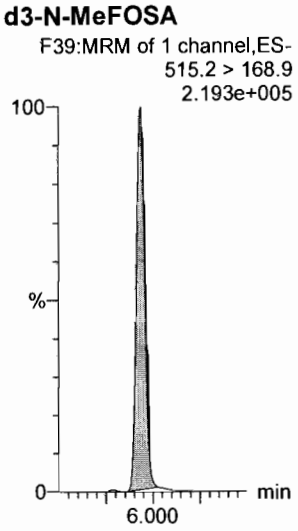
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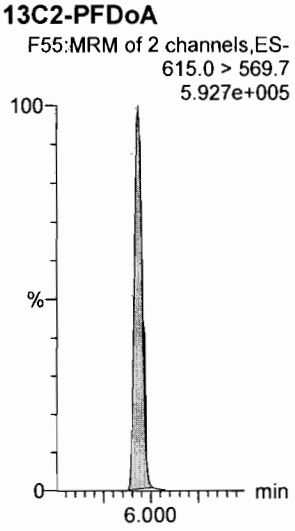
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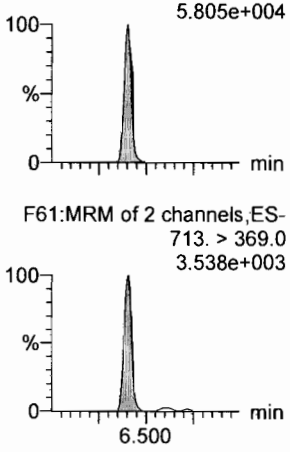


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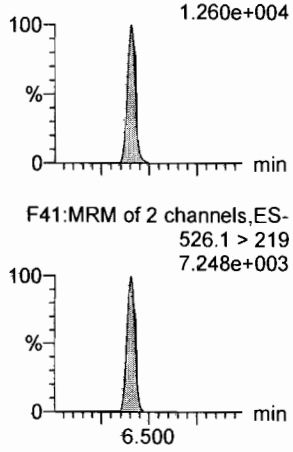
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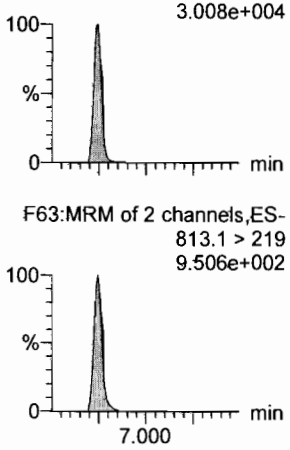
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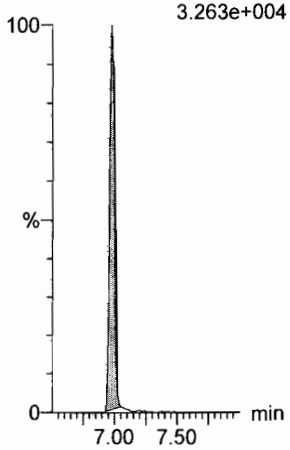
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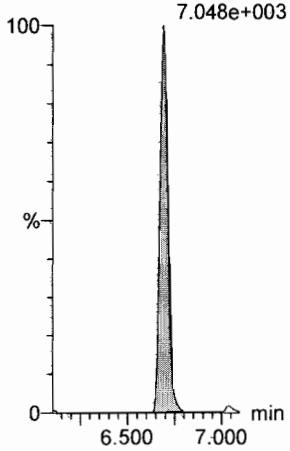
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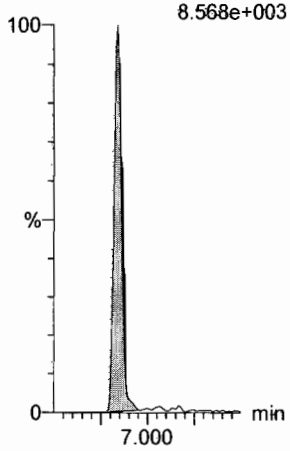
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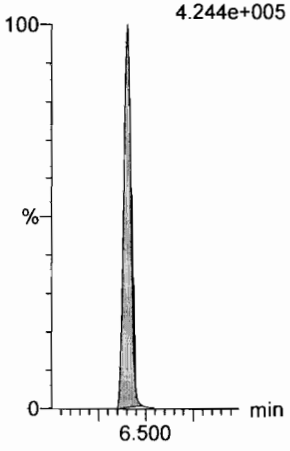
N-MeFOSE



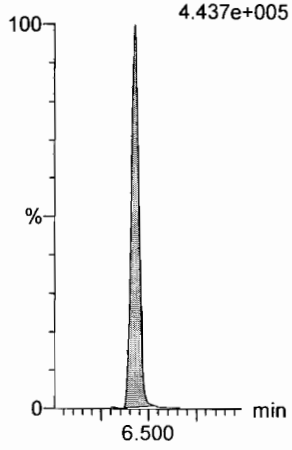
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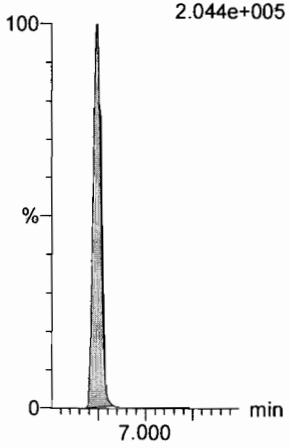
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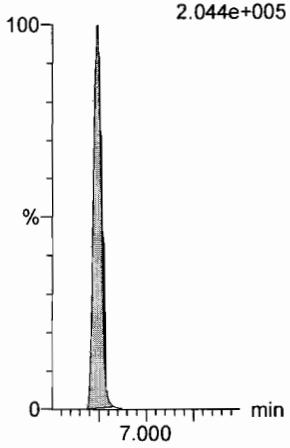
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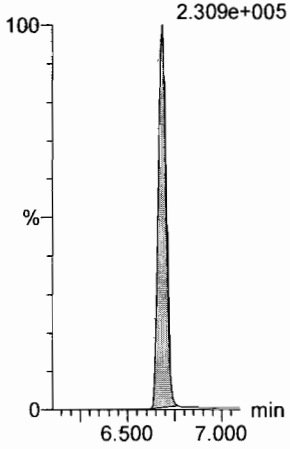
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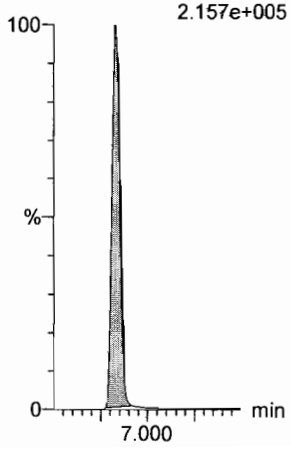
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d7-N-MeFOSE



d9-N-EtFOSE

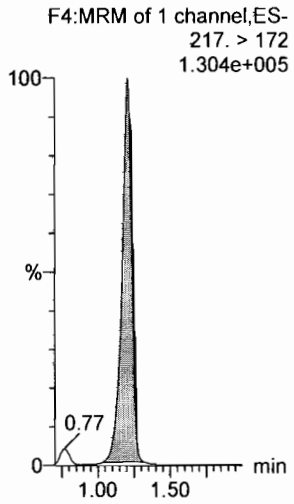


Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-59.qld

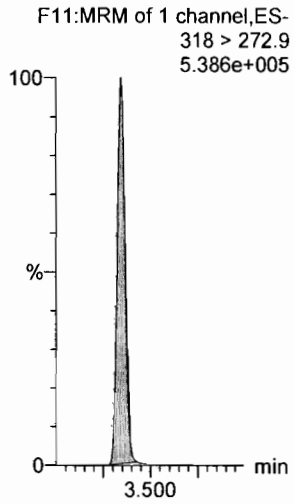
Last Altered: Wednesday, November 21, 2018 10:52:09 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:52:24 Pacific Standard Time

Name: 181120M1_59, Date: 20-Nov-2018, Time: 23:10:38, ID: ST181120M1-6 PFC CS0 18K0903, Description: PFC CS0 18K0903

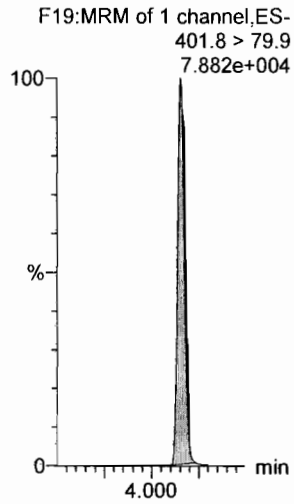
13C4-PFBA



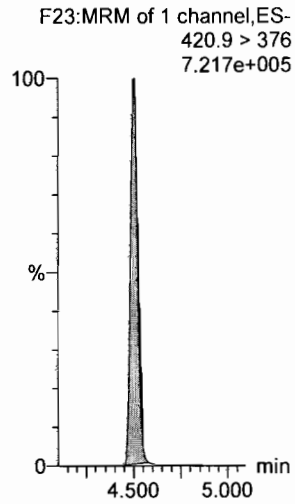
13C5-PFHxA



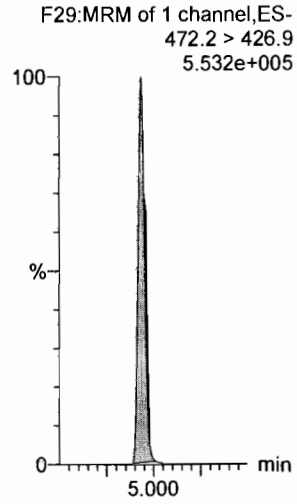
13C3-PFHxS



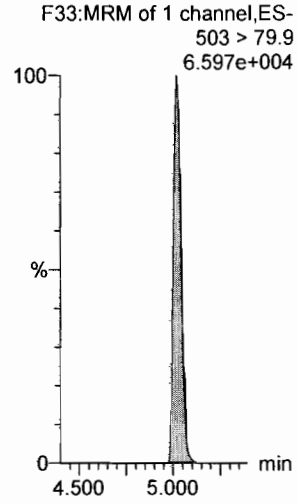
13C8-PFOA



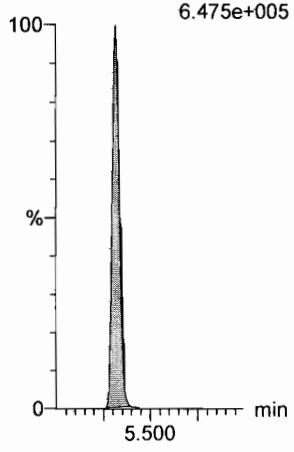
13C9-PFNA



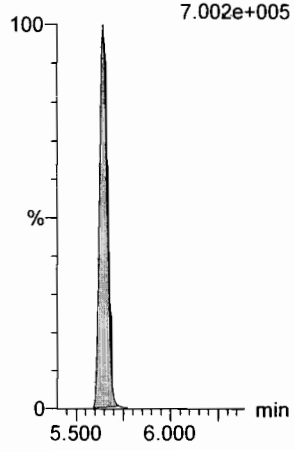
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-84.qld

Last Altered: Wednesday, November 21, 2018 10:58:39 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1	PFBA	213.0 > 168.8	7692.932	8249.276	1.00	1.21	11.657	10.0	100.0	NO		
2	2	PFPeA	263.1 > 218.9	10551.384	14328.649	1.00	2.44	9.205	9.8	97.8	NO		
3	3	PFBS	299.0 > 79.7	2727.447	1831.349	1.00	2.78	18.616	9.6	95.6	NO	2.706	NO
4	4	4:2 FTS	327.2>307.2	4077.447	4380.965	1.00	3.27	11.634	11.2	111.7	NO	1.733	NO
5	5	PFHxA	313 > 269	19326.936	10161.017	1.00	3.35	9.510	10.1	100.5	NO	15.588	NO
6	6	PFPeS	349.1>80.1	2190.302	1831.349	1.00	3.57	14.950	9.7	97.2	NO	1.467	NO
7	36	13C3-PFBA	216.1 > 171.8	8249.276	10543.670	1.00	1.21	9.780	12.5	100.3	NO		
8	37	13C3-PFPeA	266. > 221.8	14328.649	26122.148	1.00	2.44	6.857	13.1	104.8	NO		
9	38	13C3-PFBS	302. > 98.8	1831.349	3238.350	1.00	2.78	7.069	13.1	105.0	NO		
10	39	13C2-4:2 FTS	329.2>308.9	4380.965	3238.350	1.00	3.27	16.910	11.0	88.2	NO		
11	40	13C2-PFHxA	315 > 270	10161.017	26122.148	1.00	3.35	4.862	5.0	100.8	NO		
12	38	13C3-PFBS	302. > 98.8	1831.349	3238.350	1.00	2.78	7.069	13.1	105.0	NO		
13	-1												
14	10	6:2 FTS	427.1 > 407	5039.410	4628.754	1.00	4.46	13.609	11.4	113.5	NO	3.079	NO
15	7	PFHpA	363.0 > 318.9	13616.303	13035.434	1.00	4.02	13.057	9.9	98.7	NO	11.264	NO
16	8	L-PFHxS	398.9 > 79.6	2209.033	1674.781	1.00	4.16	16.487	8.7	87.1	NO	1.694	NO
17	11	L-PFOA	412.8 > 368.9	25122.506	23811.766	1.00	4.51	13.188	10.2	101.8	NO	3.349	NO
18	13	PFHpS	449 > 80.0	2563.299	3658.987	1.00	4.62	8.757	9.8	98.0	NO	1.851	NO
19	14	PFNA	463.0 > 418.8	21742.471	22169.580	1.00	4.94	12.259	9.7	97.3	NO	4.273	NO
20	43	13C2-6:2 FTS	429.1 > 408.9	4628.754	3329.835	1.00	4.46	17.376	11.3	90.5	NO		
21	41	13C4-PFHpA	367.2 > 321.8	13035.434	26122.148	1.00	4.02	6.238	12.9	103.6	NO		
22	42	18O2-PFHxS	403.0 > 102.6	1674.781	3238.350	1.00	4.16	6.465	13.5	107.8	NO		
23	44	13C2-PFOA	414.9 > 369.7	23811.766	32492.830	1.00	4.51	9.160	12.1	97.1	NO		
24	47	13C8-PFOS	507.0 > 79.9	3658.987	3329.835	1.00	5.03	13.736	13.3	106.3	NO		
25	45	13C5-PFNA	468.2 > 422.9	22169.580	21538.203	1.00	4.94	12.866	13.0	103.8	NO		
26	-1												
27	15	PFOSA	497.9 > 77.9	2688.621	3059.964	1.00	4.98	10.983	10.4	103.5	NO	25.001	NO
28	16	L-PFOS	498.9 > 79.9	2937.925	3658.987	1.00	5.03	10.037	9.4	93.9	NO	1.967	NO
29	18	PFDA	513 > 468.8	23399.117	22361.559	1.00	5.32	13.080	10.1	101.4	NO	5.482	NO
30	19	8:2 FTS	527 > 506.9	4572.388	3995.486	1.00	5.29	14.305	9.9	99.2	NO	2.377	NO
31	20	PFNS	549.1 > 80.1	2175.729	3658.987	1.00	5.39	7.433	9.9	98.7	NO	1.648	NO
32	21	L-MeFOSAA	570 > 419	8699.593	3876.608	1.00	5.48	28.052	11.1	110.9	NO	2.800	NO
33	46	13C8-PFOSA	506.1 > 77.7	3059.964	32227.963	1.00	4.98	1.187	10.6	84.6	NO		
34	47	13C8-PFOS	507.0 > 79.9	3658.987	3329.835	1.00	5.03	13.736	13.3	106.3	NO		

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-84.qld

Last Altered: Wednesday, November 21, 2018 10:58:39 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
35	48	13C2-PFDA	515.1 > 469.9	22361.559	28585.543	1.00	5.32	9.778	11.7	94.0	NO		
36	49	13C2-8:2 FTS	529.1 > 508.7	3995.486	3329.835	1.00	5.29	14.999	11.8	94.6	NO		
37	47	13C8-PFOS	507.0 > 79.9	3658.987	3329.835	1.00	5.03	13.736	13.3	106.3	NO		
38	50	d3-N-MeFOSAA	573.3 > 419	3876.608	32227.963	1.00	5.47	1.504	11.1	89.0	NO		
39	-1												
40	23	L-EtFOSAA	584.1 > 419	6742.653	6045.951	1.00	5.64	13.940	9.5	95.0	NO	1.419	NO
41	27	PFDoA	612.9 > 569.0	23807.297	27761.980	1.00	5.93	10.719	9.6	95.5	NO	8.050	NO
42	26	PFDS	598.8 > 79.9	2743.644	3658.987	1.00	5.70	9.373	9.5	94.6	NO	1.686	NO
43	25	PFUdA	563.0 > 518.9	20769.186	28883.398	1.00	5.65	8.988	9.6	96.4	NO	8.599	NO
44	28	N-MeFOSA	512.1 > 168.9	4024.106	11368.387	1.00	5.91	53.096	47.9	95.8	NO	1.458	NO
45	29	PFTrDA	662.9 > 618.9	25241.531	27761.980	1.00	6.18	11.365	10.0	99.7	NO	23.580	NO
46	52	d5-N-EtFOSAA	589.3 > 419	6045.951	32227.963	1.00	5.63	2.345	11.8	94.6	NO		
47	53	13C2-PFDoA	615.0 > 569.7	27761.980	28585.543	1.00	5.93	12.140	12.4	99.1	NO		
48	47	13C8-PFOS	507.0 > 79.9	3658.987	3329.835	1.00	5.03	13.736	13.3	106.3	NO		
49	51	13C2-PFUdA	565 > 519.8	28883.398	32227.963	1.00	5.65	11.203	12.1	96.6	NO		
50	54	d3-N-MeFOSA	515.2 > 168.9	11368.387	32227.963	1.00	5.94	4.409	127.1	84.8	NO		
51	53	13C2-PFDoA	615.0 > 569.7	27761.980	28585.543	1.00	5.93	12.140	12.4	99.1	NO		
52	-1												
53	30	PFTeDA	713.0 > 669.0	21941.877	19634.377	1.00	6.40	13.969	9.6	95.9	NO	13.239	NO
54	31	N-EtFOSA	526.1 > 168.9	5651.054	20435.166	1.00	6.40	41.480	50.3	100.7	NO	1.612	NO
55	32	PFHxDA	813.1 > 768.6	12486.769	10101.151	1.00	6.74	6.181	12.0	120.3	NO	24.910	NO
56	33	PFODA	913.1 > 868.8	14067.399	10101.151	1.00	6.99	6.963	9.3	92.8	NO		
57	34	N-MeFOSE	616.1 > 58.9	3253.749	10991.333	1.00	6.69	44.404	49.3	98.5	NO		
58	35	N-EtFOSE	630.1 > 58.9	3771.145	10440.015	1.00	6.84	54.183	48.9	97.7	NO		
59	55	13C2-PFTeDA	715.1 > 669.7	19634.377	32227.963	1.00	6.40	7.615	12.5	100.4	NO		
60	56	d5-N-ETFOSA	531.1 > 168.9	20435.166	32227.963	1.00	6.43	7.926	131.9	87.9	NO		
61	57	13C2-PFHxDA	815 > 769.7	10101.151	32227.963	1.00	6.75	3.918	4.9	97.4	NO		
62	57	13C2-PFHxDA	815 > 769.7	10101.151	32227.963	1.00	6.75	3.918	4.9	97.4	NO		
63	58	d7-N-MeFOSE	623.1 > 58.9	10991.333	32227.963	1.00	6.68	4.263	131.1	87.4	NO		
64	59	d9-N-EtFOSE	639.2 > 58.8	10440.015	32227.963	1.00	6.83	4.049	126.7	84.4	NO		
65	-1												
66	60	13C4-PFBA	217. > 172	10543.670	10543.670	1.00	1.22	12.500	12.5	100.0	NO		
67	61	13C5-PFHxA	318 > 272.9	26122.148	26122.148	1.00	3.35	12.500	12.5	100.0	NO		
68	62	13C3-PFHxS	401.8 > 79.9	3238.350	3238.350	1.00	4.16	12.500	12.5	100.0	NO		

Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-84.qld

Last Altered: Wednesday, November 21, 2018 10:58:39 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc	%Rec	Recovery ...	Ion Ratio	Ratio Out?
69	63	13C8-PFOA	420.9 > 376	32492.830	32492.830	1.00	4.51	12.500	12.5	100.0	NO		
70	64	13C9-PFNA	472.2 > 426.9	21538.203	21538.203	1.00	4.94	12.500	12.5	100.0	NO		
71	65	13C4-PFOS	503 > 79.9	3329.835	3329.835	1.00	5.03	12.500	12.5	100.0	NO		
72	66	13C6-PFDA	519.1 > 473.7	28585.543	28585.543	1.00	5.32	12.500	12.5	100.0	NO		
73	67	13C7-PFUdA	570.1 > 524.8	32227.963	32227.963	1.00	5.65	12.500	12.5	100.0	NO		

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Dataset: Untitled

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_112018.mdb 21 Nov 2018 10:29:17
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	181120M1_1	IPA	20-Nov-18	12:50:12
2	2	181120M1_2	ST181120M1-1 PFC CS0 18K0903	20-Nov-18	13:00:47
3	3	181120M1_3	IPA	20-Nov-18	13:11:26
4	4	181120M1_4	1803558-01 REEPDW1354 0.11837	20-Nov-18	13:22:02
5	5	181120M1_5	1803558-02 REEPDW1355 0.1102	20-Nov-18	13:32:38
6	6	181120M1_6	1803558-03 REEPDW1356 0.12099	20-Nov-18	13:43:16
7	7	181120M1_7	1803558-04 REEPDW1357 0.11567	20-Nov-18	13:53:50
8	8	181120M1_8	1803562-01 REEPDW1358 0.12032	20-Nov-18	14:04:29
9	9	181120M1_9	1803562-02 REEPDW1359 0.11552	20-Nov-18	14:15:02
10	10	181120M1_10	B8K0078-BS1 OPR 0.125	20-Nov-18	14:25:40
11	11	181120M1_11	B8K0078-MS1 Matrix Spike 0.11906	20-Nov-18	14:36:12
12	12	181120M1_12	B8K0078-MSD1 Matrix Spike Dup 0.11906	20-Nov-18	14:46:51
13	13	181120M1_13	B8K0078-BLK1 Method Blank 0.125	20-Nov-18	14:57:29
14	14	181120M1_14	1803579-01 REEPEF1070 0.11883	20-Nov-18	15:08:02
15	15	181120M1_15	1803579-02 REEPAR1070 0.11985	20-Nov-18	15:18:40
16	16	181120M1_16	1803579-03 REEPAC1070 0.12082	20-Nov-18	15:29:19
17	17	181120M1_17	1803579-04 REEPEF1071 0.11958	20-Nov-18	15:39:52
18	18	181120M1_18	IPA	20-Nov-18	15:50:30
19	19	181120M1_19	ST181120M1-2 PFC CS3 18K0906	20-Nov-18	16:01:03
20	20	181120M1_20	1803579-05 REEPEF5031 0.11969	20-Nov-18	16:11:45
21	21	181120M1_21	1803579-06 REEPAR1071 0.11398	20-Nov-18	16:22:20
22	22	181120M1_22	1803579-07 REEPAC1071 0.11944	20-Nov-18	16:32:58
23	23	181120M1_23	1803579-08 REEPIN1071 0.12134	20-Nov-18	16:43:31
24	24	181120M1_24	1803580-01 REEPDW1360 0.12021	20-Nov-18	16:54:10
25	25	181120M1_25	1803580-02 REEPDW584 0.12201	20-Nov-18	17:04:48
26	26	181120M1_26	1803580-03 REEPDW1361 0.1193	20-Nov-18	17:15:29
27	27	181120M1_27	1803580-04 REEPDW1362 0.12126	20-Nov-18	17:26:02
28	28	181120M1_28	1803580-05 REEPDW1363 0.1186	20-Nov-18	17:42:02
29	29	181120M1_29	1803580-06 REEPDW1364 0.11593	20-Nov-18	17:52:36
30	30	181120M1_30	IPA	20-Nov-18	18:03:14
31	31	181120M1_31	ST181120M1-3 PFC CS3 18K0906	20-Nov-18	18:13:52
32	32	181120M1_32	1803580-07 REEPDW1365 0.12097	20-Nov-18	18:24:31

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Dataset: Untitled

Last Altered: Wednesday, November 21, 2018 11:08:22 Pacific Standard Time
Printed: Wednesday, November 21, 2018 11:09:09 Pacific Standard Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
33	33	181120M1_33	1803552-02@10X WW1810291045GC 0.24014	20-Nov-18	18:35:04
34	34	181120M1_34	1803551-01 WW1810290900GC 0.23689	20-Nov-18	18:45:42
35	35	181120M1_35	1803553-01 WW1810291400GC 0.23805	20-Nov-18	18:56:15
36	36	181120M1_36	1803553-03 WW1810291500GC 0.23488	20-Nov-18	19:06:54
37	37	181120M1_37	B8K0059-BS1 OPR 0.125	20-Nov-18	19:17:32
38	38	181120M1_38	B8K0059-BSD1 LCSD 0.125	20-Nov-18	19:28:05
39	39	181120M1_39	B8K0059-BLK1 Method Blank 0.125	20-Nov-18	19:38:44
40	40	181120M1_40	1803560-01 REEPEF1061 0.11502	20-Nov-18	19:49:17
41	41	181120M1_41	1803560-02 REEPAR1061 0.11512	20-Nov-18	19:59:55
42	42	181120M1_42	1803560-03 REEPAC1061 0.11751	20-Nov-18	20:10:28
43	43	181120M1_43	1803560-04 REEPEF1064 0.11641	20-Nov-18	20:21:07
44	44	181120M1_44	1803560-05 REEPAR1064 0.10776	20-Nov-18	20:31:47
45	45	181120M1_45	IPA	20-Nov-18	20:42:20
46	46	181120M1_46	ST181120M1-4 PFC CS3 18K0906	20-Nov-18	20:52:58
47	47	181120M1_47	1803560-06 REEPAC1064 0.11777	20-Nov-18	21:03:31
48	48	181120M1_48	1803560-07 REEPEF1065 0.11651	20-Nov-18	21:14:10
49	49	181120M1_49	1803560-08 REEPAR1065 0.11979	20-Nov-18	21:24:42
50	50	181120M1_50	1803560-09 REEPAC1065 0.11635	20-Nov-18	21:35:20
51	51	181120M1_51	1803560-10 REEPEF1066 0.11571	20-Nov-18	21:45:53
52	52	181120M1_52	1803560-11 REEPAR1066 0.11617	20-Nov-18	21:56:32
53	53	181120M1_53	1803560-12 REEPAC1066 0.11943	20-Nov-18	22:07:05
54	54	181120M1_54	1803560-13 REEPEF1067 0.11797	20-Nov-18	22:17:43
55	55	181120M1_55	1803560-14 REEPAR1067 0.11772	20-Nov-18	22:28:16
56	56	181120M1_56	1803560-15 REEPAC1067 0.12134	20-Nov-18	22:38:54
57	57	181120M1_57	IPA	20-Nov-18	22:49:27
58	58	181120M1_58	ST181120M1-5 PFC CS3 18K0906	20-Nov-18	23:00:05
59	59	181120M1_59	ST181120M1-6 PFC CS0 18K0903	20-Nov-18	23:10:38
60	60	181120M1_60	1803560-16 REEPAC5029 0.12085	20-Nov-18	23:21:16
61	61	181120M1_61	B8K0091-BS1 OPR 0.125	20-Nov-18	23:31:48
62	62	181120M1_62	B8K0091-BLK1 Method Blank 0.125	20-Nov-18	23:42:26
63	63	181120M1_63	B8K0091-MS1 Matrix Spike 0.1154	20-Nov-18	23:52:59
64	64	181120M1_64	B8K0091-MSD1 Matrix Spike Dup 0.11594	21-Nov-18	00:03:37
65	65	181120M1_65	1803582-01 REEPDW1360FRB 0.11656	21-Nov-18	00:14:15
66	66	181120M1_66	1803582-02 REEPDW1361FRB 0.11659	21-Nov-18	00:24:49
67	67	181120M1_67	1803582-03 REEPDW1362FRB 0.11502	21-Nov-18	00:35:27
68	68	181120M1_68	1803582-04 REEPDW1363FRB 0.11744	21-Nov-18	00:46:01

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, November 21, 2018 11:08:22 Pacific Standard Time
Printed: Wednesday, November 21, 2018 11:09:09 Pacific Standard Time

Compound name: PFBA

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69	69	181120M1_69	1803582-05 REEPDW1364FRB 0.11686	21-Nov-18	00:56:39
70	70	181120M1_70	1803582-06 REEPDW1365FRB 0.11305	21-Nov-18	01:07:12
71	71	181120M1_71	1803615-01 A1-MW-04-SA2 0.11345	21-Nov-18	01:17:50
72	72	181120M1_72	1803615-02 A1-MW-05-SA2 0.11579	21-Nov-18	01:28:22
73	73	181120M1_73	1803615-03 A1-MW-49-SA2 0.11411	21-Nov-18	01:39:00
74	74	181120M1_74	1803615-04 A1-MW-50-SA2 0.11184	21-Nov-18	01:49:33
75	75	181120M1_75	1803615-05 A1-MW-50-SA2D 0.11445	21-Nov-18	02:00:11
76	76	181120M1_76	1803615-06 A1-MW-51-SA2 0.11681	21-Nov-18	02:10:50
77	77	181120M1_77	1803615-07 A1-MW-52-SA2 0.11468	21-Nov-18	02:21:30
78	78	181120M1_78	1803615-08 FRB-20181112 0.11506	21-Nov-18	02:32:03
79	79	181120M1_79	1803615-09 A1-PZ-19-SA2 0.1131	21-Nov-18	02:42:42
80	80	181120M1_80	B8K0075-BS1 OPR 0.125	21-Nov-18	02:53:20
81	81	181120M1_81	B8K0075-BLK1 Method Blank 0.125	21-Nov-18	03:03:53
82	82	181120M1_82	1803590-01 Winn WTP 731 0.1117	21-Nov-18	03:14:32
83	83	181120M1_83	IPA	21-Nov-18	03:25:10
84	84	181120M1_84	ST181120M1-7 PFC CS3 18K0906	21-Nov-18	03:35:42
85	85	181120M1_85	1803590-02 Mill Tank 781 0.11436	21-Nov-18	03:46:21
86	86	181120M1_86	1803590-03 Ex Tank 710 0.10366	21-Nov-18	03:56:54
87	87	181120M1_87	1803590-04 Tide Mill PRV 789 0.11523	21-Nov-18	04:07:32
88	88	181120M1_88	1803590-05 Maple Rd PRV 783 0.11149	21-Nov-18	04:18:05
89	89	181120M1_89	1803590-06 N.H. Fire 702 0.1114	21-Nov-18	04:28:43
90	90	181120M1_90	1803590-07 Rye Store 709 0.11121	21-Nov-18	04:39:21
91	91	181120M1_91	1803590-08 Mill WTP 777 0.11514	21-Nov-18	04:49:55
92	92	181120M1_92	1803590-09 Field Blank 0.11371	21-Nov-18	05:00:33
93	93	181120M1_93	1803590-10 Well 8A - 908 0.11388	21-Nov-18	05:11:06
94	94	181120M1_94	1803590-11 Well 9 - 909 0.11139	21-Nov-18	05:21:45
95	95	181120M1_95	1803590-12 Well 11 - 911 0.11267	21-Nov-18	05:32:17
96	96	181120M1_96	IPA	21-Nov-18	05:42:55
97	97	181120M1_97	ST181120M1-8 PFC CS3 18K0906	21-Nov-18	05:53:28
98	98	181120M1_98	1803590-13 Well 12 - 912 0.10946	21-Nov-18	06:04:07
99	99	181120M1_99	1803590-14 Well 16 - 916 0.11055	21-Nov-18	06:14:40
100	1...	181120M1_100	1803590-15 Well 17 - 917 0.11521	21-Nov-18	06:25:18
101	1...	181120M1_101	1803590-16 Well 20 - 920 0.10875	21-Nov-18	06:35:51
102	1...	181120M1_102	IPA	21-Nov-18	06:46:29
103	1...	181120M1_103	ST181120M1-9 PFC CS3 18K0906	21-Nov-18	06:57:02

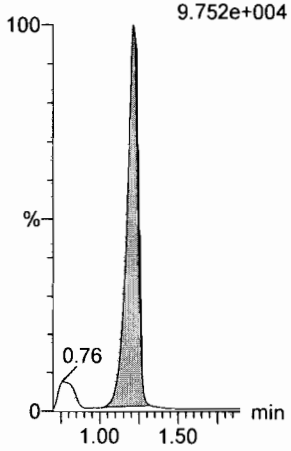
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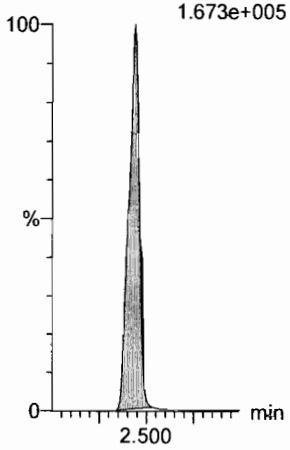
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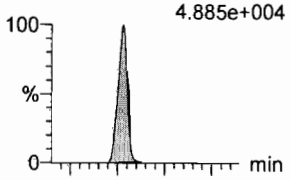
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
9.752e+004



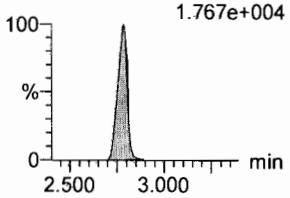
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
1.673e+005



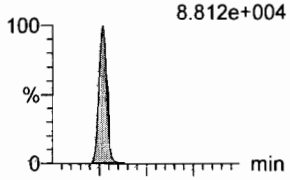
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
4.885e+004



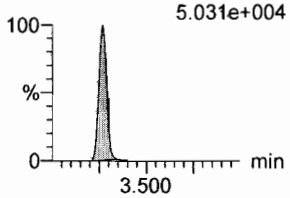
F7:MRM of 2 channels,ES-
299.0 > 99.0
1.767e+004



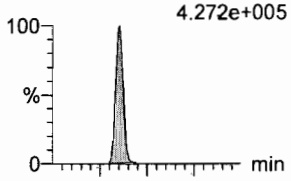
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
8.812e+004



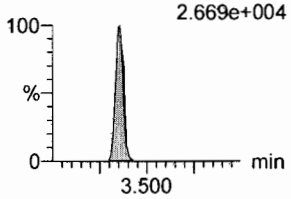
F12:MRM of 2 channels,ES-
327.2 > 81.1
5.031e+004



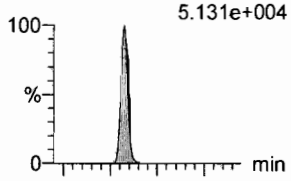
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
4.272e+005



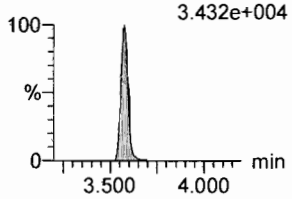
F9:MRM of 2 channels,ES-
313 > 118.9
2.669e+004



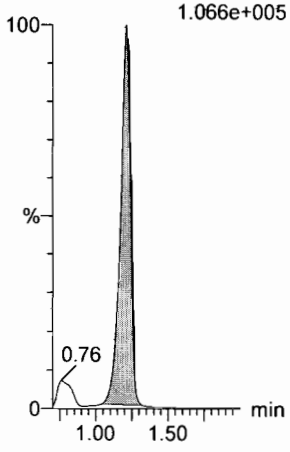
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
5.131e+004



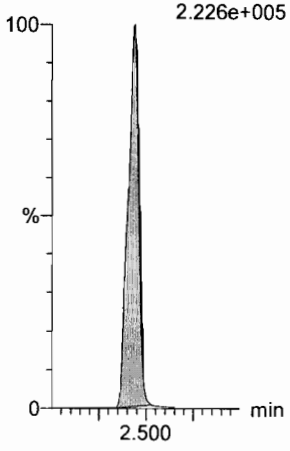
F15:MRM of 2 channels,ES-
349.1 > 99
3.432e+004



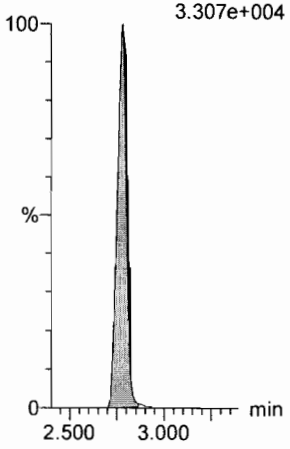
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.066e+005



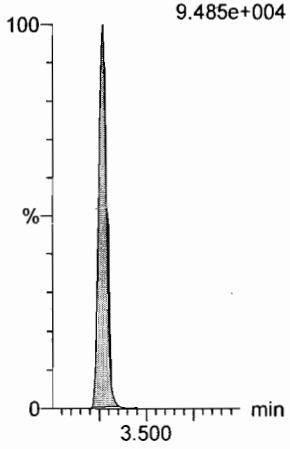
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
2.226e+005



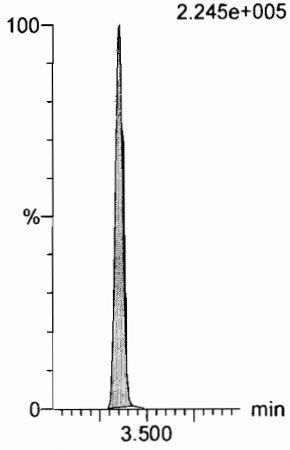
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
3.307e+004



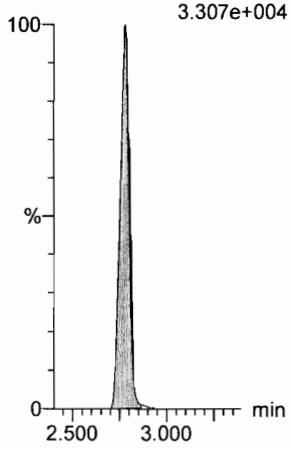
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
9.485e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
2.245e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
3.307e+004

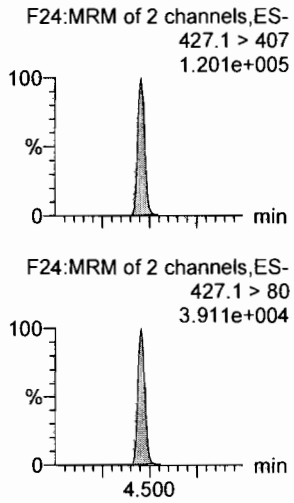


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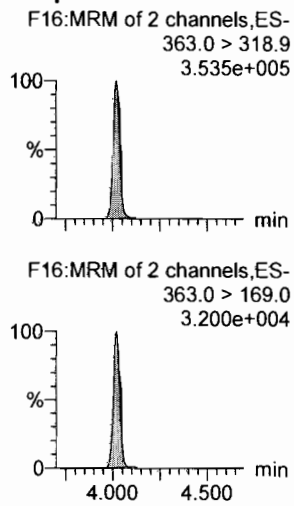
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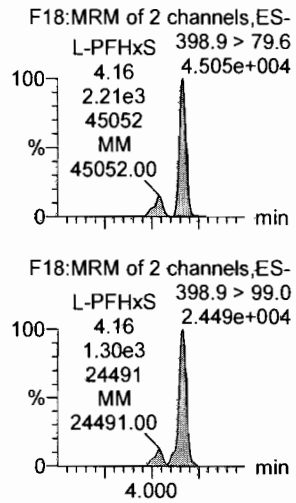
6:2 FTS



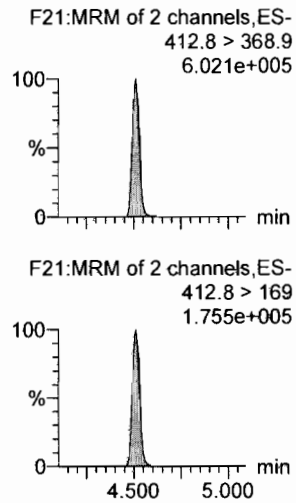
PFHpA



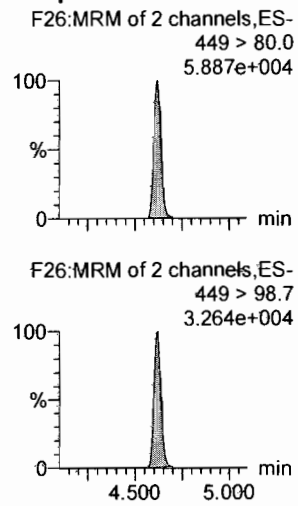
L-PFHxS



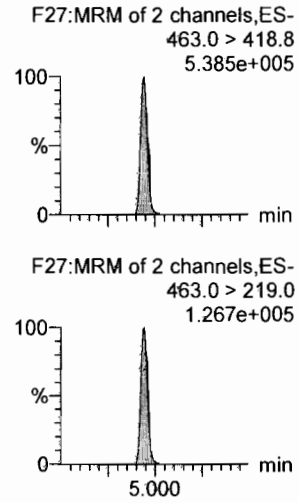
L-PFOA



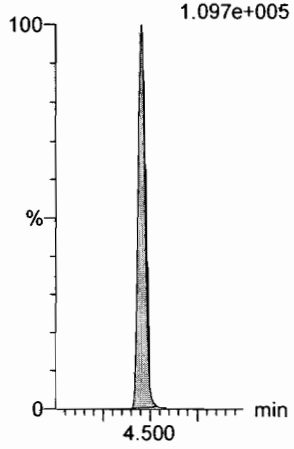
PFHpS



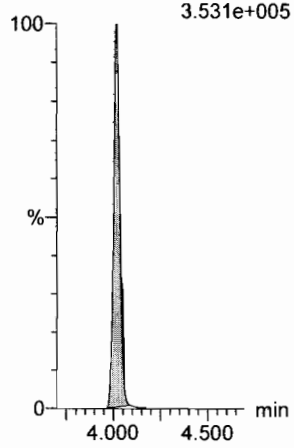
PFNA



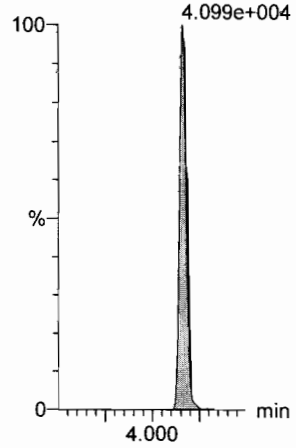
13C2-6:2 FTS



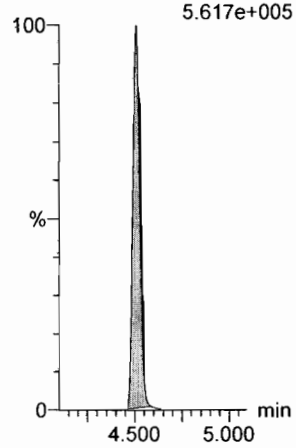
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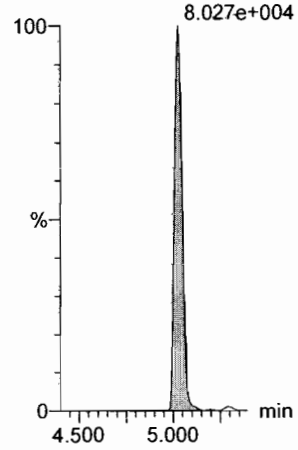
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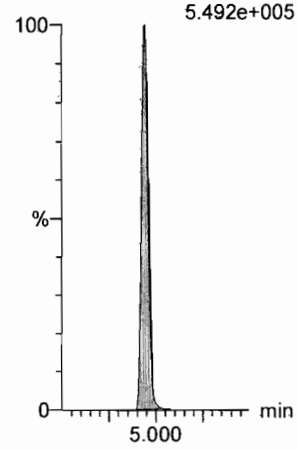
13C2-PFOA



13C8-PFOS



13C5-PFNA

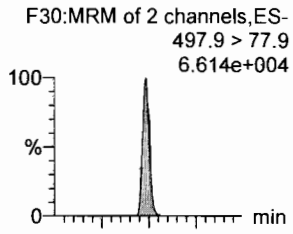


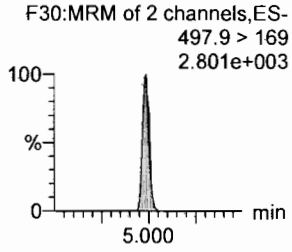
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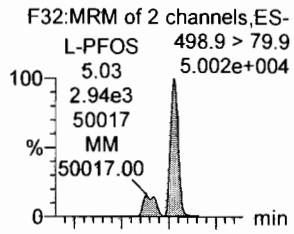
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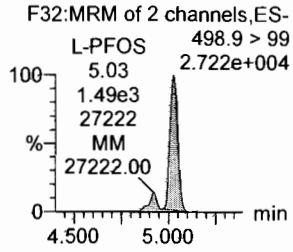
PFOSA



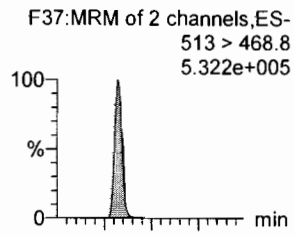


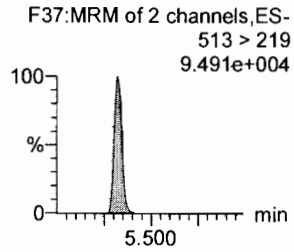
L-PFOS



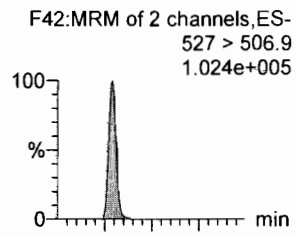


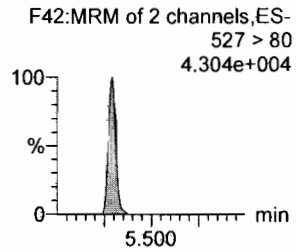
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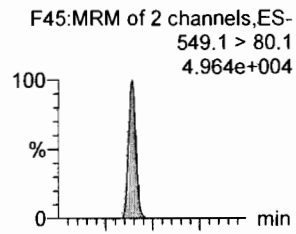


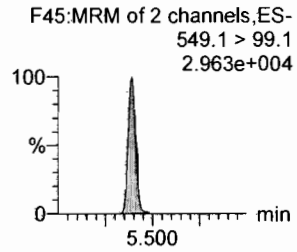
8:2 FTS



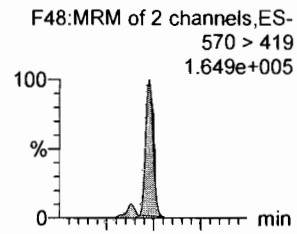


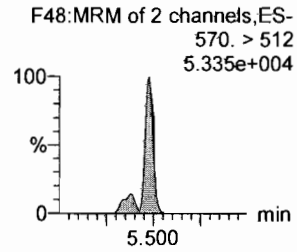
PFNS



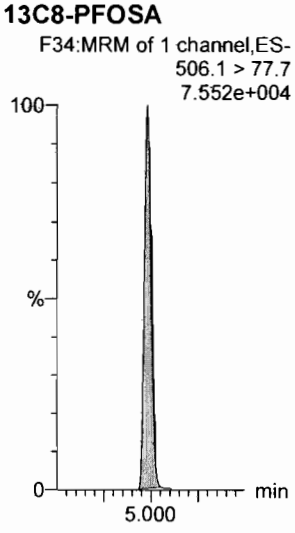


L-MeFOSAA

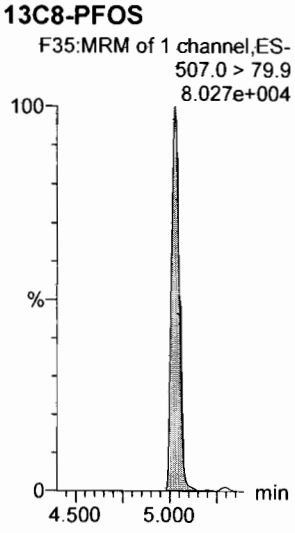




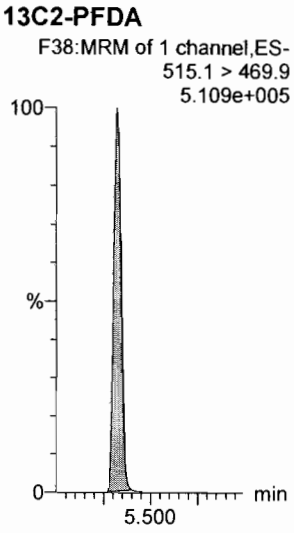
13C8-PFOSA



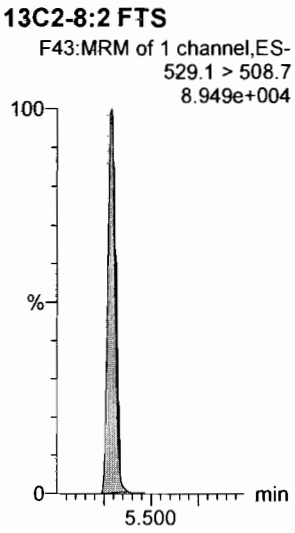
13C8-PFOS



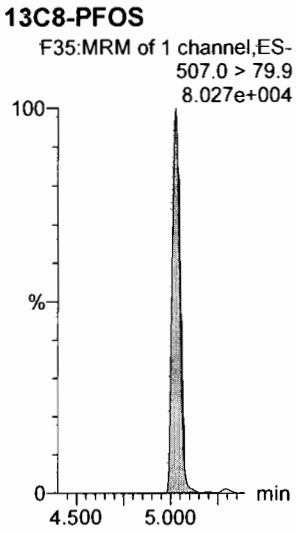
13C2-PFDA



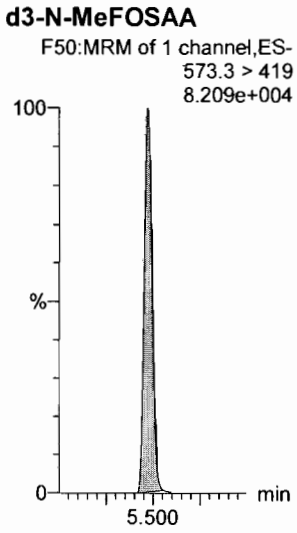
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

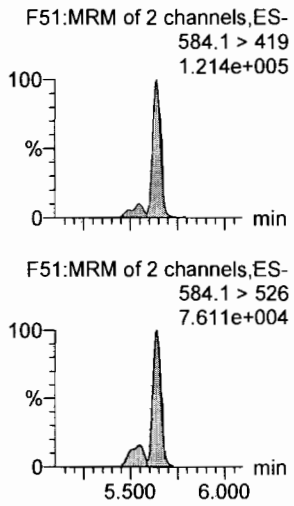


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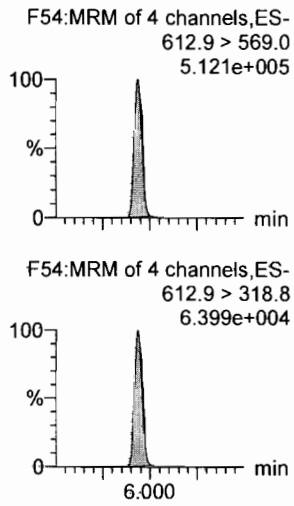
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Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

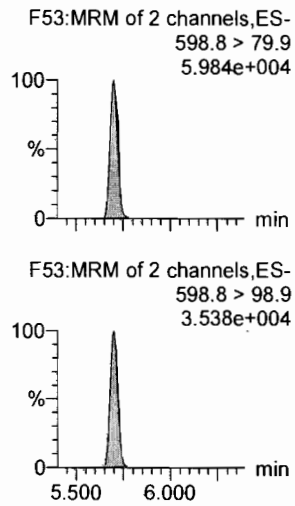
L-EtFOSAA



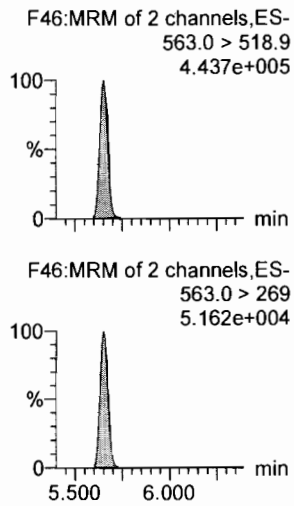
PFDoA



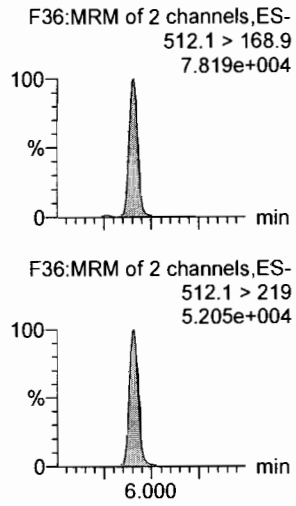
PFDS



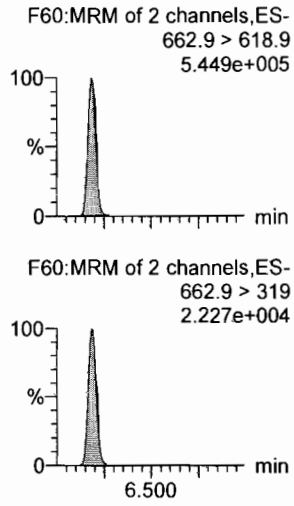
PFUdA



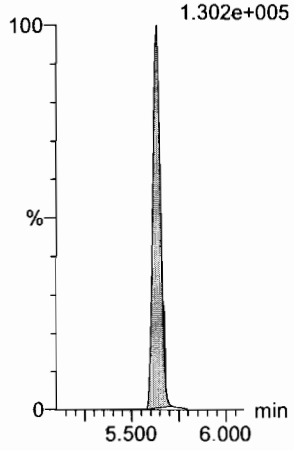
N-MeFOSA



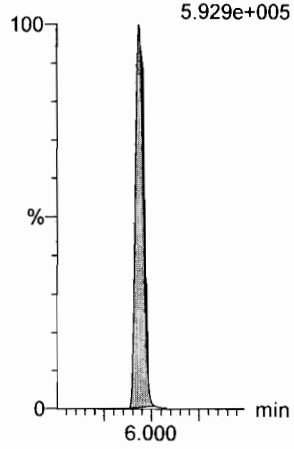
PFTrDA



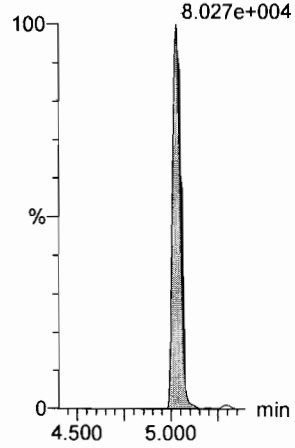
d5-N-EtFOSAA



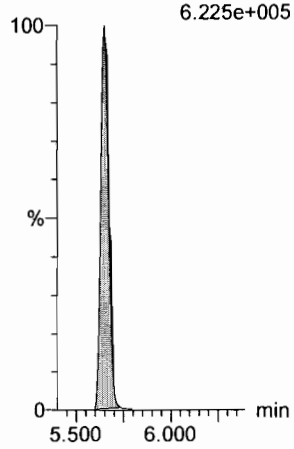
13C2-PFDoA



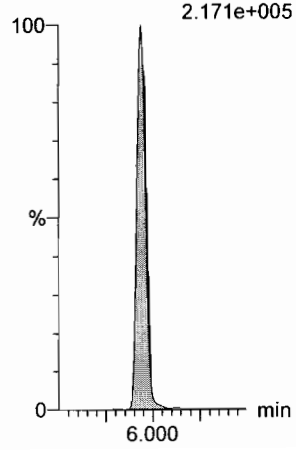
13C8-PFOS



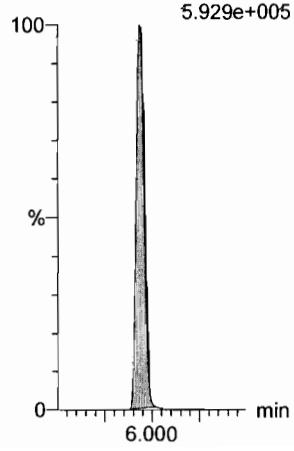
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

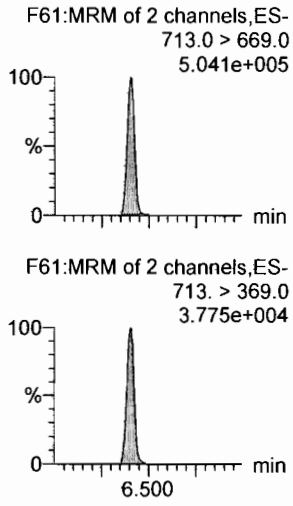


Dataset: F:\Projects\PFAS.PRO\Results\181120M1\181120M1-84.qld

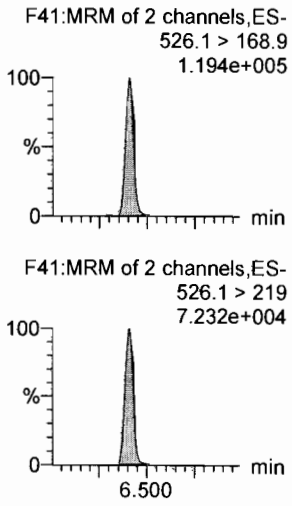
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Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

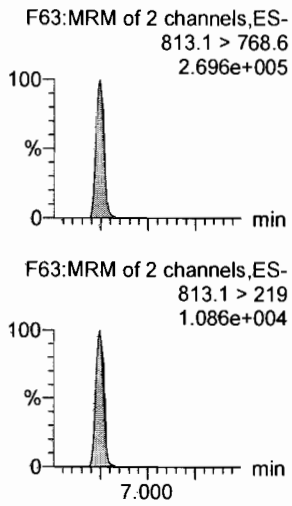
PFTeDA



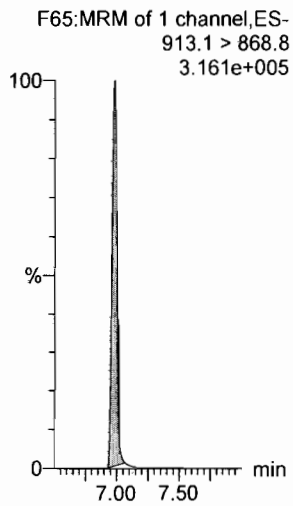
N-EtFOSA



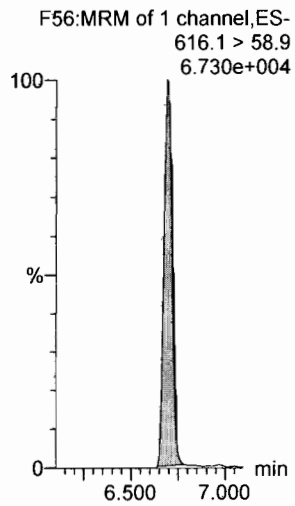
PFHxDA



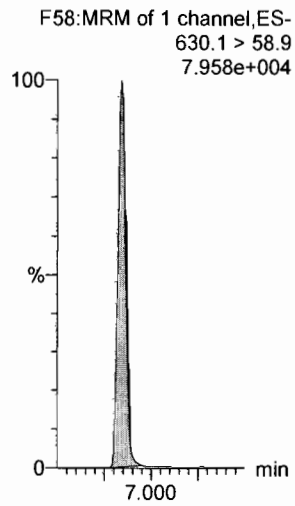
PFODA



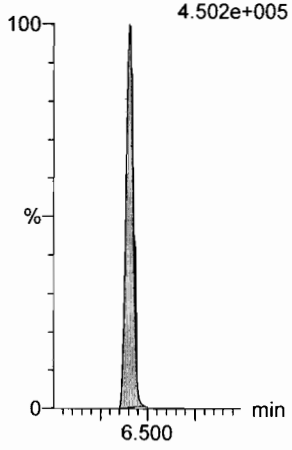
N-MeFOSE



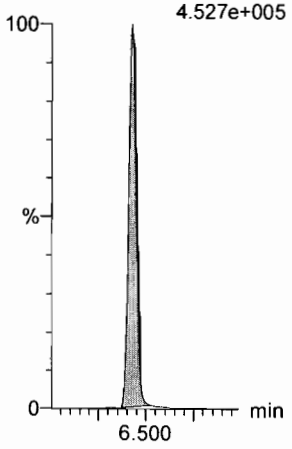
N-EtFOSE



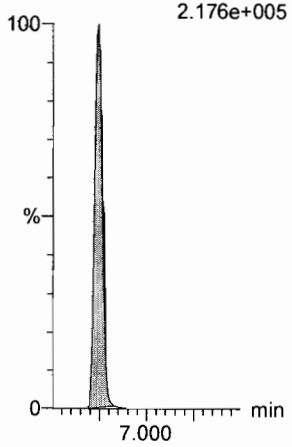
13C2-PFTeDA



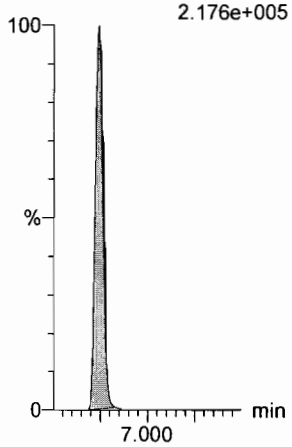
d5-N-ETFOSA



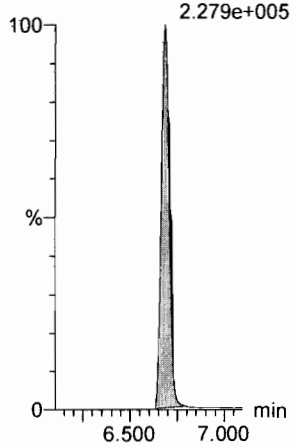
13C2-PFHxDA



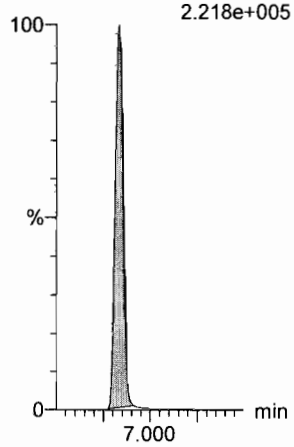
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

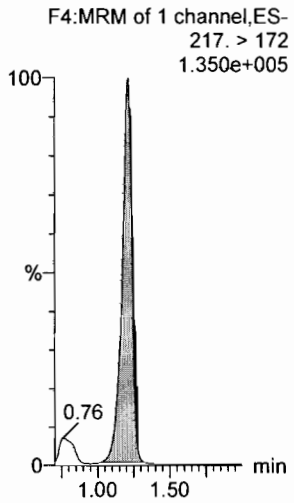


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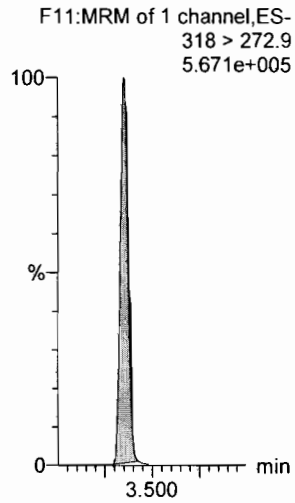
Last Altered: Wednesday, November 21, 2018 10:58:39 Pacific Standard Time
Printed: Wednesday, November 21, 2018 10:58:59 Pacific Standard Time

Name: 181120M1_84, Date: 21-Nov-2018, Time: 03:35:42, ID: ST181120M1-7 PFC CS3 18K0906, Description: PFC CS3 18K0906

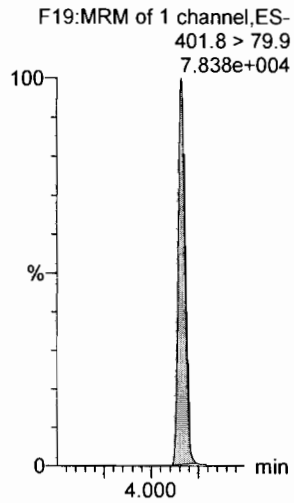
13C4-PFBA



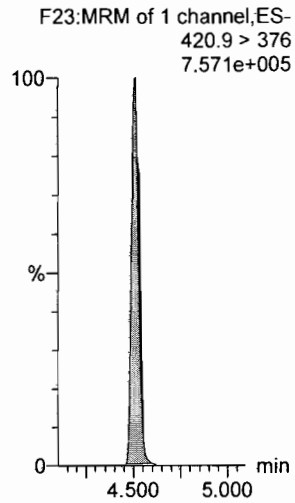
13C5-PFHxA



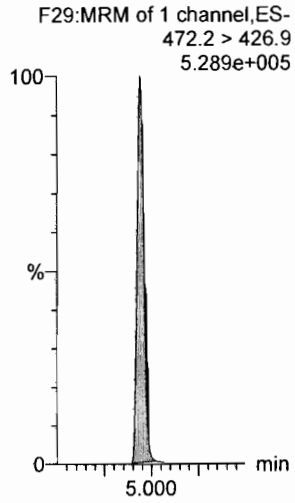
13C3-PFHxS



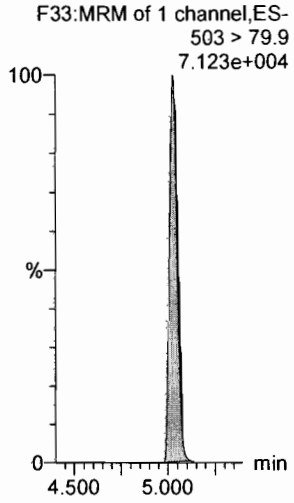
13C8-PFOA



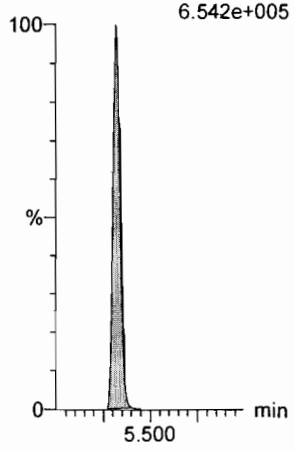
13C9-PFNA



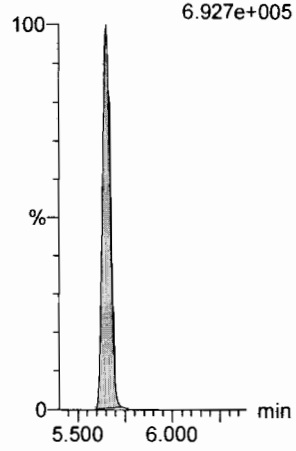
13C4-PFOS



13C6-PFDA



13C7-PFUdA



INITIAL CALIBRATION (ICAL)

INCLUDING ASSOCIATED

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

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

no low pts dropped

high pt
4:2 FTS = 100
6:2 FTS
8:2 FTS

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

11/20/18

11/20/18

Compound name: PFBA
Correlation coefficient: r = 0.999936, r^2 = 0.999871
Calibration curve: 1.15877 * x + 0.0665496
Response type: Internal Std (Ref 36), 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	181119M2_2	Standard	0.250	1.18	190.471	7922.372	0.301	0.2	-19.2	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	1.18	382.975	7014.210	0.682	0.5	6.3	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	1.18	777.744	7707.828	1.261	1.0	3.1	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	1.18	1617.640	7705.931	2.624	2.2	10.4	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	1.18	3785.407	7763.416	6.095	5.2	4.0	NO	1.000	NO	MM
6	6	181119M2_7	Standard	10.000	1.18	6927.673	7566.665	11.444	9.8	-1.8	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	1.18	36154.707	7999.171	56.498	48.7	-2.6	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	1.18	90826.258	9901.624	114.661	98.9	-1.1	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	1.18	180607.188	7713.829	292.668	252.5	1.0	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	1.18	350145.438	7558.623	579.050	499.7	-0.1	NO	1.000	NO	MM

Compound name: PFPeA
Coefficient of Determination: R^2 = 0.999855
Calibration curve: -4.00459e-005 * x^2 + 0.937455 * x + 0.0365266
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	181119M2_2	Standard	0.250	2.40	317.239	15865.156	0.250	0.2	-8.9	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	2.40	536.036	13568.036	0.494	0.5	-2.4	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	2.40	1226.402	15828.560	0.969	1.0	-0.6	NO	1.000	NO	MM
4	4	181119M2_5	Standard	2.000	2.40	2541.349	15342.569	2.071	2.2	8.5	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	2.40	6308.639	15479.487	5.094	5.4	7.9	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	2.40	11331.536	15429.634	9.180	9.8	-2.4	NO	1.000	NO	MM
7	7	181119M2_8	Standard	50.000	2.40	57161.555	15535.887	45.992	49.1	-1.8	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	2.40	142840.969	19373.652	92.162	98.7	-1.3	NO	1.000	NO	MM
9	9	181119M2_10	Standard	250.000	2.40	284179.781	15129.592	234.788	253.2	1.3	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	2.40	523638.000	14302.896	457.633	498.8	-0.2	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFBS
Coefficient of Determination: R^2 = 0.999692
Calibration curve: -6.70313e-005 * x^2 + 1.94752 * x + 0.0138443
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	181119M2_2	Standard	0.250	2.76	73.145	1980.035	0.462	0.2	-8.0	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	2.75	133.278	1777.388	0.937	0.5	-5.2	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	2.75	352.526	1967.175	2.240	1.1	14.3	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	2.75	601.302	1950.016	3.854	2.0	-1.4	NO	1.000	NO	MM
5	5	181119M2_6	Standard	5.000	2.75	1557.153	1881.051	10.348	5.3	6.1	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	2.75	2917.642	1935.022	18.848	9.7	-3.3	NO	1.000	NO	MM
7	7	181119M2_8	Standard	50.000	2.75	14341.416	1880.698	95.320	49.0	-2.0	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	2.75	35601.457	2351.786	189.226	97.5	-2.5	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	2.75	67249.664	1702.650	493.713	255.8	2.3	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	2.75	119945.047	1573.776	952.685	497.7	-0.5	NO	1.000	NO	bb

Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998555
Calibration curve: -0.00296353 * x^2 + 1.06839 * x + 0.0733065
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	181119M2_2	Standard	0.250	3.23	133.634	5344.524	0.313	0.2	-10.4	NO	0.999	NO	bb
2	2	181119M2_3	Standard	0.500	3.24	240.957	5264.625	0.572	0.5	-6.5	NO	0.999	NO	bb
3	3	181119M2_4	Standard	1.000	3.23	478.672	5620.198	1.065	0.9	-7.0	NO	0.999	NO	bb
4	4	181119M2_5	Standard	2.000	3.23	1084.560	5300.505	2.558	2.3	17.0	NO	0.999	NO	bb
5	5	181119M2_6	Standard	5.000	3.23	2407.287	5276.321	5.703	5.3	7.0	NO	0.999	NO	bb
6	6	181119M2_7	Standard	10.000	3.23	4642.297	5410.559	10.725	10.3	2.6	NO	0.999	NO	bb
7	7	181119M2_8	Standard	50.000	3.23	19518.979	5484.480	44.487	47.9	-4.1	NO	0.999	NO	bb
8	8	181119M2_9	Standard	100.000	3.23	46120.105	7388.735	78.024	101.6	1.6	NO	0.999	NO	bb
9	9	181119M2_10	Standard	250.000	3.23	78687.313	6923.139	142.073			NO	0.999	NO	bbXI
10	10	181119M2_11	Standard	500.000	3.24	124743.273	8616.051	180.975			NO	0.999	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999895
Calibration curve: -9.80484e-005 * x^2 + 0.942971 * x + 0.041646
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	181119M2_2	Standard	0.250	3.32	644.801	11966.714	0.269	0.2	-3.4	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	3.32	1149.189	11083.603	0.518	0.5	1.1	NO	1.000	NO	dd
3	3	181119M2_4	Standard	1.000	3.32	2603.592	12586.650	1.034	1.1	5.3	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	3.32	4906.760	11859.864	2.069	2.2	7.5	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	3.32	11494.797	11046.164	5.203	5.5	9.5	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	3.32	21631.896	11606.128	9.319	9.8	-1.5	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	3.32	99345.484	10716.891	46.350	49.4	-1.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	3.32	258843.766	13760.684	94.052	100.8	0.8	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	3.32	492386.875	10768.104	228.632	248.9	-0.5	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	3.32	875126.938	9779.139	447.446	500.5	0.1	NO	1.000	NO	bb

Compound name: PFPeS
Coefficient of Determination: R^2 = 0.999587
Calibration curve: -0.000364679 * x^2 + 1.51981 * x + 0.209357
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	181119M2_2	Standard	0.250	3.54	77.095	1980.035	0.487	0.2	-27.0	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	3.54	131.347	1777.388	0.924	0.5	-6.0	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	3.54	302.785	1967.175	1.924	1.1	12.8	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	3.54	547.757	1950.016	3.511	2.2	8.7	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	3.54	1295.337	1881.051	8.608	5.5	10.7	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	3.54	2500.891	1935.022	16.155	10.5	5.2	NO	1.000	NO	bd
7	7	181119M2_8	Standard	50.000	3.54	10913.900	1880.698	72.539	48.1	-3.7	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	3.54	27358.090	2351.786	145.411	97.8	-2.2	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	3.54	49523.266	1702.650	363.575	254.6	1.9	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	3.54	83941.578	1573.776	666.721	498.1	-0.4	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFHpA
Correlation coefficient: r = 0.999748, r^2 = 0.999495
Calibration curve: 1.31181 * x + 0.10388
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 181119M2_2	Standard	0.250	4.00	516.538	15212.078	0.424	0.2	-2.3	NO	0.999	NO	bb
2	2 181119M2_3	Standard	0.500	3.99	832.492	14174.076	0.734	0.5	-3.9	NO	0.999	NO	bb
3	3 181119M2_4	Standard	1.000	3.99	1842.993	16138.139	1.428	1.0	0.9	NO	0.999	NO	MM
4	4 181119M2_5	Standard	2.000	3.99	3462.800	14762.115	2.932	2.2	7.8	NO	0.999	NO	MM
5	5 181119M2_6	Standard	5.000	4.00	7960.893	14129.451	7.043	5.3	5.8	NO	0.999	NO	bb
6	6 181119M2_7	Standard	10.000	4.00	15062.813	14815.835	12.708	9.6	-3.9	NO	0.999	NO	bb
7	7 181119M2_8	Standard	50.000	4.00	69581.234	13622.270	63.849	48.6	-2.8	NO	0.999	NO	bb
8	8 181119M2_9	Standard	100.000	3.99	173599.094	17237.354	125.889	95.9	-4.1	NO	0.999	NO	bb
9	9 181119M2_10	Standard	250.000	4.00	343442.031	12727.545	337.302	257.0	2.8	NO	0.999	NO	bb
10	10 181119M2_11	Standard	500.000	4.00	595512.125	11382.896	653.955	498.4	-0.3	NO	0.999	NO	bb

Compound name: L-PFHxS
Coefficient of Determination: R^2 = 0.999706
Calibration curve: 5.96666e-005 * x^2 + 1.89134 * x + 0.0133884
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 181119M2_2	Standard	0.250	4.14	73.470	1792.613	0.512	0.3	5.5	NO	1.000	NO	MM
2	2 181119M2_3	Standard	0.500	4.13	99.019	1646.265	0.752	0.4	-21.9	NO	1.000	NO	MM
3	3 181119M2_4	Standard	1.000	4.14	314.149	1933.117	2.031	1.1	6.7	NO	1.000	NO	MM
4	4 181119M2_5	Standard	2.000	4.14	577.442	1833.109	3.938	2.1	3.7	NO	1.000	NO	MM
5	5 181119M2_6	Standard	5.000	4.14	1418.372	1607.918	11.026	5.8	16.4	NO	1.000	NO	MM
6	6 181119M2_7	Standard	10.000	4.14	2588.263	1798.872	17.985	9.5	-5.0	NO	1.000	NO	MM
7	7 181119M2_8	Standard	50.000	4.14	11925.030	1631.419	91.370	48.2	-3.5	NO	1.000	NO	MM
8	8 181119M2_9	Standard	100.000	4.14	29631.146	1946.060	190.328	100.3	0.3	NO	1.000	NO	MM
9	9 181119M2_10	Standard	250.000	4.14	56313.809	1465.594	480.299	251.9	0.8	NO	1.000	NO	MM
10	10 181119M2_11	Standard	500.000	4.14	100537.367	1310.495	958.964	499.2	-0.2	NO	1.000	NO	MM

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.998047
Calibration curve: -0.00381892 * x^2 + 1.23743 * x + 0.0518006
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	181119M2_2	Standard	0.250	4.43	164.737	5623.550	0.366	0.3	1.7	NO	0.998	NO	bb
2	2	181119M2_3	Standard	0.500	4.43	263.189	5526.397	0.595	0.4	-12.0	NO	0.998	NO	bb
3	3	181119M2_4	Standard	1.000	4.43	683.353	6134.386	1.392	1.1	8.7	NO	0.998	NO	bb
4	4	181119M2_5	Standard	2.000	4.43	1193.714	5566.914	2.680	2.1	6.9	NO	0.998	NO	bb
5	5	181119M2_6	Standard	5.000	4.43	2996.952	5399.997	6.937	5.7	13.3	NO	0.998	NO	bb
6	6	181119M2_7	Standard	10.000	4.43	5690.258	5814.821	12.232	10.2	1.6	NO	0.998	NO	bb
7	7	181119M2_8	Standard	50.000	4.43	23512.561	5863.651	50.124	47.4	-5.2	NO	0.998	NO	bb
8	8	181119M2_9	Standard	100.000	4.43	56294.121	8119.057	86.670	102.3	2.3	NO	0.998	NO	bb
9	9	181119M2_10	Standard	250.000	4.43	97923.398	7875.905	155.416			NO	0.998	NO	bbXI
10	10	181119M2_11	Standard	500.000	4.43	162323.875	9615.668	211.015			NO	0.998	NO	bbXI

Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999903
Calibration curve: 3.24421e-005 * x^2 + 1.28147 * x + 0.139843
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	181119M2_2	Standard	0.250	4.48	923.472	28231.434	0.409	0.2	-16.0	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	4.48	1567.729	26452.445	0.741	0.5	-6.2	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	4.48	3448.797	28819.477	1.496	1.1	5.8	NO	1.000	NO	MM
4	4	181119M2_5	Standard	2.000	4.48	6460.337	27397.867	2.947	2.2	9.5	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	4.48	15221.923	26708.523	7.124	5.4	9.0	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	4.48	28726.775	28259.658	12.707	9.8	-2.0	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	4.48	129551.688	25255.820	64.120	49.9	-0.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	4.48	331936.594	32066.238	129.395	100.6	0.6	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	4.48	619136.813	24147.814	320.493	248.4	-0.6	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	4.48	1121107.375	21564.240	649.865	500.7	0.1	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999858
Calibration curve: -5.37984e-005 * x^2 + 0.893106 * x + 0.00719861
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	181119M2_2	Standard	0.250	4.60	63.441	4108.609	0.193	0.2	-16.8	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	4.60	122.033	3827.049	0.399	0.4	-12.4	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	4.59	346.636	4244.481	1.021	1.1	13.5	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	4.59	601.696	4097.844	1.835	2.0	2.4	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	4.59	1564.263	3940.625	4.962	5.5	11.0	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	4.59	2947.437	3978.693	9.260	10.4	3.7	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	4.59	12618.229	3552.762	44.396	49.9	-0.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	4.59	32027.629	4565.238	87.694	98.8	-1.2	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	4.60	60000.969	3406.921	220.144	250.3	0.1	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	4.59	103417.281	2983.985	433.218	500.1	0.0	NO	1.000	NO	bb

Compound name: PFNA
Coefficient of Determination: R^2 = 0.999697
Calibration curve: -2.33201e-005 * x^2 + 1.25361 * x + 0.0678484
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	181119M2_2	Standard	0.250	4.92	778.514	26171.613	0.372	0.2	-3.0	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	4.91	1374.048	25323.861	0.678	0.5	-2.6	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	4.92	2910.551	28203.666	1.290	1.0	-2.5	NO	1.000	NO	db
4	4	181119M2_5	Standard	2.000	4.91	5679.014	25886.408	2.742	2.1	6.7	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	4.91	13372.558	24726.096	6.760	5.3	6.8	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	4.92	25387.781	26153.418	12.134	9.6	-3.7	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	4.91	116764.438	23268.891	62.726	50.0	0.1	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	4.91	293864.031	30350.779	121.028	96.7	-3.3	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	4.92	549408.438	21564.033	318.475	255.2	2.1	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	4.92	961486.125	19427.135	618.649	498.1	-0.4	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999774
Calibration curve: 7.6527e-005 * x^2 + 1.04958 * x + 0.111382
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	181119M2_2	Standard	0.250	4.95	100.605	4036.926	0.312	0.2	-23.7	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	4.95	186.581	3630.737	0.642	0.5	1.2	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	4.95	412.094	4128.867	1.248	1.1	8.2	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	4.95	764.492	3812.550	2.506	2.3	14.1	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	4.95	1658.937	3633.620	5.707	5.3	6.6	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	4.95	3140.152	3919.324	10.015	9.4	-5.7	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	4.95	15106.321	3666.471	51.502	48.8	-2.4	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	4.95	38967.730	4495.724	108.347	102.4	2.4	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	4.95	72876.633	3432.199	265.415	248.3	-0.7	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	4.96	136178.484	3125.642	544.602	500.5	0.1	NO	1.000	NO	bb

Compound name: L-PFOS
Correlation coefficient: r = 0.999888, r^2 = 0.999775
Calibration curve: 1.06971 * x + -0.0118865
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	181119M2_2	Standard	0.250	5.01	98.798	4108.609	0.301	0.3	16.8	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	5.00	154.144	3827.049	0.503	0.5	-3.6	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	5.00	351.132	4244.481	1.034	1.0	-2.2	NO	1.000	NO	MM
4	4	181119M2_5	Standard	2.000	5.00	617.678	4097.844	1.884	1.8	-11.4	NO	1.000	NO	MM
5	5	181119M2_6	Standard	5.000	5.00	1673.782	3940.625	5.309	5.0	-0.5	NO	1.000	NO	MM
6	6	181119M2_7	Standard	10.000	5.00	3361.532	3978.693	10.561	9.9	-1.2	NO	1.000	NO	MM
7	7	181119M2_8	Standard	50.000	5.00	15116.554	3552.762	53.186	49.7	-0.5	NO	1.000	NO	MM
8	8	181119M2_9	Standard	100.000	5.00	38513.621	4565.238	105.453	98.6	-1.4	NO	1.000	NO	MM
9	9	181119M2_10	Standard	250.000	5.00	71667.461	3406.921	262.948	245.8	-1.7	NO	1.000	NO	MM
10	10	181119M2_11	Standard	500.000	5.00	129266.523	2983.985	541.501	506.2	1.2	NO	1.000	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFDA
Coefficient of Determination: R^2 = 0.999698
Calibration curve: -2.71042e-005 * x^2 + 1.27845 * x + 0.117549
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	181119M2_2	Standard	0.250	5.30	843.658	27290.563	0.386	0.2	-15.9	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	5.30	1456.008	25857.824	0.704	0.5	-8.3	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	5.30	3318.442	28627.584	1.449	1.0	4.1	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	5.30	6076.232	26005.883	2.921	2.2	9.6	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	5.30	14443.004	25225.010	7.157	5.5	10.1	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	5.30	27237.396	26758.283	12.724	9.9	-1.4	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	5.30	124178.961	23960.344	64.784	50.6	1.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	5.30	318462.281	30530.443	130.387	102.1	2.1	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	5.30	584892.563	23513.342	310.937	244.4	-2.2	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	5.30	1010866.000	19883.453	635.494	502.3	0.5	NO	1.000	NO	bb

Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.998680
Calibration curve: -0.00498611 * x^2 + 1.49085 * x + 0.00285394
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	181119M2_2	Standard	0.250	5.27	112.896	4859.266	0.290	0.2	-22.8	NO	0.999	NO	bb
2	2	181119M2_3	Standard	0.500	5.27	297.895	4520.942	0.824	0.6	10.3	NO	0.999	NO	bb
3	3	181119M2_4	Standard	1.000	5.27	654.499	5013.195	1.632	1.1	9.7	NO	0.999	NO	bb
4	4	181119M2_5	Standard	2.000	5.27	1081.621	4858.129	2.783	1.9	-6.2	NO	0.999	NO	bb
5	5	181119M2_6	Standard	5.000	5.26	2833.497	4526.918	7.824	5.3	6.8	NO	0.999	NO	bb
6	6	181119M2_7	Standard	10.000	5.27	5559.701	4607.528	15.083	10.5	4.8	NO	0.999	NO	bb
7	7	181119M2_8	Standard	50.000	5.27	22980.473	4785.341	60.028	48.0	-4.1	NO	0.999	NO	bb
8	8	181119M2_9	Standard	100.000	5.27	51903.652	6477.405	100.163	101.9	1.9	NO	0.999	NO	bb
9	9	181119M2_10	Standard	250.000	5.27	92867.539	7040.150	164.889			NO	0.999	NO	bbXI
10	10	181119M2_11	Standard	500.000	5.27	148515.125	8575.246	216.488			NO	0.999	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: PFNS
Coefficient of Determination: R^2 = 0.999636
Calibration curve: -8.93498e-005 * x^2 + 0.752372 * x + 0.018373
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 181119M2_2	Standard	0.250	5.36	53.205	4108.609	0.162	0.2	-23.7	NO	1.000	NO	bb
2	2 181119M2_3	Standard	0.500	5.36	140.341	3827.049	0.458	0.6	17.0	NO	1.000	NO	bb
3	3 181119M2_4	Standard	1.000	5.36	314.901	4244.481	0.927	1.2	20.8	NO	1.000	NO	bb
4	4 181119M2_5	Standard	2.000	5.36	468.478	4097.844	1.429	1.9	-6.2	NO	1.000	NO	bb
5	5 181119M2_6	Standard	5.000	5.36	1166.102	3940.625	3.699	4.9	-2.1	NO	1.000	NO	bb
6	6 181119M2_7	Standard	10.000	5.36	2226.909	3978.693	6.996	9.3	-7.2	NO	1.000	NO	bb
7	7 181119M2_8	Standard	50.000	5.36	10975.434	3552.762	38.616	51.6	3.2	NO	1.000	NO	bb
8	8 181119M2_9	Standard	100.000	5.36	26383.539	4565.238	72.240	97.1	-2.9	NO	1.000	NO	bb
9	9 181119M2_10	Standard	250.000	5.36	50368.477	3406.921	184.802	253.2	1.3	NO	1.000	NO	bb
10	10 181119M2_11	Standard	500.000	5.36	84278.570	2983.985	353.045	498.8	-0.2	NO	1.000	NO	bb

Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999924
Calibration curve: -0.000386461 * x^2 + 2.52617 * x + 0.080661
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 181119M2_2	Standard	0.250	5.46	251.995	4628.490	0.681	0.2	-5.0	NO	1.000	NO	MM
2	2 181119M2_3	Standard	0.500	5.45	522.025	4309.020	1.514	0.6	13.5	NO	1.000	NO	MM
3	3 181119M2_4	Standard	1.000	5.46	1056.300	5236.305	2.522	1.0	-3.4	NO	1.000	NO	MM
4	4 181119M2_5	Standard	2.000	5.45	2028.296	4817.466	5.263	2.1	2.6	NO	1.000	NO	MM
5	5 181119M2_6	Standard	5.000	5.45	4627.607	4290.914	13.481	5.3	6.2	NO	1.000	NO	MM
6	6 181119M2_7	Standard	10.000	5.46	9467.222	4749.372	24.917	9.8	-1.5	NO	1.000	NO	MM
7	7 181119M2_8	Standard	50.000	5.45	44396.082	4417.319	125.631	50.1	0.2	NO	1.000	NO	MM
8	8 181119M2_9	Standard	100.000	5.45	107883.500	5373.311	250.971	100.9	0.9	NO	1.000	NO	MM
9	9 181119M2_10	Standard	250.000	5.46	198339.422	4114.792	602.520	247.9	-0.8	NO	1.000	NO	MM
10	10 181119M2_11	Standard	500.000	5.46	347308.156	3715.081	1168.575	500.9	0.2	NO	1.000	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:27 Pacific Standard Time

Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999736
Calibration curve: -0.000106299 * x^2 + 1.4734 * x + -0.0536291
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	181119M2_2	Standard	0.250	5.61	166.752	7213.673	0.289	0.2	-7.0	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	5.61	364.042	7189.671	0.633	0.5	-6.8	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	5.61	889.373	8072.732	1.377	1.0	-2.9	NO	1.000	NO	MM
4	4	181119M2_5	Standard	2.000	5.61	1828.602	7141.138	3.201	2.2	10.5	NO	1.000	NO	MM
5	5	181119M2_6	Standard	5.000	5.61	4232.383	6697.716	7.899	5.4	8.0	NO	1.000	NO	MM
6	6	181119M2_7	Standard	10.000	5.61	8322.130	7169.415	14.510	9.9	-1.1	NO	1.000	NO	MM
7	7	181119M2_8	Standard	50.000	5.61	37253.289	6243.492	74.584	50.8	1.7	NO	1.000	NO	MM
8	8	181119M2_9	Standard	100.000	5.61	87414.055	7736.290	141.240	96.6	-3.4	NO	1.000	NO	MM
9	9	181119M2_10	Standard	250.000	5.61	158263.875	5402.566	366.178	253.2	1.3	NO	1.000	NO	MM
10	10	181119M2_11	Standard	500.000	5.61	259588.375	4578.734	708.679	499.0	-0.2	NO	1.000	NO	MM

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Compound name: PFUdA
Coefficient of Determination: R^2 = 0.999904
Calibration curve: -3.81142e-005 * x^2 + 0.91974 * x + 0.12239
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	181119M2_2	Standard	0.250	5.63	857.003	33161.066	0.323	0.2	-12.7	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	5.62	1367.793	30967.859	0.552	0.5	-6.6	NO	1.000	NO	MM
3	3	181119M2_4	Standard	1.000	5.63	2801.699	34600.328	1.012	1.0	-3.3	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	5.63	5655.261	32182.045	2.197	2.3	12.8	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	5.62	12636.367	31226.184	5.058	5.4	7.4	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	5.62	25010.512	32447.098	9.635	10.3	3.5	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	5.62	111131.367	30282.404	45.873	49.8	-0.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	5.62	276373.875	37913.652	91.120	99.3	-0.7	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	5.62	494759.781	27208.760	227.298	249.6	-0.2	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	5.63	869452.938	24109.936	450.775	500.4	0.1	NO	1.000	NO	bb

Compound name: PFDS
Coefficient of Determination: R^2 = 0.999675
Calibration curve: -8.18889e-005 * x^2 + 0.987988 * x + 0.0385595
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	181119M2_2	Standard	0.250	5.68	84.529	4108.609	0.257	0.2	-11.5	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	5.67	165.738	3827.049	0.541	0.5	1.8	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	5.67	357.844	4244.481	1.054	1.0	2.8	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	5.67	723.934	4097.844	2.208	2.2	9.8	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	5.67	1528.886	3940.625	4.850	4.9	-2.6	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	5.67	3015.166	3978.693	9.473	9.6	-4.4	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	5.67	14680.209	3552.762	51.651	52.5	4.9	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	5.67	36073.879	4565.238	98.773	100.8	0.8	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	5.67	64612.719	3406.921	237.064	244.9	-2.0	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	5.68	113535.414	2983.985	475.603	502.3	0.5	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.999950
Calibration curve: -0.000162641 * x^2 + 1.1143 * x + 0.0921152
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	181119M2_2	Standard	0.250	5.92	854.313	31624.697	0.338	0.2	-11.8	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	5.91	1547.885	30269.807	0.639	0.5	-1.8	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	5.91	3270.123	33972.863	1.203	1.0	-0.3	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	5.91	6167.689	30843.951	2.500	2.2	8.1	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	5.91	14275.714	29876.510	5.973	5.3	5.6	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	5.91	27532.816	30415.438	11.315	10.1	0.9	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	5.91	126460.516	28500.293	55.465	50.1	0.1	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	5.91	312687.813	35880.168	108.935	99.1	-0.9	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	5.91	588431.875	27358.664	268.851	250.3	0.1	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	5.91	1009472.375	24426.381	516.589	500.0	0.0	NO	1.000	NO	bb

Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999829
Calibration curve: -3.45213e-005 * x^2 + 1.10576 * x + 0.229354
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	181119M2_2	Standard	1.250	5.87	187.147	14716.533	1.908	1.5	21.4	NO	1.000	NO	bb
2	2	181119M2_3	Standard	2.500	5.87	254.778	14225.475	2.686	2.2	-11.1	NO	1.000	NO	bb
3	3	181119M2_4	Standard	5.000	5.87	571.906	14721.434	5.827	5.1	1.3	NO	1.000	NO	bb
4	4	181119M2_5	Standard	10.000	5.87	1079.215	14069.096	11.506	10.2	2.0	NO	1.000	NO	MM
5	5	181119M2_6	Standard	25.000	5.86	2685.258	13369.688	30.127	27.1	8.2	NO	1.000	NO	bb
6	6	181119M2_7	Standard	50.000	5.87	5015.957	13992.553	53.771	48.5	-3.0	NO	1.000	NO	bb
7	7	181119M2_8	Standard	250.000	5.87	23541.771	13301.676	265.475	241.7	-3.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	500.000	5.87	59920.633	16427.805	547.127	502.5	0.5	NO	1.000	NO	bb
9	9	181119M2_10	Standard	1250.000	5.87	114438.148	12822.527	1338.716	1260.0	0.8	NO	1.000	NO	bb
10	10	181119M2_11	Standard	2500.000	5.87	209546.000	12354.559	2544.154	2494.9	-0.2	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.999868
Calibration curve: -5.63679e-005 * x^2 + 1.12947 * x + 0.111462
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	181119M2_2	Standard	0.250	6.17	872.553	31624.697	0.345	0.2	-17.3	NO	1.000	NO	MM
2	2	181119M2_3	Standard	0.500	6.16	1608.678	30269.807	0.664	0.5	-2.1	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	6.16	3399.574	33972.863	1.251	1.0	0.9	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	6.17	6293.828	30843.951	2.551	2.2	8.0	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	6.16	14945.619	29876.510	6.253	5.4	8.8	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	6.16	27968.576	30415.438	11.494	10.1	0.8	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	6.16	131051.219	28500.293	57.478	50.9	1.8	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	6.16	323020.906	35880.168	112.535	100.0	0.0	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	6.16	603225.063	27358.664	275.610	247.0	-1.2	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	6.17	1079276.875	24426.381	552.311	501.4	0.3	NO	1.000	NO	bb

Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999748
Calibration curve: -0.000104949 * x^2 + 1.44062 * x + 0.169939
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	181119M2_2	Standard	0.250	6.39	768.410	21172.174	0.454	0.2	-21.2	NO	1.000	NO	db
2	2	181119M2_3	Standard	0.500	6.38	1384.319	20377.557	0.849	0.5	-5.7	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	6.38	2873.409	21736.246	1.652	1.0	2.9	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	6.39	5694.235	20898.445	3.406	2.2	12.3	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	6.38	13211.146	20290.688	8.139	5.5	10.7	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	6.38	24907.279	21540.184	14.454	9.9	-0.8	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	6.39	116218.648	19586.178	74.171	51.6	3.1	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	6.39	281550.844	24609.129	143.011	99.9	-0.1	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	6.39	514074.813	18456.822	348.160	246.0	-1.6	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	6.39	910216.750	16327.394	696.848	502.0	0.4	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999708
Calibration curve: -2.13466e-005 * x^2 + 0.817824 * x + 0.372192
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	181119M2_2	Standard	1.250	6.38	216.996	26349.342	1.235	1.1	-15.6	NO	1.000	NO	bb
2	2	181119M2_3	Standard	2.500	6.38	372.795	24629.291	2.270	2.3	-7.2	NO	1.000	NO	bb
3	3	181119M2_4	Standard	5.000	6.38	795.194	25927.586	4.600	5.2	3.4	NO	1.000	NO	bb
4	4	181119M2_5	Standard	10.000	6.38	1601.034	25053.615	9.586	11.3	12.7	NO	1.000	NO	bb
5	5	181119M2_6	Standard	25.000	6.38	3603.912	23526.484	22.978	27.7	10.6	NO	1.000	NO	bb
6	6	181119M2_7	Standard	50.000	6.38	6503.048	24278.818	40.177	48.7	-2.5	NO	1.000	NO	bb
7	7	181119M2_8	Standard	250.000	6.38	31493.928	23146.490	204.095	250.7	0.3	NO	1.000	NO	bb
8	8	181119M2_9	Standard	500.000	6.38	77208.961	29545.973	391.977	485.0	-3.0	NO	1.000	NO	bb
9	9	181119M2_10	Standard	1250.000	6.38	143253.984	21416.256	1003.355	1268.4	1.5	NO	1.000	NO	bb
10	10	181119M2_11	Standard	2500.000	6.38	250437.047	19700.666	1906.817	2493.4	-0.3	NO	1.000	NO	bb

Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.999829
Calibration curve: -0.000101772 * x^2 + 0.509003 * x + 0.0746932
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	181119M2_2	Standard	0.250	6.73	411.382	11001.170	0.187	0.2	-11.8	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	6.73	627.530	10395.756	0.302	0.4	-10.7	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	6.73	1421.451	11990.450	0.593	1.0	1.8	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	6.73	2596.922	10921.020	1.189	2.2	9.5	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	6.73	5953.040	10474.562	2.842	5.4	8.8	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	6.73	11451.127	10691.082	5.355	10.4	4.0	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	6.73	52150.473	10315.671	25.277	50.0	0.0	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	6.73	126997.086	12986.853	48.894	97.8	-2.2	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	6.73	245571.938	10090.199	121.688	251.6	0.6	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	6.73	434986.156	9498.477	228.977	499.6	-0.1	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: PFODA
Coefficient of Determination: R^2 = 0.999792
Calibration curve: -0.000188326 * x^2 + 0.748104 * x + 0.0400274
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	181119M2_2	Standard	0.250	6.97	502.109	11001.170	0.228	0.3	0.6	NO	1.000	NO	bb
2	2	181119M2_3	Standard	0.500	6.97	894.711	10395.756	0.430	0.5	4.4	NO	1.000	NO	bb
3	3	181119M2_4	Standard	1.000	6.97	1880.738	11990.450	0.784	1.0	-0.5	NO	1.000	NO	bb
4	4	181119M2_5	Standard	2.000	6.97	3735.649	10921.020	1.710	2.2	11.7	NO	1.000	NO	bb
5	5	181119M2_6	Standard	5.000	6.97	8443.270	10474.562	4.030	5.3	6.8	NO	1.000	NO	bb
6	6	181119M2_7	Standard	10.000	6.97	15968.652	10691.082	7.468	10.0	-0.5	NO	1.000	NO	bb
7	7	181119M2_8	Standard	50.000	6.97	76760.453	10315.671	37.206	50.3	0.6	NO	1.000	NO	bb
8	8	181119M2_9	Standard	100.000	6.97	184513.625	12986.853	71.039	97.3	-2.7	NO	1.000	NO	bb
9	9	181119M2_10	Standard	250.000	6.97	357499.906	10090.199	177.152	252.8	1.1	NO	1.000	NO	bb
10	10	181119M2_11	Standard	500.000	6.97	620141.375	9498.477	326.443	499.0	-0.2	NO	1.000	NO	bb

Compound name: N-MeFOSE
Coefficient of Determination: R^2 = 0.999680
Calibration curve: 1.98083e-006 * x^2 + 0.89799 * x + 0.169793
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	181119M2_2	Standard	1.250	6.69	103.039	13267.294	1.165	1.1	-11.3	NO	1.000	NO	MM
2	2	181119M2_3	Standard	2.500	6.69	193.571	12809.141	2.267	2.3	-6.6	NO	1.000	NO	bb
3	3	181119M2_4	Standard	5.000	6.69	468.017	13210.400	5.314	5.7	14.6	NO	1.000	NO	MM
4	4	181119M2_5	Standard	10.000	6.69	847.691	13064.595	9.733	10.6	6.5	NO	1.000	NO	bb
5	5	181119M2_6	Standard	25.000	6.69	1931.868	12425.742	23.321	25.8	3.1	NO	1.000	NO	bb
6	6	181119M2_7	Standard	50.000	6.69	3757.965	12816.330	43.983	48.8	-2.4	NO	1.000	NO	MM
7	7	181119M2_8	Standard	250.000	6.69	17819.732	12440.439	214.861	239.0	-4.4	NO	1.000	NO	bb
8	8	181119M2_9	Standard	500.000	6.69	47787.469	16127.344	444.470	494.2	-1.2	NO	1.000	NO	bb
9	9	181119M2_10	Standard	1250.000	6.69	94955.633	12377.250	1150.768	1277.7	2.2	NO	1.000	NO	bb
10	10	181119M2_11	Standard	2500.000	6.69	185390.609	12375.545	2247.060	2488.5	-0.5	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999917
Calibration curve: -8.62216e-006 * x^2 + 1.10568 * x + 0.172062
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	181119M2_2	Standard	1.250	6.84	130.487	13020.559	1.503	1.2	-3.7	NO	1.000	NO	bb
2	2	181119M2_3	Standard	2.500	6.83	240.638	12684.013	2.846	2.4	-3.3	NO	1.000	NO	bb
3	3	181119M2_4	Standard	5.000	6.83	556.560	13616.445	6.131	5.4	7.8	NO	1.000	NO	bb
4	4	181119M2_5	Standard	10.000	6.84	969.538	13198.563	11.019	9.8	-1.9	NO	1.000	NO	bb
5	5	181119M2_6	Standard	25.000	6.83	2336.107	12083.847	28.999	26.1	4.3	NO	1.000	NO	MM
6	6	181119M2_7	Standard	50.000	6.83	4607.524	12633.202	54.707	49.3	-1.3	NO	1.000	NO	bb
7	7	181119M2_8	Standard	250.000	6.84	21125.365	11788.857	268.797	243.4	-2.6	NO	1.000	NO	bb
8	8	181119M2_9	Standard	500.000	6.84	57284.172	15594.405	551.007	500.1	0.0	NO	1.000	NO	bb
9	9	181119M2_10	Standard	1250.000	6.83	113198.852	12299.542	1380.525	1260.8	0.9	NO	1.000	NO	bb
10	10	181119M2_11	Standard	2500.000	6.84	214771.906	11908.335	2705.314	2495.1	-0.2	NO	1.000	NO	bb

Compound name: 13C3-PFBA
Response Factor: 0.780139
RRF SD: 0.0108022, Relative SD: 1.38465
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	181119M2_2	Standard	12.500	1.18	7922.372	10214.163	9.695	12.4	-0.6	NO		NO	bb
2	2	181119M2_3	Standard	12.500	1.18	7014.210	8904.677	9.846	12.6	1.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	1.18	7707.828	9973.924	9.660	12.4	-0.9	NO		NO	MM
4	4	181119M2_5	Standard	12.500	1.18	7705.931	10174.105	9.468	12.1	-2.9	NO		NO	bb
5	5	181119M2_6	Standard	12.500	1.18	7763.416	10032.227	9.673	12.4	-0.8	NO		NO	bb
6	6	181119M2_7	Standard	12.500	1.18	7566.665	9720.454	9.730	12.5	-0.2	NO		NO	bb
7	7	181119M2_8	Standard	12.500	1.18	7999.171	10085.070	9.915	12.7	1.7	NO		NO	bb
8	8	181119M2_9	Standard	12.500	1.18	9901.624	12610.282	9.815	12.6	0.6	NO		NO	bb
9	9	181119M2_10	Standard	12.500	1.17	7713.829	9821.668	9.817	12.6	0.7	NO		NO	bb
10	10	181119M2_11	Standard	12.500	1.18	7558.623	9545.869	9.898	12.7	1.5	NO		NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C3-PFPeA
Response Factor: 0.523408
RRF SD: 0.0422452, Relative SD: 8.07118
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	181119M2_2	Standard	12.500	2.40	15865.156	31577.043	6.280	12.0	-4.0	NO		NO	MM
2	2	181119M2_3	Standard	12.500	2.40	13568.036	29049.188	5.838	11.2	-10.8	NO		NO	MM
3	3	181119M2_4	Standard	12.500	2.40	15828.560	32754.859	6.041	11.5	-7.7	NO		NO	MM
4	4	181119M2_5	Standard	12.500	2.40	15342.569	31986.332	5.996	11.5	-8.4	NO		NO	MM
5	5	181119M2_6	Standard	12.500	2.40	15479.487	29222.686	6.621	12.7	1.2	NO		NO	bb
6	6	181119M2_7	Standard	12.500	2.40	15429.634	30117.441	6.404	12.2	-2.1	NO		NO	MM
7	7	181119M2_8	Standard	12.500	2.40	15535.887	27874.125	6.967	13.3	6.5	NO		NO	bb
8	8	181119M2_9	Standard	12.500	2.40	19373.652	35903.074	6.745	12.9	3.1	NO		NO	MM
9	9	181119M2_10	Standard	12.500	2.40	15129.592	26844.322	7.045	13.5	7.7	NO		NO	bb
10	10	181119M2_11	Standard	12.500	2.40	14302.896	23874.543	7.489	14.3	14.5	NO		NO	bb

Compound name: 13C3-PFBS
Response Factor: 0.538719
RRF SD: 0.0224353, Relative SD: 4.16457
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	181119M2_2	Standard	12.500	2.75	1980.035	3630.358	6.818	12.7	1.2	NO		NO	MM
2	2	181119M2_3	Standard	12.500	2.75	1777.388	3431.369	6.475	12.0	-3.8	NO		NO	MM
3	3	181119M2_4	Standard	12.500	2.75	1967.175	3870.605	6.353	11.8	-5.7	NO		NO	bb
4	4	181119M2_5	Standard	12.500	2.75	1950.016	3801.275	6.412	11.9	-4.8	NO		NO	MM
5	5	181119M2_6	Standard	12.500	2.75	1881.051	3470.908	6.774	12.6	0.6	NO		NO	bb
6	6	181119M2_7	Standard	12.500	2.75	1935.022	3672.713	6.586	12.2	-2.2	NO		NO	bb
7	7	181119M2_8	Standard	12.500	2.75	1880.698	3410.166	6.894	12.8	2.4	NO		NO	bb
8	8	181119M2_9	Standard	12.500	2.75	2351.786	4067.239	7.228	13.4	7.3	NO		NO	bb
9	9	181119M2_10	Standard	12.500	2.75	1702.650	3146.183	6.765	12.6	0.5	NO		NO	bb
10	10	181119M2_11	Standard	12.500	2.75	1573.776	2796.026	7.036	13.1	4.5	NO		NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-4:2 FTS
Response Factor: 1.53389
RRF SD: 0.130563, Relative SD: 8.5119
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 181119M2_2	Standard	12.500	3.23	5344.524	3630.358	18.402	12.0	-4.0	NO		NO	bb
2	2 181119M2_3	Standard	12.500	3.23	5264.625	3431.369	19.178	12.5	0.0	NO		NO	bb
3	3 181119M2_4	Standard	12.500	3.23	5620.198	3870.605	18.150	11.8	-5.3	NO		NO	bb
4	4 181119M2_5	Standard	12.500	3.23	5300.505	3801.275	17.430	11.4	-9.1	NO		NO	bb
5	5 181119M2_6	Standard	12.500	3.23	5276.321	3470.908	19.002	12.4	-0.9	NO		NO	bb
6	6 181119M2_7	Standard	12.500	3.23	5410.559	3672.713	18.415	12.0	-4.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	3.23	5484.480	3410.166	20.103	13.1	4.8	NO		NO	bb
8	8 181119M2_9	Standard	12.500	3.23	7388.735	4067.239	22.708	14.8	18.4	NO		NO	bb
9	9 181119M2_10	Standard	12.500	3.23	6923.139	3146.183	27.506	17.9	43.5	NO		NO	bbX
10	10 181119M2_11	Standard	12.500	3.23	8616.051	2796.026	38.519	25.1	100.9	NO		NO	bbX

Compound name: 13C2-PFHxA
Response Factor: 0.964352
RRF SD: 0.0284266, Relative SD: 2.94775
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 181119M2_2	Standard	5.000	3.32	11966.714	31577.043	4.737	4.9	-1.8	NO		NO	bb
2	2 181119M2_3	Standard	5.000	3.32	11083.603	29049.188	4.769	4.9	-1.1	NO		NO	bb
3	3 181119M2_4	Standard	5.000	3.32	12586.650	32754.859	4.803	5.0	-0.4	NO		NO	bb
4	4 181119M2_5	Standard	5.000	3.32	11859.864	31986.332	4.635	4.8	-3.9	NO		NO	bb
5	5 181119M2_6	Standard	5.000	3.32	11046.164	29222.686	4.725	4.9	-2.0	NO		NO	bb
6	6 181119M2_7	Standard	5.000	3.32	11606.128	30117.441	4.817	5.0	-0.1	NO		NO	bb
7	7 181119M2_8	Standard	5.000	3.32	10716.891	27874.125	4.806	5.0	-0.3	NO		NO	bb
8	8 181119M2_9	Standard	5.000	3.32	13760.684	35903.074	4.791	5.0	-0.6	NO		NO	bb
9	9 181119M2_10	Standard	5.000	3.32	10768.104	26844.322	5.014	5.2	4.0	NO		NO	bb
10	10 181119M2_11	Standard	5.000	3.32	9779.139	23874.543	5.120	5.3	6.2	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C4-PFHpA
Response Factor: 0.481905
RRF SD: 0.00947565, Relative SD: 1.96629
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 181119M2_2	Standard	12.500	3.99	15212.078	31577.043	6.022	12.5	-0.0	NO		NO	bb
2	2 181119M2_3	Standard	12.500	3.99	14174.076	29049.188	6.099	12.7	1.3	NO		NO	bb
3	3 181119M2_4	Standard	12.500	3.99	16138.139	32754.859	6.159	12.8	2.2	NO		NO	bb
4	4 181119M2_5	Standard	12.500	3.99	14762.115	31986.332	5.769	12.0	-4.2	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.00	14129.451	29222.686	6.044	12.5	0.3	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.00	14815.835	30117.441	6.149	12.8	2.1	NO		NO	bb
7	7 181119M2_8	Standard	12.500	3.99	13622.270	27874.125	6.109	12.7	1.4	NO		NO	bb
8	8 181119M2_9	Standard	12.500	3.99	17237.354	35903.074	6.001	12.5	-0.4	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.00	12727.545	26844.322	5.927	12.3	-1.6	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.00	11382.896	23874.543	5.960	12.4	-1.1	NO		NO	bb

Compound name: 18O2-PFHxS
Response Factor: 0.479968
RRF SD: 0.0119368, Relative SD: 2.48701
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 181119M2_2	Standard	12.500	4.14	1792.613	3630.358	6.172	12.9	2.9	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.13	1646.265	3431.369	5.997	12.5	-0.0	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.14	1933.117	3870.605	6.243	13.0	4.1	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.14	1833.109	3801.275	6.028	12.6	0.5	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.14	1607.918	3470.908	5.791	12.1	-3.5	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.14	1798.872	3672.713	6.122	12.8	2.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.14	1631.419	3410.166	5.980	12.5	-0.3	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.14	1946.060	4067.239	5.981	12.5	-0.3	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.14	1465.594	3146.183	5.823	12.1	-2.9	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.14	1310.495	2796.026	5.859	12.2	-2.3	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-6:2 FTS
Response Factor: 1.53589
RRF SD: 0.164823, Relative SD: 10.7314
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 181119M2_2	Standard	12.500	4.43	5623.550	3843.607	18.289	11.9	-4.7	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.43	5526.397	3744.634	18.448	12.0	-3.9	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.43	6134.386	4035.006	19.004	12.4	-1.0	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.43	5566.914	3884.763	17.913	11.7	-6.7	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.43	5399.997	3863.451	17.471	11.4	-9.0	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.43	5814.821	3992.555	18.205	11.9	-5.2	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.43	5863.651	3579.661	20.476	13.3	6.7	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.43	8119.057	4267.014	23.784	15.5	23.9	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.43	7875.905	3212.936	30.641	20.0	59.6	NO		NO	bbX
10	10 181119M2_11	Standard	12.500	4.43	9615.668	2976.162	40.386	26.3	110.4	NO		NO	bbX

Compound name: 13C2-PFOA
Response Factor: 0.754837
RRF SD: 0.0160286, Relative SD: 2.12346
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 181119M2_2	Standard	12.500	4.48	28231.434	36963.355	9.547	12.6	1.2	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.48	26452.445	35655.656	9.274	12.3	-1.7	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.48	28819.477	38708.566	9.307	12.3	-1.4	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.48	27397.867	36743.945	9.321	12.3	-1.2	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.48	26708.523	34087.332	9.794	13.0	3.8	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.48	28259.658	37075.613	9.528	12.6	1.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.48	25255.820	34641.109	9.113	12.1	-3.4	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.48	32066.238	42997.430	9.322	12.3	-1.2	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.48	24147.814	31563.273	9.563	12.7	1.4	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.48	21564.240	28118.881	9.586	12.7	1.6	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C5-PFNA
Response Factor: 0.991938
RRF SD: 0.0193176, Relative SD: 1.94746
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 181119M2_2	Standard	12.500	4.92	26171.613	26543.949	12.325	12.4	-0.6	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.91	25323.861	25402.279	12.461	12.6	0.5	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.91	28203.666	27779.146	12.691	12.8	2.4	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.91	25886.408	26523.551	12.200	12.3	-1.6	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.91	24726.096	24571.891	12.578	12.7	1.4	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.92	26153.418	26232.998	12.462	12.6	0.5	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.91	23268.891	23664.459	12.291	12.4	-0.9	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.91	30350.779	29651.377	12.795	12.9	3.2	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.92	21564.033	22311.814	12.081	12.2	-2.6	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.91	19427.135	20056.293	12.108	12.2	-2.3	NO		NO	bb

Compound name: 13C8-PFOSA
Response Factor: 0.112275
RRF SD: 0.00628235, Relative SD: 5.59548
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 181119M2_2	Standard	12.500	4.96	4036.926	36370.602	1.387	12.4	-1.1	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.95	3630.737	33962.305	1.336	11.9	-4.8	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.96	4128.867	38463.867	1.342	12.0	-4.4	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.96	3812.550	35754.637	1.333	11.9	-5.0	NO		NO	bb
5	5 181119M2_6	Standard	12.500	4.95	3633.620	33911.098	1.339	11.9	-4.6	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.96	3919.324	34904.867	1.404	12.5	0.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.96	3666.471	32655.039	1.403	12.5	0.0	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.96	4495.724	39339.617	1.428	12.7	1.8	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.96	3432.199	28971.465	1.481	13.2	5.5	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.96	3125.642	24725.277	1.580	14.1	12.6	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C8-PFOS
Response Factor: 1.03396
RRF SD: 0.0305741, Relative SD: 2.95699
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	181119M2_2	Standard	12.500	5.00	4108.609	3843.607	13.362	12.9	3.4	NO		NO	bb
2	2	181119M2_3	Standard	12.500	5.00	3827.049	3744.634	12.775	12.4	-1.2	NO		NO	bb
3	3	181119M2_4	Standard	12.500	5.00	4244.481	4035.006	13.149	12.7	1.7	NO		NO	bb
4	4	181119M2_5	Standard	12.500	5.00	4097.844	3884.763	13.186	12.8	2.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	5.00	3940.625	3863.451	12.750	12.3	-1.4	NO		NO	bb
6	6	181119M2_7	Standard	12.500	5.00	3978.693	3992.555	12.457	12.0	-3.6	NO		NO	bb
7	7	181119M2_8	Standard	12.500	5.00	3552.762	3579.661	12.406	12.0	-4.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	5.00	4565.238	4267.014	13.374	12.9	3.5	NO		NO	bb
9	9	181119M2_10	Standard	12.500	5.00	3406.921	3212.936	13.255	12.8	2.6	NO		NO	bb
10	10	181119M2_11	Standard	12.500	5.00	2983.985	2976.162	12.533	12.1	-3.0	NO		NO	bb

Compound name: 13C2-PFDA
Response Factor: 0.832354
RRF SD: 0.0225955, Relative SD: 2.71466
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	181119M2_2	Standard	12.500	5.30	27290.563	32499.664	10.496	12.6	0.9	NO		NO	bb
2	2	181119M2_3	Standard	12.500	5.30	25857.824	30424.650	10.624	12.8	2.1	NO		NO	bb
3	3	181119M2_4	Standard	12.500	5.30	28627.584	34728.922	10.304	12.4	-1.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	5.30	26005.883	33468.051	9.713	11.7	-6.6	NO		NO	bb
5	5	181119M2_6	Standard	12.500	5.30	25225.010	30300.555	10.406	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	5.30	26758.283	31155.236	10.736	12.9	3.2	NO		NO	bb
7	7	181119M2_8	Standard	12.500	5.30	23960.344	29050.506	10.310	12.4	-0.9	NO		NO	bb
8	8	181119M2_9	Standard	12.500	5.30	30530.443	36924.023	10.336	12.4	-0.7	NO		NO	bb
9	9	181119M2_10	Standard	12.500	5.30	23513.342	27767.018	10.585	12.7	1.7	NO		NO	bb
10	10	181119M2_11	Standard	12.500	5.30	19883.453	23592.779	10.535	12.7	1.3	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-8:2 FTS
Response Factor: 1.26814
RRF SD: 0.115978, Relative SD: 9.14554
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 181119M2_2	Standard	12.500	5.27	4859.266	3843.607	15.803	12.5	-0.3	NO		NO	bb
2	2 181119M2_3	Standard	12.500	5.26	4520.942	3744.634	15.091	11.9	-4.8	NO		NO	bb
3	3 181119M2_4	Standard	12.500	5.27	5013.195	4035.006	15.530	12.2	-2.0	NO		NO	bb
4	4 181119M2_5	Standard	12.500	5.27	4858.129	3884.763	15.632	12.3	-1.4	NO		NO	bb
5	5 181119M2_6	Standard	12.500	5.26	4526.918	3863.451	14.647	11.5	-7.6	NO		NO	bb
6	6 181119M2_7	Standard	12.500	5.27	4607.528	3992.555	14.425	11.4	-9.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	5.27	4785.341	3579.661	16.710	13.2	5.4	NO		NO	bb
8	8 181119M2_9	Standard	12.500	5.26	6477.405	4267.014	18.975	15.0	19.7	NO		NO	bb
9	9 181119M2_10	Standard	12.500	5.27	7040.150	3212.936	27.390	21.6	72.8	NO		NO	bbX
10	10 181119M2_11	Standard	12.500	5.27	8575.246	2976.162	36.016	28.4	127.2	NO		NO	bbX

Compound name: d3-N-MeFOSAA
Response Factor: 0.135175
RRF SD: 0.00733689, Relative SD: 5.42769
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 181119M2_2	Standard	12.500	5.45	4628.490	36370.602	1.591	11.8	-5.9	NO		NO	bb
2	2 181119M2_3	Standard	12.500	5.45	4309.020	33962.305	1.586	11.7	-6.1	NO		NO	bb
3	3 181119M2_4	Standard	12.500	5.45	5236.305	38463.867	1.702	12.6	0.7	NO		NO	bb
4	4 181119M2_5	Standard	12.500	5.45	4817.466	35754.637	1.684	12.5	-0.3	NO		NO	bb
5	5 181119M2_6	Standard	12.500	5.45	4290.914	33911.098	1.582	11.7	-6.4	NO		NO	bb
6	6 181119M2_7	Standard	12.500	5.45	4749.372	34904.867	1.701	12.6	0.7	NO		NO	bb
7	7 181119M2_8	Standard	12.500	5.45	4417.319	32655.039	1.691	12.5	0.1	NO		NO	bb
8	8 181119M2_9	Standard	12.500	5.45	5373.311	39339.617	1.707	12.6	1.0	NO		NO	bb
9	9 181119M2_10	Standard	12.500	5.45	4114.792	28971.465	1.775	13.1	5.1	NO		NO	bb
10	10 181119M2_11	Standard	12.500	5.45	3715.081	24725.277	1.878	13.9	11.2	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-PFUdA
Response Factor: 0.9279
RRF SD: 0.0253656, Relative SD: 2.73366
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 181119M2_2	Standard	12.500	5.63	33161.066	36370.602	11.397	12.3	-1.7	NO		NO	bb
2	2 181119M2_3	Standard	12.500	5.63	30967.859	33962.305	11.398	12.3	-1.7	NO		NO	bb
3	3 181119M2_4	Standard	12.500	5.63	34600.328	38463.867	11.244	12.1	-3.1	NO		NO	bb
4	4 181119M2_5	Standard	12.500	5.63	32182.045	35754.637	11.251	12.1	-3.0	NO		NO	bb
5	5 181119M2_6	Standard	12.500	5.63	31226.184	33911.098	11.510	12.4	-0.8	NO		NO	bb
6	6 181119M2_7	Standard	12.500	5.63	32447.098	34904.867	11.620	12.5	0.2	NO		NO	bb
7	7 181119M2_8	Standard	12.500	5.63	30282.404	32655.039	11.592	12.5	-0.1	NO		NO	bb
8	8 181119M2_9	Standard	12.500	5.63	37913.652	39339.617	12.047	13.0	3.9	NO		NO	bb
9	9 181119M2_10	Standard	12.500	5.63	27208.760	28971.465	11.739	12.7	1.2	NO		NO	bb
10	10 181119M2_11	Standard	12.500	5.63	24109.936	24725.277	12.189	13.1	5.1	NO		NO	bb

Compound name: d5-N-EtFOSAA
Response Factor: 0.198206
RRF SD: 0.00901487, Relative SD: 4.54824
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 181119M2_2	Standard	12.500	5.61	7213.673	36370.602	2.479	12.5	0.1	NO		NO	bb
2	2 181119M2_3	Standard	12.500	5.61	7189.671	33962.305	2.646	13.4	6.8	NO		NO	bb
3	3 181119M2_4	Standard	12.500	5.61	8072.732	38463.867	2.623	13.2	5.9	NO		NO	bb
4	4 181119M2_5	Standard	12.500	5.61	7141.138	35754.637	2.497	12.6	0.8	NO		NO	bb
5	5 181119M2_6	Standard	12.500	5.61	6697.716	33911.098	2.469	12.5	-0.4	NO		NO	bb
6	6 181119M2_7	Standard	12.500	5.61	7169.415	34904.867	2.567	13.0	3.6	NO		NO	bb
7	7 181119M2_8	Standard	12.500	5.61	6243.492	32655.039	2.390	12.1	-3.5	NO		NO	MM
8	8 181119M2_9	Standard	12.500	5.61	7736.290	39339.617	2.458	12.4	-0.8	NO		NO	bb
9	9 181119M2_10	Standard	12.500	5.61	5402.566	28971.465	2.331	11.8	-5.9	NO		NO	bb
10	10 181119M2_11	Standard	12.500	5.61	4578.734	24725.277	2.315	11.7	-6.6	NO		NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-PFDoA
Response Factor: 0.980349
RRF SD: 0.0276743, Relative SD: 2.8229
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 181119M2_2	Standard	12.500	5.92	31624.697	32499.664	12.163	12.4	-0.7	NO		NO	bb
2	2 181119M2_3	Standard	12.500	5.91	30269.807	30424.650	12.436	12.7	1.5	NO		NO	bb
3	3 181119M2_4	Standard	12.500	5.91	33972.863	34728.922	12.228	12.5	-0.2	NO		NO	bb
4	4 181119M2_5	Standard	12.500	5.91	30843.951	33468.051	11.520	11.8	-6.0	NO		NO	bb
5	5 181119M2_6	Standard	12.500	5.91	29876.510	30300.555	12.325	12.6	0.6	NO		NO	bb
6	6 181119M2_7	Standard	12.500	5.91	30415.438	31155.236	12.203	12.4	-0.4	NO		NO	bb
7	7 181119M2_8	Standard	12.500	5.91	28500.293	29050.506	12.263	12.5	0.1	NO		NO	bb
8	8 181119M2_9	Standard	12.500	5.91	35880.168	36924.023	12.147	12.4	-0.9	NO		NO	bb
9	9 181119M2_10	Standard	12.500	5.91	27358.664	27767.018	12.316	12.6	0.5	NO		NO	bb
10	10 181119M2_11	Standard	12.500	5.91	24426.381	23592.779	12.942	13.2	5.6	NO		NO	bb

Compound name: d3-N-MeFOSA
Response Factor: 0.0346837
RRF SD: 0.0028106, Relative SD: 8.10354
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 181119M2_2	Standard	150.000	5.90	14716.533	36370.602	5.058	145.8	-2.8	NO		NO	bb
2	2 181119M2_3	Standard	150.000	5.90	14225.475	33962.305	5.236	151.0	0.6	NO		NO	MM
3	3 181119M2_4	Standard	150.000	5.90	14721.434	38463.867	4.784	137.9	-8.0	NO		NO	bb
4	4 181119M2_5	Standard	150.000	5.90	14069.096	35754.637	4.919	141.8	-5.5	NO		NO	bb
5	5 181119M2_6	Standard	150.000	5.90	13369.688	33911.098	4.928	142.1	-5.3	NO		NO	bb
6	6 181119M2_7	Standard	150.000	5.90	13992.553	34904.867	5.011	144.5	-3.7	NO		NO	bb
7	7 181119M2_8	Standard	150.000	5.90	13301.676	32655.039	5.092	146.8	-2.1	NO		NO	bb
8	8 181119M2_9	Standard	150.000	5.90	16427.805	39339.617	5.220	150.5	0.3	NO		NO	bb
9	9 181119M2_10	Standard	150.000	5.90	12822.527	28971.465	5.532	159.5	6.3	NO		NO	MM
10	10 181119M2_11	Standard	150.000	5.90	12354.559	24725.277	6.246	180.1	20.1	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-PFTeDA
Response Factor: 0.606996
RRF SD: 0.0283884, Relative SD: 4.67687
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	181119M2_2	Standard	12.500	6.39	21172.174	36370.602	7.277	12.0	-4.1	NO		NO	bb
2	2	181119M2_3	Standard	12.500	6.38	20377.557	33962.305	7.500	12.4	-1.2	NO		NO	bb
3	3	181119M2_4	Standard	12.500	6.38	21736.246	38463.867	7.064	11.6	-6.9	NO		NO	bb
4	4	181119M2_5	Standard	12.500	6.39	20898.445	35754.637	7.306	12.0	-3.7	NO		NO	bb
5	5	181119M2_6	Standard	12.500	6.38	20290.688	33911.098	7.479	12.3	-1.4	NO		NO	bb
6	6	181119M2_7	Standard	12.500	6.38	21540.184	34904.867	7.714	12.7	1.7	NO		NO	bb
7	7	181119M2_8	Standard	12.500	6.39	19586.178	32655.039	7.497	12.4	-1.2	NO		NO	bb
8	8	181119M2_9	Standard	12.500	6.39	24609.129	39339.617	7.819	12.9	3.1	NO		NO	bb
9	9	181119M2_10	Standard	12.500	6.38	18456.822	28971.465	7.963	13.1	5.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	6.39	16327.394	24725.277	8.254	13.6	8.8	NO		NO	bb

Compound name: d5-N-ETFOSA
Response Factor: 0.0600805
RRF SD: 0.00293414, Relative SD: 4.88368
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	181119M2_2	Standard	150.000	6.41	26349.342	36370.602	9.056	150.7	0.5	NO		NO	bb
2	2	181119M2_3	Standard	150.000	6.40	24629.291	33962.305	9.065	150.9	0.6	NO		NO	bb
3	3	181119M2_4	Standard	150.000	6.40	25927.586	38463.867	8.426	140.2	-6.5	NO		NO	bb
4	4	181119M2_5	Standard	150.000	6.40	25053.615	35754.637	8.759	145.8	-2.8	NO		NO	bb
5	5	181119M2_6	Standard	150.000	6.40	23526.484	33911.098	8.672	144.3	-3.8	NO		NO	bb
6	6	181119M2_7	Standard	150.000	6.40	24278.818	34904.867	8.695	144.7	-3.5	NO		NO	bb
7	7	181119M2_8	Standard	150.000	6.40	23146.490	32655.039	8.860	147.5	-1.7	NO		NO	bb
8	8	181119M2_9	Standard	150.000	6.40	29545.973	39339.617	9.388	156.3	4.2	NO		NO	bb
9	9	181119M2_10	Standard	150.000	6.40	21416.256	28971.465	9.240	153.8	2.5	NO		NO	bb
10	10	181119M2_11	Standard	150.000	6.40	19700.666	24725.277	9.960	165.8	10.5	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C2-PFHxDA
Response Factor: 0.804846
RRF SD: 0.0650334, Relative SD: 8.08023
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 181119M2_2	Standard	5.000	6.73	11001.170	36370.602	3.781	4.7	-6.0	NO		NO	bb
2	2 181119M2_3	Standard	5.000	6.73	10395.756	33962.305	3.826	4.8	-4.9	NO		NO	bb
3	3 181119M2_4	Standard	5.000	6.72	11990.450	38463.867	3.897	4.8	-3.2	NO		NO	bb
4	4 181119M2_5	Standard	5.000	6.73	10921.020	35754.637	3.818	4.7	-5.1	NO		NO	bb
5	5 181119M2_6	Standard	5.000	6.72	10474.562	33911.098	3.861	4.8	-4.1	NO		NO	bb
6	6 181119M2_7	Standard	5.000	6.72	10691.082	34904.867	3.829	4.8	-4.9	NO		NO	bb
7	7 181119M2_8	Standard	5.000	6.73	10315.671	32655.039	3.949	4.9	-1.9	NO		NO	bb
8	8 181119M2_9	Standard	5.000	6.73	12986.853	39339.617	4.127	5.1	2.5	NO		NO	bb
9	9 181119M2_10	Standard	5.000	6.73	10090.199	28971.465	4.354	5.4	8.2	NO		NO	bb
10	10 181119M2_11	Standard	5.000	6.73	9498.477	24725.277	4.802	6.0	19.3	NO		NO	bb

Compound name: d7-N-MeFOSE
Response Factor: 0.0325254
RRF SD: 0.00380154, Relative SD: 11.6879
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 181119M2_2	Standard	150.000	6.68	13267.294	36370.602	4.560	140.2	-6.5	NO		NO	bb
2	2 181119M2_3	Standard	150.000	6.68	12809.141	33962.305	4.714	144.9	-3.4	NO		NO	bb
3	3 181119M2_4	Standard	150.000	6.68	13210.400	38463.867	4.293	132.0	-12.0	NO		NO	bb
4	4 181119M2_5	Standard	150.000	6.68	13064.595	35754.637	4.567	140.4	-6.4	NO		NO	bb
5	5 181119M2_6	Standard	150.000	6.68	12425.742	33911.098	4.580	140.8	-6.1	NO		NO	bb
6	6 181119M2_7	Standard	150.000	6.68	12816.330	34904.867	4.590	141.1	-5.9	NO		NO	bb
7	7 181119M2_8	Standard	150.000	6.68	12440.439	32655.039	4.762	146.4	-2.4	NO		NO	bb
8	8 181119M2_9	Standard	150.000	6.68	16127.344	39339.617	5.124	157.6	5.0	NO		NO	bb
9	9 181119M2_10	Standard	150.000	6.68	12377.250	28971.465	5.340	164.2	9.5	NO		NO	bb
10	10 181119M2_11	Standard	150.000	6.68	12375.545	24725.277	6.257	192.4	28.2	NO		NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: d9-N-EtFOSE
Response Factor: 0.0319706
RRF SD: 0.00340375, Relative SD: 10.6465
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 181119M2_2	Standard	150.000	6.83	13020.559	36370.602	4.475	140.0	-6.7	NO		NO	bb
2	2 181119M2_3	Standard	150.000	6.83	12684.013	33962.305	4.668	146.0	-2.7	NO		NO	bb
3	3 181119M2_4	Standard	150.000	6.83	13616.445	38463.867	4.425	138.4	-7.7	NO		NO	bb
4	4 181119M2_5	Standard	150.000	6.83	13198.563	35754.637	4.614	144.3	-3.8	NO		NO	bb
5	5 181119M2_6	Standard	150.000	6.83	12083.847	33911.098	4.454	139.3	-7.1	NO		NO	bb
6	6 181119M2_7	Standard	150.000	6.83	12633.202	34904.867	4.524	141.5	-5.7	NO		NO	bb
7	7 181119M2_8	Standard	150.000	6.83	11788.857	32655.039	4.513	141.1	-5.9	NO		NO	bb
8	8 181119M2_9	Standard	150.000	6.83	15594.405	39339.617	4.955	155.0	3.3	NO		NO	bb
9	9 181119M2_10	Standard	150.000	6.83	12299.542	28971.465	5.307	166.0	10.7	NO		NO	bb
10	10 181119M2_11	Standard	150.000	6.83	11908.335	24725.277	6.020	188.3	25.5	NO		NO	bb

Compound name: 13C4-PFBA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 60), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 181119M2_2	Standard	12.500	1.18	10214.163	10214.163	12.500	12.5	0.0	NO		NO	bb
2	2 181119M2_3	Standard	12.500	1.18	8904.677	8904.677	12.500	12.5	0.0	NO		NO	bb
3	3 181119M2_4	Standard	12.500	1.17	9973.924	9973.924	12.500	12.5	0.0	NO		NO	bb
4	4 181119M2_5	Standard	12.500	1.17	10174.105	10174.105	12.500	12.5	0.0	NO		NO	MM
5	5 181119M2_6	Standard	12.500	1.17	10032.227	10032.227	12.500	12.5	0.0	NO		NO	bb
6	6 181119M2_7	Standard	12.500	1.17	9720.454	9720.454	12.500	12.5	0.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	1.18	10085.070	10085.070	12.500	12.5	0.0	NO		NO	bb
8	8 181119M2_9	Standard	12.500	1.17	12610.282	12610.282	12.500	12.5	0.0	NO		NO	bb
9	9 181119M2_10	Standard	12.500	1.17	9821.668	9821.668	12.500	12.5	0.0	NO		NO	bb
10	10 181119M2_11	Standard	12.500	1.18	9545.869	9545.869	12.500	12.5	0.0	NO		NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C5-PFHxA
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-015
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 181119M2_2	Standard	12.500	3.32	31577.043	31577.043	12.500	12.5	0.0	NO		NO	bb
2	2 181119M2_3	Standard	12.500	3.32	29049.188	29049.188	12.500	12.5	0.0	NO		NO	bb
3	3 181119M2_4	Standard	12.500	3.32	32754.859	32754.859	12.500	12.5	0.0	NO		NO	bb
4	4 181119M2_5	Standard	12.500	3.32	31986.332	31986.332	12.500	12.5	0.0	NO		NO	bb
5	5 181119M2_6	Standard	12.500	3.32	29222.686	29222.686	12.500	12.5	0.0	NO		NO	bb
6	6 181119M2_7	Standard	12.500	3.32	30117.441	30117.441	12.500	12.5	0.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	3.32	27874.125	27874.125	12.500	12.5	0.0	NO		NO	bb
8	8 181119M2_9	Standard	12.500	3.32	35903.074	35903.074	12.500	12.5	0.0	NO		NO	bb
9	9 181119M2_10	Standard	12.500	3.32	26844.322	26844.322	12.500	12.5	0.0	NO		NO	bb
10	10 181119M2_11	Standard	12.500	3.32	23874.543	23874.543	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C3-PFHxS
Response Factor: 1
RRF SD: 0, Relative SD: 0
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 181119M2_2	Standard	12.500	4.14	3630.358	3630.358	12.500	12.5	0.0	NO		NO	bb
2	2 181119M2_3	Standard	12.500	4.13	3431.369	3431.369	12.500	12.5	0.0	NO		NO	bb
3	3 181119M2_4	Standard	12.500	4.14	3870.605	3870.605	12.500	12.5	0.0	NO		NO	bb
4	4 181119M2_5	Standard	12.500	4.14	3801.275	3801.275	12.500	12.5	0.0	NO		NO	MM
5	5 181119M2_6	Standard	12.500	4.14	3470.908	3470.908	12.500	12.5	0.0	NO		NO	bb
6	6 181119M2_7	Standard	12.500	4.14	3672.713	3672.713	12.500	12.5	0.0	NO		NO	bb
7	7 181119M2_8	Standard	12.500	4.14	3410.166	3410.166	12.500	12.5	0.0	NO		NO	bb
8	8 181119M2_9	Standard	12.500	4.14	4067.239	4067.239	12.500	12.5	0.0	NO		NO	bb
9	9 181119M2_10	Standard	12.500	4.14	3146.183	3146.183	12.500	12.5	0.0	NO		NO	bb
10	10 181119M2_11	Standard	12.500	4.14	2796.026	2796.026	12.500	12.5	0.0	NO		NO	bb

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C8-PFOA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 63), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181119M2_2	Standard	12.500	4.48	36963.355	36963.355	12.500	12.5	0.0	NO		NO	bb
2	2	181119M2_3	Standard	12.500	4.48	35655.656	35655.656	12.500	12.5	0.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	4.48	38708.566	38708.566	12.500	12.5	0.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	4.48	36743.945	36743.945	12.500	12.5	0.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	4.48	34087.332	34087.332	12.500	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	4.48	37075.613	37075.613	12.500	12.5	0.0	NO		NO	bb
7	7	181119M2_8	Standard	12.500	4.48	34641.109	34641.109	12.500	12.5	0.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	4.48	42997.430	42997.430	12.500	12.5	0.0	NO		NO	bb
9	9	181119M2_10	Standard	12.500	4.48	31563.273	31563.273	12.500	12.5	0.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	4.48	28118.881	28118.881	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	181119M2_2	Standard	12.500	4.92	26543.949	26543.949	12.500	12.5	0.0	NO		NO	bb
2	2	181119M2_3	Standard	12.500	4.91	25402.279	25402.279	12.500	12.5	0.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	4.91	27779.146	27779.146	12.500	12.5	0.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	4.91	26523.551	26523.551	12.500	12.5	0.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	4.91	24571.891	24571.891	12.500	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	4.91	26232.998	26232.998	12.500	12.5	0.0	NO		NO	bb
7	7	181119M2_8	Standard	12.500	4.91	23664.459	23664.459	12.500	12.5	0.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	4.91	29651.377	29651.377	12.500	12.5	0.0	NO		NO	bb
9	9	181119M2_10	Standard	12.500	4.91	22311.814	22311.814	12.500	12.5	0.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	4.91	20056.293	20056.293	12.500	12.5	0.0	NO		NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 65), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181119M2_2	Standard	12.500	5.01	3843.607	3843.607	12.500	12.5	0.0	NO		NO	bb
2	2	181119M2_3	Standard	12.500	5.00	3744.634	3744.634	12.500	12.5	0.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	5.00	4035.006	4035.006	12.500	12.5	0.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	5.00	3884.763	3884.763	12.500	12.5	0.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	5.00	3863.451	3863.451	12.500	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	5.00	3992.555	3992.555	12.500	12.5	0.0	NO		NO	bb
7	7	181119M2_8	Standard	12.500	5.00	3579.661	3579.661	12.500	12.5	0.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	5.00	4267.014	4267.014	12.500	12.5	0.0	NO		NO	bb
9	9	181119M2_10	Standard	12.500	5.00	3212.936	3212.936	12.500	12.5	0.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	5.00	2976.162	2976.162	12.500	12.5	0.0	NO		NO	bb

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	181119M2_2	Standard	12.500	5.30	32499.664	32499.664	12.500	12.5	0.0	NO		NO	bb
2	2	181119M2_3	Standard	12.500	5.30	30424.650	30424.650	12.500	12.5	0.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	5.30	34728.922	34728.922	12.500	12.5	0.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	5.30	33468.051	33468.051	12.500	12.5	0.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	5.30	30300.555	30300.555	12.500	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	5.30	31155.236	31155.236	12.500	12.5	0.0	NO		NO	bb
7	7	181119M2_8	Standard	12.500	5.30	29050.506	29050.506	12.500	12.5	0.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	5.30	36924.023	36924.023	12.500	12.5	0.0	NO		NO	bb
9	9	181119M2_10	Standard	12.500	5.30	27767.018	27767.018	12.500	12.5	0.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	5.30	23592.779	23592.779	12.500	12.5	0.0	NO		NO	bb

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:18:57 Pacific Standard Time

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	181119M2_2	Standard	12.500	5.63	36370.602	36370.602	12.500	12.5	0.0	NO		NO	bb
2	2	181119M2_3	Standard	12.500	5.63	33962.305	33962.305	12.500	12.5	0.0	NO		NO	bb
3	3	181119M2_4	Standard	12.500	5.63	38463.867	38463.867	12.500	12.5	0.0	NO		NO	bb
4	4	181119M2_5	Standard	12.500	5.63	35754.637	35754.637	12.500	12.5	0.0	NO		NO	bb
5	5	181119M2_6	Standard	12.500	5.63	33911.098	33911.098	12.500	12.5	0.0	NO		NO	bb
6	6	181119M2_7	Standard	12.500	5.63	34904.867	34904.867	12.500	12.5	0.0	NO		NO	bb
7	7	181119M2_8	Standard	12.500	5.63	32655.039	32655.039	12.500	12.5	0.0	NO		NO	bb
8	8	181119M2_9	Standard	12.500	5.63	39339.617	39339.617	12.500	12.5	0.0	NO		NO	bb
9	9	181119M2_10	Standard	12.500	5.63	28971.465	28971.465	12.500	12.5	0.0	NO		NO	bb
10	10	181119M2_11	Standard	12.500	5.63	24725.277	24725.277	12.500	12.5	0.0	NO		NO	bb

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:19:44 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_2, Date: 19-Nov-2018, Time: 20:17:43, ID: ST181119M2-1 PFC CS-2 18K0901, Description: PFC CS-2 18K0901

	#	Name	IS#	CoD	CoD Flag	%RSD
1	1	PFBA	36	0.9999	NO	
2	2	PFPeA	37	0.9999	NO	
3	3	PFBS	38	0.9997	NO	
4	4	4:2 FTS	39	0.9986	NO	
5	5	PFHxA	40	0.9999	NO	
6	6	PFPeS	38	0.9996	NO	
7	7	PFHpA	41	0.9995	NO	
8	8	L-PFHxS	42	0.9997	NO	
9	10	6:2 FTS	43	0.9980	NO	
10	11	L-PFOA	44	0.9999	NO	
11	13	PFHpS	47	0.9999	NO	
12	14	PFNA	45	0.9997	NO	
13	15	PFOSA	46	0.9998	NO	
14	16	L-PFOS	47	0.9998	NO	
15	18	PFDA	48	0.9997	NO	
16	19	8:2 FTS	49	0.9987	NO	
17	20	PFNS	47	0.9996	NO	
18	21	L-MeFOSAA	50	0.9999	NO	
19	23	L-EtFOSAA	52	0.9997	NO	

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:19:55 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_2, Date: 19-Nov-2018, Time: 20:17:43, ID: ST181119M2-1 PFC CS-2 18K0901, Description: PFC CS-2 18K0901

	#	Name	IS#	CoD	CoD Flag	%RSD
1	25	PFUdA	51	0.9999	NO	
2	26	PFDS	47	0.9997	NO	
3	27	PFDoA	53	0.9999	NO	
4	28	N-MeFOSA	54	0.9998	NO	
5	29	PFTrDA	53	0.9999	NO	
6	30	PFTeDA	55	0.9997	NO	
7	31	N-EtFOSA	56	0.9997	NO	
8	32	PFHxDA	57	0.9998	NO	
9	33	PFODA	57	0.9998	NO	
10	34	N-MeFOSE	58	0.9997	NO	
11	35	N-EtFOSE	59	0.9999	NO	
12	36	13C3-PFBA	60		NO	1.385
13	37	13C3-PFPeA	61		NO	8.071
14	38	13C3-PFBS	62		NO	4.165
15	39	13C2-4:2 FTS	62		NO	8.512
16	40	13C2-PFHxA	61		NO	2.948
17	41	13C4-PFHpA	61		NO	1.966
18	42	18O2-PFHxS	62		NO	2.487
19	43	13C2-6:2 FTS	65		NO	10.731
20	44	13C2-PFOA	63		NO	2.123
21	45	13C5-PFNA	64		NO	1.947
22	46	13C8-PFOSA	67		NO	5.595
23	47	13C8-PFOS	65		NO	2.957
24	48	13C2-PFDA	66		NO	2.715
25	49	13C2-8:2 FTS	65		NO	9.146
26	50	d3-N-MeFOSAA	67		NO	5.428
27	51	13C2-PFUdA	67		NO	2.734
28	52	d5-N-EtFOSAA	67		NO	4.548
29	53	13C2-PFDoA	66		NO	2.823
30	54	d3-N-MeFOSA	67		NO	8.104
31	55	13C2-PFTeDA	67		NO	4.677
32	56	d5-N-ETFOSA	67		NO	4.884

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:19:55 Pacific Standard Time

Name: 181119M2_2, Date: 19-Nov-2018, Time: 20:17:43, ID: ST181119M2-1 PFC CS-2 18K0901, Description: PFC CS-2 18K0901

	#	Name	IS#	CoD	CoD Flag	%RSD
33	57	13C2-PFHxDA	67		NO	8.080
34	58	d7-N-MeFOSE	67		NO	11.688
35	59	d9-N-EtFOSE	67		NO	10.647
36	60	13C4-PFBA	60		NO	0.000
37	61	13C5-PFHxA	61		NO	0.000
38	62	13C3-PFHxS	62		NO	0.000
39	63	13C8-PFOA	63		NO	0.000
40	64	13C9-PFNA	64		NO	0.000
41	65	13C4-PFOS	65		NO	0.000
42	66	13C6-PFDA	66		NO	0.000
43	67	13C7-PFUdA	67		NO	0.000

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:20:34 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_7, Date: 19-Nov-2018, Time: 21:10:50, ID: ST181119M2-6 PFC CS3 18K0906, Description: PFC CS3 18K0906

	Name	Ion Ratio	Ratio out?
1	PFBA		
2	PFPeA		
3	PFBS	2.698	NO
4	4:2 FTS	1.761	NO
5	PFHxA	15.481	NO
6	PFPeS	1.617	NO
7	PFHpA	13.636	NO
8	L-PFHxS	1.751	NO
9	6:2 FTS	3.201	NO
10	L-PFOA	3.490	NO
11	PFHpS	1.989	NO
12	PFNA	4.681	NO
13	PFOSA	28.479	NO
14	L-PFOS	1.878	NO
15	PFDA	5.731	NO
16	8:2 FTS	2.604	NO
17	PFNS	1.583	NO
18	L-MeFOSAA	2.381	NO
19	L-EtFOSAA	1.414	NO

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:20:47 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_7, Date: 19-Nov-2018, Time: 21:10:50, ID: ST181119M2-6 PFC CS3 18K0906, Description: PFC CS3 18K0906

	Name	Ion Ratio	Ratio out?
1	PFUdA	9.858	NO
2	PFDS	1.719	NO
3	PFDoA	8.199	NO
4	N-MeFOSA	1.446	NO
5	PFTrDA	26.257	NO
6	PFTeDA	13.519	NO
7	N-EtFOSA	1.454	NO
8	PFHxDA	24.080	NO
9	PFODA		
10	N-MeFOSE		
11	N-EtFOSE		

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Tuesday, November 20, 2018 11:23:49 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:24:00 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 10:57:12
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	181119M2_1	IPA	19-Nov-18	20:07:07
2	2	181119M2_2	ST181119M2-1 PFC CS-2 18K0901	19-Nov-18	20:17:43
3	3	181119M2_3	ST181119M2-2 PFC CS-1 18K0902	19-Nov-18	20:28:22
4	4	181119M2_4	ST181119M2-3 PFC CS0 18K0903	19-Nov-18	20:39:00
5	5	181119M2_5	ST181119M2-4 PFC CS1 18K0904	19-Nov-18	20:49:33
6	6	181119M2_6	ST181119M2-5 PFC CS2 18K0905	19-Nov-18	21:00:12
7	7	181119M2_7	ST181119M2-6 PFC CS3 18K0906	19-Nov-18	21:10:50
8	8	181119M2_8	ST181119M2-7 PFC CS4 18K0907	19-Nov-18	21:21:23
9	9	181119M2_9	ST181119M2-8 PFC CS5 18K0908	19-Nov-18	21:32:01
10	10	181119M2_10	ST181119M2-9 PFC CS6 18K0909	19-Nov-18	21:42:34
11	11	181119M2_11	ST181119M2-10 PFC CS7 18K0910	19-Nov-18	21:53:12
12	12	181119M2_12	IPA	19-Nov-18	22:03:46
13	13	181119M2_13	ICV181119M2-1 PFC ICV 18K0911	19-Nov-18	22:14:24
14	14	181119M2_14	IPA	19-Nov-18	22:24:57

11/20/18

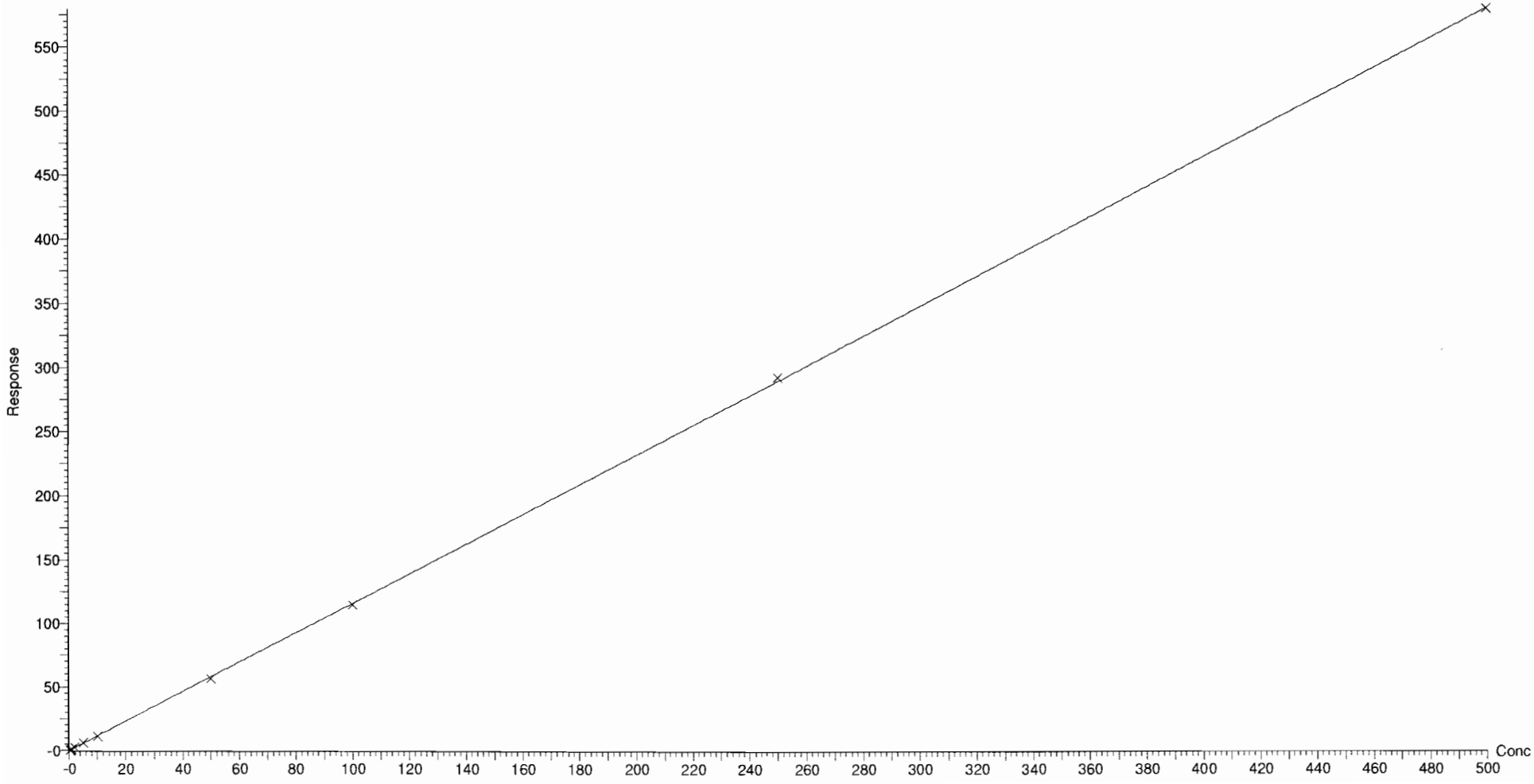
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

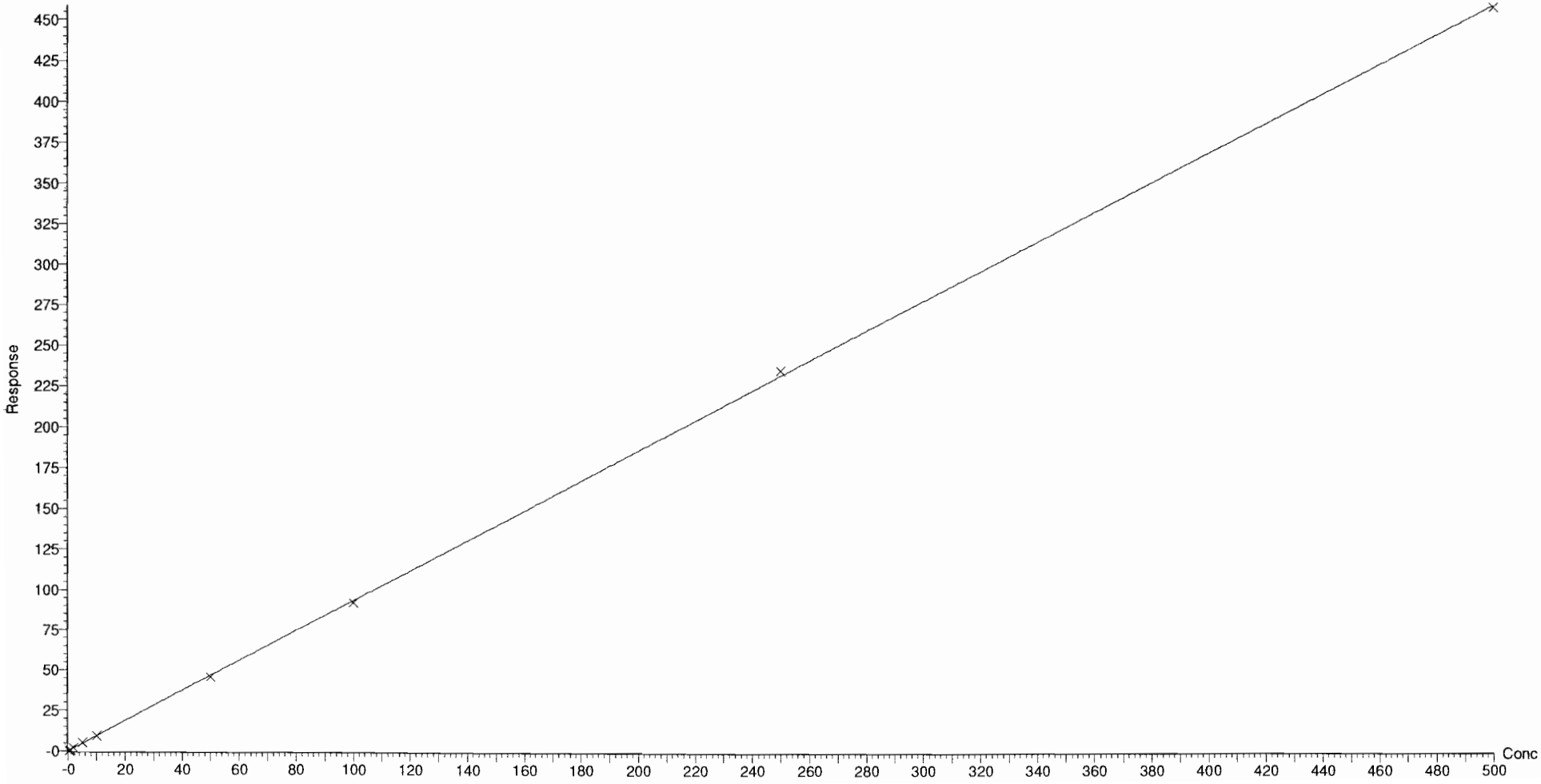
Compound name: PFBA
Correlation coefficient: r = 0.999936, r^2 = 0.999871
Calibration curve: 1.15877 * x + 0.0665496
Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

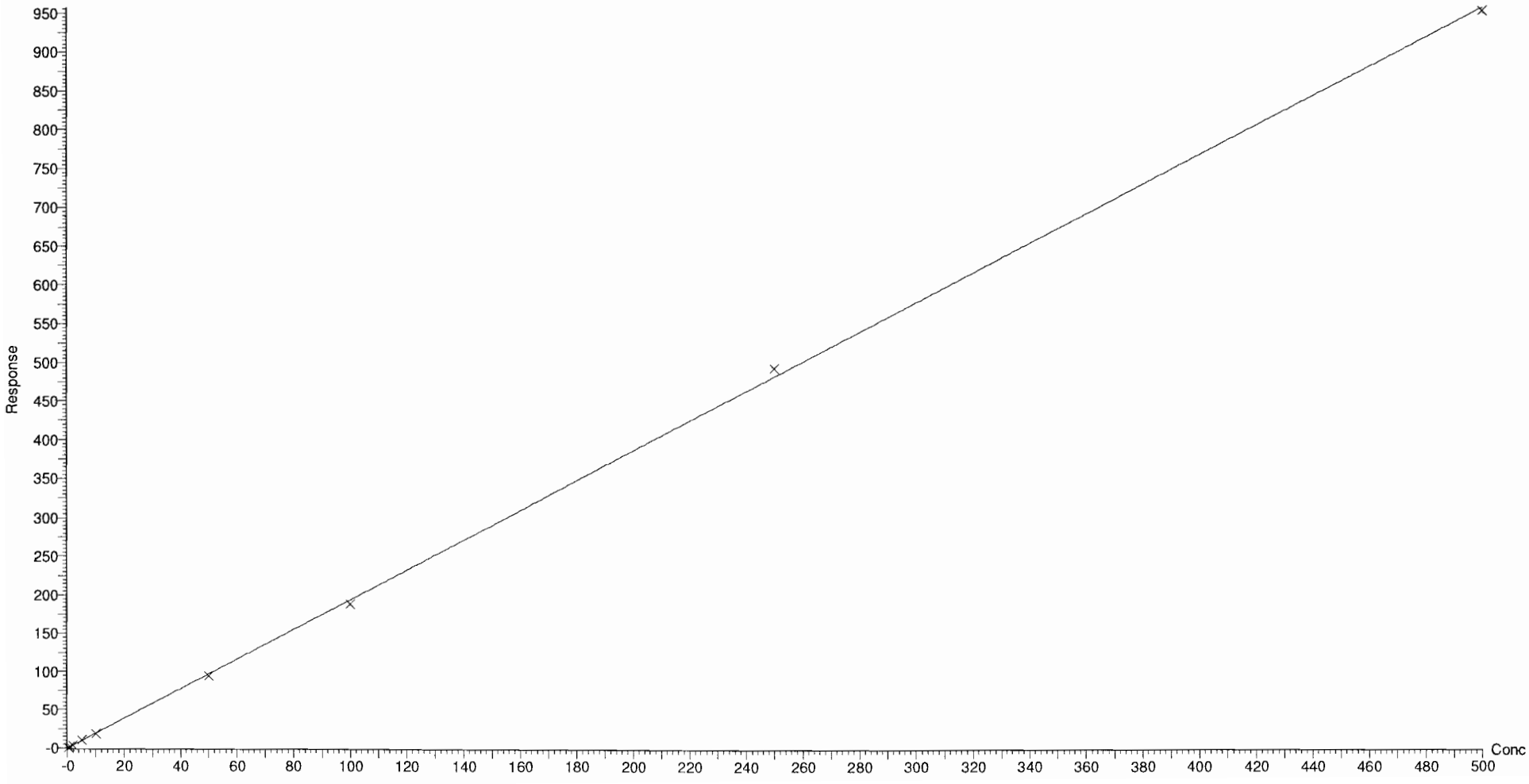
Compound name: PFPeA
Coefficient of Determination: R^2 = 0.999855
Calibration curve: -4.00459e-005 * x^2 + 0.937455 * x + 0.0365266
Response type: Internal Std (Ref 37), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

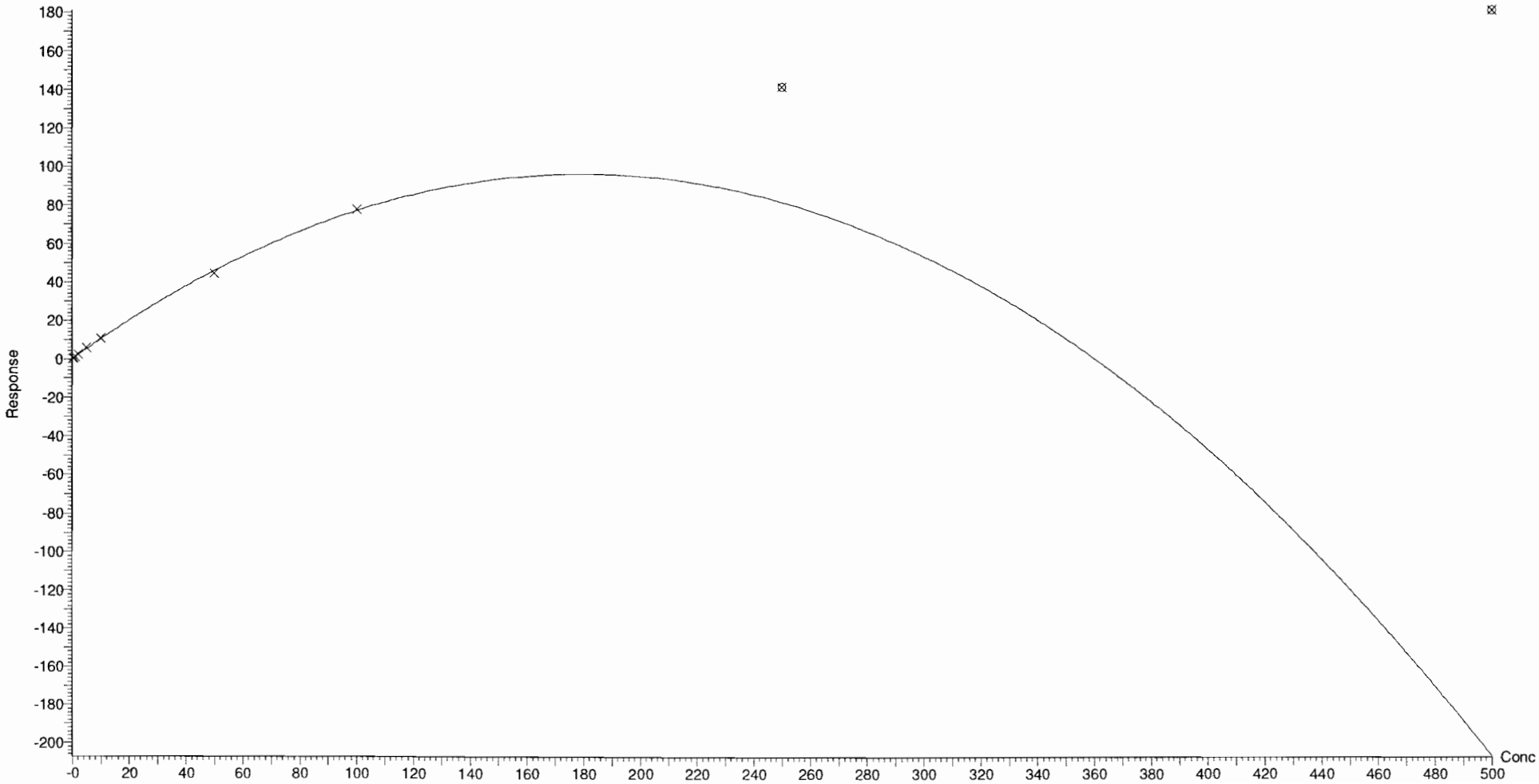
Compound name: PFBS
Coefficient of Determination: R^2 = 0.999692
Calibration curve: -6.70313e-005 * x^2 + 1.94752 * x + 0.0138443
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998555
Calibration curve: -0.00296353 * x^2 + 1.06839 * x + 0.0733065
Response type: Internal Std (Ref 39), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

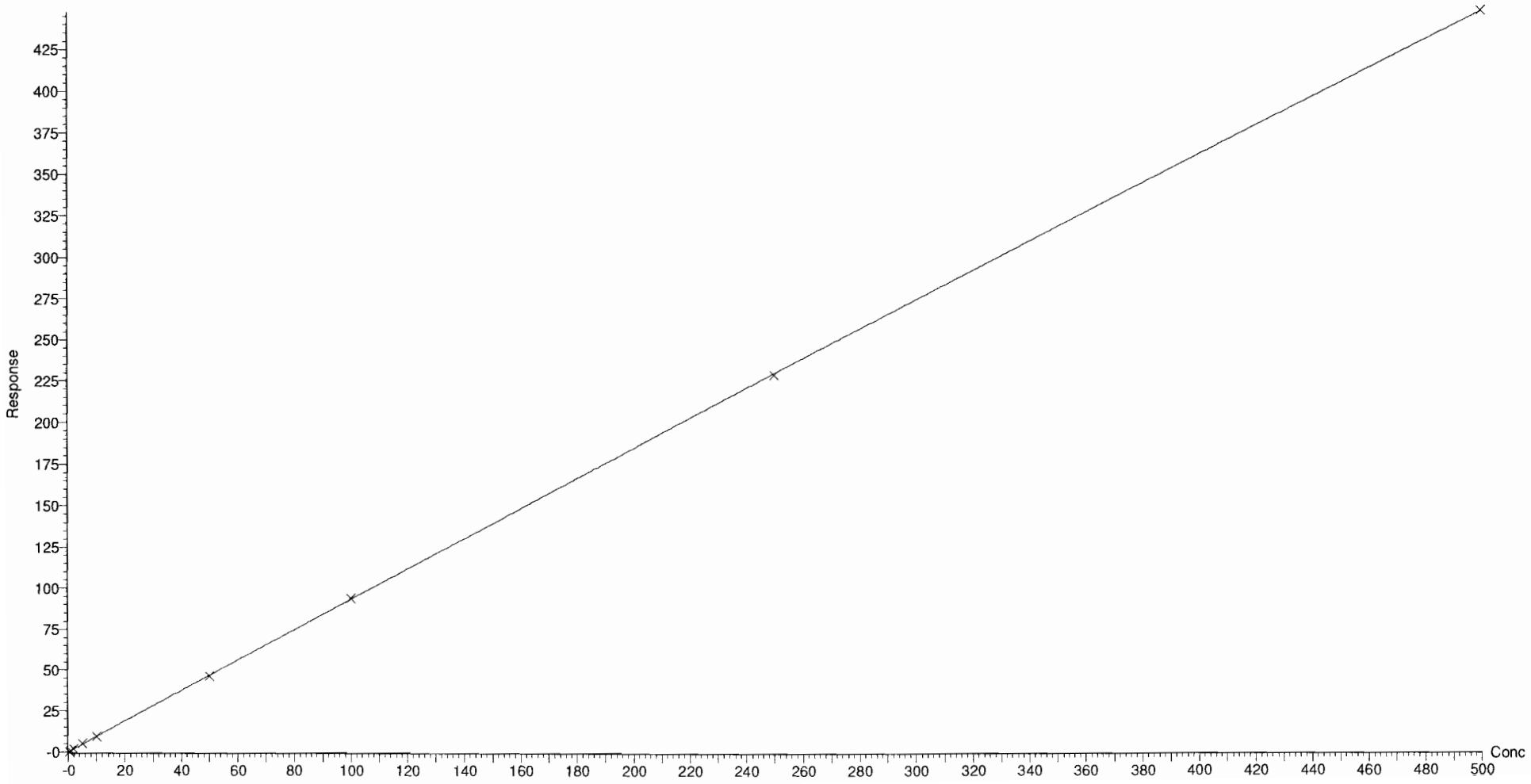


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

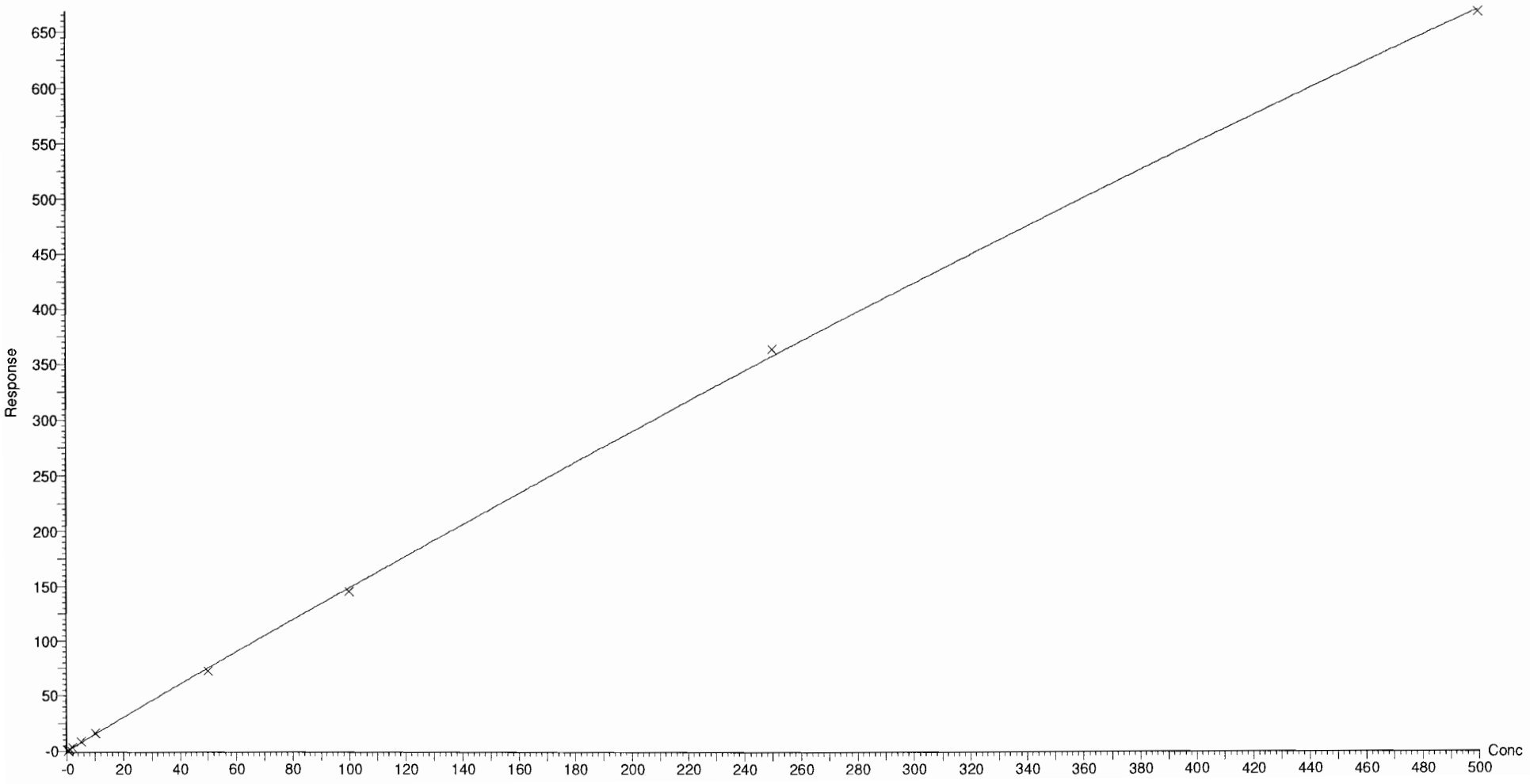
Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999895
Calibration curve: -9.80484e-005 * x^2 + 0.942971 * x + 0.041646
Response type: Internal Std (Ref 40), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

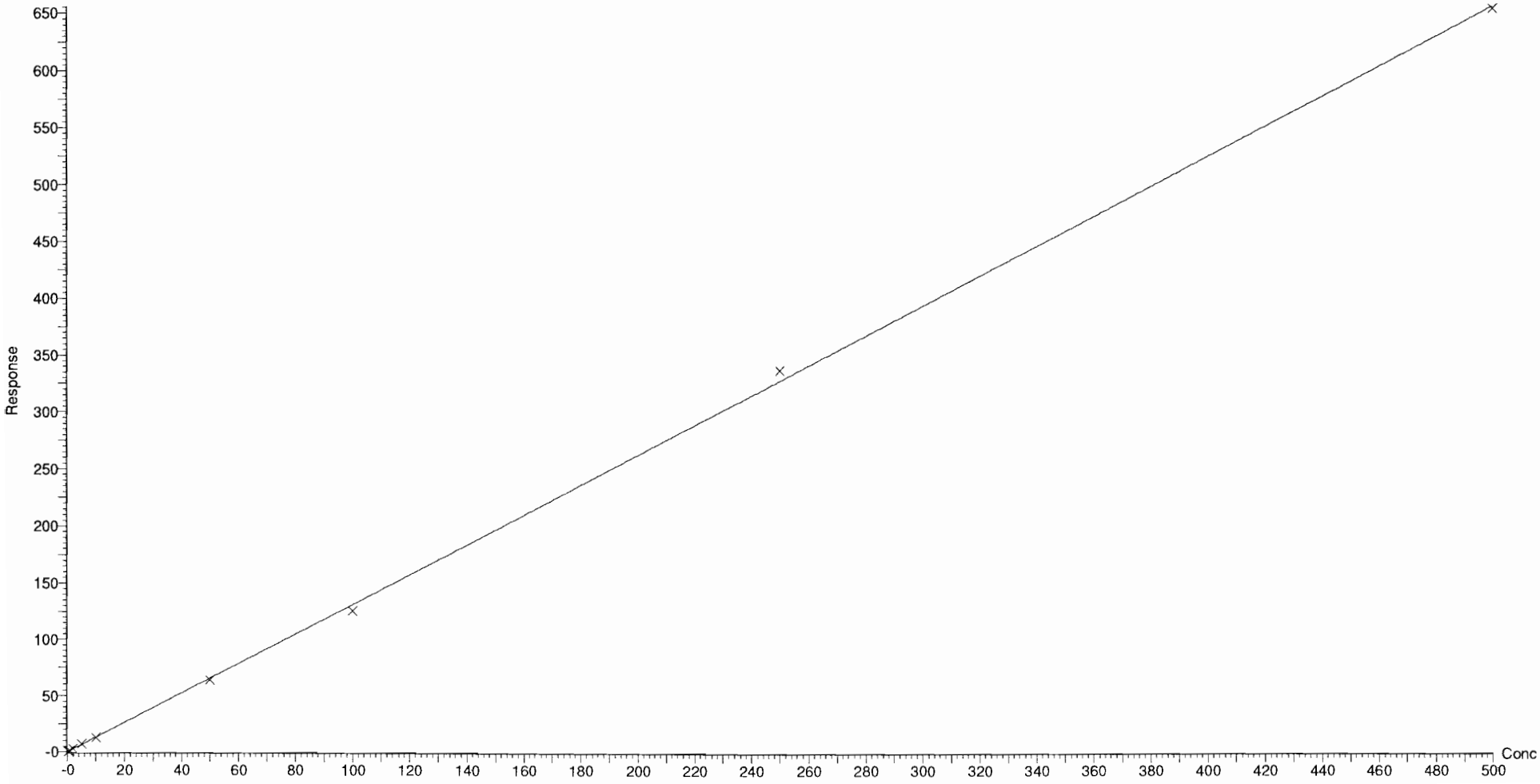
Compound name: PFPeS
Coefficient of Determination: R^2 = 0.999587
Calibration curve: -0.000364679 * x^2 + 1.51981 * x + 0.209357
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

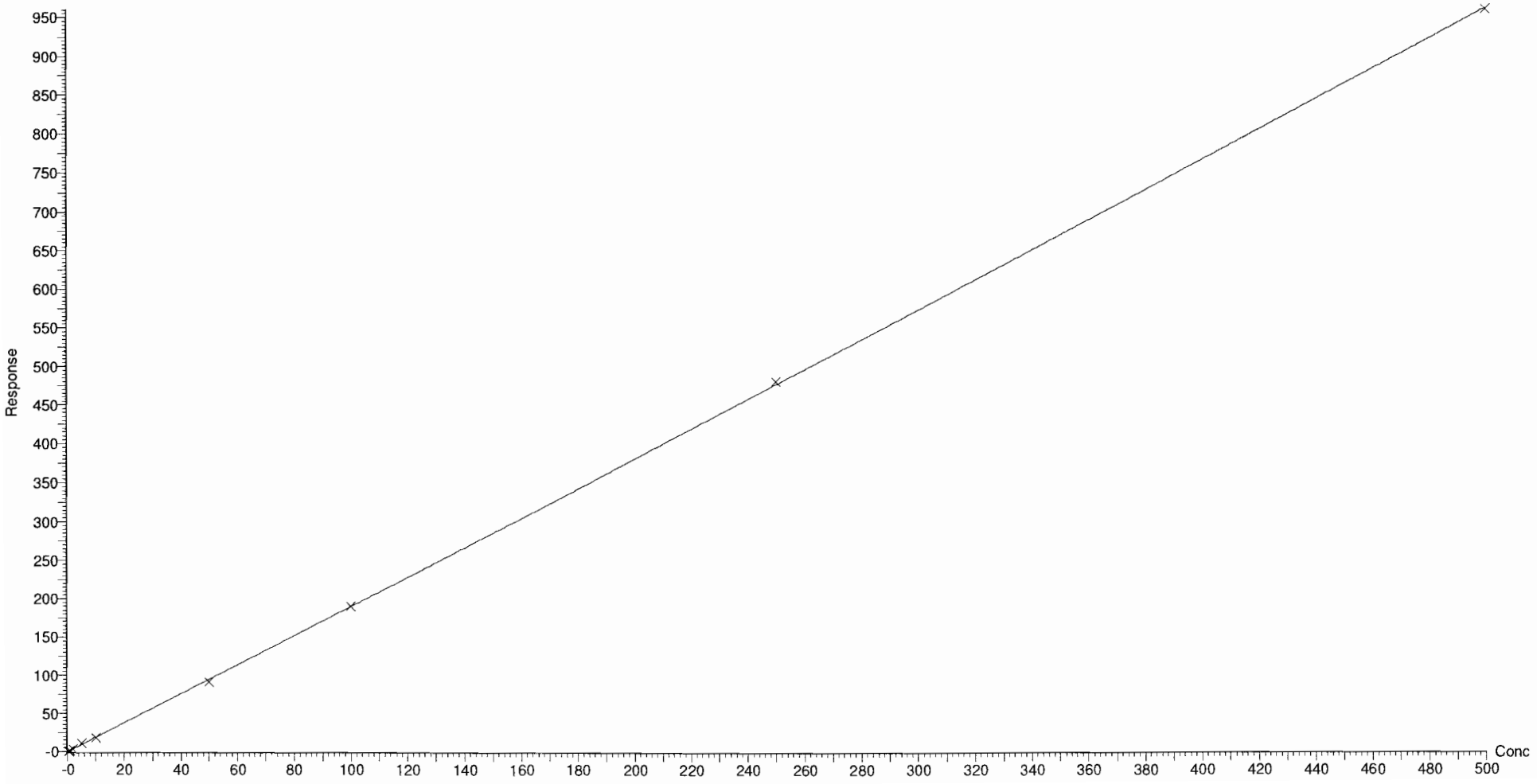
Compound name: PFHpA
Correlation coefficient: r = 0.999748, r^2 = 0.999495
Calibration curve: 1.31181 * x + 0.10388
Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

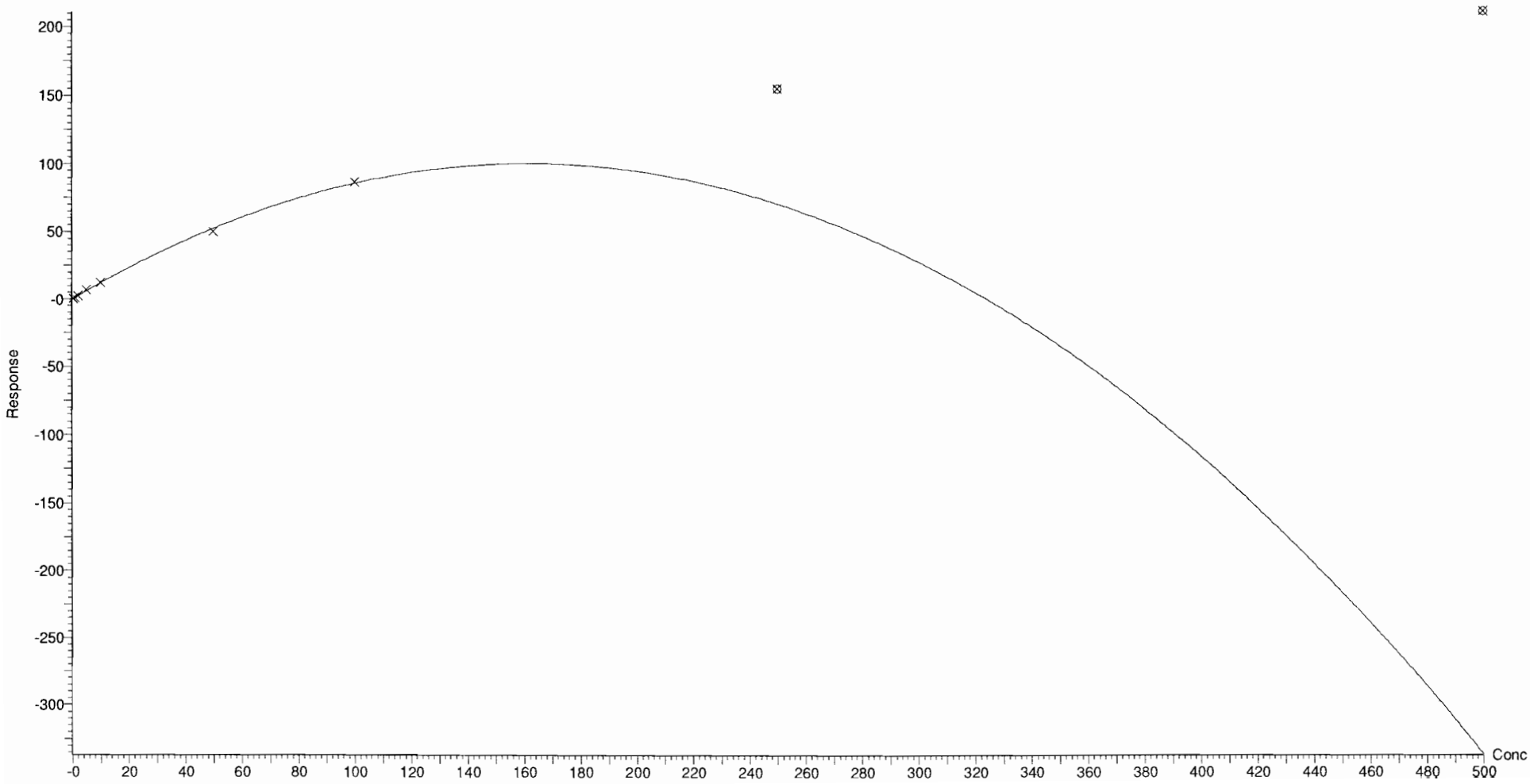
Compound name: L-PFHxS
Coefficient of Determination: R^2 = 0.999706
Calibration curve: 5.96666e-005 * x^2 + 1.89134 * x + 0.0133884
Response type: Internal Std (Ref 42), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

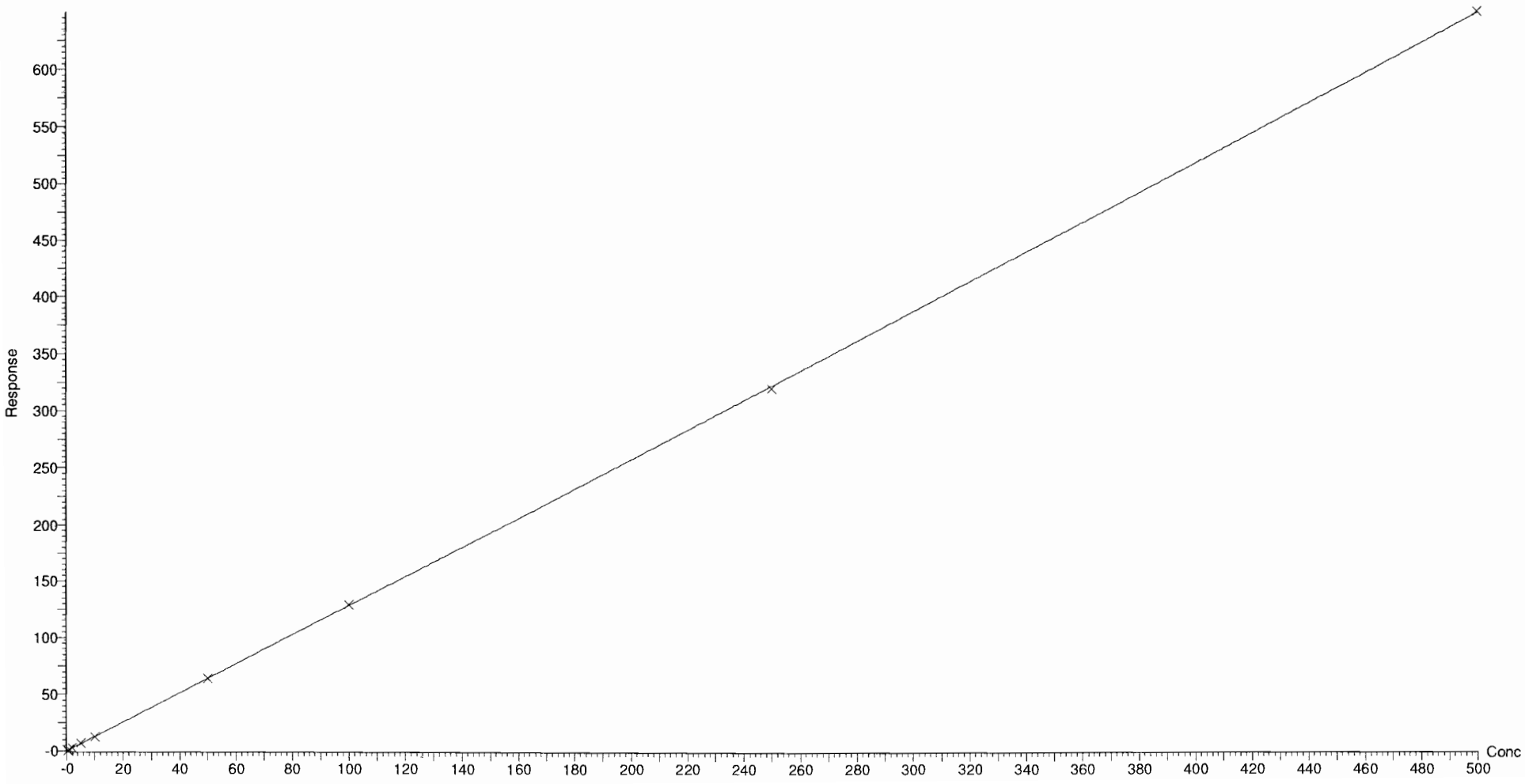
Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.998047
Calibration curve: -0.00381892 * x^2 + 1.23743 * x + 0.0518006
Response type: Internal Std (Ref 43), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

