N60087_003876
BRUNSWICK_NAS
SSIC 5000-33c

LABORATORY DATA PACKAGE, 320-32321-1, NAS BRUNSWICK ME

10/31/2017

TESTAMERICA LABORATORIES INC

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 320-32321-1

Job Description: TT: PFAS, Brunswick, Discharge

For:
Tetra Tech, Inc.
Foster Plaza VII
661 Anderson Drive
Foster Plaza 7
Pittsburgh, PA 15220

Attention: Jeff Orient

Approved for release.
David R Alltucker
Project Manager I
10/31/2017 4:55 PM

David R Alltucker, Project Manager I
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4383
david.alltucker@testamericainc.com
10/31/2017

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Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job Narrative
320-32321-1

Receipt
The samples were received on 10/11/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9º C.

LCMS
Method(s) 537 (modified): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recovery for 13C8 FOSA associated with the following samples are below the method recommended limit: TP-PFC-022-TPI (320-32321-1), TP-PFC-022-TPE (320-32321-2), TP-PFC-022-MID-CARBON (320-32321-3) and TP-PFC-022-TPE-D (320-32321-4). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples. Re-analysis confirmed the low IDA.

Method(s) 537 (modified): The following sample was diluted to bring the concentration of target analytes within the calibration range: TP-PFC-022-TPI (320-32321-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-190551.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Client Sample ID: TP-PFC-022-TPI — Lab Sample ID: 320-32321-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	63	M	2.4	0.44	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	180		2.4	0.94	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	310		2.4	0.75	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	82		2.4	0.77	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1200	E M	2.4	0.71	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	2.7		2.4	0.62	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.1	J	2.4	0.42	ng/L	1		537 (modified)	Total/NA
Perfluorotridecanoic Acid (PFTriA)	0.65	J	2.4	0.53	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.63	J	2.4	0.38	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	61		2.4	0.88	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	360	E	2.4	0.83	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS)	9.3		2.4	0.68	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	360	E	3.8	1.2	ng/L	1		537 (modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	4.6	J	38	0.61	ng/L	1		537 (modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	67	D	24	4.4	ng/L	10		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	190	D	24	9.4	ng/L	10		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	360	D	24	7.5	ng/L	10		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	77	D	24	7.7	ng/L	10		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1900	D M	24	7.1	ng/L	10		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	66	D	24	8.8	ng/L	10		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	470	D	24	8.3	ng/L	10		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS) - DL	12	J D	24	6.8	ng/L	10		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	360	D	38	12	ng/L	10		537 (modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA) - DL	11	J D	380	6.1	ng/L	10		537 (modified)	Total/NA

Client Sample ID: TP-PFC-022-TPE — Lab Sample ID: 320-32321-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	130		2.4	0.44	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	48		2.4	0.95	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	8.6		2.4	0.76	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.4	J	2.4	0.72	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TP-PFC-022-MID-CARBON — Lab Sample ID: 320-32321-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	150		2.5	0.45	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	63		2.5	0.98	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	5.5		2.5	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.83	J M	2.5	0.74	ng/L	1		537 (modified)	Total/NA

Client Sample ID: TP-PFC-022-TPE-D — Lab Sample ID: 320-32321-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	130		2.4	0.45	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	46		2.4	0.96	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: TP-PFC-022-TPE-D (Continued)

Lab Sample ID: 320-32321-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	8.3		2.4	0.76	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.76	J	2.4	0.73	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: TP-PFC-022-TPI

Lab Sample ID: 320-32321-1
Date Collected: 10/10/17 12:40
Matrix: Water
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**63**	**M**	2.4	0.44	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluoropentanoic acid (PFPeA)	**180**		2.4	0.94	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorohexanoic acid (PFHxA)	**310**		2.4	0.75	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluoroheptanoic acid (PFHpA)	**82**		2.4	0.77	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorooctanoic acid (PFOA)	**1200**	**E M**	2.4	0.71	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorononanoic acid (PFNA)	**2.7**		2.4	0.62	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorodecanoic acid (PFDA)	**1.1**	**J**	2.4	0.42	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	0.71	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	0.56	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorotridecanoic Acid (PFTriA)	**0.65**	**J**	2.4	0.53	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorotetradecanoic acid (PFTeA)	**0.63**	**J**	2.4	0.38	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorobutanesulfonic acid (PFBS)	**61**		2.4	0.88	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorohexanesulfonic acid (PFHxS)	**360**	**E**	2.4	0.83	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluoroheptanesulfonic Acid (PFHpS)	**9.3**		2.4	0.68	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorooctanesulfonic acid (PFOS)	**360**	**E**	3.8	1.2	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.8	1.2	ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorooctane Sulfonamide (FOSA)	**4.6**	**J**	38	0.61	ng/L		10/23/17 08:13	10/31/17 04:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C4 PFBA	*70*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C2 PFHxA	*86*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C4 PFOA	*63*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C5 PFNA	*78*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C2 PFDA	*79*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C2 PFUnA	*73*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C2 PFDoA	*75*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
18O2 PFHxS	*103*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C4 PFOS	*103*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C2-PFTeDA	*97*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C4-PFHpA	*89*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C5 PFPeA	*84*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*
13C3-PFBS	*107*		*25 - 150*	*10/23/17 08:13*	*10/31/17 04:01*	*1*

Method: 537 (modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**67**	**D**	24	4.4	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluoropentanoic acid (PFPeA)	**190**	**D**	24	9.4	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorohexanoic acid (PFHxA)	**360**	**D**	24	7.5	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluoroheptanoic acid (PFHpA)	**77**	**D**	24	7.7	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorooctanoic acid (PFOA)	**1900**	**D M**	24	7.1	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorononanoic acid (PFNA)	19	U	24	6.2	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorodecanoic acid (PFDA)	9.5	U	24	4.2	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluoroundecanoic acid (PFUnA)	19	U	24	7.1	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorododecanoic acid (PFDoA)	19	U	24	5.6	ng/L		10/23/17 08:13	10/31/17 02:32	10

Client Sample ID: TP-PFC-022-TPI — Lab Sample ID: 320-32321-1

Date Collected: 10/10/17 12:40 — **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotridecanoic Acid (PFTriA)	19	U	24	5.3	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorotetradecanoic acid (PFTeA)	9.5	U	24	3.8	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorobutanesulfonic acid (PFBS)	**66**	**D**	24	8.8	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorohexanesulfonic acid (PFHxS)	**470**	**D**	24	8.3	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluoroheptanesulfonic Acid (PFHpS)	**12**	**J D**	24	6.8	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorooctanesulfonic acid (PFOS)	**360**	**D**	38	12	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorodecanesulfonic acid (PFDS)	29	U	38	12	ng/L		10/23/17 08:13	10/31/17 02:32	10
Perfluorooctane Sulfonamide (FOSA)	**11**	**J D**	380	6.1	ng/L		10/23/17 08:13	10/31/17 02:32	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*6*	*Q*	*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C4 PFBA	*120*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C2 PFHxA	*109*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C4 PFOA	*96*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C5 PFNA	*89*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C2 PFDA	*76*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C2 PFUnA	*77*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C2 PFDoA	*79*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
18O2 PFHxS	*132*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C4 PFOS	*114*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C2-PFTeDA	*96*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C4-PFHpA	*119*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C5 PFPeA	*107*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*
13C3-PFBS	*117*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:32*	*10*

Client Sample ID: TP-PFC-022-TPE — Lab Sample ID: 320-32321-2

Date Collected: 10/10/17 12:50 — **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**130**		2.4	0.44	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluoropentanoic acid (PFPeA)	**48**		2.4	0.95	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorohexanoic acid (PFHxA)	**8.6**		2.4	0.76	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	0.77	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorooctanoic acid (PFOA)	**1.4**	**J**	2.4	0.72	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	0.63	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorodecanoic acid (PFDA)	0.96	U	2.4	0.42	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	0.72	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	0.56	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	0.53	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorotetradecanoic acid (PFTeA)	0.96	U	2.4	0.39	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	0.89	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	0.84	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	0.69	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	1.2	ng/L		10/23/17 08:13	10/31/17 02:39	1

Client Sample ID: TP-PFC-022-TPE — Lab Sample ID: 320-32321-2

Date Collected: 10/10/17 12:50 **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	1.2	ng/L		10/23/17 08:13	10/31/17 02:39	1
Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	0.62	ng/L		10/23/17 08:13	10/31/17 02:39	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C4 PFBA	*76*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C2 PFHxA	*87*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C4 PFOA	*85*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C5 PFNA	*71*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C2 PFDA	*66*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C2 PFUnA	*69*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C2 PFDoA	*69*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
18O2 PFHxS	*107*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C4 PFOS	*95*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C2-PFTeDA	*84*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C4-PFHpA	*93*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C5 PFPeA	*83*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*
13C3-PFBS	*100*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:39*	*1*

Client Sample ID: TP-PFC-022-MID-CARBON — Lab Sample ID: 320-32321-3

Date Collected: 10/10/17 12:45 **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**150**		2.5	0.45	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluoropentanoic acid (PFPeA)	**63**		2.5	0.98	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorohexanoic acid (PFHxA)	**5.5**		2.5	0.78	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	0.79	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorooctanoic acid (PFOA)	**0.83**	**J M**	2.5	0.74	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	0.65	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorodecanoic acid (PFDA)	0.99	U	2.5	0.43	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	0.74	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	0.58	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	0.54	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorotetradecanoic acid (PFTeA)	0.99	U	2.5	0.40	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.91	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	0.86	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	0.70	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.3	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	1.2	ng/L		10/23/17 08:13	10/31/17 02:46	1
Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	0.63	ng/L		10/23/17 08:13	10/31/17 02:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*3*	*Q*	*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*
13C4 PFBA	*83*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*
13C2 PFHxA	*96*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*
13C4 PFOA	*90*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*
13C5 PFNA	*84*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*
13C2 PFDA	*81*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:46*	*1*

Client Sample ID: TP-PFC-022-MID-CARBON — Lab Sample ID: 320-32321-3

Date Collected: 10/10/17 12:45 **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	79		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C2 PFDoA	84		25 - 150	10/23/17 08:13	10/31/17 02:46	1
18O2 PFHxS	107		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C4 PFOS	98		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C2-PFTeDA	97		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C4-PFHpA	97		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C5 PFPeA	90		25 - 150	10/23/17 08:13	10/31/17 02:46	1
13C3-PFBS	102		25 - 150	10/23/17 08:13	10/31/17 02:46	1

Client Sample ID: TP-PFC-022-TPE-D — Lab Sample ID: 320-32321-4

Date Collected: 10/10/17 00:00 **Matrix: Water**
Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**130**		2.4	0.45	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluoropentanoic acid (PFPeA)	**46**		2.4	0.96	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorohexanoic acid (PFHxA)	**8.3**		2.4	0.76	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	0.78	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorooctanoic acid (PFOA)	**0.76**	**J**	2.4	0.73	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	0.64	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorodecanoic acid (PFDA)	0.97	U	2.4	0.43	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	0.73	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	0.57	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	0.54	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorotetradecanoic acid (PFTeA)	0.97	U	2.4	0.39	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	0.89	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	0.85	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	0.69	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	1.2	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	1.2	ng/L		10/23/17 08:13	10/31/17 02:52	1
Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	0.62	ng/L		10/23/17 08:13	10/31/17 02:52	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	2	Q	25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C4 PFBA	82		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C2 PFHxA	94		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C4 PFOA	93		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C5 PFNA	87		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C2 PFDA	88		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C2 PFUnA	81		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C2 PFDoA	76		25 - 150	10/23/17 08:13	10/31/17 02:52	1
18O2 PFHxS	106		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C4 PFOS	96		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C2-PFTeDA	91		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C4-PFHpA	101		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C5 PFPeA	91		25 - 150	10/23/17 08:13	10/31/17 02:52	1
13C3-PFBS	100		25 - 150	10/23/17 08:13	10/31/17 02:52	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Prep: 3535

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	2.5	0.92	ng/L	537 (modified)
Perfluorobutanoic acid (PFBA)	2.5	0.46	ng/L	537 (modified)
Perfluorodecanesulfonic acid (PFDS)	4.0	1.2	ng/L	537 (modified)
Perfluorodecanoic acid (PFDA)	2.5	0.44	ng/L	537 (modified)
Perfluorododecanoic acid (PFDoA)	2.5	0.58	ng/L	537 (modified)
Perfluoroheptanesulfonic Acid (PFHpS)	2.5	0.71	ng/L	537 (modified)
Perfluoroheptanoic acid (PFHpA)	2.5	0.80	ng/L	537 (modified)
Perfluorohexanesulfonic acid (PFHxS)	2.5	0.87	ng/L	537 (modified)
Perfluorohexanoic acid (PFHxA)	2.5	0.79	ng/L	537 (modified)
Perfluorononanoic acid (PFNA)	2.5	0.65	ng/L	537 (modified)
Perfluorooctane Sulfonamide (FOSA)	40	0.64	ng/L	537 (modified)
Perfluorooctanesulfonic acid (PFOS)	4.0	1.3	ng/L	537 (modified)
Perfluorooctanoic acid (PFOA)	2.5	0.75	ng/L	537 (modified)
Perfluoropentanoic acid (PFPeA)	2.5	0.99	ng/L	537 (modified)
Perfluorotetradecanoic acid (PFTeA)	2.5	0.40	ng/L	537 (modified)
Perfluorotridecanoic Acid (PFTriA)	2.5	0.55	ng/L	537 (modified)
Perfluoroundecanoic acid (PFUnA)	2.5	0.75	ng/L	537 (modified)

Isotope Dilution Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOSA (25-150)	3C4 PFBA (25-150)	3C2 PFHxA (25-150)	3C4 PFOA (25-150)	3C5 PFNA (25-150)	3C2 PFDA (25-150)	3C2 PFUnA (25-150)	3C2 PFDoA (25-150)
320-32321-1	TP-PFC-022-TPI	4 Q	70	86	63	78	79	73	75
320-32321-1 - DL	TP-PFC-022-TPI	6 Q	120	109	96	89	76	77	79
320-32321-2	TP-PFC-022-TPE	4 Q	76	87	85	71	66	69	69
320-32321-3	TP-PFC-022-MID-CARBON	3 Q	83	96	90	84	81	79	84
320-32321-4	TP-PFC-022-TPE-D	2 Q	82	94	93	87	88	81	76
LCS 320-190551/2-A	Lab Control Sample	48	111	110	113	111	117	105	99
LCSD 320-190551/3-A	Lab Control Sample Dup	56	107	104	106	102	112	101	97
MB 320-190551/1-A	Method Blank	50	105	104	105	102	112	100	93

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	18O2 PFHxS (25-150)	13C4 PFOS (25-150)	13C2-PFTeDA (25-150)	13C4-PFHpA (25-150)	13C5 PFPeA (25-150)	13C3-PFBS (25-150)		
320-32321-1	TP-PFC-022-TPI	103	103	97	89	84	107		
320-32321-1 - DL	TP-PFC-022-TPI	132	114	96	119	107	117		
320-32321-2	TP-PFC-022-TPE	107	95	84	93	83	100		
320-32321-3	TP-PFC-022-MID-CARBON	107	98	97	97	90	102		
320-32321-4	TP-PFC-022-TPE-D	106	96	91	101	91	100		
LCS 320-190551/2-A	Lab Control Sample	112	109	107	118	109	110		
LCSD 320-190551/3-A	Lab Control Sample Dup	110	101	106	111	102	106		
MB 320-190551/1-A	Method Blank	108	103	100	114	102	100		

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C2-PFTeDA = 13C2-PFTeDA
13C4-PFHpA = 13C4-PFHpA
13C5 PFPeA = 13C5 PFPeA
13C3-PFBS = 13C3-PFBS

Method: 537 (modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-190551/1-A
Matrix: Water
Analysis Batch: 192039

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 190551

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.0	U	2.5	0.46	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluoropentanoic acid (PFPeA)	2.0	U	2.5	0.99	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorohexanoic acid (PFHxA)	2.0	U	2.5	0.79	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	0.80	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorooctanoic acid (PFOA)	2.0	U M	2.5	0.75	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	0.65	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorodecanoic acid (PFDA)	1.0	U	2.5	0.44	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	0.75	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	0.58	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	0.55	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorotetradecanoic acid (PFTeA)	0.627	J	2.5	0.40	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.92	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	0.87	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	0.71	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.3	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	1.2	ng/L		10/23/17 08:13	10/31/17 02:11	1
Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	0.64	ng/L		10/23/17 08:13	10/31/17 02:11	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*50*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C4 PFBA	*105*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C2 PFHxA	*104*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C4 PFOA	*105*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C5 PFNA	*102*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C2 PFDA	*112*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C2 PFUnA	*100*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C2 PFDoA	*93*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
18O2 PFHxS	*108*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C4 PFOS	*103*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C2-PFTeDA	*100*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C4-PFHpA	*114*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C5 PFPeA	*102*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*
13C3-PFBS	*100*		*25 - 150*	*10/23/17 08:13*	*10/31/17 02:11*	*1*

Lab Sample ID: LCS 320-190551/2-A
Matrix: Water
Analysis Batch: 192039

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 190551

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	40.0	43.6		ng/L		109	89 - 128
Perfluoropentanoic acid (PFPeA)	40.0	41.1		ng/L		103	66 - 136
Perfluorohexanoic acid (PFHxA)	40.0	40.7		ng/L		102	86 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	41.6		ng/L		104	89 - 127
Perfluorooctanoic acid (PFOA)	40.0	40.3		ng/L		101	80 - 120
Perfluorononanoic acid (PFNA)	40.0	38.5		ng/L		96	77 - 137
Perfluorodecanoic acid (PFDA)	40.0	40.8		ng/L		102	84 - 123
Perfluoroundecanoic acid (PFUnA)	40.0	38.8		ng/L		97	73 - 122

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-190551/2-A
Matrix: Water
Analysis Batch: 192039

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 190551

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorododecanoic acid (PFDoA)	40.0	41.8		ng/L		104	82 - 122
Perfluorotridecanoic Acid (PFTriA)	40.0	46.2		ng/L		115	56 - 163
Perfluorotetradecanoic acid (PFTeA)	40.0	40.8		ng/L		102	66 - 120
Perfluorobutanesulfonic acid (PFBS)	35.4	37.6		ng/L		106	88 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.8		ng/L		104	87 - 126
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	42.5		ng/L		112	92 - 135
Perfluorooctanesulfonic acid (PFOS)	37.1	37.6		ng/L		101	83 - 126
Perfluorodecanesulfonic acid (PFDS)	38.6	38.0		ng/L		98	80 - 129
Perfluorooctane Sulfonamide (FOSA)	40.0	40.7		ng/L		102	91 - 133

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*48*		*25 - 150*
13C4 PFBA	*111*		*25 - 150*
13C2 PFHxA	*110*		*25 - 150*
13C4 PFOA	*113*		*25 - 150*
13C5 PFNA	*111*		*25 - 150*
13C2 PFDA	*117*		*25 - 150*
13C2 PFUnA	*105*		*25 - 150*
13C2 PFDoA	*99*		*25 - 150*
18O2 PFHxS	*112*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
13C2-PFTeDA	*107*		*25 - 150*
13C4-PFHpA	*118*		*25 - 150*
13C5 PFPeA	*109*		*25 - 150*
13C3-PFBS	*110*		*25 - 150*

Lab Sample ID: LCSD 320-190551/3-A
Matrix: Water
Analysis Batch: 192039

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 190551

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	40.0	43.9		ng/L		110	89 - 128	1	30
Perfluoropentanoic acid (PFPeA)	40.0	40.8		ng/L		102	66 - 136	1	30
Perfluorohexanoic acid (PFHxA)	40.0	41.1		ng/L		103	86 - 126	1	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.4		ng/L		106	89 - 127	2	30
Perfluorooctanoic acid (PFOA)	40.0	41.7		ng/L		104	80 - 120	3	30
Perfluorononanoic acid (PFNA)	40.0	41.5		ng/L		104	77 - 137	7	30
Perfluorodecanoic acid (PFDA)	40.0	41.3		ng/L		103	84 - 123	1	30
Perfluoroundecanoic acid (PFUnA)	40.0	39.5		ng/L		99	73 - 122	2	30
Perfluorododecanoic acid (PFDoA)	40.0	42.4		ng/L		106	82 - 122	2	30

Method: 537 (modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCSD 320-190551/3-A
Matrix: Water
Analysis Batch: 192039

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 190551

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorotridecanoic Acid (PFTriA)			40.0	48.1		ng/L		120	56 - 163	4	30
Perfluorotetradecanoic acid (PFTeA)			40.0	40.9		ng/L		102	66 - 120	0	30
Perfluorobutanesulfonic acid (PFBS)			35.4	36.7		ng/L		104	88 - 130	2	30
Perfluorohexanesulfonic acid (PFHxS)			36.4	38.3		ng/L		105	87 - 126	1	30
Perfluoroheptanesulfonic Acid (PFHpS)			38.1	44.1		ng/L		116	92 - 135	4	30
Perfluorooctanesulfonic acid (PFOS)			37.1	39.6		ng/L		107	83 - 126	5	30
Perfluorodecanesulfonic acid (PFDS)			38.6	39.8		ng/L		103	80 - 129	5	30
Perfluorooctane Sulfonamide (FOSA)			40.0	41.6		ng/L		104	91 - 133	2	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C8 FOSA	*56*		*25 - 150*
13C4 PFBA	*107*		*25 - 150*
13C2 PFHxA	*104*		*25 - 150*
13C4 PFOA	*106*		*25 - 150*
13C5 PFNA	*102*		*25 - 150*
13C2 PFDA	*112*		*25 - 150*
13C2 PFUnA	*101*		*25 - 150*
13C2 PFDoA	*97*		*25 - 150*
18O2 PFHxS	*110*		*25 - 150*
13C4 PFOS	*101*		*25 - 150*
13C2-PFTeDA	*106*		*25 - 150*
13C4-PFHpA	*111*		*25 - 150*
13C5 PFPeA	*102*		*25 - 150*
13C3-PFBS	*106*		*25 - 150*

LCMS

Prep Batch: 190551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32321-1	TP-PFC-022-TPI	Total/NA	Water	3535	
320-32321-1 - DL	TP-PFC-022-TPI	Total/NA	Water	3535	
320-32321-2	TP-PFC-022-TPE	Total/NA	Water	3535	
320-32321-3	TP-PFC-022-MID-CARBON	Total/NA	Water	3535	
320-32321-4	TP-PFC-022-TPE-D	Total/NA	Water	3535	
MB 320-190551/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-190551/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-190551/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 192039

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32321-1 - DL	TP-PFC-022-TPI	Total/NA	Water	537 (modified)	190551
320-32321-1	TP-PFC-022-TPI	Total/NA	Water	537 (modified)	190551
320-32321-2	TP-PFC-022-TPE	Total/NA	Water	537 (modified)	190551
320-32321-3	TP-PFC-022-MID-CARBON	Total/NA	Water	537 (modified)	190551
320-32321-4	TP-PFC-022-TPE-D	Total/NA	Water	537 (modified)	190551
MB 320-190551/1-A	Method Blank	Total/NA	Water	537 (modified)	190551
LCS 320-190551/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	190551
LCSD 320-190551/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	190551

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Client Sample ID: TP-PFC-022-TPI
Lab Sample ID: 320-32321-1
Date Collected: 10/10/17 12:40
Matrix: Water
Date Received: 10/11/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		190551	10/23/17 08:13	CCB	TAL SAC
Total/NA	Analysis	537 (modified)	DL	10	192039	10/31/17 02:32	TTP	TAL SAC
Total/NA	Prep	3535			190551	10/23/17 08:13	CCB	TAL SAC
Total/NA	Analysis	537 (modified)		1	192039	10/31/17 04:01	TTP	TAL SAC

Client Sample ID: TP-PFC-022-TPE
Lab Sample ID: 320-32321-2
Date Collected: 10/10/17 12:50
Matrix: Water
Date Received: 10/11/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			190551	10/23/17 08:13	CCB	TAL SAC
Total/NA	Analysis	537 (modified)		1	192039	10/31/17 02:39	TTP	TAL SAC

Client Sample ID: TP-PFC-022-MID-CARBON
Lab Sample ID: 320-32321-3
Date Collected: 10/10/17 12:45
Matrix: Water
Date Received: 10/11/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			190551	10/23/17 08:13	CCB	TAL SAC
Total/NA	Analysis	537 (modified)		1	192039	10/31/17 02:46	TTP	TAL SAC

Client Sample ID: TP-PFC-022-TPE-D
Lab Sample ID: 320-32321-4
Date Collected: 10/10/17 00:00
Matrix: Water
Date Received: 10/11/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			190551	10/23/17 08:13	CCB	TAL SAC
Total/NA	Analysis	537 (modified)		1	192039	10/31/17 02:52	TTP	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-32321-1
Project/Site: TT: PFAS, Brunswick, Discharge

Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-28-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (modified)	3535	Water	Perfluoroheptanesulfonic Acid (PFHpS)
537 (modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32321-1	TP-PFC-022-TPI	Water	10/10/17 12:40	10/11/17 09:30
320-32321-2	TP-PFC-022-TPE	Water	10/10/17 12:50	10/11/17 09:30
320-32321-3	TP-PFC-022-MID-CARBON	Water	10/10/17 12:45	10/11/17 09:30
320-32321-4	TP-PFC-022-TPE-D	Water	10/10/17 00:00	10/11/17 09:30

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 191992

Lab Sample ID: IC 320-191992/3 Client Sample ID:

Date Analyzed: 10/30/17 17:59 Lab File ID: 2017.10.30ICAL_003.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	3.03	Assign Peak	phomsopha t	10/30/17 22:45

Lab Sample ID: IC 320-191992/4 Client Sample ID:

Date Analyzed: 10/30/17 18:06 Lab File ID: 2017.10.30ICAL_004.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	3.04	Assign Peak	phomsopha t	10/30/17 22:46

Lab Sample ID: IC 320-191992/6 Client Sample ID:

Date Analyzed: 10/30/17 18:20 Lab File ID: 2017.10.30ICAL_006.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	3.03	Assign Peak	phomsopha t	10/30/17 22:48

Lab Sample ID: IC 320-191992/8 Client Sample ID:

Date Analyzed: 10/30/17 18:34 Lab File ID: 2017.10.30ICAL_008.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	3.03	Assign Peak	phomsopha t	10/30/17 22:50

537 (modified)

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 192039

Lab Sample ID: MB 320-190551/1-A Client Sample ID:

Date Analyzed: 10/31/17 02:11 Lab File ID: 2017.10.30AAA_017.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	2.64	Assign Peak	phomsopha t	10/31/17 09:38

Lab Sample ID: 320-32321-1 DL Client Sample ID: TP-PFC-022-TPI DL

Date Analyzed: 10/31/17 02:32 Lab File ID: 2017.10.30AAA_020.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	2.65	Assign Peak	phomsopha t	10/31/17 09:49

Lab Sample ID: 320-32321-3 Client Sample ID: TP-PFC-022-MID-CARBON

Date Analyzed: 10/31/17 02:46 Lab File ID: 2017.10.30AAA_022.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	2.60	Assign Peak	phomsopha t	10/31/17 09:51

Lab Sample ID: 320-32321-1 Client Sample ID: TP-PFC-022-TPI

Date Analyzed: 10/31/17 04:01 Lab File ID: 2017.10.30AAA_033.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorobutanoic acid (PFBA)	1.54	Assign Peak	phomsopha t	10/31/17 10:13
Perfluorooctanoic acid (PFOA)	2.65	Assign Peak	phomsopha t	10/31/17 10:13

537 (modified)

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCM2-4:2FTSIC_00003	12/30/17	08/07/17	MeOH/H2O, Lot 09285	5000 uL	LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
LCMPFC_ALL_SU_00014	04/03/18	10/03/17	Methanol, Lot Baker 141039	200 mL	LCd-NEtFOSA-M_00006	200 uL	d-N-EtFOSA-M	0.05 ug/mL
					LCd-NMeFOSA-M_00005	200 uL	d-N-MeFOSA-M	0.05 ug/mL
					LCd3-NMeFOSAA_00005	200 uL	d3-NMeFOSAA	0.05 ug/mL
					LCd5-NEtFOSAA_00005	200 uL	d5-NEtFOSAA	0.05 ug/mL
					LCM2-6:FTS_00005	200 uL	M2-6:2FTS	0.0475 ug/mL
					LCM2-8:2FTS_00007	200 uL	M2-8:2FTS	0.0479 ug/mL
					LCM2PFHxDA_00011	200 uL	13C2-PFHxDA	0.05 ug/mL
					LCM2PFTeDA_00010	200 uL	13C2-PFTeDA	0.05 ug/mL
					LCM4PFHPA_00010	200 uL	13C4-PFHpA	0.05 ug/mL
					LCM5PFPEA_00011	200 uL	13C5 PFPeA	0.05 ug/mL
					LCM8FOSA_00014	200 uL	13C8 FOSA	0.05 ug/mL
					LCMPFBA_00011	200 uL	13C4 PFBA	0.05 ug/mL
					LCMPFBS_00004	200 uL	13C3-PFBS	0.0465 ug/mL
					LCMPFDA_00016	200 uL	13C2 PFDA	0.05 ug/mL
					LCMPFDoA_00011	200 uL	13C2 PFDoA	0.05 ug/mL
					LCMPFHxA_00017	200 uL	13C2 PFHxA	0.05 ug/mL
					LCMPFHxS_00011	200 uL	18O2 PFHxS	0.0473 ug/mL
					LCMPFNA_00011	200 uL	13C5 PFNA	0.05 ug/mL
					LCMPFOA_00015	200 uL	13C4 PFOA	0.05 ug/mL
					LCMPFOS_00023	200 uL	13C4 PFOS	0.0478 ug/mL
					LCMPFUdA_00012	200 uL	13C2 PFUnA	0.05 ug/mL
.LCd-NEtFOSA-M_00006	04/20/22	WELLINGTON, Lot dNEtFOSA0417M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
.LCd-NMeFOSA-M_00005	04/20/22	WELLINGTON, Lot dNMeFOSA0417M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
.LCd3-NMeFOSAA_00005	05/19/22	WELLINGTON, Lot d3NMeFOSAA0517			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
.LCd5-NEtFOSAA_00005	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
.LCM2-6:FTS_00005	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
.LCM2-8:2FTS_00007	07/05/22	WELLINGTON, Lot M282FTS0717			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCM2PFHxDA_00011	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00010	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00010	05/03/22	Wellington Laboratories, Lot M4PFHpA0517			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00011	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
.LCM8FOSA_00014	04/20/22	Wellington Laboratories, Lot M8FOSA0417I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00011	04/12/22	Wellington Laboratories, Lot MPFBA0417			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFBS_00004	05/24/22	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
.LCMPFDA_00016	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00011	05/23/22	Wellington Laboratories, Lot MPFDoA0517			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00017	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00011	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00011	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00015	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00023	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00012	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-IS_00009	04/23/18	10/23/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00006	150 uL	13C2-PFOA	0.25 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCM2PFOA_00006	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
LCPFC_FULL-L1_00005	12/27/17	07/07/17	MeOH/H2O, Lot 90285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC_ALL_SP_00001	25 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.467 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.474 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.479 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	0.5 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.5 ng/mL
							MeFOSA	0.5 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.5 ng/mL
							Perfluorobutanoic acid (PFBA)	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid (PFDA)	0.5 ng/mL
							Perfluorododecanoic acid (PFDoA)	0.5 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	0.482 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanesulfonic Acid (PFHpS)	0.476 ng/mL
							Perfluorohexanoic acid (PFHxA)	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.455 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctadecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.464 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	0.5 ng/mL
							Perfluoropentanoic acid (PFPeA)	0.5 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	0.5 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	0.5 ng/mL
							Perfluoroundecanoic acid (PFUnA)	0.5 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC_ALL_SP_00001	12/27/17	07/07/17	Methanol, Lot 157237	10000 uL	LCPFC2SP_00037	1000 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.0934 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
					LCPFCSP_00103	1000 uL	Perfluorobutanoic acid (PFBA)	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid (PFDA)	0.1 ug/mL
							Perfluorododecanoic acid (PFDoA)	0.1 ug/mL
							Perfluorodecanesulfonic acid (PFDS)	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	0.0952 ug/mL
							Perfluorohexanoic acid (PFHxA)	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
							Perfluorooctane Sulfonamide (FOSA)	0.1 ug/mL
							Perfluoropentanoic acid (PFPeA)	0.1 ug/mL
							Perfluorotetradecanoic acid (PFTeA)	0.1 ug/mL
							Perfluorotridecanoic Acid (PFTriA)	0.1 ug/mL
							Perfluoroundecanoic acid (PFUnA)	0.1 ug/mL
..LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC4:2FTS_00002	12/12/21		WELLINGTON, Lot 42FTS1216		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
...LC6:2FTS_00003	06/25/21		WELLINGTON, Lot 62FTS0616		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00003	08/22/21		WELLINGTON, Lot 82FTS0816		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00004	05/24/21		WELLINGTON, Lot NEtFOSA0516M		(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
...LCN-EtFOSAA_00002	01/20/21		WELLINGTON, Lot NEtFOSAA0116		(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00003	05/24/21		WELLINGTON, Lot NMeFOSA0516M		(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00003	01/20/21		WELLINGTON, Lot NMeFOSAA0116		(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
...LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
...LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
...LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
...LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
...LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
...LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
...LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
...LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
...LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
...LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
LCPFC_FULL-L2_00006	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC_ALL_SP_00001	50 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	1 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	1 ng/mL
							MeFOSA	1 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	1 ng/mL
							Perfluorobutanoic acid (PFBA)	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
							Perfluorodecanoic acid (PFDA)	1 ng/mL
							Perfluorododecanoic acid (PFDoA)	1 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	0.964 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ng/mL
							Perfluorohexanoic acid (PFHxA)	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.91 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctadecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.928 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	1 ng/mL
							Perfluoropentanoic acid (PFPeA)	1 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	1 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	1 ng/mL
							Perfluoroundecanoic acid (PFUnA)	1 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC_ALL_SP_00001	12/27/17	07/07/17	Methanol, Lot 157237	10000 uL	LCPFC2SP_00037	1000 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.0934 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
					LCPFCSP_00103	1000 uL	Perfluorobutanoic acid (PFBA)	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid (PFDA)	0.1 ug/mL
							Perfluorododecanoic acid (PFDoA)	0.1 ug/mL
							Perfluorodecanesulfonic acid (PFDS)	0.0964 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	0.0952 ug/mL
							Perfluorohexanoic acid (PFHxA)	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
							Perfluorooctane Sulfonamide (FOSA)	0.1 ug/mL
							Perfluoropentanoic acid (PFPeA)	0.1 ug/mL
							Perfluorotetradecanoic acid (PFTeA)	0.1 ug/mL
							Perfluorotridecanoic Acid (PFTriA)	0.1 ug/mL
							Perfluoroundecanoic acid (PFUnA)	0.1 ug/mL
..LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
...LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
...LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
...LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
...LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
...LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
...LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
...LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
...LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
...LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
...LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
...LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
...LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
LCPFC_FULL-L3_00005	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC_ALL_SP_00001	250 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	4.67 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	4.74 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	4.79 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							N-ethylperfluoro-1-octanesulfonamide	5 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	5 ng/mL
							MeFOSA	5 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	5 ng/mL
							Perfluorobutanoic acid (PFBA)	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid (PFDA)	5 ng/mL
							Perfluorododecanoic acid (PFDoA)	5 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	4.76 ng/mL
							Perfluorohexanoic acid (PFHxA)	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.55 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctadecanoic acid	5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.64 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	5 ng/mL
							Perfluoropentanoic acid (PFPeA)	5 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	5 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	5 ng/mL
							Perfluoroundecanoic acid (PFUnA)	5 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC_ALL_SP_00001	12/27/17	07/07/17	Methanol, Lot 157237	10000 uL	LCPFC2SP_00037	1000 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.0934 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
					LCPFCSP_00103	1000 uL	Perfluorobutanoic acid (PFBA)	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid (PFDA)	0.1 ug/mL
							Perfluorododecanoic acid (PFDoA)	0.1 ug/mL
							Perfluorodecanesulfonic acid (PFDS)	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	0.0952 ug/mL
							Perfluorohexanoic acid (PFHxA)	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
							Perfluorooctane Sulfonamide (FOSA)	0.1 ug/mL
							Perfluoropentanoic acid (PFPeA)	0.1 ug/mL
							Perfluorotetradecanoic acid (PFTeA)	0.1 ug/mL
							Perfluorotridecanoic Acid (PFTriA)	0.1 ug/mL
							Perfluoroundecanoic acid (PFUnA)	0.1 ug/mL
..LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC4:2FTS_00002	12/12/21		WELLINGTON, Lot 42FTS1216		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
...LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
...LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
...LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
...LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
...LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
...LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
...LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
...LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
...LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
...LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
...LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
...LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
LCPFC_FULL-L4_00008	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFC2SP_00037	100 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	18.68 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	18.96 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	19.16 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	20 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	20 ng/mL
							MeFOSA	20 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	20 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
					LCPFCSP_00103	100 uL	Perfluorobutanoic acid (PFBA)	20 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluorodecanoic acid (PFDA)	20 ng/mL
							Perfluorododecanoic acid (PFDoA)	20 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	19.28 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	19.04 ng/mL
							Perfluorohexanoic acid (PFHxA)	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.2 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctadecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	18.56 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	20 ng/mL
							Perfluoropentanoic acid (PFPeA)	20 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	20 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	20 ng/mL
							Perfluoroundecanoic acid (PFUnA)	20 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
..LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
..LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
..LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
..LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
..LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
..LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
..LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
..LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
..LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
..LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
..LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
..LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
LCPFC_FULL-L5_00008	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC2SP_00037	250 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	50 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
							MeFOSA	50 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
					LCPFCSP_00103	250 uL	Perfluorobutanoic acid (PFBA)	50 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluorodecanoic acid (PFDA)	50 ng/mL
							Perfluorododecanoic acid (PFDoA)	50 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	48.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ng/mL
							Perfluorohexanoic acid (PFHxA)	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctadecanoic acid	50 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	46.4 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	50 ng/mL
							Perfluoropentanoic acid (PFPeA)	50 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	50 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	50 ng/mL
							Perfluoroundecanoic acid (PFUnA)	50 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
..LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
..LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
..LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
..LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
..LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
..LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
..LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
..LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
..LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
..LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
..LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
LCPFC_FULL-L6_00006	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC2SP_00037	500 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	93.4 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	94.8 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	95.8 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	100 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	100 ng/mL
							MeFOSA	100 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	100 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
					LCPFCSP_00103	500 uL	Perfluorobutanoic acid (PFBA)	100 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	88.4 ng/mL
							Perfluorodecanoic acid (PFDA)	100 ng/mL
							Perfluorododecanoic acid (PFDoA)	100 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	96.4 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid (PFHpA)	100 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	95.2 ng/mL
							Perfluorohexanoic acid (PFHxA)	100 ng/mL
							Perfluorohexadecanoic acid	100 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	91 ng/mL
							Perfluorononanoic acid (PFNA)	100 ng/mL
							Perfluorooctanoic acid (PFOA)	100 ng/mL
							Perfluorooctadecanoic acid	100 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	92.8 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	100 ng/mL
							Perfluoropentanoic acid (PFPeA)	100 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	100 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	100 ng/mL
							Perfluoroundecanoic acid (PFUnA)	100 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
..LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
..LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
..LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
..LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
..LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
..LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
..LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
..LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
..LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
..LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
..LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
..LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
LCPFC_FULL-L7_00004	12/27/17	07/07/17	MeOH/H2O, Lot 090285	5000 uL	LCMPFC_ALL_SU_00001	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFC2SP_00037	1000 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	186.8 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	189.6 ng/mL
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	191.6 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	200 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	200 ng/mL
							MeFOSA	200 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							N-methyl perfluorooctane sulfonamidoacetic acid	200 ng/mL
					LCPFCIS_00003	50 uL	13C2-PFOA	50 ng/mL
					LCPFCSP_00103	1000 uL	Perfluorobutanoic acid (PFBA)	200 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid (PFDA)	200 ng/mL
							Perfluorododecanoic acid (PFDoA)	200 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid (PFHpS)	190.4 ng/mL
							Perfluorohexanoic acid (PFHxA)	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	182 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic acid	200 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	185.6 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	200 ng/mL
							Perfluoropentanoic acid (PFPeA)	200 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	200 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	200 ng/mL
							Perfluoroundecanoic acid (PFUnA)	200 ng/mL
.LCMPFC_ALL_SU_00001	12/29/17	06/29/17	Methanol, Lot Baker 141039	10000 uL	LCd-NEtFOSA-M_00005	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	200 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010	200 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00010	200 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00003	200 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFDoA_00010	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00010	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00022	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011	200 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00010	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00009	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00009	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00010	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00013	12/22/20	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00010	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00003	08/02/21	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00015	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00010	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00016	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00010	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00010	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00014	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00022	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00011	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS_00002	200 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.934 ug/mL
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00004	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00003	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS_00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA_00005	500 uL	13C2-PFOA	5 ug/mL
..LCM2PFOA_00005	06/19/18	Wellington Laboratories, Lot M2PFOA0613			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006	200 uL	Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010	200 uL	Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006	200 uL	Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005	200 uL	Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005	200 uL	Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
..LCPFBA_00006	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
..LCPFBS_00006	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00006	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFDoA_00006	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
..LCPFHpA_00006	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00010	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
..LCPFHxA_00005	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
..LCPFHxDA_00007	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS-br_00003	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00007	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00007	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00007	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS-br_00003	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
..LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
..LCPFPeA_00006	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
..LCPFTeDA_00005	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
..LCPFTrDA_00005	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
..LCPFUdA_00006	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
LCPFCIC_FULL_00007	12/30/17	10/20/17	MeOH/H2O, Lot 09285	5000 uL	LCMPFC_ALL_SU_00011	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
							13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5 PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C3-PFBS	46.5 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFACMXB_00010	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluorobutanoic acid (PFBA)	50 ng/mL
							Perfluorodecanesulfonic acid (PFDS)	48.25 ng/mL
							Perfluorodecanoic acid (PFDA)	50 ng/mL
							Perfluorododecanoic acid (PFDoA)	50 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorohexanoic acid (PFHxA)	50 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluoropentanoic acid (PFPeA)	50 ng/mL
							Perfluorotetradecanoic acid (PFTeA)	50 ng/mL
							Perfluorotridecanoic Acid (PFTriA)	50 ng/mL
							Perfluoroundecanoic acid (PFUnA)	50 ng/mL
					LCPFC3IM_00008	250 uL	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	50 ng/mL
.LCMPFC_ALL_SU_00011	02/22/18	08/23/17	Methanol, Lot Baker 141039	5 mL	LCd-NEtFOSA-M_00005	100 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004	100 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004	100 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004	100 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004	100 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004	100 uL	M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00011	100 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00010	100 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00010	100 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00011	100 uL	13C5 PFPeA	1 ug/mL
					LCM8FOSA_00014	100 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00011	100 uL	13C4 PFBA	1 ug/mL
					LCMPFBS_00004	100 uL	13C3-PFBS	0.93 ug/mL
					LCMPFDA_00016	100 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00011	100 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00017	100 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00011	100 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00011	100 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00015	100 uL	13C4 PFOA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFOS_00023	100 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00012	100 uL	13C2 PFUnA	1 ug/mL
..LCd-NEtFOSA-M_00005	06/10/21	WELLINGTON, Lot dNEtFOSA0616M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00004	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00004	11/22/21	WELLINGTON, Lot d3NMeFOSAA1116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00004	11/22/21	WELLINGTON, Lot d5NEtFOSAA1116			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00004	02/17/22	WELLINGTON, Lot M262FTS0217			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00004	08/22/21	WELLINGTON, Lot M282FTS0816			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
..LCM2PFHxDA_00011	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00010	12/07/20	Wellington Laboratories, Lot M2PFTeDA0217			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00010	05/03/22	Wellington Laboratories, Lot M4PFHpA0517			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00011	11/22/21	Wellington Laboratories, Lot M5PFPeA1116			(Purchased Reagent)		13C5 PFPeA	50 ug/mL
..LCM8FOSA_00014	04/20/22	Wellington Laboratories, Lot M8FOSA0417I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00011	04/12/22	Wellington Laboratories, Lot MPFBA0417			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBS_00004	05/24/22	Wellington Laboratories, Lot M3PFBS0815			(Purchased Reagent)		13C3-PFBS	46.5 ug/mL
..LCMPFDA_00016	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00011	05/23/22	Wellington Laboratories, Lot MPFDoA0517			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00017	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00011	02/17/22	Wellington Laboratories, Lot MPFHxS0217			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00011	09/30/21	Wellington Laboratories, Lot MPFNA0916			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00015	04/12/22	Wellington Laboratories, Lot MPFOA0417			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00023	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00012	11/22/21	Wellington Laboratories, Lot MPFUdA1116			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFACMXB_00010	06/20/19	Wellington Laboratories, Lot PFACMXB0614			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluorobutanoic acid (PFBA)	2 ug/mL
							Perfluorodecanesulfonic acid (PFDS)	1.93 ug/mL
							Perfluorodecanoic acid (PFDA)	2 ug/mL
							Perfluorododecanoic acid (PFDoA)	2 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorohexanoic acid (PFHxA)	2 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
							Perfluoropentanoic acid (PFPeA)	2 ug/mL
							Perfluorotetradecanoic acid (PFTeA)	2 ug/mL
							Perfluorotridecanoic Acid (PFTriA)	2 ug/mL
							Perfluoroundecanoic acid (PFUnA)	2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFC3IM_00008	03/06/18	09/06/17	Methanol, Lot 090285	5 mL	LCPFHpSA_00002	0.1 mL	Perfluoroheptanesulfonic Acid (PFHpS)	952 ng/mL
					LCPFOSA_00010	0.1 mL	Perfluorooctane Sulfonamide (FOSA)	1000 ng/mL
..LCPFHpSA_00002	10/18/21	Wellington Laboratories, Lot LPFHpS1016			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
..LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFCSP_00117	03/29/18	09/29/17	Methanol, Lot 090285	250 mL	LC4:2FTS_00003	100 uL	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	0.01868 ug/mL
					LC6:2FTS_00003	100 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.01896 ug/mL
					LC8:2FTS_00003	100 uL	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.01916 ug/mL
					LCN-EtFOSA-M_00005	100 uL	N-ethylperfluoro-1-octanesulfonamide	0.02 ug/mL
					LCN-EtFOSAA_00004	100 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	0.02 ug/mL
					LCN-MeFOSA-M_00004	100 uL	MeFOSA	0.02 ug/mL
					LCN-MeFOSAA_00004	100 uL	N-methyl perfluorooctane sulfonamidoacetic acid	0.02 ug/mL
					LCPFBA_00007	100 uL	Perfluorobutanoic acid (PFBA)	0.02 ug/mL
					LCPFBS_00008	100 uL	Perfluorobutane Sulfonate	0.01768 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.01768 ug/mL
					LCPFDA_00007	100 uL	Perfluorodecanoic acid (PFDA)	0.02 ug/mL
					LCPFDoA_00007	100 uL	Perfluorododecanoic acid (PFDoA)	0.02 ug/mL
					LCPFDSA_00002	100 uL	Perfluorodecanesulfonic acid (PFDS)	0.01928 ug/mL
					LCPFHpA_00008	100 uL	Perfluoroheptanoic acid (PFHpA)	0.02 ug/mL
					LCPFHpSA_00003	100 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.01904 ug/mL
					LCPFHxA_00007	100 uL	Perfluorohexanoic acid (PFHxA)	0.02 ug/mL
					LCPFHxDA_00008	100 uL	Perfluorohexadecanoic acid	0.02 ug/mL
					LCPFHxS-br_00004	100 uL	Perfluorohexane Sulfonate	0.0182 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0182 ug/mL
					LCPFNA_00009	100 uL	Perfluorononanoic acid (PFNA)	0.02 ug/mL
					LCPFOA_00008	100 uL	Perfluorooctanoic acid (PFOA)	0.02 ug/mL
					LCPFODA_00008	100 uL	Perfluorooctadecanoic acid	0.02 ug/mL
					LCPFOS-br_00004	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.01856 ug/mL
					LCPFOSA_00010	100 uL	Perfluorooctane Sulfonamide (FOSA)	0.02 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFPeA_00007	100 uL	Perfluoropentanoic acid (PFPeA)	0.02 ug/mL
					LCPFTeDA_00007	100 uL	Perfluorotetradecanoic acid (PFTeA)	0.02 ug/mL
					LCPFTrDA_00007	100 uL	Perfluorotridecanoic Acid (PFTriA)	0.02 ug/mL
					LCPFUdA_00007	100 uL	Perfluoroundecanoic acid (PFUnA)	0.02 ug/mL
.LC4:2FTS_00003	12/12/21	WELLINGTON, Lot 42FTS1216			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
.LC6:2FTS_00003	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
.LC8:2FTS_00003	08/22/21	WELLINGTON, Lot 82FTS0816			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
.LCN-EtFOSA-M_00005	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
.LCN-EtFOSAA_00004	09/30/21	WELLINGTON, Lot NEtFOSAA0916			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCN-MeFOSA-M_00004	05/24/21	WELLINGTON, Lot NMeFOSA0516M			(Purchased Reagent)		MeFOSA	50 ug/mL
.LCN-MeFOSAA_00004	10/12/21	WELLINGTON, Lot NMeFOSAA0916			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFBA_00007	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutanoic acid (PFBA)	50 ug/mL
.LCPFBS_00008	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00007	05/31/21	Wellington Laboratories, Lot PFDA0516			(Purchased Reagent)		Perfluorodecanoic acid (PFDA)	50 ug/mL
.LCPFDoA_00007	05/31/21	Wellington Laboratories, Lot PFDoA0516			(Purchased Reagent)		Perfluorododecanoic acid (PFDoA)	50 ug/mL
.LCPFDSA_00002	05/24/21	Wellington Laboratories, Lot LPFDS0516			(Purchased Reagent)		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
.LCPFHpA_00008	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpSA_00003	09/01/22	Wellington Laboratories, Lot LPFHpS0817			(Purchased Reagent)		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
.LCPFHxA_00007	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid (PFHxA)	50 ug/mL
.LCPFHxDA_00008	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS-br_00004	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFOA_00008	08/02/21	Wellington Laboratories, Lot PFOA0716			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00008	04/29/21	Wellington Laboratories, Lot PFODA0416			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
.LCPFOS-br_00004	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LCPFOSA_00010	09/30/21	Wellington Laboratories, Lot FOSA0916I			(Purchased Reagent)		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFPeA_00007	05/31/21	Wellington Laboratories, Lot PFPeA0516			(Purchased Reagent)		Perfluoropentanoic acid (PFPeA)	50 ug/mL
.LCPFTeDA_00007	09/30/21	Wellington Laboratories, Lot PFTeDA0916			(Purchased Reagent)		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
.LCPFTrDA_00007	02/12/21	Wellington Laboratories, Lot PFTrDA0216			(Purchased Reagent)		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
.LCPFUdA_00007	10/18/21	Wellington Laboratories, Lot PFUdA1016			(Purchased Reagent)		Perfluoroundecanoic acid (PFUnA)	50 ug/mL

Reagent

LC4:2FTS_00002

R: SBC 3/31/17

896827
ID: LC4:2FTS_00002
Exp: 12/12/21 Prpd:
4:2FTS

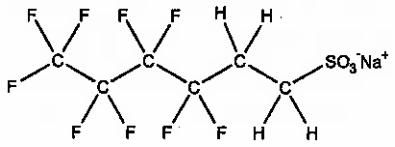
WELLINGTON LABORATORIES

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

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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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 $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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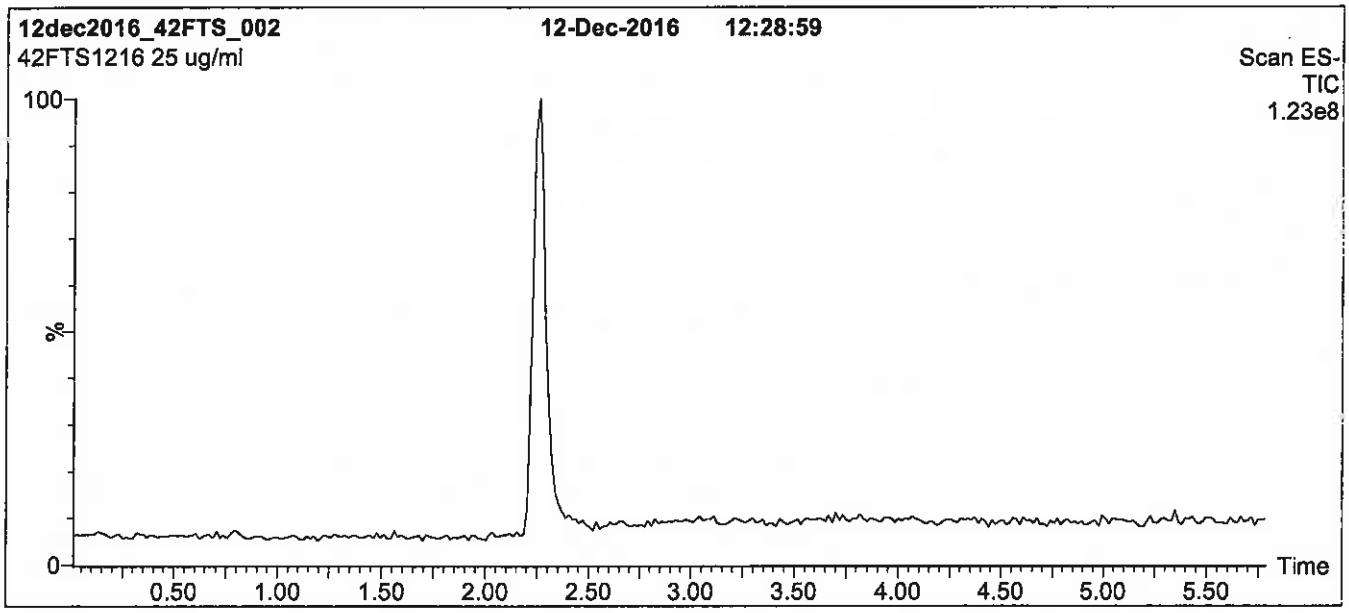
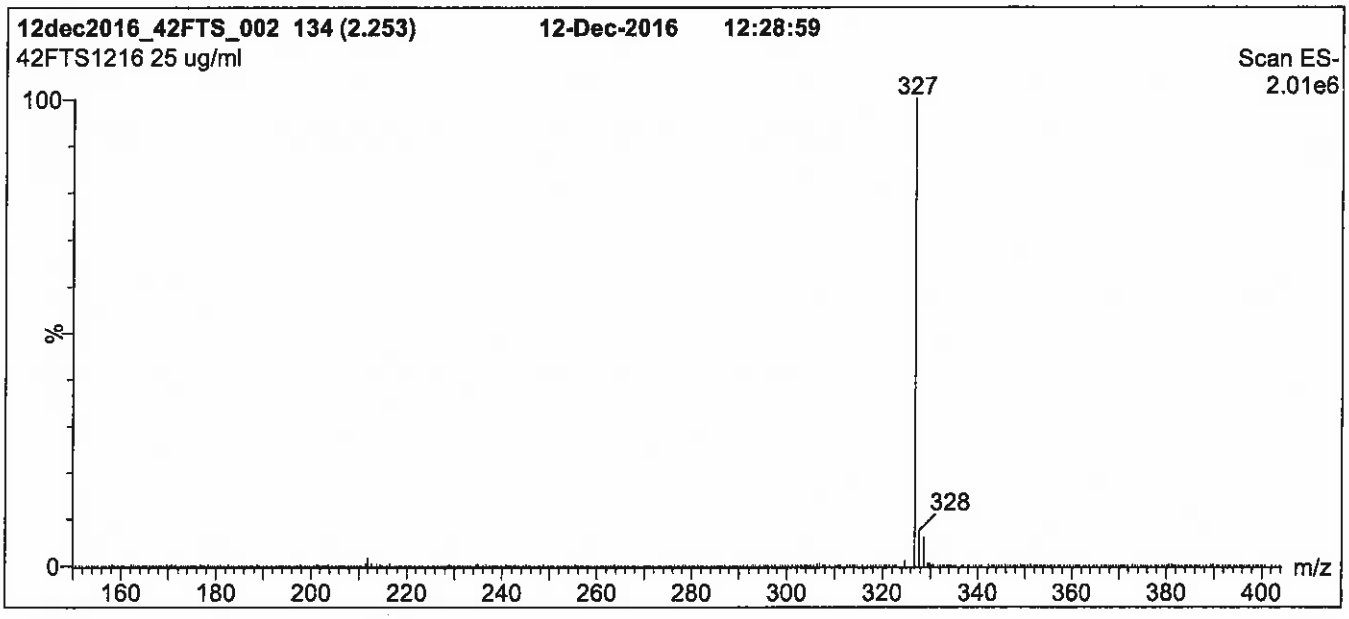
Figure 1: **4:2FTS; LC/MS Data (TIC and Mass Spectrum)**





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

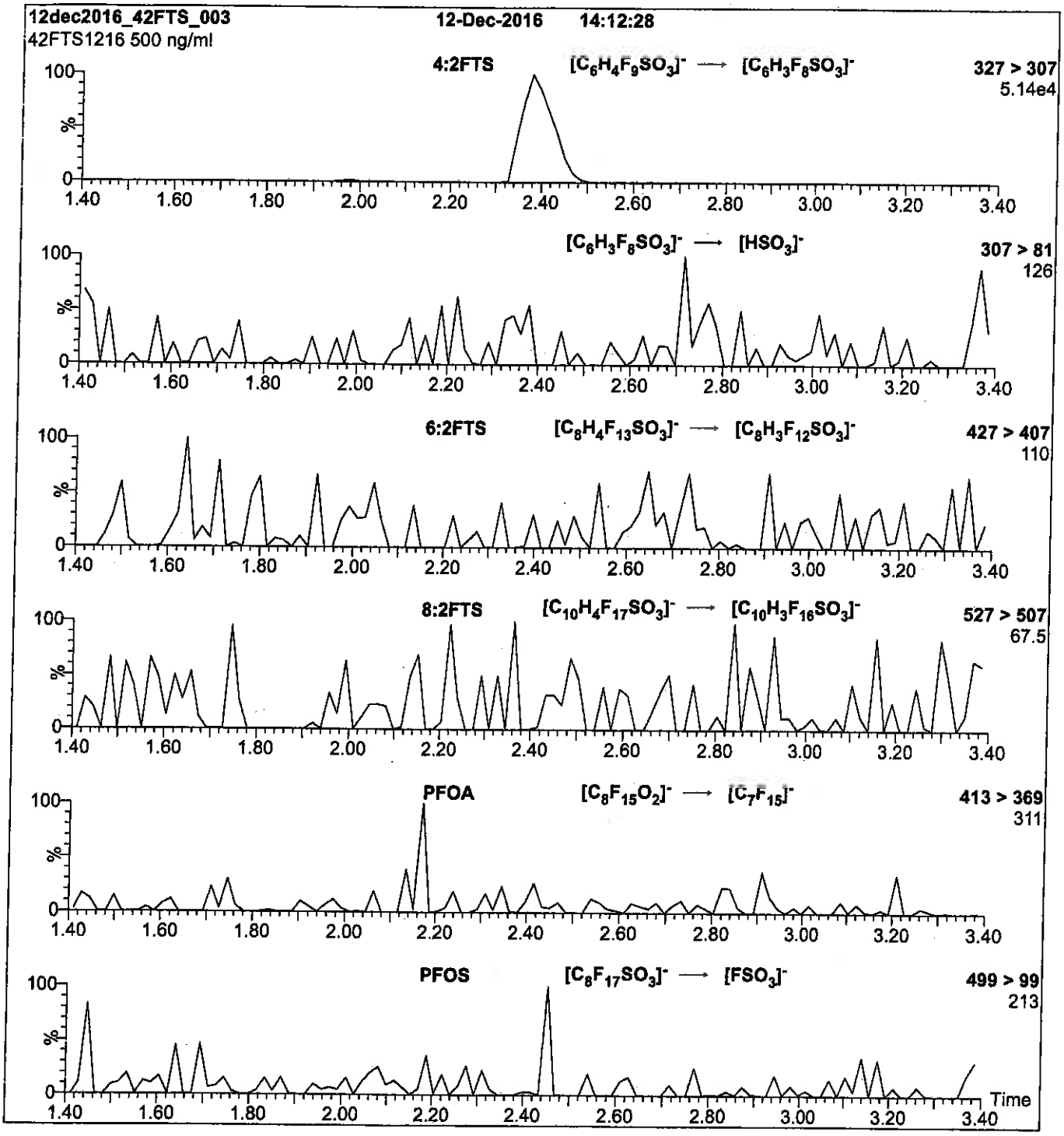
Flow: 300 µl/min

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

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

Reagent

LC4:2FTS_00003

n: 7/12/17 SK

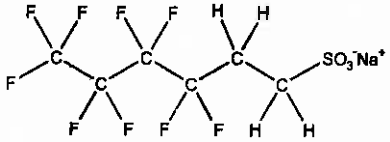
WELLINGTON LABORATORIES

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:	$C_6H_4F_8SO_3Na$	**MOLECULAR WEIGHT:**	350.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	46.7 ± 2.3 µg/ml (4:2FTS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	12/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/21/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED

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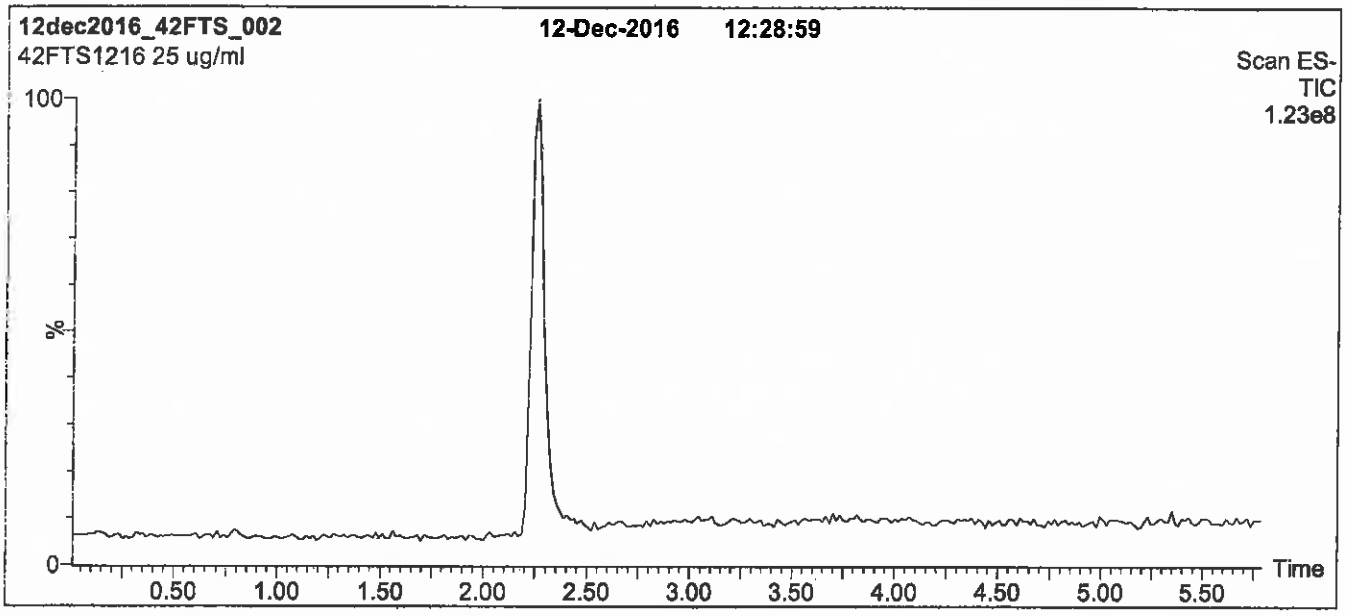
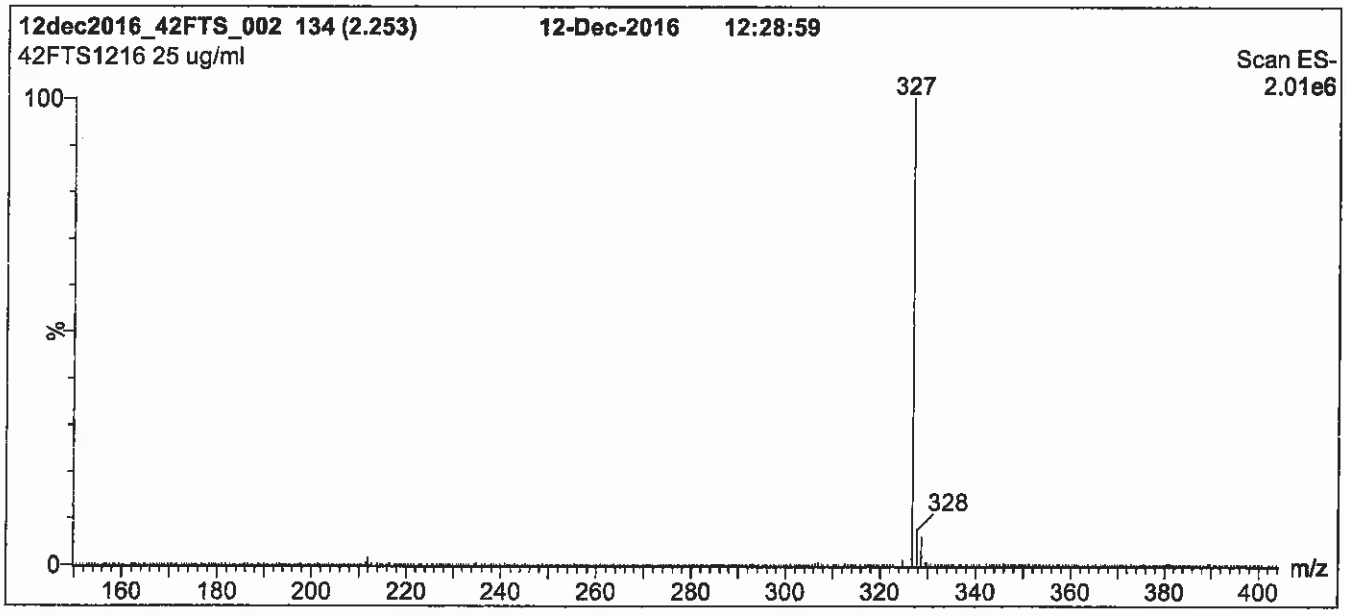




Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

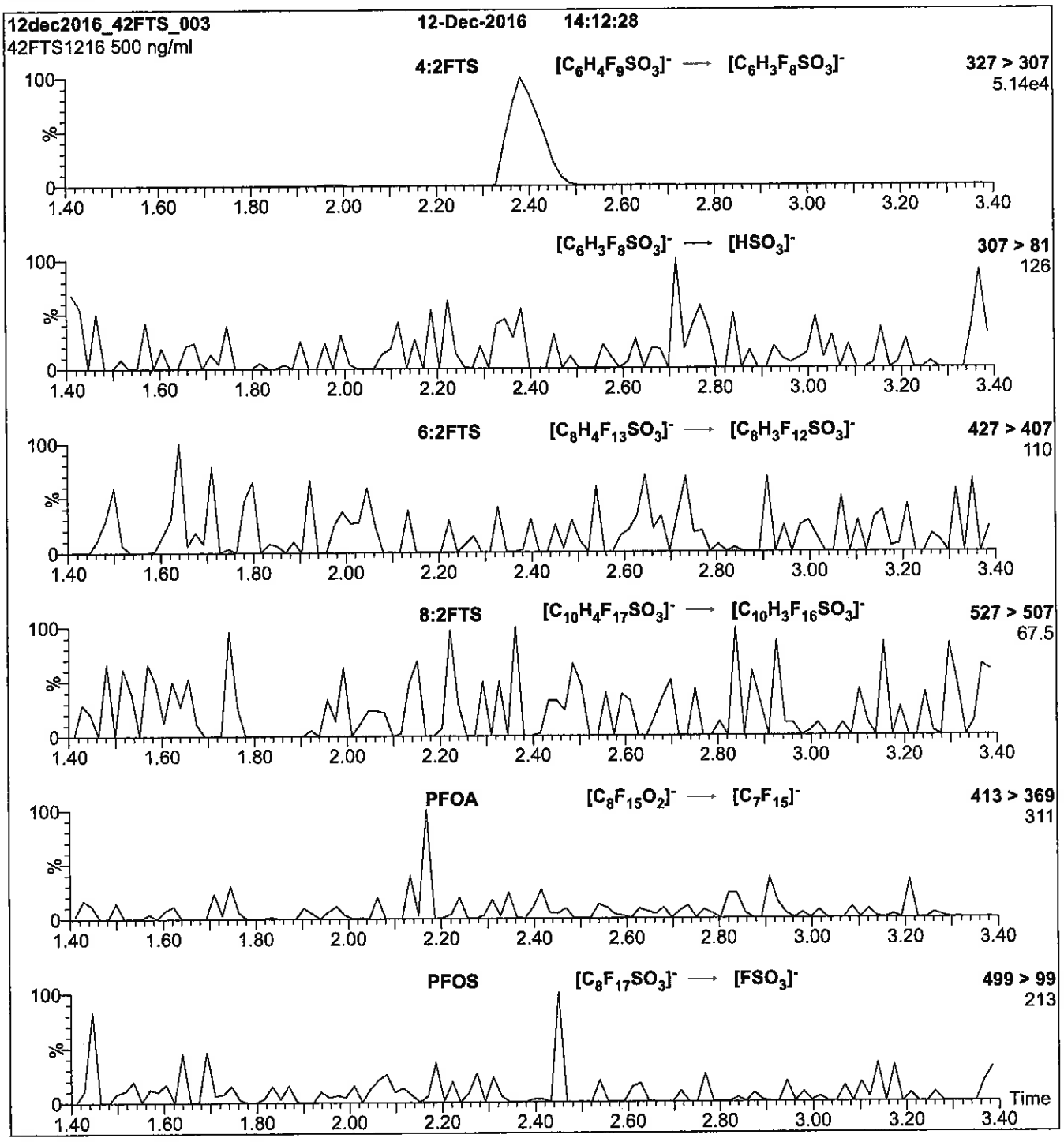
Flow: 300 µl/min

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

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

Reagent

LC6:2FTS_00003

P: 12/29/16 SRV

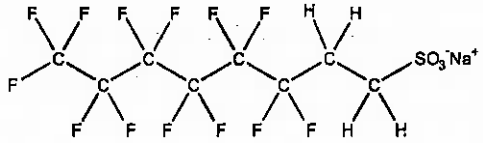
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS0616

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)	06/25/2016			
EXPIRY DATE: (mm/dd/yyyy)	06/25/2021			
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:** 06/29/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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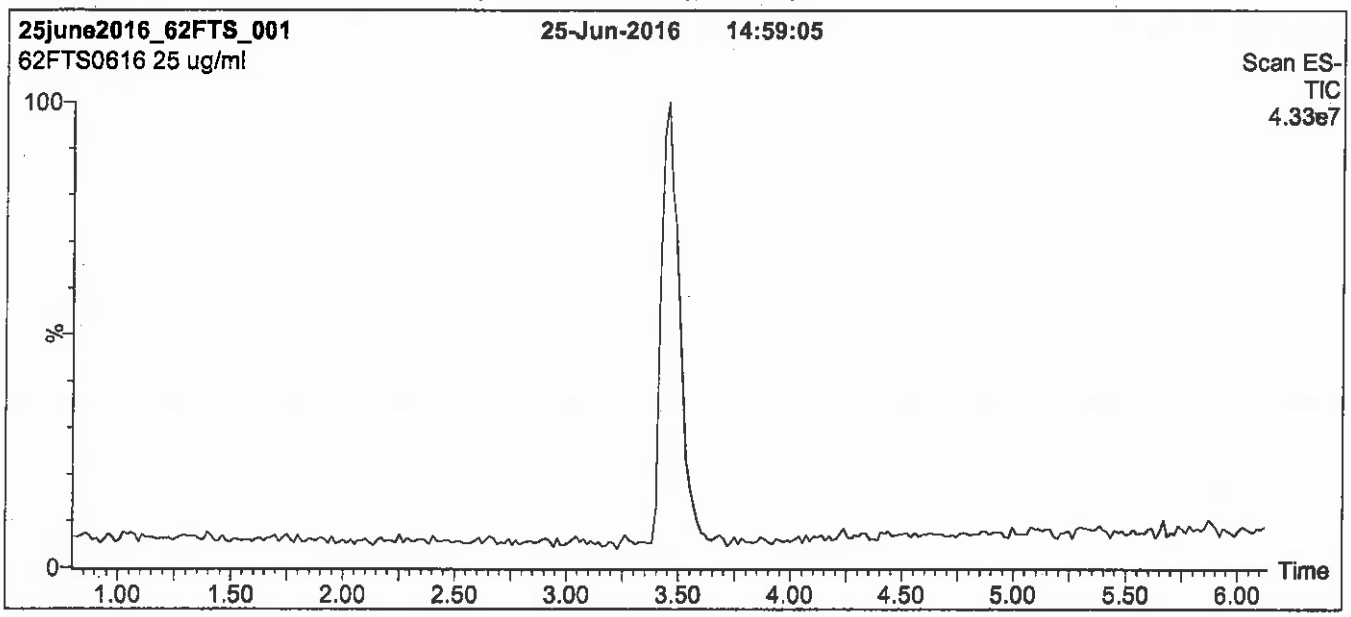
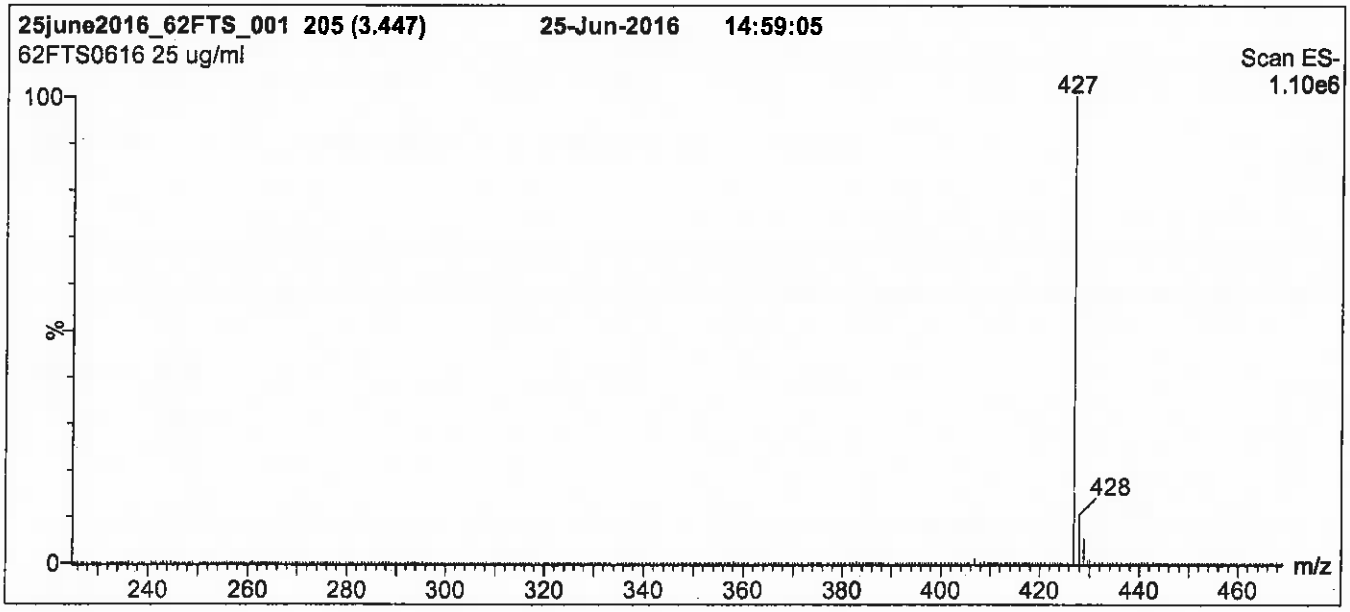
Figure 1: **6:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

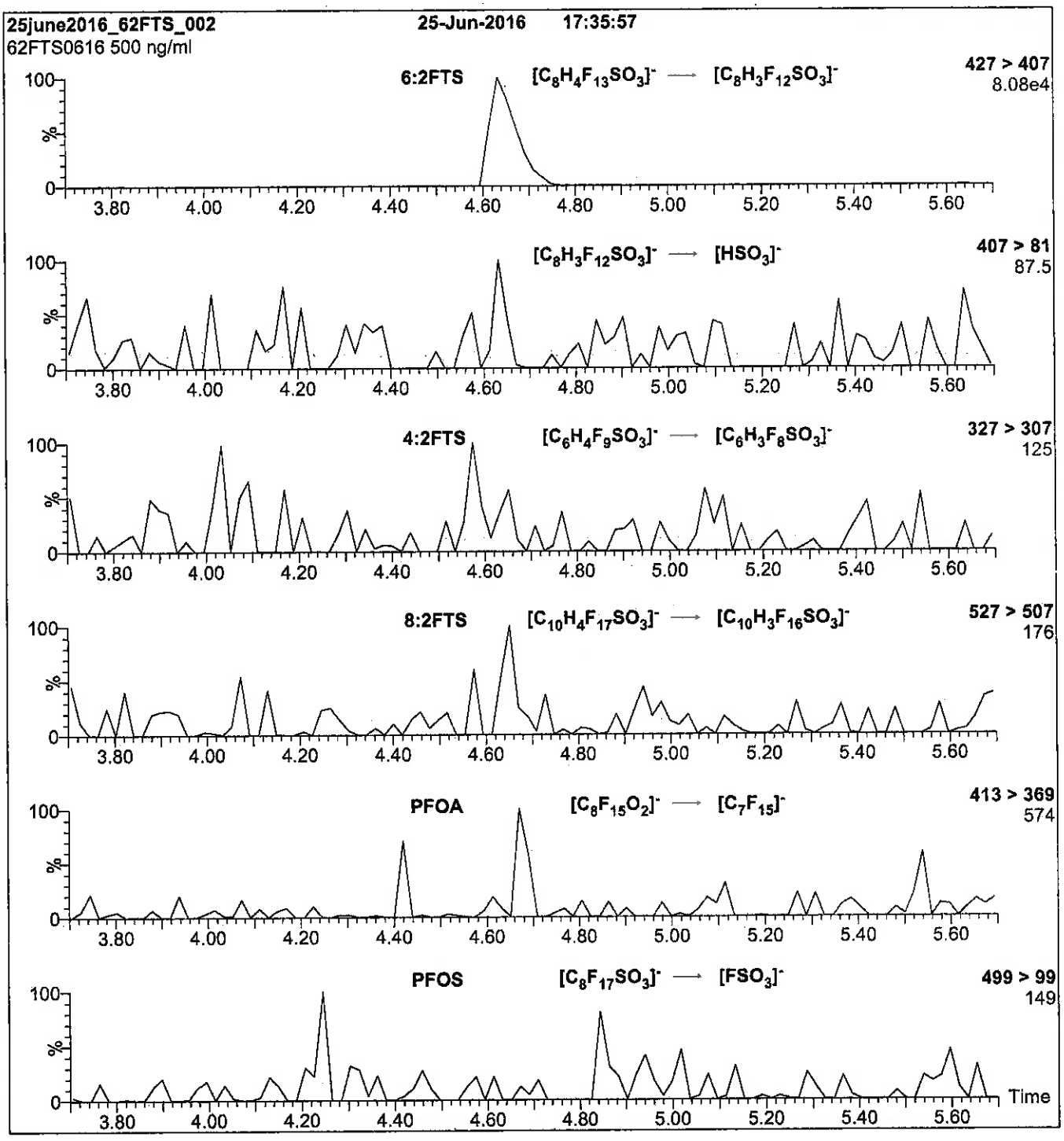
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 6:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 25

Reagent

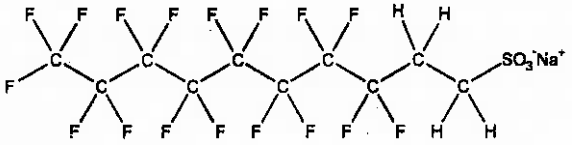
LC8:2FTS_00003

P: 12/29/16

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	8:2FTS	**LOT NUMBER:**	82FTS0816
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)	08/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/22/2021		
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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

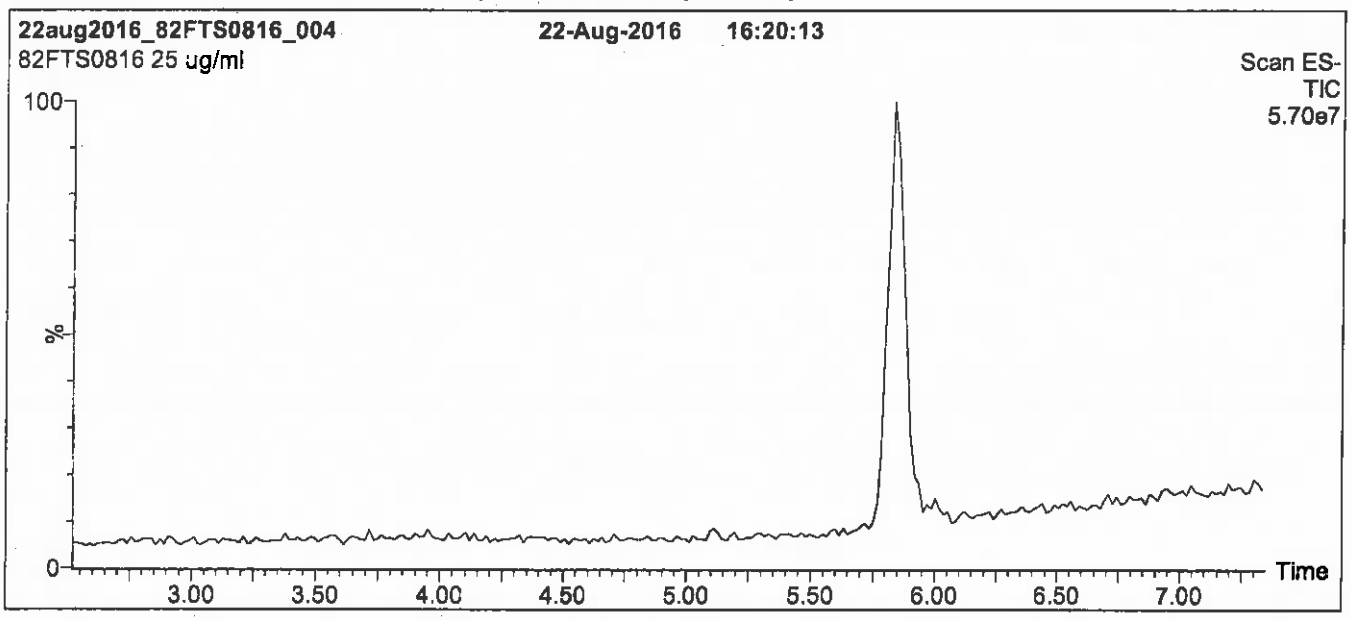
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

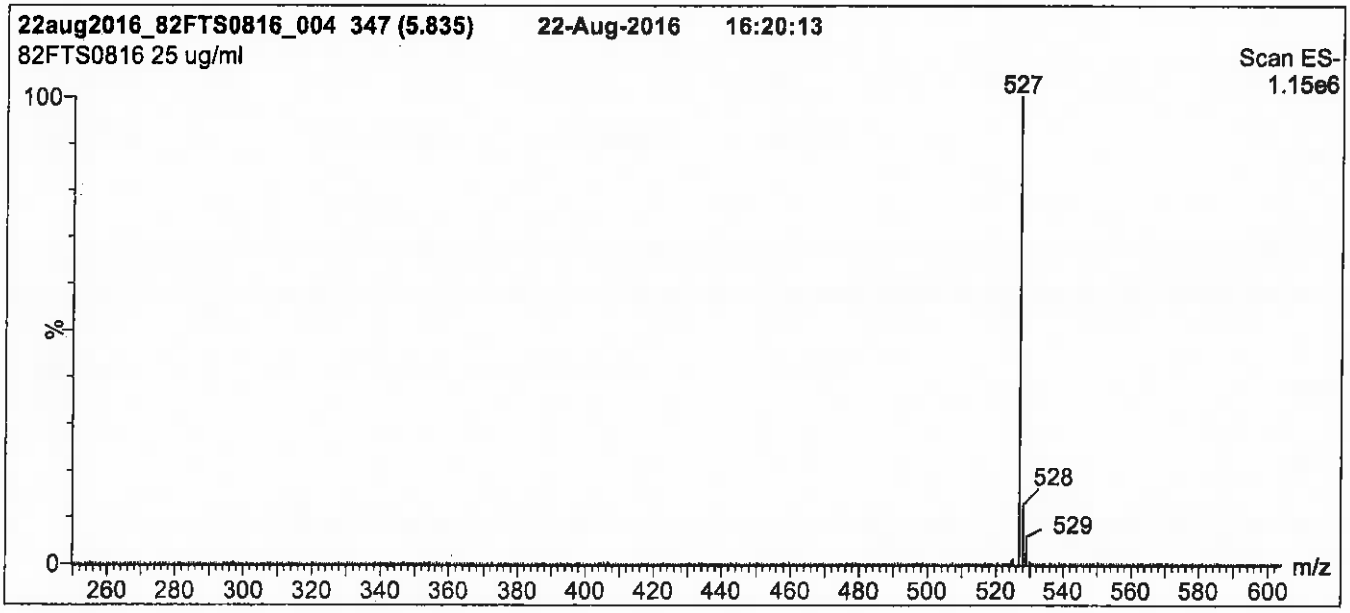
CALA

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

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: Agilent Zorbax Bonus-RP
1.8 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

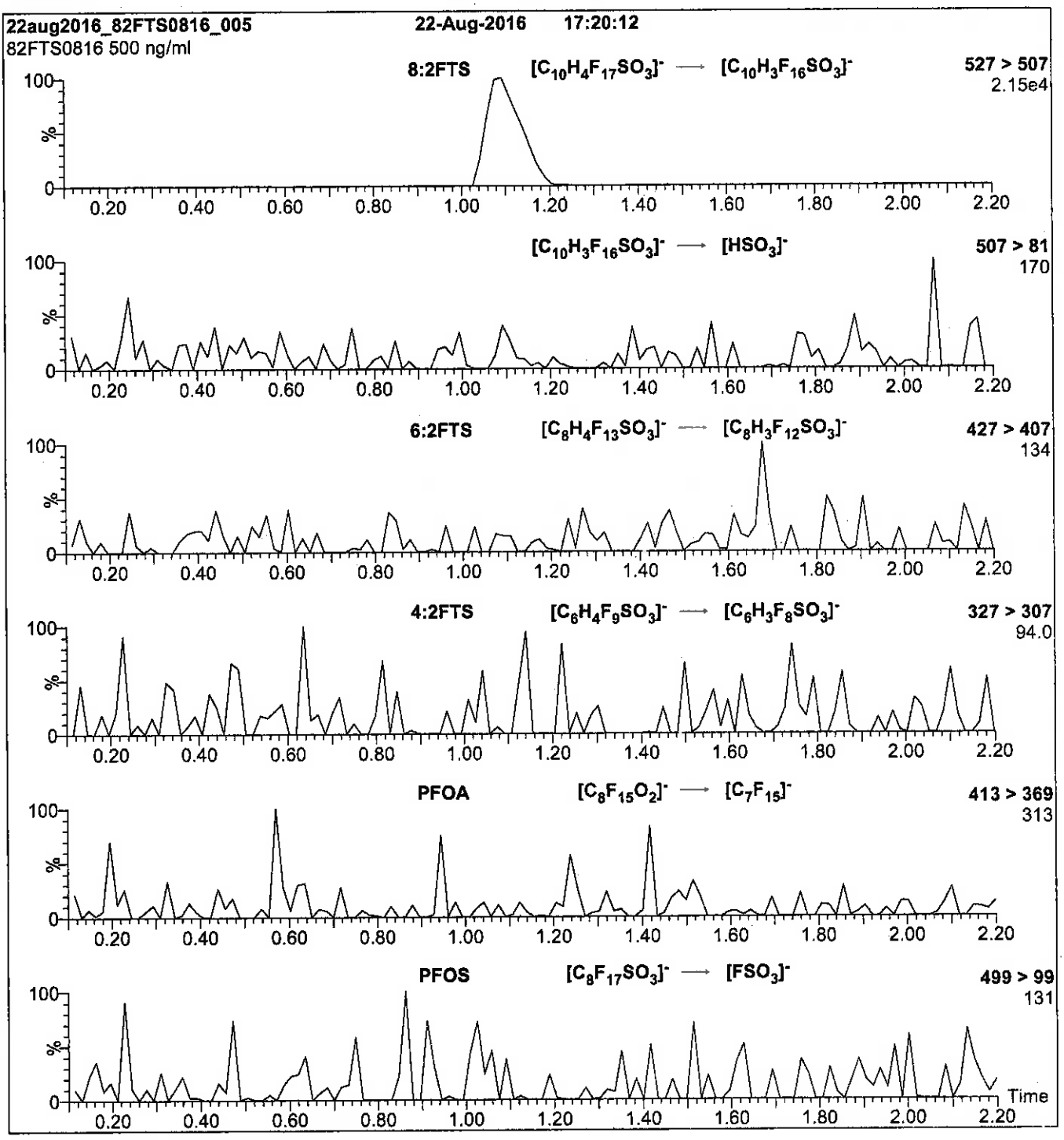
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250- 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

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) = 3.31e-3
Collision Energy (eV) = 30

Reagent

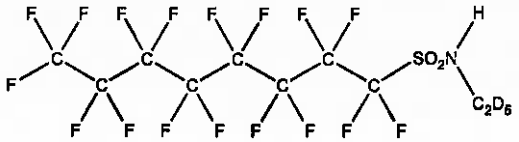
LCd-NEtFOSA-M_00005

D: 3/20/17

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	d-N-EtFOSA-M	**LOT NUMBER:**	dNEtFOSA0616M
COMPOUND:	N-ethyl-d_5-perfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_{10}D_5HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	532.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	06/10/2016		
EXPIRY DATE: (mm/dd/yyyy)	06/10/2021		
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 ~ 0.5% of N-methyl-d_3-perfluoro-1-octanesulfonamide (d-N-MeFOSA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/14/2016 (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

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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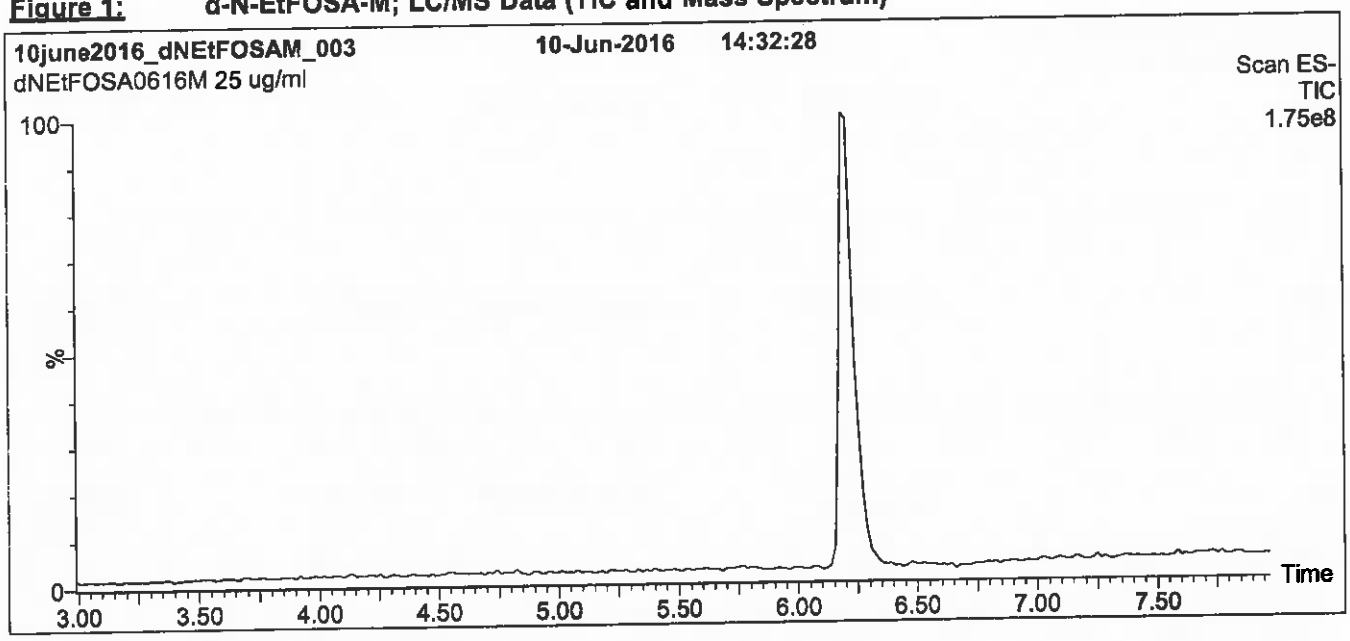
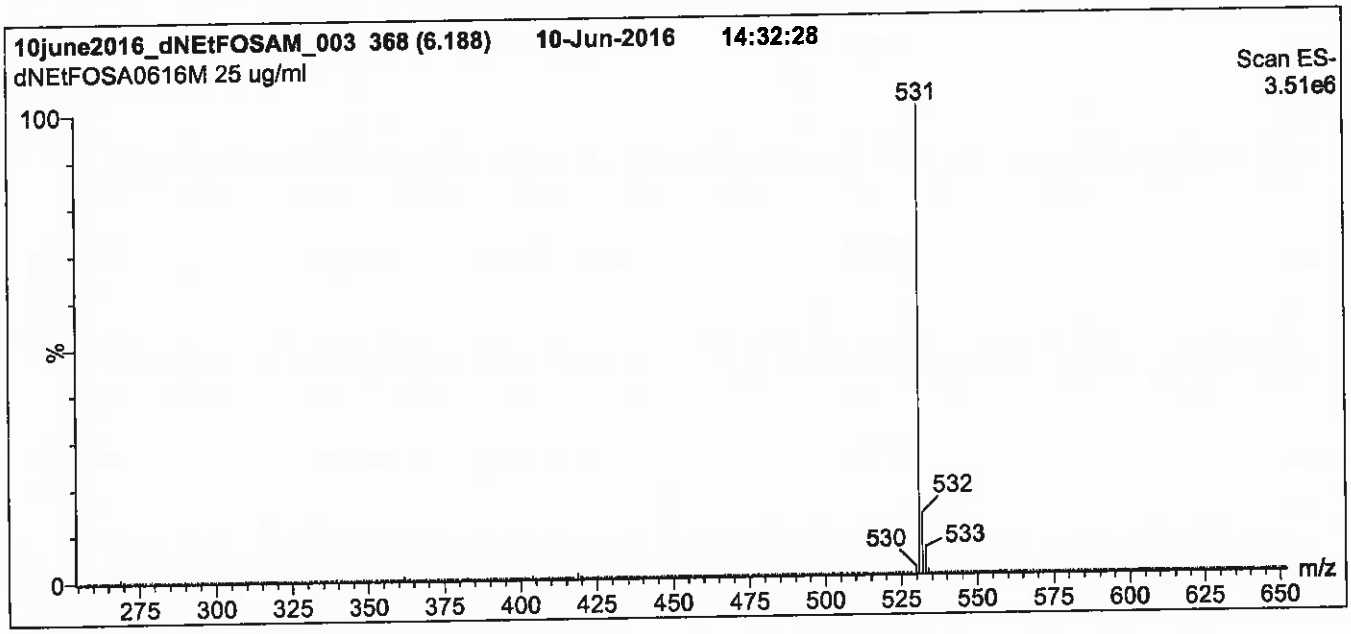
Figure 1: **d-N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

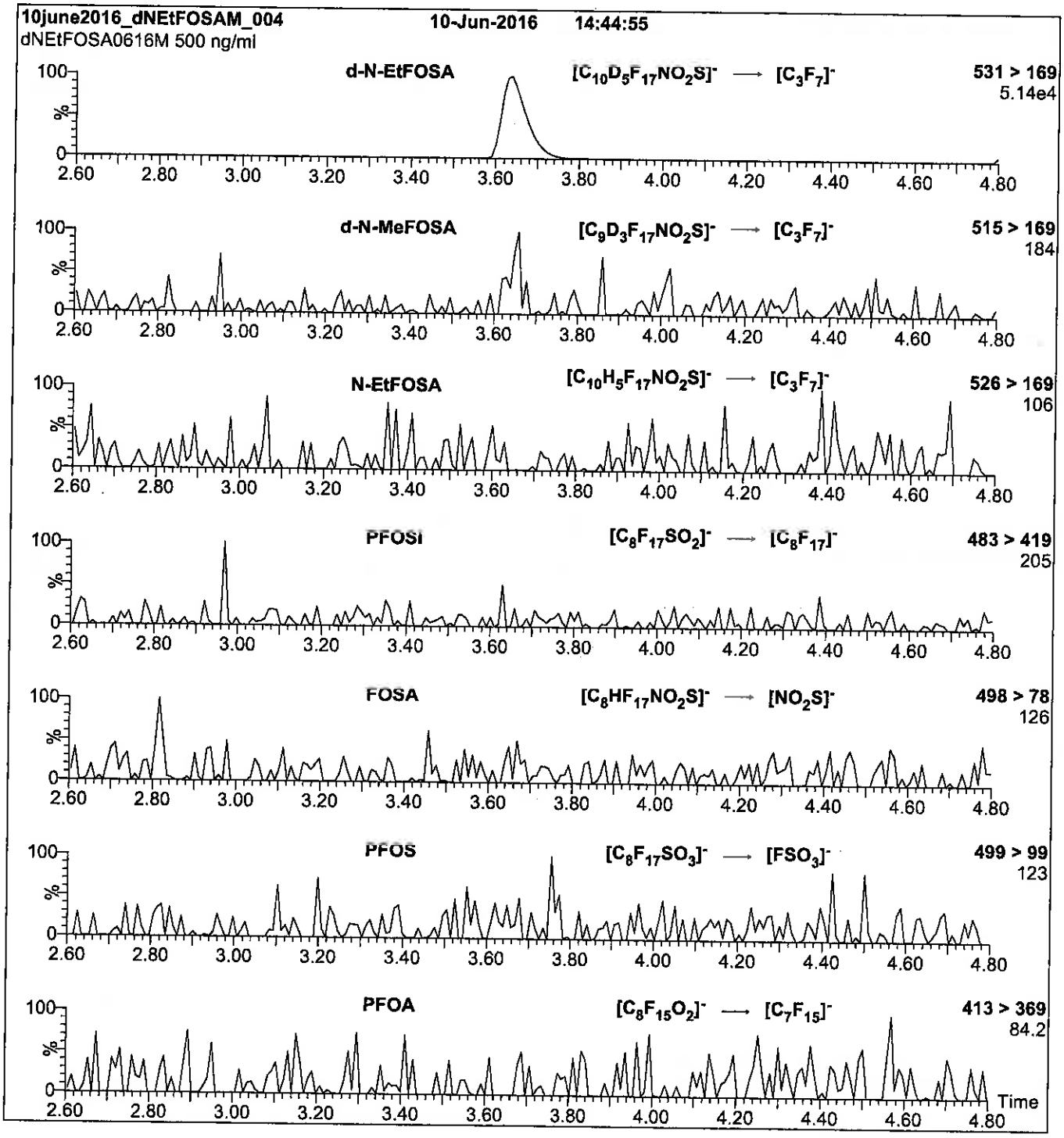
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml d-N-EtFOSA-M)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

Reagent

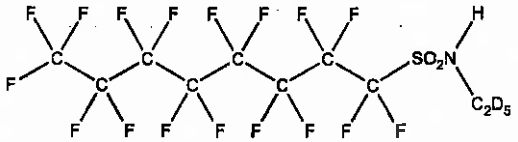
LCd-NEtFOSA-M_00006

Ps 8/30/17 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	d-N-EtFOSA-M	**LOT NUMBER:**	dNEtFOSA0417M
COMPOUND:	N-ethyl-d_5-perfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_{10}D_5HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	532.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	04/20/2017		
EXPIRY DATE: (mm/dd/yyyy)	04/20/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.5% of N-methyl-d_3-perfluoro-1-octanesulfonamide (d-N-MeFOSA).

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

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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CALA

ANAB ACCREDITED

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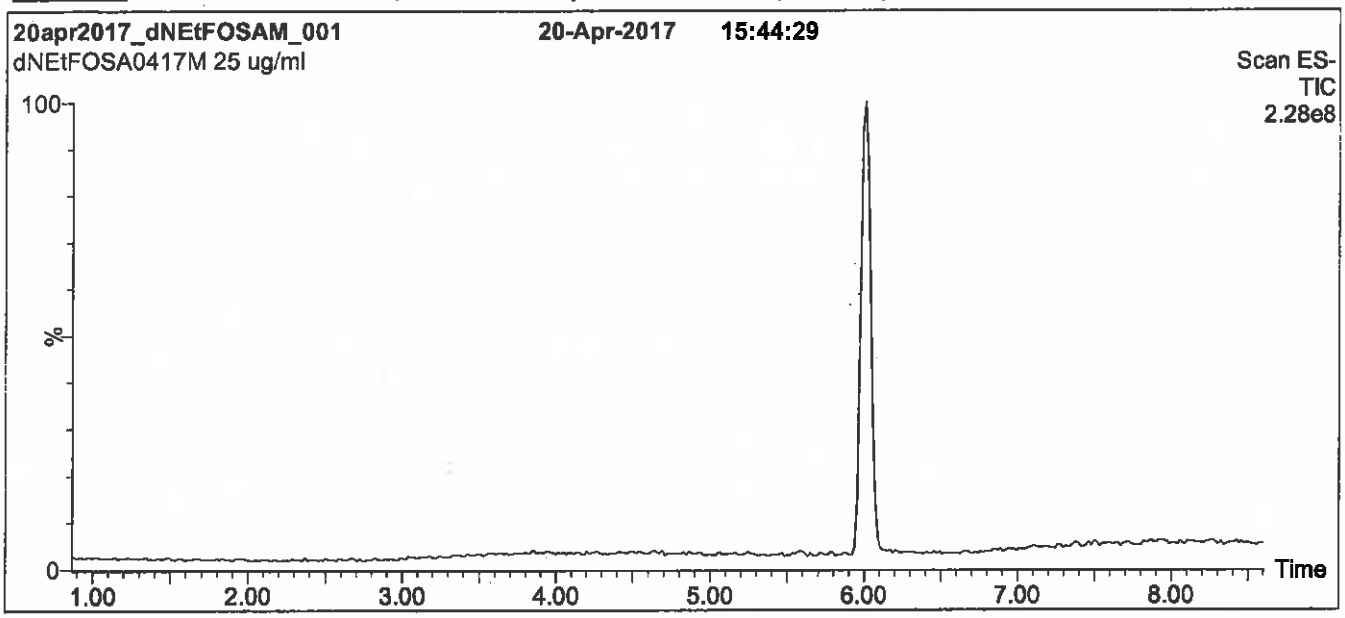
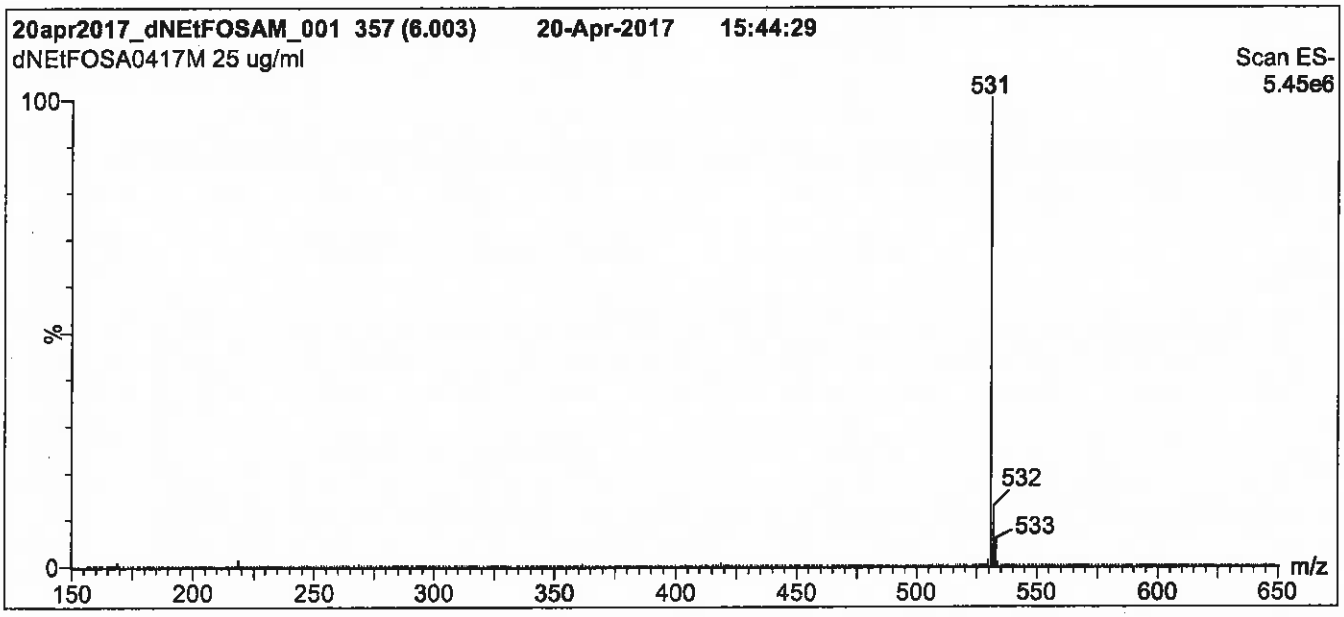
Figure 1: **d-N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

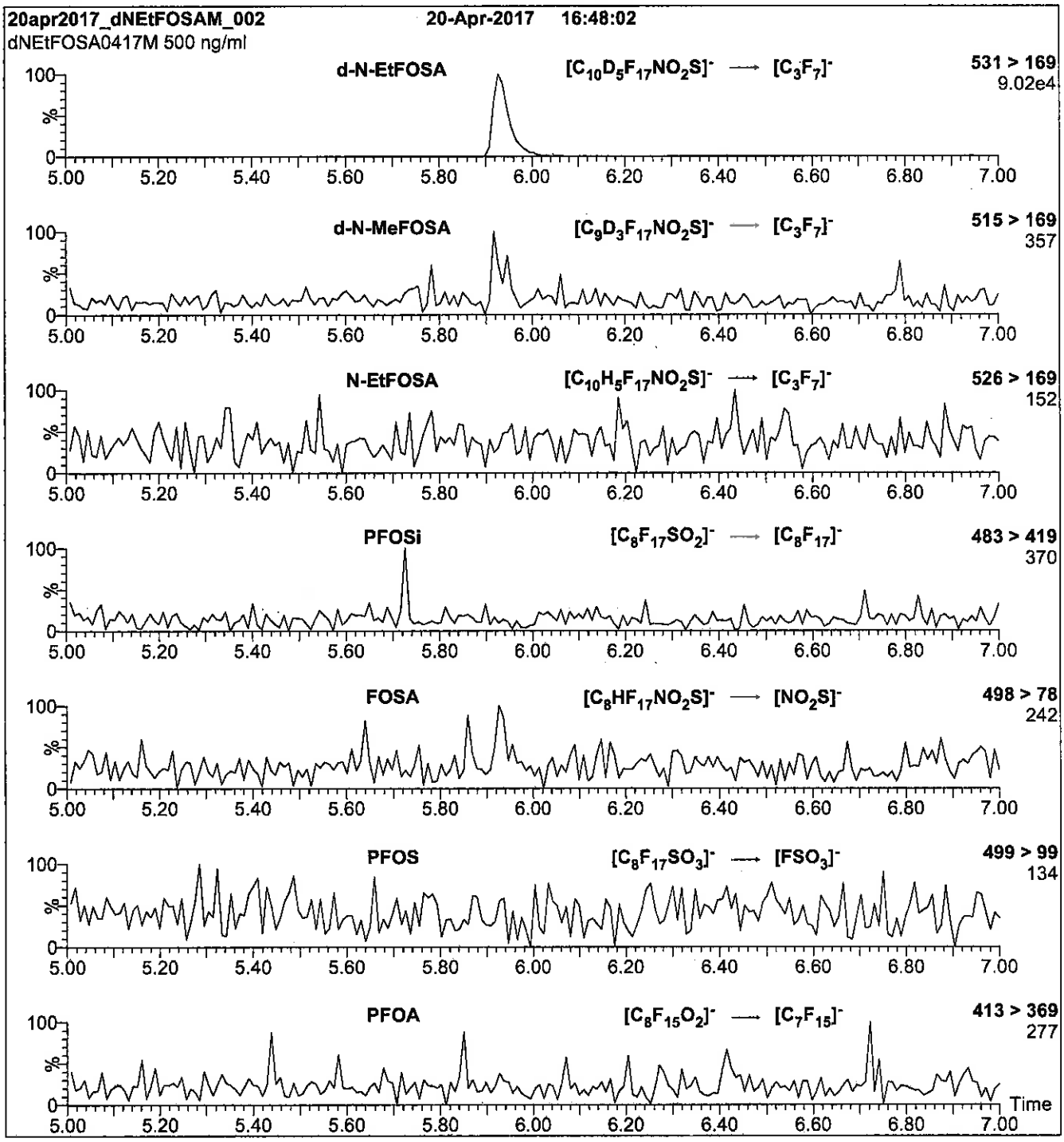
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d-N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 25

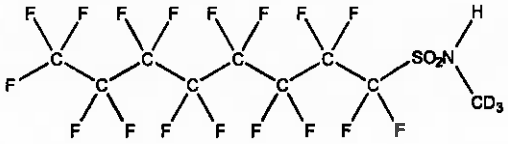
Reagent

LCd-NMeFOSA-M_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	d-N-MeFOSA-M	**LOT NUMBER:**	dNMeFOSA0616M
COMPOUND:	N-methyl-d_3-perfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_8D_3HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	516.19
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	06/10/2016		
EXPIRY DATE: (mm/dd/yyyy)	06/10/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 06/16/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • Info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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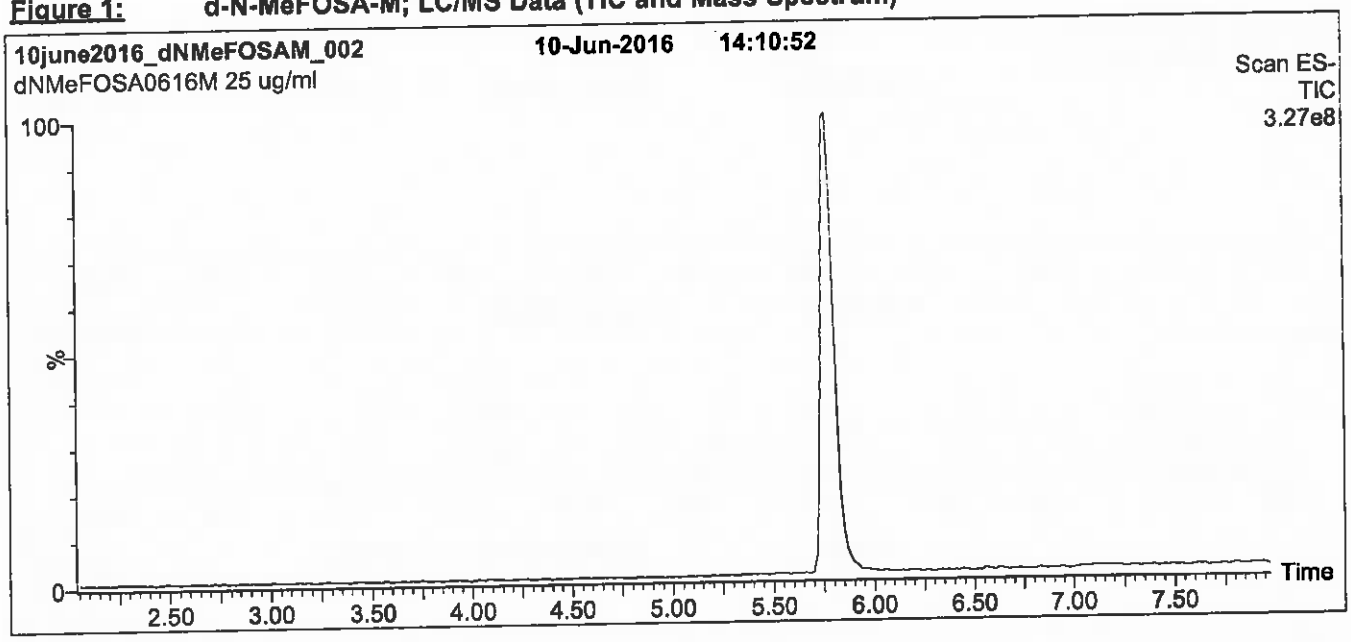
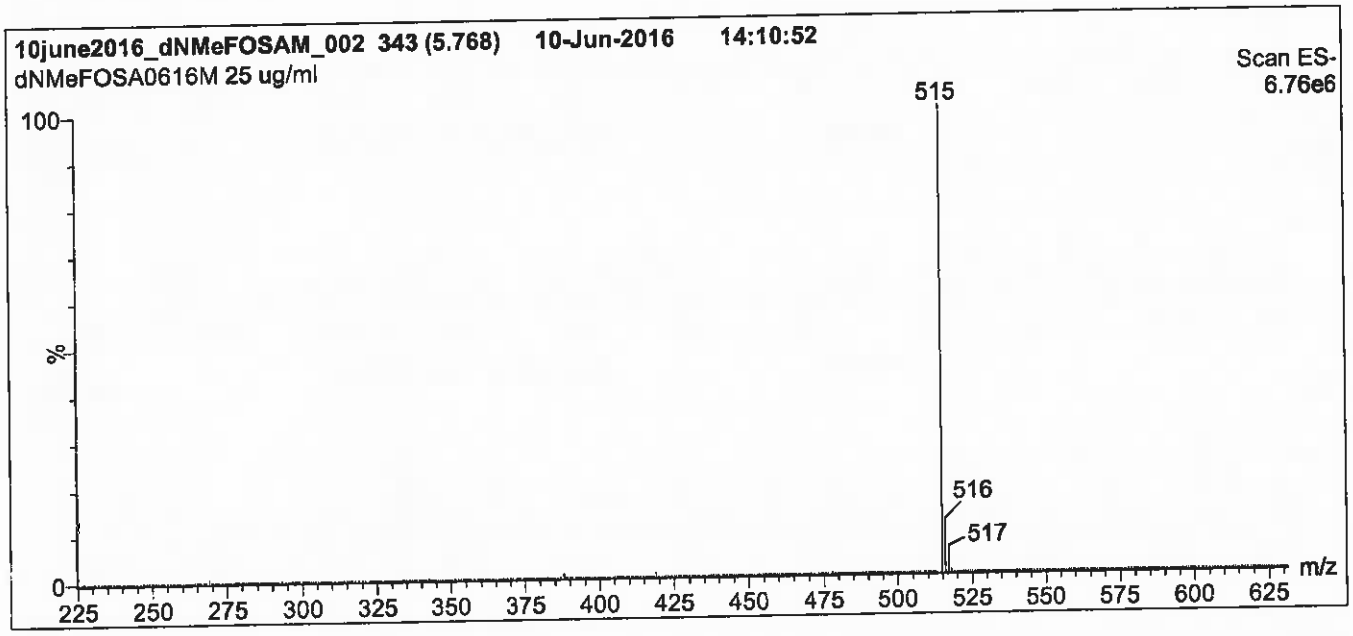
Figure 1: **d-N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

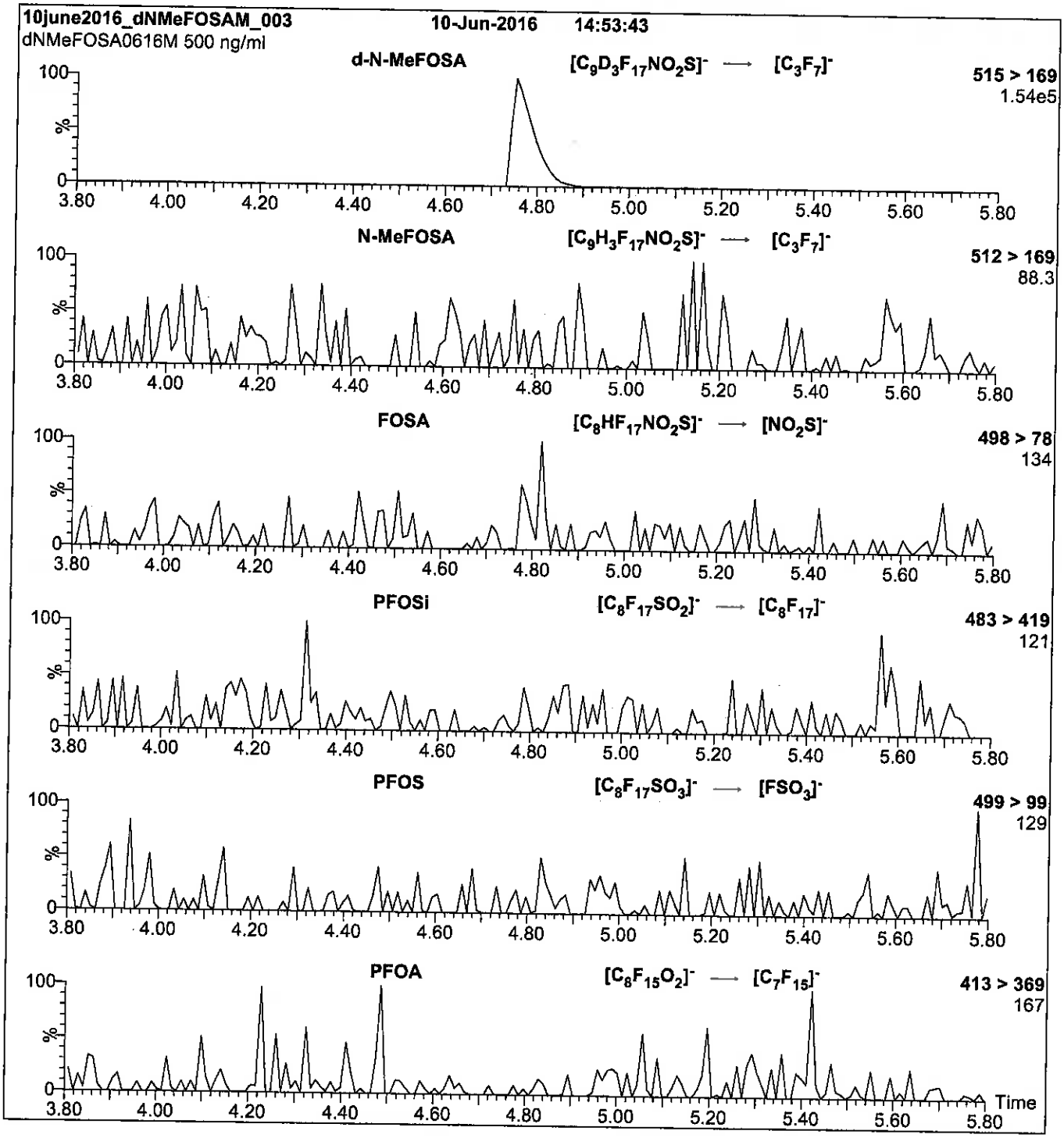
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d-N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml d-N-MeFOSA-M)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

Reagent

LCd-NMeFOSA-M_00005

r: 8/31/17 SV

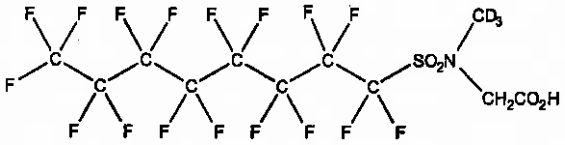
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA0517

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)	05/19/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/19/2022		
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:** 05/31/2017 (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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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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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CALA

ANAB ACCREDITED

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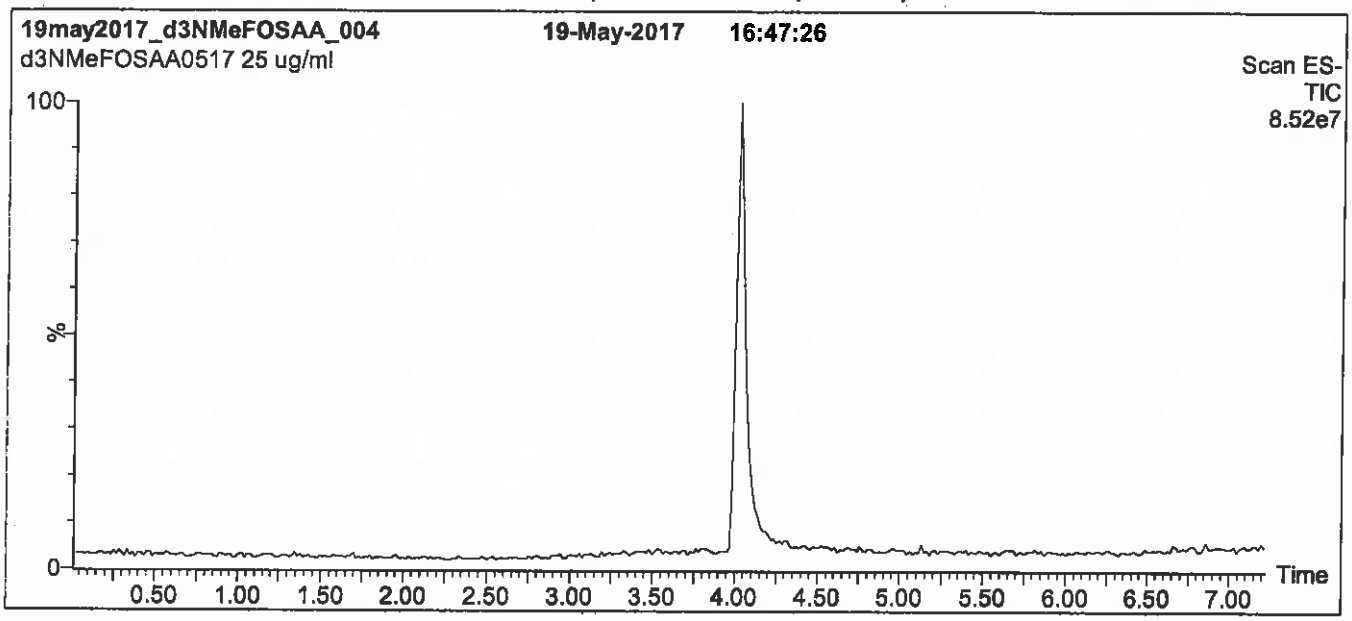

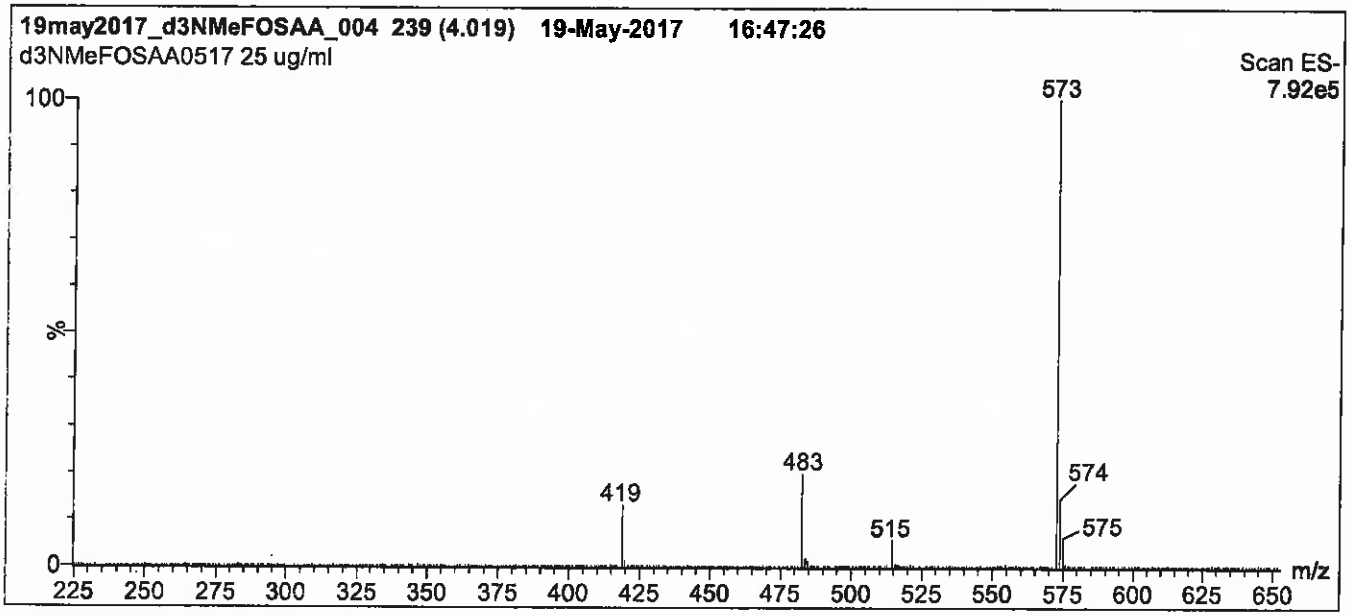

Conditions for Figure 1:

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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
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Time: 10 min

Flow: 300 µl/min

MS Parameters

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Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
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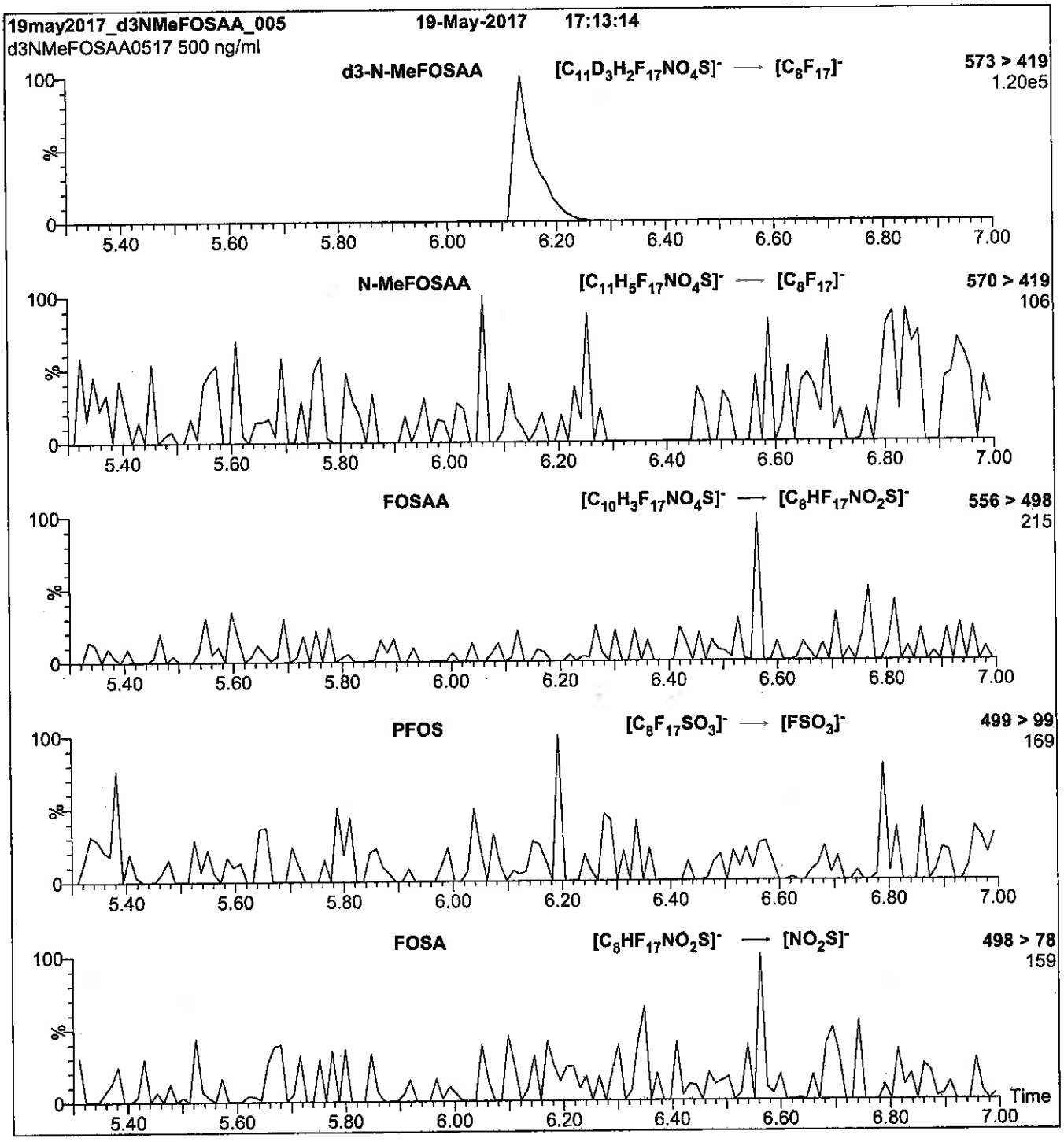
Desolvation Gas Flow (l/hr) = 750

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) = 3.39e-3
Collision Energy (eV) = 20

Reagent

LCd3-NMeFOSAA_00004

S: 3/20/17 SRV

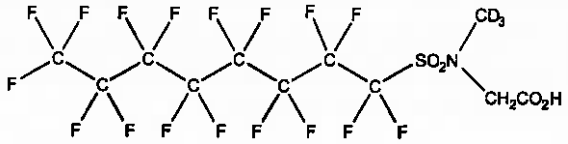
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA1116

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) 11/22/2016

EXPIRY DATE: (mm/dd/yyyy) 11/22/2021

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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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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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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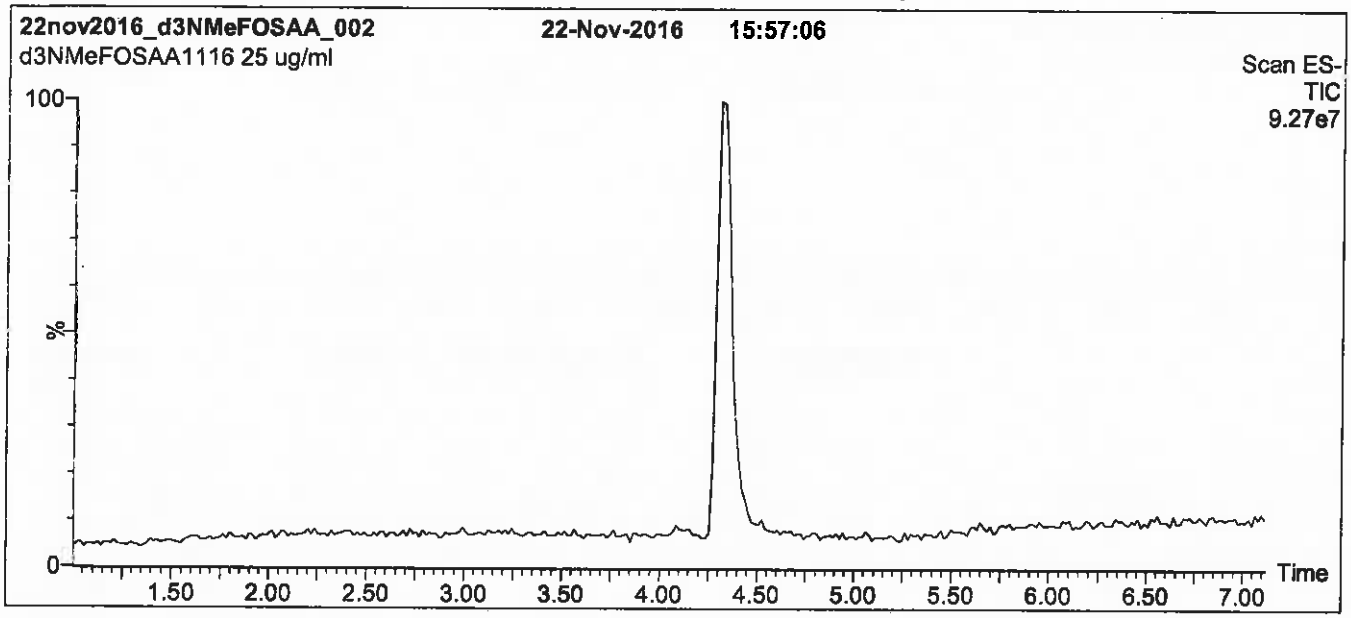
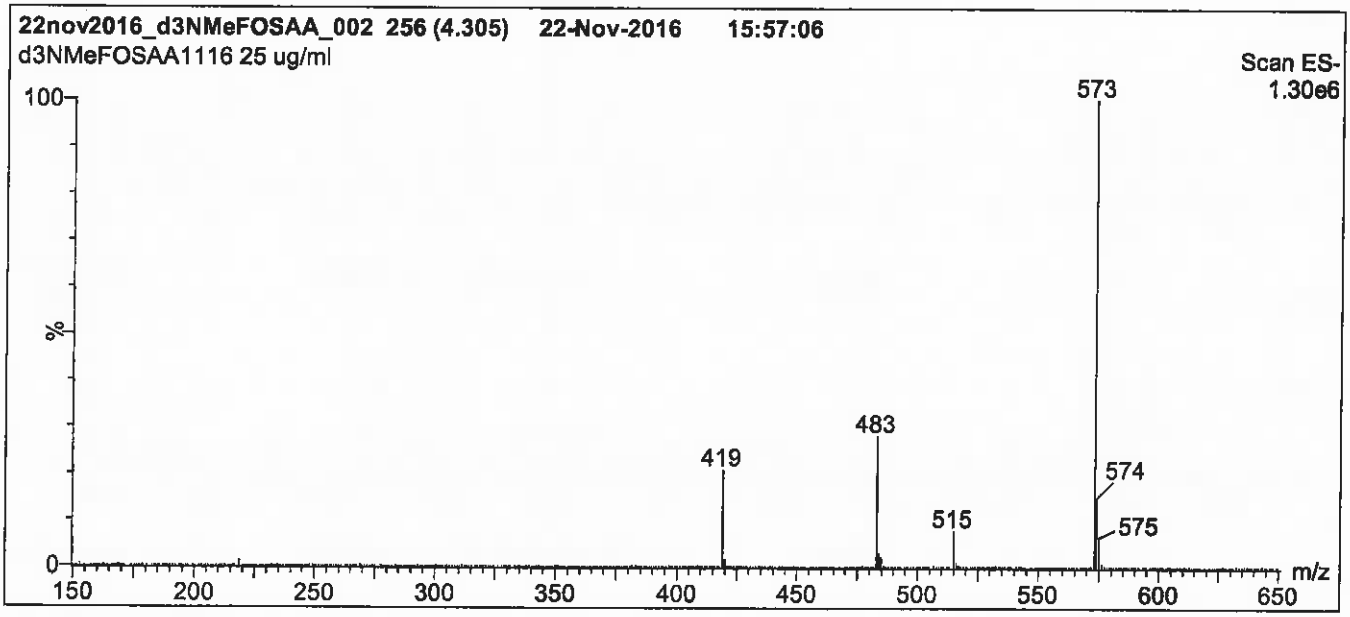




Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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

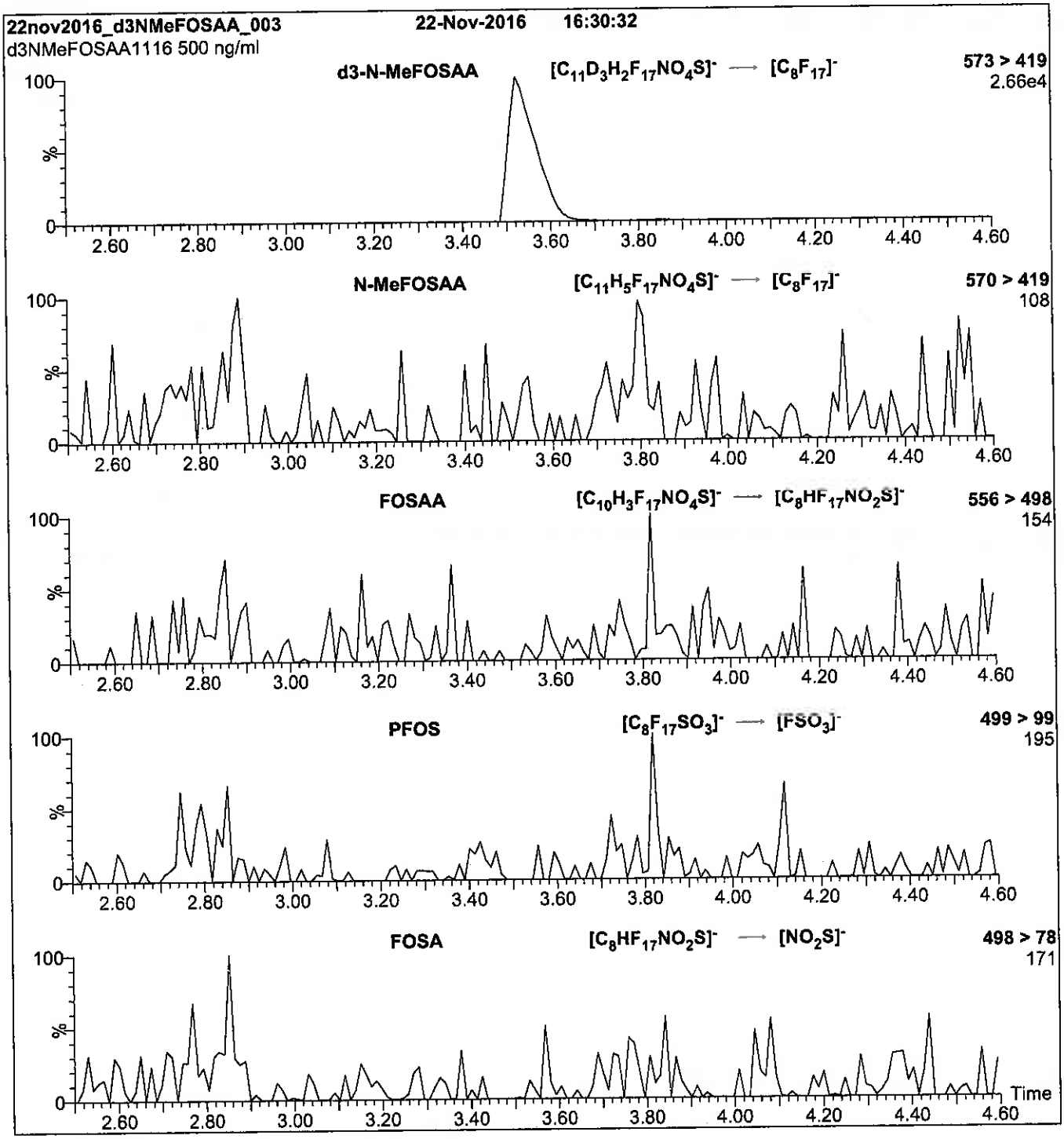
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

LCd3-NMeFOSAA_00005

r: 8/31/17 SV

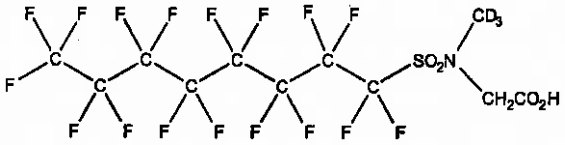
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA0517

COMPOUND: N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



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LAST TESTED: (mm/dd/yyyy)	05/19/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/19/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

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CALA

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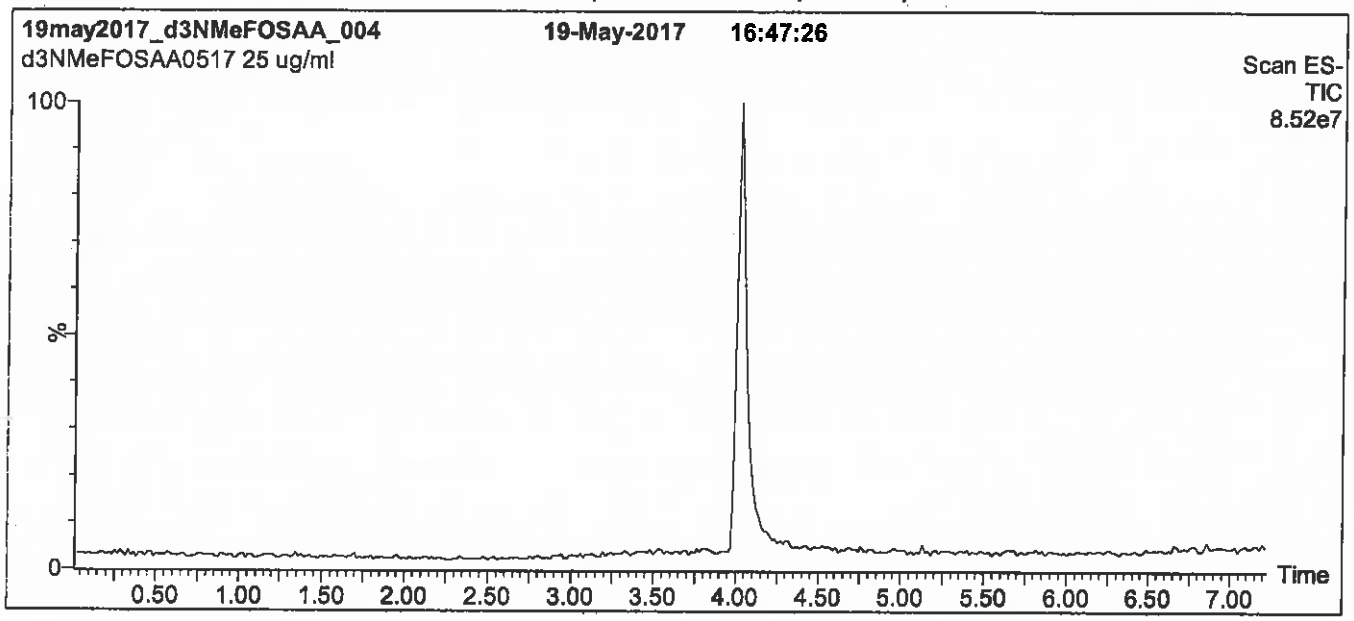

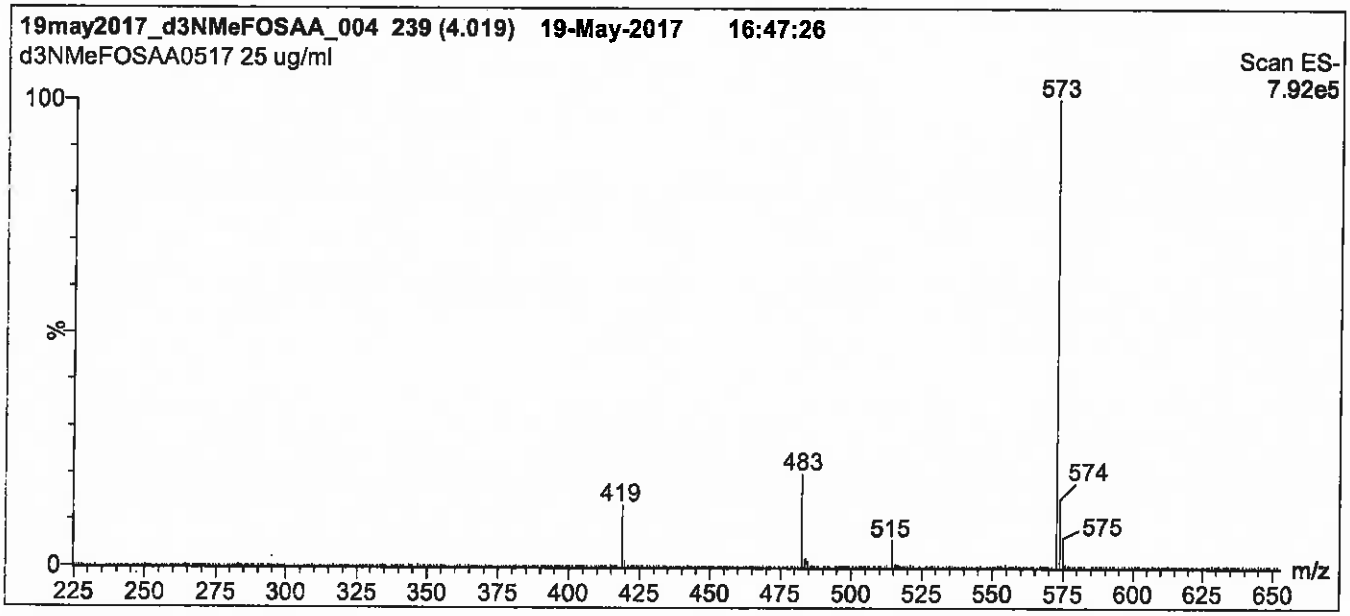

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1.7 µm, 2.1 x 100 mm

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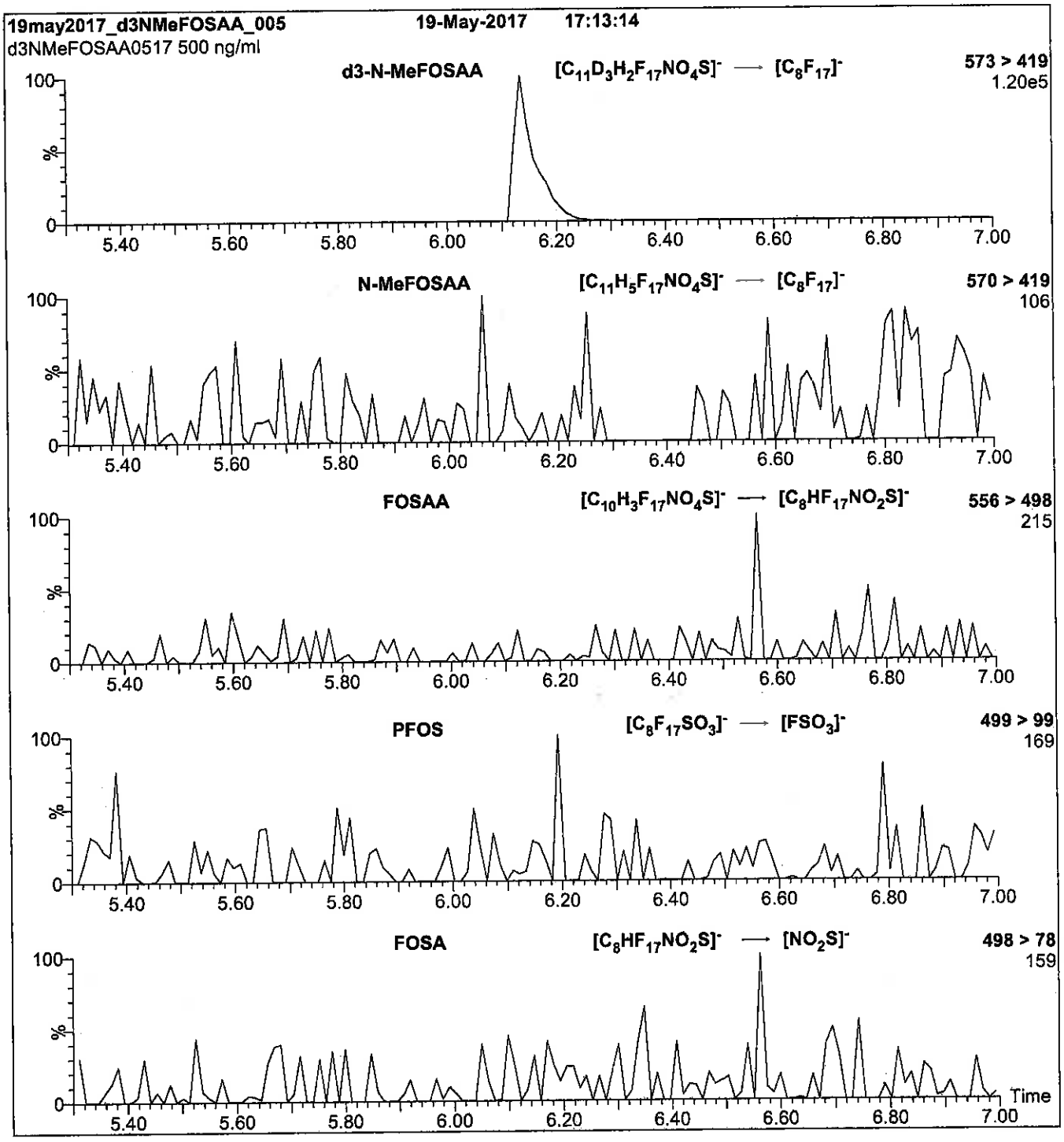
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **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) = 3.39e-3
Collision Energy (eV) = 20

Reagent

LCd5-NEtFOSAA_00004

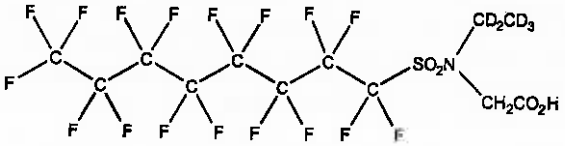
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d5-N-EtFOSAA
LOT NUMBER: d5NEtFOSAA1116
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)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/01/2016 (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

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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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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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CALA

ANAB ACCREDITED

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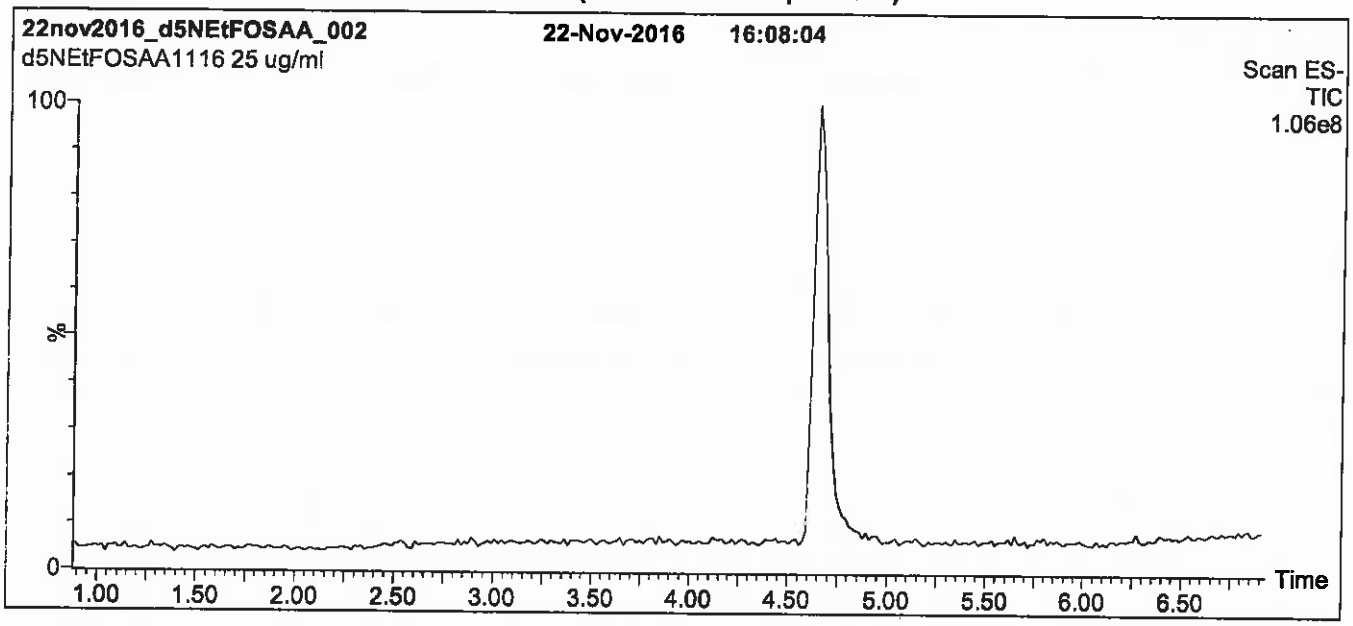
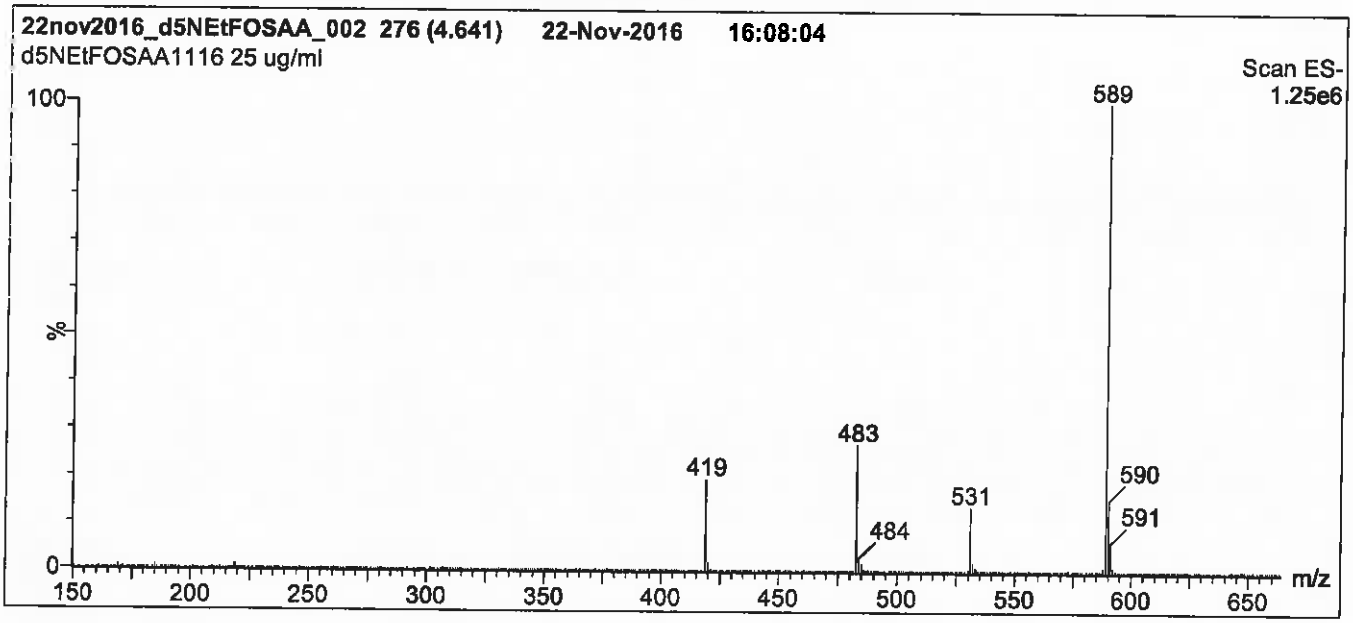
Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

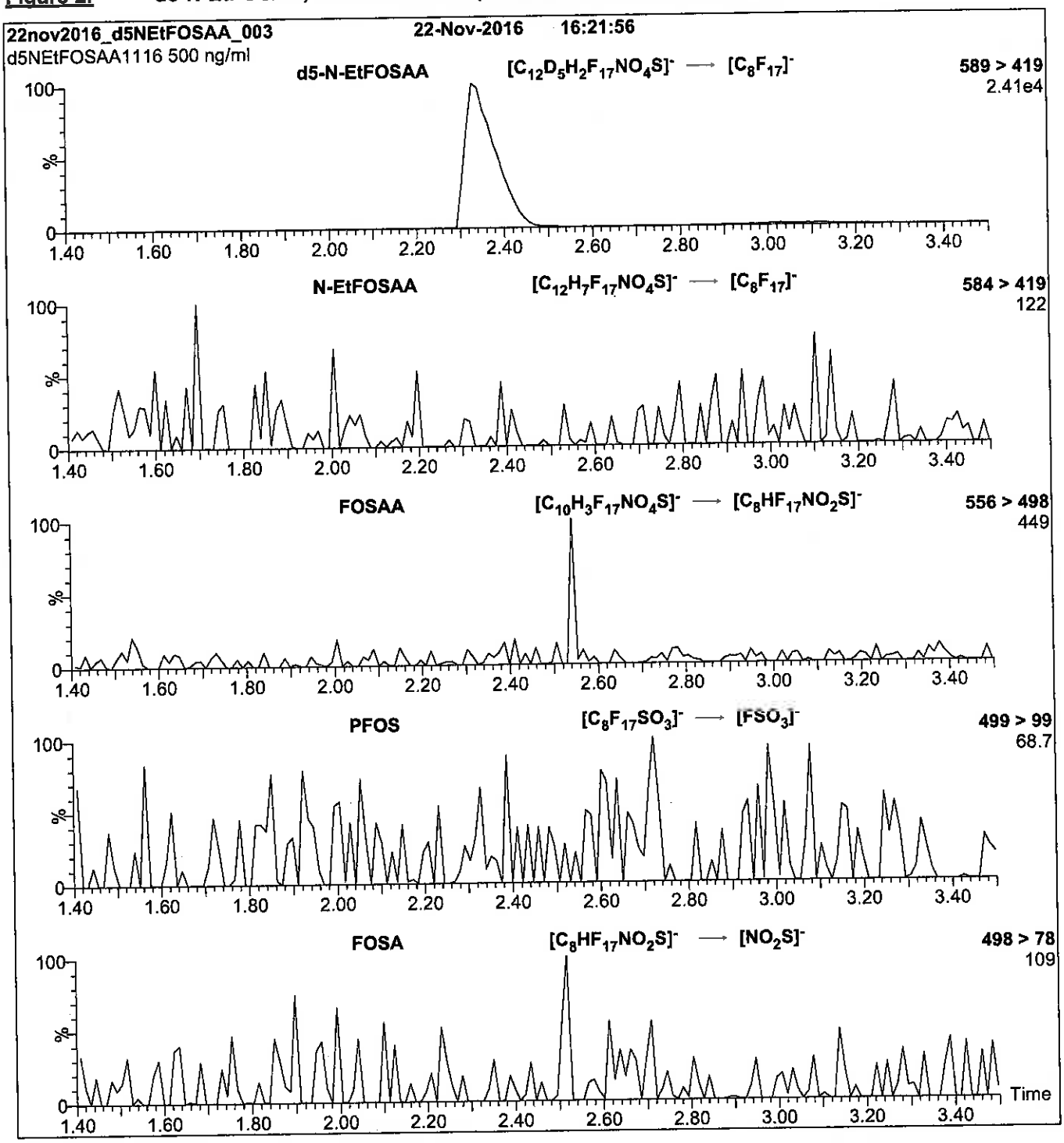
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **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) = 3.43e-3
Collision Energy (eV) = 20

Reagent

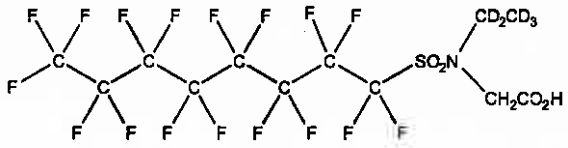
LCd5-NEtFOSAA_00005

R: 8/30/17 SKN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	d5-N-EtFOSAA	**LOT NUMBER:**	d5NEtFOSAA1116
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)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/01/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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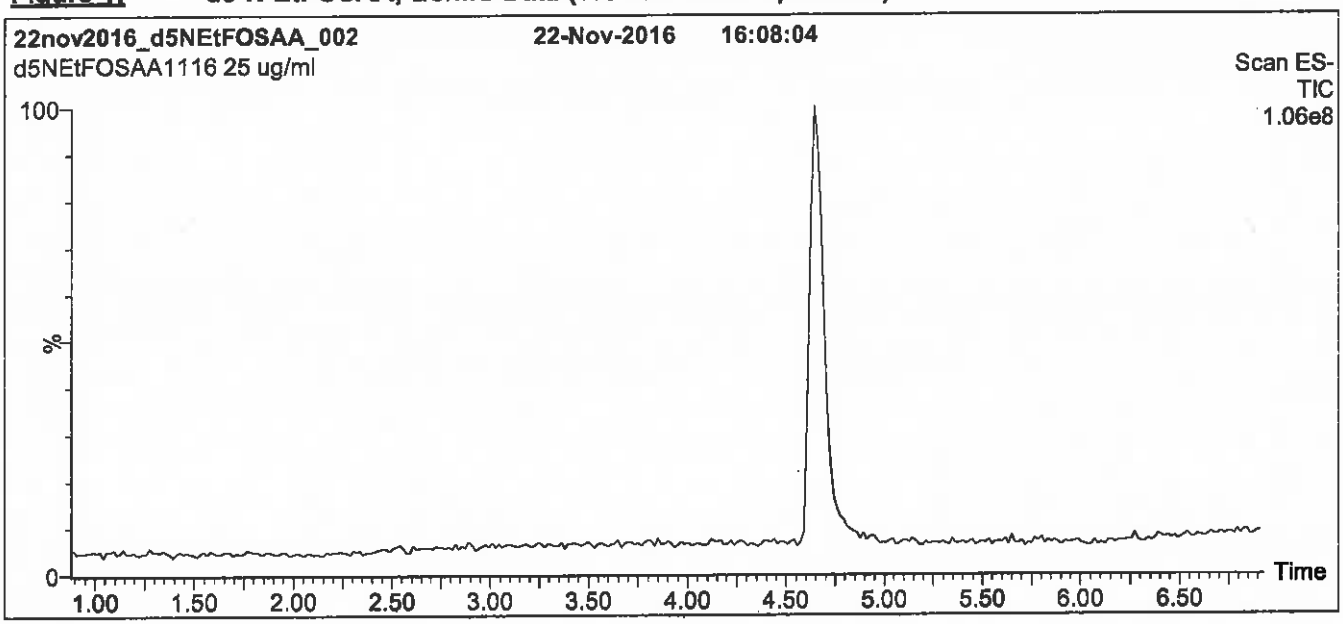
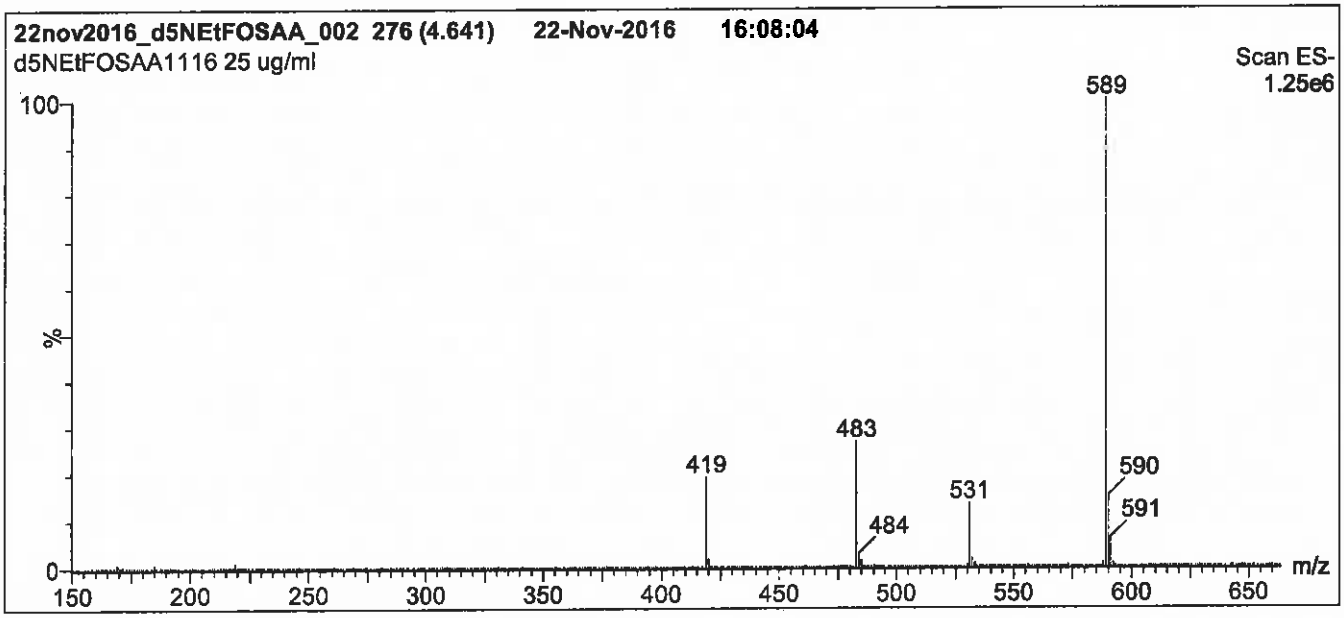
Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

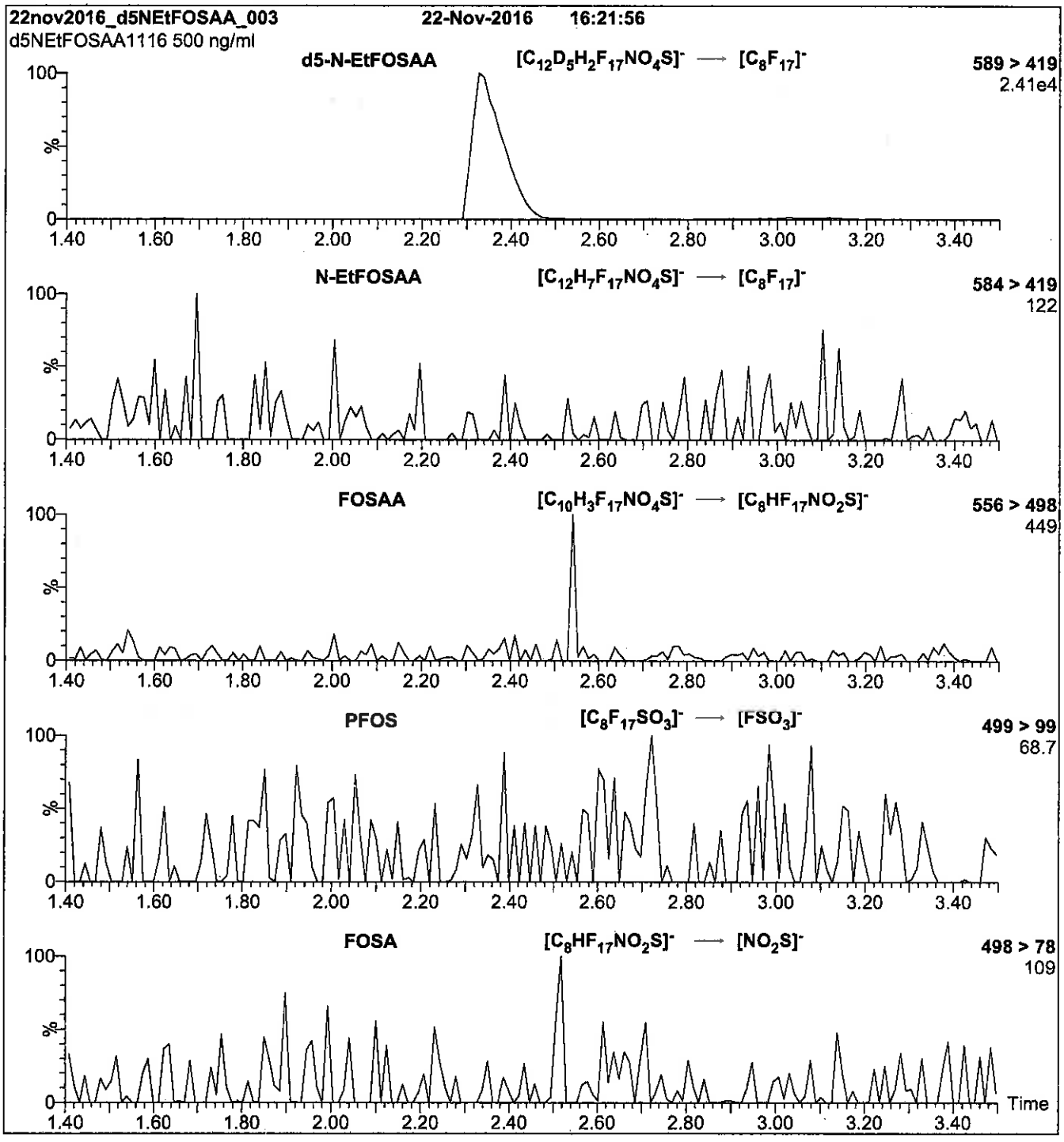
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **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) = 3.43e-3
Collision Energy (eV) = 20

Reagent

LCM2-6:FTS_00004

P: 3/20/17 SRV

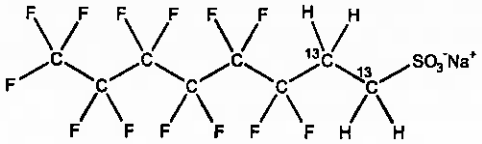
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0217

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.5 ± 2.4 µg/ml (M2-6:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 6:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/24/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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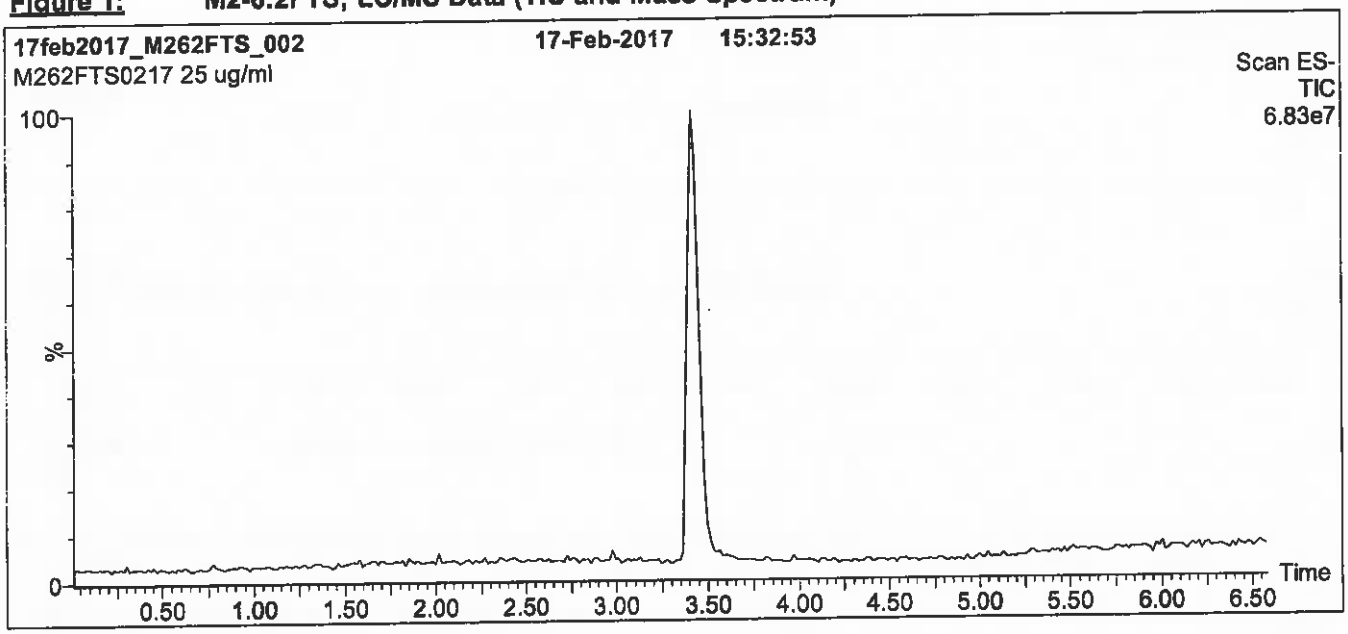

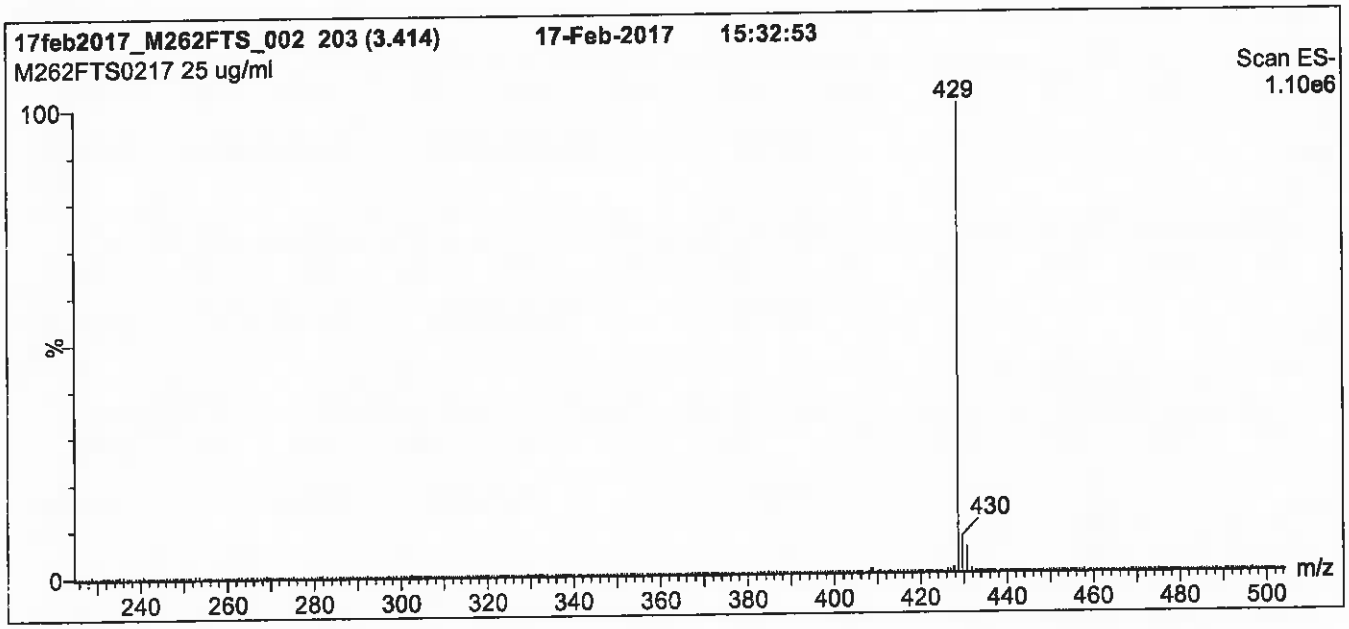

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MS: Micromass Quattro *micro* API MS

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1.7 µm, 2.1 x 100 mm

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(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

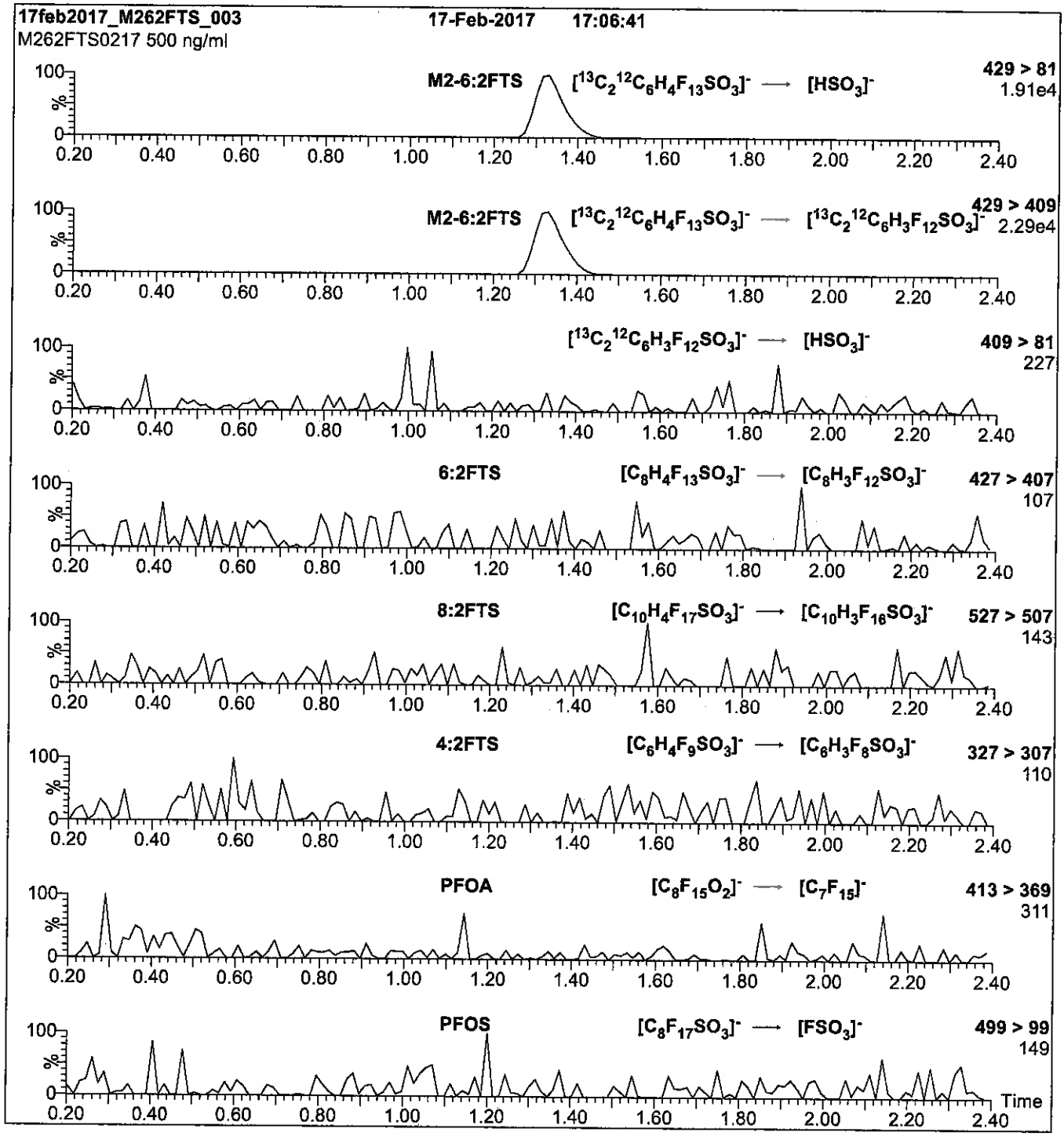
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

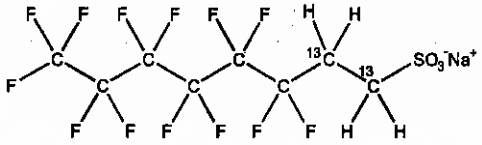
LCM2-6:FTS_00005

rf 8/30/17 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2-6:2FTS	**LOT NUMBER:**	M262FTS0217
COMPOUND:	Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.5 ± 2.4 µg/ml (M2-6:2FTS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 6:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/24/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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.

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

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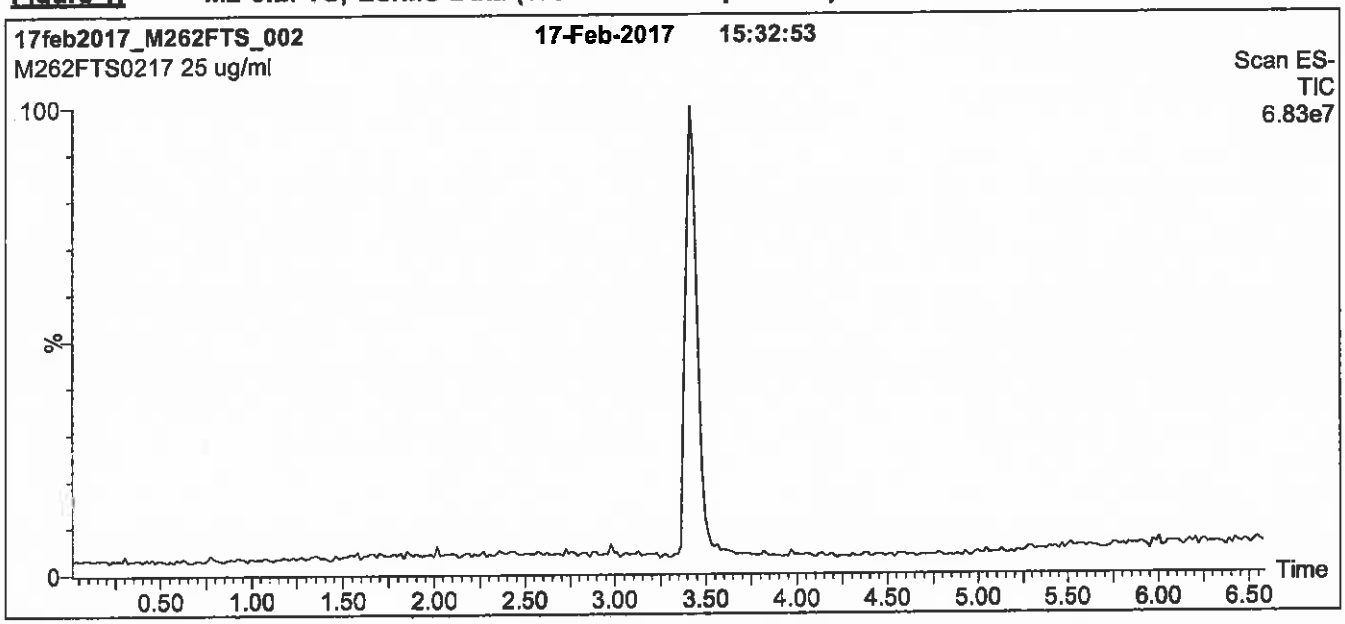
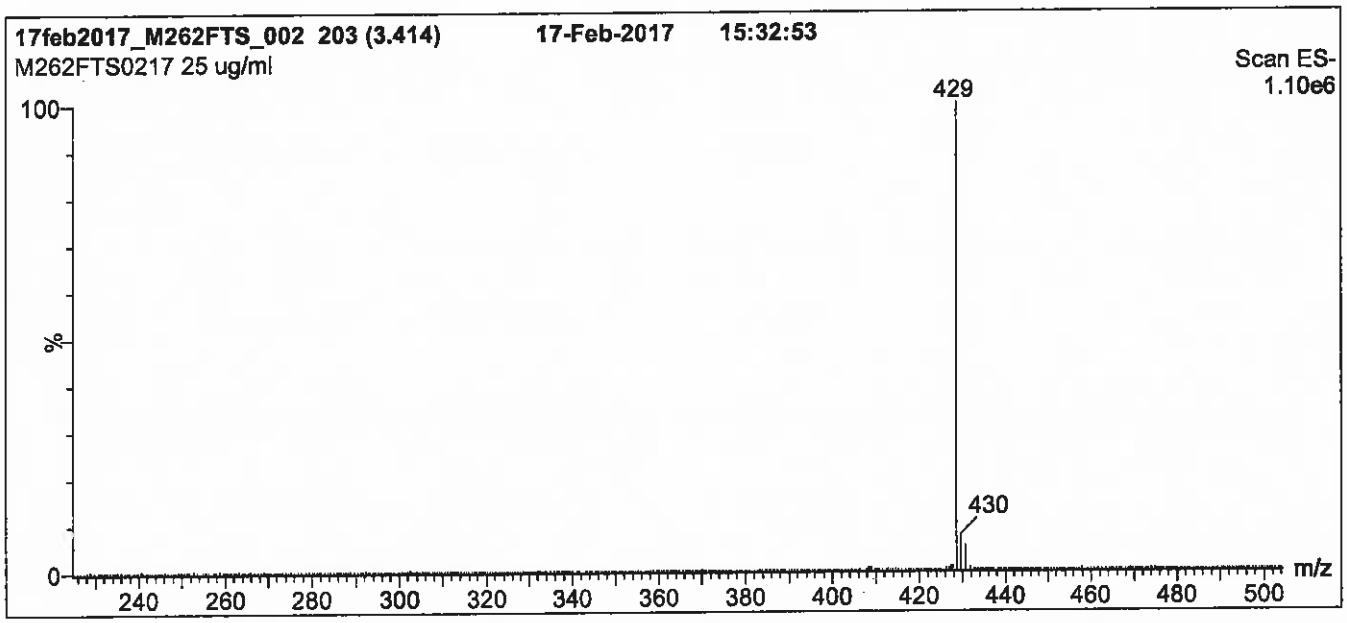
Figure 1: **M2-6:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

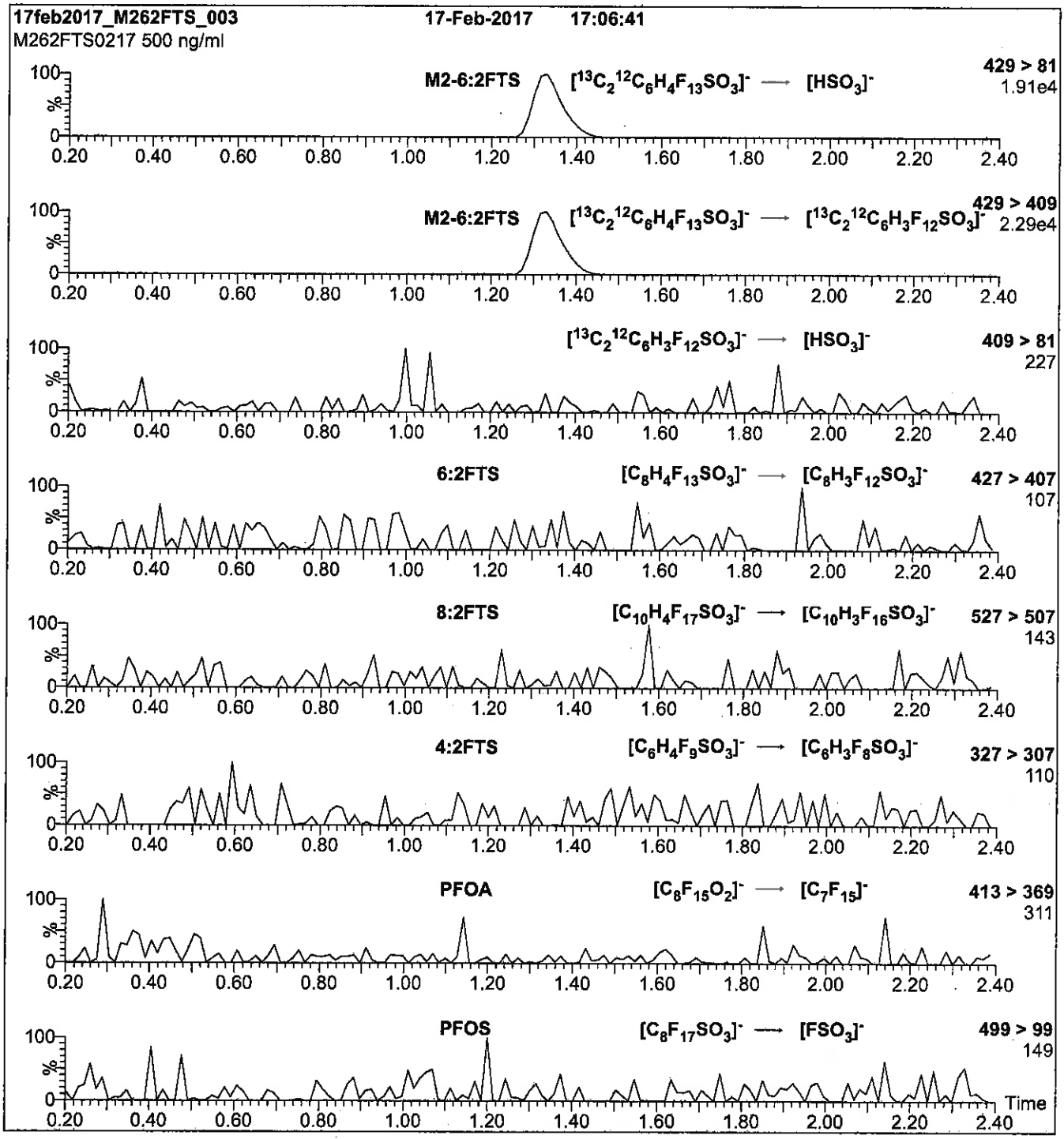
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

LCM2-8:2FTS_00004

r: 3/20/17 SEV

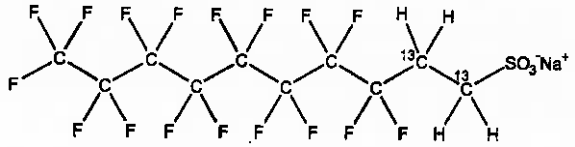
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-8:2FTS
LOT NUMBER: M282FTS0816
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)	08/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/22/2021		
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.
- 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).

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Certified By: B.G. Chittim **Date:** 09/02/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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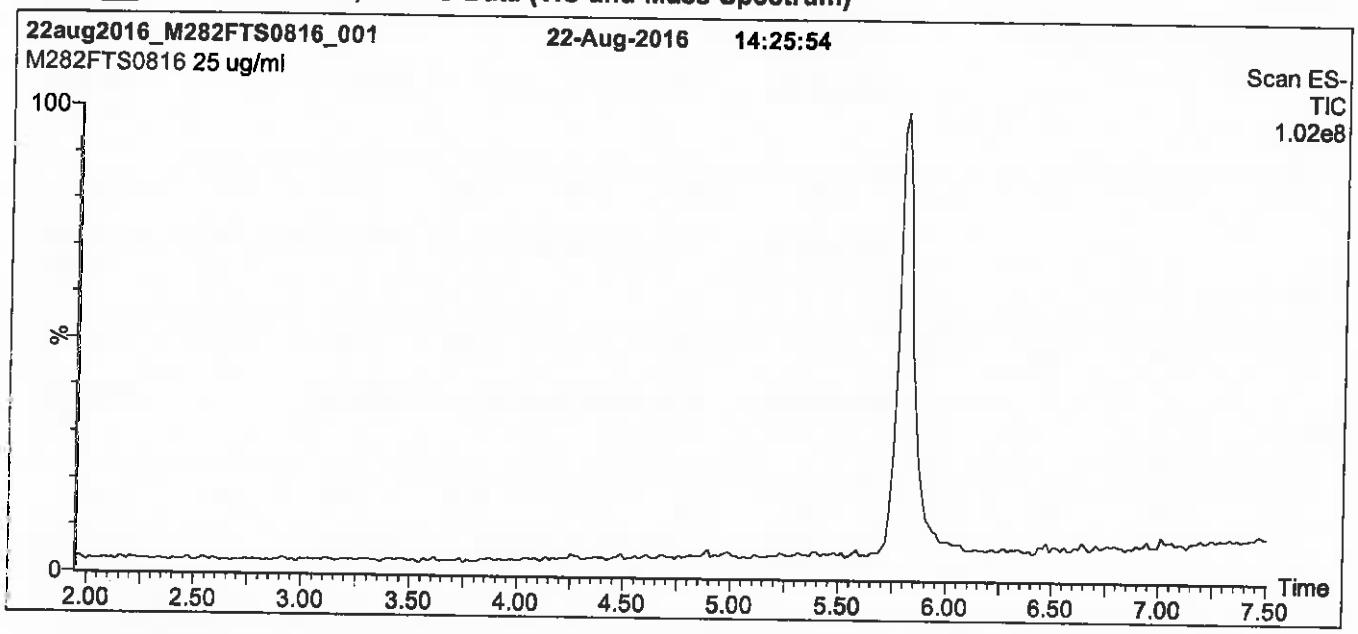
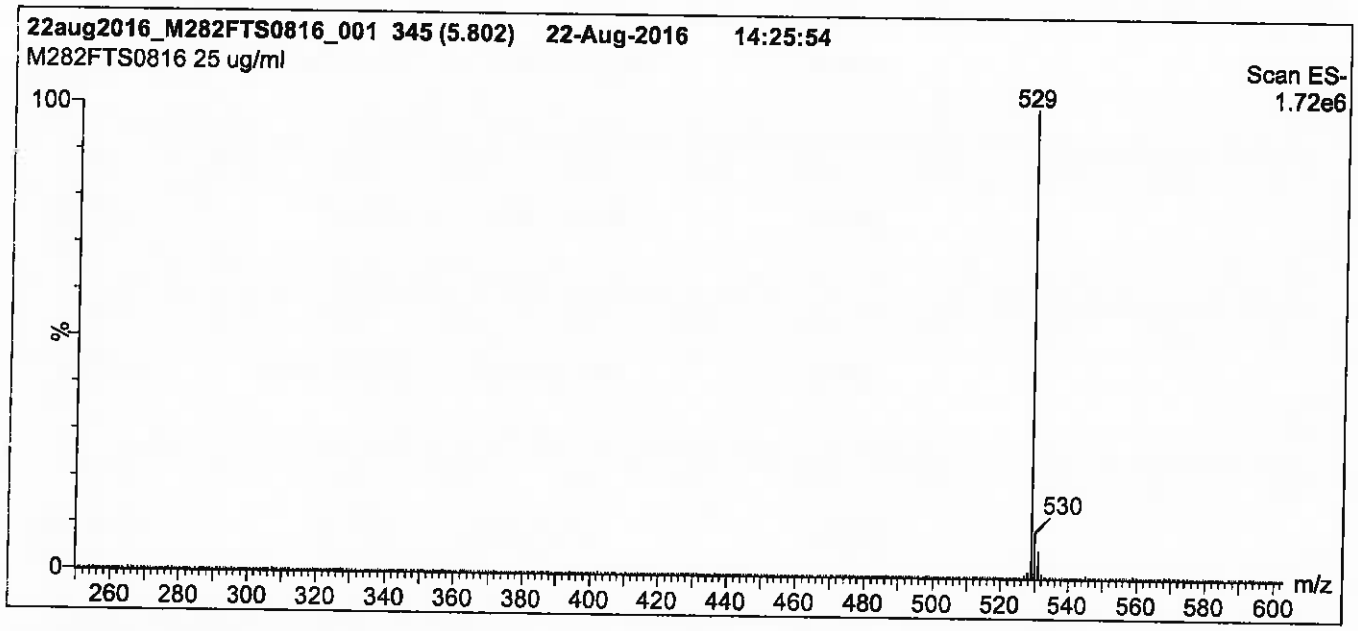
Figure 1: **M2-8:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Agilent Zorbax Bonus-RP
1.8 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

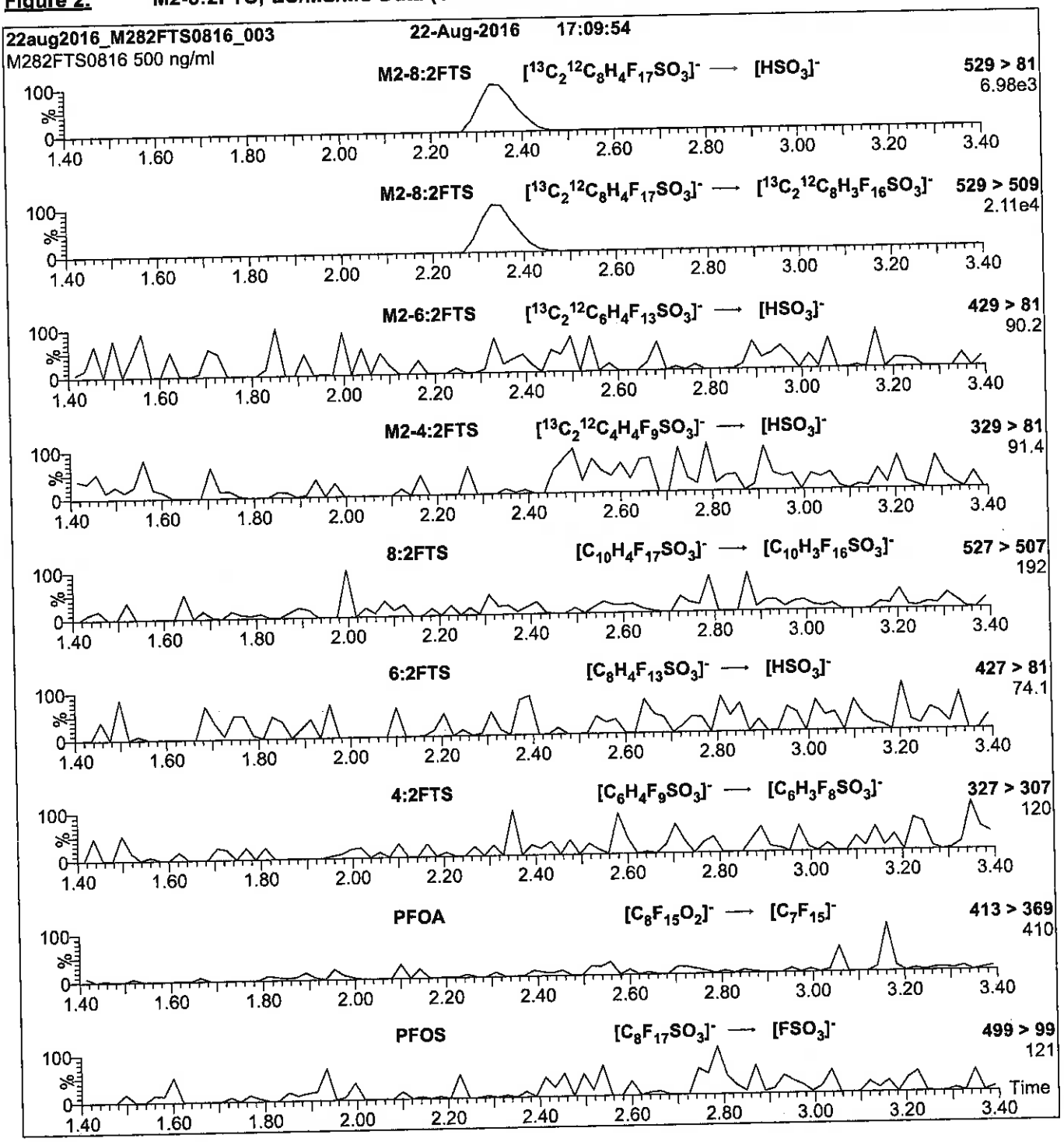
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 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

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) = 3.31e-3
Collision Energy (eV) = 30

Reagent

LCM2-8:2FTS_00007

R- 8/20/17-SFU

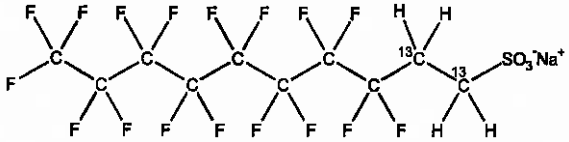
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0717

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)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
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 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).

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Certified By: _____ **Date:** 07/07/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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UNCERTAINTY:

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CALA

ANAB ACCREDITED

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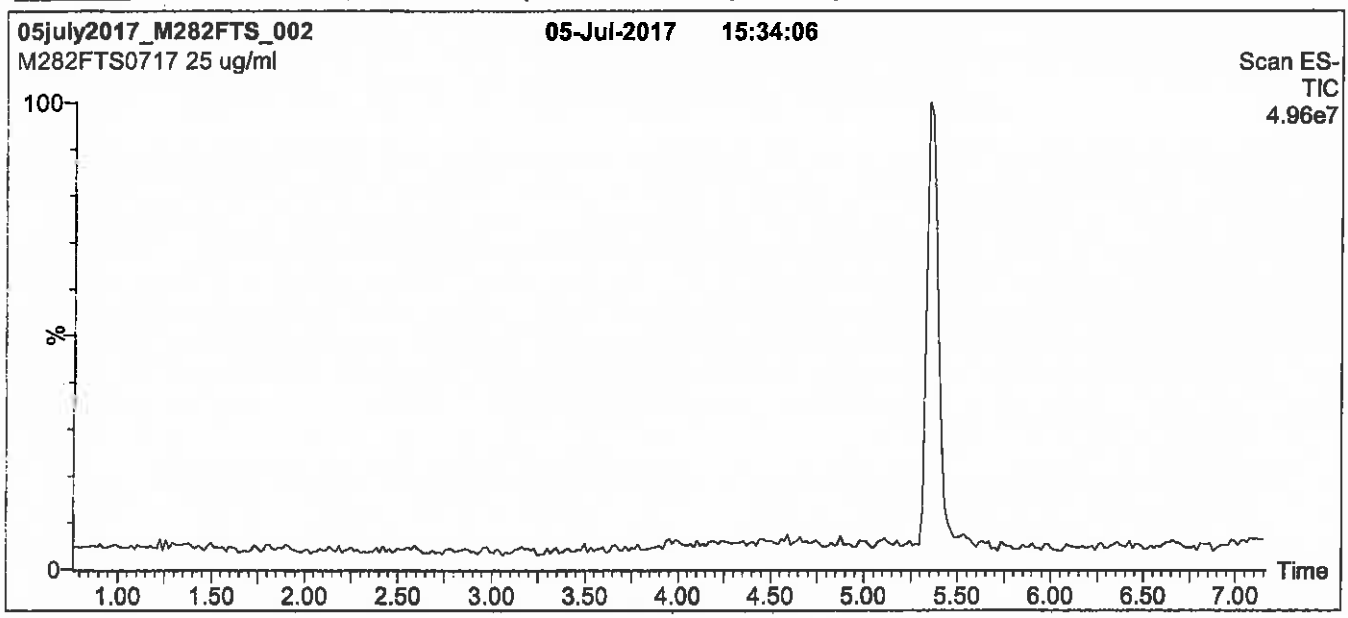
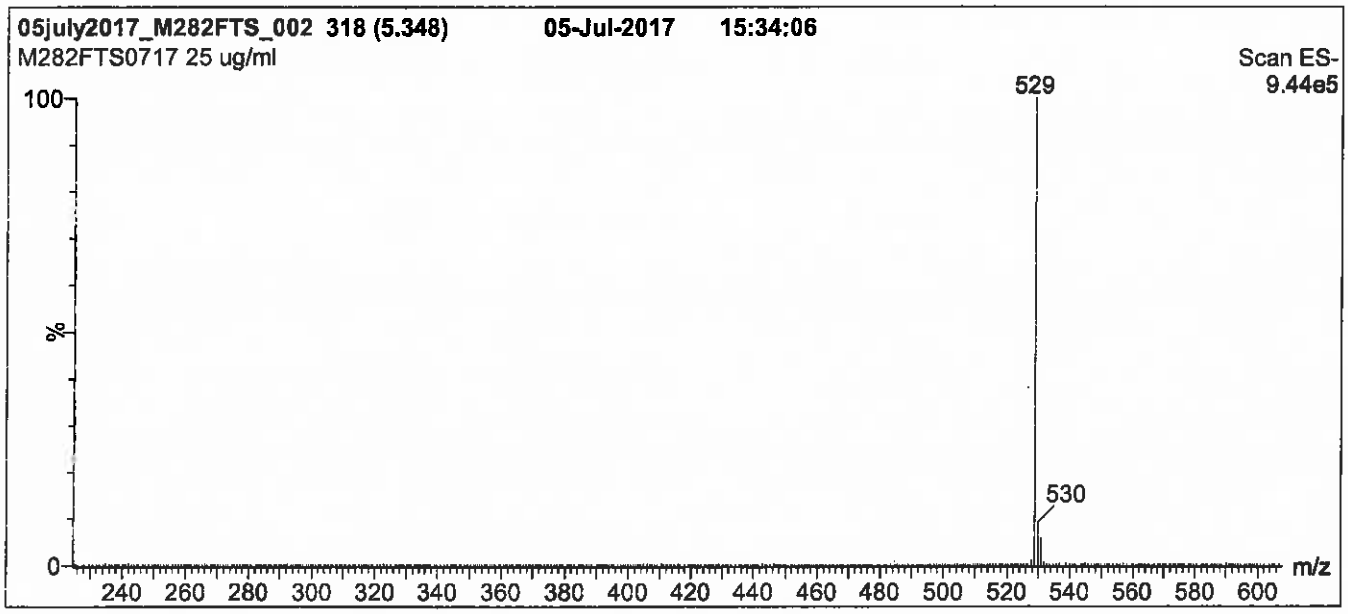




Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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

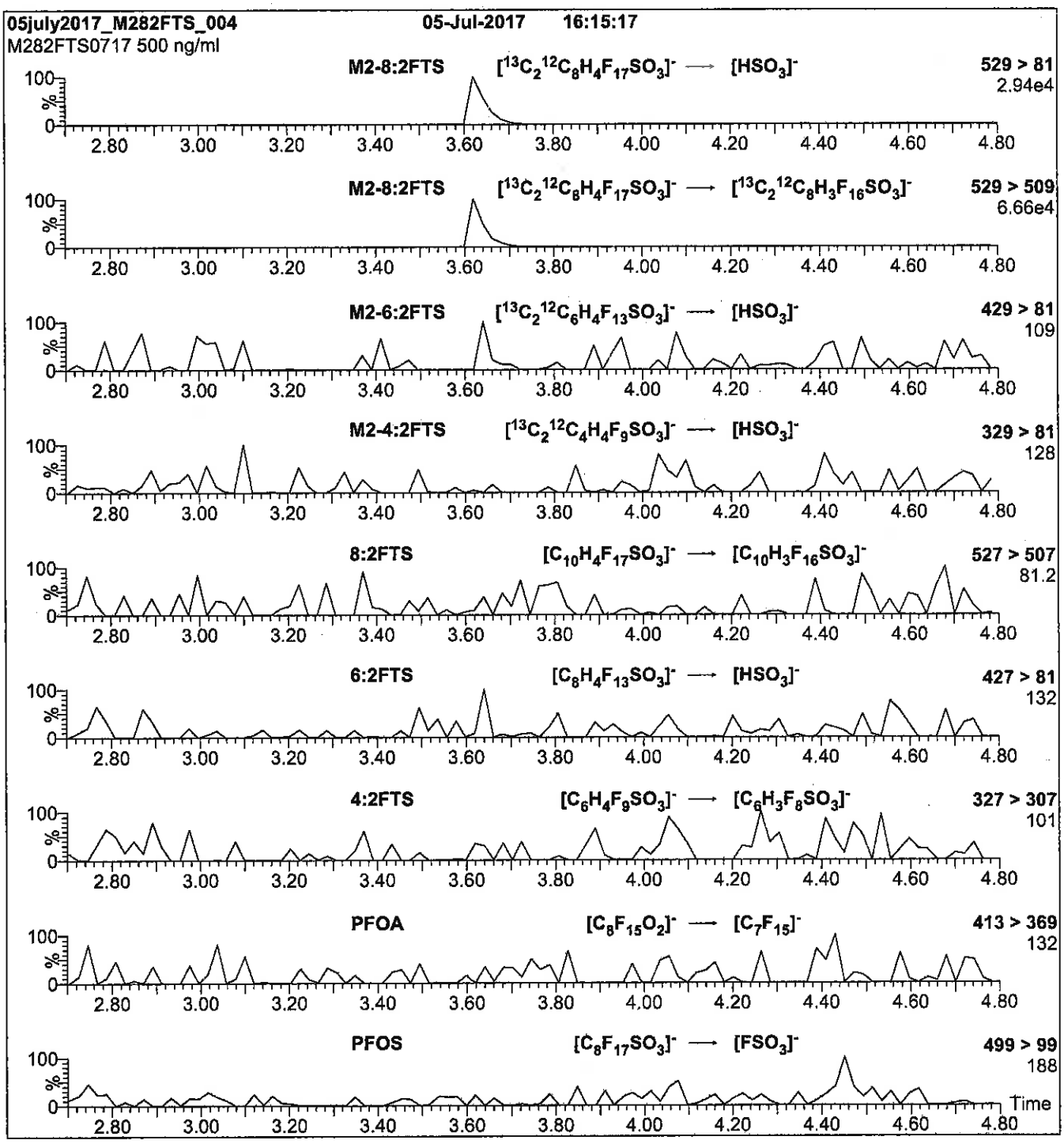
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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) = 3.50e-3
Collision Energy (eV) = 30

Reagent

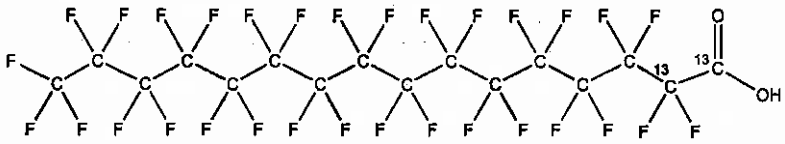
LCM2PFHxDA_00010

n: 5/3/17 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2PFHxDA	**LOT NUMBER:**	M2PFHxDA1112
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/07/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/07/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/11/2016 (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

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,...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:

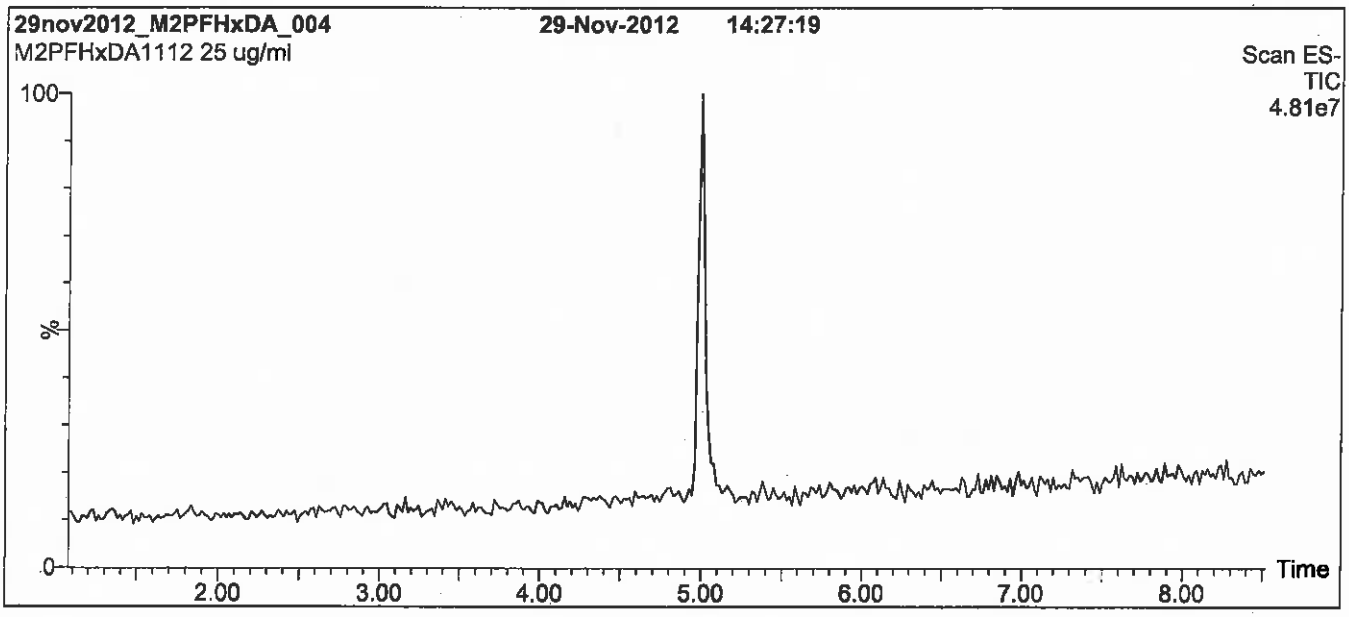
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

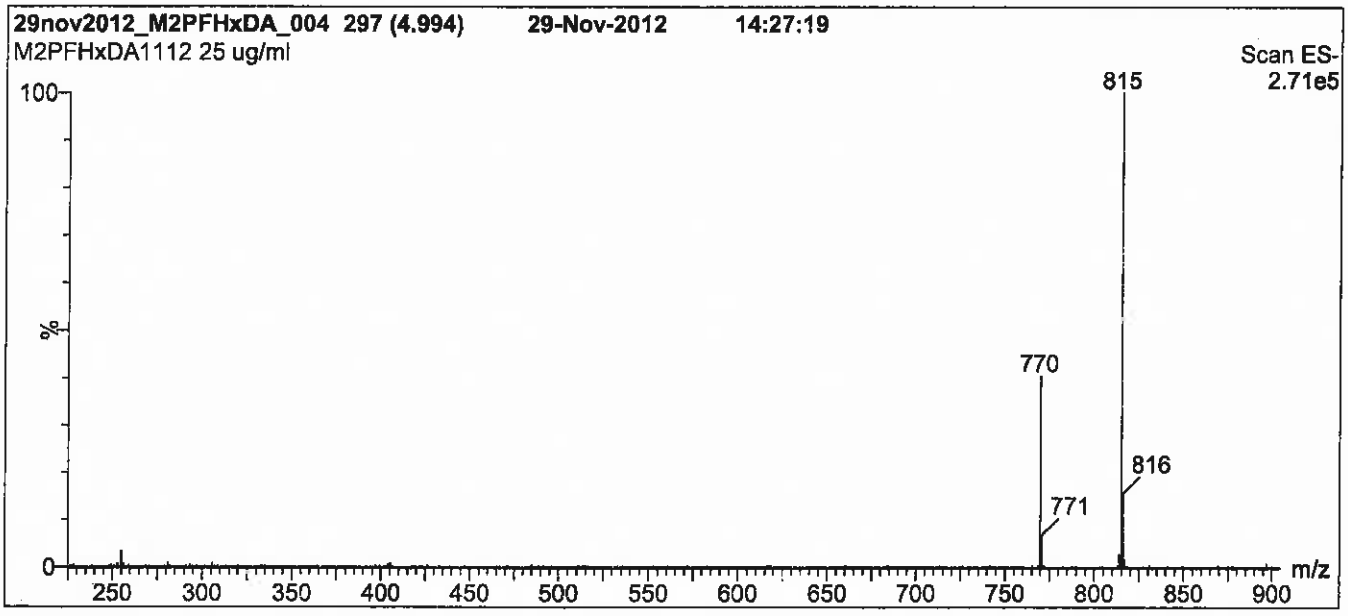
CALA

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

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: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 100% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

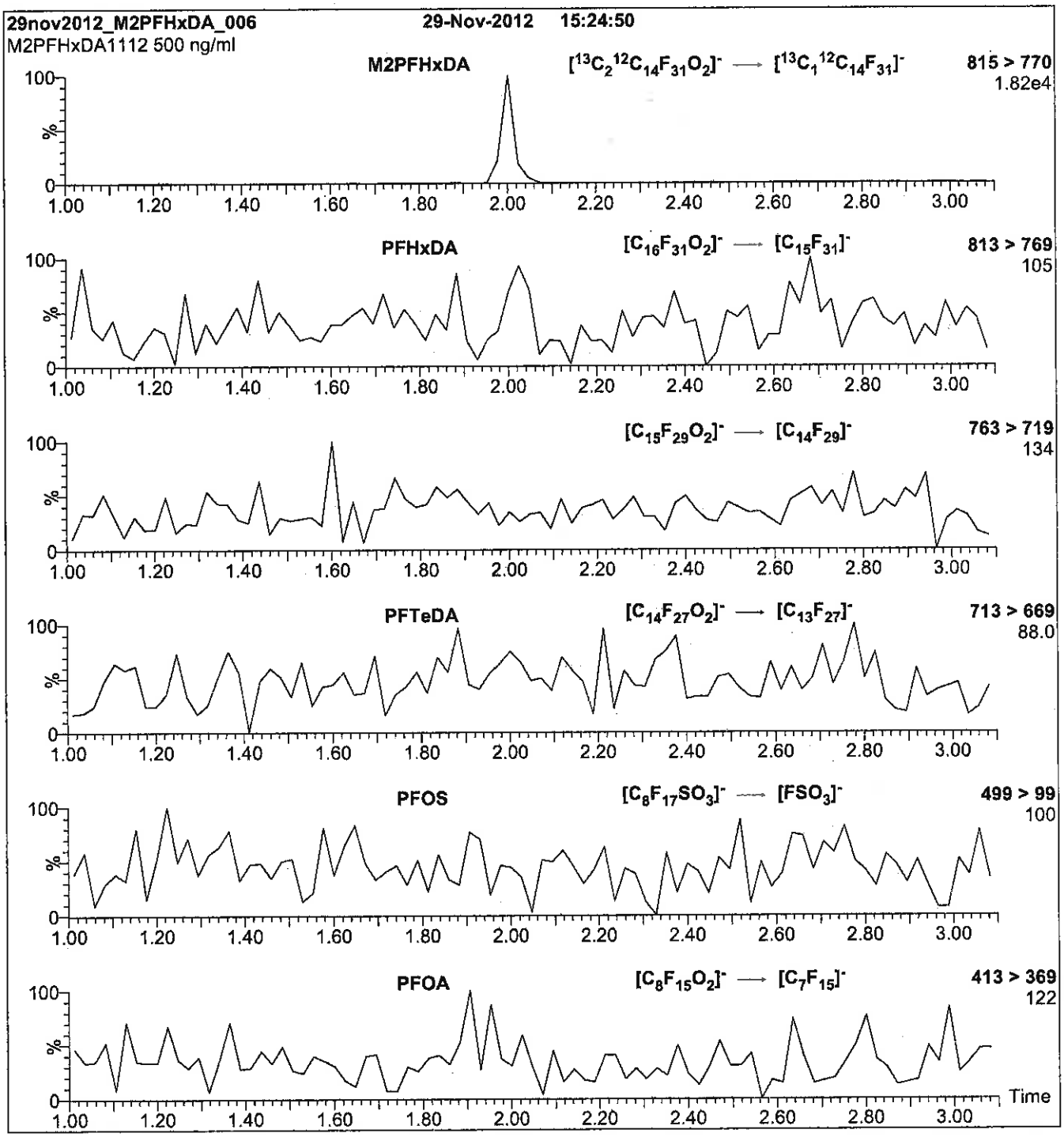
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.39e-3
Collision Energy (eV) = 15

Reagent

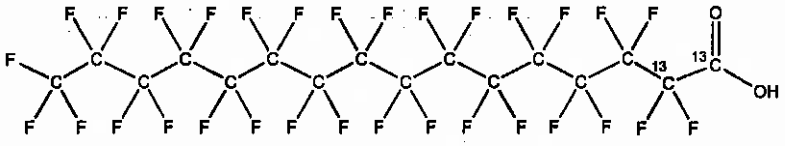
LCM2PFHxDA_00011

r: 11sl17 SCV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2PFHxDA	**LOT NUMBER:**	M2PFHxDA1112
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/07/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/07/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/11/2016 (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

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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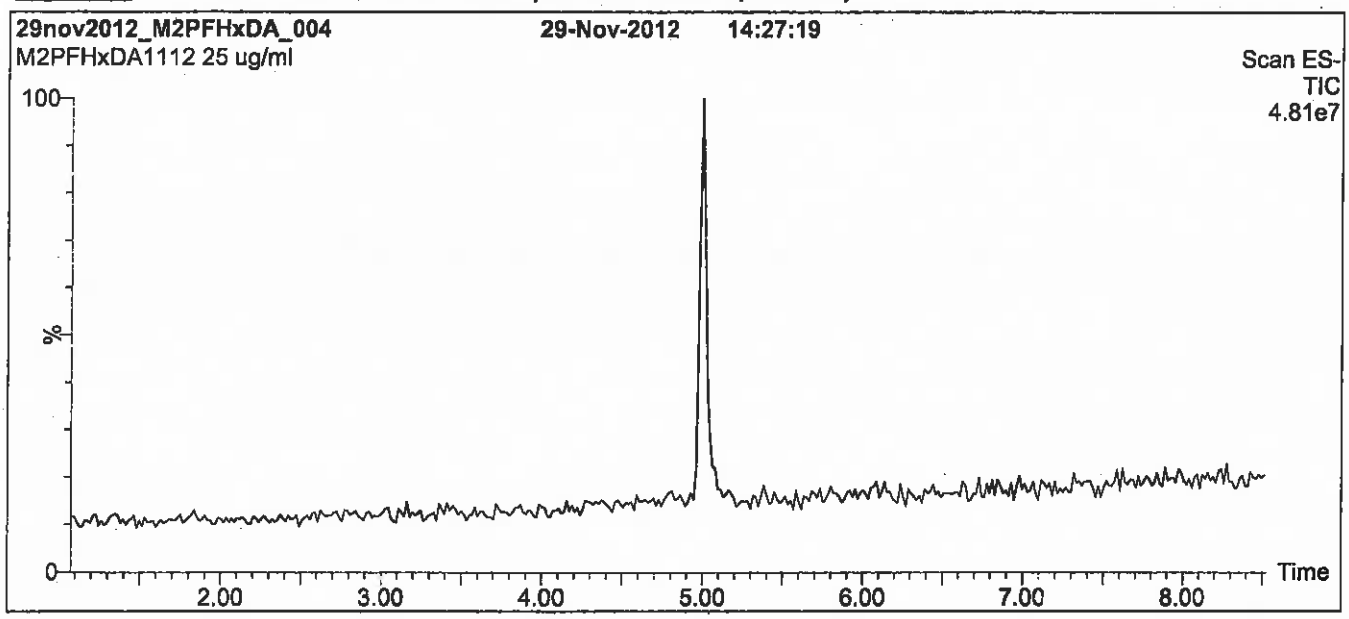
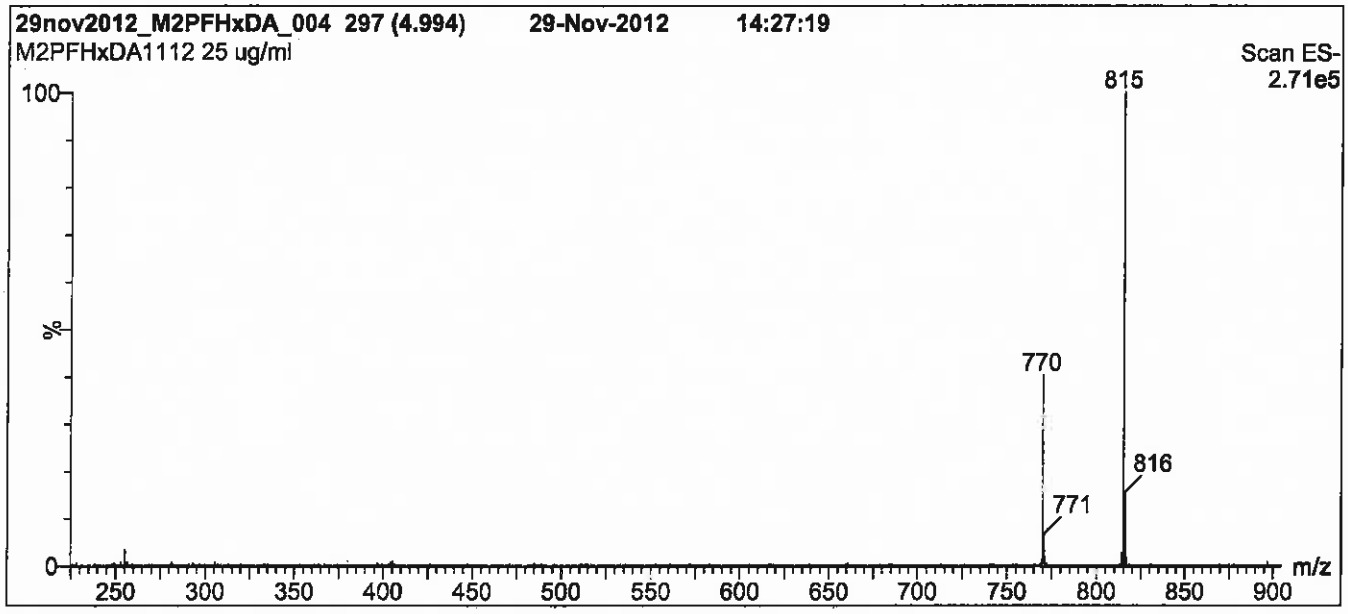
CALA

ANAB ACCREDITED 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

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: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 100% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

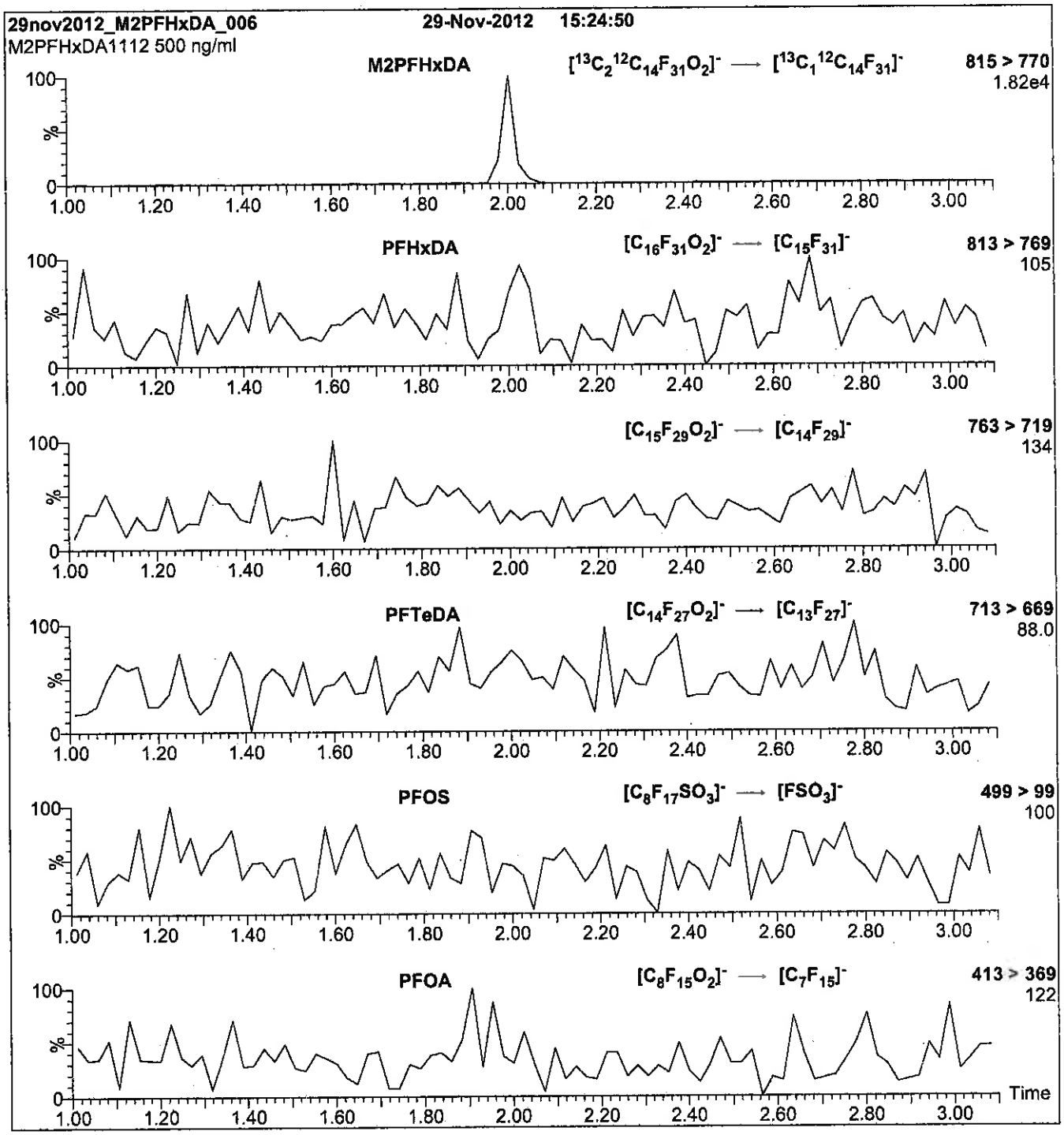
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.39e-3
Collision Energy (eV) = 15

Reagent

LCM2PFOA_00005

Rec'd. 2/10/15 SV

WELLINGTON LABORATORIES

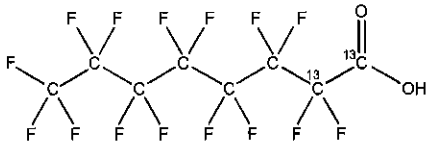
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid

LOT NUMBER: M2PFOA0613

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_6HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 416.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/16/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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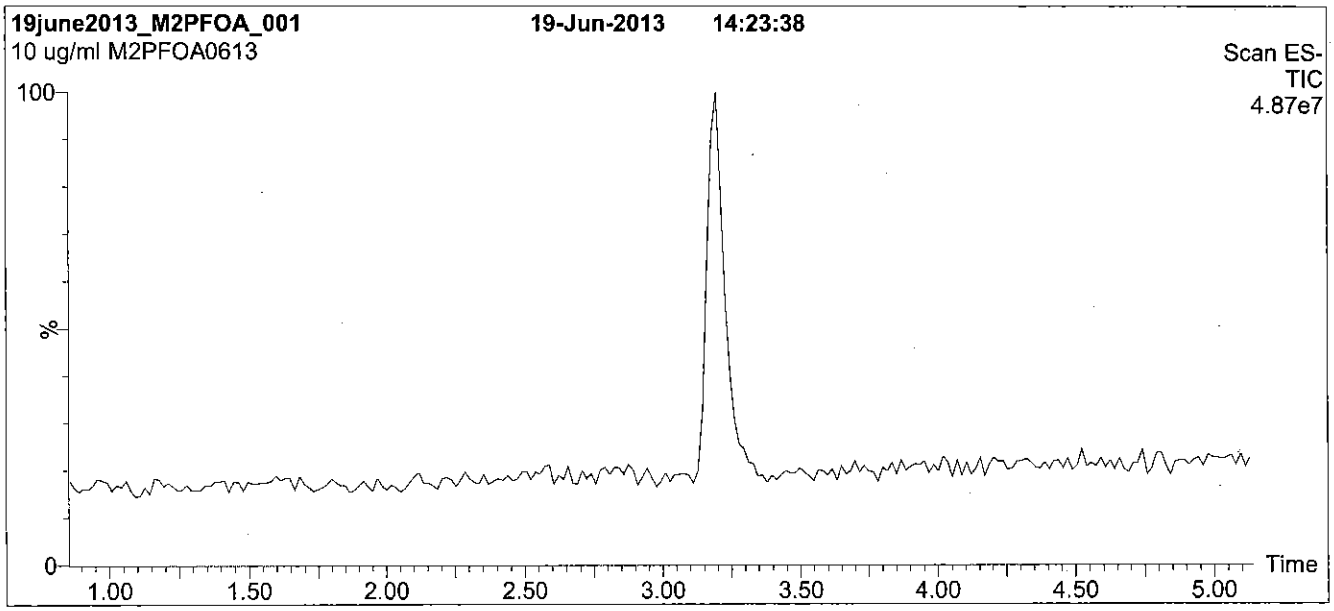
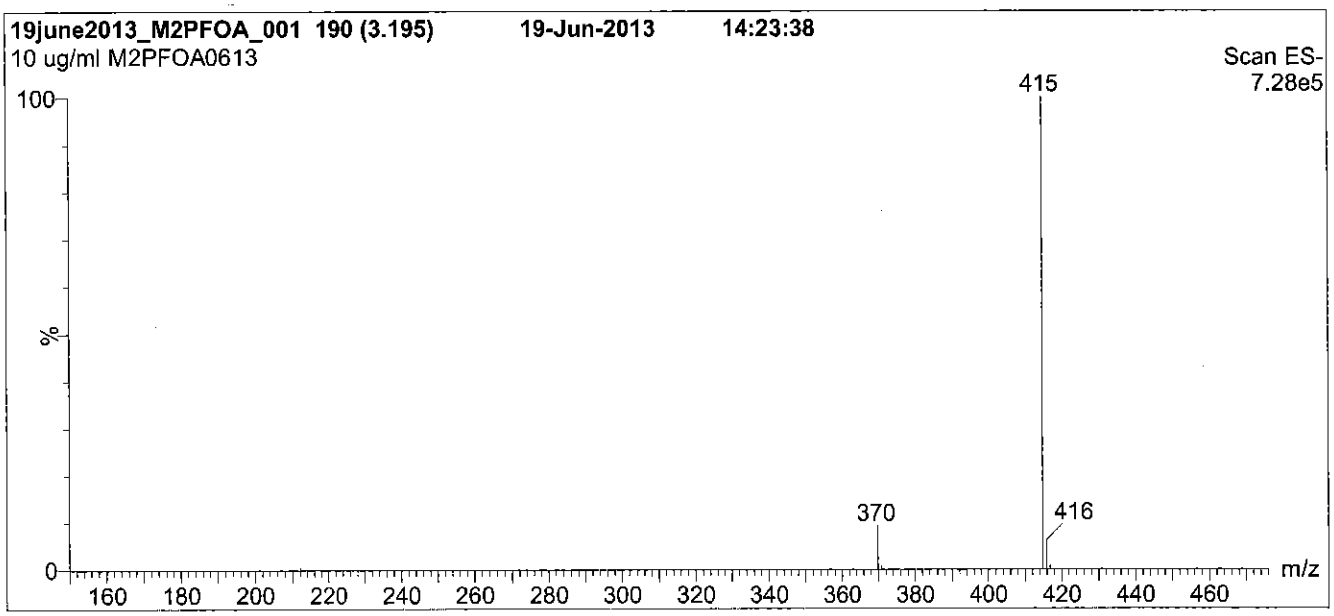
CALA Testing Accreditation No. A1226

ACLASS 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

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 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

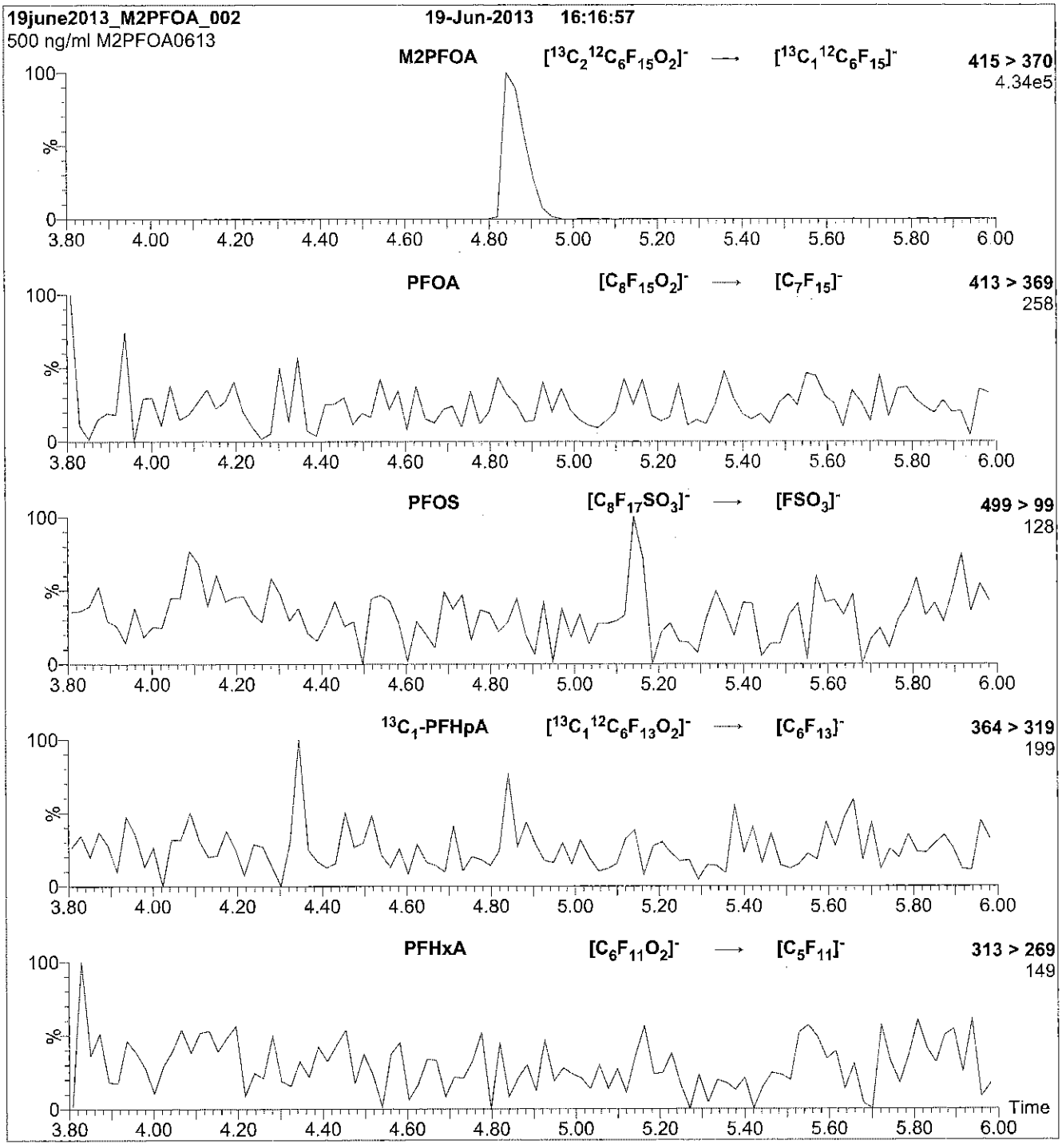
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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) = 3.66e-3
Collision Energy (eV) = 11

Reagent

LCM2PFOA_00006

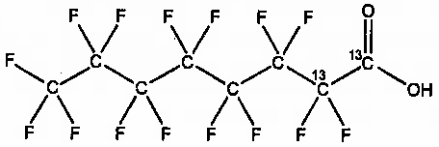
R: SBC 12/21/16

814260
ID: LCM2PFOA_00006
Exp: 02/12/21 Prpd: SBC
13C2-PFOA Stock 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2PFOA	**LOT NUMBER:**	M2PFOA0216
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6HF_{15}O_2$	**MOLECULAR WEIGHT:**	416.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	02/12/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/24/2016 (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

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.

