



### **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

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# **Definitions/Glossary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

### 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 2.9° 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		_	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	EM	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	DM	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	JD	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	JD	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		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 Sam	nia i	n. 1	ขวก	272	71 2
Lab Saiii	DIG I	D. 🔻	JZU-	JZJ	<b>4</b> 1 - 3

Analyte	Result Qualifier	LOQ	DL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	150	2.5	0.45	ng/L		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		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.

# **Detection Summary**

Client: Tetra Tech, Inc.

Project/Site: TT: PFAS, Brunswick, Discharge

TestAmerica Job ID: 320-32321-1

Client Sample ID: TP-PFC-022-TPE-D	(Continued)
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Lab Sample ID: 320-32321-4

Analyte	Result Qualifie	r 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: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

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

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	EM	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		ng/L		10/23/17 08:13	10/31/17 04:01	1
Perfluorohexanesulfonic acid (PFHxS)	360	E	2.4		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		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
lsotope Dilution	%Recovery		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
1802 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) - Perfluc	orinated F	lydrocarbor	ıs - 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: Tetra Tech, Inc. TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

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

Analyte		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	JD	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

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: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

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

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
1802 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

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: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

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

Isotope Dilution	%Recovery Qual	lifier Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	79	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C2 PFDoA	84	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
1802 PFHxS	107	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C4 PFOS	98	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C2-PFTeDA	97	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C4-PFHpA	97	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C5 PFPeA	90	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1
13C3-PFBS	102	25 - 150	10/23/17 08:13 1	0/31/17 02:46	1

Client Sample ID: TP-PFC-022-TPE-D

Date Collected: 10/10/17 00:00

Lab Sample ID: 320-32321-4

Matrix: Water

Date Received: 10/11/17 09:30

Method: 537 (modified) - Perfl Analyte		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
1802 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

## **Default Detection Limits**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

# 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.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

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

Matrix: Water Prep Type: Total/NA

			Perc	ent Isotope	<b>Dilution Re</b>	covery (Ac	ceptance L	.imits)	
		3C8 FOSA	3C4 PFB/	3C2 PFHx	3C4 PFO/	3C5 PFN/	3C2 PFD/	3C2 PFUn	3C2 PFDo
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(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)

		3O2 PFHx	3C4 PFOS	C2-PFTe[	3C4-PFHp	3C5 PFPe	3C3-PFB
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(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

1802 PFHxS = 1802 PFHxS

13C4 PFOS = 13C4 PFOS

13C2-PFTeDA = 13C2-PFTeDA

13C4-PFHpA = 13C4-PFHpA

13C5 PFPeA = 13C5 PFPeA

13C3-PFBS = 13C3-PFBS

# **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

## Method: 537 (modified) - Perfluorinated Hydrocarbons

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

**Matrix: Water** 

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

Analysis Batch: 192039								Prep Batch:	
Analysis Batch. 192039	МВ	МВ						Frep Batch.	190331
Analyte		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	UM	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
	MB	MB							
Isotope Dilution	%Recovery	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

1300 FUSA	50	25 - 150	10/23/17 06.13 10/31/17 02.11	ı
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
1802 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

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%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	

TestAmerica Sacramento

# **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

### 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

Analysis Baton. 102000	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%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

LCS LCS

Isotope Dilution	%Recovery 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
1802 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

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	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

# **QC Sample Results**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

### 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

Spike	LCSD	LCSD				%Rec.		RPD
Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
40.0	48.1		ng/L		120	56 - 163	4	30
40.0	40.9		ng/L		102	66 - 120	0	30
35.4	36.7		ng/L		104	88 - 130	2	30
36.4	38.3		ng/L		105	87 - 126	1	30
38.1	44.1		ng/L		116	92 - 135	4	30
37.1	39.6		ng/L		107	83 - 126	5	30
38.6	39.8		ng/L		103	80 - 129	5	30
40.0	41.6		ng/L		104	91 - 133	2	30
	Added 40.0 40.0 35.4 36.4 38.1 37.1 38.6	Added         Result           40.0         48.1           40.0         40.9           35.4         36.7           36.4         38.3           38.1         44.1           37.1         39.6           38.6         39.8	Added     Result 40.0     Qualifier       40.0     40.9       35.4     36.7       36.4     38.3       38.1     44.1       37.1     39.6       38.6     39.8	Added         Result 40.0         Qualifier 48.1         Unit ng/L           40.0         40.9         ng/L           35.4         36.7         ng/L           36.4         38.3         ng/L           38.1         44.1         ng/L           37.1         39.6         ng/L           38.6         39.8         ng/L	Added         Result 40.0         Qualifier 48.1         Unit ng/L         D           40.0         40.9         ng/L         ng/L           35.4         36.7         ng/L           36.4         38.3         ng/L           38.1         44.1         ng/L           37.1         39.6         ng/L           38.6         39.8         ng/L	Added         Result         Qualifier         Unit         D         %Rec           40.0         48.1         ng/L         120           40.0         40.9         ng/L         102           35.4         36.7         ng/L         104           36.4         38.3         ng/L         105           38.1         44.1         ng/L         116           37.1         39.6         ng/L         107           38.6         39.8         ng/L         103	Added         Result 40.0         Qualifier 48.1         Unit ng/L         D %Rec 120         Limits 56 - 163           40.0         40.9         ng/L         102         66 - 120           35.4         36.7         ng/L         104         88 - 130           36.4         38.3         ng/L         105         87 - 126           38.1         44.1         ng/L         116         92 - 135           37.1         39.6         ng/L         107         83 - 126           38.6         39.8         ng/L         103         80 - 129	Added         Result 40.0         Qualifier 48.1         Unit ng/L         D %Rec 120         Limits 56 - 163         RPD 56 - 163         4           40.0         40.9         ng/L         102         66 - 120         0           35.4         36.7         ng/L         104         88 - 130         2           36.4         38.3         ng/L         105         87 - 126         1           38.1         44.1         ng/L         116         92 - 135         4           37.1         39.6         ng/L         107         83 - 126         5           38.6         39.8         ng/L         103         80 - 129         5

LCSD LCSD

Isotope Dilution	%Recovery Qualified	r 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
1802 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

# **QC Association Summary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

### 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

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	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

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	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

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	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

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			190551	10/23/17 08:13	ССВ	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.

uthority	Program		EPA Region	<b>Identification Number</b>	<b>Expiration Date</b>	
regon	NELAP		10	4040	01-28-18	
The following analyte:	s are included in this repo	rt, but accreditation	/certification is not off	ered by the governing author	ority:	
Analysis Method	Prep Method	Matrix	Analyt	re		
537 (modified)	3535	Water	Perflu	orobutanesulfonic acid (PFE	BS)	
537 (modified)	3535	Water	Perflu	orobutanoic acid (PFBA)		
537 (modified)	3535	Water	Perflu	orodecanesulfonic acid (PFI	DS)	
537 (modified)	3535	Water	Perflu	orodecanoic acid (PFDA)		
537 (modified)	3535	Water	Perfluorododecanoic acid (PFDoA)			
537 (modified)	3535	Water	Perflu	roheptanesulfonic Acid (PFHpS)		
537 (modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)			
537 (modified)	3535	Water	Perflu	Perfluorohexanesulfonic acid (PFHxS)		
537 (modified)	3535	Water	Perflu	orohexanoic acid (PFHxA)		
537 (modified)	3535	Water	Perflu	orononanoic acid (PFNA)		
537 (modified)	3535	Water	Perflu	orooctane Sulfonamide (FO	SA)	
537 (modified)	3535	Water	Perflu	orooctanesulfonic acid (PFC	OS)	
537 (modified)	3535	Water	Perflu	orooctanoic acid (PFOA)		
537 (modified)	3535	Water	Perflu	Perfluoropentanoic acid (PFPeA)		
537 (modified)	3535	Water	Perflu	orotetradecanoic acid (PFTe	eA)	
537 (modified)	3535	Water	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

Lab Carrella ID	Olland Canada ID	No. a destina	Outlanded Breakerd
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

TestAmerica Job ID: 320-32321-1

#### 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	MANUAL INTEGRATION			
	TIME	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:

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

#### 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	MANUAL INTEGRATION			
	TIME	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

COMPOUND NAME	RETENTION	MANUAL INTEGRATION				
	TIME	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

COMPOUND NAME	RETENTION	MANUAL INTEGRATION			
	TIME	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	MANUAL INTEGRATION				
	TIME	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		

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

					Reagent	Parent Reager	nt		
	Exp	Prep	Dilut	ant	Final		Volume		
Reagent ID	Date	Date	Use		Volume	Reagent ID	Added	Analyte	Concentration
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		Methanol, Lot		5000 uL	LCM2PFOA 00005	500 uL	13C2-PFOA	5 ug/mL
LCM2PFOA 00005	06/19/18		ton Laboratori			(Purchased Reag		13C2-PFOA	50 ug/mL
LCMPFC_ALL_SU_00014	04/03/18	10/03/17	Methanol, Lot	Baker	200 mL	LCd-NEtFOSA-M_00006		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		d5-NEtFOSAA	0.05 ug/mL
						LCM2-6:FTS 00005		M2-6:2FTS	0.0475 ug/mL
						LCM2-8:2FTS 00007		M2-8:2FTS	0.0479 ug/mL
						LCM2PFHxDA 00011		13C2-PFHxDA	0.05 ug/mL
						LCM2PFTeDA 00010		13C2-PFTeDA	0.05 ug/mL
						LCM4PFHPA 00010		13C4-PFHpA	0.05 ug/mL
						LCM5PFPEA 00011		13C5 PFPeA	0.05 ug/mL
						LCM8FOSA 00014		13C8 FOSA	0.05 ug/mL
						LCMPFBA 00011		13C4 PFBA	0.05 ug/mL
						LCMPFBS 00004		13C3-PFBS	0.0465 ug/mL
						LCMPFDA 00016		13C2 PFDA	0.05 ug/mL
						LCMPFDoA 00011		13C2 PFDoA	0.05 ug/mL
					LCMPFHxA 00017		13C2 FFBOA 13C2 PFHxA	0.05 ug/mL	
						LCMPFHxA_00017		1802 PFHXS	
								13C5 PFNA	0.0473 ug/mL
						LCMPFNA_00011			0.05 ug/mL
						LCMPFOA_00015		13C4 PFOA	0.05 ug/mL
						LCMPFOS 00023		13C4 PFOS	0.0478 ug/mL
T.O.1. NEL BOOK 15 00000	04/00/00	7.77	T T TNOMON T - I	JNEL BOOK	141734	LCMPFUdA_00012		13C2 PFUnA	0.05 ug/mL
.LCd-NEtFOSA-M_00006	04/20/22		LLINGTON, Lot			(Purchased Reag		d-N-EtFOSA-M	50 ug/mL
.LCd-NMeFOSA-M_00005	04/20/22		LLINGTON, Lot			(Purchased Reag		d-N-MeFOSA-M	50 ug/mL
.LCd3-NMeFOSAA_00005	05/19/22		LLINGTON, Lot			(Purchased Reag		d3-NMeFOSAA	50 ug/mL
.LCd5-NEtFOSAA 00005	11/22/21		LLINGTON, Lot			(Purchased Reag		d5-NEtFOSAA	50 ug/mL
.LCM2-6:FTS_00005	02/17/22		ELLINGTON, Lot			(Purchased Reag		M2-6:2FTS	47.5 ug/mL
.LCM2-8:2FTS_00007	07/05/22		ELLINGTON, Lot			(Purchased Reag		M2-8:2FTS	47.9 ug/mL
.LCM2PFHxDA_00011	01/07/21		on Laboratorie			(Purchased Reag		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00010	12/07/20		on Laboratorie			(Purchased Reag		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00010	05/03/22		ton Laboratori			(Purchased Reag		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00011	11/22/21		ton Laboratori			(Purchased Reag		13C5 PFPeA	50 ug/mL
.LCM8FOSA_00014	04/20/22		ton Laboratori			(Purchased Reag		13C8 FOSA	50 ug/mL
.LCMPFBA_00011	04/12/22		gton Laborator			(Purchased Reag		13C4 PFBA	50 ug/mL
.LCMPFBS 00004	05/24/22		ton Laboratori			(Purchased Reag		13C3-PFBS	46.5 ug/mL
.LCMPFDA_00016	09/30/21		gton Laborator			(Purchased Reag		13C2 PFDA	50 ug/mL
.LCMPFDoA_00011	05/23/22		ton Laboratori			(Purchased Reag		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00017	11/22/21		ton Laboratori			(Purchased Reag		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00011	02/17/22		ton Laboratori			(Purchased Reag	ent)	1802 PFHxS	47.3 ug/mL
.LCMPFNA_00011	09/30/21		gton Laborator			(Purchased Reag	ent)	13C5 PFNA	50 ug/mL
.LCMPFOA 00015	04/12/22		gton Laborator	ies, Lot	MPFOA0417	(Purchased Reag	ent)	13C4 PFOA	50 ug/mL
.LCMPFOS 00023	05/19/22		gton Laborato			(Purchased Reag	ent)	13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00012	11/22/21	Welling	ton Laboratori	les, Lot M	MPFUdA1116	(Purchased Reag	ent)	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

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

				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
.LCM2PFOA_00006	02/12/21	Welling	ton Laboratories, Lot M	2PF0A0216	(Purchased Reag	ent)	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
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOA 13C4 PFOS	47.8 ng/mL
					TGDEG 711 GD 00001	0.5	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-octanesulfo	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
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				Reagent	Parent Reagen	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluoroheptanesulfonic Acid (PFHpS)	0.476 ng/mL
							Perfluorohexanoic acid (PFHxA)	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid	0.455 ng/mL
							(PFHxS)	
							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	0.5 ng/mL
							(FOSA)	
							Perfluoropentanoic acid	0.5 ng/mL
							(PFPeA) Perfluorotetradecanoic acid	0.5 ng/mL
							(PFTeA)	0.5 Hg/IIIL
							Perfluorotridecanoic Acid	0.5 ng/mL
							(PFTriA)	, , ,
							Perfluoroundecanoic acid	0.5 ng/mL
							(PFUnA)	
					LCPFCIS_00003		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		d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00004		d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004		M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004		M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010 LCM8FOSA 00013		13C5 PFPeA 13C8 FOSA	1 ug/mL 1 ug/mL
					LCMPFBA 00010		13C4 PFBA	1 ug/mL 1 ug/mL
					LCMPFBS 00003		13C3-PFBS	0.93 ug/mL
					LCMPFDA 00015		13C2 PFDA	1 ug/mL
					LCMPFDoA 00010		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00016		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00010		1802 PFHxS	0.946 ug/mL
					LCMPFNA 00010		13C5 PFNA	1 ug/mL
					LCMPFOA 00014		13C4 PFOA	1 ug/mL
					LCMPFOS_00022		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011		13C2 PFUnA	1 ug/mL
LCd-NEtFOSA-M_00005	06/10/21		LLINGTON, Lot dNEtFOSA06		(Purchased Reage		d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M_00004	06/10/21		LLINGTON, Lot dNMeFOSA06		(Purchased Reage		d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA_00004	11/22/21		LINGTON, Lot d3NMeFOSAA1		(Purchased Reage		d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA_00004	11/22/21		LINGTON, Lot d5NEtFOSAA1		(Purchased Reage		d5-NEtFOSAA	50 ug/mL
LCM2-6:FTS_00004	02/17/22	W.	ELLINGTON, Lot M262FTS02	L /	(Purchased Reage	ent)	M2-6:2FTS	47.5 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reage:	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	- Analyte	Concentration
LCM2-8:2FTS 00004	08/22/21	WE:	LLINGTON, Lot M282FTS	0816	(Purchased Read	rent)	M2-8:2FTS	47.9 ug/mL
LCM2PFHxDA 00010			n Laboratories, Lot M		(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00009			n Laboratories, Lot M		(Purchased Read		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00009			on Laboratories, Lot N		(Purchased Read		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00010	11/22/21		on Laboratories, Lot N		(Purchased Read	gent)	13C5 PFPeA	50 ug/mL
LCM8FOSA 00013	12/22/20	Wellingto	on Laboratories, Lot M	M8FOSA1215I	(Purchased Read	gent)	13C8 FOSA	50 ug/mL
LCMPFBA 00010	05/24/21	Wellingt	on Laboratories, Lot	MPFBA0516	(Purchased Read	gent)	13C4 PFBA	50 ug/mL
LCMPFBS 00003	08/02/21		on Laboratories, Lot		(Purchased Read		13C3-PFBS	46.5 ug/mL
LCMPFDA 00015	09/30/21	Wellingt	on Laboratories, Lot	MPFDA0916	(Purchased Read	gent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00010	04/08/21		on Laboratories, Lot		(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA 00016	11/22/21	Wellingt	on Laboratories, Lot	MPFHxA1116	(Purchased Read	gent)	13C2 PFHxA	50 ug/mL
LCMPFHxS 00010	02/17/22	Wellingt	on Laboratories, Lot	MPFHxS0217	(Purchased Read		1802 PFHxS	47.3 ug/mL
LCMPFNA 00010	09/30/21		on Laboratories, Lot		(Purchased Read	gent)	13C5 PFNA	50 ug/mL
LCMPFOA_00014	04/12/22	Wellingt	on Laboratories, Lot	MPFOA0417	(Purchased Read	gent)	13C4 PFOA	50 ug/mL
LCMPFOS_00022	12/12/21	Wellingt	on Laboratories, Lot	MPFOS1216	(Purchased Read	gent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA_00011	11/22/21		on Laboratories, Lot		(Purchased Read	gent)	13C2 PFUnA	50 ug/mL
.LCPFC_ALL_SP_00001	12/27/17 (	07/07/17   1	Methanol, Lot 157237	10000 uL	LCPFC2SP_00037	1000 uI		0.0934 ug/mL
							1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	
							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-octanesulfo	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 uI	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

200 1000 1000 1000 1000 1000 1000 1000	Lab Name: TestAmerica Sacramento Job No.: 320-32321-1

				Reagent	Parent Reage:	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid	0.0928 ug/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	0.1 ug/mL
							(FOSA)	
							Perfluoropentanoic acid	0.1 ug/mL
							(PFPeA)	
							Perfluorotetradecanoic acid	0.1 ug/mL
							(PFTeA)	
							Perfluorotridecanoic Acid	0.1 ug/mL
							(PFTriA)	
							Perfluoroundecanoic acid	0.1 ug/mL
							(PFUnA)	
LCPFC2SP 00037	01/07/18	07/07/17	Methanol, Lot 104453	10 mL	LC4:2FTS 00002	200 uL	Sodium	0.934 ug/mL
_					_		1H,1H,2H,2H-perfluorohexane	
							sulfonate (4:2)	
					LC6:2FTS 00003	200 uL	Sodium	0.948 ug/mL
					_		1H,1H,2H,2H-perfluorooctane	
							sulfonate (6:2)	
					LC8:2FTS 00003	200 uL	Sodium	0.958 ug/mL
					_		1H,1H,2H,2H-perfluorodecane	_
							sulfonate (8:2)	
					LCN-EtFOSA-M 00004	200 uL	N-ethylperfluoro-1-octanesulfo	1 ug/mL
					_		namide	_
					LCN-EtFOSAA 00002	200 uL	N-ethyl perfluorooctane	1 ug/mL
					_		sulfonamidoacetic acid	_
					LCN-MeFOSA-M 00003	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA 00003	200 uL	N-methyl perfluorooctane	1 ug/mL
					_		sulfonamidoacetic acid	
LC4:2FTS 00002	12/12/21		WELLINGTON, Lot 42FTS	1216	(Purchased Read	jent)	Sodium	46.7 ug/mL
_							1H,1H,2H,2H-perfluorohexane	_
							sulfonate (4:2)	
LC6:2FTS 00003	06/25/21		WELLINGTON, Lot 62FTS	0616	(Purchased Read	gent)	Sodium	47.4 ug/mL
_							1H,1H,2H,2H-perfluorooctane	
							sulfonate (6:2)	
LC8:2FTS 00003	08/22/21		WELLINGTON, Lot 82FTS	0816	(Purchased Read	gent)	Sodium	47.9 ug/mL
_							1H,1H,2H,2H-perfluorodecane	
							sulfonate (8:2)	
LCN-EtFOSA-M 00004	05/24/21	WE	ELLINGTON, Lot NETFOSA	.0516M	(Purchased Read	gent)	N-ethylperfluoro-1-octanesulfo	50 ug/mL
_							namide	_
LCN-EtFOSAA 00002	01/20/21	WE	ELLINGTON, Lot NETFOSA	A0116	(Purchased Read	gent)	N-ethyl perfluorooctane	50 ug/mL
_							sulfonamidoacetic acid	
LCN-MeFOSA-M 00003	05/24/21	WE	ELLINGTON, Lot NMeFOSA	.0516M	(Purchased Read	gent)	MeFOSA	50 ug/mL
LCN-MeFOSAA 00003	01/20/21		ELLINGTON, Lot NMeFOSA		(Purchased Read	gent)	N-methyl perfluorooctane	50 ug/mL
_			·		1	·	sulfonamidoacetic acid	
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		Perfluorobutanesulfonic acid	0.884 ug/mL
					_		(PFBS)	1
							( L L DO )	

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

				Reagent	Parent Reage	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCPFDoA_00006		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		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		Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010		Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006		Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005		Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005		Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
LCPFBA 00006	05/27/21	Wellin	gton Laboratories, Lot	PFBA0516	(Purchased Read		Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	Welling	ton Laboratories, Lot	LPFBS0316	(Purchased Read	gent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00006	05/31/21		gton Laboratories, Lot		(Purchased Read	gent)	Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006	05/31/21	_	ton Laboratories, Lot		(Purchased Read	gent)	Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005	07/02/20	Welling	ton Laboratories, Lot	LPFDS0615	(Purchased Read	gent)	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21	Welling	ton Laboratories, Lot	PFHpA0116	(Purchased Read	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpS_00010	11/06/20	Welling	ton Laboratories, Lot I	PFHpS1115	(Purchased Read	gent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA 00005	12/22/20	Welling	ton Laboratories, Lot	PFHxA1215	(Purchased Read	gent)	Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA 00007	05/25/21	Welling	ton Laboratories, Lot F	FHxDA0516	(Purchased Read	gent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20	Wellingto	on Laboratories, Lot br	PFHxSK0615	(Purchased Read	gent)	Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA 00007	10/23/20	Welling	gton Laboratories, Lot	PFNA1015	(Purchased Read	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00007	08/02/21	Wellin	gton Laboratories, Lot	PFOA0716	(Purchased Read		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00007	04/29/21		ton Laboratories, Lot		(Purchased Read	gent)	Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20		on Laboratories, Lot b		(Purchased Read		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21	Welling	ton Laboratories, Lot	FOSA0916I	(Purchased Read	gent)	Perfluorooctane Sulfonamide (FOSA)	50 ug/mL