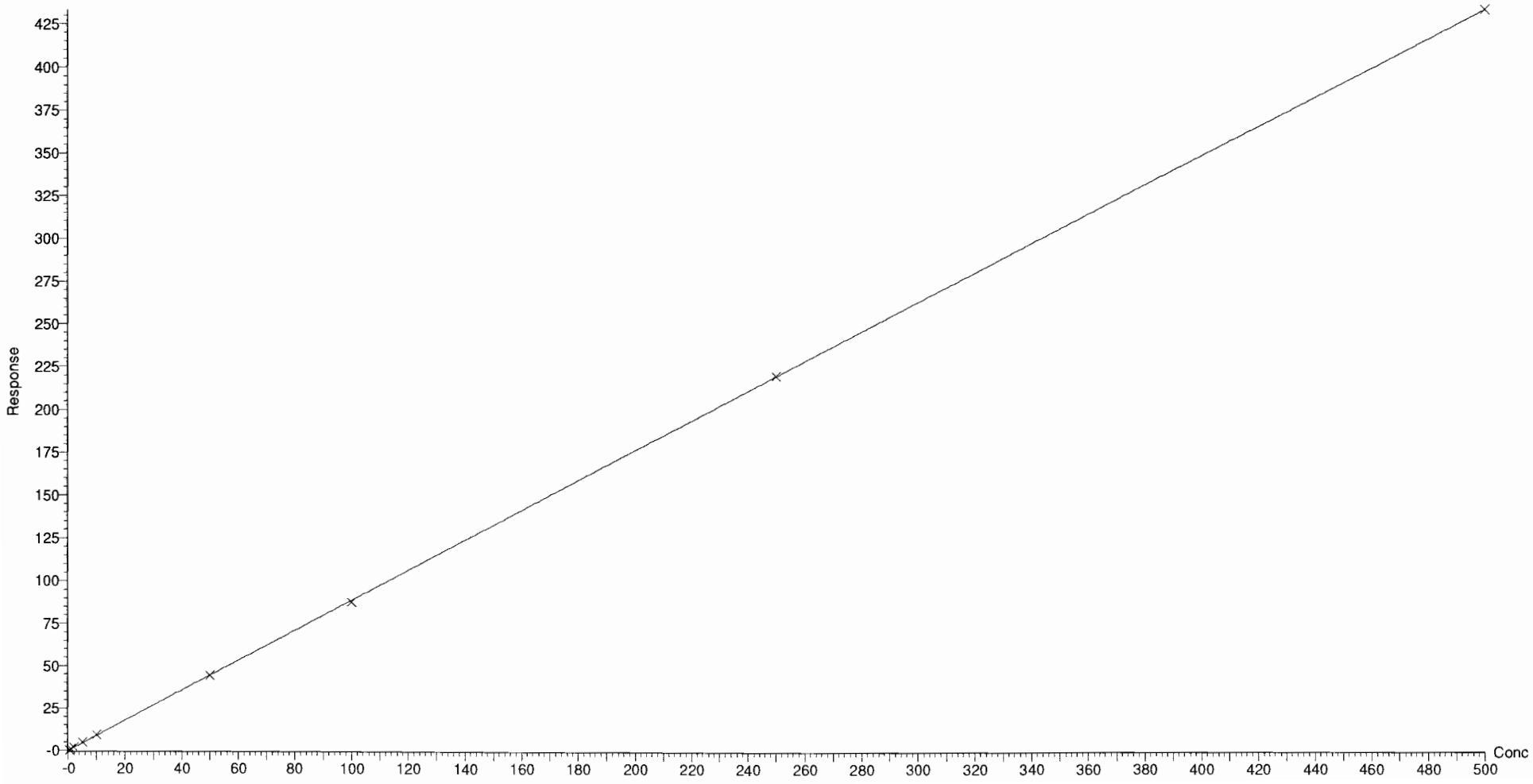
Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999903
Calibration curve: 3.24421e-005 * x^2 + 1.28147 * x + 0.139843
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

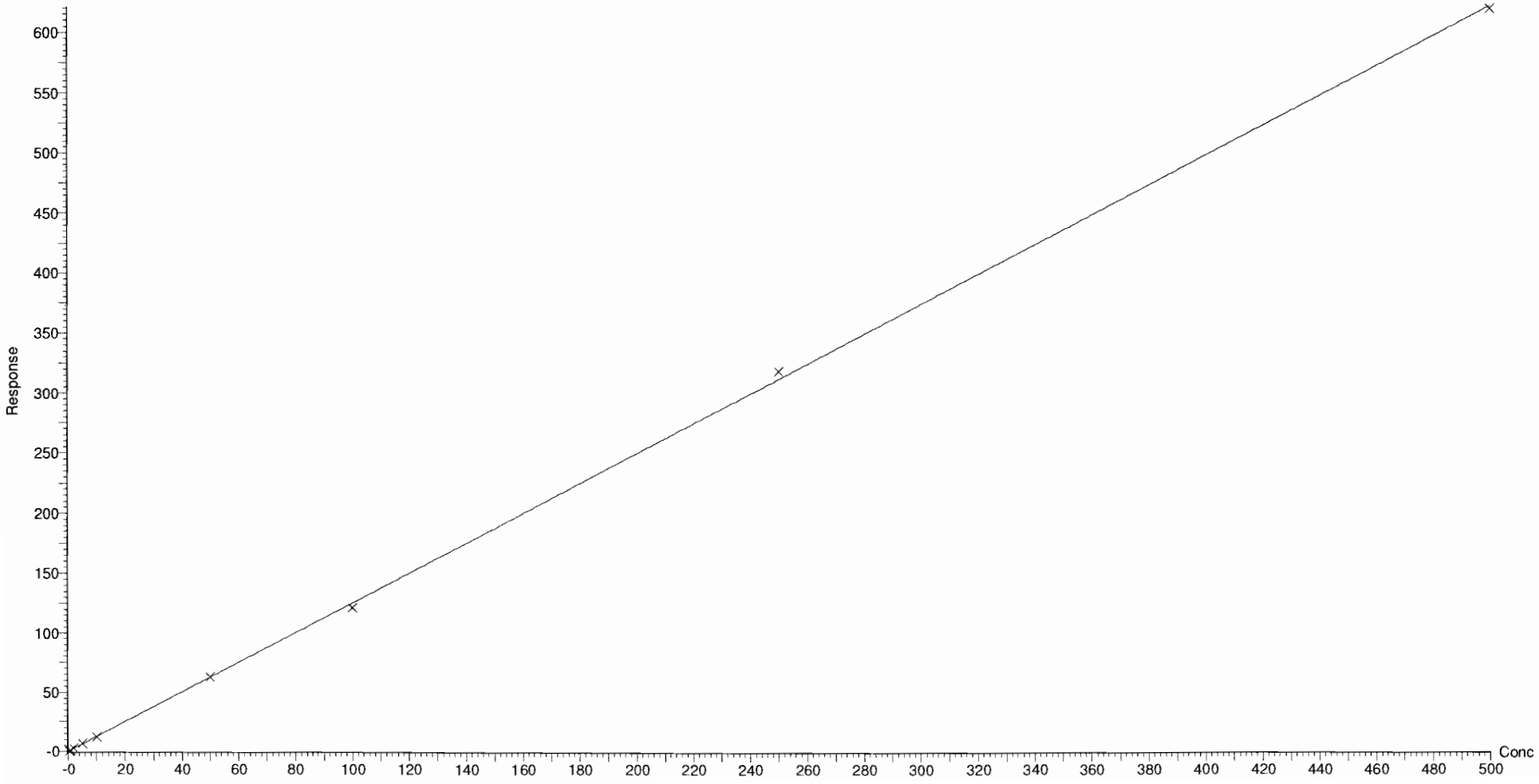
Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999858
Calibration curve: -5.37984e-005 * x^2 + 0.893106 * x + 0.00719861
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

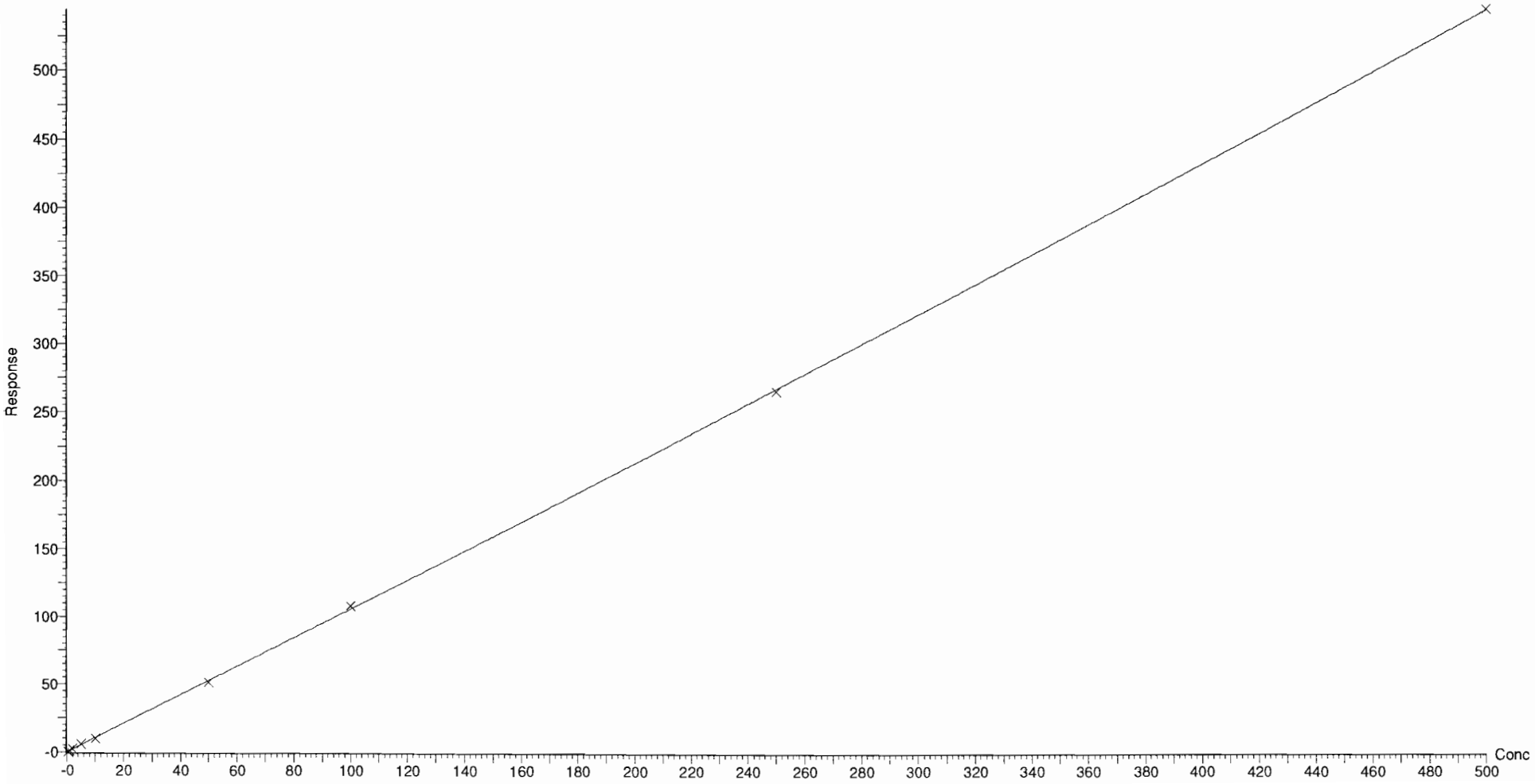
Compound name: PFNA
Coefficient of Determination: R^2 = 0.999697
Calibration curve: -2.33201e-005 * x^2 + 1.25361 * x + 0.0678484
Response type: Internal Std (Ref 45), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

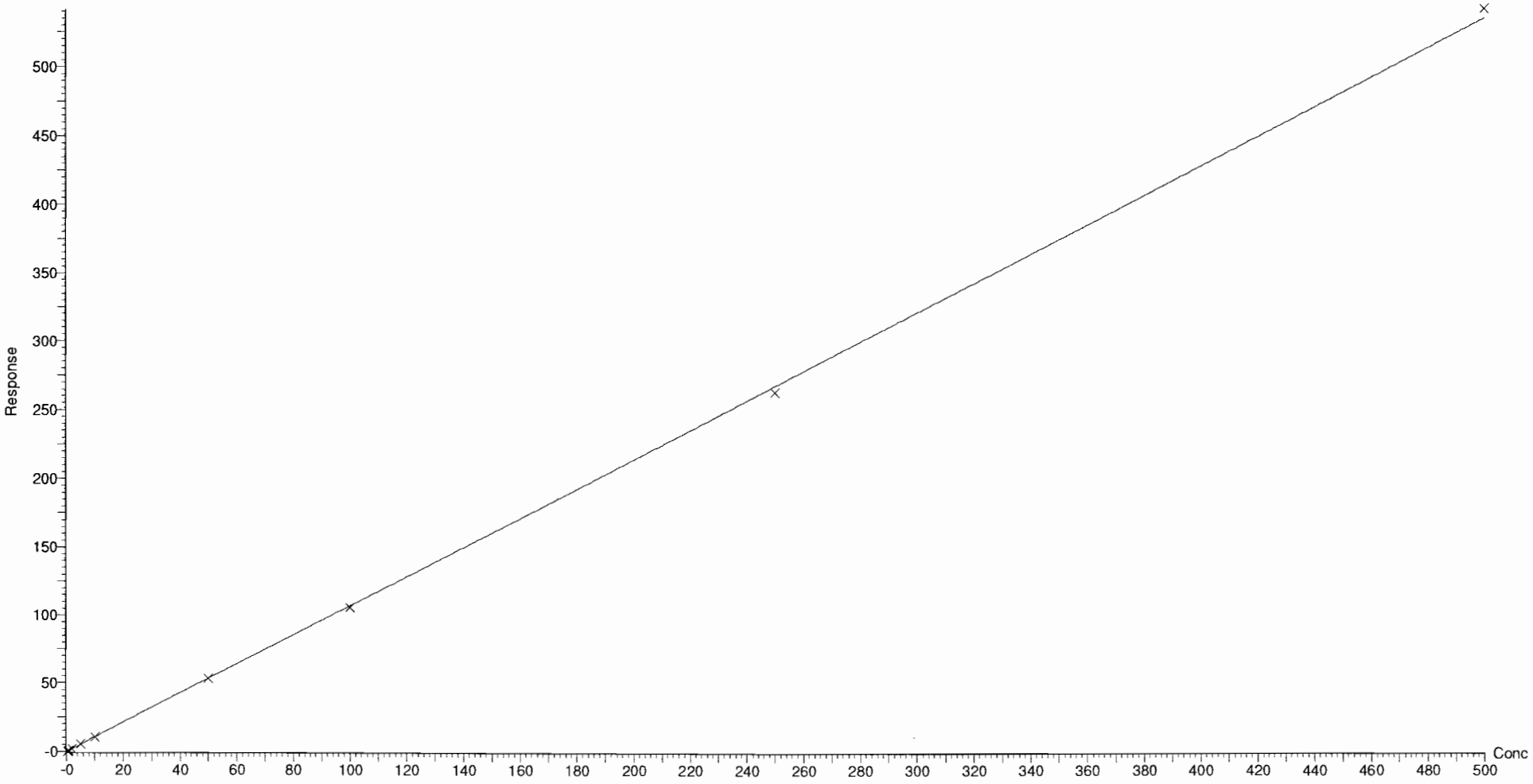
Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999774
Calibration curve: 7.6527e-005 * x^2 + 1.04958 * x + 0.111382
Response type: Internal Std (Ref 46), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

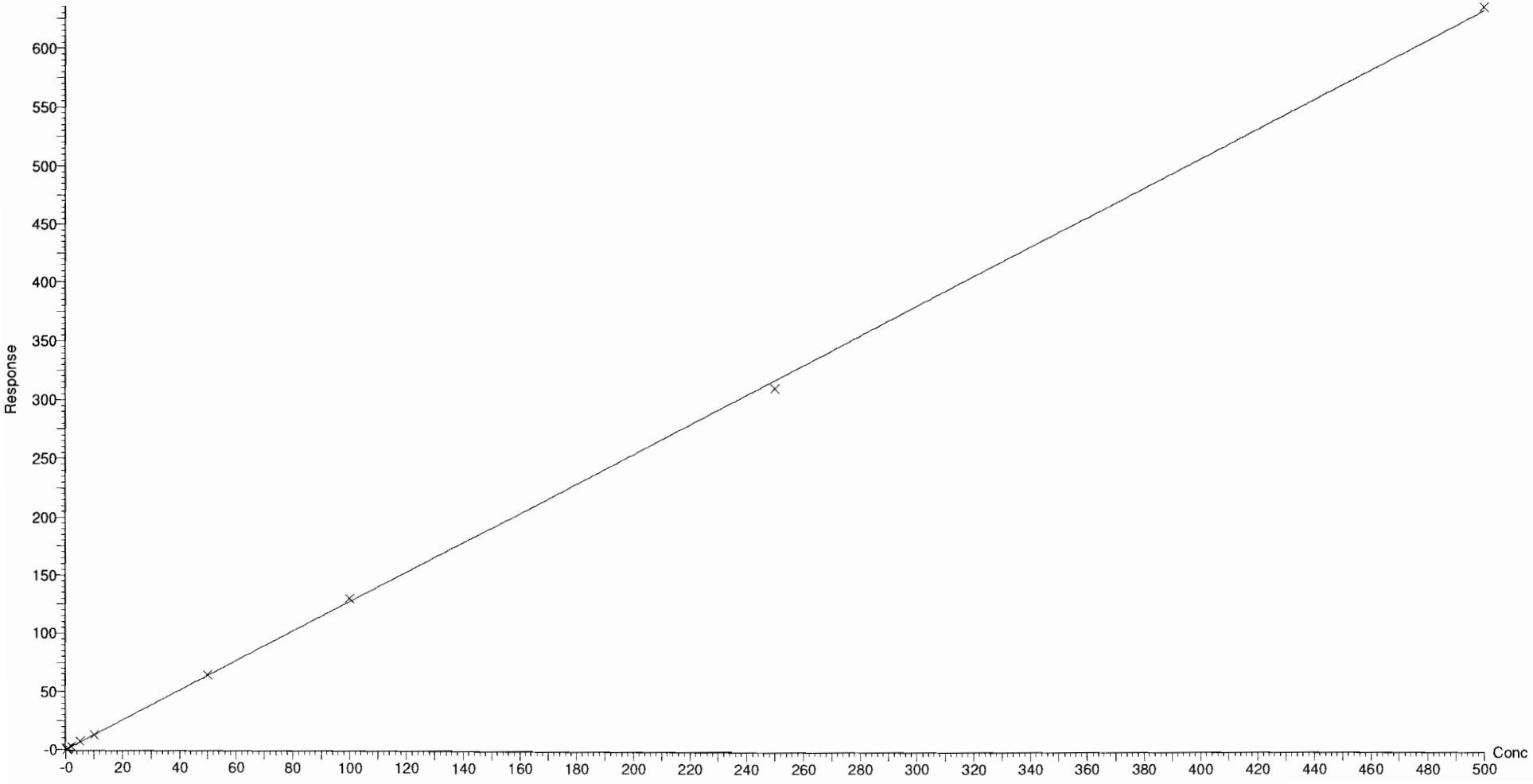
Compound name: L-PFOS
Correlation coefficient: r = 0.999888, r^2 = 0.999775
Calibration curve: 1.06971 * x + -0.0118865
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

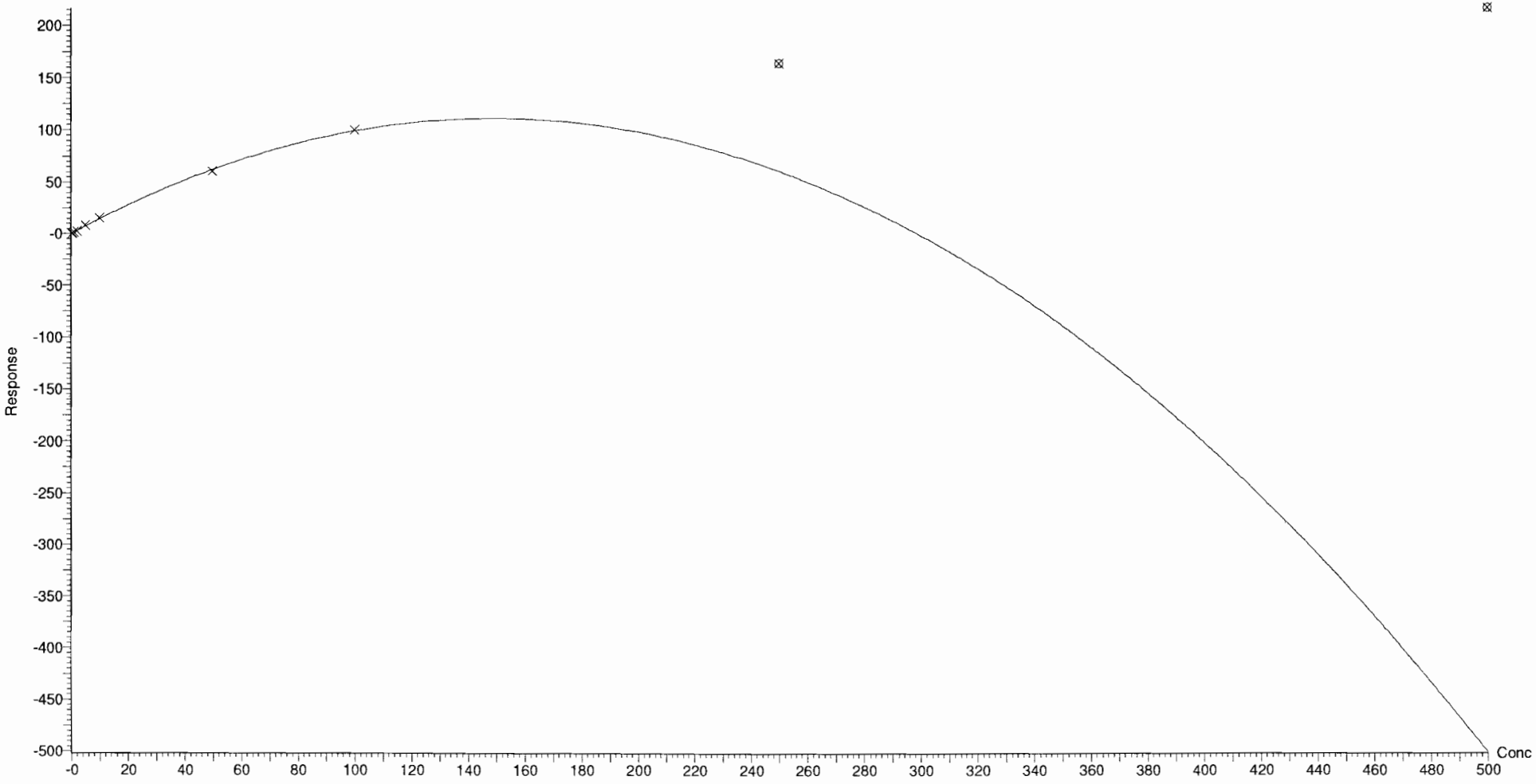
Compound name: PFDA
Coefficient of Determination: R^2 = 0.999698
Calibration curve: -2.71042e-005 * x^2 + 1.27845 * x + 0.117549
Response type: Internal Std (Ref 48), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

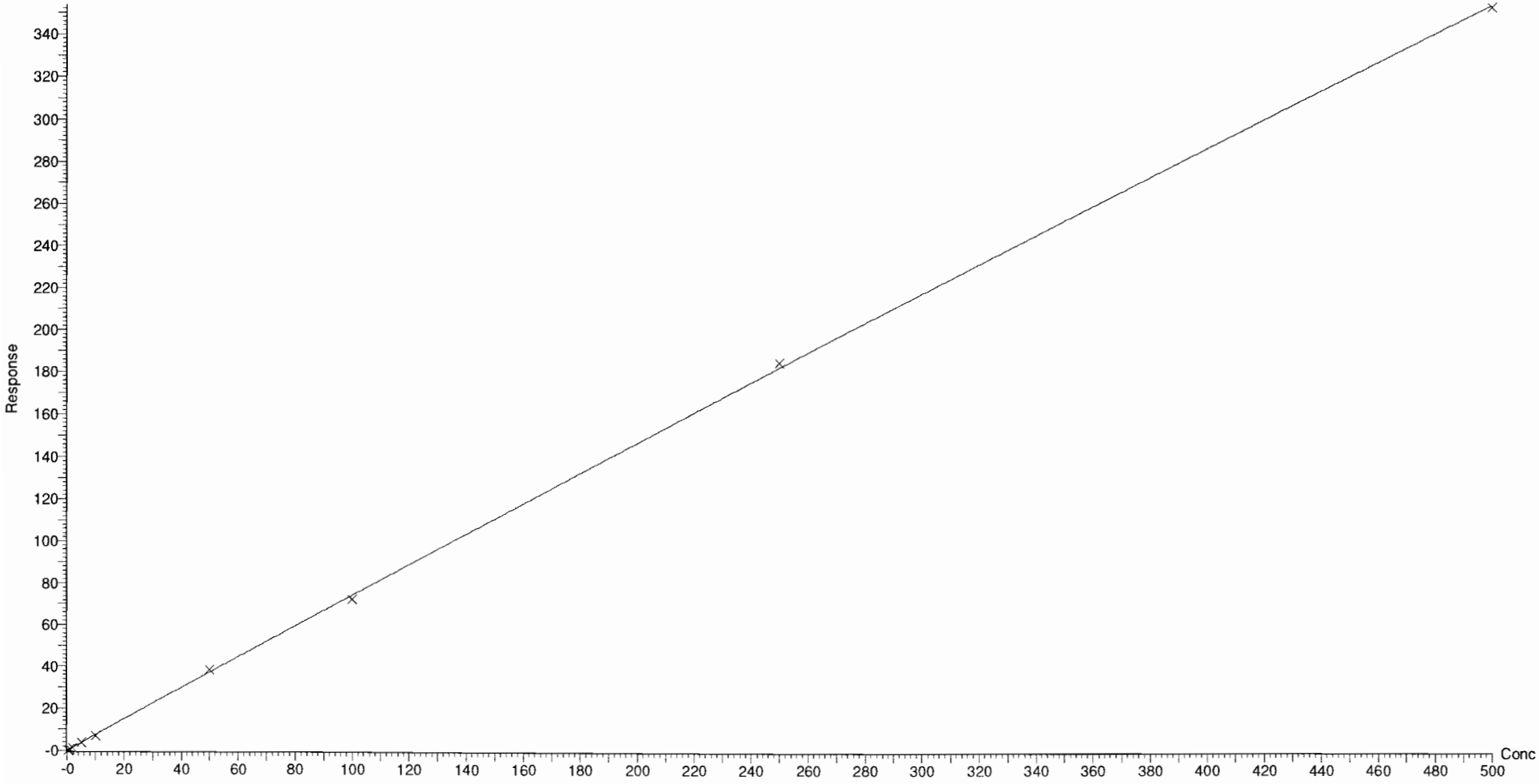
Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.998680
Calibration curve: -0.00498611 * x^2 + 1.49085 * x + 0.00285394
Response type: Internal Std (Ref 49), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

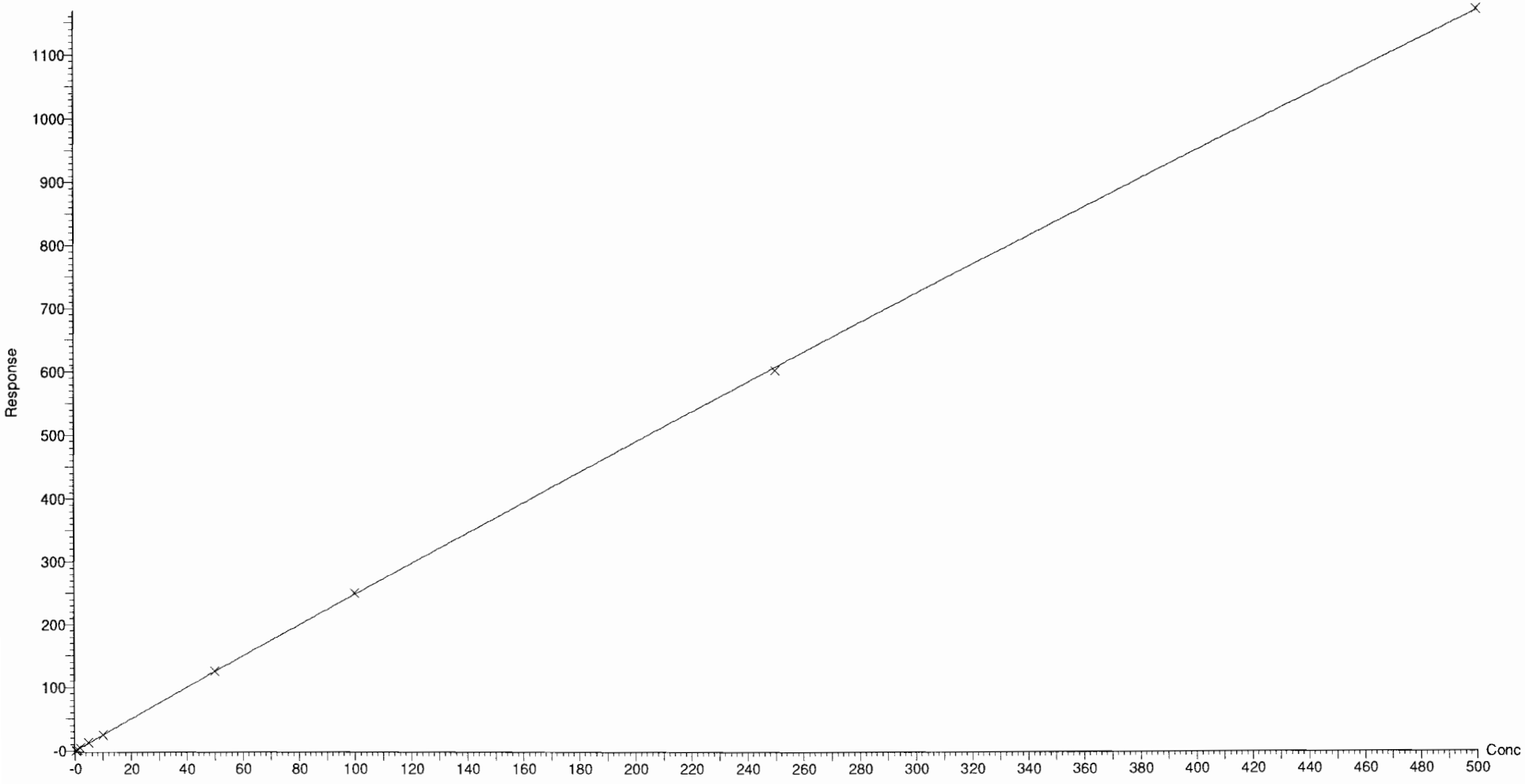
Compound name: PFNS
Coefficient of Determination: R^2 = 0.999636
Calibration curve: -8.93498e-005 * x^2 + 0.752372 * x + 0.018373
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

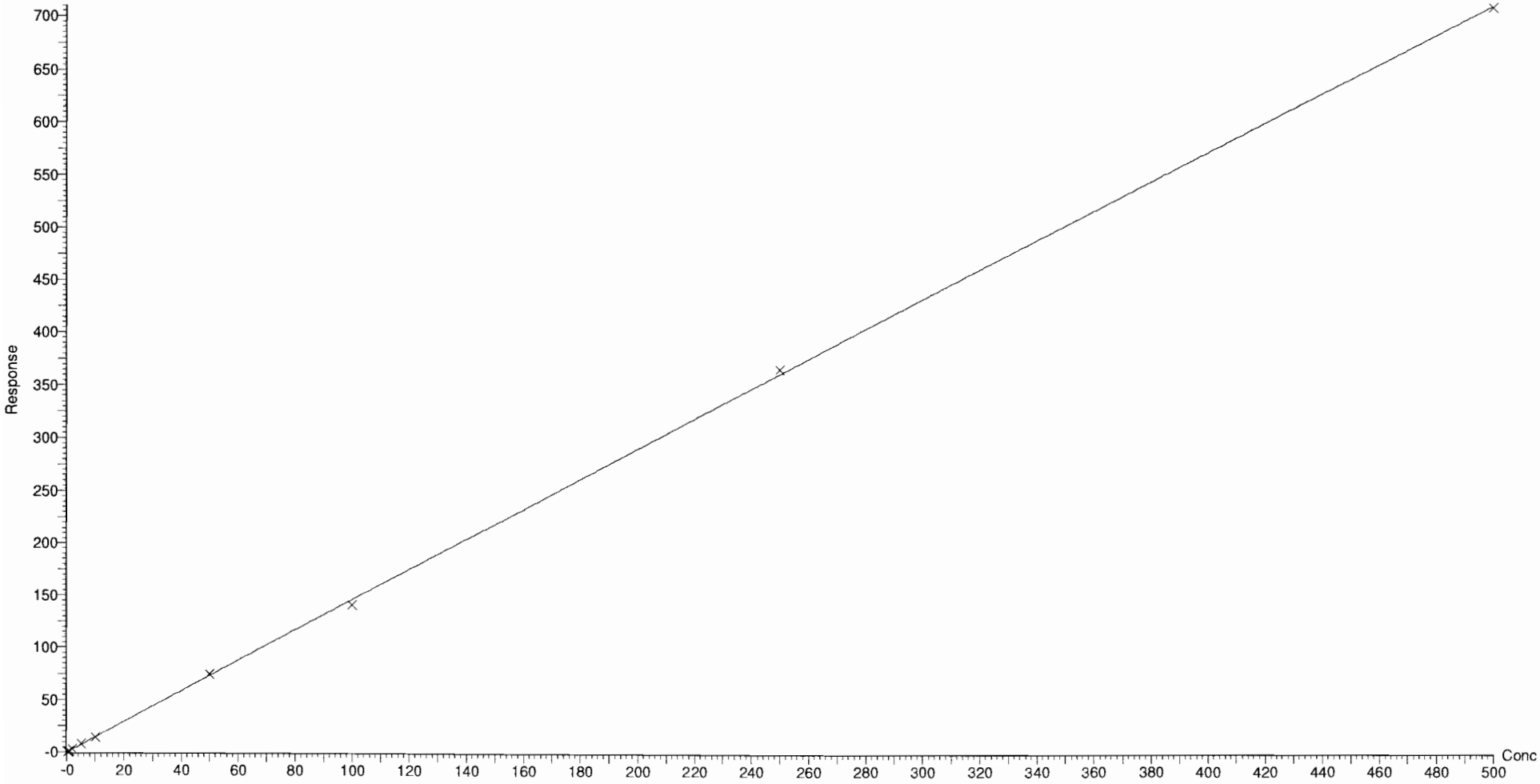
Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999924
Calibration curve: -0.000386461 * x^2 + 2.52617 * x + 0.080661
Response type: Internal Std (Ref 50), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:14 Pacific Standard Time

Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999736
Calibration curve: -0.000106299 * x^2 + 1.4734 * x + -0.0536291
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



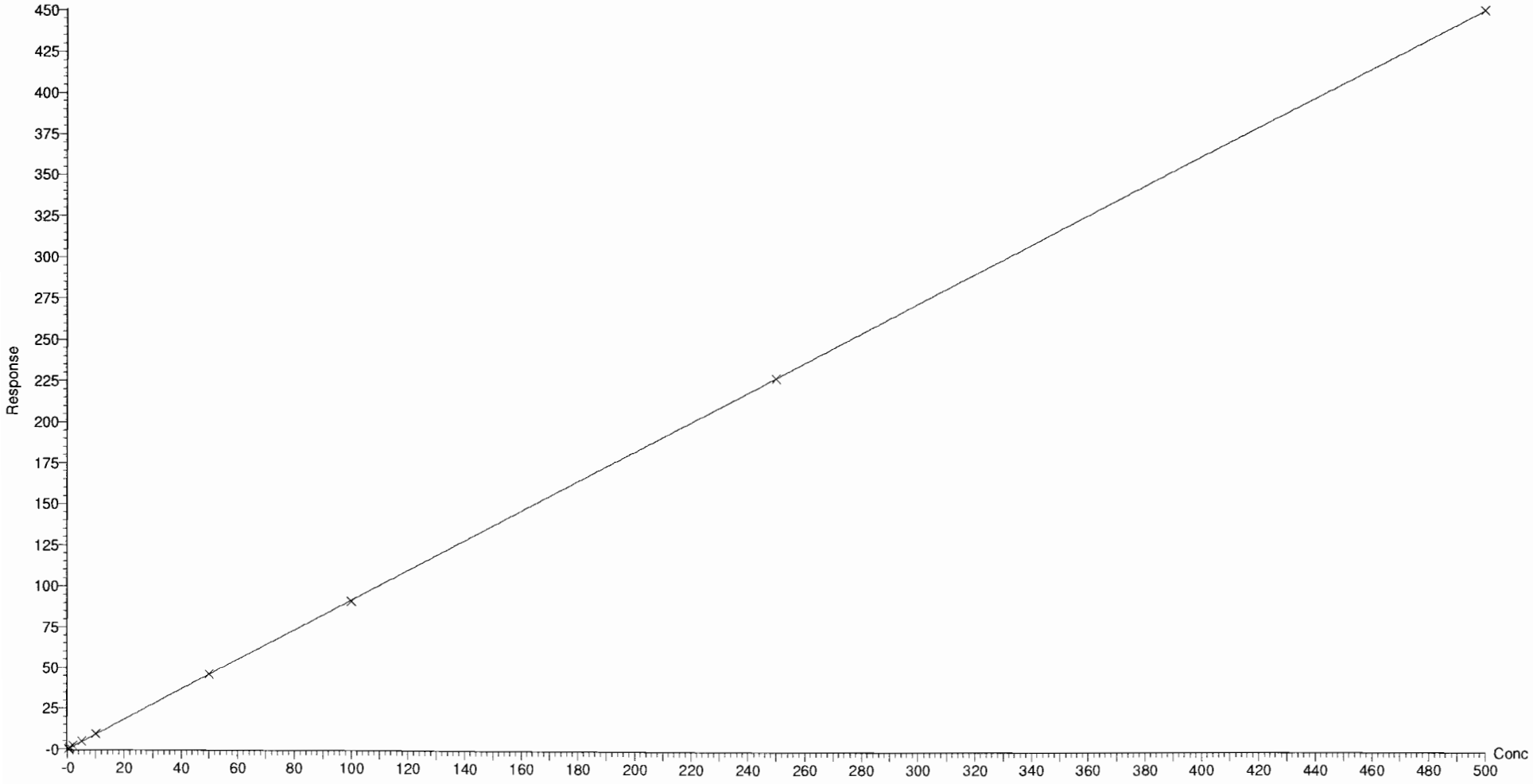
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

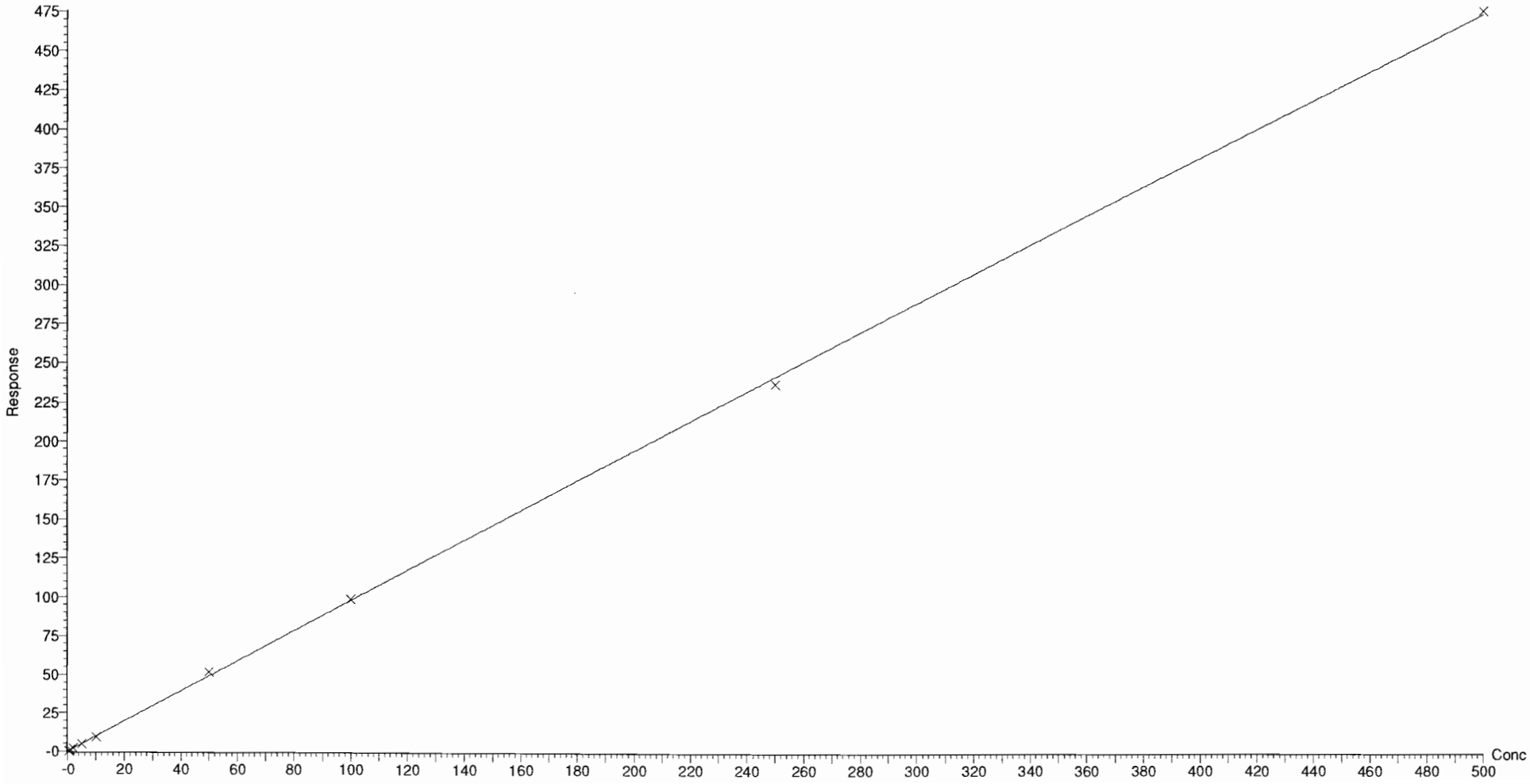
Compound name: PFUdA
Coefficient of Determination: R^2 = 0.999904
Calibration curve: -3.81142e-005 * x^2 + 0.91974 * x + 0.12239
Response type: Internal Std (Ref 51), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

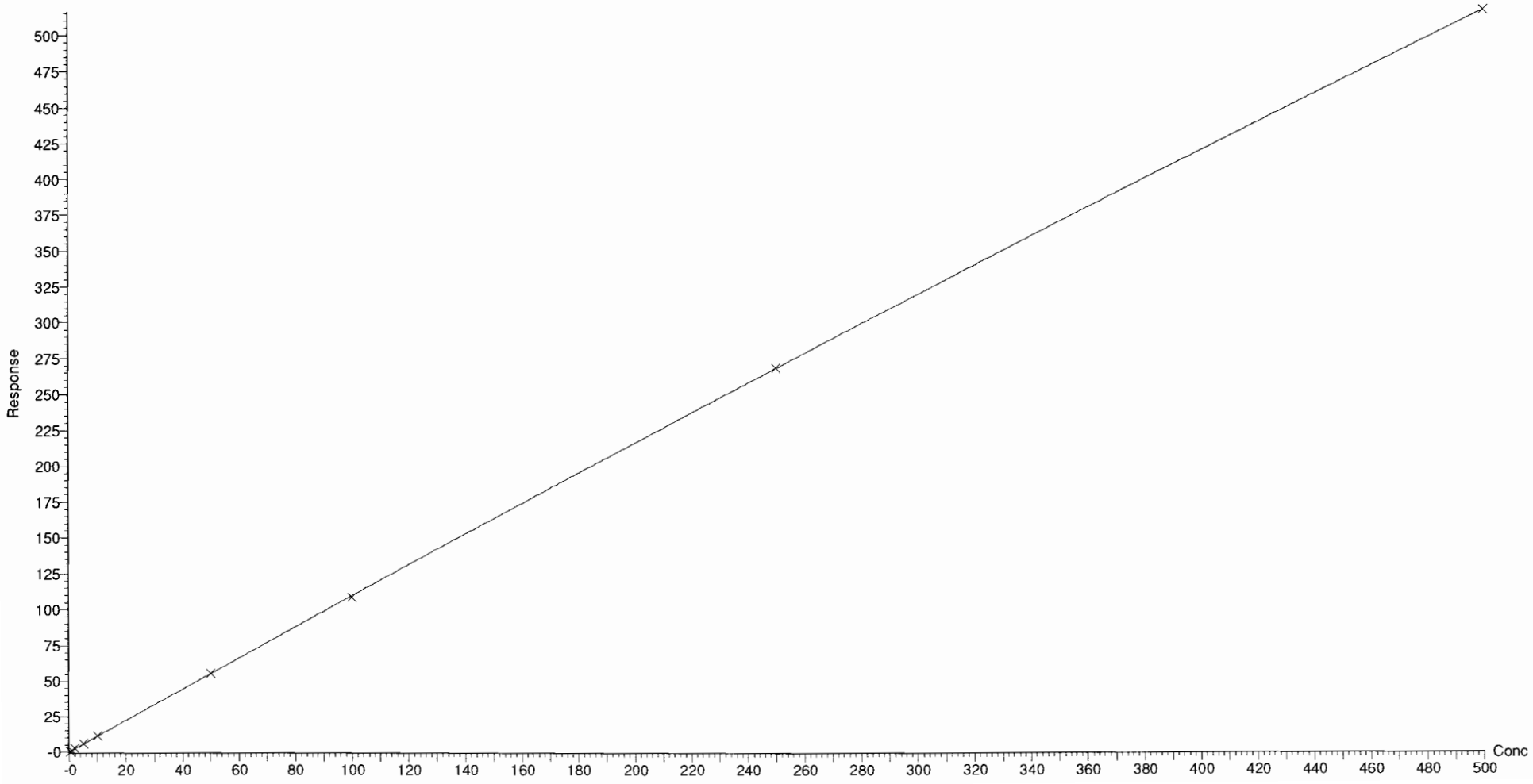
Compound name: PFDS
Coefficient of Determination: R^2 = 0.999675
Calibration curve: -8.18889e-005 * x^2 + 0.987988 * x + 0.0385595
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

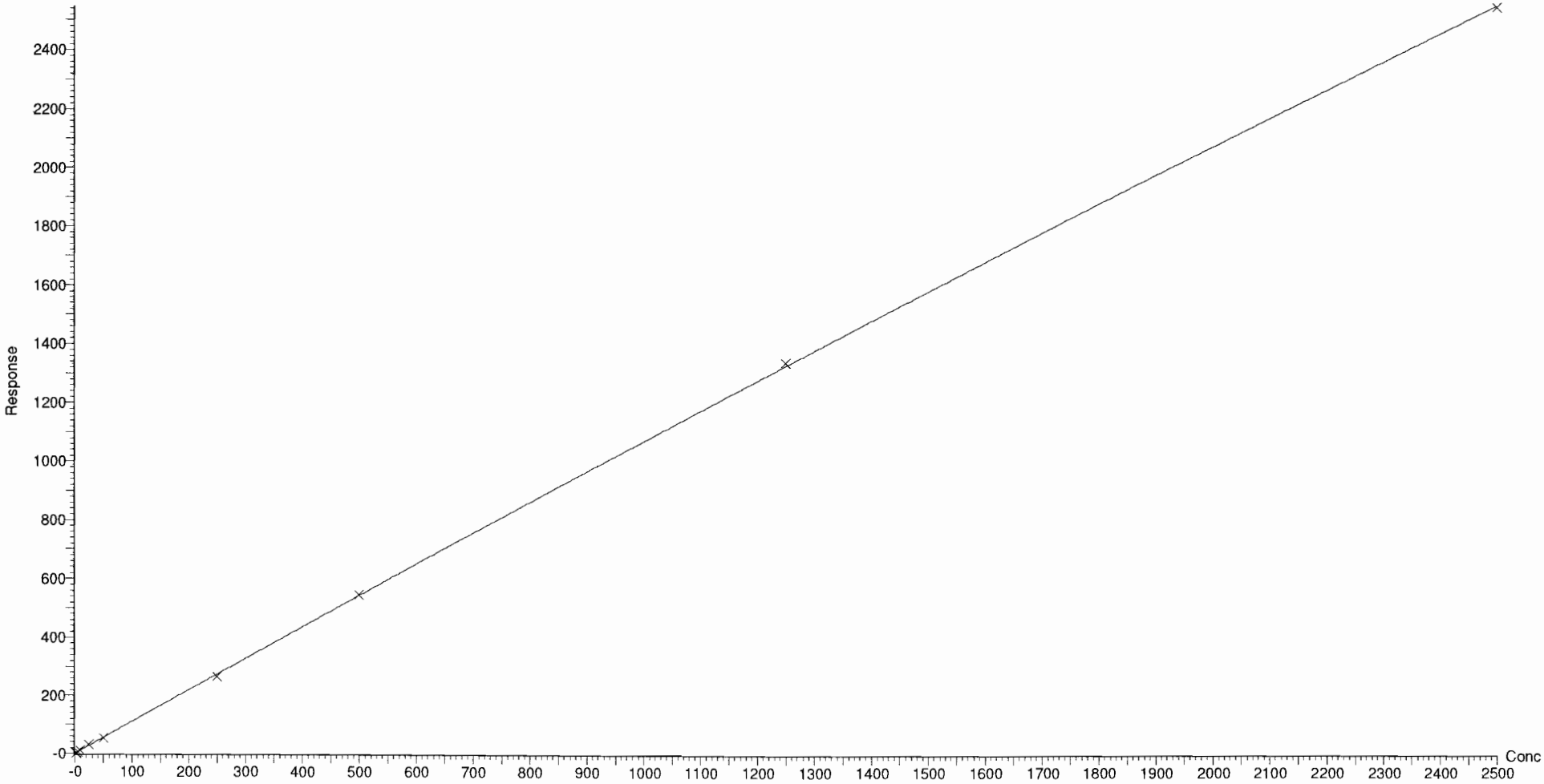
Compound name: PFDoA
Coefficient of Determination: R^2 = 0.999950
Calibration curve: -0.000162641 * x^2 + 1.1143 * x + 0.0921152
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

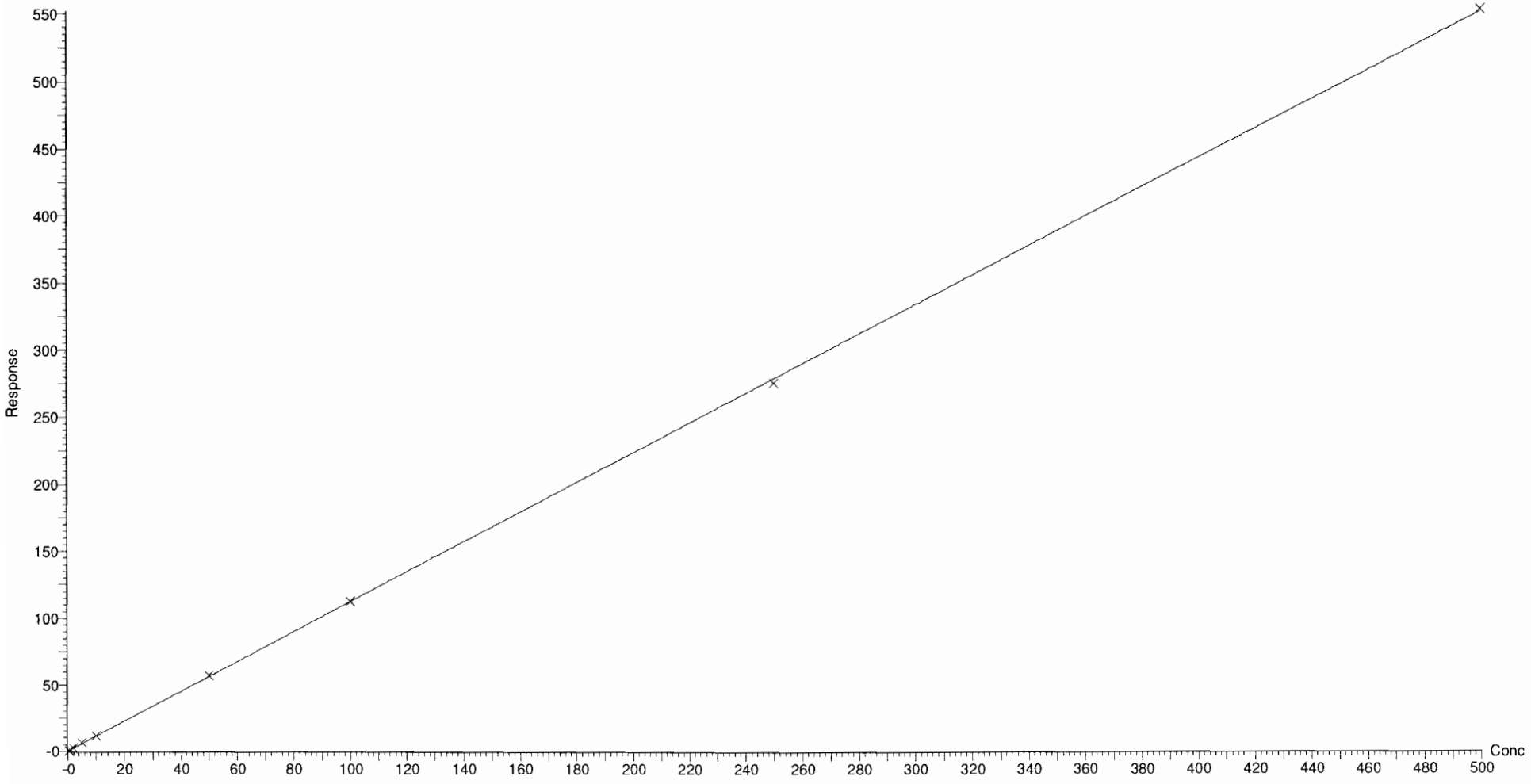
Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999829
Calibration curve: -3.45213e-005 * x^2 + 1.10576 * x + 0.229354
Response type: Internal Std (Ref 54), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

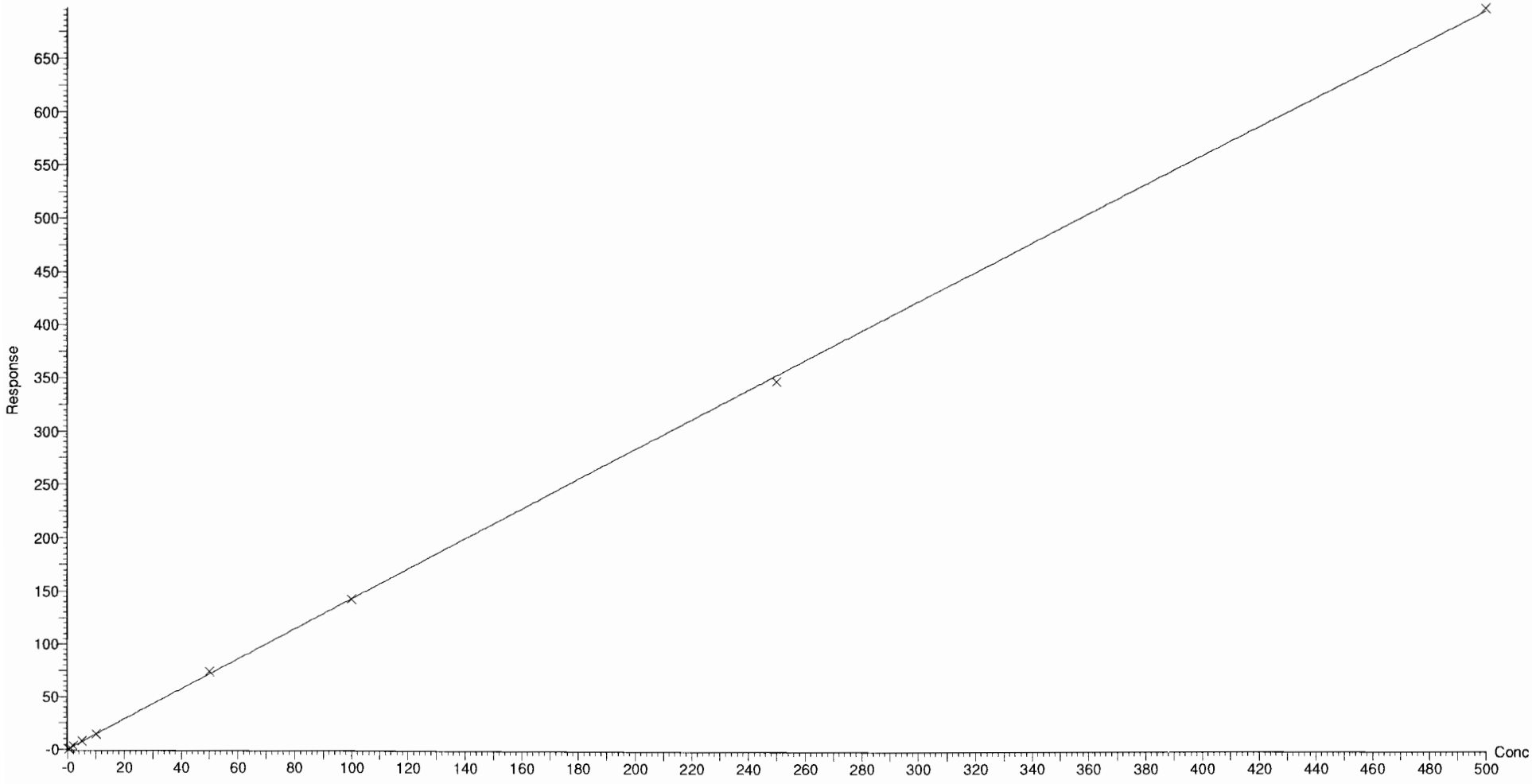
Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.999868
Calibration curve: -5.63679e-005 * x^2 + 1.12947 * x + 0.111462
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999748
Calibration curve: -0.000104949 * x^2 + 1.44062 * x + 0.169939
Response type: Internal Std (Ref 55), Area * (IS Conc. / IS Area)
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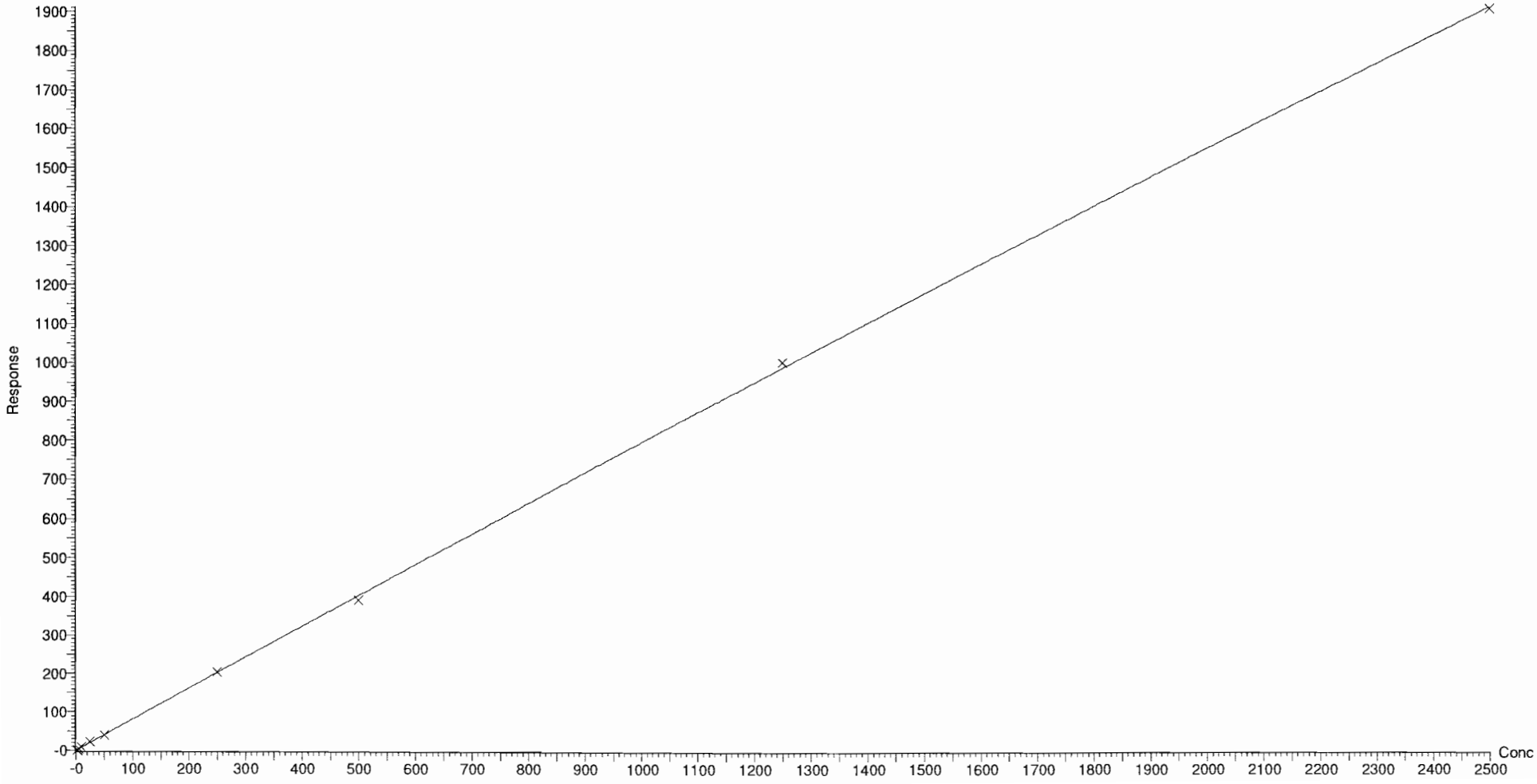


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999708
Calibration curve: -2.13466e-005 * x^2 + 0.817824 * x + 0.372192
Response type: Internal Std (Ref 56), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

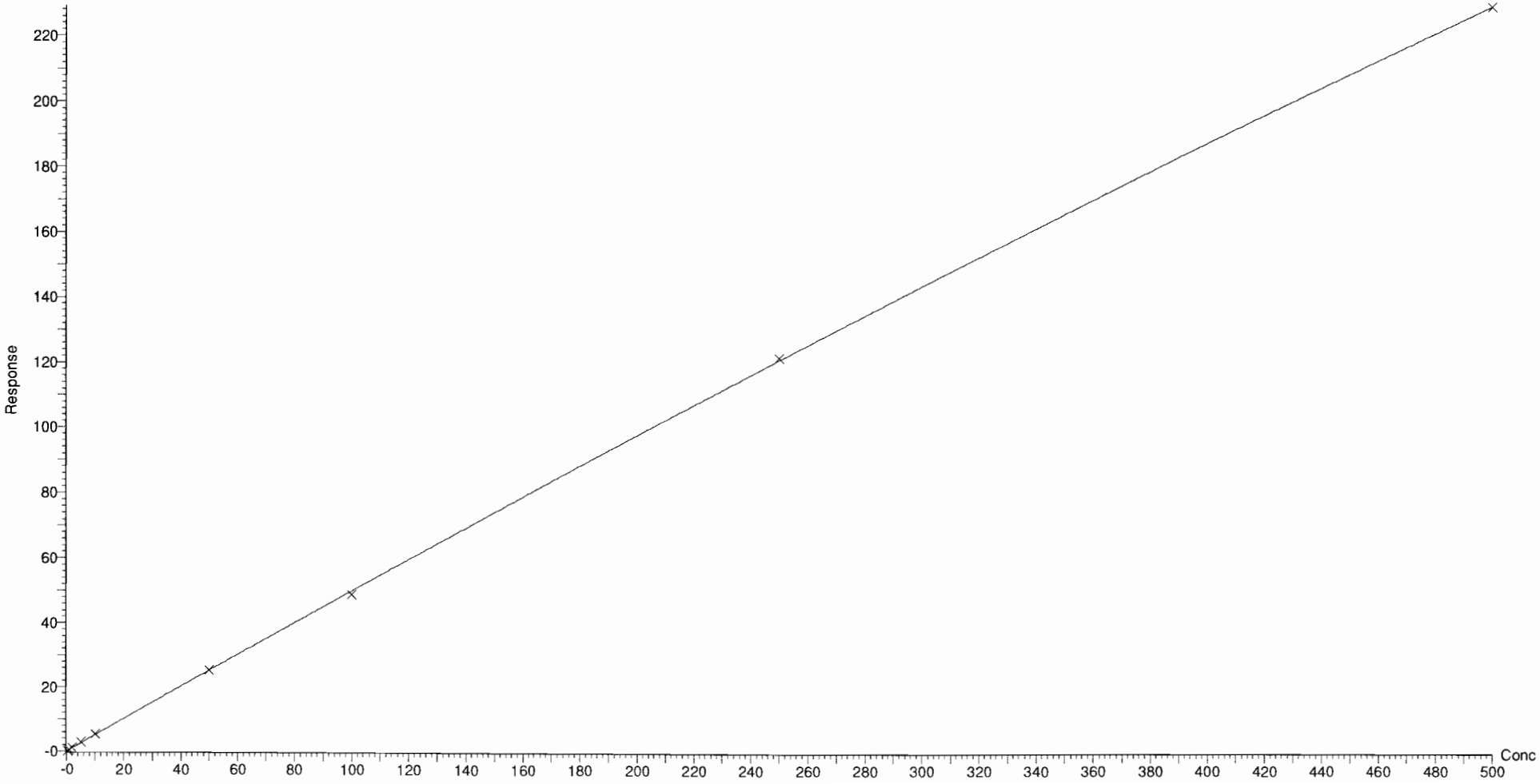


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

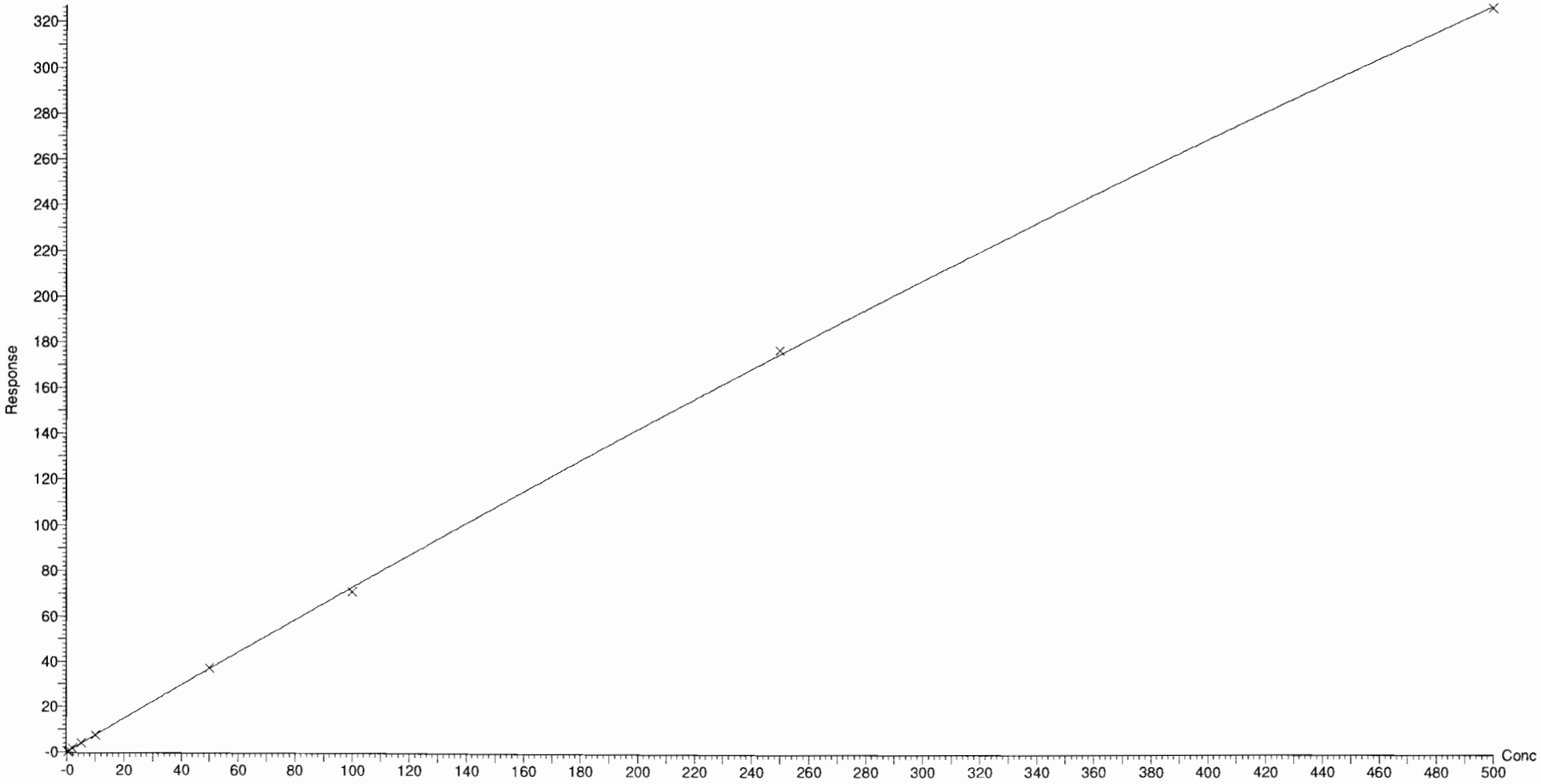
Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.999829
Calibration curve: -0.000101772 * x^2 + 0.509003 * x + 0.0746932
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

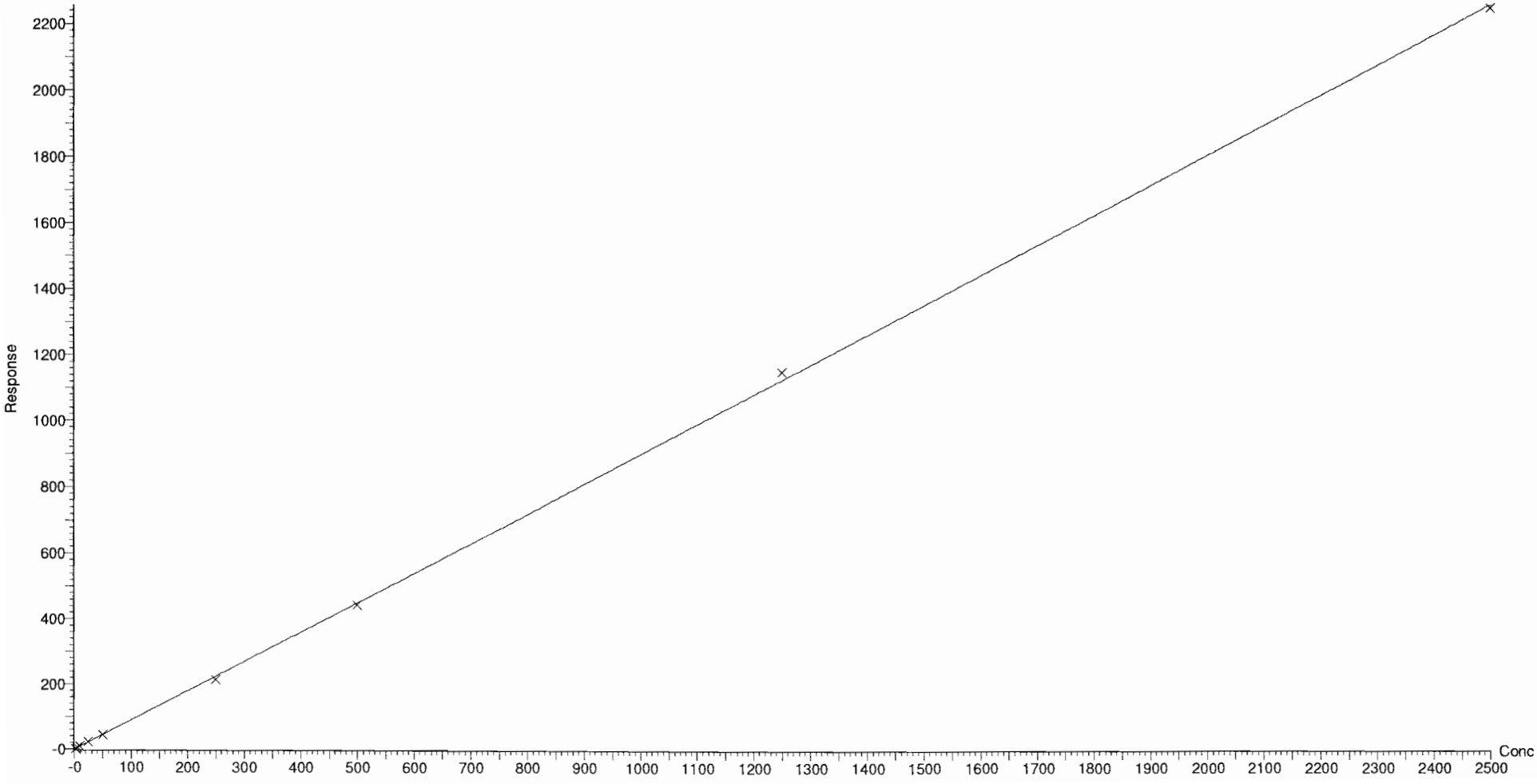
Compound name: PFODA
Coefficient of Determination: R^2 = 0.999792
Calibration curve: -0.000188326 * x^2 + 0.748104 * x + 0.0400274
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

Compound name: N-MeFOSE
Coefficient of Determination: R^2 = 0.999680
Calibration curve: 1.98083e-006 * x^2 + 0.89799 * x + 0.169793
Response type: Internal Std (Ref 58), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

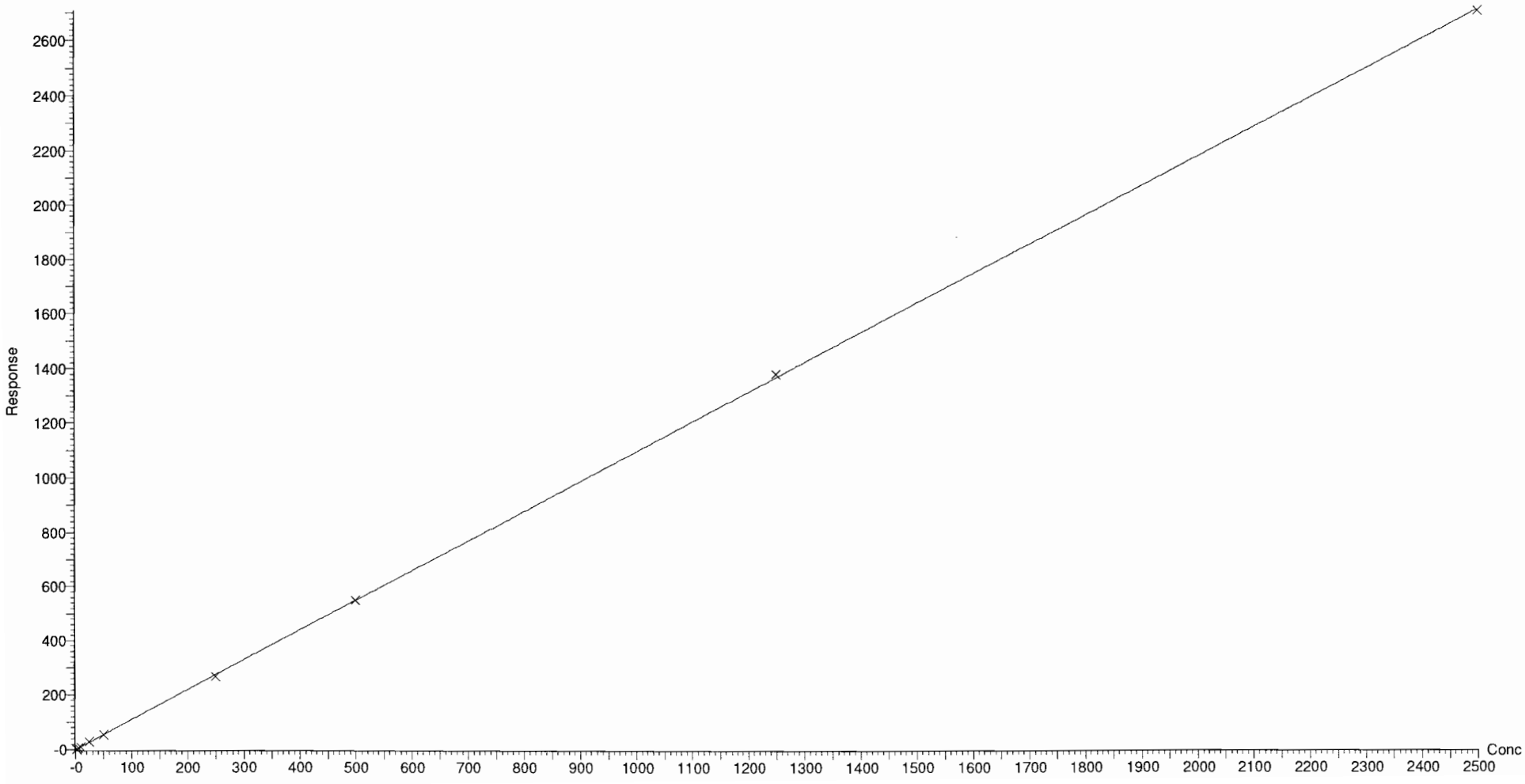


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:21:23 Pacific Standard Time

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999917
Calibration curve: -8.62216e-006 * x^2 + 1.10568 * x + 0.172062
Response type: Internal Std (Ref 59), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



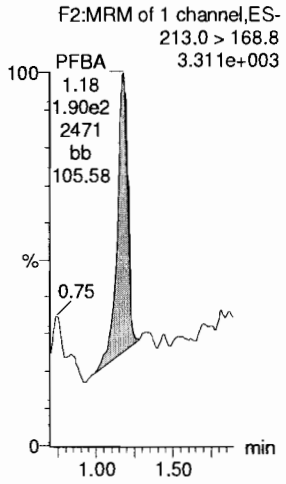
Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:16:07 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:16:51 Pacific Standard Time

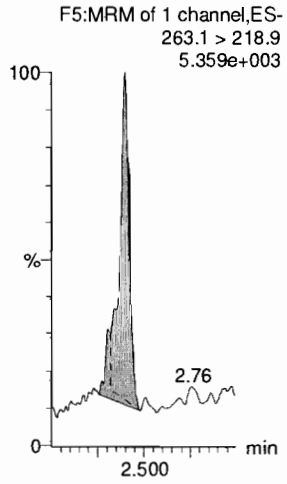
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_111918.mdb 20 Nov 2018 11:07:39
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_2, Date: 19-Nov-2018, Time: 20:17:43, ID: ST181119M2-1 PFC CS-2 18K0901, Description: PFC CS-2 18K0901

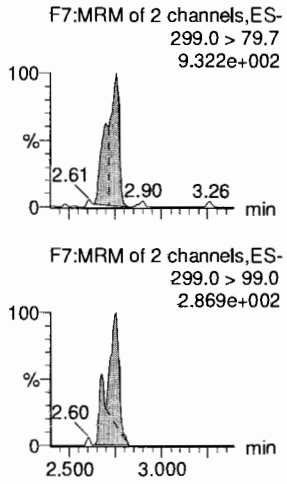
PFBA



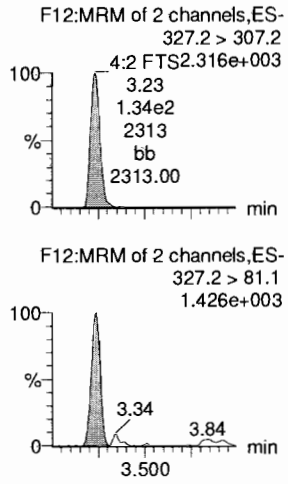
PFPeA



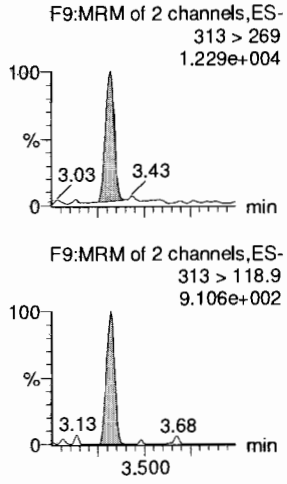
PFBS



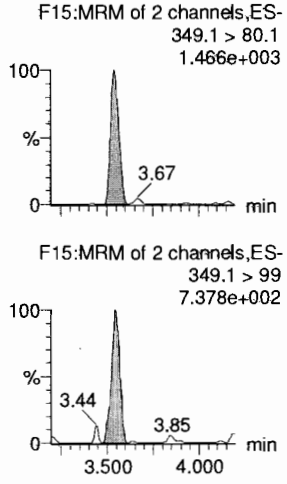
4:2 FTS



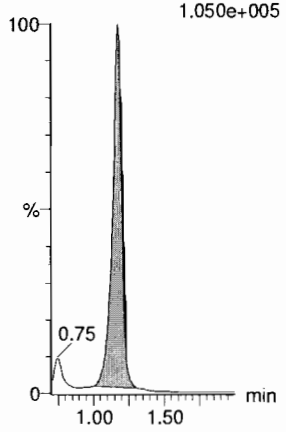
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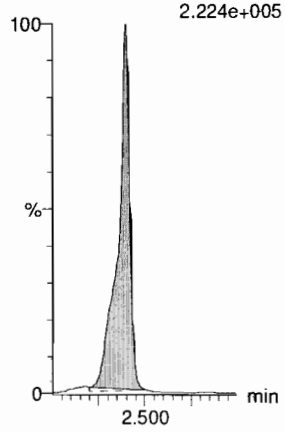
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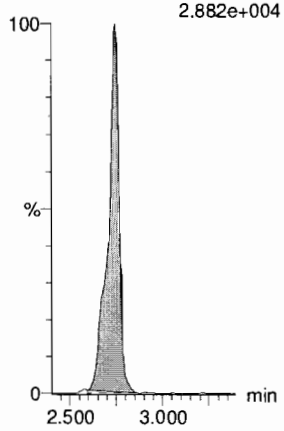
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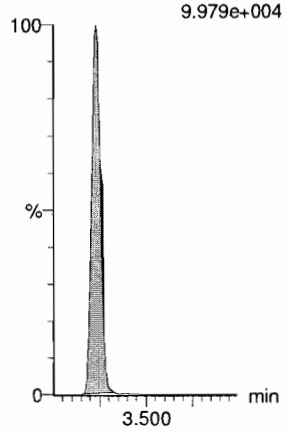
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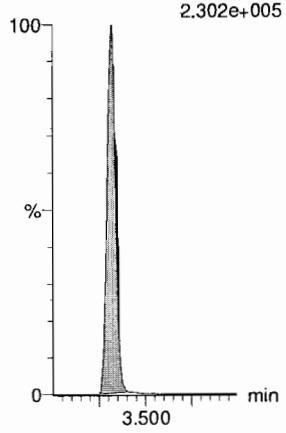
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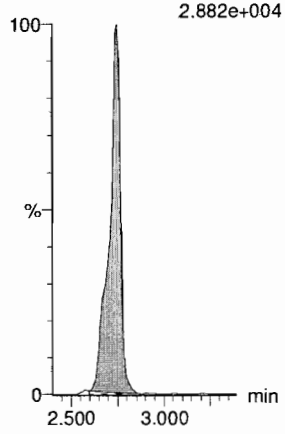
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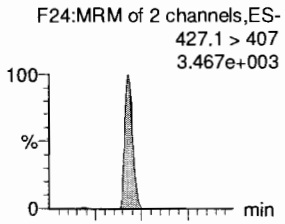


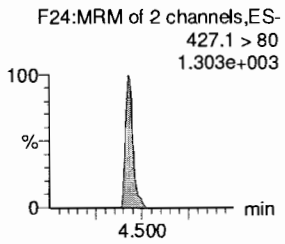
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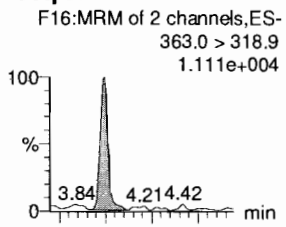
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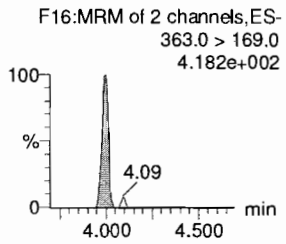
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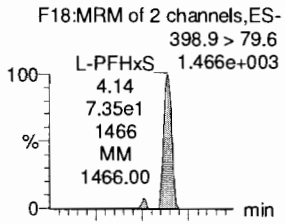


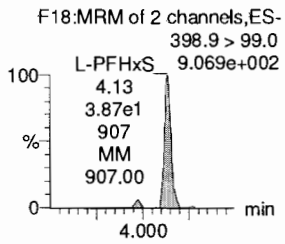
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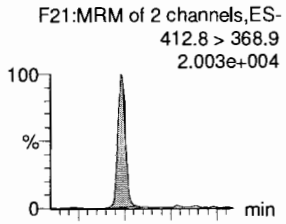


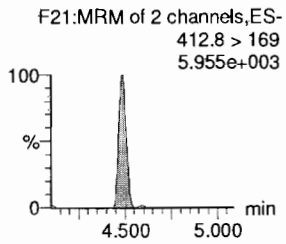
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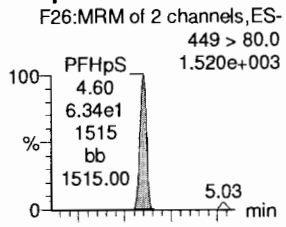


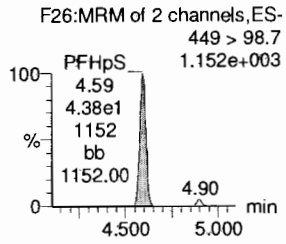
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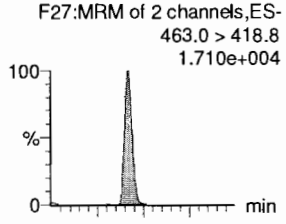


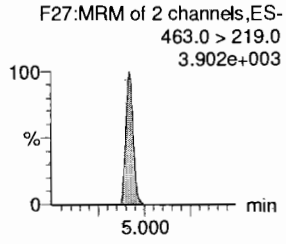
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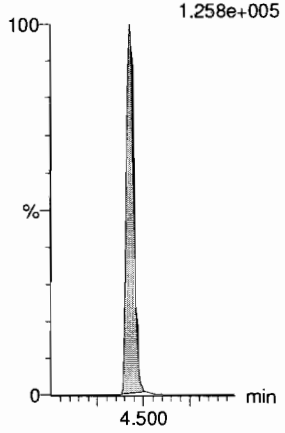


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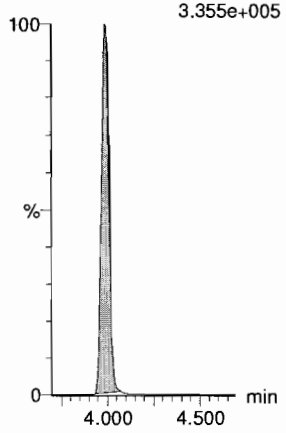




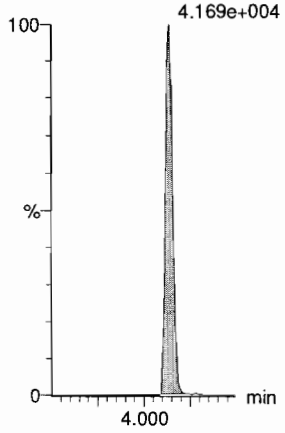
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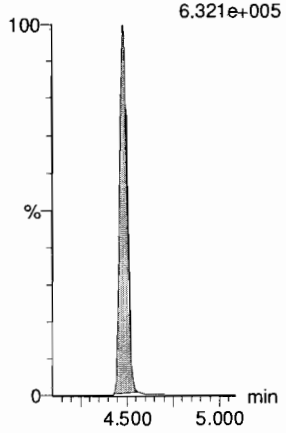
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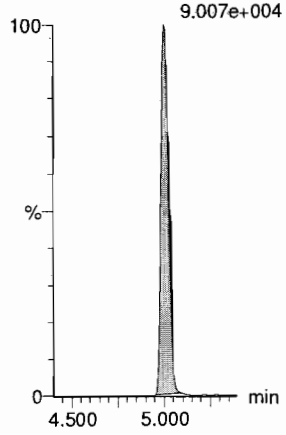
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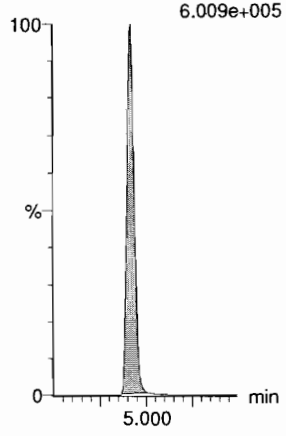
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13C8-PFOS



13C5-PFNA

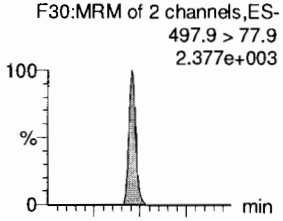


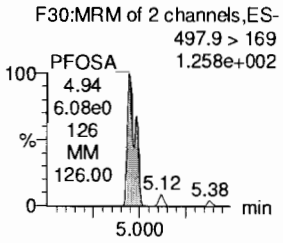
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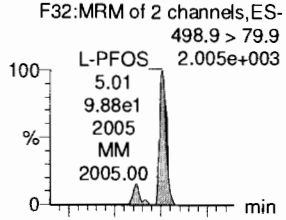
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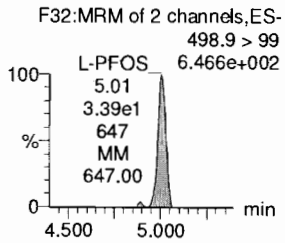
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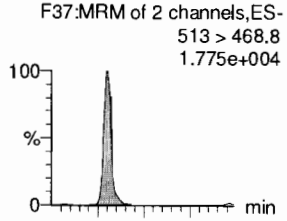


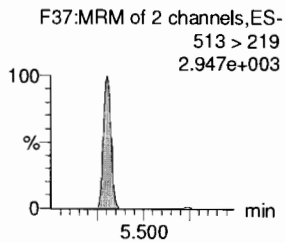
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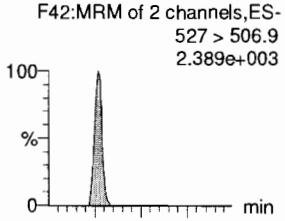


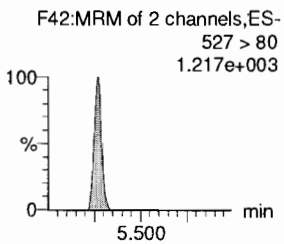
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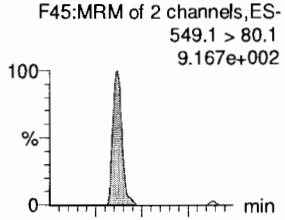


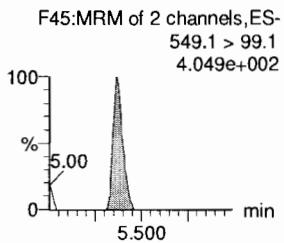
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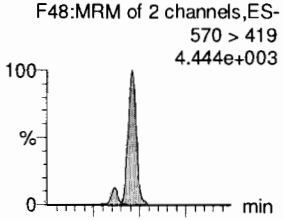


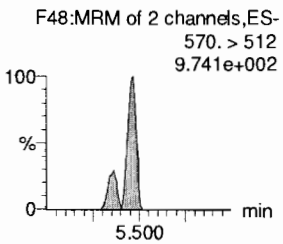
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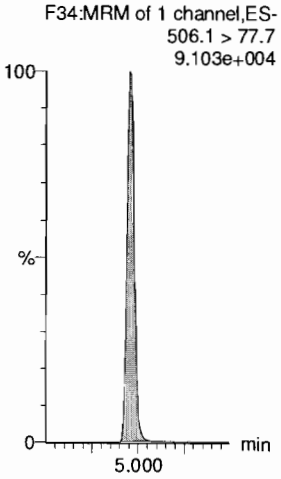


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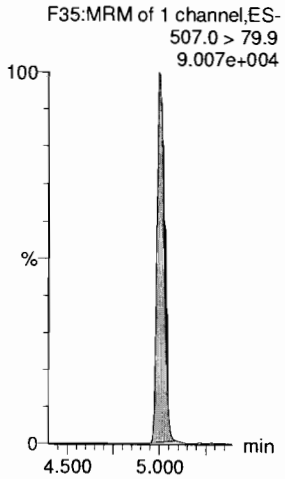




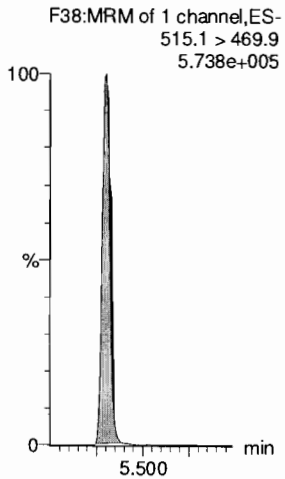
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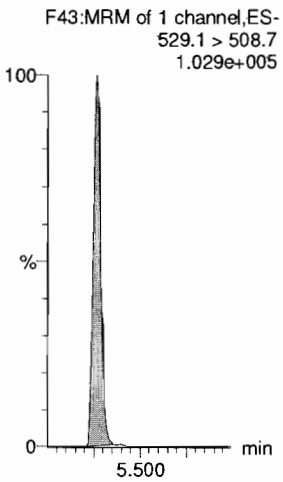
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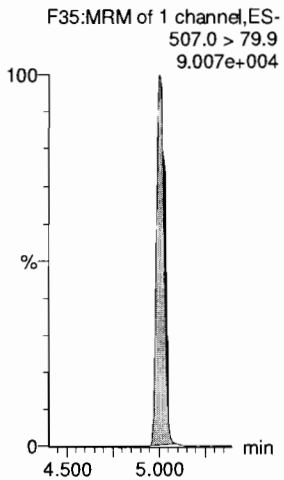
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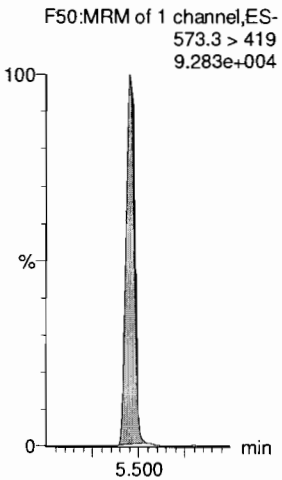
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13C8-PFOS



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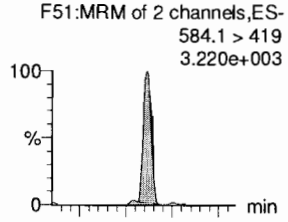


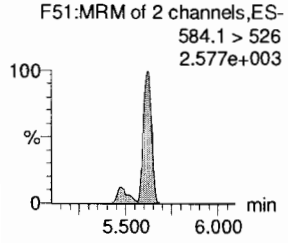
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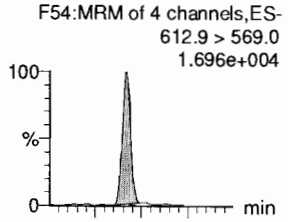
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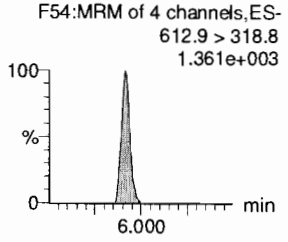
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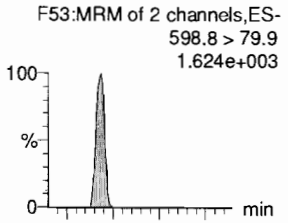


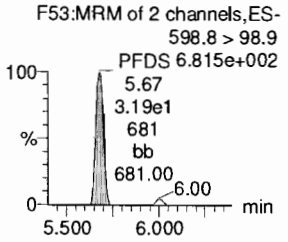
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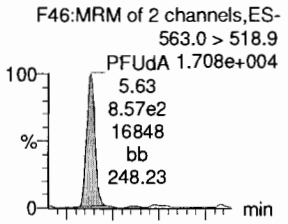


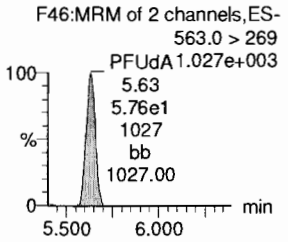
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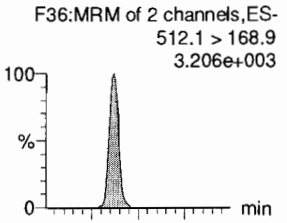


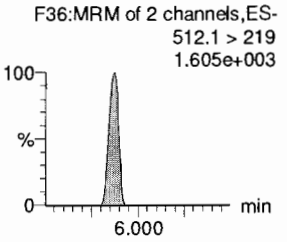
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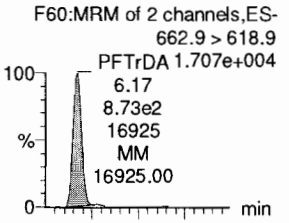


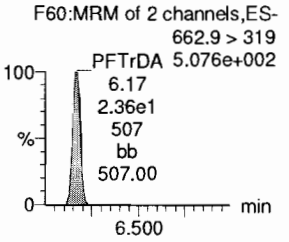
N-MeFOSA



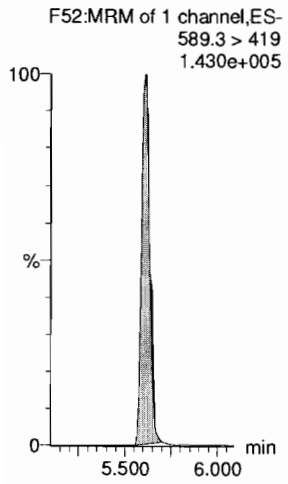


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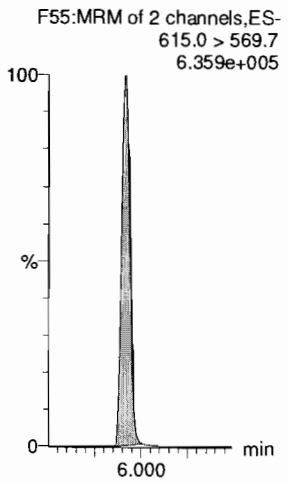




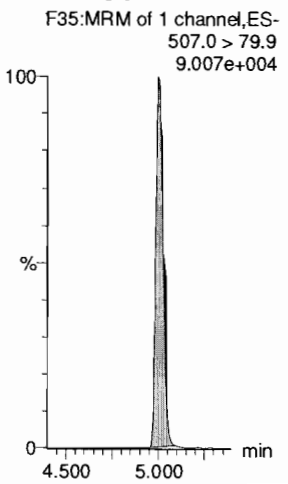
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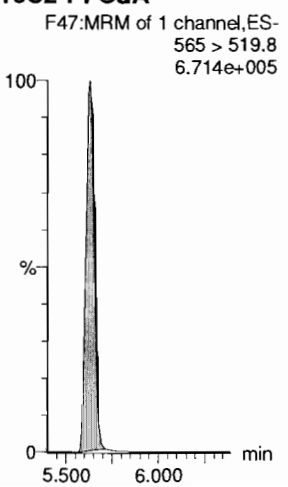
13C2-PFDoA



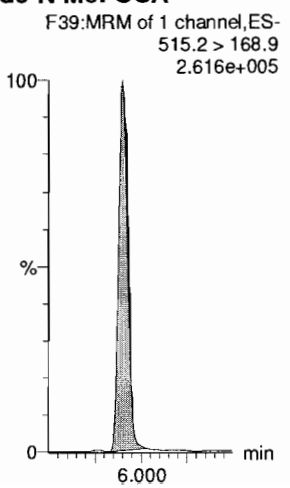
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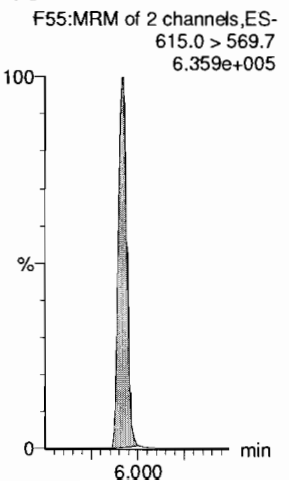
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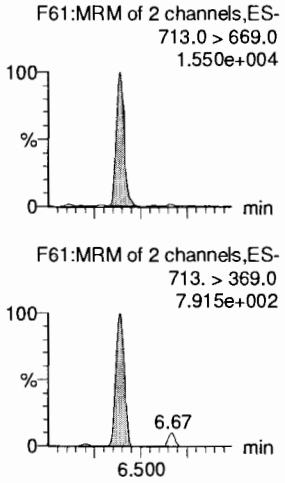


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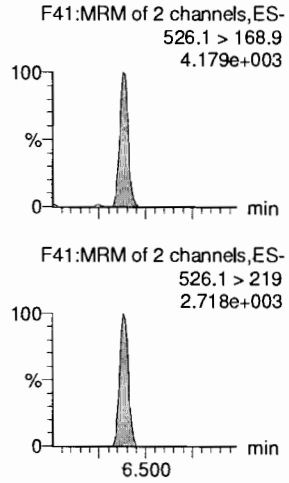
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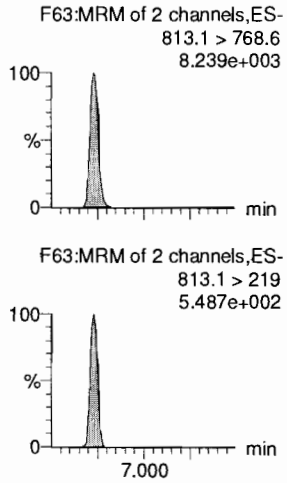
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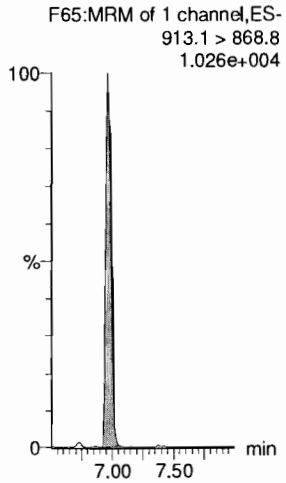
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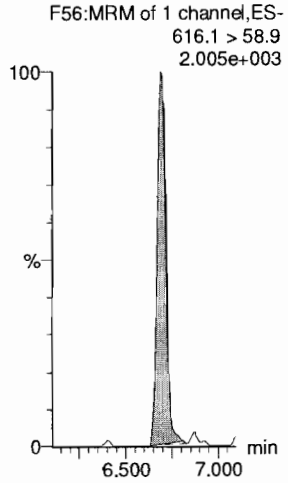
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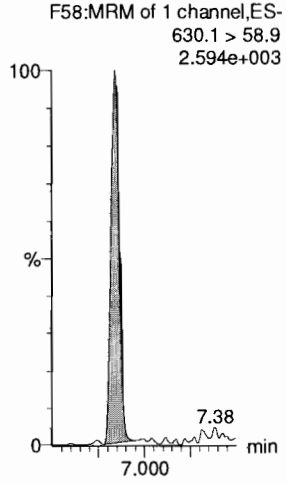
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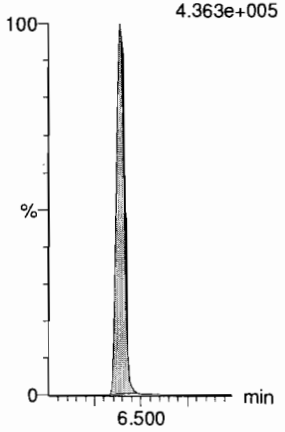
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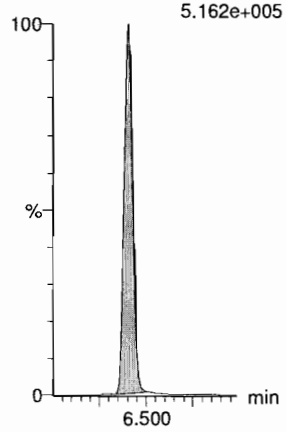
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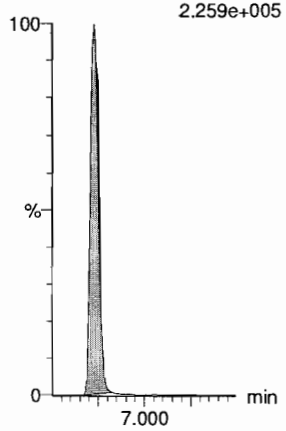
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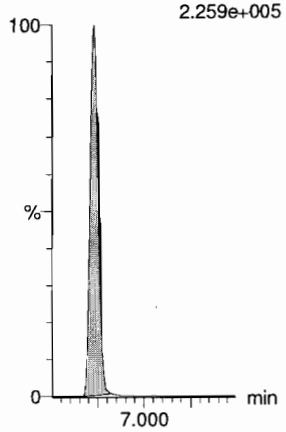
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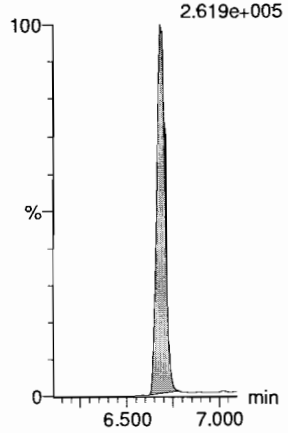
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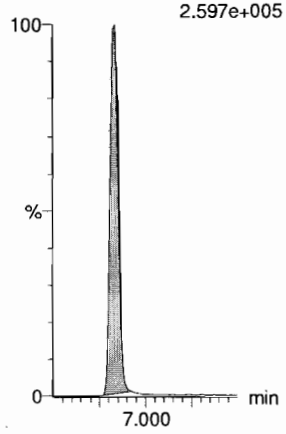
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d7-N-MeFOSE



d9-N-EtFOSE

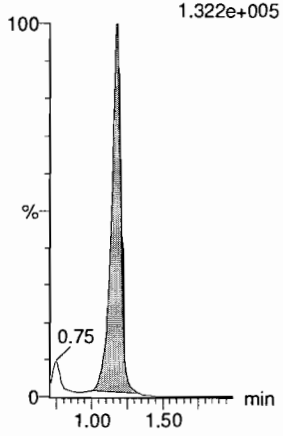


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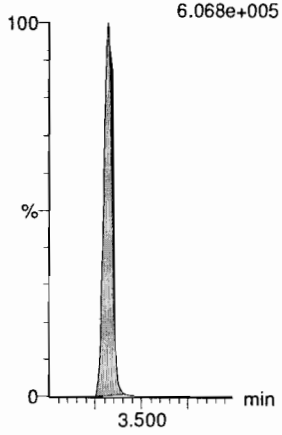
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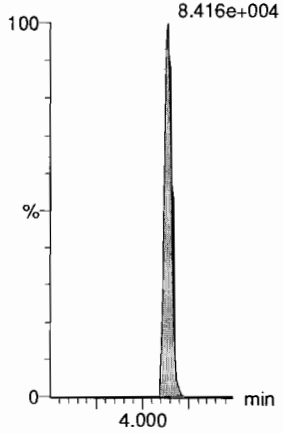
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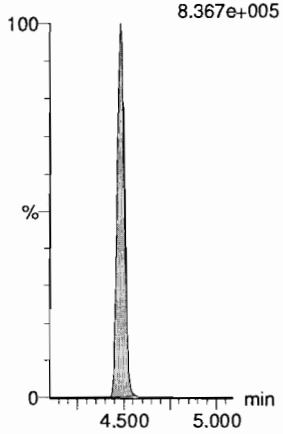
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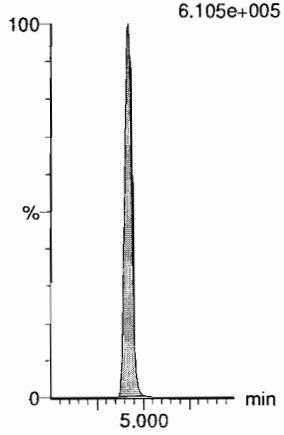
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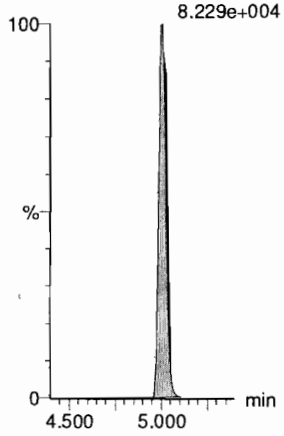
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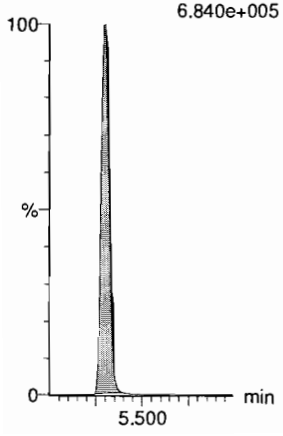
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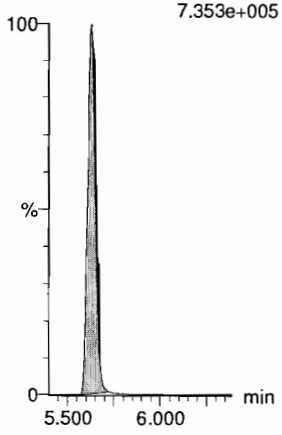
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13C6-PFDA



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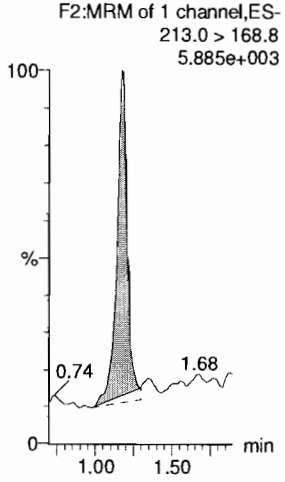


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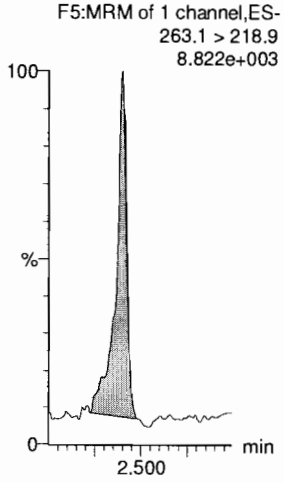
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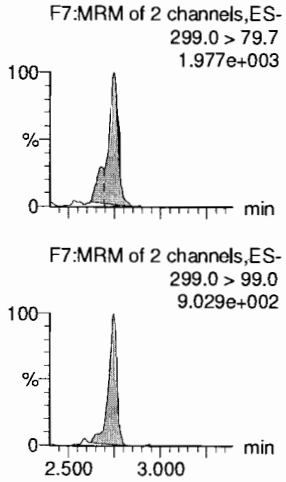
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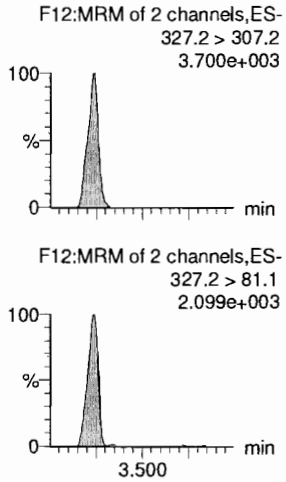
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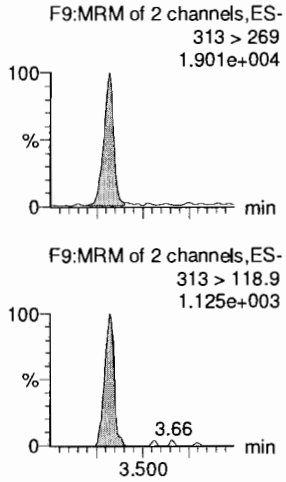
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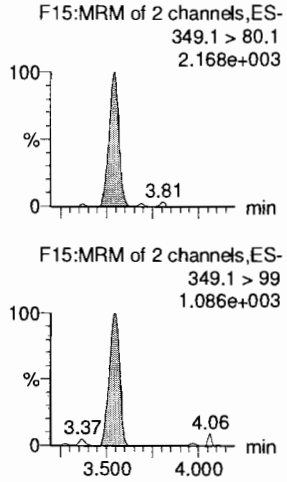
4:2 FTS



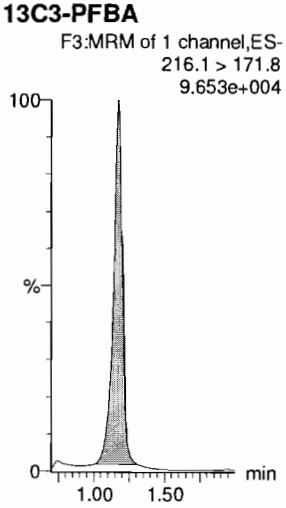
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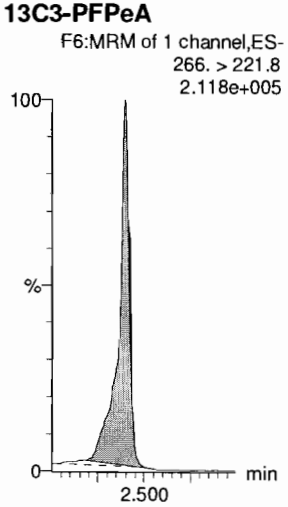
PFPeS



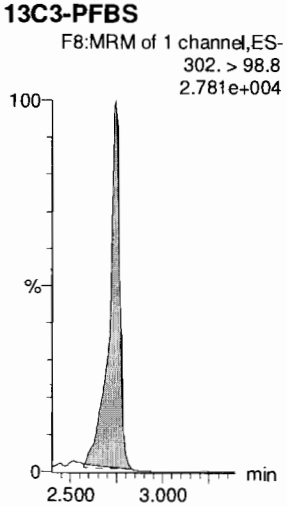
13C3-PFBA



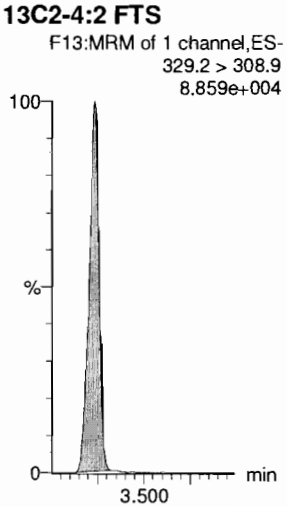
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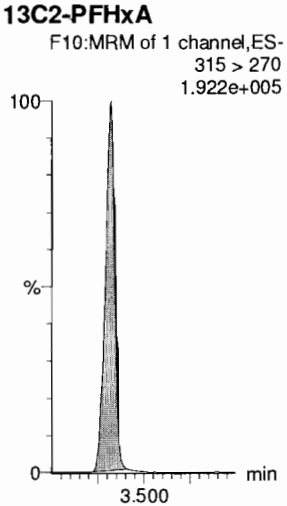
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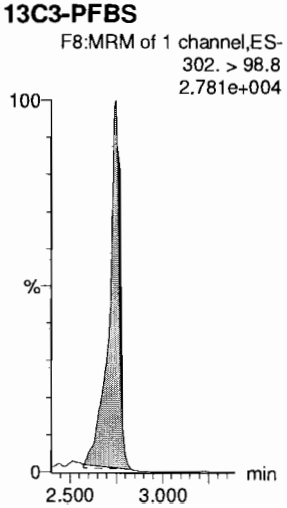
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13C2-PFHxA



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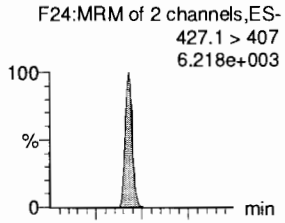


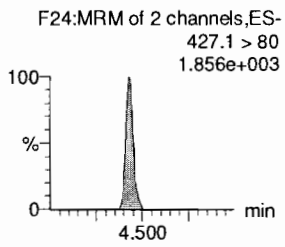
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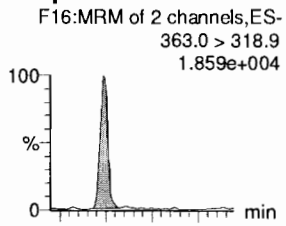
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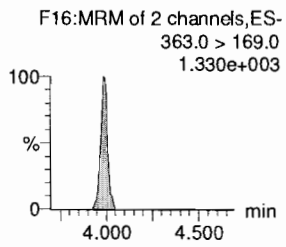
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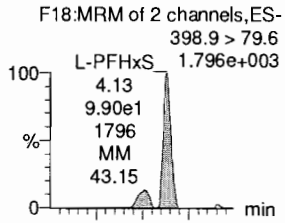


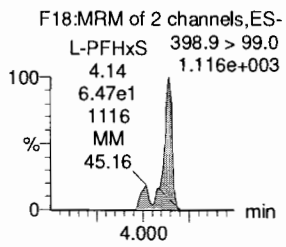
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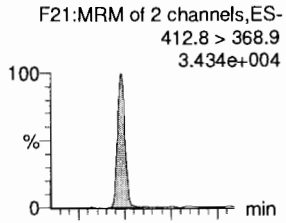


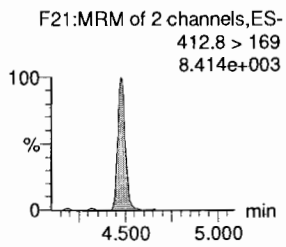
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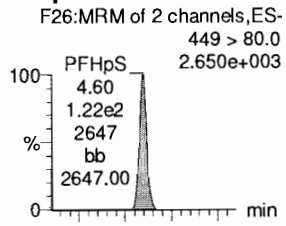


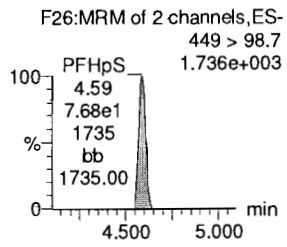
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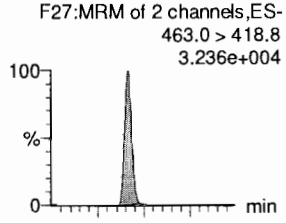


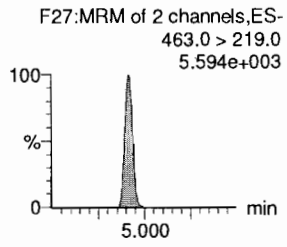
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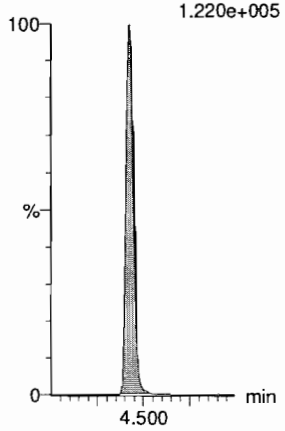


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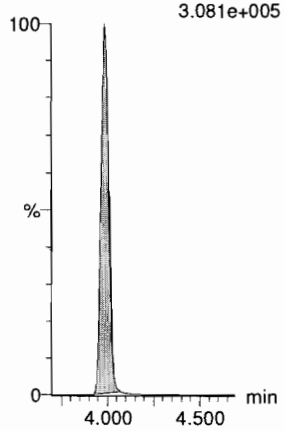




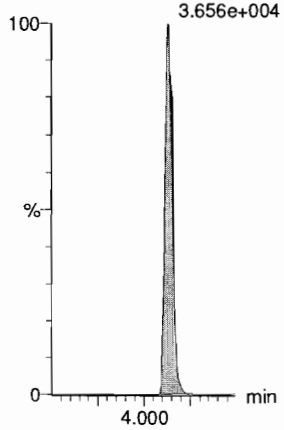
13C2-6:2 FTS



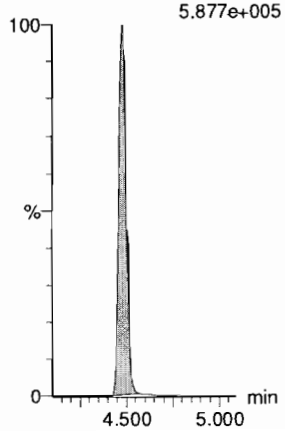
13C4-PFHpA



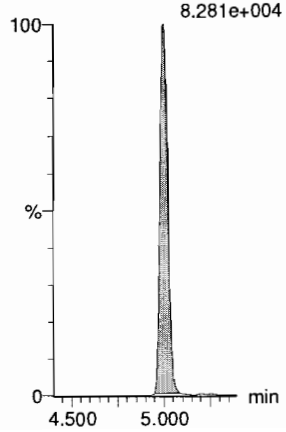
18O2-PFHxS



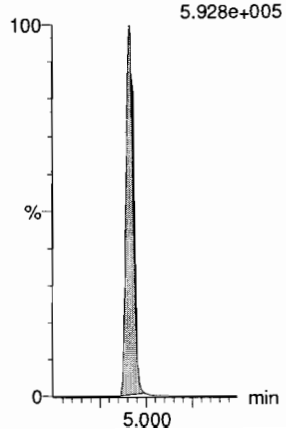
13C2-PFOA



13C8-PFOS



13C5-PFNA

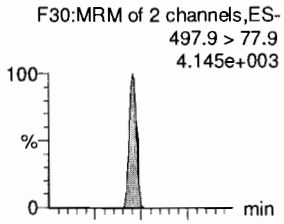


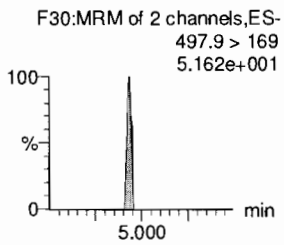
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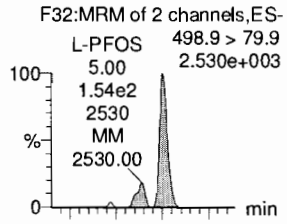
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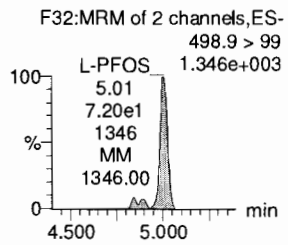
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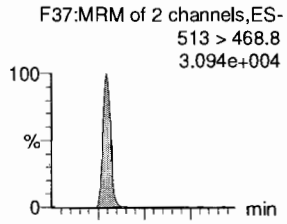


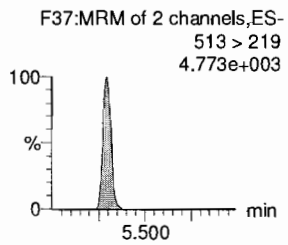
L-PFOS



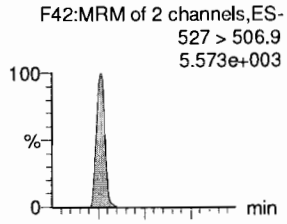


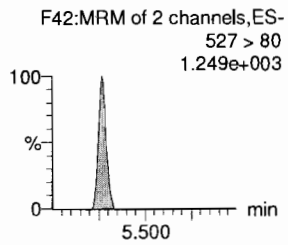
PFDA



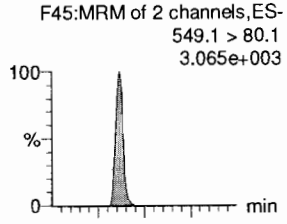


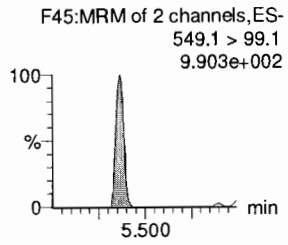
8:2 FTS



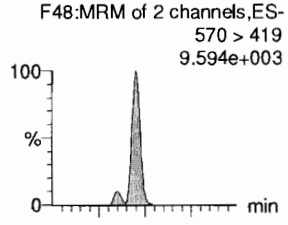


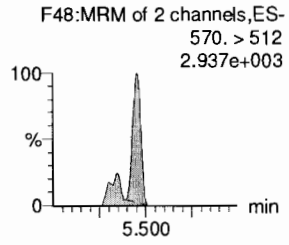
PFNS



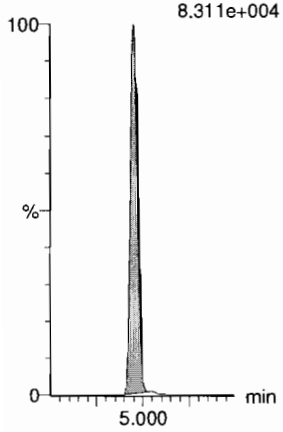


L-MeFOSAA

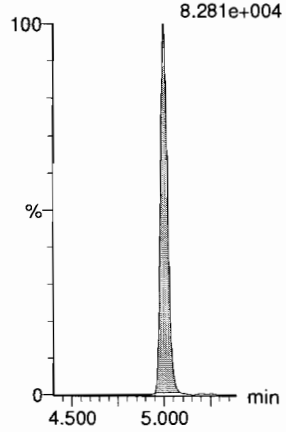




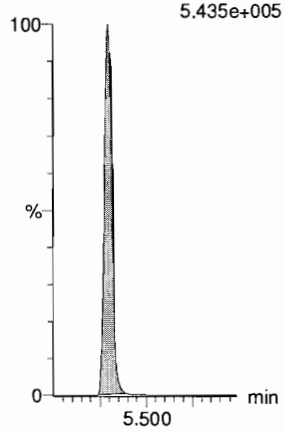
13C8-PFOSA



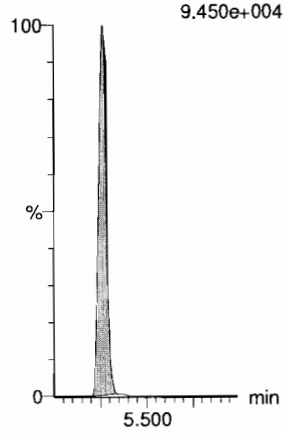
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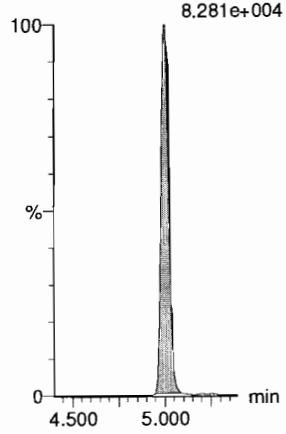
13C2-PFDA



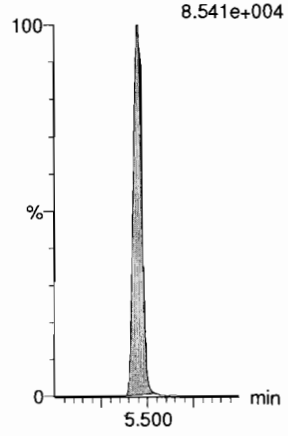
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

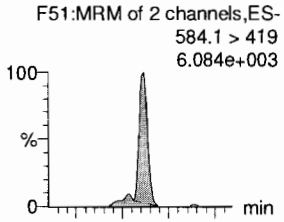


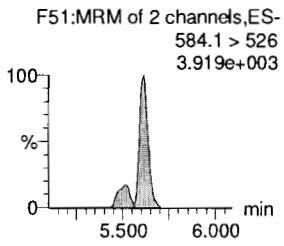
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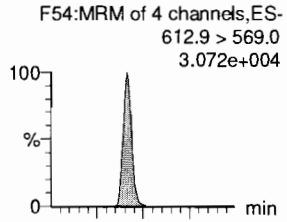
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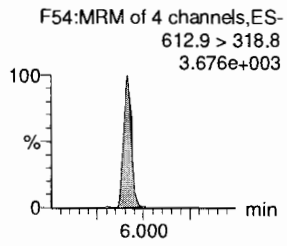
L-EtFOSAA



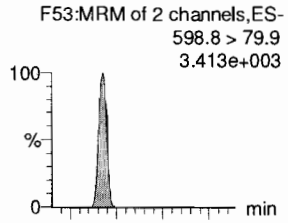


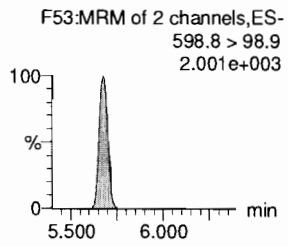
PFDoA



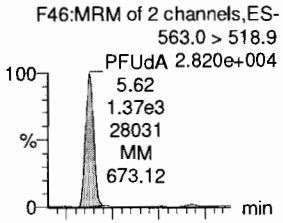


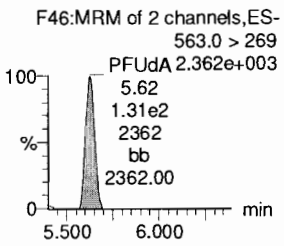
PFDS



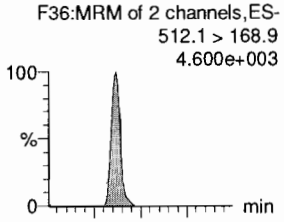


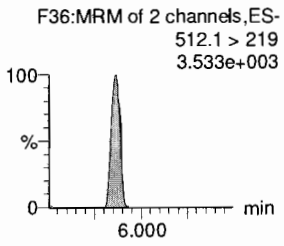
PFUdA



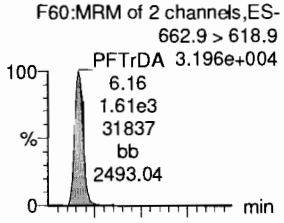


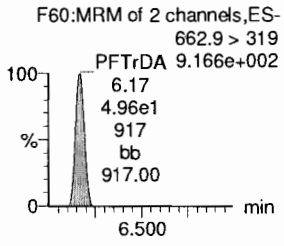
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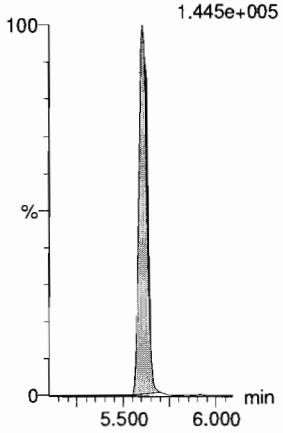


PFTrDA

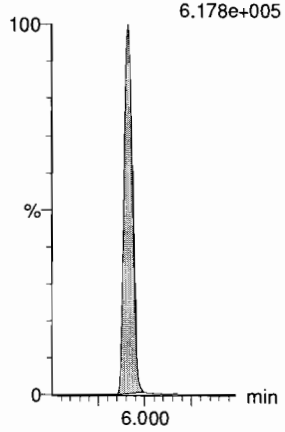




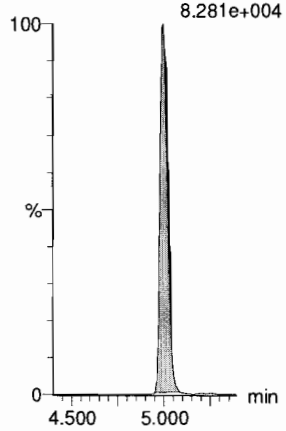
d5-N-EtFOSAA



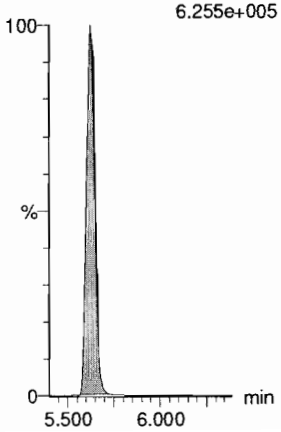
13C2-PFDoA



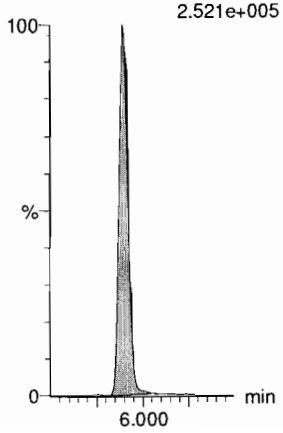
13C8-PFOS



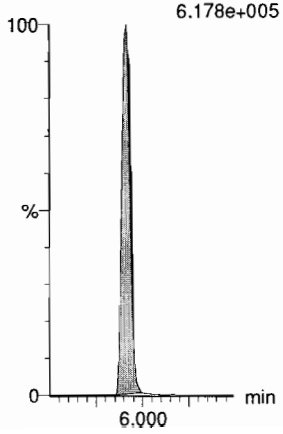
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

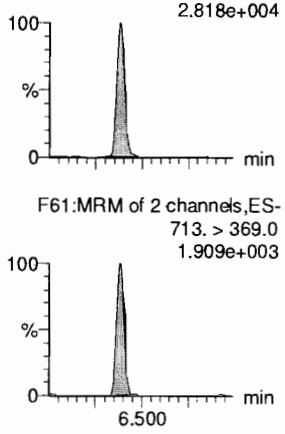


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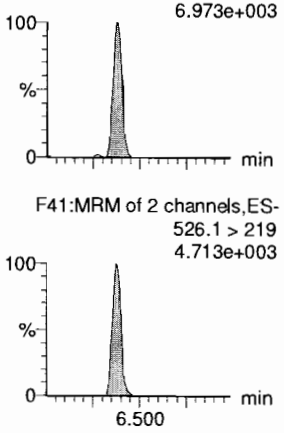
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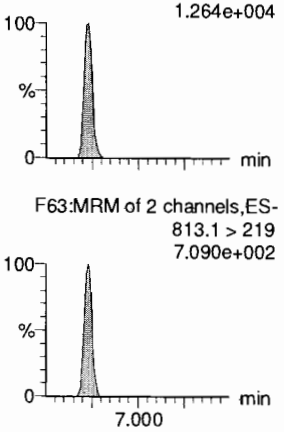
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
2.818e+004
F61:MRM of 2 channels,ES-
713. > 369.0
1.909e+003



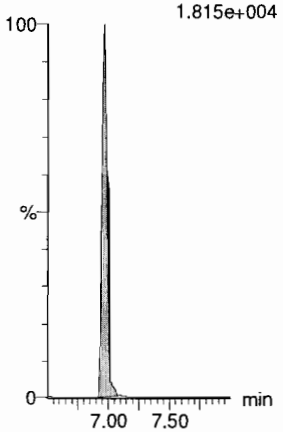
N-EtFOSA
F41:MRM of 2 channels,ES-
526.1 > 168.9
6.973e+003
F41:MRM of 2 channels,ES-
526.1 > 219
4.713e+003



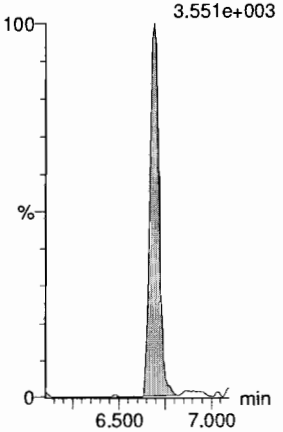
PFHxDA
F63:MRM of 2 channels,ES-
813.1 > 768.6
1.264e+004
F63:MRM of 2 channels,ES-
813.1 > 219
7.090e+002



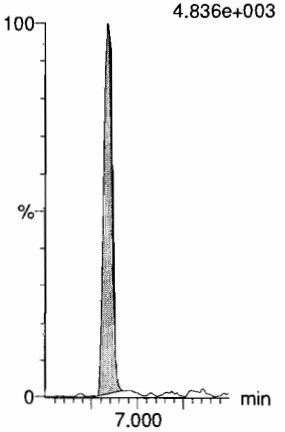
PFODA
F65:MRM of 1 channel,ES-
913.1 > 868.8
1.815e+004



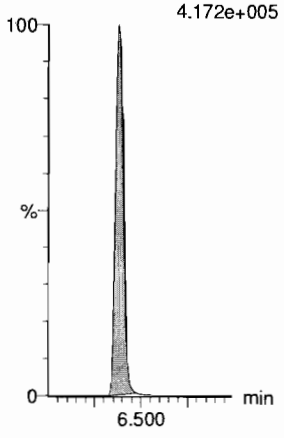
N-MeFOSE
F56:MRM of 1 channel,ES-
616.1 > 58.9
3.551e+003



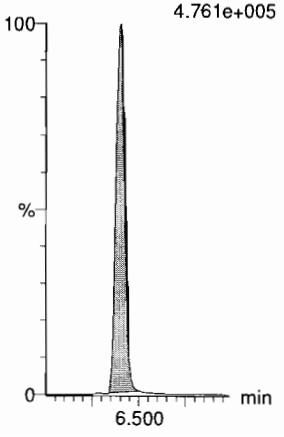
N-EtFOSE
F58:MRM of 1 channel,ES-
630.1 > 58.9
4.836e+003



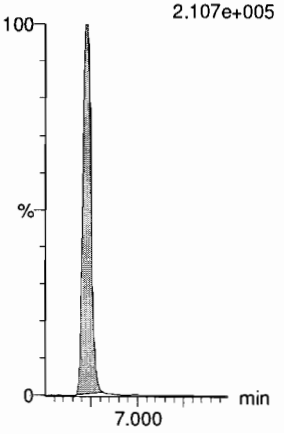
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
4.172e+005



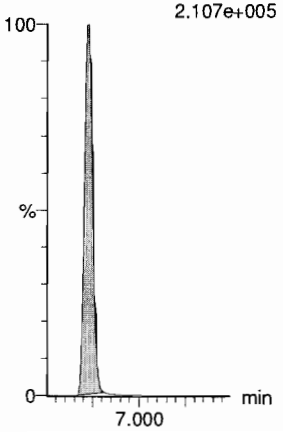
d5-N-ETFOSA
F44:MRM of 1 channel,ES-
531.1 > 168.9
4.761e+005



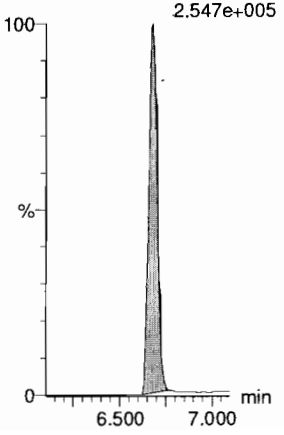
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.107e+005



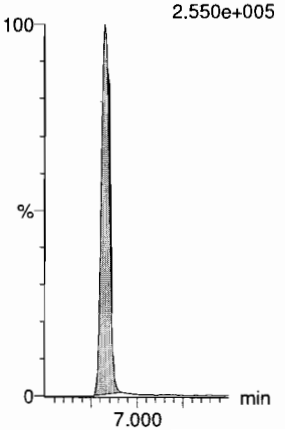
13C2-PFHxDA
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815 > 769.7
2.107e+005



d7-N-MeFOSE
F57:MRM of 1 channel,ES-
623.1 > 58.9
2.547e+005



d9-N-EtFOSE
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2.550e+005

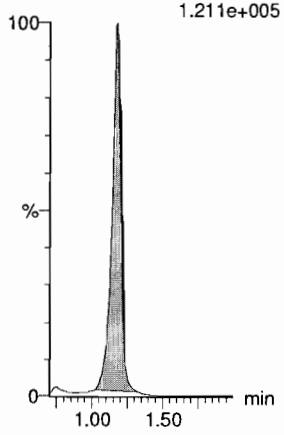


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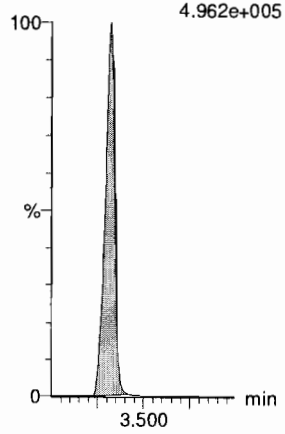
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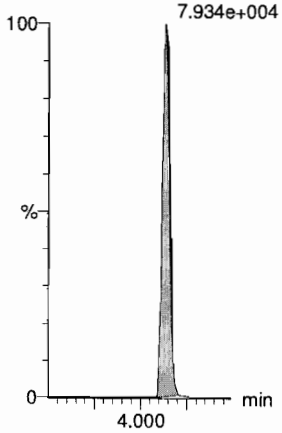
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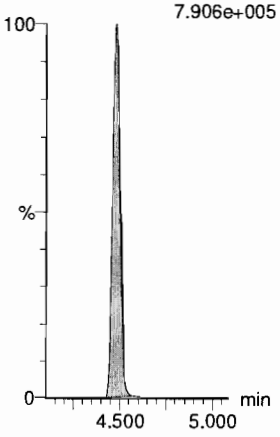
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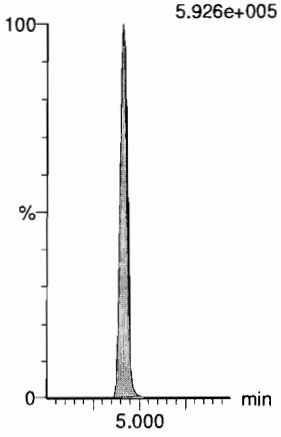
13C3-PFHxS



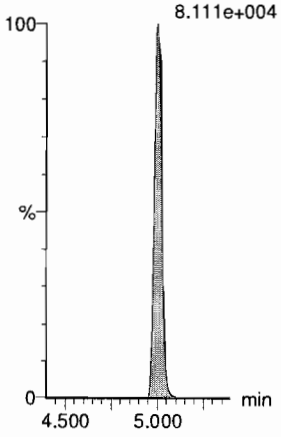
13C8-PFOA



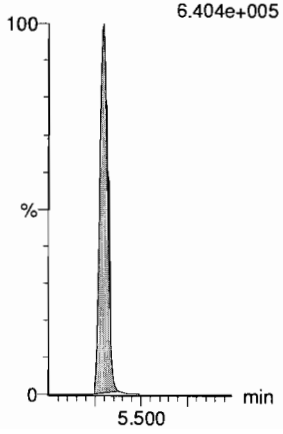
13C9-PFNA



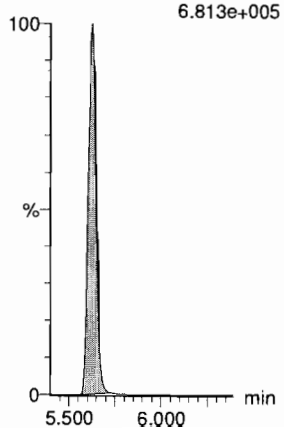
13C4-PFOS



13C6-PFDA



13C7-PFUdA

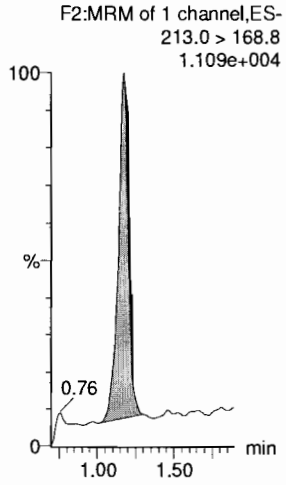


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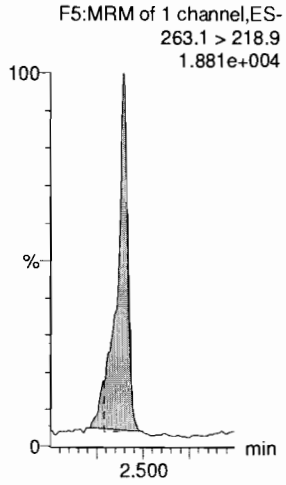
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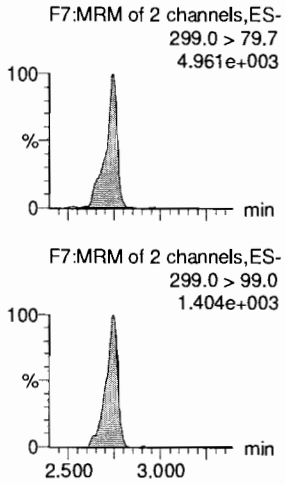
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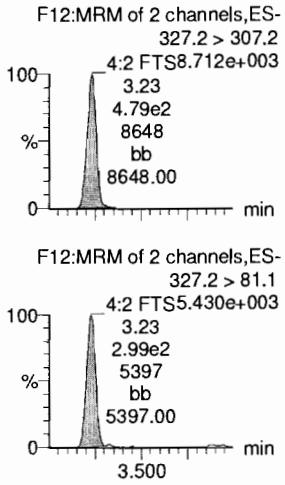
PFPeA



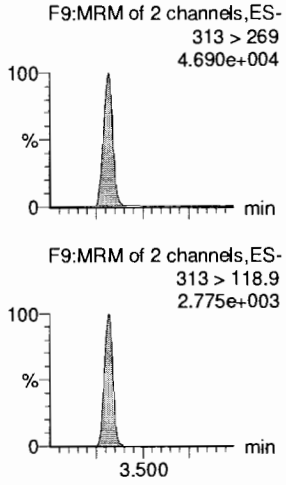
PFBS



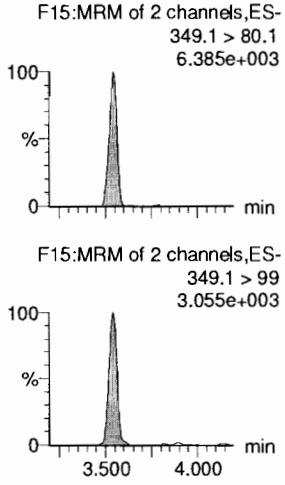
4:2 FTS



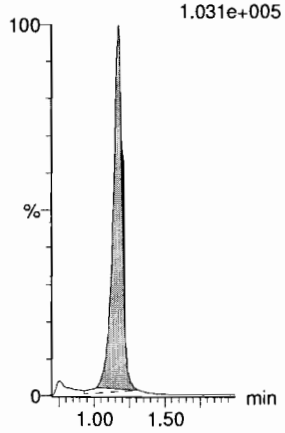
PFHxA



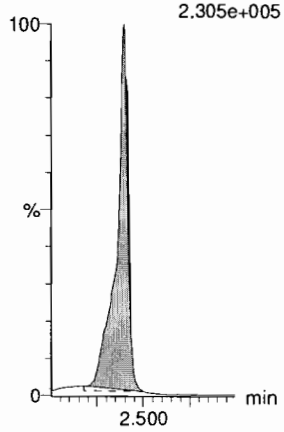
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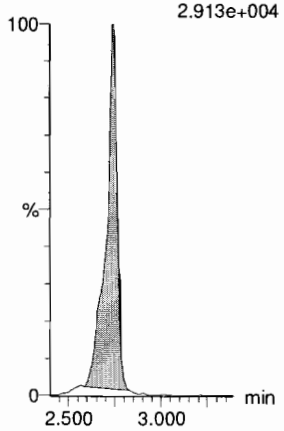
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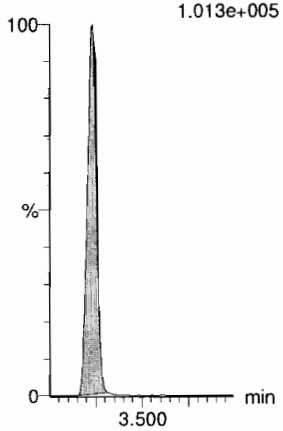
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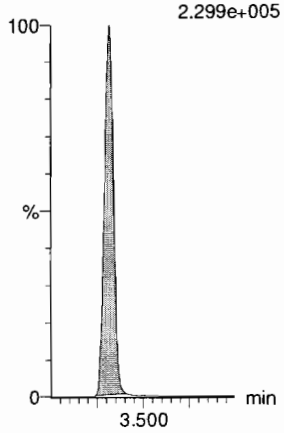
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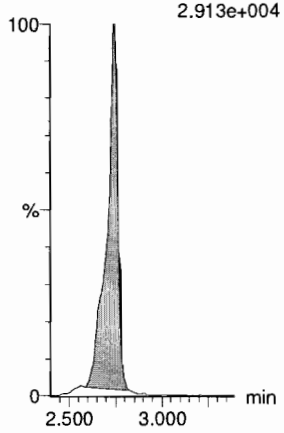
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

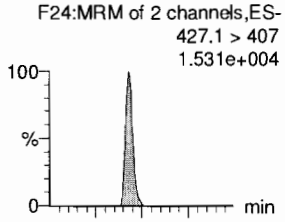


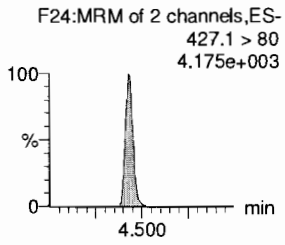
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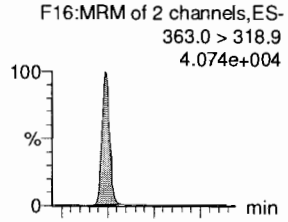
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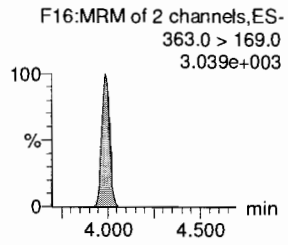
6:2 FTS



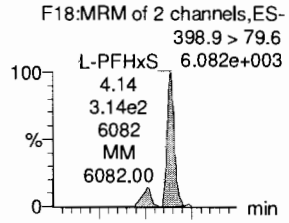


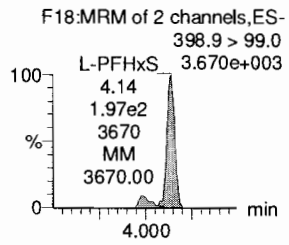
PFHpA



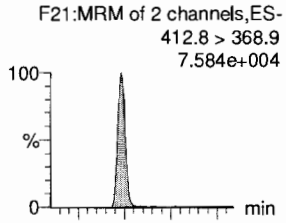


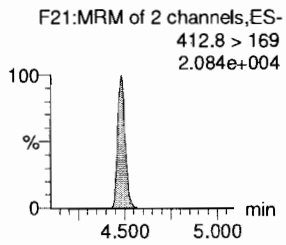
L-PFHxS



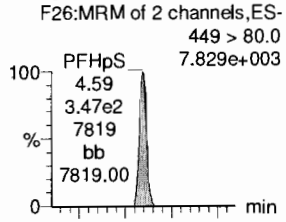


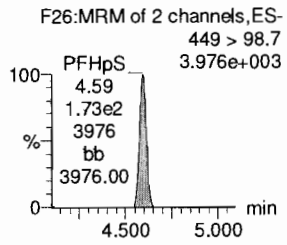
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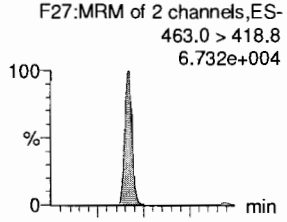


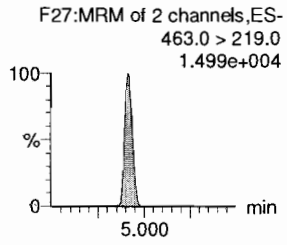
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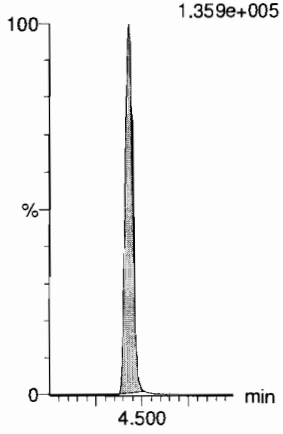


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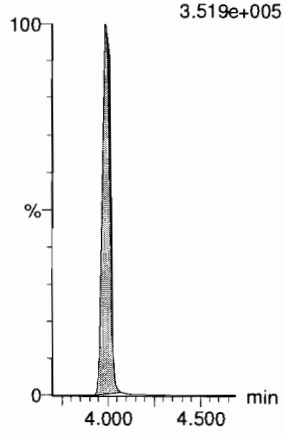




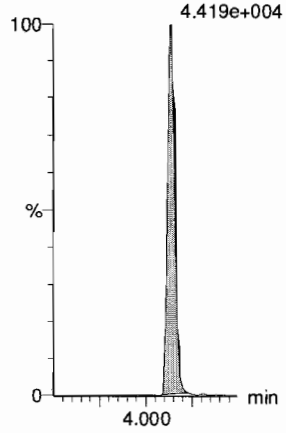
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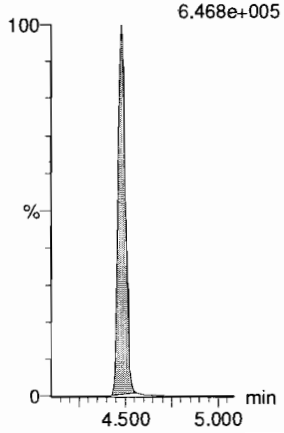
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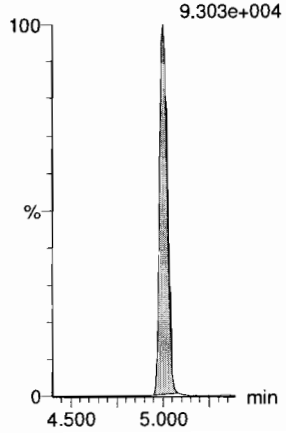
18O2-PFHxS



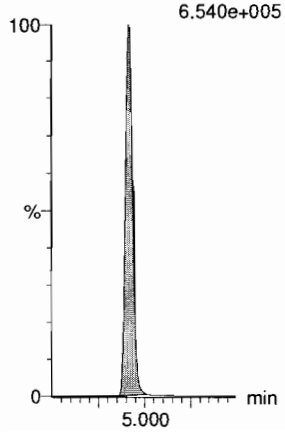
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13C8-PFOS



13C5-PFNA

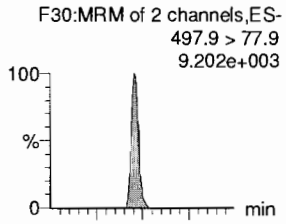


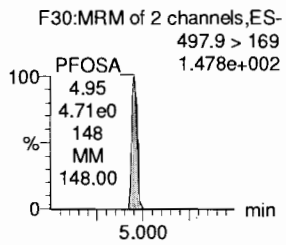
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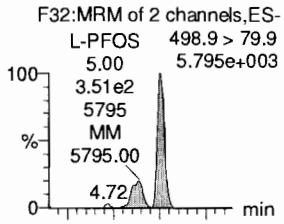
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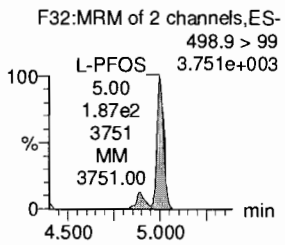
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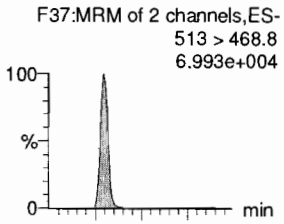


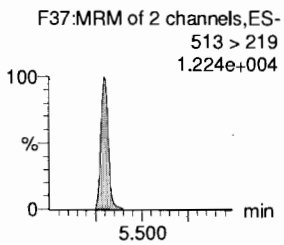
L-PFOS



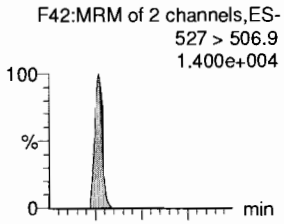


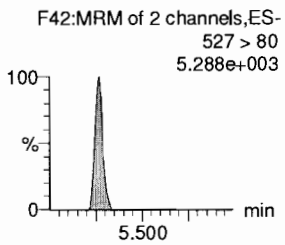
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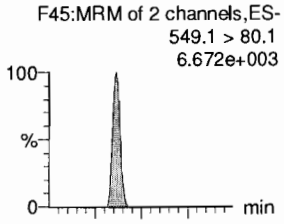


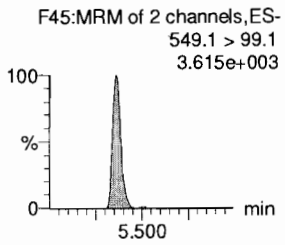
8:2 FTS



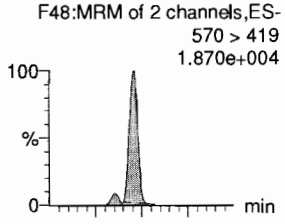


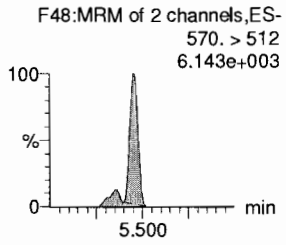
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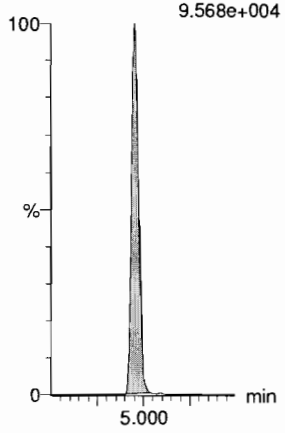


L-MeFOSAA





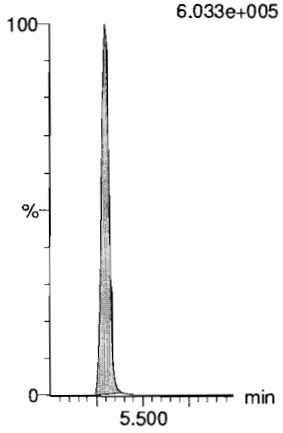
13C8-PFOSA



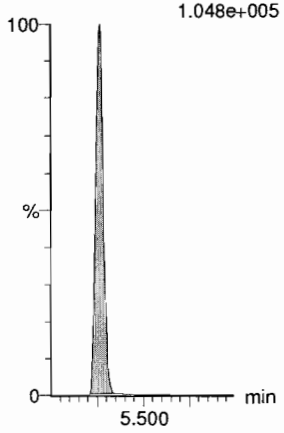
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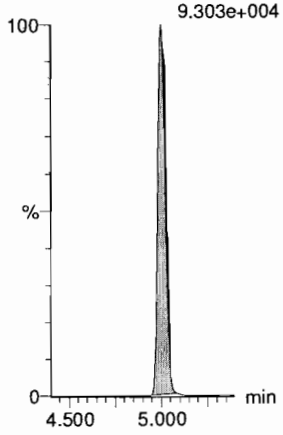
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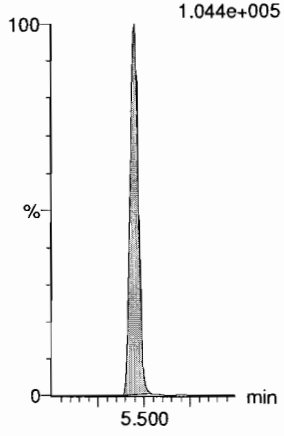
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

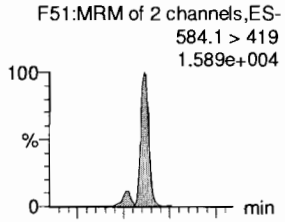


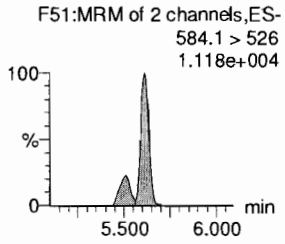
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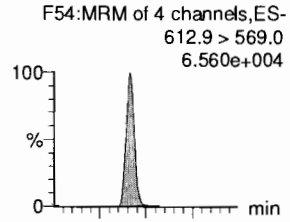
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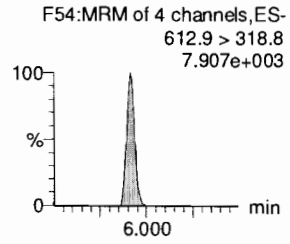
L-EtFOSAA



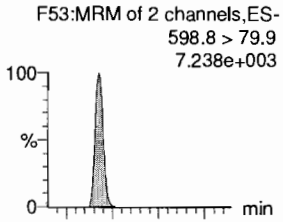


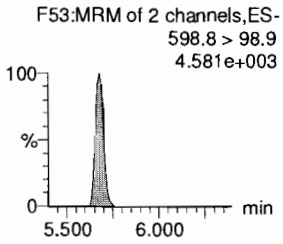
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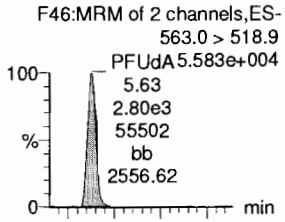


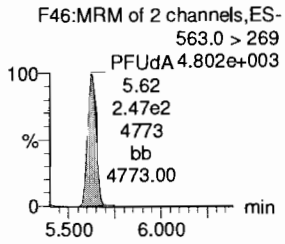
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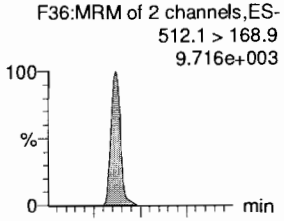


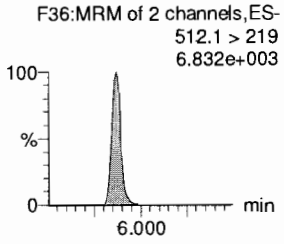
PFUdA



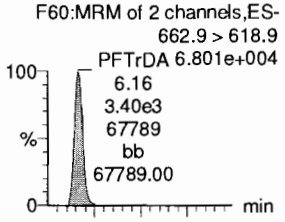


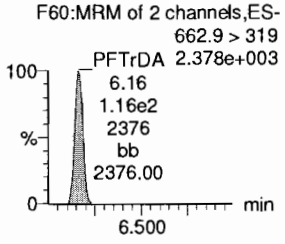
N-MeFOSA



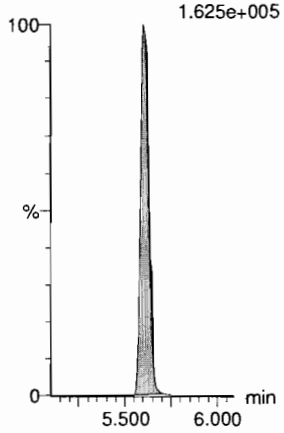


PFTrDA

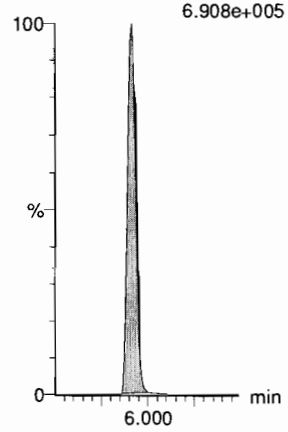




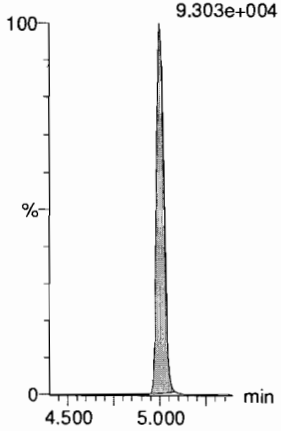
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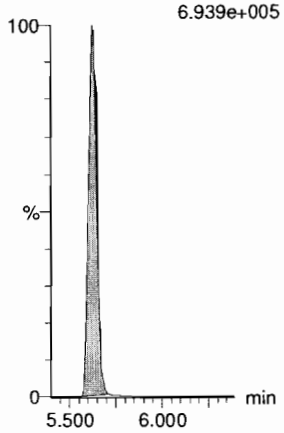
13C2-PFDoA



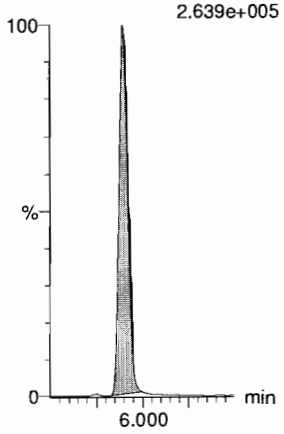
13C8-PFOS



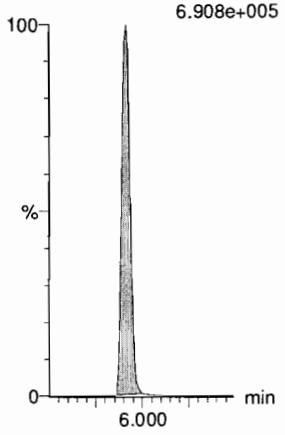
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

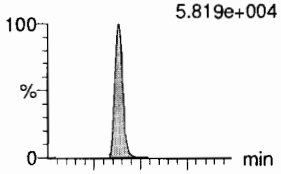


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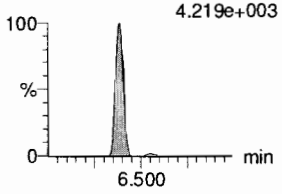
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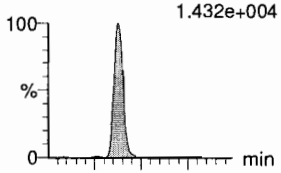
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
5.819e+004



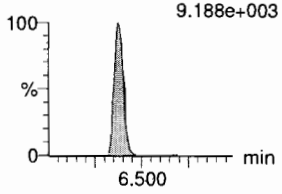
F61:MRM of 2 channels,ES-
713. > 369.0
4.219e+003



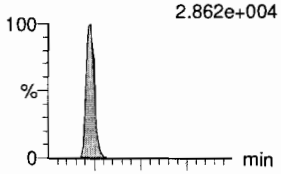
N-EtFOSA
F41:MRM of 2 channels,ES-
526.1 > 168.9
1.432e+004



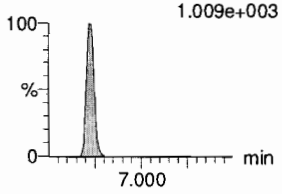
F41:MRM of 2 channels,ES-
526.1 > 219
9.188e+003



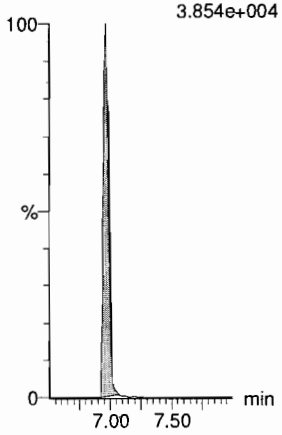
PFHxDA
F63:MRM of 2 channels,ES-
813.1 > 768.6
2.862e+004



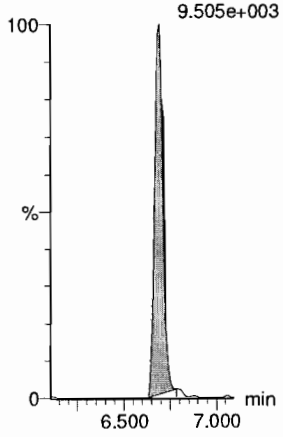
F63:MRM of 2 channels,ES-
813.1 > 219
1.009e+003



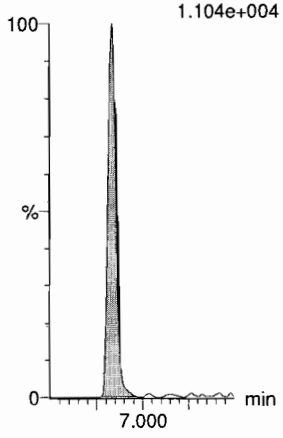
PFODA
F65:MRM of 1 channel,ES-
913.1 > 868.8
3.854e+004



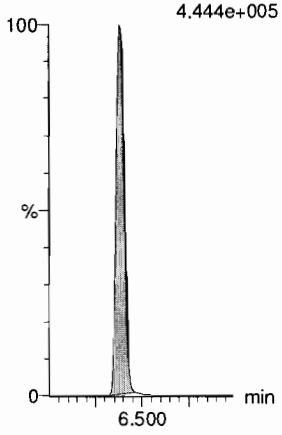
N-MeFOSE
F56:MRM of 1 channel,ES-
616.1 > 58.9
9.505e+003



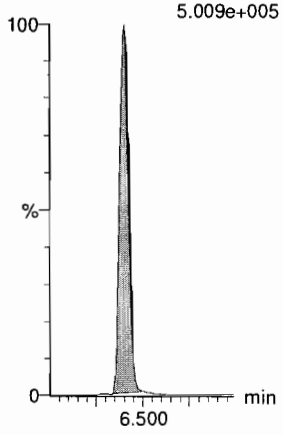
N-EtFOSE
F58:MRM of 1 channel,ES-
630.1 > 58.9
1.104e+004



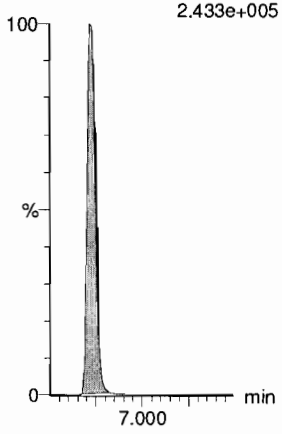
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
4.444e+005



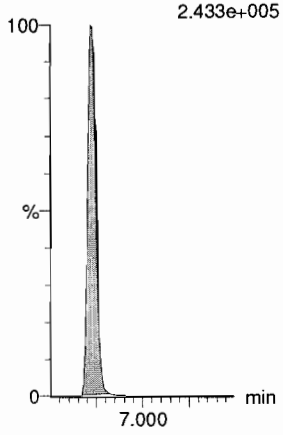
d5-N-ETFOSA
F44:MRM of 1 channel,ES-
531.1 > 168.9
5.009e+005



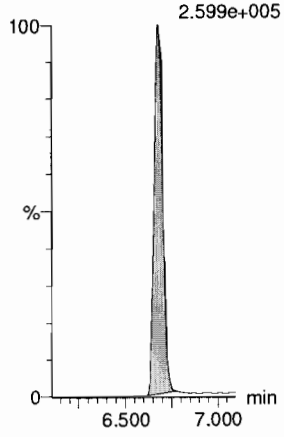
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.433e+005



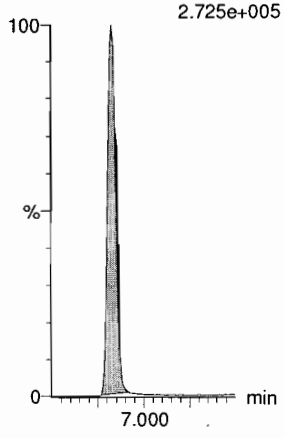
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.433e+005



d7-N-MeFOSE
F57:MRM of 1 channel,ES-
623.1 > 58.9
2.599e+005



d9-N-EtFOSE
F59:MRM of 1 channel,ES-
639.2 > 58.8
2.725e+005

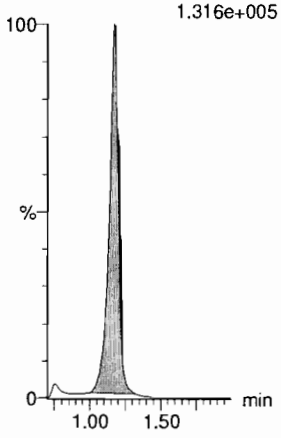


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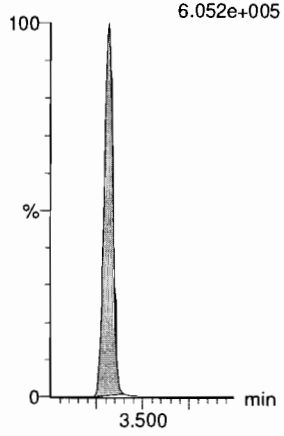
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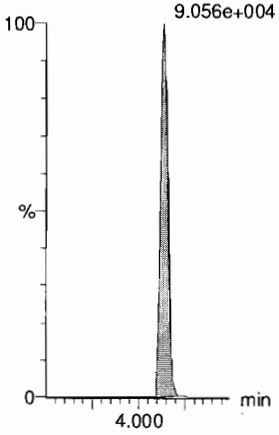
13C4-PFBA



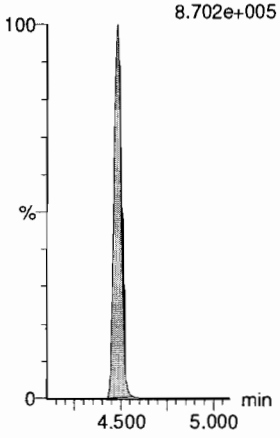
13C5-PFHxA



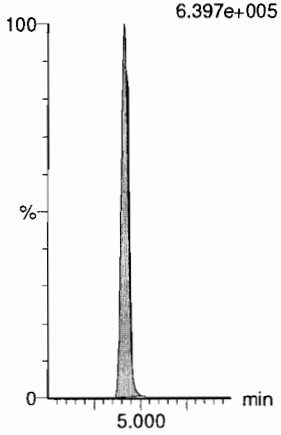
13C3-PFHxS



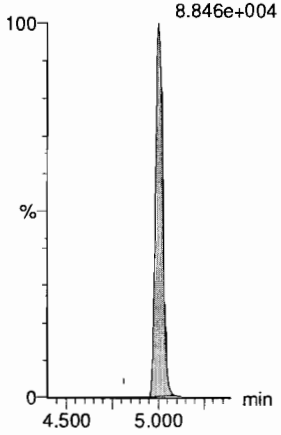
13C8-PFOA



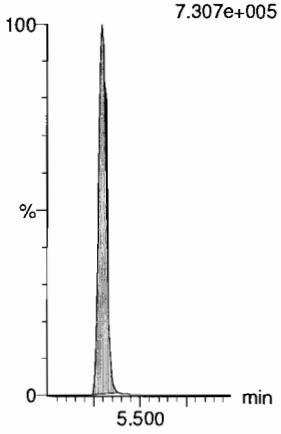
13C9-PFNA



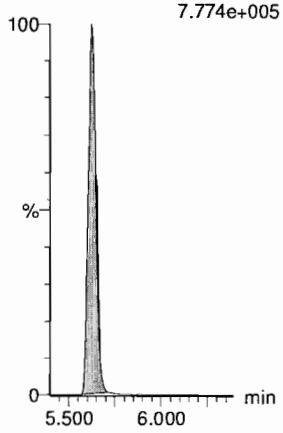
13C4-PFOS



13C6-PFDA



13C7-PFUdA

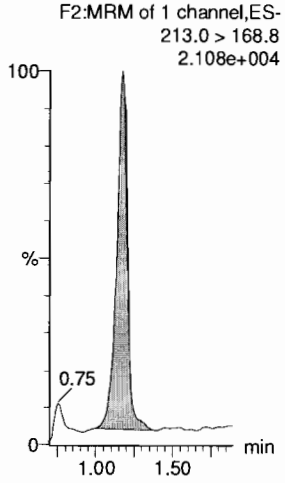


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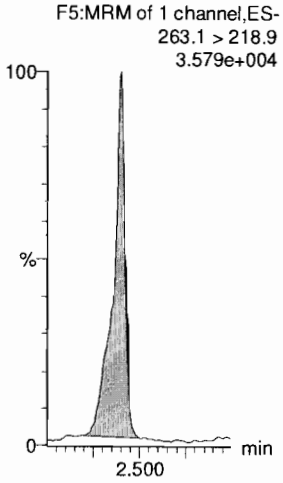
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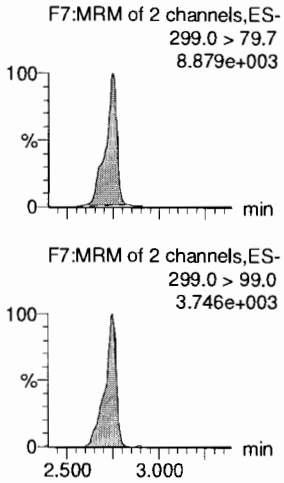
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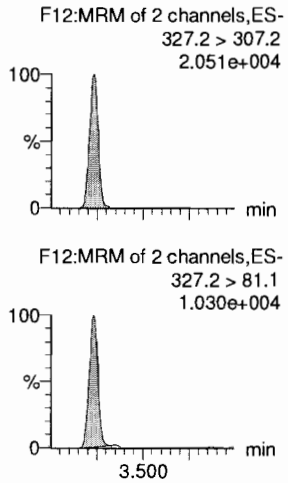
PFPeA



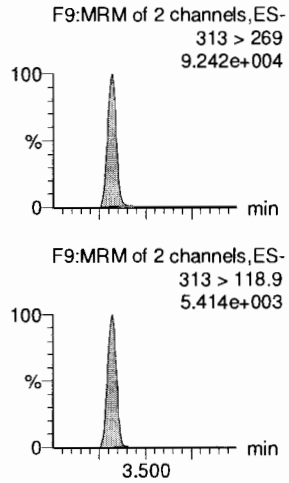
PFBS



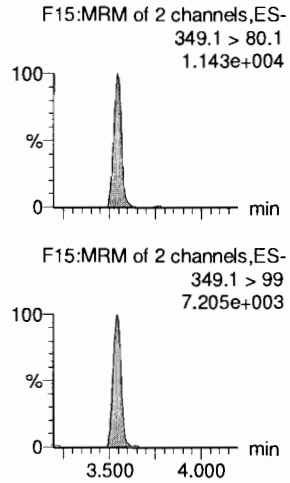
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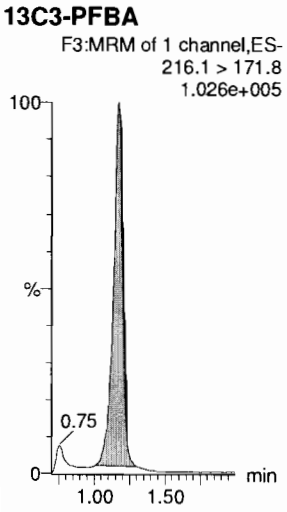
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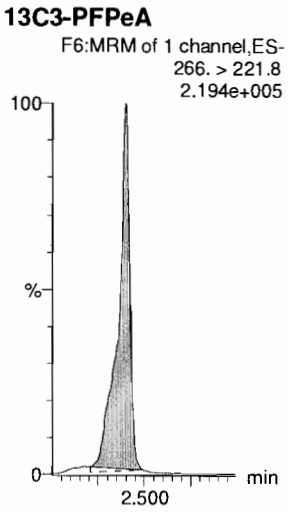
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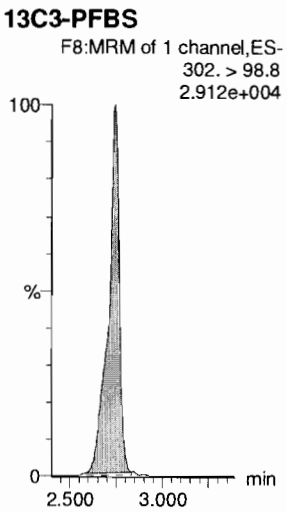
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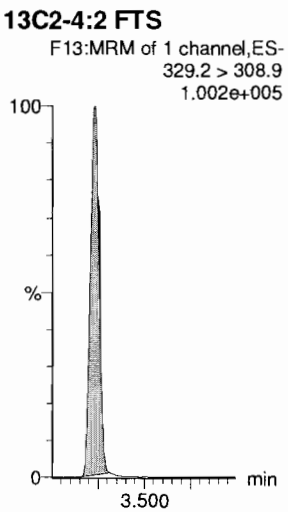
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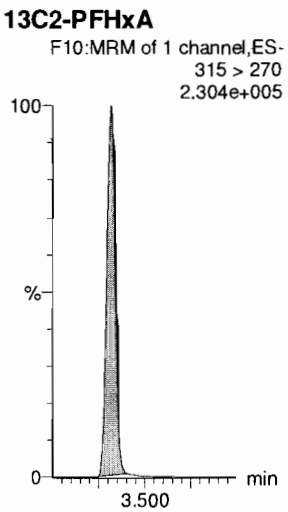
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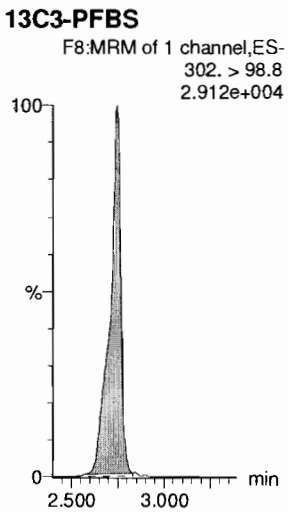
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13C2-PFHxA



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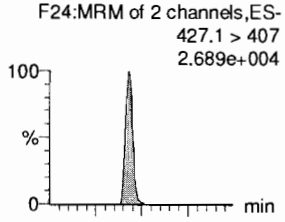


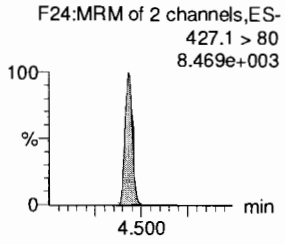
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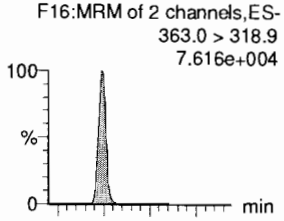
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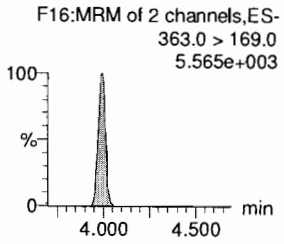
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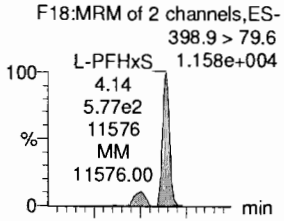


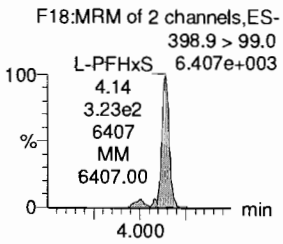
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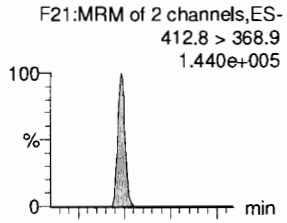


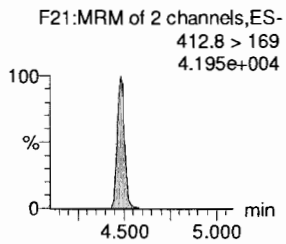
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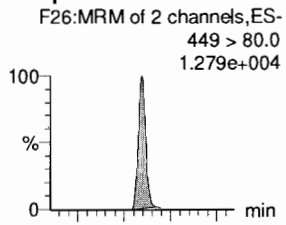


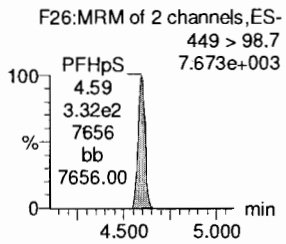
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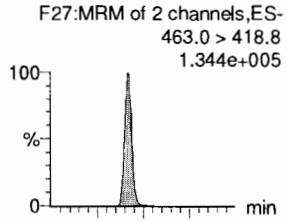


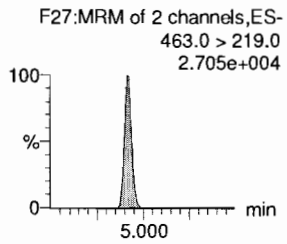
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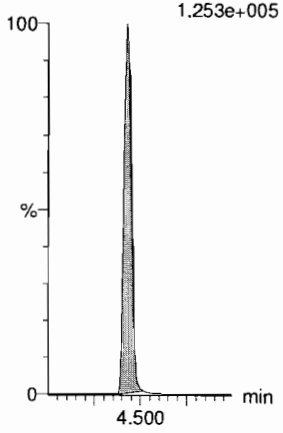


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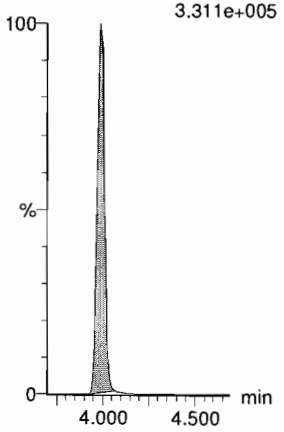