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:

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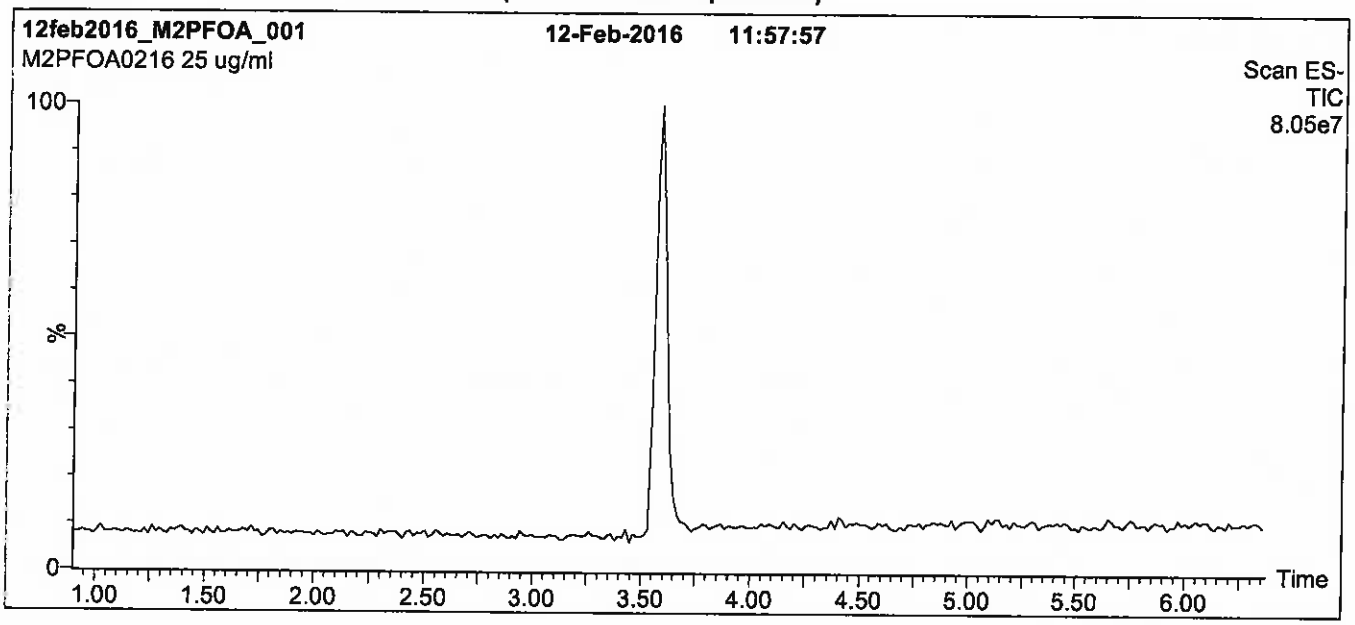
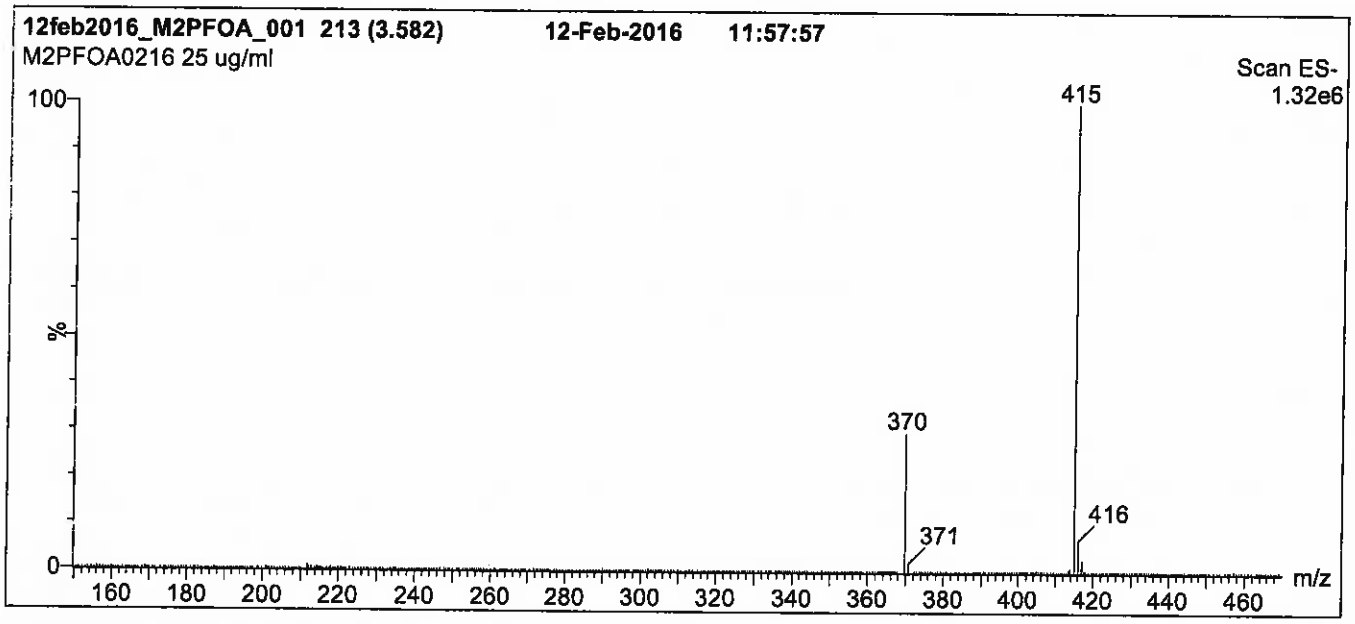
Figure 1: **M2PFOA; LC/MS Data (TIC and Mass Spectrum)**





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 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

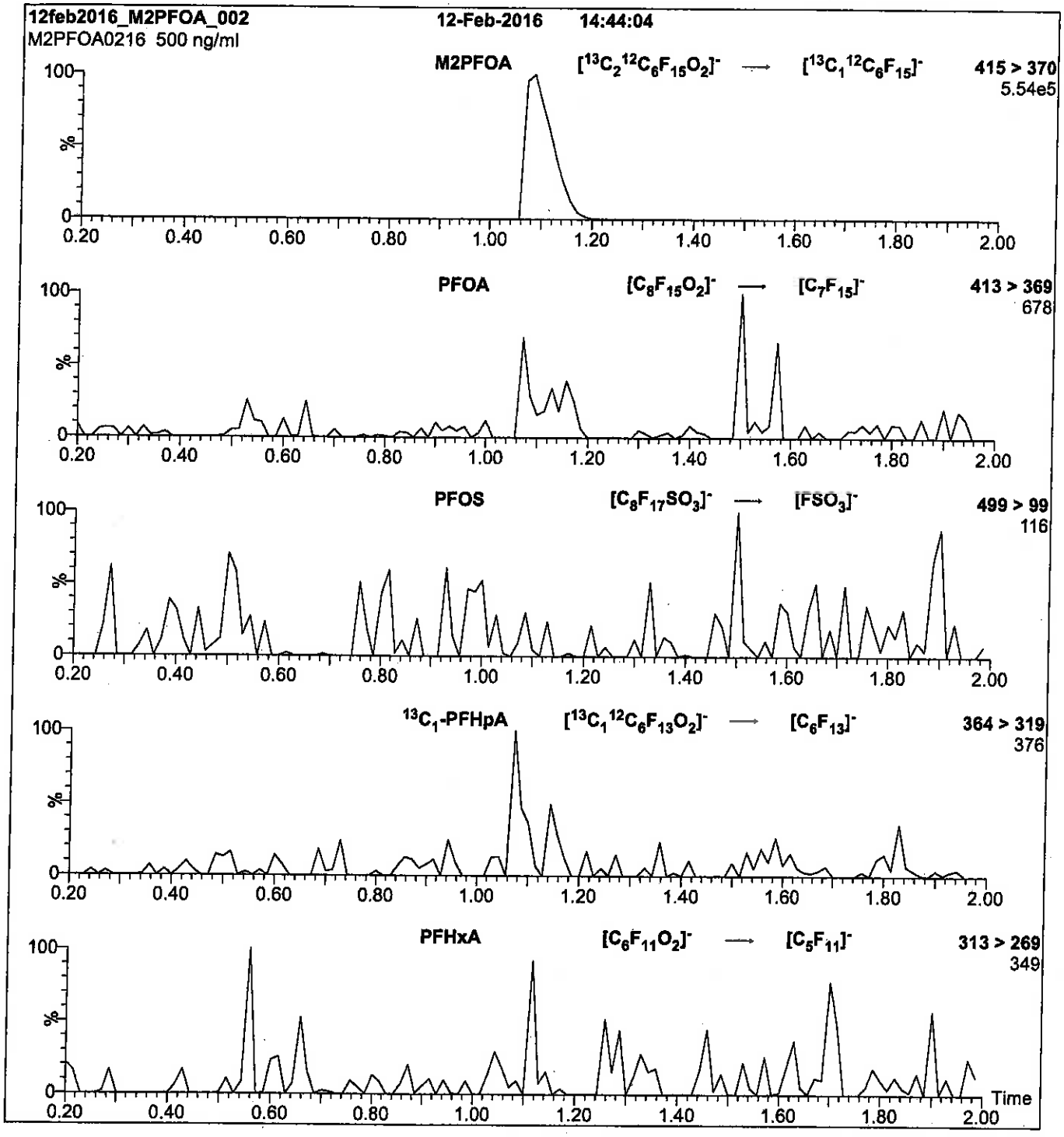
Flow: 300 µl/min

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) = 100
Desolvation Gas Flow (l/hr) = 750

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% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 10

Reagent

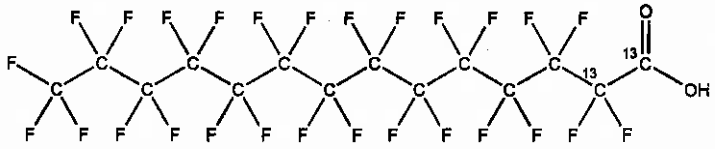
LCM2PFTeDA_00009

P:5/3/19 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M2PFTeDA	**LOT NUMBER:**	M2PFTeDA0217
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)	03/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	03/01/2022		
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 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

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Certified By: _____ **Date:** 03/07/2017 (mm/dd/yyyy)
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CALA

ANAB ACCREDITED

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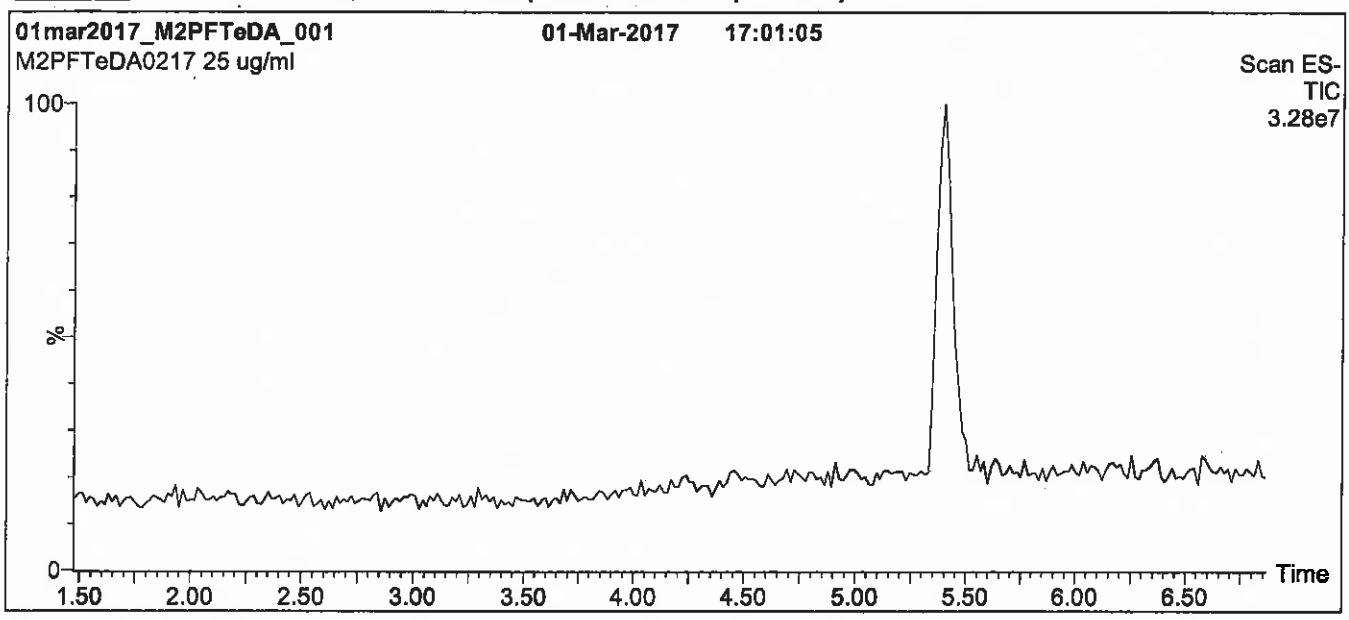

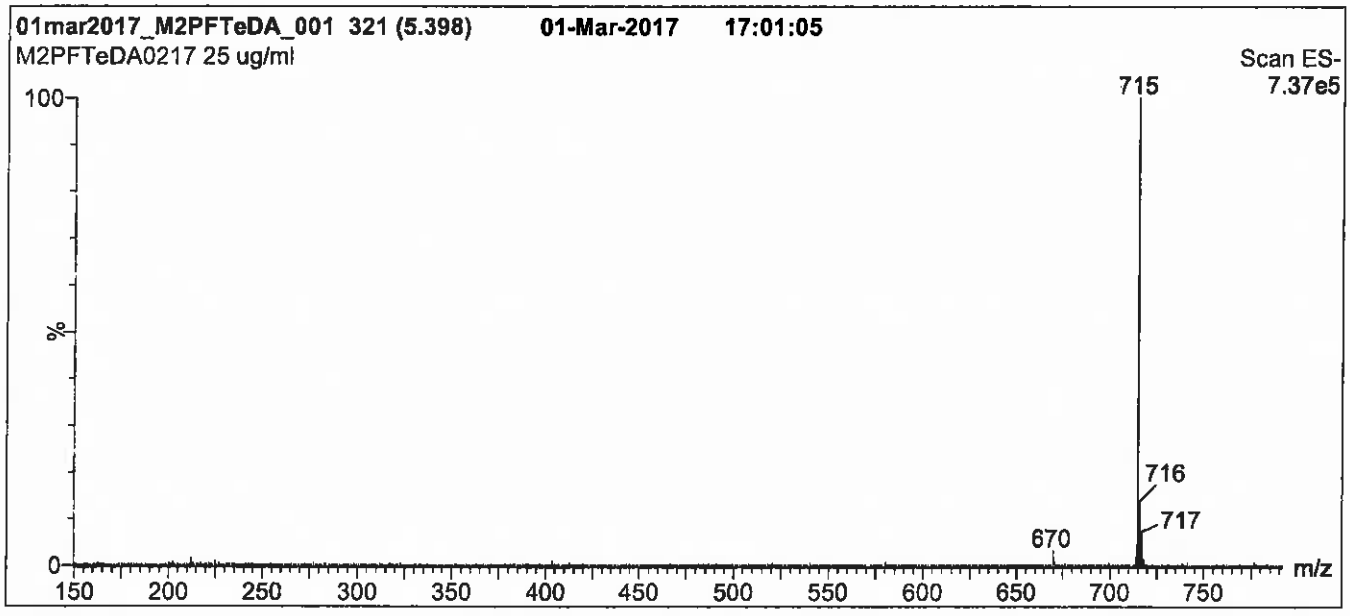

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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 (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
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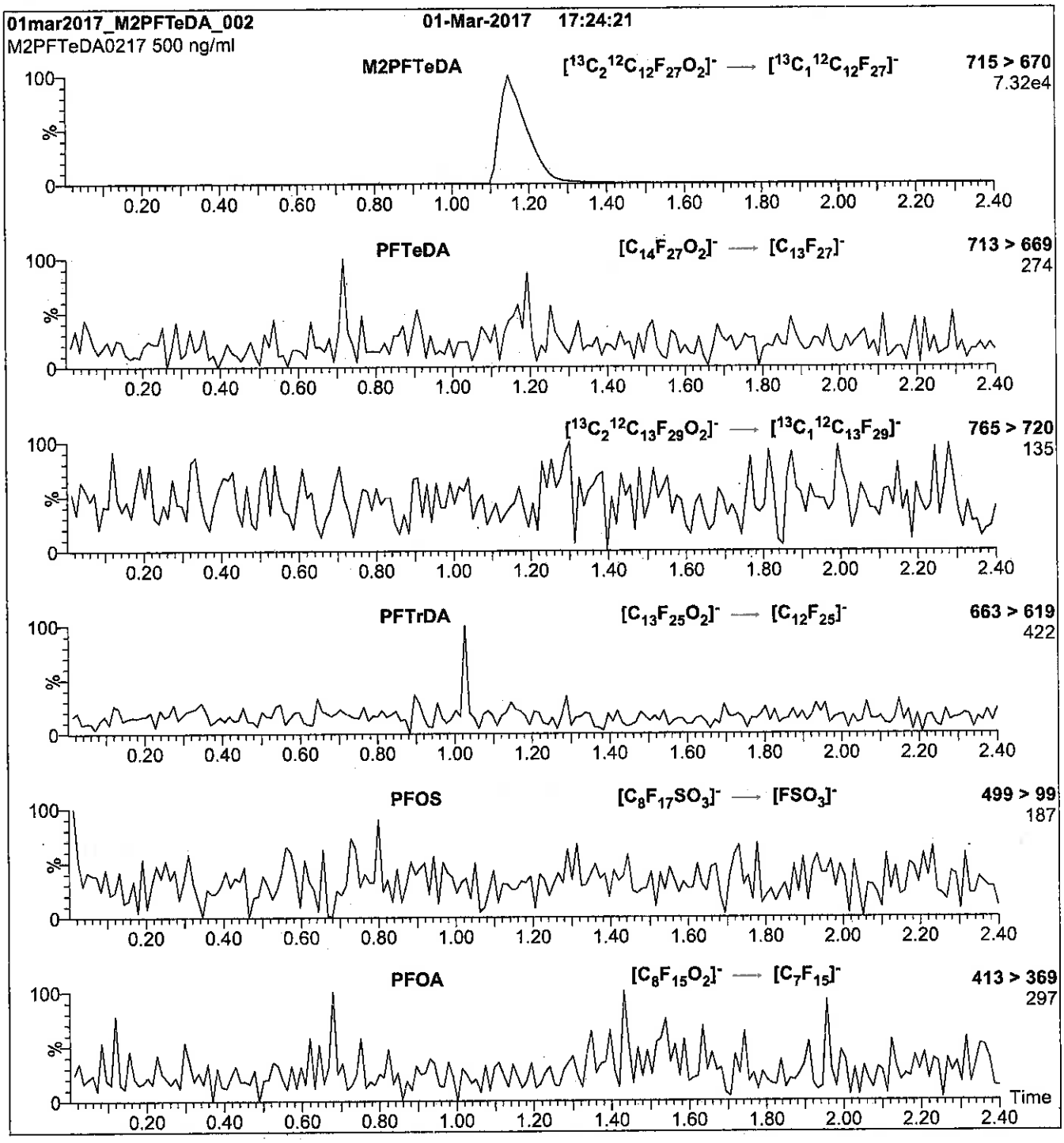
Figure 2: **M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



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) = 3.46e-3
Collision Energy (eV) = 14

Reagent

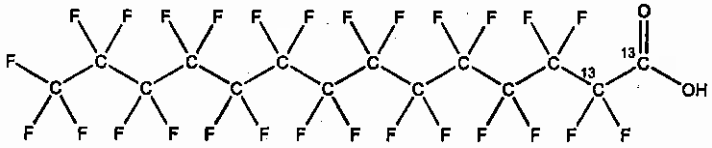
LCM2PFTeDA_00010

r: 7/5/17 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2PFTeDA	**LOT NUMBER:**	M2PFTeDA0217
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid		
STRUCTURE:		**CAS #:**	Not available



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LAST TESTED: (mm/dd/yyyy)	03/01/2017		
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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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ADDITIONAL INFORMATION:

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Certified By: _____ **Date:** 03/07/2017 (mm/dd/yyyy)
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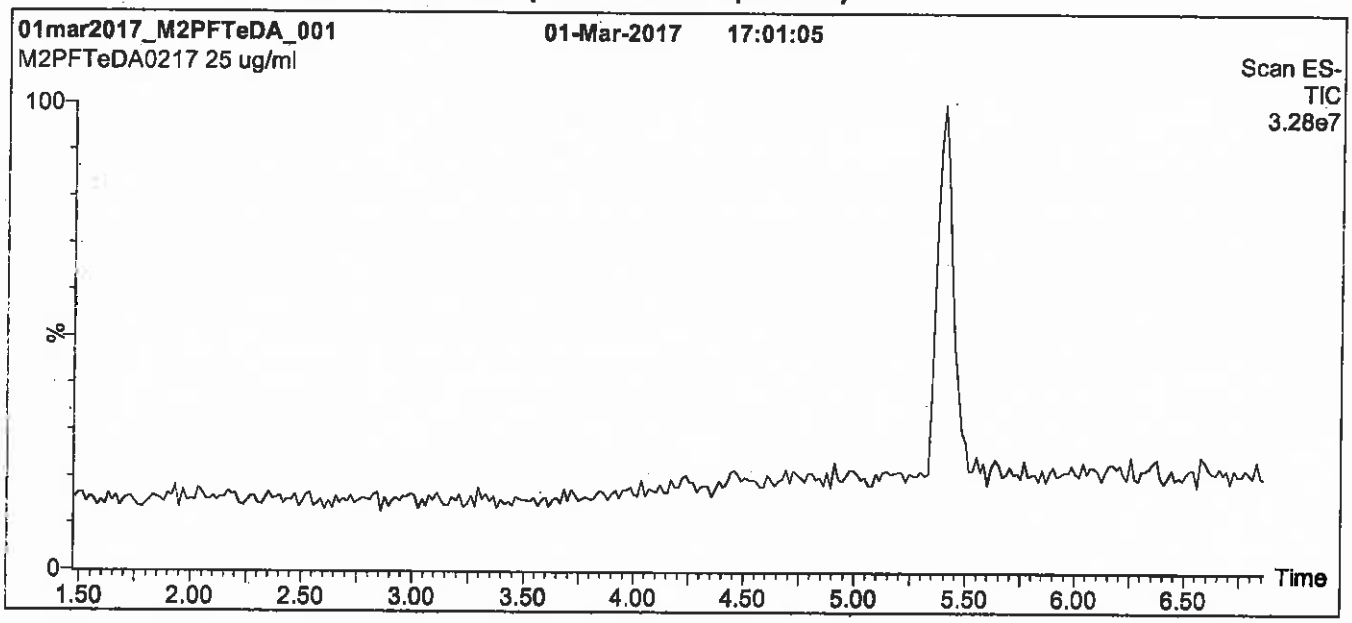

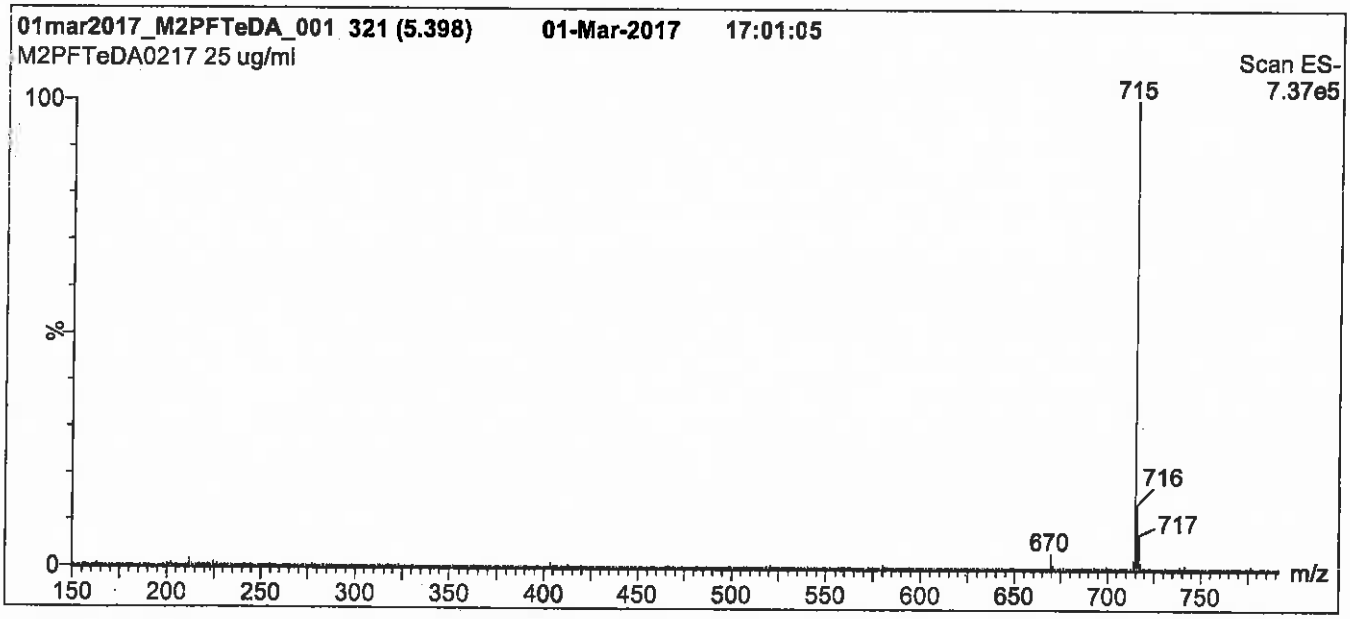

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MS: **Micromass Quattro *micro* API MS**

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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)
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Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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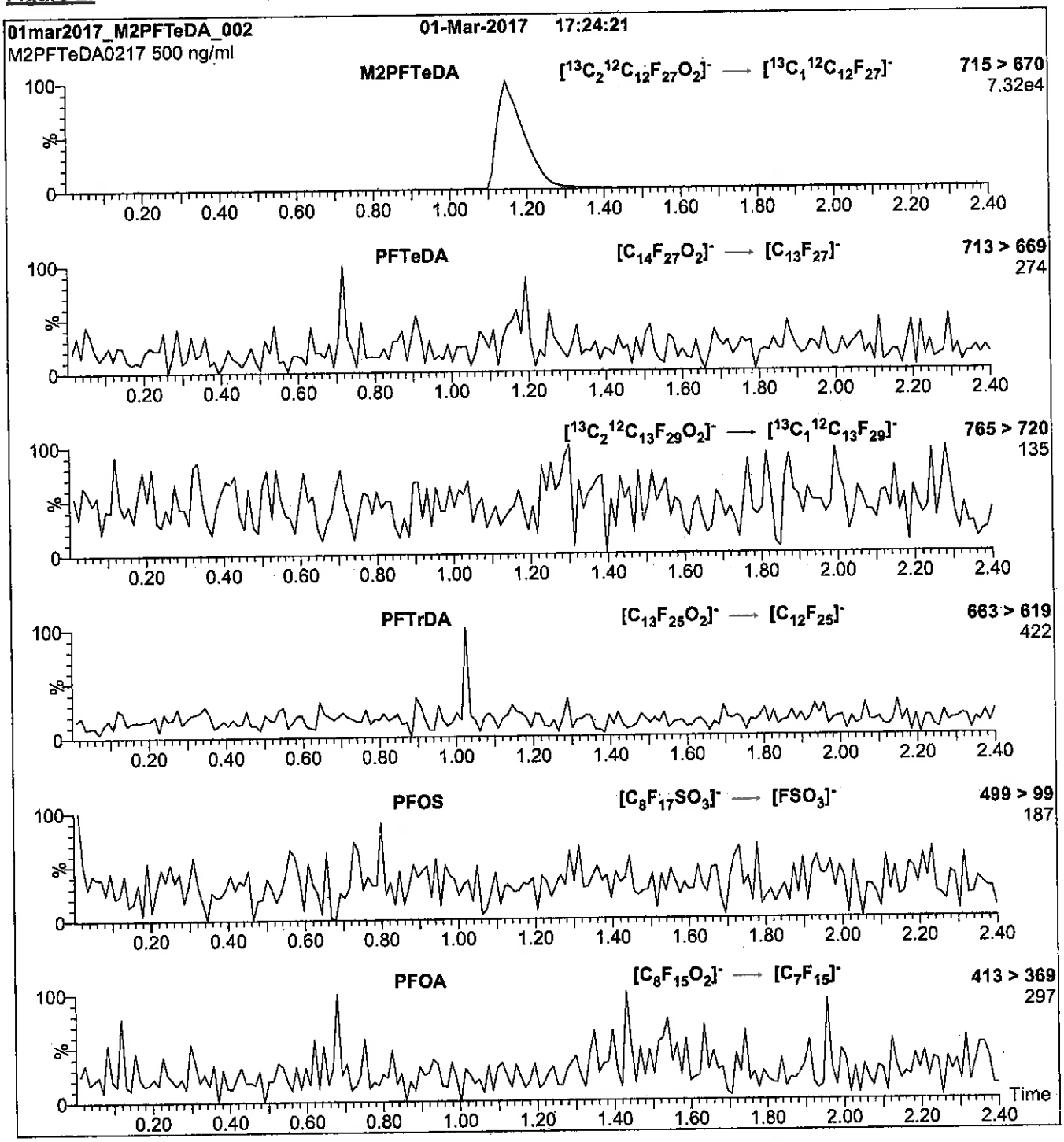

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10 µl (500 ng/ml M2PFTeDA)

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(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
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Reagent

LCM4PFHPA_00009

r: 5/3/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
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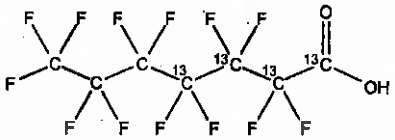
PRODUCT CODE:	M4PFHpA	**LOT NUMBER:**	M4PFHpA0516
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid		
STRUCTURE:		**CAS #:**	Not available



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CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
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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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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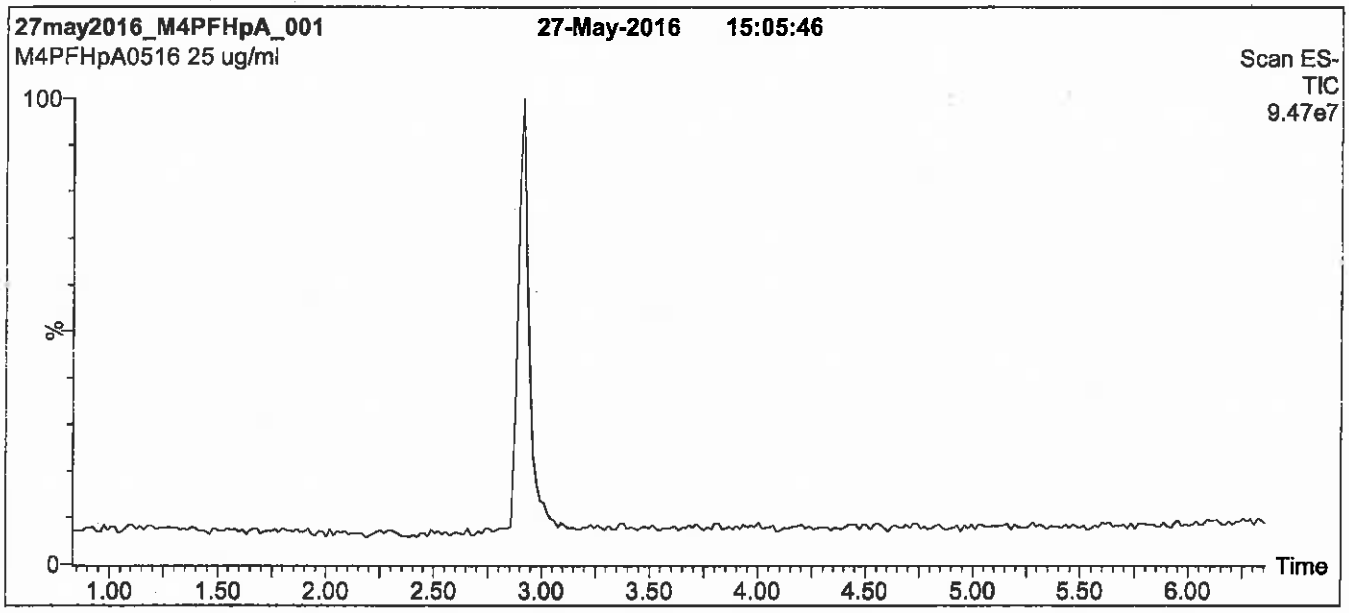
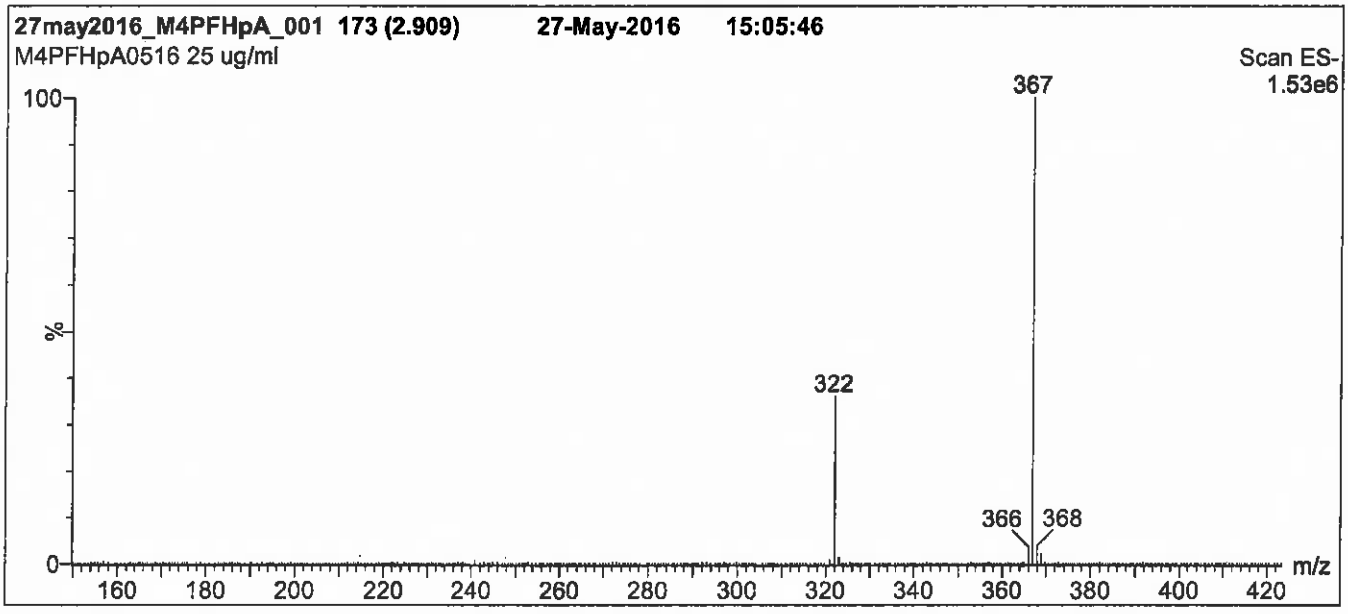
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

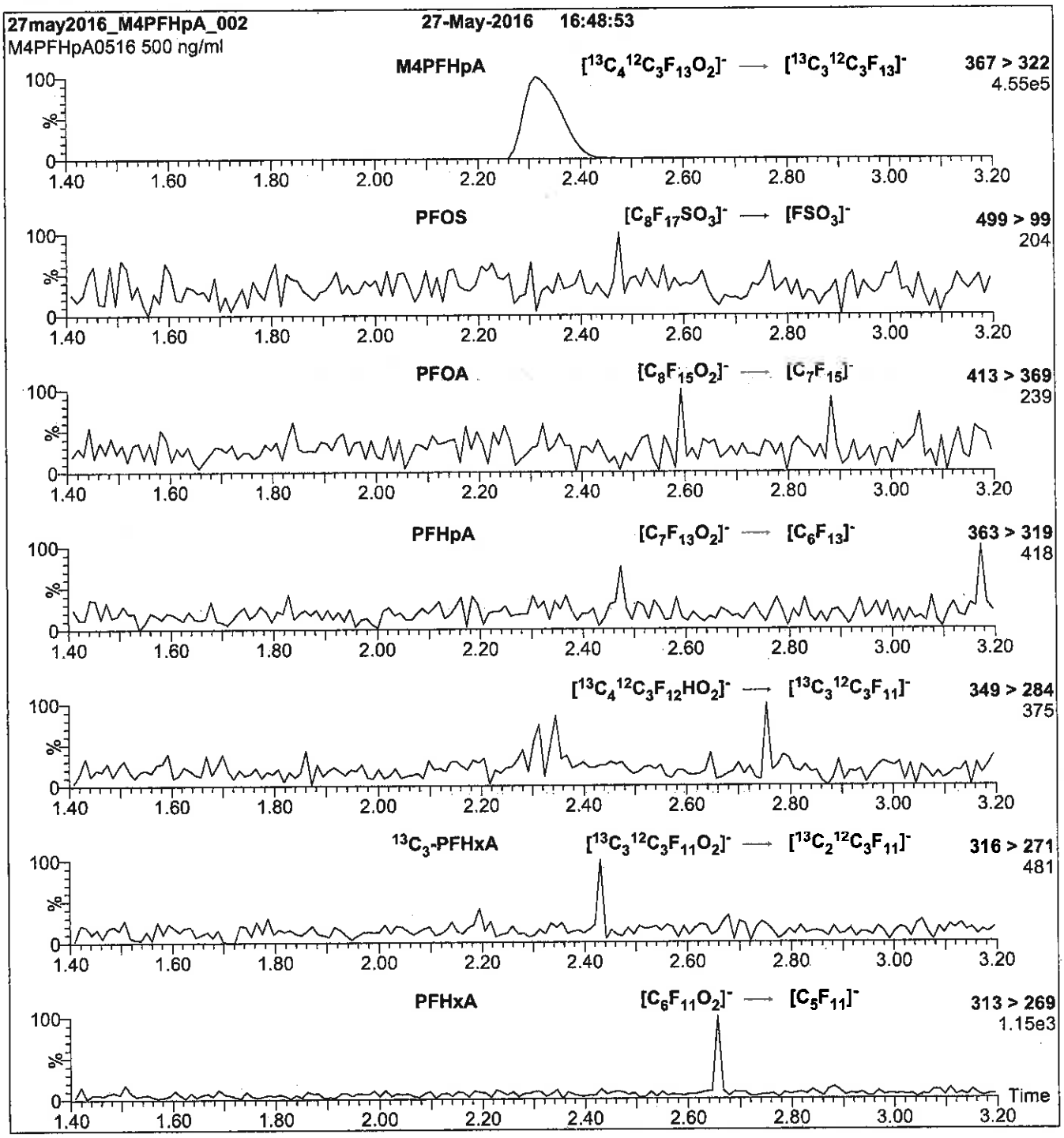
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.35e-3
Collision Energy (eV) = 11

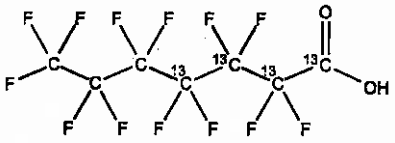
Reagent

LCM4PFHPA_00010

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M4PFHpA	**LOT NUMBER:**	M4PFHpA0517
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/03/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/03/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/11/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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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CALA

ANAB ACCREDITED

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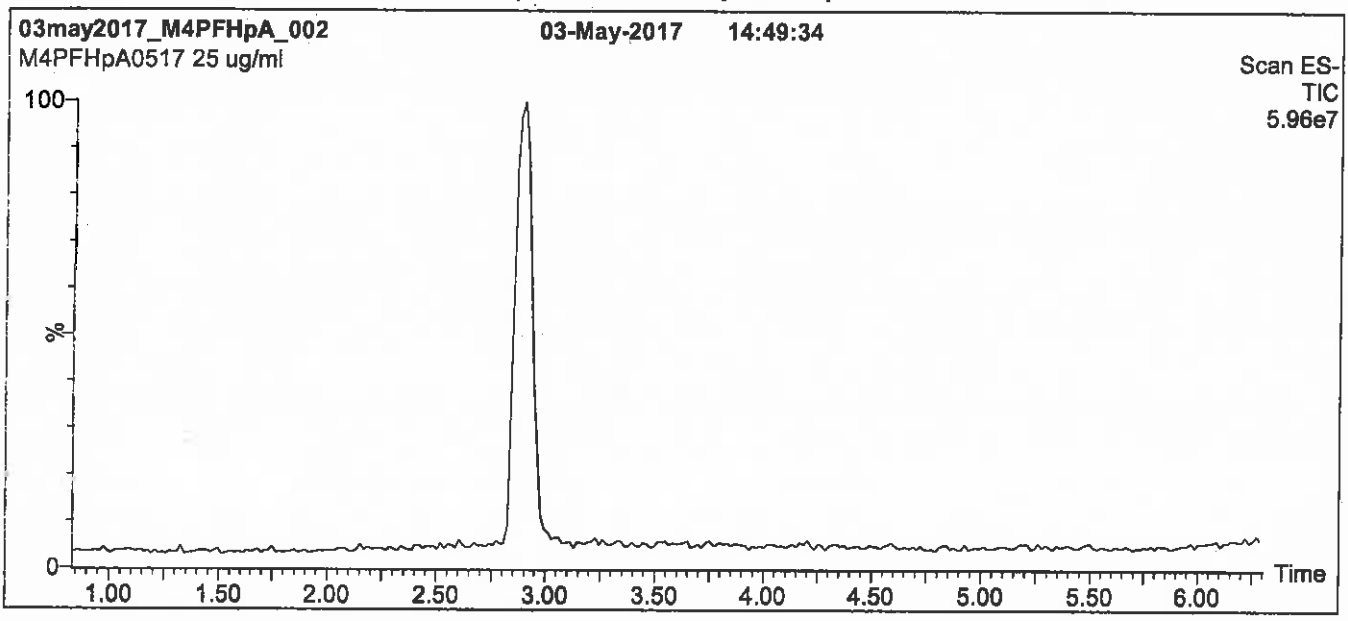
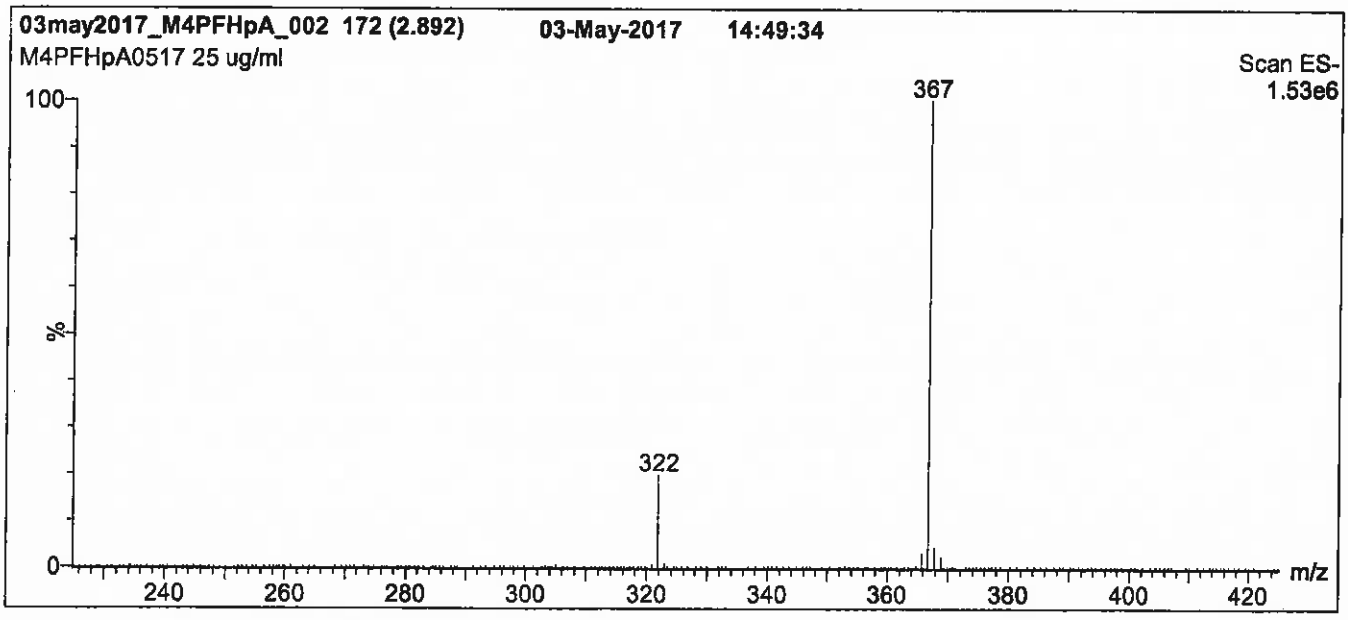




Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

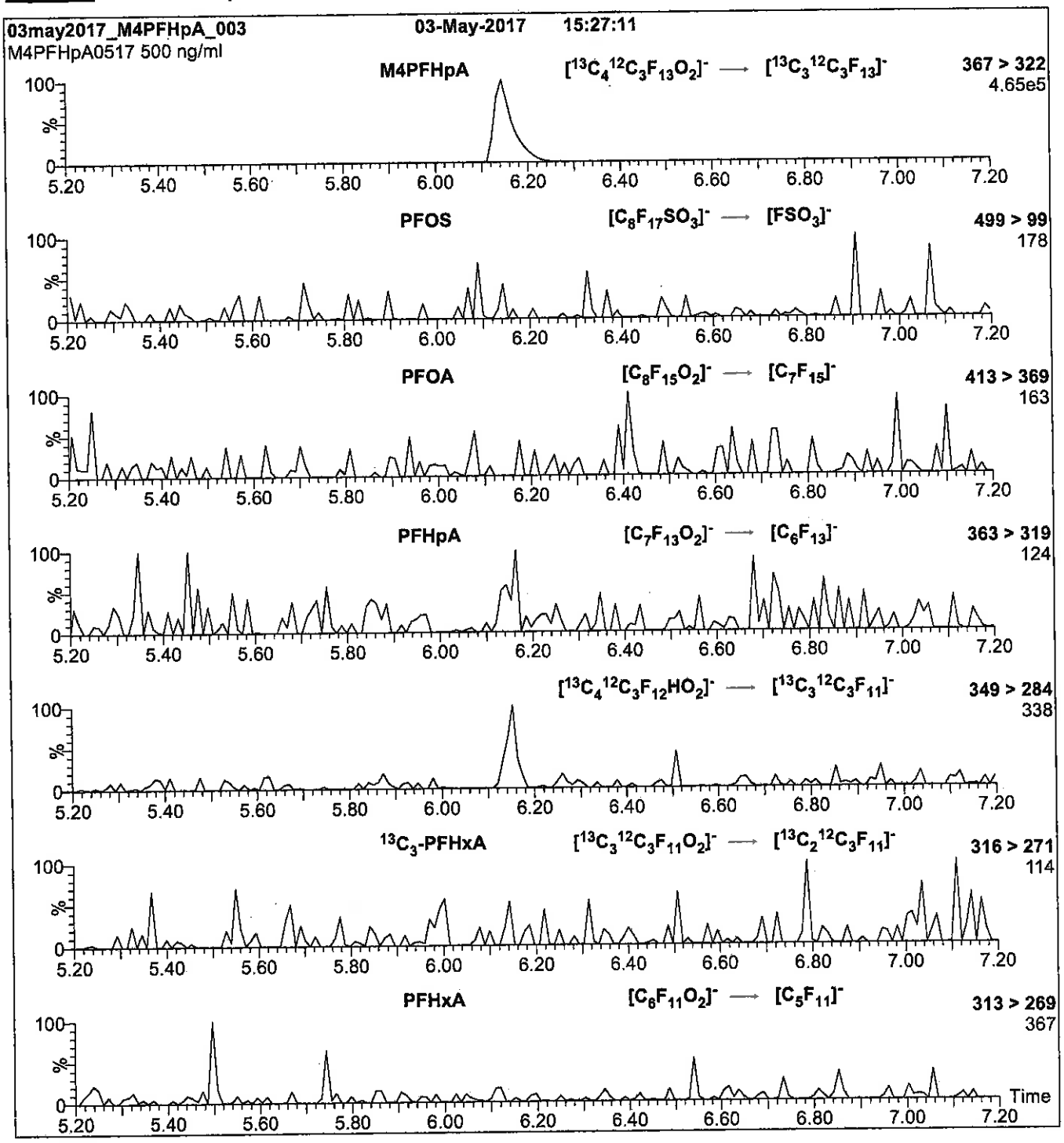
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

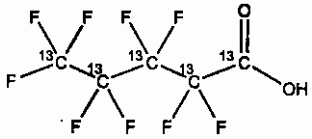
LCM5PFPEA_00010

r: 5/3/19 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M5PFPeA	**LOT NUMBER:**	M5PFPeA1116
COMPOUND:	Perfluoro-n-[$^{13}C_5$]pentanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_5HF_9O_2$	**MOLECULAR WEIGHT:**	269.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_5$)
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.
- Contains < 0.1% of perfluoro-n-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/09/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED

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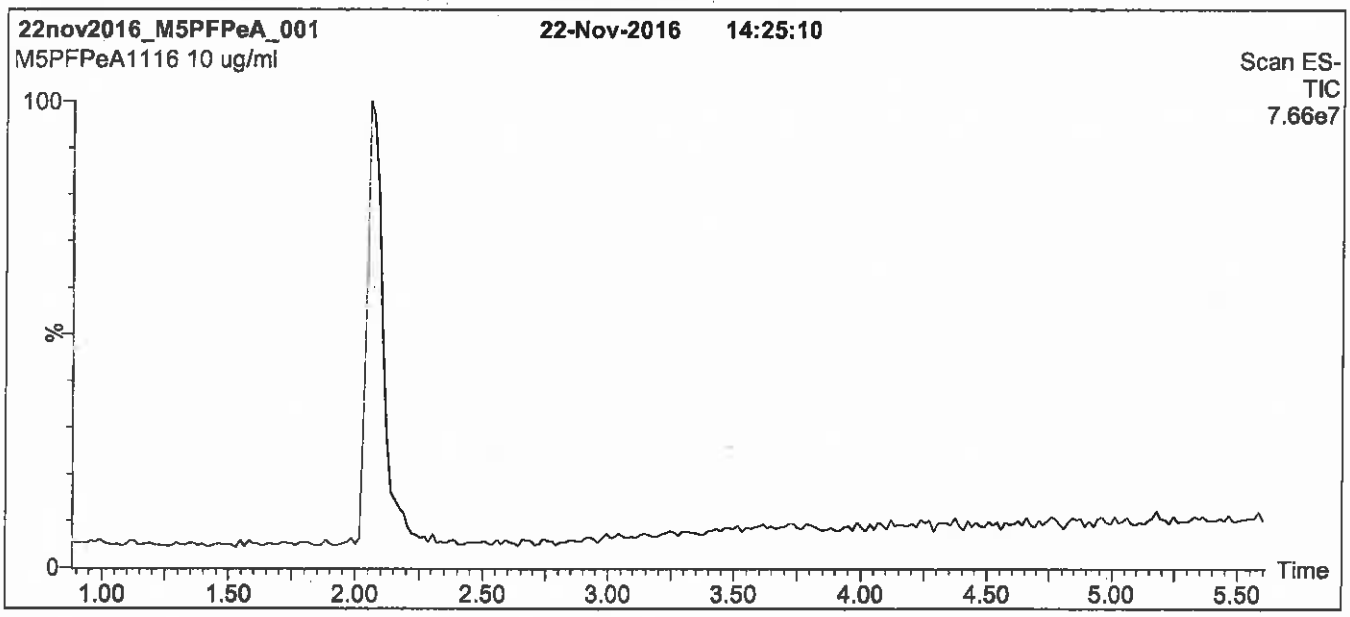
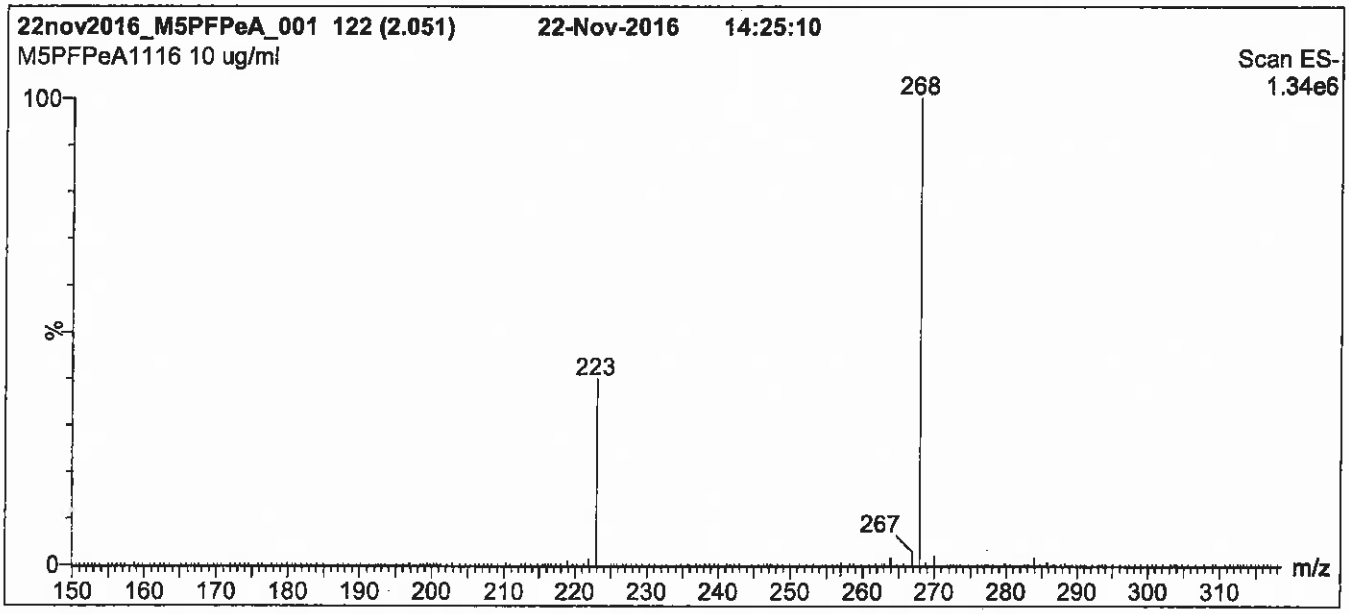
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

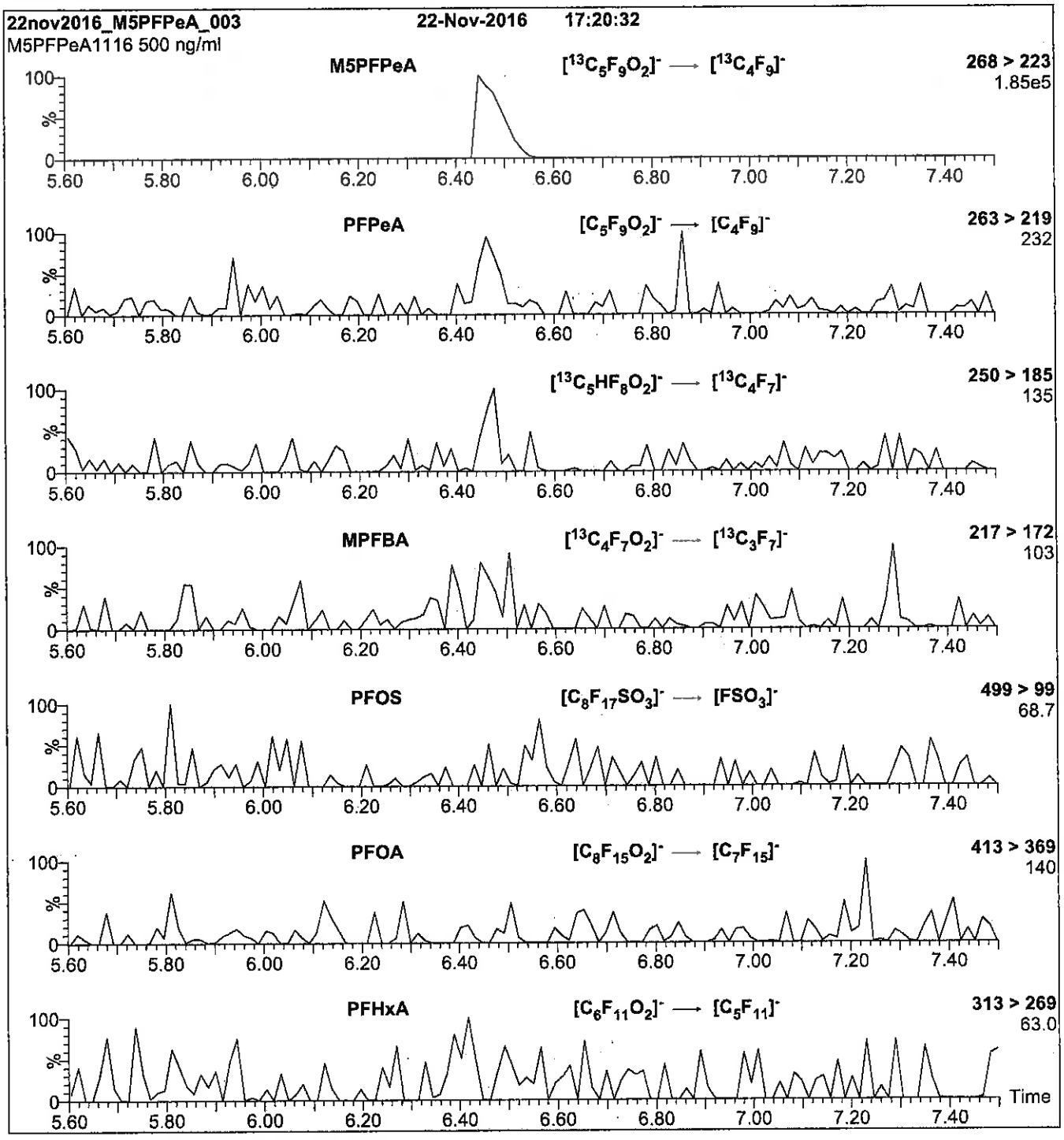
Flow: 300 µl/min

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

Figure 2: **M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M5PFPeA)

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

Reagent

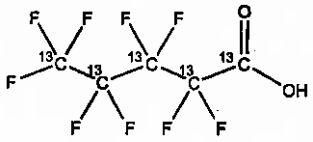
LCM5PFPEA_00011

P:7/5/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M5PFPeA	**LOT NUMBER:**	M5PFPeA1116
COMPOUND:	Perfluoro-n-[$^{13}C_5$]pentanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_6HF_9O_2$	**MOLECULAR WEIGHT:**	269.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_6$)
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		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
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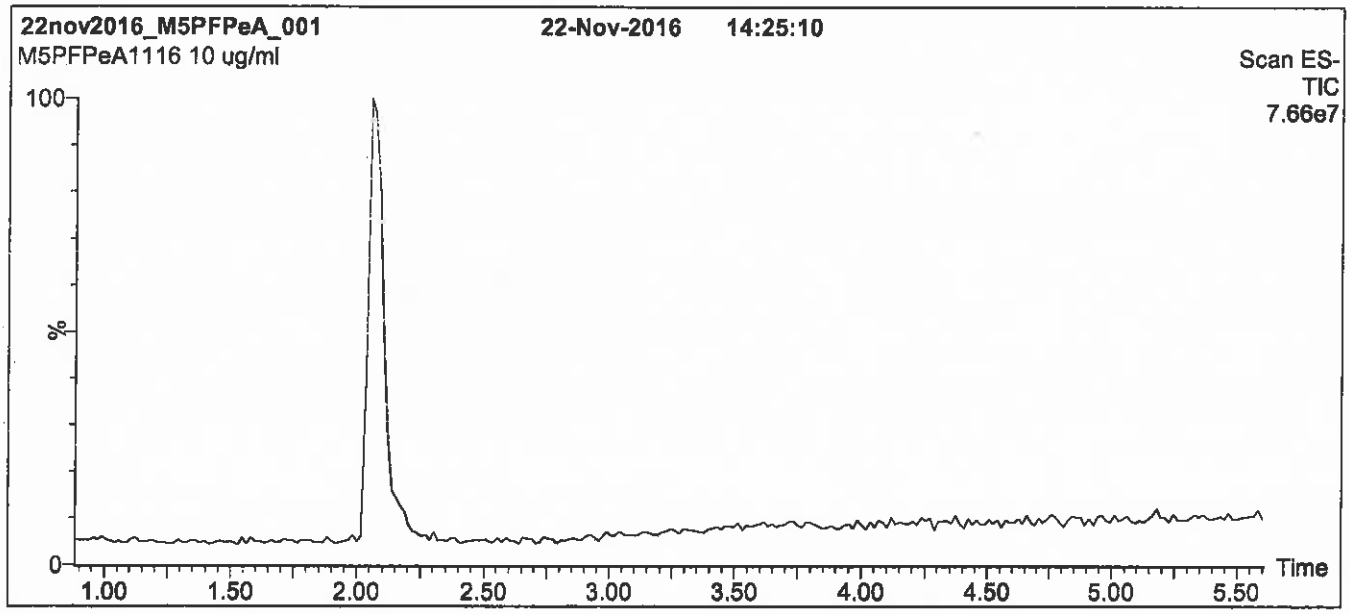
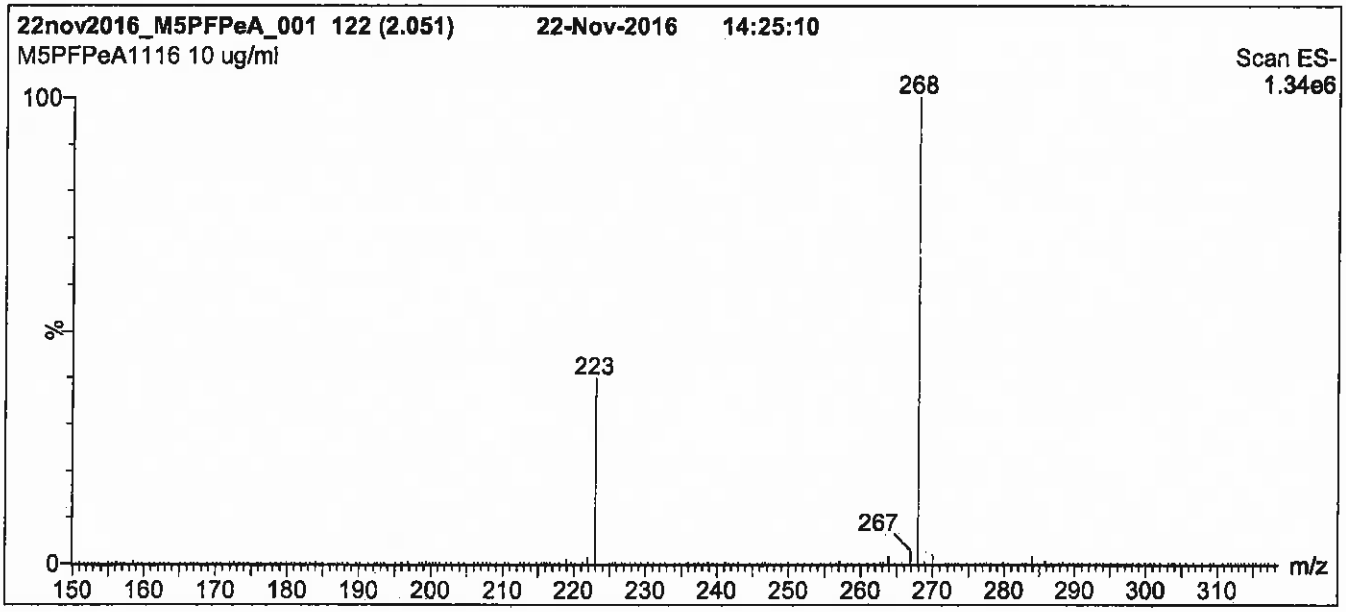
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

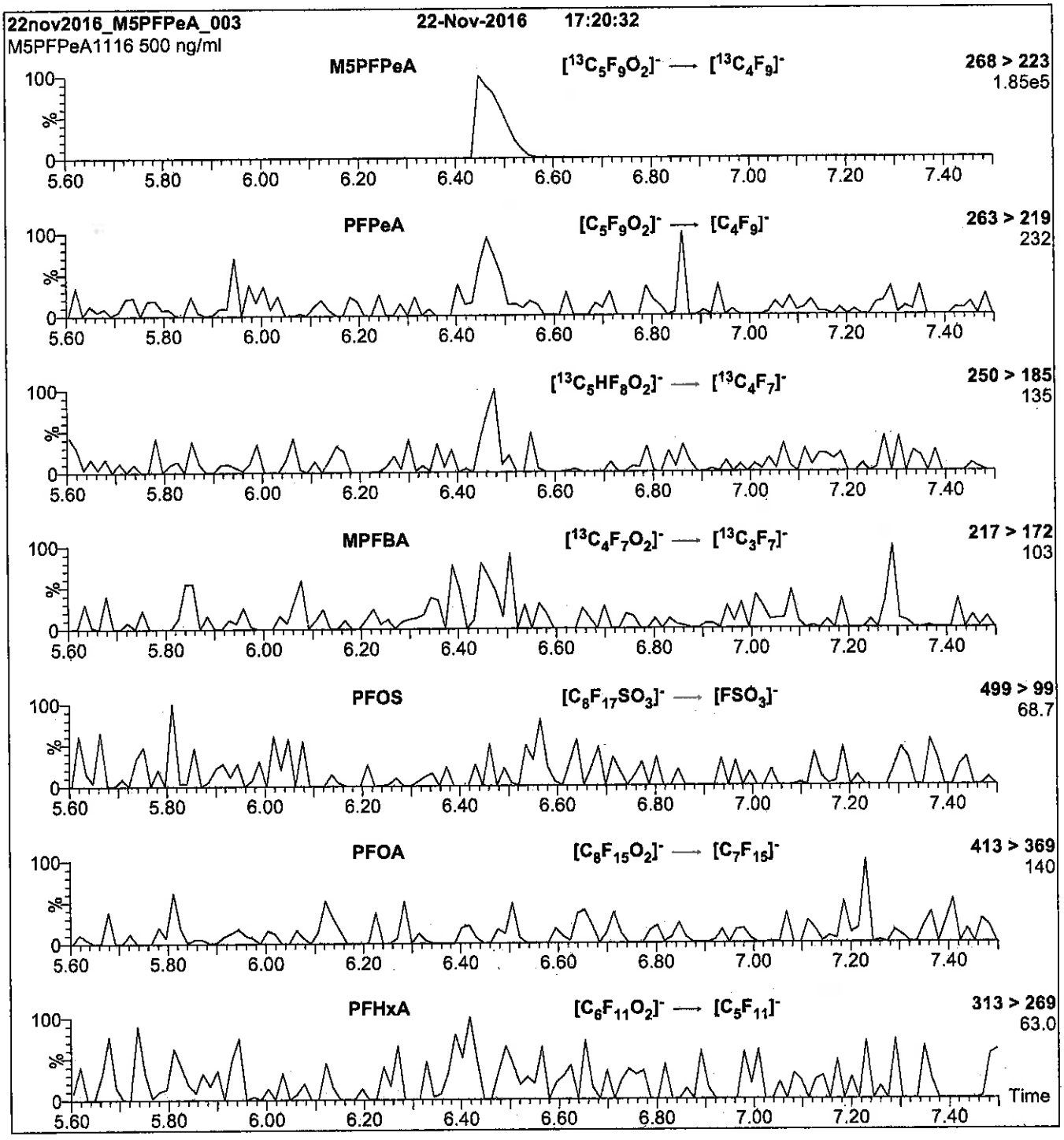
Flow: 300 µl/min

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

Figure 2: **M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M5PFPeA)

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

Reagent

LCM8FOSA_00013

r: 5/3/17 SKV

WELLINGTON LABORATORIES

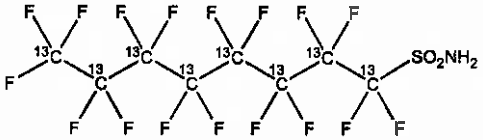
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[$^{13}C_8$]octanesulfonamide

LOT NUMBER: M8FOSA1215I

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)	12/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/22/2020		
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:** 12/13/2016 (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

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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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.

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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 NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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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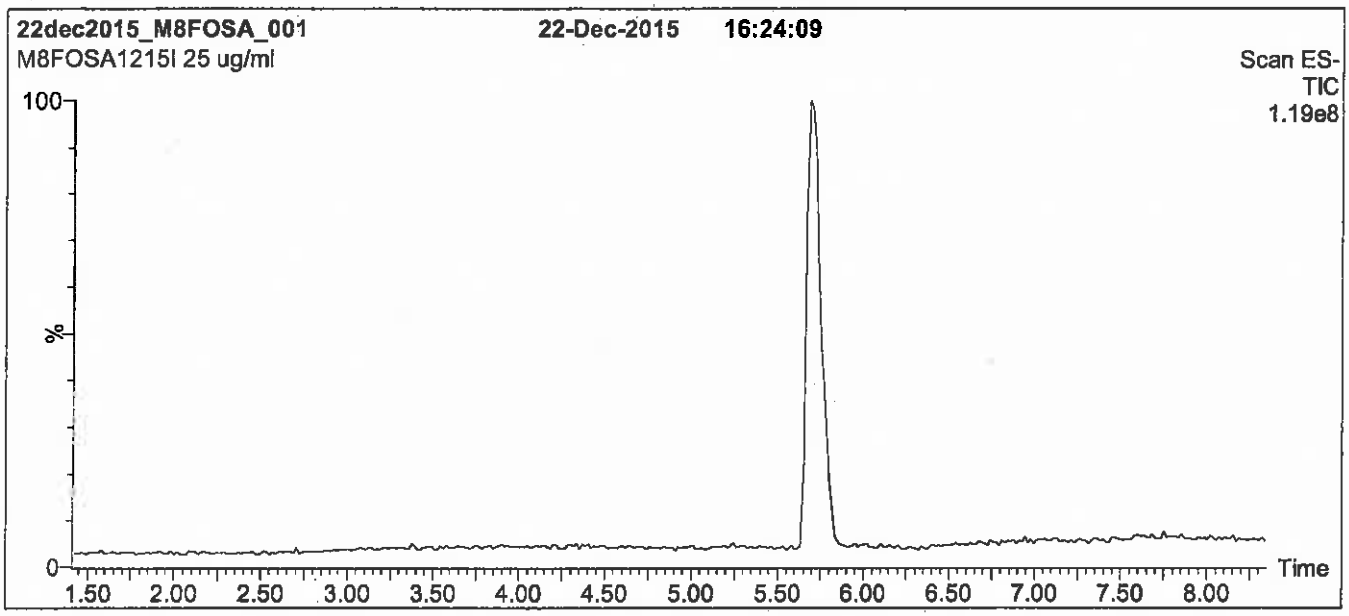
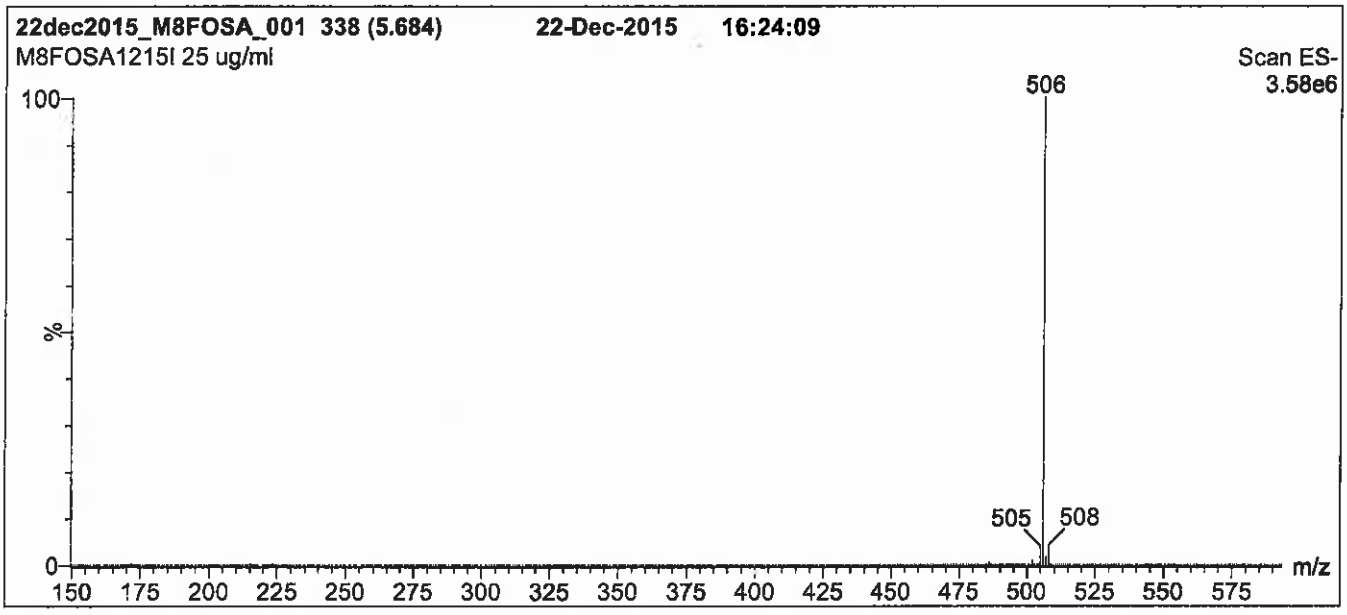
Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

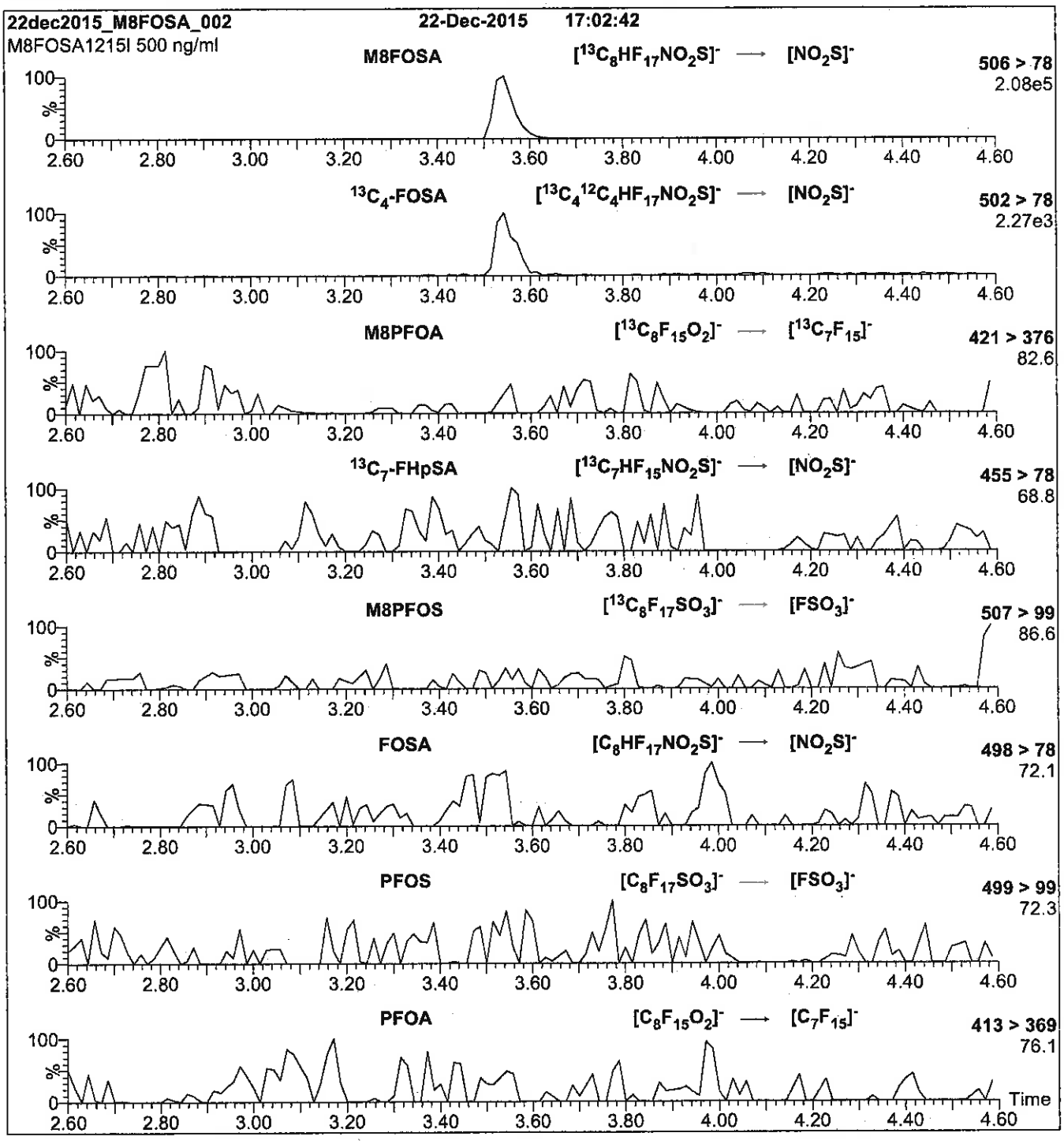
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.39e-3
Collision Energy (eV) = 30

Reagent

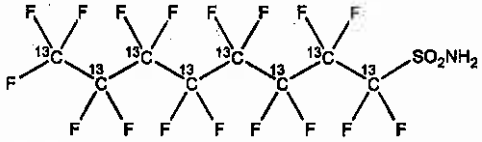
LCM8FOSA_00014

P: 7/5/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M8FOSA-I	**LOT NUMBER:**	M8FOSA0417I
COMPOUND:	Perfluoro-1-[$^{13}C_8$]octanesulfonamide		
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)	04/20/2017		
EXPIRY DATE: (mm/dd/yyyy)	04/20/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- 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:** 05/04/2017 (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

INTENDED USE:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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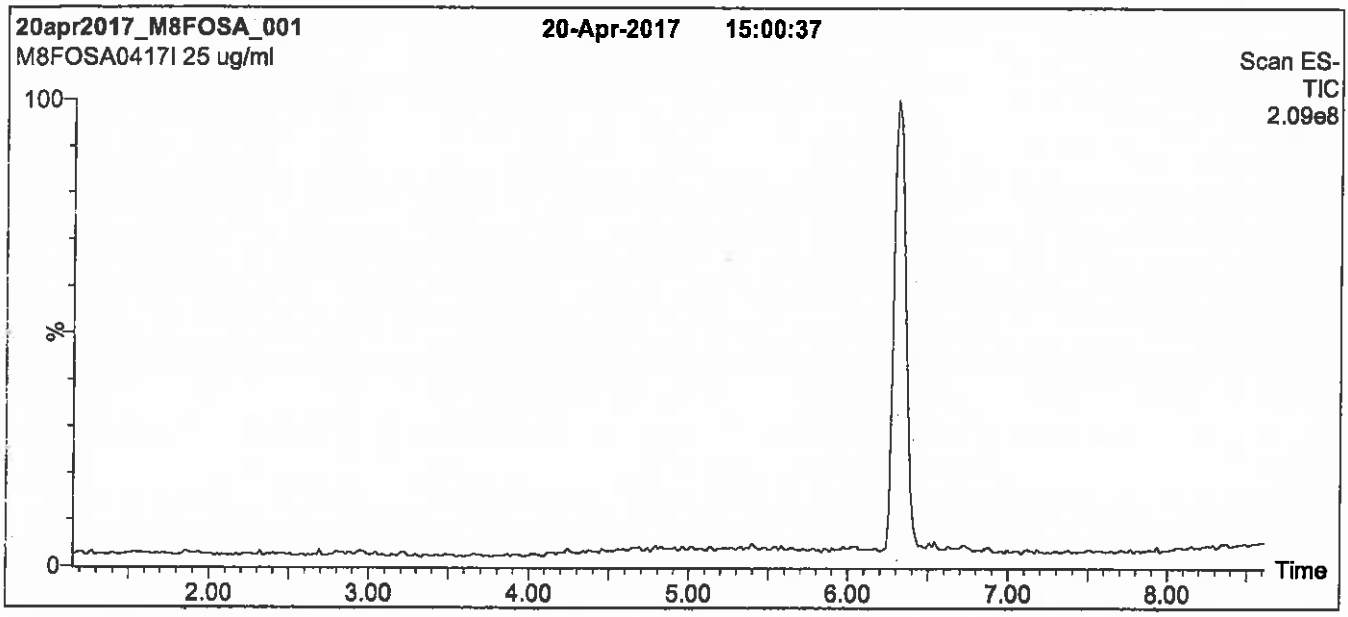
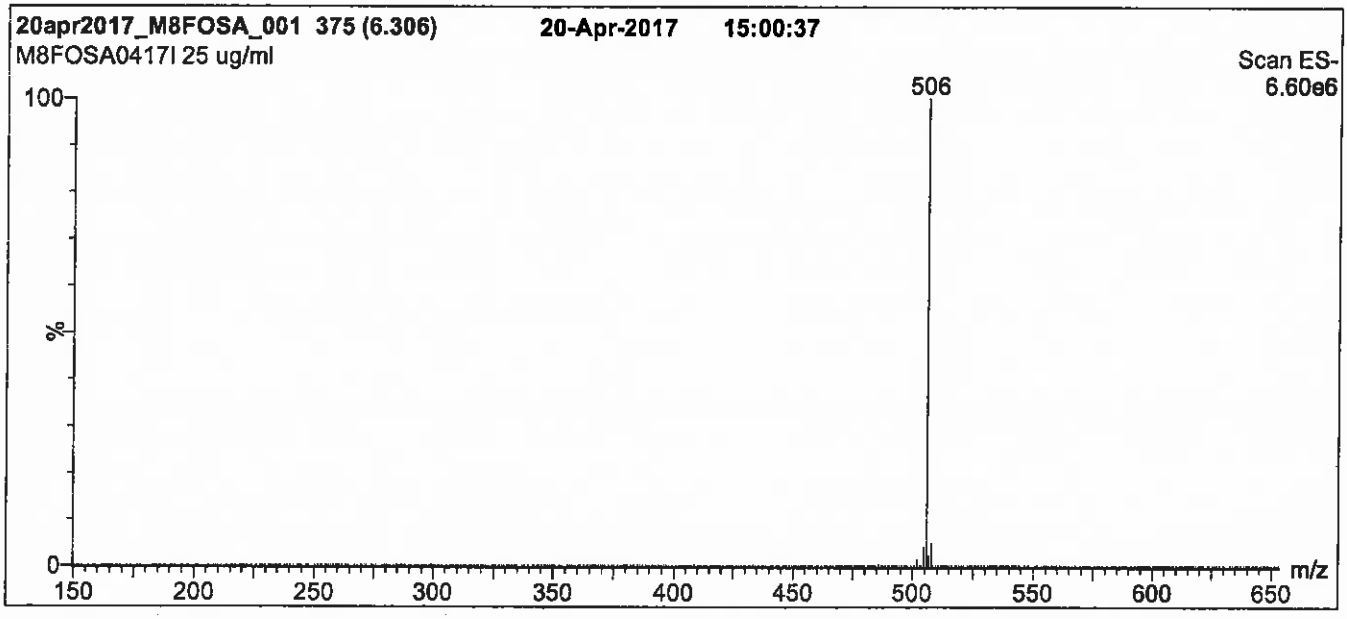
Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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

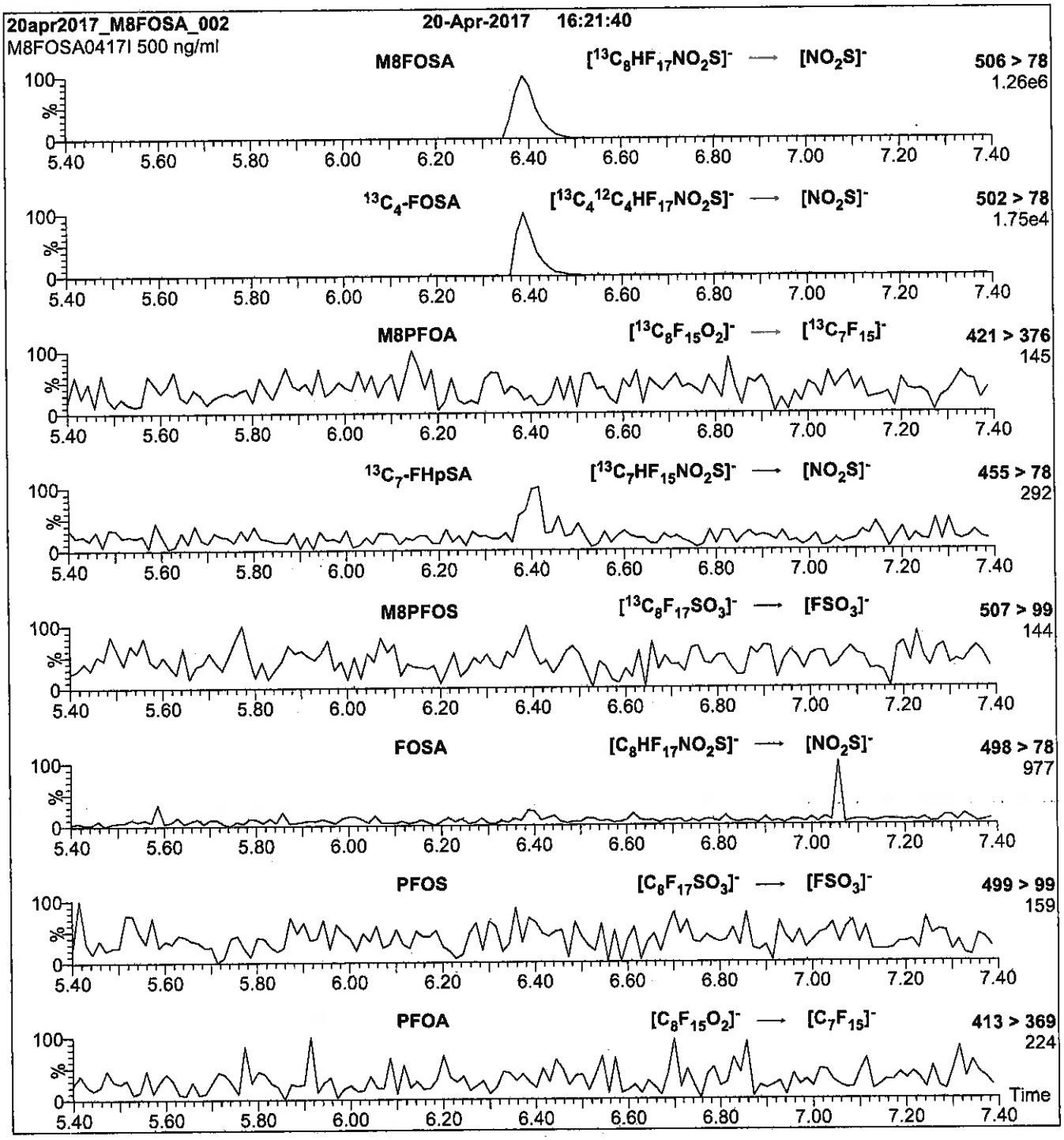
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.17e-3
Collision Energy (eV) = 30

Reagent

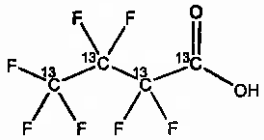
LCMPFBA_00010

rc 5/3/17 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFBA	**LOT NUMBER:**	MPFBA0516
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)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/30/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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CALA

ANAB ACCREDITED

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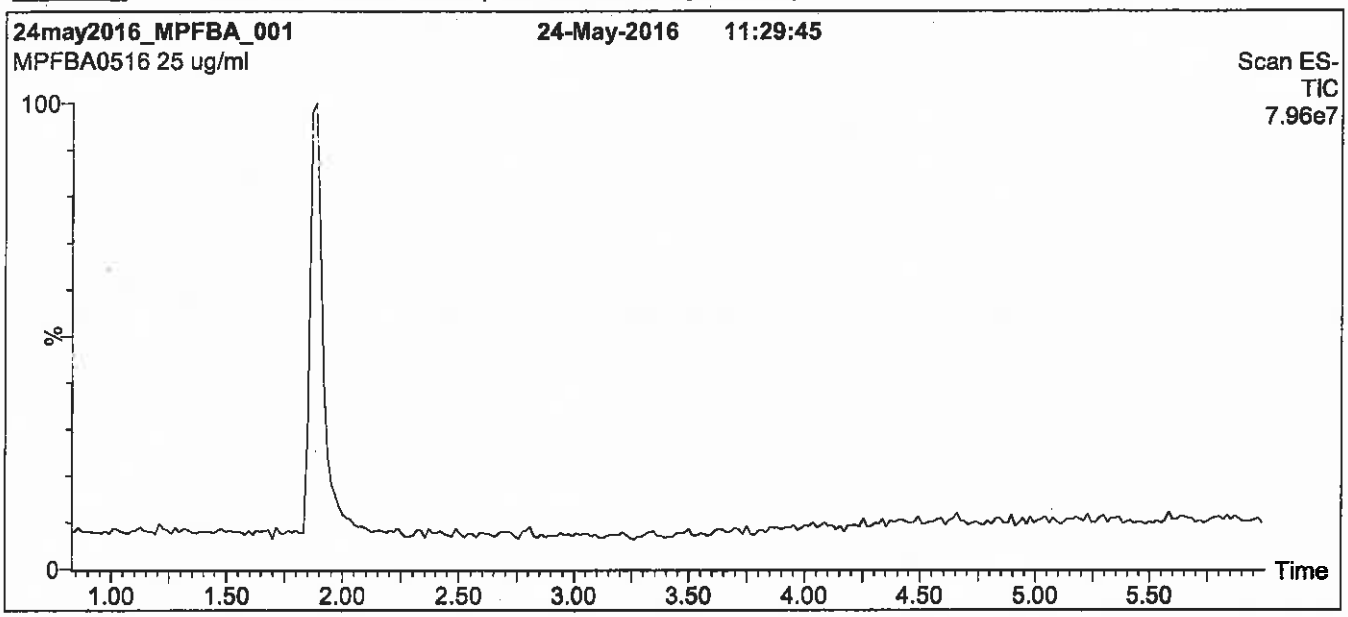
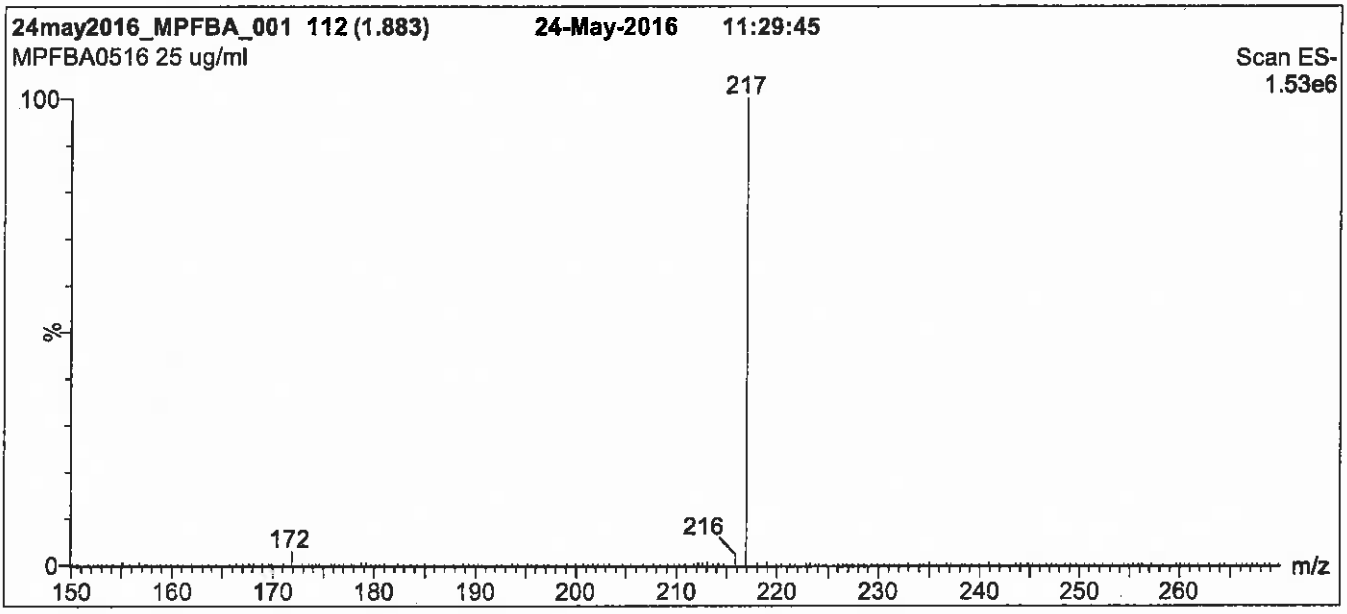
Figure 1: **MPFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

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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
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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

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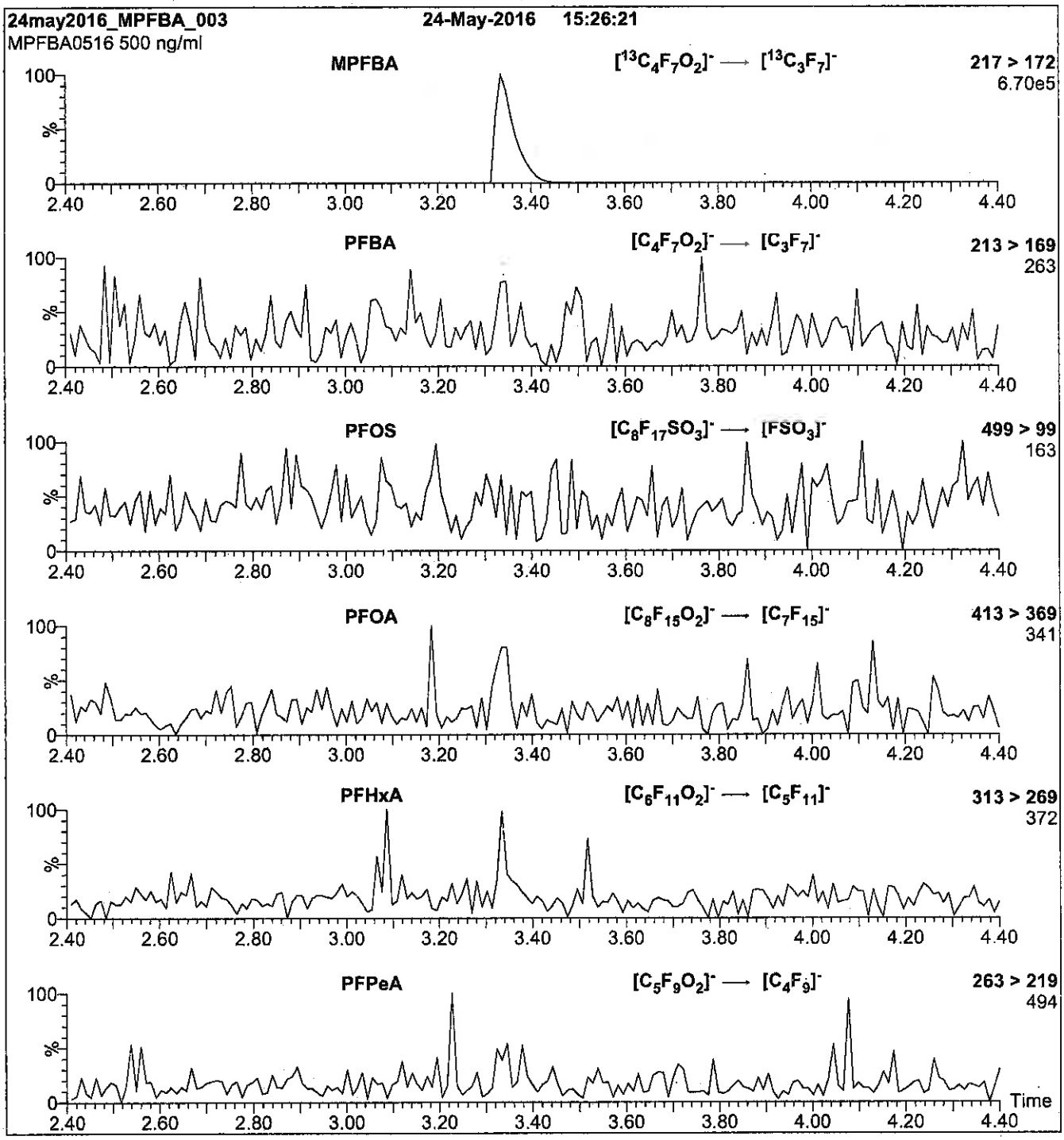
Experiment: Full Scan (150 - 850 amu)

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

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) = 3.50e-3
Collision Energy (eV) = 10

Reagent

LCMPFBA_00011

WELLINGTON LABORATORIES

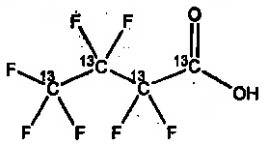
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFBA
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid

LOT NUMBER: MPFBA0417

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_4HF_7O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 218.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/12/2017
EXPIRY DATE: (mm/dd/yyyy) 04/12/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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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 $x_1, x_2, \ldots x_n$ 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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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

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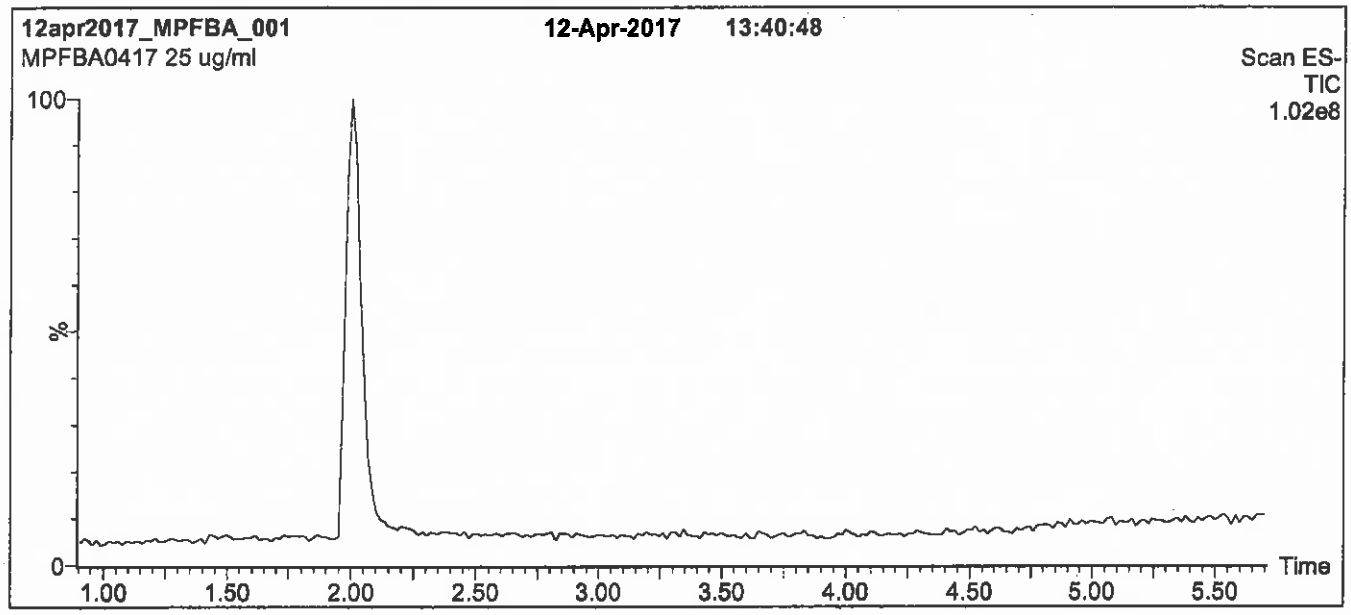
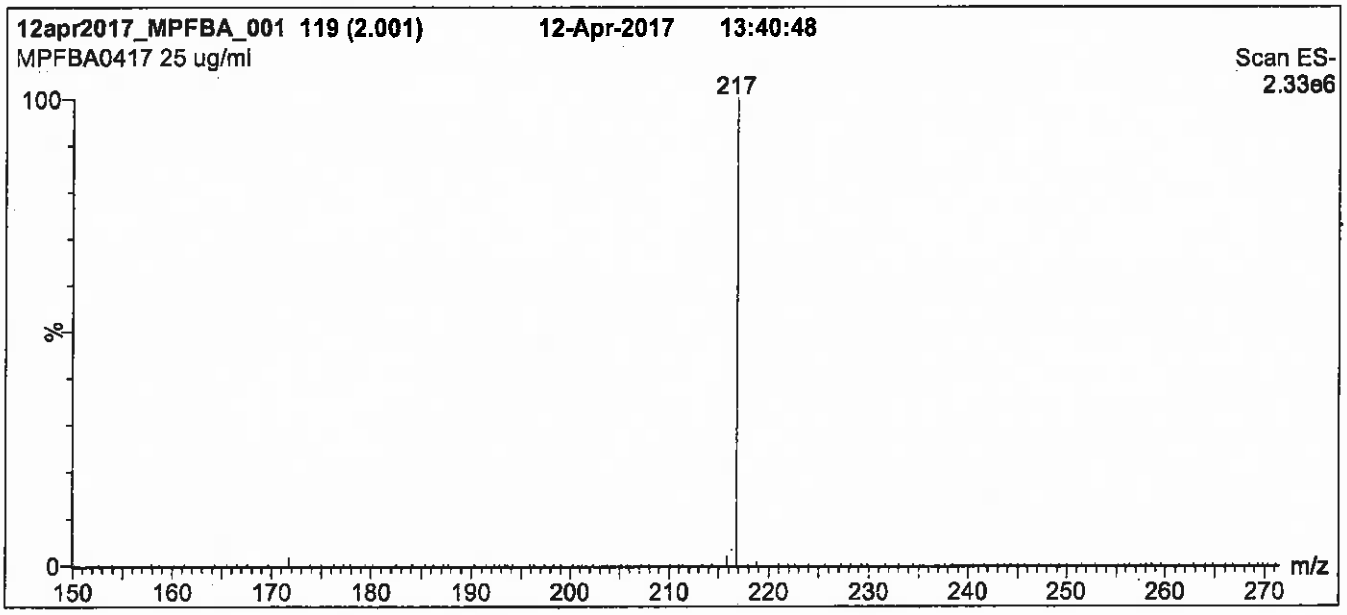
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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

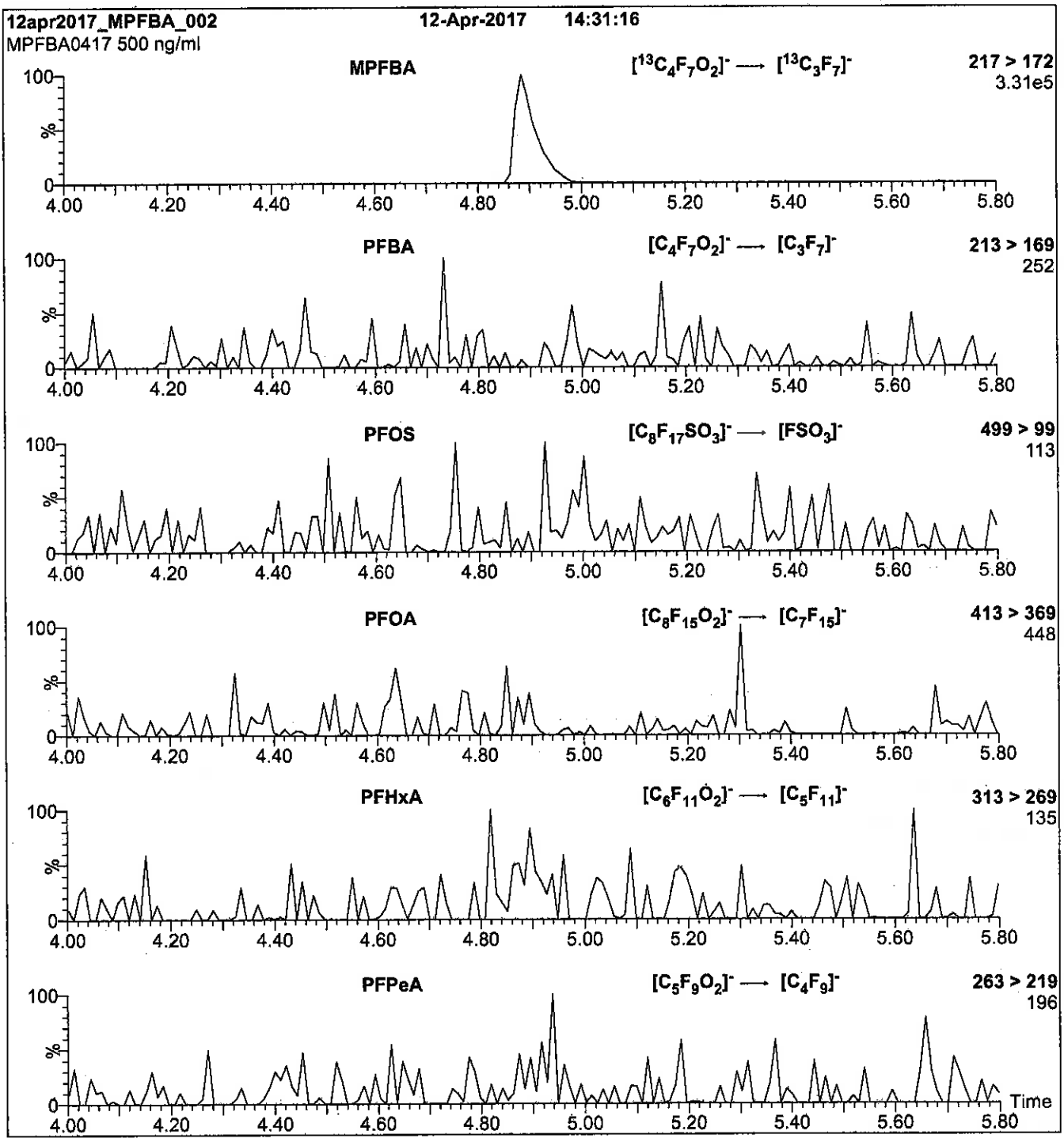
Flow: 300 µl/min

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

Figure 2: **MPFBA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFBA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

Reagent

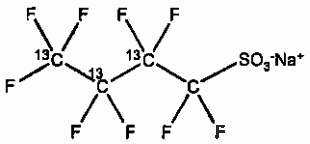
LCMPFBS_00003

r. 5/3/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M3PFBS	**LOT NUMBER:**	M3PFBS0815
COMPOUND:	Sodium perfluoro-1-[2,3,4-$^{13}C_3$]butanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}CF_9SO_3Na$	**MOLECULAR WEIGHT:**	325.06
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.5 ± 2.3 µg/ml (M3PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	08/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/02/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/05/2016 (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

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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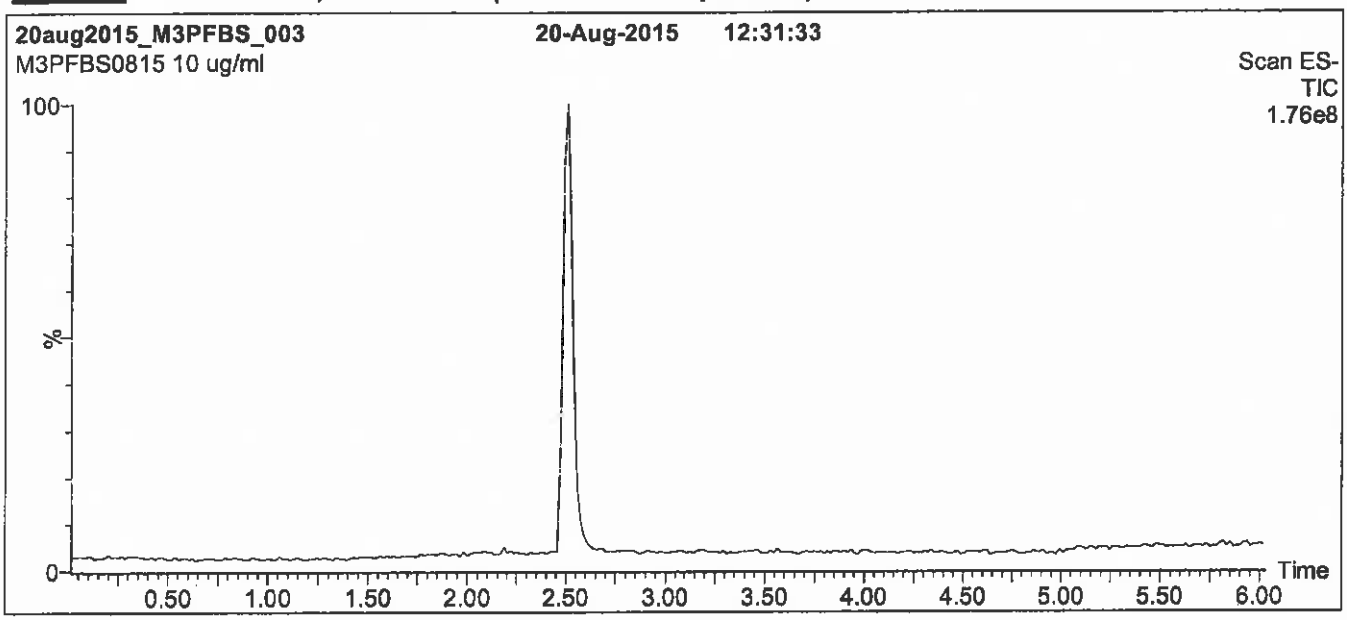
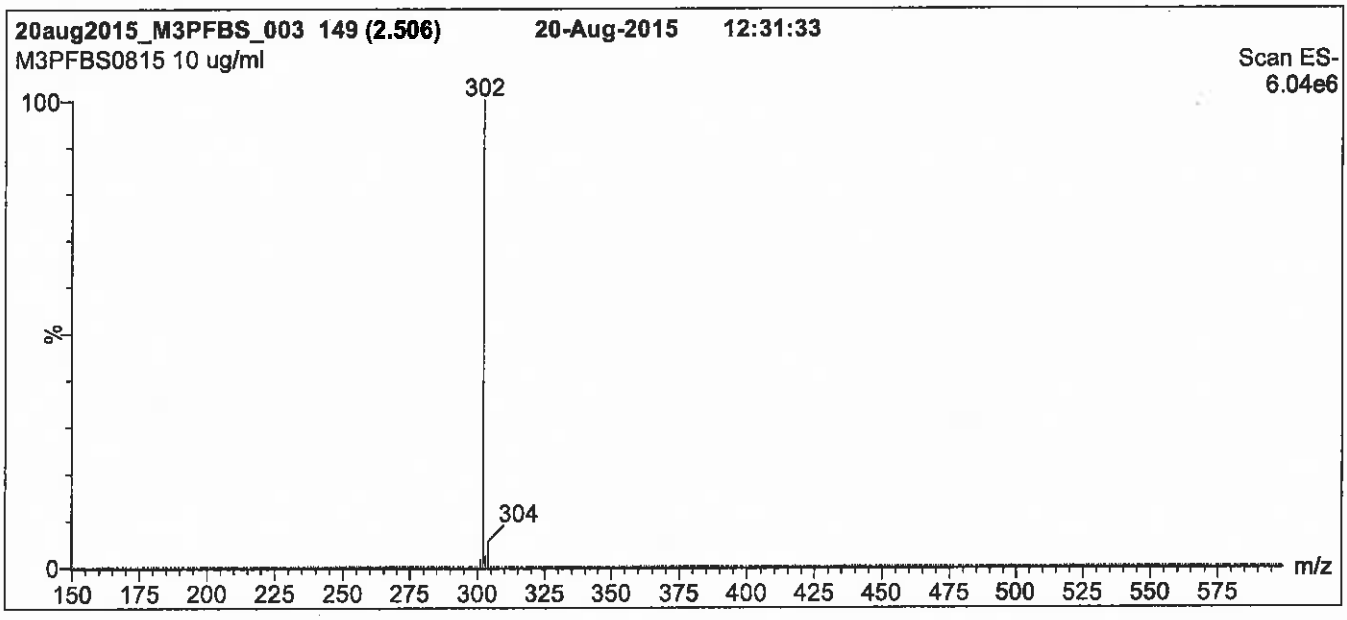
Figure 1: **M3PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

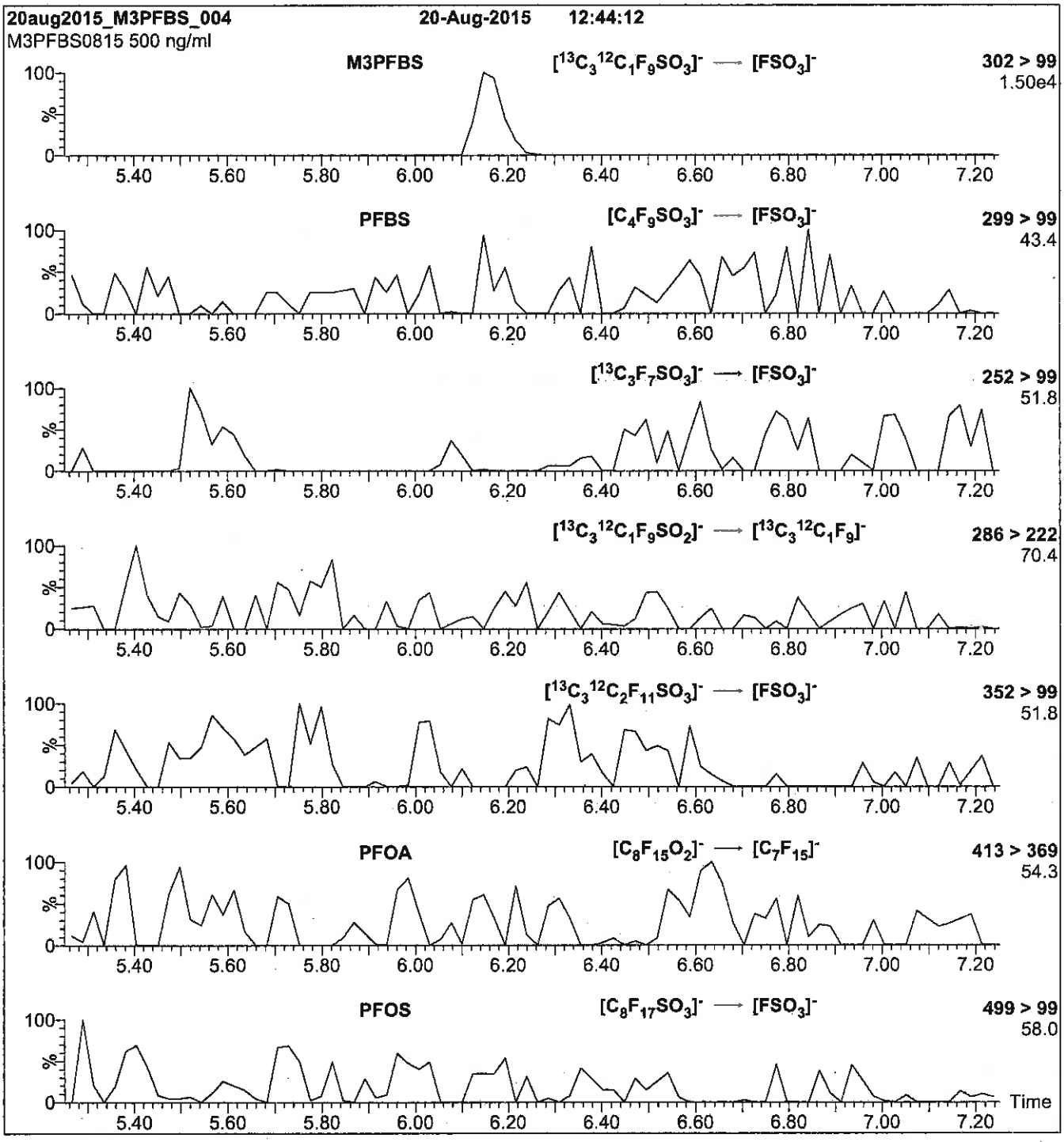
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M3PFBS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

Reagent

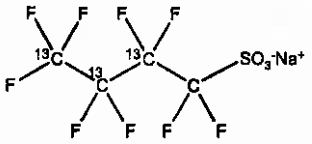
LCMPFBS_00004

r: 7152 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M3PFBS	**LOT NUMBER:**	M3PFBS0815
COMPOUND:	Sodium perfluoro-1-[2,3,4-$^{13}C_3$]butanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}CF_8SO_3Na$	**MOLECULAR WEIGHT:**	325.06
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.5 ± 2.3 µg/ml (M3PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	05/24/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/25/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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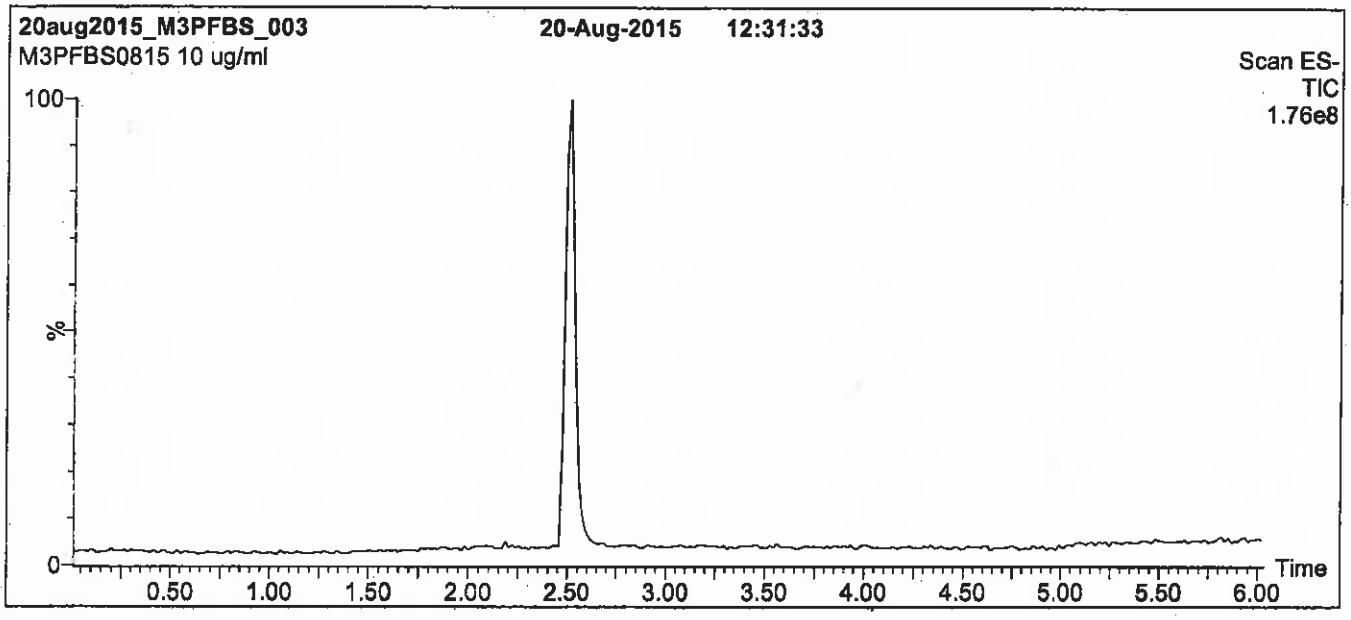
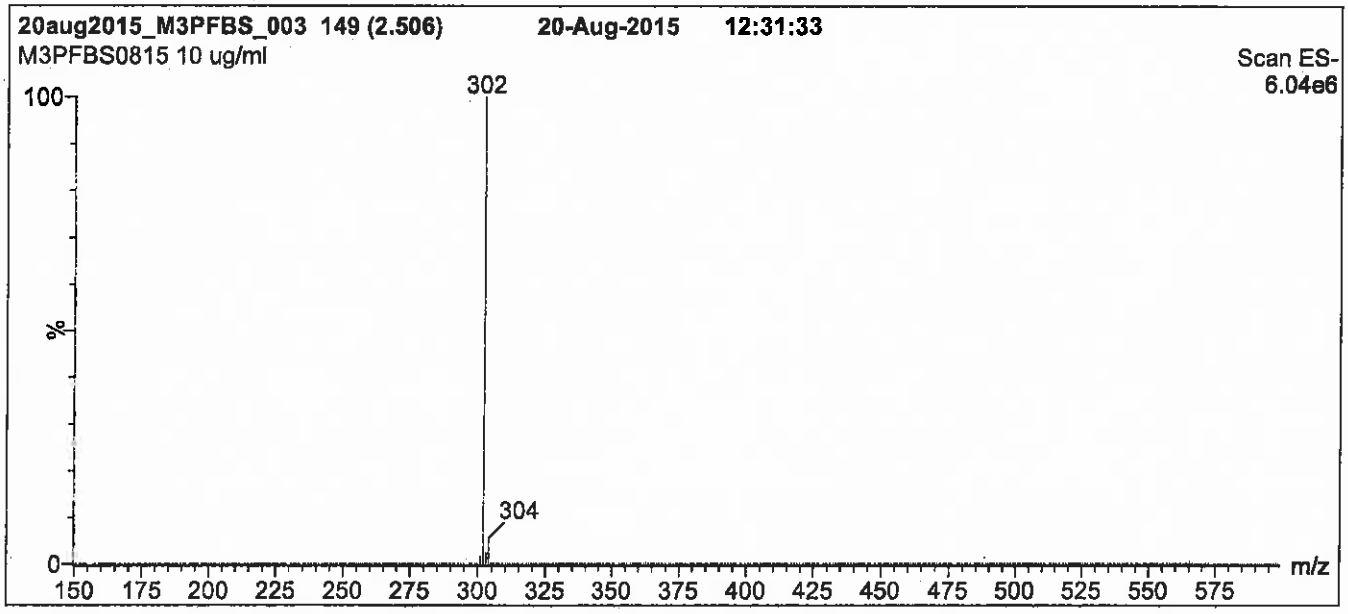
Figure 1: **M3PFBS; LC/MS Data (TIC and Mass Spectrum)**





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LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

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Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

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Start: 40% (80:20 MeOH:ACN) / 60% H_2O
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Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

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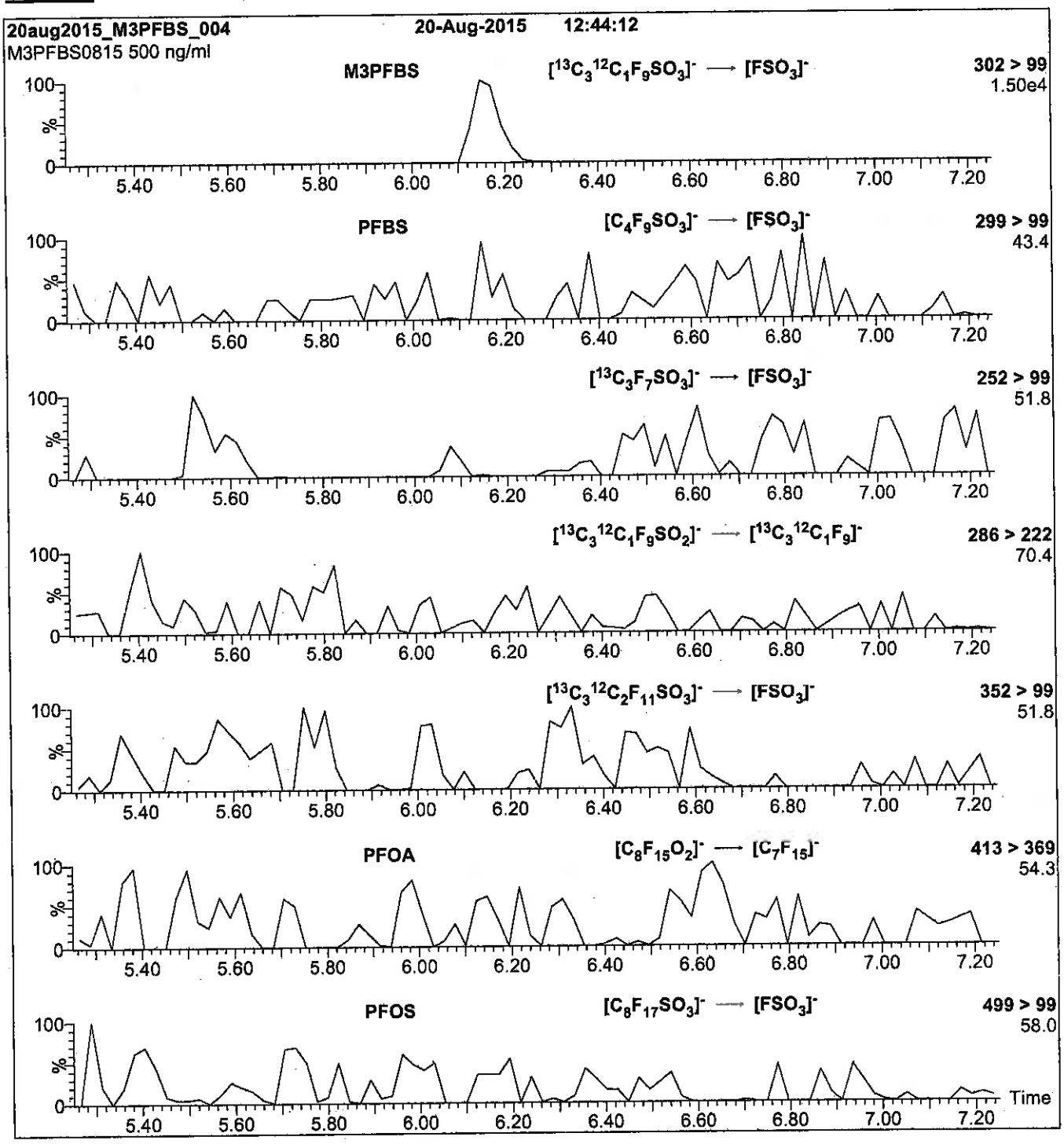
Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M3PFBS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

Reagent

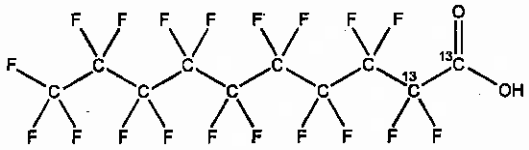
LCMPFDA_00015

P: 5/3/17-SKV
S: 5/8/17-SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFDA	**LOT NUMBER:**	MPFDA0916
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid		
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)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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HOMOGENEITY:

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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.

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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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CALA

ANAB ACCREDITED

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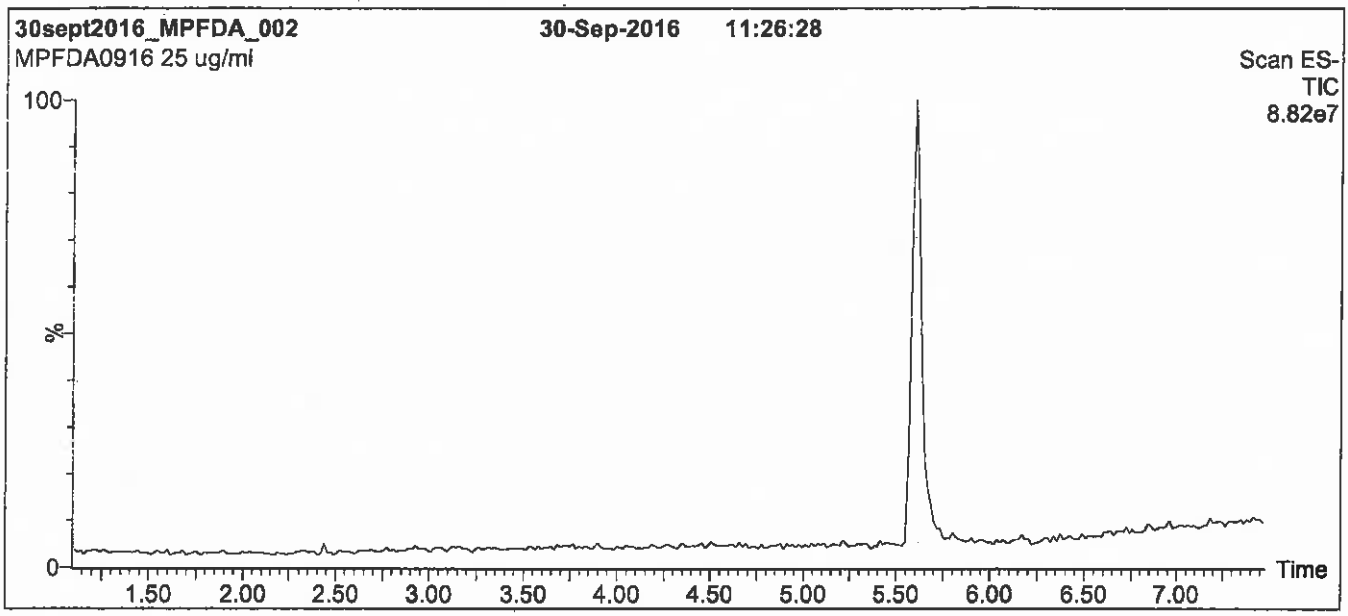
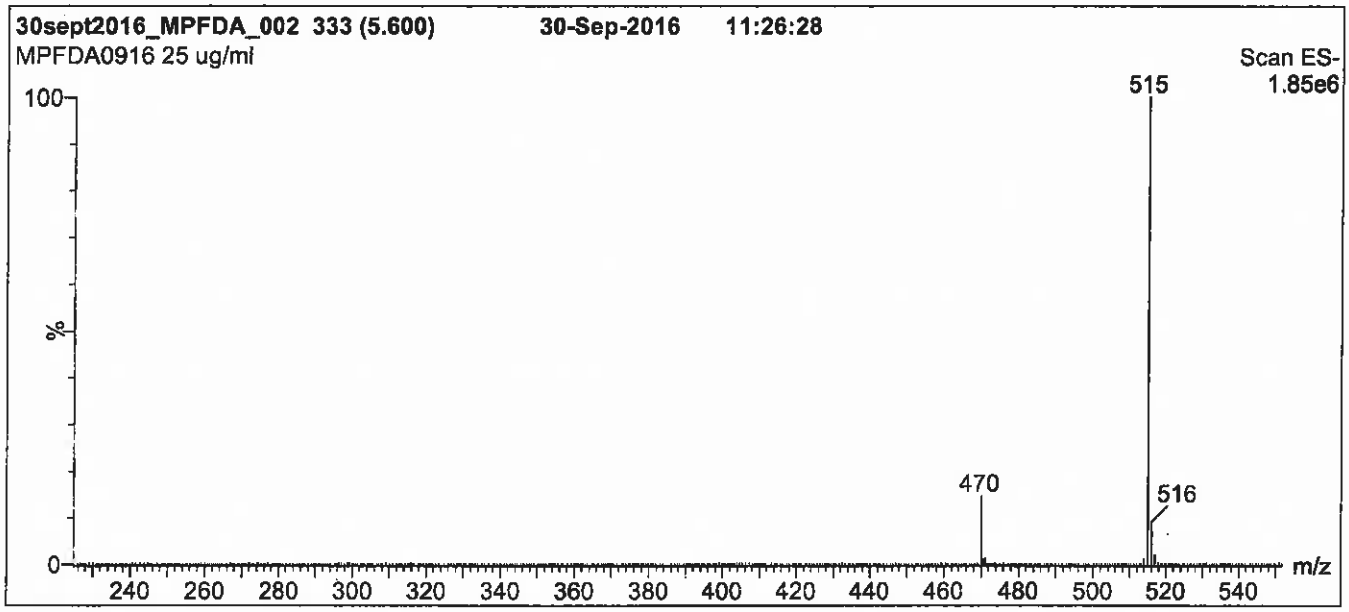
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

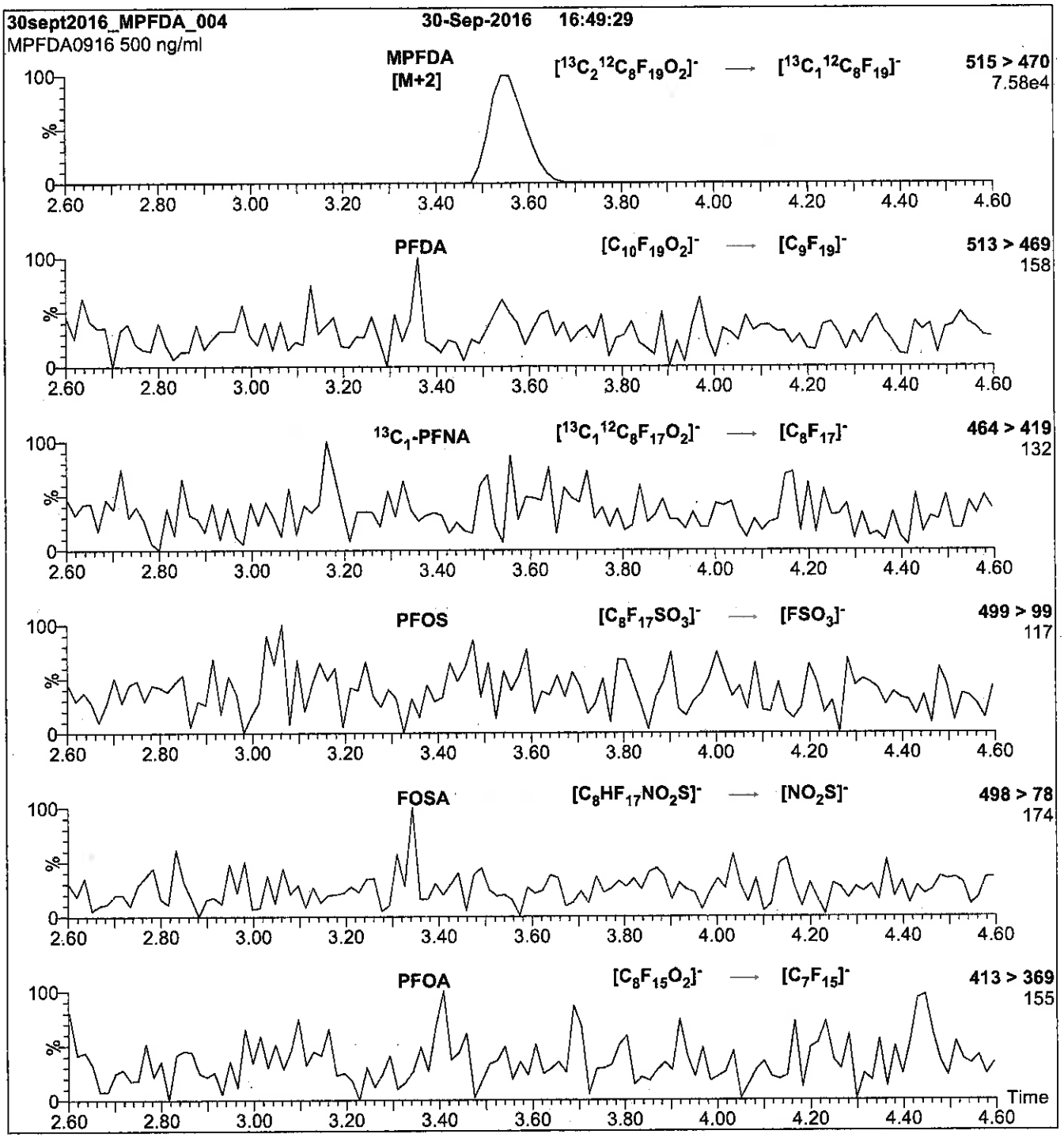
Flow: 300 µl/min

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

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) = 3.31e-3
Collision Energy (eV) = 13

Reagent

LCMPFDA_00016

r: 7/5/17 SRV

WELLINGTON LABORATORIES

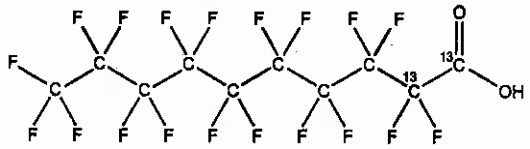
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

LOT NUMBER: MPFDA0916

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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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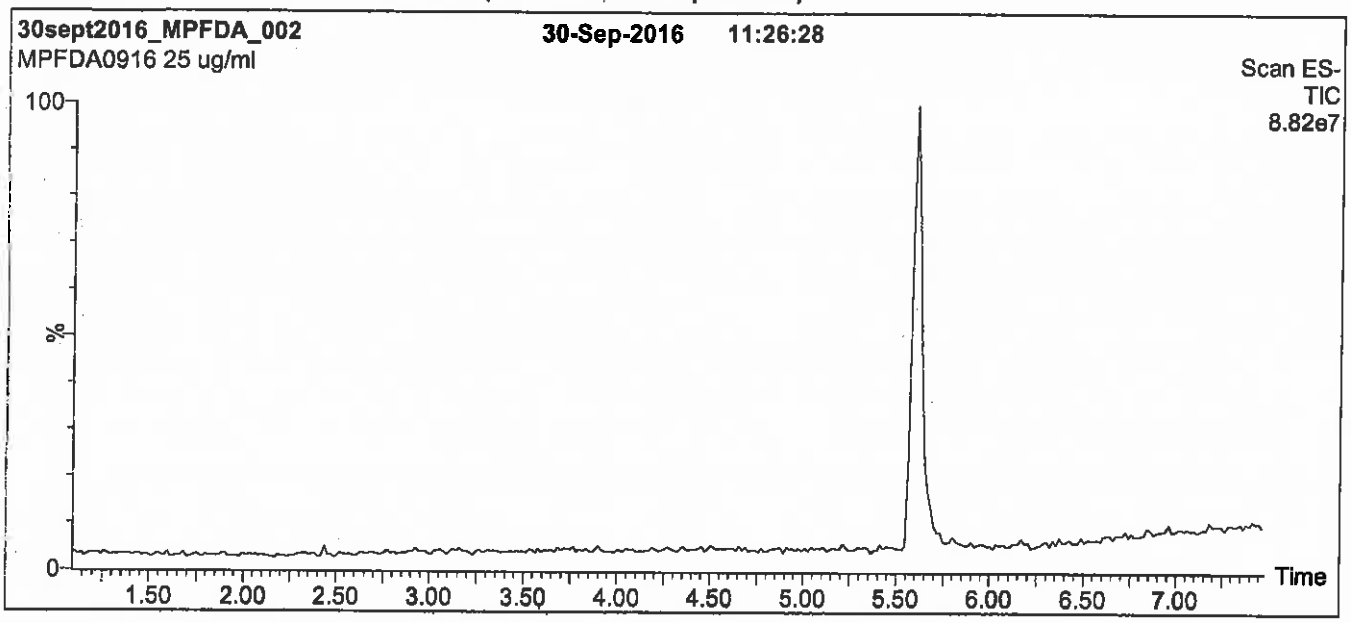
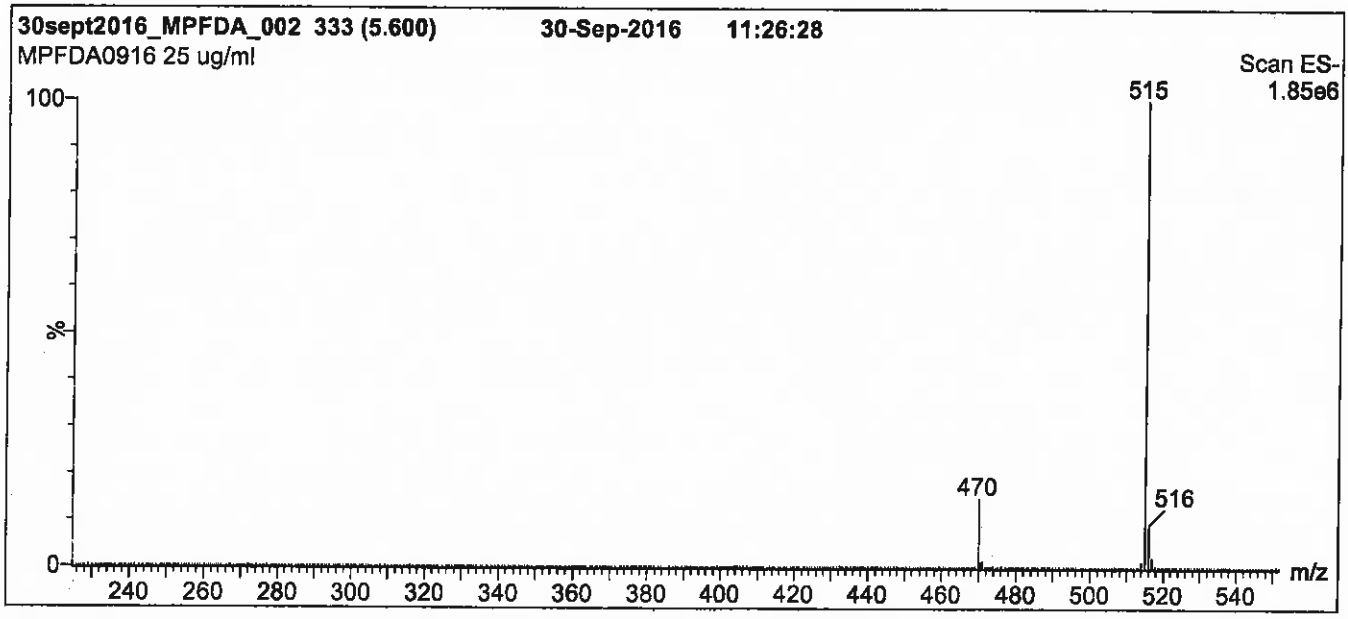
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

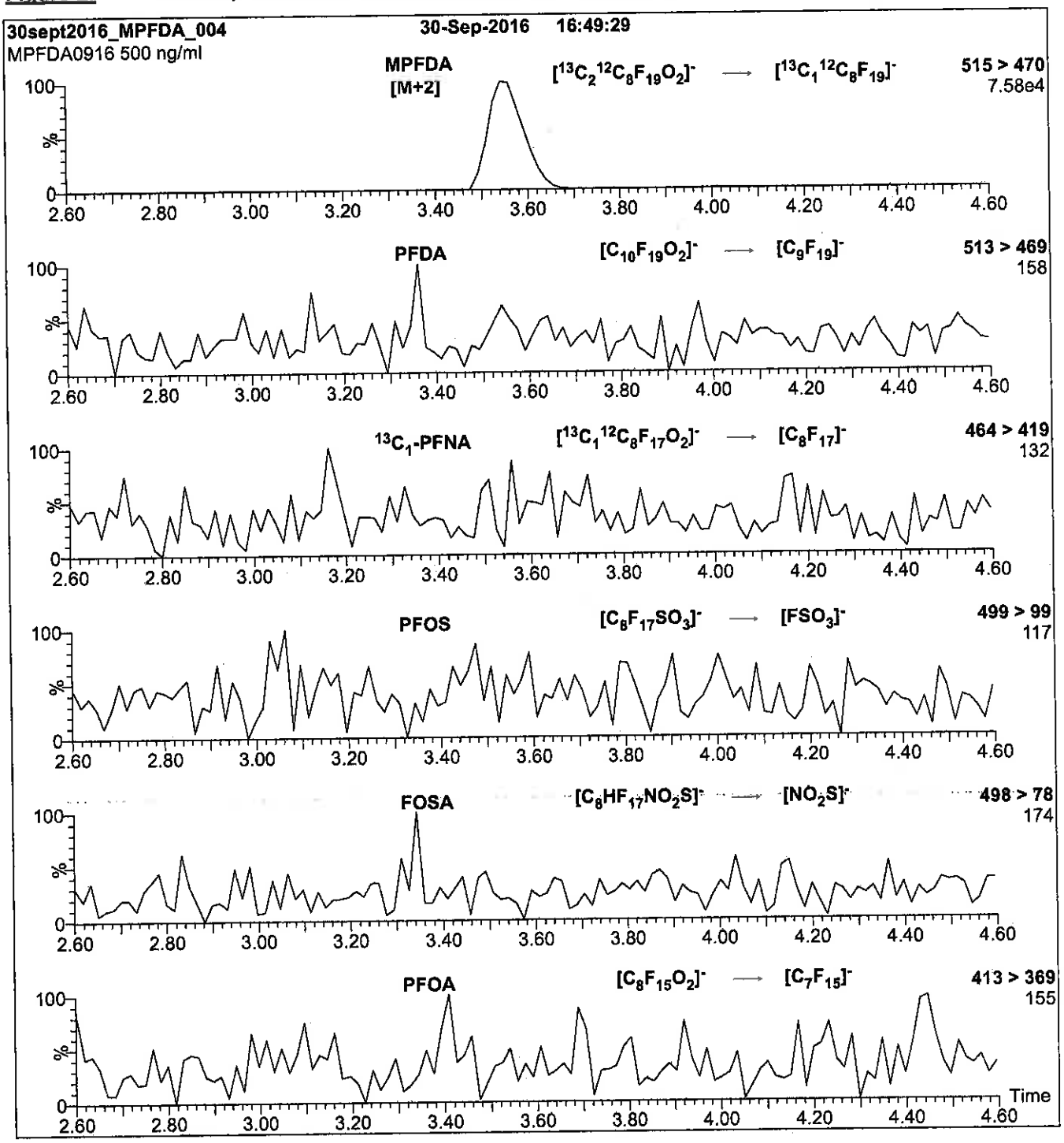
Flow: 300 µl/min

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

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) = 3.31e-3
Collision Energy (eV) = 13

Reagent

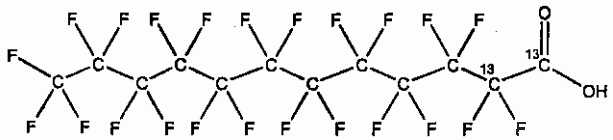
LCMPFDoA_00010

r: 5/3/19 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFDoA	**LOT NUMBER:**	MPFDoA0416
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	04/08/2016		
EXPIRY DATE: (mm/dd/yyyy)	04/08/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ B.G. Chittim **Date:** 04/15/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

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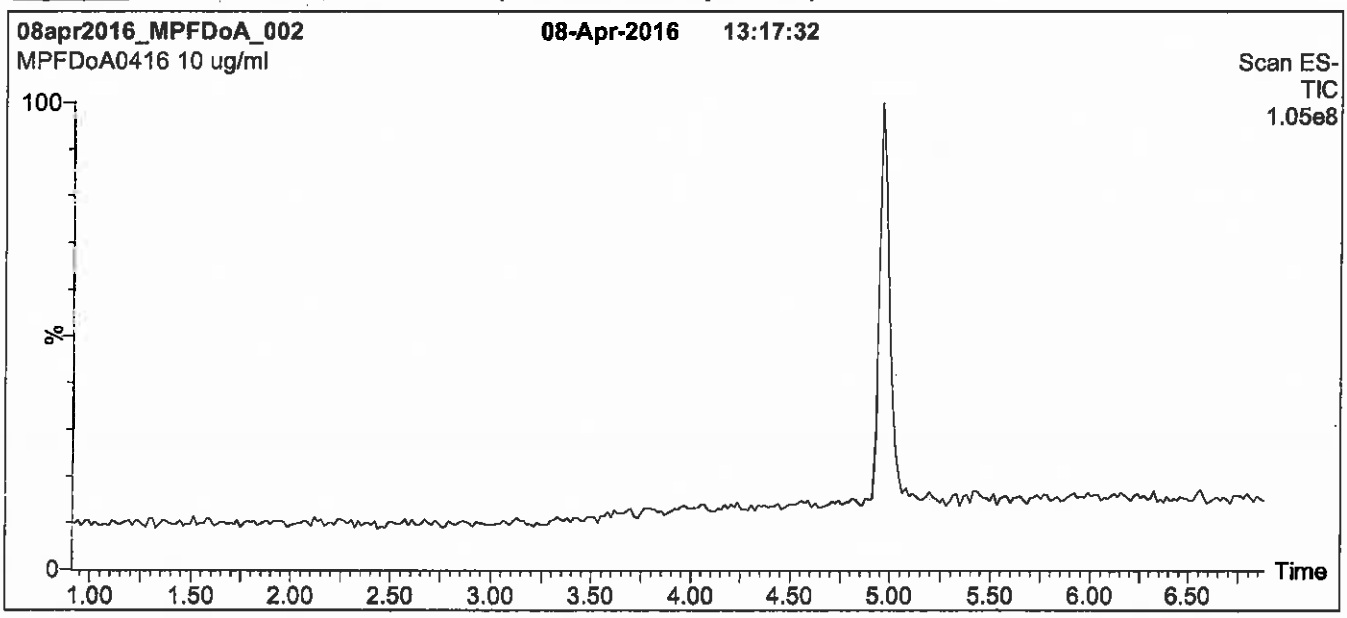
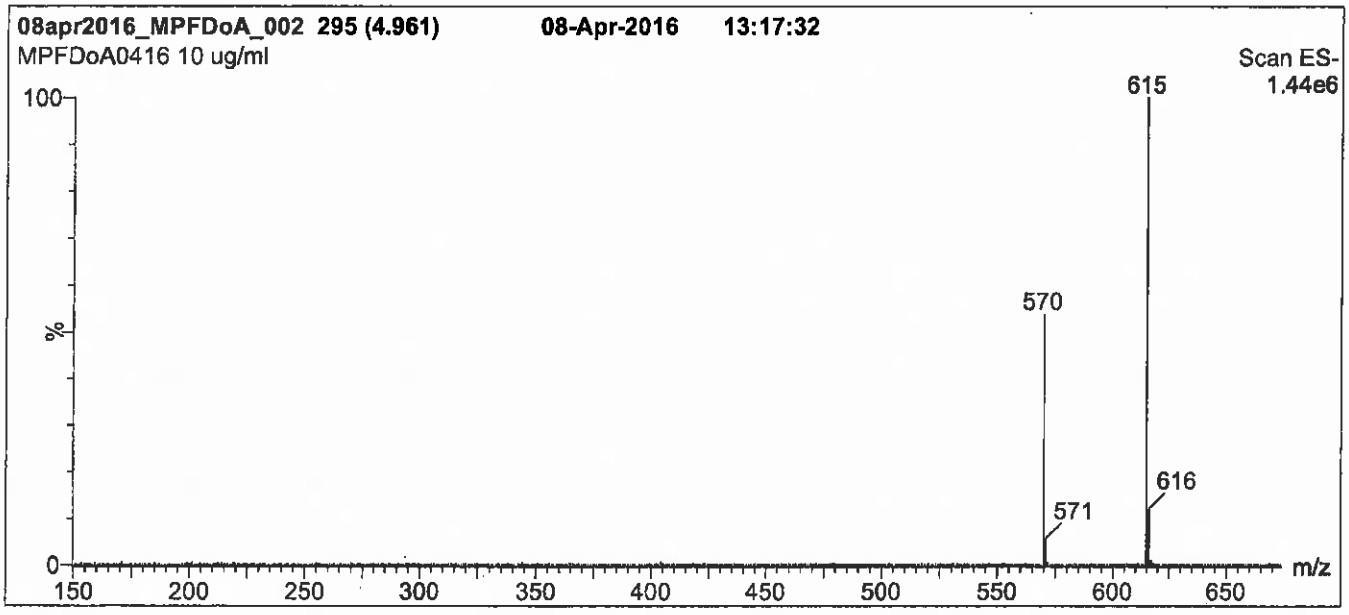
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

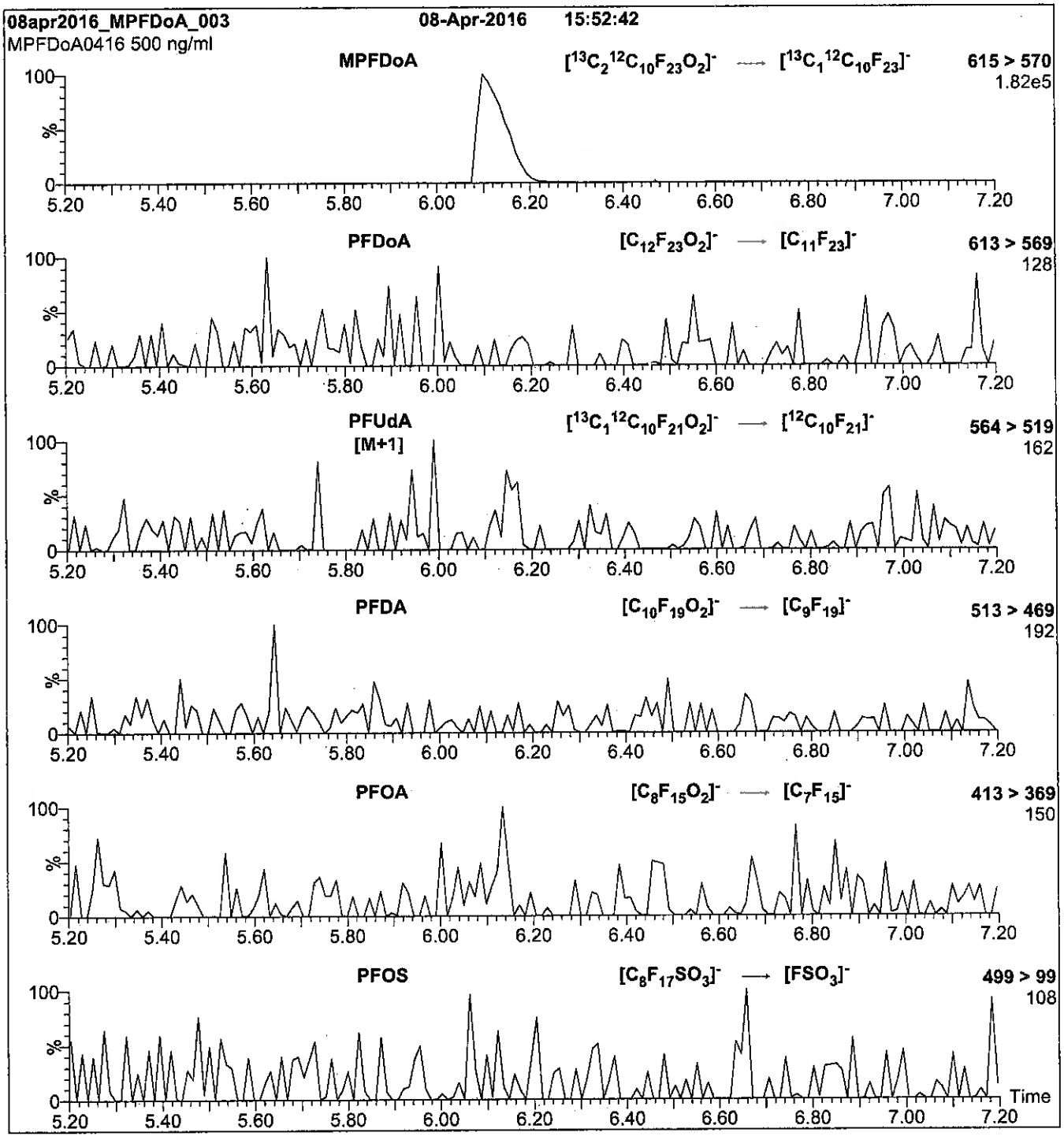
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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) = 3.24e-3
Collision Energy (eV) = 13

Reagent

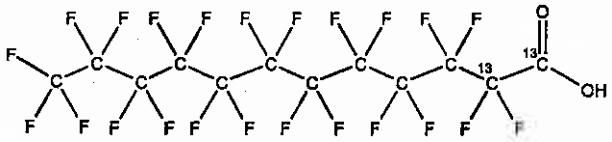
LCMPFDoA_00011

r: 7/5/17 SD/

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFDoA	**LOT NUMBER:**	MPFDoA0517
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	05/23/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/23/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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ADDITIONAL INFORMATION:

- See page 2 for further details.
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Certified By: _____ **Date:** 05/26/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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:

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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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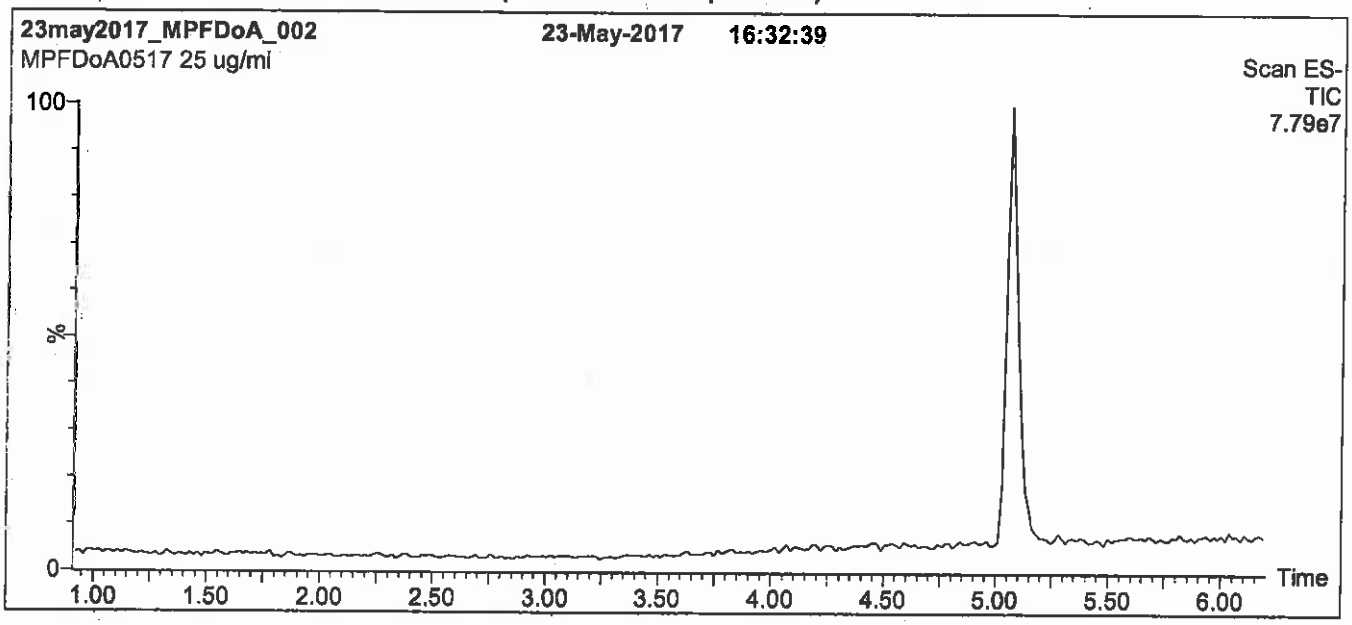
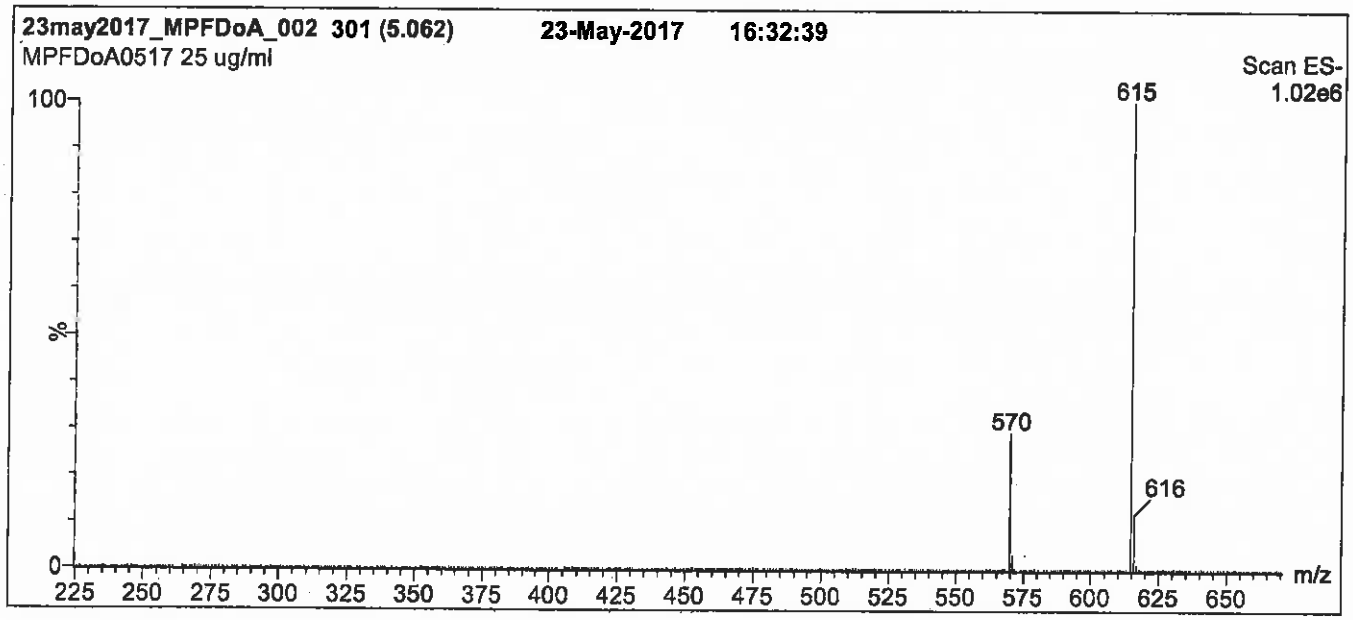
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

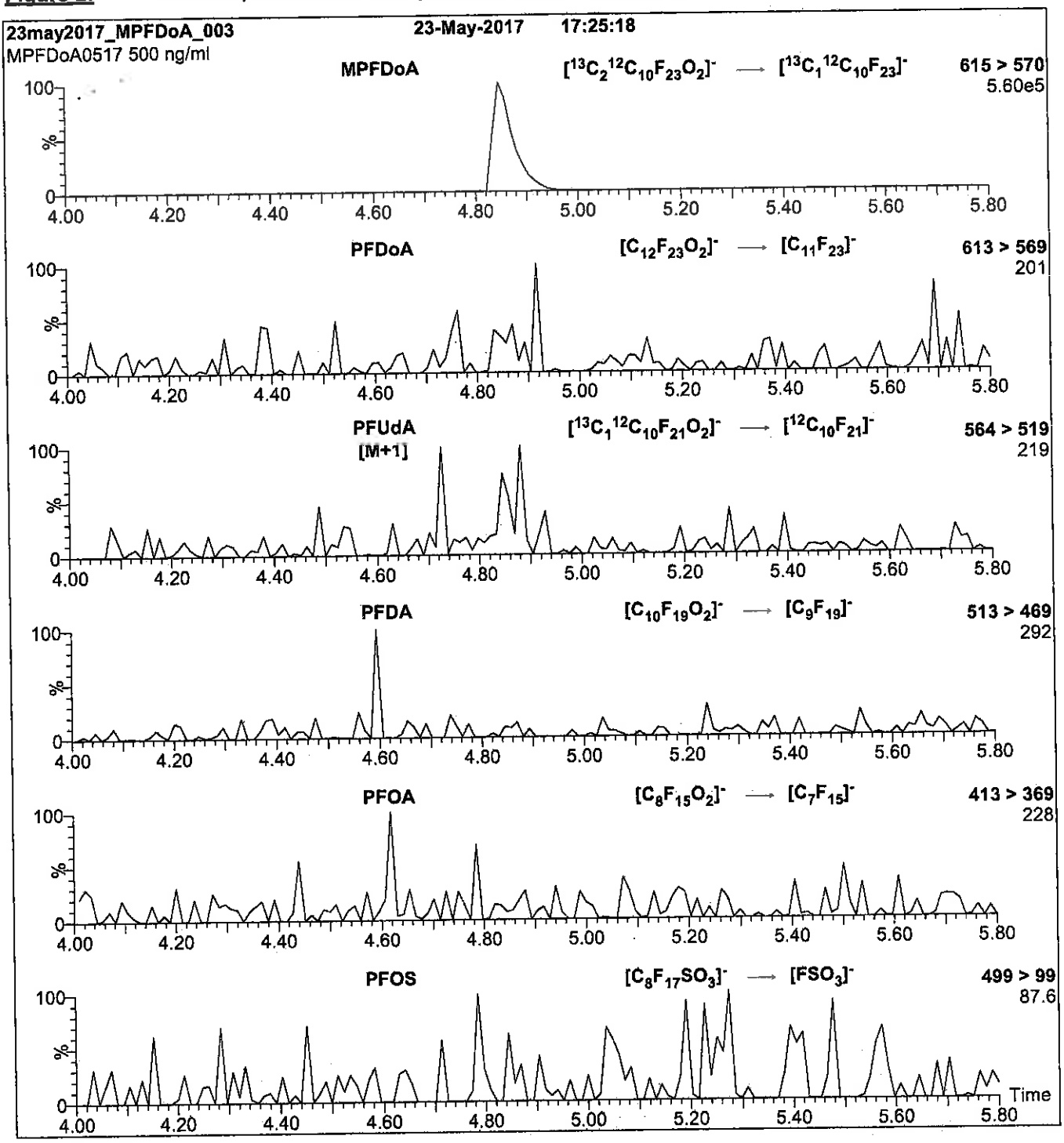
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **MPFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

Reagent

LCMPFHxA_00016

r: 5/3/17 SKV
s: 5/8/17 SKV

WELLINGTON LABORATORIES

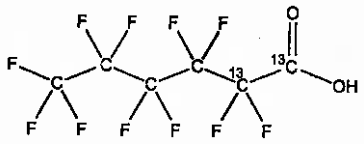
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid

LOT NUMBER: MPFHxA1116

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_4HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 316.04
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
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

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of perfluoro-n-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

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Certified By: B.G. Chittim **Date:** 12/13/2016 (mm/dd/yyyy)

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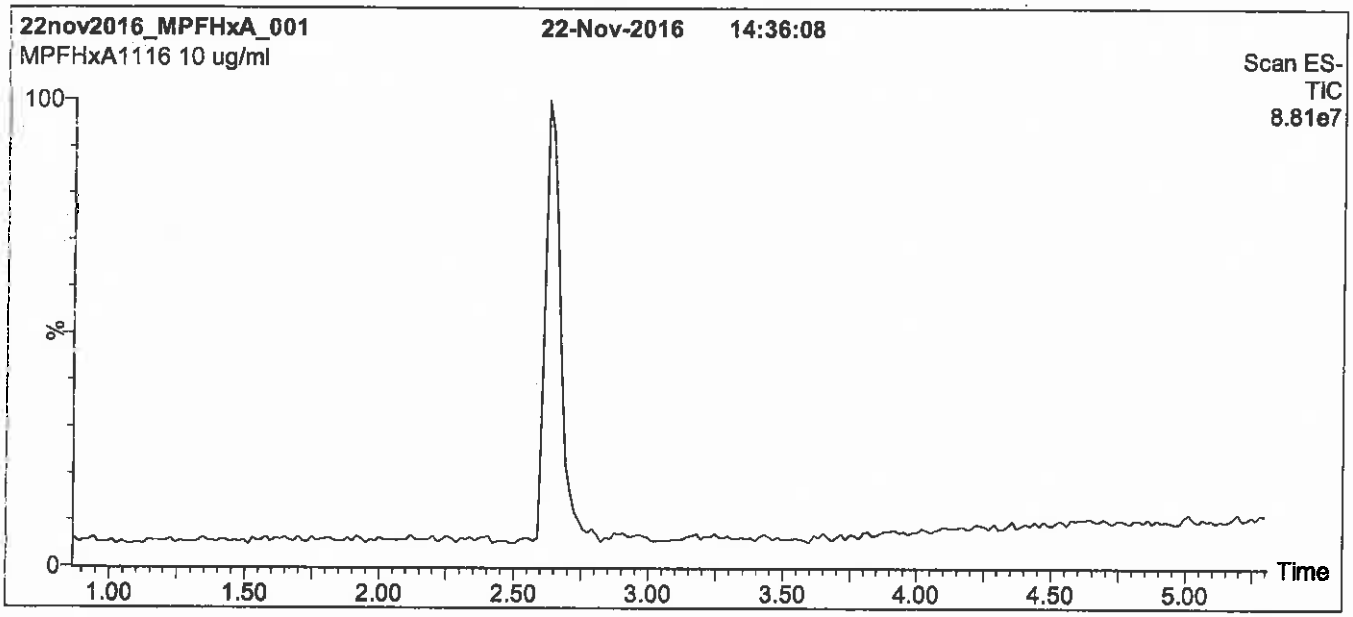
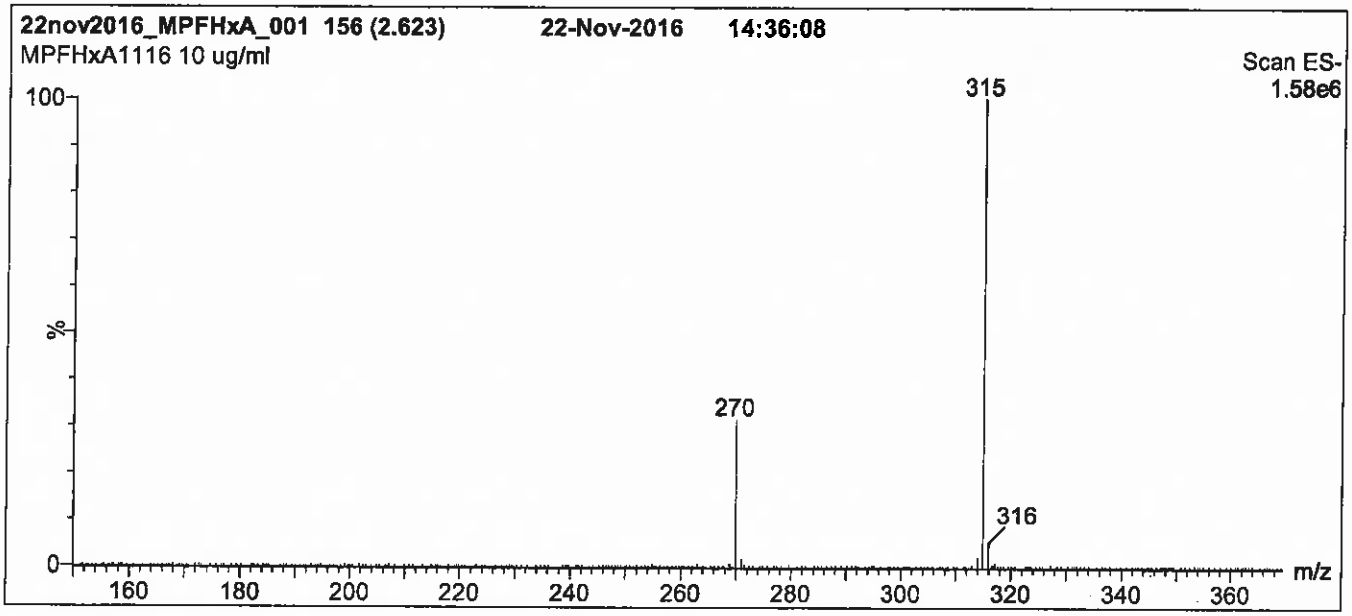




Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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

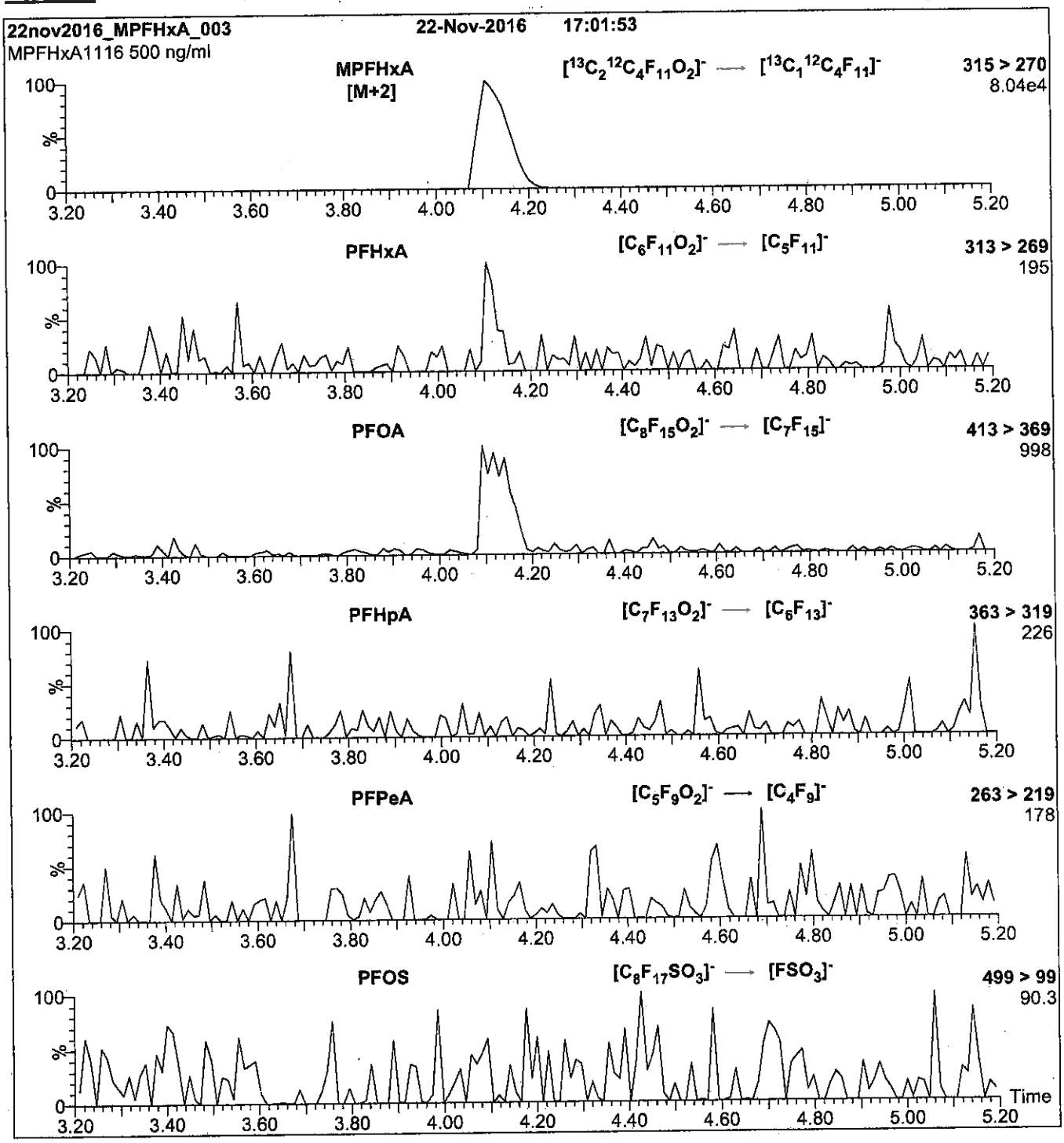
Flow: 300 µl/min

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

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) = 3.46e-3
Collision Energy (eV) = 10

Reagent

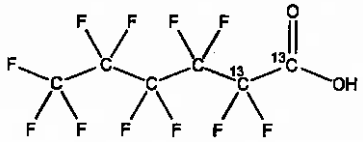
LCMPFHxA_00017

r: 7/5/17 sol

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFHxA	**LOT NUMBER:**	MPFHxA1116
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4HF_{11}O_2$	**MOLECULAR WEIGHT:**	316.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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ADDITIONAL INFORMATION:

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CALA

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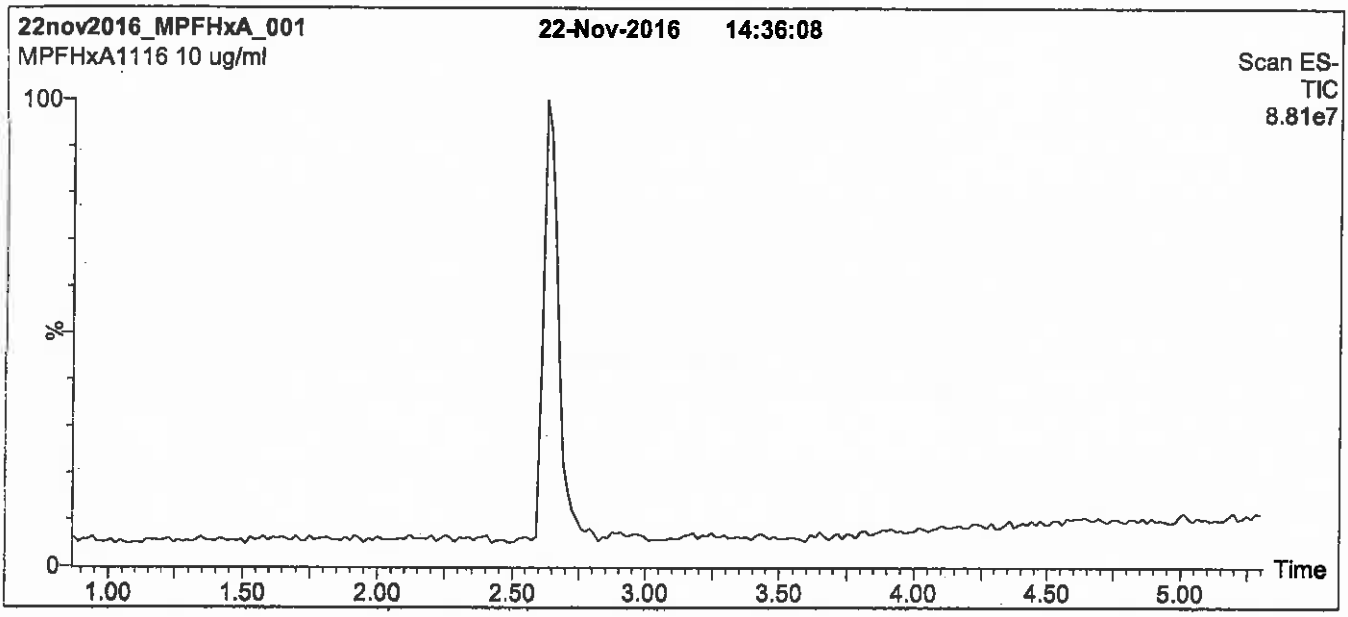

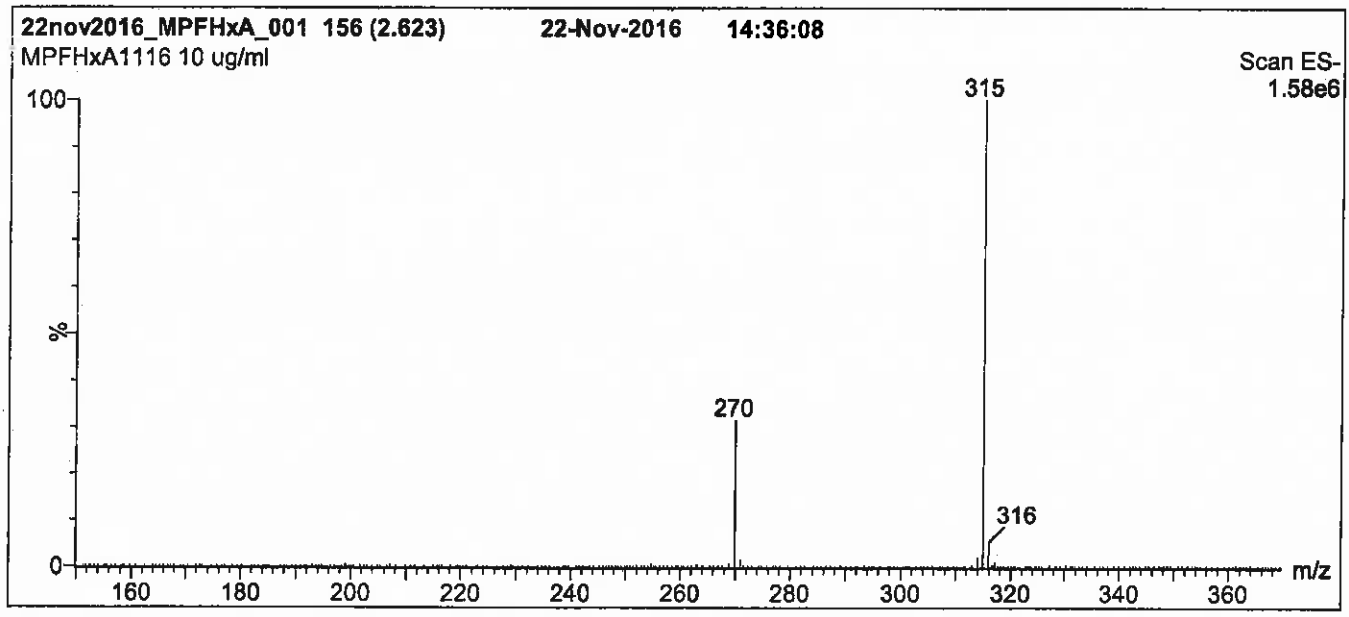

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
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Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions over 0.5 min.
Time: 10 min

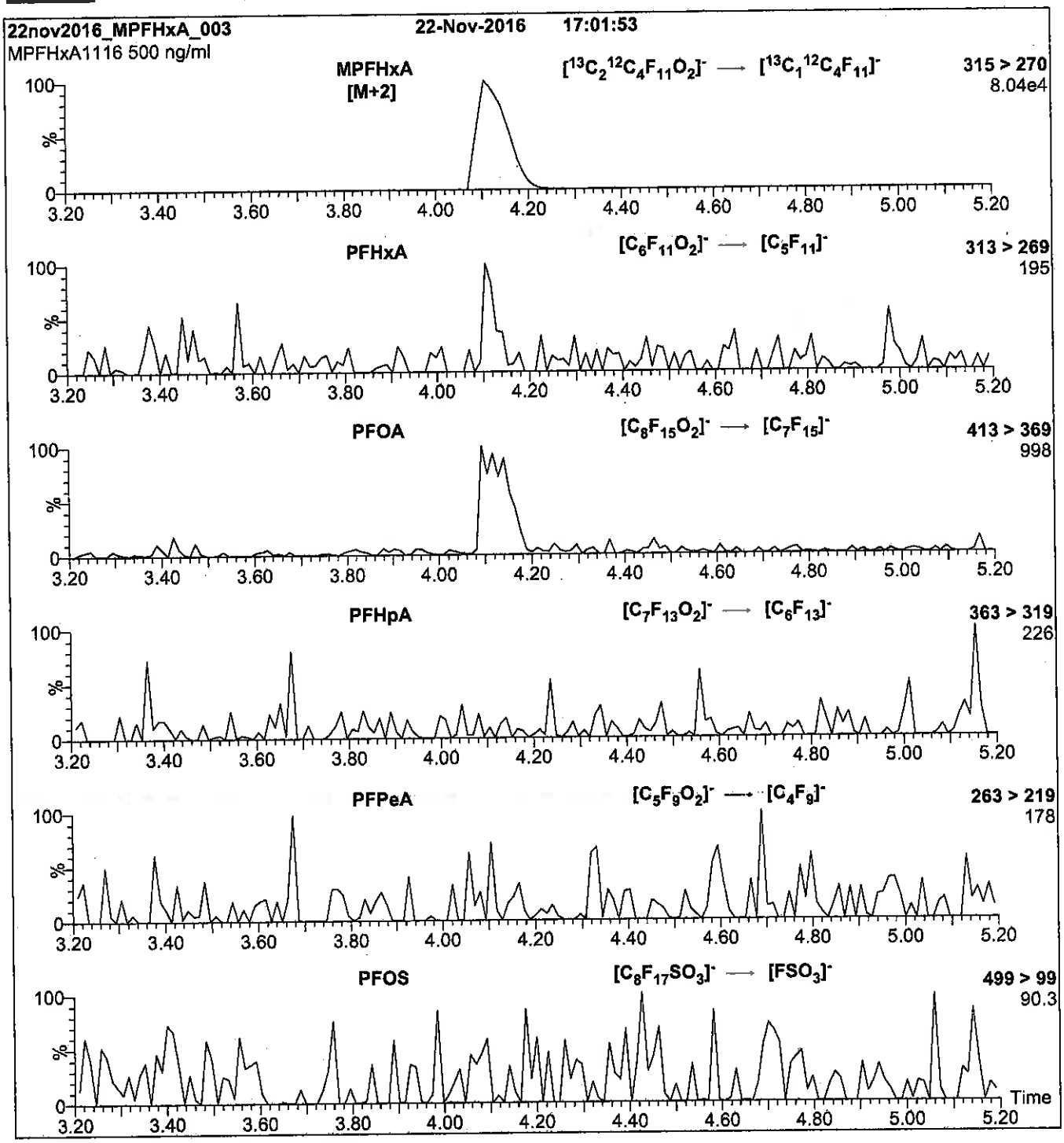
Flow: 300 µl/min

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

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) = 3.46e-3
Collision Energy (eV) = 10

Reagent

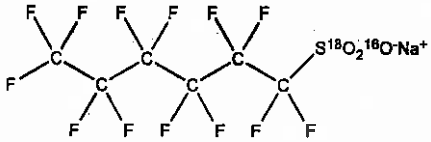
LCMPFHxS_00010

r: 5/3/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFHxS	**LOT NUMBER:**	MPFHxS0217
COMPOUND:	Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_8F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_8F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_8F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Contains ~ 1.0% of sodium perfluoro-1-octane[$^{18}O_2$]sulfonate ($^{18}O_2$-PFOS).
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

ANAB

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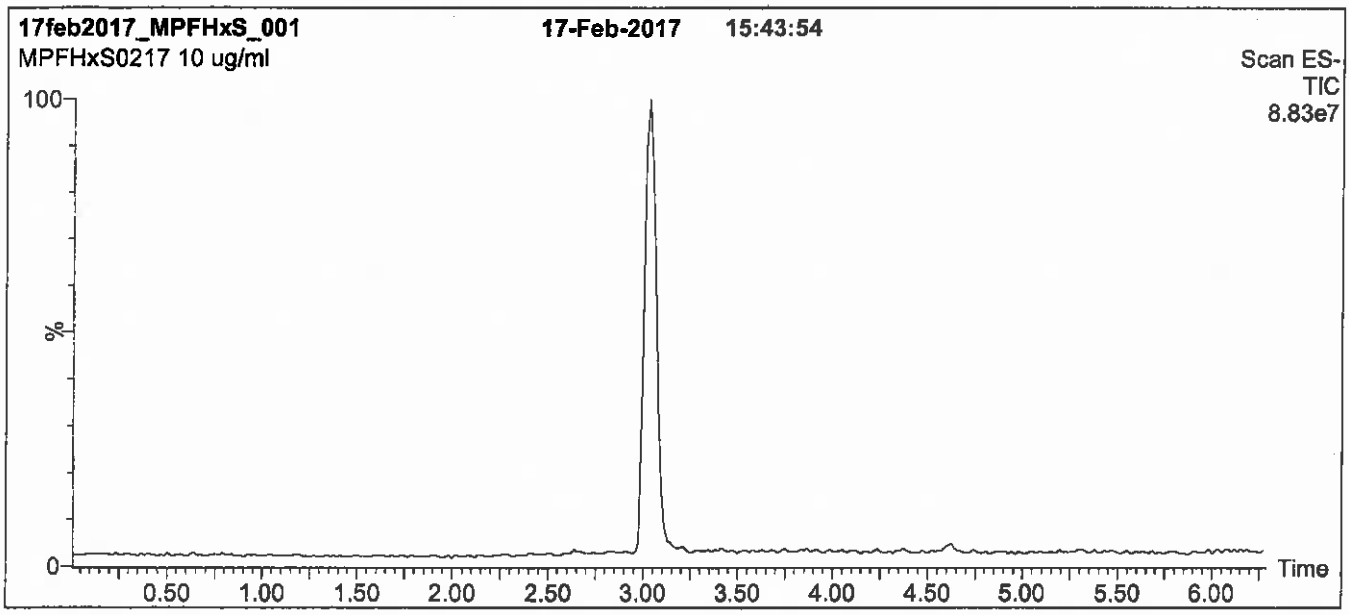
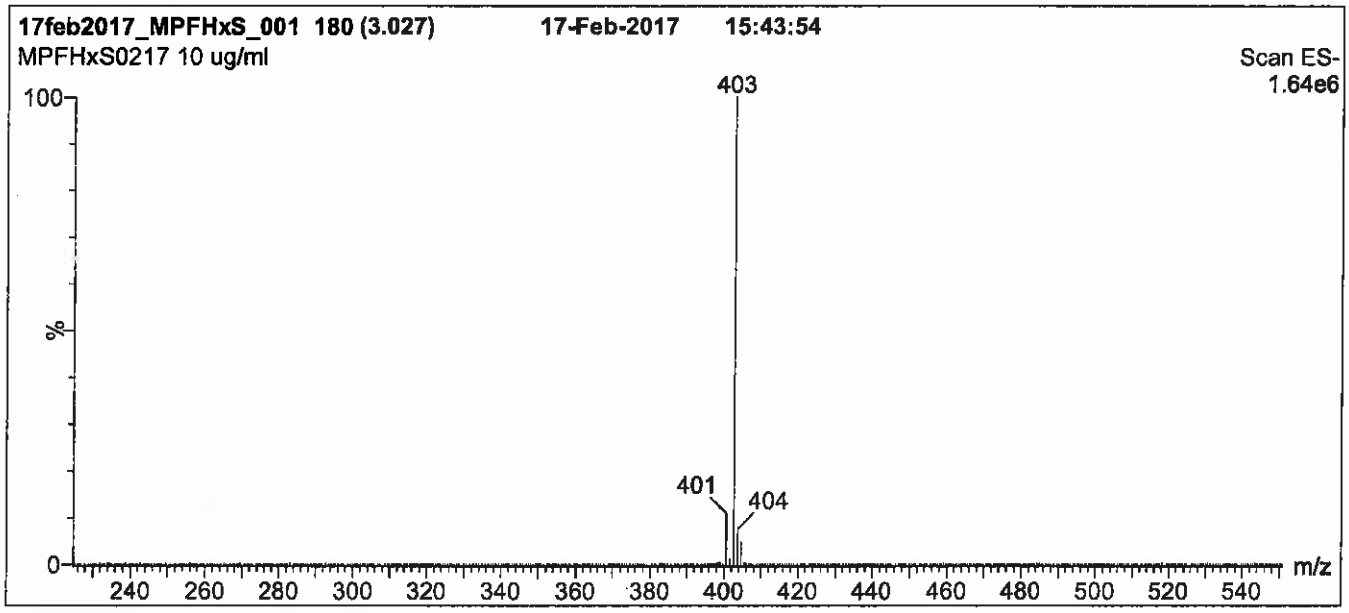
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

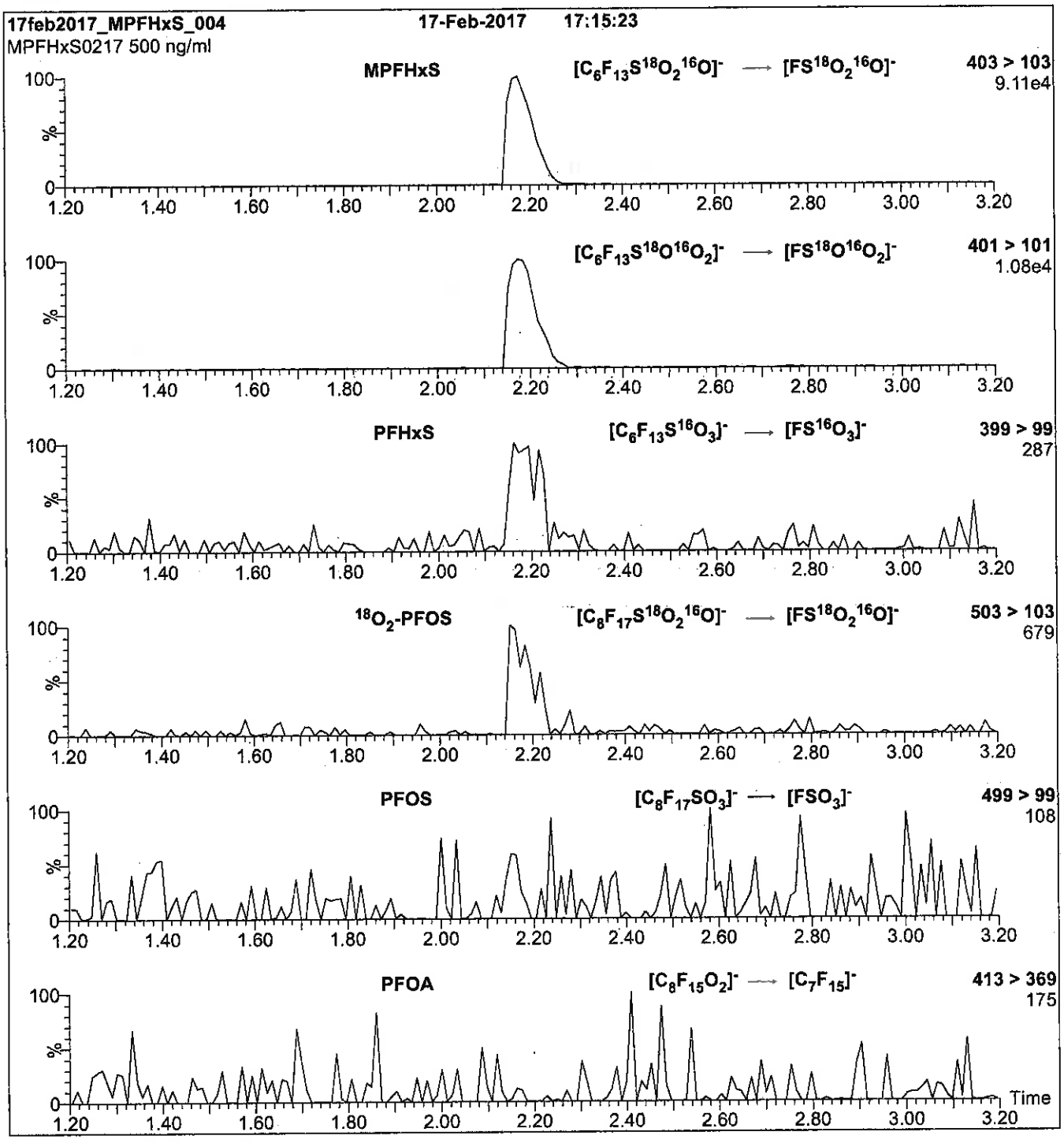
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **MPFHxS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

Reagent

LCMPFHxS_00011

P: 7/5/17 SW

WELLINGTON LABORATORIES

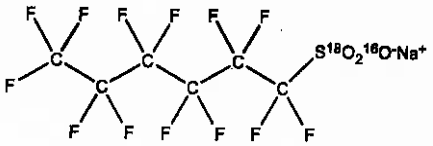
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate

LOT NUMBER: MPFHxS0217

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Contains ~ 1.0% of sodium perfluoro-1-octane[$^{18}O_2$]sulfonate ($^{18}O_2$-PFOS).
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/02/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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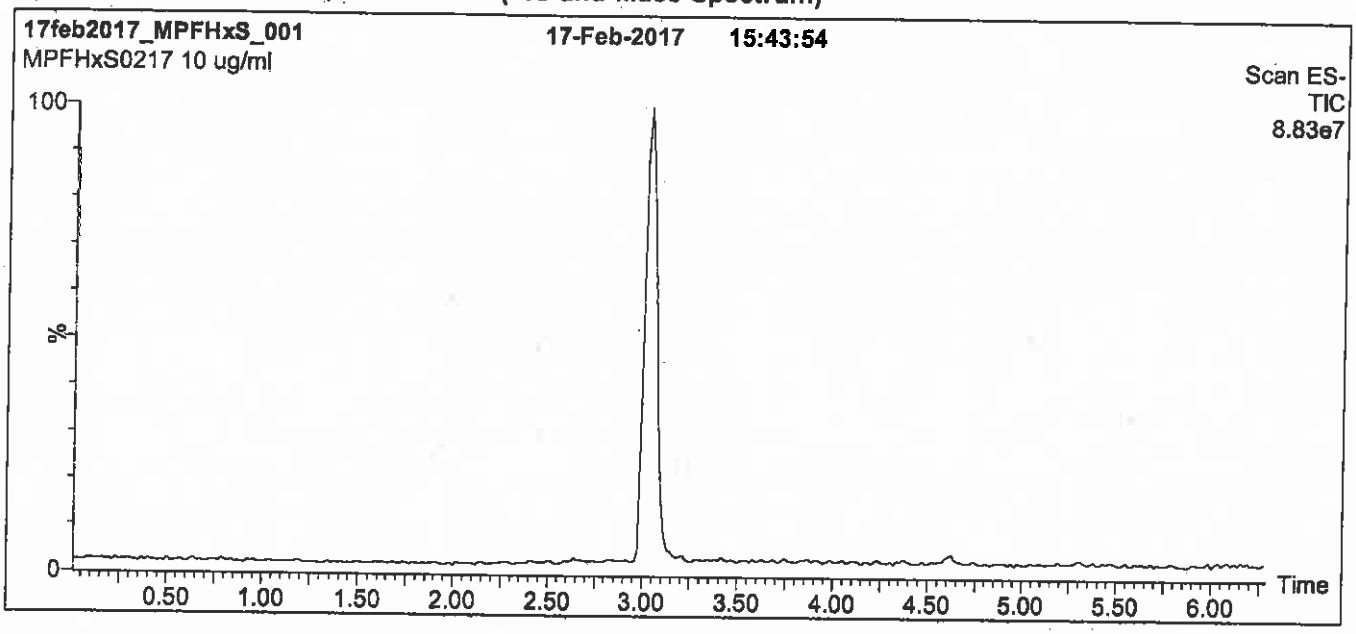

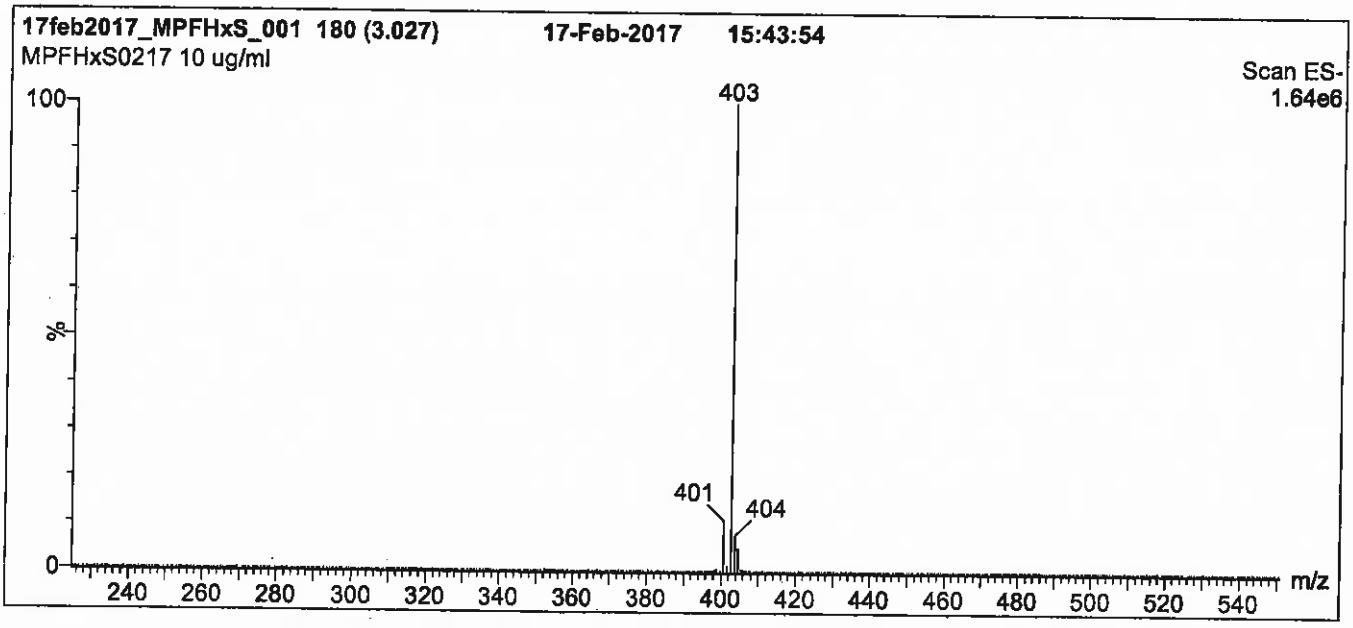

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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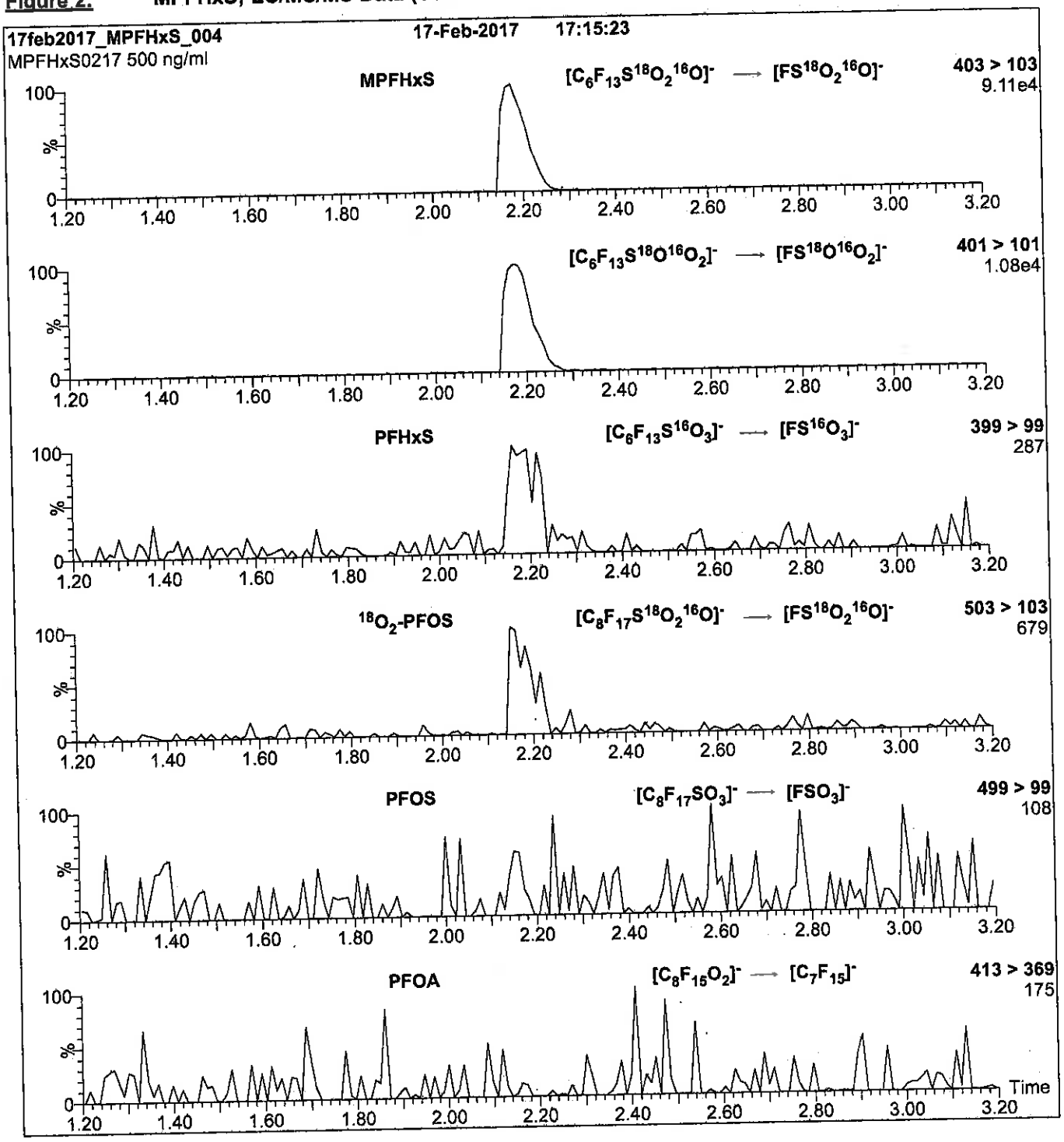

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFHxS)

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(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

Reagent

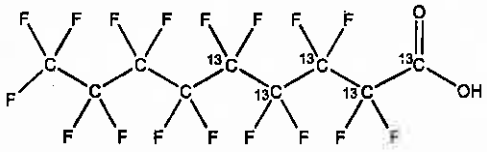
LCMPFNA_00010

r: 5/5/17 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFNA	**LOT NUMBER:**	MPFNA0916
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)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/11/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED

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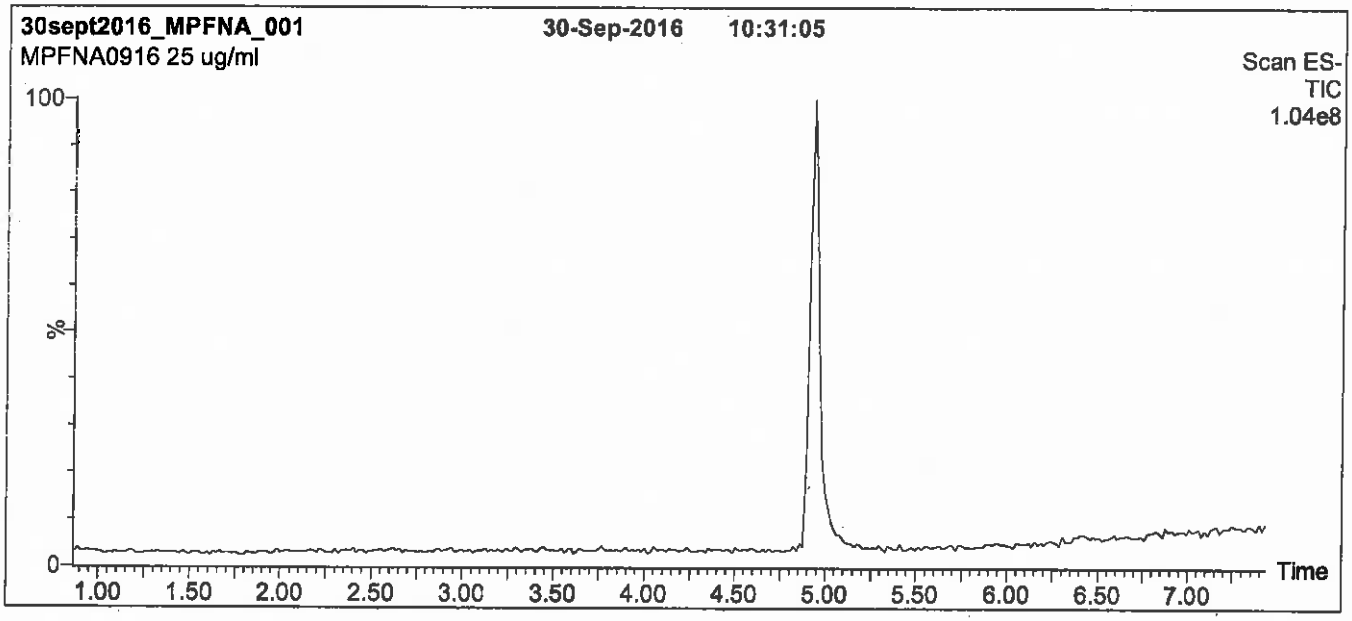

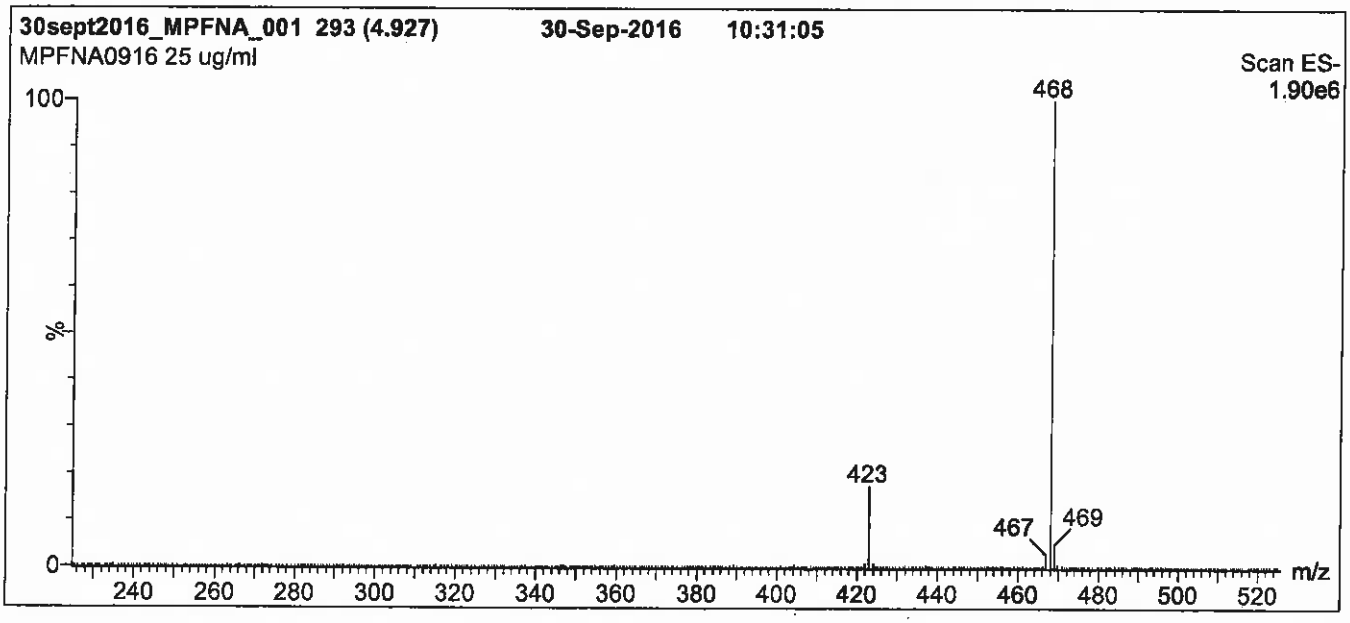

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Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

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Experiment: Full Scan (225 - 850 amu)

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Desolvation Gas Flow (l/hr) = 750

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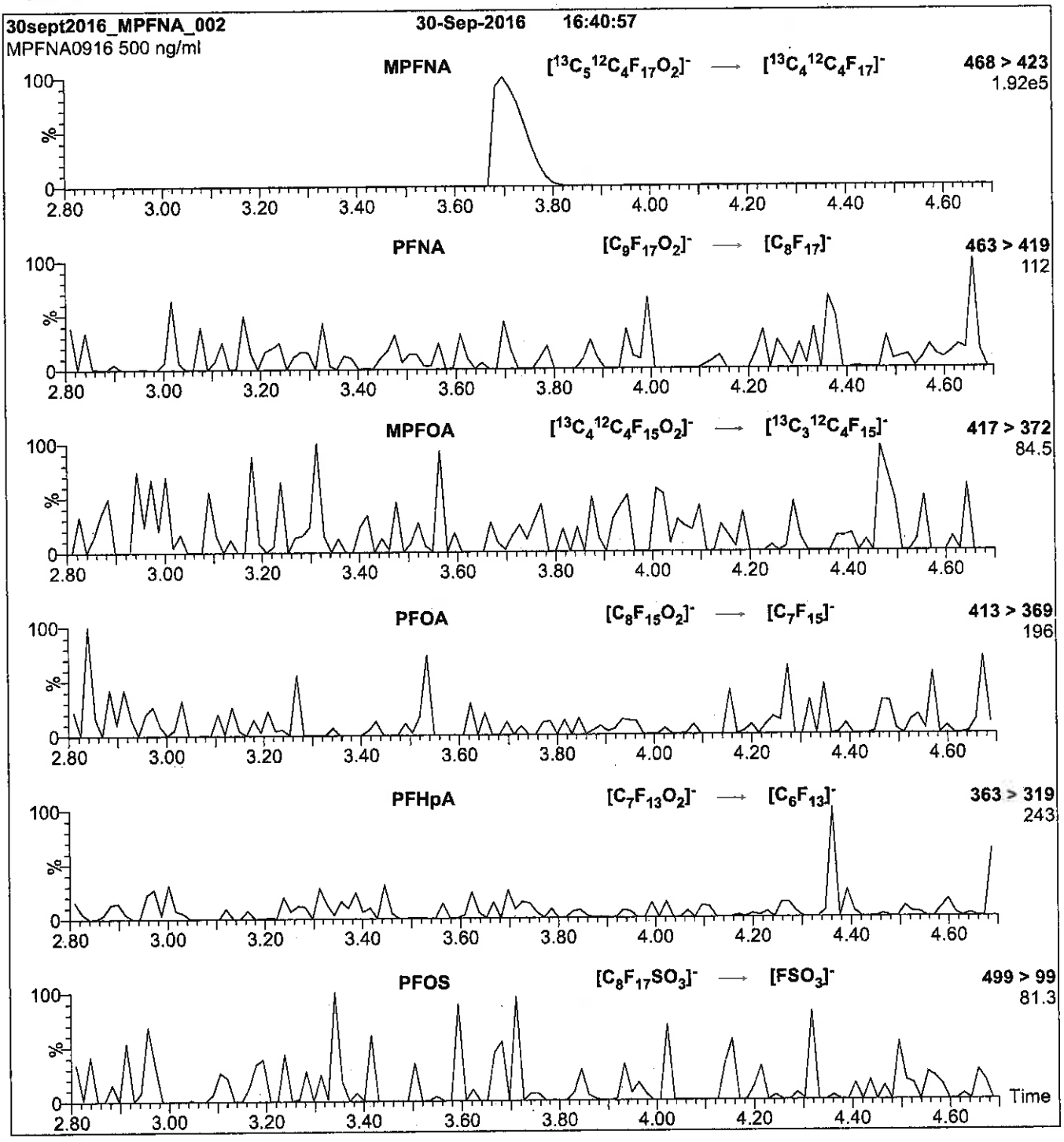

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Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
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Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11

Reagent

LCMPFNA_00011

r: 7/5/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFNA	**LOT NUMBER:**	MPFNA0916
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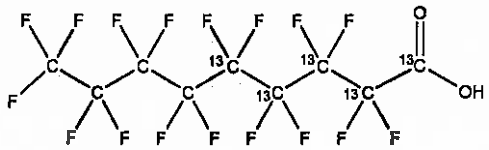
STRUCTURE:		**CAS #:**	Not available



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ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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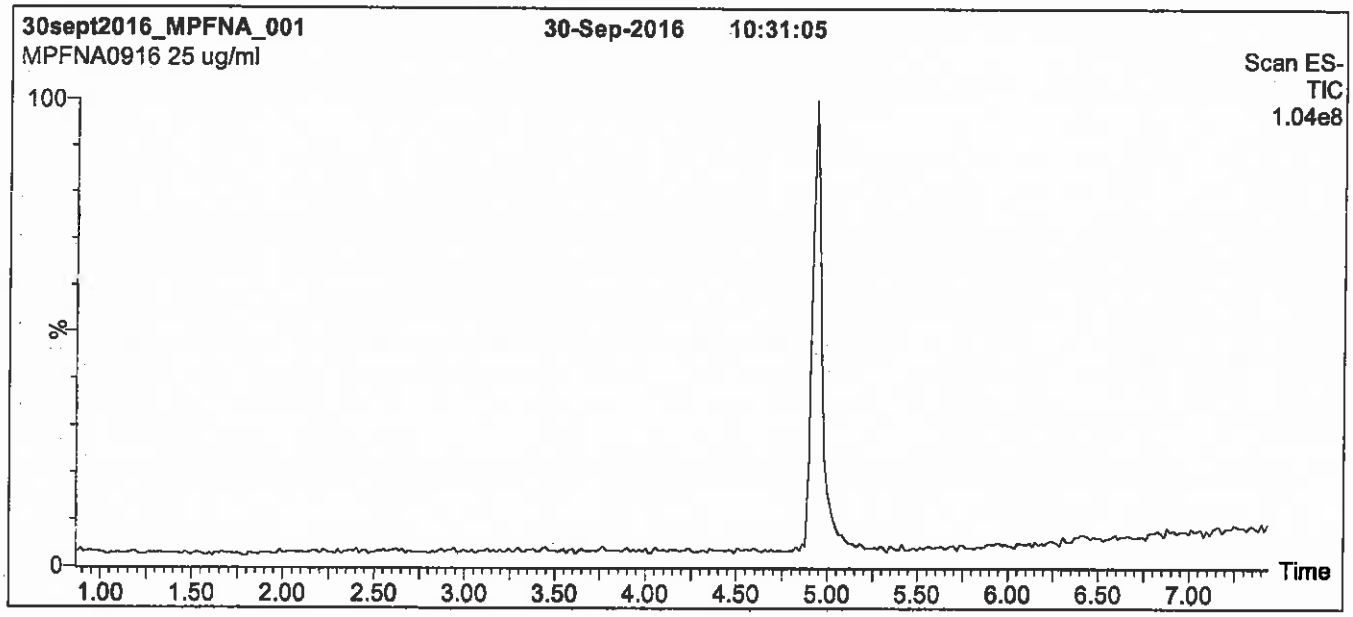
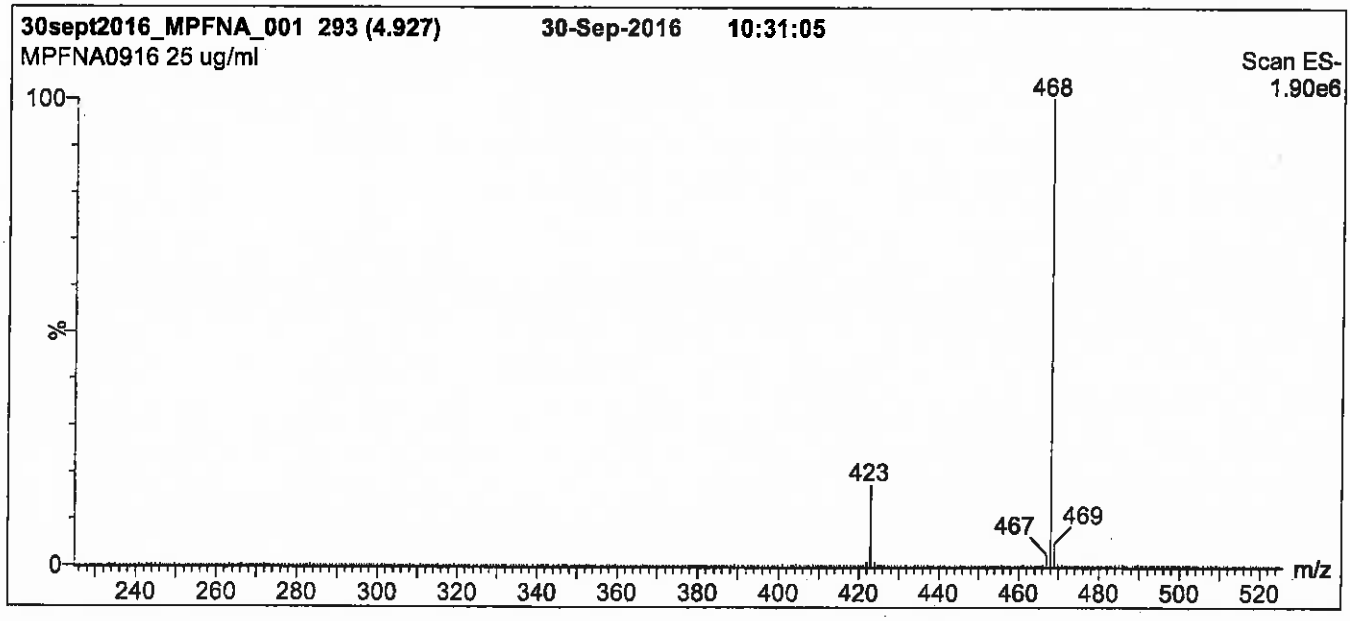
Figure 1: **MPFNA; LC/MS Data (TIC and Mass Spectrum)**





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: 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 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

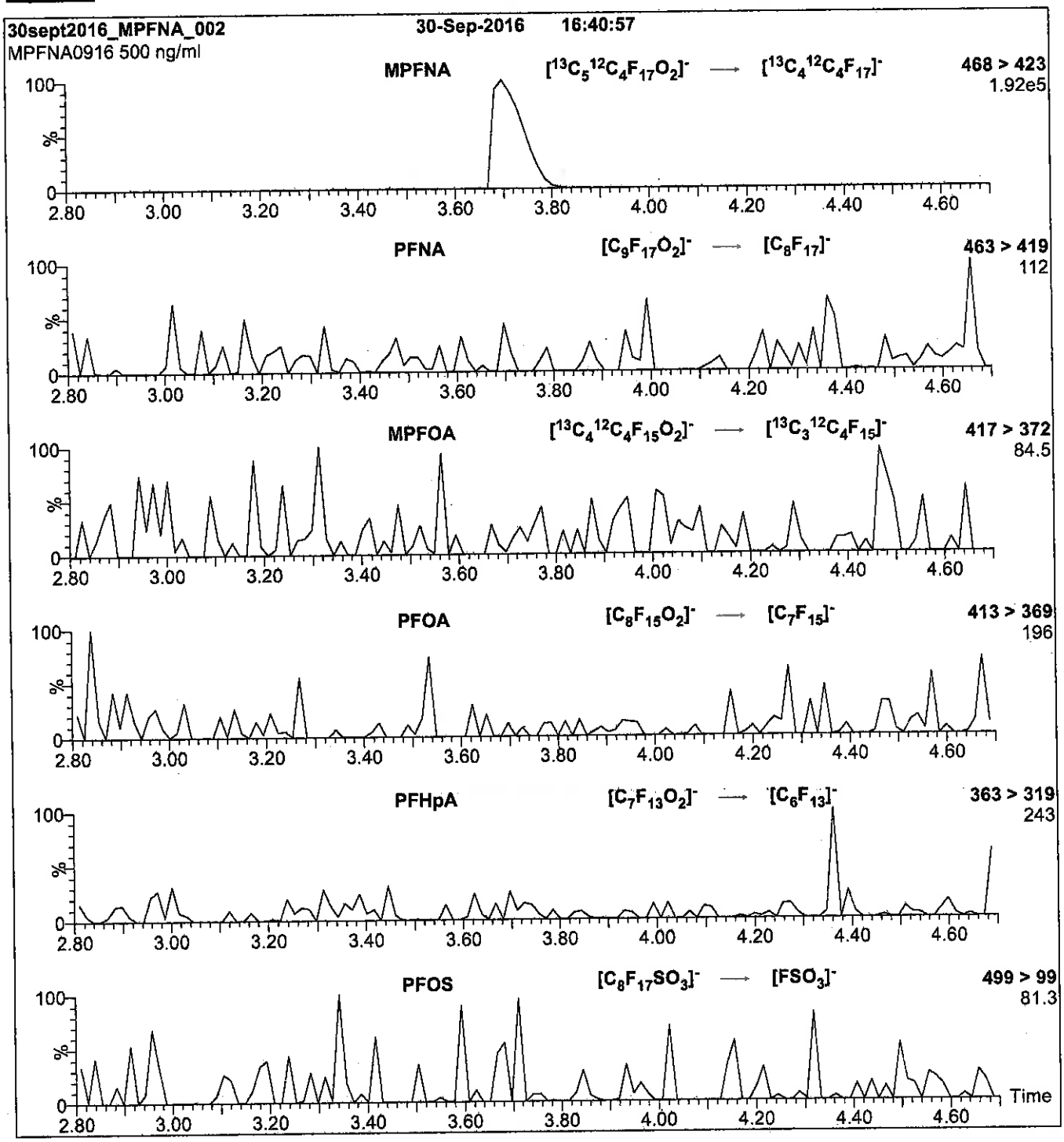
Flow: 300 µl/min

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

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) = 3.39e-3
Collision Energy (eV) = 11

Reagent

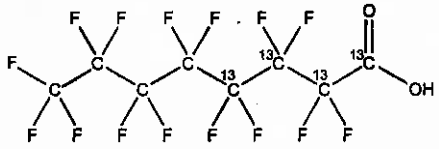
LCMPFOA_00014

V: 5/3/17

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFOA	**LOT NUMBER:**	MPFOA0417
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	04/12/2017		
EXPIRY DATE: (mm/dd/yyyy)	04/12/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of native perfluoro-n-octanoic acid (PFOA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/28/2017 (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

INTENDED USE:

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HAZARDS:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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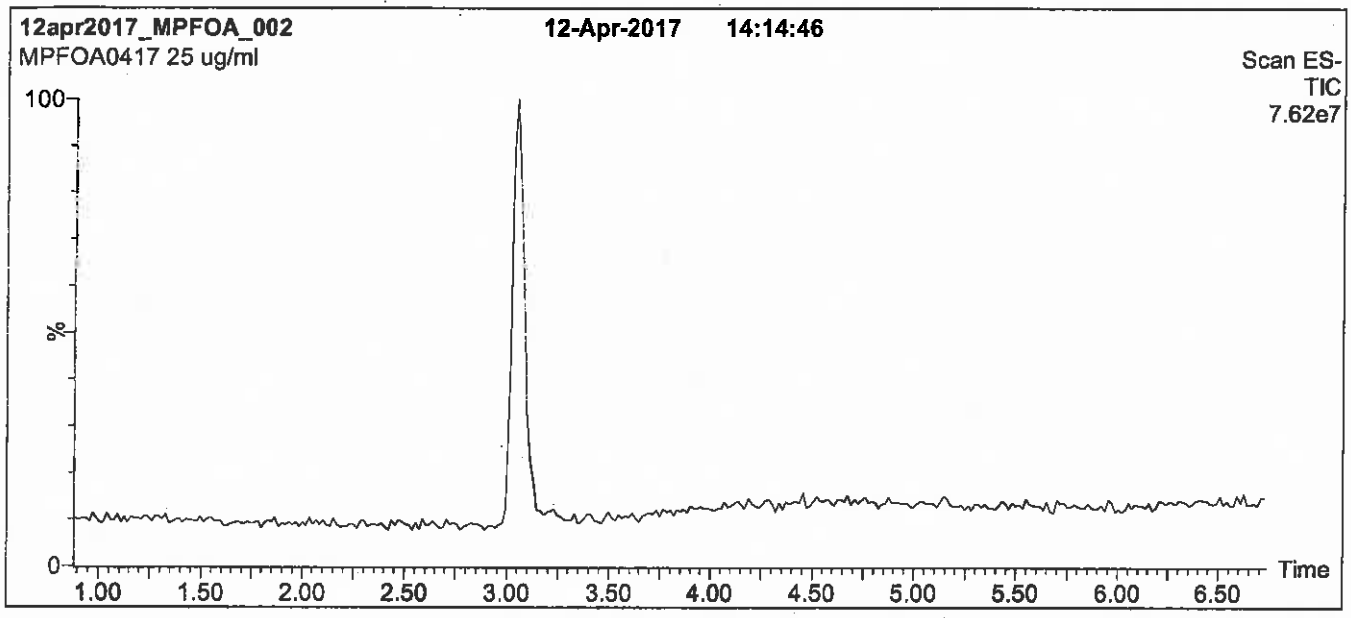
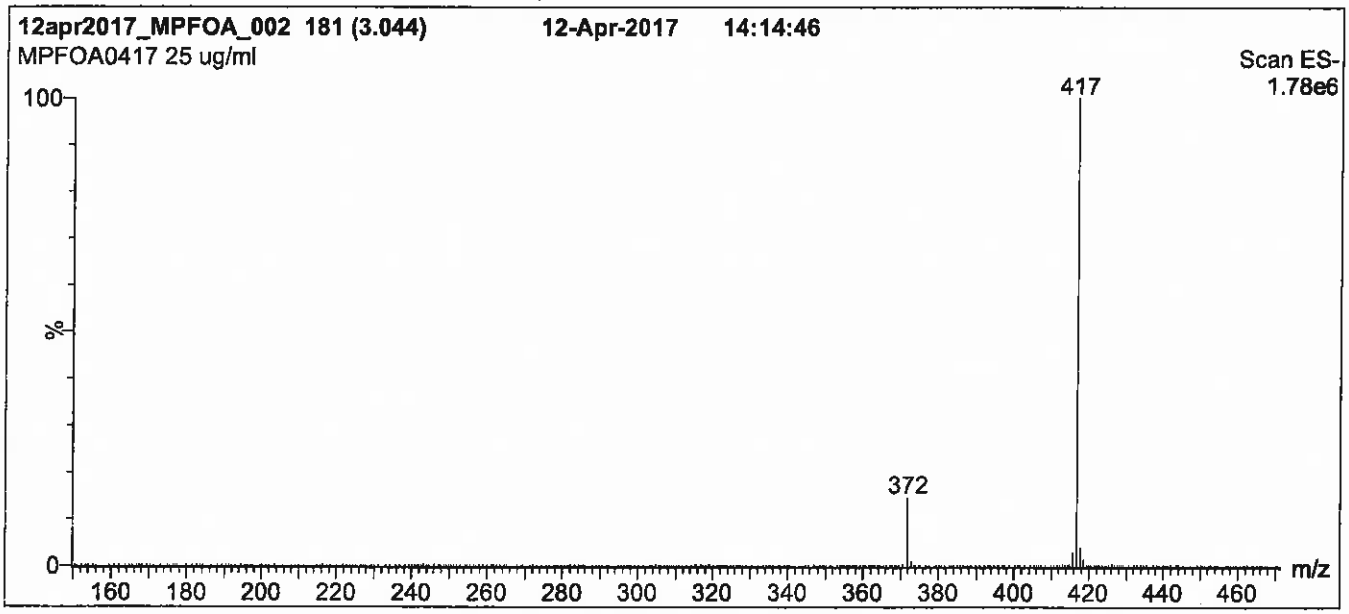




Conditions for Figure 1:

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

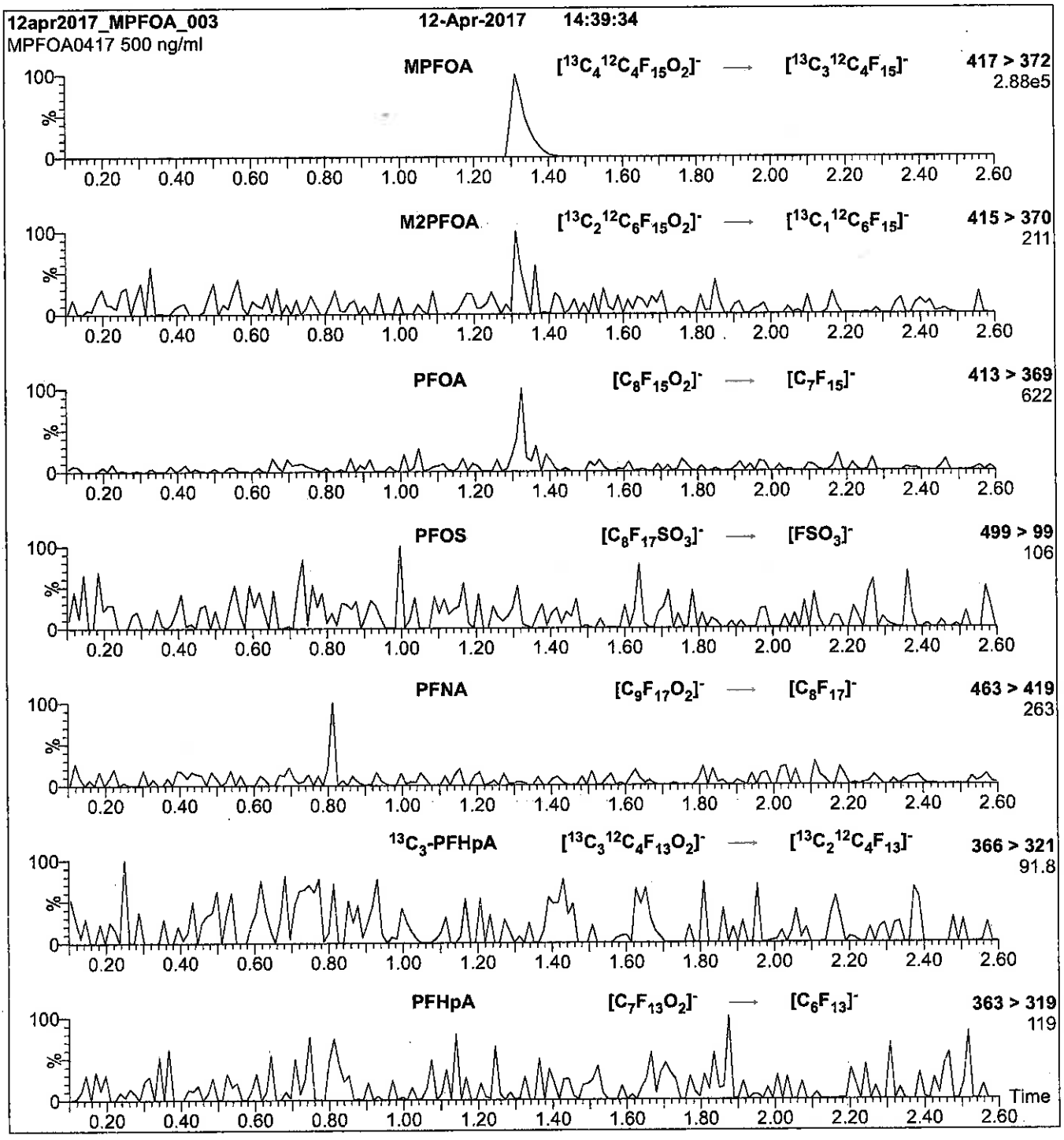
Flow: 300 µl/min

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) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **MPFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFOA)

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

Reagent

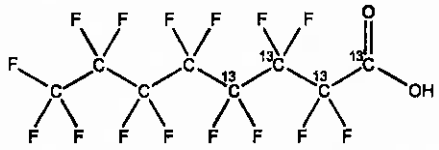
LCMPFOA_00015

r: 7/5/17 SCV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFOA	**LOT NUMBER:**	MPFOA0417
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C
LAST TESTED: (mm/dd/yyyy)	04/12/2017		(1,2,3,4-$^{13}C_4$)
EXPIRY DATE: (mm/dd/yyyy)	04/12/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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ADDITIONAL INFORMATION:

- See page 2 for further details.
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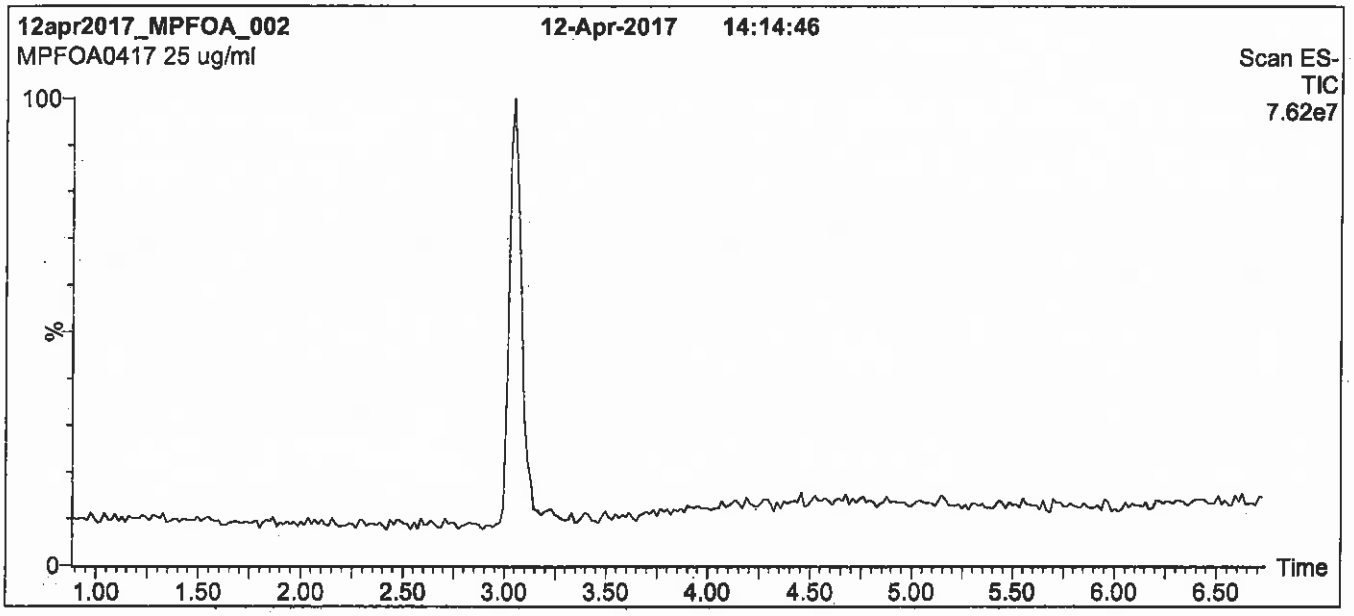

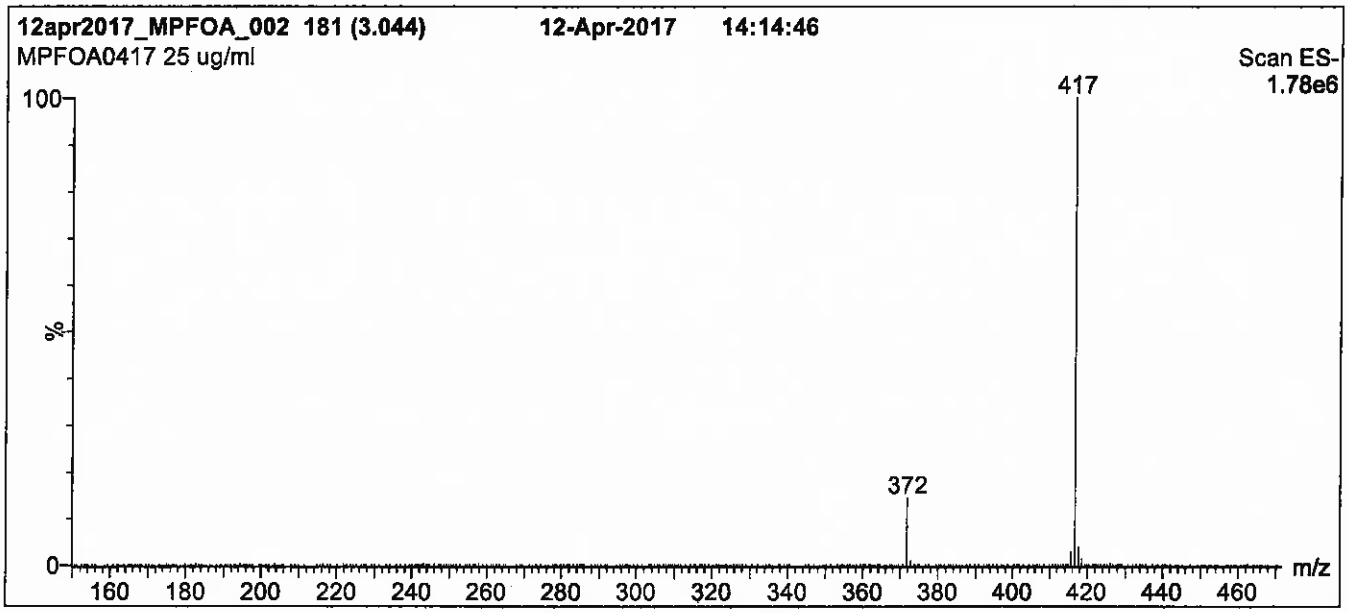

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MS: Micromass Quattro *micro* API MS

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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

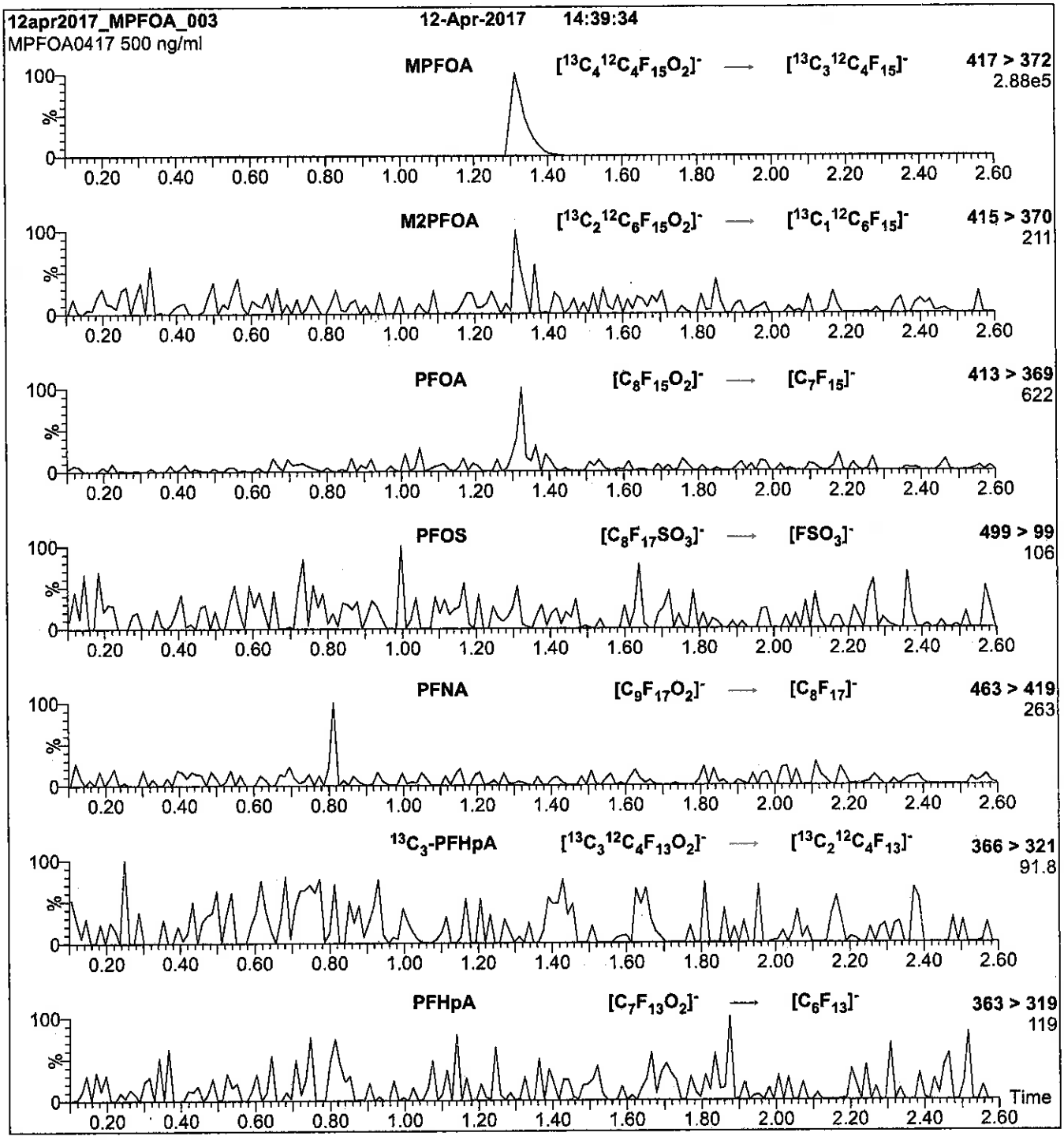
Flow: 300 µl/min

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) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **MPFOA; LC/MS/MS Data (Selected MRM Transitions)**



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Injection: Direct loop injection
10 µl (500 ng/ml MPFOA)

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

Reagent

LCMPFOS_00022

P: 5B|17SR

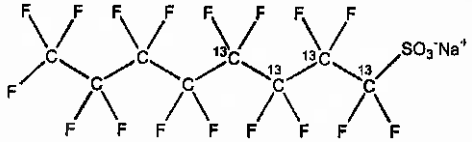
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1216

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-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	12/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021		
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 ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/14/2016 (mm/dd/yyyy)

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CALA

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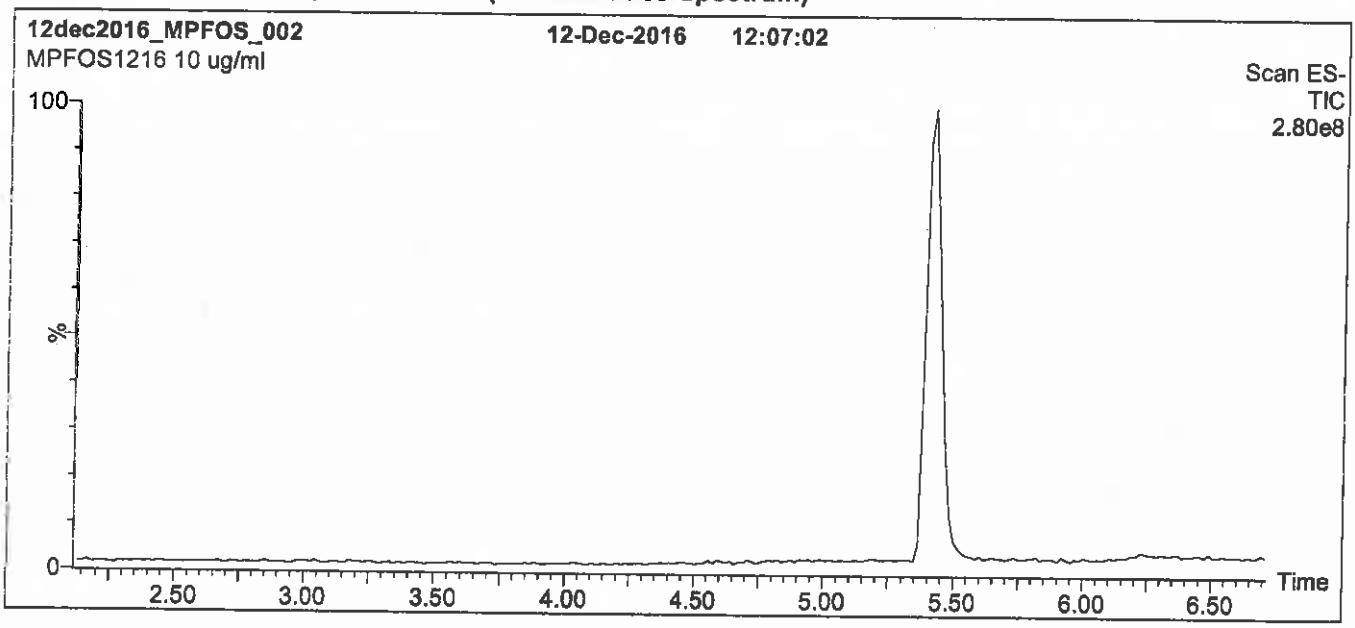
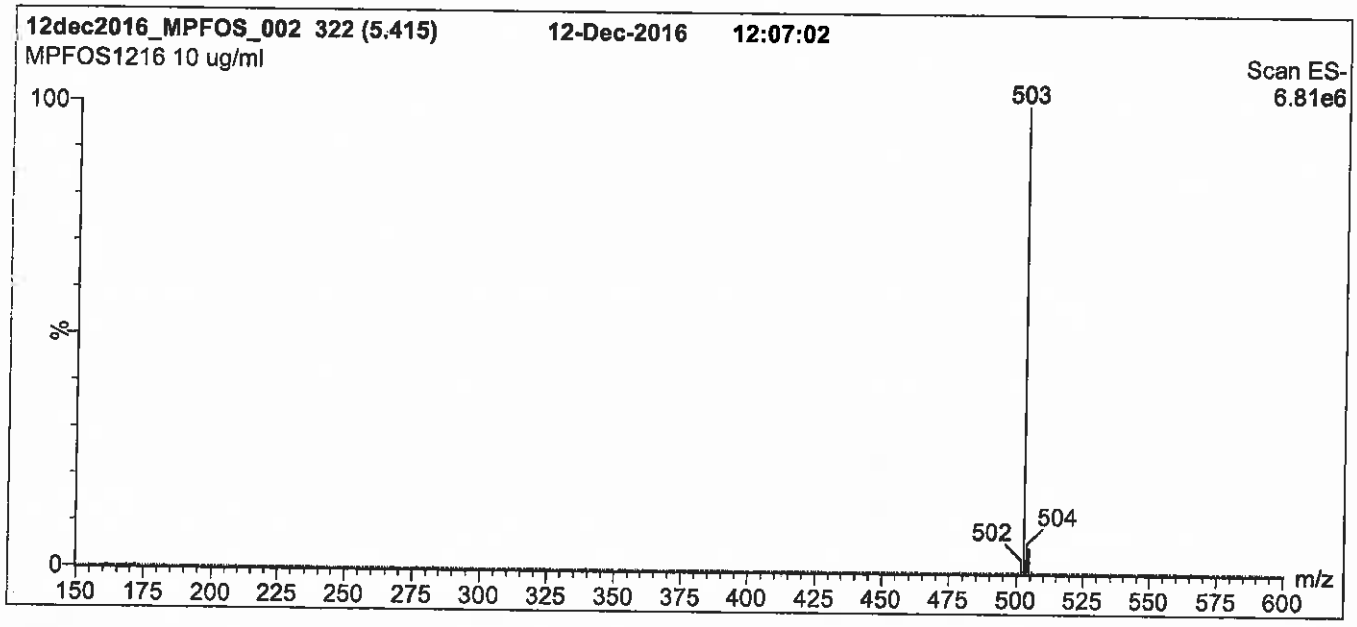
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





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 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

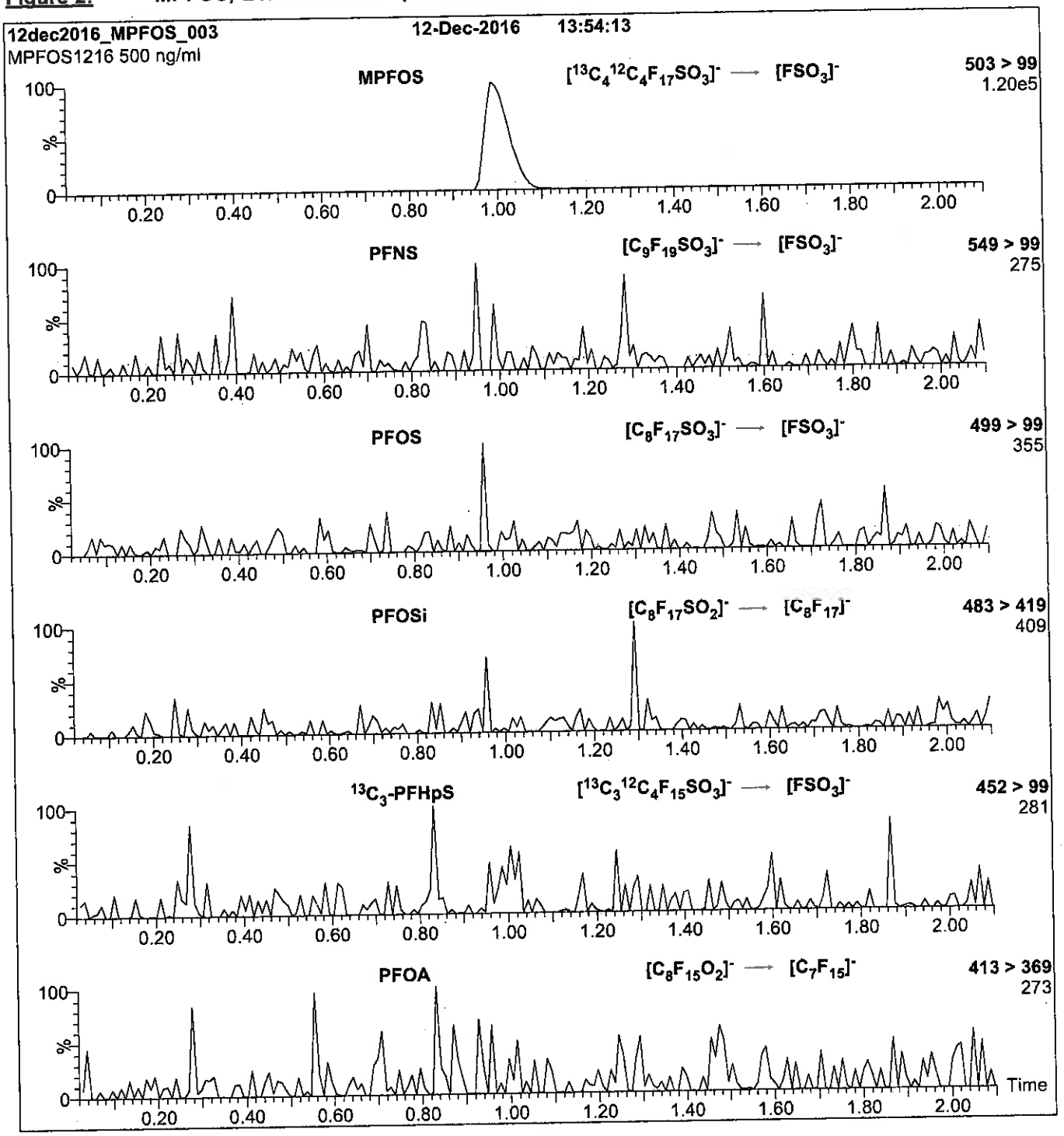
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.35e-3
Collision Energy (eV) = 40

Reagent

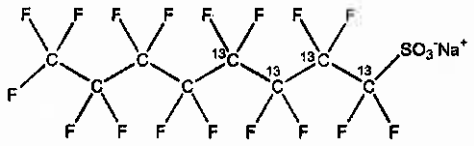
LCMPFOS_00023

r: 7/5/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFOS	**LOT NUMBER:**	MPFOS0517
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)	05/19/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/19/2022		
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 ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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HOMOGENEITY:

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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.