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

				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFPeA_00006	05/31/21	Welling	gton Laboratories, Lot	PFPeA0516	(Purchased Reag	ent)	Perfluoropentanoic acid (PFPeA)	50 ug/ml
LCPFTeDA_00005	12/09/20	Welling	ton Laboratories, Lot	PFTeDA1215	(Purchased Reag	ent)	Perfluorotetradecanoic acid (PFTeA)	50 ug/ml
LCPFTrDA_00005	02/12/21	Welling	ton Laboratories, Lot 1	PFTrDA0216	(Purchased Reag	ent)	Perfluorotridecanoic Acid (PFTriA)	50 ug/mI
LCPFUdA_00006	08/19/20	Welling	gton Laboratories, Lot	PFUdA0815	(Purchased Reag	ent)	Perfluoroundecanoic acid (PFUnA)	50 ug/mI
.LCPFCIS 00003	12/30/17	06/30/17	Methanol, Lot 14139	5000 uL	LCM2PFOA 00005	500 uL	13C2-PFOA	5 ug/mI
LCM2PFOA 00005	06/19/18	Welling	ton Laboratories, Lot 1	M2PFOA0613	(Purchased Reag	ent)	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 d-N-MeFOSA-M	50 ng/ml 50 ng/ml
							d3-NMeFOSAA	50 ng/mI
							d5-NEtFOSAA	50 ng/m1
							M2-6:2FTS	47.5 ng/ml
							M2-8:2FTS	47.9 ng/ml
							13C2-PFHxDA	50 ng/m1
							13C2-PFTeDA	50 ng/m1
							13C4-PFHpA	50 ng/m
							13C5 PFPeA	50 ng/ml
							13C8 FOSA	50 ng/mI
							13C4 PFBA	50 ng/mI
							13C3-PFBS	46.5 ng/ml
							13C2 PFDA	50 ng/ml
							13C2 PFDoA	50 ng/m
							13C2 PFHxA	50 ng/m
							1802 PFHxS	47.3 ng/m
							13C5 PFNA	50 ng/ml
							13C4 PFOA	50 ng/ml
							13C4 PFOS	47.8 ng/ml
							13C2 PFUnA	50 ng/mI
					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-octanesulfo namide	1 ng/ml
							N-ethyl perfluorooctane sulfonamidoacetic acid	1 ng/ml
							MeFOSA	1 ng/mI
							N-methyl perfluorooctane sulfonamidoacetic acid	1 ng/mI

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

Reagent ID Prep Dilutant Final Volume Reagent ID Added Analyte Perfluorobutanesulfonic actions (PFBS)	Concentration did 0.884 ng/mL
Reagent ID Date Date Used Volume Reagent ID Added Analyte Perfluorobutanesulfonic ac (PFBS)	
(PFBS)	id 0.884 ng/mL
Perfluorodecanoic acid (PR	DA) 1 ng/mL
Perfluorododecanoic acid	1 ng/mL
(PFDOA)	
Perfluorodecanesulfonic ad (PFDS)	id 0.964 ng/mL
Perfluoroheptanoic acid (PFHpA)	1 ng/mL
Perfluoroheptanesulfonic A	cid 0.952 ng/mL
(PFHpS)	1 /
Perfluorohexanoic acid (PF	
Perfluorohexadecanoic acid	
Perfluorohexanesulfonic ac (PFHxS)	id 0.91 ng/mL
Perfluorononanoic acid (PF	NA) 1 ng/mL
Perfluorooctanoic acid (Pi	
Perfluorooctadecanoic acid	
Perfluorooctanesulfonic ac	3.
(PFOS)	0.320 lig/ iii
Perfluorooctane Sulfonamic (FOSA)	e 1 ng/mL
Perfluoropentanoic acid (PFPeA)	1 ng/mL
Perfluorotetradecanoic aci	d 1 ng/mL
(PFTeA)	1 119/11111
Perfluorotridecanoic Acid	1 ng/mL
(PFTriA)	1 119, 1112
Perfluoroundecanoic acid	1 ng/mL
(PFUnA)	
LCPFCIS_00003 50 uL 13C2-PFOA	50 ng/mL
LCMPFC_ALL_SU_00001 12/29/17 06/29/17 Methanol, Lot Baker 10000 uL LCd-NEtFOSA-M_00005 200 uL d-N-EtFOSA-M 141039	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	0.946 ug/mL

Lab	Name: TestAmerica	Sacrament	o Job No.: 320-32321-1

				Reagent	Parent Reage	ent			
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration	
					LCMPFNA_00010		13C5 PFNA	1 ug/mL	
					LCMPFOA 00014		13C4 PFOA	1 ug/mL	
					LCMPFOS 00022	200 uL	13C4 PFOS	0.956 ug/mL	
					LCMPFUdA 00011	200 uL	13C2 PFUnA	1 ug/mI	
LCd-NEtFOSA-M 00005	06/10/21	WE	LLINGTON, Lot dNEtFOSA	0616M	(Purchased Rea	gent)	d-N-EtFOSA-M	50 ug/mI	
LCd-NMeFOSA-M 00004	06/10/21	WE	LLINGTON, Lot dNMeFOSA(	0616M	(Purchased Rea	gent)	d-N-MeFOSA-M	50 ug/mI	
LCd3-NMeFOSAA 00004	11/22/21	WEI	LINGTON, Lot d3NMeFOSA	A1116	(Purchased Rea	gent)	d3-NMeFOSAA	50 ug/mL	
LCd5-NEtFOSAA 00004	11/22/21	WEI	LINGTON, Lot d5NEtFOSA	A1116	(Purchased Rea	gent)	d5-NEtFOSAA	50 ug/mI	
LCM2-6:FTS 00004	02/17/22	W	ELLINGTON, Lot M262FTS(	)217	(Purchased Rea	gent)	M2-6:2FTS	47.5 ug/mI	
LCM2-8:2FTS 00004	08/22/21	W	ELLINGTON, Lot M282FTS(	0816	(Purchased Rea	gent)	M2-8:2FTS	47.9 ug/mI	
LCM2PFHxDA 00010	01/07/21		on Laboratories, Lot M2		(Purchased Rea		13C2-PFHxDA	50 ug/mL	
LCM2PFTeDA 00009	12/07/20	Wellingt	on Laboratories, Lot M2	PFTeDA0217	(Purchased Rea	gent)	13C2-PFTeDA	50 ug/mL	
LCM4PFHPA 00009	05/27/21		on Laboratories, Lot M		(Purchased Rea		13C4-PFHpA	50 ug/mI	
LCM5PFPEA 00010	11/22/21		on Laboratories, Lot M		(Purchased Rea		13C5 PFPeA	50 ug/mI	
LCM8FOSA 00013	12/22/20		on Laboratories, Lot M		(Purchased Rea		13C8 FOSA	50 ug/mI	
LCMPFBA 00010	05/24/21	Welling	ton Laboratories, Lot	MPFBA0516	(Purchased Rea	gent)	13C4 PFBA	50 ug/mI	
LCMPFBS 00003	08/02/21		ton Laboratories, Lot N		(Purchased Rea		13C3-PFBS	46.5 ug/mI	
LCMPFDA 00015	09/30/21		ton Laboratories, Lot		(Purchased Rea		13C2 PFDA	50 ug/mI	
LCMPFDoA 00010	04/08/21		ton Laboratories, Lot N		(Purchased Rea		13C2 PFDoA	50 ug/mL	
LCMPFHxA 00016	11/22/21		ton Laboratories, Lot N		(Purchased Rea		13C2 PFHxA	50 ug/mL	
LCMPFHxS 00010	02/17/22		ton Laboratories, Lot N		(Purchased Rea		1802 PFHxS	47.3 ug/mL	
LCMPFNA 00010	09/30/21		ton Laboratories, Lot		(Purchased Rea		13C5 PFNA	50 ug/mI	
LCMPFOA 00014	04/12/22	_	ton Laboratories, Lot		(Purchased Rea		13C4 PFOA	50 ug/mL	
LCMPFOS 00022	12/12/21	-	ton Laboratories, Lot		(Purchased Rea	<del></del>	13C4 PFOS	47.8 ug/mL	
LCMPFUdA 00011	11/22/21		ton Laboratories, Lot N		(Purchased Rea		13C2 PFUnA	50 ug/mL	
.LCPFC ALL SP 00001			Methanol, Lot 157237		LCPFC2SP 00037	1000 uL		0.0934 ug/mL	
							1H,1H,2H,2H-perfluorohexane sulfonate (4:2)		
							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-octanesulfo namide	]	
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL	
							MeFOSA	0.1 ug/mI	
							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/mI	
							Perfluorododecanoic acid (PFDoA)	0.1 ug/mL	
							Perfluorodecanesulfonic acid (PFDS)	0.0964 ug/mL	

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reagent			
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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	7/07/17	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		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfo namide	1 ug/mL
					LCN-EtFOSAA_00002		N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00003		MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003		N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
LC4:2FTS_00002	12/12/21		WELLINGTON, Lot 42FTS121	6	(Purchased Reag	ent)	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
LC6:2FTS_00003	06/25/21		WELLINGTON, Lot 62FTS061	6	(Purchased Reag	ent)	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
LC8:2FTS_00003	08/22/21		WELLINGTON, Lot 82FTS081	6	(Purchased Reag	ent)	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
LCN-EtFOSA-M_00004	05/24/21	WE	ELLINGTON, Lot NEtFOSA051	6M	(Purchased Reag	ent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1	
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			Reagent	Parent Reag	ent		
	Exp Prep	Dilutant	Final		Volume		
Reagent ID	Date Date		Volume	Reagent ID	Added	Analyte	Concentration
LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NETFOSA	AA0116	(Purchased Rea	agent)	N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCN-MeFOSA-M 00003	05/24/21	WELLINGTON, Lot NMeFOSA	A0516M	(Purchased Rea	agent)	MeFOSA	50 ug/mL
LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSA		(Purchased Rea		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		1 ug/mL
_				LCPFBS_00006		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
				LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
				LCPFDoA_00006		Perfluorododecanoic acid (PFDoA)	1 ug/mL
				LCPFDS_00005		Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
				LCPFHpA_00006		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
				LCPFHpS_00010		Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
				LCPFHxA_00005		Perfluorohexanoic acid (PFHxA)	1 ug/mL
				LCPFHxDA_00007		Perfluorohexadecanoic acid	1 ug/mL
				LCPFHxS-br_00003		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		Perfluorooctadecanoic acid	1 ug/mL
				LCPFOS-br_00003		Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
				LCPFOSA_00010		Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
				LCPFPeA_00006		Perfluoropentanoic acid (PFPeA)	1 ug/mL
				LCPFTeDA_00005		Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
				LCPFTrDA_00005		Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
				LCPFUdA_00006		Perfluoroundecanoic acid (PFUnA)	1 ug/mL
LCPFBA_00006		lington Laboratories, Lo		(Purchased Rea	<i></i>	Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006		ington Laboratories, Lot		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00006		lington Laboratories, Lo		(Purchased Rea		Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006		ington Laboratories, Lot		(Purchased Rea		Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005		ington Laboratories, Lot		(Purchased Rea		Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006		ington Laboratories, Lot	-	(Purchased Rea		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpS_00010	11/06/20 Well	ington Laboratories, Lot	LPFHpS1115	(Purchased Rea		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA_00005		ington Laboratories, Lot		(Purchased Rea		Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA_00007	05/25/21 Well	ington Laboratories, Lot	PFHxDA0516	(Purchased Rea	agent)	Perfluorohexadecanoic acid	50 ug/mL

Lab	Name:	TestAmerica	Sacrament	to J	do	No.	: 3	320-	-32	232	1-1	L

				Reagent	Parent Reagen	ıt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFHxS-br_00003	07/03/20	Wellingt	on Laboratories, Lot b	rPFHxSK0615	(Purchased Reag	ent)	Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA 00007	10/23/20	Wellin	gton Laboratories, Lot	PFNA1015	(Purchased Reage	ent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00007	08/02/21	Wellin	gton Laboratories, Lot	PFOA0716	(Purchased Reage	ent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00007	04/29/21		gton Laboratories, Lot		(Purchased Reage		Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20	_	ton Laboratories, Lot l		(Purchased Reage	ent)	Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21		gton Laboratories, Lot		(Purchased Reage		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21		gton Laboratories, Lot		(Purchased Reage	ent)	Perfluoropentanoic acid (PFPeA)	50 ug/mL
LCPFTeDA_00005	12/09/20	_	ton Laboratories, Lot		(Purchased Reage	ent)	Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21	_	ton Laboratories, Lot		(Purchased Reag		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
LCPFUdA_00006	08/19/20	-	gton Laboratories, Lot		(Purchased Reage		Perfluoroundecanoic acid (PFUnA)	50 ug/mL
.LCPFCIS_00003			Methanol, Lot 14139		LCM2PFOA_00005		13C2-PFOA	5 ug/mL
LCM2PFOA_00005	06/19/18	Welling	ton Laboratories, Lot	M2PFOA0613	(Purchased Reage	ent)	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
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
						0.50	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	4.74 ng/mL
							sulfonate (6:2)	
							Sodium 1H,1H,2H,2H-perfluorodecane	4.79 ng/mL
								1.73

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					Parent Reagen	ıt		
	_	_		Reagent				
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							N-ethylperfluoro-1-octanesulfo namide	5 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	5 ng/mL
							MeFOSA	5 ng/mL
							N-methyl perfluorooctane	5 ng/mL
							sulfonamidoacetic acid	_
							Perfluorobutanoic acid (PFBA)	5 ng/mL
							Perfluorobutanesulfonic acid	4.42 ng/mL
							(PFBS)	_
							Perfluorodecanoic acid (PFDA)	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							(PFDoA)	_
							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
				1	LCd3-NMeFOSAA 00004		d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA 00004		d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS 00004		M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS 00004		M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA 00010		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00009		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00009		13C4-PFHpA	1 ug/mL
				1	LCM5PFPEA 00010		13C5 PFPeA	1 ug/mL
I	I	I	I	T	TOMOLLEEW 00010	l 200 ur	1000 LLLEW	I na/ur

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1	
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				Reagent	Parent Reage	nt		
	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					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	1802 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	WEI	LINGTON, Lot dNEtFOS	A0616M	(Purchased Read	rent)	d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M 00004	06/10/21		LLINGTON, Lot dNMeFOS		(Purchased Read		d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA 00004	11/22/21		LINGTON, Lot d3NMeFOS		(Purchased Read		d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA 00004	11/22/21		LINGTON, Lot d5NEtFOS		(Purchased Read		d5-NEtFOSAA	50 ug/mL
LCM2-6:FTS 00004	02/17/22		ELLINGTON, Lot M262FT		(Purchased Read	rent)	M2-6:2FTS	47.5 ug/mL
LCM2-8:2FTS 00004	08/22/21		ELLINGTON, Lot M282FT		(Purchased Read		M2-8:2FTS	47.9 ug/mL
LCM2PFHxDA 00010	01/07/21		on Laboratories, Lot		(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00009	12/07/20		on Laboratories, Lot		(Purchased Read		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00009	05/27/21		on Laboratories, Lot		(Purchased Read		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00010	11/22/21		on Laboratories, Lot		(Purchased Read		13C5 PFPeA	50 ug/mL
LCM8FOSA 00013	12/22/20		on Laboratories, Lot		(Purchased Read		13C8 FOSA	50 ug/mL
LCMPFBA 00010	05/24/21		ton Laboratories, Lot		(Purchased Read		13C4 PFBA	50 ug/mL
LCMPFBS 00003	08/02/21		on Laboratories, Lot		(Purchased Read		13C3-PFBS	46.5 ug/mL
LCMPFDA 00015	09/30/21		ton Laboratories, Lot		(Purchased Read		13C2 PFDA	50 ug/mL
LCMPFDoA 00010	04/08/21		on Laboratories, Lot		(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA 00016	11/22/21		on Laboratories, Lot		(Purchased Read		13C2 PFHxA	50 ug/mL
LCMPFHxS 00010	02/17/22		on Laboratories, Lot		(Purchased Read		1802 PFHxS	47.3 ug/mL
LCMPFNA 00010	09/30/21		ton Laboratories, Lot		(Purchased Read		13C5 PFNA	50 ug/mL
LCMPFOA 00014	04/12/22		ton Laboratories, Lot		(Purchased Read		13C4 PFOA	50 ug/mL
LCMPFOS 00022	12/12/21		ton Laboratories, Lot		(Purchased Read		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00011	11/22/21		on Laboratories, Lot		(Purchased Read		13C2 PFUnA	50 ug/mL
.LCPFC ALL SP 00001	12/27/17		Methanol, Lot 157237		LCPFC2SP 00037		Sodium	0.0934 ug/mL
			,				1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	, , , , , , , , , , , , , , , , , , , ,
							Sodium	0.0948 ug/mL
							1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	
							Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfo namide	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

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			Reagent	Parent Reage:	nt		
	Exp Prep	Dilutant	Final		Volume		
Doogont ID	Exp Prep Date Date	Used	Volume	Dongont ID	Added	Analyte	Concentration
Reagent ID	Date Date	used	vorune	Reagent ID	Added	-	
						Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
						Perfluorodecanoic acid (PFDA)	0.1 ug/mL
						Perfluorododecanoic acid (PFDoA)	0.1 ug/mL
						Perfluorodecanesulfonic acid	0.0964 ug/mL
						(PFDS)	
						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	0.091 ug/mL
						(PFHxS)	
						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	0.1 ug/mL
	04 (07 (40 07 (07 (		4.0 -			(PFUnA)	0.001 / -
LCPFC2SP_00037	01/07/18 07/07/	7 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	0.948 ug/mL
				_		1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	
				LC8:2FTS 00003	200 uL	Sodium	0.958 ug/mL
				_		1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	
				LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfo	1 ug/mL
				LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
				LCN-MeFOSA-M 00003	200 11T.	MeFOSA	1 ug/mL
				LCN-MeFOSAA 00003		N-methyl perfluorooctane	1 ug/mL
						sulfonamidoacetic acid	. 5,
LC4:2FTS_00002	12/12/21	WELLINGTON, Lot 42FTS1216		(Purchased Reag	gent)	Sodium 1H,1H,2H,2H-perfluorohexane	46.7 ug/mL
						sulfonate (4:2)	

ab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LC6:2FTS_00003	06/25/21	Ţ	WELLINGTON, Lot 62FTS061	6	(Purchased Rea	igent)	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
LC8:2FTS_00003	08/22/21	Ţ	WELLINGTON, Lot 82FTS081	6	(Purchased Rea	igent)	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
LCN-EtFOSA-M_00004	05/24/21	WE	LLINGTON, Lot NEtFOSA051	. 6M	(Purchased Rea	igent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL
LCN-EtFOSAA_00002	01/20/21		LLINGTON, Lot NEtFOSAA01		(Purchased Rea		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCN-MeFOSA-M_00003	05/24/21		LLINGTON, Lot NMeFOSA051		(Purchased Rea	igent)	MeFOSA	50 ug/mL
LCN-MeFOSAA_00003	01/20/21	WE	LLINGTON, Lot NMeFOSAA01	.16	(Purchased Rea	-	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		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		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		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		Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010		Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006		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	Wellin	gton Laboratories, Lot P	FBA0516	(Purchased Rea	igent)	Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	Welling	ton Laboratories, Lot LF	PFBS0316	(Purchased Rea	_	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00006	05/31/21		gton Laboratories, Lot P		(Purchased Rea	igent)	Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006	05/31/21	Welling	ton Laboratories, Lot PF	DoA0516	(Purchased Rea	igent)	Perfluorododecanoic acid (PFDoA)	50 ug/mL

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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFDS_00005	07/02/20	_	ton Laboratories, Lot		(Purchased Rea	_	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21	_	ton Laboratories, Lot	-	(Purchased Rea	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHps_00010	11/06/20	Wellingt	on Laboratories, Lot	LPFHpS1115	(Purchased Rea	gent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA_00005	12/22/20	Welling	ton Laboratories, Lot	PFHxA1215	(Purchased Rea		Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA_00007	05/25/21	Wellingt	on Laboratories, Lot	PFHxDA0516	(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20	_	on Laboratories, Lot b		(Purchased Rea	gent)	Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA 00007	10/23/20	Welling	gton Laboratories, Lot	PFNA1015	(Purchased Rea		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00007	08/02/21	Welling	gton Laboratories, Lot	PFOA0716	(Purchased Rea	gent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00007	04/29/21	Welling	ton Laboratories, Lot	PFODA0416	(Purchased Rea	gent)	Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20	-	on Laboratories, Lot k		(Purchased Rea		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21	_	ton Laboratories, Lot		(Purchased Rea		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21	_	ton Laboratories, Lot		(Purchased Rea	· .	Perfluoropentanoic acid (PFPeA)	50 ug/mL
LCPFTeDA_00005	12/09/20		on Laboratories, Lot		(Purchased Rea	_	Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21	_	on Laboratories, Lot		(Purchased Rea	gent)	Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
LCPFUdA_00006	08/19/20	_	ton Laboratories, Lot		(Purchased Rea	· .	Perfluoroundecanoic acid (PFUnA)	50 ug/mL
.LCPFCIS_00003		06/30/17	Methanol, Lot 14139		LCM2PFOA_00005		13C2-PFOA	5 ug/mL
LCM2PFOA 00005	06/19/18	Wellingt	on Laboratories, Lot	M2PFOA0613	(Purchased Rea	gent)	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 uI	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
							1802 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