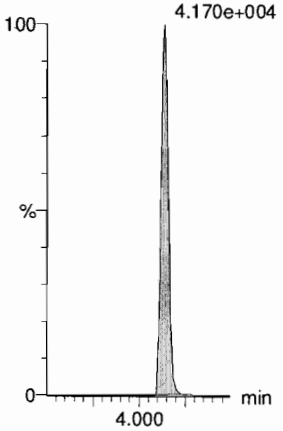
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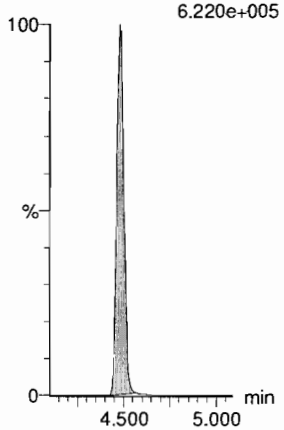
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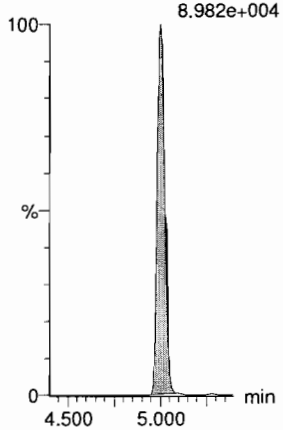
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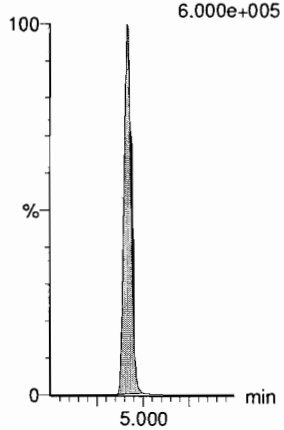
13C2-PFOA



13C8-PFOS



13C5-PFNA

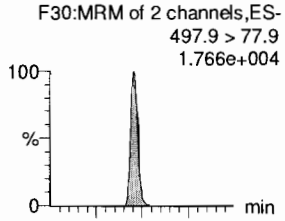


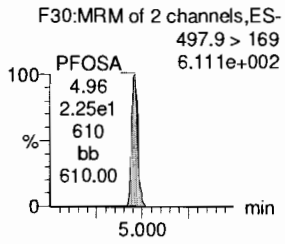
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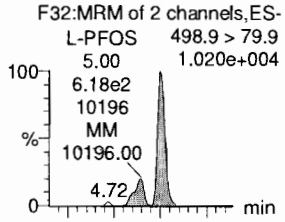
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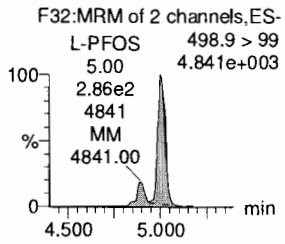
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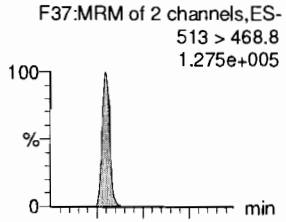


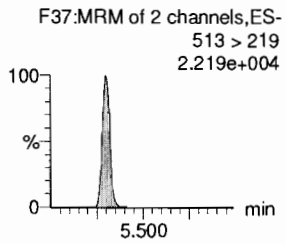
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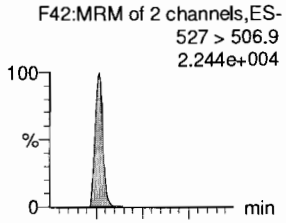


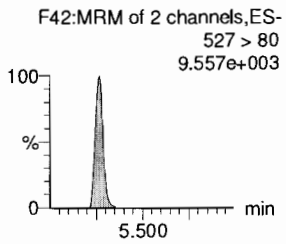
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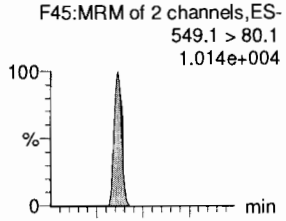


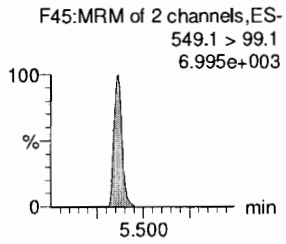
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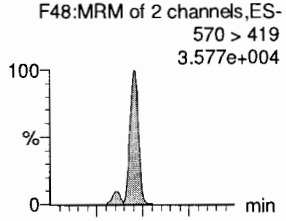


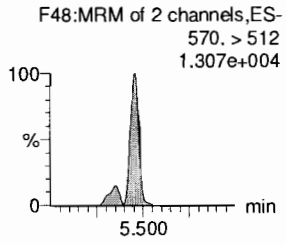
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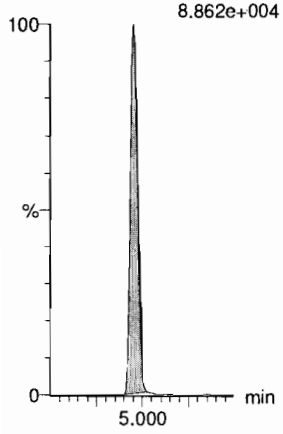


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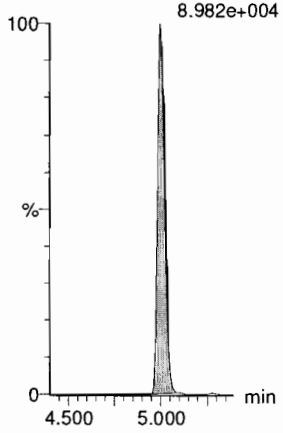




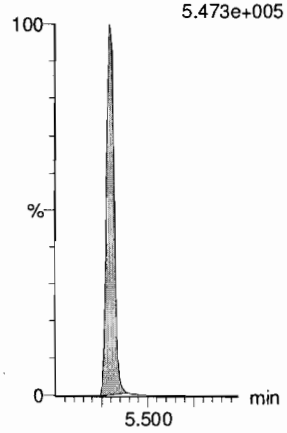
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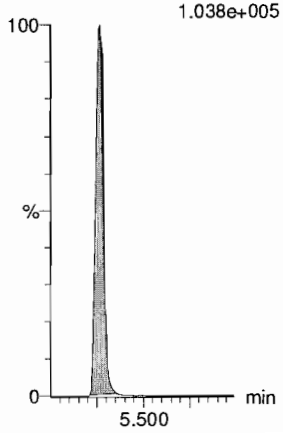
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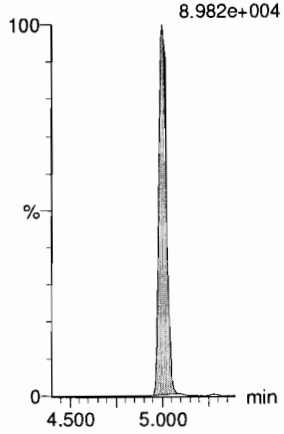
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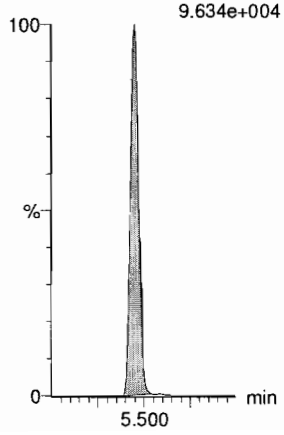
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13C8-PFOS



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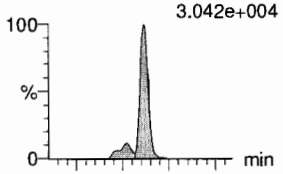


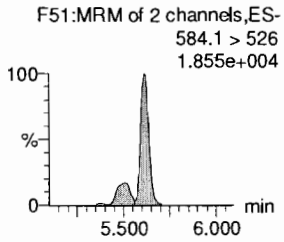
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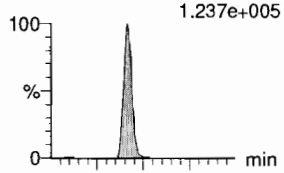
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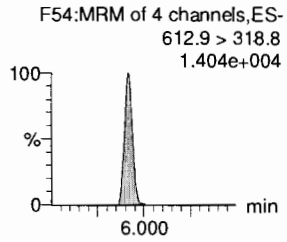
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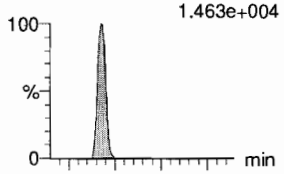


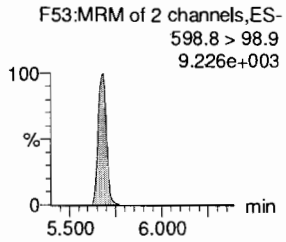
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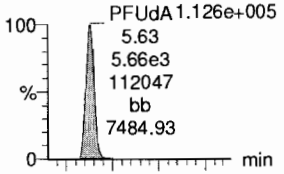


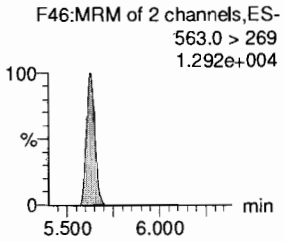
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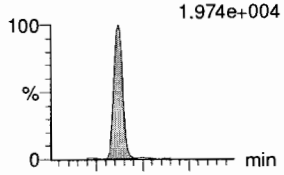


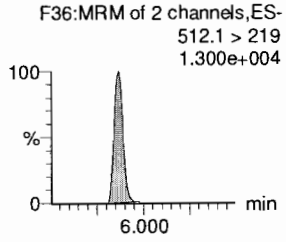
PFUdA



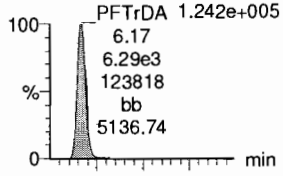


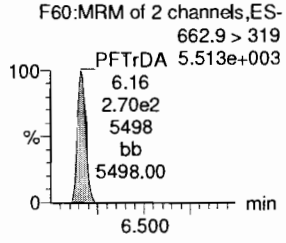
N-MeFOSA



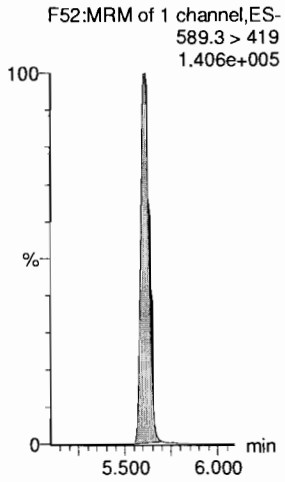


PFTrDA

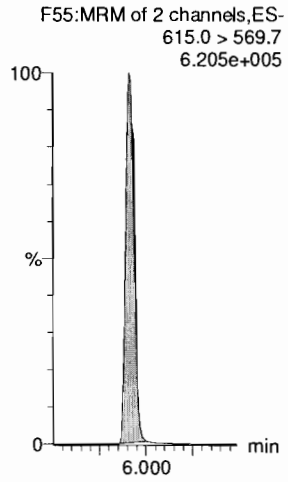




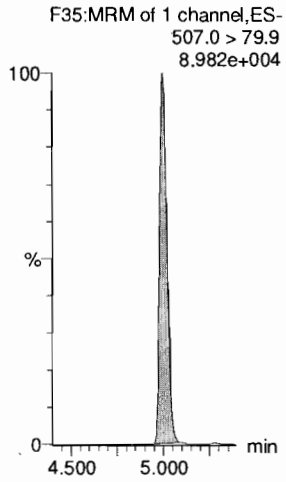
d5-N-EtFOSAA



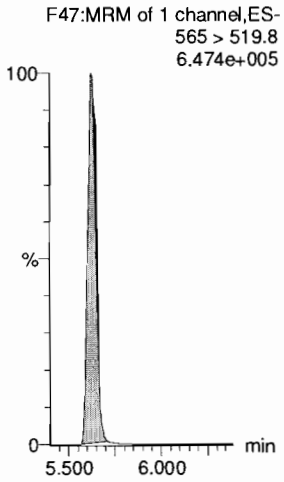
13C2-PFDoA



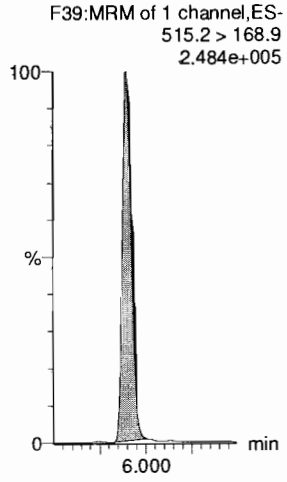
13C8-PFOS



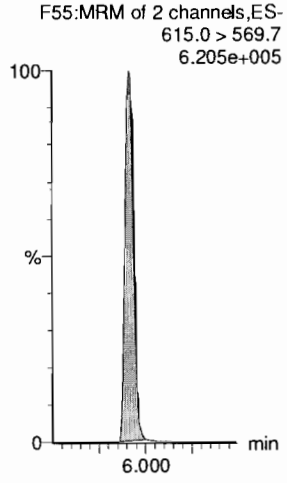
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-CRV.qld

Last Altered: Tuesday, November 20, 2018 11:07:41 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:11:39 Pacific Standard Time

Name: 181119M2_5, Date: 19-Nov-2018, Time: 20:49:33, ID: ST181119M2-4 PFC CS1 18K0904, Description: PFC CS1 18K0904

PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
1.167e+005
F61:MRM of 2 channels,ES-
713. > 369.0
7.928e+003

N-EtFOSA
F41:MRM of 2 channels,ES-
526.1 > 168.9
2.941e+004
F41:MRM of 2 channels,ES-
526.1 > 219
1.936e+004

PFHxDA
F63:MRM of 2 channels,ES-
813.1 > 768.6
5.293e+004
F63:MRM of 2 channels,ES-
813.1 > 219
2.498e+003

PFODA
F65:MRM of 1 channel,ES-
913.1 > 868.8
7.837e+004

N-MeFOSE
F56:MRM of 1 channel,ES-
616.1 > 58.9
1.700e+004

N-EtFOSE
F58:MRM of 1 channel,ES-
630.1 > 58.9
1.938e+004

13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
4.315e+005

d5-N-ETFOSA
F44:MRM of 1 channel,ES-
531.1 > 168.9
4.854e+005

13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.236e+005

13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.236e+005

d7-N-MeFOSE
F57:MRM of 1 channel,ES-
623.1 > 58.9
2.606e+005

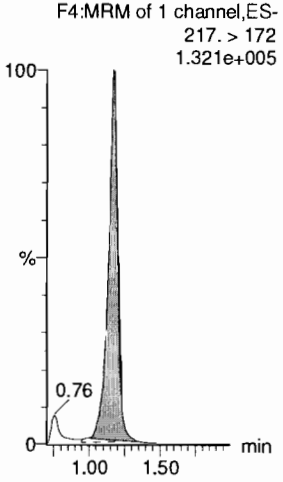
d9-N-EtFOSE
F59:MRM of 1 channel,ES-
639.2 > 58.8
2.595e+005

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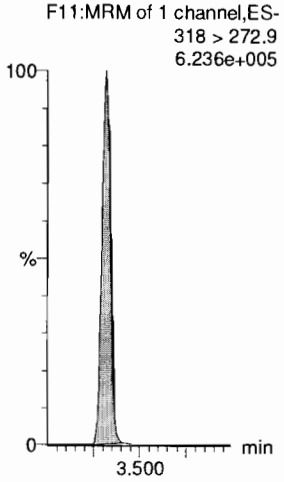
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Name: 181119M2_5, Date: 19-Nov-2018, Time: 20:49:33, ID: ST181119M2-4 PFC CS1 18K0904, Description: PFC CS1 18K0904

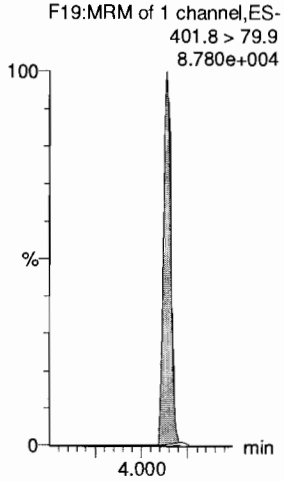
13C4-PFBA



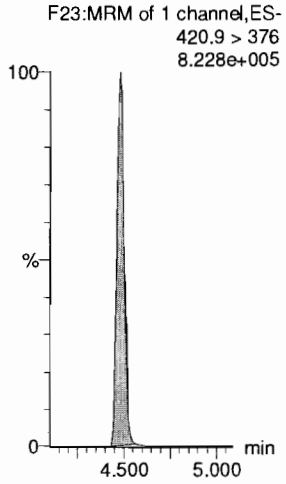
13C5-PFHxA



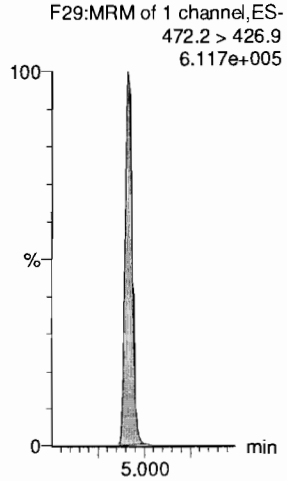
13C3-PFHxS



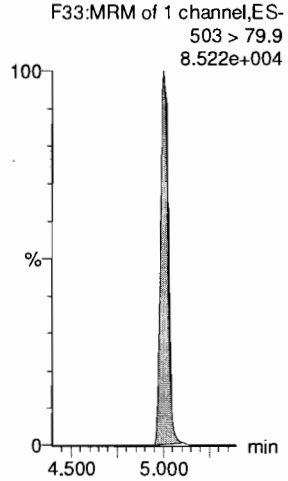
13C8-PFOA



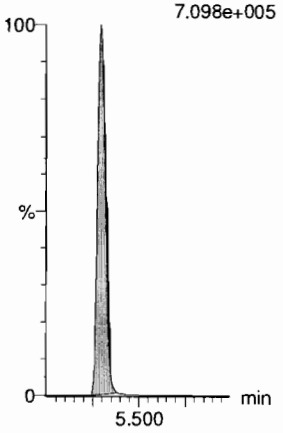
13C9-PFNA



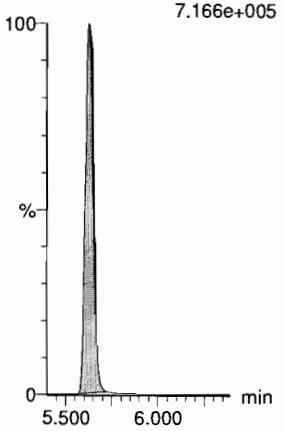
13C4-PFOS



13C6-PFDA



13C7-PFUdA

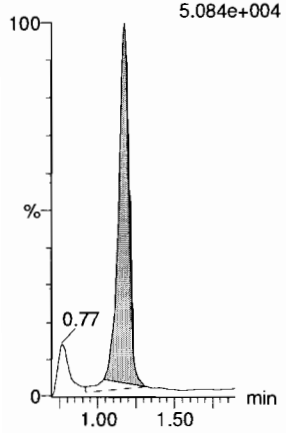


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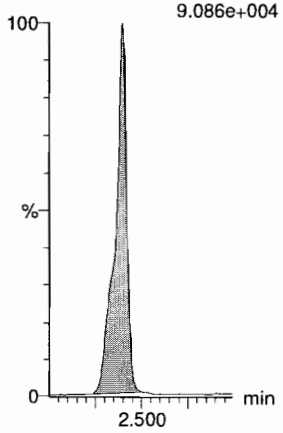
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Name: 181119M2_6, Date: 19-Nov-2018, Time: 21:00:12, ID: ST181119M2-5 PFC CS2 18K0905, Description: PFC CS2 18K0905

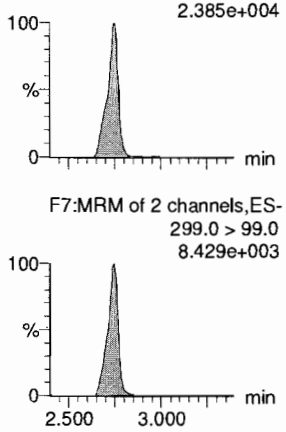
PFBA



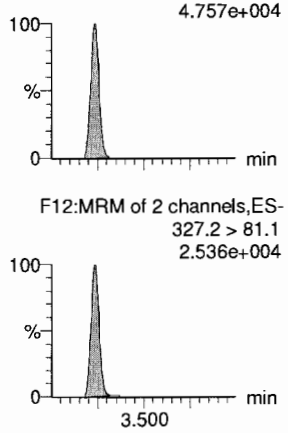
PFPeA



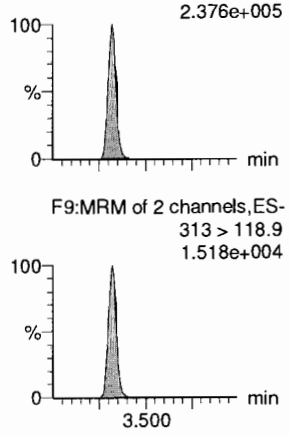
PFBS



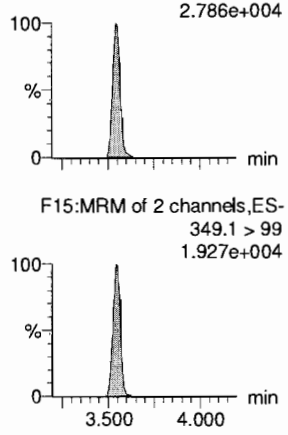
4:2 FTS



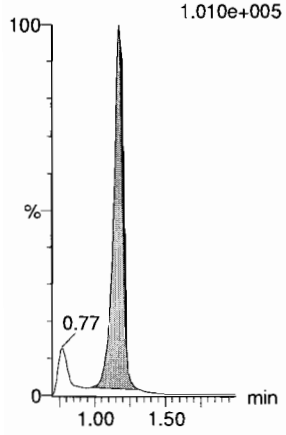
PFHxA



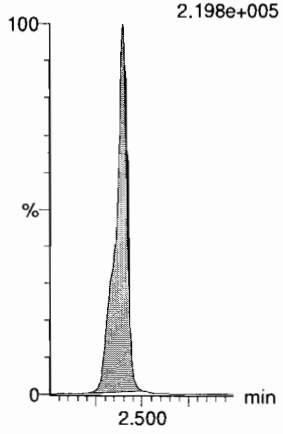
PFPeS



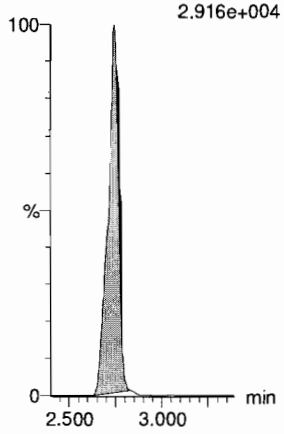
13C3-PFBA



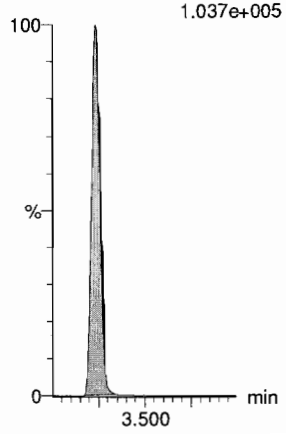
13C3-PFPeA



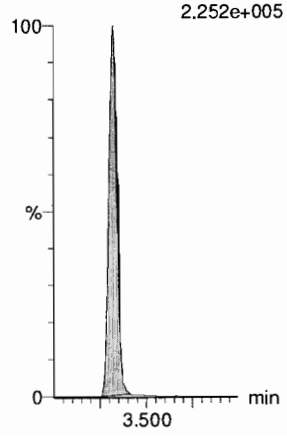
13C3-PFBS



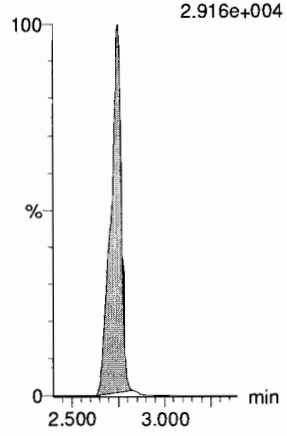
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

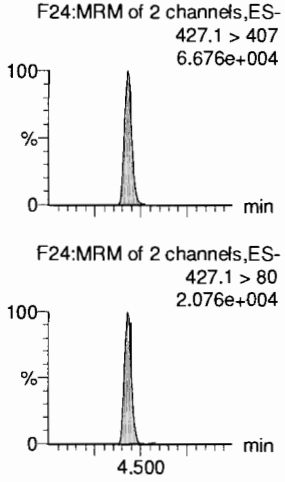


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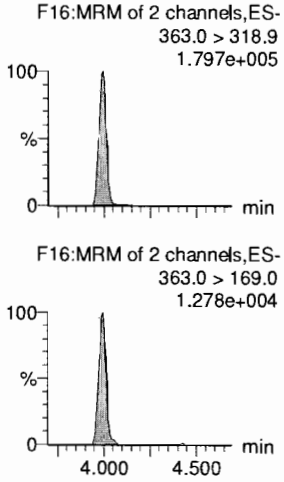
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Name: 181119M2_6, Date: 19-Nov-2018, Time: 21:00:12, ID: ST181119M2-5 PFC CS2 18K0905, Description: PFC CS2 18K0905

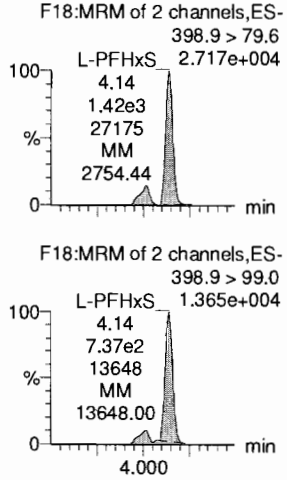
6:2 FTS



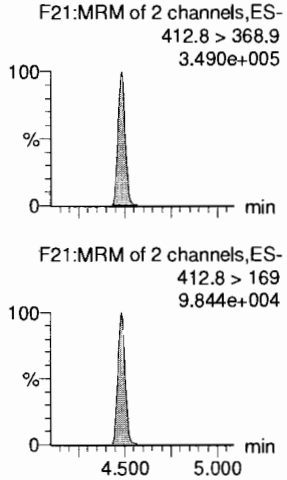
PFHpA



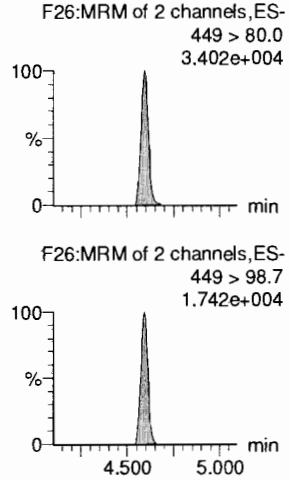
L-PFHxS



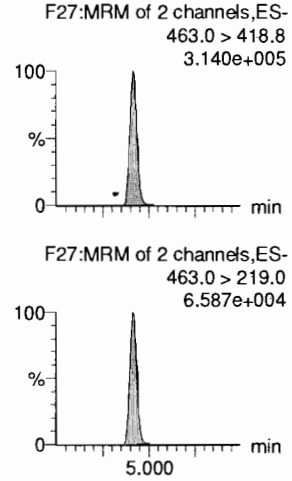
L-PFOA



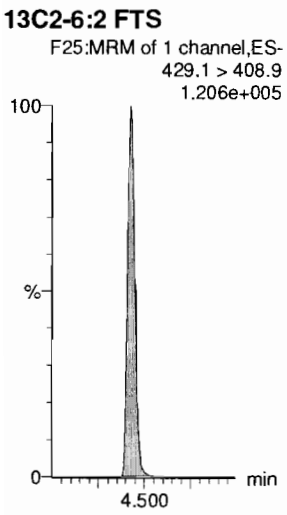
PFHpS



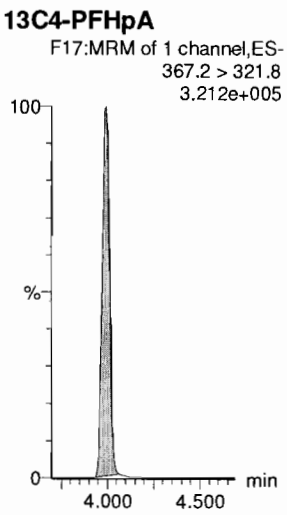
PFNA



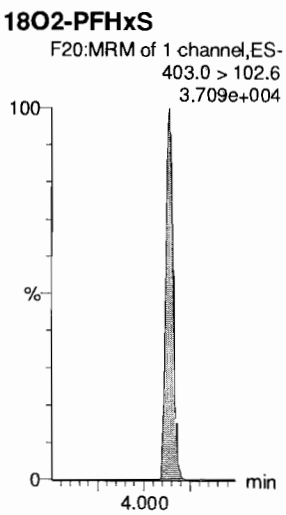
13C2-6:2 FTS



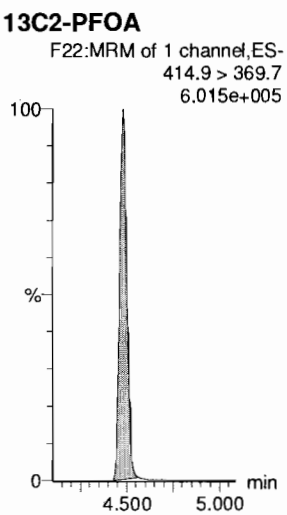
13C4-PFHpA



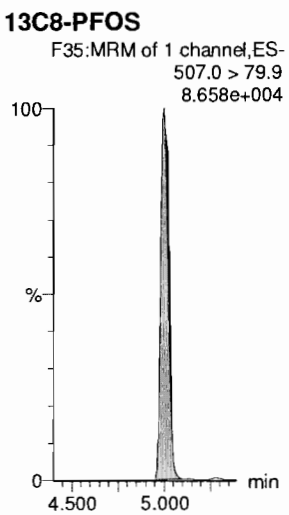
18O2-PFHxS



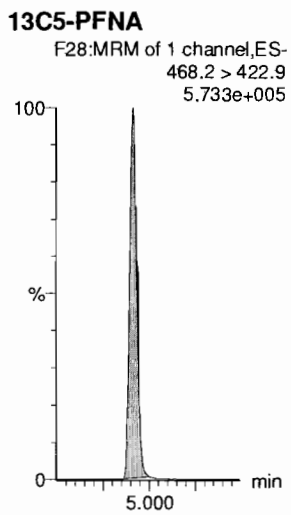
13C2-PFOA



13C8-PFOS



13C5-PFNA

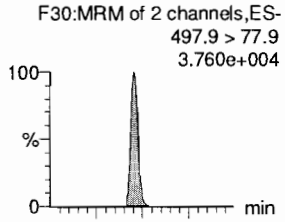


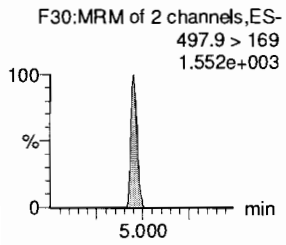
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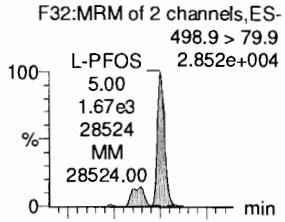
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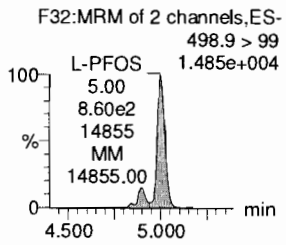
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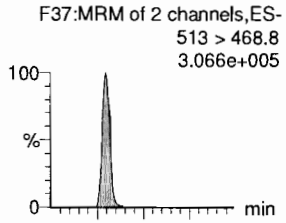


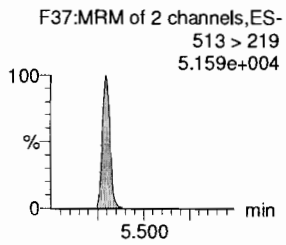
L-PFOS



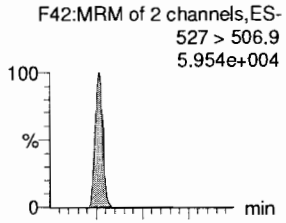


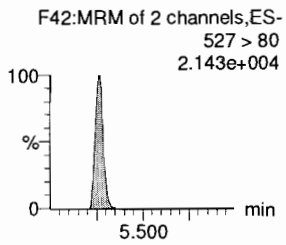
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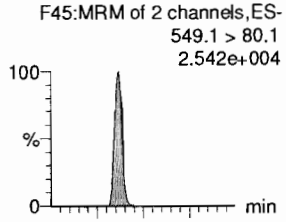


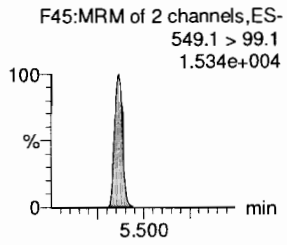
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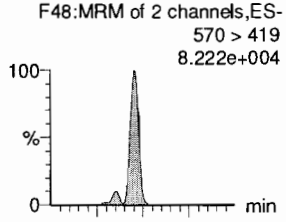


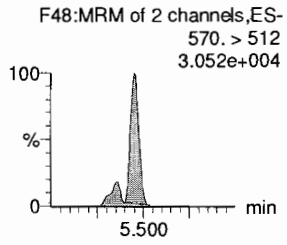
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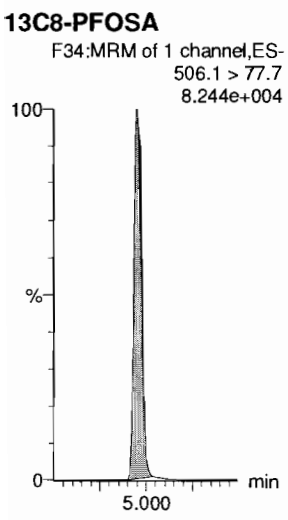


L-MeFOSAA

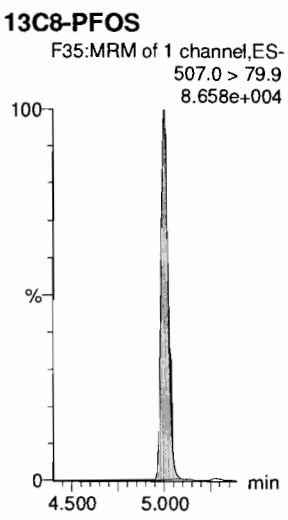




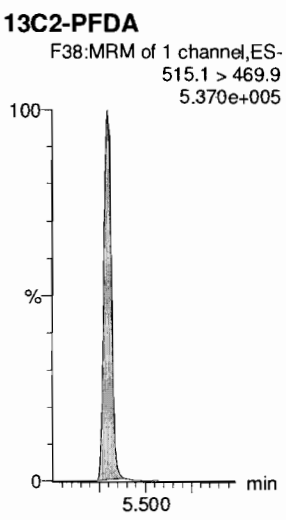
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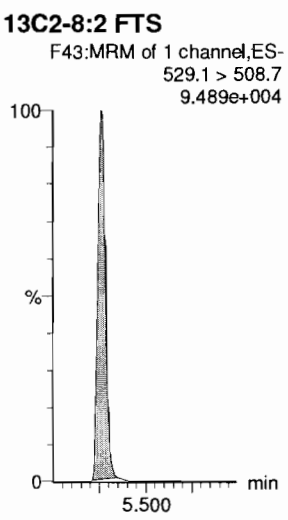
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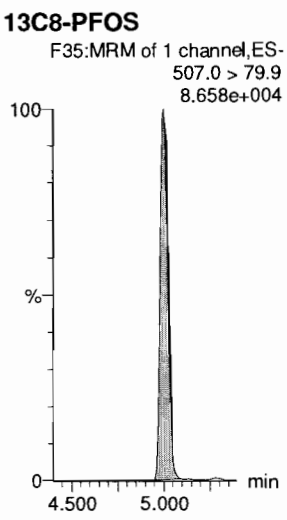
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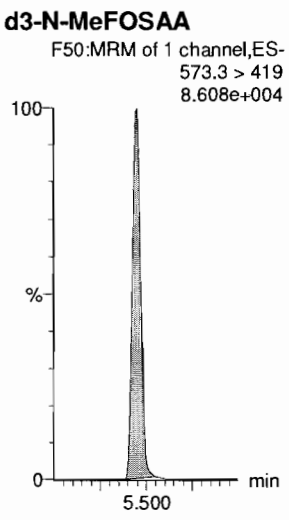
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13C8-PFOS



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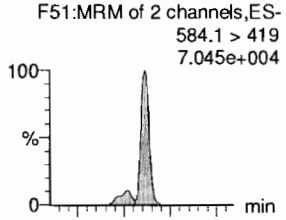


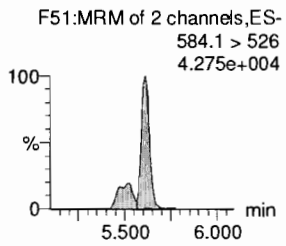
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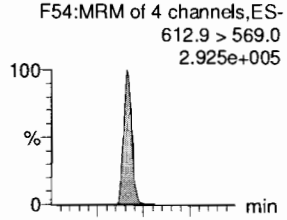
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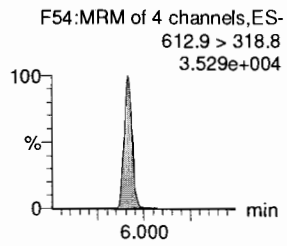
L-EtFOSAA



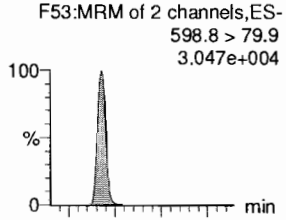


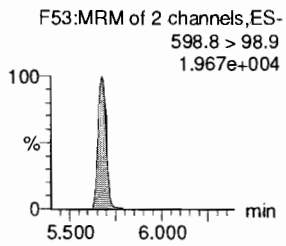
PFDoA



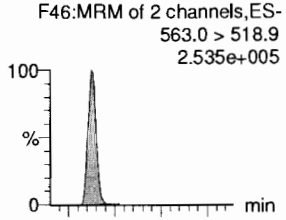


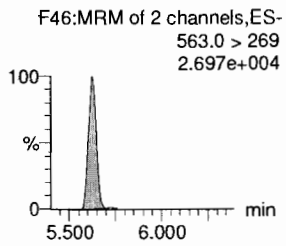
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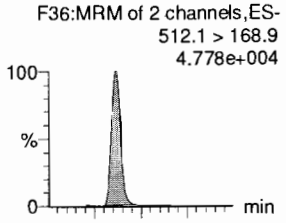


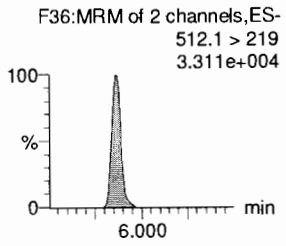
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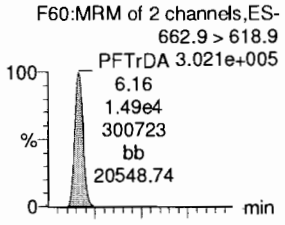


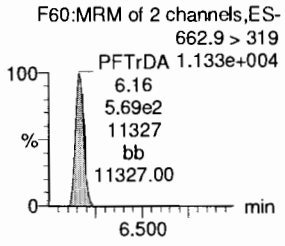
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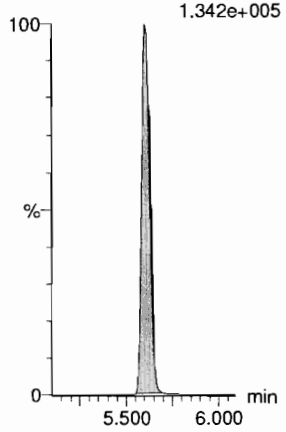


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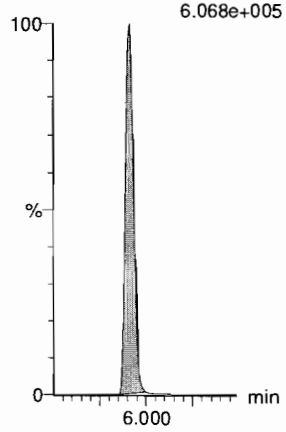




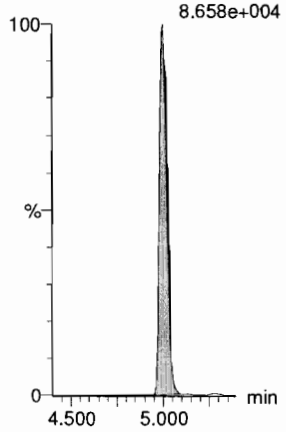
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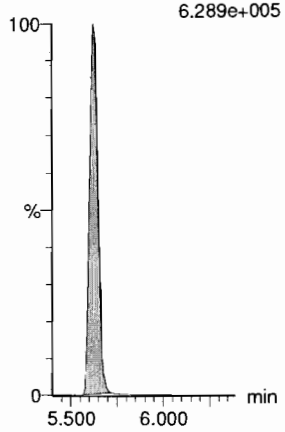
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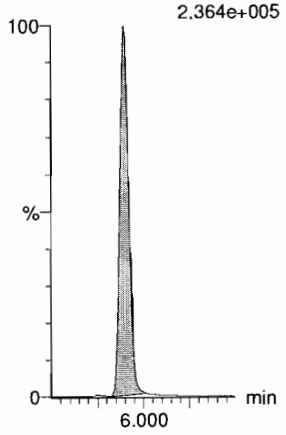
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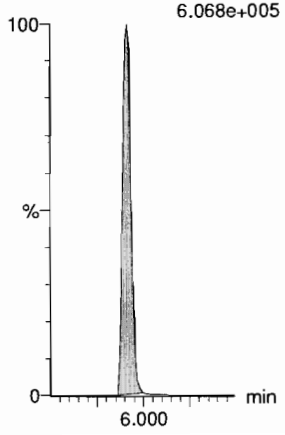
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13C2-PFDoA

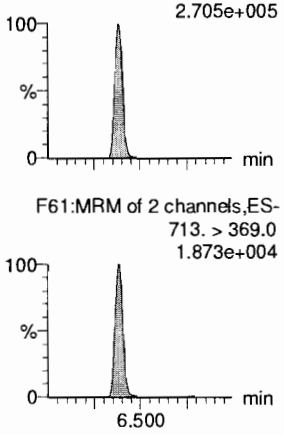


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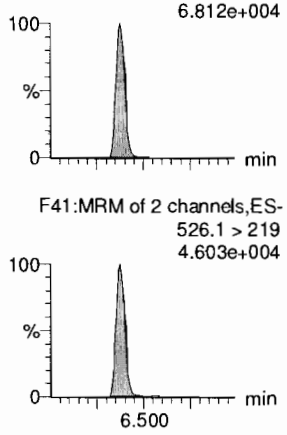
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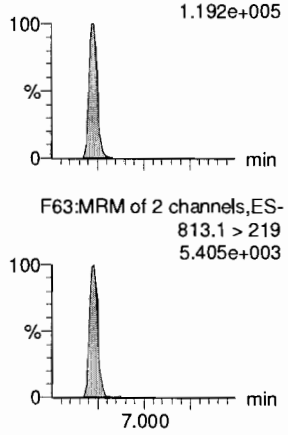
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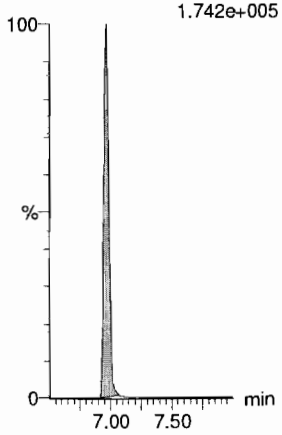
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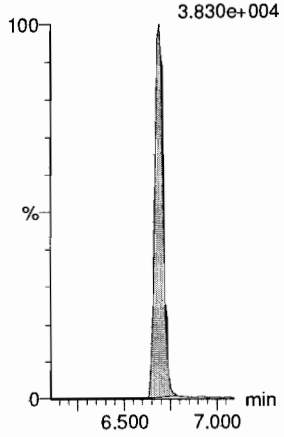
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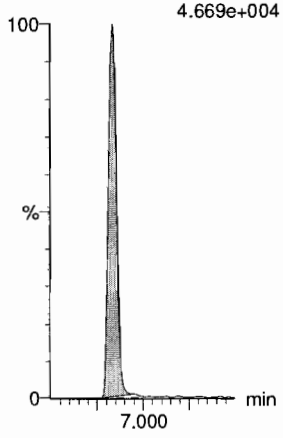
PFODA



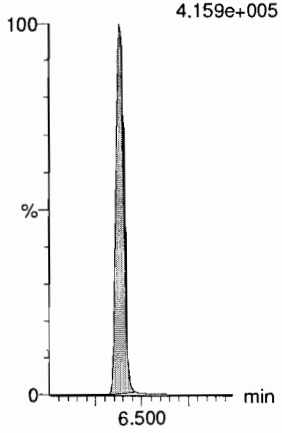
N-MeFOSE



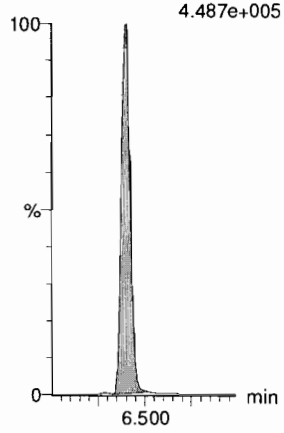
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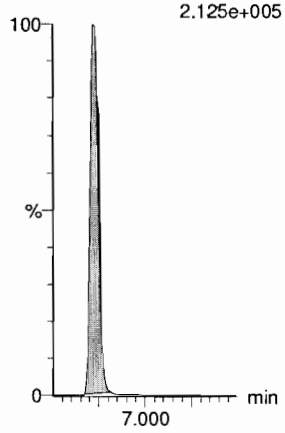
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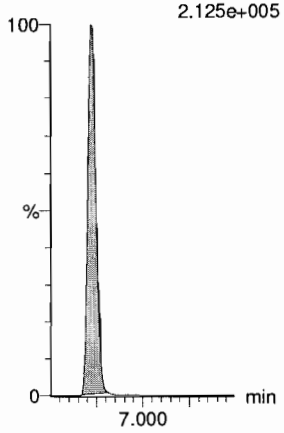
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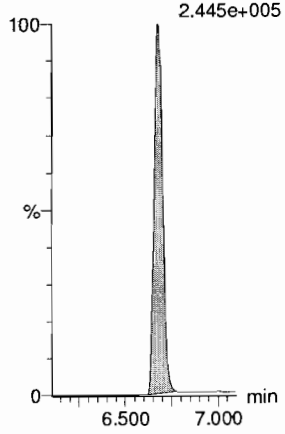
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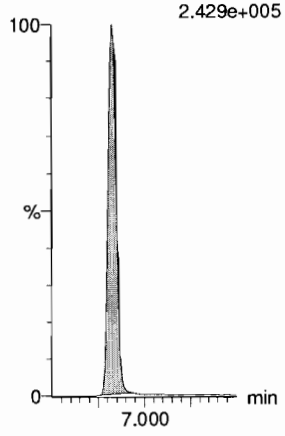
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d7-N-MeFOSE



d9-N-EtFOSE

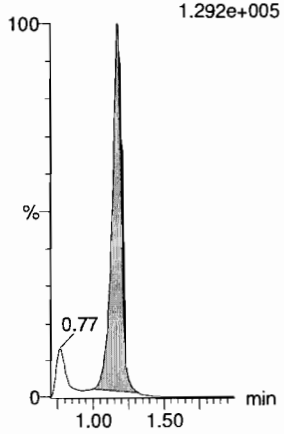


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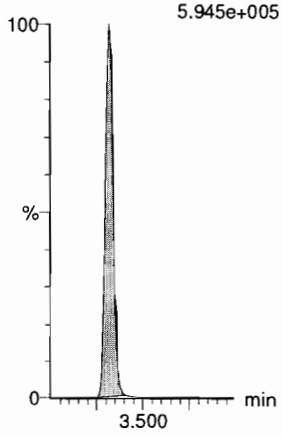
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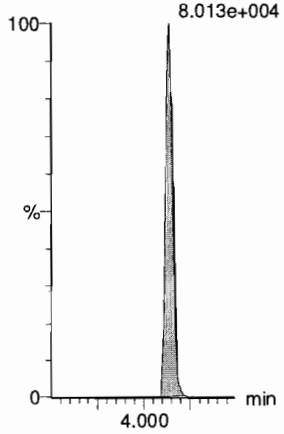
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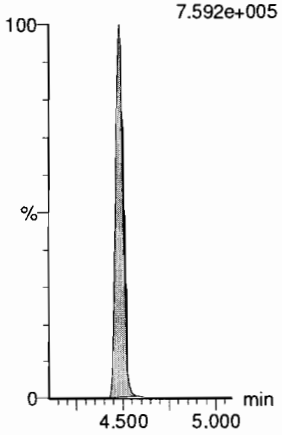
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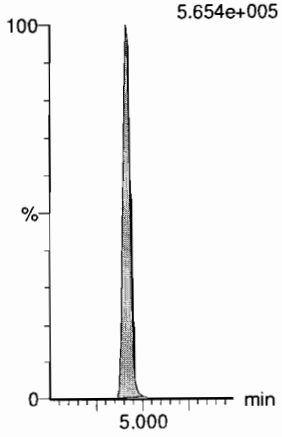
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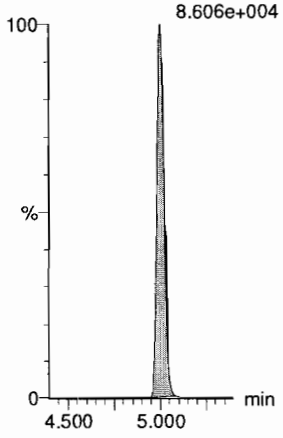
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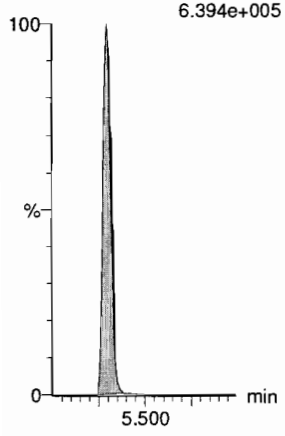
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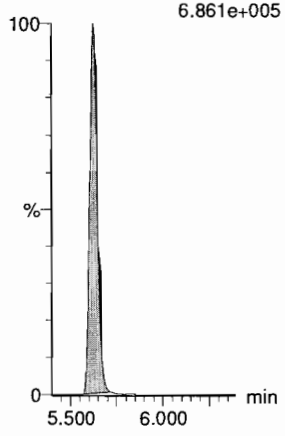
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13C6-PFDA



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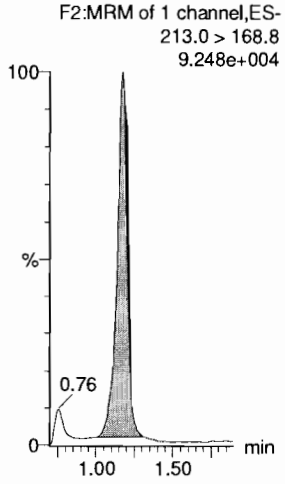


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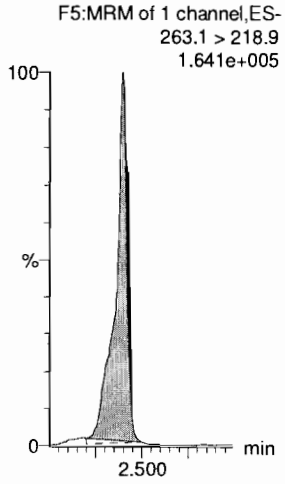
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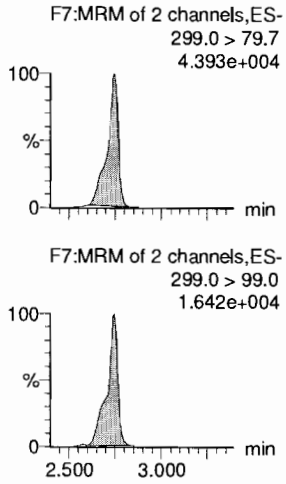
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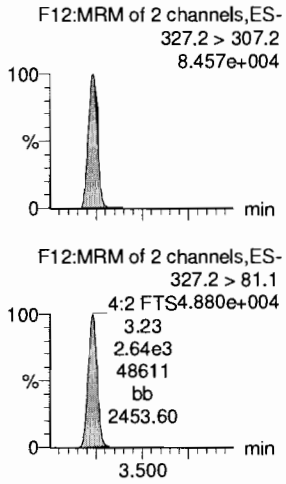
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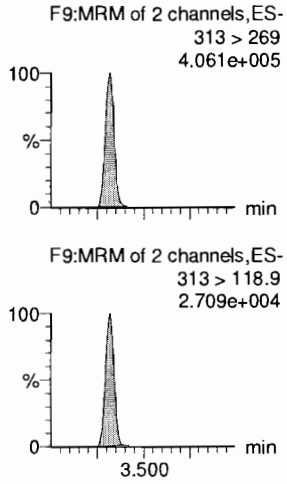
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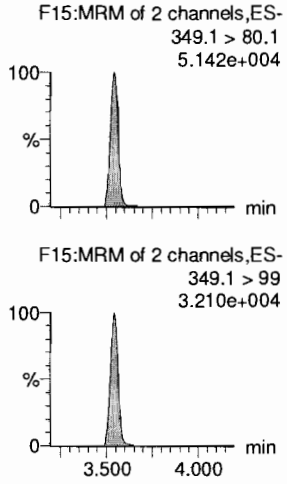
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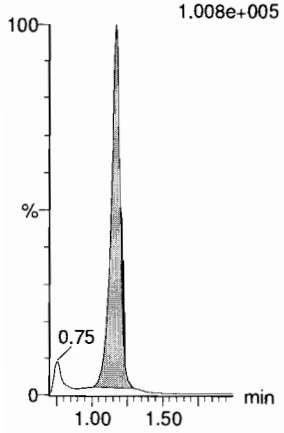
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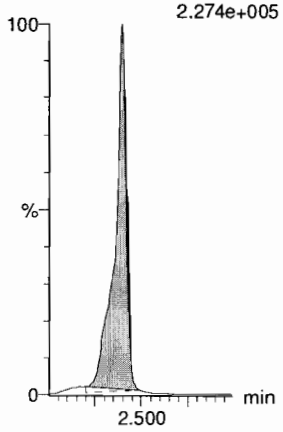
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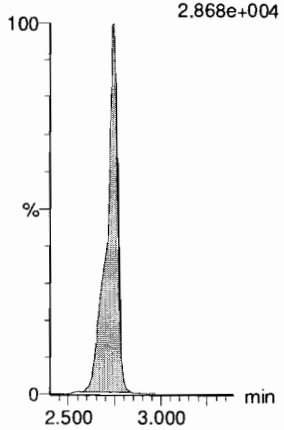
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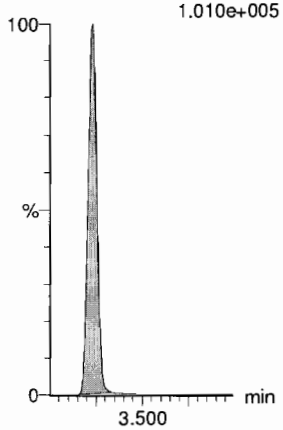
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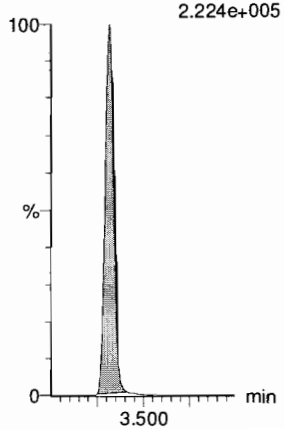
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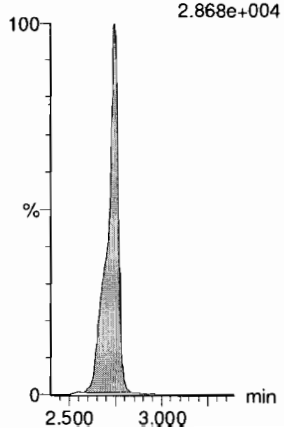
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13C2-PFHxA



13C3-PFBS

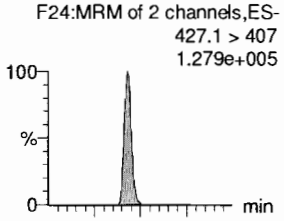


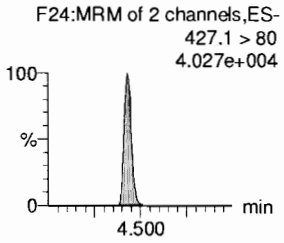
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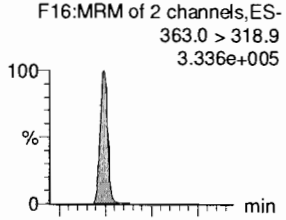
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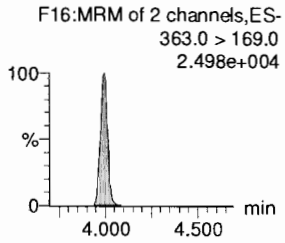
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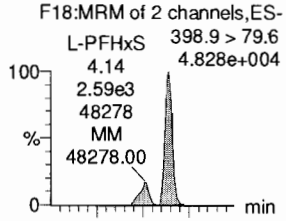


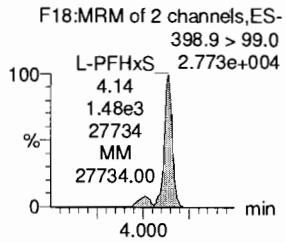
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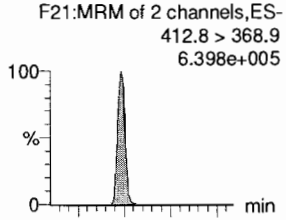


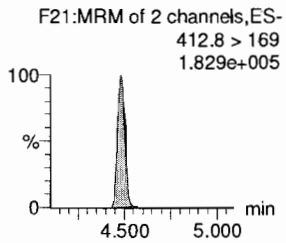
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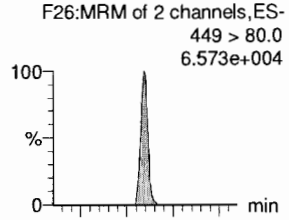


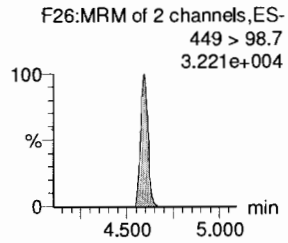
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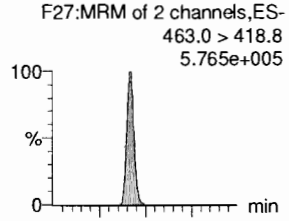


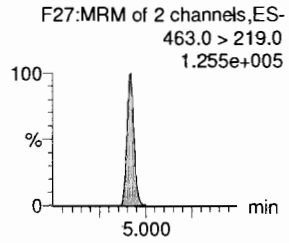
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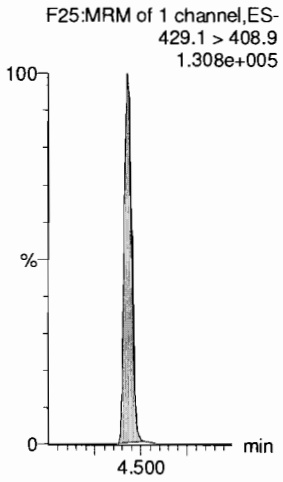


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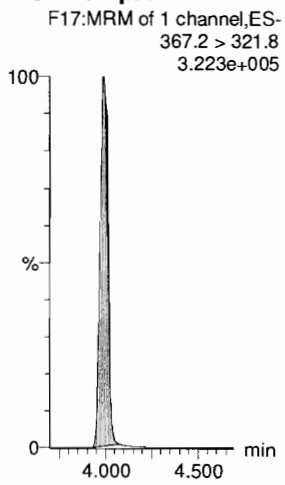




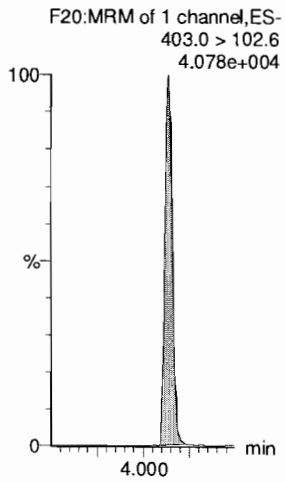
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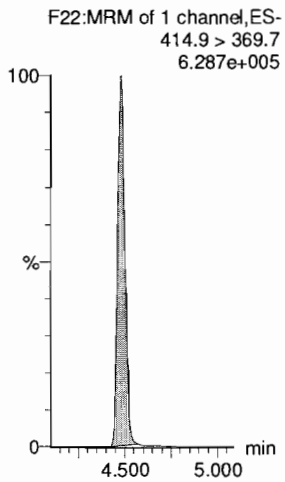
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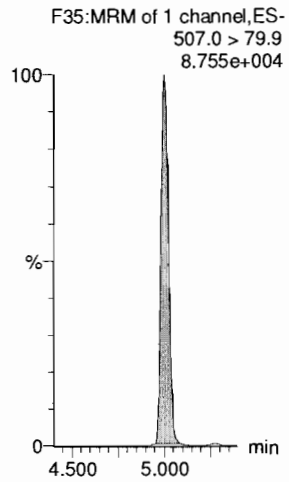
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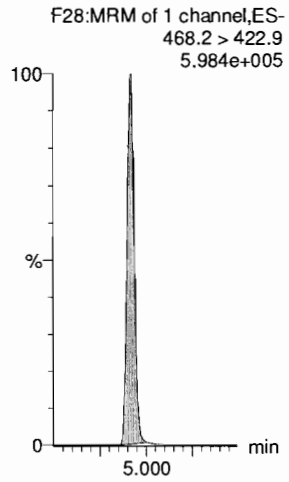
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13C8-PFOS



13C5-PFNA

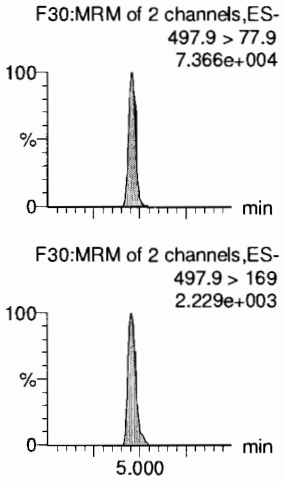


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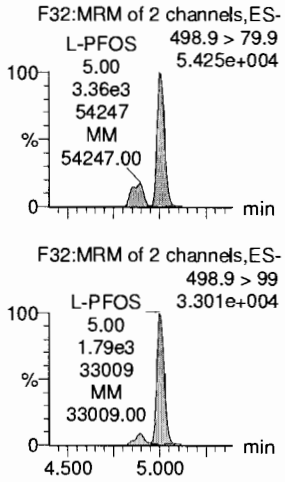
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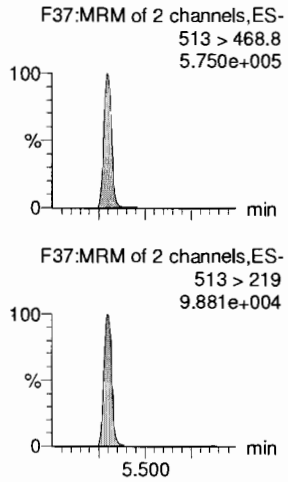
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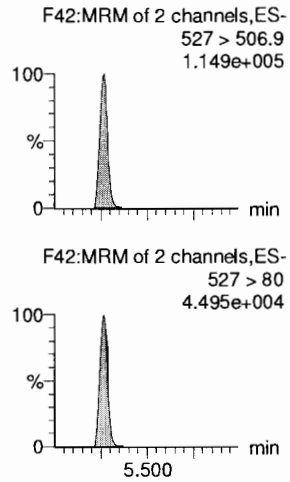
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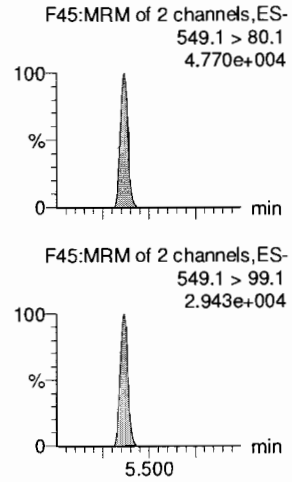
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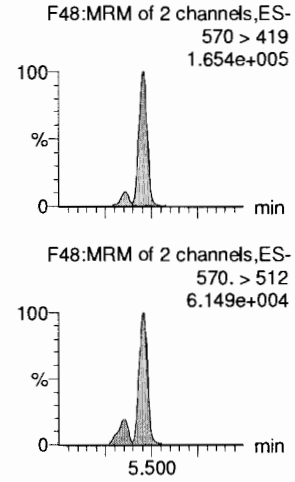
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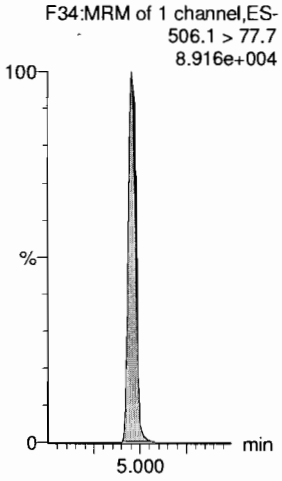
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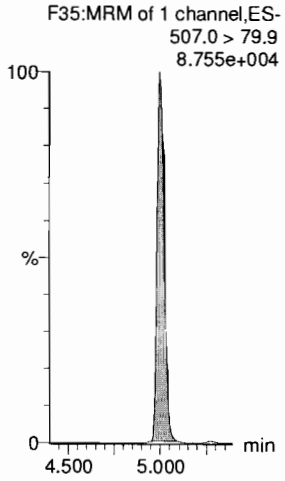
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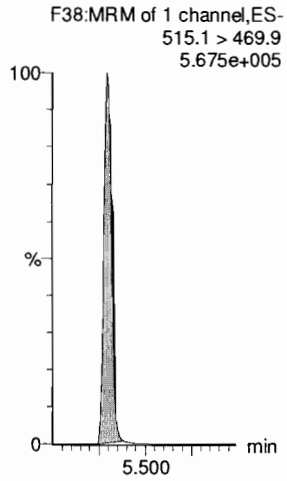
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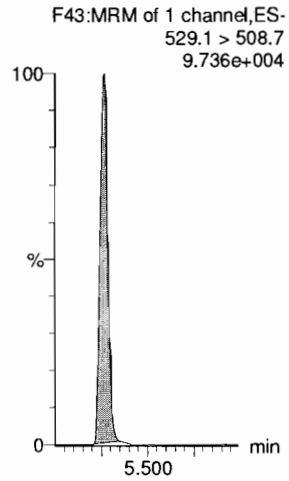
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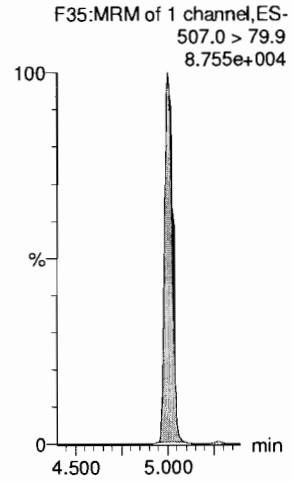
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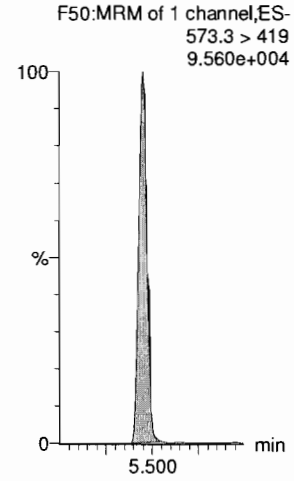
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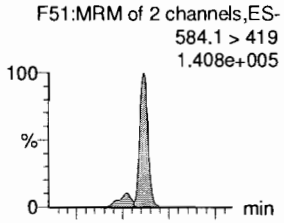


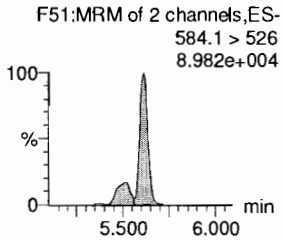
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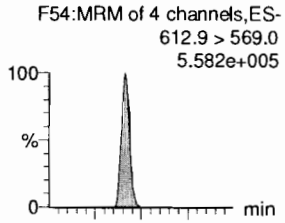
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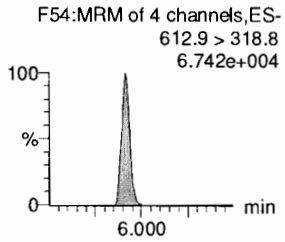
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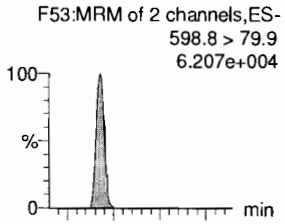


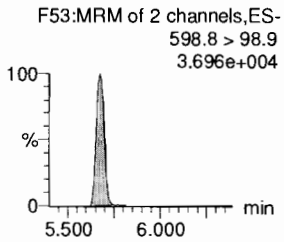
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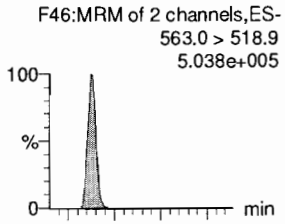


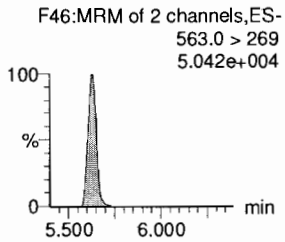
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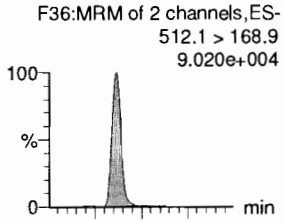


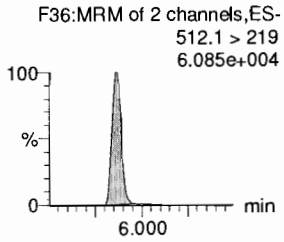
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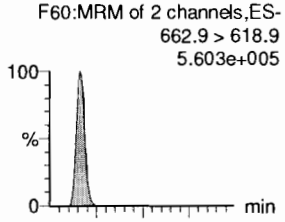


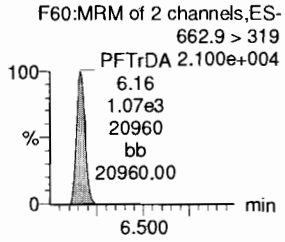
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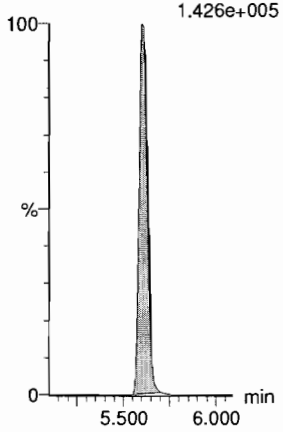


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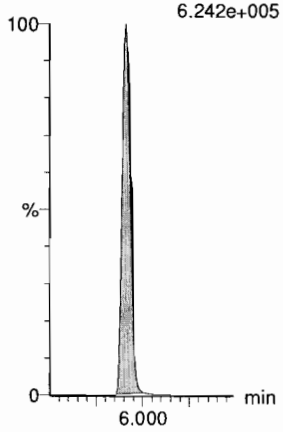




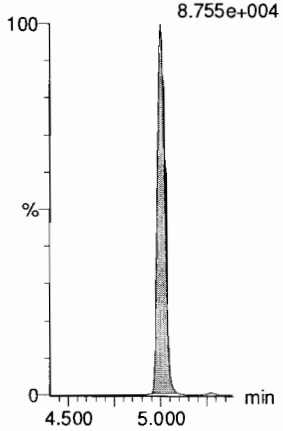
d5-N-EtFOSAA



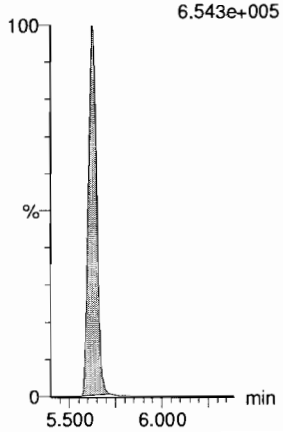
13C2-PFDoA



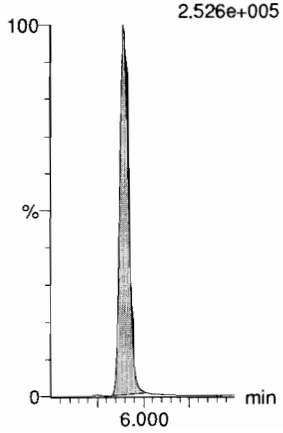
13C8-PFOS



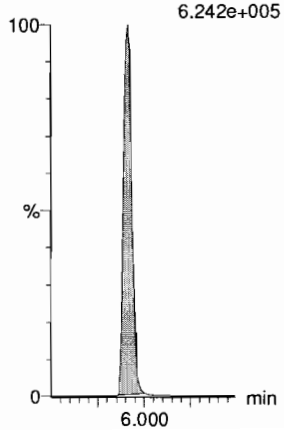
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

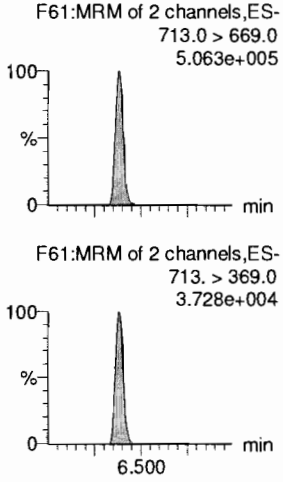


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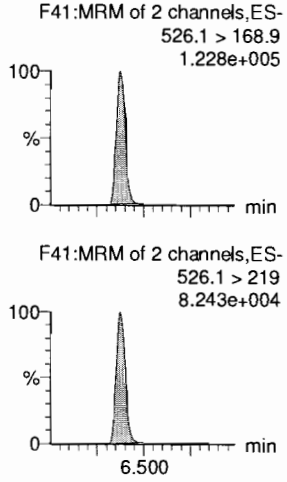
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Name: 181119M2_7, Date: 19-Nov-2018, Time: 21:10:50, ID: ST181119M2-6 PFC CS3 18K0906, Description: PFC CS3 18K0906

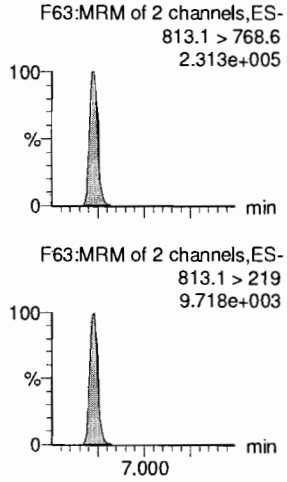
PFTeDA



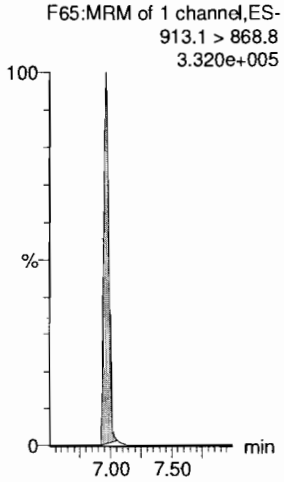
N-EtFOSA



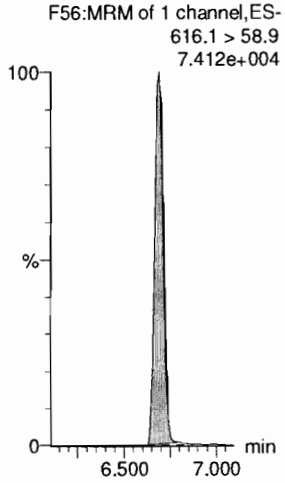
PFHxDA



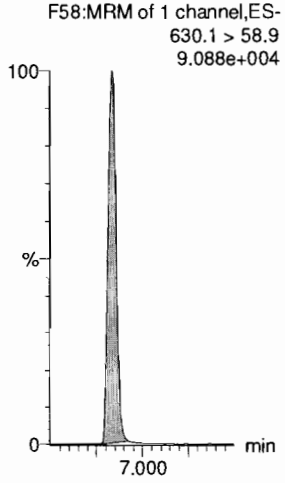
PFODA



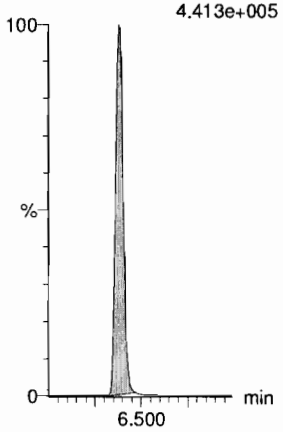
N-MeFOSE



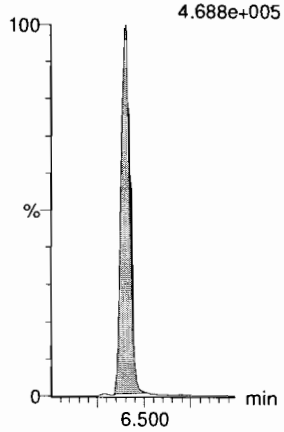
N-EtFOSE



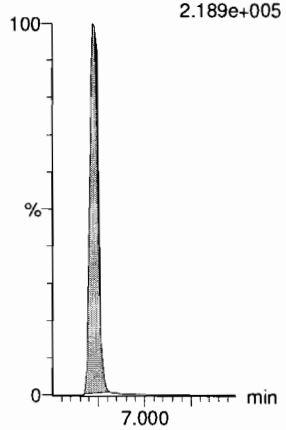
13C2-PFTeDA



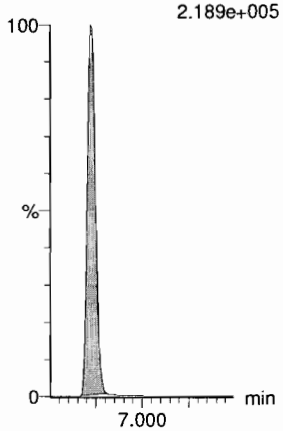
d5-N-ETFOSA



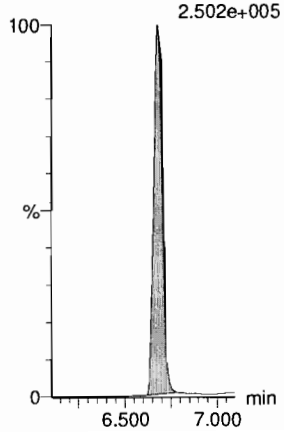
13C2-PFHxDA



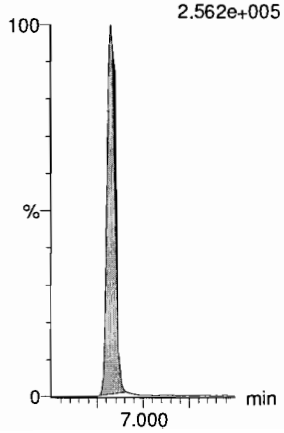
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

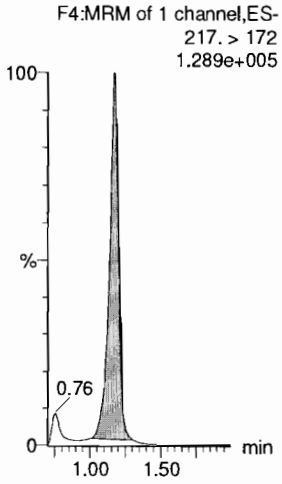


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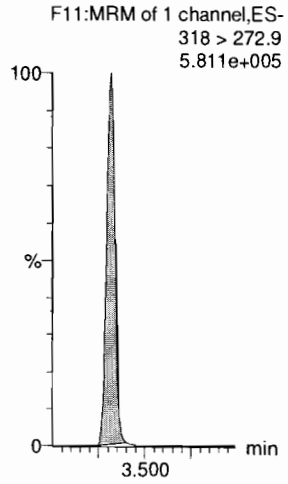
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Name: 181119M2_7, Date: 19-Nov-2018, Time: 21:10:50, ID: ST181119M2-6 PFC CS3 18K0906, Description: PFC CS3 18K0906

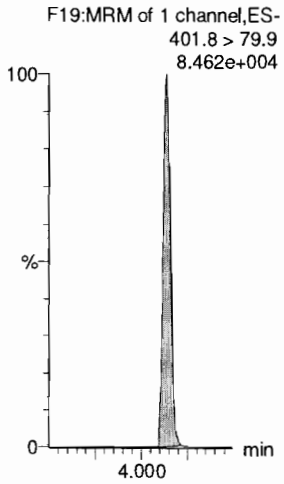
13C4-PFBA



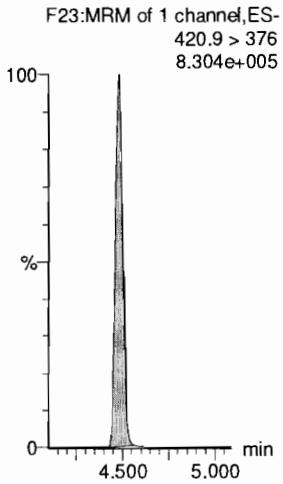
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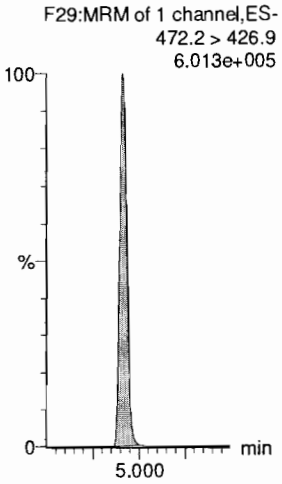
13C3-PFHxS



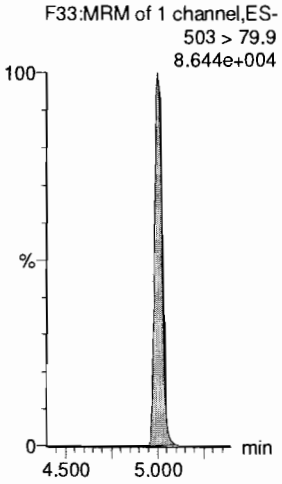
13C8-PFOA



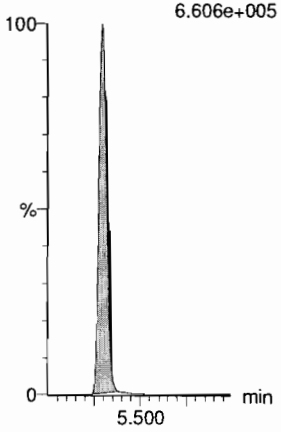
13C9-PFNA



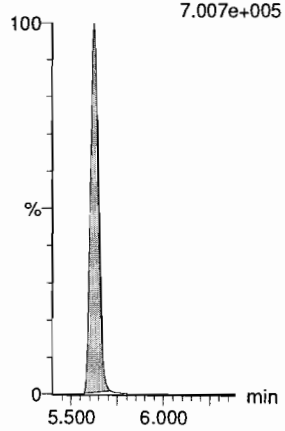
13C4-PFOS



13C6-PFDA



13C7-PFUdA

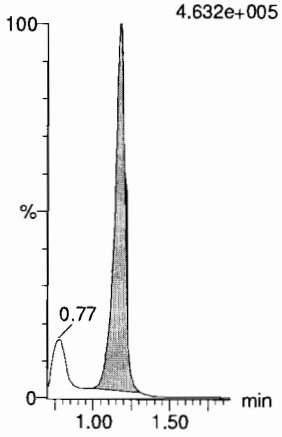


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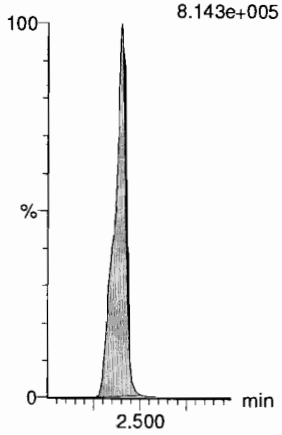
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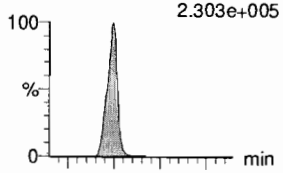
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
4.632e+005



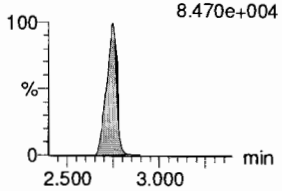
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
8.143e+005



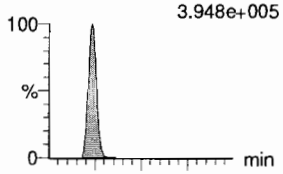
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
2.303e+005



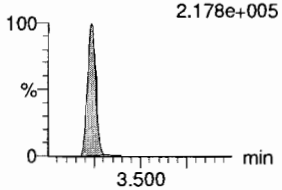
F7:MRM of 2 channels,ES-
299.0 > 99.0
8.470e+004



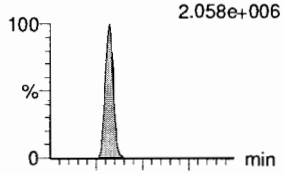
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
3.948e+005



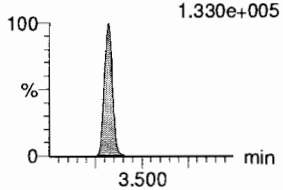
F12:MRM of 2 channels,ES-
327.2 > 81.1
2.178e+005



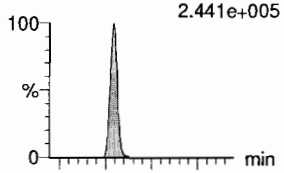
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
2.058e+006



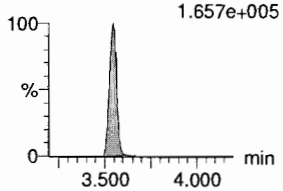
F9:MRM of 2 channels,ES-
313 > 118.9
1.330e+005



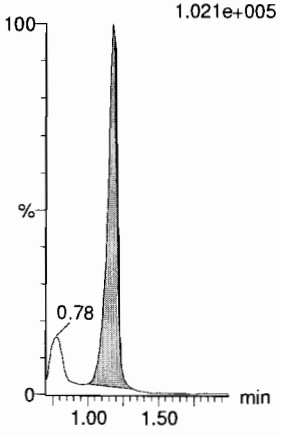
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
2.441e+005



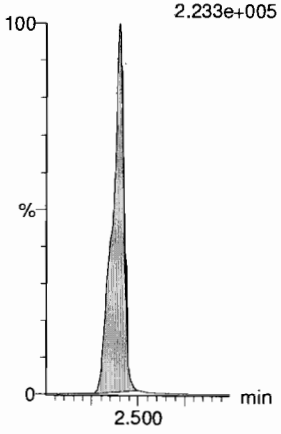
F15:MRM of 2 channels,ES-
349.1 > 99
1.657e+005



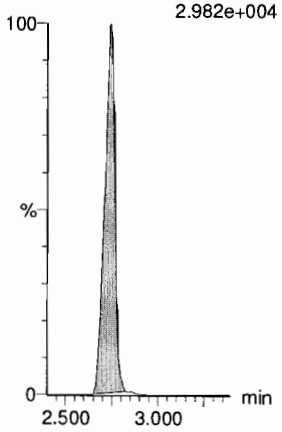
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
1.021e+005



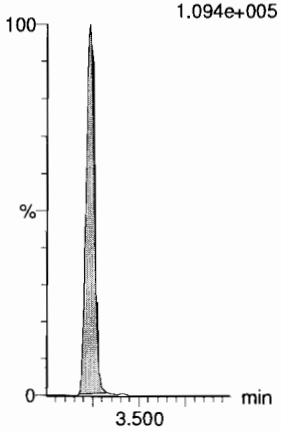
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
2.233e+005



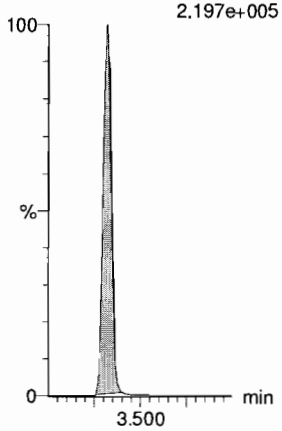
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.982e+004



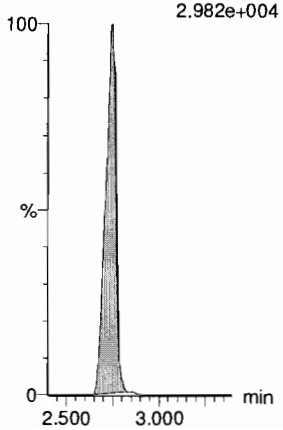
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.094e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
2.197e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.982e+004

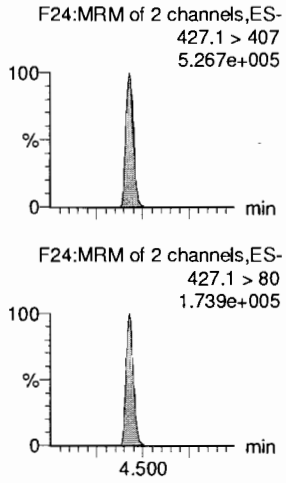


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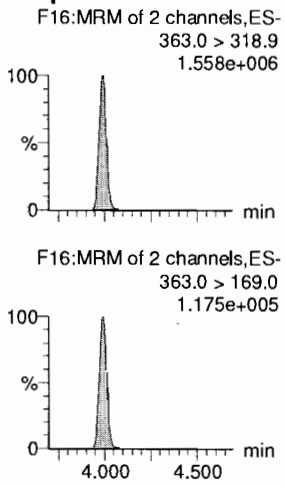
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Name: 181119M2_8, Date: 19-Nov-2018, Time: 21:21:23, ID: ST181119M2-7 PFC CS4 18K0907, Description: PFC CS4 18K0907

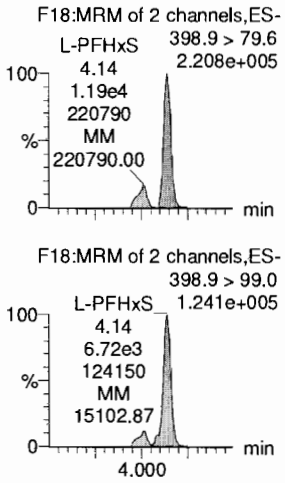
6:2 FTS



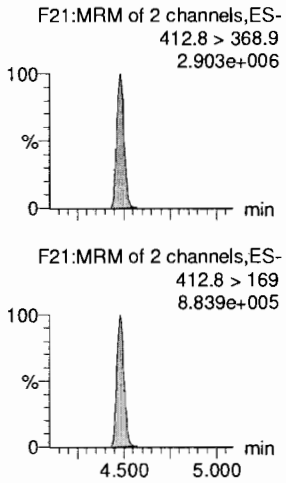
PFHpA



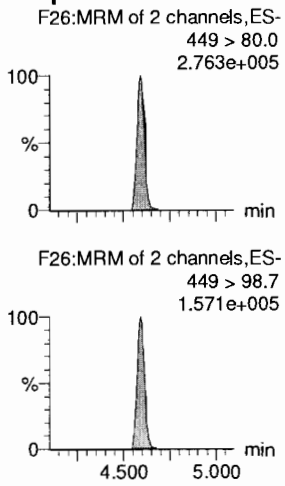
L-PFHxS



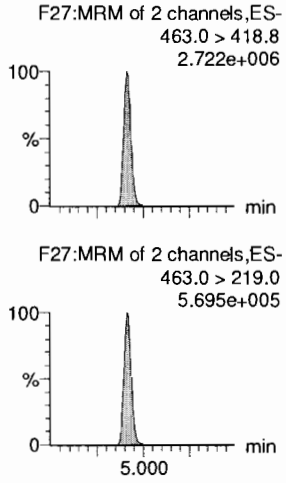
L-PFOA



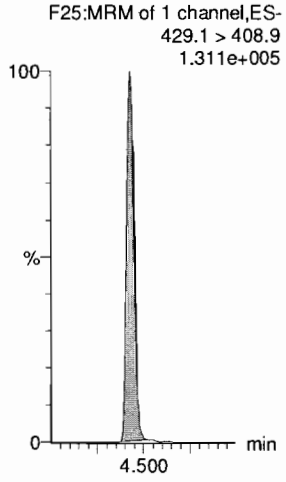
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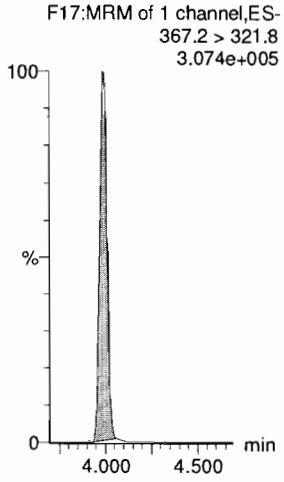
PFNA



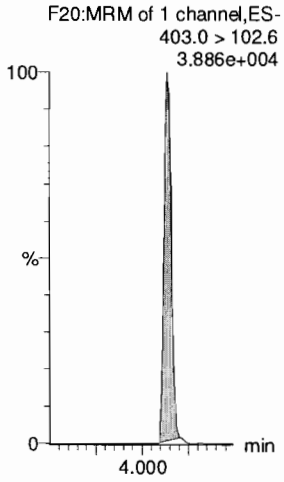
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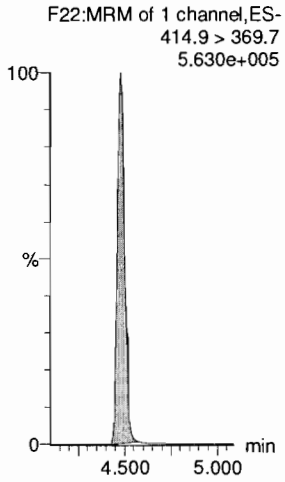
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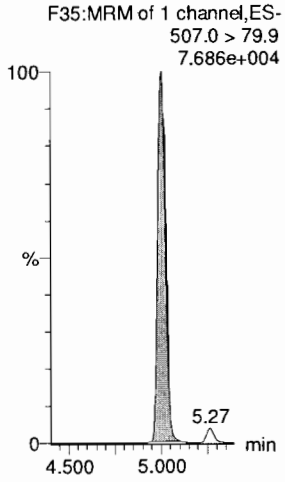
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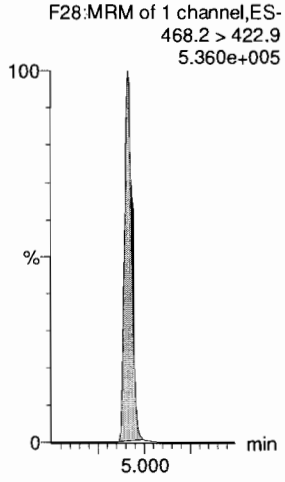
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13C8-PFOS



13C5-PFNA

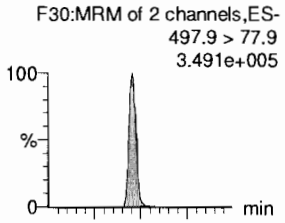


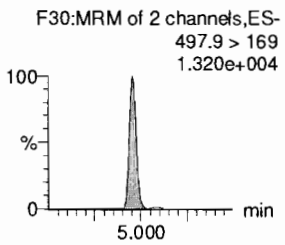
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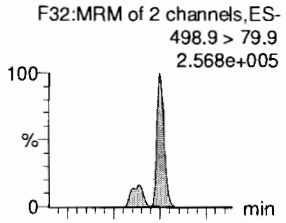
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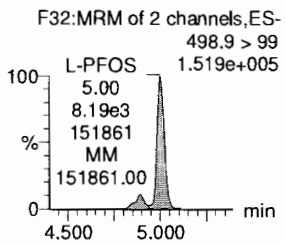
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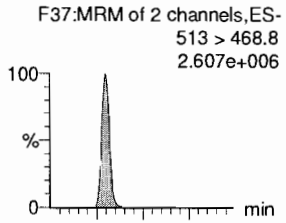


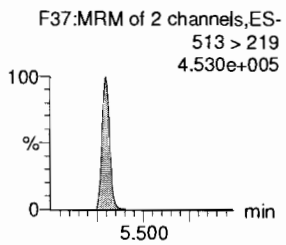
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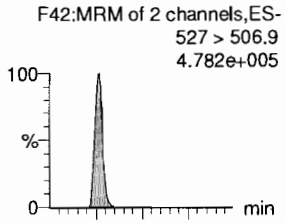


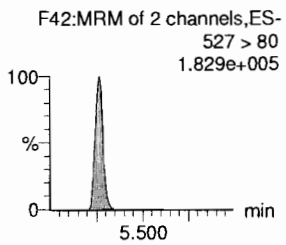
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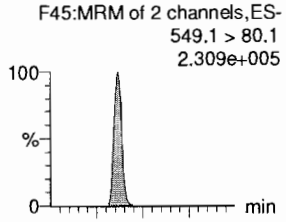


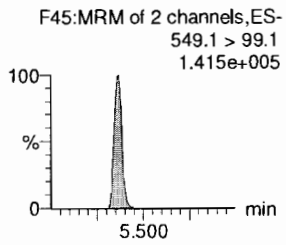
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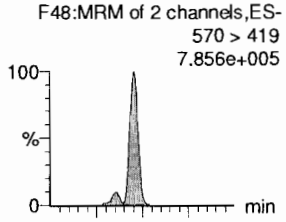


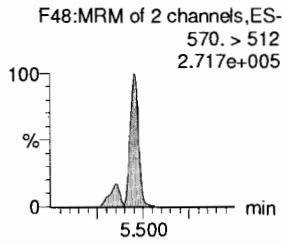
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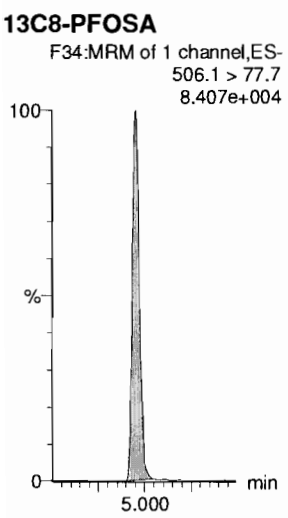


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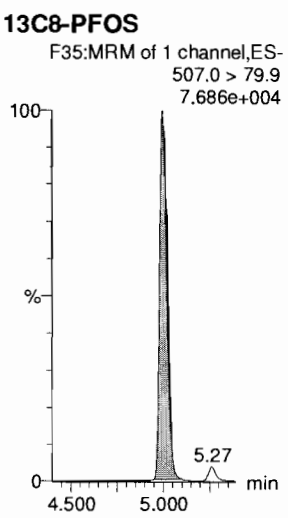




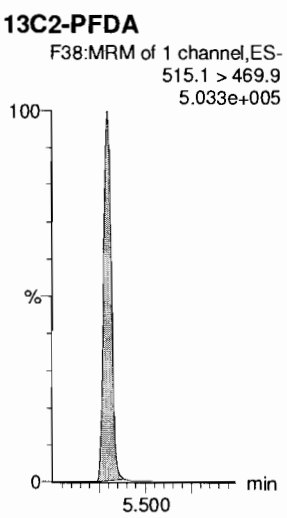
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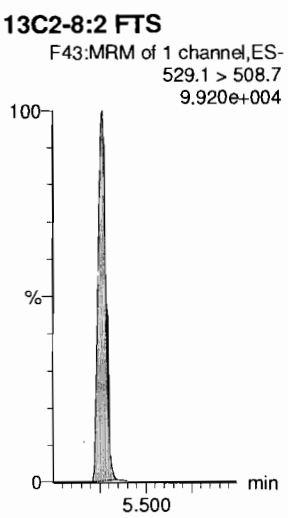
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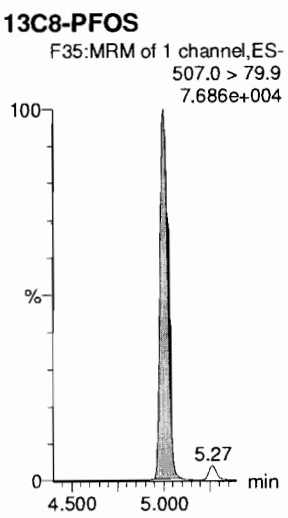
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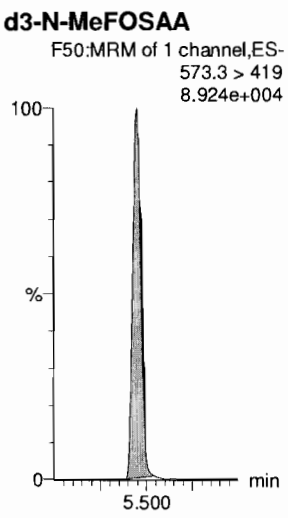
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA

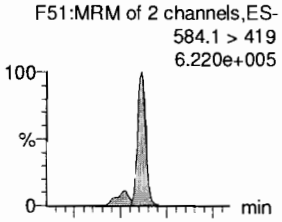


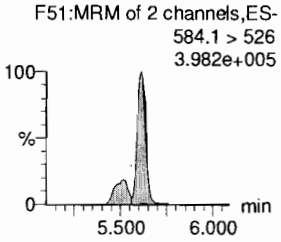
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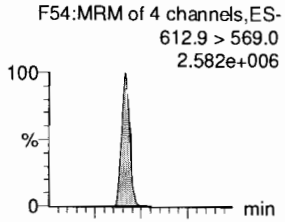
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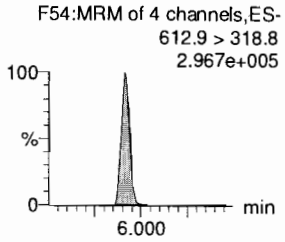
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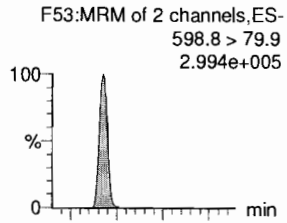


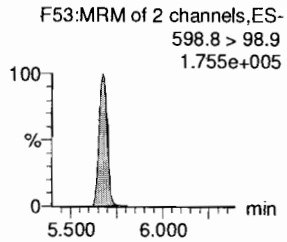
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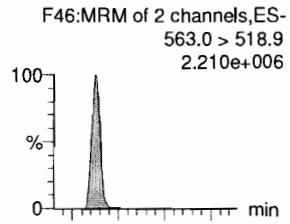


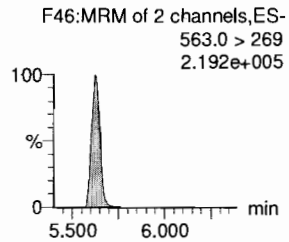
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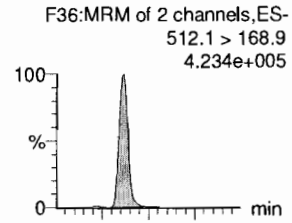


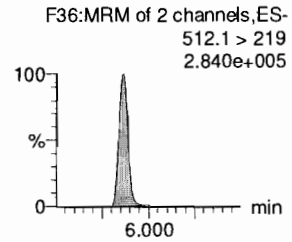
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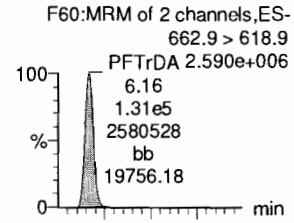


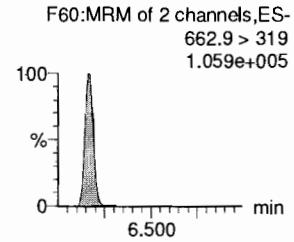
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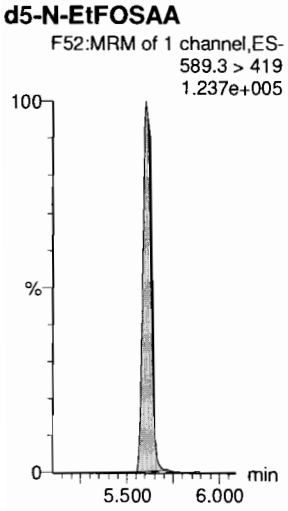


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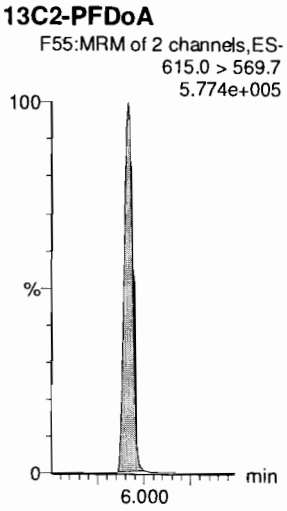




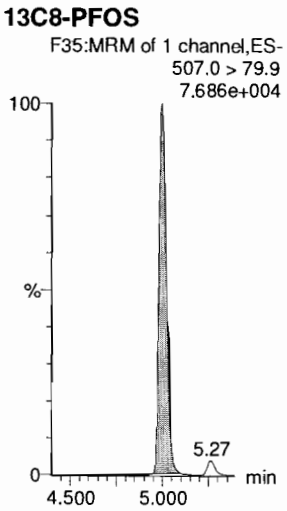
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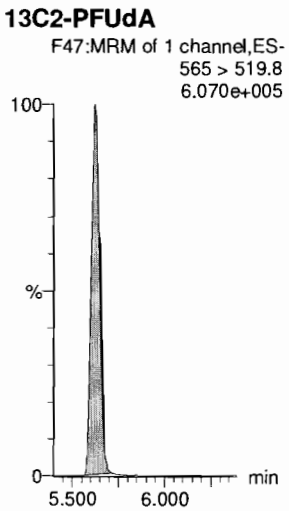
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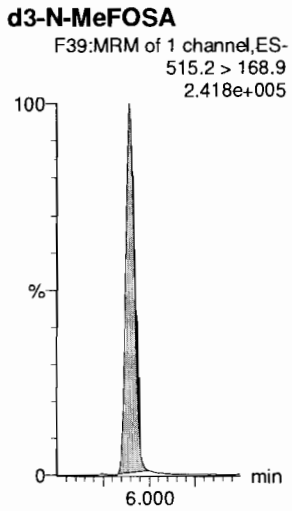
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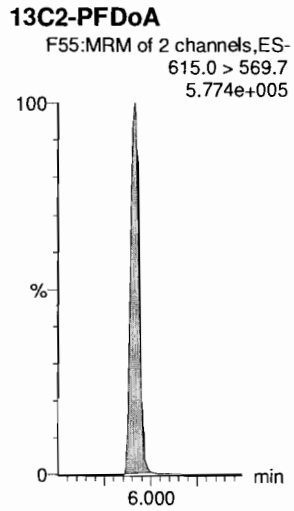
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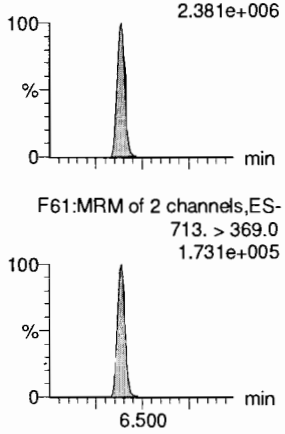


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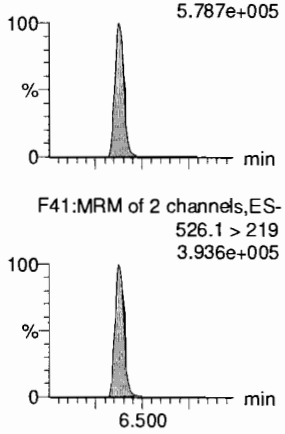
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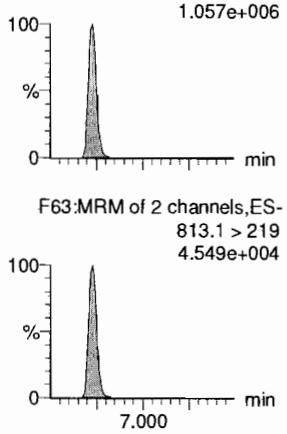
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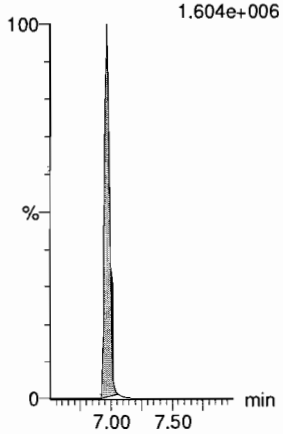
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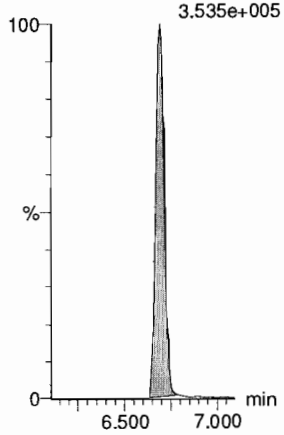
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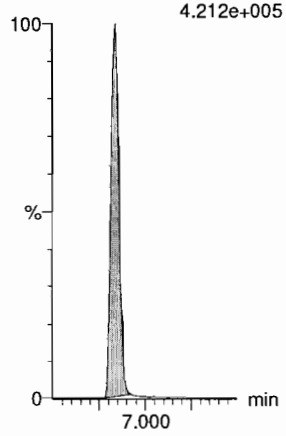
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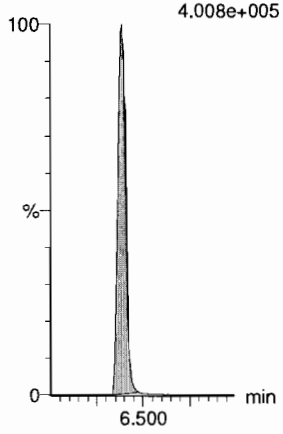
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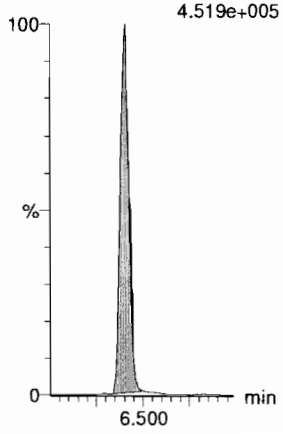
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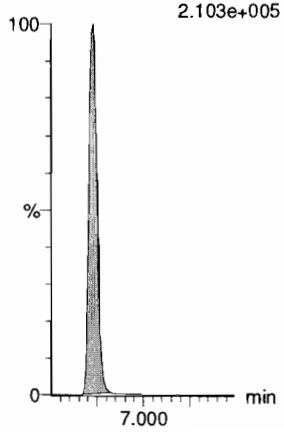
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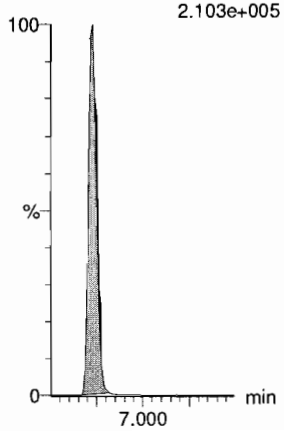
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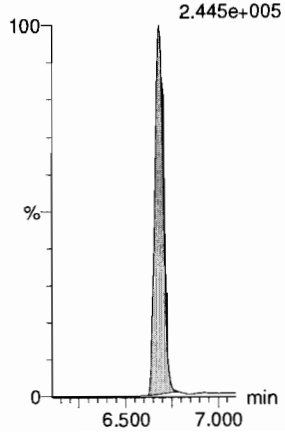
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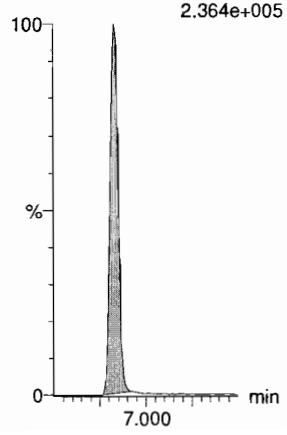
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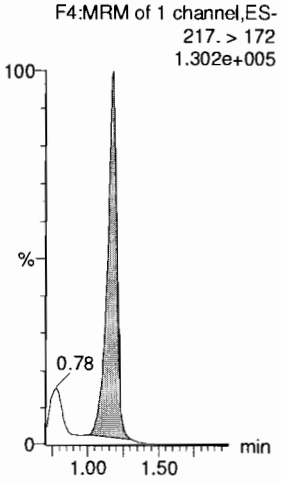


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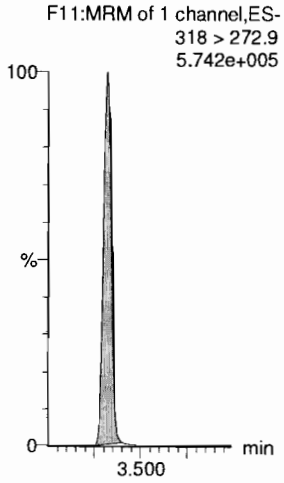
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Name: 181119M2_8, Date: 19-Nov-2018, Time: 21:21:23, ID: ST181119M2-7 PFC CS4 18K0907, Description: PFC CS4 18K0907

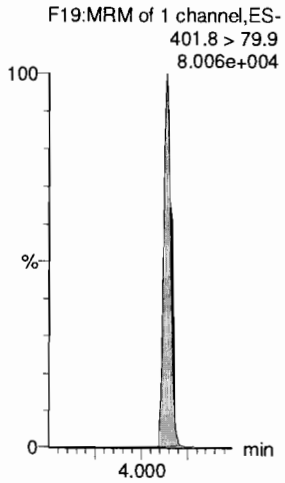
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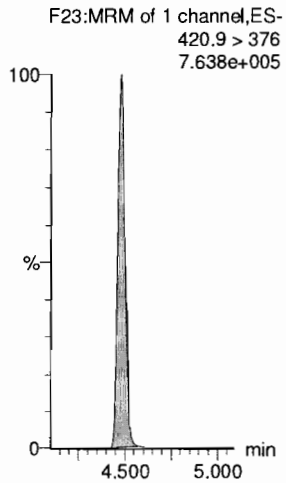
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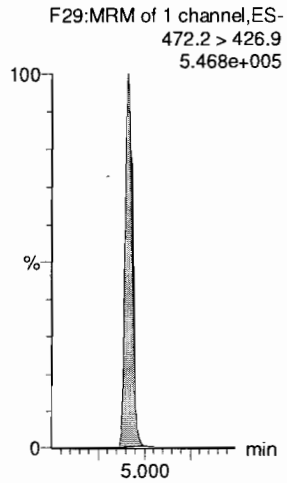
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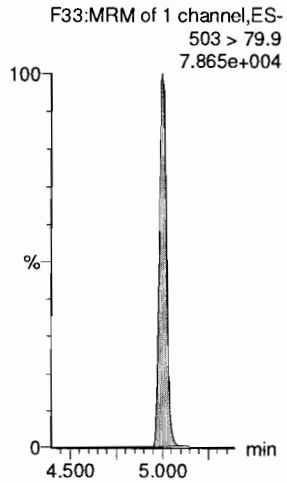
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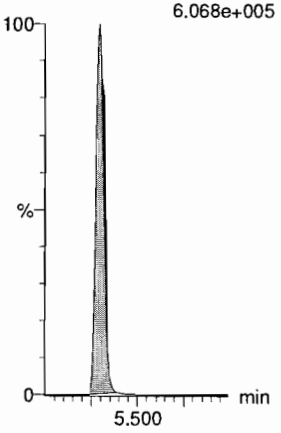
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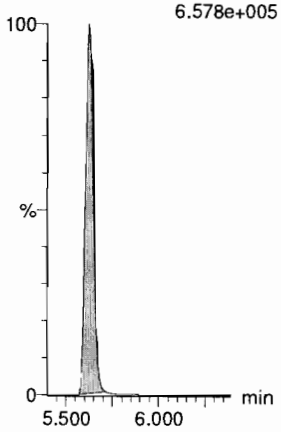
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13C7-PFUdA

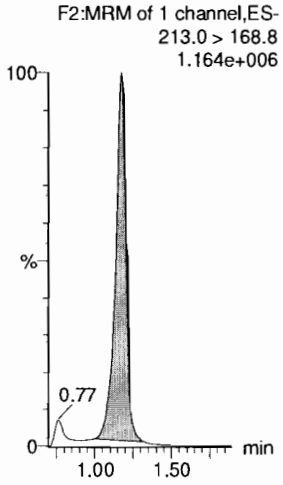


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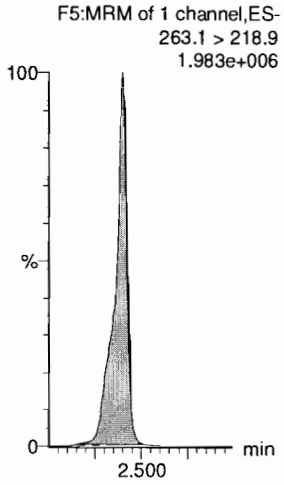
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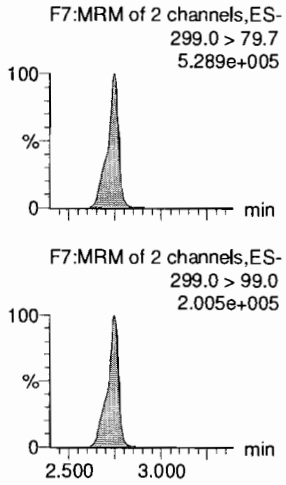
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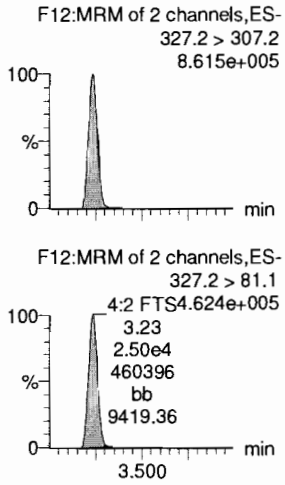
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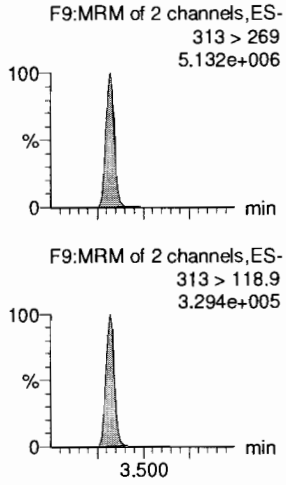
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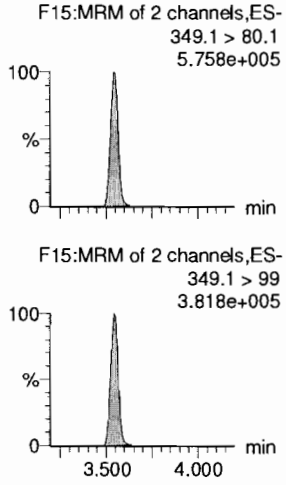
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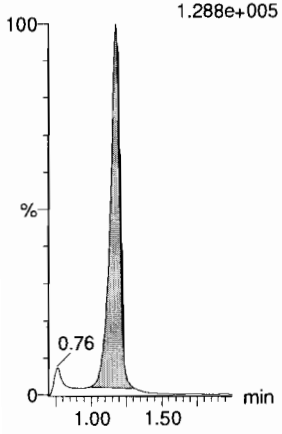
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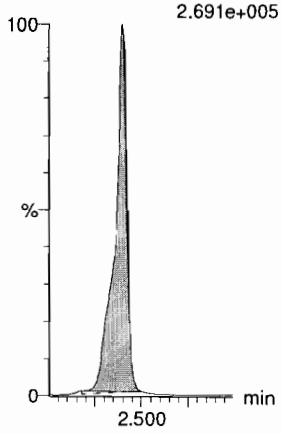
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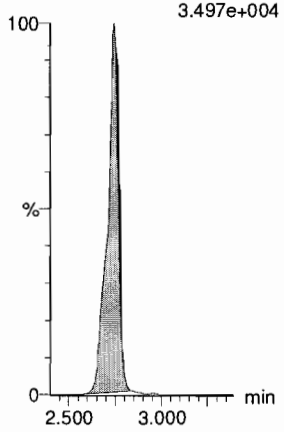
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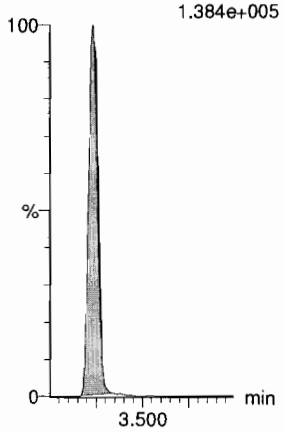
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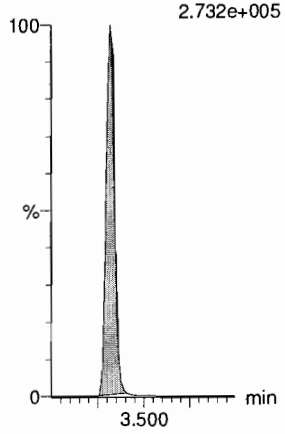
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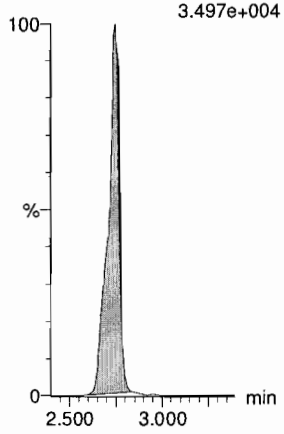
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13C2-PFHxA



13C3-PFBS

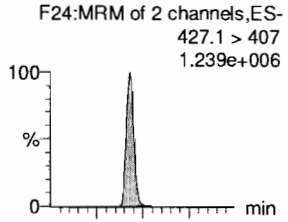


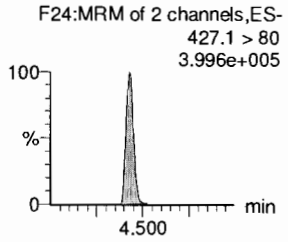
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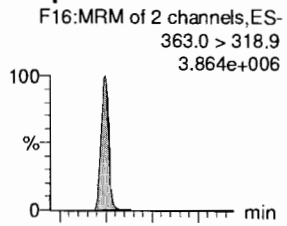
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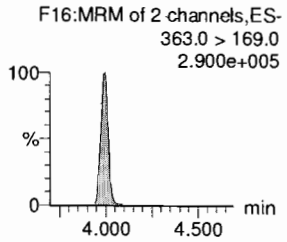
6:2 FTS



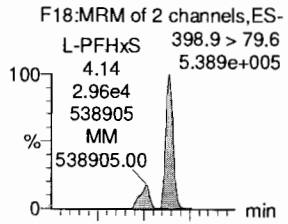


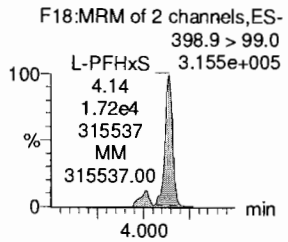
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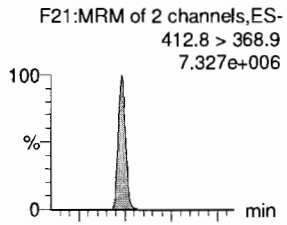


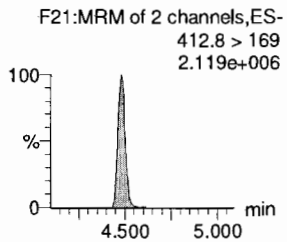
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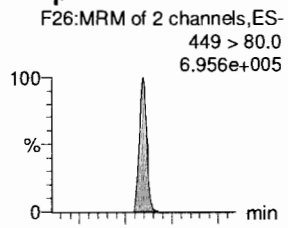


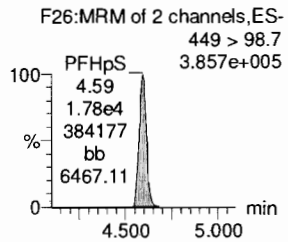
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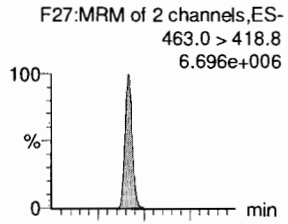


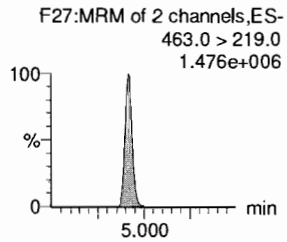
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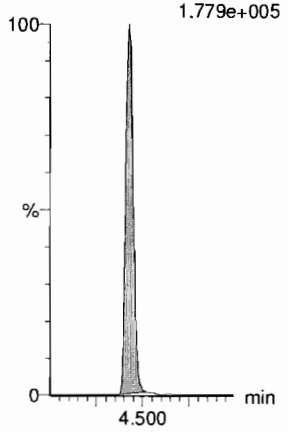


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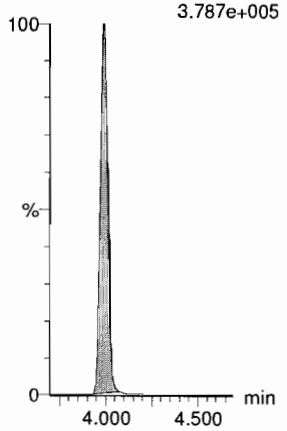




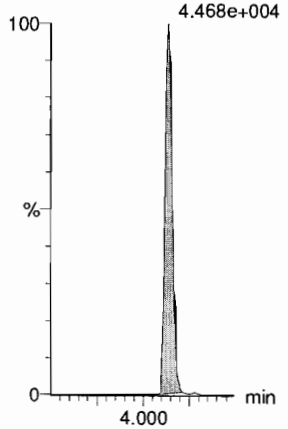
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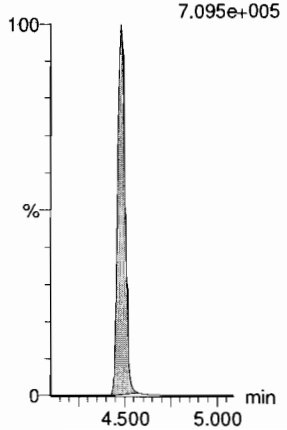
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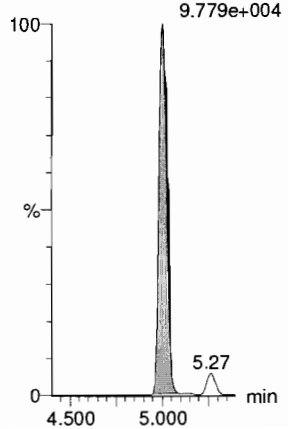
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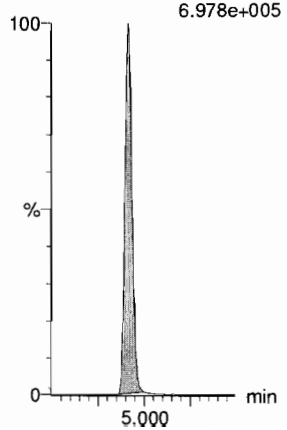
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13C8-PFOS



13C5-PFNA

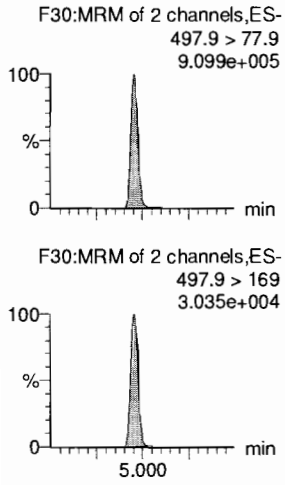


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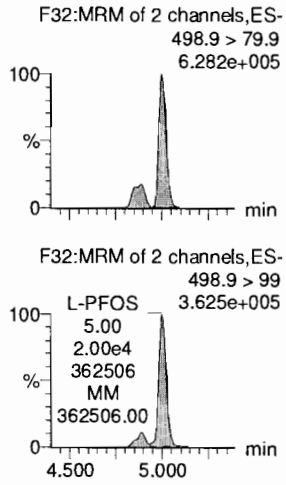
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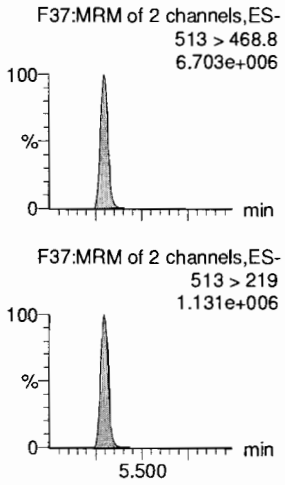
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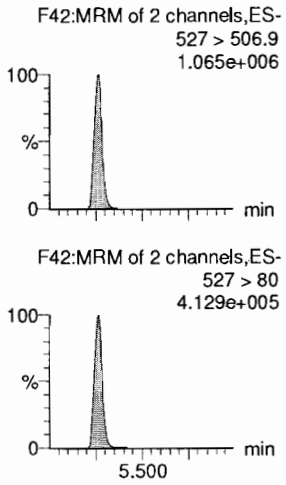
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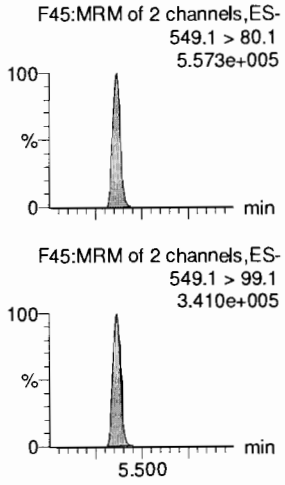
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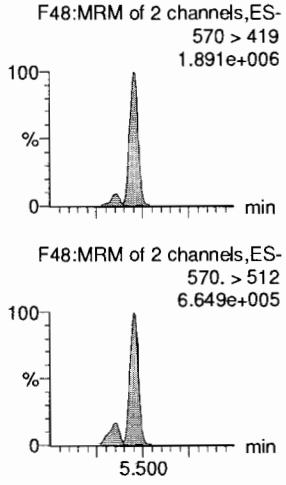
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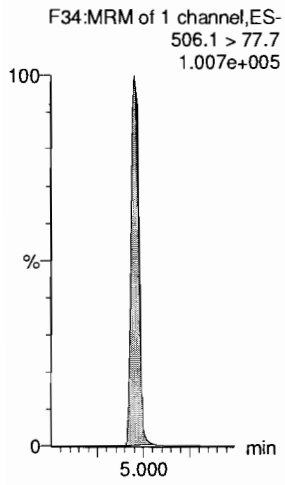
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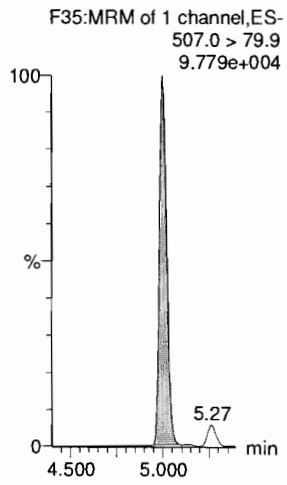
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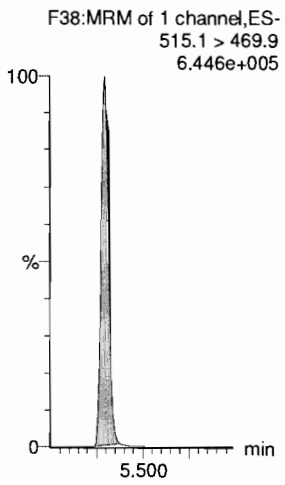
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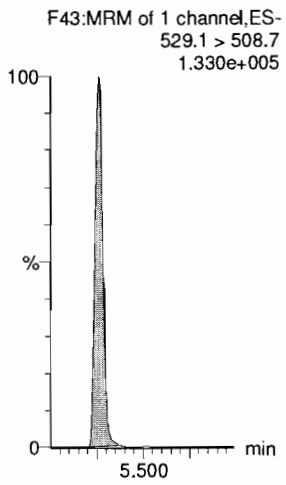
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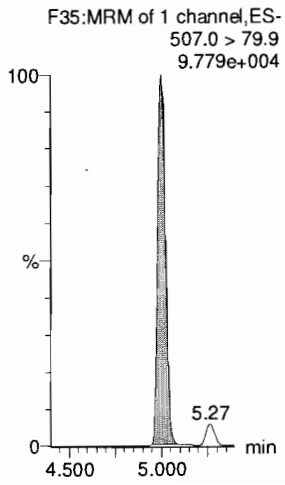
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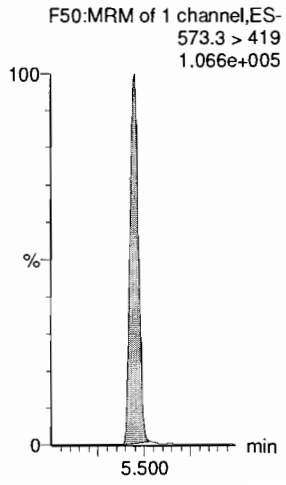
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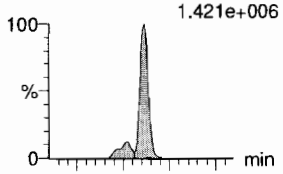


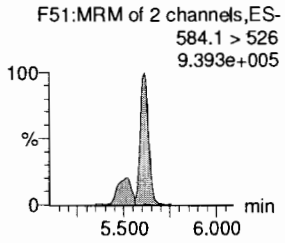
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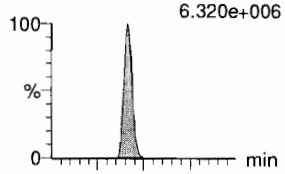
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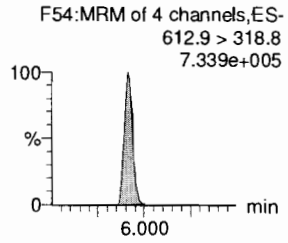
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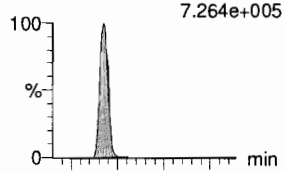


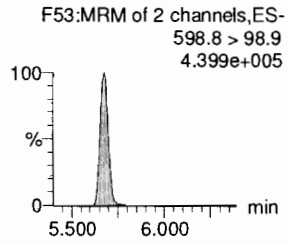
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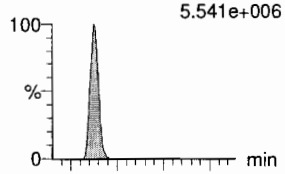


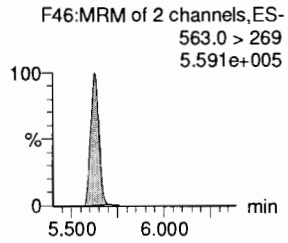
PFDS



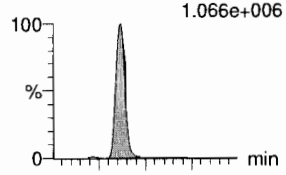


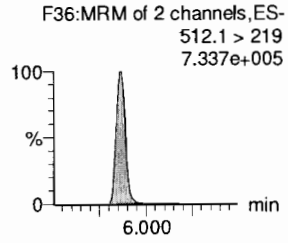
PFUdA



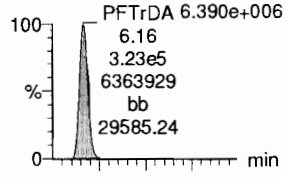


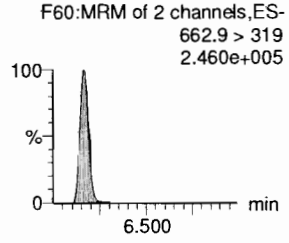
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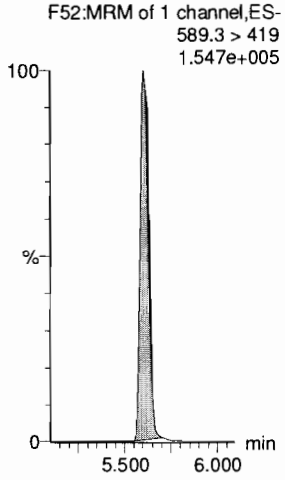


PFTrDA

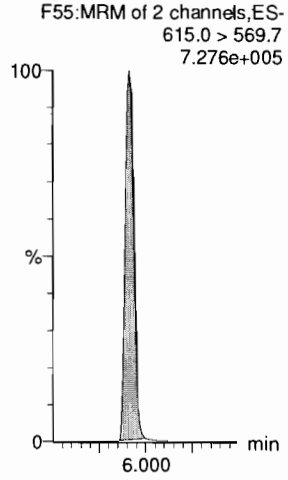




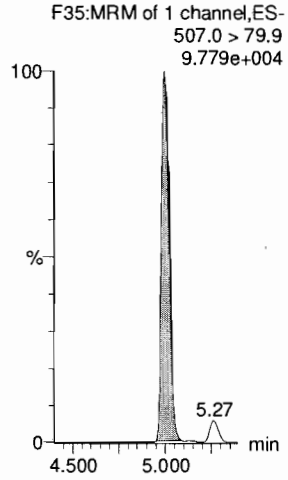
d5-N-EtFOSAA



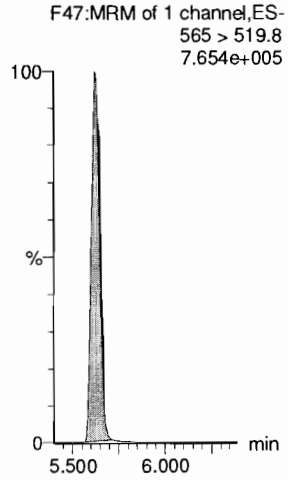
13C2-PFDoA



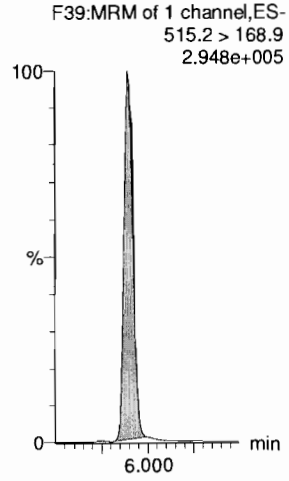
13C8-PFOS



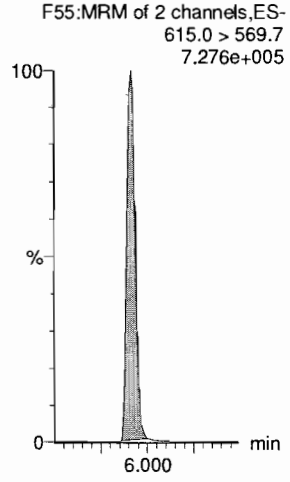
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

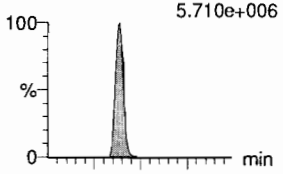


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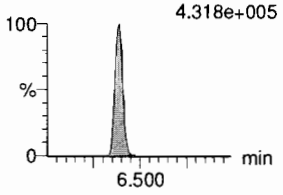
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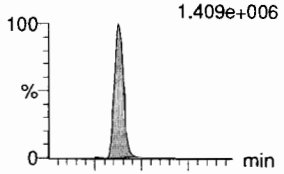
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
5.710e+006



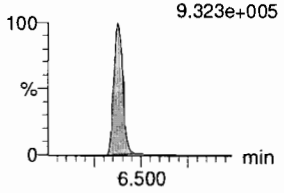
F61:MRM of 2 channels,ES-
713. > 369.0
4.318e+005



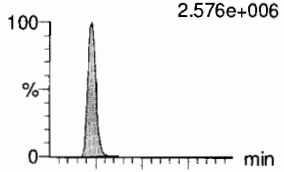
N-EtFOSA
F41:MRM of 2 channels,ES-
526.1 > 168.9
1.409e+006



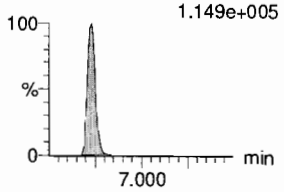
F41:MRM of 2 channels,ES-
526.1 > 219
9.323e+005



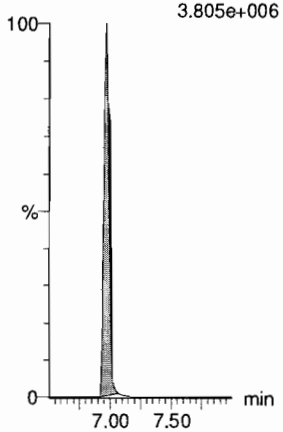
PFHxDA
F63:MRM of 2 channels,ES-
813.1 > 768.6
2.576e+006



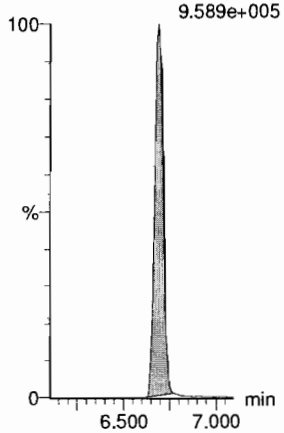
F63:MRM of 2 channels,ES-
813.1 > 219
1.149e+005



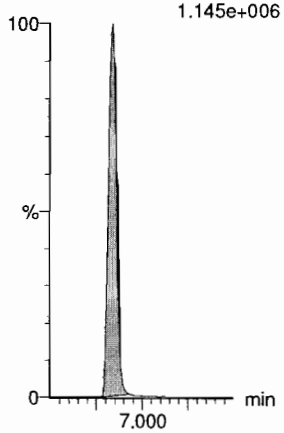
PFODA
F65:MRM of 1 channel,ES-
913.1 > 868.8
3.805e+006



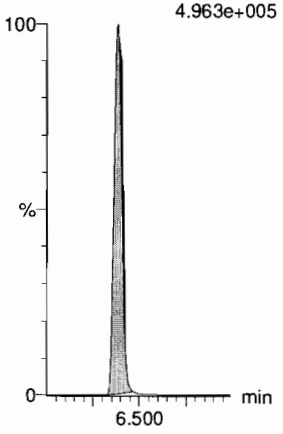
N-MeFOSE
F56:MRM of 1 channel,ES-
616.1 > 58.9
9.589e+005



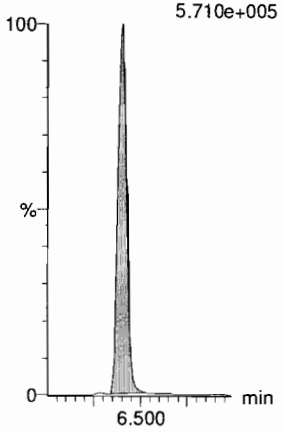
N-EtFOSE
F58:MRM of 1 channel,ES-
630.1 > 58.9
1.145e+006



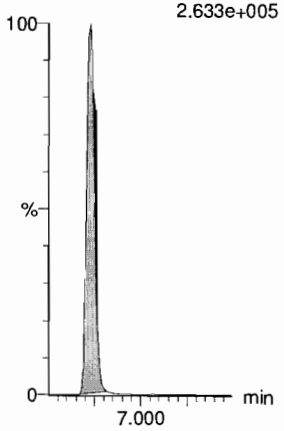
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
4.963e+005



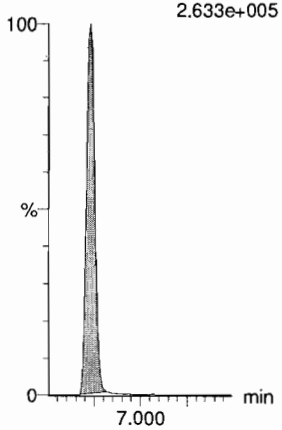
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F44:MRM of 1 channel,ES-
531.1 > 168.9
5.710e+005



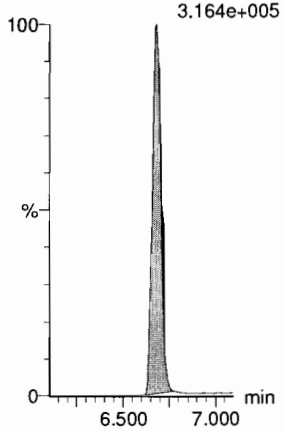
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.633e+005



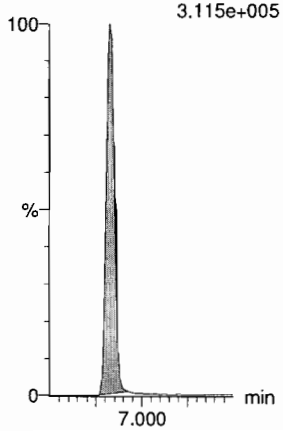
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.633e+005



d7-N-MeFOSE
F57:MRM of 1 channel,ES-
623.1 > 58.9
3.164e+005



d9-N-EtFOSE
F59:MRM of 1 channel,ES-
639.2 > 58.8
3.115e+005

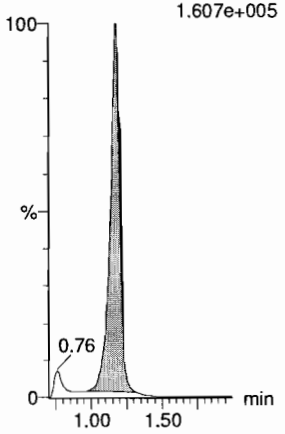


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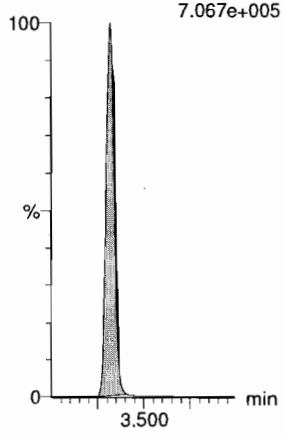
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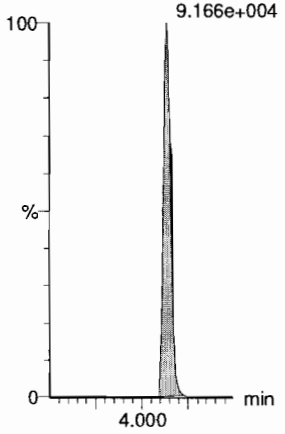
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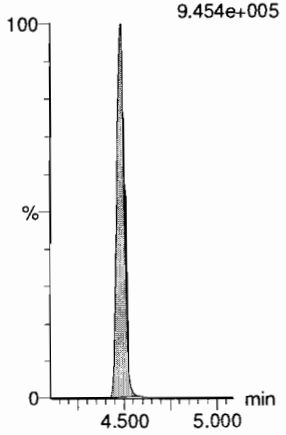
13C5-PFHxA



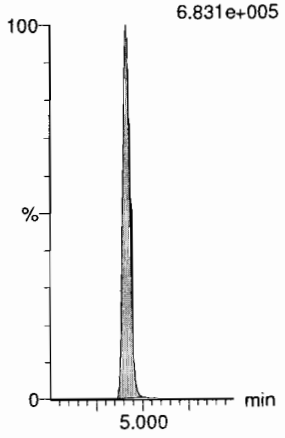
13C3-PFHxS



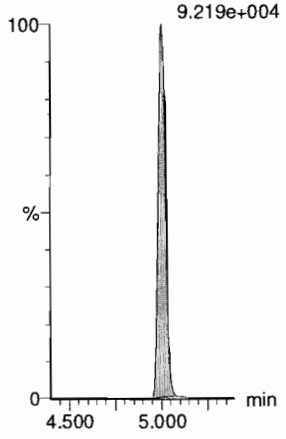
13C8-PFOA



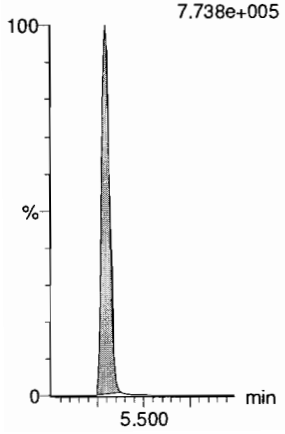
13C9-PFNA



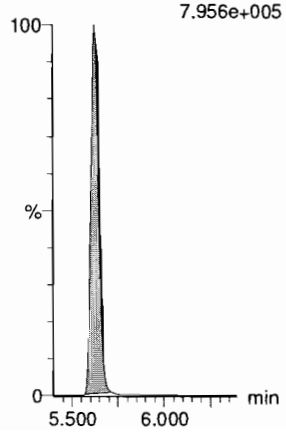
13C4-PFOS



13C6-PFDA



13C7-PFUdA

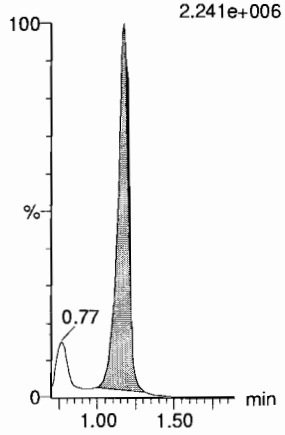


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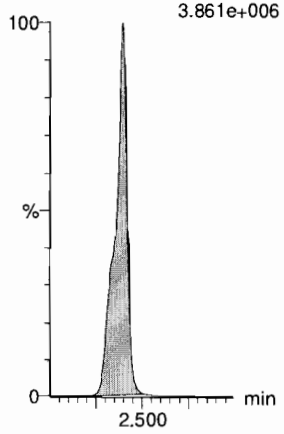
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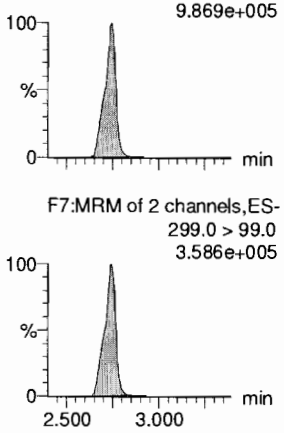
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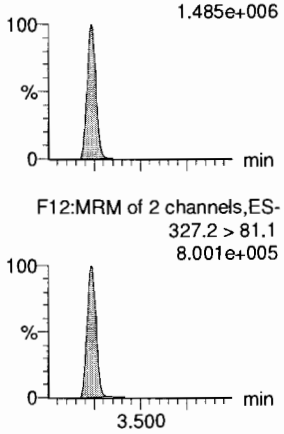
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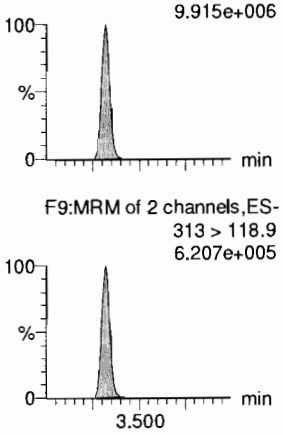
PFBS



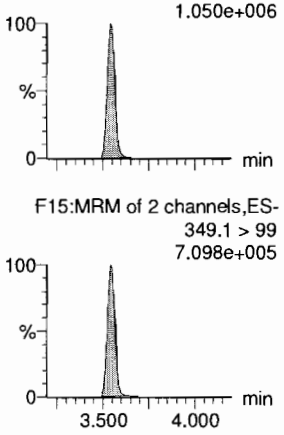
4:2 FTS



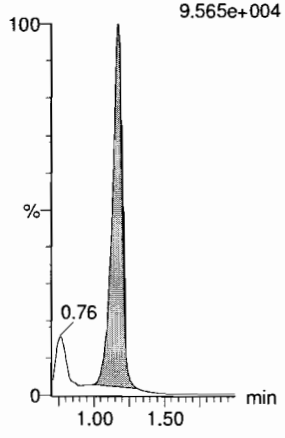
PFHxA



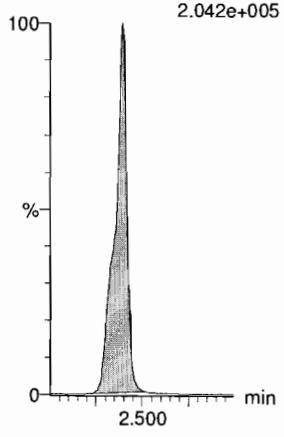
PFPeS



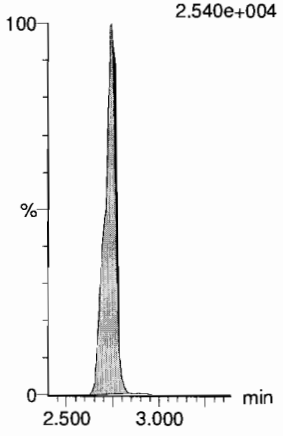
13C3-PFBA



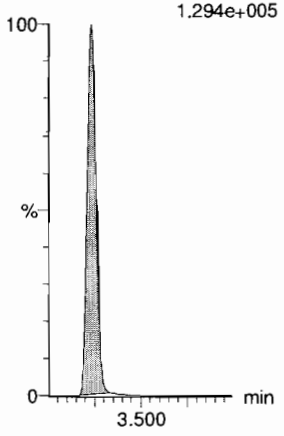
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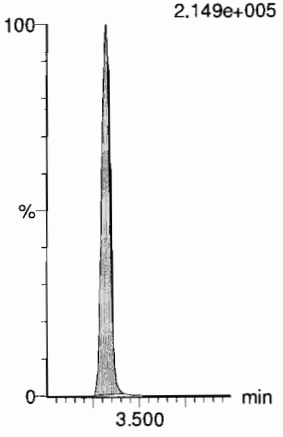
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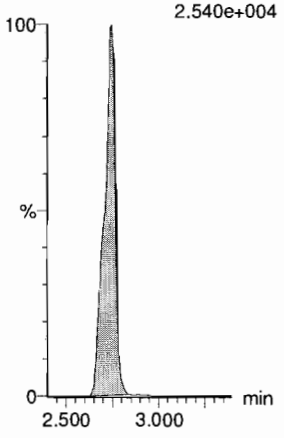
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13C2-PFHxA



13C3-PFBS

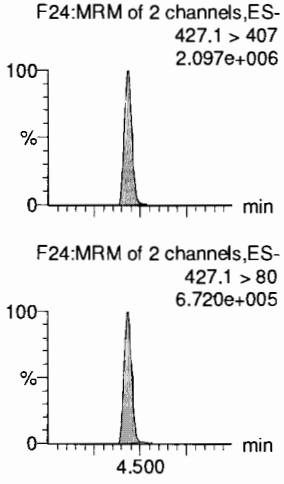


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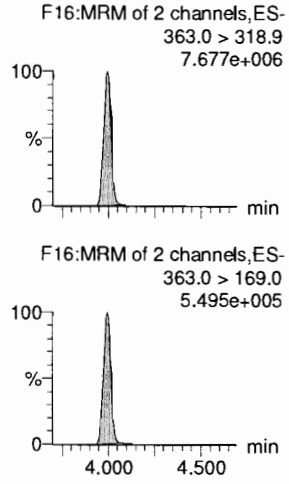
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Name: 181119M2_10, Date: 19-Nov-2018, Time: 21:42:34, ID: ST181119M2-9 PFC CS6 18K0909, Description: PFC CS6 18K0909

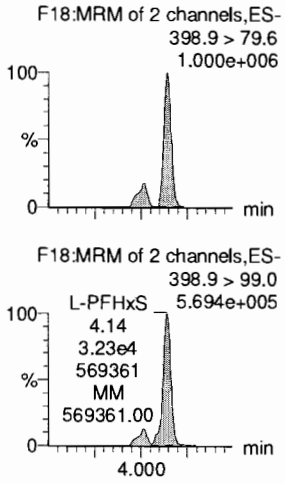
6:2 FTS



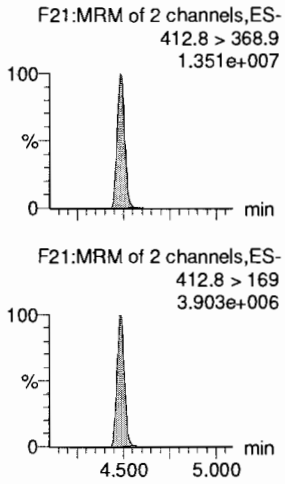
PFHpA



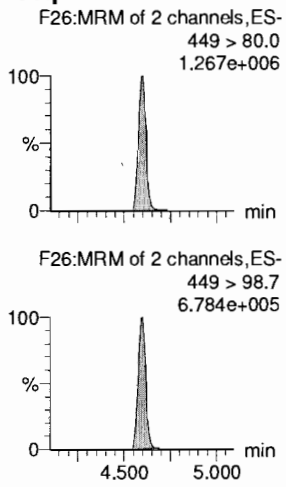
L-PFHxS



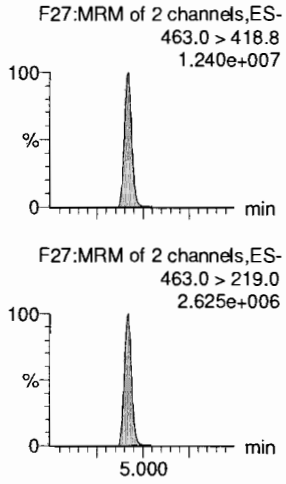
L-PFOA



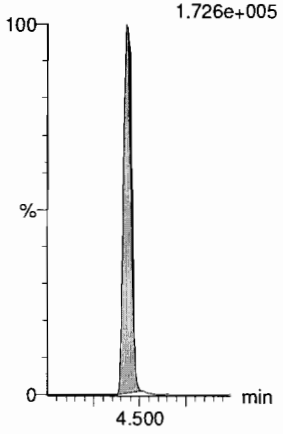
PFHpS



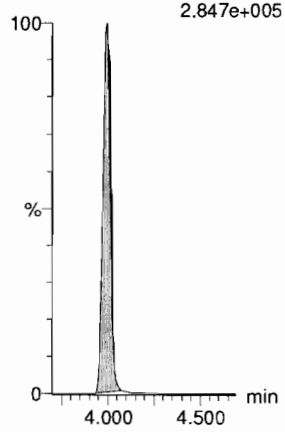
PFNA



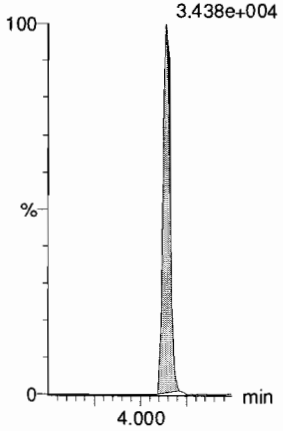
13C2-6:2 FTS



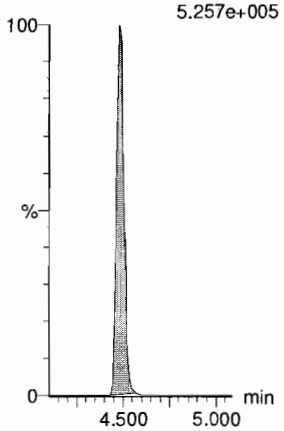
13C4-PFHpA



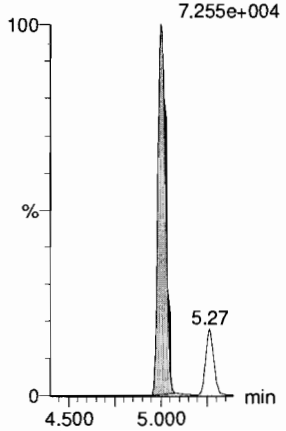
18O2-PFHxS



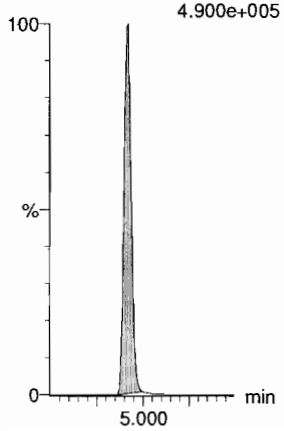
13C2-PFOA



13C8-PFOS



13C5-PFNA

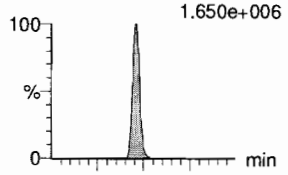


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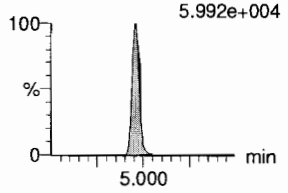
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Name: 181119M2_10, Date: 19-Nov-2018, Time: 21:42:34, ID: ST181119M2-9 PFC CS6 18K0909, Description: PFC CS6 18K0909

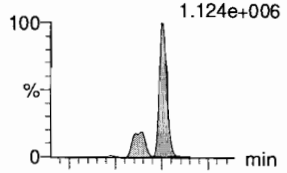
PFOSA
F30:MRM of 2 channels,ES-
497.9 > 77.9
1.650e+006



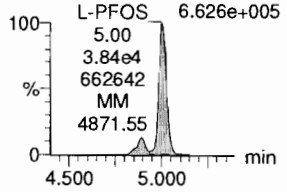
F30:MRM of 2 channels,ES-
497.9 > 169
5.992e+004



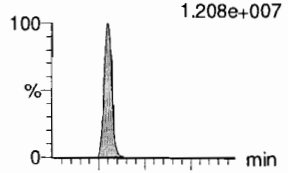
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.124e+006



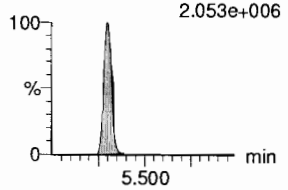
F32:MRM of 2 channels,ES-
498.9 > 99
6.626e+005
L-PFOS
5.00
3.84e4
662642
MM
4871.55



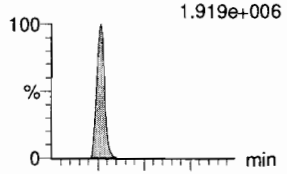
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
1.208e+007



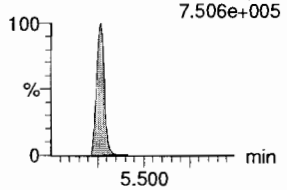
F37:MRM of 2 channels,ES-
513 > 219
2.053e+006



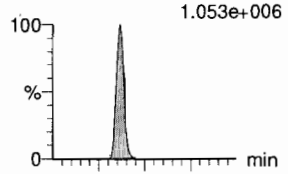
8:2 FTS
F42:MRM of 2 channels,ES-
527 > 506.9
1.919e+006



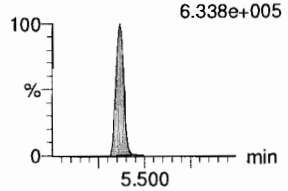
F42:MRM of 2 channels,ES-
527 > 80
7.506e+005



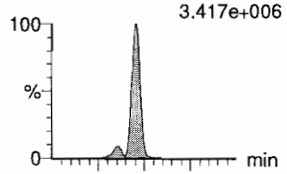
PFNS
F45:MRM of 2 channels,ES-
549.1 > 80.1
1.053e+006



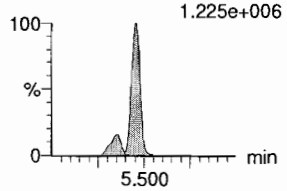
F45:MRM of 2 channels,ES-
549.1 > 99.1
6.338e+005



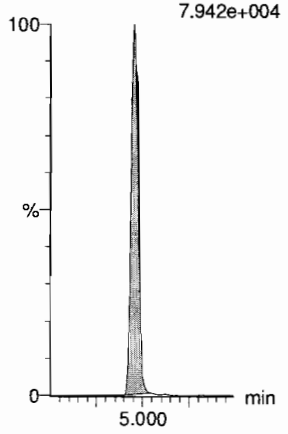
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
3.417e+006



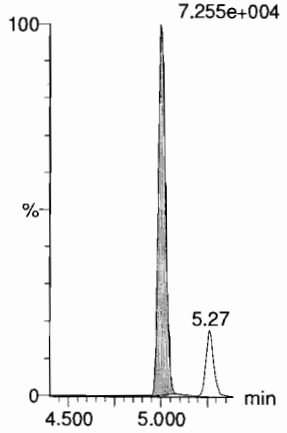
F48:MRM of 2 channels,ES-
570. > 512
1.225e+006



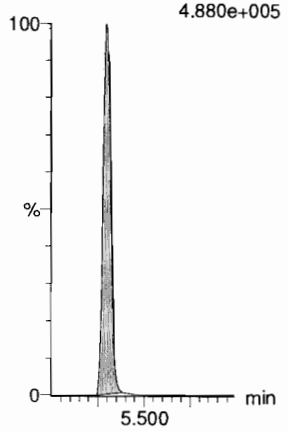
13C8-PFOSA
F34:MRM of 1 channel,ES-
506.1 > 77.7
7.942e+004



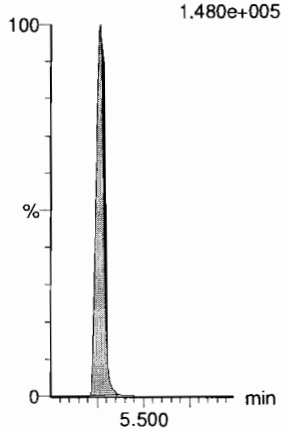
13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
7.255e+004



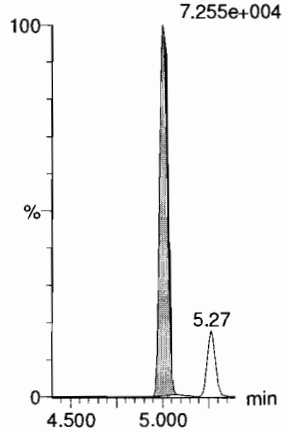
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
4.880e+005



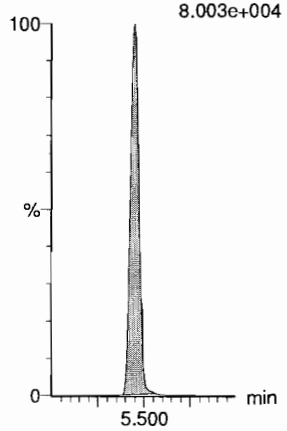
13C2-8:2 FTS
F43:MRM of 1 channel,ES-
529.1 > 508.7
1.480e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
7.255e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
8.003e+004

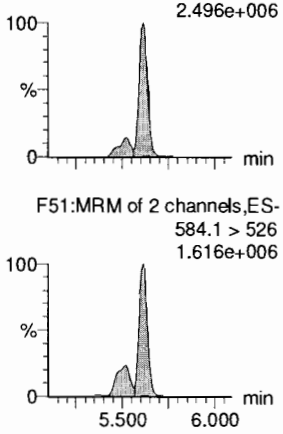


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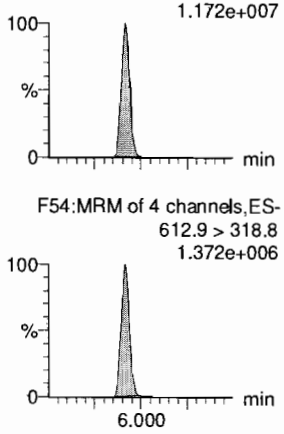
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Name: 181119M2_10, Date: 19-Nov-2018, Time: 21:42:34, ID: ST181119M2-9 PFC CS6 18K0909, Description: PFC CS6 18K0909

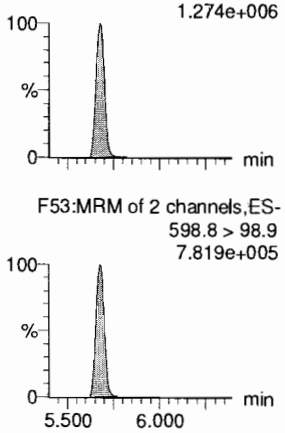
L-EtFOSAA



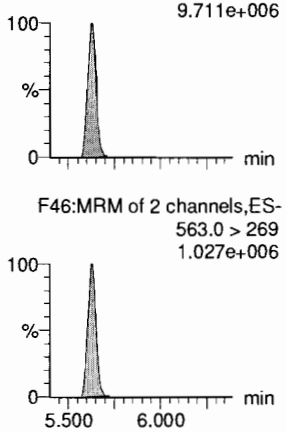
PFDoA



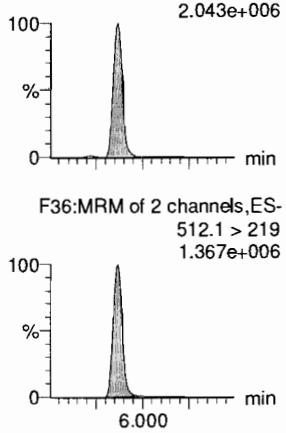
PFDS



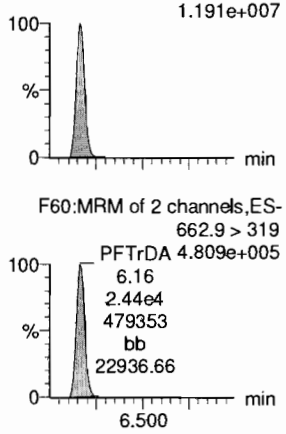
PFUdA



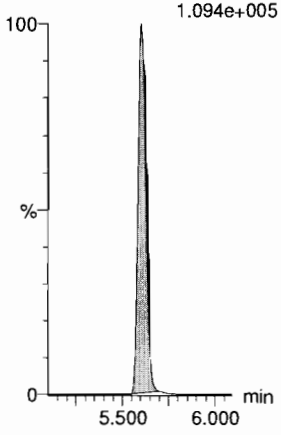
N-MeFOSA



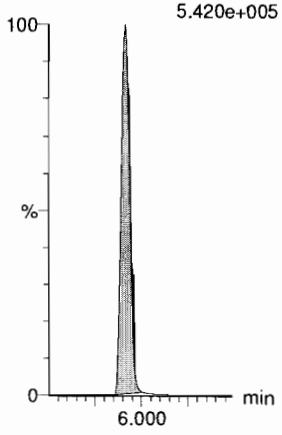
PFTrDA



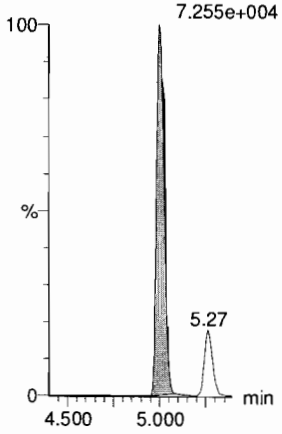
d5-N-EtFOSAA



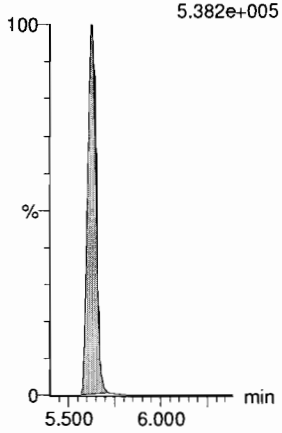
13C2-PFDoA



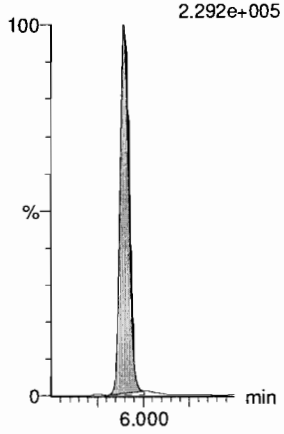
13C8-PFOS



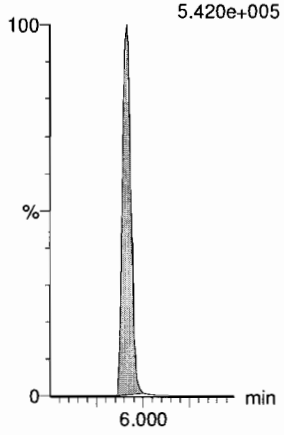
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

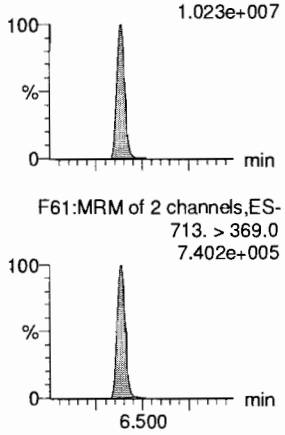


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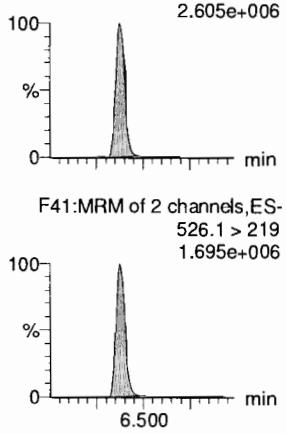
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Name: 181119M2_10, Date: 19-Nov-2018, Time: 21:42:34, ID: ST181119M2-9 PFC CS6 18K0909, Description: PFC CS6 18K0909

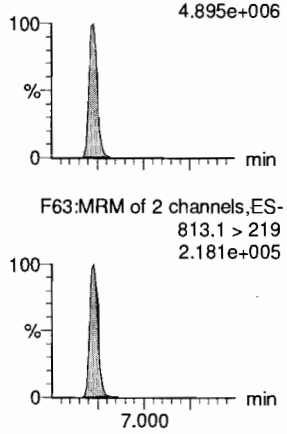
PFTeDA
F61:MRM of 2 channels,ES-
713.0 > 669.0
1.023e+007
F61:MRM of 2 channels,ES-
713. > 369.0
7.402e+005



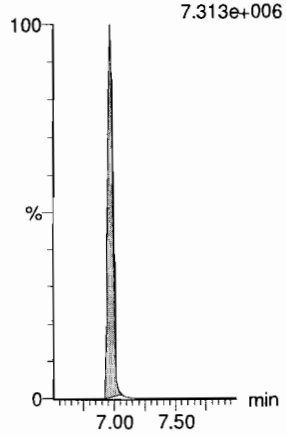
N-EtFOSA
F41:MRM of 2 channels,ES-
526.1 > 168.9
2.605e+006
F41:MRM of 2 channels,ES-
526.1 > 219
1.695e+006



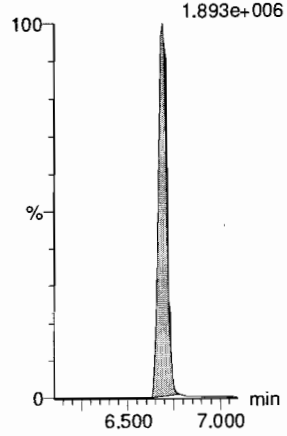
PFHxDA
F63:MRM of 2 channels,ES-
813.1 > 768.6
4.895e+006
F63:MRM of 2 channels,ES-
813.1 > 219
2.181e+005



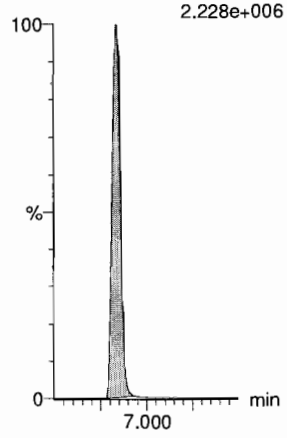
PFODA
F65:MRM of 1 channel,ES-
913.1 > 868.8
7.313e+006



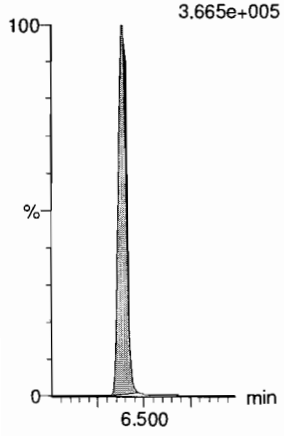
N-MeFOSE
F56:MRM of 1 channel,ES-
616.1 > 58.9
1.893e+006



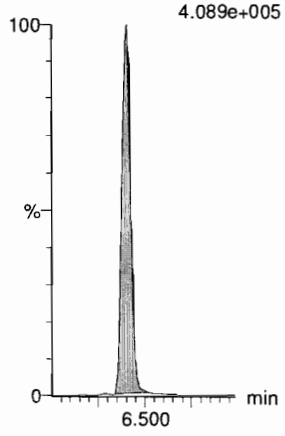
N-EtFOSE
F58:MRM of 1 channel,ES-
630.1 > 58.9
2.228e+006



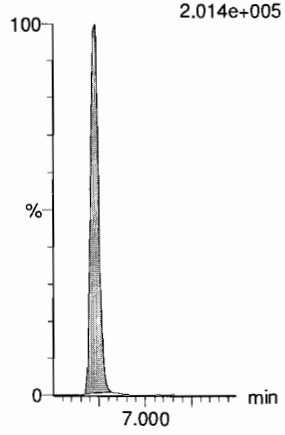
13C2-PFTeDA
F62:MRM of 2 channels,ES-
715.1 > 669.7
3.665e+005



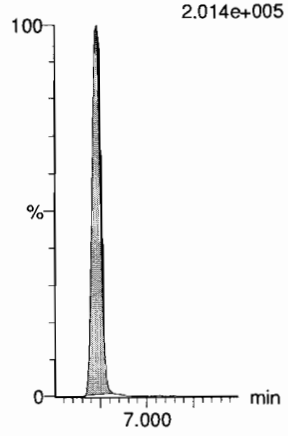
d5-N-ETFOSA
F44:MRM of 1 channel,ES-
531.1 > 168.9
4.089e+005



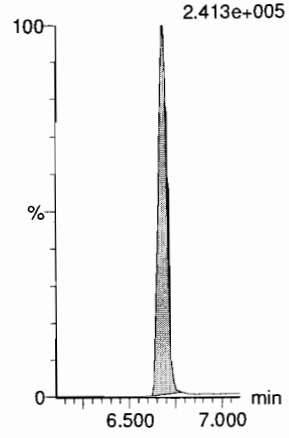
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.014e+005



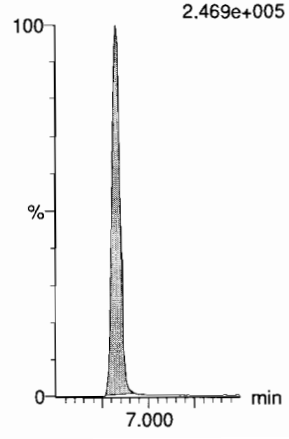
13C2-PFHxDA
F64:MRM of 1 channel,ES-
815 > 769.7
2.014e+005



d7-N-MeFOSE
F57:MRM of 1 channel,ES-
623.1 > 58.9
2.413e+005



d9-N-EtFOSE
F59:MRM of 1 channel,ES-
639.2 > 58.8
2.469e+005

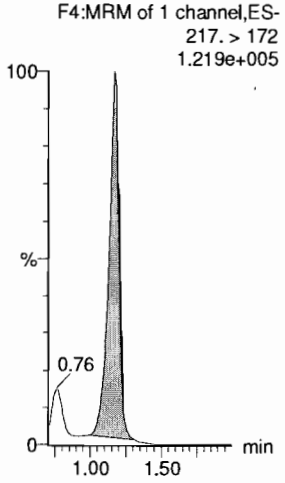


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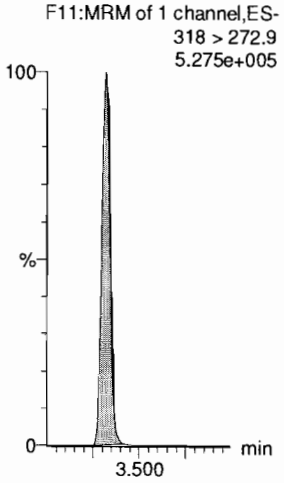
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Name: 181119M2_10, Date: 19-Nov-2018, Time: 21:42:34, ID: ST181119M2-9 PFC CS6 18K0909, Description: PFC CS6 18K0909

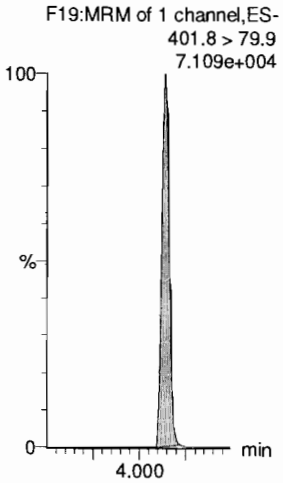
13C4-PFBA



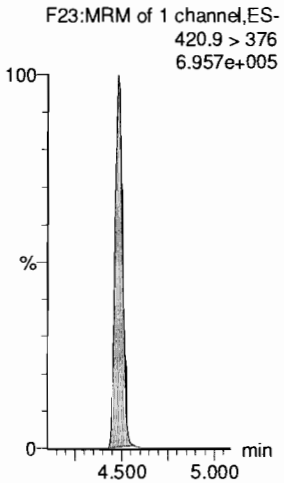
13C5-PFHxA



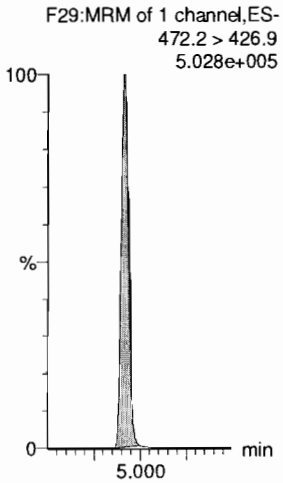
13C3-PFHxS



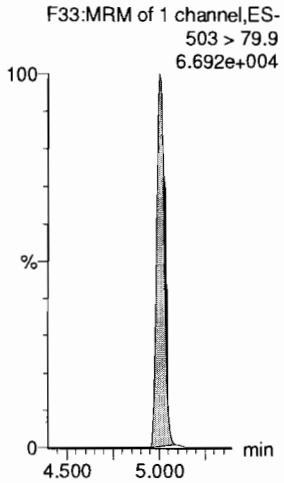
13C8-PFOA



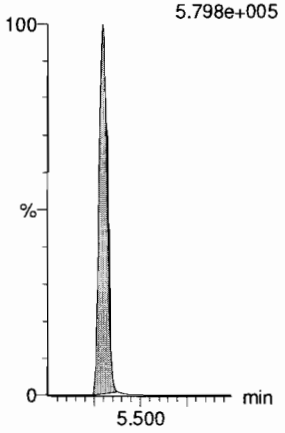
13C9-PFNA



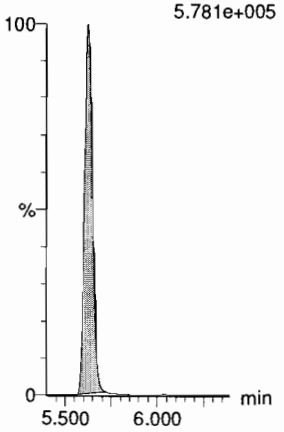
13C4-PFOS



13C6-PFDA



13C7-PFUdA

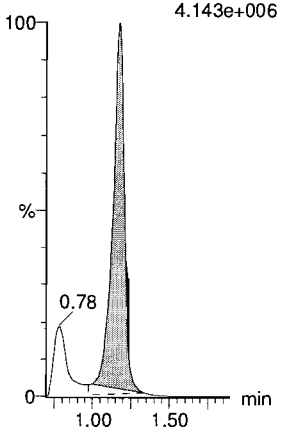


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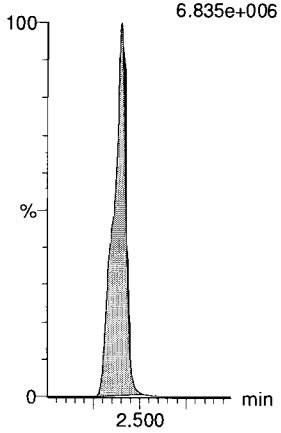
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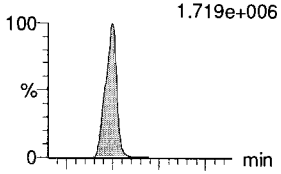
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
4.143e+006



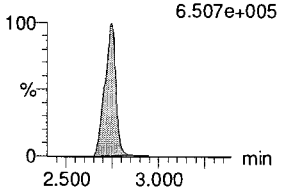
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
6.835e+006



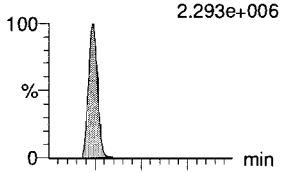
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
1.719e+006



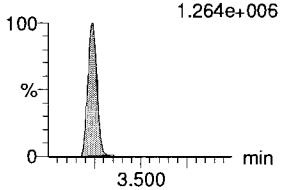
F7:MRM of 2 channels,ES-
299.0 > 99.0
6.507e+005



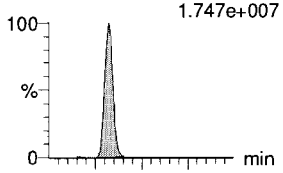
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
2.293e+006



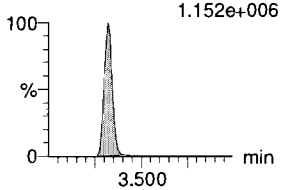
F12:MRM of 2 channels,ES-
327.2 > 81.1
1.264e+006



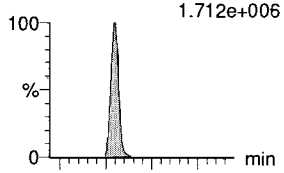
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
1.747e+007



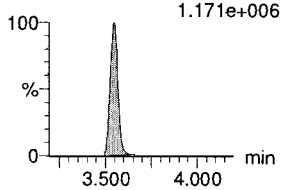
F9:MRM of 2 channels,ES-
313 > 118.9
1.152e+006



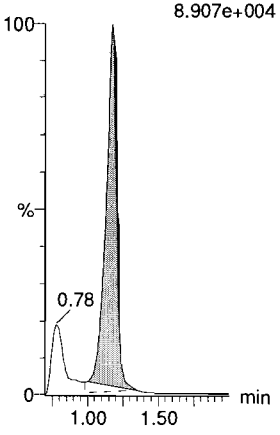
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
1.712e+006