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CALA

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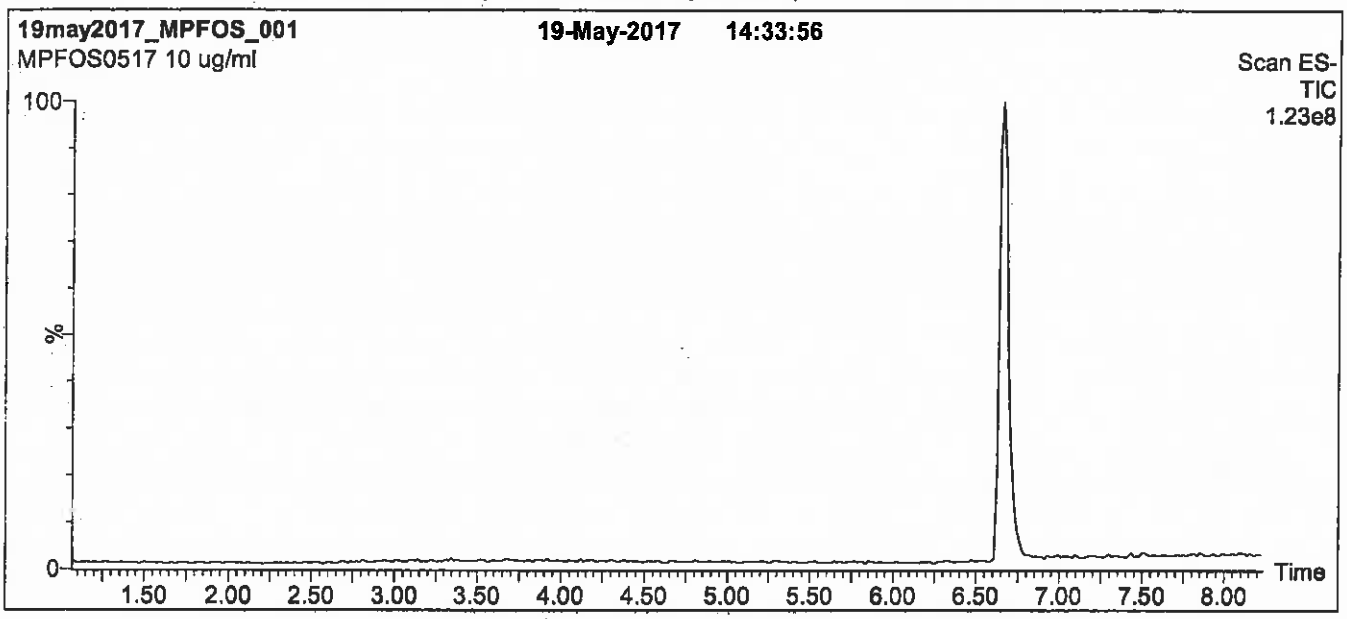

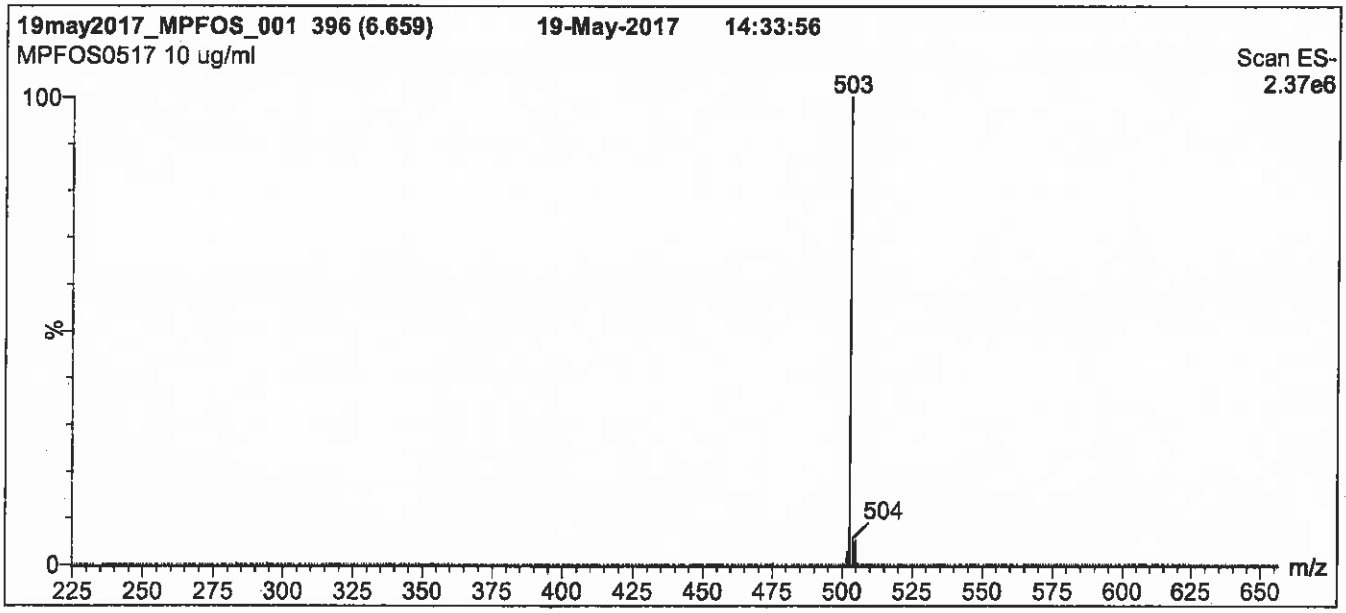

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1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

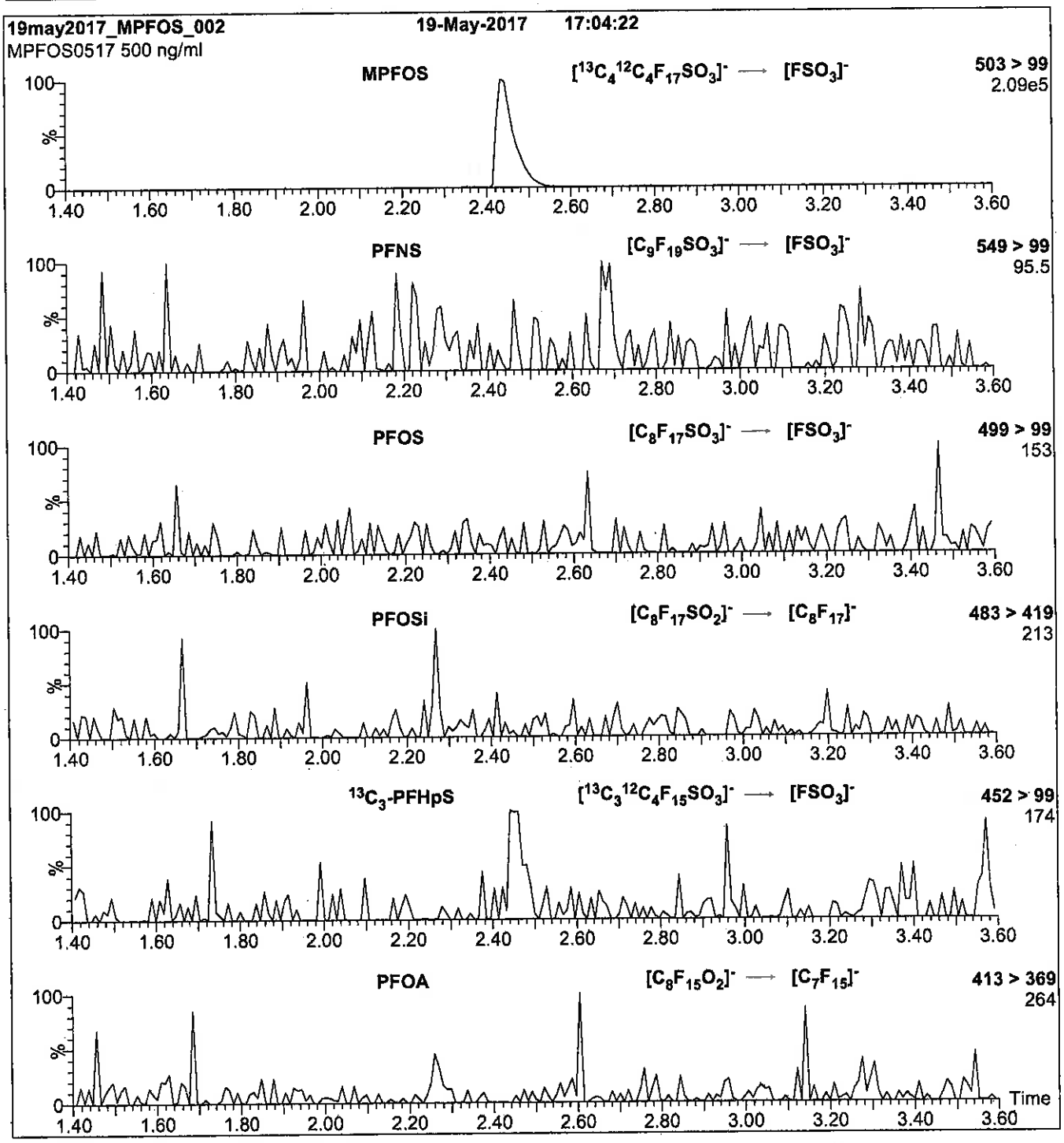
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **MPFOS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 40

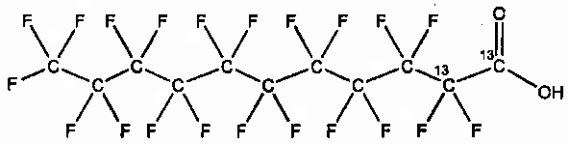
Reagent

LCMPFUdA_00011

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 ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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CALA

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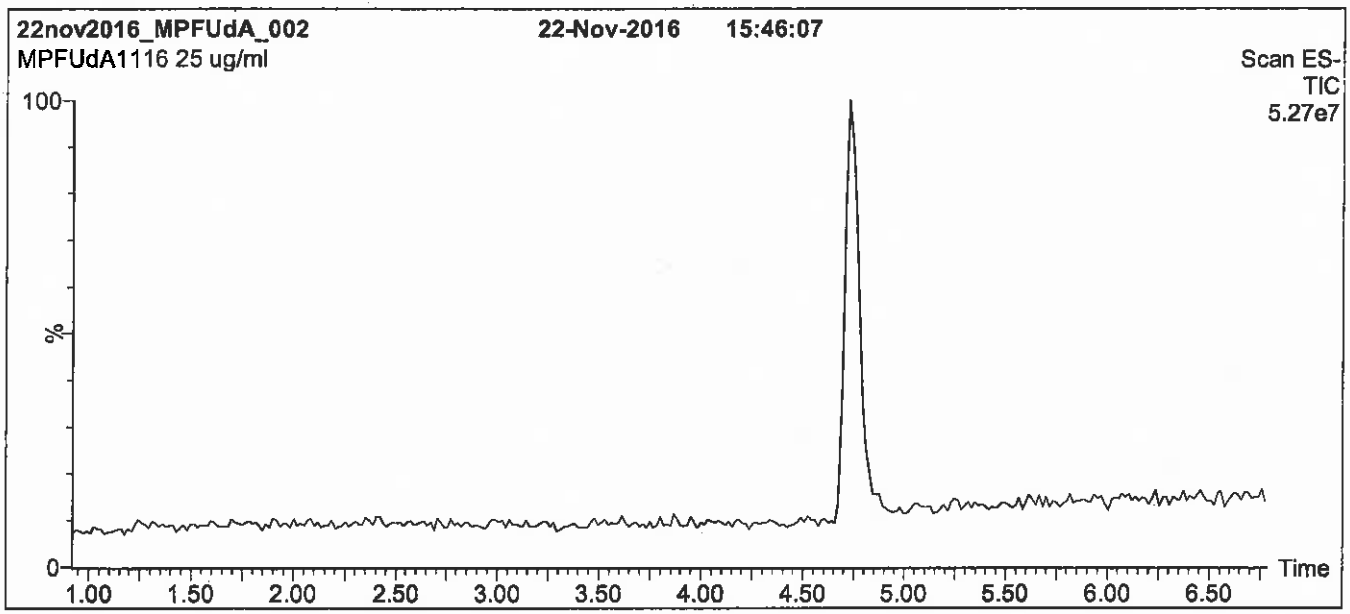

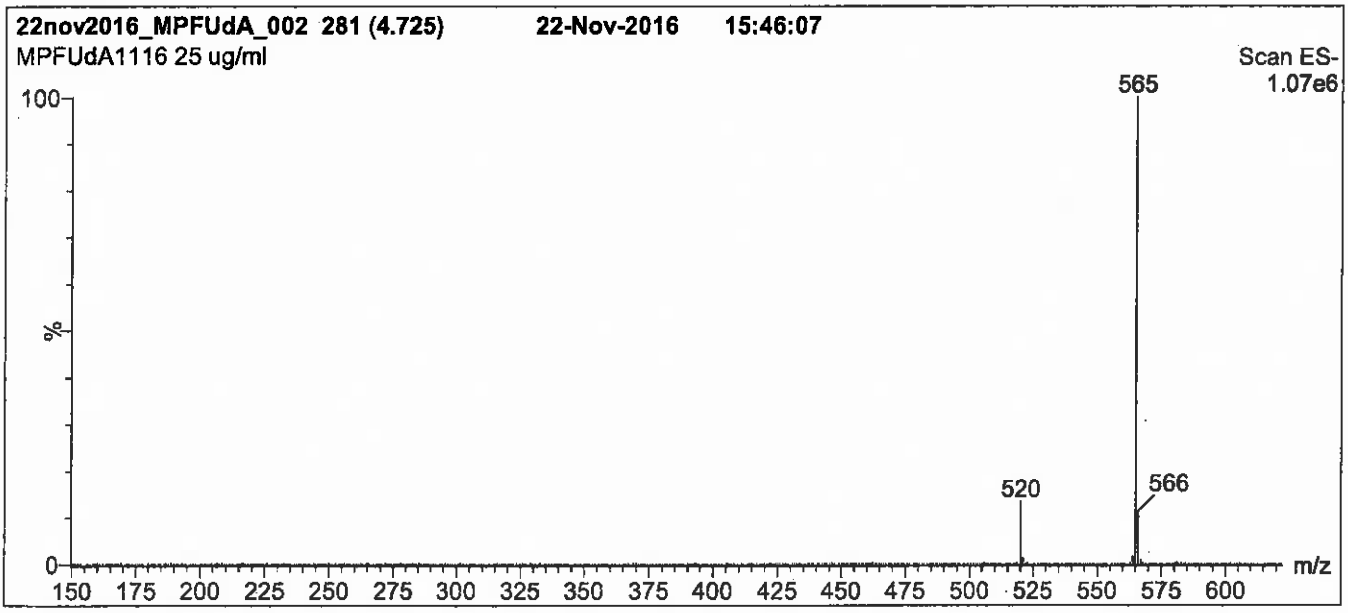

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MS: **Micromass Quattro *micro* API MS**

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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

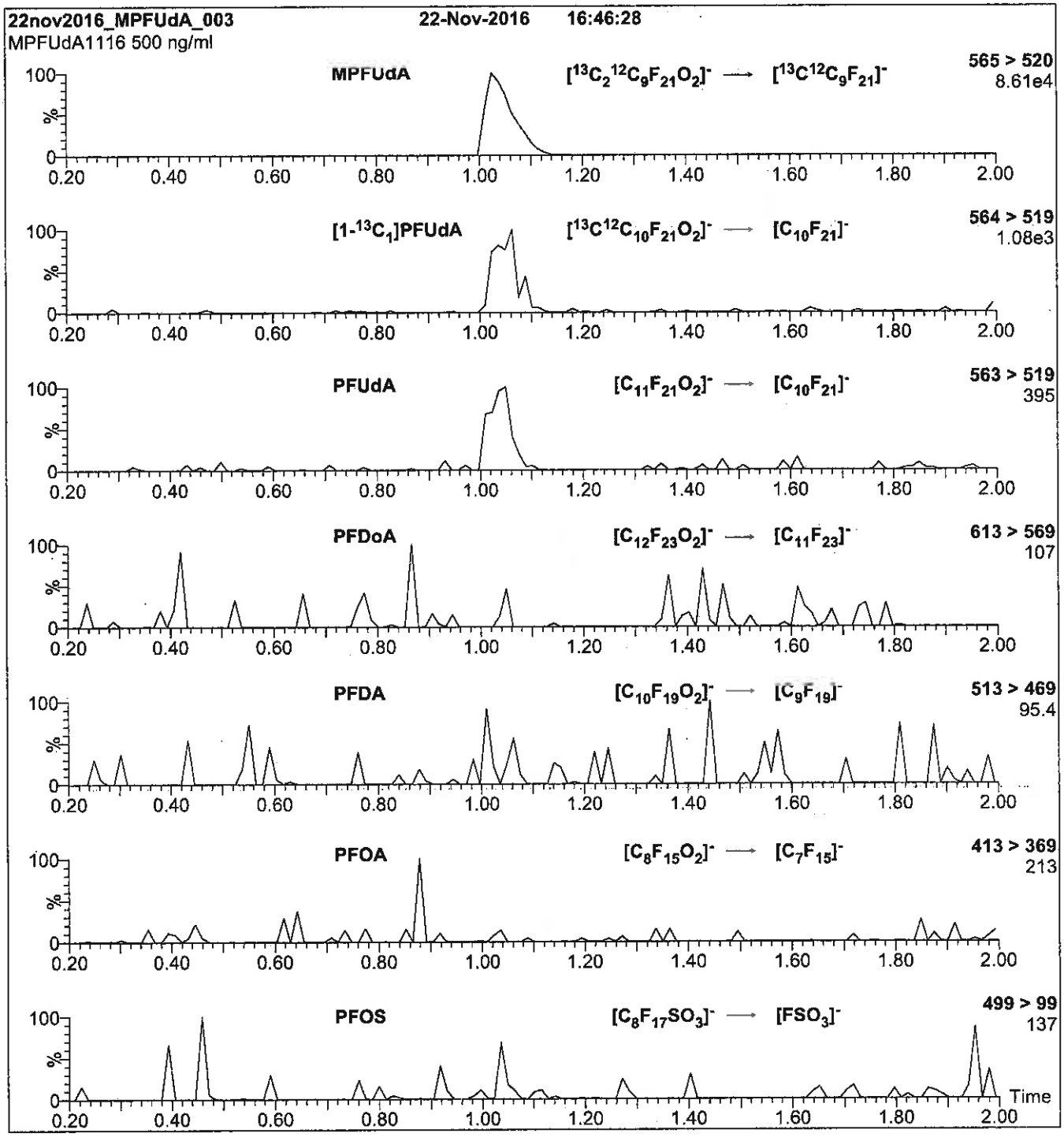
Flow: 300 µl/min

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

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

Reagent

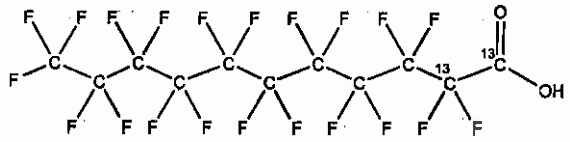
LCMPFUdA_00012

r: 7/5/17 SKV

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



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CALA

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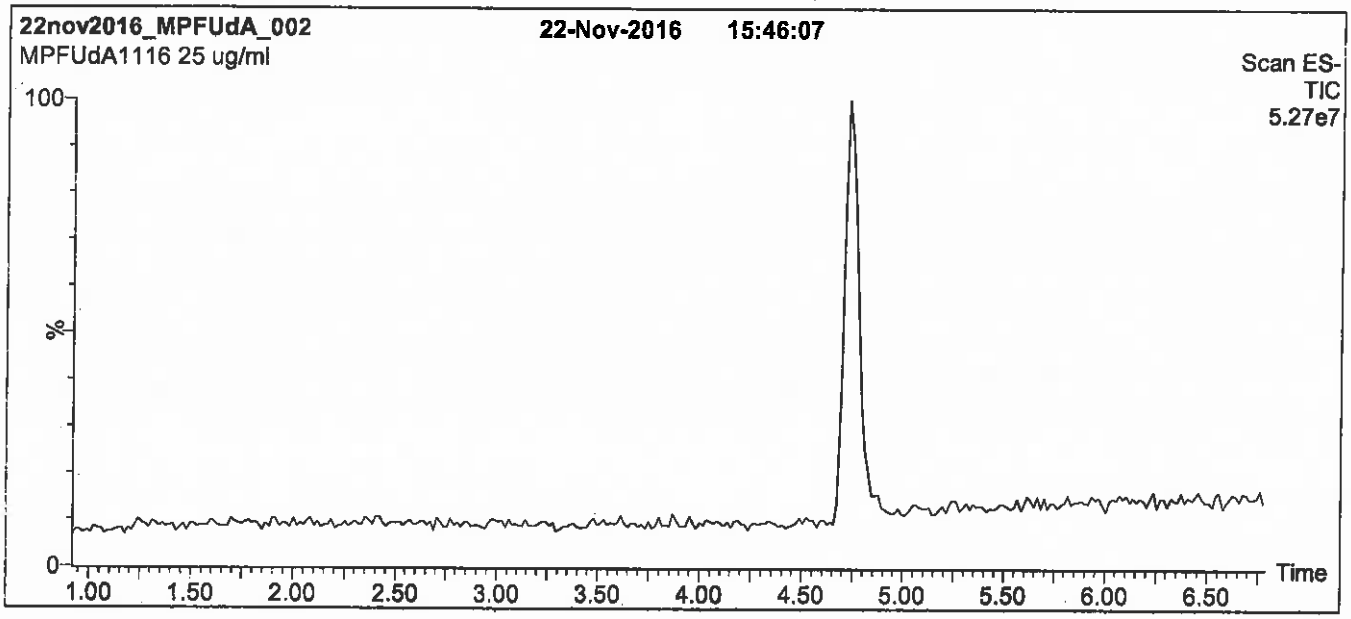
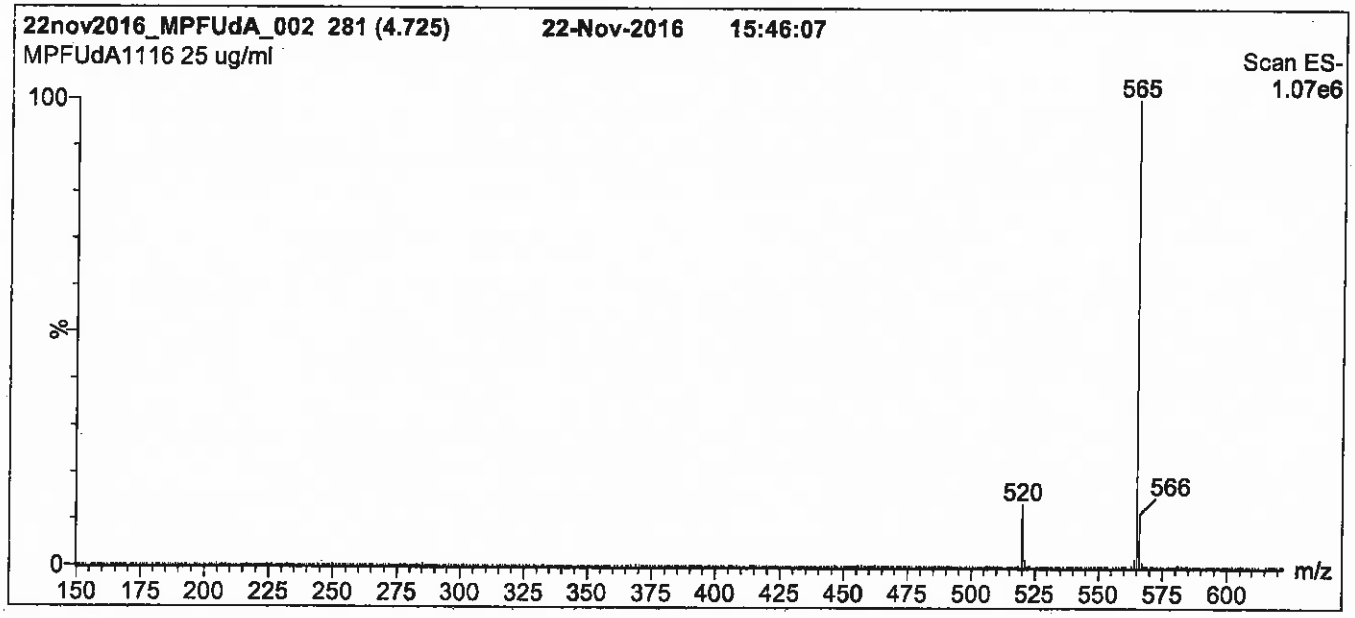




Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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

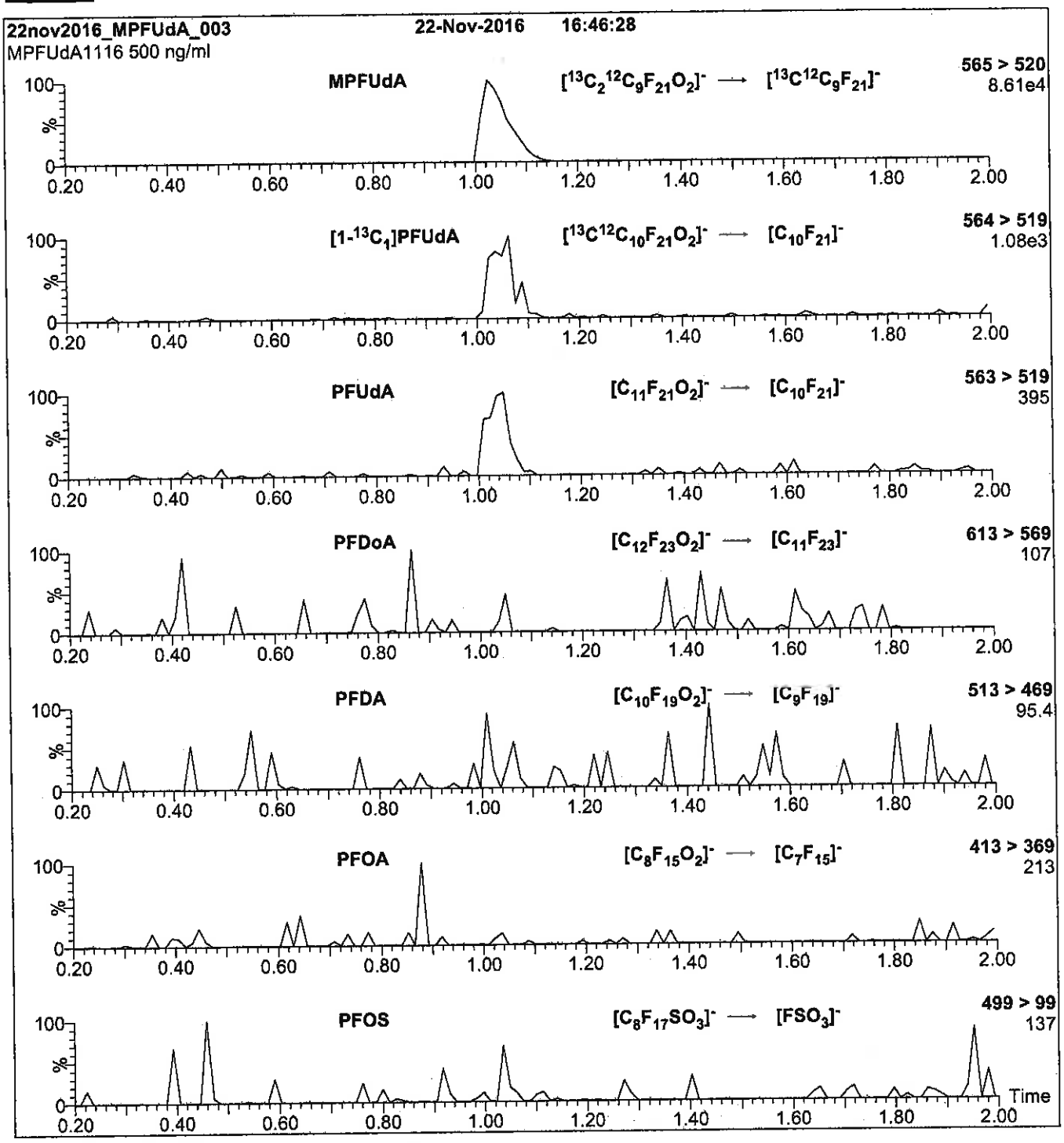
Flow: 300 µl/min

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

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

Reagent

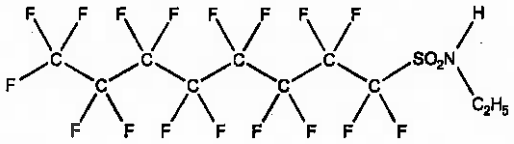
LCN-EtFOSA-M_00004

R: 12/20/16 SK✓

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	N-EtFOSA-M	**LOT NUMBER:**	NEtFOSA0516M
COMPOUND:	N-ethylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	4151-50-2



MOLECULAR FORMULA:	$C_{10}H_5F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/27/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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HAZARDS:

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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.

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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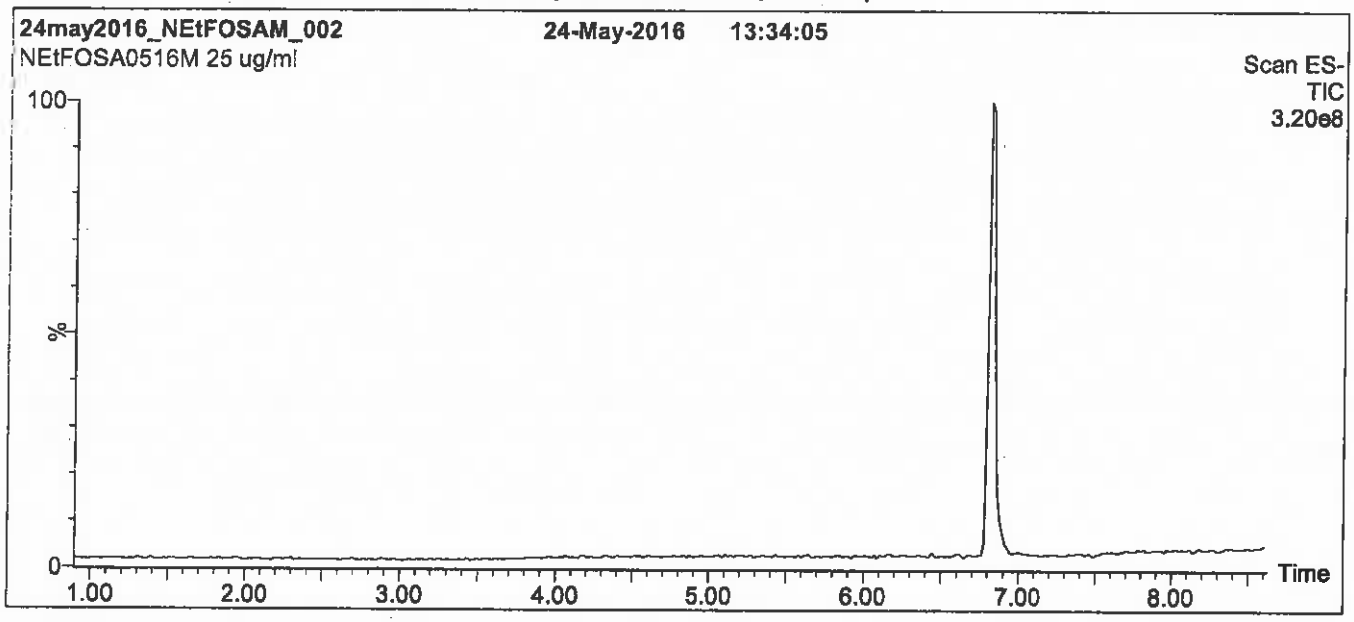
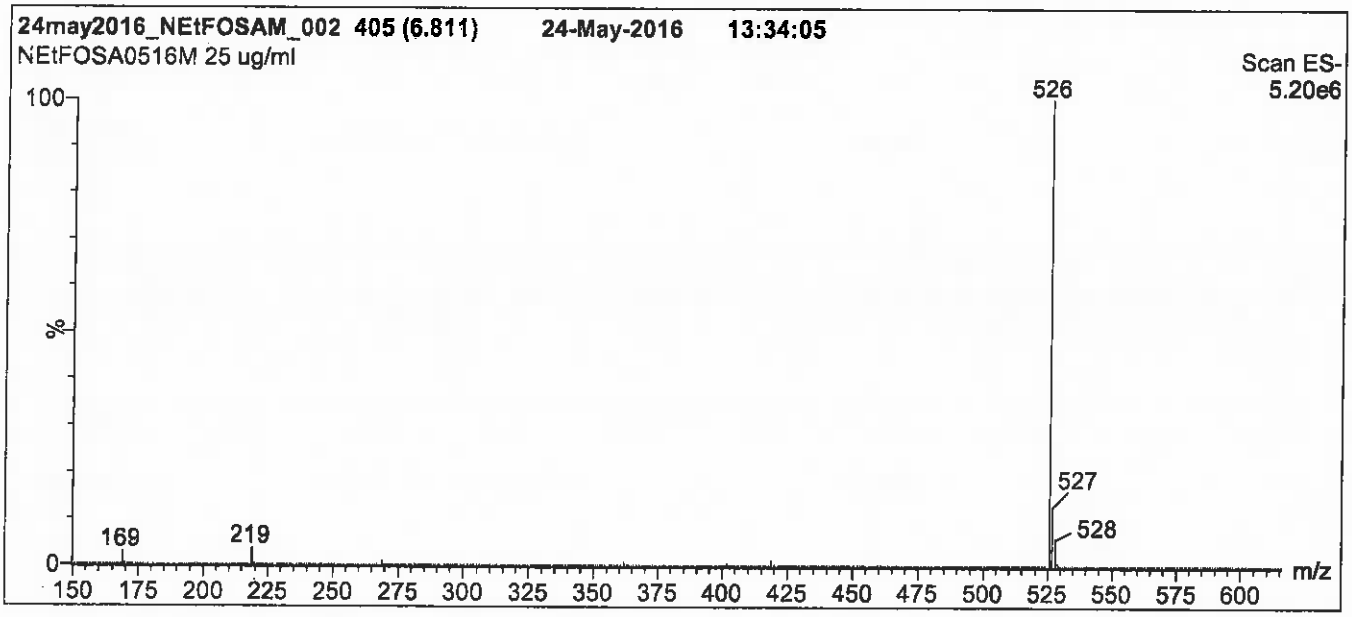
Figure 1: **N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

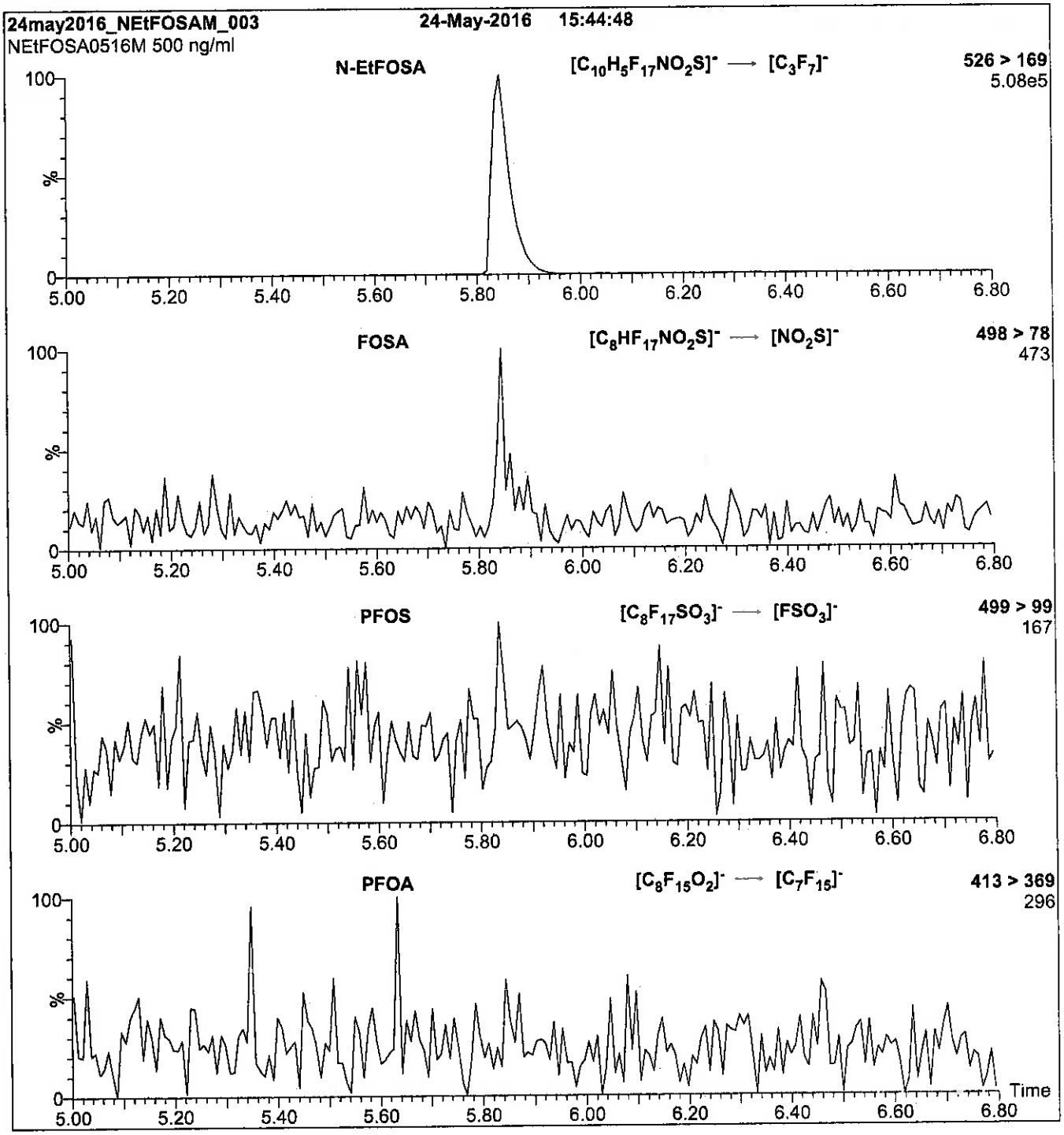
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

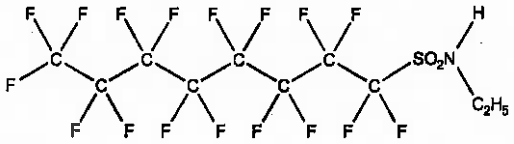
LCN-EtFOSA-M_00005

R: 12/20/16 SK✓

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	N-EtFOSA-M	**LOT NUMBER:**	NEtFOSA0516M
COMPOUND:	N-ethylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	4151-50-2



MOLECULAR FORMULA:	$C_{10}H_5F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

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Certified By: B.G. Chittim **Date:** 05/27/2016 (mm/dd/yyyy)

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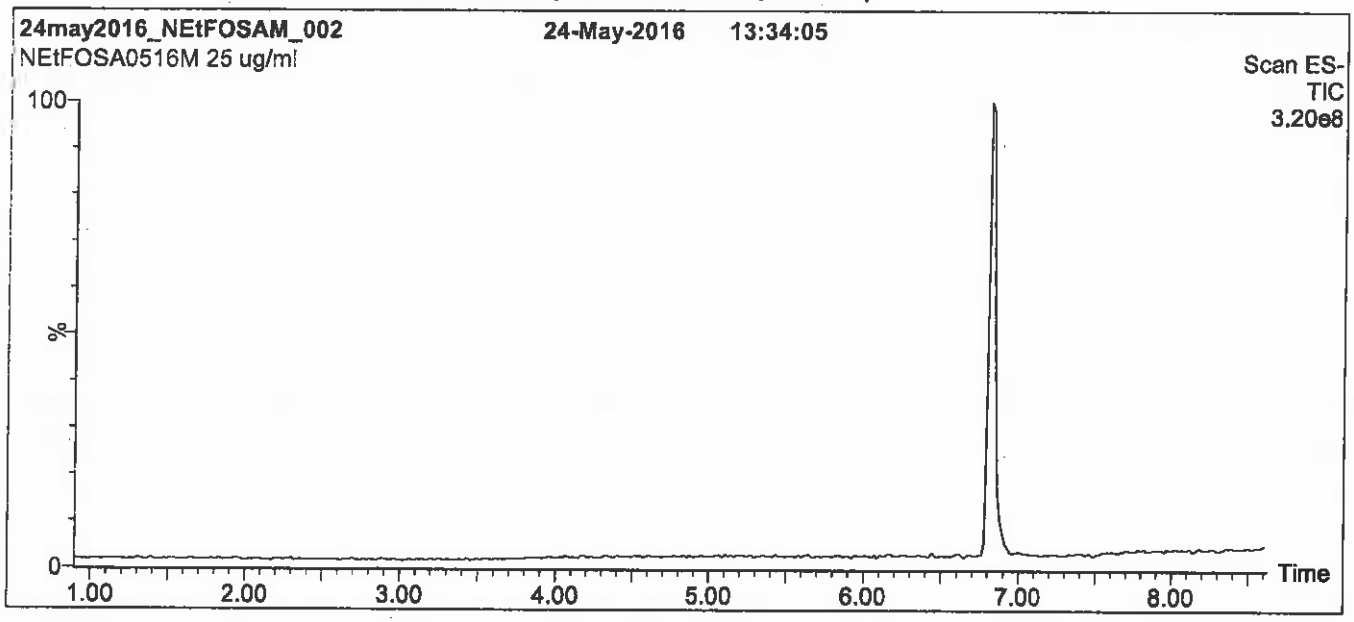
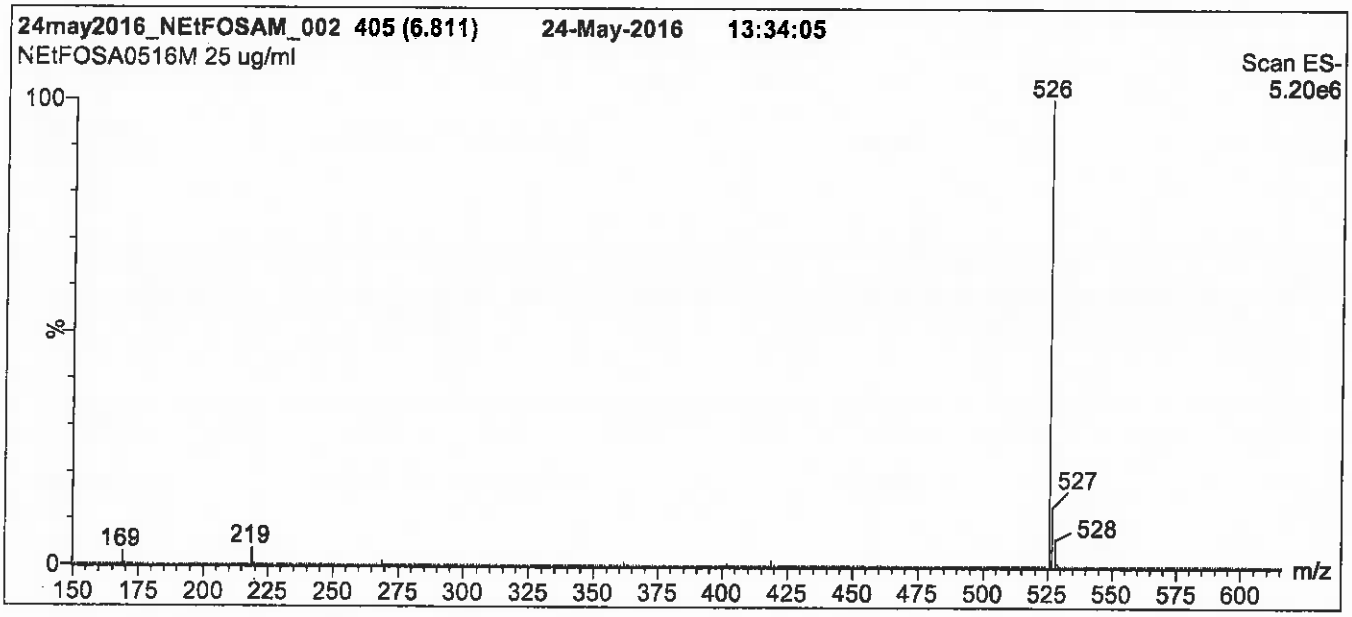
Figure 1: **N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

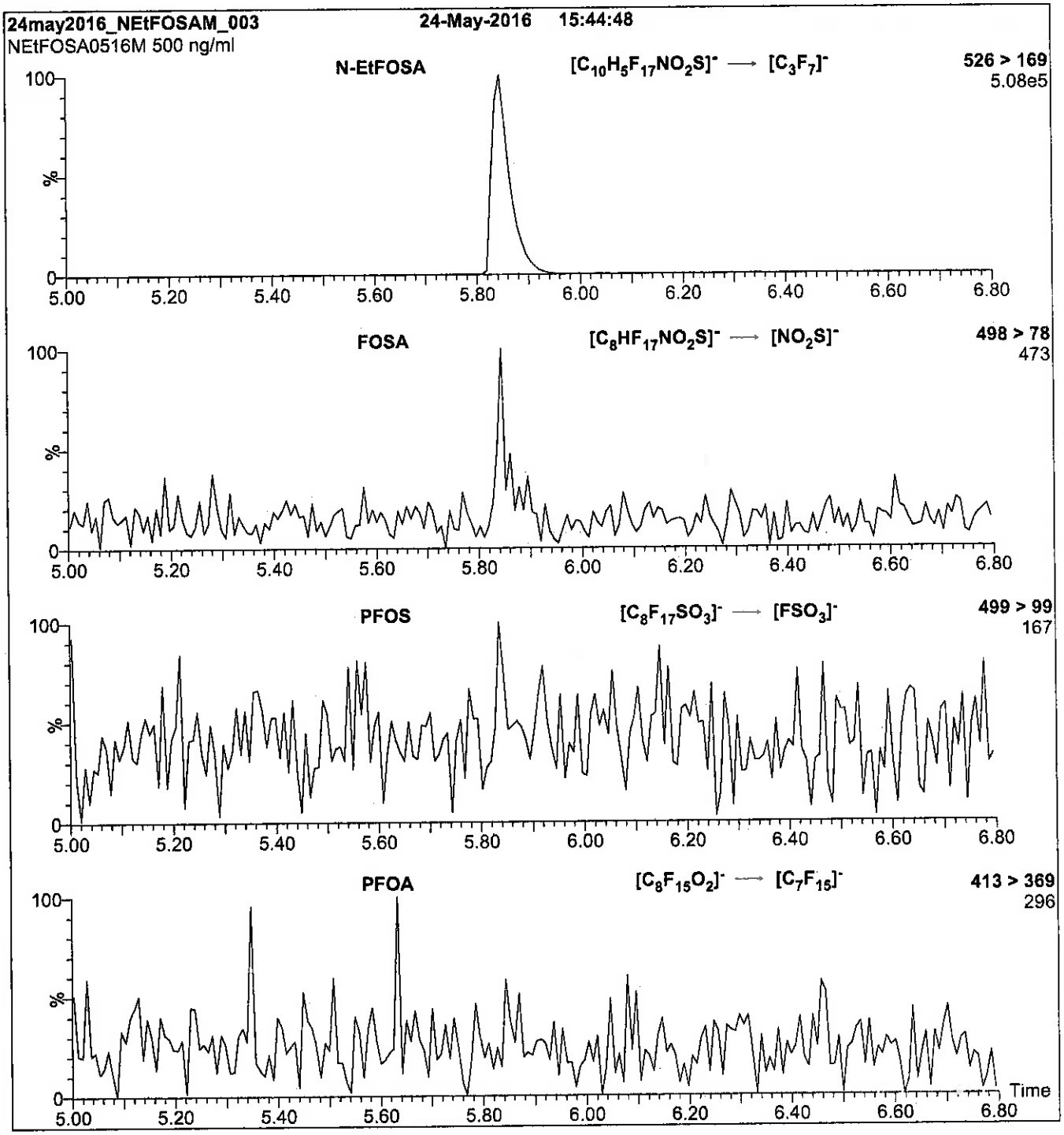
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCN-EtFOSAA_00002

R: 8/23/16 SBC

715561
ID: LCN-EtFOSAA_00002
Exp: 01/20/21 Prpd: SBC
N-EtFOSAA

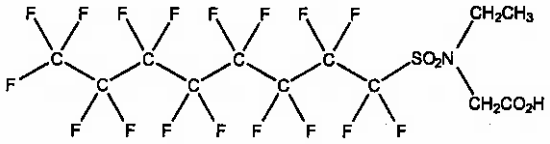
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: N-EtFOSAA **LOT NUMBER:** NEtFOSAA0116

COMPOUND: N-ethylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2991-50-6



MOLECULAR FORMULA: $C_{12}H_8F_{17}NO_4S$ **MOLECULAR WEIGHT:** 585.23

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 01/20/2016

EXPIRY DATE: (mm/dd/yyyy) 01/20/2021

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.
- 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: B.G. Chittim **Date:** 01/21/2016 (mm/dd/yyyy)

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CALA

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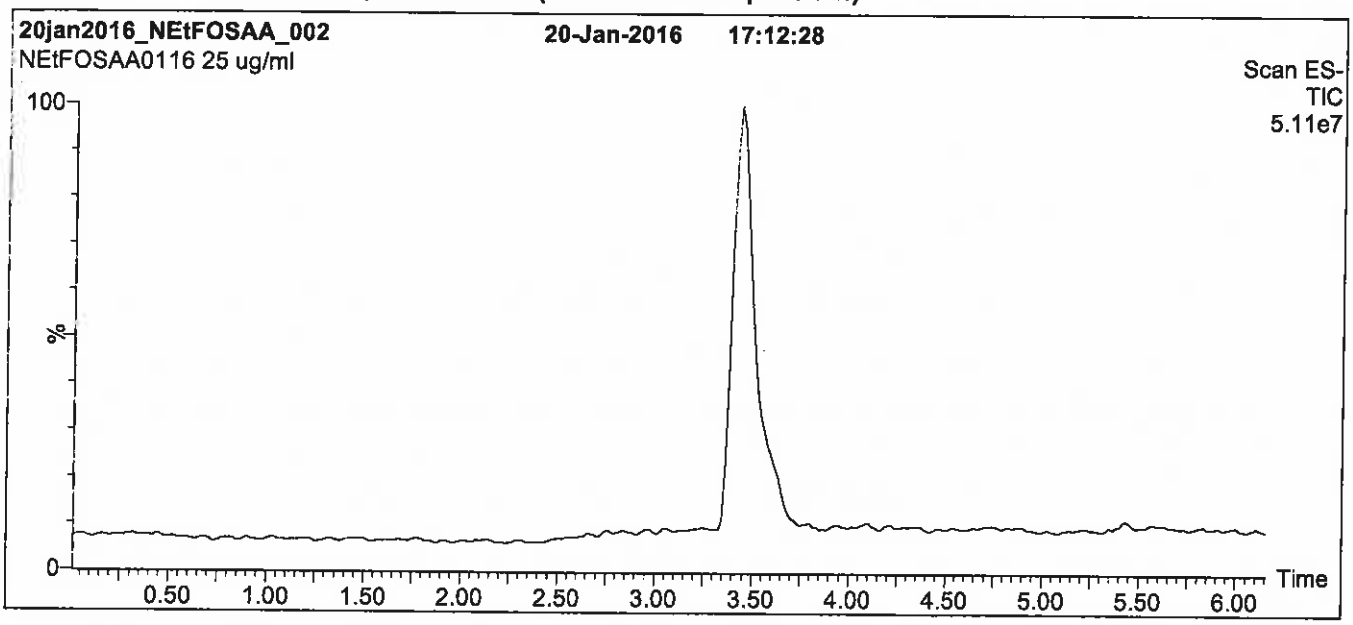
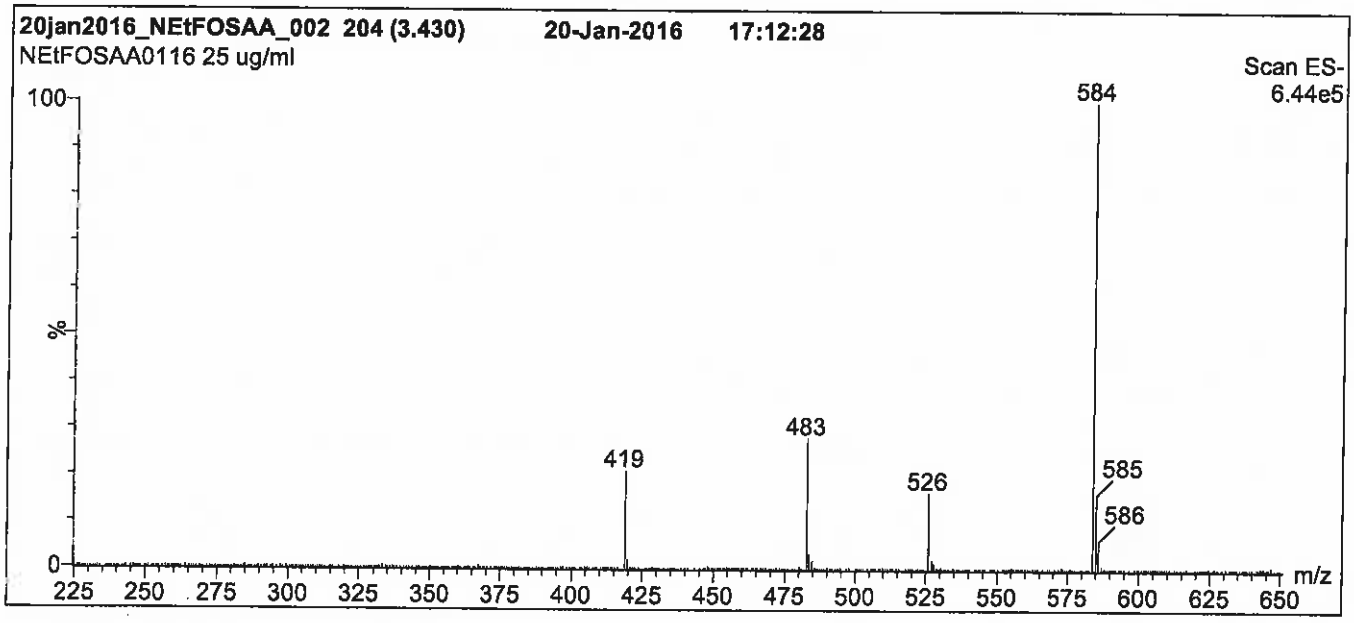
Figure 1: **N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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MS: **Micromass Quattro *micro* API MS**

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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

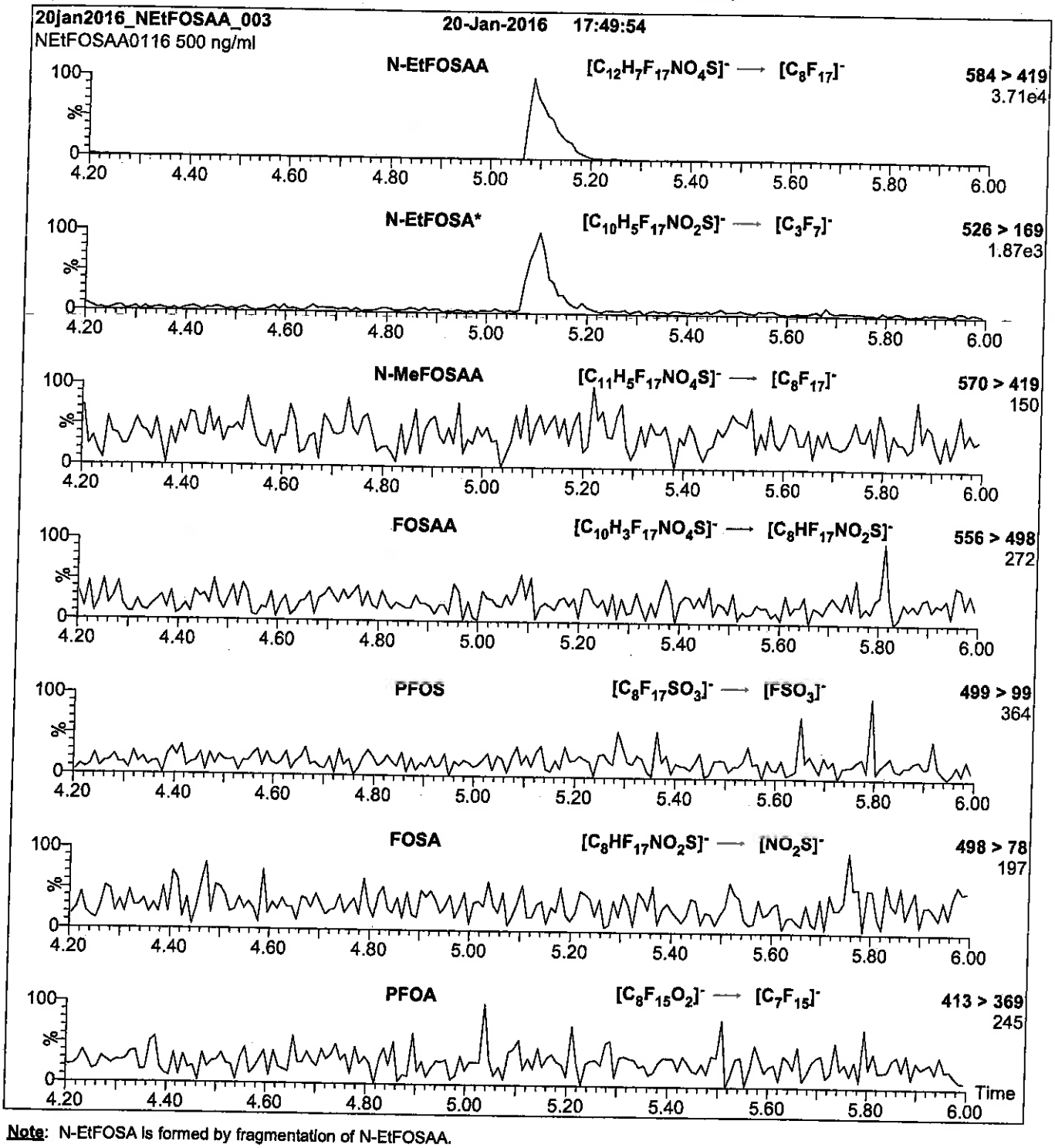
Flow: 300 µl/min

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

Figure 2: **N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Note: N-EtFOSA is formed by fragmentation of N-EtFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 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) = 3.66e-3
Collision Energy (eV) = 25

Reagent

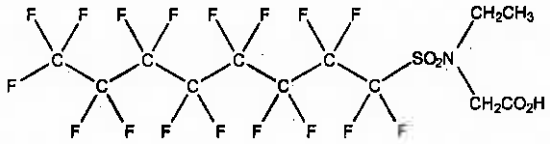
LCN-EtFOSAA_00004

P: 12/29/16 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	N-EtFOSAA	**LOT NUMBER:**	NEtFOSAA0916
COMPOUND:	N-ethylperfluoro-1-octanesulfonamidoacetic acid		
STRUCTURE:		**CAS #:**	2991-50-6



MOLECULAR FORMULA:	$C_{12}H_8F_{17}NO_4S$	**MOLECULAR WEIGHT:**	585.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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 $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using 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:

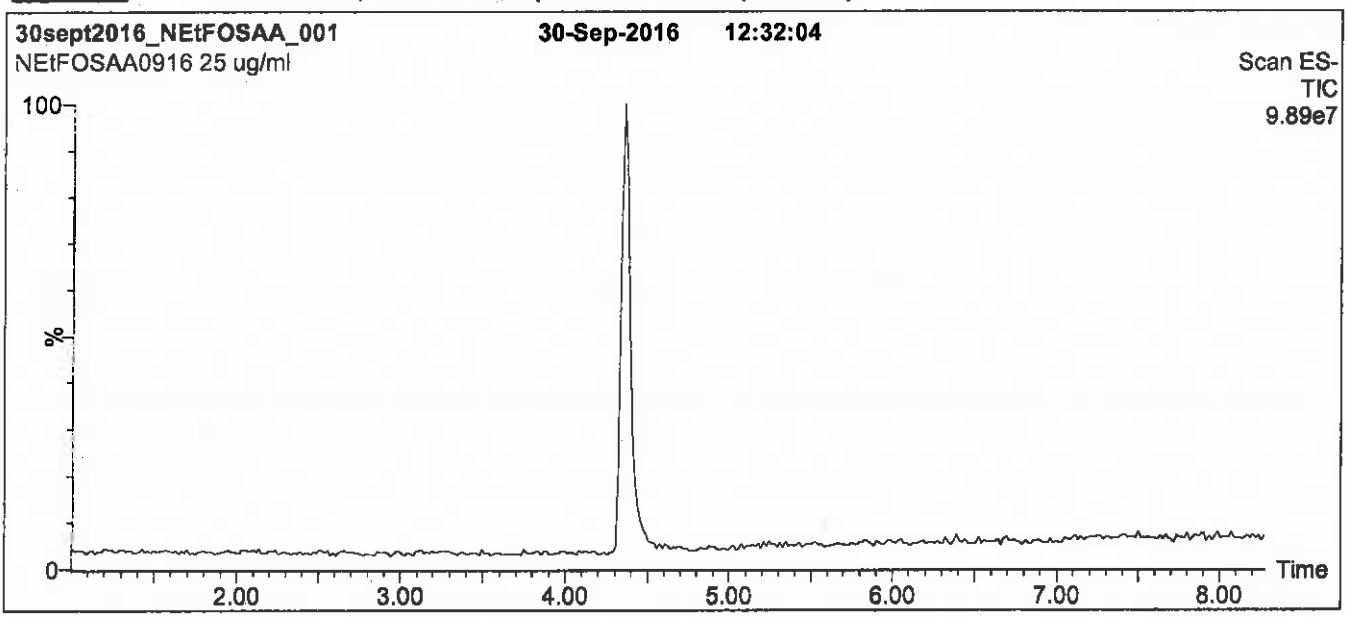
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

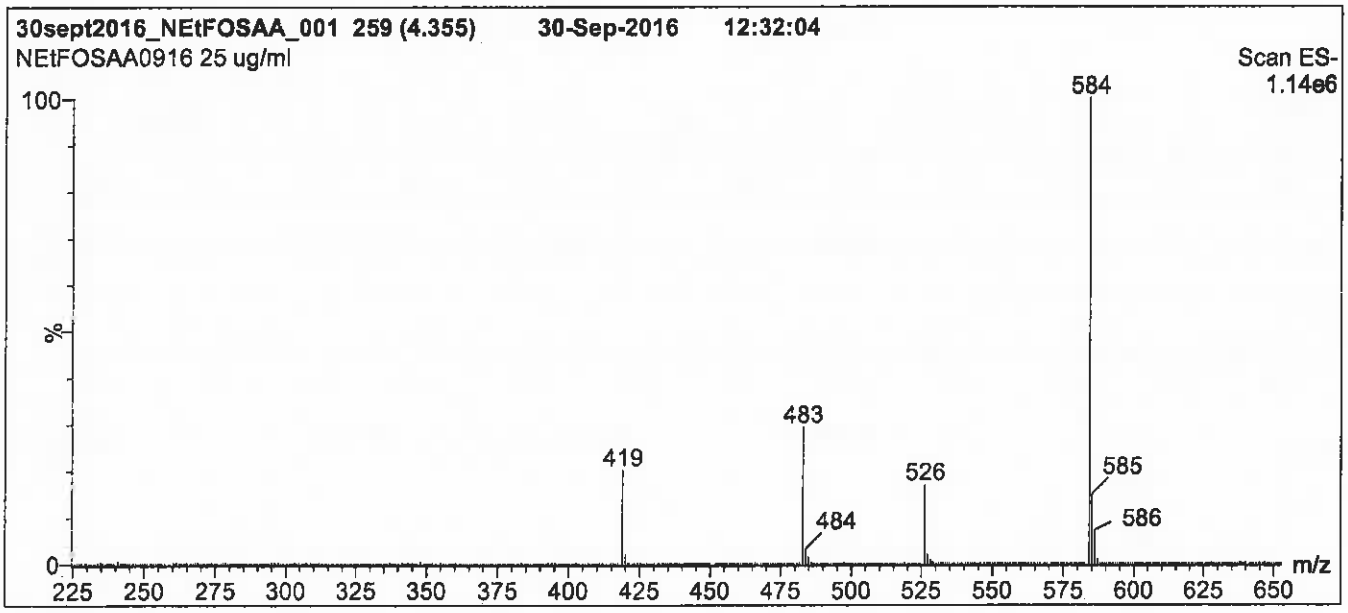
CALA

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

Figure 1: **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: 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

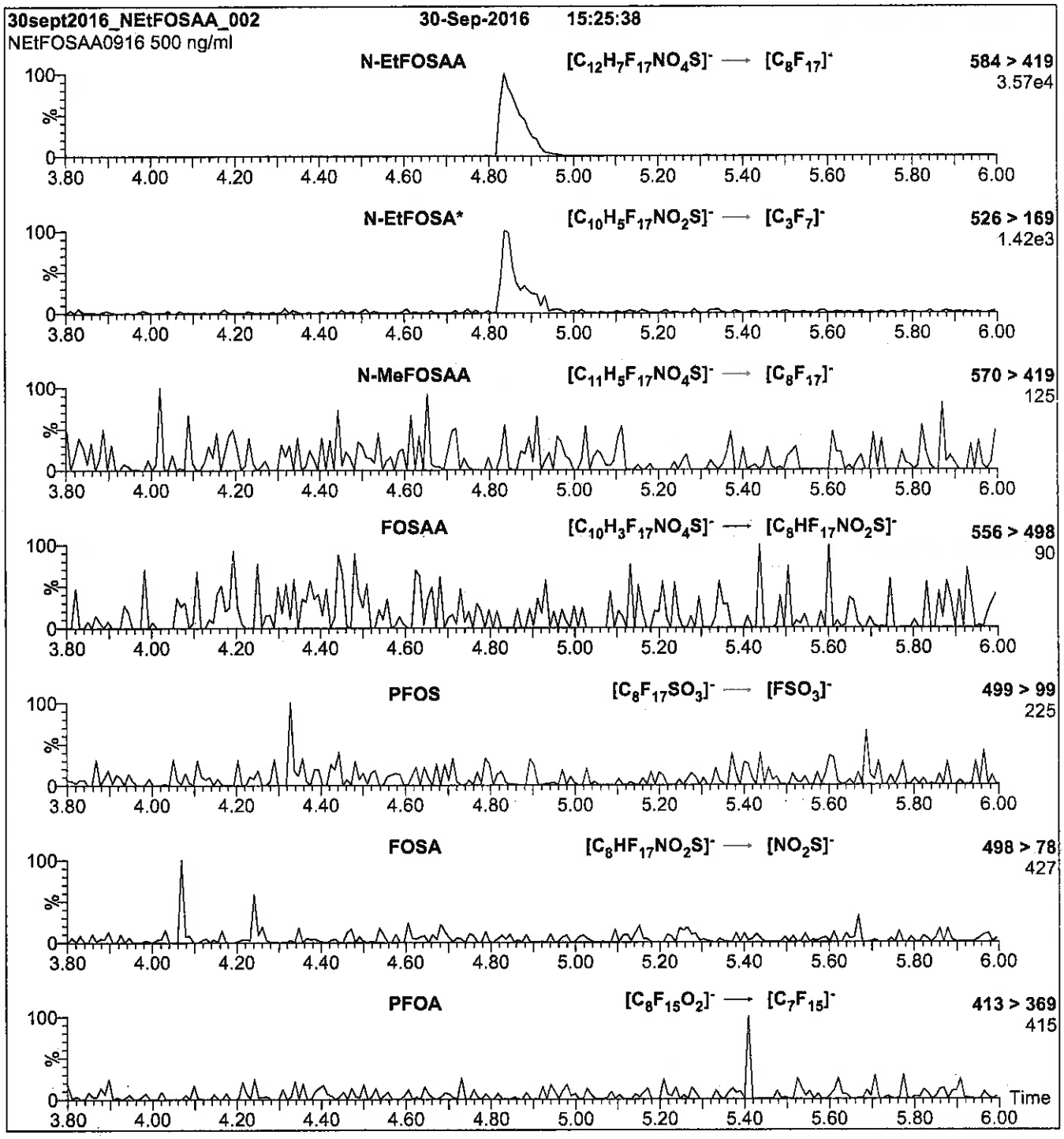
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Note: N-EtFOSA is formed by fragmentation of N-EtFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 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) = 3.43e-3
Collision Energy (eV) = 20

Reagent

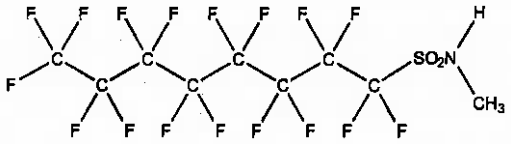
LCN-MeFOSA-M_00003

Pr 12/20/16 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	N-MeFOSA-M	**LOT NUMBER:**	NMeFOSA0516M
COMPOUND:	N-methylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	31506-32-8



MOLECULAR FORMULA:	$C_8H_4F_{17}NO_2S$	**MOLECULAR WEIGHT:**	513.17
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/26/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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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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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CALA

ANAB ACCREDITED

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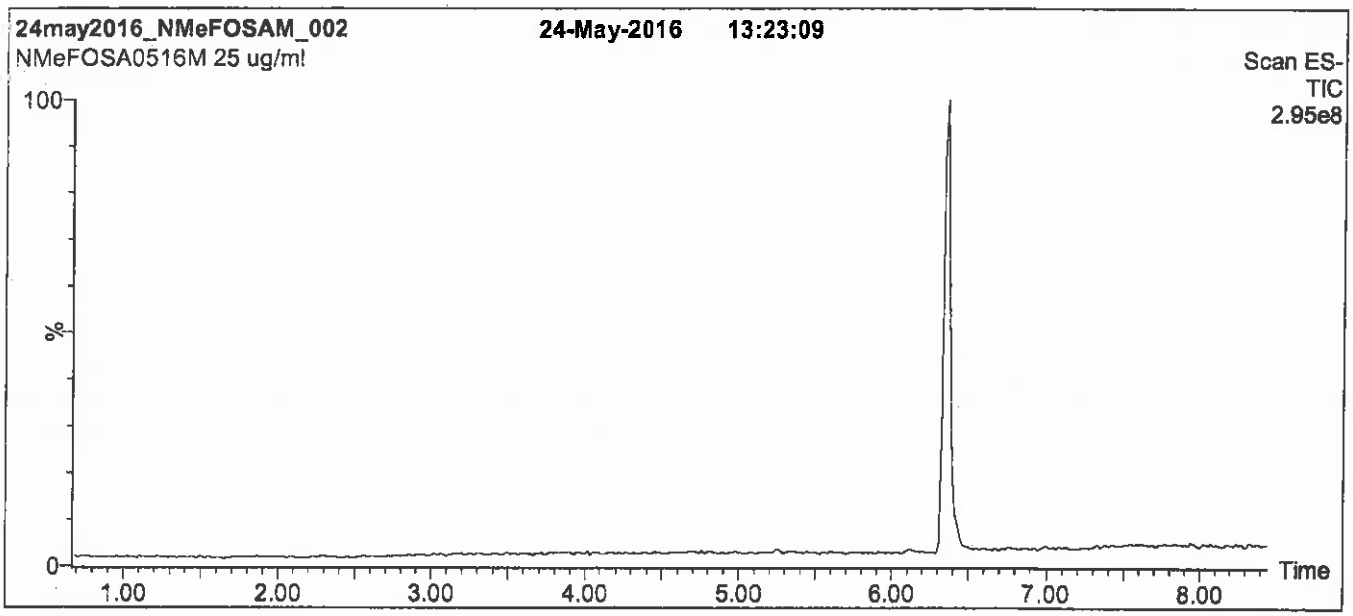
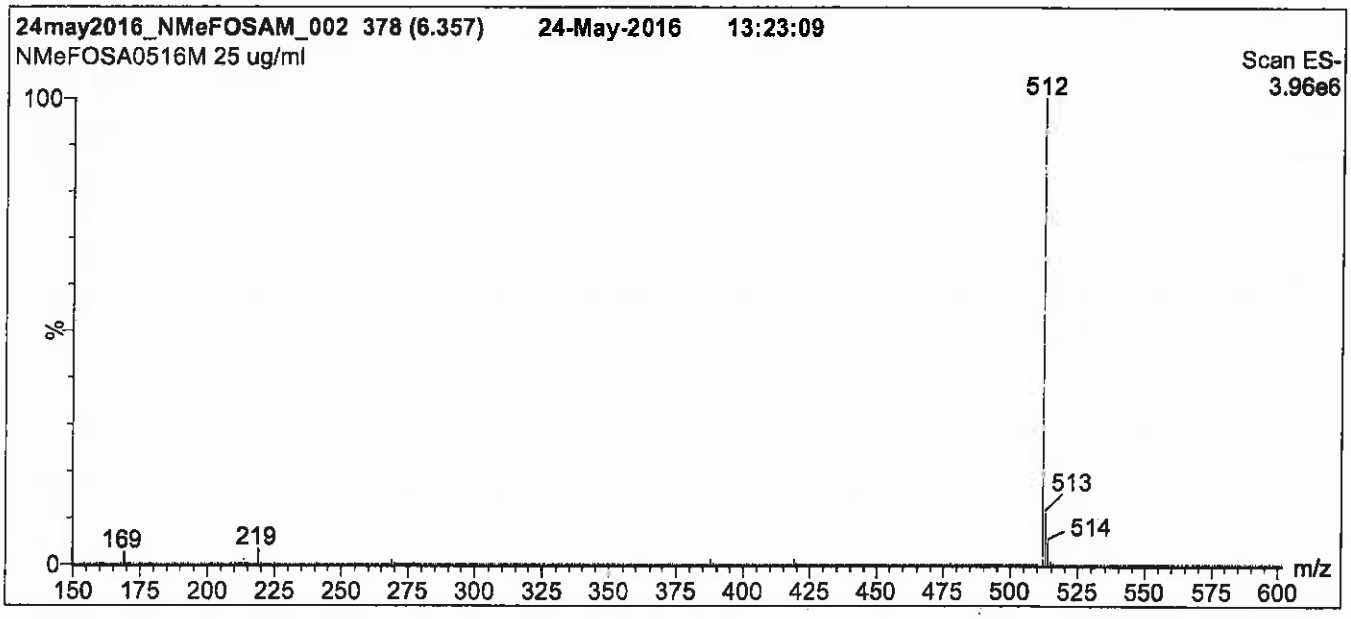
Figure 1: **N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

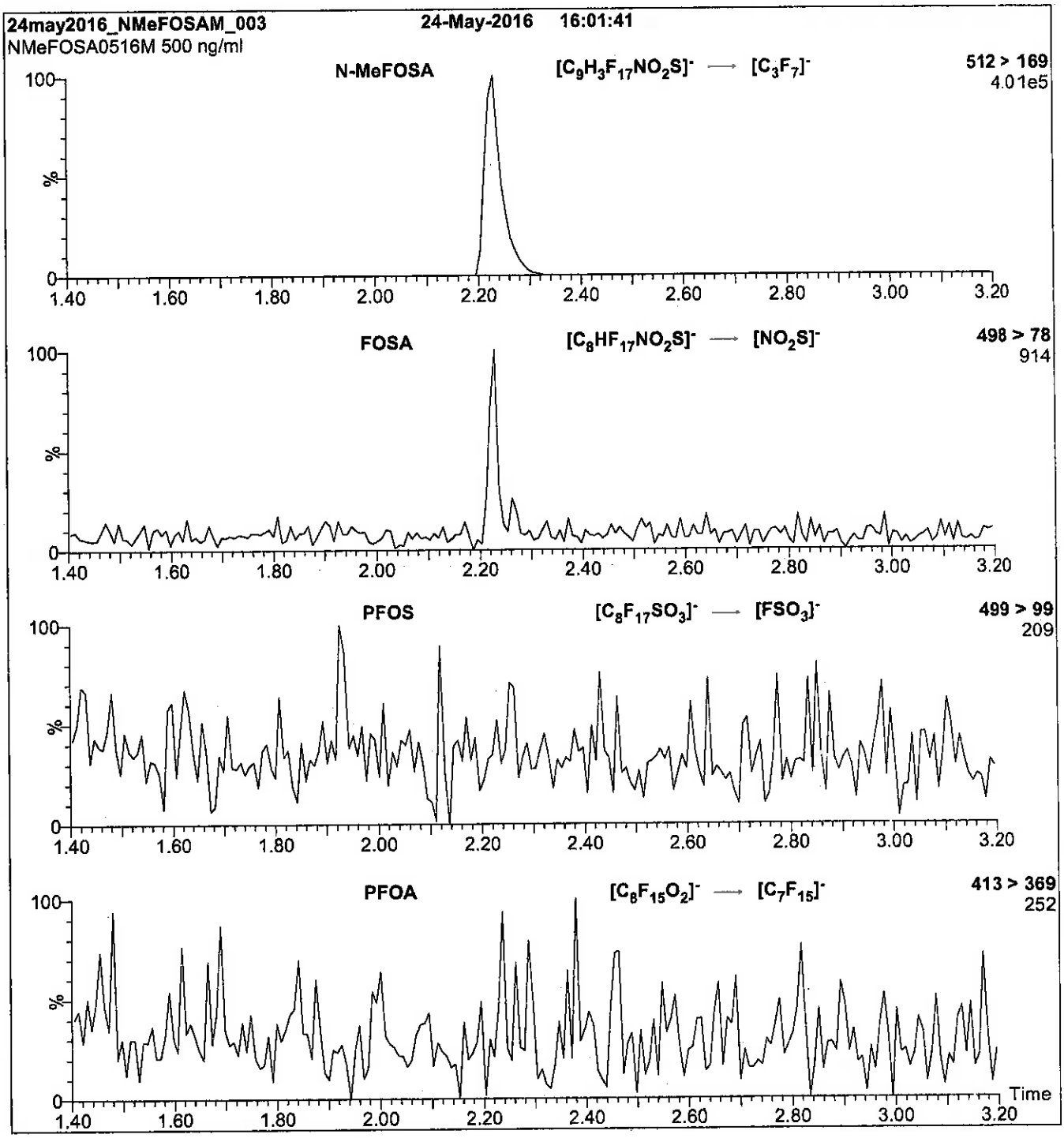
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

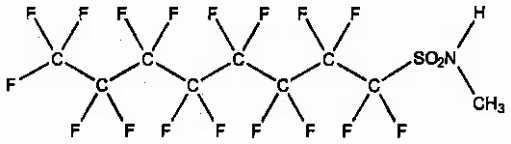
LCN-MeFOSA-M_00004

Pr 12/20/16 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	N-MeFOSA-M	**LOT NUMBER:**	NMeFOSA0516M
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)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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ADDITIONAL INFORMATION:

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CALA

ANAB ACCREDITED

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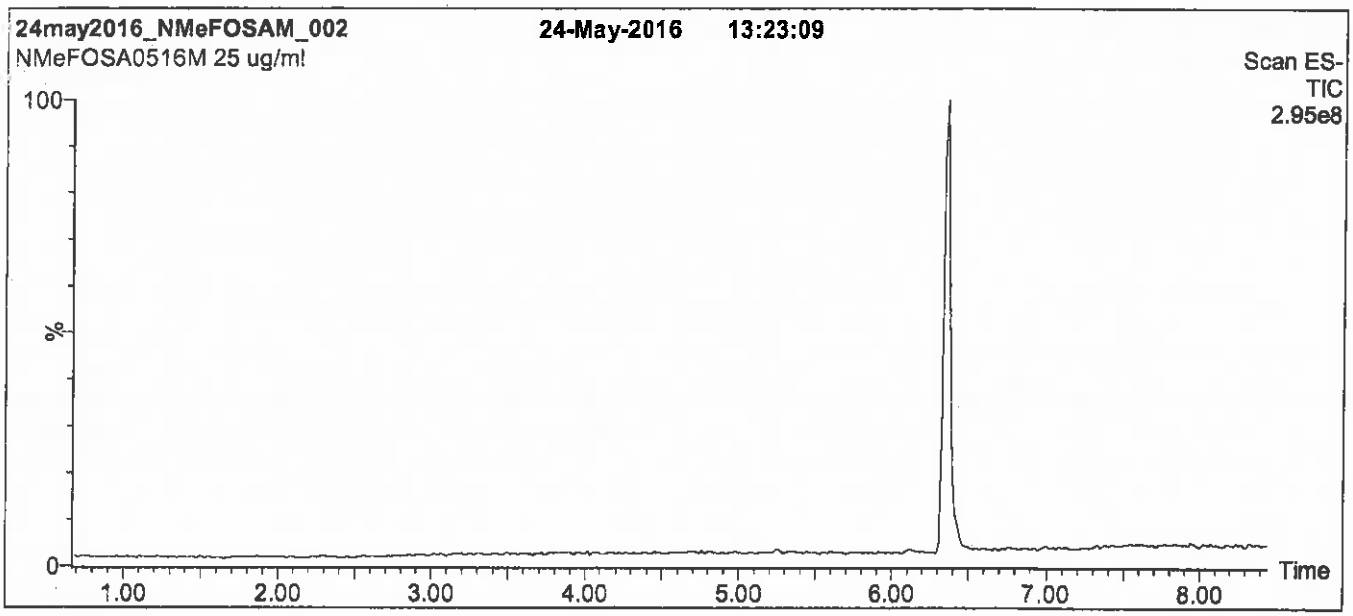
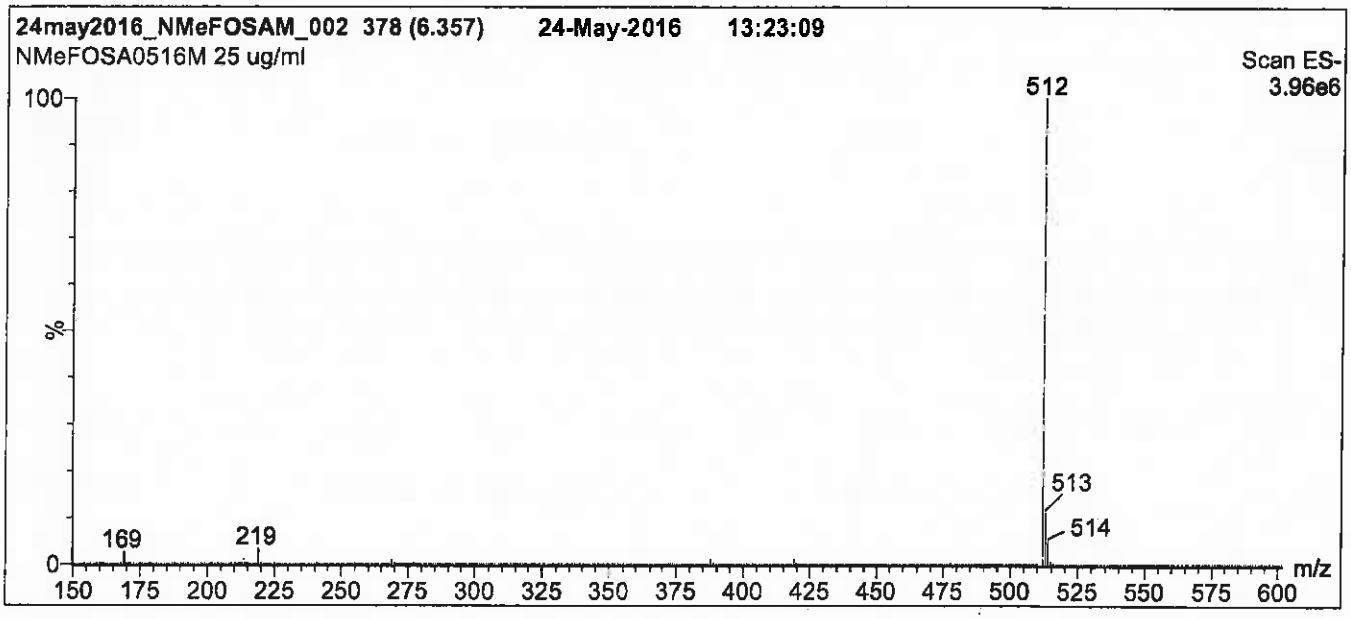
Figure 1: **N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

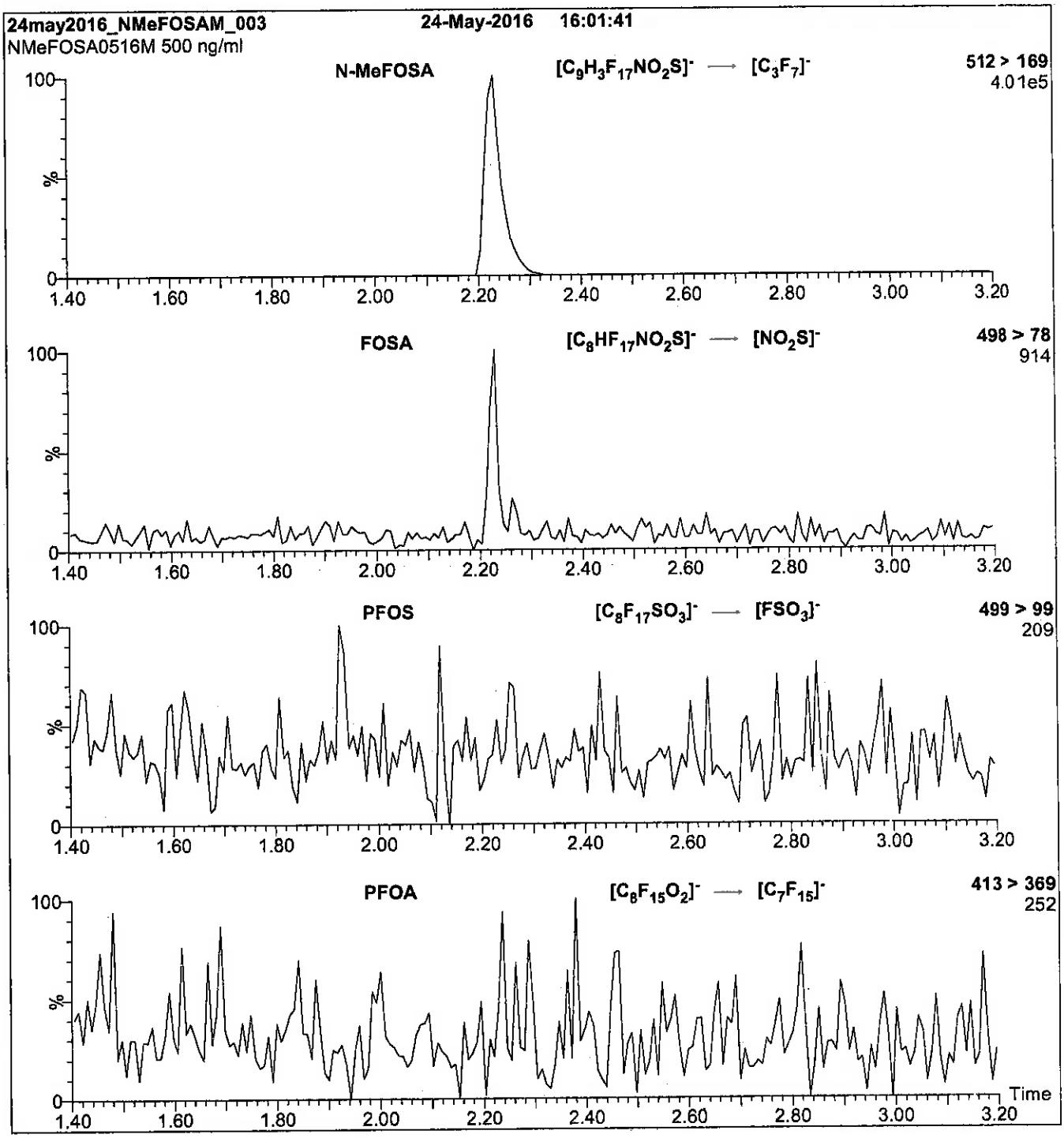
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCN-MeFOSAA_00003

R: 8/23/16 SBC

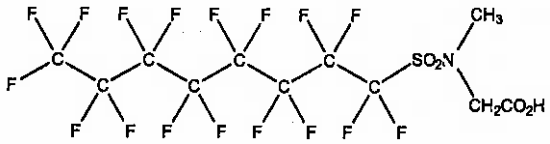
715562
ID: LCN-MeFOSAA_00003
Exp: 01/20/21 Prpd: SBC
N-MeFOSAA

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSAA **LOT NUMBER:** NMeFOSAA0116
COMPOUND: N-methylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2355-31-9



MOLECULAR FORMULA: $C_{11}H_6F_{17}NO_4S$ **MOLECULAR WEIGHT:** 571.21
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/20/2016
EXPIRY DATE: (mm/dd/yyyy) 01/20/2021
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.
- 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: B.G. Chittim **Date:** 01/21/2016 (mm/dd/yyyy)

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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.

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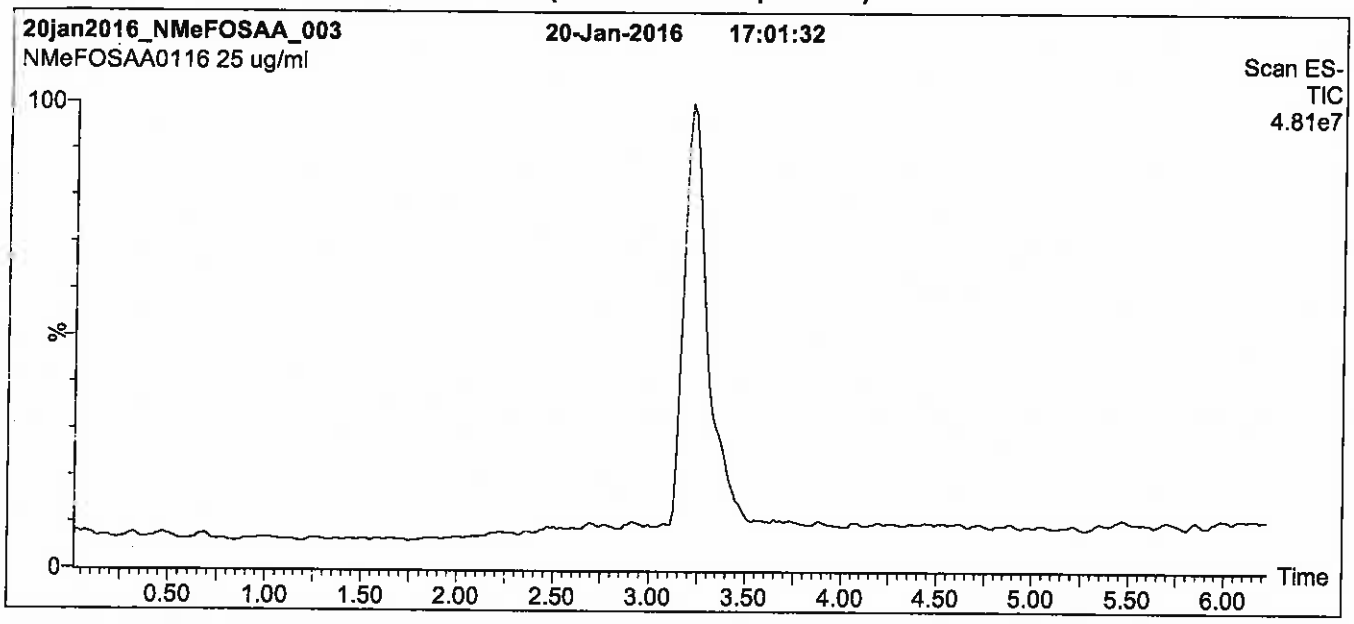
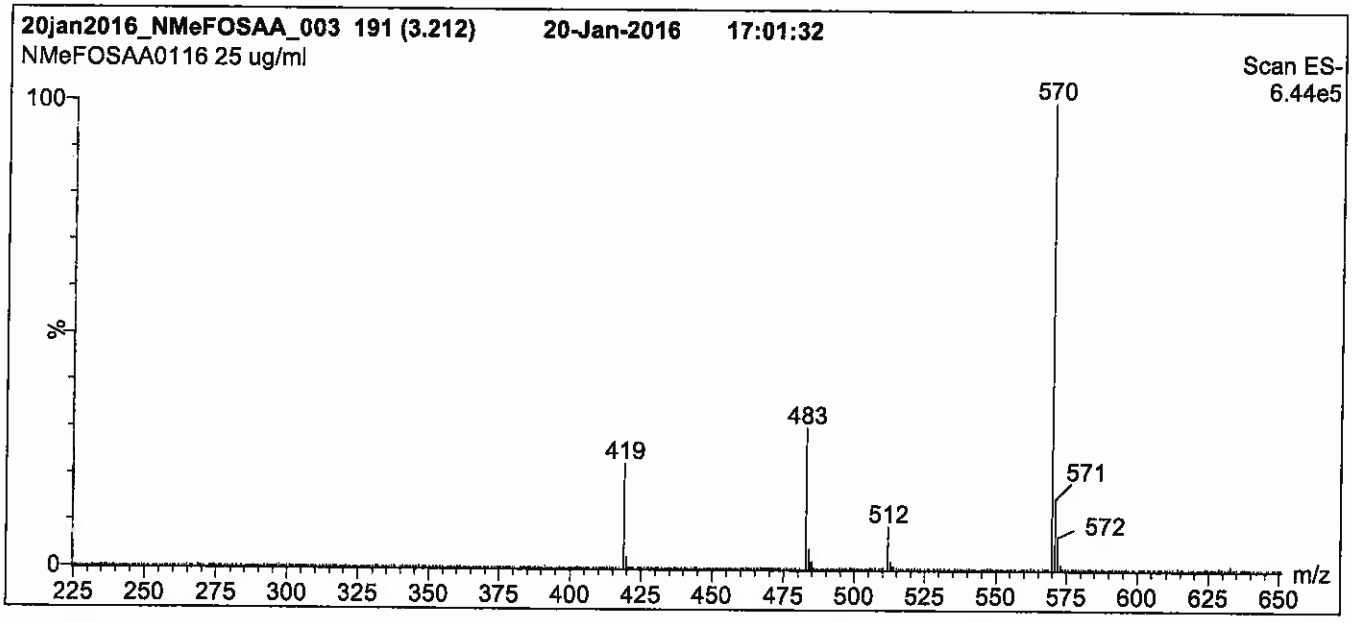
Figure 1: **N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

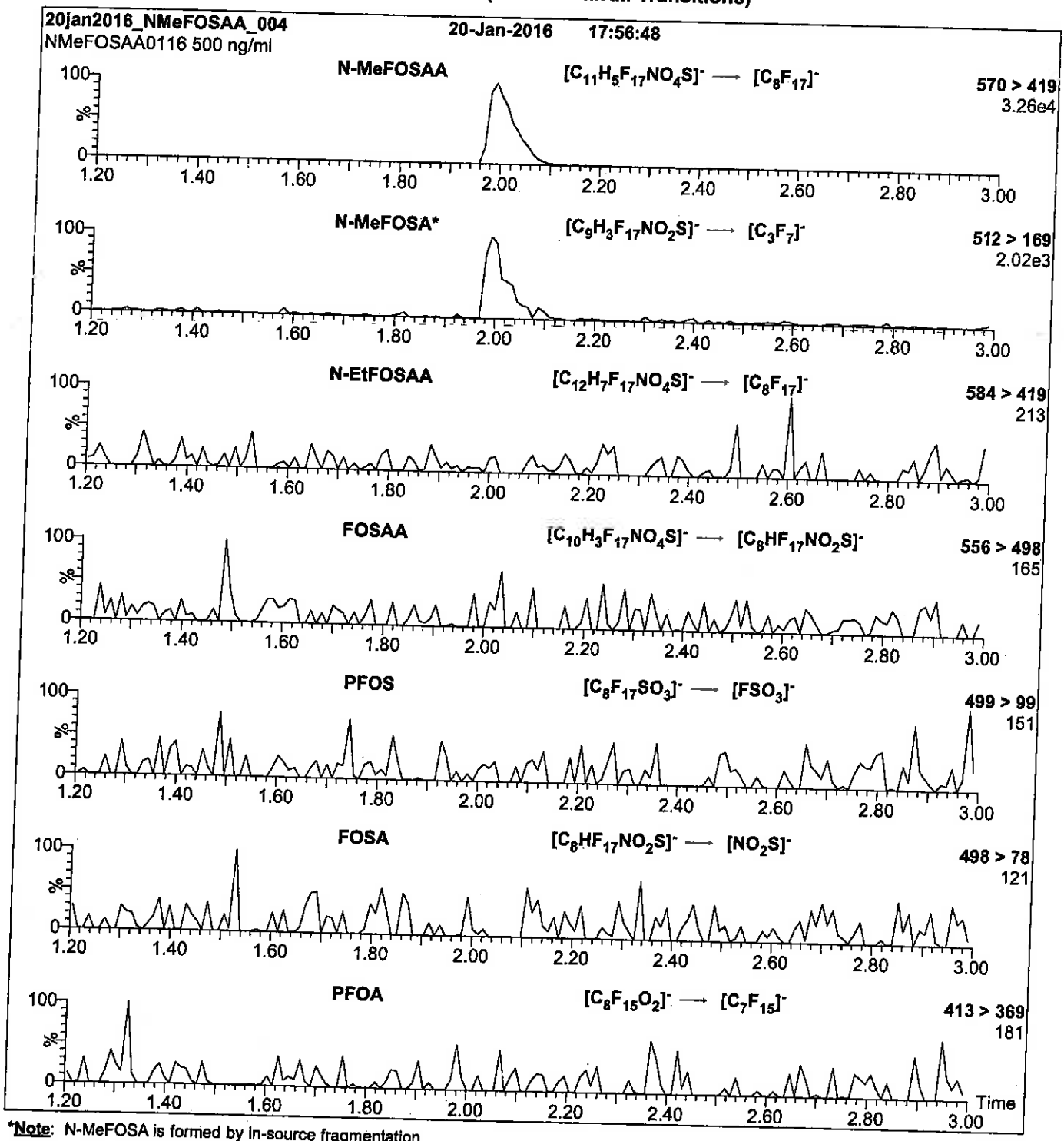
Flow: 300 µl/min

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

Figure 2: **N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



***Note**: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 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) = 3.66e-3
Collision Energy (eV) = 25

Reagent

LCN-MeFOSAA_00004

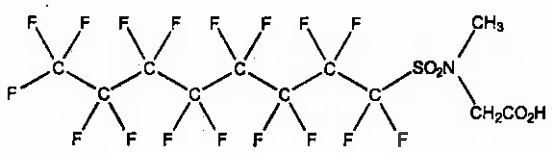
P: R/28/16 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: N-MeFOSAA
LOT NUMBER: NMeFOSAA0916
COMPOUND: N-methylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE:
CAS #: 2355-31-9



MOLECULAR FORMULA:	$C_{11}H_8F_{17}NO_4S$	**MOLECULAR WEIGHT:**	571.21
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	10/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	10/12/2021		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/25/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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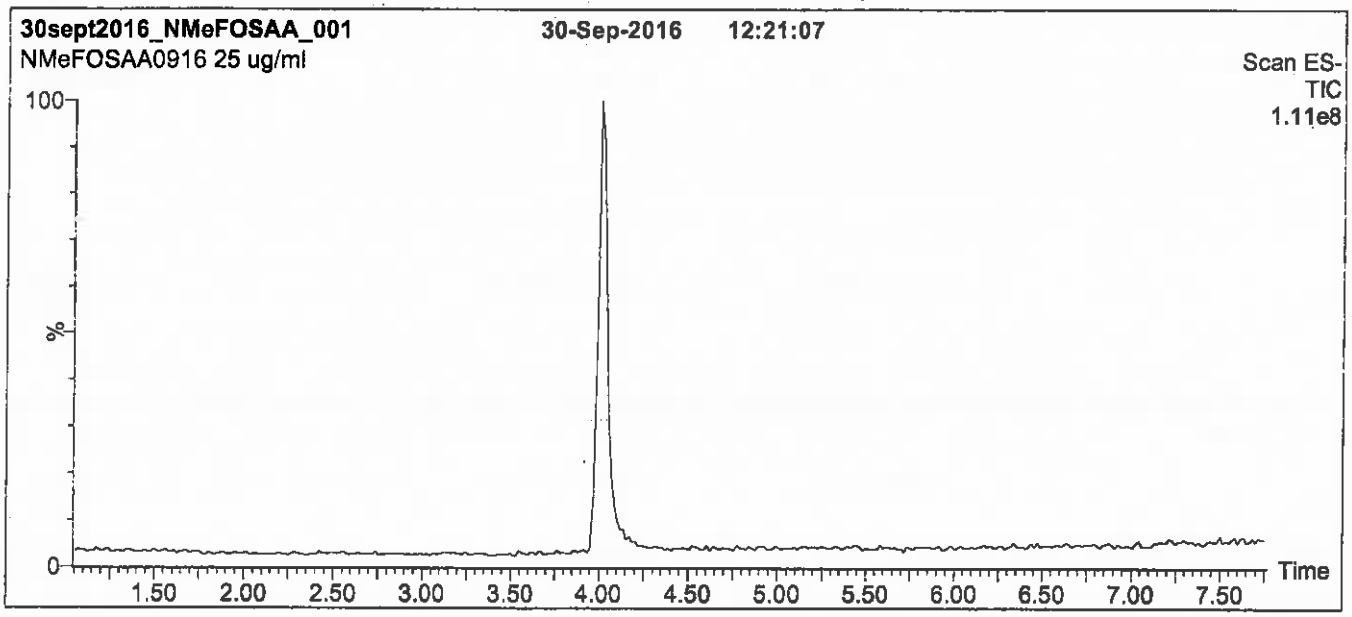

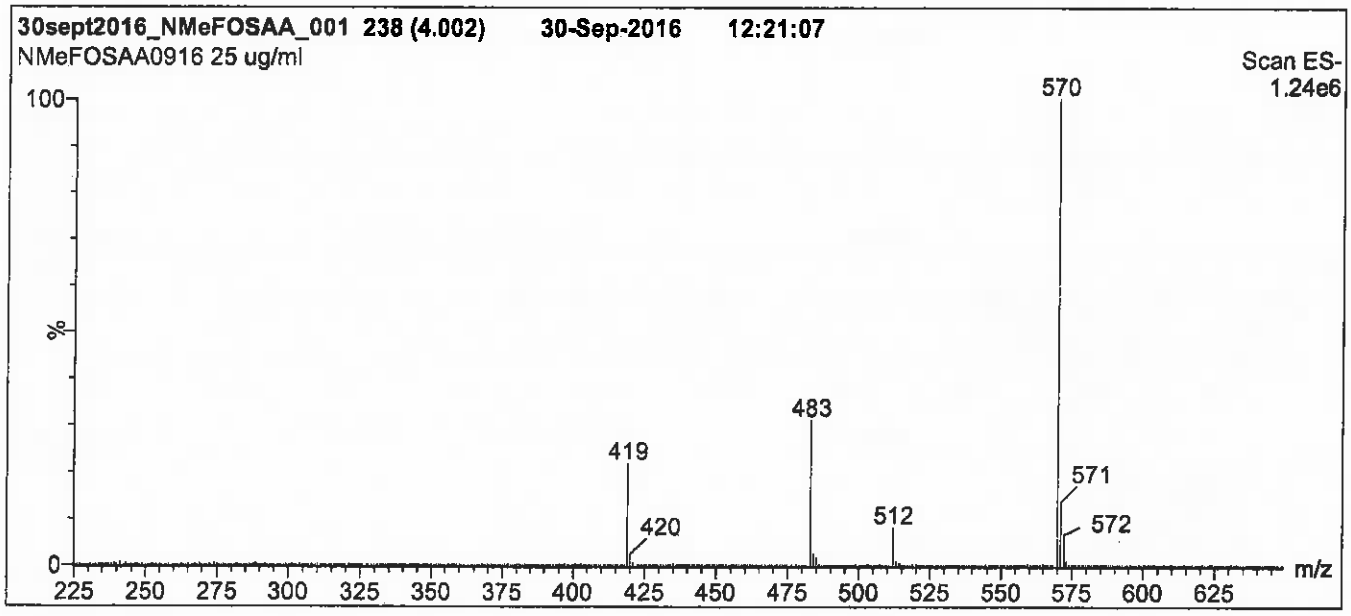

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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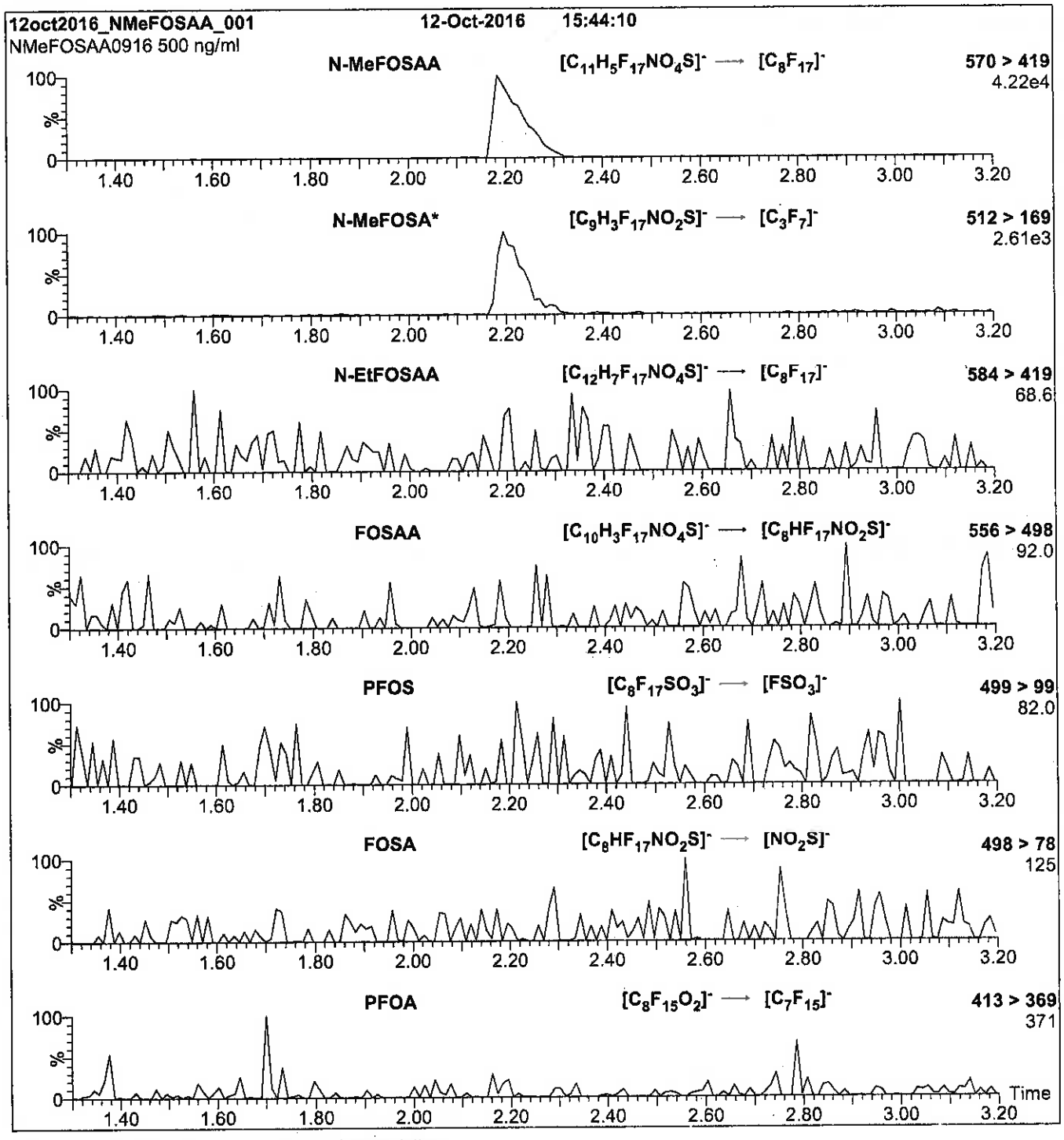


***Note**: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 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) = 3.28e-3
Collision Energy (eV) = 20

Reagent

LCPFBA_00006

Scanned 10/16/14

R: SBC 9/13/16

730531
ID: LCPFBA_00005
Exp: 05/27/21 Prpd: SBC
PF-n-butanoic acid

730532
ID: LCPFBA_00006
Exp: 05/27/21 Prpd: SBC
PF-n-butanoic acid

WELLINGTON LABORATORIES

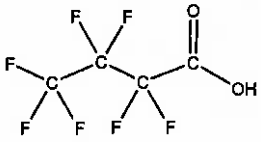
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFBA
COMPOUND: Perfluoro-n-butanoic acid

LOT NUMBER: PFBA0516

STRUCTURE:

CAS #: 375-22-4



MOLECULAR FORMULA: $C_4HF_7O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 214.04
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/27/2016
EXPIRY DATE: (mm/dd/yyyy) 05/27/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/31/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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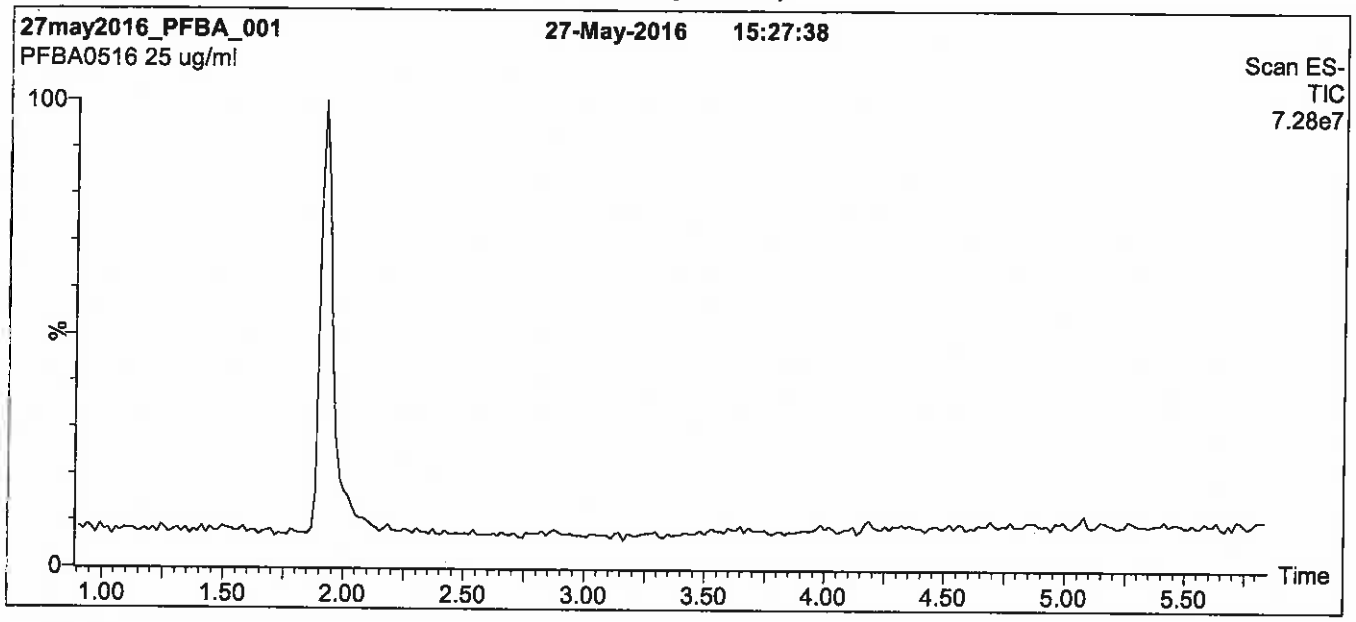
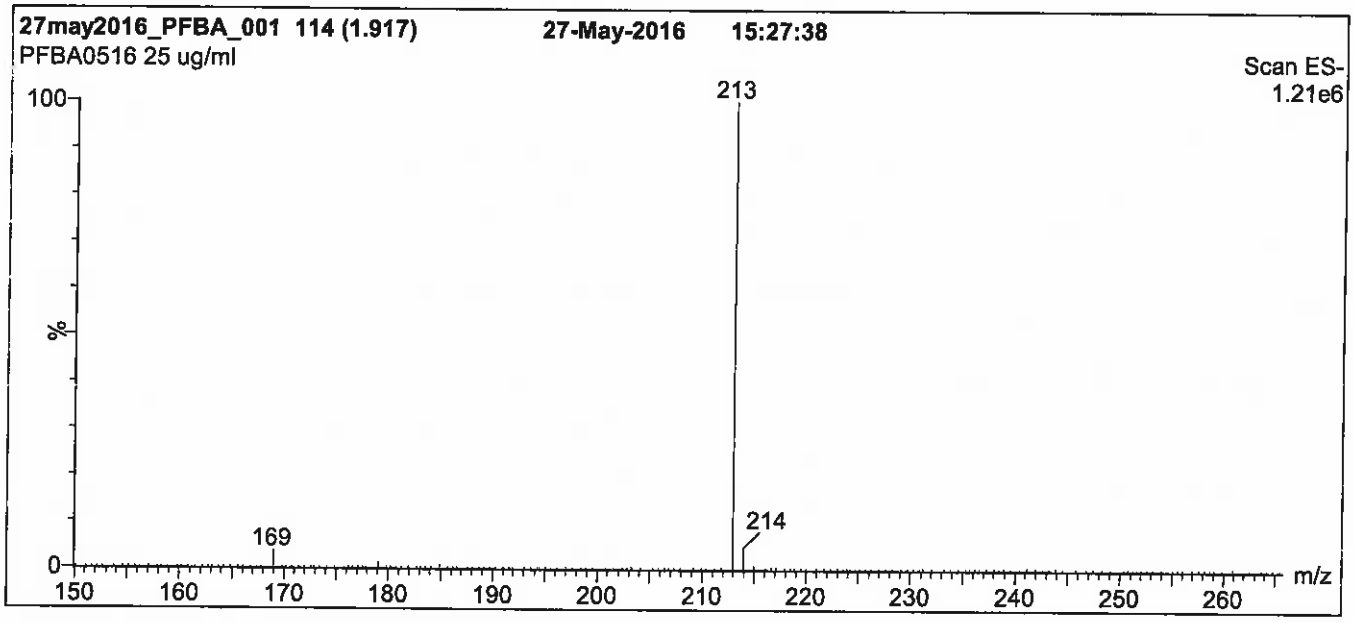
Figure 1: **PFBA; LC/MS Data (TIC and Mass Spectrum)**





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

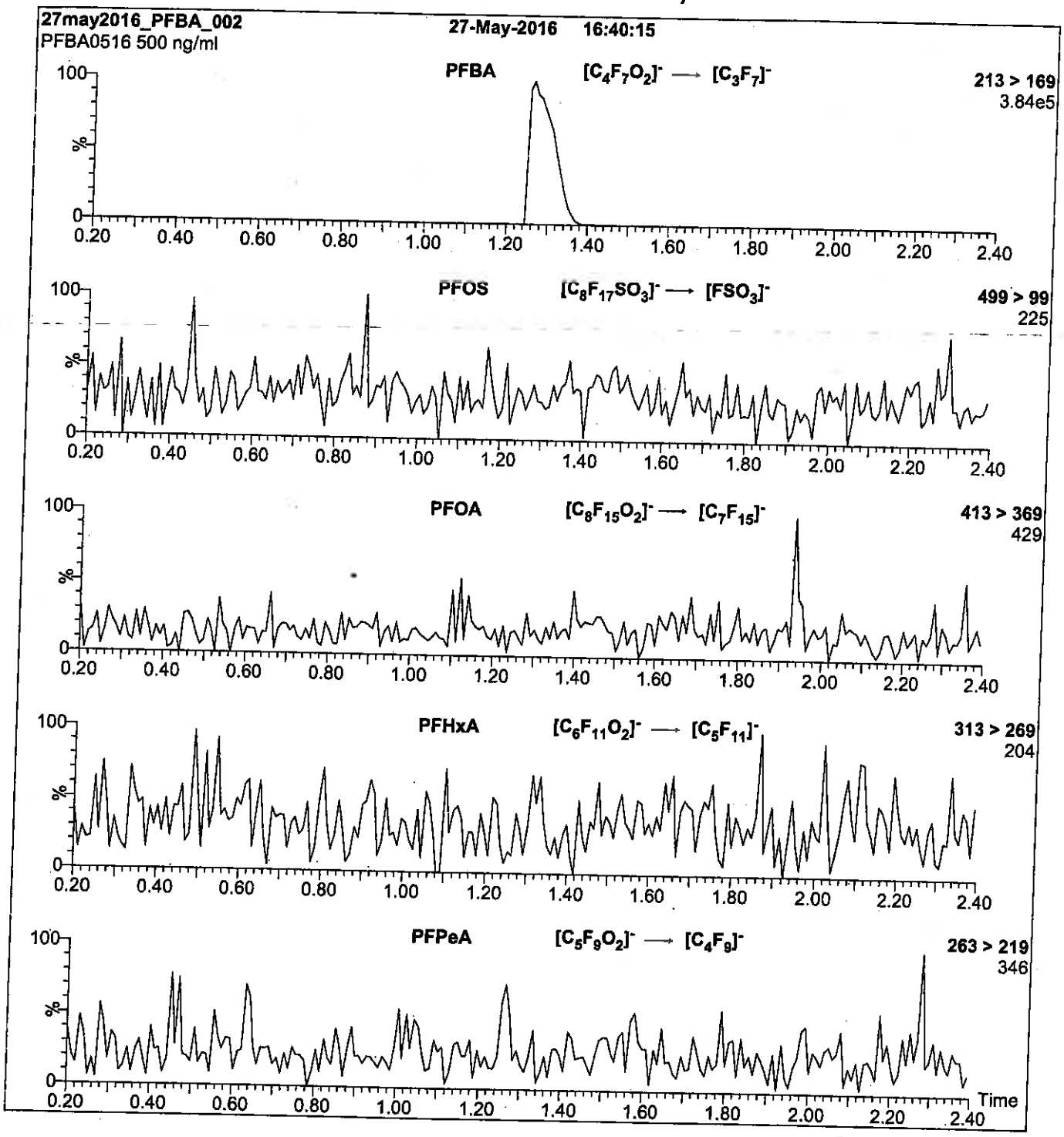
Flow: 300 µl/min

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

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) = 3.62e-3
Collision Energy (eV) = 10

Reagent

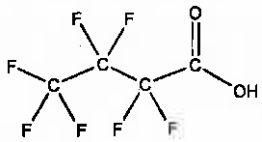
LCPFBA_00007

r: 12/20/16 SN
S

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFBA	**LOT NUMBER:**	PFBA0516
COMPOUND:	Perfluoro-n-butanoic acid		
STRUCTURE:		**CAS #:**	375-22-4



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CALA

ANAB ACCREDITED

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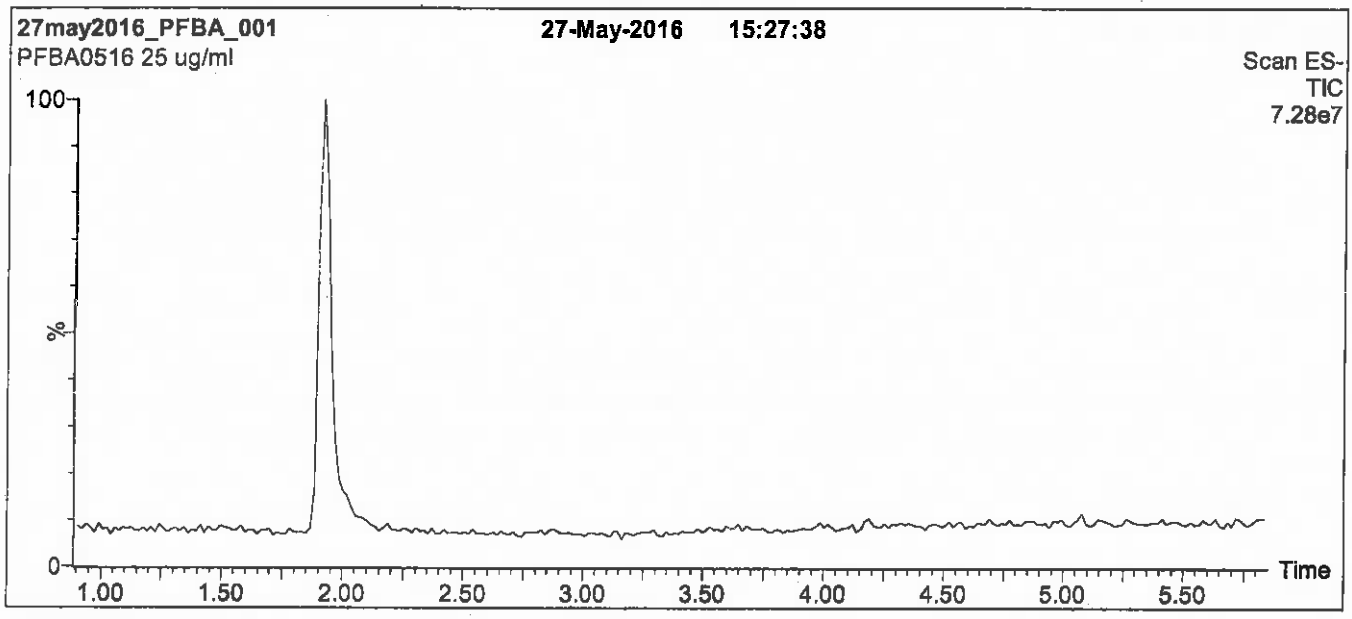
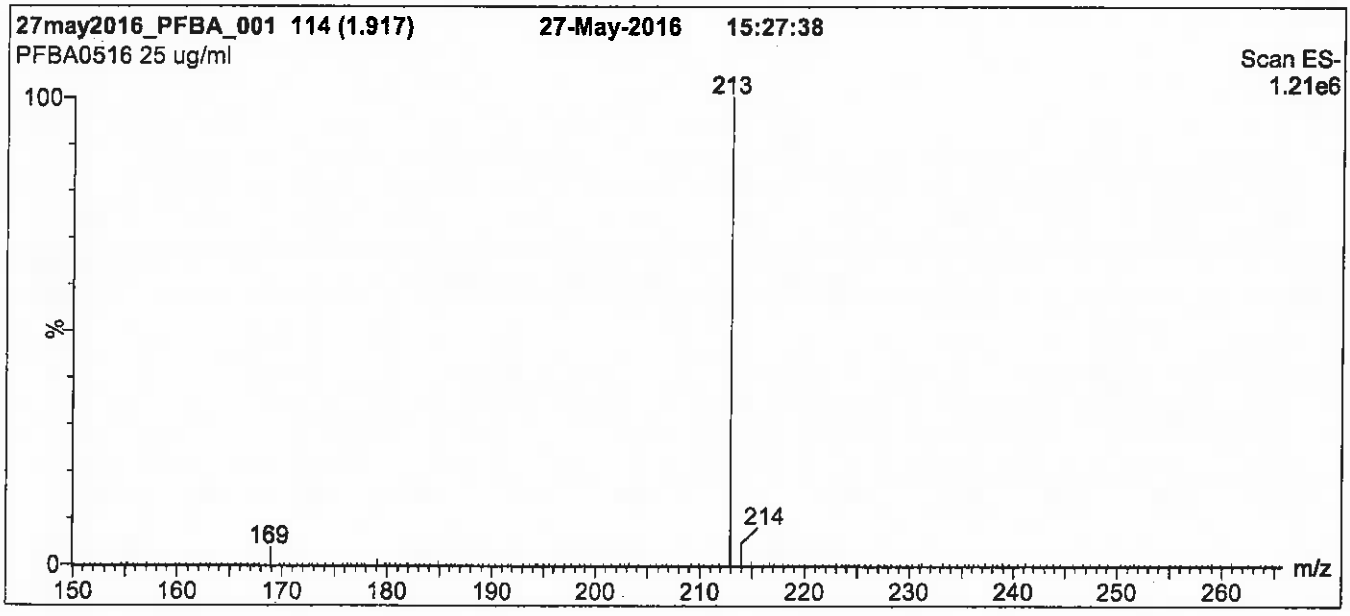
Figure 1: **PFBA; LC/MS Data (TIC and Mass Spectrum)**





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

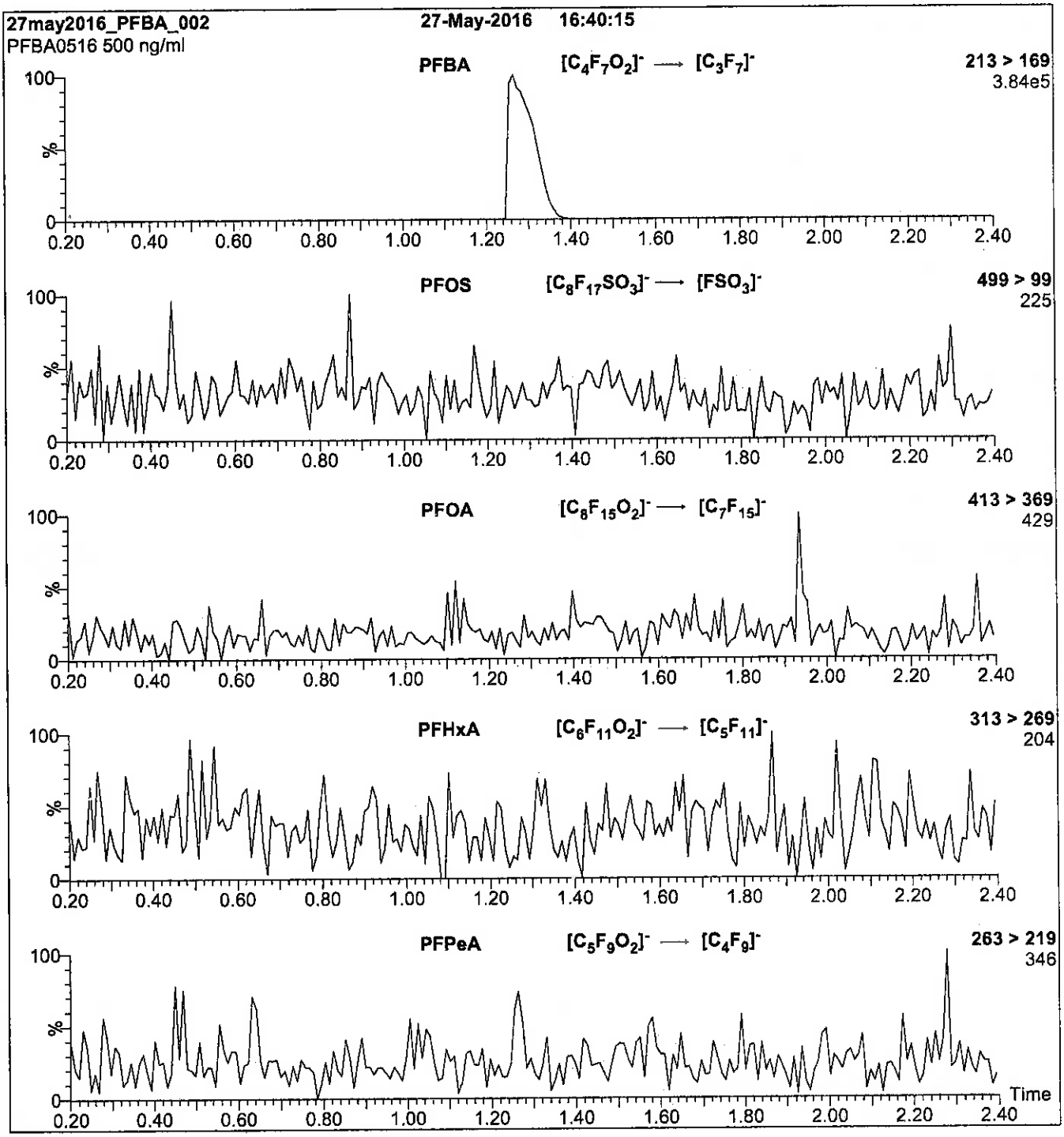
Flow: 300 µl/min

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

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) = 3.62e-3
Collision Energy (eV) = 10

Reagent

LCPFBS_00006

R: SBC 9/13/16

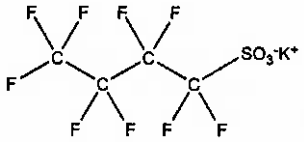
730511
ID: LCPFBS_00005
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

730512
ID: LCPFBS_00006
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
LOT NUMBER: LPFBS0316
COMPOUND: Potassium perfluoro-1-butanesulfonate
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)	03/15/2016		
EXPIRY DATE: (mm/dd/yyyy)	03/15/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/21/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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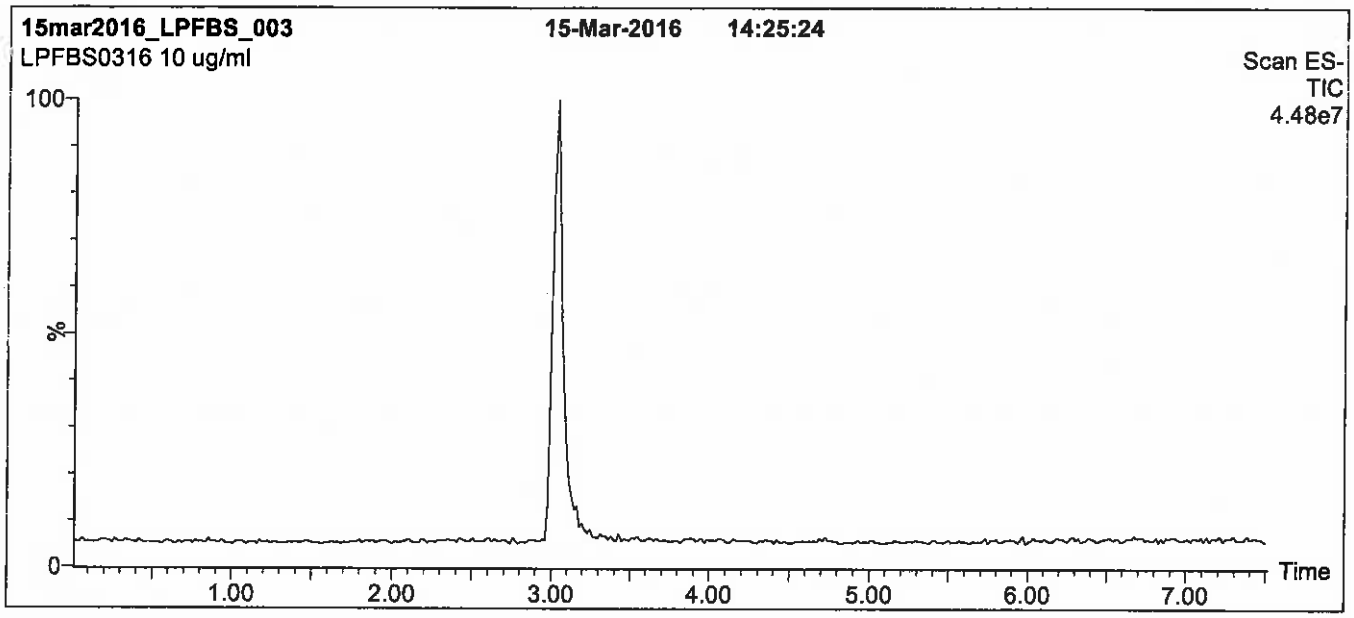
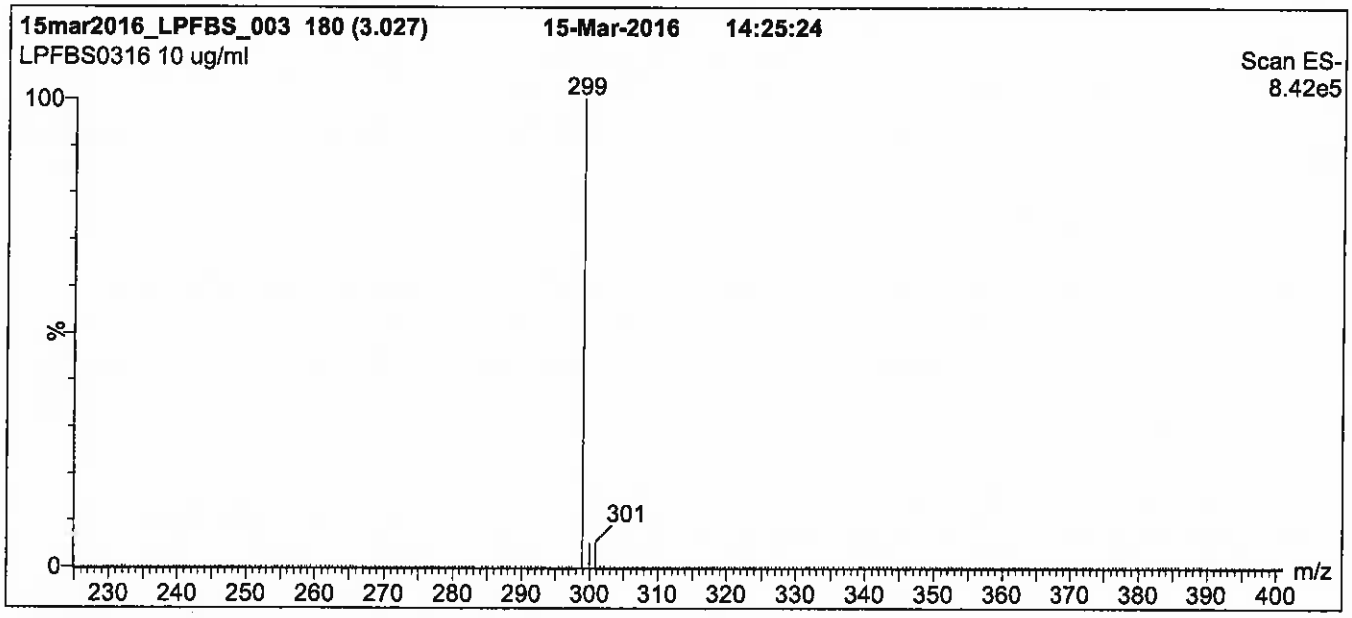
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

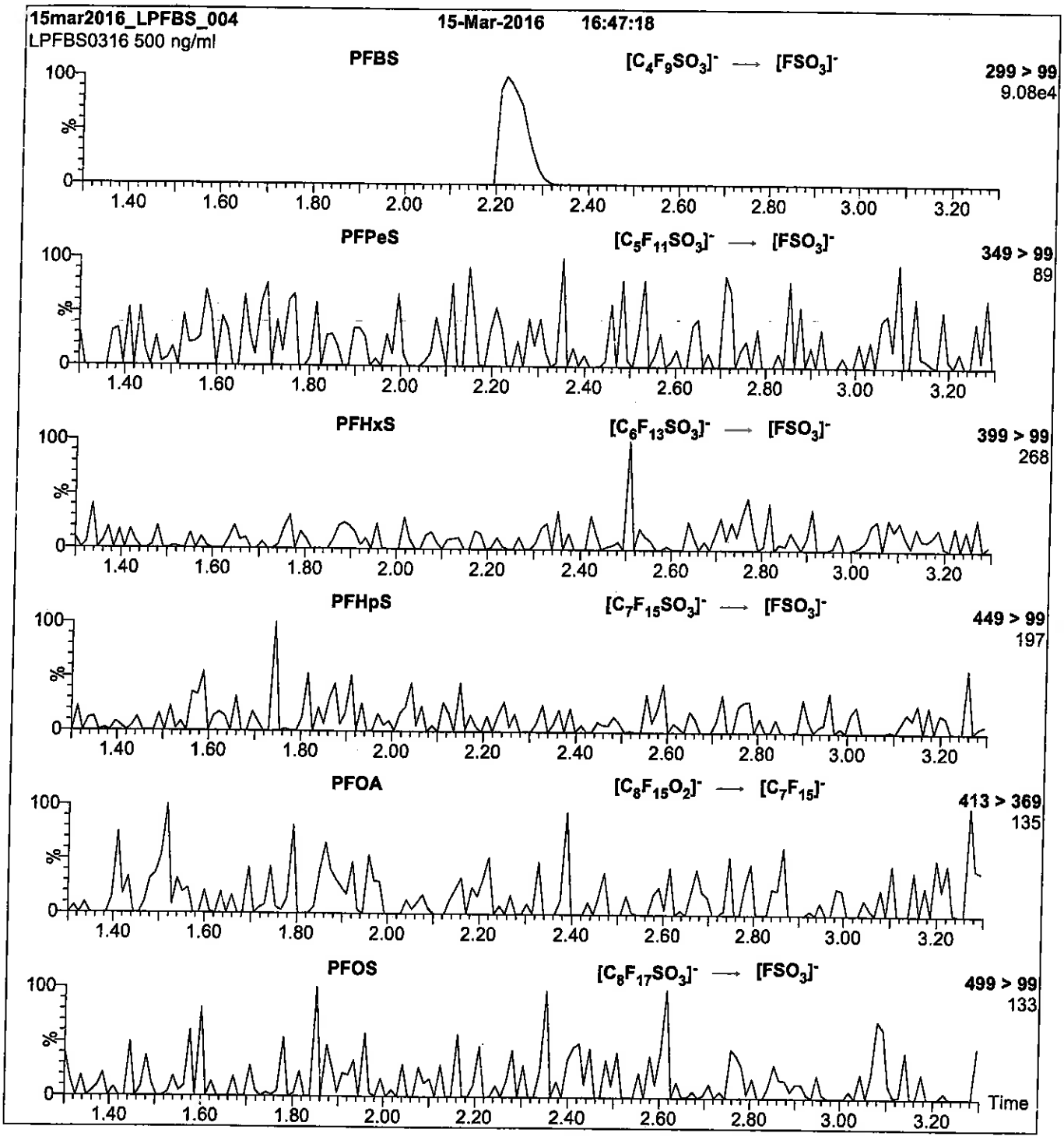
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.20e-3
Collision Energy (eV) = 25

Reagent

LCPFBS_00008

R: SBC 9/13/16

730724
ID: LCPFBS_00007
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

730725
ID: LCPFBS_00008
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

WELLINGTON LABORATORIES

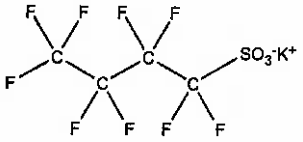
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate

LOT NUMBER: LPFBS0316

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)	03/15/2016		
EXPIRY DATE: (mm/dd/yyyy)	03/15/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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ADDITIONAL INFORMATION:

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Certified By: B.G. Chittim **Date:** 03/21/2016 (mm/dd/yyyy)

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CALA Testing Accreditation No. A1226

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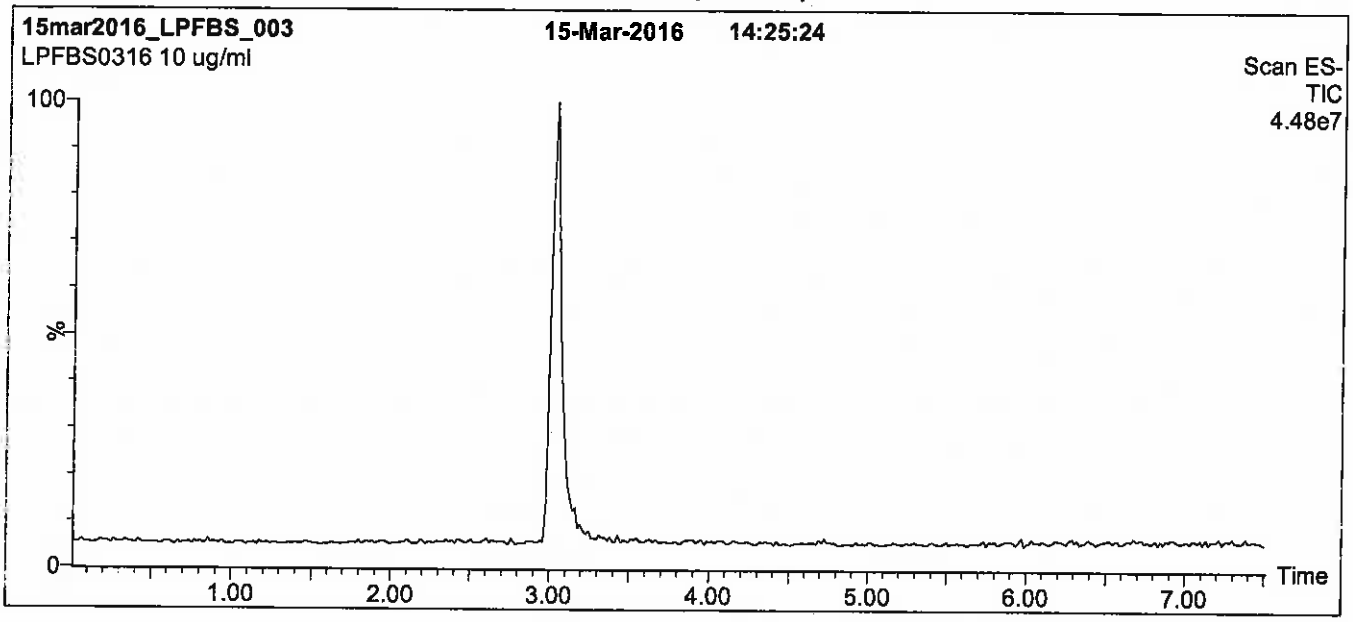

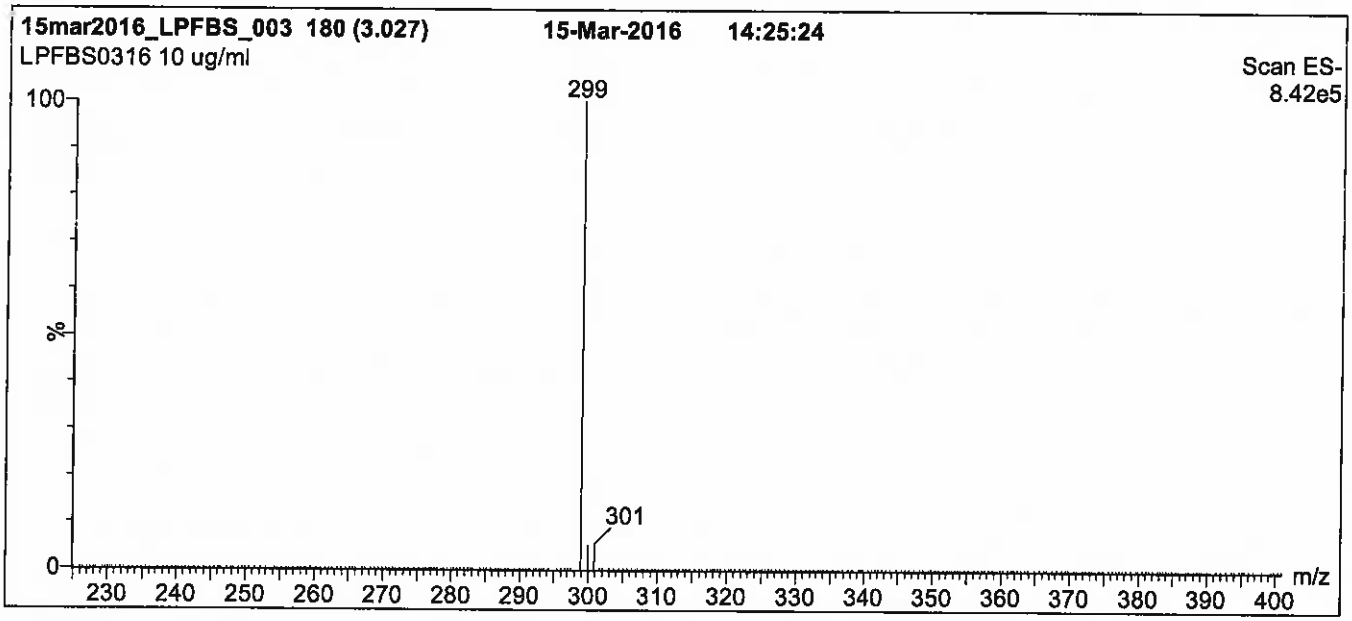

Conditions for Figure 1:

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MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

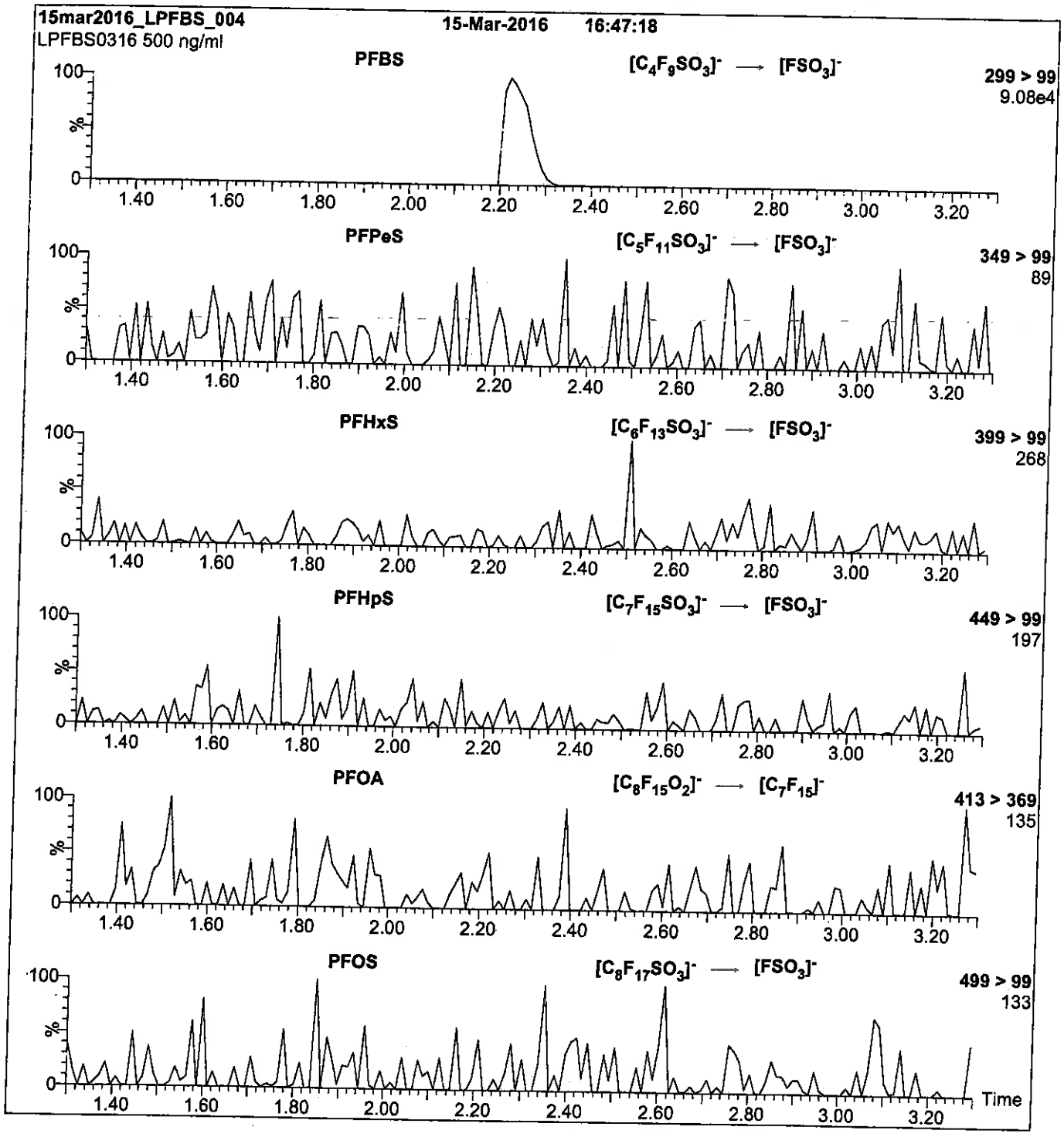
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.20e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00006

R: SBC 9/13/16
scanned 10/4/16 SR

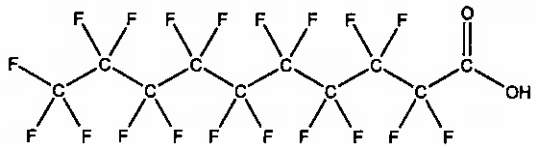
730620
ID: LCPFDA_00006
Exp: 05/31/21 Prpd: SBC
PF-n-decanoic acid

730621
ID: LCPFDA_00007
Exp: 05/31/21 Prpd: SBC
PF-n-decanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDA	**LOT NUMBER:**	PFDA0516
COMPOUND:	Perfluoro-n-decanoic acid		
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)	05/31/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of Perfluoro-n-nonanoic acid (PFNA).

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Certified By: _____ B.G. Chittim **Date:** 06/13/2016 (mm/dd/yyyy)

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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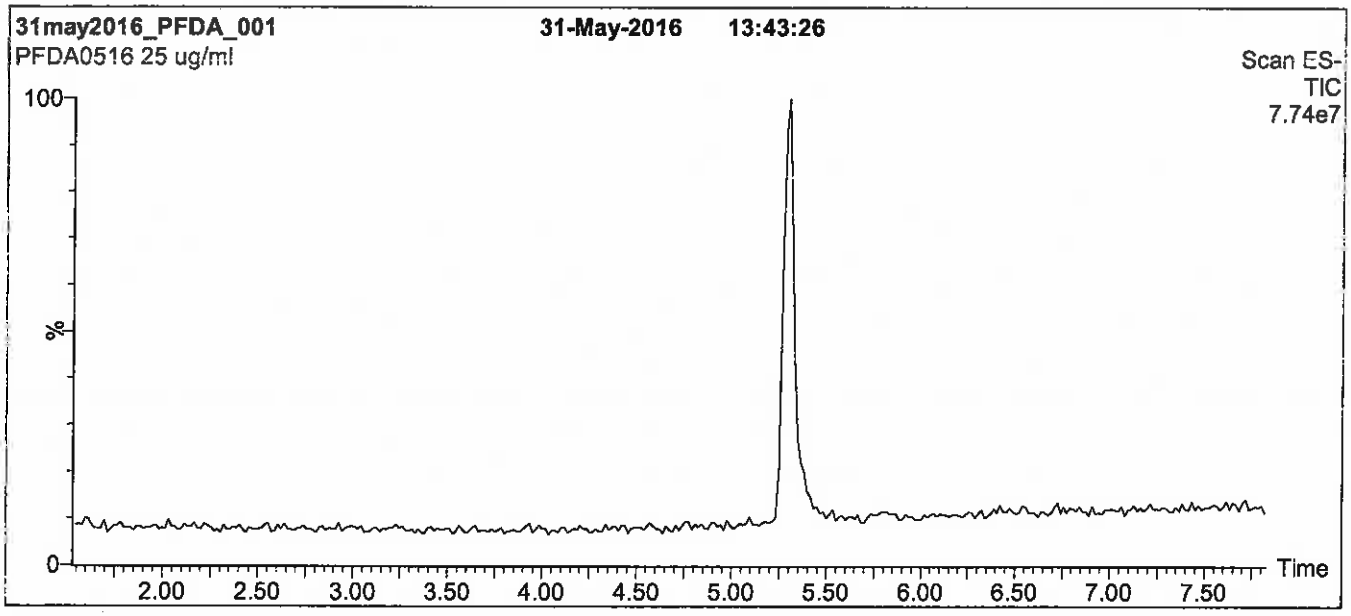
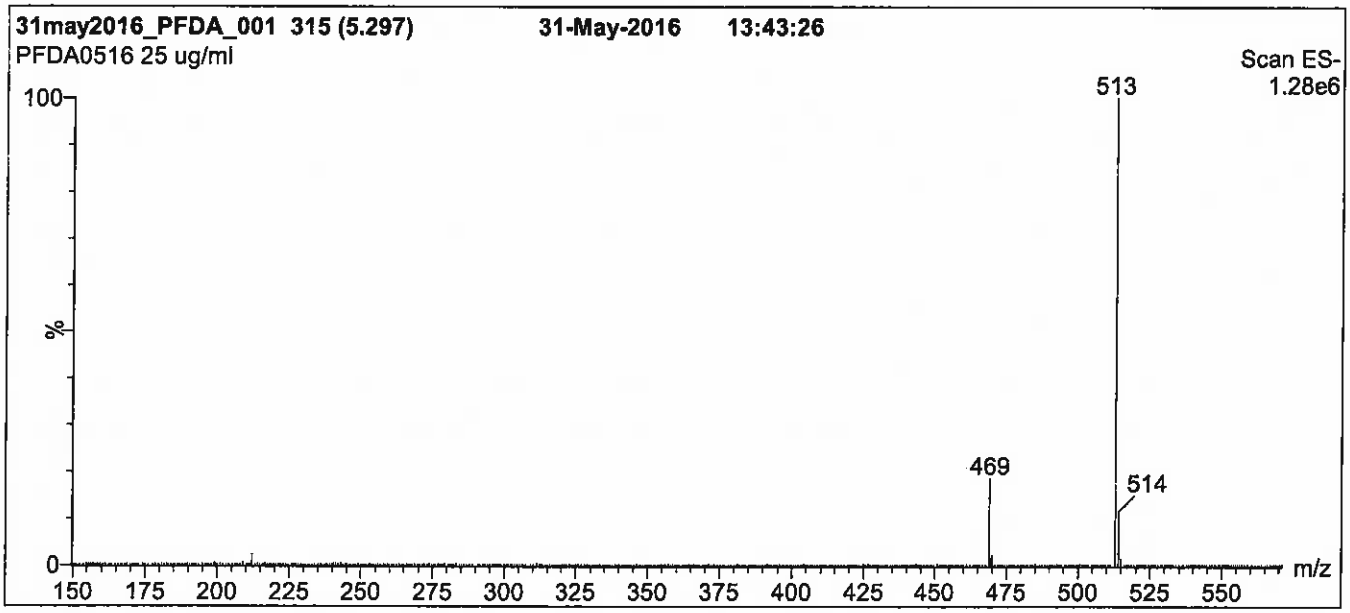
Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

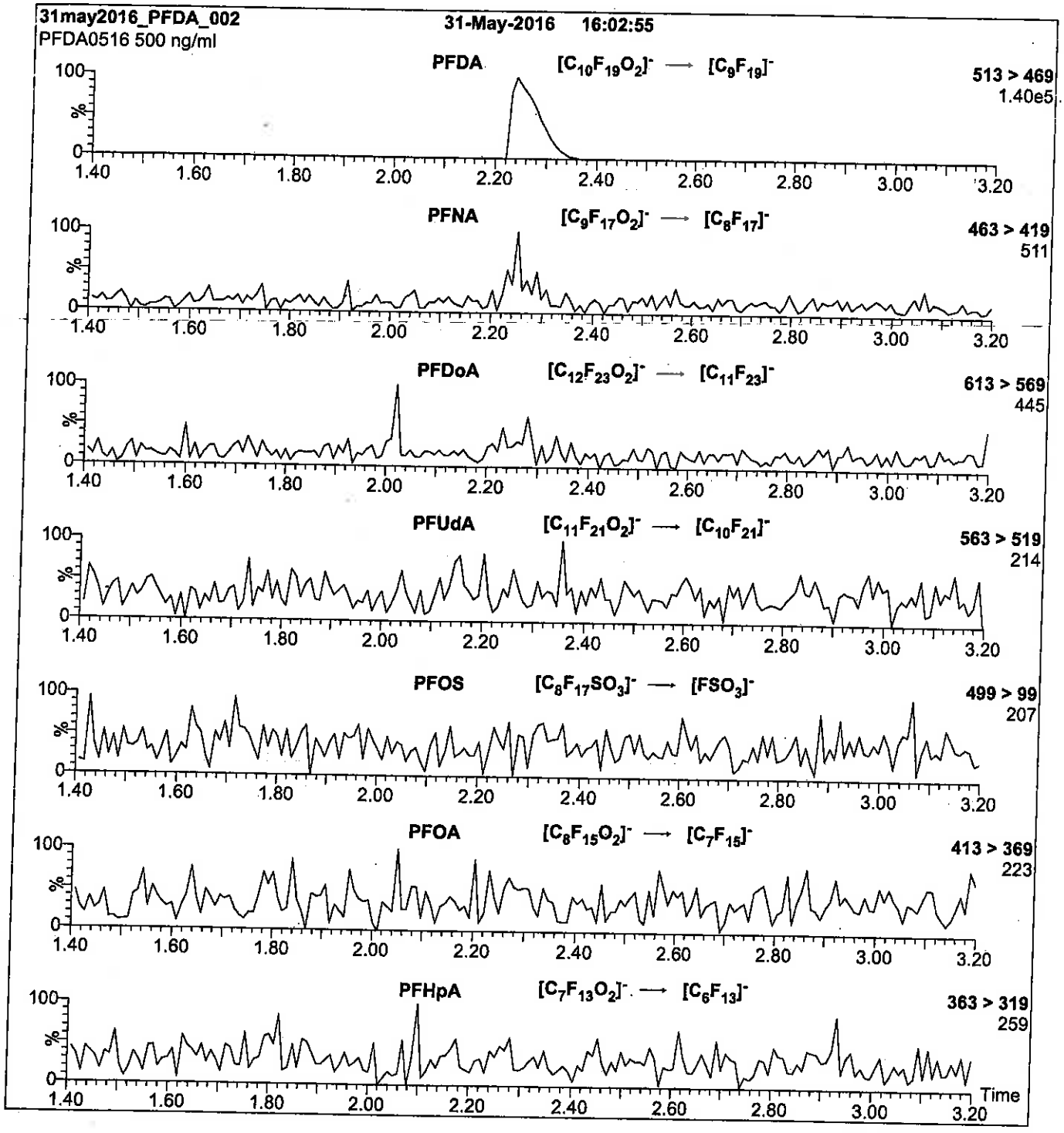
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.39e-3
Collision Energy (eV) = 13

Reagent

LCPFDA_00007

R: SBC 9/13/16
scanned 10/4/16 SR

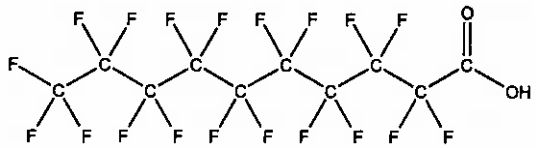
730620
ID: LCPFDA_00006
Exp: 05/31/21 Prpd: SBC
PF-n-decanoic acid

730621
ID: LCPFDA_00007
Exp: 05/31/21 Prpd: SBC
PF-n-decanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDA	**LOT NUMBER:**	PFDA0516
COMPOUND:	Perfluoro-n-decanoic acid		
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)	05/31/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of Perfluoro-n-nonanoic acid (PFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ B.G. Chittim **Date:** 06/13/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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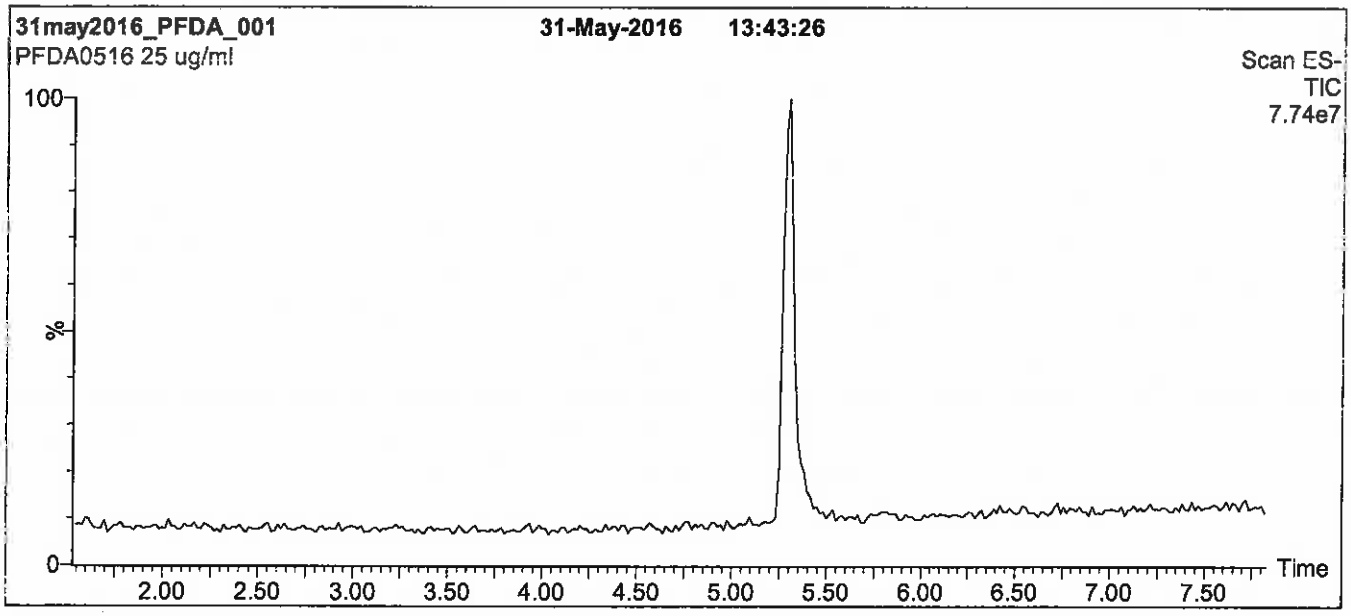

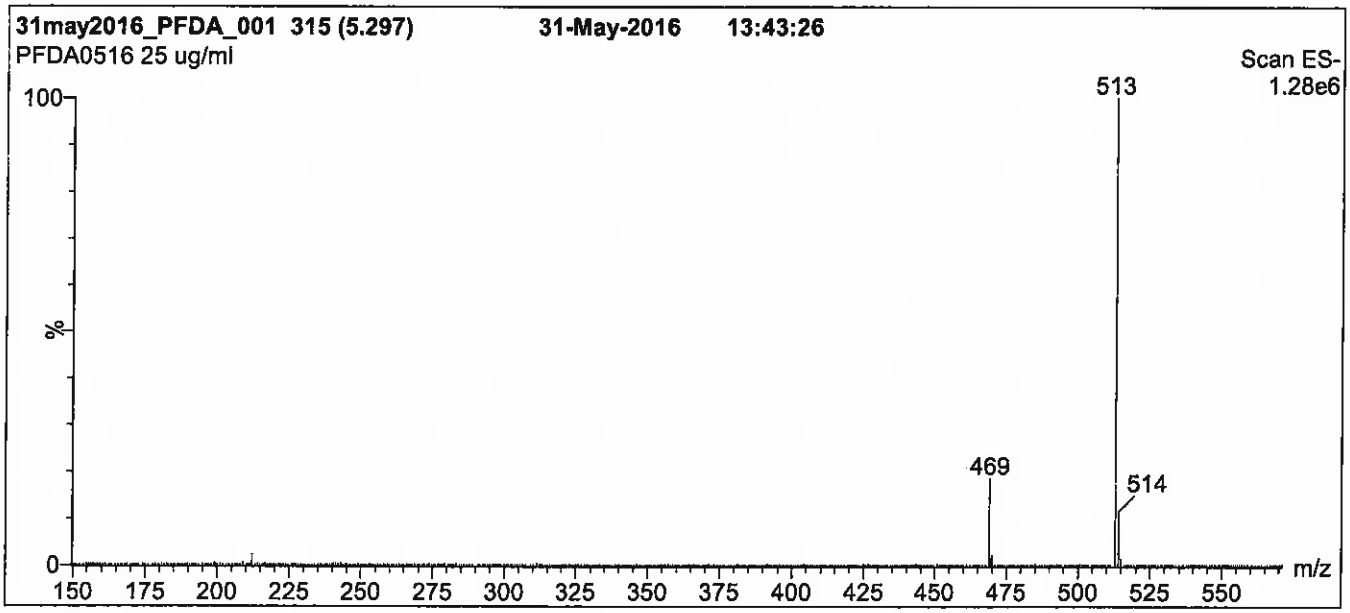

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Source: Electrospray (negative)
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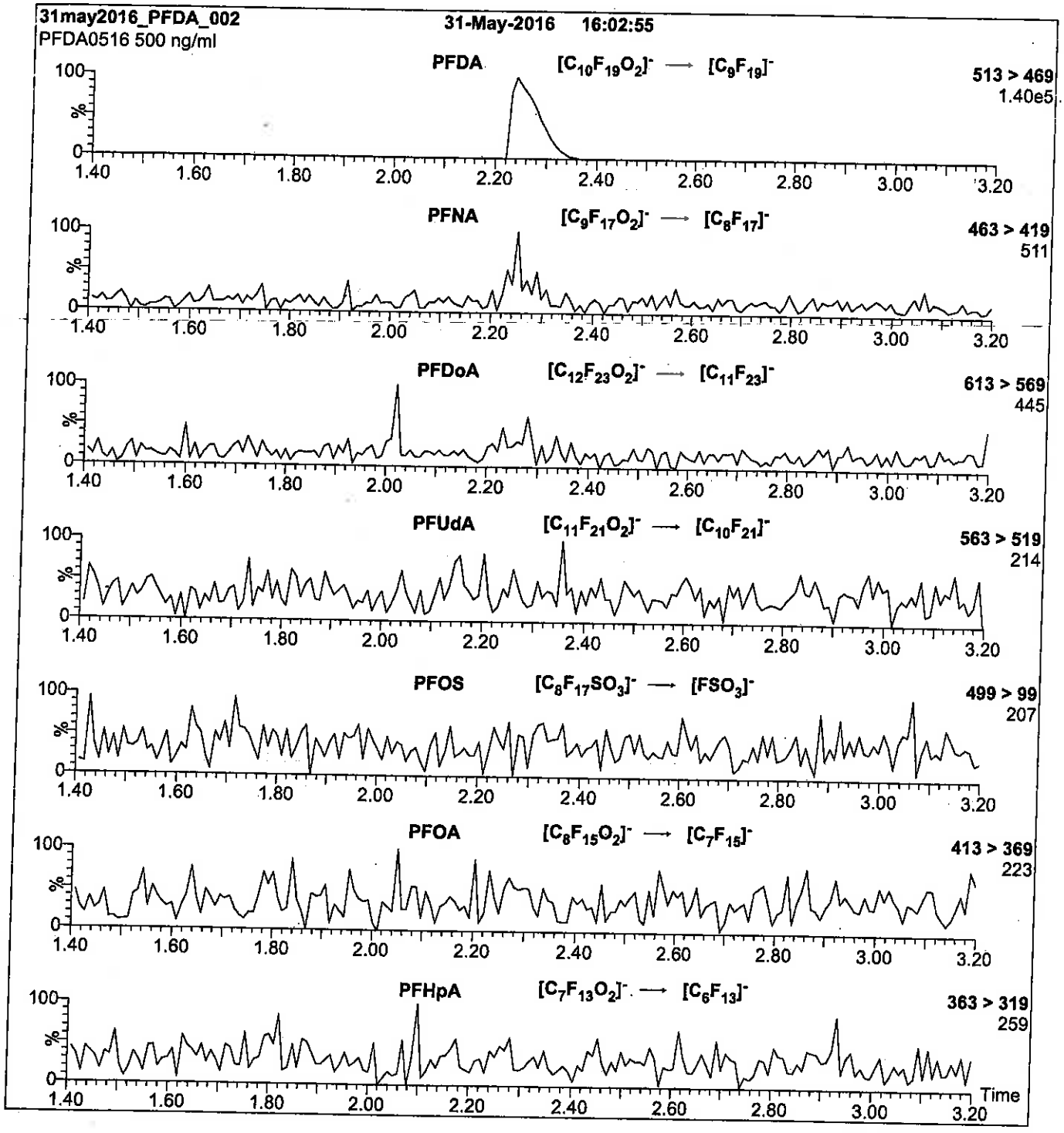


Conditions for Figure 2:

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) = 3.39e-3
Collision Energy (eV) = 13

Reagent

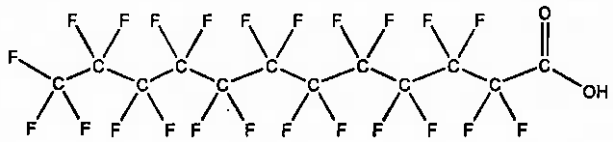
LCPFDoA_00006

r: 12/21/16 SPV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0516
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)	05/31/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 06/02/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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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.

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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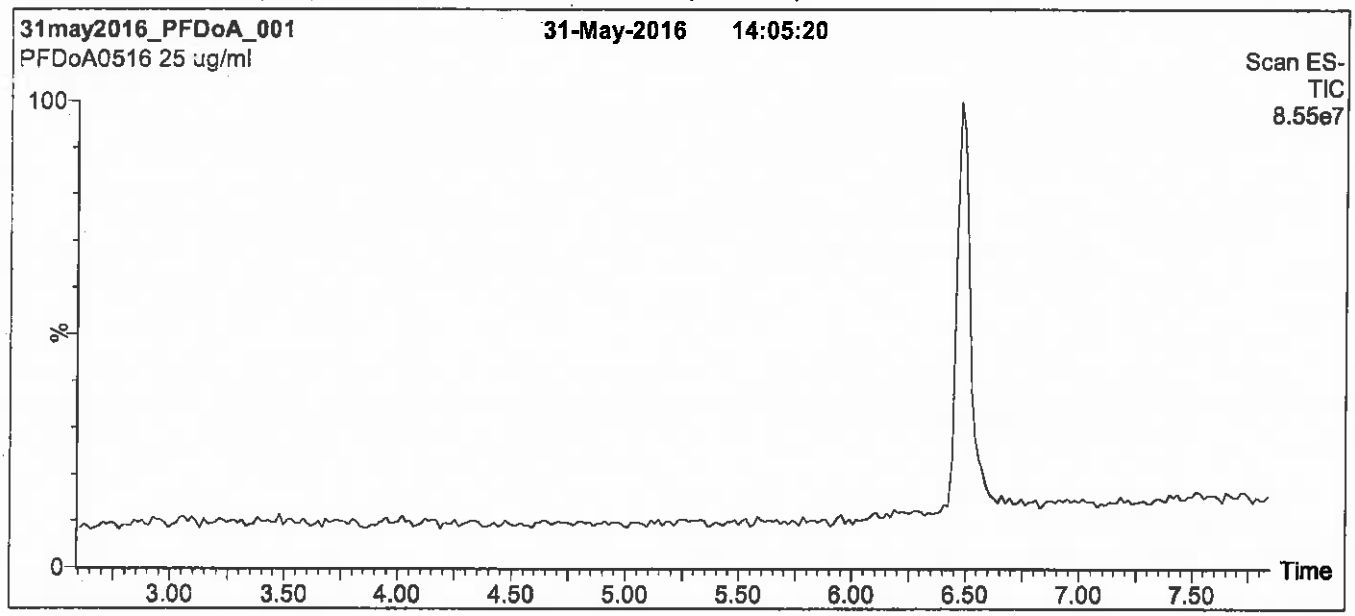
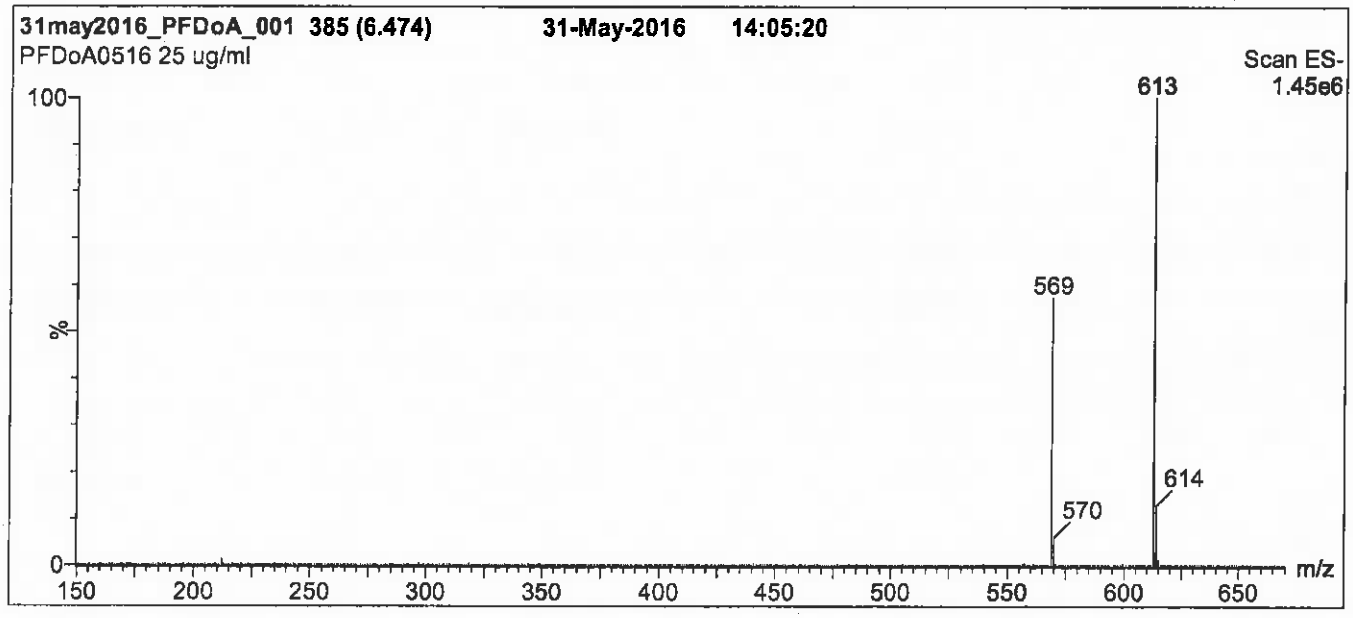




Conditions for Figure 1:

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

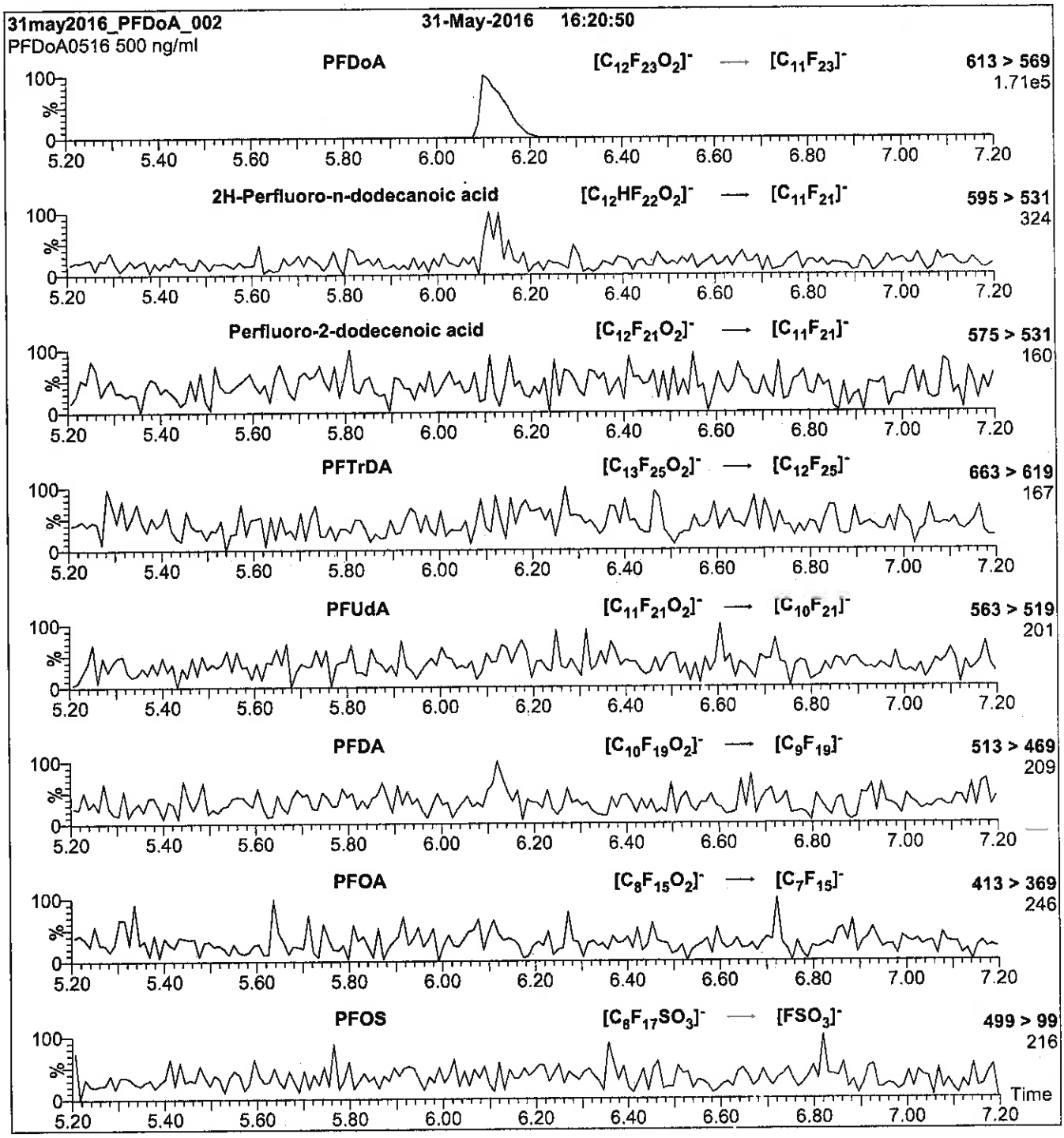
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

Reagent

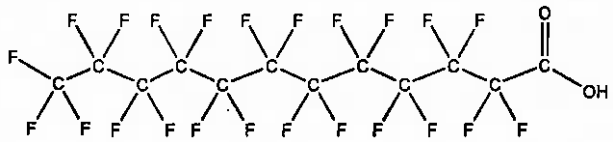
LCPFDoA_00007

r: 12/21/16 SPV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0516
COMPOUND:	Perfluoro-n-dodecanoic acid		
STRUCTURE:		**CAS #:**	307-55-1



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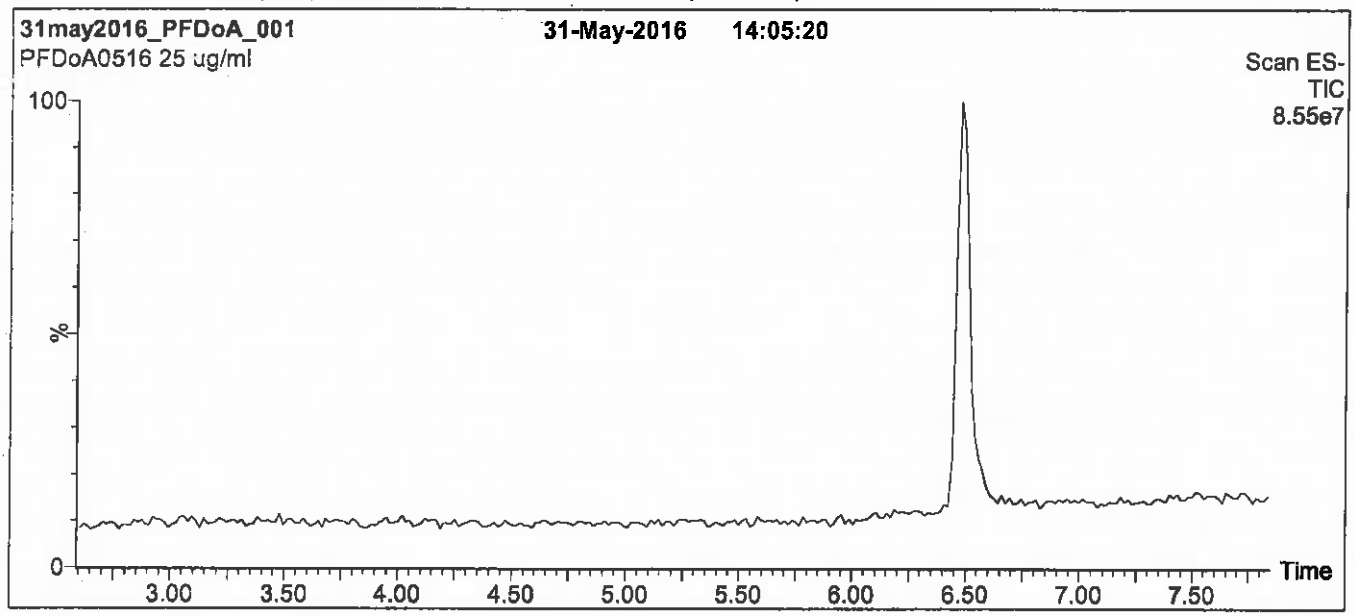

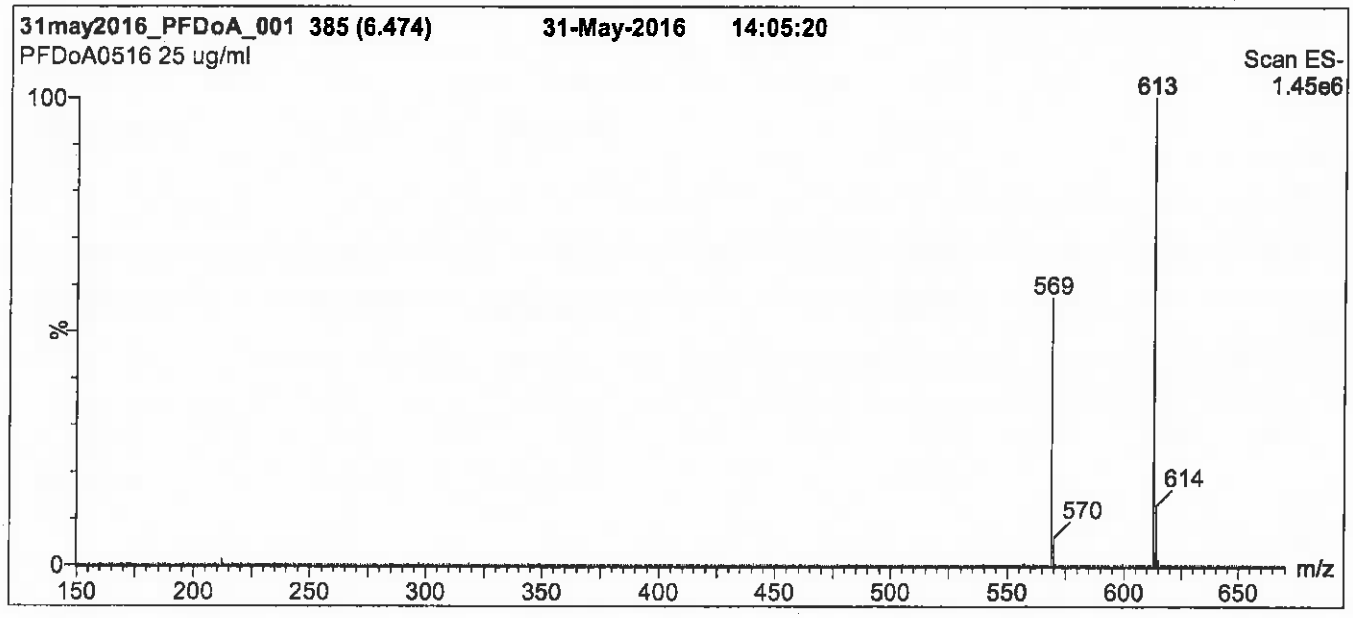

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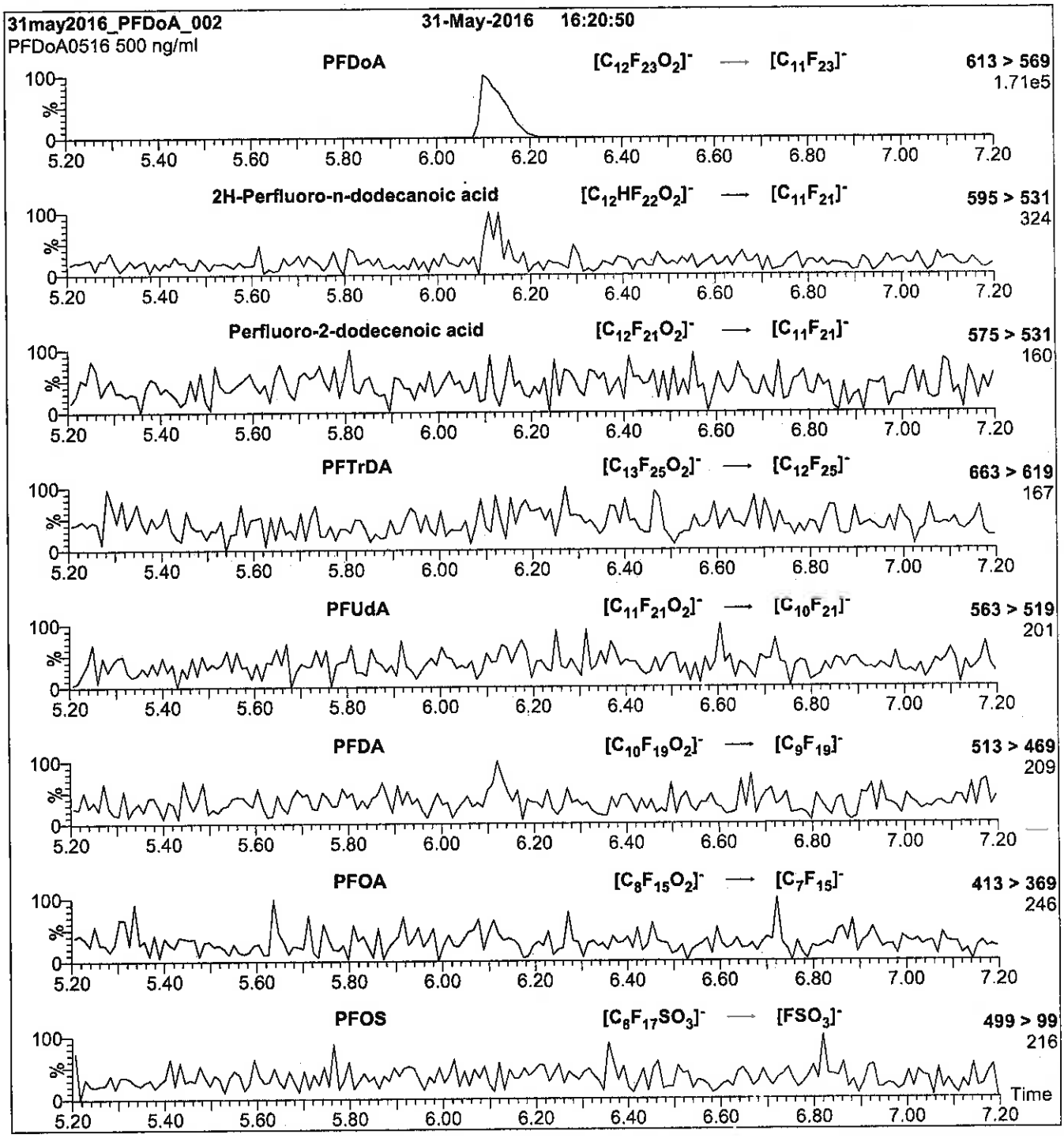
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

Reagent

LCPFDS_00005

Rec. 3/29/16 JRB

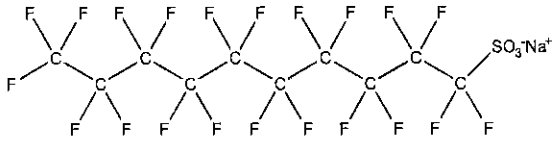
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFDS
LOT NUMBER: LPFDS0615
COMPOUND: Sodium perfluoro-1-decanesulfonate

STRUCTURE:

CAS #: 2806-15-7



MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$
MOLECULAR WEIGHT:	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.2 ± 2.4 µg/ml (PFDS anion)
SOLVENT(S):	Methanol
CHEMICAL PURITY:	>98%
LAST TESTED: (mm/dd/yyyy)	07/02/2015
EXPIRY DATE: (mm/dd/yyyy)	07/02/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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:

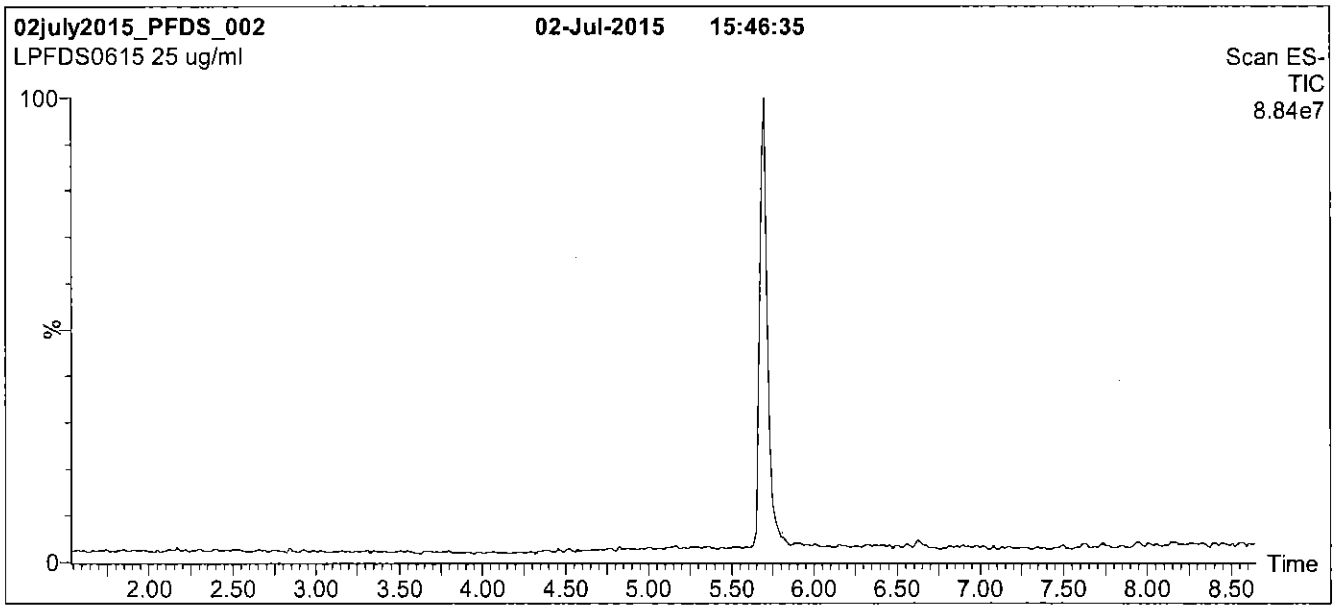
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

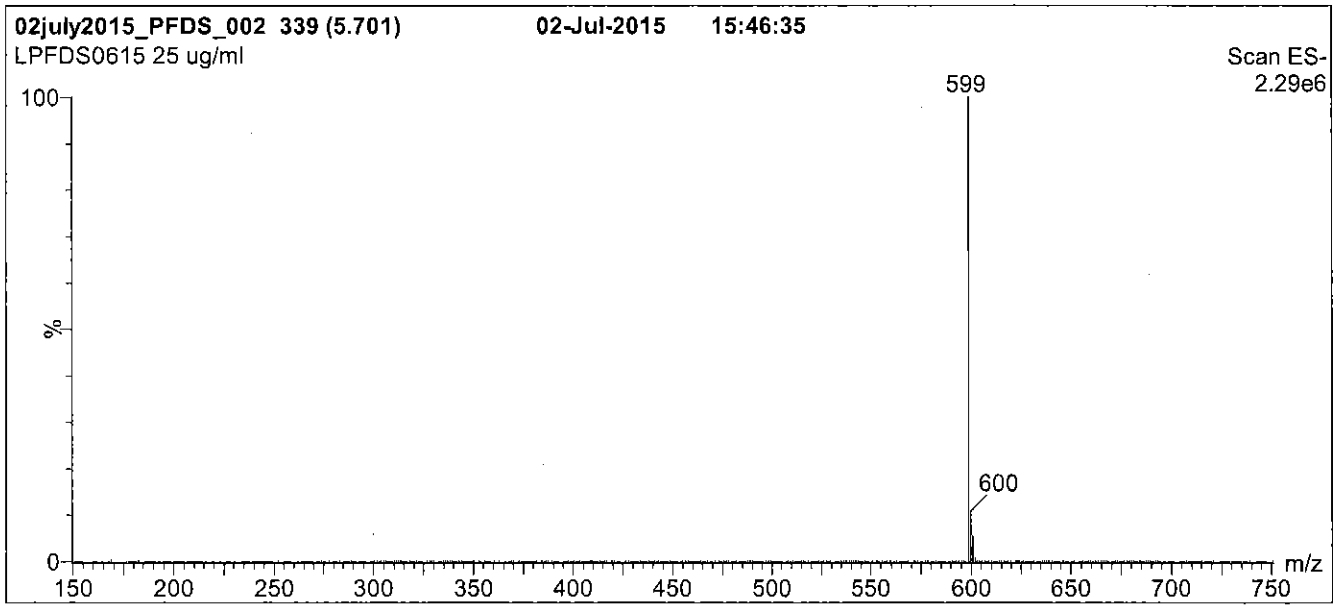
CALA

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

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

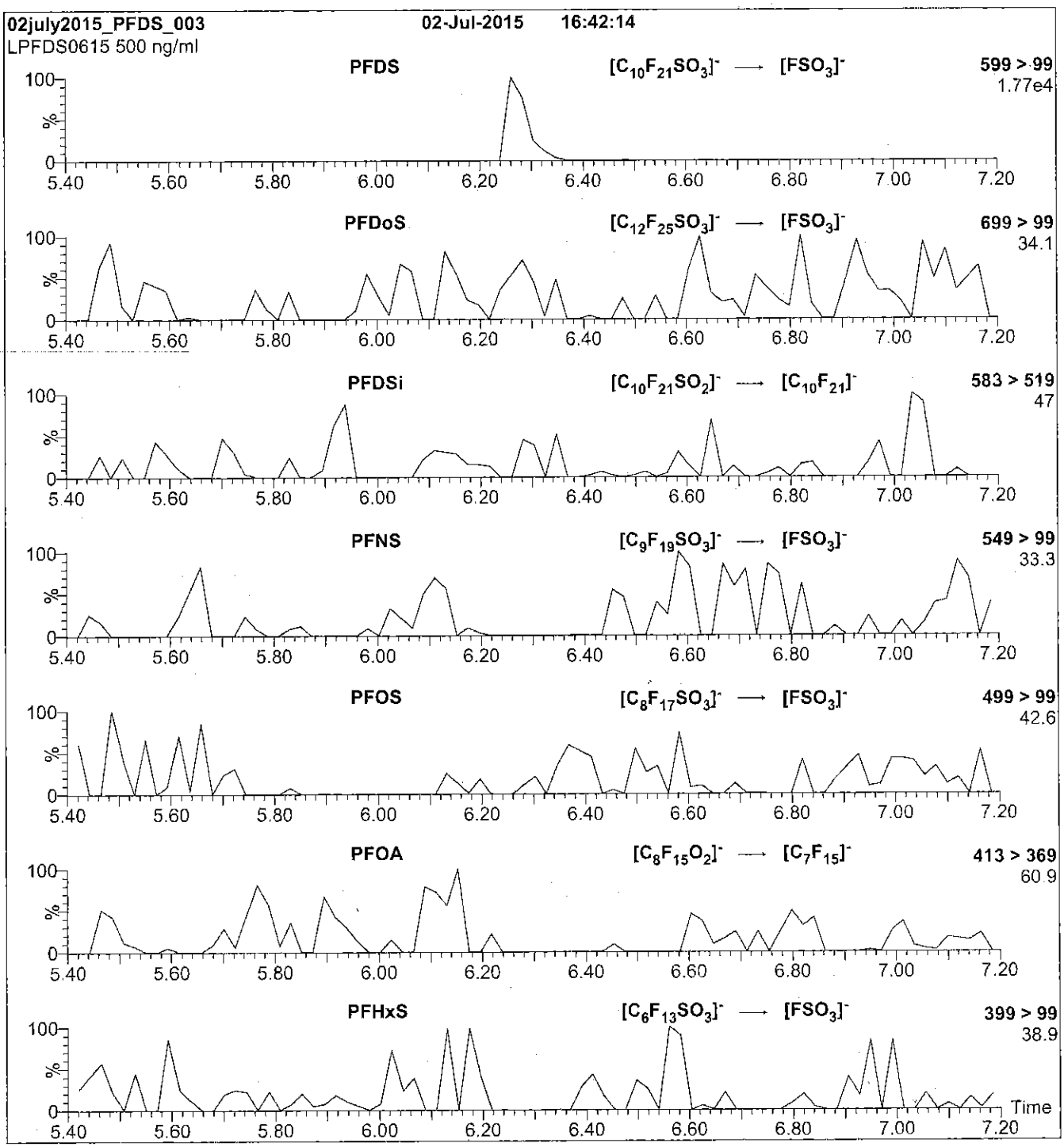
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 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

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) = 3.54e-3
Collision Energy (eV) = 50

Reagent

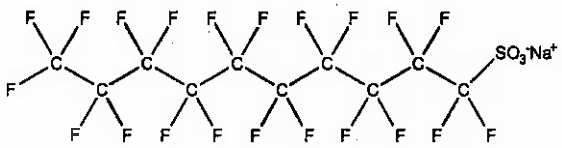
LCPFDSA_00002

R: 12/29/16 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	L-PFDS	**LOT NUMBER:**	LPFDS0516
COMPOUND:	Sodium perfluoro-1-decanesulfonate		
STRUCTURE:		**CAS #:**	2806-15-7



MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$	**MOLECULAR WEIGHT:**	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.2 ± 2.4 µg/ml (PFDS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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 ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/26/2016 (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

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:

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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.

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:

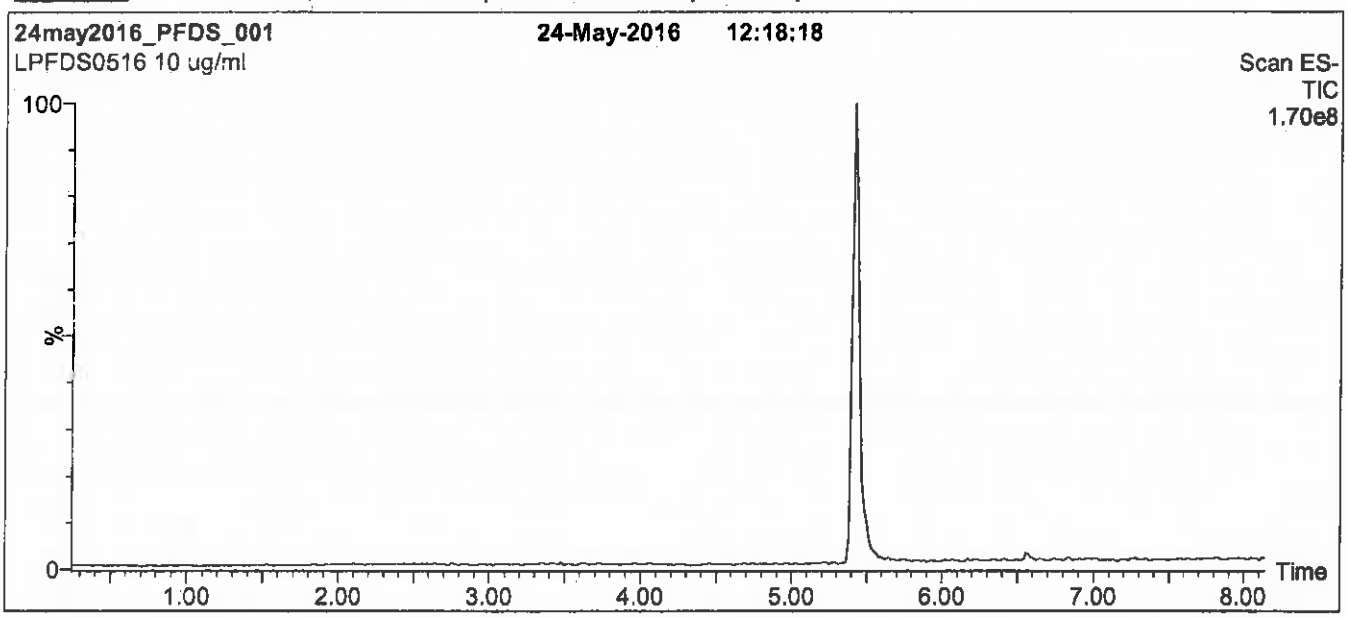
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

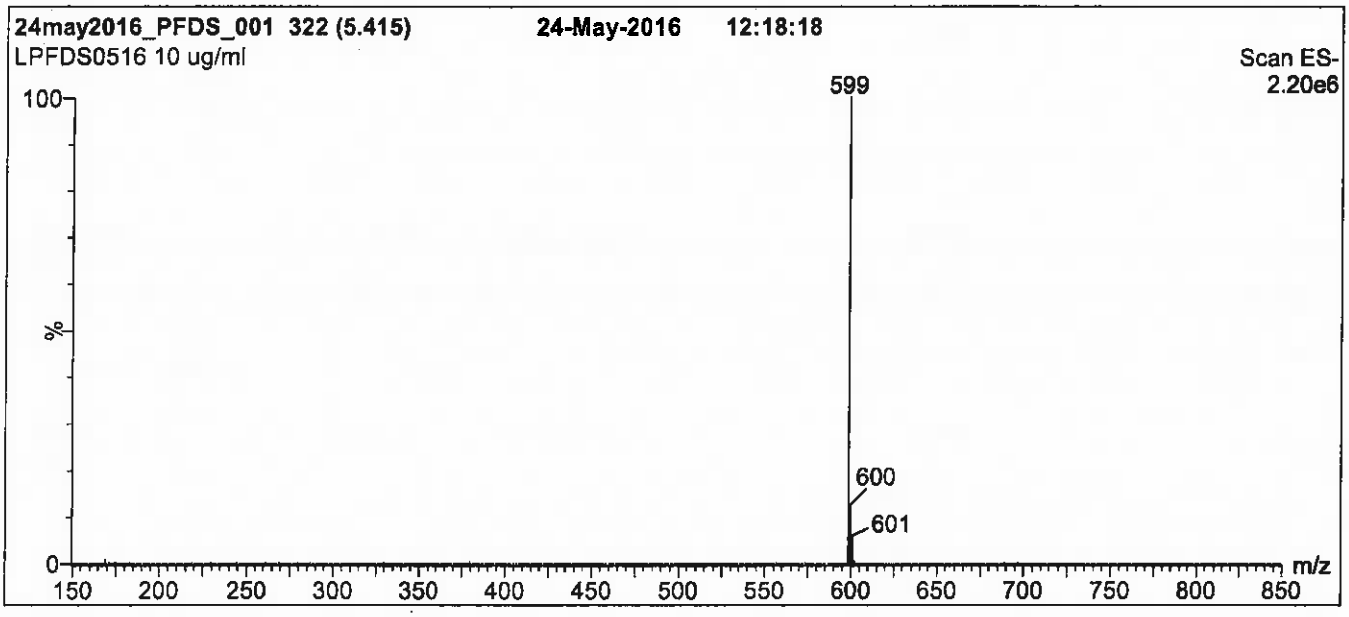
CALA

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

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: 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

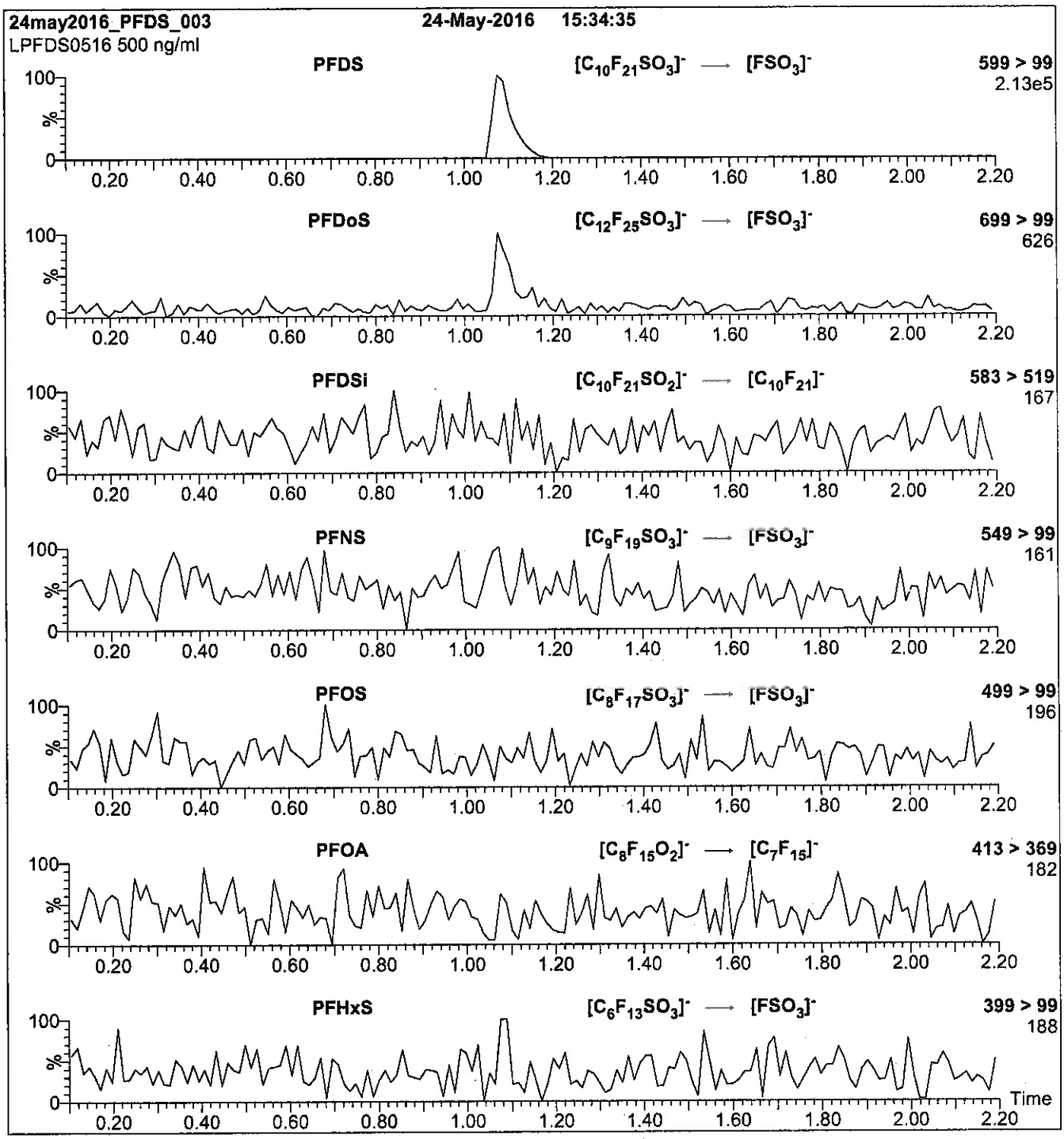
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.70e-3
Collision Energy (eV) = 50

Reagent

LCPFHpA_00006

Scanned 10/14/16 SM R: SBC 9/13/16

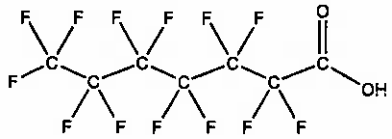
730517
ID: LCPFHpA_00006
Exp: 01/22/21 Prpd: SBC
PF-n-heptanoic acid

730518
ID: LCPFHpA_00007
Exp: 01/22/21 Prpd: SBC
PF-n-heptanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFHpA	**LOT NUMBER:**	PFHpA0116
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)	01/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/22/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/02/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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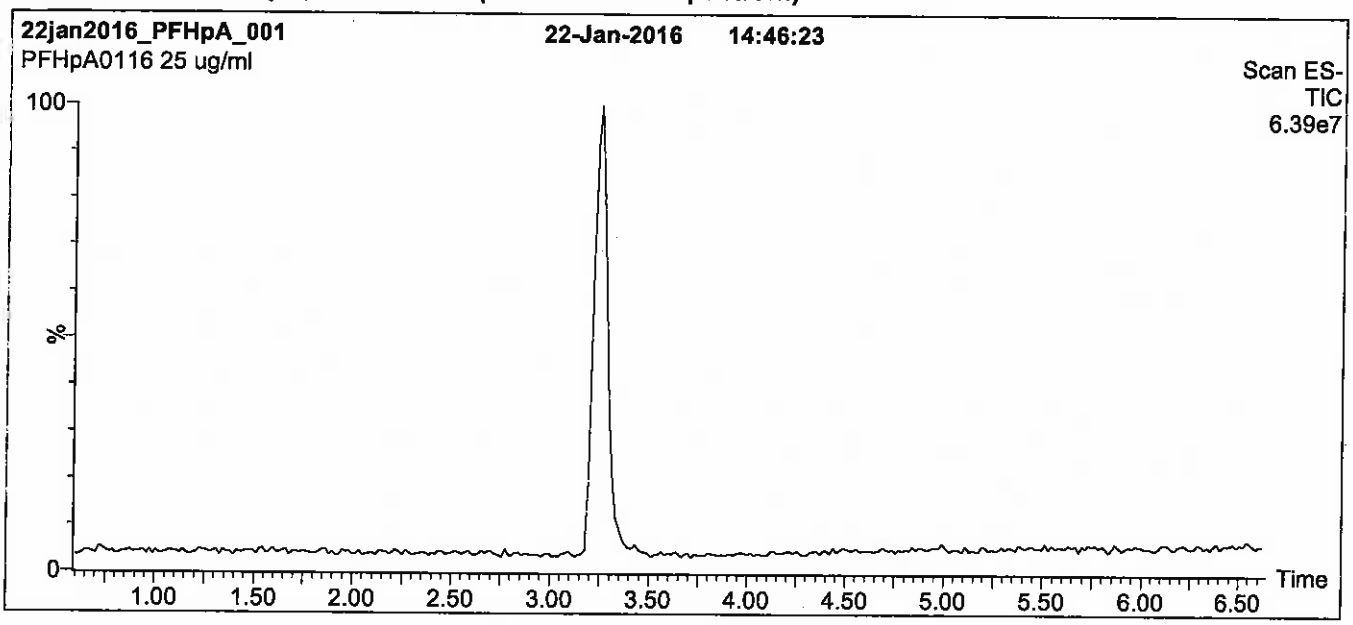
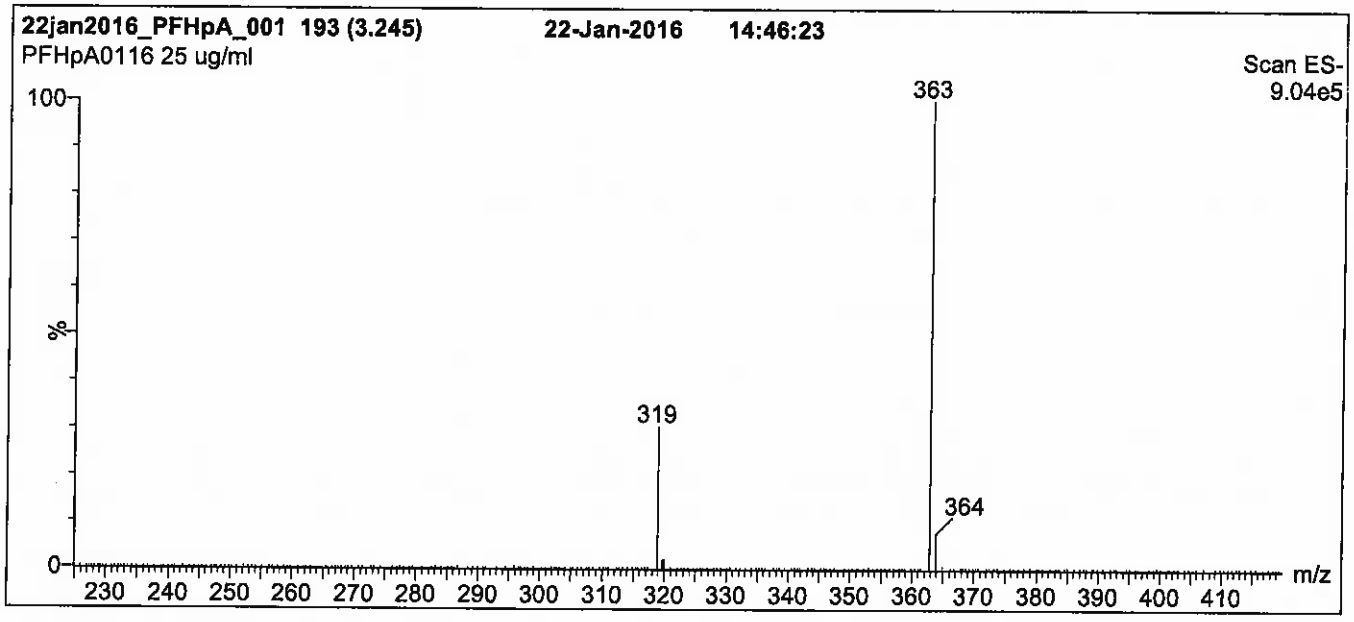
CALA

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

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: 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

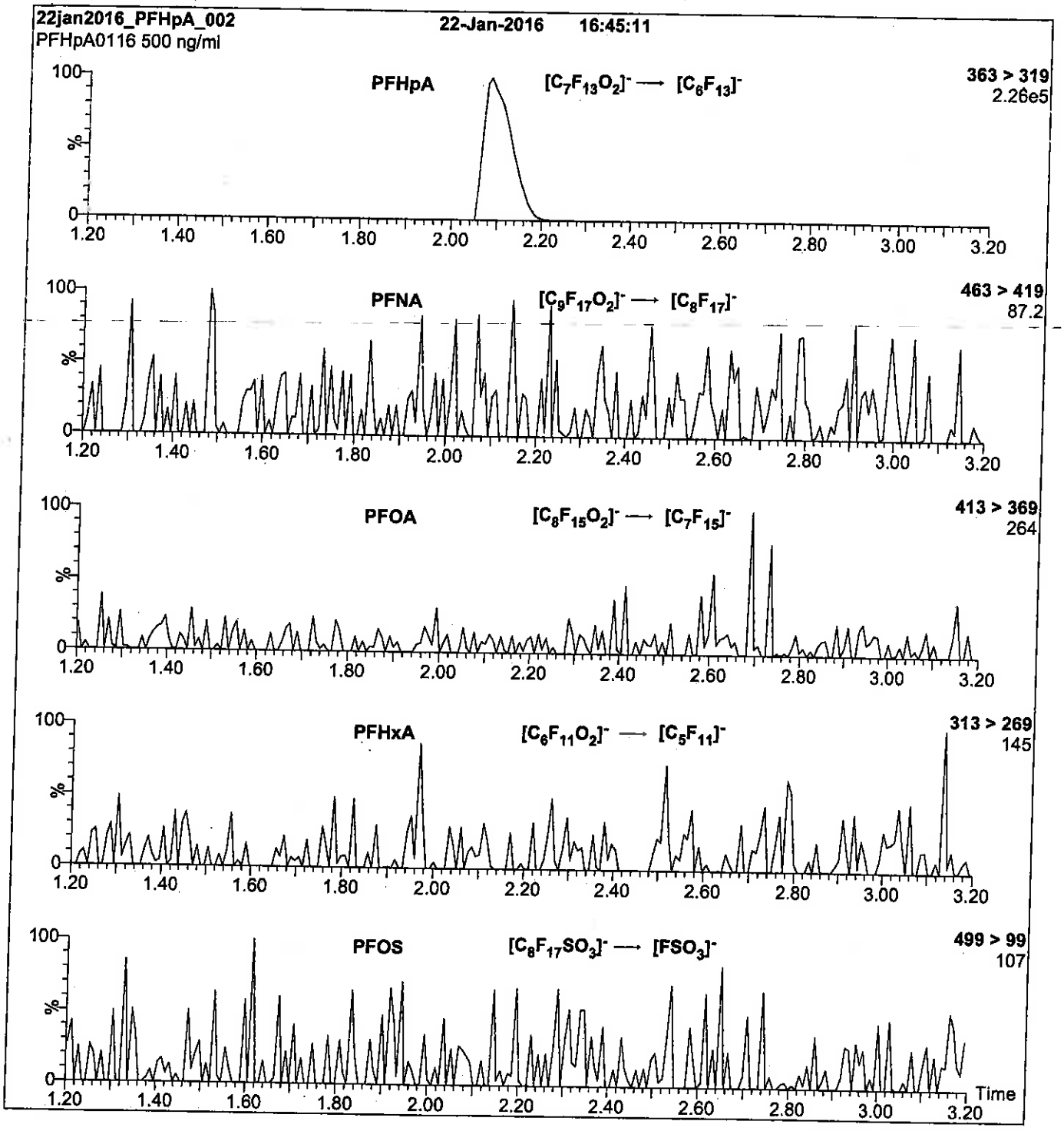
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.50e-3
Collision Energy (eV) = 11

Reagent

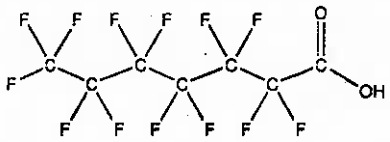
LCPFHpA_00008

P: 12/29/16 SGN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFHpA	**LOT NUMBER:**	PFHpA1216
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)	12/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/02/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ B.G. Chittim **Date:** 12/12/2016 (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

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:

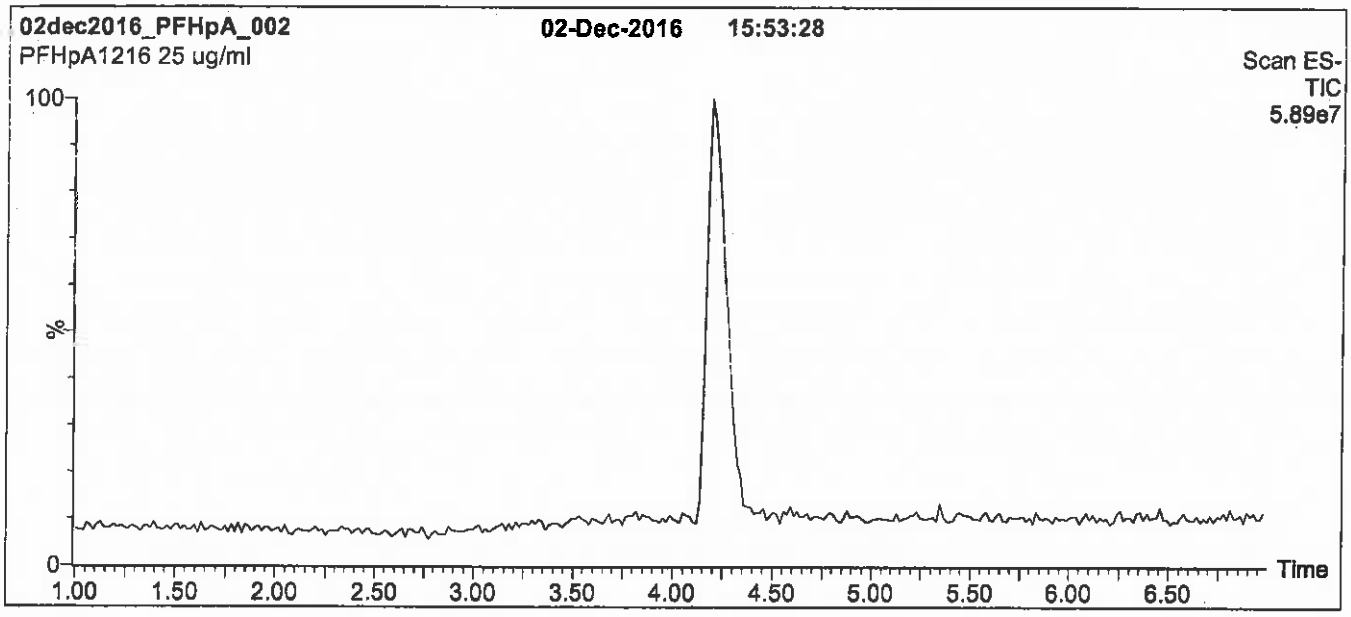
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

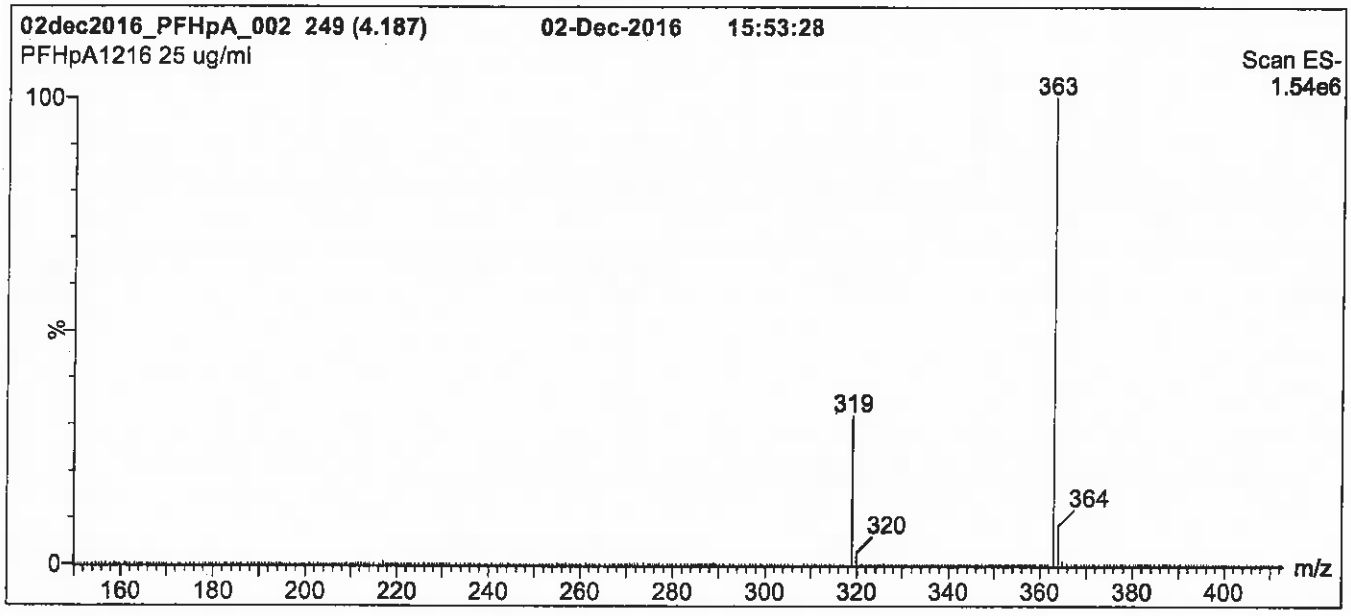
CALA

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

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 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

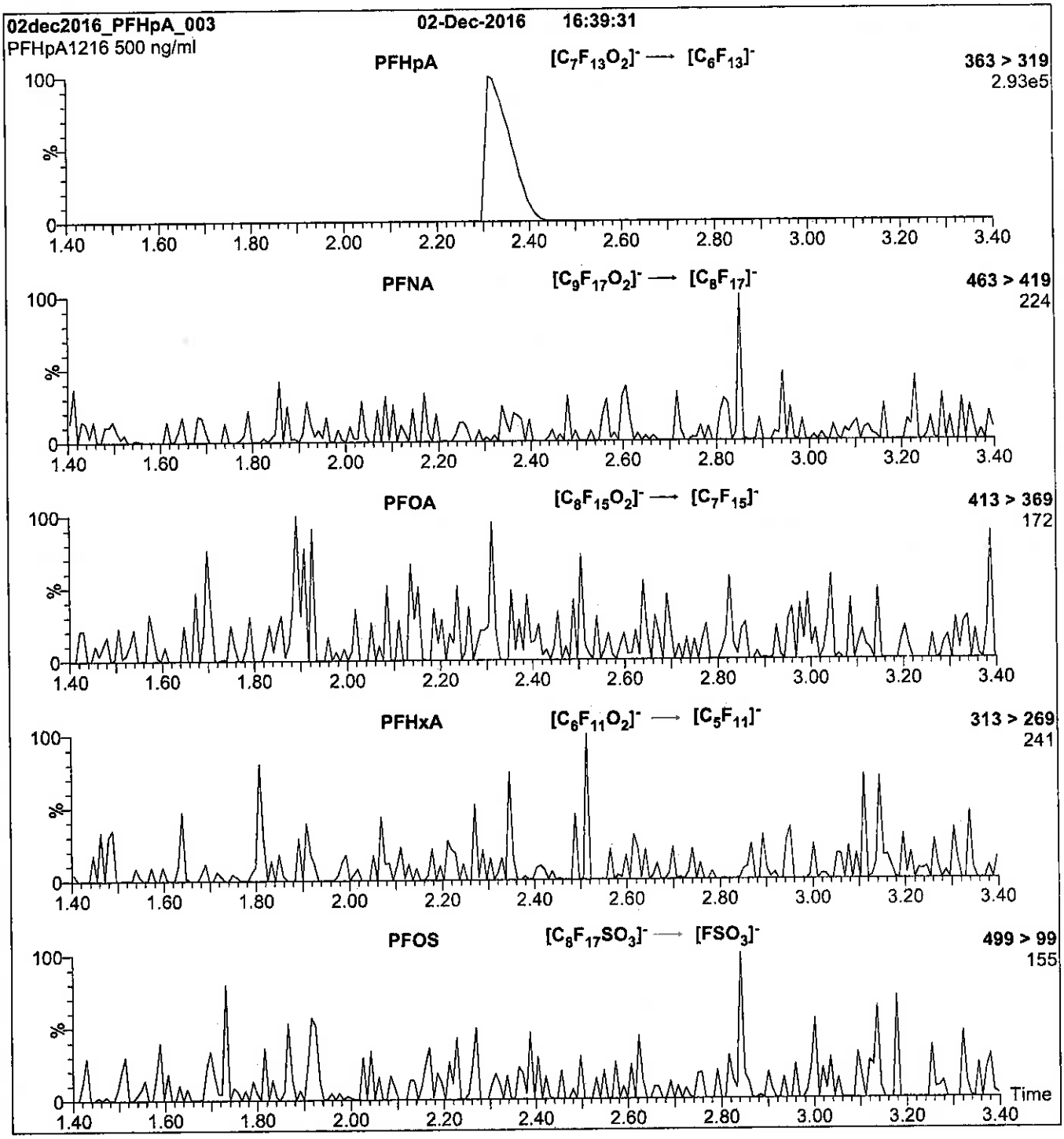
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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) = 3.50e-3
Collision Energy (eV) = 11

Reagent

LCPFHpS_00010

Scanned 10/14/16 SR R: SBC 9/13/16

730635
ID: LCPFHpS_00009
Exp: 11/06/20 Prpd: SBC
PFHpS at 47.6ug/mL

730639
ID: LCPFHpS_00010
Exp: 11/06/20 Prpd: SBC
PFHpS at 47.6ug/mL

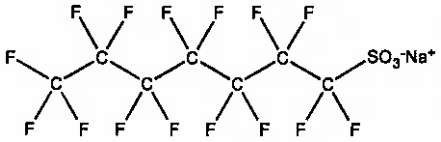
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS1115

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)	11/06/2015		
EXPIRY DATE: (mm/dd/yyyy)	11/06/2020		
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 ~ 0.1% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.2% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 11/09/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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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:

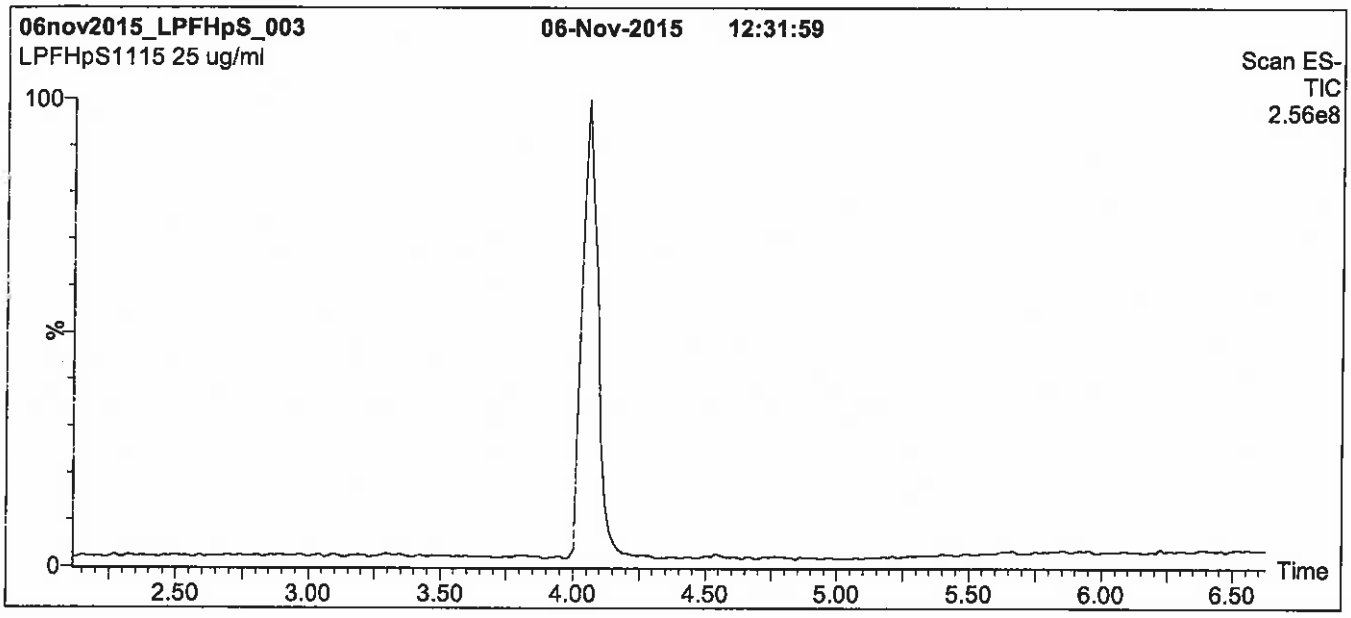
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

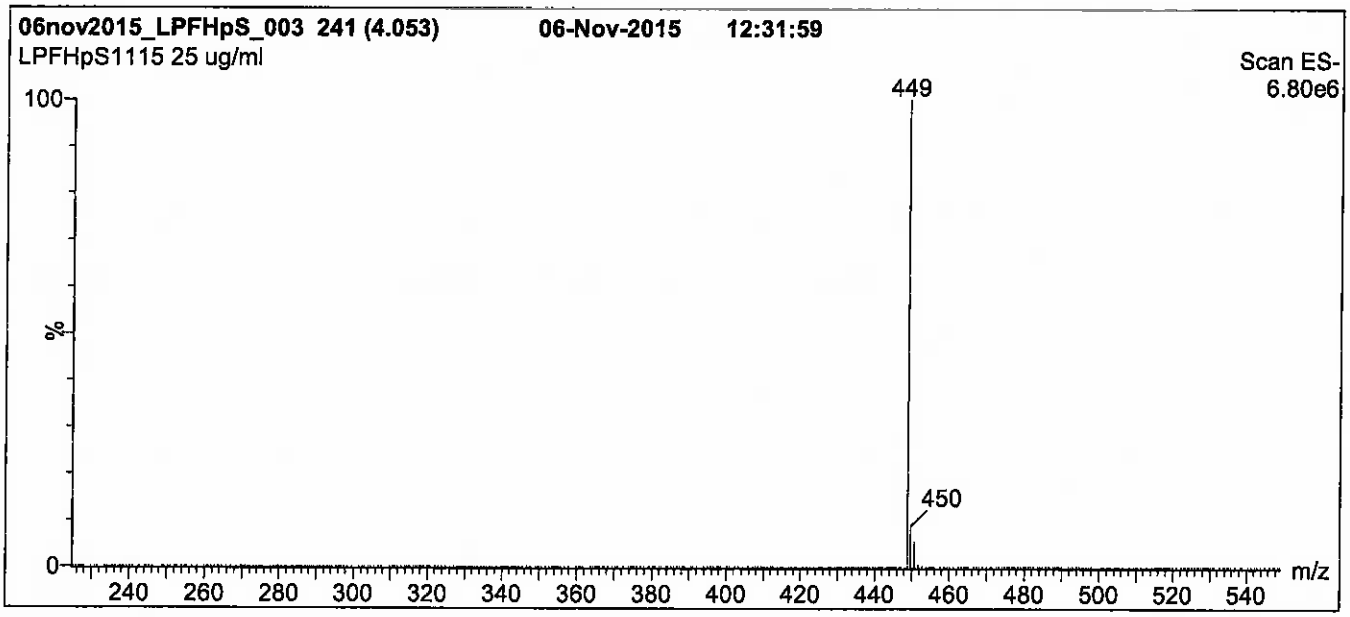
CALA

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

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 7 min and hold
for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

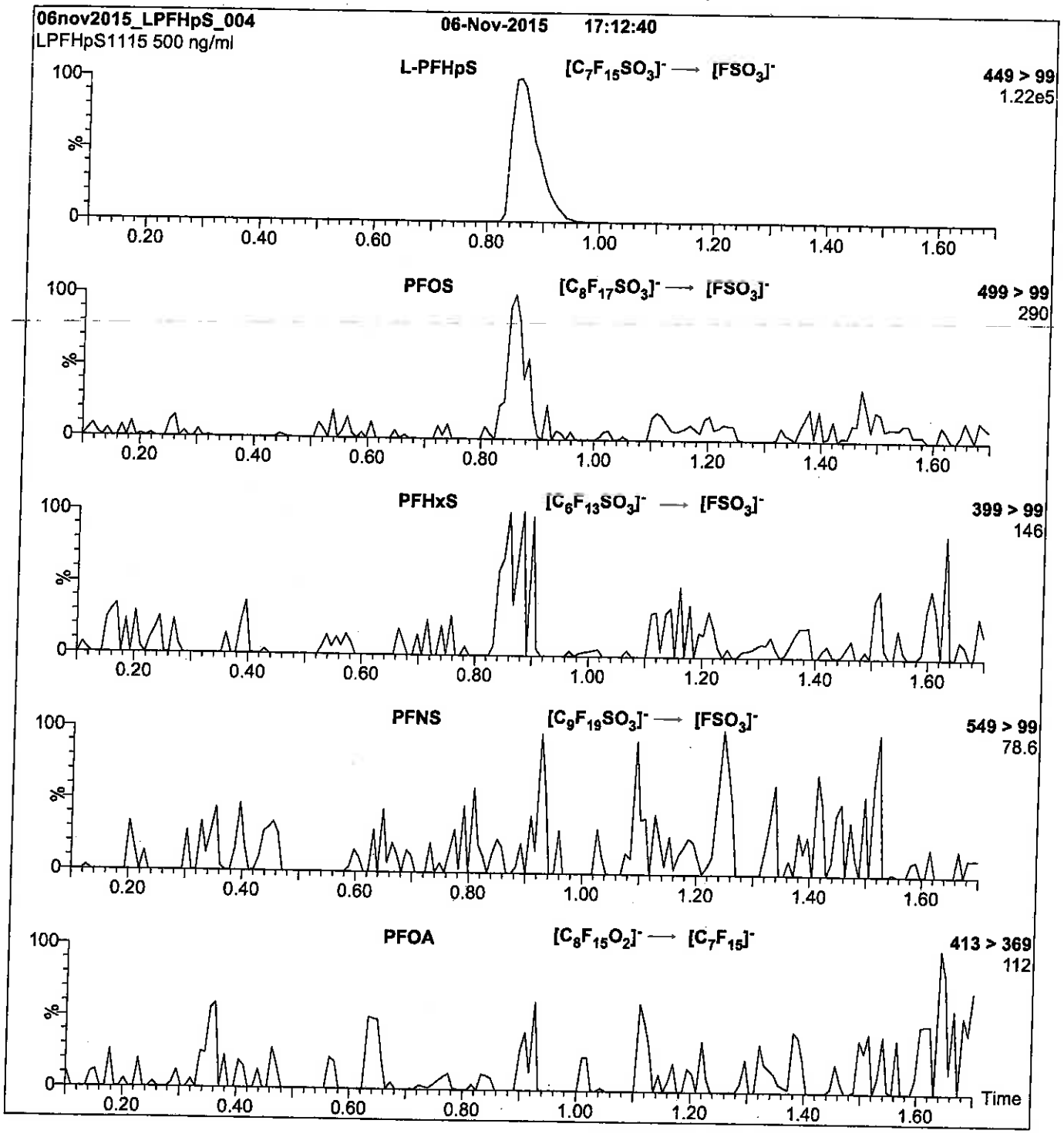
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 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) = 3.31e-3
Collision Energy (eV) = 35

Reagent

LCPFHpSA_00002

R: 12/20/16 SKV

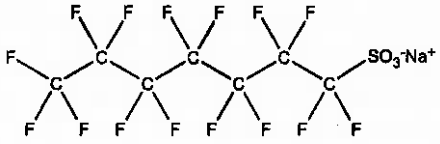
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS1016

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)	10/18/2016		
EXPIRY DATE: (mm/dd/yyyy)	10/18/2021		
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 ~ 0.2% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.1% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/20/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB

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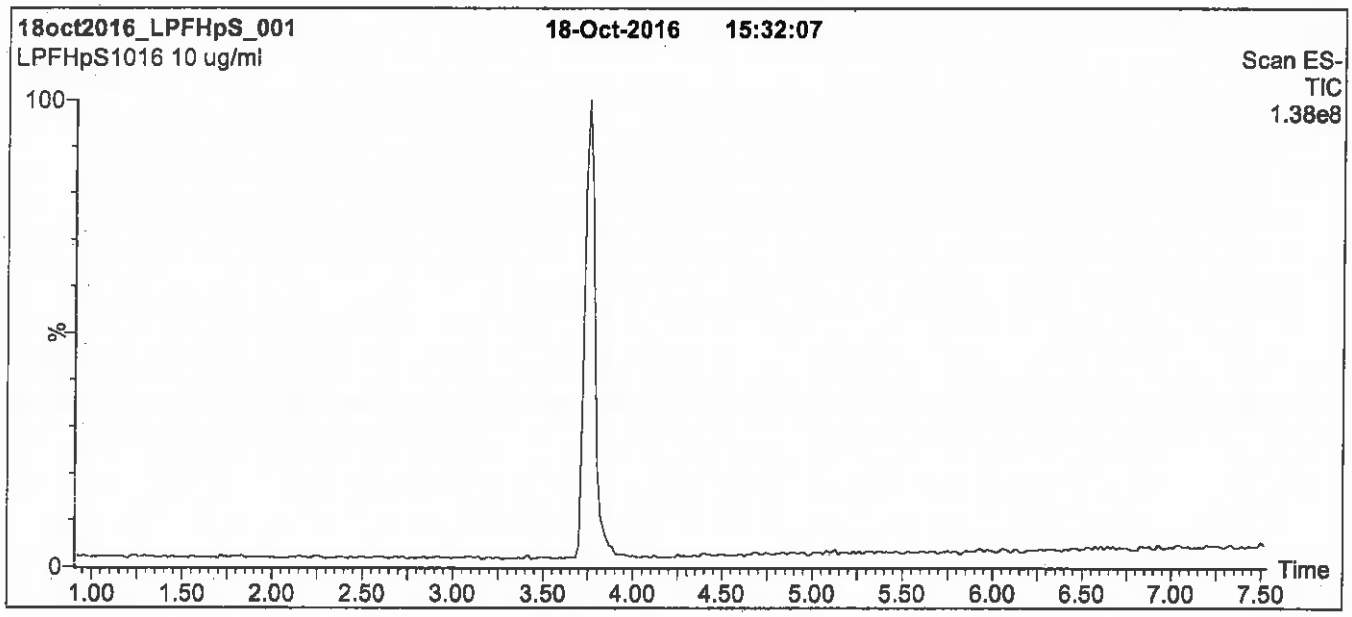
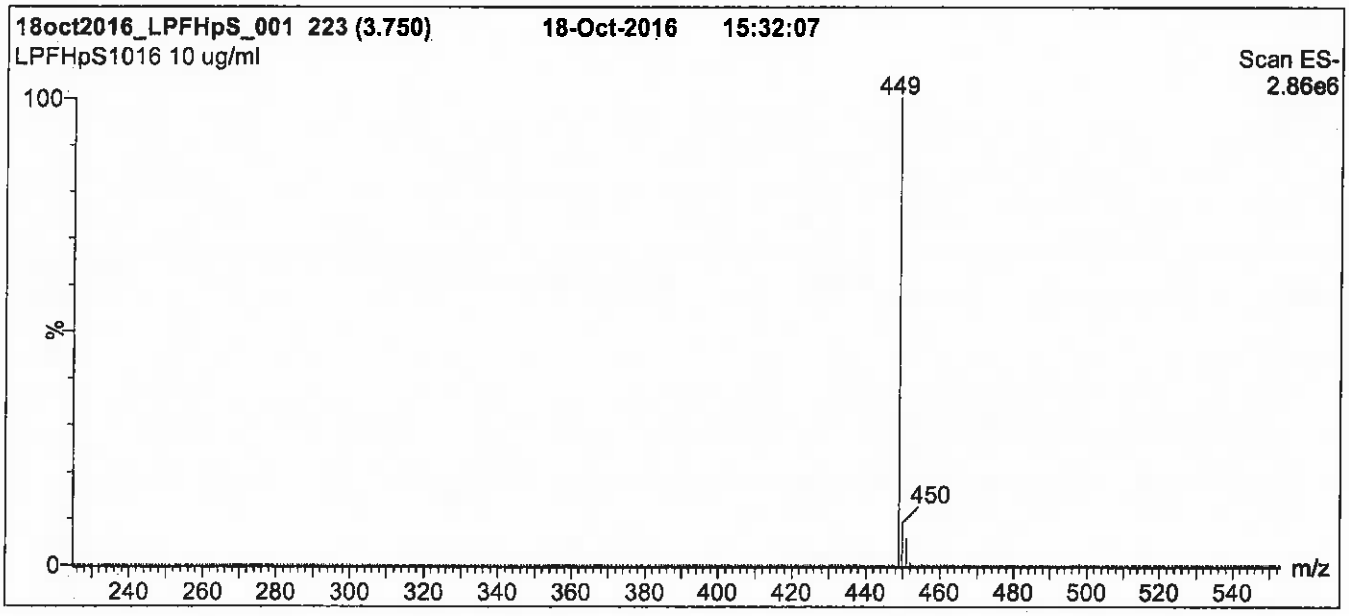
Figure 1: **L-PFHpS; LC/MS Data (TIC and Mass Spectrum)**





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: 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

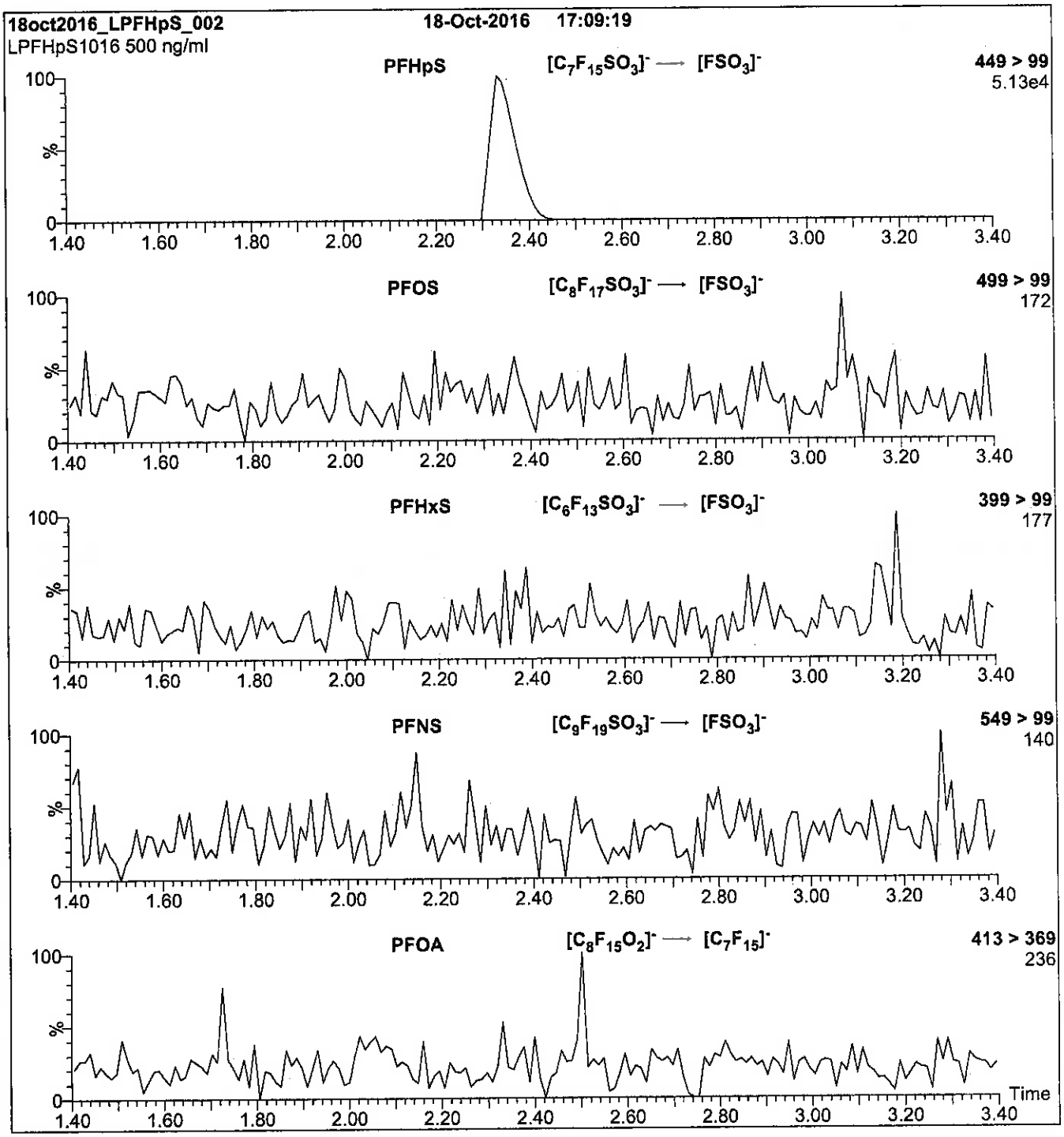
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 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) = 3.43e-3
Collision Energy (eV) = 35

Reagent

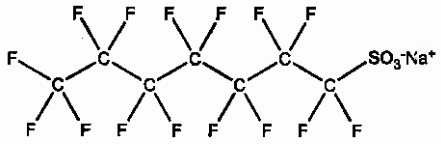
LCPFHpSA_00003

R: 9/21/17 SKV

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
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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 $x_1, x_2, \ldots x_n$ 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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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

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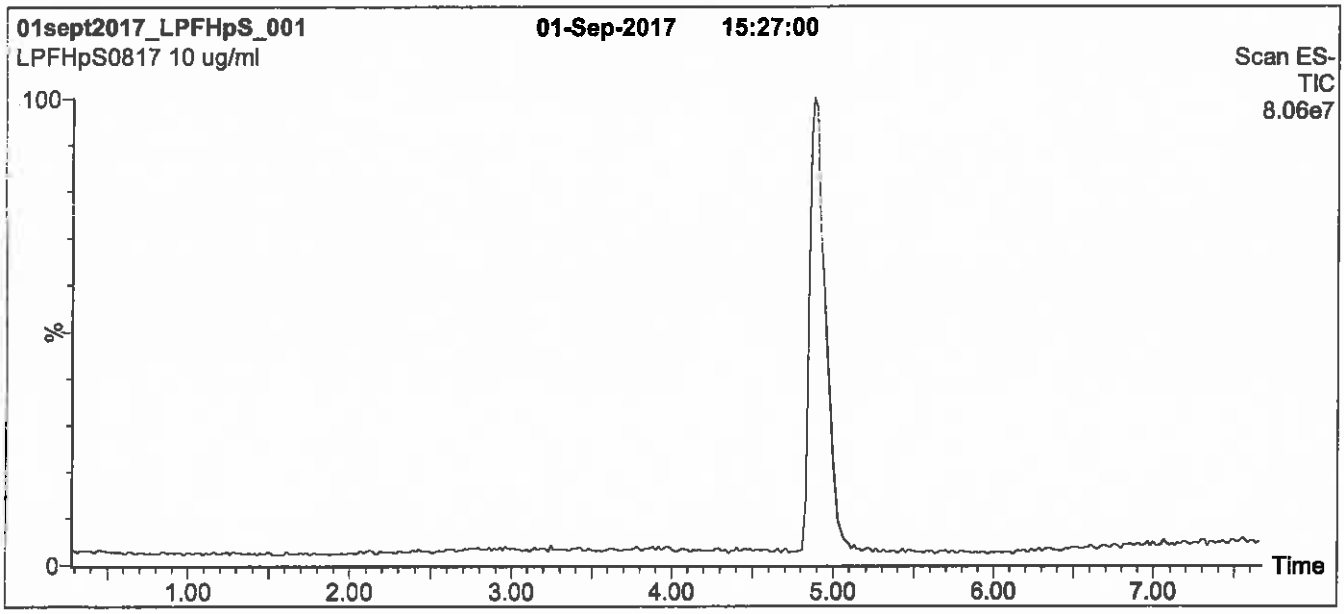
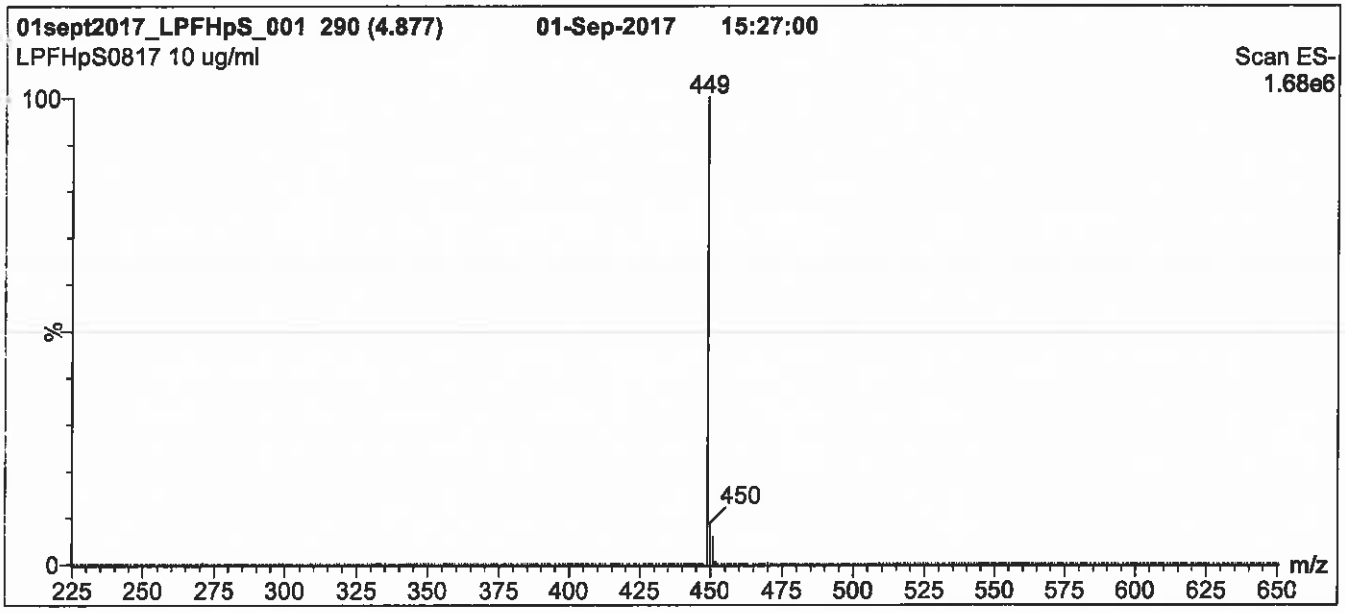
Figure 1: **L-PFHpS; LC/MS Data (TIC and Mass Spectrum)**





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

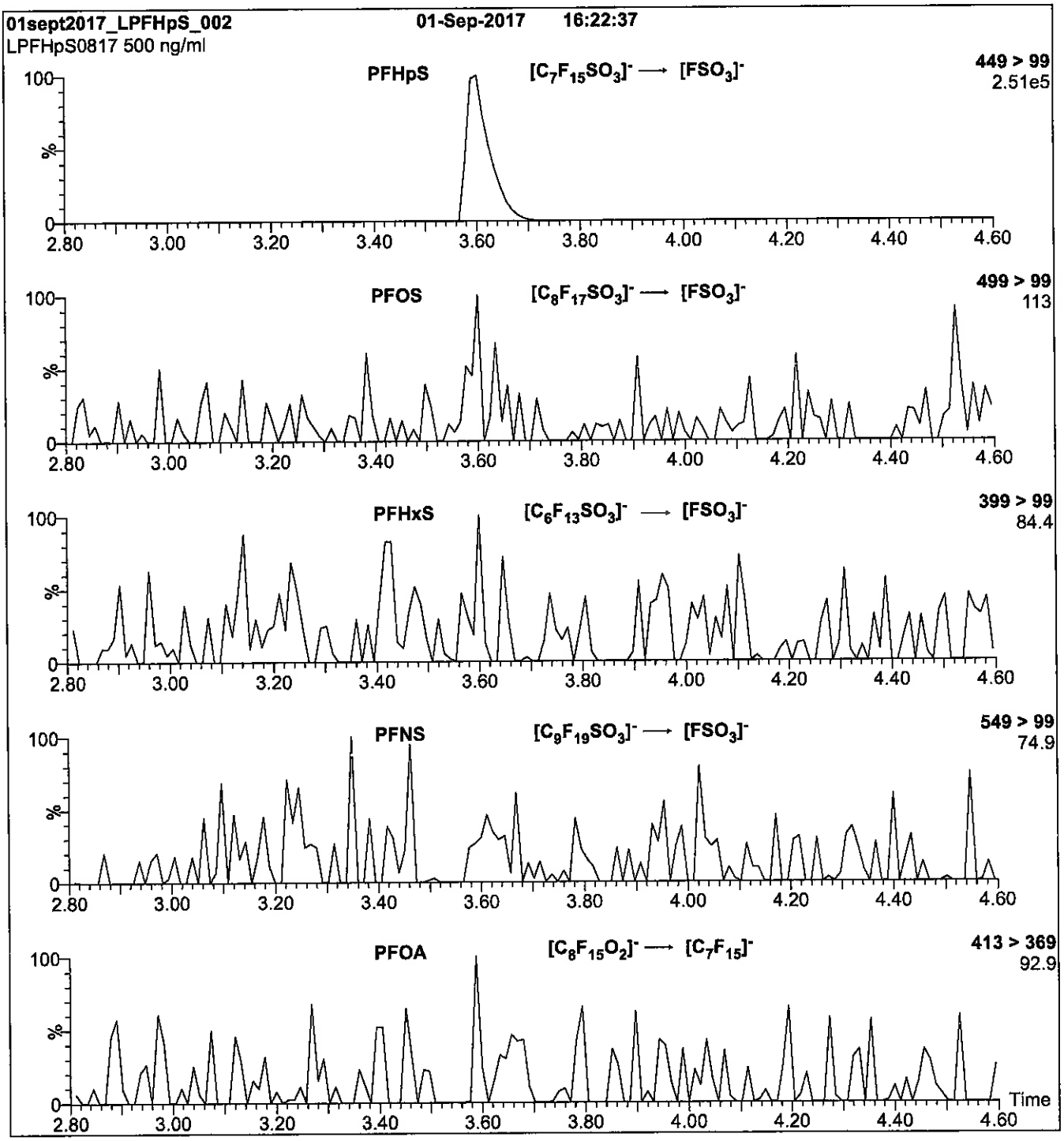
Flow: 300 µl/min

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

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

Reagent

LCPFHxA_00005

R: SBC 9/13/16

730551
ID: LCPFHxA_00005
Exp: 12/22/20 Prpd: SBC
PF-n-hexanoic acid

730552
ID: LCPFHxA_00006
Exp: 12/22/20 Prpd: SBC
PF-n-hexanoic acid

WELLINGTON LABORATORIES

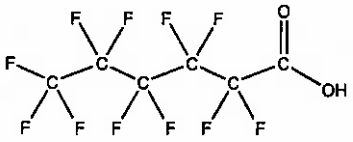
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid

LOT NUMBER: PFHxA1215

STRUCTURE:

CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 314.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/22/2015
EXPIRY DATE: (mm/dd/yyyy) 12/22/2020
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-pentanoic acid (PFPeA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/23/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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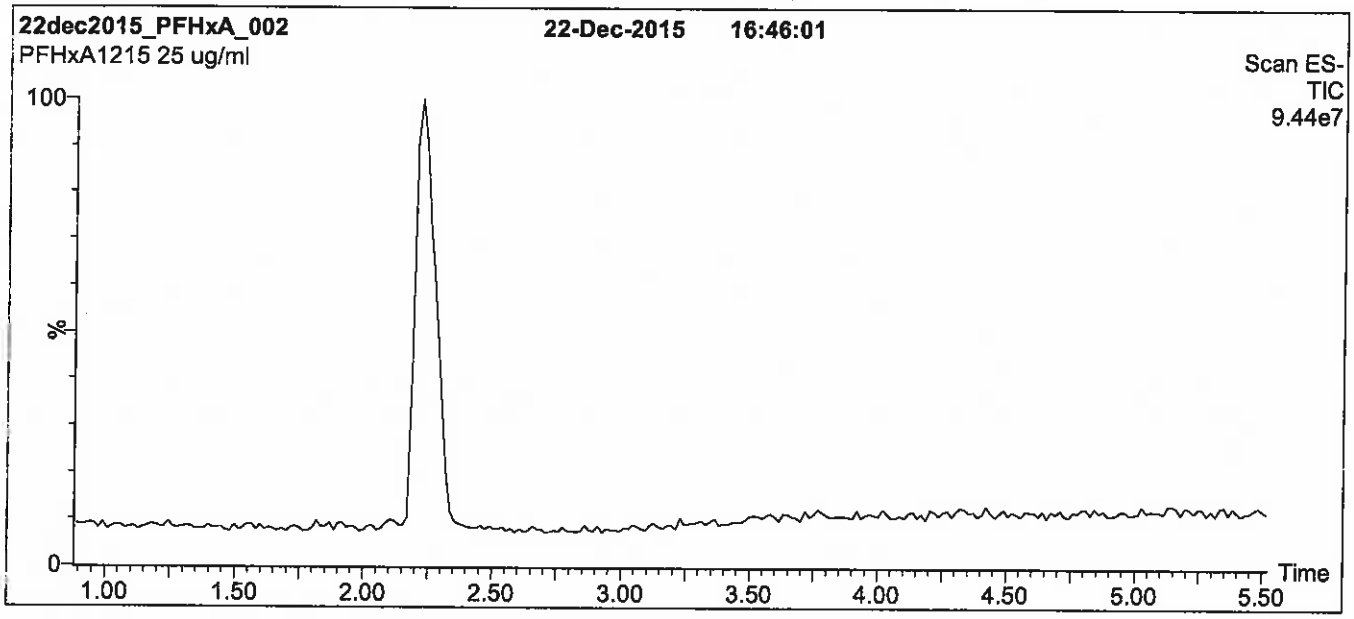
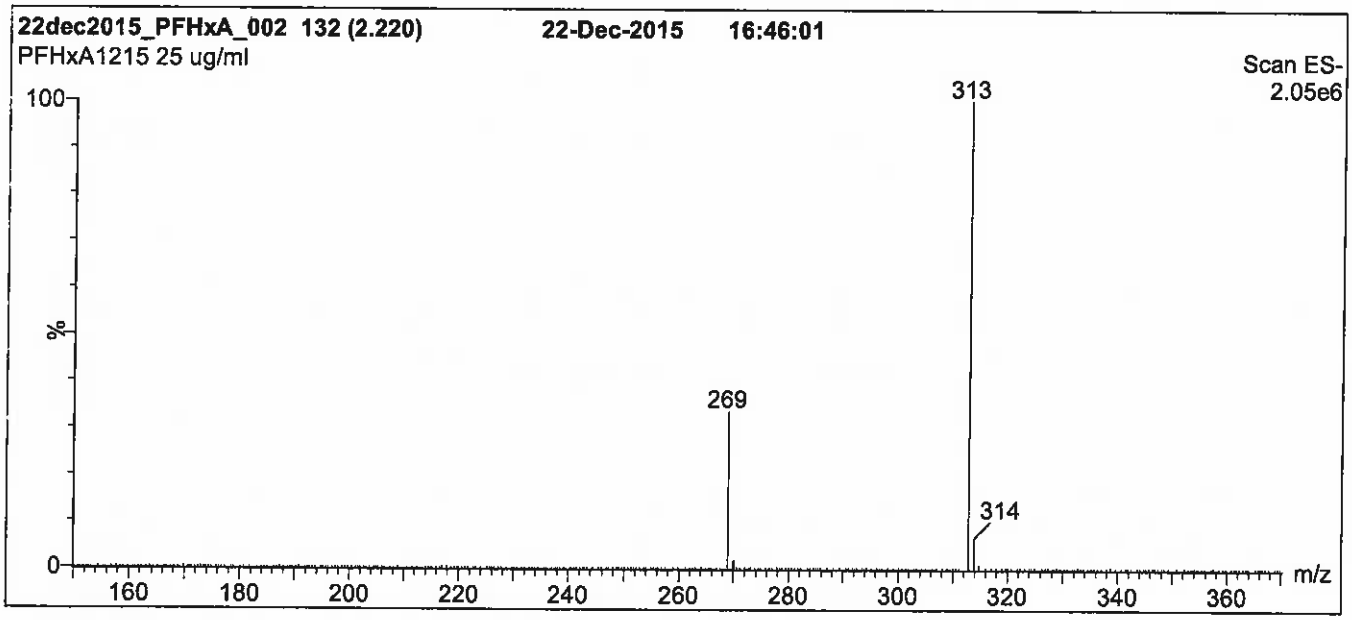
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

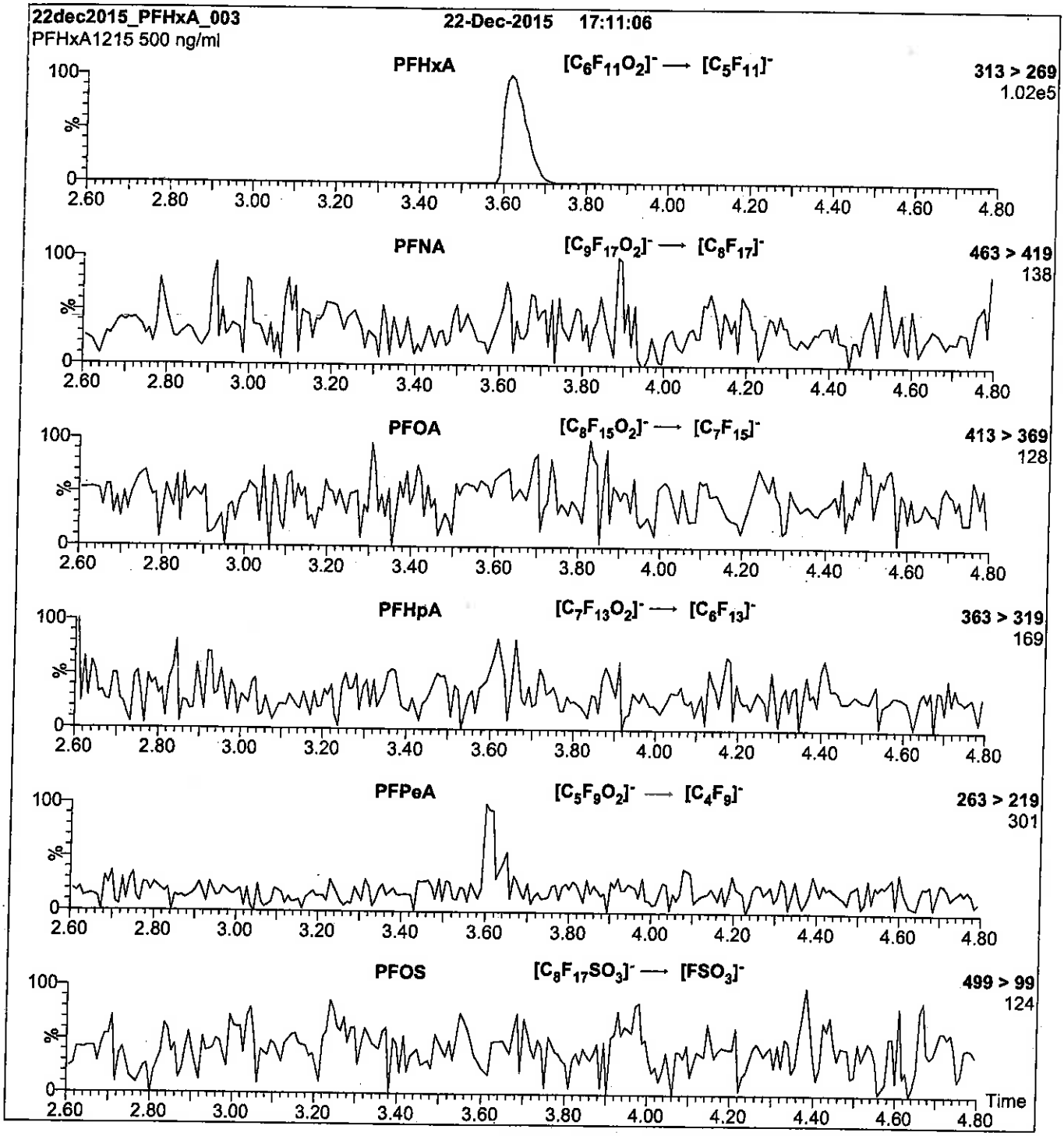
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

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) = 3.43e-3
Collision Energy (eV) = 10

Reagent

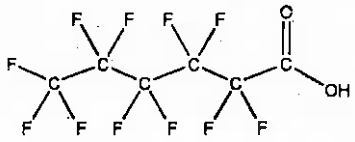
LCPFHxA_00007

R: 12/29/16 SAV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFHxA	**LOT NUMBER:**	PFHxA1215
COMPOUND:	Perfluoro-n-hexanoic acid		
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)	12/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/22/2020		
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-pentanoic acid (PFPeA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/23/2015 (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

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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

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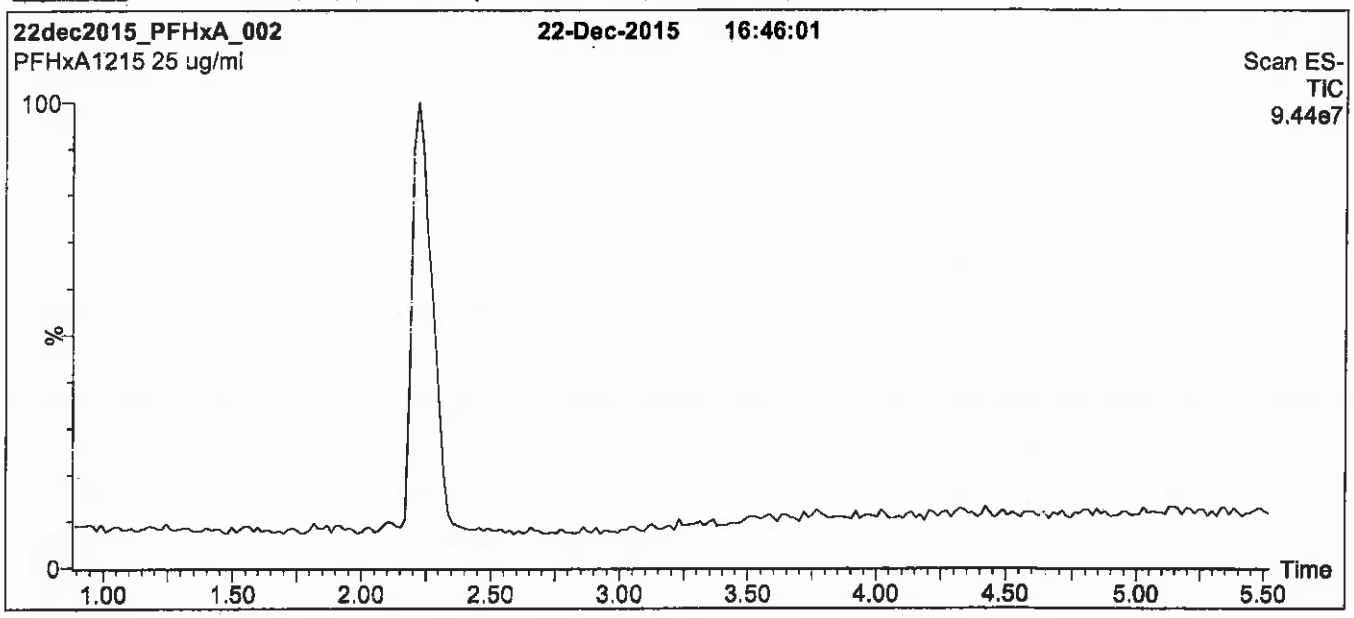
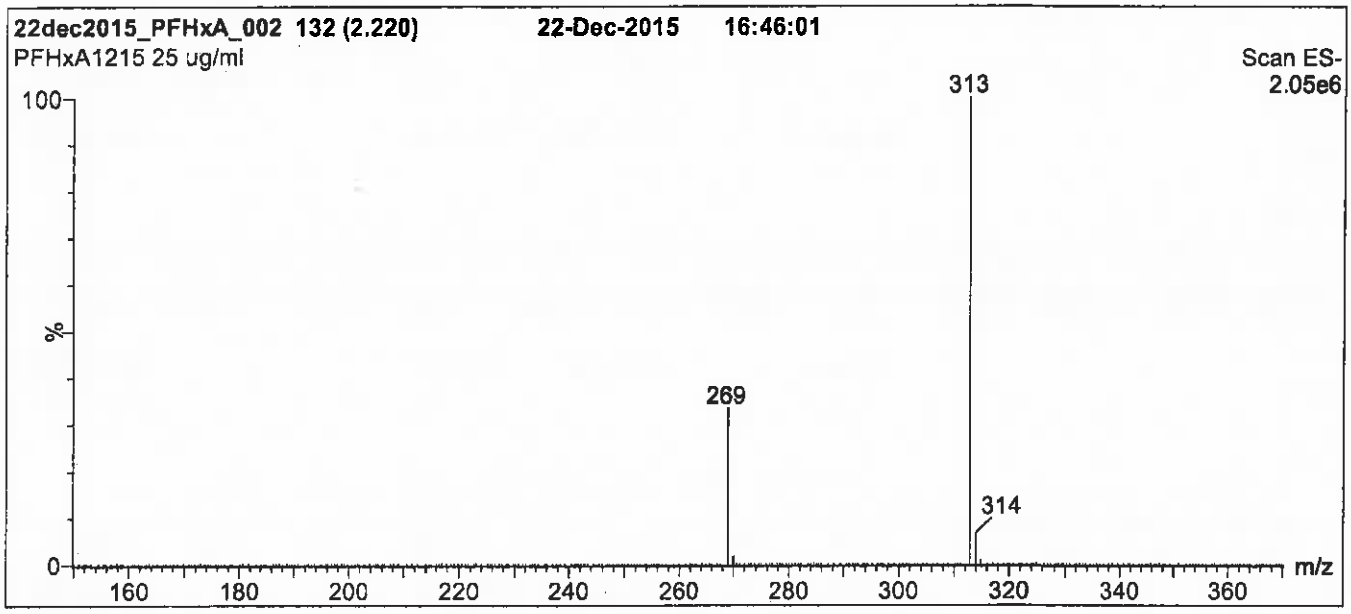
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

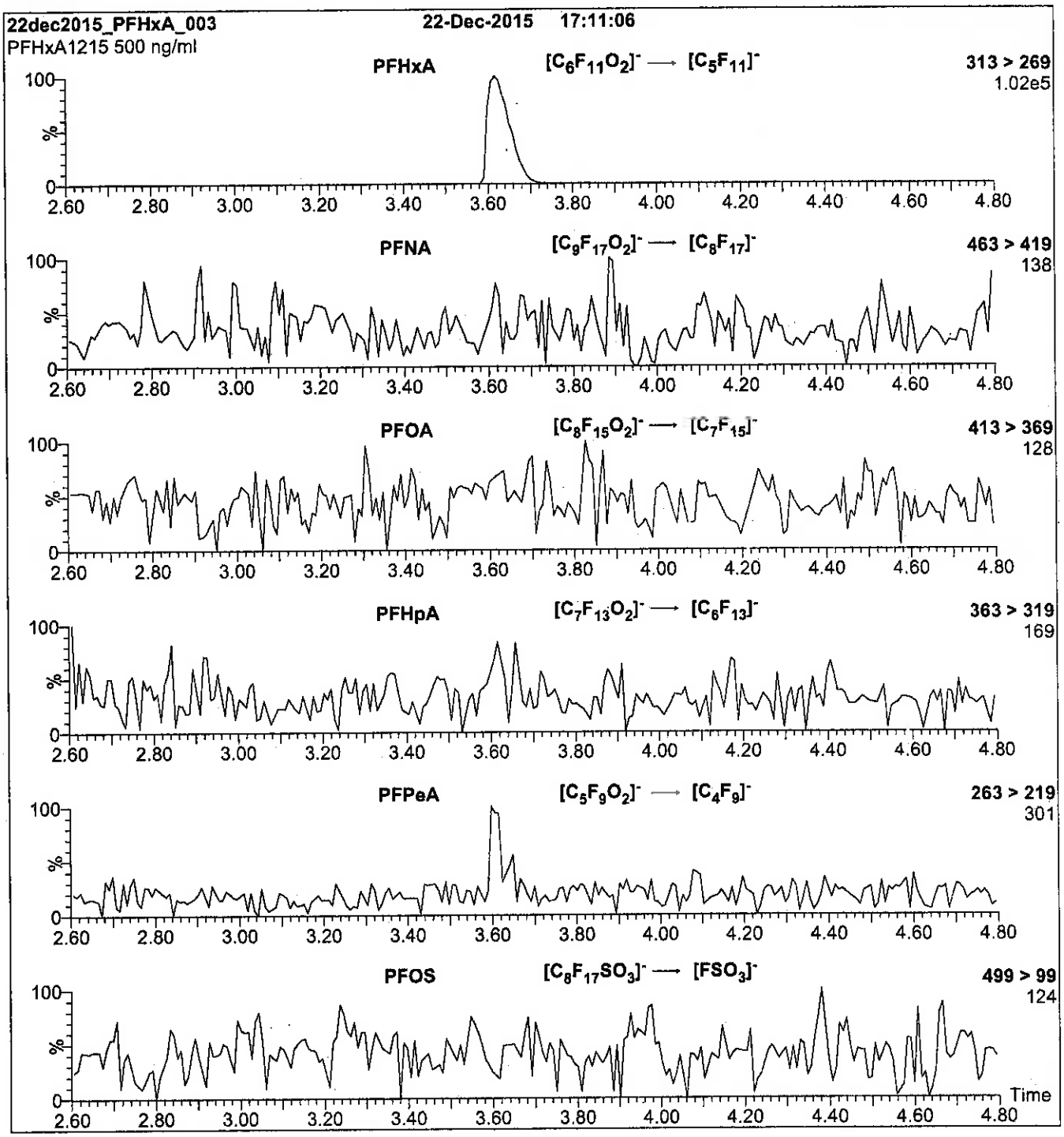
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

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) = 3.43e-3
Collision Energy (eV) = 10

Reagent

LCPFHxDA_00007

R: SBC 9/13/16

Scanned 10/14/16 SK

730630
ID: LCPFHxDA_00006
Exp: 05/25/21 Prpd: SBC
PFHxDA stock 50ug/mL

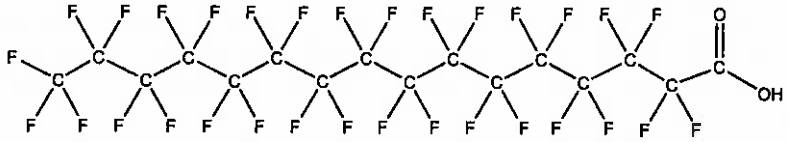
730631
ID: LCPFHxDA_00007
Exp: 05/25/21 Prpd: SBC
PFHxDA stock 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxDA
LOT NUMBER: PFHxDA0516
COMPOUND: Perfluoro-n-hexadecanoic acid

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) 05/25/2016
EXPIRY DATE: (mm/dd/yyyy) 05/25/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.4% of PFODA.