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				Reagent	Parent Reager	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCPFC2SP_00037	100 uL	Sodium	18.68 ng/mL
							1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	
							Sodium	18.96 ng/mL
							1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	
							Sodium	19.16 ng/mL
							1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	
							N-ethylperfluoro-1-octanesulfo namide	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		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 Perfluorooctanesulfonic acid	20 ng/mL
							(PFOS)	18.56 ng/mL
							Perfluorooctane Sulfonamide (FOSA)	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							(PFPeA)	20 /
							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	10000 uL	LCd-NEtFOSA-M 00005	200 uL	d-N-EtFOSA-M	1 ug/mL
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				Reagent	Parent Reager	ıt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCd-NMeFOSA-M 00004	200 uL	d-N-MeFOSA-M	1 ug/mI
					LCd3-NMeFOSAA 00004	200 uL	d3-NMeFOSAA	1 ug/mI
					LCd5-NEtFOSAA 00004	200 uL	d5-NEtFOSAA	1 ug/mI
					LCM2-6:FTS 00004	200 uL	M2-6:2FTS	0.95 ug/mI
					LCM2-8:2FTS 00004	200 uL	M2-8:2FTS	0.958 ug/mI
					LCM2PFHxDA 00010	200 uL	13C2-PFHxDA	1 ug/mI
					LCM2PFTeDA 00009	200 uL	13C2-PFTeDA	1 ug/mI
					LCM4PFHPA 00009		13C4-PFHpA	1 ug/mI
					LCM5PFPEA 00010		13C5 PFPeA	1 ug/mI
					LCM8FOSA 00013		13C8 FOSA	1 ug/ml
					LCMPFBA 00010		13C4 PFBA	1 ug/mI
					LCMPFBS 00003		13C3-PFBS	0.93 ug/mI
					LCMPFDA 00015		13C2 PFDA	1 ug/mI
					LCMPFDoA 00010		13C2 PFDoA	1 ug/mI
					LCMPFHxA 00016		13C2 PFHxA	1 ug/mI
					LCMPFHxS 00010		1802 PFHXS	0.946 ug/mI
					LCMPFNA 00010		13C5 PFNA	1 ug/mI
					LCMPFNA_00010		13C4 PFOA	
					LCMPFOA_00014		13C4 PFOA	1 ug/mI
								0.956 ug/mI
T.G.1 NEL EGG3 M. 0000E	0.6 /1.0 /0.1	F-7E7	T TNOTON THE INDIPORTOR	1.614	LCMPFUdA 00011		13C2 PFUnA	1 ug/mI
LCd-NEtFOSA-M_00005	06/10/21		LLINGTON, Lot dNEtFOSA06		(Purchased Reag		d-N-EtFOSA-M	50 ug/mI
LCd-NMeFOSA-M_00004	06/10/21		LLINGTON, Lot dNMeFOSA06		(Purchased Reag		d-N-MeFOSA-M	50 ug/mI
LCd3-NMeFOSAA_00004	11/22/21		LINGTON, Lot d3NMeFOSAA1		(Purchased Reag		d3-NMeFOSAA	50 ug/ml
LCd5-NEtFOSAA_00004	11/22/21		LINGTON, Lot d5NEtFOSAA1		(Purchased Reag		d5-NEtFOSAA	50 ug/ml
LCM2-6:FTS_00004	02/17/22		ELLINGTON, Lot M262FTS02		(Purchased Reag		M2-6:2FTS	47.5 ug/ml
LCM2-8:2FTS_00004	08/22/21		ELLINGTON, Lot M282FTS08		(Purchased Reag		M2-8:2FTS	47.9 ug/mI
LCM2PFHxDA_00010	01/07/21		on Laboratories, Lot M2P		(Purchased Reag		13C2-PFHxDA	50 ug/ml
LCM2PFTeDA_00009	12/07/20		on Laboratories, Lot M2P		(Purchased Reag		13C2-PFTeDA	50 ug/mI
LCM4PFHPA_00009	05/27/21		on Laboratories, Lot M4F		(Purchased Reag		13C4-PFHpA	50 ug/mI
LCM5PFPEA_00010	11/22/21		on Laboratories, Lot M5E		(Purchased Reag		13C5 PFPeA	50 ug/mI
LCM8FOSA_00013	12/22/20		on Laboratories, Lot M8E		(Purchased Reag		13C8 FOSA	50 ug/mI
LCMPFBA_00010	05/24/21	-	gton Laboratories, Lot ME		(Purchased Reag		13C4 PFBA	50 ug/mI
LCMPFBS_00003	08/02/21		ton Laboratories, Lot M3		(Purchased Reag	ent)	13C3-PFBS	46.5 ug/mI
LCMPFDA_00015	09/30/21		gton Laboratories, Lot ME		(Purchased Reag	ent)	13C2 PFDA	50 ug/mI
LCMPFDoA_00010	04/08/21	Welling	ton Laboratories, Lot MP	FDoA0416	(Purchased Reag		13C2 PFDoA	50 ug/mI
LCMPFHxA 00016	11/22/21	Welling	ton Laboratories, Lot MP	FHxA1116	(Purchased Reag	ent)	13C2 PFHxA	50 ug/mI
LCMPFHxS 00010	02/17/22	Welling	ton Laboratories, Lot MP	FHxS0217	(Purchased Reag	ent)	1802 PFHxS	47.3 ug/mI
LCMPFNA 00010	09/30/21	Welling	ton Laboratories, Lot ME	FNA0916	(Purchased Reag		13C5 PFNA	50 ug/mI
LCMPFOA 00014	04/12/22		gton Laboratories, Lot ME		(Purchased Reag		13C4 PFOA	50 ug/mI
LCMPFOS 00022	12/12/21	Welling	gton Laboratories, Lot ME	FOS1216	(Purchased Reag		13C4 PFOS	47.8 ug/mI
LCMPFUdA 00011	11/22/21		ton Laboratories, Lot MP		(Purchased Reag		13C2 PFUnA	50 ug/mI
.LCPFC2SP 00037	01/07/18		Methanol, Lot 104453	10 mL	1	200 uL		0.934 ug/mI
	,,						1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	
					LC6:2FTS_00003	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mI

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				Reagent	Parent Reage	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Dilutant Final	Reagent ID	Volume Added	Analyte	Concentration
					LC8:2FTS_00003		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00004		N-ethylperfluoro-1-octanesulfo namide	1 ug/mL
					LCN-EtFOSAA_00002		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 42FTS12	16	(Purchased Read	gent)	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
LC6:2FTS_00003	06/25/21		WELLINGTON, Lot 62FTS06		(Purchased Reag		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
LC8:2FTS_00003	08/22/21		WELLINGTON, Lot 82FTS08		(Purchased Read		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
LCN-EtFOSA-M_00004	05/24/21	WI	ELLINGTON, Lot NEtFOSA05	516M	(Purchased Read	gent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL
LCN-EtFOSAA_00002	01/20/21	WI	ELLINGTON, Lot NETFOSAAC	)116	(Purchased Read	gent)	N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCN-MeFOSA-M 00003	05/24/21	W	ELLINGTON, Lot NMeFOSA05	516M	(Purchased Read	gent)	MeFOSA	50 ug/mL
LCN-MeFOSAA_00003	01/20/21	WI	ELLINGTON, Lot NMeFOSAAC	)116	(Purchased Read	gent)	N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS 00003	12/30/17		Methanol, Lot 14139		LCM2PFOA 00005		13C2-PFOA	5 ug/mL
LCM2PFOA 00005	06/19/18		ton Laboratories, Lot M		(Purchased Read		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uI	LCPFBA_00006		Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00006	200 uL	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006		Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005		Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010		Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA 00005	200 uL	Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003		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		Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003	200 uL	Perfluorooctanesulfonic acid	0.928 ug/mL
					_		(PFOS)	

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				Reagent	Parent Rea	agent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCPFOSA_00010		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	Wellin	gton Laboratories, 1	Lot PFBA0516	(Purchased R	Reagent)	Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	Welling	ton Laboratories, I	Lot LPFBS0316	(Purchased R		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00006	05/31/21	Wellin	gton Laboratories,	Lot PFDA0516	(Purchased R		Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006	05/31/21	_	ton Laboratories, I		(Purchased R	-	Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005	07/02/20	_	ton Laboratories, I		(Purchased R	Reagent)	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21		ton Laboratories, I		(Purchased R	Reagent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpS_00010	11/06/20	_	ton Laboratories, Lo	=	(Purchased R	Reagent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA_00005	12/22/20		ton Laboratories, I		(Purchased R		Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA_00007	05/25/21	Welling	ton Laboratories, L	ot PFHxDA0516	(Purchased R		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20	_	on Laboratories, Lo		(Purchased R	-	Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA_00007	10/23/20	Wellin	gton Laboratories, 1	Lot PFNA1015	(Purchased R	Reagent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00007	08/02/21		gton Laboratories, 1		(Purchased R		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00007	04/29/21		ton Laboratories, I		(Purchased R		Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20		on Laboratories, Lo		(Purchased R		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21		ton Laboratories, I		(Purchased R		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21		ton Laboratories, I		(Purchased R	-	Perfluoropentanoic acid (PFPeA)	50 ug/mL
LCPFTeDA_00005	12/09/20		ton Laboratories, Lo		(Purchased R	Reagent)	Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21	Welling	ton Laboratories, Lo	ot PFTrDA0216	(Purchased R	Reagent)	Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
LCPFUdA_00006	08/19/20	Welling	ton Laboratories, I	Lot PFUdA0815	(Purchased R	Reagent)	Perfluoroundecanoic acid (PFUnA)	50 ug/mL
LCPFC_FULL-L5_00008	12/27/17	07/07/17	MeOH/H2O, Lot 09028	85 5000 uL	LCMPFC ALL SU 000	01 250 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

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				Reagent	Parent Reag	gent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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
							1802 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	46.7 ng/mL
							1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	
							Sodium	47.4 ng/mL
							1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	
							Sodium	47.9 ng/mL
							1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	
							N-ethylperfluoro-1-octanesulfo namide	50 ng/mL
							N-ethyl perfluorooctane	50 ng/mL
							sulfonamidoacetic acid	]
							MeFOSA	50 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
					LCPFCIS 00003		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	45.5 ng/mL
							(PFHxS)	, , , , , , , , , , , , , , , , , , , ,
							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
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				D	Parent Reager	nt		
	Exp	Prep	Dilutant	Reagent Final		Volume		
Reagent ID		Date		Volume	Reagent ID	Added	Analyte	Concentration
							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		d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00004		d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00004		d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA 00004		d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00004		M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00004		M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010		13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013		13C8 FOSA	1 ug/mL
					LCMPFBA 00010		13C4 PFBA	1 ug/mL
					LCMPFBS_00003		13C3-PFBS	0.93 ug/mL
					LCMPFDA_00015		13C2 PFDA	1 ug/mL
					LCMPFDoA_00010		13C2 PFDoA	1 ug/mL
					LCMPFHxA_00016		13C2 PFHxA	1 ug/mL
					LCMPFHxS_00010		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00010		13C5 PFNA	1 ug/mL
					LCMPFOA_00014		13C4 PFOA	1 ug/mL
					LCMPFOS_00022		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00011		13C2 PFUnA	1 ug/mL
LCd-NEtFOSA-M_00005	06/10/21		LLINGTON, Lot dNEtFOSA06		(Purchased Reag		d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M_00004	06/10/21		LLINGTON, Lot dNMeFOSA06		(Purchased Reag		d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA 00004	11/22/21		LINGTON, Lot d3NMeFOSAA1		(Purchased Reag		d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA_00004	11/22/21		LLINGTON, Lot d5NEtFOSAA1		(Purchased Reag		d5-NEtFOSAA	50 ug/mL
LCM2-6:FTS_00004	02/17/22		ELLINGTON, Lot M262FTS02		(Purchased Reag		M2-6:2FTS	47.5 ug/mL
LCM2-8:2FTS_00004	08/22/21		ELLINGTON, Lot M282FTS08		(Purchased Reag		M2-8:2FTS	47.9 ug/mL
LCM2PFHxDA_00010	01/07/21		on Laboratories, Lot M2P		(Purchased Reag		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00009	12/07/20		on Laboratories, Lot M2P		(Purchased Reag		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00009	05/27/21		on Laboratories, Lot M41		(Purchased Reag		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00010	11/22/21		on Laboratories, Lot M51		(Purchased Reag		13C5 PFPeA	50 ug/mL
LCM8FOSA_00013	12/22/20		on Laboratories, Lot M8E		(Purchased Reag		13C8 FOSA	50 ug/mL
LCMPFBA_00010	05/24/21	-	gton Laboratories, Lot ME		(Purchased Reag		13C4 PFBA	50 ug/mL
LCMPFBS_00003	08/02/21		ton Laboratories, Lot M3		(Purchased Reag		13C3-PFBS	46.5 ug/mL
LCMPFDA_00015	09/30/21		gton Laboratories, Lot ME		(Purchased Reag		13C2 PFDA	50 ug/mL
LCMPFDoA_00010	04/08/21	Welling	ton Laboratories, Lot MP	FDoA0416	(Purchased Reag	ent)	13C2 PFDoA	50 ug/mL

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				Reagent	Parent Reager	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCMPFHxA 00016	11/22/21		on Laboratories,		(Purchased Reag		13C2 PFHxA	50 ug/mL
LCMPFHxS_00010	02/17/22		on Laboratories,		(Purchased Reag	ent)	1802 PFHxS	47.3 ug/mL
LCMPFNA_00010	09/30/21	Wellingt	on Laboratories,	Lot MPFNA0916	(Purchased Reag	ent)	13C5 PFNA	50 ug/mL
LCMPFOA_00014	04/12/22		on Laboratories,		(Purchased Reag		13C4 PFOA	50 ug/mL
LCMPFOS_00022	12/12/21	Wellingt	on Laboratories,	Lot MPFOS1216	(Purchased Reag		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00011	11/22/21		on Laboratories,		(Purchased Reag	ent)	13C2 PFUnA	50 ug/mL
.LCPFC2SP_00037	01/07/18	07/07/17	Methanol, Lot 104	453 10 mL	LC4:2FTS_00002		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		N-ethylperfluoro-1-octanesulfo	1 ug/mL
					LCN-EtFOSAA_00002		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	W	ELLINGTON, Lot 42	FTS1216	(Purchased Reag	ent)	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
LC6:2FTS_00003	06/25/21	W	ELLINGTON, Lot 62	FTS0616	(Purchased Reag	ent)	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
LC8:2FTS_00003	08/22/21	W	ELLINGTON, Lot 82	FTS0816	(Purchased Reag	rent)	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
LCN-EtFOSA-M_00004	05/24/21	WEI	LINGTON, Lot NET	FOSA0516M	(Purchased Reag	ent)	N-ethylperfluoro-1-octanesulfo	50 ug/mL
LCN-EtFOSAA_00002	01/20/21	WEI	LINGTON, Lot NET	FOSAA0116	(Purchased Reag	ment)	N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCN-MeFOSA-M 00003	05/24/21	WEI	LINGTON, Lot NMe	FOSA0516M	(Purchased Reag	ent)	MeFOSA	50 ug/mL
LCN-MeFOSAA_00003	01/20/21	WEI	LINGTON, Lot NMe	FOSAA0116	(Purchased Reag	ent)	N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS 00003	12/30/17	06/30/17	Methanol, Lot 141	39 5000 uL	LCM2PFOA 00005	500 uL	13C2-PFOA	5 ug/mL
LCM2PFOA 00005	06/19/18	Wellingto	on Laboratories,	Lot M2PFOA0613	(Purchased Reag	ent)	13C2-PFOA	50 ug/mL
.LCPFCSP 00103	12/27/17	06/27/17	Methanol, Lot 090	285   10000 uL	LCPFBA 00006	200 uL	Perfluorobutanoic acid (PFBA)	1 ug/mL
_			•		LCPFBS_00006		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00006	200 117,	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA_00006		Perfluorododecanoic acid (PFDoA)	1 ug/mL
					LCPFDS_00005		Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
					LCPFHpA_00006	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL

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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA 00005		Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA 00007		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA 00007		Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00007		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007		Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003		Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010		Perfluorooctane Sulfonamide (FOSA)	1 ug/mL
					LCPFPeA_00006		Perfluoropentanoic acid (PFPeA)	1 ug/mL
					LCPFTeDA_00005		Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005		Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006		Perfluoroundecanoic acid (PFUnA)	1 ug/mL
LCPFBA_00006	05/27/21		gton Laboratories, Lot B		(Purchased Read		Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	_	ton Laboratories, Lot L		(Purchased Read	gent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00006	05/31/21		gton Laboratories, Lot B		(Purchased Read		Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006	05/31/21	_	ton Laboratories, Lot P		(Purchased Read		Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005	07/02/20	=	ton Laboratories, Lot L		(Purchased Read	_	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21	_	ton Laboratories, Lot P	_	(Purchased Read		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpS_00010	11/06/20		ton Laboratories, Lot LE	-	(Purchased Read		Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA_00005	12/22/20	Welling	ston Laboratories, Lot P	FHxA1215	(Purchased Read		Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA_00007	05/25/21		ton Laboratories, Lot PF		(Purchased Read		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20		on Laboratories, Lot br		(Purchased Read		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA_00007	10/23/20		gton Laboratories, Lot E		(Purchased Read		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00007	08/02/21		gton Laboratories, Lot E		(Purchased Read	<i></i>	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00007	04/29/21	Welling	ton Laboratories, Lot P	FODA0416	(Purchased Read		Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20	_	on Laboratories, Lot br		(Purchased Read		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21	=	ton Laboratories, Lot F		(Purchased Read		Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21	=	ton Laboratories, Lot P		(Purchased Read		Perfluoropentanoic acid (PFPeA)	50 ug/mL
LCPFTeDA_00005	12/09/20		ton Laboratories, Lot PF		(Purchased Read		Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21	Welling	ton Laboratories, Lot PF	FTrDA0216	(Purchased Read	gent)	Perfluorotridecanoic Acid (PFTriA)	50 ug/mL

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				Reagent	Parent Reage	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
-								
LCPFUdA_00006	08/19/20	Welling	gton Laboratories, Lot	PFUdA0815	(Purchased Read	gent)	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
							1802 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	93.4 ng/mL
							1H, 1H, 2H, 2H-perfluorohexane	
							sulfonate (4:2)	94.8 ng/mL
							1H,1H,2H,2H-perfluorooctane	94.0 119/1111
							sulfonate (6:2)	
							Sodium	95.8 ng/mL
							1H,1H,2H,2H-perfluorodecane	33.0 Hg/ III
							sulfonate (8:2)	
							N-ethylperfluoro-1-octanesulfo	100 ng/mL
							namide	
							N-ethyl perfluorooctane	100 ng/mL
							sulfonamidoacetic acid	
							MeFOSA	100 ng/mL
							N-methyl perfluorooctane	100 ng/mL
					T. GD. T. G. D. G.	F.O	sulfonamidoacetic acid	50 / -
					LCPFCIS_00003		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	100 ng/mL
							(PFDoA)	
							Perfluorodecanesulfonic acid	96.4 ng/mL
							(PFDS)	

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reagent			
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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	91 ng/mL
							(PFHxS)	) 1 11g/ min
							Perfluorononanoic acid (PFNA)	100 ng/mL
							Perfluorooctanoic acid (PFOA)	100 ng/mL
							Perfluorooctadecanoic acid	100 ng/mL
							Perfluorooctanesulfonic acid	92.8 ng/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	100 ng/mL
							(FOSA) Perfluoropentanoic acid	100 ng/mL
							(PFPeA)	100 Hg/IIIL
							Perfluorotetradecanoic acid	100 ng/mL
							(PFTeA)	, , ,
							Perfluorotridecanoic Acid	100 ng/mL
							(PFTriA)	
							Perfluoroundecanoic acid	100 ng/mL
.LCMPFC ALL SU 00001	12/20/17	06/20/17	Methanol, Lot Baker	10000 11	LCd-NEtFOSA-M 00005	200 117	(PFUnA) d-N-EtFOSA-M	1 ug/mL
.LCMFFC_ALL_30_00001	12/29/11	00/29/17	141039	10000 uL	LCG-NECFOSA-M_00005	200 uL	Q-N-ECFOSA-M	I ug/IIII
			111003		LCd-NMeFOSA-M 00004	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA 00004		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		M2-8:2FTS	0.958 ug/mL
					LCM2PFHxDA_00010		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00009		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00009		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00010		13C5 PFPeA	1 ug/mL
					LCM8FOSA_00013		13C8 FOSA	1 ug/mL
					LCMPFBA_00010		13C4 PFBA	1 ug/mL
					LCMPFBS_00003 LCMPFDA 00015		13C3-PFBS 13C2 PFDA	0.93 ug/mL 1 ug/mL
					LCMPFDA_00013		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00016		13C2 PFHXA	1 ug/mL
					LCMPFHxS 00010		1802 PFHxS	0.946 ug/mL
					LCMPFNA 00010		13C5 PFNA	1 ug/mL
					LCMPFOA 00014		13C4 PFOA	1 ug/mL
					LCMPFOS 00022		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00011		13C2 PFUnA	1 ug/mL
LCd-NEtFOSA-M 00005	06/10/21	WE	LLINGTON, Lot dNEtFOSA061	L 6M	(Purchased Reage		d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M 00004	06/10/21	WE	LLINGTON, Lot dNMeFOSA061		(Purchased Reage		d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA 00004	11/22/21		LINGTON, Lot d3NMeFOSAA1		(Purchased Reage		d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA 00004	11/22/21	WEI	LINGTON, Lot d5NEtFOSAA1	116	(Purchased Reage	ent)	d5-NEtFOSAA	50 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reage	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCM2-6:FTS 00004	02/17/22	WE:	LLINGTON, Lot M262FTS(	)217	(Purchased Read	gent)	M2-6:2FTS	47.5 ug/mI
LCM2-8:2FTS 00004	08/22/21	WE	LLINGTON, Lot M282FTS(	816	(Purchased Read	gent)	M2-8:2FTS	47.9 ug/mI
LCM2PFHxDA 00010	01/07/21	Wellington	n Laboratories, Lot M2	PFHxDA1112	(Purchased Read	gent)	13C2-PFHxDA	50 ug/mI
LCM2PFTeDA 00009	12/07/20	Wellington	n Laboratories, Lot M2	PFTeDA0217	(Purchased Read	gent)	13C2-PFTeDA	50 ug/mI
LCM4PFHPA 00009	05/27/21	Wellingto	n Laboratories, Lot M	4PFHpA0516	(Purchased Read	gent)	13C4-PFHpA	50 ug/mI
LCM5PFPEA 00010	11/22/21	Wellingto	n Laboratories, Lot M	5PFPeA1116	(Purchased Read	gent)	13C5 PFPeA	50 ug/mI
LCM8FOSA 00013	12/22/20		n Laboratories, Lot M		(Purchased Read		13C8 FOSA	50 ug/mI
LCMPFBA 00010	05/24/21		on Laboratories, Lot		(Purchased Read	gent)	13C4 PFBA	50 ug/ml
LCMPFBS 00003	08/02/21	Wellingto	on Laboratories, Lot M	13PFBS0815	(Purchased Read	gent)	13C3-PFBS	46.5 ug/ml
LCMPFDA 00015	09/30/21	Wellingt	on Laboratories, Lot	MPFDA0916	(Purchased Read	gent)	13C2 PFDA	50 ug/mI
LCMPFDoA 00010	04/08/21		on Laboratories, Lot M		(Purchased Read	gent)	13C2 PFDoA	50 ug/mI
LCMPFHxA 00016	11/22/21	Wellingto	on Laboratories, Lot M	MPFHxA1116	(Purchased Read	gent)	13C2 PFHxA	50 ug/mI
LCMPFHxS 00010	02/17/22	Wellingto	on Laboratories, Lot M	MPFHxS0217	(Purchased Read		1802 PFHxS	47.3 ug/mI
LCMPFNA 00010	09/30/21	Wellingt	on Laboratories, Lot	MPFNA0916	(Purchased Read	rent)	13C5 PFNA	50 ug/mI
LCMPFOA 00014	04/12/22	Wellingt	on Laboratories, Lot	MPFOA0417	(Purchased Read		13C4 PFOA	50 ug/mI
LCMPFOS 00022	12/12/21	Wellingt	on Laboratories, Lot	MPFOS1216	(Purchased Read	, ,	13C4 PFOS	47.8 ug/mI
LCMPFUdA 00011	11/22/21		on Laboratories, Lot M		(Purchased Read		13C2 PFUnA	50 ug/mI
.LCPFC2SP 00037			Methanol, Lot 104453	10 mT	LC4:2FTS 00002		Sodium	0.934 ug/mI
• = = = = = = = = = = = = = = = = = = =	01/0//10	0,,0,,1,		20 1112		200 42	1H, 1H, 2H, 2H-perfluorohexane	0.301 ag/
							sulfonate (4:2)	
					LC6:2FTS 00003	200 uL	Sodium	0.948 ug/mI
							1H, 1H, 2H, 2H-perfluorooctane	
							sulfonate (6:2)	
					LC8:2FTS 00003	200 uL	Sodium	0.958 ug/mL
					_		1H, 1H, 2H, 2H-perfluorodecane	]
							sulfonate (8:2)	
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfo	1 ug/mL
							namide	
					LCN-EtFOSAA_00002	200 uL	N-ethyl perfluorooctane	1 ug/mL
						000 -	sulfonamidoacetic acid	
					LCN-MeFOSA-M_00003		MeFOSA	1 ug/mL
					LCN-MeFOSAA_00003		N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
LC4:2FTS_00002	12/12/21	WI	ELLINGTON, Lot 42FTS12	216	(Purchased Read	gent)	Sodium	46.7 ug/mL
							1H,1H,2H,2H-perfluorohexane	
							sulfonate (4:2)	
LC6:2FTS_00003	06/25/21	W	ELLINGTON, Lot 62FTS06	516	(Purchased Read	gent)	Sodium	47.4 ug/mL
							1H,1H,2H,2H-perfluorooctane	
							sulfonate (6:2)	
LC8:2FTS_00003	08/22/21	W1	ELLINGTON, Lot 82FTS08	316	(Purchased Read	gent)	Sodium	47.9 ug/mL
							1H, 1H, 2H, 2H-perfluorodecane	
	05/04/04			5 4 C	( <u> </u>		sulfonate (8:2)	50 / -
LCN-EtFOSA-M_00004	05/24/21	WEI	LINGTON, Lot NETFOSAO	516M	(Purchased Read	gent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL
LCN-EtFOSAA 00002	01/20/21	TRM	LINGTON, Lot NETFOSAA	0116	(Purchased Read	rent.)	N-ethyl perfluorooctane	50 ug/mL
TOW DELODING_00005	01/20/21	WEL	LINGION, LOC NECTOSAA	0110	(Larchasca Reag	, ,	sulfonamidoacetic acid	JO ug/IIII
LCN-MeFOSA-M 00003	05/24/21	WET	LINGTON, Lot NMeFOSA0	516M	(Purchased Read	rent.)	MeFOSA	50 ug/mL
LCN-MeFOSAA 00003	01/20/21		LINGTON, Lot NMeFOSAA		(Purchased Read		N-methyl perfluorooctane	50 ug/mL
	,,		,	- <del>-</del>	(= == == == = = = = = = = = = = = = = =	,,	sulfonamidoacetic acid	
.LCPFCIS 00003	10/20/17	06/20/17/1	Methanol, Lot 14139	F000 +	LCM2PFOA 00005	E00 =	13C2-PFOA	5 ug/mL