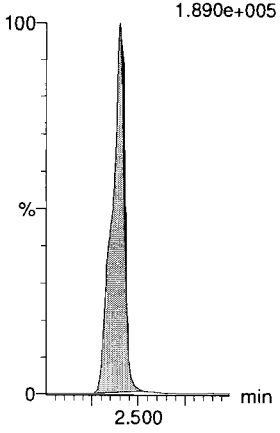
F15:MRM of 2 channels,ES-
349.1 > 99
1.171e+006



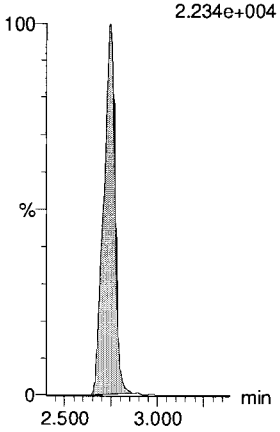
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
8.907e+004



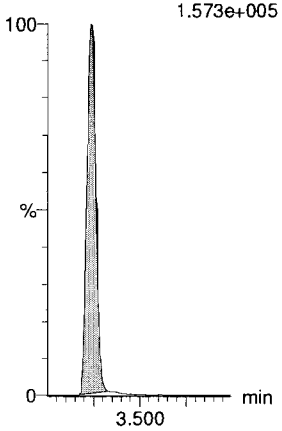
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
1.890e+005



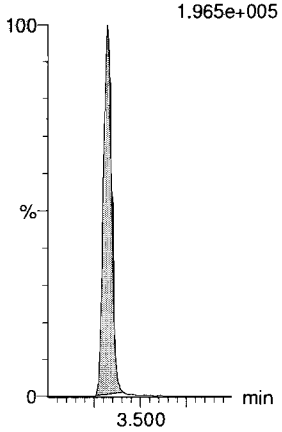
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.234e+004



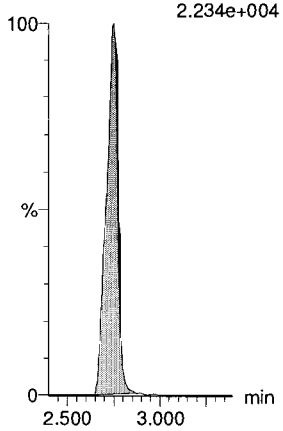
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.573e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
1.965e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.234e+004

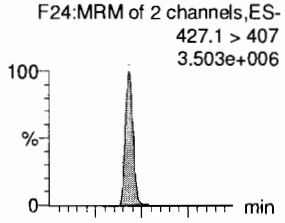


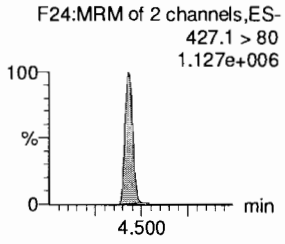
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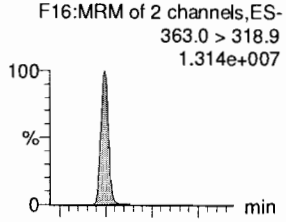
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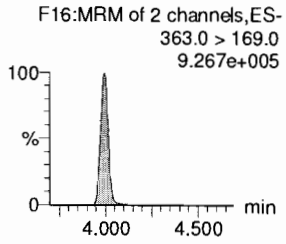
6:2 FTS



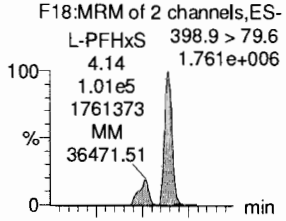


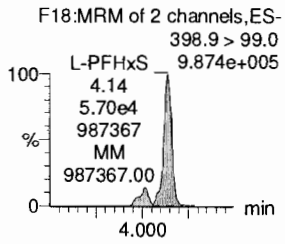
PFHpA



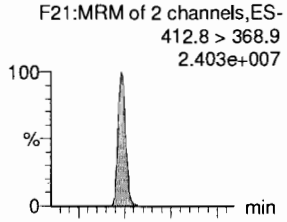


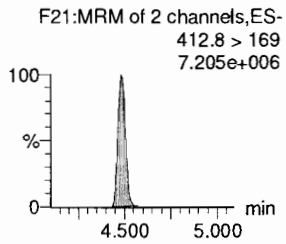
L-PFHxS



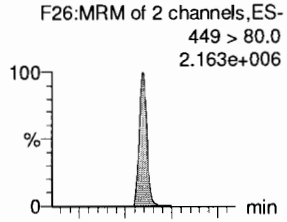


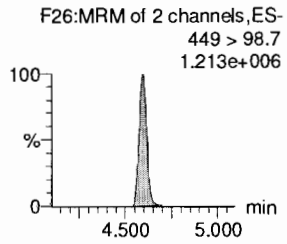
L-PFOA



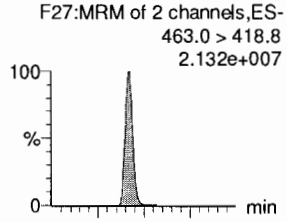


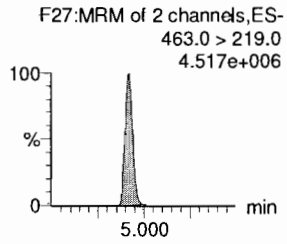
PFHpS



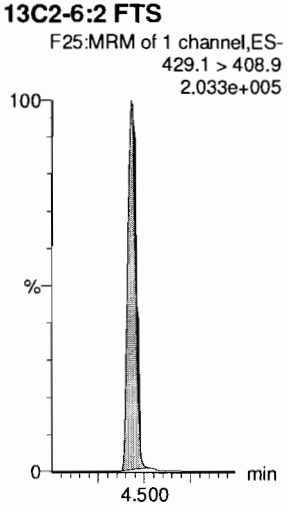


PFNA

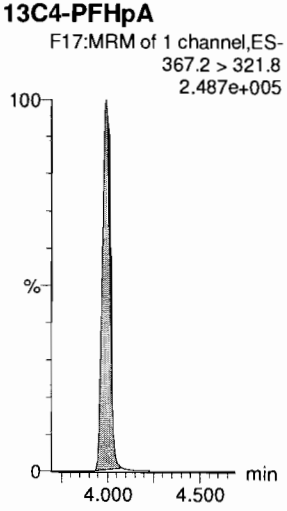




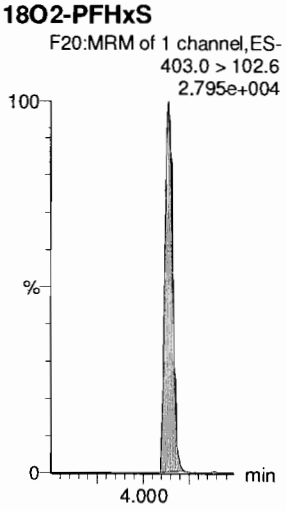
13C2-6:2 FTS



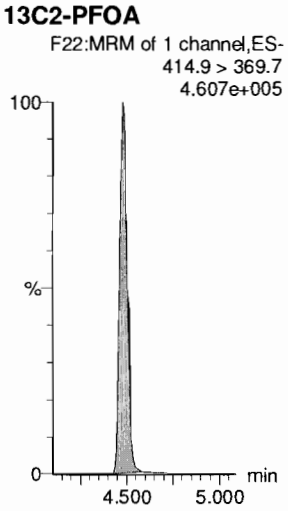
13C4-PFHpA



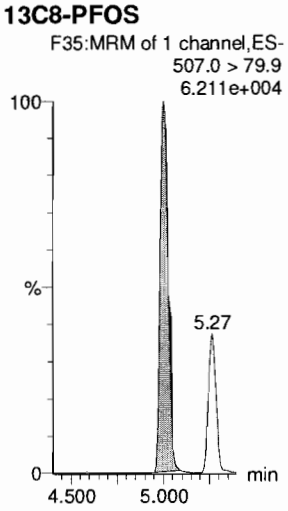
18O2-PFHxS



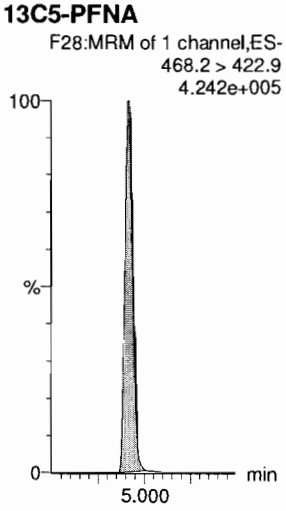
13C2-PFOA



13C8-PFOS



13C5-PFNA

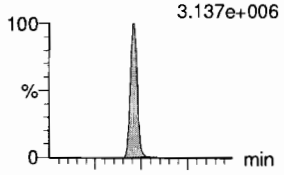


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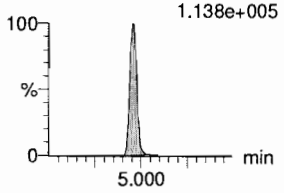
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Name: 181119M2_11, Date: 19-Nov-2018, Time: 21:53:12, ID: ST181119M2-10 PFC CS7 18K0910, Description: PFC CS7 18K0910

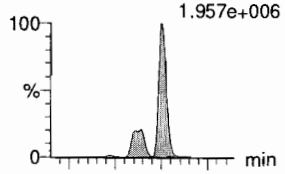
PFOSA
F30:MRM of 2 channels,ES-
497.9 > 77.9
3.137e+006



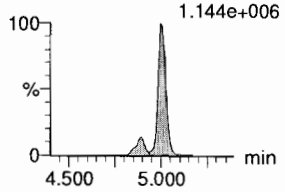
F30:MRM of 2 channels,ES-
497.9 > 169
1.138e+005



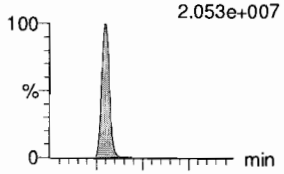
L-PFOS
F32:MRM of 2 channels,ES-
498.9 > 79.9
1.957e+006



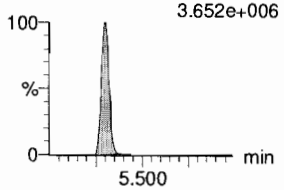
F32:MRM of 2 channels,ES-
498.9 > 99
1.144e+006



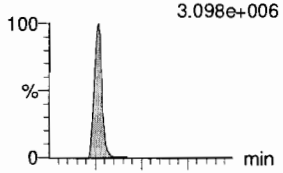
PFDA
F37:MRM of 2 channels,ES-
513 > 468.8
2.053e+007



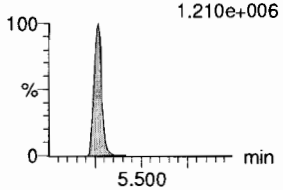
F37:MRM of 2 channels,ES-
513 > 219
3.652e+006



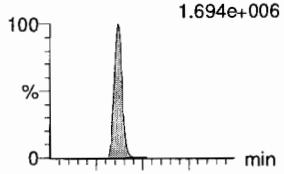
8:2 FTS
F42:MRM of 2 channels,ES-
527 > 506.9
3.098e+006



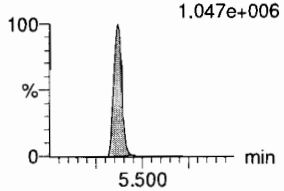
F42:MRM of 2 channels,ES-
527 > 80
1.210e+006



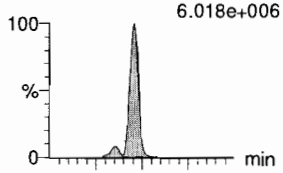
PFNS
F45:MRM of 2 channels,ES-
549.1 > 80.1
1.694e+006



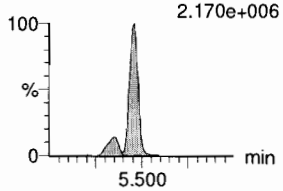
F45:MRM of 2 channels,ES-
549.1 > 99.1
1.047e+006



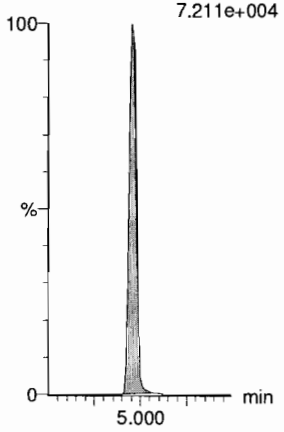
L-MeFOSAA
F48:MRM of 2 channels,ES-
570 > 419
6.018e+006



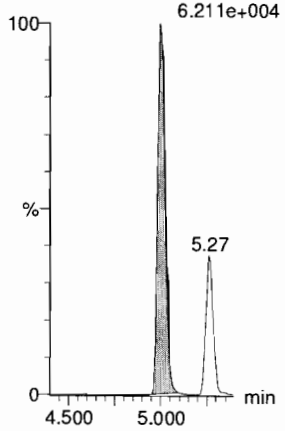
F48:MRM of 2 channels,ES-
570. > 512
2.170e+006



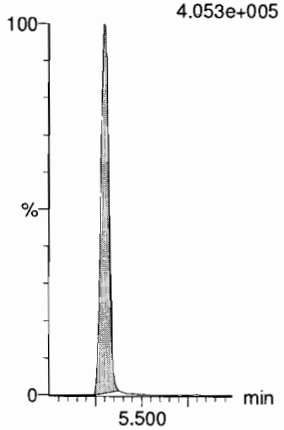
13C8-PFOSA
F34:MRM of 1 channel,ES-
506.1 > 77.7
7.211e+004



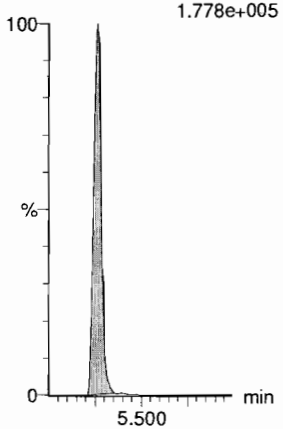
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F35:MRM of 1 channel,ES-
507.0 > 79.9
6.211e+004



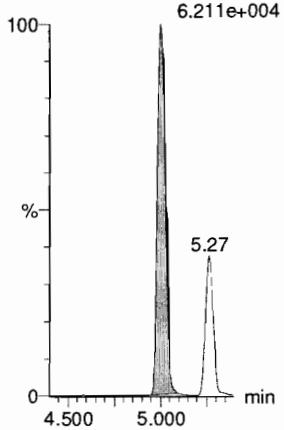
13C2-PFDA
F38:MRM of 1 channel,ES-
515.1 > 469.9
4.053e+005



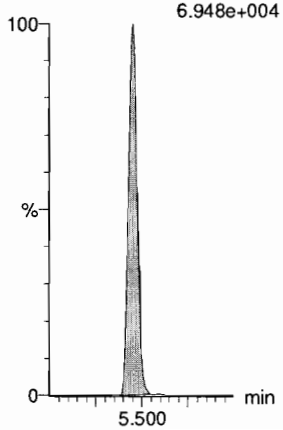
13C2-8:2 FTS
F43:MRM of 1 channel,ES-
529.1 > 508.7
1.778e+005



13C8-PFOS
F35:MRM of 1 channel,ES-
507.0 > 79.9
6.211e+004



d3-N-MeFOSAA
F50:MRM of 1 channel,ES-
573.3 > 419
6.948e+004

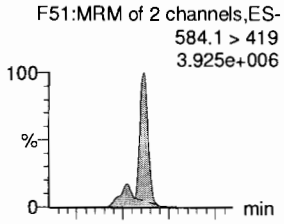


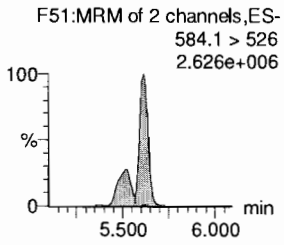
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Printed: Tuesday, November 20, 2018 11:11:39 Pacific Standard Time

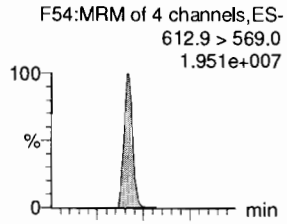
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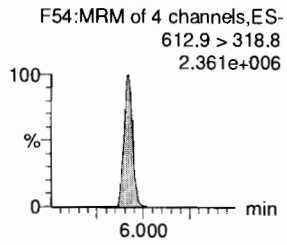
L-EtFOSAA



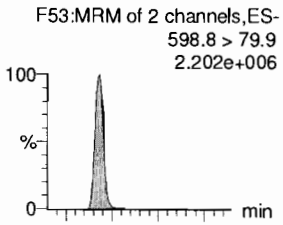


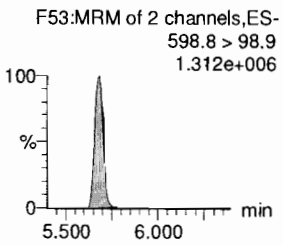
PFDoA



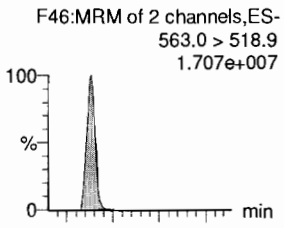


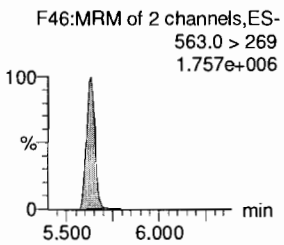
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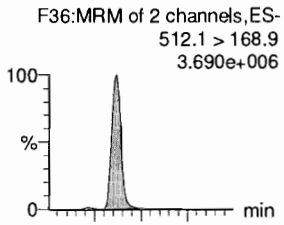


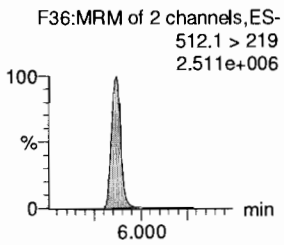
PFUdA



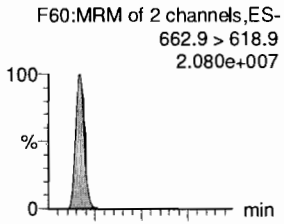


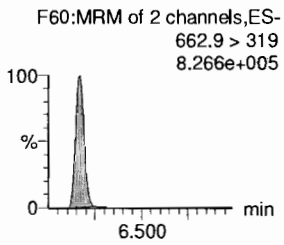
N-MeFOSA



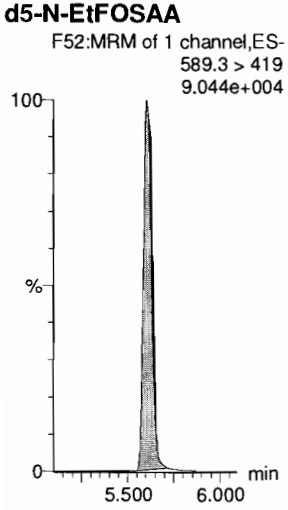


PFTrDA

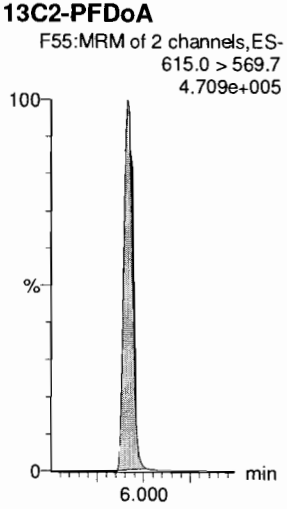




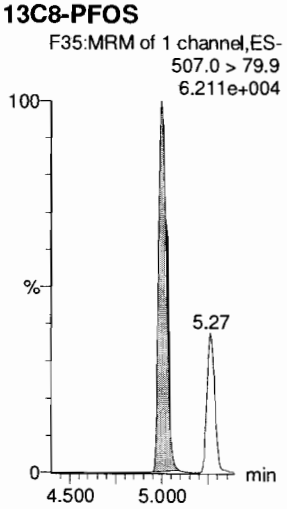
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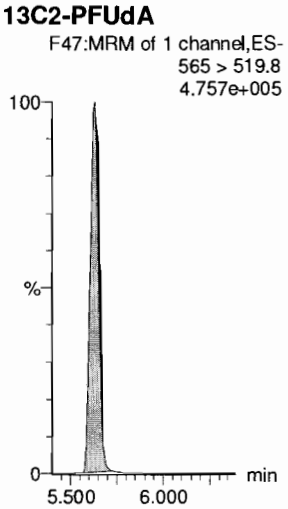
13C2-PFDoA



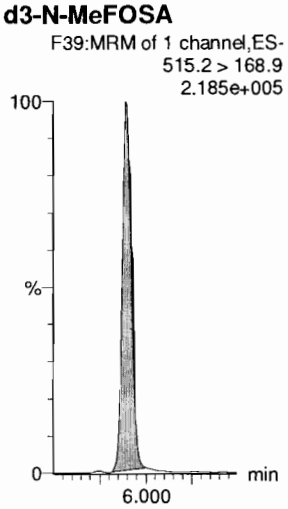
13C8-PFOS



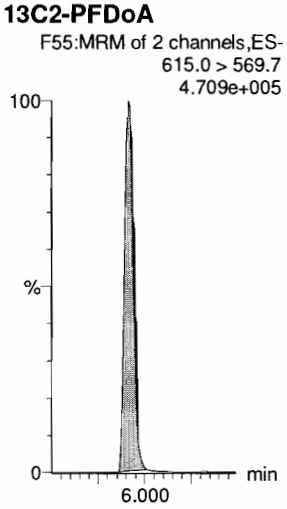
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

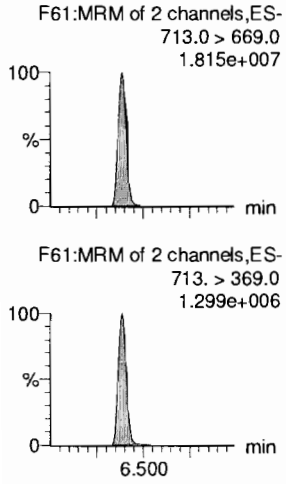


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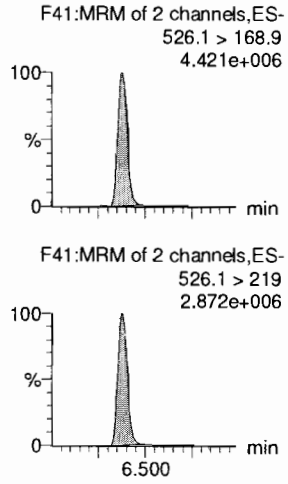
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Name: 181119M2_11, Date: 19-Nov-2018, Time: 21:53:12, ID: ST181119M2-10 PFC CS7 18K0910, Description: PFC CS7 18K0910

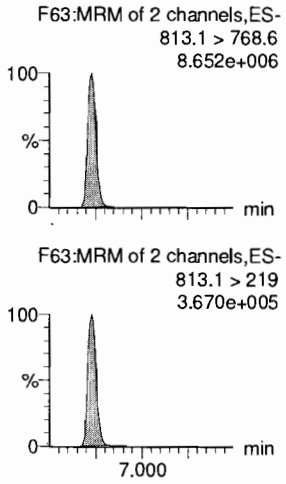
PFTeDA



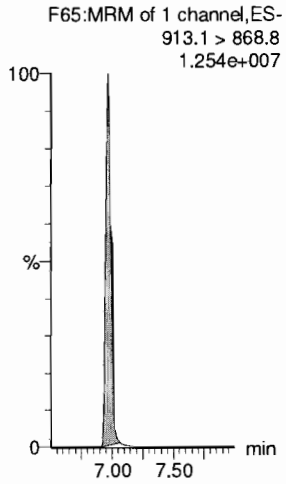
N-EtFOSA



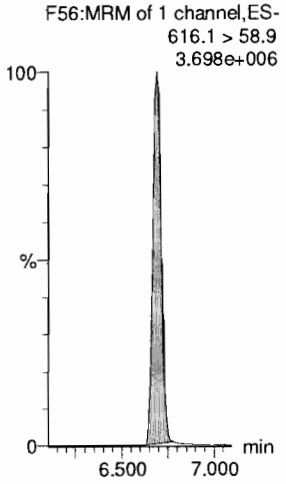
PFHxDA



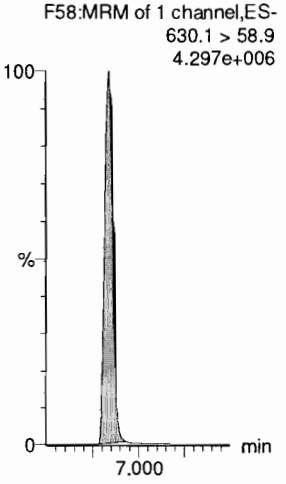
PFODA



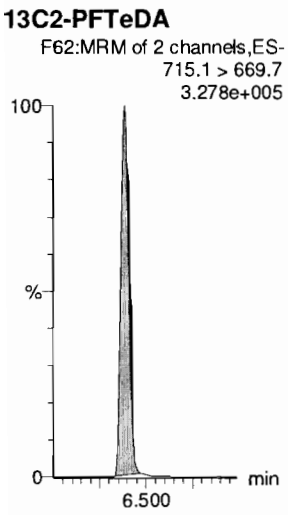
N-MeFOSE



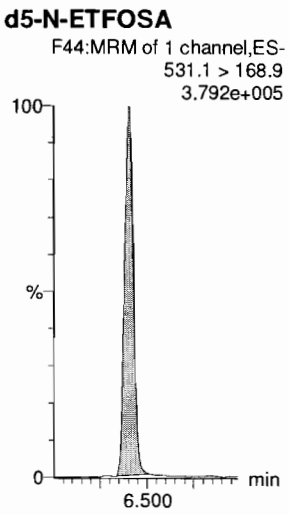
N-EtFOSE



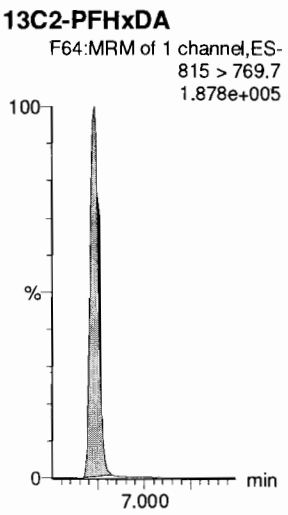
13C2-PFTeDA



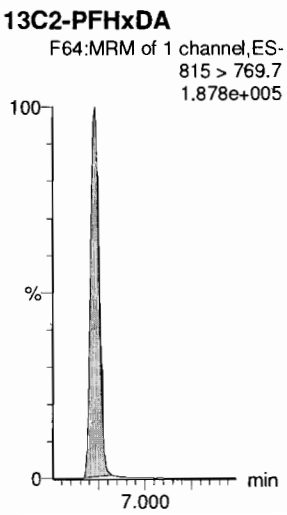
d5-N-ETFOSA



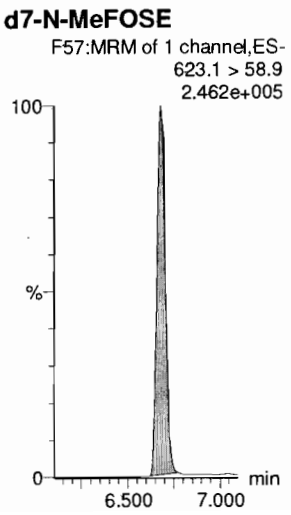
13C2-PFHxDA



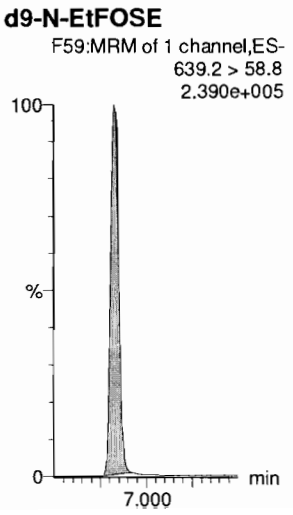
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

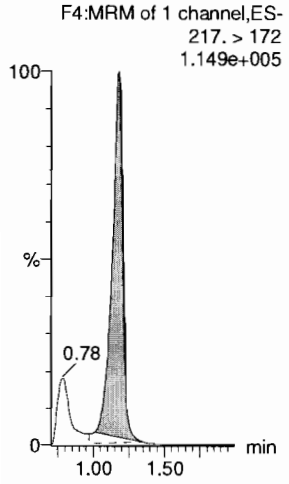


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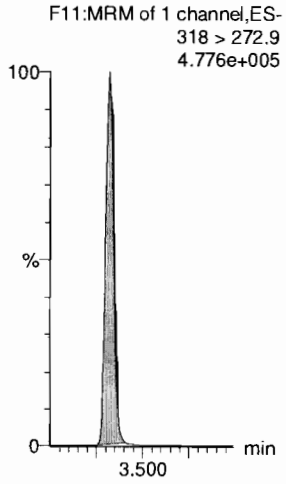
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Printed: Tuesday, November 20, 2018 11:11:39 Pacific Standard Time

Name: 181119M2_11, Date: 19-Nov-2018, Time: 21:53:12, ID: ST181119M2-10 PFC CS7 18K0910, Description: PFC CS7 18K0910

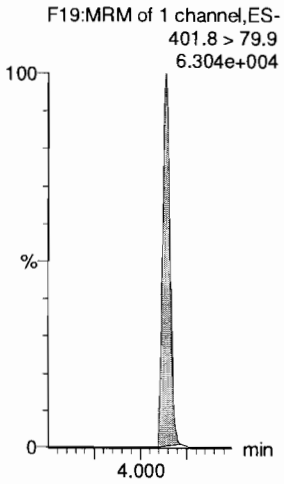
13C4-PFBA



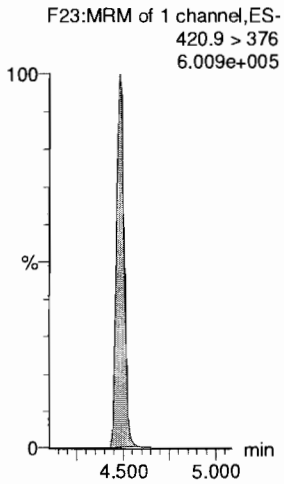
13C5-PFHxA



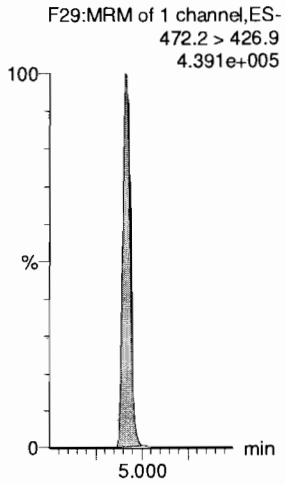
13C3-PFHxS



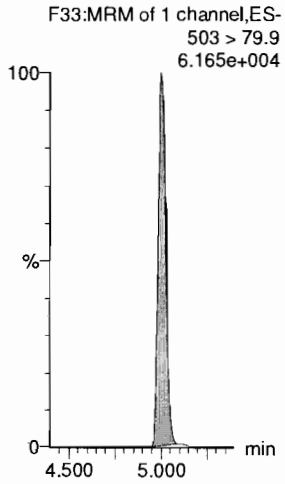
13C8-PFOA



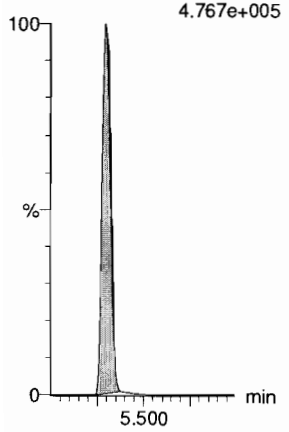
13C9-PFNA



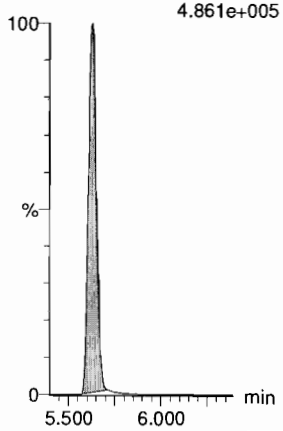
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-ICV.qld

Last Altered: Tuesday, November 20, 2018 11:26:54 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:27:16 Pacific Standard Time

9 CM 11/20/18

JAM 11/20/18

Name: 181119M2_13, Date: 19-Nov-2018, Time: 22:14:24, ID: ICV181119M2-1 PFC ICV 18K0911, Description: PFC ICV 18K0911

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
1	1	PFBA	213.0 > 168.8	7320.918	7489.974	1.00	1.18	12.218	10.5	104.9	NO		
2	2	PFPeA	263.1 > 218.9	11536.013	14934.320	1.00	2.40	9.656	10.3	102.7	NO		
3	3	PFBS	299.0 > 79.7	2664.607	1906.749	1.00	2.75	17.468	9.0	89.7	NO	2.647	NO
4	4	4:2 FTS	327.2>307.2	4323.806	5214.280	1.00	3.24	10.365	9.9	99.1	NO	1.860	NO
5	5	PFHxA	313 > 269	22547.980	11371.153	1.00	3.32	9.915	10.5	104.8	NO	15.573	NO
6	6	PFPeS	349.1>80.1	2320.249	1906.749	1.00	3.55	15.211	9.9	98.9	NO	1.470	NO
7	36	13C3-PFBA	216.1 > 171.8	7489.974	9816.729	1.00	1.18	9.537	12.2	97.8	NO		
8	37	13C3-PFPeA	266. > 221.8	14934.320	29586.725	1.00	2.40	6.310	12.1	96.4	NO		
9	38	13C3-PFBS	302. > 98.8	1906.749	3418.845	1.00	2.75	6.971	12.9	103.5	NO		
10	39	13C2-4:2 FTS	329.2>308.9	5214.280	3418.845	1.00	3.23	19.064	12.4	99.4	NO		
11	40	13C2-PFHxA	315 > 270	11371.153	29586.725	1.00	3.32	4.804	5.0	99.6	NO		
12	38	13C3-PFBS	302. > 98.8	1906.749	3418.845	1.00	2.75	6.971	12.9	103.5	NO		
13	-1												
14	10	6:2 FTS	427.1 > 407	5185.851	5484.800	1.00	4.43	11.819	9.8	98.1	NO	2.938	NO
15	7	PFHpA	363.0 > 318.9	15061.697	13645.869	1.00	4.00	13.797	10.4	104.4	NO	13.449	NO
16	8	L-PFHxS	398.9 > 79.6	2387.107	1727.766	1.00	4.14	17.270	9.1	91.2	NO	1.835	NO
17	11	L-PFOA	412.8 > 368.9	28774.910	26428.029	1.00	4.48	13.610	10.5	105.1	NO	3.456	NO
18	13	PFHpS	449 > 80.0	2706.169	3847.219	1.00	4.59	8.793	9.8	98.4	NO	1.670	NO
19	14	PFNA	463.0 > 418.8	24620.701	24239.035	1.00	4.91	12.697	10.1	100.8	NO	4.611	NO
20	43	13C2-6:2 FTS	429.1 > 408.9	5484.800	3826.634	1.00	4.43	17.917	11.7	93.3	NO		
21	41	13C4-PFHpA	367.2 > 321.8	13645.869	29586.725	1.00	4.00	5.765	12.0	95.7	NO		
22	42	18O2-PFHxS	403.0 > 102.6	1727.766	3418.845	1.00	4.14	6.317	13.2	105.3	NO		
23	44	13C2-PFOA	414.9 > 369.7	26428.029	35196.535	1.00	4.48	9.386	12.4	99.5	NO		
24	47	13C8-PFOS	507.0 > 79.9	3847.219	3826.634	1.00	5.00	12.567	12.2	97.2	NO		
25	45	13C5-PFNA	468.2 > 422.9	24239.035	24899.225	1.00	4.91	12.169	12.3	98.1	NO		
26	-1												
27	15	PFOSA	497.9 > 77.9	3300.930	3608.922	1.00	4.95	11.433	10.8	107.8	NO	30.070	NO
28	16	L-PFOS	498.9 > 79.9	2965.779	3847.219	1.00	5.00	9.636	9.0	90.2	NO	1.950	NO
29	18	PFDA	513 > 468.8	27949.389	24299.342	1.00	5.30	14.378	11.2	111.6	NO	5.981	NO
30	19	8:2 FTS	527 > 506.9	5189.924	4668.879	1.00	5.27	13.895	9.6	96.3	NO	2.644	NO
31	20	PFNS	549.1 > 80.1	2277.250	3847.219	1.00	5.36	7.399	9.8	98.2	NO	1.752	NO
32	21	L-MeFOSAA	570 > 419	10796.397	4448.059	1.00	5.46	30.340	12.0	120.0	NO	2.894	NO
33	46	13C8-PFOSA	506.1 > 77.7	3608.922	33847.918	1.00	4.96	1.333	11.9	95.0	NO		
34	47	13C8-PFOS	507.0 > 79.9	3847.219	3826.634	1.00	5.00	12.567	12.2	97.2	NO		
35	48	13C2-PFDA	515.1 > 469.9	24299.342	31301.344	1.00	5.30	9.704	11.7	93.3	NO		
36	49	13C2-8:2 FTS	529.1 > 508.7	4668.879	3826.634	1.00	5.27	15.251	12.0	96.2	NO		

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Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-ICV.qld

Last Altered: Tuesday, November 20, 2018 11:26:54 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:27:16 Pacific Standard Time

(A) Compounds not present in ICV

Name: 181119M2_13, Date: 19-Nov-2018, Time: 22:14:24, ID: ICV181116M2-1 PFC ICV 18K0911, Description: PFC ICV 18K0911

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
37	47	13C8-PFOS	507.0 > 79.9	3847.219	3826.634	1.00	5.00	12.567	12.2	97.2	NO		
38	50	d3-N-MeFOSAA	573.3 > 419	4448.059	33847.918	1.00	5.45	1.643	12.2	97.2	NO		
39	-1												
40	23	L-EtFOSAA	584.1 > 419	9455.935	6950.324	1.00	5.61	17.006	11.6	115.9	NO	1.558	NO
41	27	PFDoA	612.9 > 569.0	26861.494	28502.166	1.00	5.91	11.780	10.5	105.1	NO	8.493	NO
42	26	PFDS	598.8 > 79.9	3066.749	3847.219	1.00	5.67	9.964	10.1	100.5	NO	1.741	NO
43	25	PFUdA	563.0 > 518.9	23931.572	30121.023	1.00	5.62	9.931	10.7	106.7	NO	9.634	NO
44	28	N-MeFOSA	512.1 > 168.9		13294.935	1.00				(A)	NO		
45	29	PFTrDA	662.9 > 618.9	28274.656	28502.166	1.00	6.16	12.400	10.9	108.9	NO	24.580	NO
46	52	d5-N-EtFOSAA	589.3 > 419	6950.324	33847.918	1.00	5.61	2.567	12.9	103.6	NO		
47	53	13C2-PFDoA	615.0 > 569.7	28502.166	31301.344	1.00	5.91	11.382	11.6	92.9	NO		
48	47	13C8-PFOS	507.0 > 79.9	3847.219	3826.634	1.00	5.00	12.567	12.2	97.2	NO		
49	51	13C2-PFUdA	565 > 519.8	30121.023	33847.918	1.00	5.63	11.124	12.0	95.9	NO		
50	54	d3-N-MeFOSA	515.2 > 168.9	13294.935	33847.918	1.00	5.90	4.910	141.6	94.4	NO		
51	53	13C2-PFDoA	615.0 > 569.7	28502.166	31301.344	1.00	5.91	11.382	11.6	92.9	NO		
52	-1												
53	30	PFTeDA	713.0 > 669.0	25885.361	20016.150	1.00	6.39	16.165	11.1	111.1	NO	13.516	NO
54	31	N-EtFOSA	526.1 > 168.9		23904.494	1.00				(A)	NO		
55	32	PFHxDA	813.1 > 768.6		10454.291	1.00					NO		
56	33	PFODA	913.1 > 868.8		10454.291	1.00					NO		
57	34	N-MeFOSE	616.1 > 58.9		12606.055	1.00					NO		
58	35	N-EtFOSE	630.1 > 58.9		12032.839	1.00					NO		
59	55	13C2-PFTeDA	715.1 > 669.7	20016.150	33847.918	1.00	6.38	7.392	12.2	97.4	NO		
60	56	d5-N-ETFOSA	531.1 > 168.9	23904.494	33847.918	1.00	6.40	8.828	146.9	98.0	NO		
61	57	13C2-PFHxDA	815 > 769.7	10454.291	33847.918	1.00	6.73	3.861	4.8	95.9	NO		
62	57	13C2-PFHxDA	815 > 769.7	10454.291	33847.918	1.00	6.73	3.861	4.8	95.9	NO		
63	58	d7-N-MeFOSE	623.1 > 58.9	12606.055	33847.918	1.00	6.68	4.655	143.1	95.4	NO		
64	59	d9-N-EtFOSE	639.2 > 58.8	12032.839	33847.918	1.00	6.83	4.444	139.0	92.7	NO		
65	-1												
66	60	13C4-PFBA	217. > 172	9816.729	9816.729	1.00	1.18	12.500	12.5	100.0	NO		
67	61	13C5-PFHxA	318 > 272.9	29586.725	29586.725	1.00	3.32	12.500	12.5	100.0	NO		
68	62	13C3-PFHxS	401.8 > 79.9	3418.845	3418.845	1.00	4.14	12.500	12.5	100.0	NO		
69	63	13C8-PFOA	420.9 > 376	35196.535	35196.535	1.00	4.48	12.500	12.5	100.0	NO		
70	64	13C9-PFNA	472.2 > 426.9	24899.225	24899.225	1.00	4.91	12.500	12.5	100.0	NO		
71	65	13C4-PFOS	503 > 79.9	3826.634	3826.634	1.00	5.00	12.500	12.5	100.0	NO		
72	66	13C6-PFDA	519.1 > 473.7	31301.344	31301.344	1.00	5.30	12.500	12.5	100.0	NO		

Dataset: F:\Projects\PFAS.PRO\Results\181119M2\181119M2-ICV.qld

Last Altered: Tuesday, November 20, 2018 11:26:54 Pacific Standard Time
Printed: Tuesday, November 20, 2018 11:27:16 Pacific Standard Time

Name: 181119M2_13, Date: 19-Nov-2018, Time: 22:14:24, ID: ICV181116M2-1 PFC ICV 18K0911, Description: PFC ICV 18K0911

	#	Name	Trace	Area	IS Area	wt/vol	RT	Response	Conc.	%Rec	Recovery ...	Ion Ratio	Ratio Out?
73	67	13C7-PFUdA	570.1 > 524.8	33847.918	33847.918	1.00	5.63	12.500	12.5	100.0	NO		

Vista Analytical Laboratory

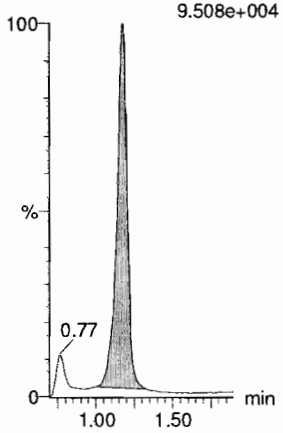
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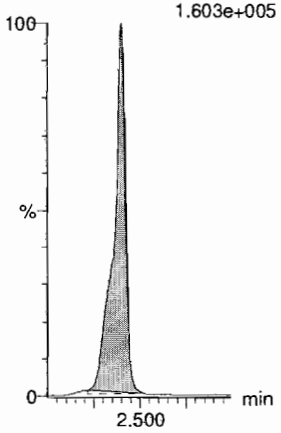
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Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_11-19-18.cdb 20 Nov 2018 11:16:07

Name: 181119M2_13, Date: 19-Nov-2018, Time: 22:14:24, ID: ICV181116M2-1 PFC ICV 18K0911, Description: PFC ICV 18K0911

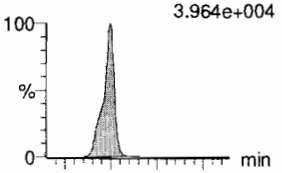
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
9.508e+004



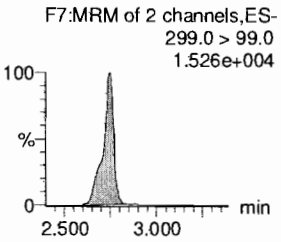
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
1.603e+005



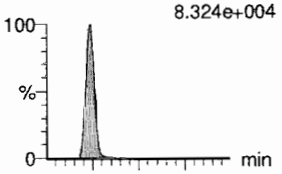
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
3.964e+004



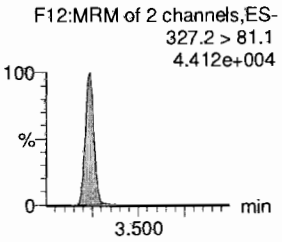
F7:MRM of 2 channels,ES-
299.0 > 99.0
1.526e+004



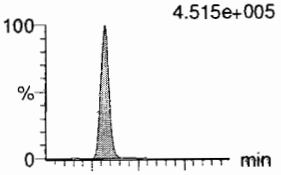
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
8.324e+004



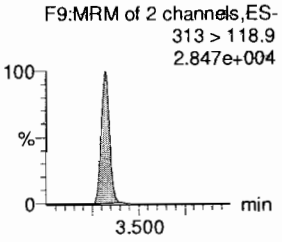
F12:MRM of 2 channels,ES-
327.2 > 81.1
4.412e+004



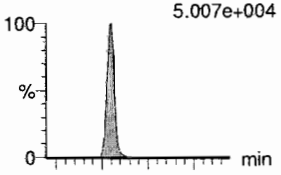
PFHxA
F9:MRM of 2 channels,ES-
313 > 269
4.515e+005



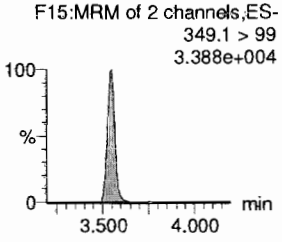
F9:MRM of 2 channels,ES-
313 > 118.9
2.847e+004



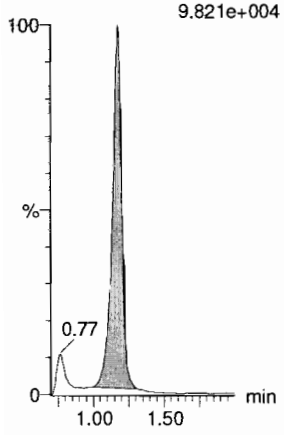
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
5.007e+004



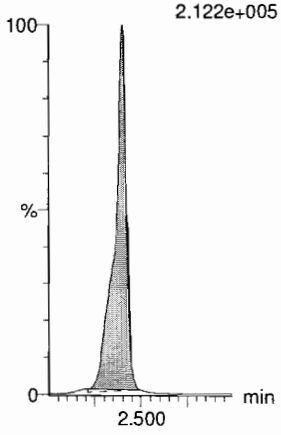
F15:MRM of 2 channels,ES-
349.1 > 99
3.388e+004



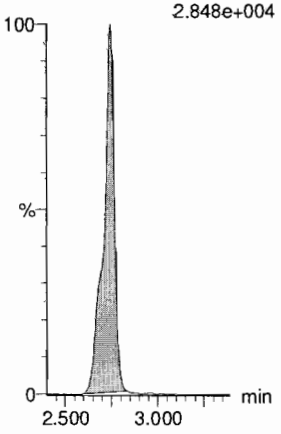
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
9.821e+004



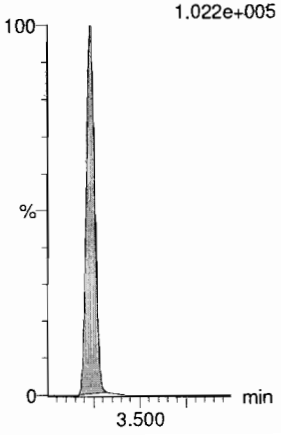
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
2.122e+005



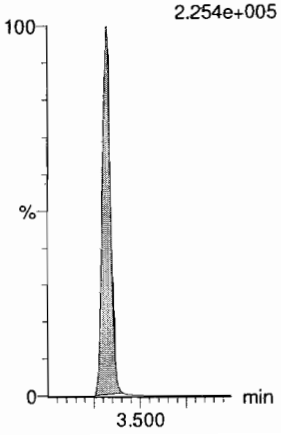
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.848e+004



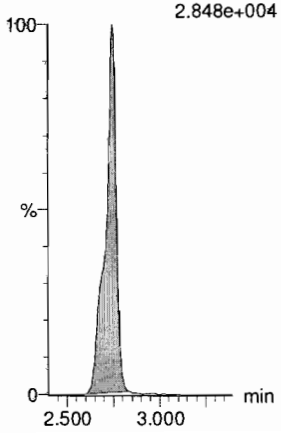
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
1.022e+005



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 270
2.254e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
2.848e+004

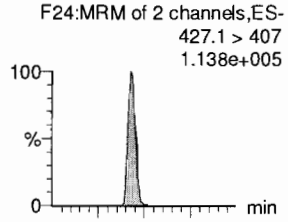


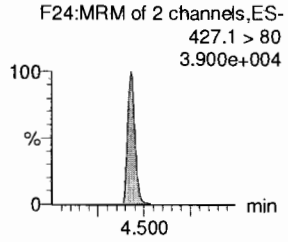
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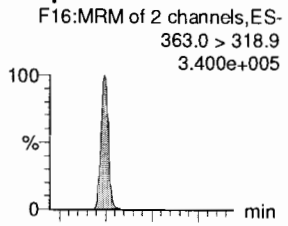
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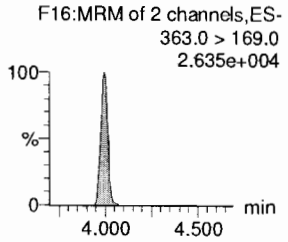
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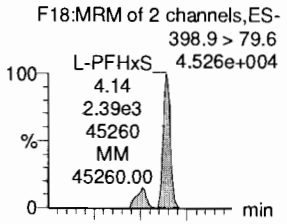


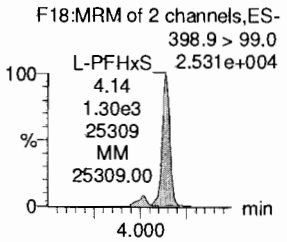
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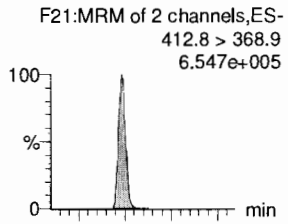


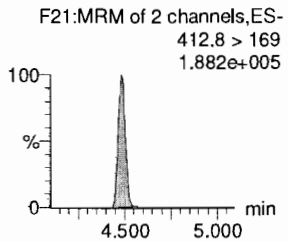
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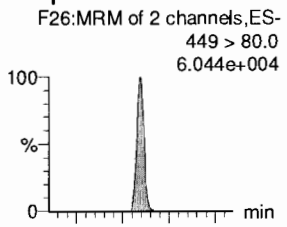


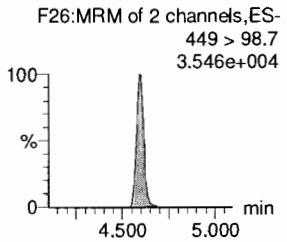
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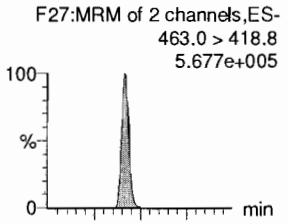


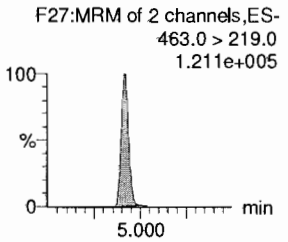
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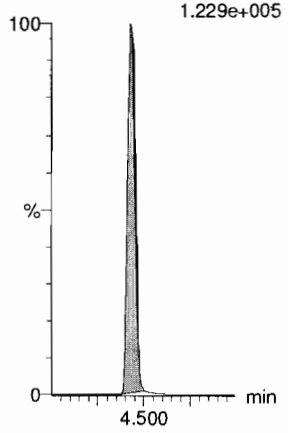


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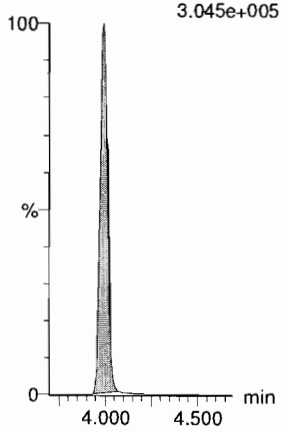




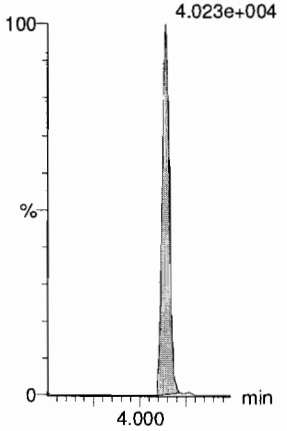
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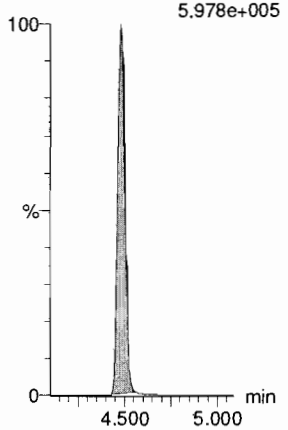
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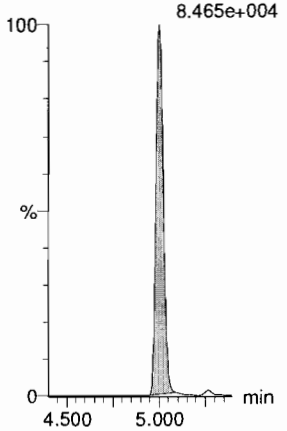
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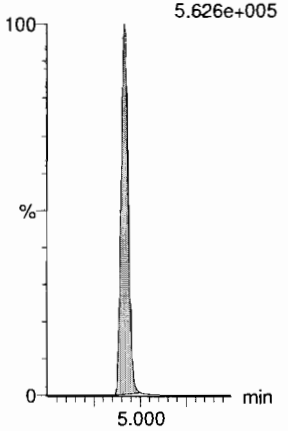
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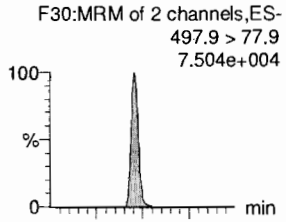
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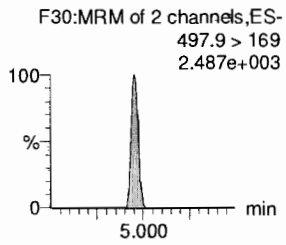
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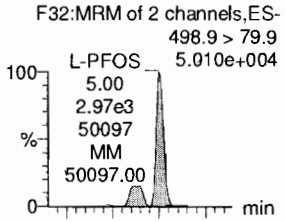
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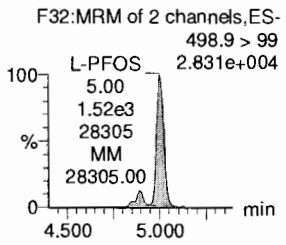
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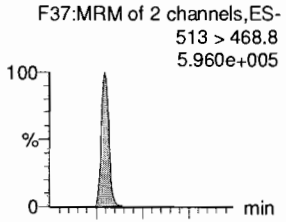


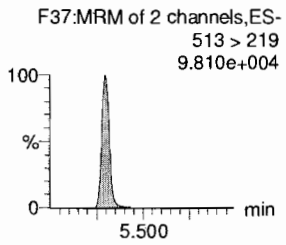
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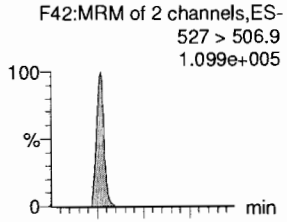


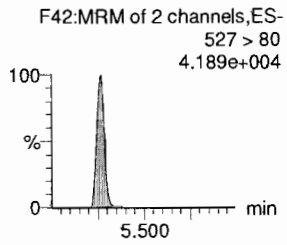
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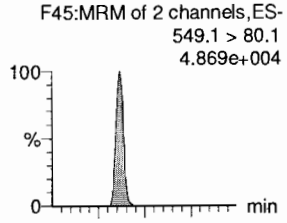


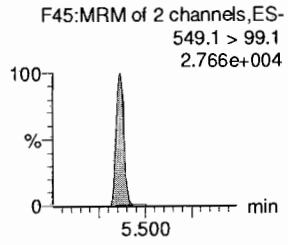
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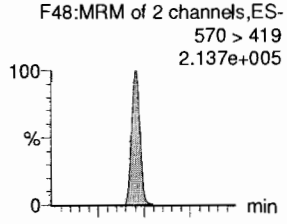


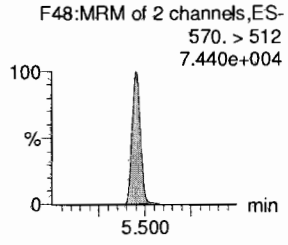
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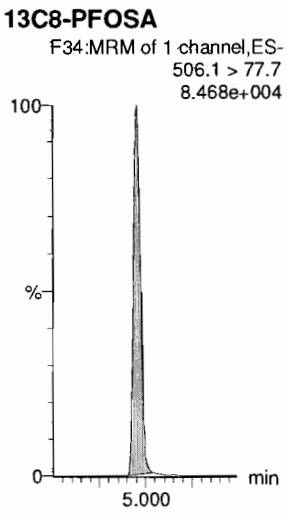


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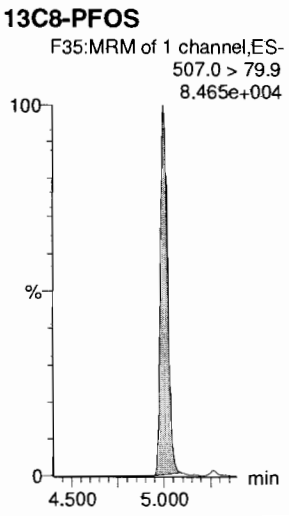




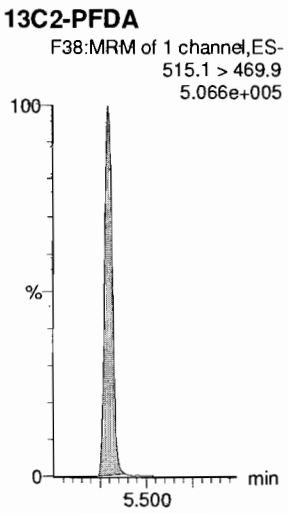
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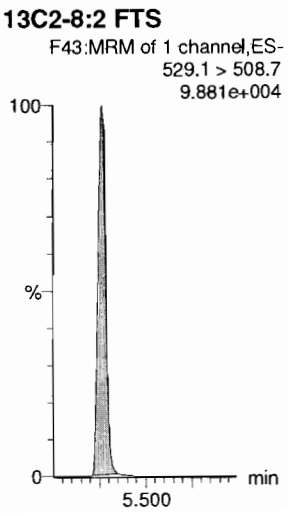
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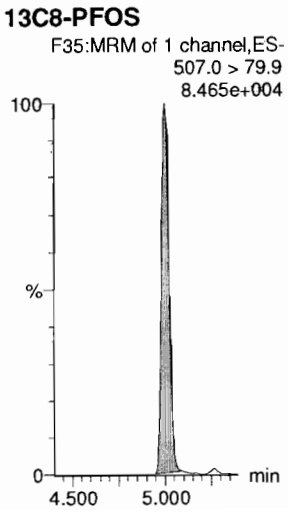
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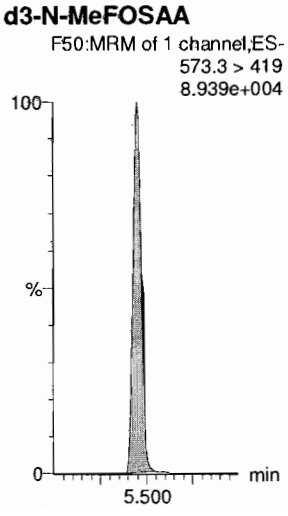
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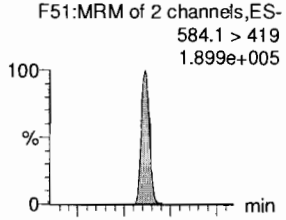


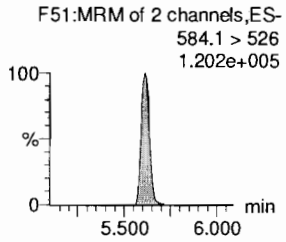
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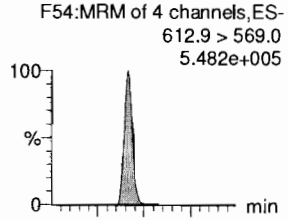
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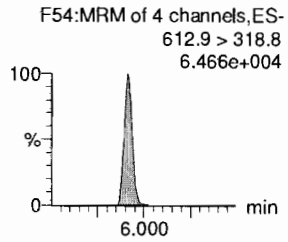
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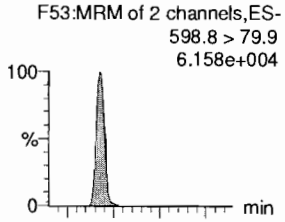


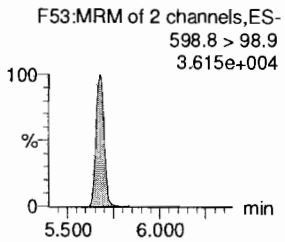
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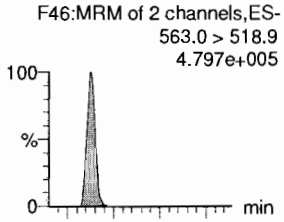


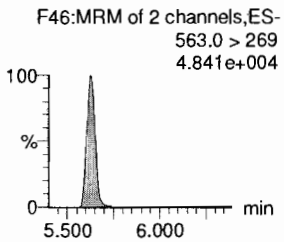
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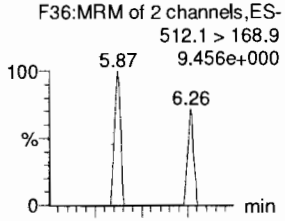


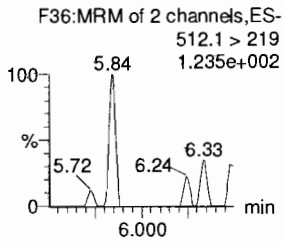
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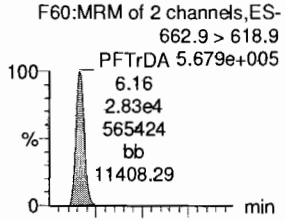


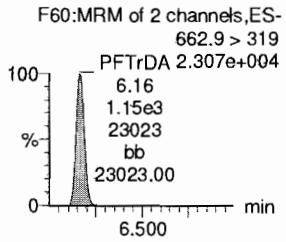
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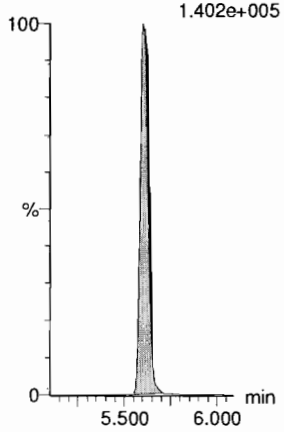


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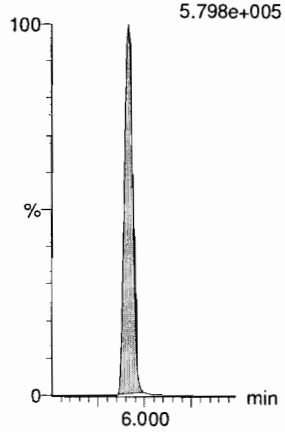




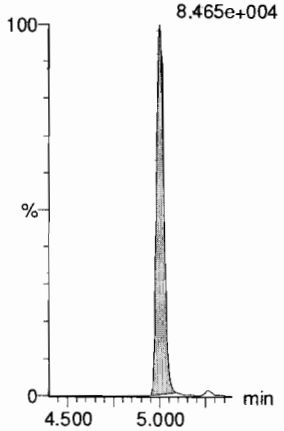
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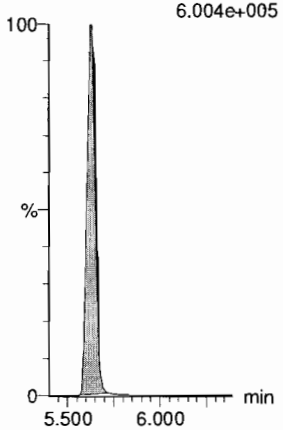
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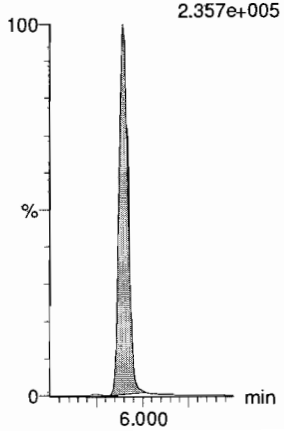
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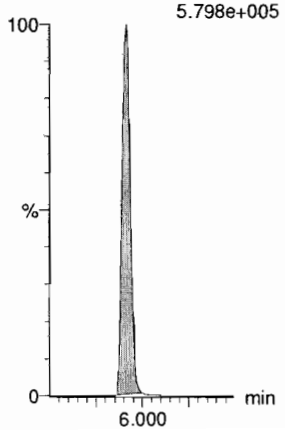
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13C2-PFDoA

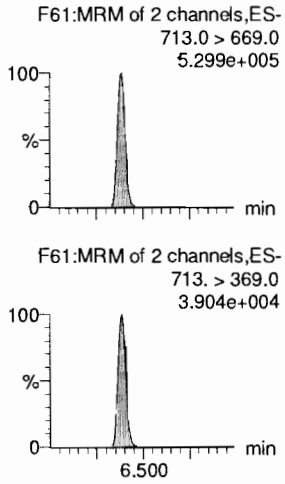


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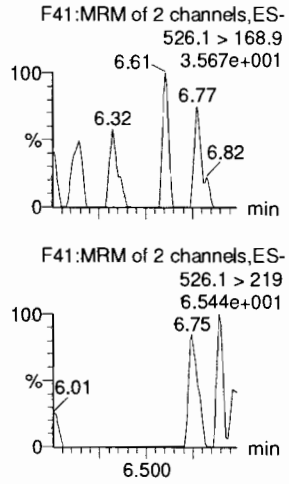
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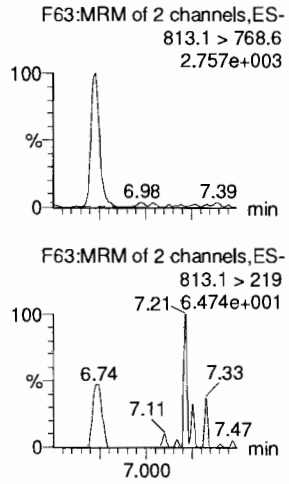
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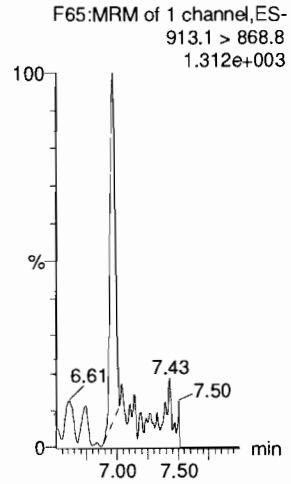
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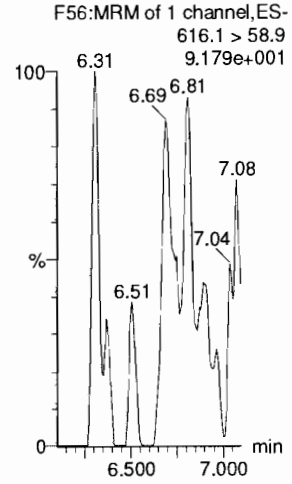
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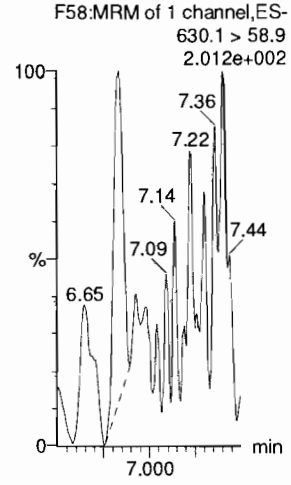
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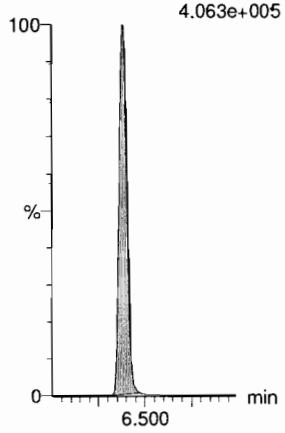
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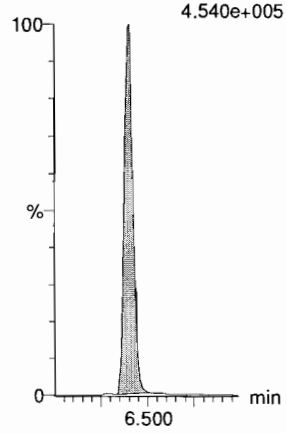
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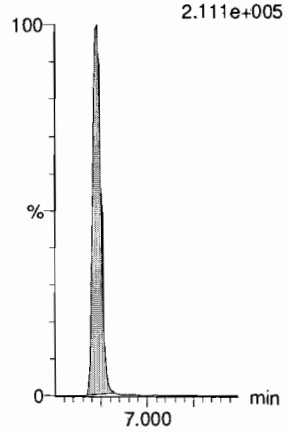
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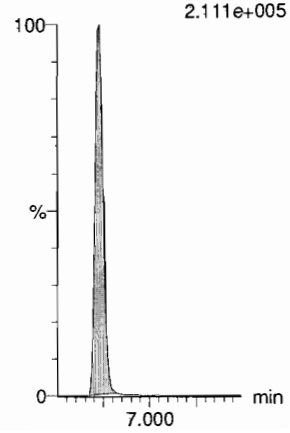
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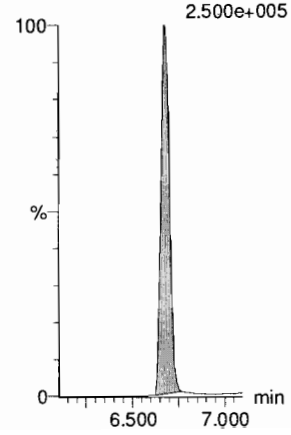
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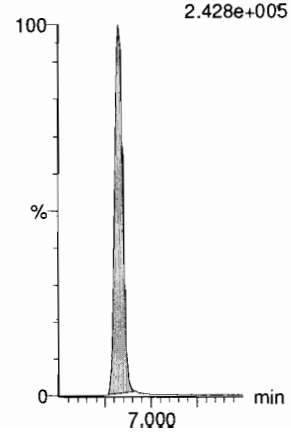
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d7-N-MeFOSE



d9-N-EtFOSE

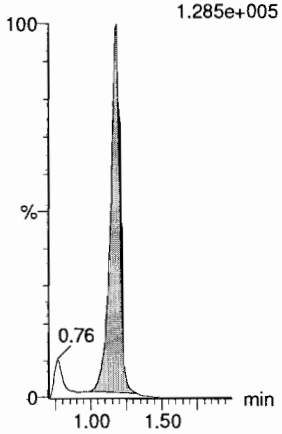


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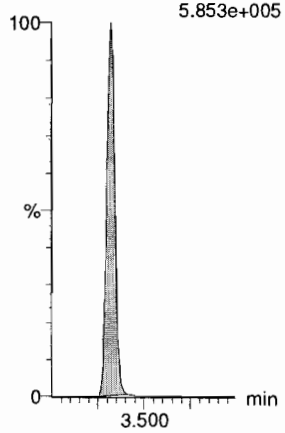
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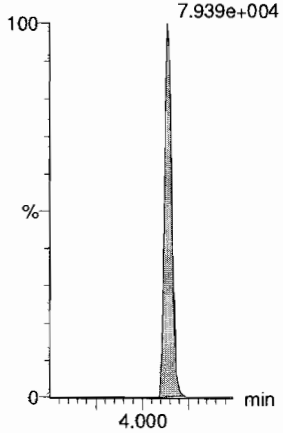
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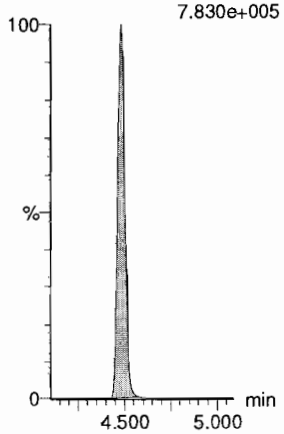
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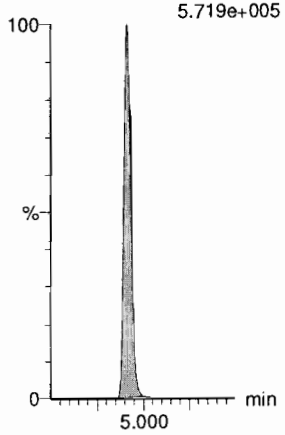
13C3-PFHxS



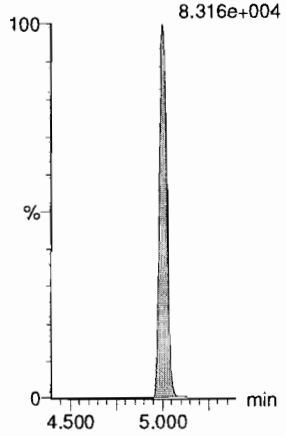
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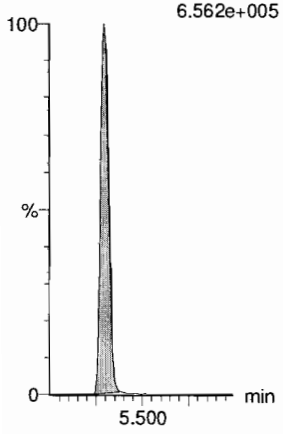
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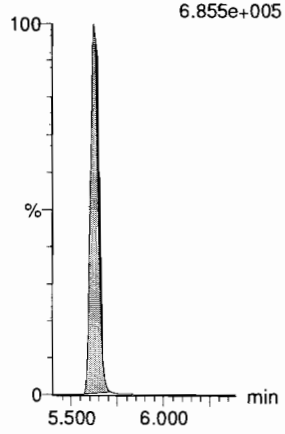
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Vista Analytical Laboratory

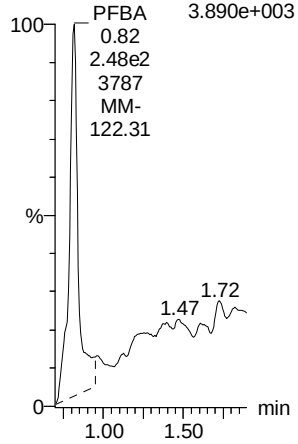
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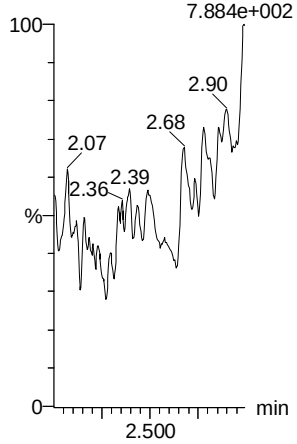
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Name: 181119M2_12, Date: 19-Nov-2018, Time: 22:03:46, ID: IPA, Description: IPA

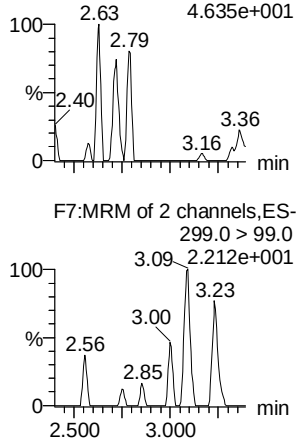
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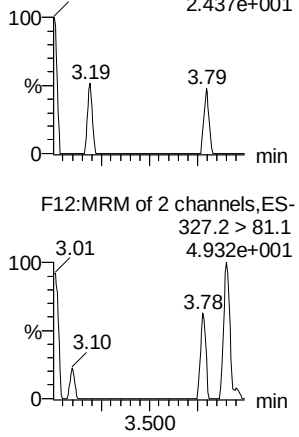
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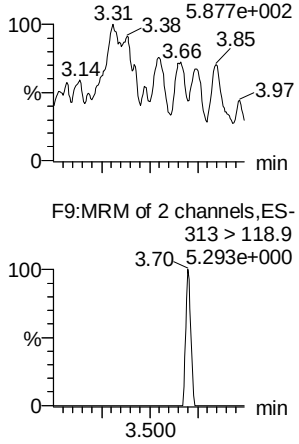
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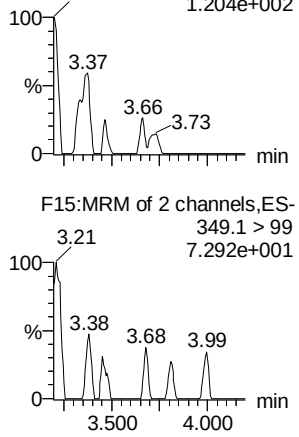
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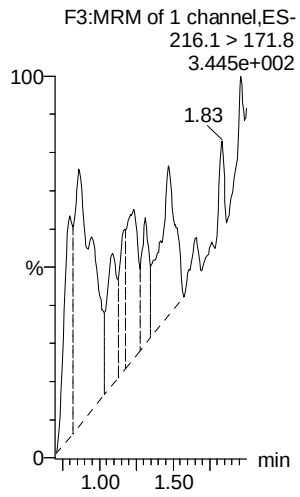
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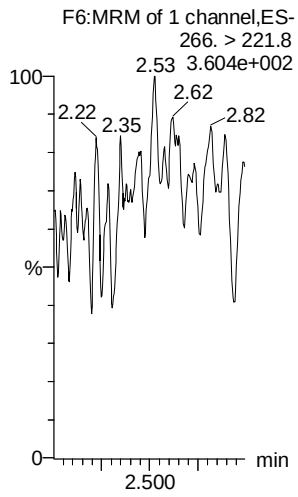
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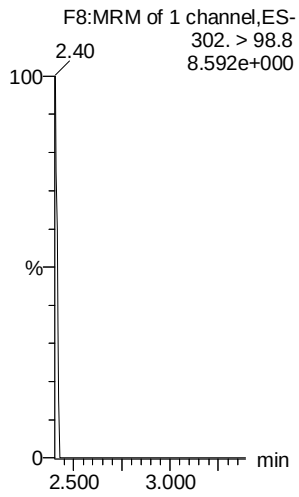
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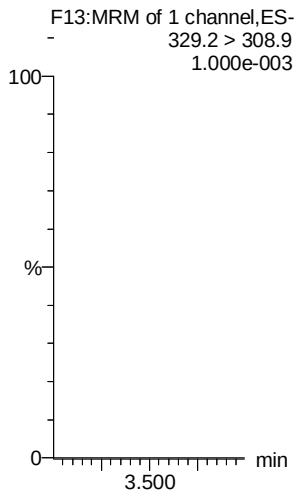
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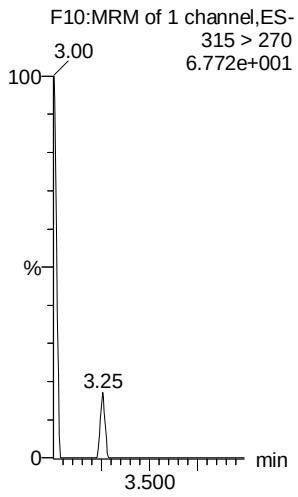
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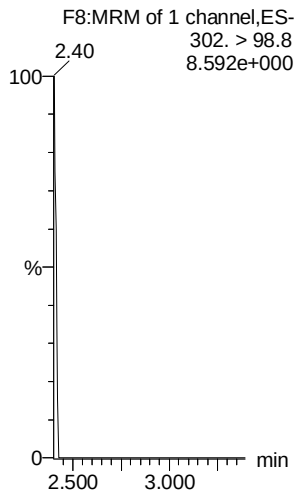
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13C2-PFHxA



13C3-PFBS



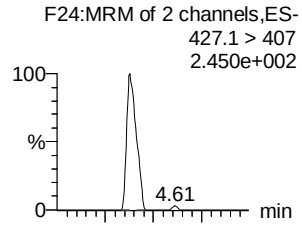
Vista Analytical Laboratory

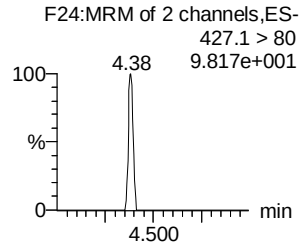
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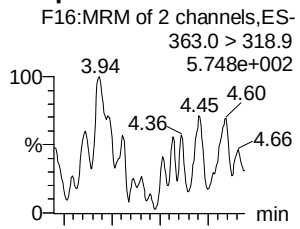
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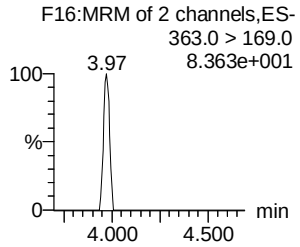
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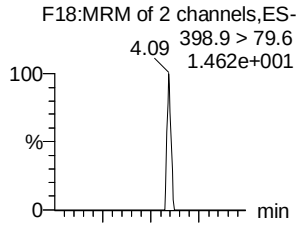


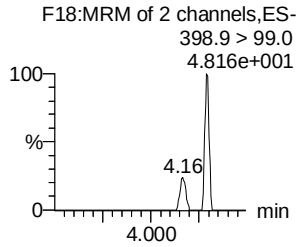
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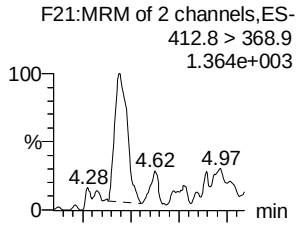


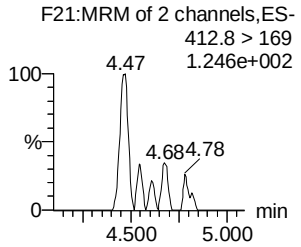
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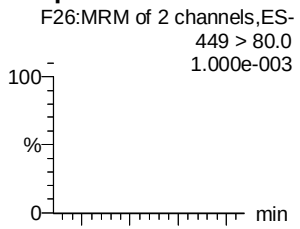


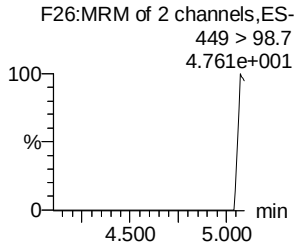
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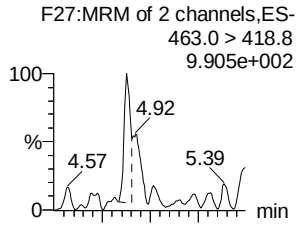


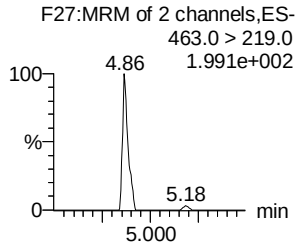
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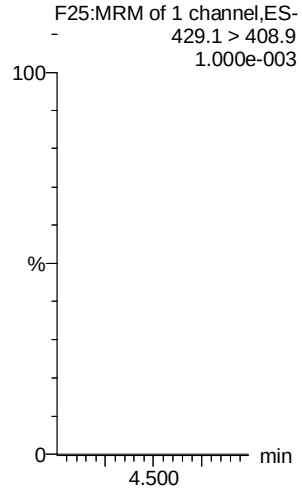


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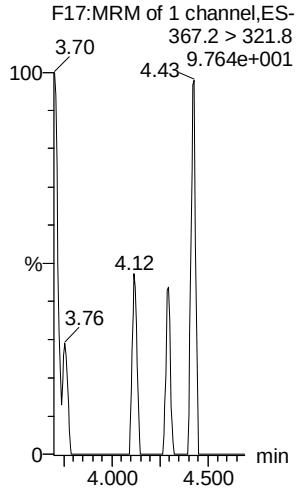




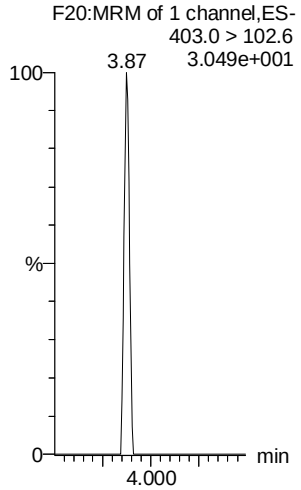
13C2-6:2 FTS



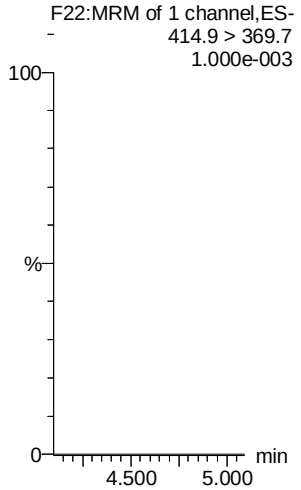
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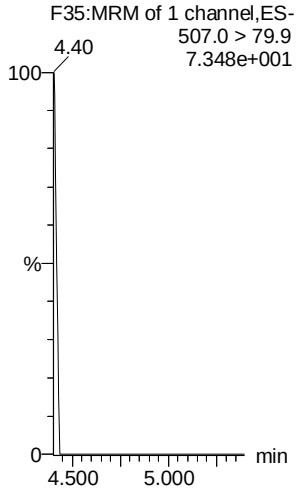
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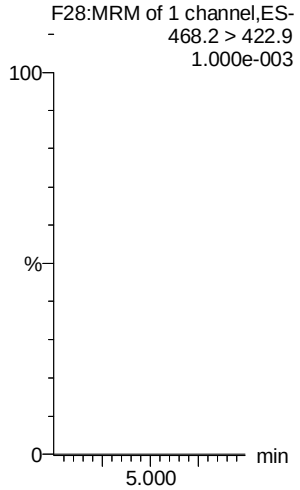
13C2-PFOA



13C8-PFOS



13C5-PFNA

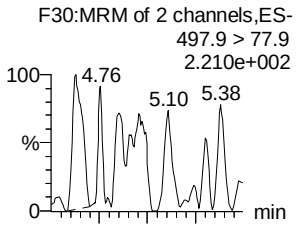


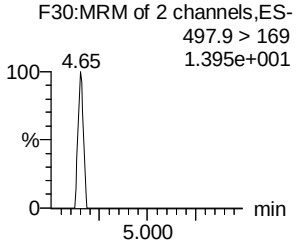
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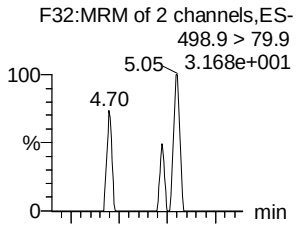
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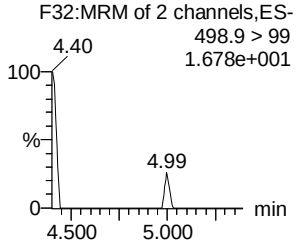
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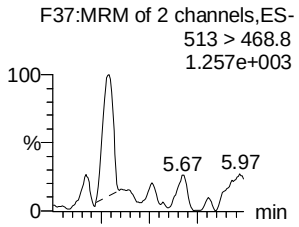


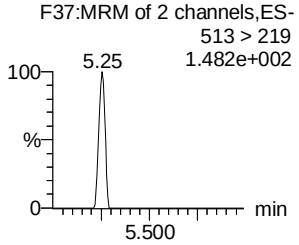
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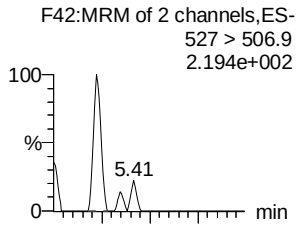


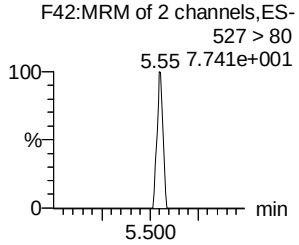
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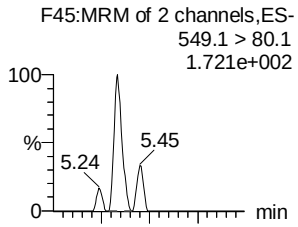


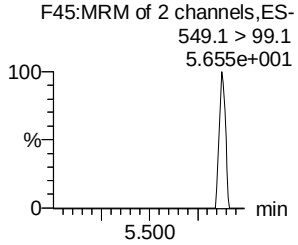
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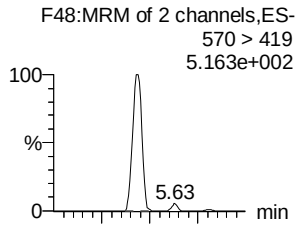


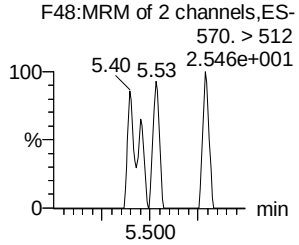
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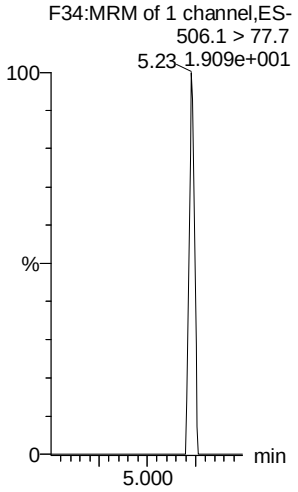


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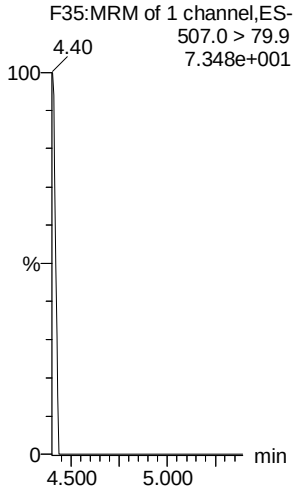




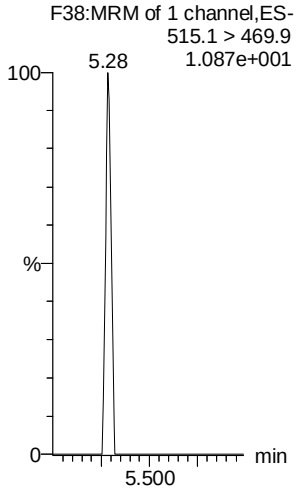
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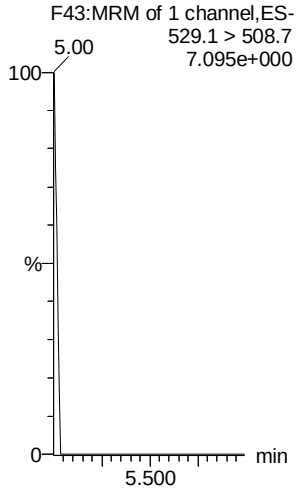
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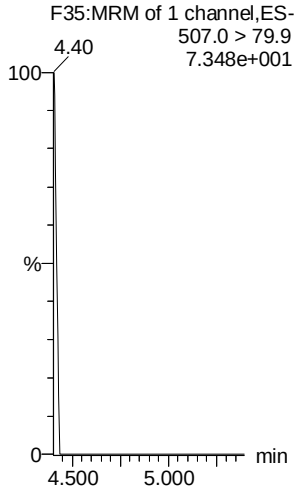
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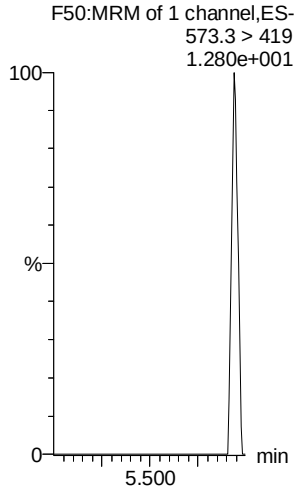
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13C8-PFOS



d3-N-MeFOSAA

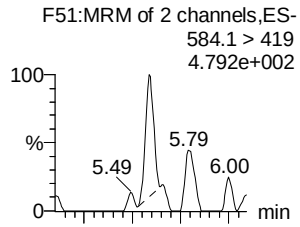


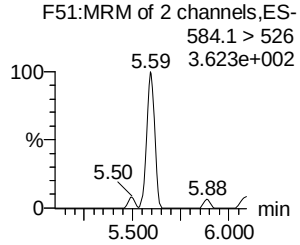
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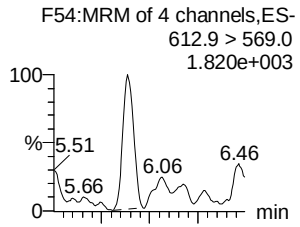
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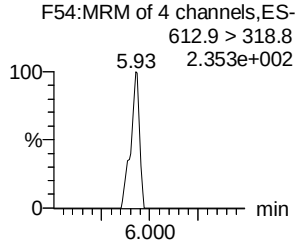
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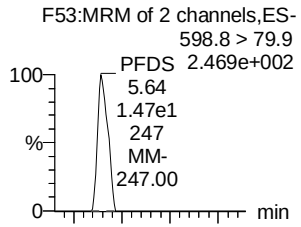


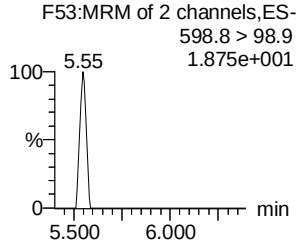
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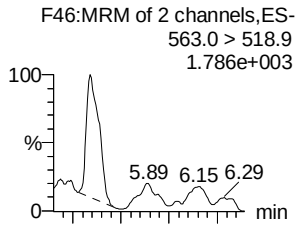


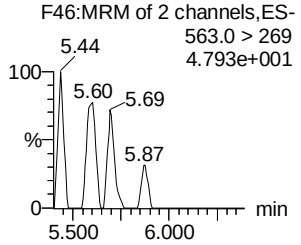
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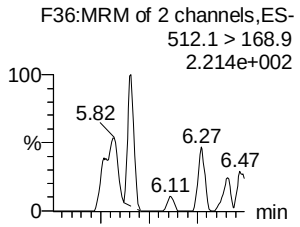


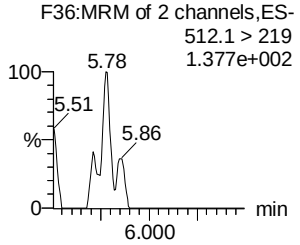
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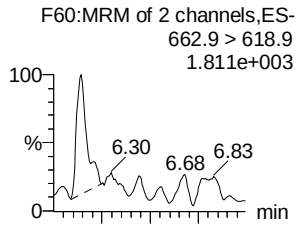


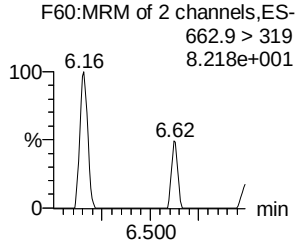
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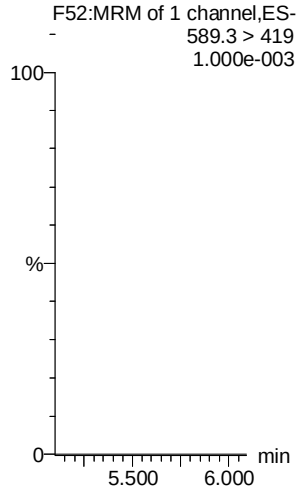


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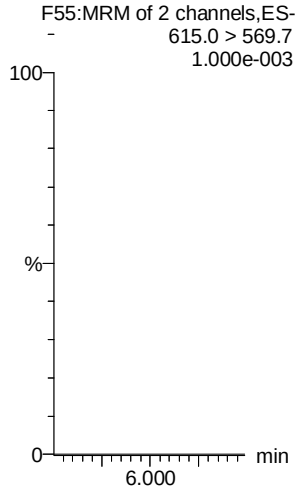




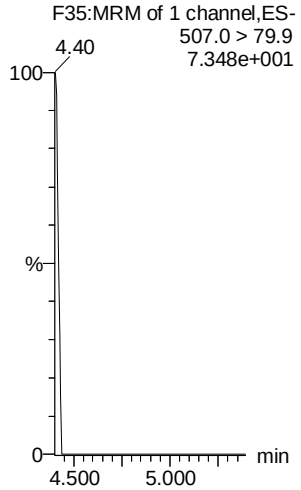
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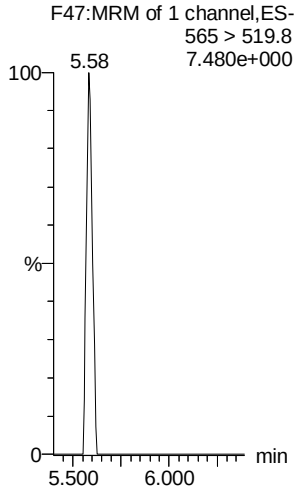
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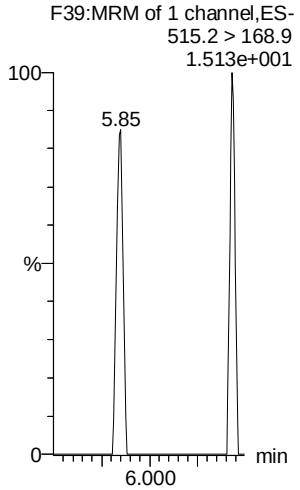
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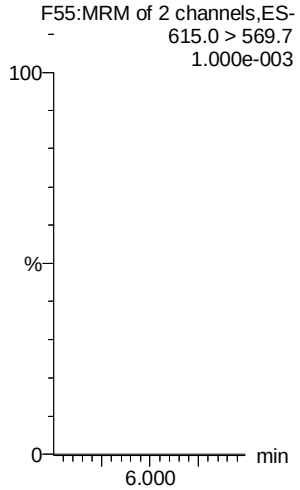
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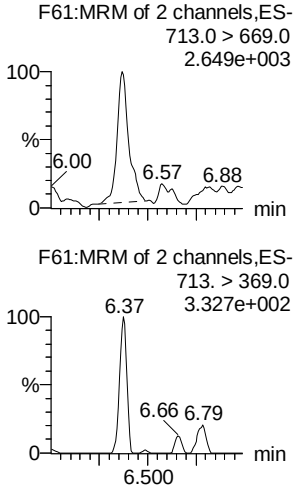


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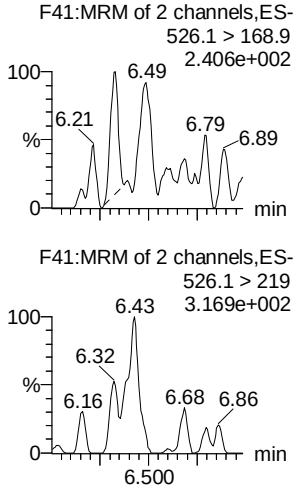
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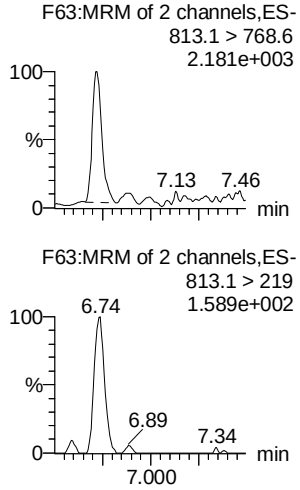
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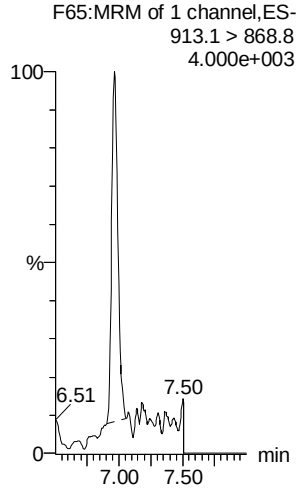
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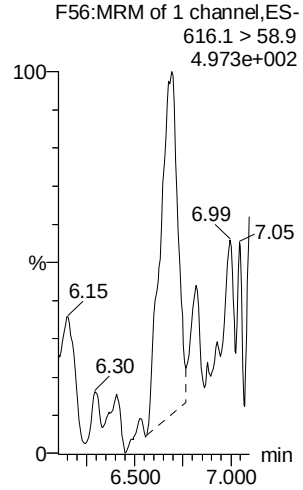
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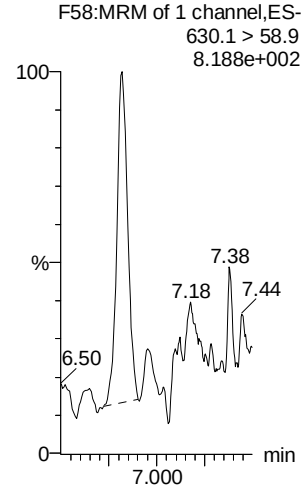
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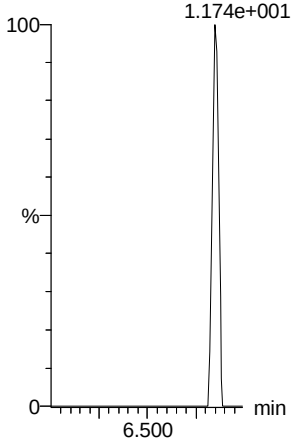
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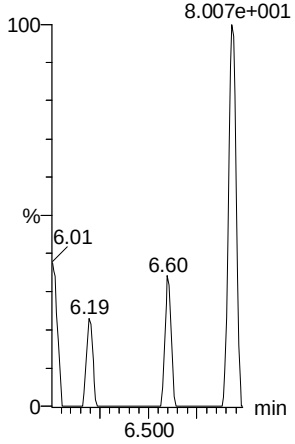
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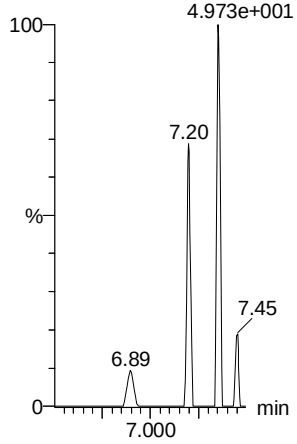
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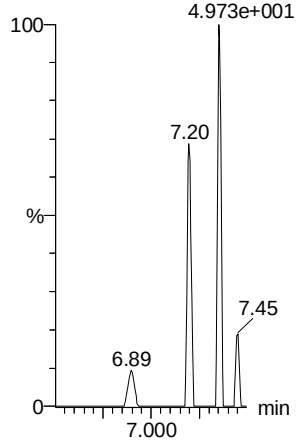
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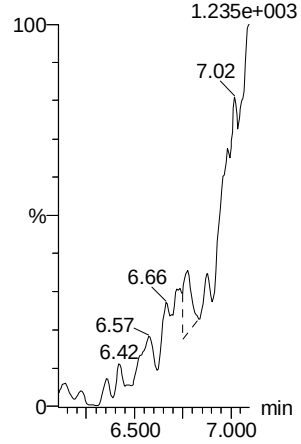
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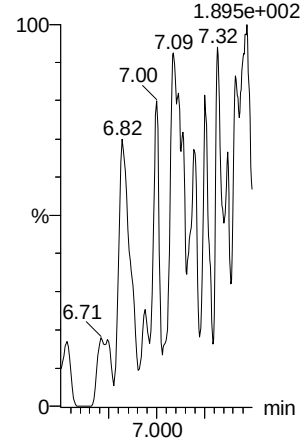
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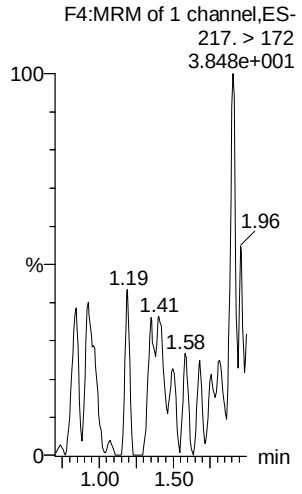
Vista Analytical Laboratory

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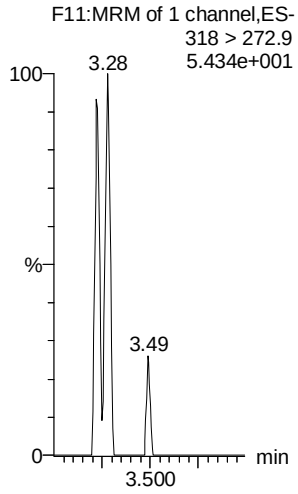
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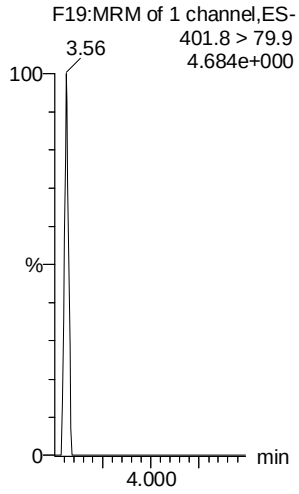
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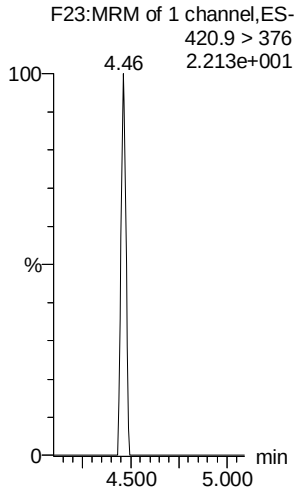
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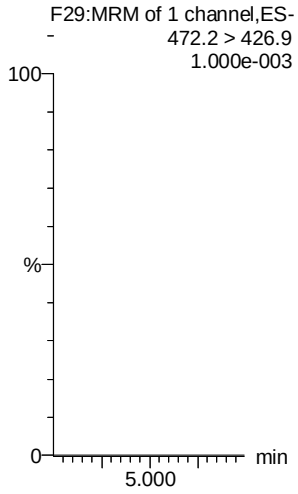
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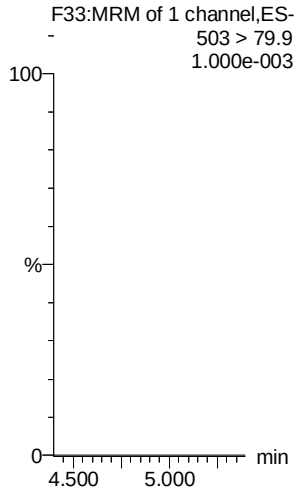
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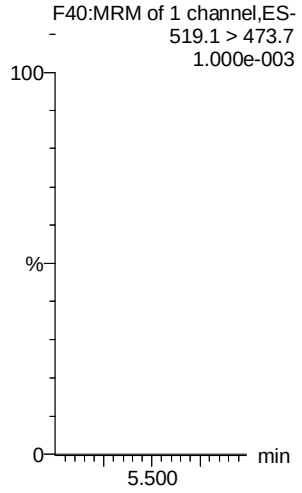
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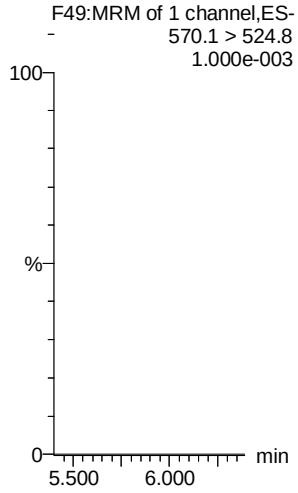
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13C6-PFDA



13C7-PFUdA



TUNE CHECKS

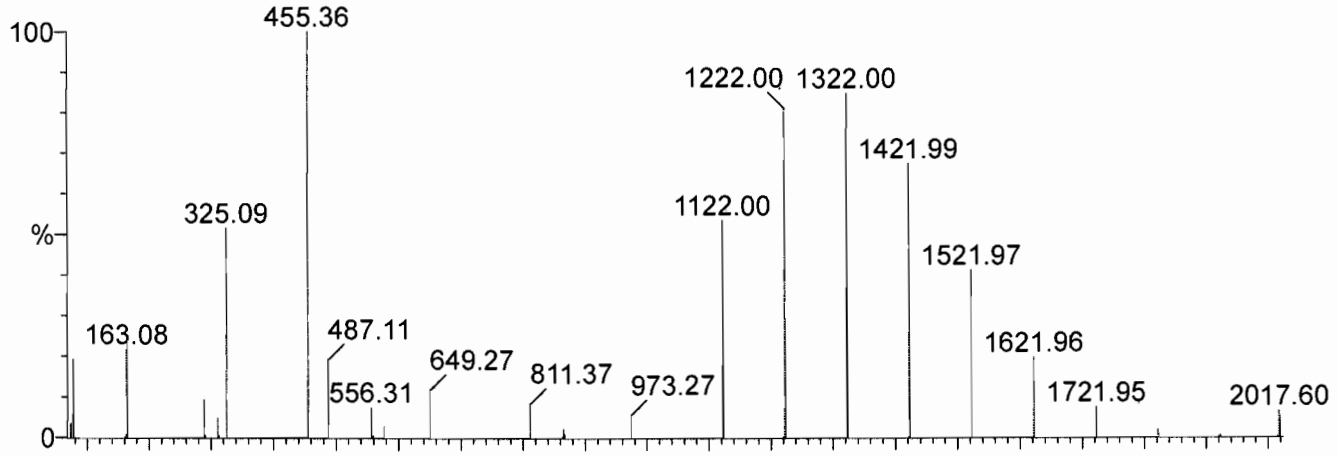
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20181120

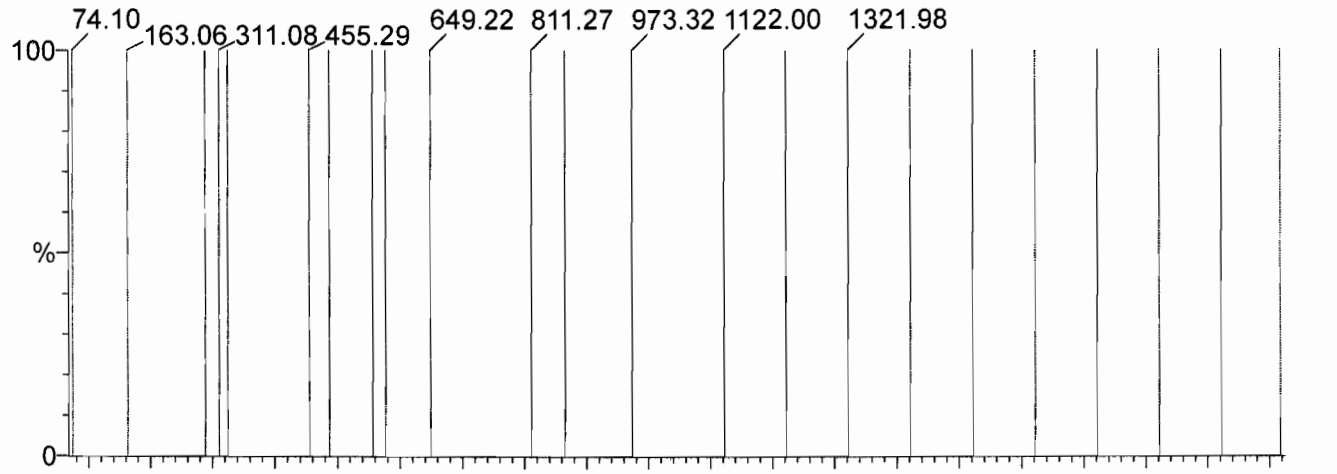
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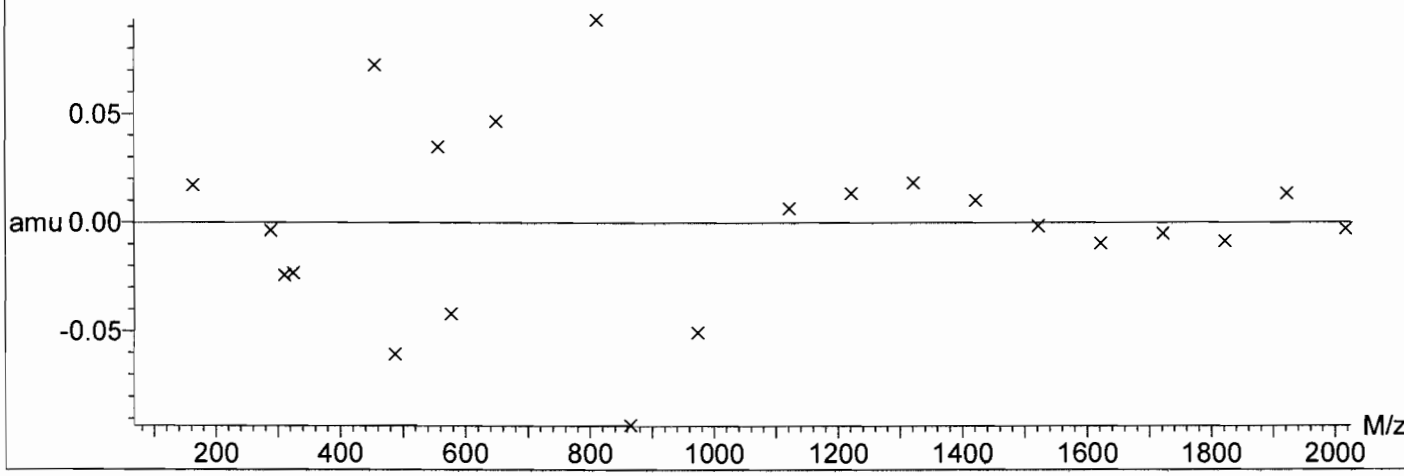
Data file: STATMS1 - Calibrated — 22 matches of 23 tested references



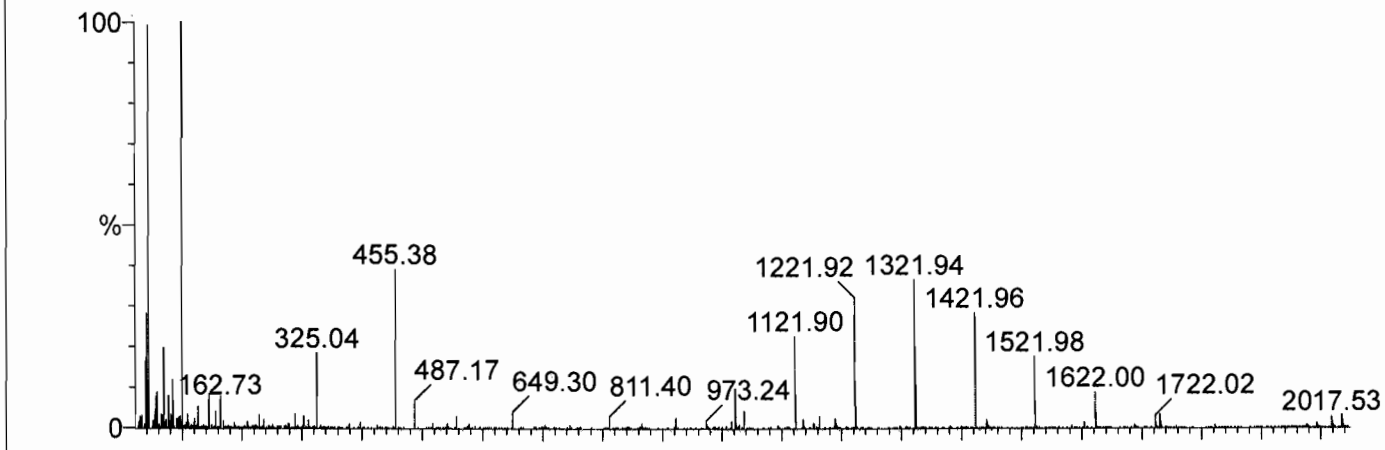
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref — Mean residual = 0.0296 amu



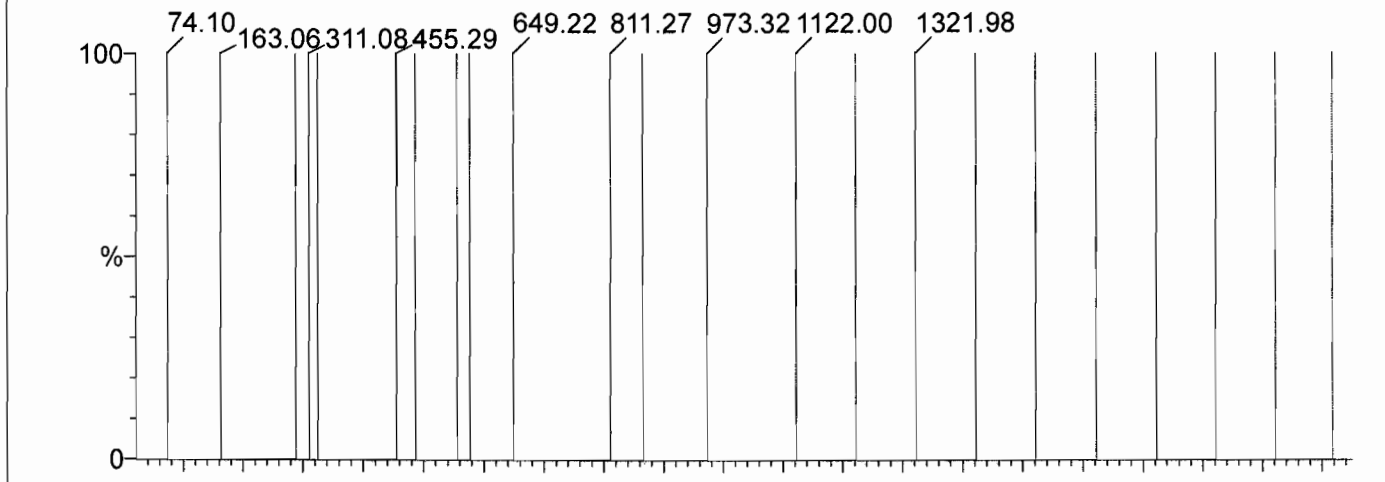
Residual — Polynomial order = 4 — RMS residual = 0.0407 amu



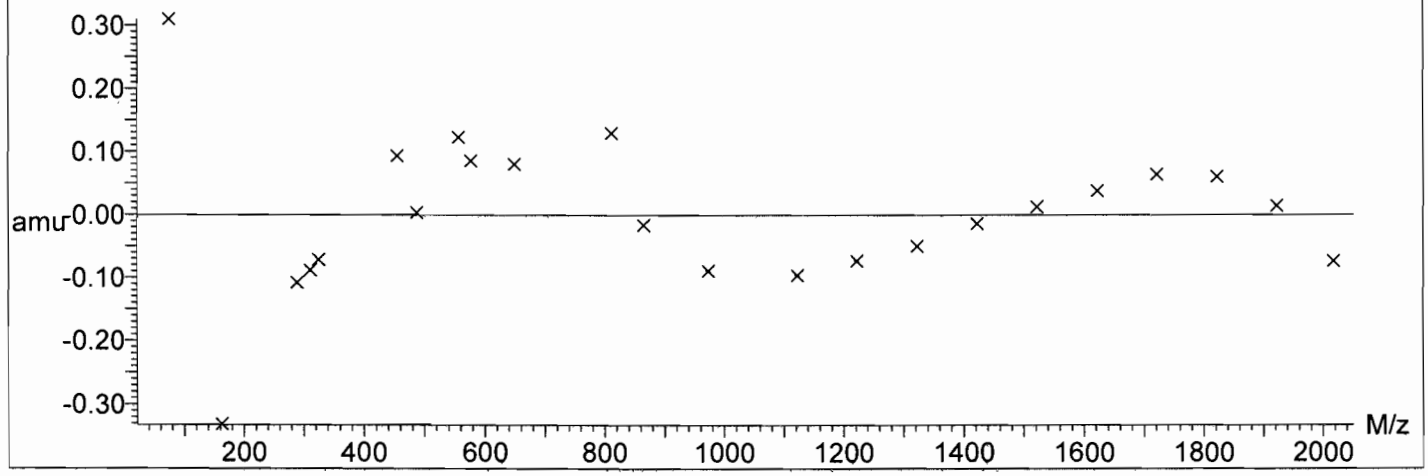
Data file: SCNMS1 - Calibrated 23 matches of 23 tested references



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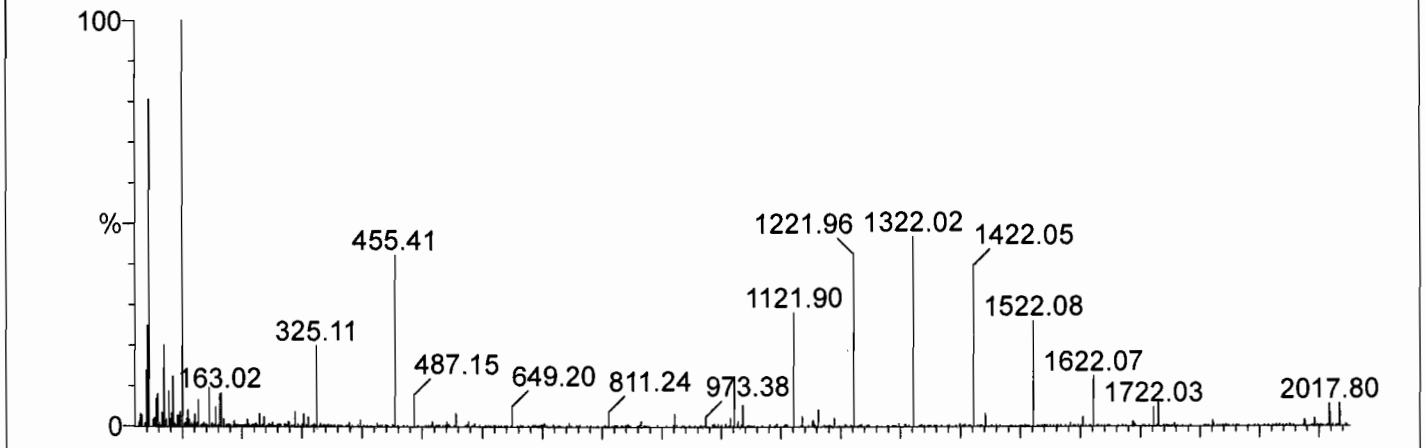


Residual Polynomial order = 4 RMS residual = 0.119 amu

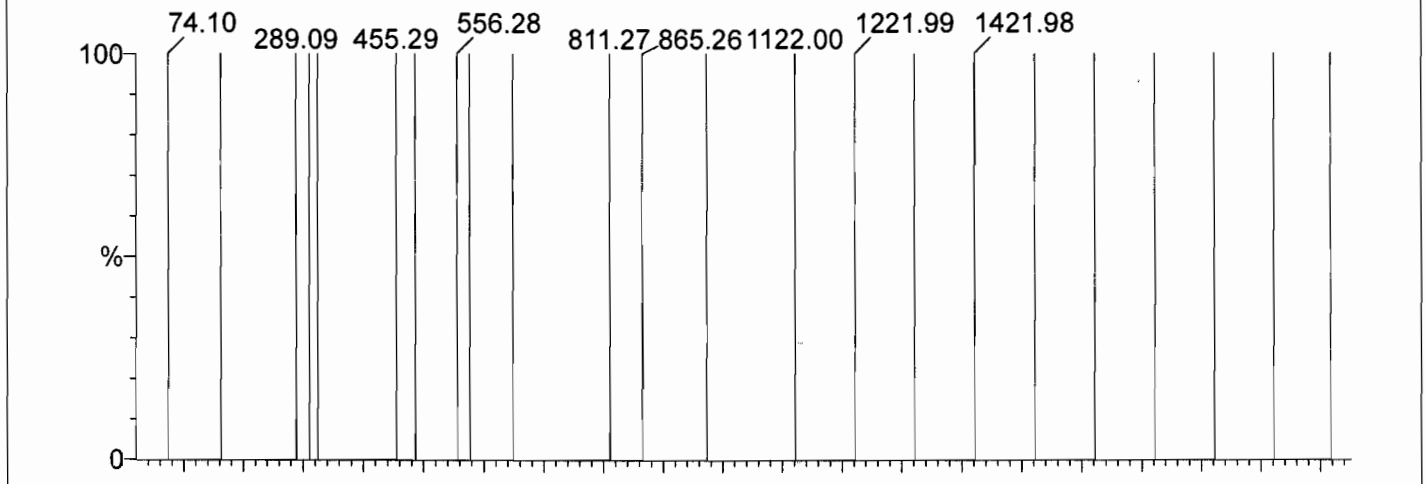


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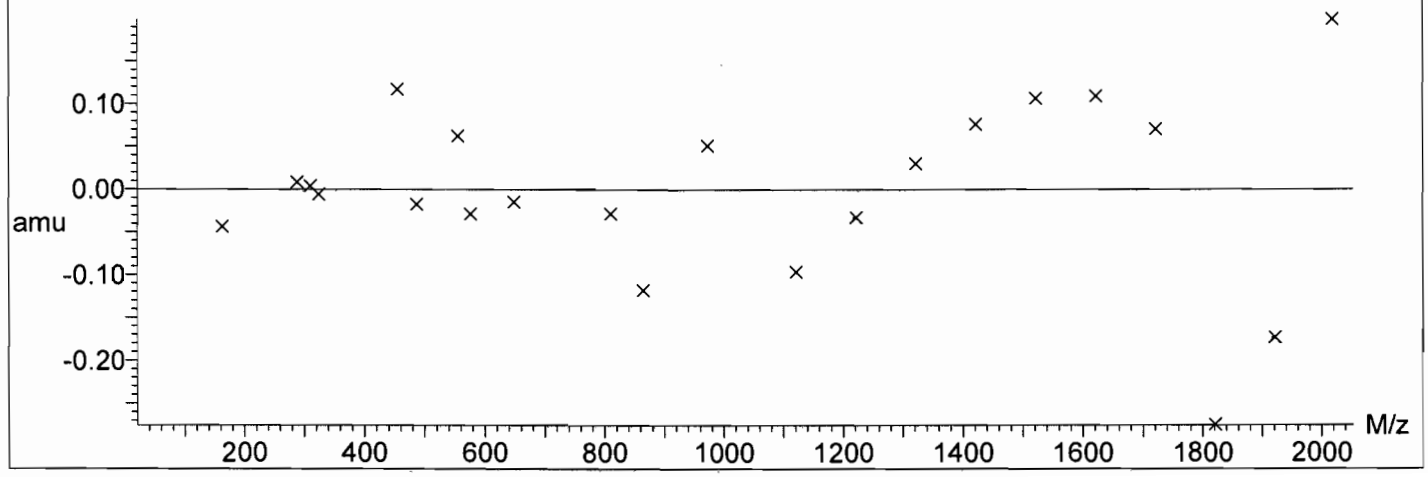
Data file: FASTMS1 - Calibrated 22 matches of 23 tested references



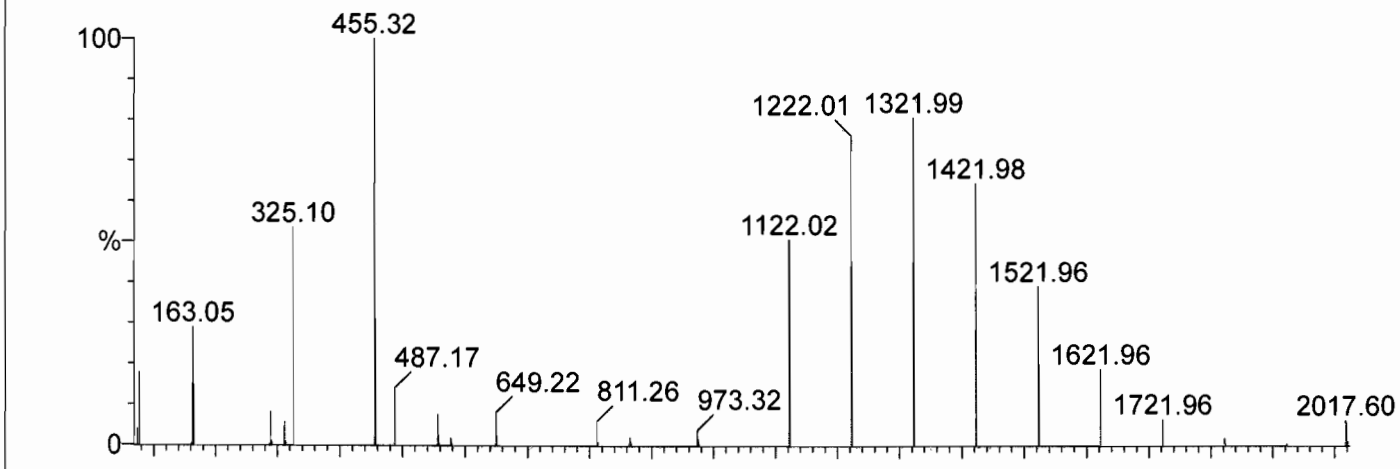
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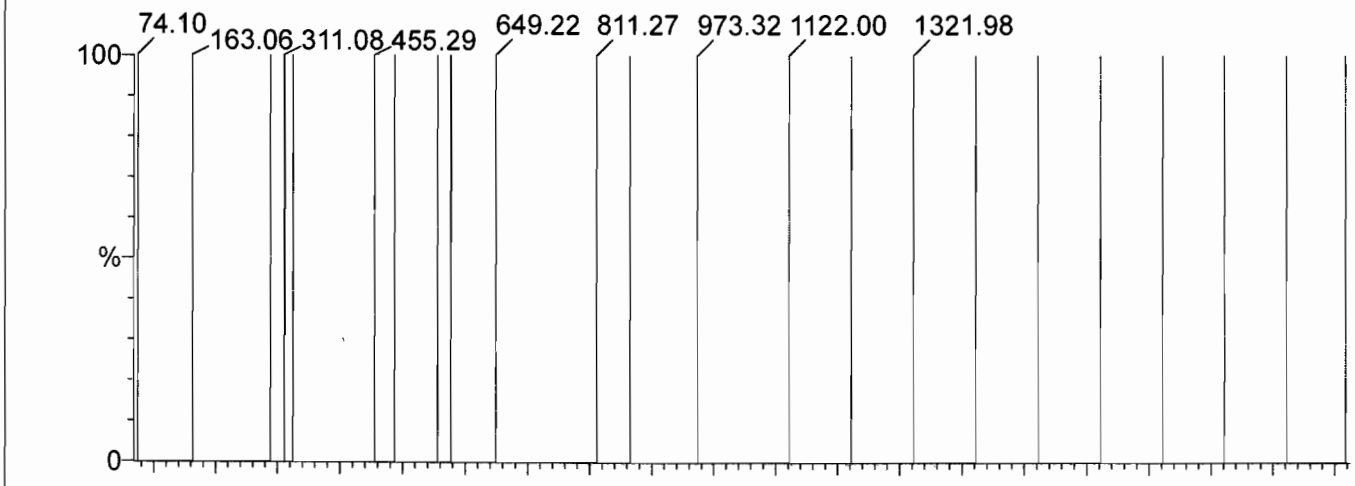
Residual Polynomial order = 4 RMS residual = 0.102 amu



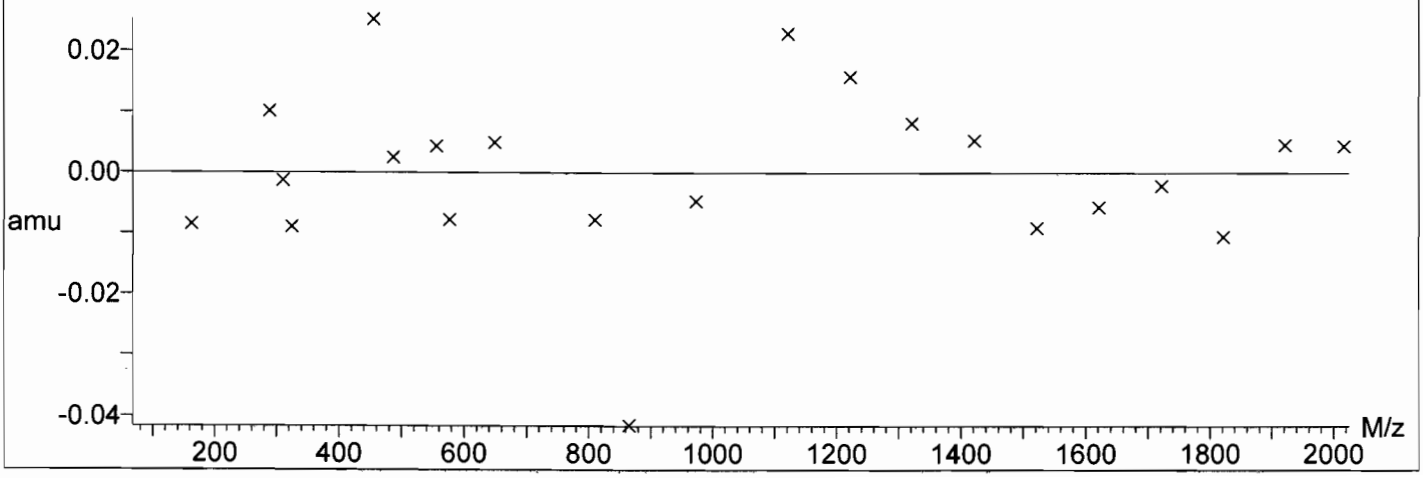
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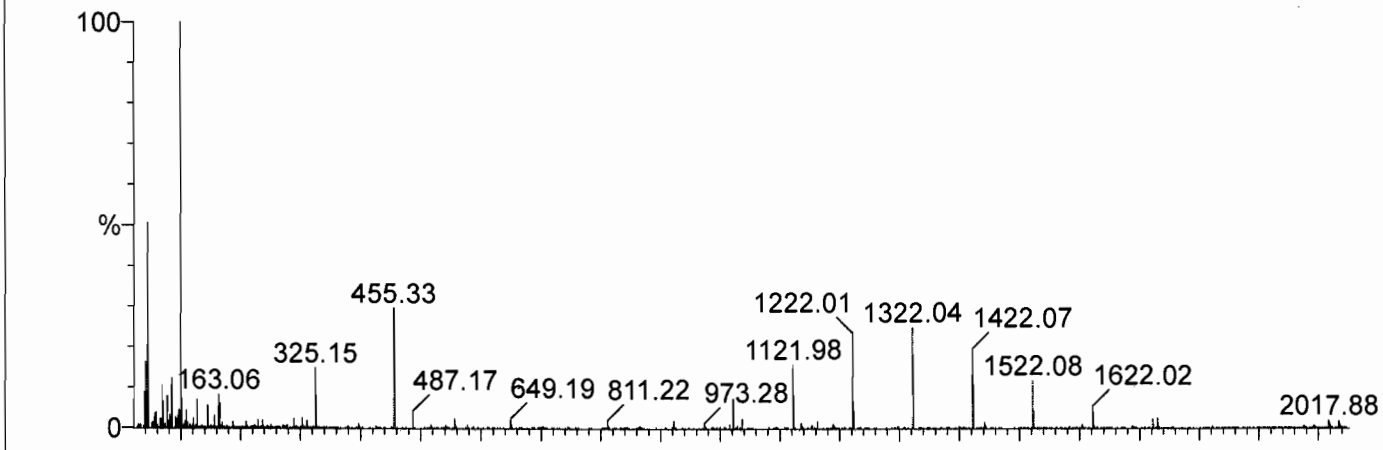
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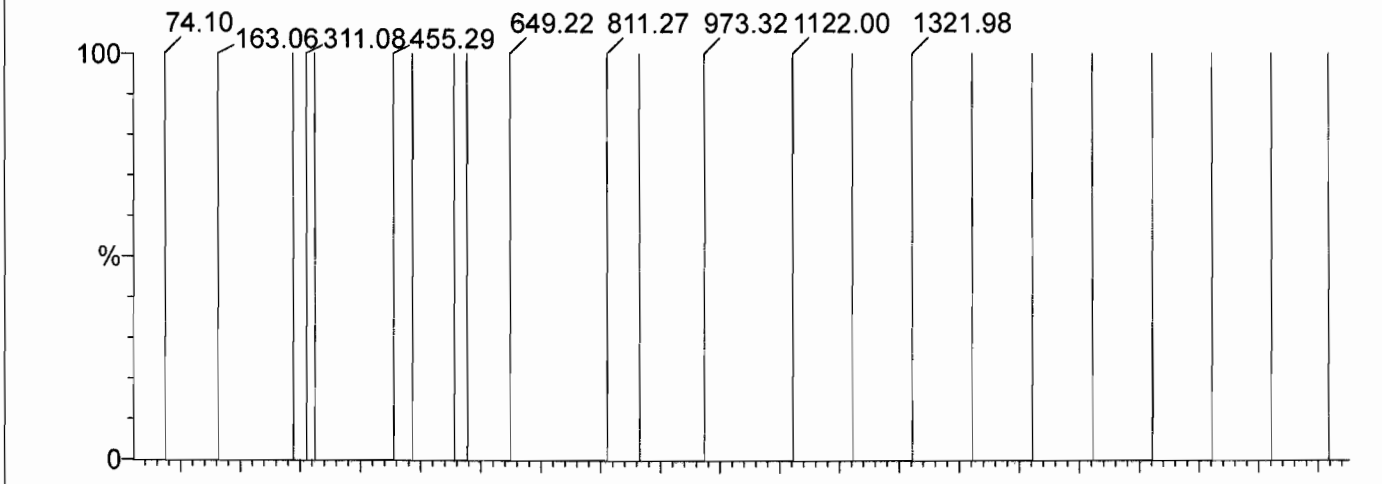
Residual Polynomial order = 4 RMS residual = 0.0134 amu



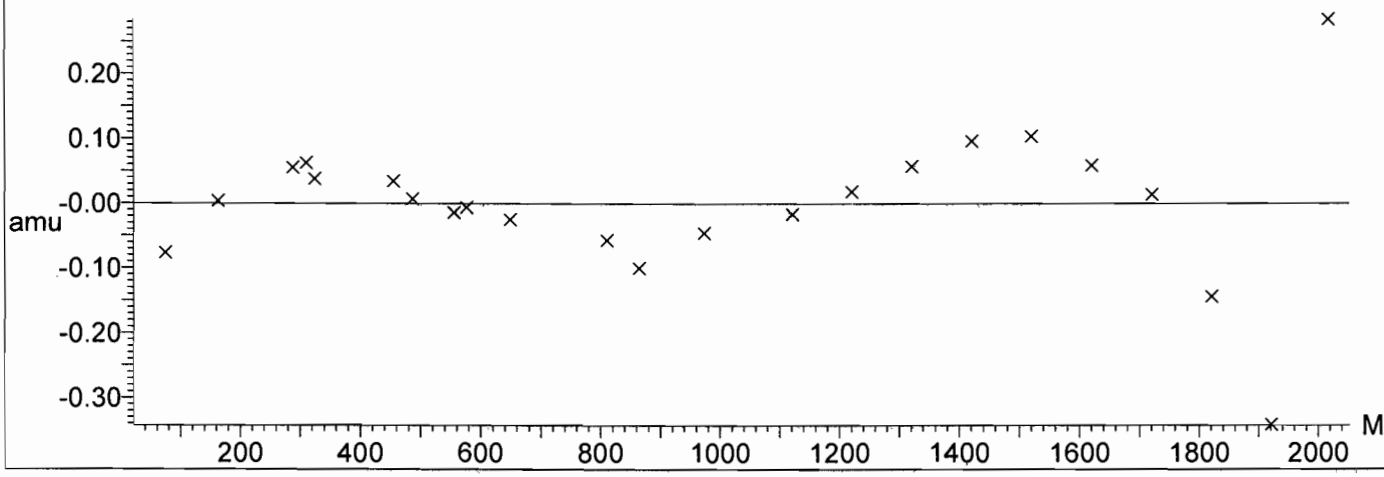
Data file: SCNMS2 - Calibrated 23 matches of 23 tested references



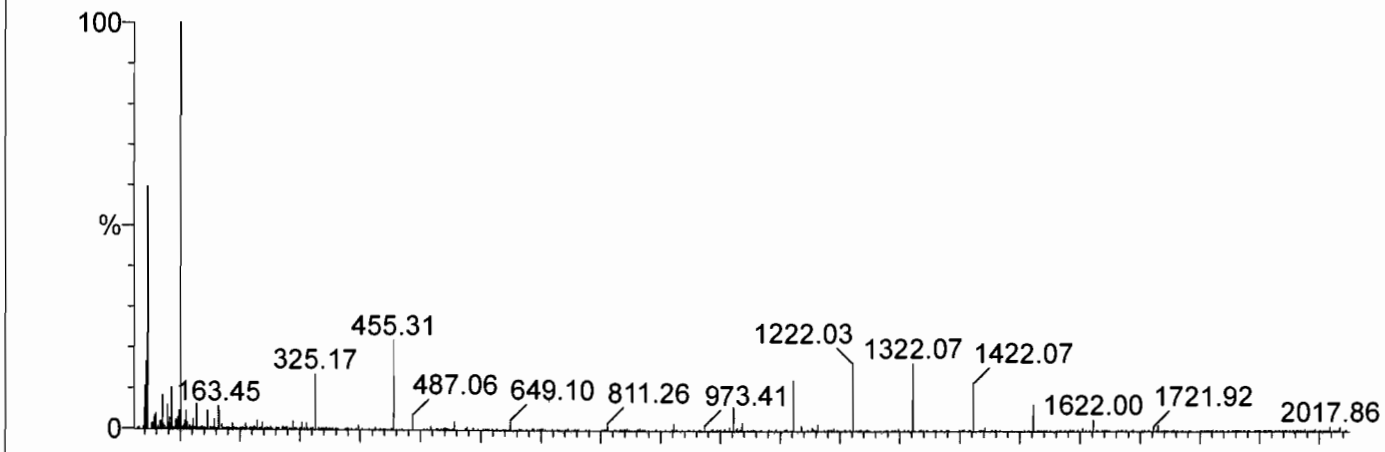
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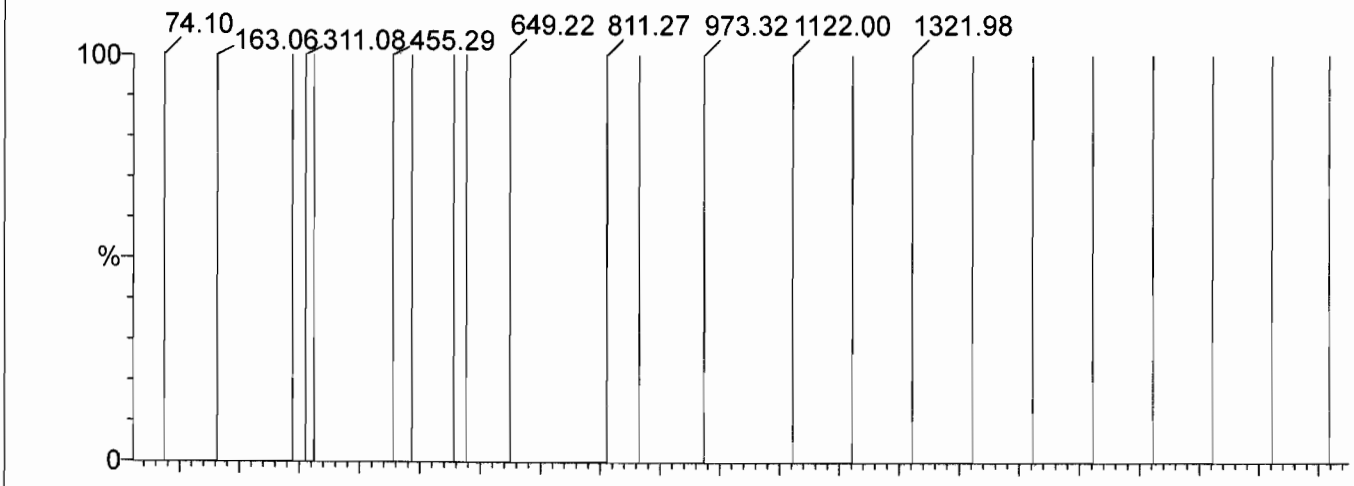
Residual Polynomial order = 4 RMS residual = 0.11 amu



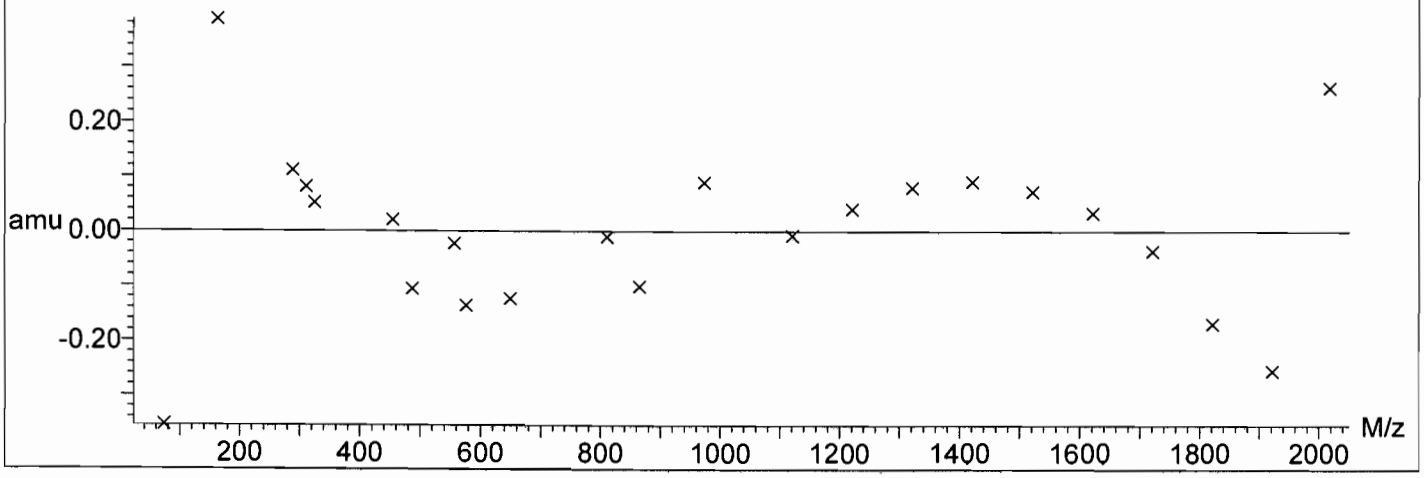
Data file: FASTMS2 - Calibrated 23 matches of 23 tested references



Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.115 amu



Residual Polynomial order = 4 RMS residual = 0.154 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

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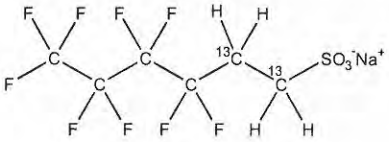
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-4:2FTS **LOT NUMBER:** M242FTS0817

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]hexane sulfonate

STRUCTURE:



CAS #: Not available

MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4H_4F_9SO_3Na$	**MOLECULAR WEIGHT:**	352.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	46.7 ± 2.3 µg/ml (M2-4:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 4:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 4:2FTS and M2-4:2FTS will produce signals in the m/z 329 to m/z 309 channel during SRM analysis. We recommend using the m/z 329 to m/z 81 transition to monitor for M2-4:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/29/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2208

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

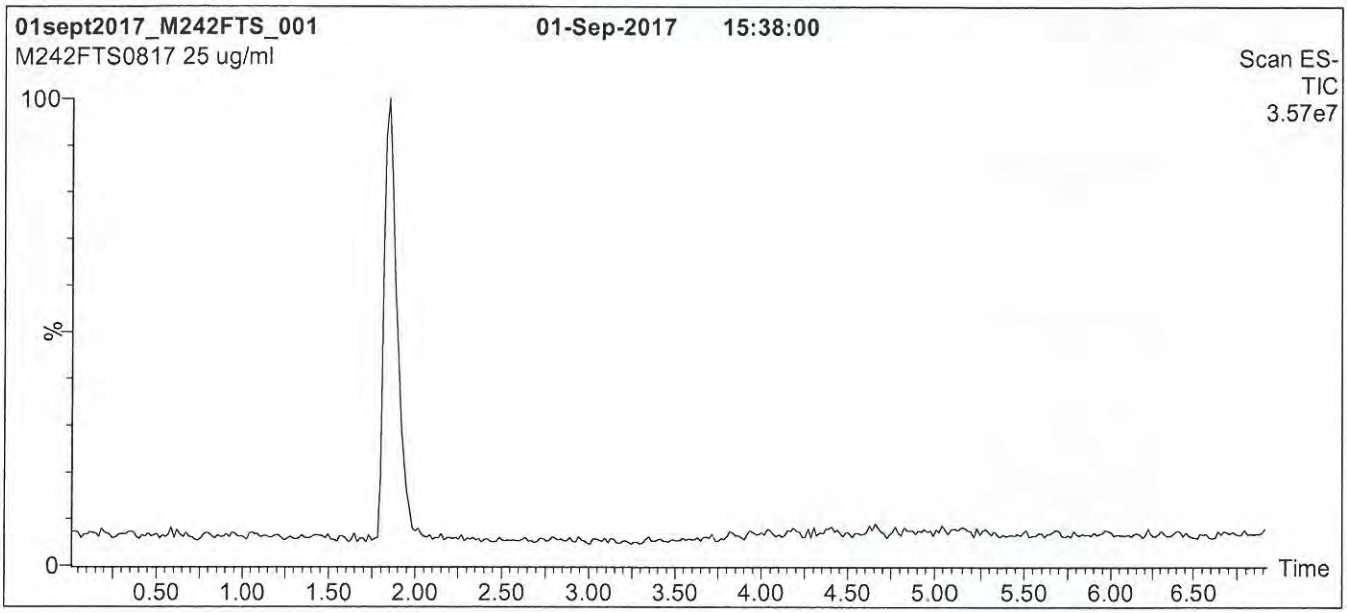
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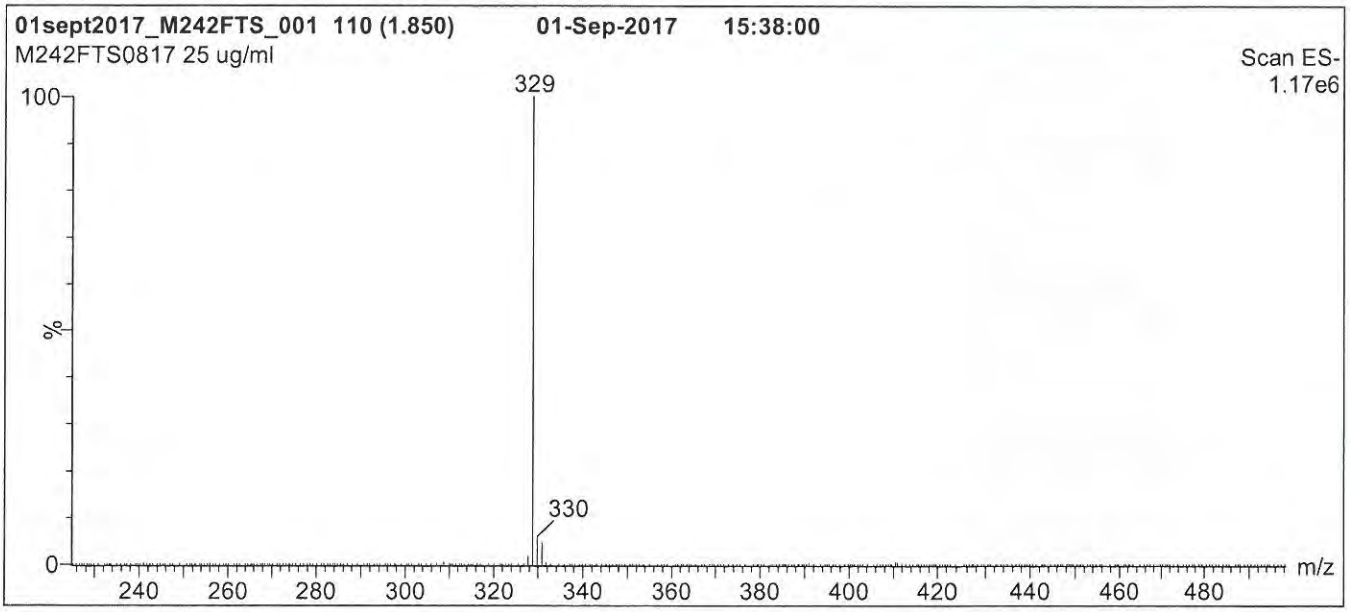
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min
and hold for 1 min before returning
to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

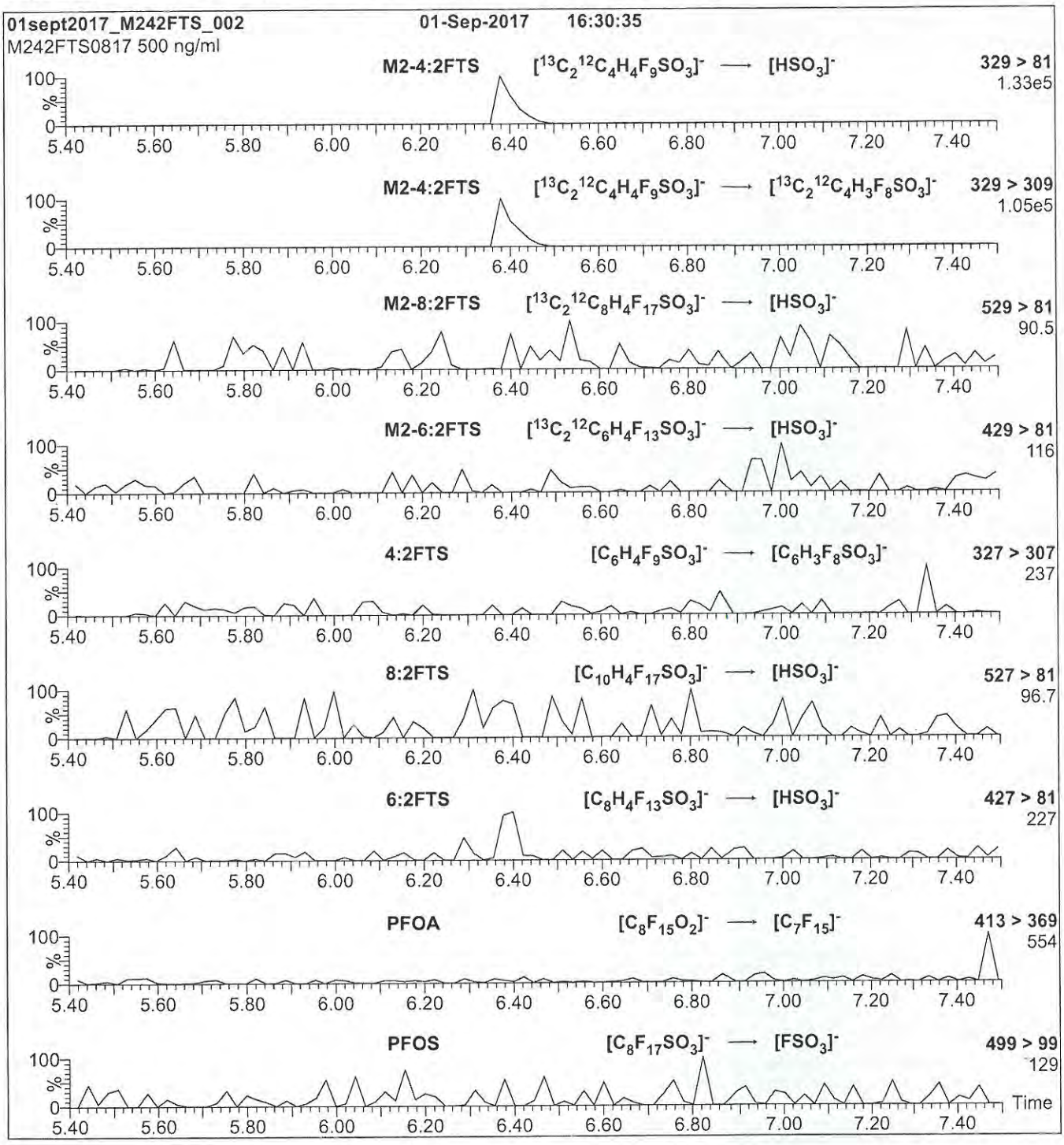
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 25

~~18F2104~~ 18F2209

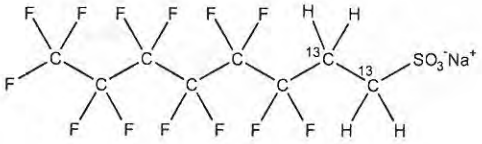
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0218

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.5 ± 2.4 µg/ml (M2-6:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/16/2018		
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 ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 03/07/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2209

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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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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,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

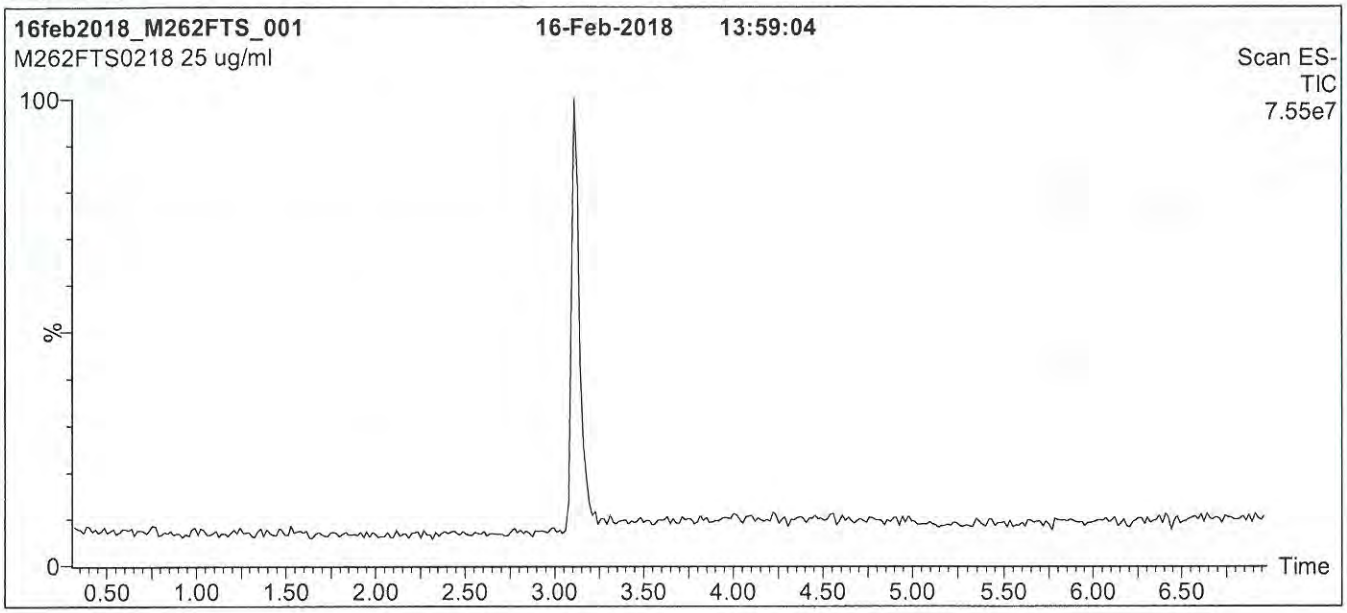
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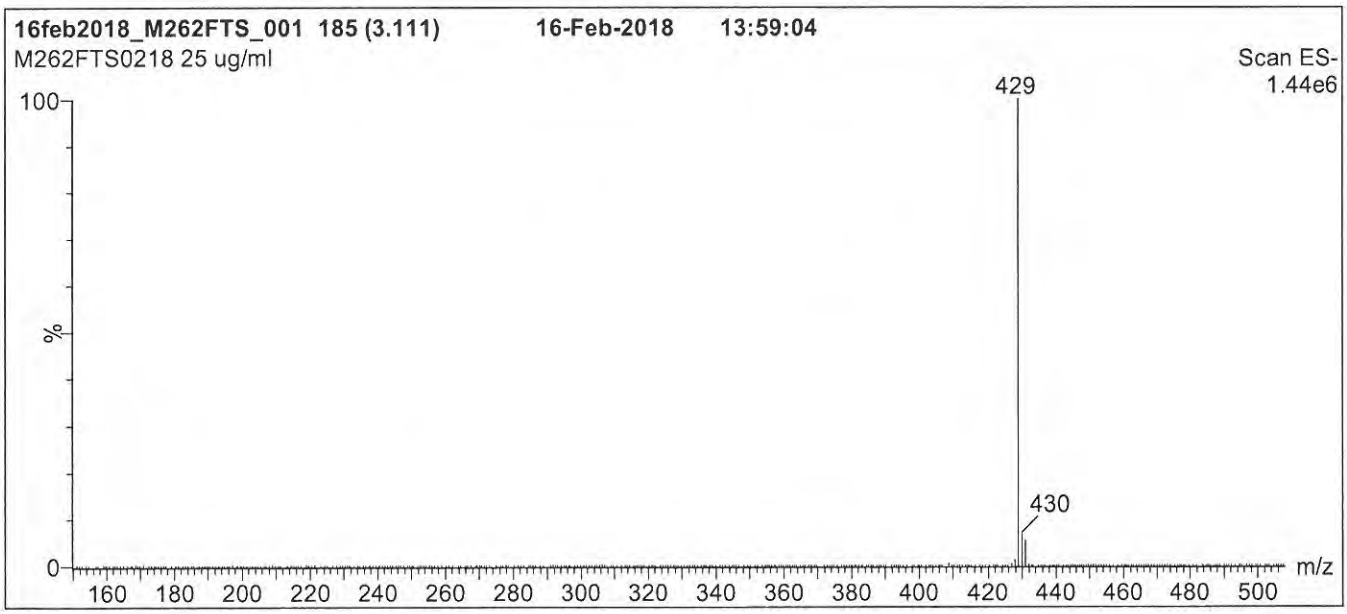
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

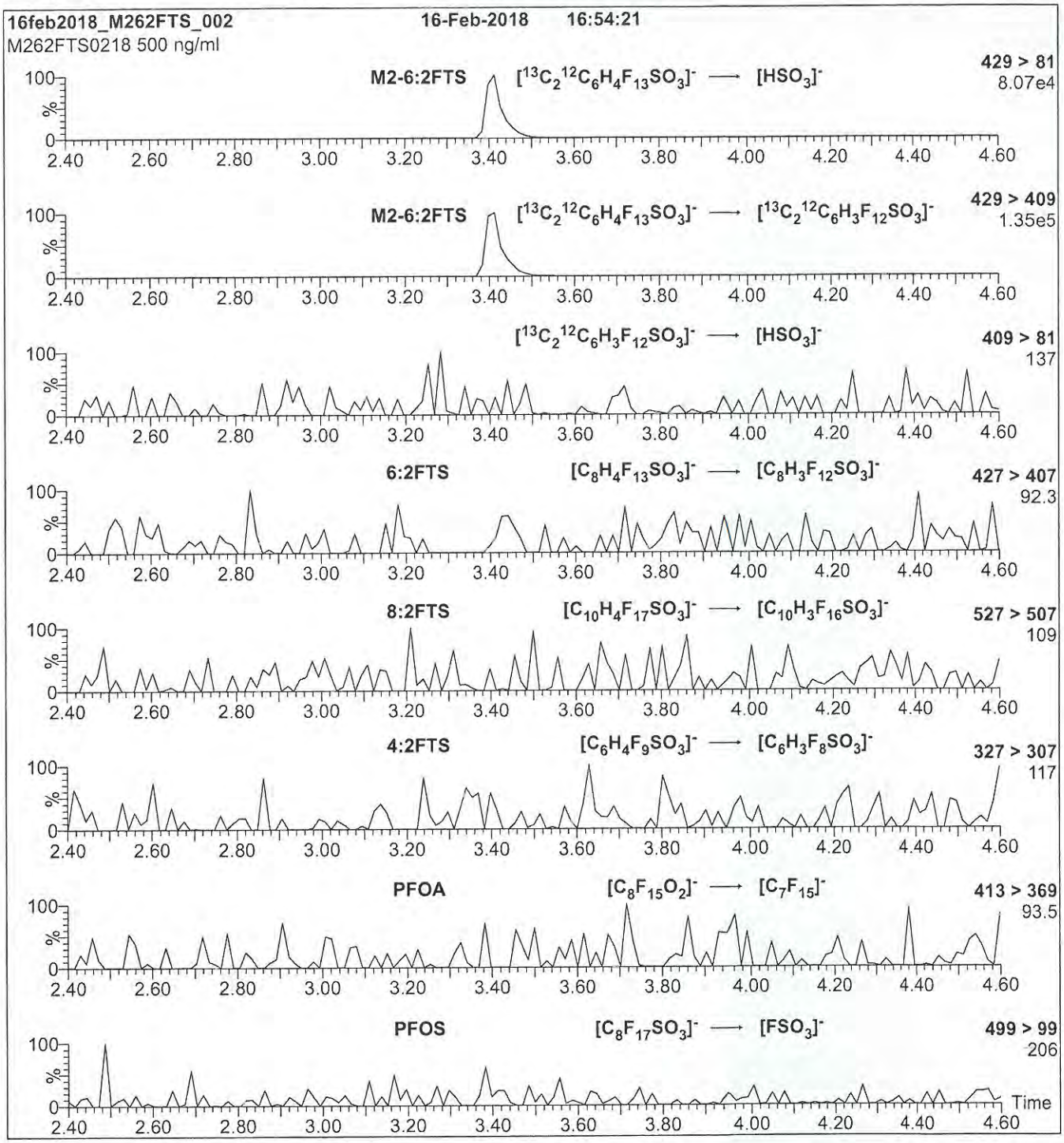
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18F2210

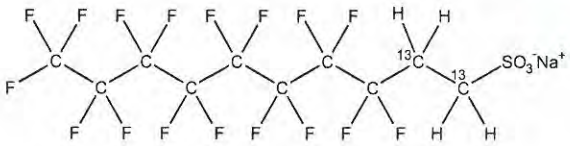
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0118

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]decane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	552.15
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml (M2-8:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/24/2018		
EXPIRY DATE: (mm/dd/yyyy)	01/24/2023		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 8:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 01/26/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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.

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Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

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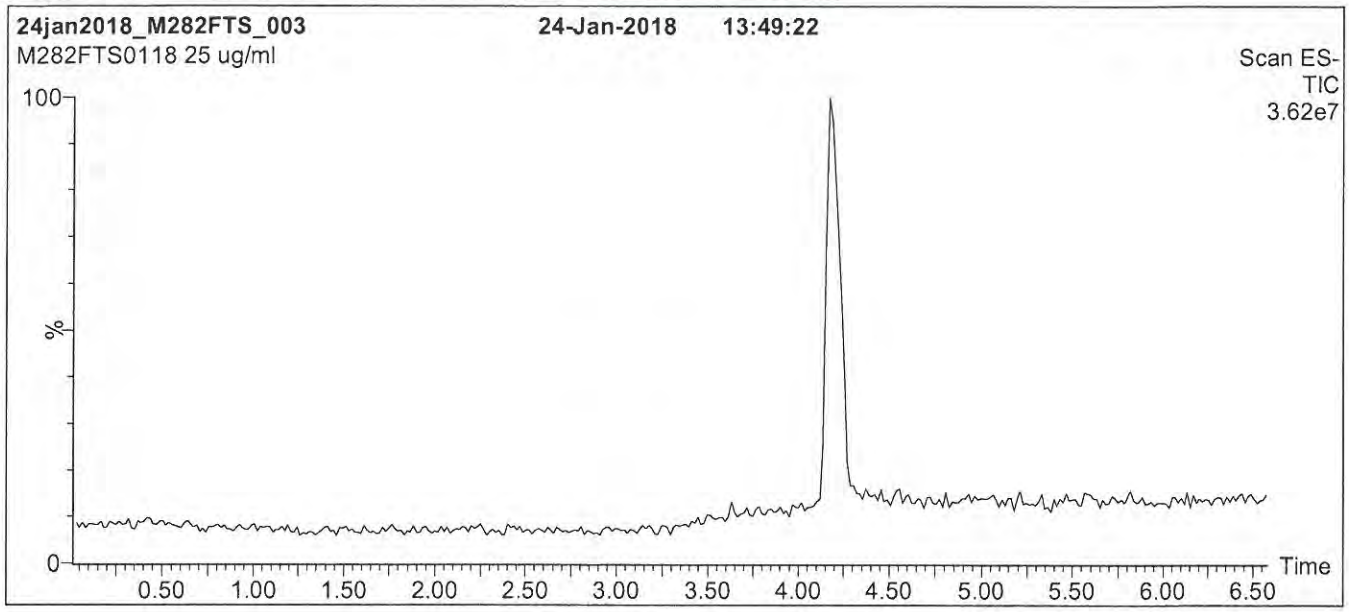
CALA

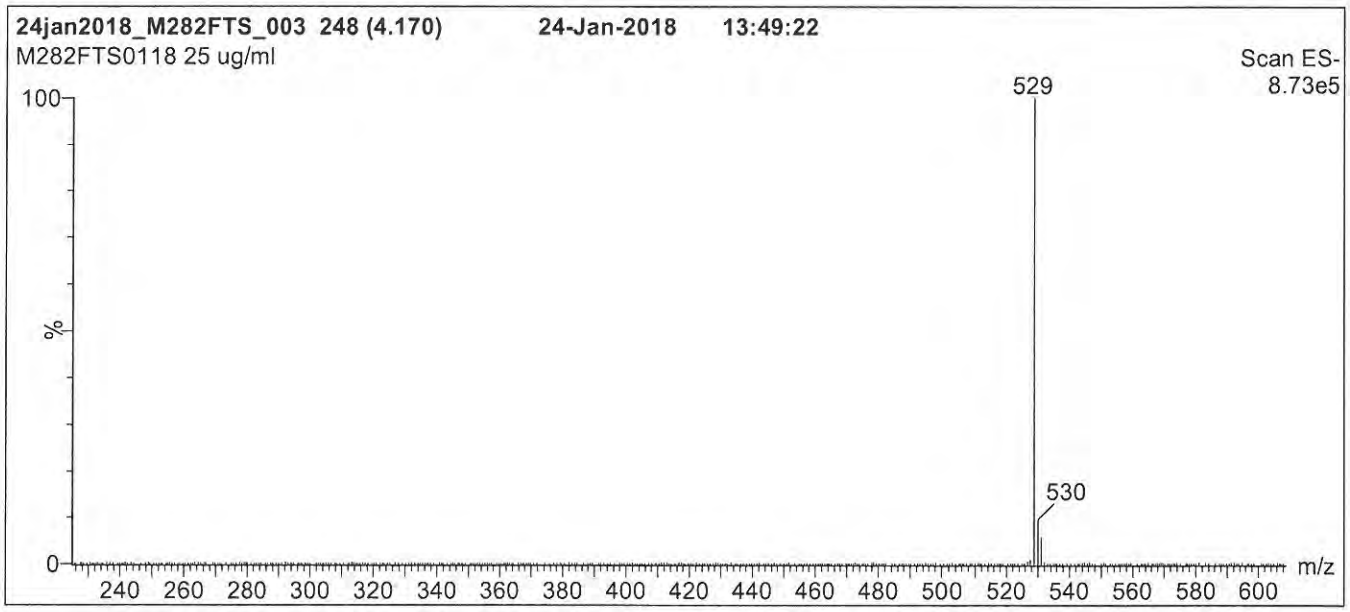
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

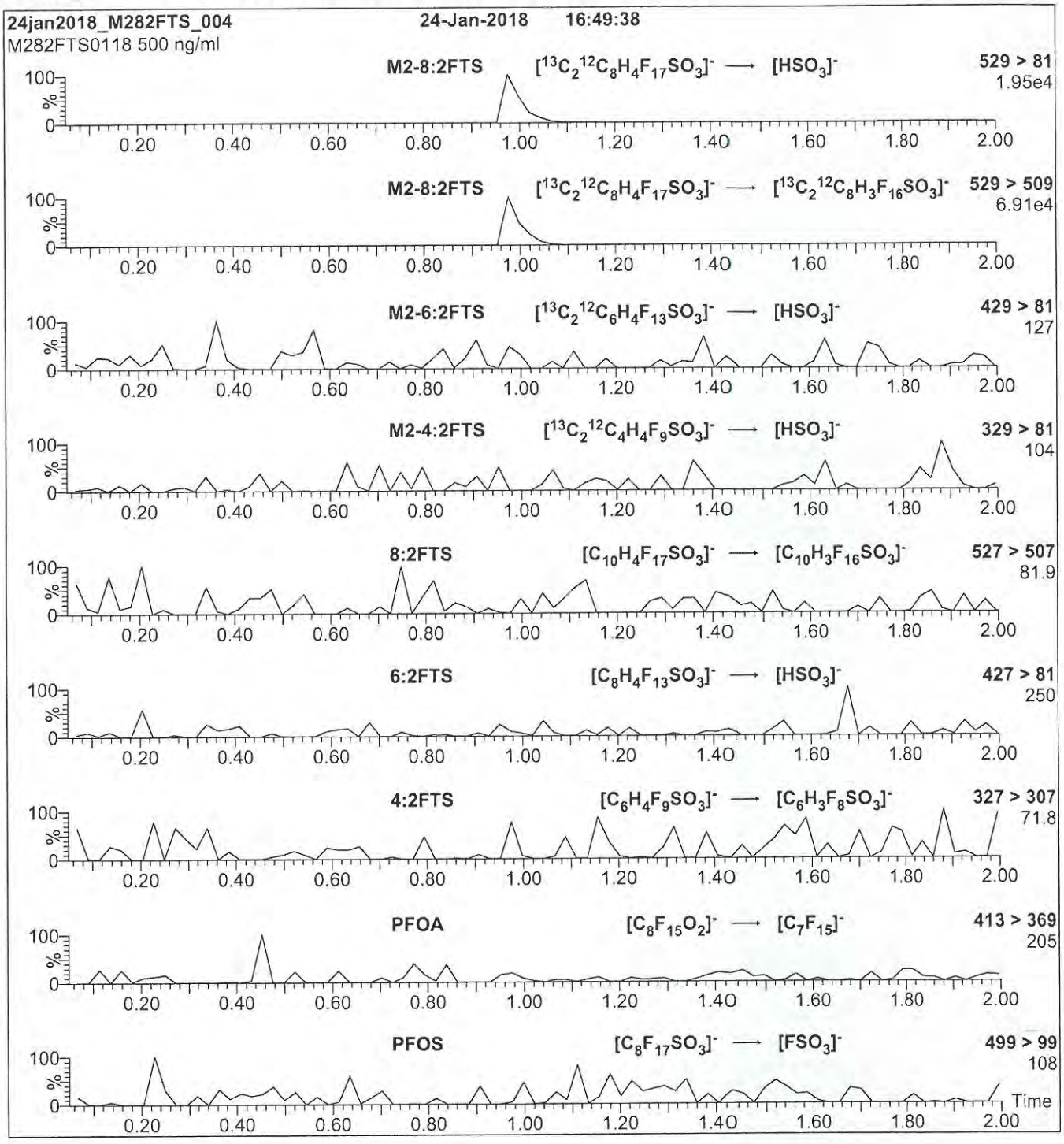
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 25

18F2211

WELLINGTON LABORATORIES

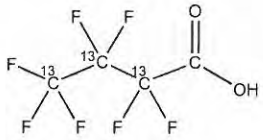
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFBA
COMPOUND: Perfluoro-n-[2,3,4-$^{13}C_3$]butanoic acid

LOT NUMBER: M3PFBA1217

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_3{}^{12}CHF_7O_2$
CONCENTRATION: 50 ± 2.5 µg/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: ≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)

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-[$^{13}C_3$]propanoic acid and also contains ~ 1.0% of perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid due to the naturally occurring isotopic abundance of ^{13}C in the unlabelled carbon atom.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2211

INTENDED USE:

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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.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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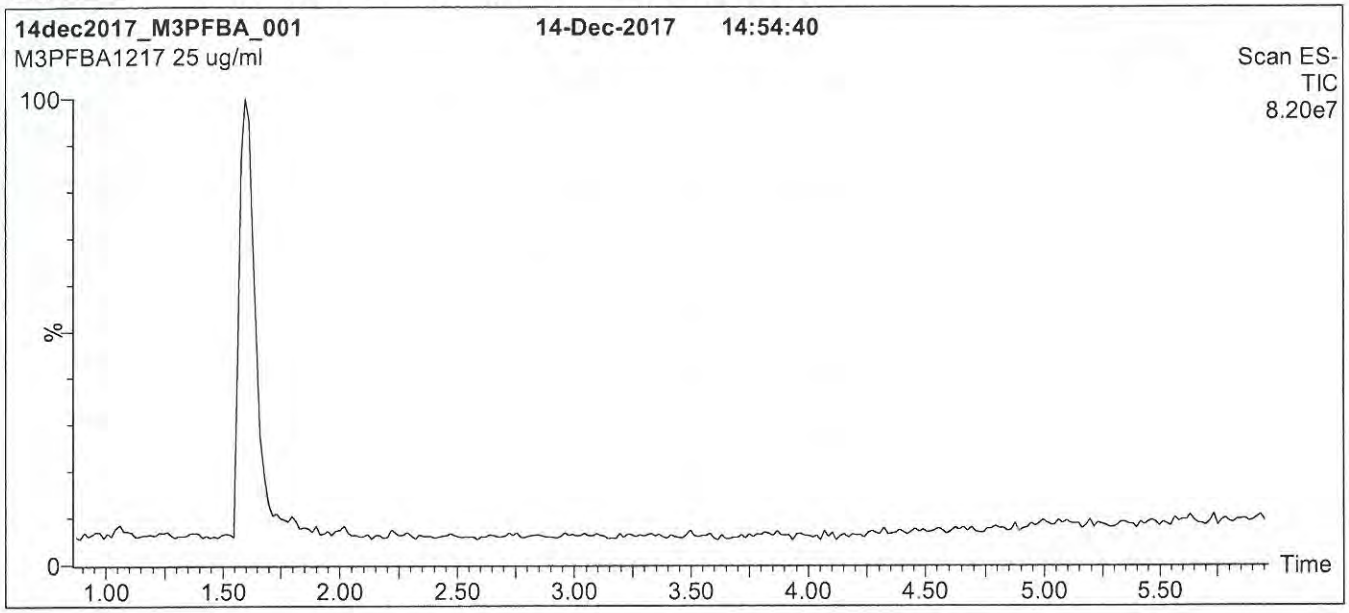
CALA

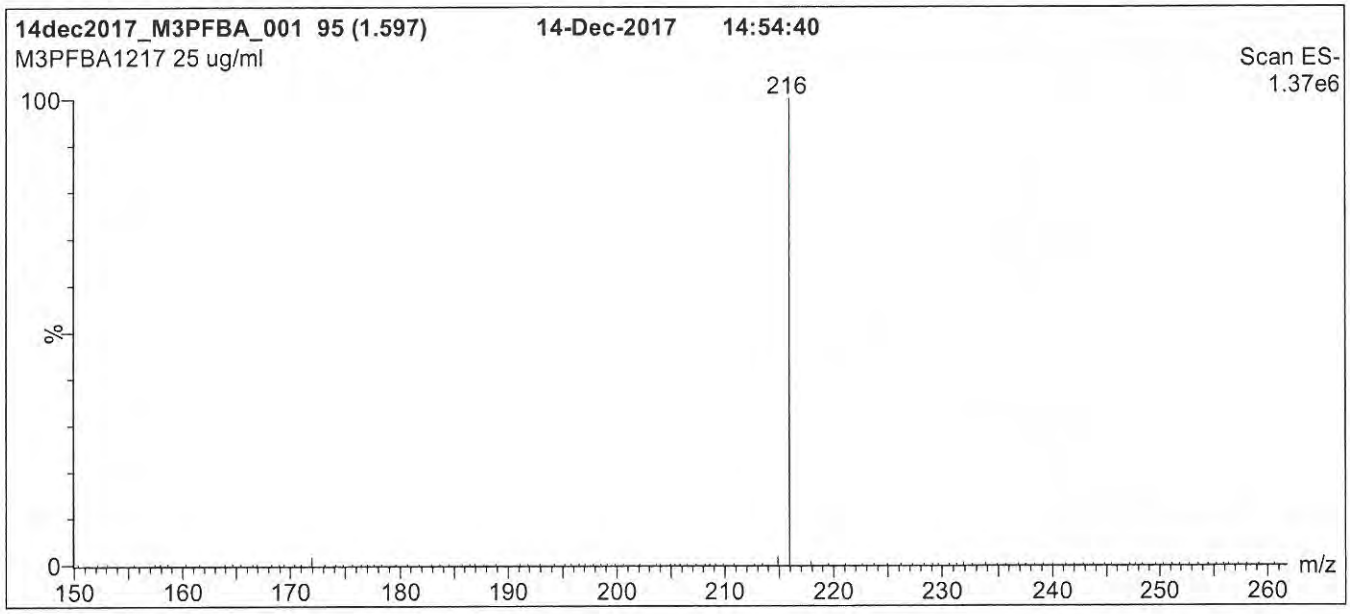
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18F2211

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

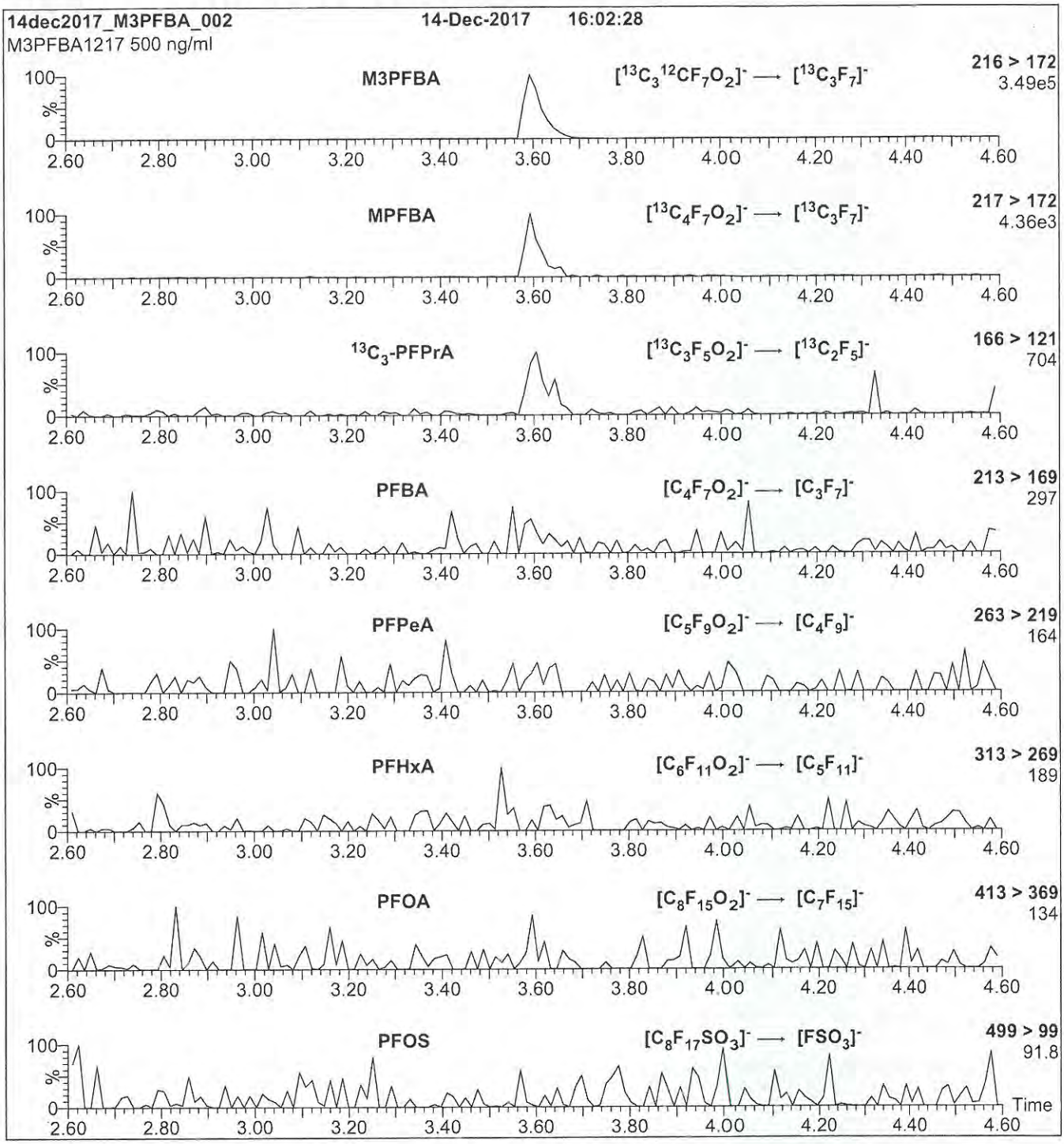
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 10

18F2212

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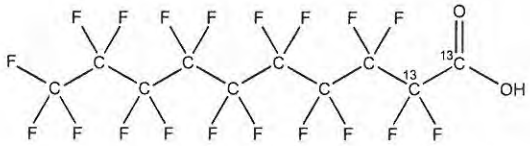
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

LOT NUMBER: MPFDA0218

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{19}O_2$	**MOLECULAR WEIGHT:**	516.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	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 < 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 03/07/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2212

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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).