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Certified By: B.G. Chittim **Date:** 05/27/2016 (mm/dd/yyyy)

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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QUALITY MANAGEMENT:

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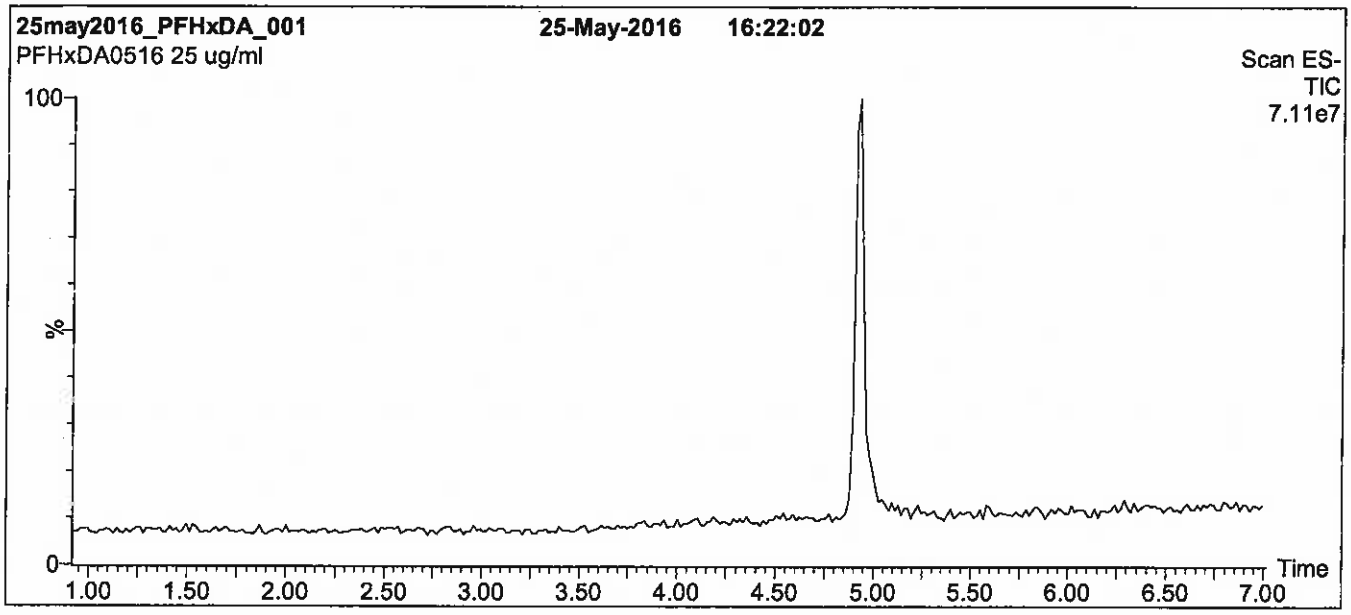
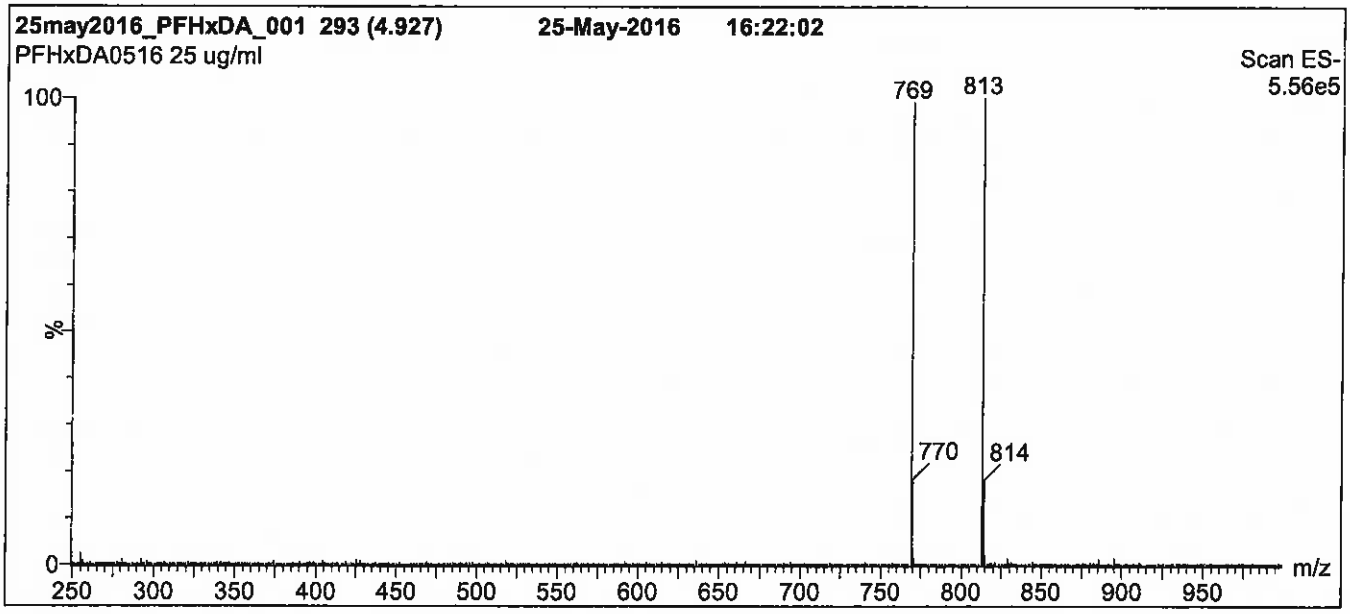
For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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: 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 6 min and hold for 2.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

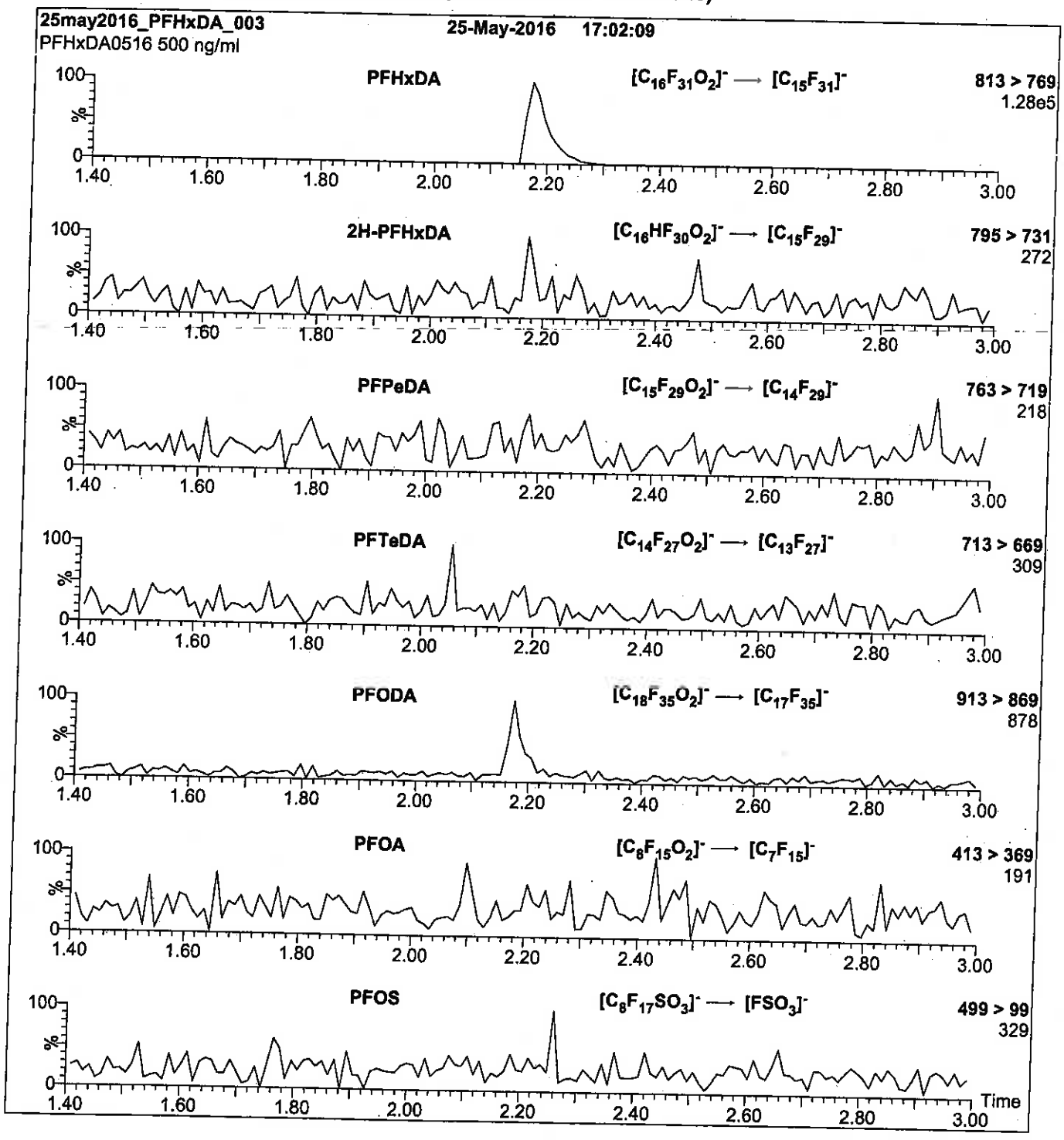
Flow: 300 µl/min

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

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) = 3.66e-3
Collision Energy (eV) = 15

Reagent

LCPFHxDA_00008

T: 12/29/16 SEV

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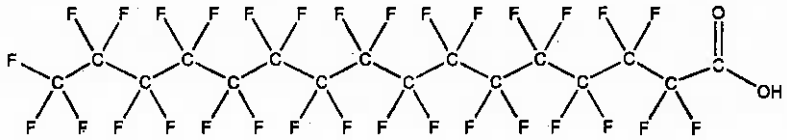
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFHxDA	**LOT NUMBER:**	PFHxDA0516
COMPOUND:	Perfluoro-n-hexadecanoic acid		
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)	05/25/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/25/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.4% of PFODA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/27/2016 (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

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:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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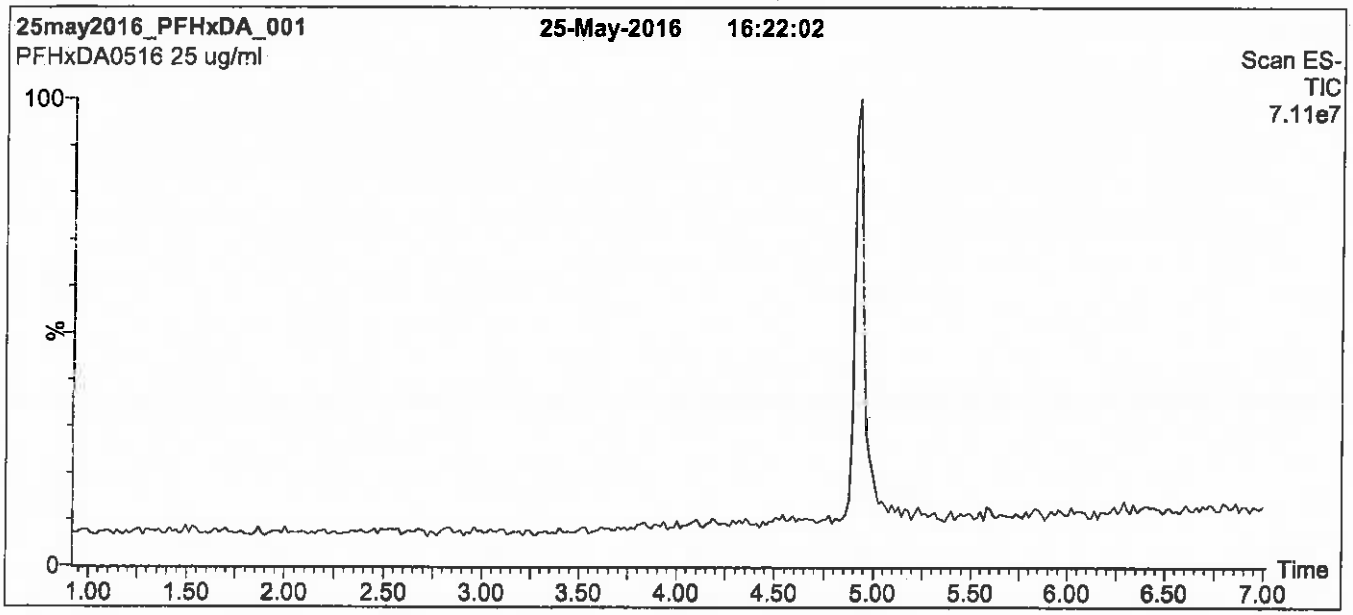
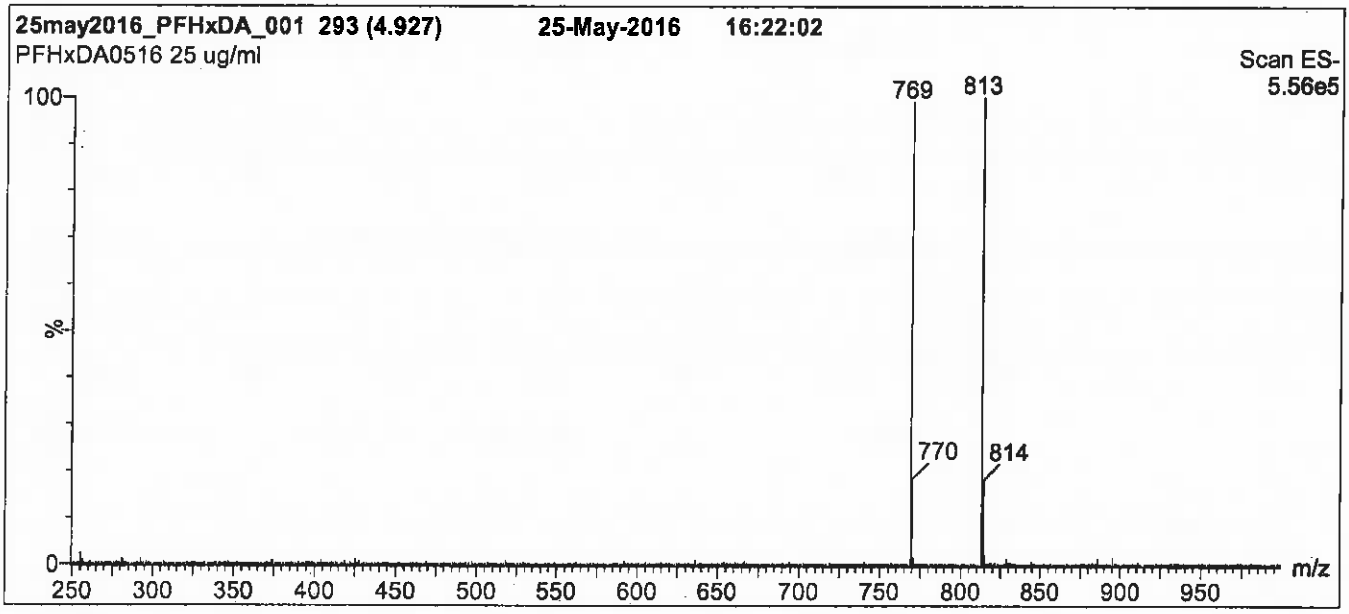
Figure 1: **PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





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: 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 6 min and hold for 2.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

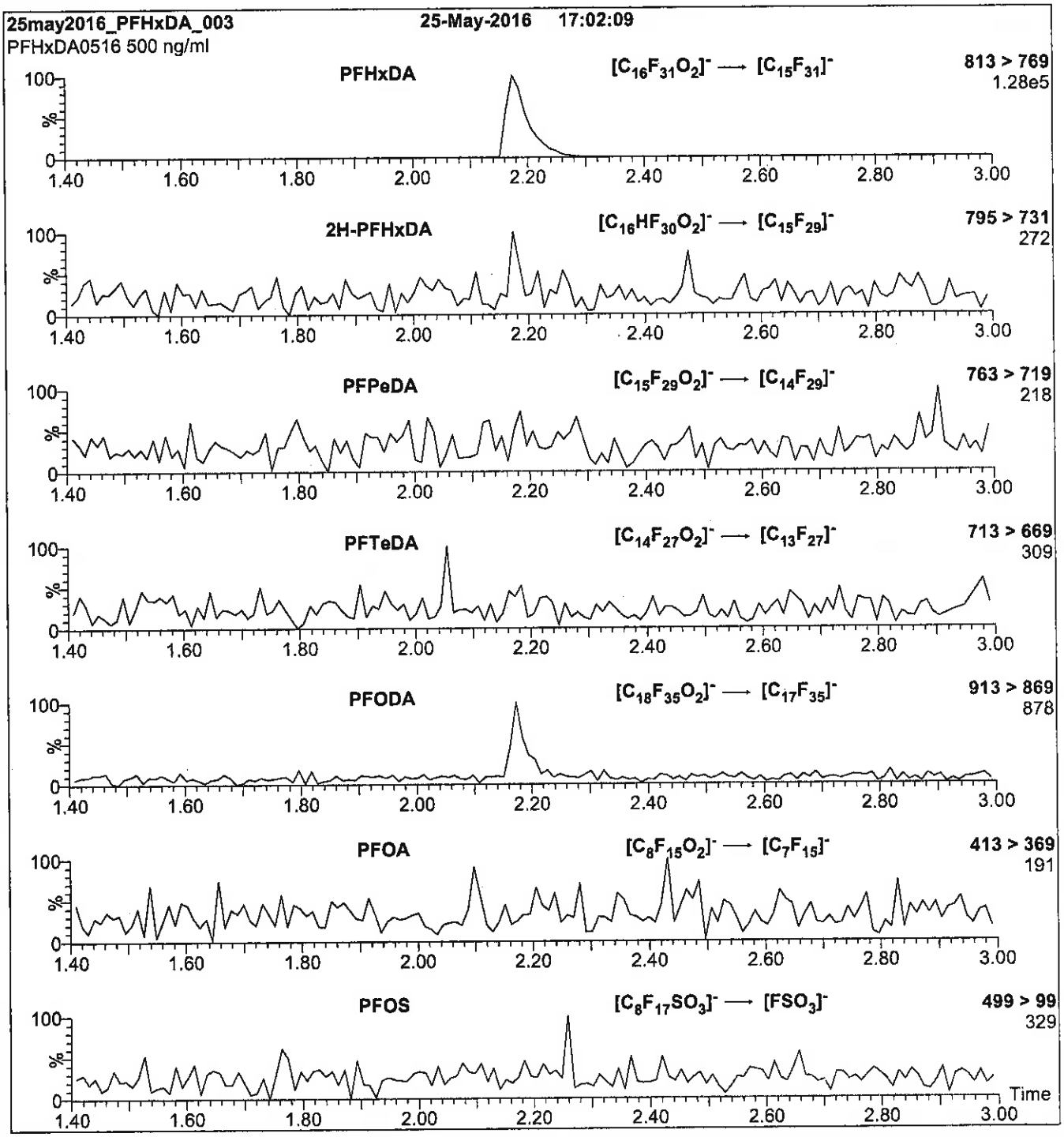
Flow: 300 µl/min

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

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) = 3.66e-3
Collision Energy (eV) = 15

Reagent

LCPFHxS-br_00003

SBC
R: 9/13/16

730513
ID: LCPFHxS-br_00002
Exp: 07/03/20 Prpd: SBC
Potassium Perfluorohexane

730514
ID: LCPFHxS-br_00003
Exp: 07/03/20 Prpd: SBC
Potassium Perfluorohexane

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFHxSK
LOT NUMBER:	brPFHxSK0615
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)	06/29/2015
LAST TESTED: (mm/dd/yyyy)	07/03/2015
EXPIRY DATE: (mm/dd/yyyy)	07/03/2020
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
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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where x is expressed as a relative standard uncertainty of the individual parameter.

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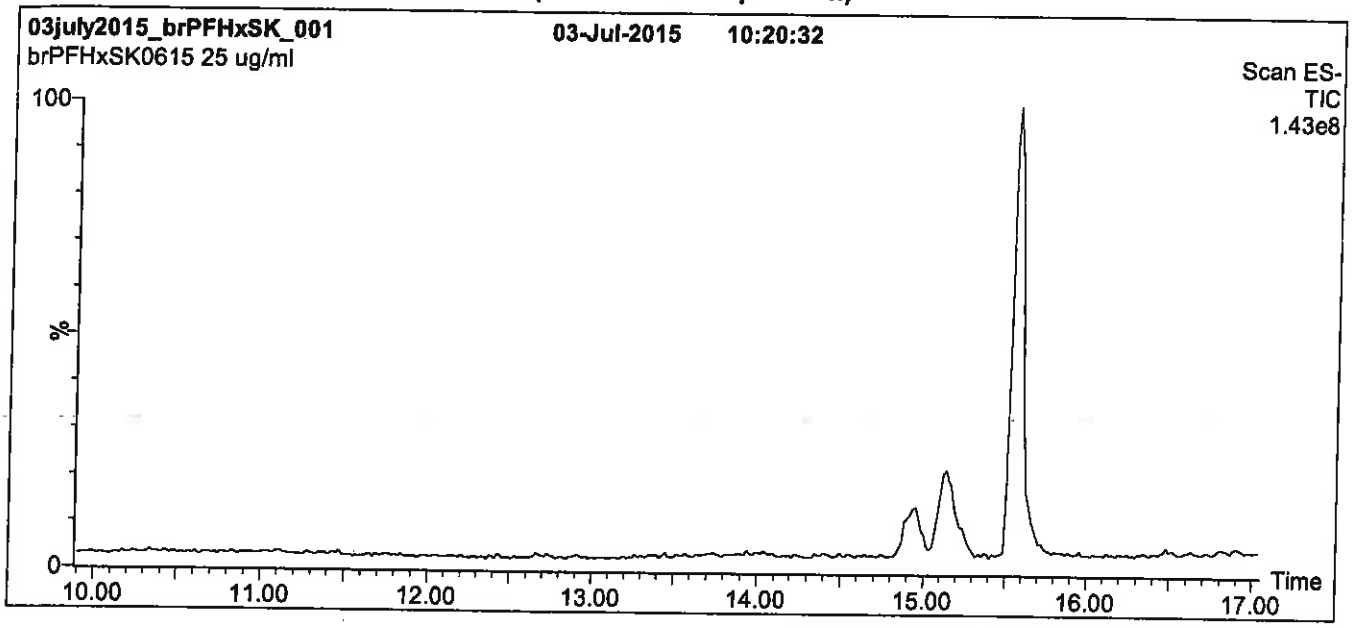
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

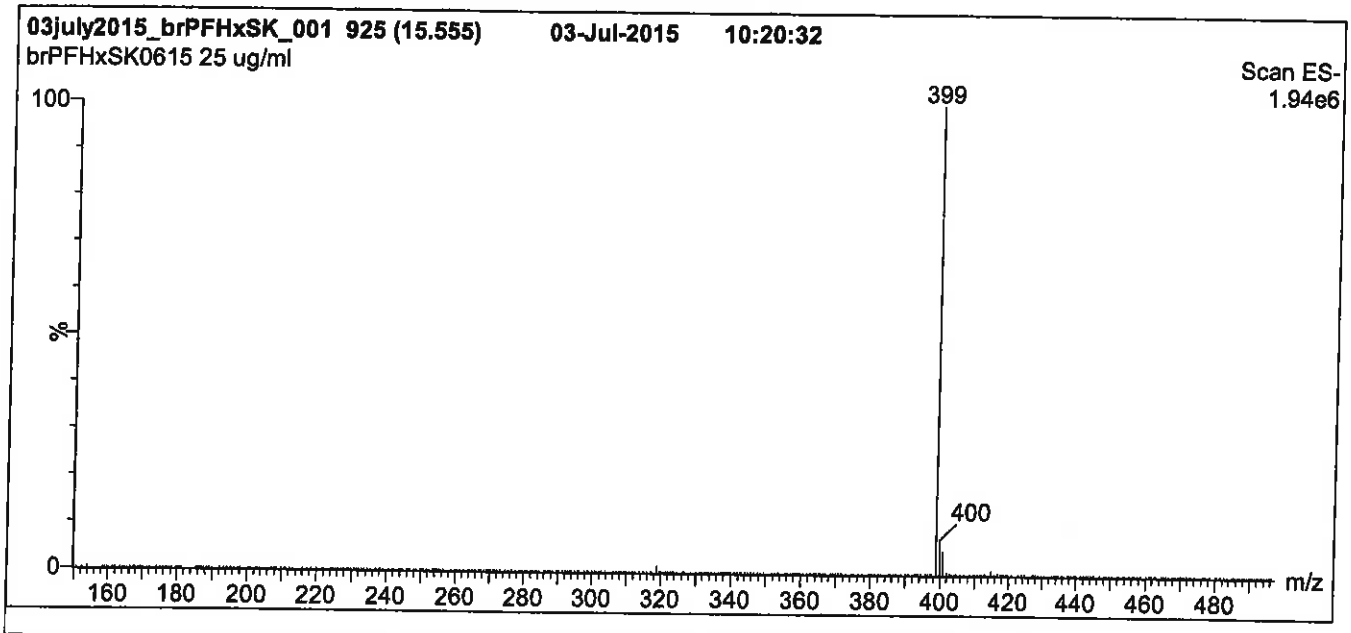
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 07/15/2015 (mm/dd/yyyy)

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

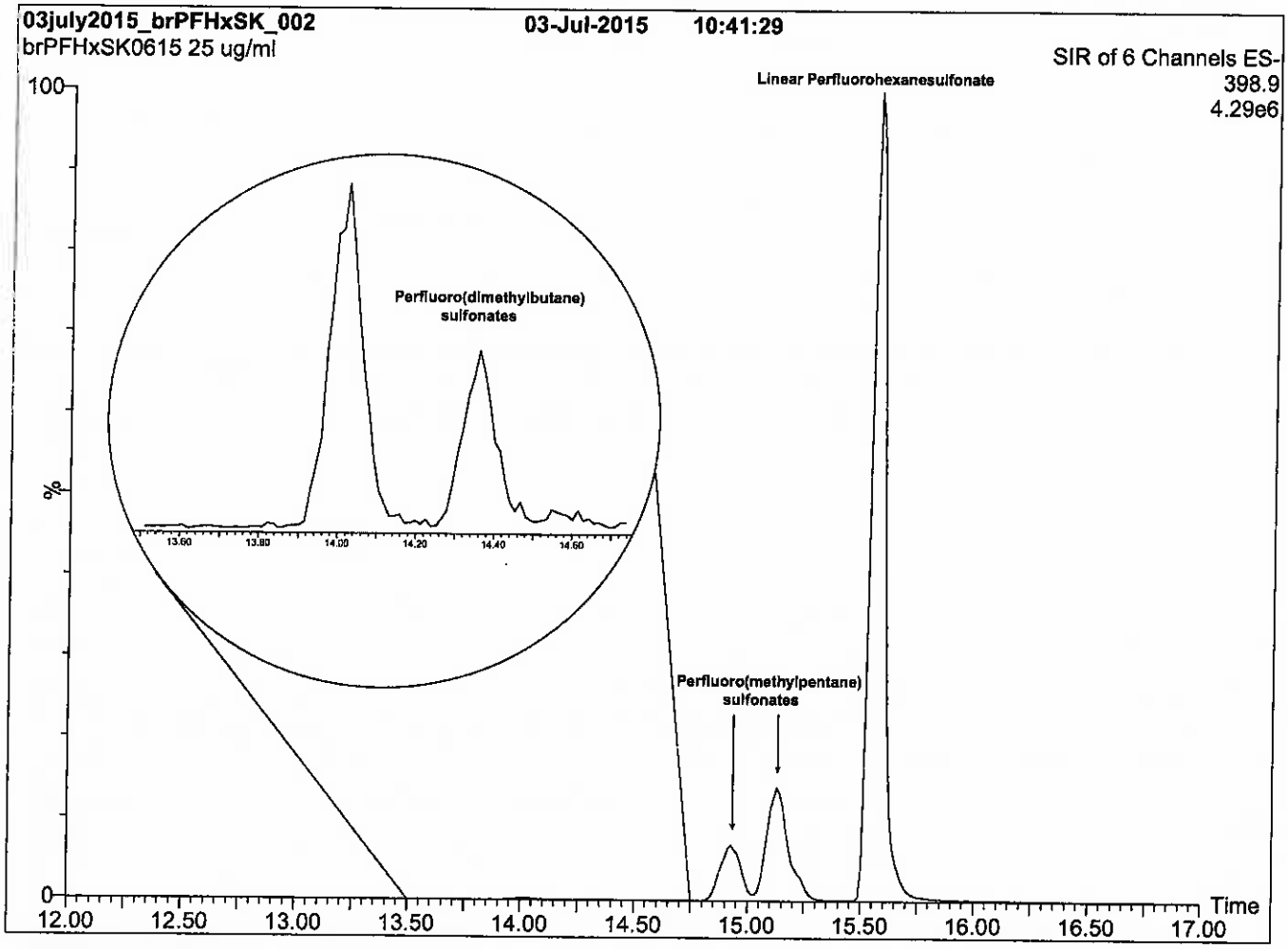
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

Figure 2: **br-PFHxSK; LC/MS Data**



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

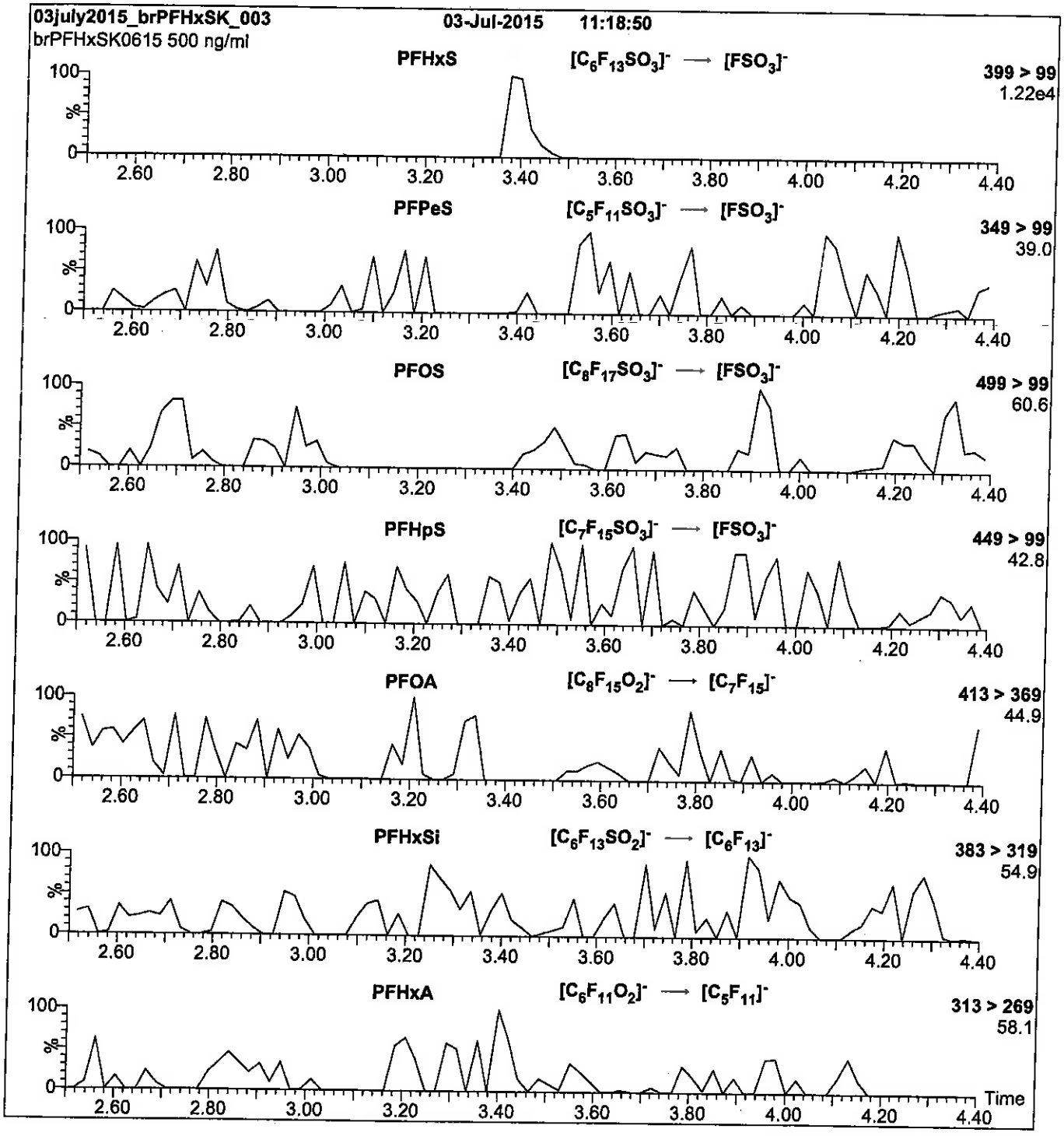
Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFHxS-br_00004

r: 12/29/16 SKd

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate
Solution/Mixture of Linear and
Branched Isomers

PRODUCT CODE:	br-PFHxSK
LOT NUMBER:	brPFHxSK0615
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)	06/29/2015
LAST TESTED: (mm/dd/yyyy)	07/03/2015
EXPIRY DATE: (mm/dd/yyyy)	07/03/2020
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
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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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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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 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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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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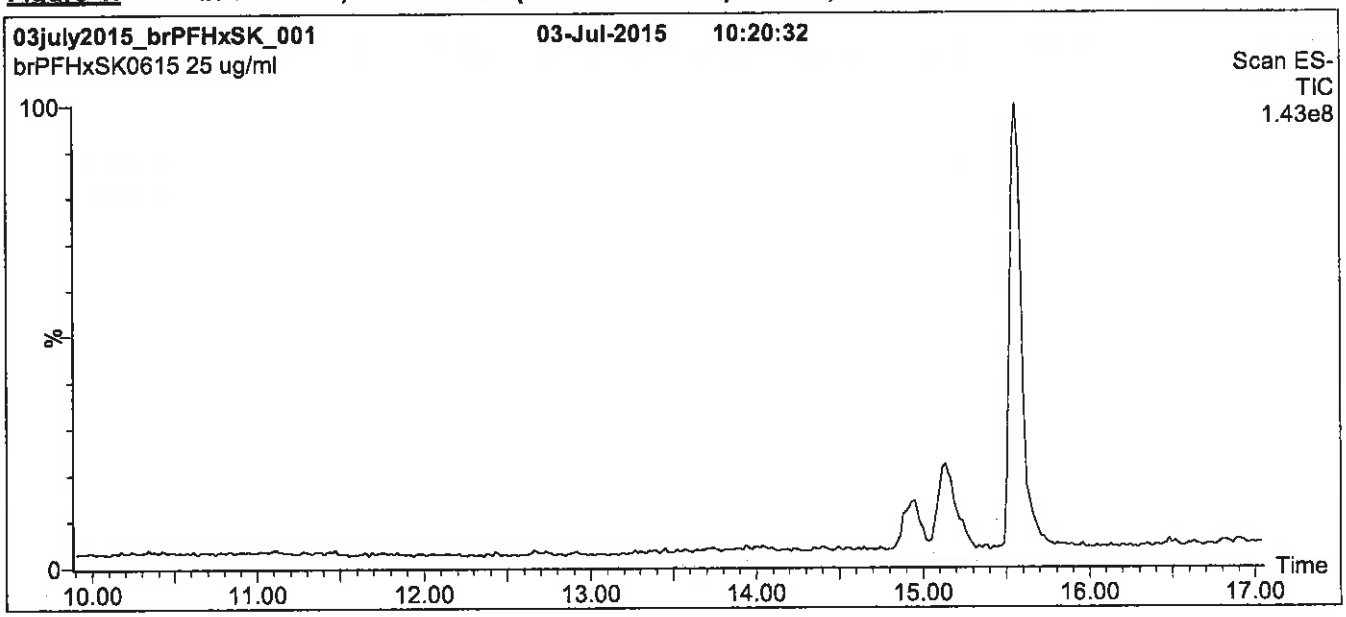
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

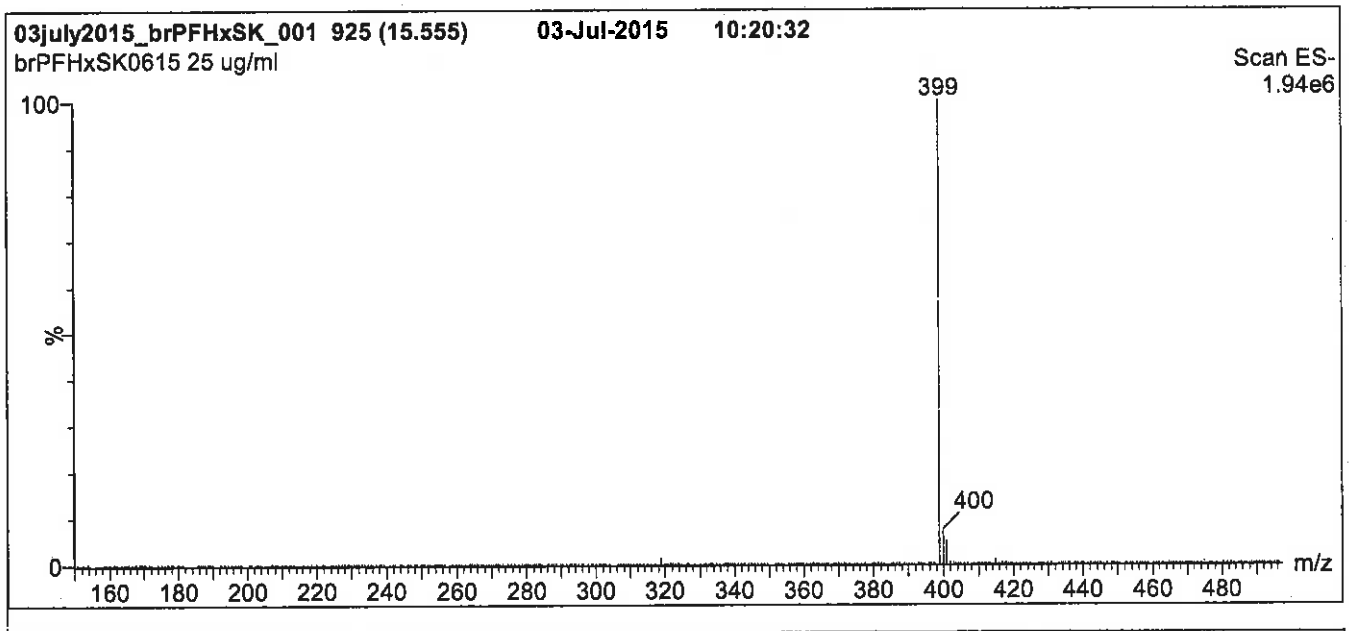
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: _____ **Date:** 09/27/2016
B.G. Chittim (mm/dd/yyyy)

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

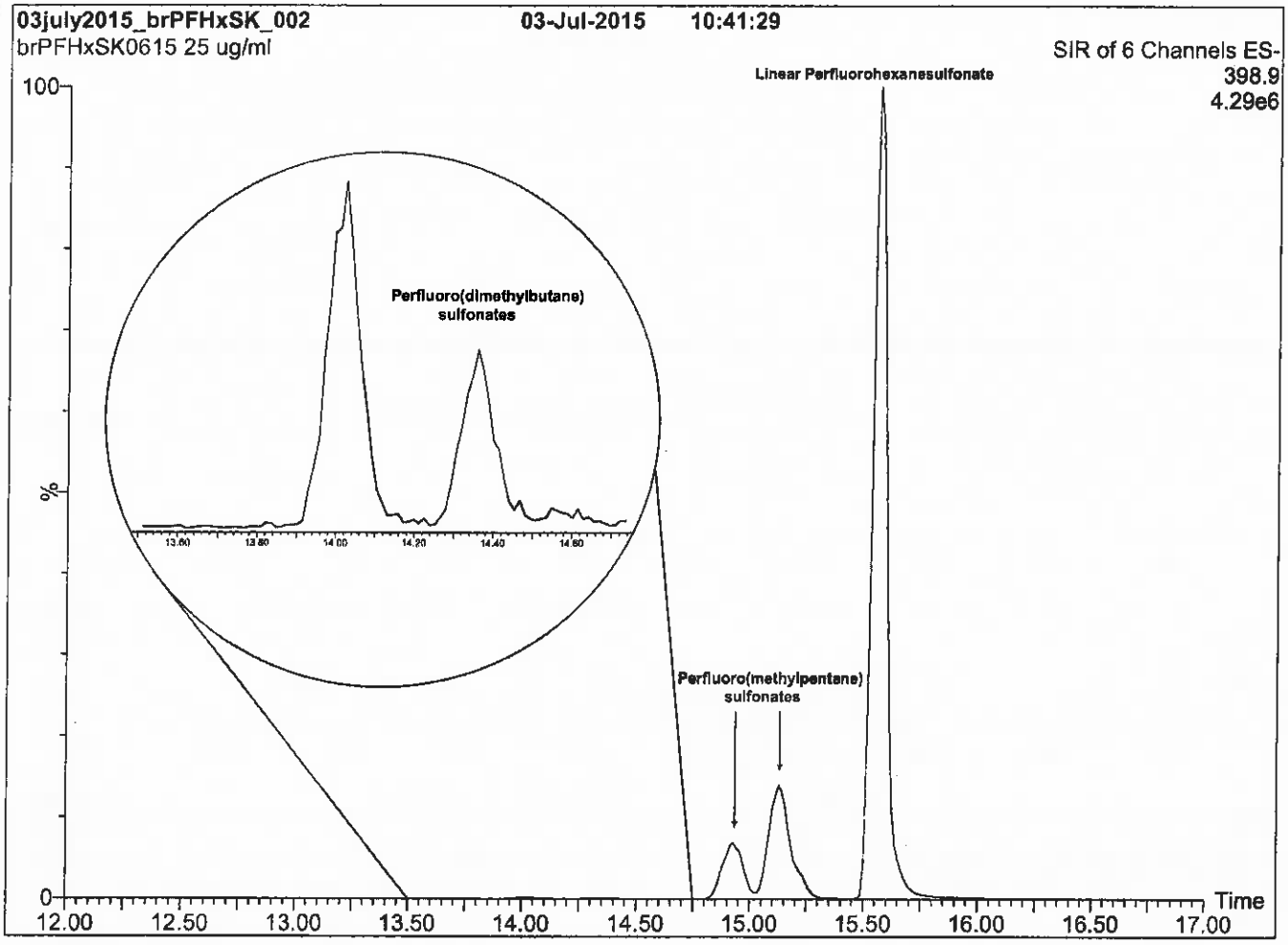
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

Figure 2: **br-PFHxSK; LC/MS Data**



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

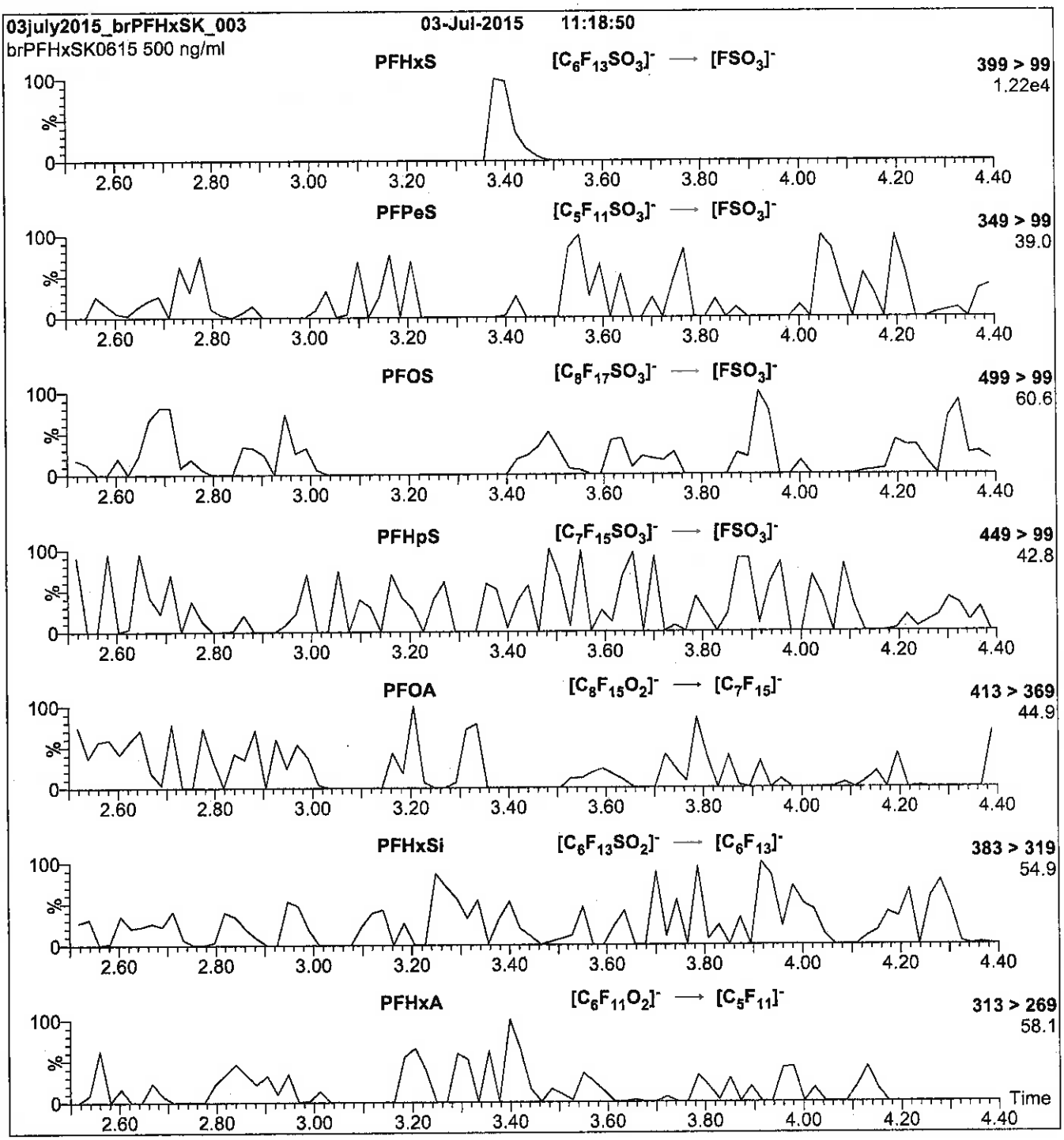
Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFNA_00007

R: SBC 9/13/16
Scanned 10/14/16

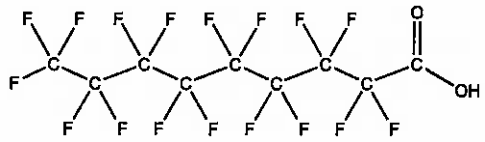
730559
ID: LCPFNA_00006
Exp: 10/23/20 Prpd: SBC
PF-n-nonanoic acid

730560
ID: LCPFNA_00007
Exp: 10/23/20 Prpd: SBC
PF-n-nonanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFNA	**LOT NUMBER:**	PFNA1015
COMPOUND:	Perfluoro-n-nonanoic acid		
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)	10/23/2015		
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020		
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) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/30/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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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:

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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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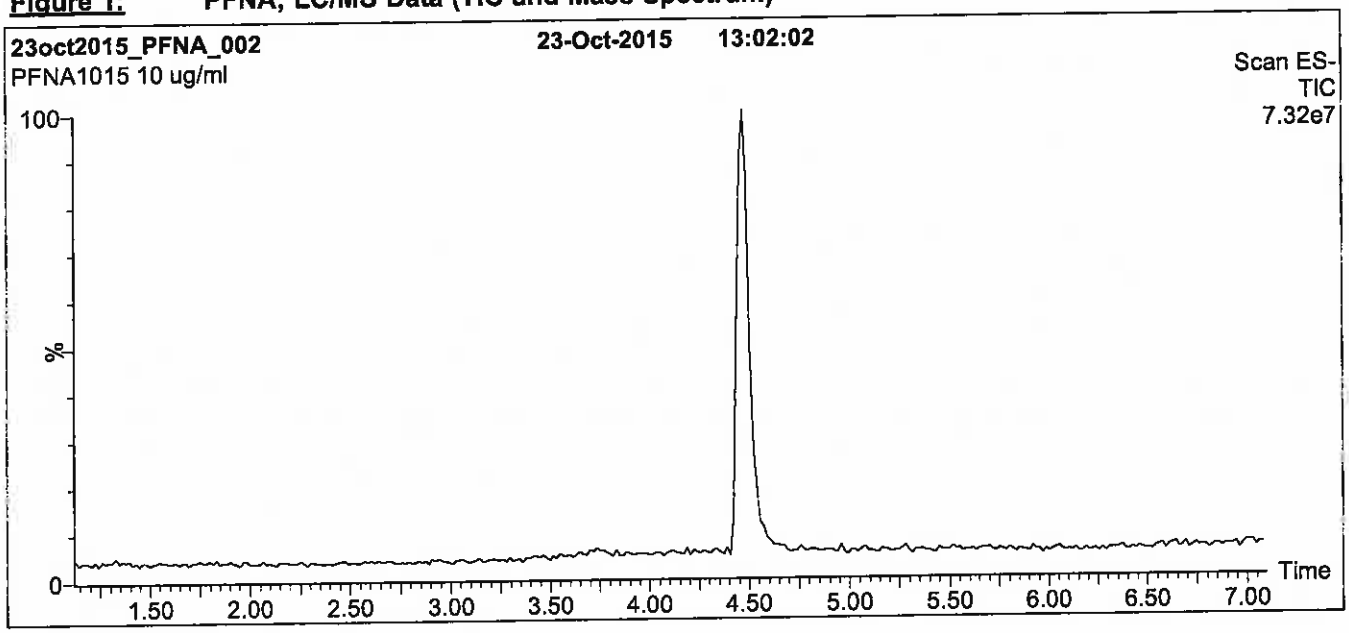
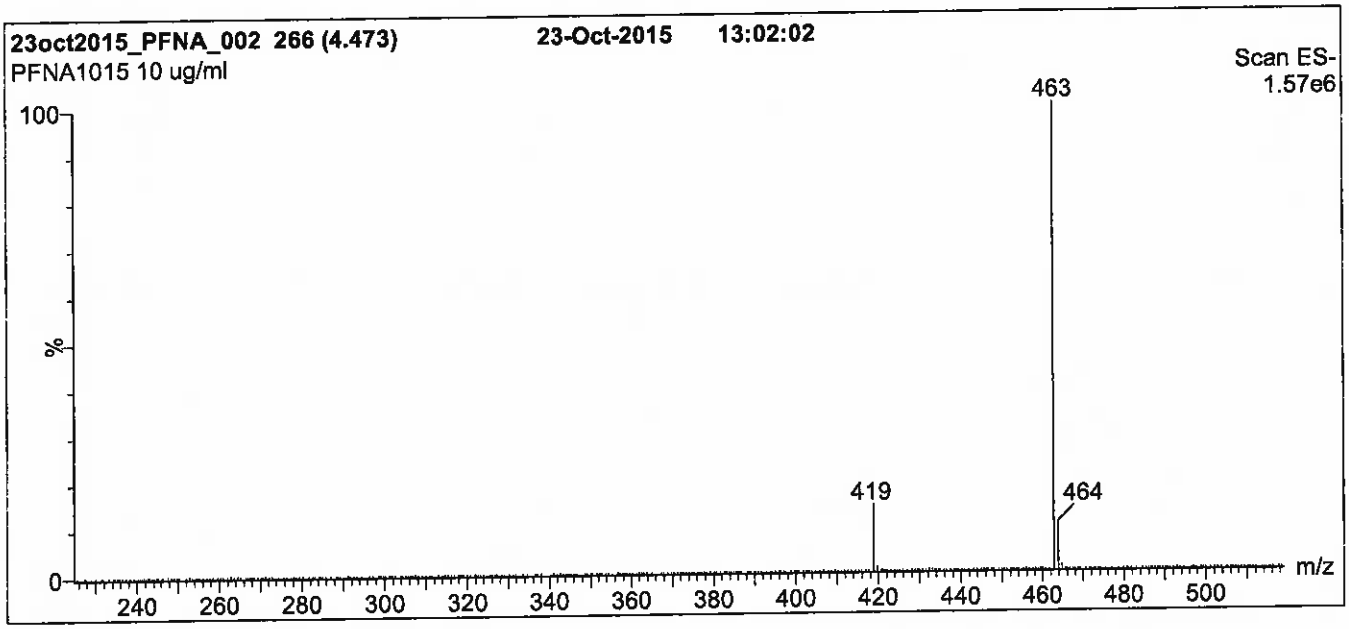
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





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)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

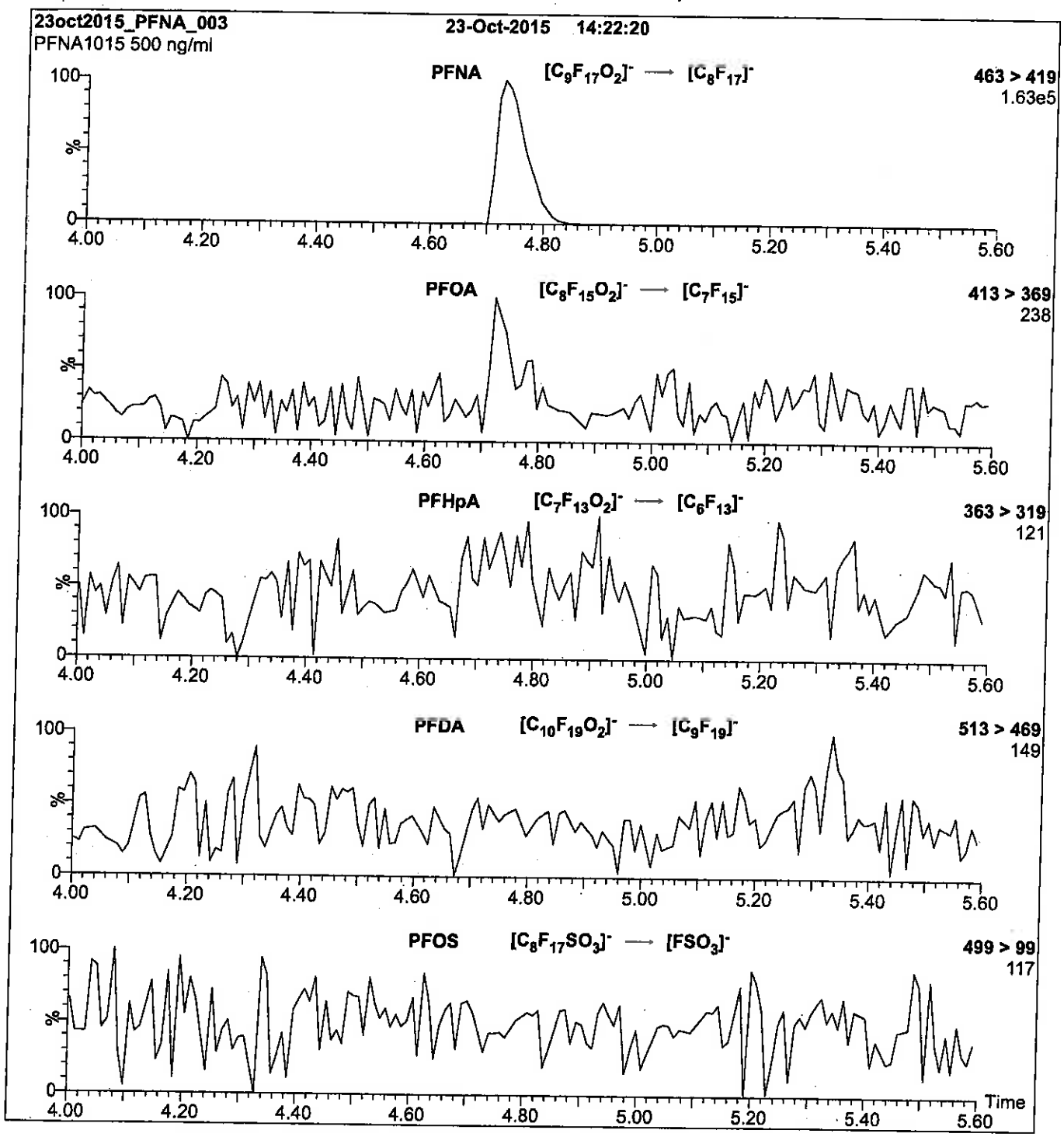
Flow: 300 µl/min

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

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) = 3.28e-3
Collision Energy (eV) = 11

Reagent

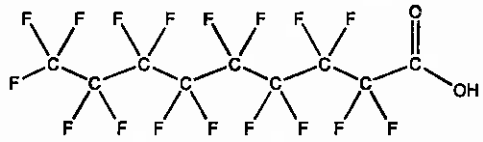
LCPFNA_00009

R: 9/21/17 SKJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFNA	**LOT NUMBER:**	PFNA0717
COMPOUND:	Perfluoro-n-nonanoic acid		
STRUCTURE:		**CAS #:**	375-95-1



MOLECULAR FORMULA:	$C_9HF_{17}O_2$	**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

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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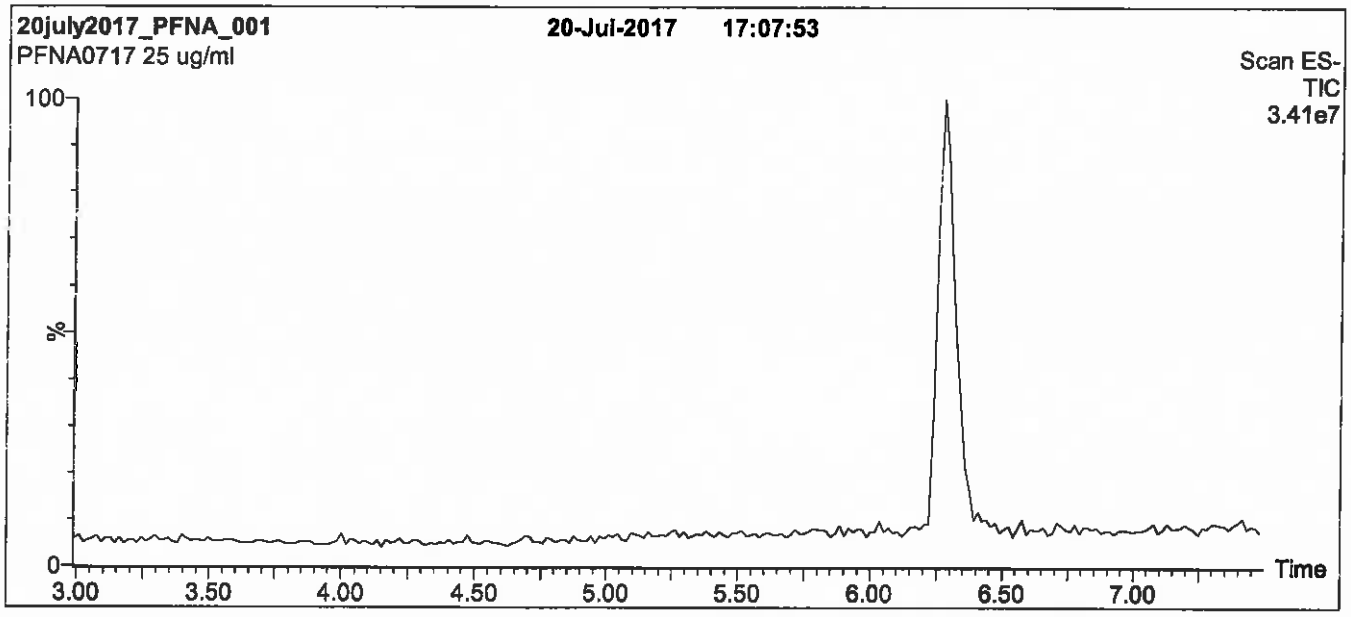
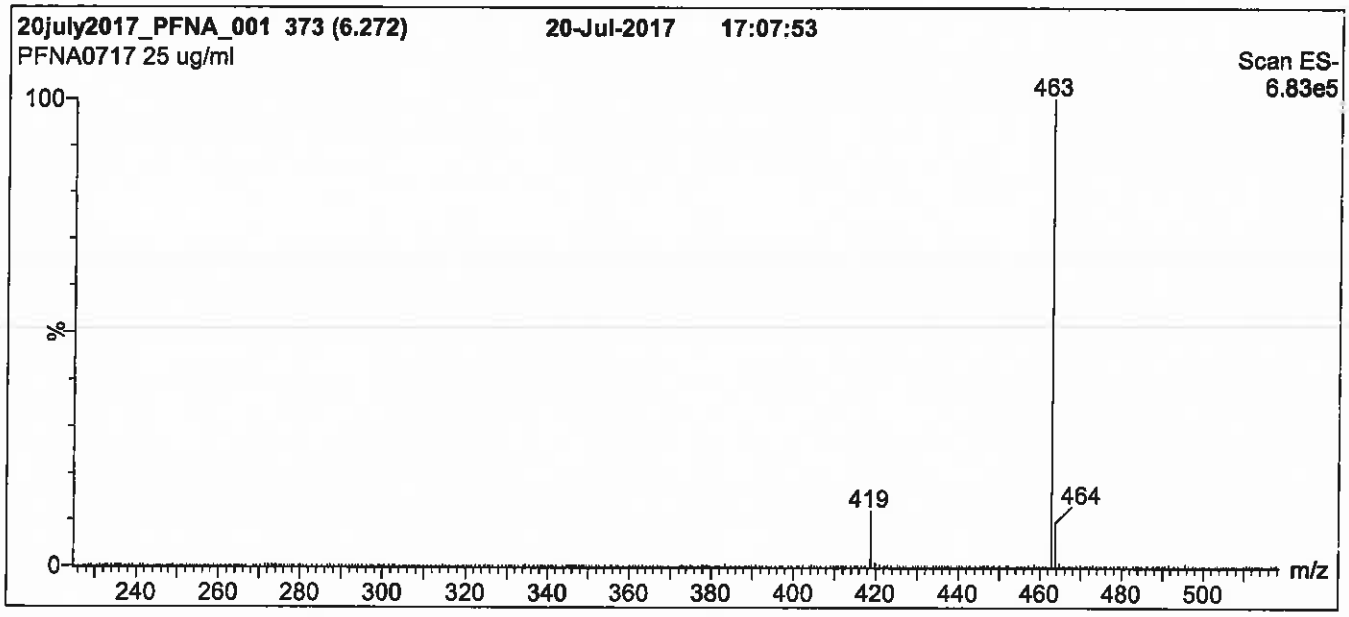
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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MS: **Micromass Quattro *micro* API MS**

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1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
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

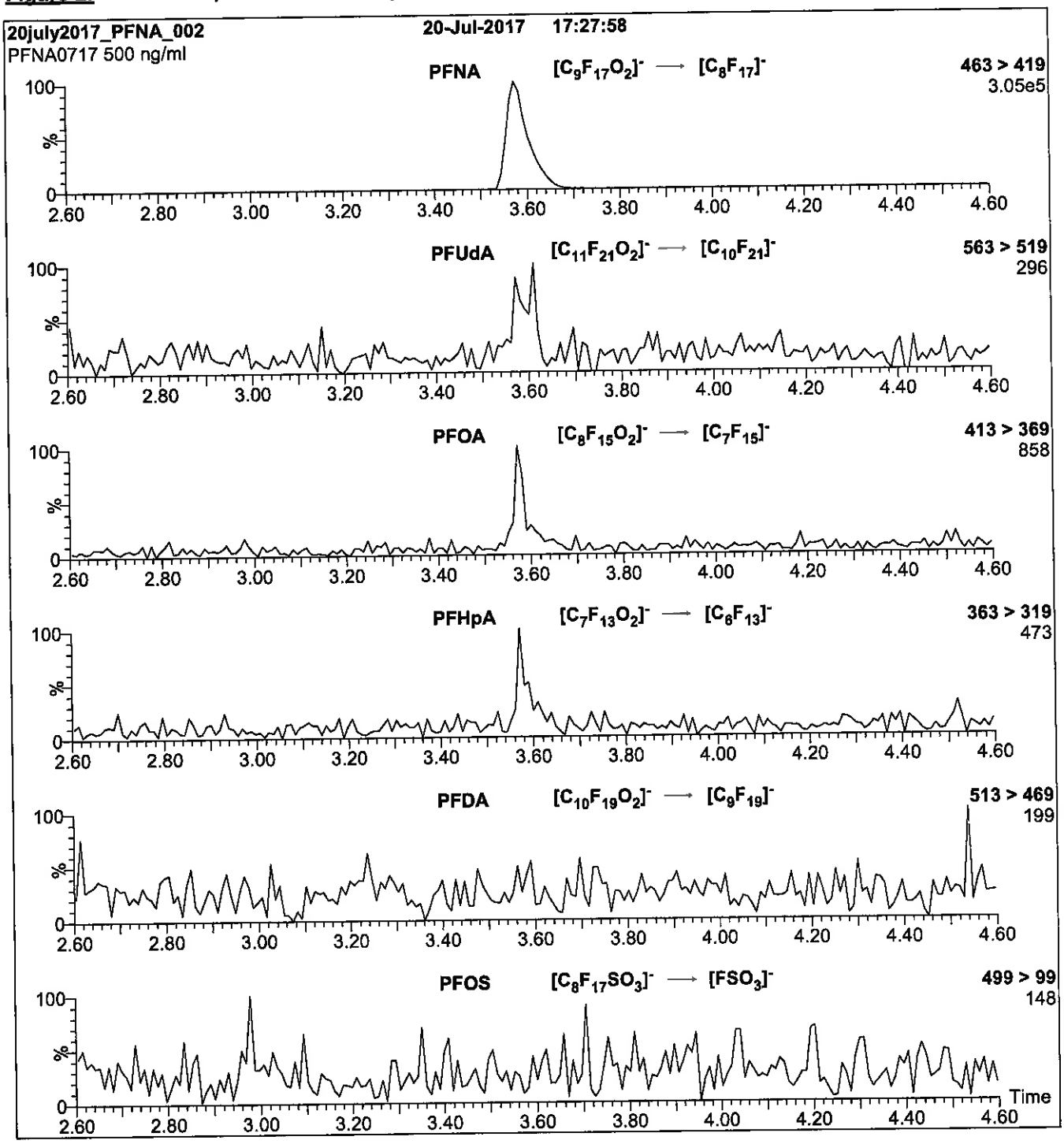
Flow: 300 µl/min

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

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

Reagent

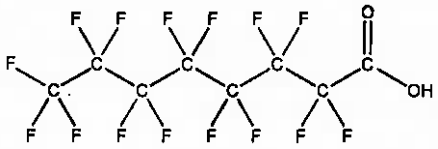
LCPFOA_00007

R: 12/21/16 SPV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFOA	**LOT NUMBER:**	PFOA0716
COMPOUND:	Perfluoro-n-octanoic acid		
STRUCTURE:		**CAS #:**	335-67-1



MOLECULAR FORMULA:	$C_8HF_{15}O_2$	**MOLECULAR WEIGHT:**	414.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	08/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/02/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/05/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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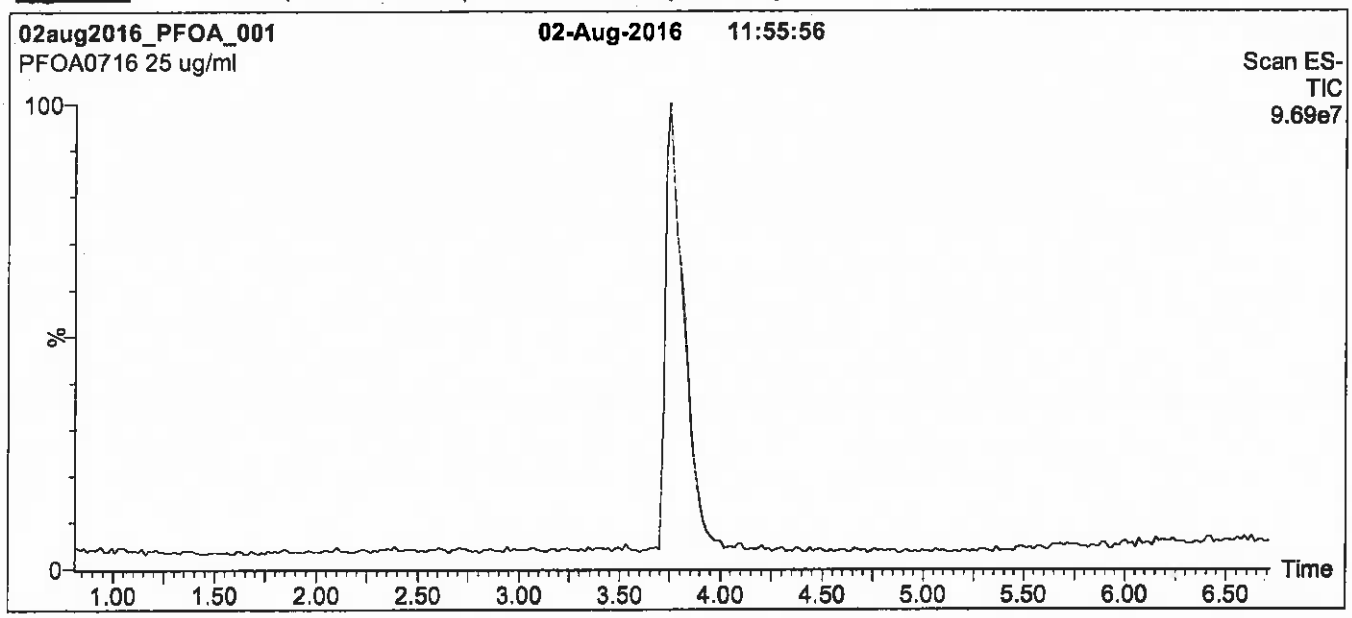
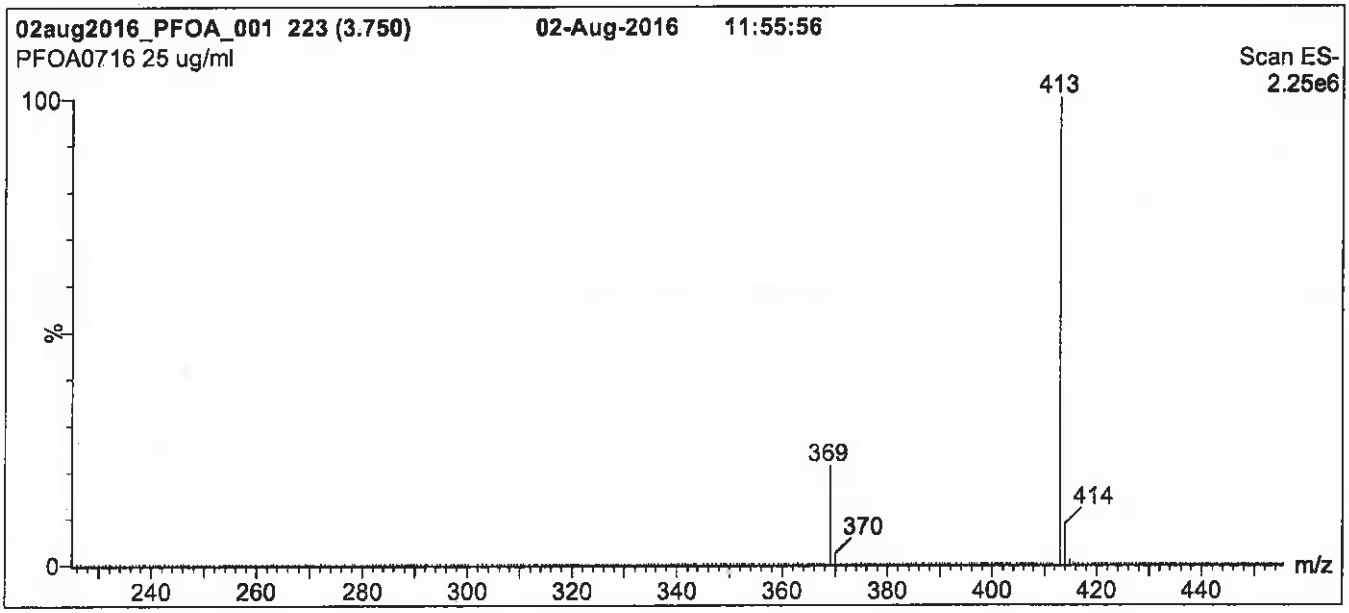
Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





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
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

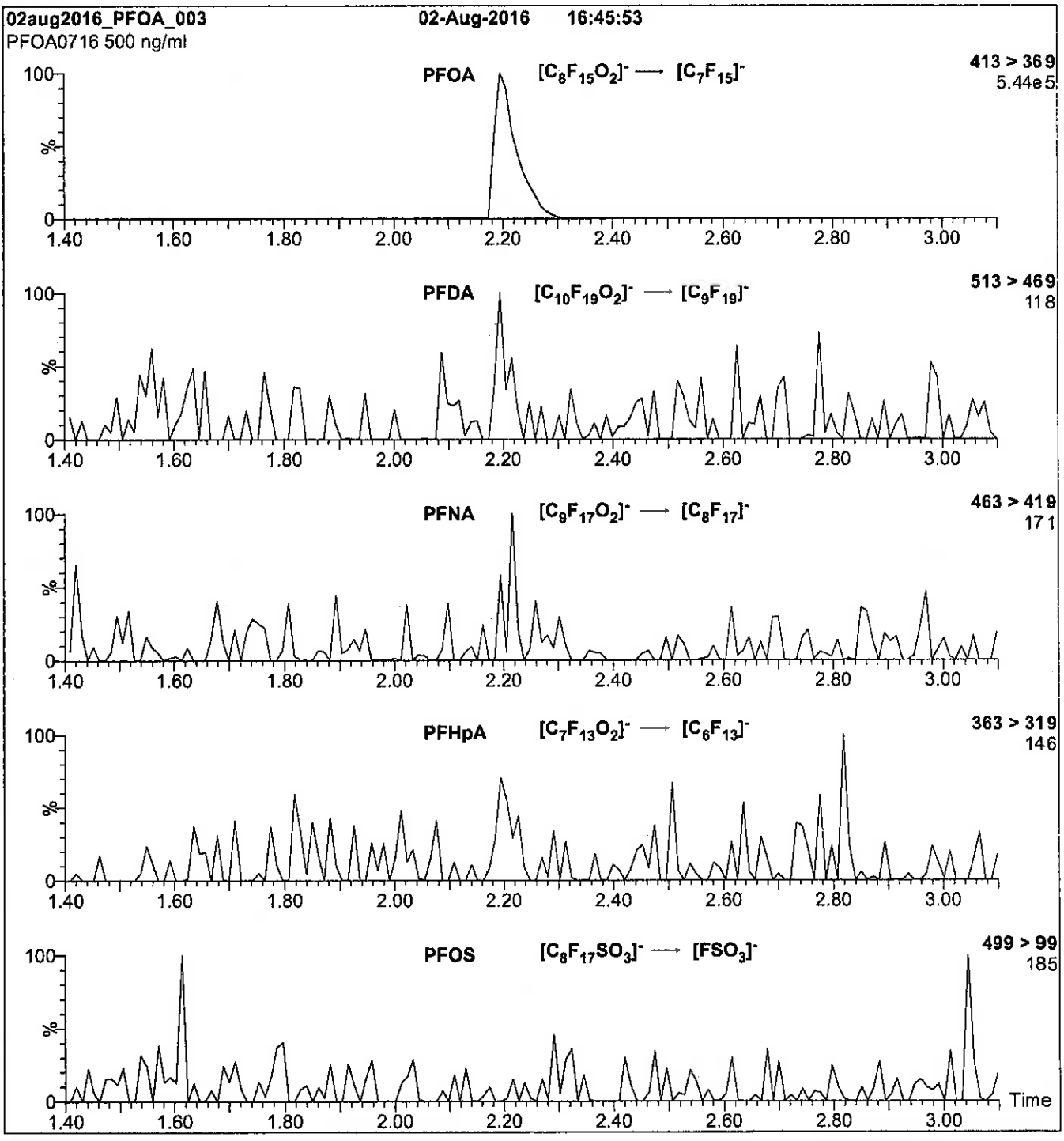
Flow: 300 µl/min

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

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) = 3.43e-3
Collision Energy (eV) = 10

Reagent

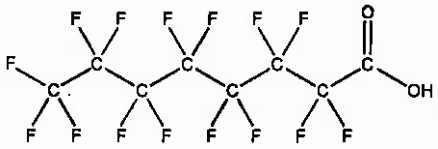
LCPFOA_00008

R: 12/21/16 SPV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFOA	**LOT NUMBER:**	PFOA0716
COMPOUND:	Perfluoro-n-octanoic acid		
STRUCTURE:		**CAS #:**	335-67-1



MOLECULAR FORMULA:	$C_8HF_{15}O_2$	**MOLECULAR WEIGHT:**	414.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	08/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/02/2021		
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.

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Certified By: B.G. Chittim **Date:** 08/05/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

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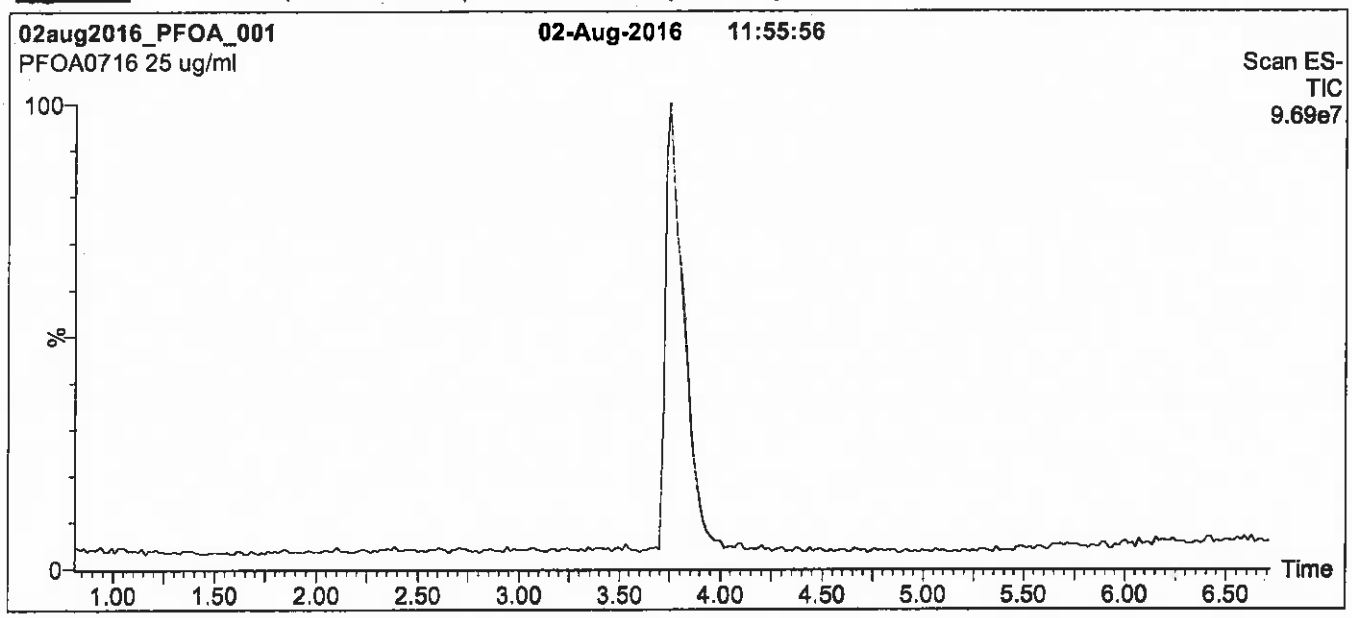

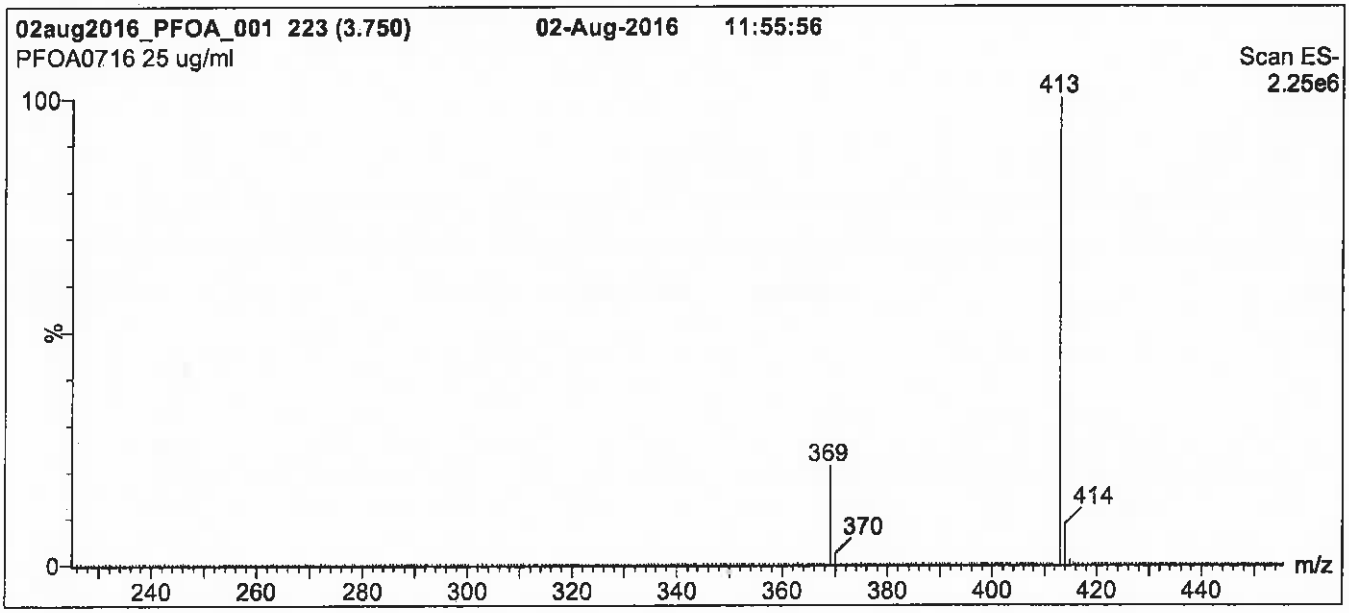

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Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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
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
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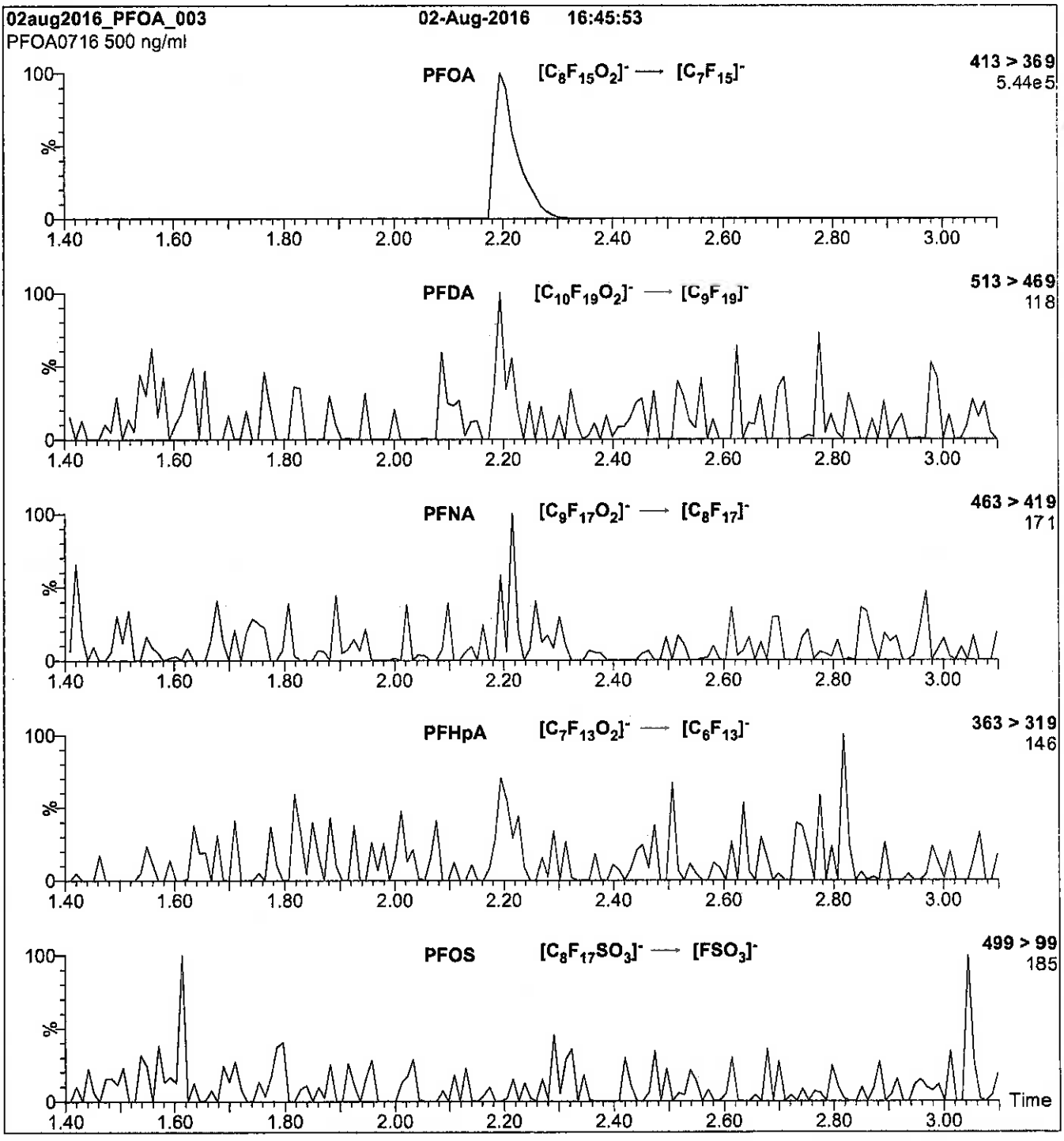
Figure 2: **PFOA; LC/MS/MS Data (Selected MRM Transitions)**



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) = 3.43e-3
Collision Energy (eV) = 10

Reagent

LCPFODA_00007

Scanned 10/14/16 R: SBC 9/13/16

730632
ID: LCPFODA_00006
Exp: 04/29/21 Prpd: SBC
PFODA stock 50ug/mL

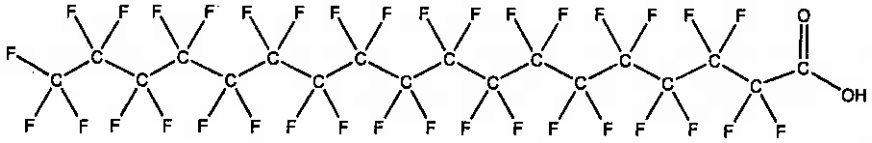
730633
ID: LCPFODA_00007
Exp: 04/29/21 Prpd: SBC
PFODA stock 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid
LOT NUMBER: PFODA0416

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) 04/29/2016
EXPIRY DATE: (mm/dd/yyyy) 04/29/2021
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/20/2016 (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

Form#:27, Issued 2004-11-10
Revision#:3, Revised 2015-03-24

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CALA Testing A1226

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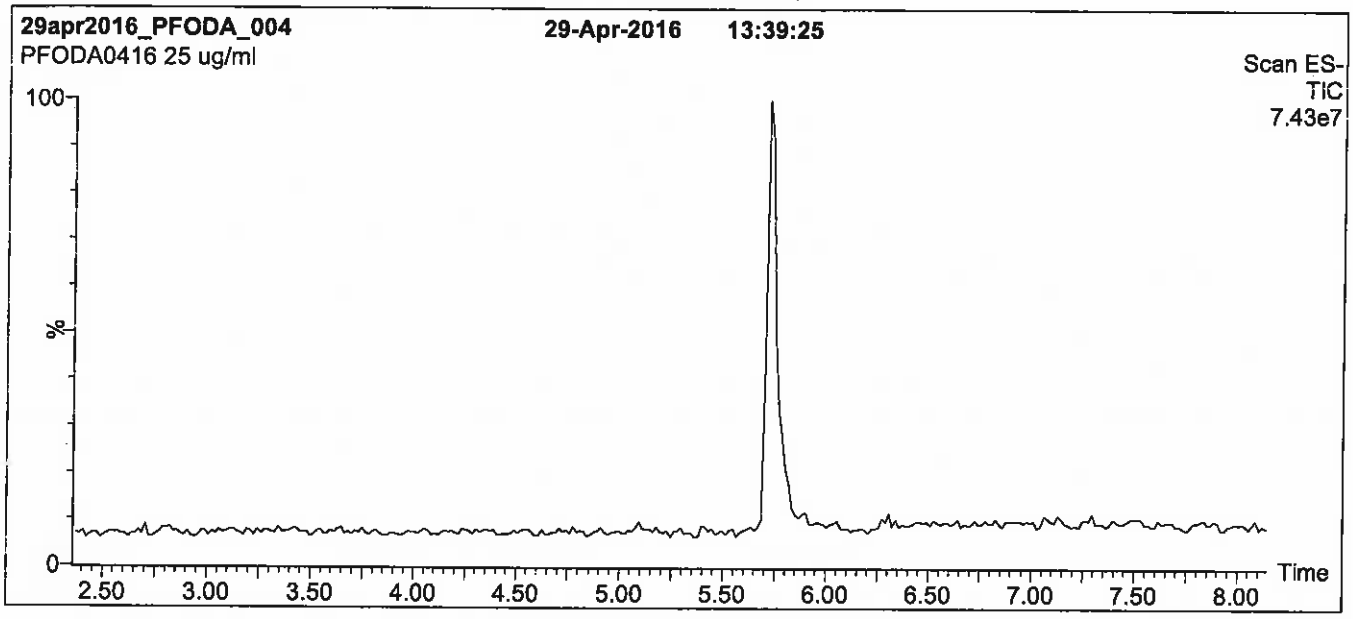

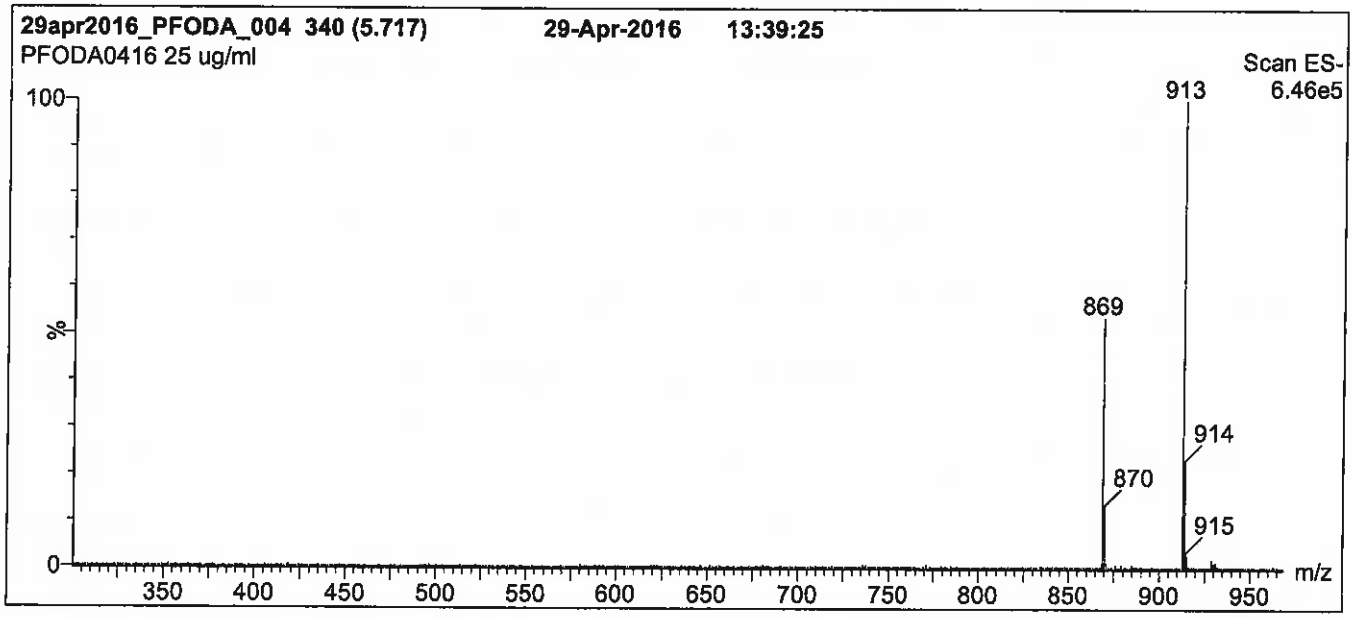

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LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 6 min and hold for
2.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

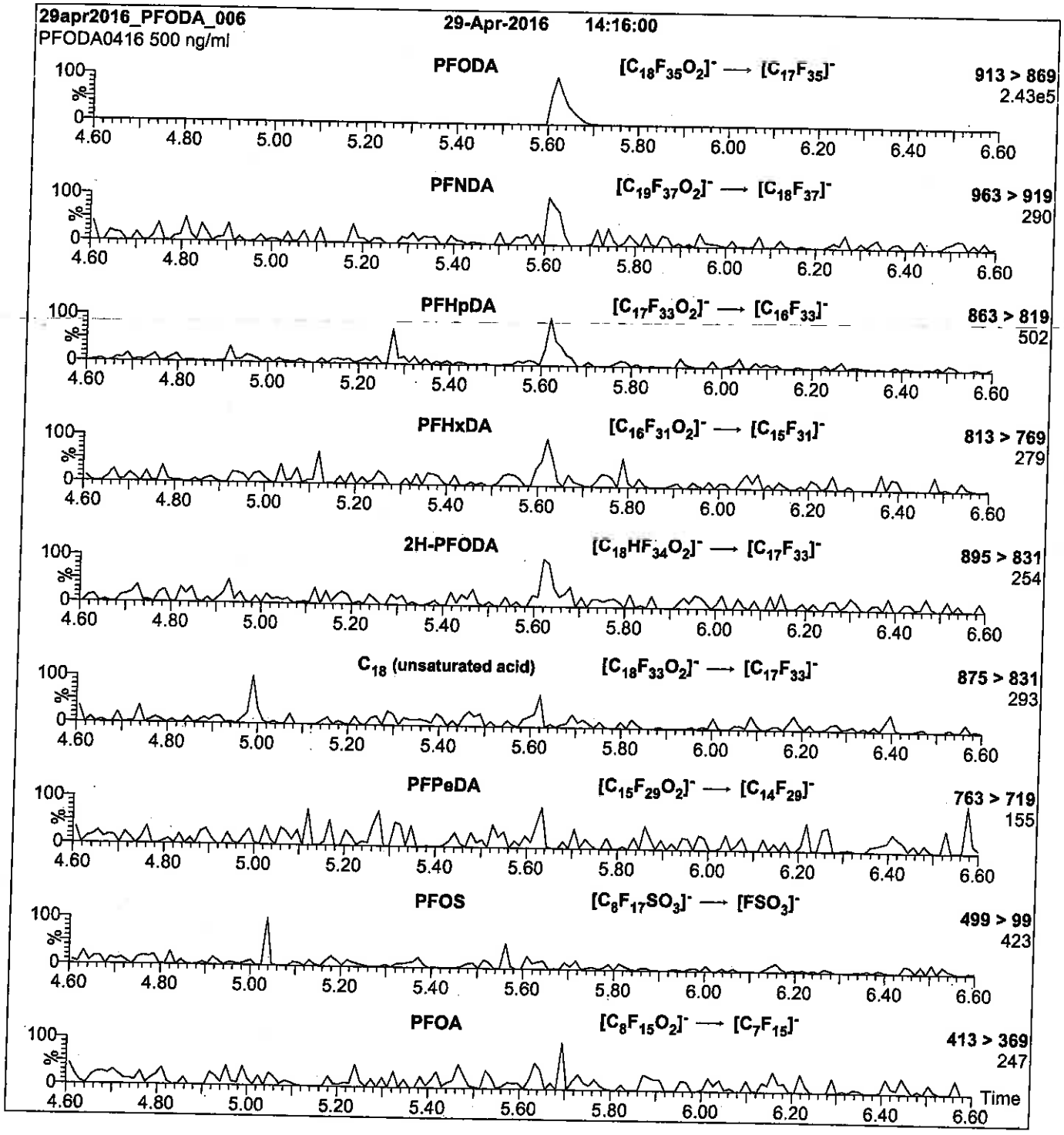
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1000 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 90% (80:20 MeOH:ACN) / 10% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 15

Reagent

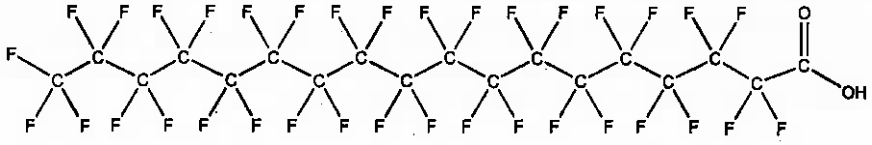
LCPFODA_00008

R: 12/20/16 SFN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFODA	**LOT NUMBER:**	PFODA0416
COMPOUND:	Perfluoro-n-octadecanoic acid		
STRUCTURE:		**CAS #:**	16517-11-6



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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 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:

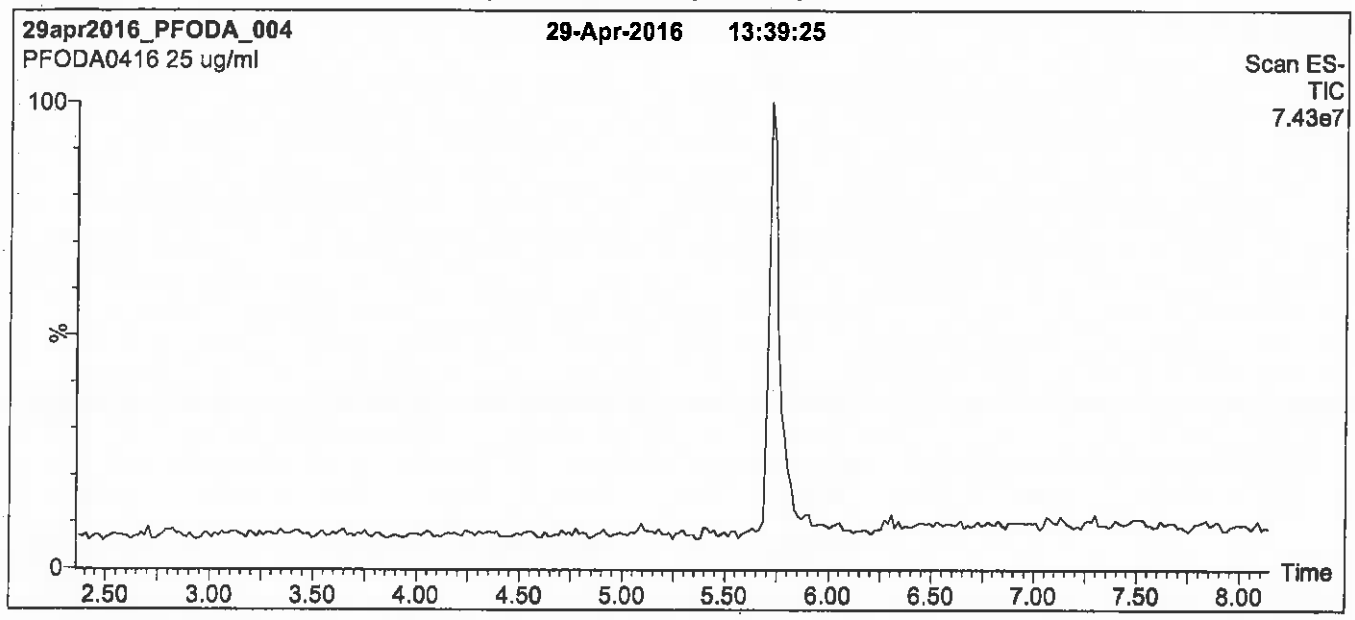
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

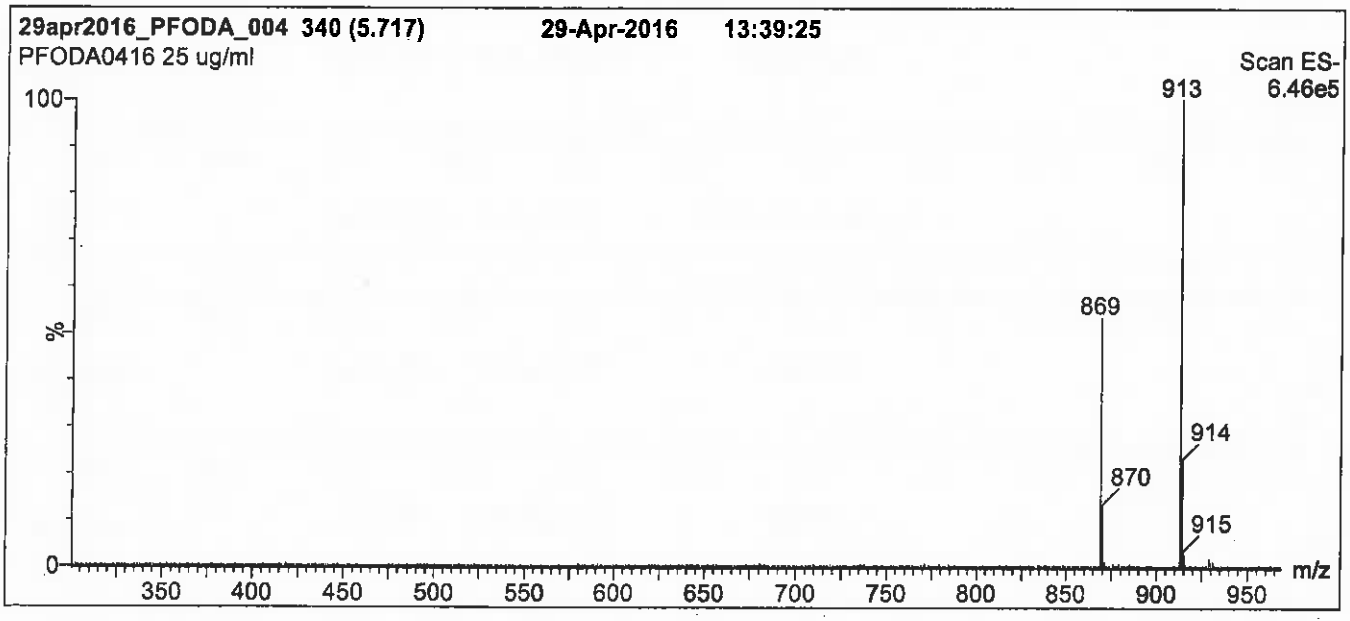
CALA

ANAB ACCREDITED REFERENCE MATERIAL

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

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: 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 6 min and hold for
2.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

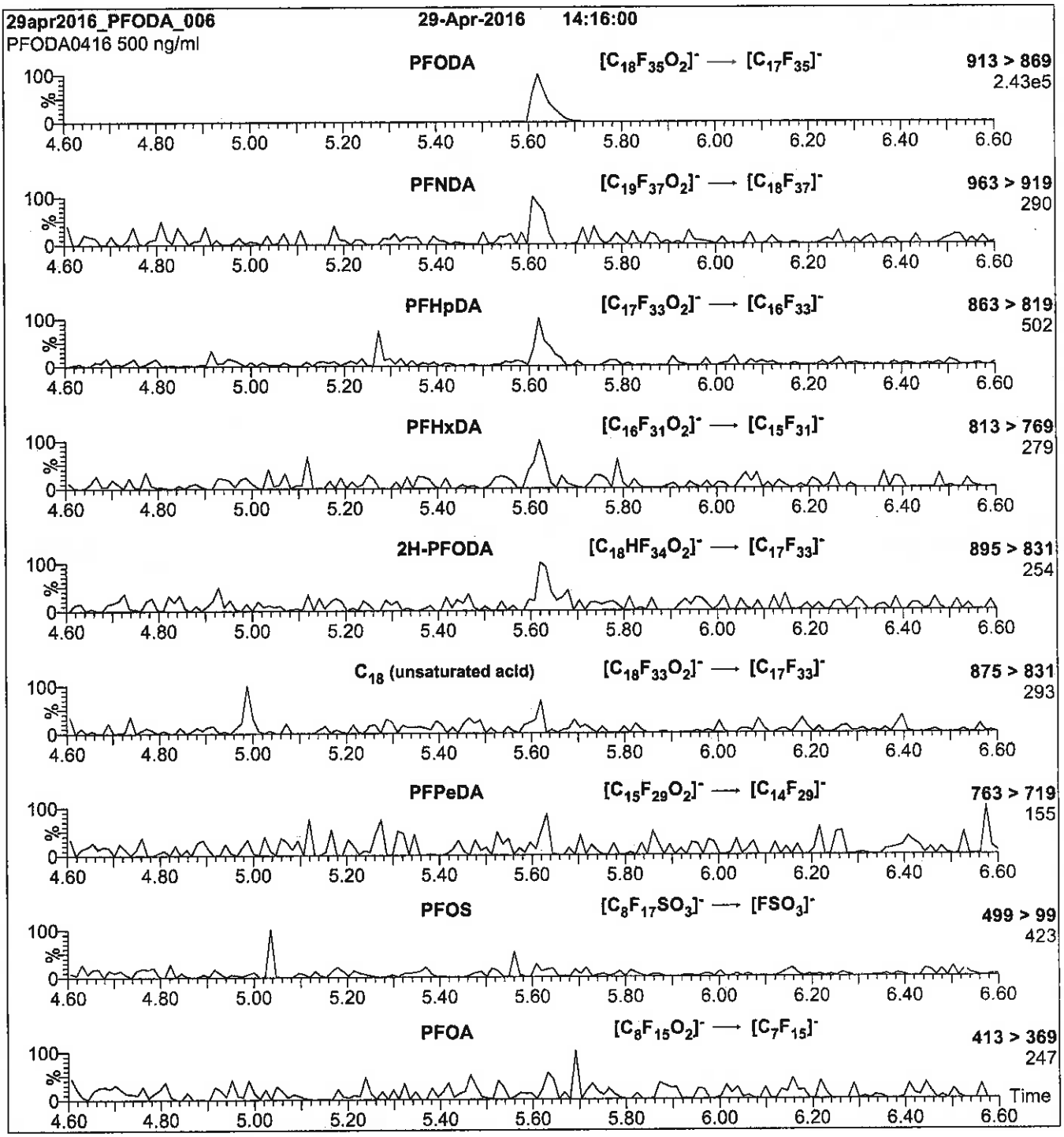
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1000 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 90% (80:20 MeOH:ACN) / 10% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 15

Reagent

LCPFOS-br_00003

Scanned 10/14/16 SR R: SBC 9/13/16

730515
ID: LCPFOS-br_00002
Exp: 10/14/20 Prpd: SBC
Potassium Perfluorooctane

730516
ID: LCPFOS-br_00003
Exp: 10/14/20 Prpd: SBC
Potassium Perfluorooctane

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFOSK
LOT NUMBER:	brPFOSK1015
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)	10/13/2015
LAST TESTED: (mm/dd/yyyy)	10/14/2015
EXPIRY DATE: (mm/dd/yyyy)	10/14/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compounds it contains.

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 REFERENCE MATERIAL PRODUCER

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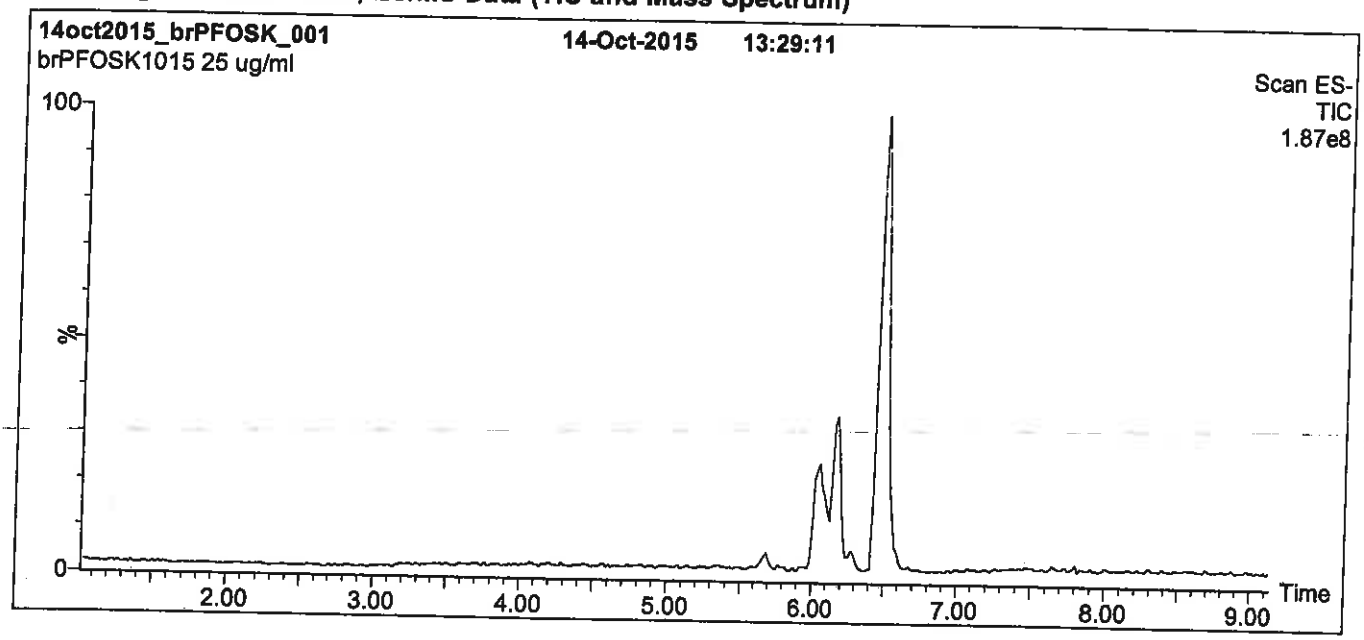
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

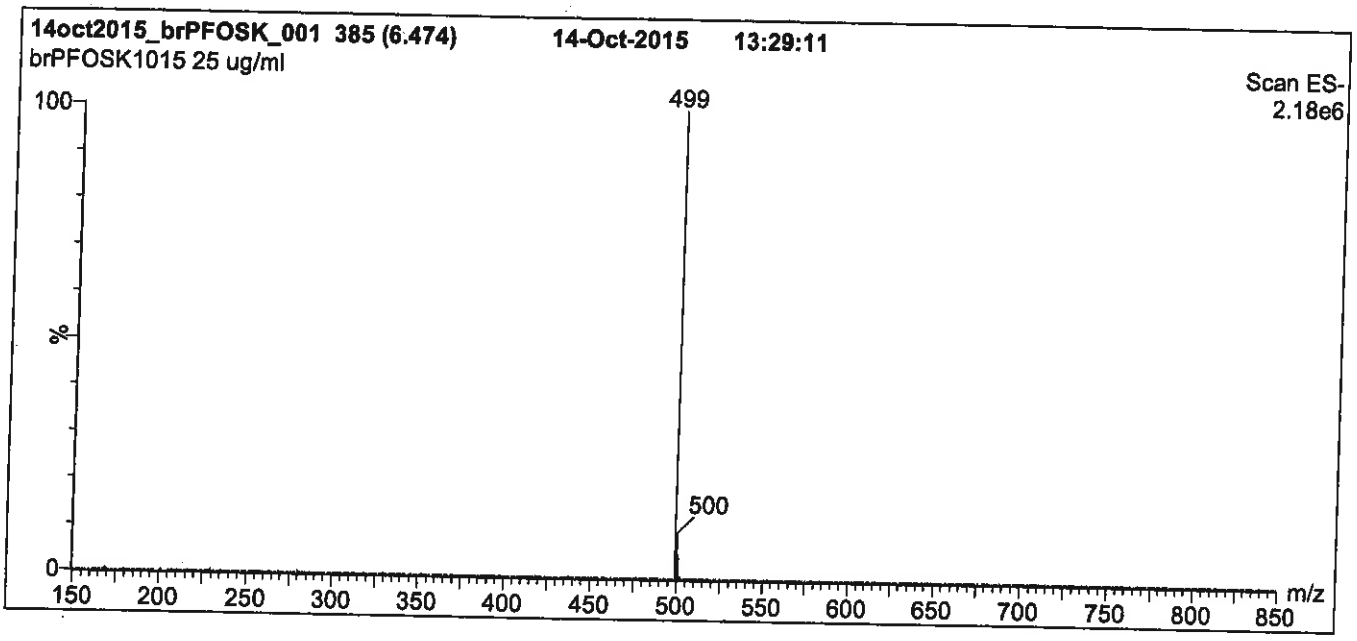
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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	$CF_3-C(CF_3)_2CF_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2-C(CF_3)_2-CF_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF(CF_3)-CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF_2-CF(CF_3)-CF_2CF_2SO_3^-K^+$	0.07

* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: _____ **Date:** 10/15/2015
B.G. Chittim (mm/dd/yyyy)

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

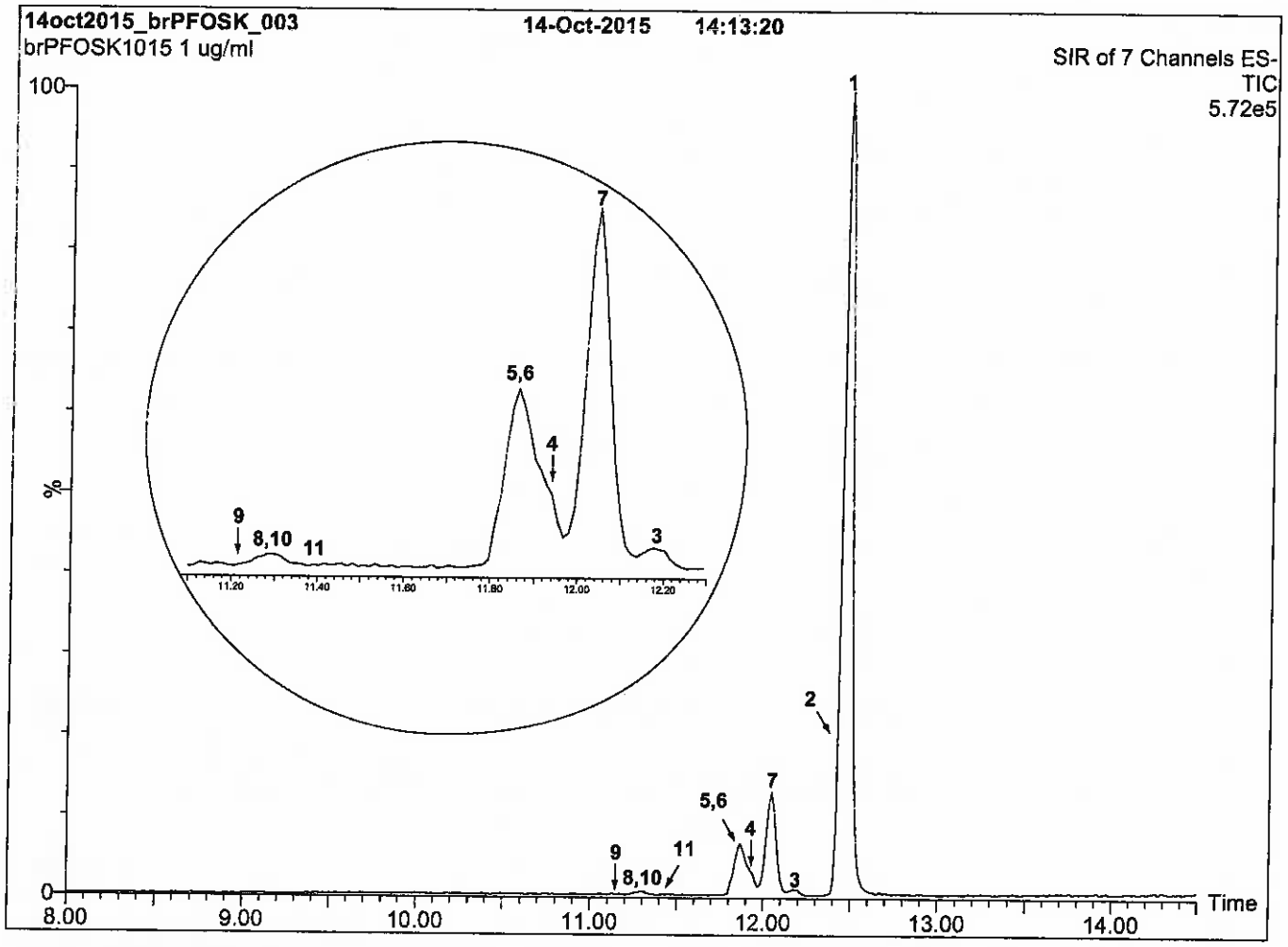
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

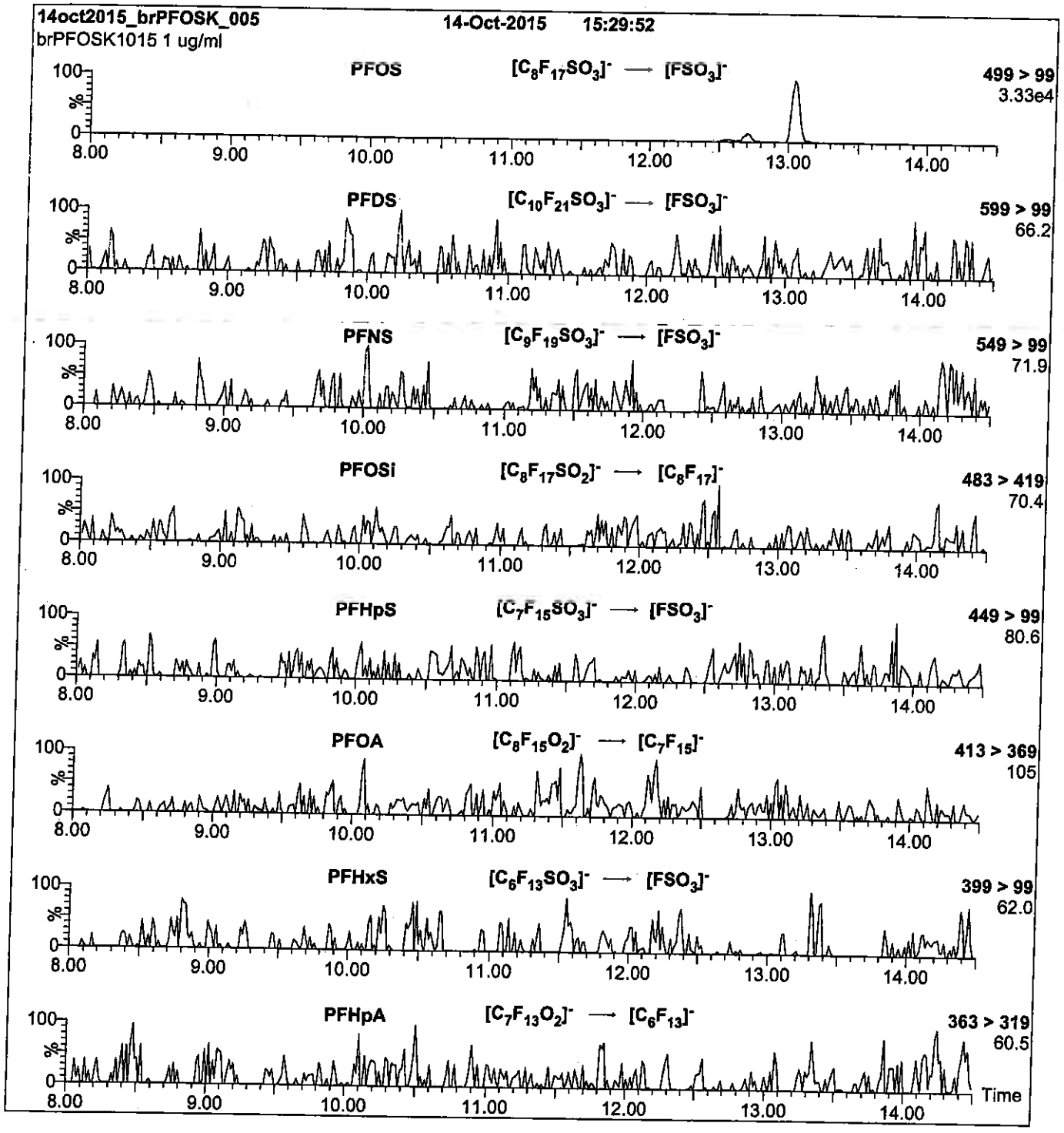
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

Flow: 300 µl/min

MS Conditions:

SIR (ES^-)
Source = 110 °C
Desolvation = 325 °C
Cone Voltage = 60V

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) = 3.06e-3
Collision Energy (eV) = 11-50 (variable)

Reagent

LCPFOS-br_00004

r: 12/20/16 SSN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFOSK
LOT NUMBER:	brPFOSK1015
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)	10/13/2015
LAST TESTED: (mm/dd/yyyy)	10/14/2015
EXPIRY DATE: (mm/dd/yyyy)	10/14/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compounds it contains.

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 $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using 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

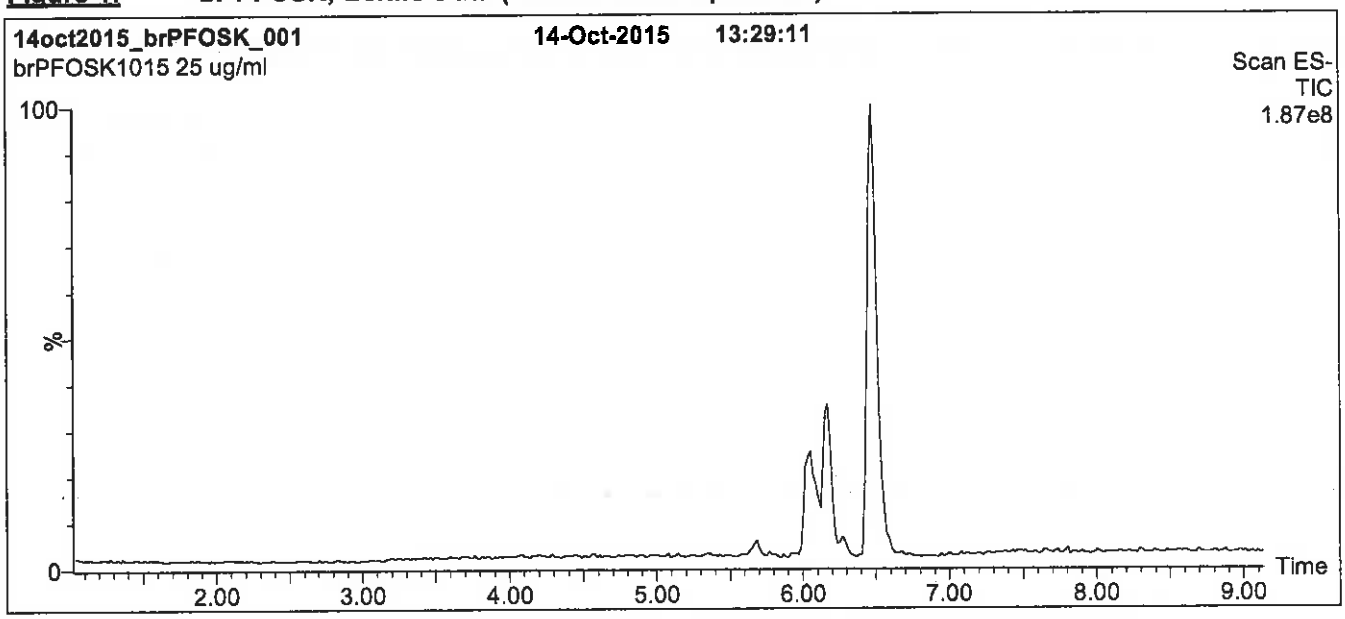
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

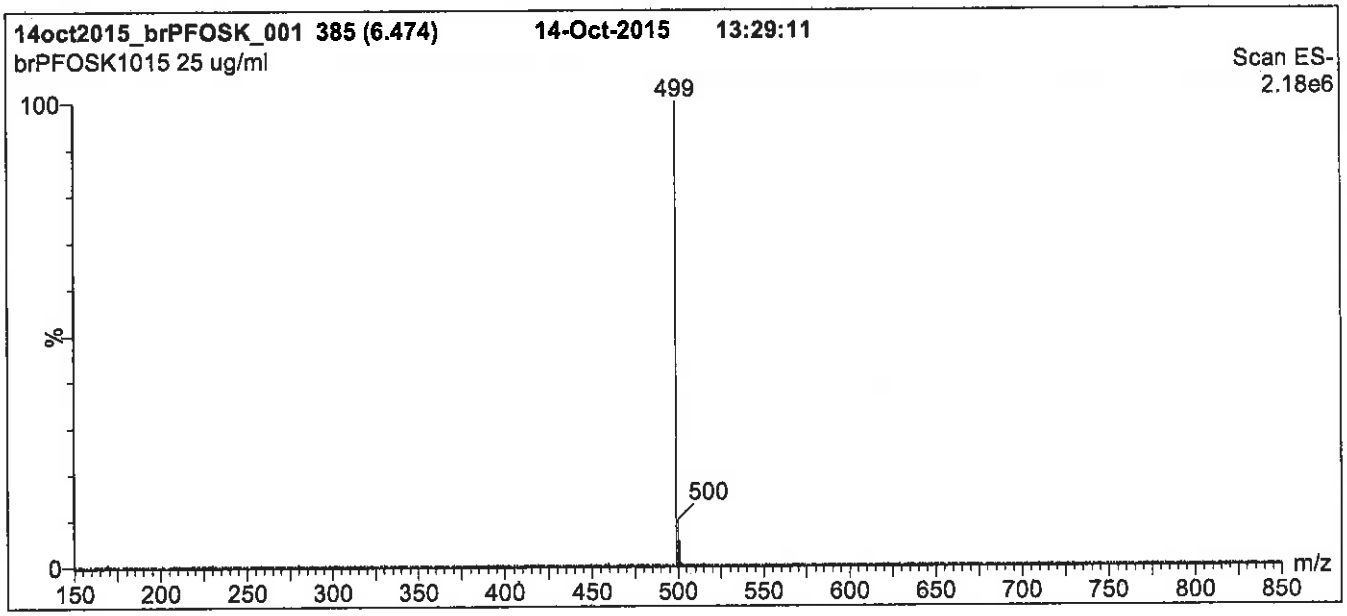
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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	$CF_3-C(CF_3)(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2-C(CF_3)(CF_3)-CF_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF(CF_3)-CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF_2-CF(CF_3)-CF_2CF_2SO_3^-K^+$	0.07

* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 10/15/2015 (mm/dd/yyyy)

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

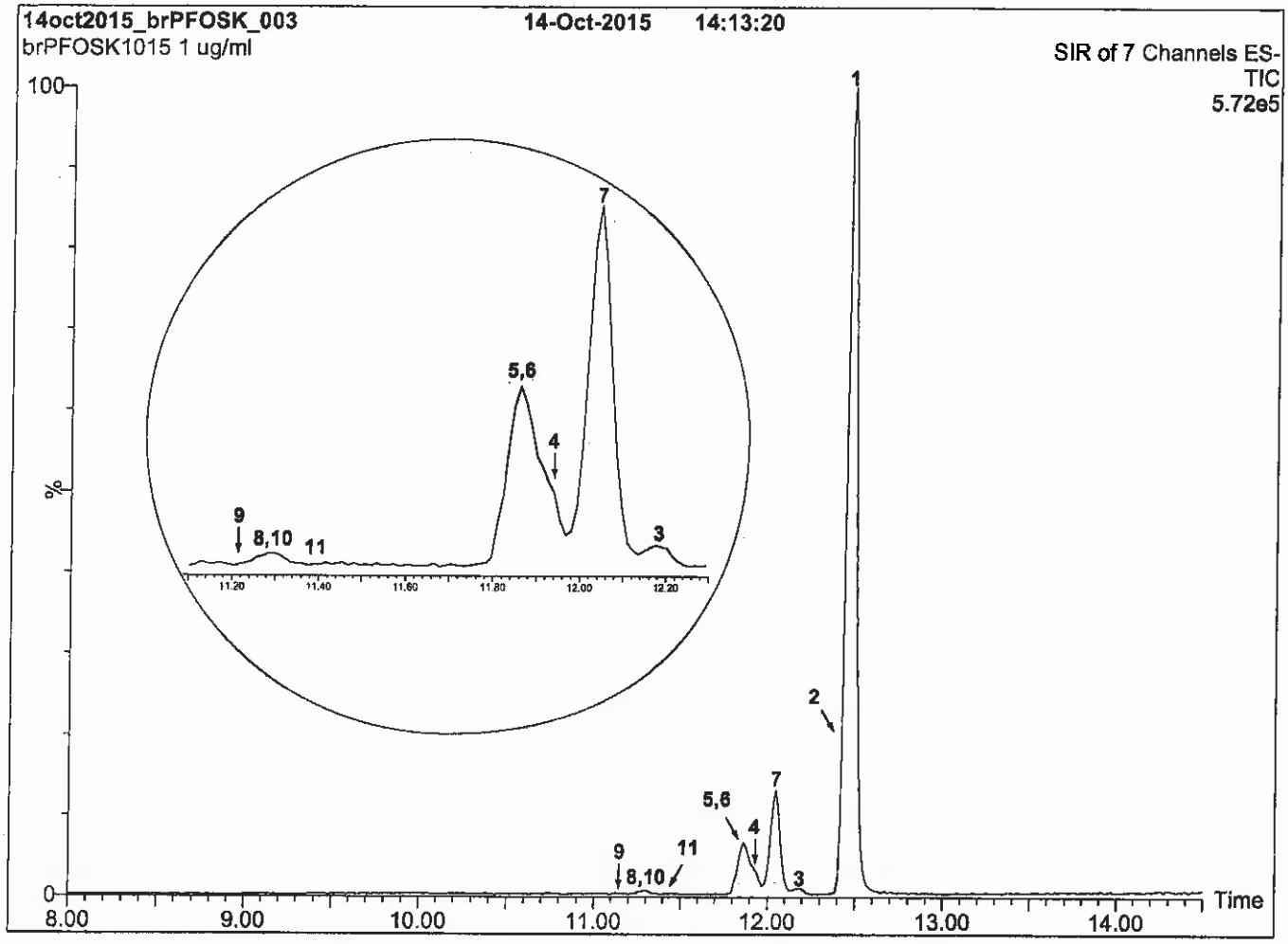
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

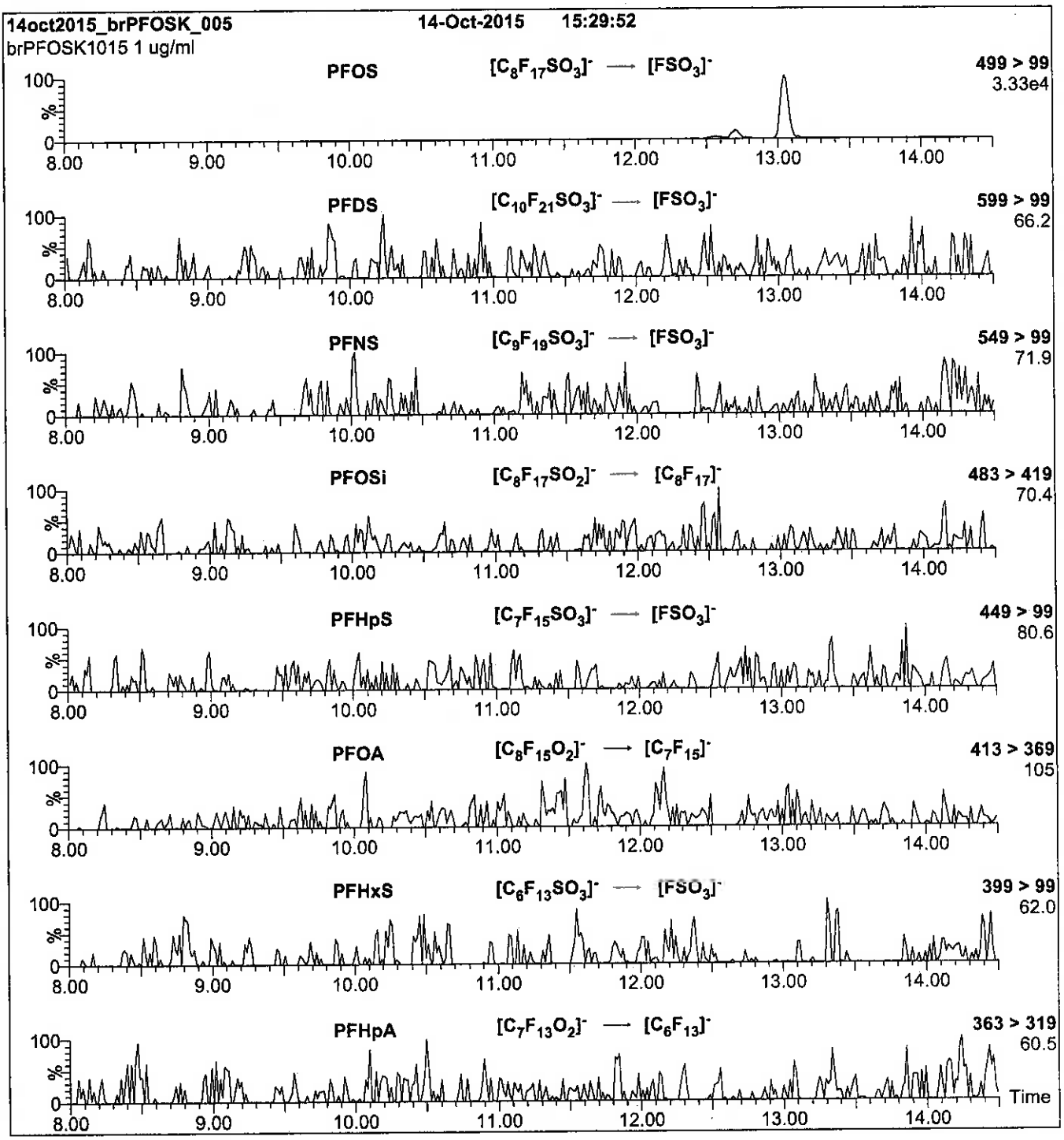
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

Flow: 300 µl/min

MS Conditions:

SIR (ES^-)
Source = 110 °C
Desolvation = 325 °C
Cone Voltage = 60V

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) = 3.06e-3
Collision Energy (eV) = 11-50 (variable)

Reagent

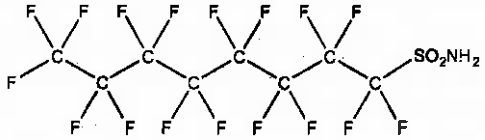
LCPFOSA_00010

12/20/16 SKI

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	FOSA-I	**LOT NUMBER:**	FOSA0916I
COMPOUND:	Perfluoro-1-octanesulfonamide		
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)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
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:** 10/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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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 $x_1, x_2, \ldots x_n$ 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:

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QUALITY MANAGEMENT:

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CALA

ANAB

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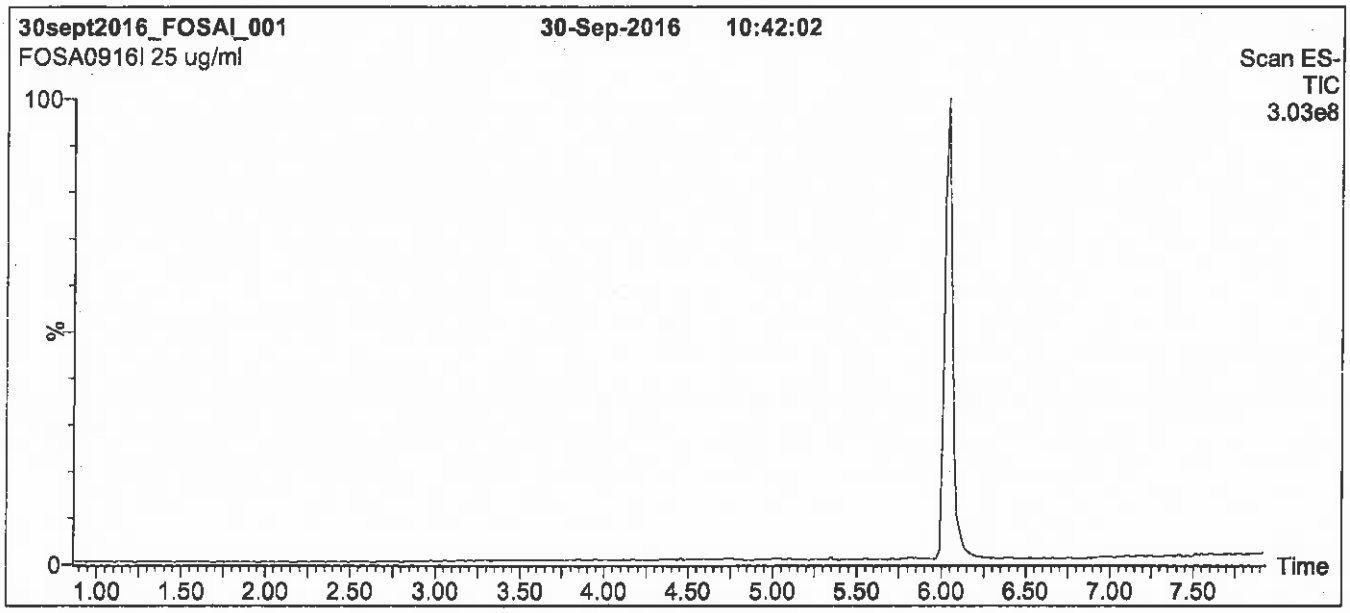
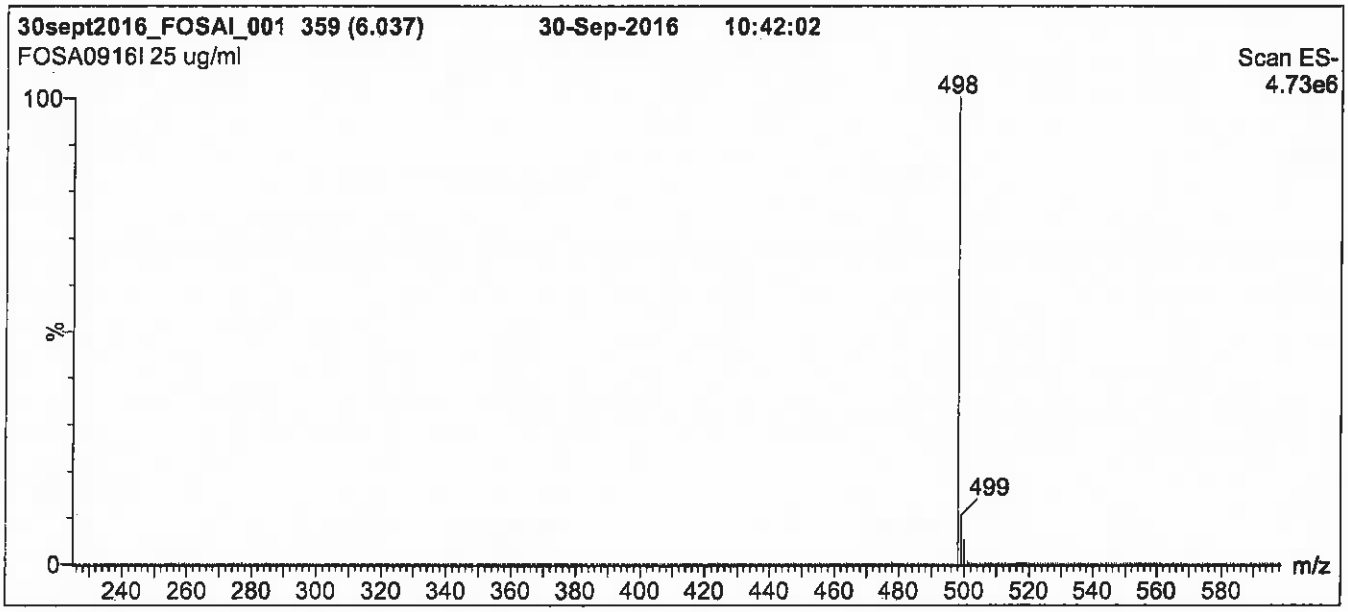
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

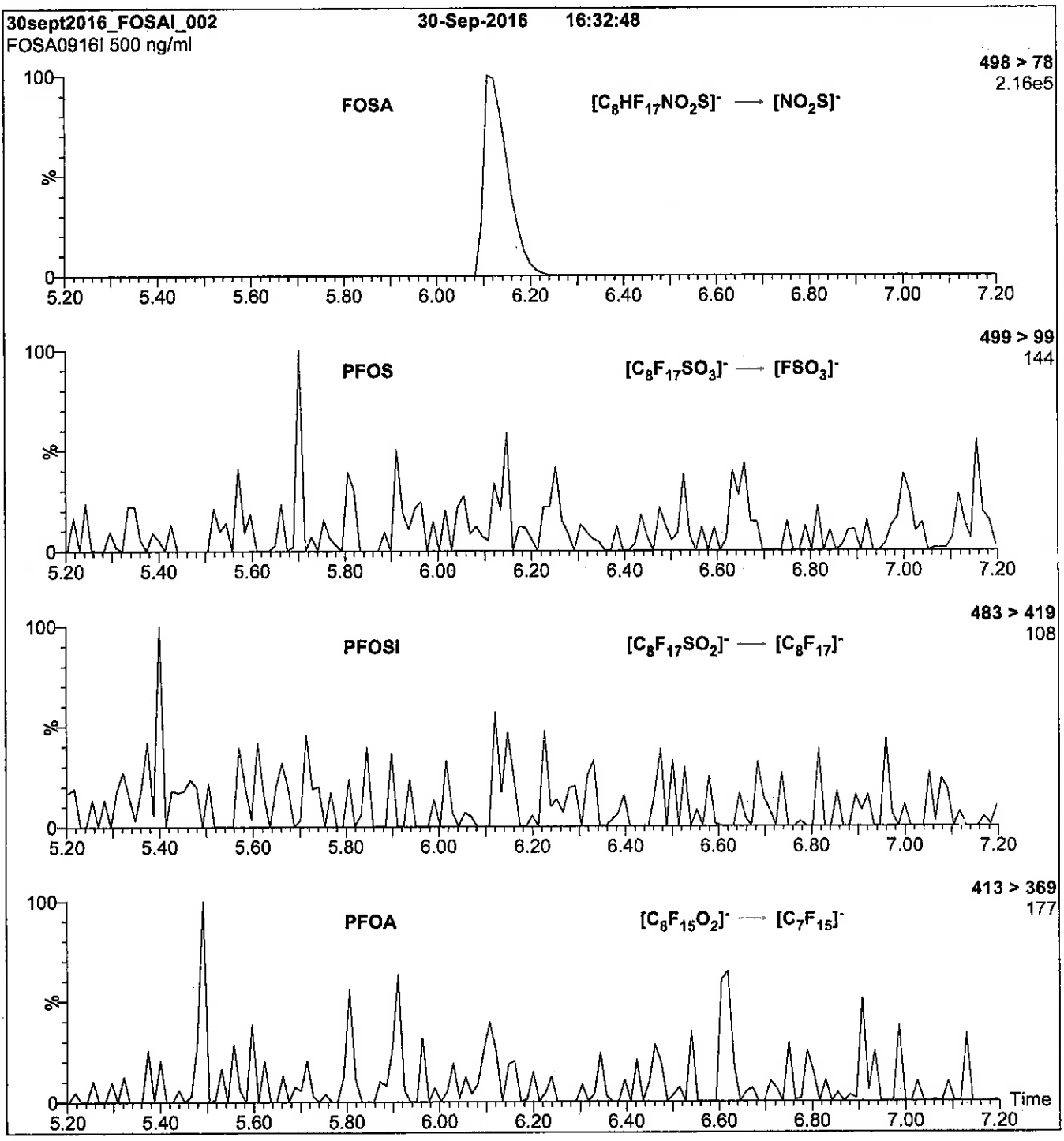
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

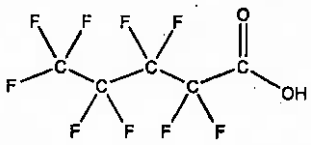
LCPFPeA_00006

r: 12/29/16 SH
s: 1/6/17 SH

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFPeA	**LOT NUMBER:**	PFPeA0516
COMPOUND:	Perfluoro-n-pentanoic acid		
STRUCTURE:		**CAS #:**	2706-90-3



MOLECULAR FORMULA:	$C_5HF_8O_2$	**MOLECULAR WEIGHT:**	264.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/31/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/31/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 06/02/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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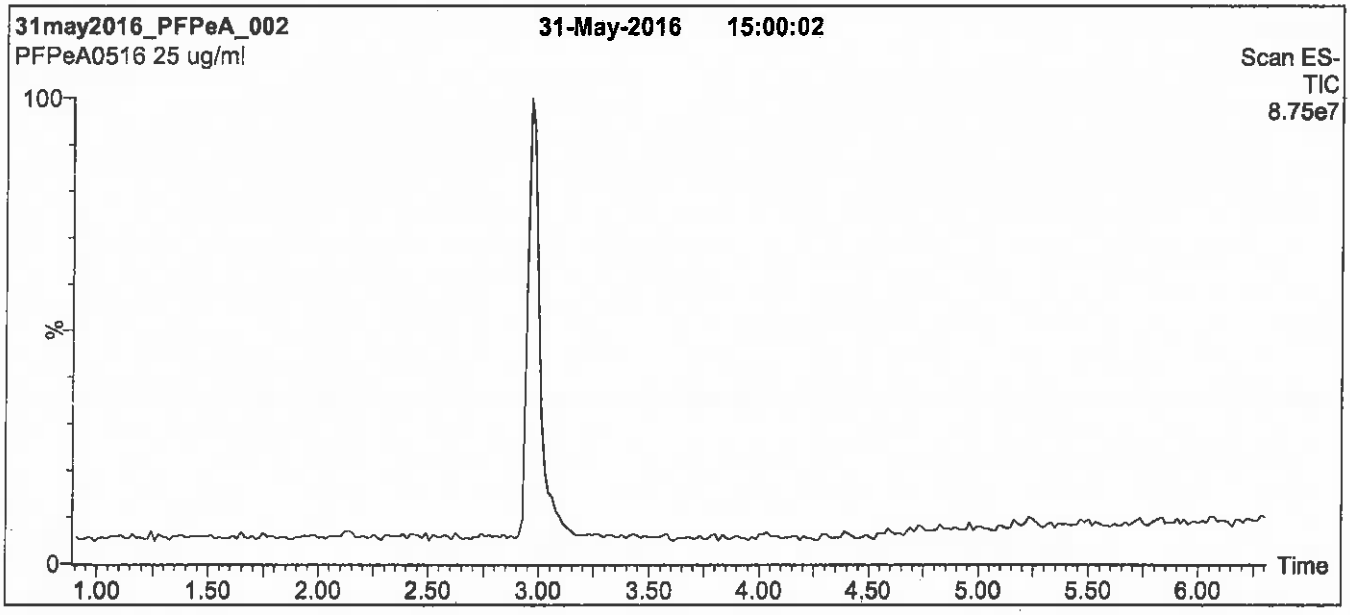
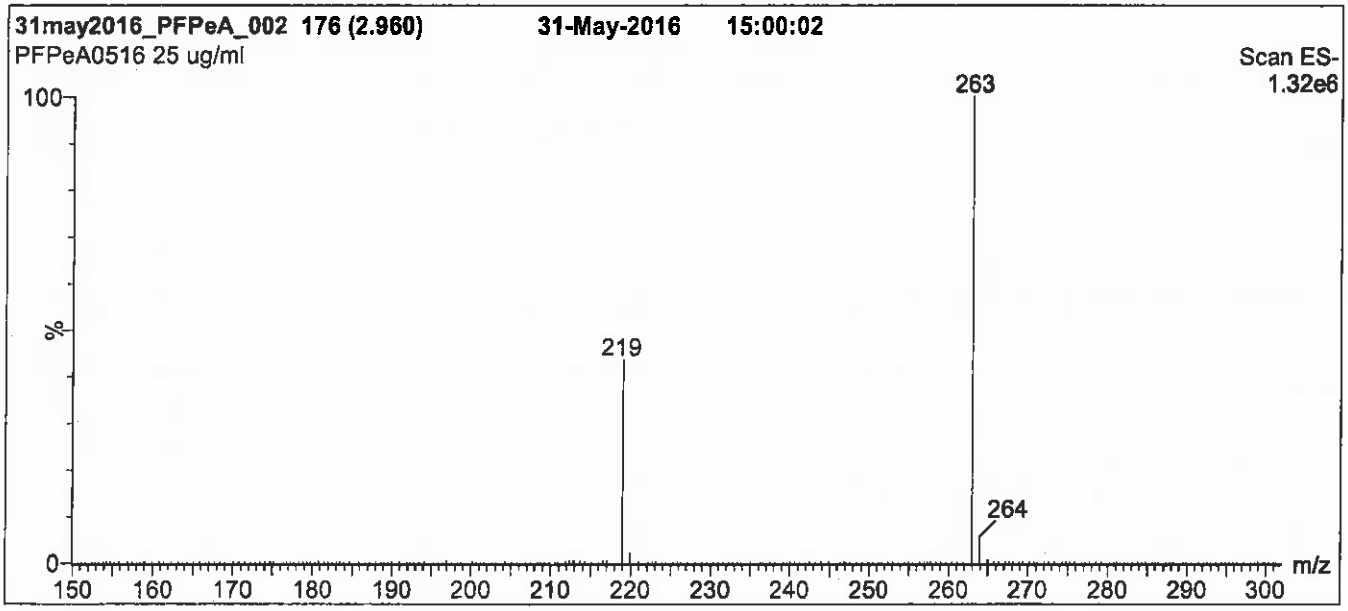
Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

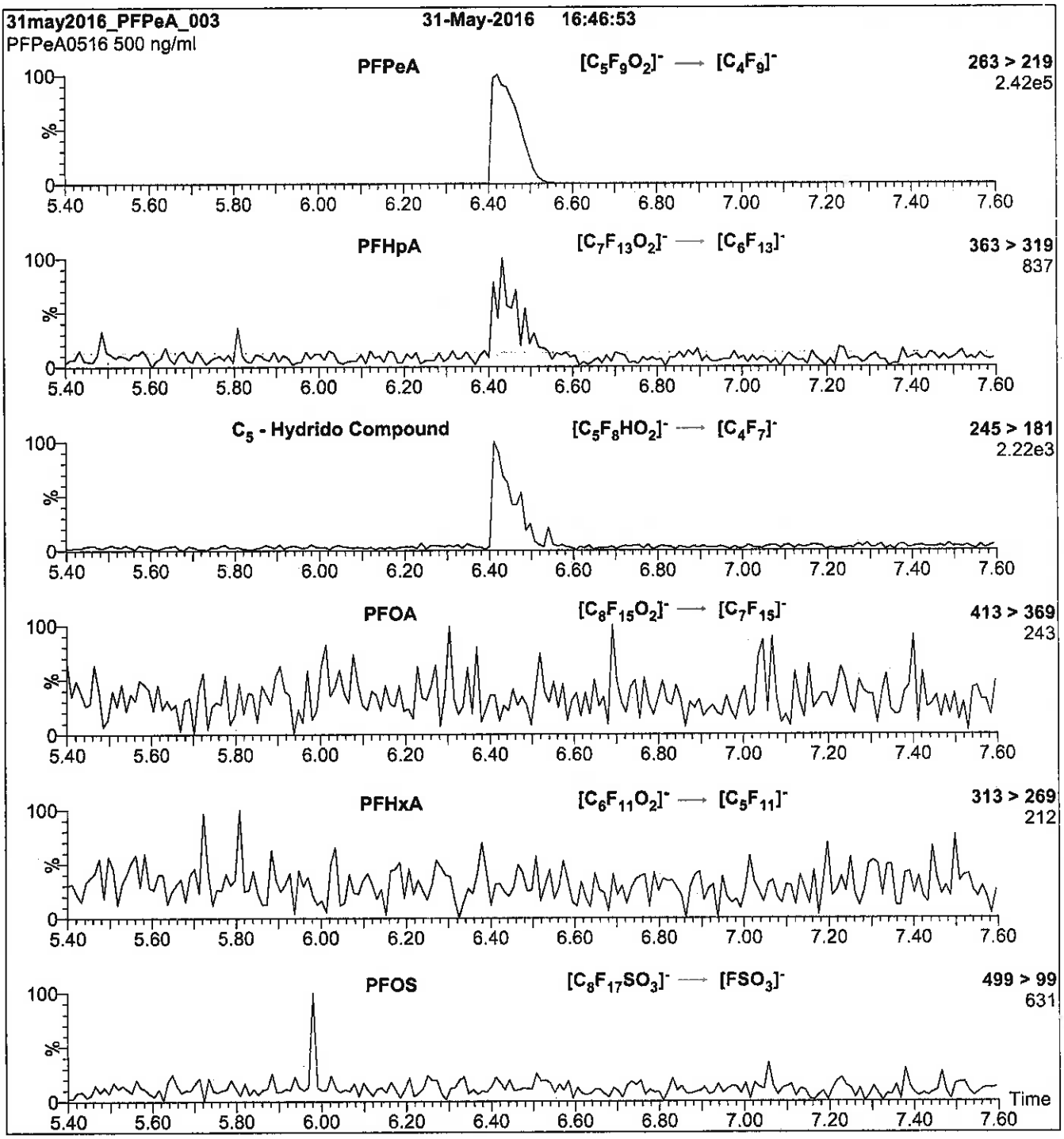
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.20e-3
Collision Energy (eV) = 9

Reagent

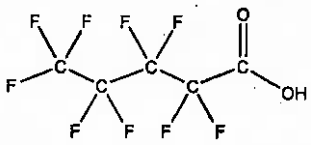
LCPFPeA_00007

r: 12/29/16 SH
s: 1/6/17 SH

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFPeA	**LOT NUMBER:**	PFPeA0516
COMPOUND:	Perfluoro-n-pentanoic acid		
STRUCTURE:		**CAS #:**	2706-90-3



MOLECULAR FORMULA:	$C_5HF_8O_2$	**MOLECULAR WEIGHT:**	264.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
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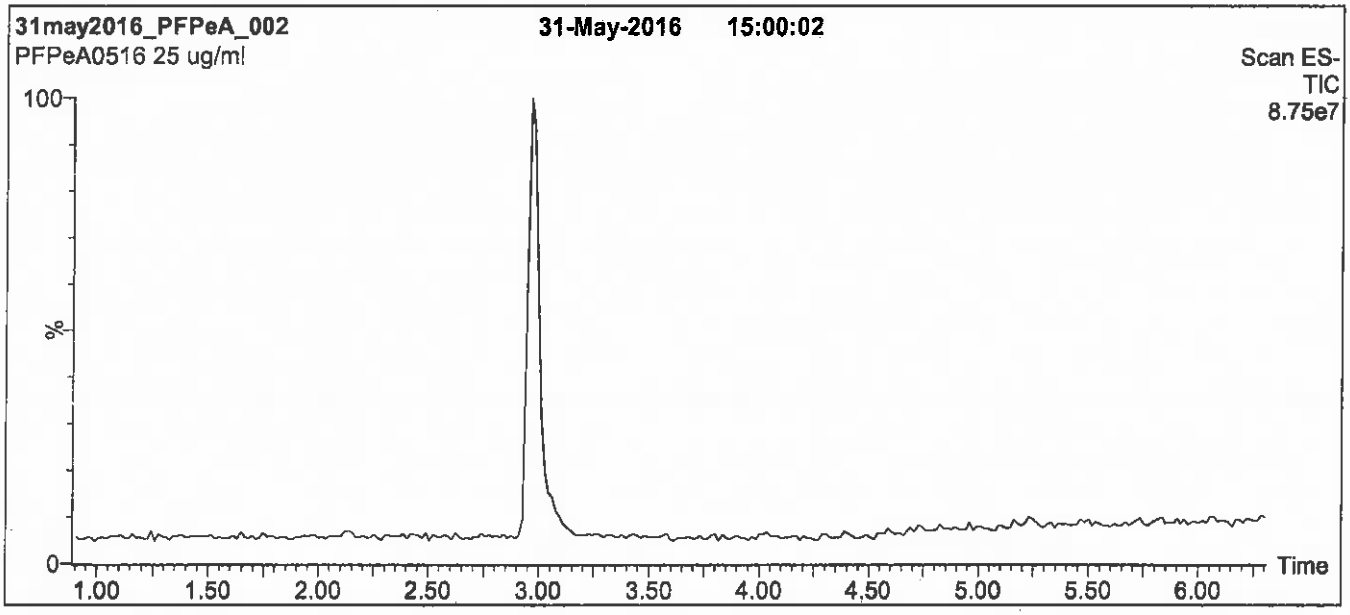
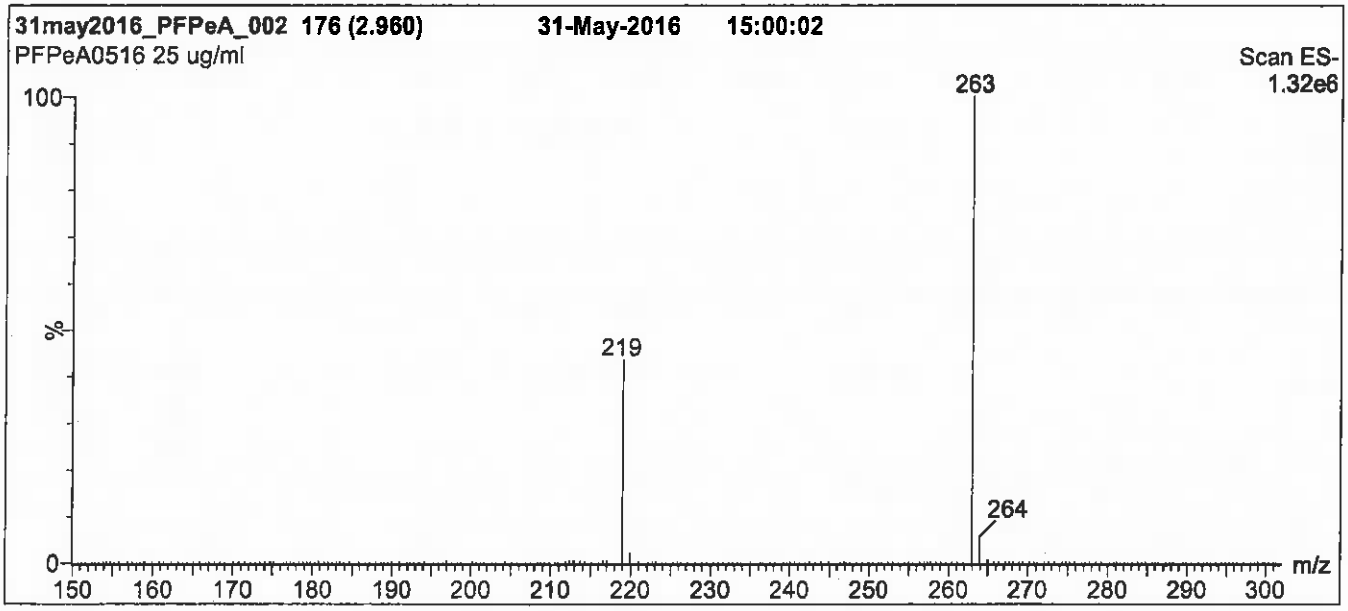




Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

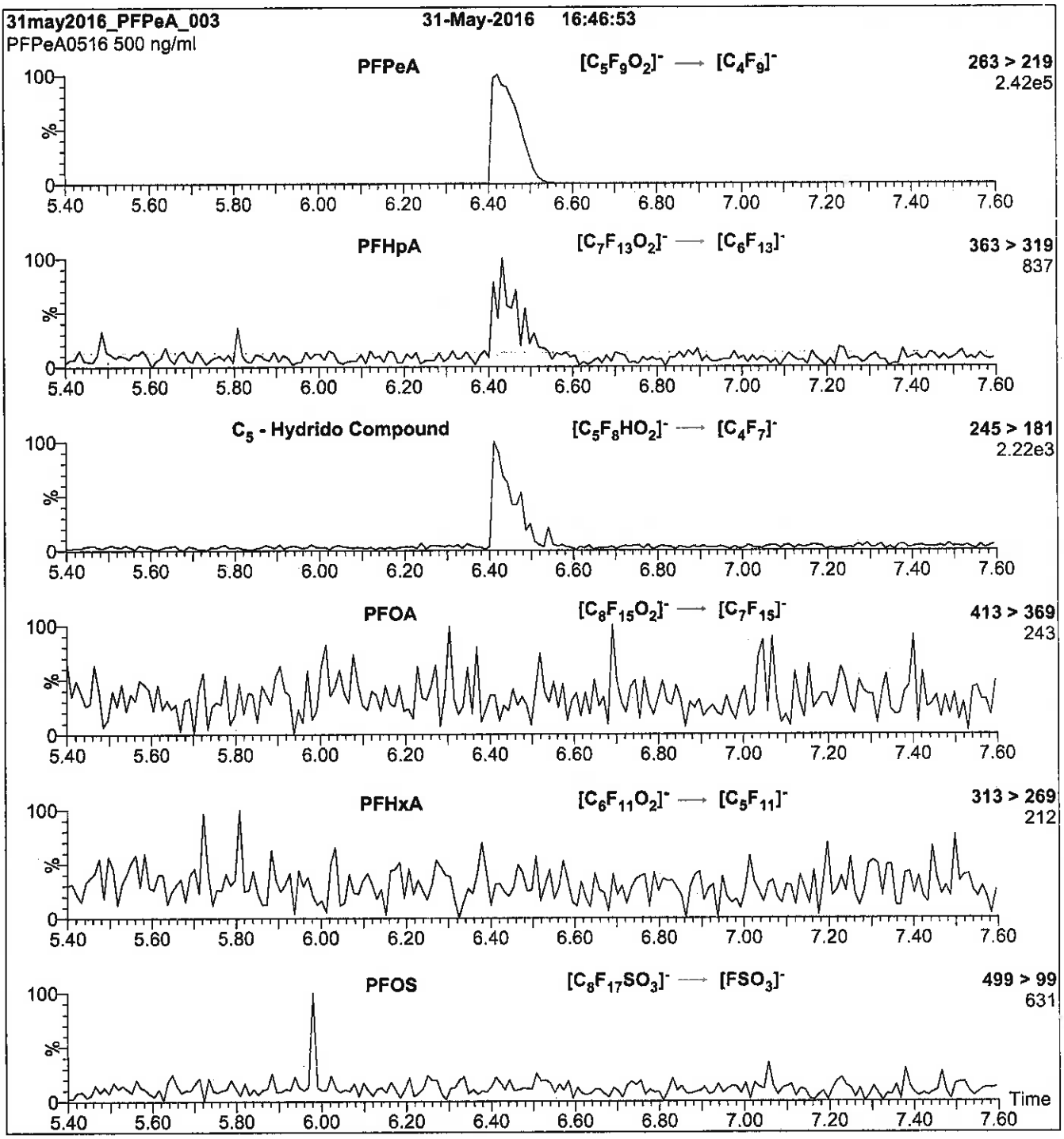
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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) = 3.20e-3
Collision Energy (eV) = 9

Reagent

LCPFTeDA_00005

R: SBG 9/13/16

730645
ID: LCPFTeDA_00005
Exp: 12/09/20 Prpd: SBC
PF-n-tetradecanoic acid

730659
ID: LCPFTeDA_00006
Exp: 12/09/20 Prpd: SBC
PF-n-tetradecanoic acid

WELLINGTON LABORATORIES

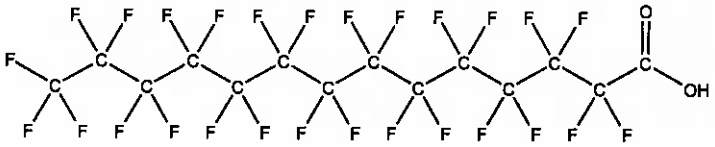
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA
COMPOUND: Perfluoro-n-tetradecanoic acid

LOT NUMBER: PFTeDA1215

STRUCTURE:

CAS #: 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 714.11
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/09/2015
EXPIRY DATE: (mm/dd/yyyy) 12/09/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/09/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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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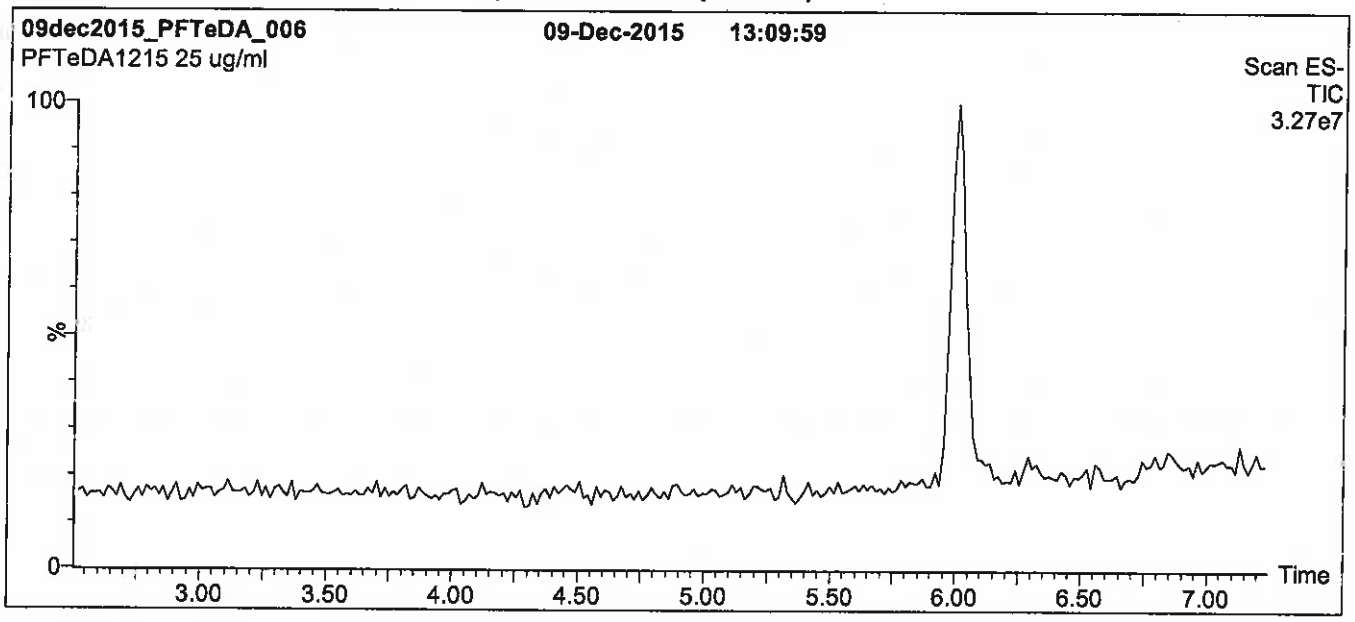
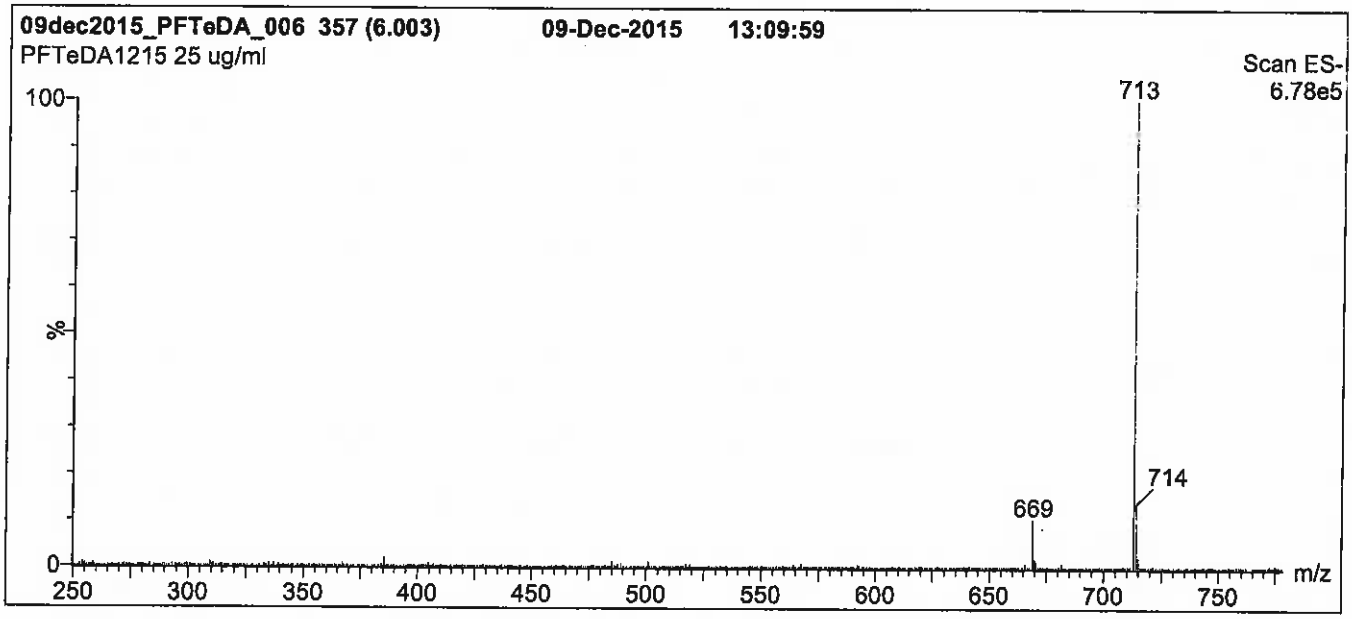
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

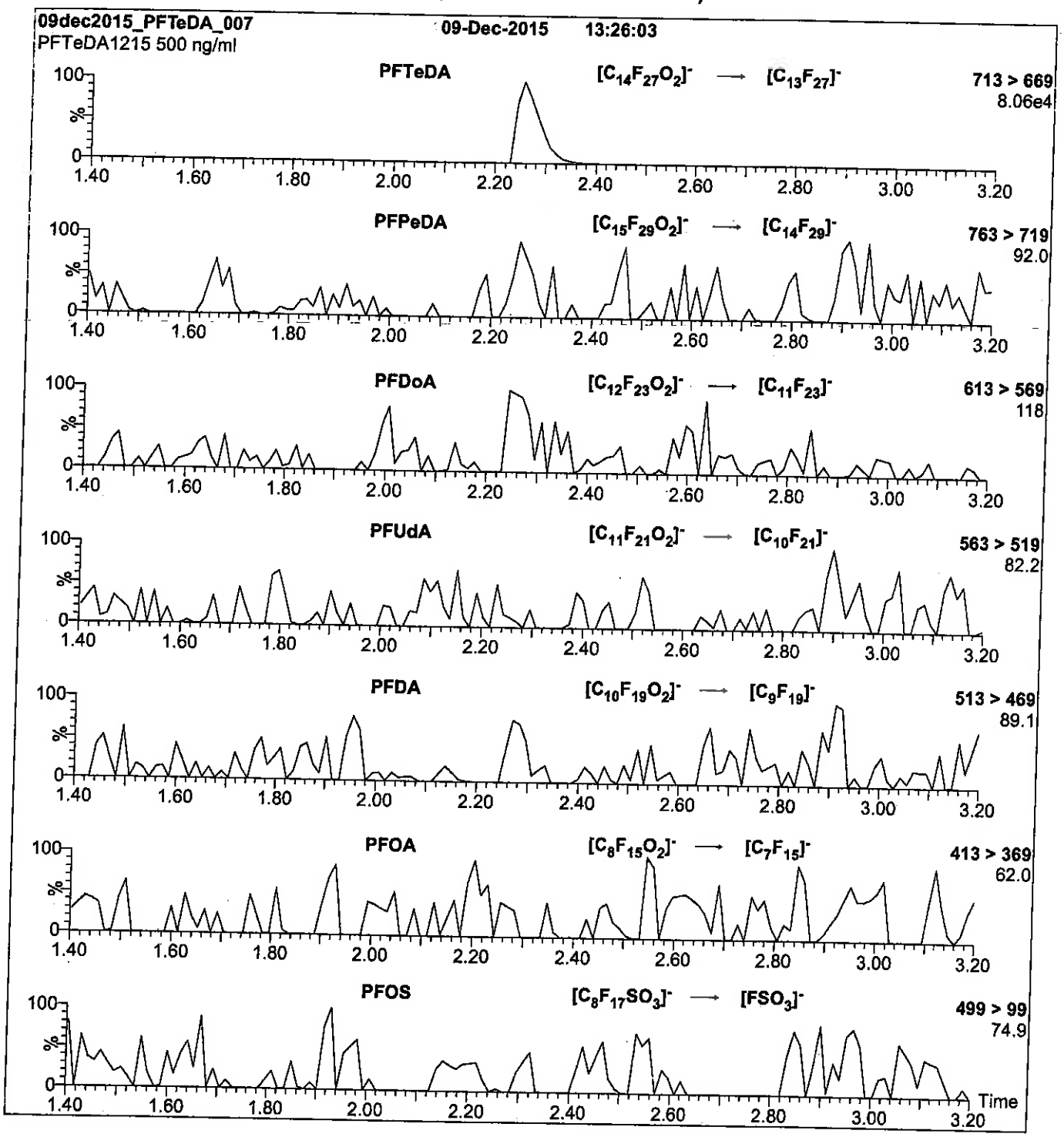
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1250 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) = 3.43e-3
Collision Energy (eV) = 14

Reagent

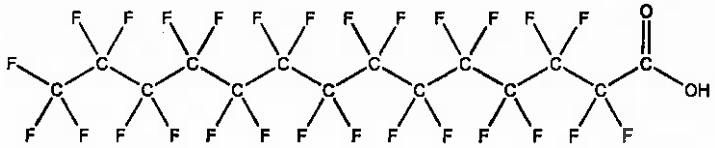
LCPFTeDA_00007

R: 12/20/16 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFTeDA	**LOT NUMBER:**	PFTeDA0916
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)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
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.
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FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/05/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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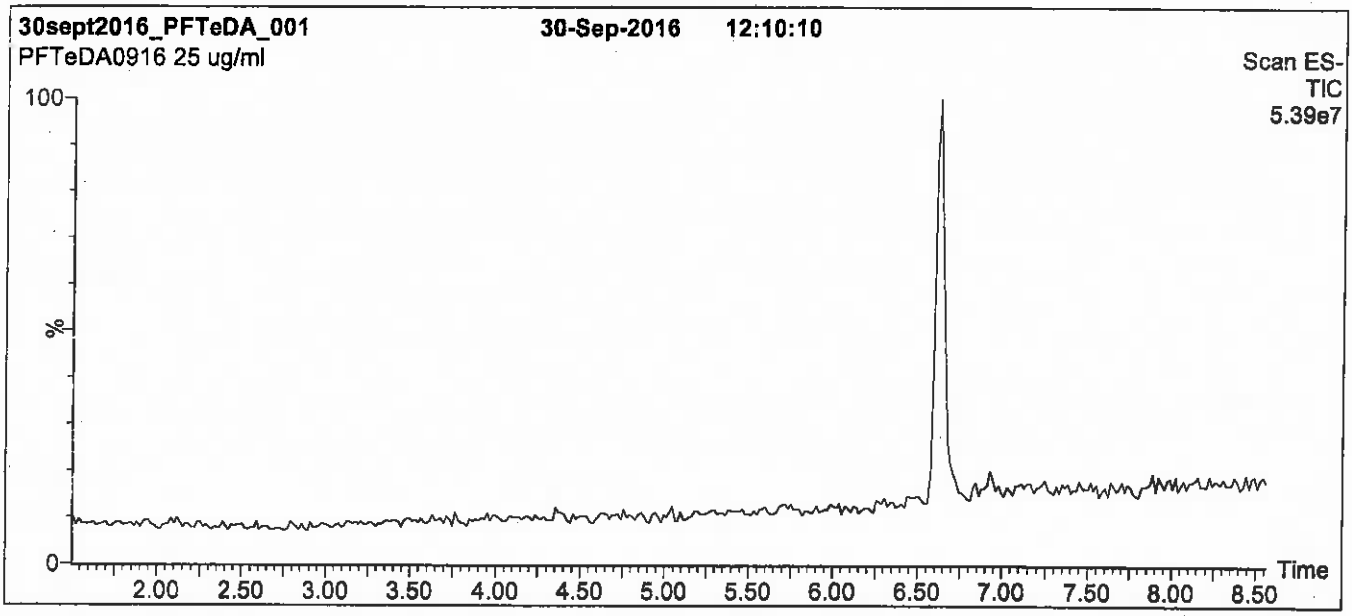
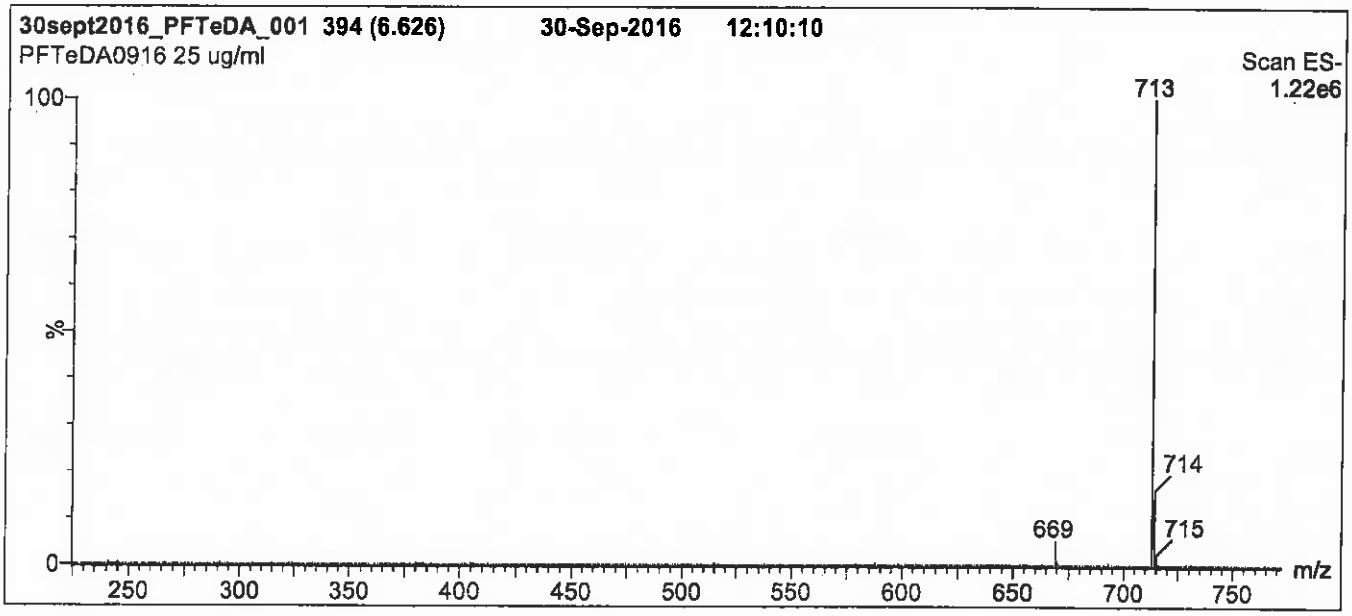
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

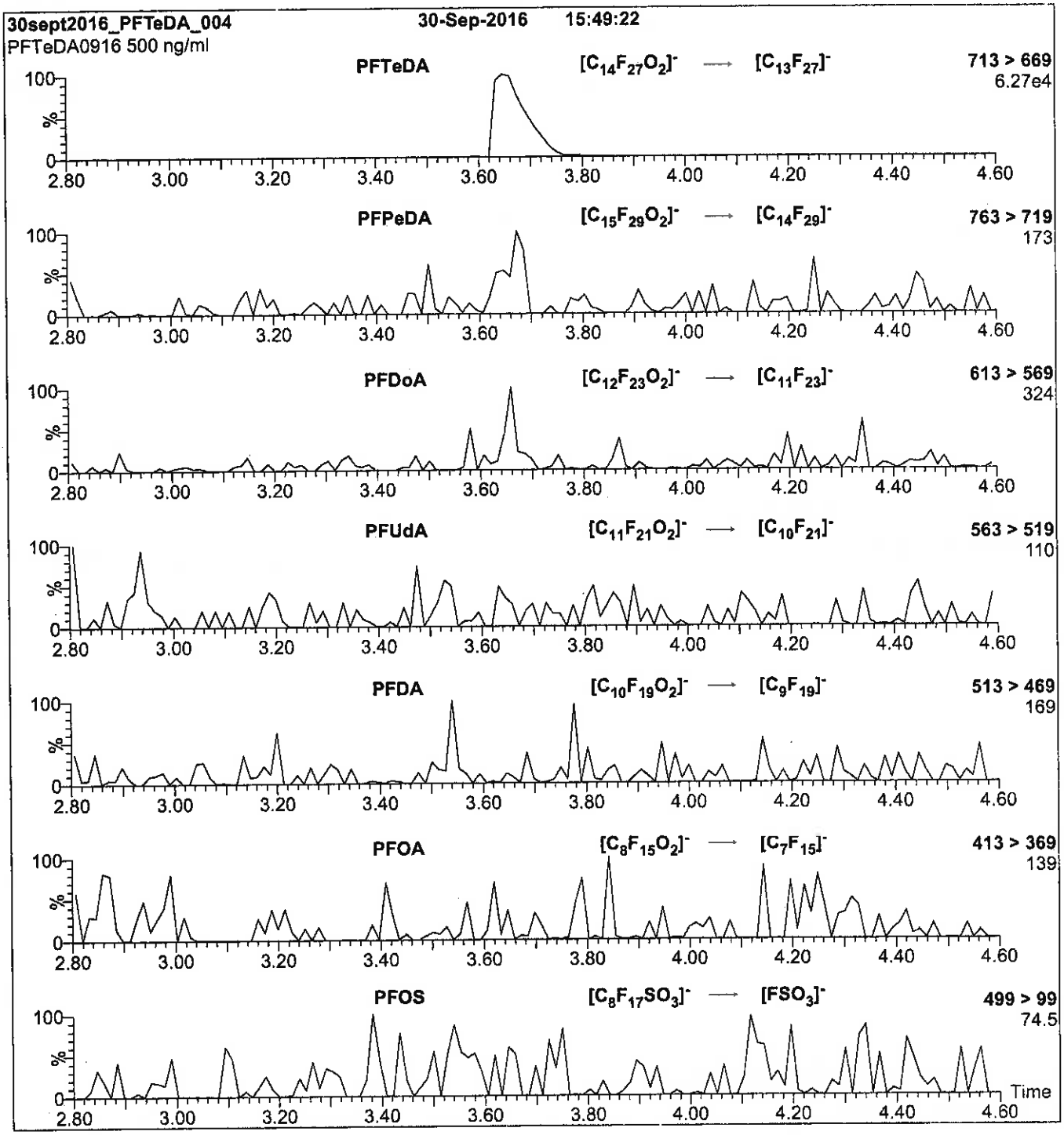
Flow: 300 µl/min

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) = 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) = 3.20e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00005

R: SBC 9/13/16

730665
ID: LCPFTrDA_00005
Exp: 02/12/21 Prpd: SBC
PF-n-tridecanoic acid

730666
ID: LCPFTrDA_00006
Exp: 02/12/21 Prpd: SBC
PF-n-tridecanoic acid

WELLINGTON LABORATORIES

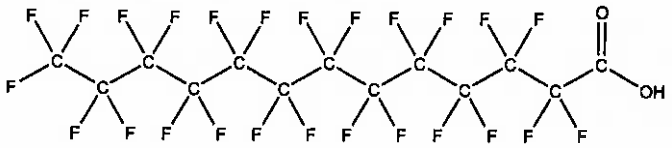
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTrDA
COMPOUND: Perfluoro-n-tridecanoic acid

LOT NUMBER: PFTrDA0216

STRUCTURE:

CAS #: 72629-94-8



MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 664.11
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 02/12/2016
EXPIRY DATE: (mm/dd/yyyy) 02/12/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% 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 **Date:** 02/16/2016 (mm/dd/yyyy)

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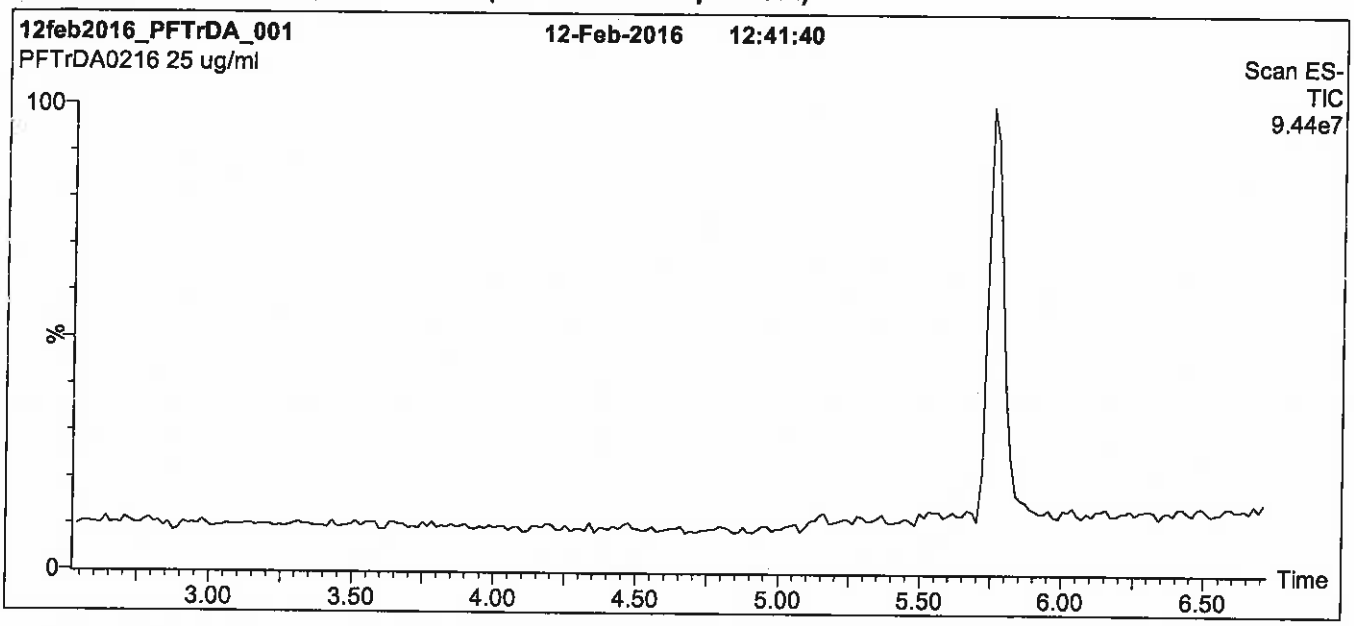
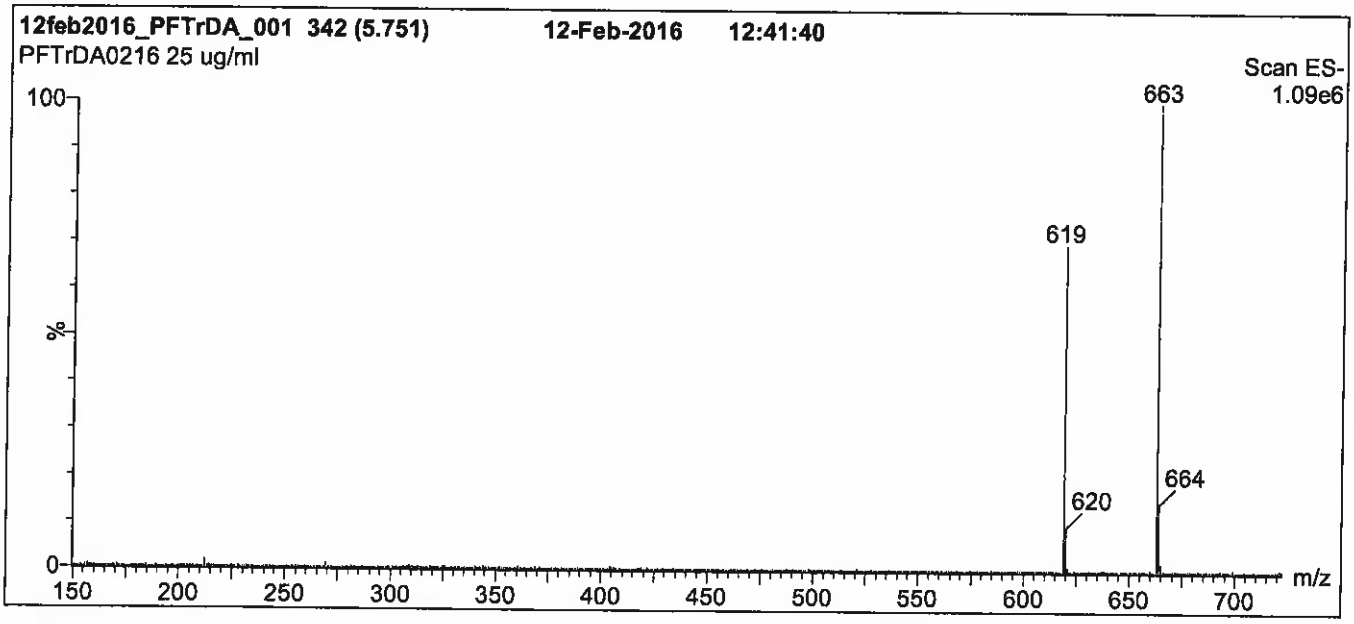
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





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

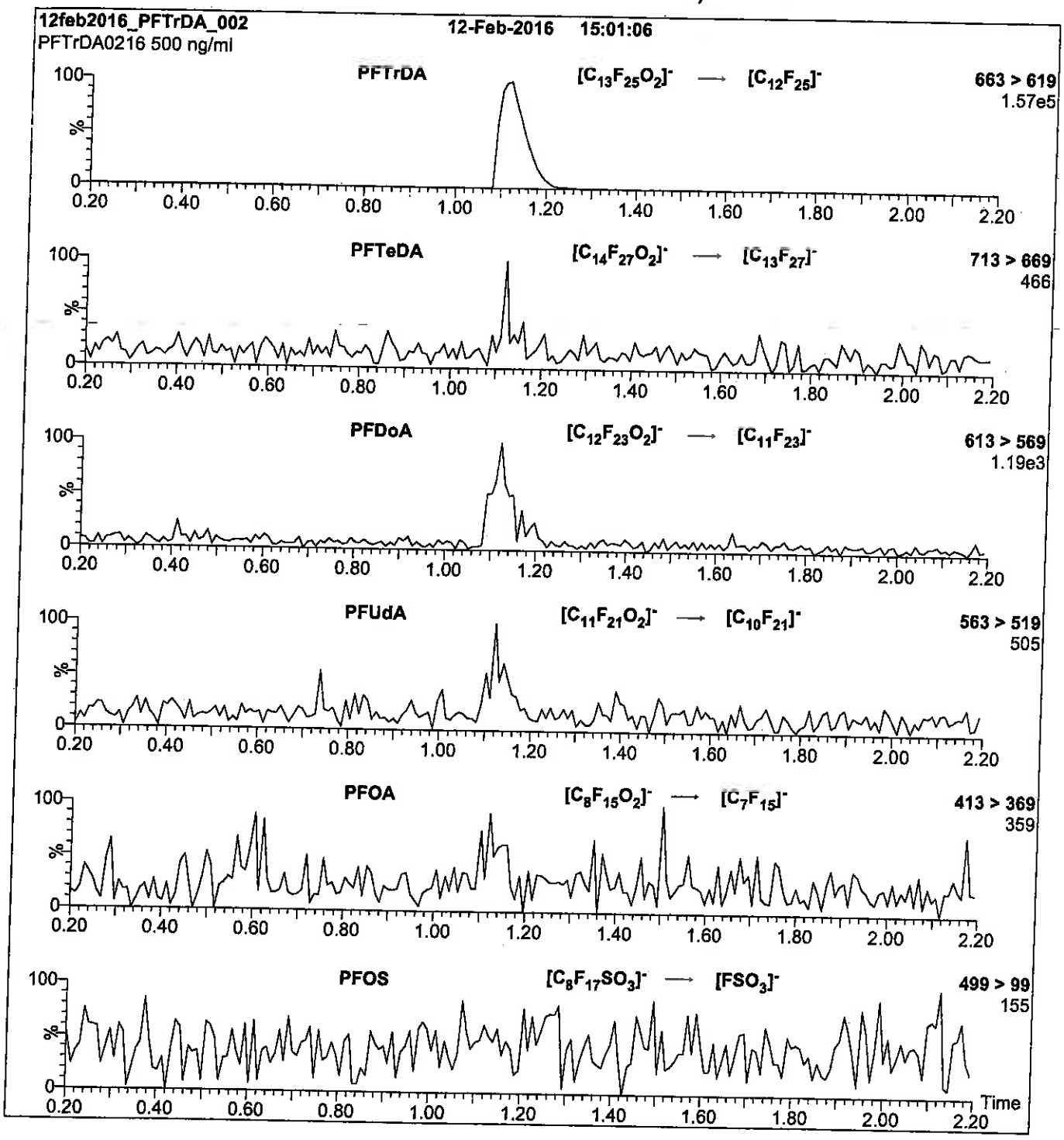
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 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

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% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 15

Reagent

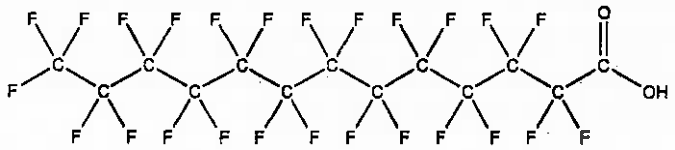
LCPFTrDA_00007

r: 12/29/16 SGJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFTrDA	**LOT NUMBER:**	PFTrDA0216
COMPOUND:	Perfluoro-n-tridecanoic acid		
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)	02/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	02/12/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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CALA

ANAB ACCREDITED

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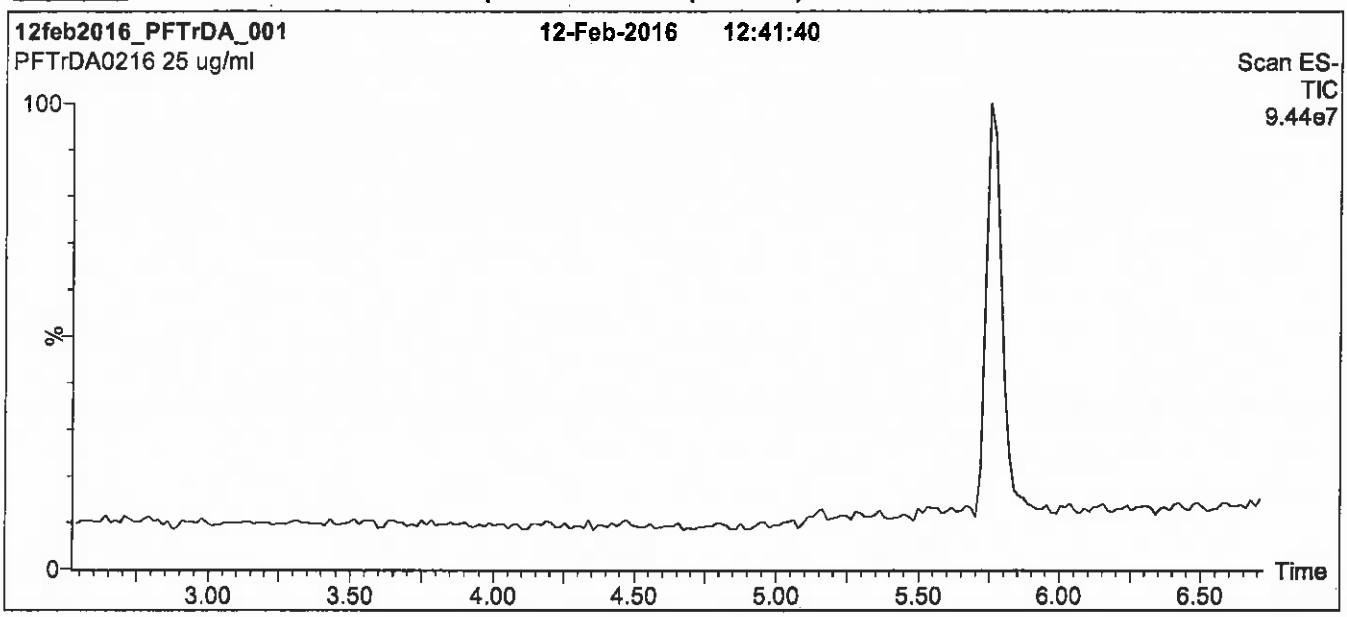
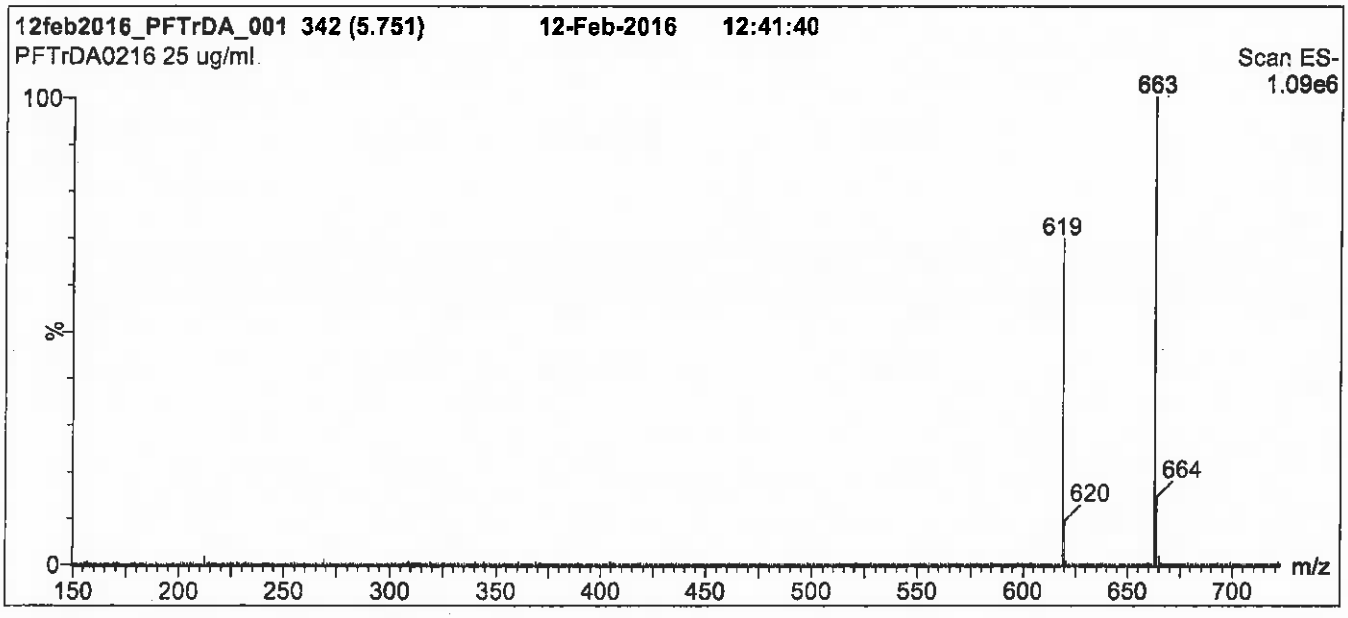
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





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

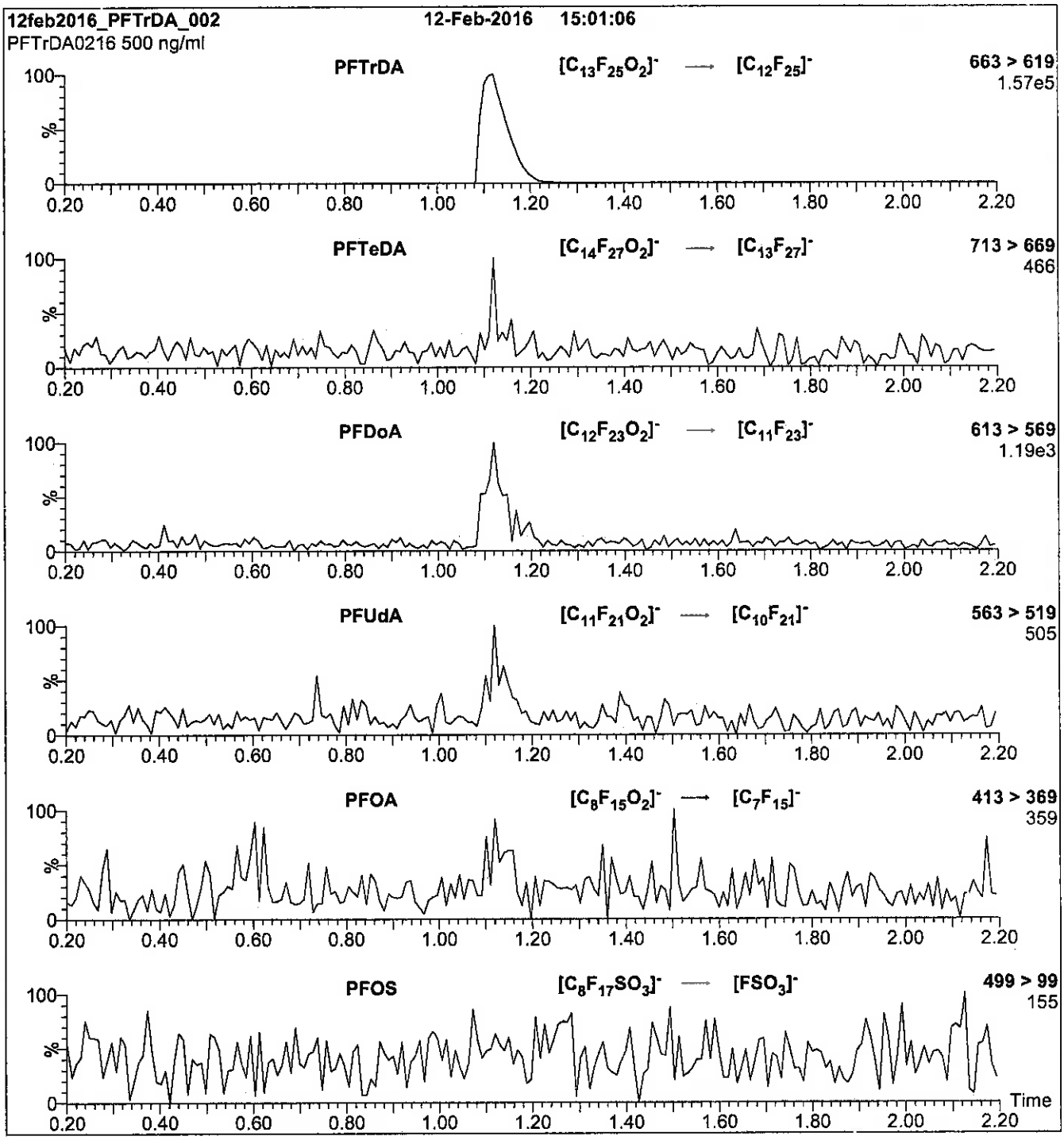
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 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

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% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00006

Scanned 10/14/16 R: SBC 9/13/16

730535
ID: LCPFUdA_00005
Exp: 08/19/20 Prpd: SBC
PF-n-undecanoic acid

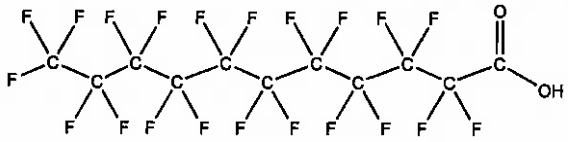
730536
ID: LCPFUdA_00006
Exp: 08/19/20 Prpd: SBC
PF-n-undecanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
LOT NUMBER: PFUdA0815
COMPOUND: Perfluoro-n-undecanoic acid

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) 08/19/2015
EXPIRY DATE: (mm/dd/yyyy) 08/19/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/21/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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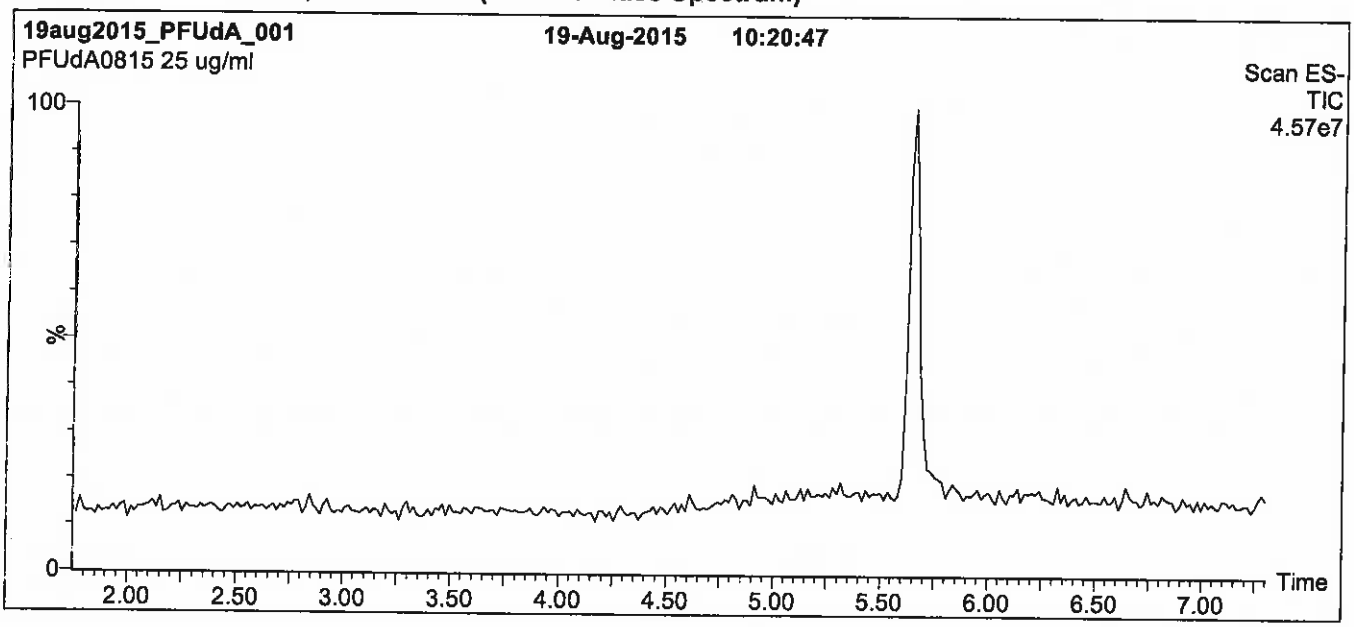
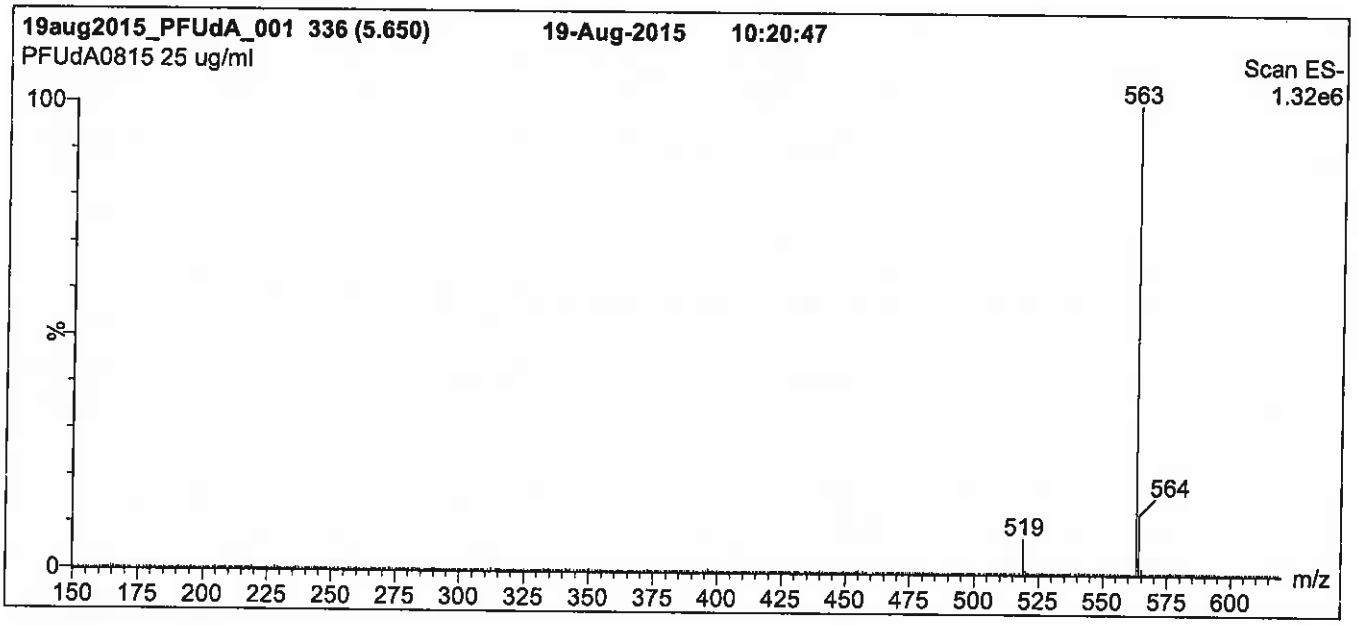
Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

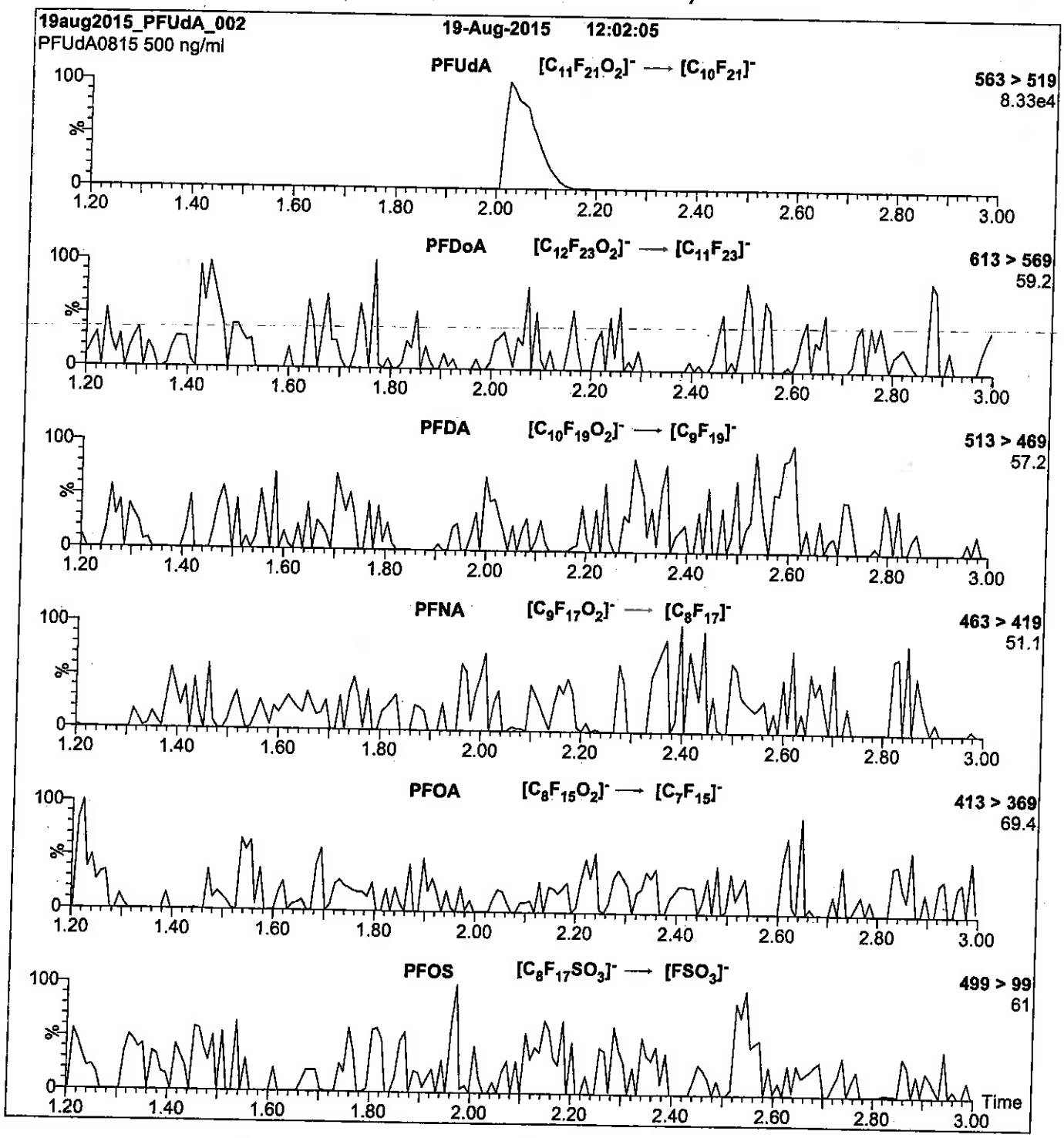
Flow: 300 µl/min

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) = 65
Desolvation Gas Flow (l/hr) = 750

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) = 3.31e-3
Collision Energy (eV) = 11

Reagent

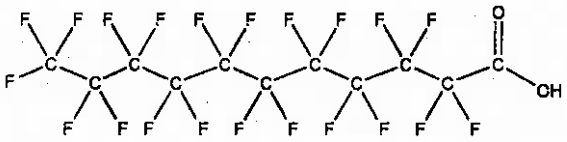
LCPFUdA_00007

r: 12/20/16 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFUdA	**LOT NUMBER:**	PFUdA1016
COMPOUND:	Perfluoro-n-undecanoic acid		
STRUCTURE:		**CAS #:**	2058-94-8



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CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	10/18/2016		
EXPIRY DATE: (mm/dd/yyyy)	10/18/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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ADDITIONAL INFORMATION:

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Certified By: B.G. Chittim **Date:** 10/19/2016 (mm/dd/yyyy)

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CALA

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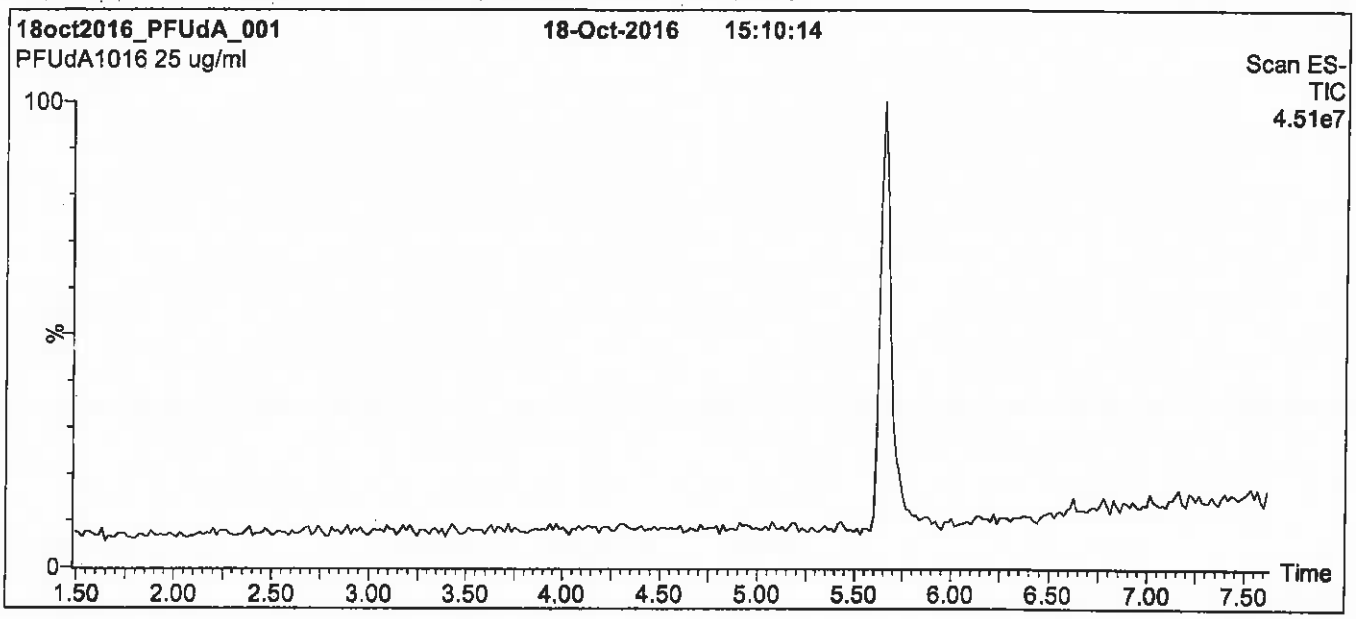

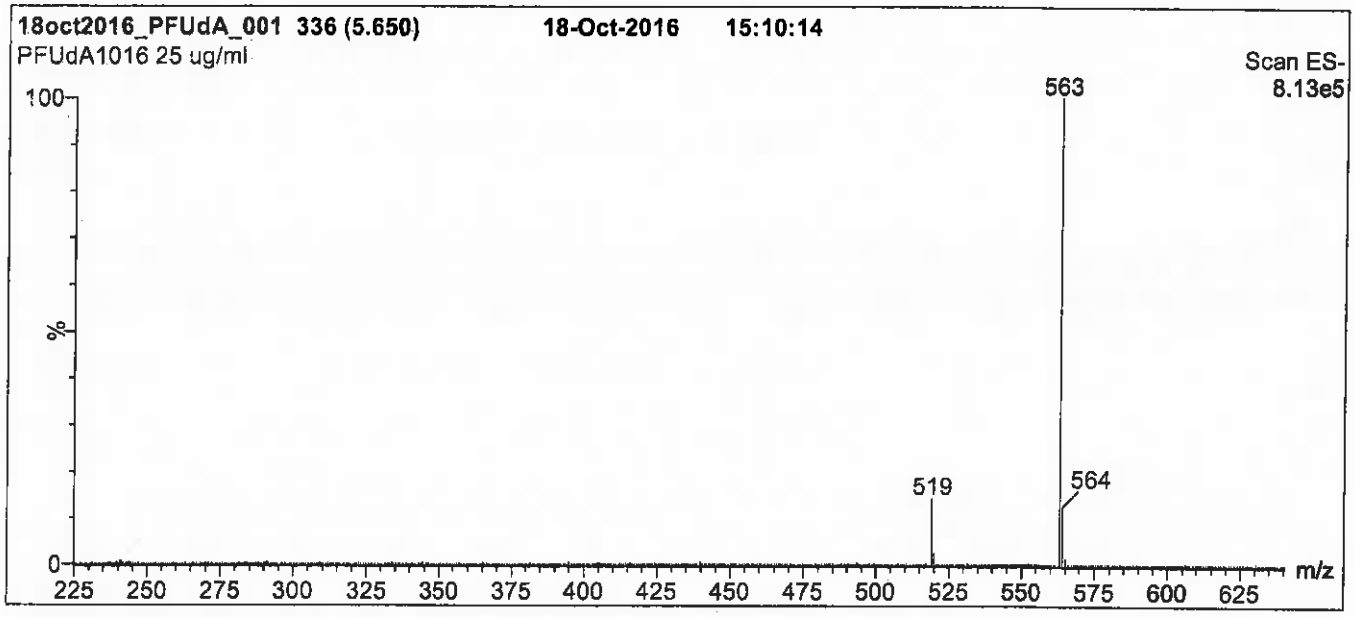

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MS: **Micromass Quattro *micro* API MS**

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1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 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