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

				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCM2PFOA 00005	06/19/18	Welling	ton Laboratories, Lot M	2PFOA0613	(Purchased Rea	gent)	13C2-PFOA	50 ug/mL
.LCPFCSP 00103	12/27/17		Methanol, Lot 090285		LCPFBA 00006		Perfluorobutanoic acid (PFBA)	1 ug/mL
_			·		LCPFBS_00006	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00006	200 11	Perfluorodecanoic acid (PFDA)	1 ug/mL
					LCPFDoA 00006		Perfluorododecanoic acid	1 ug/mL
					_		(PFDoA)	
					LCPFDS_00005		Perfluorodecanesulfonic acid (PFDS)	0.964 ug/mL
				LCPFHpA_00006		Perfluoroheptanoic acid (PFHpA)	1 ug/mL	
					LCPFHpS_00010		Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005		Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007		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		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		Perfluorotetradecanoic acid (PFTeA)	1 ug/mL
					LCPFTrDA_00005		Perfluorotridecanoic Acid (PFTriA)	1 ug/mL
					LCPFUdA_00006	200 uL	Perfluoroundecanoic acid (PFUnA)	1 ug/mL
LCPFBA_00006	05/27/21	Wellin	gton Laboratories, Lot	PFBA0516	(Purchased Rea		Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	Welling	gton Laboratories, Lot I	PFBS0316	(Purchased Rea	gent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00006	05/31/21	Wellin	gton Laboratories, Lot 1	PFDA0516	(Purchased Rea		Perfluorodecanoic acid (PFDA)	50 ug/mL
LCPFDoA_00006	05/31/21	Welling	gton Laboratories, Lot F	FDoA0516	(Purchased Rea	gent)	Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005	07/02/20	Welling	gton Laboratories, Lot I	PFDS0615	(Purchased Rea	gent)	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21	Welling	gton Laboratories, Lot F	FHpA0116	(Purchased Rea	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHps_00010	11/06/20	Welling	ton Laboratories, Lot L	PFHpS1115	(Purchased Rea	gent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFHxA 00005	12/22/20	Welling	ton Laboratories, Lot F	FHxA1215	(Purchased Rea	gent)	Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA 00007	05/25/21		ton Laboratories, Lot P		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20		on Laboratories, Lot br		(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA 00007	10/23/20 Wellington Laboratories, Lot PFNA1015			PFNA1015	(=======)		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00007	08/02/21		gton Laboratories, Lot		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL

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

				Reagent	Parent Reagen	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFODA 00007	04/29/21		ton Laboratories, Lot P		(Purchased Reage	ent)	Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20	Wellingt	on Laboratories, Lot br	PFOSK1015	(Purchased Reage	ent)	Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21	Welling	ton Laboratories, Lot F	OSA0916I	(Purchased Reage	ent)	Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21	Welling	ton Laboratories, Lot P	FPeA0516	(Purchased Reage	ent)	Perfluoropentanoic acid (PFPeA)	50 ug/mL
LCPFTeDA_00005	12/09/20	Wellingt	ton Laboratories, Lot PF	TTeDA1215	(Purchased Reag	ent)	Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21	Wellingt	ton Laboratories, Lot PF	FTrDA0216	(Purchased Reago	ent)	Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
LCPFUdA_00006	08/19/20	Welling	ton Laboratories, Lot P	FUdA0815	(Purchased Reage	ent)	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
							1802 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		186.8 ng/mL
							1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	
							Sodium	189.6 ng/mL
							1H,1H,2H,2H-perfluorooctane	
							sulfonate (6:2)	
							Sodium 1H,1H,2H,2H-perfluorodecane	191.6 ng/mL
							sulfonate (8:2)	
							N-ethylperfluoro-1-octanesulfo	200 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	200 ng/mL
							MeFOSA	200 ng/mL

Lab	Name: Te	estAmerica	Sacramento	Job No.	: 3	20-3	32321	1-1		
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			Reagent	Parent Reager	nt		
	Exp Prep	Dilutant	Final		Volume		
Reagent ID	Date Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
						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	182 ng/mL
						(PFHxS)	
						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		M2-8:2FTS	0.958 ug/mL
				LCM2PFHxDA 00010		13C2-PFHxDA	1 ug/mL
				LCM2PFTeDA 00009		13C2-PFTeDA	1 ug/mL
				LCM4PFHPA_00009		13C4-PFHpA	1 ug/mL
				LCM5PFPEA_00010		13C5 PFPeA	1 ug/mL
				LCM8FOSA_00013		13C8 FOSA	1 ug/mL
				LCMPFBA_00010		13C4 PFBA	1 ug/mL
				LCMPFBS_00003		13C3-PFBS	0.93 ug/mL
				LCMPFDA_00015	200 uL	13C2 PFDA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1	Lab	Name: TestAmerica	Sacramento	Job No.: 320-32321-1	
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					Parent Reager	<u> </u>		
				Reagent	rarent keager	.1.0		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCMPFDoA 00010	200 111	13C2 PFDoA	1 ug/mL
					LCMPFHXA 00016		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00010	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00010		13C5 PFNA	1 ug/mL
					LCMPFOA 00014	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS 00022		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00011		13C2 PFUnA	1 ug/mL
LCd-NEtFOSA-M 00005	06/10/21	WE	LLINGTON, Lot dNEtFOSA06	516M	(Purchased Reag	ent)	d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M 00004	06/10/21		LLINGTON, Lot dNMeFOSA06		(Purchased Reag		d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA 00004	11/22/21		LLINGTON, Lot d3NMeFOSAA		(Purchased Reag		d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA 00004	11/22/21	WE]	LINGTON, Lot d5NEtFOSAA	1116	(Purchased Reag	ent)	d5-NEtFOSAA	50 ug/mL
LCM2-6:FTS 00004	02/17/22		ELLINGTON, Lot M262FTS02		(Purchased Reag		M2-6:2FTS	47.5 ug/mL
LCM2-8:2FTS 00004	08/22/21	W	ELLINGTON, Lot M282FTS08	316	(Purchased Reag	ent)	M2-8:2FTS	47.9 ug/mL
LCM2PFHxDA 00010	01/07/21		on Laboratories, Lot M2F		(Purchased Reag		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00009	12/07/20		on Laboratories, Lot M2F		(Purchased Reag		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00009	05/27/21		ton Laboratories, Lot M4		(Purchased Reag		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00010	11/22/21		ton Laboratories, Lot M5		(Purchased Reag		13C5 PFPeA	50 ug/mL
LCM8FOSA 00013	12/22/20		ton Laboratories, Lot M8		(Purchased Reag		13C8 FOSA	50 ug/mL
LCMPFBA 00010	05/24/21		ton Laboratories, Lot M		(Purchased Reag		13C4 PFBA	50 ug/mL
LCMPFBS 00003	08/02/21		ton Laboratories, Lot M3		(Purchased Reag		13C3-PFBS	46.5 ug/mL
LCMPFDA 00015	09/30/21		ton Laboratories, Lot M		(Purchased Reag		13C2 PFDA	50 ug/mL
LCMPFDoA 00010	04/08/21		ton Laboratories, Lot ME		(Purchased Reag		13C2 PFDoA	50 ug/mL
LCMPFHxA 00016	11/22/21		ton Laboratories, Lot ME		(Purchased Reag		13C2 PFHxA	50 ug/mL
LCMPFHxS 00010	02/17/22		ton Laboratories, Lot ME		(Purchased Reag		1802 PFHxS	47.3 ug/mL
LCMPFNA 00010	09/30/21		gton Laboratories, Lot M		(Purchased Reag		13C5 PFNA	50 ug/mL
LCMPFOA 00014	04/12/22		gton Laboratories, Lot M		(Purchased Reag		13C4 PFOA	50 ug/mL
LCMPFOS 00022	12/12/21	Welling	gton Laboratories, Lot M	PFOS1216	(Purchased Reag		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00011	11/22/21		ton Laboratories, Lot ME		(Purchased Reag	ent)	13C2 PFUnA	50 ug/mL
.LCPFC2SP 00037			Methanol, Lot 104453		LC4:2FTS 00002		Sodium	0.934 ug/mL
			,				1H, 1H, 2H, 2H-perfluorohexane	
							sulfonate (4:2)	
					LC6:2FTS 00003	200 uL	Sodium	0.948 ug/mL
					_		1H,1H,2H,2H-perfluorooctane	
							sulfonate (6:2)	
					LC8:2FTS_00003	200 uL	Sodium	0.958 ug/mL
							1H,1H,2H,2H-perfluorodecane	
							sulfonate (8:2)	
					LCN-EtFOSA-M_00004	200 uL	N-ethylperfluoro-1-octanesulfo	1 ug/mL
							namide	1 / -
					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	1 ug/mL
					_		sulfonamidoacetic acid	_
LC4:2FTS_00002	12/12/21		WELLINGTON, Lot 42FTS121	L 6	(Purchased Reag	ent)	Sodium	46.7 ug/mL
							1H,1H,2H,2H-perfluorohexane	
							sulfonate (4:2)	

Lab Name: TestAmerica Sacramento Job No.: 320-32321-1	
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				Decemb	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	-	Reagent Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LC6:2FTS_00003	06/25/21		WELLINGTON, Lot 62FTS06	16	(Purchased Rea	agent)	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
LC8:2FTS_00003	08/22/21		WELLINGTON, Lot 82FTS08	16	(Purchased Rea	igent)	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
LCN-EtFOSA-M_00004	05/24/21	WE	LLINGTON, Lot NETFOSA05	16M	(Purchased Rea	igent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL
LCN-EtFOSAA_00002	01/20/21	WE	ELLINGTON, Lot NETFOSAAC	)116	(Purchased Rea	igent)	N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCN-MeFOSA-M 00003	05/24/21	WE	LLINGTON, Lot NMeFOSA05	516M	(Purchased Rea	agent)	MeFOSA	50 ug/mL
LCN-MeFOSAA_00003	01/20/21	WE	ELLINGTON, Lot NMeFOSAAC	116	(Purchased Rea	igent)	N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFCIS 00003	12/30/17		Methanol, Lot 14139		LCM2PFOA 00005	500 uL	13C2-PFOA	5 ug/mL
LCM2PFOA_00005	06/19/18		ton Laboratories, Lot M	2PFOA0613	(Purchased Rea		13C2-PFOA	50 ug/mL
.LCPFCSP_00103	12/27/17	06/27/17	Methanol, Lot 090285	10000 uL	LCPFBA_00006		Perfluorobutanoic acid (PFBA)	1 ug/mL
					LCPFBS_00006		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00006		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		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00010	200 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.952 ug/mL
					LCPFHxA_00005		Perfluorohexanoic acid (PFHxA)	1 ug/mL
					LCPFHxDA_00007		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00003		Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00007	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00007		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00007		Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00003		Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00010		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		gton Laboratories, Lot		(Purchased Rea	igent)	Perfluorobutanoic acid (PFBA)	50 ug/mL
LCPFBS_00006	03/15/21	Welling	ton Laboratories, Lot I	JPFBS0316	(Purchased Rea	igent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00006	05/31/21	Wellin	gton Laboratories, Lot	PFDA0516	(Purchased Rea	igent)	Perfluorodecanoic acid (PFDA)	50 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
Tab Name: 10001molifod baolamoneo	000 110 020 02021 1

				Reagent	Parent Reagen	ıt		
Reagent ID	Exp Prep Date Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	- Analyte	Concentration	
LCPFDoA_00006	05/31/21	Welling	ton Laboratories, Lot	PFDoA0516	(Purchased Reage	ent)	Perfluorododecanoic acid (PFDoA)	50 ug/mL
LCPFDS_00005	07/02/20		ton Laboratories, Lot		(Purchased Reage	ent)	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
LCPFHpA_00006	01/22/21		ton Laboratories, Lot	-	(Purchased Reage	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpS_00010	11/06/20	Welling	ton Laboratories, Lot 1	LPFHpS1115	(Purchased Reage	ent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mI
LCPFHxA 00005	12/22/20		ston Laboratories, Lot		(Purchased Reage		Perfluorohexanoic acid (PFHxA)	50 ug/mL
LCPFHxDA 00007	05/25/21	Welling	ton Laboratories, Lot 1	PFHxDA0516	(Purchased Reage	ent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxS-br_00003	07/03/20		on Laboratories, Lot b	rPFHxSK0615	(Purchased Reage	ent)	Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
LCPFNA_00007	10/23/20		gton Laboratories, Lot		(Purchased Reage		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00007	08/02/21		gton Laboratories, Lot		(Purchased Reage		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00007	04/29/21		ston Laboratories, Lot		(Purchased Reage		Perfluorooctadecanoic acid	50 ug/mL
LCPFOS-br_00003	10/14/20		on Laboratories, Lot b		(Purchased Reage		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFOSA_00010	09/30/21	-	gton Laboratories, Lot		(Purchased Reage	•	Perfluorooctane Sulfonamide (FOSA)	50 ug/mL
LCPFPeA_00006	05/31/21		ton Laboratories, Lot		(Purchased Reage	ent)	Perfluoropentanoic acid (PFPeA)	50 ug/mI
LCPFTeDA_00005	12/09/20	_	ton Laboratories, Lot 1		(Purchased Reage	ent)	Perfluorotetradecanoic acid (PFTeA)	50 ug/mL
LCPFTrDA_00005	02/12/21		ton Laboratories, Lot 1		(Purchased Reage		Perfluorotridecanoic Acid (PFTriA)	50 ug/mL
LCPFUdA_00006	08/19/20	Welling	ton Laboratories, Lot	PFUdA0815	(Purchased Reage	ent)	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 uI	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
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
ı							13C2 PFUnA	50 ng/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-32321-1
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Reagent ID  Exp Prep Dilutant Final Volume Reagent ID  Added Analyte  LCPFACMXB_00010  LCPFACMXB_00010  LCPFBS)  Perfluorobutanoic acid	Concentration c acid 44.25 ng/mL
Reagent ID Date Date Used Volume Reagent ID Added Analyte  LCPFACMXB_00010 125 uL Perfluorobutanesulfonic (PFBS)	
(PFBS)	cacid 44.25 ng/mI
Periluoroputanoic acid	(PFBA) 50 ng/mL
Perfluorodecanesulfonio (PFDS)	
Perfluorodecanoic acid	(PFDA) 50 ng/mL
Perfluorododecanoic aci	
Perfluoroheptanoic acid	d 50 ng/mL
Perfluorohexanesulfonio (PFHxS)	c acid 47.25 ng/mL
Perfluorohexanoic acid	(PFHxA) 50 ng/mL
Perfluorononanoic acid	
Perfluorooctanesulfonio (PFOS)	c acid 47.75 ng/mL
Perfluorooctanoic acid	
Perfluoropentanoic acid	d 50 ng/mL
Perfluorotetradecanoic (PFTeA)	acid 50 ng/mL
Perfluorotridecanoic Ac (PFTriA)	cid 50 ng/mL
Perfluoroundecanoic aci	
LCPFC3IM_00008 250 uL Perfluoroheptanesulfoni	ic Acid 47.6 ng/mL
Perfluorooctane Sulfona (FOSA)	amide 50 ng/mL
LCMPFC_ALL_SU_00011 02/22/18 08/23/17 Methanol, Lot Baker 5 mL LCd-NEtFOSA-M_00005 100 uL d-N-EtFOSA-M 141039	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	0.95 ug/mL
LCM2-8:2FTS_00004	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       LCM5PFPEA 00011     100 uL 13C5 PFPEA	1 ug/mL
LCM5PFPEA_00011	1 ug/mL 1 ug/mL
LCMPFBA 00014 100 dL 13C6 FOSA LCMPFBA 00011 100 dL 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	1 ug/mL
LCMPFHxS 00011 100 uL 1802 PFHxS	0.946 ug/mL
LCMPFNA 00011 100 uL 13C5 PFNA	1 ug/mL
LCMPFOA_00015 100 uL 13C4 PFOA	1 ug/mL

Lab N	lame:	TestAmerica	Sacramento	Job No.:	320-32321-1	
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCMPFOS_00023		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00012	100 uL	13C2 PFUnA	1 ug/mL
LCd-NEtFOSA-M_00005	06/10/21		LLINGTON, Lot dNEtFOSAO		(Purchased Read		d-N-EtFOSA-M	50 ug/mL
LCd-NMeFOSA-M_00004	06/10/21		LLINGTON, Lot dNMeFOSA0		(Purchased Read	gent)	d-N-MeFOSA-M	50 ug/mL
LCd3-NMeFOSAA_00004	11/22/21	WEI	LINGTON, Lot d3NMeFOSAA	1116	(Purchased Read	gent)	d3-NMeFOSAA	50 ug/mL
LCd5-NEtFOSAA_00004	11/22/21	WEI	LINGTON, Lot d5NEtFOSAA	1116	(Purchased Read	gent)	d5-NEtFOSAA	50 ug/mL
LCM2-6:FTS_00004	02/17/22		ELLINGTON, Lot M262FTS0:		(Purchased Read	gent)	M2-6:2FTS	47.5 ug/mL
LCM2-8:2FTS_00004	08/22/21		ELLINGTON, Lot M282FTS0		(Purchased Read		M2-8:2FTS	47.9 ug/mL
LCM2PFHxDA_00011	01/07/21		on Laboratories, Lot M2		(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00010	12/07/20	Wellingt	on Laboratories, Lot M2	PFTeDA0217	(Purchased Read	gent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00010	05/03/22	Wellingt	on Laboratories, Lot M4	PFHpA0517	(Purchased Read	gent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA_00011	11/22/21	Wellingt	on Laboratories, Lot M5	PFPeA1116	(Purchased Read	gent)	13C5 PFPeA	50 ug/mL
LCM8FOSA_00014	04/20/22	Wellingt	on Laboratories, Lot M8	FOSA0417I	(Purchased Read		13C8 FOSA	50 ug/mL
LCMPFBA_00011	04/12/22	Welling	ton Laboratories, Lot M	IPFBA0417	(Purchased Read	gent)	13C4 PFBA	50 ug/mL
LCMPFBS_00004	05/24/22		ton Laboratories, Lot M		(Purchased Read	gent)	13C3-PFBS	46.5 ug/mL
LCMPFDA_00016	09/30/21	Welling	ton Laboratories, Lot M	IPFDA0916	(Purchased Read		13C2 PFDA	50 ug/mL
LCMPFDoA_00011	05/23/22		ton Laboratories, Lot M		(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA_00017	11/22/21	Welling	ton Laboratories, Lot M	PFHxA1116	(Purchased Read	gent)	13C2 PFHxA	50 ug/mL
LCMPFHxS_00011	02/17/22	Welling	ton Laboratories, Lot M	PFHxS0217	(Purchased Read	gent)	1802 PFHxS	47.3 ug/mL
LCMPFNA_00011	09/30/21	Welling	ton Laboratories, Lot M	IPFNA0916	(Purchased Read		13C5 PFNA	50 ug/mL
LCMPFOA_00015	04/12/22	Welling	ton Laboratories, Lot M	IPFOA0417	(Purchased Read	gent)	13C4 PFOA	50 ug/mL
LCMPFOS_00023	05/19/22		gton Laboratories, Lot D		(Purchased Read	gent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA_00012	11/22/21	Welling	ton Laboratories, Lot M	PFUdA1116	(Purchased Read	gent)	13C2 PFUnA	50 ug/mL
.LCPFACMXB_00010	06/20/19	Wellingt	on Laboratories, Lot PF	'ACMXB0614	(Purchased Read	gent)	Perfluorobutanesulfonic acid	1.77 ug/mL
							(PFBS)	
							Perfluorobutanoic acid (PFBA)	2 ug/mL
							Perfluorodecanesulfonic acid (PFDS)	1.93 ug/mL
							Perfluorodecanoic acid (PFDA)	2 ug/mL
							Perfluorododecanoic acid	2 ug/mL
							(PFDoA)	3.
							Perfluoroheptanoic acid	2 ug/mL
							(PFHpA)	
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorohexanoic acid (PFHxA)	2 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid	1.91 ug/mL
							(PFOS)	3.
							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