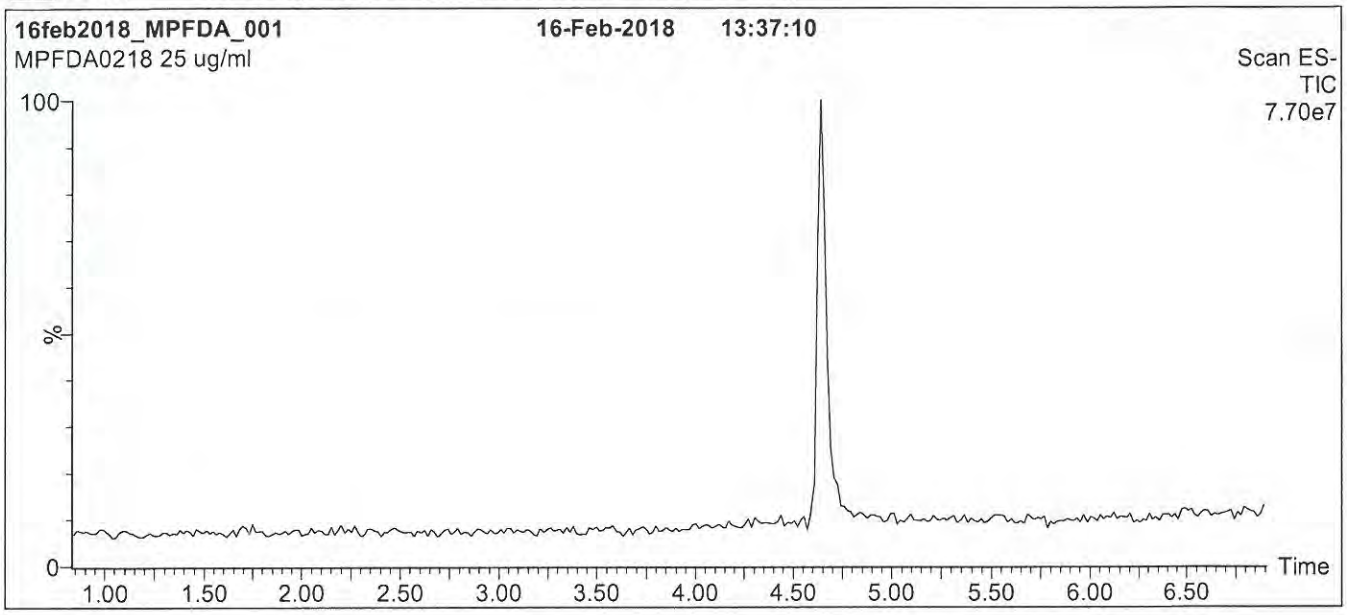
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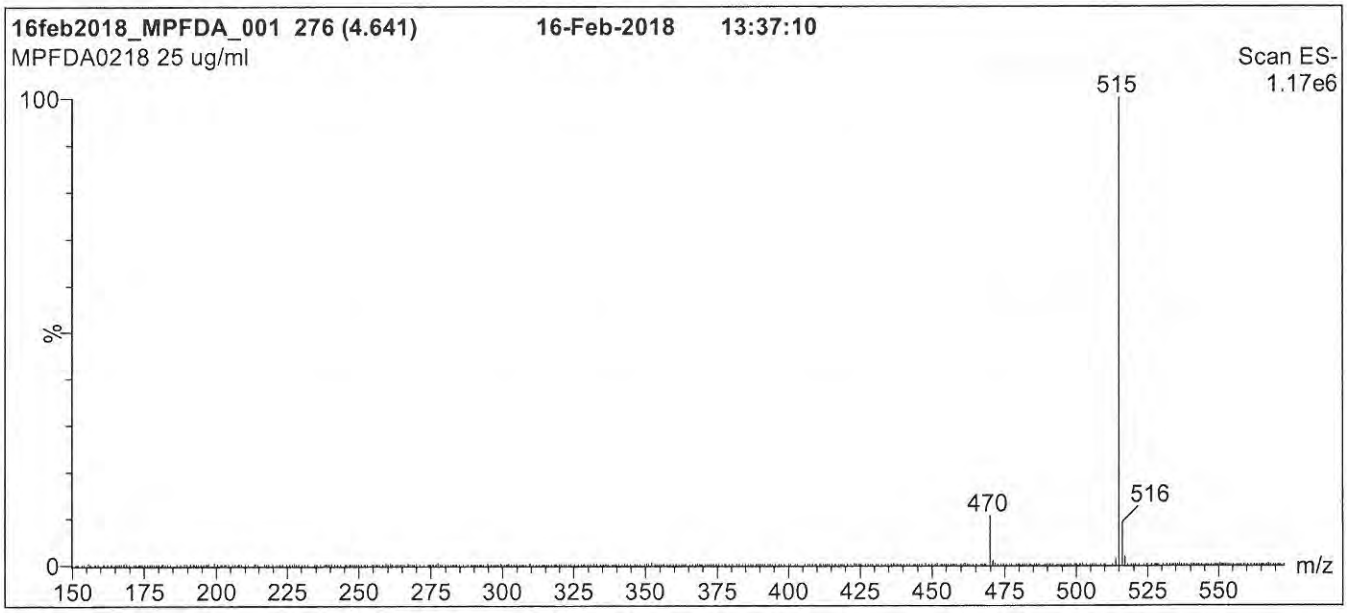
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCERS

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

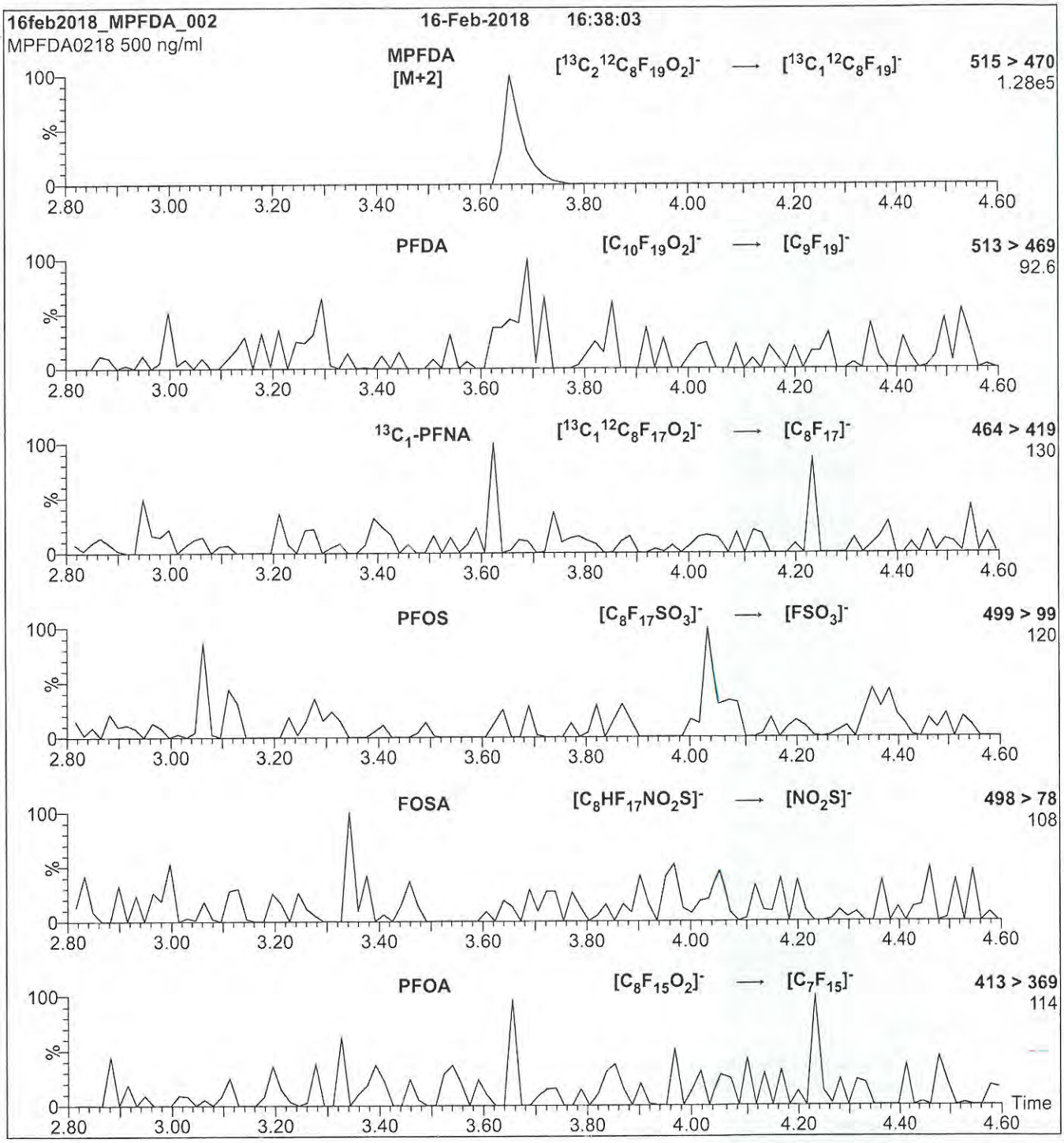
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 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 µl (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

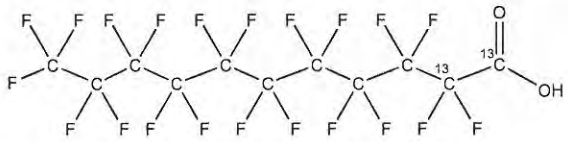
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

18F2213

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFUdA	**LOT NUMBER:**	MPFUdA1116
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_9HF_{21}O_2$	**MOLECULAR WEIGHT:**	566.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/07/2016 (mm/dd/yyyy)
B.G. Chittim

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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

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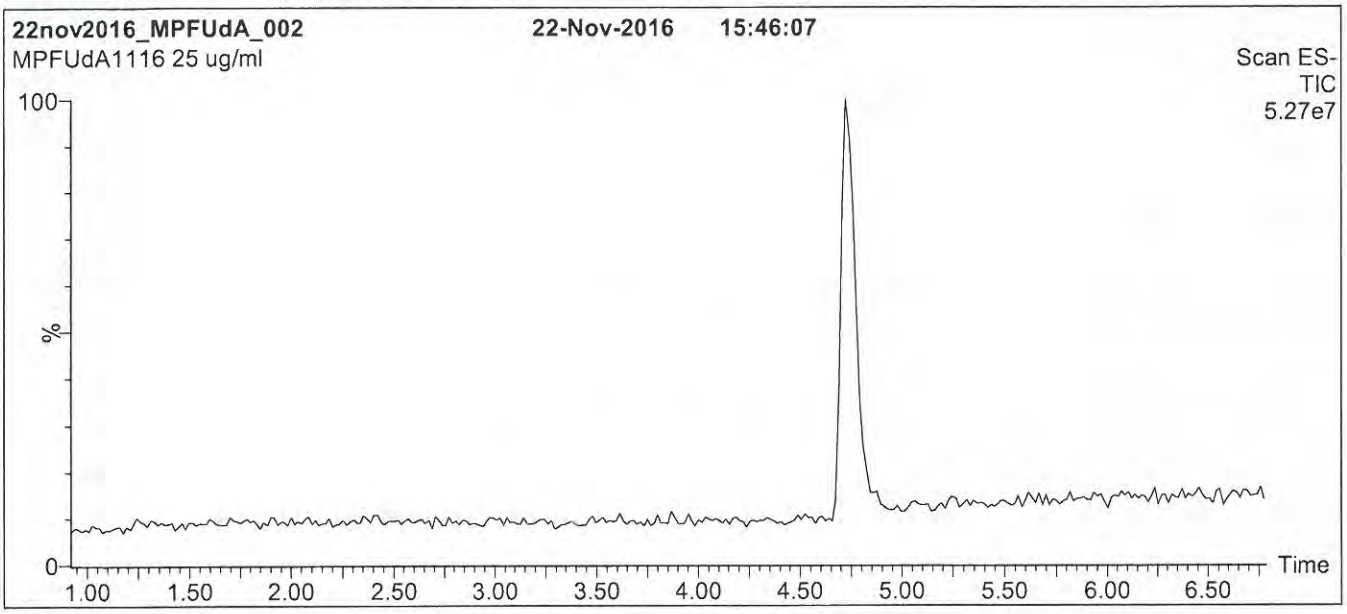
CALA

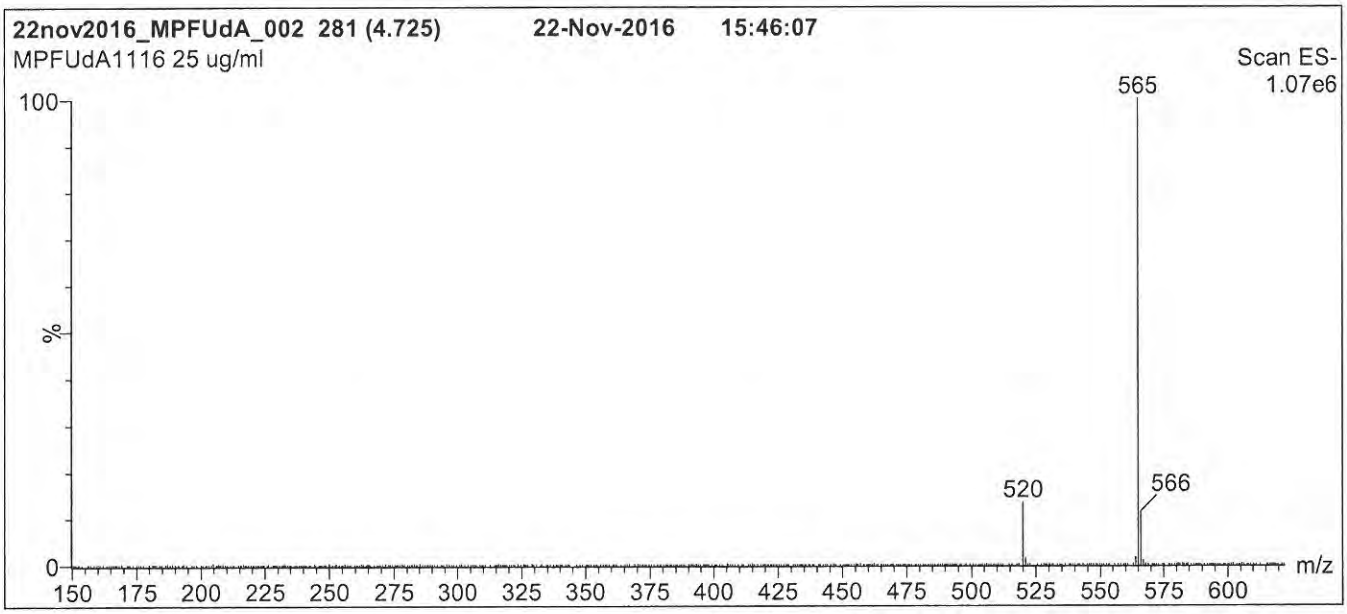
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18F2213

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

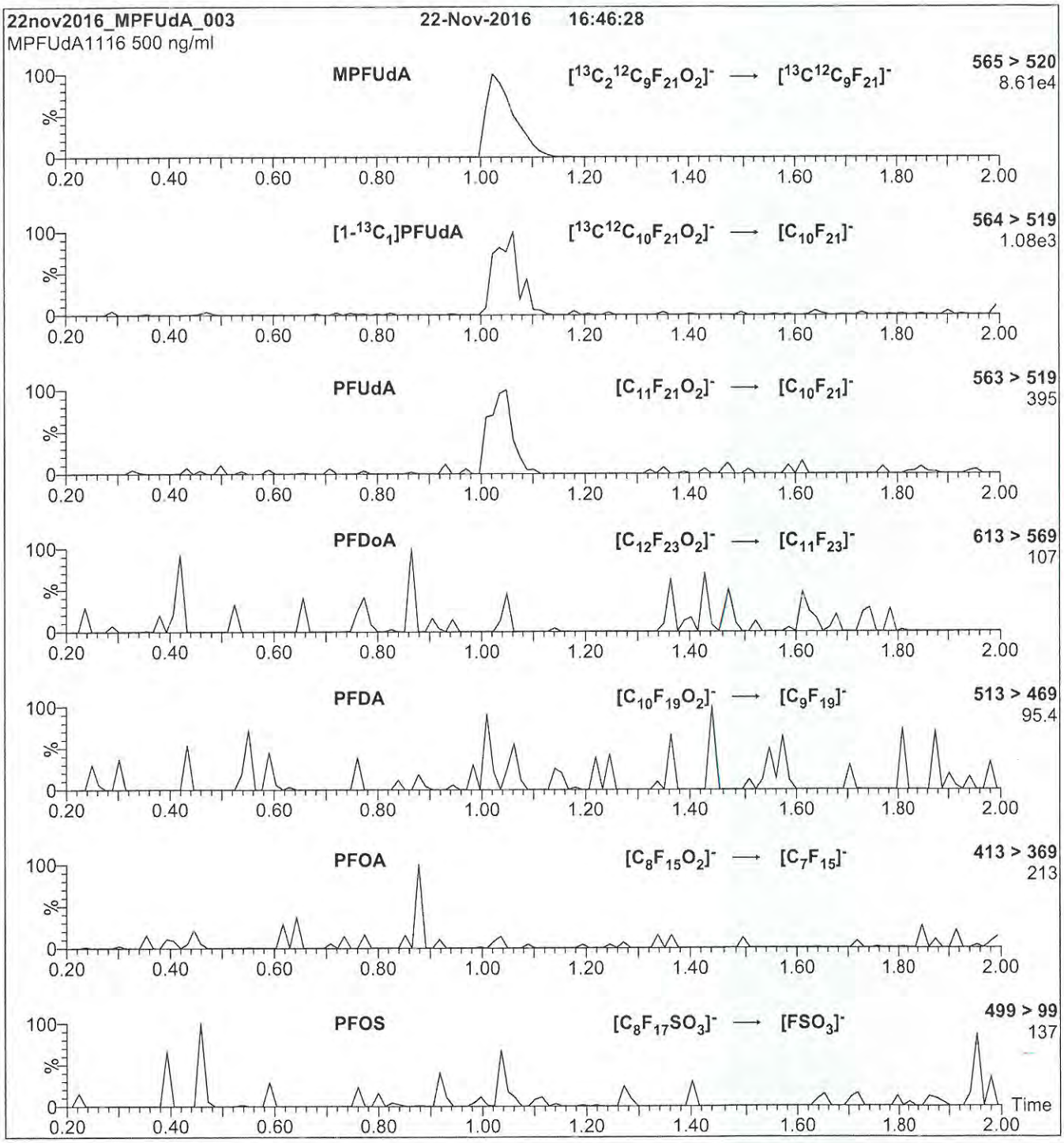
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

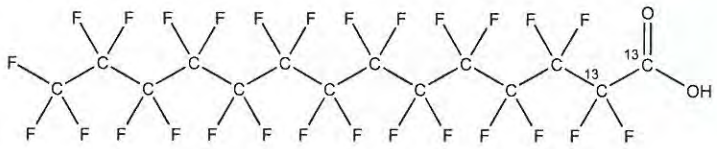
18F2214

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFTeDA
LOT NUMBER: M2PFTeDA1117
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{12}HF_{27}O_2$	**MOLECULAR WEIGHT:**	716.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/30/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/30/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/01/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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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).

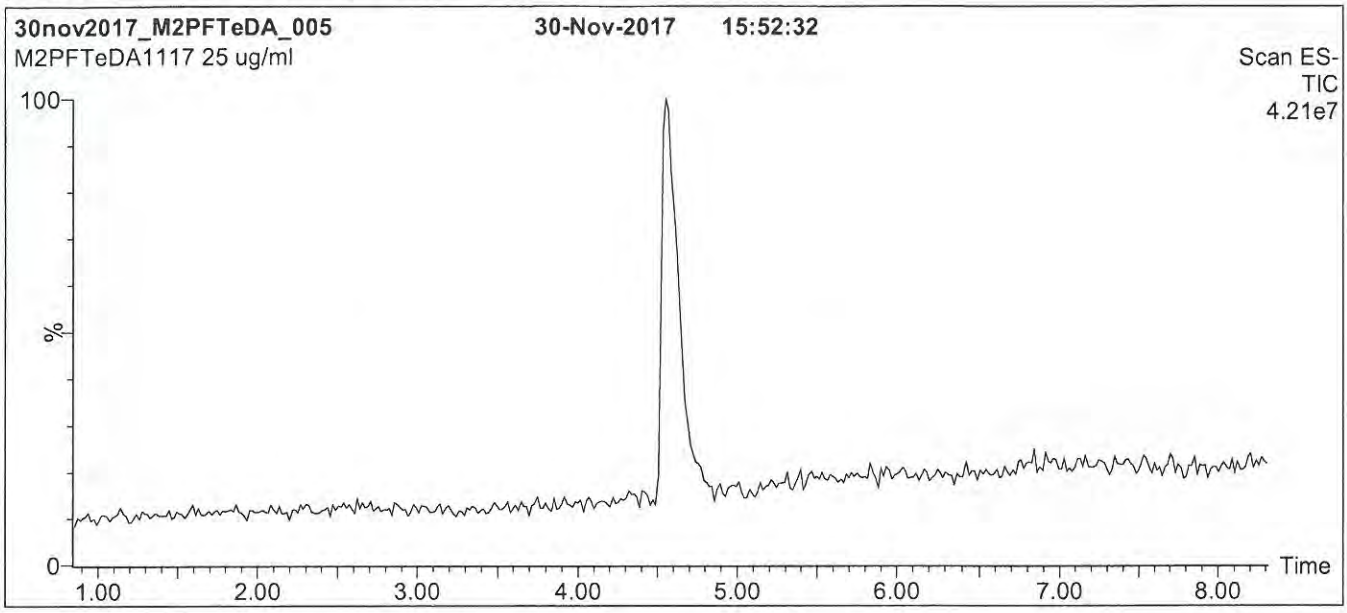
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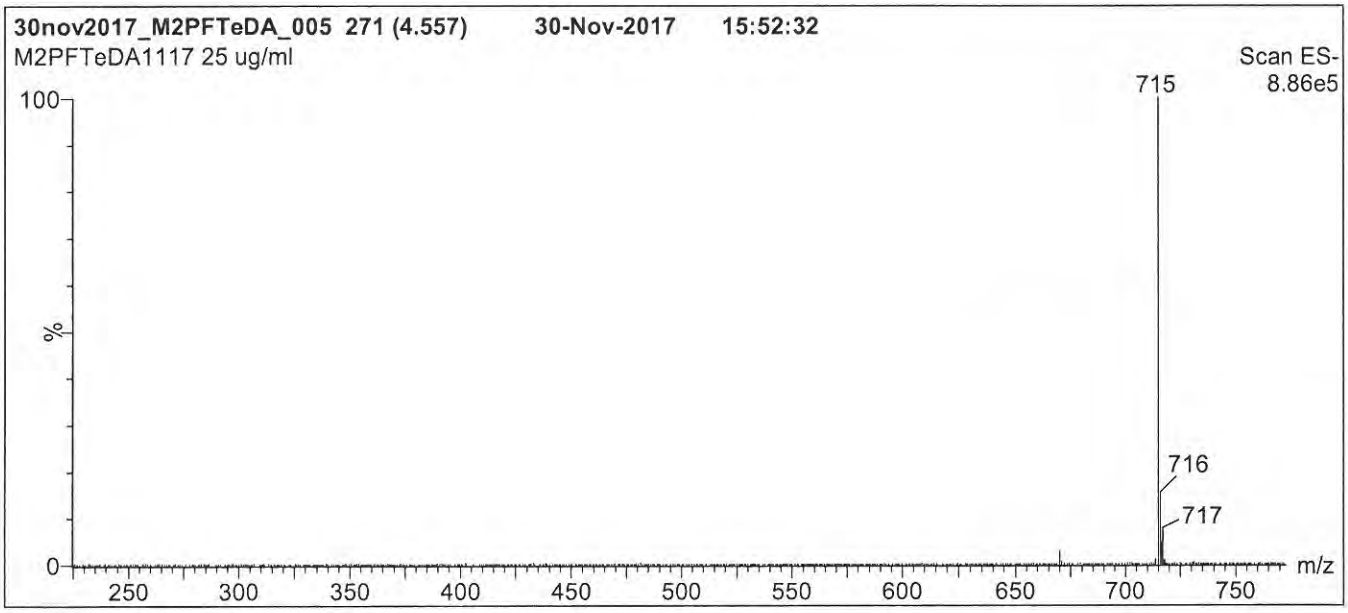
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18F2214

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

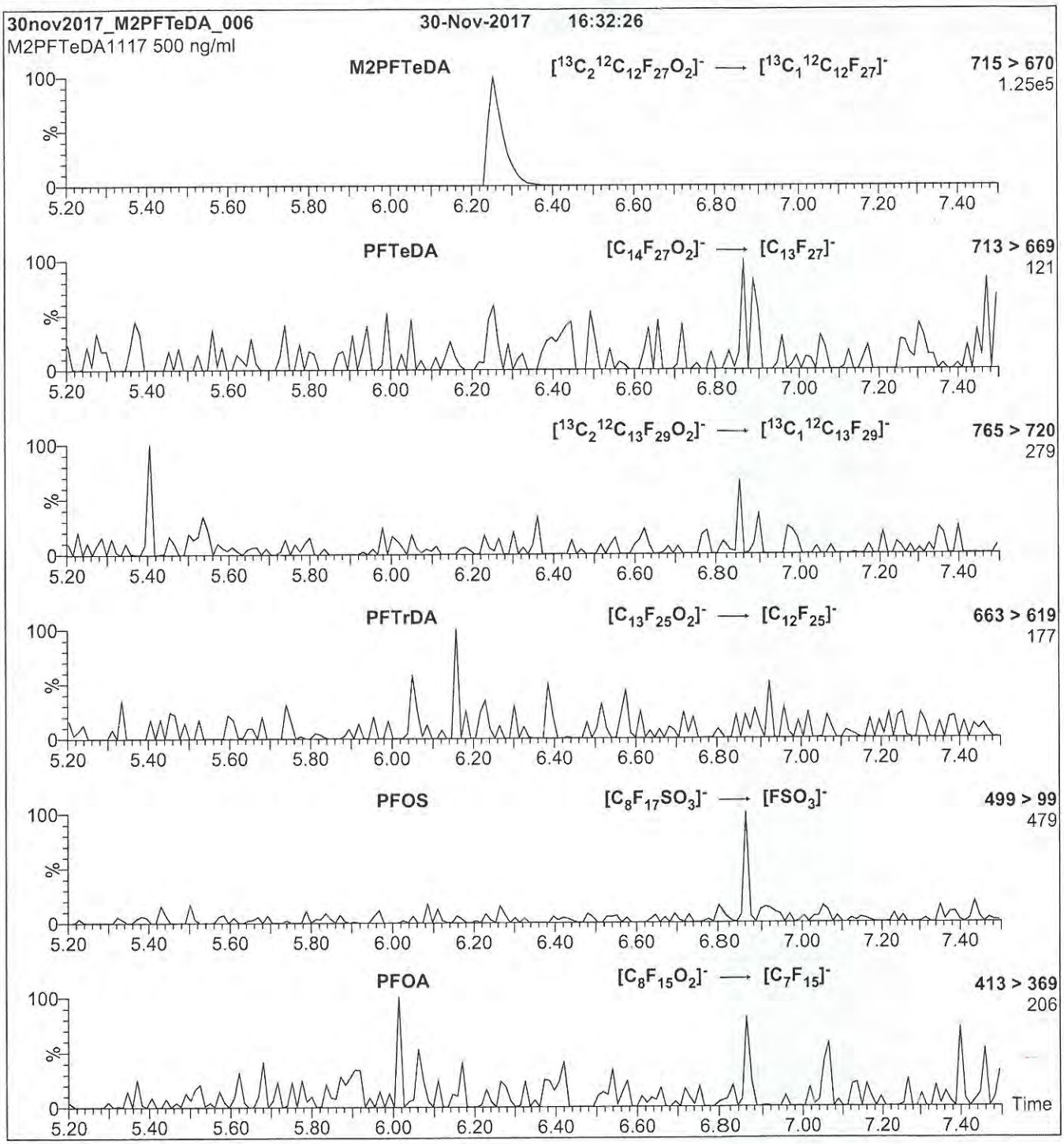
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

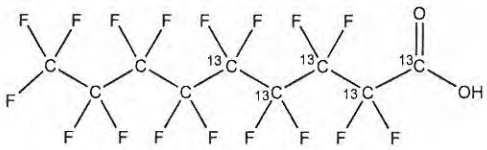
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 14

18F2215

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFNA	**LOT NUMBER:**	MPFNA1217
COMPOUND:	Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_4HF_{17}O_2$	**MOLECULAR WEIGHT:**	469.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	12/14/2017		
EXPIRY DATE: (mm/dd/yyyy)	12/14/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/19/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

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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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:

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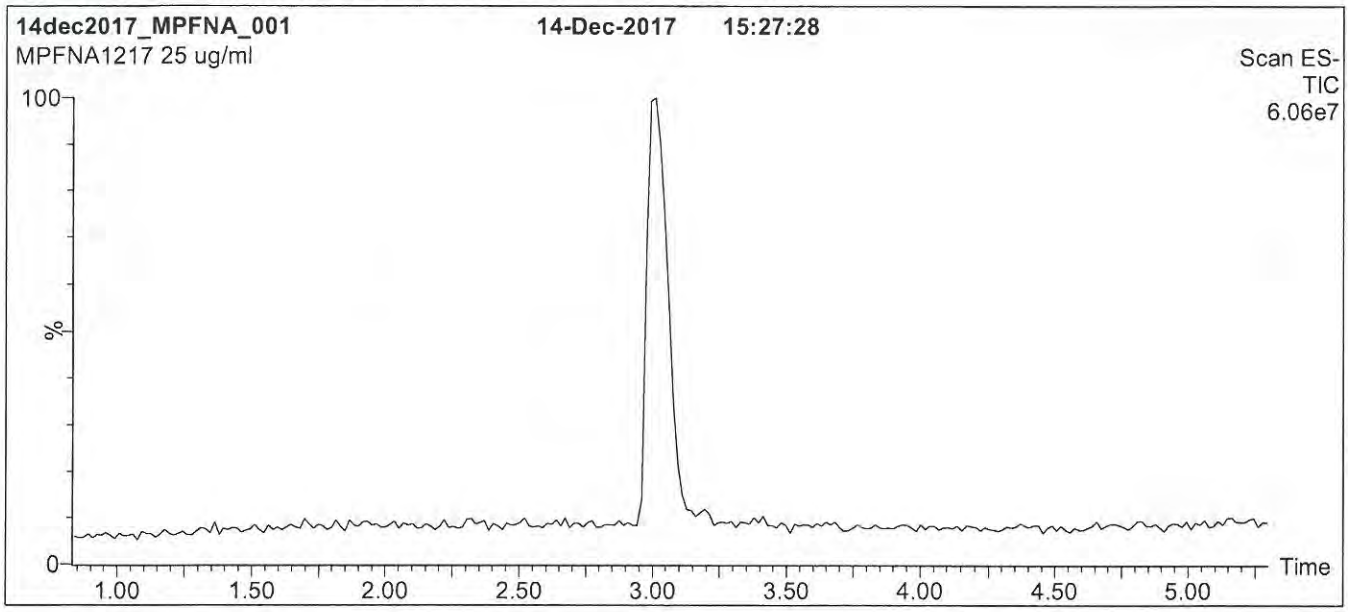
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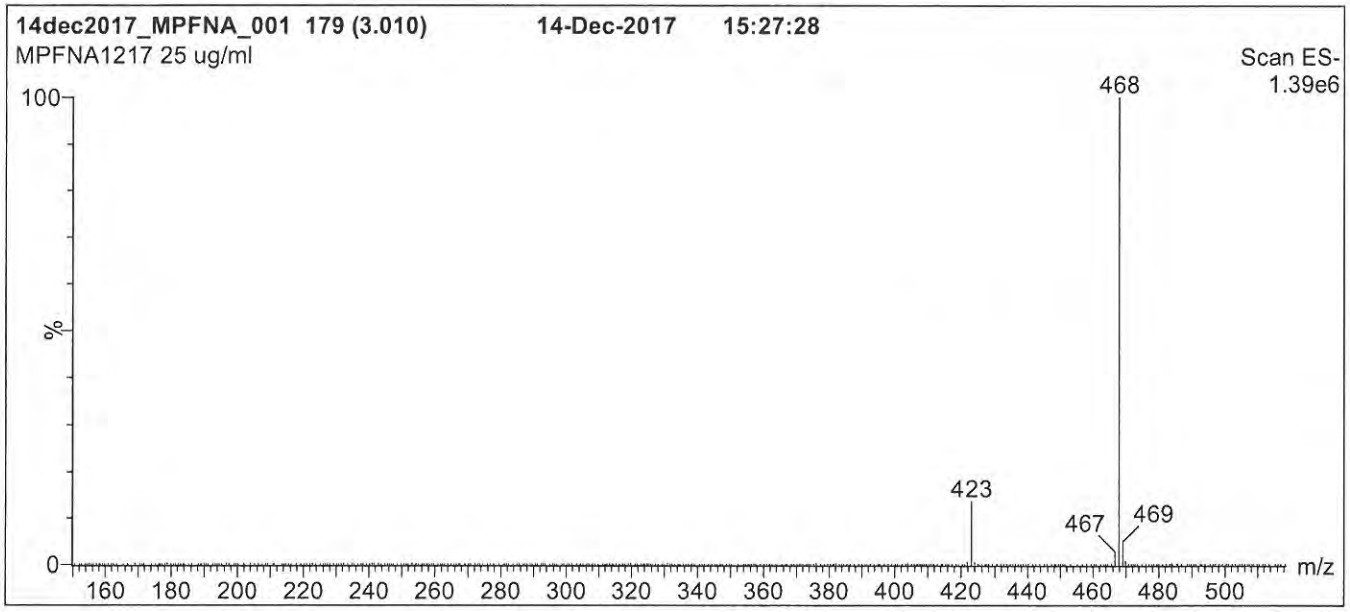
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

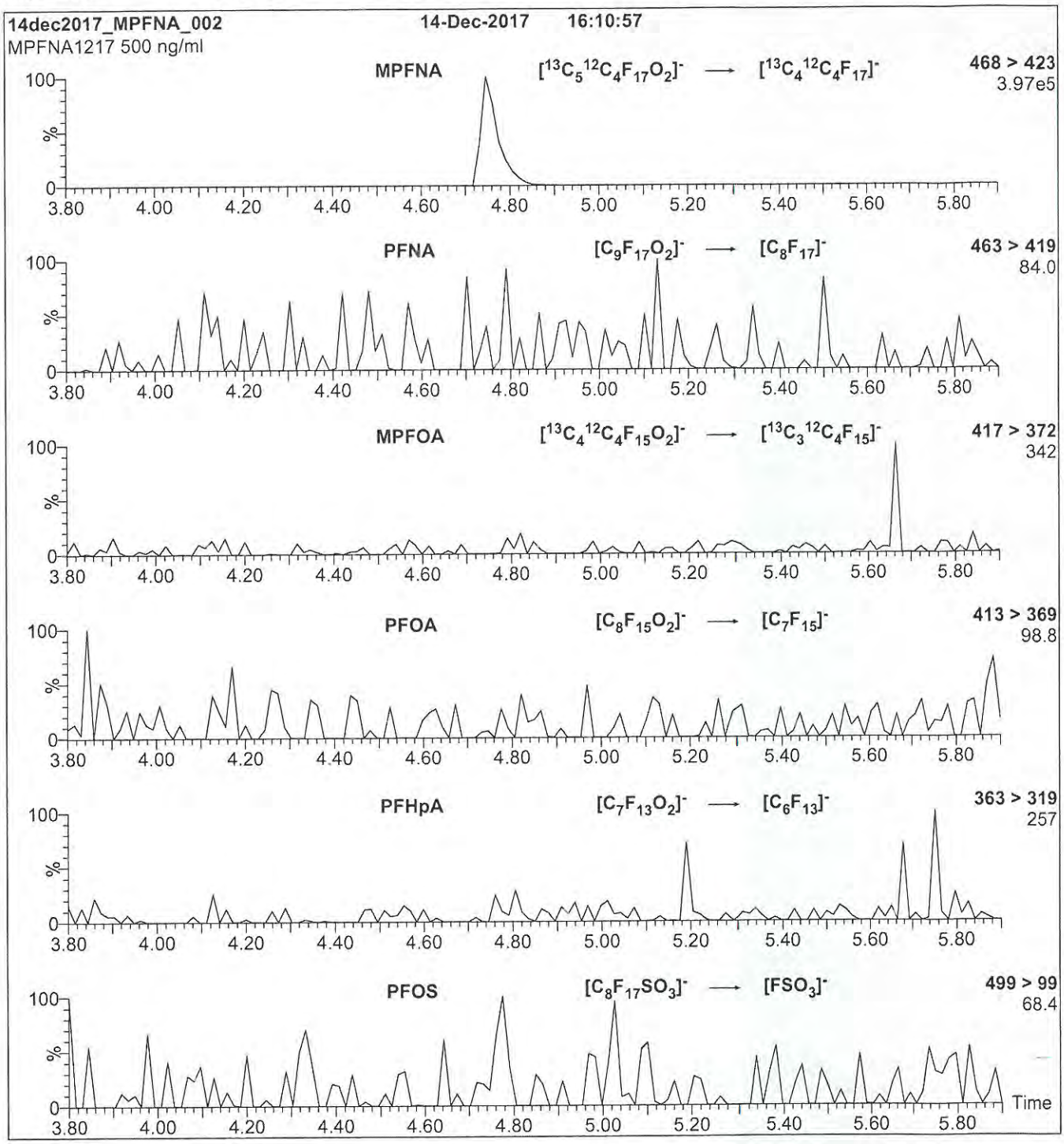
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

18F2216

WELLINGTON LABORATORIES

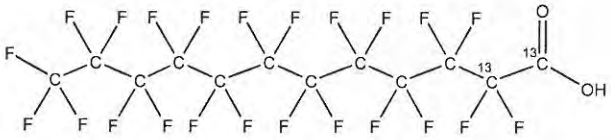
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDoA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid

LOT NUMBER: MPFDoA0218

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	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: _____ **Date:** 02/23/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

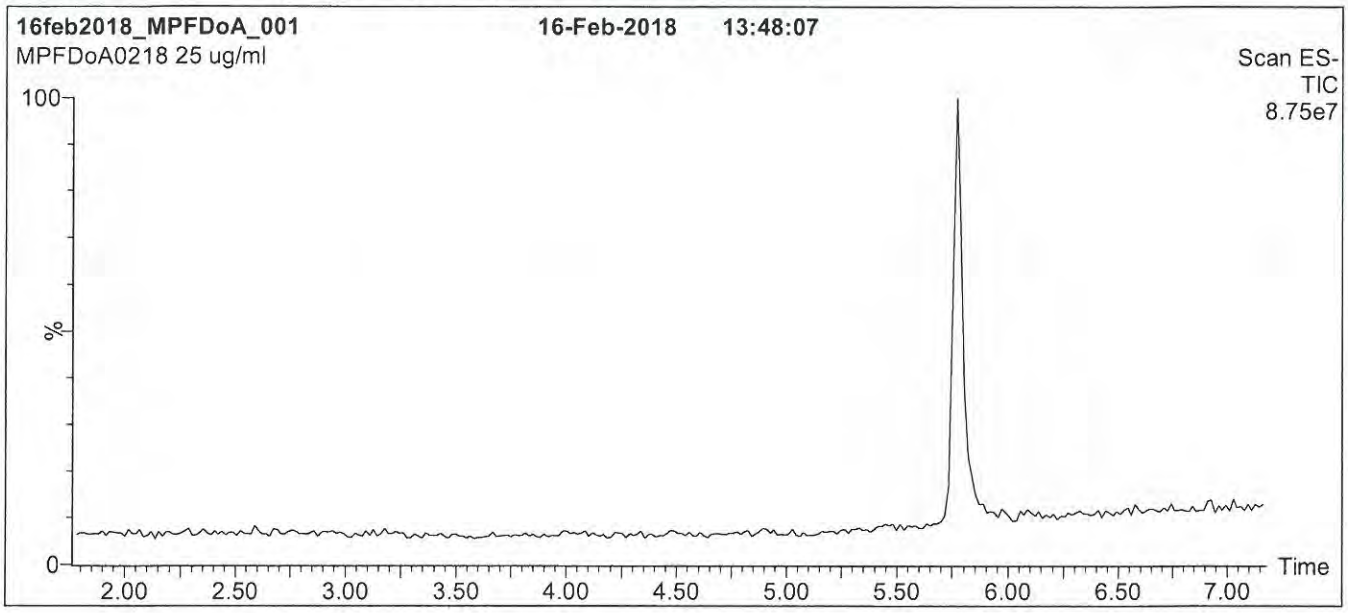
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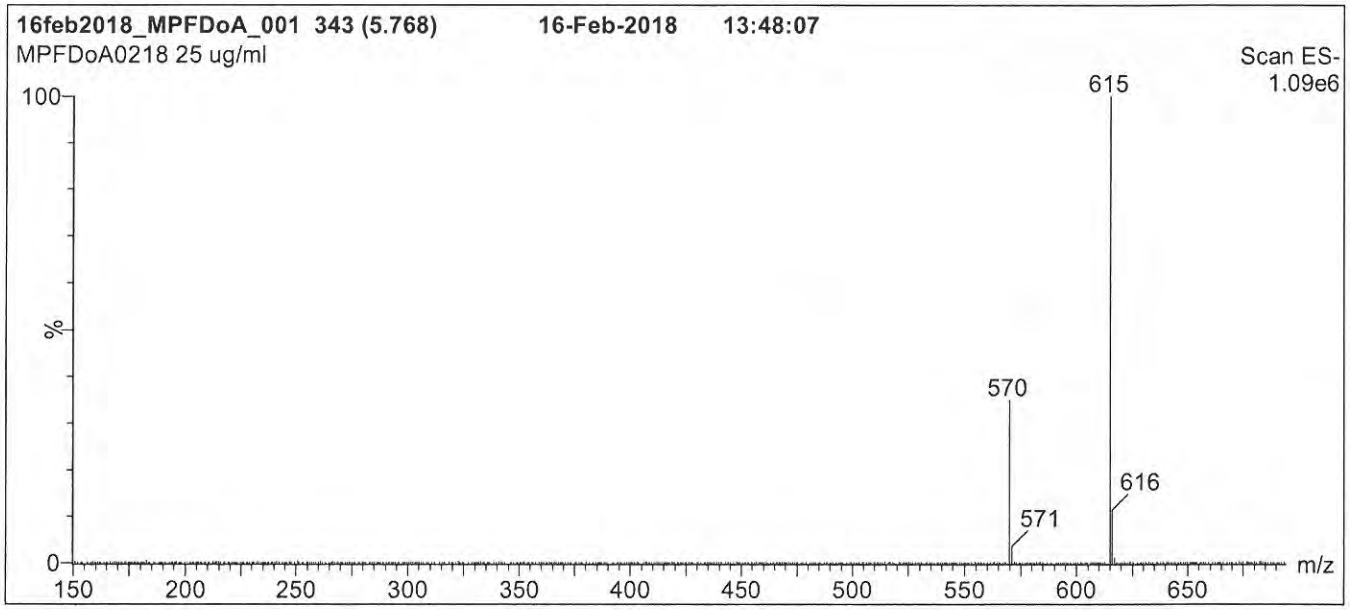
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

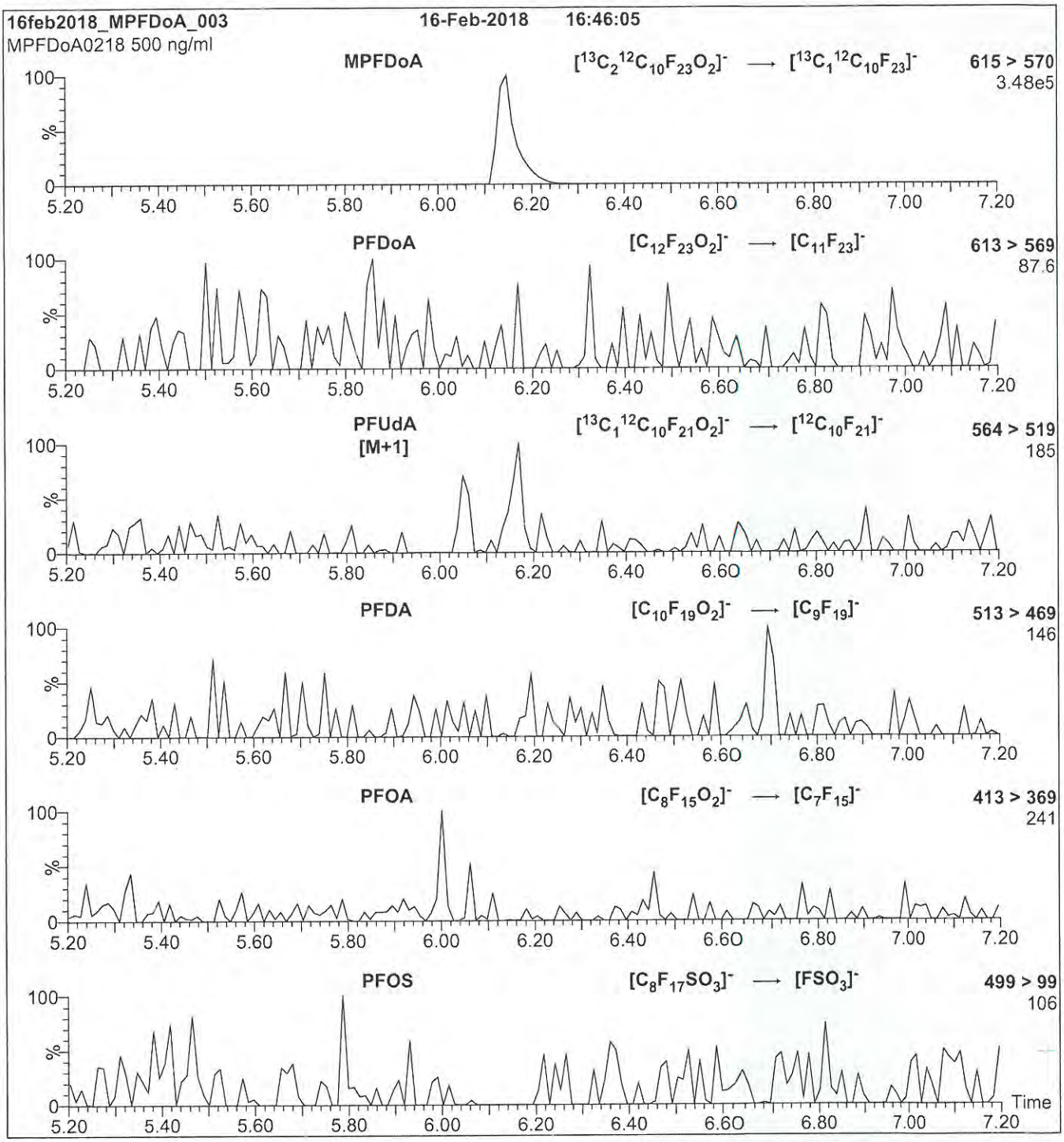
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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 µl/min

MS Parameters

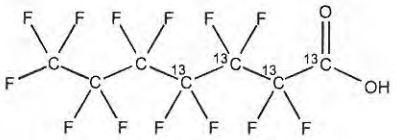
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 13

18F2217

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M4PFHpA	**LOT NUMBER:**	M4PFHpA0517
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/03/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/03/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/11/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

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SYNTHESIS / CHARACTERIZATION:

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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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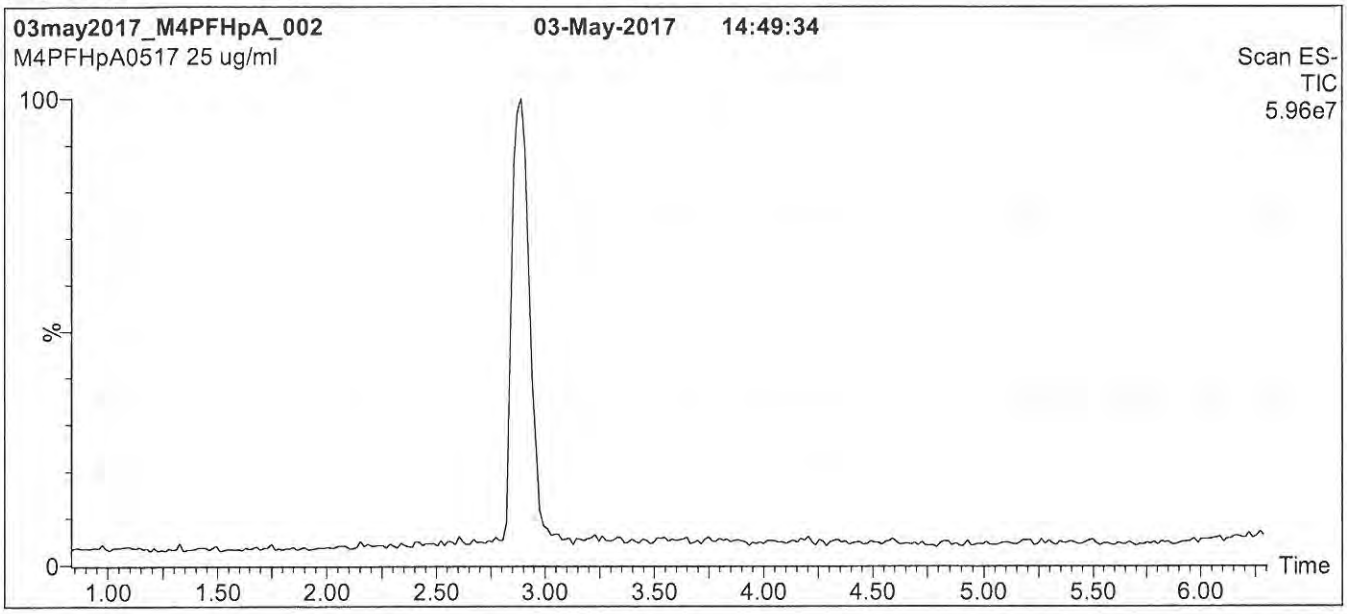
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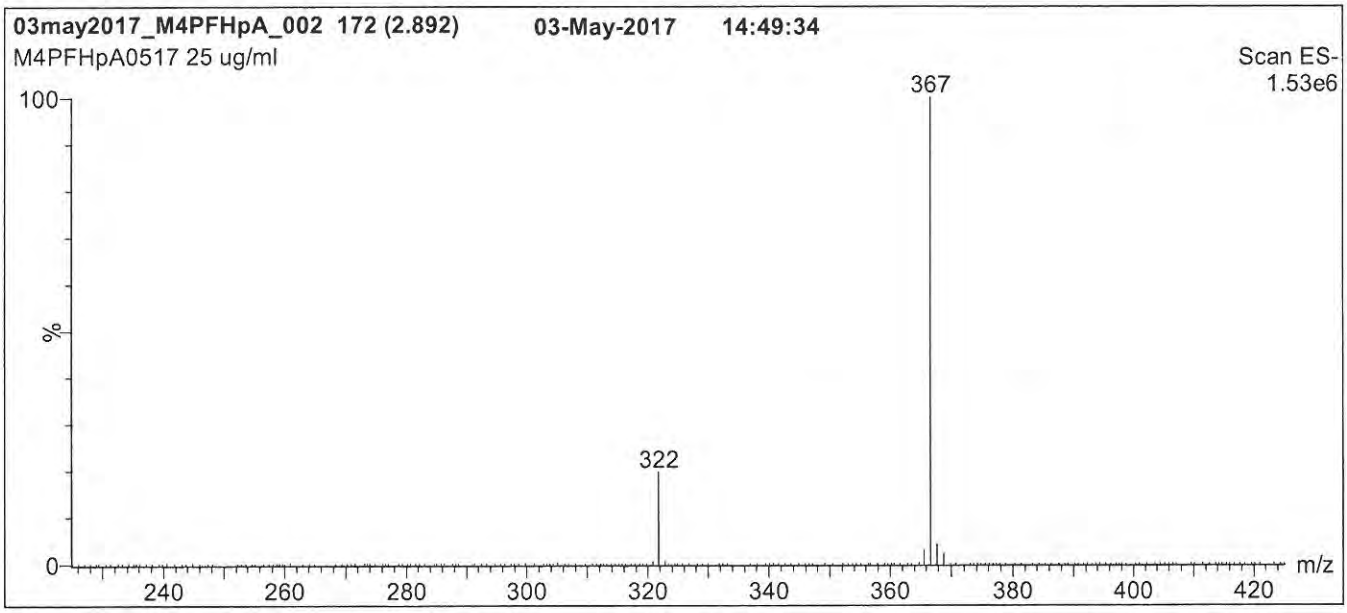
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18F2217

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

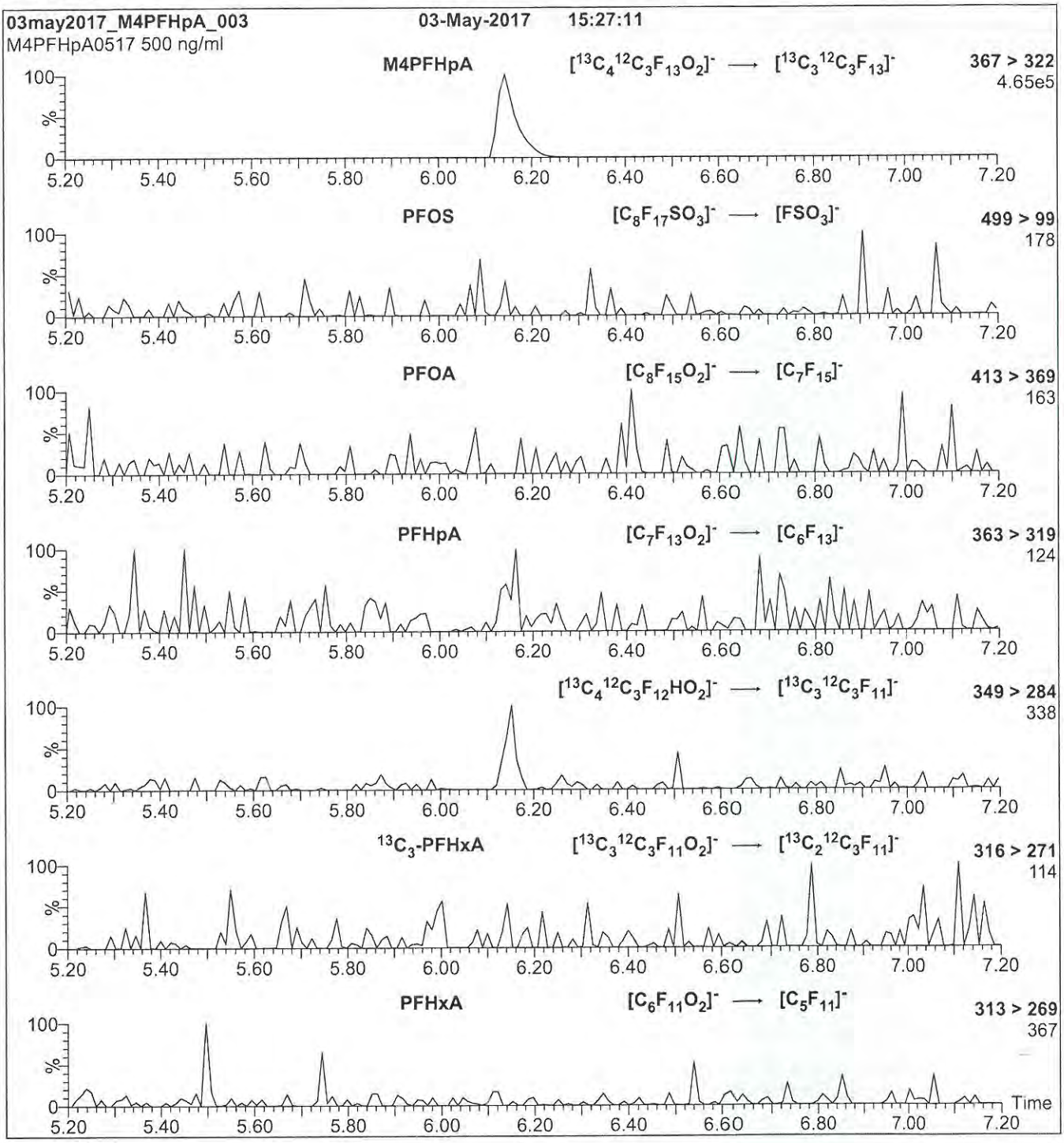
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 9

18F2218

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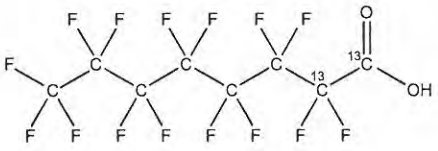
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid

LOT NUMBER: M2PFOA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6HF_{15}O_2$	**MOLECULAR WEIGHT:**	416.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	10/26/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/26/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2218

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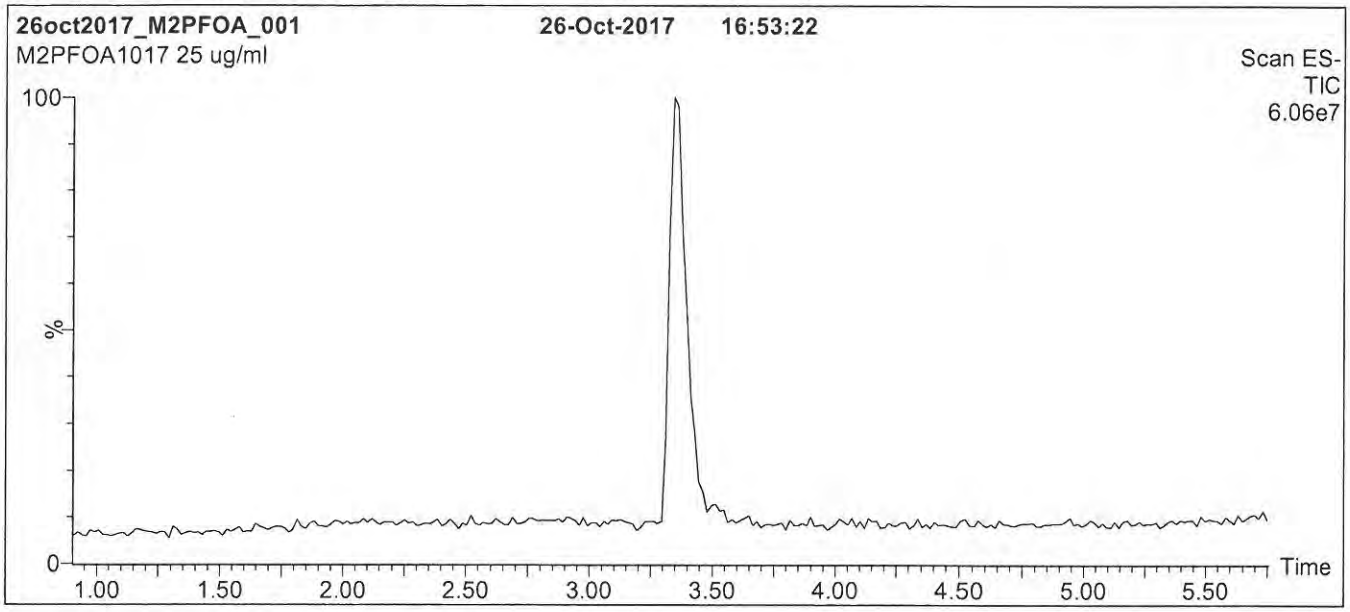
CALA

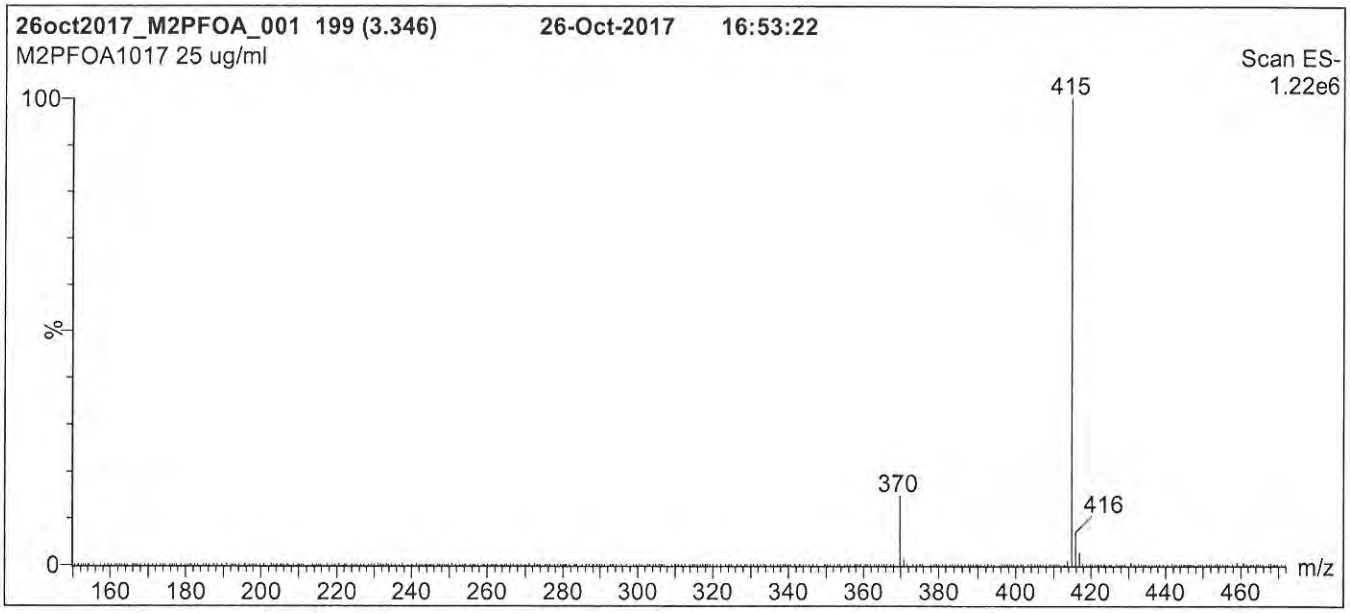
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

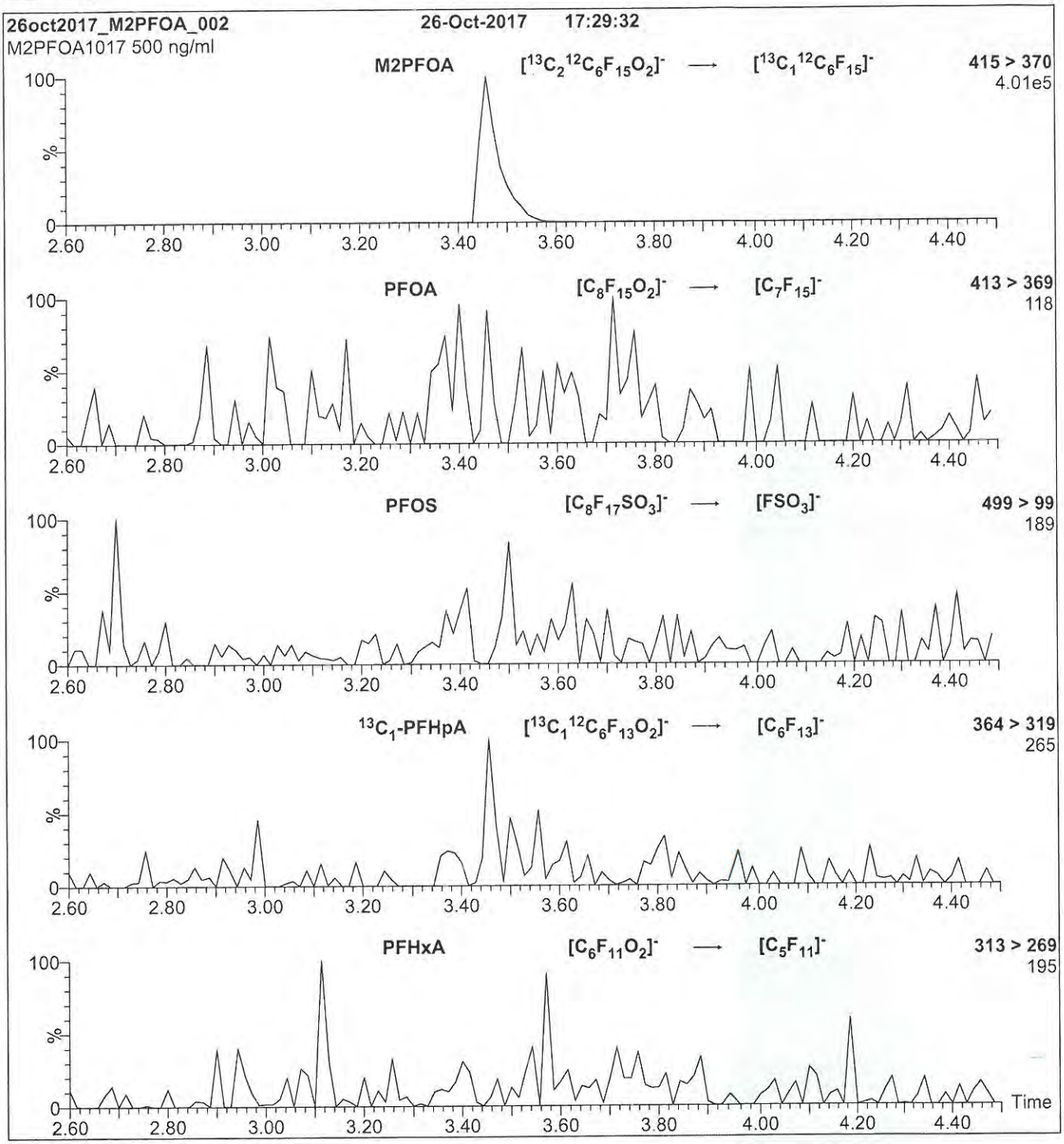
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

18F2219

WELLINGTON LABORATORIES

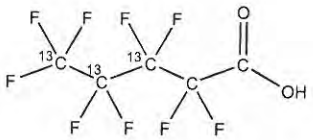
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M3PFPeA
COMPOUND: Perfluoro-n-[3,4,5-$^{13}C_3$]pentanoic acid

LOT NUMBER: M3PFPeA0417

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_3{}^{12}C_2HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 267.02
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
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

ISOTOPIC PURITY: ≥99% ^{13}C ($3,4,5$-$^{13}C_3$)

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 ~ 0.95% of perfluoro-n-[$^{13}C_3$]butanoic acid and 0.05% of perfluoro-1-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/24/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2219

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

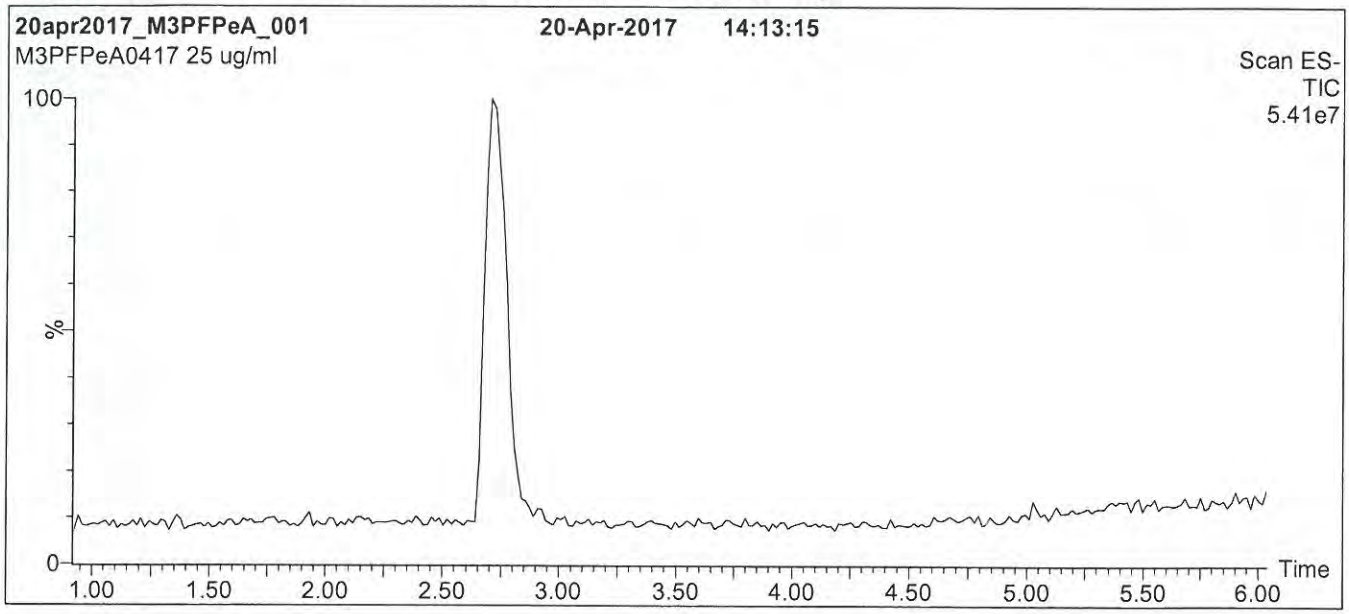
CALA

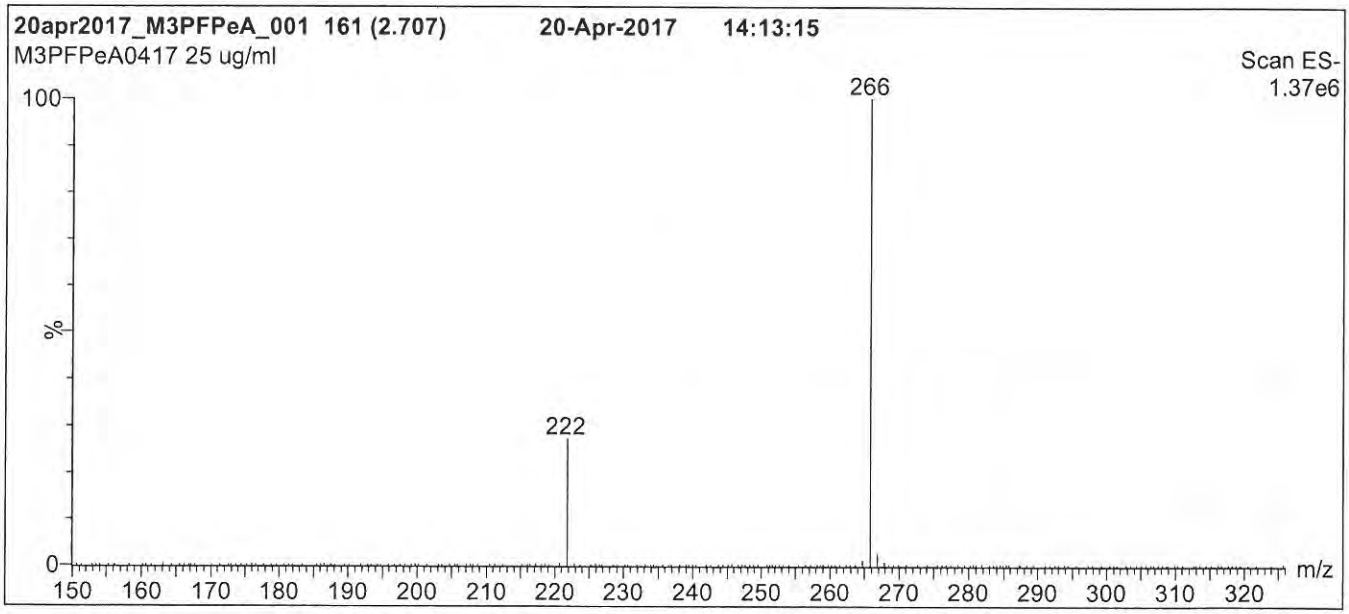
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

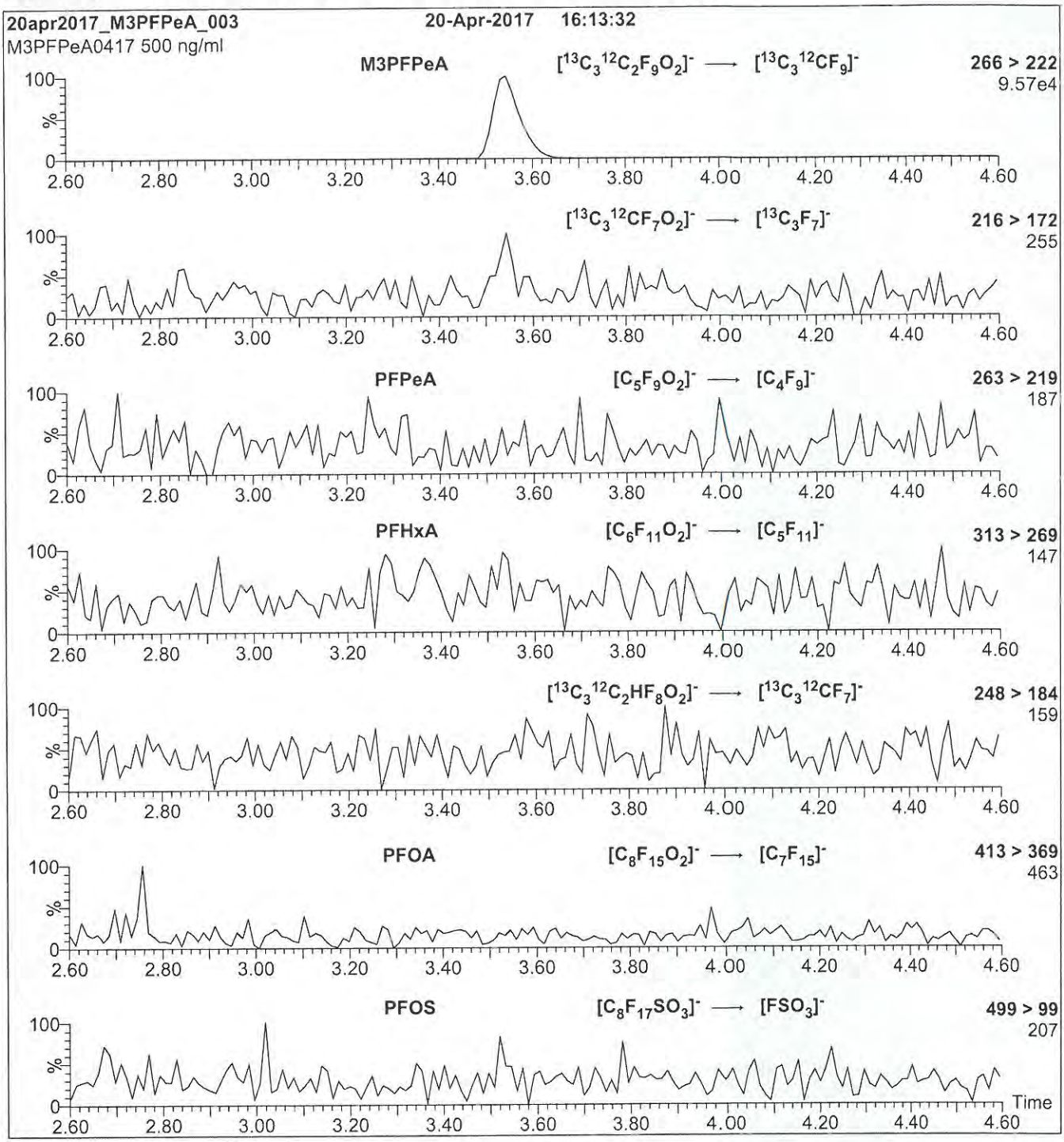
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18F2220

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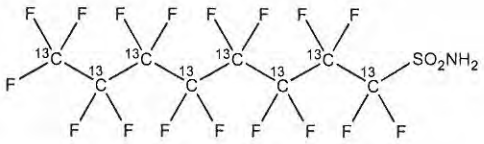
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[$^{13}C_8$]octanesulfonamide

LOT NUMBER: M8FOSA1017I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	10/11/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/11/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 1.1% of perfluoro-1-[$^{13}C_4$]octanesulfonamide and ~ 0.01% of perfluoro-1-[$^{13}C_7$]heptanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2220

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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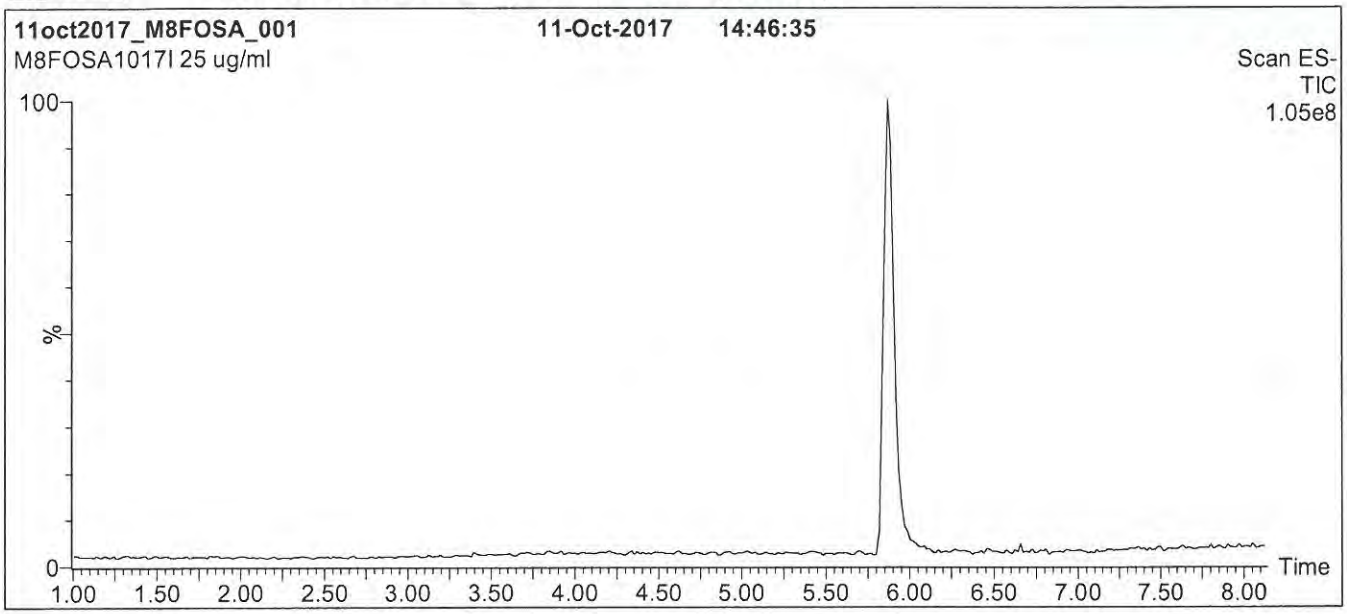
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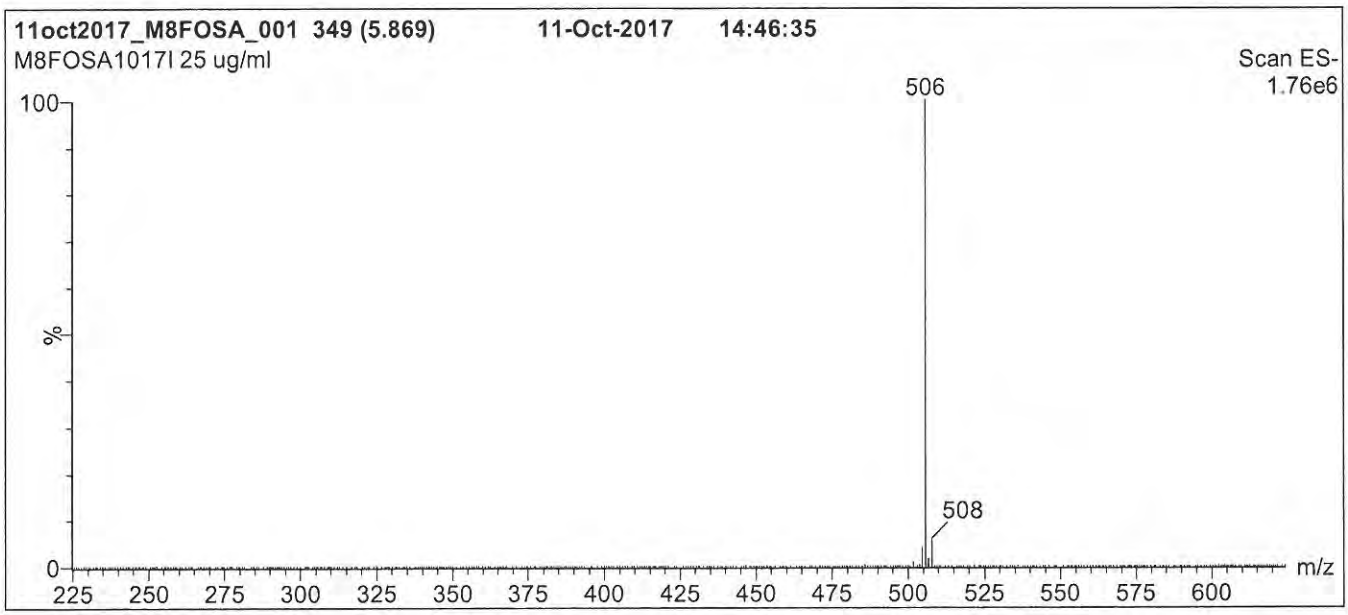
ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

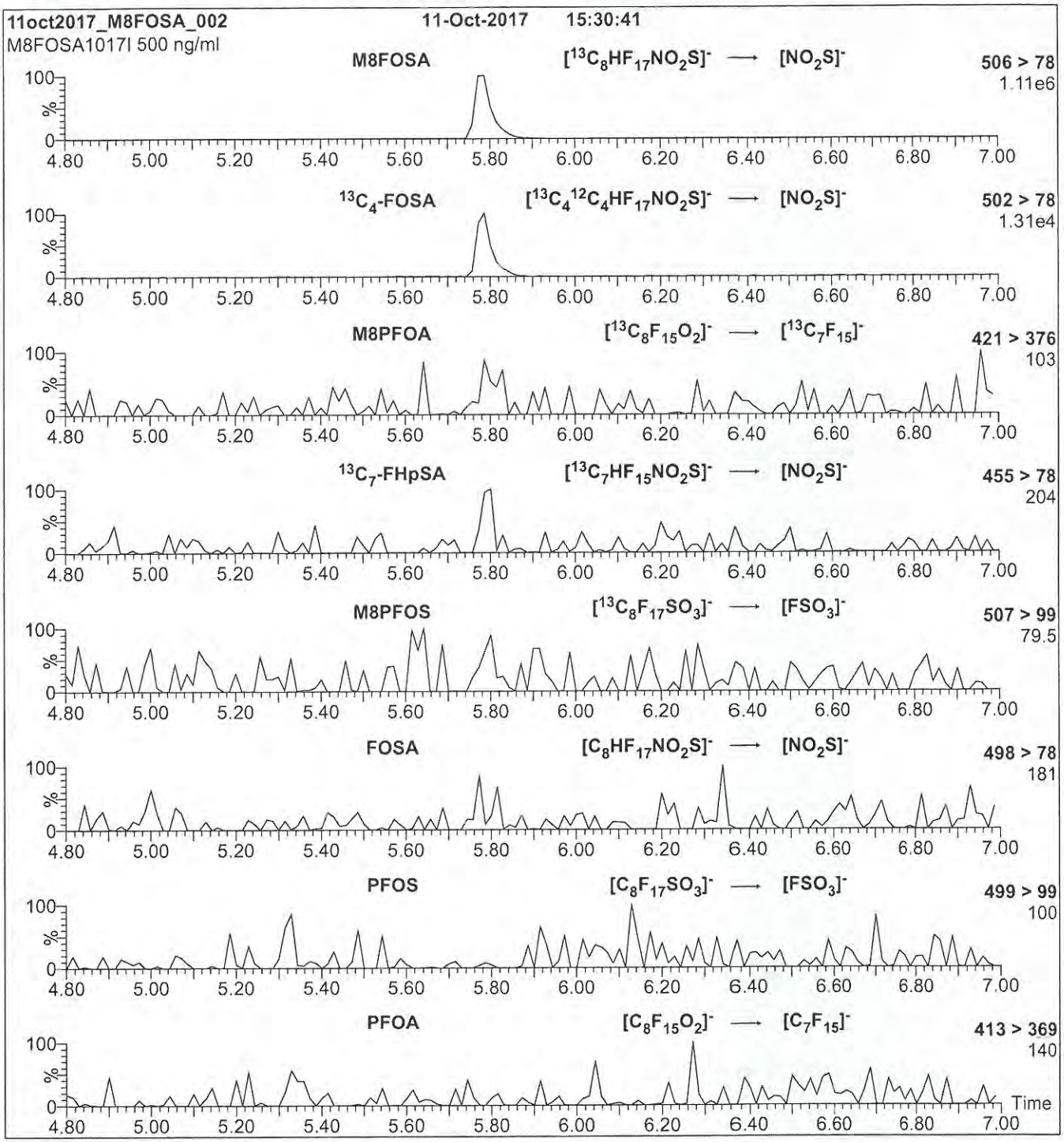
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18F2221

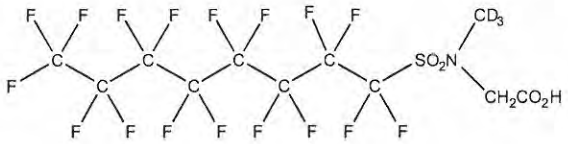
WELLINGTON LABORATORIES

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:	$C_{11}D_3H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	574.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2221

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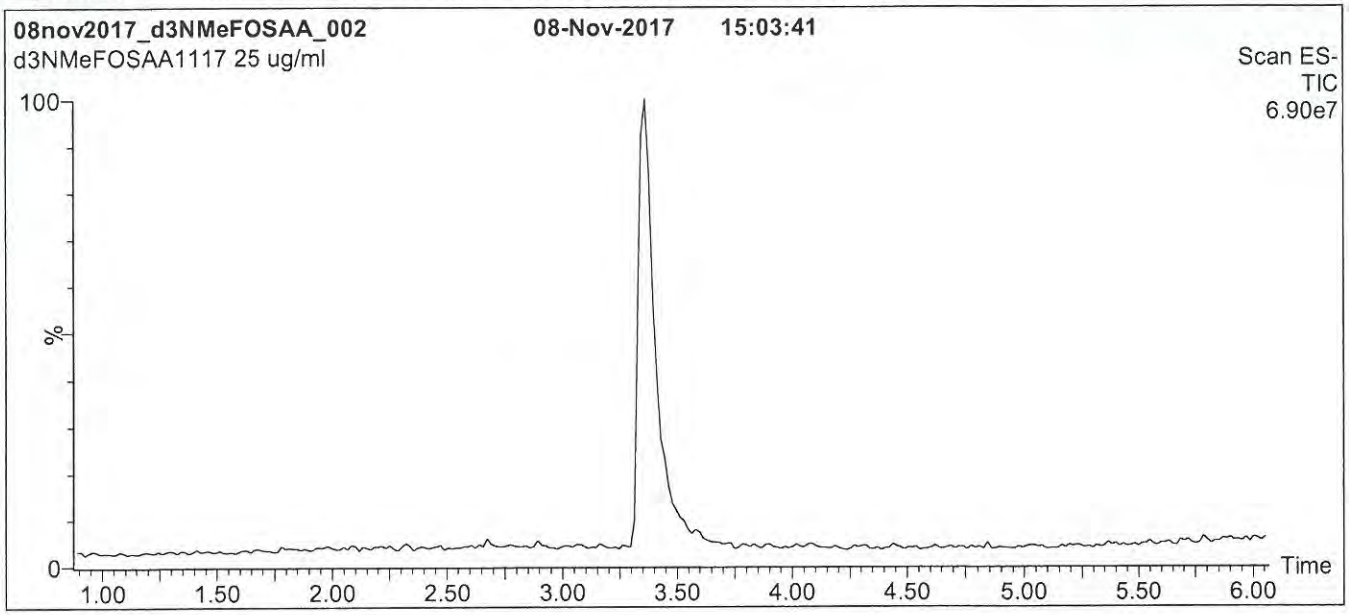
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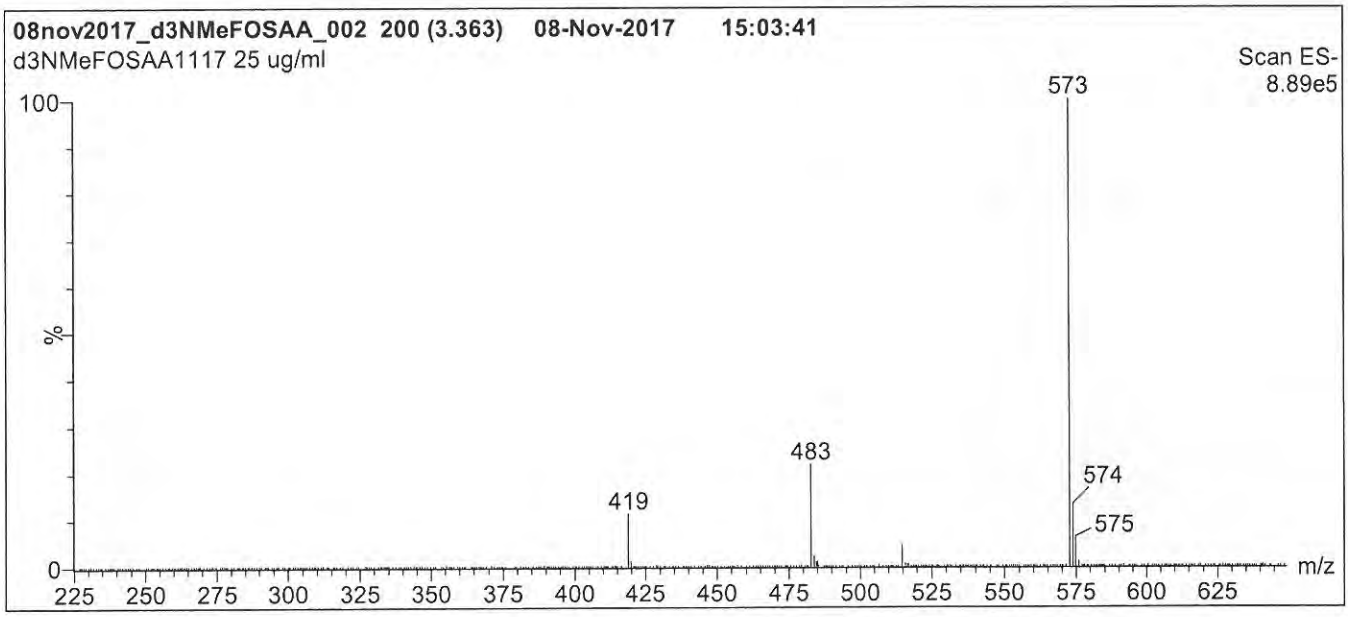
ANAB ACCREDITED Reference Material Producer

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

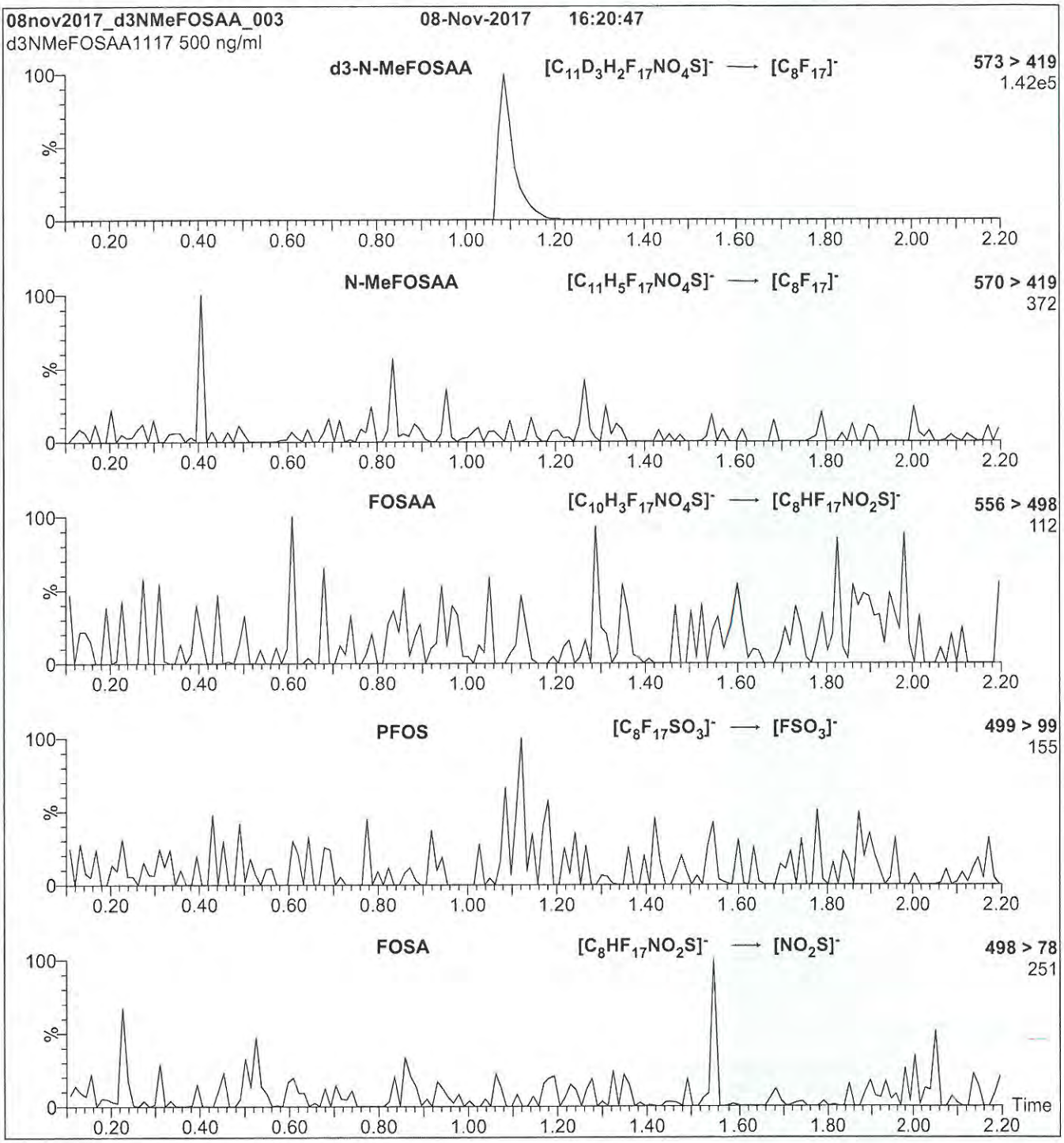
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18F2221

Figure 2: **d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d3-N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 20

18F2222

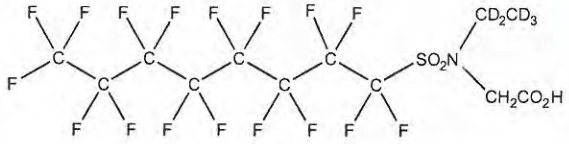
WELLINGTON LABORATORIES

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:	$C_{12}D_5H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	590.26
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

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Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
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18F2222

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where x is expressed as a relative standard uncertainty of the individual parameter.

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All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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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:

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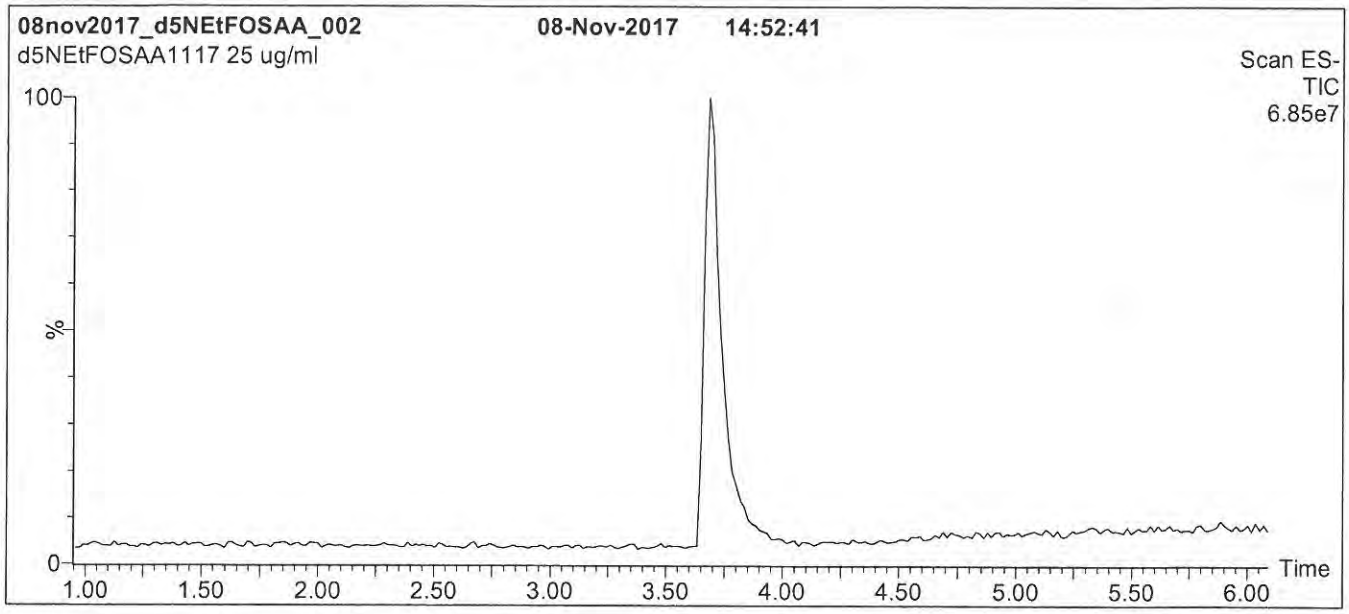
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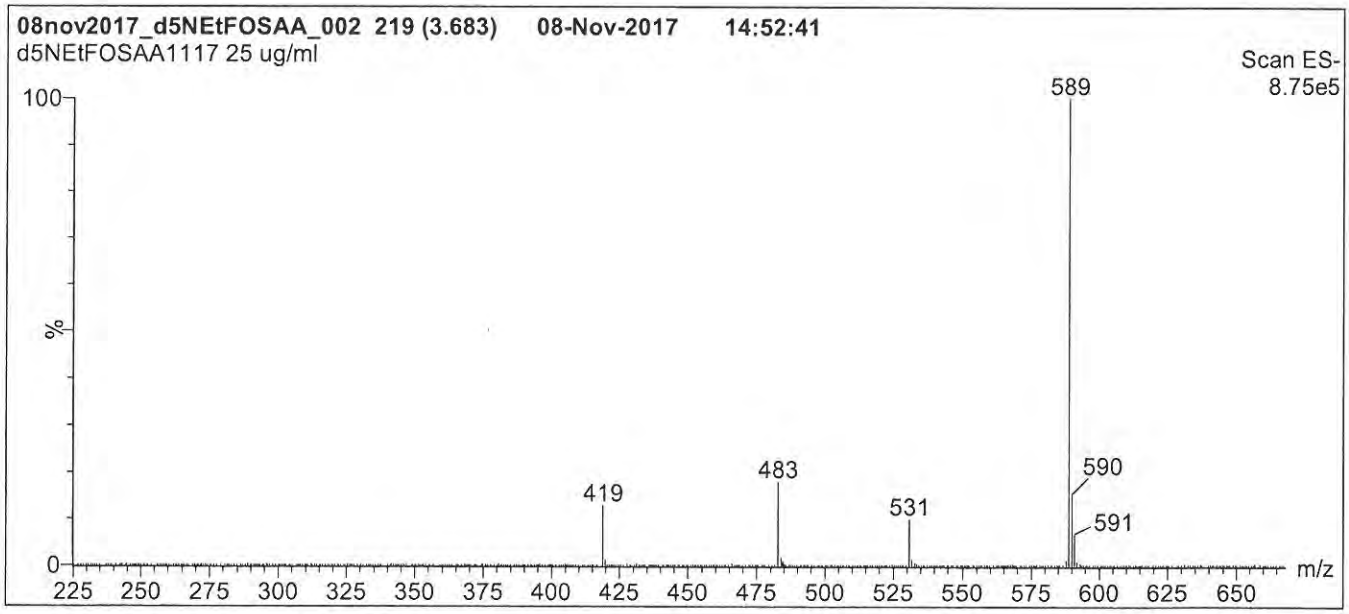
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

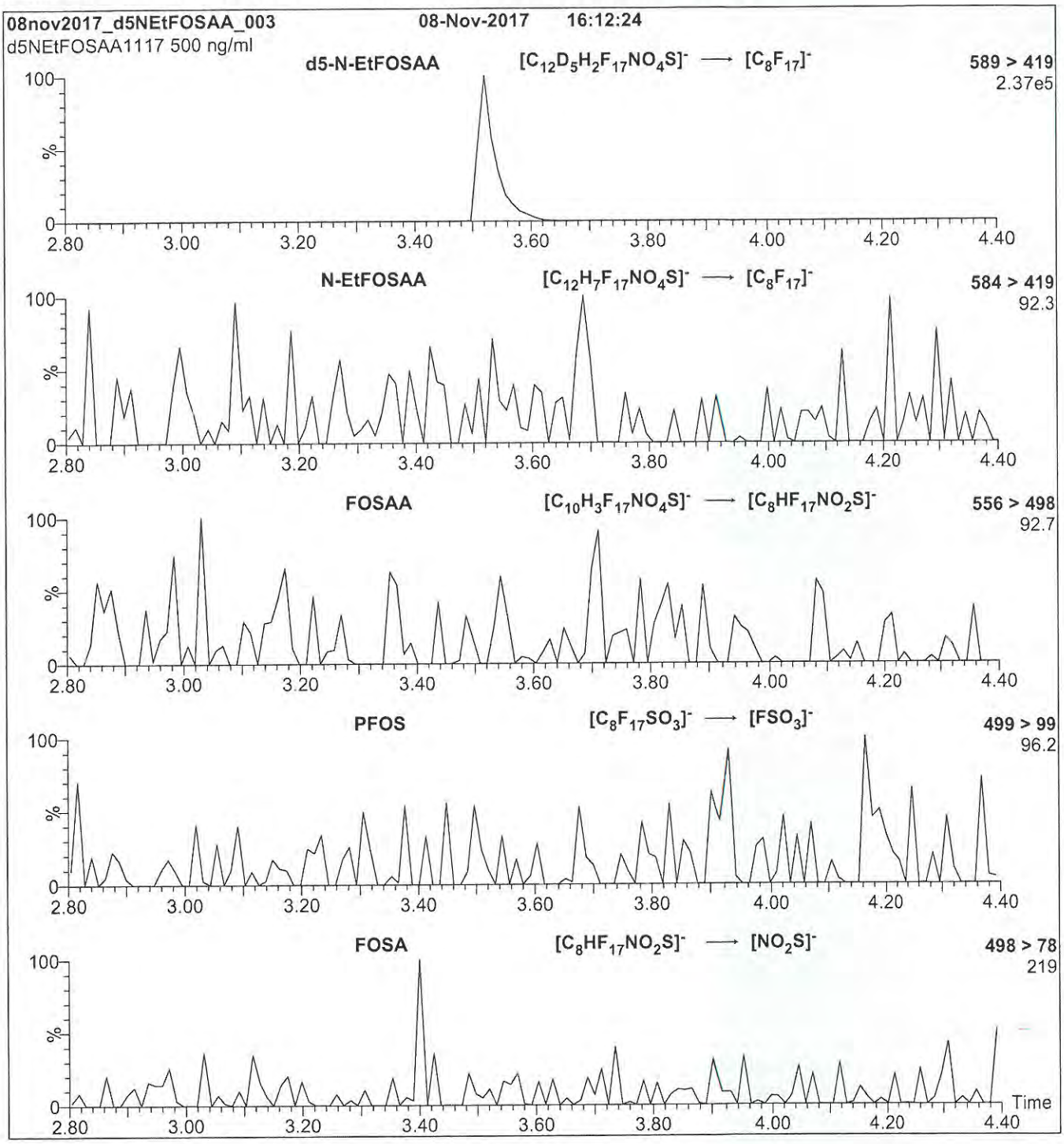
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18F2222

Figure 2: d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d5-N-EtFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 20

18F2223

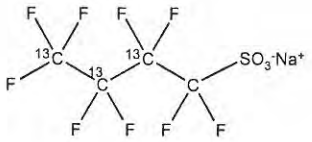
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M3PFBS **LOT NUMBER:** M3PFBS0218

COMPOUND: Sodium perfluoro-1-[2,3,4-$^{13}C_3$]butanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}CF_9SO_3Na$	**MOLECULAR WEIGHT:**	325.06
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.5 ± 2.3 µg/ml (M3PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 02/16/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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.

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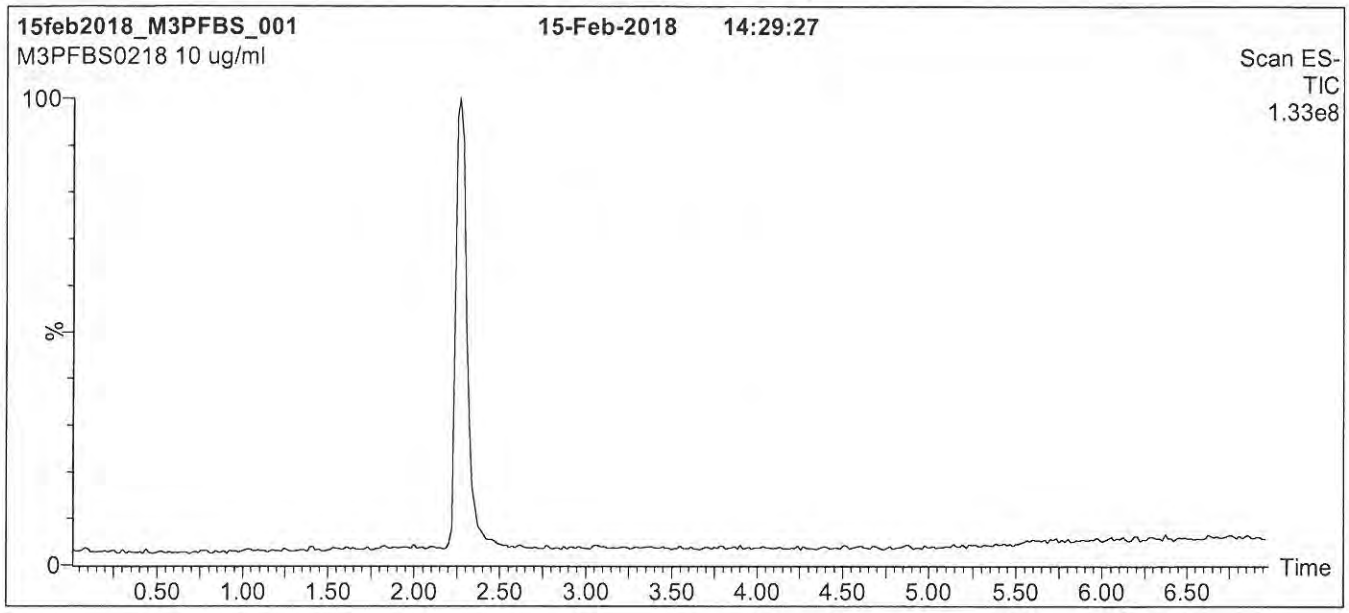
CALA

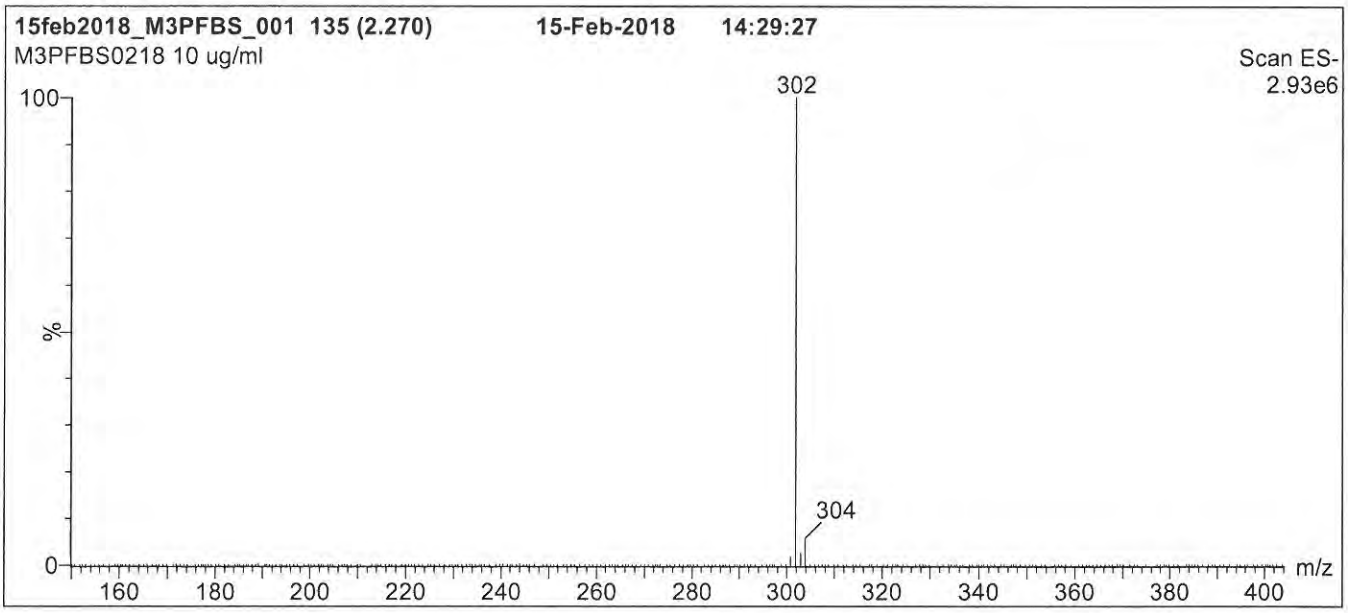
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

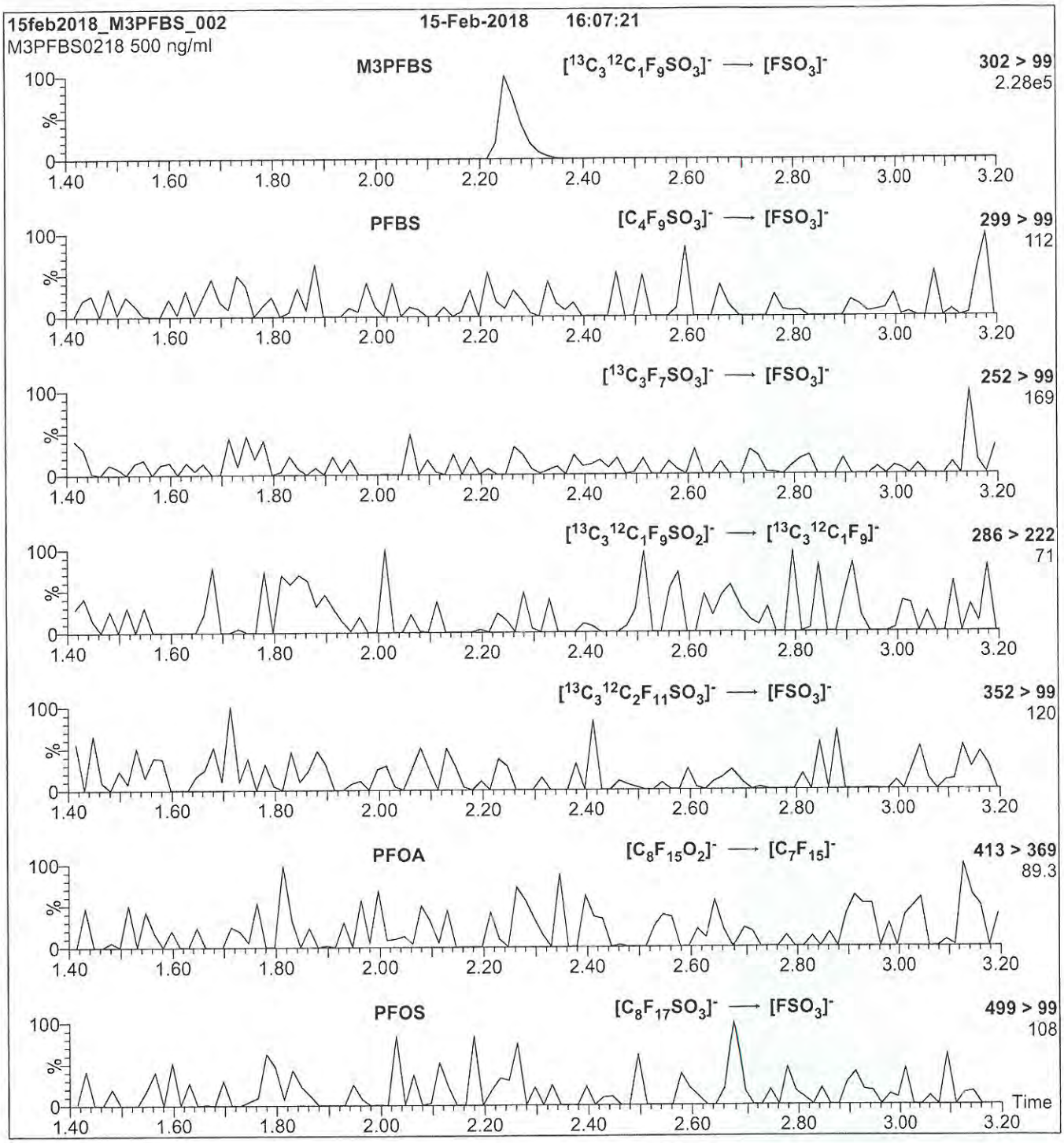
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 25

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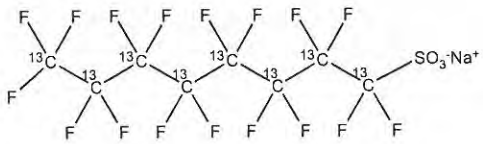
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M8PFOS
COMPOUND: Sodium perfluoro-1-[$^{13}C_8$]octanesulfonate

LOT NUMBER: M8PFOS1117

CAS #: Not available

STRUCTURE:



MOLECULAR FORMULA: $^{13}C_8F_{17}SO_3Na$
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.8 ± 2.4 µg/ml (M8PFOS 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

MOLECULAR WEIGHT: 530.05
SOLVENT(S): Methanol

ISOTOPIC PURITY: >99% ^{13}C ($^{13}C_8$)

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 ~ 0.3% of sodium perfluoro-1-[$^{13}C_7$]heptanesulfonate ($^{13}C_7$-PFHpS) and ~ 0.8% of sodium perfluoro-1-[$^{13}C_4$]octanesulfonate (MPFOS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2224

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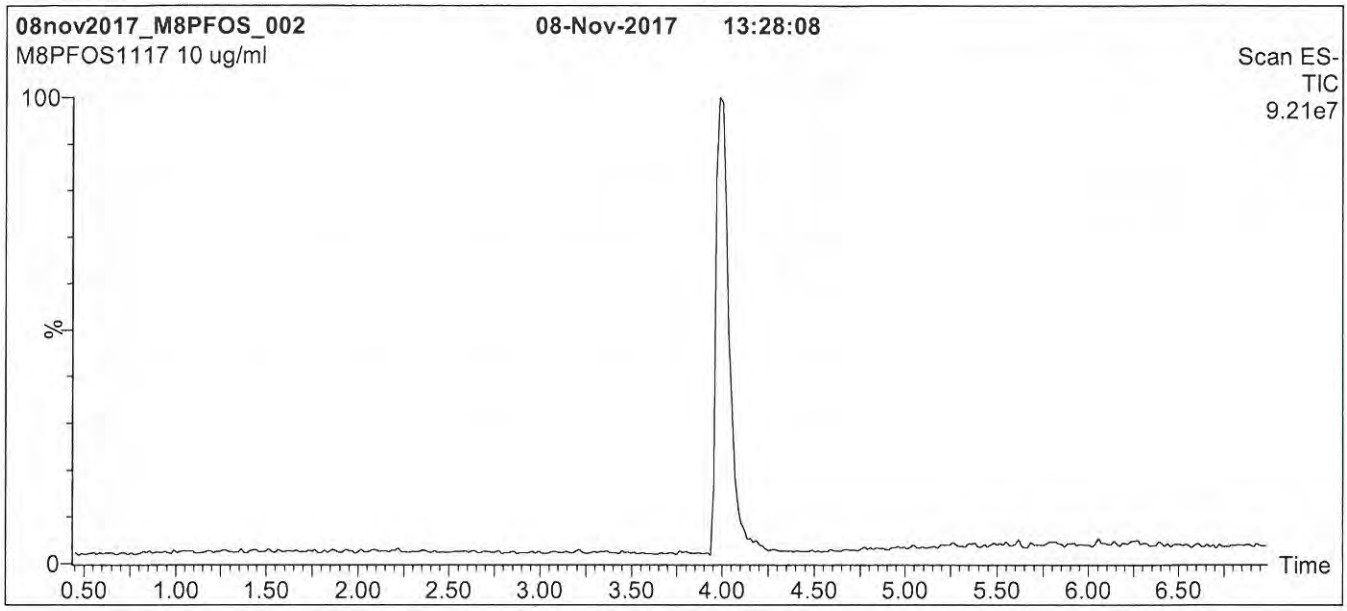
CALA

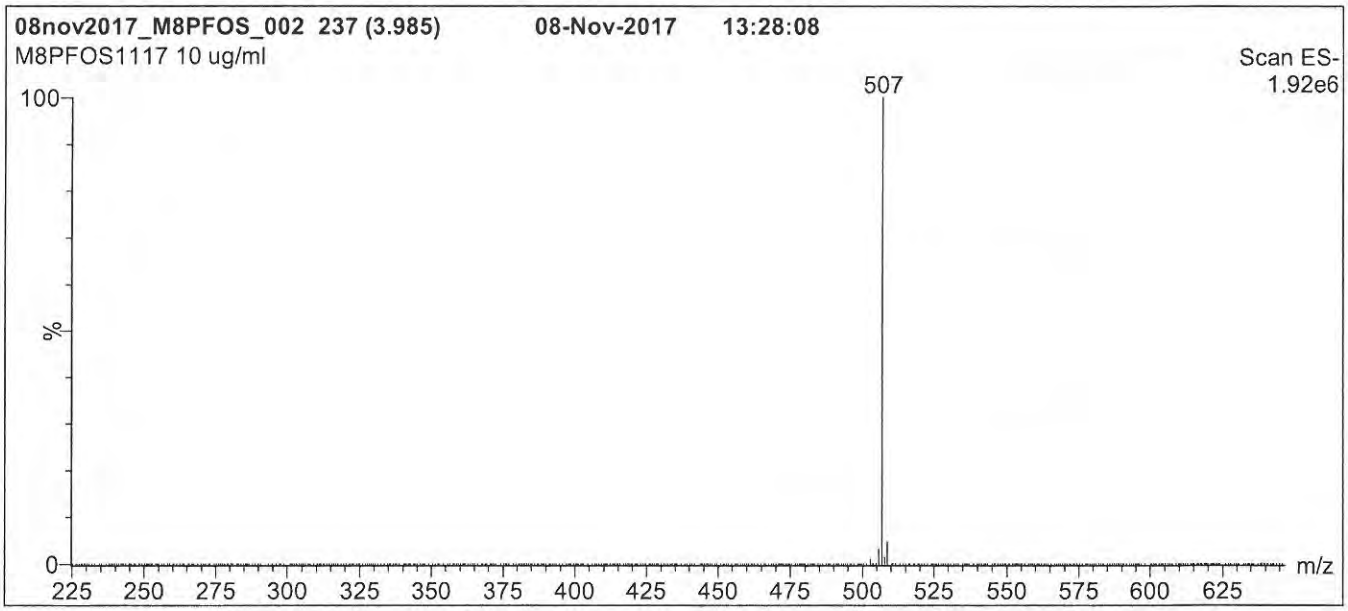
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18F2224

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

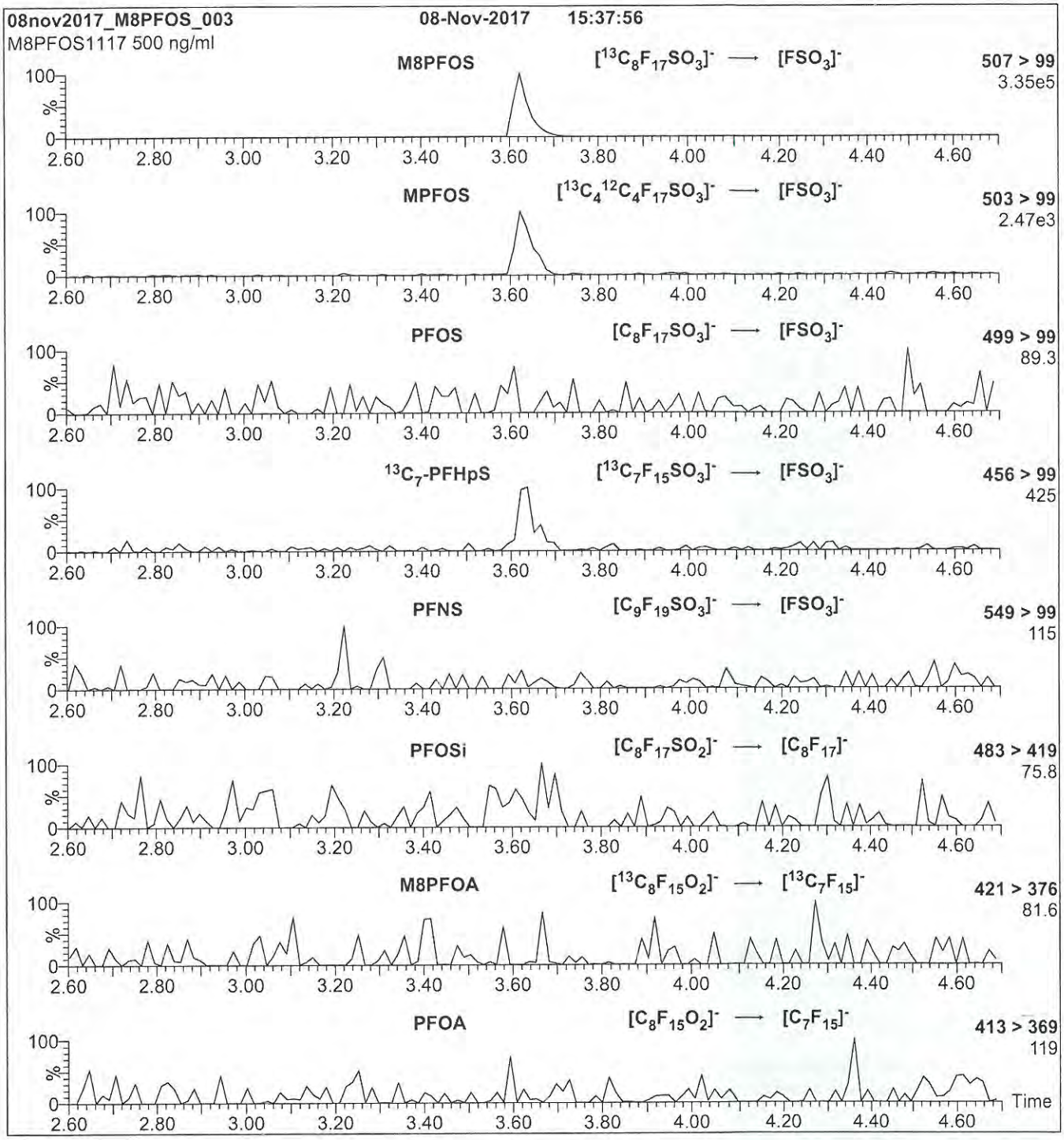
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 40

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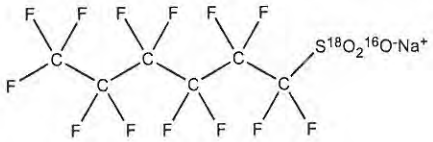
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate

LOT NUMBER: MPFHxS0318

STRUCTURE:

CAS #: 1585941-14-5



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)
	47.3 ± 2.4 µg/ml (MPFHxS anion)
CHEMICAL PURITY:	>98%
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

MOLECULAR WEIGHT:	426.10
SOLVENT(S):	Methanol
ISOTOPIC PURITY:	>94% ($^{18}O_2$)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Contains ~ 1.0% of sodium perfluoro-1-octane[$^{18}O_2$]sulfonate ($^{18}O_2$-PFOS) and ~ 0.3% of sodium perfluoro-1-heptane[$^{18}O_2$]sulfonate ($^{18}O_2$-PFHpS).
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 06/07/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2225

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

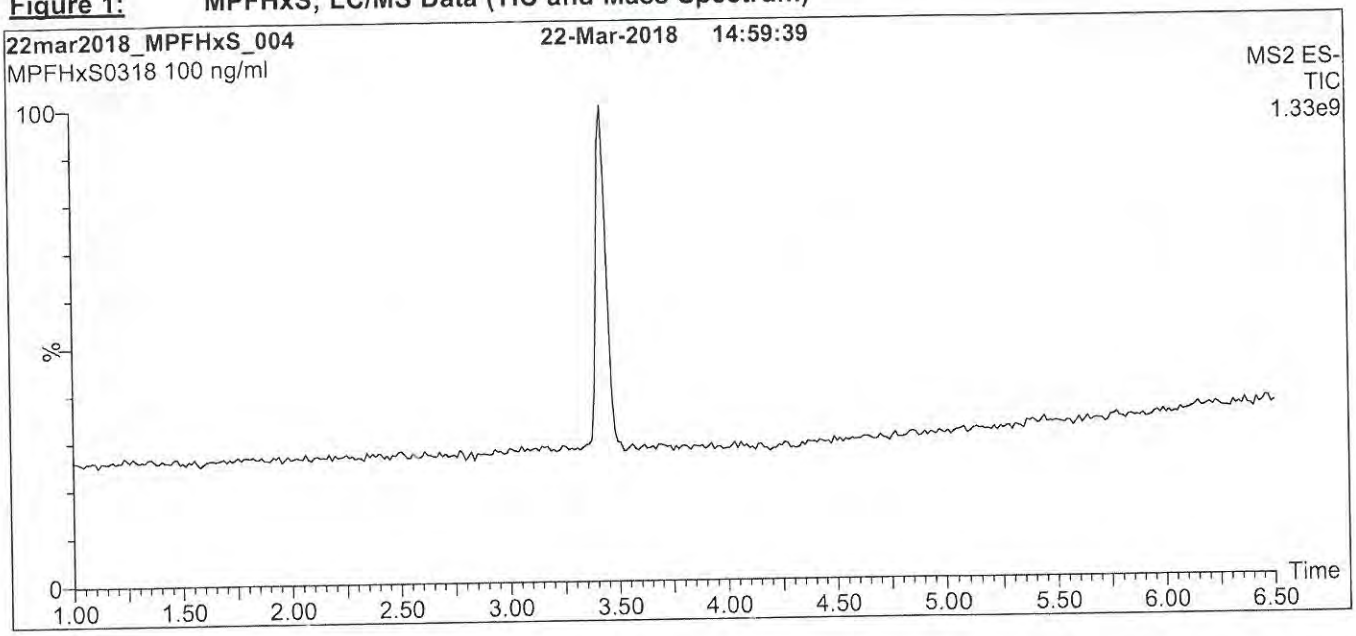
CALA Testing

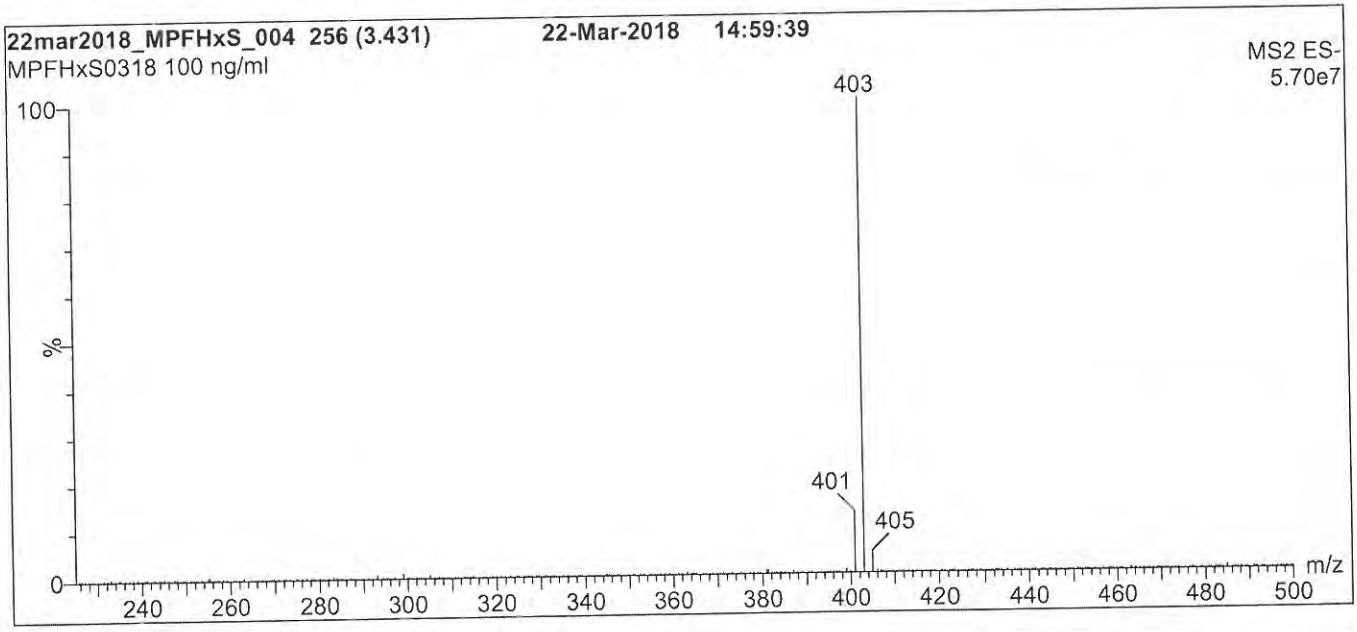
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 80% organic over 7 min and hold for 3 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 µl/min

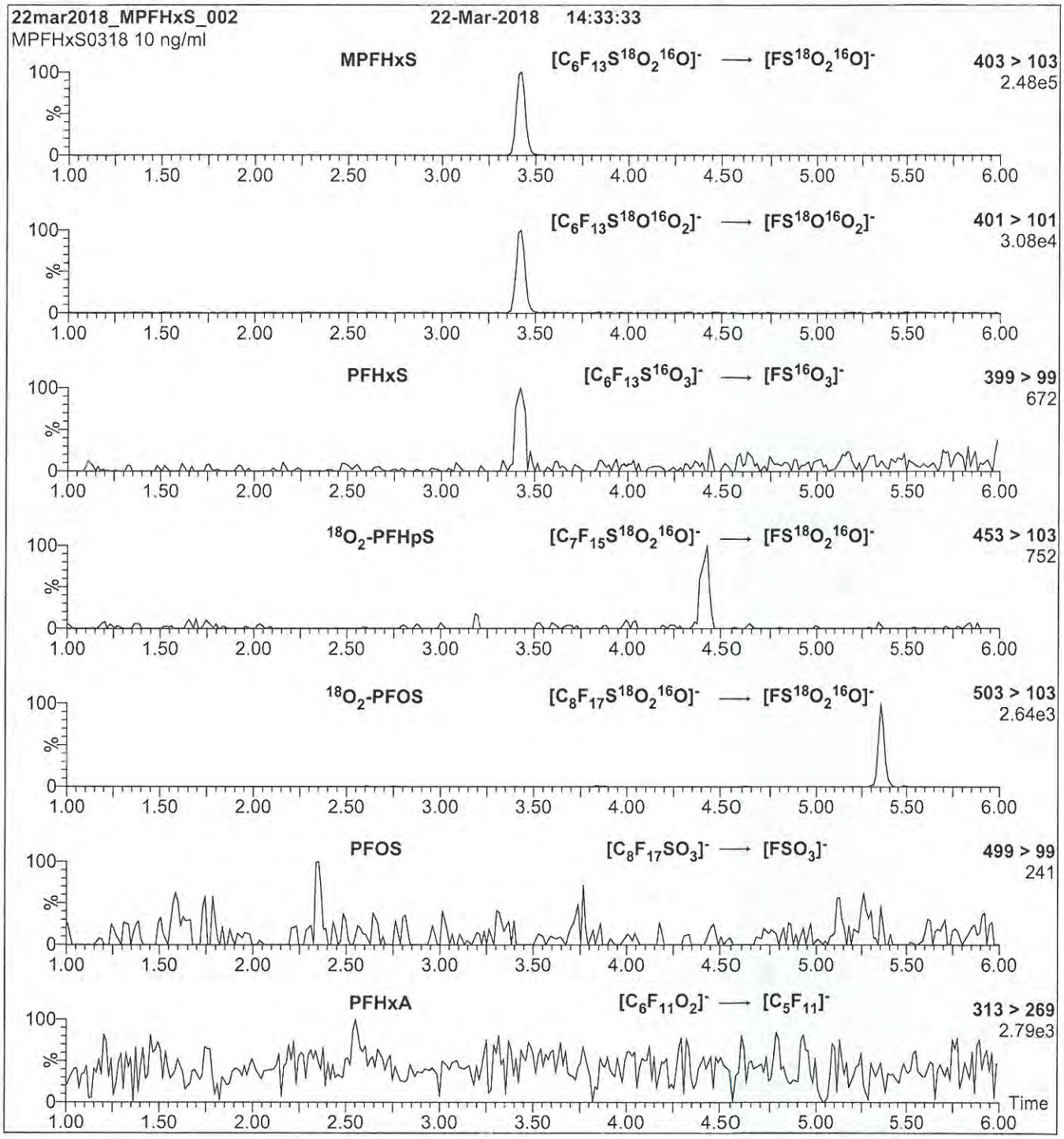
MS Parameters

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.64e-3

Collision Energy (eV) = 32

18F2226

WELLINGTON LABORATORIES

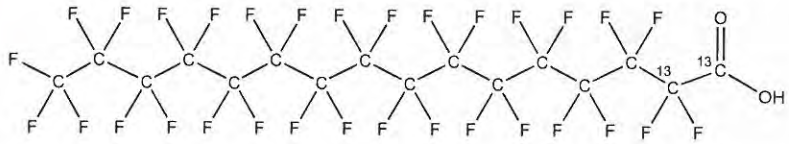
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFHxDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

LOT NUMBER: M2PFHxDA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	07/13/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/13/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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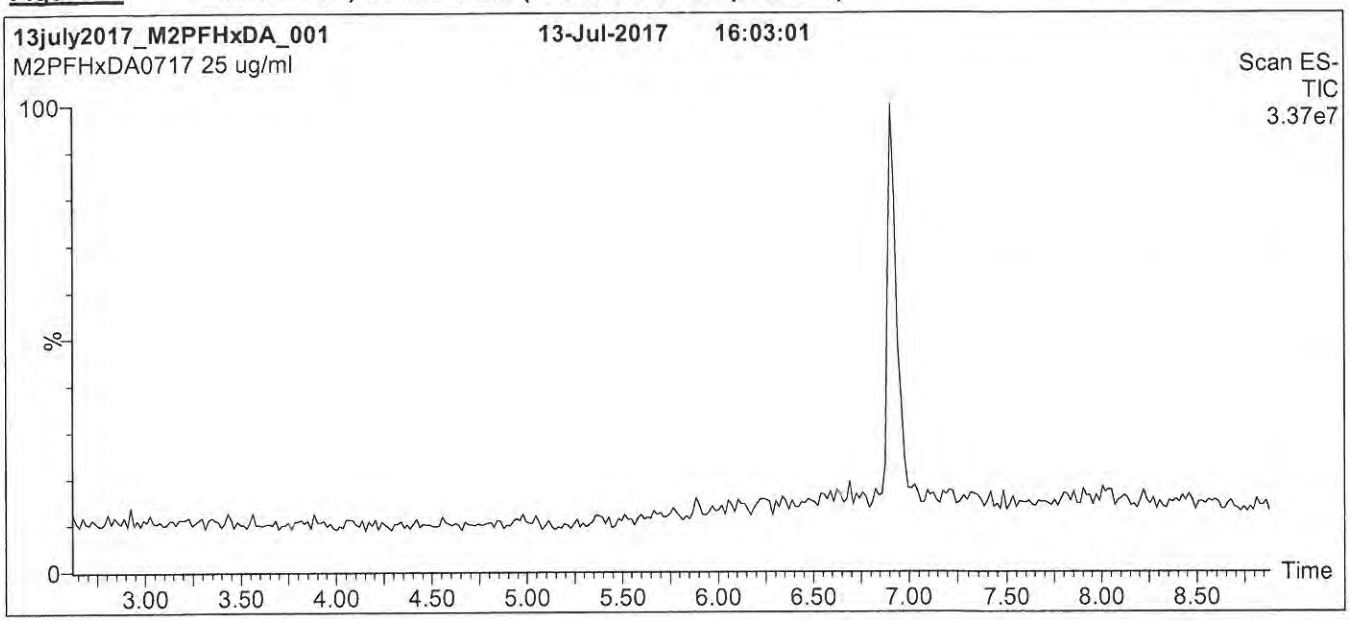
CALA Testing Accreditation No. A 1226

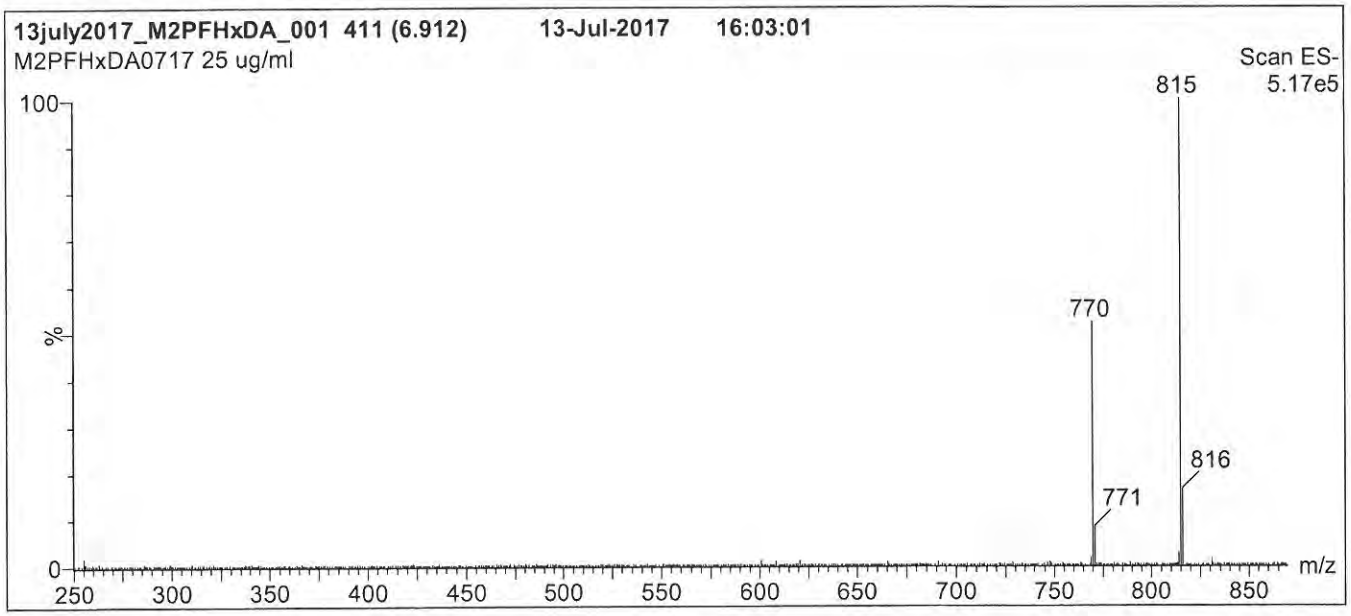
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

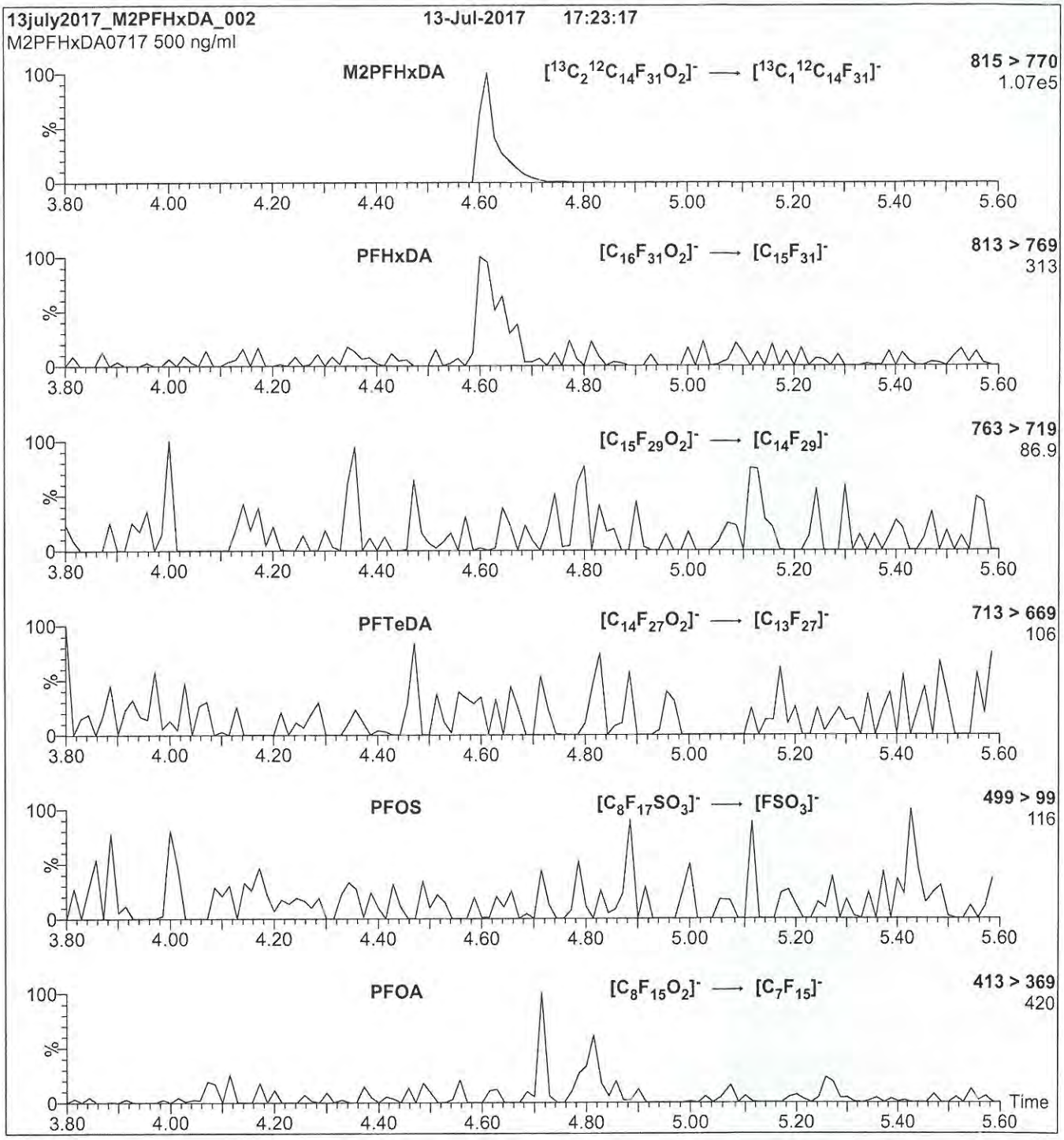
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 15

18F2227

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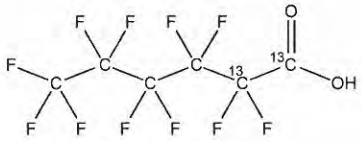
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid

LOT NUMBER: MPFHxA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4HF_{11}O_2$	**MOLECULAR WEIGHT:**	316.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	10/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/27/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of perfluoro-n-hexanoic acid and < 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2227

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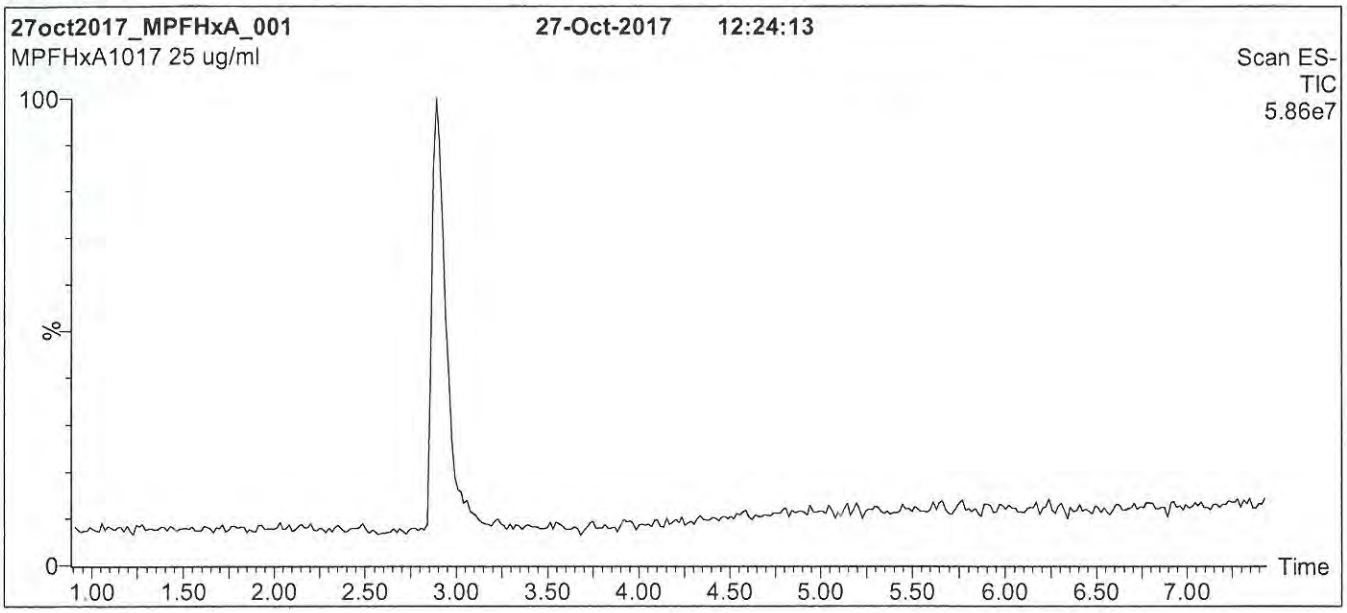
CALA

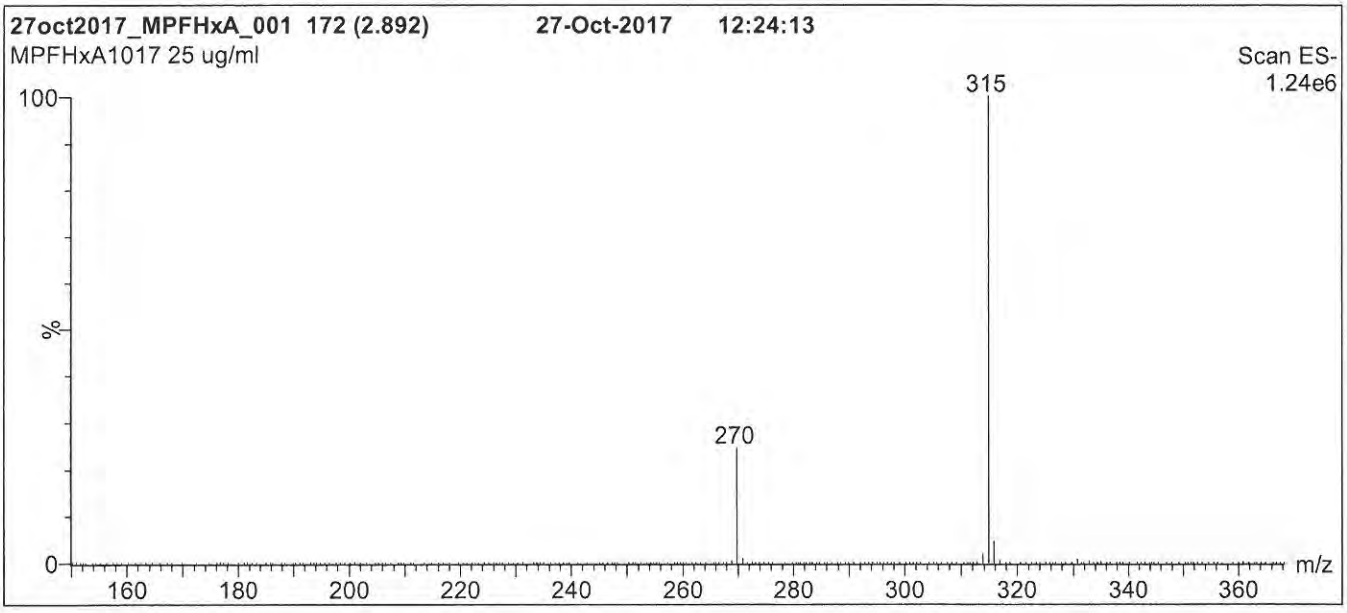
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 µl/min

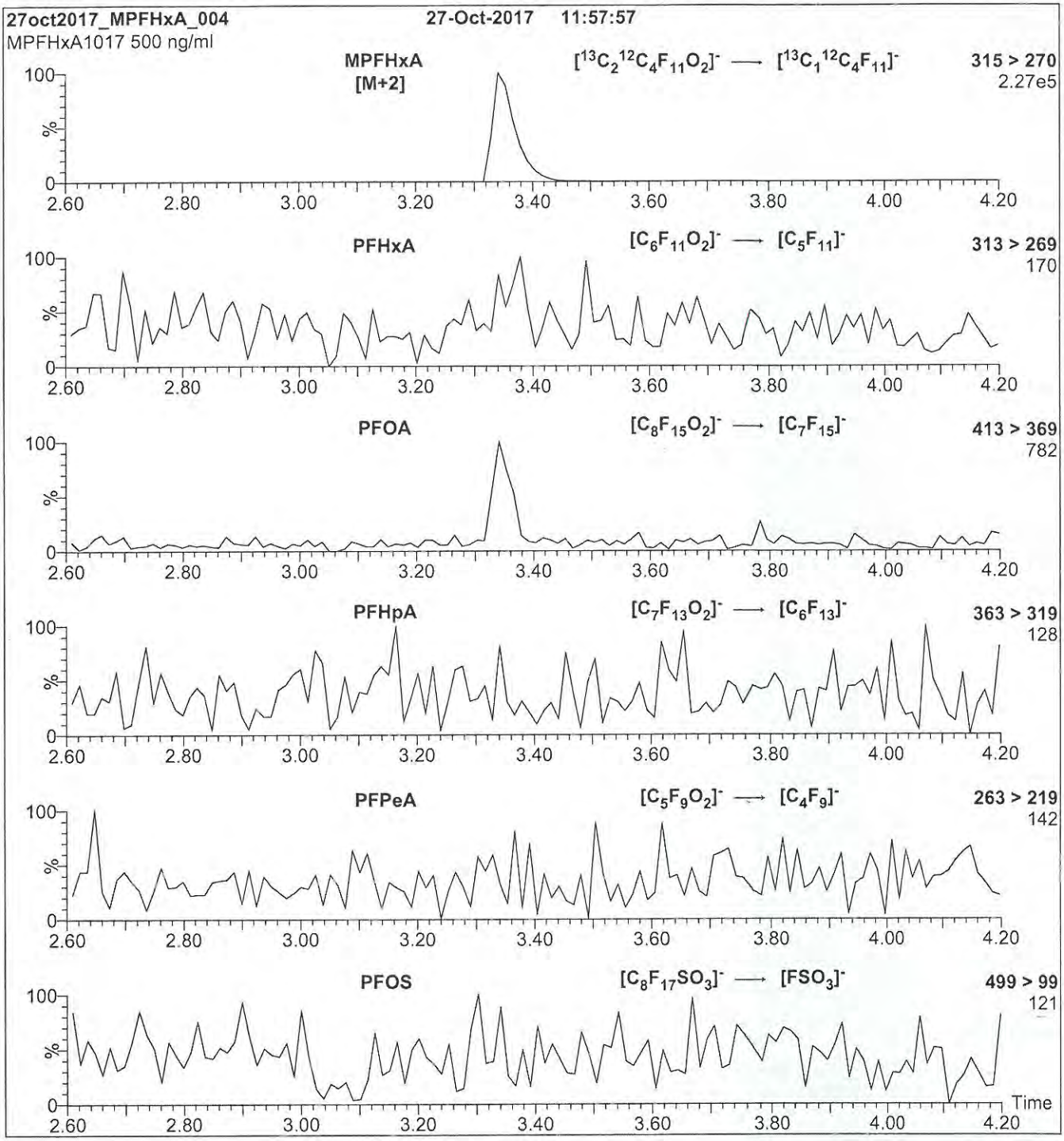
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18F2227

Figure 2: **MPFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 10

Analytical Standard Record

Vista Analytical Laboratory

18J1505

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18E0707	PFDoA	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	PFTrDA	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-PFTrDA		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.

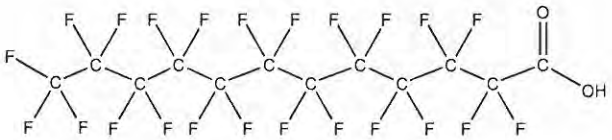
Analyte	CAS Number	Concentration	Units
PFPeS	2706-91-4	1	ug/mL
PFTeDA	376-06-7	1	ug/mL
PFTrDA	72629-94-8	1	ug/mL
PFODA	16517-11-6	1	ug/mL
Total 6:2 FTS		1	ug/mL
PFOA	335-67-1	1	ug/mL
Total MeFOSAA		1	ug/mL
Total PFDS		1	ug/mL
Total PFHpS		1	ug/mL
Total PFHxS		1	ug/mL
Total PFOA		1	ug/mL
Total PFOS		1	ug/mL
PFUnA	2058-94-8	1	ug/mL
PFHpA	375-85-9	1	ug/mL
MeFOSA	31506-32-8	5	ug/mL
MeFOSAA	2355-31-9	1	ug/mL
MeFOSE	24448-09-7	5	ug/mL
PFBA	375-22-4	1	ug/mL
PFBS	375-73-5	1	ug/mL
PFDA	335-76-2	1	ug/mL
PFOS	1763-23-1	1	ug/mL
PFDS	335-77-3	1	ug/mL
Total PFUnA		1	ug/mL
PFHpS	375-92-8	1	ug/mL
PFHxA	307-24-4	1	ug/mL
PFHxDA	67905-19-5	1	ug/mL
PFHxS	355-46-4	1	ug/mL
PFNA	375-95-1	1	ug/mL
PFNS	68259-12-1	1	ug/mL
PFDoA	307-55-1	1	ug/mL

18E0707

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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0418
COMPOUND:	Perfluoro-n-dodecanoic acid		
STRUCTURE:		**CAS #:**	307-55-1



MOLECULAR FORMULA:	$C_{12}HF_{23}O_2$	**MOLECULAR WEIGHT:**	614.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	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: _____ **Date:** 04/24/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0707

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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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18E0707

Figure 1: **PFDoA; LC/MS Data (SIR)**

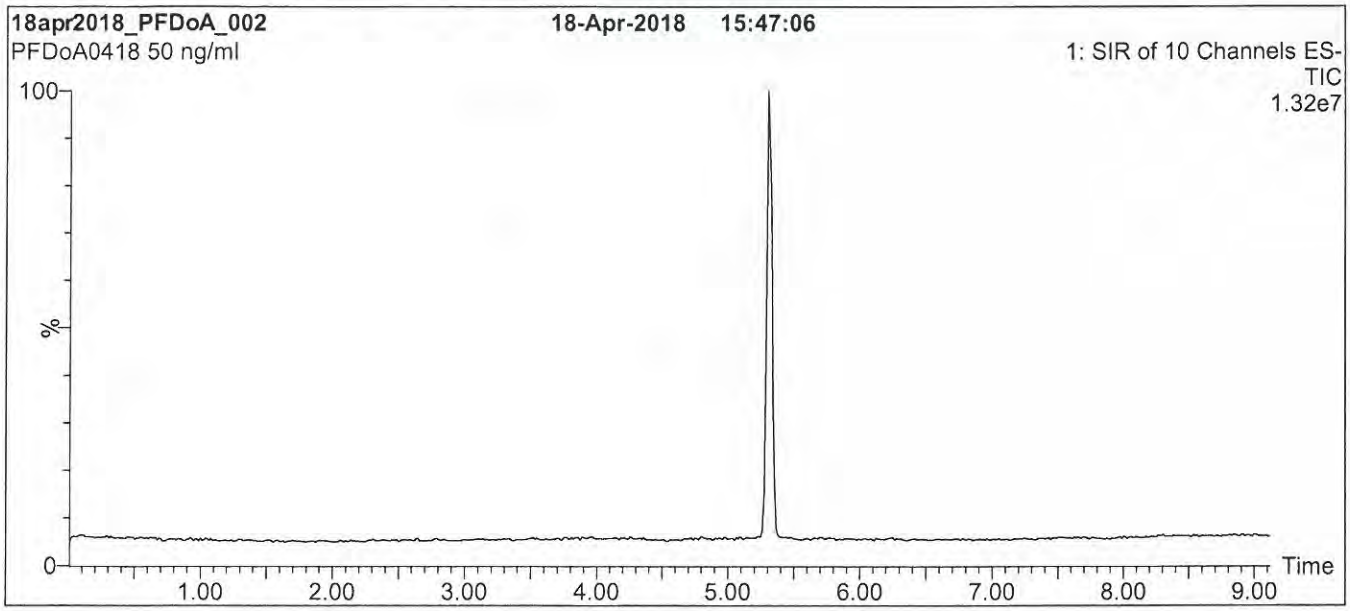
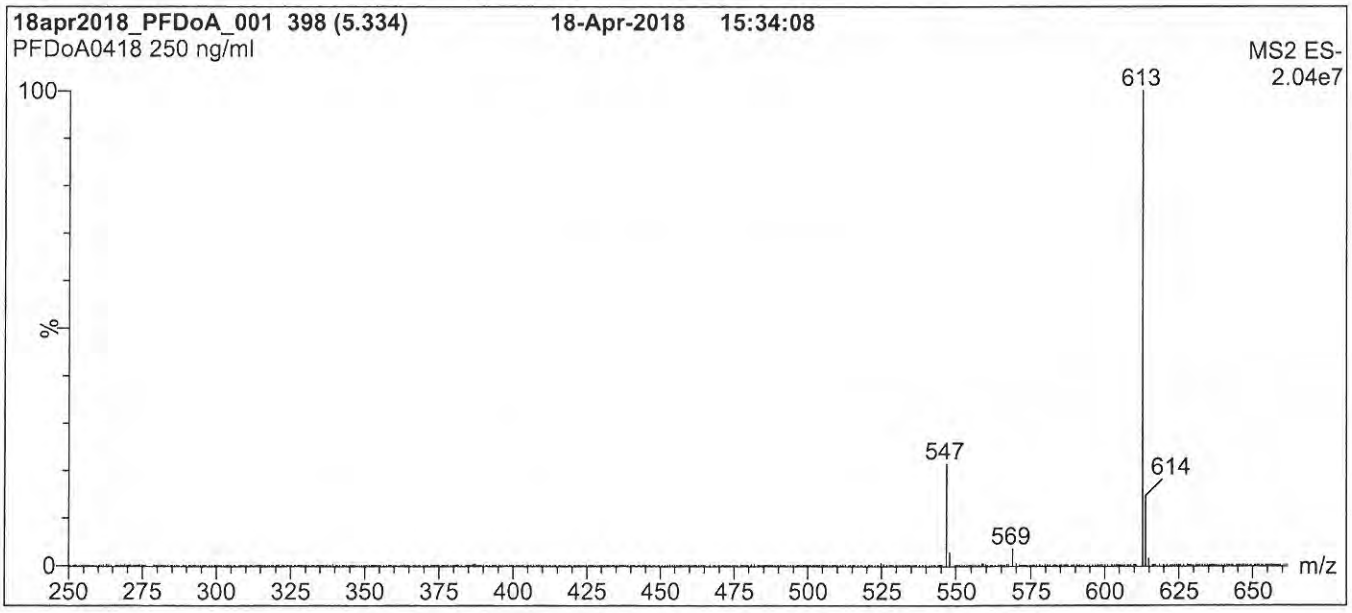


Figure 2: **PFDoA; LC/MS Data (Mass Spectrum)**



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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

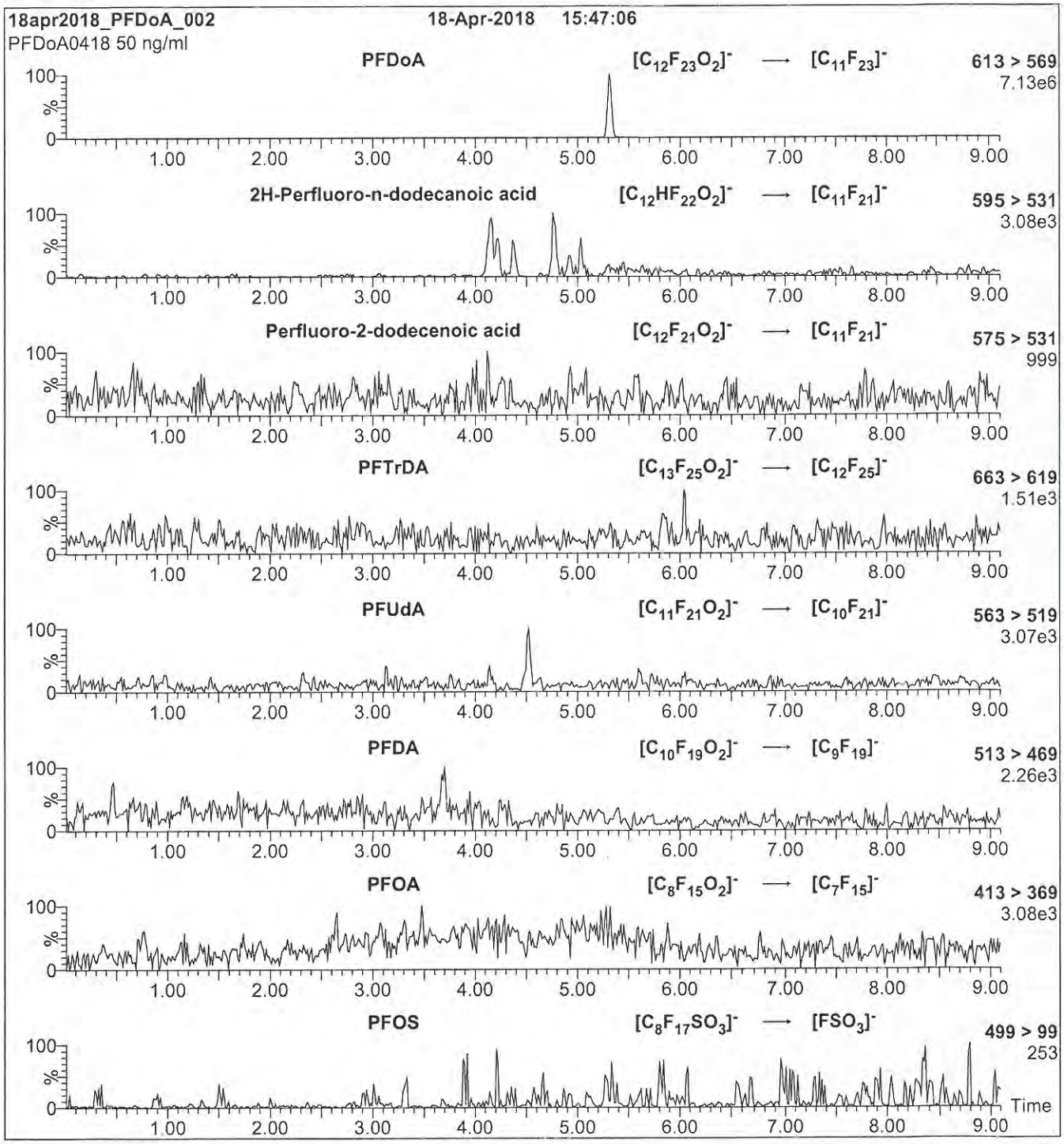
Flow: 300 µl/min

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.47e-3

Collision Energy (eV) = 12

18E0708

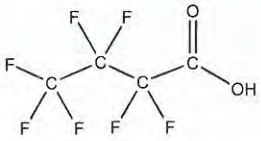
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFBA
COMPOUND: Perfluoro-n-butanoic acid
LOT NUMBER: PFBA1217

STRUCTURE:

CAS #: 375-22-4



MOLECULAR FORMULA: $C_4HF_7O_2$
MOLECULAR WEIGHT: 214.04
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/14/2017
EXPIRY DATE: (mm/dd/yyyy) 12/14/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

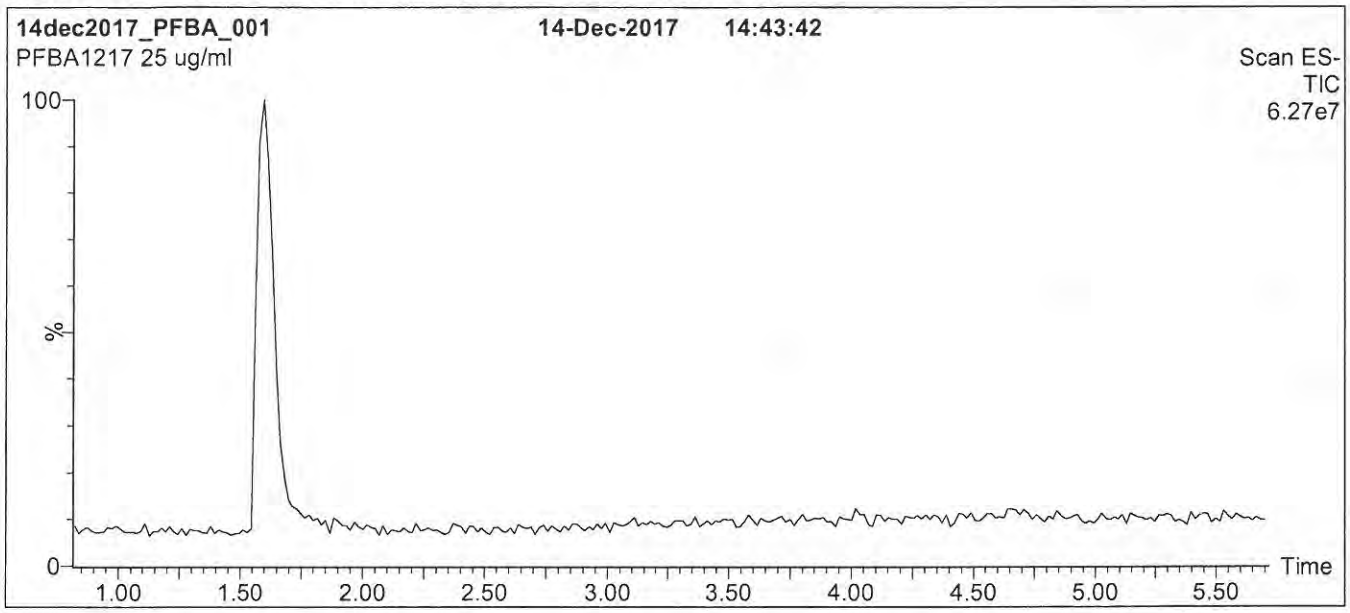
CALA

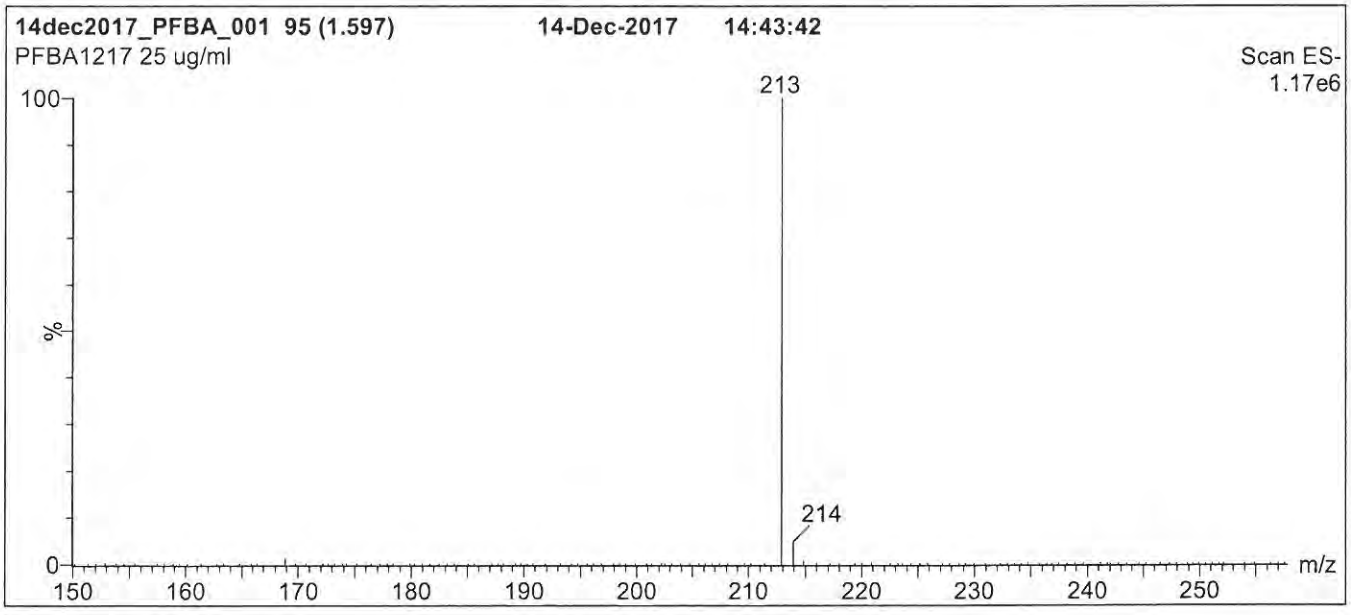
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

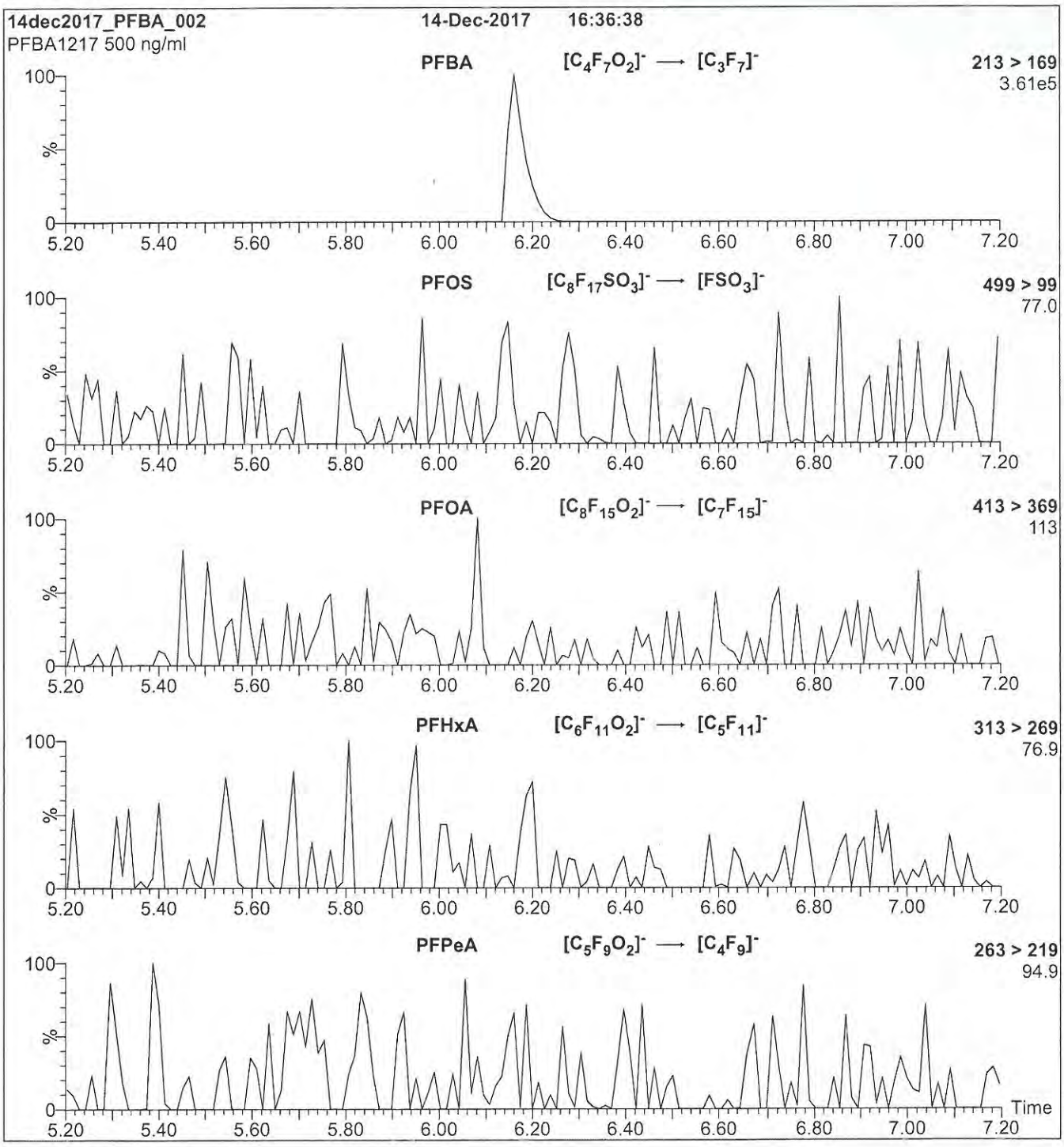
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18E0708

Figure 2: **PFBA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 10

18E0709

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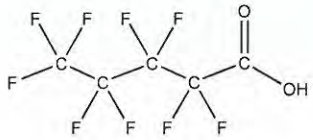
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid

LOT NUMBER: PFPeA0218

STRUCTURE:

CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 264.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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: _____ **Date:** 02/20/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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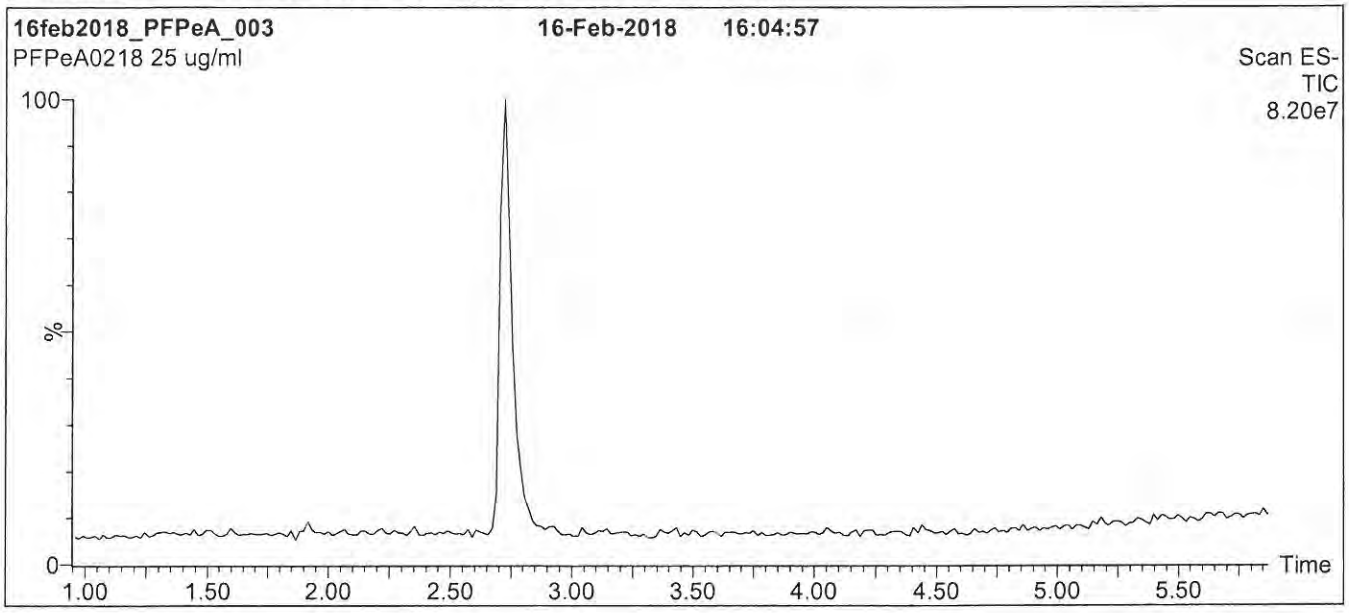
CALA Testing

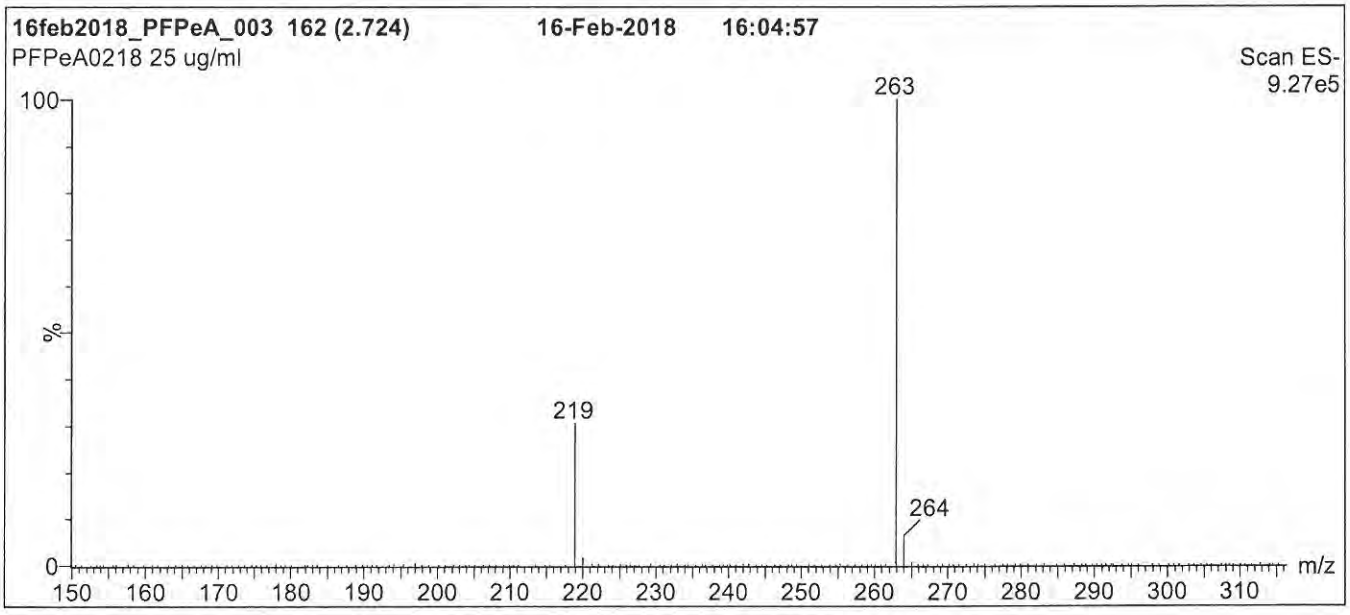
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

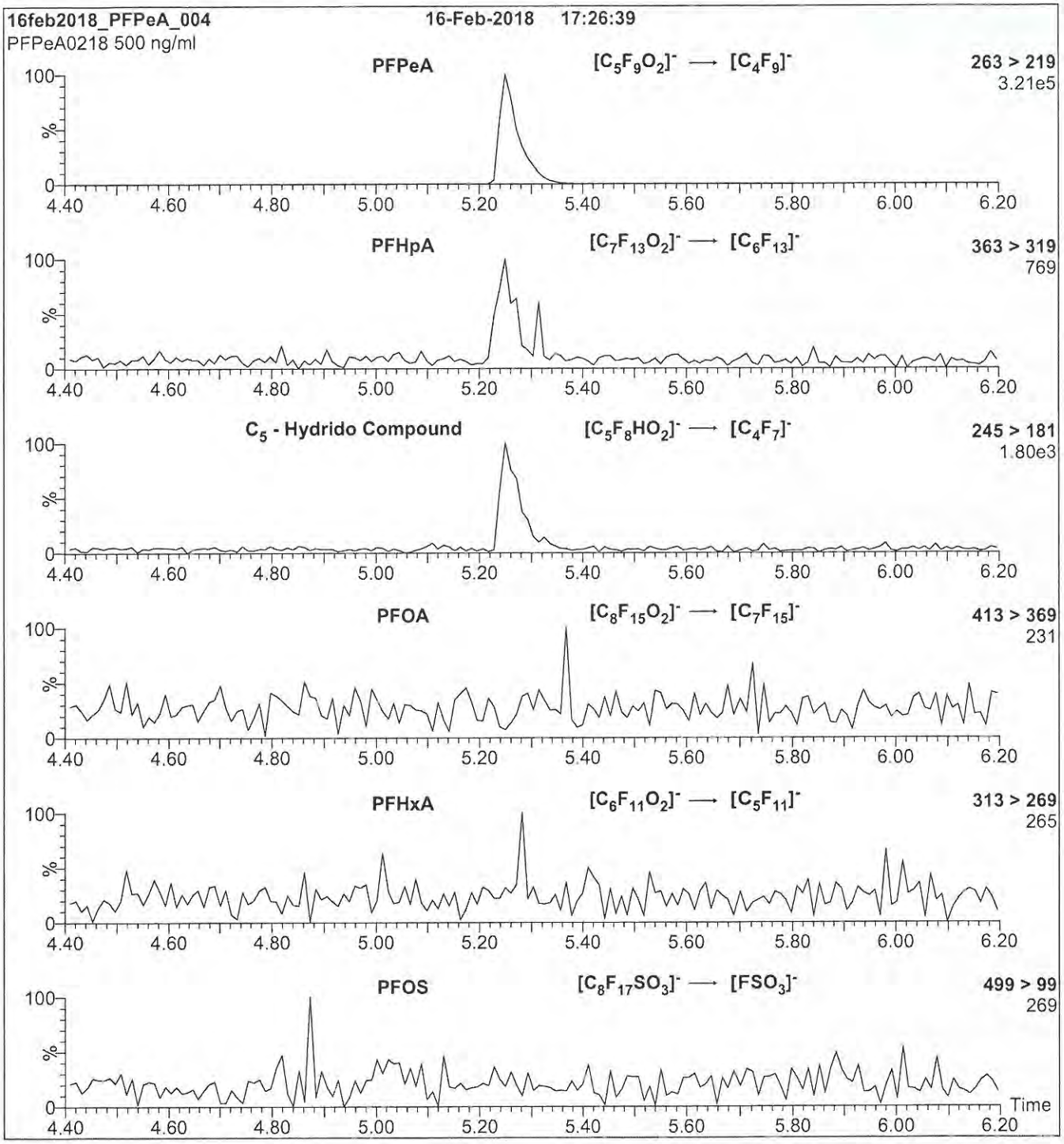
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
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 µl (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 9

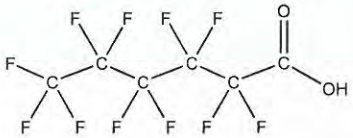
18E0710

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid
LOT NUMBER: PFHxA0917

STRUCTURE:
CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
MOLECULAR WEIGHT: 314.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/27/2017
EXPIRY DATE: (mm/dd/yyyy) 09/27/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 1.0% of branched isomers.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/01/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0710