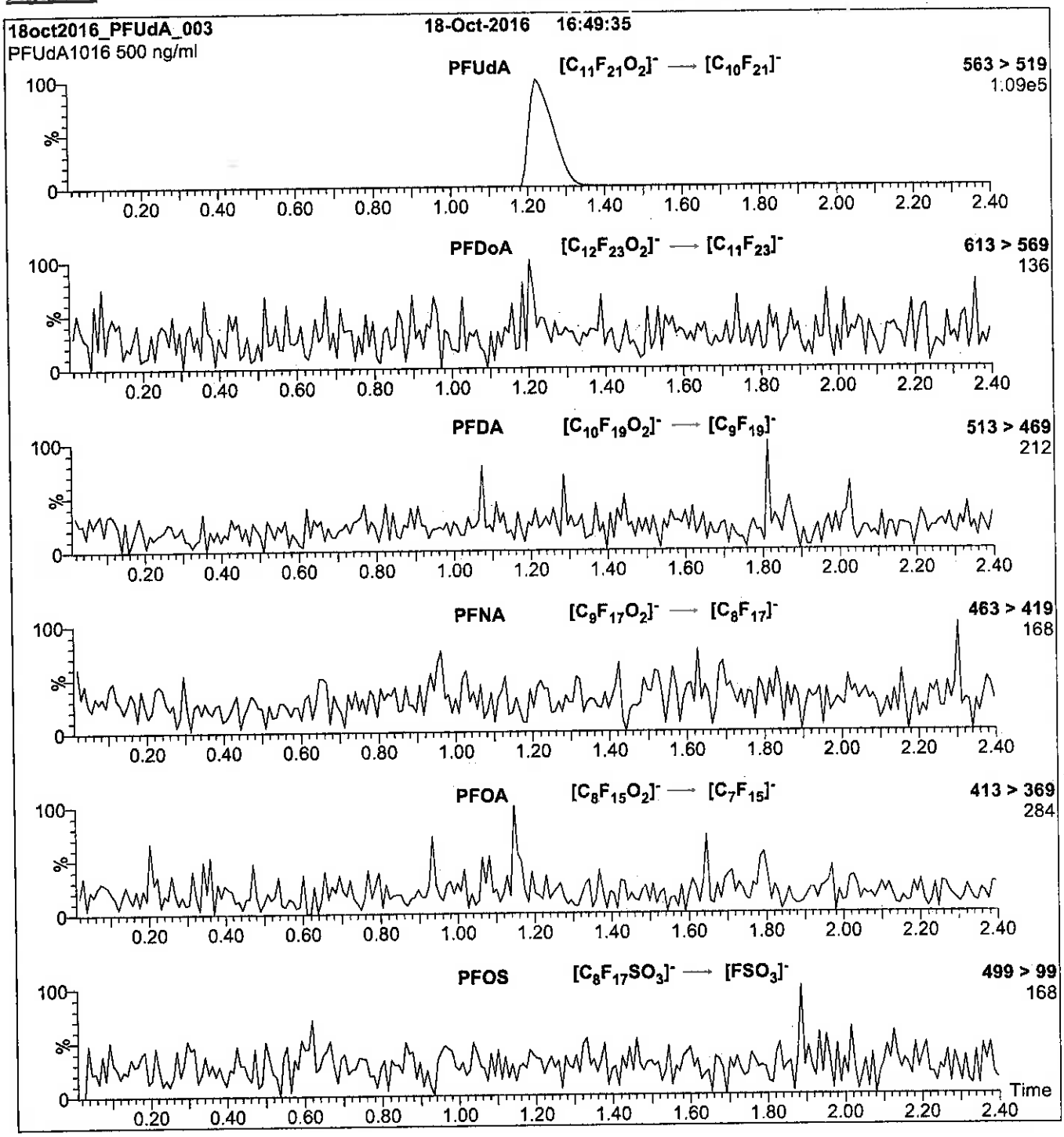
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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) = 3.24e-3
Collision Energy (eV) = 11

Method PFC DOD

Perfluorinated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	13C3-PFBS #	PFHxA #	PFHpA #	PFHxS #	PFOA #	PFNA #
TP-PFC-022-TPI	320-32321-1	70	84	107	86	89	103	63	78
TP-PFC-022-TPI DL	320-32321-1 DL	120	107	117	109	119	132	96	89
TP-PFC-022-TPE	320-32321-2	76	83	100	87	93	107	85	71
TP-PFC-022-MID-CARBON	320-32321-3	83	90	102	96	97	107	90	84
TP-PFC-022-TPE-D	320-32321-4	82	91	100	94	101	106	93	87
	MB 320-190551/1-A	105	102	100	104	114	108	105	102
	LCS 320-190551/2-A	111	109	110	110	118	112	113	111
	LCSD 320-190551/3-A	107	102	106	104	111	110	106	102

	QC LIMITS
PFBA = 13C4 PFBA	25-150
PFPeA = 13C5 PFPeA	25-150
13C3-PFBS = 13C3-PFBS	25-150
PFHxA = 13C2 PFHxA	25-150
PFHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II 537 (modified)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFOS #	PFDA #	PFOSA #	PFUnA #	PFDoA #	PFTDA #
TP-PFC-022-TPI	320-32321-1	103	79	4 Q	73	75	97
TP-PFC-022-TPI DL	320-32321-1 DL	114	76	6 Q	77	79	96
TP-PFC-022-TPE	320-32321-2	95	66	4 Q	69	69	84
TP-PFC-022-MID-CARBON	320-32321-3	98	81	3 Q	79	84	97
TP-PFC-022-TPE-D	320-32321-4	96	88	2 Q	81	76	91
	MB 320-190551/1-A	103	112	50	100	93	100
	LCS 320-190551/2-A	109	117	48	105	99	107
	LCSD 320-190551/3-A	101	112	56	101	97	106

	QC LIMITS
PFOS = 13C4 PFOS	25-150
PFOSA = 13C8 FOSA	25-150
PFDA = 13C2 PFDA	25-150
PFUnA = 13C2 PFUnA	25-150
PFDoA = 13C2 PFDoA	25-150
PFTDA = 13C2-PFTeDA	25-150

Column to be used to flag recovery values

FORM II 537 (modified)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.10.30AAA_018.d

Lab ID: LCS 320-190551/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorobutanoic acid (PFBA)	40.0	43.6	109	89-128	
Perfluoropentanoic acid (PFPeA)	40.0	41.1	103	66-136	
Perfluorohexanoic acid (PFHxA)	40.0	40.7	102	86-126	
Perfluoroheptanoic acid (PFHpA)	40.0	41.6	104	89-127	
Perfluorooctanoic acid (PFOA)	40.0	40.3	101	80-120	
Perfluorononanoic acid (PFNA)	40.0	38.5	96	77-137	
Perfluorodecanoic acid (PFDA)	40.0	40.8	102	84-123	
Perfluoroundecanoic acid (PFUnA)	40.0	38.8	97	73-122	
Perfluorododecanoic acid (PFDoA)	40.0	41.8	104	82-122	
Perfluorotridecanoic Acid (PFTriA)	40.0	46.2	115	56-163	
Perfluorotetradecanoic acid (PFTeA)	40.0	40.8	102	66-120	
Perfluorobutanesulfonic acid (PFBS)	35.4	37.6	106	88-130	
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.8	104	87-126	
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	42.5	112	92-135	
Perfluorooctanesulfonic acid (PFOS)	37.1	37.6	101	83-126	
Perfluorodecanesulfonic acid (PFDS)	38.6	38.0	98	80-129	
Perfluorooctane Sulfonamide (FOSA)	40.0	40.7	102	91-133	
13C8 FOSA	100	48.3	48	25-150	
13C4 PFBA	100	111	111	25-150	
13C2 PFHxA	100	110	110	25-150	
13C4 PFOA	100	113	113	25-150	
13C5 PFNA	100	111	111	25-150	
13C2 PFDA	100	117	117	25-150	
13C2 PFUnA	100	105	105	25-150	
13C2 PFDoA	100	98.9	99	25-150	
18O2 PFHxS	94.6	106	112	25-150	
13C4 PFOS	95.6	104	109	25-150	
13C2-PFTeDA	100	107	107	25-150	
13C4-PFHpA	100	118	118	25-150	
13C5 PFPeA	100	109	109	25-150	
13C3-PFBS	93.0	102	110	25-150	

Column to be used to flag recovery and RPD values

FORM III 537 (modified)

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.10.30AAA_019.d

Lab ID: LCSD 320-190551/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorobutanoic acid (PFBA)	40.0	43.9	110	1	30	89-128	
Perfluoropentanoic acid (PFPeA)	40.0	40.8	102	1	30	66-136	
Perfluorohexanoic acid (PFHxA)	40.0	41.1	103	1	30	86-126	
Perfluoroheptanoic acid (PFHpA)	40.0	42.4	106	2	30	89-127	
Perfluorooctanoic acid (PFOA)	40.0	41.7	104	3	30	80-120	
Perfluorononanoic acid (PFNA)	40.0	41.5	104	7	30	77-137	
Perfluorodecanoic acid (PFDA)	40.0	41.3	103	1	30	84-123	
Perfluoroundecanoic acid (PFUnA)	40.0	39.5	99	2	30	73-122	
Perfluorododecanoic acid (PFDoA)	40.0	42.4	106	2	30	82-122	
Perfluorotridecanoic Acid (PFTriA)	40.0	48.1	120	4	30	56-163	
Perfluorotetradecanoic acid (PFTeA)	40.0	40.9	102	0	30	66-120	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.7	104	2	30	88-130	
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.3	105	1	30	87-126	
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	44.1	116	4	30	92-135	
Perfluorooctanesulfonic acid (PFOS)	37.1	39.6	107	5	30	83-126	
Perfluorodecanesulfonic acid (PFDS)	38.6	39.8	103	5	30	80-129	
Perfluorooctane Sulfonamide (FOSA)	40.0	41.6	104	2	30	91-133	
13C8 FOSA	100	55.5	56			25-150	
13C4 PFBA	100	107	107			25-150	
13C2 PFHxA	100	104	104			25-150	
13C4 PFOA	100	106	106			25-150	
13C5 PFNA	100	102	102			25-150	
13C2 PFDA	100	112	112			25-150	
13C2 PFUnA	100	101	101			25-150	
13C2 PFDoA	100	96.9	97			25-150	
18O2 PFHxS	94.6	104	110			25-150	
13C4 PFOS	95.6	96.3	101			25-150	
13C2-PFTeDA	100	106	106			25-150	
13C4-PFHpA	100	111	111			25-150	
13C5 PFPeA	100	102	102			25-150	
13C3-PFBS	93.0	98.1	106			25-150	

Column to be used to flag recovery and RPD values

FORM III 537 (modified)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab File ID: 2017.10.30AAA_017.d Lab Sample ID: MB 320-190551/1-A

Matrix: Water Date Extracted: 10/23/2017 08:13

Instrument ID: A8_N Date Analyzed: 10/31/2017 02:11

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-190551/2-A	2017.10.30AAA_018.d	10/31/2017 02:18
	LCSD 320-190551/3-A	2017.10.30AAA_019.d	10/31/2017 02:25
TP-PFC-022-TPI DL	320-32321-1 DL	2017.10.30AAA_020.d	10/31/2017 02:32
TP-PFC-022-TPE	320-32321-2	2017.10.30AAA_021.d	10/31/2017 02:39
TP-PFC-022-MID-CARBON	320-32321-3	2017.10.30AAA_022.d	10/31/2017 02:46
TP-PFC-022-TPE-D	320-32321-4	2017.10.30AAA_023.d	10/31/2017 02:52
TP-PFC-022-TPI	320-32321-1	2017.10.30AAA_033.d	10/31/2017 04:01

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI | Lab Sample ID: 320-32321-1

Matrix: Water | Lab File ID: 2017.10.30AAA_033.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 04:01

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	63	M	2.4	0.95	0.44
2706-90-3	Perfluoropentanoic acid (PFPeA)	180		2.4	1.9	0.94
307-24-4	Perfluorohexanoic acid (PFHxA)	310		2.4	1.9	0.75
375-85-9	Perfluoroheptanoic acid (PFHpA)	82		2.4	1.9	0.77
335-67-1	*Perfluorooctanoic acid (PFOA)*	*1200*	*E M*	*2.4*	1.9	*0.71*
375-95-1	Perfluorononanoic acid (PFNA)	2.7		2.4	1.9	0.62
335-76-2	Perfluorodecanoic acid (PFDA)	1.1	J	2.4	0.95	0.42
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.71
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	0.65	J	2.4	1.9	0.53
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.63	J	2.4	0.95	0.38
375-73-5	Perfluorobutanesulfonic acid (PFBS)	61		2.4	1.9	0.88
355-46-4	*Perfluorohexanesulfonic acid (PFHxS)*	*360*	*E*	*2.4*	1.9	*0.83*
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	9.3		2.4	1.9	0.68
1763-23-1	*Perfluorooctanesulfonic acid (PFOS)*	*360*	*E*	*3.8*	2.9	*1.2*
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.8	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	4.6	J	38	1.9	0.61

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI | Lab Sample ID: 320-32321-1

Matrix: Water | Lab File ID: 2017.10.30AAA_033.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 04:01

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	4	Q	25-150
STL00992	13C4 PFBA	70		25-150
STL00993	13C2 PFHxA	86		25-150
STL00990	13C4 PFOA	63		25-150
STL00995	13C5 PFNA	78		25-150
STL00996	13C2 PFDA	79		25-150
STL00997	13C2 PFUnA	73		25-150
STL00998	13C2 PFDoA	75		25-150
STL00994	18O2 PFHxS	103		25-150
STL00991	13C4 PFOS	103		25-150
STL02116	13C2-PFTeDA	97		25-150
STL01892	13C4-PFHpA	89		25-150
STL01893	13C5 PFPeA	84		25-150
STL02337	13C3-PFBS	107		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_033.d
Lims ID: 320-32321-A-1-A
Client ID: TP-PFC-022-TPI
Sample Type: Client
Inject. Date: 31-Oct-2017 04:01:59 ALS Bottle#: 28 Worklist Smp#: 19
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32321-a-1-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 10:14:23 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 10:14:38

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.528	1.536	-0.008		12286002	35.0		70.1	16943	
2 Perfluorobutyric acid										M
212.90 > 169.00	1.537	1.536	0.001	1.000	7726918	33.0			272	M
4 Perfluoropentanoic acid										
262.90 > 219.00	1.727	1.736	-0.009	1.000	19184805	93.8			2787	
D 3 13C5-PFPeA										
267.90 > 223.00	1.727	1.736	-0.009		9521686	42.2		84.4	34923	
D 47 13C3-PFBS										
301.90 > 83.00	1.745	1.754	-0.009		249302	49.6		107	1971	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.754	0.001	1.000	12353232	31.8			3781	
298.90 > 99.00	1.755	1.754	0.001	1.000	5680288		2.17(0.00-0.00)		3592	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.983	1.994	-0.011	1.000	31856624	160.6			6120	
D 7 13C2 PFHxA										
315.00 > 270.00	1.983	1.994	-0.011		10377940	42.8		85.7	21022	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.297	2.308	-0.011	1.000	9051602	43.0			3560	
D 9 13C4-PFHpA										
367.00 > 322.00	2.297	2.308	-0.011		10870325	44.6		89.2	18601	
8 Perfluorohexanesulfonic acid										E
399.00 > 80.00	2.318	2.318	0.0	1.000	61450717	190.9			5188	E
D 11 18O2 PFHxS										
403.00 > 84.00	2.318	2.318	0.0		14728565	48.9		103	20723	
* 62 13C2-PFOA										
415.00 > 370.00	2.637	2.644	-0.007		10451412	50.0			16735	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										EM
413.00 > 369.00	2.645	2.651	-0.006	1.000	105563840	650.7			2725	E
413.00 > 169.00	2.645	2.651	-0.006	1.000	78442582		1.35(0.90-1.10)		2166	M
D 14 13C4 PFOA										
417.00 > 372.00	2.645	2.651	-0.006		7550652	31.6		63.3	13850	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.652	2.658	-0.006	1.000	1250701	4.86			124	
D 18 13C4 PFOS										
503.00 > 80.00	3.006	3.015	-0.009		10477626	49.4		103	10205	
17 Perfluorooctane sulfonic acid										E
499.00 > 80.00	3.006	3.015	-0.009	1.000	43321191	190.0			3245	E
499.00 > 99.00	3.006	3.015	-0.009	1.000	10101541		4.29(0.90-1.10)		5281	
20 Perfluorononanoic acid										
463.00 > 419.00	3.006	3.015	-0.009	1.000	218906	1.43			154	
D 19 13C5 PFNA										
468.00 > 423.00	3.006	3.015	-0.009		7914250	39.2		78.4	11402	
D 21 13C8 FOSA										
506.00 > 78.00	3.364	3.372	-0.008		627932	2.02		4.0	3714	
D 23 13C2 PFDA										
515.00 > 470.00	3.364	3.372	-0.008		7245615	39.7		79.4	15303	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.364	3.372	-0.008	1.000	77379	0.5685			191	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.364	3.372	-0.008	1.000	28690	2.42			298	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.672	3.680	-0.008	1.000	15075	0.1062			66.3	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.692	3.699	-0.007	1.000	32064	0.2818			140	
D 30 13C2 PFUnA										
565.00 > 520.00	3.692	3.699	-0.007		5331400	36.6		73.2	5705	
D 36 13C2 PFDoA										
615.00 > 570.00	3.985	3.990	-0.005		6269940	37.3		74.7	7160	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.985	3.990	-0.005	1.000	27919	0.2421			190	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.251	4.257	-0.006	1.000	43902	0.3388			45.4	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.481	4.480	0.001	1.000	14497	0.3291			351	
713.00 > 219.00	4.490	4.480	0.010	1.002	10915		1.33(0.00-0.00)		251	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.481	4.489	-0.007		9908211	48.4		96.8	17956	

QC Flag Legend

Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

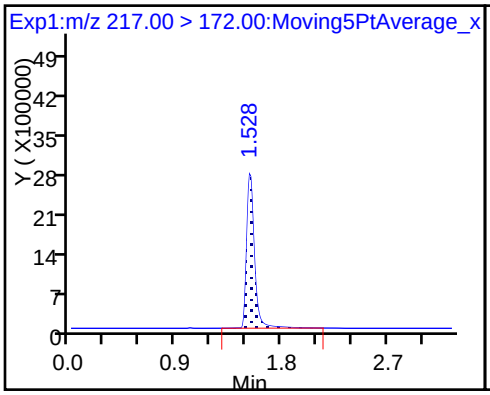
Report Date: 31-Oct-2017 10:14:38 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

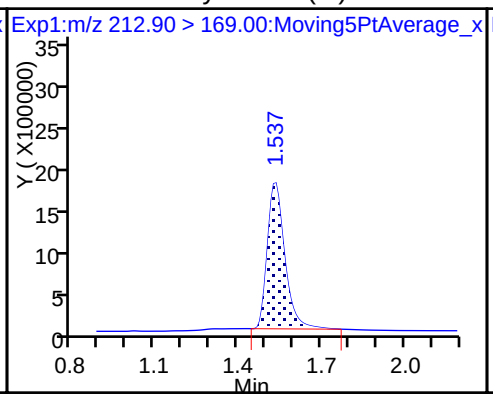
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_033.d

Injection Date:	31-Oct-2017 04:01:59	Instrument ID:	A8_N		
Lims ID:	320-32321-A-1-A	Lab Sample ID:	320-32321-1		
Client ID:	TP-PFC-022-TPI				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	28	Worklist Smp#:	19
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

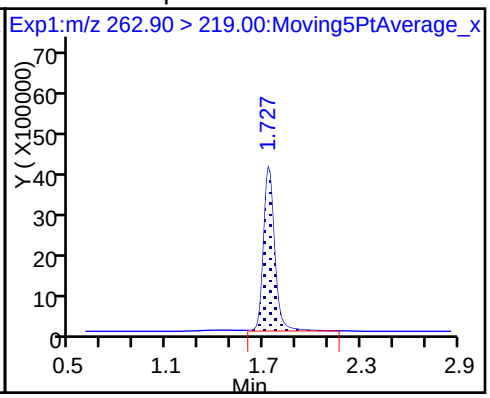
D 1 13C4 PFBA



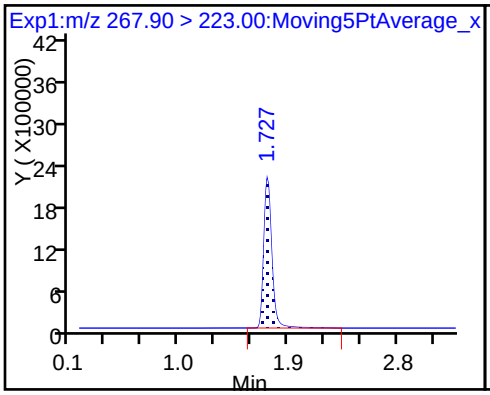
2 Perfluorobutyric acid (M)



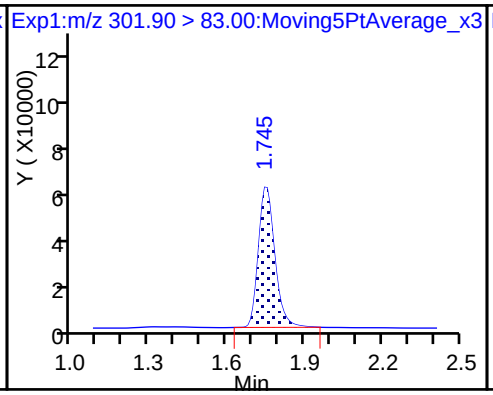
4 Perfluoropentanoic acid



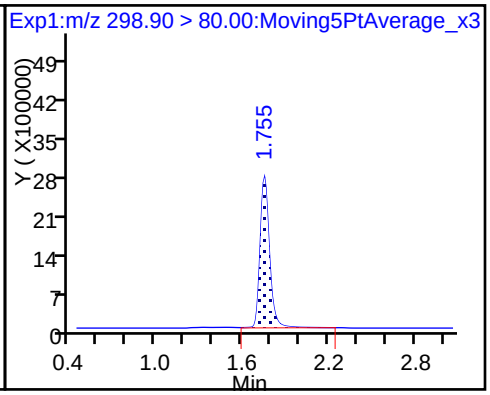
D 3 13C5-PFPeA



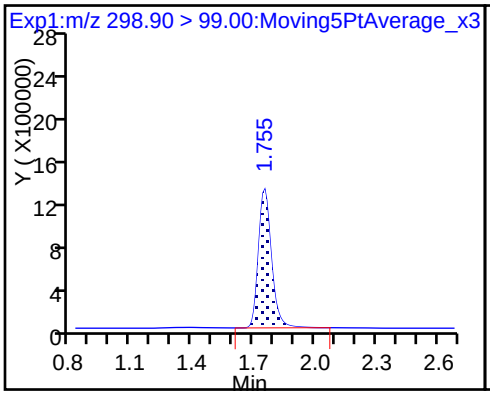
D 47 13C3-PFBS



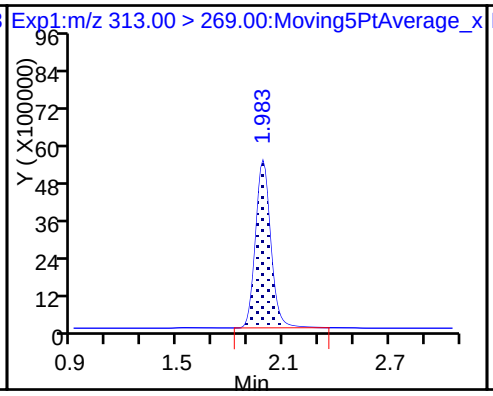
5 Perfluorobutanesulfonic acid



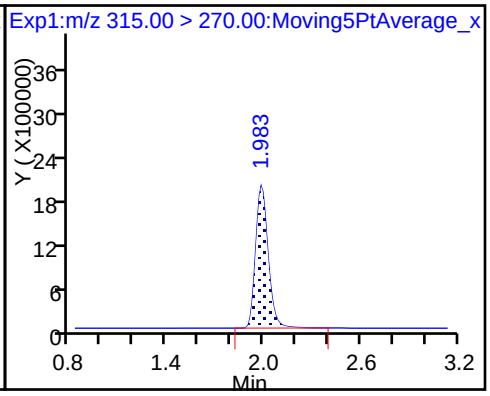
5 Perfluorobutanesulfonic acid



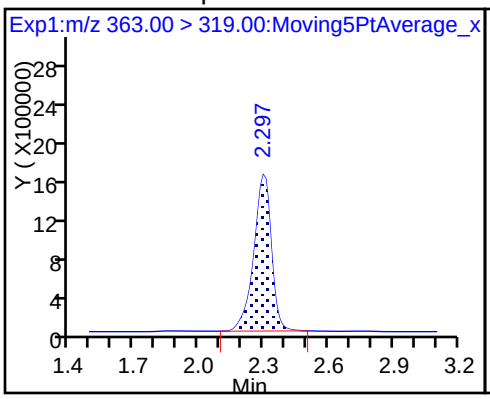
6 Perfluorohexanoic acid



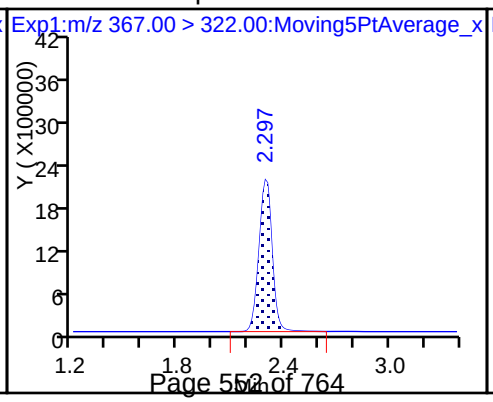
D 7 13C2 PFHxA



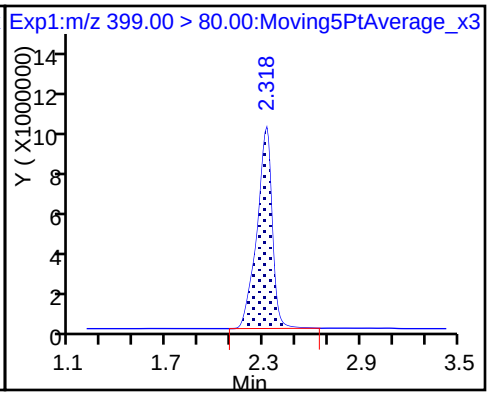
10 Perfluoroheptanoic acid



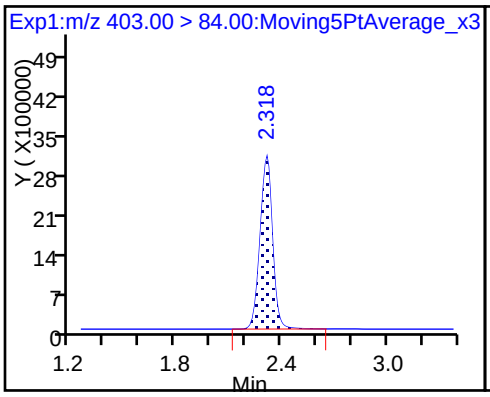
D 9 13C4-PFHpA



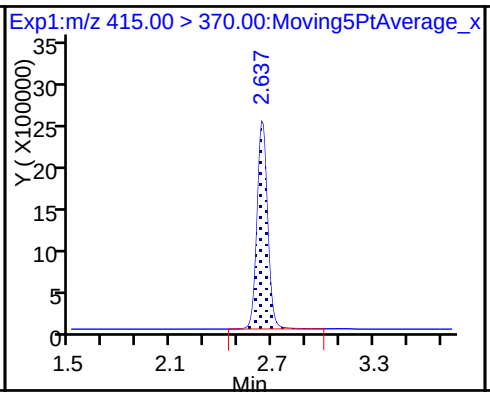
8 Perfluorohexanesulfonic acid



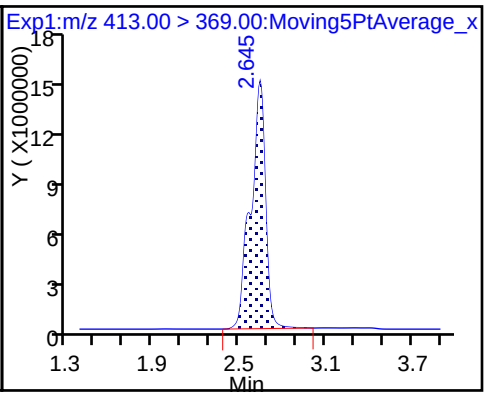
D 11 18O2 PFHxS



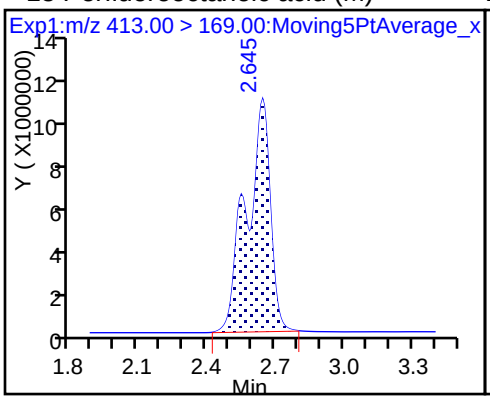
* 62 13C2-PFOA



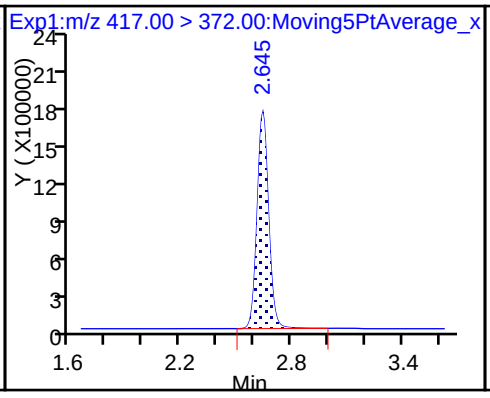
15 Perfluorooctanoic acid



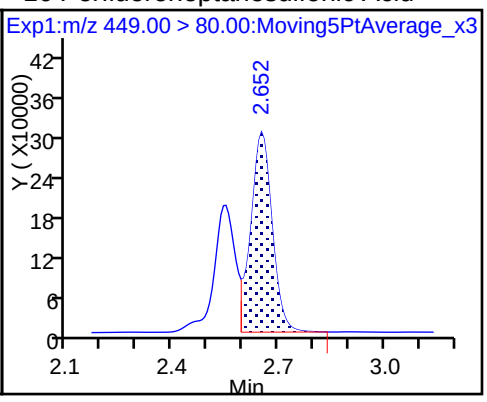
15 Perfluorooctanoic acid (M)



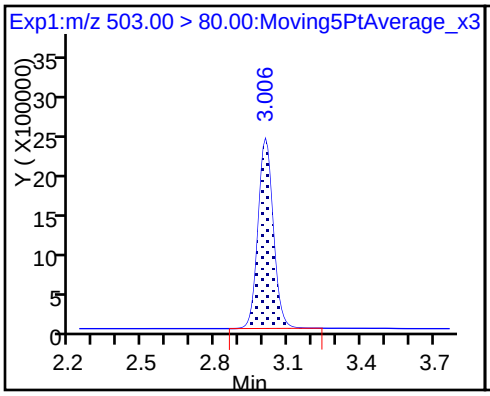
D 14 13C4 PFOA



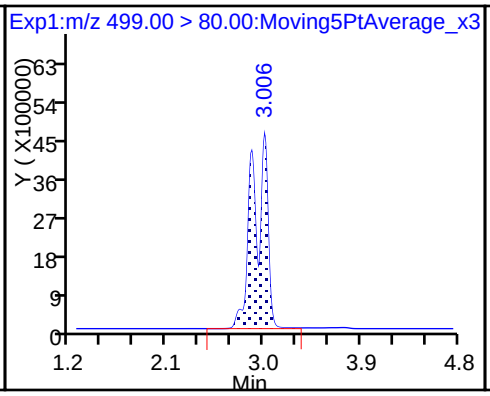
16 Perfluoroheptanesulfonic Acid



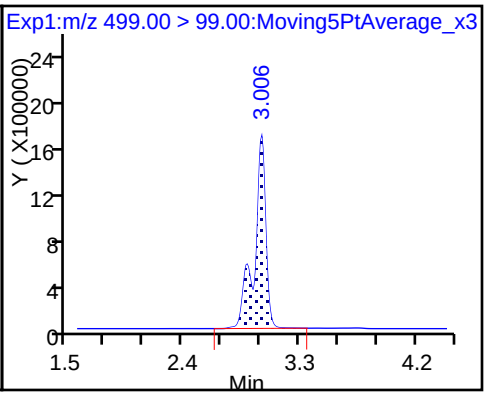
D 18 13C4 PFOS



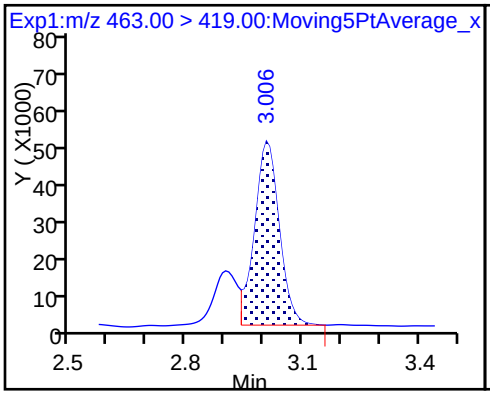
17 Perfluorooctane sulfonic acid



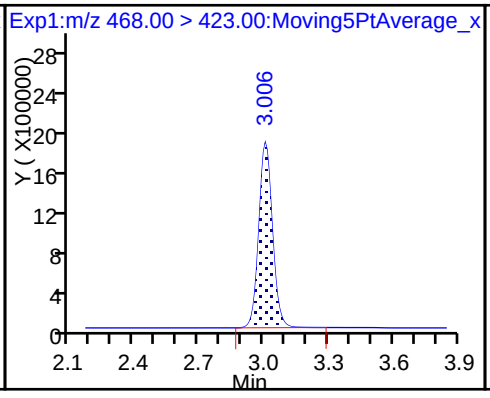
17 Perfluorooctane sulfonic acid



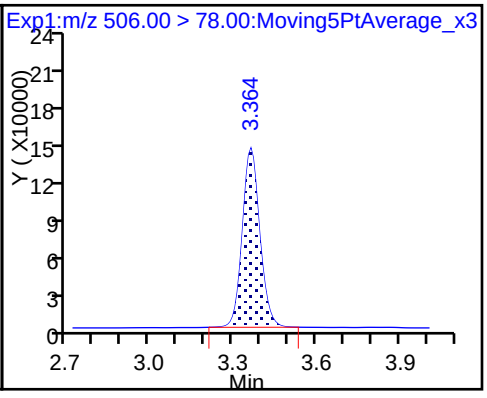
20 Perfluorononanoic acid



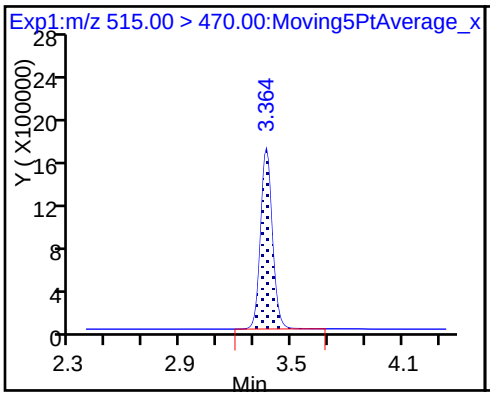
D 19 13C5 PFNA



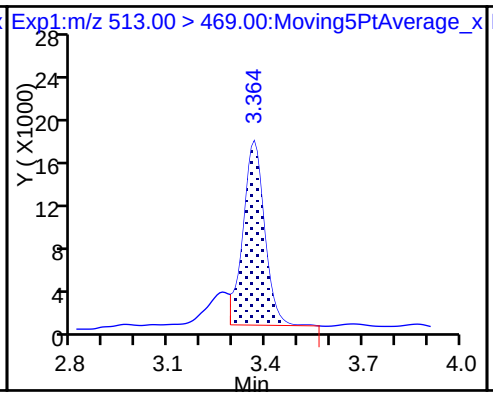
D 21 13C8 FOSA



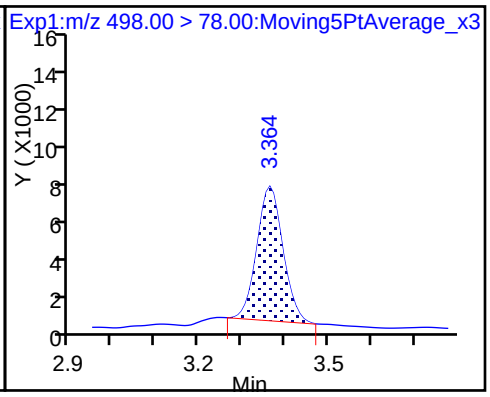
D 23 13C2 PFDA



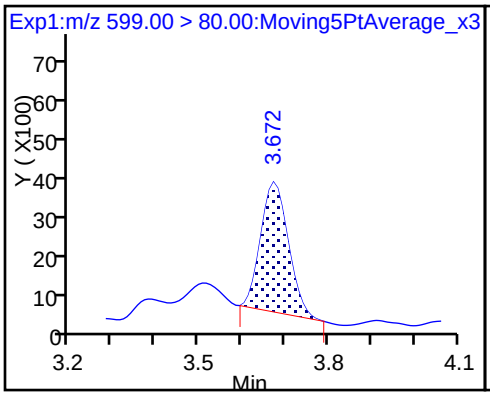
24 Perfluorodecanoic acid



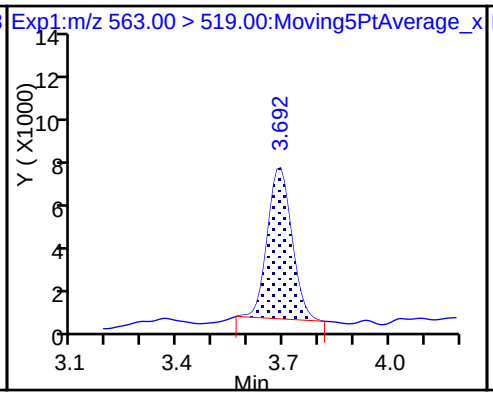
22 Perfluorooctane Sulfonamide



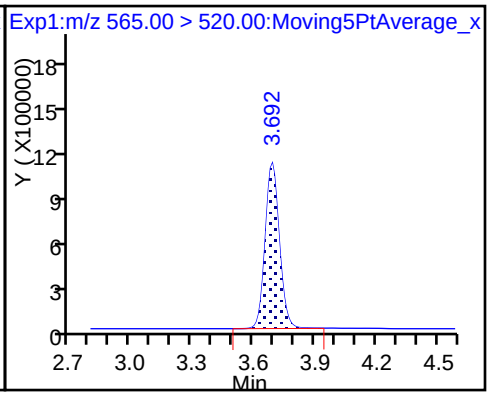
29 Perfluorodecane Sulfonic acid



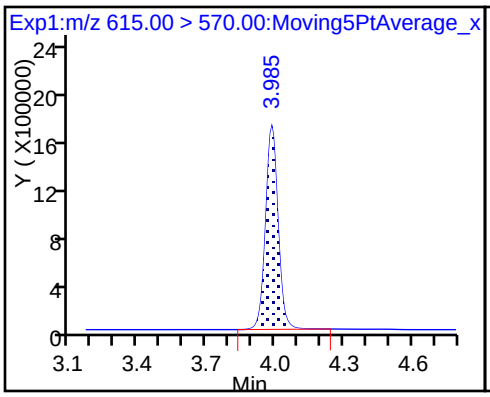
31 Perfluoroundecanoic acid



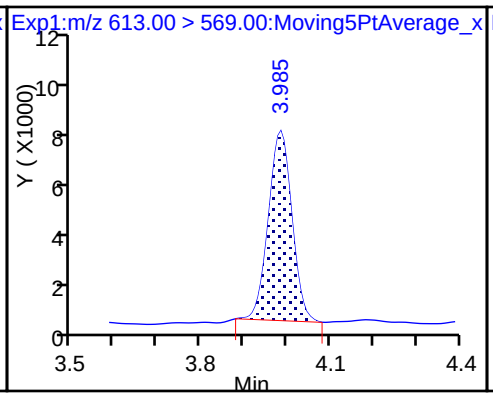
D 30 13C2 PFUnA



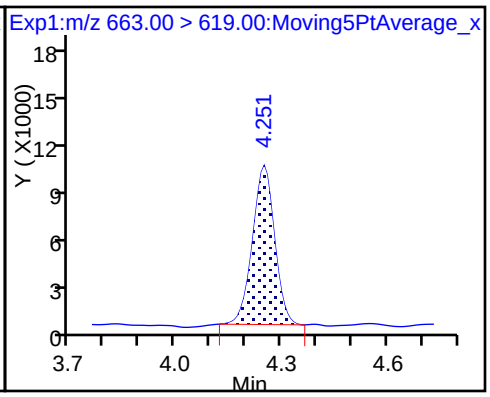
D 36 13C2 PFDoA



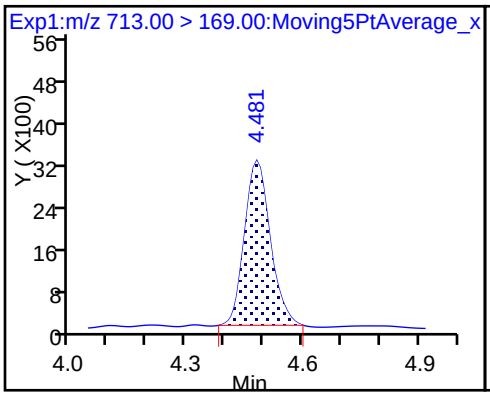
37 Perfluorododecanoic acid



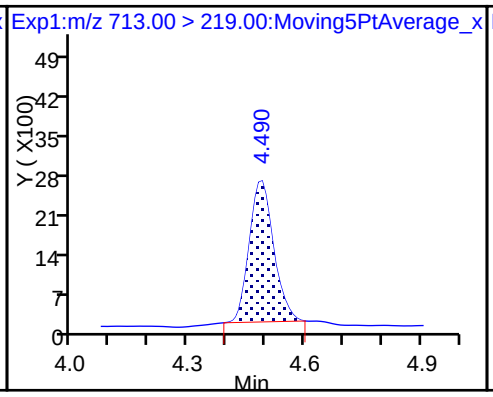
41 Perfluorotridecanoic acid



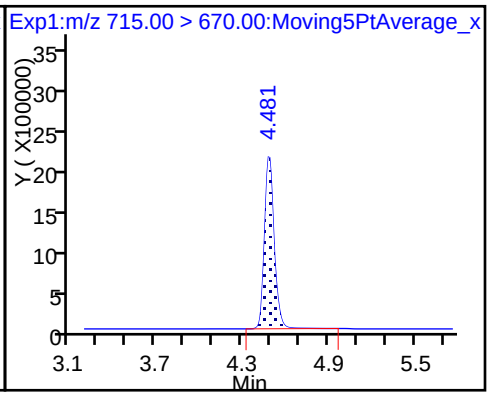
42 Perfluorotetradecanoic acid



42 Perfluorotetradecanoic acid



D 43 13C2-PFTeDA



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

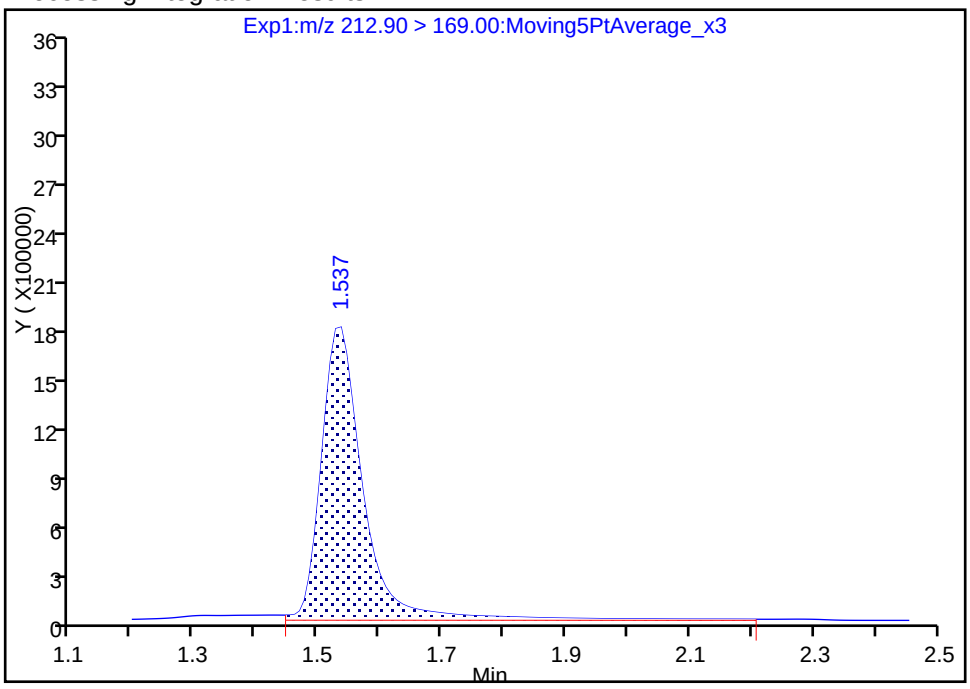
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_033.d				
Injection Date:	31-Oct-2017 04:01:59	Instrument ID:	A8_N		
Lims ID:	320-32321-A-1-A	Lab Sample ID:	320-32321-1		
Client ID:	TP-PFC-022-TPI				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	28	Worklist Smp#:	19
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

2 Perfluorobutyric acid, CAS: 375-22-4

Signal: 1

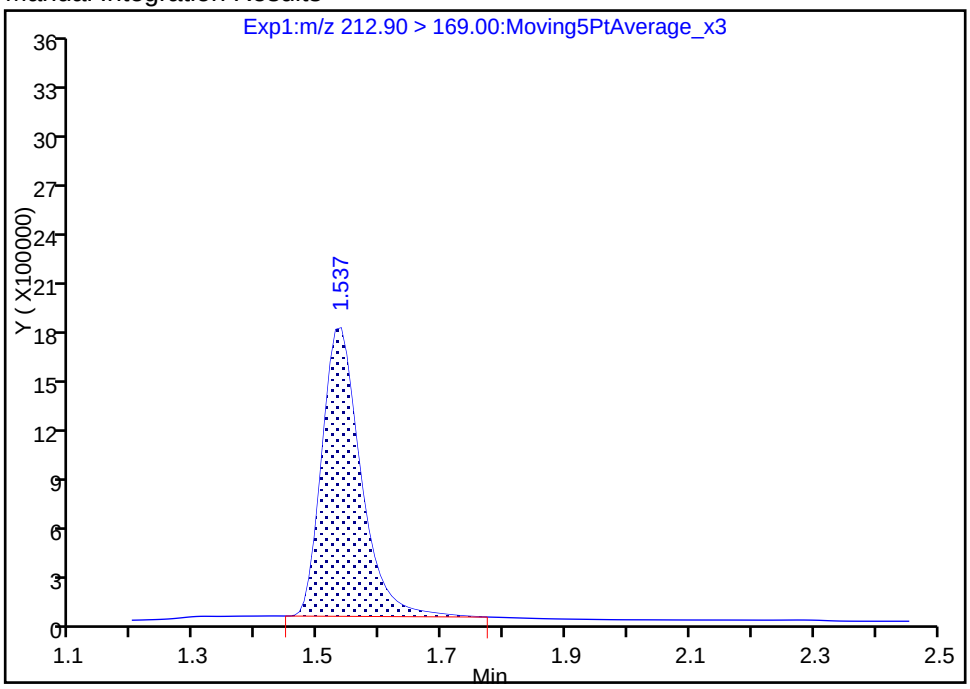
Processing Integration Results

RT: 1.54
Area: 8569586
Amount: 36.625144
Amount Units: ng/ml



Manual Integration Results

RT: 1.54
Area: 7726918
Amount: 33.023706
Amount Units: ng/ml



Reviewer: phomsophat, 31-Oct-2017 10:13:48

Audit Action: Manually Integrated Audit Reason: Assign Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

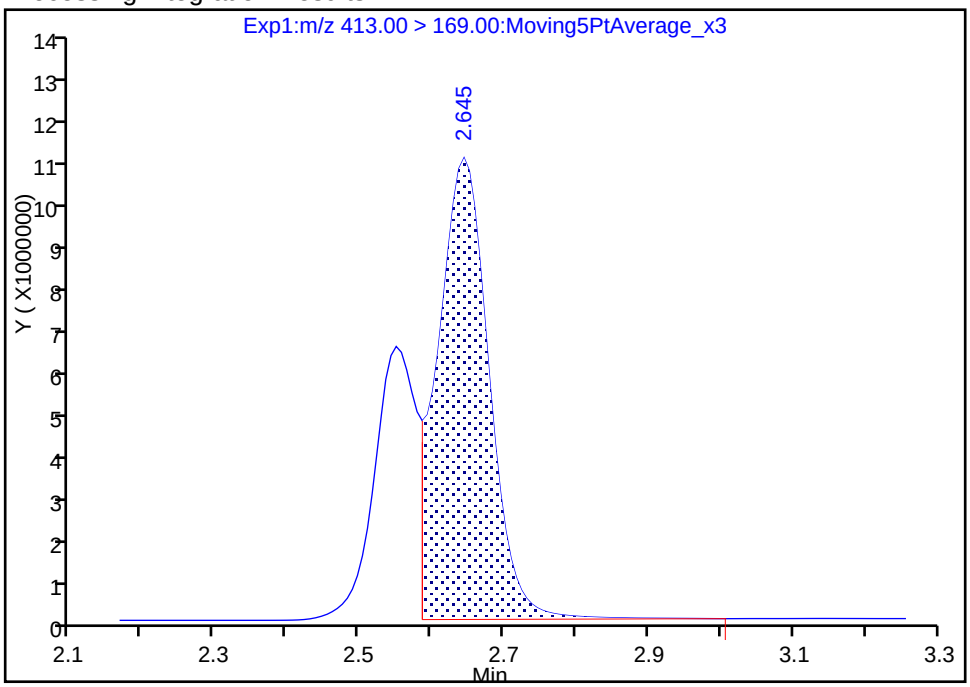
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_033.d				
Injection Date:	31-Oct-2017 04:01:59	Instrument ID:	A8_N		
Lims ID:	320-32321-A-1-A	Lab Sample ID:	320-32321-1		
Client ID:	TP-PFC-022-TPI				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	28	Worklist Smp#:	19
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

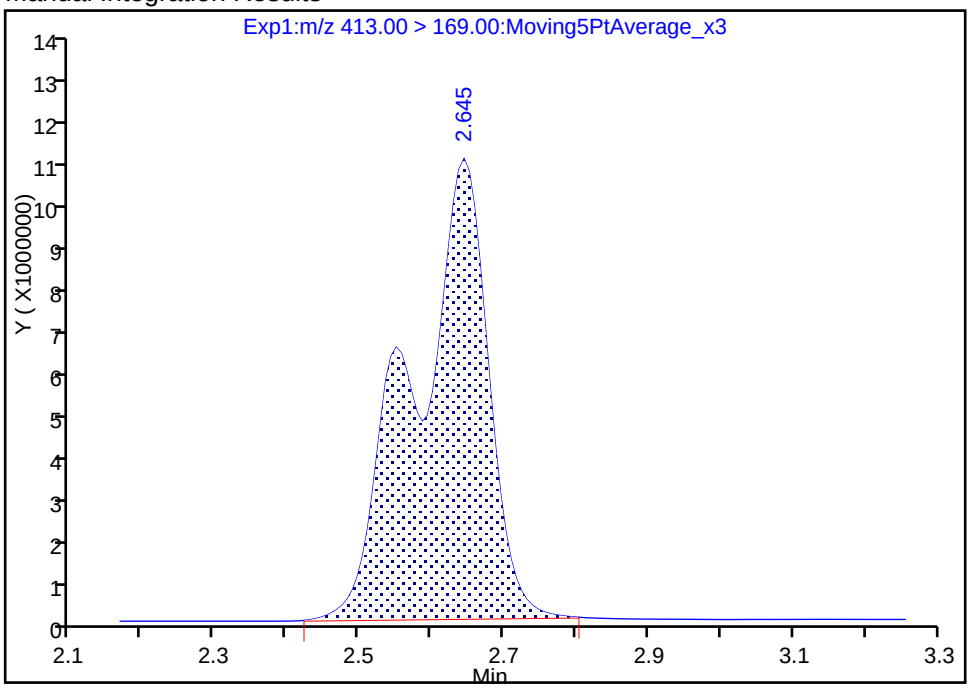
Processing Integration Results

RT: 2.64
Area: 53239780
Amount: 650.7215
Amount Units: ng/ml



Manual Integration Results

RT: 2.64
Area: 78442582
Amount: 650.7215
Amount Units: ng/ml



Reviewer: phomsophat, 31-Oct-2017 10:13:28

Audit Action: Manually Integrated Audit Reason: Assign Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI DL | Lab Sample ID: 320-32321-1 DL

Matrix: Water | Lab File ID: 2017.10.30AAA_020.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 02:32

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 10

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	*Perfluorobutanoic acid (PFBA)*	*67*	*D*	*24*	9.5	*4.4*
2706-90-3	*Perfluoropentanoic acid (PFPeA)*	*190*	*D*	*24*	19	*9.4*
307-24-4	*Perfluorohexanoic acid (PFHxA)*	*360*	*D*	*24*	19	*7.5*
375-85-9	*Perfluoroheptanoic acid (PFHpA)*	*77*	*D*	*24*	19	*7.7*
335-67-1	Perfluorooctanoic acid (PFOA)	1900	D M	24	19	7.1
375-95-1	*Perfluorononanoic acid (PFNA)*	*19*	*U*	*24*	19	*6.2*
335-76-2	*Perfluorodecanoic acid (PFDA)*	*9.5*	*U*	*24*	9.5	*4.2*
2058-94-8	*Perfluoroundecanoic acid (PFUnA)*	*19*	*U*	*24*	19	*7.1*
307-55-1	*Perfluorododecanoic acid (PFDoA)*	*19*	*U*	*24*	19	*5.6*
72629-94-8	*Perfluorotridecanoic Acid (PFTriA)*	*19*	*U*	*24*	19	*5.3*
376-06-7	*Perfluorotetradecanoic acid (PFTeA)*	*9.5*	*U*	*24*	9.5	*3.8*
375-73-5	*Perfluorobutanesulfonic acid (PFBS)*	*66*	*D*	*24*	19	*8.8*
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	470	D	24	19	8.3
375-92-8	*Perfluoroheptanesulfonic Acid (PFHpS)*	*12*	*J D*	*24*	19	*6.8*
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	360	D	38	29	12
335-77-3	*Perfluorodecanesulfonic acid (PFDS)*	*29*	*U*	*38*	29	*12*
754-91-6	*Perfluorooctane Sulfonamide (FOSA)*	*11*	*J D*	*380*	19	*6.1*

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI DL | Lab Sample ID: 320-32321-1 DL

Matrix: Water | Lab File ID: 2017.10.30AAA_020.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 02:32

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 10

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	6	Q	25-150
STL00992	13C4 PFBA	120		25-150
STL00993	13C2 PFHxA	109		25-150
STL00990	13C4 PFOA	96		25-150
STL00995	13C5 PFNA	89		25-150
STL00996	13C2 PFDA	76		25-150
STL00997	13C2 PFUnA	77		25-150
STL00998	13C2 PFDoA	79		25-150
STL00994	18O2 PFHxS	132		25-150
STL00991	13C4 PFOS	114		25-150
STL02116	13C2-PFTeDA	96		25-150
STL01892	13C4-PFHpA	119		25-150
STL01893	13C5 PFPeA	107		25-150
STL02337	13C3-PFBS	117		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_020.d
Lims ID: 320-32321-A-1-A
Client ID: TP-PFC-022-TPI
Sample Type: Client
Inject. Date: 31-Oct-2017 02:32:17 ALS Bottle#: 17 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 10.0000
Sample Info: 320-32321-a-1-a 10X
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:49:52 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:49:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.539	1.529	0.010		2110777	6.02		12.0	2621	
2 Perfluorobutyric acid										
212.90 > 169.00	1.539	1.537	0.002	1.000	1401657	3.49			156	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.738	1.737	0.001	1.000	2634452	10.1			1743	
D 3 13C5-PFPeA										
267.90 > 223.00	1.738	1.737	0.001		1208816	5.36		10.7	5889	
D 47 13C3-PFBS										
301.90 > 83.00	1.757	1.755	0.002		27294	5.43		11.7	1087	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.766	1.755	0.011	1.000	1480242	3.48			2034	
298.90 > 99.00	1.757	1.755	0.002	0.995	641267		2.31(0.00-0.00)		1838	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.987	1.984	0.002	1.000	4713011	18.7			3455	
D 7 13C2 PFHxA										
315.00 > 270.00	1.998	1.984	0.014		1318405	5.44		10.9	5191	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.305	2.308	-0.003	1.000	1122499	4.01			1200	
D 9 13C4-PFHpA										
367.00 > 322.00	2.305	2.308	-0.003		1446735	5.94		11.9	6733	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.321	2.318	0.003	1.000	10046871	24.4			6001	
D 11 18O2 PFHxS										
403.00 > 84.00	2.321	2.318	0.003		1884615	6.26		13.2	12144	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		1488440	5.00			5215	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.651	2.644	0.007	1.000	23817480	96.9			5172	
413.00 > 169.00	2.651	2.644	0.007	1.000	15119820		1.58(0.90-1.10)		4236	M
D 14 13C4 PFOA										
417.00 > 372.00	2.651	2.644	0.007		1143966	4.79		9.6	5961	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.658	2.651	0.007	1.000	173401	0.6119			162	
D 18 13C4 PFOS										
503.00 > 80.00	3.015	3.014	0.001		1154704	5.45		11.4	5570	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.015	3.014	0.001	1.000	4735298	18.8			1369	
499.00 > 99.00	3.006	3.014	-0.008	0.997	1032848		4.58(0.90-1.10)		1758	
20 Perfluorononanoic acid										
463.00 > 419.00	3.015	3.014	0.001	1.000	37958	0.2182			48.3	
D 19 13C5 PFNA										
468.00 > 423.00	3.015	3.014	0.001		898229	4.45		8.9	4370	
D 21 13C8 FOSA										
506.00 > 78.00	3.372	3.372	0.0		90550	0.2910		0.6	906	
D 23 13C2 PFDA										
515.00 > 470.00	3.372	3.372	0.0		697434	3.82		7.6	4211	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.372	3.372	0.0	1.000	20166	0.1539			69.3	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.364	3.372	-0.008	1.000	9894	0.5797			134	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.690	3.679	0.011	1.000	10503	0.0671			178	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.700	3.698	0.002	1.000	14673	0.1230			42.5	
D 30 13C2 PFUnA										
565.00 > 520.00	3.700	3.698	0.002		559134	3.84		7.7	2518	
D 36 13C2 PFDoA										
615.00 > 570.00	3.990	3.989	0.001		660877	3.94		7.9	3342	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.990	3.995	-0.005	1.000	12931	0.1064			51.6	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	17525	0.1283			25.4	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.488	4.488	0.0	1.000	4914	0.1125			160	
713.00 > 219.00	4.488	4.488	0.0	1.000	3831		1.28(0.00-0.00)		147	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.497	4.488	0.009		982909	4.80		9.6	2362	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_020.d

Injection Date: 31-Oct-2017 02:32:17 Instrument ID: A8_N

Lims ID: 320-32321-A-1-A Lab Sample ID: 320-32321-1

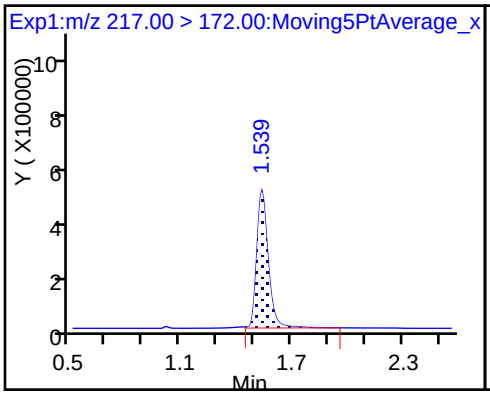
Client ID: TP-PFC-022-TPI

Operator ID: SACINSTLCMS01 ALS Bottle#: 17 Worklist Smp#: 6

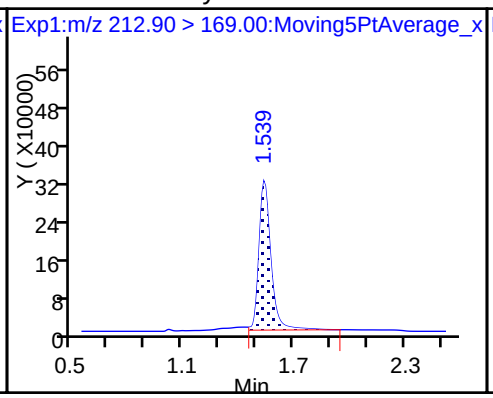
Injection Vol: 2.0 ul Dil. Factor: 10.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

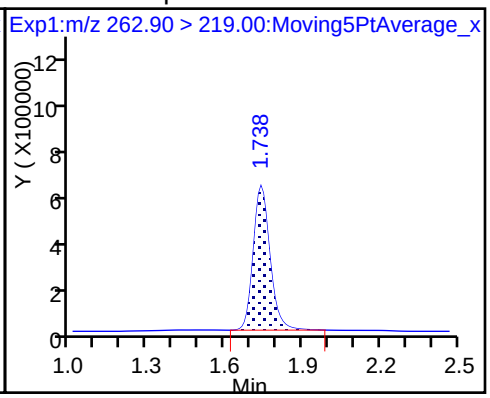
D 1 13C4 PFBA



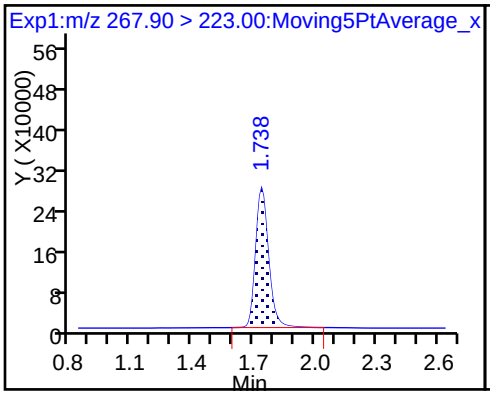
2 Perfluorobutyric acid



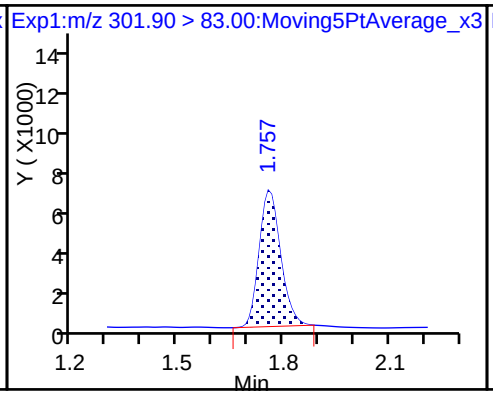
4 Perfluoropentanoic acid



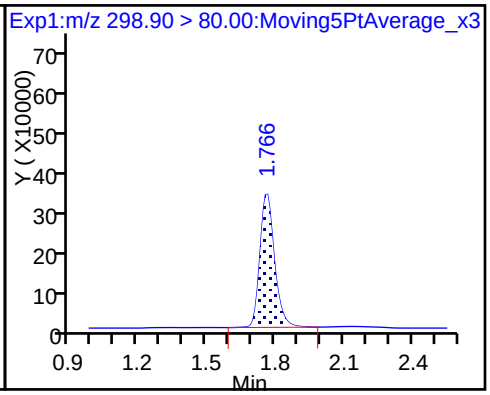
D 3 13C5-PFPeA



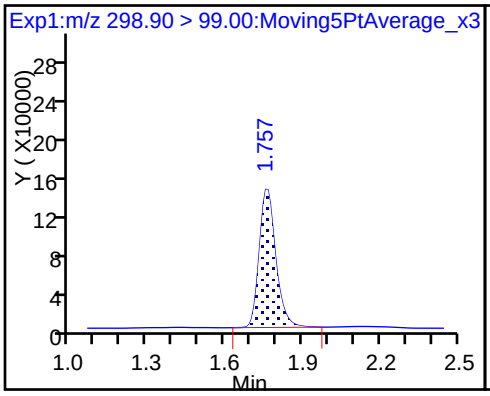
D 47 13C3-PFBS



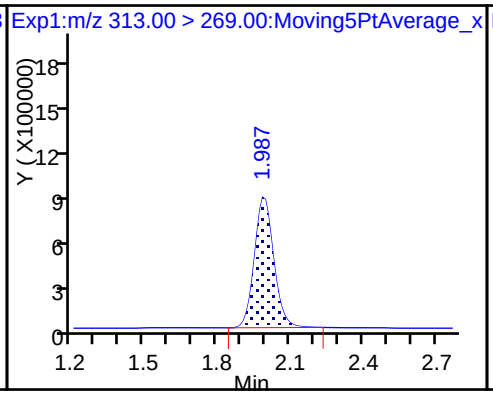
5 Perfluorobutanesulfonic acid



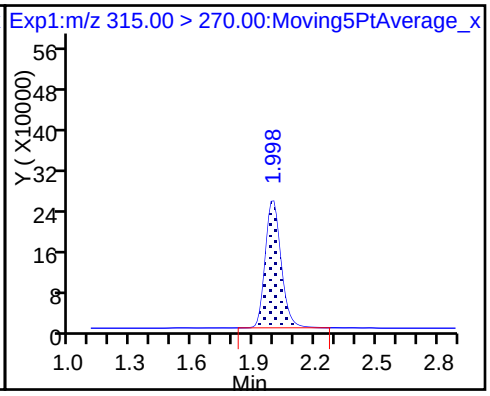
5 Perfluorobutanesulfonic acid



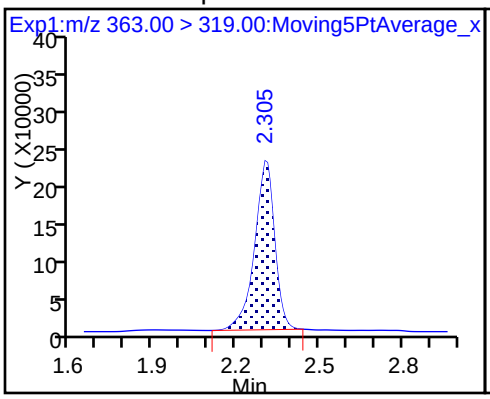
6 Perfluorohexanoic acid



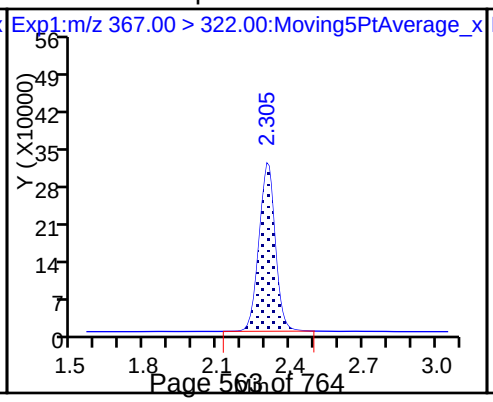
D 7 13C2 PFHxA



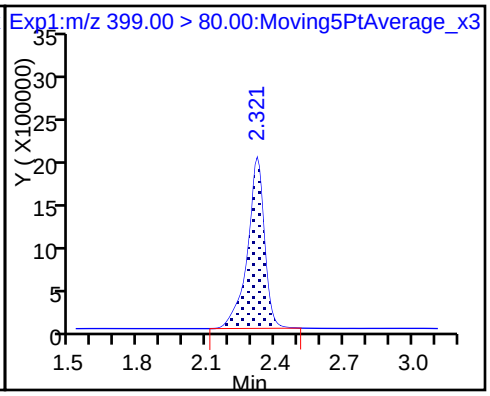
10 Perfluoroheptanoic acid



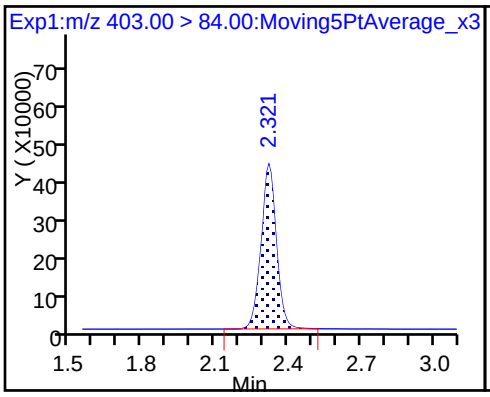
D 9 13C4-PFHpA



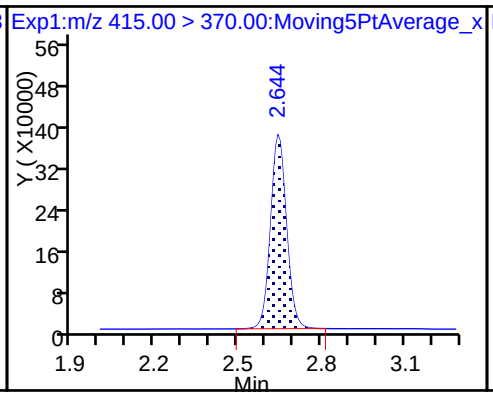
8 Perfluorohexanesulfonic acid



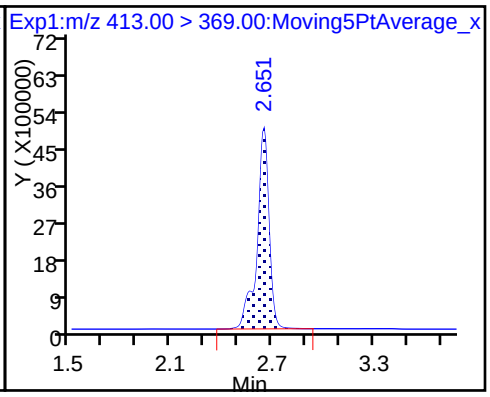
D 11 18O2 PFHxS



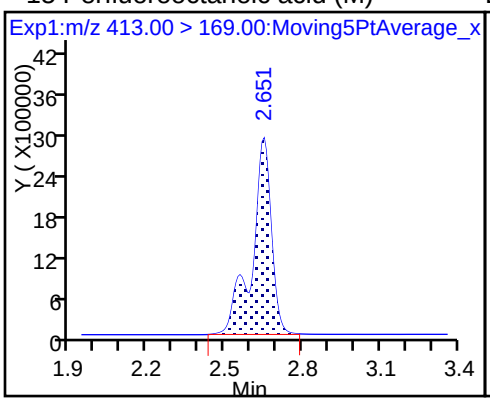
* 62 13C2-PFOA



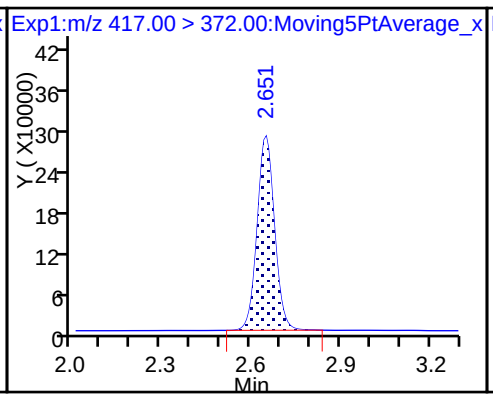
15 Perfluorooctanoic acid



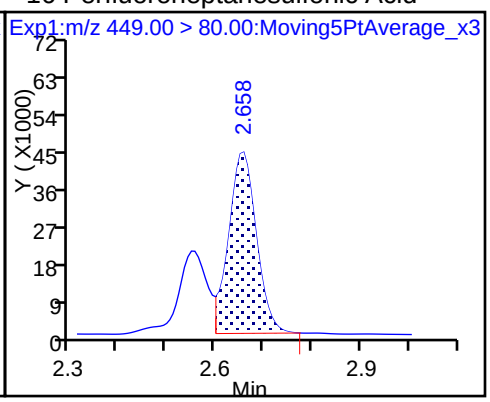
15 Perfluorooctanoic acid (M)



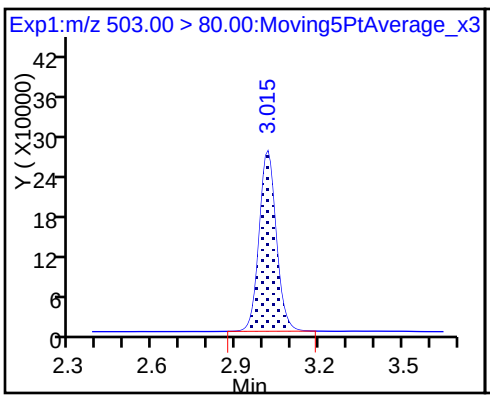
D 14 13C4 PFOA



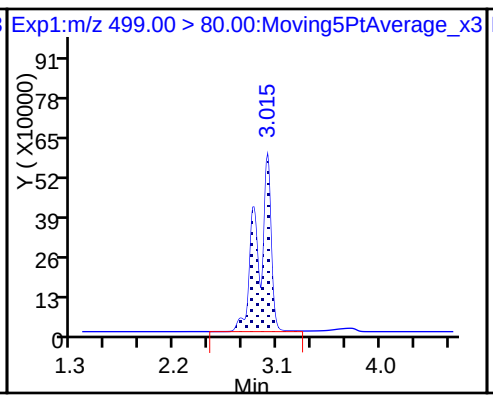
16 Perfluoroheptanesulfonic Acid



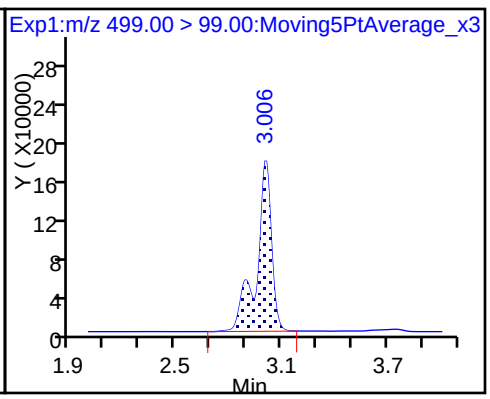
D 18 13C4 PFOS



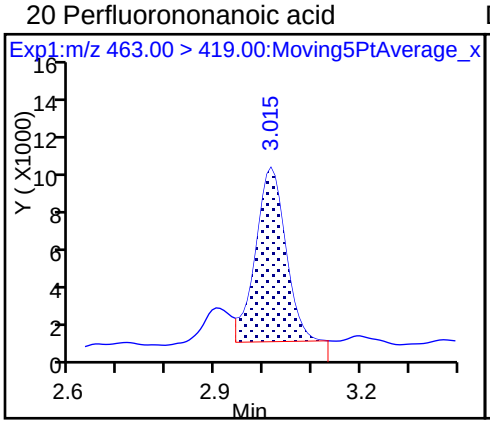
17 Perfluorooctane sulfonic acid



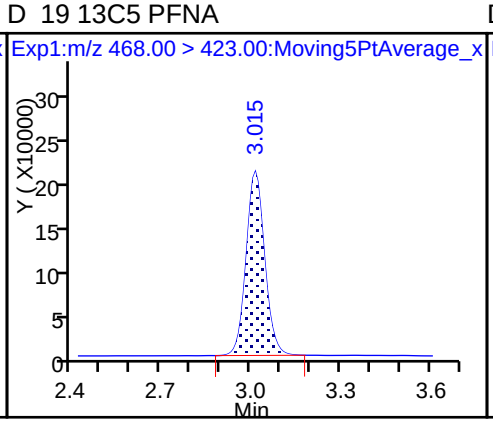
17 Perfluorooctane sulfonic acid



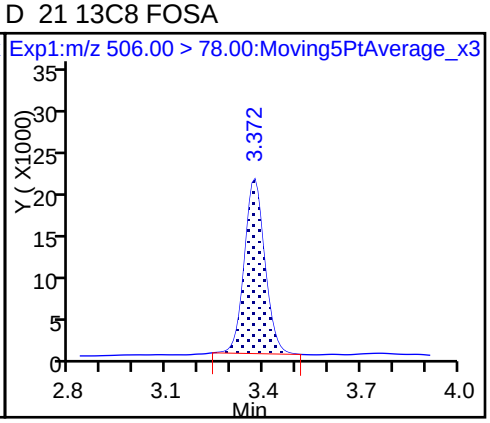
20 Perfluorononanoic acid



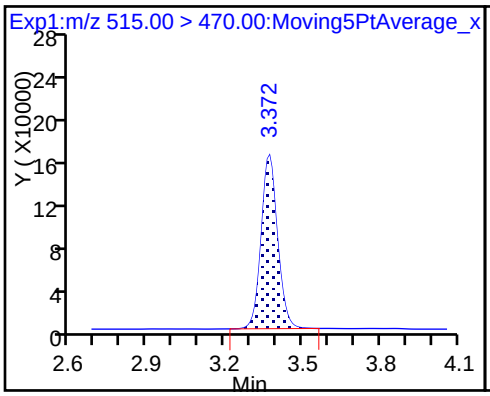
D 19 13C5 PFNA



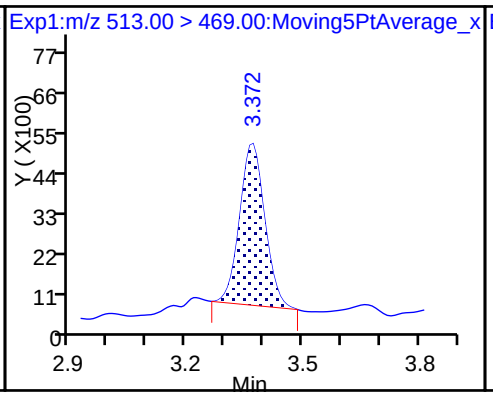
D 21 13C8 FOSA



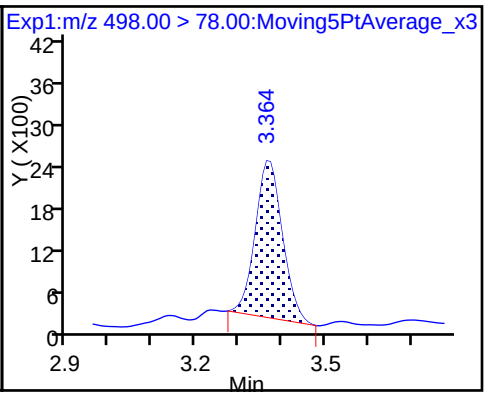
D 23 13C2 PFDA



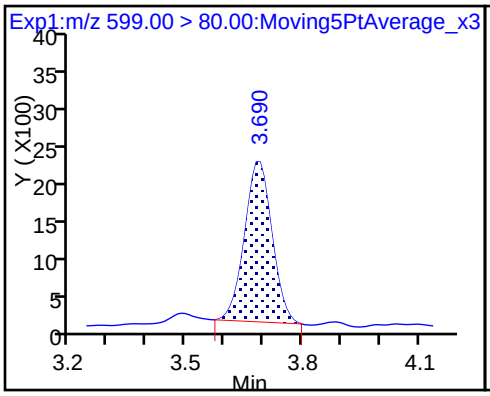
24 Perfluorodecanoic acid



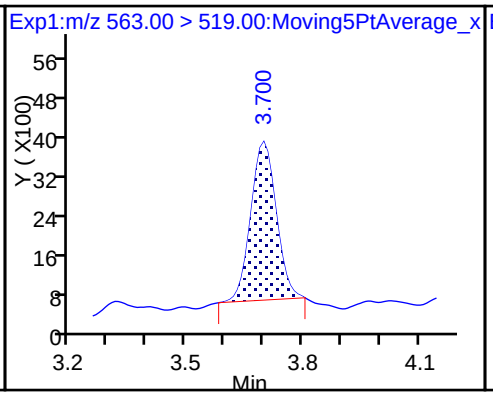
22 Perfluorooctane Sulfonamide



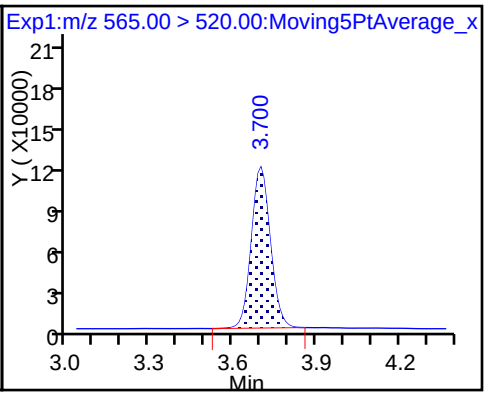
29 Perfluorodecane Sulfonic acid



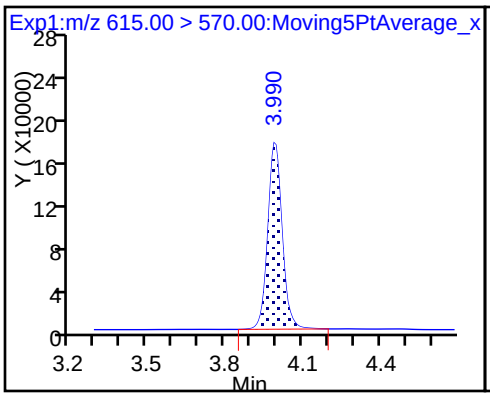
31 Perfluoroundecanoic acid



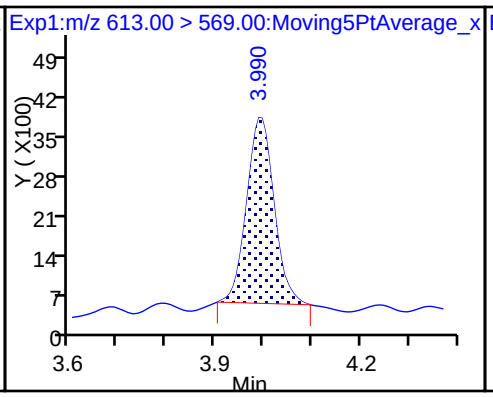
D 30 13C2 PFUnA



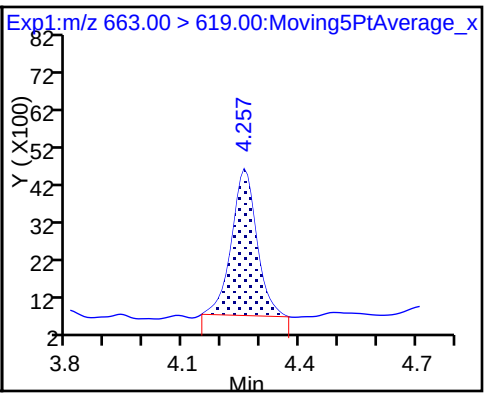
D 36 13C2 PFDoA



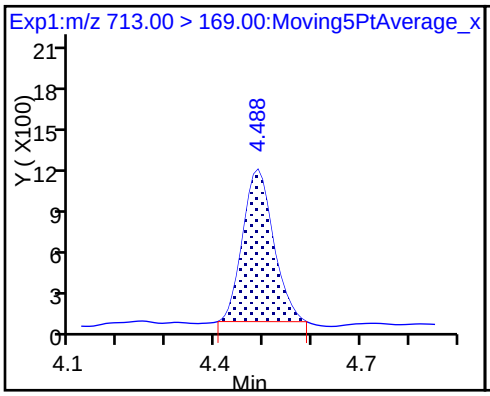
37 Perfluorododecanoic acid



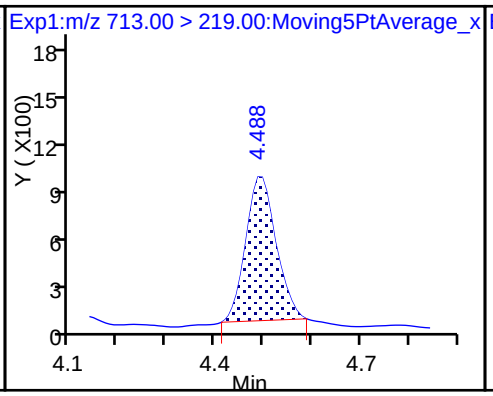
41 Perfluorotridecanoic acid



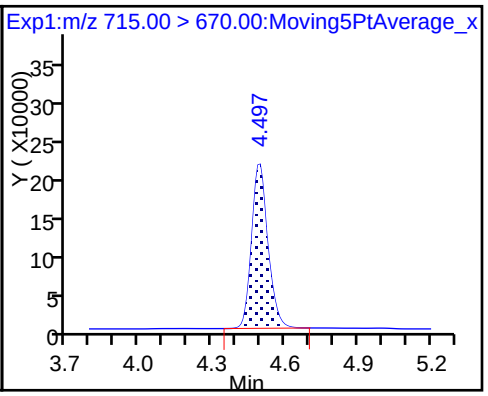
42 Perfluorotetradecanoic acid



42 Perfluorotetradecanoic acid



D 43 13C2-PFTeDA



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

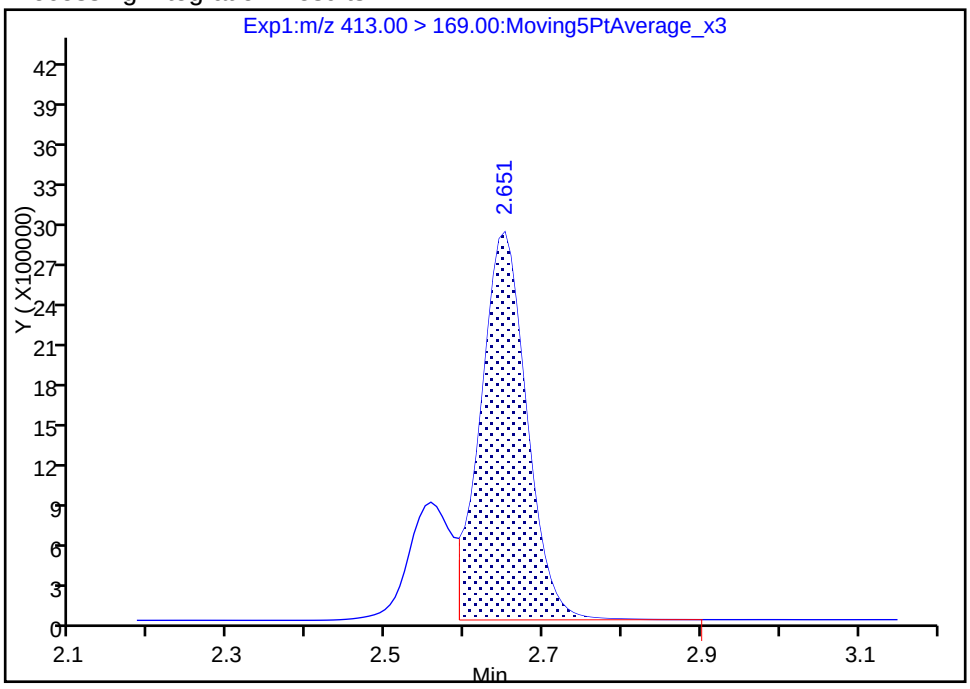
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_020.d				
Injection Date:	31-Oct-2017 02:32:17	Instrument ID:	A8_N		
Lims ID:	320-32321-A-1-A	Lab Sample ID:	320-32321-1		
Client ID:	TP-PFC-022-TPI				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	17	Worklist Smp#:	6
Injection Vol:	2.0 ul	Dil. Factor:	10.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

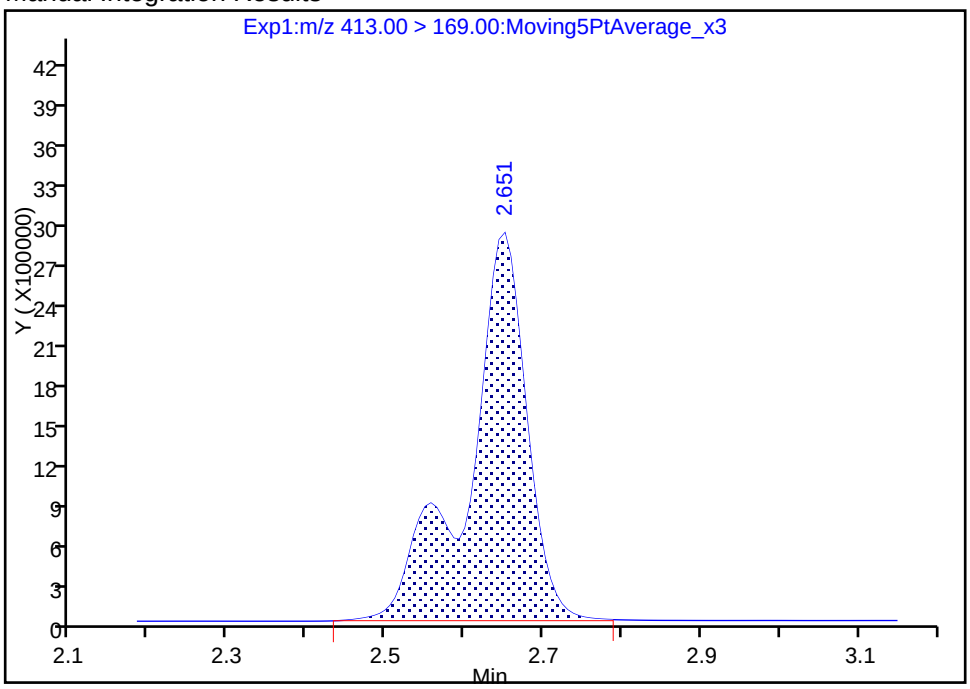
Processing Integration Results

RT: 2.65
Area: 11783714
Amount: 96.905216
Amount Units: ng/ml



Manual Integration Results

RT: 2.65
Area: 15119820
Amount: 96.905216
Amount Units: ng/ml



Reviewer: phomsophat, 31-Oct-2017 09:49:04

Audit Action: Manually Integrated Audit Reason: Assign Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE | Lab Sample ID: 320-32321-2

Matrix: Water | Lab File ID: 2017.10.30AAA_021.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:50

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 259.2(mL) | Date Analyzed: 10/31/2017 02:39

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	130		2.4	0.96	0.44
2706-90-3	Perfluoropentanoic acid (PFPeA)	48		2.4	1.9	0.95
307-24-4	Perfluorohexanoic acid (PFHxA)	8.6		2.4	1.9	0.76
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
335-67-1	Perfluorooctanoic acid (PFOA)	1.4	J	2.4	1.9	0.72
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
335-76-2	Perfluorodecanoic acid (PFDA)	0.96	U	2.4	0.96	0.42
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.72
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	1.9	0.53
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.96	U	2.4	0.96	0.39
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	1.9	0.62

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE | Lab Sample ID: 320-32321-2

Matrix: Water | Lab File ID: 2017.10.30AAA_021.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:50

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 259.2(mL) | Date Analyzed: 10/31/2017 02:39

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	4	Q	25-150
STL00992	13C4 PFBA	76		25-150
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	85		25-150
STL00995	13C5 PFNA	71		25-150
STL00996	13C2 PFDA	66		25-150
STL00997	13C2 PFUnA	69		25-150
STL00998	13C2 PFDoA	69		25-150
STL00994	18O2 PFHxS	107		25-150
STL00991	13C4 PFOS	95		25-150
STL02116	13C2-PFTeDA	84		25-150
STL01892	13C4-PFHpA	93		25-150
STL01893	13C5 PFPeA	83		25-150
STL02337	13C3-PFBS	100		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_021.d
Lims ID: 320-32321-A-2-A
Client ID: TP-PFC-022-TPE
Sample Type: Client
Inject. Date: 31-Oct-2017 02:39:11 ALS Bottle#: 18 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32321-a-2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:50:54 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:50:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.528	1.529	-0.001		13241344	37.8		75.5	34812	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	16909221	67.1			1616	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.718	1.737	-0.019	1.000	4994844	24.9			5120	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.737	-0.001		9325690	41.3		82.7	67630	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		232824	46.3		99.6	7750	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	42999	0.1185			99.3	
298.90 > 99.00	1.755	1.755	0.0	1.000	20599		2.09(0.00-0.00)		67.2	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.972	1.984	-0.012	1.000	899376	4.44			818	
D 7 13C2 PFHxA										
315.00 > 270.00	1.983	1.984	-0.001		10600115	43.7		87.5	32192	
D 9 13C4-PFHpA										
367.00 > 322.00	2.300	2.308	-0.008		11292655	46.3		92.7	26876	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.322	2.318	0.004	1.000	102380	0.3077			481	
D 11 18O2 PFHxS										
403.00 > 84.00	2.322	2.318	0.004		15222353	50.6		107	22751	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		13721196	50.0			26292	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.644	2.644	0.0	1.000	160593	0.7327			92.5	
413.00 > 169.00	2.644	2.644	0.0	1.000	98907		1.62(0.90-1.10)		141	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 14 13C4 PFOA										
417.00 > 372.00	2.644	2.644	0.0		10201567	42.7		85.5	17854	
D 18 13C4 PFOS										
503.00 > 80.00	3.014	3.014	0.0		9575042	45.2		94.5	11567	
20 Perfluorononanoic acid										
463.00 > 419.00	3.014	3.014	0.0	1.000	3565	0.0255			7.8	
D 19 13C5 PFNA										
468.00 > 423.00	3.014	3.014	0.0		7211142	35.7		71.5	9701	
D 21 13C8 FOSA										
506.00 > 78.00	3.370	3.372	-0.002		643049	2.07		4.1	5258	
D 23 13C2 PFDA										
515.00 > 470.00	3.370	3.372	-0.002		6056237	33.2		66.4	26558	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.378	3.372	0.006	1.000	3981	0.0350			30.5	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.370	3.372	-0.002	1.000	3706	0.3058			80.5	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.685	3.679	0.006	1.000	1540	0.0119			9.9	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.695	3.698	-0.003	1.000	12543	0.1166			76.5	
D 30 13C2 PFUnA										
565.00 > 520.00	3.704	3.698	0.006		5041047	34.6		69.2	10148	
D 36 13C2 PFDoA										
615.00 > 570.00	3.993	3.989	0.004		5772883	34.4		68.8	12731	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.993	3.995	-0.002	1.000	3334	0.0314			35.7	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.261	4.257	0.004	1.000	5481	0.0459			7.0	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.491	4.488	0.003	1.000	3634	0.0956			170	
713.00 > 219.00	4.500	4.488	0.012	1.002	1982		1.83(0.00-0.00)		59.9	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.491	4.488	0.003		8553497	41.8		83.6	8278	

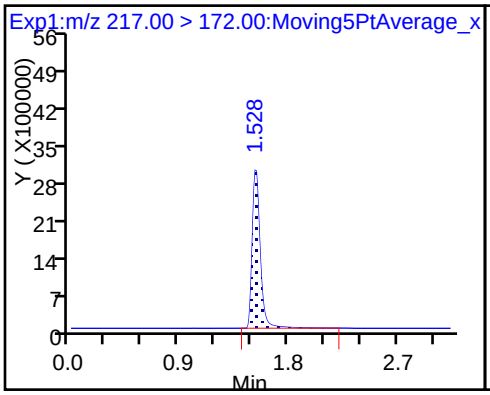
Report Date: 31-Oct-2017 09:50:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

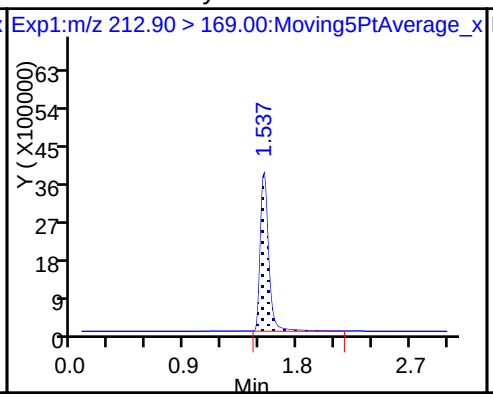
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_021.d

Injection Date:	31-Oct-2017 02:39:11	Instrument ID:	A8_N		
Lims ID:	320-32321-A-2-A	Lab Sample ID:	320-32321-2		
Client ID:	TP-PFC-022-TPE				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	18	Worklist Smp#:	7
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

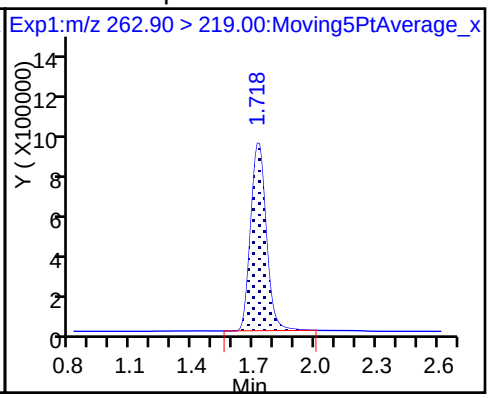
D 1 13C4 PFBA



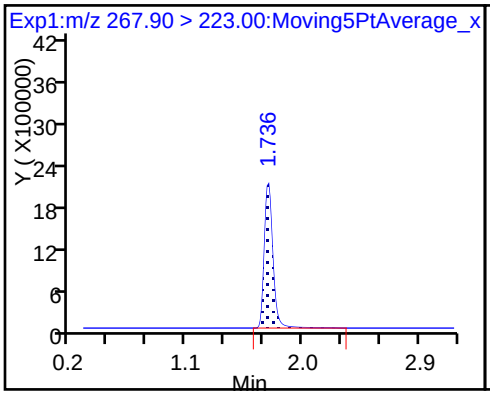
2 Perfluorobutyric acid



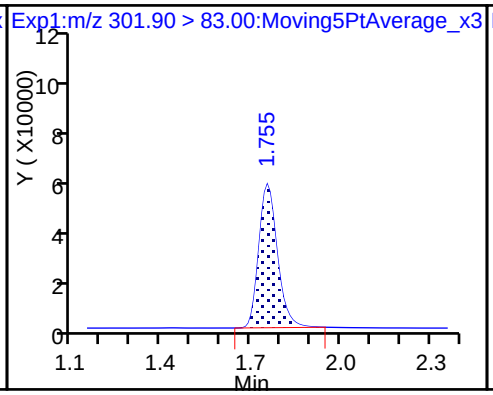
4 Perfluoropentanoic acid



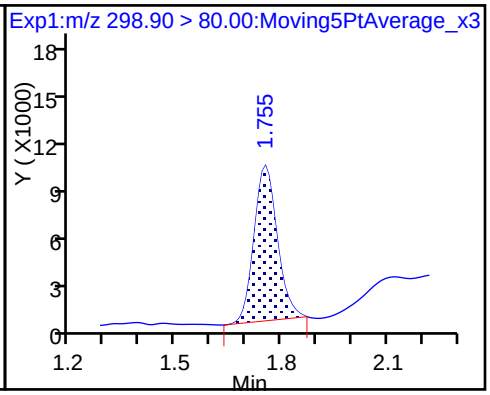
D 3 13C5-PFPeA



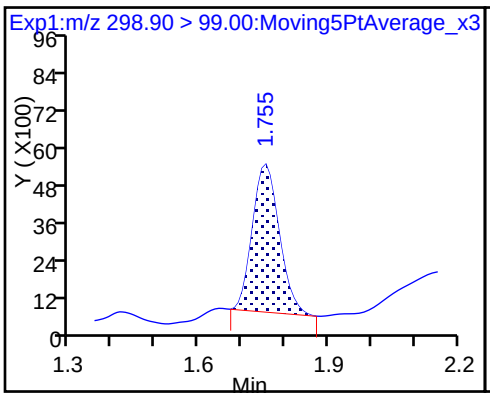
D 47 13C3-PFBS



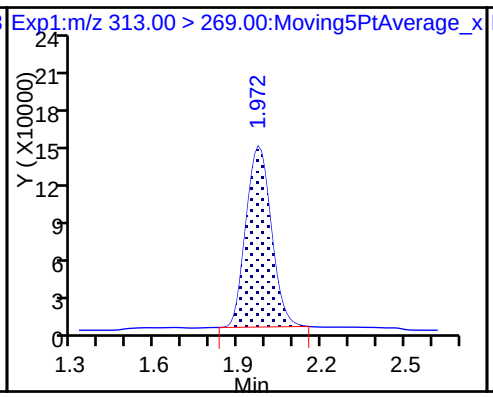
5 Perfluorobutanesulfonic acid



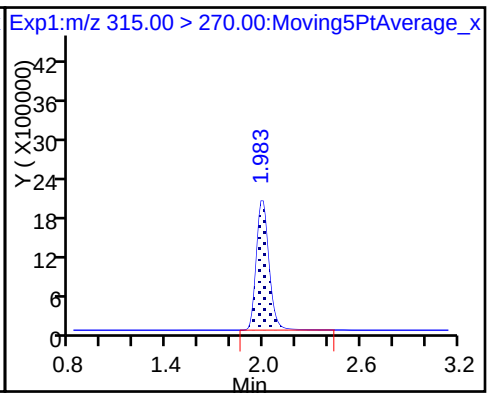
5 Perfluorobutanesulfonic acid



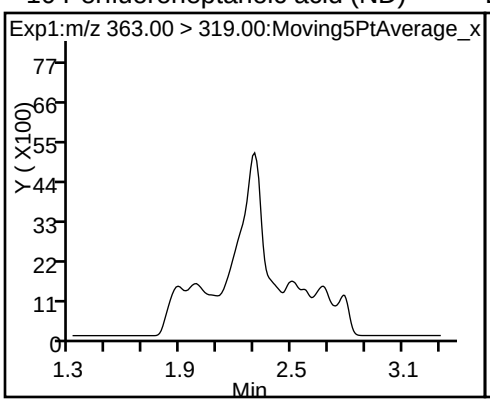
6 Perfluorohexanoic acid



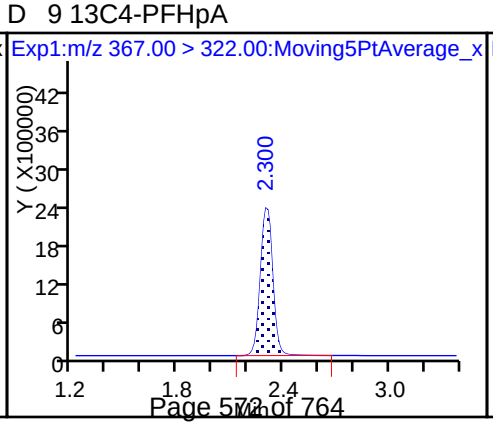
D 7 13C2 PFHxA



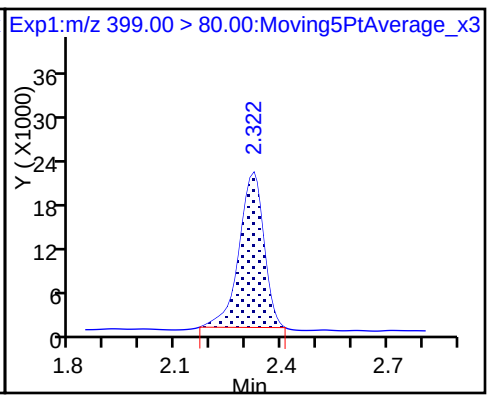
10 Perfluoroheptanoic acid (ND)



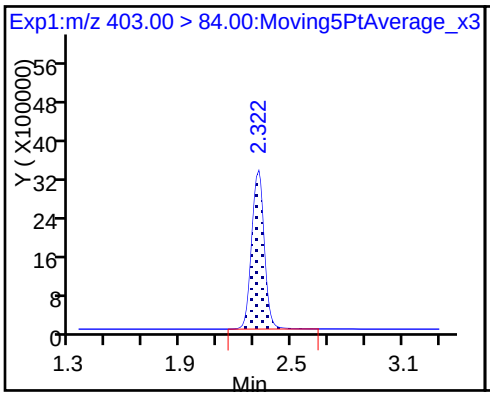
D 9 13C4-PFHpA



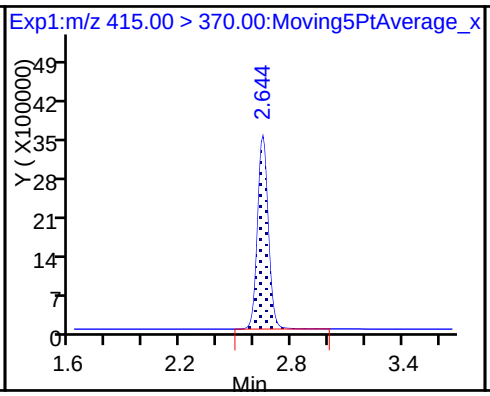
8 Perfluorohexanesulfonic acid



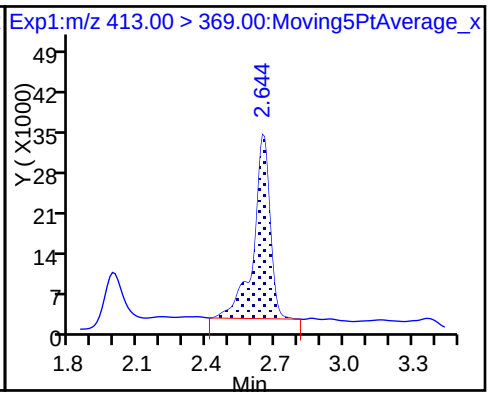
D 11 18O2 PFHxS



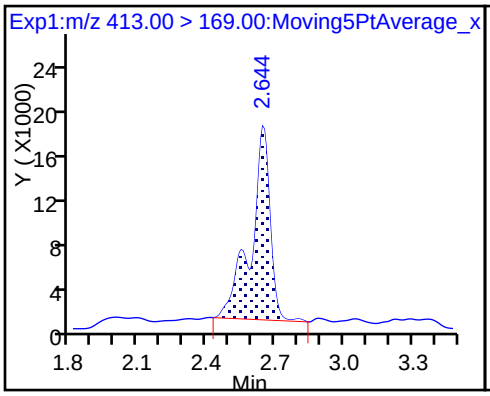
* 62 13C2-PFOA



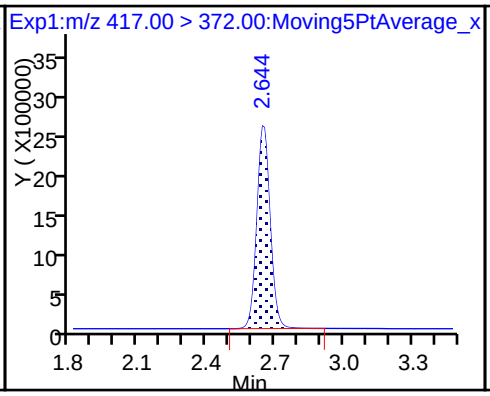
15 Perfluorooctanoic acid



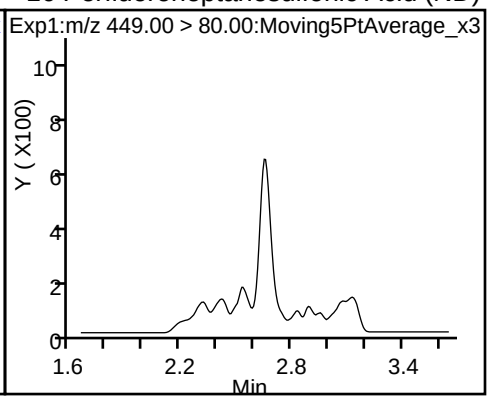
15 Perfluorooctanoic acid



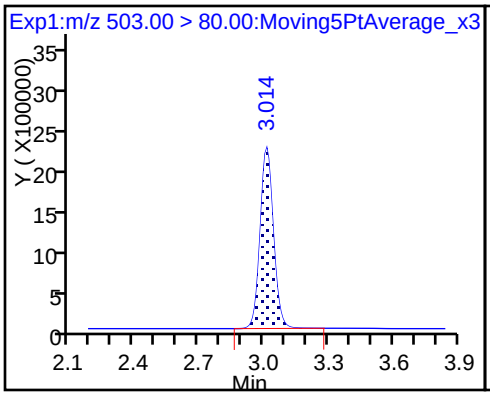
D 14 13C4 PFOA



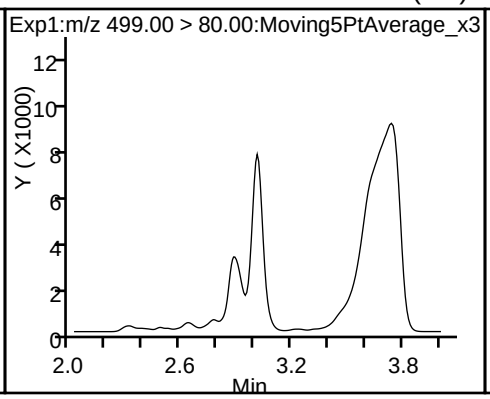
16 Perfluoroheptanesulfonic Acid (ND)



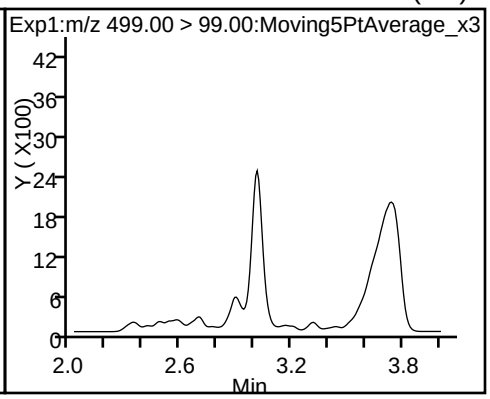
D 18 13C4 PFOS



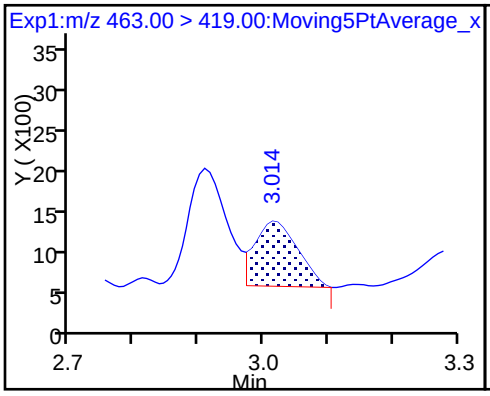
17 Perfluorooctane sulfonic acid (ND)



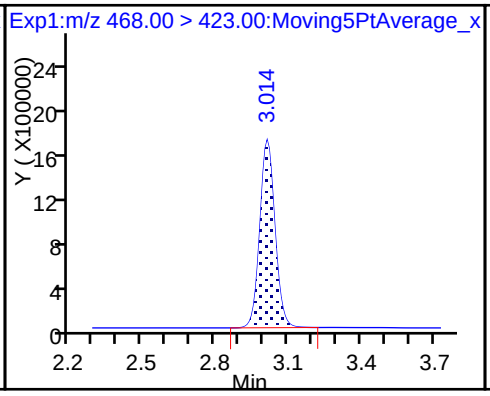
17 Perfluorooctane sulfonic acid (ND)



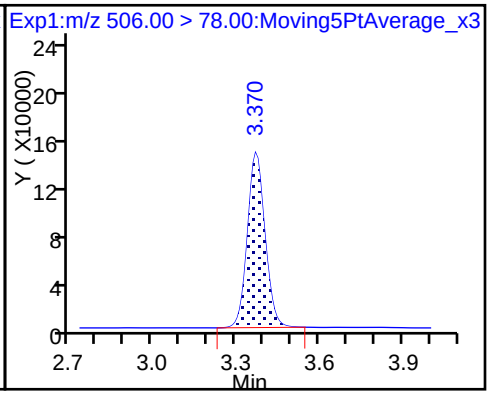
20 Perfluorononanoic acid



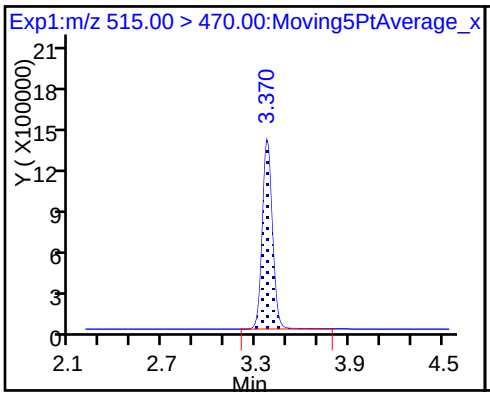
D 19 13C5 PFNA



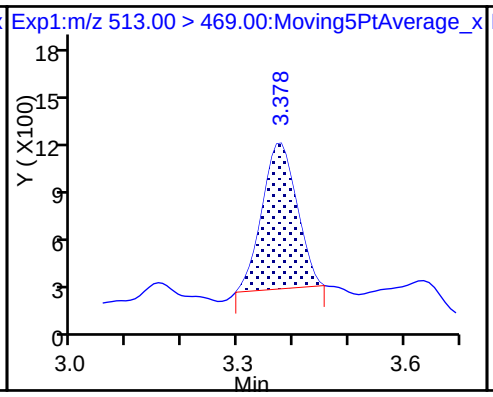
D 21 13C8 FOSA



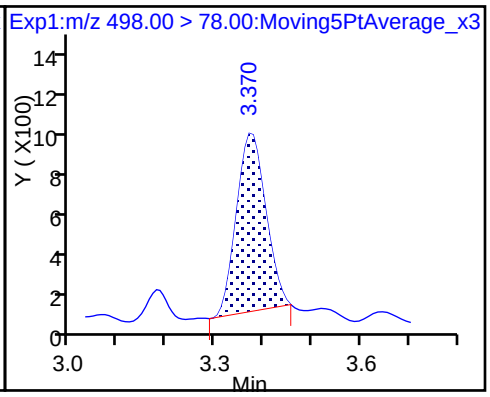
D 23 13C2 PFDA



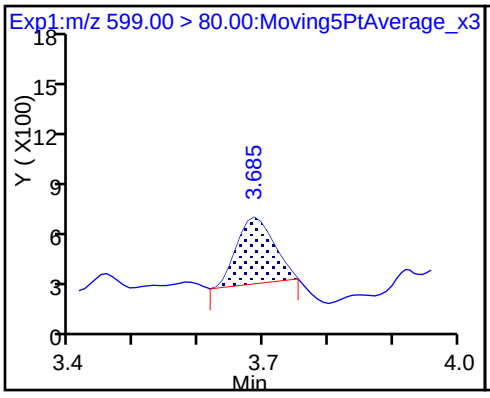
24 Perfluorodecanoic acid



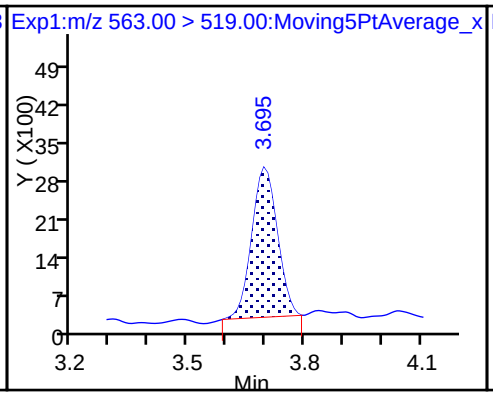
22 Perfluorooctane Sulfonamide



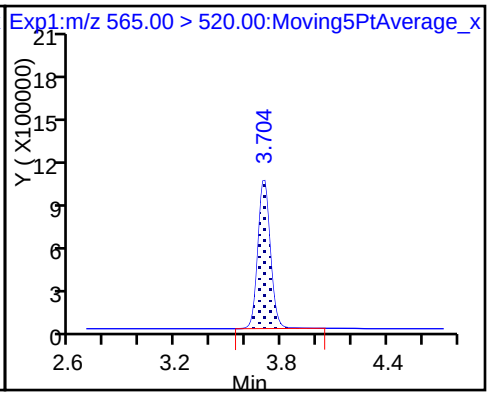
29 Perfluorodecane Sulfonic acid



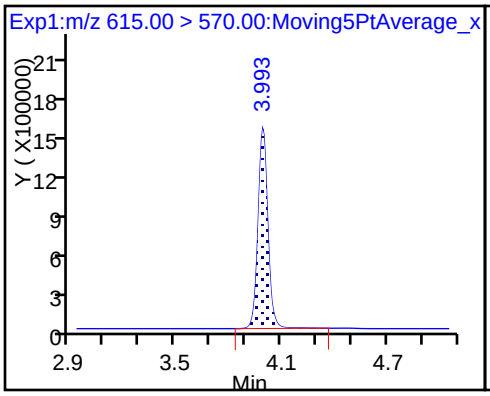
31 Perfluoroundecanoic acid



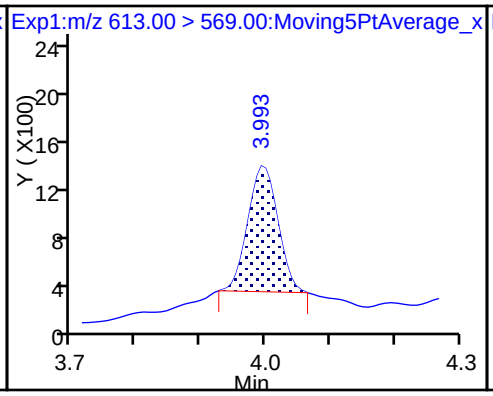
D 30 13C2 PFUnA



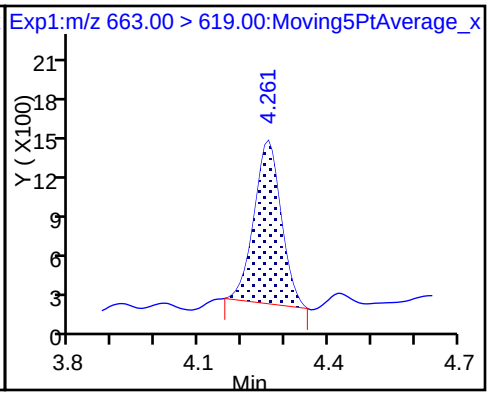
D 36 13C2 PFDoA



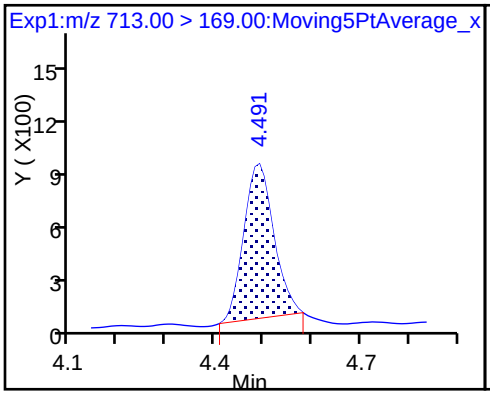
37 Perfluorododecanoic acid



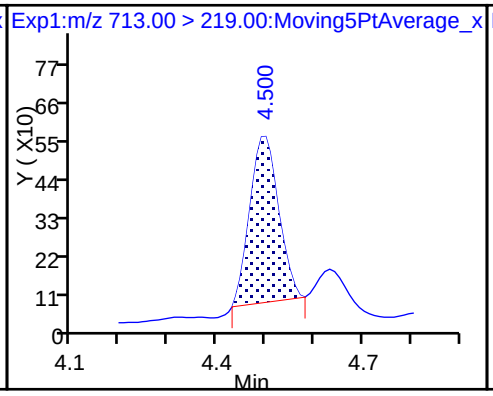
41 Perfluorotridecanoic acid



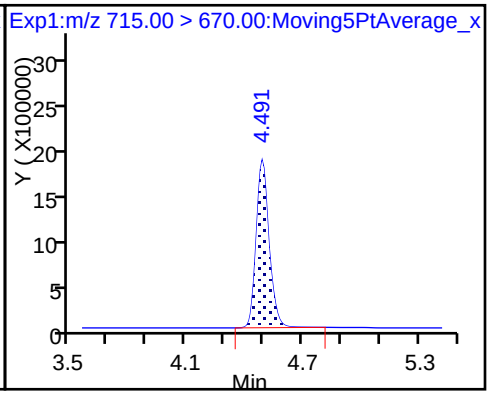
42 Perfluorotetradecanoic acid



42 Perfluorotetradecanoic acid



D 43 13C2-PFTeDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-MID-CARBON | Lab Sample ID: 320-32321-3

Matrix: Water | Lab File ID: 2017.10.30AAA_022.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:45

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 253.1(mL) | Date Analyzed: 10/31/2017 02:46

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	150		2.5	0.99	0.45
2706-90-3	Perfluoropentanoic acid (PFPeA)	63		2.5	2.0	0.98
307-24-4	Perfluorohexanoic acid (PFHxA)	5.5		2.5	2.0	0.78
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79
335-67-1	Perfluorooctanoic acid (PFOA)	0.83	J M	2.5	2.0	0.74
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	0.99	U	2.5	0.99	0.43
2058-94-8	Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	2.0	0.74
307-55-1	Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	2.0	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.99	U	2.5	0.99	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.91
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	2.0	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	2.0	0.63

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-MID-CARBON | Lab Sample ID: 320-32321-3

Matrix: Water | Lab File ID: 2017.10.30AAA_022.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:45

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 253.1(mL) | Date Analyzed: 10/31/2017 02:46

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	3	Q	25-150
STL00992	13C4 PFBA	83		25-150
STL00993	13C2 PFHxA	96		25-150
STL00990	13C4 PFOA	90		25-150
STL00995	13C5 PFNA	84		25-150
STL00996	13C2 PFDA	81		25-150
STL00997	13C2 PFUnA	79		25-150
STL00998	13C2 PFDoA	84		25-150
STL00994	18O2 PFHxS	107		25-150
STL00991	13C4 PFOS	98		25-150
STL02116	13C2-PFTeDA	97		25-150
STL01892	13C4-PFHpA	97		25-150
STL01893	13C5 PFPeA	90		25-150
STL02337	13C3-PFBS	102		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_022.d
Lims ID: 320-32321-A-3-A
Client ID: TP-PFC-022-MID-CARBON
Sample Type: Client
Inject. Date: 31-Oct-2017 02:46:05 ALS Bottle#: 19 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32321-a-3-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 10:01:33 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 10:01:33

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.529	0.008		14513603	41.4		82.8	28089	
2 Perfluorobutyric acid										
212.90 > 169.00	1.545	1.537	0.008	1.000	20610779	74.6			1221	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.727	1.737	-0.010	1.000	6899780	31.7			6436	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.737	-0.001		10119181	44.9		89.7	70447	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.755	0.009		238013	47.3		102	6814	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	10540	0.0284			23.7	
298.90 > 99.00	1.755	1.755	0.0	1.000	5098		2.07(0.00-0.00)		18.1	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.960	1.984	-0.024	1.000	619842	2.79			509	
D 7 13C2 PFHxA										
315.00 > 270.00	1.994	1.984	0.010		11625591	48.0		96.0	44209	
D 9 13C4-PFHpA										
367.00 > 322.00	2.312	2.308	0.004		11856721	48.6		97.3	24245	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.331	2.318	0.013	1.000	54369	0.1632			274	
D 11 18O2 PFHxS										
403.00 > 84.00	2.323	2.318	0.005		15238857	50.6		107	23837	
* 62 13C2-PFOA										
415.00 > 370.00	2.647	2.644	0.003		13774754	50.0			15938	
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.604	2.644	-0.040	1.000	97069	0.4188			29.4	
413.00 > 169.00	2.654	2.644	0.010	1.019	29060		3.34(0.90-1.10)		34.6	M

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 14 13C4 PFOA										
417.00 > 372.00	2.654	2.644	0.010		10787688	45.2		90.4	13913	
D 18 13C4 PFOS										
503.00 > 80.00	3.018	3.014	0.004		9889723	46.7		97.6	8266	
D 19 13C5 PFNA										
468.00 > 423.00	3.018	3.014	0.004		8520876	42.2		84.5	10810	
D 21 13C8 FOSA										
506.00 > 78.00	3.373	3.372	0.001		395935	1.27		2.5	3664	
D 23 13C2 PFDA										
515.00 > 470.00	3.373	3.372	0.001		7389012	40.5		81.0	10970	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.373	3.372	0.001	1.000	1789	0.0129			17.2	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.710	3.698	0.012	1.000	13744	0.1113			97.0	
D 30 13C2 PFUnA										
565.00 > 520.00	3.700	3.698	0.002		5786119	39.7		79.4	4450	
D 36 13C2 PFDoA										
615.00 > 570.00	3.997	3.989	0.008		7085462	42.2		84.4	5502	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.997	3.995	0.002	1.000	3544	0.0272			39.4	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.258	4.257	0.001	1.000	3735	0.0255			5.3	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.489	4.488	0.001	1.000	2492	0.0563			98.5	
713.00 > 219.00	4.498	4.488	0.010	1.002	1780		1.40(0.00-0.00)		54.9	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.498	4.488	0.010		9951926	48.6		97.3	19289	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 31-Oct-2017 10:01:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_022.d

Injection Date: 31-Oct-2017 02:46:05 Instrument ID: A8_N

Lims ID: 320-32321-A-3-A Lab Sample ID: 320-32321-3

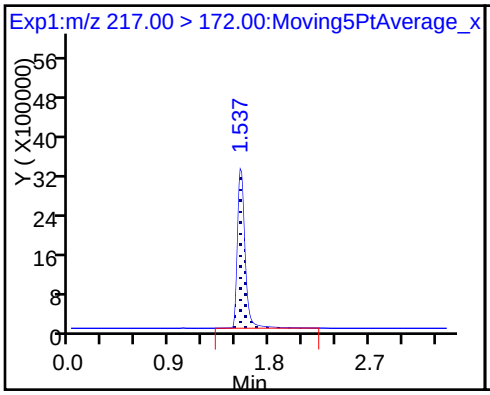
Client ID: TP-PFC-022-MID-CARBON

Operator ID: SACINSTLCMS01 ALS Bottle#: 19 Worklist Smp#: 8

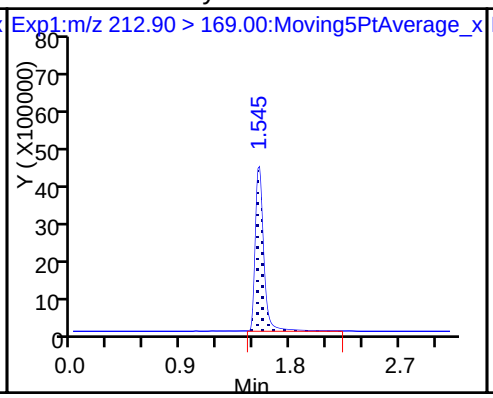
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

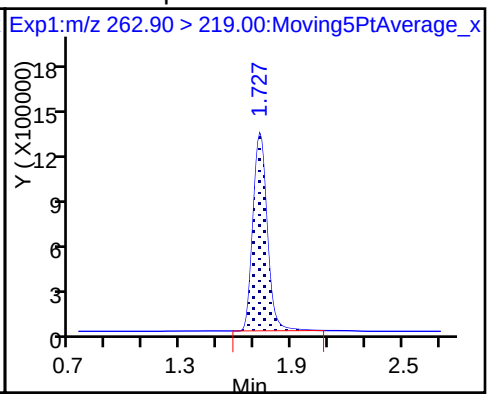
D 1 13C4 PFBA



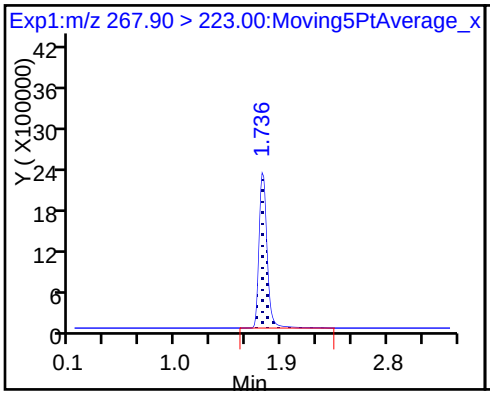
2 Perfluorobutyric acid



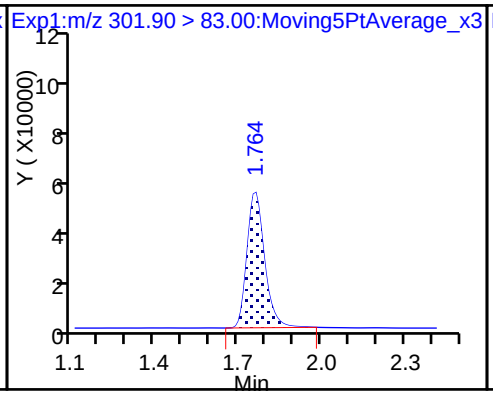
4 Perfluoropentanoic acid



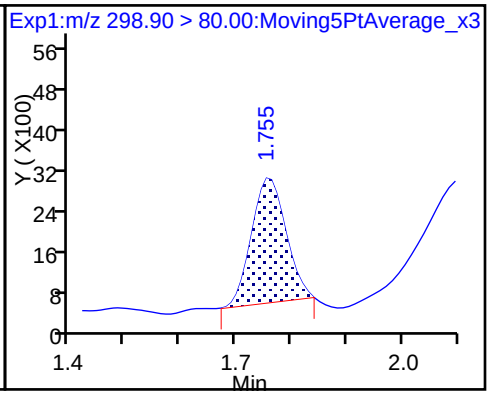
D 3 13C5-PFPeA



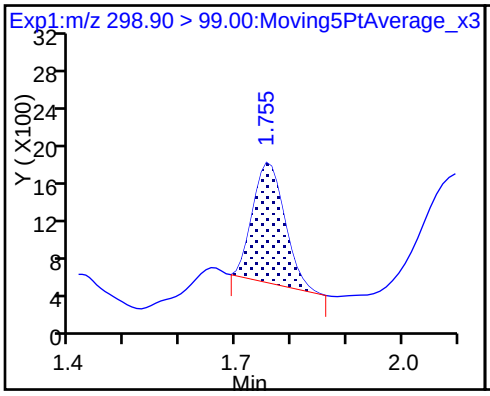
D 47 13C3-PFBS



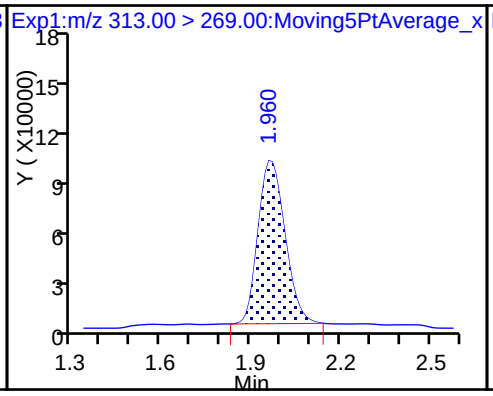
5 Perfluorobutanesulfonic acid



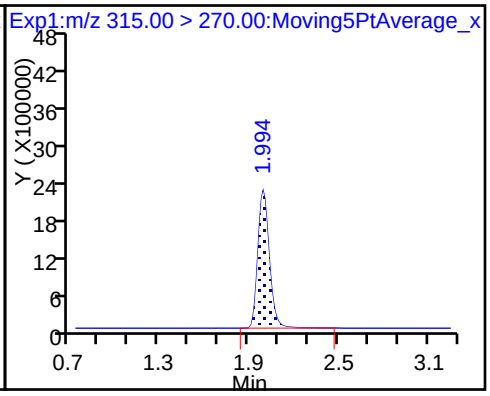
5 Perfluorobutanesulfonic acid



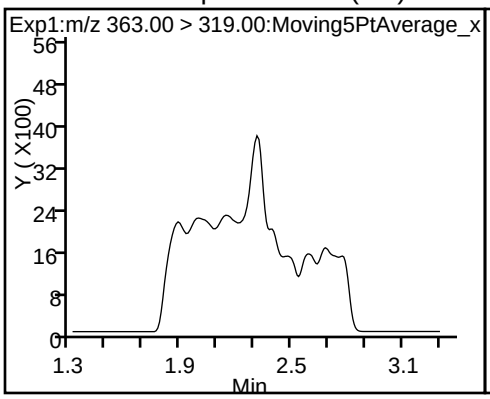
6 Perfluorohexanoic acid



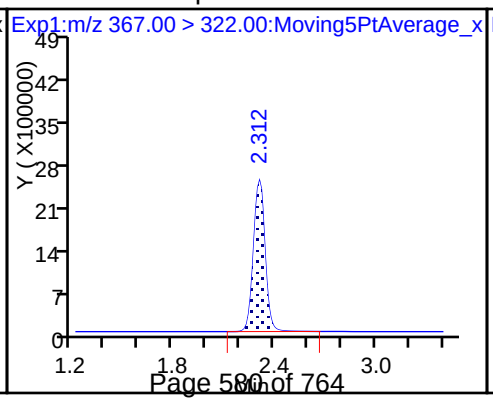
D 7 13C2 PFHxA



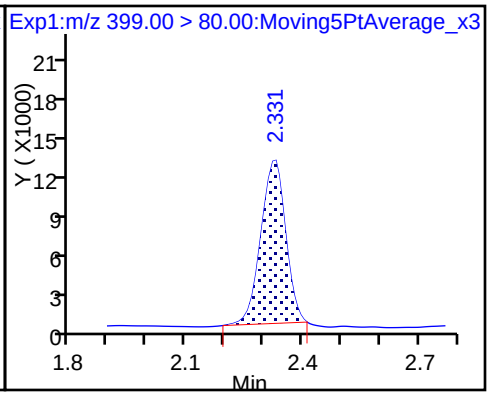
10 Perfluoroheptanoic acid (ND)



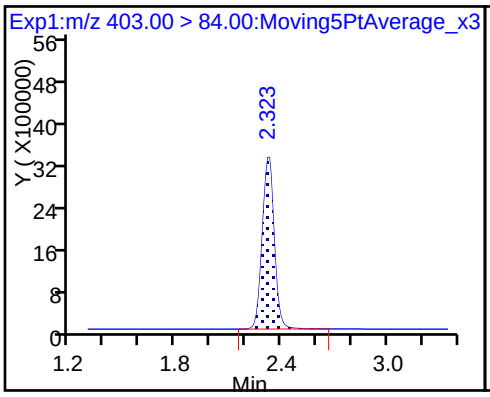
D 9 13C4-PFHpA



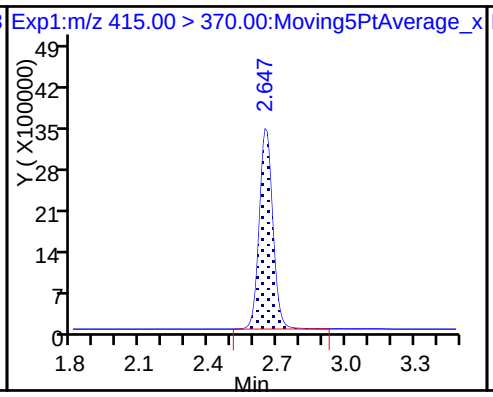
8 Perfluorohexanesulfonic acid



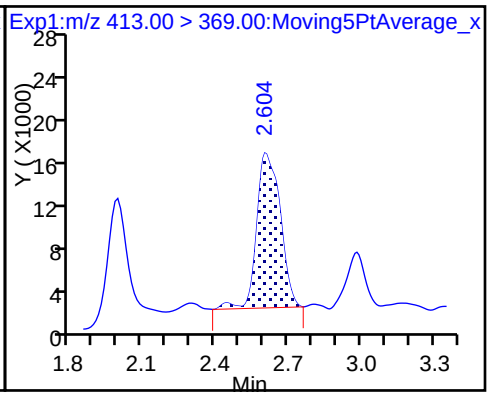
D 11 18O2 PFHxS



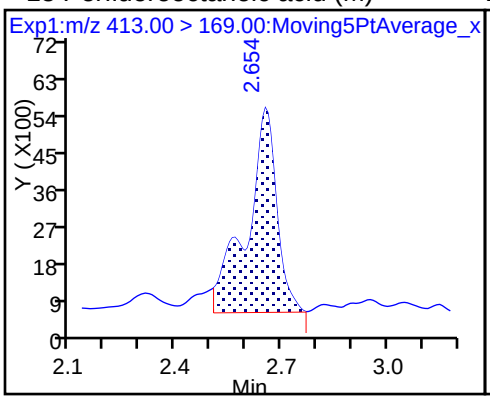
* 62 13C2-PFOA



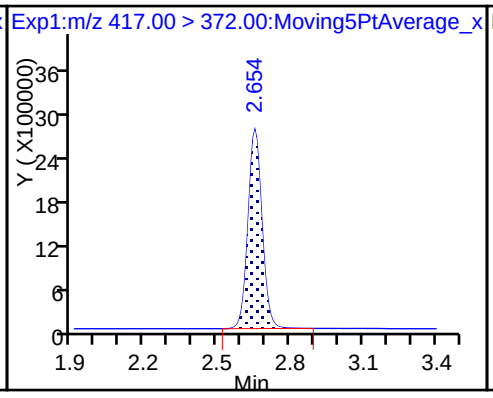
15 Perfluorooctanoic acid



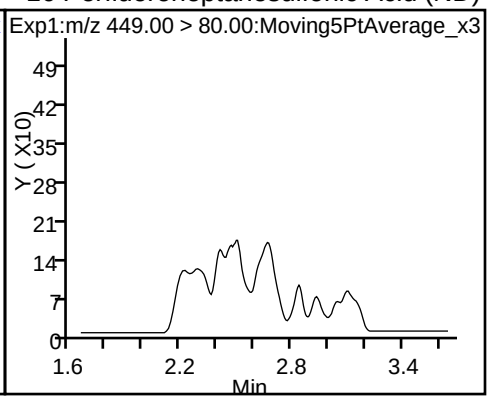
15 Perfluorooctanoic acid (M)



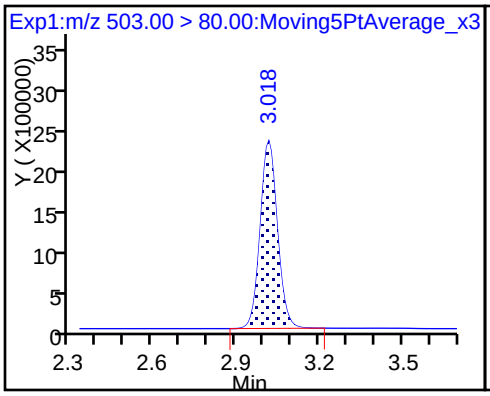
D 14 13C4 PFOA



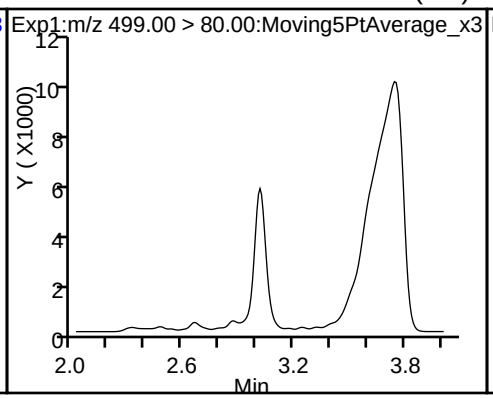
16 Perfluoroheptanesulfonic Acid (ND)



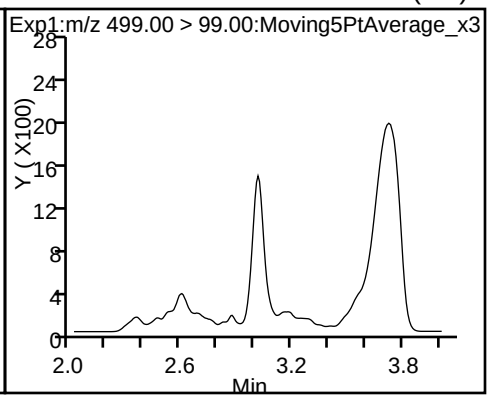
D 18 13C4 PFOS



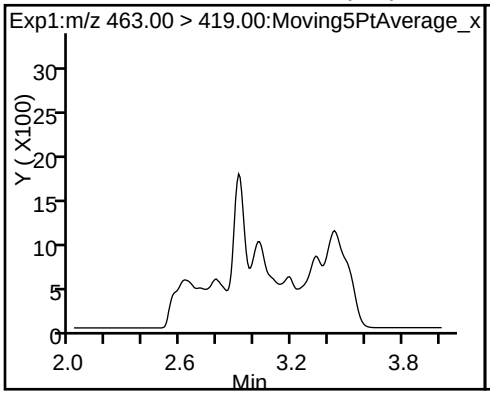
17 Perfluorooctane sulfonic acid (ND)



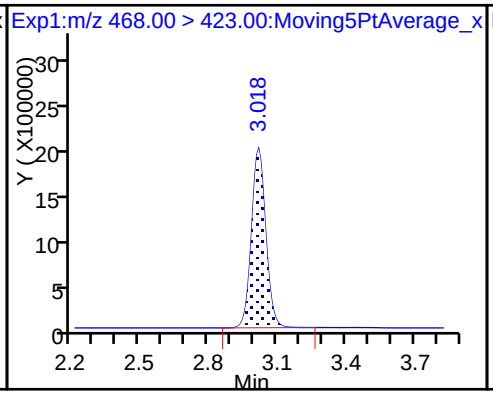
17 Perfluorooctane sulfonic acid (ND)



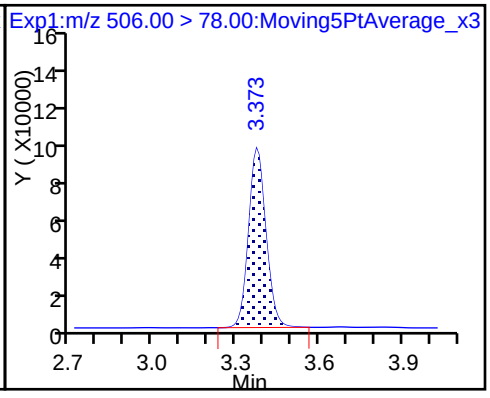
20 Perfluorononanoic acid (ND)



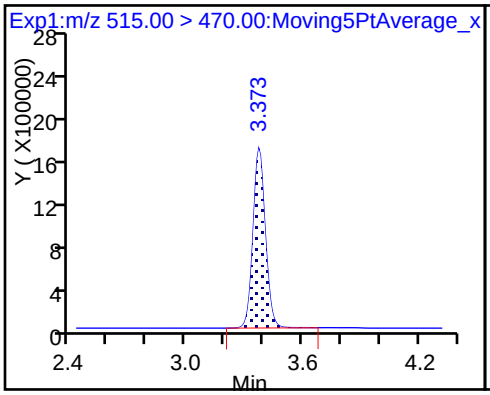
D 19 13C5 PFNA



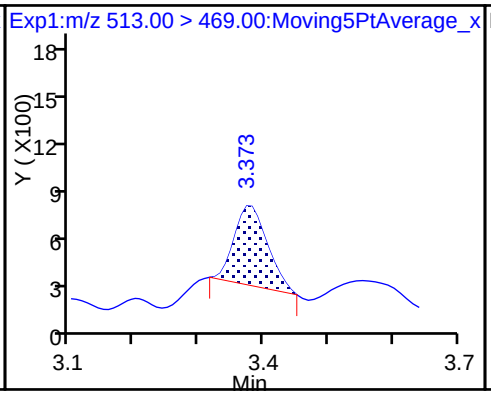
D 21 13C8 FOSA



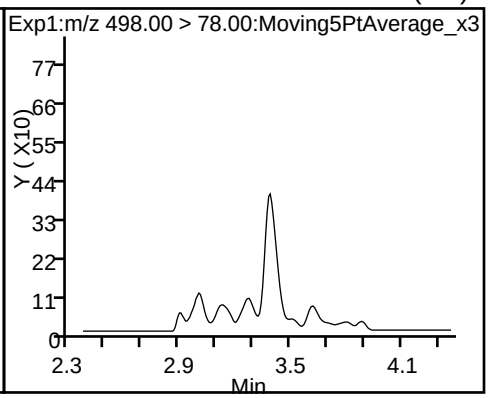
D 23 13C2 PFDA



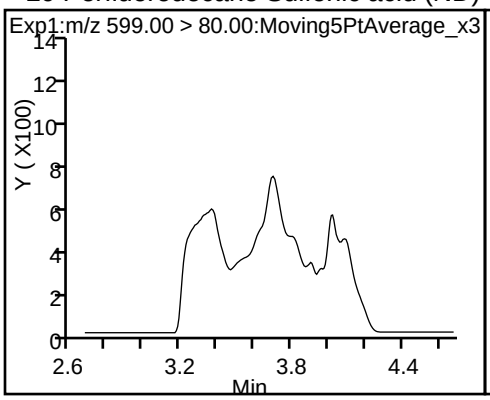
24 Perfluorodecanoic acid



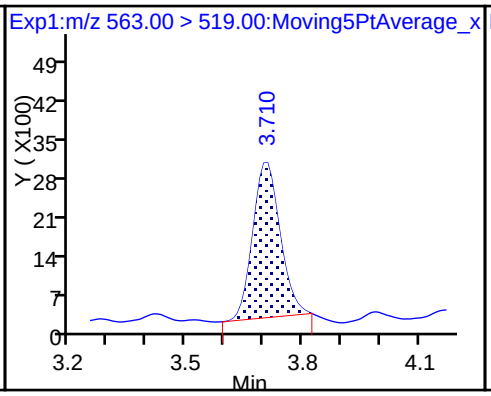
22 Perfluorooctane Sulfonamide (ND)



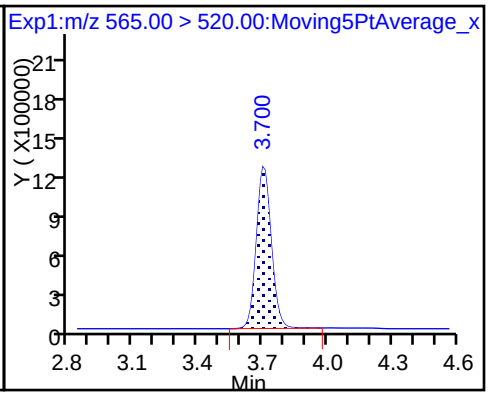
29 Perfluorodecane Sulfonic acid (ND)



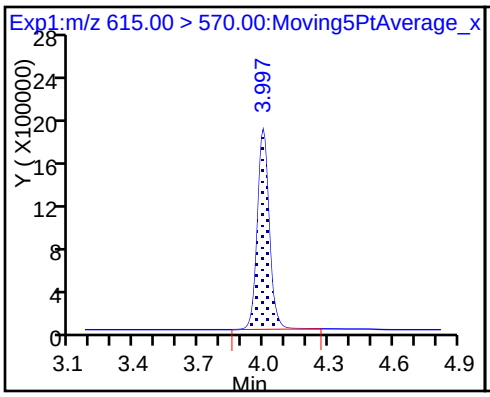
31 Perfluoroundecanoic acid



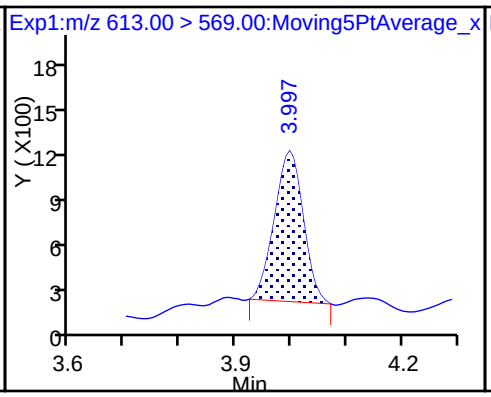
D 30 13C2 PFUnA



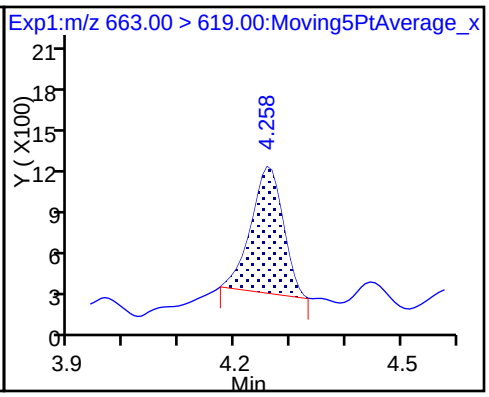
D 36 13C2 PFDoA



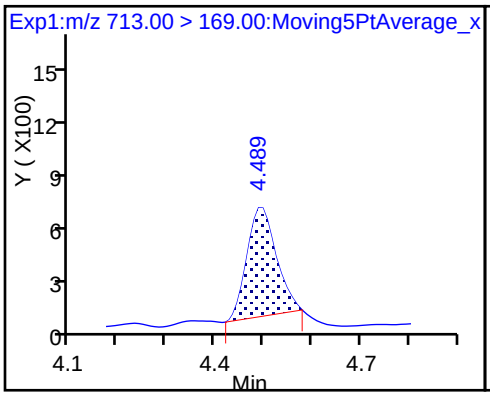
37 Perfluorododecanoic acid



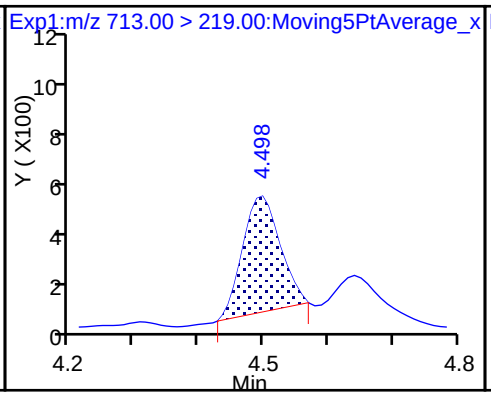
41 Perfluorotridecanoic acid



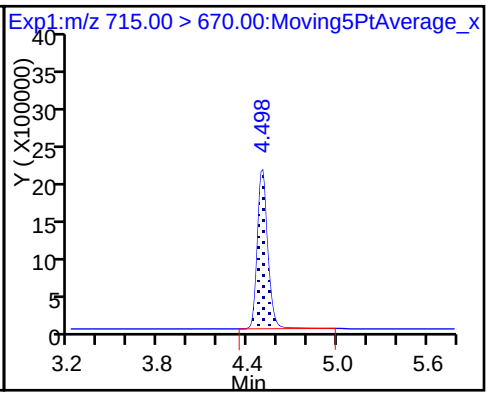
42 Perfluorotetradecanoic acid



42 Perfluorotetradecanoic acid



D 43 13C2-PFTeDA



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

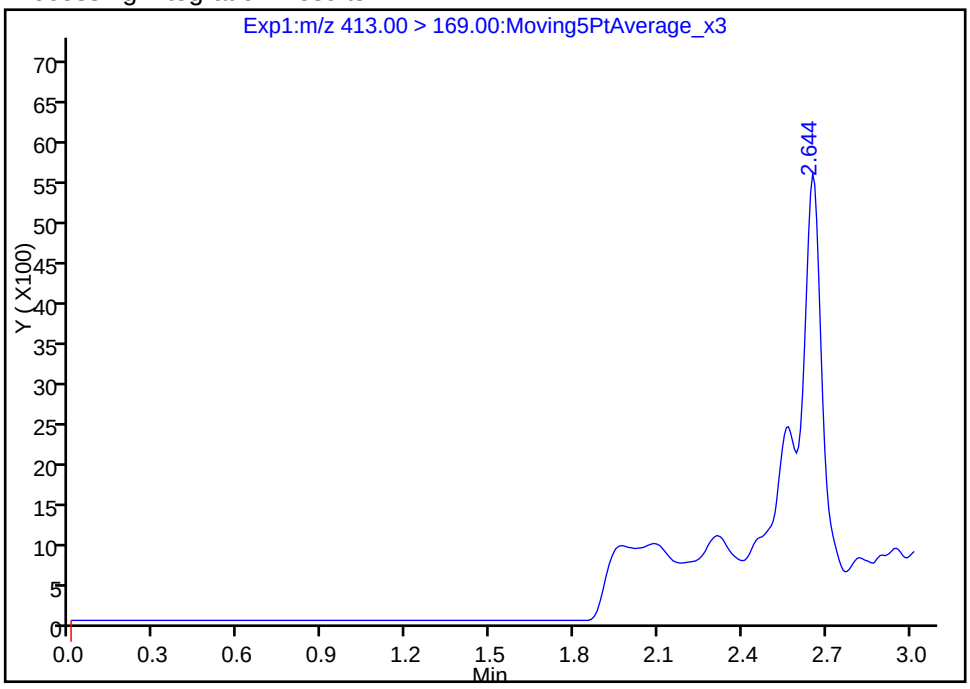
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_022.d				
Injection Date:	31-Oct-2017 02:46:05	Instrument ID:	A8_N		
Lims ID:	320-32321-A-3-A	Lab Sample ID:	320-32321-3		
Client ID:	TP-PFC-022-MID-CARBON				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	19	Worklist Smp#:	8
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

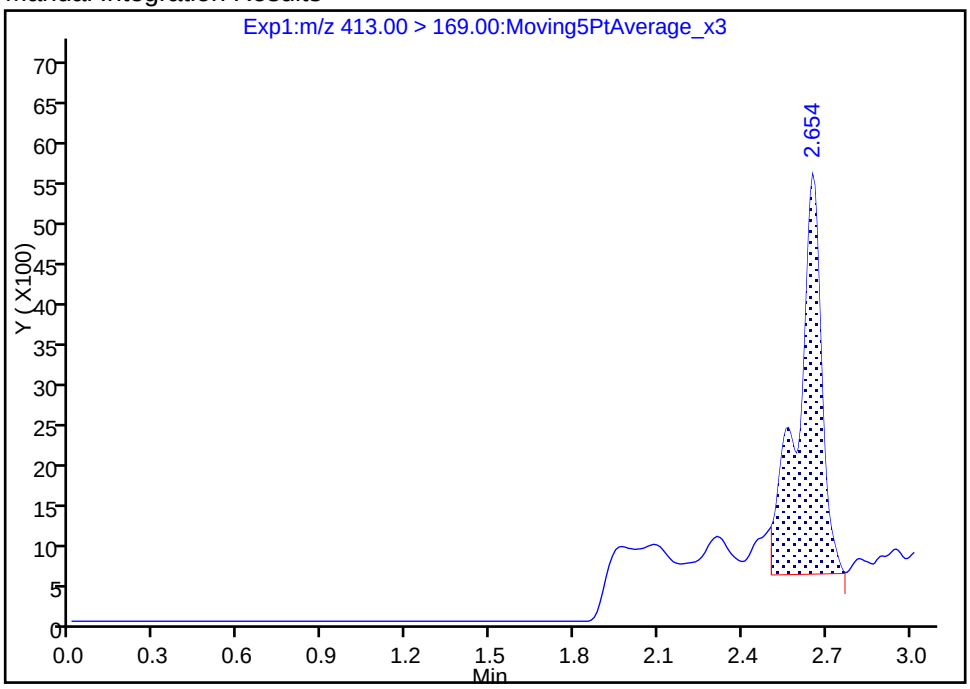
Processing Integration Results

RT: 2.64
Area: 0
Amount: 0.418810
Amount Units: ng/ml



Manual Integration Results

RT: 2.65
Area: 29060
Amount: 0.418810
Amount Units: ng/ml



Reviewer: phomsophat, 31-Oct-2017 09:51:32

Audit Action: Manually Integrated Audit Reason: Assign Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE-D | Lab Sample ID: 320-32321-4

Matrix: Water | Lab File ID: 2017.10.30AAA_023.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 00:00

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 257.3(mL) | Date Analyzed: 10/31/2017 02:52

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	130		2.4	0.97	0.45
2706-90-3	Perfluoropentanoic acid (PFPeA)	46		2.4	1.9	0.96
307-24-4	Perfluorohexanoic acid (PFHxA)	8.3		2.4	1.9	0.76
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.78
335-67-1	Perfluorooctanoic acid (PFOA)	0.76	J	2.4	1.9	0.73
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.64
335-76-2	Perfluorodecanoic acid (PFDA)	0.97	U	2.4	0.97	0.43
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.73
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.57
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	1.9	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.97	U	2.4	0.97	0.39
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.85
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	1.9	0.62

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE-D | Lab Sample ID: 320-32321-4

Matrix: Water | Lab File ID: 2017.10.30AAA_023.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 00:00

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 257.3(mL) | Date Analyzed: 10/31/2017 02:52

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	2	Q	25-150
STL00992	13C4 PFBA	82		25-150
STL00993	13C2 PFHxA	94		25-150
STL00990	13C4 PFOA	93		25-150
STL00995	13C5 PFNA	87		25-150
STL00996	13C2 PFDA	88		25-150
STL00997	13C2 PFUnA	81		25-150
STL00998	13C2 PFDoA	76		25-150
STL00994	18O2 PFHxS	106		25-150
STL00991	13C4 PFOS	96		25-150
STL02116	13C2-PFTeDA	91		25-150
STL01892	13C4-PFHpA	101		25-150
STL01893	13C5 PFPeA	91		25-150
STL02337	13C3-PFBS	100		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_023.d
Lims ID: 320-32321-A-4-A
Client ID: TP-PFC-022-TPE-D
Sample Type: Client
Inject. Date: 31-Oct-2017 02:52:58 ALS Bottle#: 20 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32321-a-4-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:56:44 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:56:53

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.533	1.529	0.004		14406472	41.1		82.2	17323	
2 Perfluorobutyric acid										
212.90 > 169.00	1.533	1.537	-0.004	1.000	18242642	66.5			1025	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.724	1.737	-0.013	1.000	5198719	23.6			5292	
D 3 13C5-PFPeA										
267.90 > 223.00	1.733	1.737	-0.004		10250486	45.4		90.9	59312	
D 47 13C3-PFBS										
301.90 > 83.00	1.751	1.755	-0.004		233624	46.5		99.9	6712	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.751	1.755	-0.004	1.000	40947	0.1124			101	
298.90 > 99.00	1.751	1.755	-0.004	1.000	20677		1.98(0.00-0.00)		72.3	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.968	1.984	-0.016	1.000	929811	4.29			801	
D 7 13C2 PFHxA										
315.00 > 270.00	1.991	1.984	0.007		11346758	46.8		93.6	28358	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.296	2.308	-0.012	1.000	12355	0.0521			17.6	
D 9 13C4-PFHpA										
367.00 > 322.00	2.296	2.308	-0.012		12250526	50.3		101	25093	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.318	2.318	0.0	1.000	67267	0.2038			404	
D 11 18O2 PFHxS										
403.00 > 84.00	2.318	2.318	0.0		15102812	50.2		106	34037	
* 62 13C2-PFOA										
415.00 > 370.00	2.637	2.644	-0.007		13237930	50.0			15724	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.645	2.644	0.001	1.000	93190	0.3909			47.6	
413.00 > 169.00	2.645	2.644	0.001	1.000	58718		1.59(0.90-1.10)		71.5	
D 14 13C4 PFOA										
417.00 > 372.00	2.645	2.644	0.001		11097362	46.5		93.0	15231	
D 18 13C4 PFOS										
503.00 > 80.00	3.006	3.014	-0.008		9701189	45.8		95.8	10092	
20 Perfluorononanoic acid										
463.00 > 419.00	3.006	3.014	-0.008	1.000	32529	0.1907			85.4	
D 19 13C5 PFNA										
468.00 > 423.00	3.006	3.014	-0.008		8805983	43.6		87.3	9261	
D 21 13C8 FOSA										
506.00 > 78.00	3.370	3.372	-0.002		237073	0.7618		1.5	3415	
D 23 13C2 PFDA										
515.00 > 470.00	3.370	3.372	-0.002		8071678	44.2		88.4	9712	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.362	3.372	-0.010	1.000	10171	0.0671			70.1	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.695	3.698	-0.003	1.000	43131	0.3442			113	
D 30 13C2 PFUnA										
565.00 > 520.00	3.695	3.698	-0.003		5872042	40.3		80.6	4275	
D 36 13C2 PFDoA										
615.00 > 570.00	3.993	3.989	0.004		6399928	38.1		76.2	6147	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.993	3.995	-0.002	1.000	4684	0.0398			45.4	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.252	4.257	-0.005	1.000	5978	0.0452			6.5	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.482	4.488	-0.006	1.000	3575	0.0867			211	
713.00 > 219.00	4.491	4.488	0.003	1.002	1948		1.84(0.00-0.00)		67.0	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.491	4.488	0.003		9270945	45.3		90.6	16843	

Report Date: 31-Oct-2017 09:56:54 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_023.d

Injection Date: 31-Oct-2017 02:52:58 Instrument ID: A8_N

Lims ID: 320-32321-A-4-A Lab Sample ID: 320-32321-4

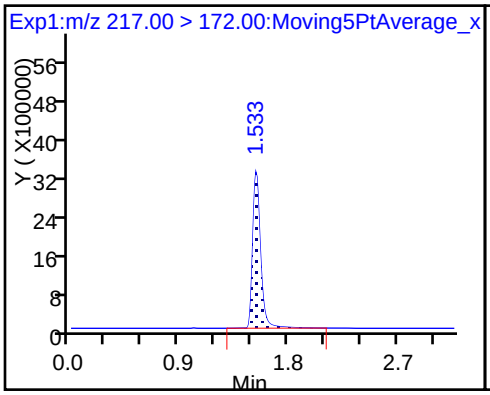
Client ID: TP-PFC-022-TPE-D

Operator ID: SACINSTLCMS01 ALS Bottle#: 20 Worklist Smp#: 9

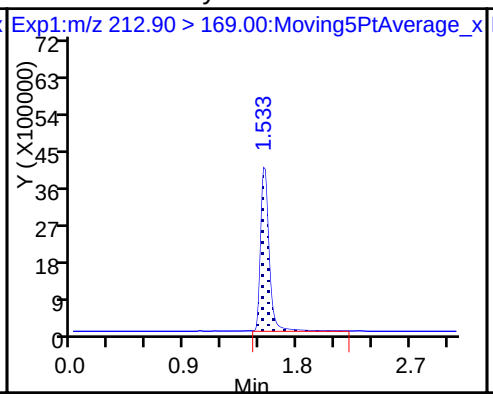
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

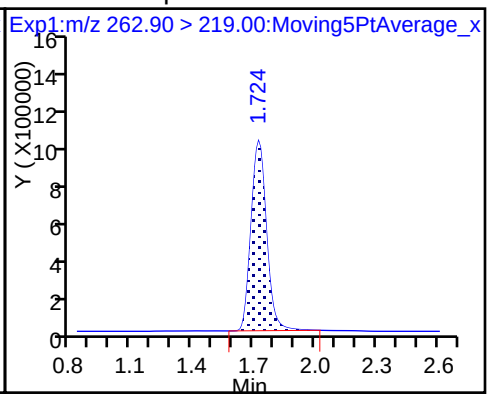
D 1 13C4 PFBA



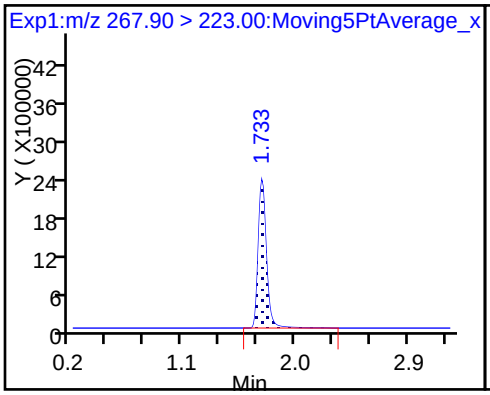
2 Perfluorobutyric acid



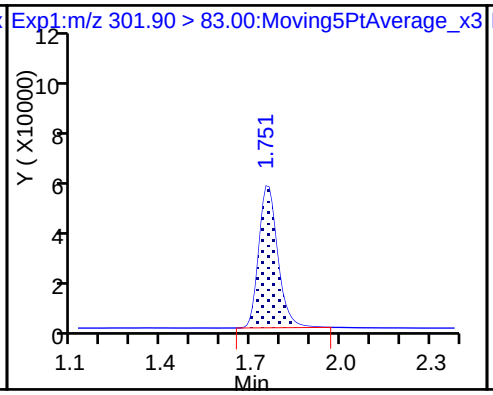
4 Perfluoropentanoic acid



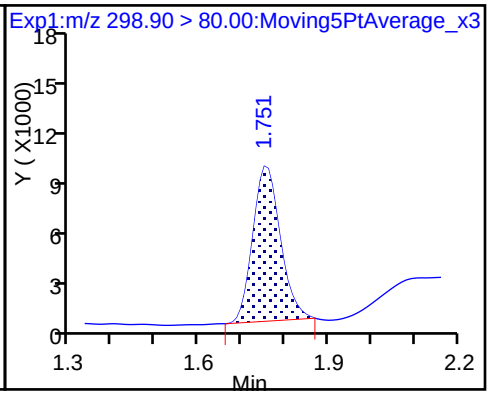
D 3 13C5-PFPeA



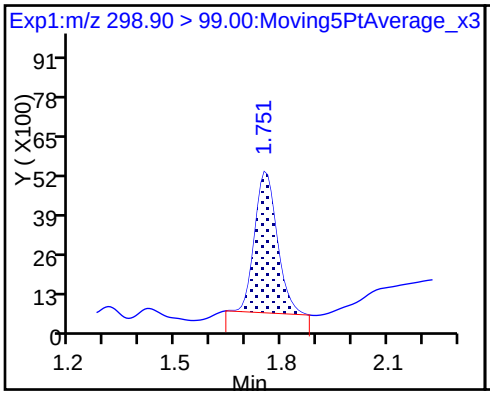
D 47 13C3-PFBS



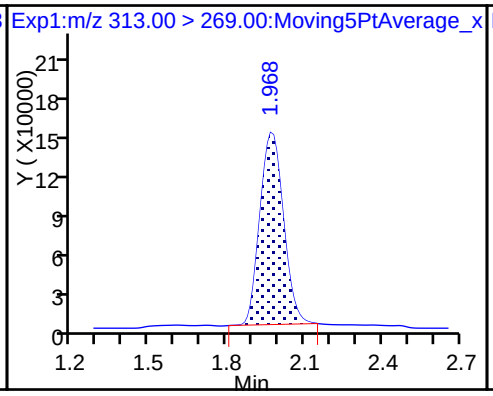
5 Perfluorobutanesulfonic acid



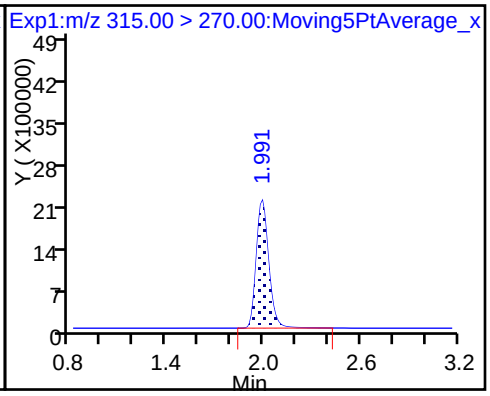
5 Perfluorobutanesulfonic acid



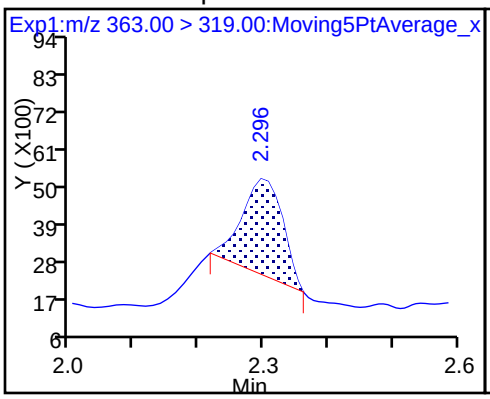
6 Perfluorohexanoic acid



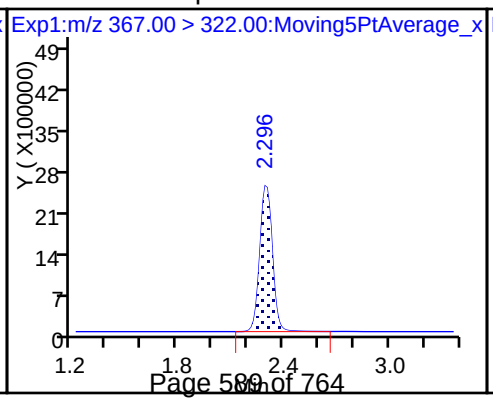
D 7 13C2 PFHxA



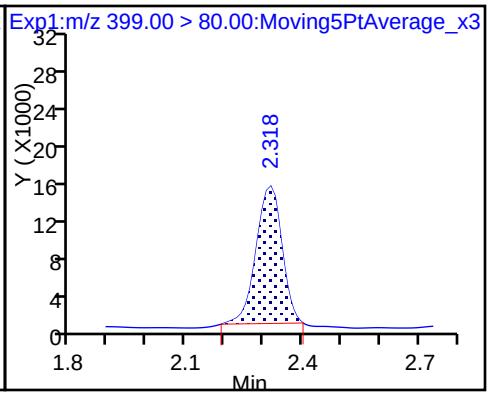
10 Perfluoroheptanoic acid



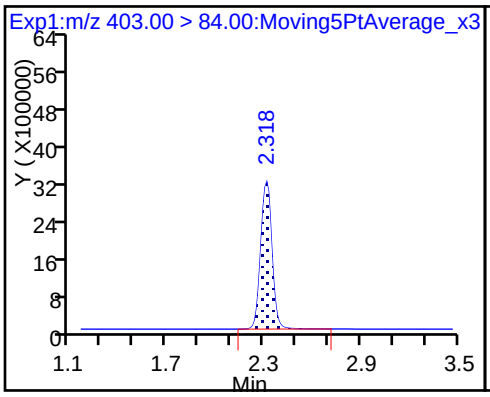
D 9 13C4-PFHpA



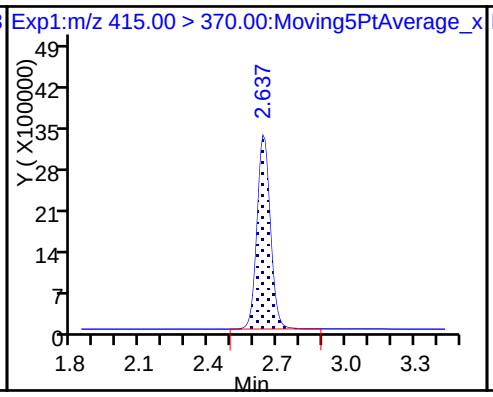
8 Perfluorohexanesulfonic acid



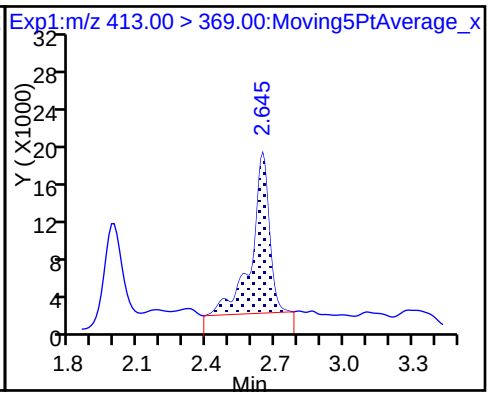
D 11 18O2 PFHxS



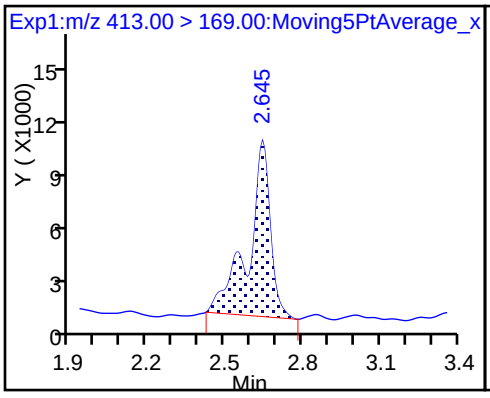
* 62 13C2-PFOA



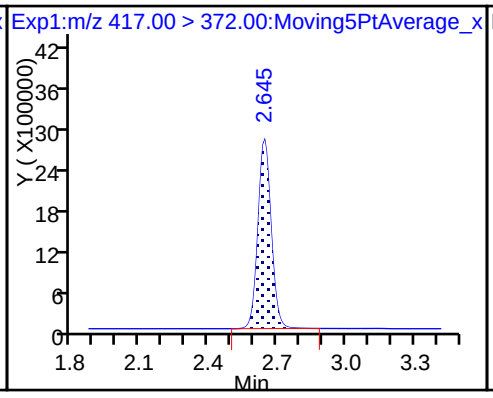
15 Perfluorooctanoic acid



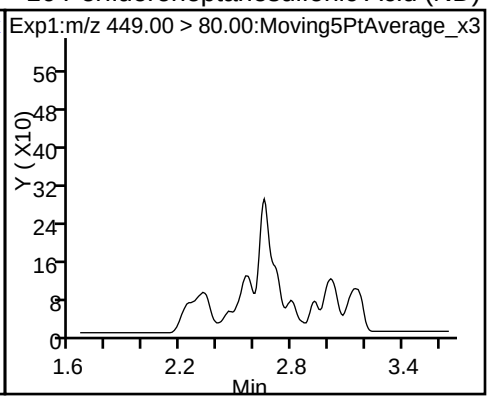
15 Perfluorooctanoic acid



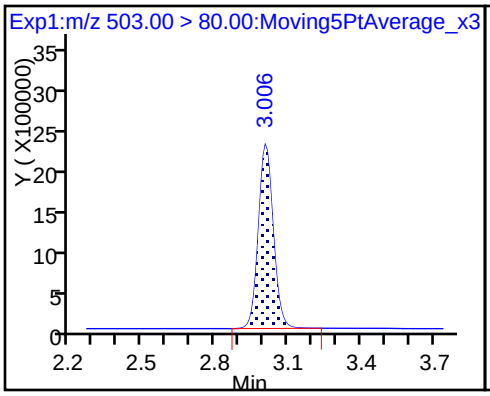
D 14 13C4 PFOA



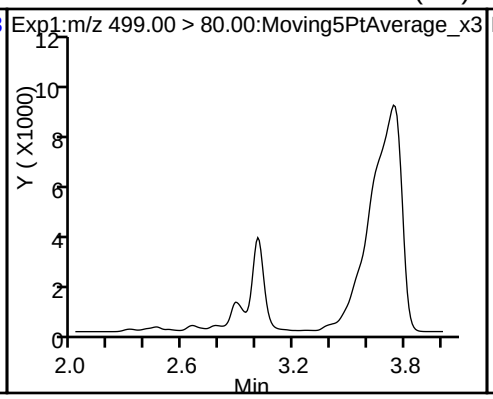
16 Perfluoroheptanesulfonic Acid (ND)



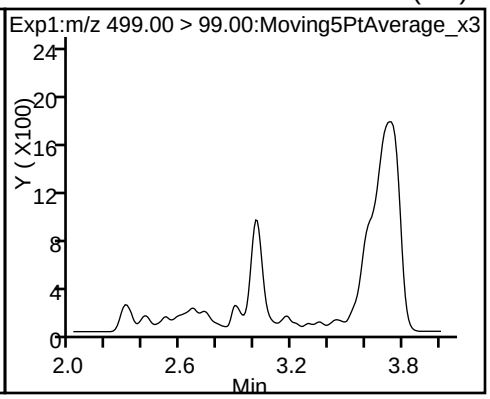
D 18 13C4 PFOS



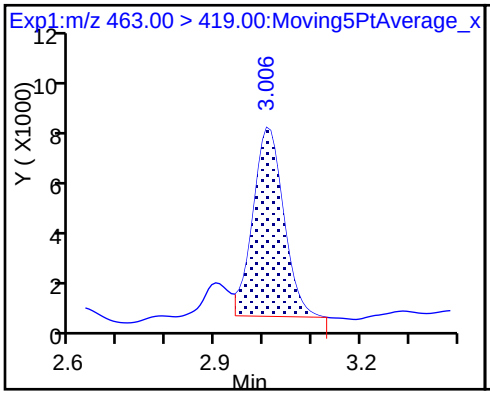
17 Perfluorooctane sulfonic acid (ND)



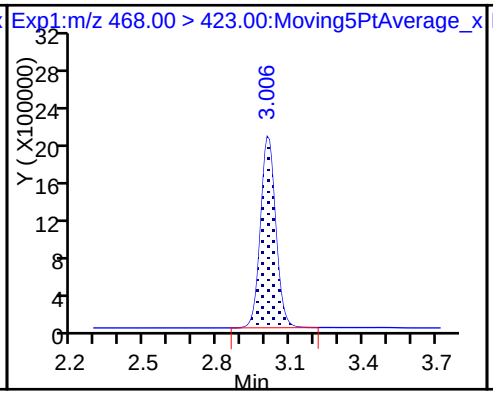
17 Perfluorooctane sulfonic acid (ND)



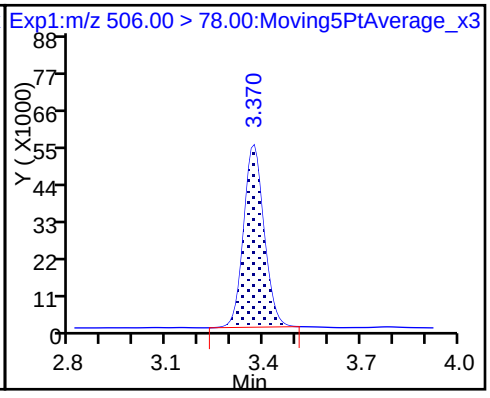
20 Perfluorononanoic acid



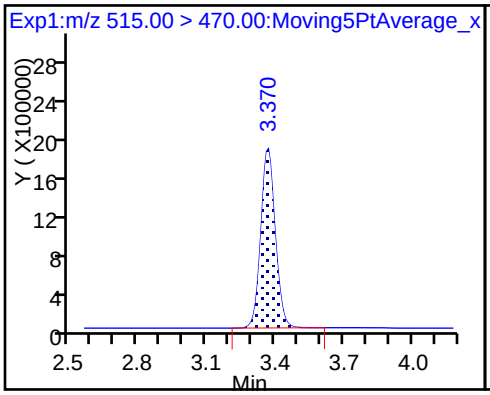
D 19 13C5 PFNA



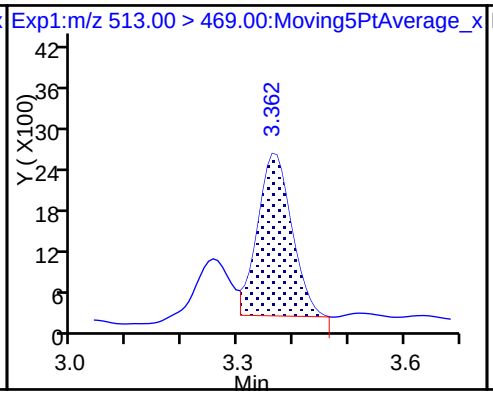
D 21 13C8 FOSA



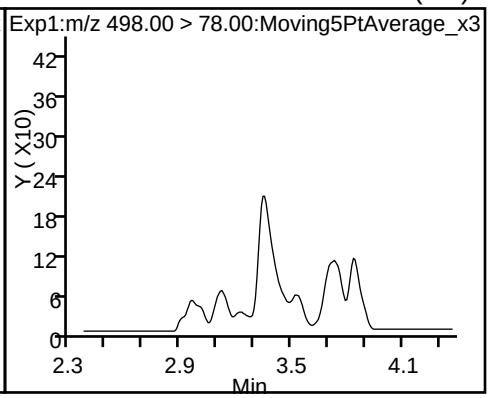
D 23 13C2 PFDA



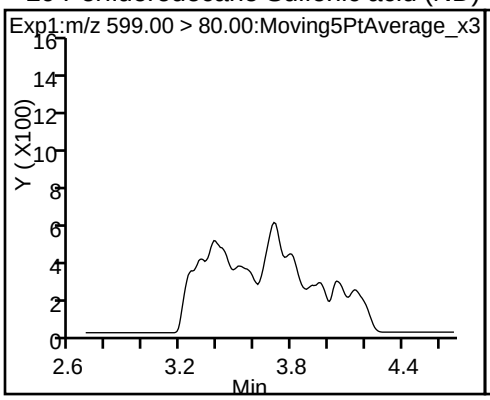
24 Perfluorodecanoic acid



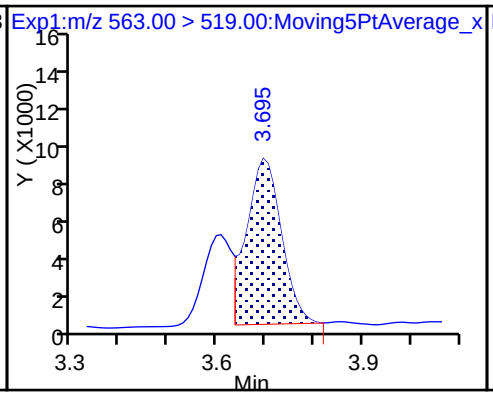
22 Perfluorooctane Sulfonamide (ND)



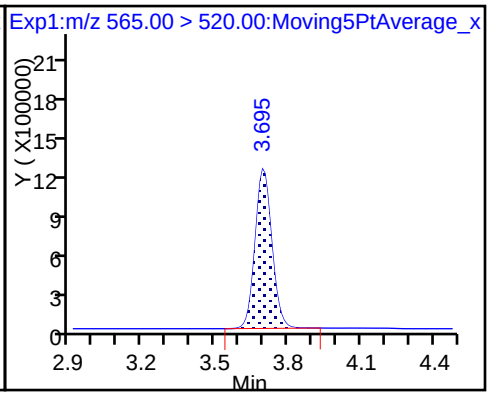
29 Perfluorodecane Sulfonic acid (ND)



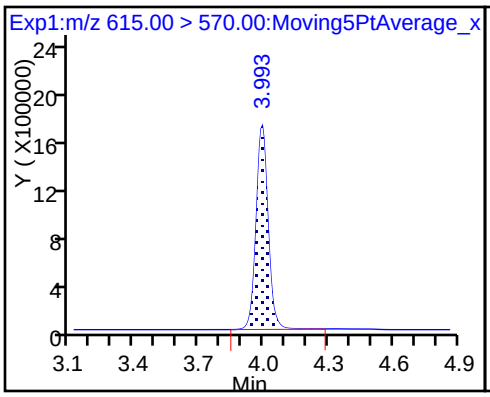
31 Perfluoroundecanoic acid



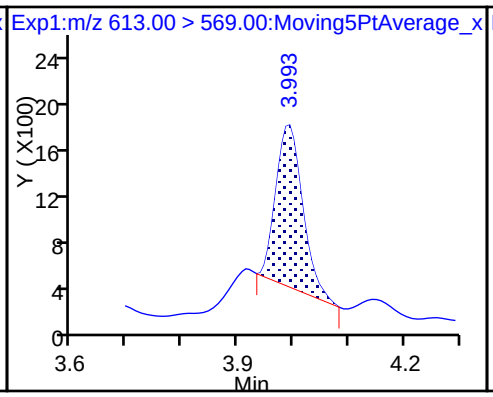
D 30 13C2 PFUnA



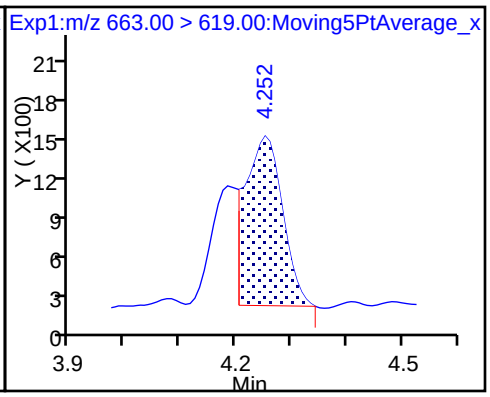
D 36 13C2 PFDoA



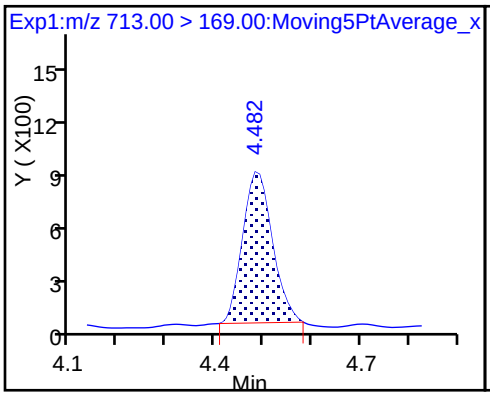
37 Perfluorododecanoic acid



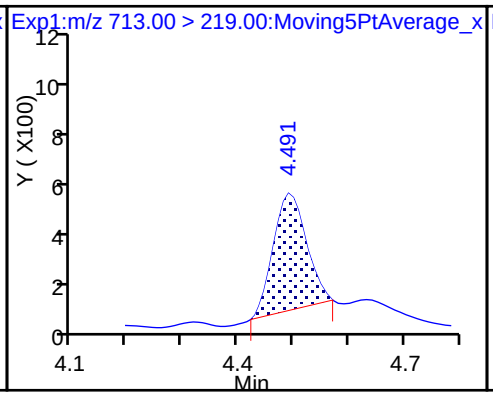
41 Perfluorotridecanoic acid



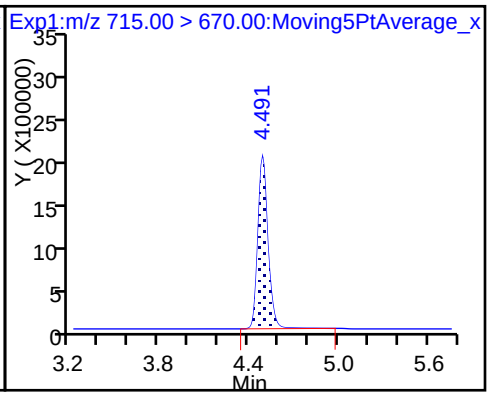
42 Perfluorotetradecanoic acid



42 Perfluorotetradecanoic acid



D 43 13C2-PFTeDA



FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	1.537	1.537	1.537	1.536	1.539	1.537	+++++				1.287 - 1.787	1.537
Perfluoropentanoic acid (PFPeA)	1.736	1.746	1.746	1.736	1.748	1.737	1.736				1.491 - 1.991	1.741
Perfluorobutanesulfonic acid (PFBS)	1.764	1.764	1.764	1.764	1.766	1.764	+++++				1.584 - 1.944	1.764
4:2 FTS	1.960	1.960	1.961	1.960	1.964	1.960	1.960				1.711 - 2.211	1.961
Perfluorohexanoic acid (PFHxA)	1.995	2.006	2.006	1.994	1.998	1.995	1.994				1.748 - 2.248	1.998
Perfluoroheptanoic acid (PFHpA)	2.318	2.320	2.325	2.319	2.327	2.311	2.311				2.069 - 2.569	2.319
Perfluorohexanesulfonic acid (PFHxS)	+++++	2.337	2.333	2.335	2.336	2.333	2.324				2.083 - 2.583	2.333
6:2FTS	2.643	2.647	2.643	2.640	2.637	2.636	2.638				2.391 - 2.891	2.641
Perfluorooctanoic acid (PFOA)	2.672	2.669	2.664	2.669	2.666	2.665	2.659				2.416 - 2.916	2.666
Perfluoroheptanesulfonic Acid (PFHpS)	2.672	2.676	2.671	2.676	2.673	2.665	2.667				2.422 - 2.922	2.671
Perfluorooctanesulfonic acid (PFOS)	3.033	3.035	3.031	3.030	3.036	3.026	3.027				2.781 - 3.281	3.031
Perfluorononanoic acid (PFNA)	3.033	3.035	3.039	3.038	3.036	3.026	3.027				2.783 - 3.283	3.033
Perfluorooctane Sulfonamide (FOSA)	3.382	3.388	3.381	3.376	3.382	3.372	3.375				3.129 - 3.629	3.379
8:2FTS	3.382	3.388	3.381	3.384	3.382	3.372	3.375				3.131 - 3.631	3.381
Perfluorodecanoic acid (PFDA)	3.391	3.396	3.398	3.392	3.390	3.389	3.383				3.141 - 3.641	3.391
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	3.555	3.562	3.554	3.548	3.557	3.545	3.549				3.303 - 3.803	3.553
Perfluorodecanesulfonic acid (PFDS)	3.702	3.710	3.711	3.706	3.705	3.704	3.697				3.455 - 3.955	3.705
Perfluoroundecanoic acid (PFUnA)	3.722	3.729	3.731	3.715	3.724	3.714	3.717				3.472 - 3.972	3.722
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	3.722	3.729	3.731	3.715	3.724	3.723	3.717				3.473 - 3.973	3.723
MeFOSA	3.879	3.886	3.888	3.882	3.891	3.882	3.886				3.635 - 4.135	3.885
Perfluorododecanoic acid (PFDoA)	4.013	4.018	4.020	4.016	4.017	4.016	4.013				3.766 - 4.266	4.016
N-EtFOSA-M	4.074	4.073	4.074	4.070	4.071	4.079	4.074				3.824 - 4.324	4.074
Perfluorotridecanoic Acid (PFTriA)	4.285	4.285	4.286	4.274	4.277	4.277	4.280				4.031 - 4.531	4.281
Perfluorotetradecanoic acid (PFTeA)	4.509	4.517	4.511	4.507	4.508	4.509	4.506				4.260 - 4.760	4.510
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	4.931	4.933	4.929	4.933	4.924	+++++				4.679 - 5.179	4.930
Perfluoro-n-octadecanoic acid (PFODA)	5.285	5.285	5.287	5.280	5.278	5.279	5.270				5.031 - 5.531	5.281
13C4 PFBA	1.537	1.537	1.537	1.536	1.539	1.537	1.537				1.287 - 1.787	1.537
13C5 PFPeA	1.736	1.746	1.746	1.736	1.739	1.737	1.736				1.489 - 1.989	1.739
13C3-PFBS	1.764	1.764	1.764	1.764	1.766	1.764	1.755				1.663 - 1.863	1.763
13C2 PFHxA	1.995	2.006	2.006	1.994	1.998	1.995	1.994				1.748 - 2.248	1.998
13C4-PFHpA	2.318	2.320	2.325	2.319	2.327	2.311	2.311				2.069 - 2.569	2.319
18O2 PFHxS	2.334	2.337	2.333	2.335	2.336	2.333	2.324				2.083 - 2.583	2.333

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
M2-6:2FTS	2.643	2.647	2.643	2.640	2.637	2.636	2.638				2.391 - 2.891	2.641
13C4 PFOA	2.665	2.669	2.664	2.669	2.666	2.658	2.659				2.414 - 2.914	2.664
13C4 PFOS	3.033	3.035	3.031	3.030	3.027	3.026	3.027				2.780 - 3.280	3.030
13C5 PFNA	3.033	3.035	3.039	3.030	3.027	3.026	3.027				2.781 - 3.281	3.031
13C8 FOSA	3.374	3.380	3.381	3.376	3.382	3.372	3.375				3.127 - 3.627	3.377
M2-8:2FTS	3.382	3.388	3.381	3.384	3.382	3.372	3.375				3.131 - 3.631	3.381
13C2 PFDA	3.391	3.396	3.398	3.392	3.390	3.389	3.383				3.141 - 3.641	3.391
d3-NMeFOSAA	3.545	3.552	3.554	3.548	3.546	3.545	3.539				3.297 - 3.797	3.547
d5-NEtFOSAA	3.712	3.719	3.721	3.715	3.714	3.714	3.707				3.465 - 3.965	3.715
13C2 PFUnA	3.722	3.729	3.731	3.715	3.724	3.714	3.717				3.472 - 3.972	3.722
d-N-MeFOSA-M	3.879	3.886	3.888	3.874	3.882	3.882	3.877				3.631 - 4.131	3.881
13C2 PFDoA	4.013	4.018	4.020	4.009	4.017	4.016	4.013				3.765 - 4.265	4.015
d-N-EtFOSA-M	4.065	4.073	4.074	4.061	4.071	4.070	4.065				3.818 - 4.318	4.068
13C2-PFTeDA	4.518	4.517	4.520	4.516	4.517	4.509	4.515				4.266 - 4.766	4.516
13C2-PFHxDA	4.931	4.931	4.933	4.929	4.933	4.924	4.921				4.679 - 5.179	4.929

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	357454 367712	361835 337012	360847 328168	341347	Ave		350625.089				4.3		50.0			
13C5 PFPeA	229652 235435	232924 215938	239360 200135	225357	Ave		225542.900				6.0		50.0			
13C3-PFBS	5235.3 5270.3	5158.3 4771.5	5375.8 4493.4	4893.4	Ave		5028.26728				6.3		50.0			
13C2 PFHxA	248461 264451	250675 227253	249802 219016	236613	Ave		242324.389				6.4		50.0			
13C4-PFHpA	258575 256249	258553 221578	261274 202092	247774	Ave		243727.906				9.4		50.0			
18O2 PFHxS	308165 321776	309221 291030	320140 261497	294875	Ave		300957.723				6.9		50.0			
M2-6:2FTS	71694 74371	75262 65842	71802 60191	68055	Ave		69602.5053				7.6		50.0			
13C4 PFOA	248108 251797	260489 224515	243082 212123	230695	Ave		238686.837				7.1		50.0			
13C4 PFOS	219277 221852	218752 203959	218960 195635	205064	Ave		211928.443				4.8		50.0			
13C5 PFNA	207186 211206	211411 193219	212841 181758	194946	Ave		201795.246				5.9		50.0			
13C8 FOSA	320984 328144	328829 291724	326783 281975	299843	Ave		311183.117				6.3		50.0			
M2-8:2FTS	74829 75756	74497 67679	79102 63616	70267	Ave		72249.5139				7.4		50.0			
13C2 PFDA	186941 192820	192854 174523	190202 164606	175786	Ave		182533.157				6.0		50.0			
d3-NMeFOSAA	80669 87522	82855 81594	83040 79589	76433	Ave		81671.6286				4.2		50.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
d5-NEtFOSAA	92322 86792	91775 75965	90115 70212	80691	Ave		83981.6057				10.2		50.0			
13C2 PFUnA	154125 150589	157265 133581	155792 124554	144359	Ave		145752.240				8.5		50.0			
d-N-MeFOSA-M	89055 95610	89086 89734	91517 94929	84265	Ave		90599.4429				4.3		50.0			
13C2 PFDoA	171903 173314	171388 162739	178894 153273	163730	Ave		167891.409				5.1		50.0			
d-N-EtFOSA-M	85399 92065	84840 88170	85727 91826	79791	Ave		86831.1857				5.0		50.0			
13C2-PFTeDA	212525 211748	213382 189599	213836 191404	199780	Ave		204610.654				5.3		50.0			
13C2-PFHxDA	316335 321624	315575 294845	321643 288866	285897	Ave		306397.771				5.2		50.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	1.0179 0.7783	0.9710 +++++	1.0228	1.0067	0.9166	AveID		0.9522				9.9		35.0			
Perfluoropentanoic acid (PFPeA)	1.3078 0.9453	1.1531 0.8180	1.1091	1.1020	1.0849	AveID		1.0743				14.5		35.0			
Perfluorobutanesulfonic acid (PFBS)	76.921 60.901	74.513 +++++	75.981	75.540	71.043	AveID		72.483				8.3		50.0			
4:2 FTS	1.1693 1.2317	1.1911 1.2487	1.2202	1.1994	1.2442	AveID		1.2149				2.4		35.0			
Perfluorohexanoic acid (PFHxA)	1.0535 0.9048	0.9804 0.7653	1.0428	1.0135	0.9279	AveID		0.9555				10.5		35.0			
Perfluoroheptanoic acid (PFHpA)	1.0722 0.9138	0.9805 0.8127	1.0424	0.9826	0.9704	AveID		0.9678				8.8		35.0			
Perfluorohexanesulfonic acid (PFHxS)	+++++ 0.9647	1.1825 0.8876	1.0684	1.0622	1.0371	AveID		1.0338				9.7		35.0			
6:2FTS	1.3246 1.2449	1.2035 1.2525	1.2548	1.2100	1.2264	AveID		1.2452				3.2		35.0			
Perfluorooctanoic acid (PFOA)	1.2601 0.9811	1.1981 0.8515	1.1175	1.0816	1.0298	AveID		1.0743				12.7		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	1.2670 1.0787	1.2537 0.9245	1.2541	1.2396	1.1947	AveID		1.1732				10.9		50.0			
Perfluorooctanesulfonic acid (PFOS)	1.0915 1.0175	1.0291 0.9962	1.0618	1.0219	1.0626	AveID		1.0401				3.2		35.0			
Perfluorononanoic acid (PFNA)	1.0866 0.9130	1.0034 0.8449	0.9887	0.9803	0.9627	AveID		0.9685				7.8		35.0			
Perfluorooctane Sulfonamide (FOSA)	1.0636 0.8691	0.9720 0.7263	1.0130	0.9987	0.9543	AveID		0.9424				11.9		35.0			
8:2FTS	1.1617 1.1143	1.0925 1.0834	1.1388	1.0814	1.1138	AveID		1.1123				2.7		35.0			
Perfluorodecanoic acid (PFDA)	1.0481 0.9028	0.9649 0.8212	0.9579	0.9349	0.9452	AveID		0.9393				7.3		35.0			
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	1.0493 0.9205	0.8741 0.9397	0.9435	0.9337	0.8869	AveID		0.9354				6.1		35.0			
Perfluorodecanesulfonic acid (PFDS)	0.6419 0.6562	0.6440 0.5867	0.6761	0.6437	0.6863	AveID		0.6479				4.9		50.0			
Perfluoroundecanoic acid (PFUnA)	1.2610 1.0152	1.1238 0.9438	1.0643	1.0261	1.0353	AveID		1.0671				9.5		35.0			
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	0.8302 0.8496	0.8007 0.8638	0.8557	0.8499	0.8599	AveID		0.8443				2.6		35.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
MeFOSA	0.9077 0.9189	0.9049 0.8473	0.9020	0.8866	0.8774	AveID		0.8921				2.7		35.0			
Perfluorododecanoic acid (PFDoA)	0.9797 0.8959	0.9515 0.8282	0.9211	0.9103	0.9498	AveID		0.9195				5.4		35.0			
N-EtFOSA-M	0.9658 0.9276	0.9421 0.8766	0.9523	0.9320	0.9125	AveID		0.9298				3.1		35.0			
Perfluorotridecanoic Acid (PFTriA)	1.1377 0.9876	1.0442 0.9155	1.0465	1.0092	1.0927	AveID		1.0333				7.0		50.0			
Perfluorotetradecanoic acid (PFTeA)	0.2420 0.2277	0.2236 0.2100	0.2200	0.2115	0.2212	AveID		0.2223				4.8		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 0.8086	1.3010 +++++	0.9673	0.9210	0.8877	L2ID	0.4413	0.8642							0.9980		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	1.1230 0.8809	1.0058 0.7433	0.9977	0.9816	0.9217	AveID		0.9506				12.5		50.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	17872710 16850593	18091732 16408424	18042358	17067362	18385602	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5 PFPeA	Ave	11482582 10796893	11646212 10006745	11968018	11267831	11771734	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C3-PFBS	Ave	243441 221874	239859 208945	249974	227541	245067	46.5 46.5	46.5 46.5	46.5	46.5	46.5
13C2 PFHxA	Ave	12423043 11362658	12533747 10950785	12490114	11830628	13222561	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	12928764 11078906	12927656 10104592	13063724	12388693	12812432	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	14576214 13765700	14626159 12368812	15142641	13947567	15220009	47.3 47.3	47.3 47.3	47.3	47.3	47.3
M2-6:2FTS	Ave	3405451 3127517	3574947 2859084	3410618	3232615	3532601	47.5 47.5	47.5 47.5	47.5	47.5	47.5
13C4 PFOA	Ave	12405416 11225726	13024434 10606146	12154092	11534754	12589825	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	10481446 9749248	10456339 9351352	10466308	9802057	10604507	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	10359275 9660967	10570529 9087907	10642051	9747291	10560316	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	16049178 14586209	16441468 14098730	16339148	14992145	16407213	50.0 50.0	50.0 50.0	50.0	50.0	50.0
M2-8:2FTS	Ave	3584296 3241827	3568424 3047225	3788998	3365770	3628722	47.9 47.9	47.9 47.9	47.9	47.9	47.9
13C2 PFDA	Ave	9347060 8726152	9642702 8230300	9510123	8789284	9640984	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d3-NMeFOSAA	Ave	4033450 4079711	4142746 3979428	4152012	3821639	4376084	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d5-NEtFOSAA	Ave	4616095 3798242	4588738 3510602	4505726	4034536	4339623	50.0 50.0	50.0 50.0	50.0	50.0	50.0

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C2 PFUnA	Ave	7706271 6679039	7863227 6227711	7789622	7217943	7529471	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d-N-MeFOSA-M	Ave	4452727 4486722	4454324 4746426	4575836	4213258	4780512	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	8595136 8136951	8569420 7663646	8944676	8186478	8665686	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d-N-EtFOSA-M	Ave	4269967 4408487	4241996 4591296	4286339	3989568	4603262	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	10626247 9479964	10669124 9570197	10691814	9989003	10587380	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	15816734 14742231	15778734 14443282	16082155	14294873	16081211	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		AveID	181930 26228900	351349 +++++	1845411	6872498	16852992	0.500 100	1.00 +++++	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	150164 20413300	268577 32740106	1327357	4966682	12771661	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		AveID	177995 25688097	339771 +++++	1805379	6535299	16549064	0.442 88.4	0.884 +++++	4.42	17.7	44.2
4:2 FTS		AveID	39150 7574658	83727 14040224	409149	1524770	4321214	0.467 93.4	0.934 187	4.67	18.7	46.7
Perfluorohexanoic acid (PFHxA)		AveID	130877 20561075	245774 33523091	1302471	4796137	12269212	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		AveID	138618 20248813	253519 32847152	1361815	4869377	12433273	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 25548500	332754 42243112	1556248	5700596	15184106	+++++ 91.0	0.910 182	4.55	18.2	45.5
6:2FTS		AveID	45012 7770479	85870 14294286	427077	1561284	4323097	0.474 94.8	0.948 190	4.74	19.0	47.4
Perfluorooctanoic acid (PFOA)		AveID	156326 22026634	312091 36125926	1358217	4990434	12964935	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	132244 20944569	261088 34435082	1307067	4839750	12616457	0.476 95.2	0.952 190	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	111053 19258573	208901 36170703	1078764	3889485	10938097	0.464 92.8	0.928 186	4.64	18.6	46.4
Perfluorononanoic acid (PFNA)		AveID	112564 17641757	212119 30714706	1052198	3822275	10166844	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	170696 25353469	319607 40961582	1655149	5989035	15657067	0.500 100	1.00 200	5.00	20.0	50.0
8:2FTS		AveID	41639 7224840	77968 13205694	431491	1455859	4041494	0.479 95.8	0.958 192	4.79	19.2	47.9
Perfluorodecanoic acid (PFDA)		AveID	97971 15755129	186086 27033900	910996	3286997	9112657	0.500 100	1.00 200	5.00	20.0	50.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		AveID	42323 7510668	72427 14958318	391751	1427297	3881322	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)		AveID	67840 12902020	135804 22131027	713584	2545089	7338718	0.482 96.4	0.964 193	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		AveID	97179 13560915	176741 23510391	829066	2962400	7795195	0.500 100	1.00 200	5.00	20.0	50.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		AveID	38324 6454094	73483 12130483	385572	1371561	3731718	0.500 100	1.00 200	5.00	20.0	50.0
MeFOSA		AveID	40419 8245970	80614 16086774	412739	1494136	4194611	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	84204 14579972	163075 25387048	823879	2980875	8230749	0.500 100	1.00 200	5.00	20.0	50.0
N-EtFOSA-M		AveID	41241 8178532	79926 16098373	408209	1487266	4200616	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorotridecanoic Acid (PFTriA)		AveID	97785 16072205	178964 28065123	936032	3304558	9468872	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		AveID	25717 4317118	47718 8038993	235213	845237	2341628	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 23840509	410574 +++++	1555603	5266453	14275131	+++++ 100	1.00 +++++	5.00	20.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)		AveID	177628 25973108	317418 42943723	1604499	5612557	14822218	0.500 100	1.00 200	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L2ID = Linear 1/conc^2 IsoDil

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid (PFBA)	+++++	2.0	7.4	5.7	-3.7	-18.3		25	25	25	25	25
Perfluoropentanoic acid (PFPeA)	-23.9	7.3	3.2	2.6	1.0	-12.0	25	25	25	25	25	25
Perfluorobutanesulfonic acid (PFBS)	+++++	2.8	4.8	4.2	-2.0	-16.0		25	25	25	25	25
4:2 FTS	2.8	-2.0	0.4	-1.3	2.4	1.4	25	25	25	25	25	25
Perfluorohexanoic acid (PFHxA)	-19.9	2.6	9.1	6.1	-2.9	-5.3	25	25	25	25	25	25
Perfluoroheptanoic acid (PFHpA)	-16.0	1.3	7.7	1.5	0.3	-5.6	25	25	25	25	25	25
Perfluorohexanesulfonic acid (PFHxS)	+++++ -14.1		3.3	2.8	0.3	-6.7	25		25	25	25	25
6:2FTS	0.6	-3.3	0.8	-2.8	-1.5	0.0	25	25	25	25	25	25
Perfluorooctanoic acid (PFOA)	-20.7	11.5	4.0	0.7	-4.1	-8.7	25	25	25	25	25	25
Perfluoroheptanesulfonic Acid (PFHpS)	-21.2	6.9	6.9	5.7	1.8	-8.1	25	25	25	25	25	25
Perfluorooctanesulfonic acid (PFOS)	-4.2	-1.1	2.1	-1.7	2.2	-2.2	25	25	25	25	25	25
Perfluorononanoic acid (PFNA)	-12.8	3.6	2.1	1.2	-0.6	-5.7	25	25	25	25	25	25
Perfluorooctane Sulfonamide (FOSA)	-22.9	3.1	7.5	6.0	1.3	-7.8	25	25	25	25	25	25
8:2FTS	-2.6	-1.8	2.4	-2.8	0.1	0.2	25	25	25	25	25	25
Perfluorodecanoic acid (PFDA)	-12.6	2.7	2.0	-0.5	0.6	-3.9	25	25	25	25	25	25

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	0.5	-6.5	0.9	-0.2	-5.2	-1.6	25	25	25	25	25	25
Perfluorodecanesulfonic acid (PFDS)	-9.4	-0.6	4.4	-0.6	5.9	1.3	25	25	25	25	25	25
Perfluoroundecanoic acid (PFUnA)	-11.6	5.3	-0.3	-3.8	-3.0	-4.9	25	25	25	25	25	25
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2.3	-5.2	1.4	0.7	1.9	0.6	25	25	25	25	25	25
MeFOSA	-5.0	1.4	1.1	-0.6	-1.6	3.0	25	25	25	25	25	25
Perfluorododecanoic acid (PFDoA)	-9.9	3.5	0.2	-1.0	3.3	-2.6	25	25	25	25	25	25
N-EtFOSA-M	-5.7	1.3	2.4	0.2	-1.9	-0.2	25	25	25	25	25	25
Perfluorotridecanoic Acid (PFTriA)	-11.4	1.1	1.3	-2.3	5.7	-4.4	25	25	25	25	25	25
Perfluorotetradecanoic acid (PFTeA)	-5.5	0.6	-1.0	-4.8	-0.5	2.4	25	25	25	25	25	25
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ +++++		1.7	4.0	1.7	-6.9			25	25	25	25
Perfluoro-n-octadecanoic acid (PFODA)	-21.8	5.8	5.0	3.3	-3.0	-7.3	25	25	25	25	25	25

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_003.d
Lims ID: IC L1 Full
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 30-Oct-2017 17:59:31 ALS Bottle#: 28 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:19:28 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 18:26:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		17872710	51.0		102	27345	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	181930	0.5345		107	49.1	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.739	-0.003		11482582	50.9		102	184744	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.741	-0.005	1.000	150164	0.6087		122	140	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.763	0.001		243441	48.4		104	5599	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	177995	0.4691		106	653	
298.90 > 99.00	1.764	1.764	0.0	1.000	71801		2.48(0.00-0.00)	106	534	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	39150	0.4495		96.2	2572	
D 7 13C2 PFHxA										
315.00 > 270.00	1.995	1.998	-0.003		12423043	51.3		103	37770	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.998	-0.003	1.000	130877	0.5513		110	231	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.318	2.319	-0.001	1.000	138618	0.5539		111	270	
D 9 13C4-PFHpA										
367.00 > 322.00	2.318	2.319	-0.001		12928764	53.0		106	25064	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.334	2.333	0.001	1.000	198484	0.6231		137	1323	
D 11 18O2 PFHxS										
403.00 > 84.00	2.334	2.333	0.001		14576214	48.4		102	28468	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.643	2.641	0.002		3405451	48.9		103	13050	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.643	2.641	0.002	1.000	45012	0.5042		106	1355	
* 62 13C2-PFOA										
415.00 > 370.00	2.665	2.655	0.010		12313014	50.0			25965	
D 14 13C4 PFOA										
417.00 > 372.00	2.665	2.664	0.001		12405416	52.0		104	20502	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.672	2.666	0.006	1.000	156326	0.5865		117	64.6	
413.00 > 169.00	2.665	2.666	-0.001	0.997	86610		1.80(0.90-1.10)	117	309	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.672	2.672	0.0	1.000	132244	0.5141		108	2981	
D 18 13C4 PFOS										
503.00 > 80.00	3.033	3.030	0.003		10481446	49.5		103	18912	
17 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.033	3.031	0.002	1.000	111053	0.4869		105	78.2	
499.00 > 99.00	3.033	3.031	0.002	1.000	22603		4.91(0.90-1.10)	105	86.3	M
D 19 13C5 PFNA										
468.00 > 423.00	3.033	3.031	0.002		10359275	51.3		103	13268	
20 Perfluorononanoic acid										
463.00 > 419.00	3.033	3.033	0.0	1.000	112564	0.5610		112	113	
D 21 13C8 FOSA										
506.00 > 78.00	3.374	3.377	-0.003		16049178	51.6		103	8814	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.382	3.379	0.003	1.000	170696	0.5643		113	2588	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.382	3.381	0.001	1.000	41639	0.5003		104	982	
D 26 M2-8:2FTS										
529.00 > 81.00	3.382	3.381	0.001		3584296	49.6		104	6848	
D 23 13C2 PFDA										
515.00 > 470.00	3.391	3.391	0.0		9347060	51.2		102	13247	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.391	3.391	0.0	1.000	97971	0.5579		112	341	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.545	3.547	-0.002		4033450	49.4		98.8	6042	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.555	3.553	0.002	1.003	42323	0.5609		112	153	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.702	3.705	-0.003	1.000	67840	0.4775		99.1	1436	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.712	3.715	-0.003		4616095	55.0		110	5382	
D 30 13C2 PFUnA										
565.00 > 520.00	3.722	3.722	0.0		7706271	52.9		106	10780	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.722	3.722	0.0	1.000	97179	0.5909		118	319	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.722	3.723	-0.001	1.003	38324	0.4917		98.3	737	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.879	3.881	-0.002		4452727	49.1		98.3	1119	
35 MeFOSA										
512.00 > 169.00	3.879	3.885	-0.006	1.000	40419	0.5087		102	972	
D 36 13C2 PFDoA										
615.00 > 570.00	4.013	4.015	-0.002		8595136	51.2		102	9324	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.013	4.016	-0.003	1.000	84204	0.5327		107	88.9	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.065	4.068	-0.003		4269967	49.2		98.4	2818	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.074	4.074	0.0	1.000	41241	0.5194		104	1100	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.285	4.281	0.004	1.000	97785	0.5505		110	40.7	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.509	4.510	-0.001	1.000	25717	0.5444		109	903	
713.00 > 219.00	4.518	4.510	0.008	1.002	21625		1.19(0.00-0.00)	109	644	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.518	4.516	0.002		10626247	51.9		104	9952	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.931	4.929	0.002		15816734	51.6		103	4368	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.931	4.929	0.002	1.000	284601	0.5305		106	27.9	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.285	5.281	0.004	1.000	177628	0.5907		118	16.8	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC_FULL-L1_00005 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:19:29 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_003.d

Injection Date: 30-Oct-2017 17:59:31 Instrument ID: A8_N

Lims ID: IC L1 Full

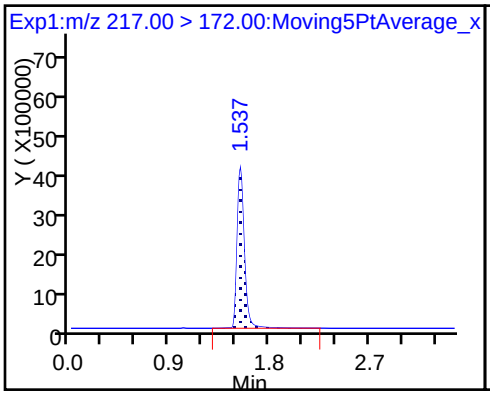
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 28 Worklist Smp#: 3

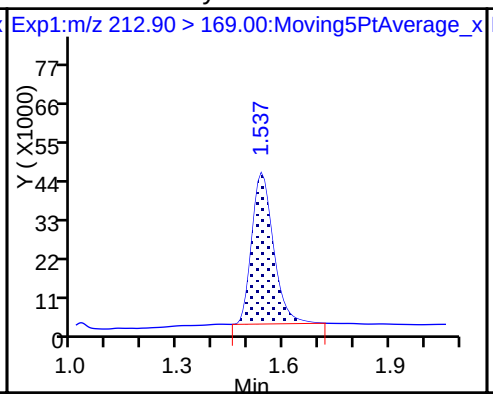
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

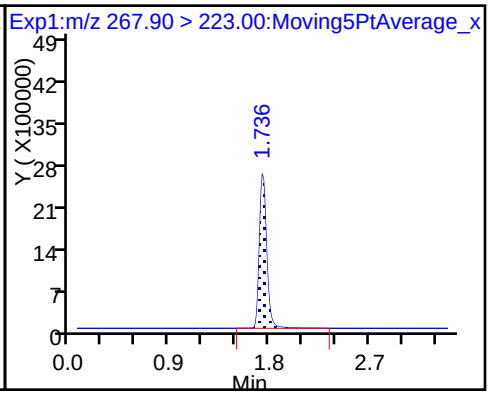
D 1 13C4 PFBA



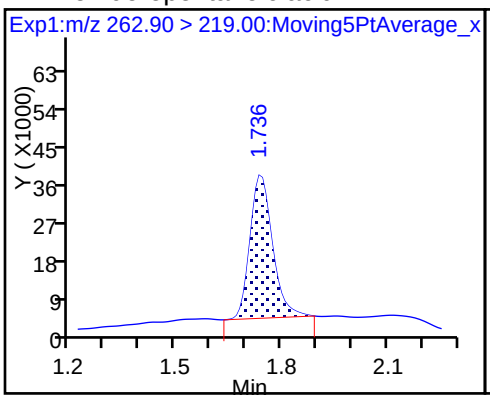
2 Perfluorobutyric acid



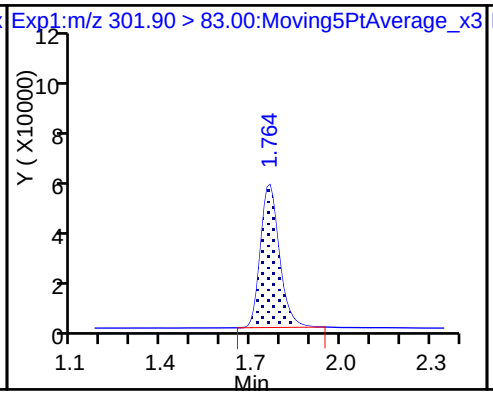
D 3 13C5-PFPeA



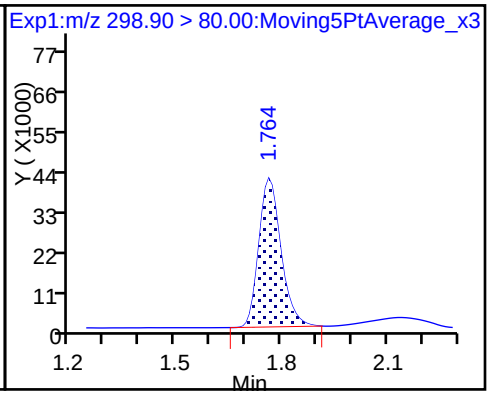
4 Perfluoropentanoic acid



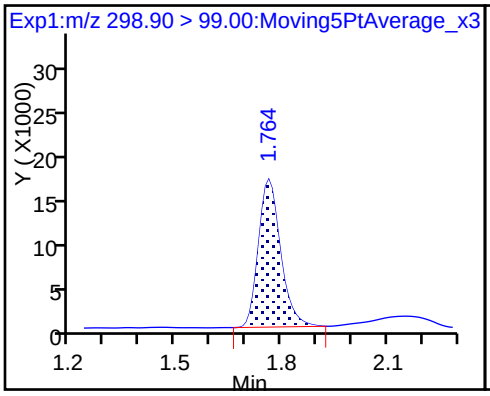
D 47 13C3-PFBS



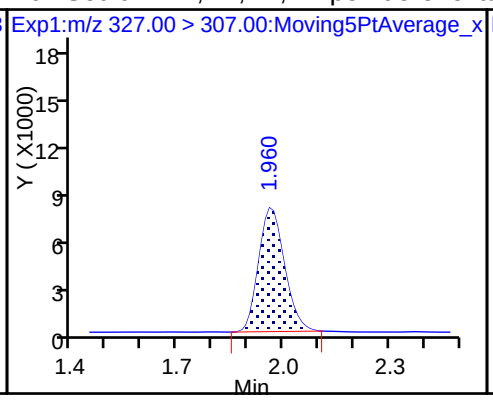
5 Perfluorobutanesulfonic acid



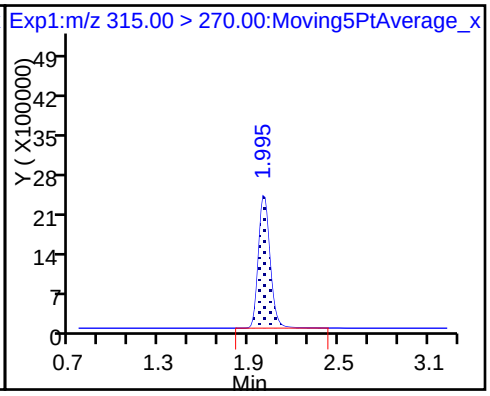
5 Perfluorobutanesulfonic acid



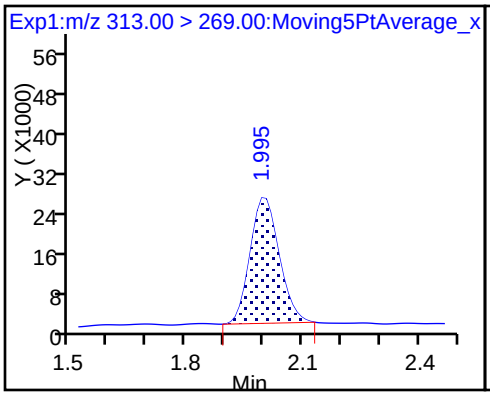
61 Sodium 1H,1H,2H,2H-perfluorohexa



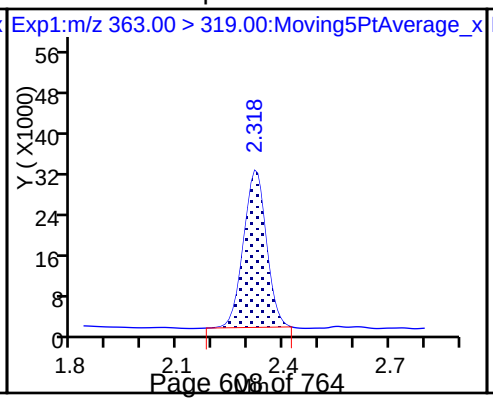
D 7 13C2 PFHxA



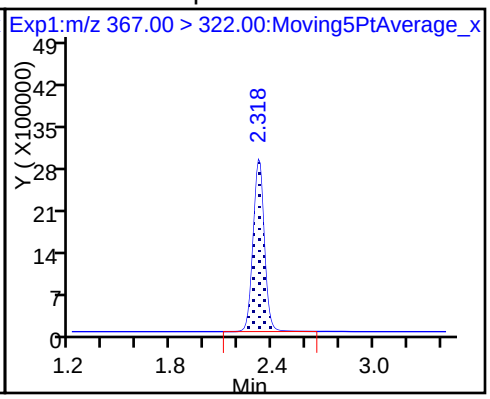
6 Perfluorohexanoic acid



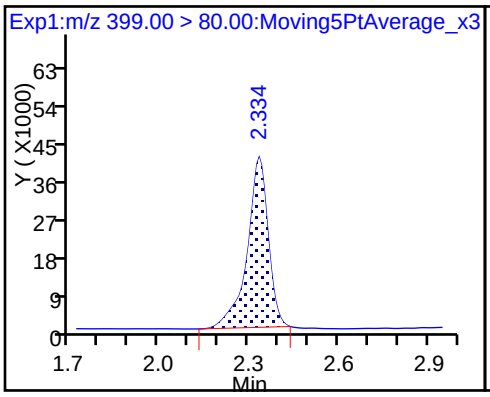
10 Perfluoroheptanoic acid



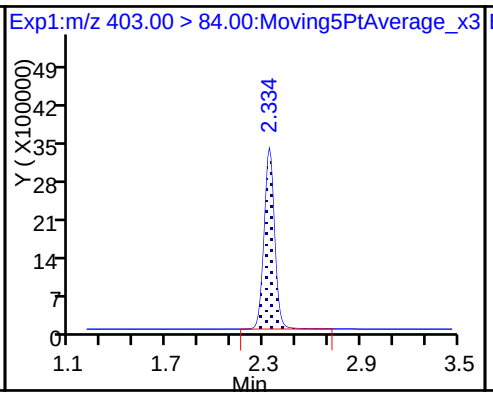
D 9 13C4-PFHpA



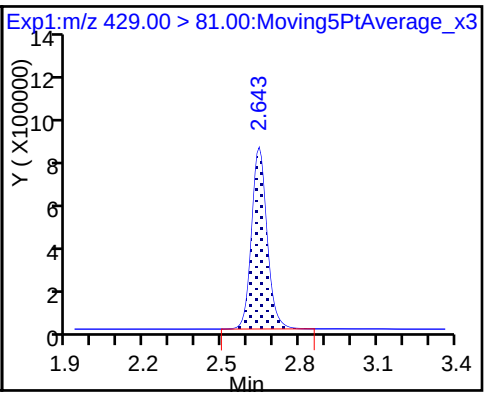
8 Perfluorohexanesulfonic acid



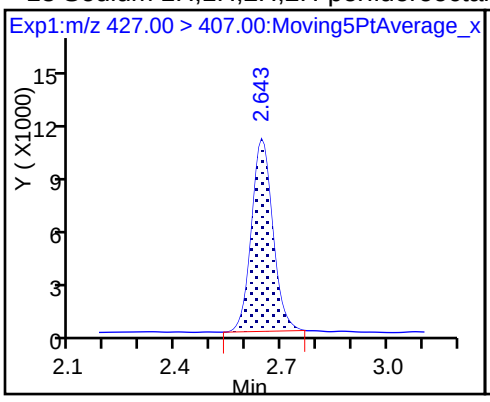
D 11 18O2 PFHxS



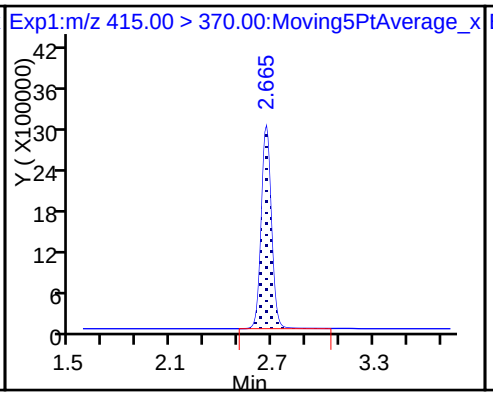
D 12 M2-6:2FTS



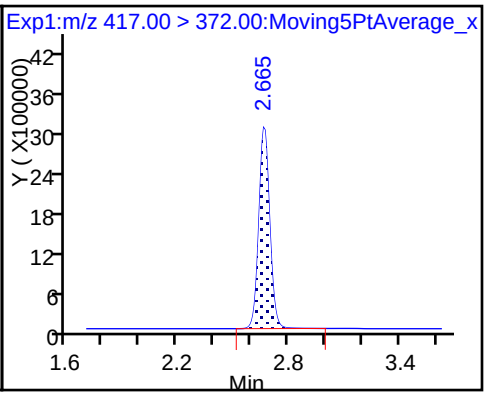
13 Sodium 1H,1H,2H,2H-perfluorooctane



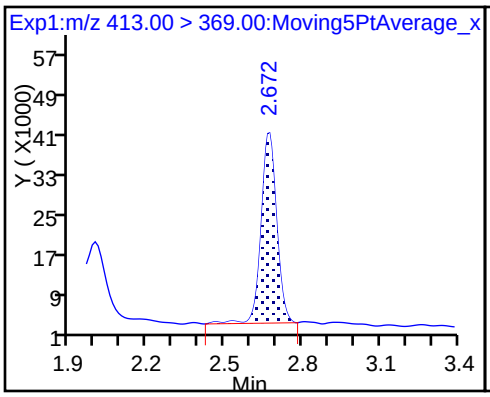
62 13C2-PFOA



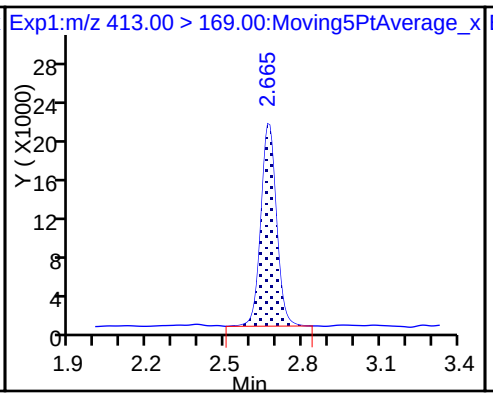
D 14 13C4 PFOA



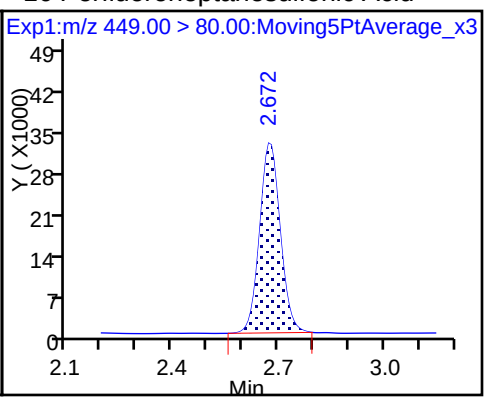
15 Perfluorooctanoic acid



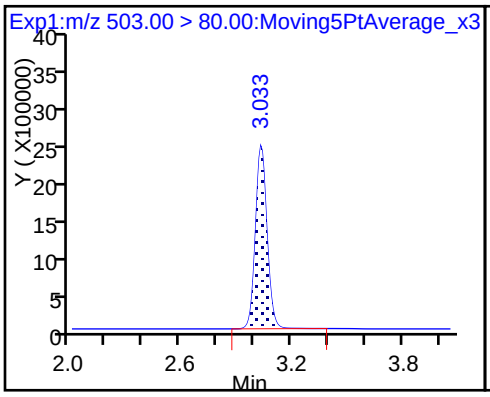
15 Perfluorooctanoic acid



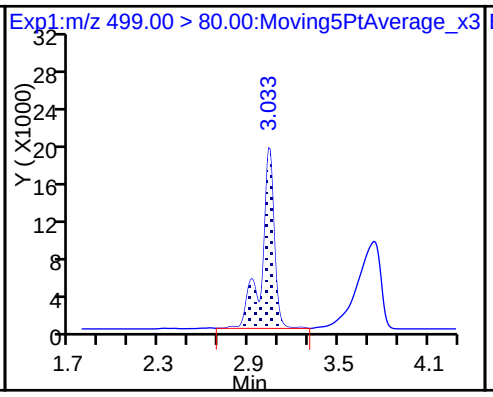
16 Perfluoroheptanesulfonic Acid



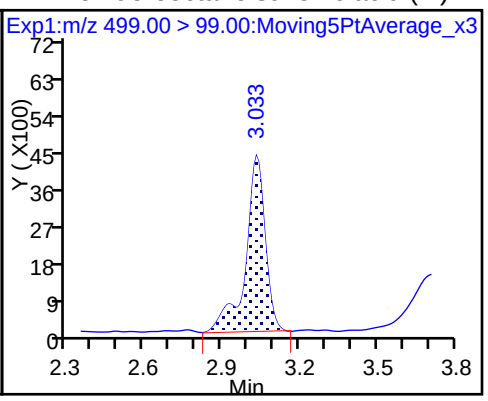
D 18 13C4 PFOS



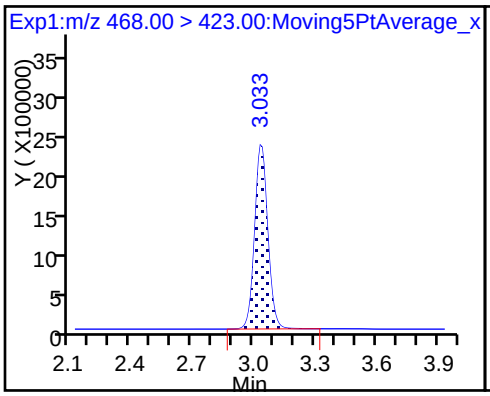
17 Perfluorooctane sulfonic acid



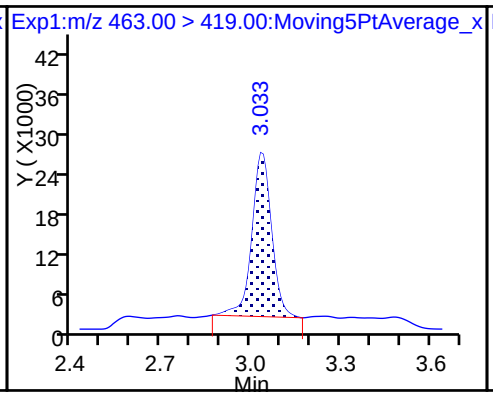
17 Perfluorooctane sulfonic acid (M)



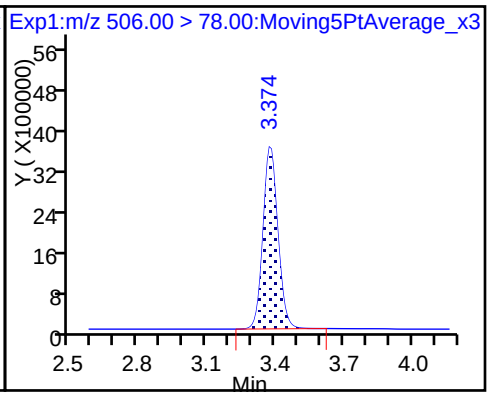
D 19 13C5 PFNA



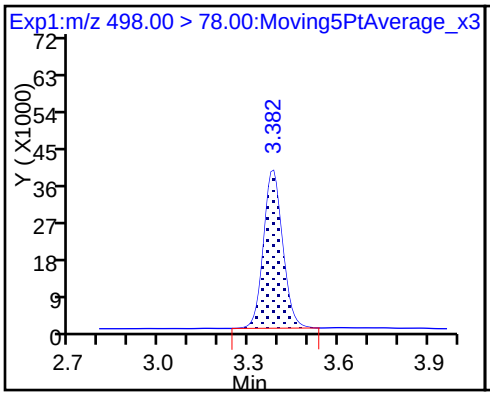
20 Perfluorononanoic acid



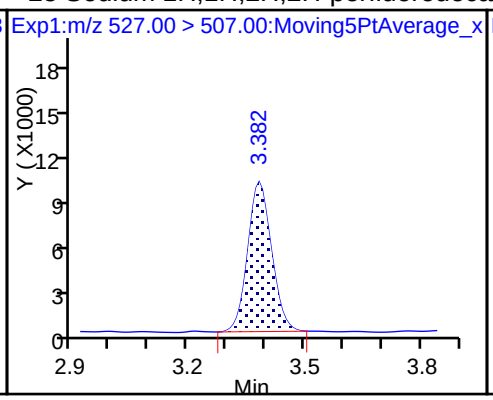
D 21 13C8 FOSA



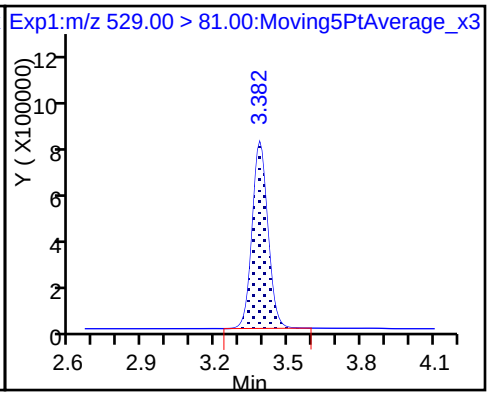
22 Perfluorooctane Sulfonamide



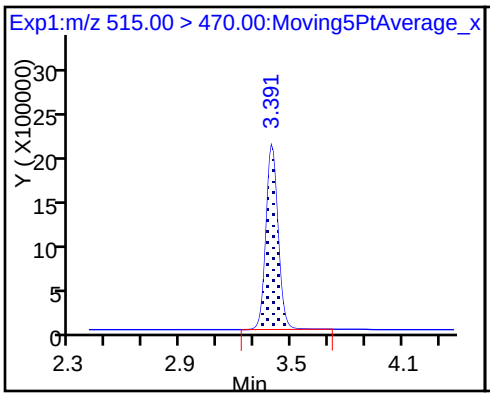
25 Sodium 1H,1H,2H,2H-perfluorodecane



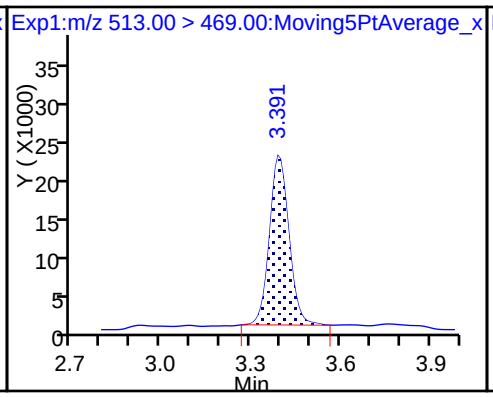
D 26 M2-8:2FTS



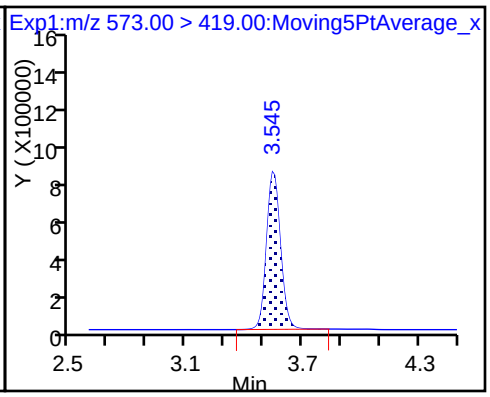
D 23 13C2 PFDA



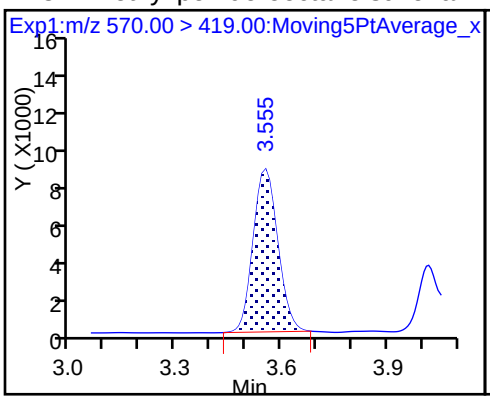
24 Perfluorodecanoic acid



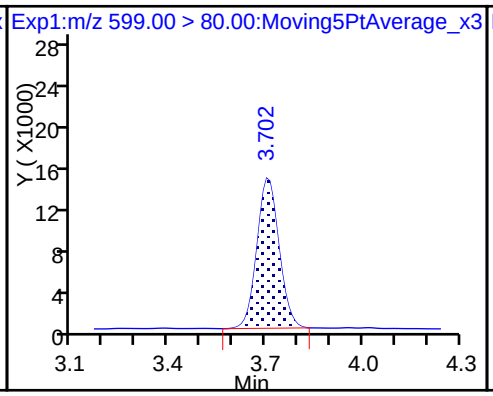
D 27 d3-NMeFOSAA



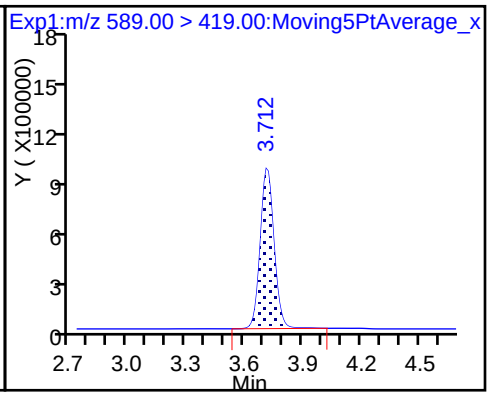
28 N-methyl perfluorooctane sulfonami



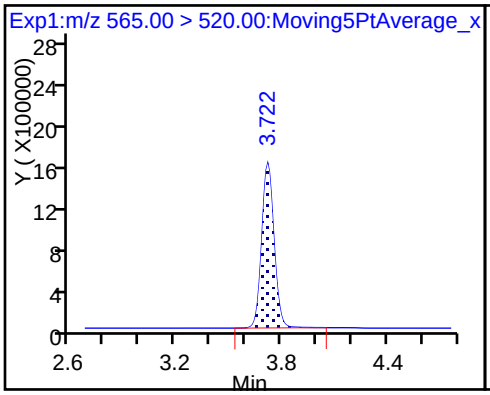
29 Perfluorodecane Sulfonic acid



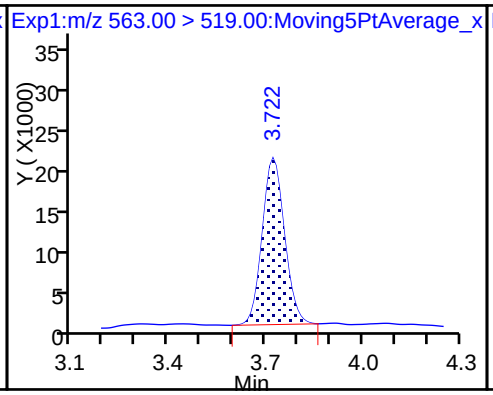
D 32 d5-NEtFOSAA



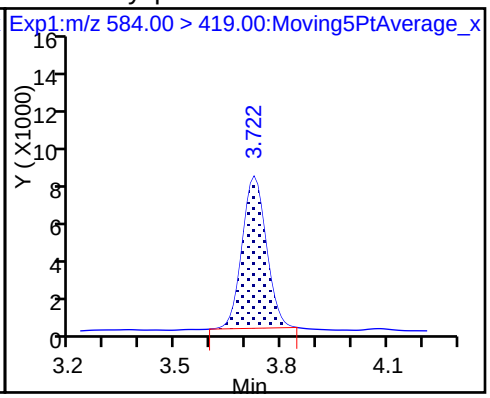
D 30 13C2 PFUnA



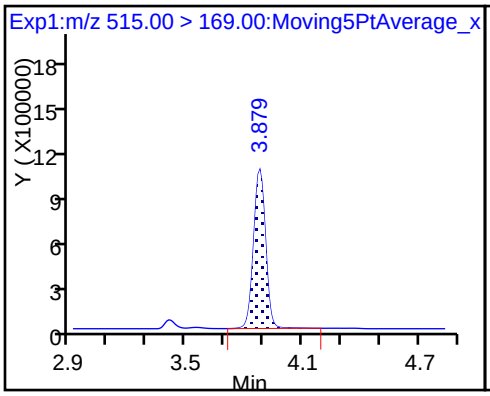
31 Perfluoroundecanoic acid



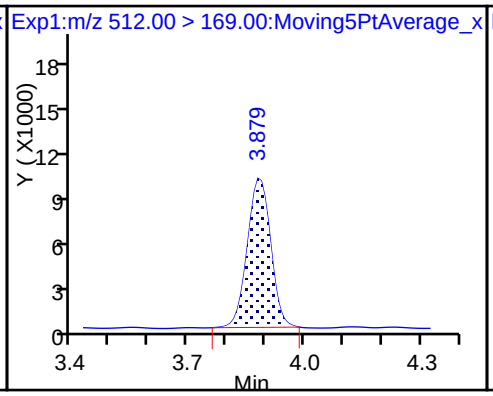
33 N-ethyl perfluorooctane sulfonamid



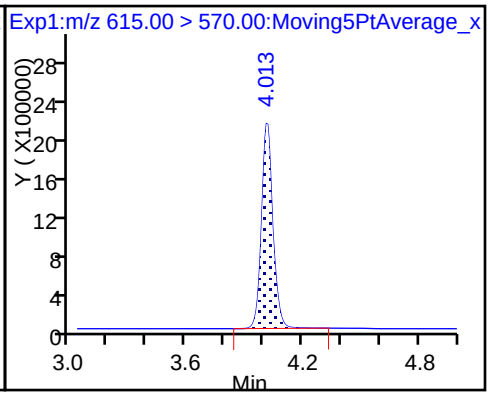
D 34 d-N-MeFOSA-M



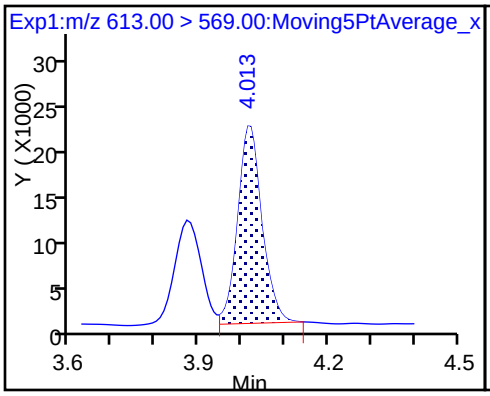
35 MeFOSA



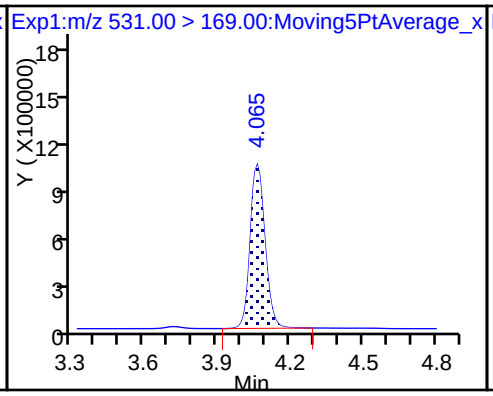
D 36 13C2 PFDoA



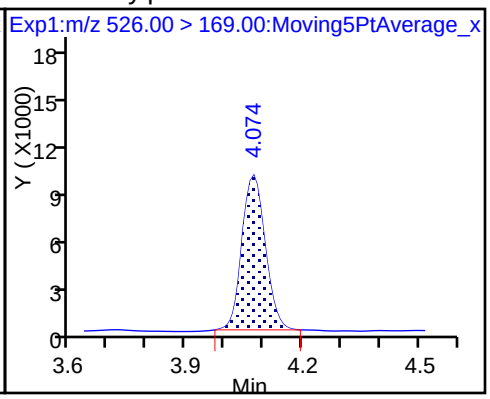
37 Perfluorododecanoic acid



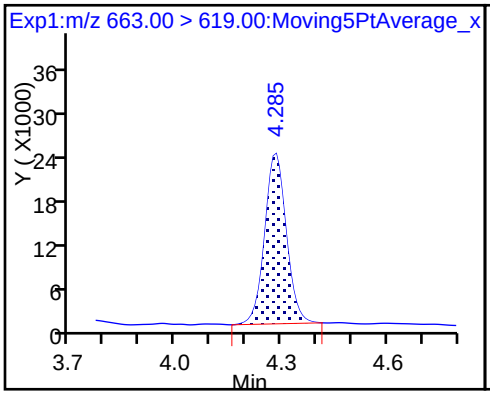
D 38 d-N-EtFOSA-M



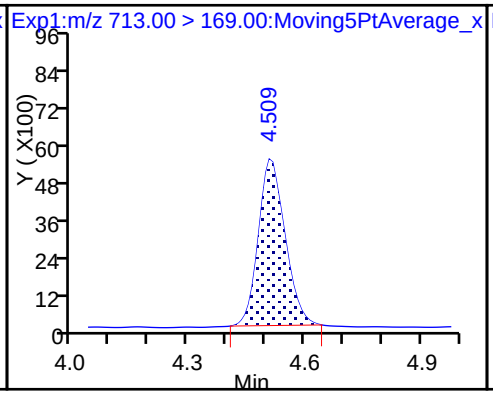
39 N-ethylperfluoro-1-octanesulfonami



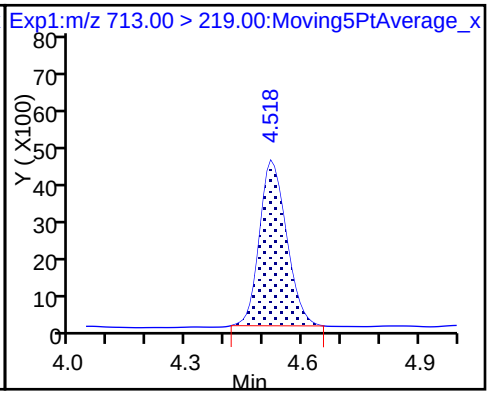
41 Perfluorotridecanoic acid



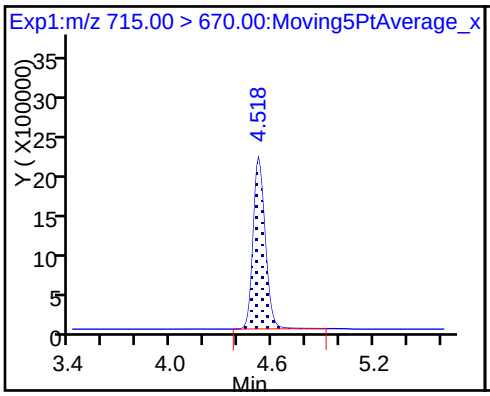
42 Perfluorotetradecanoic acid



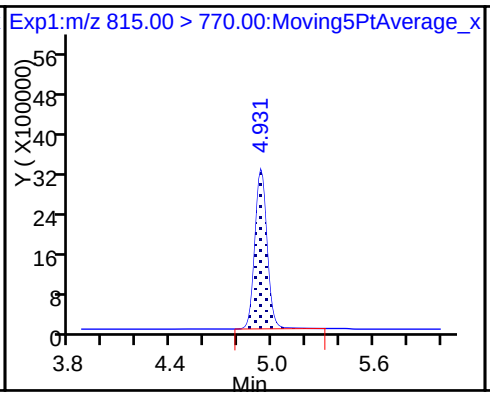
42 Perfluorotetradecanoic acid



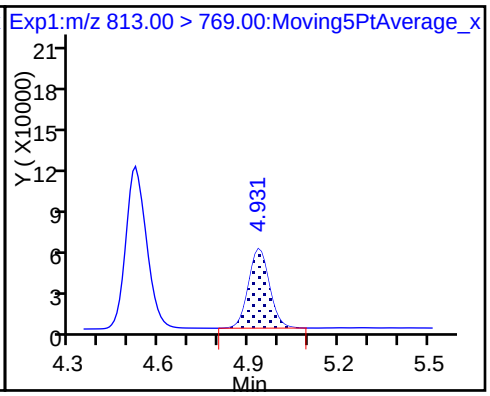
D 43 13C2-PFTeDA



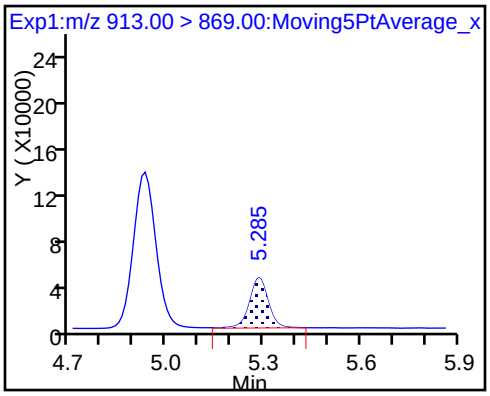
D 44 13C2-PFHxDA



45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

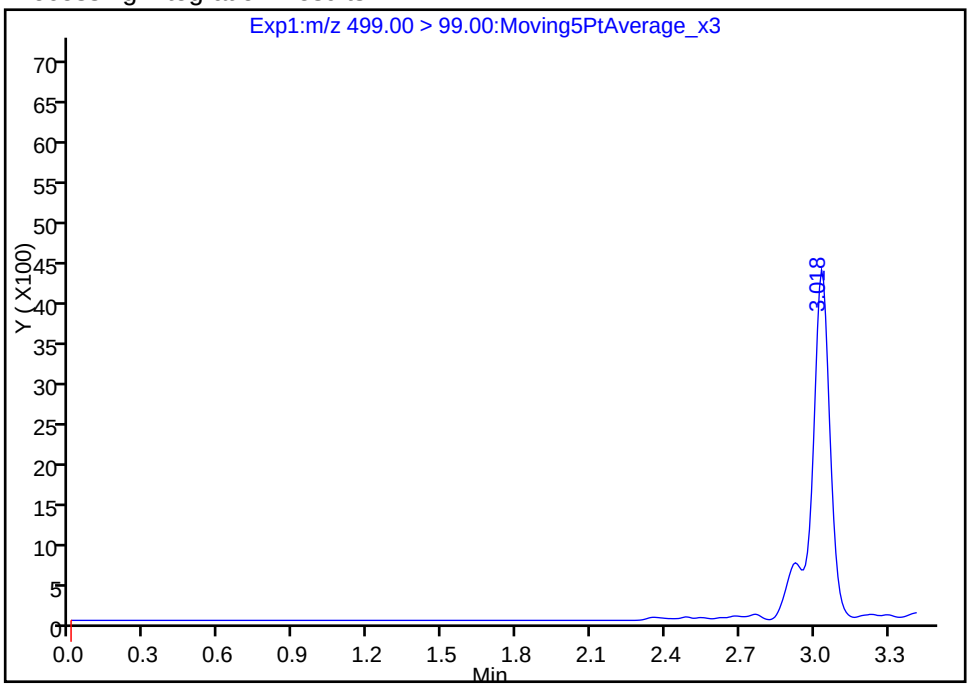
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_003.d				
Injection Date:	30-Oct-2017 17:59:31	Instrument ID:	A8_N		
Lims ID:	IC L1 Full				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	28	Worklist Smp#:	3
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