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

		Prep Date		Reagent Final Volume	Parent Reagent			
Reagent ID	Exp Date		Dilutant Used		Reagent ID	Volume Added	Analyte	Concentration
.LCPFC3IM_00008	03/06/18	09/06/17	Methanol, Lot 090285	5 mL	LCPFHpSA_00002		Perfluoroheptanesulfonic Acid (PFHpS)	952 ng/mL
					LCPFOSA_00010		Perfluorooctane Sulfonamide (FOSA)	1000 ng/mL
LCPFHpSA_00002	10/18/21		ton Laboratories, Lot L		(Purchased Read	gent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
LCPFOSA_00010	09/30/21	Welling	gton Laboratories, Lot F	OSA0916I	(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		Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	0.01916 ug/mL
					LCN-EtFOSA-M_00005		N-ethylperfluoro-1-octanesulfo namide	0.02 ug/mL
					LCN-EtFOSAA_00004		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/mI
					LCPFBS_00008		Perfluorobutane Sulfonate Perfluorobutanesulfonic acid (PFBS)	0.01768 ug/mL 0.01768 ug/mL
					LCPFDA 00007	100 uL	Perfluorodecanoic acid (PFDA)	0.02 ug/mI
					LCPFDoA_00007	100 uL	Perfluorododecanoic acid (PFDoA)	0.02 ug/mL
					LCPFDSA_00002		Perfluorodecanesulfonic acid (PFDS)	0.01928 ug/mL
					LCPFHpA_00008		Perfluoroheptanoic acid (PFHpA)	0.02 ug/mL
					LCPFHpSA_00003	100 uL	Perfluoroheptanesulfonic Acid (PFHpS)	0.01904 ug/mL
					LCPFHxA 00007		Perfluorohexanoic acid (PFHxA)	0.02 ug/mL
					LCPFHxDA 00008		Perfluorohexadecanoic acid	0.02 ug/mL
					LCPFHxS-br_00004		Perfluorohexane Sulfonate Perfluorohexanesulfonic acid	0.0182 ug/mL 0.0182 ug/mL
					LCPFNA 00009	100 117.	(PFHxS) Perfluorononanoic acid (PFNA)	0.02 ug/mL
					LCPFOA 00008		Perfluorooctanoic acid (PFOA)	0.02 ug/mL
					LCPFODA 00008		Perfluorooctadecanoic acid	0.02 ug/mL
					LCPFOS-br_00004		Perfluorooctanesulfonic acid (PFOS)	0.01856 ug/mL
					LCPFOSA_00010	100 uL	Perfluorooctane Sulfonamide (FOSA)	0.02 ug/mL

Lab Name	: TestAmerica	Sacramento	Job No.: 320-32321-1
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				Reagent	Parent Reage	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					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 42FTS12	16	(Purchased Read	gent)	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	46.7 ug/mL
.LC6:2FTS_00003	06/25/21		WELLINGTON, Lot 62FTS06	16	(Purchased Read		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
.LC8:2FTS_00003	08/22/21		WELLINGTON, Lot 82FTS08		(Purchased Read	gent)	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	47.9 ug/mL
.LCN-EtFOSA-M_00005	05/24/21	W	ELLINGTON, Lot NEtFOSA05	516M	(Purchased Read	gent)	N-ethylperfluoro-1-octanesulfo namide	50 ug/mL
.LCN-EtFOSAA_00004	09/30/21	W	ELLINGTON, Lot NEtFOSAA(	0916	(Purchased Read	gent)	N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCN-MeFOSA-M 00004	05/24/21	W	ELLINGTON, Lot NMeFOSA05	516M	(Purchased Read	gent)	MeFOSA	50 ug/mL
.LCN-MeFOSAA_00004	10/12/21	W	ELLINGTON, Lot NMeFOSAA(	0916	(Purchased Read	gent)	N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFBA 00007	05/27/21	Wellin	gton Laboratories, Lot	PFBA0516	(Purchased Read	gent)	Perfluorobutanoic acid (PFBA)	50 ug/mL
.LCPFBS_00008	03/15/21	Wellin	gton Laboratories, Lot I	LPFBS0316	(Purchased Read	gent)	Perfluorobutane Sulfonate Perfluorobutanesulfonic acid	44.2 ug/mL 44.2 ug/mL
							(PFBS)	
.LCPFDA_00007	05/31/21	Wellin	gton Laboratories, Lot	PFDA0516	(Purchased Read		Perfluorodecanoic acid (PFDA)	50 ug/mL
.LCPFDoA_00007	05/31/21		gton Laboratories, Lot E		(Purchased Read	gent)	Perfluorododecanoic acid (PFDoA)	50 ug/mL
.LCPFDSA_00002	05/24/21		gton Laboratories, Lot I		(Purchased Read	,	Perfluorodecanesulfonic acid (PFDS)	48.2 ug/mL
.LCPFHpA_00008	12/02/21		gton Laboratories, Lot F	=	(Purchased Read	,	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpSA_00003	09/01/22		ton Laboratories, Lot L		(Purchased Read	gent)	Perfluoroheptanesulfonic Acid (PFHpS)	47.6 ug/mL
.LCPFHxA_00007	12/22/20		gton Laboratories, Lot B		(Purchased Read	gent)	Perfluorohexanoic acid (PFHxA)	50 ug/mL
.LCPFHxDA_00008	05/25/21	Welling	ton Laboratories, Lot P	FHxDA0516	(Purchased Read	gent)	Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS-br_00004	07/03/20	Wellingt	on Laboratories, Lot br	PFHxSK0615	(Purchased Read	gent)	Perfluorohexane Sulfonate	45.5 ug/mL
_							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA 00009	07/20/22		gton Laboratories, Lot		(Purchased Read	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFOA 00008	08/02/21		gton Laboratories, Lot		(Purchased Read	gent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA 00008	04/29/21		gton Laboratories, Lot H		(Purchased Read	gent)	Perfluorooctadecanoic acid	50 ug/mL
.LCPFOS-br_00004	10/14/20		ton Laboratories, Lot br		(Purchased Read	gent)	Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LCPFOSA_00010	09/30/21	Wellin	gton Laboratories, Lot E	FOSA0916I	(Purchased Read	gent)	Perfluorooctane Sulfonamide (FOSA)	50 ug/mL

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

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

# Reagent

LC4:2FTS\_00002





## CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**4:2FTS** 

**LOT NUMBER:** 

42FTS1216

**COMPOUND:** 

Sodium 1H,1H,2H,2H-perfluorohexane sutfonate

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C,H,F,SO,Na

 $46.7 \pm 2.3 \,\mu g/ml$ 

**MOLECULAR WEIGHT:** 

350.13

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

SOLVENT(S):

Methanol

**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

(4:2FTS anion)

Certified By:

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

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### **TRACEABILITY:**

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

## **EXPIRY DATE / PERIOD OF VALIDITY:**

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

## **LIMITED WARRANTY:**

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

## QUALITY MANAGEMENT:

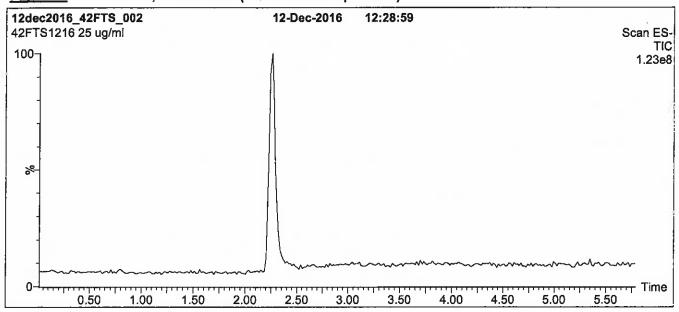
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

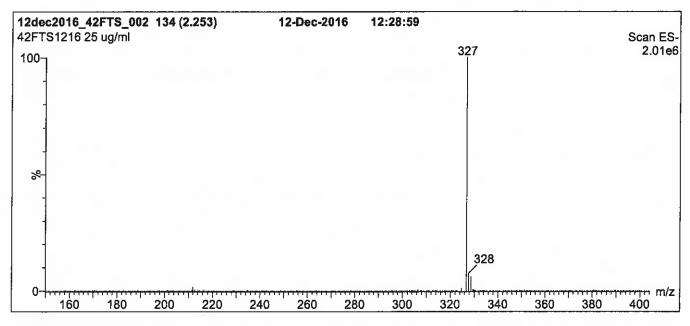




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





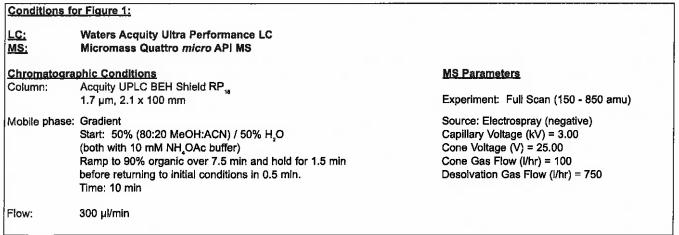
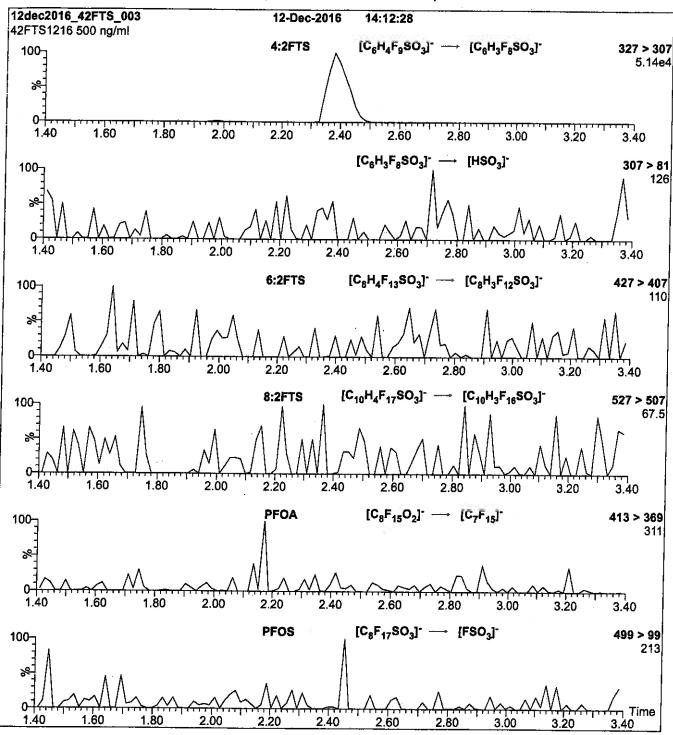
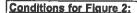


Figure 2: 4:2FTS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml 4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH OAc buffer)

Flow:

300 µl/min

## **MS Parameters**

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

# Reagent

LC4:2FTS\_00003



## **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,H,F,SO,Na

MOLECULAR WEIGHT:

350.13

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

SOLVENT(S):

Methanol

 $46.7 \pm 2.3 \, \mu g/ml$ 

(4:2FTS anion)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

12/12/2016

EXPIRY DATE: (mm/dd/yyyy)

12/12/2021

**RECOMMENDED STORAGE:** 

Refrigerate ampoule

## **DOCUMENTATION/ DATA ATTACHED:**

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

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

## **ADDITIONAL INFORMATION:**

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/21/2016

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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## **UNCERTAINTY:**

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The combined relative standard uncertainty,  $u_{c}(y)$ , of a value y and the uncertainty of the independent parameters

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

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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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## **EXPIRY DATE / PERIOD OF VALIDITY:**

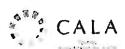
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## **QUALITY MANAGEMENT:**

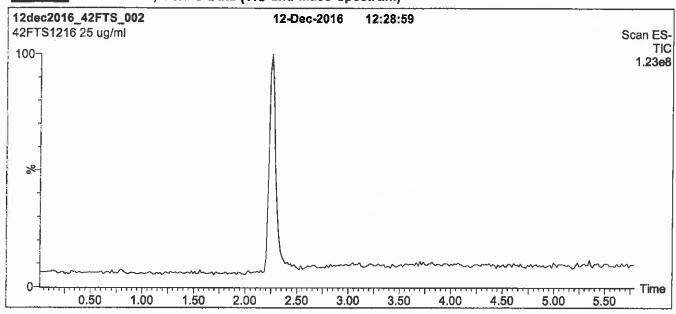
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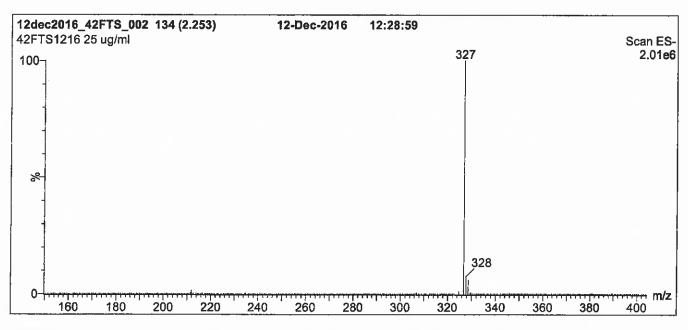




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Figure 1: 4:2FTS; LC/MS Data (TIC and Mass Spectrum)





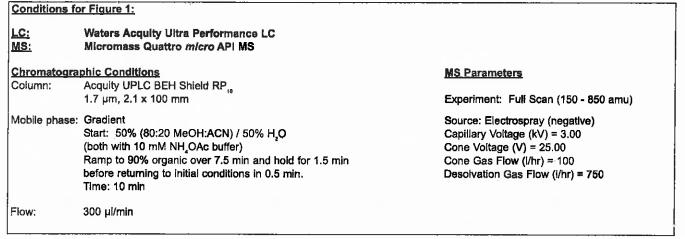
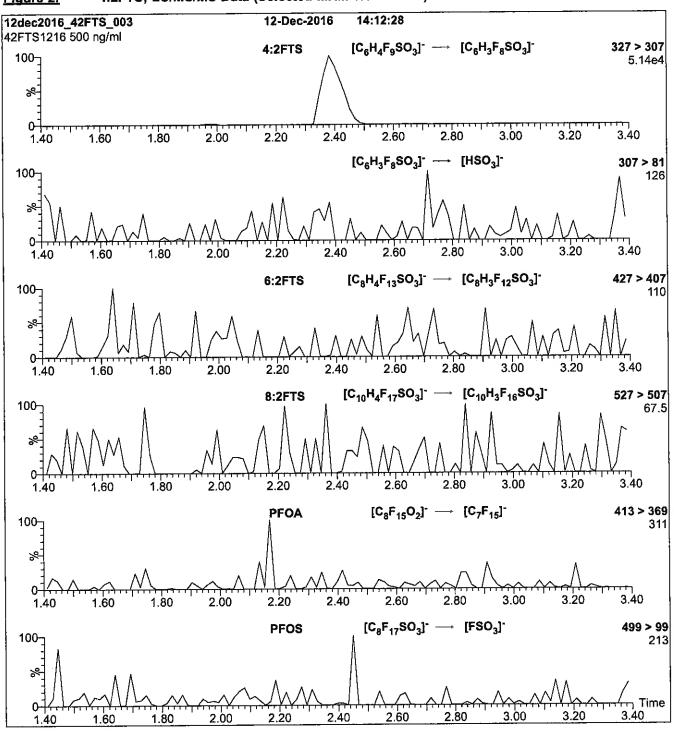
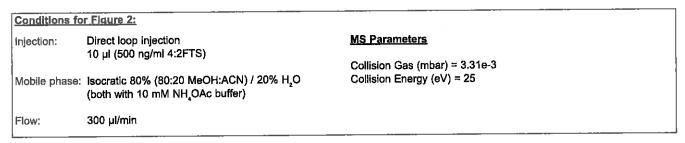


Figure 2: 4:2FTS; LC/MS/MS Data (Selected MRM Transitions)





LC6:2FTS\_00003



PRODUCT CODE:

6:2FTS

LOT NUMBER:

62FTS0616

**COMPOUND:** 

Sodium 1H,1H,2H,2H-perfluorooctane sulfonate

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

C<sub>B</sub>H<sub>4</sub>F<sub>13</sub>SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

450.15

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$ 

47.4 ± 2.4 µg/ml

(Na salt)

(6:2FTS anion)

SOLVENT(S):

Methanol

**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:

Date: 06/29/2016

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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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

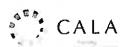
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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

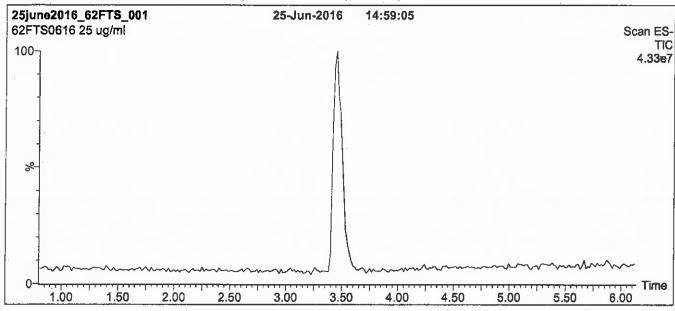
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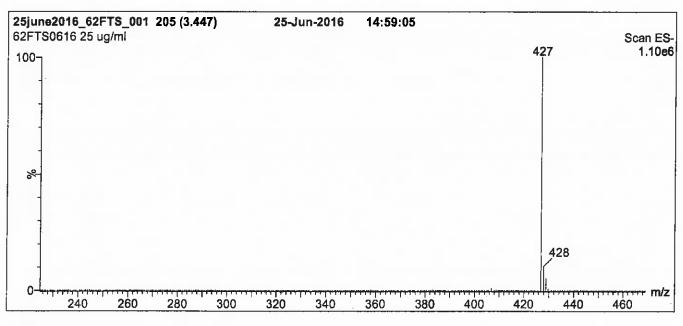




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Figure 1: 6:2FTS; LC/MS Data (TIC and Mass Spectrum)





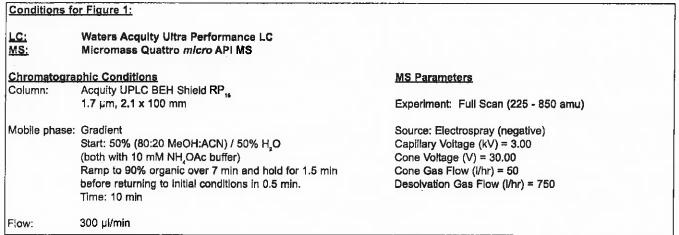
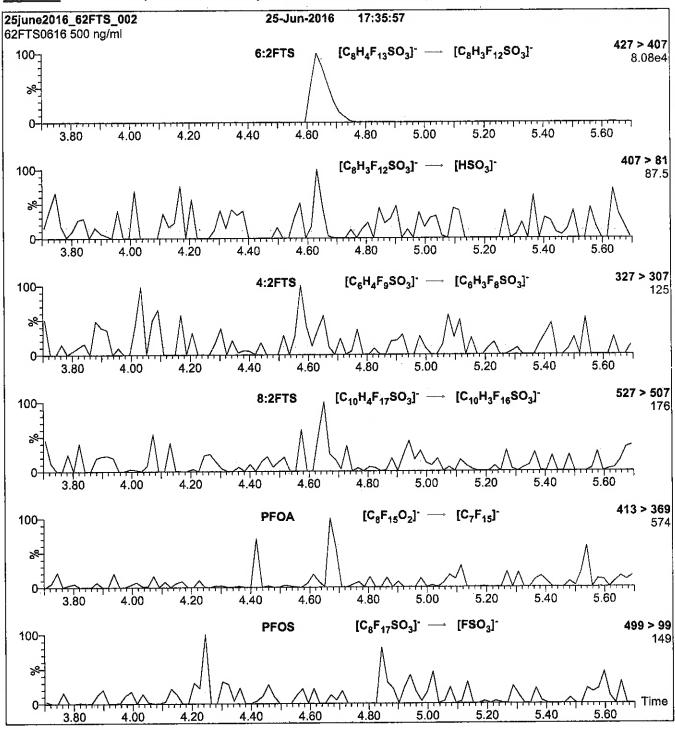
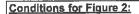


Figure 2: 6:2FTS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Flow:

Direct loop injection

10 μl (500 ng/ml 6:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

300 µl/min

#### MS Parameters

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

Form#:27, Issued 2004-11-10 Revision#:3, Revised 2015-03-24

LC8:2FTS\_00003



**PRODUCT CODE:** 

8:2FTS

LOT NUMBER:

82FTS0816

**COMPOUND:** 

-

Sodium 1H,1H,2H,2H-perfluorodecane sulfonate

STRUCTURE:

**CAS #:** 

Not available

(8:2FTS anion)

**MOLECULAR FORMULA:** 

C<sub>10</sub>H<sub>4</sub>F<sub>17</sub>SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

550.16

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt) SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

47.9 ± 2.4 µg/ml >98%

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>08/25/2016</u> (mm/dd/yyyy)

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#### **QUALITY MANAGEMENT:**