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

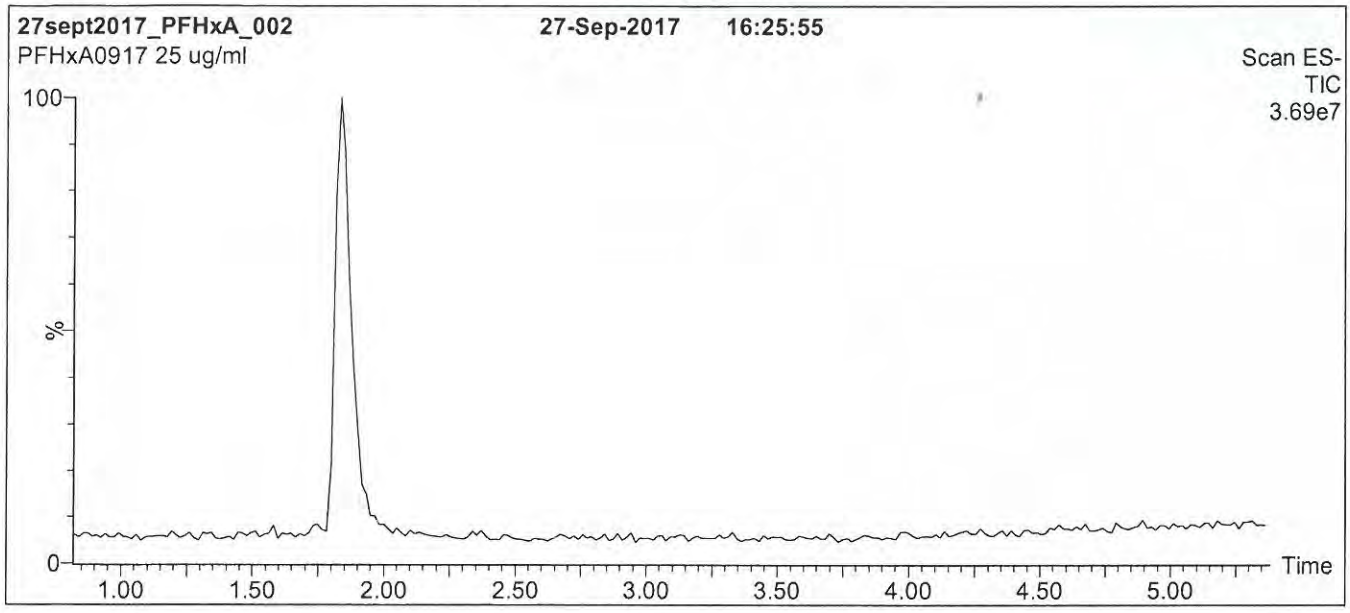
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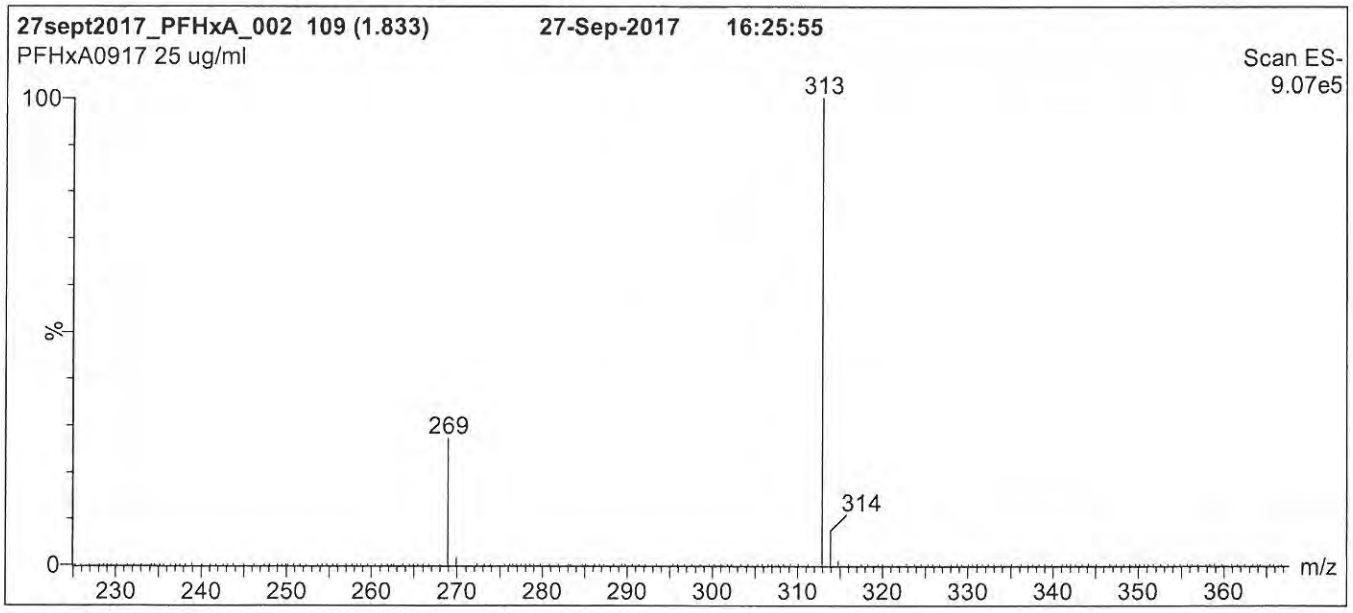
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

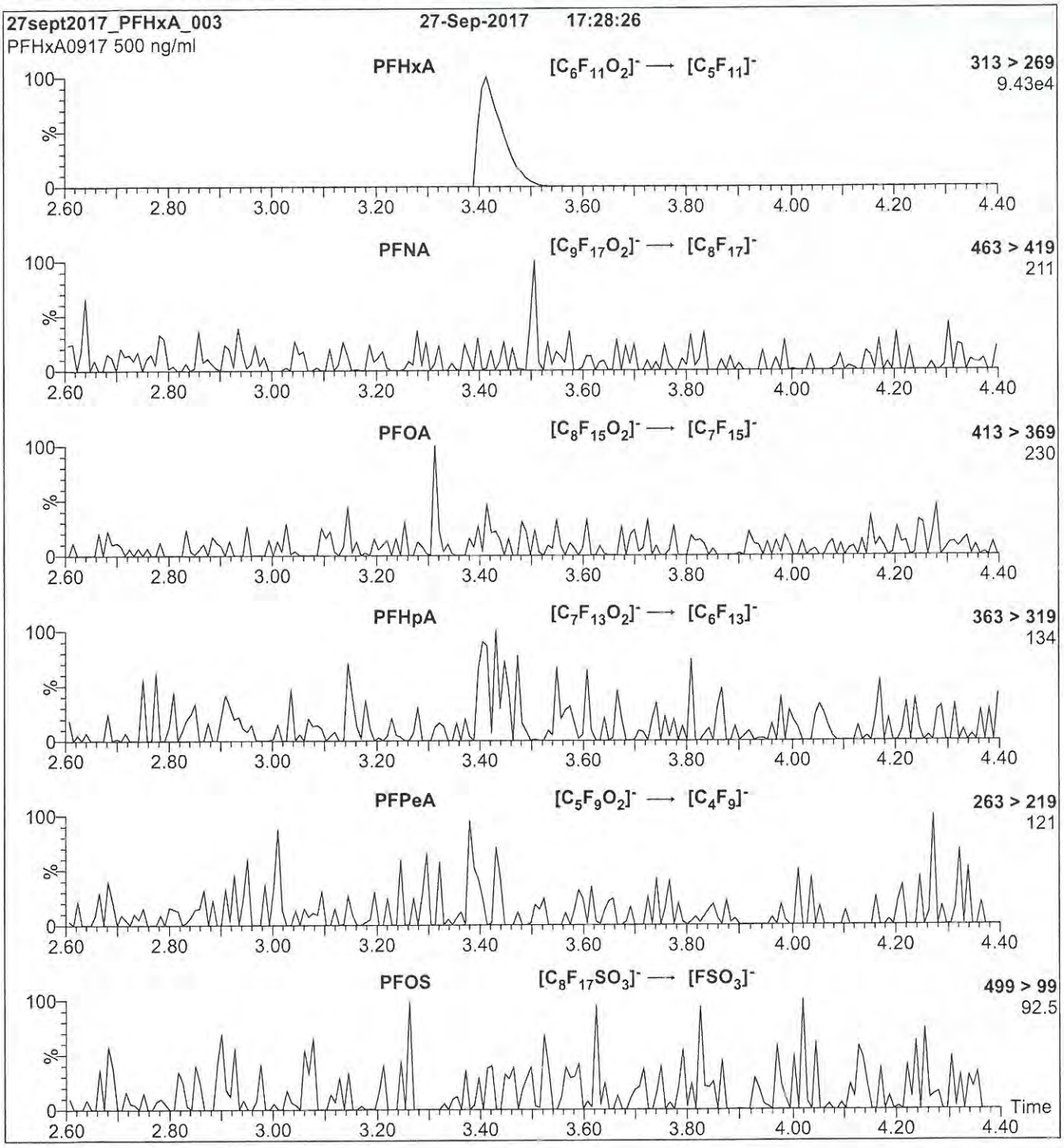
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18E0710

Figure 2: **PFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 10

18E0711

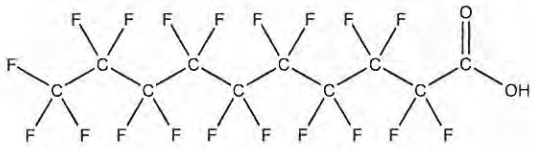
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid
LOT NUMBER: PFDA1217

STRUCTURE:

CAS #: 335-76-2



MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
MOLECULAR WEIGHT: 514.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/14/2017
EXPIRY DATE: (mm/dd/yyyy) 12/14/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of perfluoro-n-nonanoic acid (PFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

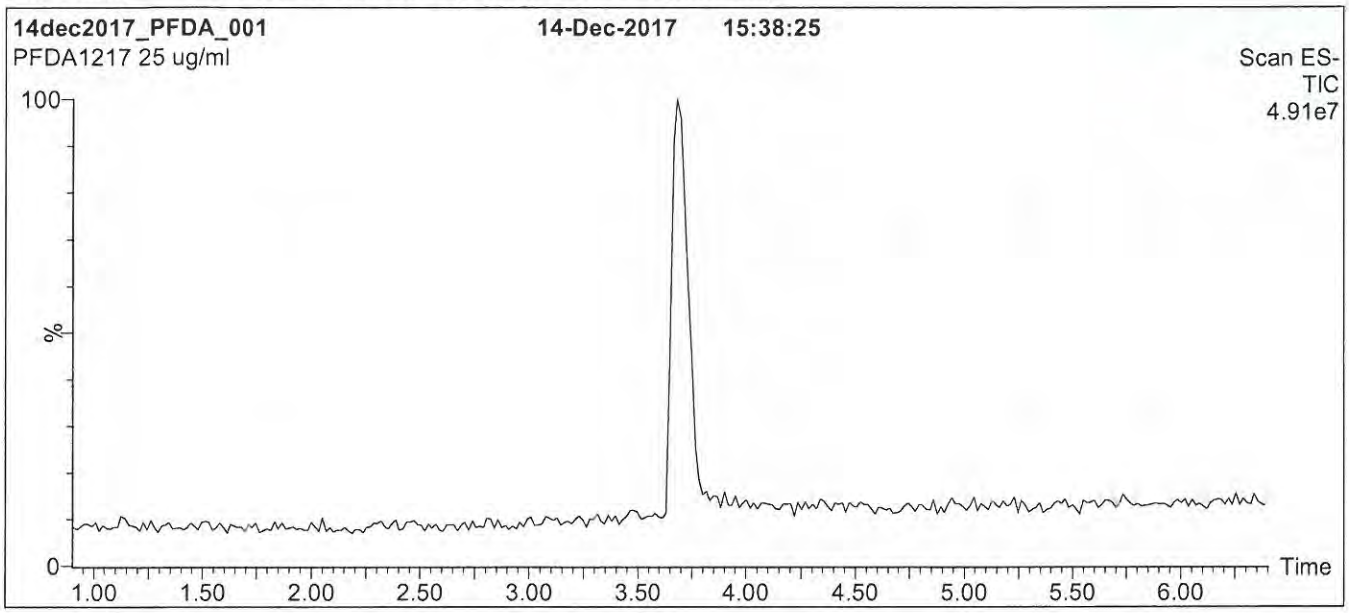
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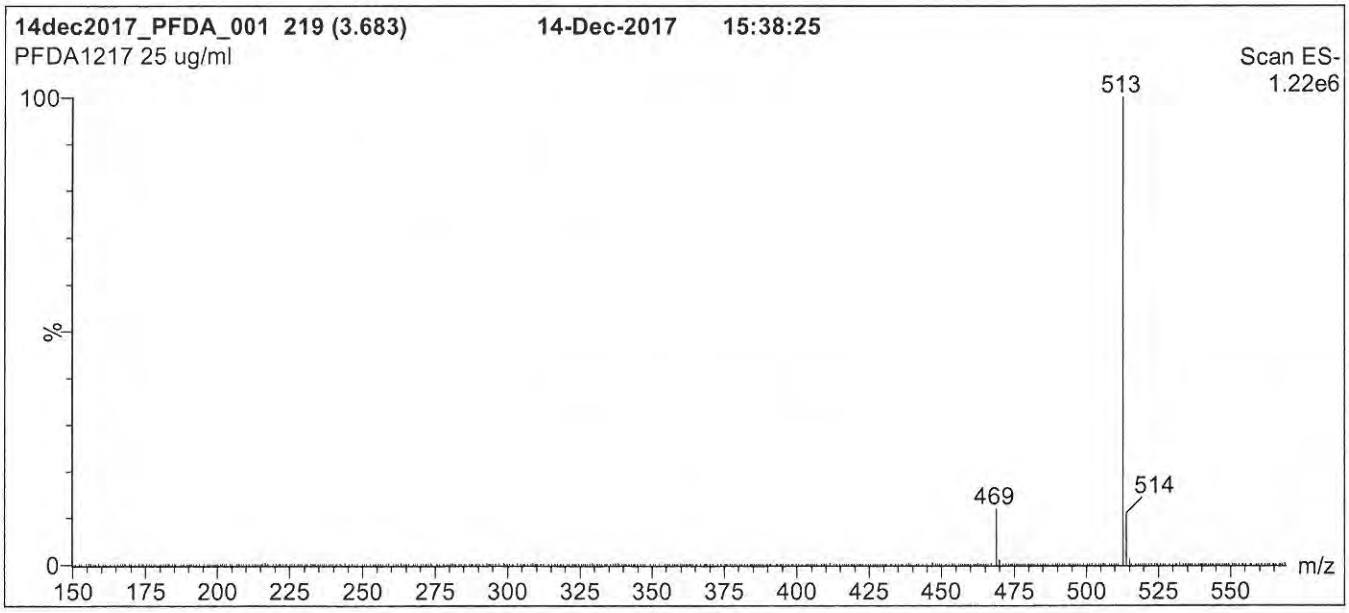
ANAB ACCREDITED

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

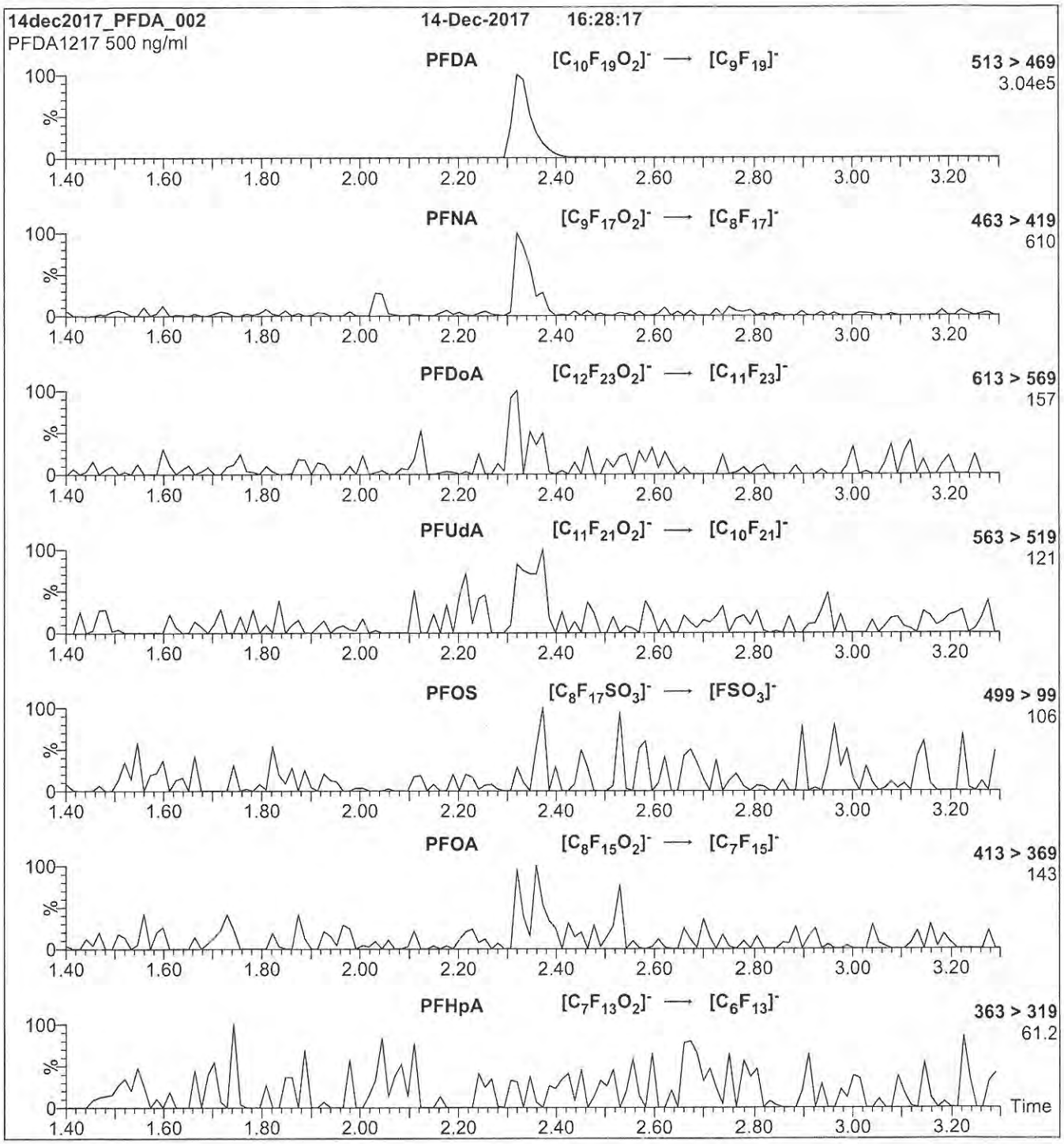
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

180711

Figure 2: **PFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 13

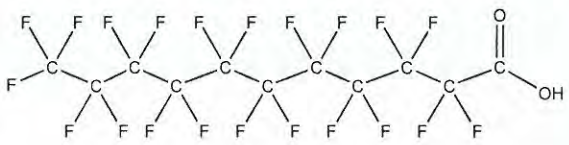
18E0712

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFUdA
COMPOUND: Perfluoro-n-undecanoic acid
LOT NUMBER: PFUdA0917

STRUCTURE:
CAS #: 2058-94-8



MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
MOLECULAR WEIGHT: 564.09
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/21/2017
EXPIRY DATE: (mm/dd/yyyy) 09/21/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

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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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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:

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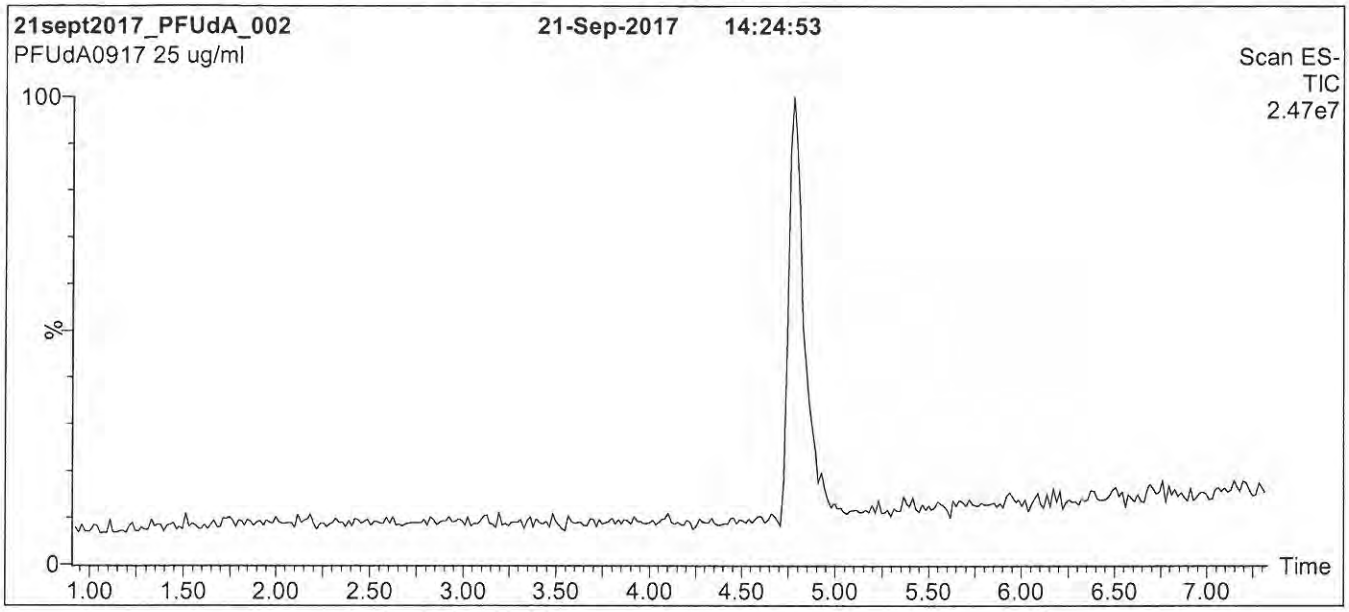
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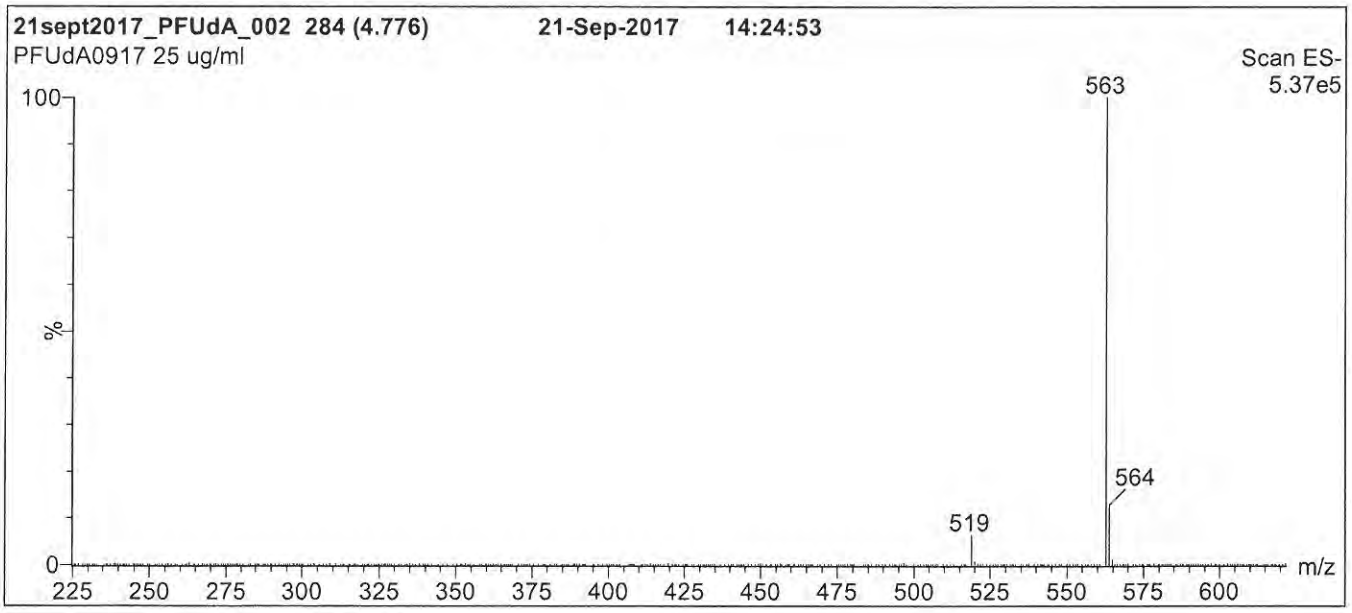
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

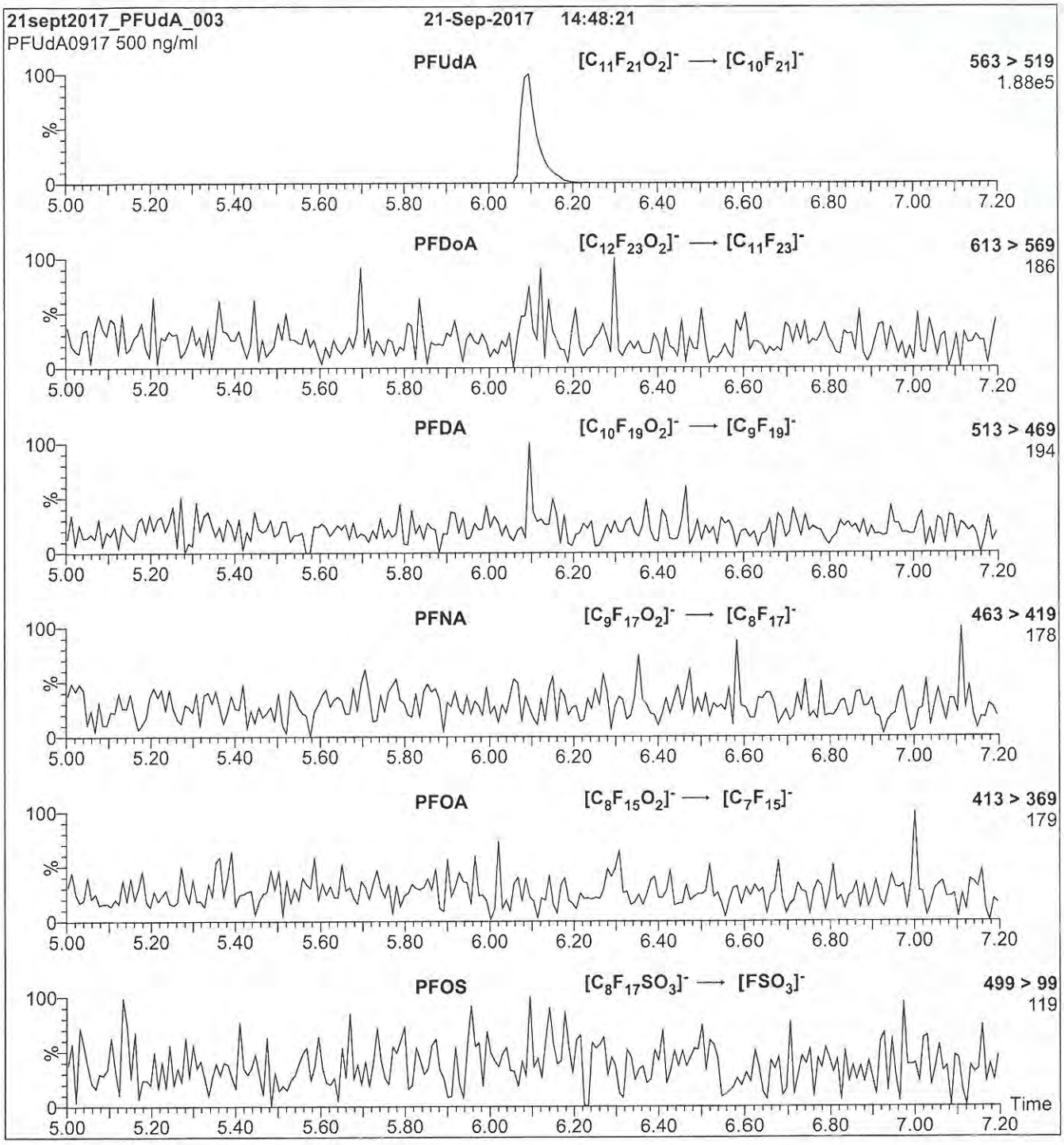
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

18E0712

Figure 2: **PFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

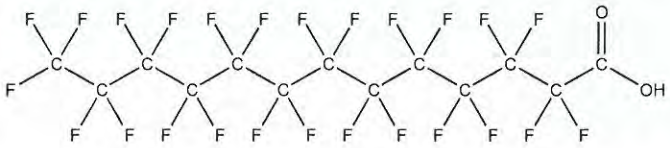
18E0713

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTrDA
COMPOUND: Perfluoro-n-tridecanoic acid
LOT NUMBER: PFTrDA0517

STRUCTURE:
CAS #: 72629-94-8



MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
MOLECULAR WEIGHT: 664.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/02/2017
EXPIRY DATE: (mm/dd/yyyy) 05/02/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim, General Manager
Date: 05/04/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

180713

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

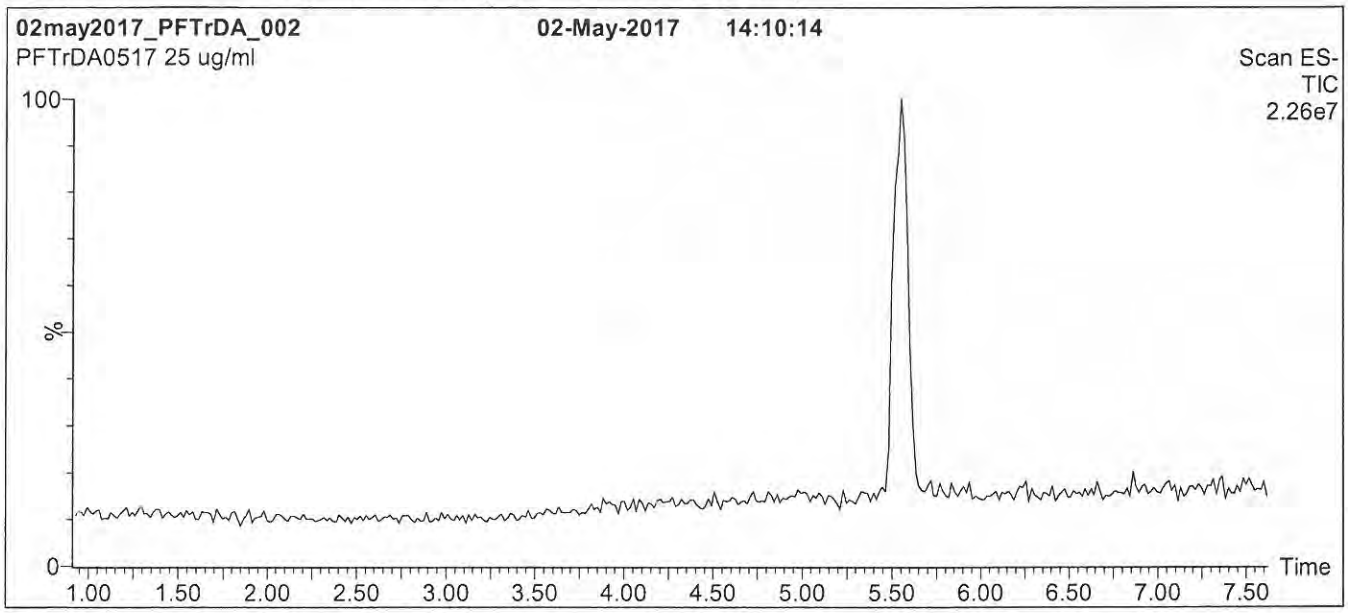
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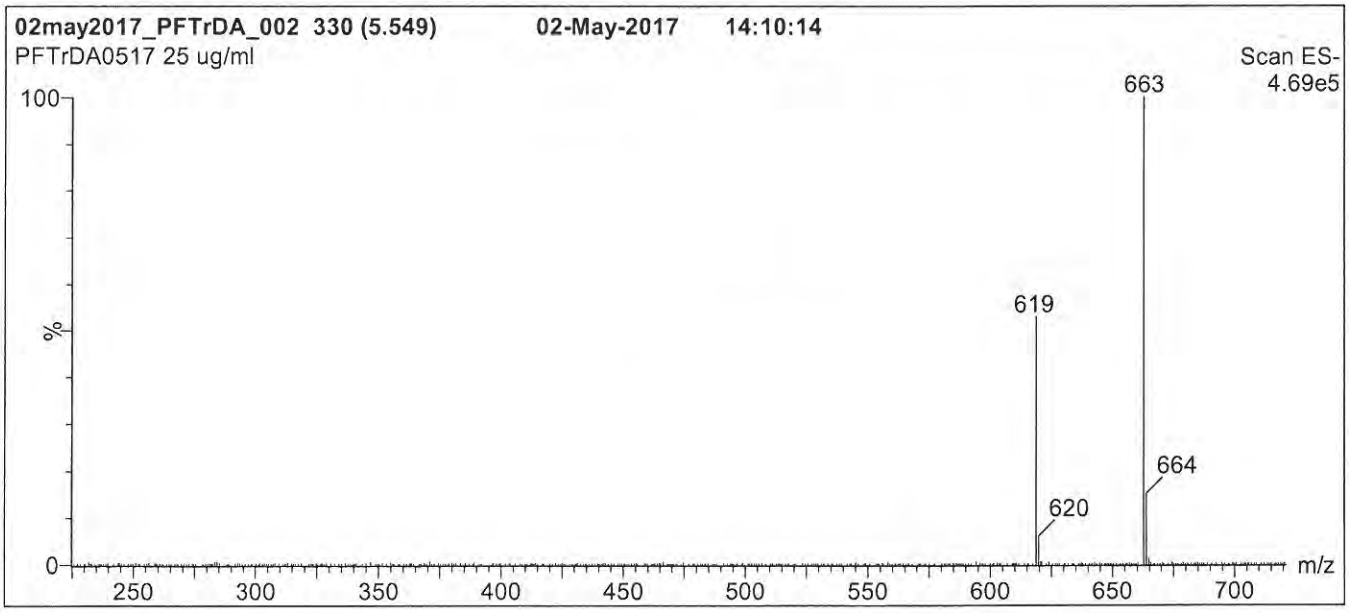
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18E0713

Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

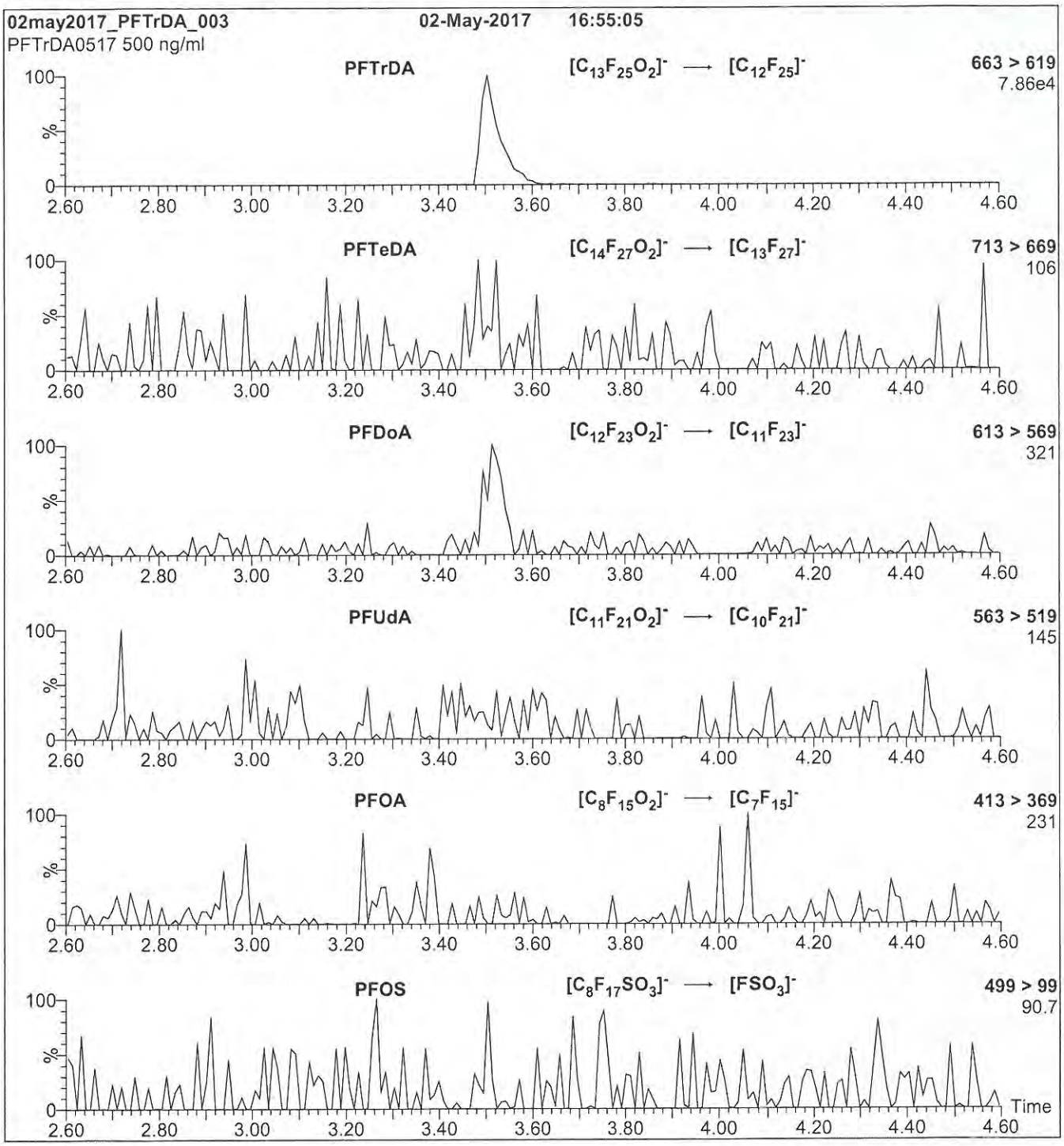
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

18E0713

Figure 2: **PFTrDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

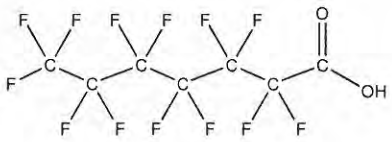
Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 15

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:	$C_7HF_{13}O_2$	**MOLECULAR WEIGHT:**	364.06
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/27/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/29/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1803714

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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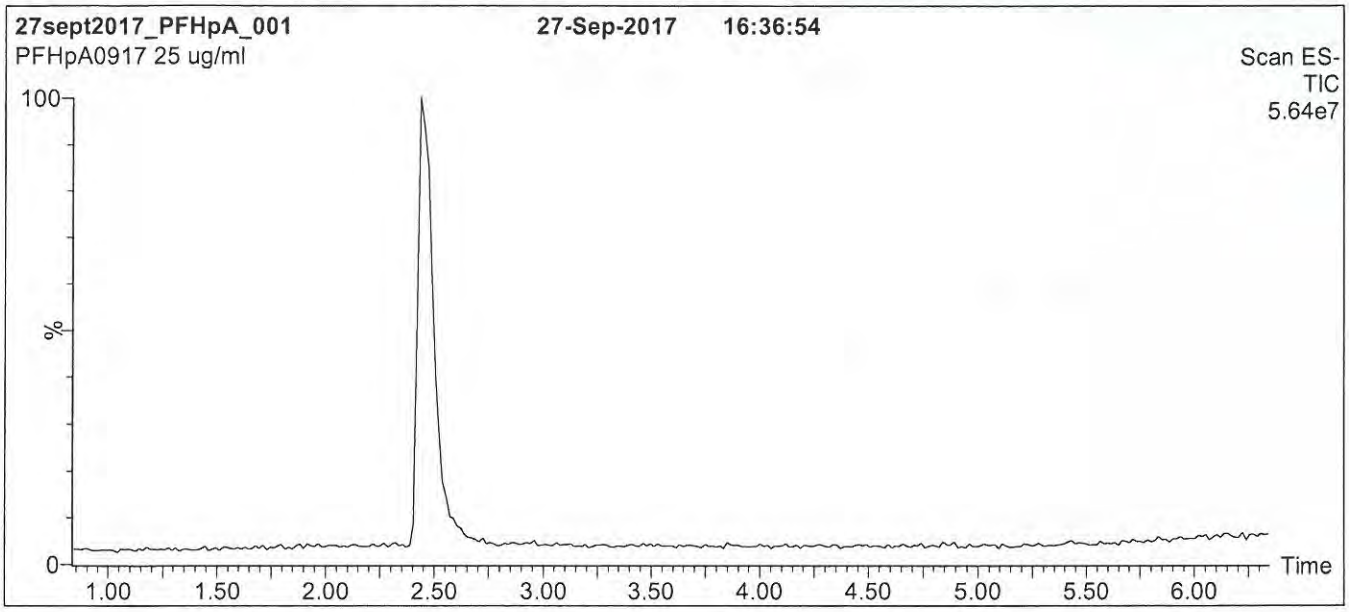
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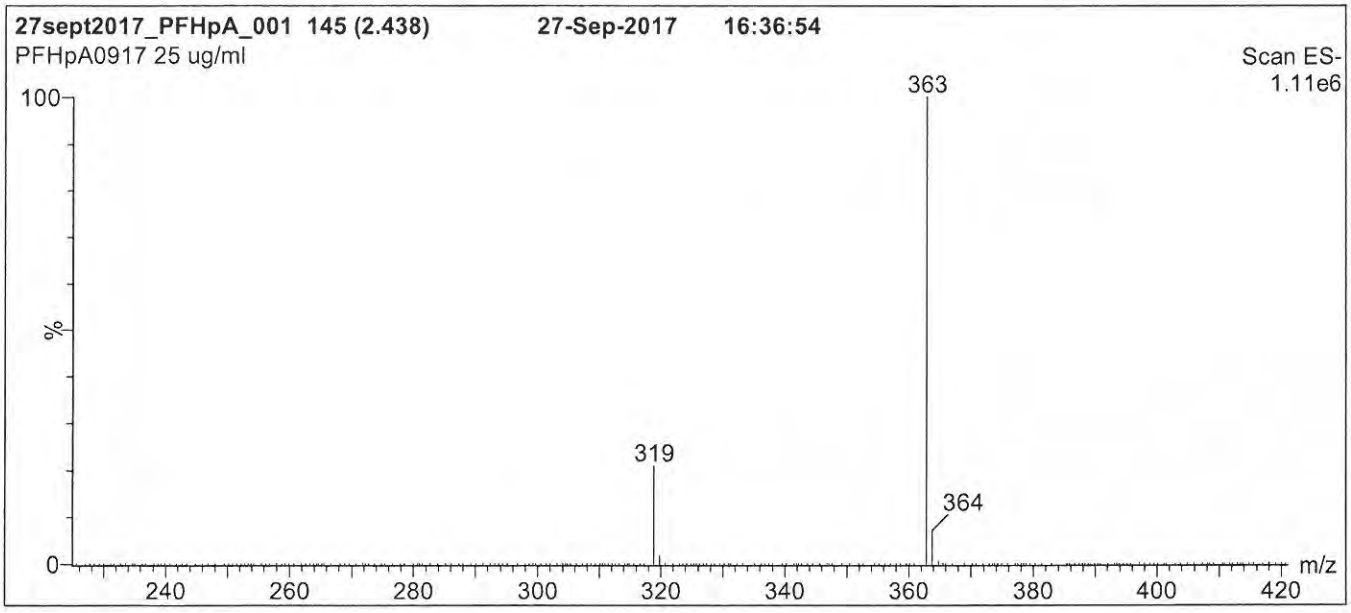
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

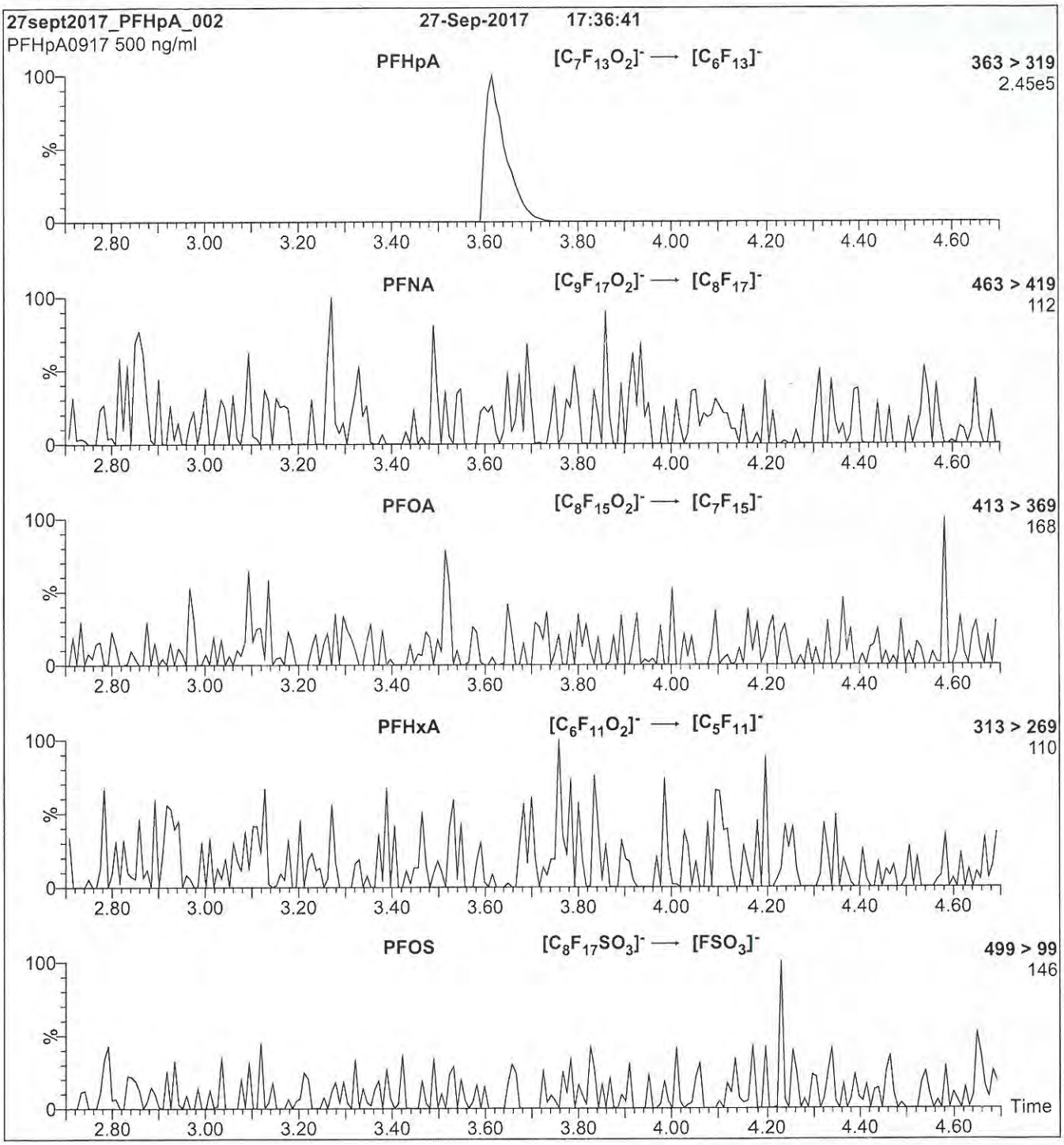
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18E0714

Figure 2: **PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

18E0715

WELLINGTON LABORATORIES

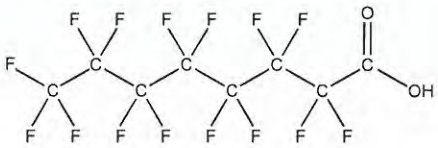
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid

LOT NUMBER: PFOA0218

STRUCTURE:

CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 414.07
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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: _____ **Date:** 02/20/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0715

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:

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

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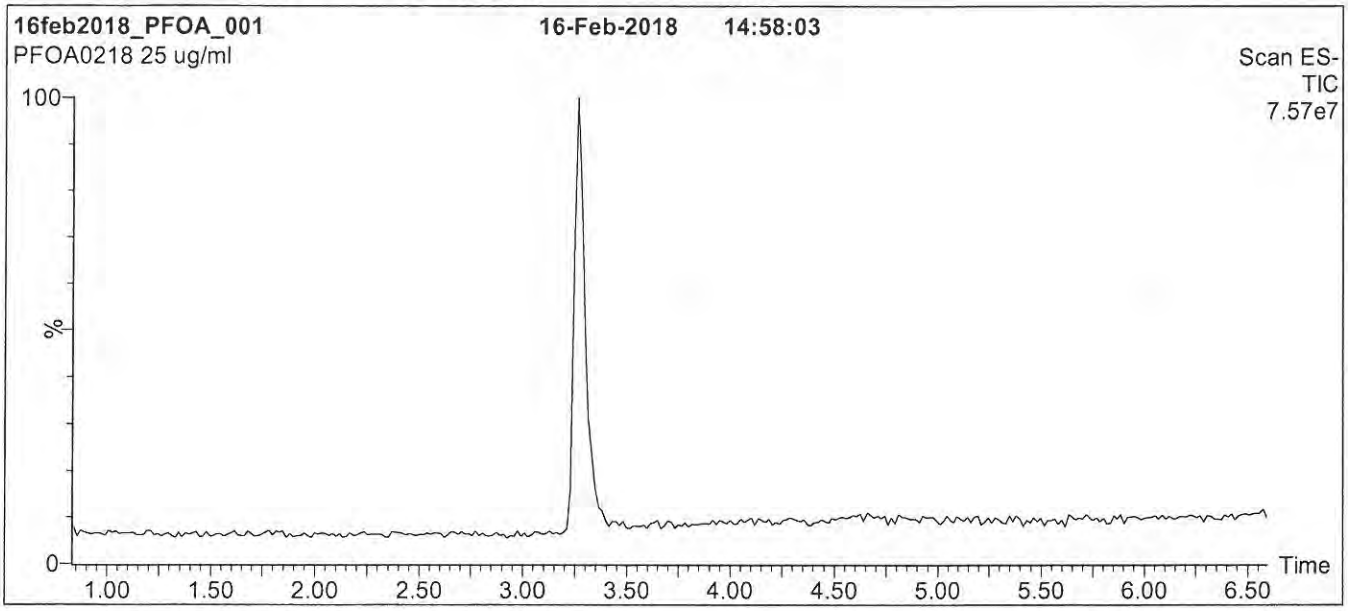
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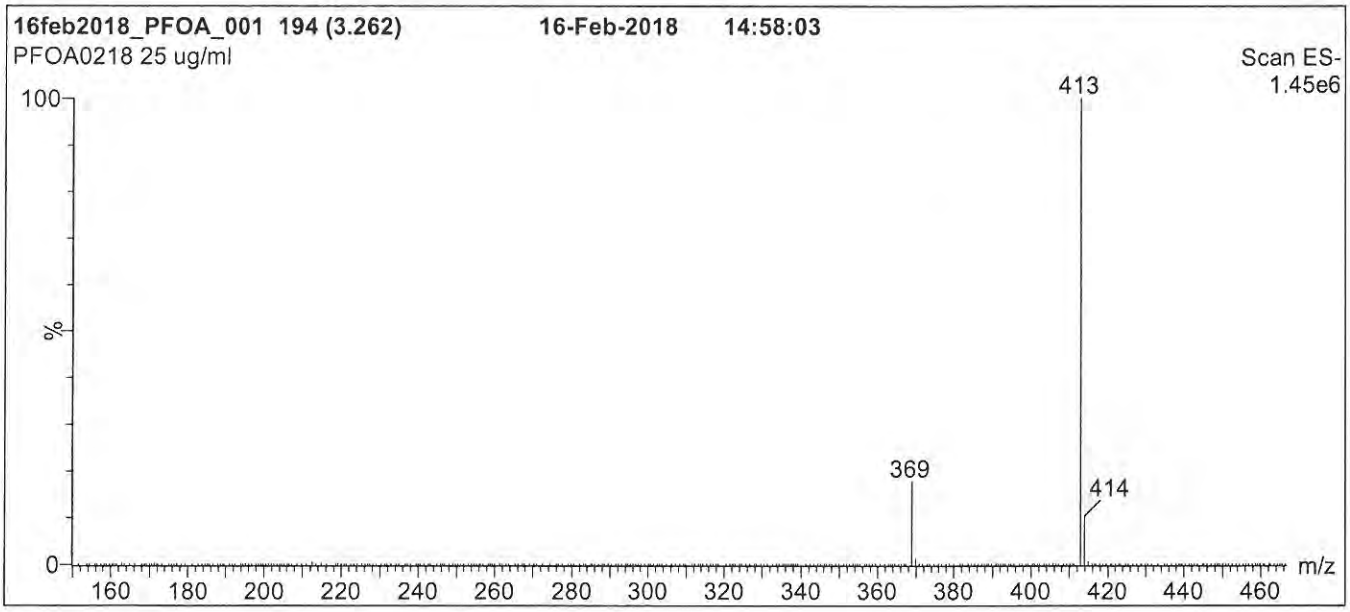
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

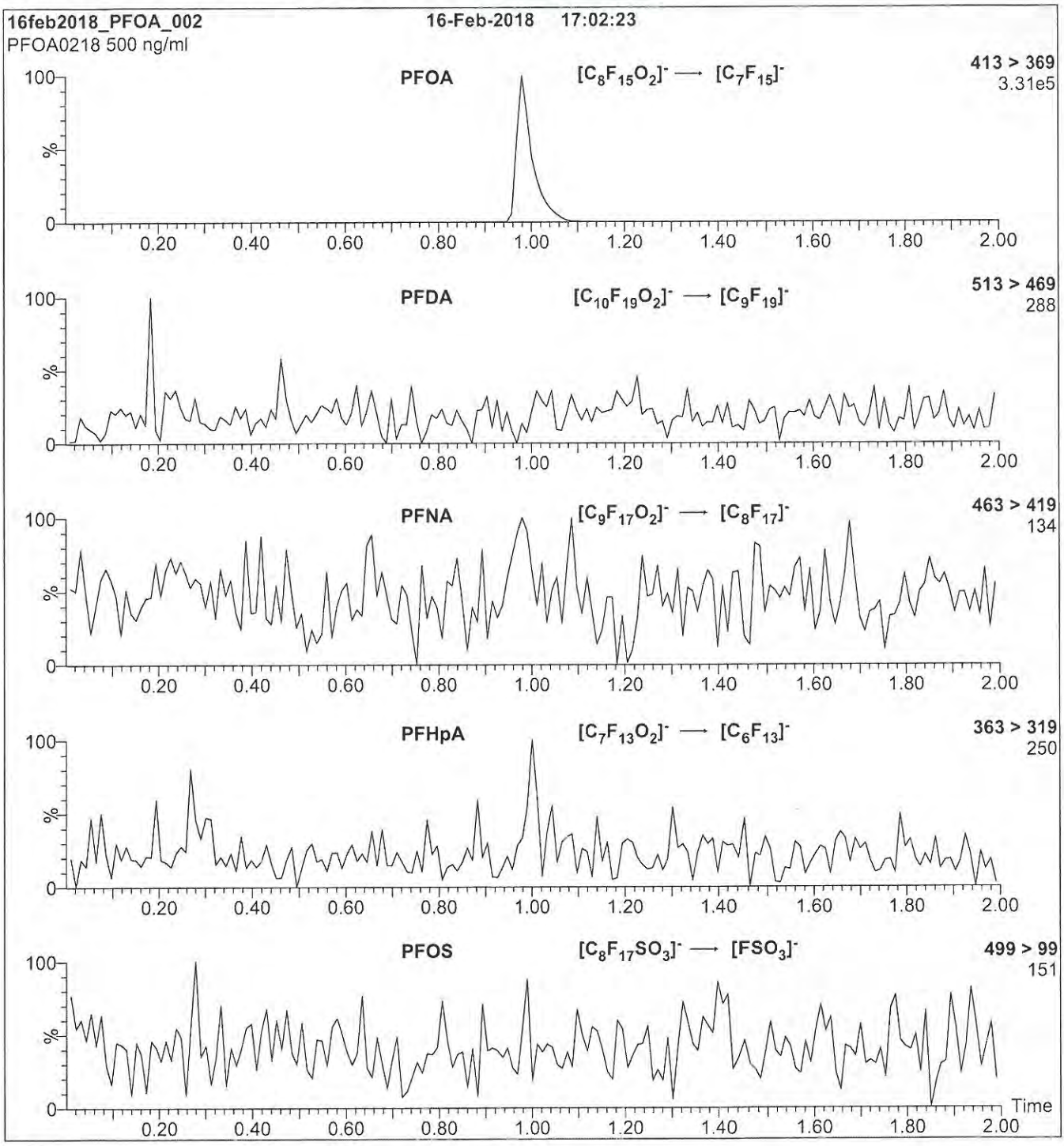
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

180715

Figure 2: **PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

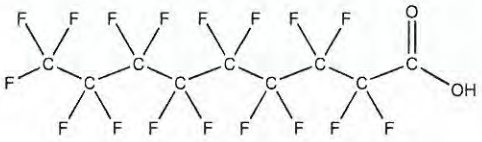
18E0716

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFNA
COMPOUND: Perfluoro-n-nonanoic acid
LOT NUMBER: PFNA0717

STRUCTURE:
CAS #: 375-95-1



MOLECULAR FORMULA: $C_9HF_{17}O_2$
MOLECULAR WEIGHT: 464.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/20/2017
EXPIRY DATE: (mm/dd/yyyy) 07/20/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA), < 0.1% of perfluoro-n-heptanoic acid (PFHpA), and < 0.1% of perfluoro-n-undecanoic acid (PFUdA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/24/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0716

INTENDED USE:

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HAZARDS:

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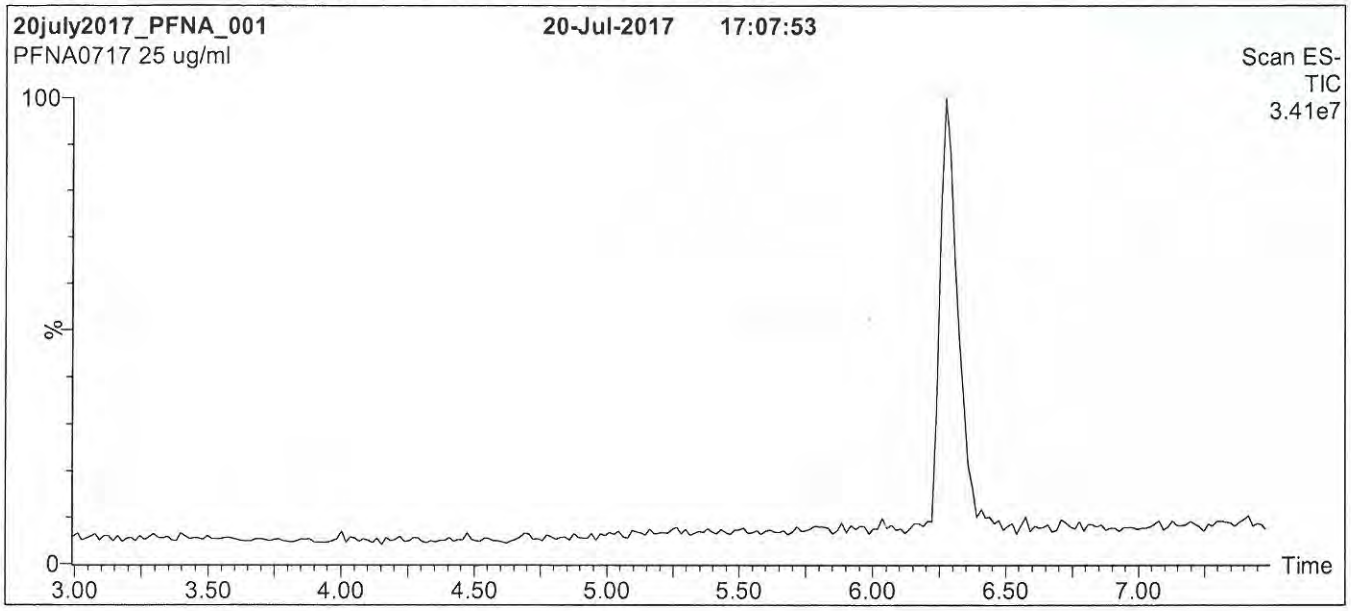
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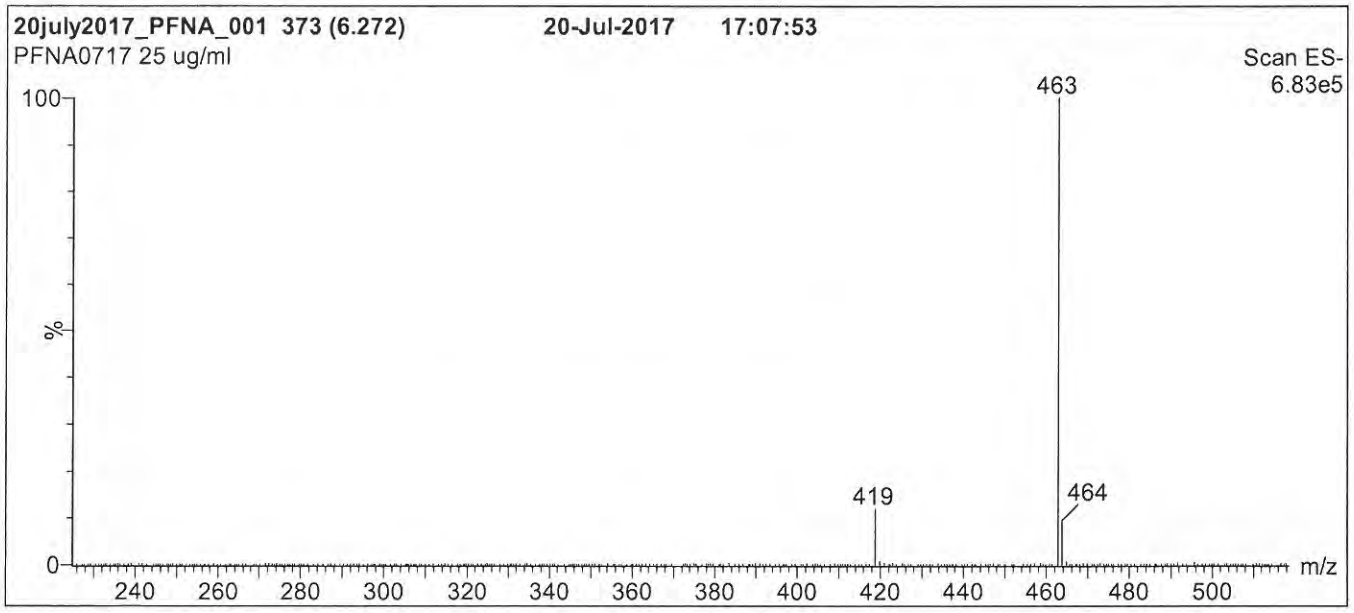
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

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

18E0716

Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Hold for 1 min. Ramp to 90% organic over 7 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

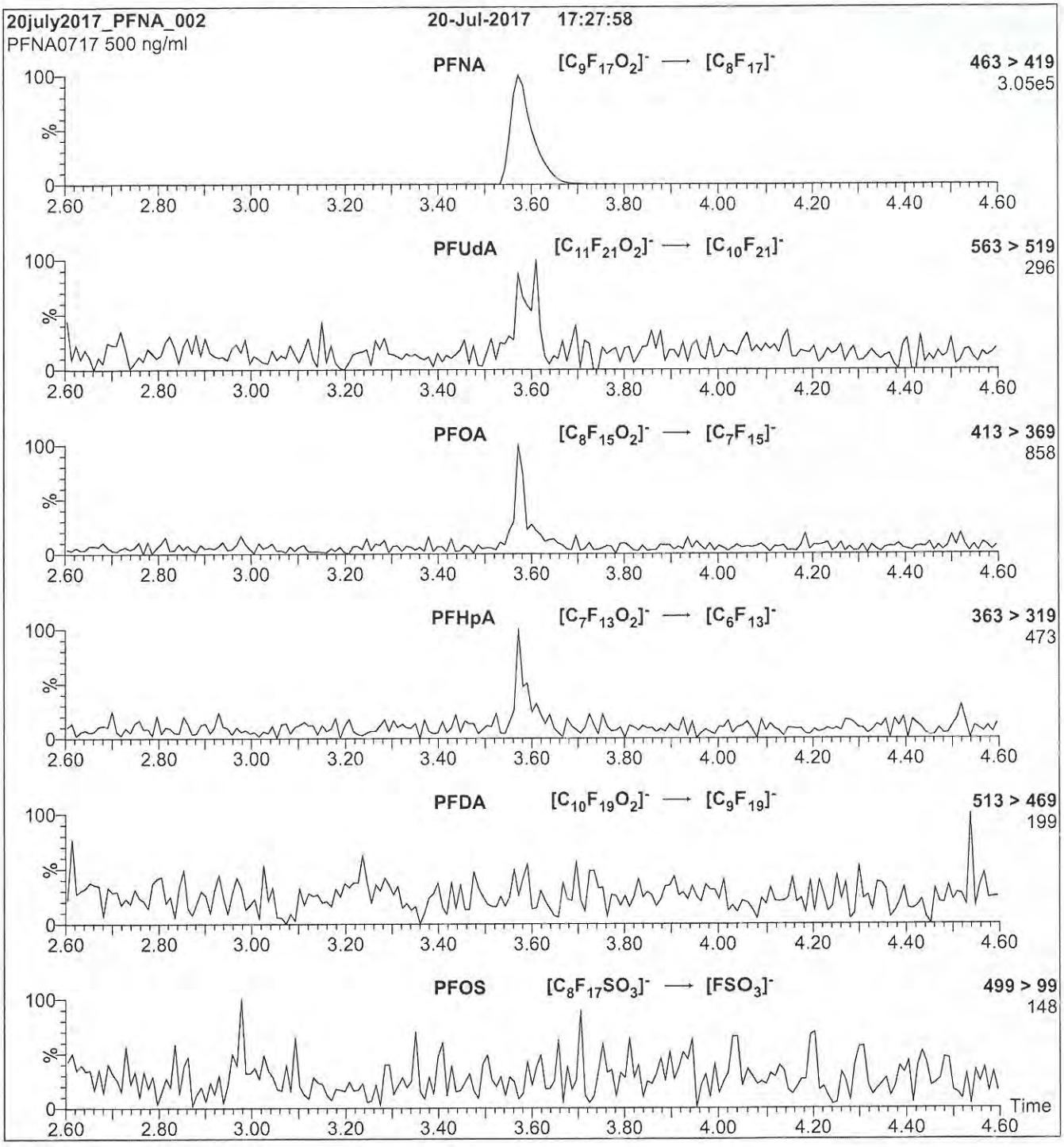
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1803716

Figure 2: **PFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

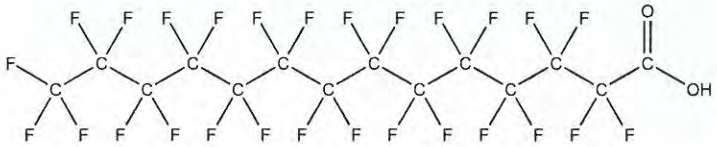
Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 11

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 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/21/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/21/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/21/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0717

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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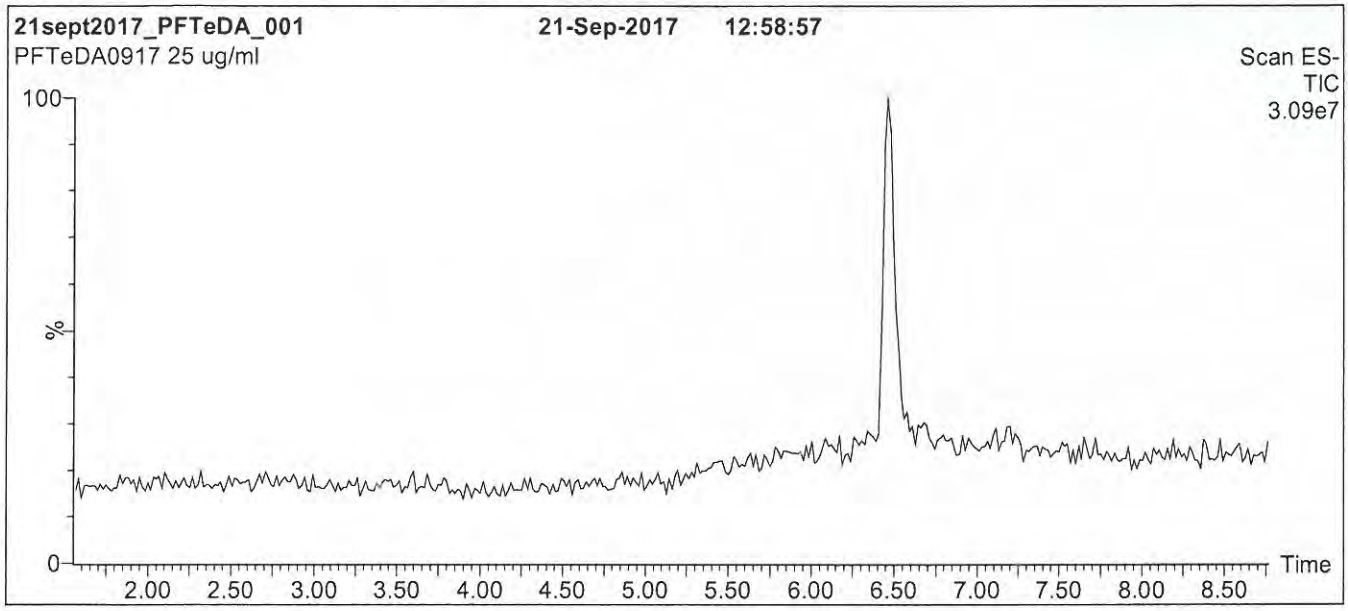
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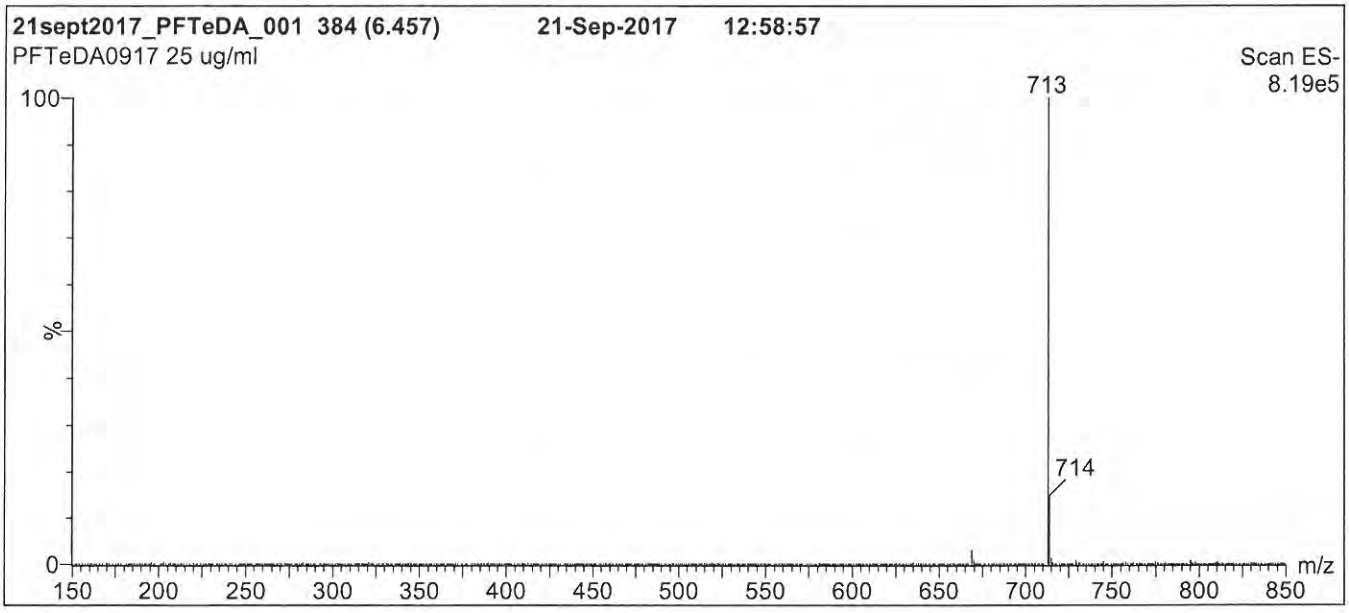
ANAB ACCREDITED

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1803717

Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

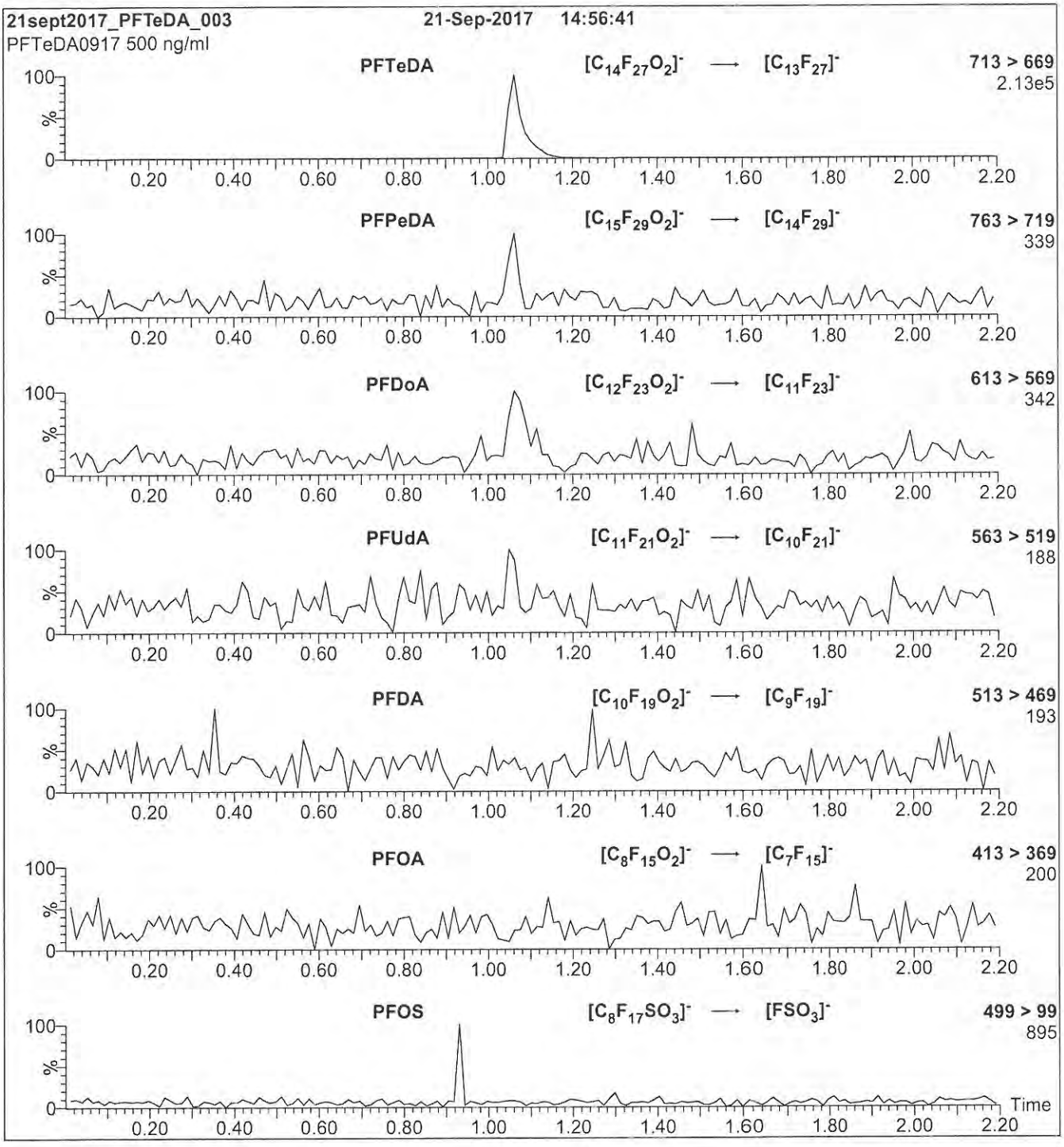
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 14

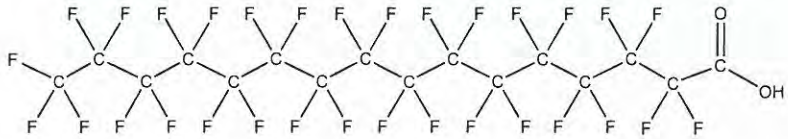
18E0718

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxDA
COMPOUND: Perfluoro-n-hexadecanoic acid
LOT NUMBER: PFHxDA0717

STRUCTURE:
CAS #: 67905-19-5



MOLECULAR FORMULA: $C_{16}HF_{31}O_2$
MOLECULAR WEIGHT: 814.13
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/13/2017
EXPIRY DATE: (mm/dd/yyyy) 07/13/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 08/04/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0718

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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EXPIRY DATE / PERIOD OF VALIDITY:

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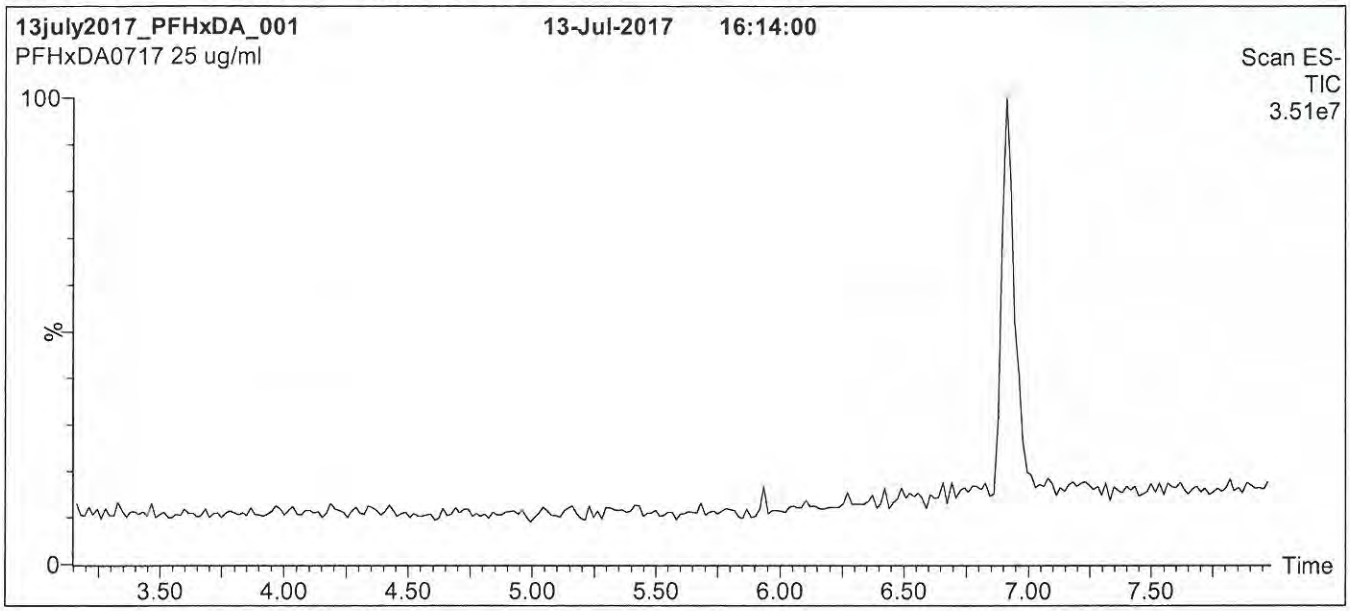
CALA Testing

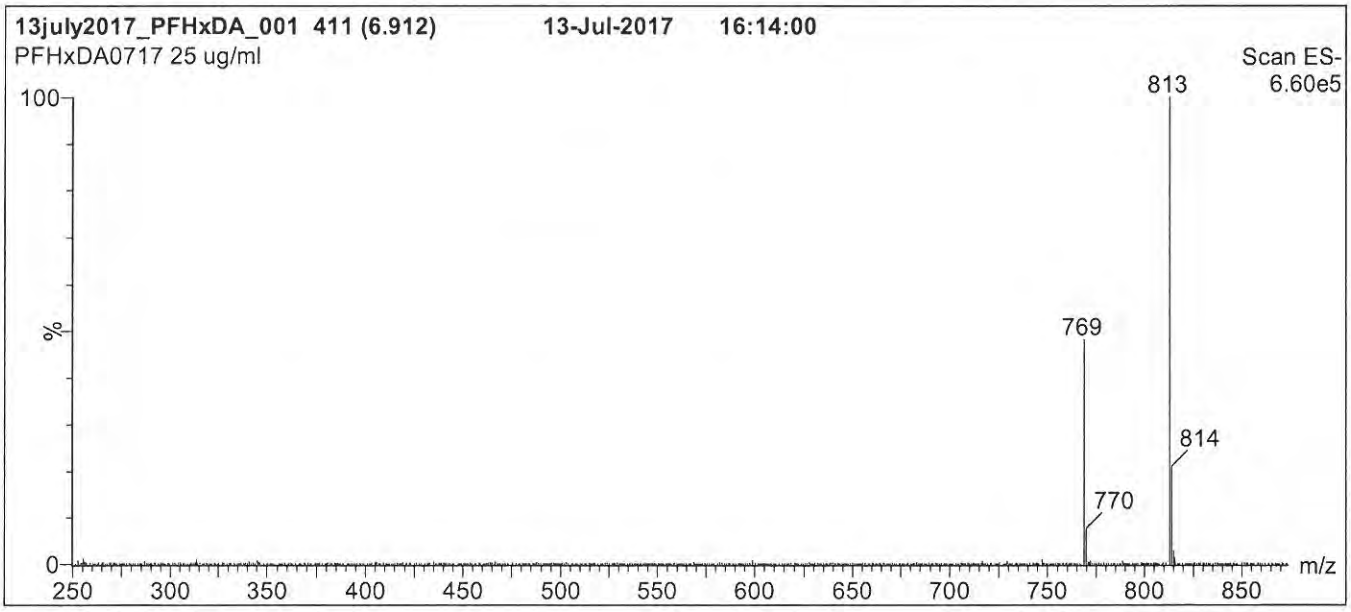
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18E0718

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

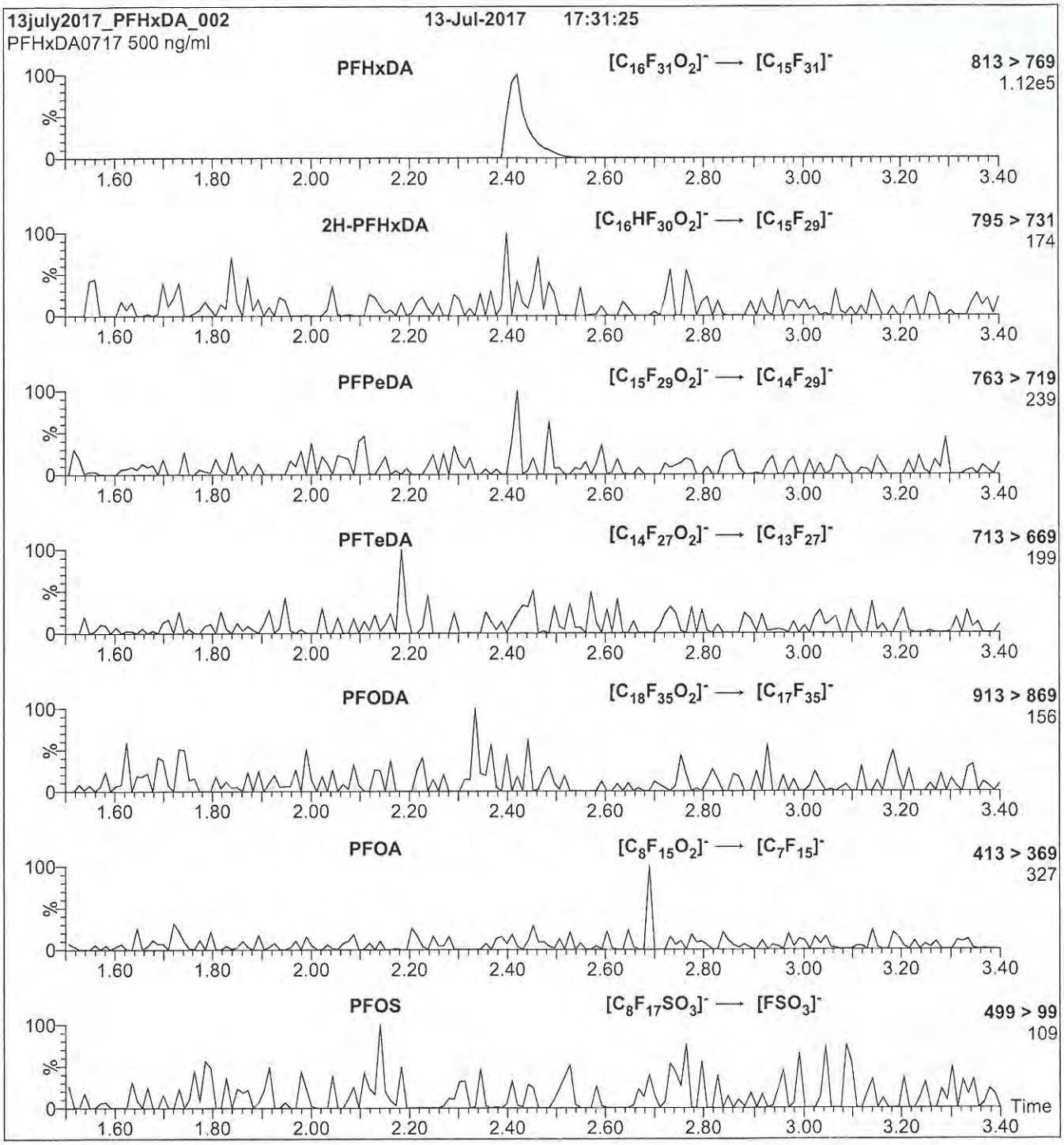
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18E0718

Figure 2: **PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.13e-3
Collision Energy (eV) = 15

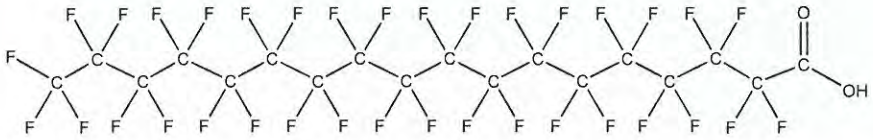
18E0719

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid
LOT NUMBER: PFODA0717

STRUCTURE:
CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.14
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/13/2017
EXPIRY DATE: (mm/dd/yyyy) 07/13/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0719

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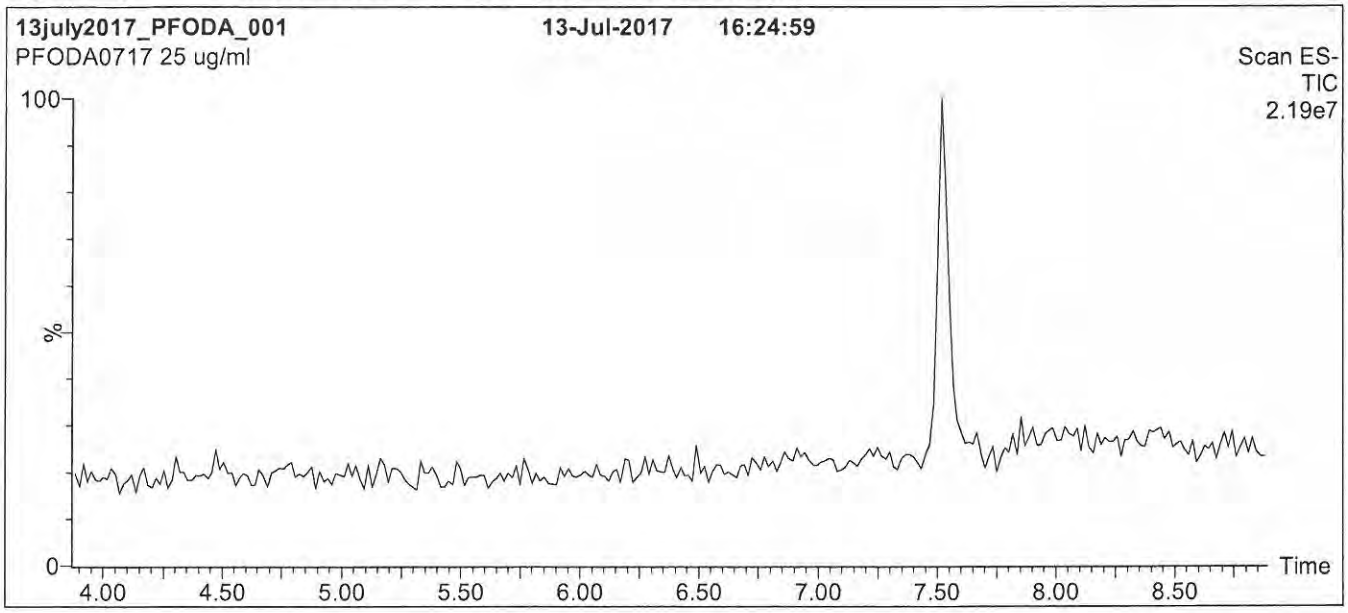
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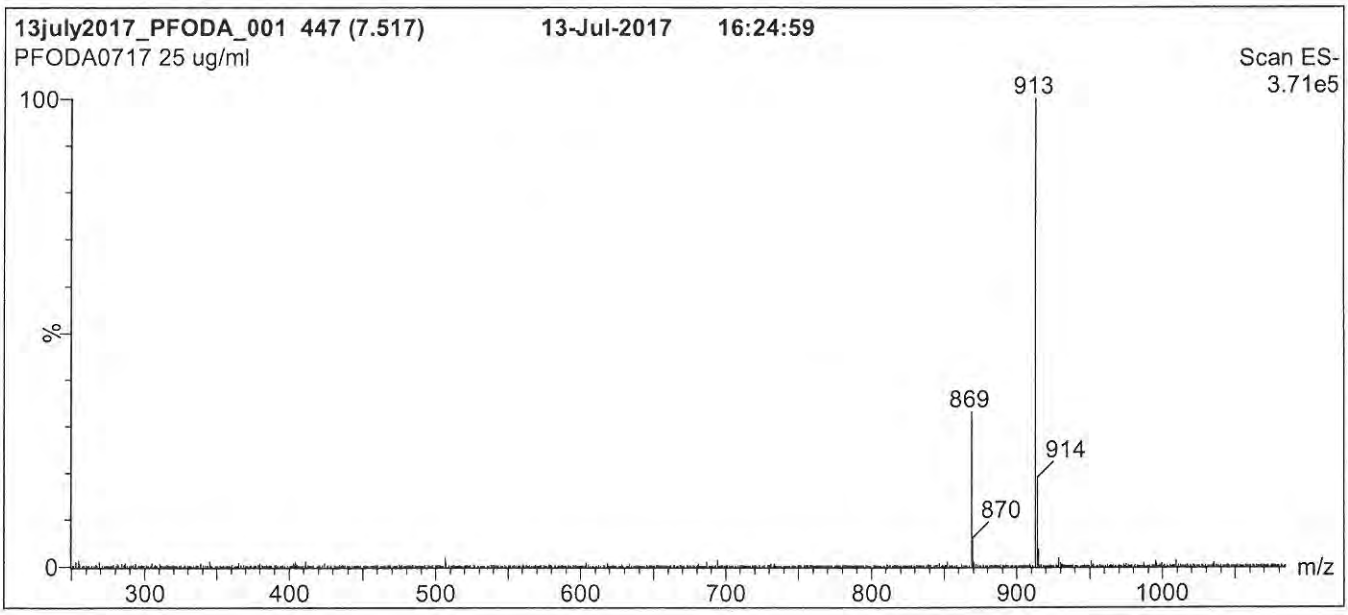
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

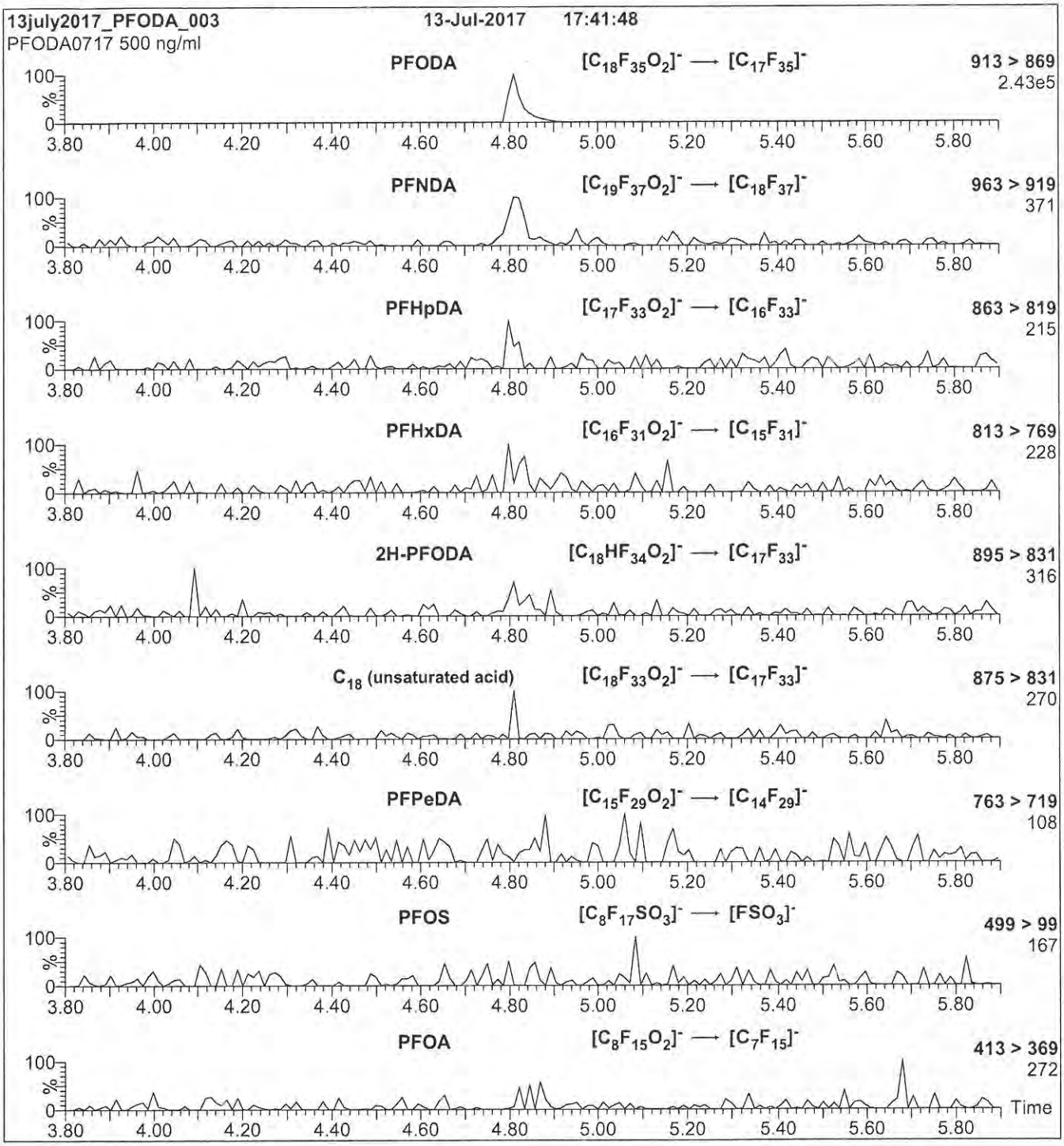
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18E0719

Figure 2: **PFODA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFODA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 15

18E0720

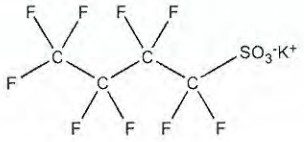
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate
LOT NUMBER: LPFBS0917

STRUCTURE:

CAS #: 29420-49-3



MOLECULAR FORMULA:	$C_4F_9SO_3K$	**MOLECULAR WEIGHT:**	338.19
CONCENTRATION:	50.0 ± 2.5 µg/ml (K salt) 44.2 ± 2.2 µg/ml (PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/21/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/21/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1803720

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

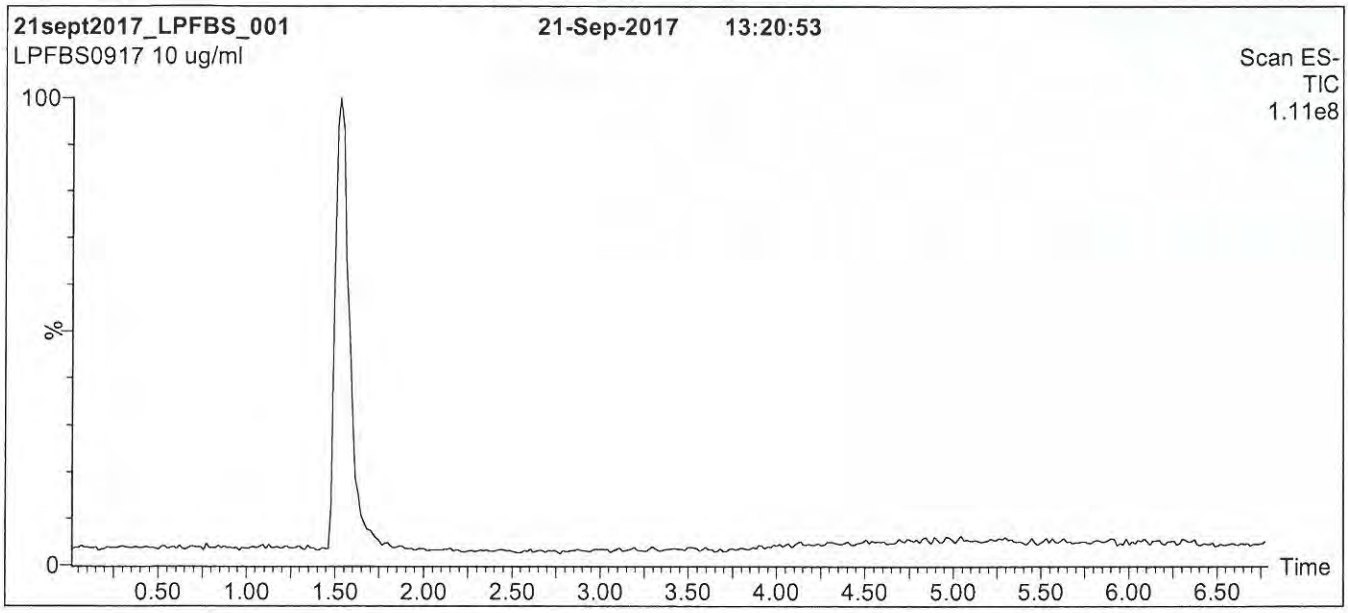
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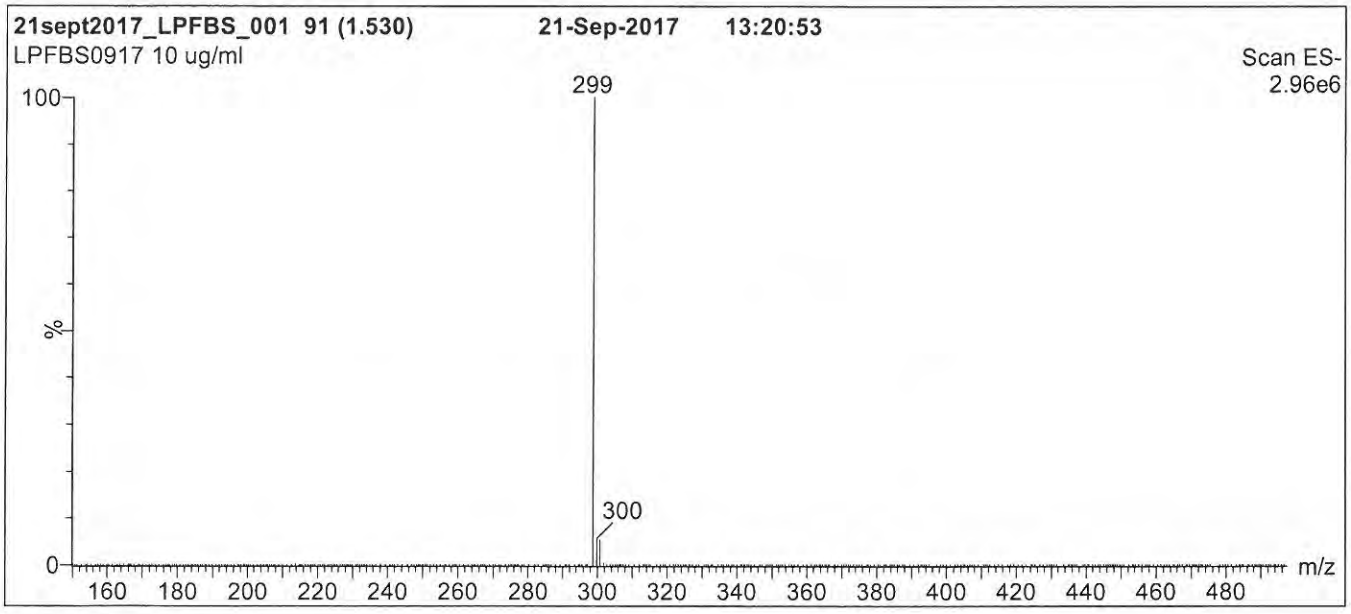
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

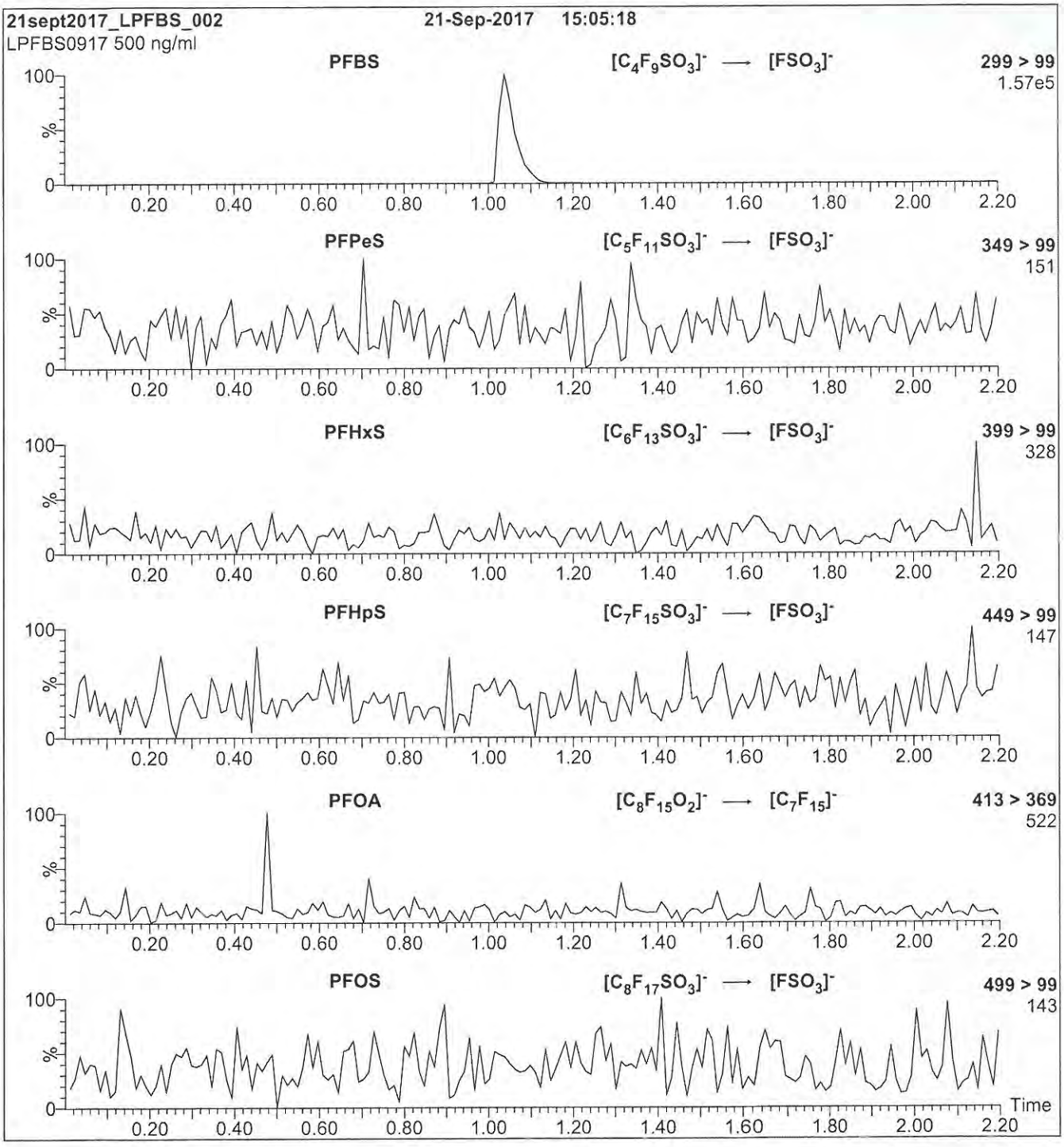
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18E0720

Figure 2: **L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

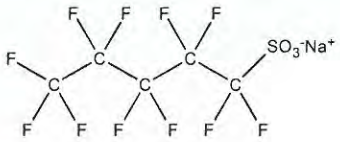
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18E0721

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFPeS	**LOT NUMBER:**	LPFPeS0117
COMPOUND:	Sodium perfluoro-1-pentanesulfonate		
STRUCTURE:		**CAS #:**	630402-22-1



MOLECULAR FORMULA:	$C_5F_{11}SO_3Na$	**MOLECULAR WEIGHT:**	372.09
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.9 ± 2.3 µg/ml (PFPeS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/11/2017		
EXPIRY DATE: (mm/dd/yyyy)	01/11/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/06/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0721

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

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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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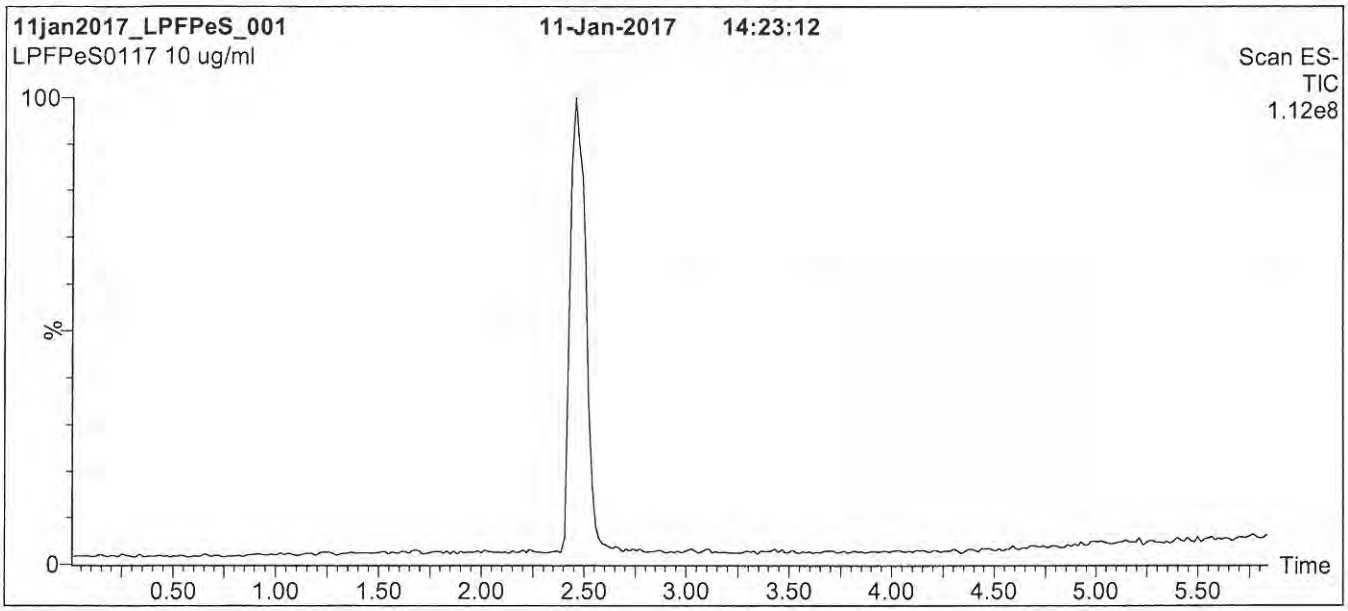
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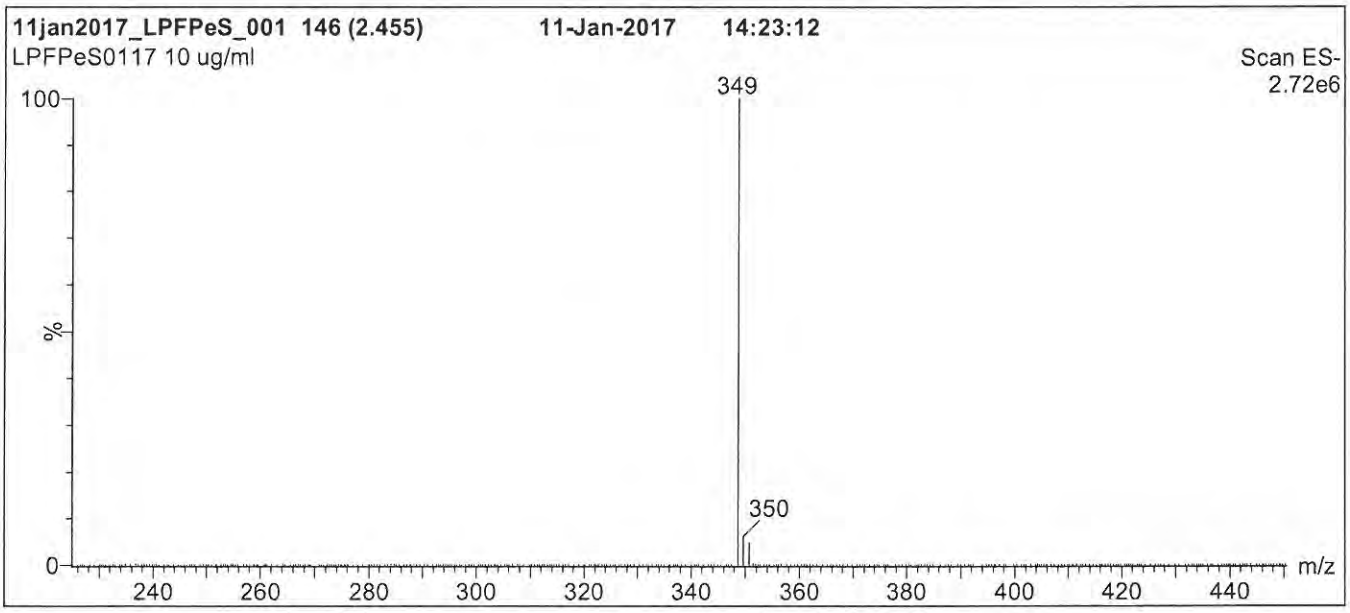
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

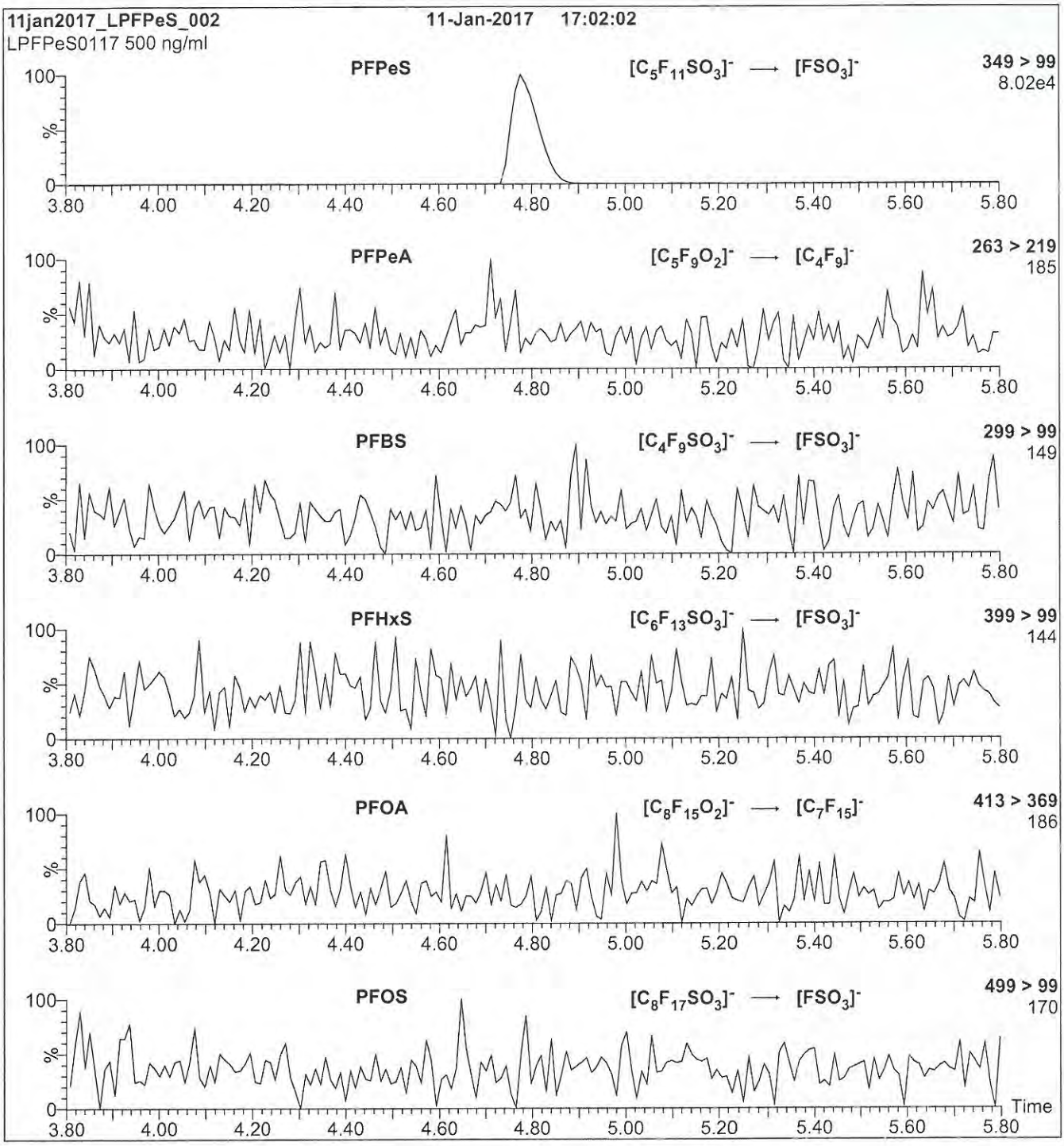
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 30

18E0722

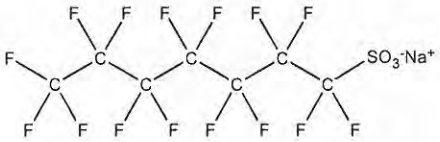
WELLINGTON LABORATORIES

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) 47.6 ± 2.4 µg/ml (PFHpS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.2% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.1% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/07/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0722

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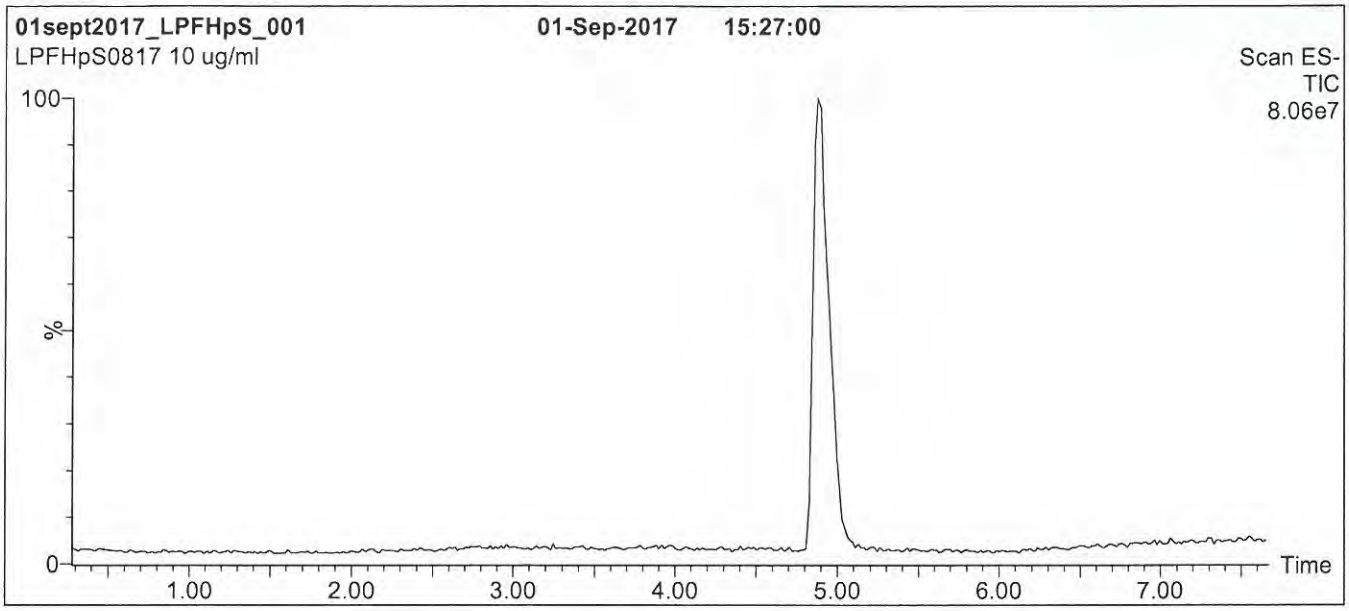
QUALITY MANAGEMENT:

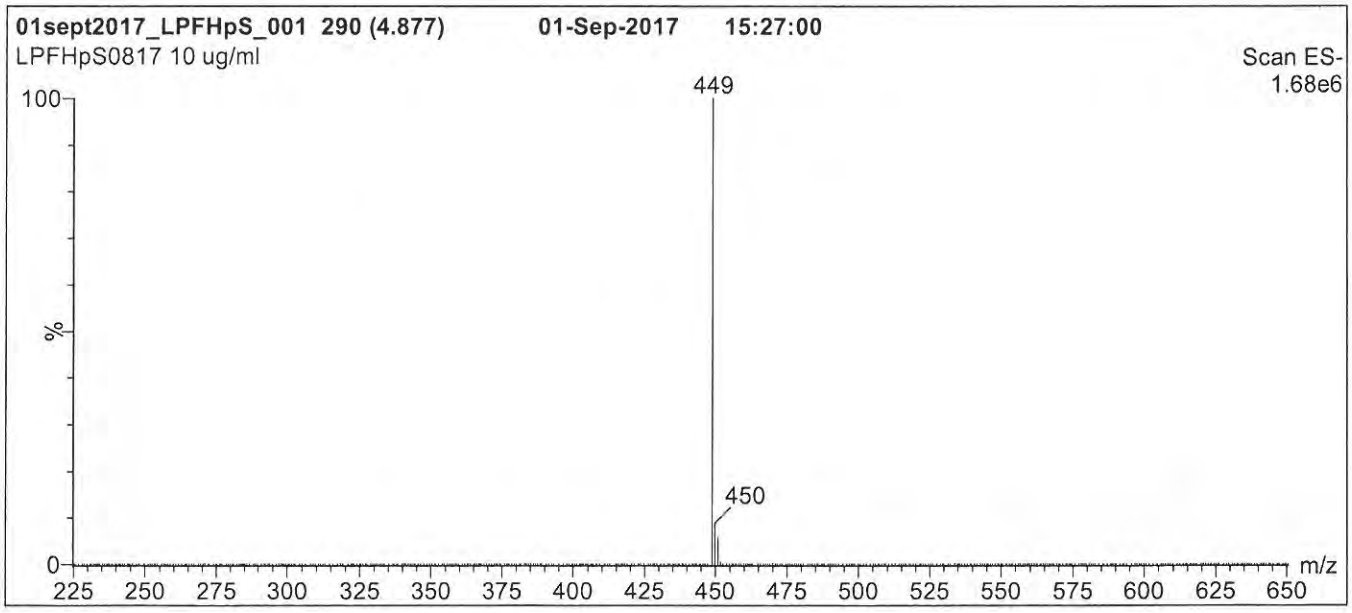
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold
for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

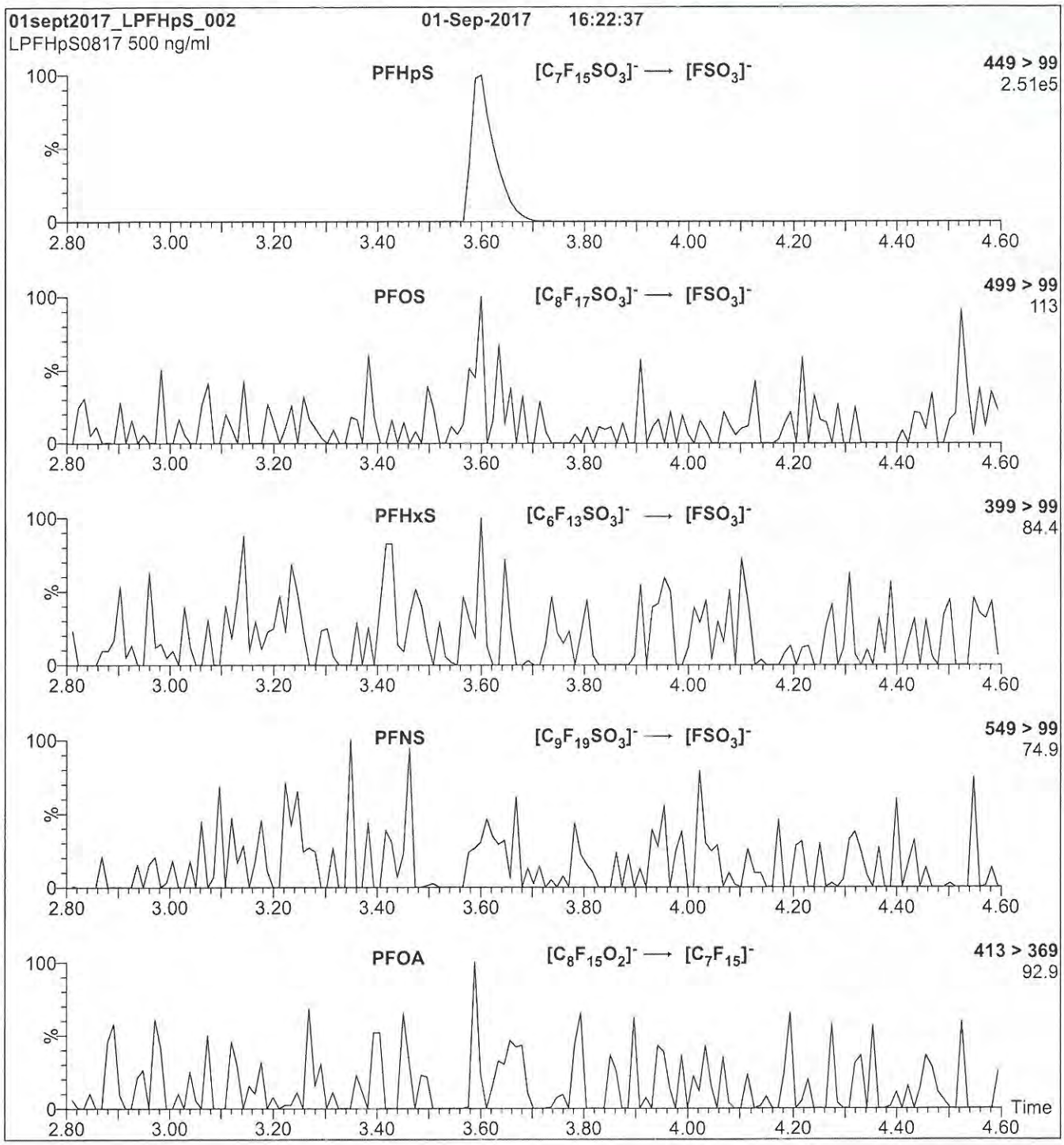
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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Figure 2: **L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

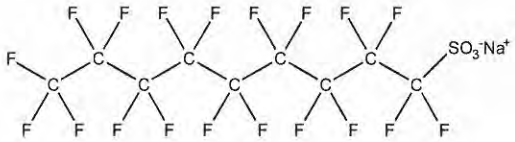
Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 35

18E0723

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFNS	**LOT NUMBER:**	LPFNS0917
COMPOUND:	Sodium perfluoro-1-nonanesulfonate		
STRUCTURE:		**CAS #:**	98789-57-2



MOLECULAR FORMULA:	$C_9F_{19}SO_3Na$	**MOLECULAR WEIGHT:**	572.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.0 ± 2.4 µg/ml (PFNS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/27/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/28/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1BE0723

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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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

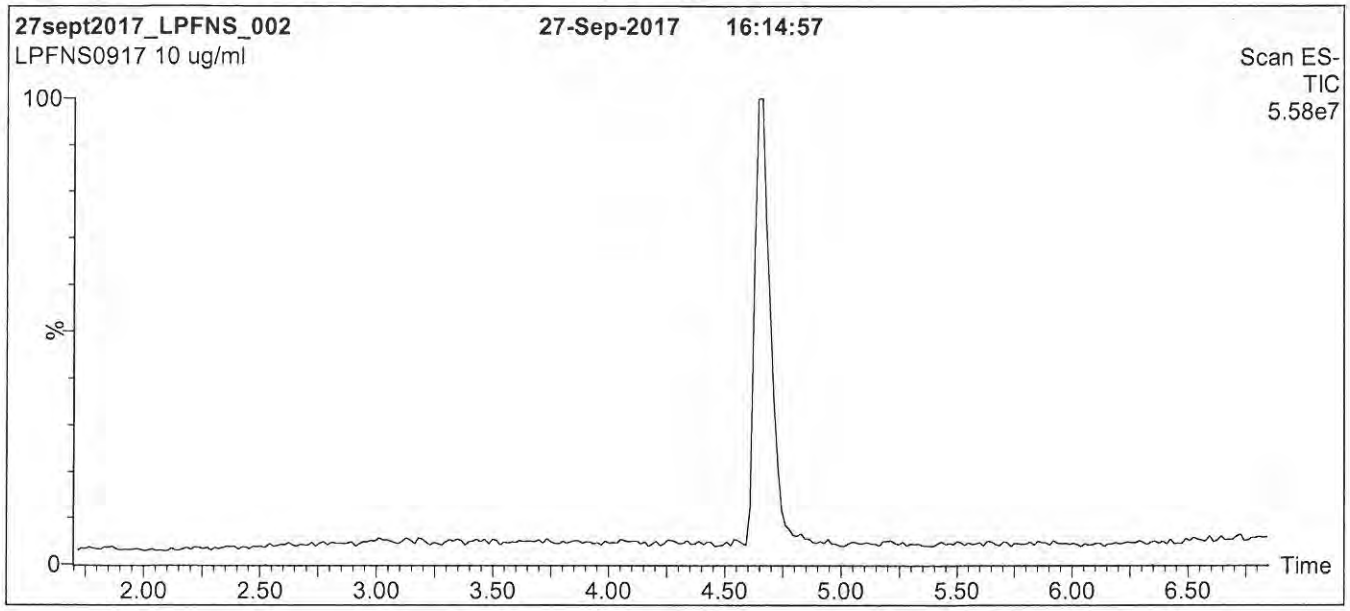
CALA

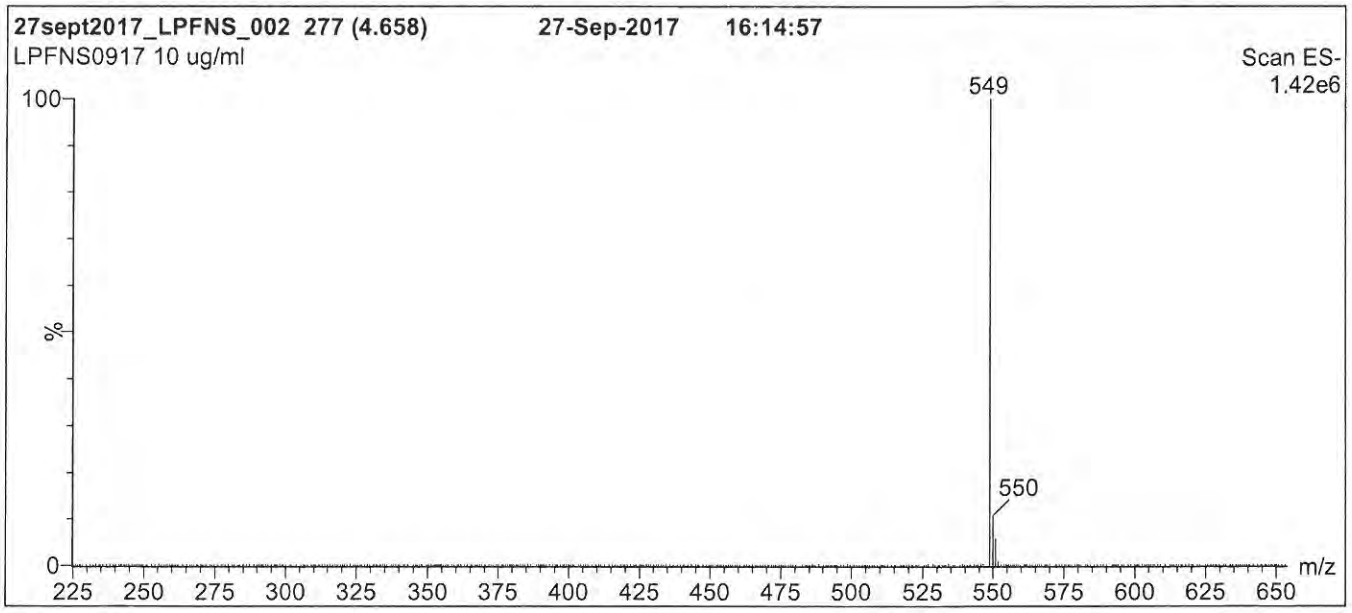
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

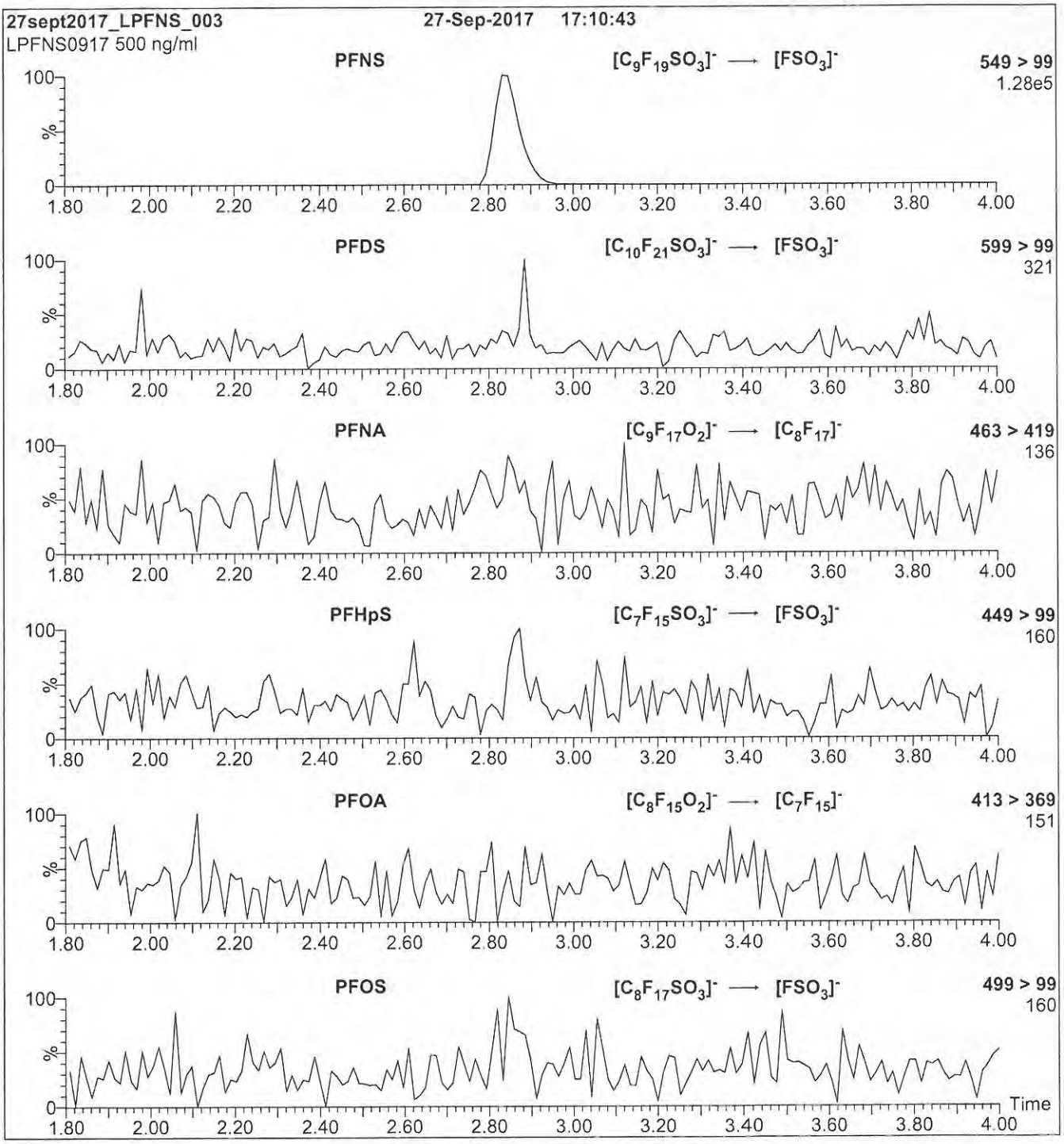
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18E0723

Figure 2: **L-PFNS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFNS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 45

18E0724

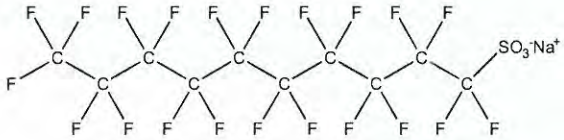
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
COMPOUND: Sodium perfluoro-1-decanesulfonate
LOT NUMBER: LPFDS1117

STRUCTURE:

CAS #: 2806-15-7



MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$	**MOLECULAR WEIGHT:**	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.2 ± 2.4 µg/ml (PFDS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0724

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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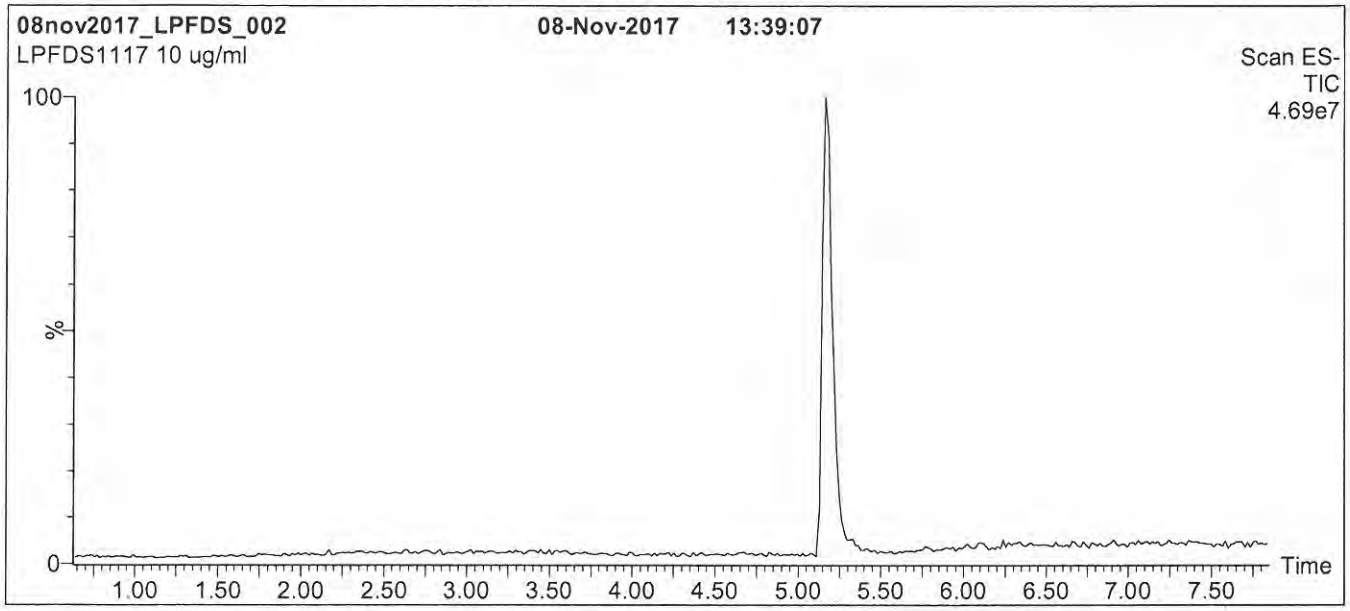
CALA

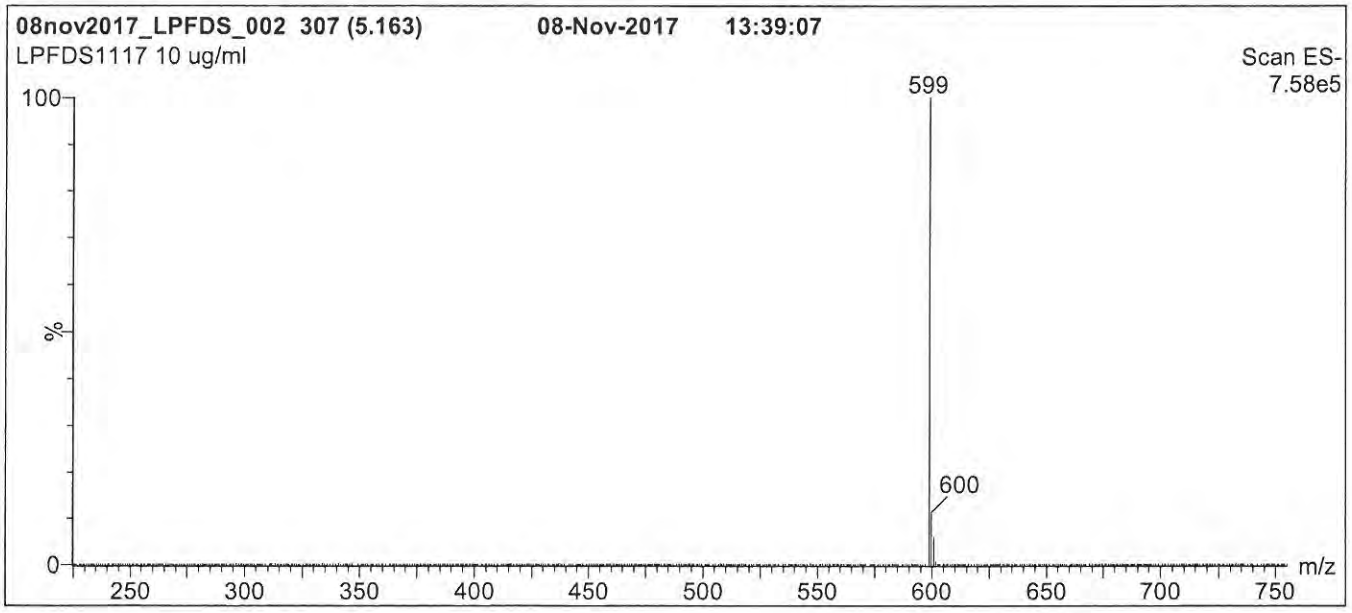
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18E0724

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

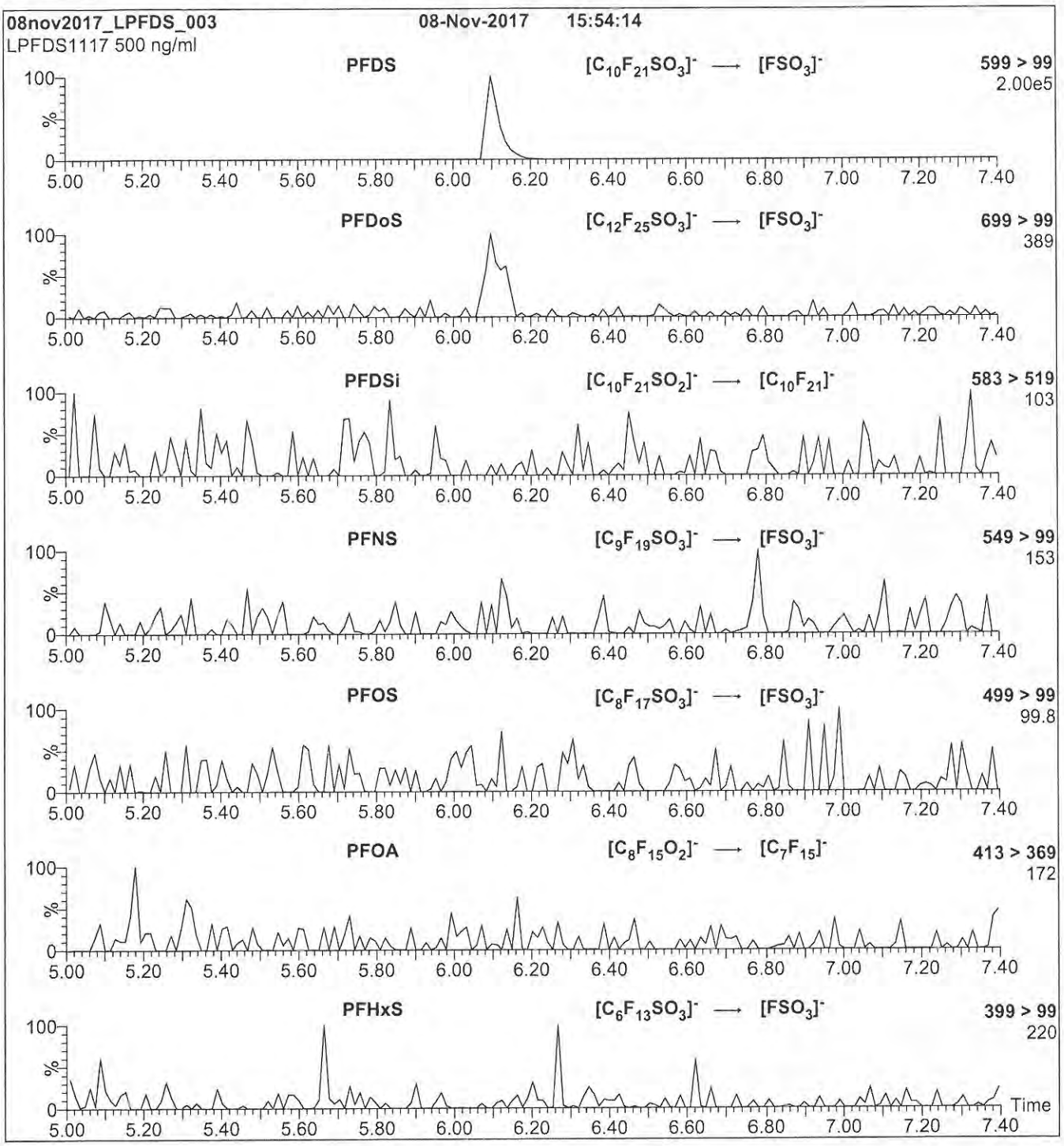
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18E0724

Figure 2: **L-PFDS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 50

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 ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.5% of perfluoro-1-pentanesulfonate and ~ 0.2% of perfluoro-1-octanesulfonate.
- CAS#: 3871-99-6 (for linear isomer; potassium salt).

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18E0725

INTENDED USE:

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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,...x_n on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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CALA

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18E0725

Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

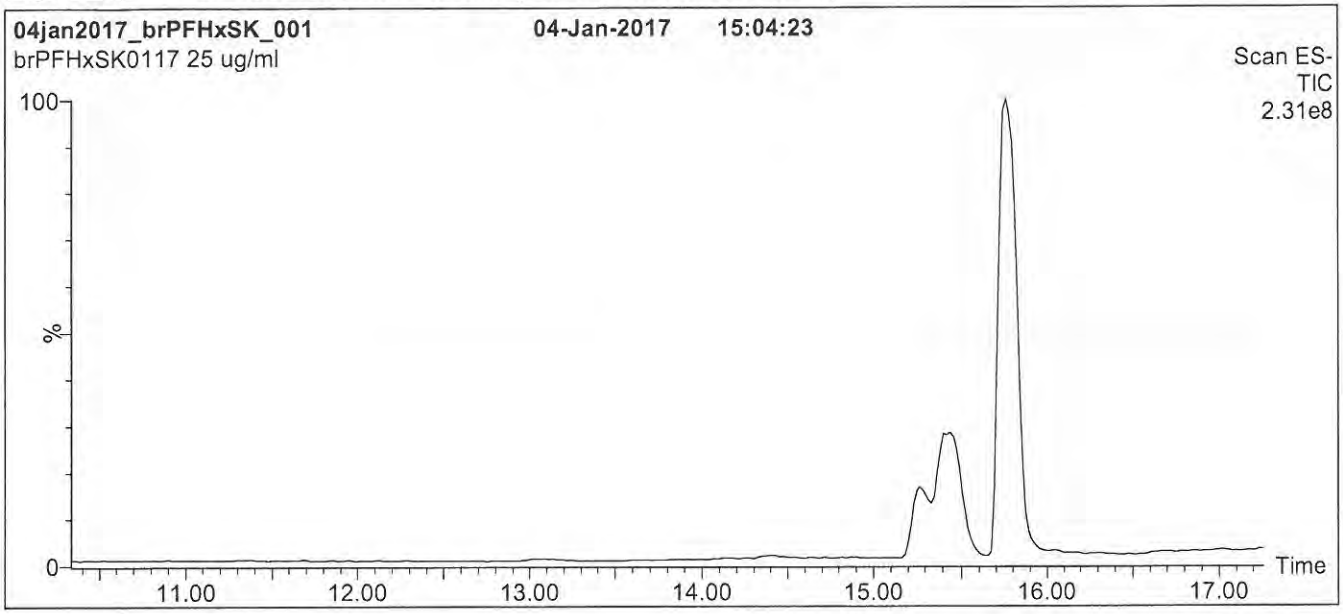
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)_2CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

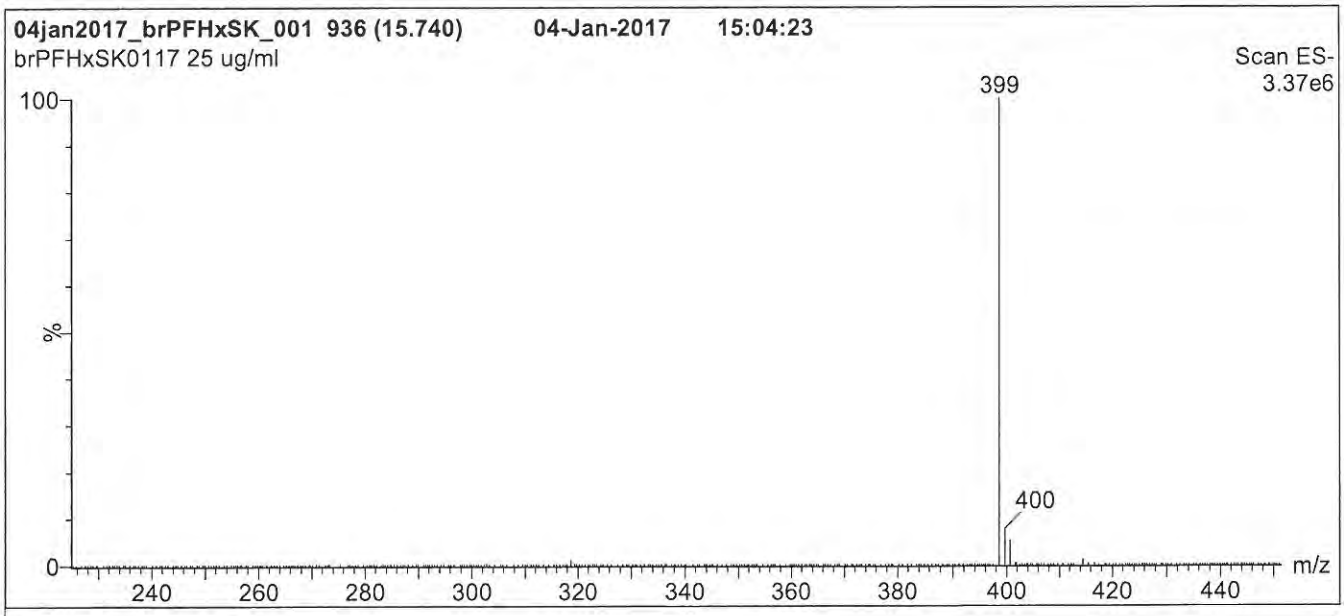
* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 01/20/2017 (mm/dd/yyyy)

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

Flow: 300 µl/min

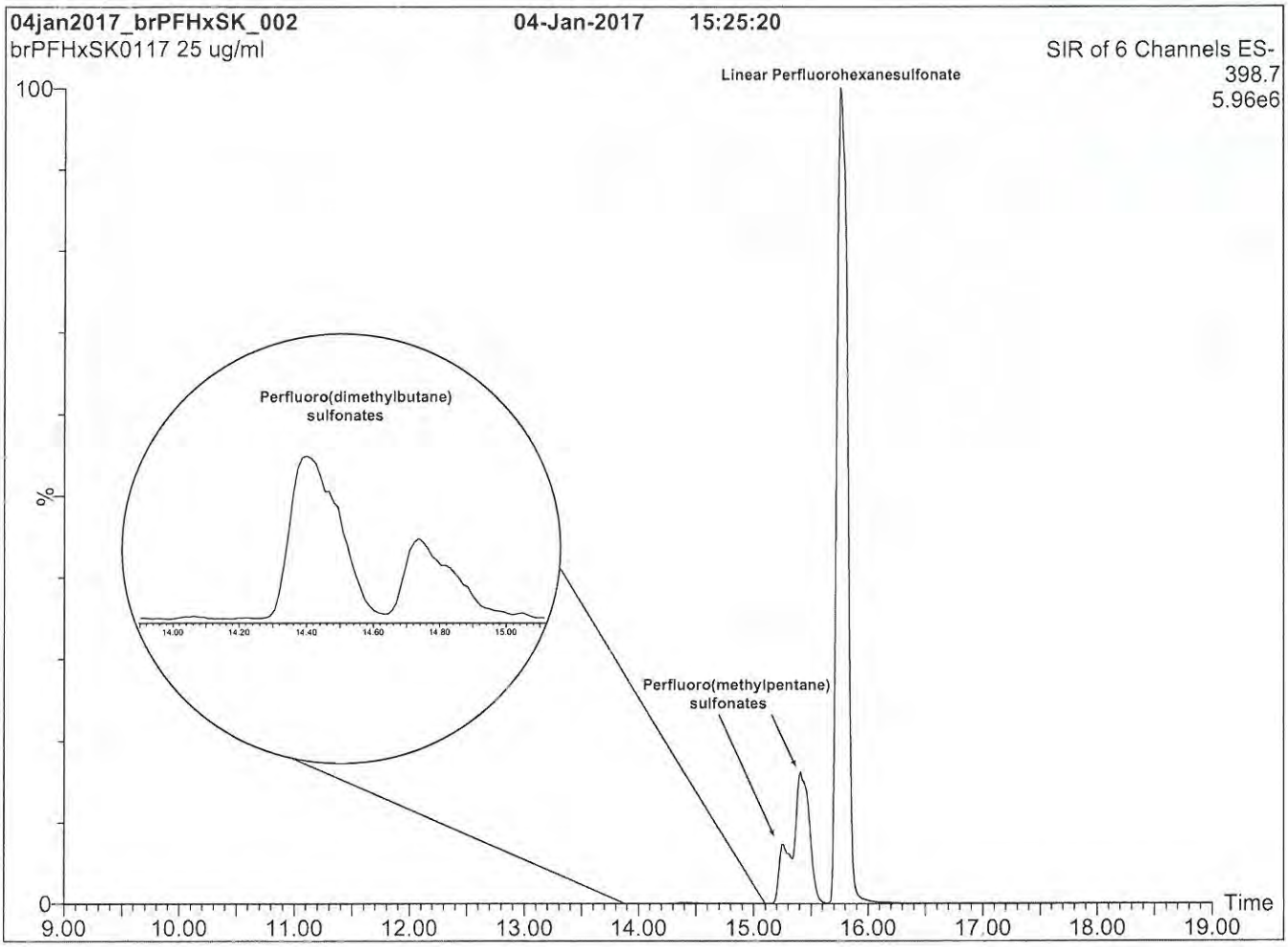
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

Flow: 300 µl/min

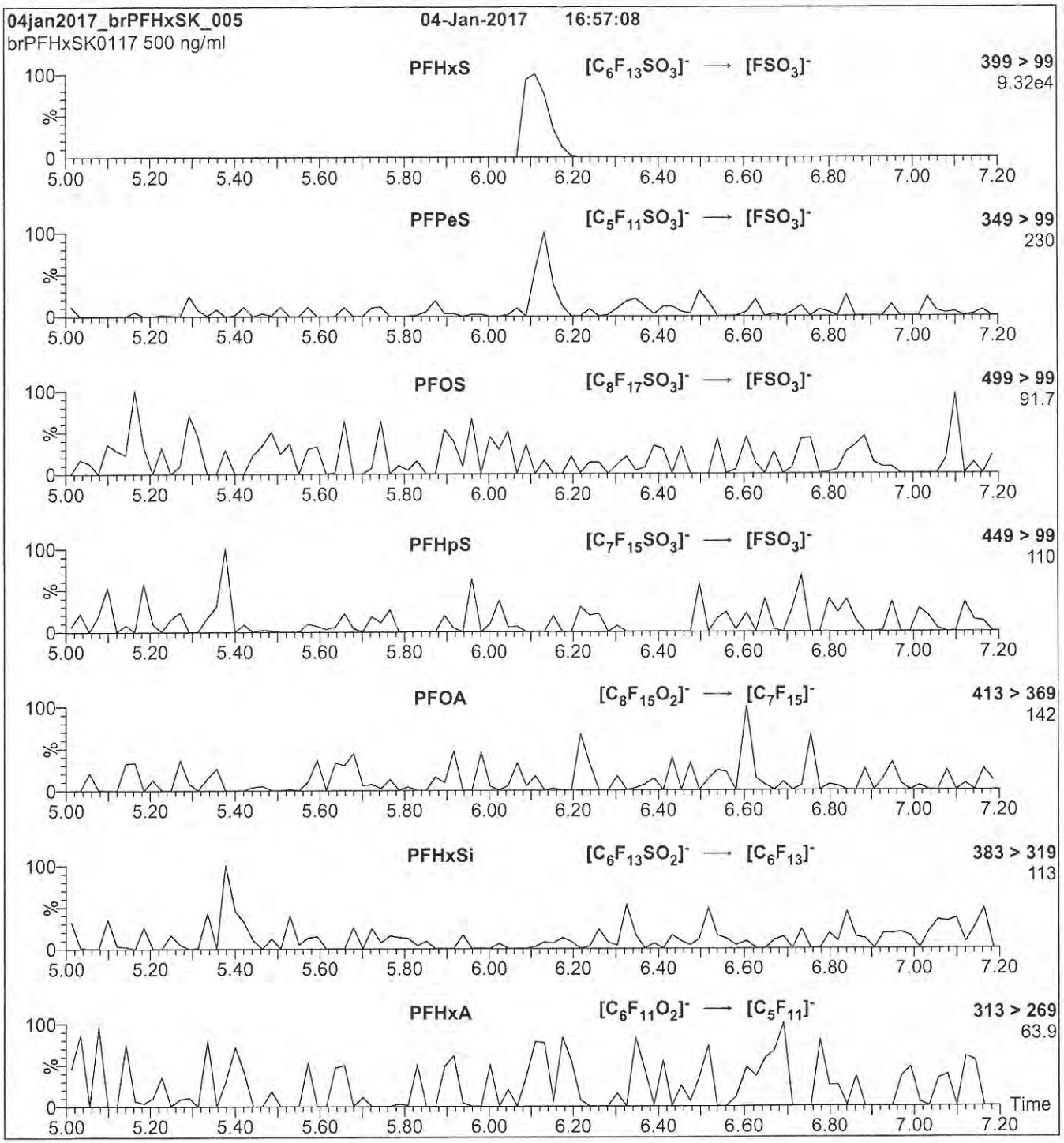
MS Parameters

Experiment: SIR (6 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = variable (15-62)
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

180725

Figure 3: **br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

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 ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

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18E0726

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This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18E0726

Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

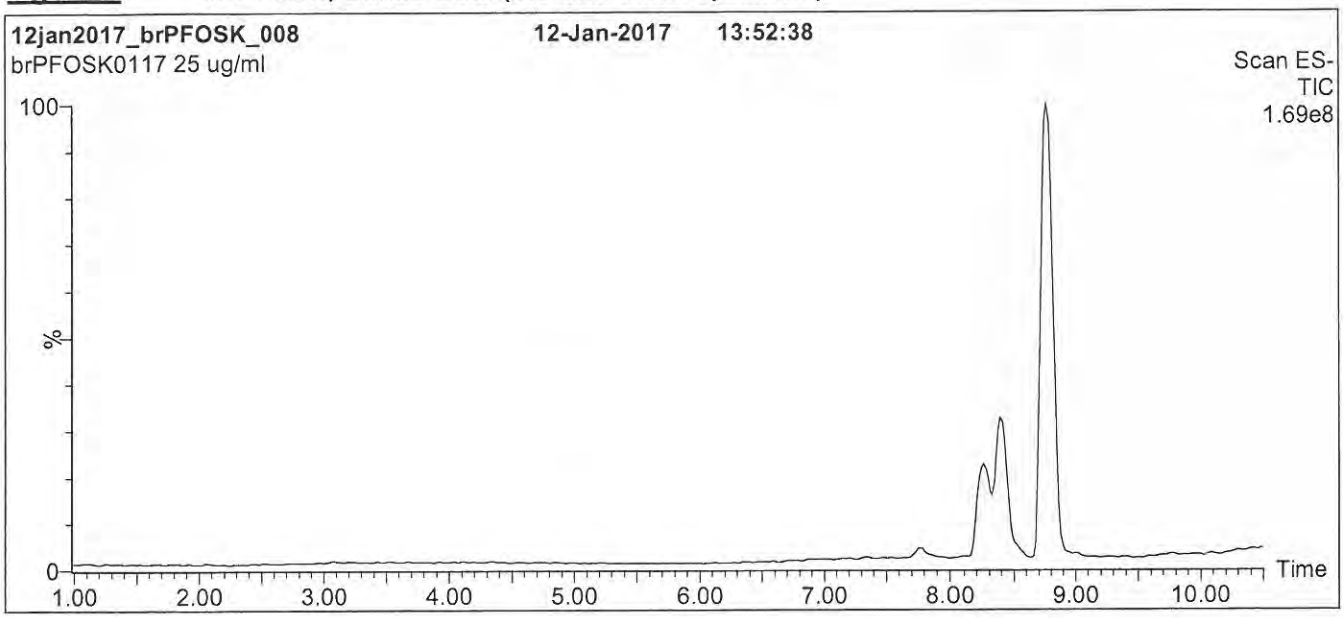
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3C(CF_3)_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2C(CF_3)_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF(CF_3)CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF_2CF(CF_3)CF_2SO_3^-K^+$	0.07

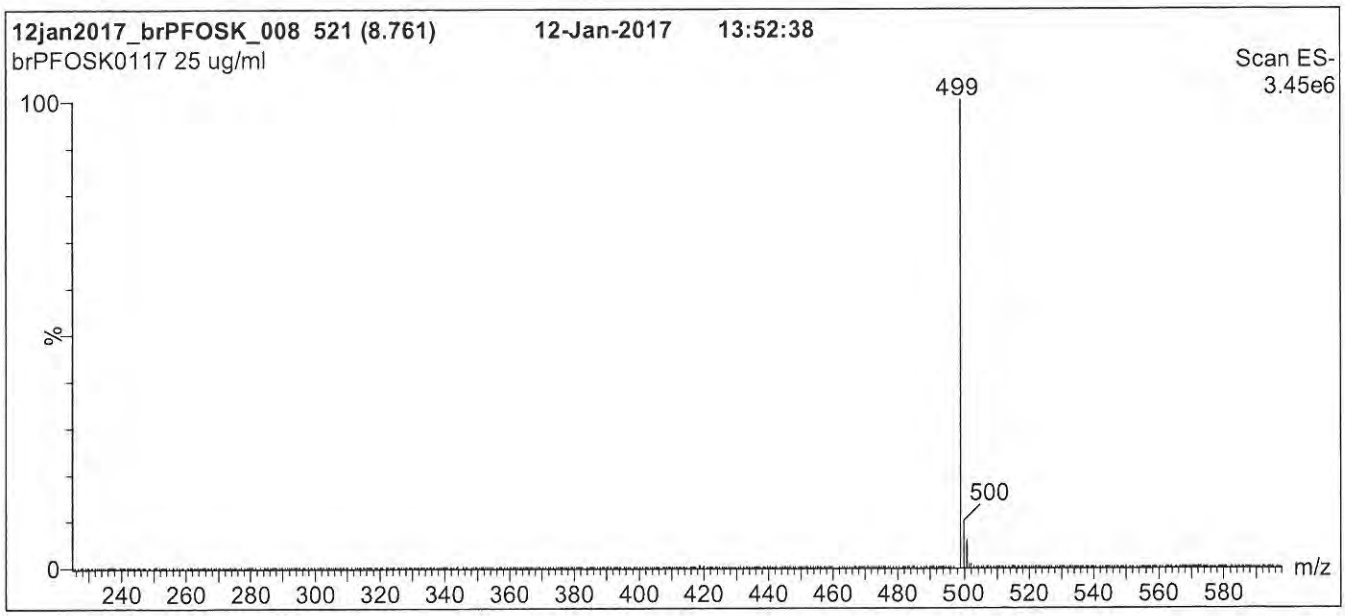
* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 01/20/2017 (mm/dd/yyyy)

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 12 min and hold for 2 min.
Return to initial conditions over 0.5 min.
Time: 16 min

Flow: 300 µl/min

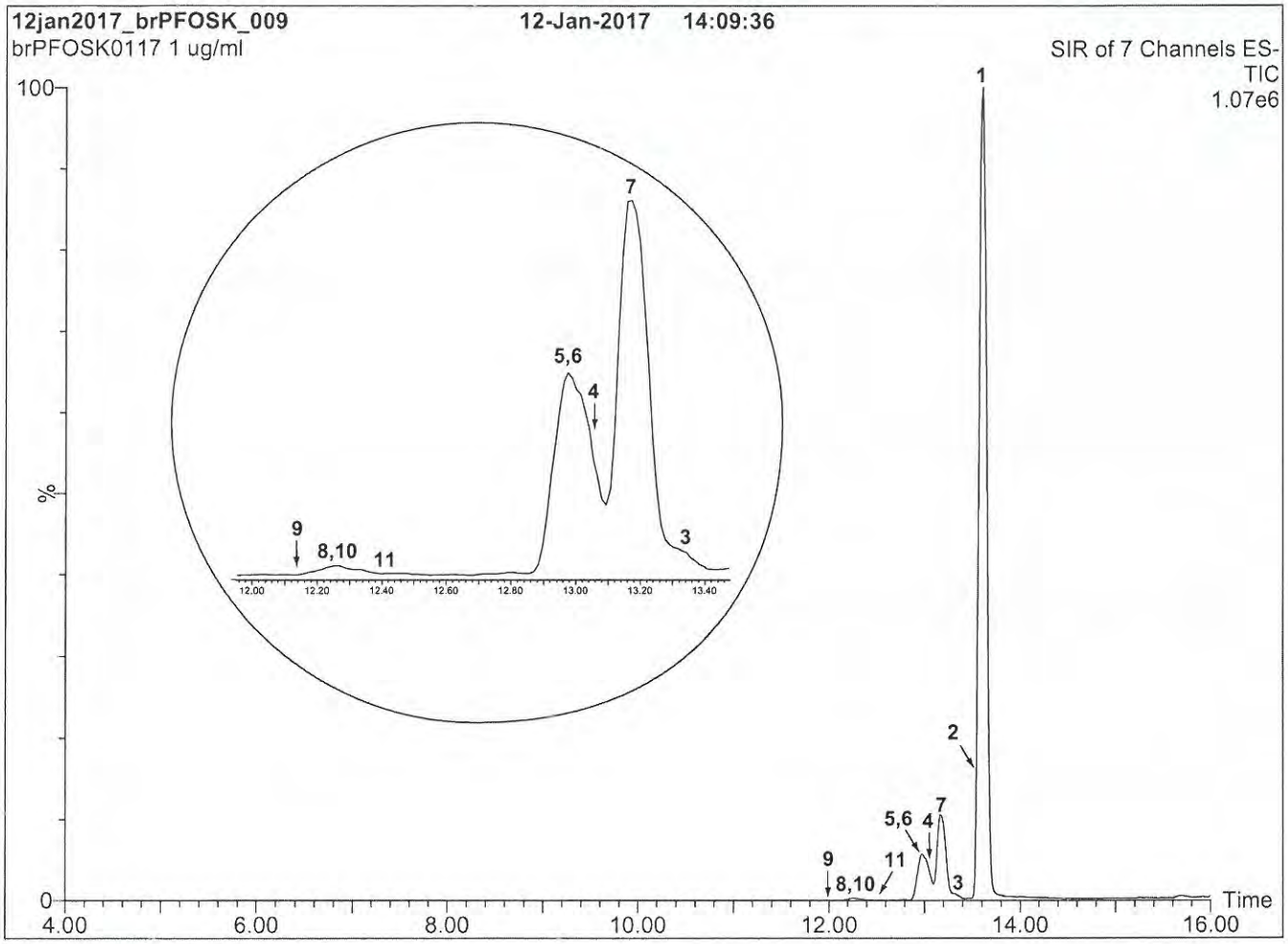
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 RP_{18} (1.7 µm, 2.1 x 100 mm)

Injection: 1.0 µg/ml of br-PFOSK

Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

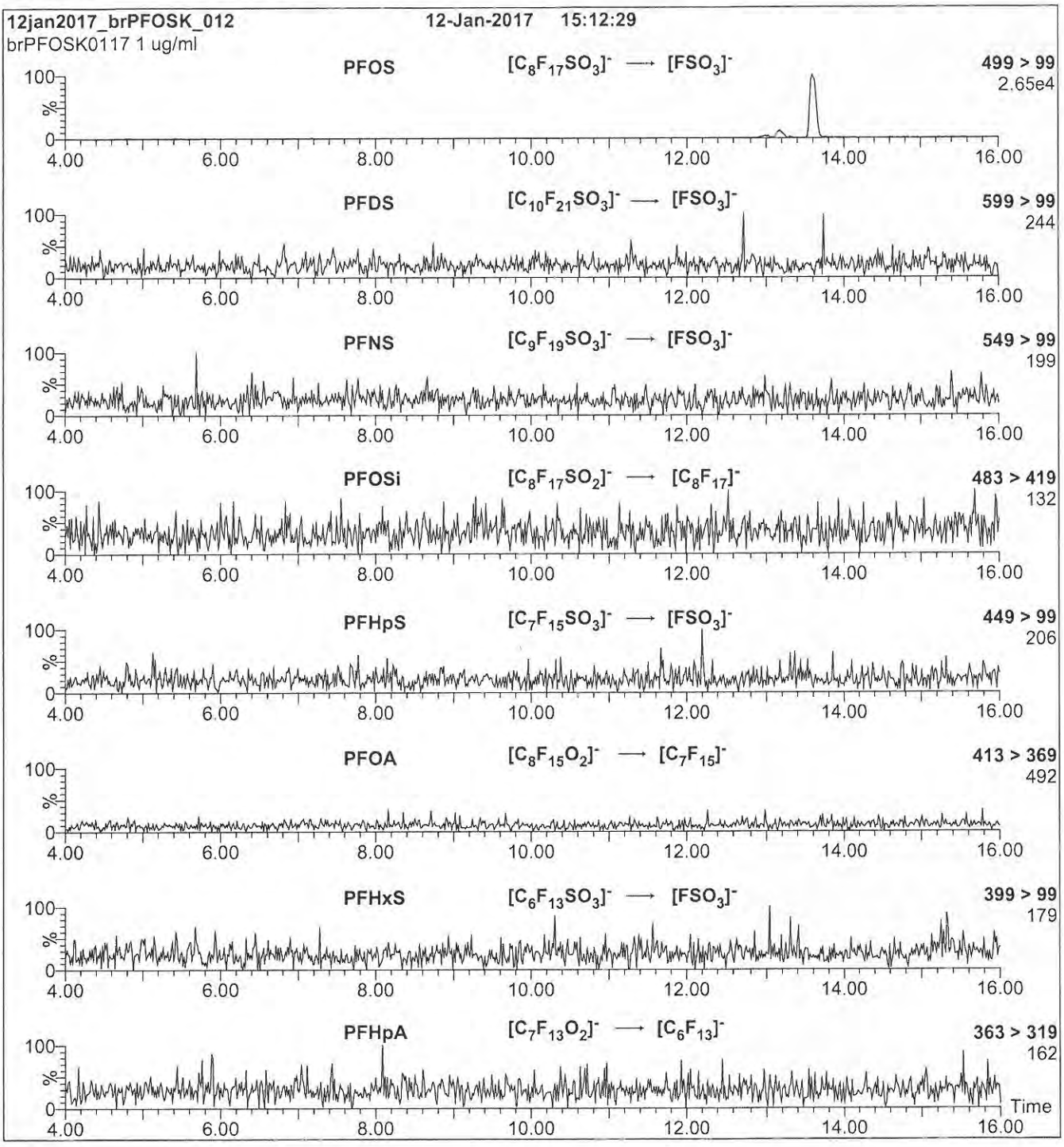
Flow: 300 µl/min

MS Conditions:

SIR (ES^-)
Source = 110 °C
Desolvation = 325 °C
Cone Voltage = 60V

1803726

Figure 3: **br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 11-50 (variable)

18E0727

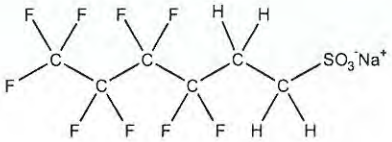
WELLINGTON LABORATORIES

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 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	46.7 ± 2.3 µg/ml	(4:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	12/12/2016			
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021			
RECOMMENDED STORAGE:	Refrigerate ampoule			

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/21/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

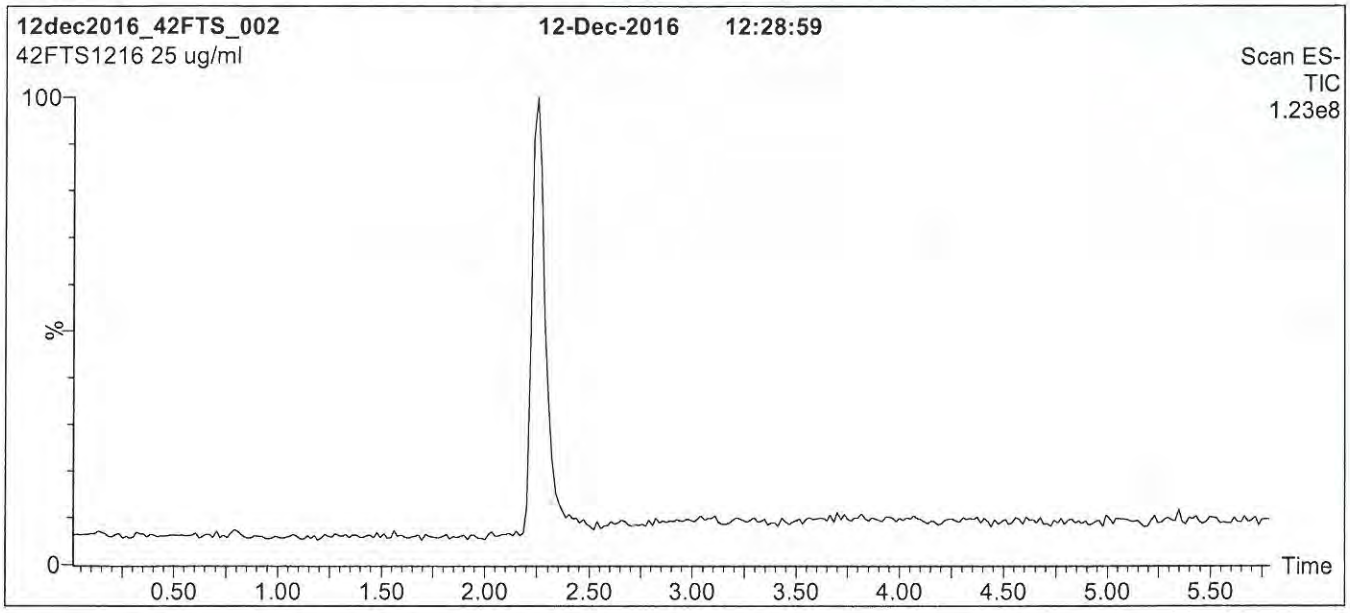
CALA

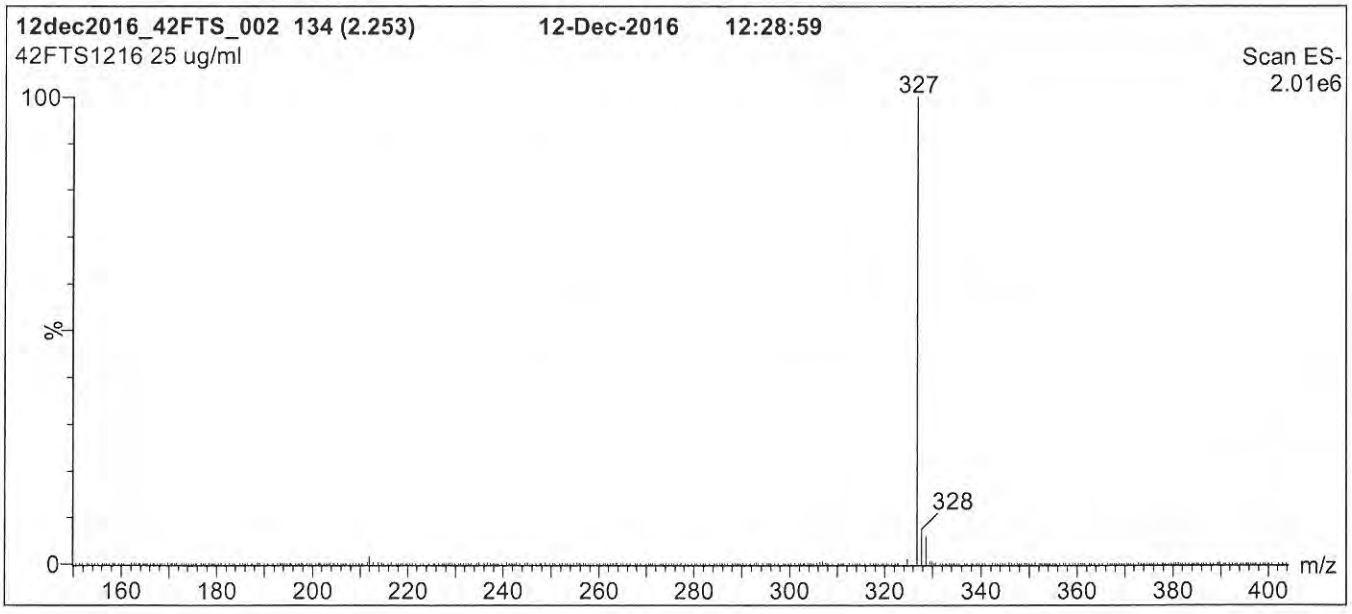
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

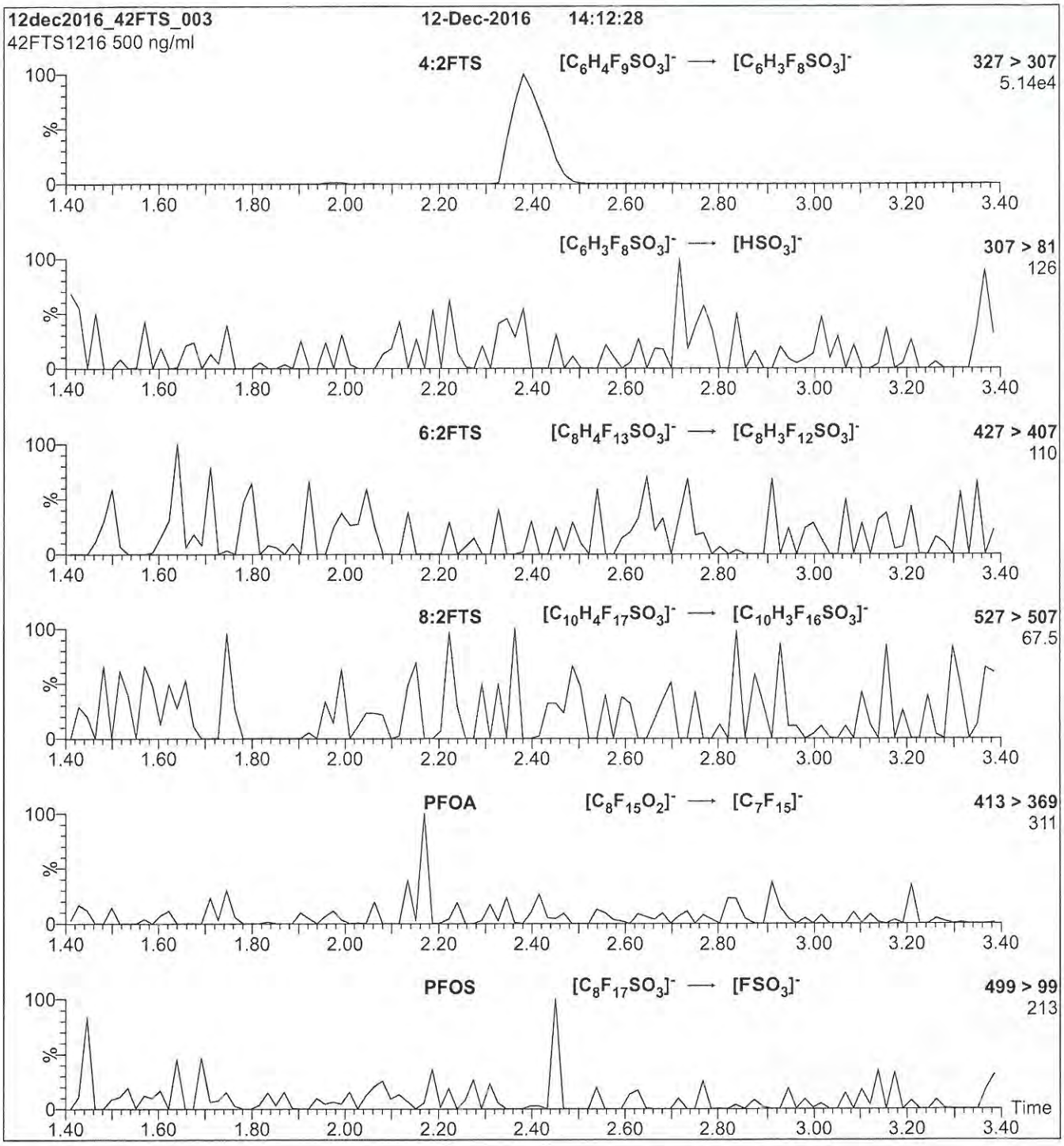
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

180727

Figure 2: **4:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

18E0728

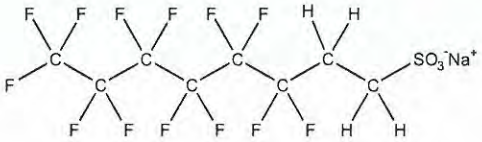
WELLINGTON LABORATORIES

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 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.4 ± 2.4 µg/ml	(6:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	04/03/2018			
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: _____ **Date:** 04/09/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1 8E0728

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HANDLING:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

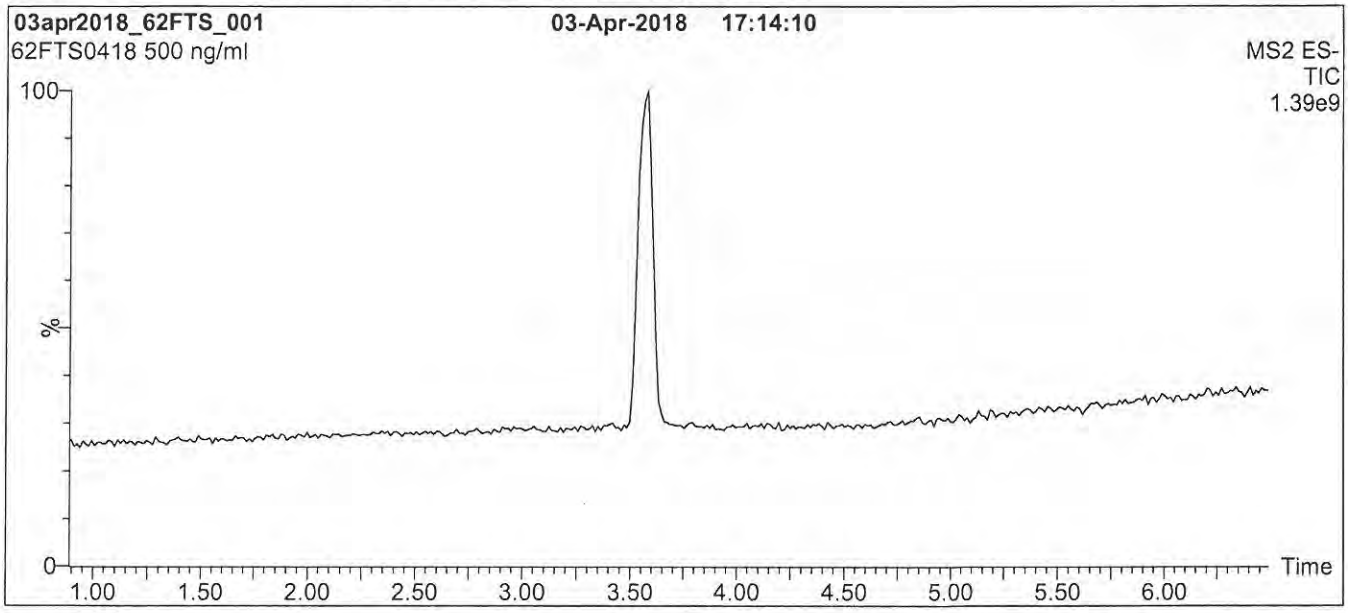
CALA Testing Accreditation No. A 1226

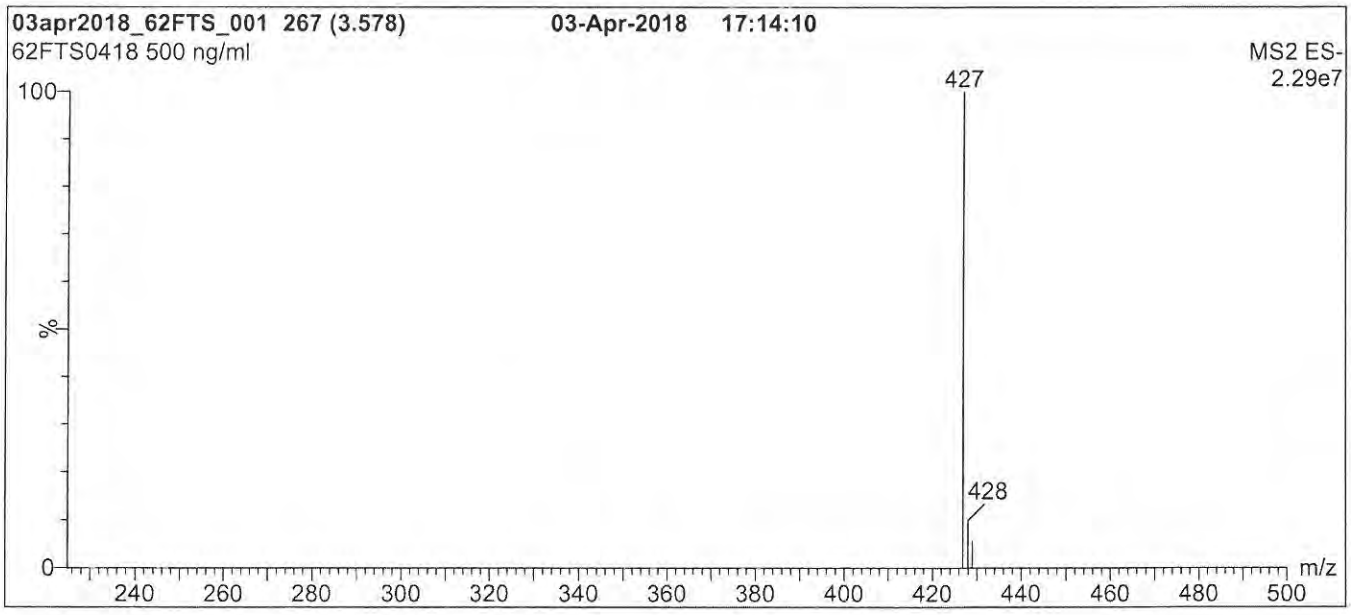
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 80% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 µl/min

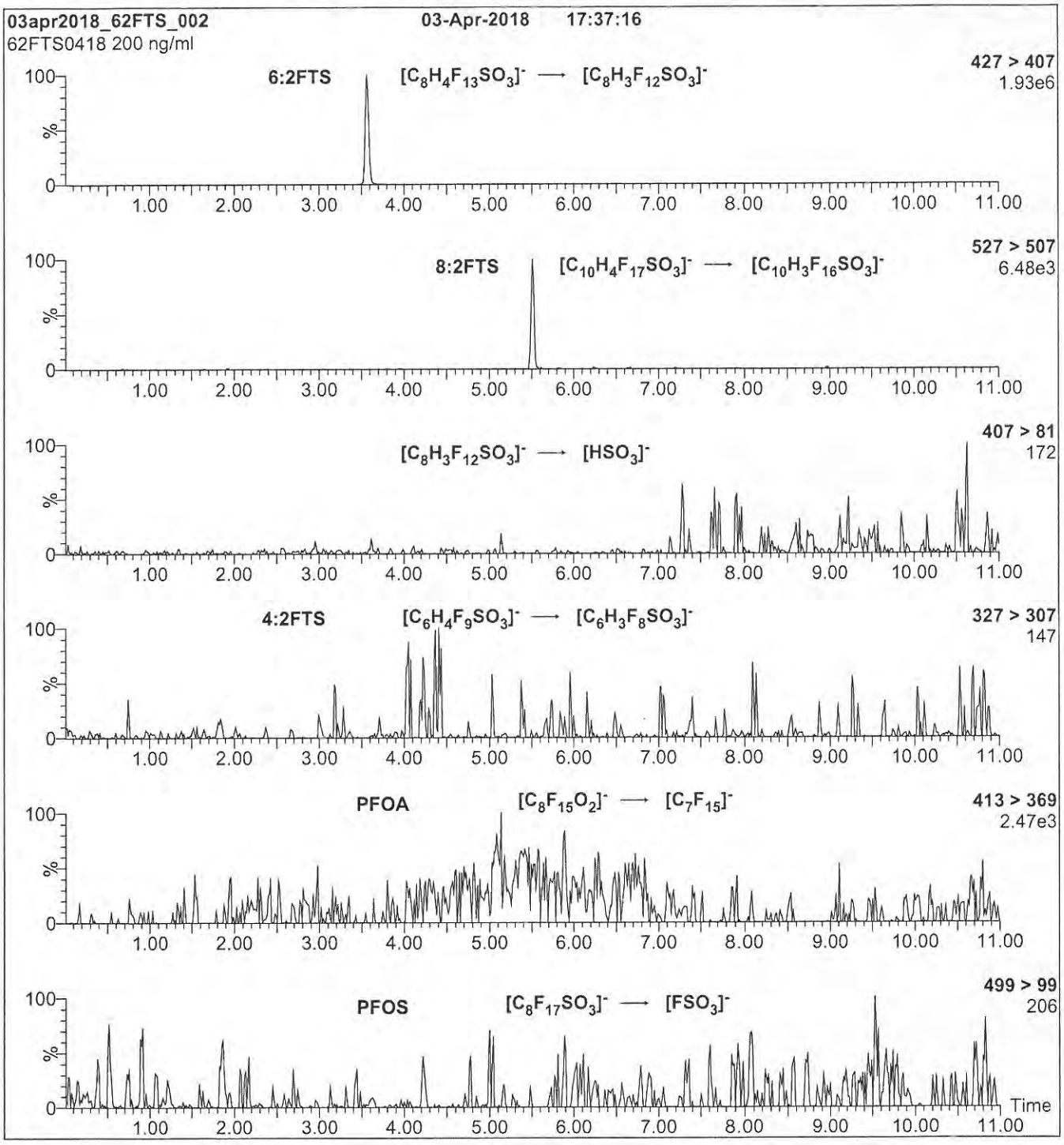
MS Parameters

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 20

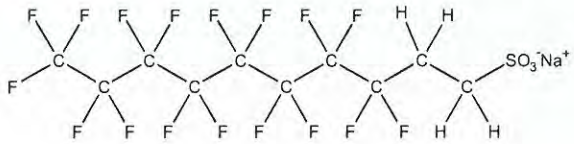
18E0729

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 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
47.9 ± 2.4 µg/ml (8:2FTS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/24/2018
EXPIRY DATE: (mm/dd/yyyy) 01/24/2023
RECOMMENDED STORAGE: Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 01/31/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18E0729

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HANDLING:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

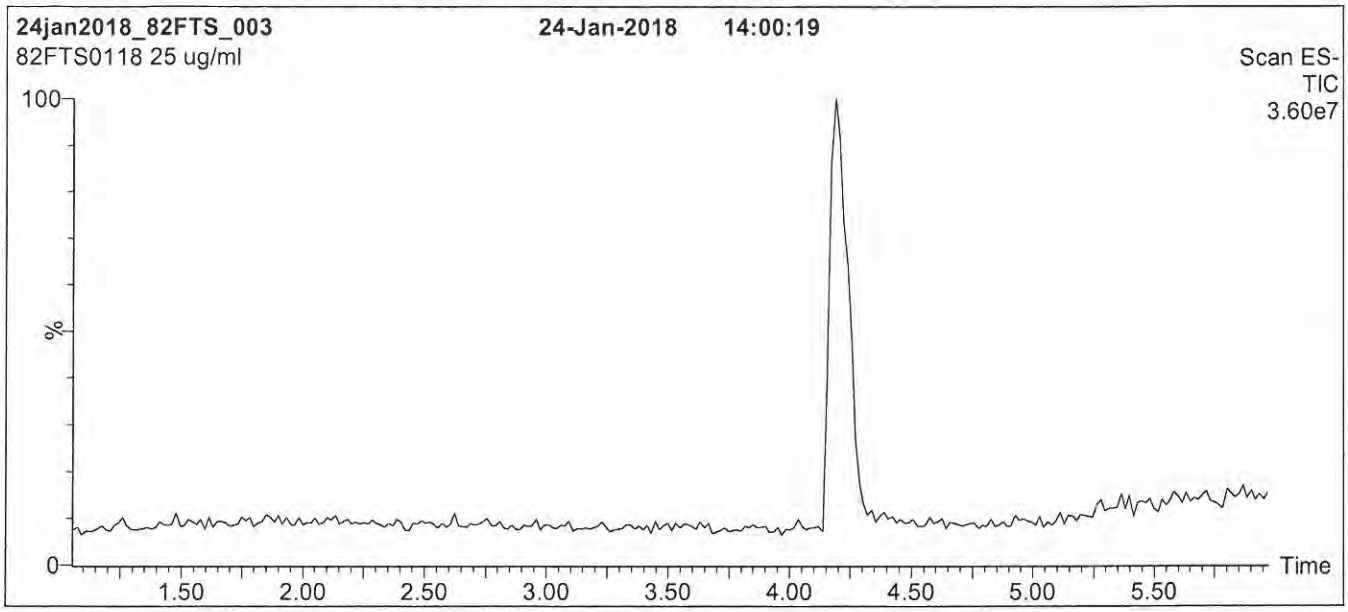
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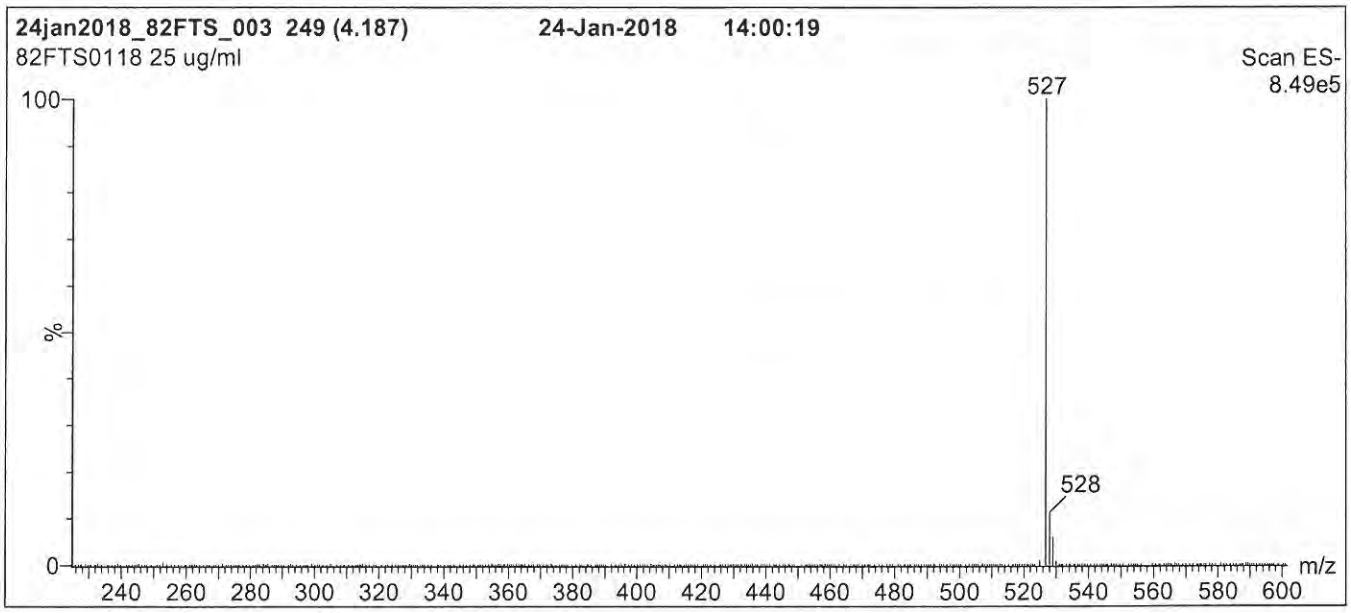
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

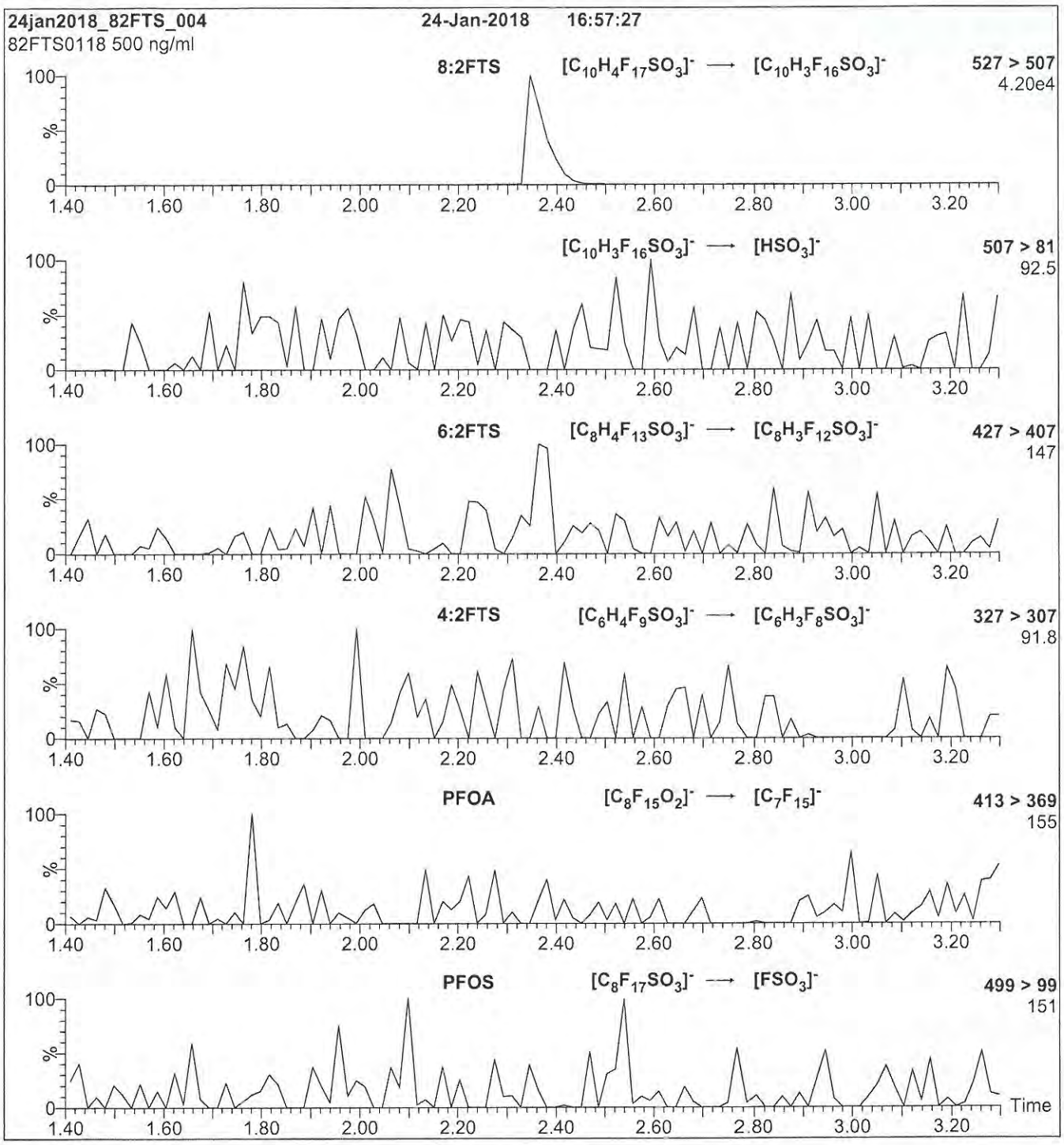
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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Figure 2: **8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18E0730

WELLINGTON LABORATORIES

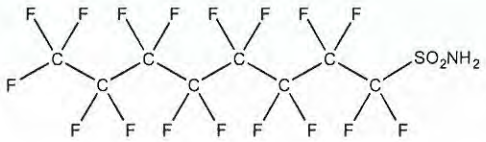
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide

LOT NUMBER: FOSA0817I

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA:	$C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	499.14
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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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,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

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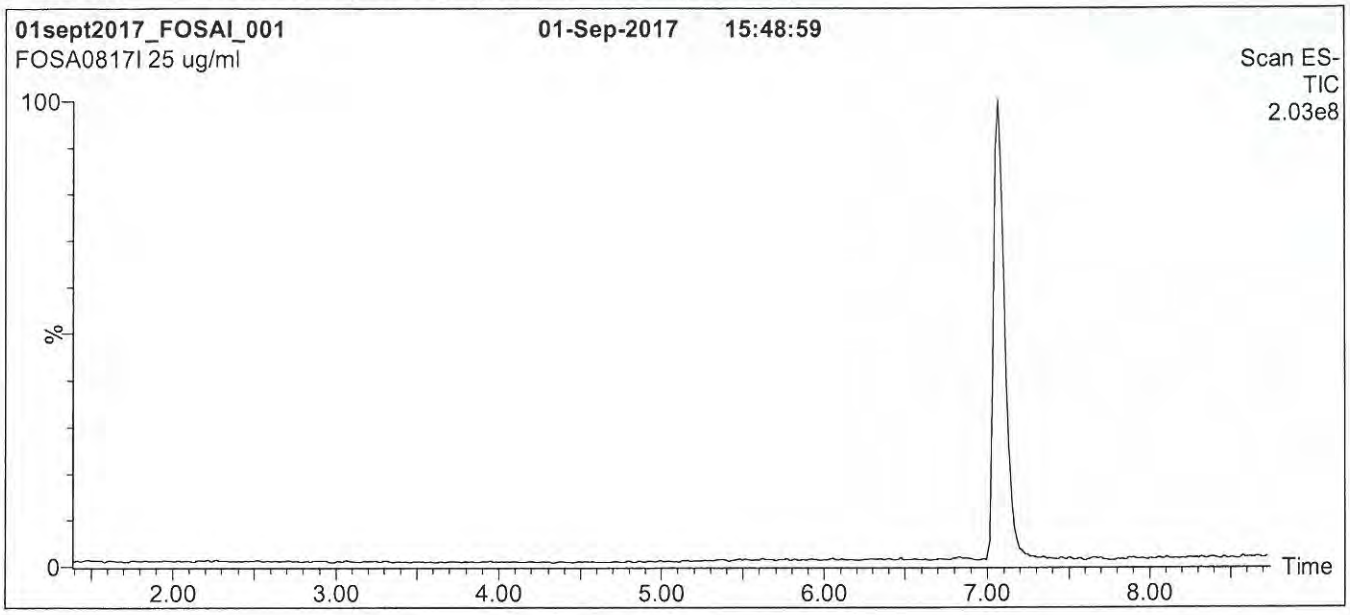
CALA

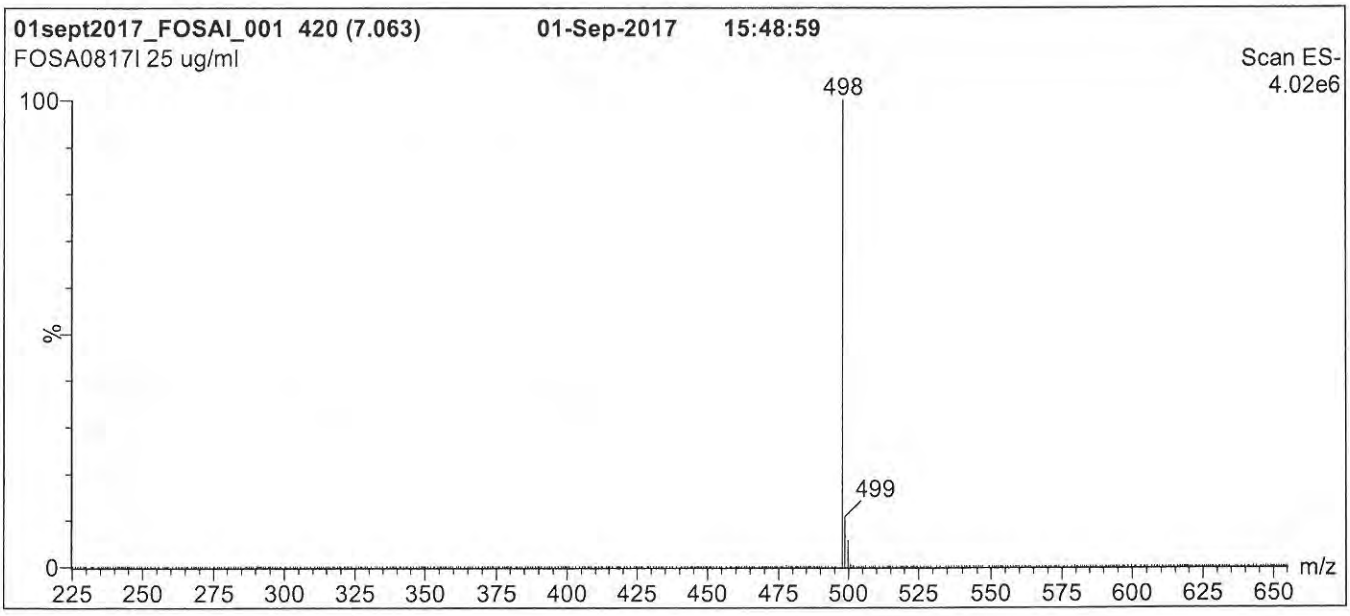
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

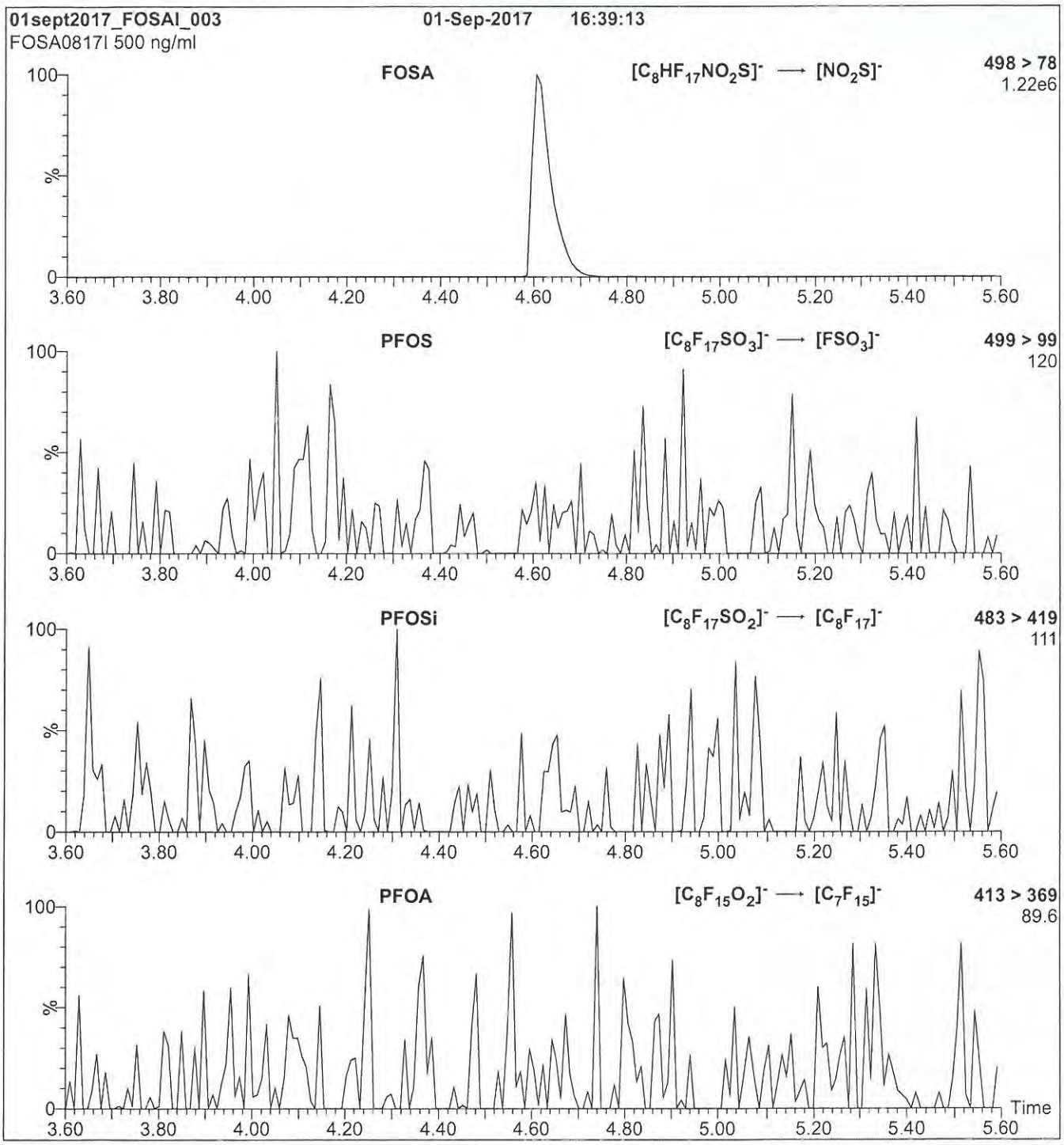
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18E0730

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 30

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 ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the acetic acid moiety to its respective methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18E0731

INTENDED USE:

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HANDLING:

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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:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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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 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA Testing Accreditation for A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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Table A: **br-NMeFOSAA; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-methylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(CH_3)CH_2CO_2H$	76.0
2	N-methylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(CH_3)CH_2CO_2H$	0.7
3	N-methylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(CH_3)CH_2CO_2H$	2.0
4	N-methylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	6.0
5	N-methylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(CH_3)CH_2CO_2H$	14.0
6	N-methylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	0.2
7	Other Unidentified Isomers		1.1

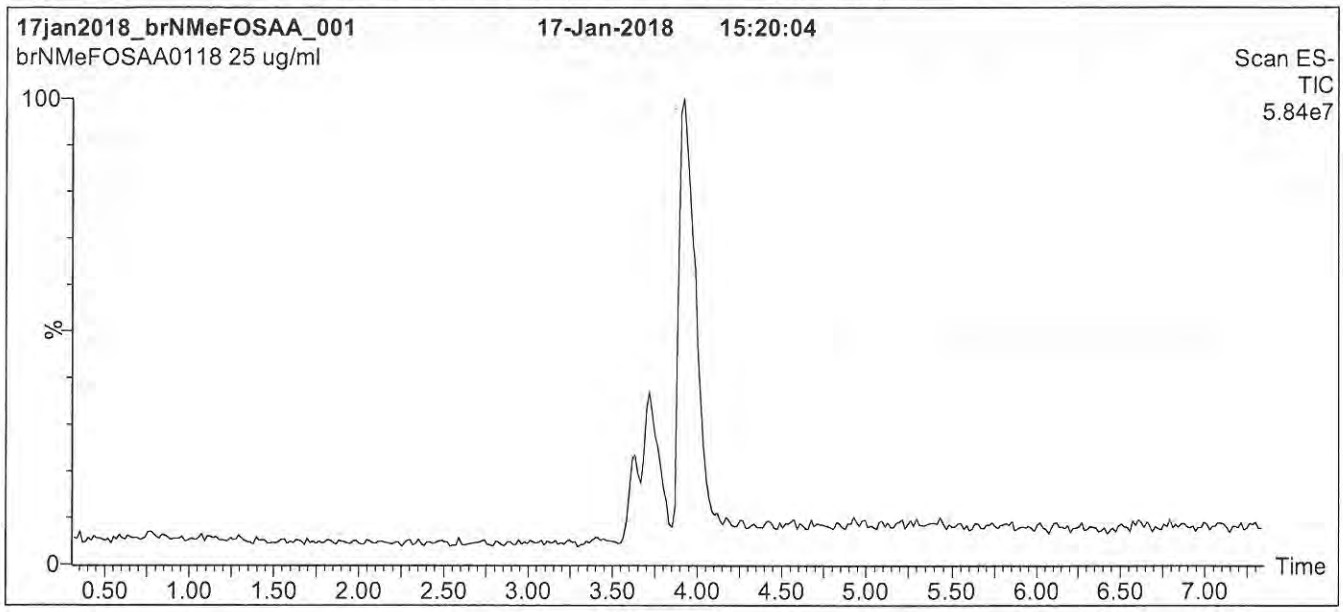
* Percent of total N-methylperfluorooctanesulfonamidoacetic acid isomers only.