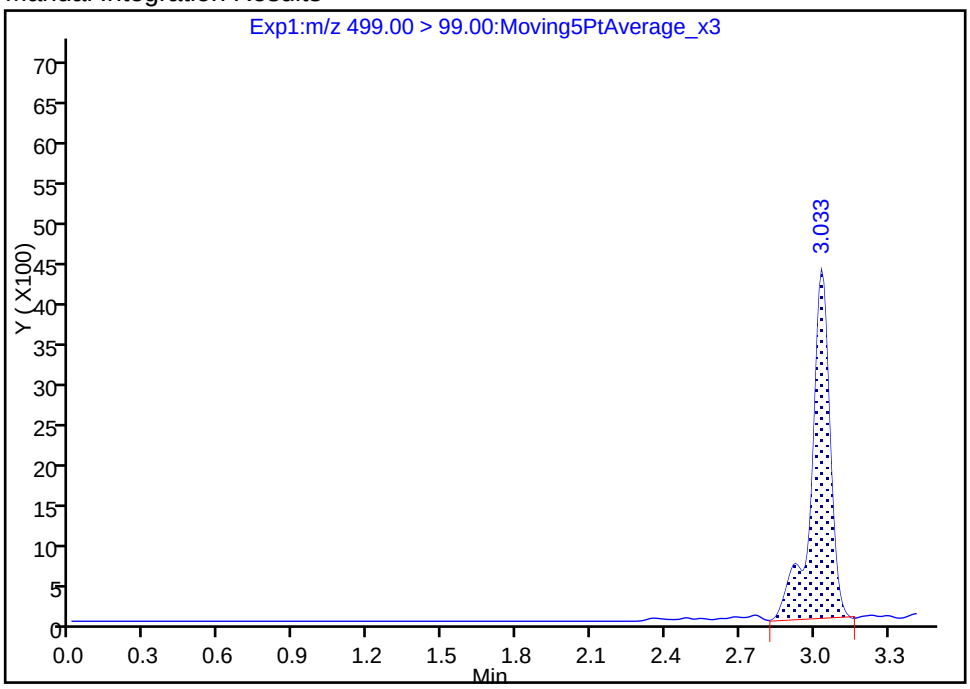
Processing Integration Results

RT: 3.02
Area: 0
Amount: 0.483253
Amount Units: ng/ml



Manual Integration Results

RT: 3.03
Area: 22603
Amount: 0.486936
Amount Units: ng/ml



Reviewer: phomsophat, 30-Oct-2017 22:45:13

Audit Action: Manually Integrated Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_004.d
Lims ID: IC L2 Full
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 30-Oct-2017 18:06:25 ALS Bottle#: 29 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:19:34 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:46:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	351349	1.02		102	87.3	
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		18091732	51.6		103	22433	
D 3 13C5-PFPeA										
267.90 > 223.00	1.746	1.739	0.007		11646212	51.6		103	152571	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.746	1.741	0.005	1.000	268577	1.07		107	258	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.763	0.001		239859	47.7		103	7784	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	339771	0.9088		103	944	
298.90 > 99.00	1.764	1.764	0.0	1.000	142401		2.39(0.00-0.00)	103	1205	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	83727	0.9157		98.0	4058	
6 Perfluorohexanoic acid										
313.00 > 269.00	2.006	1.998	0.008	1.000	245774	1.03		103	428	
D 7 13C2 PFHxA										
315.00 > 270.00	2.006	1.998	0.008		12533747	51.7		103	28766	
D 9 13C4-PFHpA										
367.00 > 322.00	2.320	2.319	0.001		12927656	53.0		106	25030	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.320	2.319	0.001	1.000	253519	1.01		101	516	
D 11 18O2 PFHxS										
403.00 > 84.00	2.337	2.333	0.004		14626159	48.6		103	22687	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.337	2.333	0.004	1.000	332754	1.04		114	1959	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.647	2.641	0.006	1.000	85870	0.9162		96.7	2253	
D 12 M2-6:2FTS										
429.00 > 81.00	2.647	2.641	0.006		3574947	51.4		108	12690	
* 62 13C2-PFOA										
415.00 > 370.00	2.669	2.655	0.014		12780795	50.0			15425	
D 14 13C4 PFOA										
417.00 > 372.00	2.669	2.664	0.005		13024434	54.6		109	24852	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.669	2.666	0.003	1.000	312091	1.12		112	130	
413.00 > 169.00	2.669	2.666	0.003	1.000	153854		2.03(0.90-1.10)	112	542	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.676	2.672	0.004	1.000	261088	1.02		107	4092	
D 18 13C4 PFOS										
503.00 > 80.00	3.035	3.030	0.005		10456339	49.3		103	12740	
D 19 13C5 PFNA										
468.00 > 423.00	3.035	3.031	0.004		10570529	52.4		105	11270	
17 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.035	3.031	0.004	1.000	208901	0.9182		98.9	140	
499.00 > 99.00	3.035	3.031	0.004	1.000	45102		4.63(0.90-1.10)	98.9	196	M
20 Perfluorononanoic acid										
463.00 > 419.00	3.035	3.033	0.002	1.000	212119	1.04		104	224	
D 21 13C8 FOSA										
506.00 > 78.00	3.380	3.377	0.003		16441468	52.8		106	16739	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.388	3.379	0.009	1.000	319607	1.03		103	3300	
D 26 M2-8:2FTS										
529.00 > 81.00	3.388	3.381	0.007		3568424	49.4		103	8557	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.388	3.381	0.007	1.000	77968	0.9410		98.2	1327	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.396	3.391	0.005	1.000	186086	1.03		103	583	
D 23 13C2 PFDA										
515.00 > 470.00	3.396	3.391	0.005		9642702	52.8		106	11815	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.552	3.547	0.005		4142746	50.7		101	5419	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.562	3.553	0.009	1.003	72427	0.9345		93.5	213	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.710	3.705	0.005	1.000	135804	0.9583		99.4	2409	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.719	3.715	0.004		4588738	54.6		109	4086	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.729	3.722	0.007	1.000	176741	1.05		105	525	
D 30 13C2 PFUnA										
565.00 > 520.00	3.729	3.722	0.007		7863227	53.9		108	5846	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.729	3.723	0.006	1.003	73483	0.9484		94.8	1080	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.886	3.881	0.005		4454324	49.2		98.3	872	
35 MeFOSA										
512.00 > 169.00	3.886	3.885	0.001	1.000	80614	1.01		101	1622	
D 36 13C2 PFDoA										
615.00 > 570.00	4.018	4.015	0.003		8569420	51.0		102	12186	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.018	4.016	0.002	1.000	163075	1.03		103	164	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.073	4.068	0.005		4241996	48.9		97.7	3334	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.073	4.074	-0.001	1.000	79926	1.01		101	1439	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.285	4.281	0.004	1.000	178964	1.01		101	71.9	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.517	4.510	0.007	1.000	47718	1.01		101	1119	
713.00 > 219.00	4.517	4.510	0.007	1.000	36319		1.31(0.00-0.00)	101	934	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.517	4.516	0.001		10669124	52.1		104	17484	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.931	4.929	0.002	1.000	410574	0.99		99.5	40.8	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.931	4.929	0.002		15778734	51.5		103	9833	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.285	5.281	0.004	1.000	317418	1.06		106	31.5	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC_FULL-L2_00006 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:19:36 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_004.d

Injection Date: 30-Oct-2017 18:06:25 Instrument ID: A8_N

Lims ID: IC L2 Full

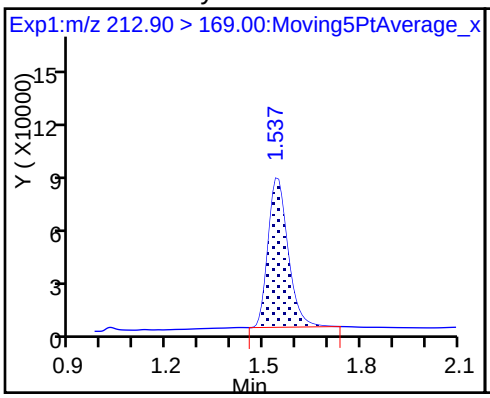
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 29 Worklist Smp#: 4

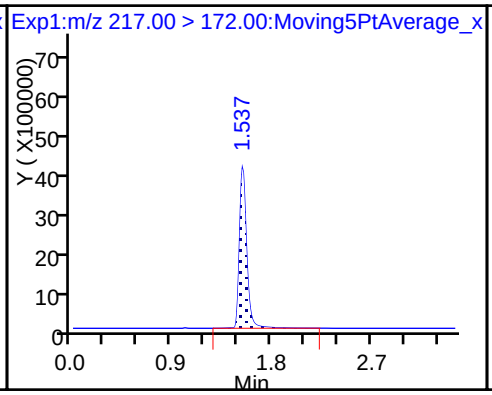
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

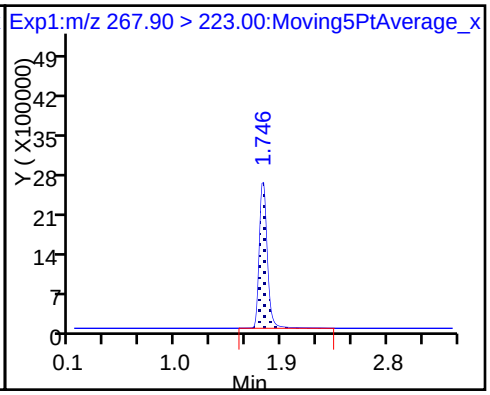
2 Perfluorobutyric acid



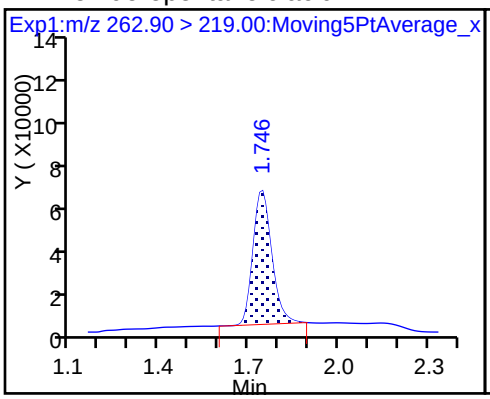
D 1 13C4 PFBA



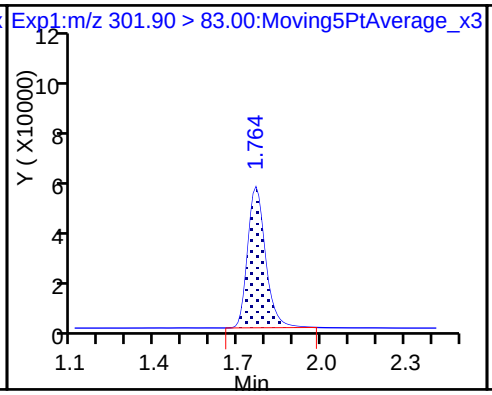
D 3 13C5-PFPeA



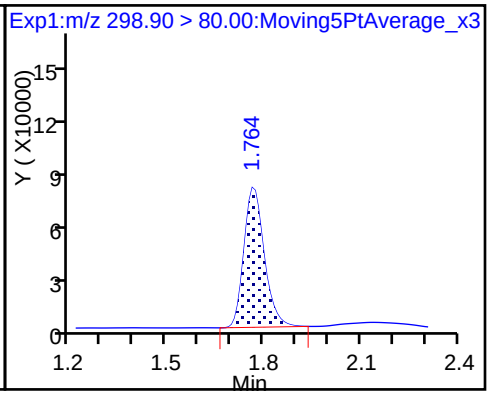
4 Perfluoropentanoic acid



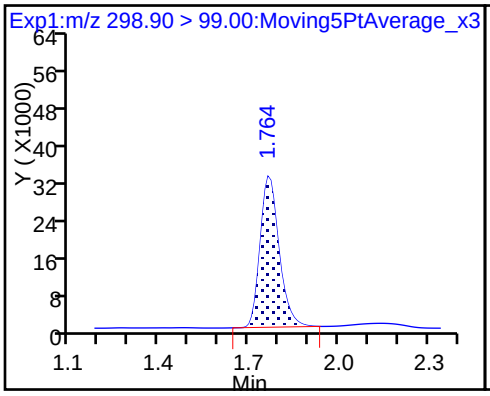
D 47 13C3-PFBS



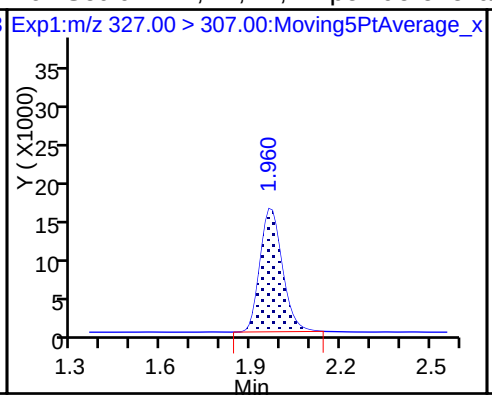
5 Perfluorobutanesulfonic acid



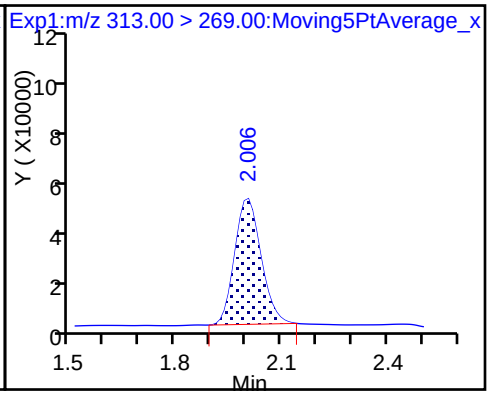
5 Perfluorobutanesulfonic acid



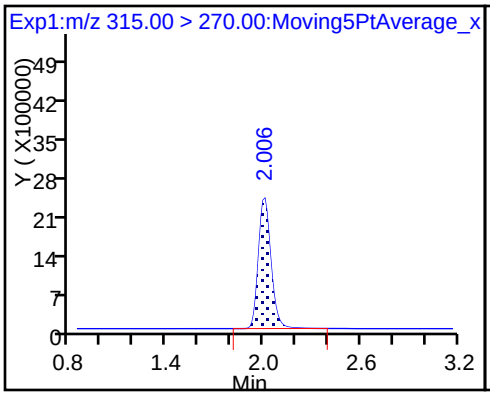
61 Sodium 1H,1H,2H,2H-perfluorohexane



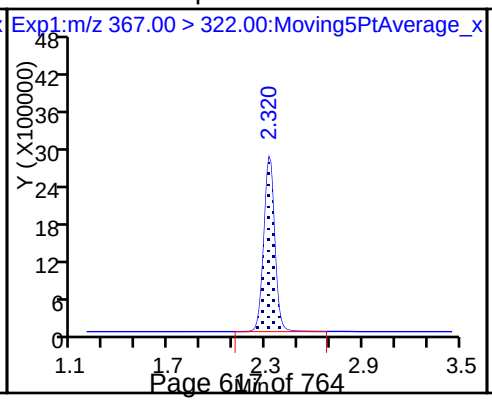
6 Perfluorohexanoic acid



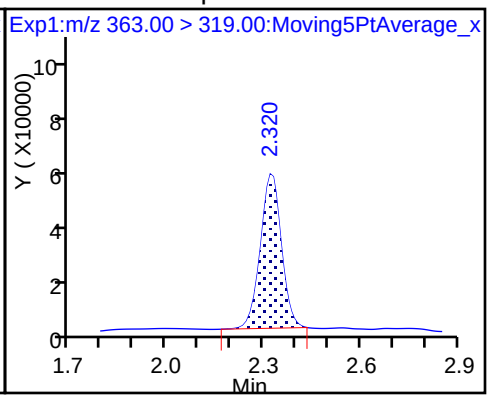
D 7 13C2 PFHxA



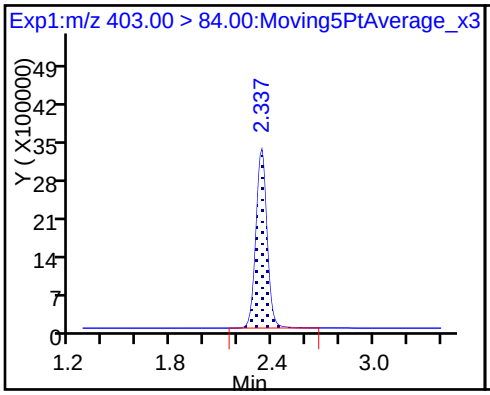
D 9 13C4-PFHpA



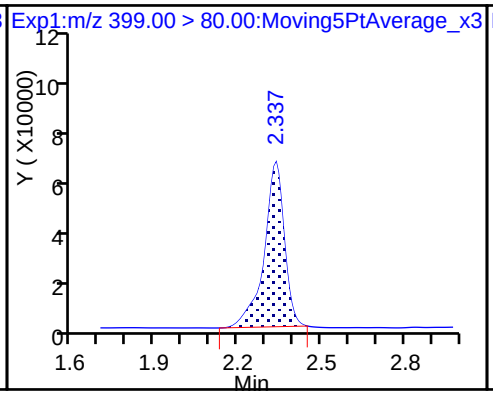
10 Perfluoroheptanoic acid



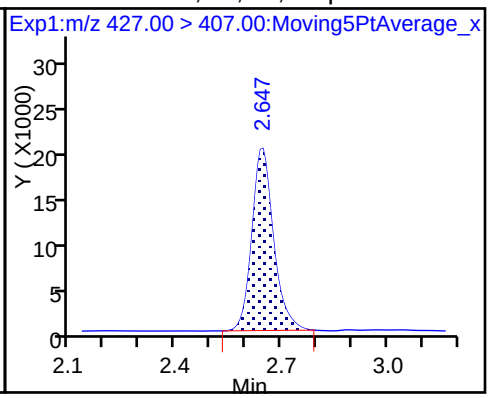
D 11 18O2 PFHxS



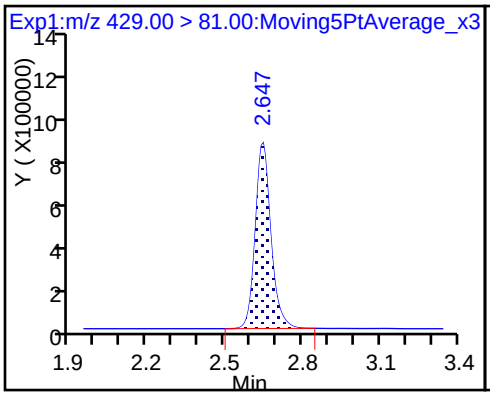
8 Perfluorohexanesulfonic acid



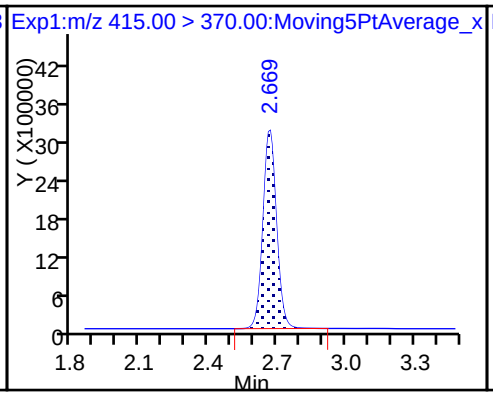
13 Sodium 1H,1H,2H,2H-perfluorooctane



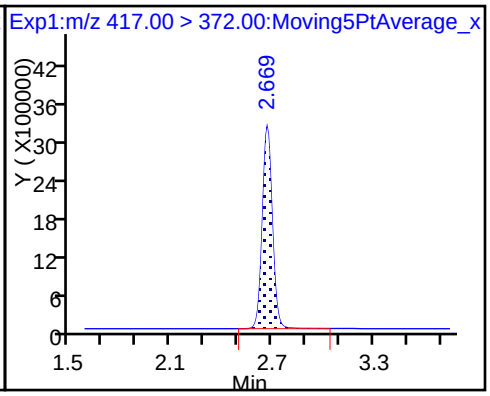
D 12 M2-6:2FTS



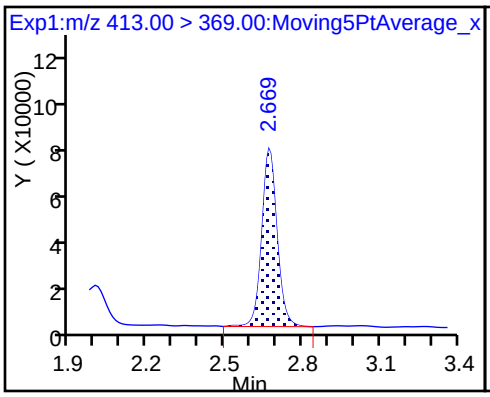
* 62 13C2-PFOA



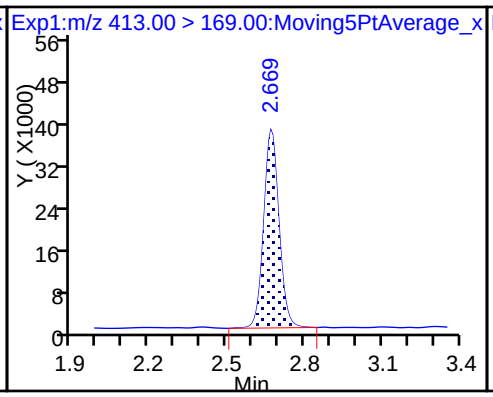
D 14 13C4 PFOA



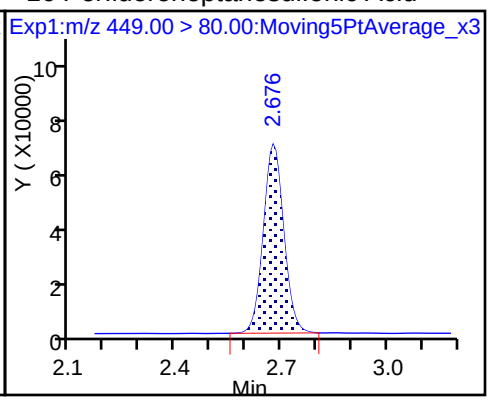
15 Perfluorooctanoic acid



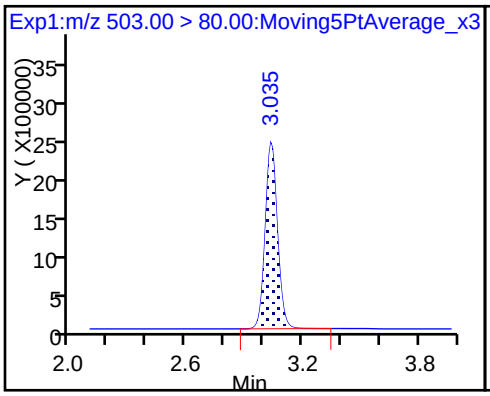
15 Perfluorooctanoic acid



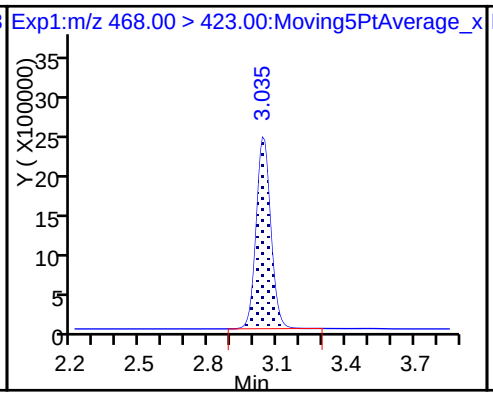
16 Perfluoroheptanesulfonic Acid



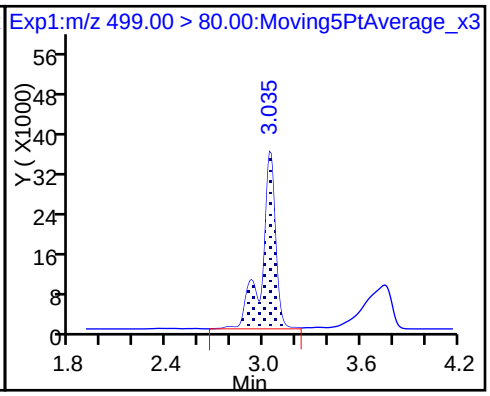
D 18 13C4 PFOS



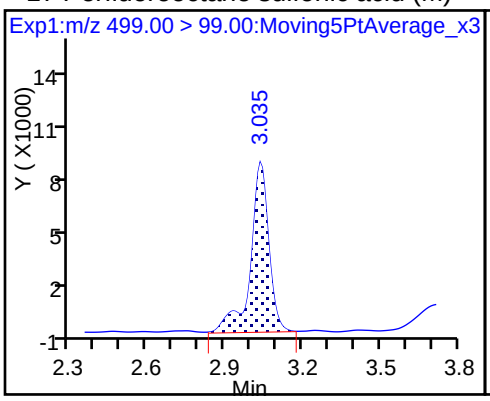
D 19 13C5 PFNA



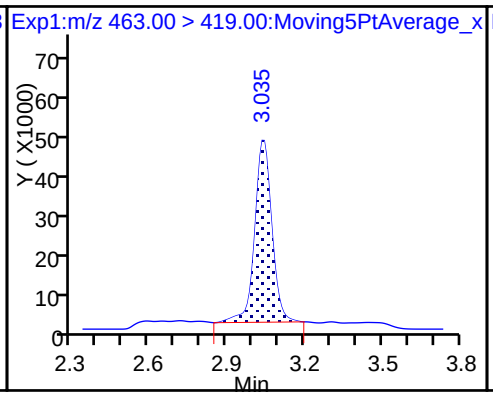
17 Perfluorooctane sulfonic acid



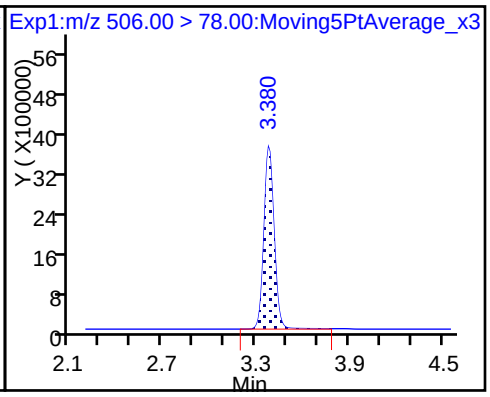
17 Perfluorooctane sulfonic acid (M)



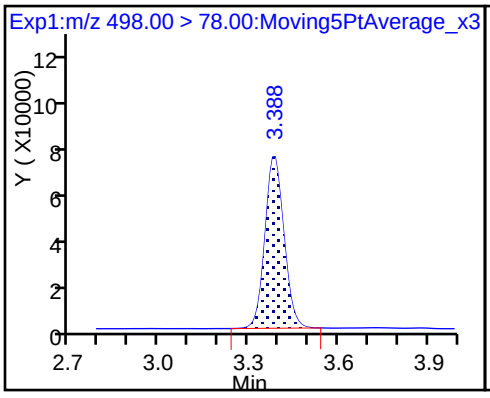
20 Perfluorononanoic acid



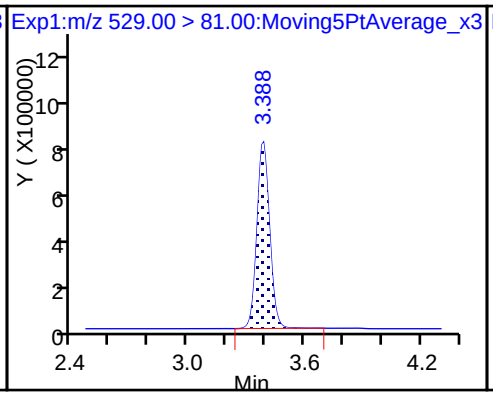
D 21 13C8 FOSA



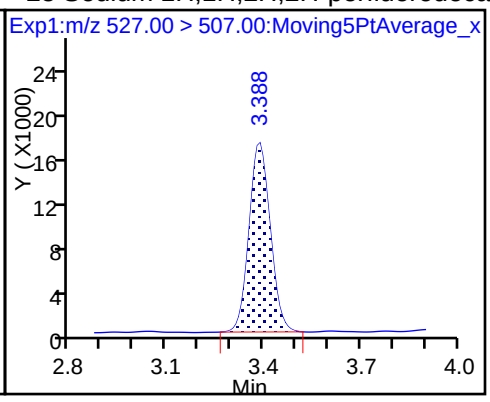
22 Perfluorooctane Sulfonamide



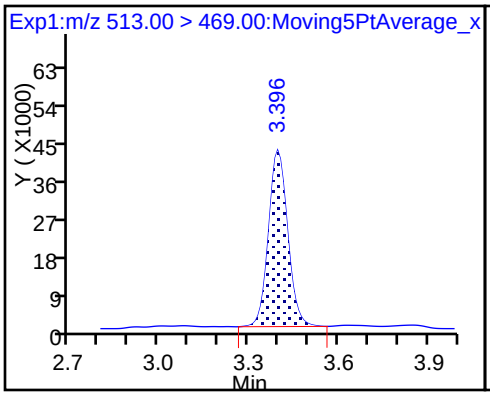
D 26 M2-8:2FTS



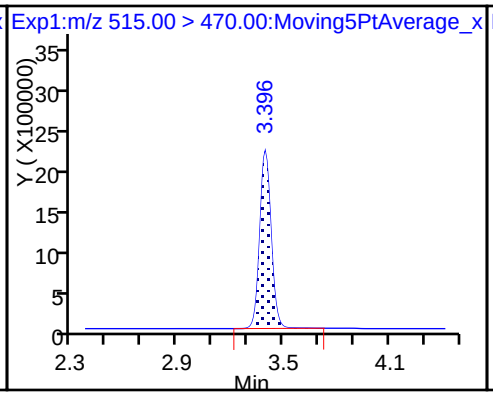
25 Sodium 1H,1H,2H,2H-perfluorodecane



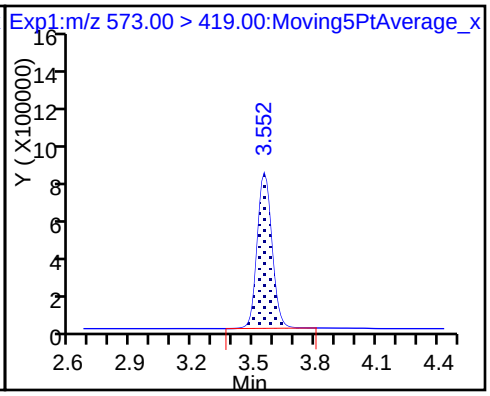
24 Perfluorodecanoic acid



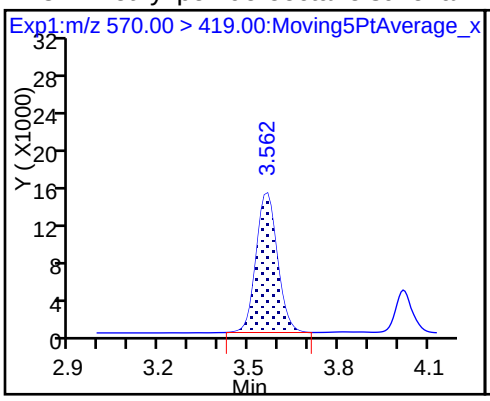
D 23 13C2 PFDA



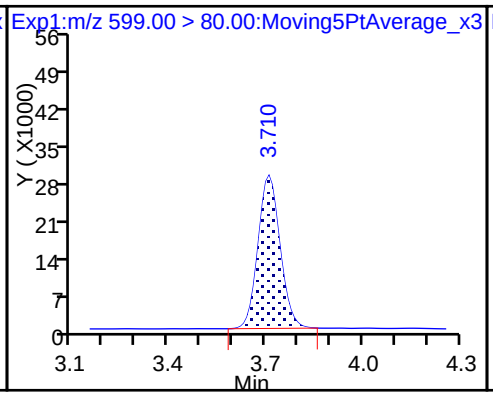
D 27 d3-NMeFOSAA



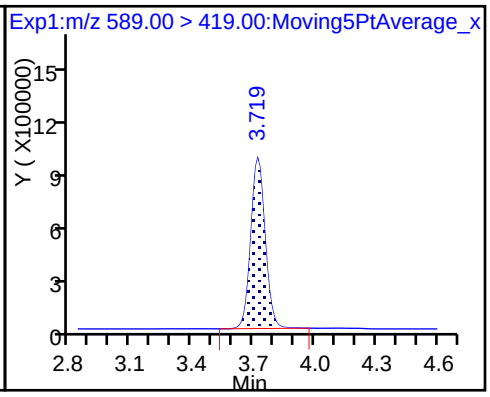
28 N-methyl perfluorooctane sulfonami



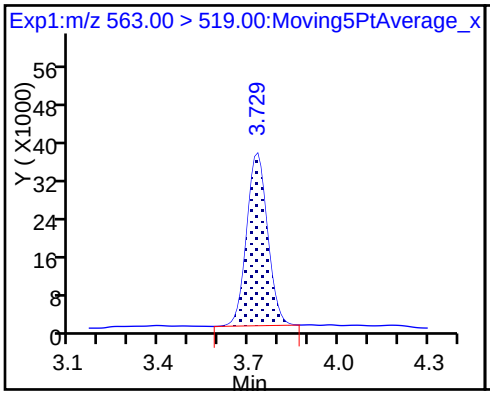
29 Perfluorodecane Sulfonic acid



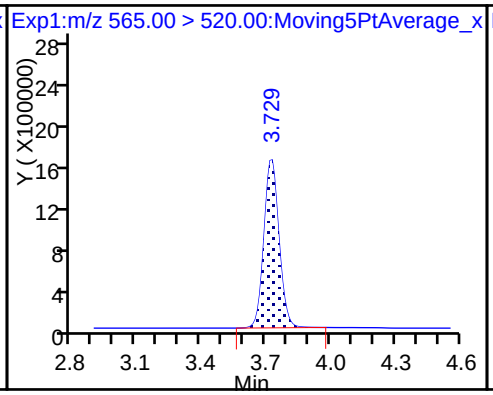
D 32 d5-NEtFOSAA



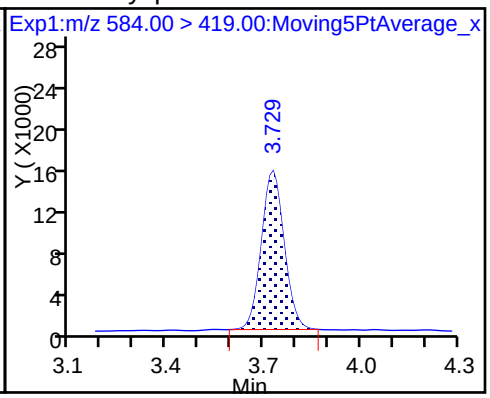
31 Perfluoroundecanoic acid



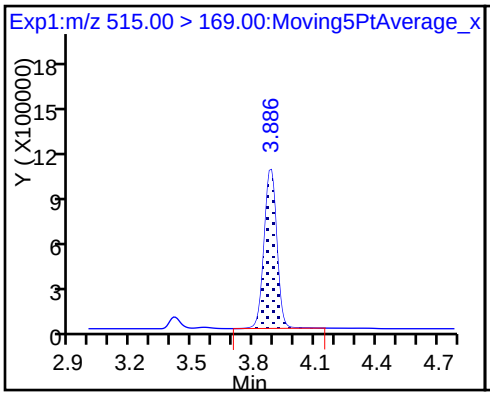
D 30 13C2 PFUnA



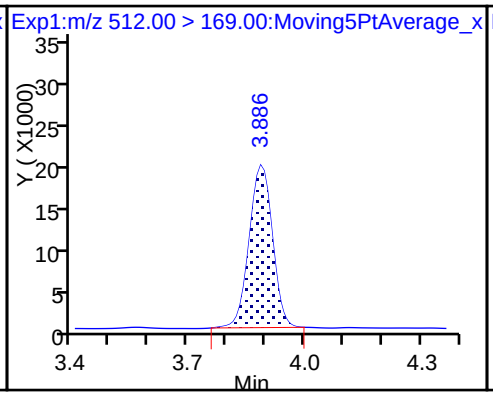
33 N-ethyl perfluorooctane sulfonamid



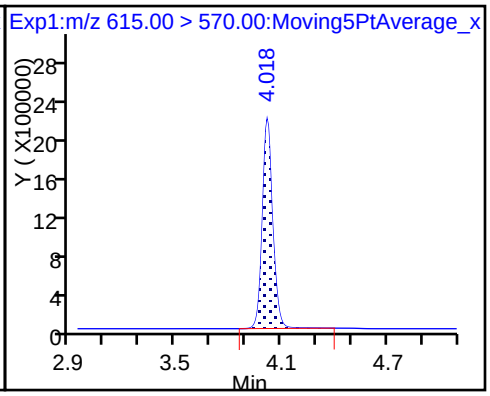
D 34 d-N-MeFOSA-M



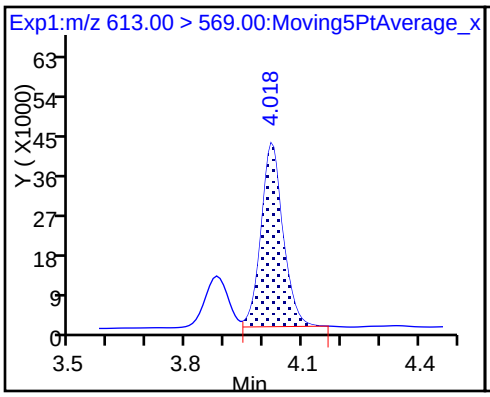
35 MeFOSA



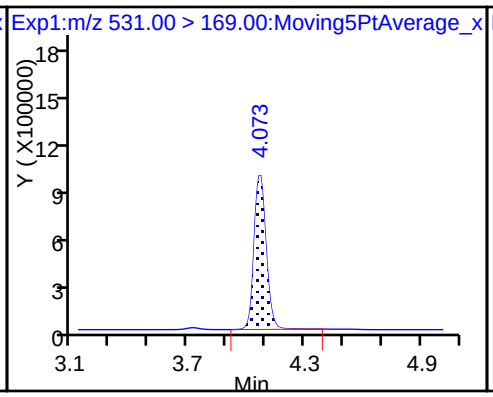
D 36 13C2 PFDoA



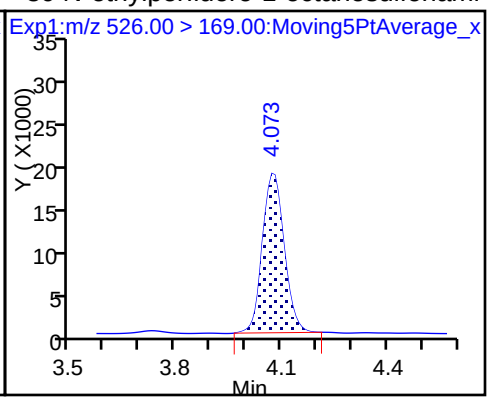
37 Perfluorododecanoic acid



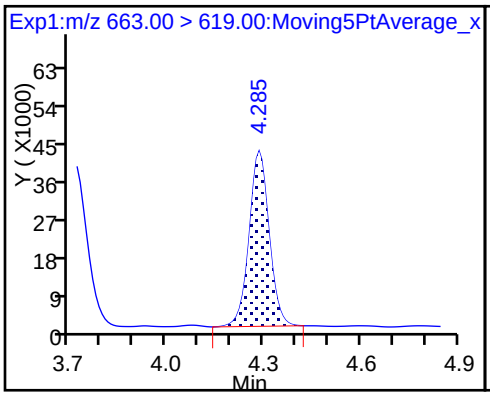
D 38 d-N-EtFOSA-M



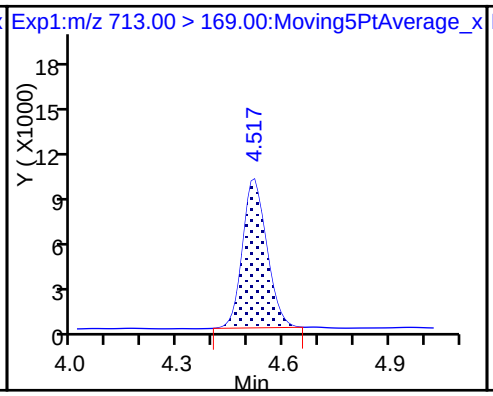
39 N-ethylperfluoro-1-octanesulfonami



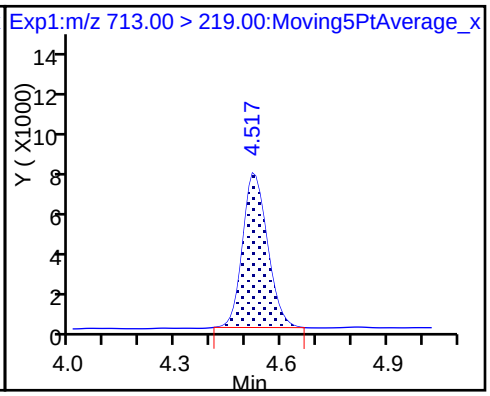
41 Perfluorotridecanoic acid



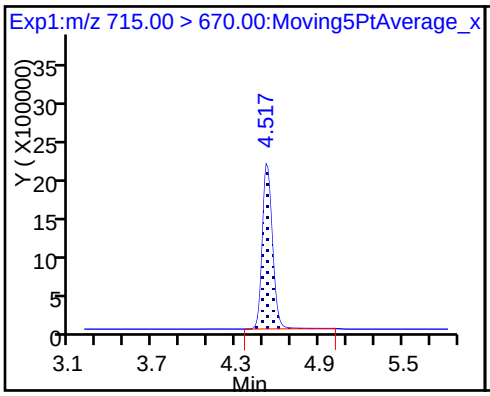
42 Perfluorotetradecanoic acid



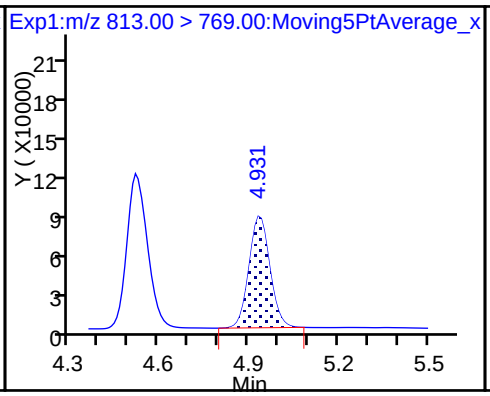
42 Perfluorotetradecanoic acid



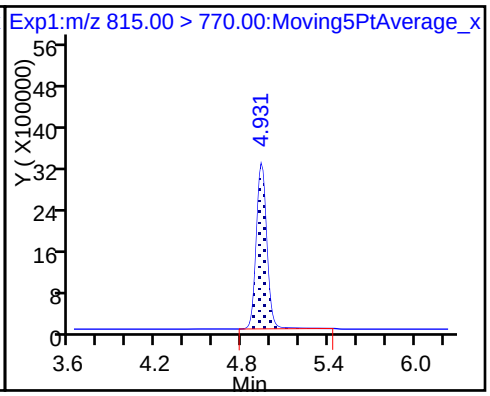
D 43 13C2-PFTeDA



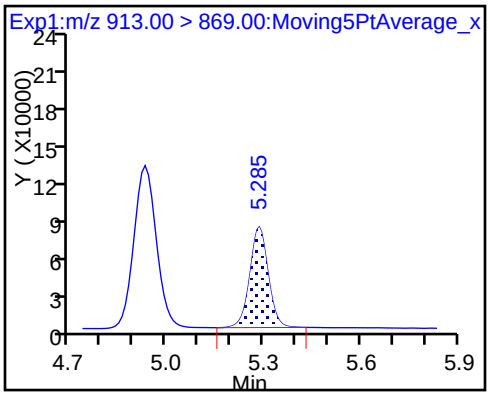
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

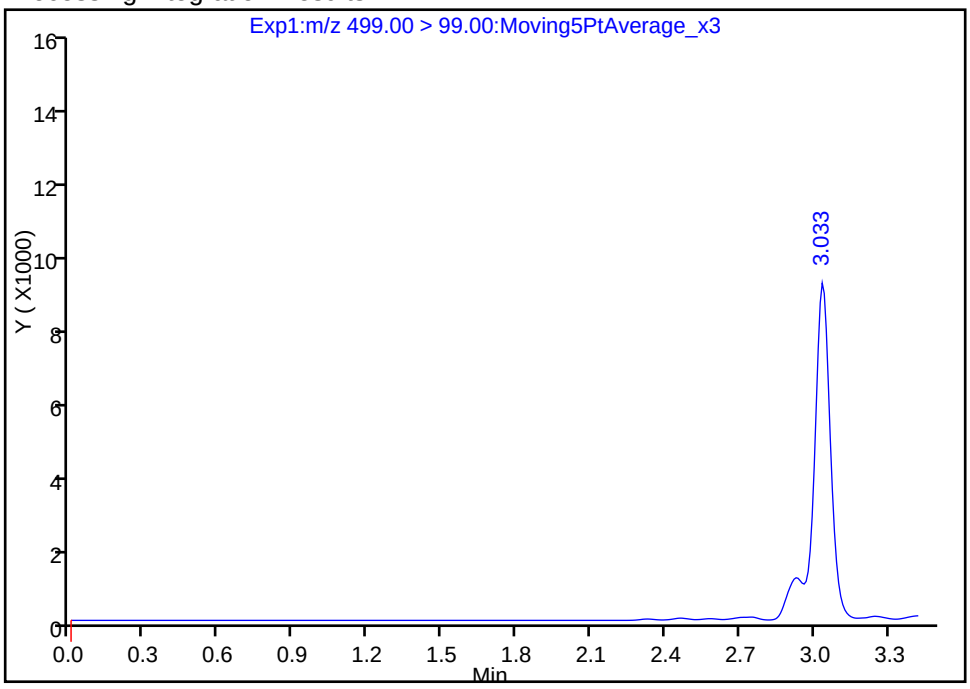
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_004.d				
Injection Date:	30-Oct-2017 18:06:25	Instrument ID:	A8_N		
Lims ID:	IC L2 Full				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	29	Worklist Smp#:	4
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

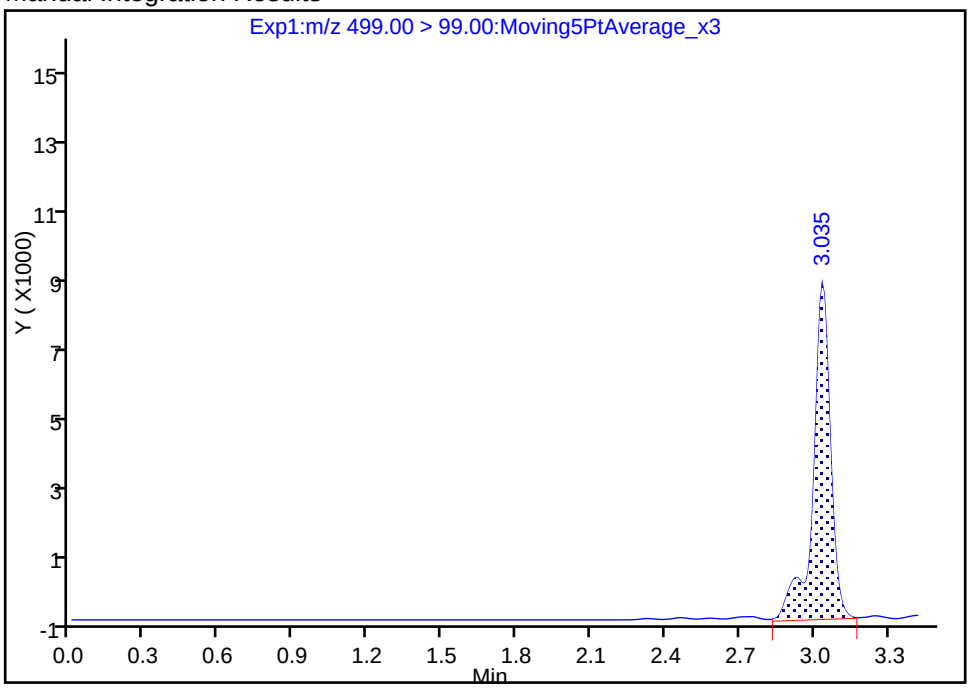
Processing Integration Results

RT: 3.03
Area: 0
Amount: 0.911227
Amount Units: ng/ml



Manual Integration Results

RT: 3.04
Area: 45102
Amount: 0.918171
Amount Units: ng/ml



Reviewer: phomsophat, 30-Oct-2017 22:46:30

Audit Action: Manually Integrated Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_005.d
Lims ID: IC L3 Full
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 30-Oct-2017 18:13:19 ALS Bottle#: 30 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:19:44 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:48:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		18042358	51.5		103	28423	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	1845411	5.37		107	524	
D 3 13C5-PFPeA										
267.90 > 223.00	1.746	1.739	0.007		11968018	53.1		106	158446	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.746	1.741	0.005	1.000	1327357	5.16		103	1245	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.763	0.001		249974	49.7		107	8199	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	1805379	4.63		105	4347	
298.90 > 99.00	1.764	1.764	0.0	1.000	755670		2.39(0.00-0.00)	105	4257	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.961	1.961	-0.001	1.000	409149	4.69		100	15641	
D 7 13C2 PFHxA										
315.00 > 270.00	2.006	1.998	0.008		12490114	51.5		103	29975	
6 Perfluorohexanoic acid										
313.00 > 269.00	2.006	1.998	0.008	1.000	1302471	5.46		109	2198	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.325	2.319	0.006	1.000	1361815	5.39		108	2280	
D 9 13C4-PFHpA										
367.00 > 322.00	2.325	2.319	0.006		13063724	53.6		107	17987	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.333	2.333	0.0	1.000	1556248	4.70		103	3982	
D 11 18O2 PFHxS										
403.00 > 84.00	2.333	2.333	0.0		15142641	50.3		106	20726	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.643	2.641	0.002		3410618	49.0		103	11471	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.643	2.641	0.002	1.000	427077	4.78		101	6231	
* 62 13C2-PFOA										
415.00 > 370.00	2.664	2.655	0.009		12125916	50.0			24012	
D 14 13C4 PFOA										
417.00 > 372.00	2.664	2.664	0.0		12154092	50.9		102	27110	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.664	2.666	-0.002	1.000	1358217	5.20		104	527	
413.00 > 169.00	2.664	2.666	-0.002	1.000	702616		1.93(0.90-1.10)	104	2191	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.671	2.672	-0.001	1.000	1307067	5.09		107	8328	
D 18 13C4 PFOS										
503.00 > 80.00	3.031	3.030	0.001		10466308	49.4		103	18225	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.031	3.031	0.0	1.000	1078764	4.74		102	628	
499.00 > 99.00	3.031	3.031	0.0	1.000	227223		4.75(0.90-1.10)	102	770	
D 19 13C5 PFNA										
468.00 > 423.00	3.039	3.031	0.008		10642051	52.7		105	19695	
20 Perfluorononanoic acid										
463.00 > 419.00	3.039	3.033	0.006	1.000	1052198	5.10		102	975	
D 21 13C8 FOSA										
506.00 > 78.00	3.381	3.377	0.004		16339148	52.5		105	106737	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.381	3.379	0.002	1.000	1655149	5.37		107	8693	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.381	3.381	0.0	1.000	431491	4.90		102	4615	
D 26 M2-8:2FTS										
529.00 > 81.00	3.381	3.381	0.0		3788998	52.4		109	7224	
D 23 13C2 PFDA										
515.00 > 470.00	3.398	3.391	0.007		9510123	52.1		104	10230	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.398	3.391	0.007	1.000	910996	5.10		102	2401	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.554	3.547	0.007		4152012	50.8		102	5575	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.554	3.553	0.001	1.000	391751	5.04		101	939	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.711	3.705	0.006	1.000	713584	5.03		104	6254	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.721	3.715	0.006		4505726	53.7		107	5240	
D 30 13C2 PFUnA										
565.00 > 520.00	3.731	3.722	0.009		7789622	53.4		107	8200	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.731	3.722	0.009	1.000	829066	4.99		99.7	1976	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.731	3.723	0.008	1.003	385572	5.07		101	2949	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.888	3.881	0.007		4575836	50.5		101	1001	
35 MeFOSA										
512.00 > 169.00	3.888	3.885	0.003	1.000	412739	5.06		101	2691	
D 36 13C2 PFDoA										
615.00 > 570.00	4.020	4.015	0.005		8944676	53.3		107	22379	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.020	4.016	0.004	1.000	823879	5.01		100	728	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.074	4.068	0.006		4286339	49.4		98.7	2576	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.074	4.074	0.0	1.000	408209	5.12		102	2159	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.286	4.281	0.005	1.000	936032	5.06		101	368	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.511	4.510	0.001	1.000	235213	4.95		99.0	2901	
713.00 > 219.00	4.520	4.510	0.010	1.002	178542		1.32(0.00-0.00)	99.0	2637	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.520	4.516	0.004		10691814	52.3		105	10247	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.933	4.929	0.004		16082155	52.5		105	7116	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.933	4.929	0.004	1.000	1555603	5.09		102	136	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.287	5.281	0.006	1.000	1604499	5.25		105	140	

Reagents:

LCPFC_FULL-L3_00005 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:19:46 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_005.d

Injection Date: 30-Oct-2017 18:13:19 Instrument ID: A8_N

Lims ID: IC L3 Full

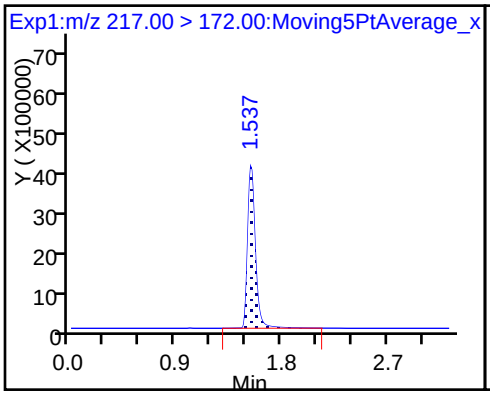
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 30 Worklist Smp#: 5

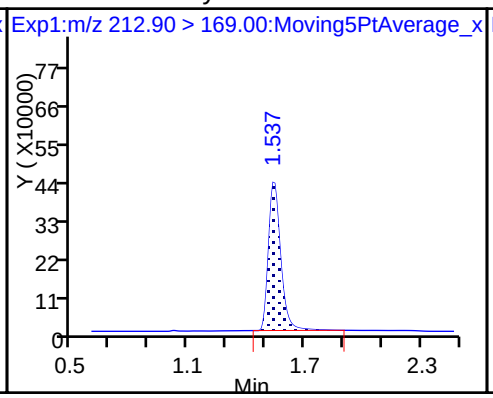
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

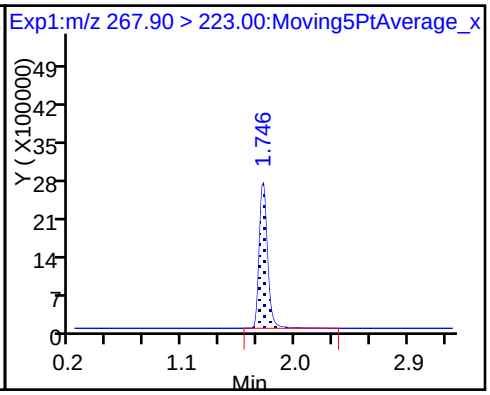
D 1 13C4 PFBA



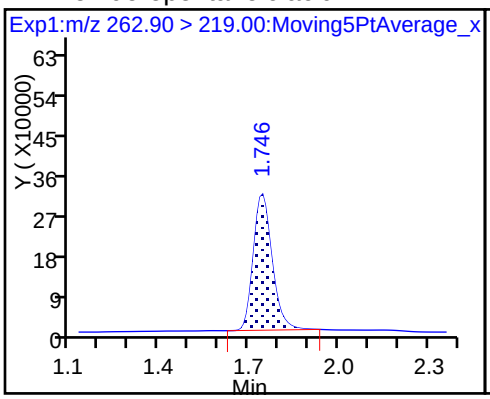
2 Perfluorobutyric acid



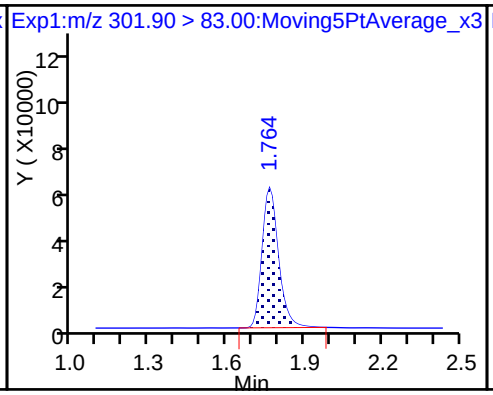
D 3 13C5-PFPeA



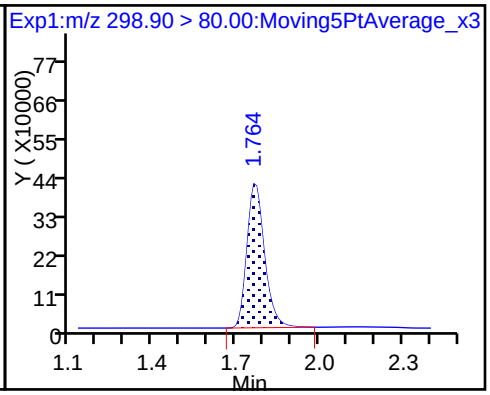
4 Perfluoropentanoic acid



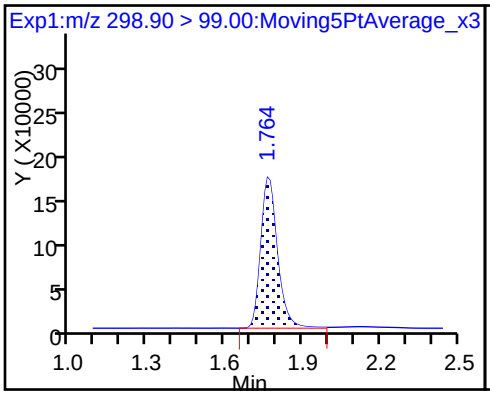
D 47 13C3-PFBS



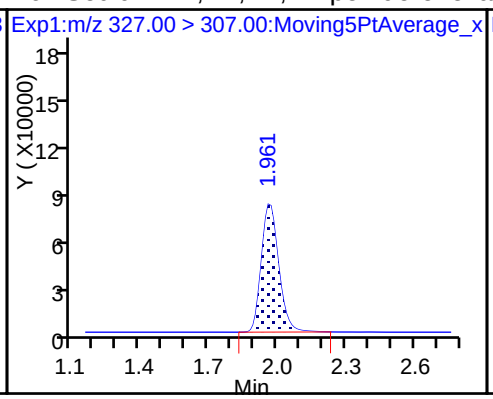
5 Perfluorobutanesulfonic acid



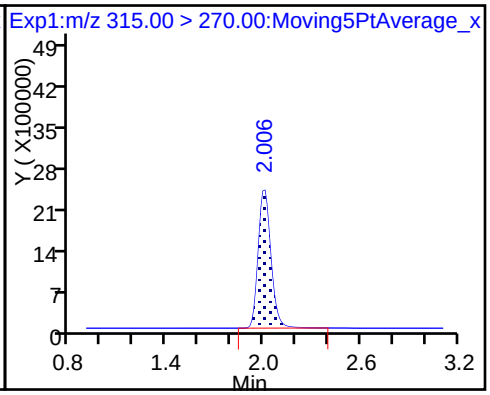
5 Perfluorobutanesulfonic acid



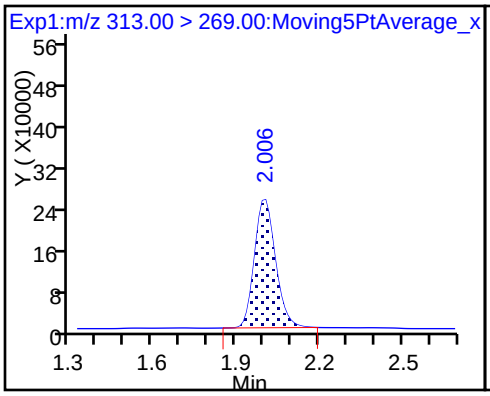
61 Sodium 1H,1H,2H,2H-perfluorohexa



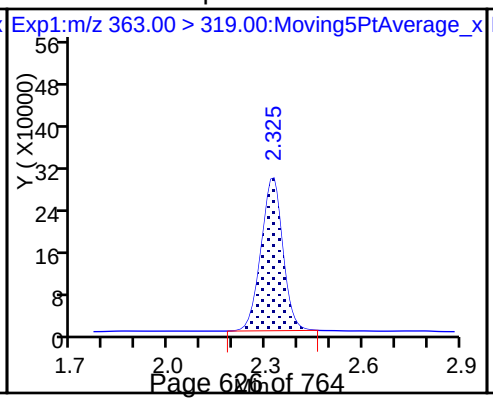
D 7 13C2 PFHxA



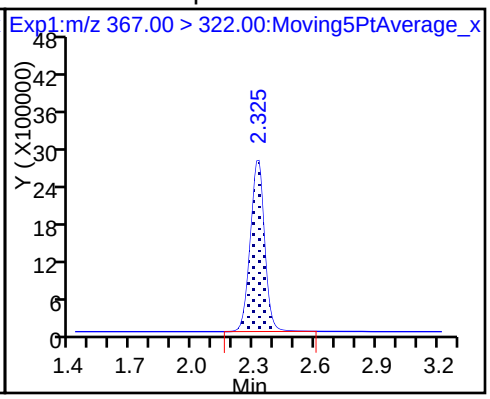
6 Perfluorohexanoic acid



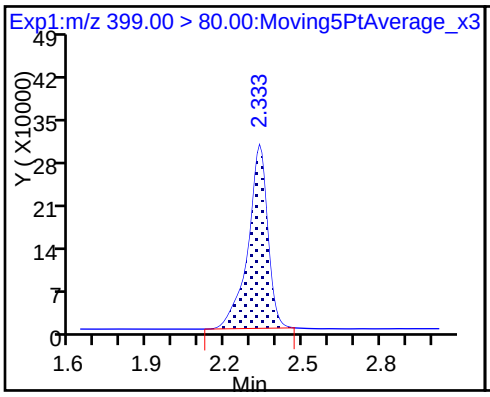
10 Perfluoroheptanoic acid



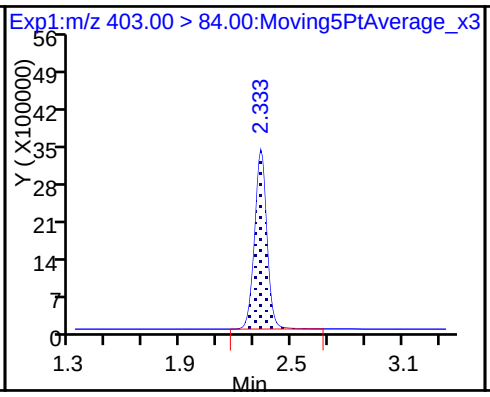
D 9 13C4-PFHpA



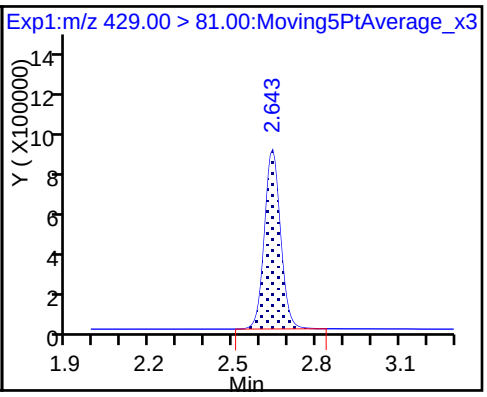
8 Perfluorohexanesulfonic acid



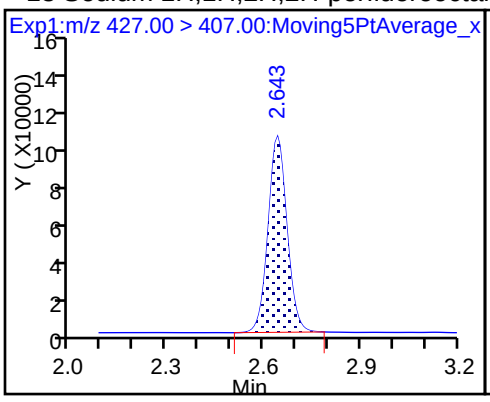
D 11 18O2 PFHxS



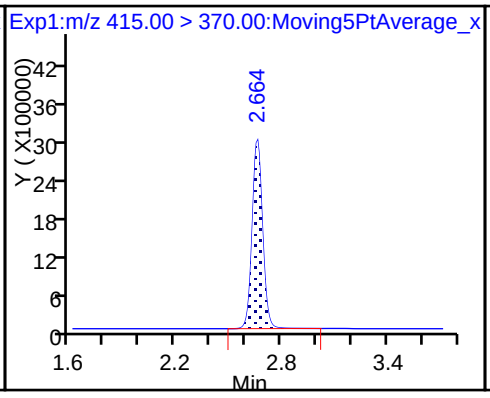
D 12 M2-6:2FTS



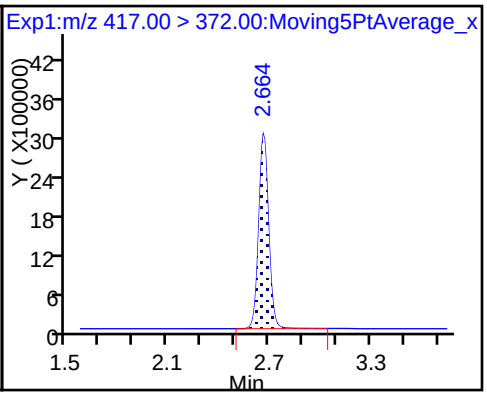
13 Sodium 1H,1H,2H,2H-perfluorooctane



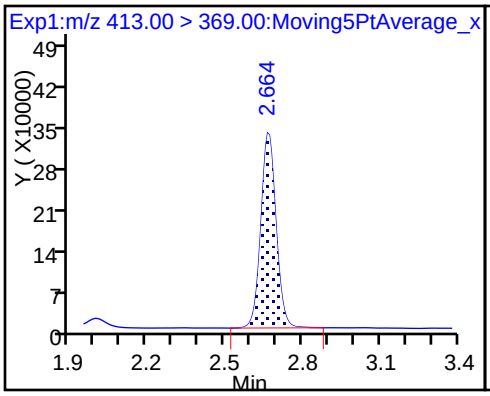
62 13C2-PFOA



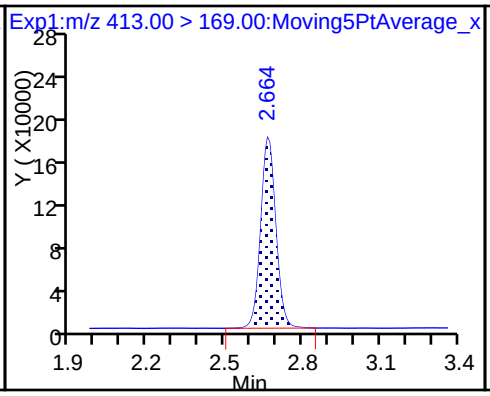
D 14 13C4 PFOA



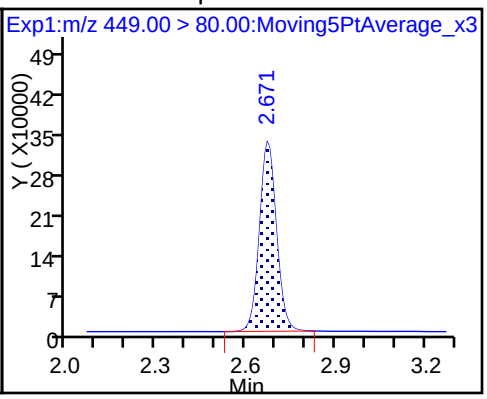
15 Perfluorooctanoic acid



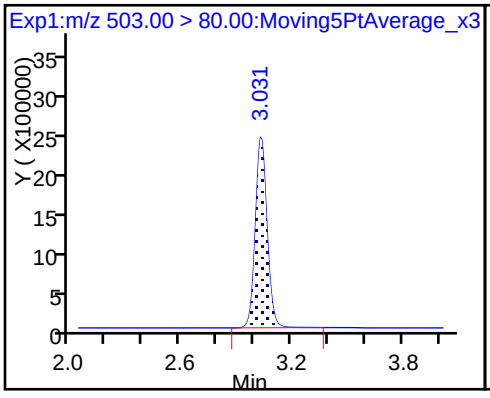
15 Perfluorooctanoic acid



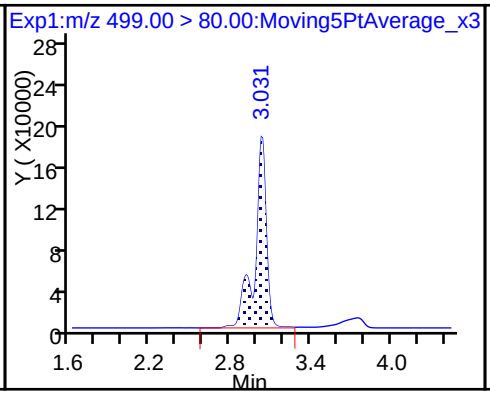
16 Perfluoroheptanesulfonic Acid



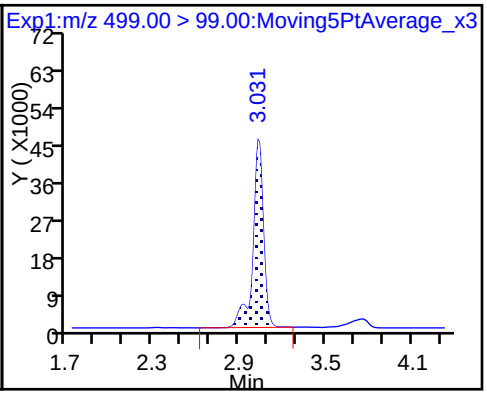
D 18 13C4 PFOS



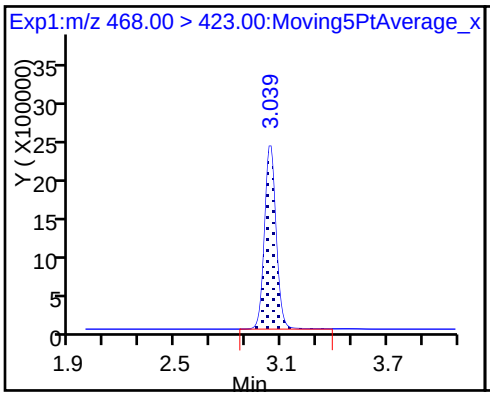
17 Perfluorooctane sulfonic acid



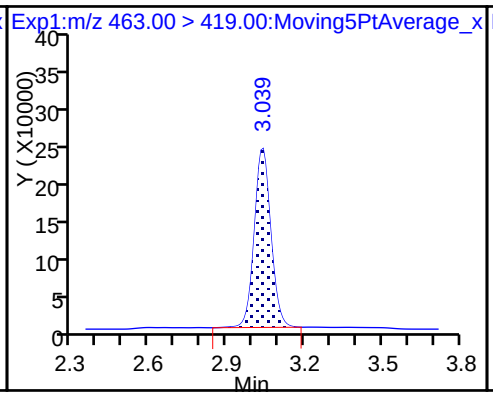
17 Perfluorooctane sulfonic acid



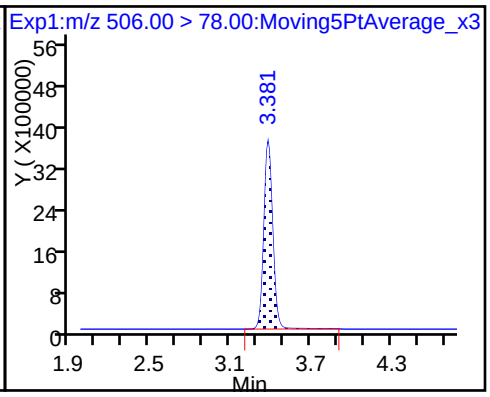
D 19 13C5 PFNA



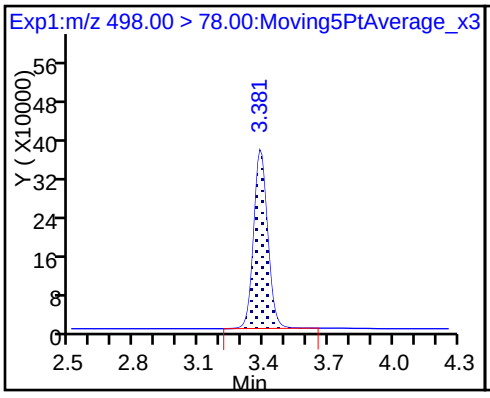
20 Perfluorononanoic acid



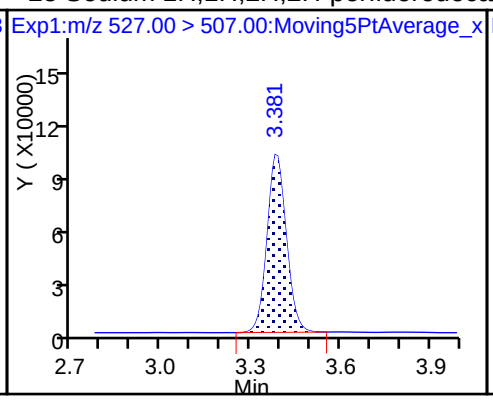
D 21 13C8 FOSA



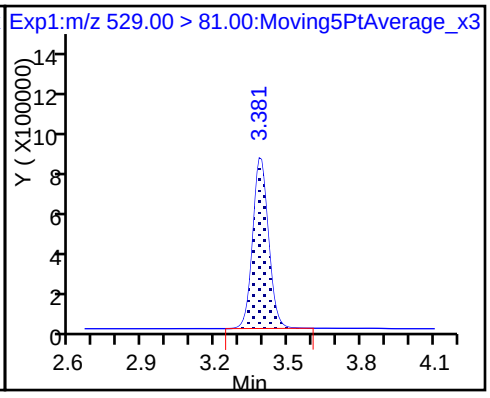
22 Perfluorooctane Sulfonamide



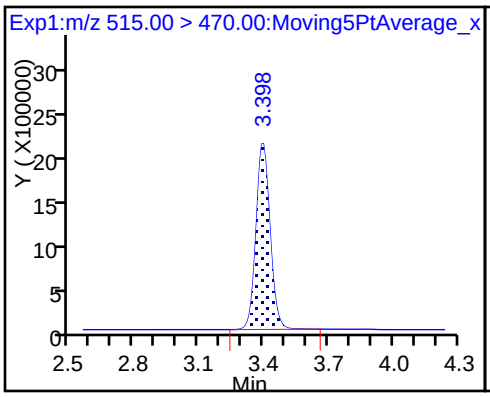
25 Sodium 1H,1H,2H,2H-perfluorodecan



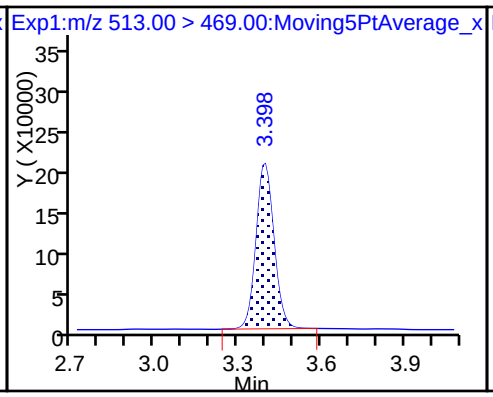
D 26 M2-8:2FTS



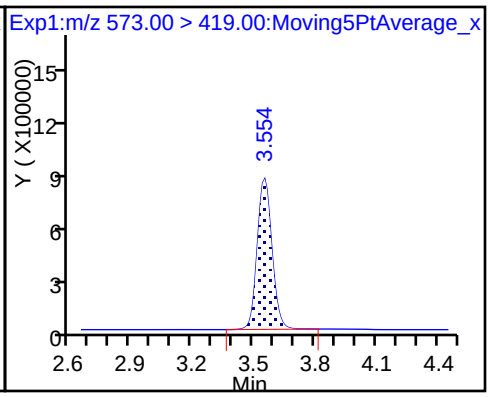
D 23 13C2 PFDA



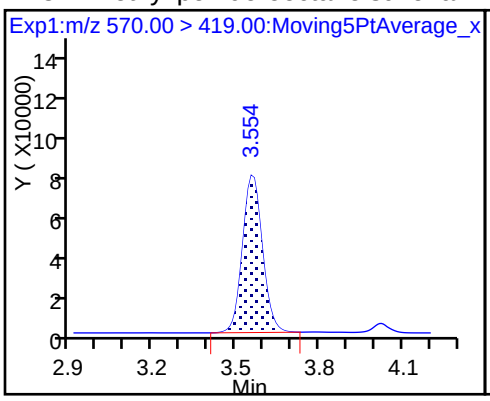
24 Perfluorodecanoic acid



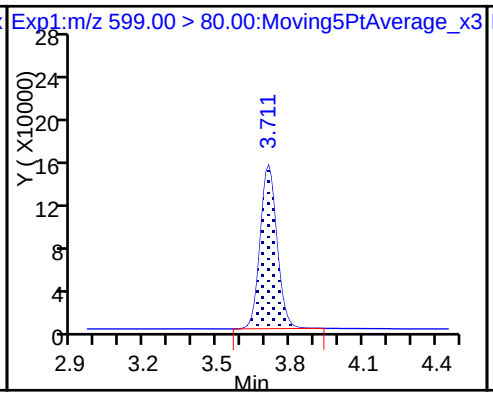
D 27 d3-NMeFOSAA



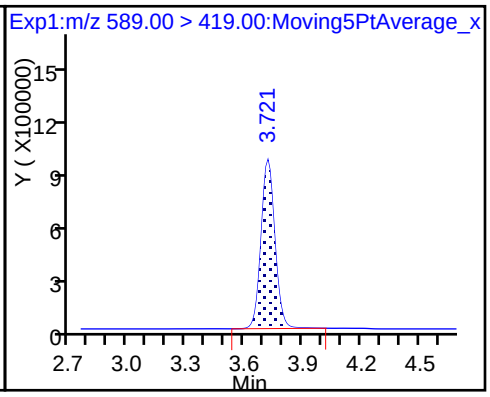
28 N-methyl perfluorooctane sulfonami



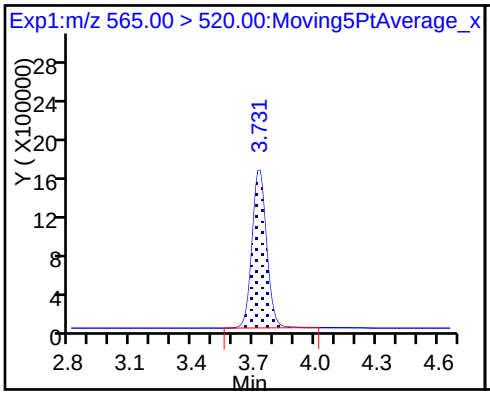
29 Perfluorodecane Sulfonic acid



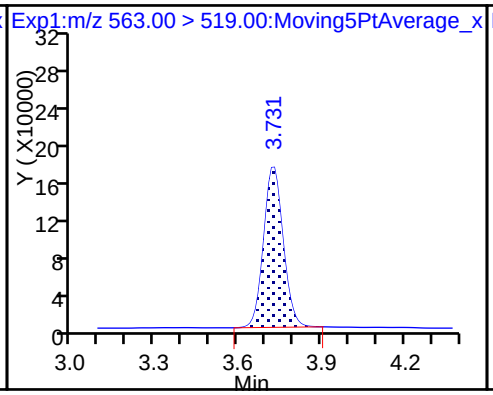
D 32 d5-NEtFOSAA



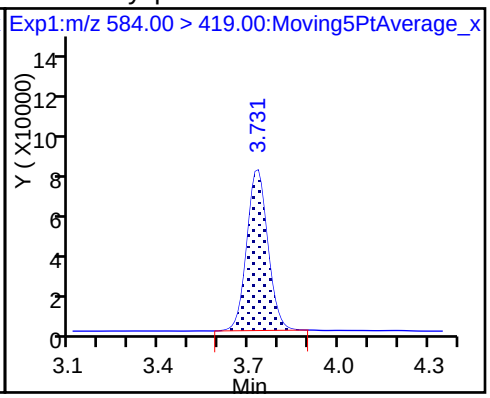
D 30 13C2 PFUnA



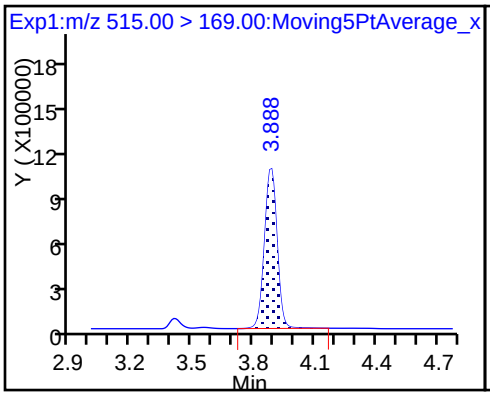
31 Perfluoroundecanoic acid



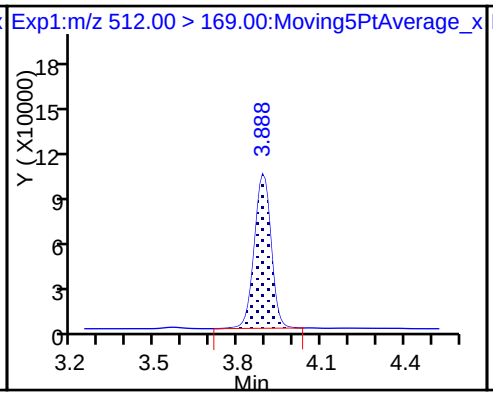
33 N-ethyl perfluorooctane sulfonamid



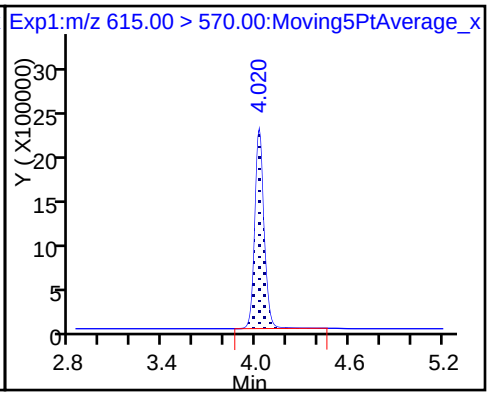
D 34 d-N-MeFOSA-M



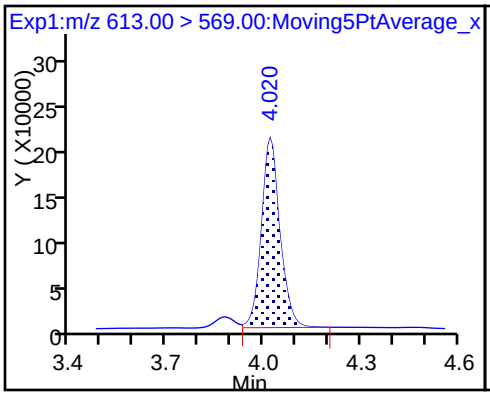
35 MeFOSA



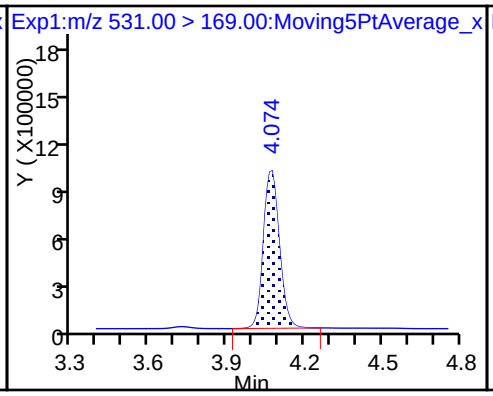
D 36 13C2 PFDoA



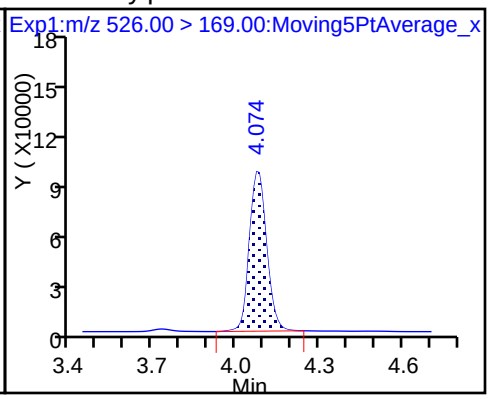
37 Perfluorododecanoic acid



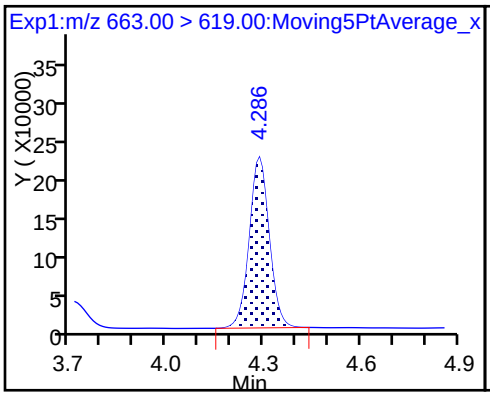
D 38 d-N-EtFOSA-M



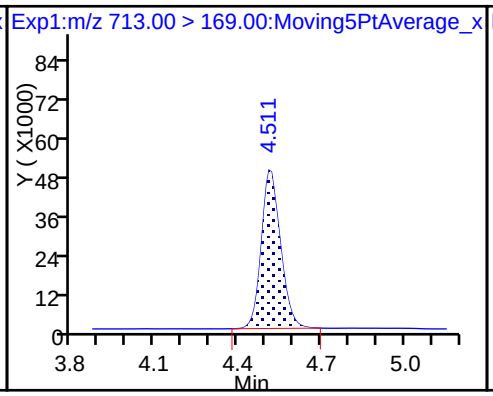
39 N-ethylperfluoro-1-octanesulfonami



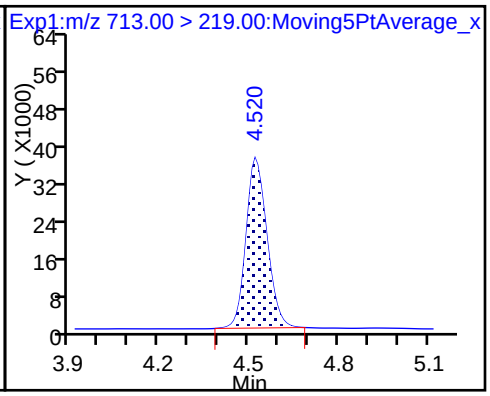
41 Perfluorotridecanoic acid



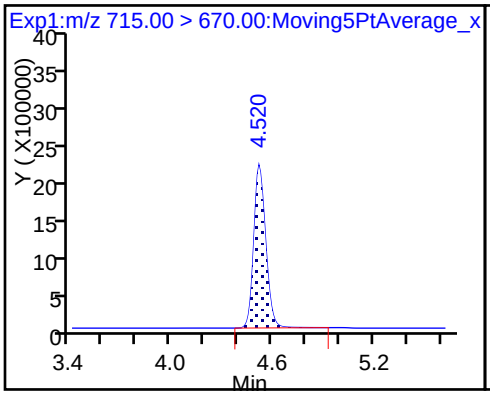
42 Perfluorotetradecanoic acid



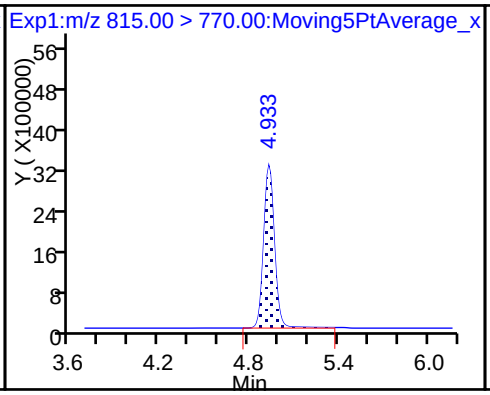
42 Perfluorotetradecanoic acid



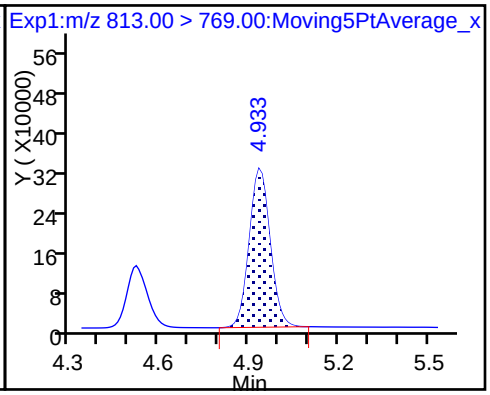
D 43 13C2-PFTeDA



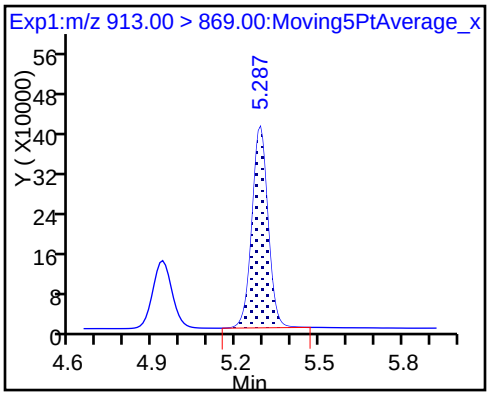
D 44 13C2-PFHxDA



45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_006.d
Lims ID: IC L4 Full
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 30-Oct-2017 18:20:13 ALS Bottle#: 31 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:19:54 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:48:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.90 > 169.00	1.536	1.537	-0.001	1.000	6872498	21.1		106	1728	
D 1 13C4 PFBA										
217.00 > 172.00	1.536	1.537	-0.001		17067362	48.7		97.4	32424	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.739	-0.003		11267831	50.0		99.9	159596	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.741	-0.005	1.000	4966682	20.5		103	4199	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.763	0.001		227541	45.3		97.3	5798	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	6535299	18.4		104	13143	
298.90 > 99.00	1.764	1.764	0.0	1.000	2749098		2.38(0.00-0.00)	104	14341	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	1524770	18.4		98.7	24492	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.994	1.998	-0.004	1.000	4796137	21.2		106	6485	
D 7 13C2 PFHxA										
315.00 > 270.00	1.994	1.998	-0.004		11830628	48.8		97.6	30278	
D 9 13C4-PFHpA										
367.00 > 322.00	2.319	2.319	0.0		12388693	50.8		102	22303	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.319	2.319	0.0	1.000	4869377	20.3		102	5436	
D 11 18O2 PFHxS										
403.00 > 84.00	2.335	2.333	0.002		13947567	46.3		98.0	20191	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.335	2.333	0.002	1.000	5700596	18.7		103	5582	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.640	2.641	-0.001	1.000	1561284	18.4		97.2	10348	
D 12 M2-6:2FTS										
429.00 > 81.00	2.640	2.641	-0.001		3232615	46.4		97.8	13110	
* 62 13C2-PFOA										
415.00 > 370.00	2.662	2.655	0.007		11421330	50.0			15064	
D 14 13C4 PFOA										
417.00 > 372.00	2.669	2.664	0.005		11534754	48.3		96.7	15363	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.669	2.666	0.003	1.000	4990434	20.1		101	1789	
413.00 > 169.00	2.669	2.666	0.003	1.000	2591422		1.93(0.90-1.10)	101	4621	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.676	2.672	0.004	1.000	4839750	20.1		106	13203	
D 18 13C4 PFOS										
503.00 > 80.00	3.030	3.030	0.0		9802057	46.3		96.8	12526	
D 19 13C5 PFNA										
468.00 > 423.00	3.030	3.031	-0.001		9747291	48.3		96.6	9452	
17 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.030	3.031	-0.001	1.000	3889485	18.2		98.3	1613	M
499.00 > 99.00	3.030	3.031	-0.001	1.000	846582		4.59(0.90-1.10)	98.3	1980	
20 Perfluorononanoic acid										
463.00 > 419.00	3.038	3.033	0.005	1.000	3822275	20.2		101	3219	
D 21 13C8 FOSA										
506.00 > 78.00	3.376	3.377	-0.001		14992145	48.2		96.4	16020	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.376	3.379	-0.003	1.000	5989035	21.2		106	9085	
D 26 M2-8:2FTS										
529.00 > 81.00	3.384	3.381	0.003		3365770	46.6		97.3	5672	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.384	3.381	0.003	1.000	1455859	18.6		97.2	6644	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.392	3.391	0.001	1.000	3286997	19.9		99.5	5613	
D 23 13C2 PFDA										
515.00 > 470.00	3.392	3.391	0.001		8789284	48.2		96.3	9387	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.548	3.547	0.001		3821639	46.8		93.6	4021	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.548	3.553	-0.005	1.000	1427297	20.0		99.8	2214	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.706	3.705	0.001	1.000	2545089	19.2		99.4	5193	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.715	3.715	0.0		4034536	48.0		96.1	2632	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.715	3.722	-0.007	1.000	2962400	19.2		96.2	3791	
D 30 13C2 PFUnA										
565.00 > 520.00	3.715	3.722	-0.007		7217943	49.5		99.0	6399	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.715	3.723	-0.008	1.000	1371561	20.1		101	3446	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.874	3.881	-0.007		4213258	46.5		93.0	813	
35 MeFOSA										
512.00 > 169.00	3.882	3.885	-0.003	1.000	1494136	19.9		99.4	3218	
D 36 13C2 PFDoA										
615.00 > 570.00	4.009	4.015	-0.006		8186478	48.8		97.5	10551	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.016	4.016	0.0	1.000	2980875	19.8		99.0	2457	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.061	4.068	-0.007		3989568	45.9		91.9	2639	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.070	4.074	-0.004	1.000	1487266	20.0		100	2789	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.274	4.281	-0.007	1.000	3304558	19.5		97.7	1029	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.507	4.510	-0.003	1.000	845237	19.0		95.2	3737	
713.00 > 219.00	4.516	4.510	0.006	1.002	665315		1.27(0.00-0.00)	95.2	4567	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.516	4.516	0.0		9989003	48.8		97.6	27889	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.929	4.929	0.0	1.000	5266453	20.8		104	410	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.929	4.929	0.0		14294873	46.7		93.3	4876	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.280	5.281	-0.001	1.000	5612557	20.7		103	421	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC_FULL-L4_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:19:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_006.d

Injection Date: 30-Oct-2017 18:20:13 Instrument ID: A8_N

Lims ID: IC L4 Full

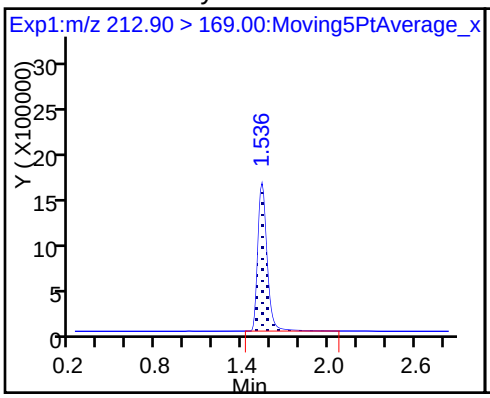
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 31 Worklist Smp#: 6

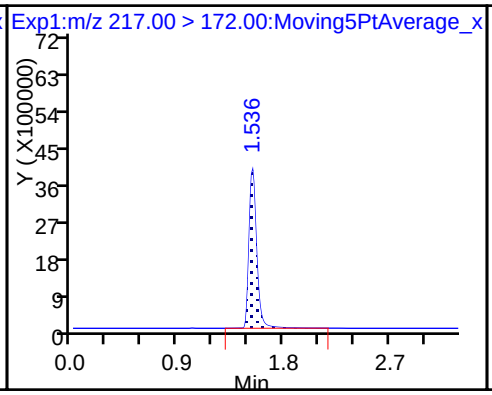
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

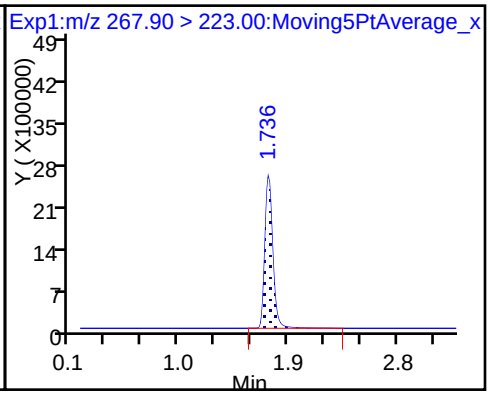
2 Perfluorobutyric acid



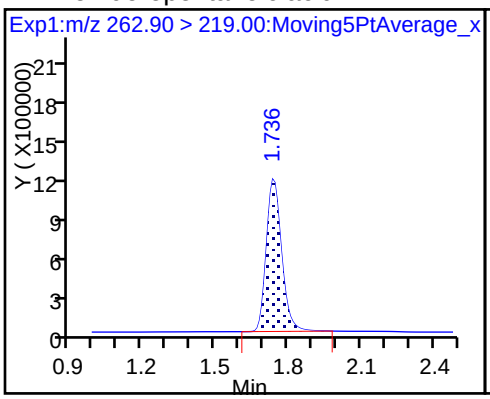
D 1 13C4 PFBA



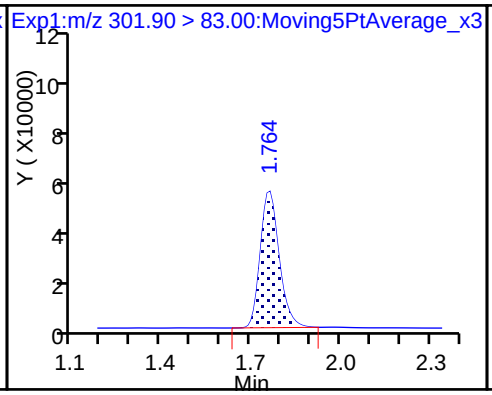
D 3 13C5-PFPeA



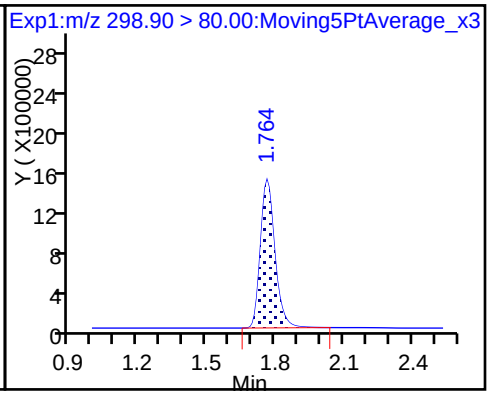
4 Perfluoropentanoic acid



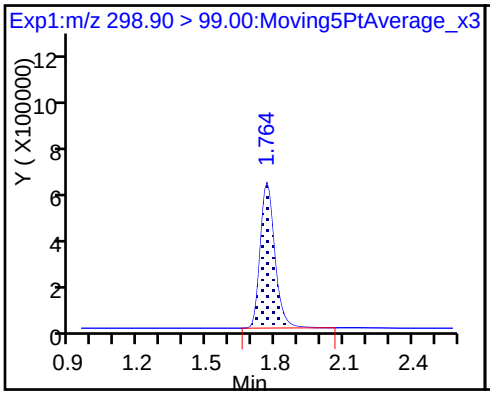
D 47 13C3-PFBS



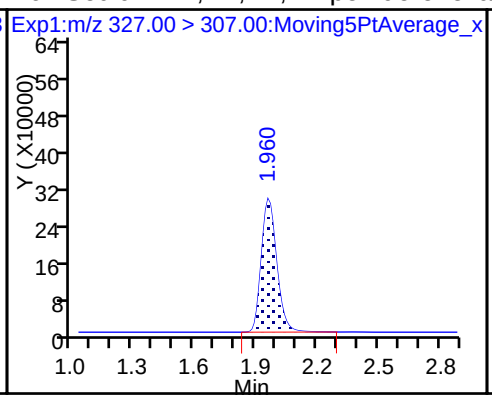
5 Perfluorobutanesulfonic acid



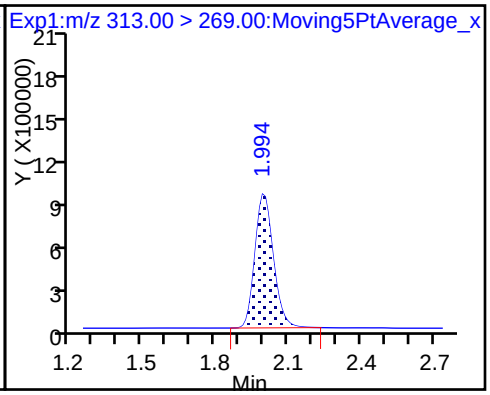
5 Perfluorobutanesulfonic acid



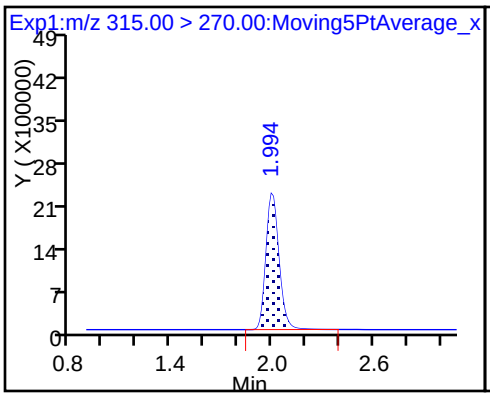
61 Sodium 1H,1H,2H,2H-perfluorohexane



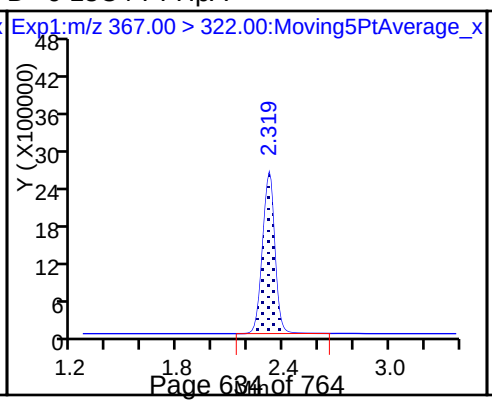
6 Perfluorohexanoic acid



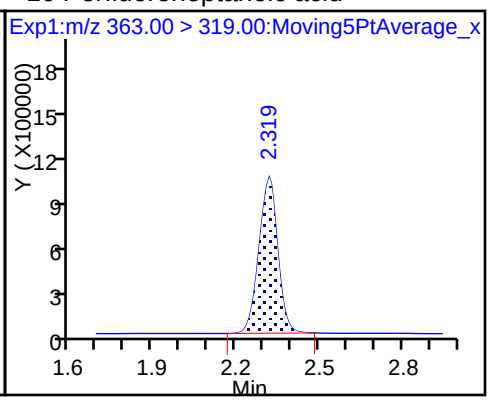
D 7 13C2 PFHxA



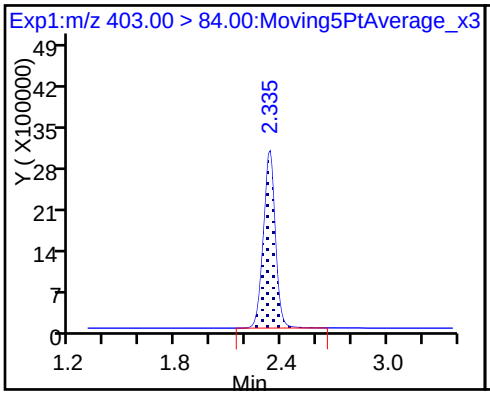
D 9 13C4-PFHpA



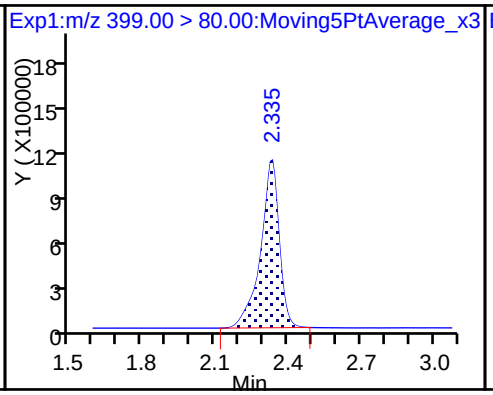
10 Perfluoroheptanoic acid



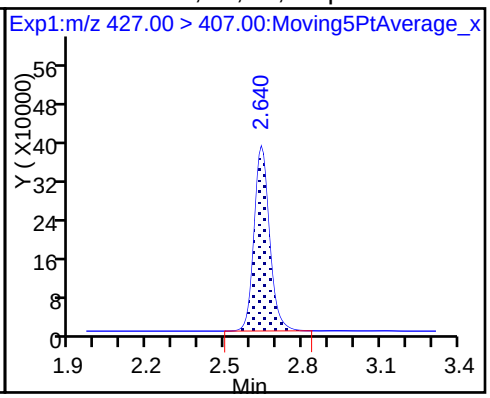
D 11 18O2 PFHxS



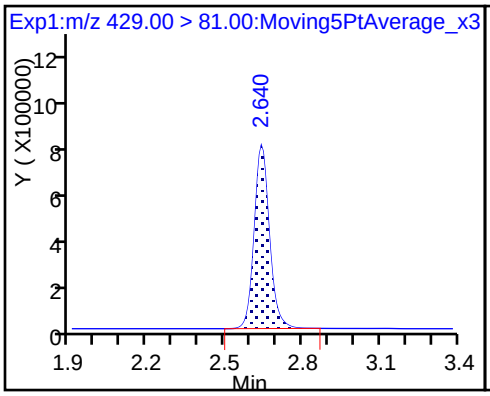
8 Perfluorohexanesulfonic acid



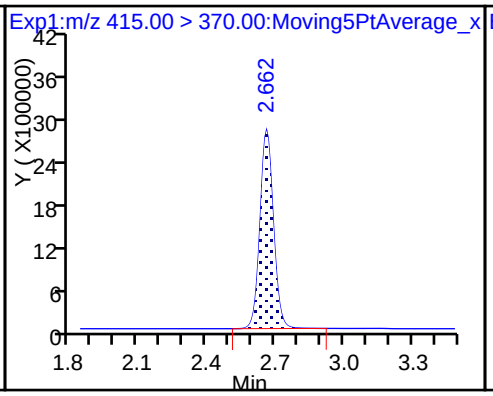
13 Sodium 1H,1H,2H,2H-perfluorooctane



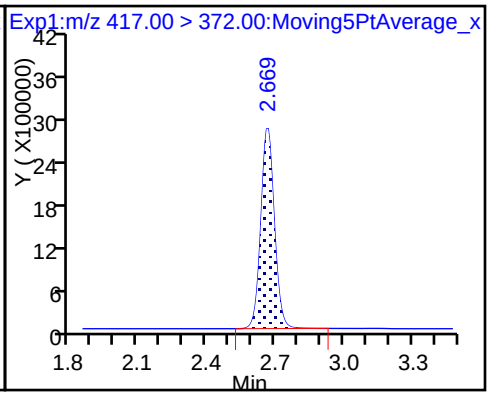
D 12 M2-6:2FTS



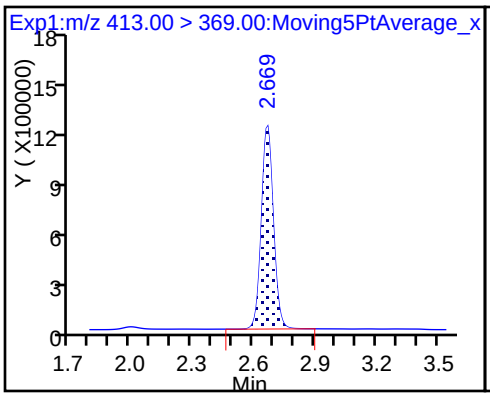
* 62 13C2-PFOA



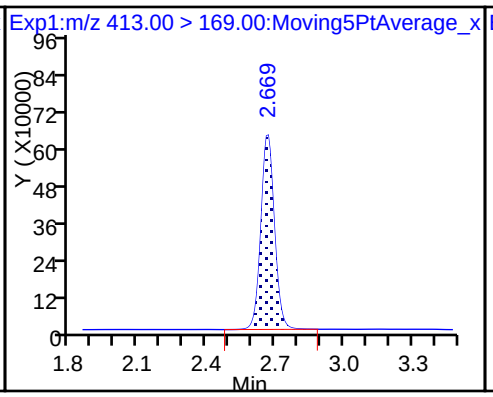
D 14 13C4 PFOA



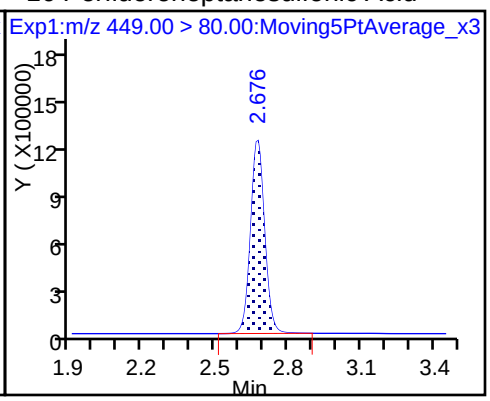
15 Perfluorooctanoic acid



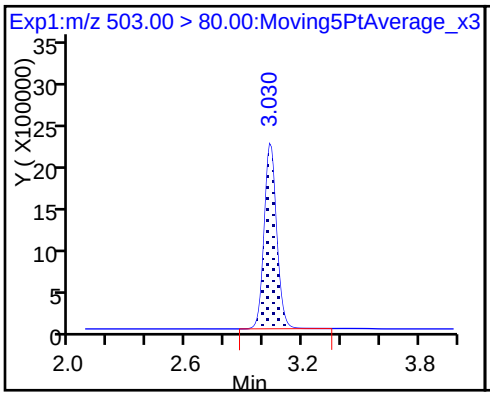
15 Perfluorooctanoic acid



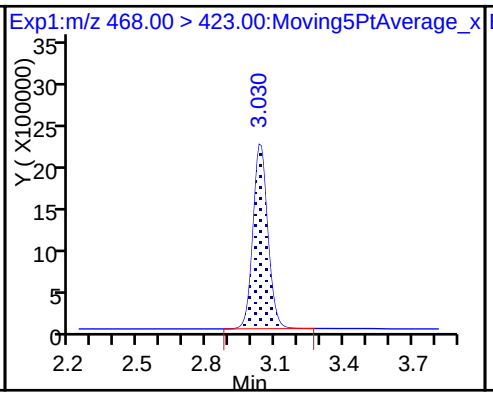
16 Perfluoroheptanesulfonic Acid



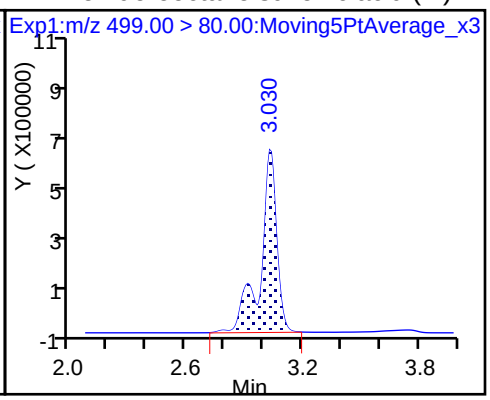
D 18 13C4 PFOS



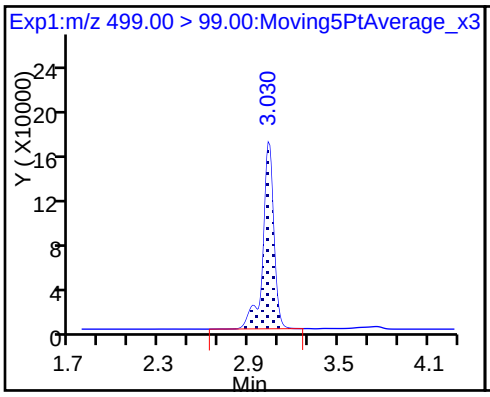
D 19 13C5 PFNA



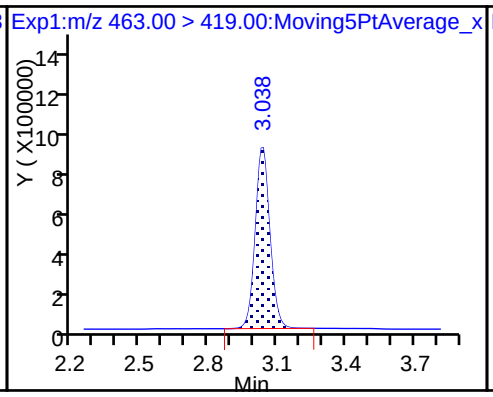
17 Perfluorooctane sulfonic acid (M)



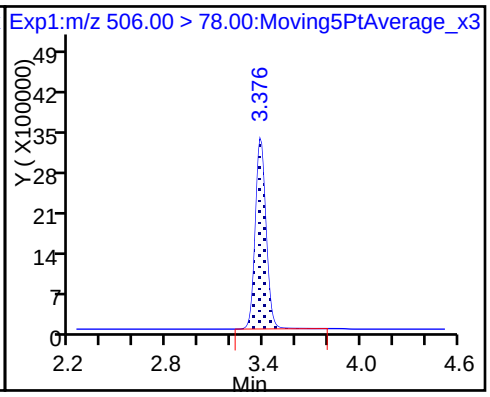
17 Perfluorooctane sulfonic acid



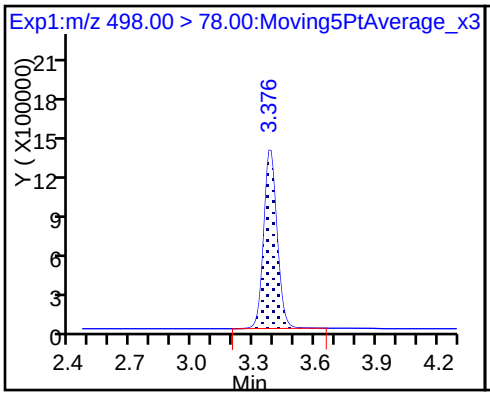
20 Perfluorononanoic acid



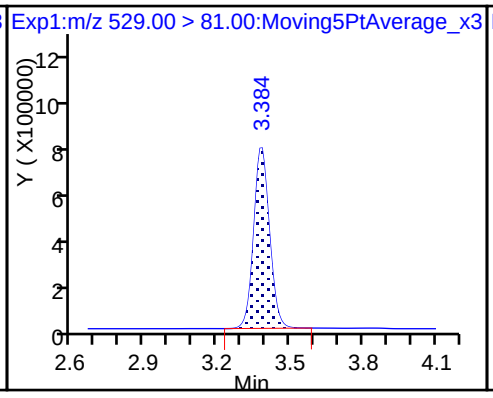
D 21 13C8 FOSA



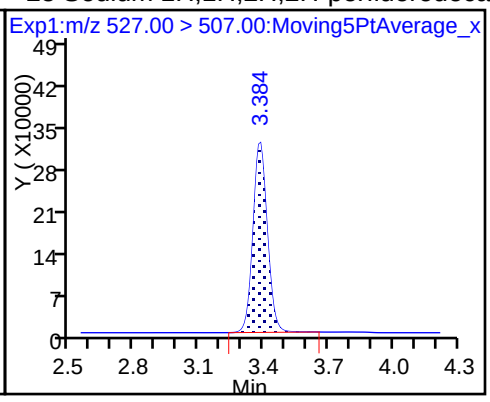
22 Perfluorooctane Sulfonamide



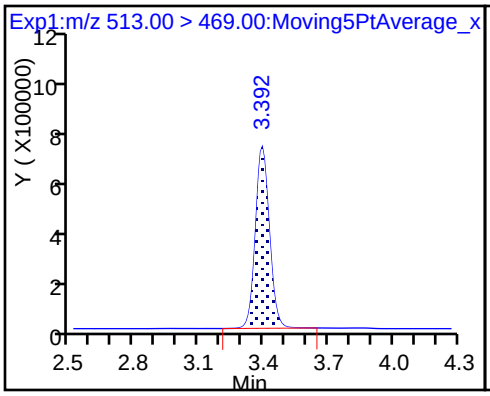
D 26 M2-8:2FTS



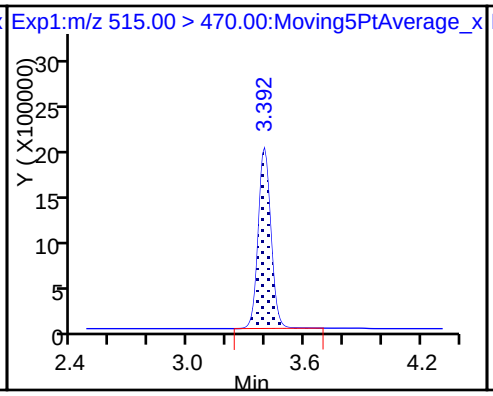
25 Sodium 1H,1H,2H,2H-perfluorodecane



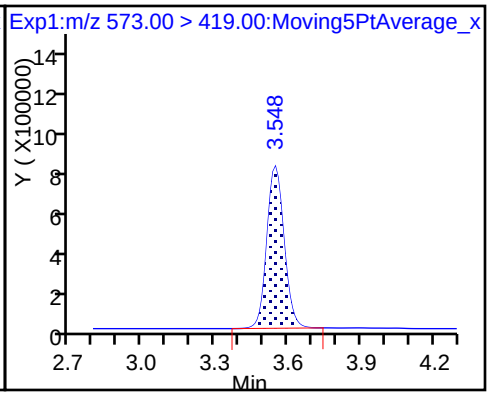
24 Perfluorodecanoic acid



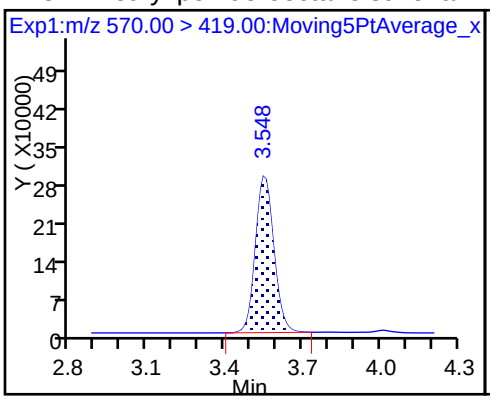
D 23 13C2 PFDA



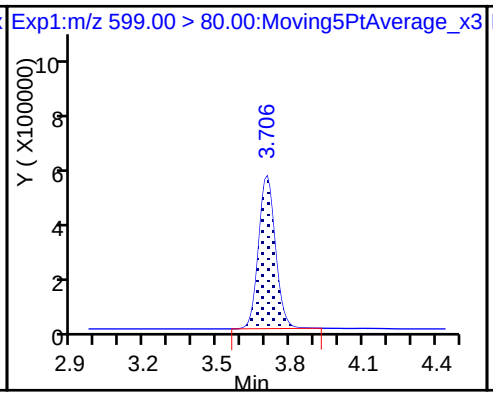
D 27 d3-NMeFOSAA



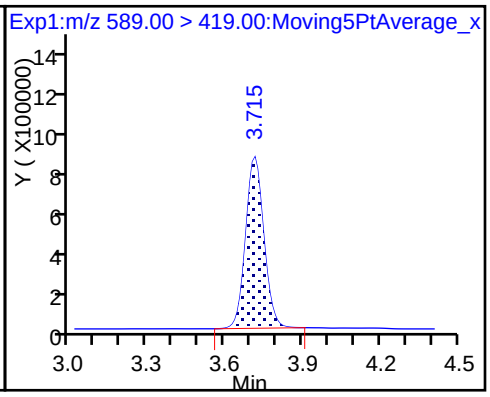
28 N-methyl perfluorooctane sulfonami



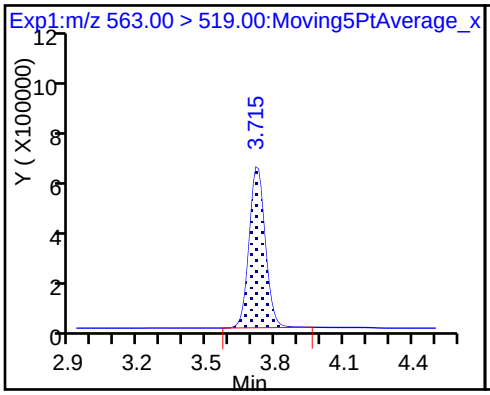
29 Perfluorodecane Sulfonic acid



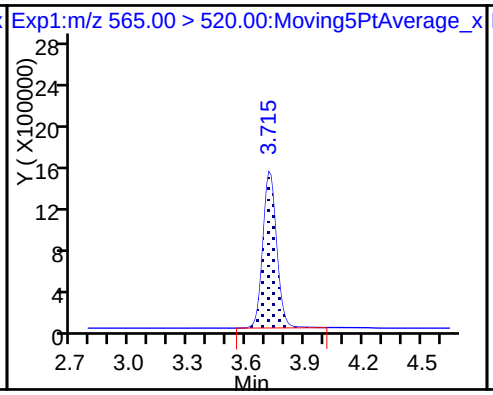
D 32 d5-NEtFOSAA



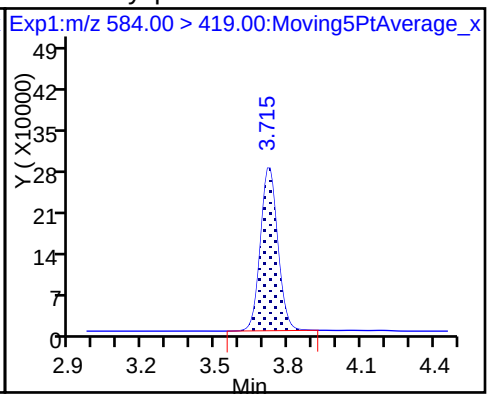
31 Perfluoroundecanoic acid



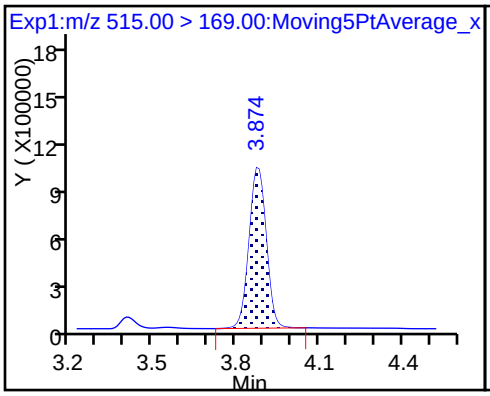
D 30 13C2 PFUnA



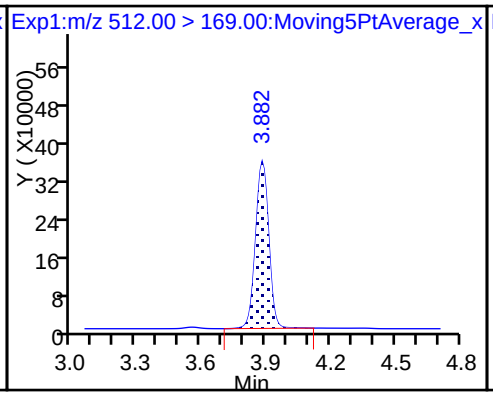
33 N-ethyl perfluorooctane sulfonamid



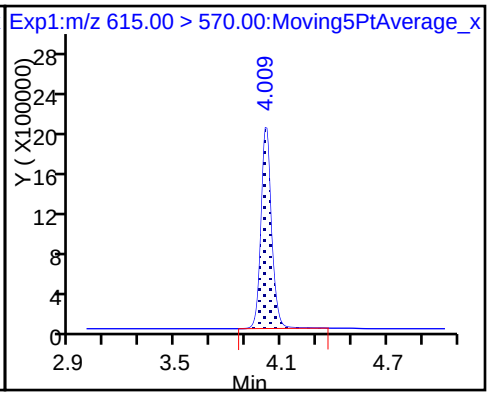
D 34 d-N-MeFOSA-M



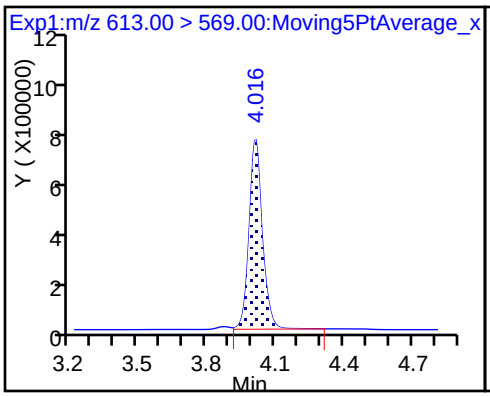
35 MeFOSA



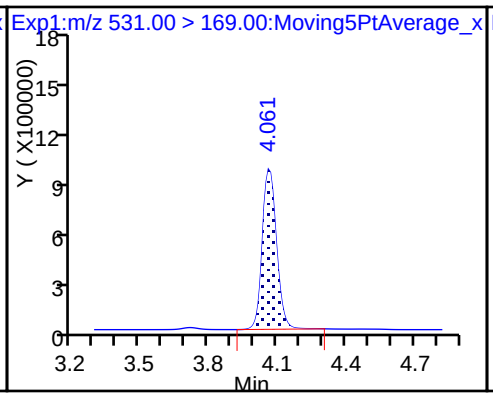
D 36 13C2 PFDoA



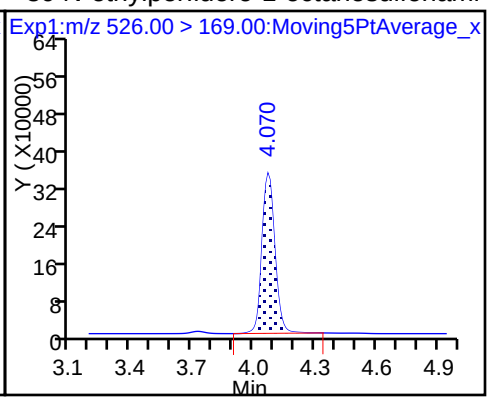
37 Perfluorododecanoic acid



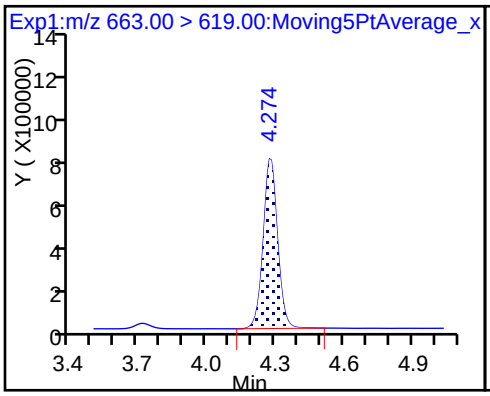
D 38 d-N-EtFOSA-M



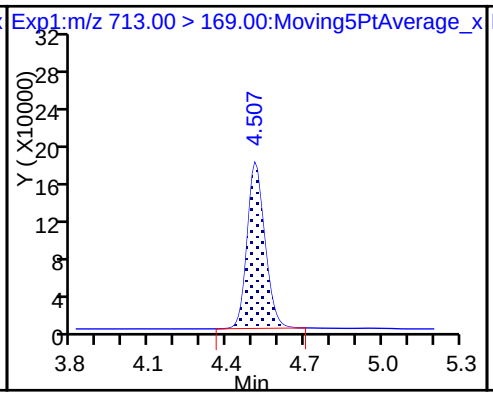
39 N-ethylperfluoro-1-octanesulfonami



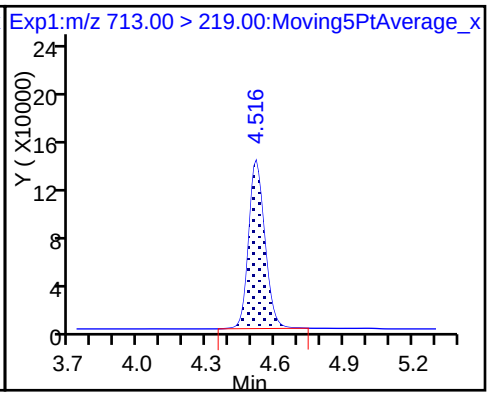
41 Perfluorotridecanoic acid



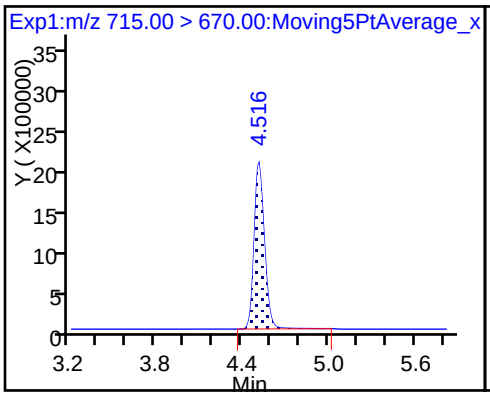
42 Perfluorotetradecanoic acid



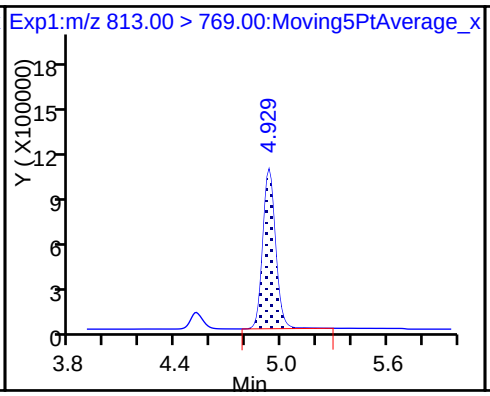
42 Perfluorotetradecanoic acid



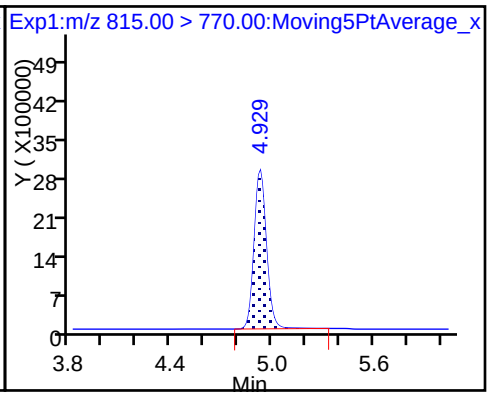
D 43 13C2-PFTeDA



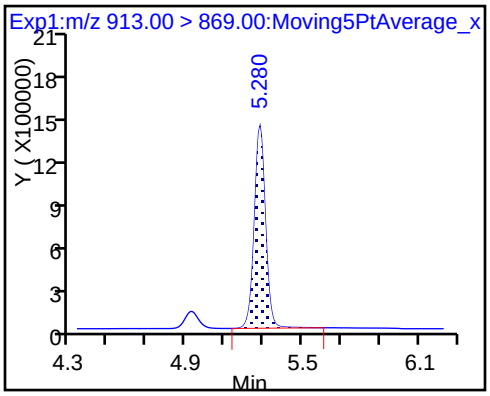
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

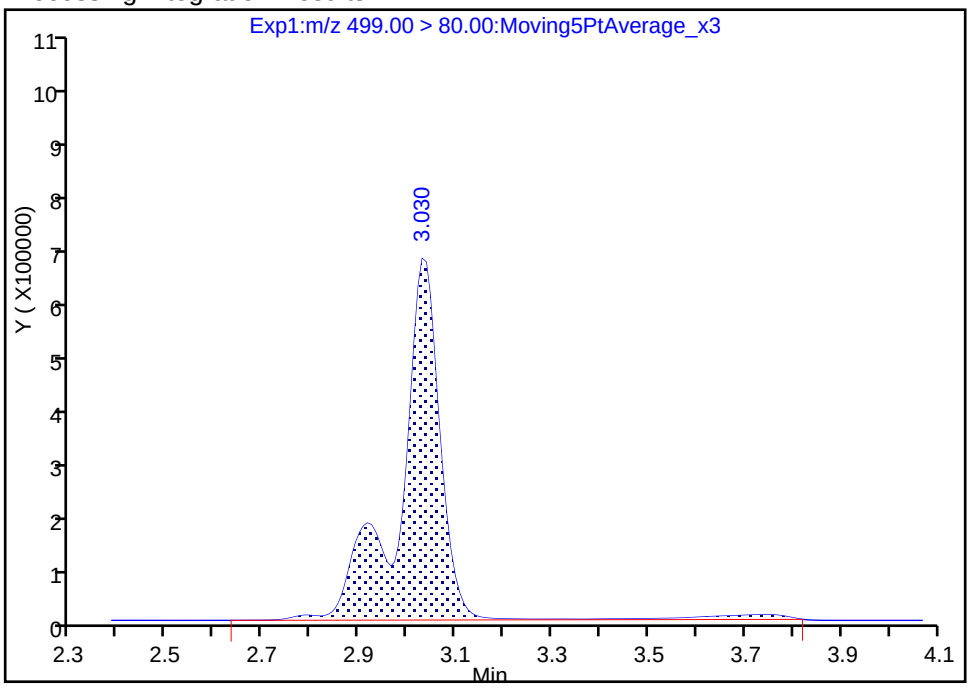
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_006.d				
Injection Date:	30-Oct-2017 18:20:13	Instrument ID:	A8_N		
Lims ID:	IC L4 Full				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	31	Worklist Smp#:	6
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

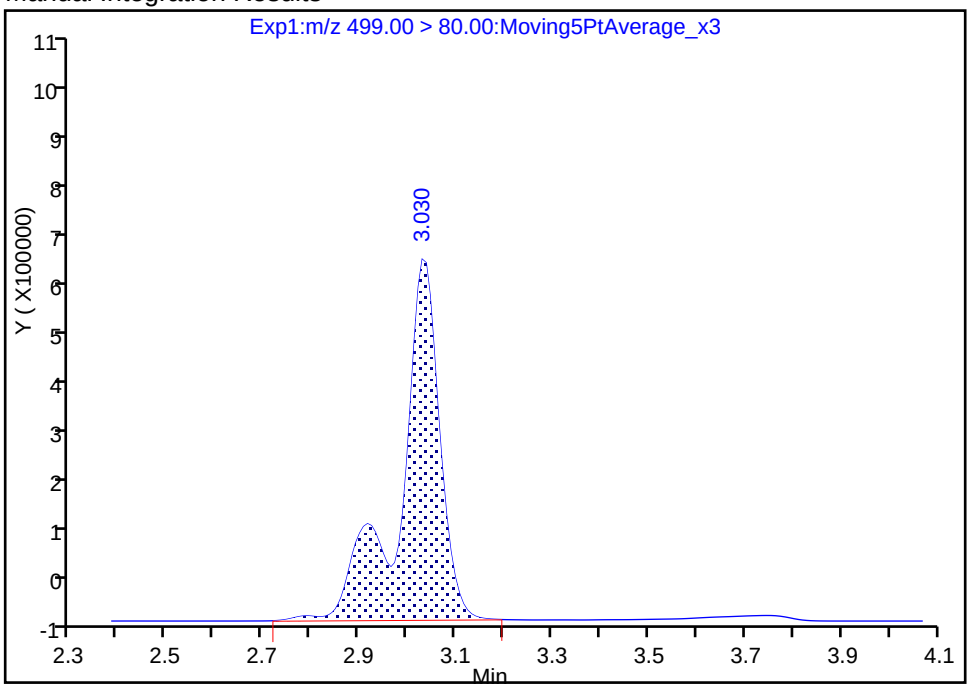
Processing Integration Results

RT: 3.03
Area: 4020308
Amount: 18.707163
Amount Units: ng/ml



Manual Integration Results

RT: 3.03
Area: 3889485
Amount: 18.236345
Amount Units: ng/ml



Reviewer: phomsophat, 30-Oct-2017 22:48:37

Audit Action: Manually Integrated Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_007.d
Lims ID: IC L5 Full
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 30-Oct-2017 18:27:07 ALS Bottle#: 32 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:20:02 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:49:48

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.539	1.537	0.002		18385602	52.4		105	23625	
2 Perfluorobutyric acid										
212.90 > 169.00	1.539	1.537	0.002	1.000	16852992	48.1		96.3	2150	
D 3 13C5-PFPeA										
267.90 > 223.00	1.739	1.739	0.0		11771734	52.2		104	145325	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.748	1.741	0.007	1.000	12771661	50.5		101	11158	
D 47 13C3-PFBS										
301.90 > 83.00	1.766	1.763	0.003		245067	48.7		105	7041	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.766	1.764	0.002	1.000	16549064	43.3		98.0	242170	
298.90 > 99.00	1.766	1.764	0.002	1.000	7725899		2.14(0.00-0.00)	98.0	33040	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.964	1.961	0.003	1.000	4321214	47.8		102	34780	
D 7 13C2 PFHxA										
315.00 > 270.00	1.998	1.998	0.0		13222561	54.6		109	30087	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.998	1.998	0.0	1.000	12269212	48.6		97.1	12021	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.327	2.319	0.008	1.000	12433273	50.1		100	7718	
D 9 13C4-PFHpA										
367.00 > 322.00	2.327	2.319	0.008		12812432	52.6		105	17152	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.336	2.333	0.003	1.000	15184106	45.6		100	5936	
D 11 18O2 PFHxS										
403.00 > 84.00	2.336	2.333	0.003		15220009	50.6		107	17136	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.637	2.641	-0.004		3532601	50.8		107	11253	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.637	2.641	-0.004	1.000	4323097	46.7		98.5	14357	
* 62 13C2-PFOA										
415.00 > 370.00	2.659	2.655	0.004		12181675	50.0			19736	
D 14 13C4 PFOA										
417.00 > 372.00	2.666	2.664	0.002		12589825	52.7		105	10436	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.666	2.666	0.0	1.000	12964935	47.9		95.9	3183	
413.00 > 169.00	2.666	2.666	0.0	1.000	7227313		1.79(0.90-1.10)	95.9	6045	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.673	2.672	0.001	1.000	12616457	48.5		102	11433	
D 18 13C4 PFOS										
503.00 > 80.00	3.027	3.030	-0.003		10604507	50.0		105	8444	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.036	3.031	0.005	1.000	10938097	47.4		102	2609	
499.00 > 99.00	3.027	3.031	-0.004	0.997	2315579		4.72(0.90-1.10)	102	3556	
D 19 13C5 PFNA										
468.00 > 423.00	3.027	3.031	-0.004		10560316	52.3		105	9265	
20 Perfluorononanoic acid										
463.00 > 419.00	3.036	3.033	0.003	1.000	10166844	49.7		99.4	4155	
D 21 13C8 FOSA										
506.00 > 78.00	3.382	3.377	0.005		16407213	52.7		105	9720	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.382	3.379	0.003	1.000	15657067	50.6		101	10097	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.382	3.381	0.001	1.000	4041494	48.0		100	7006	
D 26 M2-8:2FTS										
529.00 > 81.00	3.382	3.381	0.001		3628722	50.2		105	8155	
D 23 13C2 PFDA										
515.00 > 470.00	3.390	3.391	-0.001		9640984	52.8		106	9380	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.390	3.391	-0.001	1.000	9112657	50.3		101	8551	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.546	3.547	-0.001		4376084	53.6		107	4490	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.557	3.553	0.004	1.003	3881322	47.4		94.8	2875	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.705	3.705	0.0	1.000	7338718	51.1		106	5571	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.714	3.715	-0.001		4339623	51.7		103	4019	
D 30 13C2 PFUnA										
565.00 > 520.00	3.724	3.722	0.002		7529471	51.7		103	5292	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.724	3.722	0.002	1.000	7795195	48.5		97.0	5198	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.724	3.723	0.001	1.003	3731718	50.9		102	4853	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.882	3.881	0.001		4780512	52.8		106	1170	
35 MeFOSA										
512.00 > 169.00	3.891	3.885	0.006	1.000	4194611	49.2		98.4	4128	
D 36 13C2 PFDoA										
615.00 > 570.00	4.017	4.015	0.002		8665686	51.6		103	7656	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.017	4.016	0.001	1.000	8230749	51.6		103	4395	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.071	4.068	0.003		4603262	53.0		106	2088	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.071	4.074	-0.003	1.000	4200616	49.1		98.1	2991	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.277	4.281	-0.004	1.000	9468872	52.9		106	1944	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.508	4.510	-0.002	1.000	2341628	49.7		99.5	5212	
713.00 > 219.00	4.517	4.510	0.007	1.002	1800740		1.30(0.00-0.00)	99.5	4181	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.517	4.516	0.001		10587380	51.7		103	8090	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.933	4.929	0.004		16081211	52.5		105	3322	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.933	4.929	0.004	1.000	14275131	50.9		102	717	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.278	5.281	-0.003	1.000	14822218	48.5		97.0	722	

Reagents:

LCPFC_FULL-L5_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:20:04 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_007.d

Injection Date: 30-Oct-2017 18:27:07 Instrument ID: A8_N

Lims ID: IC L5 Full

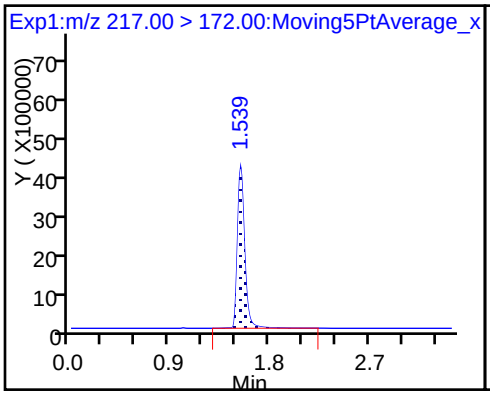
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 7

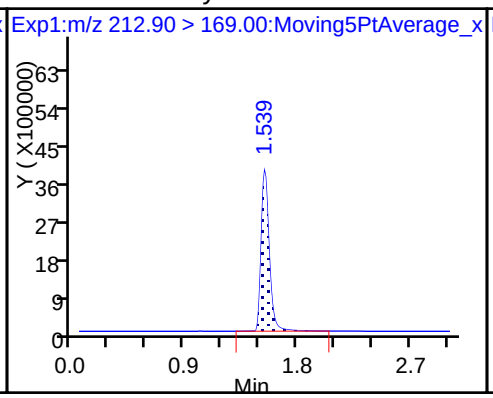
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

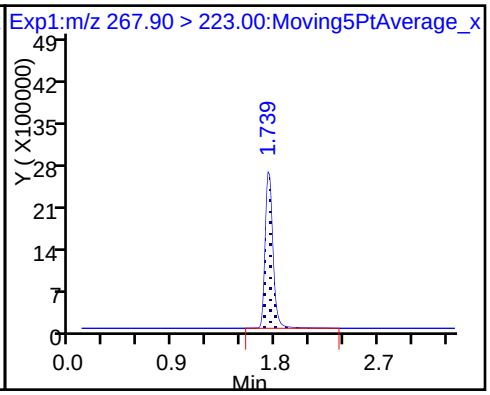
D 1 13C4 PFBA



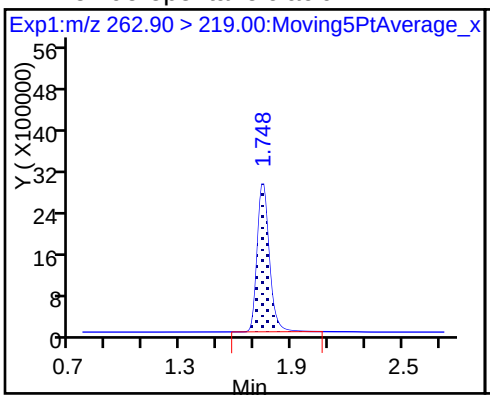
2 Perfluorobutyric acid



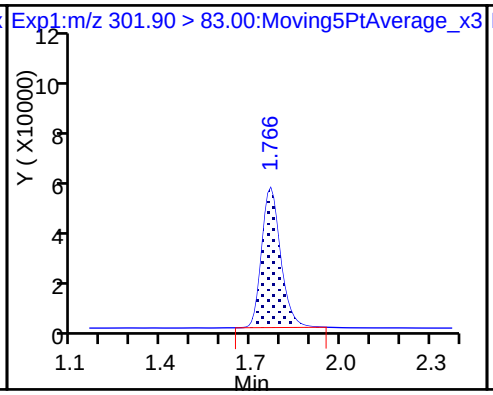
D 3 13C5-PFPeA



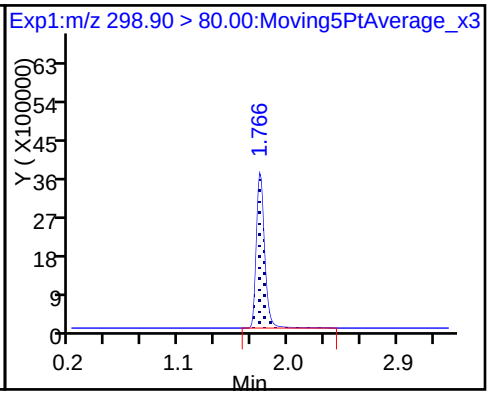
4 Perfluoropentanoic acid



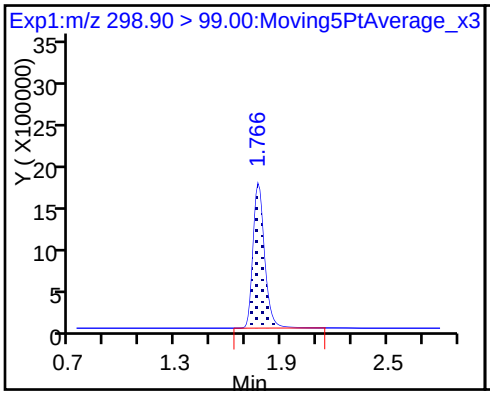
D 47 13C3-PFBS



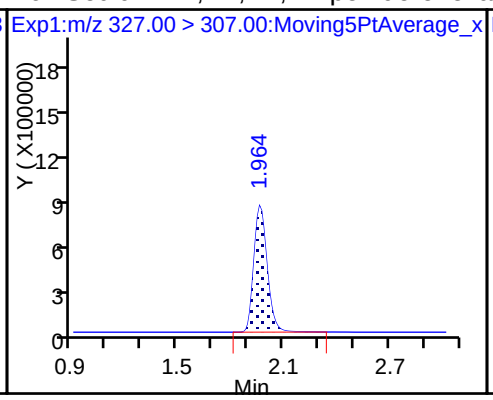
5 Perfluorobutanesulfonic acid



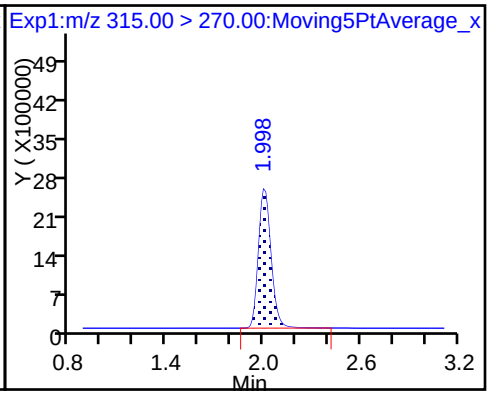
5 Perfluorobutanesulfonic acid



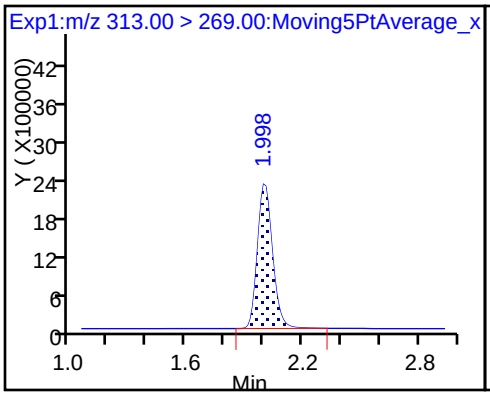
61 Sodium 1H,1H,2H,2H-perfluorohexa



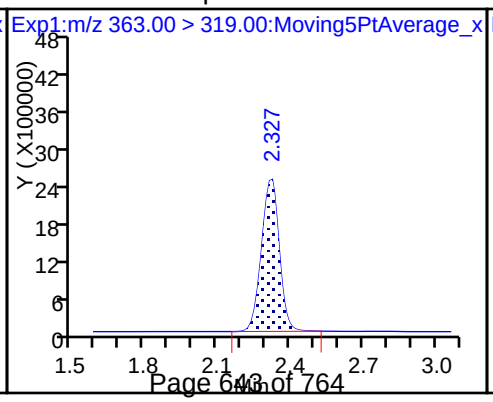
D 7 13C2 PFHxA



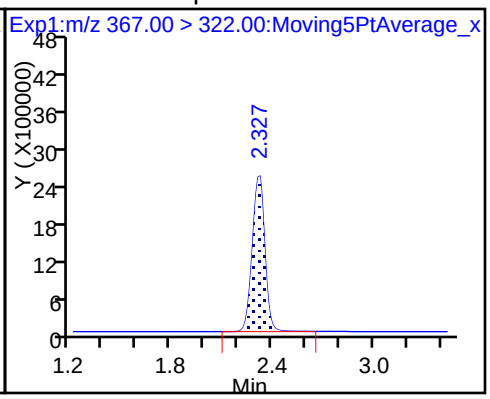
6 Perfluorohexanoic acid



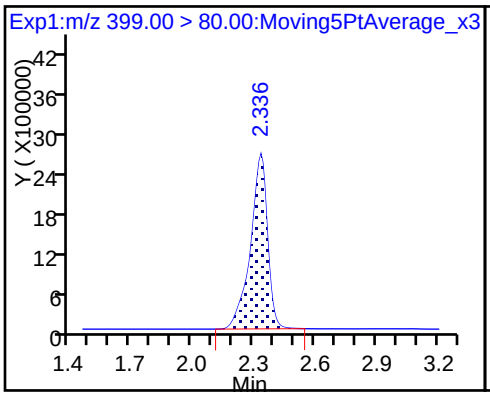
10 Perfluoroheptanoic acid



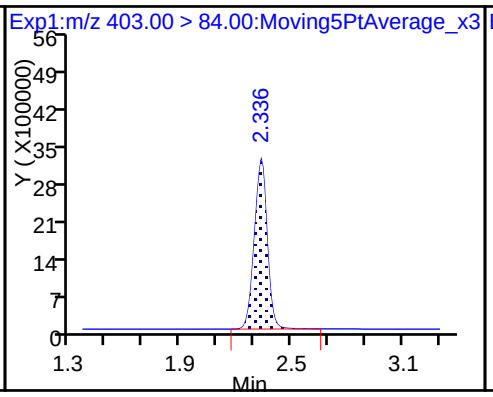
D 9 13C4-PFHpA



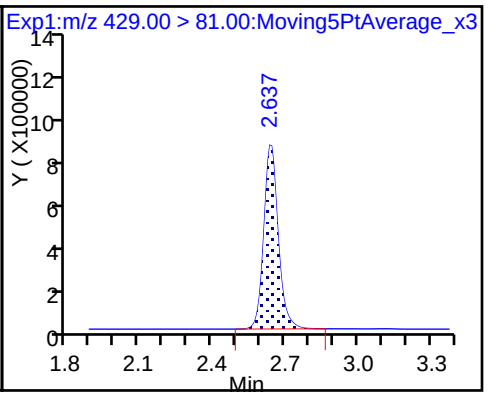
8 Perfluorohexanesulfonic acid



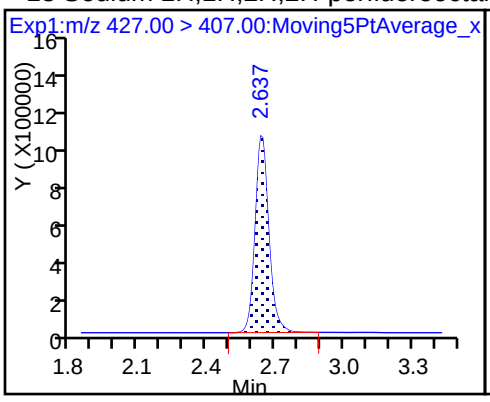
D 11 18O2 PFHxS



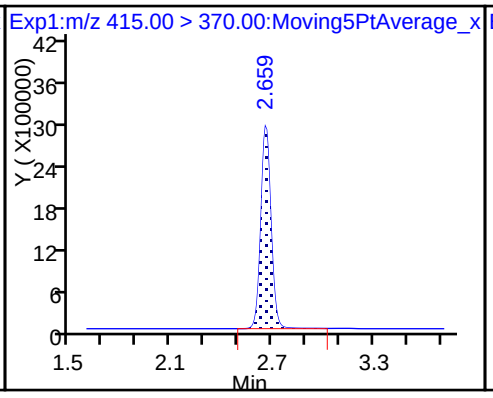
D 12 M2-6:2FTS



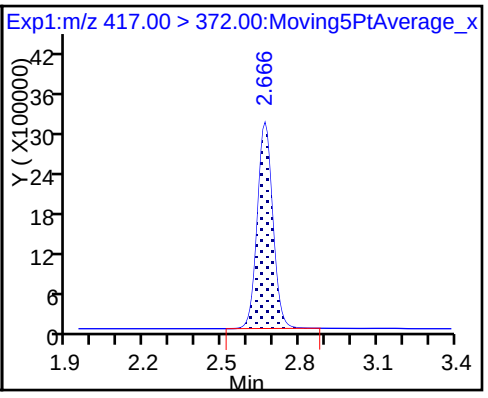
13 Sodium 1H,1H,2H,2H-perfluorooctane



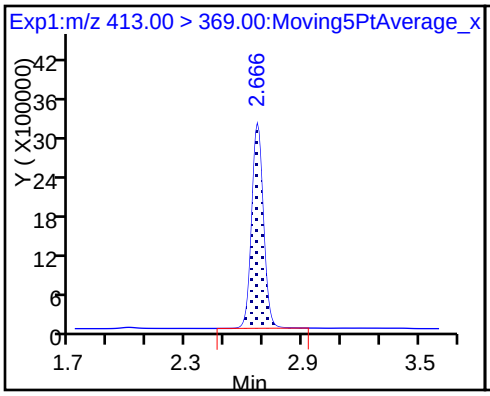
62 13C2-PFOA



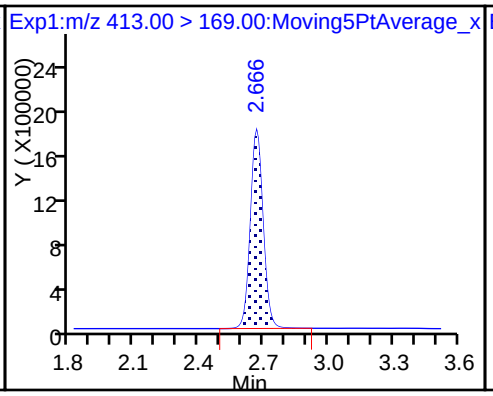
D 14 13C4 PFOA



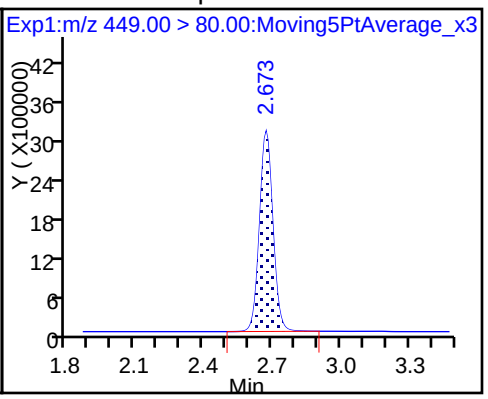
15 Perfluorooctanoic acid



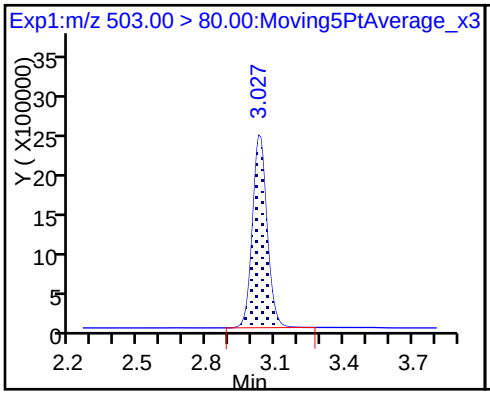
15 Perfluorooctanoic acid



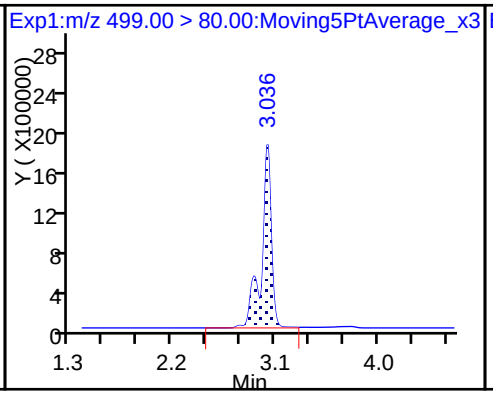
16 Perfluoroheptanesulfonic Acid



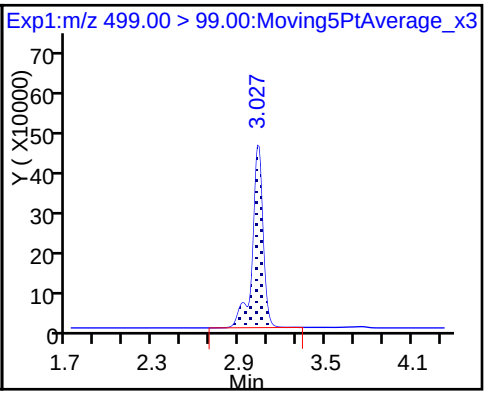
D 18 13C4 PFOS



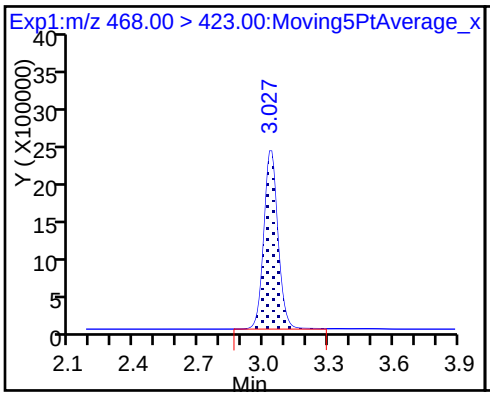
17 Perfluorooctane sulfonic acid



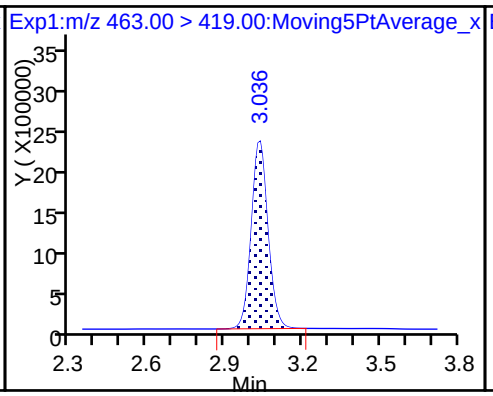
17 Perfluorooctane sulfonic acid



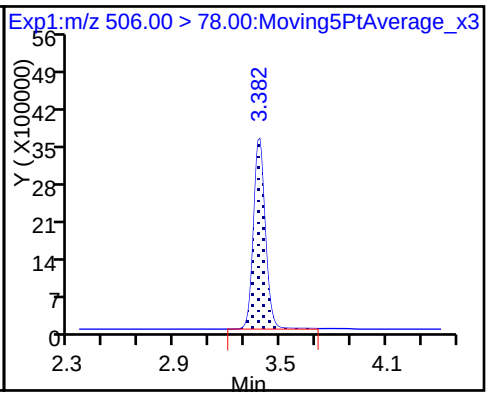
D 19 13C5 PFNA



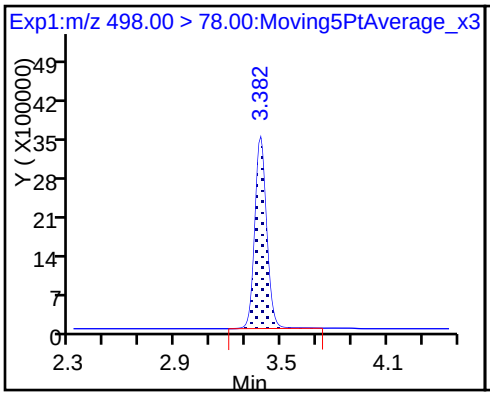
20 Perfluorononanoic acid



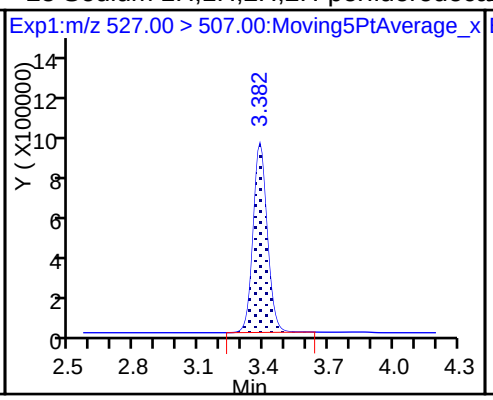
D 21 13C8 FOSA



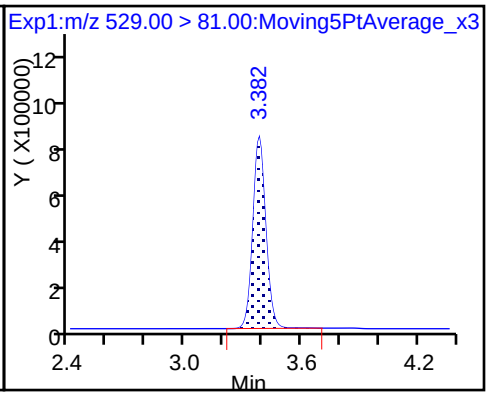
22 Perfluorooctane Sulfonamide



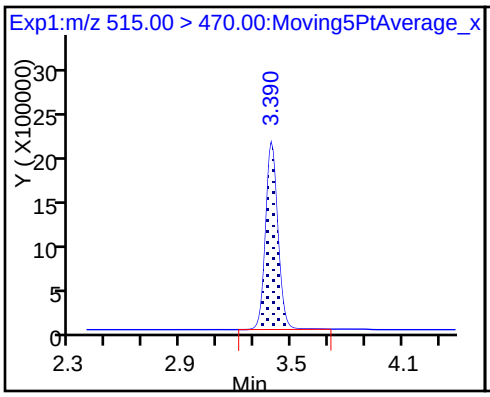
25 Sodium 1H,1H,2H,2H-perfluorodecane



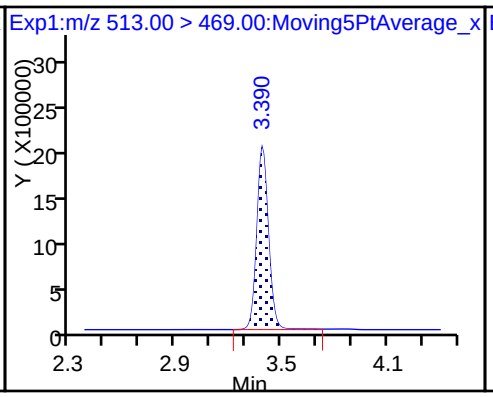
D 26 M2-8:2FTS



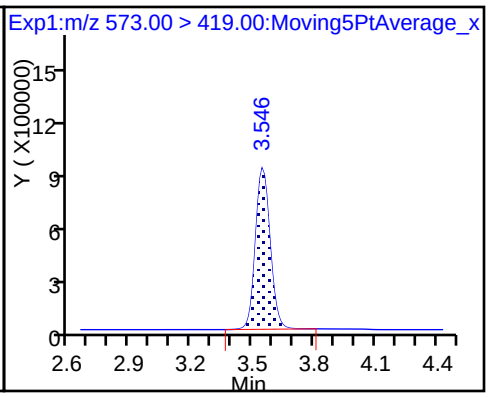
D 23 13C2 PFDA



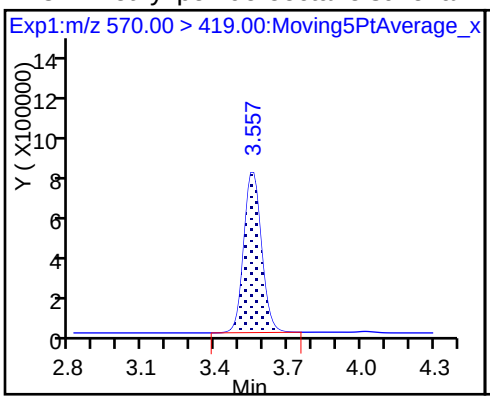
24 Perfluorodecanoic acid



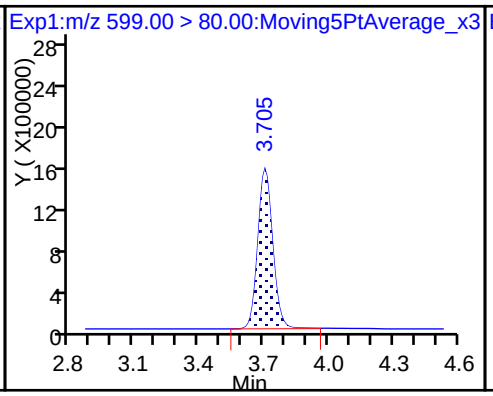
D 27 d3-NMeFOSAA



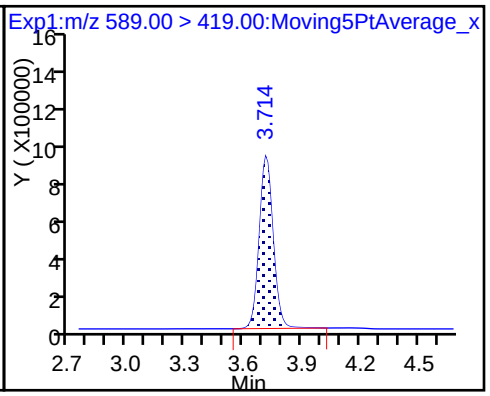
28 N-methyl perfluorooctane sulfonami



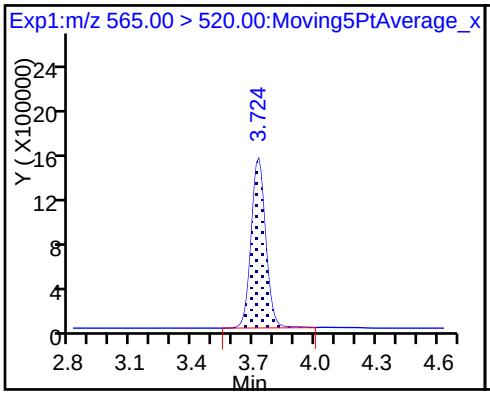
29 Perfluorodecane Sulfonic acid



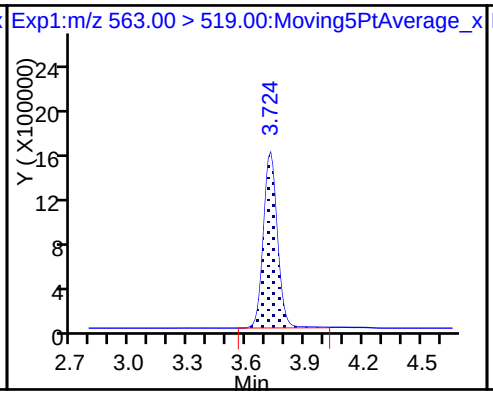
D 32 d5-NEtFOSAA



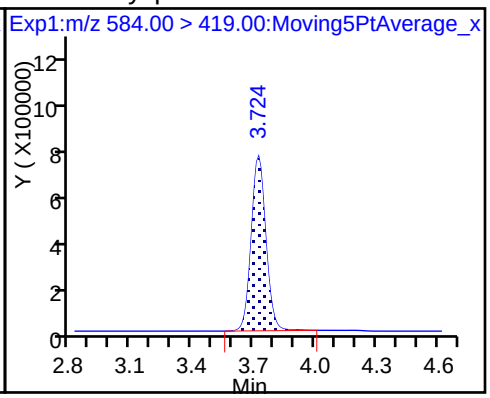
D 30 13C2 PFUnA



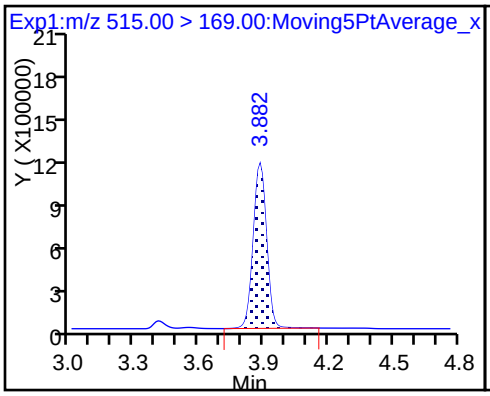
31 Perfluoroundecanoic acid



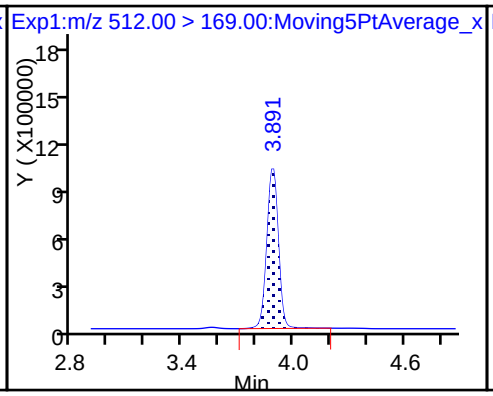
33 N-ethyl perfluorooctane sulfonamid



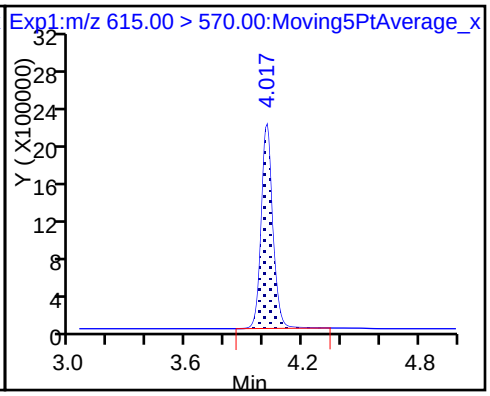
D 34 d-N-MeFOSA-M



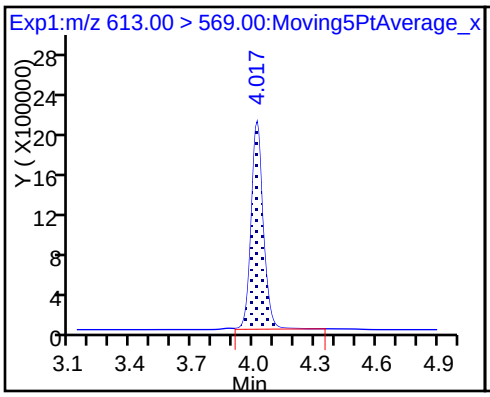
35 MeFOSA



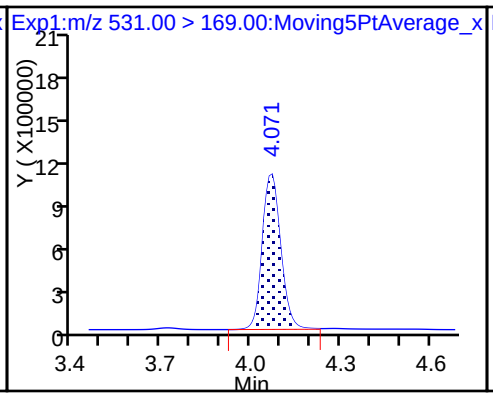
D 36 13C2 PFDoA



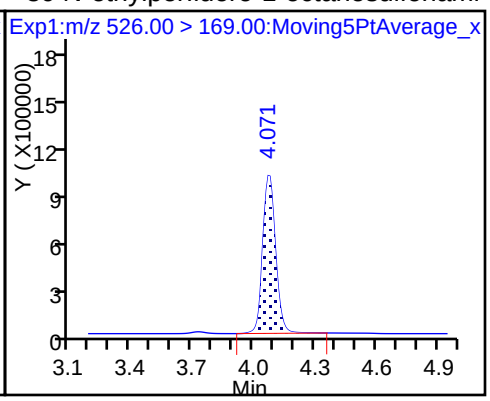
37 Perfluorododecanoic acid



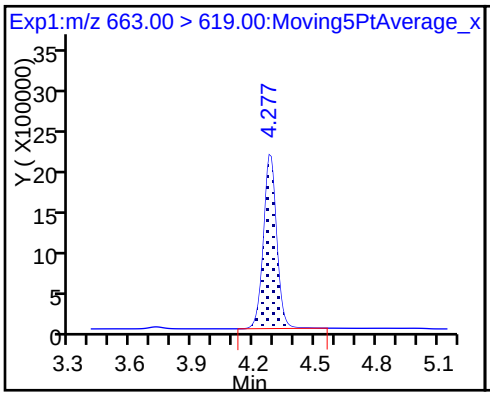
D 38 d-N-EtFOSA-M



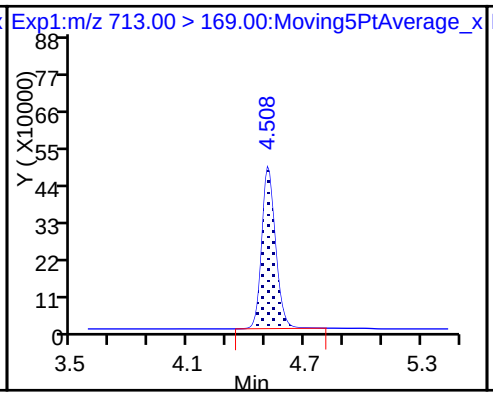
39 N-ethylperfluoro-1-octanesulfonami



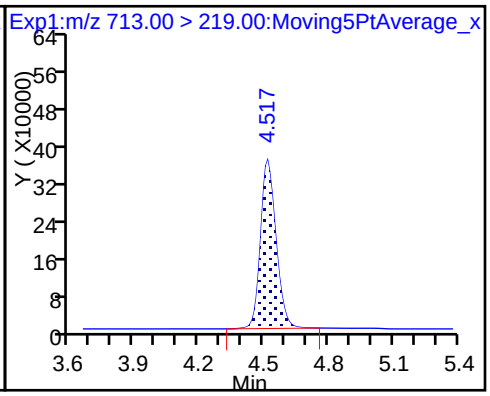
41 Perfluorotridecanoic acid



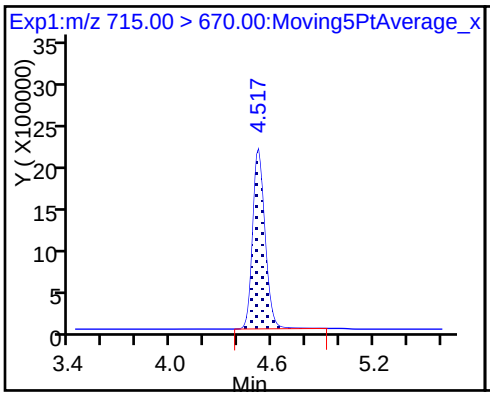
42 Perfluorotetradecanoic acid



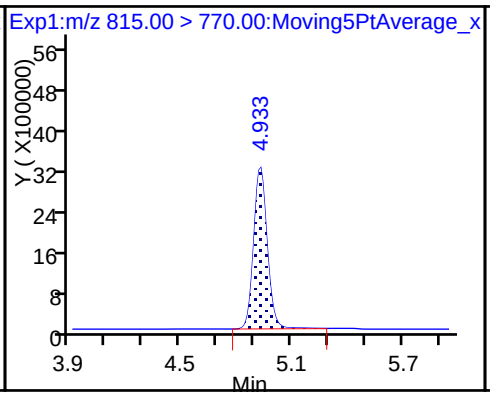
42 Perfluorotetradecanoic acid



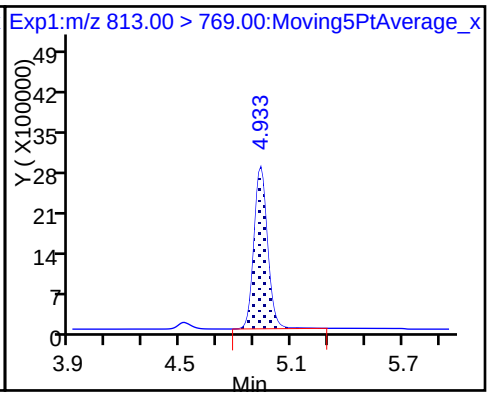
D 43 13C2-PFTeDA



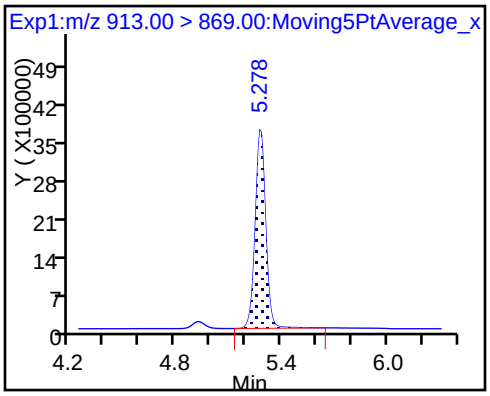
D 44 13C2-PFHxDA



45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_008.d
Lims ID: IC L6 Full
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 30-Oct-2017 18:34:01 ALS Bottle#: 33 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:20:15 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:50:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	26228900	81.7		81.7	2699	
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		16850593	48.1		96.1	16260	
D 3 13C5-PFPeA										
267.90 > 223.00	1.737	1.739	-0.002		10796893	47.9		95.7	133503	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.737	1.741	-0.004	1.000	20413300	88.0		88.0	18550	
D 47 13C3-PFBS										
301.90 > 83.00	1.764	1.763	0.001		221874	44.1		94.9	6371	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	25688097	74.3		84.0	230315	
298.90 > 99.00	1.764	1.764	0.0	1.000	13085894		1.96(0.00-0.00)	84.0	208610	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	7574658	94.7		101	29721	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.998	-0.003	1.000	20561075	94.7		94.7	14764	
D 7 13C2 PFHxA										
315.00 > 270.00	1.995	1.998	-0.003		11362658	46.9		93.8	24438	
D 9 13C4-PFHpA										
367.00 > 322.00	2.311	2.319	-0.008		11078906	45.5		90.9	17130	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.311	2.319	-0.008	1.000	20248813	94.4		94.4	7877	
D 11 18O2 PFHxS										
403.00 > 84.00	2.333	2.333	0.0		13765700	45.7		96.7	17739	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.333	2.333	0.0	1.000	25548500	84.9		93.3	5712	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.636	2.641	-0.005	1.000	7770479	94.8		100.0	13970	
D 12 M2-6:2FTS										
429.00 > 81.00	2.636	2.641	-0.005		3127517	44.9		94.6	11184	
* 62 13C2-PFOA										
415.00 > 370.00	2.658	2.655	0.003		11137395	50.0			17587	
D 14 13C4 PFOA										
417.00 > 372.00	2.658	2.664	-0.006		11225726	47.0		94.1	16613	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.665	2.666	-0.001	1.000	22026634	91.3		91.3	4588	
413.00 > 169.00	2.658	2.666	-0.008	0.997	12526713		1.76(0.90-1.10)	91.3	7440	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.665	2.672	-0.007	1.000	20944569	87.5		91.9	11319	
D 18 13C4 PFOS										
503.00 > 80.00	3.026	3.030	-0.004		9749248	46.0		96.2	10806	
D 19 13C5 PFNA										
468.00 > 423.00	3.026	3.031	-0.005		9660967	47.9		95.8	10362	
17 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.026	3.031	-0.005	1.000	19258573	90.8		97.8	2906	M
499.00 > 99.00	3.026	3.031	-0.005	1.000	4296938		4.48(0.90-1.10)	97.8	5814	
20 Perfluorononanoic acid										
463.00 > 419.00	3.026	3.033	-0.007	1.000	17641757	94.3		94.3	9041	
D 21 13C8 FOSA										
506.00 > 78.00	3.372	3.377	-0.005		14586209	46.9		93.7	12153	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.372	3.379	-0.007	1.000	25353469	92.2		92.2	11535	
D 26 M2-8:2FTS										
529.00 > 81.00	3.372	3.381	-0.009		3241827	44.9		93.7	7183	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.372	3.381	-0.009	1.000	7224840	96.0		100	8388	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.389	3.391	-0.002	1.000	15755129	96.1		96.1	10952	
D 23 13C2 PFDA										
515.00 > 470.00	3.389	3.391	-0.002		8726152	47.8		95.6	12345	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.545	3.547	-0.002		4079711	50.0		99.9	5919	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.545	3.553	-0.008	1.000	7510668	98.4		98.4	4289	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.704	3.705	-0.001	1.000	12902020	97.6		101	8909	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.714	3.715	-0.001		3798242	45.2		90.5	3839	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.714	3.722	-0.008	1.000	13560915	95.1		95.1	6073	
D 30 13C2 PFUnA										
565.00 > 520.00	3.714	3.722	-0.008		6679039	45.8		91.6	7053	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.723	3.723	0.0	1.003	6454094	100.6		101	5379	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.882	3.881	0.001		4486722	49.5		99.0	1372	
35 MeFOSA										
512.00 > 169.00	3.882	3.885	-0.003	1.000	8245970	103.0		103	5764	
D 36 13C2 PFDoA										
615.00 > 570.00	4.016	4.015	0.001		8136951	48.5		96.9	11666	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.016	4.016	0.0	1.000	14579972	97.4		97.4	7999	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.070	4.068	0.002		4408487	50.8		102	2086	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.079	4.074	0.005	1.000	8178532	99.8		99.8	3476	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.277	4.281	-0.004	1.000	16072205	95.6		95.6	3023	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.509	4.510	-0.001	1.000	4317118	102.4		102	6266	
713.00 > 219.00	4.518	4.510	0.008	1.002	3294450		1.31(0.00-0.00)	102	6386	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.509	4.516	-0.007		9479964	46.3		92.7	8431	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.924	4.929	-0.005	1.000	23840509	93.1		93.1	925	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.924	4.929	-0.005		14742231	48.1		96.2	3521	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.279	5.281	-0.002	1.000	25973108	92.7		92.7	1272	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC_FULL-L6_00006 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:20:16 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_008.d

Injection Date: 30-Oct-2017 18:34:01 Instrument ID: A8_N

Lims ID: IC L6 Full

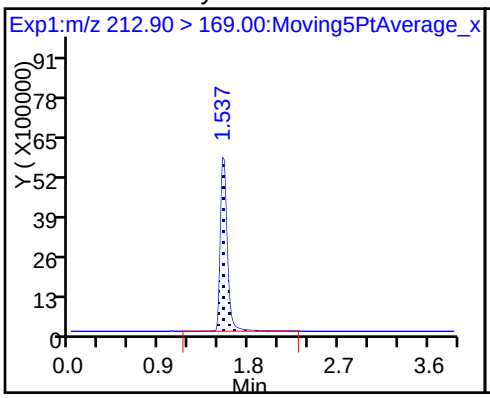
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 33 Worklist Smp#: 8

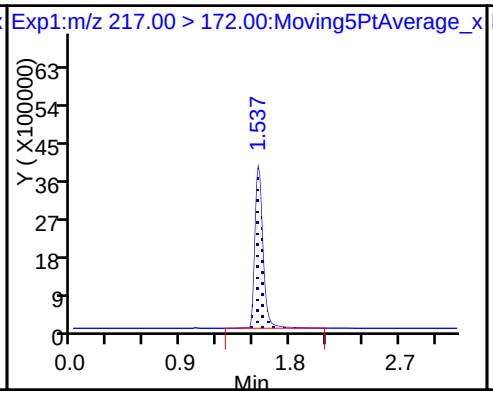
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

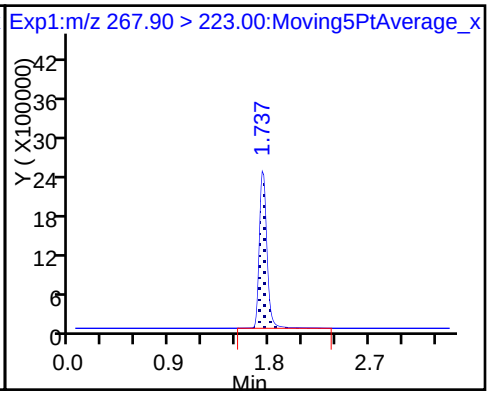
2 Perfluorobutyric acid



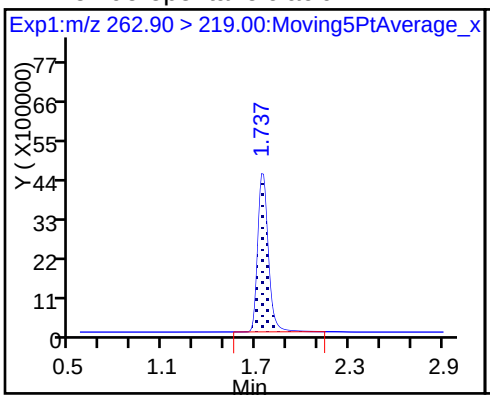
D 1 13C4 PFBA



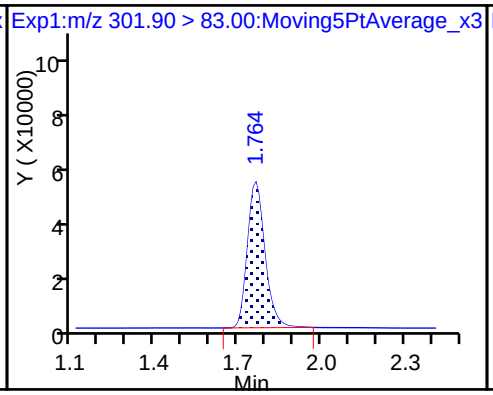
D 3 13C5-PFPeA



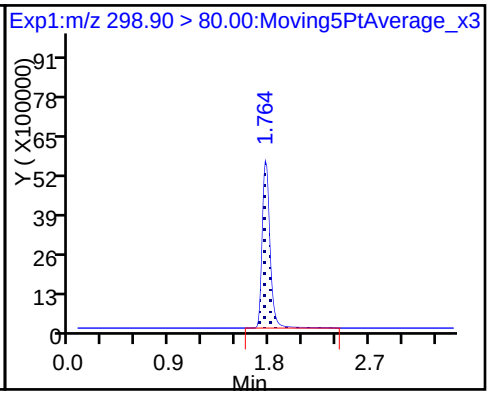
4 Perfluoropentanoic acid



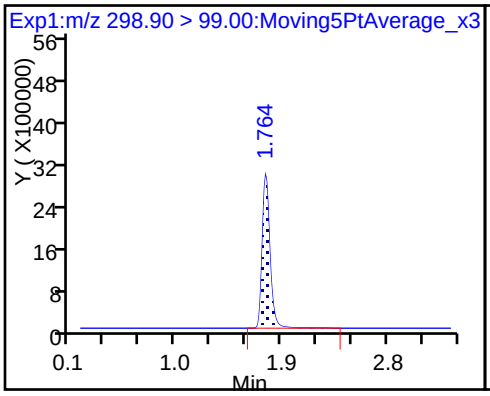
D 47 13C3-PFBS



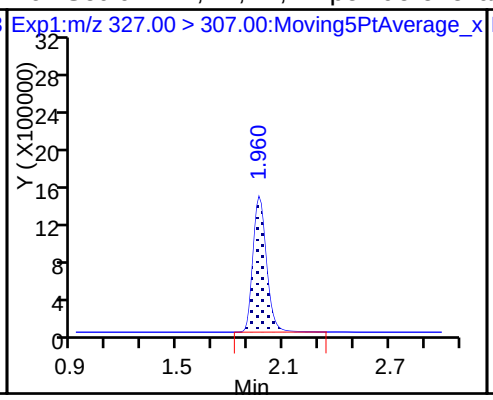
5 Perfluorobutanesulfonic acid



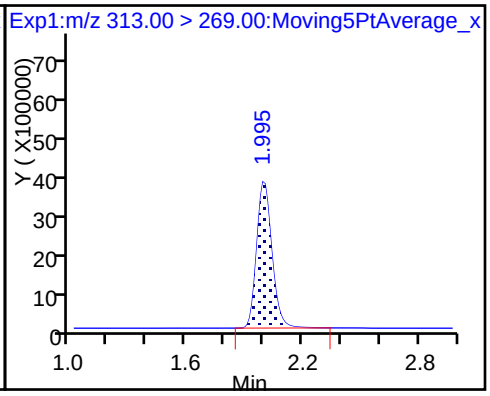
5 Perfluorobutanesulfonic acid



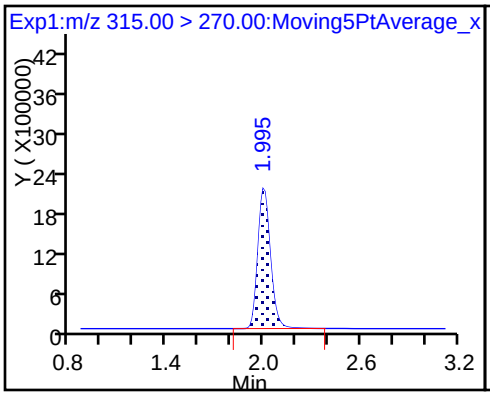
61 Sodium 1H,1H,2H,2H-perfluorohexane



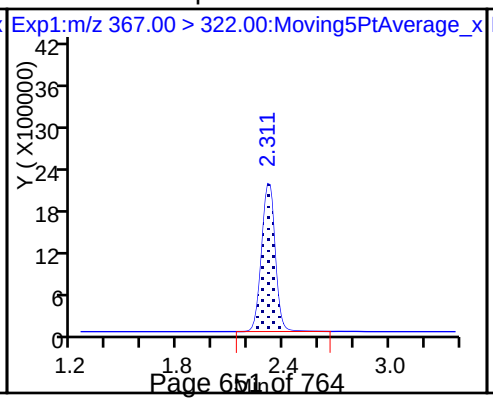
6 Perfluorohexanoic acid



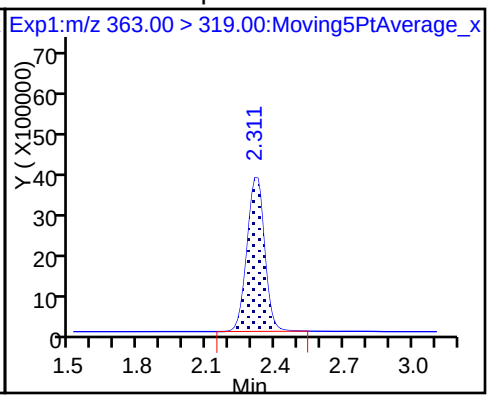
D 7 13C2 PFHxA



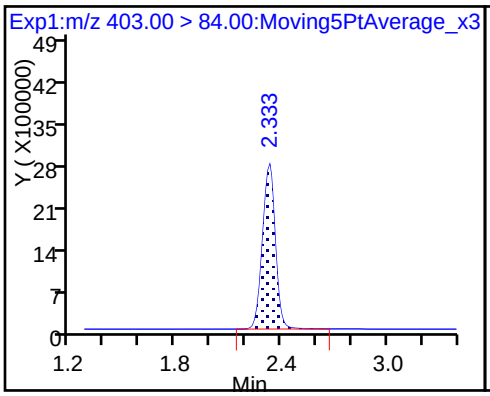
D 9 13C4-PFHpA



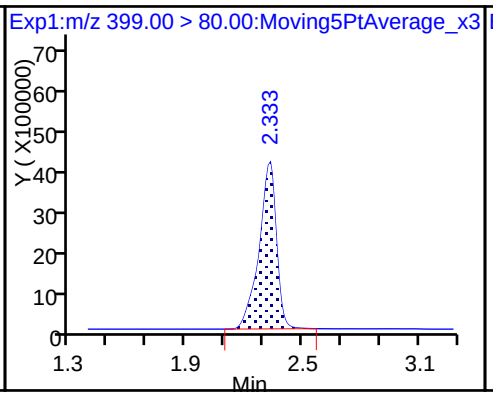
10 Perfluoroheptanoic acid



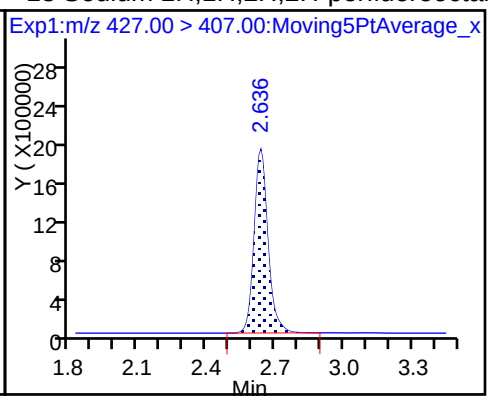
D 11 18O2 PFHxS



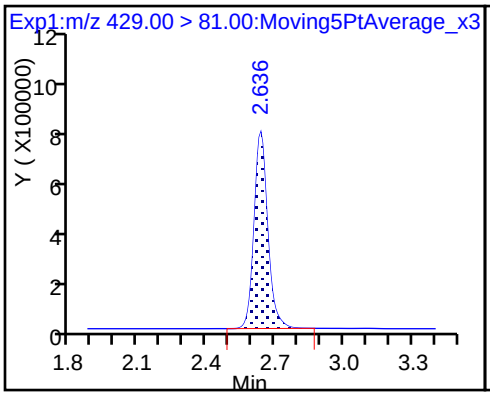
8 Perfluorohexanesulfonic acid



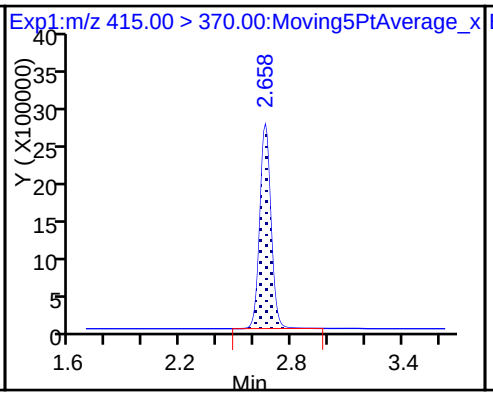
13 Sodium 1H,1H,2H,2H-perfluorooctane



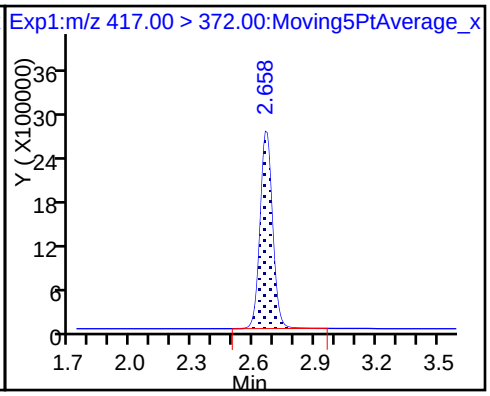
D 12 M2-6:2FTS



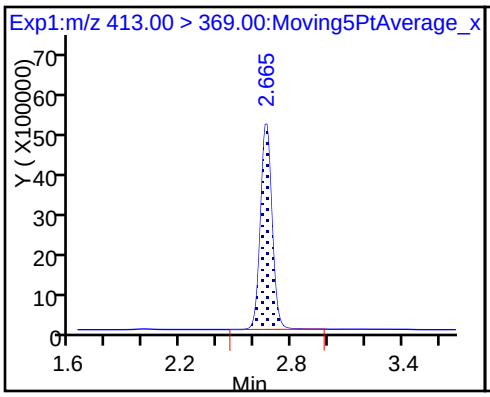
* 62 13C2-PFOA



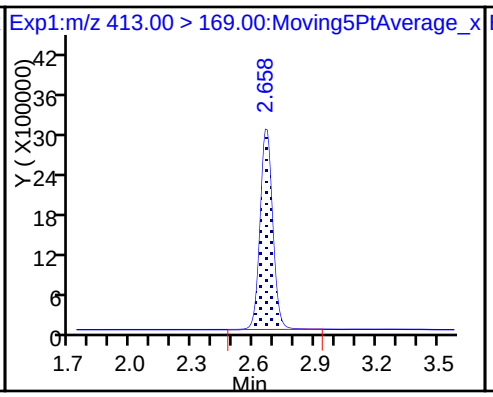
D 14 13C4 PFOA



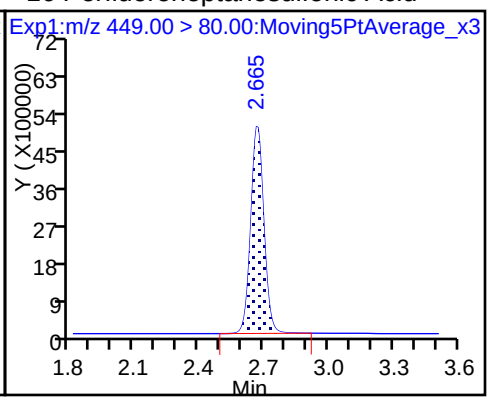
15 Perfluorooctanoic acid



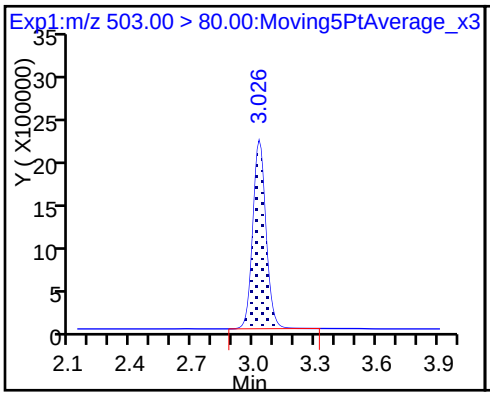
15 Perfluorooctanoic acid



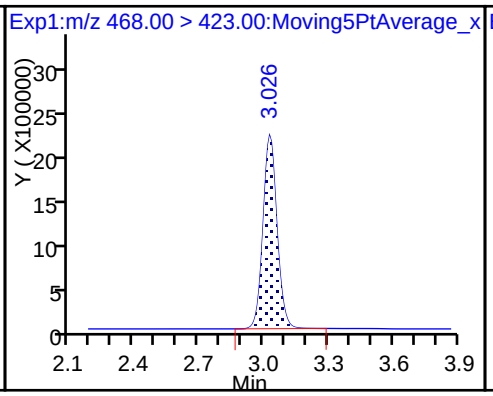
16 Perfluoroheptanesulfonic Acid



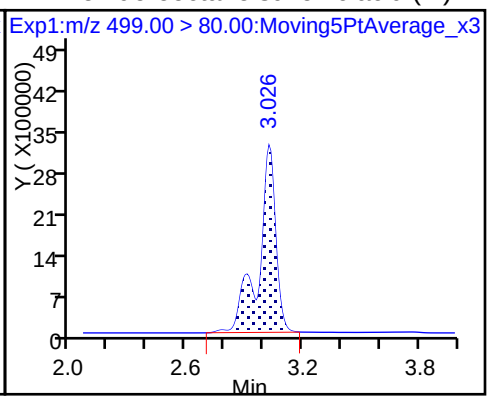
D 18 13C4 PFOS



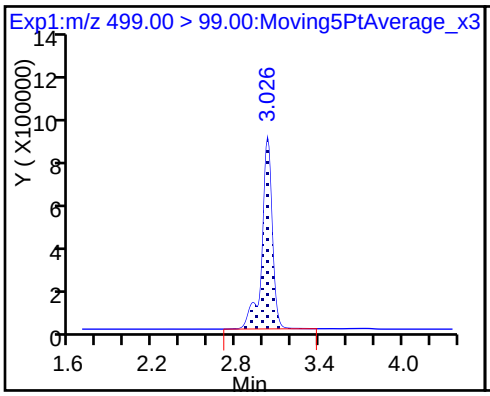
D 19 13C5 PFNA



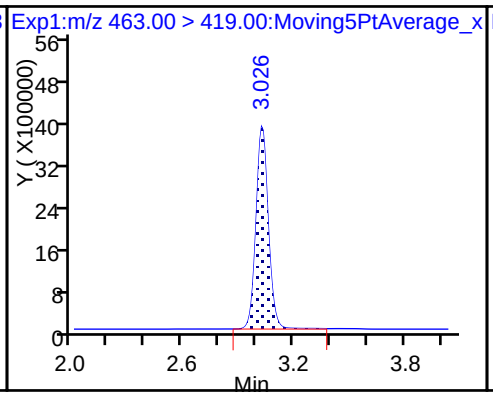
17 Perfluorooctane sulfonic acid (M)



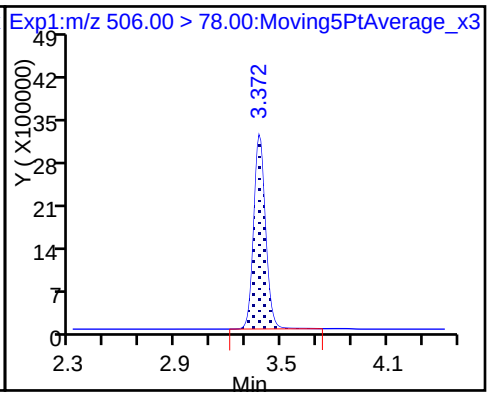
17 Perfluorooctane sulfonic acid



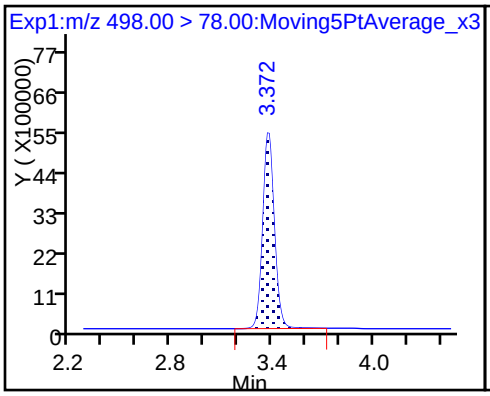
20 Perfluorononanoic acid



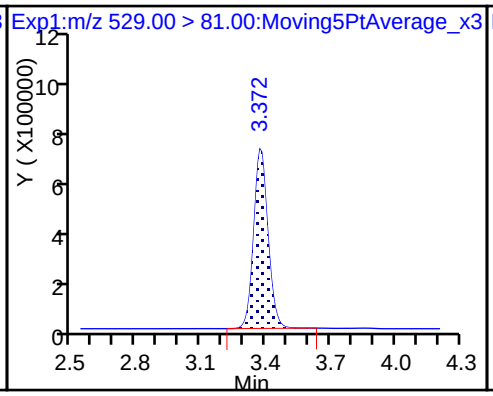
D 21 13C8 FOSA



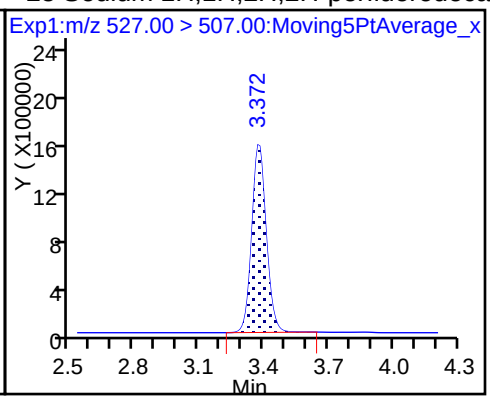
22 Perfluorooctane Sulfonamide



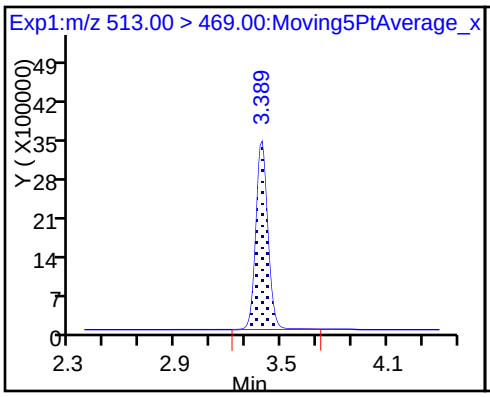
D 26 M2-8:2FTS



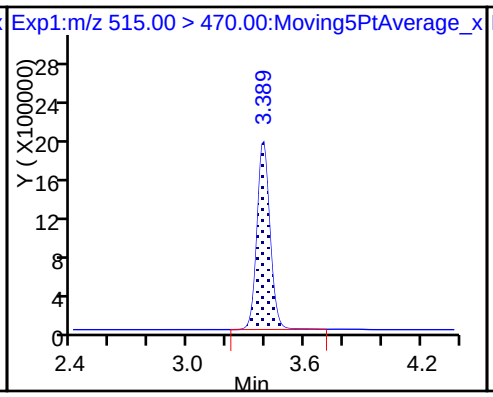
25 Sodium 1H,1H,2H,2H-perfluorodecane



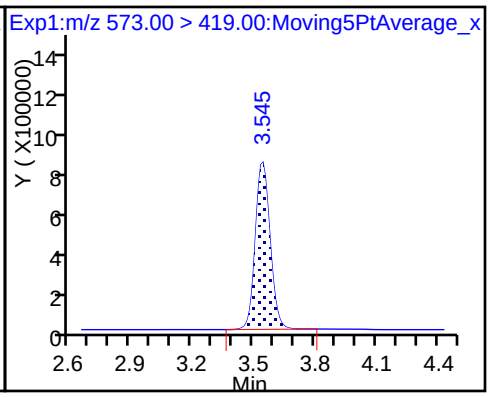
24 Perfluorodecanoic acid



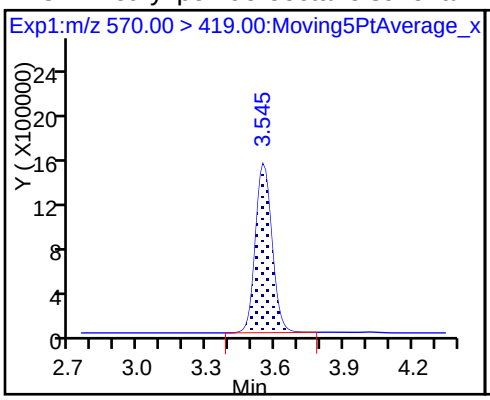
D 23 13C2 PFDA



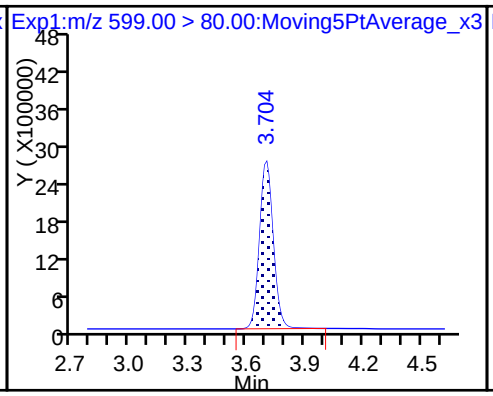
D 27 d3-NMeFOSAA



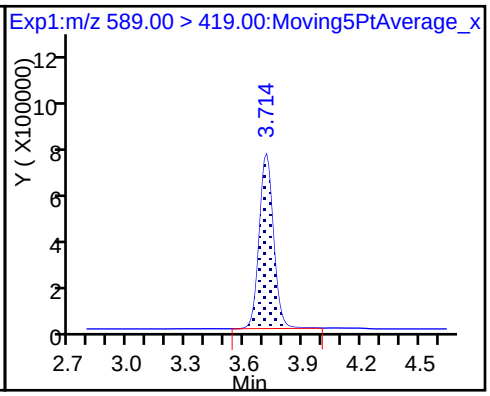
28 N-methyl perfluorooctane sulfonami



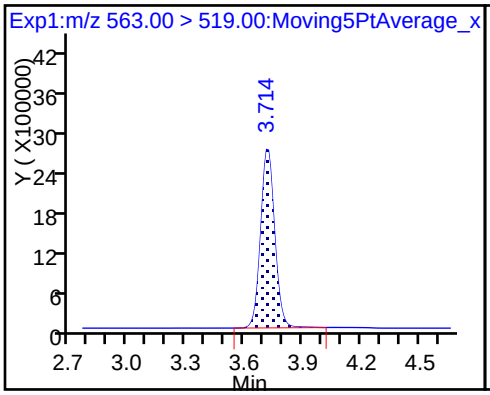
29 Perfluorodecane Sulfonic acid



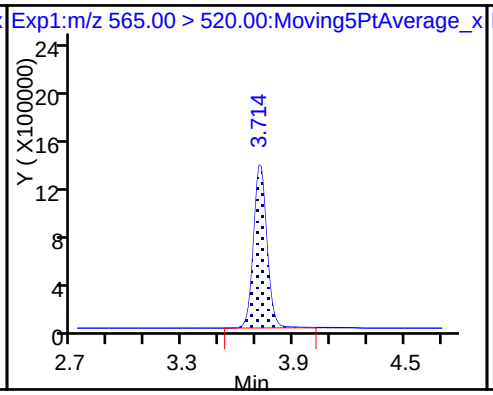
D 32 d5-NEtFOSAA



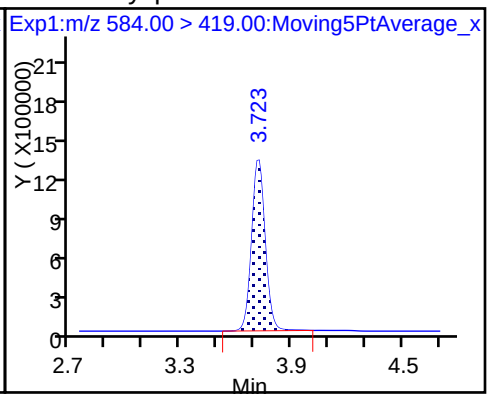
31 Perfluoroundecanoic acid



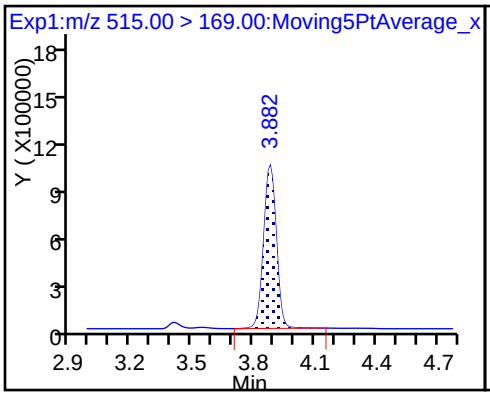
D 30 13C2 PFUnA



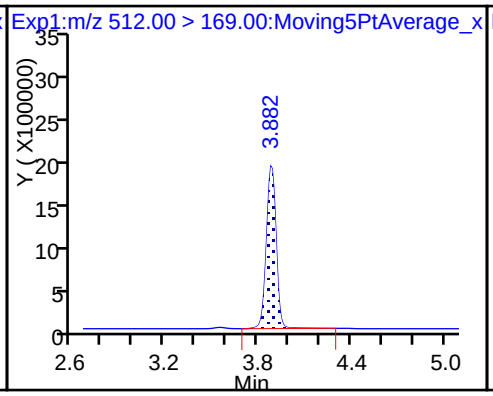
33 N-ethyl perfluorooctane sulfonamid



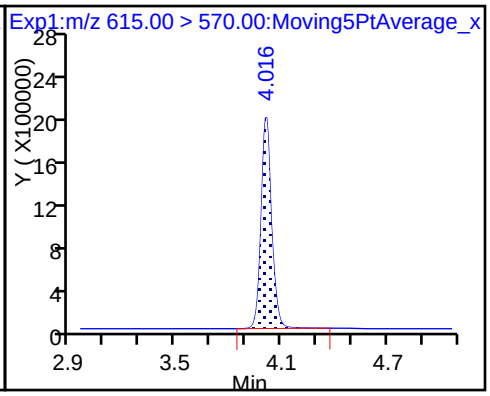
D 34 d-N-MeFOSA-M



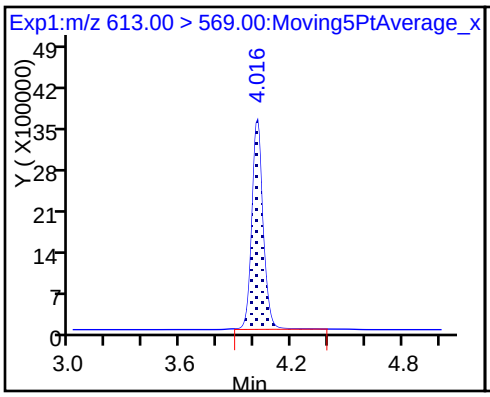
35 MeFOSA



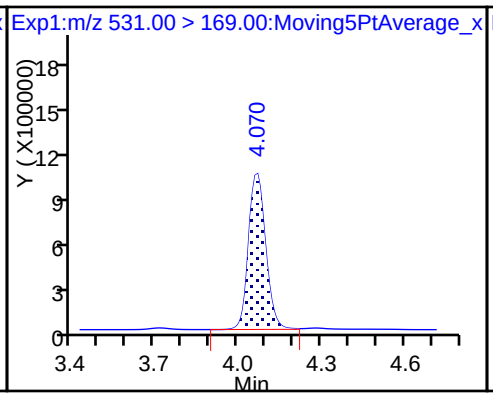
D 36 13C2 PFDoA



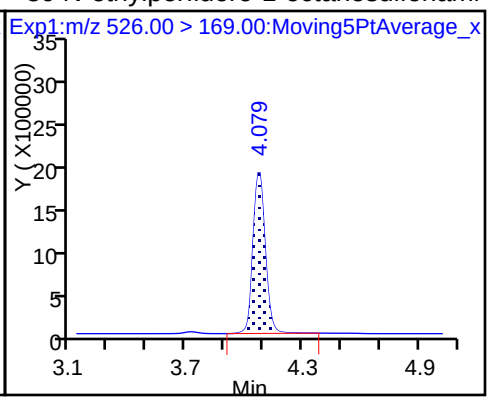
37 Perfluorododecanoic acid



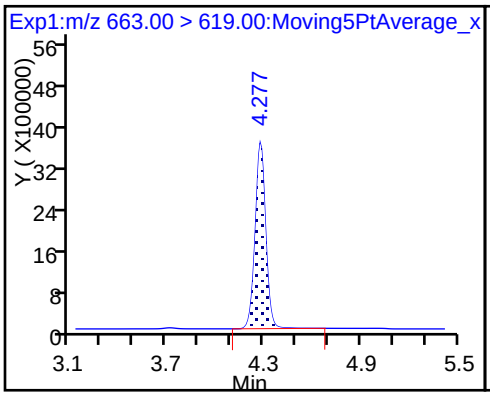
D 38 d-N-EtFOSA-M



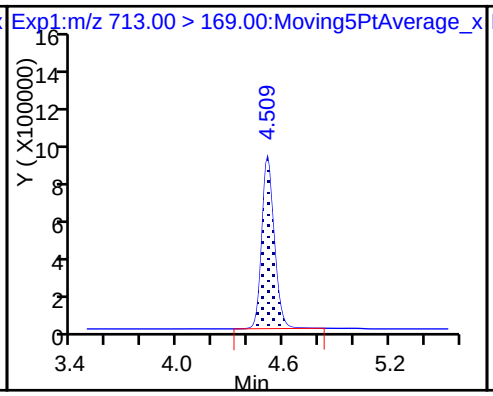
39 N-ethylperfluoro-1-octanesulfonami



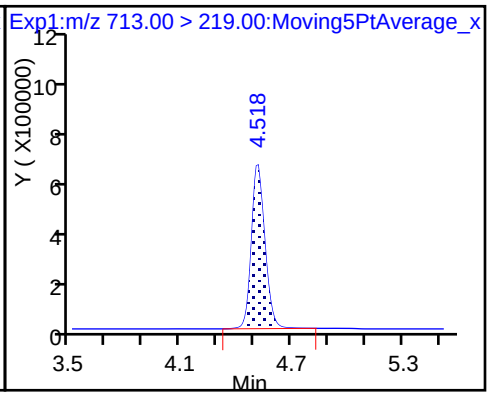
41 Perfluorotridecanoic acid



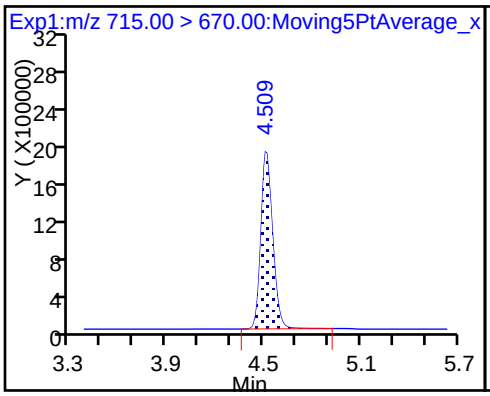
42 Perfluorotetradecanoic acid



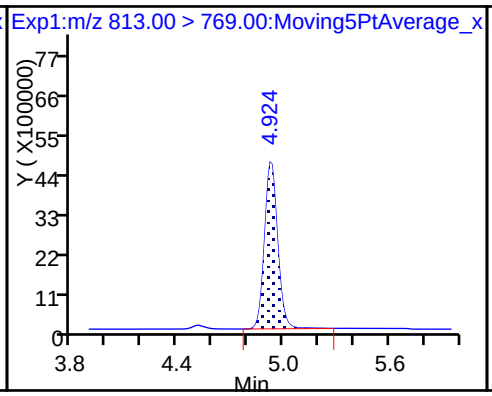
42 Perfluorotetradecanoic acid



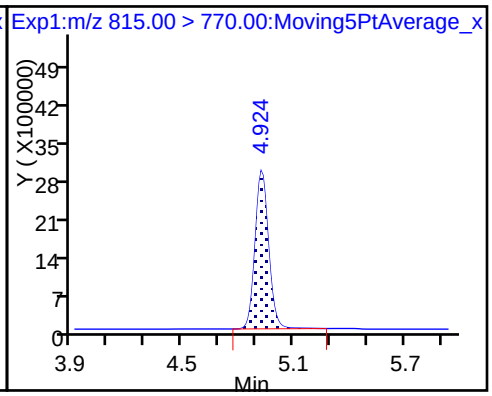
D 43 13C2-PFTeDA



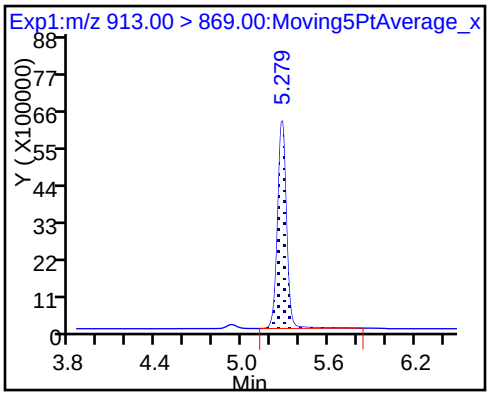
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

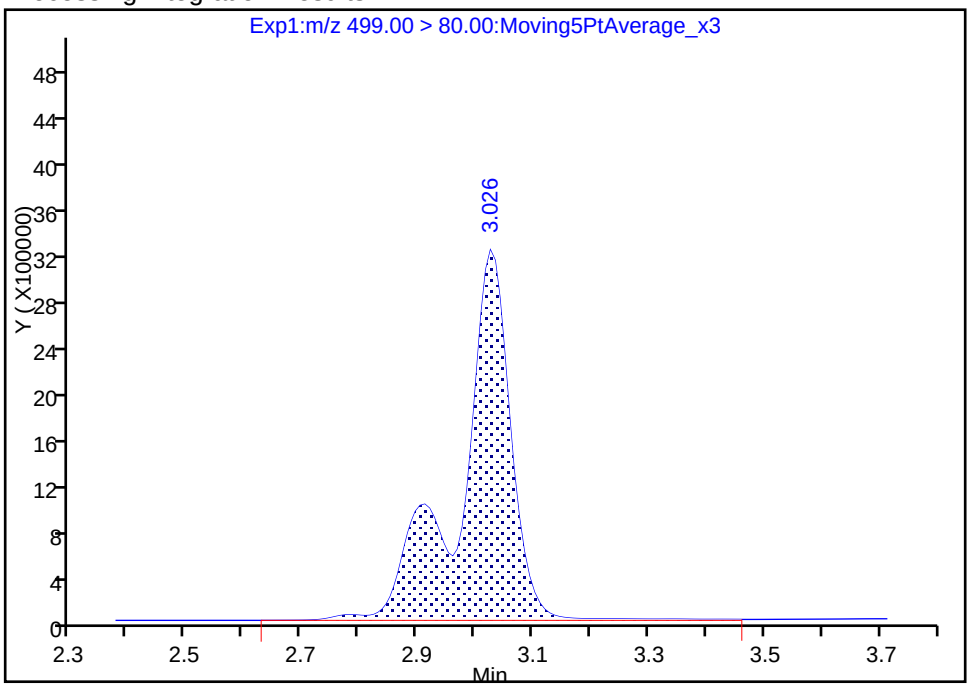
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_008.d				
Injection Date:	30-Oct-2017 18:34:01	Instrument ID:	A8_N		
Lims ID:	IC L6 Full				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	33	Worklist Smp#:	8
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

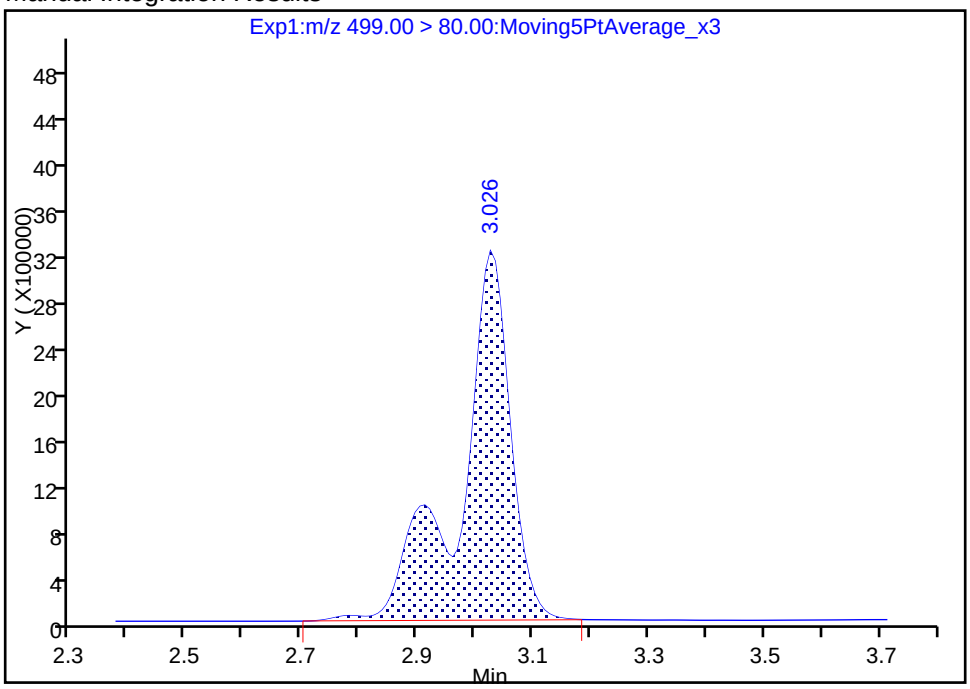
Processing Integration Results

RT: 3.03
Area: 19658133
Amount: 92.400994
Amount Units: ng/ml



Manual Integration Results

RT: 3.03
Area: 19258573
Amount: 90.785378
Amount Units: ng/ml



Reviewer: phomsophat, 30-Oct-2017 22:50:12

Audit Action: Manually Integrated Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_009.d
Lims ID: IC L7 Full
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 30-Oct-2017 18:40:55 ALS Bottle#: 34 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L7-FULL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:20:21 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:51:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		16408424	46.8		93.6	27338	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	41832393	133.9		66.9	2762	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.739	-0.003		10006745	44.4		88.7	123502	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.741	-0.005	1.000	32740106	152.3		76.1	57658	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.763	-0.008		208945	41.6		89.4	5901	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	40469998	124.3		70.3	41738	
298.90 > 99.00	1.764	1.764	0.0	1.000	22327969		1.81(0.00-0.00)	70.3	302817	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	14040224	192.0		103	30045	
D 7 13C2 PFHxA										
315.00 > 270.00	1.994	1.998	-0.004		10950785	45.2		90.4	24951	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.994	1.998	-0.004	1.000	33523091	160.2		80.1	14483	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.311	2.319	-0.008	1.000	32847152	167.9		84.0	11973	
D 9 13C4-PFHpA										
367.00 > 322.00	2.311	2.319	-0.008		10104592	41.5		82.9	17251	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.324	2.333	-0.009	1.000	42243112	156.3		85.9	5720	
D 11 18O2 PFHxS										
403.00 > 84.00	2.324	2.333	-0.009		12368812	41.1		86.9	16295	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.638	2.641	-0.003		2859084	41.1		86.5	12215	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.638	2.641	-0.003	1.000	14294286	190.7		101	15508	
* 62 13C2-PFOA										
415.00 > 370.00	2.659	2.655	0.004		10310552	50.0			19417	
D 14 13C4 PFOA										
417.00 > 372.00	2.659	2.664	-0.005		10606146	44.4		88.9	23508	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.659	2.666	-0.007	1.000	36125926	158.5		79.3	5458	
413.00 > 169.00	2.659	2.666	-0.007	1.000	21490887		1.68(0.90-1.10)	79.3	8360	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.667	2.672	-0.006	1.000	34435082	150.0		78.8	16058	
D 18 13C4 PFOS										
503.00 > 80.00	3.027	3.030	-0.003		9351352	44.1		92.3	8702	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.027	3.031	-0.004	1.000	36170703	177.8		95.8	4459	
499.00 > 99.00	3.027	3.031	-0.004	1.000	8547284		4.23(0.90-1.10)	95.8	6620	
D 19 13C5 PFNA										
468.00 > 423.00	3.027	3.031	-0.004		9087907	45.0		90.1	13880	
20 Perfluorononanoic acid										
463.00 > 419.00	3.027	3.033	-0.006	1.000	30714706	174.5		87.2	11853	
D 21 13C8 FOSA										
506.00 > 78.00	3.375	3.377	-0.002		14098730	45.3		90.6	12584	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.375	3.379	-0.004	1.000	40961582	154.1		77.1	9214	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.375	3.381	-0.006	1.000	13205694	186.6		97.4	10729	
D 26 M2-8:2FTS										
529.00 > 81.00	3.375	3.381	-0.006		3047225	42.2		88.1	8508	
D 23 13C2 PFDA										
515.00 > 470.00	3.383	3.391	-0.008		8230300	45.1		90.2	12227	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.383	3.391	-0.008	1.000	27033900	174.8		87.4	9519	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.539	3.547	-0.008		3979428	48.7		97.4	5679	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.549	3.553	-0.004	1.003	14958318	200.9		100	4383	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.697	3.705	-0.008	1.000	22131027	174.6		90.6	8483	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.707	3.715	-0.008		3510602	41.8		83.6	3985	
D 30 13C2 PFUnA										
565.00 > 520.00	3.717	3.722	-0.005		6227711	42.7		85.5	6335	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.717	3.722	-0.005	1.000	23510391	176.9		88.4	5442	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.717	3.723	-0.006	1.003	12130483	204.6		102	5584	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.877	3.881	-0.004		4746426	52.4		105	1133	
35 MeFOSA										
512.00 > 169.00	3.886	3.885	0.001	1.000	16086774	190.0		95.0	4714	
D 36 13C2 PFDoA										
615.00 > 570.00	4.013	4.015	-0.002		7663646	45.6		91.3	6850	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.013	4.016	-0.003	1.000	25387048	180.1		90.1	5925	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.065	4.068	-0.003		4591296	52.9		106	2045	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.074	4.074	0.0	1.000	16098373	188.5		94.3	4325	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.280	4.281	-0.001	1.000	28065123	177.2		88.6	2505	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.506	4.510	-0.004	1.000	8038993	188.9		94.5	8635	
713.00 > 219.00	4.515	4.510	0.005	1.002	6418574		1.25(0.00-0.00)	94.5	9993	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.515	4.516	-0.001		9570197	46.8		93.5	8807	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.921	4.929	-0.008		14443282	47.1		94.3	3462	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.921	4.929	-0.008	1.000	39228425	156.6		78.3	1006	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.270	5.281	-0.011	1.000	42943723	156.4		78.2	1706	

Reagents:

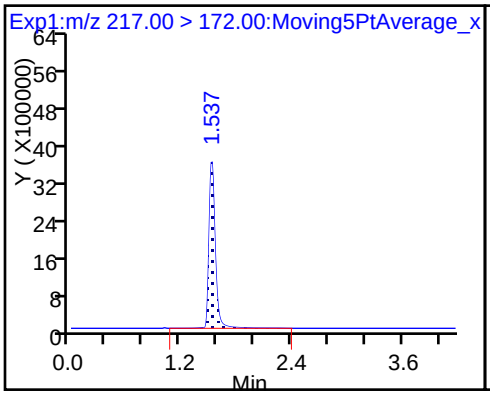
LCPFC_FULL-L7_00004 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:20:22 Chrom Revision: 2.2 16-Aug-2017 16:24:46

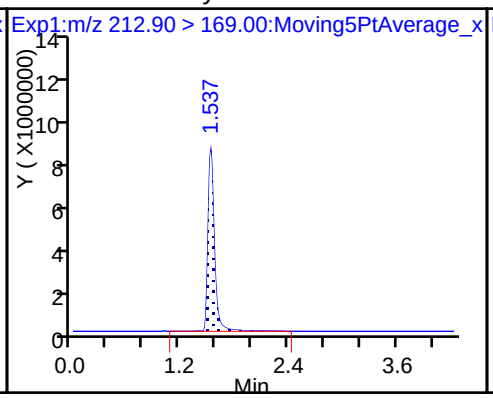
TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_009.d
Injection Date: 30-Oct-2017 18:40:55 Instrument ID: A8_N
Lims ID: IC L7 Full
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL