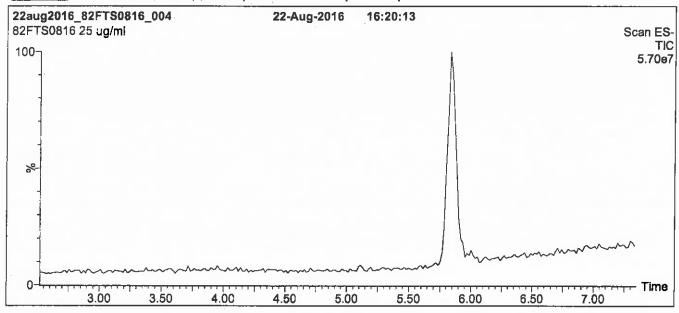
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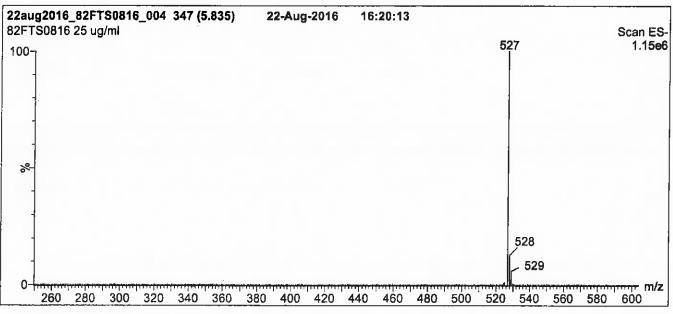


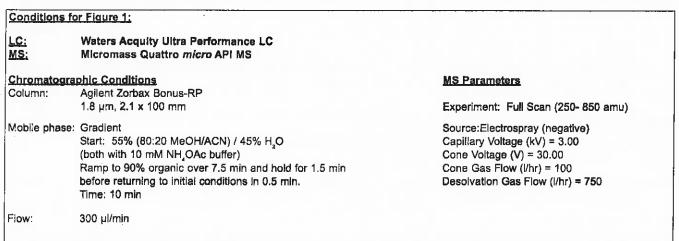


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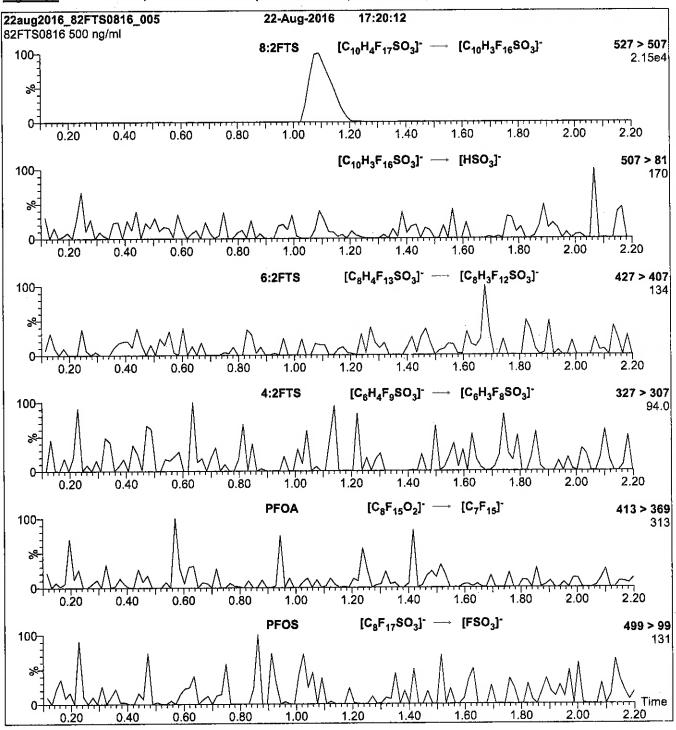
Figure 1: 8:2FTS; LC/MS Data (TIC and Mass Spectrum)







8:2FTS; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml 8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

**MS Parameters** 

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

Flow:

300 µl/min

# LCd-NEtFOSA-M\_00005



PRODUCT CODE:

d-N-EtFOSA-M

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

**ISOTOPIC PURITY:** 

dNEtFOSA0616M

532.23

Methanol

≥98% <sup>2</sup>H<sub>c</sub>

**COMPOUND:** 

N-ethyl-d<sub>s</sub>-perfluoro-1-octanesulfonamide

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C,D,HF,,NO,S

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyw)

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\_-perfluoro-1-octanesulfonamide (d-N-MeFOSA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 07/14/2016

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

519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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#### QUALITY MANAGEMENT:

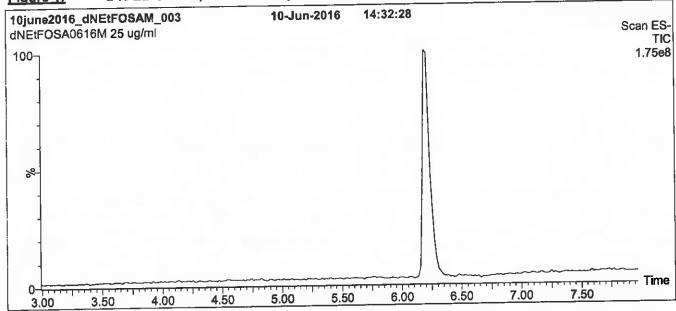
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

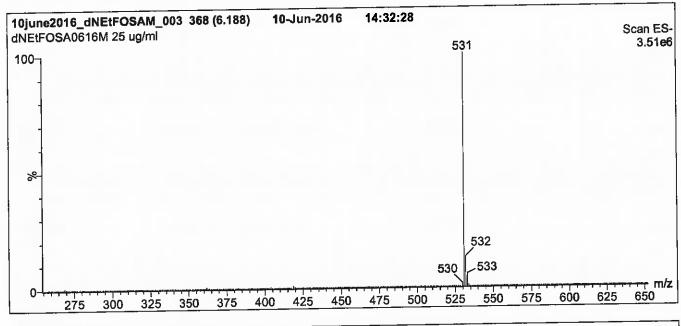




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





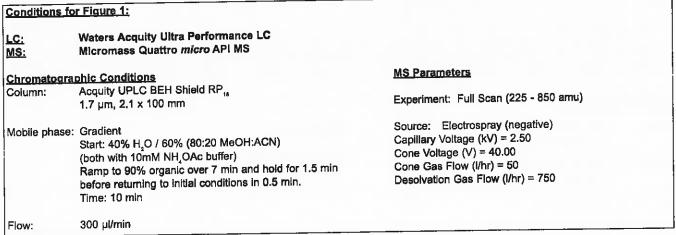
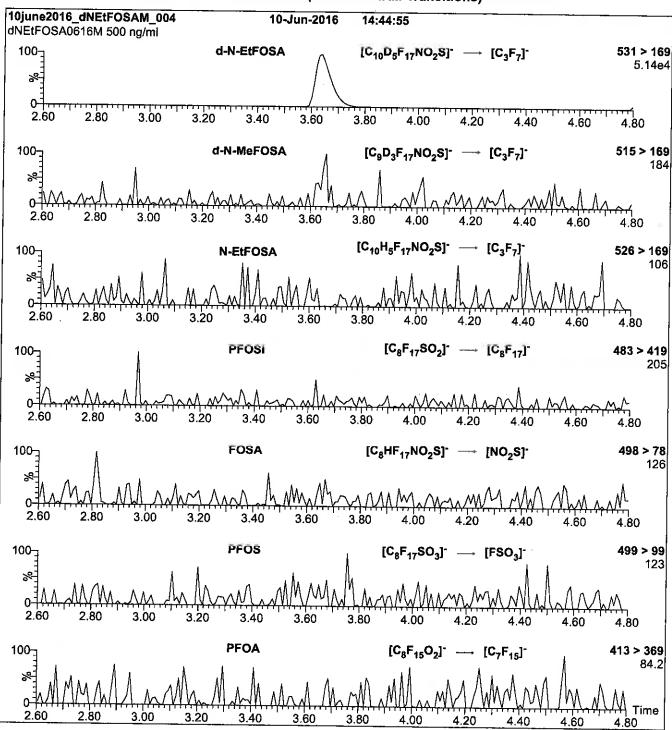
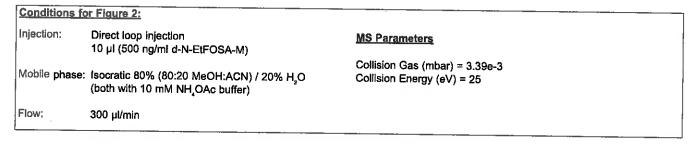


Figure 2: d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)





# LCd-NEtFOSA-M\_00006



PRODUCT CODE:

d-N-EtFOSA-M

**LOT NUMBER:** 

dNEtFOSA0417M

COMPOUND:

N-ethyl-d\_-perfluoro-1-octanesulfonamide

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C<sub>10</sub>D<sub>5</sub>HF<sub>17</sub>NO<sub>2</sub>S

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

04/20/2017

EXPIRY DATE: (mm/dd/yyyy)

04/20/2022

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 

Methanol

SOLVENT(S): **ISOTOPIC PURITY:** 

532.23

≥98% 2H<sub>x</sub>

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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\_-perfluoro-1-octanesulfonamide (d-N-MeFOSA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: <u>04/24/2017</u>

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

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

#### **HAZARDS**;

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_i, x_2,...x_n$$
 on which it depends is: 
$$u_c(y(x_i,x_2,...x_n)) = \sqrt{\sum_{i=1}^n u(y,x_i)^2}$$

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

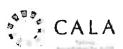
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

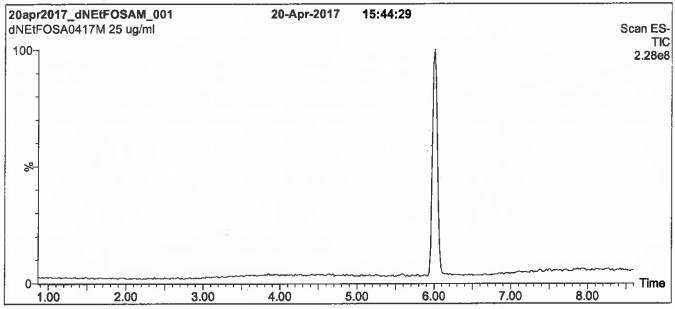
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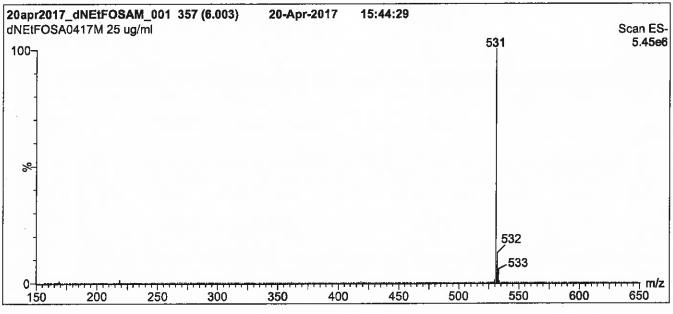




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Figure 1: d-N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)





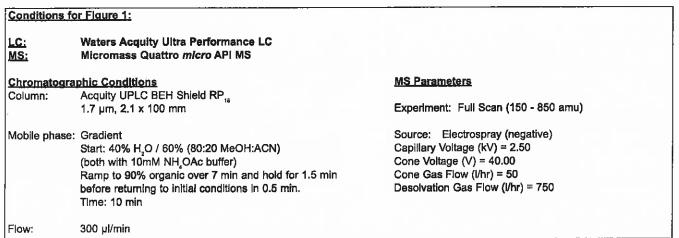
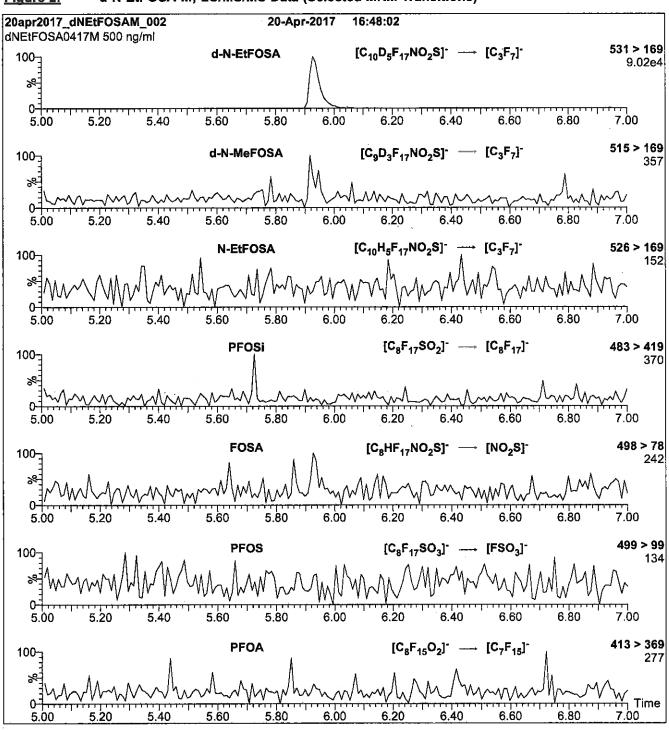
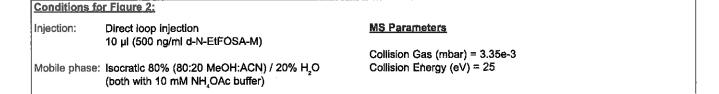


Figure 2: d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)





300 µl/min

Flow:

# LCd-NMeFOSA-M\_00004



**PRODUCT CODE:** 

d-N-MeFOSA-M

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

**ISOTOPIC PURITY:** 

dNMeFOSA0616M

516.19

Methanol

≥98% <sup>2</sup>H<sub>4</sub>

**COMPOUND:** 

N-methyl-d<sub>3</sub>-perfluoro-1-octanesulfonamide

CAS#:

Not available

**STRUCTURE:** 

**MOLECULAR FORMULA:** 

C,D,HF,,NO,S

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

**CHEMICAL PURITY:** 

>98%

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:

Date: 06/16/2016

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

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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#### **UNCERTAINTY:**

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

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

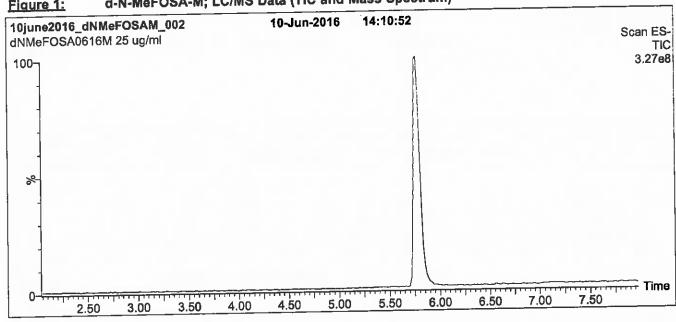
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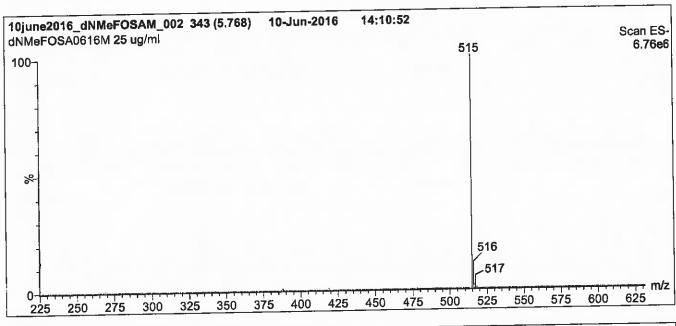




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Figure 1: d-N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)





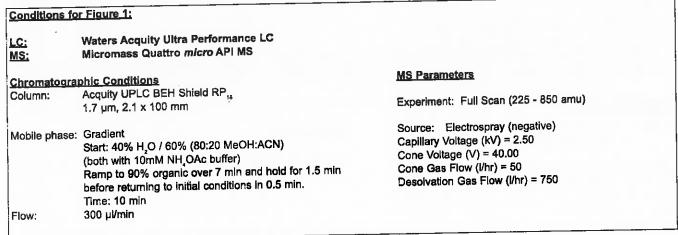
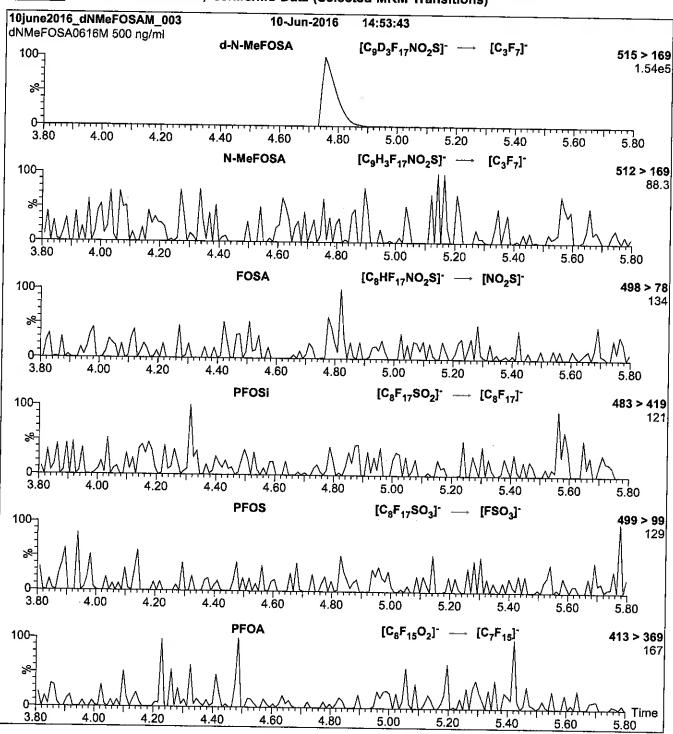
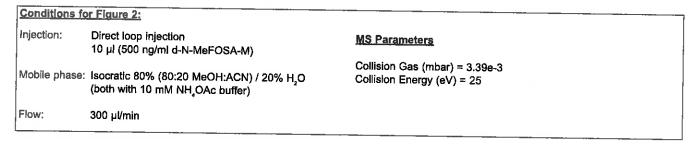


Figure 2: d-N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)





# LCd-NMeFOSA-M\_00005



**PRODUCT CODE:** 

d3-N-MeFOSAA

LOT NUMBER:

d3NMeFOSAA0517

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C,D,H,F,,NO,S

**MOLECULAR WEIGHT:** 

574.23

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

ISOTOPIC PURITY:

Water (<1%) ≥98% <sup>2</sup>H<sub>3</sub>

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:

B.G. Chittim, General Manager

Date: \_

05/31/2017

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

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

#### **HAZARDS:**

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#### SYNTHESIS / CHARACTERIZATION:

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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$$\mathbf{x}_{\mathbf{r}}, \mathbf{x}_{\mathbf{r}}, \dots, \mathbf{x}_{\mathbf{n}}$$
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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:

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

#### QUALITY MANAGEMENT:

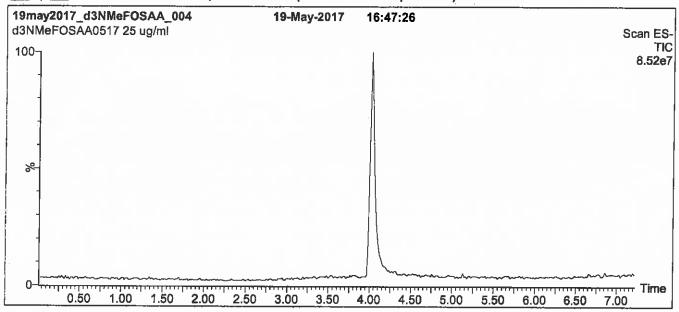
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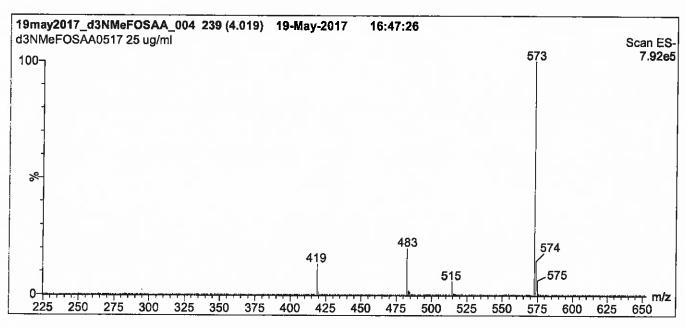




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Figure 1: d3-N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)





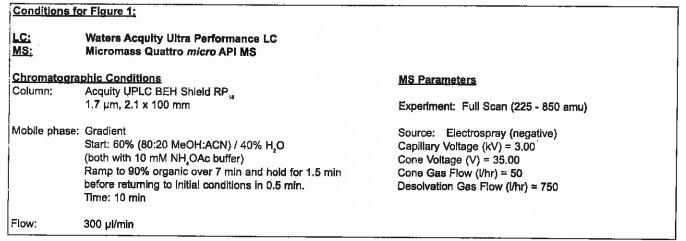
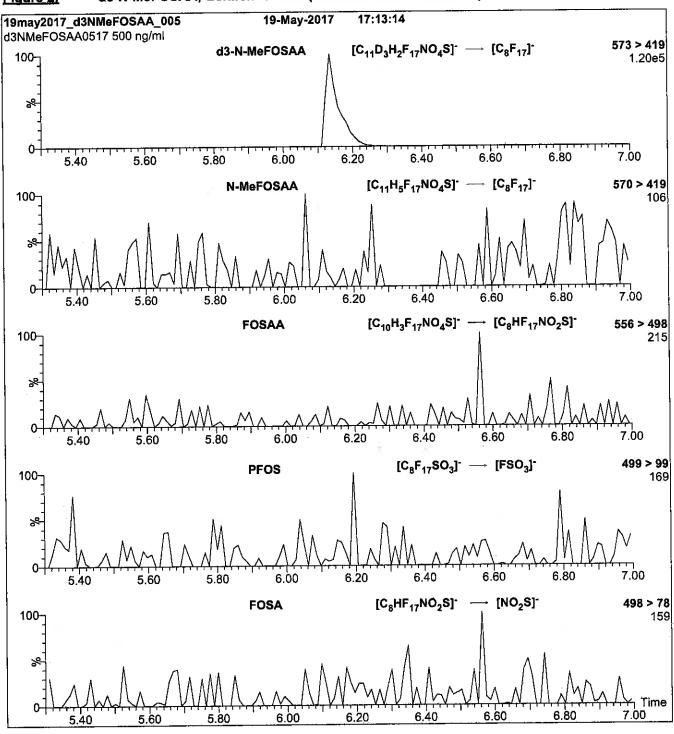
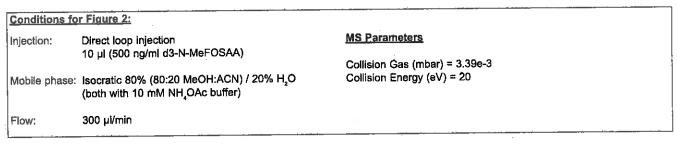


Figure 2: d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)