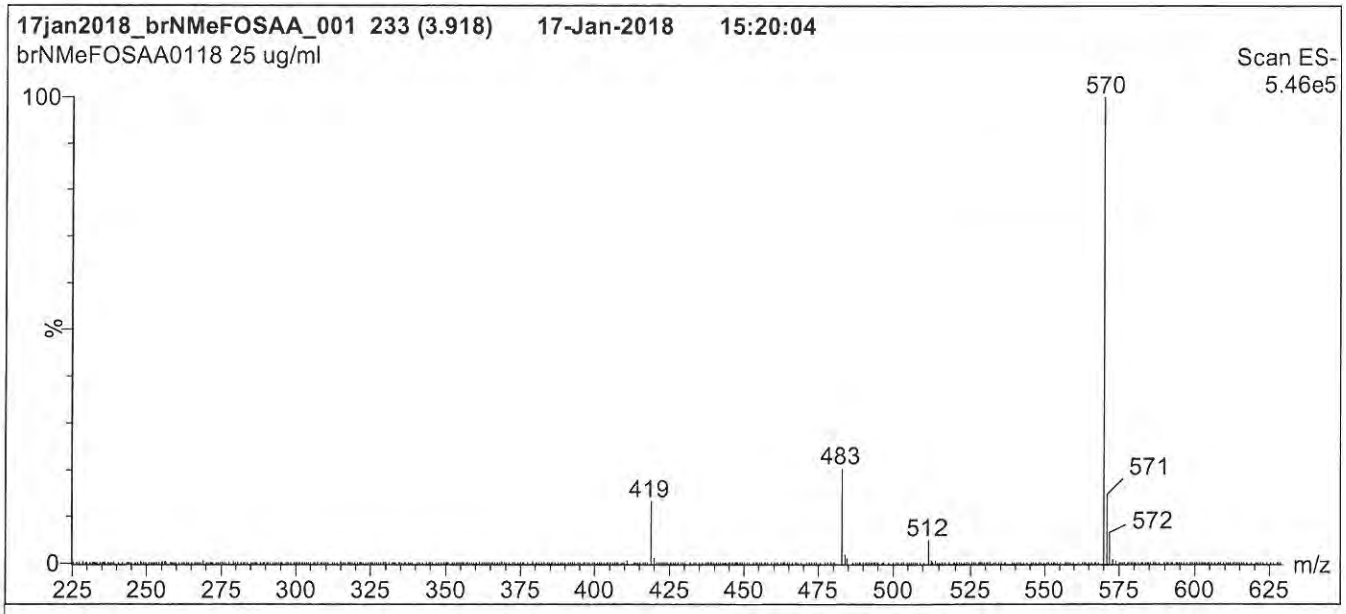
Certified By: _____ **Date:** 03/22/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

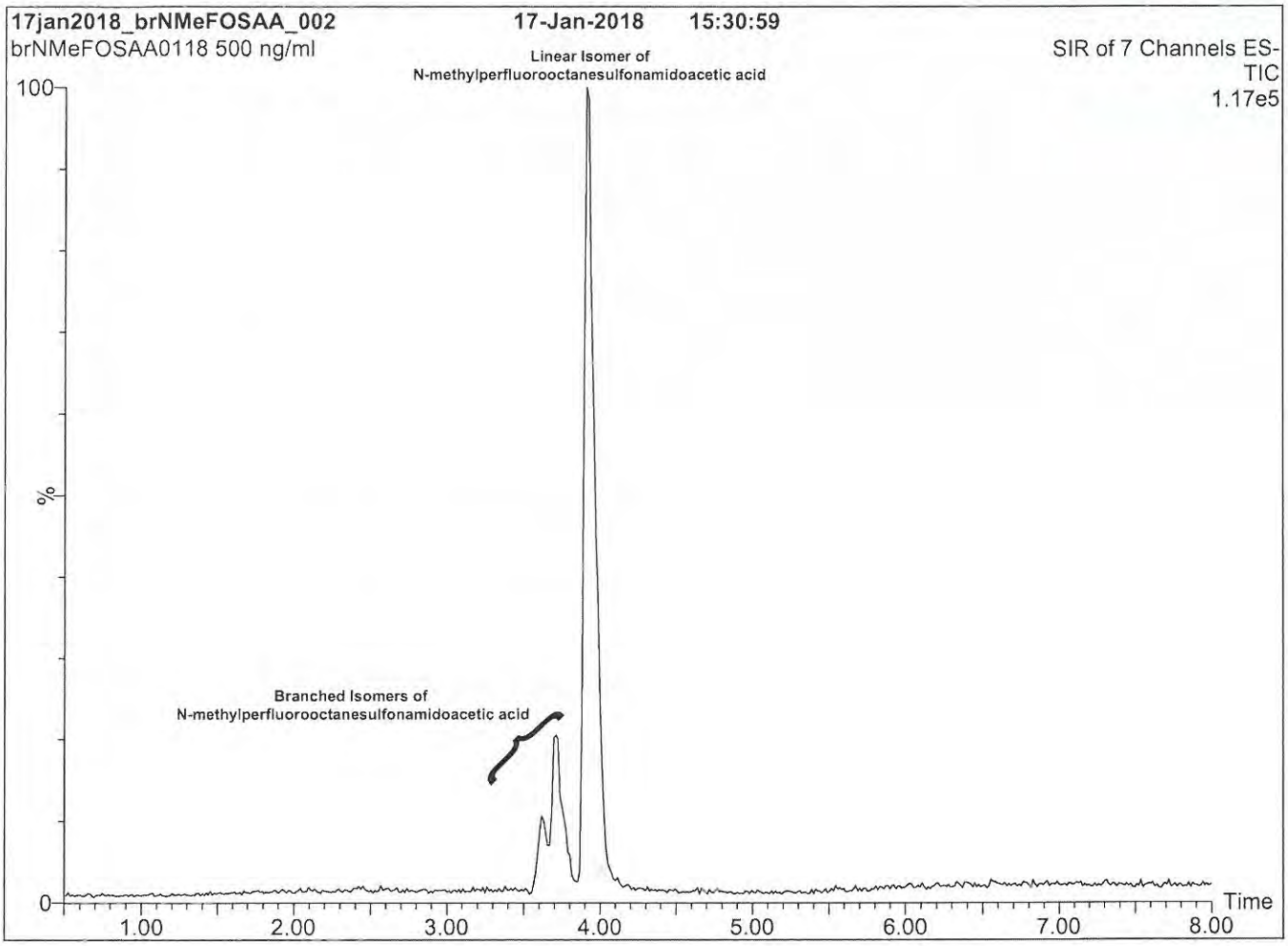
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

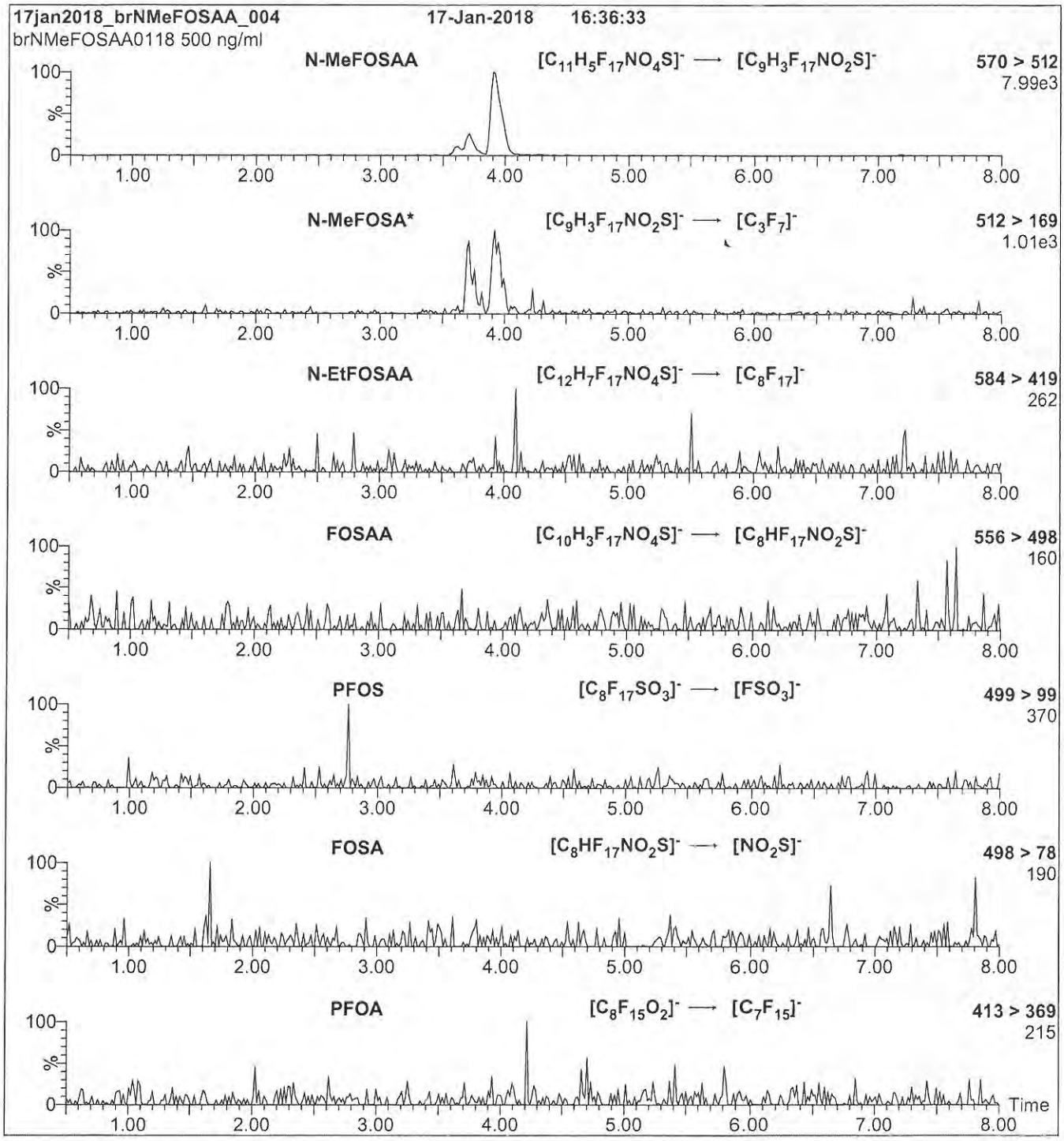
MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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Figure 3: **br-NMeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



***Note**: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

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 ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the acetic acid moiety to its respective methyl ester.

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HANDLING:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products, as well as mixtures and calibration solutions, are compared to older lots in a similar manner. This further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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LIMITED WARRANTY:

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

1 8E0732

Table A: **br-NEtFOSAA; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-ethylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(C_2H_5)CH_2CO_2H$	77.5
2	N-ethylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	2.3
3	N-ethylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	2.2
4	N-ethylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	5.4
5	N-ethylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(C_2H_5)CH_2CO_2H$	10.4
6	N-ethylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	0.3
7	N-ethylperfluoro-4,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	0.3
8	N-ethylperfluoro-3,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF_2CF(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	0.3
9	Other Unidentified Isomers		1.3

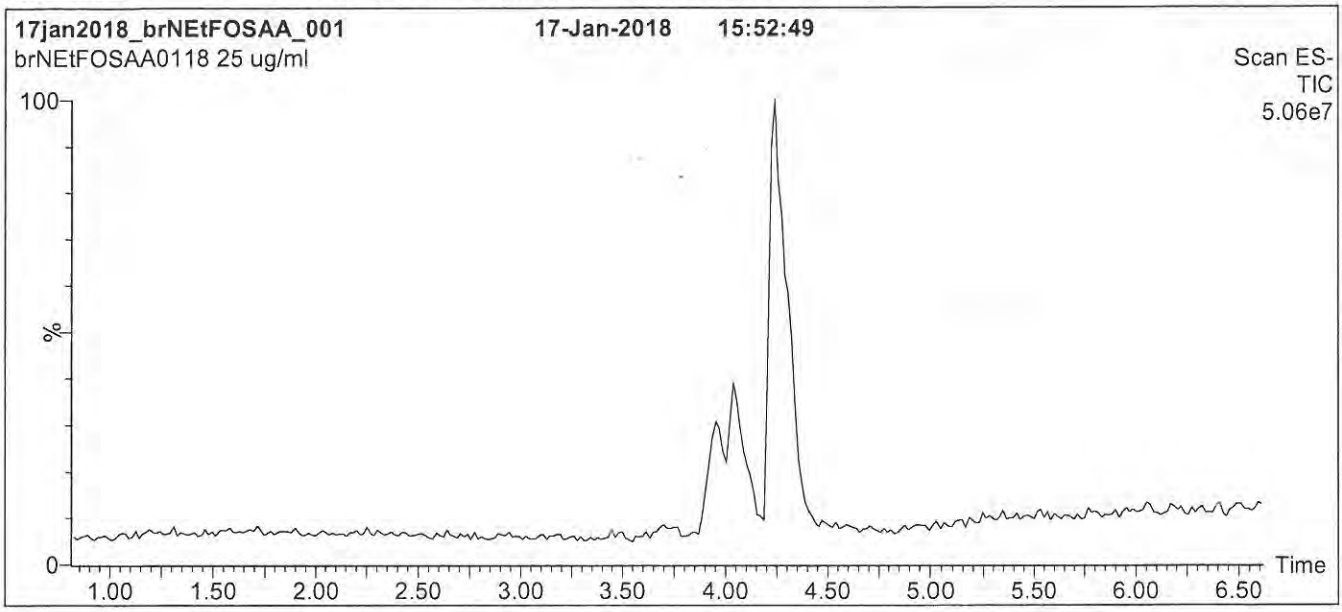
* Percent of total N-ethylperfluorooctanesulfonamidoacetic acid isomers only.

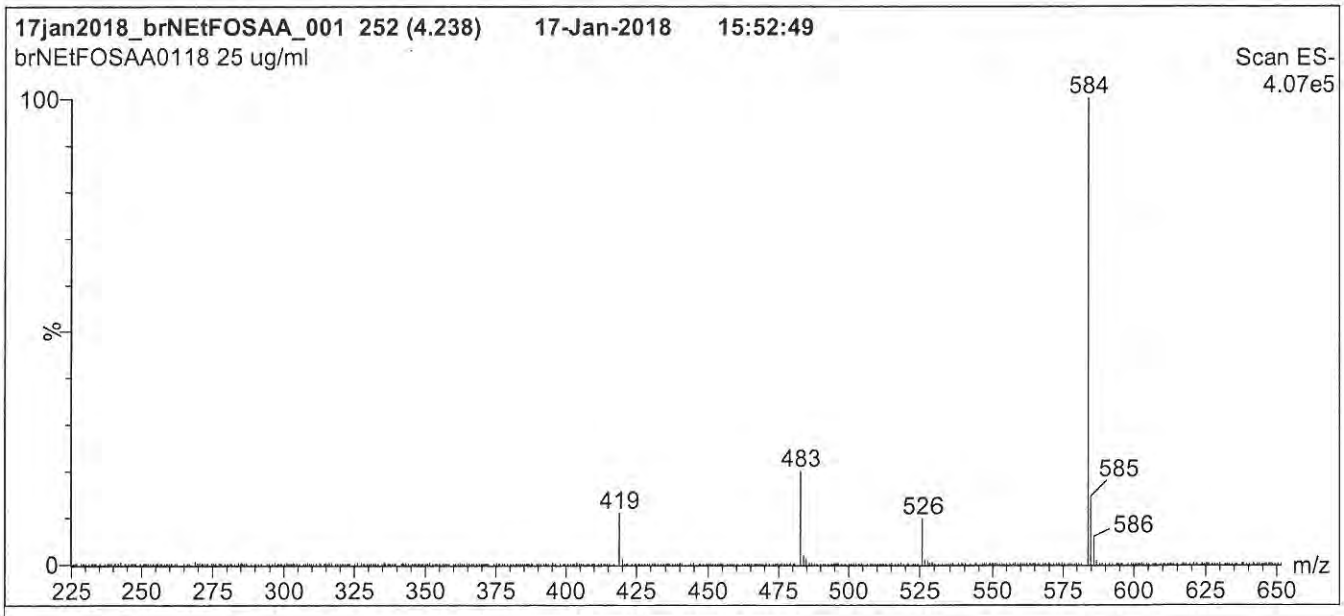
Certified By: _____ **Date:** 03/22/2018
(mm/dd/yyyy)

B.G. Chittim, General Manager

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

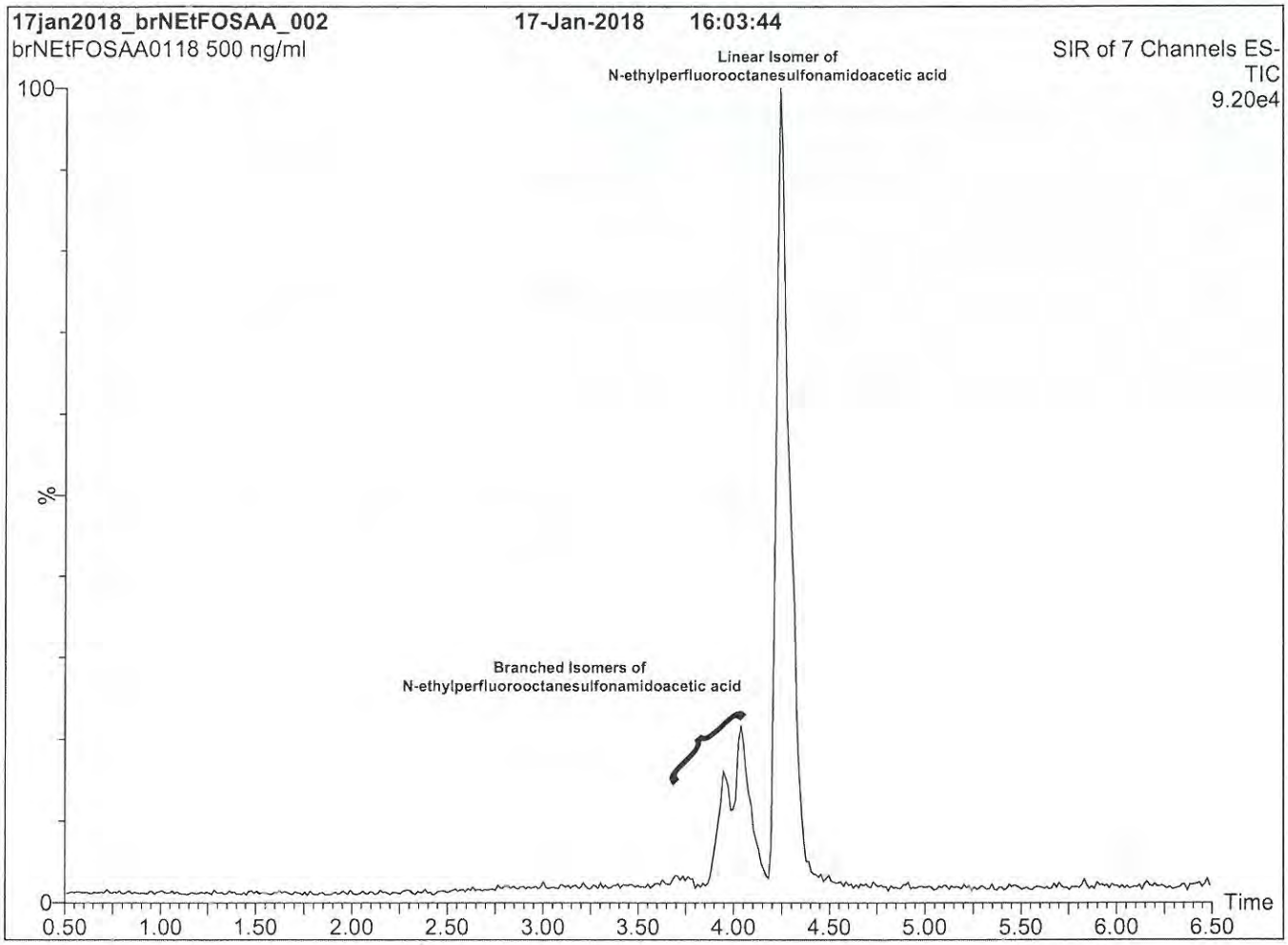
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1803732

Figure 2: **br-NEtFOSAA; LC/MS Data (SIR)**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

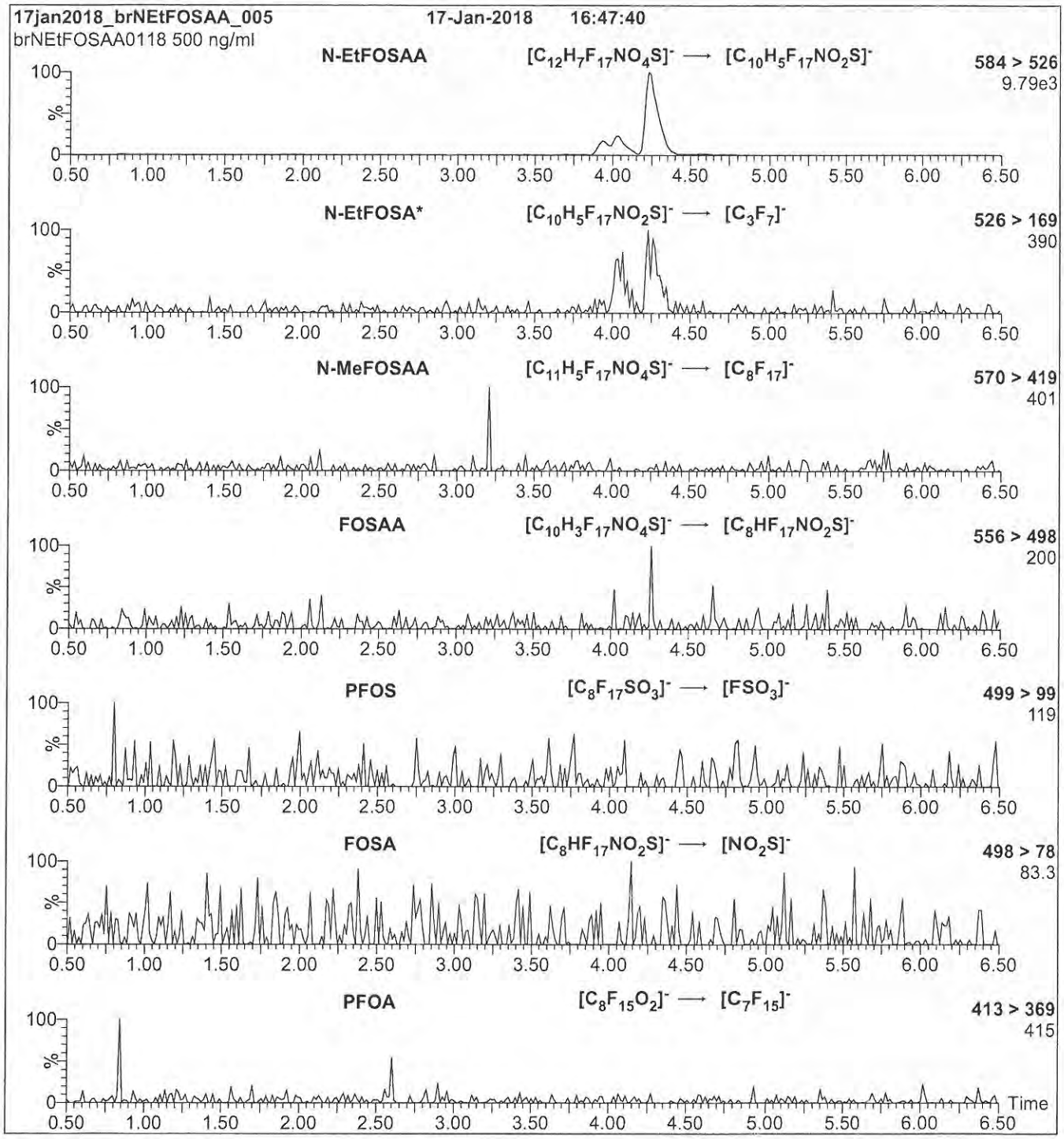
MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

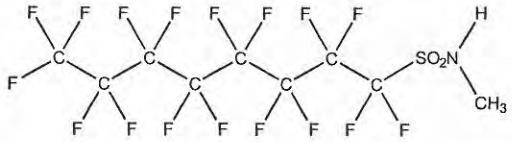
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

1810762

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	N-MeFOSA-M	**LOT NUMBER:**	NMeFOSA0518M
COMPOUND:	N-methylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	31506-32-8



MOLECULAR FORMULA:	$C_9H_4F_{17}NO_2S$	**MOLECULAR WEIGHT:**	513.17
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/31/2018		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2023		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 06/07/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18I0762

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where x is expressed as a relative standard uncertainty of the individual parameter.

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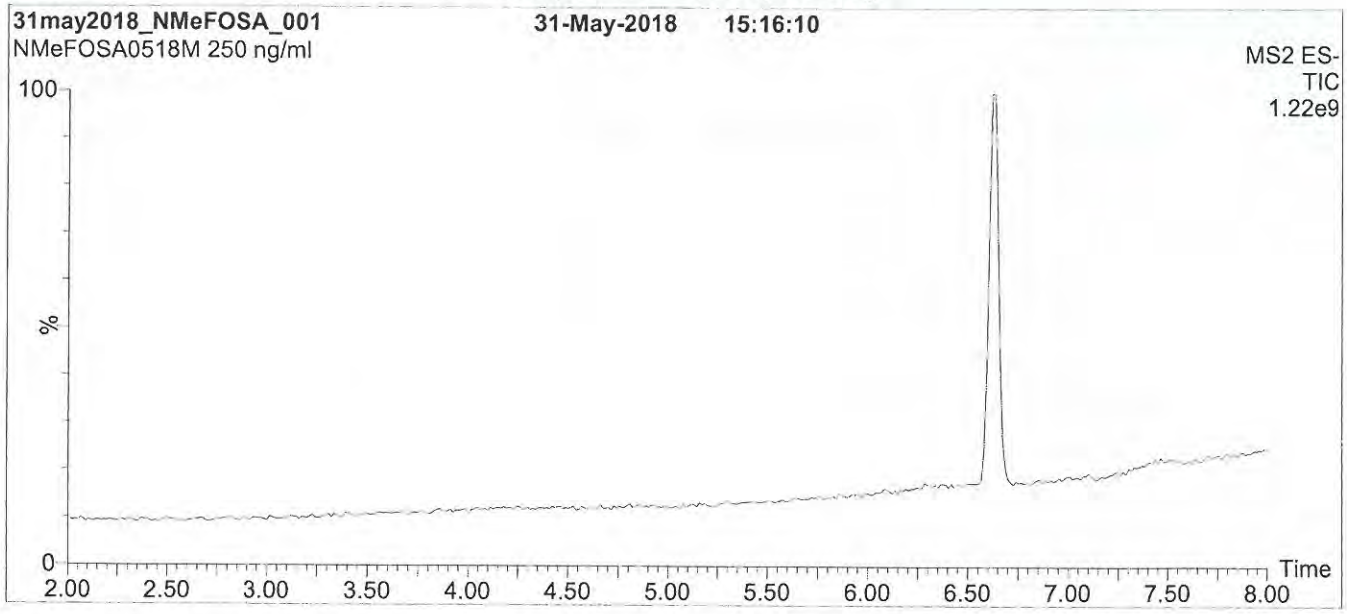
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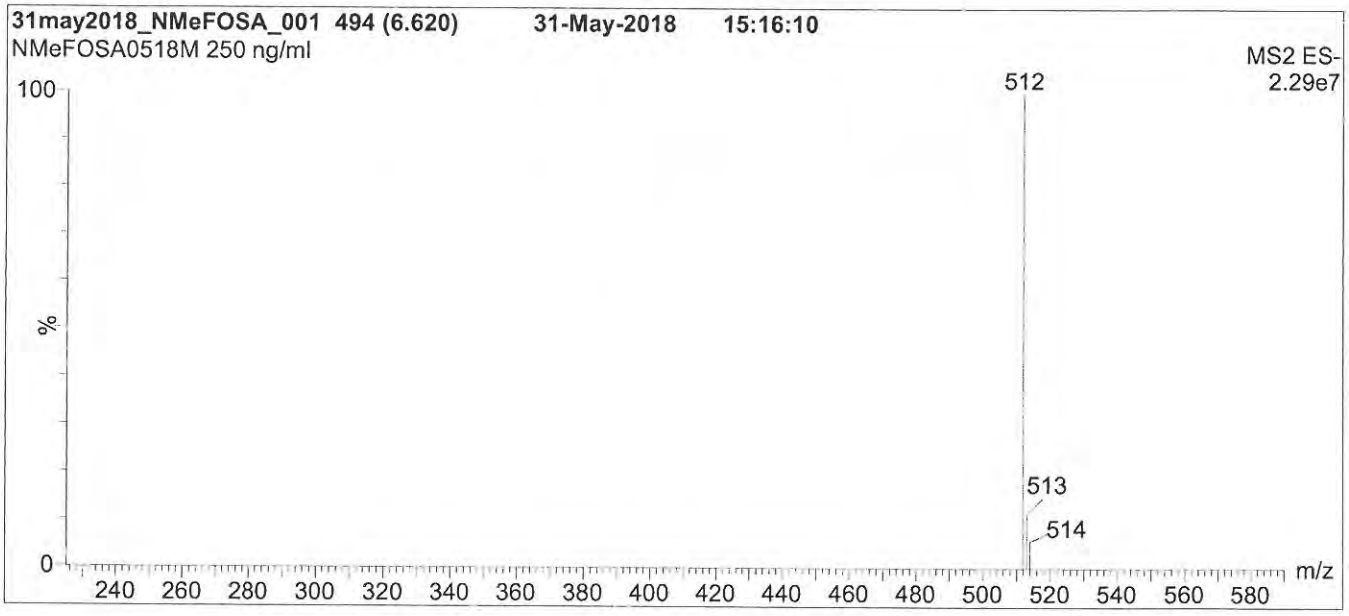
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 µl/min

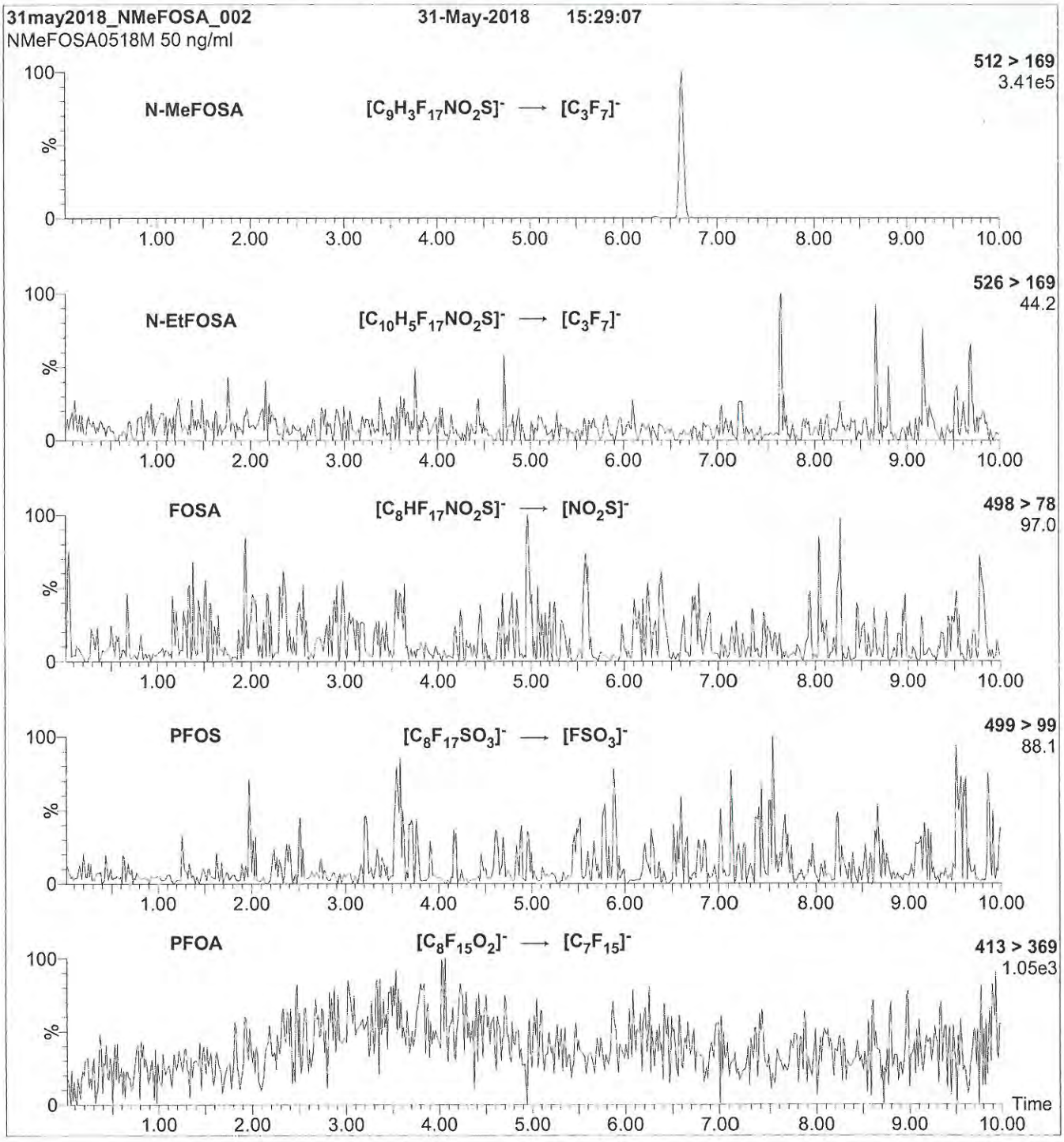
MS Parameters

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

18I0762

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.37e-3
Collision Energy (eV) = 24

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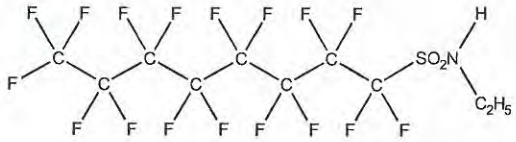
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: N-EtFOSA-M
COMPOUND: N-ethylperfluoro-1-octanesulfonamide
LOT NUMBER: NEtFOSA0518M

STRUCTURE:

CAS #: 4151-50-2



MOLECULAR FORMULA:	$C_{10}H_6F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/31/2018		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2023		
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 ~ 0.5% branched isomers of N-ethylperfluorooctanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 06/12/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18I0763

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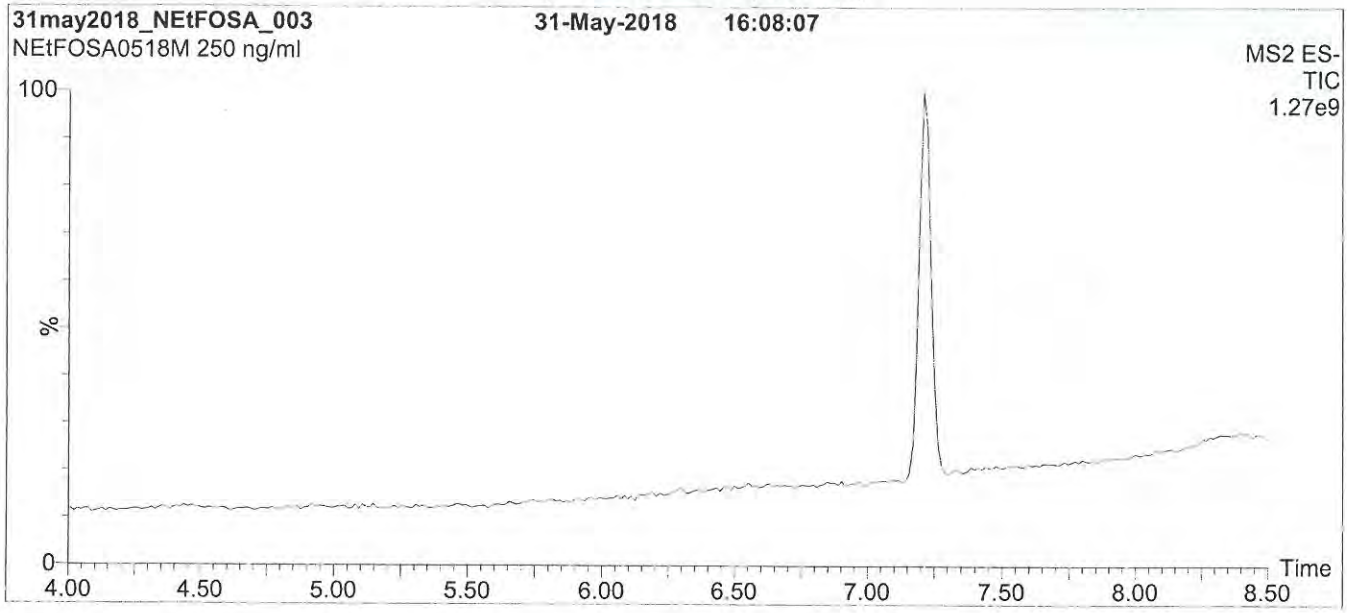
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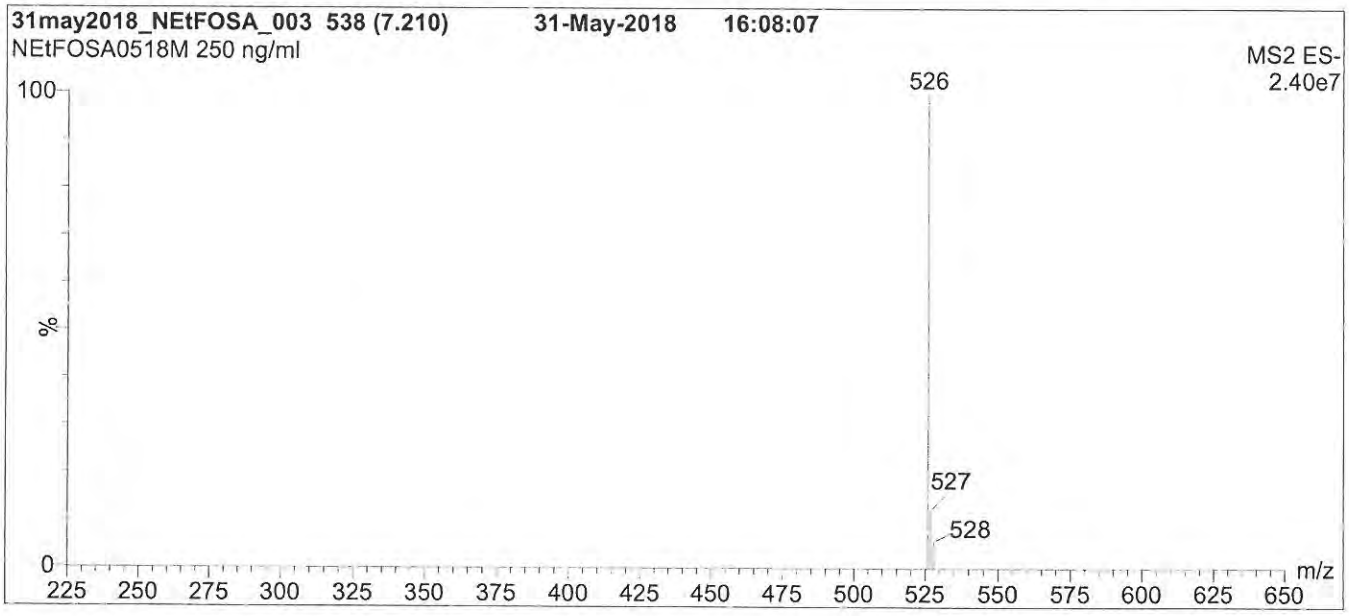
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7 min and hold for
3 min before returning to initial conditions in 0.75 min.
Time: 12 min

Flow: 300 µl/min

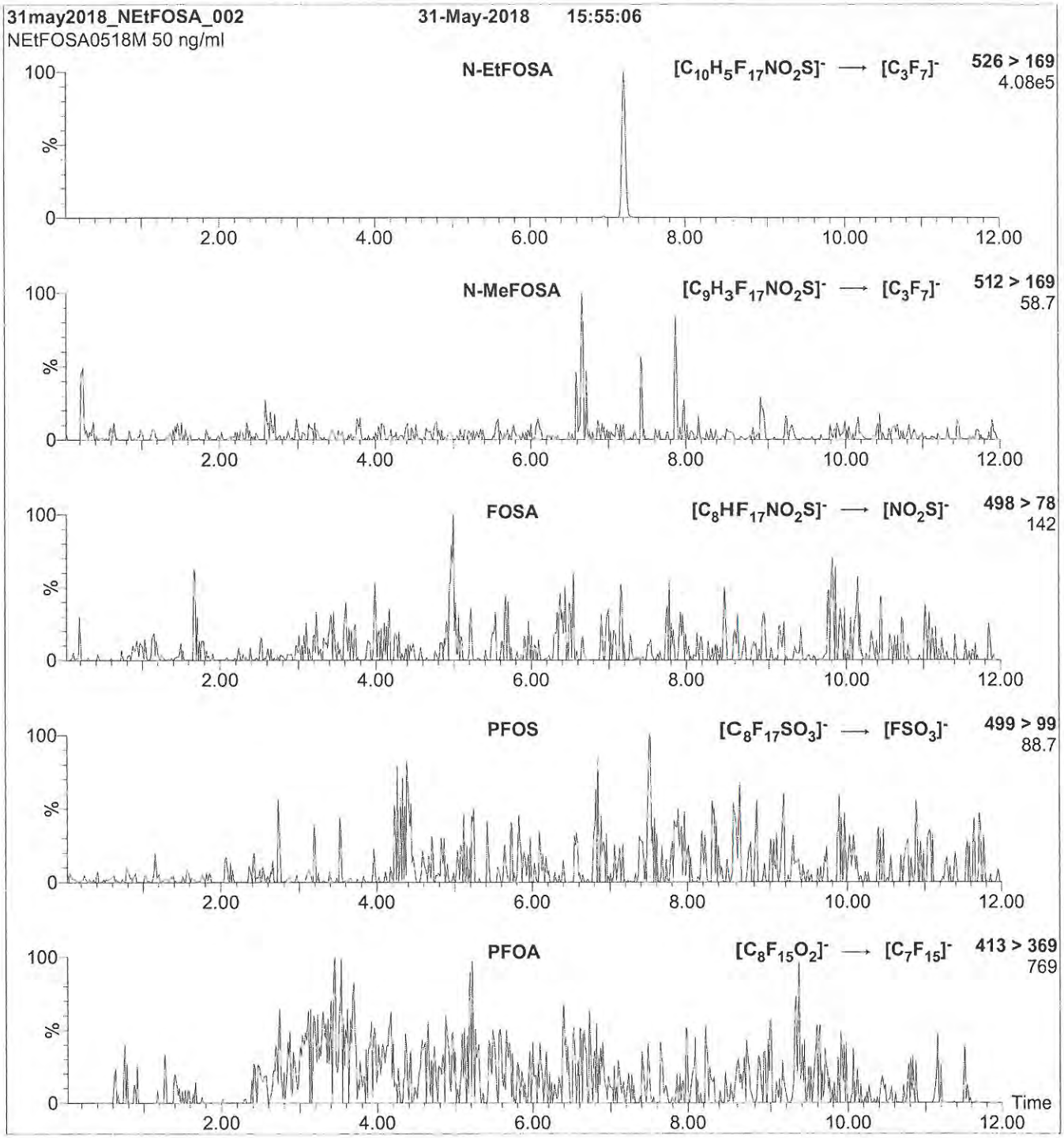
MS Parameters

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.37e-3
Collision Energy (eV) = 24

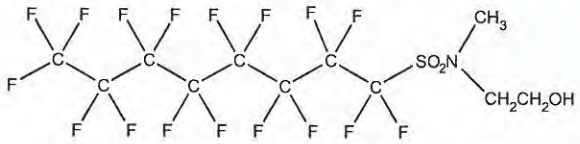
18I0764

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 ± 2.5 µg/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: _____ **Date:** 05/25/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18I0764

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.

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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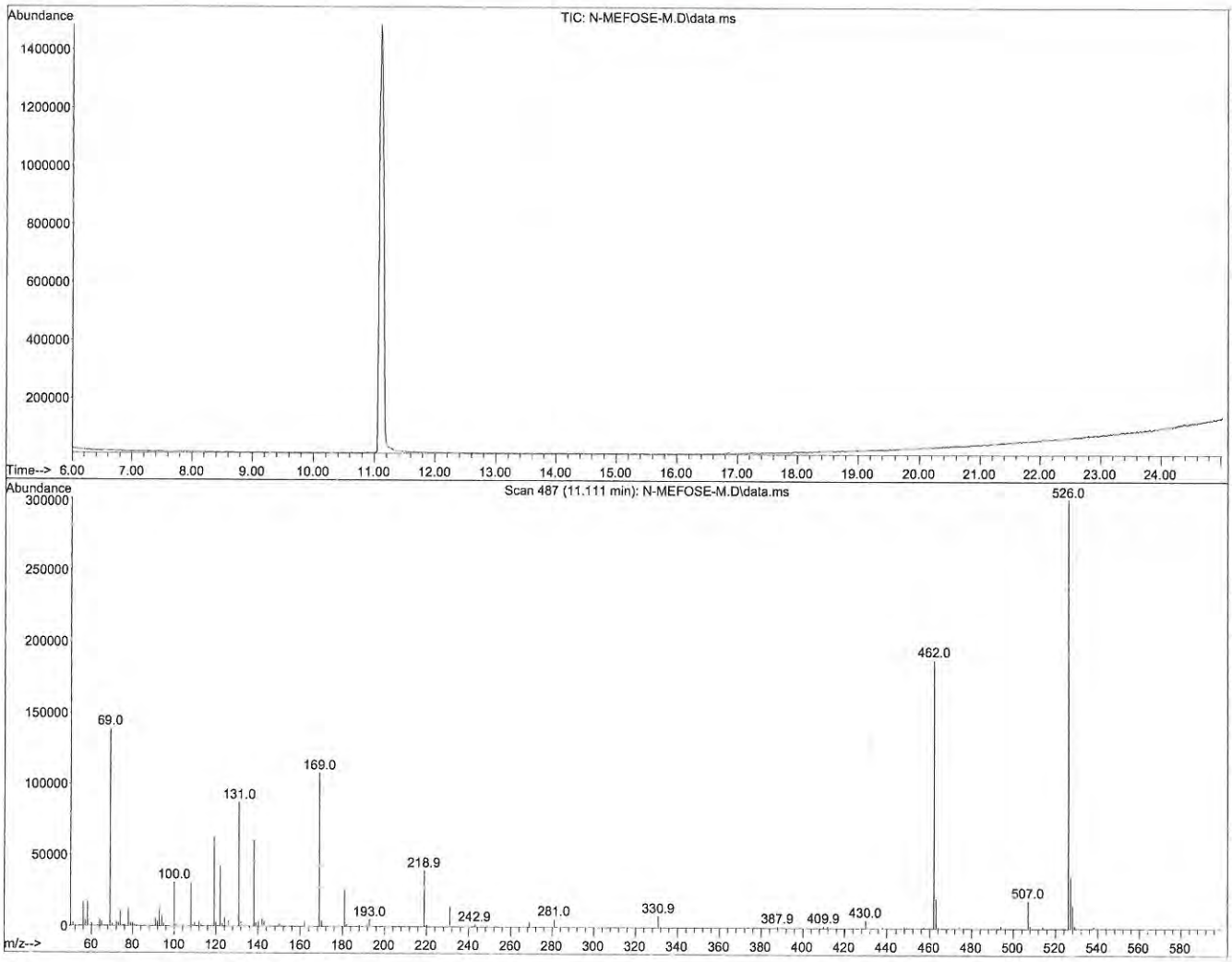
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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18I0764

Figure 1: **N-MeFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

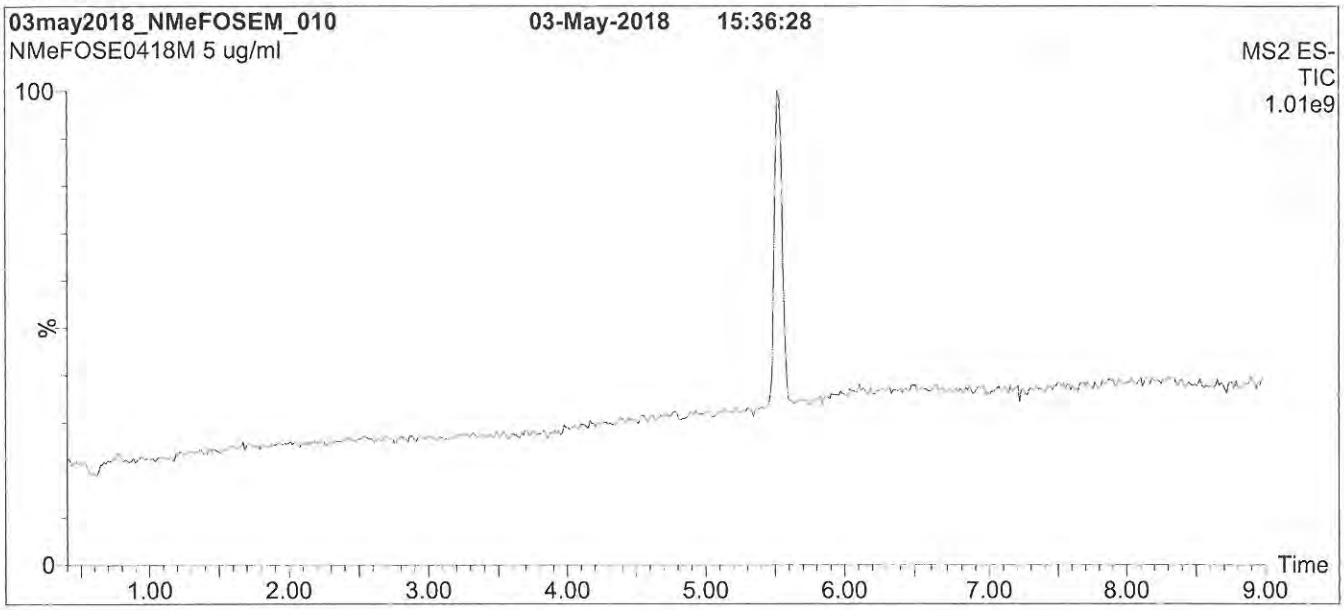
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

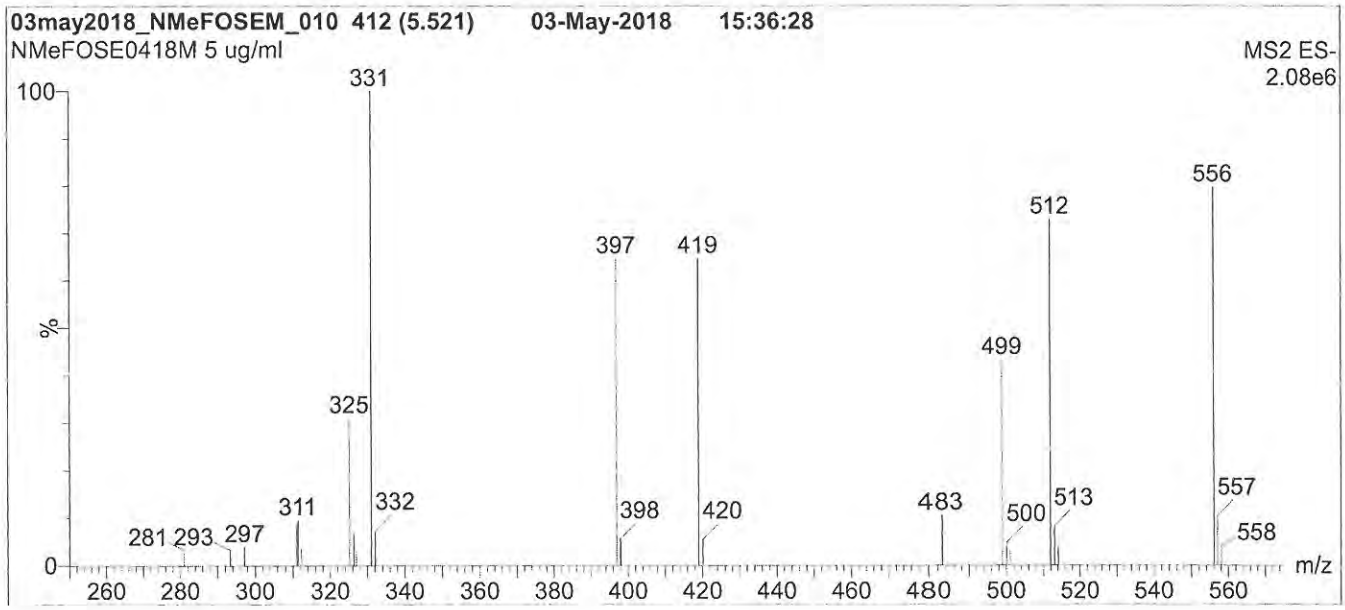
Chromatographic Conditions:

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% MeOH / 35% H_2O
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 µl/min

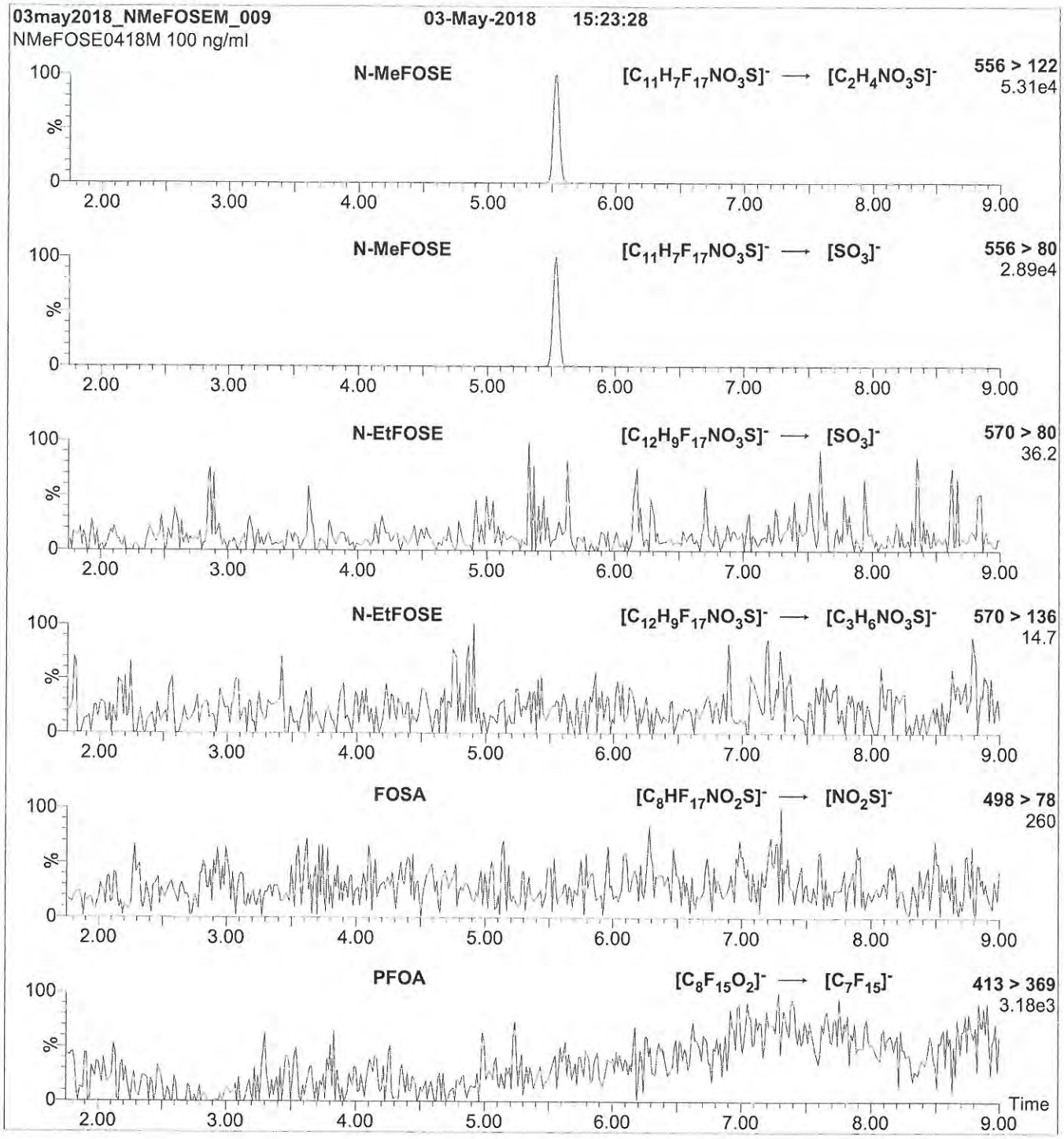
MS Parameters

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

18I0764

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.47e-3
Collision Energy (eV) = 36

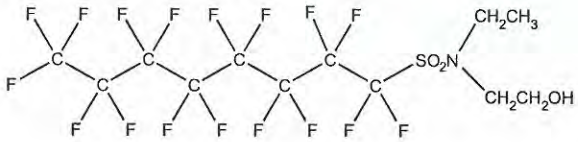
~~1801764~~ 1801765
GRB 9/12/18

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 ± 2.5 µg/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: _____ **Date:** 06/04/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

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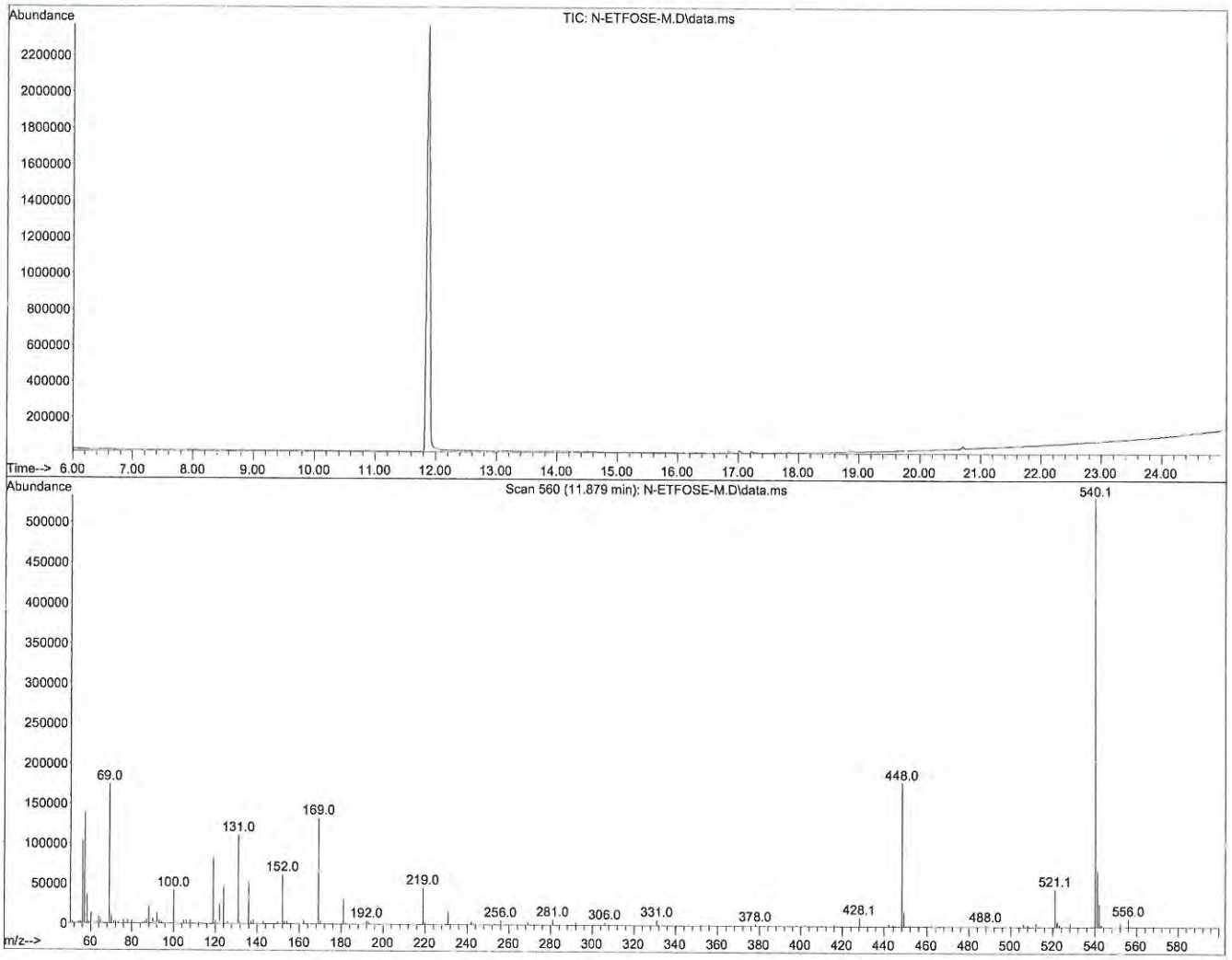
CALA Testing Accreditation No. A 1226

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18I0765

Figure 1: **N-EtFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

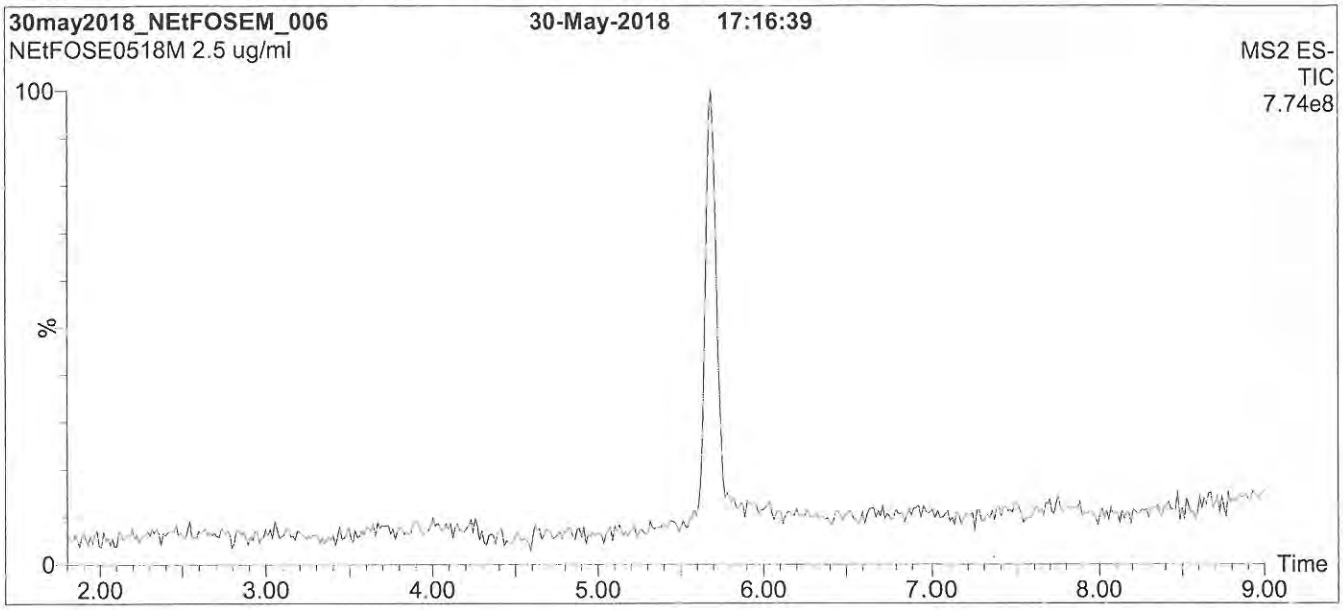
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

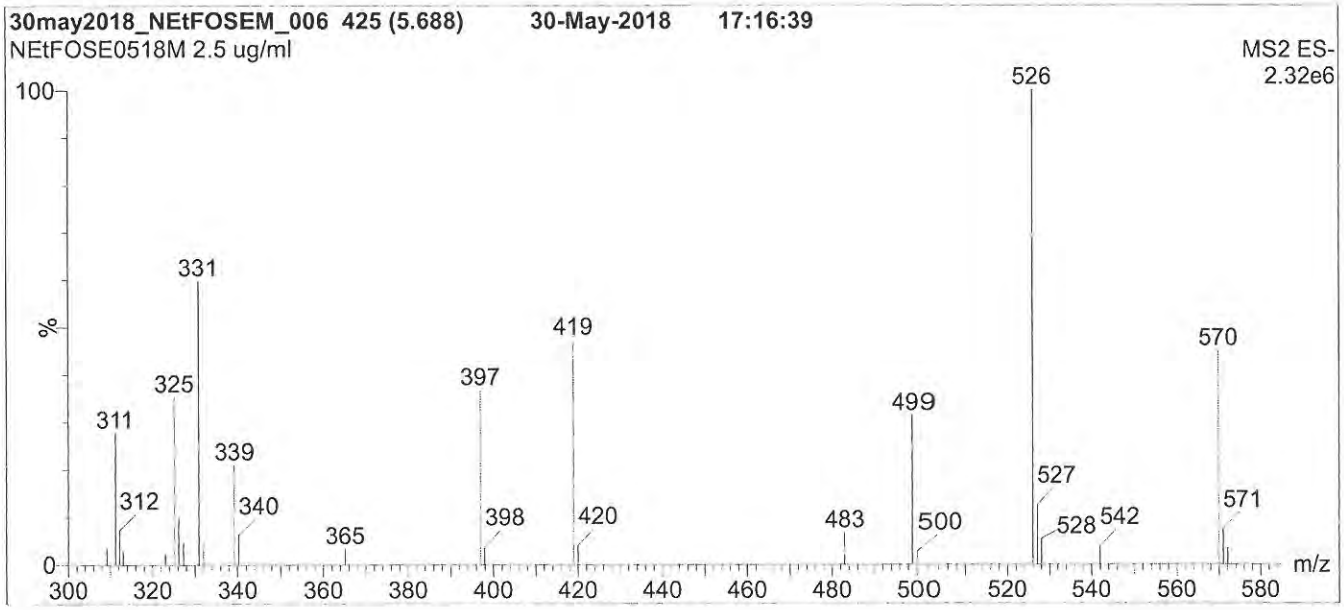
Chromatographic Conditions:

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 C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 70% MeOH / 30% H_2O
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 µl/min

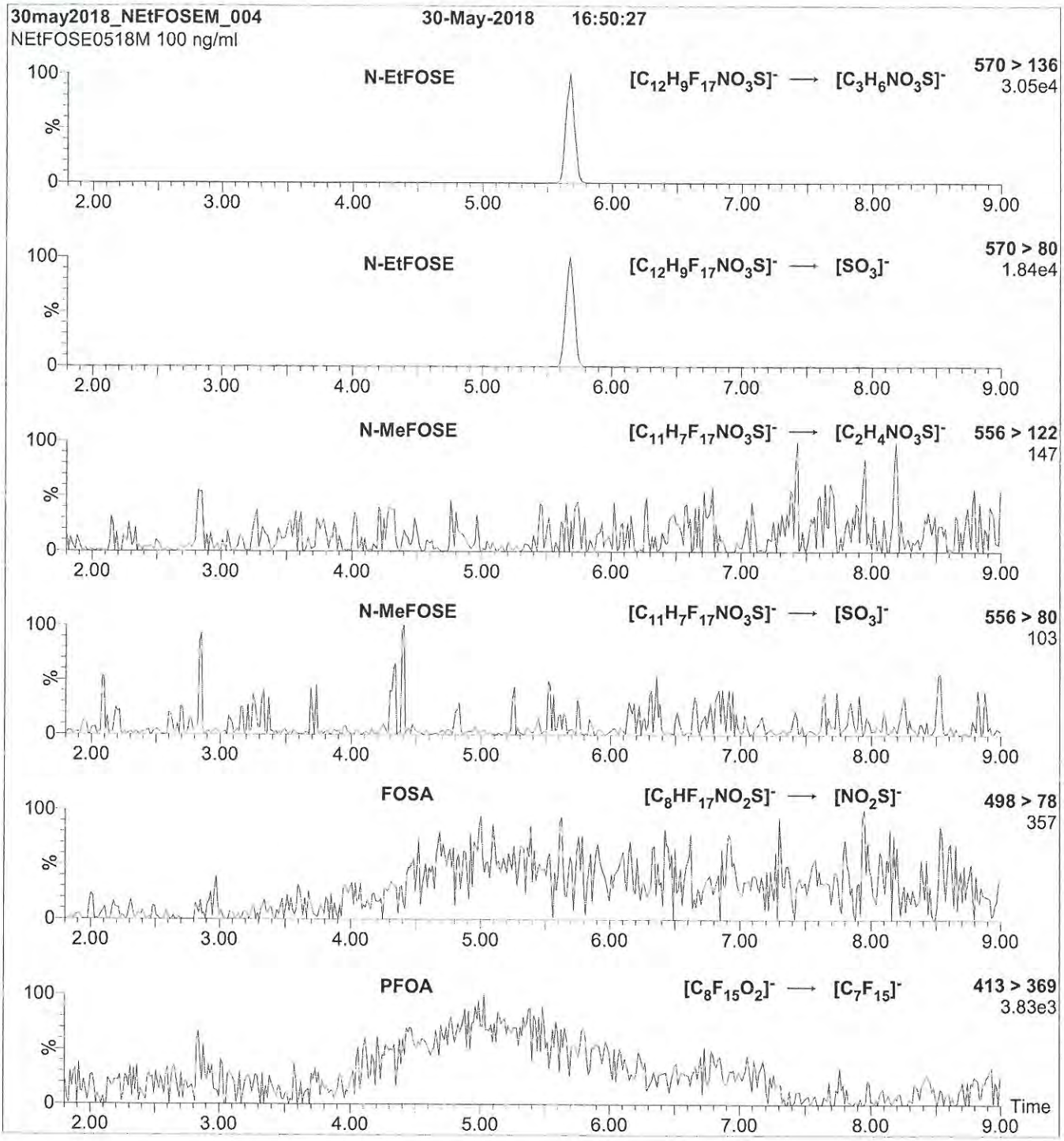
MS Parameters

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 µl/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

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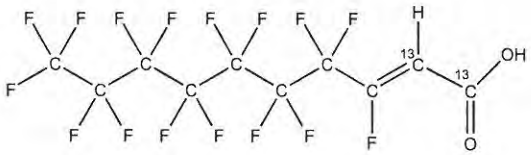
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MFOUEA
COMPOUND: 2H-Perfluoro-[1,2-$^{13}C_2$]-2-decenoic acid

LOT NUMBER: MFOUEA1117

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_2F_{16}O_2$	**MOLECULAR WEIGHT:**	460.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Anhydrous Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/14/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/14/2019		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Dilution of this standard in methanol may lead to the formation of 2H-3-methoxy-perfluoro-[1,2-$^{13}C_2$]-2-decenoic acid. This reaction can be catalyzed by the presence of acid or base. All dilutions should be routinely checked for degradation.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/15/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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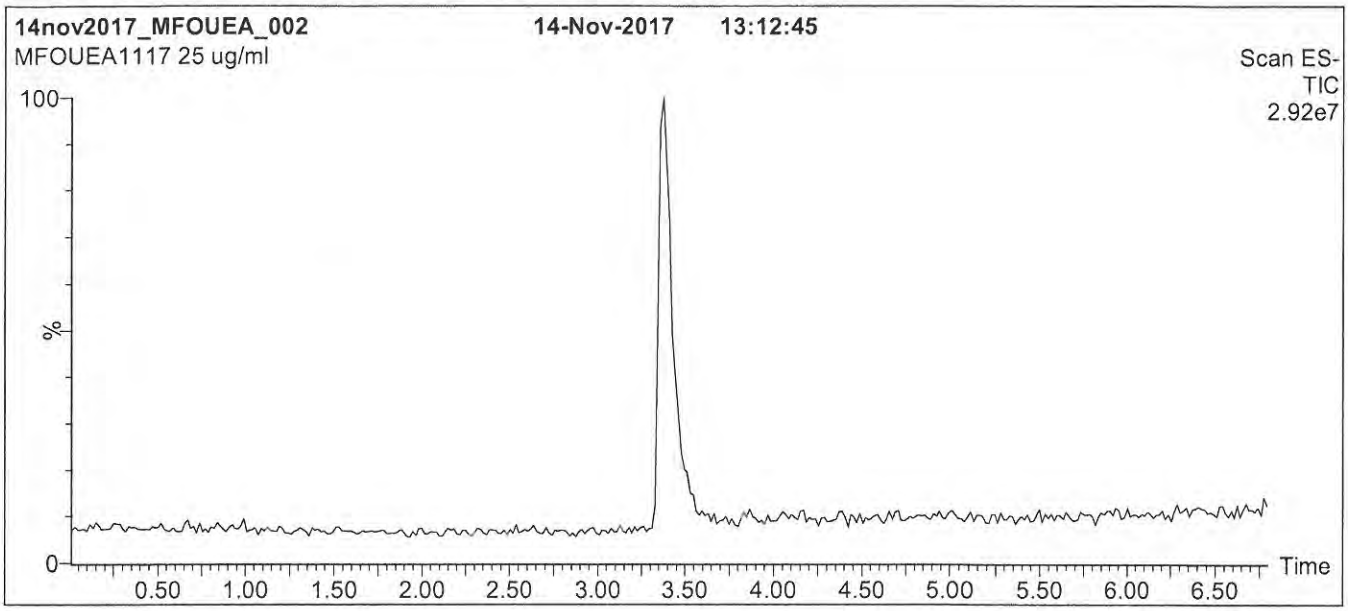
CALA

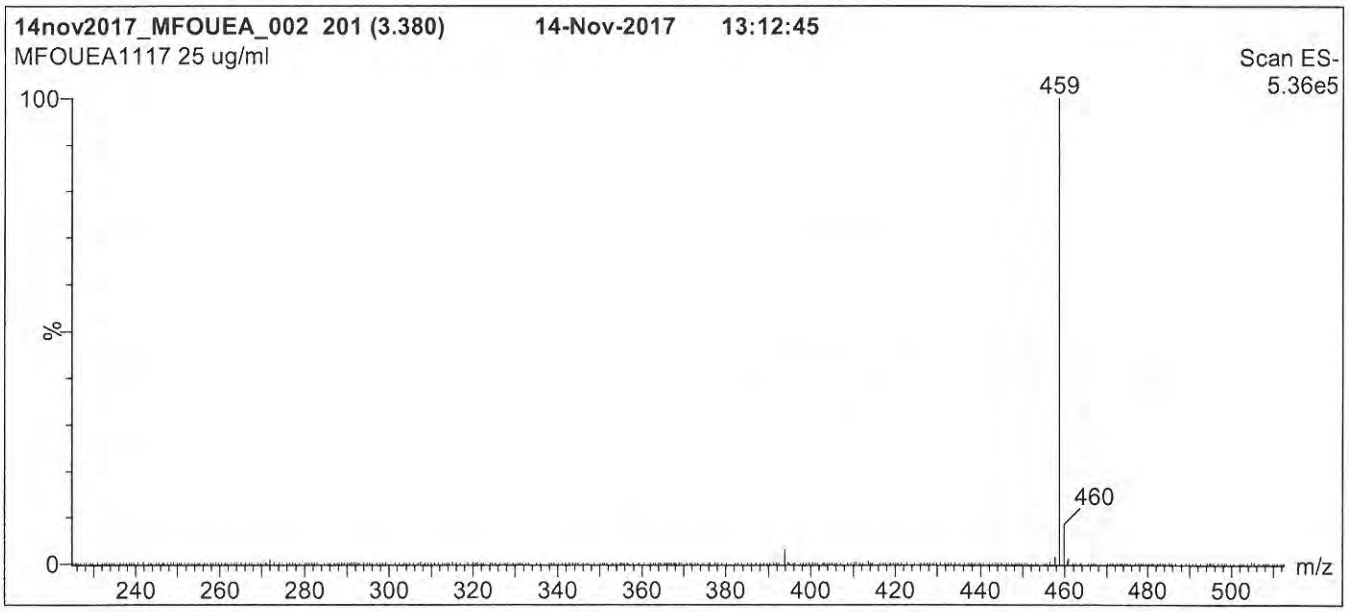
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold
for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

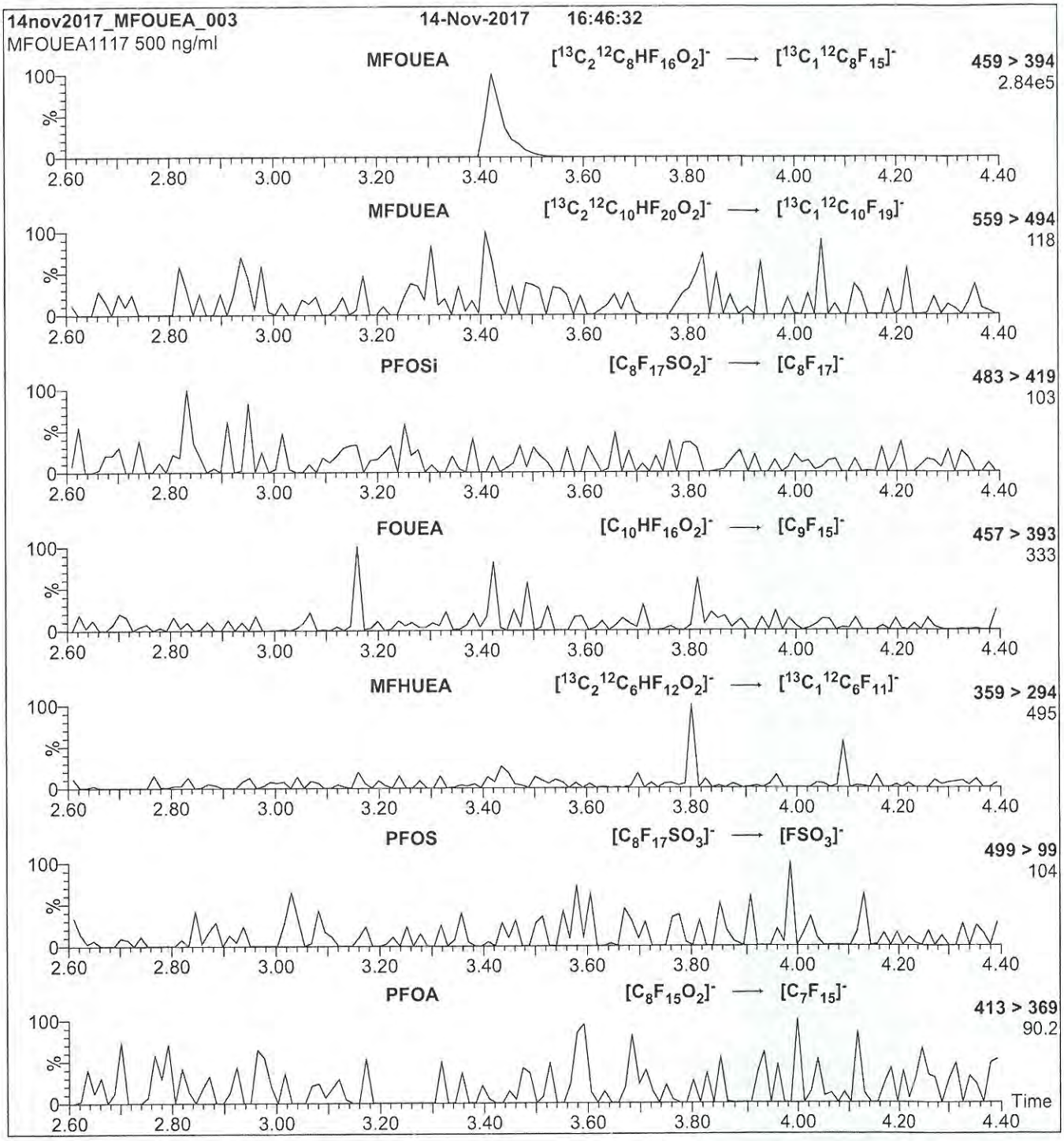
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 14.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

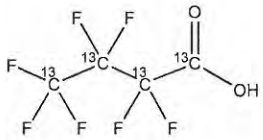
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 21

18F2229

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFBA	**LOT NUMBER:**	MPFBA0218
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4HF_7O_2$	**MOLECULAR WEIGHT:**	218.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	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: _____ **Date:** 02/22/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2229

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,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

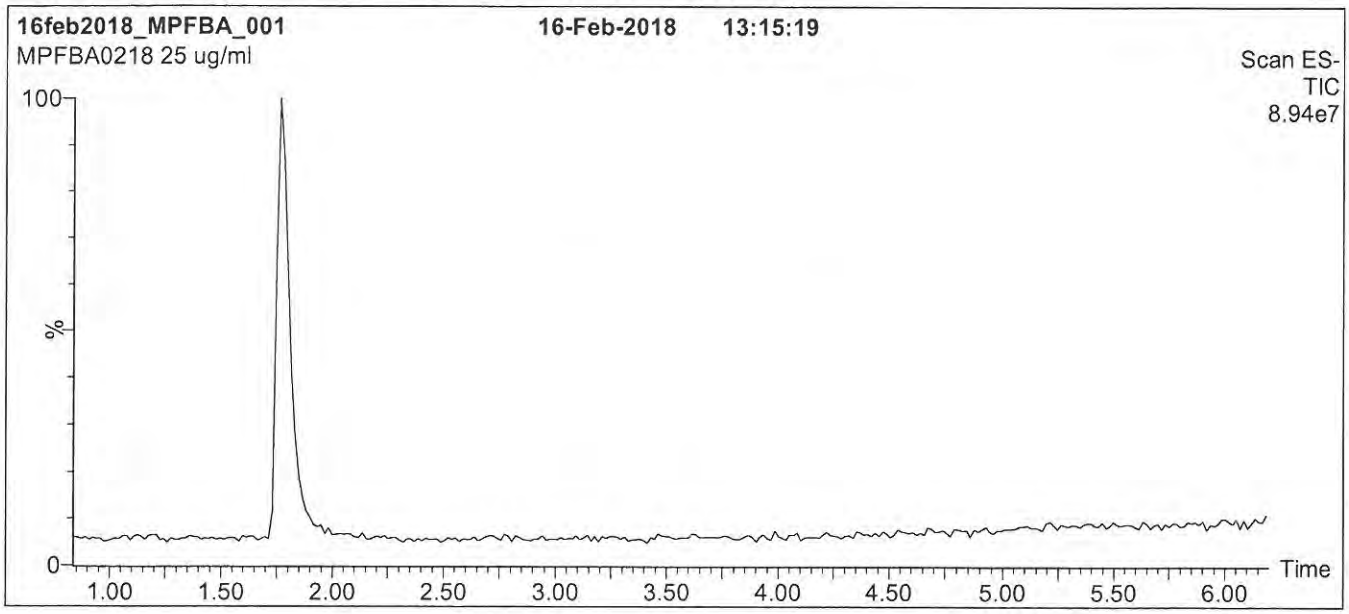
CALA

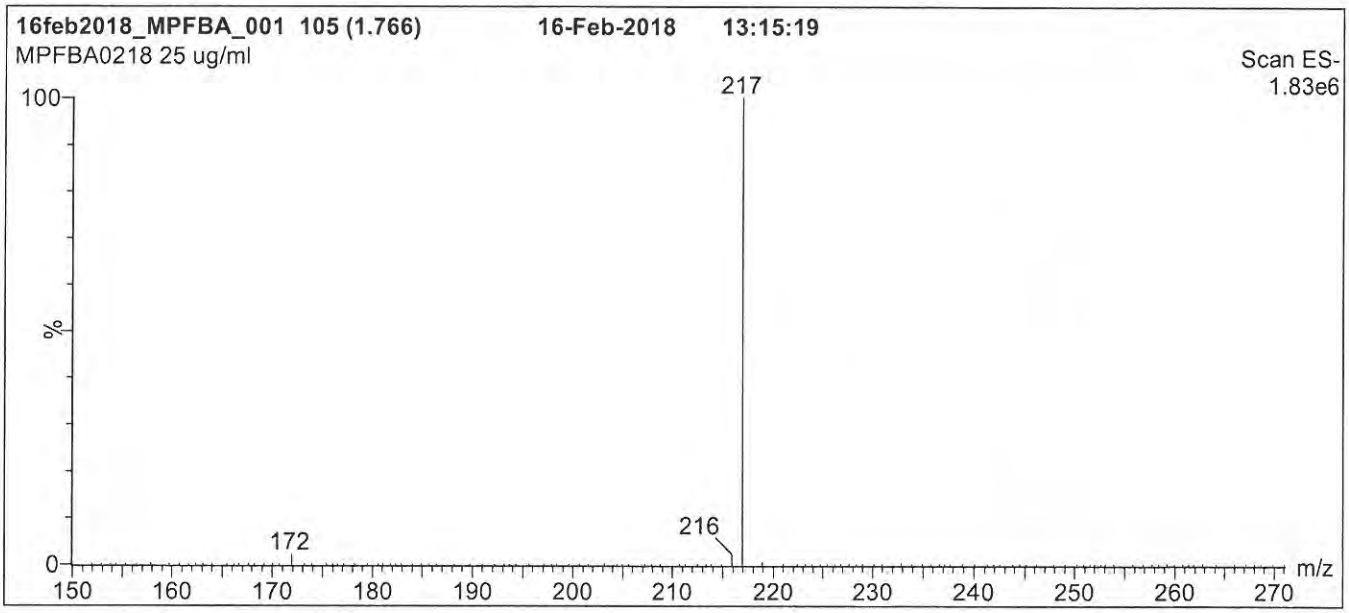
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

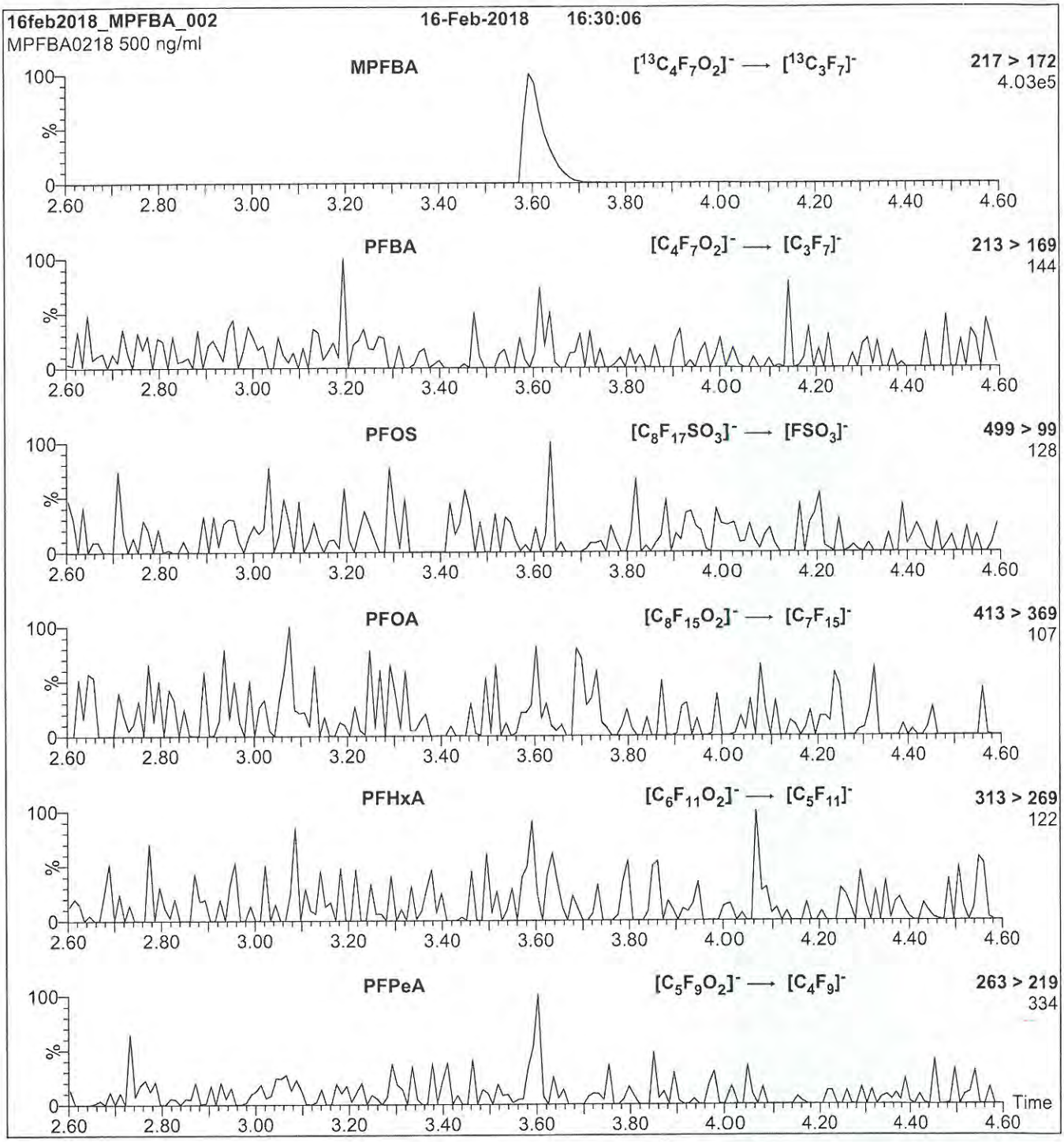
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

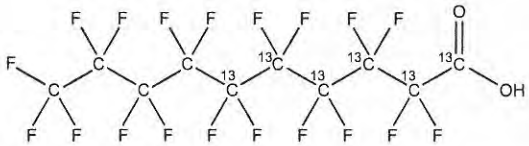
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 10

18F2230

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M6PFDA	**LOT NUMBER:**	M6PFDA1017
COMPOUND:	Perfluoro-n-[1,2,3,4,5,6-$^{13}C_6$]decanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_6{}^{12}C_4HF_{19}O_2$	**MOLECULAR WEIGHT:**	520.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5,6-$^{13}C_6$)
LAST TESTED: (mm/dd/yyyy)	10/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

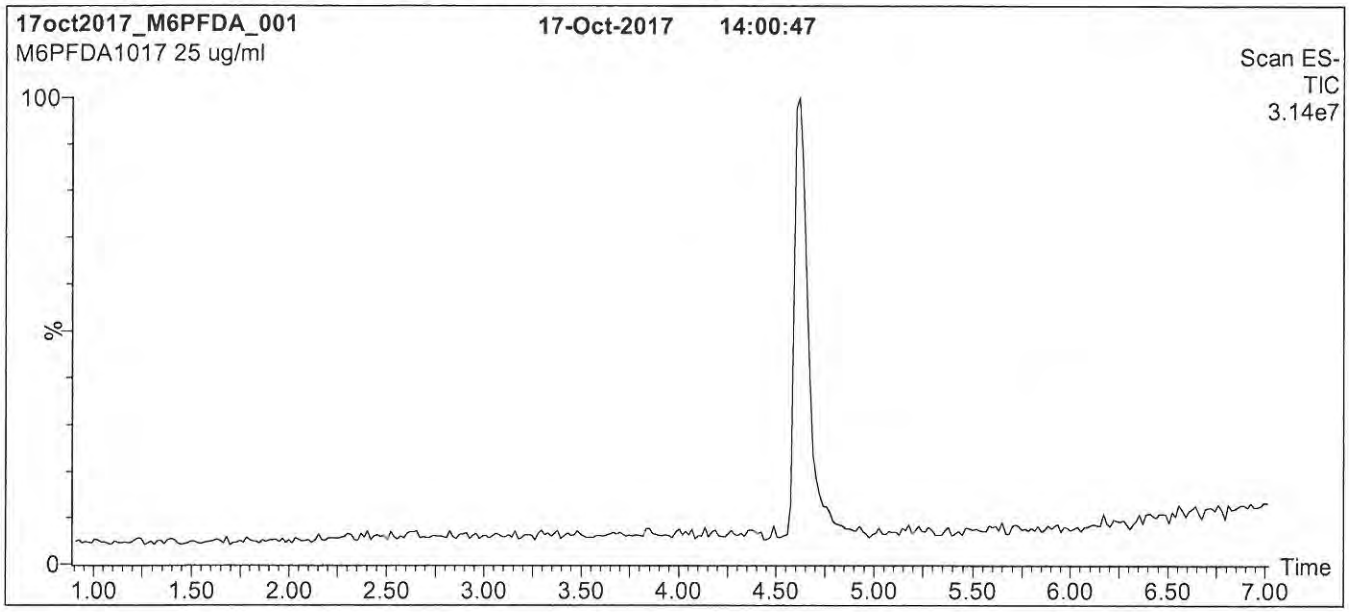
CALA

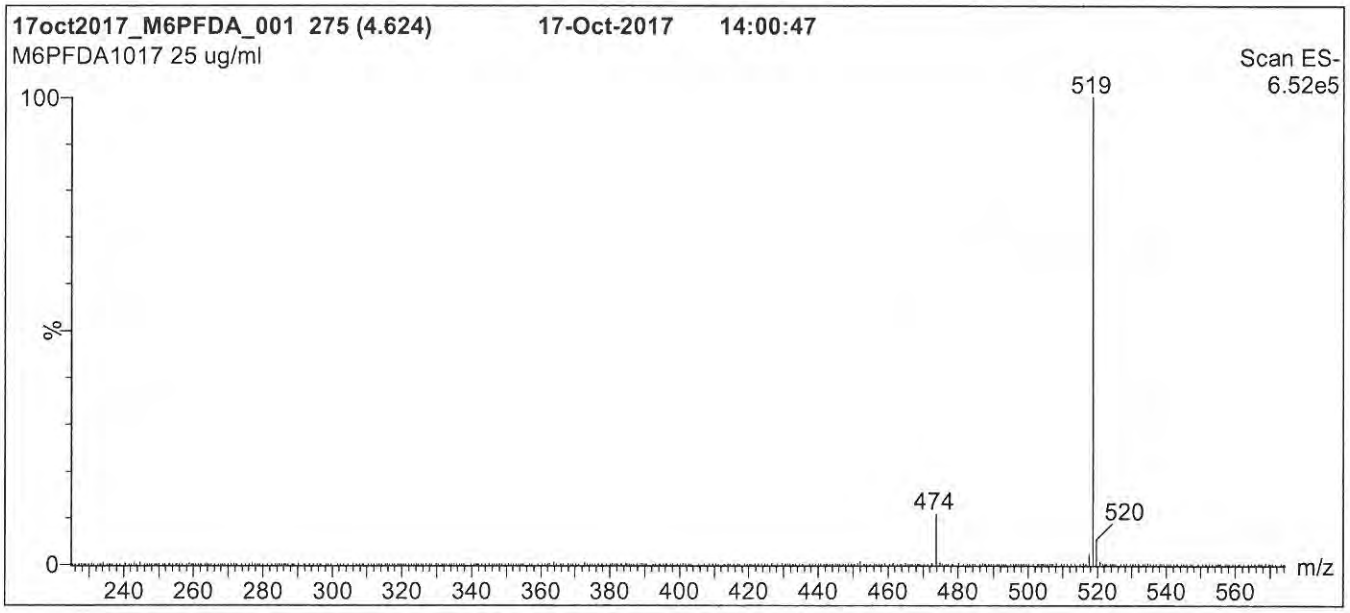
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18F2230

Figure 1: **M6PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

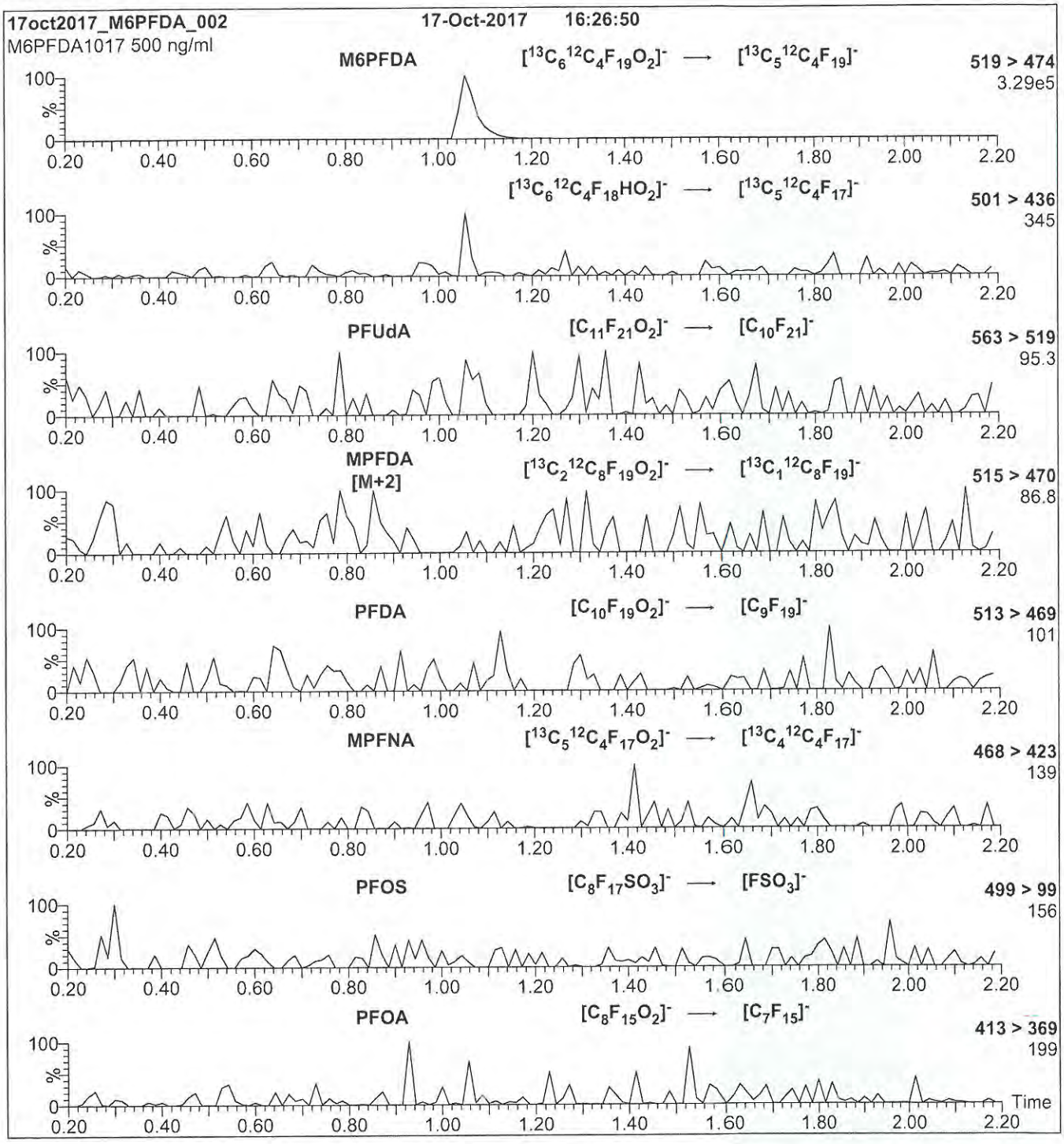
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 13

18F2231

WELLINGTON LABORATORIES

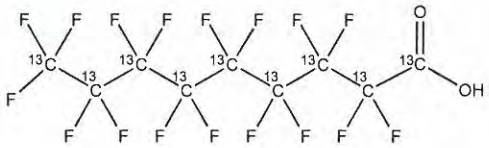
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M9PFNA
COMPOUND: Perfluoro-n-[$^{13}C_9$]nonanoic acid

LOT NUMBER: M9PFNA0517

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_9HF_{17}O_2$	**MOLECULAR WEIGHT:**	473.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_9$)
LAST TESTED: (mm/dd/yyyy)	05/23/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/23/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.9% of $^{13}C_5{}^{12}C_4HF_{17}O_2$ (MPFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/25/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2231

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EXPIRY DATE / PERIOD OF VALIDITY:

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QUALITY MANAGEMENT:

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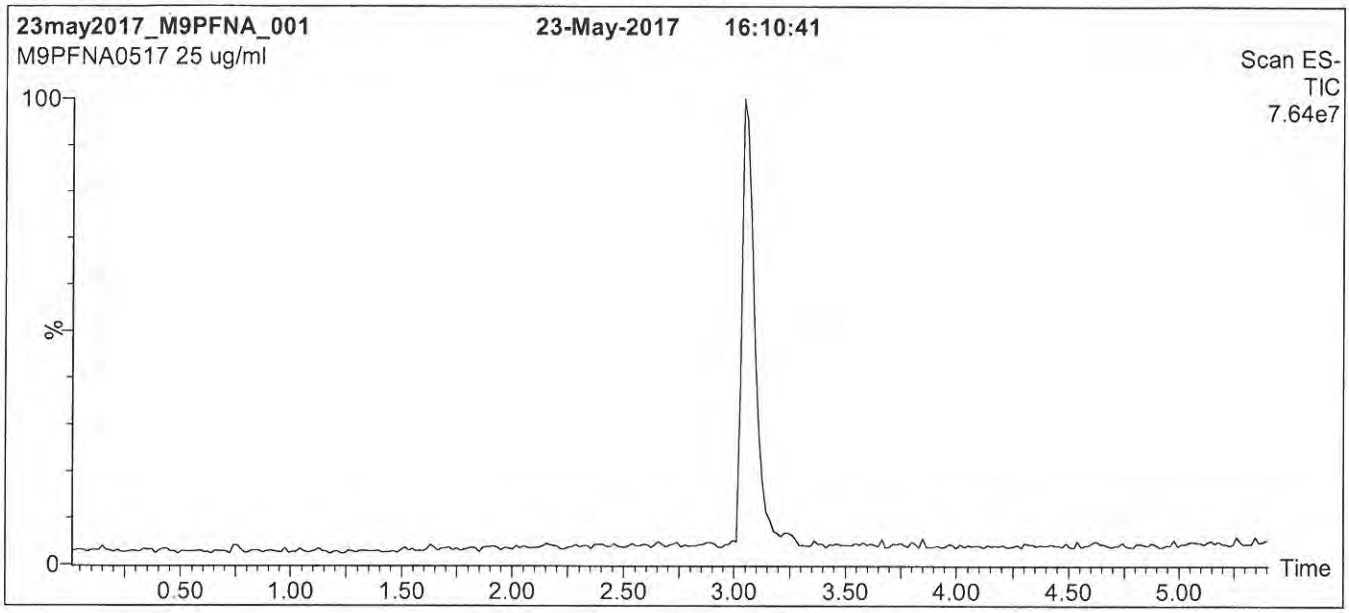
CALA Testing

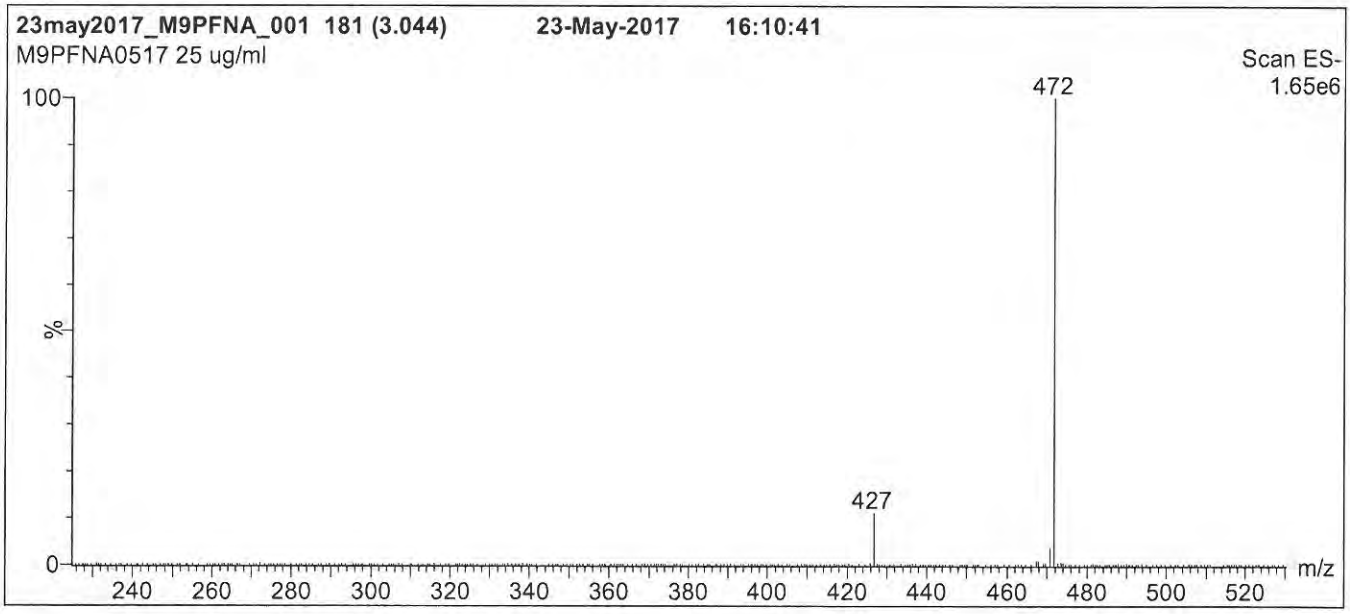
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

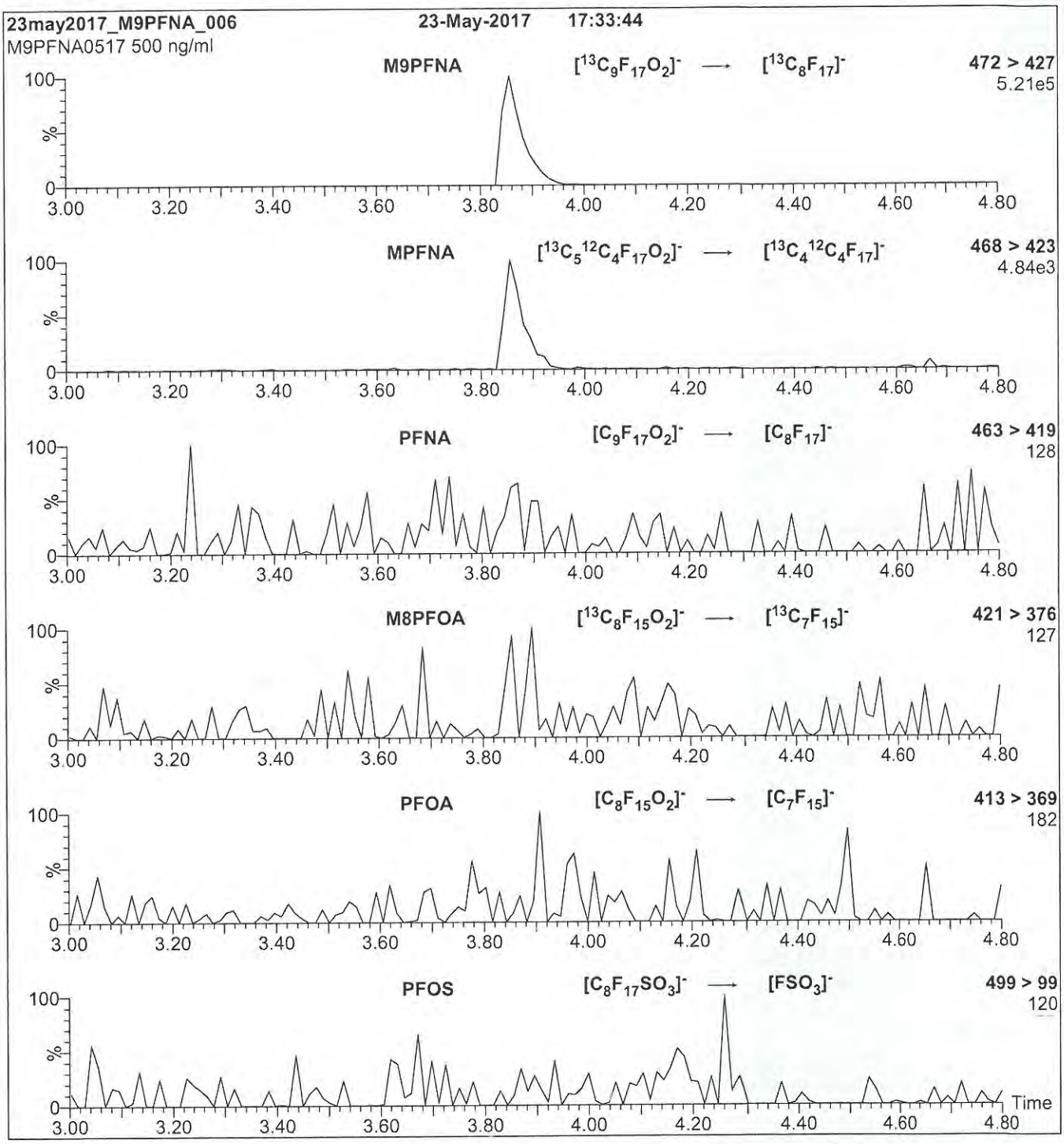
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

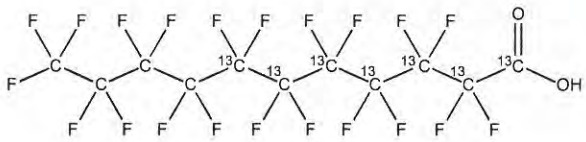
Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 11

18F2232

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M7PFUdA	**LOT NUMBER:**	M7PFUdA0717
COMPOUND:	Perfluoro-n-[1,2,3,4,5,6,7-$^{13}C_7$]undecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_7{}^{12}C_4HF_{21}O_2$	**MOLECULAR WEIGHT:**	571.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C
LAST TESTED: (mm/dd/yyyy)	07/13/2017		(1,2,3,4,5,6,7-$^{13}C_7$)
EXPIRY DATE: (mm/dd/yyyy)	07/13/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2232

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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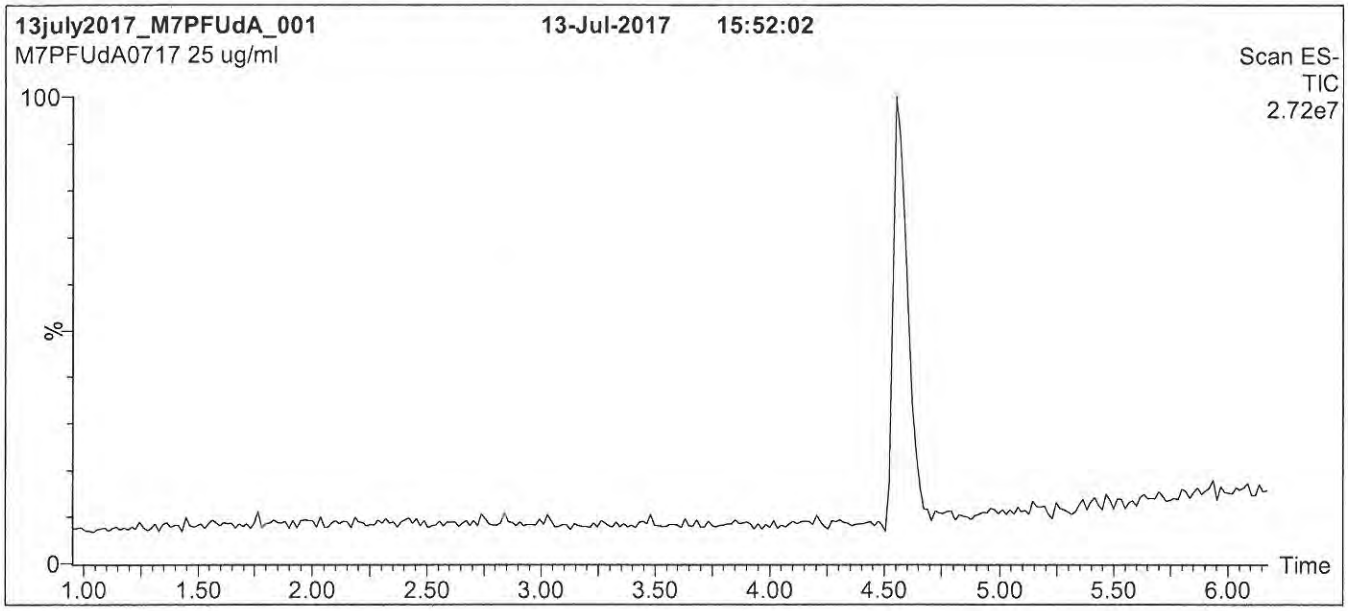
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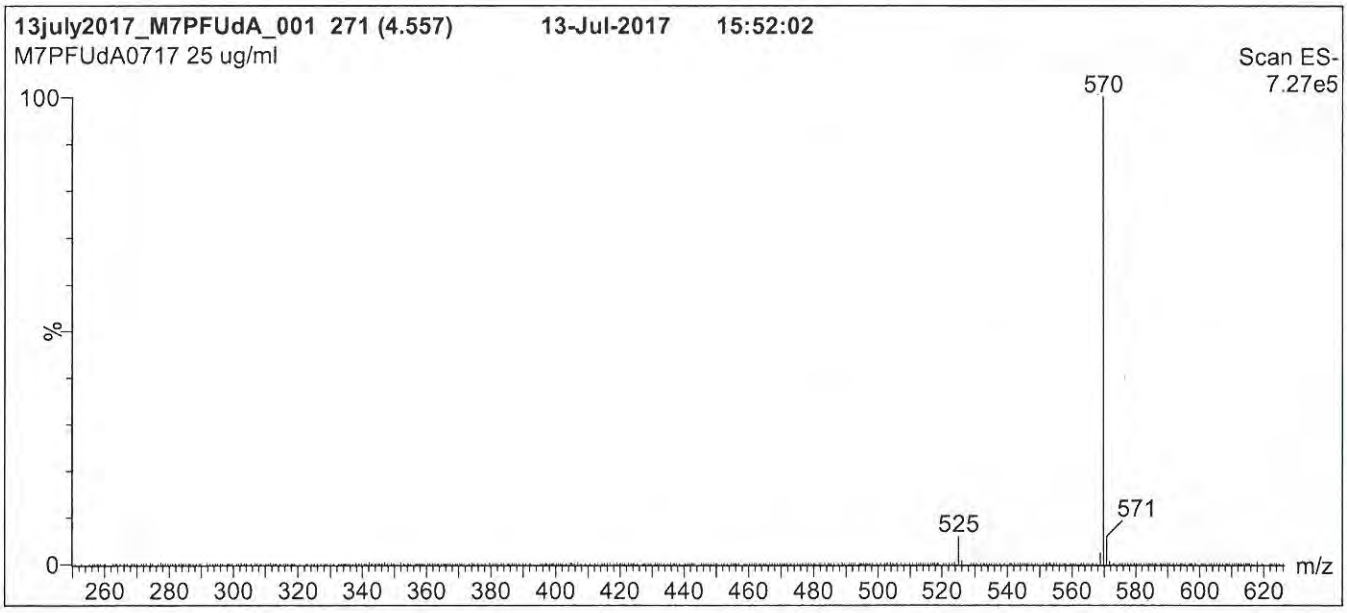
ANAB ACCREDITED

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

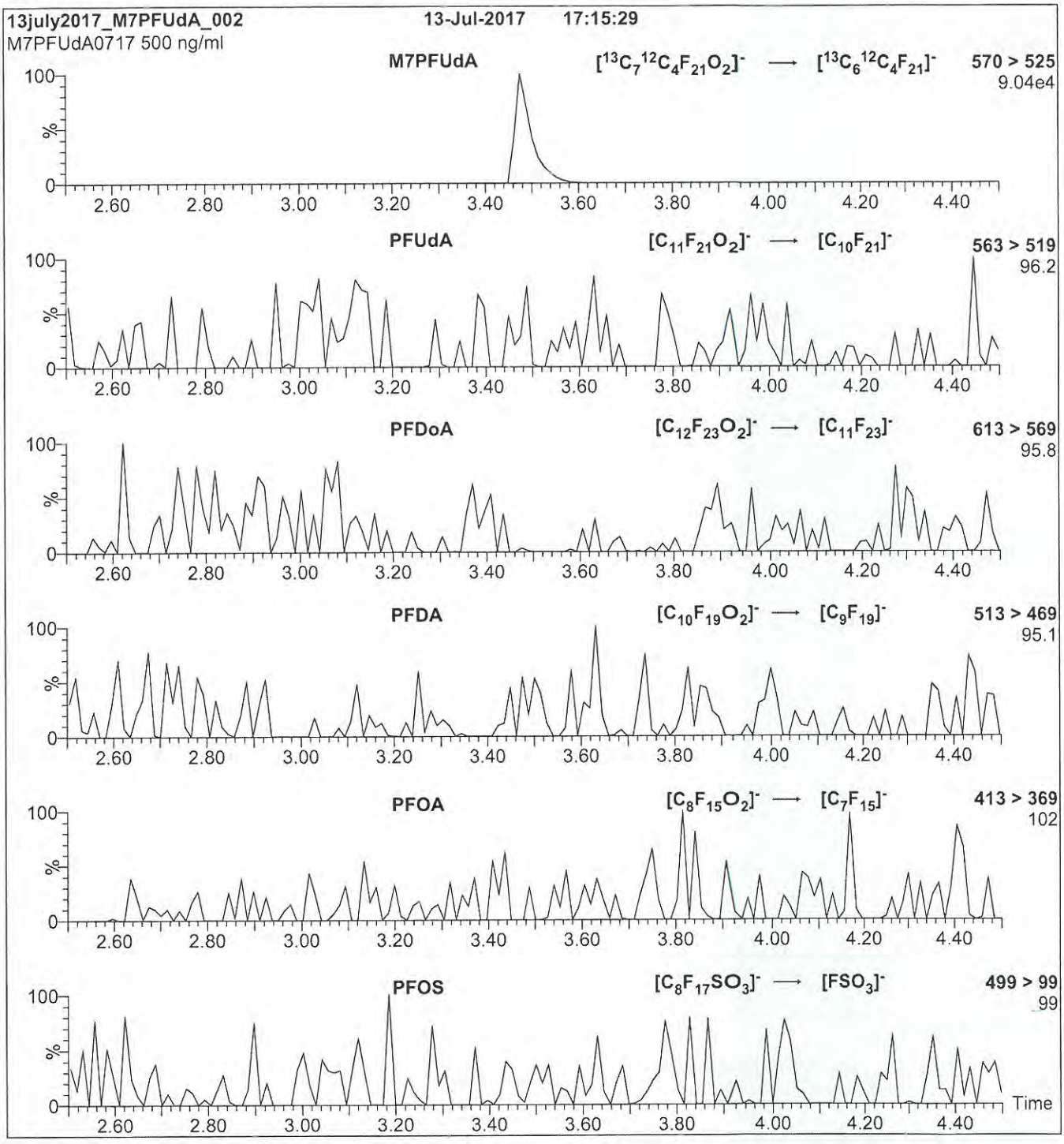
MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

18F2233

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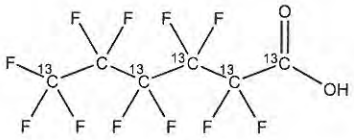
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M5PFHxA
COMPOUND: Perfluoro-n-[1,2,3,4,6-$^{13}C_5$]hexanoic acid

LOT NUMBER: M5PFHxA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_1HF_{11}O_2$	**MOLECULAR WEIGHT:**	319.02
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,6-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	10/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

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Certified By: _____ **Date:** 10/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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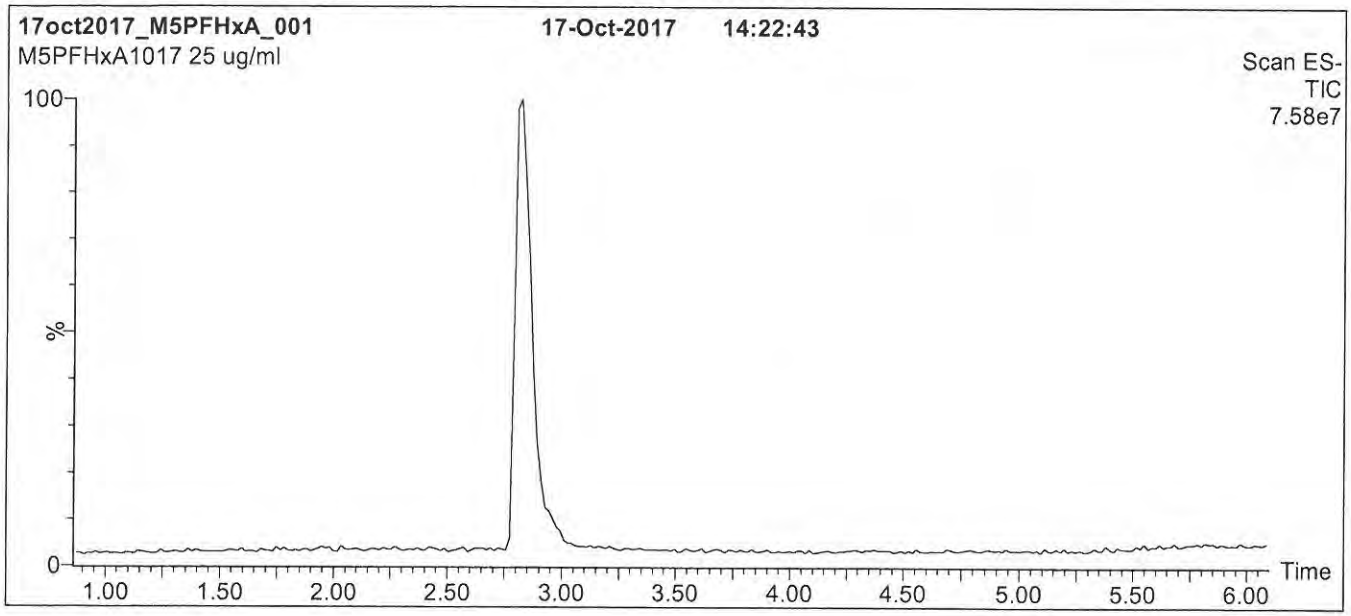
CALA

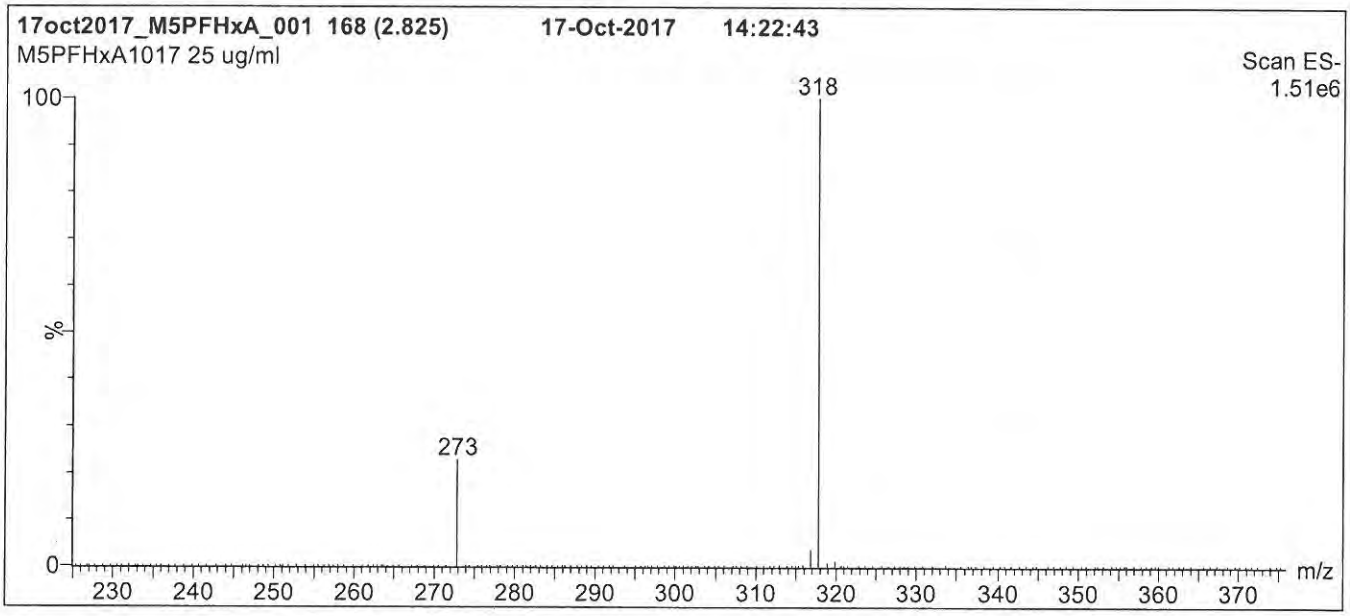
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18F2233

Figure 1: **M5PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

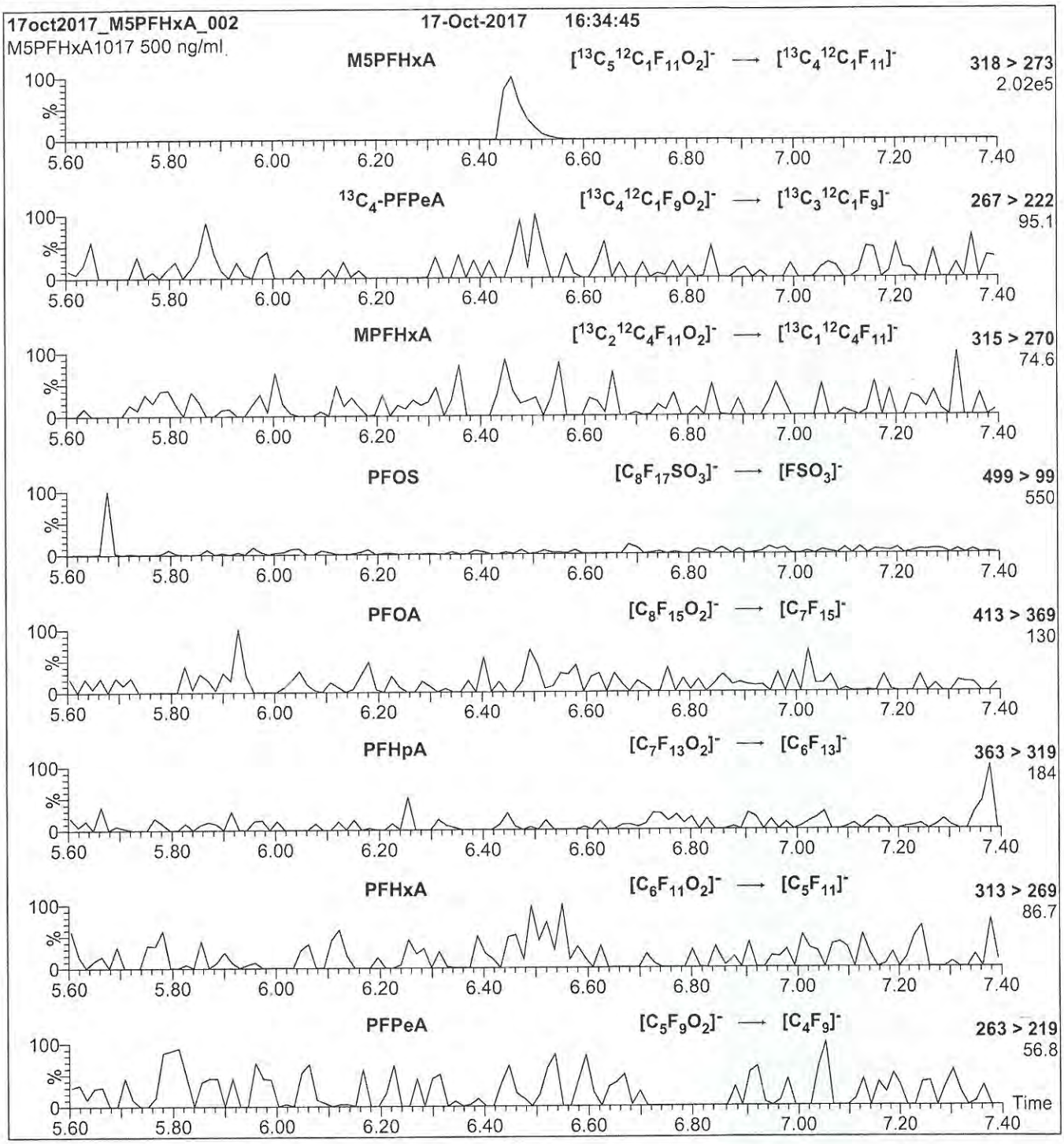
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18F2234

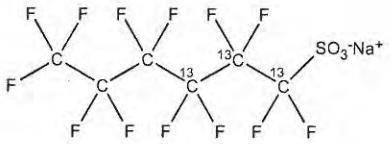
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFHxS **LOT NUMBER:** M3PFHxS0717

COMPOUND: Sodium perfluoro-1-[1,2,3-$^{13}C_3$]hexanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}C_3F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	425.07
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (M3PFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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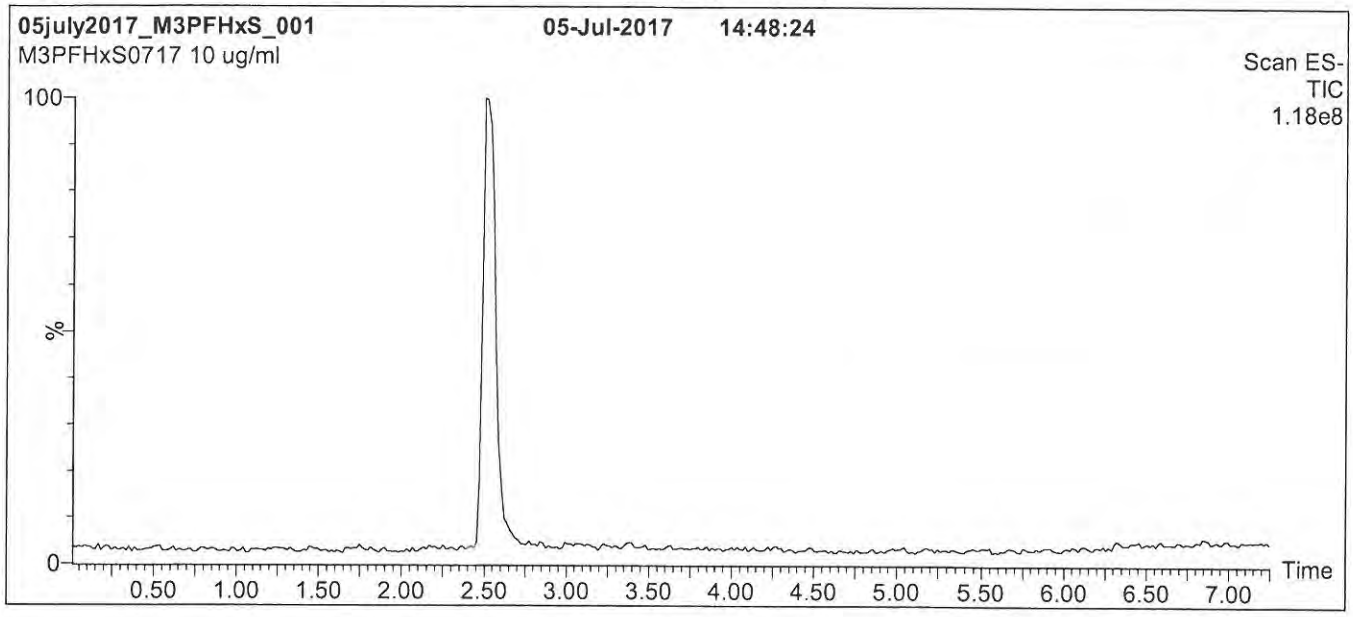
CALA Testing

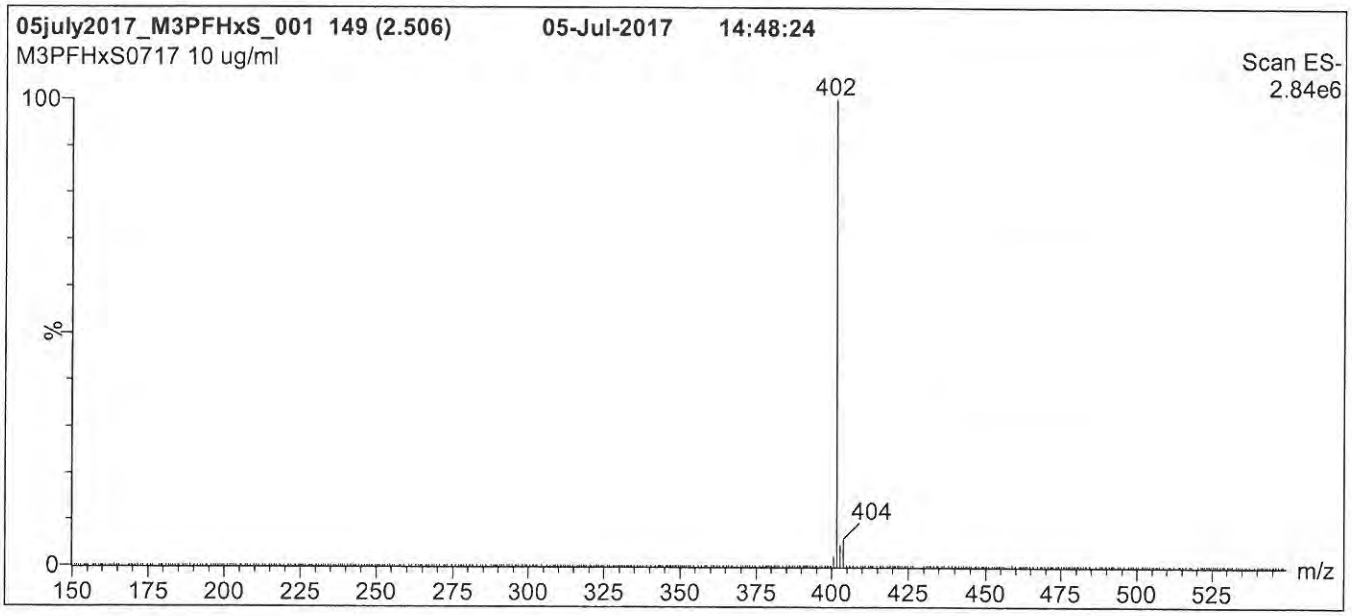
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18F2234

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

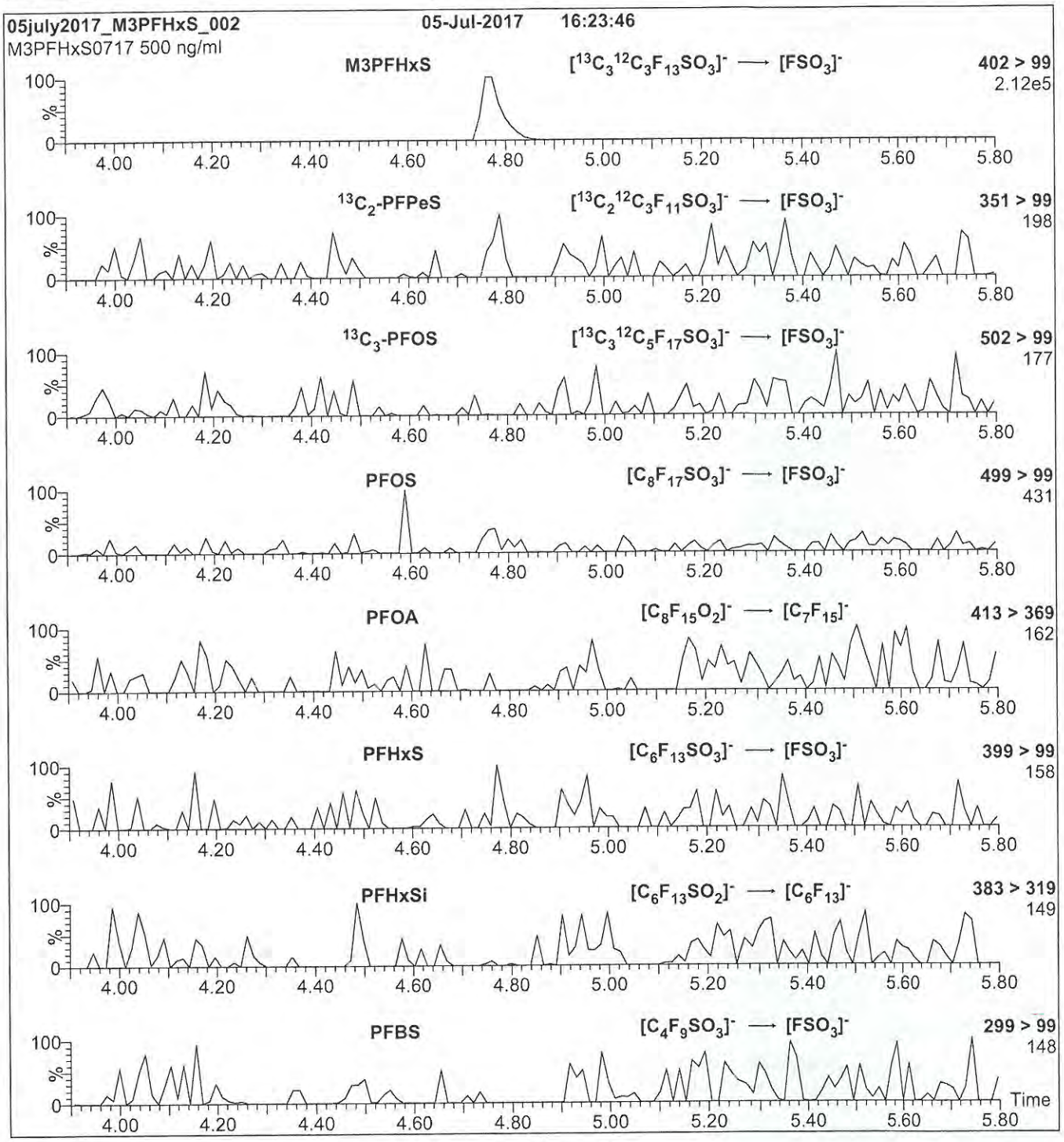
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

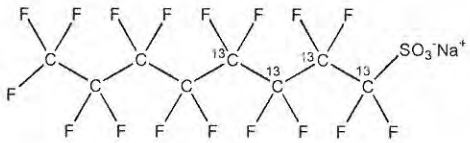
18F2235

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS
LOT NUMBER: MPFOS0218
COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	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-$^{13}C_3$]heptanesulfonate.

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Certified By: _____ **Date:** 02/20/2018 (mm/dd/yyyy)
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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly 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).