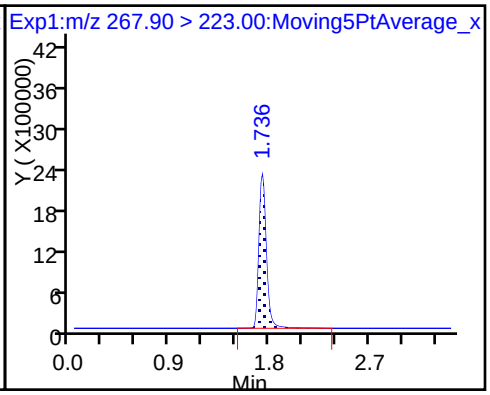
D 1 13C4 PFBA



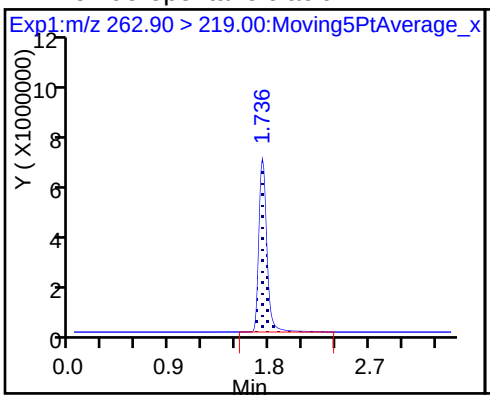
2 Perfluorobutyric acid



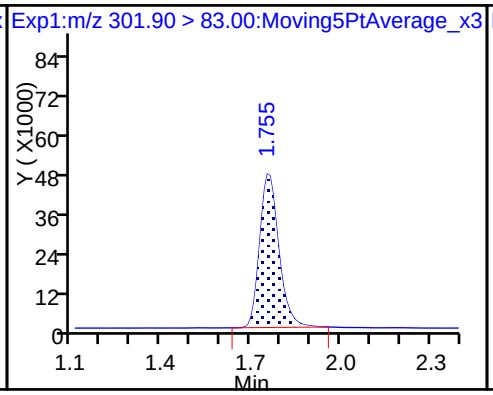
D 3 13C5-PFPeA



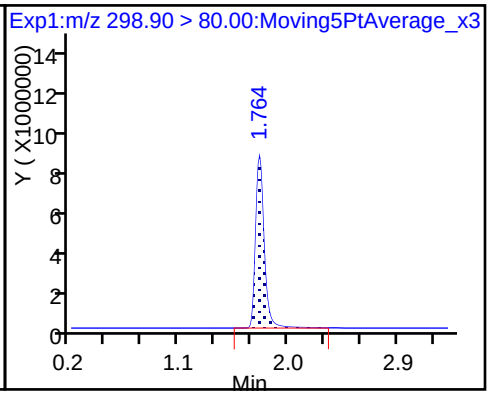
4 Perfluoropentanoic acid



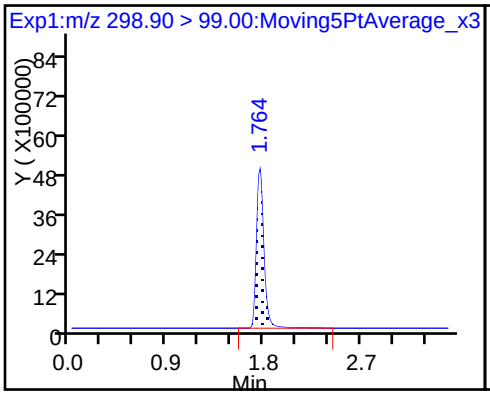
D 47 13C3-PFBS



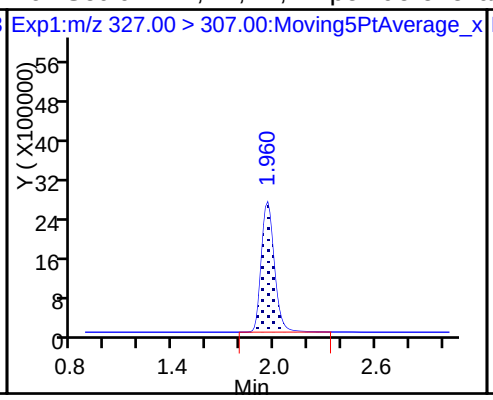
5 Perfluorobutanesulfonic acid



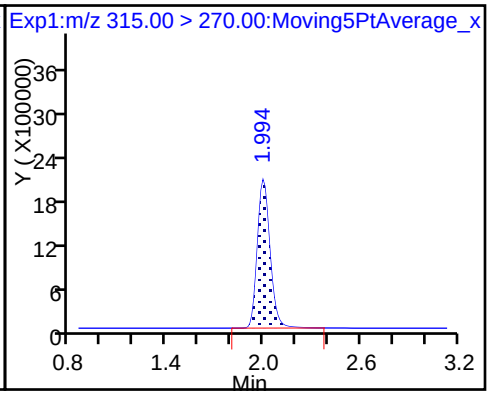
5 Perfluorobutanesulfonic acid



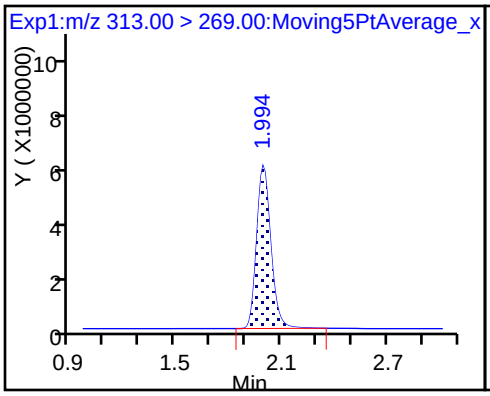
61 Sodium 1H,1H,2H,2H-perfluorohexa



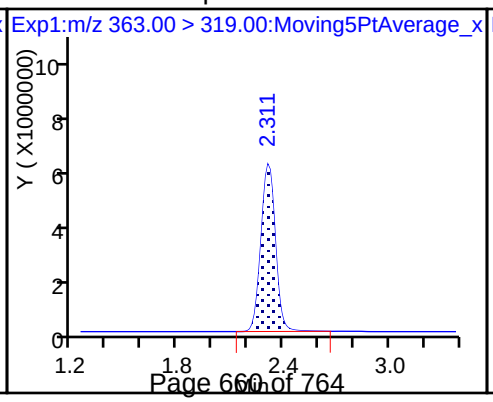
D 7 13C2 PFHxA



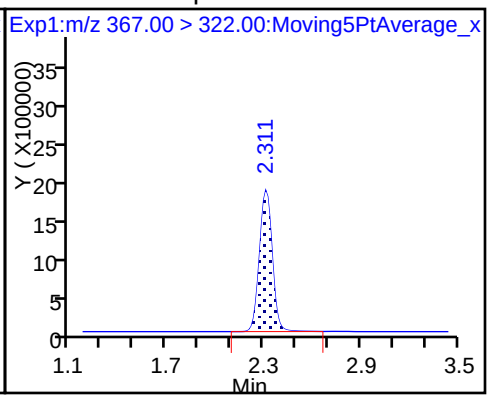
6 Perfluorohexanoic acid



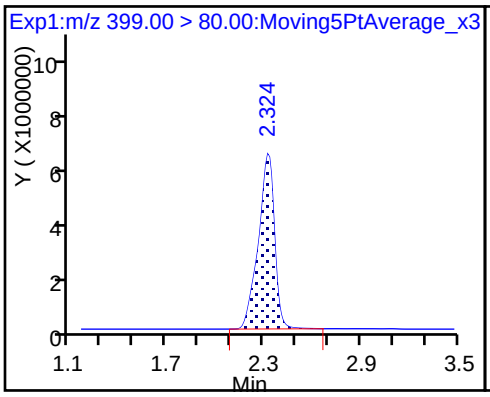
10 Perfluoroheptanoic acid



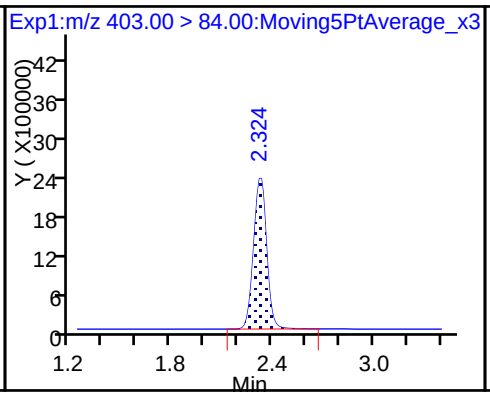
D 9 13C4-PFHpA



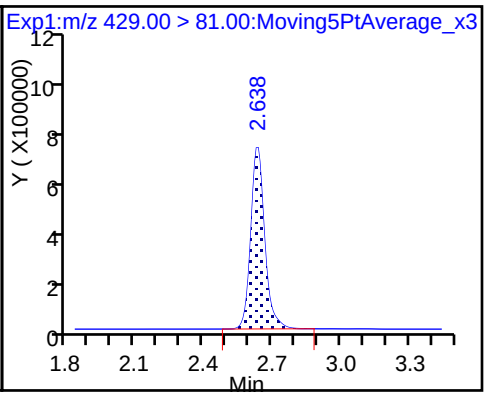
8 Perfluorohexanesulfonic acid



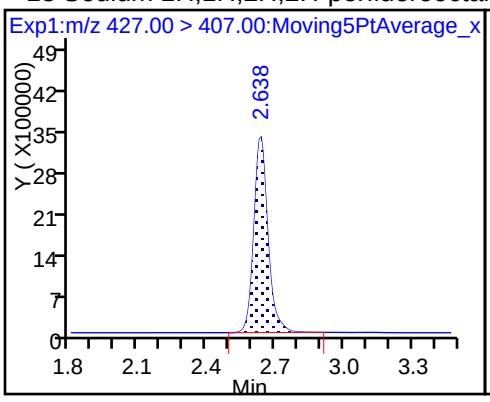
D 11 18O2 PFHxS



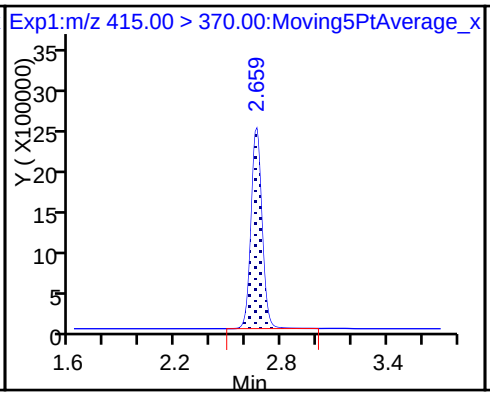
D 12 M2-6:2FTS



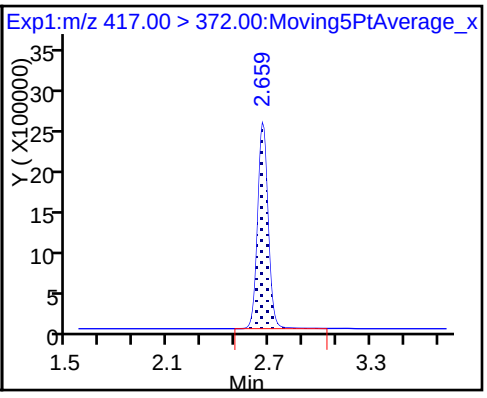
13 Sodium 1H,1H,2H,2H-perfluorooctane



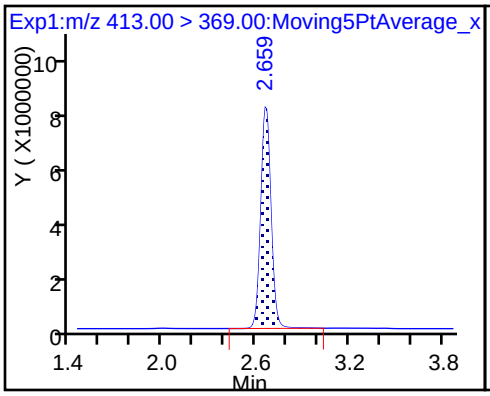
62 13C2-PFOA



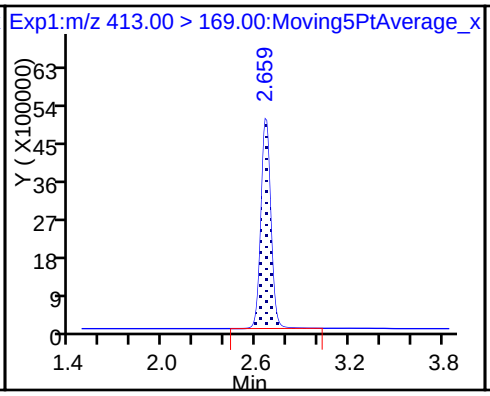
D 14 13C4 PFOA



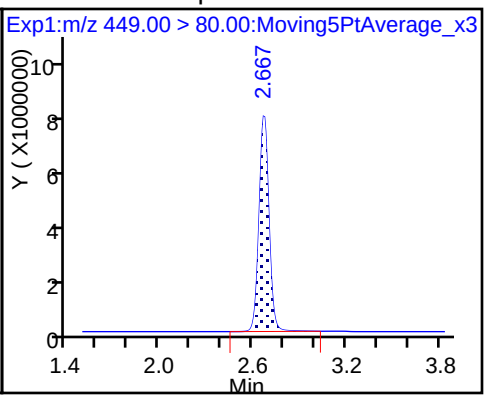
15 Perfluorooctanoic acid



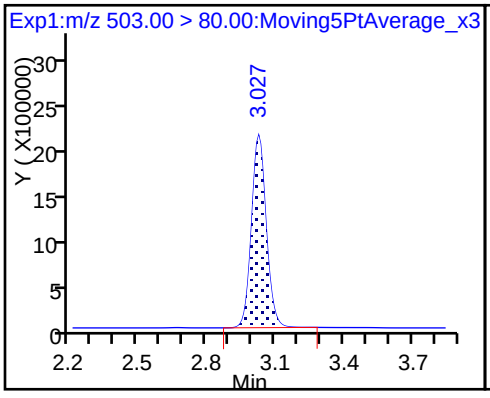
15 Perfluorooctanoic acid



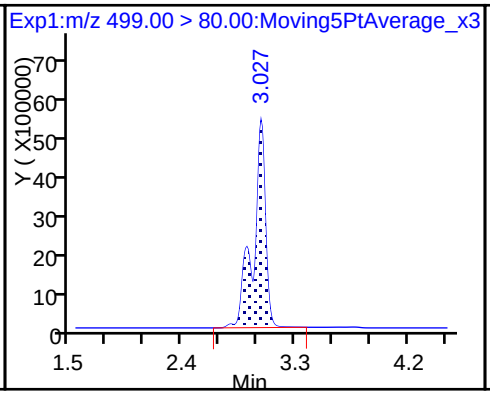
16 Perfluoroheptanesulfonic Acid



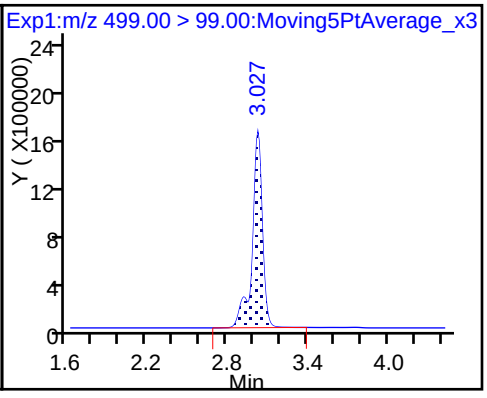
D 18 13C4 PFOS



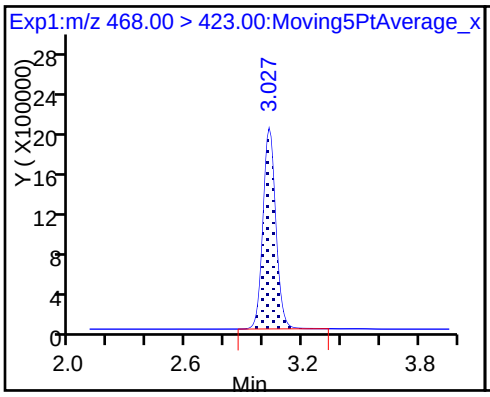
17 Perfluorooctane sulfonic acid



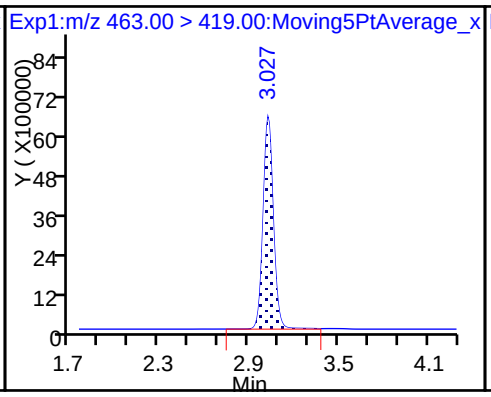
17 Perfluorooctane sulfonic acid



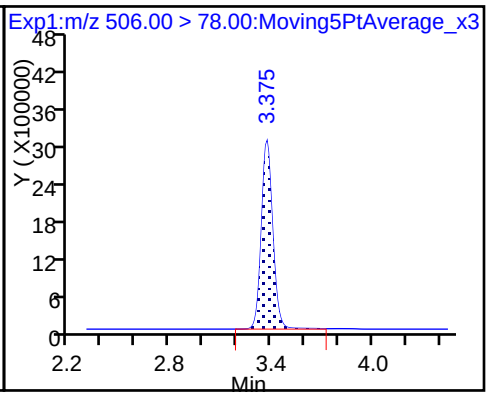
D 19 13C5 PFNA



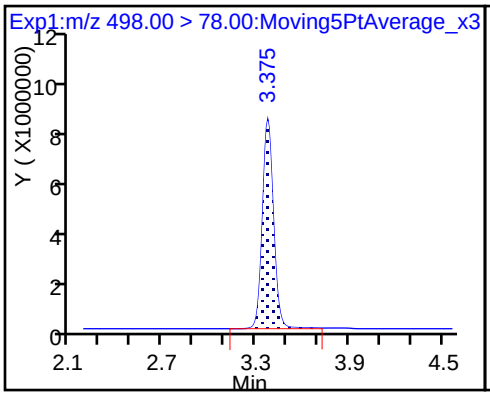
20 Perfluorononanoic acid



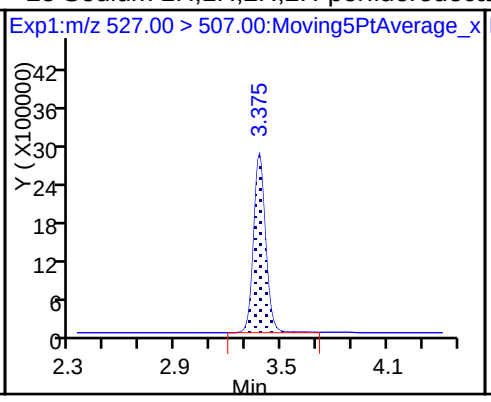
D 21 13C8 FOSA



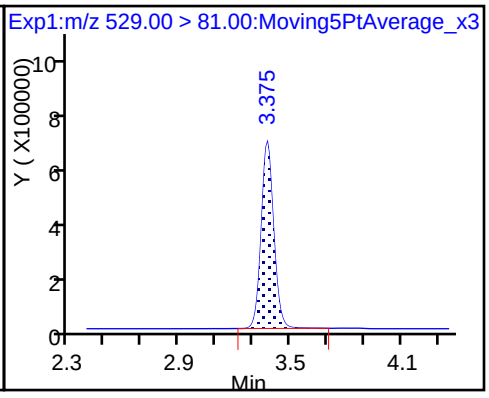
22 Perfluorooctane Sulfonamide



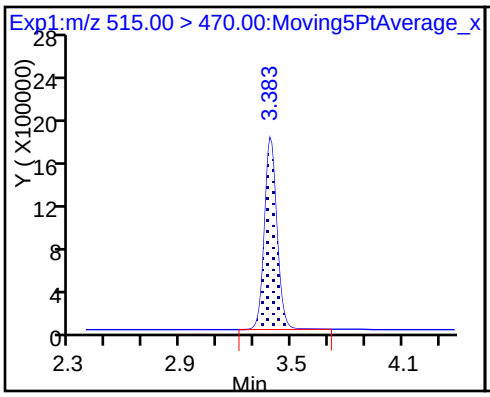
25 Sodium 1H,1H,2H,2H-perfluorodecane



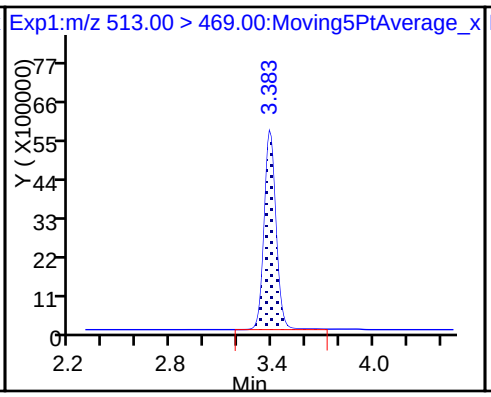
D 26 M2-8:2FTS



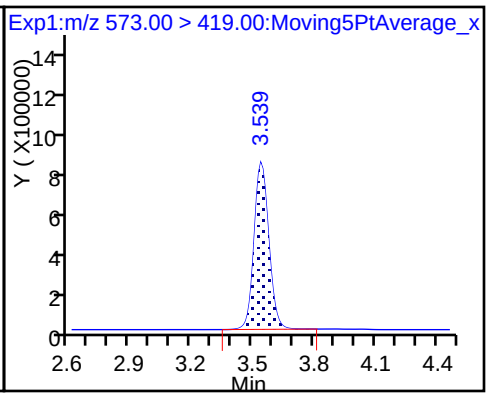
D 23 13C2 PFDA



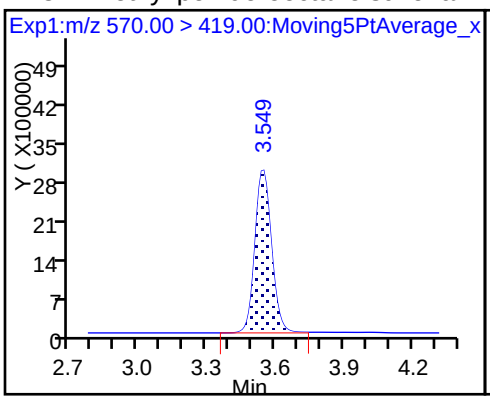
24 Perfluorodecanoic acid



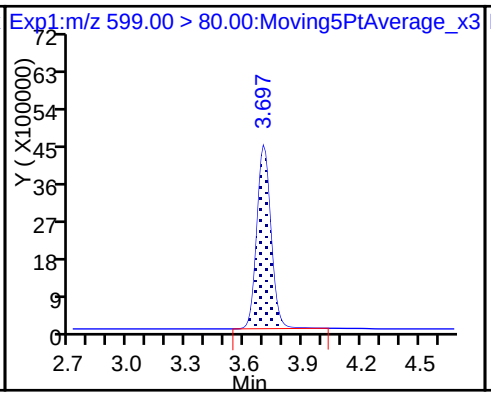
D 27 d3-NMeFOSAA



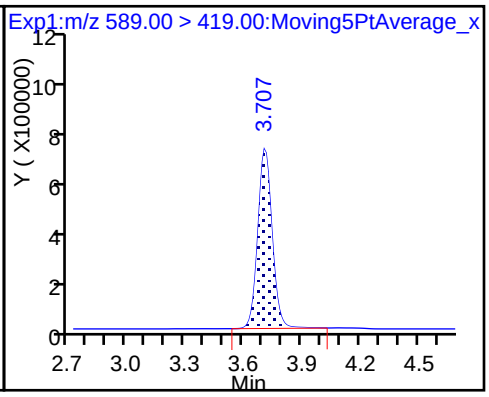
28 N-methyl perfluorooctane sulfonami



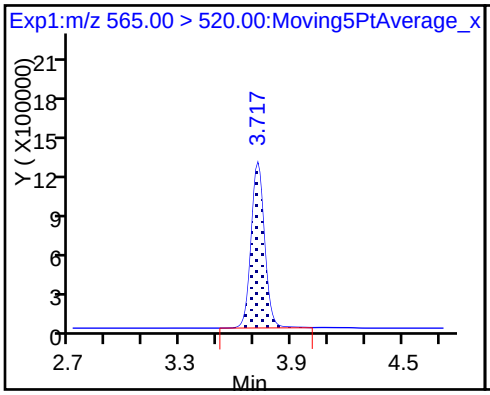
29 Perfluorodecane Sulfonic acid



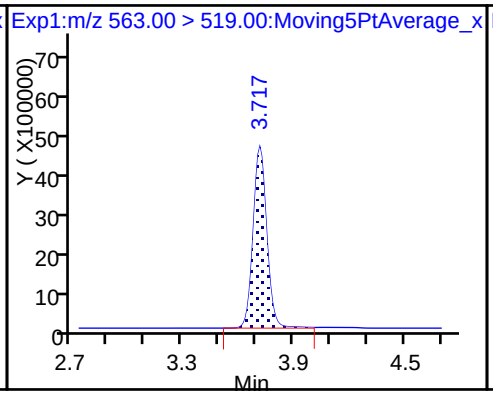
D 32 d5-NEtFOSAA



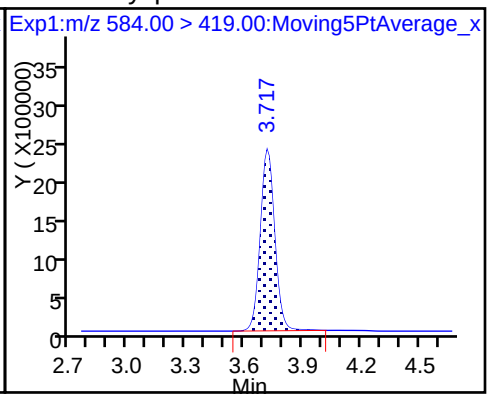
D 30 13C2 PFUnA



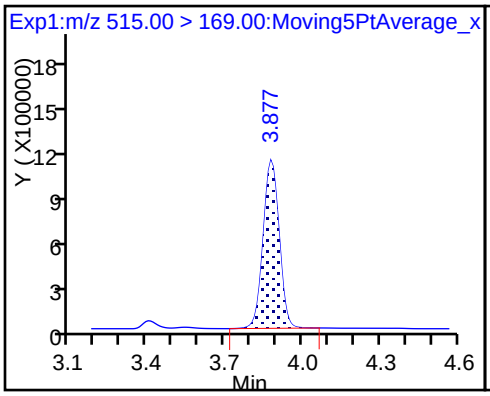
31 Perfluoroundecanoic acid



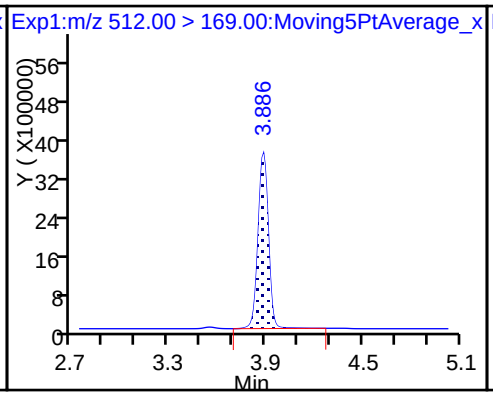
33 N-ethyl perfluorooctane sulfonamid



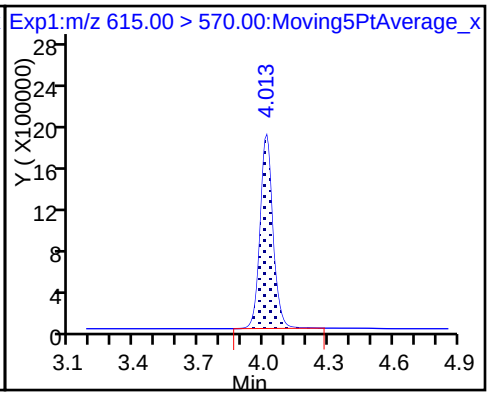
D 34 d-N-MeFOSA-M



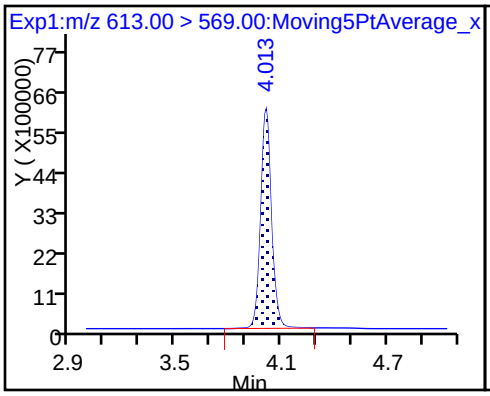
35 MeFOSA



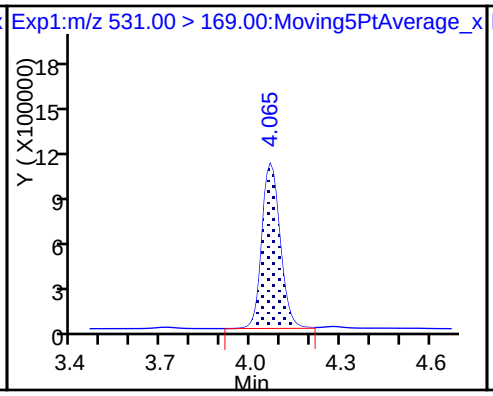
D 36 13C2 PFDoA



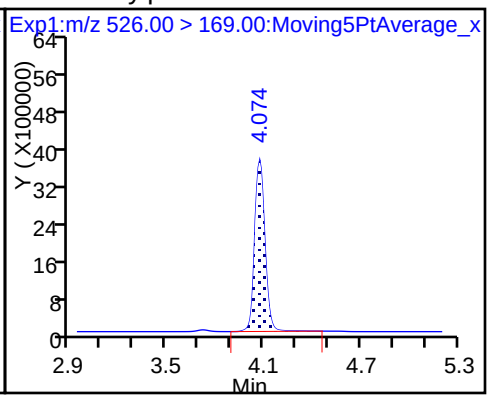
37 Perfluorododecanoic acid



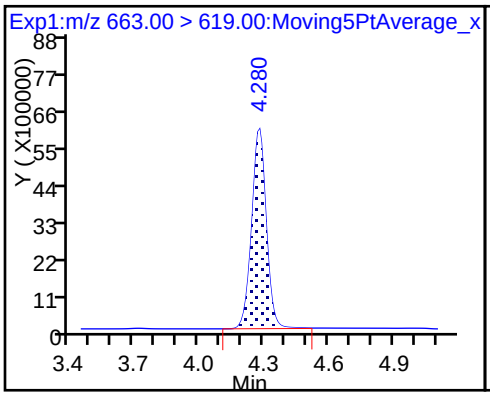
D 38 d-N-EtFOSA-M



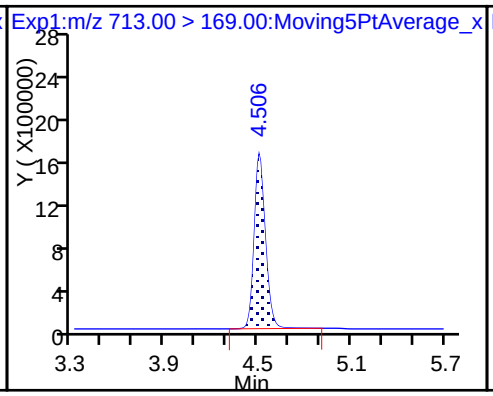
39 N-ethylperfluoro-1-octanesulfonami



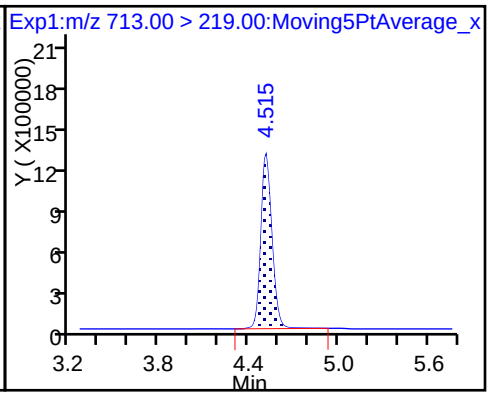
41 Perfluorotridecanoic acid



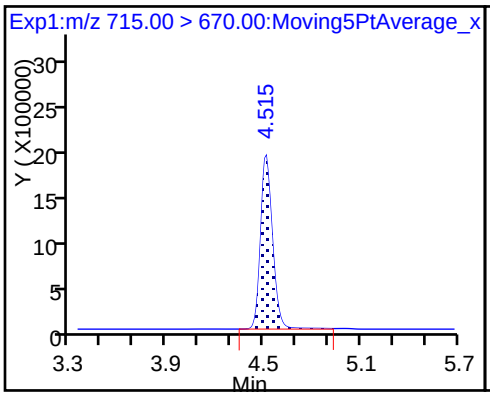
42 Perfluorotetradecanoic acid



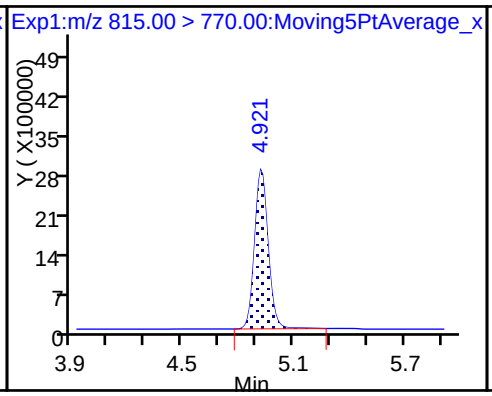
42 Perfluorotetradecanoic acid



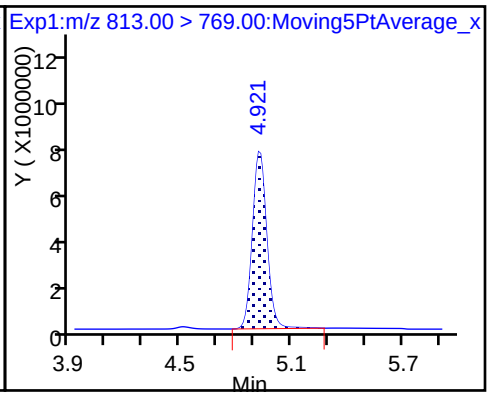
D 43 13C2-PFTeDA



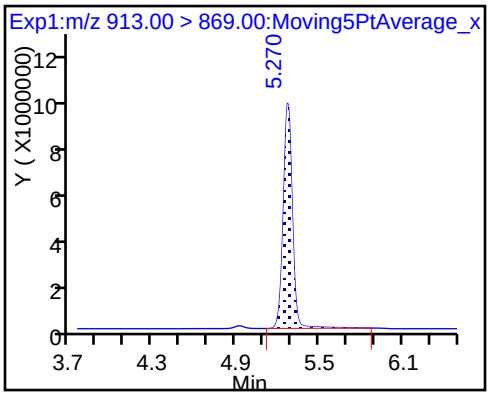
D 44 13C2-PFHxDA



45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d
Lims ID: IC M2-4:2FTS
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 30-Oct-2017 18:47:49 ALS Bottle#: 37 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: M2:4-2FTS Calibration Std
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub19

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:20:32 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 22:51:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 60 M2-4:2FTS										
329.00 > 81.00	1.963	1.963	0.0		4341497	NC			17443	
* 62 13C2-PFOA										
415.00 > 370.00	2.661	2.655	0.006		19235629	50.0			19164	

QC Flag Legend

Processing Flags
NC - Not Calibrated

Reagents:

LCM2-4:2FTSIC_00003 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:20:33 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Injection Date: 30-Oct-2017 18:47:49 Instrument ID: A8_N

Lims ID: IC M2-4:2FTS

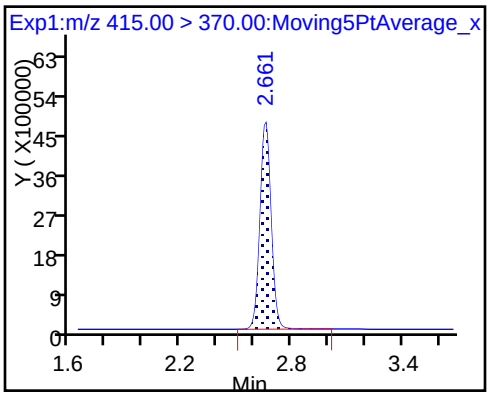
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 37 Worklist Smp#: 10

Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

* 62 13C2-PFOA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: ICV 320-191992/12 Calibration Date: 10/30/2017 19:01

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30ICAL_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9225		48.4	50.0	-3.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.113		51.8	50.0	3.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	72.75		44.4	44.3	0.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	1.007		52.7	50.0	5.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.052		54.3	50.0	8.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.068		48.8	47.3	3.3	25.0
6:2FTS	AveID	1.245	1.378		52.5	47.4	10.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.126		52.4	50.0	4.8	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.126		45.7	47.6	-4.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	1.050		54.2	50.0	8.5	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	0.997		45.8	47.8	-4.2	25.0
8:2FTS	AveID	1.112	1.221		52.6	47.9	9.8	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9440		50.1	50.0	0.2	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	1.006		53.5	50.0	7.1	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9766		52.2	50.0	4.4	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7123		53.0	48.3	9.9	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.113		52.1	50.0	4.3	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.9580		56.7	50.0	13.5	25.0
MeFOSA	AveID	0.8921	0.9479		53.1	50.0	6.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	1.010		54.9	50.0	9.9	25.0
N-EtFOSA-M	AveID	0.9298	1.006		54.1	50.0	8.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.191		57.6	50.0	15.3	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2378		53.5	50.0	7.0	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9508		54.5	50.0	9.0	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	1.016		53.4	50.0	6.9	25.0
13C4 PFBA	Ave	350625	336708		48.0	50.0	-4.0	50.0
13C5 PFPeA	Ave	225543	212495		47.1	50.0	-5.8	50.0
13C3-PFBS	Ave	5028	4771		44.1	46.5	-5.1	50.0
13C2 PFHxA	Ave	242324	235653		48.6	50.0	-2.8	50.0
13C4-PFHpA	Ave	243728	225771		46.3	50.0	-7.4	50.0
18O2 PFHxS	Ave	300958	284601		44.7	47.3	-5.4	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: ICV 320-191992/12 Calibration Date: 10/30/2017 19:01

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30ICAL_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	65159		44.5	47.5	-6.4	50.0
13C4 PFOA	Ave	238687	227387		47.6	50.0	-4.7	50.0
13C4 PFOS	Ave	211928	202514		45.7	47.8	-4.4	50.0
13C5 PFNA	Ave	201795	185119		45.9	50.0	-8.3	50.0
13C8 FOSA	Ave	311183	286027		46.0	50.0	-8.1	50.0
M2-8:2FTS	Ave	72250	67720		44.9	47.9	-6.3	50.0
13C2 PFDA	Ave	182533	177371		48.6	50.0	-2.8	50.0
d3-NMeFOSAA	Ave	81672	75445		46.2	50.0	-7.6	50.0
13C2 PFUnA	Ave	145752	137361		47.1	50.0	-5.8	50.0
d5-NEtFOSAA	Ave	83982	75221		44.8	50.0	-10.4	50.0
d-N-MeFOSA-M	Ave	90599	86021		47.5	50.0	-5.1	50.0
13C2 PFDoA	Ave	167891	153957		45.9	50.0	-8.3	50.0
d-N-EtFOSA-M	Ave	86831	79789		45.9	50.0	-8.1	50.0
13C2-PFTeDA	Ave	204611	194140		47.4	50.0	-5.1	50.0
13C2-PFHxDA	Ave	306398	285400		46.6	50.0	-6.9	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_012.d
Lims ID: ICV Full
Client ID:
Sample Type: ICV
Inject. Date: 30-Oct-2017 19:01:37 ALS Bottle#: 36 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 15:21:01 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 30-Oct-2017 23:11:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	15530327	48.4			3392	
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		16835407	48.0		96.0	21040	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.739	-0.003		10624773	47.1		94.2	126408	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.741	-0.005	1.000	11823403	51.8			9631	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.763	-0.008		221842	44.1		94.9	7264	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	15357473	44.4			32185	
298.90 > 99.00	1.764	1.764	0.0	1.000	6973089		2.20(0.00-0.00)		28855	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.960	1.961	-0.001	1.000	4200584	53.1			38634	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.998	-0.003	1.000	11868377	52.7			12309	
D 7 13C2 PFHxA										
315.00 > 270.00	1.995	1.998	-0.003		11782650	48.6		97.2	49787	
D 9 13C4-PFHpA										
367.00 > 322.00	2.311	2.319	-0.008		11288532	46.3		92.6	18671	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.311	2.319	-0.008	1.000	11871875	54.3			7791	
D 11 18O2 PFHxS										
403.00 > 84.00	2.331	2.333	-0.002		13461639	44.7		94.6	19293	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.331	2.333	-0.002	1.000	14356642	48.8			7022	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.629	2.641	-0.012	1.000	4255756	52.5			18060	
D 12 M2-6:2FTS										
429.00 > 81.00	2.629	2.641	-0.012		3095045	44.5		93.6	13199	
* 62 13C2-PFOA										
415.00 > 370.00	2.651	2.655	-0.004		11923381	50.0			13806	
D 14 13C4 PFOA										
417.00 > 372.00	2.658	2.664	-0.006		11369325	47.6		95.3	20344	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.658	2.666	-0.008	1.000	12796602	52.4			3711	
413.00 > 169.00	2.658	2.666	-0.008	1.000	6698303		1.91(0.90-1.10)		7033	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.665	2.672	-0.007	1.000	10853636	45.7			12533	
D 18 13C4 PFOS										
503.00 > 80.00	3.025	3.030	-0.005		9680186	45.7		95.6	13603	
D 19 13C5 PFNA										
468.00 > 423.00	3.025	3.031	-0.006		9255966	45.9		91.7	14772	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.025	3.031	-0.006	1.000	9639206	45.8			4757	
499.00 > 99.00	3.025	3.031	-0.006	1.000	2223076		4.34(0.90-1.10)		4076	
20 Perfluorononanoic acid										
463.00 > 419.00	3.025	3.033	-0.008	1.000	9723044	54.2			5903	
D 21 13C8 FOSA										
506.00 > 78.00	3.368	3.377	-0.009		14301331	46.0		91.9	21091	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.368	3.379	-0.011	1.000	13500882	50.1			22278	
D 26 M2-8:2FTS										
529.00 > 81.00	3.368	3.381	-0.013		3243780	44.9		93.7	8317	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.368	3.381	-0.013	1.000	3961836	52.6			8903	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.377	3.391	-0.014	1.000	8920651	53.5			11128	
D 23 13C2 PFDA										
515.00 > 470.00	3.377	3.391	-0.014		8868531	48.6		97.2	25535	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.538	3.547	-0.009		3772244	46.2		92.4	5656	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.538	3.553	-0.015	1.000	3683979	52.2			3689	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.696	3.705	-0.009	1.000	6959758	53.0			7596	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.706	3.715	-0.009		3761052	44.8		89.6	3624	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.706	3.722	-0.016	1.000	7641324	52.1			6131	
D 30 13C2 PFUnA										
565.00 > 520.00	3.706	3.722	-0.016		6868026	47.1		94.2	7803	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.715	3.723	-0.008	1.003	3603089	56.7			7296	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.874	3.881	-0.007		4301040	47.5		94.9	1604	
35 MeFOSA										
512.00 > 169.00	3.883	3.885	-0.002	1.000	4076884	53.1			4635	
D 36 13C2 PFDoA										
615.00 > 570.00	4.002	4.015	-0.013		7697856	45.9		91.7	7830	
37 Perfluorododecanoic acid										
613.00 > 569.00	4.002	4.016	-0.014	1.000	7778489	54.9			5744	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.060	4.068	-0.008		3989440	45.9		91.9	2235	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.069	4.074	-0.005	1.000	4013063	54.1			2987	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.274	4.281	-0.007	1.000	9168861	57.6			2193	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.497	4.510	-0.013	1.000	2308578	53.5			5386	
713.00 > 219.00	4.506	4.510	-0.004	1.002	1760253		1.31(0.00-0.00)		4760	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.506	4.516	-0.010		9707005	47.4		94.9	9598	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.920	4.929	-0.009	1.000	13568160	54.5			772	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.920	4.929	-0.009		14270022	46.6		93.1	3573	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.268	5.281	-0.013	1.000	14497704	53.4			790	

Reagents:

LCPFCIC_FULL_00007 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_012.d

Injection Date: 30-Oct-2017 19:01:37 Instrument ID: A8_N

Lims ID: ICV Full

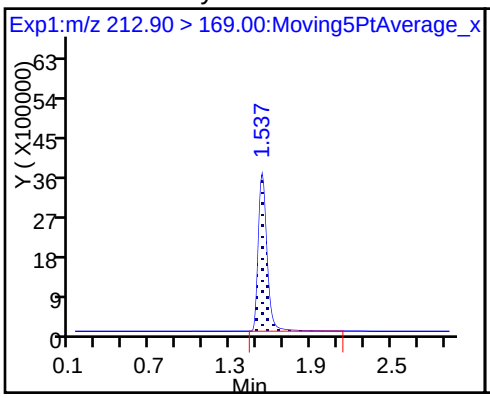
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 36 Worklist Smp#: 12

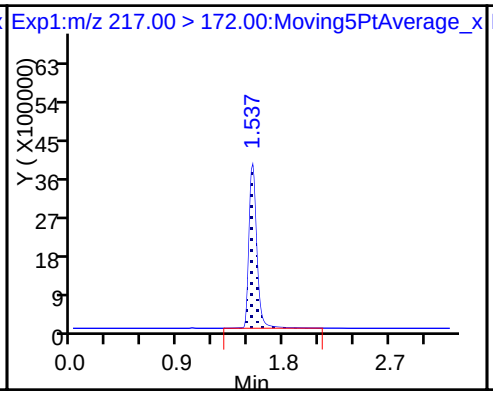
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

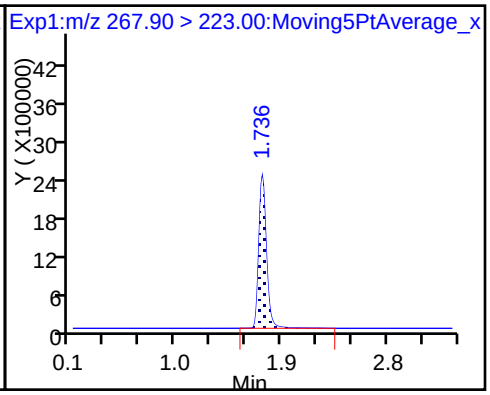
2 Perfluorobutyric acid



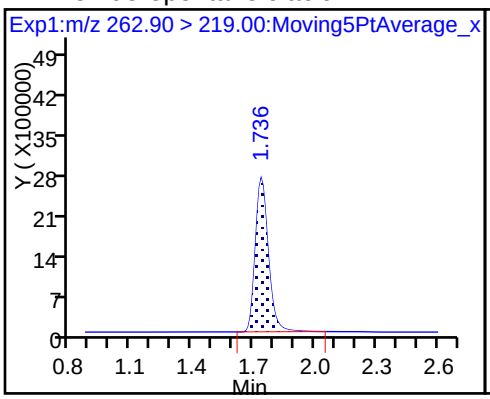
D 1 13C4 PFBA



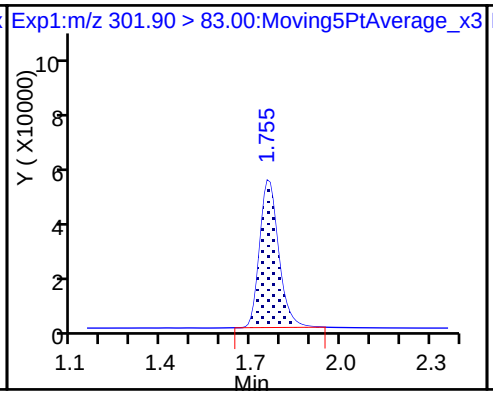
D 3 13C5-PFPeA



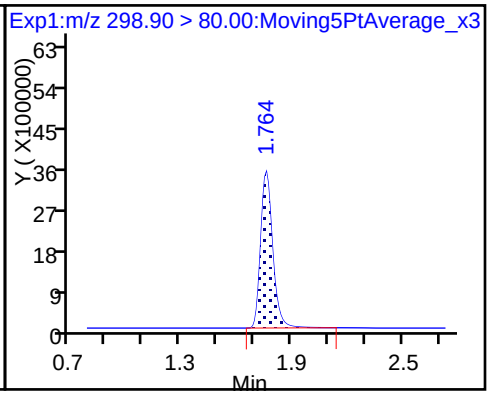
4 Perfluoropentanoic acid



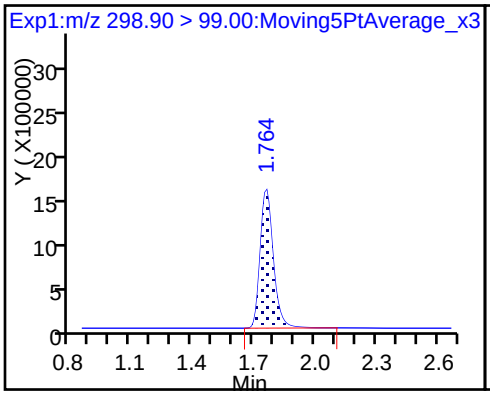
D 47 13C3-PFBS



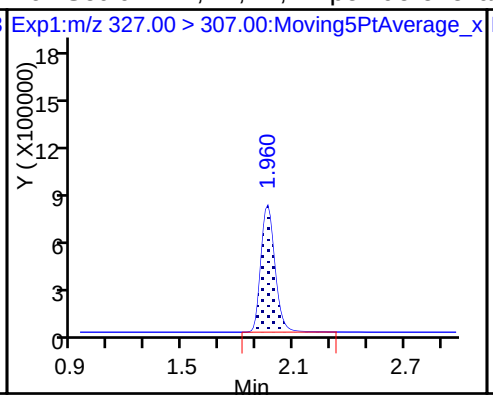
5 Perfluorobutanesulfonic acid



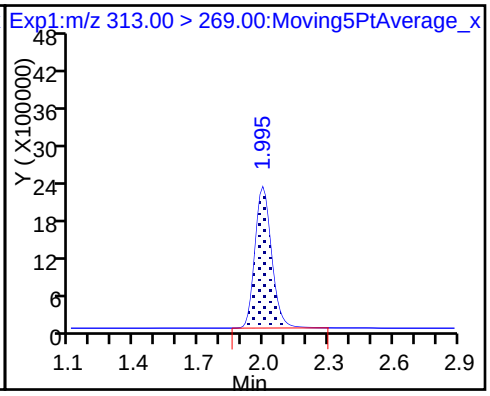
5 Perfluorobutanesulfonic acid



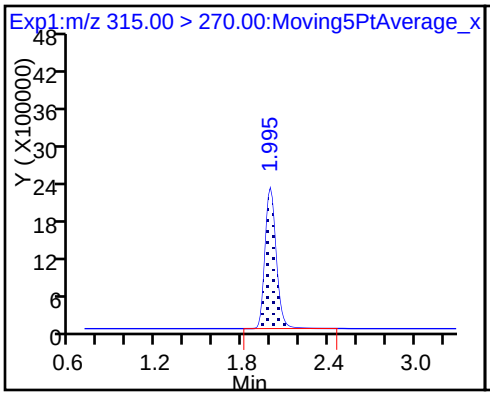
61 Sodium 1H,1H,2H,2H-perfluorohexane



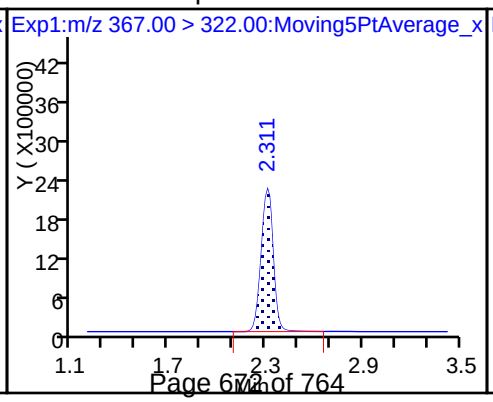
6 Perfluorohexanoic acid



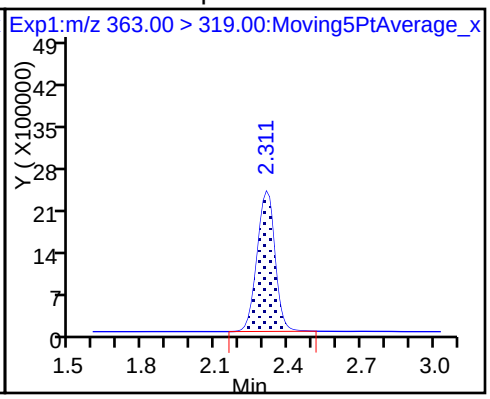
D 7 13C2 PFHxA



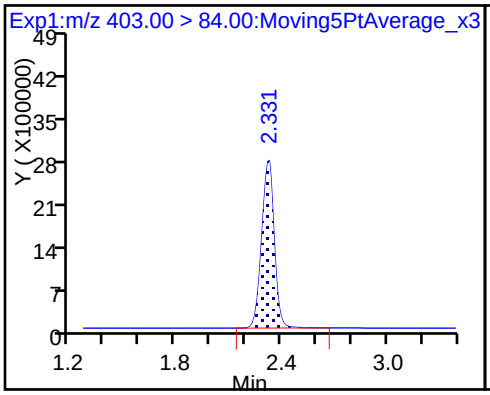
D 9 13C4-PFHpA



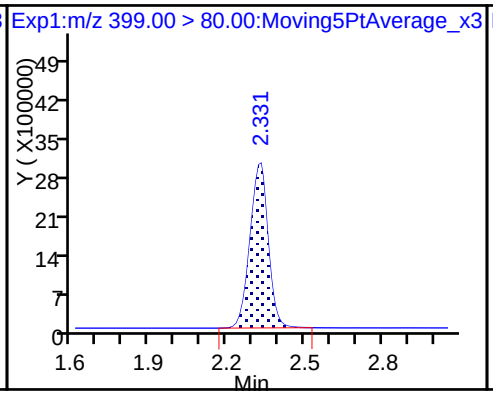
10 Perfluoroheptanoic acid



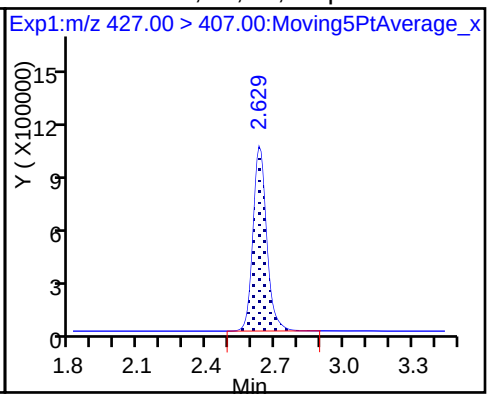
D 11 18O2 PFHxS



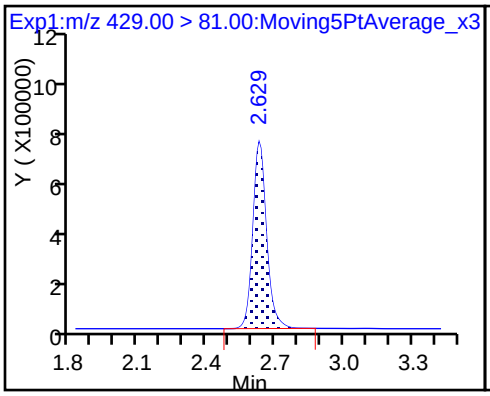
8 Perfluorohexanesulfonic acid



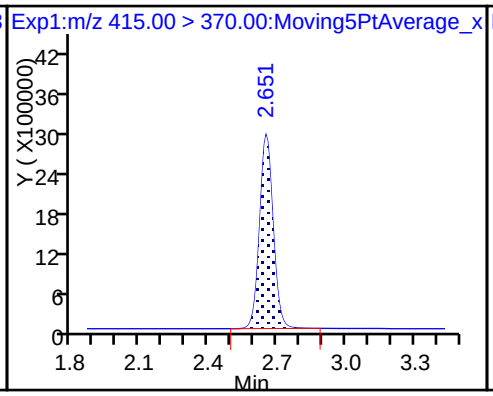
13 Sodium 1H,1H,2H,2H-perfluorooctane



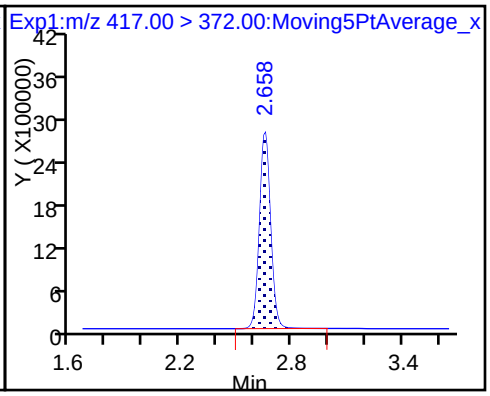
D 12 M2-6:2FTS



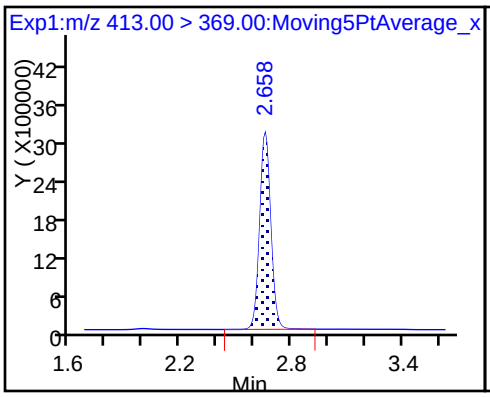
* 62 13C2-PFOA



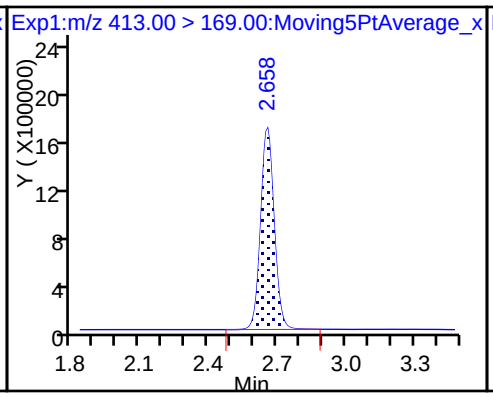
D 14 13C4 PFOA



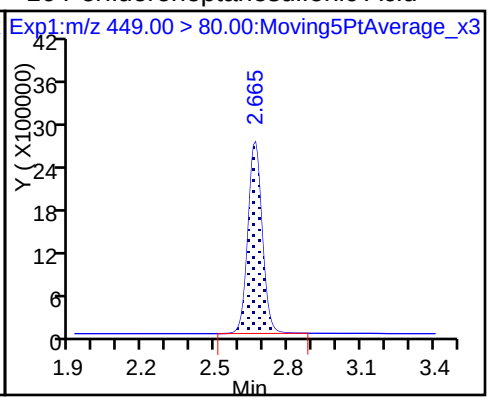
15 Perfluorooctanoic acid



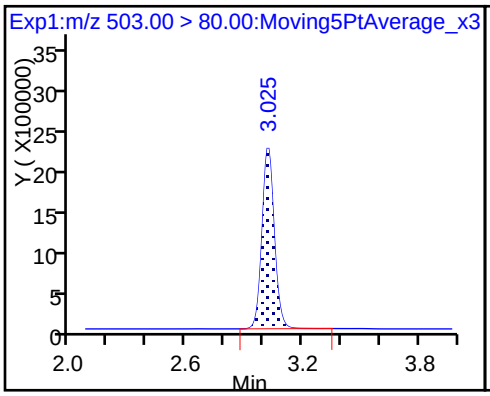
15 Perfluorooctanoic acid



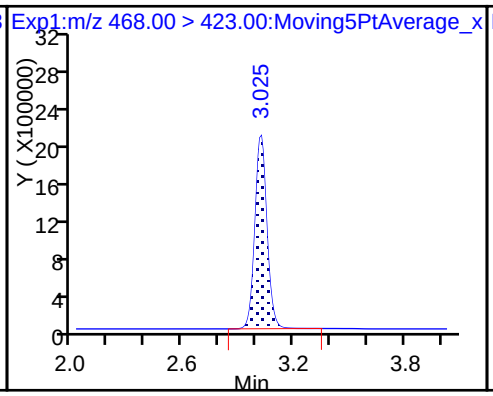
16 Perfluoroheptanesulfonic Acid



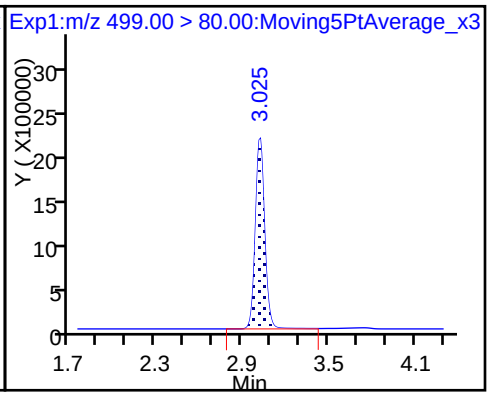
D 18 13C4 PFOS



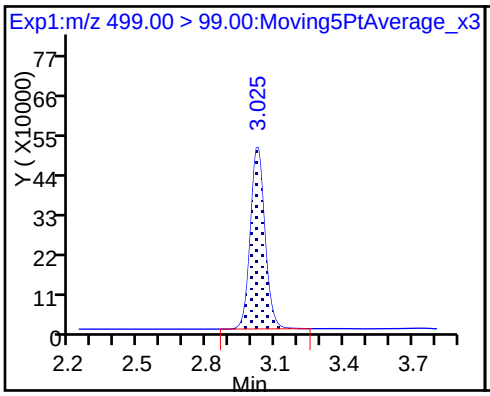
D 19 13C5 PFNA



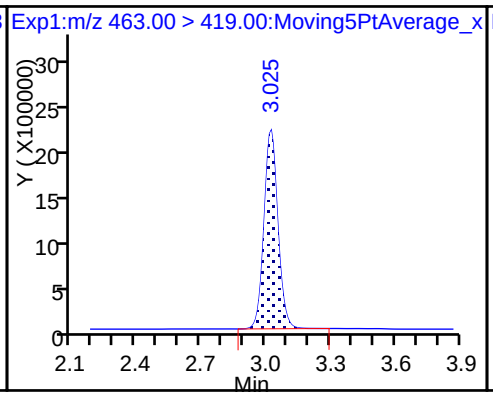
17 Perfluorooctane sulfonic acid



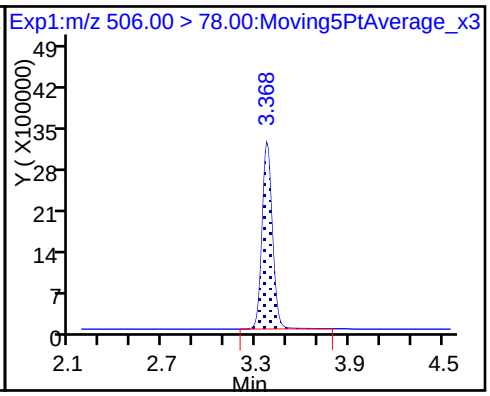
17 Perfluorooctane sulfonic acid



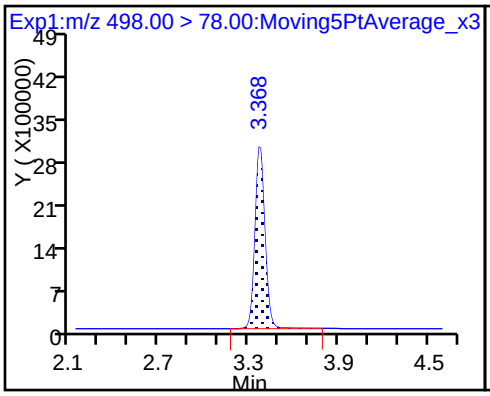
20 Perfluorononanoic acid



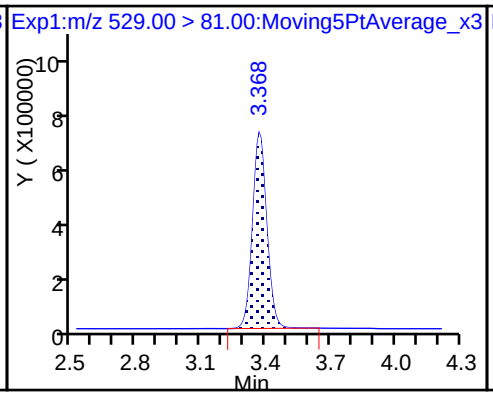
D 21 13C8 FOSA



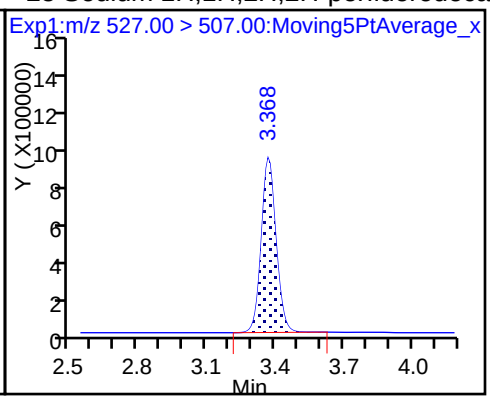
22 Perfluorooctane Sulfonamide



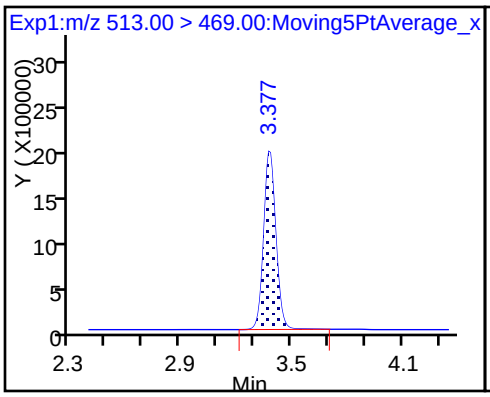
D 26 M2-8:2FTS



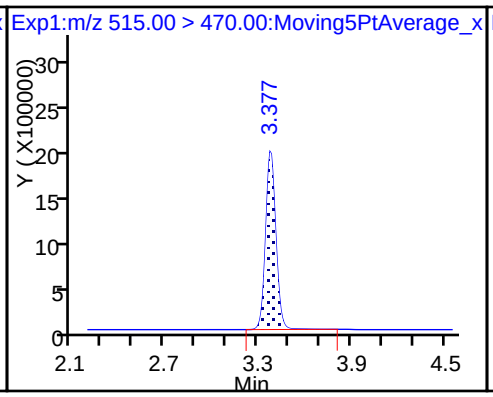
25 Sodium 1H,1H,2H,2H-perfluorodecane



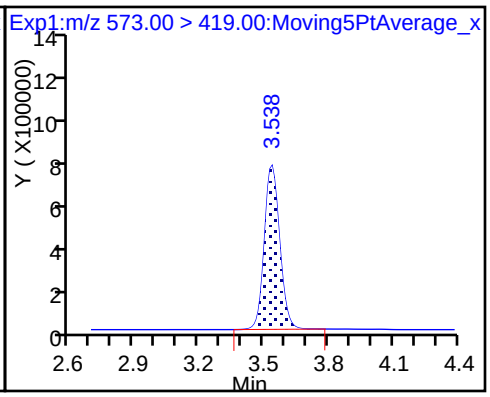
24 Perfluorodecanoic acid



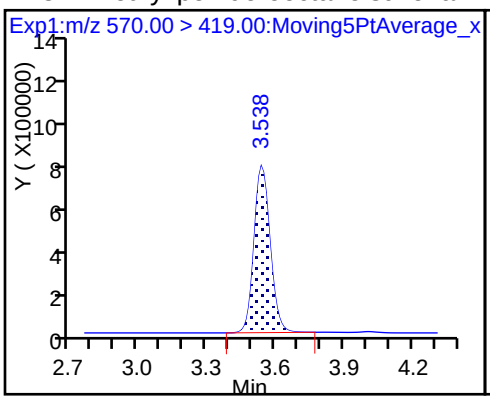
D 23 13C2 PFDA



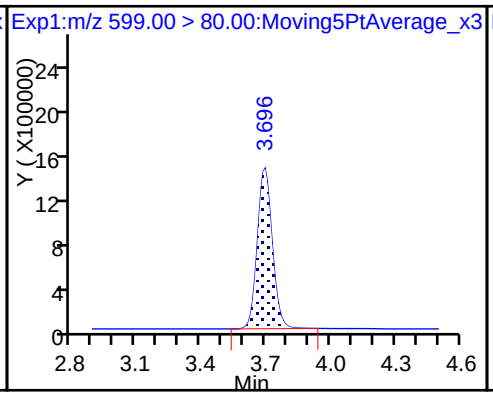
D 27 d3-NMeFOSAA



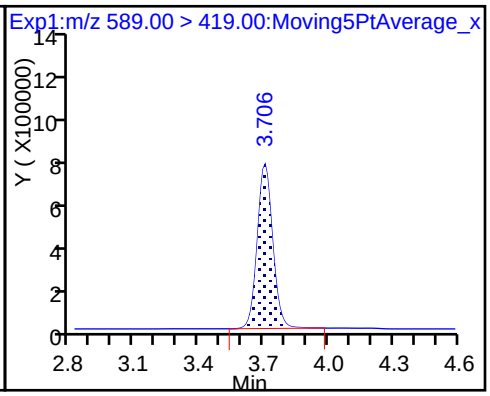
28 N-methyl perfluorooctane sulfonami



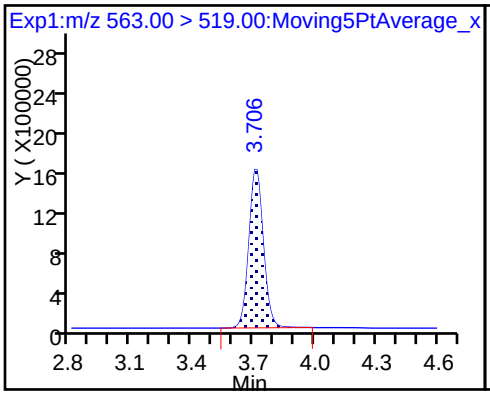
29 Perfluorodecane Sulfonic acid



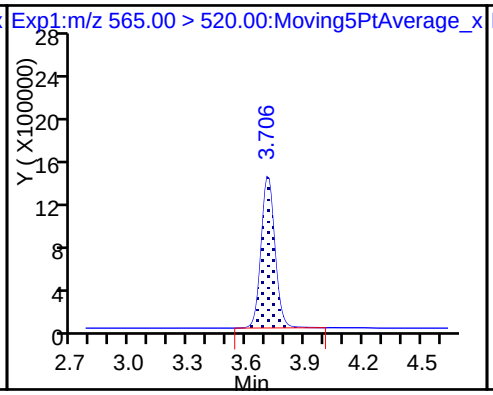
D 32 d5-NEtFOSAA



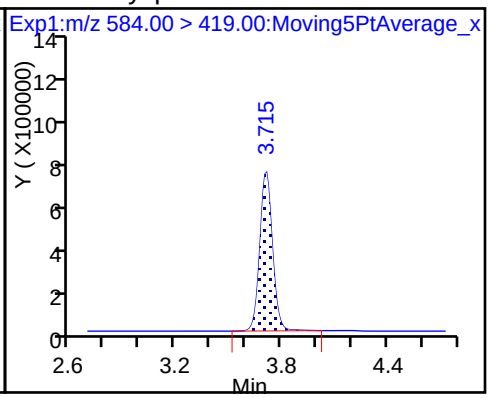
31 Perfluoroundecanoic acid



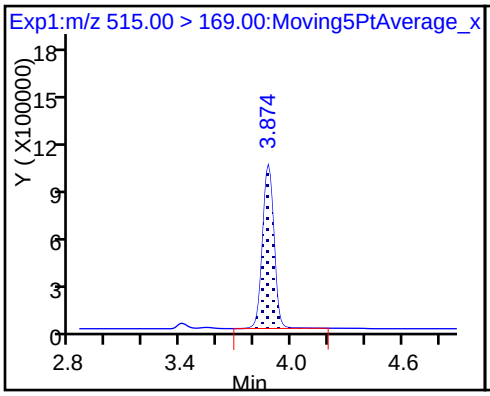
D 30 13C2 PFUnA



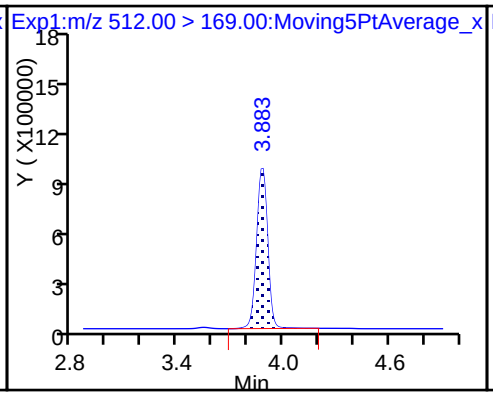
33 N-ethyl perfluorooctane sulfonamid



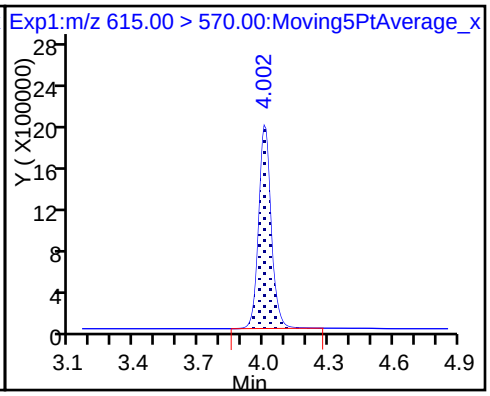
D 34 d-N-MeFOSA-M



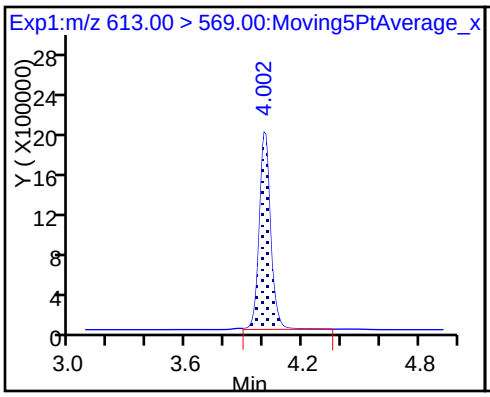
35 MeFOSA



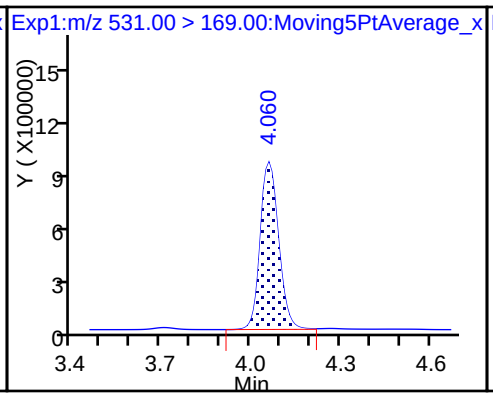
D 36 13C2 PFDoA



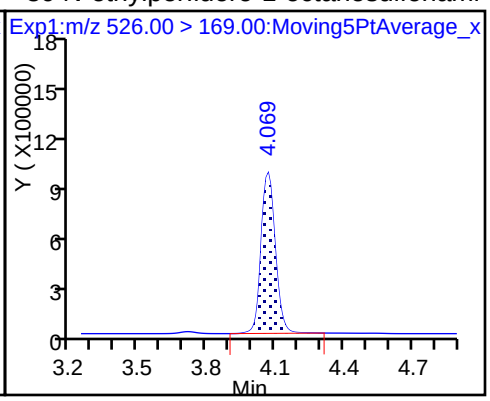
37 Perfluorododecanoic acid



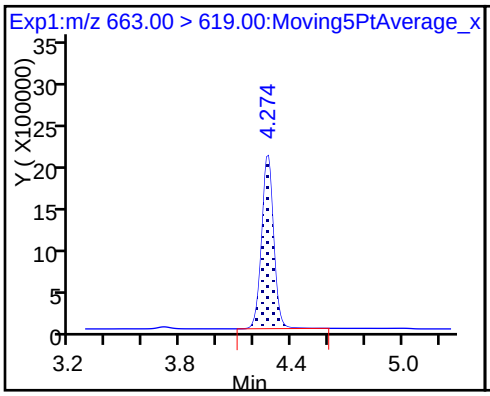
D 38 d-N-EtFOSA-M



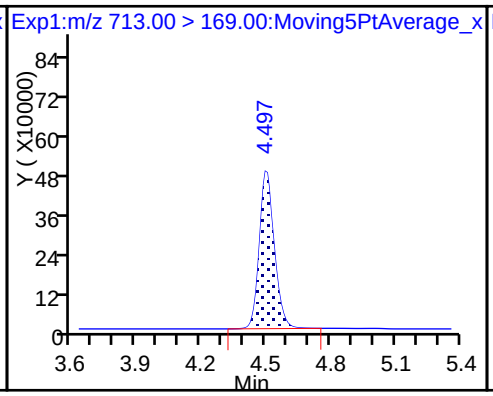
39 N-ethylperfluoro-1-octanesulfonami



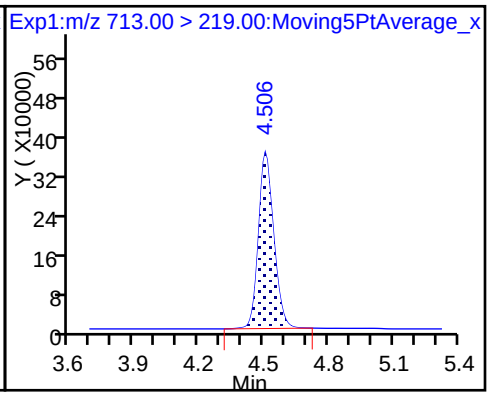
41 Perfluorotridecanoic acid



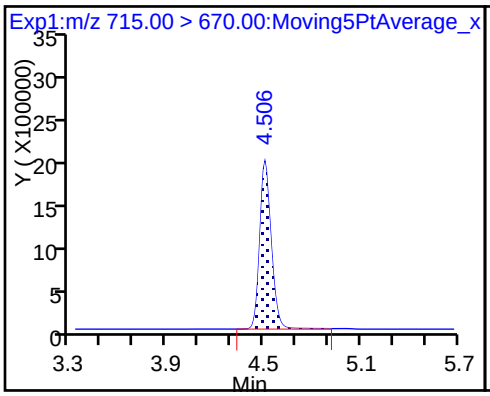
42 Perfluorotetradecanoic acid



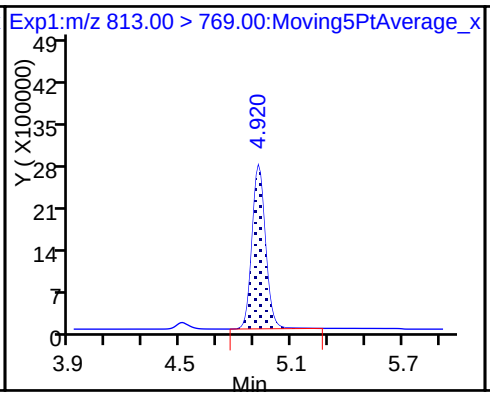
42 Perfluorotetradecanoic acid



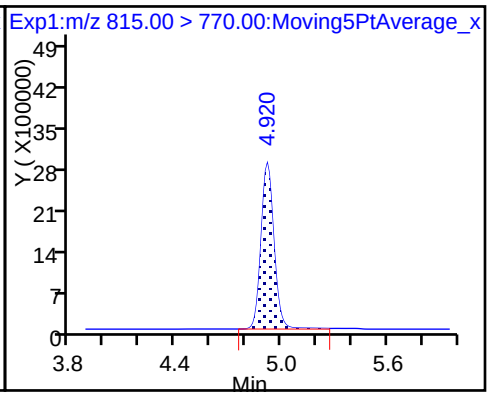
D 43 13C2-PFTeDA



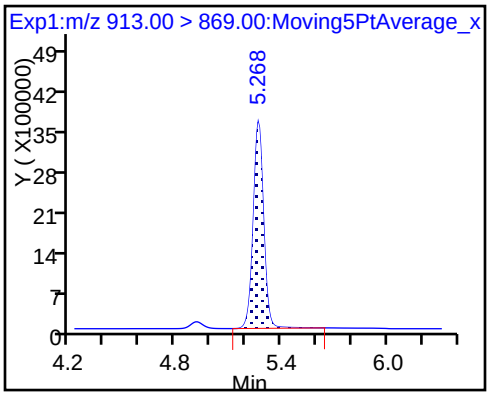
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/1 Calibration Date: 10/31/2017 01:57

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	1.034		21.7	20.0	8.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.131		21.1	20.0	5.3	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	74.48		18.2	17.7	2.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9876		20.7	20.0	3.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.038		21.4	20.0	7.2	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.103		19.4	18.2	6.7	25.0
6:2FTS	AveID	1.245	1.209		18.6	19.0	-1.8	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.113		20.7	20.0	3.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.243		20.2	19.0	5.9	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9836		20.3	20.0	1.6	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.044		18.6	18.6	0.3	25.0
8:2FTS	AveID	1.112	1.075		18.5	19.2	-3.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9384		20.0	20.0	-0.0	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	1.015		21.5	20.0	7.7	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.8748		18.7	20.0	-6.5	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.6867		20.4	19.3	6.0	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8107		19.2	20.0	-4.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.034		19.4	20.0	-3.1	25.0
MeFOSA	AveID	0.8921	0.8449		18.9	20.0	-5.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9370		20.4	20.0	1.9	25.0
N-EtFOSA-M	AveID	0.9298	0.8994		19.3	20.0	-3.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.129		21.8	20.0	9.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2237		20.1	20.0	0.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9452		21.4	20.0	6.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	1.021		21.5	20.0	7.4	25.0
13C4 PFBA	Ave	350625	362811		51.7	50.0	3.5	50.0
13C5 PFPeA	Ave	225543	235109		52.1	50.0	4.2	50.0
13C3-PFBS	Ave	5028	5330		49.3	46.5	6.0	50.0
13C2 PFHxA	Ave	242324	258713		53.4	50.0	6.8	50.0
13C4-PFHpA	Ave	243728	246570		50.6	50.0	1.2	50.0
18O2 PFHxS	Ave	300958	313834		49.3	47.3	4.3	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/1 Calibration Date: 10/31/2017 01:57

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	64779		44.2	47.5	-6.9	50.0
13C4 PFOA	Ave	238687	243380		51.0	50.0	2.0	50.0
13C4 PFOS	Ave	211928	220428		49.7	47.8	4.0	50.0
13C5 PFNA	Ave	201795	210484		52.2	50.0	4.3	50.0
M2-8:2FTS	Ave	72250	68945		45.7	47.9	-4.6	50.0
13C2 PFDA	Ave	182533	192678		52.8	50.0	5.6	50.0
13C8 FOSA	Ave	311183	308138		49.5	50.0	-1.0	50.0
d3-NMeFOSAA	Ave	81672	90859		55.6	50.0	11.2	50.0
d5-NEtFOSAA	Ave	83982	93373		55.6	50.0	11.2	50.0
13C2 PFUnA	Ave	145752	147554		50.6	50.0	1.2	50.0
d-N-MeFOSA-M	Ave	90599	95523		52.7	50.0	5.4	50.0
13C2 PFDoA	Ave	167891	165378		49.3	50.0	-1.5	50.0
d-N-EtFOSA-M	Ave	86831	90494		52.1	50.0	4.2	50.0
13C2-PFTeDA	Ave	204611	213509		52.2	50.0	4.3	50.0
13C2-PFHxDA	Ave	306398	328804		53.7	50.0	7.3	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_016.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 31-Oct-2017 01:57:47 ALS Bottle#: 31 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub18

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:38:00 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:38:00

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.529	1.529	0.0		18140570	51.7		103	18884	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	7501380	21.7		109	1864	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.737	1.737	0.0	1.000	5318087	21.1		105	4970	
D 3 13C5-PFPeA										
267.90 > 223.00	1.737	1.737	0.0		11755461	52.1		104	79592	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		247829	49.3		106	8232	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	7017912	18.2		103	13594	
298.90 > 99.00	1.755	1.755	0.0	1.000	2953982		2.38(0.00-0.00)		11950	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	1471155	18.7		100	26068	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.984	1.984	0.0	1.000	5110303	20.7		103	4309	
D 7 13C2 PFHxA										
315.00 > 270.00	1.984	1.984	0.0		12935642	53.4		107	29743	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.308	2.308	0.0	1.000	5116667	21.4		107	4252	
D 9 13C4-PFHpA										
367.00 > 322.00	2.308	2.308	0.0		12328483	50.6		101	17802	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.318	2.318	0.0	1.000	6299264	19.4		107	5618	
D 11 18O2 PFHxS										
403.00 > 84.00	2.318	2.318	0.0		14844340	49.3		104	25894	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.622	2.622	0.0	1.000	1484495	18.6		98.2	9904	
D 12 M2-6:2FTS										
429.00 > 81.00	2.622	2.622	0.0		3076999	44.2		93.1	15591	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		12196546	50.0		100	13292	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.644	2.644	0.0	1.000	5419156	20.7		104	1738	
413.00 > 169.00	2.644	2.644	0.0	1.000	2811029		1.93(0.90-1.10)		3977	
D 14 13C4 PFOA										
417.00 > 372.00	2.644	2.644	0.0		12168993	51.0		102	14574	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.651	2.651	0.0	1.000	5215759	20.2		106	11008	
D 18 13C4 PFOS										
503.00 > 80.00	3.014	3.014	0.0		10536469	49.7		104	10639	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.014	3.014	0.0	1.000	4269116	18.6		100	1838	
499.00 > 99.00	3.014	3.014	0.0	1.000	893166		4.78(0.90-1.10)		2127	
20 Perfluorononanoic acid										
463.00 > 419.00	3.014	3.014	0.0	1.000	4140549	20.3		102	4270	
D 19 13C5 PFNA										
468.00 > 423.00	3.014	3.014	0.0		10524223	52.2		104	10438	
D 26 M2-8:2FTS										
529.00 > 81.00	3.355	3.355	0.0		3302484	45.7		95.4	8420	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.364	3.364	0.0	1.002	1419805	18.5		96.6	6330	
D 21 13C8 FOSA										
506.00 > 78.00	3.372	3.372	0.0		15406915	49.5		99.0	13792	
D 23 13C2 PFDA										
515.00 > 470.00	3.372	3.372	0.0		9633884	52.8		106	18749	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.372	3.372	0.0	1.000	3616334	20.0		99.9	7162	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.372	3.372	0.0	1.000	6253563	21.5		108	8221	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.522	3.522	0.0		4542961	55.6		111	5716	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.532	3.532	0.0	1.003	1589691	18.7		93.5	2356	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.679	3.679	0.0	1.000	2918398	20.4		106	7515	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.689	3.689	0.0		4668635	55.6		111	4821	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.698	3.698	0.0	1.000	3051783	19.4		96.9	3781	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.698	3.698	0.0	1.003	1513864	19.2		96.0	3535	
D 30 13C2 PFUnA										
565.00 > 520.00	3.698	3.698	0.0		7377687	50.6		101	9419	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
35 MeFOSA										
512.00 > 169.00	3.876	3.876	0.0	1.000	1614079	18.9		94.7	2822	
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.876	3.876	0.0		4776126	52.7		105	2752	
D 36 13C2 PFDoA										
615.00 > 570.00	3.989	3.989	0.0		8268918	49.3		98.5	9653	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.995	3.995	0.0	1.000	3099226	20.4		102	2441	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.060	4.060	0.0		4524689	52.1		104	2900	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.070	4.070	0.0	1.000	1627758	19.3		96.7	2997	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	3733191	21.8		109	1227	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.488	4.488	0.0	1.000	955423	20.1		101	3993	
713.00 > 219.00	4.497	4.488	0.009	1.002	711368		1.34(0.00-0.00)		3598	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.488	4.488	0.0		10675467	52.2		104	10597	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.897	4.897	0.0	1.000	6215712	21.4		107	467	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.897	4.897	0.0		16440187	53.7		107	4040	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.246	5.246	0.0	1.000	6712876	21.5		107	454	

Reagents:

LCPFC_FULL-L4_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 09:38:00 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_016.d

Injection Date: 31-Oct-2017 01:57:47 Instrument ID: A8_N

Lims ID: CCV L4

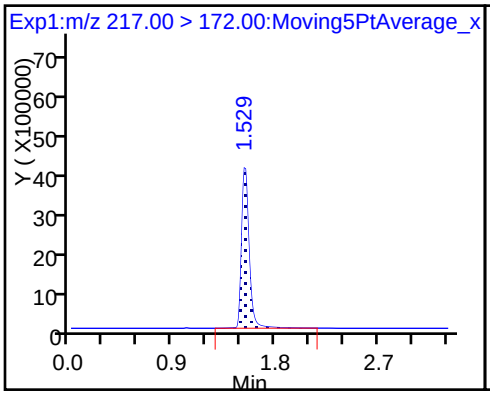
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 31 Worklist Smp#: 1

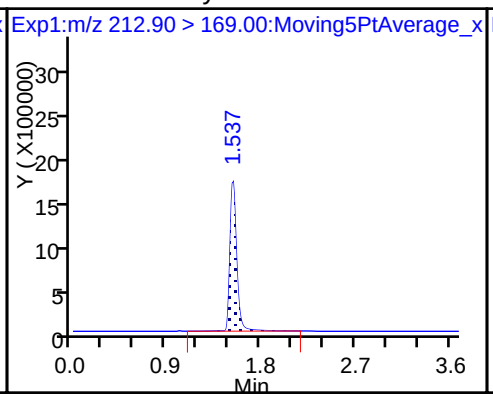
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

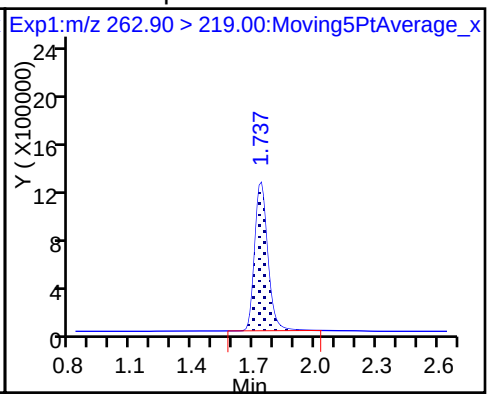
D 1 13C4 PFBA



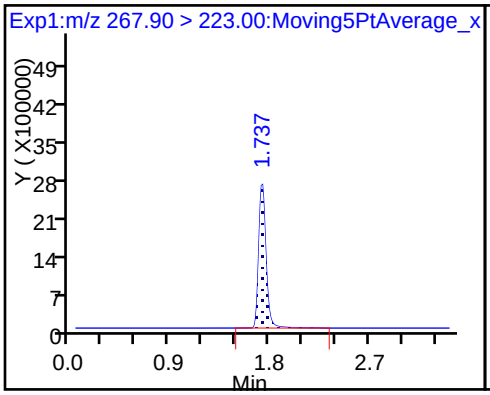
2 Perfluorobutyric acid



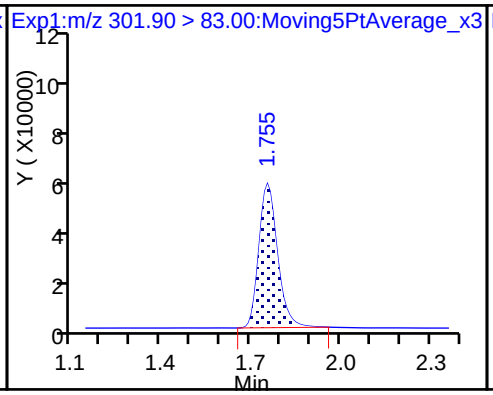
4 Perfluoropentanoic acid



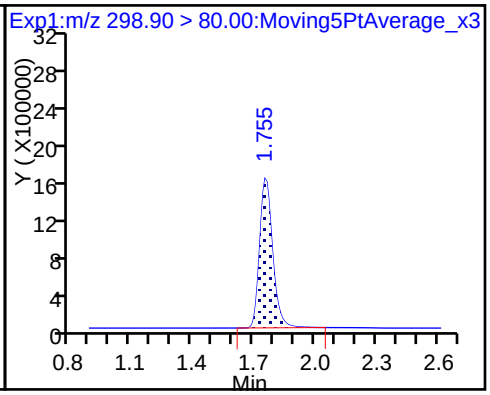
D 3 13C5-PFPeA



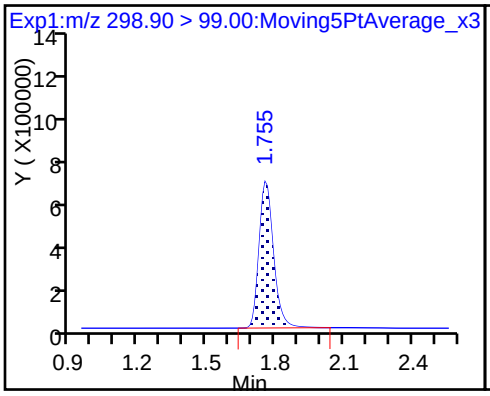
D 47 13C3-PFBS



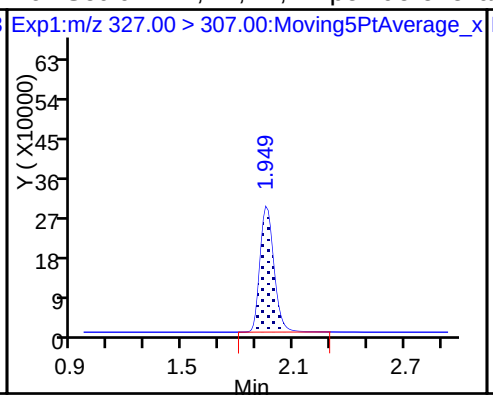
5 Perfluorobutanesulfonic acid



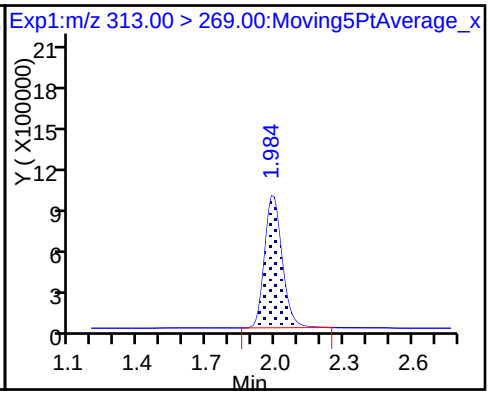
5 Perfluorobutanesulfonic acid



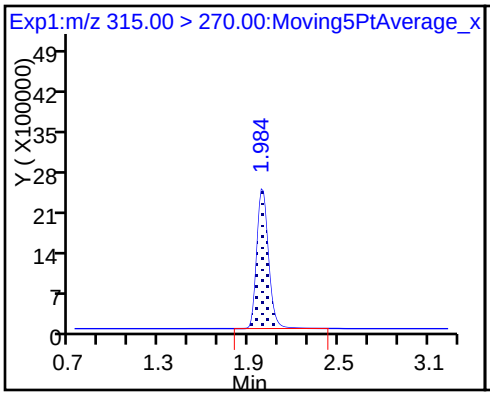
61 Sodium 1H,1H,2H,2H-perfluorohexane



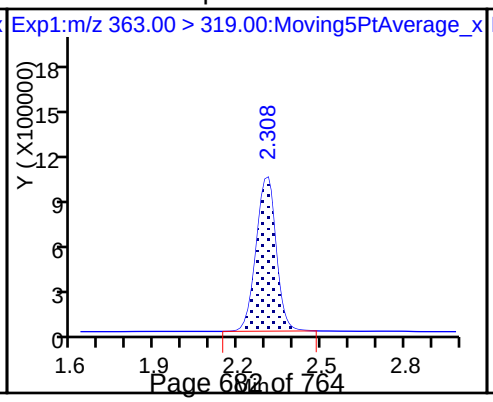
6 Perfluorohexanoic acid



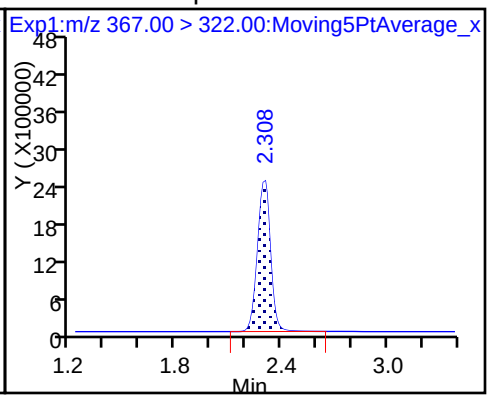
D 7 13C2 PFHxA



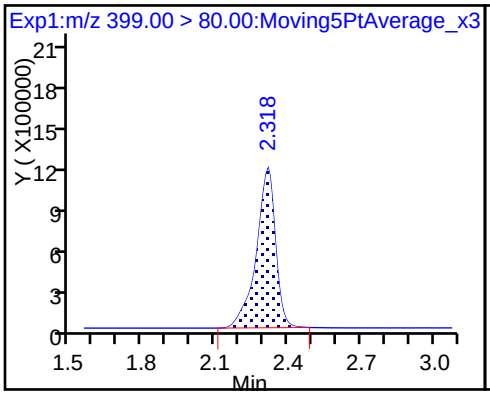
10 Perfluoroheptanoic acid



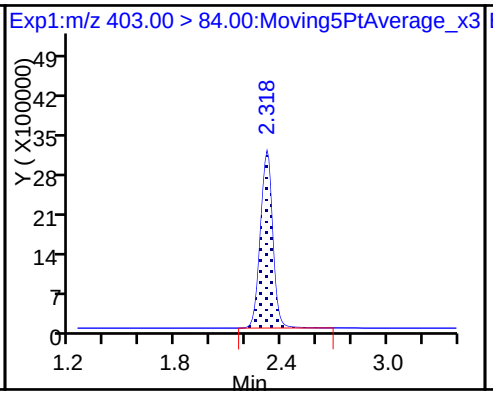
D 9 13C4-PFHpA



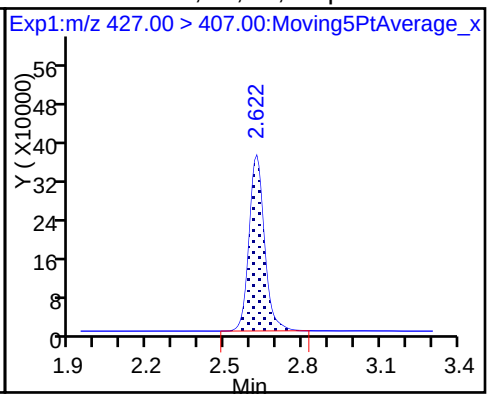
8 Perfluorohexanesulfonic acid



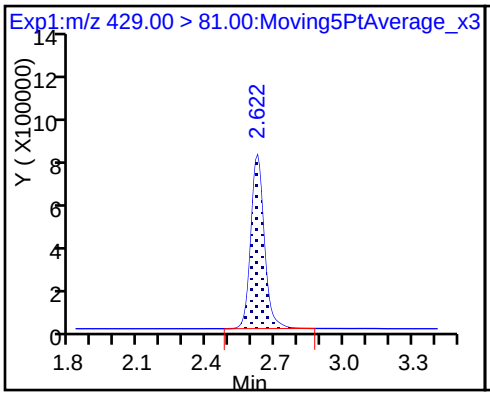
D 11 18O2 PFHxS



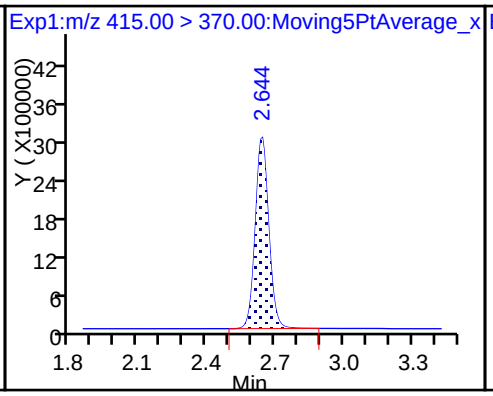
13 Sodium 1H,1H,2H,2H-perfluorooctane



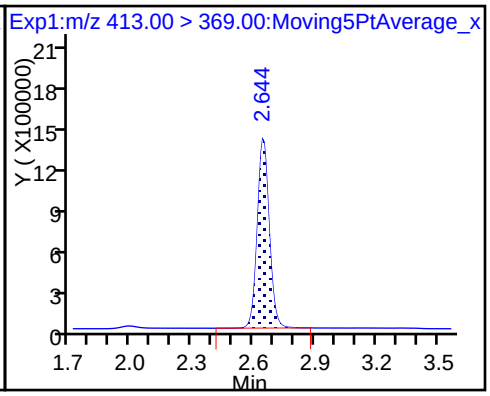
D 12 M2-6:2FTS



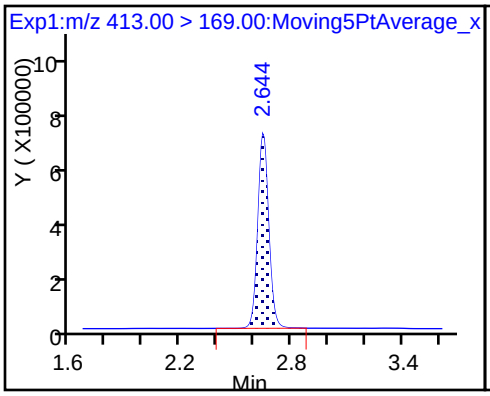
* 62 13C2-PFOA



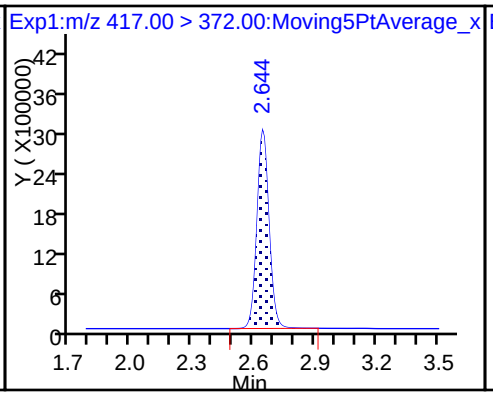
15 Perfluorooctanoic acid



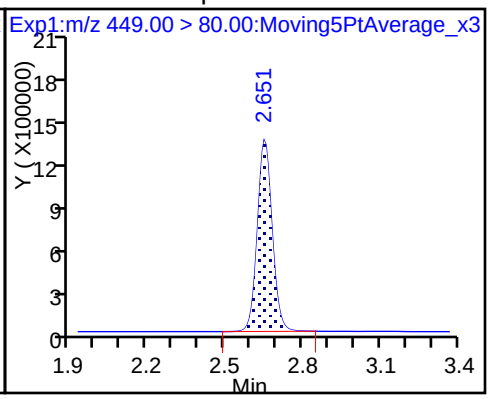
15 Perfluorooctanoic acid



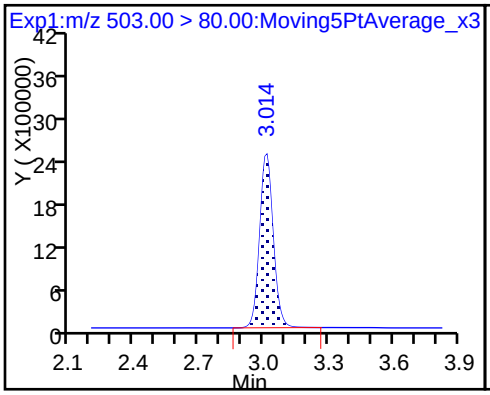
D 14 13C4 PFOA



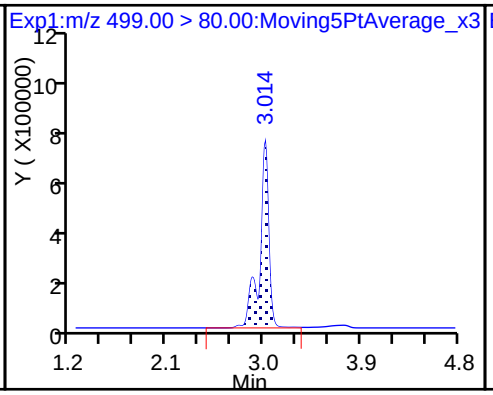
16 Perfluoroheptanesulfonic Acid



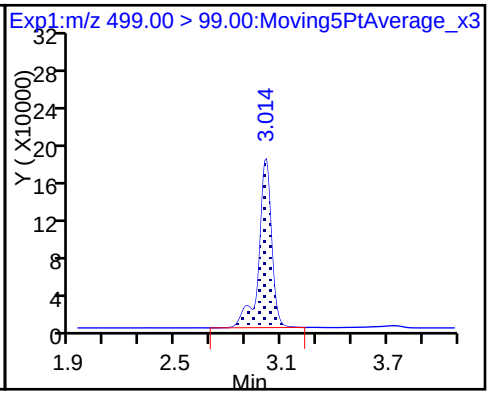
D 18 13C4 PFOS



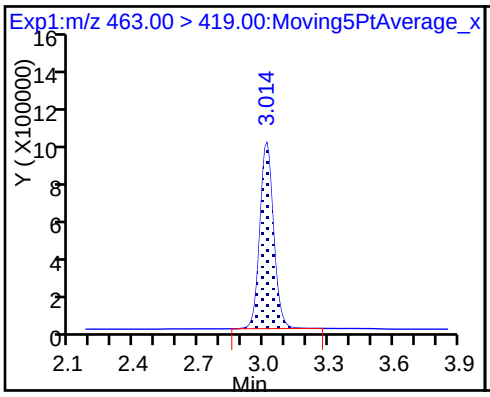
17 Perfluorooctane sulfonic acid



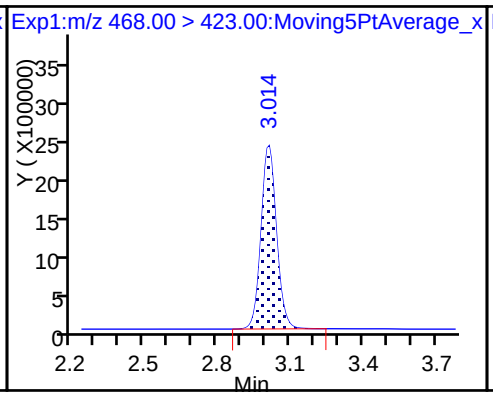
17 Perfluorooctane sulfonic acid



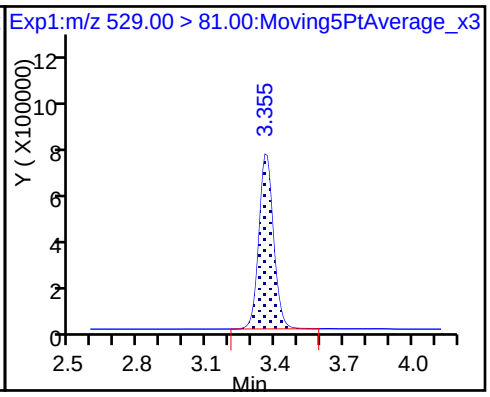
20 Perfluorononanoic acid



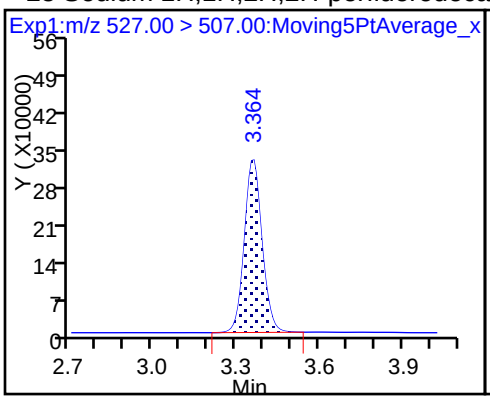
D 19 13C5 PFNA



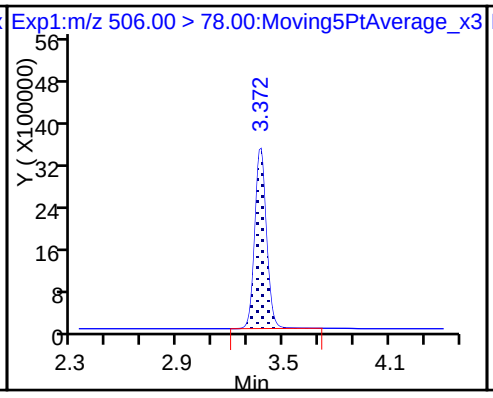
D 26 M2-8:2FTS



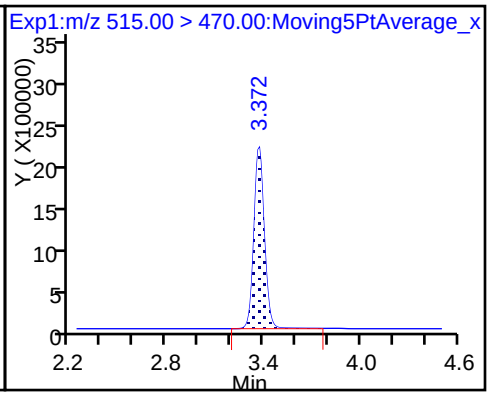
25 Sodium 1H,1H,2H,2H-perfluorodecane



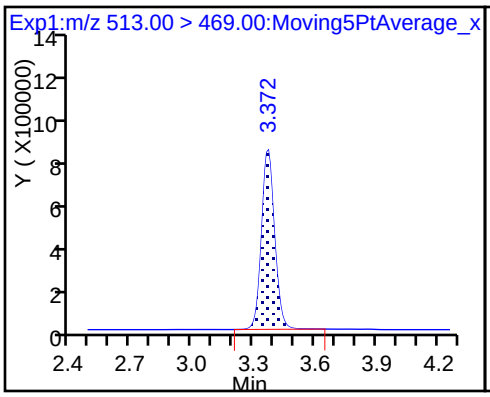
D 21 13C8 FOSA



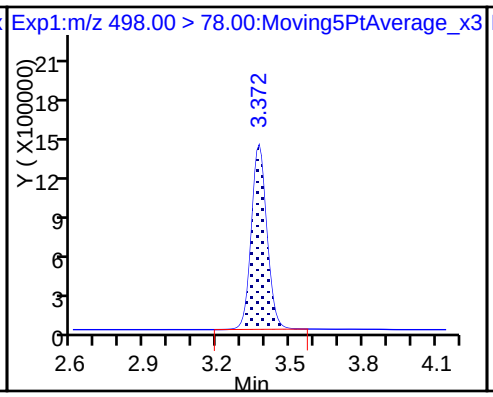
D 23 13C2 PFDA



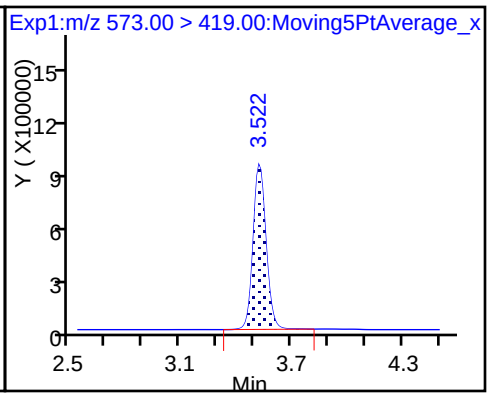
24 Perfluorodecanoic acid



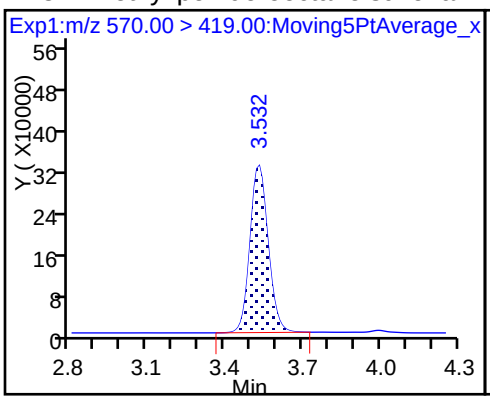
22 Perfluorooctane Sulfonamide



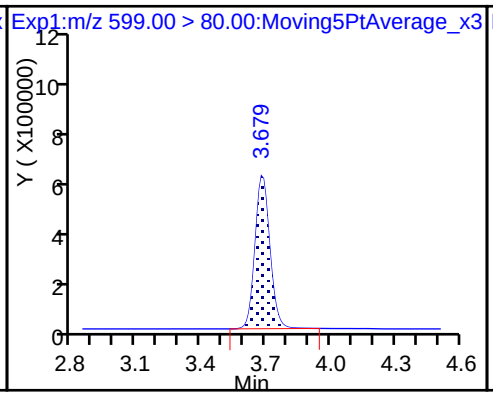
D 27 d3-NMeFOSAA



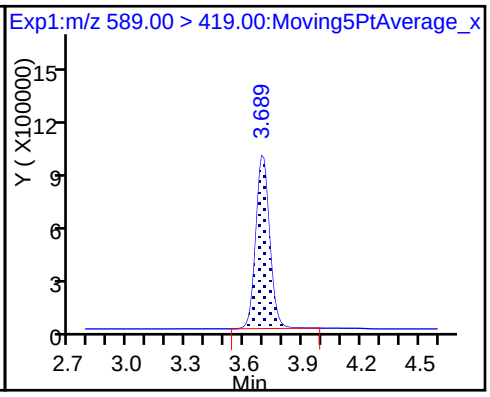
28 N-methyl perfluorooctane sulfonami



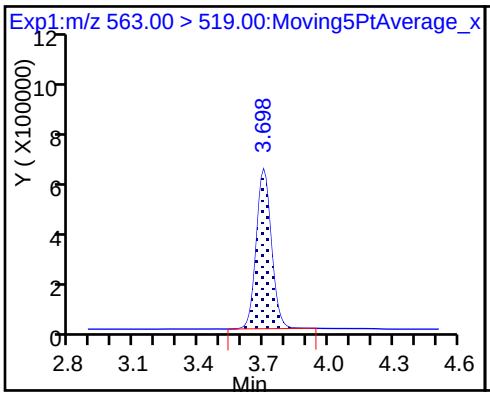
29 Perfluorodecane Sulfonic acid



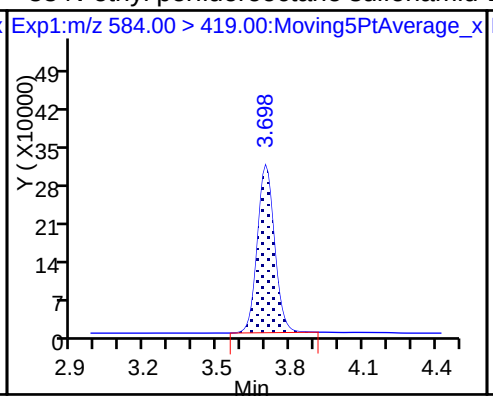
D 32 d5-NEtFOSAA



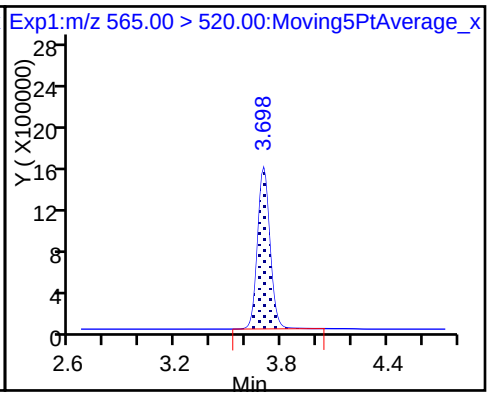
31 Perfluoroundecanoic acid



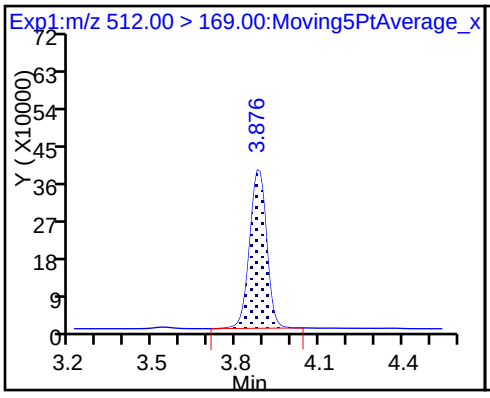
33 N-ethyl perfluorooctane sulfonamid



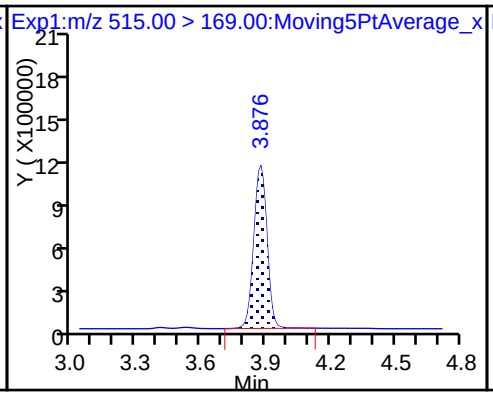
D 30 13C2 PFUnA



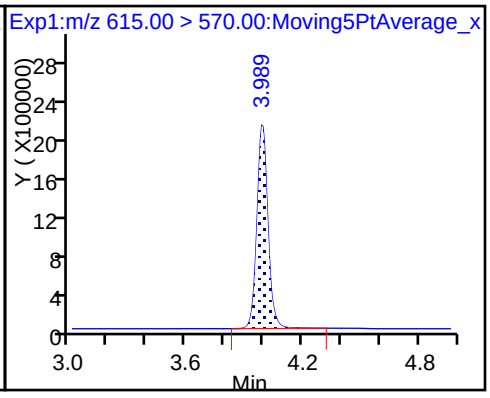
35 MeFOSA



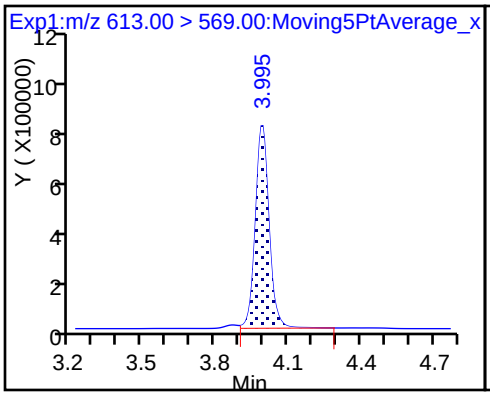
D 34 d-N-MeFOSA-M



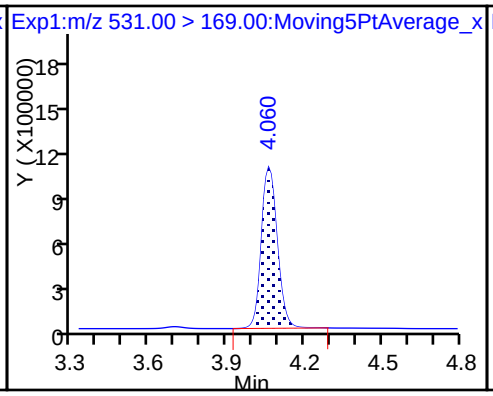
D 36 13C2 PFDoA



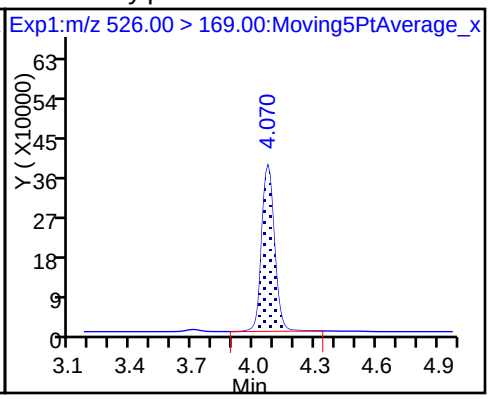
37 Perfluorododecanoic acid



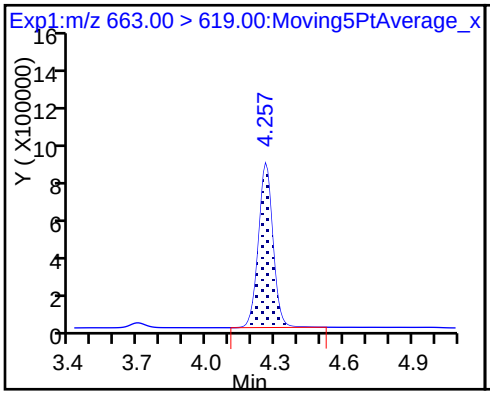
D 38 d-N-EtFOSA-M



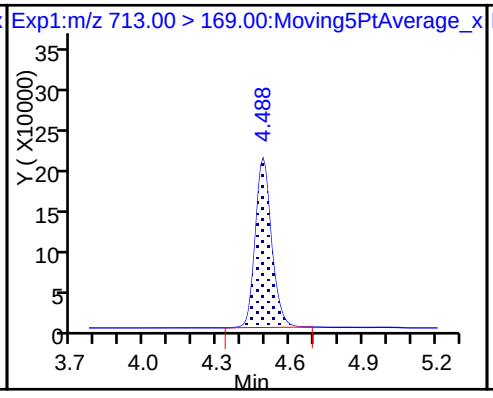
39 N-ethylperfluoro-1-octanesulfonami



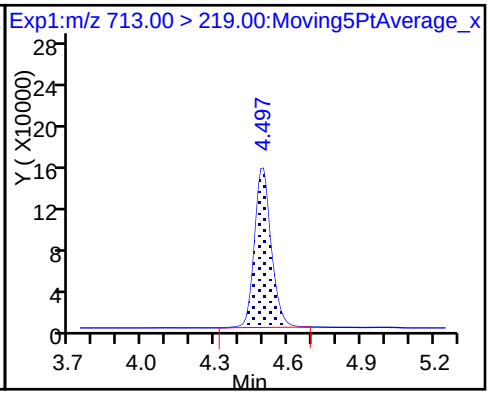
41 Perfluorotridecanoic acid



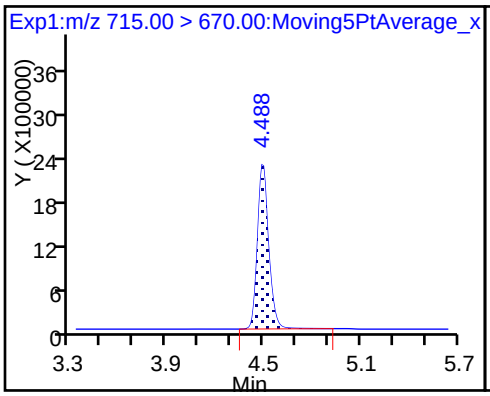
42 Perfluorotetradecanoic acid



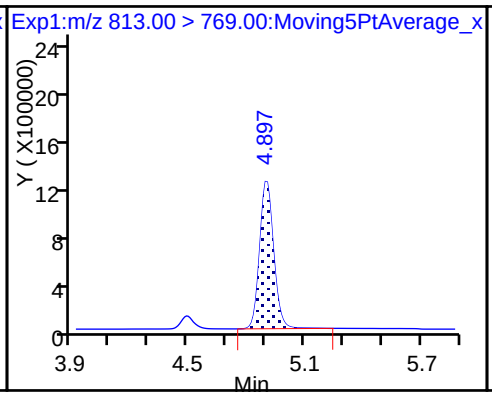
42 Perfluorotetradecanoic acid



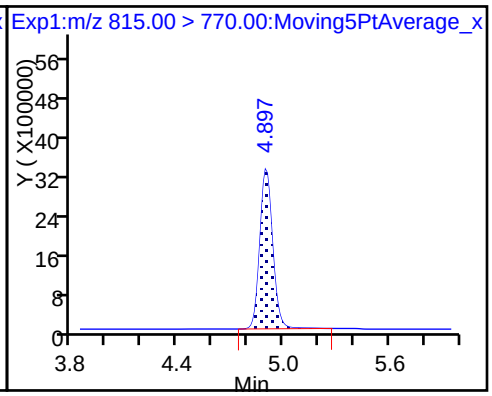
D 43 13C2-PFTeDA



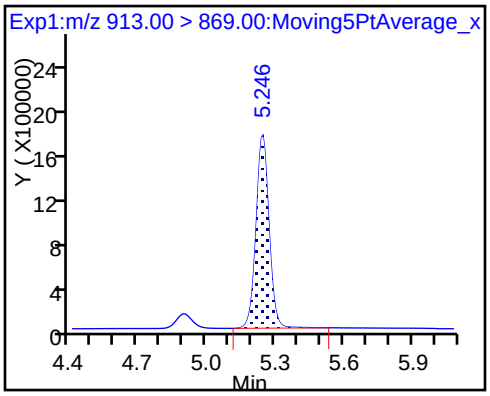
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/12 Calibration Date: 10/31/2017 03:13

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9146		48.0	50.0	-3.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.057		49.2	50.0	-1.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	69.28		42.2	44.2	-4.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9403		49.2	50.0	-1.6	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	0.9903		51.2	50.0	2.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.048		46.1	45.5	1.4	25.0
6:2FTS	AveID	1.245	1.237		47.7	47.4	0.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.056		49.2	50.0	-1.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.202		48.8	47.6	2.4	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	1.006		51.9	50.0	3.9	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.071		47.8	46.4	3.0	25.0
8:2FTS	AveID	1.112	1.102		47.5	47.9	-0.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9345		49.7	50.0	-0.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9680		51.4	50.0	2.7	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9653		51.6	50.0	3.2	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7042		52.4	48.2	8.7	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8430		49.9	50.0	-0.1	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.077		50.4	50.0	0.9	25.0
MeFOSA	AveID	0.8921	0.8724		48.9	50.0	-2.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9406		51.1	50.0	2.3	25.0
N-EtFOSA-M	AveID	0.9298	0.9086		48.9	50.0	-2.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.147		55.5	50.0	11.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2217		49.9	50.0	-0.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.8789		50.3	50.0	0.7	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.9414		49.5	50.0	-1.0	25.0
13C4 PFBA	Ave	350625	390151		55.6	50.0	11.3	50.0
13C5 PFPeA	Ave	225543	248444		55.1	50.0	10.2	50.0
13C3-PFBS	Ave	5028	5622		52.0	46.5	11.8	50.0
13C2 PFHxA	Ave	242324	270750		55.9	50.0	11.7	50.0
13C4-PFHpA	Ave	243728	249463		51.2	50.0	2.4	50.0
18O2 PFHxS	Ave	300958	317495		49.9	47.3	5.5	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/12 Calibration Date: 10/31/2017 03:13

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	66925		45.7	47.5	-3.8	50.0
13C4 PFOA	Ave	238687	256857		53.8	50.0	7.6	50.0
13C4 PFOS	Ave	211928	225689		50.9	47.8	6.5	50.0
13C5 PFNA	Ave	201795	217021		53.8	50.0	7.5	50.0
M2-8:2FTS	Ave	72250	70399		46.7	47.9	-2.6	50.0
13C2 PFDA	Ave	182533	199089		54.5	50.0	9.1	50.0
13C8 FOSA	Ave	311183	325243		52.3	50.0	4.5	50.0
d3-NMeFOSAA	Ave	81672	91924		56.3	50.0	12.6	50.0
d5-NEtFOSAA	Ave	83982	92877		55.3	50.0	10.6	50.0
13C2 PFUnA	Ave	145752	151653		52.0	50.0	4.0	50.0
d-N-MeFOSA-M	Ave	90599	99703		55.0	50.0	10.0	50.0
13C2 PFDoA	Ave	167891	170977		50.9	50.0	1.8	50.0
d-N-EtFOSA-M	Ave	86831	96445		55.5	50.0	11.1	50.0
13C2-PFTeDA	Ave	204611	221664		54.2	50.0	8.3	50.0
13C2-PFHxDA	Ave	306398	352898		57.6	50.0	15.2	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_026.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 31-Oct-2017 03:13:41 ALS Bottle#: 32 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub18

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:59:56 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:59:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.537	0.0		19507558	55.6		111	32134	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	17842241	48.0		96.1	1909	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.737	1.737	0.0	1.000	13134618	49.2		98.4	9261	
D 3 13C5-PFPeA										
267.90 > 223.00	1.737	1.737	0.0		12422205	55.1		110	77095	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		261407	52.0		112	7450	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.764	1.764	0.0	1.000	17214293	42.2		95.6	197601	
298.90 > 99.00	1.764	1.764	0.0	1.000	8017309		2.15(0.00-0.00)		118527	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	4037328	49.7		106	55344	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.995	0.0	1.000	12728963	49.2		98.4	8599	
D 7 13C2 PFHxA										
315.00 > 270.00	1.995	1.995	0.0		13537495	55.9		112	29710	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.298	2.298	0.0	1.000	12352419	51.2		102	6581	
D 9 13C4-PFHpA										
367.00 > 322.00	2.298	2.298	0.0		12473153	51.2		102	15090	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.322	2.322	0.0	1.000	15144562	46.1		101	5456	
D 11 18O2 PFHxS										
403.00 > 84.00	2.322	2.322	0.0		15017532	49.9		105	16534	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.623	2.623	0.0	1.000	3924803	47.7		101	12185	
D 12 M2-6:2FTS										
429.00 > 81.00	2.623	2.623	0.0		3178914	45.7		96.2	15307	
* 62 13C2-PFOA										
415.00 > 370.00	2.637	2.637	0.0		12652569	50.0		100	21080	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.645	2.645	0.0	1.000	13567052	49.2		98.3	3292	
413.00 > 169.00	2.645	2.645	0.0	1.000	7354481		1.84(0.90-1.10)		4812	
D 14 13C4 PFOA										
417.00 > 372.00	2.645	2.645	0.0		12842834	53.8		108	12697	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.652	2.652	0.0	1.000	12908191	48.8		102	11143	
D 18 13C4 PFOS										
503.00 > 80.00	3.008	3.008	0.0		10787953	50.9		106	13102	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.008	3.008	0.0	1.000	11217481	47.8		103	2665	
499.00 > 99.00	3.008	3.008	0.0	1.000	2368331		4.74(0.90-1.10)		2957	
20 Perfluorononanoic acid										
463.00 > 419.00	3.008	3.008	0.0	1.000	10915234	51.9		104	6567	
D 19 13C5 PFNA										
468.00 > 423.00	3.008	3.008	0.0		10851028	53.8		108	9167	
D 26 M2-8:2FTS										
529.00 > 81.00	3.357	3.357	0.0		3372120	46.7		97.4	4693	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.357	3.357	0.0	1.000	3715660	47.5		99.1	5220	
D 21 13C8 FOSA										
506.00 > 78.00	3.365	3.365	0.0		16262142	52.3		105	8199	
D 23 13C2 PFDA										
515.00 > 470.00	3.365	3.365	0.0		9954447	54.5		109	8576	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.365	3.365	0.0	1.000	9302706	49.7		99.5	7927	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.373	3.373	0.0	1.000	15742327	51.4		103	8893	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.523	3.523	0.0		4596175	56.3		113	3446	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.523	3.523	0.0	1.000	4436539	51.6		103	2913	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.680	3.680	0.0	1.000	7660209	52.4		109	5453	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.690	3.690	0.0		4643870	55.3		111	3216	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.699	3.699	0.0	1.000	8163908	50.4		101	3891	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.699	3.699	0.0	1.003	3914845	49.9		99.9	2477	
D 30 13C2 PFUnA										
565.00 > 520.00	3.699	3.699	0.0		7582635	52.0		104	4190	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
35 MeFOSA										
512.00 > 169.00	3.877	3.877	0.0	1.000	4349232	48.9		97.8	2624	
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.877	3.877	0.0		4985166	55.0		110	2367	
D 36 13C2 PFDoA										
615.00 > 570.00	3.990	3.990	0.0		8548863	50.9		102	8112	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.990	3.990	0.0	1.000	8041051	51.1		102	4922	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.061	4.061	0.0		4822249	55.5		111	1879	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.071	4.071	0.0	1.000	4381668	48.9		97.7	2229	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	9805504	55.5		111	1829	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.489	4.489	0.0	1.000	2457230	49.9		99.7	6031	
713.00 > 219.00	4.489	4.489	0.0	1.000	1870088		1.31(0.00-0.00)		4413	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.489	4.489	0.0		11083196	54.2		108	8974	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.899	4.899	0.0	1.000	15508230	50.3		101	949	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.899	4.899	0.0		17644904	57.6		115	6851	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.245	5.245	0.0	1.000	16611686	49.5		99.0	956	

Reagents:

LCPFC_FULL-L5_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 09:59:56 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_026.d

Injection Date: 31-Oct-2017 03:13:41 Instrument ID: A8_N

Lims ID: CCV L5

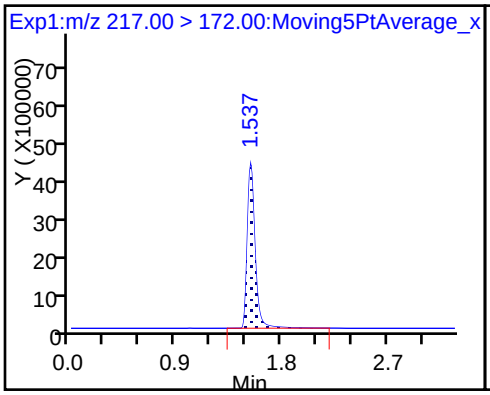
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 12

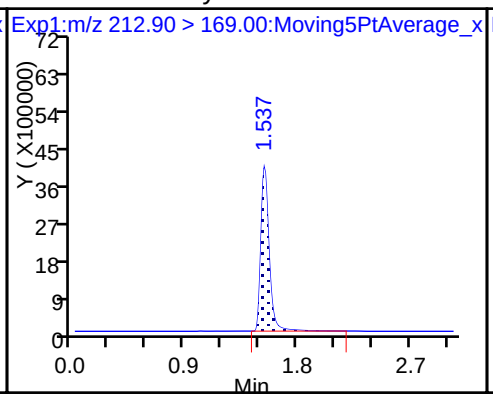
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

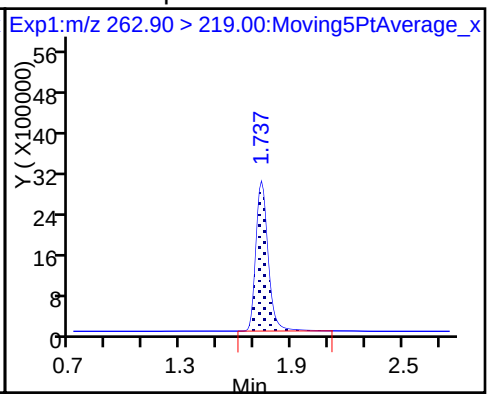
D 1 13C4 PFBA



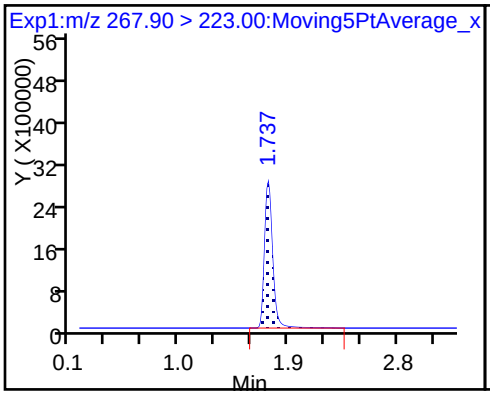
2 Perfluorobutyric acid



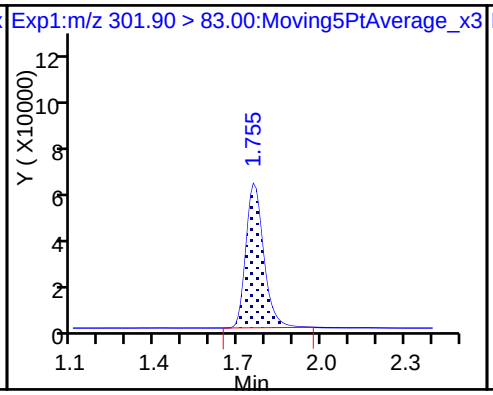
4 Perfluoropentanoic acid



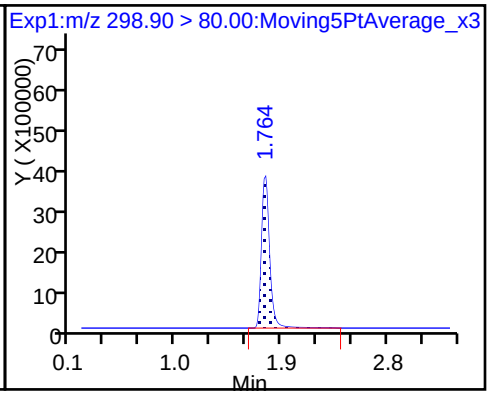
D 3 13C5-PFPeA



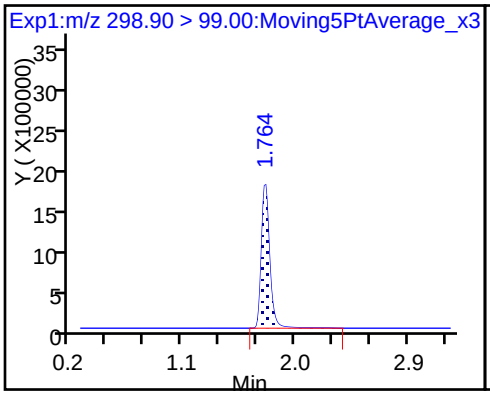
D 47 13C3-PFBS



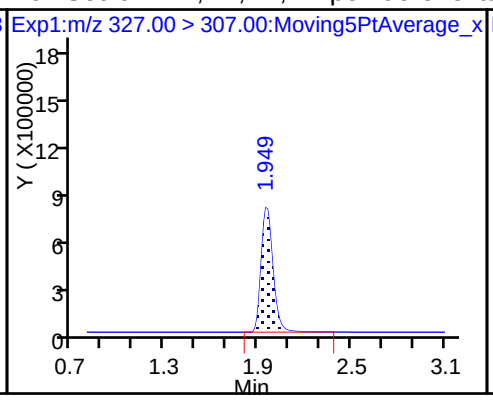
5 Perfluorobutanesulfonic acid



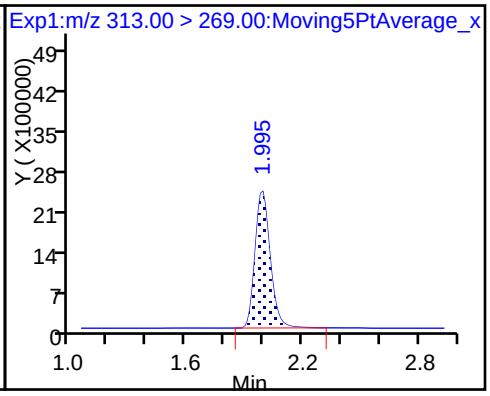
5 Perfluorobutanesulfonic acid



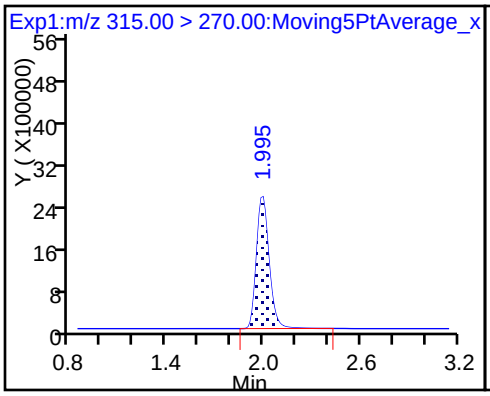
61 Sodium 1H,1H,2H,2H-perfluorohexane



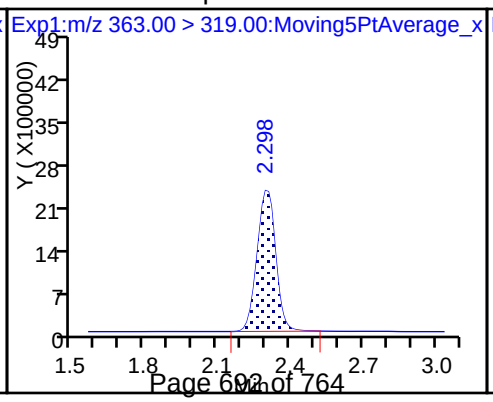
6 Perfluorohexanoic acid



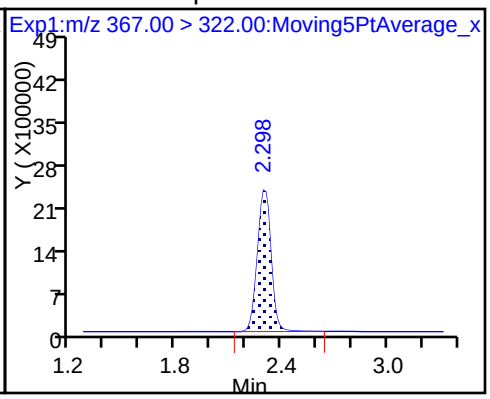
D 7 13C2 PFHxA



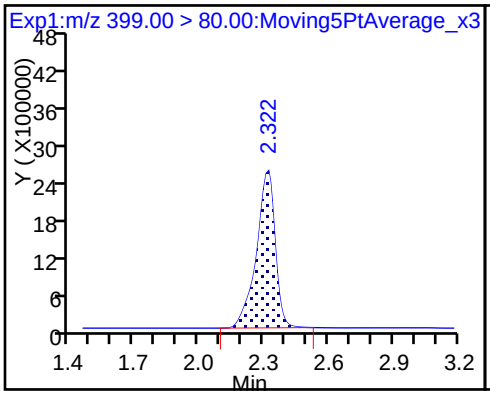
10 Perfluoroheptanoic acid



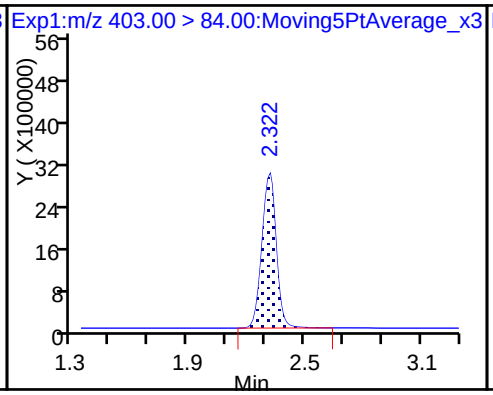
D 9 13C4-PFHpA



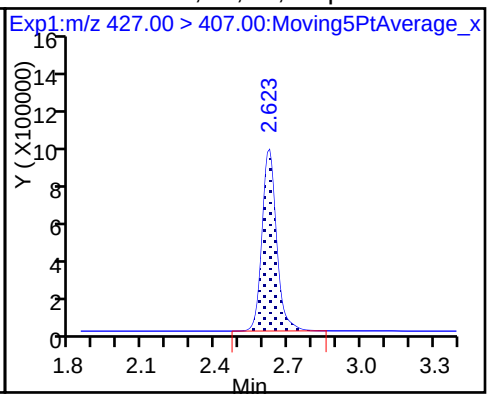
8 Perfluorohexanesulfonic acid



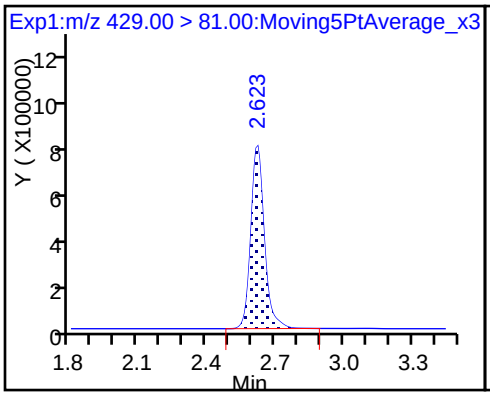
D 11 18O2 PFHxS



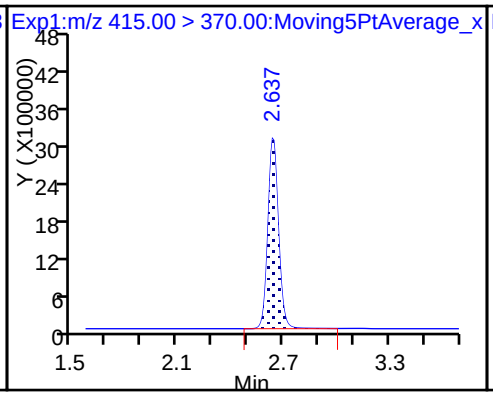
13 Sodium 1H,1H,2H,2H-perfluorooctane



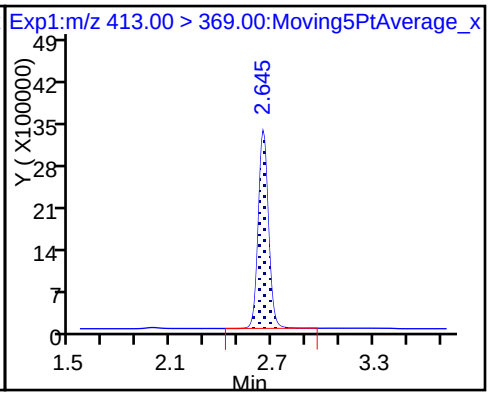
D 12 M2-6:2FTS



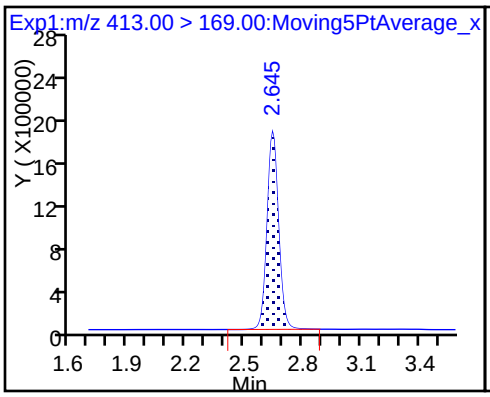
* 62 13C2-PFOA



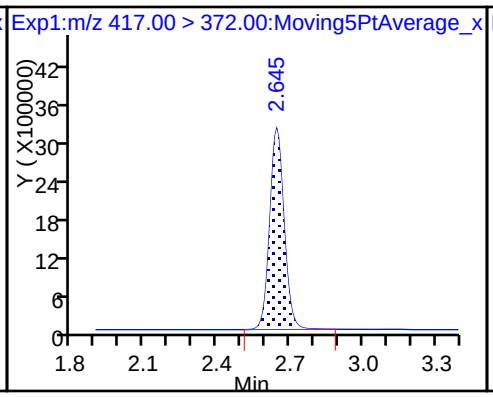
15 Perfluorooctanoic acid



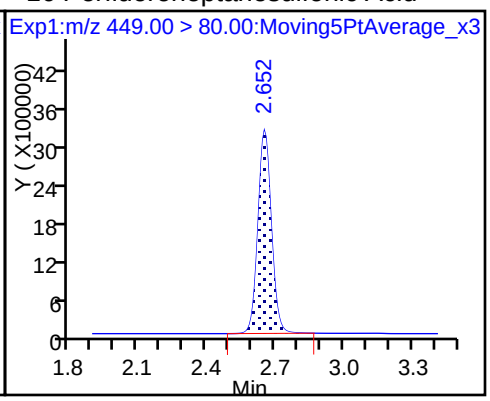
15 Perfluorooctanoic acid



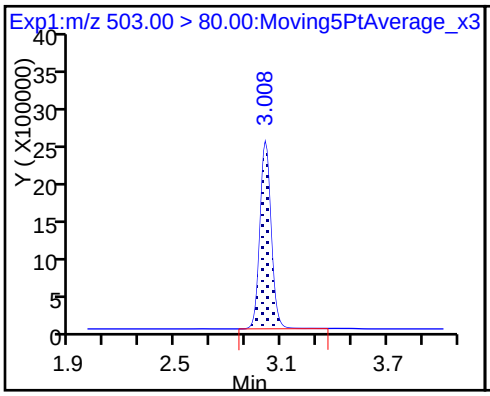
D 14 13C4 PFOA



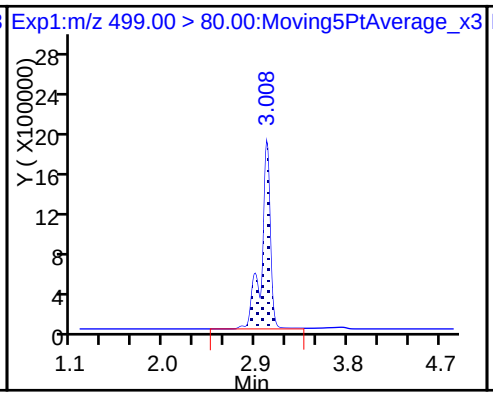
16 Perfluoroheptanesulfonic Acid



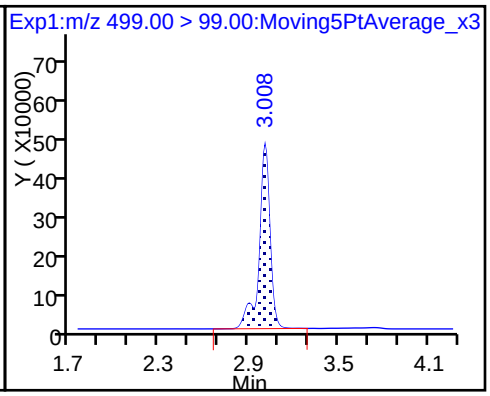
D 18 13C4 PFOS



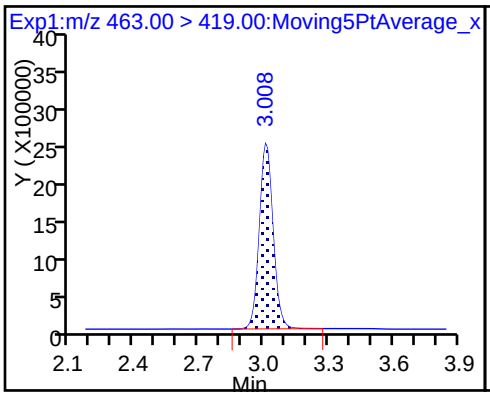
17 Perfluorooctane sulfonic acid



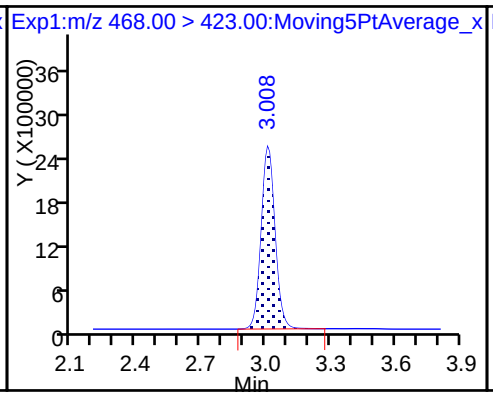
17 Perfluorooctane sulfonic acid



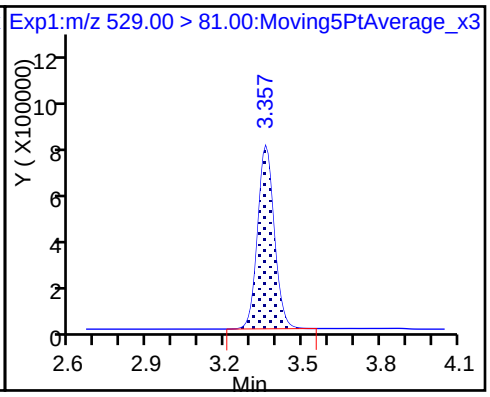
20 Perfluorononanoic acid



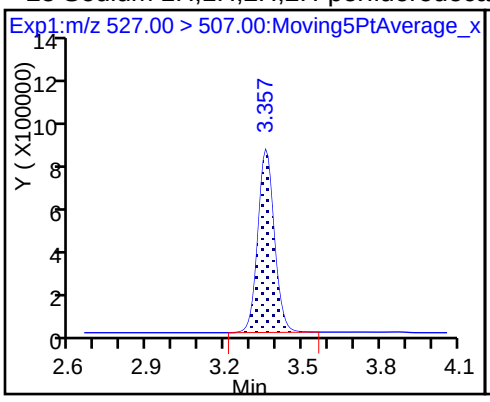
D 19 13C5 PFNA



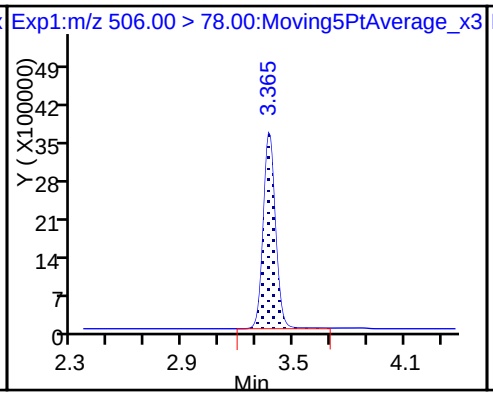
D 26 M2-8:2FTS



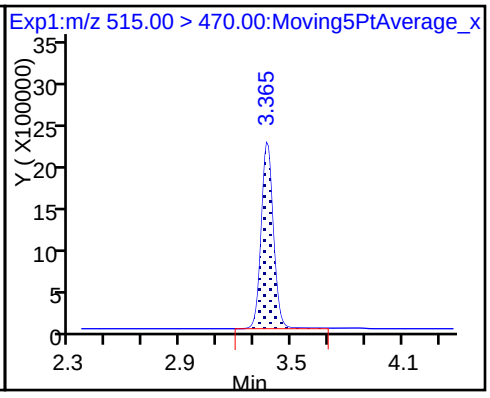
25 Sodium 1H,1H,2H,2H-perfluorodecane



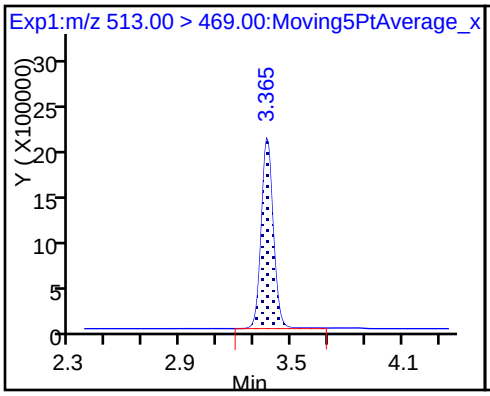
D 21 13C8 FOSA



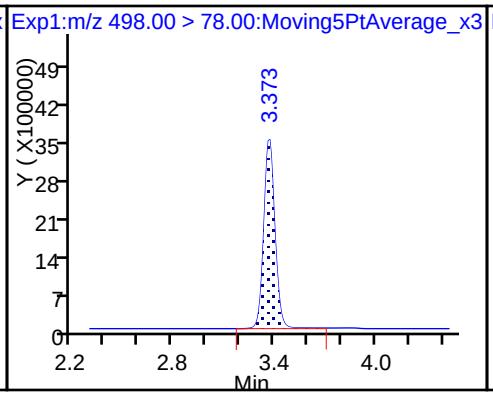
D 23 13C2 PFDA



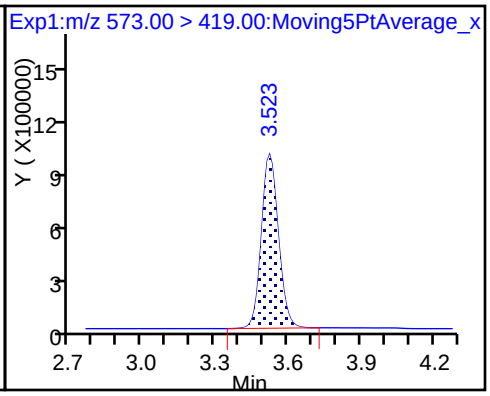
24 Perfluorodecanoic acid



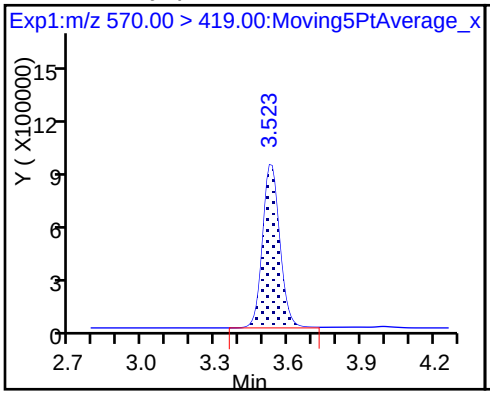
22 Perfluorooctane Sulfonamide



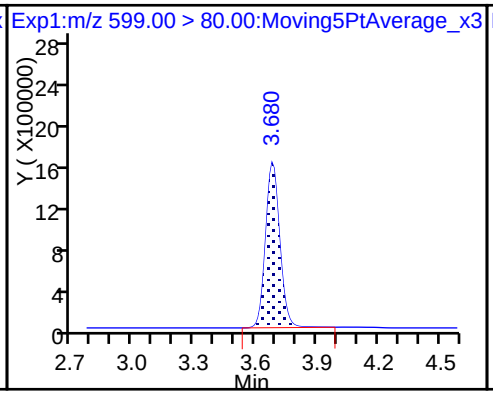
D 27 d3-NMeFOSAA



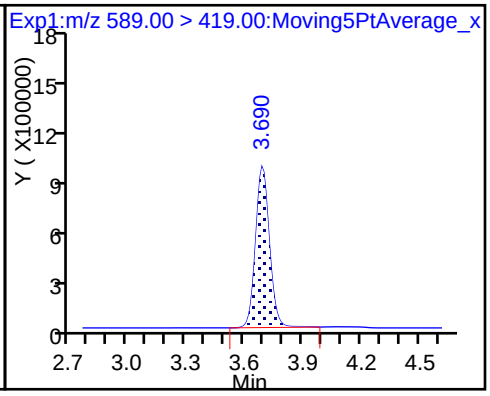
28 N-methyl perfluorooctane sulfonami



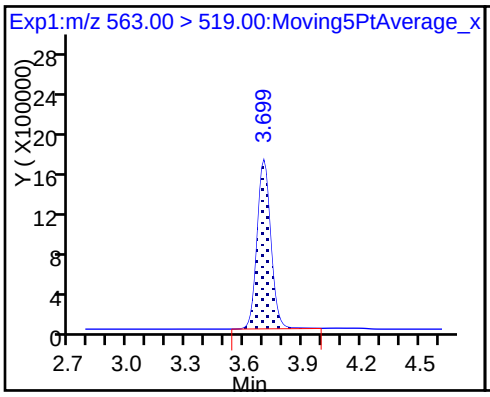
29 Perfluorodecane Sulfonic acid



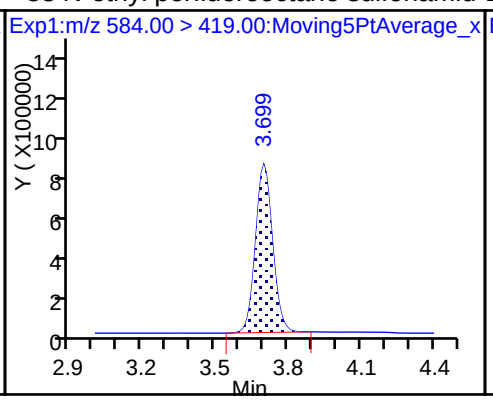
D 32 d5-NEtFOSAA



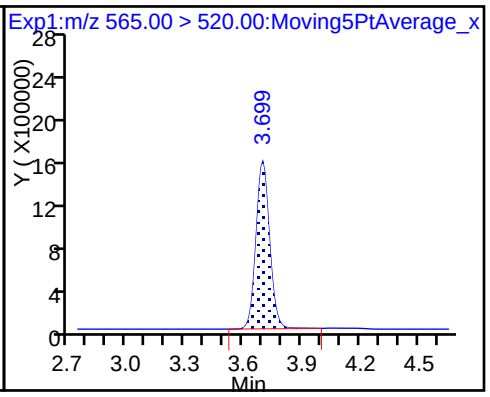
31 Perfluoroundecanoic acid



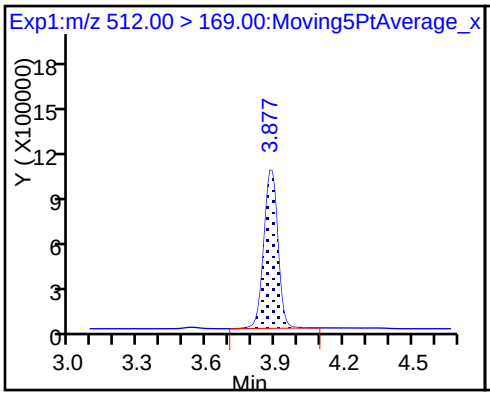
33 N-ethyl perfluorooctane sulfonamid



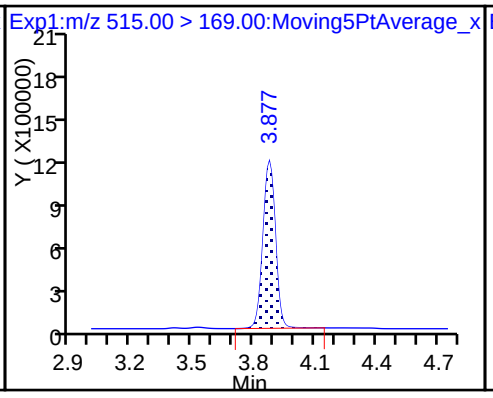
D 30 13C2 PFUnA



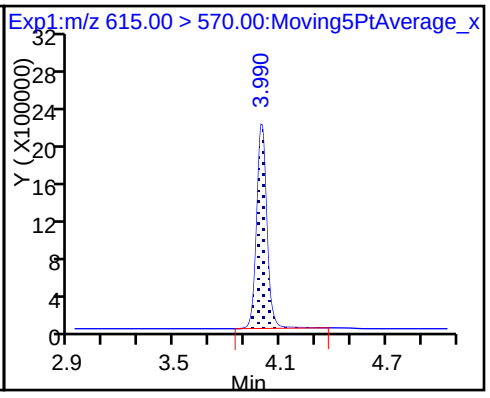
35 MeFOSA



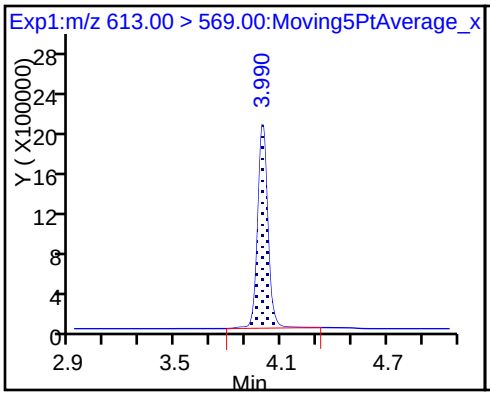
D 34 d-N-MeFOSA-M



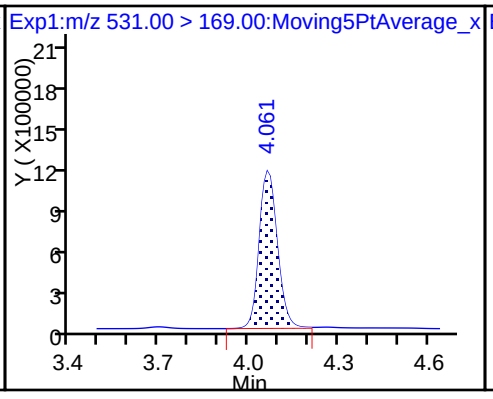
D 36 13C2 PFDoA



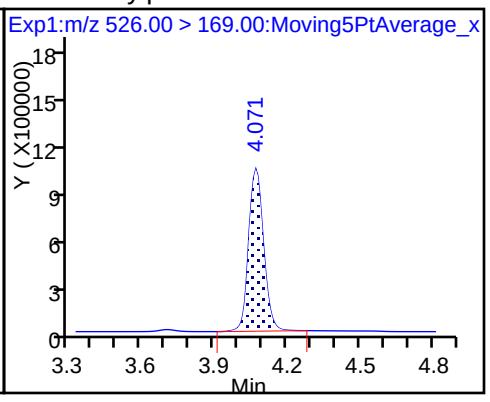
37 Perfluorododecanoic acid



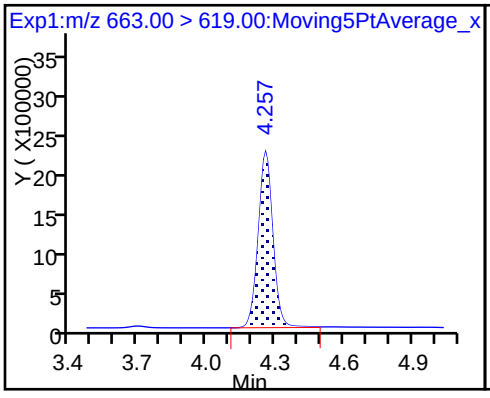
D 38 d-N-EtFOSA-M



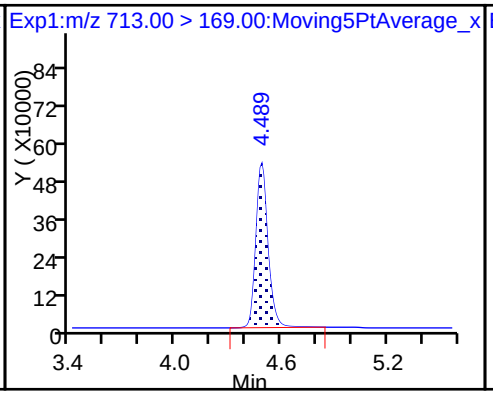
39 N-ethylperfluoro-1-octanesulfonami



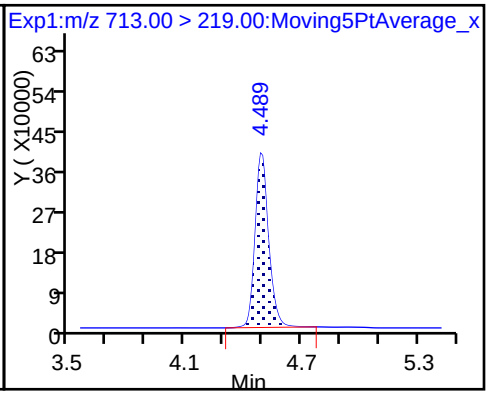
41 Perfluorotridecanoic acid



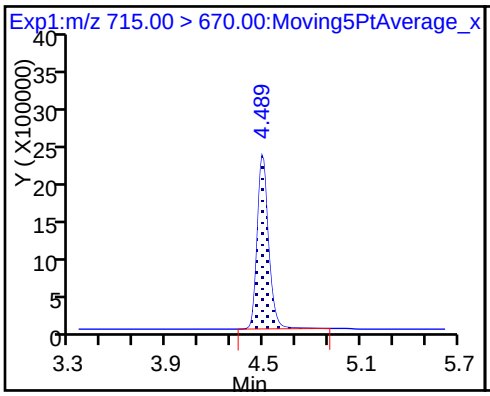
42 Perfluorotetradecanoic acid



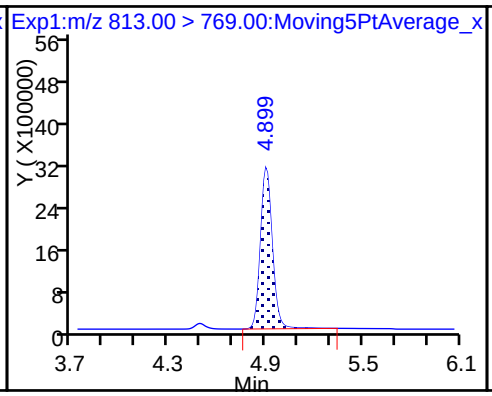
42 Perfluorotetradecanoic acid



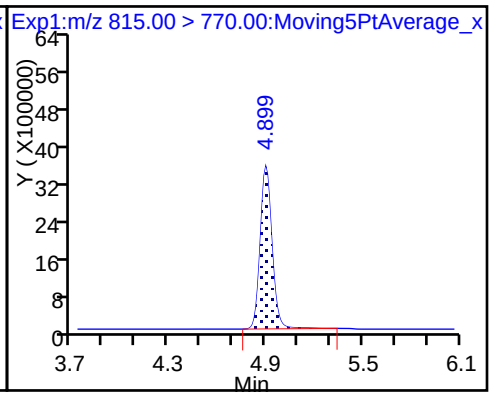
D 43 13C2-PFTeDA



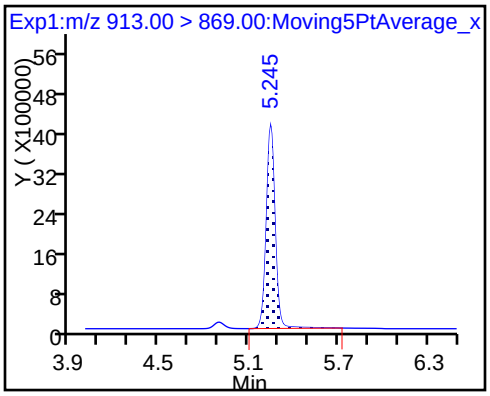
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/18 Calibration Date: 10/31/2017 03:55

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_032.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	1.017		21.4	20.0	6.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.113		20.7	20.0	3.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	71.89		17.5	17.7	-0.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9570		20.0	20.0	0.2	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.020		21.1	20.0	5.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.074		18.9	18.2	3.8	25.0
6:2FTS	AveID	1.245	1.217		18.7	19.0	-1.2	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.078		20.1	20.0	0.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.260		20.4	19.0	7.4	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9744		20.1	20.0	0.6	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.075		19.2	18.6	3.4	25.0
8:2FTS	AveID	1.112	1.102		19.0	19.2	-0.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9071		19.3	20.0	-3.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	1.014		21.5	20.0	7.6	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.8759		18.7	20.0	-6.4	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7098		21.1	19.3	9.6	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8257		19.6	20.0	-2.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.061		19.9	20.0	-0.6	25.0
MeFOSA	AveID	0.8921	0.8804		19.7	20.0	-1.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9278		20.2	20.0	0.9	25.0
N-EtFOSA-M	AveID	0.9298	0.9271		19.9	20.0	-0.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.139		22.0	20.0	10.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2188		19.7	20.0	-1.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9480		21.4	20.0	7.2	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.997		21.0	20.0	4.9	25.0
13C4 PFBA	Ave	350625	372726		53.2	50.0	6.3	50.0
13C5 PFPeA	Ave	225543	237796		52.7	50.0	5.4	50.0
13C3-PFBS	Ave	5028	5568		51.5	46.5	10.7	50.0
13C2 PFHxA	Ave	242324	264108		54.5	50.0	9.0	50.0
13C4-PFHpA	Ave	243728	255543		52.4	50.0	4.8	50.0
18O2 PFHxS	Ave	300958	331577		52.1	47.3	10.2	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/18 Calibration Date: 10/31/2017 03:55

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_032.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	64093		43.7	47.5	-7.9	50.0
13C4 PFOA	Ave	238687	252087		52.8	50.0	5.6	50.0
13C4 PFOS	Ave	211928	221217		49.9	47.8	4.4	50.0
13C5 PFNA	Ave	201795	217040		53.8	50.0	7.6	50.0
M2-8:2FTS	Ave	72250	70576		46.8	47.9	-2.3	50.0
13C2 PFDA	Ave	182533	203989		55.9	50.0	11.8	50.0
13C8 FOSA	Ave	311183	316450		50.8	50.0	1.7	50.0
d3-NMeFOSAA	Ave	81672	92331		56.5	50.0	13.1	50.0
d5-NEtFOSAA	Ave	83982	92112		54.8	50.0	9.7	50.0
13C2 PFUnA	Ave	145752	151547		52.0	50.0	4.0	50.0
d-N-MeFOSA-M	Ave	90599	97666		53.9	50.0	7.8	50.0
13C2 PFDoA	Ave	167891	170496		50.8	50.0	1.6	50.0
d-N-EtFOSA-M	Ave	86831	92785		53.4	50.0	6.9	50.0
13C2-PFTeDA	Ave	204611	221468		54.1	50.0	8.2	50.0
13C2-PFHxDA	Ave	306398	328025		53.5	50.0	7.1	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_032.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 31-Oct-2017 03:55:05 ALS Bottle#: 31 Worklist Smp#: 18
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub18

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 10:12:56 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 10:12:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.536	1.536	0.0		18636318	53.2		106	36479	
2 Perfluorobutyric acid										
212.90 > 169.00	1.536	1.536	0.0	1.000	7579157	21.4		107	1893	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.736	0.0	1.000	5291247	20.7		104	5554	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.736	0.0		11889813	52.7		105	70279	
D 47 13C3-PFBS										
301.90 > 83.00	1.754	1.754	0.0		258925	51.5		111	6686	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.754	1.754	0.0	1.000	7077460	17.5		99.2	13008	
298.90 > 99.00	1.754	1.754	0.0	1.000	3041962		2.33(0.00-0.00)		19351	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	1438988	18.5		98.9	27569	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.994	1.994	0.0	1.000	5055077	20.0		100	4984	
D 7 13C2 PFHxA										
315.00 > 270.00	1.994	1.994	0.0		13205377	54.5		109	36491	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.308	2.308	0.0	1.000	5211200	21.1		105	4391	
D 9 13C4-PFHpA										
367.00 > 322.00	2.308	2.308	0.0		12777128	52.4		105	15058	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.318	2.318	0.0	1.000	6478407	18.9		104	6074	
D 11 18O2 PFHxS										
403.00 > 84.00	2.318	2.318	0.0		15683601	52.1		110	30104	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.622	2.622	0.0	1.000	1478505	18.7		98.8	11736	
D 12 M2-6:2FTS										
429.00 > 81.00	2.622	2.622	0.0		3044425	43.7		92.1	13107	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		12354171	50.0		100	27926	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.651	2.651	0.0	1.000	5432595	20.1		100	1679	
413.00 > 169.00	2.651	2.651	0.0	1.000	2891855		1.88(0.90-1.10)		3910	
D 14 13C4 PFOA										
417.00 > 372.00	2.651	2.651	0.0		12604359	52.8		106	16548	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.658	2.658	0.0	1.000	5306042	20.4		107	12293	
D 18 13C4 PFOS										
503.00 > 80.00	3.015	3.015	0.0		10574165	49.9		104	12912	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.015	3.015	0.0	1.000	4415152	19.2		103	1864	
499.00 > 99.00	3.015	3.015	0.0	1.000	931525		4.74(0.90-1.10)		2340	
20 Perfluorononanoic acid										
463.00 > 419.00	3.015	3.015	0.0	1.000	4229642	20.1		101	4050	
D 19 13C5 PFNA										
468.00 > 423.00	3.015	3.015	0.0		10852008	53.8		108	15832	
D 26 M2-8:2FTS										
529.00 > 81.00	3.364	3.364	0.0		3380607	46.8		97.7	9559	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.364	3.364	0.0	1.000	1490463	19.0		99.1	7332	
D 21 13C8 FOSA										
506.00 > 78.00	3.372	3.372	0.0		15822494	50.8		102	20822	
D 23 13C2 PFDA										
515.00 > 470.00	3.372	3.372	0.0		10199432	55.9		112	19231	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.372	3.372	0.0	1.000	3700678	19.3		96.6	11296	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.372	3.372	0.0	1.000	6417158	21.5		108	15970	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.523	3.523	0.0		4616573	56.5		113	8359	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.533	3.533	0.0	1.003	1617537	18.7		93.6	2768	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.680	3.680	0.0	1.000	3027445	21.1		110	8737	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.689	3.689	0.0		4605593	54.8		110	5437	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.699	3.699	0.0	1.000	3215656	19.9		99.4	5294	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.699	3.699	0.0	1.003	1521168	19.6		97.8	3661	
D 30 13C2 PFUnA										
565.00 > 520.00	3.699	3.699	0.0		7577351	52.0		104	11883	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
35 MeFOSA										
512.00 > 169.00	3.877	3.877	0.0	1.000	1719732	19.7		98.7	3678	
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.877	3.877	0.0		4883295	53.9		108	2872	
D 36 13C2 PFDoA										
615.00 > 570.00	3.990	3.990	0.0		8524776	50.8		102	19203	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.990	3.990	0.0	1.000	3163604	20.2		101	3036	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.061	4.061	0.0		4639249	53.4		107	3832	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.071	4.071	0.0	1.000	1720334	19.9		99.7	3134	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	3882890	22.0		110	1360	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.480	4.480	0.0	1.000	968975	19.7		98.4	5342	
713.00 > 219.00	4.489	4.480	0.008	1.002	740598		1.31(0.00-0.00)		4606	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.489	4.489	0.0		11073379	54.1		108	15365	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.897	4.897	0.0	1.000	6219619	21.4		107	505	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.897	4.897	0.0		16401259	53.5		107	4961	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.246	5.246	0.0	1.000	6541683	21.0		105	491	

Reagents:

LCPFC_FULL-L4_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_032.d

Injection Date: 31-Oct-2017 03:55:05 Instrument ID: A8_N

Lims ID: CCV L4

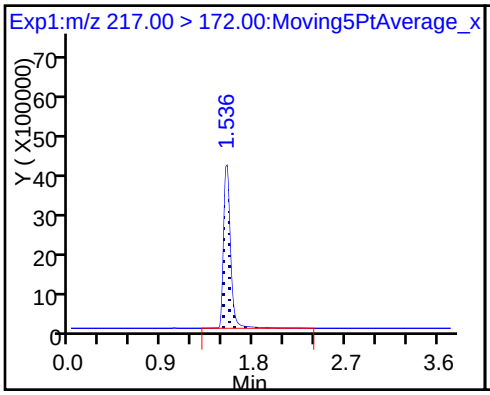
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 31 Worklist Smp#: 18

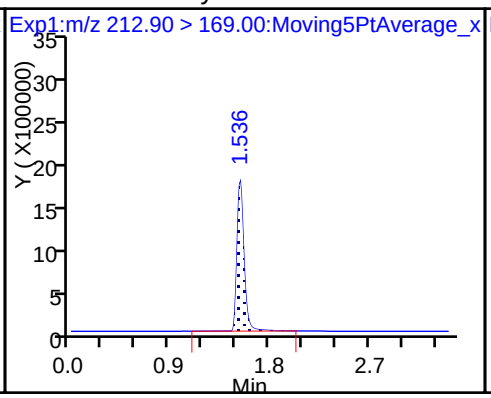
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

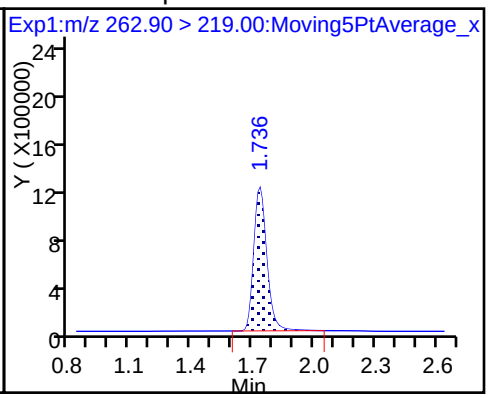
D 1 13C4 PFBA



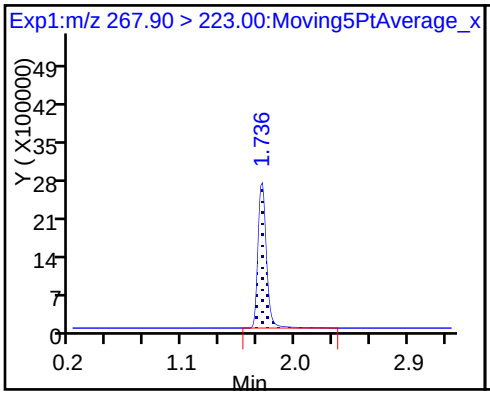
2 Perfluorobutyric acid



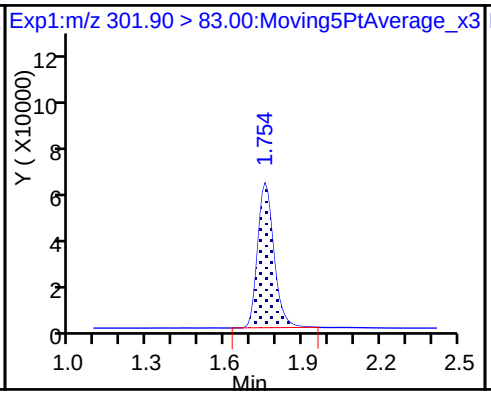
4 Perfluoropentanoic acid



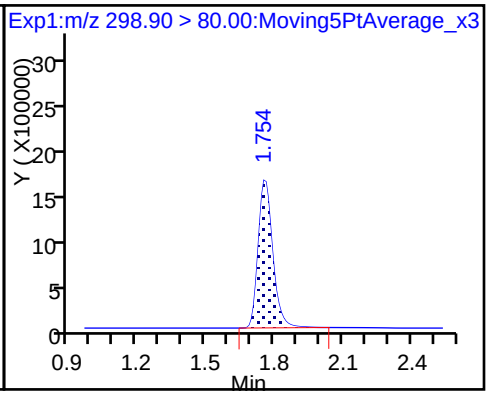
D 3 13C5-PFPeA



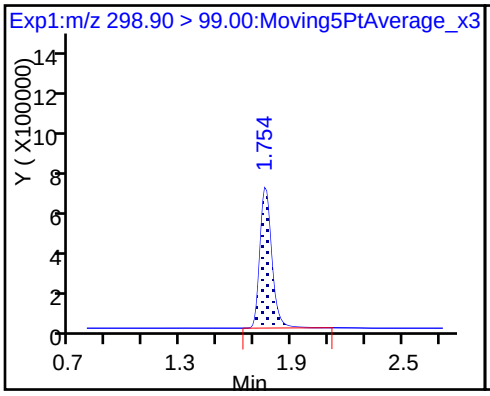
D 47 13C3-PFBS



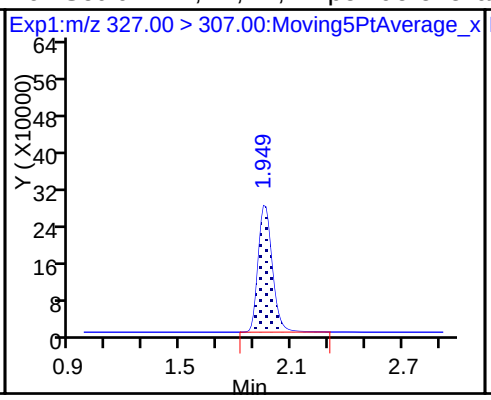
5 Perfluorobutanesulfonic acid



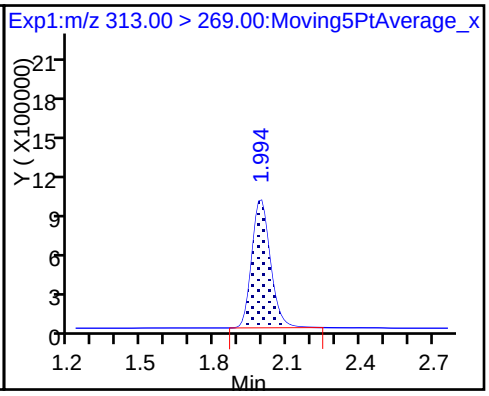
5 Perfluorobutanesulfonic acid



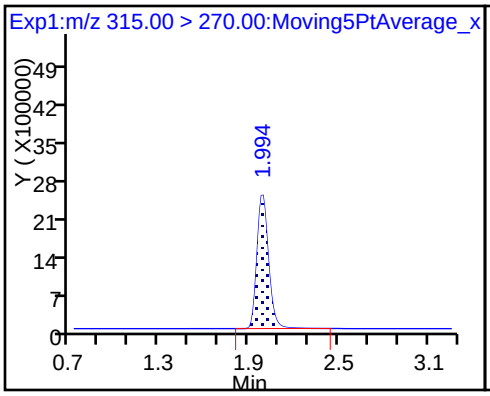
61 Sodium 1H,1H,2H,2H-perfluorohexane



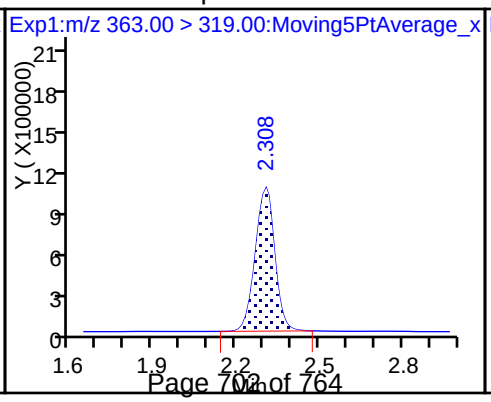
6 Perfluorohexanoic acid



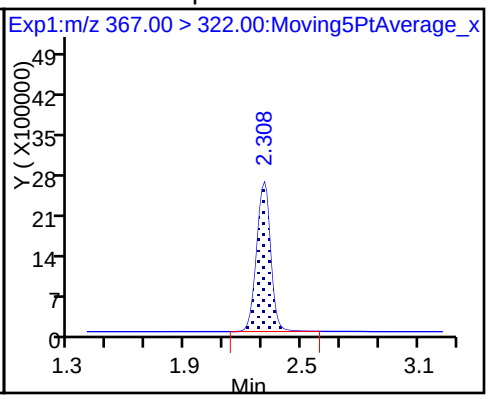
D 7 13C2 PFHxA



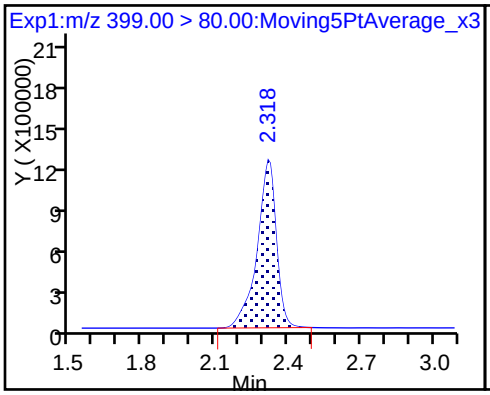
10 Perfluoroheptanoic acid



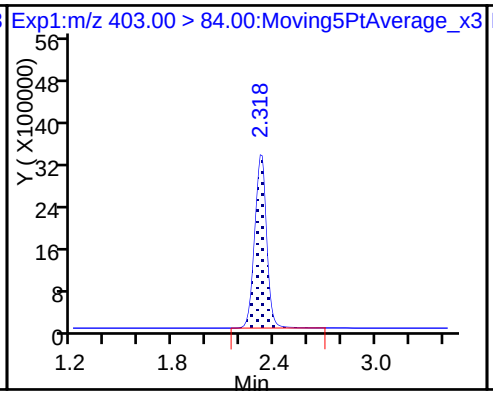
D 9 13C4-PFHpA



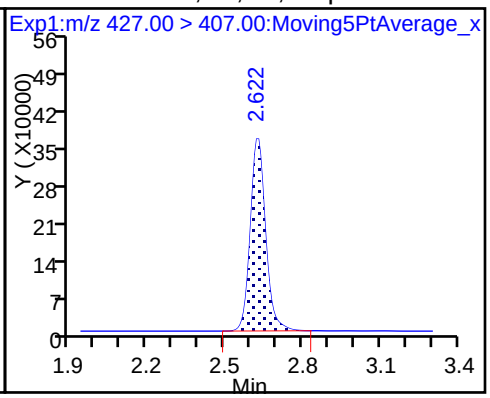
8 Perfluorohexanesulfonic acid



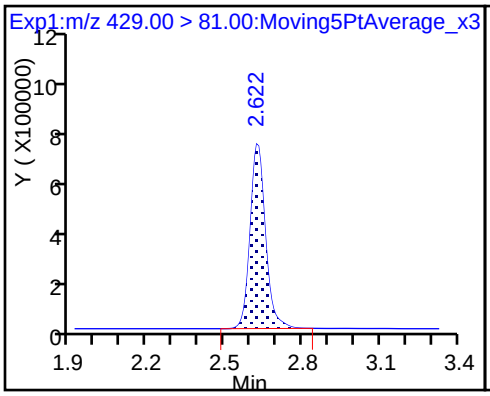
D 11 18O2 PFHxS



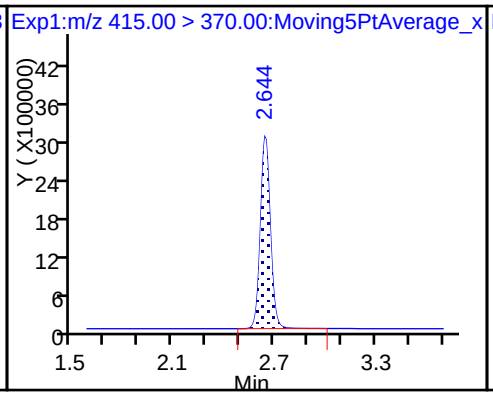
13 Sodium 1H,1H,2H,2H-perfluorooctane



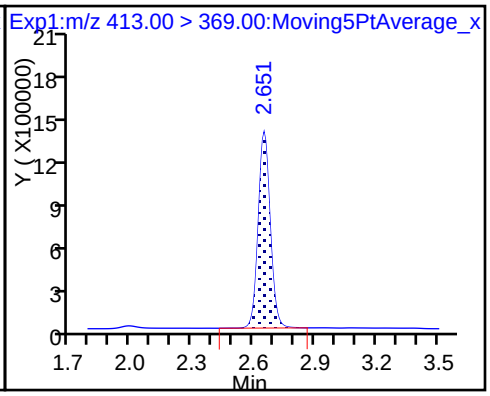
D 12 M2-6:2FTS



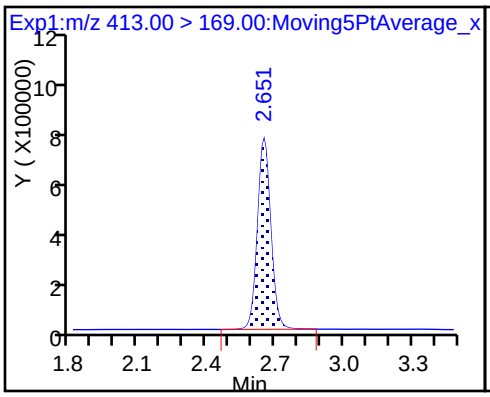
* 62 13C2-PFOA



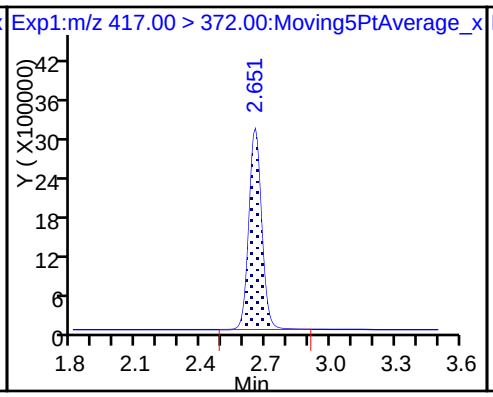
15 Perfluorooctanoic acid



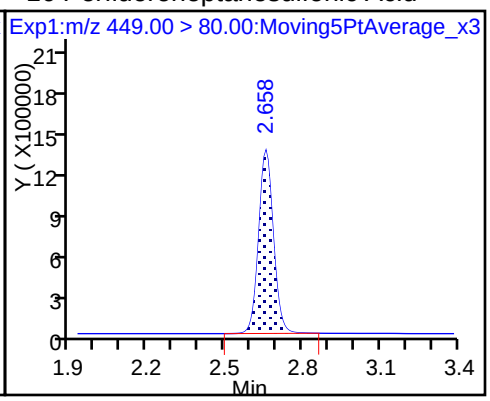
15 Perfluorooctanoic acid



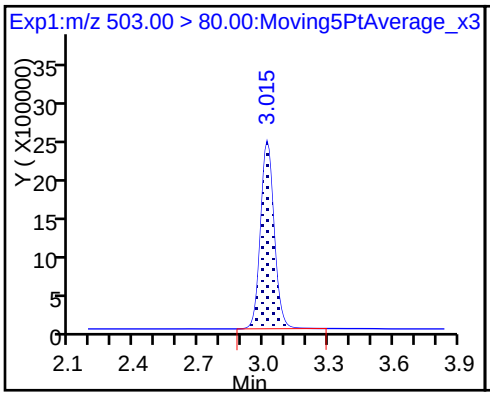
D 14 13C4 PFOA



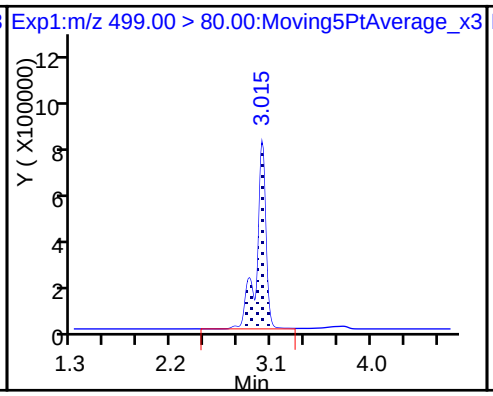
16 Perfluoroheptanesulfonic Acid



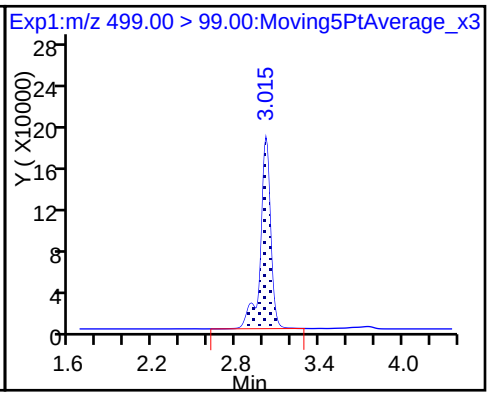
D 18 13C4 PFOS



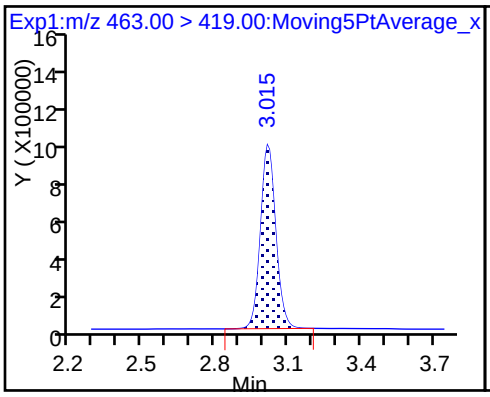
17 Perfluorooctane sulfonic acid



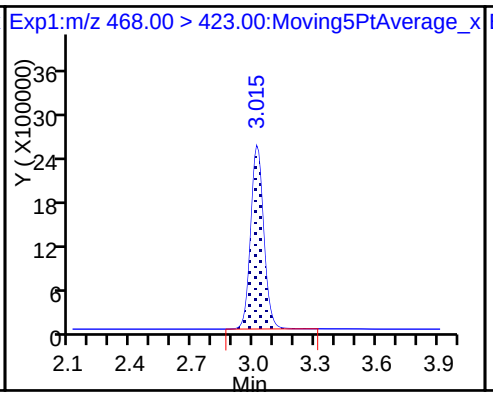
17 Perfluorooctane sulfonic acid



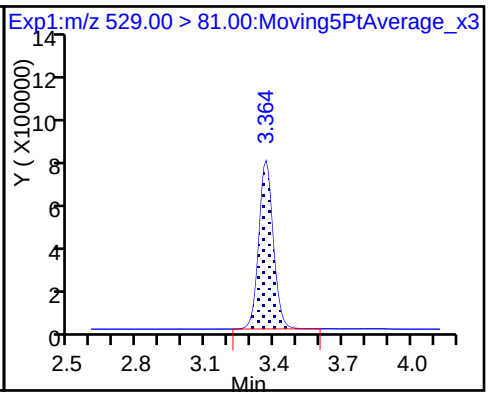
20 Perfluorononanoic acid



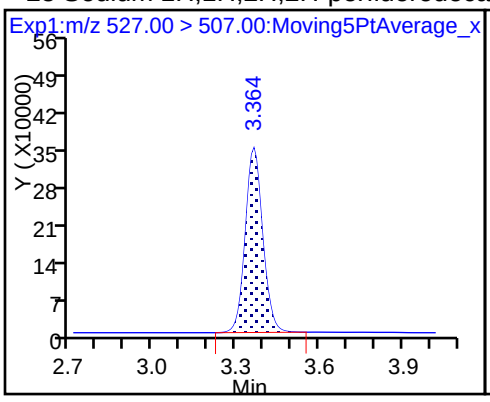
D 19 13C5 PFNA



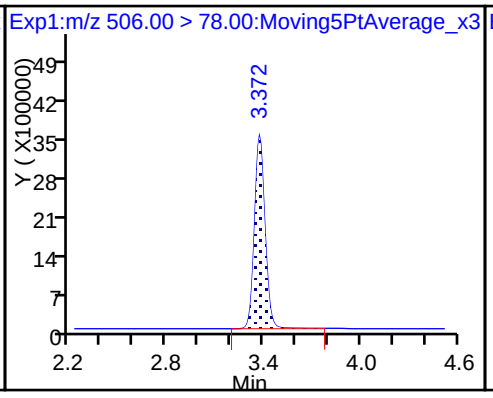
D 26 M2-8:2FTS



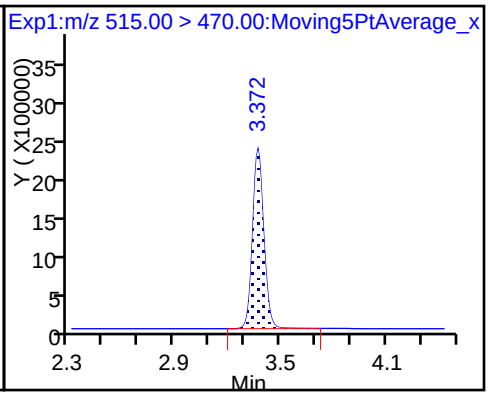
25 Sodium 1H,1H,2H,2H-perfluorodecane



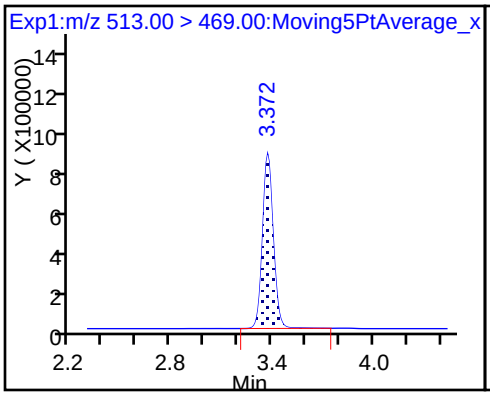
D 21 13C8 FOSA



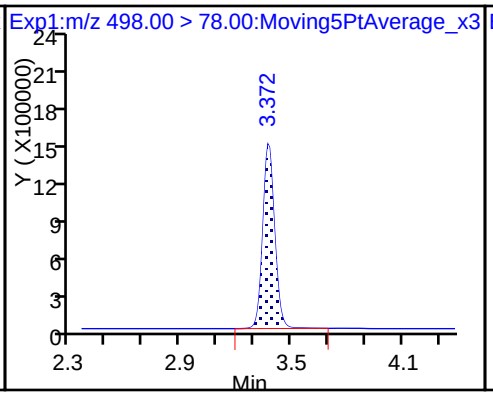
D 23 13C2 PFDA



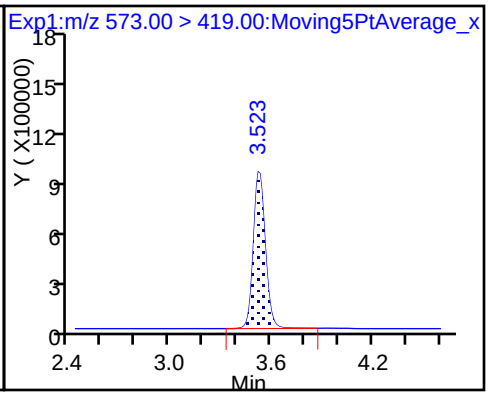
24 Perfluorodecanoic acid



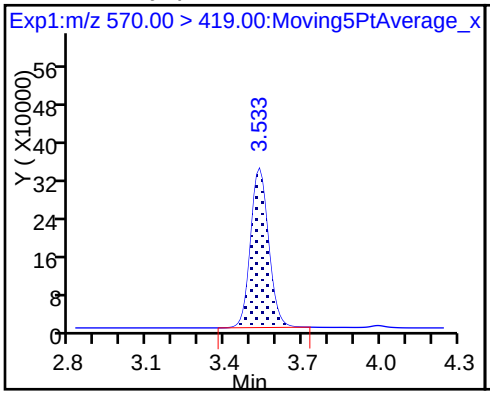
22 Perfluorooctane Sulfonamide



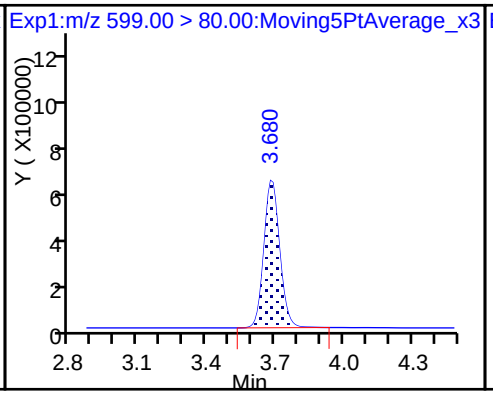
D 27 d3-NMeFOSAA



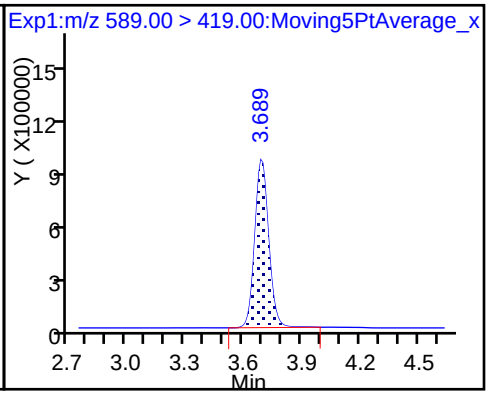
28 N-methyl perfluorooctane sulfonami



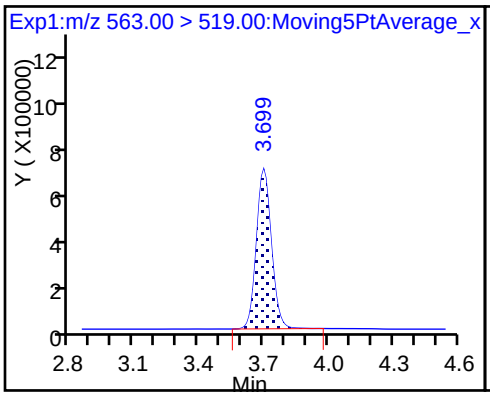
29 Perfluorodecane Sulfonic acid



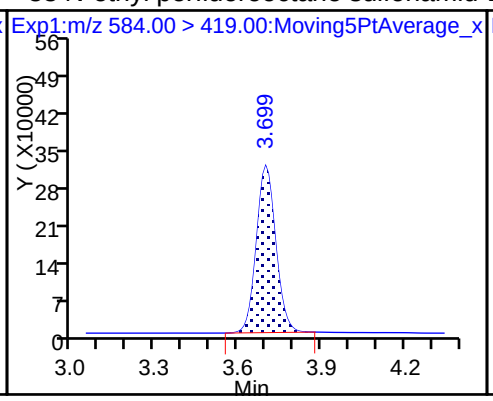
D 32 d5-NEtFOSAA



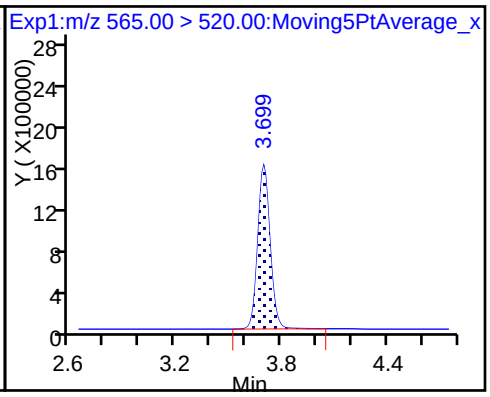
31 Perfluoroundecanoic acid



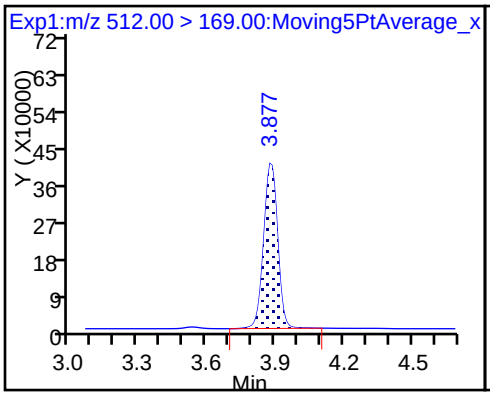
33 N-ethyl perfluorooctane sulfonamid



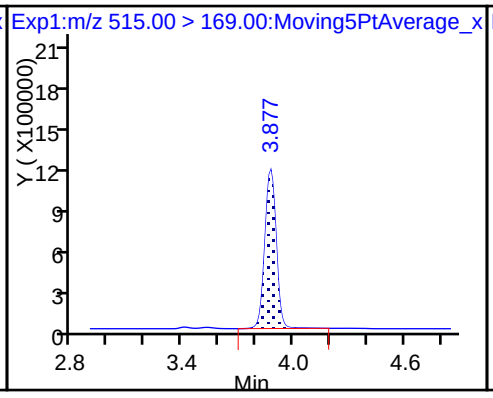
D 30 13C2 PFUnA



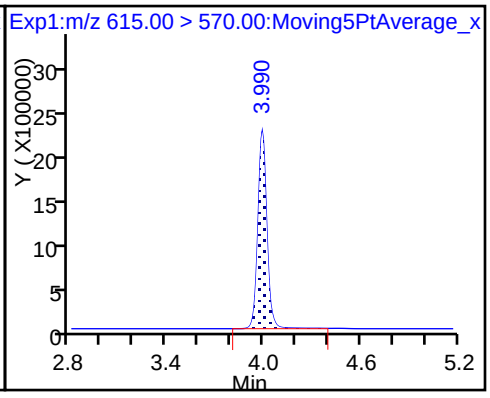
35 MeFOSA



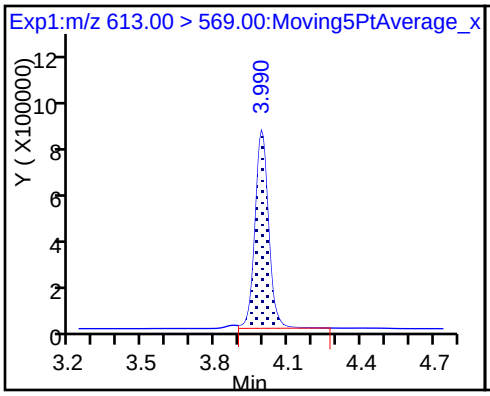
D 34 d-N-MeFOSA-M



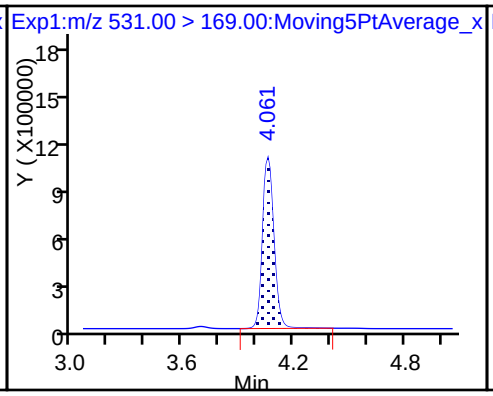
D 36 13C2 PFDoA



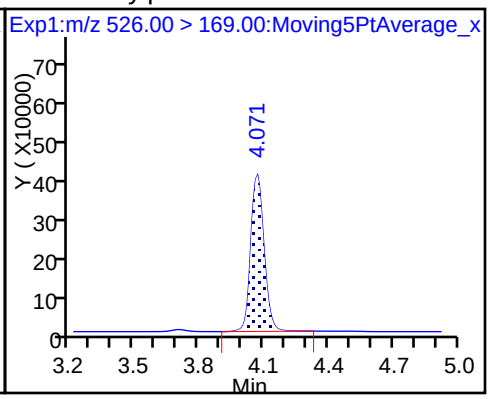
37 Perfluorododecanoic acid



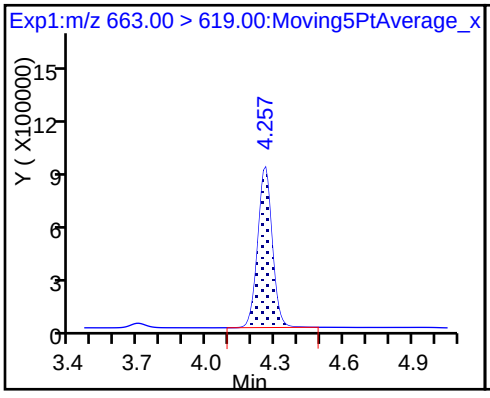
D 38 d-N-EtFOSA-M



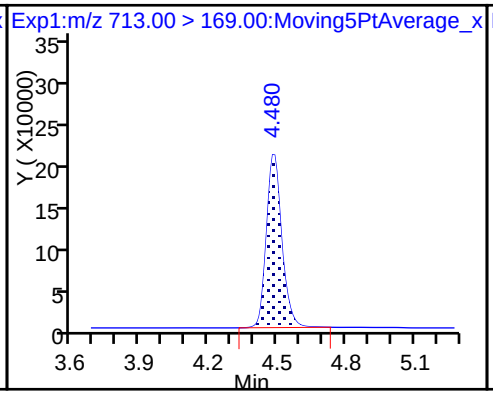
39 N-ethylperfluoro-1-octanesulfonami



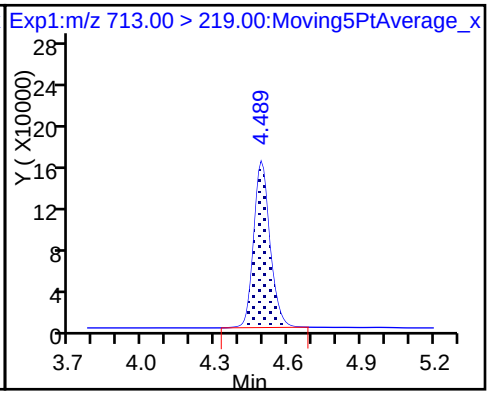
41 Perfluorotridecanoic acid



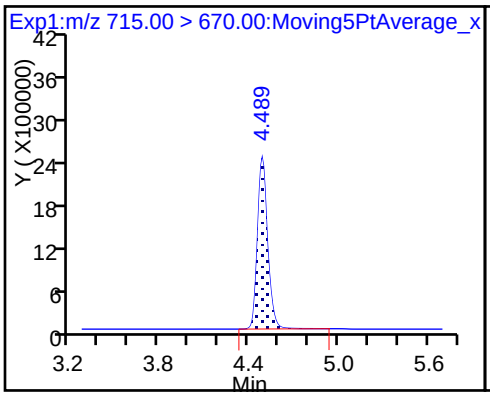
42 Perfluorotetradecanoic acid



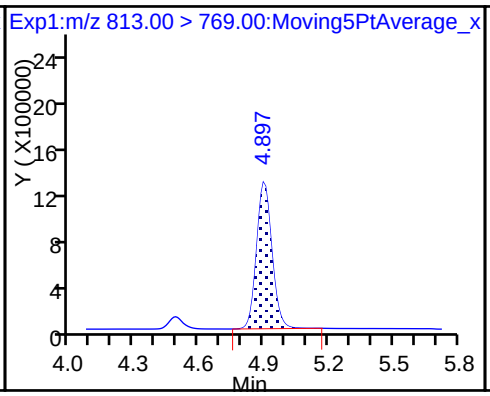
42 Perfluorotetradecanoic acid



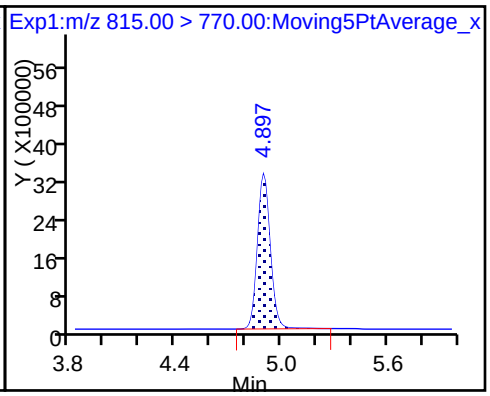
D 43 13C2-PFTeDA



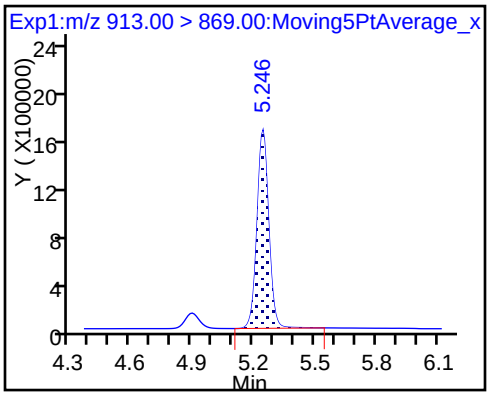
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/25 Calibration Date: 10/31/2017 04:43

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9253		48.6	50.0	-2.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.088		50.6	50.0	1.3	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	68.37		41.7	44.2	-5.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9933		52.0	50.0	4.0	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	0.9930		51.3	50.0	2.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.054		46.4	45.5	2.0	25.0
6:2FTS	AveID	1.245	1.197		46.1	47.4	-2.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.017		47.3	50.0	-5.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.206		48.9	47.6	2.8	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9685		50.0	50.0	0.0	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.078		48.1	46.4	3.7	25.0
8:2FTS	AveID	1.112	1.100		47.4	47.9	-1.1	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9467		50.4	50.0	0.8	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9650		51.2	50.0	2.4	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9181		49.1	50.0	-1.9	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.6967		51.8	48.2	7.5	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8169		48.4	50.0	-3.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.055		49.4	50.0	-1.2	25.0
MeFOSA	AveID	0.8921	0.8696		48.7	50.0	-2.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9549		51.9	50.0	3.9	25.0
N-EtFOSA-M	AveID	0.9298	0.9082		48.8	50.0	-2.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.125		54.4	50.0	8.9	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2281		51.3	50.0	2.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.8836		50.6	50.0	1.2	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.9763		51.4	50.0	2.7	25.0
13C4 PFBA	Ave	350625	395867		56.5	50.0	12.9	50.0
13C5 PFPeA	Ave	225543	256123		56.8	50.0	13.6	50.0
13C3-PFBS	Ave	5028	5792		53.6	46.5	15.2	50.0
13C2 PFHxA	Ave	242324	274279		56.6	50.0	13.2	50.0
13C4-PFHpA	Ave	243728	262300		53.8	50.0	7.6	50.0
18O2 PFHxS	Ave	300958	332065		52.2	47.3	10.3	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/25 Calibration Date: 10/31/2017 04:43

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	68739		46.9	47.5	-1.2	50.0
13C4 PFOA	Ave	238687	275679		57.7	50.0	15.5	50.0
13C4 PFOS	Ave	211928	237530		53.6	47.8	12.1	50.0
13C5 PFNA	Ave	201795	235219		58.3	50.0	16.6	50.0
M2-8:2FTS	Ave	72250	73672		48.8	47.9	2.0	50.0
13C2 PFDA	Ave	182533	210563		57.7	50.0	15.4	50.0
13C8 FOSA	Ave	311183	335970		54.0	50.0	8.0	50.0
d3-NMeFOSAA	Ave	81672	98371		60.2	50.0	20.4	50.0
d5-NEtFOSAA	Ave	83982	100153		59.6	50.0	19.3	50.0
13C2 PFUnA	Ave	145752	161817		55.5	50.0	11.0	50.0
d-N-MeFOSA-M	Ave	90599	109186		60.3	50.0	20.5	50.0
13C2 PFDoA	Ave	167891	180301		53.7	50.0	7.4	50.0
d-N-EtFOSA-M	Ave	86831	102267		58.9	50.0	17.8	50.0
13C2-PFTeDA	Ave	204611	232896		56.9	50.0	13.8	50.0
13C2-PFHxDA	Ave	306398	356065		58.1	50.0	16.2	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_039.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 31-Oct-2017 04:43:23 ALS Bottle#: 32 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-A8_N*sub18

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 10:41:54 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 10:41:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.528	1.528	0.0		19793349	56.5		113	43059	
2 Perfluorobutyric acid										
212.90 > 169.00	1.528	1.528	0.0	1.000	18313764	48.6		97.2	2253	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.727	1.727	0.0	1.000	13929731	50.6		101	16531	
D 3 13C5-PFPeA										
267.90 > 223.00	1.727	1.727	0.0		12806148	56.8		114	86434	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		269330	53.6		115	6227	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	17503821	41.7		94.3	482618	
298.90 > 99.00	1.755	1.755	0.0	1.000	8192210		2.14(0.00-0.00)		205023	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	3842084	46.0		98.5	39185	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.983	1.983	0.0	1.000	13621376	52.0		104	10749	
D 7 13C2 PFHxA										
315.00 > 270.00	1.983	1.983	0.0		13713929	56.6		113	28651	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.297	2.297	0.0	1.000	13023137	51.3		103	7313	
D 9 13C4-PFHpA										
367.00 > 322.00	2.297	2.297	0.0		13114978	53.8		108	18180	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.321	2.321	0.0	1.000	15931038	46.4		102	5831	
D 11 18O2 PFHxS										
403.00 > 84.00	2.321	2.321	0.0		15706676	52.2		110	21325	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.620	2.620	0.0	1.000	3900138	46.1		97.3	14641	
D 12 M2-6:2FTS										
429.00 > 81.00	2.620	2.620	0.0		3265118	46.9		98.8	15002	
* 62 13C2-PFOA										
415.00 > 370.00	2.642	2.642	0.0		13266981	50.0		100	14542	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.649	2.649	0.0	1.000	14017862	47.3		94.7	3379	
413.00 > 169.00	2.649	2.649	0.0	1.000	7824973		1.79(0.90-1.10)		5759	
D 14 13C4 PFOA										
417.00 > 372.00	2.649	2.649	0.0		13783965	57.7		115	18041	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.656	2.656	0.0	1.000	13633491	48.9		103	21332	
D 18 13C4 PFOS										
503.00 > 80.00	3.011	3.011	0.0		11353920	53.6		112	9599	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.011	3.011	0.0	1.000	11884630	48.1		104	4132	
499.00 > 99.00	3.011	3.011	0.0	1.000	2545795		4.67(0.90-1.10)		4385	
20 Perfluorononanoic acid										
463.00 > 419.00	3.011	3.011	0.0	1.000	11390873	50.0		100	7193	
D 19 13C5 PFNA										
468.00 > 423.00	3.011	3.011	0.0		11760951	58.3		117	18996	
D 26 M2-8:2FTS										
529.00 > 81.00	3.353	3.353	0.0		3528889	48.8		102	10598	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.353	3.353	0.0	1.000	3883079	47.4		98.9	10354	
D 21 13C8 FOSA										
506.00 > 78.00	3.370	3.370	0.0		16798484	54.0		108	15715	
D 23 13C2 PFDA										
515.00 > 470.00	3.370	3.370	0.0		10528131	57.7		115	21269	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.370	3.370	0.0	1.000	9967029	50.4		101	16405	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.370	3.370	0.0	1.000	16210132	51.2		102	31070	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.519	3.519	0.0		4918529	60.2		120	6940	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.529	3.529	0.0	1.003	4515490	49.1		98.1	4543	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.675	3.675	0.0	1.000	7975899	51.8		108	9725	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.685	3.685	0.0		5007629	59.6		119	4830	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.695	3.695	0.0	1.000	8532385	49.4		98.8	7936	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.695	3.695	0.0	1.003	4090770	48.4		96.8	6463	
D 30 13C2 PFUnA										
565.00 > 520.00	3.695	3.695	0.0		8090861	55.5		111	9266	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
35 MeFOSA										
512.00 > 169.00	3.882	3.882	0.0	1.000	4747130	48.7		97.5	4524	
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.873	3.873	0.0		5459324	60.3		121	3819	
D 36 13C2 PFDoA										
615.00 > 570.00	3.987	3.987	0.0		9015056	53.7		107	13299	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.987	3.987	0.0	1.000	8608550	51.9		104	8896	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.056	4.056	0.0		5113354	58.9		118	2528	
39 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.065	4.065	0.0	1.000	4643960	48.8		97.7	3906	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.253	4.253	0.0	1.000	10142898	54.4		109	2491	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.483	4.483	0.0	1.000	2656269	51.3		103	6620	
713.00 > 219.00	4.491	4.483	0.008	1.002	1931600		1.38(0.00-0.00)		5510	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.491	4.491	0.0		11644790	56.9		114	11661	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.901	4.901	0.0	1.000	15730090	50.6		101	963	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.891	4.891	0.0		17803273	58.1		116	8521	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.241	5.241	0.0	1.000	17380937	51.4		103	1035	

Reagents:

LCPFC_FULL-L5_00008 Amount Added: 1.00 Units: mL

Report Date: 31-Oct-2017 10:41:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_039.d

Injection Date: 31-Oct-2017 04:43:23 Instrument ID: A8_N

Lims ID: CCV L5

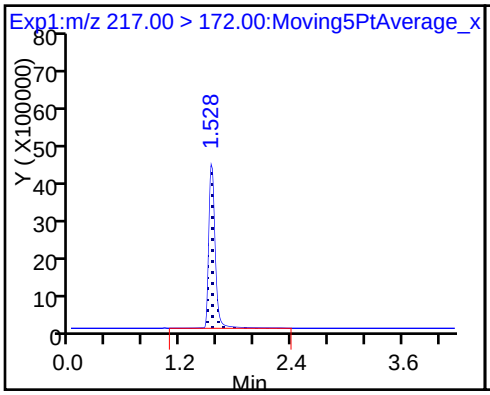
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 25

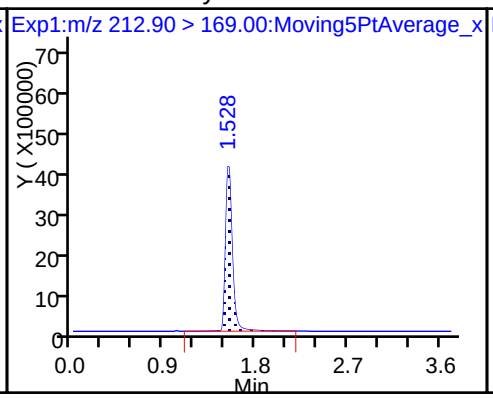
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

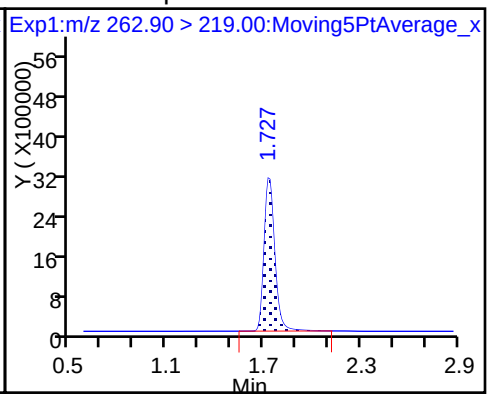
D 1 13C4 PFBA



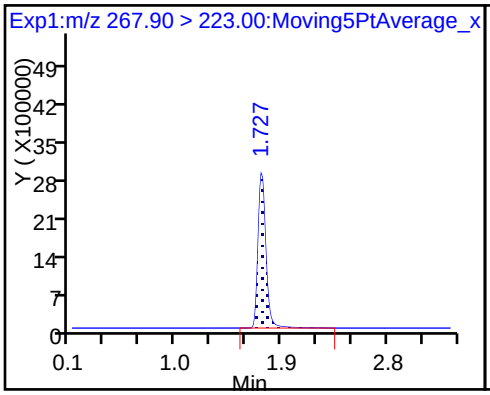
2 Perfluorobutyric acid



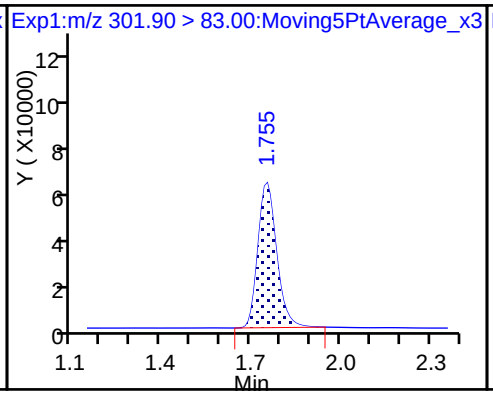
4 Perfluoropentanoic acid



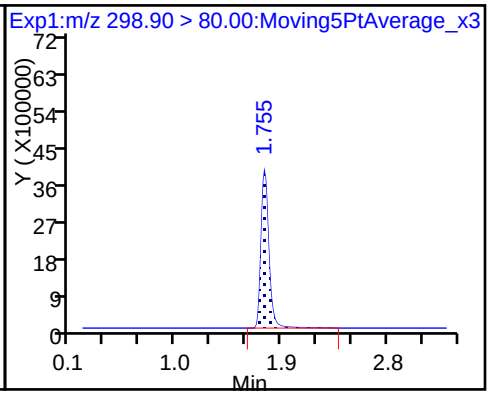
D 3 13C5-PFPeA



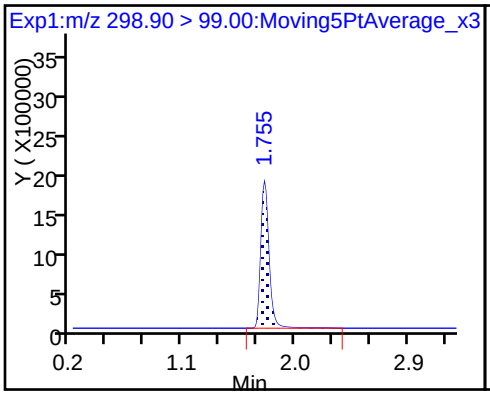
D 47 13C3-PFBS



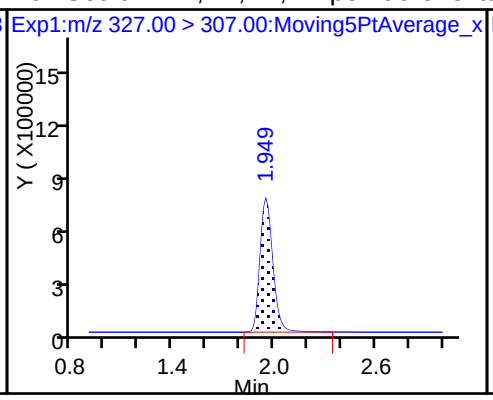
5 Perfluorobutanesulfonic acid



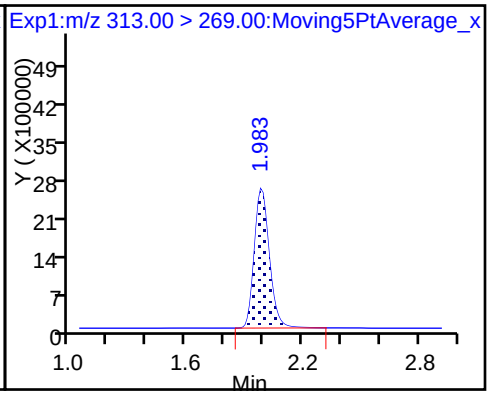
5 Perfluorobutanesulfonic acid



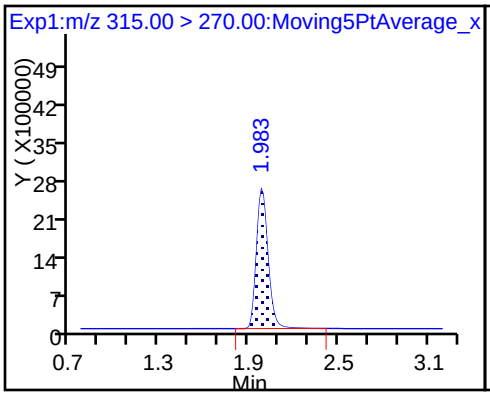
61 Sodium 1H,1H,2H,2H-perfluorohexane



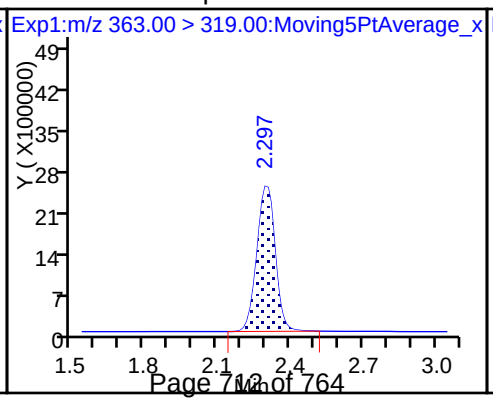
6 Perfluorohexanoic acid



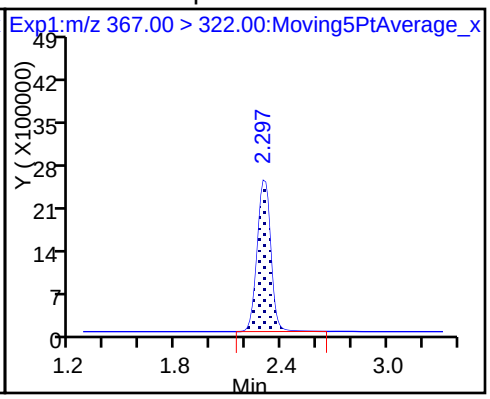
D 7 13C2 PFHxA



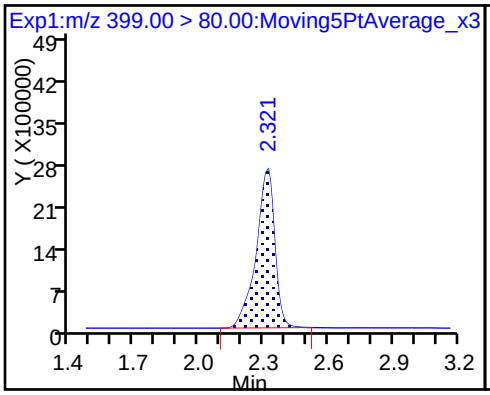
10 Perfluoroheptanoic acid



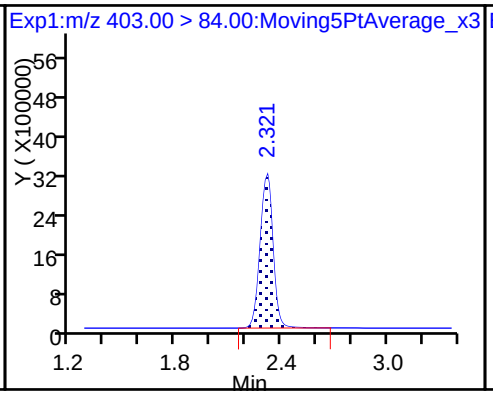
D 9 13C4-PFHpA



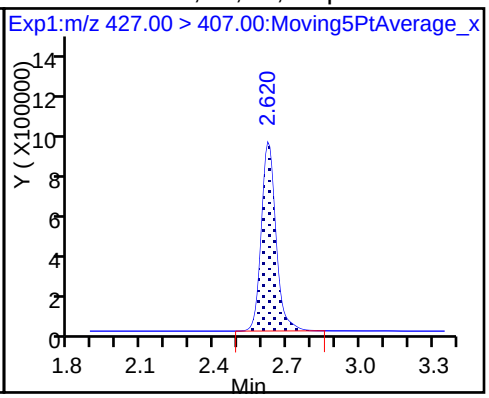
8 Perfluorohexanesulfonic acid



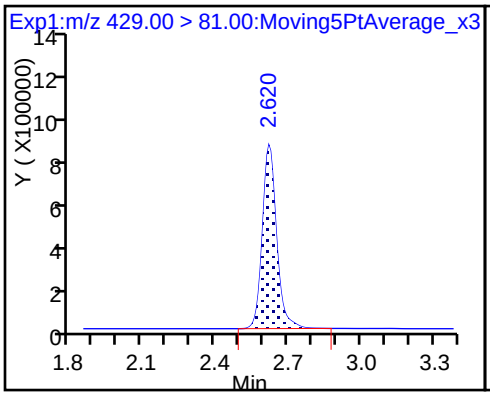
D 11 18O2 PFHxS



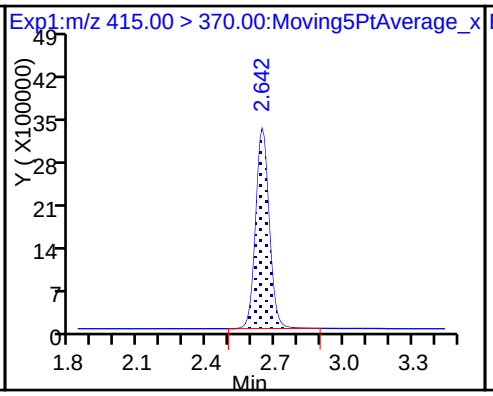
13 Sodium 1H,1H,2H,2H-perfluorooctane



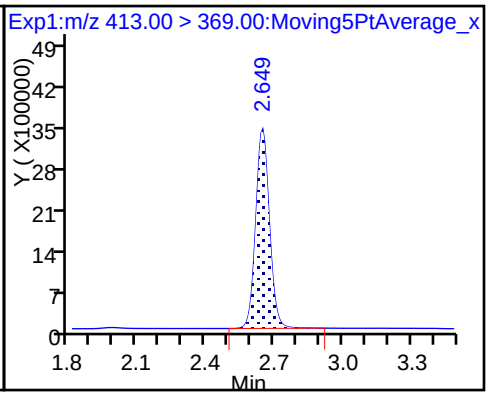
D 12 M2-6:2FTS



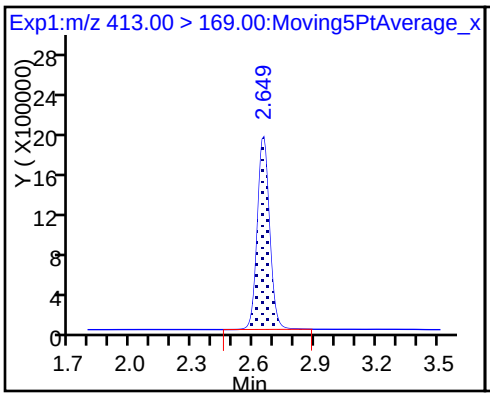
* 62 13C2-PFOA



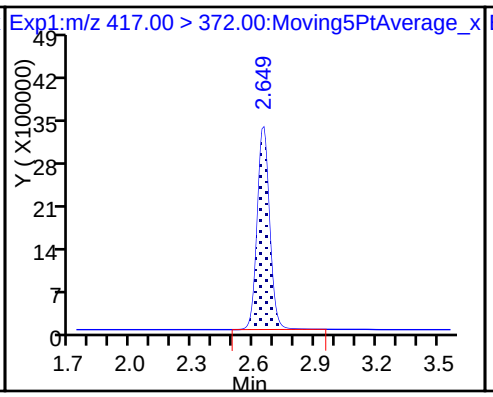
15 Perfluorooctanoic acid



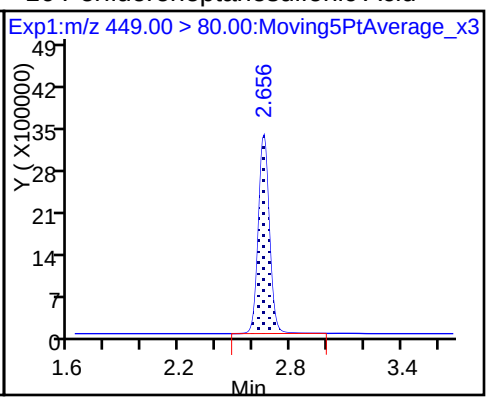
15 Perfluorooctanoic acid



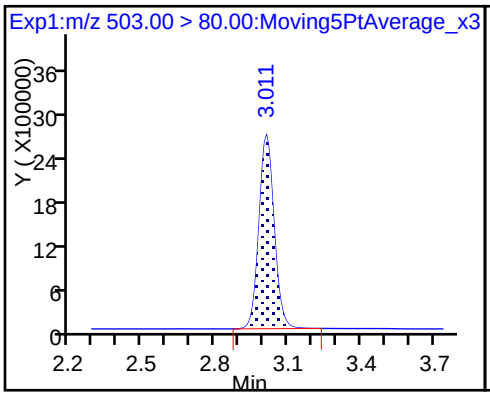
D 14 13C4 PFOA



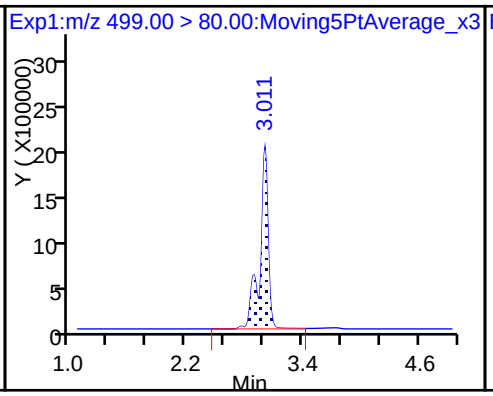
16 Perfluoroheptanesulfonic Acid



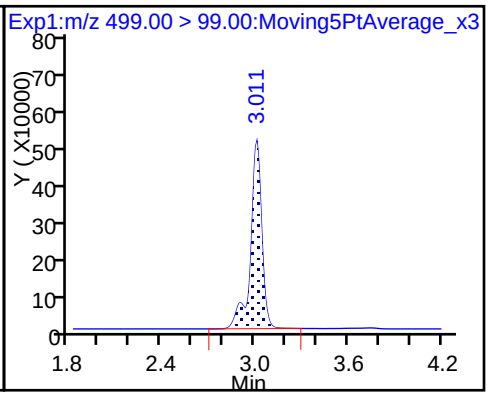
D 18 13C4 PFOS



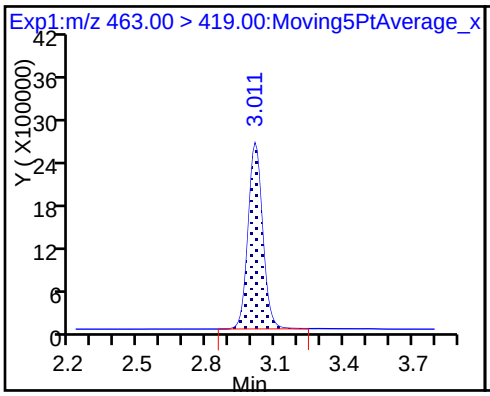
17 Perfluorooctane sulfonic acid



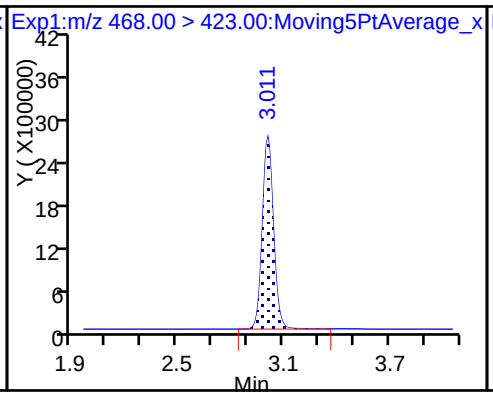
17 Perfluorooctane sulfonic acid



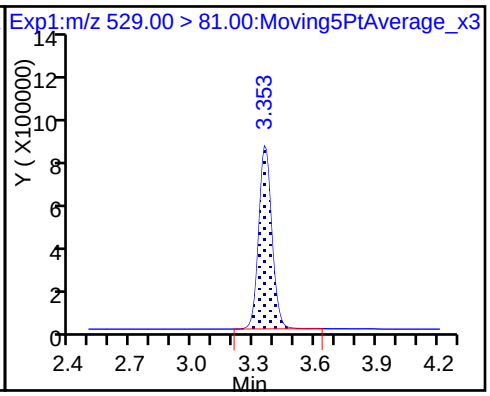
20 Perfluorononanoic acid



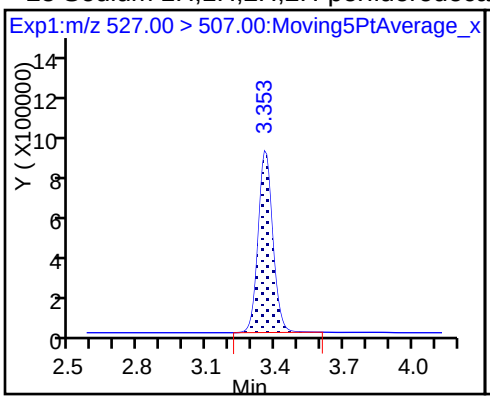
D 19 13C5 PFNA



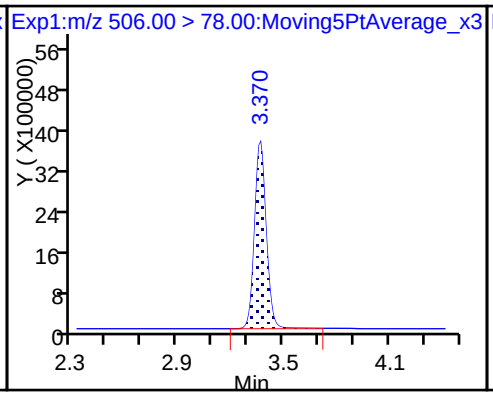
D 26 M2-8:2FTS



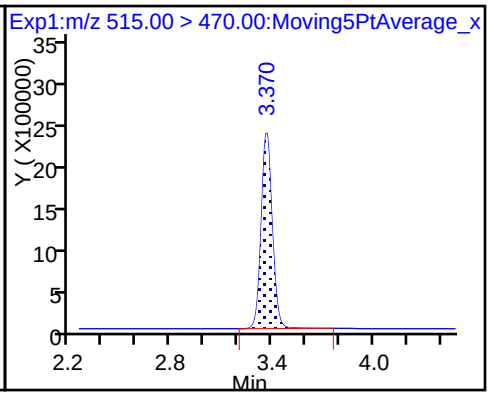
25 Sodium 1H,1H,2H,2H-perfluorodecane



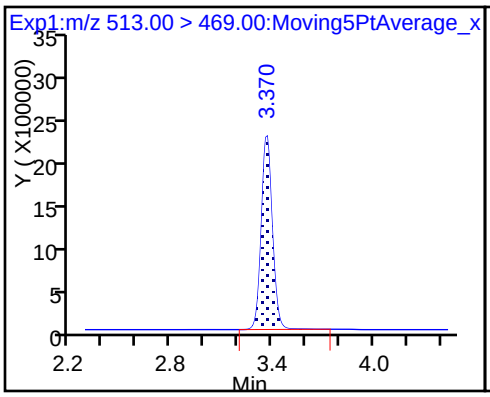
D 21 13C8 FOSA



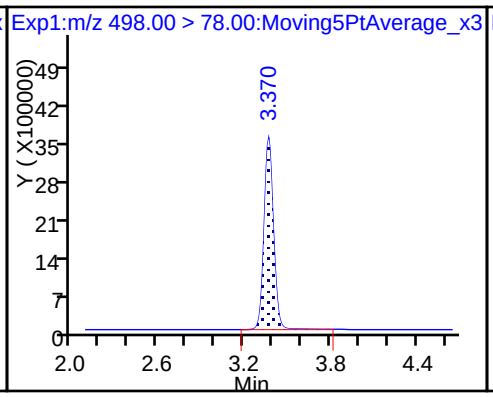
D 23 13C2 PFDA



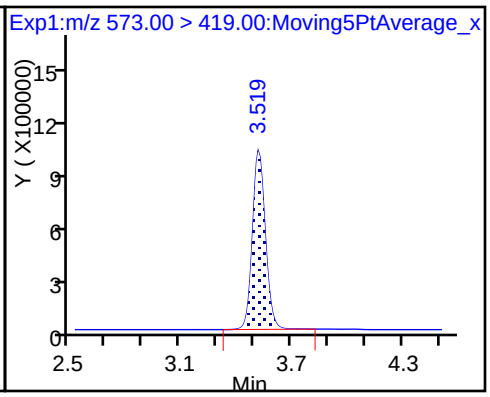
24 Perfluorodecanoic acid



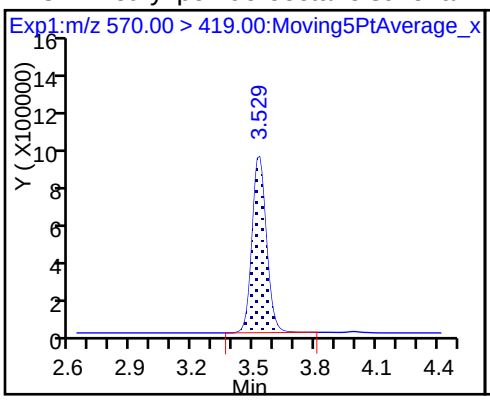
22 Perfluorooctane Sulfonamide



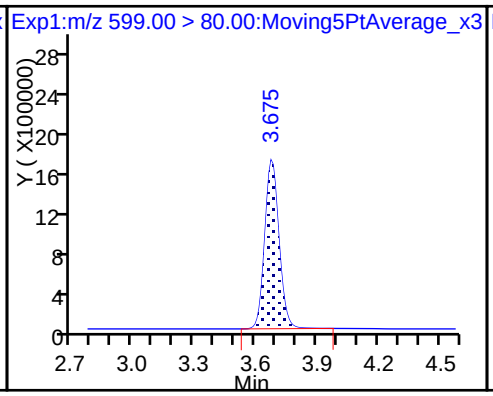
D 27 d3-NMeFOSAA



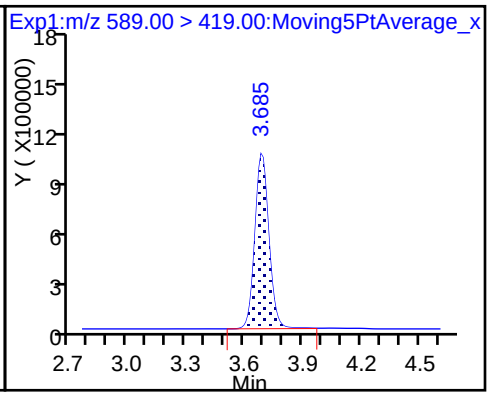
28 N-methyl perfluorooctane sulfonami



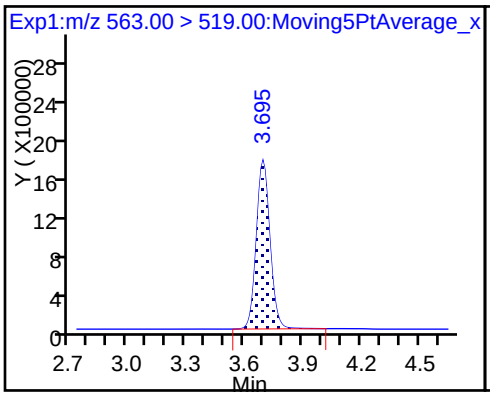
29 Perfluorodecane Sulfonic acid



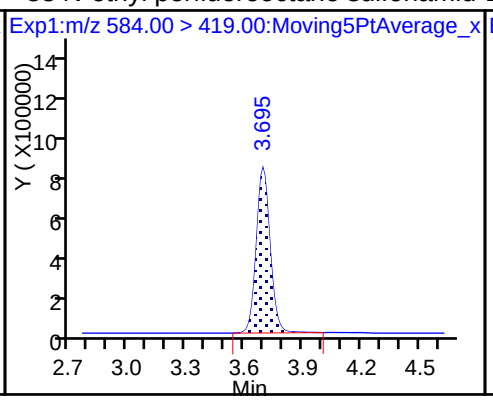
D 32 d5-NEtFOSAA



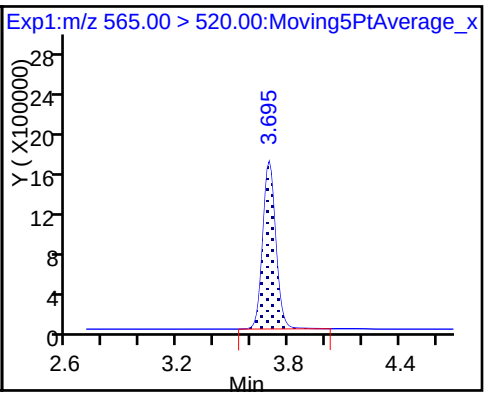
31 Perfluoroundecanoic acid



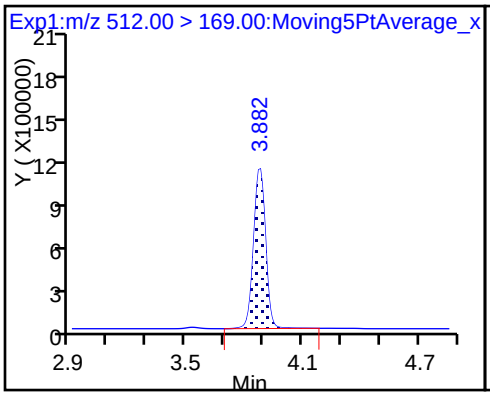
33 N-ethyl perfluorooctane sulfonamid



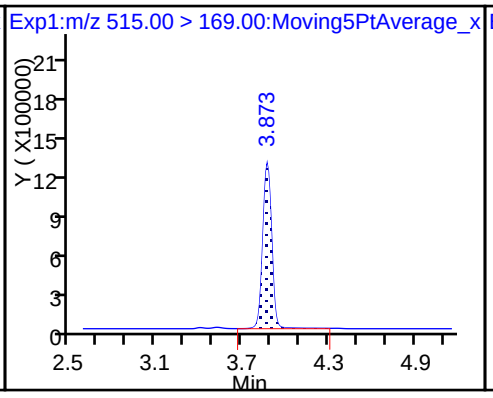
D 30 13C2 PFUnA



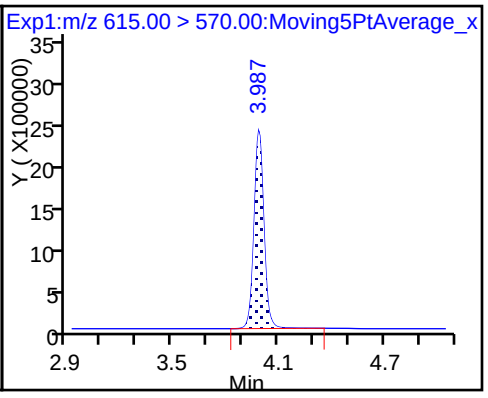
35 MeFOSA



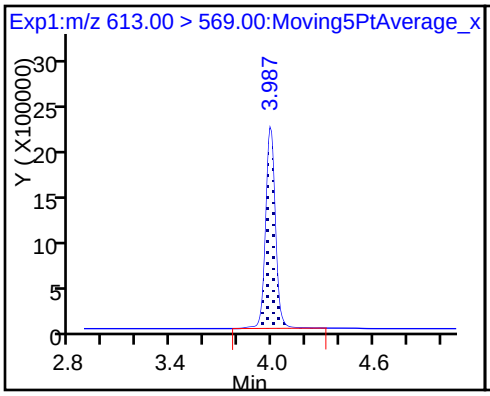
D 34 d-N-MeFOSA-M



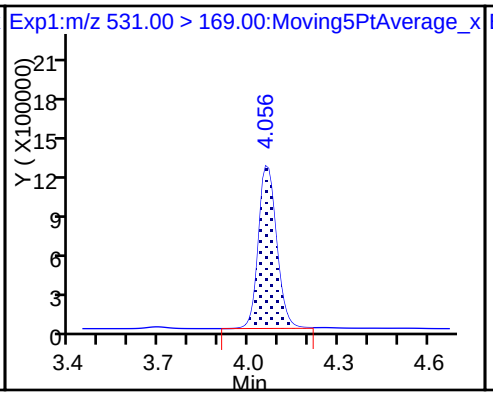
D 36 13C2 PFDoA



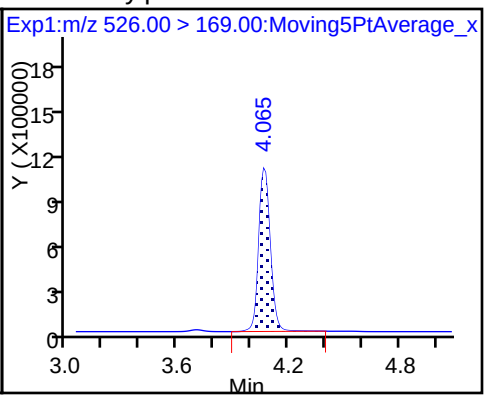
37 Perfluorododecanoic acid



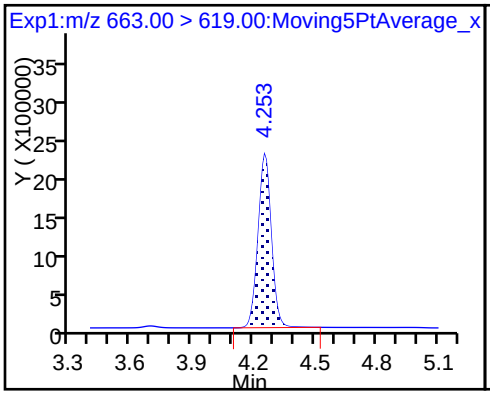
D 38 d-N-EtFOSA-M



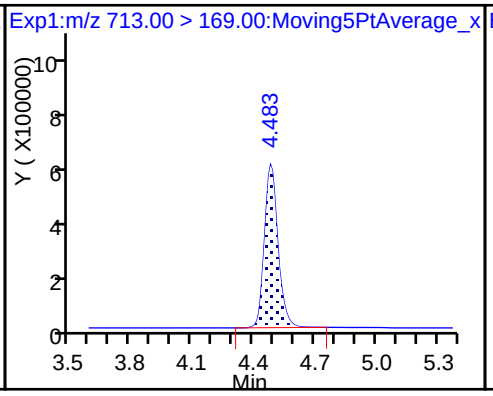
39 N-ethylperfluoro-1-octanesulfonami



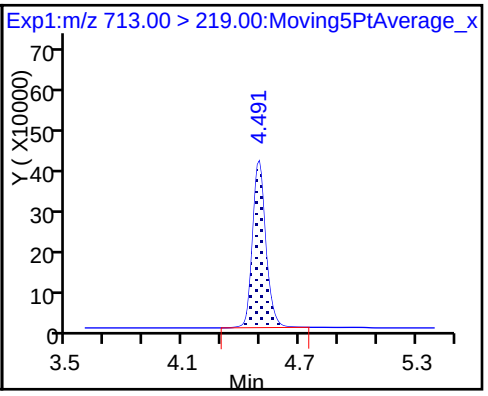
41 Perfluorotridecanoic acid



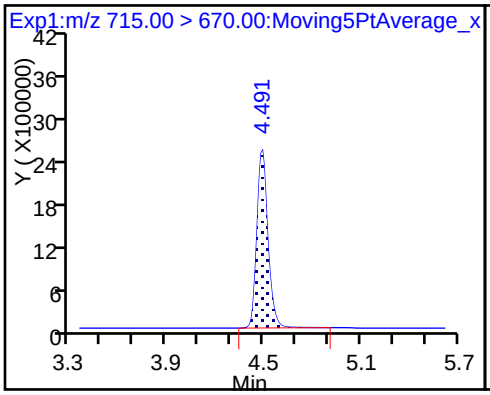
42 Perfluorotetradecanoic acid



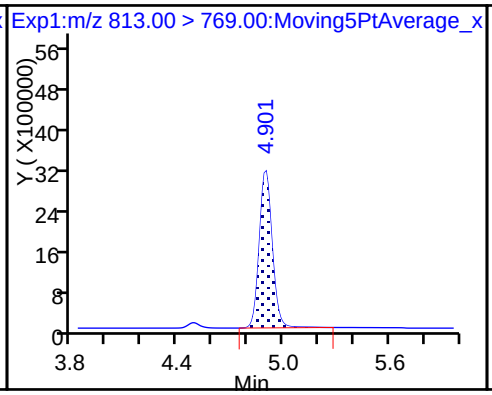
42 Perfluorotetradecanoic acid



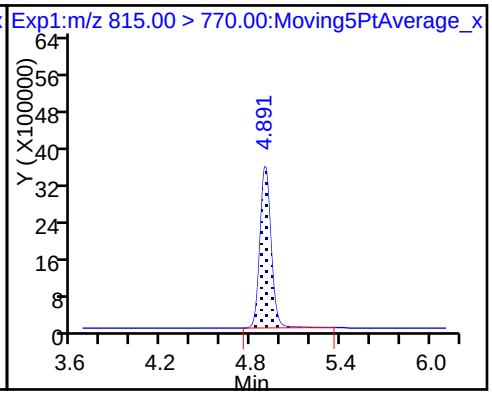
D 43 13C2-PFTeDA



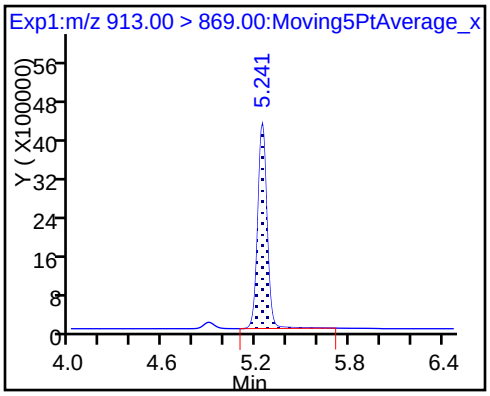
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-190551/1-A

Matrix: Water | Lab File ID: 2017.10.30AAA_017.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:11

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	1.0	U	2.5	1.0	0.46
2706-90-3	Perfluoropentanoic acid (PFPeA)	2.0	U	2.5	2.0	0.99
307-24-4	Perfluorohexanoic acid (PFHxA)	2.0	U	2.5	2.0	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U M	2.5	2.0	0.75
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	1.0	U	2.5	1.0	0.44
2058-94-8	Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	2.0	0.75
307-55-1	Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	2.0	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.627	J	2.5	1.0	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	2.0	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	2.0	0.64

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 320-190551/1-A

Matrix: Water Lab File ID: 2017.10.30AAA_017.d

Analysis Method: 537 (modified) Date Collected:

Extraction Method: 3535 Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) Date Analyzed: 10/31/2017 02:11

Con. Extract Vol.: 0.50(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	50		25-150
STL00992	13C4 PFBA	105		25-150
STL00993	13C2 PFHxA	104		25-150
STL00990	13C4 PFOA	105		25-150
STL00995	13C5 PFNA	102		25-150
STL00996	13C2 PFDA	112		25-150
STL00997	13C2 PFUnA	100		25-150
STL00998	13C2 PFDoA	93		25-150
STL00994	18O2 PFHxS	108		25-150
STL00991	13C4 PFOS	103		25-150
STL02116	13C2-PFTeDA	100		25-150
STL01892	13C4-PFHpA	114		25-150
STL01893	13C5 PFPeA	102		25-150
STL02337	13C3-PFBS	100		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_017.d
Lims ID: MB 320-190551/1-A
Client ID:
Sample Type: MB
Inject. Date: 31-Oct-2017 02:11:35 ALS Bottle#: 14 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-190551/1-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:39:33 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:39:33

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.529	0.008		18329891	52.3		105	44464	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	76541	0.2193			7.5	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.737	1.737	0.0	1.000	17077	0.0690			13.3	
D 3 13C5-PFPeA										
267.90 > 223.00	1.737	1.737	0.0		11518808	51.1		102	99705	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		234411	46.6		100	4880	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.984	0.011	1.000	13258	0.0550			13.6	
D 7 13C2 PFHxA										
315.00 > 270.00	1.995	1.984	0.011		12614862	52.1		104	33395	
D 9 13C4-PFHpA										
367.00 > 322.00	2.309	2.308	0.001		13905539	57.1		114	24410	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.318	2.318	0.0	1.000	49795	0.1479			386	
D 11 18O2 PFHxS										
403.00 > 84.00	2.318	2.318	0.0		15406692	51.2		108	20243	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.622	2.622	0.0	1.000	26451	0.2732			976	
D 12 M2-6:2FTS										
429.00 > 81.00	2.622	2.622	0.0		3418792	49.1		103	15108	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		13710459	50.0			16541	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.644	2.644	0.0	1.000	33442	0.1238			10.7	
413.00 > 169.00	2.644	2.644	0.0	1.000	18608		1.80(0.90-1.10)		40.1	M
D 14 13C4 PFOA										
417.00 > 372.00	2.651	2.644	0.007		12571924	52.7		105	24519	
D 18 13C4 PFOS										
503.00 > 80.00	3.014	3.014	0.0		10430446	49.2		103	13440	
20 Perfluorononanoic acid										
463.00 > 419.00	3.014	3.014	0.0	1.000	29476	0.1478			29.7	
D 19 13C5 PFNA										
468.00 > 423.00	3.014	3.014	0.0		10296214	51.0		102	12166	
D 26 M2-8:2FTS										
529.00 > 81.00	3.362	3.355	0.007		3812076	52.8		110	9119	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.362	3.364	-0.002	1.000	1919	0.0217			64.9	
D 21 13C8 FOSA										
506.00 > 78.00	3.370	3.372	-0.002		7780337	25.0		50.0	14542	
D 23 13C2 PFDA										
515.00 > 470.00	3.370	3.372	-0.002		10208636	55.9		112	13525	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.370	3.372	-0.002	1.000	10723	0.0559			29.0	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.370	3.372	-0.002	1.000	38524	0.2627			748	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.529	3.522	0.007		3807482	46.6		93.2	5973	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.529	3.532	-0.003	1.000	8688	0.1220			29.8	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.685	3.679	0.006	1.000	4089	0.0289			82.9	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.695	3.689	0.006		3945973	47.0		94.0	4028	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.695	3.698	-0.003	1.000	23686	0.1517			37.1	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.695	3.698	-0.003	1.000	14776	0.2218			209	
D 30 13C2 PFUnA										
565.00 > 520.00	3.695	3.698	-0.003		7318298	50.2		100	11514	
D 34 d-N-MeFOSA-M										
515.00 > 169.00	3.882	3.876	0.006		5320	0.0587		0.1	5.2	
D 36 13C2 PFDoA										
615.00 > 570.00	3.993	3.989	0.004		7786687	46.4		92.8	11148	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.993	3.995	-0.002	1.000	19537	0.1364			55.0	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.065	4.060	0.005		3855	0.0444		0.1	6.0	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.261	4.257	0.004	1.000	39844	0.2476			17.9	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.482	4.488	-0.006	1.000	14217	0.3137			626	
713.00 > 219.00	4.491	4.488	0.003	1.002	11129		1.28(0.00-0.00)		351	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.491	4.488	0.003		10193043	49.8		99.6	6080	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.899	4.897	0.002	1.000	181000	0.1965			23.1	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.899	4.897	0.002		14808414	48.3		96.7	4685	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.249	5.246	0.003	1.000	51364	0.1824			6.0	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_017.d