# LCd3-NMeFOSAA\_00004



PRODUCT CODE:

d3-N-MeFOSAA

LOT NUMBER:

d3NMeFOSAA1116

**COMPOUND:** 

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

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

C,D,H,F,,NO,S

**MOLECULAR WEIGHT:** 574.23

**CONCENTRATION:** 

 $50 \pm 2.5 \mu g/ml$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

Water (<1%) ≥98% <sup>2</sup>H,

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 molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date:

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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**LIMITED WARRANTY:** 

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**QUALITY MANAGEMENT:** 

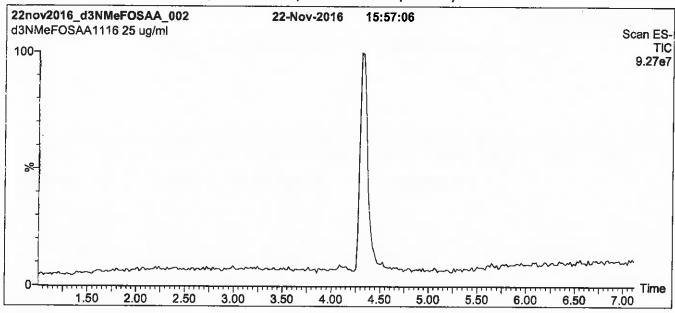
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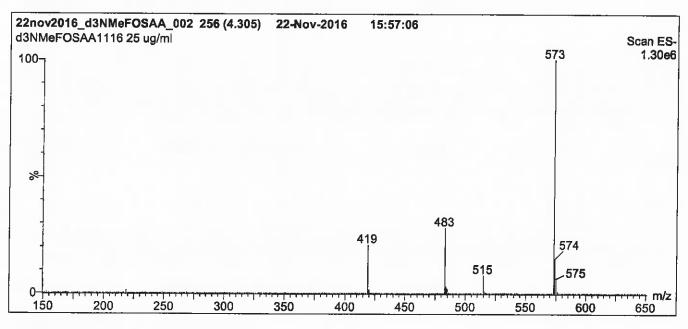




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="https://www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

Figure 1: d3-N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)





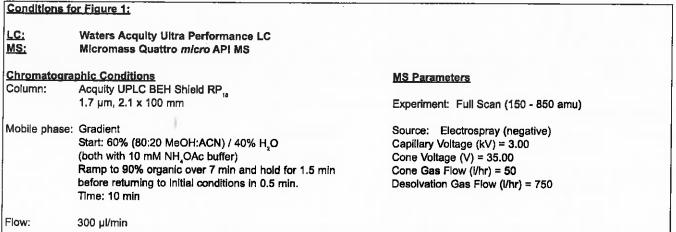
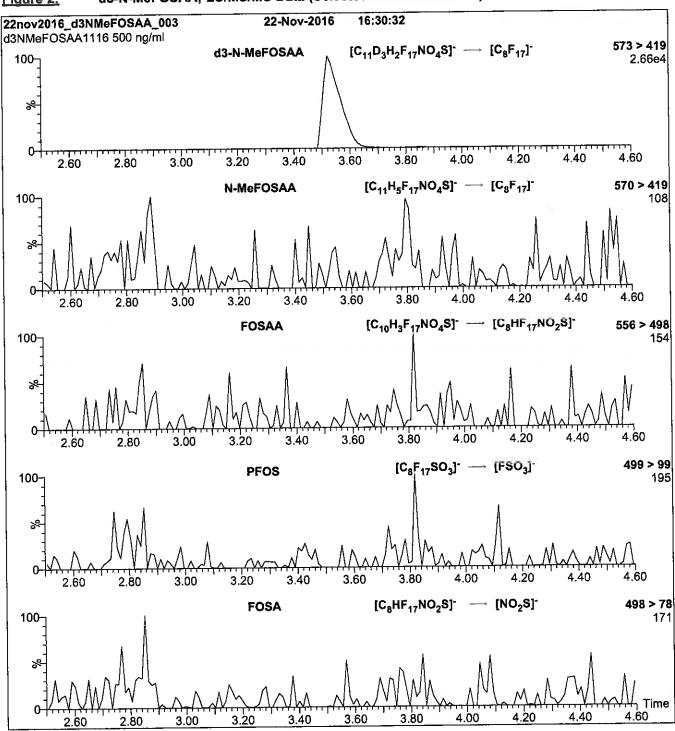
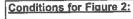


Figure 2: d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µI (500 ng/ml d3-N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH OAc buffer)

#### **MS Parameters**

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 20

Flow:

300 µl/min

# LCd3-NMeFOSAA\_00005



PRODUCT CODE:

d3-N-MeFOSAA

LOT NUMBER:

d3NMeFOSAA0517

COMPOUND:

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

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C,D,H,F,,NO,S

**MOLECULAR WEIGHT:** 

574.23

**CONCENTRATION:** 

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol Water (<1%)

≥98% <sup>2</sup>H<sub>3</sub>

**CHEMICAL PURITY:** 

>98%

ISOTOPIC PURITY:

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:

B.G. Chittim, General Manager

Date:

05/31/2017

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

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

#### **HAZARDS:**

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_{i}, x_{2},...x_{n}$$
 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

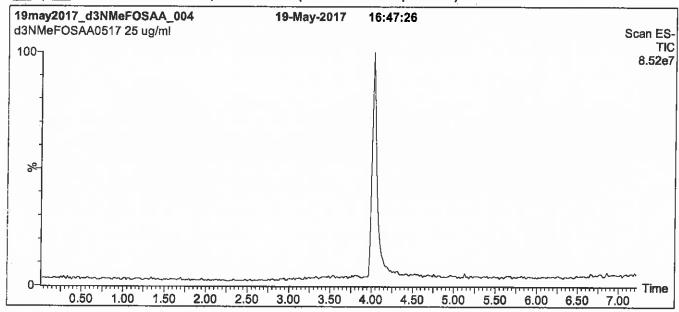
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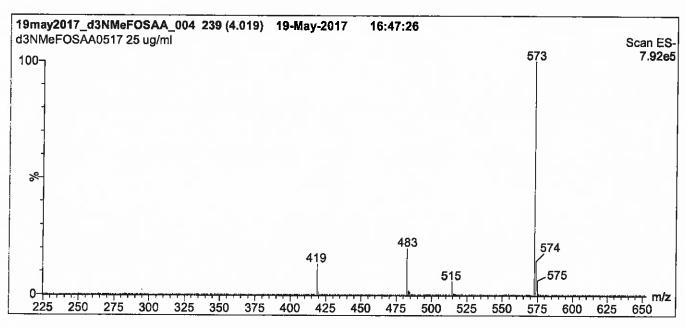




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Figure 1: d3-N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)





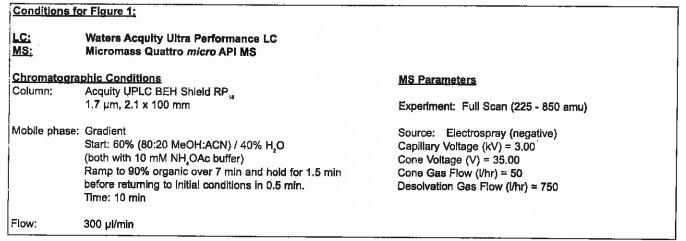
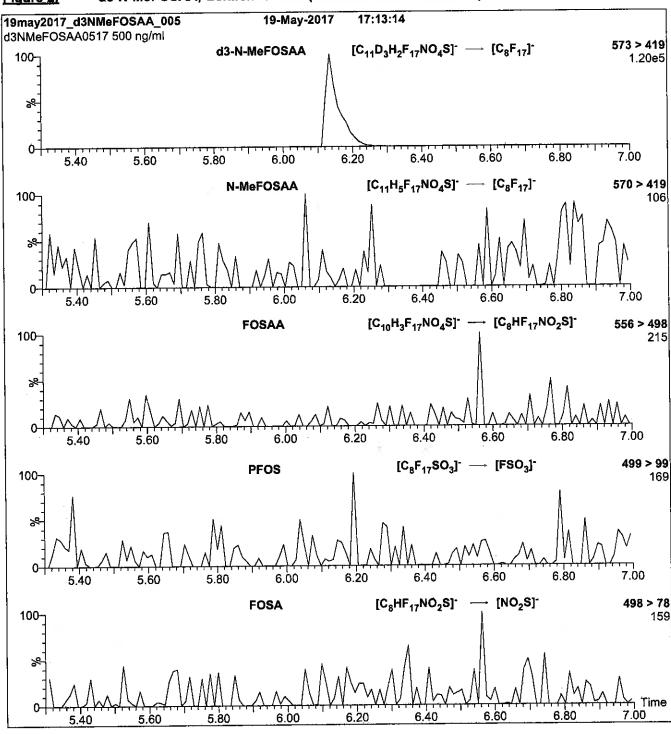
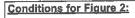


Figure 2: d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Flow:

Direct loop injection

10 µl (500 ng/ml d3-N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc buffer)

300 µì/min

#### **MS Parameters**

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

# LCd5-NEtFOSAA\_00004



**PRODUCT CODE:** 

d5-N-EtFOSAA

LOT NUMBER:

d5NEtFOSAA1116

COMPOUND:

N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C<sub>12</sub>D<sub>5</sub>H<sub>3</sub>F<sub>17</sub>NO<sub>4</sub>S

**MOLECULAR WEIGHT:** 

ISOTOPIC PURITY:

590.26

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

≥98% <sup>2</sup>H<sub>-</sub>

Water (<1%)

CHEMICAL PURITY:

>98%

- 00 /0

LAST TESTED: (mm/dd/yyyy)

11/22/2016

EXPIRY DATE: (mm/dd/yyy)

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 molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 12/01/2016

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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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

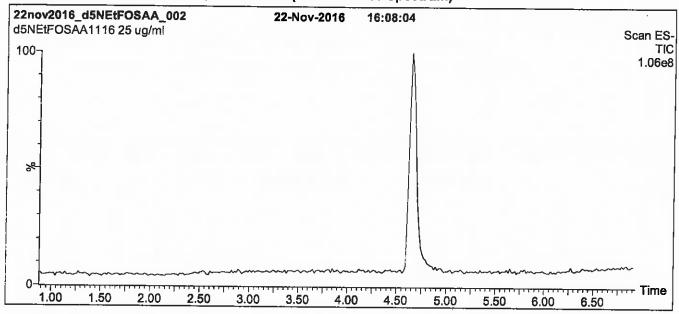
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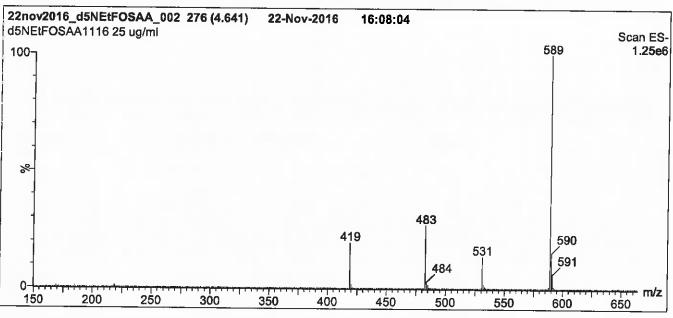


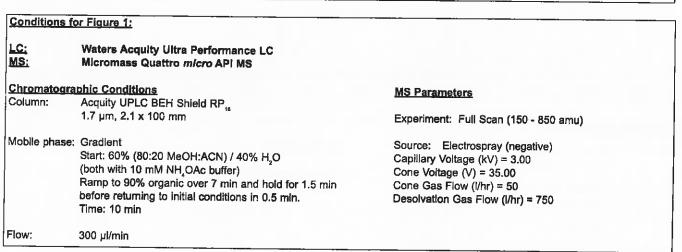


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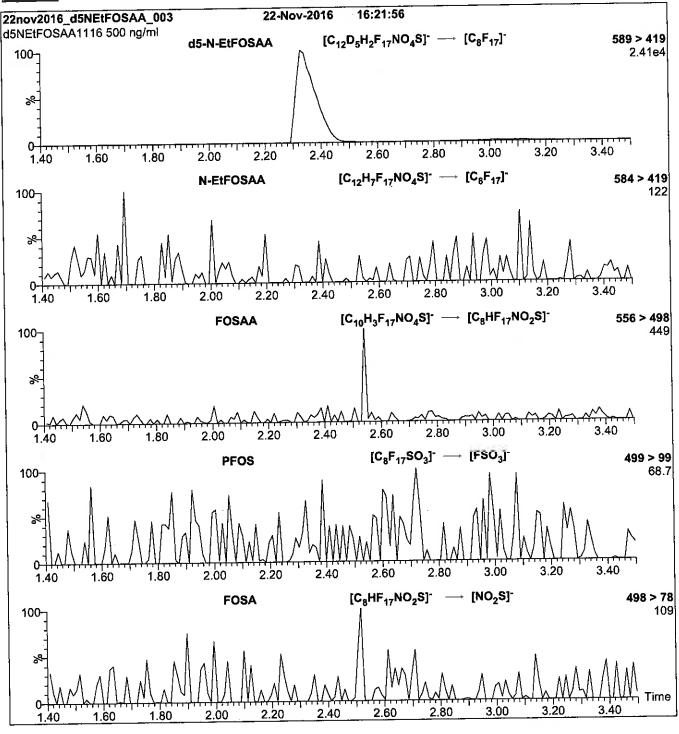
Figure 1: d5-N-EtFOSAA; LC/MS Data (TiC and Mass Spectrum)

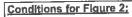






d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µI (500 ng/ml d5-N-EtFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 20

# LCd5-NEtFOSAA\_00005



PRODUCT CODE:

d5-N-EtFOSAA

LOT NUMBER:

d5NEtFOSAA1116

**COMPOUND:** 

N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C, D, H, F, NO, S

**MOLECULAR WEIGHT:** 

**ISOTOPIC PURITY:** 

590.26

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

SOLVENT(S):

Methanol

≥98% 2H<sub>e</sub>

Water (<1%)

**CHEMICAL PURITY:** LAST TESTED: (mm/dd/yyyy) >98%

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 molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/01/2016

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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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

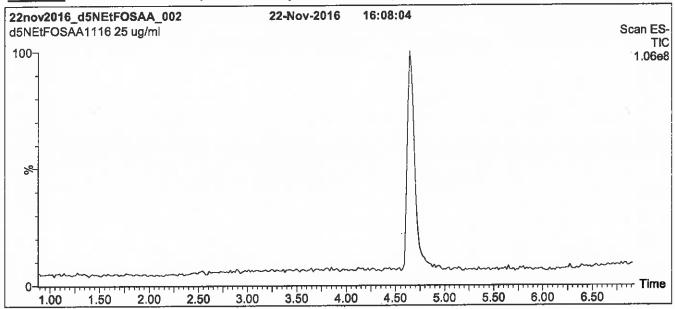
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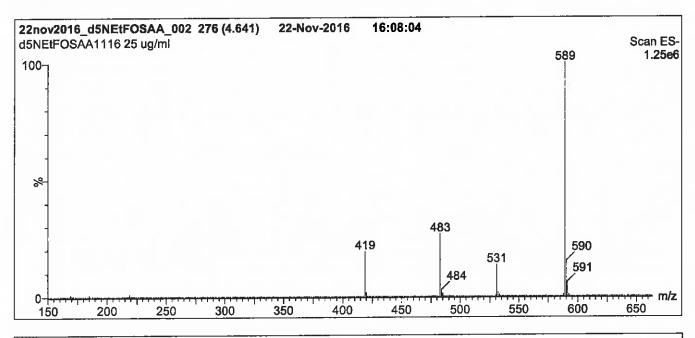




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Figure 1: d5-N-EtFOSAA; LC/MS Data (TiC and Mass Spectrum)





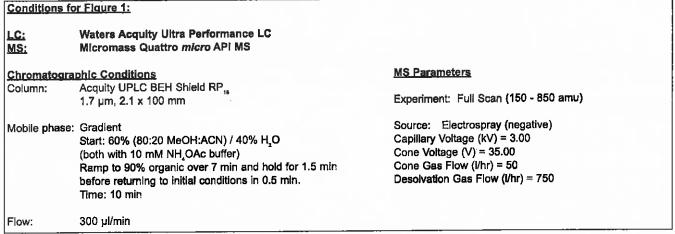
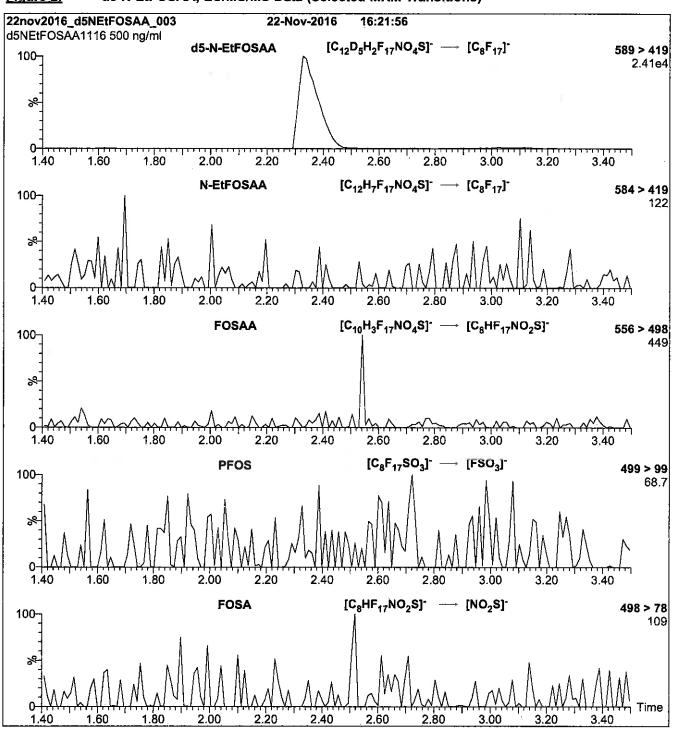
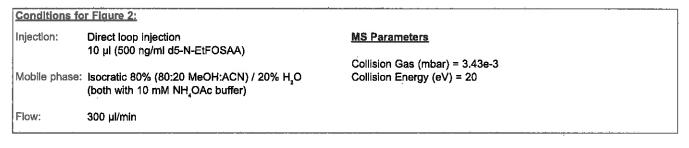


Figure 2: d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)





LCM2-6:FTS\_00004



PRODUCT CODE:

M2-6:2FTS

LOT NUMBER:

M262FTS0217

**COMPOUND:** 

Sodium 1H,1H,2H,2H-perfluoro-[1,2-13C] octane sulfonate

**STRUCTURE:** 

CAS #:

Not available

F F F F F F H H SO<sub>3</sub> Na\*

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>H<sub>4</sub>F<sub>13</sub>SO<sub>3</sub>Na

47.5 ± 2.4 µg/ml

**MOLECULAR WEIGHT:** 

452.13

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu\text{g/ml}$  (Na salt)

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

IPOTO

≥99% <sup>13</sup>C

LAST TESTED: (mm/dd/yyyy)

02/17/2017

ISOTOPIC PURITY:

(1,2-13C<sub>2</sub>)

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 <sup>34</sup>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).

(M2-6:2FTS anion)

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B C Phittim

Date:

02/24/2017

(mm/dd/yyyy

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#### QUALITY MANAGEMENT:

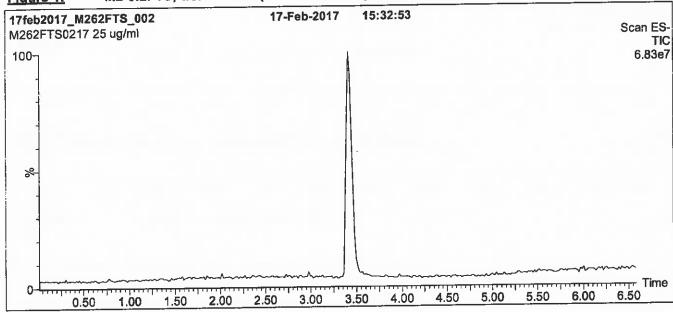
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

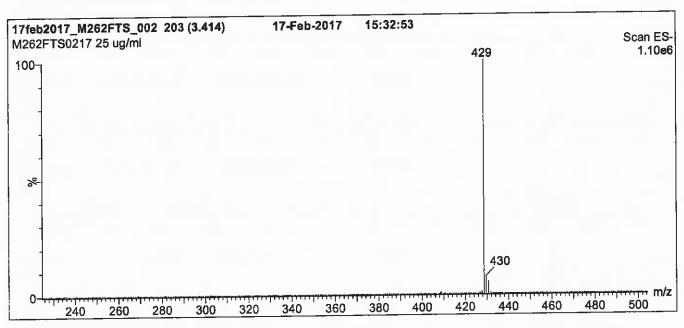




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com\*\*







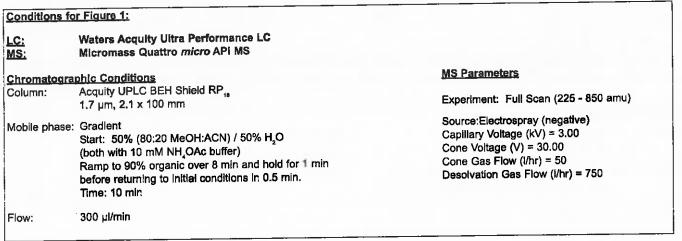
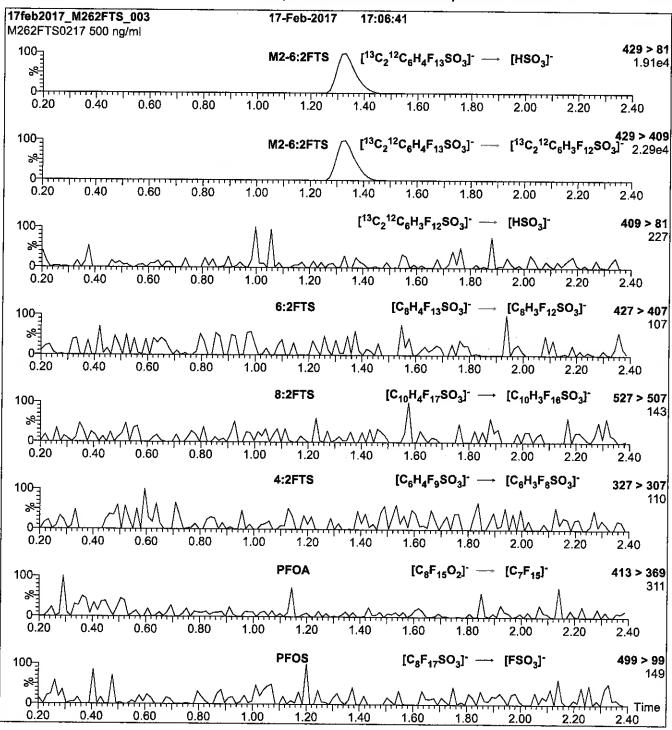
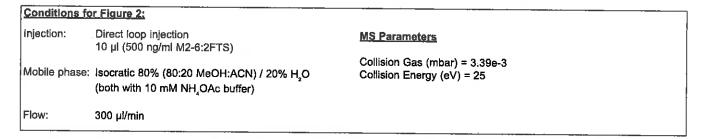