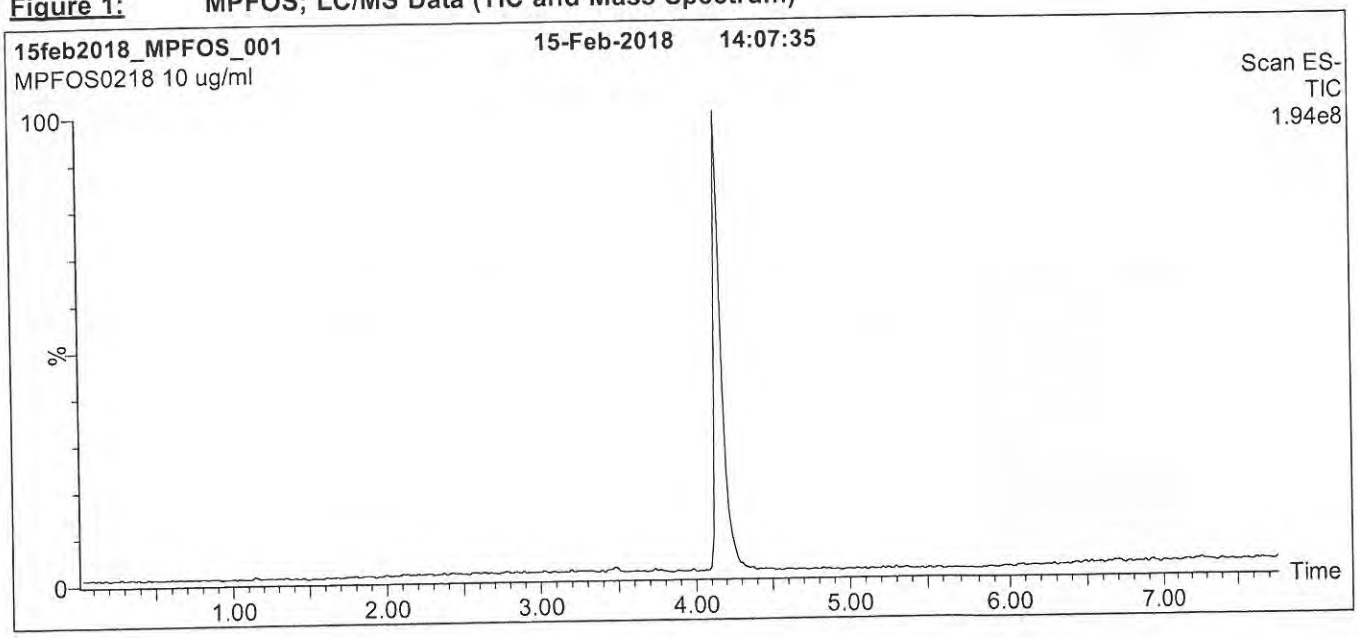
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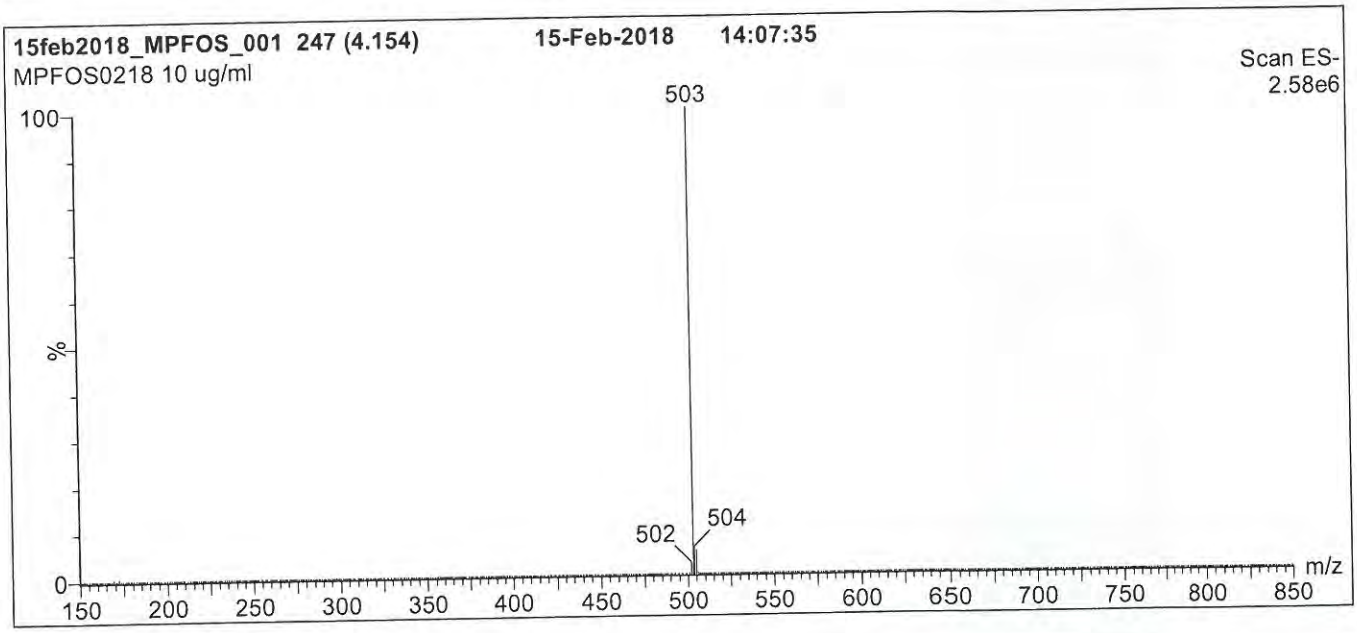
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

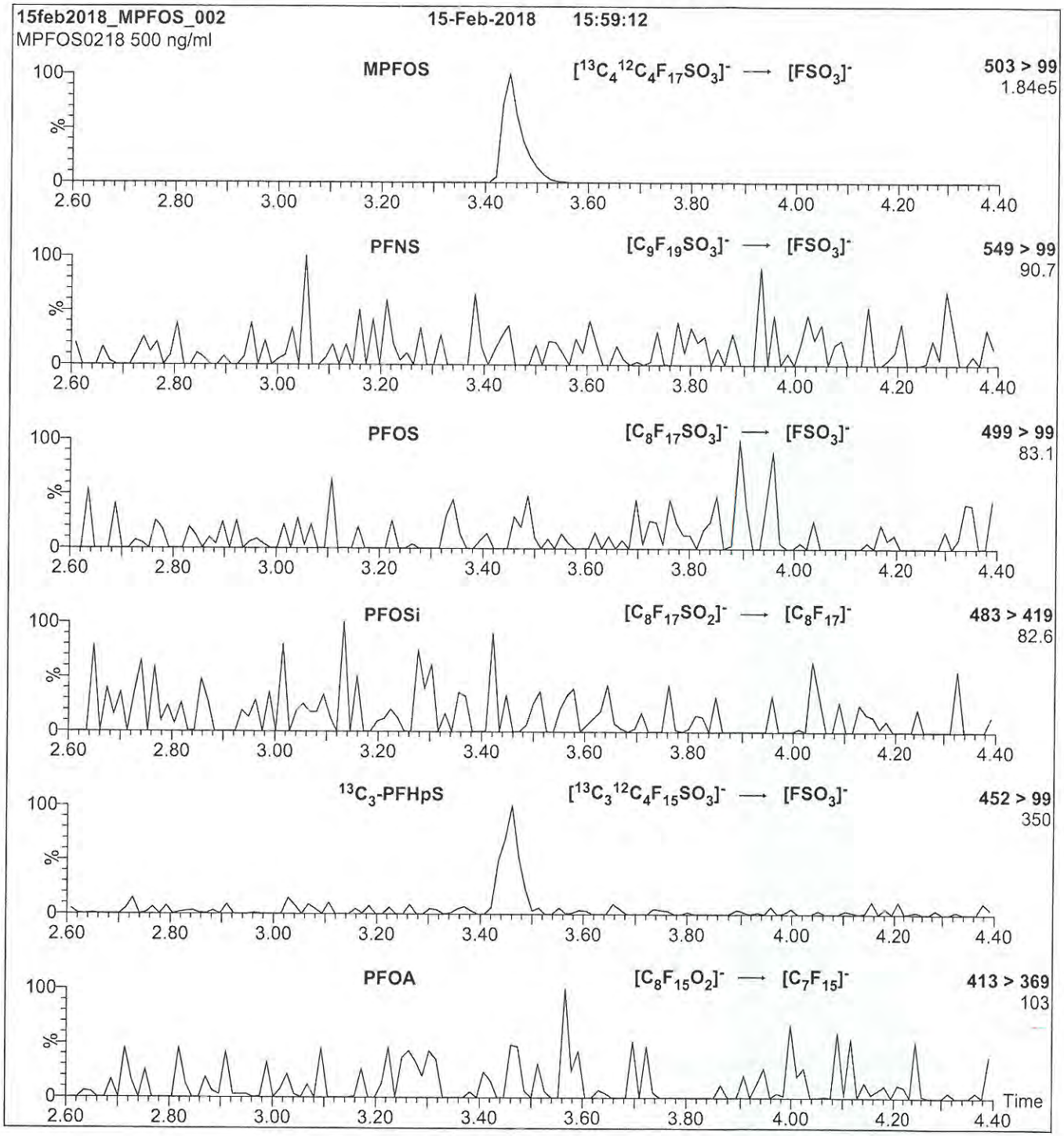
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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 µl/min

MS Parameters

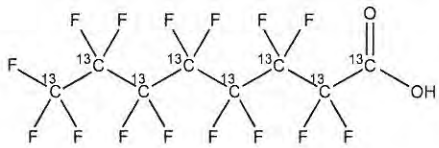
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 40

18F2236

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M8PFOA	**LOT NUMBER:**	M8PFOA0717
COMPOUND:	Perfluoro-n-[$^{13}C_8$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_8HF_{15}O_2$	**MOLECULAR WEIGHT:**	422.01
CONCENTRATION:	49 ± 2.45 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	97.9% (M8PFOA) 2.1% (MPFOA [M+4])	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of native perfluoro-n-octanoic acid (PFOA) and ~ 2.1% of [M+4] perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18F2236

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

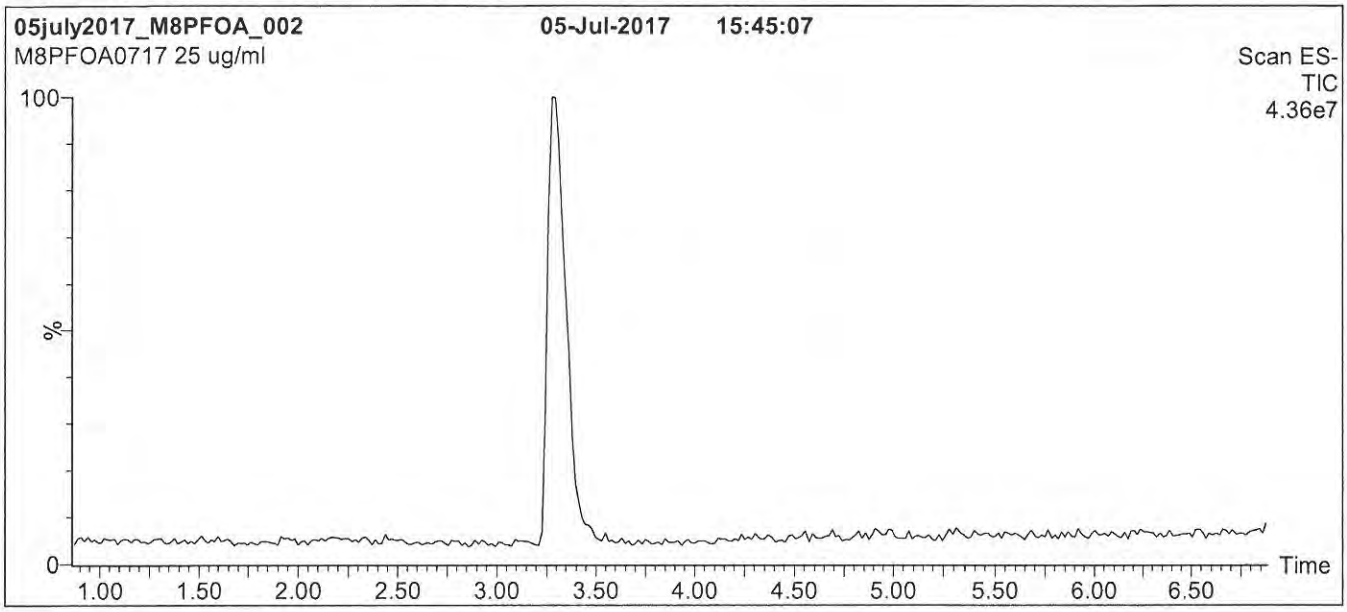
CALA Testing

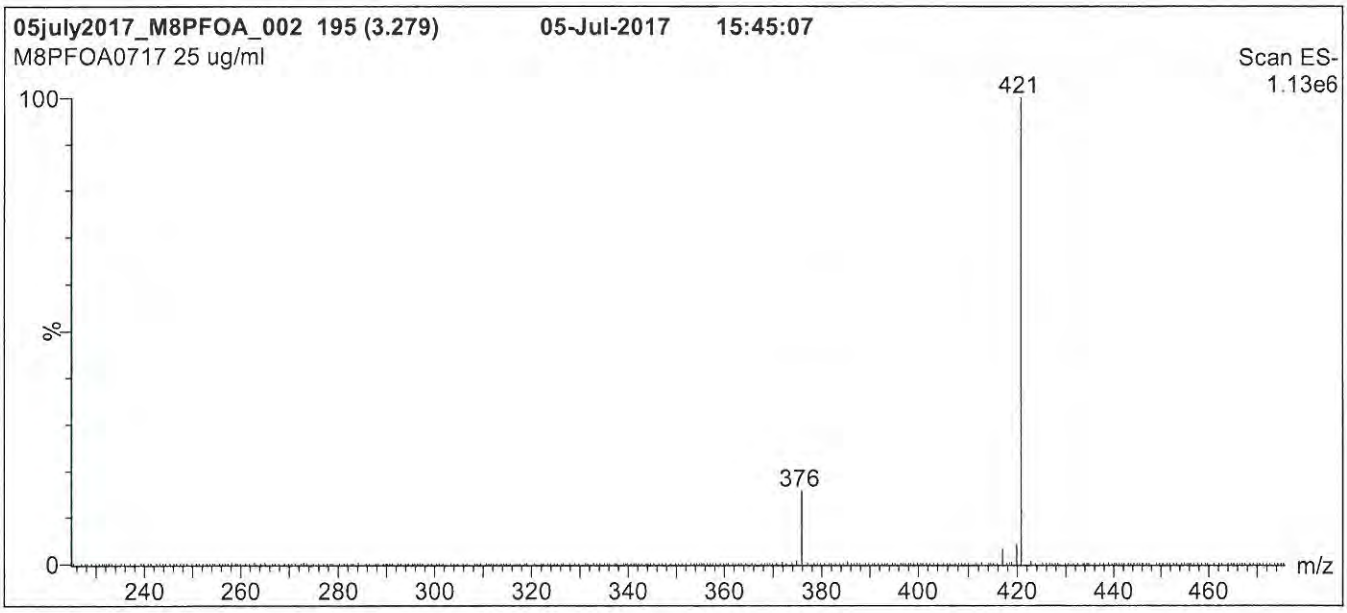
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18F2236

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

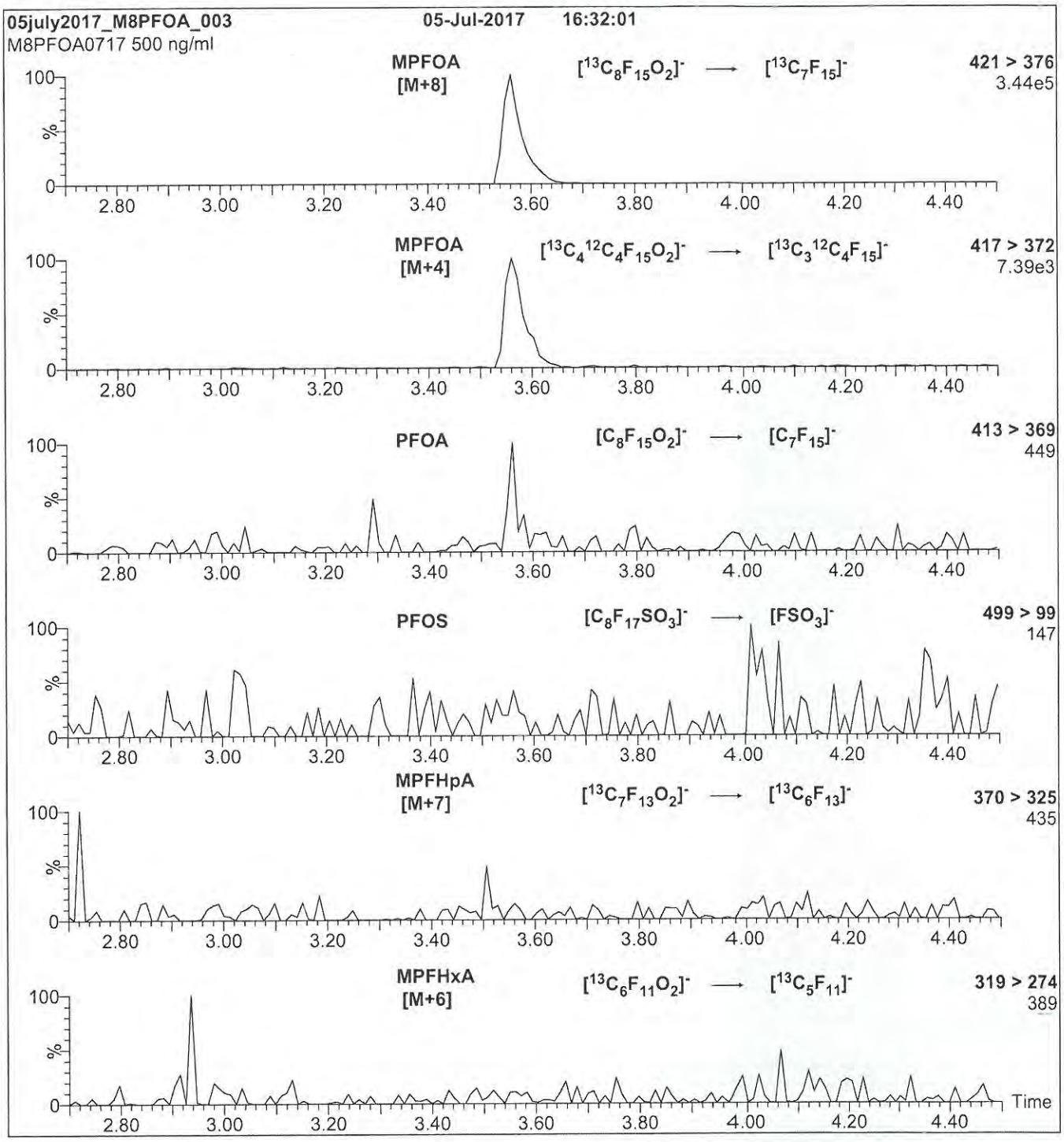
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

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"A1-MW-05-SA2","537 MOD","RES","1803615-02","Vista","376-06-
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EtFOSAA","96.0","%R","","","CRDL","","IS","96.0","","","CRDL","",""
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"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","375-85-
9","PFHpA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","355-46-
4","PFHxS","0.0353","ug/L","","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","335-67-
1","PFOA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","375-95-
1","PFNA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","1763-23-
1","PFOS","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","335-76-
2","PFDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","2355-31-
9","NMeFOSAA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","2991-50-
6","NEtFOSAA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","2058-94-
8","PFUnA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","307-55-
1","PFDoA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","72629-94-
8","PFTrDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","376-06-
7","PFTeDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00876","CRDL","YES","0.00300"
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C3-PFBS","13C3-
PFBS","90.7","%R","","","CRDL","","IS","90.7","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFHxA","13C2-
PFHxA","89.5","%R","","","CRDL","","IS","89.5","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C4-PFHpA","13C4-
PFHpA","93.6","%R","","","CRDL","","IS","93.6","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","18O2-PFHxS","18O2-
PFHxS","91.3","%R","","","CRDL","","IS","91.3","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFOA","13C2-
PFOA","78.0","%R","","","CRDL","","IS","78.0","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C5-PFNA","13C5-
PFNA","76.1","%R","","","CRDL","","IS","76.1","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C8-PFOS","13C8-
PFOS","83.1","%R","","","CRDL","","IS","83.1","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFDA","13C2-
PFDA","69.2","%R","","","CRDL","","IS","69.2","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","d3-MeFOSAA","d3-
MeFOSAA","93.8","%R","","","CRDL","","IS","93.8","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","d5-EtFOSAA","d5-
EtFOSAA","98.1","%R","","","CRDL","","IS","98.1","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFUnA","13C2-
PFUnA","68.0","%R","","","CRDL","","IS","68.0","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFDoA","13C2-
PFDoA","90.8","%R","","","CRDL","","IS","90.8","","","CRDL","",""
"A1-MW-49-SA2","537 MOD","RES","1803615-03","Vista","13C2-PFTeDA","13C2-

PFTeDA","102","%R","","","CRDL","","IS","102","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","375-73-
5","PFBS","0.0250","ug/L","","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","307-24-
4","PFHxA","0.0806","ug/L","","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","375-85-9","PFHpA","0.00474","ug/L","J,
Q","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","355-46-
4","PFHxS","0.0367","ug/L","","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","335-67-
1","PFOA","0.00947","ug/L","","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","375-95-
1","PFNA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","1763-23-
1","PFOS","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","335-76-
2","PFDA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","2355-31-
9","NMeFOSAA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","2991-50-
6","NEtFOSAA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","2058-94-
8","PFUnA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","307-55-
1","PFDoA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","72629-94-
8","PFTrDA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","376-06-
7","PFTeDA","0.00446","ug/L","U","0.00446","CRDL","","TRG","","","0.00894","CRDL","YES","0.00306"
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C3-PFBS","13C3-
PFBS","82.2","%R","","","CRDL","","IS","82.2","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFHxA","13C2-
PFHxA","86.5","%R","","","CRDL","","IS","86.5","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C4-PFHpA","13C4-
PFHpA","96.2","%R","","","CRDL","","IS","96.2","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","18O2-PFHxS","18O2-
PFHxS","80.4","%R","","","CRDL","","IS","80.4","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFOA","13C2-
PFOA","79.5","%R","","","CRDL","","IS","79.5","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C5-PFNA","13C5-
PFNA","72.7","%R","","","CRDL","","IS","72.7","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C8-PFOS","13C8-
PFOS","90.9","%R","","","CRDL","","IS","90.9","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFDA","13C2-
PFDA","64.5","%R","","","CRDL","","IS","64.5","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","d3-MeFOSAA","d3-
MeFOSAA","102","%R","","","CRDL","","IS","102","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","d5-EtFOSAA","d5-
EtFOSAA","113","%R","","","CRDL","","IS","113","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFUnA","13C2-
PFUnA","71.3","%R","","","CRDL","","IS","71.3","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFDoA","13C2-
PFDoA","93.6","%R","","","CRDL","","IS","93.6","","","CRDL","",""
"A1-MW-50-SA2","537 MOD","RES","1803615-04","Vista","13C2-PFTeDA","13C2-

PFTeDA","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","375-73-
5","PFBS","0.0264","ug/L","","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","307-24-
4","PFHxA","0.0829","ug/L","","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","375-85-
9","PFHpA","0.00494","ug/L","J","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","355-46-
4","PFHxS","0.0355","ug/L","","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","335-67-
1","PFOA","0.00878","ug/L","","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","375-95-
1","PFNA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","1763-23-
1","PFOS","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","335-76-
2","PFDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","2355-31-
9","NMeFOSAA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","2991-50-
6","NEtFOSAA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","2058-94-
8","PFUnA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","307-55-
1","PFDoA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","72629-94-
8","PFTrDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","376-06-
7","PFTeDA","0.00439","ug/L","U","0.00439","CRDL","","TRG","","","0.00874","CRDL","YES","0.00299"
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C3-PFBS","13C3-
PFBS","80.4","%R","","","CRDL","","IS","80.4","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFHxA","13C2-
PFHxA","77.3","%R","","","CRDL","","IS","77.3","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C4-PFHpA","13C4-
PFHpA","83.4","%R","","","CRDL","","IS","83.4","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","18O2-PFHxS","18O2-
PFHxS","83.2","%R","","","CRDL","","IS","83.2","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFOA","13C2-
PFOA","74.1","%R","","","CRDL","","IS","74.1","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C5-PFNA","13C5-
PFNA","70.3","%R","","","CRDL","","IS","70.3","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C8-PFOS","13C8-
PFOS","80.0","%R","","","CRDL","","IS","80.0","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFDA","13C2-
PFDA","60.4","%R","","","CRDL","","IS","60.4","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","d3-MeFOSAA","d3-
MeFOSAA","75.1","%R","","","CRDL","","IS","75.1","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","d5-EtFOSAA","d5-
EtFOSAA","86.8","%R","","","CRDL","","IS","86.8","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFUnA","13C2-
PFUnA","61.1","%R","","","CRDL","","IS","61.1","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFDoA","13C2-
PFDoA","78.6","%R","","","CRDL","","IS","78.6","","","CRDL","",""
"A1-MW-50-SA2D","537 MOD","RES","1803615-05","Vista","13C2-PFTeDA","13C2-

PFTeDA","81.5","%R","","","CRDL","","IS","81.5","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","375-73-
5","PFBS","0.0663","ug/L","","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","307-24-
4","PFHxA","0.180","ug/L","","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","375-85-
9","PFHpA","0.0139","ug/L","","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","355-46-
4","PFHxS","0.0914","ug/L","","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","335-67-
1","PFOA","0.0186","ug/L","","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","375-95-
1","PFNA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","1763-23-
1","PFOS","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","335-76-
2","PFDA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","2355-31-
9","NMeFOSAA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","2991-50-
6","NEtFOSAA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","2058-94-
8","PFUnA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","307-55-
1","PFDoA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","72629-94-
8","PFTrDA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","376-06-
7","PFTeDA","0.00427","ug/L","U","0.00427","CRDL","","TRG","","","0.00856","CRDL","YES","0.00293"
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C3-PFBS","13C3-
PFBS","90.4","%R","","","CRDL","","IS","90.4","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFHxA","13C2-
PFHxA","86.4","%R","","","CRDL","","IS","86.4","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C4-PFHpA","13C4-
PFHpA","90.1","%R","","","CRDL","","IS","90.1","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","18O2-PFHxS","18O2-
PFHxS","90.8","%R","","","CRDL","","IS","90.8","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFOA","13C2-
PFOA","87.3","%R","","","CRDL","","IS","87.3","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C5-PFNA","13C5-
PFNA","79.9","%R","","","CRDL","","IS","79.9","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C8-PFOS","13C8-
PFOS","89.6","%R","","","CRDL","","IS","89.6","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFDA","13C2-
PFDA","74.3","%R","","","CRDL","","IS","74.3","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","d3-MeFOSAA","d3-
MeFOSAA","109","%R","","","CRDL","","IS","109","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","d5-EtFOSAA","d5-
EtFOSAA","113","%R","","","CRDL","","IS","113","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFUnA","13C2-
PFUnA","72.0","%R","","","CRDL","","IS","72.0","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFDoA","13C2-
PFDoA","98.2","%R","","","CRDL","","IS","98.2","","","CRDL","",""
"A1-MW-51-SA2","537 MOD","RES","1803615-06","Vista","13C2-PFTeDA","13C2-

PFTeDA","103","%R","","","CRDL","","IS","103","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","375-73-
5","PFBS","0.167","ug/L","","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","307-24-
4","PFHxA","0.466","ug/L","","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","375-85-
9","PFHpA","0.0204","ug/L","","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","355-46-
4","PFHxS","0.106","ug/L","","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","335-67-
1","PFOA","0.0270","ug/L","","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","375-95-
1","PFNA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","1763-23-
1","PFOS","0.00356","ug/L","J","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","335-76-
2","PFDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","2355-31-
9","NMeFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","2991-50-
6","NEtFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","2058-94-
8","PFUnA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","307-55-
1","PFDoA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","72629-94-
8","PFTrDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","376-06-
7","PFTeDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00872","CRDL","YES","0.00299"
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C3-PFBS","13C3-
PFBS","82.5","%R","","","CRDL","","IS","82.5","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFHxA","13C2-
PFHxA","78.4","%R","","","CRDL","","IS","78.4","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C4-PFHpA","13C4-
PFHpA","97.8","%R","","","CRDL","","IS","97.8","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","18O2-PFHxS","18O2-
PFHxS","82.1","%R","","","CRDL","","IS","82.1","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFOA","13C2-
PFOA","79.6","%R","","","CRDL","","IS","79.6","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C5-PFNA","13C5-
PFNA","72.0","%R","","","CRDL","","IS","72.0","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C8-PFOS","13C8-
PFOS","84.6","%R","","","CRDL","","IS","84.6","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFDA","13C2-
PFDA","64.3","%R","","","CRDL","","IS","64.3","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","d3-MeFOSAA","d3-
MeFOSAA","82.7","%R","","","CRDL","","IS","82.7","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","d5-EtFOSAA","d5-
EtFOSAA","89.3","%R","","","CRDL","","IS","89.3","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFUnA","13C2-
PFUnA","66.3","%R","","","CRDL","","IS","66.3","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFDoA","13C2-
PFDoA","88.6","%R","","","CRDL","","IS","88.6","","","CRDL","",""
"A1-MW-52-SA2","537 MOD","RES","1803615-07","Vista","13C2-PFTeDA","13C2-

PFTeDA","91.6","%R","","","CRDL","","IS","91.6","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","375-73-
5","PFBS","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","307-24-
4","PFHxA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","375-85-
9","PFHpA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","355-46-
4","PFHxS","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","335-67-
1","PFOA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","375-95-
1","PFNA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","1763-23-
1","PFOS","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","335-76-
2","PFDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","2355-31-
9","NMeFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","2991-50-
6","NEtFOSAA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","2058-94-
8","PFUnA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","307-55-
1","PFDoA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","72629-94-
8","PFTrDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","376-06-
7","PFTeDA","0.00435","ug/L","U","0.00435","CRDL","","TRG","","","0.00869","CRDL","YES","0.00298"
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C3-PFBS","13C3-
PFBS","78.1","%R","","","CRDL","","IS","78.1","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFHxA","13C2-
PFHxA","71.7","%R","","","CRDL","","IS","71.7","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C4-PFHpA","13C4-
PFHpA","71.6","%R","","","CRDL","","IS","71.6","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","18O2-PFHxS","18O2-
PFHxS","80.9","%R","","","CRDL","","IS","80.9","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFOA","13C2-
PFOA","69.1","%R","","","CRDL","","IS","69.1","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C5-PFNA","13C5-
PFNA","63.1","%R","","","CRDL","","IS","63.1","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C8-PFOS","13C8-
PFOS","72.9","%R","","","CRDL","","IS","72.9","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFDA","13C2-
PFDA","55.9","%R","","","CRDL","","IS","55.9","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","d3-MeFOSAA","d3-
MeFOSAA","61.2","%R","","","CRDL","","IS","61.2","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","d5-EtFOSAA","d5-
EtFOSAA","71.0","%R","","","CRDL","","IS","71.0","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFUnA","13C2-
PFUnA","55.8","%R","","","CRDL","","IS","55.8","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFDoA","13C2-
PFDoA","74.1","%R","","","CRDL","","IS","74.1","","","CRDL","",""
"FRB-20181112","537 MOD","RES","1803615-08","Vista","13C2-PFTeDA","13C2-

PFTeDA","68.3","%R","","","CRDL","","IS","68.3","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","375-73-
5","PFBS","0.0338","ug/L","","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","307-24-
4","PFHxA","0.103","ug/L","","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","375-85-
9","PFHpA","0.00548","ug/L","J","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","355-46-
4","PFHxS","0.0277","ug/L","","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","335-67-
1","PFOA","0.0144","ug/L","","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","375-95-
1","PFNA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","1763-23-1","PFOS","0.00321","ug/L","J,
Q","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","335-76-
2","PFDA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","2355-31-
9","NMeFOSAA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","2991-50-
6","NEtFOSAA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","2058-94-
8","PFUnA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","307-55-
1","PFDoA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","72629-94-
8","PFTrDA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","376-06-
7","PFTeDA","0.00442","ug/L","U","0.00442","CRDL","","TRG","","","0.00884","CRDL","YES","0.00303"
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C3-PFBS","13C3-
PFBS","87.2","%R","","","CRDL","","IS","87.2","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFHxA","13C2-
PFHxA","86.9","%R","","","CRDL","","IS","86.9","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C4-PFHpA","13C4-
PFHpA","89.2","%R","","","CRDL","","IS","89.2","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","18O2-PFHxS","18O2-
PFHxS","88.6","%R","","","CRDL","","IS","88.6","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFOA","13C2-
PFOA","78.2","%R","","","CRDL","","IS","78.2","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C5-PFNA","13C5-
PFNA","76.3","%R","","","CRDL","","IS","76.3","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C8-PFOS","13C8-
PFOS","83.4","%R","","","CRDL","","IS","83.4","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFDA","13C2-
PFDA","67.4","%R","","","CRDL","","IS","67.4","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","d3-MeFOSAA","d3-
MeFOSAA","87.5","%R","","","CRDL","","IS","87.5","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","d5-EtFOSAA","d5-
EtFOSAA","88.2","%R","","","CRDL","","IS","88.2","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFUnA","13C2-
PFUnA","70.3","%R","","","CRDL","","IS","70.3","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFDoA","13C2-
PFDoA","77.7","%R","","","CRDL","","IS","77.7","","","CRDL","",""
"A1-PZ-19-SA2","537 MOD","RES","1803615-09","Vista","13C2-PFTeDA","13C2-

PFTeDA","92.6","%R","","","CRDL","","IS","92.6","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","375-73-
5","PFBS","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","307-24-
4","PFHxA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","375-85-
9","PFHpA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","355-46-
4","PFHxS","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","335-67-
1","PFOA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","375-95-
1","PFNA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","1763-23-
1","PFOS","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","335-76-
2","PFDA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","2355-31-
9","NMeFOSAA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","2991-50-
6","NEtFOSAA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","2058-94-
8","PFUnA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","307-55-
1","PFDoA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","72629-94-
8","PFTrDA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","376-06-
7","PFTeDA","0.00400","ug/L","U","0.00400","CRDL","","TRG","","","0.00800","CRDL","YES","0.00274"
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C3-PFBS","13C3-
PFBS","80.2","%R","","","CRDL","","IS","80.2","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFHxA","13C2-
PFHxA","79.8","%R","","","CRDL","","IS","79.8","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C4-PFHpA","13C4-
PFHpA","79.6","%R","","","CRDL","","IS","79.6","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","18O2-PFHxS","18O2-
PFHxS","81.2","%R","","","CRDL","","IS","81.2","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFOA","13C2-
PFOA","72.1","%R","","","CRDL","","IS","72.1","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C5-PFNA","13C5-
PFNA","68.8","%R","","","CRDL","","IS","68.8","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C8-PFOS","13C8-
PFOS","82.9","%R","","","CRDL","","IS","82.9","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFDA","13C2-
PFDA","62.6","%R","","","CRDL","","IS","62.6","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","d3-MeFOSAA","d3-
MeFOSAA","61.1","%R","","","CRDL","","IS","61.1","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","d5-EtFOSAA","d5-
EtFOSAA","67.4","%R","","","CRDL","","IS","67.4","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFUnA","13C2-
PFUnA","63.1","%R","","","CRDL","","IS","63.1","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFDoA","13C2-
PFDoA","64.7","%R","","","CRDL","","IS","64.7","","","CRDL","",""
"B8K0091-BLK1","537 MOD","RES","B8K0091-BLK1","Vista","13C2-PFTeDA","13C2-

PFTeDA","71.1","%R","","","CRDL","","IS","71.1","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","375-73-
5","PFBS","0.0900","ug/L","","0.00400","CRDL","","SPK","112","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","307-24-
4","PFHxA","0.0984","ug/L","","0.00400","CRDL","","SPK","123","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","375-85-
9","PFHpA","0.0962","ug/L","","0.00400","CRDL","","SPK","120","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","355-46-
4","PFHxS","0.0843","ug/L","","0.00400","CRDL","","SPK","105","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","335-67-
1","PFOA","0.0949","ug/L","","0.00400","CRDL","","SPK","119","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","375-95-
1","PFNA","0.0931","ug/L","","0.00400","CRDL","","SPK","116","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","1763-23-
1","PFOS","0.0864","ug/L","","0.00400","CRDL","","SPK","108","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","335-76-
2","PFDA","0.0982","ug/L","","0.00400","CRDL","","SPK","123","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","2355-31-
9","NMeFOSAA","0.0890","ug/L","","0.00400","CRDL","","SPK","111","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","2991-50-
6","NEtFOSAA","0.0854","ug/L","","0.00400","CRDL","","SPK","107","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","2058-94-
8","PFUnA","0.0949","ug/L","","0.00400","CRDL","","SPK","119","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","307-55-
1","PFDoA","0.0934","ug/L","","0.00400","CRDL","","SPK","117","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","72629-94-
8","PFTrDA","0.0948","ug/L","","0.00400","CRDL","","SPK","119","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","376-06-
7","PFTeDA","0.0916","ug/L","","0.00400","CRDL","","SPK","114","","0.00800","CRDL","YES","0.00274"
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C3-PFBS","13C3-
PFBS","76.3","%R","","","CRDL","","IS","76.3","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFHxA","13C2-
PFHxA","70.1","%R","","","CRDL","","IS","70.1","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C4-PFHpA","13C4-
PFHpA","73.9","%R","","","CRDL","","IS","73.9","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","18O2-PFHxS","18O2-
PFHxS","77.7","%R","","","CRDL","","IS","77.7","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFOA","13C2-
PFOA","65.2","%R","","","CRDL","","IS","65.2","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C5-PFNA","13C5-
PFNA","59.2","%R","","","CRDL","","IS","59.2","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C8-PFOS","13C8-
PFOS","70.7","%R","","","CRDL","","IS","70.7","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFDA","13C2-
PFDA","57.3","%R","","","CRDL","","IS","57.3","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","d3-MeFOSAA","d3-
MeFOSAA","51.7","%R","","","CRDL","","IS","51.7","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","d5-EtFOSAA","d5-
EtFOSAA","53.2","%R","","","CRDL","","IS","53.2","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFUnA","13C2-
PFUnA","52.1","%R","","","CRDL","","IS","52.1","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFDoA","13C2-
PFDoA","56.5","%R","","","CRDL","","IS","56.5","","","CRDL","",""
"B8K0091-BS1","537 MOD","RES","B8K0091-BS1","Vista","13C2-PFTeDA","13C2-

PFTeDA","57.3","%R","","","CRDL","","IS","57.3","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","375-73-
5","PFBS","0.126","ug/L","","0.00435","CRDL","","SPK","116","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","307-24-
4","PFHxA","0.183","ug/L","","0.00435","CRDL","","SPK","118","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","375-85-
9","PFHpA","0.101","ug/L","","0.00435","CRDL","","SPK","111","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","355-46-
4","PFHxS","0.120","ug/L","","0.00435","CRDL","","SPK","96.0","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","335-67-
1","PFOA","0.112","ug/L","","0.00435","CRDL","","SPK","118","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","375-95-
1","PFNA","0.0949","ug/L","","0.00435","CRDL","","SPK","109","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","1763-23-
1","PFOS","0.0954","ug/L","","0.00435","CRDL","","SPK","110","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","335-76-
2","PFDA","0.0989","ug/L","","0.00435","CRDL","","SPK","114","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","2355-31-
9","NMeFOSAA","0.0958","ug/L","","0.00435","CRDL","","SPK","110","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","2991-50-
6","NEtFOSAA","0.0834","ug/L","","0.00435","CRDL","","SPK","96.2","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","2058-94-
8","PFUnA","0.0938","ug/L","","0.00435","CRDL","","SPK","108","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","307-55-
1","PFDoA","0.0913","ug/L","","0.00435","CRDL","","SPK","105","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","72629-94-
8","PFTrDA","0.105","ug/L","","0.00435","CRDL","","SPK","122","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","376-06-
7","PFTeDA","0.0904","ug/L","","0.00435","CRDL","","SPK","104","","0.00867","CRDL","YES","0.00297"
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C3-PFBS","13C3-
PFBS","72.7","%R","","","CRDL","","IS","72.7","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFHxA","13C2-
PFHxA","76.2","%R","","","CRDL","","IS","76.2","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C4-PFHpA","13C4-
PFHpA","78.0","%R","","","CRDL","","IS","78.0","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","18O2-PFHxS","18O2-
PFHxS","79.0","%R","","","CRDL","","IS","79.0","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFOA","13C2-
PFOA","70.4","%R","","","CRDL","","IS","70.4","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C5-PFNA","13C5-
PFNA","64.2","%R","","","CRDL","","IS","64.2","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C8-PFOS","13C8-
PFOS","78.3","%R","","","CRDL","","IS","78.3","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFDA","13C2-
PFDA","60.5","%R","","","CRDL","","IS","60.5","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","d3-MeFOSAA","d3-
MeFOSAA","65.0","%R","","","CRDL","","IS","65.0","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","d5-EtFOSAA","d5-
EtFOSAA","72.1","%R","","","CRDL","","IS","72.1","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFUnA","13C2-
PFUnA","57.2","%R","","","CRDL","","IS","57.2","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFDoA","13C2-
PFDoA","66.7","%R","","","CRDL","","IS","66.7","","","CRDL","",""
"A1-MW-50-SA2MS","537 MOD","RES","B8K0091-MS1","Vista","13C2-PFTeDA","13C2-

PFTeDA","71.9","%R","","","CRDL","","IS","71.9","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","375-73-
5","PFBS","0.112","ug/L","","0.00431","CRDL","","SPK","101","13.8","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","307-24-
4","PFHxA","0.166","ug/L","","0.00431","CRDL","","SPK","98.6","17.9","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","375-85-
9","PFHpA","0.0910","ug/L","","0.00431","CRDL","","SPK","100.0","10.4","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","355-46-
4","PFHxS","0.120","ug/L","","0.00431","CRDL","","SPK","96.9","0.933","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","335-67-
1","PFOA","0.110","ug/L","","0.00431","CRDL","","SPK","116","1.71","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","375-95-
1","PFNA","0.0867","ug/L","","0.00431","CRDL","","SPK","100","8.61","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","1763-23-
1","PFOS","0.0910","ug/L","","0.00431","CRDL","","SPK","105","4.65","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","335-76-
2","PFDA","0.0931","ug/L","","0.00431","CRDL","","SPK","108","5.41","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","2355-31-
9","NMeFOSAA","0.0932","ug/L","","0.00431","CRDL","","SPK","108","1.83","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","2991-50-
6","NEtFOSAA","0.0811","ug/L","","0.00431","CRDL","","SPK","94.0","2.31","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","2058-94-
8","PFUnA","0.0893","ug/L","","0.00431","CRDL","","SPK","103","4.74","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","307-55-
1","PFDoA","0.0847","ug/L","","0.00431","CRDL","","SPK","98.1","6.79","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","72629-94-
8","PFTrDA","0.0926","ug/L","","0.00431","CRDL","","SPK","107","13.1","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","376-06-
7","PFTeDA","0.0852","ug/L","","0.00431","CRDL","","SPK","98.7","5.23","0.00863","CRDL","YES","0.00295"
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C3-PFBS","13C3-
PFBS","88.8","%R","","","CRDL","","IS","88.8","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFHxA","13C2-
PFHxA","87.1","%R","","","CRDL","","IS","87.1","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C4-PFHpA","13C4-
PFHpA","108","%R","","","CRDL","","IS","108","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","18O2-PFHxS","18O2-
PFHxS","87.9","%R","","","CRDL","","IS","87.9","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFOA","13C2-
PFOA","78.8","%R","","","CRDL","","IS","78.8","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C5-PFNA","13C5-
PFNA","74.8","%R","","","CRDL","","IS","74.8","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C8-PFOS","13C8-
PFOS","83.3","%R","","","CRDL","","IS","83.3","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFDA","13C2-
PFDA","67.0","%R","","","CRDL","","IS","67.0","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","d3-MeFOSAA","d3-
MeFOSAA","76.2","%R","","","CRDL","","IS","76.2","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","d5-EtFOSAA","d5-
EtFOSAA","85.7","%R","","","CRDL","","IS","85.7","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFUnA","13C2-
PFUnA","69.1","%R","","","CRDL","","IS","69.1","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFDoA","13C2-
PFDoA","83.7","%R","","","CRDL","","IS","83.7","","","CRDL","",""
"A1-MW-50-SA2MSD","537 MOD","RES","B8K0091-MSD1","Vista","13C2-PFTeDA","13C2-

PFTeDA","88.8","%R","","","CRDL","","IS","88.8","","","CRDL","",""
"4663.3803","CTO 17F3803 Yuma","A1-MW-04-SA2","11/12/2018 11:40","AQ","1803615-01","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
01:17","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-05-SA2","11/12/2018 14:24","AQ","1803615-02","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
01:28","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-49-SA2","11/12/2018 08:32","AQ","1803615-03","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
01:39","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-50-SA2","11/12/2018 09:25","AQ","1803615-04","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
01:49","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-50-SA2D","11/12/2018 09:35","AQ","1803615-05","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
02:00","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-51-SA2","11/12/2018 10:46","AQ","1803615-06","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
02:10","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-52-SA2","11/12/2018 13:39","AQ","1803615-07","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
02:21","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","FRB-20181112","11/12/2018 14:50","AQ","1803615-08","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
02:32","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","A1-PZ-19-SA2","11/12/2018 12:43","AQ","1803615-09","","","","537
MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
02:42","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","11/13/2018
10:06","11/29/2018 00:00"
"4663.3803","CTO 17F3803 Yuma","B8K0091-BLK1","","AQ","B8K0091-BLK1","MB","","","537 MOD","Gen
Prep","RES","11/19/2018 13:30","11/20/2018
23:42","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","","11/29/2018
00:00"
"4663.3803","CTO 17F3803 Yuma","B8K0091-BS1","","AQ","B8K0091-BS1","LCS","","","537 MOD","Gen
Prep","RES","11/19/2018 13:30","11/20/2018
23:31","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","","11/29/2018
00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-50-SA2MS","11/19/2018 13:30","AQ","B8K0091-
MS1","MS","","","537 MOD","Gen Prep","RES","11/19/2018 13:30","11/20/2018
23:52","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","","11/29/2018
00:00"
"4663.3803","CTO 17F3803 Yuma","A1-MW-50-SA2MSD","11/19/2018 13:30","AQ","B8K0091-
MSD1","MSD","","","537 MOD","Gen Prep","RES","11/19/2018 13:30","11/21/2018
00:03","Vista","COA","","","1","","","","","B8K0091","B8K0091","S8K0060","S8K0060","1803615","","11/29/2018
00:00"

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

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

July 24, 2018

SUBJECT: MCAS Yuma, CTO 17F3803, Data Validation

Dear Ms. Sudoko,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on July 6, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #42613:

SDG #	Fraction
280-110058-1, 280-110112-1 280-110226-1, 280-110291-1 280-110353-1, L1818881 L1819087, L1819352 L1819562, L1820050 L1820175, 1801024 1801037, 1801039 1801054, 1801071 1801084	Volatiles, 1,4-Dioxane, Wet Chemistry, Perfluorinated Alkyl Acids

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona; April 2018
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1; 2017
- USEPA National Functional Guidelines for Superfund Organic Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
Project Manager/Chemist

ADR/Stage 4 NEDD 80/20 **LDC #42613 (Tetra Tech-EC, Inc.-Irvine, CA / MCAS Yuma, CTO 17F3803)** **PO# 1153059**

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) VOA (8260B)		1,4-Diox (8270D -SIM)		PFAs (537)		Cl,SO_4 NO_3-N (9056A)		Fe II (3500 -Fe B)		pH (9040C)																							
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	280-110058-1	07/06/18	07/27/18	6	0	-	-	-	-	5	0	5	0	5	0																				
B	280-110112-1	07/06/18	07/27/18	7	0	-	-	-	-	6	0	6	0	6	0																				
C	280-110226-1	07/06/18	07/27/18	9	0	-	-	-	-	6	0	6	0	6	0																				
D	280-110291-1	07/06/18	07/27/18	7	0	-	-	-	-	6	0	6	0	6	0																				
E	280-110353-1	07/06/18	07/27/18	5	0	-	-	-	-	3	0	3	0	3	0																				
F	L1818881	07/06/18	07/27/18	-	-	5	0	-	-	-	-	-	-	-	-																				
G	L1819087	07/06/18	07/27/18	-	-	6	0	-	-	-	-	-	-	-	-																				
H	L1819352	07/06/18	07/27/18	-	-	5	0	-	-	-	-	-	-	-	-																				
I	L1819562	07/06/18	07/27/18	-	-	8	0	-	-	-	-	-	-	-	-																				
J	L1820050	07/06/18	07/27/18	-	-	4	0	-	-	-	-	-	-	-	-																				
K	L1820175	07/06/18	07/27/18	-	-	1	0	-	-	-	-	-	-	-	-																				
L	1801024	07/06/18	07/27/18	-	-	-	-	6	0	-	-	-	-	-	-																				
M	1801037	07/06/18	07/27/18	-	-	-	-	1	0	-	-	-	-	-	-																				
M	1801037	07/06/18	07/27/18	-	-	-	-	8	0	-	-	-	-	-	-																				
N	1801039	07/06/18	07/27/18	-	-	-	-	6	0	-	-	-	-	-	-																				
O	1801054	07/06/18	07/27/18	-	-	-	-	9	0	-	-	-	-	-	-																				
P	1801071	07/06/18	07/27/18	-	-	-	-	5	0	-	-	-	-	-	-																				
Q	1801084	07/06/18	07/27/18	-	-	-	-	1	0	-	-	-	-	-	-																				
Total	T/SM			34	0	29	0	36	0	26	0	26	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177

Shaded cells indicate Stage 4 validation (all other cells are ADR/Stage 2B validation).

Data Validation Report
MCAS Yuma, CTO 17F3803

SDGs: 280-110058-1, 280-110112-1, 280-110226-1, 280-110291-1, 280-110353-1, L1818881, L1819087, L1819352, L1819562, L1820050, L1820175, 1801024, 1801037, 1801039, 1801054, 1801071, and 1801084

Prepared for

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

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

July 24, 2018

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2B and Stage 4 data validation results for samples collected during the May 2018 sampling period. Data validation was performed in accordance with the Final Sampling and Analysis Plan (SAP) for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), a modified outline of the US EPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017), and a modified outline of the US EPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B
1,4-Dioxane by EPA SW 846 Method 8270D utilizing Selective Ion Monitoring (SIM)
Perfluorinated Alkyl Acids (PFAs) by EPA Method 537 Modified

Wet Chemistry:
Chloride, Nitrate as Nitrogen, and Sulfate by EPA SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

For samples reviewed by automated data review, the sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2B Automated Data Review outliers are presented in Enclosure I. DVRs for samples on which Stage 4 validation was performed are presented in Enclosure II. Validation for 1,4-Dioxane was performed manually and DVRs for Stage 2B and Stage 4 manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, initial and continuing calibrations, laboratory blanks, initial and continuing calibration blanks (ICB/CCBs), surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), ongoing precision recovery (OPR), internal standards, trip blanks, equipment blanks, field rinsate blanks, and field duplicates. Approximately 20 percent of samples were subjected to Stage 4 evaluation as indicated in Attachment 1, which comprises a review of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of the calibrations, ICB/CCBs, and internal standards, and all QC for 1,4-Dioxane, which were validated manually. Quality assurance (QA)/QC criteria specified in the SAP, DoD QSM, and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition with the following exceptions:

SDG/ Method	Sample	Compound	Finding	Criteria	Flag	A or P
280-110291-1/ 8260B	A1-MW-23-SA1	All compounds	A headspace of >6 mm was apparent in the sample containers.	There should be no headspace in the sample containers.	J (all detects) UJ (all non-detects)	A

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures upon receipt by the laboratory met validation criteria with the exception of one cooler in SDG L1818881 that was reported at 7.9°C. No data was qualified based on the cooler temperature.

All technical holding time requirements were met with the exception of twenty-five samples for pH and twenty-one samples for ferrous iron. Due to grossly exceeded holding times (e.g., >2x recommended holding time), 15 ferrous iron results were qualified as rejected (R). Additionally, the remainder of the data were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

II. Instrument Performance Check

A tune was performed at 12 hour intervals as required by the methods.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

All criteria for the initial calibration and initial calibration verifications of each method were met.

IV. Continuing Calibration

All criteria for the continuing calibration of each method were met with the exception of one continuing calibration for PFAs. Since the outlier was associated with laboratory QC and there were no associated client samples, no data were qualified.

V. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program with the exception of one blank for chloride and sulfate. The associated sample results were not detected or were significantly greater than the concentrations found in the blanks, therefore no data were qualified. The details are presented in Enclosure I.

No contaminant concentrations were detected in the initial or continuing calibration blanks with the following exceptions:

SDG/ Method	Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
280-110226-1/ 9056A	ICB/CCB	Nitrate as Nitrogen	0.04663 mg/L	A1-MW-42-SA1 A1-MW-54-SA1 A1-PZ-19-SA1 A1-MW-52-SA1 A1-MW-01-SA1 A1-MW-31-SA1
280-110291-1/ 9056A	ICB/CCB	Sulfate	0.2460 mg/L	A1-MW-14-SA1 A1-MW-23-SA1 A1-MW-55-SA1
280-110353-1/ 9056A	ICB/CCB	Chloride Sulfate	0.5385 mg/L 0.6554 mg/L	A1-MW-13-SA1 A1-MW-11-SA1 A1-MW-15-SA1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were not detected or were significantly greater than the concentrations found in the associated blanks.

VI. Field Blank Samples

Five trip blanks were collected and analyzed for VOCs. No contaminants were found.

One equipment blank was collected and analyzed for VOCs and PFAs. No contaminants were found.

Five field rinsate blanks were collected and analyzed for PFAs. No contaminants were found.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the exception of sample 16-HS-03-SA1 in SDG 280-110112-1 for VOCs. The associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosure I.

IX. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for 1,1-dichloroethene, two MS/MSD pairs for several PFAs, three MS/MSD pairs for chloride and sulfate, and three MS/MSD pairs for ferrous iron. The ferrous iron results in samples 16-HS-03-SA1 and A1-MW-31-SA1 were qualified as rejected (R) due to MS/MSD %Rs grossly outside QC limits (i.e., ≤ 30%). The remainder of the associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. No data were qualified where sample concentrations were significantly greater (>4x) than the spike amount. The details regarding the qualification of data are provided in Enclosures I and II.

X. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

XII. Laboratory Control Samples/Ongoing Precision Recovery

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Ongoing precision recovery (OPR) samples were analyzed as required by Method 537 Mod. Percent recoveries (%R) were within QC limits with the exception of two OPR for PFTrDA. No data were qualified due to high %Rs since the associated results were non-detected. The details are presented in Enclosures I and II.

XIII. Field Duplicate Samples

Two field duplicate pairs were collected and analyzed for all methods. All RPDs were within QC limits. RPDs were not calculated when sample results in one or both samples were less than 5X the limit of quantitation (LOQ). The field duplicate result comparisons are provided in Enclosures I and II.

XIV. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801024/ 537	A1-MW-51-SA1	^{13}C3-PFBS	247 (50-150)	PFBS	J (all detects)	P
1801024/ 537	A1-MW-51-SA1	^{13}C3-NEtFOSAA	151 (50-150)	NEtFOSAA	UJ (all non-detects)	P
1801037/ 537	A1-MW-18-SA1	^{13}C3-PFBS	170 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-08-SA1	^{13}C3-PFBS	187 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-19-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-37-SA1	^{13}C3-PFBS	228 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-37-SA1D	^{13}C3-PFBS	161 (50-150)	PFBS	J (all detects)	P

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801037/ 537	16-HS-03-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-09-SA1	^{13}C3-PFBS	153 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-06-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-13-SA1	^{13}C3-PFBS	419 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-11-SA1	^{13}C3-PFBS	271 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-14-SA1	^{13}C3-PFBS	527 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-15-SA1	^{13}C3-PFBS	235 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-25-SA1	^{13}C3-PFBS	428 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-42-SA1	^{13}C3-PFBS	310 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-54-SA1	^{13}C3-PFBS	175 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-53-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-PZ-19-SA1	^{13}C3-PFBS	182 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-52-SA1	^{13}C3-PFBS	211 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-01-SA1	^{13}C3-PFBS	192 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-01-SA1D	^{13}C3-PFBS	204 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-31-SA1	^{13}C3-PFBS	254 (50-150)	PFBS	J (all detects)	P
1801071/ 537	A1-MW-27-SA1	^{13}C3-PFBS	174 (50-150)	PFBS	J (all detects)	P

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801071/ 537	A1-MW-07-SA1	$^{13}C3$-PFBS	209 (50-150)	PFBS	J (all detects)	P
1801071/ 537	A1-MW-55-SA1	$^{13}C3$-PFBS	165 (50-150)	PFBS	UJ (all non-detects)	P

XV. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosures I and II.

XVI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to severe holding time exceedances and MS/MSD %Rs, data were qualified as rejected in fifteen samples.

Due to headspace, data were qualified as estimated in one sample.

Due to holding time exceedances, data were qualified as estimated in twenty-five samples.

Due to surrogate %R, data were qualified as estimated in one sample.

Due to MS/MSD %R and RPD, data were qualified as estimated in three samples.

Due to internal standard %R, data were qualified as estimated in twenty-five samples.

Due to results below the LOQ, data were qualified as estimated in twenty-six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
22-May-2018	TB-20180522	280-110058-1	TB	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1	1801024-01	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1DUP	280-110058-2DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1MS	280-110058-2MS	MS	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1MS	280-110058-2MS	MS	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1MSD	280-110058-2MSD	MSD	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1MSD	280-110058-2MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-50-SA1	1801024-02	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-50-SA1DUP	280-110058-3DUP	DUP	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-49-SA1	1801024-03	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-05-SA1	1801024-04	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	9056A	Stage 2B

N = Normal Sample
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
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

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
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

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
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

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
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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MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-55-SA1	1801071-02	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-23-SA1	1801071-03	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-07-SA1	1801071-04	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1DUP	280-110291-2DUP	DUP	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1MS	280-110291-2MS	MS	METHOD	9056A	Stage 2B

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DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-14-SA1MSD	280-110291-2MSD	MSD	METHOD	9056A	Stage 2B
30-May-2018	FRB-20180530	1801071-05	FRB	Gen Prep	537 MOD	Stage 2B
31-May-2018	TB-20180531	280-110353-1	TB	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1DUP	280-110353-3DUP	DUP	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	EB-20180531	1801084-01	EB	Gen Prep	537 MOD	Stage 2B
31-May-2018	EB-20180531	280-110353-5	EB	METHOD	8260B	Stage 2B
31-May-2018	16-HS-03-SA1MS	B8E0244-MS1	MS	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MS	B8E0244-MS2	MS	Gen Prep	537 MOD	Stage 2B
31-May-2018	16-HS-03-SA1MSD	B8E0244-MSD1	MSD	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MSD	B8E0244-MSD2	MSD	Gen Prep	537 MOD	Stage 2B

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Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110058-1

Method Category: EM

Method: 9040C **Matrix: AQ**

Sample ID: A1-MW-04-SA1 **Collected:** 5/22/2018 2:06:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-05-SA1 **Collected:** 5/22/2018 1:19:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-49-SA1 **Collected:** 5/22/2018 12:20:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-50-SA1 **Collected:** 5/22/2018 11:30:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-51-SA1 **Collected:** 5/22/2018 10:14:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A **Matrix: AQ**

Sample ID: A1-MW-49-SA1 **Collected:** 5/22/2018 12:20:00 PM **Analysis Type:** RE/TOT **Dilution:** 10

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	2.82	J	1.00	LOD	5.00	LOQ	mg/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110058-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-04-SA1** ***Collected:*** **5/22/2018 2:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0751	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-05-SA1** ***Collected:*** **5/22/2018 1:19:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0617	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-49-SA1** ***Collected:*** **5/22/2018 12:20:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	UJ	StoA

Sample ID: **A1-MW-50-SA1** ***Collected:*** **5/22/2018 11:30:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-51-SA1** ***Collected:*** **5/22/2018 10:14:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0563	J HF F1	0.0500	LOD	0.200	LOQ	mg/L	J	RI, Ms, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA1** ***Collected:*** **5/22/2018 11:30:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.643	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.903	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110058-1

Method Category: VOA

Method: 8260B **Matrix:** AQ

Sample ID: A1-MW-51-SA1 **Collected:** 5/22/2018 10:14:00 AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.629	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.571	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110112-1

Method Category: EM

Method: 9040C **Matrix:** AQ

Sample ID: 16-HS-03-SA1 **Collected:** 5/23/2018 2:19:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.2	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: 16-MW-08-SA1 **Collected:** 5/23/2018 11:09:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-18-SA1 **Collected:** 5/23/2018 9:00:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-19-SA1 **Collected:** 5/23/2018 12:03:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110112-1

Method Category: EM
Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM
Method: 9056A ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RE2/TOT ***Dilution:*** 50

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Sulfate	2120	F1	25.0	LOD	250	LOQ	mg/L	J	Ms

Method Category: GENCHEM
Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	Ms

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0403	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0215	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110112-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.166	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.800	U F1 F2	0.800	LOD	1.00	LOQ	ug/L	UJ	Ms, Surr
TETRACHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Surr
TRICHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Surr

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.669	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.452	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-19-SA1 ***Collected:*** 5/23/2018 12:03:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.424	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110112-1

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.624	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-37-SA1D ***Collected:*** 5/23/2018 1:26:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.652	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110226-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-01-SA1 ***Collected:*** 5/25/2018 1:56:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-31-SA1 ***Collected:*** 5/25/2018 2:49:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-42-SA1 ***Collected:*** 5/25/2018 7:56:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-52-SA1 ***Collected:*** 5/25/2018 1:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110226-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **9056A** ***Matrix:*** **AQ**

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RE/TOT** ***Dilution:*** **5**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLORIDE	500	F1	2.50	LOD	15.0	LOQ	mg/L	J	Ms

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	0.343	J	0.100	LOD	0.500	LOQ	mg/L	J	RI

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA1** ***Collected:*** **5/25/2018 1:56:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110226-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	Ms, StoA

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.198	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.353	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110226-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.298	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.415	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.507	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.627	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.269	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110291-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110291-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-25-SA1** ***Collected:*** **5/30/2018 9:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-27-SA1** ***Collected:*** **5/30/2018 8:18:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-55-SA1** ***Collected:*** **5/30/2018 10:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110291-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-23-SA1 ***Collected:*** 5/30/2018 11:10:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-25-SA1 ***Collected:*** 5/30/2018 9:12:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.123	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: A1-MW-27-SA1 ***Collected:*** 5/30/2018 8:18:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-55-SA1 ***Collected:*** 5/30/2018 10:16:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-07-SA1 ***Collected:*** 5/30/2018 12:06:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.405	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.797	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-14-SA1 ***Collected:*** 5/30/2018 1:38:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.898	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110291-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.876	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.800	U	0.800	LOD	1.00	LOQ	ug/L	UJ	Headspace
TETRACHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Headspace
TRICHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Headspace

Sample ID: **A1-MW-25-SA1** ***Collected:*** **5/30/2018 9:12:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.204	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.418	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110353-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/31/2018 8:24:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/31/2018 7:43:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110353-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/31/2018 8:24:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/31/2018 7:43:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
TRICHLOROETHENE	0.321	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

Reason Code Legend

Reason Code	*Description*
Headspace	Preservation
Mb	Method Blank Contamination
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
Preservation	Preservation
RI	Reporting Limit Trace Value
StoA	Sampling to Analysis Estimation
StoA	Sampling to Analysis Rejection
Surr	Surrogate/Tracer Recovery Lower Estimation

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801024

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-04-SA1** ***Collected:*** **5/22/2018 2:06:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00333	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI
PFOS	0.00161	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI

Sample ID: **A1-MW-05-SA1** ***Collected:*** **5/22/2018 1:19:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.000917	J	0.00525	LOD	0.00842	LOQ	ug/L	J	RI
PFHxS	0.00278	J	0.00525	LOD	0.00842	LOQ	ug/L	J	RI

Sample ID: **A1-MW-49-SA1** ***Collected:*** **5/22/2018 12:20:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.00627	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI

Sample ID: **A1-MW-51-SA1** ***Collected:*** **5/22/2018 10:14:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00521	U	0.00521	LOD	0.00836	LOQ	ug/L	UJ	Is
PFBS	0.0613		0.00521	LOD	0.00836	LOQ	ug/L	J	Is
PFOS	0.00303	J	0.00521	LOD	0.00836	LOQ	ug/L	J	RI

SDG: 1801037

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **16-HS-03-SA1** ***Collected:*** **5/23/2018 2:19:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.582		0.00500	LOD	0.00803	LOQ	ug/L	J	Is
PFHxS	0.150		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801037

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.0218		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms
PFHpA	0.198		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms, Ms

Sample ID: 16-MW-06-SA1 ***Collected:*** 5/23/2018 9:50:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.112		0.00563	LOD	0.00897	LOQ	ug/L	J	Is
PFOS	0.00227	J	0.00563	LOD	0.00897	LOQ	ug/L	J	RI

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	1.29		0.00543	LOD	0.00870	LOQ	ug/L	J	Is
PFNA	0.00102	J	0.00543	LOD	0.00870	LOQ	ug/L	J	RI

Sample ID: 16-MW-09-SA1 ***Collected:*** 5/23/2018 10:15:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.124		0.00543	LOD	0.00871	LOQ	ug/L	J	Is
PFDA	0.00440	J	0.00543	LOD	0.00871	LOQ	ug/L	J	RI
PFNA	0.00326	J	0.00543	LOD	0.00871	LOQ	ug/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0244		0.00553	LOD	0.00888	LOQ	ug/L	J	Is
PFOA	0.00187	J	0.00553	LOD	0.00888	LOQ	ug/L	J	RI
PFOS	0.00437	J	0.00553	LOD	0.00888	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801037

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-19-SA1** ***Collected:*** **5/23/2018 12:03:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0166		0.00530	LOD	0.00846	LOQ	ug/L	J	Is
PFDA	0.00727	J	0.00530	LOD	0.00846	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA1** ***Collected:*** **5/23/2018 1:16:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.230		0.00525	LOD	0.00839	LOQ	ug/L	J	Is
PFNA	0.00170	J	0.00525	LOD	0.00839	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA1D** ***Collected:*** **5/23/2018 1:26:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.252		0.00539	LOD	0.00862	LOQ	ug/L	J	Is
PFNA	0.00210	J	0.00539	LOD	0.00862	LOQ	ug/L	J	RI
PFUnA	0.00135	J	0.00539	LOD	0.00862	LOQ	ug/L	J	RI

SDG: 1801039

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/24/2018 8:51:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00359	J	0.00539	LOD	0.00860	LOQ	ug/L	J	RI
PFBS	0.109		0.00539	LOD	0.00860	LOQ	ug/L	J	Is

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/24/2018 7:44:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.318		0.00568	LOD	0.00912	LOQ	ug/L	J	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039, **Laboratory: Vista**

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

SDG: 1801039

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: A1-MW-14-SA1 ***Collected:*** 5/24/2018 10:05:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.118		0.00558	LOD	0.00893	LOQ	ug/L	J	Is

Sample ID: A1-MW-15-SA1 ***Collected:*** 5/24/2018 11:11:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.523		0.00558	LOD	0.00889	LOQ	ug/L	J	Is

Sample ID: A1-MW-25-SA1 ***Collected:*** 5/24/2018 2:18:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.355		0.00553	LOD	0.00889	LOQ	ug/L	J	Is

SDG: 1801054

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: A1-MW-01-SA1 ***Collected:*** 5/25/2018 1:56:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0524		0.00568	LOD	0.00907	LOQ	ug/L	J	Is
PFHpA	0.00225	J	0.00568	LOD	0.00907	LOQ	ug/L	J	RI

Sample ID: A1-MW-01-SA1D ***Collected:*** 5/25/2018 2:06:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0557		0.00534	LOD	0.00854	LOQ	ug/L	J	Is
PFHpA	0.00273	J	0.00534	LOD	0.00854	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039, **Laboratory: Vista**

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

SDG: 1801054

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0634		0.00553	LOD	0.00887	LOQ	ug/L	J	Is
PFHpA	0.00851	J	0.00553	LOD	0.00887	LOQ	ug/L	J	RI

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.292		0.00553	LOD	0.00887	LOQ	ug/L	J	Is
PFOS	0.00186	J	0.00553	LOD	0.00887	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.146		0.00543	LOD	0.00869	LOQ	ug/L	J	Is

Sample ID: **A1-MW-53-SA1** ***Collected:*** **5/25/2018 10:14:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.551		0.00548	LOD	0.00878	LOQ	ug/L	J	Is
PFOS	0.00188	J	0.00548	LOD	0.00878	LOQ	ug/L	J	RI

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.536		0.00558	LOD	0.00892	LOQ	ug/L	J	Is
PFOS	0.00652	J	0.00558	LOD	0.00892	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0152		0.00534	LOD	0.00852	LOQ	ug/L	J	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801054

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00326	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI
PFOA	0.00756	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI
PFOS	0.00115	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI

SDG: 1801071

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.112		0.00525	LOD	0.00840	LOQ	ug/L	J	Is

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00581	J	0.00548	LOD	0.00874	LOQ	ug/L	J	RI

Sample ID: **A1-MW-27-SA1** ***Collected:*** **5/30/2018 8:18:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0819		0.00534	LOD	0.00854	LOQ	ug/L	J	Is

Sample ID: **A1-MW-55-SA1** ***Collected:*** **5/30/2018 10:16:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.00548	U	0.00548	LOD	0.00875	LOQ	ug/L	UJ	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

Reason Code Legend

Reason Code	*Description*
Is	Internal Standard Estimation
Lcs	Laboratory Control Spike Upper Estimation
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
Ms	Matrix Spike Upper Estimation
RI	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Enclosure I

Stage 2B ADR Outliers

(Including Manual Review Outliers)

Quality Control
Outlier Reports

280-110058-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA1 (RES/TOT)	Sampling To Analysis	226.00	24.00	HOURS	J (all detects)
A1-MW-05-SA1 (RES/TOT)		319.25	24.00	HOURS	
A1-MW-49-SA1 (RES/TOT)		227.75	24.00	HOURS	
A1-MW-50-SA1 (RES/TOT)		228.25	24.00	HOURS	
A1-MW-50-SA1DUP (RES/TOT)		228.50	24.00	HOURS	
A1-MW-51-SA1 (RES/TOT)		229.25	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA1 (RES/TOT)	Sampling To Analysis	45.75	24.00	HOURS	J(all detects)
A1-MW-05-SA1 (RES/TOT)		46.50	24.00	HOURS	UJ(all non-detects)
A1-MW-49-SA1 (RES/TOT)		47.50	24.00	HOURS	
A1-MW-50-SA1 (RES/TOT)	Sampling To Analysis	48.25	24.00	HOURS	J(all detects)
A1-MW-51-SA1 (RES/TOT)		49.50	24.00	HOURS	R(all non-detects)
A1-MW-51-SA1DUP (RES/TOT)		49.50	24.00	HOURS	
A1-MW-51-SA1MS (RES/TOT)		49.50	24.00	HOURS	
A1-MW-51-SA1MSD (RES/TOT)		49.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-51-SA1MS A1-MW-51-SA1MSD (A1-MW-51-SA1)	Ferrous Iron	38	39	85.00-113.00	-	Ferrous Iron	J (all detects) UJ (all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-50-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.643 0.903	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-51-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.629 0.571	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: 9056A

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-49-SA1	NITRATE	J	2.82	5.00	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-04-SA1	Ferrous Iron	J HF	0.0751	0.200	LOQ	mg/L	J (all detects)
A1-MW-05-SA1	Ferrous Iron	J HF	0.0617	0.200	LOQ	mg/L	J (all detects)
A1-MW-51-SA1	Ferrous Iron	J HF F1	0.0563	0.200	LOQ	mg/L	J (all detects)

LDC #: 42613A1
SDG #: 280-110058-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/13/18
Page: 1 of 1
Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤20%
IV.	Continuing calibration	A	CCV≤20/60%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB=1.
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180522	280-110058-1	Water	05/22/18
2	A1-MW-51-SA1	280-110058-2	Water	05/22/18
3	A1-MW-50-SA1	280-110058-3	Water	05/22/18
4	A1-MW-49-SA1	280-110058-4	Water	05/22/18
5	A1-MW-05-SA1	280-110058-5	Water	05/22/18
6	A1-MW-04-SA1	280-110058-6	Water	05/22/18
7	A1-MW-51-SA1MS	280-110058-2MS	Water	05/22/18
8	A1-MW-51-SA1MSD	280-110058-2MSD	Water	05/22/18
9				
10				

Notes:

LDC #: 42613A6
SDG #: 280-110058-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: a
2nd Reviewer: KC

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	280-110058-2	Water	05/22/18
2	A1-MW-50-SA1	280-110058-3	Water	05/22/18
3	A1-MW-49-SA1	280-110058-4	Water	05/22/18
4	A1-MW-05-SA1	280-110058-5	Water	05/22/18
5	A1-MW-04-SA1	280-110058-6	Water	05/22/18
6	A1-MW-51-SA1MS	280-110058-2MS	Water	05/22/18
7	A1-MW-51-SA1MSD	280-110058-2MSD	Water	05/22/18
8	A1-MW-51-SA1DUP	280-110058-2DUP	Water	05/22/18
9	A1-MW-50-SA1DUP	280-110058-3DUP	Water	05/22/18
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 42613A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KW

All circled methods are applicable to each sample.

Sample ID	Parameter
1-5	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe3+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC:6,7	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
8	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
9	(pH) TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

Quality Control
Outlier Reports

280-110112-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA1 (RES/TOT)	Sampling To Analysis	201.25	24.00	HOURS	J (all detects)
16-MW-08-SA1 (RES/TOT)		204.25	24.00	HOURS	
A1-MW-18-SA1 (RES/TOT)		206.25	24.00	HOURS	
A1-MW-19-SA1 (RES/TOT)		203.25	24.00	HOURS	
A1-MW-37-SA1 (RES/TOT)		202.25	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-18-SA1 (RES/TOT)	Sampling To Analysis	26.85	24.00	HOURS	J(all detects) UJ(all non-detects)

Surrogate Outlier Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**
Matrix: **AQ**

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
16-HS-03-SA1	TOLUENE-D8	75	89.00-112.00	All Target Analytes	J (all detects) UJ (all non-detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	Ferrous Iron	1	0	85.00-113.00	-	Ferrous Iron	J (all detects) R (all non-detects)

Method: 8260B
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	1,1-DICHLOROETHENE	56	33	71.00-131.00	53 (20.00)	1,1-DICHLOROETHENE	J(all detects) UJ(all non-detects)

Method: 9056A
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MSD (16-HS-03-SA1)	Sulfate	-	86	87.00-112.00	-	Sulfate	J(all detects) UJ(all non-detects)
A1-MW-18-SA1MS A1-MW-18-SA1MSD (A1-MW-18-SA1)	CHLORIDE Sulfate	50 73	45 72	87.00-111.00 87.00-112.00	- -	CHLORIDE Sulfate	No Qual, >4x

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-08-SA1	TETRACHLOROETHENE	J	0.669	1.00	LOQ	ug/L	J (all detects)
A1-MW-18-SA1	1,1-DICHLOROETHENE	J	0.452	1.00	LOQ	ug/L	J (all detects)
A1-MW-19-SA1	TRICHLOROETHENE	J	0.424	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA1	TRICHLOROETHENE	J	0.624	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA1D	TRICHLOROETHENE	J	0.652	1.00	LOQ	ug/L	J (all detects)

Method: **SM3500 Fe B D**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-08-SA1	Ferrous Iron	J HF	0.0403	0.200	LOQ	mg/L	J (all detects)
A1-MW-18-SA1	Ferrous Iron	J HF	0.0215	0.200	LOQ	mg/L	J (all detects)
A1-MW-37-SA1	Ferrous Iron	J HF	0.166	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA1	A1-MW-37-SA1D			
TRICHLOROETHENE	0.624	0.652	NC	30.00	No Qualifiers Applied

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Quality Control
Outlier Reports

280-110226-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA1 (RES/TOT)	Sampling To Analysis	154.50	24.00	HOURS	J (all detects)
A1-MW-31-SA1 (RES/TOT)		154.00	24.00	HOURS	
A1-MW-42-SA1 (RES/TOT)		160.25	24.00	HOURS	
A1-MW-52-SA1 (RES/TOT)		155.50	24.00	HOURS	
A1-MW-54-SA1 (RES/TOT)		159.25	24.00	HOURS	
A1-PZ-19-SA1 (RES/TOT)		156.50	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA1 (RES/TOT)	Sampling To Analysis	452.25	24.00	HOURS	J(all detects)
A1-MW-31-SA1 (RES/TOT)		451.25	24.00	HOURS	R(all non-detects)
A1-MW-31-SA1DUP (RES/TOT)		451.25	24.00	HOURS	
A1-MW-31-SA1DUP (RE/TOT)		452.25	24.00	HOURS	
A1-MW-31-SA1MS (RES/TOT)		451.25	24.00	HOURS	
A1-MW-31-SA1MS (RE/TOT)		452.25	24.00	HOURS	
A1-MW-31-SA1MSD (RES/TOT)		451.50	24.00	HOURS	
A1-MW-31-SA1MSD (RE/TOT)		452.25	24.00	HOURS	
A1-MW-42-SA1 (RES/TOT)		458.25	24.00	HOURS	
A1-MW-52-SA1 (RES/TOT)		453.25	24.00	HOURS	
A1-MW-54-SA1 (RES/TOT)		457.00	24.00	HOURS	
A1-PZ-19-SA1 (RES/TOT)		454.25	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9056A
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-52-SA1MS A1-MW-52-SA1MSD (A1-MW-52-SA1)	CHLORIDE Sulfate	- 75	84 70	87.00-111.00 87.00-112.00	- -	CHLORIDE Sulfate**	J (all detects) ** No Qual, >4x

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-31-SA1MS A1-MW-31-SA1MSD (A1-MW-31-SA1)	Ferrous Iron	21	21	85.00-113.00	-	Ferrous Iron	J(all detects) R(all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-31-SA1	TRICHLOROETHENE	J	0.353	1.00	LOQ	ug/L	J (all detects)
A1-MW-42-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.298 0.415	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-52-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.507 0.627	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-PZ-19-SA1	TRICHLOROETHENE	J	0.269	1.00	LOQ	ug/L	J (all detects)

Method: 9056A

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-54-SA1	NITRATE	J	0.343	0.500	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-PZ-19-SA1	Ferrous Iron	J HF	0.198	0.200	LOQ	mg/L	J (all detects)

LDC #: 42613C1
SDG #: 280-110226-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/19/18
Page: 1 of 1
Reviewer: 1
2nd Reviewer: RW

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/20%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 9
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	ND	D = 6+7
XI.	Internal standards	A	(MS/MSD - FSaut)
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	280-110226-1	Water	05/25/18
2	A1-MW-54-SA1	280-110226-2	Water	05/25/18
3	A1-MW-53-SA1	280-110226-3	Water	05/25/18
4	A1-PZ-19-SA1	280-110226-4	Water	05/25/18
5	A1-MW-52-SA1	280-110226-5	Water	05/25/18
6	A1-MW-01-SA1	280-110226-6	Water	05/25/18
7	A1-MW-01-SA1D	280-110226-7	Water	05/25/18
8	A1-MW-31-SA1	280-110226-8	Water	05/25/18
9	TB-20180525	280-110226-12	Water	05/25/18
10	A1-MW-53-SA1MS	280-110226-3MS	Water	05/25/18
11	A1-MW-53-SA1MSD	280-110226-3MSD	Water	05/25/18
12				
13				

LDC #: 42613C6
SDG #: 280-110226-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: G
2nd Reviewer: KW

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B)
pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/-	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	ASW	
V	Field blanks	-	
VI.	Matrix Spike/Matrix Spike Duplicates	N	7/8:SO4 7/x
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	-	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	280-110226-1	Water	05/25/18
2	A1-MW-54-SA1	280-110226-2	Water	05/25/18
3	A1-PZ-19-SA1	280-110226-4	Water	05/25/18
4	A1-MW-52-SA1	280-110226-5	Water	05/25/18
5	A1-MW-01-SA1	280-110226-6	Water	05/25/18
6	A1-MW-31-SA1	280-110226-8	Water	05/25/18
7	A1-MW-52-SA1MS	280-110226-5MS	Water	05/25/18
8	A1-MW-52-SA1MSD	280-110226-5MSD	Water	05/25/18
9	A1-MW-52-SA1DUP	280-110226-5DUP	Water	05/25/18
10	A1-MW-31-SA1MS1	280-110226-8MS1	Water	05/25/18
11	A1-MW-31-SA1MSD1	280-110226-8MSD1	Water	05/25/18
12	A1-MW-31-SA1DUP1	280-110226-8DUP2	Water	05/25/18
13	A1-MW-31-SA1MS2	280-110226-8MS2	Water	05/25/18
14	A1-MW-31-SA1MSD2	280-110226-8MSD2	Water	05/25/18
15	A1-MW-31-SA1DUP2	280-110226-8DUP2	Water	05/25/18
16				

Notes:

LDC #: 42613C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
10,11	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
12	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
13,14	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
15	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613C6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** All

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No qual (>5x)								
NO3-N		0.04663	0.23315									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-110291-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110291-1 **Laboratory: TA DEN**

EDD Filename: 280-110291-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA1 (RES/TOT)	Sampling To Analysis	78.25	24.00	HOURS	J (all detects)
A1-MW-14-SA1 (RES/TOT)		76.25	24.00	HOURS	
A1-MW-23-SA1 (RES/TOT)		79.00	24.00	HOURS	
A1-MW-25-SA1 (RES/TOT)		81.00	24.00	HOURS	
A1-MW-27-SA1 (RES/TOT)		82.00	24.00	HOURS	
A1-MW-55-SA1 (RES/TOT)		79.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA1 (RES/TOT)	Sampling To Analysis	334.25	24.00	HOURS	J(all detects)
A1-MW-14-SA1 (RES/TOT)		332.50	24.00	HOURS	R(all non-detects)
A1-MW-23-SA1 (RES/TOT)		335.00	24.00	HOURS	
A1-MW-25-SA1 (RES/TOT)		337.00	24.00	HOURS	
A1-MW-27-SA1 (RES/TOT)		338.00	24.00	HOURS	
A1-MW-55-SA1 (RES/TOT)		336.00	24.00	HOURS	

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110291-1 **Laboratory: TA DEN**

EDD Filename: 280-110291-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-07-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.405 0.797	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-14-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.898 0.876	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-25-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.204 0.418	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: **SM3500 Fe B D**

Matrix: **AQ**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-25-SA1	Ferrous Iron	J HF	0.123	0.200	LOQ	mg/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613D1

SDG #: 280-110291-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

ADR

Date: 7/18/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration / Endrin	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180530	280-110291-1	Water	05/30/18
2	A1-MW-14-SA1	280-110291-2	Water	05/30/18
3	A1-MW-23-SA1	280-110291-3	Water	05/30/18
4	A1-MW-55-SA1	280-110291-4	Water	05/30/18
5	A1-MW-25-SA1	280-110291-5	Water	05/30/18
6	A1-MW-27-SA1	280-110291-6	Water	05/30/18
7	A1-MW-07-SA1	280-110291-7	Water	05/30/18
8				
9				

Notes:

LDC #: 43613D1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RK

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
(Y) N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
3 (ND)	Headspace		> 6 mm				J (ND)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 42613D6
SDG #: 280-110291-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: a
2nd Reviewer: KK

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/-	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-14-SA1	280-110291-2	Water	05/30/18
2	A1-MW-23-SA1	280-110291-3	Water	05/30/18
3	A1-MW-55-SA1	280-110291-4	Water	05/30/18
4	A1-MW-25-SA1	280-110291-5	Water	05/30/18
5	A1-MW-27-SA1	280-110291-6	Water	05/30/18
6	A1-MW-07-SA1	280-110291-7	Water	05/30/18
7	A1-MW-14-SA1MS	280-110291-2MS	Water	05/30/18
8	A1-MW-14-SA1MSD	280-110291-2MSD	Water	05/30/18
9	A1-MW-14-SA1DUP	280-110291-2DUP	Water	05/30/18
10				
11				
12				
13				
14				
15				
16				

Notes:

LDC #: 42613O6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: RW

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments: _____

LDC #: 42613D6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-3

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No qual (>5x)								
SO4		0.2460	1.23									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-110353-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA1 (RES/TOT)	Sampling To Analysis	111.75	24.00	HOURS	J (all detects)
A1-MW-11-SA1DUP (RES/TOT)		111.75	24.00	HOURS	
A1-MW-13-SA1 (RES/TOT)		112.50	24.00	HOURS	
A1-MW-15-SA1 (RES/TOT)		110.50	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA1 (RES/TOT)	Sampling To Analysis	313.75	24.00	HOURS	J(all detects)
A1-MW-13-SA1 (RES/TOT)		314.50	24.00	HOURS	R(all non-detects)
A1-MW-15-SA1 (RES/TOT)		313.00	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-417070/6	6/1/2018 12:10:00 PM	CHLORIDE Sulfate	0.5189 mg/L 0.6146 mg/L	A1-MW-11-SA1 A1-MW-13-SA1 A1-MW-15-SA1

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-15-SA1	TRICHLOROETHENE	J	0.321	1.00	LOQ	ug/L	J (all detects)

LDC #: 42613E1 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/12/18
SDG #: 280-110353-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 1. EB = 5
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180531	280-110353-1	Water	05/31/18
2	A1-MW-13-SA1	280-110353-2	Water	05/31/18
3	A1-MW-11-SA1	280-110353-3	Water	05/31/18
4	A1-MW-15-SA1	280-110353-4	Water	05/31/18
5	EB-20180531	280-110353-5	Water	05/31/18
6				
7				
8				

Notes:

LDC #: 42613E6
SDG #: 280-110353-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/8/18
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/—	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	280-110353-2	Water	05/31/18
2	A1-MW-11-SA1	280-110353-3	Water	05/31/18
3	A1-MW-15-SA1	280-110353-4	Water	05/31/18
4	A1-MW-11-SA1DUP	280-110353-3DUP	Water	05/31/18
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Notes:

LDC #: 42613E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC:4	(pH) TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613E6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** All

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No qual (>5x)									
Cl		0.5385	2.6925										
SO4		0.6554	3.277										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control Outlier Reports

1801024

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801024 **Laboratory: Vista**

EDD Filename: 1801024 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0250-BS1 (A1-MW-04-SA1 A1-MW-05-SA1 A1-MW-49-SA1 A1-MW-50-SA1 A1-MW-51-SA1 FRB-20180522)	PFTrDA	138	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801024 **Laboratory: Vista**

EDD Filename: 1801024 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-04-SA1	PFOA PFOS	J J	0.00333 0.00161	0.00812 0.00812	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-05-SA1	PFHpA PFHxS	J J	0.000917 0.00278	0.00842 0.00842	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-49-SA1	PFBS	J	0.00627	0.00812	LOQ	ug/L	J (all detects)
A1-MW-51-SA1	PFOS	J	0.00303	0.00836	LOQ	ug/L	J (all detects)

LDC #: 42613L96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801024 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 2nd Reviewer: KLC

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD<20% r². True/ICV = 30%
IV.	Continuing calibration	A	CCV = 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB = 6
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	1801024-01	Water	05/22/18
2	A1-MW-50-SA1	1801024-02	Water	05/22/18
3	A1-MW-49-SA1	1801024-03	Water	05/22/18
4	A1-MW-05-SA1	1801024-04	Water	05/22/18
5	A1-MW-04-SA1	1801024-05	Water	05/22/18
6	FRB-20180522	1801024-06	Water	05/22/18
7				
8				
9				

Notes:

	BBE0250-BK1						

LDC #: 26132L96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A Were all internal standard area counts within 50-150% limits?

Y/N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		BBE0250-BA	13C2-PFUnA	AT. 6 (50-150)		Y/N/A
		1 (dets)	13C3-PFBS	247		(PFBS)
		(ND)	d5-Et FOSAA	151		(Et FOSAA)

Privileged and Confidential

Quality Control
Outlier Reports

1801037

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	NMeFOSAA	-	-	70.00-130.00	41.1 (30.00)	NMeFOSAA	J (all detects)
	PFDA	132	-	70.00-130.00	-	PFDA	
	PFDoA	136	-	70.00-130.00	-	PFDoA	
	PFHpA	140	-	70.00-130.00	49.6 (30.00)	PFHpA	
	PFHxS	146	-	70.00-130.00	-	PFHxS	
	PFOA	131	-	70.00-130.00	-	PFOA	
	PFTrDA	136	133	70.00-130.00	-	PFTrDA	
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	PFHxA	-21	-	70.00-130.00	329 (30.00)	PFHxA	No Qual, >4x
	PFBS	182	-	70.00-130.00	45.9 (30.00)	PFBS	

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0244-BS1 (16-HS-03-SA1 16-MW-06-SA1 16-MW-08-SA1 16-MW-09-SA1 A1-MW-18-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D FRB-20180523)	PFTrDA	153	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA1	PFOS	J	0.00227	0.00897	LOQ	ug/L	J (all detects)
16-MW-08-SA1	PFNA	J	0.00102	0.00870	LOQ	ug/L	J (all detects)
16-MW-09-SA1	PFDA PFNA	J J	0.00440 0.00326	0.00871 0.00871	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-18-SA1	PFOA PFOS	J J	0.00187 0.00437	0.00888 0.00888	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-19-SA1	PFDA	J	0.00727	0.00846	LOQ	ug/L	J (all detects)
A1-MW-37-SA1	PFNA	J	0.00170	0.00839	LOQ	ug/L	J (all detects)
A1-MW-37-SA1D	PFNA PFUnA	J J	0.00210 0.00135	0.00862 0.00862	LOQ LOQ	ug/L ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	A1-MW-37-SA1	A1-MW-37-SA1D			
PFBS	0.230	0.252	9	30.00	No Qualifiers Applied
PFHpA	0.0328	0.0322	NC	30.00	
PFHxA	1.66	1.71	3	30.00	
PFHxS	0.155	0.152	2	30.00	
PFNA	0.00170	0.00210	NC	30.00	
PFOA	0.0196	0.0203	NC	30.00	
PFOS	0.0458	0.0416	NC	30.00	
PFUnA	0.00839 U	0.00135	NC	30.00	

LDC #: 42613M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801037 ADR/Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 1
2nd Reviewer: KC

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	Not reviewed for ADR validation
VI.	Field blanks	ND	FRB = 9
VII.	Surrogate spikes	N	Not reviewed for ADR validation
VIII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation
IX.	Laboratory control samples		Not reviewed for ADR validation
X.	Field duplicates	SW	D = 4+5
XI.	Internal standards	SW	Not reviewed for ADR validation
XII.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation
XIII.	Target compound identification		Not reviewed for ADR validation
XIV.	System performance		Not reviewed for ADR validation
XV.	Overall assessment of data		Not reviewed for ADR validation

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1**	1801037-01**	Water	05/23/18
2	16-MW-08-SA1**	1801037-02**	Water	05/23/18
3	A1-MW-19-SA1**	1801037-03**	Water	05/23/18
4	A1-MW-37-SA1**	1801037-04**	Water	05/23/18
5	A1-MW-37-SA1D**	1801037-05**	Water	05/23/18
6	16-HS-03-SA1**	1801037-06**	Water	05/23/18
7	16-MW-09-SA1**	1801037-07**	Water	05/23/18
8	16-MW-06-SA1**	1801037-08**	Water	05/23/18
9	FRB-20180523	1801037-09	Water	05/23/18
10	16-HS-03-SA1MS	1801037-06MS	Water	05/23/18
11	16-HS-03-SA1MSD	1801037-06MSD	Water	05/23/18
12				
13	B8E0244-BLK1			
14				

LDC #: 423496

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (lab)	13C3-PFBS	170 (50-150)		J (PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8		214		
		10 (MS)		167		No Qual
		11 (MSD)		165		

Privileged and Confidential

LDC#: 42613M96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	4	5		
PFBS	0.230	0.252	9	
PFHxA	1.66	1.71	3	
PFHpA	0.0328	0.0322	~~2~~ NC	
PFHxS	0.155	0.152	2	
PFOA	0.0196	0.0203	~~4~~ NC	
PFNA	0.00170	0.00210	~~21~~ NC	
PFOS	0.0458	0.0416	~~10~~ NC	
PFUnA	0.00525U	0.00135	NC	

Quality Control
Outlier Reports

1801039

Reporting Limit Outliers

Lab Reporting Batch ID: 1801039 **Laboratory: Vista**

EDD Filename: 1801039 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-11-SA1	PFOS	J	0.00359	0.00860	LOQ	ug/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613N96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/12/18
SDG #: 1801039 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB=6
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	1801039-01	Water	05/24/18
2	A1-MW-11-SA1	1801039-02	Water	05/24/18
3	A1-MW-14-SA1	1801039-03	Water	05/24/18
4	A1-MW-15-SA1	1801039-04	Water	05/24/18
5	A1-MW-25-SA1	1801039-07	Water	05/24/18
6	FRB-20180524	1801039-08	Water	05/24/18
7				
8				
9				

Notes:

	BBF0004-BK1						

LDC #: ~~26363N96~~

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dob)	13C3-PFBS	419 (50-150)		Y/N/A (PFBS)
		2		271		
		3		527		
		4		235		
		5 (~~ND~~) (Det)		428		

Privileged and Confidential

Quality Control Outlier Reports

1801054

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-53-SA1MS A1-MW-53-SA1MSD (A1-MW-53-SA1)	NMeFOSAA PFTrDA	- 141	- 148	70.00-130.00 70.00-130.00	32.9 (30.00) -	NMeFOSAA PFTrDA	J (all detects)
A1-MW-53-SA1MS A1-MW-53-SA1MSD (A1-MW-53-SA1)	PFBS PFHxS PFHxA	- 141 232	37.7 58.4 175	70.00-130.00 70.00-130.00 70.00-130.00	96.5 (30.00) 82.8 (30.00) -	PFBS PFHxS PFHxA	No Qual, >4x

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0244-BS1 (A1-MW-01-SA1 A1-MW-01-SA1D A1-MW-31-SA1 A1-MW-42-SA1 A1-MW-52-SA1 A1-MW-53-SA1 A1-MW-54-SA1 A1-PZ-19-SA1 FRB-20180525)	PFTrDA	153	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-01-SA1	PFHpA	J	0.00225	0.00907	LOQ	ug/L	J (all detects)
A1-MW-01-SA1D	PFHpA	J	0.00273	0.00854	LOQ	ug/L	J (all detects)
A1-MW-31-SA1	PFHpA	J	0.00851	0.00887	LOQ	ug/L	J (all detects)
A1-MW-42-SA1	PFOS	J	0.00186	0.00887	LOQ	ug/L	J (all detects)
A1-MW-53-SA1	PFOS	J	0.00188	0.00878	LOQ	ug/L	J (all detects)
A1-MW-54-SA1	PFOS	J	0.00652	0.00892	LOQ	ug/L	J (all detects)
A1-PZ-19-SA1	PFHpA	J	0.00326	0.00852	LOQ	ug/L	J (all detects)
	PFOA	J	0.00756	0.00852	LOQ	ug/L	
	PFOS	J	0.00115	0.00852	LOQ	ug/L	

Field Duplicate RPD Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-01-SA1	A1-MW-01-SA1D			
PFBS	0.0524	0.0557	6	30.00	No Qualifiers Applied
PFHpA	0.00225	0.00273	NC	30.00	
PFHxA	0.101	0.0971	4	30.00	
PFHxS	0.0230	0.0238	NC	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613O96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801054 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 9
2nd Reviewer: KW

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤20% . r^2 ≥ TMW/ICV = 30%
IV.	Continuing calibration	A	CCV ≤ 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	A = 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	BBE0244-BK1			

LDC#: 42613096

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: WK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	6	7		
PFBS	0.0524	0.0557	6	
PFHxA	0.101	0.0971	4	
PFHpA	0.00225	0.00273	~~19~~ NC	
PFHxS	0.0230	0.0238	~~3~~ NC	

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LDC #: 42613096

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: MK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C3-PFBS	310 (50-150)		J (all dets) UJ (PFBS)
		2 (dets)		175		
		3		154		
		10 (MS)		169		No qual
		11 (MSD)		161		
		4 (dets)		182		J (all dets) UJ (PFBS)
		5		211		
		6		192		
		7		204		
		8		254		

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Quality Control Outlier Reports

1801071

Reporting Limit Outliers

Lab Reporting Batch ID: 1801071 **Laboratory: Vista**

EDD Filename: 1801071 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-23-SA1	PFHxS	J	0.00581	0.00874	LOQ	ug/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613P96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801071 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB = 5
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-27-SA1	1801071-01	Water	05/30/18
2	A1-MW-55-SA1	1801071-02	Water	05/30/18
3	A1-MW-23-SA1	1801071-03	Water	05/30/18
4	A1-MW-07-SA1	1801071-04	Water	05/30/18
5	FRB-20180530	1801071-05	Water	05/30/18
6				
7				
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42613P96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C8-PFBS	174 (50-150)		J/UJ (PFBS)
		2 (ND)	↓	165		↓
		4 (dets)	↓	209		↓

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Quality Control
Outlier Reports

1801084

LDC #: 42613Q96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18

SDG #: 1801084 ADR Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	~~RSD≤20%~~. r^2 TMO/ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 30% ~~≤20%~~
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	EB=1
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EB-20180531	1801084-01	Water	05/31/18
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	RBF0069-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: ~~42638~~ 96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Q
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	6/18/18	180617M1-10	d3-T	55.2 (~~>50%~~)		MB	J/UJ/P (T)

Enclosure II

Manual Stage 2B and Stage 4 Data Validation Reports

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-110112-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-20180523	280-110112-1	Water	05/23/18
A1-MW-18-SA1	280-110112-2	Water	05/23/18
16-MW-08-SA1	280-110112-3	Water	05/23/18
A1-MW-19-SA1	280-110112-4	Water	05/23/18
A1-MW-37-SA1D	280-110112-5	Water	05/23/18
A1-MW-37-SA1	280-110112-6	Water	05/23/18
16-HS-03-SA1	280-110112-7	Water	05/23/18
16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-20180523 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
16-HS-03-SA1	Toluene-d8	75 (89-112)	All compounds	UJ (all non-detects)	A

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	1,1-Dichloroethene	56 (71-131)	33 (71-131)	UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	1,1-Dichloroethene	53 (≤20)	NA	-

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA1D	A1-MW-37-SA1			
Trichloroethene	0.652	0.624	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1D A1-MW-37-SA1	All compounds reported below the LOQ.	J (all detects)	A

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to surrogate %R, MS/MSD %R, and results below the LOQ, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Volatiles - Data Qualification Summary - SDG 280-110112-1

Sample	Compound	Flag	A or P	Reason
16-HS-03-SA1	All compounds	UJ (all non-detects)	A	Surrogates (%R)
16-HS-03-SA1	1,1-Dichloroethene	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1D A1-MW-37-SA1	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Volatiles - Field Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

LDC #: 42613B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18

SDG #: 280-110112-1 Stage 4 Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: Q

2nd Reviewer: KLC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration Level 3	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D = 5+6
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180523	280-110112-1	Water	05/23/18
2	A1-MW-18-SA1	280-110112-2	Water	05/23/18
3	16-MW-08-SA1	280-110112-3	Water	05/23/18
4	A1-MW-19-SA1	280-110112-4	Water	05/23/18
5	A1-MW-37-SA1D	280-110112-5	Water	05/23/18
6	A1-MW-37-SA1	280-110112-6	Water	05/23/18
7	16-HS-03-SA1	280-110112-7	Water	05/23/18
8	16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
9	16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
10				
11				
12				
13				

LDC #: 42613B1

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: RV

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	✓			

LDC #: 42613B1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer:
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		7	TOL	75 (89-112)	J/UH/A (ND)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	

(TOL) = Toluene-d8 (DCE) = 1,2-Dichloroethane-d4
(BFB) = Bromofluorobenzene (DFM) = Dibromofluoromethane

LDC #: 43633

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		8/9	H	56 (71-131)	33 (71-131)	( )	7 (ND)	J (H) / A
			H	( )	( )	53 (≤20)		J (all det.) / A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )	

LDC#: 42613B1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GCMS VOA 8260B

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	5	6		
S	0.652	0.624	4 NC	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613B1.wpd

LDC #: ~~42643B~~

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL (R1)	5/16/18	H (1st internal standard)	0.3187	0.3187	0.3149	0.3149	4.8	4.8
			AA (2nd internal standard)	1.3348	1.3348	1.3251	1.3251	3.5	3.5
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	R1735	6/4/18	H (1st internal standard)	0.3149	0.3312	0.3312	5.2	5.2
			AA (2nd internal standard)	1.325	1.401	1.401	5.7	5.7
			(3rd internal standard)					
			(4th internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 40413B1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	11.5	12.2	106	106	0
1,2-Dichloroethane-d4	↓	12.4	108	108	↓
Toluene-d8		11.5	100	100	
Bromofluorobenzene		11.6	100	102	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 42438J

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 8/9

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	ND	2.795	1.629	56	56	33	33	53	53
Trichloroethene	V	V	V	4.863	4.489	97	97	90	90	8	8
Benzene											
Toluene											
Chlorobenzene											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: 280-417198/4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	5.615	NA	112	112				
Trichloroethene	↓	↓	5.111	↓	102	102				
Benzene										
Toluene										
Chlorobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26138

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: A
2nd reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 2 , H :

Conc. = $\frac{(22988)(12.5)(1)}{(201941)(0.3149)(\quad)(\quad)}$

= 0.452 µg/L

#	Sample ID	Compound	Reported Concentration (µg/L)	Calculated Concentration ( )	Qualification
	2	H	0.452		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-110112-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA1	280-110112-2	Water	05/23/18
16-MW-08-SA1	280-110112-3	Water	05/23/18
A1-MW-19-SA1	280-110112-4	Water	05/23/18
A1-MW-37-SA1	280-110112-6	Water	05/23/18
16-HS-03-SA1	280-110112-7	Water	05/23/18
A1-MW-18-SA1MS	280-110112-2MS	Water	05/23/18
A1-MW-18-SA1MSD	280-110112-2MSD	Water	05/23/18
A1-MW-18-SA1DUP	280-110112-2DUP	Water	05/23/18
16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
16-HS-03-SA1DUP	280-110112-7DUP	Water	05/23/18
16-HS-03-SA1DLMS	280-110112-7DLMS	Water	05/23/18
16-HS-03-SA1DLMSD	280-110112-7DLMSD	Water	05/23/18
16-HS-03-SA1DLDUP	280-110112-7DLDUP	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 16-HS-03-SA1	pH	8 days	24 hours	J (all detects)	P
A1-MW-18-SA1	Ferrous Iron	26.85 hours	24 hours	J (all detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	Sulfate	88 (87-112)	86 (87-112)	J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	Ferrous Iron	1 (85-113)	0 (85-113)	R (all non-detects)	A

For A1-MW-18-SA1MS/MSD, no data were qualified for Chloride and Sulfate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable.

All analytes reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-37-SA1	All analytes reported below the LOQ.	J (all detects)	A

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

Due to MS/MSD %R, data were rejected in one sample.

Due to technical holding time, MS/MSD %R, and results below the LOQ, data were qualified as estimated in five samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Wet Chemistry - Data Qualification Summary - SDG 280-110112-1

Sample	Analyte	Flag	A or P	Reason
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 16-HS-03-SA1	pH	J (all detects)	P	Technical holding times
A1-MW-18-SA1	Ferrous Iron	J (all detects)	P	Technical holding times
16-HS-03-SA1	Sulfate	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
16-HS-03-SA1	Ferrous Iron	R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-37-SA1	All analytes reported below the LOQ.	J (all detects)	A	Sample result verification

MCAS Yuma, CTO 17F3803
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

LDC #: 42613B6
SDG #: 280-110112-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Statge 4

Date: 7/18/18
Page: 1 of 1
Reviewer: CL
2nd Reviewer: KK

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B)
pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	~~1of1~~ Cl, SO4 : 7/8 >4x
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	(4,5) a
X.	Sample result verification	A	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1	280-110112-2	Water	05/23/18
2	16-MW-08-SA1	280-110112-3	Water	05/23/18
3	A1-MW-19-SA1	280-110112-4	Water	05/23/18
~~4~~	~~A1-MW-37-SA1D~~	~~280-110112-5~~	~~Water~~	~~05/23/18~~ 02
5	A1-MW-37-SA1	280-110112-6	Water	05/23/18
6	16-HS-03-SA1	280-110112-7	Water	05/23/18
7	A1-MW-18-SA1MS	280-110112-2MS	Water	05/23/18
8	A1-MW-18-SA1MSD	280-110112-2MSD	Water	05/23/18
9	A1-MW-18-SA1DUP	280-110112-2DUP	Water	05/23/18
10	16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
11	16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
12	16-HS-03-SA1DUP	280-110112-7DUP	Water	05/23/18
13	#6 DL MS			
14	↓ MSD			
15	↓ DUP			

Notes:

LDC #: 47961386

VALIDATION FINDINGS CHECKLIST

Reviewer: 01
2nd Reviewer: KK

Method: Inorganics (EPA Method Sel cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 4296B86

VALIDATION FINDINGS CHECKLIST

Reviewer: 02
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 42653B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3,5,6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
10,11	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
12	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
13,14	pH TDS (Cl) F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
15	pH TDS (Cl) F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CA
2nd reviewer: KK

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	9040C				SM 3500 FE B		
Parameters:	pH				Ferrous Iron		
Technical holding time:	~~48 HRS~~ 24 hrs				24 hrs		
Sample ID	Sampling date	Analysis date	Time ~~Exceeded~~	Qualifier	Analysis date	Time Exceeded	Qualifier
All (Det)	5/23/18	5/31/18	8days	J/UJ/P			
1 (Det)	5/23/18				5/24/18	26.85 hrs	J/UJ/P
	(09:00)				(11:51)		

HTTETRA.wpd

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer:
2nd Reviewer: KK

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	10/11		SO_4	88(87-112)	86		6	J/UJ/A (Det)
			~~Ferrous Fe~~	1(85-113)	0		6	J/R/A (MD)
			Ferrous Iron					

Comments: 7/8: Cl, SO_4 74X

LDC #: 42623B6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: G
2nd Reviewer: KK

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 3/21/18

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cl	s1	1.0	16911296	*1.000*	*1.000*	Y
		s2	2.5	43759132			
		s3	5	85841374			
		s4	60	1053445301			
		s5	120	2068634717			
		s6	200	3433898767			
Calibration verification	NO_3N	ICV	4	3.93	98	98	
Calibration verification	SO_4	CCV	100	102.1	102	102	
Calibration verification	Fe^{2+}	CCV	1.0	10686	107	107	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: OR
2nd Reviewer: KK

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Ferrous Iron	2.2416	2.00	112	112	Y
10	Matrix spike sample	NO3N	(SSR-SR) 10.0	10	100	100	
12	Duplicate sample	SO4	42.4	38.4	10	10	

Comments: _____

LDC #: 42613 B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: KK

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = 1655360x - 440112$

Recalculation: $\frac{1079969301 + 440112}{1655360} \times 50 = 3263.3 mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	pH (SU)	7.7	7.7	Y
	2	Ferrous Iron	0.0403	0.0403	↓
	3	Cl	3260	3260	↓
	5	NO_3N	7.26	7.26	↓
	6	SO_4	2120	2120	✓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1818881

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-51-SA1	L1818881-01	Water	05/22/18
A1-MW-50-SA1	L1818881-02	Water	05/22/18
A1-MW-49-SA1	L1818881-03	Water	05/22/18
A1-MW-05-SA1	L1818881-04	Water	05/22/18
A1-MW-04-SA1	L1818881-05	Water	05/22/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for all samples were reported at 7.9°C upon receipt by the laboratory. No data was qualified based on the cooler temperature.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

LDC #: 42613F2b

SDG #: L1818881

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KW

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	Temp @ 7.9°C
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration / 2nd Col	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	⊂
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	L1818881-01	Water	05/22/18
2	A1-MW-50-SA1	L1818881-02	Water	05/22/18
3	A1-MW-49-SA1	L1818881-03	Water	05/22/18
4	A1-MW-05-SA1	L1818881-04	Water	05/22/18
5	A1-MW-04-SA1	L1818881-05	Water	05/22/18
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819087

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA	L1819087-01	Water	05/23/18
16-MW-08-SA1	L1819087-02	Water	05/23/18
A1-MW-19-SA1	L1819087-03	Water	05/23/18
A1-MW-37-SA1	L1819087-04	Water	05/23/18
A1-MW-37-SA1D	L1819087-05	Water	05/23/18
16-HS-03-SA1	L1819087-06	Water	05/23/18
16-HS-03-SA1MS	L1819087-06MS	Water	05/23/18
16-HS-03-SA1MSD	L1819087-06MSD	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ng/L)				
Compound	A1-MW-37-SA1	A1-MW-37-SA1D	RPD (Limits)	Flag	A or P
1,4-Dioxane	7780	7500	4 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations were within validation criteria.

XIII. Target Compound Identifications

All target compound identifications were within validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

LDC #: 42613G2b **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: L1819087 Stage 4 Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD≤ 15%. ICV≤ 20%
IV.	Continuing calibration / Endrin	A	CCV≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=4+5
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA	L1819087-01	Water	05/23/18
2	16-MW-08-SA1	L1819087-02	Water	05/23/18
3	A1-MW-19-SA1	L1819087-03	Water	05/23/18
4	A1-MW-37-SA1	L1819087-04	Water	05/23/18
5	A1-MW-37-SA1D	L1819087-05	Water	05/23/18
6	16-HS-03-SA1	L1819087-06	Water	05/23/18
7	16-HS-03-SA1MS	L1819087-06MS	Water	05/23/18
8	16-HS-03-SA1MSD	L1819087-06MSD	Water	05/23/18
9				

Notes:

LDC #: 42613F3b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: O
2nd Reviewer: RK

Method: Semivolatiles (EPA SW 846 Method 8270C-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 42613B6

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: MK

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	AA. 2-Chloronaphthalene	AAA. Butylbenzylphthalate	AAAA. Dibenzothiophene	A1.
B. Bis (2-chloroethyl) ether	BB. 2-Nitroaniline	BBB. 3,3'-Dichlorobenzidine	BBBB. Benzo(a)fluoranthene	B1.
C. 2-Chlorophenol	CC. Dimethylphthalate	CCC. Benzo(a)anthracene	CCCC. Benzo(b)fluorene	C1.
D. 1,3-Dichlorobenzene	DD. Acenaphthylene	DDD. Chrysene	DDDD. cis/trans-Decalin	D1.
E. 1,4-Dichlorobenzene	EE. 2,6-Dinitrotoluene	EEE. Bis(2-ethylhexyl)phthalate	EEEE. Biphenyl	E1.
F. 1,2-Dichlorobenzene	FF. 3-Nitroaniline	FFF. Di-n-octylphthalate	FFFF. Retene	F1.
G. 2-Methylphenol	GG. Acenaphthene	GGG. Benzo(b)fluoranthene	GGGG. C30-Hopane	G1.
H. 2,2'-Oxybis(1-chloropropane)	HH. 2,4-Dinitrophenol	HHH. Benzo(k)fluoranthene	HHHH. 1-Methylphenanthrene	H1.
I. 4-Methylphenol	II. 4-Nitrophenol	III. Benzo(a)pyrene	IIII. 1,4-Dioxane	I1.
J. N-Nitroso-di-n-propylamine	JJ. Dibenzofuran	JJJ. Indeno(1,2,3-cd)pyrene	JJJJ. Acetophenone	J1.
K. Hexachloroethane	KK. 2,4-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	KKKK. Atrazine	K1.
L. Nitrobenzene	LL. Diethylphthalate	LLL. Benzo(g,h,i)perylene	LLLL. Benzaldehyde	L1.
M. Isophorone	MM. 4-Chlorophenyl-phenyl ether	MMM. Bis(2-Chloroisopropyl)ether	MMMM. Caprolactam	M1.
N. 2-Nitrophenol	NN. Fluorene	NNN. Aniline	NNNN. 2,6-Dichlorophenol	N1.
O. 2,4-Dimethylphenol	OO. 4-Nitroaniline	OOO. N-Nitrosodimethylamine	OOOO. 1,2-Diphenylhydrazine	O1.
P. Bis(2-chloroethoxy)methane	PP. 4,6-Dinitro-2-methylphenol	PPP. Benzoic Acid	PPPP. 3-Methylphenol	P1.
Q. 2,4-Dichlorophenol	QQ. N-Nitrosodiphenylamine	QQQ. Benzyl alcohol	QQQQ. 3&4-Methylphenol	Q1.
R. 1,2,4-Trichlorobenzene	RR. 4-Bromophenyl-phenylether	RRR. Pyridine	RRRR. 4-Dimethyldibenzothiophene (4MDT)	R1.
S. Naphthalene	SS. Hexachlorobenzene	SSS. Benzidine	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	S1.
T. 4-Chloroaniline	TT. Pentachlorophenol	TTT. 1-Methylnaphthalene	TTTT. 1-Methyldibenzothiophene (1MDT)	T1.
U. Hexachlorobutadiene	UU. Phenanthrene	UUU.Benzo(b)thiophene	UUUU.	U1.
V. 4-Chloro-3-methylphenol	VV. Anthracene	VVV.Benzonaphthothiophene	VVVV.	V1.
W. 2-Methylnaphthalene	WW. Carbazole	WWW.Benzo(e)pyrene	WWWW.	W1.
X. Hexachlorocyclopentadiene	XX. Di-n-butylphthalate	XXX. 2,6-Dimethylnaphthalene	XXXX.	X1.
Y. 2,4,6-Trichlorophenol	YY. Fluoranthene	YYY. 2,3,5-Trimethylnaphthalene	YYYY.	Y1.
Z. 2,4,5-Trichlorophenol	ZZ. Pyrene	ZZZ. Perylene	ZZZZ.	Z1.

LDC#: 42613G2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GCMS SVOA 8270D-SIM

Compound	Concentration (ng/L)		(≤30) RPD	Qual
	4	5		
1,4-Dioxane	7780	7500	4	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613G2b.wpd

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS BNA (EPA SW 846 Method 8270C-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (500 std)	Recalculated RRF (500 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	5/29/18	IIII (1st internal standard)	1.618	1.618	1.686	1.686	7.57	7.57
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2	ICAL	6/1/18	IIII (1st internal standard)	1.471	1.471	1.437	1.437	4.02	4.02
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			(1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~46613~~6

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: A
2nd Reviewer: KK

METHOD: GC/MS BNA (EPA SW 846 Method 8270C-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	F6060118 02	6/1/18	1111 (1st internal standard)	1.686	1.767	1.767	4.8	4.8
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2	F1606058 07	6/5/18	1111 (1st internal standard)	1.437	1.538	1.538	7	7
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3	~~F~~		(1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42436-b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: KK

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
1,4-Dioxane-d8	500	98.32	20	20	0

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

LDC #: 36154-D

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS (EPA SW 846 Method 8270C-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 7/8

Compound	Spike Added (NS/L)		Sample Concentration (NS/L)	Spiked Sample Concentration (NS/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene											
Pyrene											
1,4-Dioxane	5100	5100	3270	8340	8660	99	99	106	106	4	4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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:

% 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: NG1120650-1/-3

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene										
Pyrene										
1,4-Dioxane	5000	5000	5640	5660	113	113	113	113	0	0

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613-26

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: KK

METHOD: GC/MS PAHs (EPA SW 846 Method 8270D-SIM)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, 1,4-Dioxane

Conc. = $\frac{(2376)(500)(5)(1)(\quad)}{(5587)(1.686)(0.5)(\quad)(\quad)}$

= 1261.1 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	1,4-Dioxane	1260		

LDC Report# 42613H2b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819352

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-13-SA1	L1819352-01	Water	05/24/18
A1-MW-11-SA1	L1819352-02	Water	05/24/18
A1-MW-14-SA1	L1819352-03	Water	05/24/18
A1-MW-15-SA1	L1819352-04	Water	05/24/18
A1-MW-25-SA1	L1819352-07	Water	05/24/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

LDC #: 42613H2b

SDG #: L1819352

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCSB
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	L1819352-01	Water	05/24/18
2	A1-MW-11-SA1	L1819352-02	Water	05/24/18
3	A1-MW-14-SA1	L1819352-03	Water	05/24/18
4	A1-MW-15-SA1	L1819352-04	Water	05/24/18
5	A1-MW-25-SA1	L1819352-07	Water	05/24/18
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819562

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-42-SA1	L1819562-01	Water	05/25/18
A1-MW-54-SA1	L1819562-02	Water	05/25/18
A1-MW-53-SA1	L1819562-03	Water	05/25/18
A1-PZ-19-SA1	L1819562-04	Water	05/25/18
A1-MW-52-SA1	L1819562-05	Water	05/25/18
A1-MW-01-SA1	L1819562-06	Water	05/25/18
A1-MW-01-SA1D	L1819562-07	Water	05/25/18
A1-MW-31-SA1	L1819562-08	Water	05/25/18
A1-MW-53-SA1MS	L1819562-03MS	Water	05/25/18
A1-MW-53-SA1MSD	L1819562-03MSD	Water	05/25/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-01-SA1 and A1-MW-01-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)				
Compound	A1-MW-01-SA1	A1-MW-01-SA1D	RPD (Limits)	Flag	A or P
1,4-Dioxane	1840	1880	2 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

LDC #: 42613I2b

SDG #: L1819562

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 6+7
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	L1819562-01	Water	05/25/18
2	A1-MW-54-SA1	L1819562-02	Water	05/25/18
3	A1-MW-53-SA1	L1819562-03	Water	05/25/18
4	A1-PZ-19-SA1	L1819562-04	Water	05/25/18
5	A1-MW-52-SA1	L1819562-05	Water	05/25/18
6	A1-MW-01-SA1	L1819562-06	Water	05/25/18
7	A1-MW-01-SA1D	L1819562-07	Water	05/25/18
8	A1-MW-31-SA1	L1819562-08	Water	05/25/18
9	A1-MW-53-SA1MS	L1819562-03MS	Water	05/25/18
10	A1-MW-53-SA1MSD	L1819562-03MSD	Water	05/25/18
11				
12				
13				

LDC#: 42613I2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: KK

METHOD: GCMS SVOA 8270D-SIM

Compound	Concentration (ng/L)		(≤30) RPD	Qual
	6	7		
1,4-Dioxane	1840	1880	2	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613I2b.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1820050

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-27-SA1	L1820050-01	Water	05/30/18
A1-MW-55-SA1	L1820050-02	Water	05/30/18
A1-MW-23-SA1	L1820050-03	Water	05/30/18
A1-MW-07-SA1	L1820050-04	Water	05/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compounds reported below the reporting limit (RL) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-23-SA1	All compounds reported below the RL.	J (all detects)	A

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the RL, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1820050

Sample	Compound	Flag	A or P	Reason
A1-MW-23-SA1	All compounds reported below the RL.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1820050

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1820050

No Sample Data Qualified in this SDG

LDC #: 42613J2b

SDG #: L1820050

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/12/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤20%
IV.	Continuing calibration	A	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-27-SA1	L1820050-01	Water	05/30/18
2	A1-MW-55-SA1	L1820050-02	Water	05/30/18
3	A1-MW-23-SA1	L1820050-03	Water	05/30/18
4	A1-MW-07-SA1	L1820050-04	Water	05/30/18
5				
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1820175

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EB-20180531	L1820175-01	Water	05/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-20180531 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

LDC #: 42613K2b

SDG #: L1820175

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: RK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/6
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EB-20180531	L1820175-01	Water	05/31/18
2				
3				
4				
5				
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1801037

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA1	1801037-01	Water	05/23/18
16-MW-08-SA1	1801037-02	Water	05/23/18
A1-MW-19-SA1	1801037-03	Water	05/23/18
A1-MW-37-SA1	1801037-04	Water	05/23/18
A1-MW-37-SA1D	1801037-05	Water	05/23/18
16-HS-03-SA1	1801037-06	Water	05/23/18
16-MW-09-SA1	1801037-07	Water	05/23/18
16-MW-06-SA1	1801037-08	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration point, the percent differences (%D) for their true value were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample FRB-20180523 was identified as a field rinsate blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFHpA PFHxS PFOA	140 (70-130) 146 (70-130) 131 (70-130)	- - -	J (all detects) J (all detects) J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFDA PFDoA PFTrDA	132 (70-130) 136 (70-130) 136 (70-130)	- - 133 (70-130)	NA	-

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFHpA	49.6 (≤30)	J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	NMeFOSAA	41.1 (≤30)	NA	-

For 16-HS-03-SA1MS/MSD, no data were qualified for PFBS and PFHxA percent recoveries (%R) and relative percent differences (RPD) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

OPR ID (Associated Samples)	Compound	%R (Limits)	Flag	A or P
B8E0244-BS1 (All samples in SDG 1801037)	PFTrDA	153 (70-130)	NA	-

IX. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA1	A1-MW-37-SA1D			
PFBS	0.230	0.252	9 (≤30)	-	-
PFHxA	1.66	1.71	3 (≤30)	-	-
PFHpA	0.0328	0.0322	Not calculable	-	-
PFHxS	0.155	0.152	2 (≤30)	-	-
PFOA	0.0196	0.0203	Not calculable	-	-
PFNA	0.00170	0.00210	Not calculable	-	-
PFOS	0.0458	0.0416	Not calculable	-	-
PFUnA	0.00525U	0.00135	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
A1-MW-18-SA1	^{13}C3-PFBS	170 (50-150)	PFBS	J (all detects)	P
16-MW-08-SA1	^{13}C3-PFBS	187 (50-150)	PFBS	J (all detects)	P
A1-MW-19-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
A1-MW-37-SA1	^{13}C3-PFBS	228 (50-150)	PFBS	J (all detects)	P
A1-MW-37-SA1D	^{13}C3-PFBS	161 (50-150)	PFBS	J (all detects)	P
16-HS-03-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
16-MW-09-SA1	^{13}C3-PFBS	153 (50-150)	PFBS	J (all detects)	P
16-MW-06-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P

XI. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-MW-09-SA1 16-MW-06-SA1	All compounds reported below the LOQ.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R and RPD, internal standard %R, and results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1801037

Sample	Compound	Flag	A or P	Reason
16-HS-03-SA1	PFHpA PFHxS PFOA	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
16-HS-03-SA1	PFHpA	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-HS-03-SA1 16-MW-09-SA1 16-MW-06-SA1	PFBS	J (all detects)	P	Internal standards (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-MW-09-SA1 16-MW-06-SA1	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1801037

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1801037

No Sample Data Qualified in this SDG

LDC #: 42613M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801037 Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: IKK

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 20% or r^2 True value/ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	FRB = 9
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	SW	OPR
X.	Field duplicates	SW	D = 1-5
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1**	1801037-01**	Water	05/23/18
2	16-MW-08-SA1**	1801037-02**	Water	05/23/18
3	A1-MW-19-SA1**	1801037-03**	Water	05/23/18
4	A1-MW-37-SA1**	1801037-04**	Water	05/23/18
5	A1-MW-37-SA1D**	1801037-05**	Water	05/23/18
6	16-HS-03-SA1**	1801037-06**	Water	05/23/18
7	16-MW-09-SA1**	1801037-07**	Water	05/23/18
8	16-MW-06-SA1**	1801037-08**	Water	05/23/18
9	FRB-20180523	1801037-09	Water	05/23/18
10	16-HS-03-SA1MS	1801037-06MS	Water	05/23/18
11	16-HS-03-SA1MSD	1801037-06MSD	Water	05/23/18
12				
13				
14				

LDC #: 42613496

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: WC

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42613M96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42613M96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates/Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
Y N N/A Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD/DUP ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		10/11	PFBS	180 (70-130)		45.9 (≤30)	6 (dets)	No qual ~~NA~~
			PFHxA	-210 (↓)		329 (↓)	↓	↓
			PFHpA	140 (70-130)				dets/A
			PFHxS	146 (			↓	
			PFOA	131 (				↓
			PFDA	132 (			(ND)	
			PFDoA	86 (			↓	
			PFTrDA	136 (↓)	133 (70-130)			
			PFHpA			49.6 (≤30)	(dets)	dets/A
			MeFOSAA			41.1 (↓)	(ND)	d

Privileged and Confidential

LDC #: 42623M96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a LCS required?

Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	BBE0244-BS1		( )	( )	( )		
	B		( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	BBE0244-BS1	PFTeDA	153 (70-130)	( )	( )	All (ND)	J+ (all samples)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )	

LDC#: 42613M96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: KK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	4	5		
PFBS	0.230	0.252	9	
PFHxA	1.66	1.71	3	
PFHpA	0.0328	0.0322	~~2~~ NC	
PFHxS	0.155	0.152	2	
PFOA	0.0196	0.0203	~~4~~ NC	
PFNA	0.00170	0.00210	~~21~~ NC	
PFOS	0.0458	0.0416	~~10~~ NC	
PFUnA	0.00525U	0.00135	NC	

LDC #: 4-163496

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C3-PFBS	170 (50-150)		J (4 PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8		214		
		10 (MS)		167		No qual
		11 (MSD)		165		

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LDC #: 46634 96

Validation Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: KK

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/6/2018	M2	PFBS	0	0.51953	0.25	0.0625
			s1	0.9040925	0.5	0.25
			s2	1.9572675	1	1
			s3	3.7049862	2	4
			s4	10.06541	5	25
			s5	19.886856	10	100
			s6	99.722347	50	2500
			s7	204.60758	100	10000
			s8	513.09516	250	62500
			s9	1017.3084	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	-0.63805	c	-0.0700934
Std Err of Y Est				
R Squared		0.9999897		0.9999340
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	2.063159148	-5.34413E-05	2.03725	2.30679E-06
Std Err of Coef.				
Correlation Coefficient		0.999995		
Coefficient of Determination (r^2)		0.999990		

Validation Findings Worksheet
Initial Calibration Calculation Verification

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/6/2018	M2	PFOA	0	0.2482712	0.25	0.0625
			s1	0.5747737	0.5	0.25
			s2	1.0592625	1	1
			s3	1.846235	2	4
			s4	4.6900387	5	25
			s5	10.243193	10	100
			s6	51.521462	50	2500
			s7	93.85144027	100	10000
			s8	228.044994	250	62500
			s9	451.7265496	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	0.76340	c	0.0441882
Std Err of Y Est				
R Squared		0.9998726		0.9994240
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	0.931889278	-6.1517E-05	0.964706	-0.000132122
Std Err of Coef.				
Correlation Coefficient		0.999936		
Coefficient of Determination (r^2)		0.999873		

Validation Findings Worksheet
Initial Calibration Calculation Verification

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/13/2018	M2	PFHxA	0	0.4266035	0.25	0.0625
			s1	0.97093	0.5	0.25
			s2	1.9639255	1	1
			s3	3.6634565	2	4
			s4	8.4481905	5	25
			s5	15.881127	10	100
			s6	85.352945	50	2500
			s7	154.4073192	100	10000
			s8	412.8312447	250	62500
			s9	789.7483287	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	-0.57068	c	0.0713566
Std Err of Y Est				
R Squared		0.9997320		0.9993330
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	1.676648676	-0.000187679	1.64736	-0.000124659
Std Err of Coef.				
Correlation Coefficient		0.999866		
Coefficient of Determination (r^2)		0.999732		

LDC #: 26BU96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 1
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	18060TM2_3	6/7/18	PFBS (1st internal standard)	1.0	0.913	0.911	8.7	8.9
			PFOA (2nd internal standard)	1.0	1.05	1.06	5.4	5.8
			(3rd internalstandard)					
2	18060TM2_28	6/7/18	PFBS (1st internal standard)	10.0	9.27	9.27	7.3	7.3
			PFOA (2nd internal standard)	10.0	9.52	9.53	4.8	4.7
			(3rd internalstandard)					
3	18060TM2_45	6/7/18	PFBS (1st internal standard)	1.0	0.885	0.884	11.5	11.8
			PFOA (2nd internal standard)	1.0	1.10	1.10	9.8	10.1
			(3rd internalstandard)					
4	18061TM2_40	6/13/18	PFHxA (1st internal standard)	10.0	10.4	10.4	4.2	4.5
			(2nd internal standard)					
			(3rd internalstandard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 4963M90

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = | MSC - MSC | * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFBS	0.0907	0.0883	0.582	0.746	0.682	182	181	114	113	~~45.9~~	45.9
PFOA	↓	↓	0.0218	0.141	0.113	131	131	103	103	23.9	23.9

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BBE0244-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFBS	0.0800	NA	0.0918	NA	115	115				
PFOA	↓	↓	0.0941	↓	118	118				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 42683M96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOA:

Conc. = $\frac{(0.964(06) + \sqrt{(0.964(06)^2 - 4 \times (-0.000132)(0)}}{(2)(-0.000132)(2)} \frac{(180 \times 10^5)}{9070} + 0.0448)(0.113)$

= 1.87 ng/L

= 0.00187 µg/L

#	Sample ID	Compound	Reported Concentration (µg/L)	Calculated Concentration ( )	Qualification
	1	PFOA	0.00187		

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LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

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

January 2, 2019

SUBJECT: MCAS Yuma, CTO 3803, Data Validation

Dear Ms. Sudoko,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 10, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #43888:

SDG #	Fraction
280-116898-1, 280-116942-1 280-117007-1, 280-117103-1 280-117110-1, L1846366 L1846592, L1846856 L1847243, L1847316 1803615, 1803626 1803659, 1803676 1803678	Volatiles, 1,4-Dioxane, Wet Chemistry, Perfluoroalkyl and Polyfluoroalkyl Substances

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona; April 2018
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1; 2017
- USEPA National Functional Guidelines for Superfund Organic Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
Project Manager/Chemist

Stage 2B/4 ADR/NEDD 80/20

LDC #43888 (Tetra Tech-EC, Inc.-Irvine, CA / MCAS Yuma, CTO 3803)

PO# 1153059

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) VOA (8260B)		1,4-Diox (8270D -SIM)		PFAs (537)		Cl,SO_4 NO_3-N (9056A)		Fe II (3500 -Fe B)		pH (9040C)																							
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	280-116898-1	12/10/18	01/02/19	1	0	-	-	-	-	1	0	1	0	1	0																				
A	280-116898-1	12/10/18	01/02/19	8	0	-	-	-	-	6	0	6	0	6	0																				
B	280-116942-1	12/10/18	01/02/19	9	0	-	-	-	-	7	0	7	0	7	0																				
C	280-117007-1	12/10/18	01/02/19	7	0	-	-	-	-	6	0	6	0	6	0																				
D	280-117103-1	12/10/18	01/02/19	8	0	-	-	-	-	6	0	6	0	6	0																				
E	280-117110-1	12/10/18	01/02/19	4	0	-	-	-	-	2	0	2	0	2	0																				
F	L1846366	12/10/18	01/02/19	-	-	1	0	-	-	-	-	-	-	-	-																				
F	L1846366	12/10/18	01/02/19	-	-	7	0	-	-	-	-	-	-	-	-																				
G	L1846592	12/10/18	01/02/19	-	-	8	0	-	-	-	-	-	-	-	-																				
H	L1846856	12/10/18	01/02/19	-	-	6	0	-	-	-	-	-	-	-	-																				
I	L1847243	12/10/18	01/02/19	-	-	7	0	-	-	-	-	-	-	-	-																				
J	L1847316	12/10/18	01/02/19	-	-	3	0	-	-	-	-	-	-	-	-																				
K	1803615	12/10/18	01/02/19	-	-	-	-	1	0	-	-	-	-	-	-																				
K	1803615	12/10/18	01/02/19	-	-	-	-	8	0	-	-	-	-	-	-																				
L	1803626	12/10/18	01/02/19	-	-	-	-	9	0	-	-	-	-	-	-																				
M	1803659	12/10/18	01/02/19	-	-	-	-	7	0	-	-	-	-	-	-																				
N	1803676	12/10/18	01/02/19	-	-	-	-	8	0	-	-	-	-	-	-																				
O	1803678	12/10/18	01/02/19	-	-	-	-	4	0	-	-	-	-	-	-																				
Total	T/SM			37	0	32	0	37	0	28	0	28	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190

Shaded cells indicate Stage 4 validation (all other cells are ADR validation).

Data Validation Report
MCAS Yuma, CTO 3803

SDGs: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1, L1846366, L1846592, L1846856, L1847243, L1847316, 1803615, 1803626, 1803659, 1803676, and 1803678

Prepared for

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

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

January 2, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2B and Stage 4 data validation results for samples collected during the November 2018 sampling period. Data validation was performed in accordance with the Final Sampling and Analysis Plan (SAP) for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), a modified outline of the US EPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017), and a modified outline of the US EPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B
1,4-Dioxane by EPA SW 846 Method 8270D utilizing Selective Ion Monitoring (SIM)
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by EPA Method 537 Modified

Wet Chemistry:
Chloride, Nitrate as Nitrogen, and Sulfate by EPA SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

For samples reviewed by automated data review, the sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2B Automated Data Review outliers are presented in Enclosure I. DVRs for samples on which Stage 4 validation was performed are presented in Enclosure II. Validation for 1,4-Dioxane was performed manually and DVRs for Stage 2B and Stage 4 manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, initial and continuing calibrations, laboratory blanks, initial and continuing calibration blanks (ICB/CCBs), surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), ongoing precision recovery (OPR), internal standards, trip blanks, equipment blanks, field rinsate blanks, and field duplicates. Approximately 20 percent of samples were subjected to Stage 4 evaluation as indicated in Attachment 1, which comprises a review of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of the calibrations, ICB/CCBs, and internal standards, and all QC for 1,4-Dioxane, which were validated manually. Quality assurance (QA)/QC criteria specified in the SAP, DoD QSM, and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the exception of eight samples for PFAs, twenty-eight samples for pH, one sample for nitrate as N, and twenty-eight samples for ferrous iron. Due to grossly exceeded holding times (e.g., >2x recommended holding time), 23 ferrous iron results were qualified as rejected (R). The remainder of the data were qualified as detected estimated (J) and non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

II. Instrument Performance Check

A tune was performed at 12 hour intervals as required by the methods.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

All criteria for the initial calibration and initial calibration verifications of each method were met.

IV. Continuing Calibration

All criteria for the continuing calibration verifications of each method were met with the following exceptions:

SDG/ Method	Date	Compound	%D (Limits)	Associated Samples	Flag	A or P
1803676/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-37-SA2D FRB-20181115 A1-MW-31-SA2	UJ (all non-detects)	A
1803678/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-01-SA2 A1-MW-42-SA2 FRB-20181116 EB-20181116	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program with the exception of several blanks for chloride, nitrate as N, and sulfate. The associated sample results were not detected or were significantly greater than the concentrations found in the blanks, therefore no data were qualified. The details are presented in Enclosures I and II.

No contaminant concentrations were detected in the initial or continuing calibration blanks with the following exceptions:

SDG/ Method	Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
280-116898-1/ 9056A	ICB/CCB	Nitrate as Nitrogen Sulfate	0.04526 mg/L 0.3841 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2
280-116942-1/ 9056A	ICB/CCB	Sulfate	0.6931 mg/L	16-HS-03-SA2 16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-19-SA2
280-116942-1/ 9056A	ICB/CCB	Chloride	0.3086 mg/L	16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-53-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2558 mg/L	A1-MW-07-SA2 A1-MW-23-SA2 A1-MW-25-SA2 A1-MW-27-SA2 A1-MW-55-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2618 mg/L	A1-MW-54-SA2
280-117103-1/ 9056A	ICB/CCB	Chloride Sulfate	0.2982 mg/L 0.4094 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-31-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04805 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04749 mg/L	A1-MW-31-SA2
280-117110-1/ 9056A	ICB/CCB	Chloride Sulfate	0.6147 mg/L 0.3987 mg/L	A1-MW-42-SA2

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were not detected or were significantly greater than the concentrations found in the associated blanks.

VI. Field Blank Samples

Five trip blanks were collected and analyzed for VOCs. No contaminants were found.
One equipment blank was collected and analyzed for VOCs and PFAs. No contaminants were found.

Five field rinsate blanks were collected and analyzed for PFAs. No contaminants were found.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the exception of sample EB-20181116 in SDG 280-117110-1 for VOCs. No data were qualified due to high %Rs since the associated results were non-detected.

IX. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for 1,1-dichloroethene, one MS/MSD pair for PFTeDA, one MS/MSD pair for sulfate, three MS/MSD pairs for ferrous iron. The ferrous iron results in sample A1-MW-42-SA2 was qualified as rejected (R) due to MS/MSD %Rs grossly outside QC limits (i.e., < 30%). The remainder of the associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

X. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

XII. Laboratory Control Samples/Ongoing Precision Recovery

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Ongoing precision recovery (OPR) samples were analyzed as required by Method 537 Mod. Percent recoveries (%R) were within QC limits with the exception of two OPR samples for PFTeDA. No data were qualified due to high %Rs since the associated results were non-detected. The details are presented in Enclosure I.

XIII. Field Duplicate Samples

Three field duplicate pairs were collected and analyzed for all methods. All RPDs were within QC limits. RPDs were not calculated when sample results in one or both samples were less than 5X the limit of quantitation (LOQ). The field duplicate result comparisons are provided in Enclosures I and II.

XIV. Internal Standards/Labeled Compounds

All internal standard areas and retention times were within QC limits. All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XV. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

SDG/Method	Sample	Compound	Finding
1803615/537M	A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803626/537M	A1-MW-53-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803659/537M	A1-MW-25-SA2 A1-MW-54-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803678/537M	A1-MW-01-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosures I and II.

XVI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to severe holding time exceedances, data were qualified as rejected in twenty-three samples.

Due to gross MS/MSD %R exceedance, data were qualified as rejected in one sample.

Due to holding time exceedances, data were qualified as estimated in thirty samples.

Due to CCV %D, data were qualified as estimated in twelve samples.

Due to MS/MSD %R, data were qualified as estimated in one sample.

Due to results below the LOQ, data were qualified as estimated in twenty-two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	TB-20181112	280-116898-7	TB	METHOD	8260B	Stage 2B
12-Nov-2018	A1-MW-49-SA2	1803615-03	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2	1803615-04	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2DUP	280-116898-4DUP	DUP	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2D	1803615-05	FD	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2D	280-116898-5	FD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	1803615-06	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9040C	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9056A	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	SM3500 Fe B D	Stage 2B
12-Nov-2018	A1-MW-04-SA2	1803615-01	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9040C	Stage 4

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank
MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-PZ-19-SA2	1803615-09	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-52-SA2	1803615-07	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-05-SA2	1803615-02	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	FRB-20181112	1803615-08	FRB	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	TB-20181113	280-116942-7	TB	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	1803626-02	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-06-SA2DUP	280-116942-2DUP	DUP	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2MS	280-116942-2MS	MS	METHOD	9056A	Stage 2B

N = Normal Sample *MS = Matrix Spike* *DUP = Laboratory Duplicate*
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TB = Trip Blank *EB = Equipment Blank* *FRB = Field Rinsate Blank*

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
13-Nov-2018	16-MW-06-SA2MSD	280-116942-2MSD	MSD	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-18-SA2	1803626-05	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	A1-MW-19-SA2	1803626-06	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-HS-03-SA2	1803626-01	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-HS-03-SA2D	1803626-09	FD	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-HS-03-SA2D	280-116942-9	FD	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-08-SA2	1803626-03	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2	1803626-04	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	9040C	Stage 2B

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FD = Field Duplicate *MSD = Matrix Spike Duplicate*
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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2DUP	280-116942-4DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2MS	280-116942-4MS	MS	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2MSD	280-116942-4MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	A1-MW-53-SA2	1803626-08	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	FRB-20181113	1803626-07	FRB	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	TB-20181114	280-117007-6	TB	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2	1803659-01	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-07-SA2MS	280-117007-1MS	MS	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2MSD	280-117007-1MSD	MSD	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-23-SA2	1803659-02	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-55-SA2	1803659-05	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-55-SA2	280-117007-5	N	METHOD	8260B	Stage 2B

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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

N = Normal Sample
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MSD = Matrix Spike Duplicate
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DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-11-SA2	1803676-01	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-15-SA2	1803676-04	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2	1803676-03	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2DUP	280-117103-3DUP	DUP	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	1803676-05	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	1803676-06	FD	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	280-117103-6	FD	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-31-SA2	1803676-08	N	Gen Prep	537 MOD	Stage 2B

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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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FD = Field Duplicate *MSD = Matrix Spike Duplicate*
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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
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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MSD = Matrix Spike Duplicate
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DUP = Laboratory Duplicate
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Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

11/12/2018 11:40:00

Sample ID: **A1-MW-04-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 2:24:00

Sample ID: **A1-MW-05-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 8:32:00

Sample ID: **A1-MW-49-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 9:25:00

Sample ID: **A1-MW-50-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 10:46:00

Sample ID: **A1-MW-51-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 1:39:00

Sample ID: **A1-MW-52-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-PZ-19-SA2 ***Collected:*** 11/12/2018 12:43:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A ***Matrix:*** AQ

Sample ID: A1-PZ-19-SA2 ***Collected:*** 11/12/2018 12:43:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 2

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	0.896	J B	0.200	LOD	1.00	LOQ	mg/L	J	RI

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-04-SA2 ***Collected:*** 11/12/2018 11:40:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-05-SA2 ***Collected:*** 11/12/2018 2:24:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.119	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: A1-MW-49-SA2 ***Collected:*** 11/12/2018 8:32:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2** ***Collected:*** **11/12/2018 9:25:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.380	HF	0.0500	LOD	0.200	LOQ	mg/L	J	StoA

Sample ID: **A1-MW-51-SA2** ***Collected:*** **11/12/2018 10:46:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0278	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-52-SA2** ***Collected:*** **11/12/2018 1:39:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-PZ-19-SA2** ***Collected:*** **11/12/2018 12:43:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0591	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2** ***Collected:*** **11/12/2018 9:25:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.564	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.780	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-50-SA2D** ***Collected:*** **11/12/2018 9:35:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.630	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2D** ***Collected:*** **11/12/2018 9:35:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.949	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA2** ***Collected:*** **11/12/2018 1:39:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.458	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.811	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA2** ***Collected:*** **11/12/2018 12:43:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.430	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-116942-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **16-HS-03-SA2** ***Collected:*** **11/13/2018 12:00:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.4	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **16-MW-06-SA2** ***Collected:*** **11/13/2018 9:38:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.2	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: EM

Method: 9040C **Matrix: AQ**

Sample ID:16-MW-08-SA2 **Collected: 11/13/2018 1:00:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:16-MW-09-SA2 **Collected: 11/13/2018 1:44:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-18-SA2 **Collected: 11/13/2018 10:31:00 AM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-19-SA2 **Collected: 11/13/2018 11:15:00 AM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-53-SA2 **Collected: 11/13/2018 2:54:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A **Matrix: AQ**

Sample ID:16-MW-06-SA2 **Collected: 11/13/2018 9:38:00 AM** **Analysis Type: RE/TOT** **Dilution: 10**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Sulfate	695	F1	5.00	LOD	50.0	LOQ	mg/L	J	Ms

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: GENCHEM

Method: 9056A ***Matrix:*** AQ

Sample ID: A1-MW-18-SA2 ***Collected:*** 11/13/2018 10:31:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 5

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	11.0	H	0.500	LOD	2.50	LOQ	mg/L	J	StoA

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: 16-HS-03-SA2 ***Collected:*** 11/13/2018 12:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-06-SA2 ***Collected:*** 11/13/2018 9:38:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-08-SA2 ***Collected:*** 11/13/2018 1:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-09-SA2 ***Collected:*** 11/13/2018 1:44:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-18-SA2 ***Collected:*** 11/13/2018 10:31:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-19-SA2 ***Collected:*** 11/13/2018 11:15:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-53-SA2 ***Collected:*** 11/13/2018 2:54:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: 16-MW-06-SA2 ***Collected:*** 11/13/2018 9:38:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.195	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: 16-MW-08-SA2 ***Collected:*** 11/13/2018 1:00:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.538	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: 16-MW-09-SA2 ***Collected:*** 11/13/2018 1:44:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.271	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-19-SA2 ***Collected:*** 11/13/2018 11:15:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.545	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1,

Laboratory: TA DEN

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-117007-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA2** ***Collected:*** **11/14/2018 9:07:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-23-SA2** ***Collected:*** **11/14/2018 10:03:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-25-SA2** ***Collected:*** **11/14/2018 12:15:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-27-SA2** ***Collected:*** **11/14/2018 1:03:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-54-SA2** ***Collected:*** **11/14/2018 3:17:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-55-SA2** ***Collected:*** **11/14/2018 11:02:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117007-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

11/14/2018 9:07:00

Sample ID: **A1-MW-07-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 10:03:00

Sample ID: **A1-MW-23-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 12:15:00

Sample ID: **A1-MW-25-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 1:03:00

Sample ID: **A1-MW-27-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 3:17:00

Sample ID: **A1-MW-54-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 11:02:00

Sample ID: **A1-MW-55-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117007-1

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-07-SA2 ***Collected:*** 11/14/2018 9:07:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.357	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.826	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-25-SA2 ***Collected:*** 11/14/2018 12:15:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.273	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.539	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-117103-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-11-SA2 ***Collected:*** 11/15/2018 9:06:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-13-SA2 ***Collected:*** 11/15/2018 8:20:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-14-SA2 ***Collected:*** 11/15/2018 10:53:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

11/15/2018 10:07:00

Sample ID: **A1-MW-15-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/15/2018 2:16:00

Sample ID: **A1-MW-31-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/15/2018 11:54:00

Sample ID: **A1-MW-37-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

11/15/2018 9:06:00

Sample ID: **A1-MW-11-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/15/2018 8:20:00

Sample ID: **A1-MW-13-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/15/2018 10:53:00

Sample ID: **A1-MW-14-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-15-SA2 ***Collected:*** 11/15/2018 10:07:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-31-SA2 ***Collected:*** 11/15/2018 2:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-37-SA2 ***Collected:*** 11/15/2018 11:54:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.156	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-14-SA2 ***Collected:*** 11/15/2018 10:53:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.635	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.728	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-15-SA2 ***Collected:*** 11/15/2018 10:07:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.426	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-37-SA2 ***Collected:*** 11/15/2018 11:54:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.379	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-37-SA2** ***Collected:*** **11/15/2018 11:54:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.914	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA2D** ***Collected:*** **11/15/2018 12:04:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.373	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.909	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-117110-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA2** ***Collected:*** **11/16/2018 8:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-42-SA2** ***Collected:*** **11/16/2018 9:17:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA2** ***Collected:*** **11/16/2018 8:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117110-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-42-SA2 ***Collected:*** 11/16/2018 9:17:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	Ms, StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-42-SA2 ***Collected:*** 11/16/2018 9:17:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.238	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.367	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1,

Laboratory: TA DEN

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

Reason Code Legend

Reason Code	*Description*
Mb	Method Blank Contamination
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
RI	Reporting Limit Trace Value
StoA	Sampling to Analysis Estimation
StoA	Sampling to Analysis Rejection
Surr	Surrogate/Tracer Recovery Upper Estimation

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803615

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/12/2018 11:40:

Sample ID: A1-MW-04-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00646	J	0.00442	LOD	0.00881	LOQ	ug/L	J	RI

11/12/2018 2:24:0

Sample ID: A1-MW-05-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00359	J, Q	0.00431	LOD	0.00864	LOQ	ug/L	J	RI

11/12/2018 9:25:0

Sample ID: A1-MW-50-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00474	J, Q	0.00446	LOD	0.00894	LOQ	ug/L	J	RI

11/12/2018 9:35:0

Sample ID: A1-MW-50-SA2D **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00494	J	0.00439	LOD	0.00874	LOQ	ug/L	J	RI

11/12/2018 1:39:0

Sample ID: A1-MW-52-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00356	J	0.00435	LOD	0.00872	LOQ	ug/L	J	RI

11/12/2018 12:43:

Sample ID: A1-PZ-19-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00548	J	0.00442	LOD	0.00884	LOQ	ug/L	J	RI
PFOS	0.00321	J, Q	0.00442	LOD	0.00884	LOQ	ug/L	J	RI

SDG: 1803626

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803626

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/13/2018 9:38:0
Sample ID:16-MW-06-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00582	J	0.00417	LOD	0.00835	LOQ	ug/L	J	RI

11/13/2018 1:44:0
Sample ID:16-MW-09-SA2 **Collected:**PM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00449	J	0.00427	LOD	0.00852	LOQ	ug/L	J	RI
PFOS	0.00503	J	0.00427	LOD	0.00852	LOQ	ug/L	J	RI

11/13/2018 10:31:
Sample ID:A1-MW-18-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00309	J	0.00427	LOD	0.00856	LOQ	ug/L	J	RI

11/13/2018 11:15:
Sample ID:A1-MW-19-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFDA	0.00721	J	0.00431	LOD	0.00861	LOQ	ug/L	J	RI
PFNA	0.00398	J	0.00431	LOD	0.00861	LOQ	ug/L	J	RI

11/13/2018 2:54:0
Sample ID:A1-MW-53-SA2 **Collected:**PM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00400	J, Q	0.00420	LOD	0.00841	LOQ	ug/L	J	RI

SDG: 1803659

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/14/2018 10:03:
Sample ID:A1-MW-23-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00594	J	0.00424	LOD	0.00849	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA
Method: 537 MOD ***Matrix:*** AQ

11/15/2018 9:06:0

Sample ID: A1-MW-11-SA2 ***Collected:*** AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFBS	0.184		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFDoA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFHpA	0.0352		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxA	0.460		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxS	0.109		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFNA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOS	0.00916		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFTeDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFUnA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOA	0.0349		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE

11/15/2018 8:20:0

Sample ID: A1-MW-13-SA2 ***Collected:*** AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFBS	0.259		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFDoA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFHpA	0.105		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFHxA	0.655		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFHxS	0.368		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFNA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFOA	0.0695		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFOS	0.107		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFTeDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFUnA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/15/2018 10:53

Sample ID: A1-MW-14-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFBS	0.101		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFDoA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFHpA	0.0658		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxA	0.327		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxS	0.253		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFNA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOA	0.0527		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFOS	0.0604		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFTeDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFUnA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE

11/15/2018 10:07

Sample ID: A1-MW-15-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFBS	0.363		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFDoA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFHpA	0.0773		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFHxA	0.596		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFHxS	0.322		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFNA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFOA	0.190		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFOS	0.0185		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFTeDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFUnA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/15/2018 2:16:0

Sample ID: A1-MW-31-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFBS	0.0235		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFDoA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFHpA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFHxA	0.0732		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFHxS	0.00855		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFNA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFOA	0.00388	J	0.00427	LOD	0.00855	LOQ	ug/L	J	RI, StoE
PFOS	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFTeDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFUnA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE

11/15/2018 11:54:

Sample ID: A1-MW-37-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFBS	0.151		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFDoA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFHpA	0.0856		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFHxA	0.520		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFHxS	0.438		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFNA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFOA	0.0599		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFOS	0.0288		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFTeDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFUnA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/15/2018 12:04:

Sample ID: A1-MW-37-SA2D **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFBS	0.150		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFDoA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFHpA	0.0830		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFHxA	0.529		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFHxS	0.429		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFNA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFOA	0.0555		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFOS	0.0275		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFTeDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFUnA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE

11/15/2018 2:30:0

Sample ID: FRB-20181115 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFBS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFDoA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHpA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHxA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHxS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFNA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFOA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFOS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFTeDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFUnA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803678

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/16/2018 8:12:0
Sample ID: A1-MW-01-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00446	U	0.00446	LOD	0.00894	LOQ	ug/L	UJ	Ccv

11/16/2018 9:17:0
Sample ID: A1-MW-42-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00424	U	0.00424	LOD	0.00849	LOQ	ug/L	UJ	Ccv

11/16/2018 9:50:0
Sample ID: EB-20181116 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00424	U	0.00424	LOD	0.00849	LOQ	ug/L	UJ	Ccv

11/16/2018 9:40:0
Sample ID: FRB-20181116 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00481	U	0.00481	LOD	0.00965	LOQ	ug/L	UJ	Ccv

* denotes a non-reportable result

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

Reason Code Legend

Reason Code	*Description*
Ccv	Continuing Calibration Verification Percent Difference Lower Estimation
Lcs	Laboratory Control Spike Upper Estimation
Ms	Matrix Spike Precision
Ms	Matrix Spike Upper Estimation
RI	Reporting Limit Trace Value
StoE	Sampling to Extraction Estimation

* denotes a non-reportable result

Enclosure I

Stage 2B ADR Outliers

(Including Manual Review Outliers)

Quality Control
Outlier Reports

280-116898-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA2 (RES/TOT)	Sampling To Analysis	267.00	24.00	HOURS	J (all detects)
A1-MW-05-SA2 (RES/TOT)		335.00	24.00	HOURS	
A1-MW-49-SA2 (RES/TOT)		341.00	24.00	HOURS	
A1-MW-50-SA2 (RES/TOT)		270.00	24.00	HOURS	
A1-MW-51-SA2 (RES/TOT)		268.75	24.00	HOURS	
A1-MW-52-SA2 (RES/TOT)		265.75	24.00	HOURS	
A1-PZ-19-SA2 (RES/TOT)		336.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA2 (RES/TOT)	Sampling To Analysis	222.75	24.00	HOURS	J(all detects)
A1-MW-05-SA2 (RES/TOT)		220.00	24.00	HOURS	R(all non-detects)
A1-MW-49-SA2 (RES/TOT)		226.00	24.00	HOURS	
A1-MW-50-SA2 (RES/TOT)		225.00	24.00	HOURS	
A1-MW-51-SA2 (RES/TOT)		223.75	24.00	HOURS	
A1-MW-52-SA2 (RES/TOT)		220.75	24.00	HOURS	
A1-PZ-19-SA2 (RES/TOT)		221.75	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-437370/6	11/13/2018 12:25:00 PM	Sulfate	0.3332 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2
MB 280-437371/6	11/13/2018 12:25:00 PM	NITRATE	0.04530 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2

Reporting Limit Outliers

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-50-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.564 0.780	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-50-SA2D	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.630 0.949	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-52-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.458 0.811	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-PZ-19-SA2	TRICHLOROETHENE	J	0.430	1.00	LOQ	ug/L	J (all detects)

Method: 9056A
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-PZ-19-SA2	NITRATE	J B	0.896	1.00	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-05-SA2	Ferrous Iron	J HF	0.119	0.200	LOQ	mg/L	J (all detects)
A1-MW-51-SA2	Ferrous Iron	J HF	0.0278	0.200	LOQ	mg/L	J (all detects)
A1-PZ-19-SA2	Ferrous Iron	J HF	0.0591	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: Prep280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	A1-MW-50-SA2	A1-MW-50-SA2D			
1,1-DICHLOROETHENE	0.564	0.630	NC	30.00	No Qualifiers Applied
TRICHLOROETHENE	0.780	0.949	NC	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888A1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/18
SDG #: 280-116898-1 ADR/Stage ~~2B~~ 4 Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: DM
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20 %
IV.	Continuing calibration	A	CCV ≤ 20/50 %
V.	Laboratory Blanks	N	Not reviewed for ADR validation.
VI.	Field blanks		
VII.	Surrogate spikes		Not reviewed for ADR validation.
VIII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation.
IX.	Laboratory control samples		Not reviewed for ADR validation.
X.	Field duplicates		
XI.	Internal standards	A	Not reviewed for ADR validation.
XII.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation.
XIII.	Target compound identification		Not reviewed for ADR validation.
XIV.	System performance		Not reviewed for ADR validation.
XV.	Overall assessment of data		Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	A1-MW-50-SA2D**	280-116898-5**	Water	11/12/18
6	A1-MW-51-SA2**	280-116898-6**	Water	11/12/18
7	TB-20181112	280-116898-7	Water	11/12/18
8	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
9	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
10	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
11	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
12				
13	MB 280-498700/6 - 498747/4			

LDC #: 43888A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-116898-1 ADR/~~Stage 4~~ Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	Not reviewed for ADR validation. MS/MSD
VII.	Duplicate sample analysis	A	Not reviewed for ADR validation. DUP
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for ADR validation.
XI	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	A1-MW-51-SA2	280-116898-6	Water	11/12/18
6	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
7	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
8	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
9	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
10	A1-MW-50-SA2DUP	280-116898-4DUP	Water	11/12/18
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1 → 7	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+3)
QC 8 → 10	↓	pH TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: MG
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9040C		SM 3500 Fe B			
Parameters:		pH		Ferrous Iron			
Technical holding time:		24 hr		24 hr			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	11:40 11-12-18	14:43 11-23-18	(11 days)				J/UJ/P (det)
2	14:24 11-12-18	13:37 11-26-18	(14)				( )
3	08:32 11-12-18	13:36 11-26-18	(14)				( )
4	09:35 11-12-18	15:19 11-23-18	(11)				( )
5	10:46 11-12-18	15:33 11-23-18	(11)				( )
6	12:43 11-12-18	13:32 11-26-18	(14)				( )
7	13:39 11-12-18	15:23 11-23-18	(11)				( )
1	11:40 11-12-18			18:30 11-21-18	(9 days)		J/R/P (N.D.)
2	14:24 11-12-18				( )		(det)
3	08:32 11-12-18				( )		(ND)
4	09:35 11-12-18				( )		(det)
5	10:46 11-12-18				( )		( )
6	12:43 11-12-18				( )		( )
7	13:39 11-12-18				( )		(ND)

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all **(NO3-N: 2x dil, SO4: 20x dil, >5x or ND)**

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
NO3-N	0.04530	0.04526	0.4526									
SO4	0.3332	0.3841	38.41									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-116942-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA2 (RES/TOT)	Sampling To Analysis	316.00	24.00	HOURS	J (all detects)
16-MW-06-SA2 (RES/TOT)		318.50	24.00	HOURS	
16-MW-08-SA2 (RES/TOT)		314.75	24.00	HOURS	
16-MW-09-SA2 (RES/TOT)		314.50	24.00	HOURS	
A1-MW-18-SA2 (RES/TOT)		317.50	24.00	HOURS	
A1-MW-19-SA2 (RES/TOT)		316.25	24.00	HOURS	
A1-MW-53-SA2 (RES/TOT)		312.75	24.00	HOURS	

Method: 9056A **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-18-SA2 (RES/TOT)	Sampling To Analysis	62.25	48.00	HOURS	J(all detects)
		62.50	48.00	HOURS	UJ(all non-detects)

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA2 (RES/TOT)	Sampling To Analysis	198.50	24.00	HOURS	J(all detects)
16-MW-06-SA2 (RES/TOT)		200.75	24.00	HOURS	R(all non-detects)
16-MW-08-SA2 (RES/TOT)		197.50	24.00	HOURS	
16-MW-09-SA2 (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2DUP (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2MS (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2MSD (RES/TOT)		196.75	24.00	HOURS	
A1-MW-18-SA2 (RES/TOT)		200.00	24.00	HOURS	
A1-MW-19-SA2 (RES/TOT)		199.25	24.00	HOURS	
A1-MW-53-SA2 (RES/TOT)		195.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-MW-06-SA2MS 16-MW-06-SA2MSD (16-MW-06-SA2)	Sulfate	80	74	87.00-112.00	-	Sulfate	J (all detects) UJ (all non-detects)

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-MW-09-SA2MS 16-MW-09-SA2MSD (16-MW-09-SA2)	Ferrous Iron	53	51	85.00-113.00	-	Ferrous Iron	J(all detects) UJ(all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA2	TRICHLOROETHENE	J	0.195	1.00	LOQ	ug/L	J (all detects)
16-MW-08-SA2	TETRACHLOROETHENE	J	0.538	1.00	LOQ	ug/L	J (all detects)
16-MW-09-SA2	TETRACHLOROETHENE	J	0.271	1.00	LOQ	ug/L	J (all detects)
A1-MW-19-SA2	TRICHLOROETHENE	J	0.545	1.00	LOQ	ug/L	J (all detects)

LDC #: 43888B1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-116942-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: DG
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%.
IV.	Continuing calibration	A	CCV ≤ 20/50%.
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	280-116942-1	Water	11/13/18
2	16-MW-06-SA2	280-116942-2	Water	11/13/18
3	16-MW-08-SA2	280-116942-3	Water	11/13/18
4	16-MW-09-SA2	280-116942-4	Water	11/13/18
5	A1-MW-18-SA2	280-116942-5	Water	11/13/18
6	A1-MW-19-SA2	280-116942-6	Water	11/13/18
7	TB-20181113	280-116942-7	Water	11/13/18
8	A1-MW-53-SA2	280-116942-8	Water	11/13/18
9	16-HS-063-SA2D	280-116942-9	Water	11/13/18
10				
11				
12	MB 280-438817/4			
13				

(H, AA, S only)

LDC #: 43888B6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-116942-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}; NO3 out for #5
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#8/9: SO4 fails, #11/12: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	280-116942-1	Water	11/13/18
2	16-MW-06-SA2	280-116942-2	Water	11/13/18
3	16-MW-08-SA2	280-116942-3	Water	11/13/18
4	16-MW-09-SA2	280-116942-4	Water	11/13/18
5	A1-MW-18-SA2	280-116942-5	Water	11/13/18
6	A1-MW-19-SA2	280-116942-6	Water	11/13/18
7	A1-MW-53-SA2	280-116942-8	Water	11/13/18
8	16-MW-06-SA2MS	280-116942-2MS	Water	11/13/18
9	16-MW-06-SA2MSD	280-116942-2MSD	Water	11/13/18
10	16-MW-06-SA2DUP	280-116942-2DUP	Water	11/13/18
11	16-MW-09-SA2MS	280-116942-4MS	Water	11/13/18
12	16-MW-09-SA2MSD	280-116942-4MSD	Water	11/13/18
13	16-MW-09-SA2DUP	280-116942-4DUP	Water	11/13/18
14	PBW1			
15	PBW2			

Notes:

LDC #: 43888B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→7	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 8→10	↓	pH TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
↓ 11→13	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888B6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-4,6 (various dilutions, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
SO4		0.6931	3.466									

Conc. units: mg/L **Associated Samples:** 2,3,4,7 (various dilutions, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.3086	1.543									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117007-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA2 (RES/TOT)	Sampling To Analysis	363.25	24.00	HOURS	J (all detects)
A1-MW-23-SA2 (RES/TOT)		362.25	24.00	HOURS	
A1-MW-25-SA2 (RES/TOT)		359.75	24.00	HOURS	
A1-MW-27-SA2 (RES/TOT)		359.25	24.00	HOURS	
A1-MW-54-SA2 (RES/TOT)		356.75	24.00	HOURS	
A1-MW-55-SA2 (RES/TOT)		361.00	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA2 (RES/TOT)	Sampling To Analysis	177.50	24.00	HOURS	J(all detects)
A1-MW-23-SA2 (RES/TOT)		176.50	24.00	HOURS	R(all non-detects)
A1-MW-25-SA2 (RES/TOT)		174.25	24.00	HOURS	
A1-MW-27-SA2 (RES/TOT)		173.50	24.00	HOURS	
A1-MW-54-SA2 (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2DUP (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2MS (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2MSD (RES/TOT)		171.25	24.00	HOURS	
A1-MW-55-SA2 (RES/TOT)		175.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-54-SA2MS A1-MW-54-SA2MSD (A1-MW-54-SA2)	Ferrous Iron	34	35	85.00-113.00	-	Ferrous Iron	J (all detects) UJ (all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-07-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.357 0.826	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-25-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.273 0.539	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

LDC #: 43888C1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117007-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JV
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	280-117007-1	Water	11/14/18
2	A1-MW-23-SA2	280-117007-2	Water	11/14/18
3	A1-MW-25-SA2	280-117007-3	Water	11/14/18
4	A1-MW-27-SA2	280-117007-4	Water	11/14/18
5	A1-MW-55-SA2	280-117007-5	Water	11/14/18
6	TB-20181114	280-117007-6	Water	11/14/18
7	A1-MW-54-SA2	280-117007-7	Water	11/14/18
8	A1-MW-07-SA2MS	280-117007-1MS	Water	11/14/18
9	A1-MW-07-SA2MSD	280-117007-1MSD	Water	11/14/18
10				
11	MB 280-438841/6			
12				
13				

(H, AA, S only)

LDC #: 43888C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117007-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#7/8: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	280-117007-1	Water	11/14/18
2	A1-MW-23-SA2	280-117007-2	Water	11/14/18
3	A1-MW-25-SA2	280-117007-3	Water	11/14/18
4	A1-MW-27-SA2	280-117007-4	Water	11/14/18
5	A1-MW-55-SA2	280-117007-5	Water	11/14/18
6	A1-MW-54-SA2	280-117007-7	Water	11/14/18
7	A1-MW-54-SA2MS	280-117007-7MS	Water	11/14/18
8	A1-MW-54-SA2MSD	280-117007-7MSD	Water	11/14/18
9	A1-MW-54-SA2DUP	280-117007-7DUP	Water	11/14/18
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→6	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 7→9	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888C6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-5 (10x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.2558	12.79									

Conc. units: mg/L **Associated Samples:** 6 (10x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual.								
Cl		0.2618	13.09									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117103-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA2 (RES/TOT)	Sampling To Analysis	340.75	24.00	HOURS	J (all detects)
A1-MW-13-SA2 (RES/TOT)		341.00	24.00	HOURS	
A1-MW-14-SA2 (RES/TOT)		338.75	24.00	HOURS	
A1-MW-14-SA2DUP (RES/TOT)		338.75	24.00	HOURS	
A1-MW-15-SA2 (RES/TOT)		339.75	24.00	HOURS	
A1-MW-31-SA2 (RES/TOT)		335.50	24.00	HOURS	
A1-MW-37-SA2 (RES/TOT)		337.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA2 (RES/TOT)	Sampling To Analysis	153.50	24.00	HOURS	J(all detects)
A1-MW-13-SA2 (RES/TOT)		154.25	24.00	HOURS	R(all non-detects)
A1-MW-14-SA2 (RES/TOT)		151.75	24.00	HOURS	
A1-MW-15-SA2 (RES/TOT)		152.50	24.00	HOURS	
A1-MW-31-SA2 (RES/TOT)		148.25	24.00	HOURS	
A1-MW-37-SA2 (RES/TOT)		150.75	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-437914/6	11/16/2018 5:36:00 PM	CHLORIDE Sulfate	0.2635 mg/L 0.3386 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2
MB 280-437915/6	11/16/2018 5:36:00 PM	NITRATE	0.04638 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-14-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.635 0.728	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-15-SA2	TRICHLOROETHENE	J	0.426	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.379 0.914	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-37-SA2D	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.373 0.909	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-37-SA2	Ferrous Iron	J HF	0.156	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: Prep280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA2	**A1-MW-37-SA2D**			
1,1-DICHLOROETHENE	0.379	0.373	NC	30.00	No Qualifiers Applied
TRICHLOROETHENE	0.914	0.909	NC	30.00	

LDC #: 43888D1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117103-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: SV6
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15? ICV ≤ 20?
IV.	Continuing calibration	A	CCV ≤ 20/50?
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	280-117103-1	Water	11/15/18
2	A1-MW-13-SA2	280-117103-2	Water	11/15/18
3	A1-MW-14-SA2	280-117103-3	Water	11/15/18
4	A1-MW-15-SA2	280-117103-4	Water	11/15/18
5	A1-MW-37-SA2	280-117103-5	Water	11/15/18
6	A1-MW-37-SA2D	280-117103-6	Water	11/15/18
7	TB-20181115	280-117103-7	Water	11/15/18
8	A1-MW-31-SA2	280-117103-8	Water	11/15/18
9				
10				
11				
12	MB 280-438823/9			
13				

(H, AA, S only)

LDC #: 43888D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117103-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	client specified
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	280-117103-1	Water	11/15/18
2	A1-MW-13-SA2	280-117103-2	Water	11/15/18
3	A1-MW-14-SA2	280-117103-3	Water	11/15/18
4	A1-MW-15-SA2	280-117103-4	Water	11/15/18
5	A1-MW-37-SA2	280-117103-5	Water	11/15/18
6	A1-MW-31-SA2	280-117103-8	Water	11/15/18
7	A1-MW-14-SA2DUP	280-117103-3DUP	Water	11/15/18
8				
9				
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→6	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 7	↓	(pH) TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888D6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all (20x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.2982	29.82									
SO4		0.4094	40.94									

Conc. units: mg/L **Associated Samples:** 1-5 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
NO3-N		0.04805	0.2402									

Conc. units: mg/L **Associated Samples:** 6 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual.								
NO3-N		0.04749	0.2374									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117110-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA2 (RES/TOT)	Sampling To Analysis	318.00	24.00	HOURS	J (all detects)
A1-MW-42-SA2 (RES/TOT)		316.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA2 (RES/TOT)	Sampling To Analysis	130.25	24.00	HOURS	J(all detects)
A1-MW-42-SA2 (RES/TOT)		129.25	24.00	HOURS	R(all non-detects)
A1-MW-42-SA2DUP (RES/TOT)		129.25	24.00	HOURS	
A1-MW-42-SA2MS (RES/TOT)		129.25	24.00	HOURS	
A1-MW-42-SA2MSD (RES/TOT)		129.25	24.00	HOURS	

Surrogate Outlier Report

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**
Matrix: **AQ**

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
EB-20181116	1,2-DICHLOROETHANE-D4	122	81.00-118.00	All Target Analytes	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-42-SA2MS A1-MW-42-SA2MSD (A1-MW-42-SA2)	Ferrous Iron	27	27	85.00-113.00	-	Ferrous Iron	J (all detects) R (all non-detects)

Method: 8260B
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-01-SA2MSD (A1-MW-01-SA2)	1,1-DICHLOROETHENE	-	-	71.00-131.00	22 (20.00)	1,1-DICHLOROETHENE	J(all detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-42-SA2	1,1-DICHLOROETHENE	J	0.238	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.367	1.00	LOQ	ug/L	

LDC #: 43888E1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117110-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JV
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	TB
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	NA	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	280-117110-1	Water	11/16/18
2	A1-MW-42-SA2	280-117110-2	Water	11/16/18
3	TB-20181116	280-117110-3	Water	11/16/18
4	EB-20181116	280-117110-4	Water	11/16/18
5	A1-MW-01-SA2MS	280-117110-1MS	Water	11/16/18
6	A1-MW-01-SA2MSD	280-117110-1MSD	Water	11/16/18
7				
8				
9				

Notes:

(H, AA, S only)

LDC #: 43888E6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117110-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#3/4: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	280-117110-1	Water	11/16/18
2	A1-MW-42-SA2	280-117110-2	Water	11/16/18
3	A1-MW-42-SA2MS	280-117110-2MS	Water	11/16/18
4	A1-MW-42-SA2MSD	280-117110-2MSD	Water	11/16/18
5	A1-MW-42-SA2DUP	280-117110-2DUP	Water	11/16/18
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1, 2	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 3→5	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888E6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 2 (20x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.6147	61.47									
SO4		0.3987	39.87									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

1803615

Reporting Limit Outliers

Lab Reporting Batch ID: 1803615 **Laboratory: Vista**

EDD Filename: 1803615 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-04-SA2	PFOA	J	0.00646	0.00881	LOQ	ug/L	J (all detects)
A1-MW-05-SA2	PFHxS	J, Q	0.00359	0.00864	LOQ	ug/L	J (all detects)
A1-MW-50-SA2	PFHpA	J, Q	0.00474	0.00894	LOQ	ug/L	J (all detects)
A1-MW-50-SA2D	PFHpA	J	0.00494	0.00874	LOQ	ug/L	J (all detects)
A1-MW-52-SA2	PFOS	J	0.00356	0.00872	LOQ	ug/L	J (all detects)
A1-PZ-19-SA2	PFHpA PFOS	J J, Q	0.00548 0.00321	0.00884 0.00884	LOQ LOQ	ug/L ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803615 **Laboratory: Vista**

EDD Filename: Prep1803615 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-50-SA2	**A1-MW-50-SA2D**			
PFBS	0.0250	0.0264	5	30.00	
PFHpA	0.00474	0.00494	NC	30.00	
PFHxA	0.0806	0.0829	3	30.00	No Qualifiers Applied
PFHxS	0.0367	0.0355	3	30.00	
PFOA	0.00947	0.00878	8	30.00	

LDC #: 43888K96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803615 ADR/Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JM
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 20% Individual ≤ 30% ICV ≤ 30%
IV.	Continuing calibration/ISC	A	CCV ≤ 30% true conc.
V.	Laboratory Blanks	N	Not reviewed for ADR validation.
VI.	Field blanks		
VII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation.
VIII.	Laboratory control samples		Not reviewed for ADR validation.
IX.	Field duplicates		
X.	Labeled Compounds	A	Not reviewed for ADR validation.
XI.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation.
XII.	Target compound identification		Not reviewed for ADR validation.
XIII.	System performance		Not reviewed for ADR validation.
XIV.	Overall assessment of data		Not reviewed for ADR validation.

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	1803615-01**	Water	11/12/18
2	A1-MW-05-SA2**	1803615-02**	Water	11/12/18
3	A1-MW-49-SA2**	1803615-03**	Water	11/12/18
4	A1-MW-50-SA2**	1803615-04**	Water	11/12/18
5	A1-MW-50-SA2D**	1803615-05**	Water	11/12/18
6	A1-MW-51-SA2**	1803615-06**	Water	11/12/18
7	A1-MW-52-SA2**	1803615-07**	Water	11/12/18
8	FRB-20181112	1803615-08	Water	11/12/18
9	A1-~~MW~~ PZ-19-SA2**	1803615-09**	Water	11/12/18
10	A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
11	A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18
12				
13				
14	PBW0091-BLK1			
15				

Quality Control
Outlier Reports

1803626

Reporting Limit Outliers

Lab Reporting Batch ID: 1803626 **Laboratory: Vista**

EDD Filename: 1803626 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA2	PFOS	J	0.00582	0.00835	LOQ	ug/L	J (all detects)
16-MW-09-SA2	PFOA PFOS	J J	0.00449 0.00503	0.00852 0.00852	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-18-SA2	PFOA	J	0.00309	0.00856	LOQ	ug/L	J (all detects)
A1-MW-19-SA2	PFDA PFNA	J J	0.00721 0.00398	0.00861 0.00861	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-53-SA2	PFOS	J, Q	0.00400	0.00841	LOQ	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803626 **Laboratory: Vista**

EDD Filename: 1803626 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	16-HS-03-SA2	**16-HS-03-SA2D**			
PFBS	1.34	1.39	4	30.00	
PFHpA	0.405	0.412	2	30.00	
PFHxA	10.3	11.7	13	30.00	No Qualifiers Applied
PFHxS	0.324	0.312	4	30.00	
PFOA	0.0206	0.0200	3	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888L96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803626 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JVC
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	r² Individual ≤30% Mean value ICV ≤30%
IV.	Continuing calibration/ISC	A	CCV ≤30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	N/A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	1803626-01	Water	11/13/18
2	16-MW-06-SA2	1803626-02	Water	11/13/18
3	16-MW-08-SA2	1803626-03	Water	11/13/18
4	16-MW-09-SA2	1803626-04	Water	11/13/18
5	A1-MW-18-SA2	1803626-05	Water	11/13/18
6	A1-MW-19-SA2	1803626-06	Water	11/13/18
7	FRB-20181113	1803626-07	Water	11/13/18
8	A1-MW-53-SA2	1803626-08	Water	11/13/18
9	16-HS-03-SA2D	1803626-09	Water	11/13/18
10				
11				

Notes:

Quality Control
Outlier Reports

1803659

Reporting Limit Outliers

Lab Reporting Batch ID: 1803659 **Laboratory: Vista**

EDD Filename: 1803659 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-23-SA2	PFHxS	J	0.00594	0.00849	LOQ	ug/L	J (all detects)

LDC #: 43888M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803659 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: SM
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	~~r~~ r Individual ≤30% ICV ≤ 30% True value
IV.	Continuing calibration/ISC	A	CCV ≤ 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	~~N~~ A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	1803659-01	Water	11/14/18
2	A1-MW-23-SA2	1803659-02	Water	11/14/18
3	A1-MW-25-SA2	1803659-03	Water	11/14/18
4	A1-MW-27-SA2	1803659-04	Water	11/14/18
5	A1-MW-55-SA2	1803659-05	Water	11/14/18
6	A1-MW-54-SA2	1803659-06	Water	11/14/18
7	FRB-20181114	1803659-07	Water	11/14/18
8				
9				
10				

Notes:

	B8K0149-BLK1						

Quality Control
Outlier Reports

1803676

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD **Preparation Method: Gen Prep**

Matrix: AQ

Sample ID	*Type*	*Actual*	*Criteria*	*Units*	*Flag*
A1-MW-11-SA2 (RES)	Sampling To Extraction	15.00	14.00	DAYS	J (all detects)
A1-MW-13-SA2 (RES)		15.00	14.00	DAYS	UJ (all non-detects)
A1-MW-14-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-15-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-31-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-37-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-37-SA2D (RES)		15.00	14.00	DAYS	
FRB-20181115 (RES)		15.00	14.00	DAYS	

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8K0153-BS1 (A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2 A1-MW-37-SA2D FRB-20181115)	PFTeDA	140	-	70.00-130.00	-	PFTeDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-31-SA2	PFOA	J	0.00388	0.00855	LOQ	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA2	**A1-MW-37-SA2D**			
PFBS	0.151	0.150	1	30.00	No Qualifiers Applied
PFHpA	0.0856	0.0830	3	30.00	
PFHxA	0.520	0.529	2	30.00	
PFHxS	0.438	0.429	2	30.00	
PFOA	0.0599	0.0555	8	30.00	
PFOS	0.0288	0.0275	5	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888N96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803676 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: DG
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A, ~~A~~SW	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	r r Individual ≤30% ICV≤30% true value
IV.	Continuing calibration/ISC	SW	CCV≤30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	~~N~~ A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	1803676-01	Water	11/15/18
2	A1-MW-13-SA2	1803676-02	Water	11/15/18
3	A1-MW-14-SA2	1803676-03	Water	11/15/18
4	A1-MW-15-SA2	1803676-04	Water	11/15/18
5	A1-MW-37-SA2	1803676-05	Water	11/15/18
6	A1-MW-37-SA2D	1803676-06	Water	11/15/18
7	FRB-20181115	1803676-07	Water	11/15/18
8	A1-MW-31-SA2	1803676-08	Water	11/15/18
9				
10				
11				

Notes:

	B8K0153-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC #: 43588 N96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: MG
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y N N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	12/03/18	181203M1_3	I	42.4	All (ND)	J/UJ/A

Quality Control
Outlier Reports

1803678

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803678 **Laboratory: Vista**

EDD Filename: 1803678 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-01-SA2MS A1-MW-01-SA2MSD (A1-MW-01-SA2)	PFTeDA	139	-	70.00-130.00	31.7 (30.00)	PFTeDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803678 **Laboratory: Vista**

EDD Filename: 1803678 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	LCS %R	LCSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
B8K0153-BS1 (A1-MW-01-SA2 A1-MW-42-SA2 EB-20181116 FRB-20181116)	PFTeDA	140	-	70.00-130.00	-	PFTeDA	J (all detects)

LDC #: 43888O96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803678 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JW
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	te r² Individual ≤ 30% ICV ≤ 30% True value
IV.	Continuing calibration/ISC	SW	CCV ≤ 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	FRB = 3 EB = 4
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	N/A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	1803678-01	Water	11/16/18
2	A1-MW-42-SA2	1803678-02	Water	11/16/18
3	FRB-20181116	1803678-03	Water	11/16/18
4	EB-20181116	1803678-04	Water	11/16/18
5	A1-MW-01-SA2MS	1803678-01MS	Water	11/16/18
6	A1-MW-01-SA2MSD	1803678-01MSD	Water	11/16/18
7				
8				
9				
10				

Notes:

	B8K0153-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC #: 43888096

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: C

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	12/03/18	181203M1_2	I	42.4		All (ND)	J/UJ/A

Enclosure II

Manual Stage 2B and Stage 4 Data Validation Reports

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-116898-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	280-116898-1	Water	11/12/18
A1-MW-05-SA2	280-116898-2	Water	11/12/18
A1-MW-49-SA2	280-116898-3	Water	11/12/18
A1-MW-50-SA2	280-116898-4	Water	11/12/18
A1-MW-50-SA2D	280-116898-5	Water	11/12/18
A1-MW-51-SA2	280-116898-6	Water	11/12/18
A1-PZ-19-SA2	280-116898-8	Water	11/12/18
A1-MW-52-SA2	280-116898-9	Water	11/12/18
A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-20181112 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples A1-MW-50-SA2 and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)				
Compound	A1-MW-50-SA2	A1-MW-50-SA2D	RPD (Limits)	Flag	A or P
1,1-Dichloroethene	0.564	0.630	Not calculable	-	-
Trichloroethene	0.780	0.949	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All compounds reported below the LOQ.	J (all detects)	A

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Volatiles - Data Qualification Summary - SDG 280-116898-1

Sample	Compound	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Volatiles - Field Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

LDC #: 43888A1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-116898-1 ADR/Stage ~~2B~~ 4 Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50 %
V.	Laboratory Blanks	A	~~Not reviewed for ADR validation.~~
VI.	Field blanks	ND	TB = 7
VII.	Surrogate spikes	A	~~Not reviewed for ADR validation.~~
VIII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ADR validation.
IX.	Laboratory control samples	A	~~Not reviewed for ADR validation.~~ LCS
X.	Field duplicates	SW	D = 4/5
XI.	Internal standards	A	~~Not reviewed for ADR validation.~~
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for ADR validation.
XIII.	Target compound identification	A	Not reviewed for ADR validation.
XIV.	System performance	A	Not reviewed for ADR validation.
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation.~~

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2** D	280-116898-4**	Water	11/12/18
5	A1-MW-50-SA2D** D	280-116898-5**	Water	11/12/18
6	A1-MW-51-SA2**	280-116898-6**	Water	11/12/18
7	~~TB-20181112~~	280-116898-7	Water	11/12/18
8	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
9	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
10	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
11	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
12	MB 280-438700/6			
13	L - 438747/4			

(H, AA, S only)

LDC #: 43888A1N

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓	*		
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	

LDC #: 93888A1a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.	Z2.

LDC#: 43888A1a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GCMS VOA (EPA SW 846 Method 8260B)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤30%)	Qualifications (Parent only)
	4	5		
H	0.564	0.630	NC	
S	0.780	0.949	NC	

V:\Josephine\FIELD DUPLICATES\43888A1a ttech yuma.wpd

LDC #: 43888A1a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL GC MSV G	10/29/2018	Trichloroethene (IS1)	0.4141	0.4141	0.3989	0.3989	3.0	3.0
			Tetrachloroethene (IS2)	1.5494	1.5494	1.4974	1.4974	2.5	2.5
2	ICAL GC MSV Z	11/3/2018	Trichloroethene (IS1)	0.4665	0.4665	0.4837	0.4837	6.8	6.8
			Tetrachloroethene (IS2)	1.6975	1.6975	1.7599	1.7599	5.9	5.9

LDC # 43888A1a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CCV)	Recalculated RRF (CCV)	Reported % D	Recalculated %D
1	G2197 GC MSV G	11/26/2018	Trichloroethene (IS1)	0.3989	0.4216	0.4216	5.7	5.7
			Tetrachloroethene (IS2)	1.4974	1.5171	1.5171	1.3	1.3
2	Z3472 GC MSV Z	11/26/2018	Trichloroethene (IS1)	0.4837	0.5081	0.5081	5.0	5.0
			Tetrachloroethene (IS2)	1.7599	1.7106	1.7106	2.8	2.8

LDC #: 43888 A1a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	10.0	10.1	101	101	0
1,2-Dichloroethane-d4		9.22	92	92	
Toluene-d8		10.3	103	103	
Bromofluorobenzene		10.1	101	101	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 42888A1a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 10/11

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	0.564	5.549	5.972	100	100	108	108	7	7
Trichloroethene	↓	↓	0.780	5.580	5.935	96	96	103	107	6	6
Benzene											
Toluene											
Chlorobenzene											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 93888 A1a

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: LCS 280-438700/4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	4.874	NA	97	97				
Trichloroethene	5.00	↓	5.029	↓	101	101				
Benzene										
Toluene										
Chlorobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A1a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 4, TCE:

Conc. = $\frac{(13951)(12.5)(\quad)}{(560722)(0.3989)(\quad)(\quad)}$

= 0.780 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
			0.780		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: January 2, 2019

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-116898-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	280-116898-1	Water	11/12/18
A1-MW-05-SA2	280-116898-2	Water	11/12/18
A1-MW-49-SA2	280-116898-3	Water	11/12/18
A1-MW-50-SA2	280-116898-4	Water	11/12/18
A1-PZ-19-SA2	280-116898-8	Water	11/12/18
A1-MW-52-SA2	280-116898-9	Water	11/12/18
A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
A1-MW-50-SA2DUP	280-116898-4DUP	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
A1-MW-04-SA2 A1-MW-50-SA2 A1-MW-52-SA2	pH	11 days	24 hours	J (all detects)	P
A1-MW-05-SA2 A1-MW-49-SA2 A1-PZ-19-SA2	pH	14 days	24 hours	J (all detects)	P
A1-MW-04-SA2 A1-MW-49-SA2 A1-MW-52-SA2	Ferrous Iron	9 days	24 hours	R (all non-detects)	P
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	Ferrous Iron	9 days	24 hours	J (all detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Nitrate as N Sulfate	0.04530 mg/L 0.3332 mg/L	All samples in SDG 280-116898-1
ICB/CCB	Nitrate as N Sulfate	0.04526 mg/L 0.3841 mg/L	All samples in SDG 280-116898-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable.

All analytes reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All analytes reported below the LOQ.	J (all detects)	A

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

Due to technical holding time, data were rejected in three samples.

Due to technical holding time and results below the LOQ, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Wet Chemistry - Data Qualification Summary - SDG 280-116898-1

Sample	Analyte	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	pH	J (all detects)	P	Technical holding times
A1-MW-04-SA2 A1-MW-49-SA2 A1-MW-52-SA2	Ferrous Iron	R (all non-detects)	P	Technical holding times
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	Ferrous Iron	J (all detects)	P	Technical holding times
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All analytes reported below the LOQ.	J (all detects)	A	Sample result verification

MCAS Yuma, CTO 17F3803
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

LDC #: 43888A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18

SDG #: 280-116898-1 ~~ADR~~/Stage 4 Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: MG

2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	Not reviewed for ADR validation. MS/MSD
VII.	Duplicate sample analysis	A	Not reviewed for ADR validation. DUP
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for ADR validation.
XI	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	~~A1-MW-51-SA2~~	280-116898-6	Water	11/12/18
6	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
7	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
8	~~A1-MW-50-SA2MS~~	280-116898-4MS	Water	11/12/18
9	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
10	~~A1-MW-50-SA2DUP~~	280-116898-4DUP	Water	11/12/18
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888A6

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→7	W	(pH) TDS (Cl) F (NO_3) NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (Fe+2)
QC 8→10	↓	pH TDS (Cl) F (NO_3) NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: MG
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	9040C	SM 3500 Fe B				
Parameters:	pH	Ferrous Iron				
Technical holding time:	24 hr	24 hr				

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier	
1	11:40 11-12-18	14:43 11-23-18	(11 days)				J/UJ/P	(det)
2	14:24 11-12-18	13:27 11-26-18	(14)					( )
3	08:32 11-12-18	13:36 11-26-18	(14)					( )
4	09:25 11-12-18	15:19 11-23-18	(11)					( )
~~5~~	~~10:46 11-12-18~~	~~15:33 11-23-18~~	(11)					( )
6	12:43 11-12-18	13:32 11-26-18	(14)					( )
7	13:39 11-12-18	15:23 11-23-18	(11)					( )
1	11:40 11-12-18			18:30 11-21-18	(9 days)		J/R/P	(N.D.)
2	14:24 11-12-18				( )			(det)
3	08:32 11-12-18				( )			(ND)
4	09:25 11-12-18				( )			(det)
~~5~~	~~10:46 11-12-18~~				( )			( )
6	12:43 11-12-18				( )			( )
7	13:39 11-12-18				( )			(ND)

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all **(NO3-N: 2x dil, SO4: 20x dil, >5x or ND)**

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.									
NO3-N	0.04530	0.04526	0.4526									
SO4	0.3332	0.3841	38.41									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 9-1-18

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc. Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	Cl	Blank	-	-	r=1.000	r= 1.000	Y
		Standard 1	1.0 (mg/L)	17320827			
		Standard 2	2.5 ( )	46063990			
		Standard 3	5.0 ( )	94576246			
		Standard 4	60.0 ( )	1169987193			
		Standard 5	120.0 ( )	2305131911			
		Standard 6	200.0 ( )	3845262113			
		Standard 7	-	-			
Calibration verification	Ferrous Iron	1830 ICV	1.045 (mg/L)	1.00 (mg/L)	104	105	
Calibration verification	NO_3-N	1052 CCV	4.85 (mg/L)	5.00 (mg/L)	97	97	
Calibration verification	SO_4	1646 CCV	102.2 (mg/L)	100 (mg/L)	102	102	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
1830 LCS	Laboratory control sample	Ferrous Iron	2.13 (mg/L)	2.00 (mg/L)	106	106	Y
1801 8	Matrix spike sample	Cl	(SSR-SR) 512 (mg/L)	500 (mg/L)	102	102	
1724/1743 10	Duplicate sample	SO_4	894 (mg/L)	866 (mg/L)	3	3	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer:

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for #1, SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $Y = mx + b$
where
$m = 14253830$
$b = -272056$
dil = 20 x

Recalculation:

$$601084316 = 14253830\left(\frac{x}{20}\right) - 272056$$

$$843.78 \text{ mg/L} = x$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	SO_4	847	844	Y
2	2	Ferrous Iron	0.119	0.119	
3	3	pH	7.9 (SU)	7.9 (SU)	
4	4	NO_3-N	3.26	3.18	
5	6	Ferrous Iron	0.0591	0.0591	
6	7	pH	8.0 (SU)	8.0 (SU)	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B & 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846366

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2**	L1846366-01**	Water	11/12/18
A1-MW-05-SA2**	L1846366-02**	Water	11/12/18
A1-MW-49-SA2**	L1846366-03**	Water	11/12/18
A1-MW-50-SA2**	L1846366-04**	Water	11/12/18
A1-MW-50-SA2D	L1846366-05	Water	11/12/18
A1-MW-51-SA2**	L1846366-06**	Water	11/12/18
A1-PZ-19-SA2**	L1846366-07**	Water	11/12/18
A1-MW-52-SA2**	L1846366-08**	Water	11/12/18
A1-MW-50-SA2MS	L1846366-04MS	Water	11/12/18
A1-MW-50-SA2MSD	L1846366-04MSD	Water	11/12/18

**Indicates sample underwent Stage 4 validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-50-SA2** and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ng/L)				
Compound	A1-MW-50-SA2**	A1-MW-50-SA2D	RPD (Limits)	Flag	A or P
1,4-Dioxane	592	591	0 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

LDC #: 43888F2b

SDG #: L1846366

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

~~ADR/~~Stage 4 2B

Date: 12/19/18

Page: 1 of 1

Reviewer: JG

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	~~Not reviewed for ADR validation~~.
VI.	Field blanks	N	
VII.	Surrogate spikes	A	~~Not reviewed for ADR validation~~.
VIII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ~~ADR~~ validation.
IX.	Laboratory control samples	A	~~Not reviewed for ADR validation~~. LCS/D
X.	Field duplicates	SW	D = 4/5
XI.	Internal standards	A	~~Not reviewed for ADR validation~~.
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for ADR validation.
XIII.	Target compound identification	A	Not reviewed for ADR validation.
XIV.	System performance	A	Not reviewed for ADR validation.
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation~~.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	L1846366-01**	Water	11/12/18
2	A1-MW-05-SA2**	L1846366-02**	Water	11/12/18
3	A1-MW-49-SA2**	L1846366-03**	Water	11/12/18
4	A1-MW-50-SA2** D	L1846366-04**	Water	11/12/18
5	A1-MW-50-SA2D D	L1846366-05	Water	11/12/18
6	A1-MW-51-SA2**	L1846366-06**	Water	11/12/18
7	A1-PZ-19-SA2**	L1846366-07**	Water	11/12/18
8	A1-MW-52-SA2**	L1846366-08**	Water	11/12/18
9	A1-MW-50-SA2MS	L1846366-04MS	Water	11/12/18
10	A1-MW-50-SA2MSD	L1846366-04MSD	Water	11/12/18
11				
12				
13	NG118091I-1 BLANK			

LDC #: 43888F2b

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Method: ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤30% or percent recoveries (%R) 70-130%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 43858F26

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓	-		
Were target compounds detected in the field duplicates?		✓		
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 43888F2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (500 std)	Recalculated RRF (500 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS16	11/15/2018	1,4-Dioxane (DXN-d8)	1.428	1.428	1.407	1.407	3.61	3.60

LDC #: 43888 F2b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
~~Nitrobenzene-d5~~ 1,4-Dioxane-d8	500	126.288	25	25	0
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

LDC #: 43888 F26

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 9/10

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Acenaphthene											
Pyrene											
1,4-Dioxane-d8	5000	5000	592	6560	6760	119	119	123	123	3	3

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888F2b

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: WG11 80911-2/3

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene										
Pyrene										
1,4-Dioxane	5000	5000	5780	5890	116	116	118	118	2	2

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888 F26

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
Y (N) N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, 1,4-Dioxane

Conc. = $\frac{(9071)(500)(5\ ml)(\ )(\ )(\ )}{(7476)(1.407)(0.5\ L)(\ )(\ )(\ )}$

= 4311 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
			4310		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846592

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
16-HS-03-SA2	L1846592-01	Water	11/13/18
16-MW-06-SA2	L1846592-02	Water	11/13/18
16-MW-08-SA2	L1846592-03	Water	11/13/18
16-MW-09-SA2	L1846592-04	Water	11/13/18
A1-MW-18-SA2	L1846592-05	Water	11/13/18
A1-MW-19-SA2	L1846592-06	Water	11/13/18
A1-MW-53-SA2	L1846592-07	Water	11/13/18
16-HS-03-SA2D	L1846592-08	Water	11/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples 16-HS-03-SA2 and 16-HS-03-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	16-HS-03-SA2	16-HS-03-SA2D			
1,4-Dioxane	5330	6120	14 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

LDC #: 43888G2b **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: L1846592 ADR Stage2B Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N/A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N/A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N/A	LCS/D
X.	Field duplicates	SW	D = 1/8
XI.	Internal standards	N/A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N/A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	16-HS-03-SA2	D	L1846592-01	Water	11/13/18
2	16-MW-06-SA2		L1846592-02	Water	11/13/18
3	16-MW-08-SA2		L1846592-03	Water	11/13/18
4	16-MW-09-SA2		L1846592-04	Water	11/13/18
5	A1-MW-18-SA2		L1846592-05	Water	11/13/18
6	A1-MW-19-SA2		L1846592-06	Water	11/13/18
7	A1-MW-53-SA2		L1846592-07	Water	11/13/18
8	16-HS-03-SA2D	D	L1846592-08	Water	11/13/18
9					
10					

Notes:

	WG 1180911-1 BLANK						

LDC#: 43888G2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GCMS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent only)
	1	8		
1,4-Dioxane	5330	6120	14	

V:\Josephine\FIELD DUPLICATES\43888G2b ttech yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846856

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-07-SA2	L1846856-01	Water	11/14/18
A1-MW-23-SA2	L1846856-02	Water	11/14/18
A1-MW-25-SA2	L1846856-03	Water	11/14/18
A1-MW-27-SA2	L1846856-04	Water	11/14/18
A1-MW-55-SA2	L1846856-05	Water	11/14/18
A1-MW-54-SA2	L1846856-06	Water	11/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

LDC #: 43888H2b **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: L1846856 ~~ADR~~ Stage2B Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	~~N~~ A	
VI.	Field blanks	N	
VII.	Surrogate spikes	~~N~~ A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	~~N~~ A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~N~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
+ 1	A1-MW-07-SA2	L1846856-01	Water	11/14/18
— 2	A1-MW-23-SA2	L1846856-02	Water	11/14/18
+ 3	A1-MW-25-SA2	L1846856-03	Water	11/14/18
+ 4	A1-MW-27-SA2	L1846856-04	Water	11/14/18
— 5	A1-MW-55-SA2	L1846856-05	Water	11/14/18
— 6	A1-MW-54-SA2	L1846856-06	Water	11/14/18
7				
8				
9				

Notes:

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847243

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-11-SA2	L1847243-01	Water	11/15/18
A1-MW-13-SA2	L1847243-02	Water	11/15/18
A1-MW-14-SA2	L1847243-03	Water	11/15/18
A1-MW-15-SA2	L1847243-04	Water	11/15/18
A1-MW-37-SA2	L1847243-05	Water	11/15/18
A1-MW-37-SA2D	L1847243-06	Water	11/15/18
A1-MW-31-SA2	L1847243-07	Water	11/15/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA2 and A1-MW-37-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA2	A1-MW-37-SA2D			
1,4-Dioxane	13100	13200	1 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

LDC #: 43888I2b

SDG #: L1847243

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

ADR Stage 2B

Date: 12/19/18

Page: 1 of 1

Reviewer: JM

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	~~N~~ A	
VI.	Field blanks	N	
VII.	Surrogate spikes	~~N~~ A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	~~N~~ A	LCS/D
X.	Field duplicates	SW	D = 5/6
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~N~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	A1-MW-11-SA2		L1847243-01	Water	11/15/18
2	A1-MW-13-SA2		L1847243-02	Water	11/15/18
3	A1-MW-14-SA2		L1847243-03	Water	11/15/18
4	A1-MW-15-SA2		L1847243-04	Water	11/15/18
5	A1-MW-37-SA2	D	L1847243-05	Water	11/15/18
6	A1-MW-37-SA2D	D	L1847243-06	Water	11/15/18
7	A1-MW-31-SA2		L1847243-07	Water	11/15/18
8					
9					

Notes:

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(EB - on hold)

LDC#: 43888I2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GCMS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent only)
	5	6		
1,4-Dioxane	13100	13200	1	

V:\Josephine\FIELD DUPLICATES\43888I2b ttech yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847316

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-01-SA2	L1847316-01	Water	11/16/18
A1-MW-42-SA2	L1847316-02	Water	11/16/18
EB-20181116	L1847316-03	Water	11/16/18
A1-MW-01-SA2MS	L1847316-01MS	Water	11/16/18
A1-MW-01-SA2MSD	L1847316-01MSD	Water	11/16/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-20181116 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

LDC #: 43888J2b

VALIDATION COMPLETENESS WORKSHEET

~~ADR~~ Stage2B

Date: 2/19/19

SDG #: L1847316

Page: 1 of 1

Laboratory: Alpha Analytical, Inc.

Reviewer: JVG

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%/50%.
V.	Laboratory Blanks	~~X~~ A	
VI.	Field blanks	ND	EB = 3
VII.	Surrogate spikes	~~X~~ A	
VIII.	Matrix spike/Matrix spike duplicates	~~X~~ A	
IX.	Laboratory control samples	~~X~~ A	LCS
X.	Field duplicates	N	
XI.	Internal standards	~~X~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~X~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
+ 1	A1-MW-01-SA2	L1847316-01	Water	11/16/18
+ 2	A1-MW-42-SA2	L1847316-02	Water	11/16/18
− 3	EB-20181116	L1847316-03	Water	11/16/18
4	A1-MW-01-SA2MS	L1847316-01MS	Water	11/16/18
5	A1-MW-01-SA2MSD	L1847316-01MSD	Water	11/16/18
6				
7				
8				

Notes:

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: January 2, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1803615

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	1803615-01	Water	11/12/18
A1-MW-05-SA2	1803615-02	Water	11/12/18
A1-MW-49-SA2	1803615-03	Water	11/12/18
A1-MW-50-SA2	1803615-04	Water	11/12/18
A1-MW-50-SA2D	1803615-05	Water	11/12/18
A1-MW-51-SA2	1803615-06	Water	11/12/18
A1-MW-52-SA2	1803615-07	Water	11/12/18
FRB-20181112	1803615-08	Water	11/12/18
A1-PZ-19-SA2	1803615-09	Water	11/12/18
A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were less than or equal to 30% of their true value.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample FRB-20181112 was identified as a field rinsate blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples A1-MW-50-SA2 and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-50-SA2	A1-MW-50-SA2D			
PFTeDA	0.0250	0.0264	5 (≤30)	-	-
PFHxA	0.0806	0.0829	3 (≤30)	-	-
PFHpA	0.00474	0.00494	Not calculable	-	-
PFHxS	0.0367	0.0355	3 (≤30)	-	-
PFOA	0.00947	0.00878	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

Sample	Compound	Finding
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG 1803615

Sample	Compound	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

LDC #: 43888K96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18

SDG #: 1803615 ADR/Stage 4 Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: SVG

2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A, A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	ICAL ~~≤~~ r² Individual ≤30% ICV ≤ 30%
IV.	Continuing calibration/ISC	A	CCV ≤ 30% True value
V.	Laboratory Blanks	A	Not reviewed for ADR validation.
VI.	Field blanks	ND	FRB = 8
VII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ADR validation.
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. OPR
IX.	Field duplicates	SW	D = 4/5
X.	Labeled Compounds	A	Not reviewed for ADR validation.
XI.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for ADR validation.
XII.	Target compound identification	A	Not reviewed for ADR validation.
XIII.	System performance	A	Not reviewed for ADR validation.
XIV.	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER: FRB = Field Rinsate Blk

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	1803615-01**	Water	11/12/18
2	A1-MW-05-SA2**	1803615-02**	Water	11/12/18
3	A1-MW-49-SA2**	1803615-03**	Water	11/12/18
4	A1-MW-50-SA2**	1803615-04**	Water	11/12/18
5	A1-MW-50-SA2D**	1803615-05**	Water	11/12/18
6	A1-MW-51-SA2**	1803615-06**	Water	11/12/18
7	A1-MW-52-SA2**	1803615-07**	Water	11/12/18
8	FRB-20181112	1803615-08	Water	11/12/18
9	A1-MW-19-SA2**	1803615-09**	Water	11/12/18
10	A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
11	A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18
12				
13				
14	B8K0091-BLK1			
15				

LDC #: 43888 K96

VALIDATION FINDINGS CHECKLIST

Reviewer: SK
2nd Reviewer: [illegible]

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration < 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check < 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC#: 43888K96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: LCMS PFAS (EPA Method 537M)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤30%)	Qualifications (Parent only)
	4	5		
J	0.0250	0.0264	5	
A	0.0806	0.0829	3	
B	0.00474	0.00494	NC	
K	0.0367	0.0355	3	
C	0.00947	0.00878	NC	

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LDC #: 43888K96

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer: JVG
2nd Reviewer: A

METHOD: LCMS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Samples	Compound	Finding	Qualifications
	2, 4, 9	All compounds qualified "Q" by the lab.	The laboratory indicated that the parent/product transition ion ratio was outside of the 70-130% laboratory limits.	Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

Comments: See sample calculation verification worksheet for recalculations

LDC # 43888K96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537Mod)

Calibration Date	Instrument	Compound	Standard	(Y) Response ratio	(X) Conc. Ratio	(X^2) Conc. Ratio
11/19/2018	SCN960	PFOA	1	0.0327	0.02	0.00040
			2	0.0593	0.04	0.0016
		13C2-PFOA	3	0.1197	0.08	0.0064
			4	0.2358	0.16	0.0256
			5	0.5699	0.40	0.1600
			6	1.0165	0.80	0.6400
			7	5.1296	4.00	16.0000
			8	10.3516	8.00	64.0000
			9	25.6395	20.00	400.0000
			10	51.9892	40.00	1600.0000

Regression Output	**Calculated**		***Reported WQR***	
Constant	*c*	*0.03180*	*c*	*0.1398430*
Std Err of Y Est				
R Squared		*0.9999917*		*0.9999030*
Degrees of Freedom				
	m1	*m2*	*m1*	*m2*
X Coefficient(s)	*1.2736124*	*0.0006421*	*1.2814700*	*0.000032442*
Std Err of Coef.				
Correlation Coefficient		*0.999996*		
Coefficient of Determination (r^2)		*0.999992*		

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: LC/MS PFCs (EPA Method 537Mod)

Calibration Date	System	Compound	Standard	(Y) Area ratio	(X) Conc ratio
11/19/2018	SCN960	PFOS	1	0.02405	0.020
			2	0.04028	0.040
			3	0.00828	0.080
		13C8-PFOS	4	0.15076	0.160
			5	0.42475	0.400
			6	0.84488	0.800
			7	4.25487	4.000
			8	8.43628	8.000
			9	21.03584	20.000
			10	43.32010	40.000

Regression Output	Calculated	Reported WLR
Constant	-0.073380	-0.0118865
Std Err of Y Est		
R Squared	0.999854	0.999775
Degrees of Freedom		
X Coefficient(s)	1.07855632	1.069710
Std Err of Coef.		
Correlation Coefficient	0.999927	
Coefficient of Determination (r^2)	0.999854	0.999775

LDC # 43888K96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFAs (EPA Method 537Mod)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound	(IS)	Conc	Reported	Recalculated	Reported % R	Recalculated % R
1	181120M1_58	11/20/2018	PFOA	(13C2-PFOA)	1.00	1.139	1.139	113.9	113.9
			PFOS	(13C8-PFOS)	1.00	1.092	1.092	109.2	109.2

LDC #: 43888k9G

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFAS (EPA Method 537Mod)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added (ng/L)		Sample Conc (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
PFOA	0.0567	0.0863	0.00947	0.112	0.110	118	118	116	116	1.71	1.80
PFOS	↓	↓	0	0.0954	0.0910	110	110	105	105	4.65	4.72

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888K96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/ Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537Mod)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BSK0091-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc..
PFOS	0.0800	~~0.086~~ NA	0.0864	NA	108	108				
PFOA	"	"	0.0969	"	119	119				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888 K96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

METHOD: LC/MS PFAS (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 , PFOA :

Conc. $= \frac{(437)(12.5)}{(5070)} = 3.24421e-5X^2 + 1.28147X + 0.B9843$

$X = 0.73163$

final conc. $= \frac{(0.73163)(1L)}{(0.113454)(1000)}$

$= 0.00645$ ng/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
			0.00646		

LOCATION-NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	SDG	COORD_X	COORD_Y	ANALYTICAL_METHOD_GRP_DESC	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIC_DESC	COLLECT_DATE
A1-MW-04	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803615	436280.9228	607319.2492	Perfluoroalkyl Compounds	A1-MW-04-SA2	WG	GROUNDWATER	11/12/2018
A1-MW-05	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803615	436301.6301	607443.138	Perfluoroalkyl Compounds	A1-MW-05-SA2	WG	GROUNDWATER	11/12/2018
A1-MW-49A	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1803615	436416.958	607790.698	Perfluoroalkyl Compounds	A1-MW-49-SA2	WG	GROUNDWATER	11/12/2018
A1-MW-50	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1803615	436424.214	607790.973	Perfluoroalkyl Compounds	A1-MW-50-SA2	WG	GROUNDWATER	11/12/2018
A1-MW-51	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1803615	436441.752	607789.623	Perfluoroalkyl Compounds	A1-MW-51-SA2	WG	GROUNDWATER	11/12/2018
A1-MW-52	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1803615	436320.115	607239.298	Perfluoroalkyl Compounds	A1-MW-52-SA2	WG	GROUNDWATER	11/12/2018
A1-PZ-19	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1803615	436357.6995	607259.7175	Perfluoroalkyl Compounds	A1-PZ-19-SA2	WG	GROUNDWATER	11/12/2018