Injection Date: 31-Oct-2017 02:11:35 Instrument ID: A8_N

Lims ID: MB 320-190551/1-A

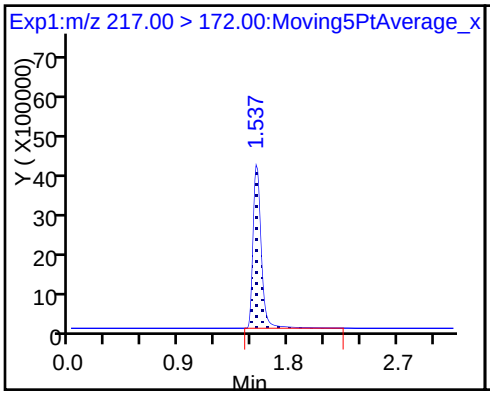
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 14 Worklist Smp#: 3

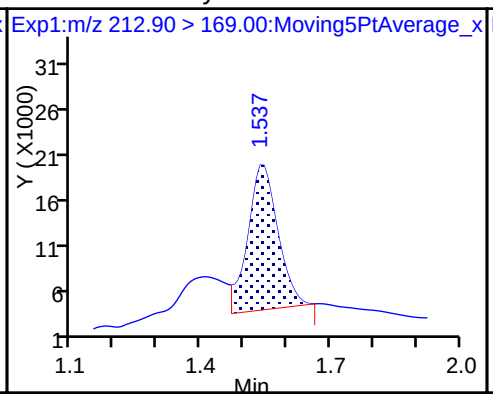
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

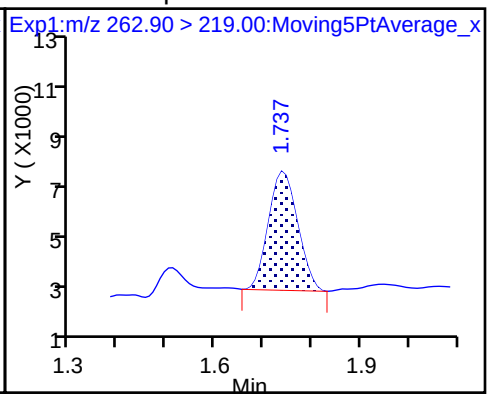
D 1 13C4 PFBA



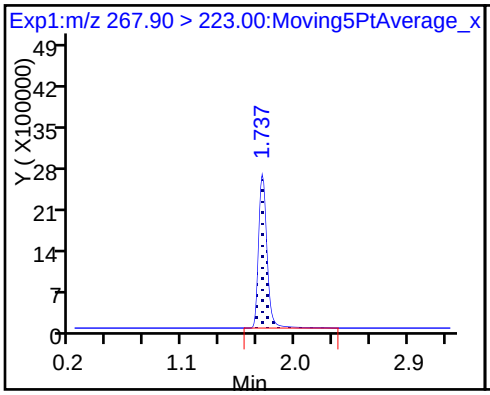
2 Perfluorobutyric acid



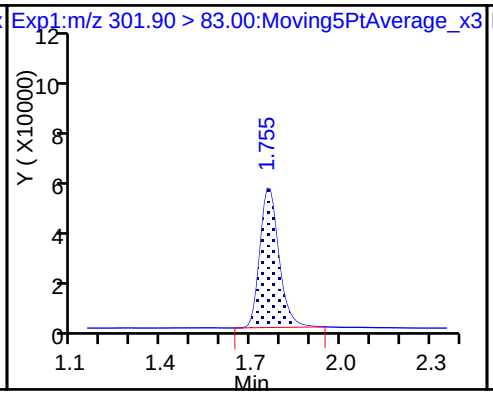
4 Perfluoropentanoic acid



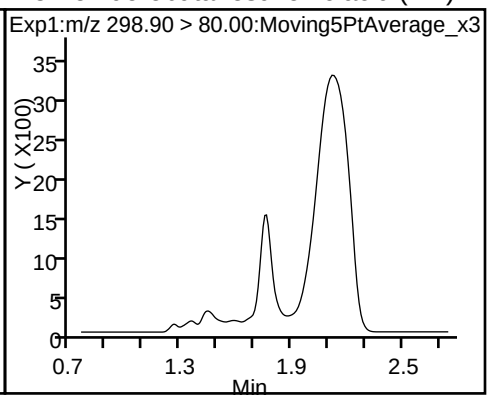
D 3 13C5-PFPeA



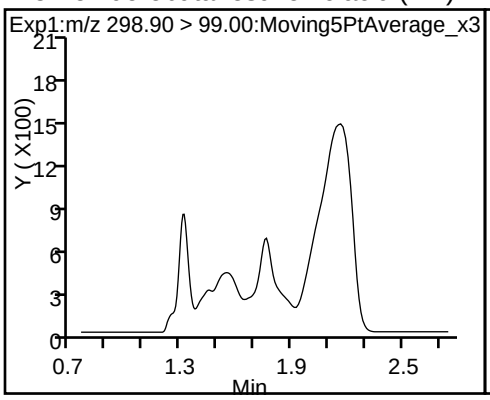
D 47 13C3-PFBS



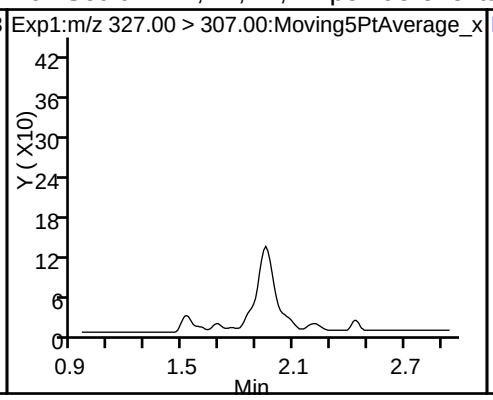
5 Perfluorobutanesulfonic acid (ND)



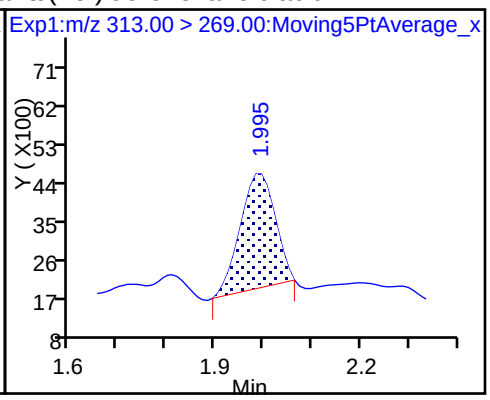
5 Perfluorobutanesulfonic acid (ND)



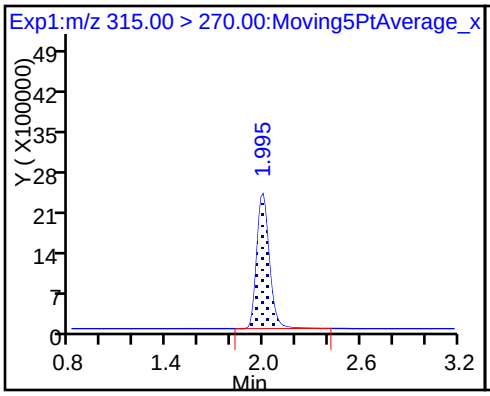
61 Sodium 1H,1H,2H,2H-perfluorohexane6(ND)



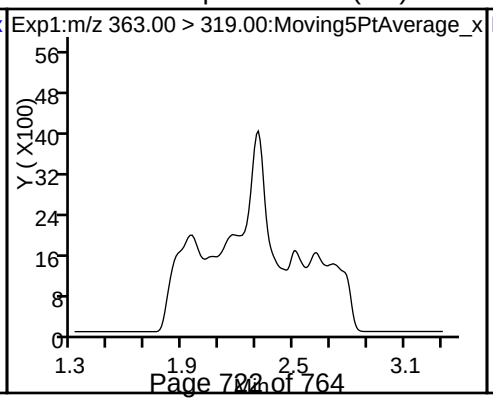
6 Perfluorohexanoic acid



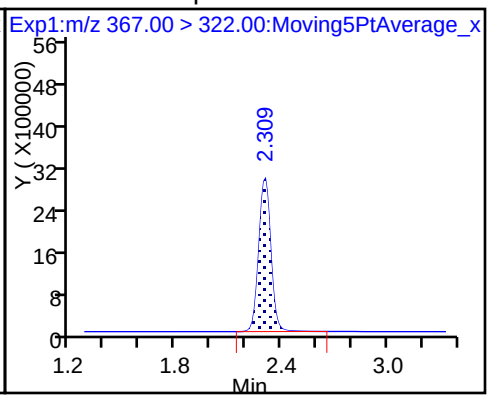
D 7 13C2 PFHxA



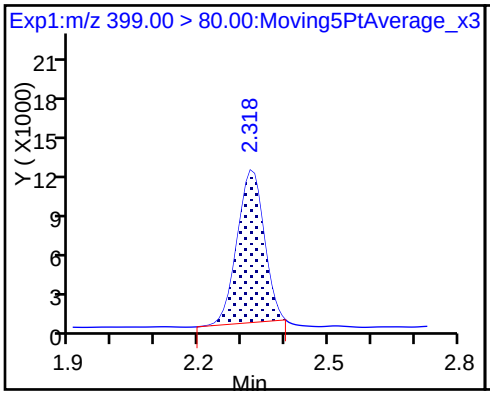
10 Perfluoroheptanoic acid (ND)



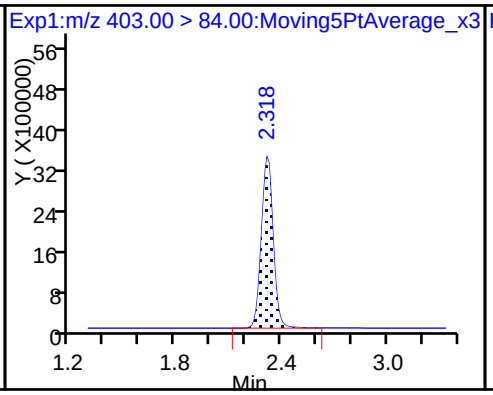
D 9 13C4-PFHpA



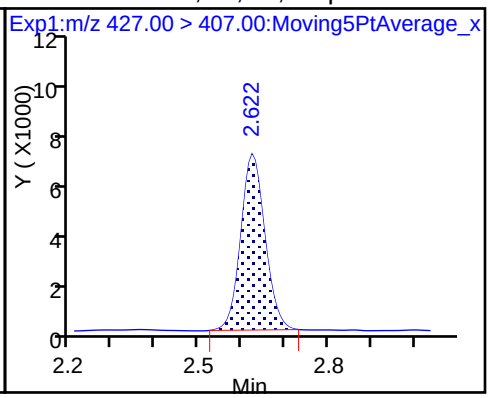
8 Perfluorohexanesulfonic acid



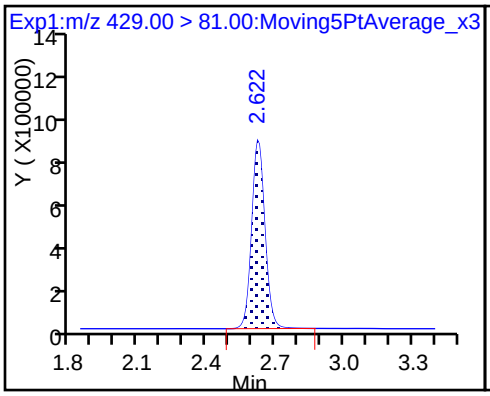
D 11 18O2 PFHxS



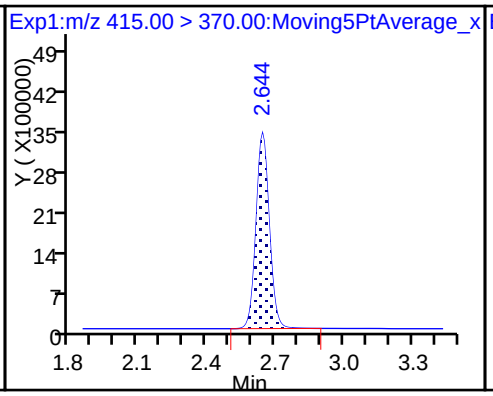
13 Sodium 1H,1H,2H,2H-perfluorooctane



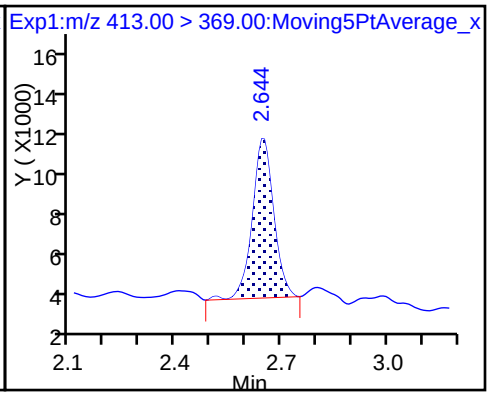
D 12 M2-6:2FTS



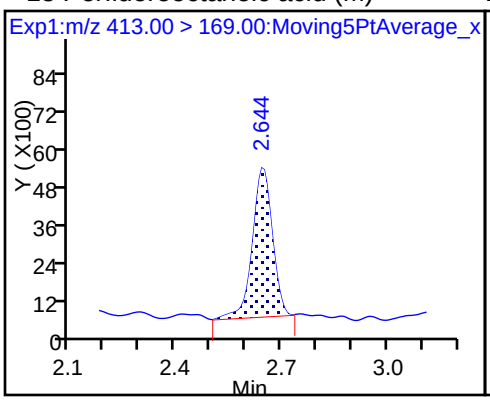
* 62 13C2-PFOA



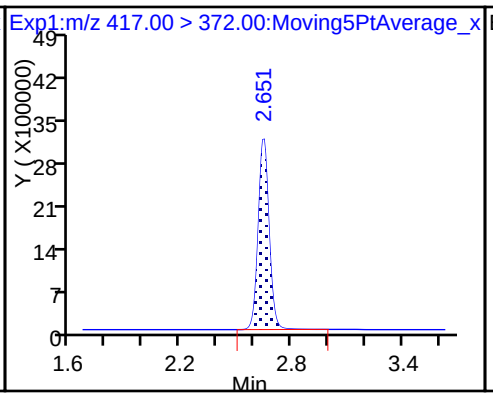
15 Perfluorooctanoic acid



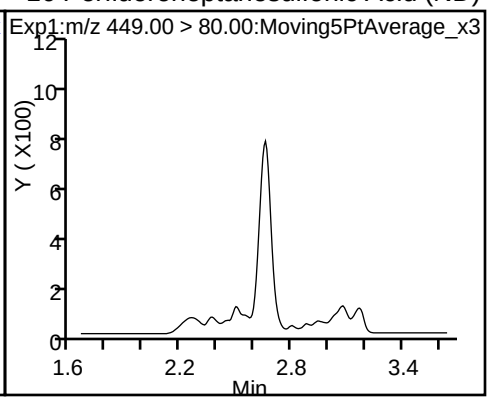
15 Perfluorooctanoic acid (M)



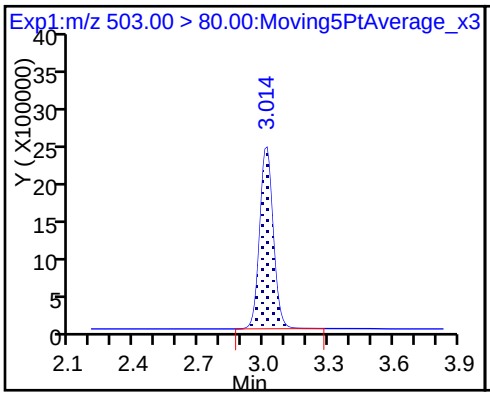
D 14 13C4 PFOA



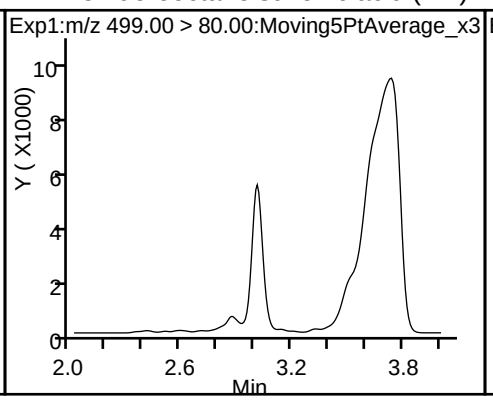
16 Perfluoroheptanesulfonic Acid (ND)



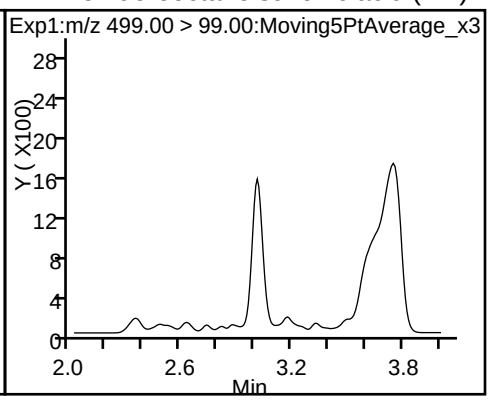
D 18 13C4 PFOS



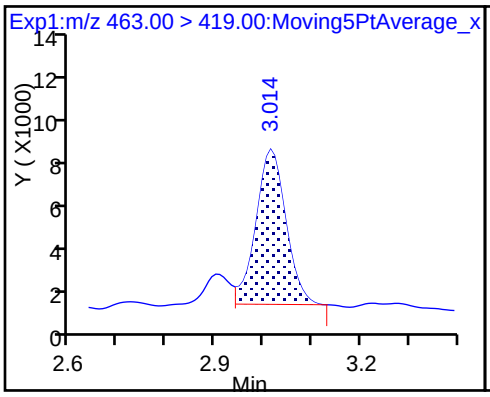
17 Perfluorooctane sulfonic acid (ND)



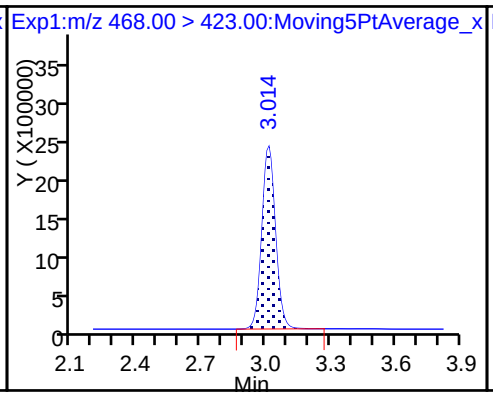
17 Perfluorooctane sulfonic acid (ND)



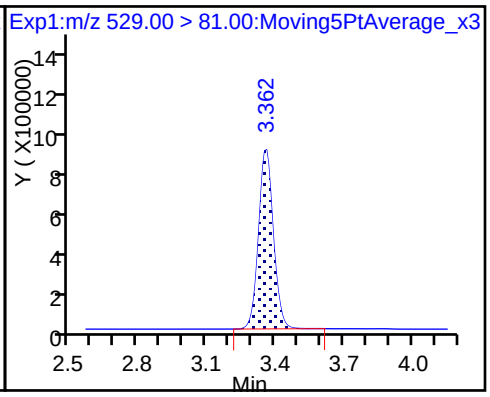
20 Perfluorononanoic acid



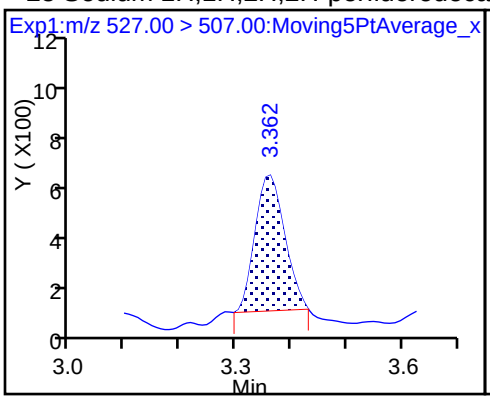
D 19 13C5 PFNA



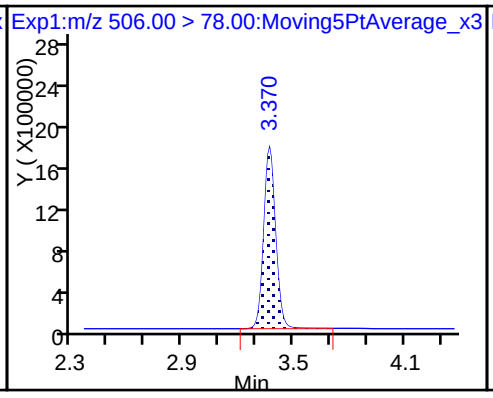
D 26 M2-8:2FTS



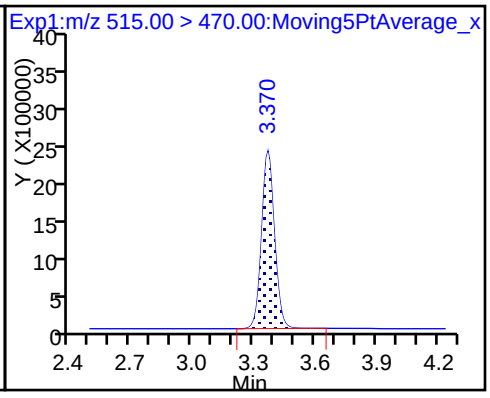
25 Sodium 1H,1H,2H,2H-perfluorodecane



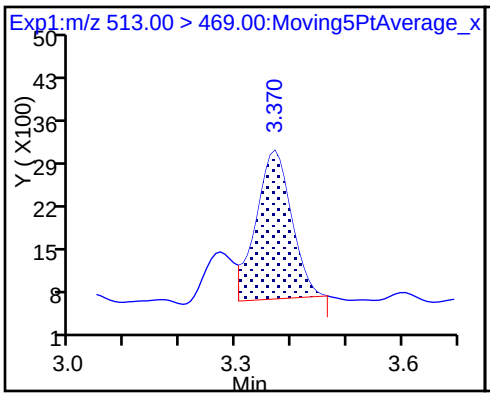
D 21 13C8 FOSA



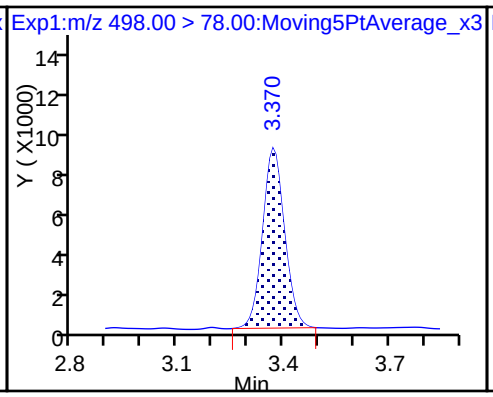
D 23 13C2 PFDA



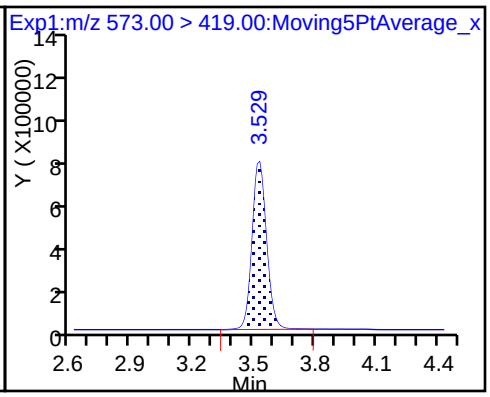
24 Perfluorodecanoic acid



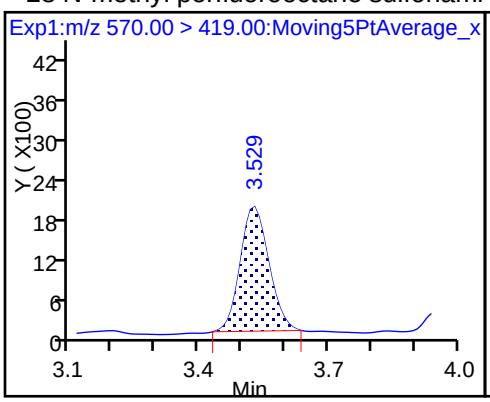
22 Perfluorooctane Sulfonamide



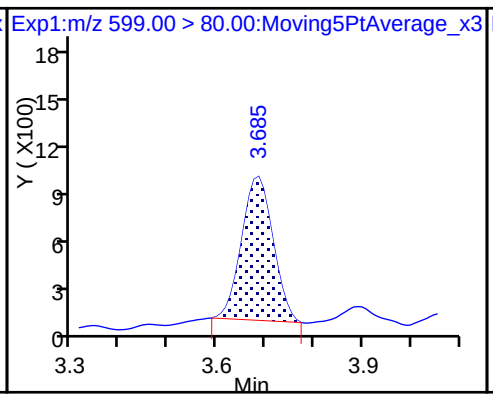
D 27 d3-NMeFOSAA



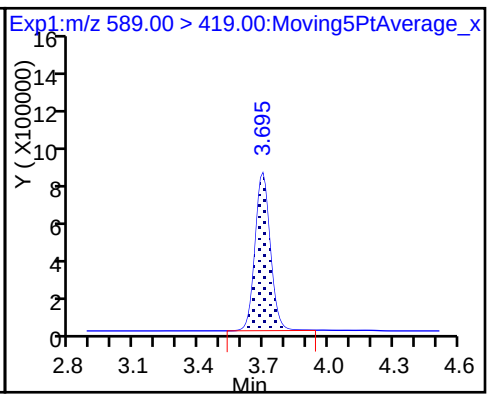
28 N-methyl perfluorooctane sulfonami



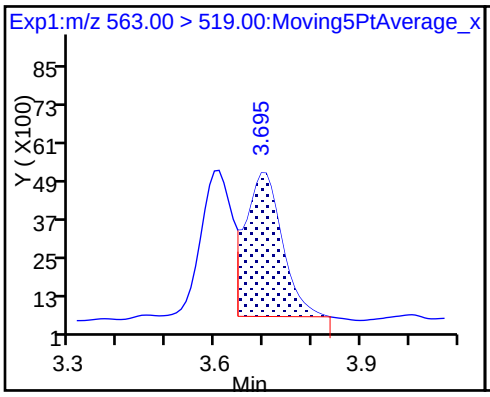
29 Perfluorodecane Sulfonic acid



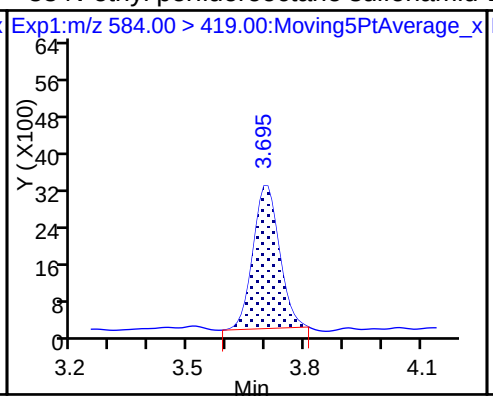
D 32 d5-NEtFOSAA



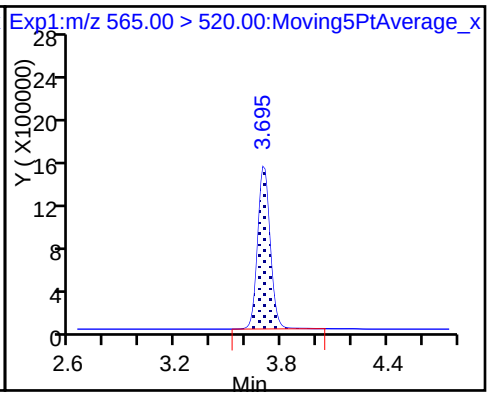
31 Perfluoroundecanoic acid



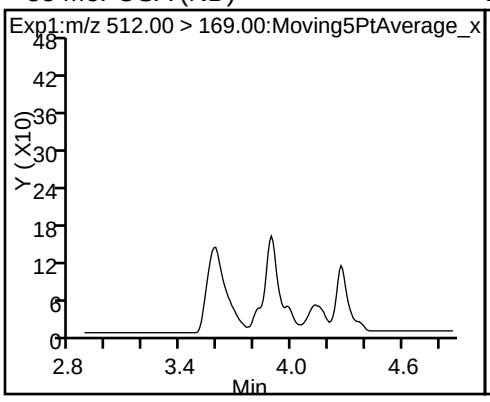
33 N-ethyl perfluorooctane sulfonamid



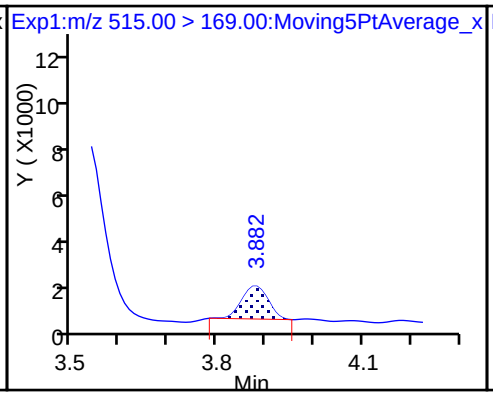
D 30 13C2 PFUnA



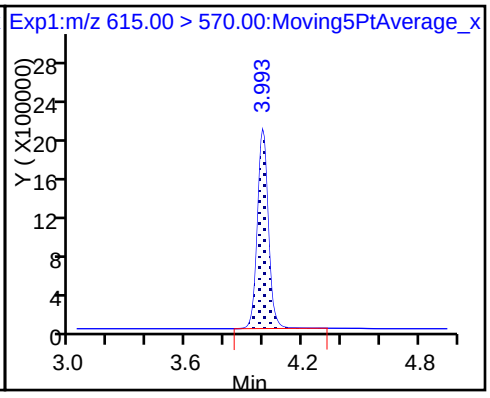
35 MeFOSA (ND)



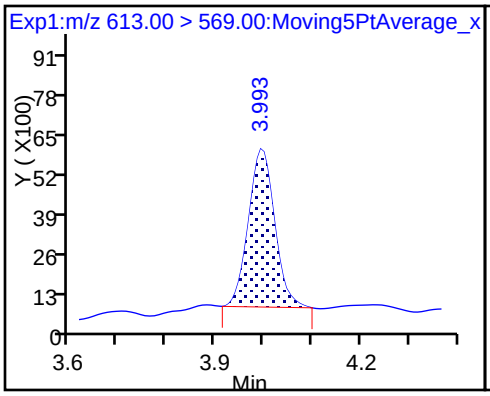
D 34 d-N-MeFOSA-M



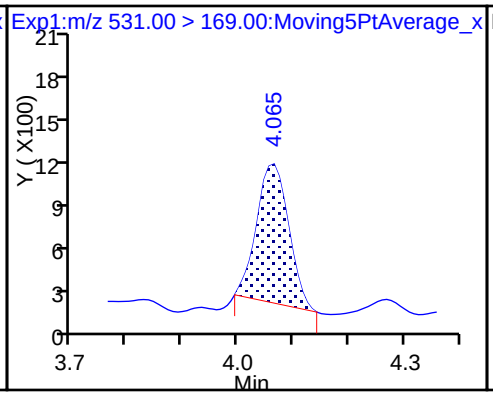
D 36 13C2 PFDoA



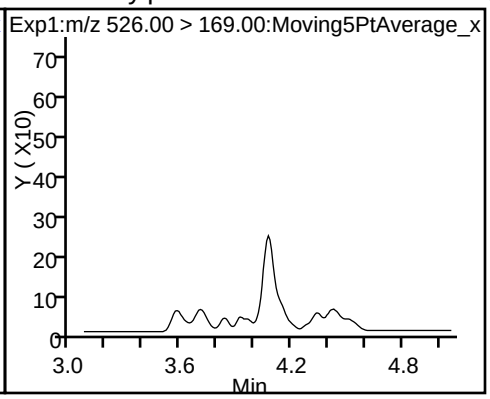
37 Perfluorododecanoic acid



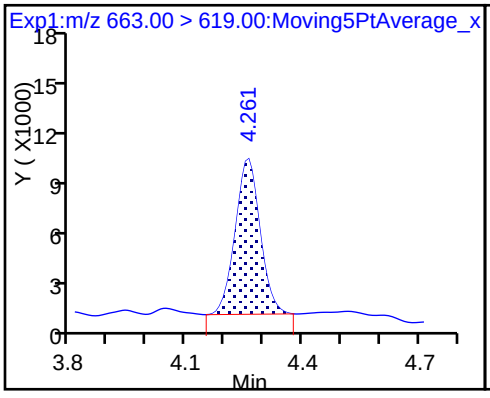
D 38 d-N-EtFOSA-M



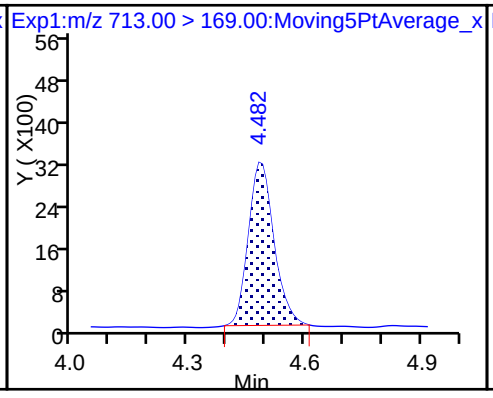
39 N-ethylperfluoro-1-octanesulfonami (ND)



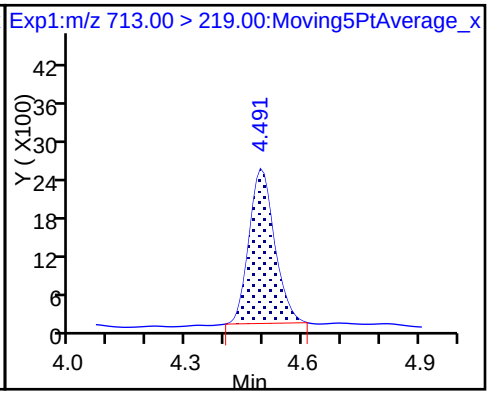
41 Perfluorotridecanoic acid



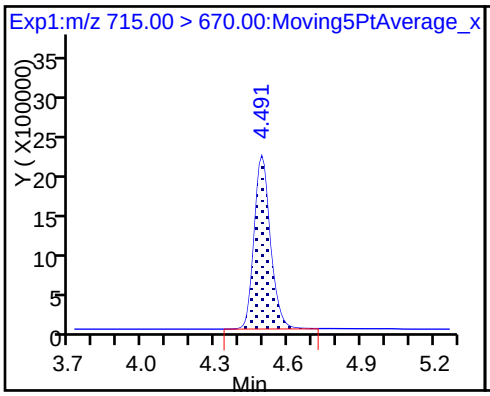
42 Perfluorotetradecanoic acid



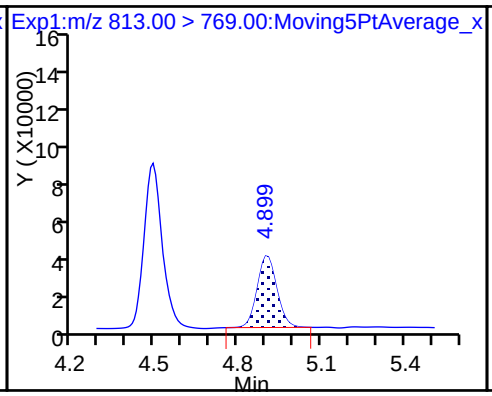
42 Perfluorotetradecanoic acid



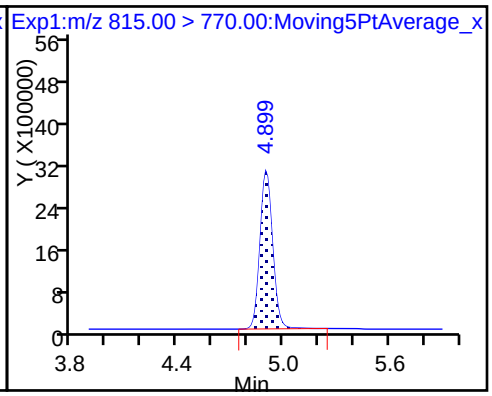
D 43 13C2-PFTeDA



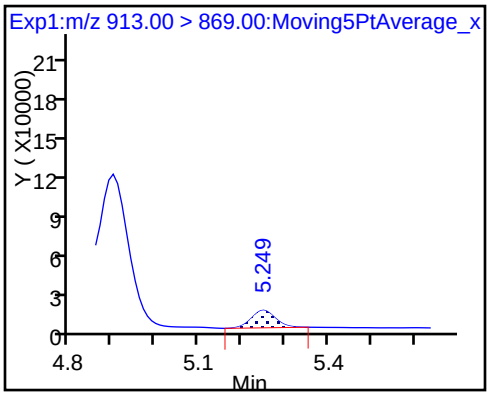
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

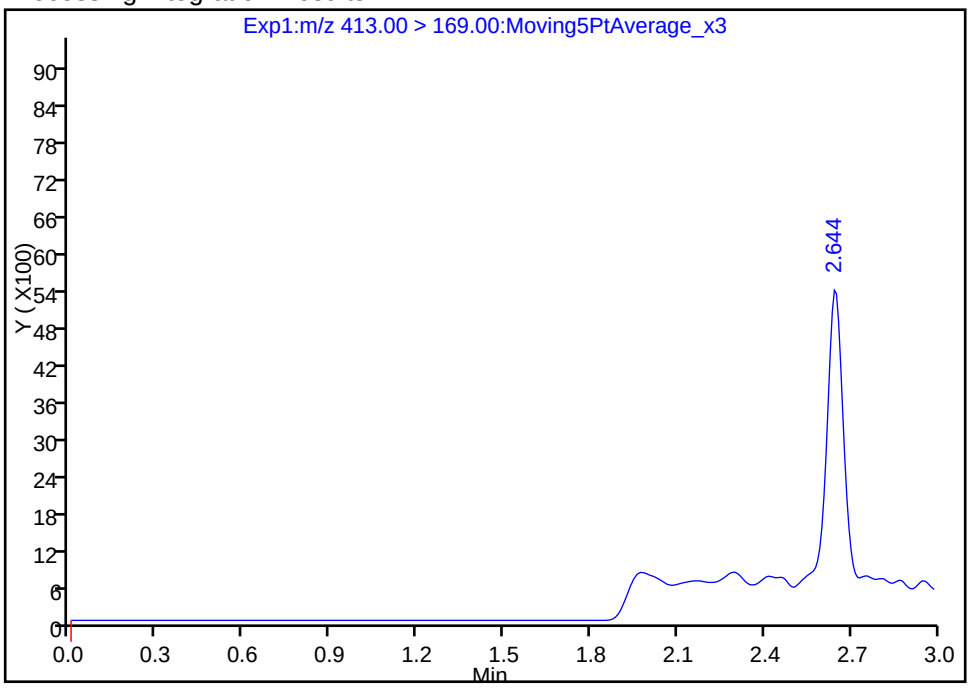
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_017.d				
Injection Date:	31-Oct-2017 02:11:35	Instrument ID:	A8_N		
Lims ID:	MB 320-190551/1-A				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	14	Worklist Smp#:	3
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

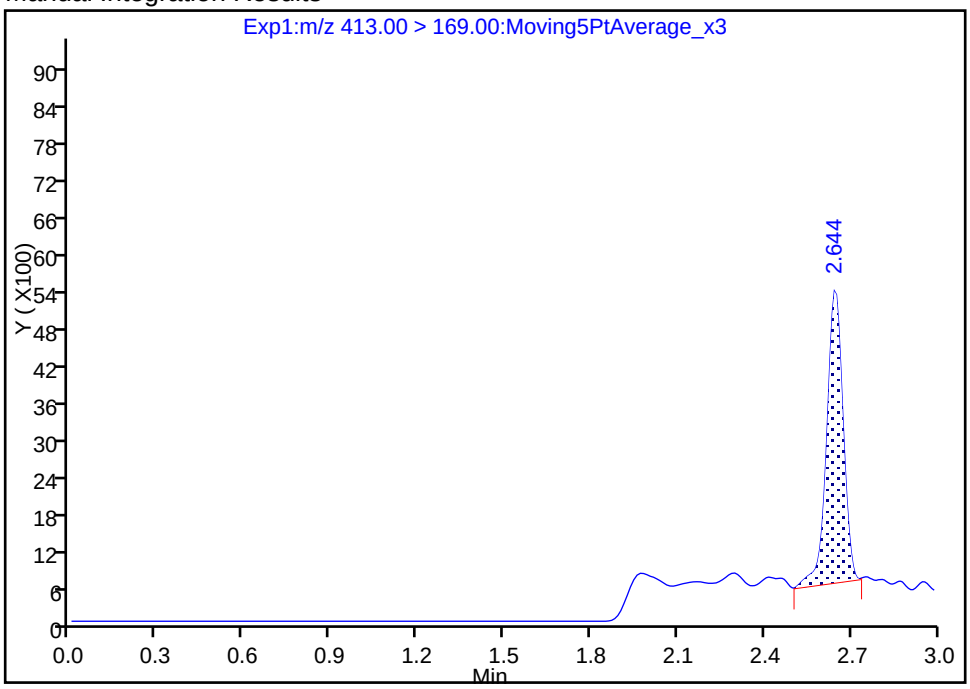
Processing Integration Results

RT: 2.64
Area: 0
Amount: 0.123810
Amount Units: ng/ml



Manual Integration Results

RT: 2.64
Area: 18608
Amount: 0.123810
Amount Units: ng/ml



Reviewer: phomsophat, 31-Oct-2017 09:38:53

Audit Action: Manually Integrated Audit Reason: Assign Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-190551/2-A

Matrix: Water | Lab File ID: 2017.10.30AAA_018.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:18

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	43.6		2.5	1.0	0.46
2706-90-3	Perfluoropentanoic acid (PFPeA)	41.1		2.5	2.0	0.99
307-24-4	Perfluorohexanoic acid (PFHxA)	40.7		2.5	2.0	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	41.6		2.5	2.0	0.80
335-67-1	Perfluorooctanoic acid (PFOA)	40.3		2.5	2.0	0.75
375-95-1	Perfluorononanoic acid (PFNA)	38.5		2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	40.8		2.5	1.0	0.44
2058-94-8	Perfluoroundecanoic acid (PFUnA)	38.8		2.5	2.0	0.75
307-55-1	Perfluorododecanoic acid (PFDoA)	41.8		2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	46.2		2.5	2.0	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	40.8		2.5	1.0	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	37.6		2.5	2.0	0.92
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	37.8		2.5	2.0	0.87
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	42.5		2.5	2.0	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	37.6		4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	38.0		4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	40.7		40	2.0	0.64

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-190551/2-A

Matrix: Water | Lab File ID: 2017.10.30AAA_018.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:18

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	48		25-150
STL00992	13C4 PFBA	111		25-150
STL00993	13C2 PFHxA	110		25-150
STL00990	13C4 PFOA	113		25-150
STL00995	13C5 PFNA	111		25-150
STL00996	13C2 PFDA	117		25-150
STL00997	13C2 PFUnA	105		25-150
STL00998	13C2 PFDoA	99		25-150
STL00994	18O2 PFHxS	112		25-150
STL00991	13C4 PFOS	109		25-150
STL02116	13C2-PFTeDA	107		25-150
STL01892	13C4-PFHpA	118		25-150
STL01893	13C5 PFPeA	109		25-150
STL02337	13C3-PFBS	110		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_018.d
Lims ID: LCS 320-190551/2-A
Client ID:
Sample Type: LCS
Inject. Date: 31-Oct-2017 02:18:29 ALS Bottle#: 15 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-190551/2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:39:33 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:40:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.528	1.529	-0.001		19417225	55.4		111	32704	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	8053668	21.8		109	1120	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.727	1.737	-0.010	1.000	5414142	20.5		103	4238	
D 3 13C5-PFPeA										
267.90 > 223.00	1.727	1.737	-0.010		12275519	54.4		109	83396	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		257109	51.1		110	5391	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	7530043	18.8		106	15228	
298.90 > 99.00	1.755	1.755	0.0	1.000	3280830		2.30(0.00-0.00)		9621	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	1786098	19.3		103	13272	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.983	1.984	-0.001	1.000	5172660	20.3		102	4741	
D 7 13C2 PFHxA										
315.00 > 270.00	1.983	1.984	-0.001		13303815	54.9		110	41323	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.296	2.308	-0.012	1.000	5779907	20.8		104	4879	
D 9 13C4-PFHpA										
367.00 > 322.00	2.296	2.308	-0.012		14354078	58.9		118	25301	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.317	2.318	-0.001	1.000	6602893	18.9		104	6119	
D 11 18O2 PFHxS										
403.00 > 84.00	2.317	2.318	-0.001		15965490	53.0		112	23651	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.614	2.622	-0.008	1.000	1924180	20.5		108	12881	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.614	2.622	-0.008		3625647	52.1		110	10641	
* 62 13C2-PFOA										
415.00 > 370.00	2.636	2.644	-0.008		14538085	50.0		100	25675	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.643	2.644	-0.001	1.000	5848221	20.1		101	1822	
413.00 > 169.00	2.643	2.644	-0.001	1.000	3143984		1.86(0.90-1.10)		4240	
D 14 13C4 PFOA										
417.00 > 372.00	2.643	2.644	-0.001		13509633	56.6		113	16410	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.650	2.651	-0.001	1.000	5770591	21.3		112	13604	
D 18 13C4 PFOS										
503.00 > 80.00	3.004	3.014	-0.010		11059269	52.2		109	12578	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.004	3.014	-0.010	1.000	4522329	18.8		101	1971	
499.00 > 99.00	3.004	3.014	-0.010	1.000	944528		4.79(0.90-1.10)		2364	
20 Perfluorononanoic acid										
463.00 > 419.00	3.004	3.014	-0.010	1.000	4165751	19.3		96.3	3920	
D 19 13C5 PFNA										
468.00 > 423.00	3.004	3.014	-0.010		11169940	55.4		111	13393	
D 26 M2-8:2FTS										
529.00 > 81.00	3.355	3.355	-0.001		4019595	55.6		116	6846	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.355	3.364	-0.010	1.000	1828062	19.6		102	6790	
D 21 13C8 FOSA										
506.00 > 78.00	3.363	3.372	-0.009		7509204	24.1		48.3	9251	
D 23 13C2 PFDA										
515.00 > 470.00	3.363	3.372	-0.009		10644219	58.3		117	11698	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.363	3.372	-0.009	1.000	4083167	20.4		102	6563	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.363	3.372	-0.009	1.000	2882373	20.4		102	7524	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.520	3.522	-0.002		4213247	51.6		103	6423	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.520	3.532	-0.012	1.000	1584313	20.1		100	2725	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.676	3.679	-0.003	1.000	2845696	19.0		98.5	7296	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.686	3.689	-0.003		4198178	50.0		100.0	3631	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.696	3.698	-0.002	1.000	3176637	19.4		96.9	3818	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.696	3.698	-0.002	1.003	1439957	20.3		102	3880	
D 30 13C2 PFUnA										
565.00 > 520.00	3.686	3.698	-0.012		7682295	52.7		105	9211	
D 36 13C2 PFDoA										
615.00 > 570.00	3.987	3.989	-0.002		8303554	49.5		98.9	15366	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
37 Perfluorododecanoic acid										
613.00 > 569.00	3.987	3.995	-0.008	1.000	3189048	20.9		104	4263	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.253	4.060	0.193		6021	0.0693		0.1	8.1	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.245	4.257	-0.012	1.000	3963238	23.1		115	1434	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.476	4.488	-0.012	1.000	993501	20.4		102	6015	
713.00 > 219.00	4.484	4.488	-0.004	1.002	764542		1.30(0.00-0.00)		4959	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.484	4.488	-0.004		10948836	53.5		107	6788	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.889	4.897	-0.008	1.000	5793131	20.7		104	519	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.889	4.897	-0.008		15798297	51.6		103	4879	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.237	5.246	-0.009	1.000	6121888	20.4		102	518	

Report Date: 31-Oct-2017 09:40:26 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_018.d

Injection Date: 31-Oct-2017 02:18:29 Instrument ID: A8_N

Lims ID: LCS 320-190551/2-A

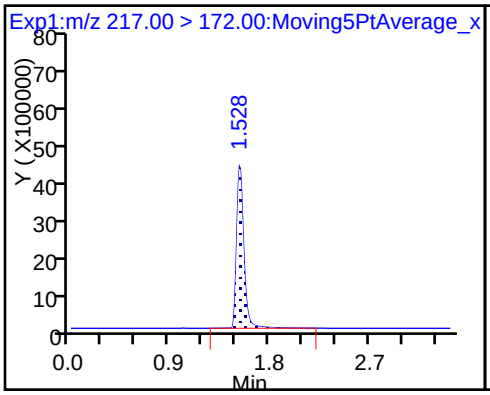
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 15 Worklist Smp#: 4

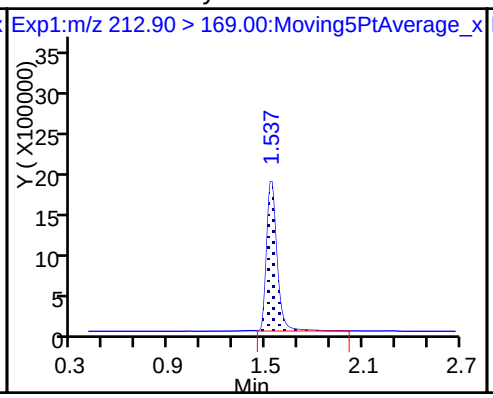
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

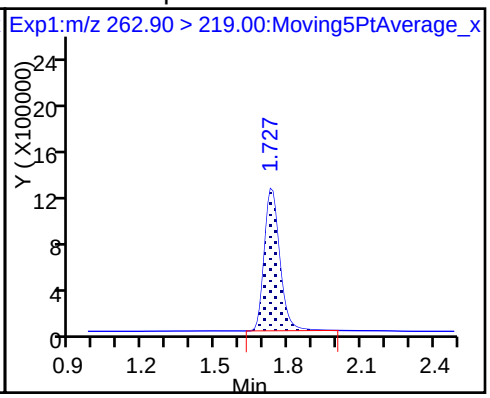
D 1 13C4 PFBA



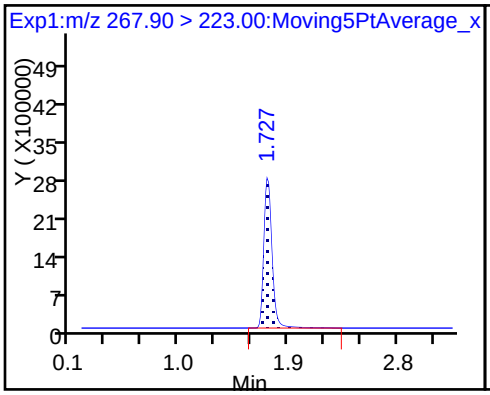
2 Perfluorobutyric acid



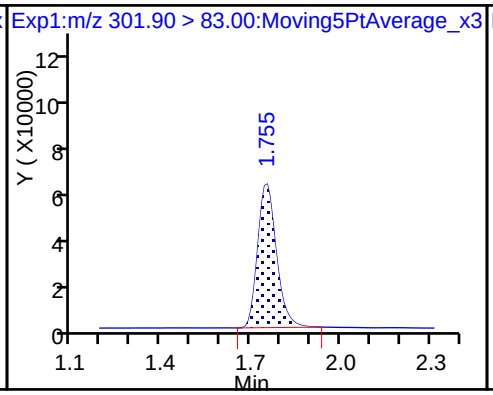
4 Perfluoropentanoic acid



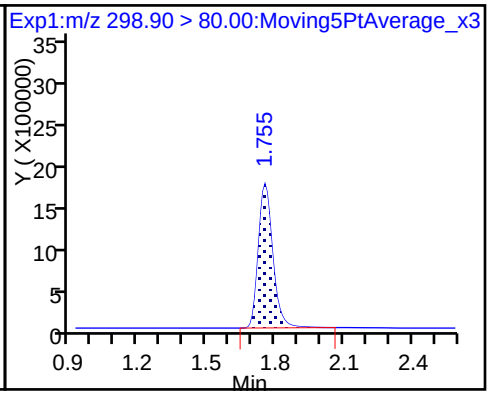
D 3 13C5-PFPeA



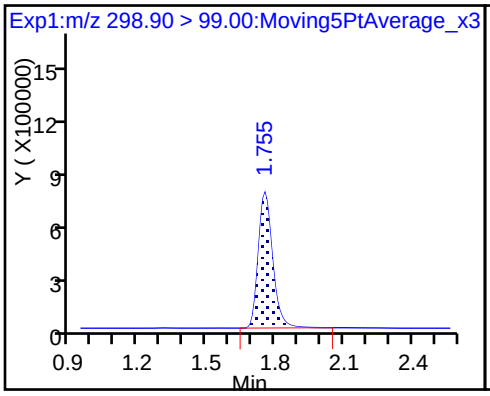
D 47 13C3-PFBS



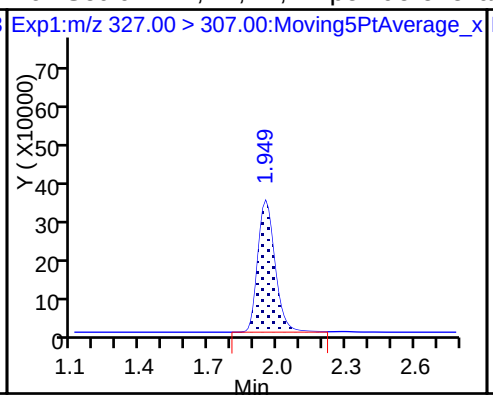
5 Perfluorobutanesulfonic acid



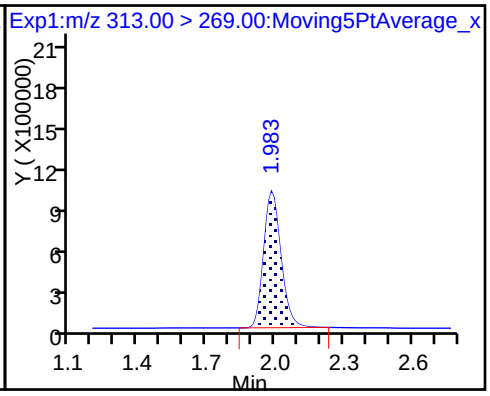
5 Perfluorobutanesulfonic acid



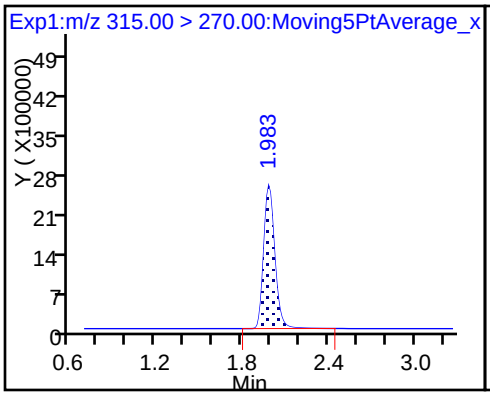
61 Sodium 1H,1H,2H,2H-perfluorohexane



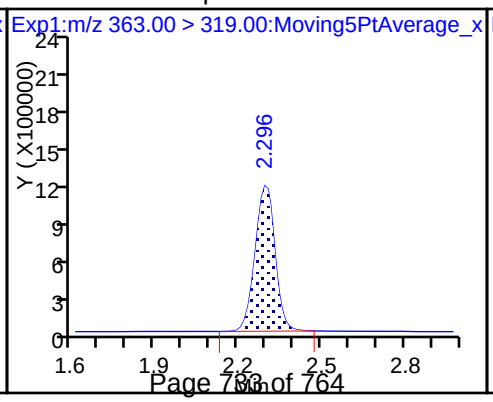
6 Perfluorohexanoic acid



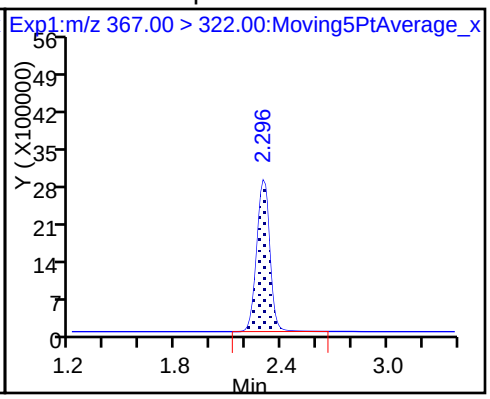
D 7 13C2 PFHxA



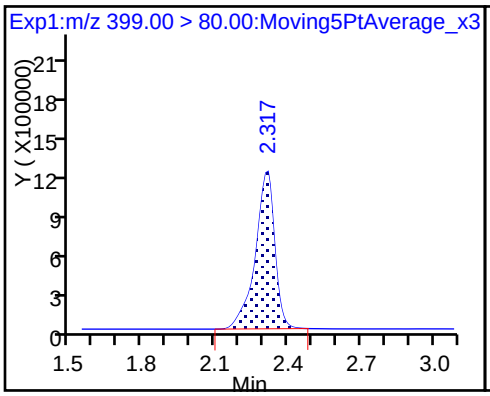
10 Perfluoroheptanoic acid



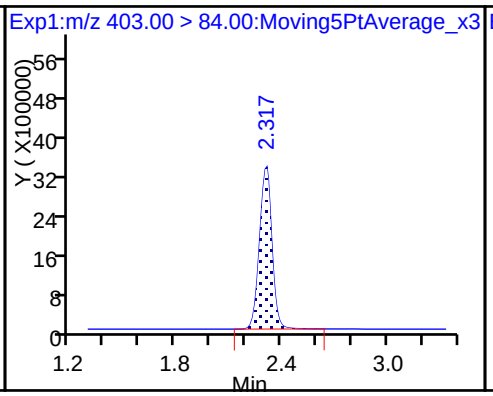
D 9 13C4-PFHpA



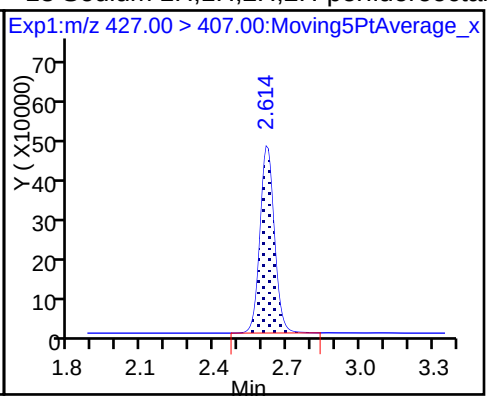
8 Perfluorohexanesulfonic acid



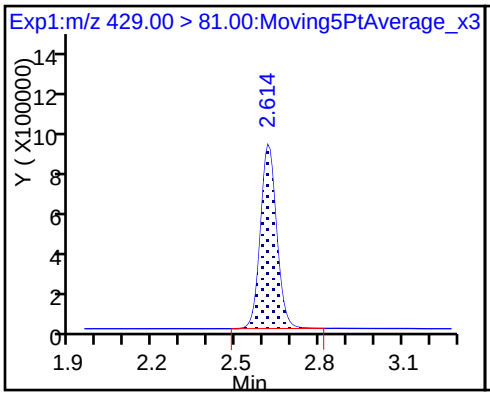
D 11 18O2 PFHxS



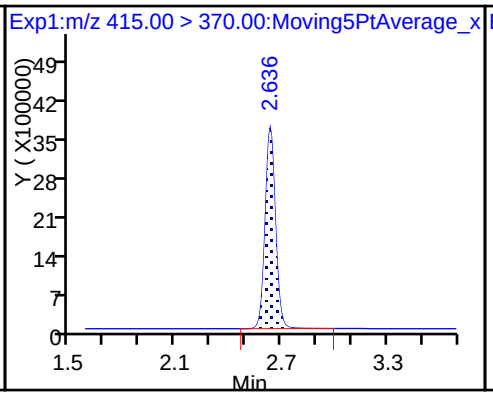
13 Sodium 1H,1H,2H,2H-perfluorooctane



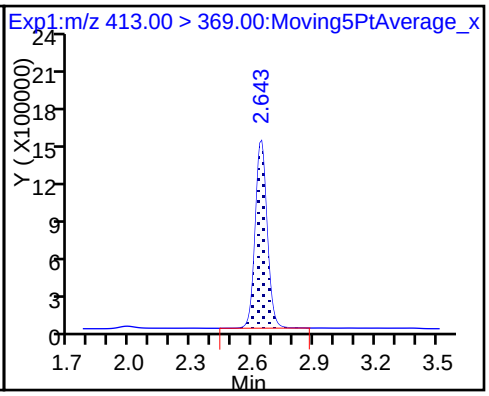
D 12 M2-6:2FTS



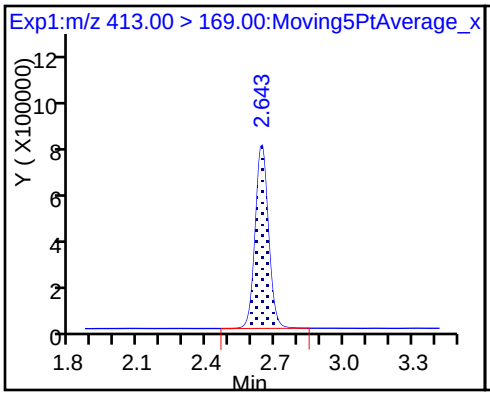
* 62 13C2-PFOA



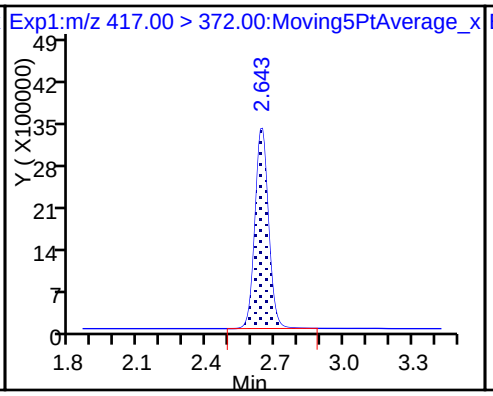
15 Perfluorooctanoic acid



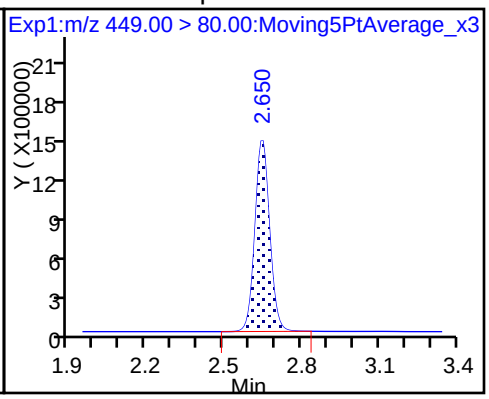
15 Perfluorooctanoic acid



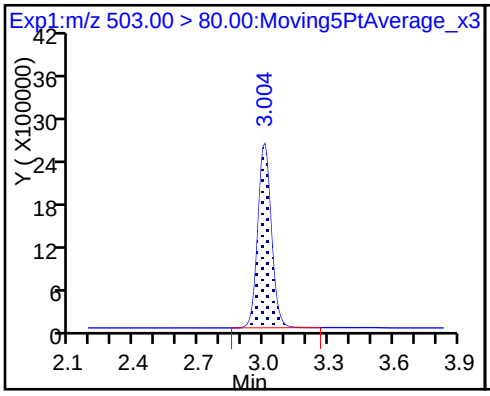
D 14 13C4 PFOA



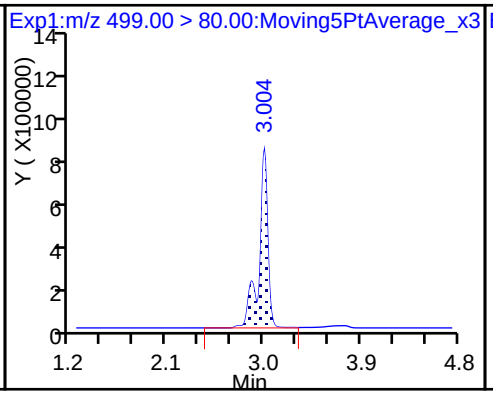
16 Perfluoroheptanesulfonic Acid



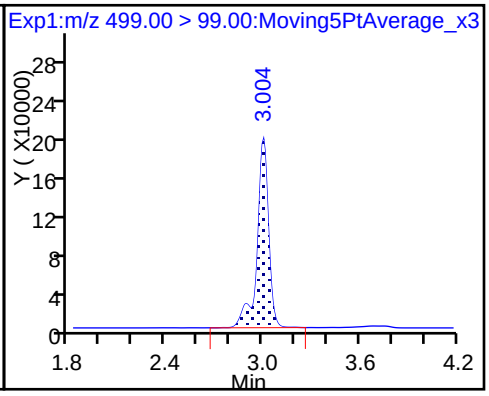
D 18 13C4 PFOS



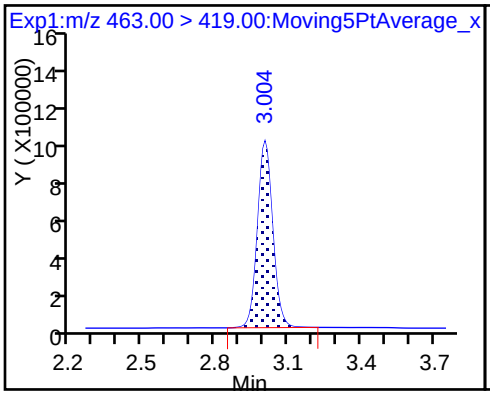
17 Perfluorooctane sulfonic acid



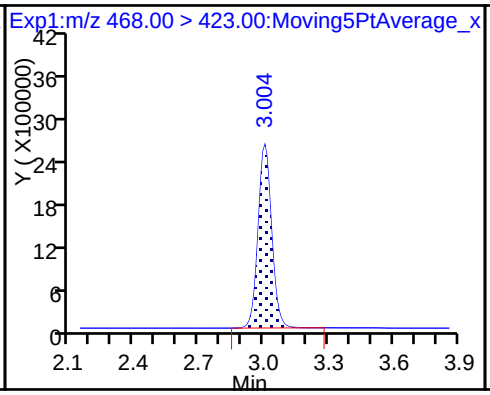
17 Perfluorooctane sulfonic acid



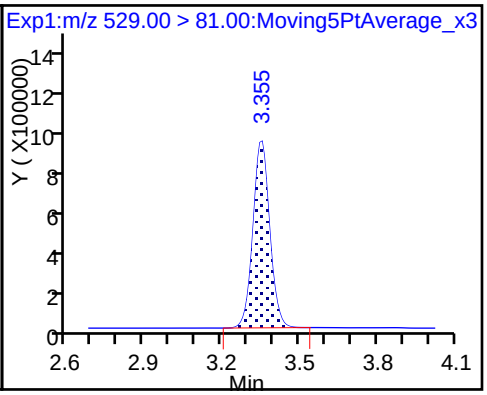
20 Perfluorononanoic acid



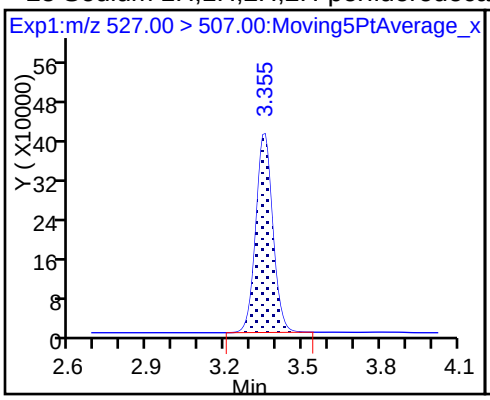
D 19 13C5 PFNA



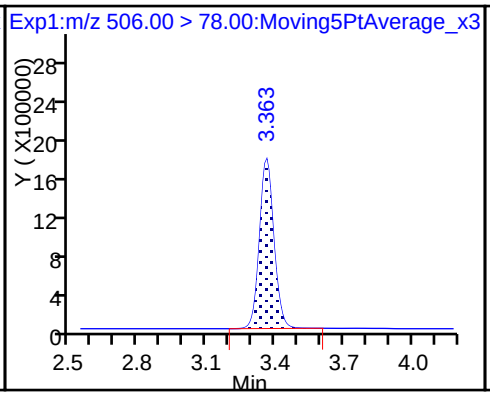
D 26 M2-8:2FTS



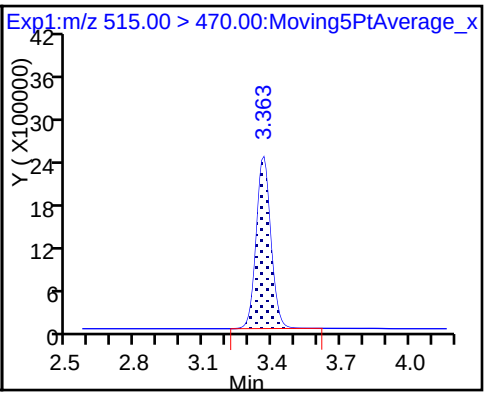
25 Sodium 1H,1H,2H,2H-perfluorodecane



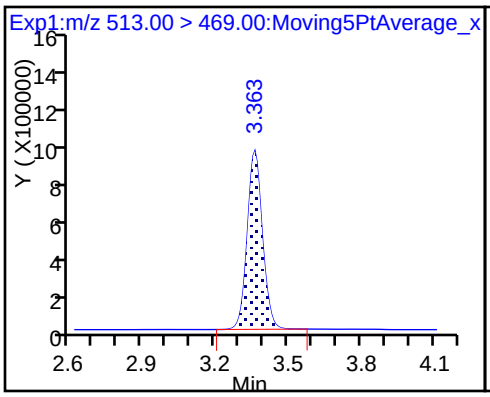
D 21 13C8 FOSA



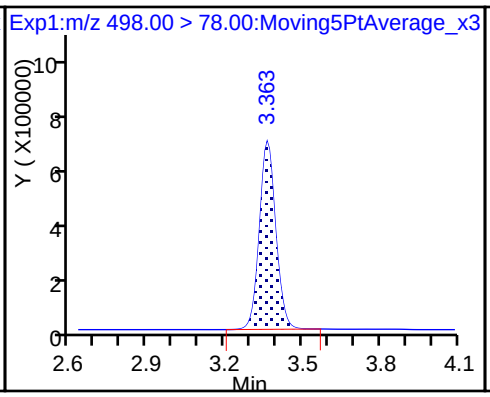
D 23 13C2 PFDA



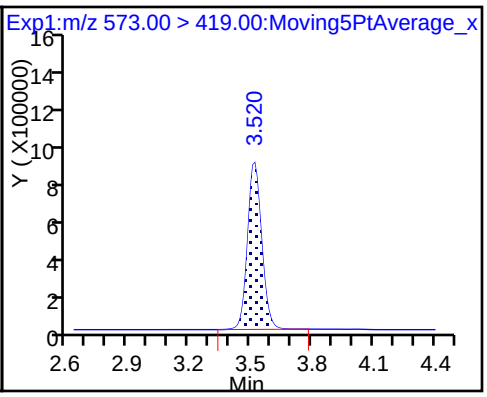
24 Perfluorodecanoic acid



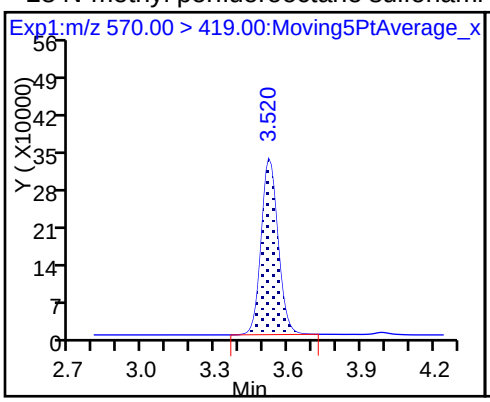
22 Perfluorooctane Sulfonamide



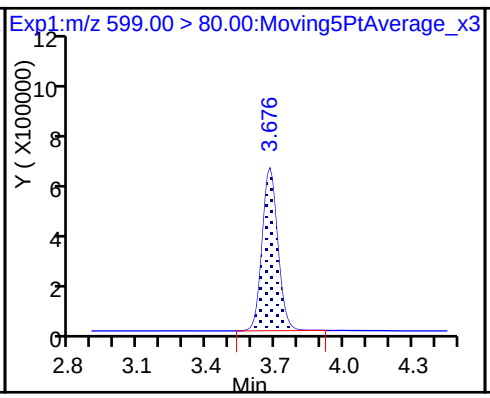
D 27 d3-NMeFOSAA



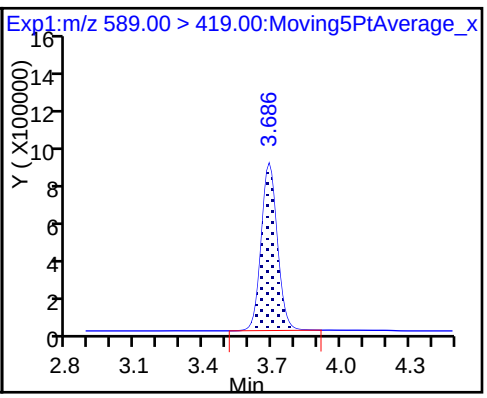
28 N-methyl perfluorooctane sulfonami



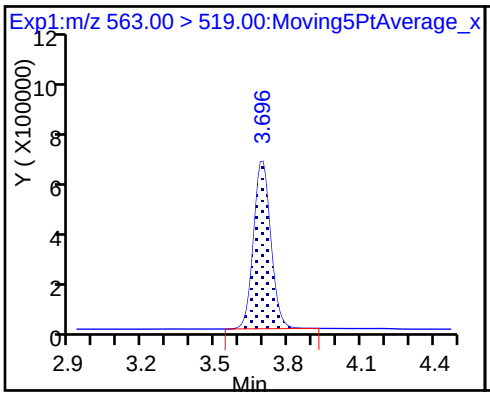
29 Perfluorodecane Sulfonic acid



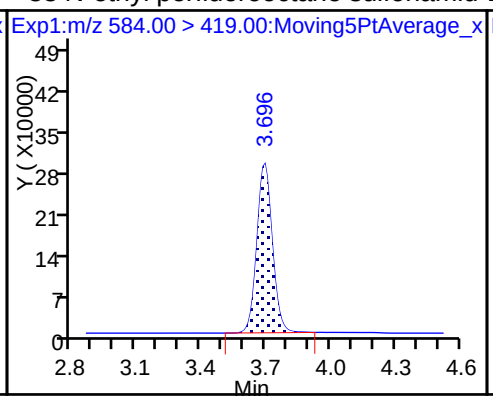
D 32 d5-NEtFOSAA



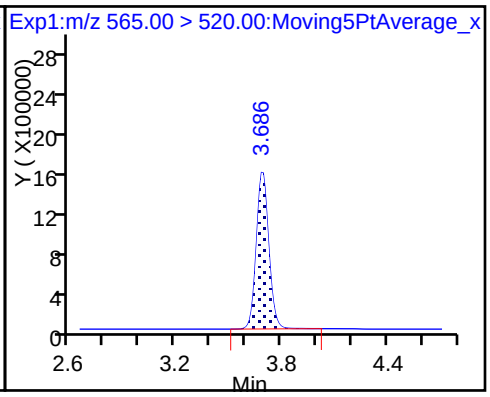
31 Perfluoroundecanoic acid



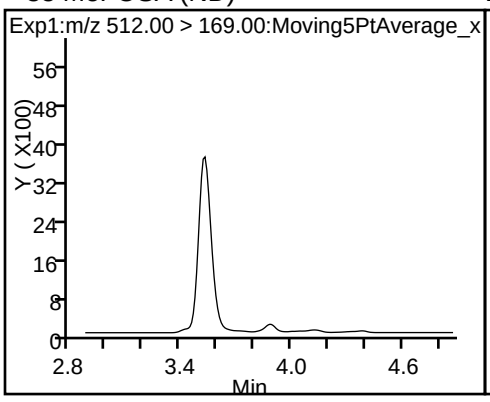
33 N-ethyl perfluorooctane sulfonamid



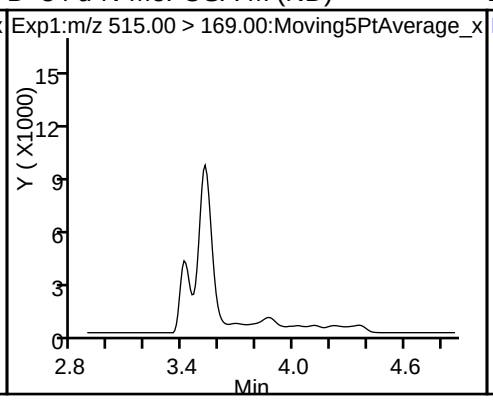
D 30 13C2 PFUnA



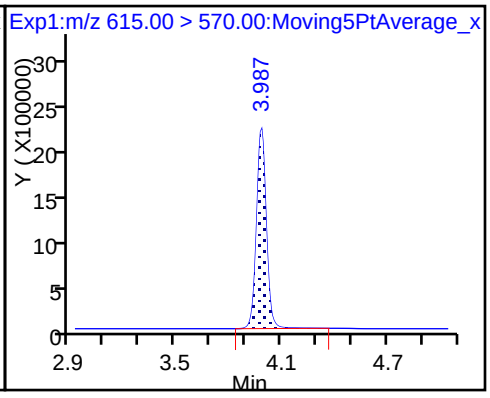
35 MeFOSA (ND)



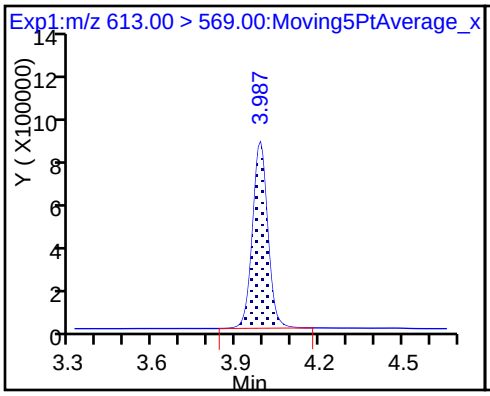
D 34 d-N-MeFOSA-M (ND)



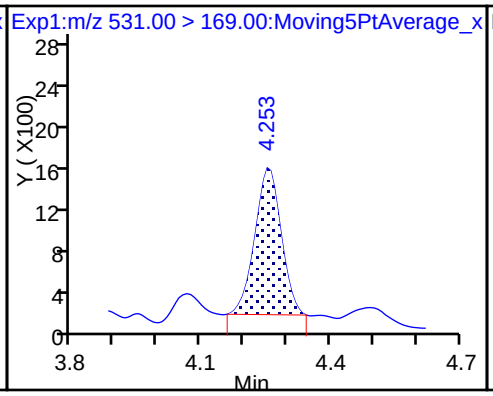
D 36 13C2 PFDoA



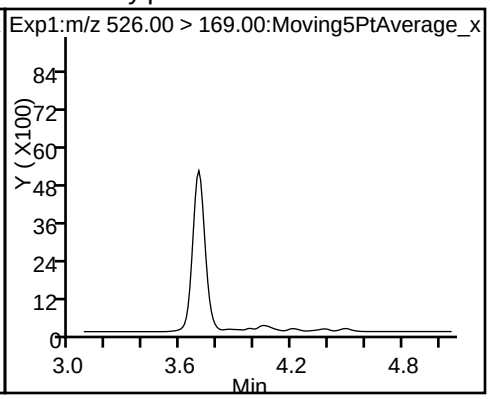
37 Perfluorododecanoic acid



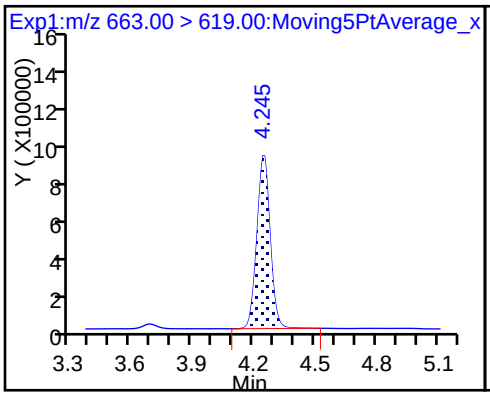
D 38 d-N-EtFOSA-M



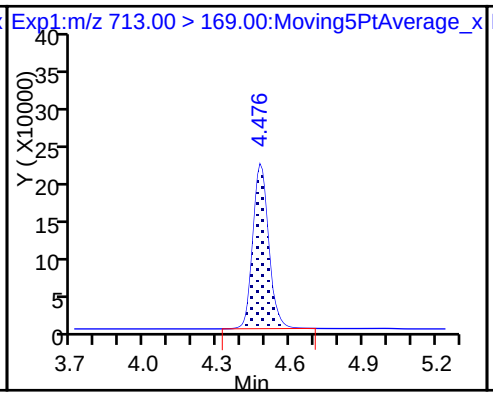
39 N-ethylperfluoro-1-octanesulfonami (ND)



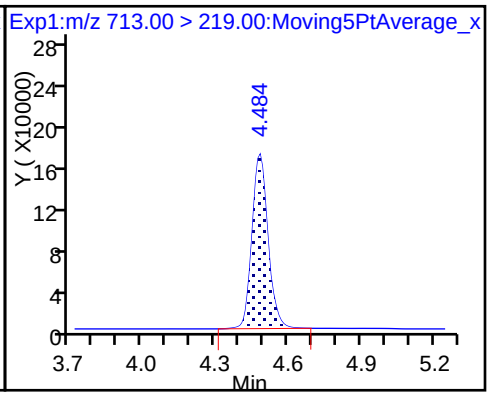
41 Perfluorotridecanoic acid



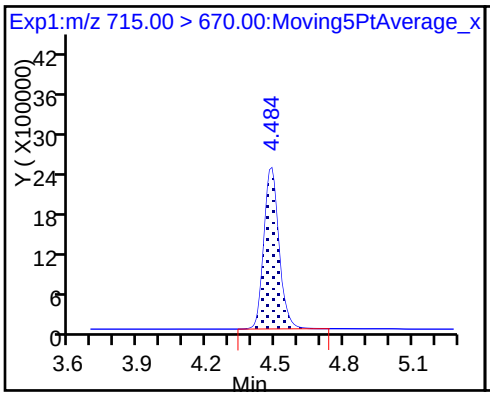
42 Perfluorotetradecanoic acid



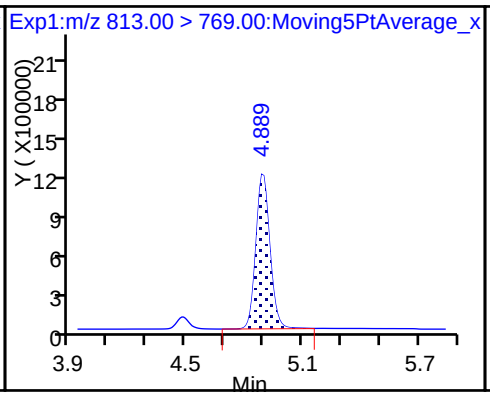
42 Perfluorotetradecanoic acid



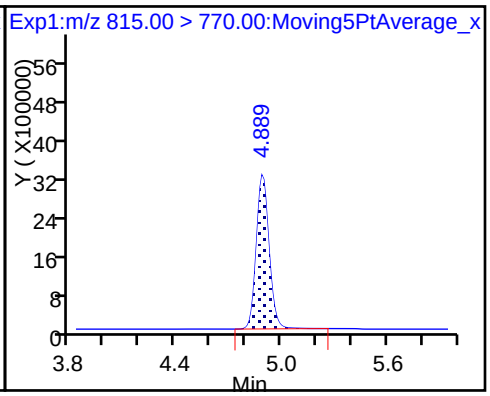
D 43 13C2-PFTeDA



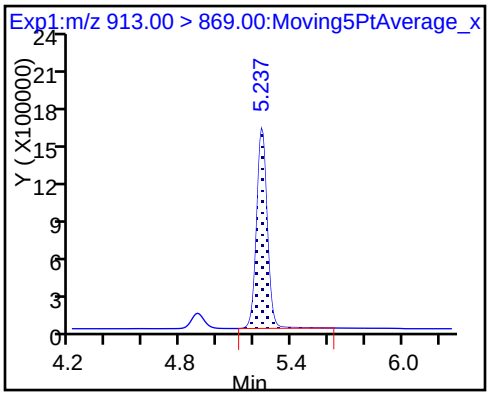
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 320-190551/3-A

Matrix: Water | Lab File ID: 2017.10.30AAA_019.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:25

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	43.9		2.5	1.0	0.46
2706-90-3	Perfluoropentanoic acid (PFPeA)	40.8		2.5	2.0	0.99
307-24-4	Perfluorohexanoic acid (PFHxA)	41.1		2.5	2.0	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	42.4		2.5	2.0	0.80
335-67-1	Perfluorooctanoic acid (PFOA)	41.7		2.5	2.0	0.75
375-95-1	Perfluorononanoic acid (PFNA)	41.5		2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	41.3		2.5	1.0	0.44
2058-94-8	Perfluoroundecanoic acid (PFUnA)	39.5		2.5	2.0	0.75
307-55-1	Perfluorododecanoic acid (PFDoA)	42.4		2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	48.1		2.5	2.0	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	40.9		2.5	1.0	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.7		2.5	2.0	0.92
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	38.3		2.5	2.0	0.87
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	44.1		2.5	2.0	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	39.6		4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	39.8		4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	41.6		40	2.0	0.64

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 320-190551/3-A

Matrix: Water | Lab File ID: 2017.10.30AAA_019.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:25

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	56		25-150
STL00992	13C4 PFBA	107		25-150
STL00993	13C2 PFHxA	104		25-150
STL00990	13C4 PFOA	106		25-150
STL00995	13C5 PFNA	102		25-150
STL00996	13C2 PFDA	112		25-150
STL00997	13C2 PFUnA	101		25-150
STL00998	13C2 PFDoA	97		25-150
STL00994	18O2 PFHxS	110		25-150
STL00991	13C4 PFOS	101		25-150
STL02116	13C2-PFTeDA	106		25-150
STL01892	13C4-PFHpA	111		25-150
STL01893	13C5 PFPeA	102		25-150
STL02337	13C3-PFBS	106		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_019.d
Lims ID: LCSD 320-190551/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 31-Oct-2017 02:25:23 ALS Bottle#: 16 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-190551/3-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:40:56 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:41:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.537	1.529	0.008		18709847	53.4		107	49254	
2 Perfluorobutyric acid										
212.90 > 169.00	1.537	1.537	0.0	1.000	7828782	22.0		110	840	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.736	1.737	-0.001	1.000	5037846	20.4		102	4527	
D 3 13C5-PFPeA										
267.90 > 223.00	1.736	1.737	-0.001		11491014	50.9		102	75599	
D 47 13C3-PFBS										
301.90 > 83.00	1.755	1.755	0.0		246736	49.1		106	6314	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.755	1.755	0.0	1.000	7065833	18.4		104	11792	
298.90 > 99.00	1.755	1.755	0.0	1.000	2980333		2.37(0.00-0.00)		6802	
61 Sodium 1H,1H,2H,2H-perfluorohexane										
327.00 > 307.00	1.949	1.949	0.0	1.000	1762018	20.2		108	9932	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.995	1.984	0.011	1.000	4946941	20.6		103	4319	
D 7 13C2 PFHxA										
315.00 > 270.00	1.983	1.984	-0.001		12590059	52.0		104	28677	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.309	2.308	0.001	1.000	5573117	21.2		106	4526	
D 9 13C4-PFHpA										
367.00 > 322.00	2.309	2.308	0.001		13576387	55.7		111	23056	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.319	2.318	0.001	1.000	6545496	19.2		105	5705	
D 11 18O2 PFHxS										
403.00 > 84.00	2.319	2.318	0.001		15620680	51.9		110	20584	
13 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.623	2.622	0.001	1.000	1848362	20.9		110	10341	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS										
429.00 > 81.00	2.623	2.622	0.001		3411803	49.0		103	12111	
* 62 13C2-PFOA										
415.00 > 370.00	2.645	2.644	0.001		13868978	50.0		100	20911	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.645	2.644	0.001	1.000	5646978	20.8		104	1724	
413.00 > 169.00	2.645	2.644	0.001	1.000	2935261		1.92(0.90-1.10)		4264	
D 14 13C4 PFOA										
417.00 > 372.00	2.645	2.644	0.001		12607923	52.8		106	13314	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.652	2.651	0.001	1.000	5517792	22.0		116	13954	
D 18 13C4 PFOS										
503.00 > 80.00	3.008	3.014	-0.006		10203394	48.1		101	10543	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.008	3.014	-0.006	1.000	4395374	19.8		107	1888	
499.00 > 99.00	3.008	3.014	-0.006	1.000	910203		4.83(0.90-1.10)		2080	
20 Perfluorononanoic acid										
463.00 > 419.00	3.008	3.014	-0.006	1.000	4120696	20.7		104	3309	
D 19 13C5 PFNA										
468.00 > 423.00	3.008	3.014	-0.006		10262526	50.9		102	13286	
D 26 M2-8:2FTS										
529.00 > 81.00	3.357	3.355	0.002		4054445	56.1		117	10001	
25 Sodium 1H,1H,2H,2H-perfluorodecane										
527.00 > 507.00	3.357	3.364	-0.007	1.000	1880719	20.0		104	6309	
D 21 13C8 FOSA										
506.00 > 78.00	3.365	3.372	-0.007		8641260	27.8		55.5	9599	
D 23 13C2 PFDA										
515.00 > 470.00	3.365	3.372	-0.007		10250518	56.2		112	15461	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.365	3.372	-0.007	1.000	3978069	20.7		103	7921	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.365	3.372	-0.007	1.000	3385595	20.8		104	8014	
D 27 d3-NMeFOSAA										
573.00 > 419.00	3.523	3.522	0.001		4111264	50.3		101	5182	
28 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.523	3.532	-0.009	1.000	1595056	20.7		104	2811	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.680	3.679	0.001	1.000	2752353	19.9		103	5222	
D 32 d5-NEtFOSAA										
589.00 > 419.00	3.690	3.689	0.001		4063607	48.4		96.8	3861	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.700	3.698	0.002	1.000	3099874	19.7		98.7	3416	
33 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.700	3.698	0.002	1.003	1497733	21.8		109	4130	
D 30 13C2 PFUnA										
565.00 > 520.00	3.700	3.698	0.002		7358218	50.5		101	6650	
D 36 13C2 PFDoA										
615.00 > 570.00	3.989	3.989	0.0		8130518	48.4		96.9	12376	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
37 Perfluorododecanoic acid										
613.00 > 569.00	3.989	3.995	-0.006	1.000	3173004	21.2		106	4805	
D 38 d-N-EtFOSA-M										
531.00 > 169.00	4.257	4.060	0.197		5094	0.0587		0.1	6.9	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	4039074	24.0		120	1367	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.488	4.488	0.0	1.000	982583	20.5		102	4117	
713.00 > 219.00	4.488	4.488	0.0	1.000	774298		1.27(0.00-0.00)		4233	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.488	4.488	0.0		10803603	52.8		106	4890	
45 Perfluorohexadecanoic acid										
813.00 > 769.00	4.906	4.897	0.009	1.000	5336087	20.6		103	492	
D 44 13C2-PFHxDA										
815.00 > 770.00	4.896	4.897	-0.001		14598910	47.6		95.3	6318	
46 Perfluorooctadecanoic acid										
913.00 > 869.00	5.245	5.246	-0.001	1.000	5715368	20.6		103	474	

Report Date: 31-Oct-2017 09:41:41 Chrom Revision: 2.2 16-Aug-2017 16:24:46

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_019.d

Injection Date: 31-Oct-2017 02:25:23 Instrument ID: A8_N

Lims ID: LCSD 320-190551/3-A

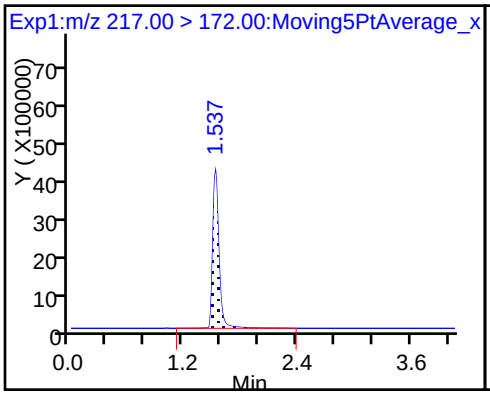
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 16 Worklist Smp#: 5

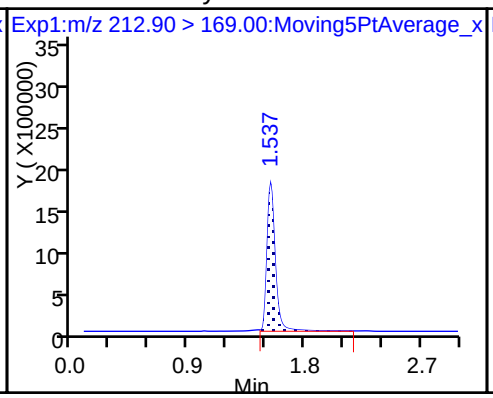
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

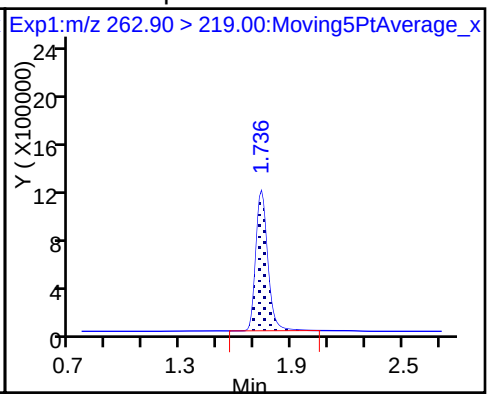
D 1 13C4 PFBA



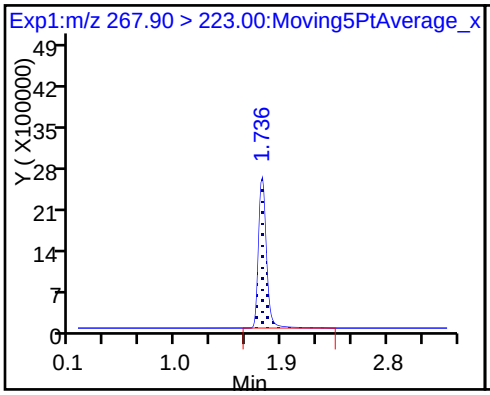
2 Perfluorobutyric acid



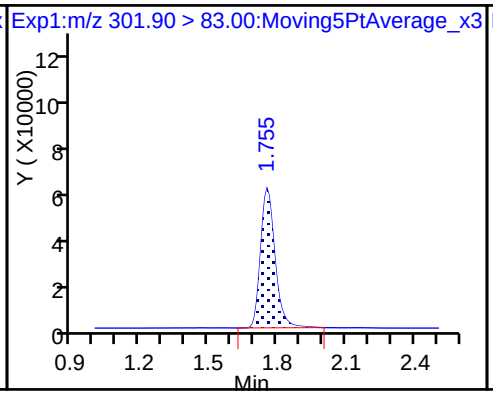
4 Perfluoropentanoic acid



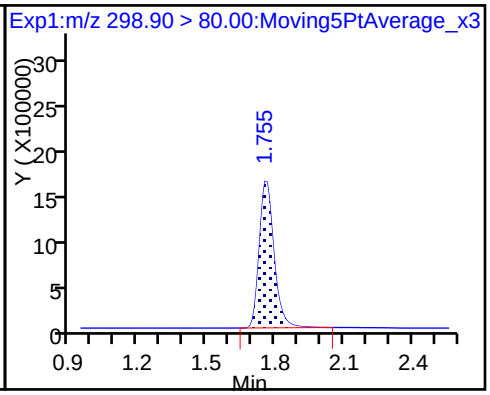
D 3 13C5-PFPeA



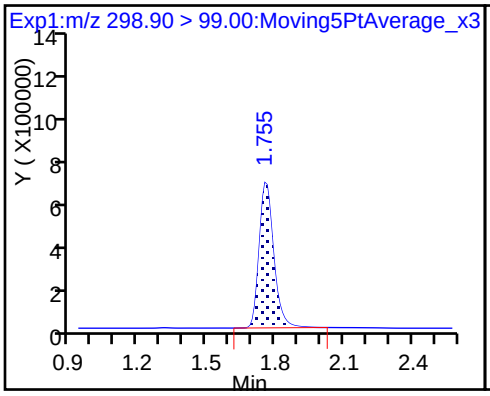
D 47 13C3-PFBS



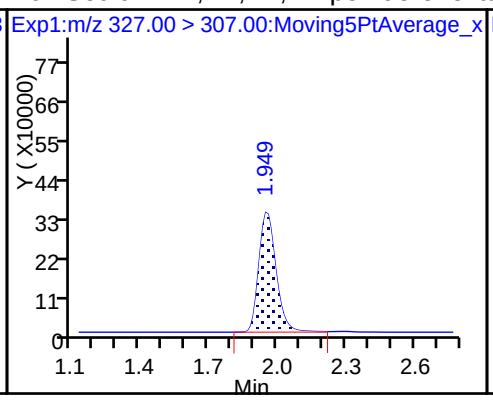
5 Perfluorobutanesulfonic acid



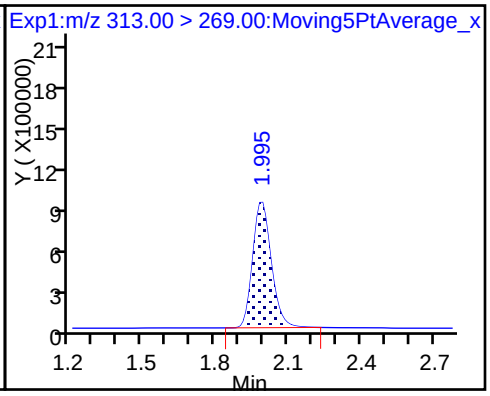
5 Perfluorobutanesulfonic acid



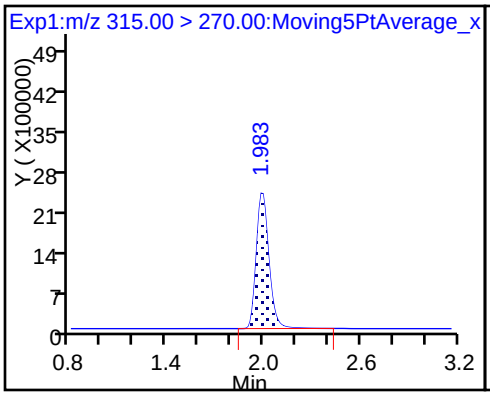
61 Sodium 1H,1H,2H,2H-perfluorohexane



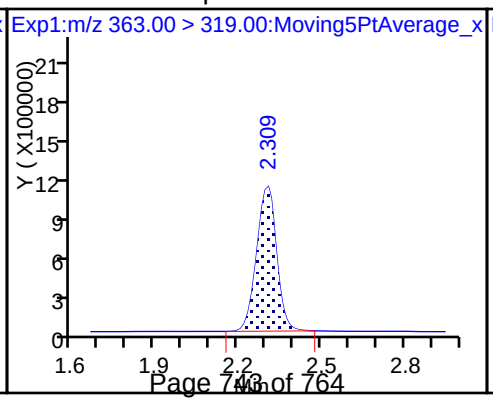
6 Perfluorohexanoic acid



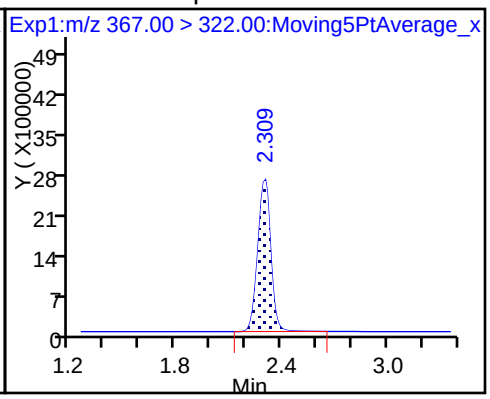
D 7 13C2 PFHxA



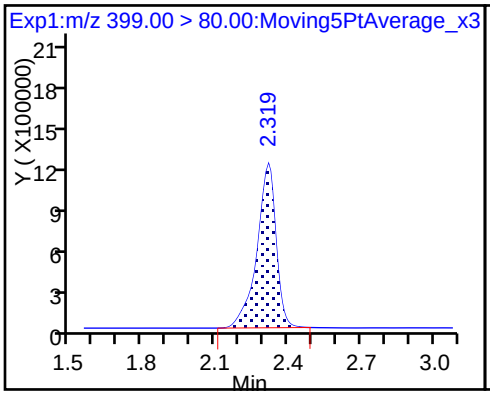
10 Perfluoroheptanoic acid



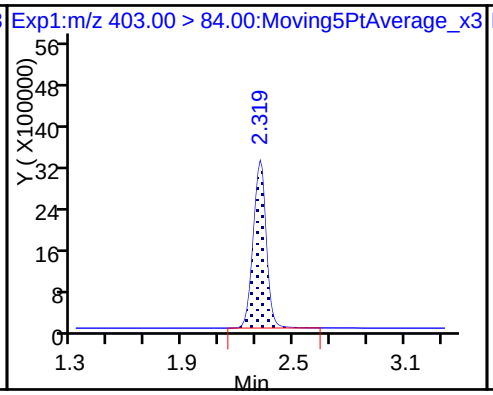
D 9 13C4-PFHpA



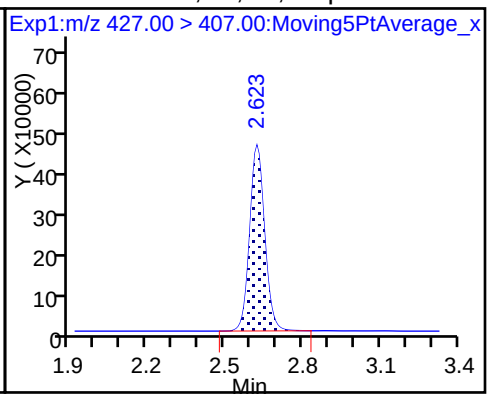
8 Perfluorohexanesulfonic acid



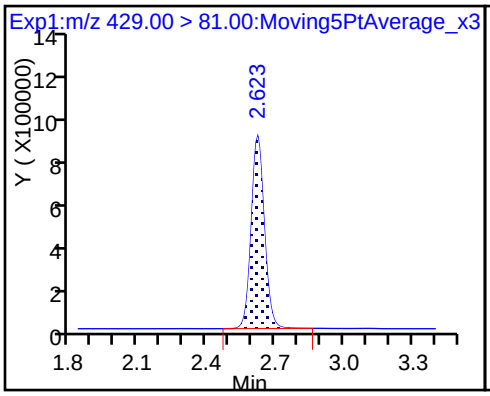
D 11 18O2 PFHxS



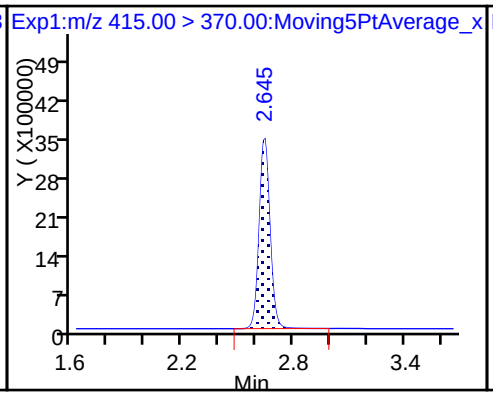
13 Sodium 1H,1H,2H,2H-perfluorooctane



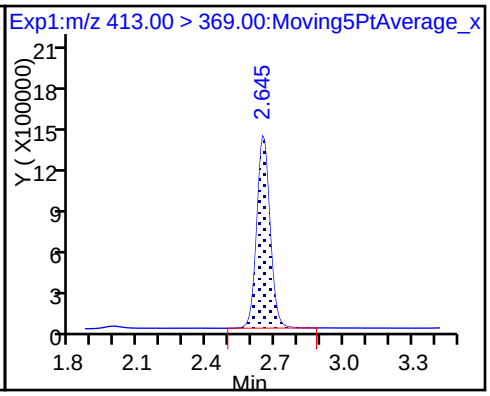
D 12 M2-6:2FTS



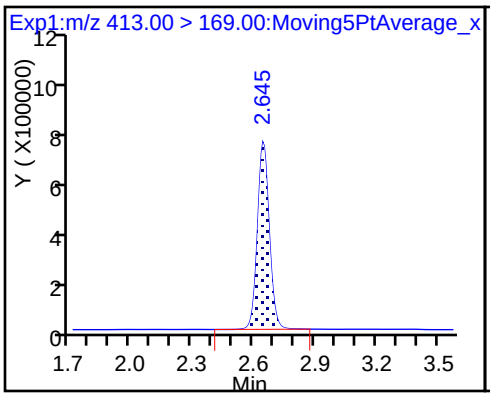
* 62 13C2-PFOA



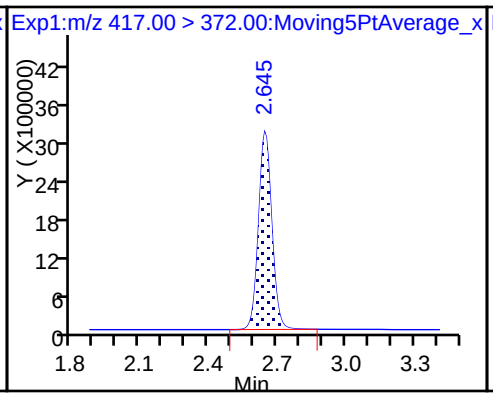
15 Perfluorooctanoic acid



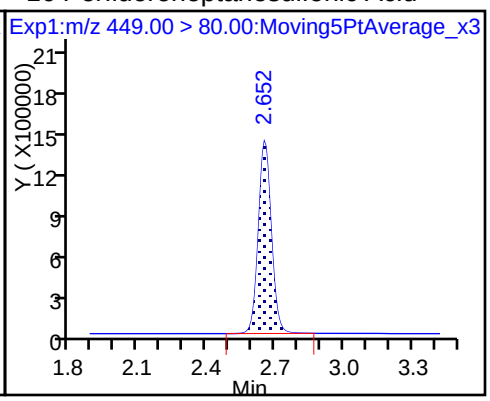
15 Perfluorooctanoic acid



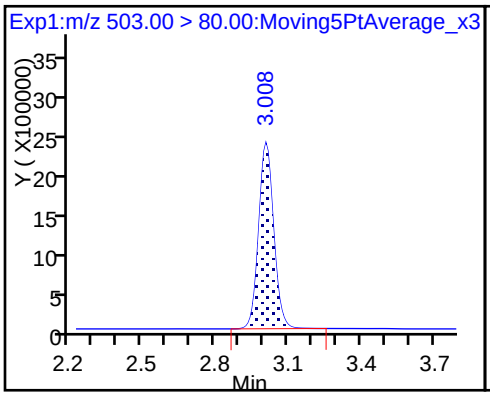
D 14 13C4 PFOA



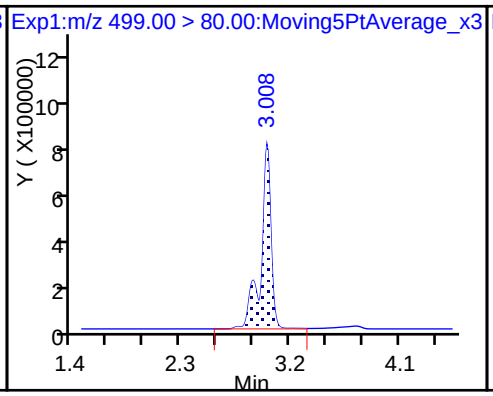
16 Perfluoroheptanesulfonic Acid



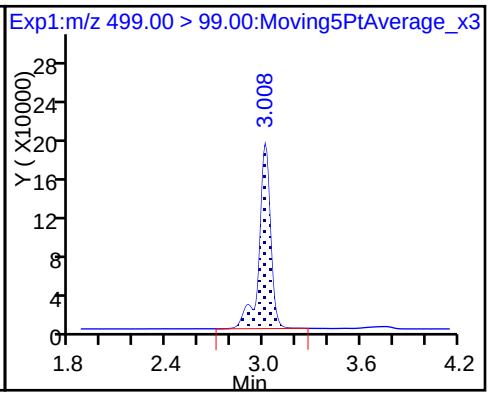
D 18 13C4 PFOS



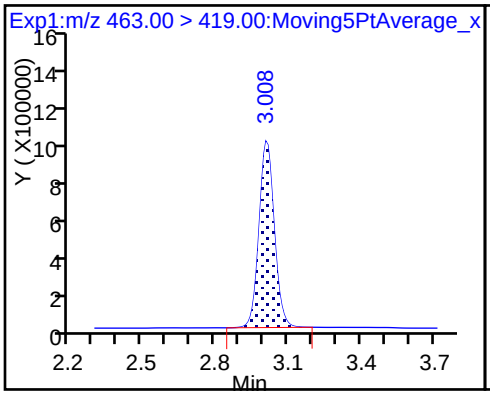
17 Perfluorooctane sulfonic acid



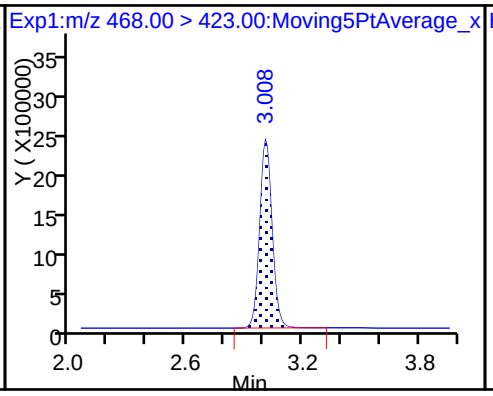
17 Perfluorooctane sulfonic acid



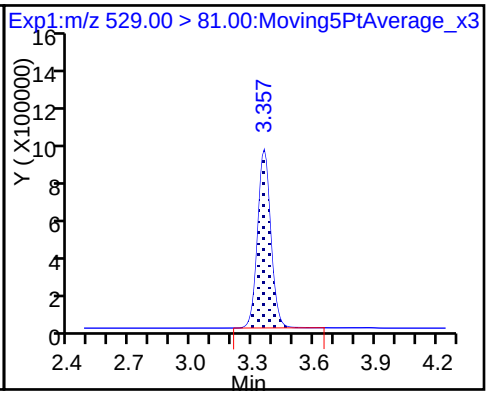
20 Perfluorononanoic acid



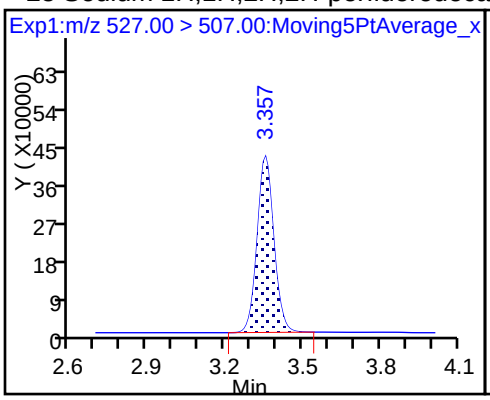
D 19 13C5 PFNA



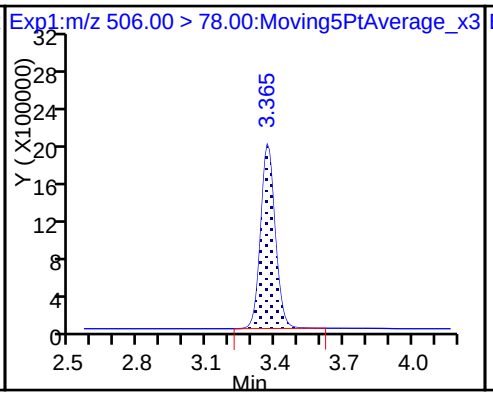
D 26 M2-8:2FTS



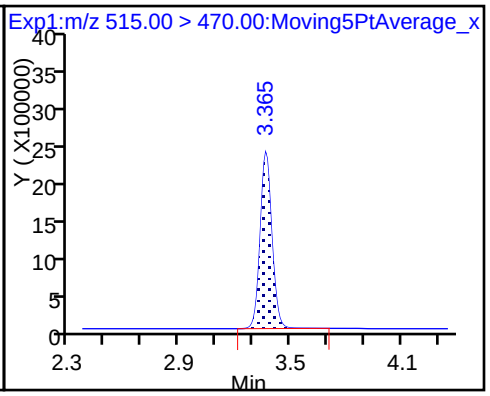
25 Sodium 1H,1H,2H,2H-perfluorodecane



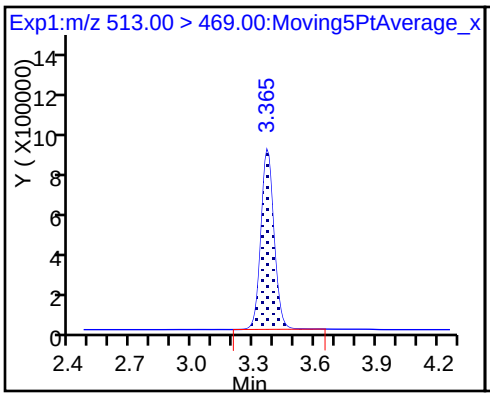
D 21 13C8 FOSA



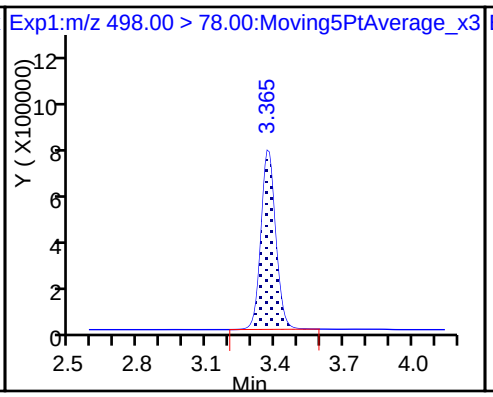
D 23 13C2 PFDA



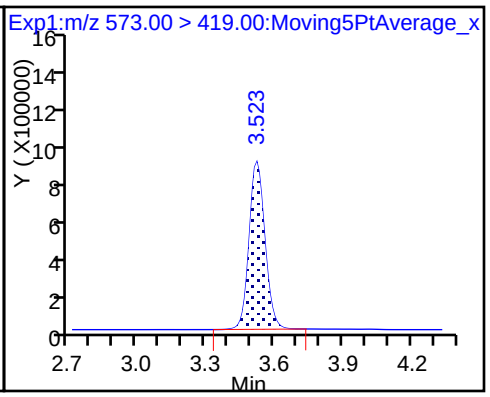
24 Perfluorodecanoic acid



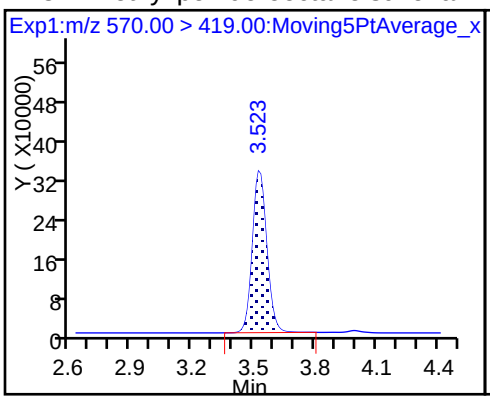
22 Perfluorooctane Sulfonamide



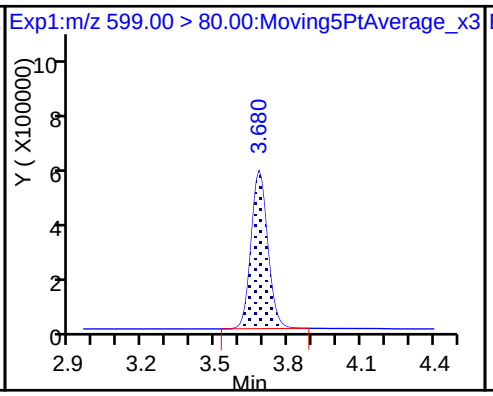
D 27 d3-NMeFOSAA



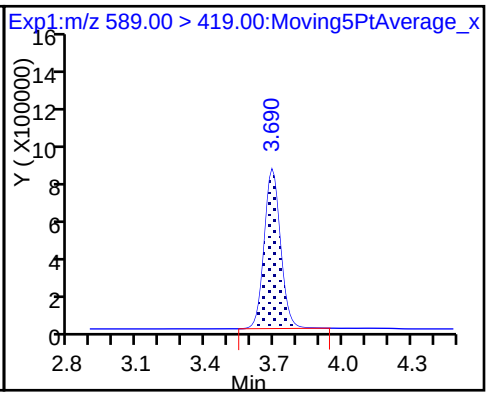
28 N-methyl perfluorooctane sulfonami



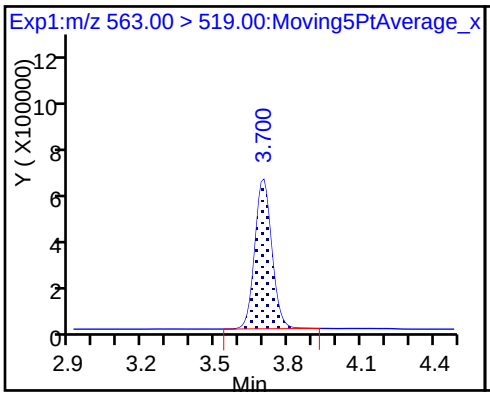
29 Perfluorodecane Sulfonic acid



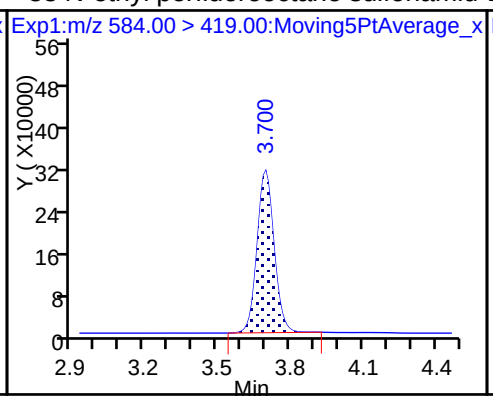
D 32 d5-NEtFOSAA



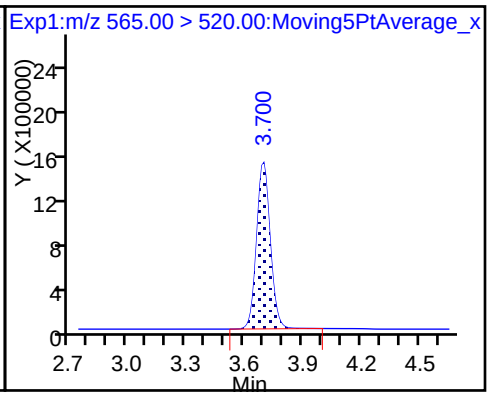
31 Perfluoroundecanoic acid



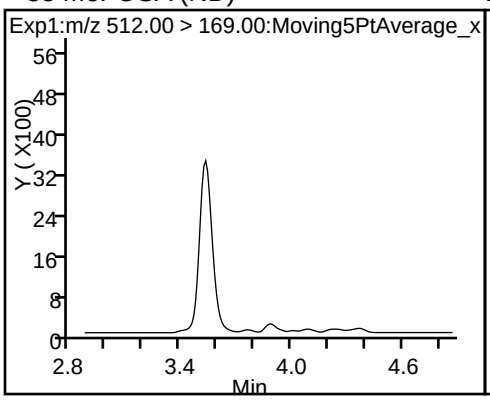
33 N-ethyl perfluorooctane sulfonamid



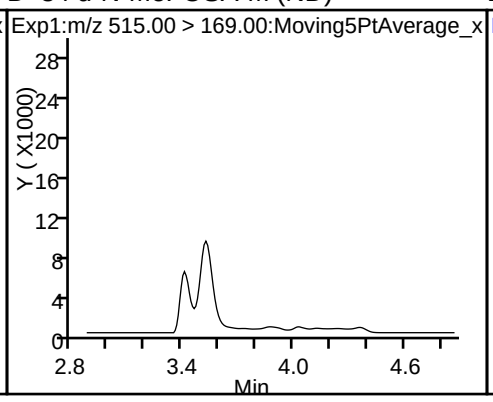
D 30 13C2 PFUnA



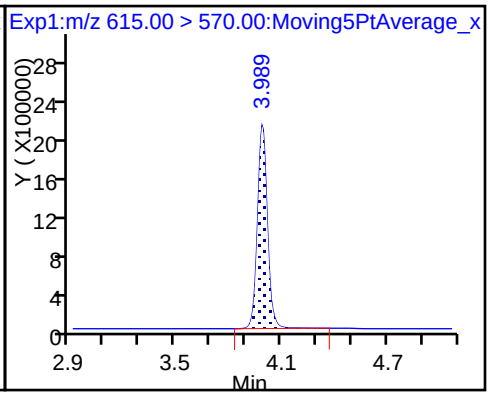
35 MeFOSA (ND)



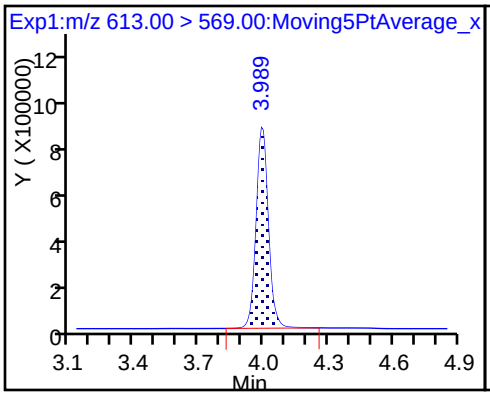
D 34 d-N-MeFOSA-M (ND)



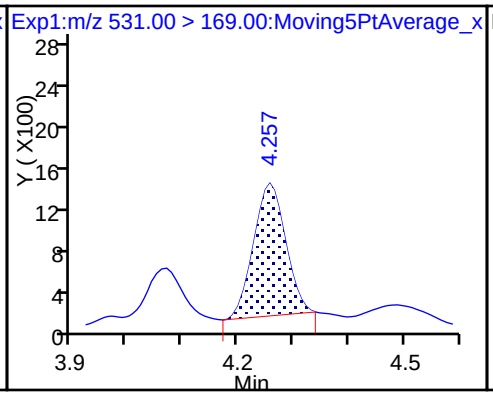
D 36 13C2 PFDoA



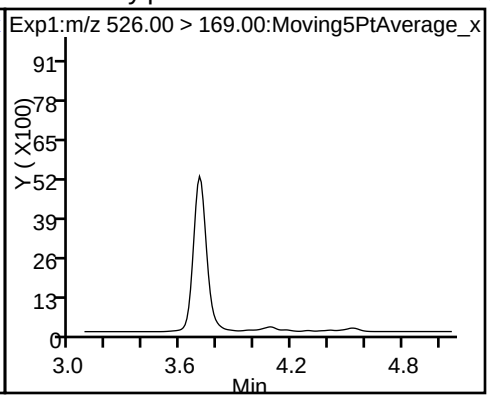
37 Perfluorododecanoic acid



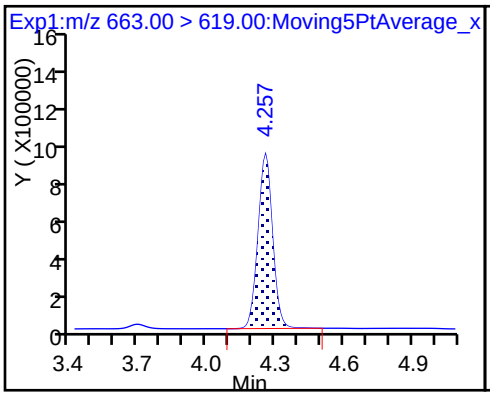
D 38 d-N-EtFOSA-M



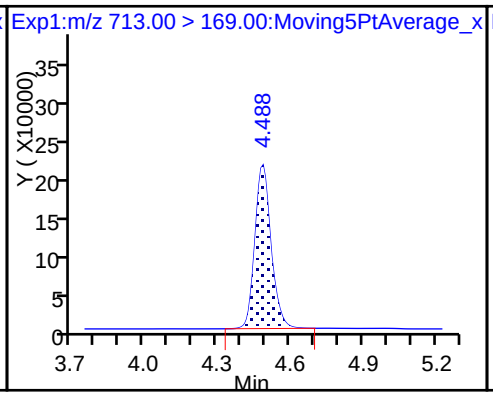
39 N-ethylperfluoro-1-octanesulfonami (ND)



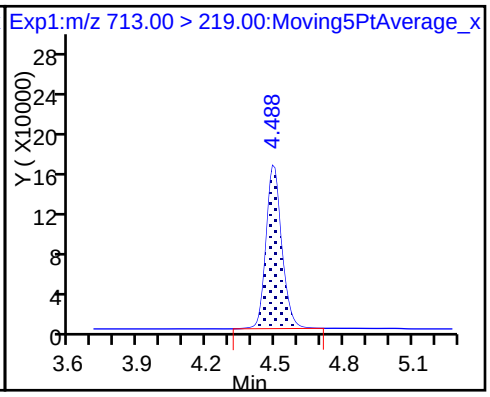
41 Perfluorotridecanoic acid



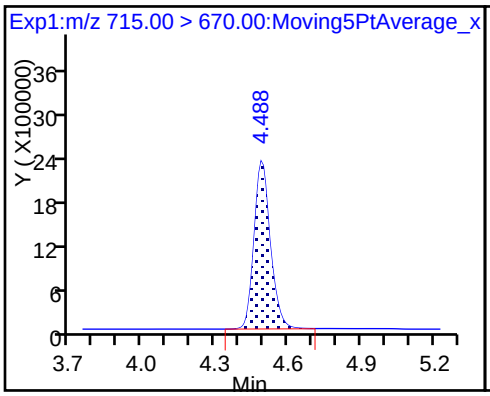
42 Perfluorotetradecanoic acid



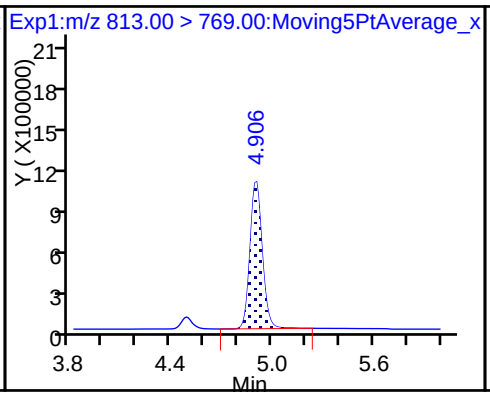
42 Perfluorotetradecanoic acid



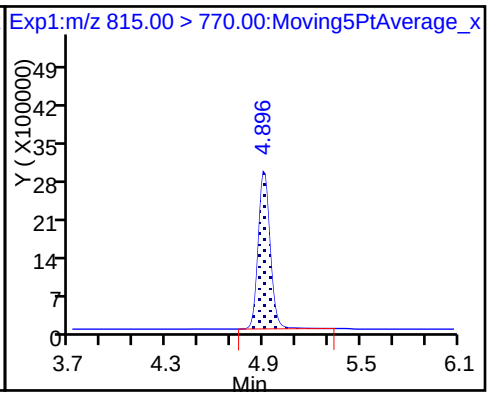
D 43 13C2-PFTeDA



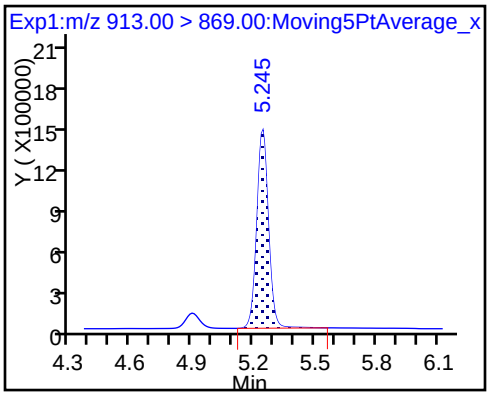
45 Perfluorohexadecanoic acid



D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Start Date: 10/30/2017 17:59

Analysis Batch Number: 191992 End Date: 10/30/2017 19:29

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-191992/3		10/30/2017 17:59	1	2017.10.30ICAL_003.d	GeminiC18 3x100 3(mm)
IC 320-191992/4		10/30/2017 18:06	1	2017.10.30ICAL_004.d	GeminiC18 3x100 3(mm)
IC 320-191992/5		10/30/2017 18:13	1	2017.10.30ICAL_005.d	GeminiC18 3x100 3(mm)
IC 320-191992/6		10/30/2017 18:20	1	2017.10.30ICAL_006.d	GeminiC18 3x100 3(mm)
IC 320-191992/7		10/30/2017 18:27	1	2017.10.30ICAL_007.d	GeminiC18 3x100 3(mm)
IC 320-191992/8		10/30/2017 18:34	1	2017.10.30ICAL_008.d	GeminiC18 3x100 3(mm)
IC 320-191992/9		10/30/2017 18:40	1	2017.10.30ICAL_009.d	GeminiC18 3x100 3(mm)
IC 320-191992/10		10/30/2017 18:47	1	2017.10.30ICAL_010.d	GeminiC18 3x100 3(mm)
ICB 320-191992/11		10/30/2017 18:54	1		GeminiC18 3x100 3(mm)
ICV 320-191992/12		10/30/2017 19:01	1	2017.10.30ICAL_012.d	GeminiC18 3x100 3(mm)
RINSE 320-191992/13		10/30/2017 19:08	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/30/2017 19:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/30/2017 19:22	1		GeminiC18 3x100 3(mm)
CCV 320-191992/16		10/30/2017 19:29	1		GeminiC18 3x100 3(mm)

537 (modified)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Start Date: 10/31/2017 01:57

Analysis Batch Number: 192039 End Date: 10/31/2017 04:43

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-192039/1		10/31/2017 01:57	1	2017.10.30AAA_016.d	GeminiC18 3x100 3(mm)
RINSE 320-192039/2		10/31/2017 02:04	1		GeminiC18 3x100 3(mm)
MB 320-190551/1-A		10/31/2017 02:11	1	2017.10.30AAA_017.d	GeminiC18 3x100 3(mm)
LCS 320-190551/2-A		10/31/2017 02:18	1	2017.10.30AAA_018.d	GeminiC18 3x100 3(mm)
LCSD 320-190551/3-A		10/31/2017 02:25	1	2017.10.30AAA_019.d	GeminiC18 3x100 3(mm)
320-32321-1 DL		10/31/2017 02:32	10	2017.10.30AAA_020.d	GeminiC18 3x100 3(mm)
320-32321-2		10/31/2017 02:39	1	2017.10.30AAA_021.d	GeminiC18 3x100 3(mm)
320-32321-3		10/31/2017 02:46	1	2017.10.30AAA_022.d	GeminiC18 3x100 3(mm)
320-32321-4		10/31/2017 02:52	1	2017.10.30AAA_023.d	GeminiC18 3x100 3(mm)
CCV 320-192039/12		10/31/2017 03:13	1	2017.10.30AAA_026.d	GeminiC18 3x100 3(mm)
CCV 320-192039/18		10/31/2017 03:55	1	2017.10.30AAA_032.d	GeminiC18 3x100 3(mm)
320-32321-1		10/31/2017 04:01	1	2017.10.30AAA_033.d	GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:08	1		GeminiC18 3x100 3(mm)
RINSE 320-192039/21		10/31/2017 04:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:22	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:29	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:36	1		GeminiC18 3x100 3(mm)
CCV 320-192039/25		10/31/2017 04:43	1	2017.10.30AAA_039.d	GeminiC18 3x100 3(mm)

537 (modified)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Batch Number: 190551 Batch Start Date: 10/23/17 08:13 Batch Analyst: Branscum, Cassie

Batch Method: 3535 Batch End Date: 10/24/17 19:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFC_ALL_SU 00014	LCPFC-IS 00009
MB 320-190551/1		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
LCS 320-190551/2		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
LCSD 320-190551/3		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
320-32321-A-1	TP-PFC-022-TPI	3535, 537 (modified)	T	288.15 g	26.29 g	261.9 mL	0.50 mL	500 uL	100 uL
320-32321-A-2	TP-PFC-022-TPE	3535, 537 (modified)	T	285.12 g	25.93 g	259.2 mL	0.50 mL	500 uL	100 uL
320-32321-A-3	TP-PFC-022-MID-CARBON	3535, 537 (modified)	T	279.09 g	25.98 g	253.1 mL	0.50 mL	500 uL	100 uL
320-32321-A-4	TP-PFC-022-TPE-D	3535, 537 (modified)	T	283.78 g	26.47 g	257.3 mL	0.50 mL	500 uL	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LCPFCSP 00117					
MB 320-190551/1		3535, 537 (modified)							
LCS 320-190551/2		3535, 537 (modified)		500 uL					
LCSD 320-190551/3		3535, 537 (modified)		500 uL					
320-32321-A-1	TP-PFC-022-TPI	3535, 537 (modified)	T						
320-32321-A-2	TP-PFC-022-TPE	3535, 537 (modified)	T						
320-32321-A-3	TP-PFC-022-MID-CARBON	3535, 537 (modified)	T						
320-32321-A-4	TP-PFC-022-TPE-D	3535, 537 (modified)	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Batch Number: 190551 Batch Start Date: 10/23/17 08:13 Batch Analyst: Branscum, Cassie

Batch Method: 3535 Batch End Date: 10/24/17 19:54

Batch Notes	
Analyst ID - Aliquot Step	TQN
Balance ID	QA-070
Analyst ID - Concentration	CCB/ABH
Analyst ID - Final Volume Step	ABH
H2O ID	10/18/17
Hexane ID	981617
Internal Standard ID#	1068480
Manifold ID	11,16
Methanol ID	1052414
Sodium Hydroxide ID	1062694
Pipette ID	N32761F
Analyst ID - Reagent Drop	CCB
Analyst ID - IS Reagent Drop	TWL
Analyst ID - IS Reagent Drop Witness	ABH
Analyst ID - SU Reagent Drop	CCB
Analyst ID - SU Reagent Drop Witness	JNS
Solvent Lot #	1063864
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	003137011A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-32041, 320-32261, 320-32321, 320-32038

Work List ID(s): 49784

Extraction Batch: 190551

Analysis Batch(es): 190008, 192039, 192040

Delivery Rank: 2/4

Due Date: 10/27/17

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 191992, 191993	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?	✓	✓	
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.			✓
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?	✓	✓	
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
C. Sample Analysis			
1. Was correct analysis performed and were project instructions followed?	✓	✓	
2. If required, are compounds within RT windows?	✓	✓	
3. If required, are positive hits confirmed and >40% RPD flagged?			✓
4. Manual Integrations reviewed and appropriate.	✓	✓	
5. All analytes correctly reported. (Primary, secondary, acceptable status)	✓	✓	
6. Correct reporting limits used. (based on client request, prep factors, and dilutions)	✓	✓	
D. Documentation NCM: 105791, 105803, 105799, 105783, 105784			
1. Are all non-conformances documented/attached? NCM# 105789, 105790	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.

1st Level (Analyst): TP Date: 10/31/17

2nd Level Reviewer: MW Date: 01/31/2017

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 30OCT2017F_PFC Worklist Number: 49784
Instrument Name: A8_N Chrom Method: A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b
QC Batching: Disabled Limit Group Batching: Enabled

QC Batch: 1	LC PFC_DOD ICAL Raw Batch: 192039	LC PFC ICAL Raw Batch: 192040	LC PFC_QSM5-1 ICAL Raw Batch: 192041	LC PFAS ICAL Raw Batch: 192042
# 1 CCV L4	# 1 CCV L4	# 1 CCV L4	# 1 CCV L4	
# 2 RINSE	# 2 RINSE	# 2 RINSE	# 2 RINSE	
# 3 MB 320-190551/1-A	# 3 MB 320-190551/1-A	# 3 MB 320-190551/1-A		
# 4 LCS 320-190551/2-A	# 4 LCS 320-190551/2-A	# 4 LCS 320-190551/2-A		
# 5 LCSD	# 5 LCSD	# 5 LCSD		
320-190551/3-A	320-190551/3-A	320-190551/3-A		
# 6 320-32321-A-1-A	# 6 320-32321-A-1-A ~10A low			
# 7 320-32321-A-2-A	# 7 320-32321-A-2-A			
# 8 320-32321-A-3-A	# 8 320-32321-A-3-A			
# 9 320-32321-A-4-A	# 9 320-32321-A-4-A			#10 320-32038-B-2-A
#10 320-32038-B-2-A		#10 320-32038-B-2-A	10A low	#11 320-32041-B-1-A
#11 320-32041-B-1-A		#11 320-32041-B-1-A	#12 CCV L5	
#12 CCV L5	#12 CCV L5	#12 CCV L5		#13 320-32261-A-1-A
#13 320-32261-A-1-A		#13 320-32261-A-1-A		#14 320-32261-A-2-A
#14 320-32261-A-2-A		#14 320-32261-A-2-A		#15 320-32261-A-3-A
#15 320-32261-A-3-A		#15 320-32261-A-3-A		#16 320-32261-A-4-A
#16 320-32261-A-4-A		#16 320-32261-A-4-A		#17 320-32261-A-5-A
#17 320-32261-A-5-A		#17 320-32261-A-5-A	#18 CCV L4	
#18 CCV L4	#18 CCV L4	#18 CCV L4		
#19 320-32321-A-1-A	#19 320-32321-A-1-A 10A low			
#20 320-32321-A-1-A	#20 320-32321-A-1-A 10A low			
#21 RINSE	#21 RINSE	#21 RINSE		
#22 320-32321-A-2-A	#22 320-32321-A-2-A			
#23 320-32321-A-3-A	#23 320-32321-A-3-A			
#24 320-32321-A-4-A	#24 320-32321-A-4-A		#25 CCV L5	
#25 CCV L5	#25 CCV L5	#25 CCV L5		

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Test America – Sacramento

Sample Dilution Record

Method ID PFC_IDA **Job #** 320-32321

Analyst (Print Name) Amani Royce/Chem Prep **Analyst Initials** aar/TP

Date 10/26/17

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
320-32321-1	500	30	300	10X

Comments:

53 RX-low Fosa

A8 10/25/17
A8 10/26/17
A8 10/30/17

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Method Code: 320-3535_PFC-320

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Batch End: 10/24/2017 7:54:00PM

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB-320-190551/1 N/A	N/A		250 mL				N/A	N/A	N/A		MB 320-190551/1-A
				0.50 mL								
2	LCS-320-190551/2 N/A	N/A		250 mL				N/A	N/A	N/A		LCS 320-190551/2-A
				0.50 mL								
3	LCSD-320-190551/3 N/A	N/A		250 mL				N/A	N/A	N/A		LCSD 320-190551/3-A
				0.50 mL								
4	320-32321-A-1 (PFC_IDA_DOD5)	N/A (320-32321-1)	288.15 g	261.9 mL				10/27/17	16_Days	4	10X	320-32321-A-1-A
			26.29 g	0.50 mL								
5	320-32321-A-2 (PFC_IDA_DOD5)	N/A (320-32321-1)	285.12 g	259.2 mL				10/27/17	16_Days	4		320-32321-A-2-A
			25.93 g	0.50 mL								
6	320-32321-A-3 (PFC_IDA_DOD5)	N/A (320-32321-1)	279.09 g	253.1 mL				10/27/17	16_Days	4	Carbon	320-32321-A-3-A
			25.98 g	0.50 mL								
7	320-32321-A-4 (PFC_IDA_DOD5)	N/A (320-32321-1)	283.78 g	257.3 mL				10/27/17	16_Days	4		320-32321-A-4-A
			26.47 g	0.50 mL								
8	320-32038-B-2 (PFC_IDA)	N/A (320-32038-1)	276.52 g	250.5 mL				10/24/17	16_Days	4	Green color RX 10X	320-32038-B-2-A
			26.03 g	0.50 mL								
9	320-32041-B-1 (PFC_IDA)	N/A (320-32041-1)	268.44 g	242.5 mL				10/12/17	8_Days	2	Yellow color RX RA	320-32041-B-1-A
			25.92 g	0.50 mL								
10	320-32261-A-1 (PFC_IDA)	N/A (320-32261-1)	283.66 g	257.6 mL				10/26/17	12_Days	2		320-32261-A-1-A
			26.04 g	0.50 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Method Code: 320-3535_PFC-320

Batch End: 10/24/2017 7:54:00PM

11	320-32261-A-2 (PFC_IDA)	N/A (320-32261-1)	285.25 g 25.96 g	259.3 mL 0.50 mL				10/26/17	12_Days	2	
12	320-32261-A-3 (PFC_IDA)	N/A (320-32261-1)	289.11 g 26.21 g	262.9 mL 0.50 mL				10/26/17	12_Days	2	
13	320-32261-A-4 (PFC_IDA)	N/A (320-32261-1)	295.77 g 26.71 g	269.1 mL 0.50 mL				10/26/17	12_Days	2	
14	320-32261-A-5 (PFC_IDA)	N/A (320-32261-1)	284.08 g 26.08 g	258 mL 0.50 mL				10/26/17	12_Days	2	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551
Method Code: 320-3535_PFC-320

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM
Batch End:

Batch Notes

Manifold ID	11,16
Methanol ID	1052414
Hexane ID	981617
Sodium Hydroxide ID	1062694
First Start time	NA
First End time	NA
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	003137011A
Balance ID	QA-070
H2O ID	10/18/17
Pipette ID	N32761F
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	1063864
Analyst ID - Reagent Drop	CCB
Analyst ID - SU Reagent Drop	CCB
Analyst ID - SU Reagent Drop Witness	JNS
Acid Name	NA
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
Analyst ID - IS Reagent Drop	TWL

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Method Code: 320-3535_PFC-320

Batch End:

Analyst ID - IS Reagent Drop Witness	ABH
Internal Standard ID#	1068480
Analyst ID - Concentration	CCB/ABH
Analyst ID - Aliquot Step	TRM
Analyst ID - Final Volume Step	ABH
SOP Number	WS-LC-0025
Batch Comment	N/A

Comments

320-32038-B-2	Rework Comments:	Low 13C8-FOSA recovery (<1%)
320-32041-B-1	Rework Comments:	Low 13C8-FOSA recovery (<1%)

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Method Code: 320-3535_PFC-320

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-190551/1	LCMPFC_ALL_SU_00014	500 uL	0.50 mL	10-23-17	10/23/17
LCS 320-190551/2	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
LCS 320-190551/2	LCPFCSP_00117	500 uL	0.50 mL		
LCSD 320-190551/3	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
LCSD 320-190551/3	LCPFCSP_00117	500 uL	0.50 mL		
320-32321-A-1	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32321-A-2	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32321-A-3	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32321-A-4	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32038-B-2	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32041-B-1	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32261-A-1	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32261-A-2	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32261-A-3	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32261-A-4	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
320-32261-A-5	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Method Code: 320-3535_PFC-320

Batch End:

Other Reagents:

Reagent	Amount/Units	Lot#:
IS: 1068480 100 uL	LCPFC-IS_00009	Spiked: JWZ 10/24/17 JWZ 10/24/17 Witness: ABH 10/24/17

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Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s) 190551 Test 3535_PFC

Earliest Holding Time 10/13/17

Batch Information	1st Level Reviewer	2nd Level Reviewer
Date and time accurate and entered into TALS correctly	✓	✓
All necessary batch information complete and entered into TALS correctly	✓	✓
BD, FV, and AL initials are transcribed into the batch comment	✓	✓
Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
Holding time violation NCM filed	✓	✓
MS/MSD or MS/DU NCM filed	✓	✓
NCM for any anomalies filed	✓	✓
All NCMs include method code, matrix, and prep batch	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Batch contains no more than 20 live samples	✓	✓
Worksheet Tab	1st Level Reviewer	2nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	✓	✓
The pH is transcribed properly in TALS	NA	NA
All additional information is transcribed into TALS and is correct and raw data is attached	✓	✓
Comments/Observations are transcribed correctly in TALS	✓	✓
Reagents Tab	1st Level Reviewer	2nd Level Reviewer
All necessary reagents not expired and checked into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Internal Standard is added to the reagents	✓	✓
All units are correctly transcribed into TALS	✓	✓

1st Level Reviewer: JW2 Date: 10/24/17

2nd Level Reviewer: VPM Date: 10/24/17

Comments: _____

Shipping and Receiving Documents

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

Chain of Custody Record 241871

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Jeff Orient	Site Contact: Kevin Lasonta	Date: 10/10/2017	COC No: 241871
Company Name: Tetra Tech	Tel/Fax: (412) 921-8778	Lab Contact: David Alltucker	Carrier: FedEx	1 of 1 COCs
Address: 661 Anderson Dr.	Analysis Turnaround Time			Sampler:
City/State/Zip: Pittsburg, PA 15220	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: (412) 921-8778	TAT if different from Below			Walk-in Client:
Fax:	☑ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site: Former NAS Brunswick GWETS	☐ 2 days			Job / SDG No.:
PO# 112G08005-WE21	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PFC (Full List) ug/kg/ms	Sample Specific Notes:
TP-PFC-022-TPI	10/10/17	1240	G	W	4	N	N	X	
TP-PFC-022-TPE	10/10/17	1250	G	W	4	N	N	X	KD4
TP-PFC-022-MID-CARBON	10/10/17	1245	G	W	4	N	N	X	
PP-PFC-022-TPE-D	10/10/17	0000	G	W	4	N	N	X	

320-32321 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 2.9 Corr'd: _____ | Therm ID No.: AK-02

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Tetra Tech	10/10/17 1730	[signature]	TAWS	10/11/17 0930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-32321-1

Login Number: 32321
List Number: 1
Creator: Aguayo, Alonso

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","360","ng/L","D","12","DL","","TRG","","","38","LOQ","YES","-99","","261.9","0.50","29",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","2058-94-8","Perfluoroundecanoic acid (PFUnA)","19","ng/L","U","7.1","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","2706-90-3","Perfluoropentanoic acid (PFPeA)","190","ng/L","D","9.4","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","307-24-4","Perfluorohexanoic acid (PFHxA)","360","ng/L","D","7.5","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","307-55-1","Perfluorododecanoic acid (PFDoA)","19","ng/L","U","5.6","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","1900","ng/L","D M","7.1","DL","","TRG","","","24","LOQ","YES","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","335-76-2","Perfluorodecanoic acid (PFDA)","9.5","ng/L","U","4.2","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","9.5",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","335-77-3","Perfluorodecanesulfonic acid (PFDS)","29","ng/L","U","12","DL","","TRG","","","38","LOQ","NO","-99","","261.9","0.50","29",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","470","ng/L","D","8.3","DL","","TRG","","","24","LOQ","YES","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","375-22-4","Perfluorobutanoic acid (PFBA)","67","ng/L","D","4.4","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","9.5",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","66","ng/L","D","8.8","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","77","ng/L","D","7.7","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid (PFHpS)","12","ng/L","J D","6.8","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","6.2","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","376-06-7","Perfluorotetradecanoic acid (PFTeA)","9.5","ng/L","U","3.8","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","9.5",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","72629-94-8","Perfluorotridecanoic Acid (PFTriA)","19","ng/L","U","5.3","DL","","TRG","","","24","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","754-91-6","Perfluorooctane Sulfonamide (FOSA)","11","ng/L","J D","6.1","DL","","TRG","","","380","LOQ","NO","-99","","261.9","0.50","19",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00990","13C4 PFOA","91","ng/L","","-99","DL","","TRG","96","","-99","LOQ","YES","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00991","13C4 PFOS","100","ng/L","","-99","DL","","TRG","114","","-99","LOQ","YES","91.3","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00992","13C4 PFBA","110","ng/L","","-99","DL","","TRG","120","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00993","13C2 PFHxA","100","ng/L","","-99","DL","","TRG","109","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00994","18O2 PFHxS","120","ng/L","","-99","DL","","TRG","132","","-99","LOQ","YES","90.3","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00995","13C5 PFNA","85","ng/L","","-99","DL","","TRG","89","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00996","13C2 PFDA","73","ng/L","","-99","DL","","TRG","76","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00997","13C2 PFUnA","73","ng/L","","-99","DL","","TRG","77","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL00998","13C2 PFDoA","75","ng/L","","-99","DL","","TRG","79","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL01056","13C8

FOSA","5.6","ng/L","Q","-99","DL","","TRG","6","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL01892","13C4-
PFHpA","110","ng/L","","-99","DL","","TRG","119","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL01893","13C5
PFPeA","100","ng/L","","-99","DL","","TRG","107","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL02116","13C2-
PFTeDA","92","ng/L","","-99","DL","","TRG","96","","-99","LOQ","NO","95.5","","261.9","0.50","950",""
"TP-PFC-022-TPI","537 (modified)","DL","320-32321-1","TALSAC","STL02337","13C3-
PFBS","100","ng/L","","-99","DL","","TRG","117","","-99","LOQ","NO","88.8","","261.9","0.50","0",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid
(PFOS)","360","ng/L","E","1.2","DL","","TRG","","","3.8","LOQ","NO","-99","","261.9","0.50","2.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","2058-94-8","Perfluoroundecanoic acid
(PFUnA)","1.9","ng/L","U","0.71","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","2706-90-3","Perfluoropentanoic acid
(PFPeA)","180","ng/L","","0.94","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","307-24-4","Perfluorohexanoic acid
(PFHxA)","310","ng/L","","0.75","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","307-55-1","Perfluorododecanoic acid
(PFDoA)","1.9","ng/L","U","0.56","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","335-67-1","Perfluorooctanoic acid
(PFOA)","1200","ng/L","E M","0.71","DL","","TRG","","","2.4","LOQ","NO","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","335-76-2","Perfluorodecanoic acid
(PFDA)","1.1","ng/L","J","0.42","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","0.95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","335-77-3","Perfluorodecanesulfonic acid
(PFDS)","2.9","ng/L","U","1.2","DL","","TRG","","","3.8","LOQ","YES","-99","","261.9","0.50","2.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","360","ng/L","E","0.83","DL","","TRG","","","2.4","LOQ","NO","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","375-22-4","Perfluorobutanoic acid
(PFBA)","63","ng/L","M","0.44","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","0.95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","61","ng/L","","0.88","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","82","ng/L","","0.77","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid
(PFHpS)","9.3","ng/L","","0.68","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","2.7","ng/L","","0.62","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","376-06-7","Perfluorotetradecanoic acid
(PFTeA)","0.63","ng/L","J","0.38","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","0.95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","72629-94-8","Perfluorotridecanoic Acid
(PFTriA)","0.65","ng/L","J","0.53","DL","","TRG","","","2.4","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","754-91-6","Perfluorooctane Sulfonamide
(FOSA)","4.6","ng/L","J","0.61","DL","","TRG","","","38","LOQ","YES","-99","","261.9","0.50","1.9",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00990","13C4
PFOA","60","ng/L","","-99","DL","","TRG","63","","-99","LOQ","NO","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00991","13C4
PFOS","94","ng/L","","-99","DL","","TRG","103","","-99","LOQ","YES","91.3","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00992","13C4
PFBA","67","ng/L","","-99","DL","","TRG","70","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00993","13C2
PFHxA","82","ng/L","","-99","DL","","TRG","86","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00994","18O2
PFHxS","93","ng/L","","-99","DL","","TRG","103","","-99","LOQ","NO","90.3","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00995","13C5

PFNA","75","ng/L","","-99","DL","","TRG","78","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00996","13C2
PFDA","76","ng/L","","-99","DL","","TRG","79","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00997","13C2
PFUnA","70","ng/L","","-99","DL","","TRG","73","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL00998","13C2
PFDoA","71","ng/L","","-99","DL","","TRG","75","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL01056","13C8
FOSA","3.9","ng/L","Q","-99","DL","","TRG","4","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL01892","13C4-
PFHpA","85","ng/L","","-99","DL","","TRG","89","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL01893","13C5
PFPeA","81","ng/L","","-99","DL","","TRG","84","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL02116","13C2-
PFTeDA","92","ng/L","","-99","DL","","TRG","97","","-99","LOQ","YES","95.5","","261.9","0.50","95",""
"TP-PFC-022-TPI","537 (modified)","RES","320-32321-1","TALSAC","STL02337","13C3-
PFBS","95","ng/L","","-99","DL","","TRG","107","","-99","LOQ","YES","88.8","","261.9","0.50","0",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid
(PFOS)","2.9","ng/L","U","1.2","DL","","TRG","","","3.9","LOQ","YES","-99","","259.2","0.50","2.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","2058-94-8","Perfluoroundecanoic acid
(PFUnA)","1.9","ng/L","U","0.72","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","2706-90-3","Perfluoropentanoic acid
(PFPeA)","48","ng/L","","0.95","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","307-24-4","Perfluorohexanoic acid
(PFHxA)","8.6","ng/L","","0.76","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","307-55-1","Perfluorododecanoic acid
(PFDoA)","1.9","ng/L","U","0.56","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","335-67-1","Perfluorooctanoic acid
(PFOA)","1.4","ng/L","J","0.72","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","335-76-2","Perfluorodecanoic acid
(PFDA)","0.96","ng/L","U","0.42","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","0.96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","335-77-3","Perfluorodecanesulfonic acid
(PFDS)","2.9","ng/L","U","1.2","DL","","TRG","","","3.9","LOQ","YES","-99","","259.2","0.50","2.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","1.9","ng/L","U","0.84","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","375-22-4","Perfluorobutanoic acid
(PFBA)","130","ng/L","","0.44","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","0.96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","1.9","ng/L","U","0.89","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","1.9","ng/L","U","0.77","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid
(PFHpS)","1.9","ng/L","U","0.69","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","1.9","ng/L","U","0.63","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","376-06-7","Perfluorotetradecanoic acid
(PFTeA)","0.96","ng/L","U","0.39","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","0.96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","72629-94-8","Perfluorotridecanoic Acid
(PFTriA)","1.9","ng/L","U","0.53","DL","","TRG","","","2.4","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","754-91-6","Perfluorooctane Sulfonamide
(FOSA)","1.9","ng/L","U","0.62","DL","","TRG","","","39","LOQ","YES","-99","","259.2","0.50","1.9",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00990","13C4
PFOA","82","ng/L","","-99","DL","","TRG","85","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00991","13C4

PFOS","87","ng/L","","-99","DL","","TRG","95","","-99","LOQ","YES","92.2","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00992","13C4
PFBA","73","ng/L","","-99","DL","","TRG","76","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00993","13C2
PFHxA","84","ng/L","","-99","DL","","TRG","87","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00994","18O2
PFHxS","98","ng/L","","-99","DL","","TRG","107","","-99","LOQ","YES","91.2","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00995","13C5
PFNA","69","ng/L","","-99","DL","","TRG","71","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00996","13C2
PFDA","64","ng/L","","-99","DL","","TRG","66","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00997","13C2
PFUnA","67","ng/L","","-99","DL","","TRG","69","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL00998","13C2
PFDoA","66","ng/L","","-99","DL","","TRG","69","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL01056","13C8
FOSA","4.0","ng/L","Q","-99","DL","","TRG","4","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL01892","13C4-
PFHpA","89","ng/L","","-99","DL","","TRG","93","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL01893","13C5
PFPeA","80","ng/L","","-99","DL","","TRG","83","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL02116","13C2-
PFTeDA","81","ng/L","","-99","DL","","TRG","84","","-99","LOQ","YES","96.5","","259.2","0.50","96",""
"TP-PFC-022-TPE","537 (modified)","RES","320-32321-2","TALSAC","STL02337","13C3-
PFBS","89","ng/L","","-99","DL","","TRG","100","","-99","LOQ","YES","89.7","","259.2","0.50","0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","1763-23-
1","Perfluorooctanesulfonic acid
(PFOS)","3.0","ng/L","U","1.3","DL","","TRG","","","4.0","LOQ","YES","-99","","253.1","0.50","3.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","2058-94-8","Perfluoroundecanoic
acid (PFUnA)","2.0","ng/L","U","0.74","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","2706-90-3","Perfluoropentanoic
acid (PFPeA)","63","ng/L","","0.98","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","307-24-4","Perfluorohexanoic
acid (PFHxA)","5.5","ng/L","","0.78","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","307-55-1","Perfluorododecanoic
acid (PFDoA)","2.0","ng/L","U","0.58","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","335-67-1","Perfluorooctanoic
acid (PFOA)","0.83","ng/L","J M","0.74","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","335-76-2","Perfluorodecanoic
acid (PFDA)","0.99","ng/L","U","0.43","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","0.99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","335-77-
3","Perfluorodecanesulfonic acid
(PFDS)","3.0","ng/L","U","1.2","DL","","TRG","","","4.0","LOQ","YES","-99","","253.1","0.50","3.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","355-46-
4","Perfluorohexanesulfonic acid
(PFHxS)","2.0","ng/L","U","0.86","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","375-22-4","Perfluorobutanoic
acid (PFBA)","150","ng/L","","0.45","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","0.99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","375-73-
5","Perfluorobutanesulfonic acid
(PFBS)","2.0","ng/L","U","0.91","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","375-85-9","Perfluoroheptanoic
acid (PFHpA)","2.0","ng/L","U","0.79","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","375-92-

8","Perfluoroheptanesulfonic Acid
(PFHpS)","2.0","ng/L","U","0.70","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","375-95-1","Perfluorononanoic
acid (PFNA)","2.0","ng/L","U","0.65","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","376-06-
7","Perfluorotetradecanoic acid
(PFTeA)","0.99","ng/L","U","0.40","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","0.99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","72629-94-
8","Perfluorotridecanoic Acid
(PFTriA)","2.0","ng/L","U","0.54","DL","","TRG","","","2.5","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","754-91-6","Perfluorooctane
Sulfonamide
(FOSA)","2.0","ng/L","U","0.63","DL","","TRG","","","40","LOQ","YES","-99","","253.1","0.50","2.0",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00990","13C4
PFOA","89","ng/L","","-99","DL","","TRG","90","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00991","13C4
PFOS","92","ng/L","","-99","DL","","TRG","98","","-99","LOQ","YES","94.4","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00992","13C4
PFBA","82","ng/L","","-99","DL","","TRG","83","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00993","13C2
PFHxA","95","ng/L","","-99","DL","","TRG","96","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00994","18O2
PFHxS","100","ng/L","","-99","DL","","TRG","107","","-99","LOQ","YES","93.4","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00995","13C5
PFNA","83","ng/L","","-99","DL","","TRG","84","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00996","13C2
PFDA","80","ng/L","","-99","DL","","TRG","81","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00997","13C2
PFUnA","78","ng/L","","-99","DL","","TRG","79","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL00998","13C2
PFDoA","83","ng/L","","-99","DL","","TRG","84","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL01056","13C8
FOSA","2.5","ng/L","Q","-99","DL","","TRG","3","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL01892","13C4-
PFHpA","96","ng/L","","-99","DL","","TRG","97","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL01893","13C5
PFPeA","89","ng/L","","-99","DL","","TRG","90","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL02116","13C2-
PFTeDA","96","ng/L","","-99","DL","","TRG","97","","-99","LOQ","YES","98.8","","253.1","0.50","99",""
"TP-PFC-022-MID-CARBON","537 (modified)","RES","320-32321-3","TALSAC","STL02337","13C3-
PFBS","94","ng/L","","-99","DL","","TRG","102","","-99","LOQ","YES","91.9","","253.1","0.50","0",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","1763-23-1","Perfluorooctanesulfonic acid
(PFOS)","2.9","ng/L","U","1.2","DL","","TRG","","","3.9","LOQ","YES","-99","","257.3","0.50","2.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","2058-94-8","Perfluoroundecanoic acid
(PFUnA)","1.9","ng/L","U","0.73","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","2706-90-3","Perfluoropentanoic acid
(PFPeA)","46","ng/L","","0.96","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","307-24-4","Perfluorohexanoic acid
(PFHxA)","8.3","ng/L","","0.76","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","307-55-1","Perfluorododecanoic acid
(PFDoA)","1.9","ng/L","U","0.57","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","335-67-1","Perfluorooctanoic acid
(PFOA)","0.76","ng/L","J","0.73","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","335-76-2","Perfluorodecanoic acid

(PFDA)","0.97","ng/L","U","0.43","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","0.97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","335-77-3","Perfluorodecanesulfonic acid
(PFDS)","2.9","ng/L","U","1.2","DL","","TRG","","","3.9","LOQ","YES","-99","","257.3","0.50","2.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","1.9","ng/L","U","0.85","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","375-22-4","Perfluorobutanoic acid
(PFBA)","130","ng/L","","0.45","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","0.97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","1.9","ng/L","U","0.89","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","1.9","ng/L","U","0.78","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid
(PFHpS)","1.9","ng/L","U","0.69","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","1.9","ng/L","U","0.64","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","376-06-7","Perfluorotetradecanoic acid
(PFTeA)","0.97","ng/L","U","0.39","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","0.97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","72629-94-8","Perfluorotridecanoic Acid
(PFTriA)","1.9","ng/L","U","0.54","DL","","TRG","","","2.4","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","754-91-6","Perfluorooctane Sulfonamide
(FOSA)","1.9","ng/L","U","0.62","DL","","TRG","","","39","LOQ","YES","-99","","257.3","0.50","1.9",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00990","13C4
PFOA","90","ng/L","","-99","DL","","TRG","93","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00991","13C4
PFOS","89","ng/L","","-99","DL","","TRG","96","","-99","LOQ","YES","92.9","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00992","13C4
PFBA","80","ng/L","","-99","DL","","TRG","82","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00993","13C2
PFHxA","91","ng/L","","-99","DL","","TRG","94","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00994","18O2
PFHxS","98","ng/L","","-99","DL","","TRG","106","","-99","LOQ","YES","91.9","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00995","13C5
PFNA","85","ng/L","","-99","DL","","TRG","87","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00996","13C2
PFDA","86","ng/L","","-99","DL","","TRG","88","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00997","13C2
PFUnA","78","ng/L","","-99","DL","","TRG","81","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL00998","13C2
PFDoA","74","ng/L","","-99","DL","","TRG","76","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL01056","13C8
FOSA","1.5","ng/L","Q","-99","DL","","TRG","2","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL01892","13C4-
PFHpA","98","ng/L","","-99","DL","","TRG","101","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL01893","13C5
PFPeA","88","ng/L","","-99","DL","","TRG","91","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL02116","13C2-
PFTeDA","88","ng/L","","-99","DL","","TRG","91","","-99","LOQ","YES","97.2","","257.3","0.50","97",""
"TP-PFC-022-TPE-D","537 (modified)","RES","320-32321-4","TALSAC","STL02337","13C3-
PFBS","90","ng/L","","-99","DL","","TRG","100","","-99","LOQ","YES","90.4","","257.3","0.50","0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","1763-23-
1","Perfluorooctanesulfonic acid
(PFOS)","37.6","ng/L","","1.3","DL","","SPK","101","","4.0","LOQ","YES","37.1","","250","0.50","3.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","2058-94-
8","Perfluoroundecanoic acid

(PFUnA)","38.8","ng/L","","0.75","DL","","SPK","97","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","2706-90-3","Perfluoropentanoic
acid (PFPeA)","41.1","ng/L","","0.99","DL","","SPK","103","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","307-24-4","Perfluorohexanoic
acid (PFHxA)","40.7","ng/L","","0.79","DL","","SPK","102","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","307-55-1","Perfluorododecanoic
acid (PFDoA)","41.8","ng/L","","0.58","DL","","SPK","104","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","335-67-1","Perfluorooctanoic
acid (PFOA)","40.3","ng/L","","0.75","DL","","SPK","101","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","335-76-2","Perfluorodecanoic
acid (PFDA)","40.8","ng/L","","0.44","DL","","SPK","102","","2.5","LOQ","YES","40.0","","250","0.50","1.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","335-77-
3","Perfluorodecanesulfonic acid
(PFDS)","38.0","ng/L","","1.2","DL","","SPK","98","","4.0","LOQ","YES","38.6","","250","0.50","3.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","355-46-
4","Perfluorohexanesulfonic acid
(PFHxS)","37.8","ng/L","","0.87","DL","","SPK","104","","2.5","LOQ","YES","36.4","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","375-22-4","Perfluorobutanoic
acid (PFBA)","43.6","ng/L","","0.46","DL","","SPK","109","","2.5","LOQ","YES","40.0","","250","0.50","1.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","375-73-
5","Perfluorobutanesulfonic acid
(PFBS)","37.6","ng/L","","0.92","DL","","SPK","106","","2.5","LOQ","YES","35.4","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","375-85-9","Perfluoroheptanoic
acid (PFHpA)","41.6","ng/L","","0.80","DL","","SPK","104","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","375-92-
8","Perfluoroheptanesulfonic Acid
(PFHpS)","42.5","ng/L","","0.71","DL","","SPK","112","","2.5","LOQ","YES","38.1","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","375-95-1","Perfluorononanoic
acid (PFNA)","38.5","ng/L","","0.65","DL","","SPK","96","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","376-06-
7","Perfluorotetradecanoic acid
(PFTeA)","40.8","ng/L","","0.40","DL","","SPK","102","","2.5","LOQ","YES","40.0","","250","0.50","1.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","72629-94-
8","Perfluorotridecanoic Acid
(PFTriA)","46.2","ng/L","","0.55","DL","","SPK","115","","2.5","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","754-91-6","Perfluorooctane
Sulfonamide
(FOSA)","40.7","ng/L","","0.64","DL","","SPK","102","","40","LOQ","YES","40.0","","250","0.50","2.0",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00990","13C4
PFOA","113","ng/L","","-99","DL","","SPK","113","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00991","13C4
PFOS","104","ng/L","","-99","DL","","SPK","109","","-99","LOQ","YES","95.6","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00992","13C4
PFBA","111","ng/L","","-99","DL","","SPK","111","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00993","13C2
PFHxA","110","ng/L","","-99","DL","","SPK","110","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00994","18O2
PFHxS","106","ng/L","","-99","DL","","SPK","112","","-99","LOQ","YES","94.6","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00995","13C5
PFNA","111","ng/L","","-99","DL","","SPK","111","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00996","13C2
PFDA","117","ng/L","","-99","DL","","SPK","117","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00997","13C2
PFUnA","105","ng/L","","-99","DL","","SPK","105","","-99","LOQ","YES","100","","250","0.50","100",""

"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL00998","13C2 PFDoA","98.9","ng/L","","-99","DL","","SPK","99","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL01056","13C8 FOSA","48.3","ng/L","","-99","DL","","SPK","48","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL01892","13C4-PFHpA","118","ng/L","","-99","DL","","SPK","118","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL01893","13C5 PFPeA","109","ng/L","","-99","DL","","SPK","109","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL02116","13C2-PFTeDA","107","ng/L","","-99","DL","","SPK","107","","-99","LOQ","YES","100","","250","0.50","100",""
"LCS 320-190551/2-A","537 (modified)","RES","LCS 320-190551/2-A","TALSAC","STL02337","13C3-PFBS","102","ng/L","","-99","DL","","SPK","110","","-99","LOQ","YES","93.0","","250","0.50","0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","39.6","ng/L","","1.3","DL","","SPK","107","5","4.0","LOQ","YES","37.1","LCS 320-190551/2-A","250","0.50","3.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","2058-94-8","Perfluoroundecanoic acid (PFUnA)","39.5","ng/L","","0.75","DL","","SPK","99","2","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","2706-90-3","Perfluoropentanoic acid (PFPeA)","40.8","ng/L","","0.99","DL","","SPK","102","1","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","307-24-4","Perfluorohexanoic acid (PFHxA)","41.1","ng/L","","0.79","DL","","SPK","103","1","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","307-55-1","Perfluorododecanoic acid (PFDoA)","42.4","ng/L","","0.58","DL","","SPK","106","2","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","41.7","ng/L","","0.75","DL","","SPK","104","3","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","335-76-2","Perfluorodecanoic acid (PFDA)","41.3","ng/L","","0.44","DL","","SPK","103","1","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","1.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","335-77-3","Perfluorodecanesulfonic acid (PFDS)","39.8","ng/L","","1.2","DL","","SPK","103","5","4.0","LOQ","YES","38.6","LCS 320-190551/2-A","250","0.50","3.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","38.3","ng/L","","0.87","DL","","SPK","105","1","2.5","LOQ","YES","36.4","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","375-22-4","Perfluorobutanoic acid (PFBA)","43.9","ng/L","","0.46","DL","","SPK","110","1","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","1.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid

(PFBS)","36.7","ng/L","","0.92","DL","","SPK","104","2","2.5","LOQ","YES","35.4","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","42.4","ng/L","","0.80","DL","","SPK","106","2","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid
(PFHpS)","44.1","ng/L","","0.71","DL","","SPK","116","4","2.5","LOQ","YES","38.1","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","41.5","ng/L","","0.65","DL","","SPK","104","7","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","376-06-7","Perfluorotetradecanoic acid
(PFTeA)","40.9","ng/L","","0.40","DL","","SPK","102","0","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","1.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","72629-94-8","Perfluorotridecanoic Acid
(PFTriA)","48.1","ng/L","","0.55","DL","","SPK","120","4","2.5","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","754-91-6","Perfluorooctane Sulfonamide (FOSA)","41.6","ng/L","","0.64","DL","","SPK","104","2","40","LOQ","YES","40.0","LCS 320-190551/2-A","250","0.50","2.0",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00990","13C4 PFOA","106","ng/L","","-99","DL","","SPK","106","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00991","13C4 PFOS","96.3","ng/L","","-99","DL","","SPK","101","","-99","LOQ","YES","95.6","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00992","13C4 PFBA","107","ng/L","","-99","DL","","SPK","107","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00993","13C2 PFHxA","104","ng/L","","-99","DL","","SPK","104","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00994","18O2 PFHxS","104","ng/L","","-99","DL","","SPK","110","","-99","LOQ","YES","94.6","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00995","13C5 PFNA","102","ng/L","","-99","DL","","SPK","102","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00996","13C2 PFDA","112","ng/L","","-99","DL","","SPK","112","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00997","13C2 PFUnA","101","ng/L","","-99","DL","","SPK","101","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL00998","13C2 PFDoA","96.9","ng/L","","-99","DL","","SPK","97","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL01056","13C8 FOSA","55.5","ng/L","","-99","DL","","SPK","56","","-99","LOQ","YES","100","LCS 320-190551/2-

A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL01892","13C4-PFHpA","111","ng/L","","-99","DL","","SPK","111","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL01893","13C5-PFPeA","102","ng/L","","-99","DL","","SPK","102","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL02116","13C2-PFTeDA","106","ng/L","","-99","DL","","SPK","106","","-99","LOQ","YES","100","LCS 320-190551/2-A","250","0.50","100",""
"LCSD 320-190551/3-A","537 (modified)","RES","LCSD 320-190551/3-A","TALSAC","STL02337","13C3-PFBS","98.1","ng/L","","-99","DL","","SPK","106","","-99","LOQ","YES","93.0","LCS 320-190551/2-A","250","0.50","0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","3.0","ng/L","U","1.3","DL","","TRG","","","4.0","LOQ","YES","-99","","250","0.50","3.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","2058-94-8","Perfluoroundecanoic acid (PFUnA)","2.0","ng/L","U","0.75","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","2706-90-3","Perfluoropentanoic acid (PFPeA)","2.0","ng/L","U","0.99","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","307-24-4","Perfluorohexanoic acid (PFHxA)","2.0","ng/L","U","0.79","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","307-55-1","Perfluorododecanoic acid (PFDoA)","2.0","ng/L","U","0.58","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","2.0","ng/L","U M","0.75","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","335-76-2","Perfluorodecanoic acid (PFDA)","1.0","ng/L","U","0.44","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","1.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","335-77-3","Perfluorodecanesulfonic acid (PFDS)","3.0","ng/L","U","1.2","DL","","TRG","","","4.0","LOQ","YES","-99","","250","0.50","3.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","2.0","ng/L","U","0.87","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","375-22-4","Perfluorobutanoic acid (PFBA)","1.0","ng/L","U","0.46","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","1.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","2.0","ng/L","U","0.92","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","2.0","ng/L","U","0.80","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","375-92-8","Perfluoroheptanesulfonic Acid (PFHpS)","2.0","ng/L","U","0.71","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","2.0","ng/L","U","0.65","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","376-06-7","Perfluorotetradecanoic acid (PFTeA)","0.627","ng/L","J","0.40","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","1.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","72629-94-8","Perfluorotridecanoic Acid (PFTriA)","2.0","ng/L","U","0.55","DL","","TRG","","","2.5","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","754-91-6","Perfluorooctane Sulfonamide (FOSA)","2.0","ng/L","U","0.64","DL","","TRG","","","40","LOQ","YES","-99","","250","0.50","2.0",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00990","13C4

PFOA","105","ng/L","","-99","DL","","TRG","105","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00991","13C4
PFOS","98.4","ng/L","","-99","DL","","TRG","103","","-99","LOQ","YES","95.6","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00992","13C4
PFBA","105","ng/L","","-99","DL","","TRG","105","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00993","13C2
PFHxA","104","ng/L","","-99","DL","","TRG","104","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00994","18O2
PFHxS","102","ng/L","","-99","DL","","TRG","108","","-99","LOQ","YES","94.6","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00995","13C5
PFNA","102","ng/L","","-99","DL","","TRG","102","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00996","13C2
PFDA","112","ng/L","","-99","DL","","TRG","112","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00997","13C2
PFUnA","100","ng/L","","-99","DL","","TRG","100","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL00998","13C2
PFDoA","92.8","ng/L","","-99","DL","","TRG","93","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL01056","13C8
FOSA","50.0","ng/L","","-99","DL","","TRG","50","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL01892","13C4-
PFHpA","114","ng/L","","-99","DL","","TRG","114","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL01893","13C5
PFPeA","102","ng/L","","-99","DL","","TRG","102","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL02116","13C2-
PFTeDA","99.6","ng/L","","-99","DL","","TRG","100","","-99","LOQ","YES","100","","250","0.50","100",""
"MB 320-190551/1-A","537 (modified)","RES","MB 320-190551/1-A","TALSAC","STL02337","13C3-
PFBS","93.2","ng/L","","-99","DL","","TRG","100","","-99","LOQ","YES","93.0","","250","0.50","0",""
"Unknown","Unknown","TP-PFC-022-TPI","10/10/2017 12:40","AQ","320-32321-1","NM","","2.90","537
(modified)","3535","DL","10/23/2017 08:13","10/31/2017
02:32","TALSAC","COA","WET","NA","10","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
"Unknown","Unknown","TP-PFC-022-TPI","10/10/2017 12:40","AQ","320-32321-1","NM","","2.90","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
04:01","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
"Unknown","Unknown","TP-PFC-022-TPE","10/10/2017 12:50","AQ","320-32321-2","NM","","2.90","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:39","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
"Unknown","Unknown","TP-PFC-022-MID-CARBON","10/10/2017 12:45","AQ","320-32321-
3","NM","","2.90","537 (modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:46","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
"Unknown","Unknown","TP-PFC-022-TPE-D","10/10/2017 00:00","AQ","320-32321-4","FD","","2.90","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:52","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
"Unknown","Unknown","LCS 320-190551/2-A","","AQ","LCS 320-190551/2-A","LCS","","-99","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:18","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/23/2017 08:13","10/12/2017 13:25",""
"Unknown","Unknown","LCSD 320-190551/3-A","","AQ","LCSD 320-190551/3-A","LCSD","","-99","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:25","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-

192039","320-32321-1","10/23/2017 08:13","10/12/2017 13:25",""
"Unknown","Unknown","MB 320-190551/1-A","","AQ","MB 320-190551/1-A","MB","","-99","537
(modified)","3535","RES","10/23/2017 08:13","10/31/2017
02:11","TALSAC","COA","WET","NA","1","NA","NA","","100","320-190551","320-190551","NA","320-
192039","320-32321-1","10/23/2017 08:13","10/12/2017 13:25",""

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **J. ORIENT** **DATE:** **NOVEMEBER 17, 2017**

FROM: **MICHELLE L. ALLEN** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – POLYFLUOROALKYL SUBSTANCES (PFAS)**
FORMER NAVAL AIR STATION (NAS) BRUNSWICK, BRUNSWICK, ME
CTO WE21 PFC ASSESSMENT
SAMPLE DELIVERY GROUP (SDG) 320-32321-1

SAMPLES: 4/Aqueous/PFAS

TP-PFC-022-MID-CARBON TP-PFC-022-TPE TP-PFC-022-TPE-D
TP-PFC-022-TPI

Overview

The sample set for former NAS Brunswick, SDG 320-32321-1 consisted of four (4) aqueous environmental samples. All four (4) aqueous samples were analyzed for Polyfluoroalkyl Substances (PFAS). One field duplicate pair was included in this Sample Delivery Groups (SDG): TP-PFC-022-TPE/TP-PFC-022-TPE-D.

The samples were collected by Tetra Tech, Inc. on October 10, 2017 and analyzed by Test America, Inc. The analyses were conducted using EPA Method 537 (Modified) analytical and reporting protocols. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times/Sample Preservation
* • LC/MS Tuning
* • Initial and Continuing Calibration Results
• Laboratory Method Blank Results
• Surrogate Spike Recoveries
* • Laboratory Control Sample/Laboratory Control Sample Duplicate Results
* • Field Duplicate Precision
* • Detection Limits
* • Compound Identification and Quantification

The asterisk (*) indicates that all quality control criteria were met for this parameter. Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B, and Appendix C contains the documentation to support the findings as discussed in this data validation report. An EPA Region 1 tier II validation was performed on the data in this SDG. The text of this report has been formulated to address only those areas affecting data quality.

LABORATORY METHOD BLANK RESULTS

The following compound was detected in the laboratory method blank at the following maximum concentration:

Analyte	Concentration (ng/L)	Action Level Limit of Quantitation (LOQ) > or <
Perfluorotetradecanoic acid (PFTeA) (1)	0.627	<

(1) - Maximum concentration detected in the laboratory method blank, MB 320-190551/1-A, from preparation batch #320-190551 affecting all samples.

The detected result reported for this compound below the LOQ was qualified as non-detected, (U).

SURROGATE SPIKE RECOVERIES

The Percent Recoveries (%Rs) for the surrogate spike compound, 13C8-perfluorooctane sulfonamide (13C8-FOSA) were below 10% in all the samples. According to the laboratory case narrative, the results for the re-reanalyses of samples confirmed the results. The %Rs for 13C8-FOSA for the reanalyses were not provided for these samples on the surrogate summary Form IIs. The results from the initial analyses of these samples were used in the data validation. The detected result reported for perfluorooctane sulfonamide (FOSA) in sample TP-PFC-022-TPI was qualified as estimated, (J). The remaining non-detected results reported for FOSA were qualified as rejected, (UR).

NOTES

Field Reagent Blanks (FRBs) were not provided with the environmental samples.

The concentrations of pentadecafluorooctanoic acid (perfluorooctanoic acid (PFOA)), perfluorooctanesulfonic acid (PFOS), and perfluorohexanesulfonic acid (PFHxA) exceeded the instrument calibration range in sample TP-PFC-022-TPI. The sample was reanalyzed at a 10X dilution. The results for these compounds from the dilution were used in the data validation.

Detected results reported below the LOQ but above the Detection Limit (DL) were qualified as estimated, (J). Non-detected results are reported to the Limit of Detection (LOD).

EXECUTIVE SUMMARY

Laboratory Performance: A contaminant was detected in the laboratory method blank. Surrogate spike %Rs were below 10% for 13C8-FOSA.

Other Factors Affecting Data Quality: One sample was further diluted. Detected results below the LOQ were estimated.

The data for these analyses were reviewed with reference to the EPA New England Environmental Data Review Supplement for Regional Data Review Elements Superfund Guidance/Procedures (April 2013), National Functional Guidelines for Organic Data Validation (January 2017), and the Department of Defense (DoD) document entitled, "Quality Systems Manual (QSM) for Environmental Laboratories" (July 2013). The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Environmental Chemist

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:

Appendix A - Qualified Analytical Results
Appendix B - Results as reported by the Laboratory
Appendix C - Support Documentation

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08005-WE21	NSAMPLE	TP-PFC-022-MID-CARBON			TP-PFC-022-TPE			TP-PFC-022-TPE-D			TP-PFC-022-TPI		
SDG: 320-32321-1	LAB_ID	320-32321-3			320-32321-2			320-32321-4			320-32321-1		
FRACTION: PFAS	SAMP_DATE	10/10/2017			10/10/2017			10/10/2017			10/10/2017		
MEDIA: WATER	QC_TYPE	NM			NM			FD			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID		0.83	J	P	1.4	J	P	0.76	J	P			
PERFLUOROBUTANESULFONIC ACID		2	U		1.9	U		1.9	U		61		
PERFLUOROBUTANOIC ACID		150			130			130			63		
PERFLUORODECANE SULFONIC ACID		3	U		2.9	U		2.9	U		2.9	U	
PERFLUORODECANOIC ACID		0.99	U		0.96	U		0.97	U		1.1	J	P
PERFLUORODODECANOIC ACID		2	U		1.9	U		1.9	U		1.9	U	
PERFLUOROHEPTANESULFONIC ACID		2	U		1.9	U		1.9	U		9.3		
PERFLUOROHEPTANOIC ACID		2	U		1.9	U		1.9	U		82		
PERFLUOROHEXANESULFONIC ACID		2	U		1.9	U		1.9	U				
PERFLUOROHEXANOIC ACID		5.5			8.6			8.3			310		
PERFLUORONONANOIC ACID		2	U		1.9	U		1.9	U		2.7		
PERFLUOROOCTANE SULFONAMIDE		2	UR	R	1.9	UR	R	1.9	UR	R	4.6	J	PR
PERFLUOROOCTANE SULFONIC ACID		3	U		2.9	U		2.9	U				
PERFLUOROPENTANOIC ACID		63			48			46			180		
PERFLUOROTETRADECANOIC ACID		0.99	U		0.96	U		0.97	U		0.63	U	A
PERFLUOROTRIDECANOIC ACID		2	U		1.9	U		1.9	U		0.65	J	P
PERFLUOROUNDECANOIC ACID		2	U		1.9	U		1.9	U		1.9	U	

PROJ_NO: 08005-WE21	NSAMPLE	TP-PFC-022-TPI-DL		
SDG: 320-32321-1	LAB_ID	320-32321-1		
FRACTION: PFAS	SAMP_DATE	10/10/2017		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	NG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID		1900		
PERFLUOROBUTANESULFONIC ACID				
PERFLUOROBUTANOIC ACID				
PERFLUORODECANE SULFONIC ACID				
PERFLUORODECANOIC ACID				
PERFLUORODODECANOIC ACID				
PERFLUOROHEPTANESULFONIC ACID				
PERFLUOROHEPTANOIC ACID				
PERFLUOROHEXANESULFONIC ACID				
PERFLUOROHEXANOIC ACID		360		
PERFLUORONONANOIC ACID				
PERFLUOROOCTANE SULFONAMIDE				
PERFLUOROOCTANE SULFONIC ACID		360		
PERFLUOROPENTANOIC ACID				
PERFLUOROTETRADECANOIC ACID				
PERFLUOROTRIDECANOIC ACID				
PERFLUOROUNDECANOIC ACID				

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI | Lab Sample ID: 320-32321-1

Matrix: Water | Lab File ID: 2017.10.30AAA_033.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 04:01

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	63	M	2.4	0.95	0.44
2706-90-3	Perfluoropentanoic acid (PFPeA)	180		2.4	1.9	0.94
307-24-4	Perfluorohexanoic acid (PFHxA)	310		2.4	1.9	0.75
375-85-9	Perfluoroheptanoic acid (PFHpA)	82		2.4	1.9	0.77
335-67-1	*Perfluorooctanoic acid (PFOA)*	*1200*	*E M*	*2.4*	1.9	*0.71*
375-95-1	Perfluorononanoic acid (PFNA)	2.7		2.4	1.9	0.62
335-76-2	Perfluorodecanoic acid (PFDA)	1.1	J	2.4	0.95	0.42
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.71
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	0.65	J	2.4	1.9	0.53
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.63	J	2.4	0.95	0.38
375-73-5	Perfluorobutanesulfonic acid (PFBS)	61		2.4	1.9	0.88
355-46-4	*Perfluorohexanesulfonic acid (PFHxS)*	*360*	*E*	*2.4*	1.9	*0.83*
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	9.3		2.4	1.9	0.68
1763-23-1	*Perfluorooctanesulfonic acid (PFOS)*	*360*	*E*	*3.8*	2.9	*1.2*
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.8	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	4.6	J	38	1.9	0.61

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI | Lab Sample ID: 320-32321-1

Matrix: Water | Lab File ID: 2017.10.30AAA_033.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 04:01

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	4	Q	25-150
STL00992	13C4 PFBA	70		25-150
STL00993	13C2 PFHxA	86		25-150
STL00990	13C4 PFOA	63		25-150
STL00995	13C5 PFNA	78		25-150
STL00996	13C2 PFDA	79		25-150
STL00997	13C2 PFUnA	73		25-150
STL00998	13C2 PFDoA	75		25-150
STL00994	18O2 PFHxS	103		25-150
STL00991	13C4 PFOS	103		25-150
STL02116	13C2-PFTeDA	97		25-150
STL01892	13C4-PFHpA	89		25-150
STL01893	13C5 PFPeA	84		25-150
STL02337	13C3-PFBS	107		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI DL | Lab Sample ID: 320-32321-1 DL

Matrix: Water | Lab File ID: 2017.10.30AAA_020.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 02:32

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 10

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	*Perfluorobutanoic acid (PFBA)*	*67*	*D*	*24*	9.5	*4.4*
2706-90-3	*Perfluoropentanoic acid (PFPeA)*	*190*	*D*	*24*	19	*9.4*
307-24-4	*Perfluorohexanoic acid (PFHxA)*	*360*	*D*	*24*	19	*7.5*
375-85-9	*Perfluoroheptanoic acid (PFHpA)*	*77*	*D*	*24*	19	*7.7*
335-67-1	Perfluorooctanoic acid (PFOA)	1900	D M	24	19	7.1
375-95-1	*Perfluorononanoic acid (PFNA)*	*19*	*U*	*24*	19	*6.2*
335-76-2	*Perfluorodecanoic acid (PFDA)*	*9.5*	*U*	*24*	9.5	*4.2*
2058-94-8	*Perfluoroundecanoic acid (PFUnA)*	*19*	*U*	*24*	19	*7.1*
307-55-1	*Perfluorododecanoic acid (PFDoA)*	*19*	*U*	*24*	19	*5.6*
72629-94-8	*Perfluorotridecanoic Acid (PFTriA)*	*19*	*U*	*24*	19	*5.3*
376-06-7	*Perfluorotetradecanoic acid (PFTeA)*	*9.5*	*U*	*24*	9.5	*3.8*
375-73-5	*Perfluorobutanesulfonic acid (PFBS)*	*66*	*D*	*24*	19	*8.8*
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	470	D	24	19	8.3
375-92-8	*Perfluoroheptanesulfonic Acid (PFHpS)*	*12*	*J D*	*24*	19	*6.8*
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	360	D	38	29	12
335-77-3	*Perfluorodecanesulfonic acid (PFDS)*	*29*	*U*	*38*	29	*12*
754-91-6	*Perfluorooctane Sulfonamide (FOSA)*	*11*	*J D*	*380*	19	*6.1*

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPI DL | Lab Sample ID: 320-32321-1 DL

Matrix: Water | Lab File ID: 2017.10.30AAA_020.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:40

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 261.9(mL) | Date Analyzed: 10/31/2017 02:32

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 10

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	6	Q	25-150
STL00992	13C4 PFBA	120		25-150
STL00993	13C2 PFHxA	109		25-150
STL00990	13C4 PFOA	96		25-150
STL00995	13C5 PFNA	89		25-150
STL00996	13C2 PFDA	76		25-150
STL00997	13C2 PFUnA	77		25-150
STL00998	13C2 PFDoA	79		25-150
STL00994	18O2 PFHxS	132		25-150
STL00991	13C4 PFOS	114		25-150
STL02116	13C2-PFTeDA	96		25-150
STL01892	13C4-PFHpA	119		25-150
STL01893	13C5 PFPeA	107		25-150
STL02337	13C3-PFBS	117		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE | Lab Sample ID: 320-32321-2

Matrix: Water | Lab File ID: 2017.10.30AAA_021.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:50

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 259.2(mL) | Date Analyzed: 10/31/2017 02:39

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	130		2.4	0.96	0.44
2706-90-3	Perfluoropentanoic acid (PFPeA)	48		2.4	1.9	0.95
307-24-4	Perfluorohexanoic acid (PFHxA)	8.6		2.4	1.9	0.76
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
335-67-1	Perfluorooctanoic acid (PFOA)	1.4	J	2.4	1.9	0.72
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
335-76-2	Perfluorodecanoic acid (PFDA)	0.96	U	2.4	0.96	0.42
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.72
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.56
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	1.9	0.53
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.96	U	2.4	0.96	0.39
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	1.9	0.62

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE | Lab Sample ID: 320-32321-2

Matrix: Water | Lab File ID: 2017.10.30AAA_021.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:50

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 259.2(mL) | Date Analyzed: 10/31/2017 02:39

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	4	Q	25-150
STL00992	13C4 PFBA	76		25-150
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	85		25-150
STL00995	13C5 PFNA	71		25-150
STL00996	13C2 PFDA	66		25-150
STL00997	13C2 PFUnA	69		25-150
STL00998	13C2 PFDoA	69		25-150
STL00994	18O2 PFHxS	107		25-150
STL00991	13C4 PFOS	95		25-150
STL02116	13C2-PFTeDA	84		25-150
STL01892	13C4-PFHpA	93		25-150
STL01893	13C5 PFPeA	83		25-150
STL02337	13C3-PFBS	100		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-MID-CARBON | Lab Sample ID: 320-32321-3

Matrix: Water | Lab File ID: 2017.10.30AAA_022.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:45

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 253.1(mL) | Date Analyzed: 10/31/2017 02:46

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	150		2.5	0.99	0.45
2706-90-3	Perfluoropentanoic acid (PFPeA)	63		2.5	2.0	0.98
307-24-4	Perfluorohexanoic acid (PFHxA)	5.5		2.5	2.0	0.78
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79
335-67-1	Perfluorooctanoic acid (PFOA)	0.83	J M	2.5	2.0	0.74
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	0.99	U	2.5	0.99	0.43
2058-94-8	Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	2.0	0.74
307-55-1	Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	2.0	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.99	U	2.5	0.99	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.91
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	2.0	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	2.0	0.63

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-MID-CARBON | Lab Sample ID: 320-32321-3

Matrix: Water | Lab File ID: 2017.10.30AAA_022.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 12:45

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 253.1(mL) | Date Analyzed: 10/31/2017 02:46

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	3	Q	25-150
STL00992	13C4 PFBA	83		25-150
STL00993	13C2 PFHxA	96		25-150
STL00990	13C4 PFOA	90		25-150
STL00995	13C5 PFNA	84		25-150
STL00996	13C2 PFDA	81		25-150
STL00997	13C2 PFUnA	79		25-150
STL00998	13C2 PFDoA	84		25-150
STL00994	18O2 PFHxS	107		25-150
STL00991	13C4 PFOS	98		25-150
STL02116	13C2-PFTeDA	97		25-150
STL01892	13C4-PFHpA	97		25-150
STL01893	13C5 PFPeA	90		25-150
STL02337	13C3-PFBS	102		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE-D | Lab Sample ID: 320-32321-4

Matrix: Water | Lab File ID: 2017.10.30AAA_023.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 00:00

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 257.3(mL) | Date Analyzed: 10/31/2017 02:52

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	130		2.4	0.97	0.45
2706-90-3	Perfluoropentanoic acid (PFPeA)	46		2.4	1.9	0.96
307-24-4	Perfluorohexanoic acid (PFHxA)	8.3		2.4	1.9	0.76
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.78
335-67-1	Perfluorooctanoic acid (PFOA)	0.76	J	2.4	1.9	0.73
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.64
335-76-2	Perfluorodecanoic acid (PFDA)	0.97	U	2.4	0.97	0.43
2058-94-8	Perfluoroundecanoic acid (PFUnA)	1.9	U	2.4	1.9	0.73
307-55-1	Perfluorododecanoic acid (PFDoA)	1.9	U	2.4	1.9	0.57
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	1.9	U	2.4	1.9	0.54
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.97	U	2.4	0.97	0.39
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.85
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	U	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	U	3.9	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.9	U	39	1.9	0.62

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: TP-PFC-022-TPE-D | Lab Sample ID: 320-32321-4

Matrix: Water | Lab File ID: 2017.10.30AAA_023.d

Analysis Method: 537 (modified) | Date Collected: 10/10/2017 00:00

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 257.3(mL) | Date Analyzed: 10/31/2017 02:52

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	2	Q	25-150
STL00992	13C4 PFBA	82		25-150
STL00993	13C2 PFHxA	94		25-150
STL00990	13C4 PFOA	93		25-150
STL00995	13C5 PFNA	87		25-150
STL00996	13C2 PFDA	88		25-150
STL00997	13C2 PFUnA	81		25-150
STL00998	13C2 PFDoA	76		25-150
STL00994	18O2 PFHxS	106		25-150
STL00991	13C4 PFOS	96		25-150
STL02116	13C2-PFTeDA	91		25-150
STL01892	13C4-PFHpA	101		25-150
STL01893	13C5 PFPeA	91		25-150
STL02337	13C3-PFBS	100		25-150

APPENDIX C

SUPPORT DOCUMENTATION

NAS BRUNSWICK
SDG 320-32321-1

SAMPLE IDENTIFICATION	TP-PFC-022-TPI	
COMPOUND	PENTADECAFLUOROOCTANOIC ACID	
COMPOUND AREA	23817480	
INTERNAL STANDARD AMOUNT (ng/ml)	5	
DILUTION FACTOR	10	
INTERNAL STANDARD AREA	1143966	
AVERAGE RRF	1.073	
SAMPLE VOLUME (ml)	261.9	
VOLUME EXTRACT (ml)	0.5	
VOLUME INJECTED (µl)	1	
ml to L	1000	
CONCENTRATION =	1852.20	ng/L

23817480 x 5ng/ml x 1000ml x 0.5ml x 10/(1143966 x 1.073 x 261.9ml x 1µl x 1L)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_020.d
Lims ID: 320-32321-A-1-A
Client ID: TP-PFC-022-TPI
Sample Type: Client
Inject. Date: 31-Oct-2017 02:32:17 ALS Bottle#: 17 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 10.0000
Sample Info: 320-32321-a-1-a 10X
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 31-Oct-2017 09:49:52 Calib Date: 30-Oct-2017 18:47:49
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171030-49773.b\2017.10.30ICAL_010.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 31-Oct-2017 09:49:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.00 > 172.00	1.539	1.529	0.010		2110777	6.02		12.0	2621	
2 Perfluorobutyric acid										
212.90 > 169.00	1.539	1.537	0.002	1.000	1401657	3.49			156	
4 Perfluoropentanoic acid										
262.90 > 219.00	1.738	1.737	0.001	1.000	2634452	10.1			1743	
D 3 13C5-PFPeA										
267.90 > 223.00	1.738	1.737	0.001		1208816	5.36		10.7	5889	
D 47 13C3-PFBS										
301.90 > 83.00	1.757	1.755	0.002		27294	5.43		11.7	1087	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.766	1.755	0.011	1.000	1480242	3.48			2034	
298.90 > 99.00	1.757	1.755	0.002	0.995	641267		2.31(0.00-0.00)		1838	
6 Perfluorohexanoic acid										
313.00 > 269.00	1.987	1.984	0.002	1.000	4713011	18.7			3455	
D 7 13C2 PFHxA										
315.00 > 270.00	1.998	1.984	0.014		1318405	5.44		10.9	5191	
10 Perfluoroheptanoic acid										
363.00 > 319.00	2.305	2.308	-0.003	1.000	1122499	4.01			1200	
D 9 13C4-PFHpA										
367.00 > 322.00	2.305	2.308	-0.003		1446735	5.94		11.9	6733	
8 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.321	2.318	0.003	1.000	10046871	24.4			6001	
D 11 18O2 PFHxS										
403.00 > 84.00	2.321	2.318	0.003		1884615	6.26		13.2	12144	
* 62 13C2-PFOA										
415.00 > 370.00	2.644	2.644	0.0		1488440	5.00			5215	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.651	2.644	0.007	1.000	23817480	96.9			5172	
413.00 > 169.00	2.651	2.644	0.007	1.000	15119820		1.58(0.90-1.10)		4236	M
D 14 13C4 PFOA										
417.00 > 372.00	2.651	2.644	0.007		1143966	4.79		9.6	5961	
16 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.658	2.651	0.007	1.000	173401	0.6119			162	
D 18 13C4 PFOS										
503.00 > 80.00	3.015	3.014	0.001		1154704	5.45		11.4	5570	
17 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.015	3.014	0.001	1.000	4735298	18.8			1369	
499.00 > 99.00	3.006	3.014	-0.008	0.997	1032848		4.58(0.90-1.10)		1758	
20 Perfluorononanoic acid										
463.00 > 419.00	3.015	3.014	0.001	1.000	37958	0.2182			48.3	
D 19 13C5 PFNA										
468.00 > 423.00	3.015	3.014	0.001		898229	4.45		8.9	4370	
D 21 13C8 FOSA										
506.00 > 78.00	3.372	3.372	0.0		90550	0.2910		0.6	906	
D 23 13C2 PFDA										
515.00 > 470.00	3.372	3.372	0.0		697434	3.82		7.6	4211	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.372	3.372	0.0	1.000	20166	0.1539			69.3	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.364	3.372	-0.008	1.000	9894	0.5797			134	
29 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.690	3.679	0.011	1.000	10503	0.0671			178	
31 Perfluoroundecanoic acid										
563.00 > 519.00	3.700	3.698	0.002	1.000	14673	0.1230			42.5	
D 30 13C2 PFUnA										
565.00 > 520.00	3.700	3.698	0.002		559134	3.84		7.7	2518	
D 36 13C2 PFDoA										
615.00 > 570.00	3.990	3.989	0.001		660877	3.94		7.9	3342	
37 Perfluorododecanoic acid										
613.00 > 569.00	3.990	3.995	-0.005	1.000	12931	0.1064			51.6	
41 Perfluorotridecanoic acid										
663.00 > 619.00	4.257	4.257	0.0	1.000	17525	0.1283			25.4	
42 Perfluorotetradecanoic acid										
713.00 > 169.00	4.488	4.488	0.0	1.000	4914	0.1125			160	
713.00 > 219.00	4.488	4.488	0.0	1.000	3831		1.28(0.00-0.00)		147	
D 43 13C2-PFTeDA										
715.00 > 670.00	4.497	4.488	0.009		982909	4.80		9.6	2362	

ANALYTE	ORIGINAL	DUPLICATE	RL	RPD	RPD > 30%	ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2xRL
PENTADECAFLUOROOCTANOIC ACID	1.4	0.76	1.9	59.26	TRUE	FALSE	FALSE	FALSE
PERFLUOROBUTANOIC ACID	130	130	0.96	0.00	FALSE	TRUE	TRUE	FALSE
PERFLUOROHEXANOIC ACID	8.6	8.3	1.9	3.55	FALSE	TRUE	TRUE	FALSE
PERFLUOROPENTANOIC ACID	48	46	1.9	4.26	FALSE	TRUE	TRUE	FALSE

SDG 320-32321-1

TP-PFC-022-TPE/TP-PFC-022-TPE-D

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

Chain of Custody Record 241871

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Jeff Orient	Site Contact: Kevin Lastrapes	Date: 10/10/2017	COC No: 241871
Company Name: Tetra Tech	Tel/Fax: (412) 921-8778	Lab Contact: David Allbrecht	Carrier: FedEx	1 of 1 COCs
Address: 661 Anderson Dr.	Analysis Turnaround Time			Sampler:
City/State/Zip: Pittsburg, PA 15220	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: (412) 921-8778	TAT if different from Below			Walk-in Client:
Fax:	☑ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site: Former NAS Brunswick GWETS	☐ 2 days			Job / SDG No.:
PO# 112G08005-WE21	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFC (Full List) ug/kg/ms	Sample Specific Notes:
TP-PFC-022-TPI	10/10/17	1240	G	W	4	N	N	X	
TP-PFC-022-TPE	10/10/17	1250	G	W	4	N	N	X	KD
TP-PFC-022-MID-CARBON	10/10/17	1245	G	W	4	N	N	X	
PP-PFC-022-TPE-D	10/10/17	0000	G	W	4	N	N	X	

320-32321 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 2.9 Corr'd: _____ | Therm ID No.: AK-02

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech	10/10/17 1730	Andrew Bost	TAWS	10/11/17 0930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-32321-1

Login Number: 32321
List Number: 1
Creator: Aguayo, Alonso

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Narrative
320-32321-1

Receipt
The samples were received on 10/11/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9º C.

LCMS
Method(s) 537 (modified): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recovery for 13C8 FOSA associated with the following samples are below the method recommended limit: TP-PFC-022-TPI (320-32321-1), TP-PFC-022-TPE (320-32321-2), TP-PFC-022-MID-CARBON (320-32321-3) and TP-PFC-022-TPE-D (320-32321-4). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples. Re-analysis confirmed the low IDA.

Method(s) 537 (modified): The following sample was diluted to bring the concentration of target analytes within the calibration range: TP-PFC-022-TPI (320-32321-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-190551.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32321-1	TP-PFC-022-TPI	Water	10/10/17 12:40	10/11/17 09:30
320-32321-2	TP-PFC-022-TPE	Water	10/10/17 12:50	10/11/17 09:30
320-32321-3	TP-PFC-022-MID-CARBON	Water	10/10/17 12:45	10/11/17 09:30
320-32321-4	TP-PFC-022-TPE-D	Water	10/10/17 00:00	10/11/17 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	13C3-PFBS #	PFHxA #	PFHpA #	PFHxS #	PFOA #	PFNA #
TP-PFC-022-TPI	320-32321-1	70	84	107	86	89	103	63	78
TP-PFC-022-TPI DL	320-32321-1 DL	120	107	117	109	119	132	96	89
TP-PFC-022-TPE	320-32321-2	76	83	100	87	93	107	85	71
TP-PFC-022-MID-CARBON	320-32321-3	83	90	102	96	97	107	90	84
TP-PFC-022-TPE-D	320-32321-4	82	91	100	94	101	106	93	87
	MB 320-190551/1-A	105	102	100	104	114	108	105	102
	LCS 320-190551/2-A	111	109	110	110	118	112	113	111
	LCSD 320-190551/3-A	107	102	106	104	111	110	106	102

	QC LIMITS
PFBA = 13C4 PFBA	25-150
PFPeA = 13C5 PFPeA	25-150
13C3-PFBS = 13C3-PFBS	25-150
PFHxA = 13C2 PFHxA	25-150
PFHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II 537 (modified)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFOS #	PFDA #	PFOSA #		PFUnA #	PFDoA #	PFTDA #
TP-PFC-022-TPI	320-32321-1	103	79	4	Q	73	75	97
TP-PFC-022-TPI DL	320-32321-1 DL	114	76	6	Q	77	79	96
TP-PFC-022-TPE	320-32321-2	95	66	4	Q	69	69	84
TP-PFC-022-MID-CARBON	320-32321-3	98	81	3	Q	79	84	97
TP-PFC-022-TPE-D	320-32321-4	96	88	2	Q	81	76	91
	MB 320-190551/1-A	103	112	50		100	93	100
	LCS 320-190551/2-A	109	117	48		105	99	107
	LCSD 320-190551/3-A	101	112	56		101	97	106

	QC LIMITS
PFOS = 13C4 PFOS	25-150
PFOSA = 13C8 FOSA	25-150
PFDA = 13C2 PFDA	25-150
PFUnA = 13C2 PFUnA	25-150
PFDoA = 13C2 PFDoA	25-150
PFTDA = 13C2-PFTeDA	25-150

Column to be used to flag recovery values

FORM II 537 (modified)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab File ID: 2017.10.30AAA_017.d Lab Sample ID: MB 320-190551/1-A

Matrix: Water Date Extracted: 10/23/2017 08:13

Instrument ID: A8_N Date Analyzed: 10/31/2017 02:11

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-190551/2-A	2017.10.30AAA_018.d	10/31/2017 02:18
	LCSD 320-190551/3-A	2017.10.30AAA_019.d	10/31/2017 02:25
TP-PFC-022-TPI DL	320-32321-1 DL	2017.10.30AAA_020.d	10/31/2017 02:32
TP-PFC-022-TPE	320-32321-2	2017.10.30AAA_021.d	10/31/2017 02:39
TP-PFC-022-MID-CARBON	320-32321-3	2017.10.30AAA_022.d	10/31/2017 02:46
TP-PFC-022-TPE-D	320-32321-4	2017.10.30AAA_023.d	10/31/2017 02:52
TP-PFC-022-TPI	320-32321-1	2017.10.30AAA_033.d	10/31/2017 04:01

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-32321-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-190551/1-A

Matrix: Water | Lab File ID: 2017.10.30AAA_017.d

Analysis Method: 537 (modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) | Date Analyzed: 10/31/2017 02:11

Con. Extract Vol.: 0.50(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-22-4	Perfluorobutanoic acid (PFBA)	1.0	U	2.5	1.0	0.46
2706-90-3	Perfluoropentanoic acid (PFPeA)	2.0	U	2.5	2.0	0.99
307-24-4	Perfluorohexanoic acid (PFHxA)	2.0	U	2.5	2.0	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U M	2.5	2.0	0.75
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
335-76-2	Perfluorodecanoic acid (PFDA)	1.0	U	2.5	1.0	0.44
2058-94-8	Perfluoroundecanoic acid (PFUnA)	2.0	U	2.5	2.0	0.75
307-55-1	Perfluorododecanoic acid (PFDoA)	2.0	U	2.5	2.0	0.58
72629-94-8	Perfluorotridecanoic Acid (PFTriA)	2.0	U	2.5	2.0	0.55
376-06-7	Perfluorotetradecanoic acid (PFTeA)	0.627	J	2.5	1.0	0.40
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	2.0	U	2.5	2.0	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	3.0	U	4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	2.0	U	40	2.0	0.64

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 320-190551/1-A

Matrix: Water Lab File ID: 2017.10.30AAA_017.d

Analysis Method: 537 (modified) Date Collected:

Extraction Method: 3535 Date Extracted: 10/23/2017 08:13

Sample wt/vol: 250(mL) Date Analyzed: 10/31/2017 02:11

Con. Extract Vol.: 0.50(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 192039 Units: ng/L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01056	13C8 FOSA	50		25-150
STL00992	13C4 PFBA	105		25-150
STL00993	13C2 PFHxA	104		25-150
STL00990	13C4 PFOA	105		25-150
STL00995	13C5 PFNA	102		25-150
STL00996	13C2 PFDA	112		25-150
STL00997	13C2 PFUnA	100		25-150
STL00998	13C2 PFDoA	93		25-150
STL00994	18O2 PFHxS	108		25-150
STL00991	13C4 PFOS	103		25-150
STL02116	13C2-PFTeDA	100		25-150
STL01892	13C4-PFHpA	114		25-150
STL01893	13C5 PFPeA	102		25-150
STL02337	13C3-PFBS	100		25-150

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.10.30AAA_018.d

Lab ID: LCS 320-190551/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorobutanoic acid (PFBA)	40.0	43.6	109	89-128	
Perfluoropentanoic acid (PFPeA)	40.0	41.1	103	66-136	
Perfluorohexanoic acid (PFHxA)	40.0	40.7	102	86-126	
Perfluoroheptanoic acid (PFHpA)	40.0	41.6	104	89-127	
Perfluorooctanoic acid (PFOA)	40.0	40.3	101	80-120	
Perfluorononanoic acid (PFNA)	40.0	38.5	96	77-137	
Perfluorodecanoic acid (PFDA)	40.0	40.8	102	84-123	
Perfluoroundecanoic acid (PFUnA)	40.0	38.8	97	73-122	
Perfluorododecanoic acid (PFDoA)	40.0	41.8	104	82-122	
Perfluorotridecanoic Acid (PFTriA)	40.0	46.2	115	56-163	
Perfluorotetradecanoic acid (PFTeA)	40.0	40.8	102	66-120	
Perfluorobutanesulfonic acid (PFBS)	35.4	37.6	106	88-130	
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.8	104	87-126	
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	42.5	112	92-135	
Perfluorooctanesulfonic acid (PFOS)	37.1	37.6	101	83-126	
Perfluorodecanesulfonic acid (PFDS)	38.6	38.0	98	80-129	
Perfluorooctane Sulfonamide (FOSA)	40.0	40.7	102	91-133	
13C8 FOSA	100	48.3	48	25-150	
13C4 PFBA	100	111	111	25-150	
13C2 PFHxA	100	110	110	25-150	
13C4 PFOA	100	113	113	25-150	
13C5 PFNA	100	111	111	25-150	
13C2 PFDA	100	117	117	25-150	
13C2 PFUnA	100	105	105	25-150	
13C2 PFDoA	100	98.9	99	25-150	
18O2 PFHxS	94.6	106	112	25-150	
13C4 PFOS	95.6	104	109	25-150	
13C2-PFTeDA	100	107	107	25-150	
13C4-PFHpA	100	118	118	25-150	
13C5 PFPeA	100	109	109	25-150	
13C3-PFBS	93.0	102	110	25-150	

Column to be used to flag recovery and RPD values

FORM III 537 (modified)

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.10.30AAA_019.d

Lab ID: LCSD 320-190551/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorobutanoic acid (PFBA)	40.0	43.9	110	1	30	89-128	
Perfluoropentanoic acid (PFPeA)	40.0	40.8	102	1	30	66-136	
Perfluorohexanoic acid (PFHxA)	40.0	41.1	103	1	30	86-126	
Perfluoroheptanoic acid (PFHpA)	40.0	42.4	106	2	30	89-127	
Perfluorooctanoic acid (PFOA)	40.0	41.7	104	3	30	80-120	
Perfluorononanoic acid (PFNA)	40.0	41.5	104	7	30	77-137	
Perfluorodecanoic acid (PFDA)	40.0	41.3	103	1	30	84-123	
Perfluoroundecanoic acid (PFUnA)	40.0	39.5	99	2	30	73-122	
Perfluorododecanoic acid (PFDoA)	40.0	42.4	106	2	30	82-122	
Perfluorotridecanoic Acid (PFTriA)	40.0	48.1	120	4	30	56-163	
Perfluorotetradecanoic acid (PFTeA)	40.0	40.9	102	0	30	66-120	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.7	104	2	30	88-130	
Perfluorohexanesulfonic acid (PFHxS)	36.4	38.3	105	1	30	87-126	
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	44.1	116	4	30	92-135	
Perfluorooctanesulfonic acid (PFOS)	37.1	39.6	107	5	30	83-126	
Perfluorodecanesulfonic acid (PFDS)	38.6	39.8	103	5	30	80-129	
Perfluorooctane Sulfonamide (FOSA)	40.0	41.6	104	2	30	91-133	
13C8 FOSA	100	55.5	56			25-150	
13C4 PFBA	100	107	107			25-150	
13C2 PFHxA	100	104	104			25-150	
13C4 PFOA	100	106	106			25-150	
13C5 PFNA	100	102	102			25-150	
13C2 PFDA	100	112	112			25-150	
13C2 PFUnA	100	101	101			25-150	
13C2 PFDoA	100	96.9	97			25-150	
18O2 PFHxS	94.6	104	110			25-150	
13C4 PFOS	95.6	96.3	101			25-150	
13C2-PFTeDA	100	106	106			25-150	
13C4-PFHpA	100	111	111			25-150	
13C5 PFPeA	100	102	102			25-150	
13C3-PFBS	93.0	98.1	106			25-150	

Column to be used to flag recovery and RPD values

FORM III 537 (modified)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Start Date: 10/30/2017 17:59

Analysis Batch Number: 191992 End Date: 10/30/2017 19:29

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-191992/3		10/30/2017 17:59	1	2017.10.30ICAL_003.d	GeminiC18 3x100 3(mm)
IC 320-191992/4		10/30/2017 18:06	1	2017.10.30ICAL_004.d	GeminiC18 3x100 3(mm)
IC 320-191992/5		10/30/2017 18:13	1	2017.10.30ICAL_005.d	GeminiC18 3x100 3(mm)
IC 320-191992/6		10/30/2017 18:20	1	2017.10.30ICAL_006.d	GeminiC18 3x100 3(mm)
IC 320-191992/7		10/30/2017 18:27	1	2017.10.30ICAL_007.d	GeminiC18 3x100 3(mm)
IC 320-191992/8		10/30/2017 18:34	1	2017.10.30ICAL_008.d	GeminiC18 3x100 3(mm)
IC 320-191992/9		10/30/2017 18:40	1	2017.10.30ICAL_009.d	GeminiC18 3x100 3(mm)
IC 320-191992/10		10/30/2017 18:47	1	2017.10.30ICAL_010.d	GeminiC18 3x100 3(mm)
ICB 320-191992/11		10/30/2017 18:54	1		GeminiC18 3x100 3(mm)
ICV 320-191992/12		10/30/2017 19:01	1	2017.10.30ICAL_012.d	GeminiC18 3x100 3(mm)
RINSE 320-191992/13		10/30/2017 19:08	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/30/2017 19:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/30/2017 19:22	1		GeminiC18 3x100 3(mm)
CCV 320-191992/16		10/30/2017 19:29	1		GeminiC18 3x100 3(mm)

537 (modified)

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	357454 367712	361835 337012	360847 328168	341347	Ave		350625.089				4.3		50.0			
13C5 PFPeA	229652 235435	232924 215938	239360 200135	225357	Ave		225542.900				6.0		50.0			
13C3-PFBS	5235.3 5270.3	5158.3 4771.5	5375.8 4493.4	4893.4	Ave		5028.26728				6.3		50.0			
13C2 PFHxA	248461 264451	250675 227253	249802 219016	236613	Ave		242324.389				6.4		50.0			
13C4-PFHpA	258575 256249	258553 221578	261274 202092	247774	Ave		243727.906				9.4		50.0			
18O2 PFHxS	308165 321776	309221 291030	320140 261497	294875	Ave		300957.723				6.9		50.0			
M2-6:2FTS	71694 74371	75262 65842	71802 60191	68055	Ave		69602.5053				7.6		50.0			
13C4 PFOA	248108 251797	260489 224515	243082 212123	230695	Ave		238686.837				7.1		50.0			
13C4 PFOS	219277 221852	218752 203959	218960 195635	205064	Ave		211928.443				4.8		50.0			
13C5 PFNA	207186 211206	211411 193219	212841 181758	194946	Ave		201795.246				5.9		50.0			
13C8 FOSA	320984 328144	328829 291724	326783 281975	299843	Ave		311183.117				6.3		50.0			
M2-8:2FTS	74829 75756	74497 67679	79102 63616	70267	Ave		72249.5139				7.4		50.0			
13C2 PFDA	186941 192820	192854 174523	190202 164606	175786	Ave		182533.157				6.0		50.0			
d3-NMeFOSAA	80669 87522	82855 81594	83040 79589	76433	Ave		81671.6286				4.2		50.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
d5-NEtFOSAA	92322 86792	91775 75965	90115 70212	80691	Ave		83981.6057				10.2		50.0			
13C2 PFUnA	154125 150589	157265 133581	155792 124554	144359	Ave		145752.240				8.5		50.0			
d-N-MeFOSA-M	89055 95610	89086 89734	91517 94929	84265	Ave		90599.4429				4.3		50.0			
13C2 PFDoA	171903 173314	171388 162739	178894 153273	163730	Ave		167891.409				5.1		50.0			
d-N-EtFOSA-M	85399 92065	84840 88170	85727 91826	79791	Ave		86831.1857				5.0		50.0			
13C2-PFTeDA	212525 211748	213382 189599	213836 191404	199780	Ave		204610.654				5.3		50.0			
13C2-PFHxDA	316335 321624	315575 294845	321643 288866	285897	Ave		306397.771				5.2		50.0			

Note: The M1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	1.0179 0.7783	0.9710 +++++	1.0228	1.0067	0.9166	AveID		0.9522				9.9		35.0			
Perfluoropentanoic acid (PFPeA)	1.3078 0.9453	1.1531 0.8180	1.1091	1.1020	1.0849	AveID		1.0743				14.5		35.0			
Perfluorobutanesulfonic acid (PFBS)	76.921 60.901	74.513 +++++	75.981	75.540	71.043	AveID		72.483				8.3		50.0			
4:2 FTS	1.1693 1.2317	1.1911 1.2487	1.2202	1.1994	1.2442	AveID		1.2149				2.4		35.0			
Perfluorohexanoic acid (PFHxA)	1.0535 0.9048	0.9804 0.7653	1.0428	1.0135	0.9279	AveID		0.9555				10.5		35.0			
Perfluoroheptanoic acid (PFHpA)	1.0722 0.9138	0.9805 0.8127	1.0424	0.9826	0.9704	AveID		0.9678				8.8		35.0			
Perfluorohexanesulfonic acid (PFHxS)	+++++ 0.9647	1.1825 0.8876	1.0684	1.0622	1.0371	AveID		1.0338				9.7		35.0			
6:2FTS	1.3246 1.2449	1.2035 1.2525	1.2548	1.2100	1.2264	AveID		1.2452				3.2		35.0			
Perfluorooctanoic acid (PFOA)	1.2601 0.9811	1.1981 0.8515	1.1175	1.0816	1.0298	AveID		1.0743				12.7		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	1.2670 1.0787	1.2537 0.9245	1.2541	1.2396	1.1947	AveID		1.1732				10.9		50.0			
Perfluorooctanesulfonic acid (PFOS)	1.0915 1.0175	1.0291 0.9962	1.0618	1.0219	1.0626	AveID		1.0401				3.2		35.0			
Perfluorononanoic acid (PFNA)	1.0866 0.9130	1.0034 0.8449	0.9887	0.9803	0.9627	AveID		0.9685				7.8		35.0			
Perfluorooctane Sulfonamide (FOSA)	1.0636 0.8691	0.9720 0.7263	1.0130	0.9987	0.9543	AveID		0.9424				11.9		35.0			
8:2FTS	1.1617 1.1143	1.0925 1.0834	1.1388	1.0814	1.1138	AveID		1.1123				2.7		35.0			
Perfluorodecanoic acid (PFDA)	1.0481 0.9028	0.9649 0.8212	0.9579	0.9349	0.9452	AveID		0.9393				7.3		35.0			
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	1.0493 0.9205	0.8741 0.9397	0.9435	0.9337	0.8869	AveID		0.9354				6.1		35.0			
Perfluorodecanesulfonic acid (PFDS)	0.6419 0.6562	0.6440 0.5867	0.6761	0.6437	0.6863	AveID		0.6479				4.9		50.0			
Perfluoroundecanoic acid (PFUnA)	1.2610 1.0152	1.1238 0.9438	1.0643	1.0261	1.0353	AveID		1.0671				9.5		35.0			
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	0.8302 0.8496	0.8007 0.8638	0.8557	0.8499	0.8599	AveID		0.8443				2.6		35.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
MeFOSA	0.9077 0.9189	0.9049 0.8473	0.9020	0.8866	0.8774	AveID		0.8921				2.7		35.0			
Perfluorododecanoic acid (PFDoA)	0.9797 0.8959	0.9515 0.8282	0.9211	0.9103	0.9498	AveID		0.9195				5.4		35.0			
N-EtFOSA-M	0.9658 0.9276	0.9421 0.8766	0.9523	0.9320	0.9125	AveID		0.9298				3.1		35.0			
Perfluorotridecanoic Acid (PFTriA)	1.1377 0.9876	1.0442 0.9155	1.0465	1.0092	1.0927	AveID		1.0333				7.0		50.0			
Perfluorotetradecanoic acid (PFTeA)	0.2420 0.2277	0.2236 0.2100	0.2200	0.2115	0.2212	AveID		0.2223				4.8		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 0.8086	1.3010 +++++	0.9673	0.9210	0.8877	L2ID	0.4413	0.8642							0.9980		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	1.1230 0.8809	1.0058 0.7433	0.9977	0.9816	0.9217	AveID		0.9506				12.5		50.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	17872710 16850593	18091732 16408424	18042358	17067362	18385602	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5 PFPeA	Ave	11482582 10796893	11646212 10006745	11968018	11267831	11771734	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C3-PFBS	Ave	243441 221874	239859 208945	249974	227541	245067	46.5 46.5	46.5 46.5	46.5	46.5	46.5
13C2 PFHxA	Ave	12423043 11362658	12533747 10950785	12490114	11830628	13222561	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	12928764 11078906	12927656 10104592	13063724	12388693	12812432	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	14576214 13765700	14626159 12368812	15142641	13947567	15220009	47.3 47.3	47.3 47.3	47.3	47.3	47.3
M2-6:2FTS	Ave	3405451 3127517	3574947 2859084	3410618	3232615	3532601	47.5 47.5	47.5 47.5	47.5	47.5	47.5
13C4 PFOA	Ave	12405416 11225726	13024434 10606146	12154092	11534754	12589825	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	10481446 9749248	10456339 9351352	10466308	9802057	10604507	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	10359275 9660967	10570529 9087907	10642051	9747291	10560316	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	16049178 14586209	16441468 14098730	16339148	14992145	16407213	50.0 50.0	50.0 50.0	50.0	50.0	50.0
M2-8:2FTS	Ave	3584296 3241827	3568424 3047225	3788998	3365770	3628722	47.9 47.9	47.9 47.9	47.9	47.9	47.9
13C2 PFDA	Ave	9347060 8726152	9642702 8230300	9510123	8789284	9640984	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d3-NMeFOSAA	Ave	4033450 4079711	4142746 3979428	4152012	3821639	4376084	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d5-NEtFOSAA	Ave	4616095 3798242	4588738 3510602	4505726	4034536	4339623	50.0 50.0	50.0 50.0	50.0	50.0	50.0

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C2 PFUnA	Ave	7706271 6679039	7863227 6227711	7789622	7217943	7529471	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d-N-MeFOSA-M	Ave	4452727 4486722	4454324 4746426	4575836	4213258	4780512	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	8595136 8136951	8569420 7663646	8944676	8186478	8665686	50.0 50.0	50.0 50.0	50.0	50.0	50.0
d-N-EtFOSA-M	Ave	4269967 4408487	4241996 4591296	4286339	3989568	4603262	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	10626247 9479964	10669124 9570197	10691814	9989003	10587380	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	15816734 14742231	15778734 14443282	16082155	14294873	16081211	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-191992/3	2017.10.30ICAL_003.d
Level 2	IC 320-191992/4	2017.10.30ICAL_004.d
Level 3	IC 320-191992/5	2017.10.30ICAL_005.d
Level 4	IC 320-191992/6	2017.10.30ICAL_006.d
Level 5	IC 320-191992/7	2017.10.30ICAL_007.d
Level 6	IC 320-191992/8	2017.10.30ICAL_008.d
Level 7	IC 320-191992/9	2017.10.30ICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		AveID	181930 26228900	351349 +++++	1845411	6872498	16852992	0.500 100	1.00 +++++	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	150164 20413300	268577 32740106	1327357	4966682	12771661	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		AveID	177995 25688097	339771 +++++	1805379	6535299	16549064	0.442 88.4	0.884 +++++	4.42	17.7	44.2
4:2 FTS		AveID	39150 7574658	83727 14040224	409149	1524770	4321214	0.467 93.4	0.934 187	4.67	18.7	46.7
Perfluorohexanoic acid (PFHxA)		AveID	130877 20561075	245774 33523091	1302471	4796137	12269212	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		AveID	138618 20248813	253519 32847152	1361815	4869377	12433273	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 25548500	332754 42243112	1556248	5700596	15184106	+++++ 91.0	0.910 182	4.55	18.2	45.5
6:2FTS		AveID	45012 7770479	85870 14294286	427077	1561284	4323097	0.474 94.8	0.948 190	4.74	19.0	47.4
Perfluorooctanoic acid (PFOA)		AveID	156326 22026634	312091 36125926	1358217	4990434	12964935	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	132244 20944569	261088 34435082	1307067	4839750	12616457	0.476 95.2	0.952 190	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	111053 19258573	208901 36170703	1078764	3889485	10938097	0.464 92.8	0.928 186	4.64	18.6	46.4
Perfluorononanoic acid (PFNA)		AveID	112564 17641757	212119 30714706	1052198	3822275	10166844	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	170696 25353469	319607 40961582	1655149	5989035	15657067	0.500 100	1.00 200	5.00	20.0	50.0
8:2FTS		AveID	41639 7224840	77968 13205694	431491	1455859	4041494	0.479 95.8	0.958 192	4.79	19.2	47.9
Perfluorodecanoic acid (PFDA)		AveID	97971 15755129	186086 27033900	910996	3286997	9112657	0.500 100	1.00 200	5.00	20.0	50.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1 Analy Batch No.: 191992

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		AveID	42323 7510668	72427 14958318	391751	1427297	3881322	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)		AveID	67840 12902020	135804 22131027	713584	2545089	7338718	0.482 96.4	0.964 193	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		AveID	97179 13560915	176741 23510391	829066	2962400	7795195	0.500 100	1.00 200	5.00	20.0	50.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		AveID	38324 6454094	73483 12130483	385572	1371561	3731718	0.500 100	1.00 200	5.00	20.0	50.0
MeFOSA		AveID	40419 8245970	80614 16086774	412739	1494136	4194611	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	84204 14579972	163075 25387048	823879	2980875	8230749	0.500 100	1.00 200	5.00	20.0	50.0
N-EtFOSA-M		AveID	41241 8178532	79926 16098373	408209	1487266	4200616	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorotridecanoic Acid (PFTriA)		AveID	97785 16072205	178964 28065123	936032	3304558	9468872	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		AveID	25717 4317118	47718 8038993	235213	845237	2341628	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 23840509	410574 +++++	1555603	5266453	14275131	+++++ 100	1.00 +++++	5.00	20.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)		AveID	177628 25973108	317418 42943723	1604499	5612557	14822218	0.500 100	1.00 200	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L2ID = Linear 1/conc^2 IsoDil

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: ICV 320-191992/12 Calibration Date: 10/30/2017 19:01

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30ICAL_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9225		48.4	50.0	-3.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.113		51.8	50.0	3.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	72.75		44.4	44.3	0.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	1.007		52.7	50.0	5.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.052		54.3	50.0	8.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.068		48.8	47.3	3.3	25.0
6:2FTS	AveID	1.245	1.378		52.5	47.4	10.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.126		52.4	50.0	4.8	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.126		45.7	47.6	-4.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	1.050		54.2	50.0	8.5	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	0.997		45.8	47.8	-4.2	25.0
8:2FTS	AveID	1.112	1.221		52.6	47.9	9.8	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9440		50.1	50.0	0.2	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	1.006		53.5	50.0	7.1	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9766		52.2	50.0	4.4	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7123		53.0	48.3	9.9	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.113		52.1	50.0	4.3	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.9580		56.7	50.0	13.5	25.0
MeFOSA	AveID	0.8921	0.9479		53.1	50.0	6.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	1.010		54.9	50.0	9.9	25.0
N-EtFOSA-M	AveID	0.9298	1.006		54.1	50.0	8.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.191		57.6	50.0	15.3	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2378		53.5	50.0	7.0	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9508		54.5	50.0	9.0	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	1.016		53.4	50.0	6.9	25.0
13C4 PFBA	Ave	350625	336708		48.0	50.0	-4.0	50.0
13C5 PFPeA	Ave	225543	212495		47.1	50.0	-5.8	50.0
13C3-PFBS	Ave	5028	4771		44.1	46.5	-5.1	50.0
13C2 PFHxA	Ave	242324	235653		48.6	50.0	-2.8	50.0
13C4-PFHpA	Ave	243728	225771		46.3	50.0	-7.4	50.0
18O2 PFHxS	Ave	300958	284601		44.7	47.3	-5.4	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: ICV 320-191992/12 Calibration Date: 10/30/2017 19:01

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30ICAL_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	65159		44.5	47.5	-6.4	50.0
13C4 PFOA	Ave	238687	227387		47.6	50.0	-4.7	50.0
13C4 PFOS	Ave	211928	202514		45.7	47.8	-4.4	50.0
13C5 PFNA	Ave	201795	185119		45.9	50.0	-8.3	50.0
13C8 FOSA	Ave	311183	286027		46.0	50.0	-8.1	50.0
M2-8:2FTS	Ave	72250	67720		44.9	47.9	-6.3	50.0
13C2 PFDA	Ave	182533	177371		48.6	50.0	-2.8	50.0
d3-NMeFOSAA	Ave	81672	75445		46.2	50.0	-7.6	50.0
13C2 PFUnA	Ave	145752	137361		47.1	50.0	-5.8	50.0
d5-NEtFOSAA	Ave	83982	75221		44.8	50.0	-10.4	50.0
d-N-MeFOSA-M	Ave	90599	86021		47.5	50.0	-5.1	50.0
13C2 PFDoA	Ave	167891	153957		45.9	50.0	-8.3	50.0
d-N-EtFOSA-M	Ave	86831	79789		45.9	50.0	-8.1	50.0
13C2-PFTeDA	Ave	204611	194140		47.4	50.0	-5.1	50.0
13C2-PFHxDA	Ave	306398	285400		46.6	50.0	-6.9	50.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Instrument ID: A8_N Start Date: 10/31/2017 01:57

Analysis Batch Number: 192039 End Date: 10/31/2017 04:43

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-192039/1		10/31/2017 01:57	1	2017.10.30AAA_016.d	GeminiC18 3x100 3(mm)
RINSE 320-192039/2		10/31/2017 02:04	1		GeminiC18 3x100 3(mm)
MB 320-190551/1-A		10/31/2017 02:11	1	2017.10.30AAA_017.d	GeminiC18 3x100 3(mm)
LCS 320-190551/2-A		10/31/2017 02:18	1	2017.10.30AAA_018.d	GeminiC18 3x100 3(mm)
LCSD 320-190551/3-A		10/31/2017 02:25	1	2017.10.30AAA_019.d	GeminiC18 3x100 3(mm)
320-32321-1 DL		10/31/2017 02:32	10	2017.10.30AAA_020.d	GeminiC18 3x100 3(mm)
320-32321-2		10/31/2017 02:39	1	2017.10.30AAA_021.d	GeminiC18 3x100 3(mm)
320-32321-3		10/31/2017 02:46	1	2017.10.30AAA_022.d	GeminiC18 3x100 3(mm)
320-32321-4		10/31/2017 02:52	1	2017.10.30AAA_023.d	GeminiC18 3x100 3(mm)
CCV 320-192039/12		10/31/2017 03:13	1	2017.10.30AAA_026.d	GeminiC18 3x100 3(mm)
CCV 320-192039/18		10/31/2017 03:55	1	2017.10.30AAA_032.d	GeminiC18 3x100 3(mm)
320-32321-1		10/31/2017 04:01	1	2017.10.30AAA_033.d	GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:08	1		GeminiC18 3x100 3(mm)
RINSE 320-192039/21		10/31/2017 04:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:22	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:29	1		GeminiC18 3x100 3(mm)
ZZZZZ		10/31/2017 04:36	1		GeminiC18 3x100 3(mm)
CCV 320-192039/25		10/31/2017 04:43	1	2017.10.30AAA_039.d	GeminiC18 3x100 3(mm)

537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/1 Calibration Date: 10/31/2017 01:57

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	1.034		21.7	20.0	8.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.131		21.1	20.0	5.3	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	74.48		18.2	17.7	2.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9876		20.7	20.0	3.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.038		21.4	20.0	7.2	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.103		19.4	18.2	6.7	25.0
6:2FTS	AveID	1.245	1.209		18.6	19.0	-1.8	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.113		20.7	20.0	3.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.243		20.2	19.0	5.9	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9836		20.3	20.0	1.6	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.044		18.6	18.6	0.3	25.0
8:2FTS	AveID	1.112	1.075		18.5	19.2	-3.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9384		20.0	20.0	-0.0	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	1.015		21.5	20.0	7.7	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.8748		18.7	20.0	-6.5	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.6867		20.4	19.3	6.0	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8107		19.2	20.0	-4.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.034		19.4	20.0	-3.1	25.0
MeFOSA	AveID	0.8921	0.8449		18.9	20.0	-5.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9370		20.4	20.0	1.9	25.0
N-EtFOSA-M	AveID	0.9298	0.8994		19.3	20.0	-3.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.129		21.8	20.0	9.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2237		20.1	20.0	0.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9452		21.4	20.0	6.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	1.021		21.5	20.0	7.4	25.0
13C4 PFBA	Ave	350625	362811		51.7	50.0	3.5	50.0
13C5 PFPeA	Ave	225543	235109		52.1	50.0	4.2	50.0
13C3-PFBS	Ave	5028	5330		49.3	46.5	6.0	50.0
13C2 PFHxA	Ave	242324	258713		53.4	50.0	6.8	50.0
13C4-PFHpA	Ave	243728	246570		50.6	50.0	1.2	50.0
18O2 PFHxS	Ave	300958	313834		49.3	47.3	4.3	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/1 Calibration Date: 10/31/2017 01:57

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	64779		44.2	47.5	-6.9	50.0
13C4 PFOA	Ave	238687	243380		51.0	50.0	2.0	50.0
13C4 PFOS	Ave	211928	220428		49.7	47.8	4.0	50.0
13C5 PFNA	Ave	201795	210484		52.2	50.0	4.3	50.0
M2-8:2FTS	Ave	72250	68945		45.7	47.9	-4.6	50.0
13C2 PFDA	Ave	182533	192678		52.8	50.0	5.6	50.0
13C8 FOSA	Ave	311183	308138		49.5	50.0	-1.0	50.0
d3-NMeFOSAA	Ave	81672	90859		55.6	50.0	11.2	50.0
d5-NEtFOSAA	Ave	83982	93373		55.6	50.0	11.2	50.0
13C2 PFUnA	Ave	145752	147554		50.6	50.0	1.2	50.0
d-N-MeFOSA-M	Ave	90599	95523		52.7	50.0	5.4	50.0
13C2 PFDoA	Ave	167891	165378		49.3	50.0	-1.5	50.0
d-N-EtFOSA-M	Ave	86831	90494		52.1	50.0	4.2	50.0
13C2-PFTeDA	Ave	204611	213509		52.2	50.0	4.3	50.0
13C2-PFHxDA	Ave	306398	328804		53.7	50.0	7.3	50.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/12 Calibration Date: 10/31/2017 03:13

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9146		48.0	50.0	-3.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.057		49.2	50.0	-1.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	69.28		42.2	44.2	-4.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9403		49.2	50.0	-1.6	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	0.9903		51.2	50.0	2.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.048		46.1	45.5	1.4	25.0
6:2FTS	AveID	1.245	1.237		47.7	47.4	0.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.056		49.2	50.0	-1.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.202		48.8	47.6	2.4	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	1.006		51.9	50.0	3.9	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.071		47.8	46.4	3.0	25.0
8:2FTS	AveID	1.112	1.102		47.5	47.9	-0.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9345		49.7	50.0	-0.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9680		51.4	50.0	2.7	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9653		51.6	50.0	3.2	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7042		52.4	48.2	8.7	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8430		49.9	50.0	-0.1	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.077		50.4	50.0	0.9	25.0
MeFOSA	AveID	0.8921	0.8724		48.9	50.0	-2.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9406		51.1	50.0	2.3	25.0
N-EtFOSA-M	AveID	0.9298	0.9086		48.9	50.0	-2.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.147		55.5	50.0	11.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2217		49.9	50.0	-0.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.8789		50.3	50.0	0.7	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.9414		49.5	50.0	-1.0	25.0
13C4 PFBA	Ave	350625	390151		55.6	50.0	11.3	50.0
13C5 PFPeA	Ave	225543	248444		55.1	50.0	10.2	50.0
13C3-PFBS	Ave	5028	5622		52.0	46.5	11.8	50.0
13C2 PFHxA	Ave	242324	270750		55.9	50.0	11.7	50.0
13C4-PFHpA	Ave	243728	249463		51.2	50.0	2.4	50.0
18O2 PFHxS	Ave	300958	317495		49.9	47.3	5.5	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/12 Calibration Date: 10/31/2017 03:13

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	66925		45.7	47.5	-3.8	50.0
13C4 PFOA	Ave	238687	256857		53.8	50.0	7.6	50.0
13C4 PFOS	Ave	211928	225689		50.9	47.8	6.5	50.0
13C5 PFNA	Ave	201795	217021		53.8	50.0	7.5	50.0
M2-8:2FTS	Ave	72250	70399		46.7	47.9	-2.6	50.0
13C2 PFDA	Ave	182533	199089		54.5	50.0	9.1	50.0
13C8 FOSA	Ave	311183	325243		52.3	50.0	4.5	50.0
d3-NMeFOSAA	Ave	81672	91924		56.3	50.0	12.6	50.0
d5-NEtFOSAA	Ave	83982	92877		55.3	50.0	10.6	50.0
13C2 PFUnA	Ave	145752	151653		52.0	50.0	4.0	50.0
d-N-MeFOSA-M	Ave	90599	99703		55.0	50.0	10.0	50.0
13C2 PFDoA	Ave	167891	170977		50.9	50.0	1.8	50.0
d-N-EtFOSA-M	Ave	86831	96445		55.5	50.0	11.1	50.0
13C2-PFTeDA	Ave	204611	221664		54.2	50.0	8.3	50.0
13C2-PFHxDA	Ave	306398	352898		57.6	50.0	15.2	50.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/18 Calibration Date: 10/31/2017 03:55

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_032.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	1.017		21.4	20.0	6.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.113		20.7	20.0	3.6	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	71.89		17.5	17.7	-0.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9570		20.0	20.0	0.2	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	1.020		21.1	20.0	5.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.074		18.9	18.2	3.8	25.0
6:2FTS	AveID	1.245	1.217		18.7	19.0	-1.2	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.078		20.1	20.0	0.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.260		20.4	19.0	7.4	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9744		20.1	20.0	0.6	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.075		19.2	18.6	3.4	25.0
8:2FTS	AveID	1.112	1.102		19.0	19.2	-0.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9071		19.3	20.0	-3.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	1.014		21.5	20.0	7.6	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.8759		18.7	20.0	-6.4	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.7098		21.1	19.3	9.6	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8257		19.6	20.0	-2.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.061		19.9	20.0	-0.6	25.0
MeFOSA	AveID	0.8921	0.8804		19.7	20.0	-1.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9278		20.2	20.0	0.9	25.0
N-EtFOSA-M	AveID	0.9298	0.9271		19.9	20.0	-0.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.139		22.0	20.0	10.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2188		19.7	20.0	-1.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.9480		21.4	20.0	7.2	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.997		21.0	20.0	4.9	25.0
13C4 PFBA	Ave	350625	372726		53.2	50.0	6.3	50.0
13C5 PFPeA	Ave	225543	237796		52.7	50.0	5.4	50.0
13C3-PFBS	Ave	5028	5568		51.5	46.5	10.7	50.0
13C2 PFHxA	Ave	242324	264108		54.5	50.0	9.0	50.0
13C4-PFHpA	Ave	243728	255543		52.4	50.0	4.8	50.0
18O2 PFHxS	Ave	300958	331577		52.1	47.3	10.2	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/18 Calibration Date: 10/31/2017 03:55

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_032.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	64093		43.7	47.5	-7.9	50.0
13C4 PFOA	Ave	238687	252087		52.8	50.0	5.6	50.0
13C4 PFOS	Ave	211928	221217		49.9	47.8	4.4	50.0
13C5 PFNA	Ave	201795	217040		53.8	50.0	7.6	50.0
M2-8:2FTS	Ave	72250	70576		46.8	47.9	-2.3	50.0
13C2 PFDA	Ave	182533	203989		55.9	50.0	11.8	50.0
13C8 FOSA	Ave	311183	316450		50.8	50.0	1.7	50.0
d3-NMeFOSAA	Ave	81672	92331		56.5	50.0	13.1	50.0
d5-NEtFOSAA	Ave	83982	92112		54.8	50.0	9.7	50.0
13C2 PFUnA	Ave	145752	151547		52.0	50.0	4.0	50.0
d-N-MeFOSA-M	Ave	90599	97666		53.9	50.0	7.8	50.0
13C2 PFDoA	Ave	167891	170496		50.8	50.0	1.6	50.0
d-N-EtFOSA-M	Ave	86831	92785		53.4	50.0	6.9	50.0
13C2-PFTeDA	Ave	204611	221468		54.1	50.0	8.2	50.0
13C2-PFHxDA	Ave	306398	328025		53.5	50.0	7.1	50.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/25 Calibration Date: 10/31/2017 04:43

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.9522	0.9253		48.6	50.0	-2.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.074	1.088		50.6	50.0	1.3	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	72.48	68.37		41.7	44.2	-5.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9555	0.9933		52.0	50.0	4.0	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9678	0.9930		51.3	50.0	2.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.034	1.054		46.4	45.5	2.0	25.0
6:2FTS	AveID	1.245	1.197		46.1	47.4	-2.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.074	1.017		47.3	50.0	-5.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.173	1.206		48.9	47.6	2.8	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9685	0.9685		50.0	50.0	0.0	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.040	1.078		48.1	46.4	3.7	25.0
8:2FTS	AveID	1.112	1.100		47.4	47.9	-1.1	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9393	0.9467		50.4	50.0	0.8	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9424	0.9650		51.2	50.0	2.4	25.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	AveID	0.9354	0.9181		49.1	50.0	-1.9	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6479	0.6967		51.8	48.2	7.5	25.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	AveID	0.8443	0.8169		48.4	50.0	-3.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.067	1.055		49.4	50.0	-1.2	25.0
MeFOSA	AveID	0.8921	0.8696		48.7	50.0	-2.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9195	0.9549		51.9	50.0	3.9	25.0
N-EtFOSA-M	AveID	0.9298	0.9082		48.8	50.0	-2.3	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.033	1.125		54.4	50.0	8.9	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.2223	0.2281		51.3	50.0	2.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		0.8836		50.6	50.0	1.2	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9506	0.9763		51.4	50.0	2.7	25.0
13C4 PFBA	Ave	350625	395867		56.5	50.0	12.9	50.0
13C5 PFPeA	Ave	225543	256123		56.8	50.0	13.6	50.0
13C3-PFBS	Ave	5028	5792		53.6	46.5	15.2	50.0
13C2 PFHxA	Ave	242324	274279		56.6	50.0	13.2	50.0
13C4-PFHpA	Ave	243728	262300		53.8	50.0	7.6	50.0
18O2 PFHxS	Ave	300958	332065		52.2	47.3	10.3	50.0

FORM VII 537 (modified)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Lab Sample ID: CCV 320-192039/25 Calibration Date: 10/31/2017 04:43

Instrument ID: A8_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 10/30/2017 18:47

Lab File ID: 2017.10.30AAA_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
M2-6:2FTS	Ave	69603	68739		46.9	47.5	-1.2	50.0
13C4 PFOA	Ave	238687	275679		57.7	50.0	15.5	50.0
13C4 PFOS	Ave	211928	237530		53.6	47.8	12.1	50.0
13C5 PFNA	Ave	201795	235219		58.3	50.0	16.6	50.0
M2-8:2FTS	Ave	72250	73672		48.8	47.9	2.0	50.0
13C2 PFDA	Ave	182533	210563		57.7	50.0	15.4	50.0
13C8 FOSA	Ave	311183	335970		54.0	50.0	8.0	50.0
d3-NMeFOSAA	Ave	81672	98371		60.2	50.0	20.4	50.0
d5-NEtFOSAA	Ave	83982	100153		59.6	50.0	19.3	50.0
13C2 PFUnA	Ave	145752	161817		55.5	50.0	11.0	50.0
d-N-MeFOSA-M	Ave	90599	109186		60.3	50.0	20.5	50.0
13C2 PFDoA	Ave	167891	180301		53.7	50.0	7.4	50.0
d-N-EtFOSA-M	Ave	86831	102267		58.9	50.0	17.8	50.0
13C2-PFTeDA	Ave	204611	232896		56.9	50.0	13.8	50.0
13C2-PFHxDA	Ave	306398	356065		58.1	50.0	16.2	50.0

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Batch Number: 190551 Batch Start Date: 10/23/17 08:13 Batch Analyst: Branscum, Cassie

Batch Method: 3535 Batch End Date: 10/24/17 19:54

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFC_ALL_SU 00014	LCPFC-IS 00009
MB 320-190551/1		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
LCS 320-190551/2		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
LCSD 320-190551/3		3535, 537 (modified)				250 mL	0.50 mL	500 uL	100 uL
320-32321-A-1	TP-PFC-022-TPI	3535, 537 (modified)	T	288.15 g	26.29 g	261.9 mL	0.50 mL	500 uL	100 uL
320-32321-A-2	TP-PFC-022-TPE	3535, 537 (modified)	T	285.12 g	25.93 g	259.2 mL	0.50 mL	500 uL	100 uL
320-32321-A-3	TP-PFC-022-MID-CARBON	3535, 537 (modified)	T	279.09 g	25.98 g	253.1 mL	0.50 mL	500 uL	100 uL
320-32321-A-4	TP-PFC-022-TPE-D	3535, 537 (modified)	T	283.78 g	26.47 g	257.3 mL	0.50 mL	500 uL	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LCPFCSP 00117					
MB 320-190551/1		3535, 537 (modified)							
LCS 320-190551/2		3535, 537 (modified)		500 uL					
LCSD 320-190551/3		3535, 537 (modified)		500 uL					
320-32321-A-1	TP-PFC-022-TPI	3535, 537 (modified)	T						
320-32321-A-2	TP-PFC-022-TPE	3535, 537 (modified)	T						
320-32321-A-3	TP-PFC-022-MID-CARBON	3535, 537 (modified)	T						
320-32321-A-4	TP-PFC-022-TPE-D	3535, 537 (modified)	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

SDG No.:

Batch Number: 190551 Batch Start Date: 10/23/17 08:13 Batch Analyst: Branscum, Cassie

Batch Method: 3535 Batch End Date: 10/24/17 19:54

Batch Notes	
Analyst ID - Aliquot Step	TQN
Balance ID	QA-070
Analyst ID - Concentration	CCB/ABH
Analyst ID - Final Volume Step	ABH
H2O ID	10/18/17
Hexane ID	981617
Internal Standard ID#	1068480
Manifold ID	11,16
Methanol ID	1052414
Sodium Hydroxide ID	1062694
Pipette ID	N32761F
Analyst ID - Reagent Drop	CCB
Analyst ID - IS Reagent Drop	TWL
Analyst ID - IS Reagent Drop Witness	ABH
Analyst ID - SU Reagent Drop	CCB
Analyst ID - SU Reagent Drop Witness	JNS
Solvent Lot #	1063864
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	003137011A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	BRUNSWICK_NAS	320-32321-1	SITE 00011	SITE 00011	TP-PFC-INFLUENT	Monitoring well	3015831.52	384866.155	N6247016D9008	WE21	TETRA TECH, INC.	TP-PFC-022-TPI	Ground water	Normal (Regular)	10-Oct-17	537	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-32321-1	SITE 00011	SITE 00011	TP-PFC-EFFLUENT	Monitoring well	3015831.52	384866.155	N6247016D9008	WE21	TETRA TECH, INC.	TP-PFC-022-TPE	Ground water	Normal (Regular)	10-Oct-17	537	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-32321-1	SITE 00011	SITE 00011	TP-PFC-MIDPOINT	Monitoring well	3015831.52	384866.155	N6247016D9008	WE21	TETRA TECH, INC.	TP-PFC-022-MID-CARBON	Ground water	Normal (Regular)	10-Oct-17	537	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-32321-1	SITE 00011	SITE 00011	TP-PFC-EFFLUENT	Monitoring well	3015831.52	384866.155	N6247016D9008	WE21	TETRA TECH, INC.	TP-PFC-022-TPE-D	Ground water	Field duplicate	10-Oct-17	537	Perfluoroalkyl Compounds