Figure 2: M2-6:2FTS; LC/MS/MS Data (Selected MRM Transitions)





LCM2-6:FTS\_00005



PRODUCT CODE:

M2-6:2FTS

LOT NUMBER:

M262FTS0217

COMPOUND:

Sodium 1H,1H,2H,2H-perfluoro-[1,2-13C] octane sulfonate

**STRUCTURE:** 

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

13C,12C,H,F,3SO,Na

**MOLECULAR WEIGHT:** 

452.13

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt) SOLVENT(S):

Methanol

47.5 ± 2.4 µg/ml (M2-6:2FTS anion)

≥99% 13C

**CHEMICAL PURITY:** LAST TESTED: (mm/dd/yyyy)

>98%

**ISOTOPIC PURITY:** 

(1,2-13C<sub>2</sub>)

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 <sup>34</sup>S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 02/24/2017

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

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 sultable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

#### **SYNTHESIS / CHARACTERIZATION:**

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

#### **UNCERTAINTY:**

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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:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

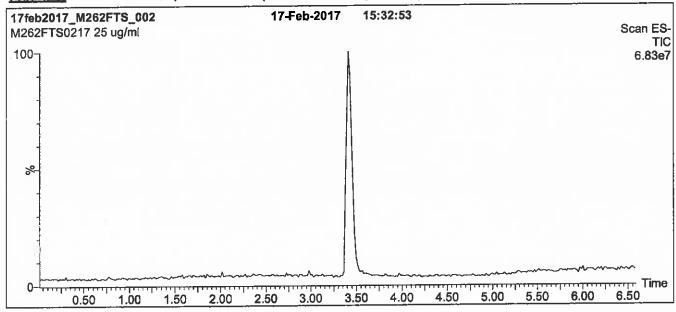
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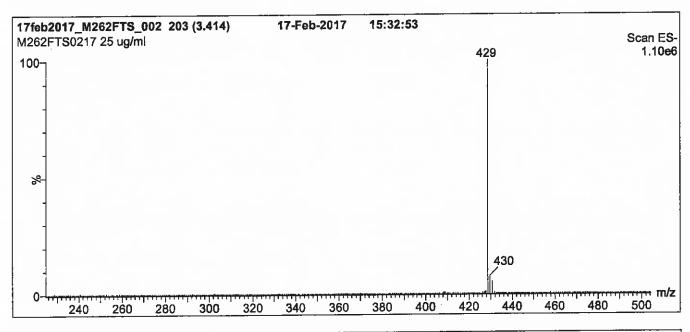


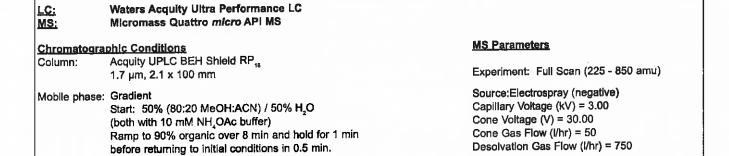


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Figure 1: M2-6:2FTS; LC/MS Data (TIC and Mass Spectrum)





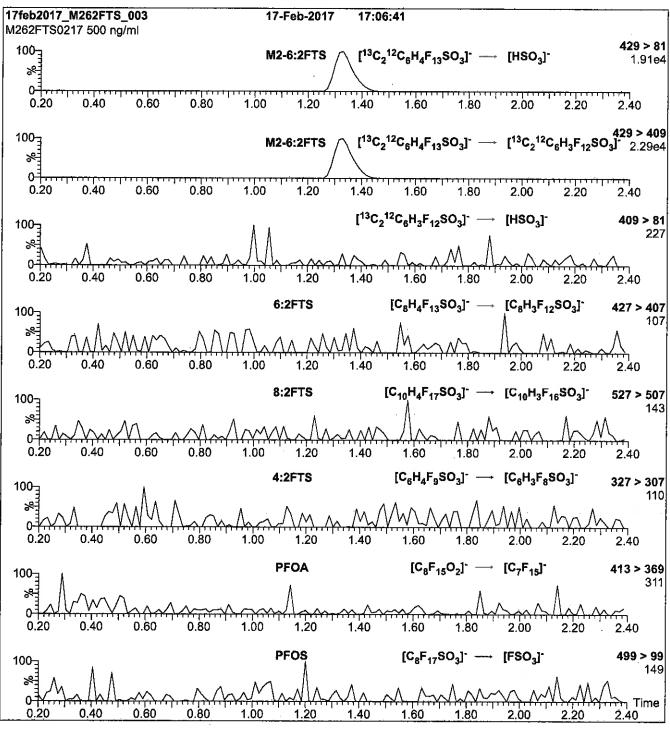


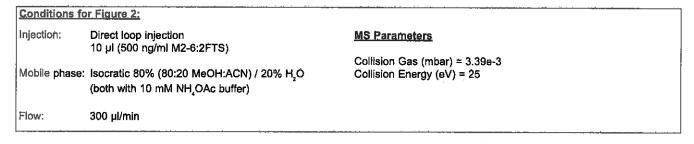
Flow: 300 µl/min

Time: 10 min

Conditions for Figure 1:

Figure 2: M2-6:2FTS; LC/MS/MS Data (Selected MRM Transitions)





LCM2-8:2FTS 00004



PRODUCT CODE:

M2-8:2FTS

LOT NUMBER:

M282FTS0816

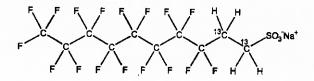
**COMPOUND:** 

Sodium 1H,1H,2H,2H-perfluoro-[1,2-13C,]decane sulfonate

STRUCTURE:

CAS #:

Not available



**MOLECULAR FORMULA:** 

13C, 12C, H,F,,SO,Na

MOLECULAR WEIGHT:

552.15

**CONCENTRATION:** 

50.0 ± 2.5 µg/ml (Na salt)

 $47.9 \pm 2.4 \, \mu g/ml$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

≥99% <sup>13</sup>C

LAST TESTED: (mm/dd/yyyy)

08/22/2016

**ISOTOPIC PURITY:** 

(1,2-13C<sub>2</sub>)

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 34S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

(M2-8:2FTS anion)

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 09/02/2016

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

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:** 

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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:

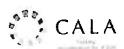
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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:

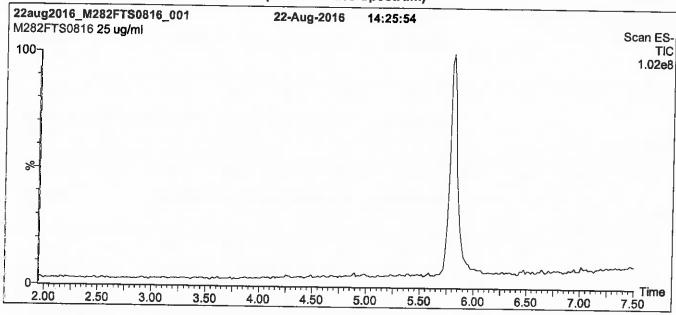
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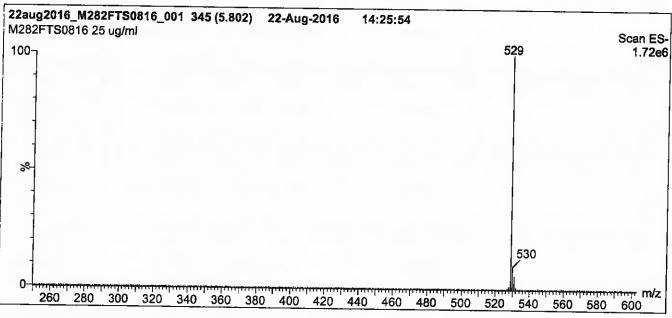




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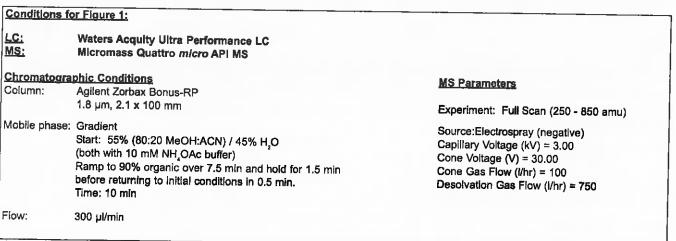
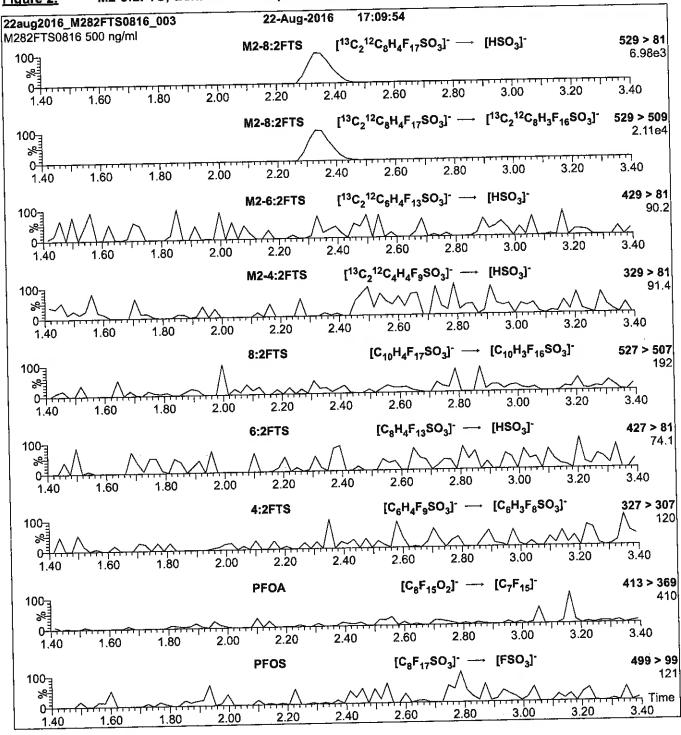
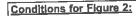


Figure 2: M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml M2-8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

#### MS Parameters

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

. . . . .

LCM2-8:2FTS 00007



PRODUCT CODE:

M2-8:2FTS

LOT NUMBER:

M282FTS0717

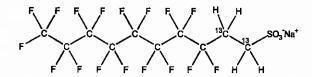
**COMPOUND:** 

Sodium 1H,1H,2H,2H-perfluoro-[1,2-13C,]decane sulfonate

STRUCTURE:

CAS #:

Not available



**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>H<sub>4</sub>F<sub>17</sub>SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

552.15

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/mi$ (Na salt)

47.9 ± 2.4 µg/ml

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99% <sup>13</sup>C

LAST TESTED: (mm/dd/yyyy)

07/05/2017

(1,2-13C<sub>a</sub>)

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 34S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis, We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

(M2-8:2FTS anion)

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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:**

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,  $u_{a}(y)$ , of a value y and the uncertainty of the independent parameters

$$x_i, x_2,...x_n$$
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where x is expressed as a relative standard uncertainty of the individual parameter.

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#### LIMITED WARRANTY:

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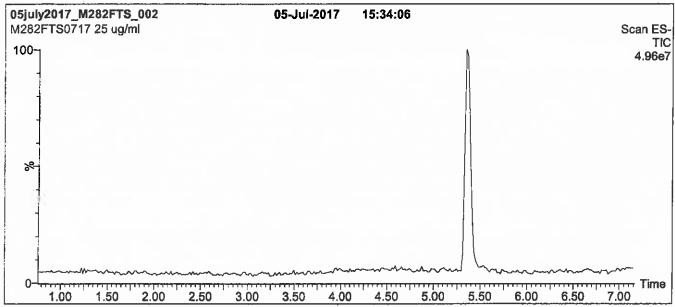
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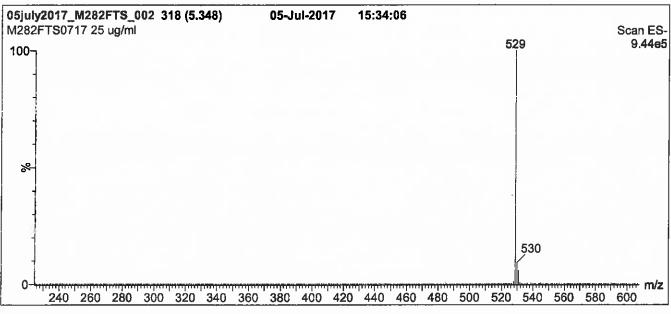




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Figure 1: M2-8:2FTS; LC/MS Data (TIC and Mass Spectrum)





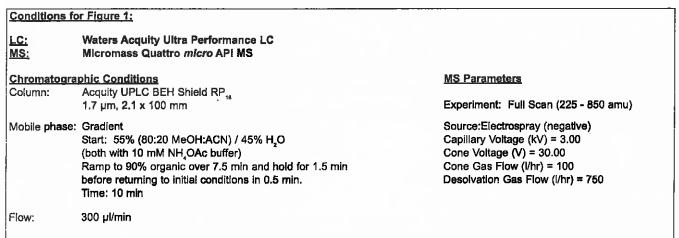
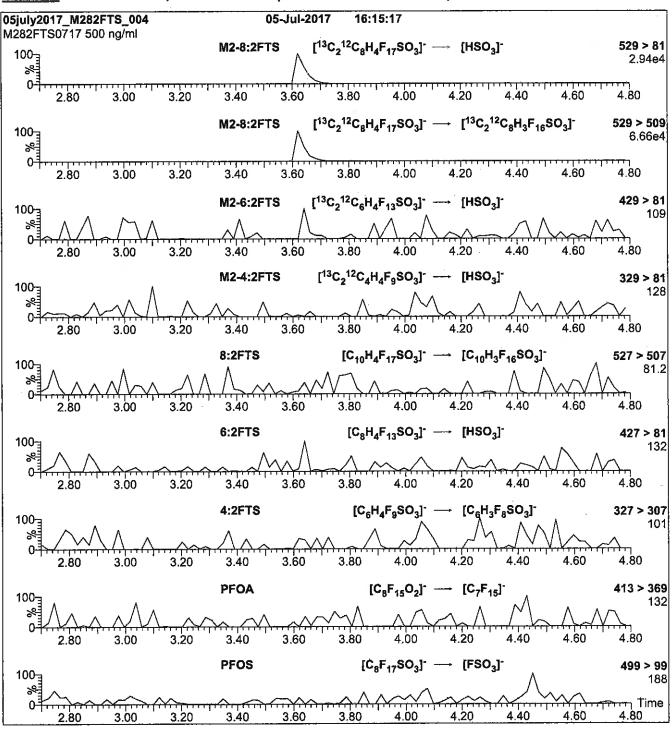
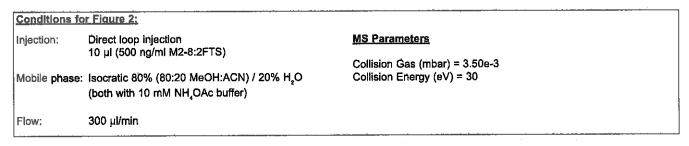


Figure 2: M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)





# LCM2PFHxDA\_00010



PRODUCT CODE:

M2PFHxDA

**LOT NUMBER:** 

M2PFHxDA1112

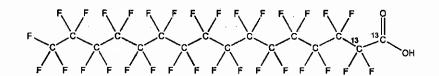
COMPOUND:

Perfluoro-n-[1,2-13C<sub>2</sub>]hexadecanoic acid

**STRUCTURE:** 

CAS #:

Not available



**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>14</sub>HF<sub>31</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

816.11

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) >99% <sup>13</sup>C

LAST TESTED: (mm/eld/yyyy)

01/07/2016

ISUTUPIC PURIT

≥99% ¹°C (1,2-¹³C,)

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. Phittim

Date: <u>01/</u>

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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:**

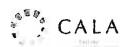
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### 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:**

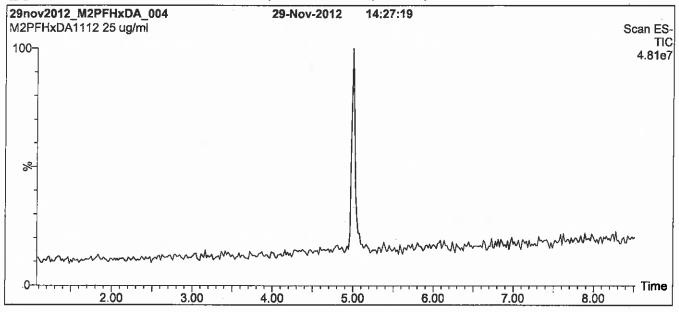
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

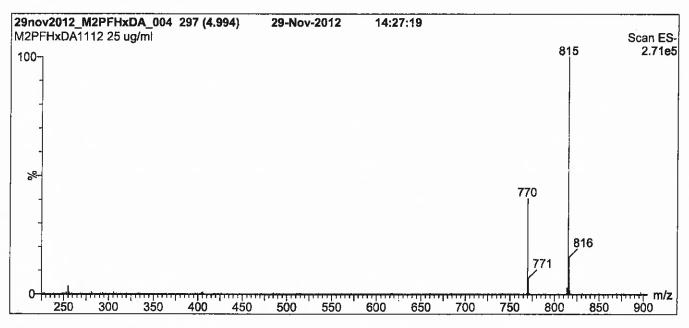




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

Figure 1: M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)





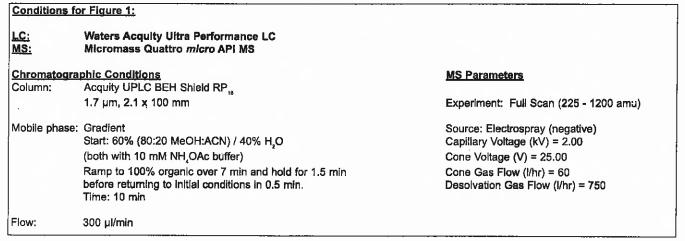
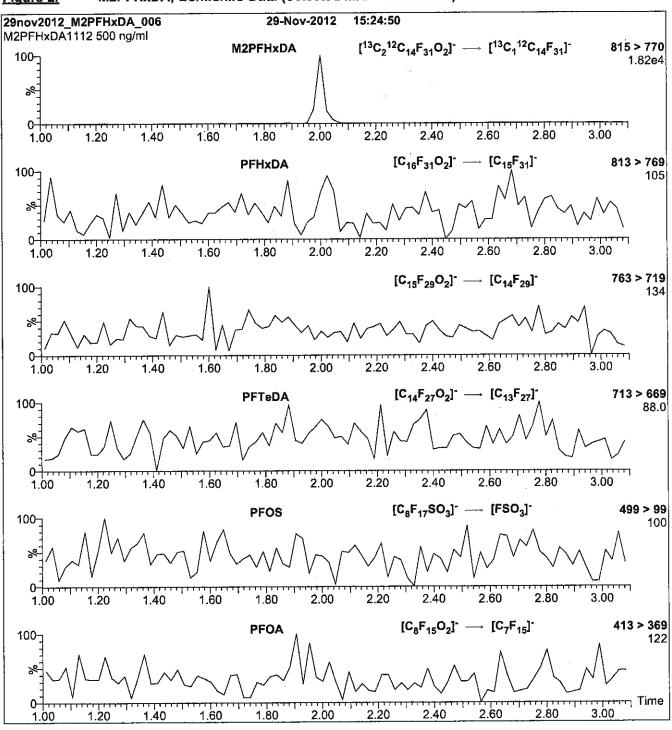
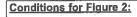


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow:

300 µl/min

### **MS Parameters**

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

# LCM2PFHxDA\_00011



**PRODUCT CODE:** 

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

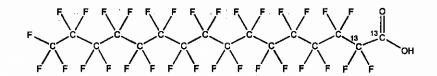
COMPOUND:

Perfluoro-n-[1,2-13C]hexadecanoic acid

**STRUCTURE:** 

**CAS #:** 

Not available



**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>14</sub>HF<sub>31</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

816.11

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) ≥99% <sup>13</sup>C (1,2-<sup>13</sup>C<sub>a</sub>)

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)

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,  $u_i(y)$ , 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:**

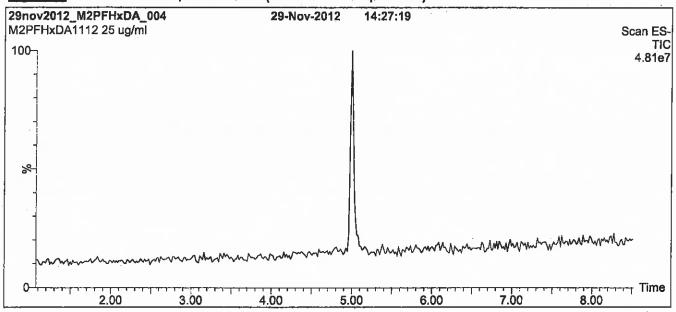
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

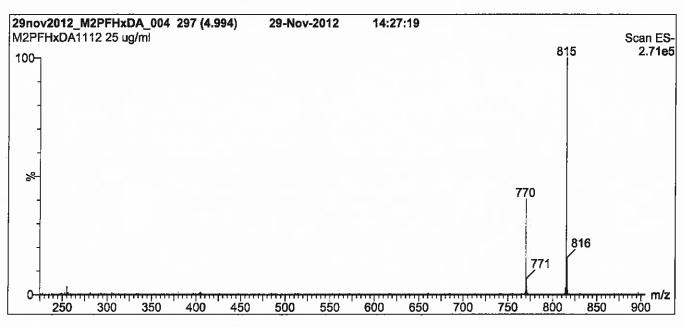




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

Figure 1: M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)





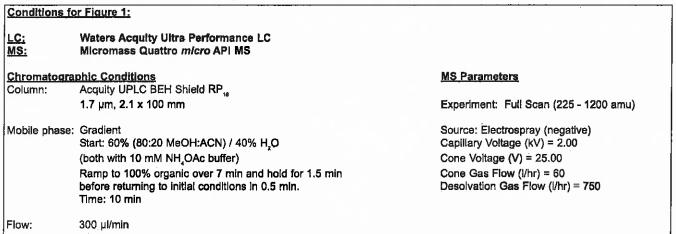
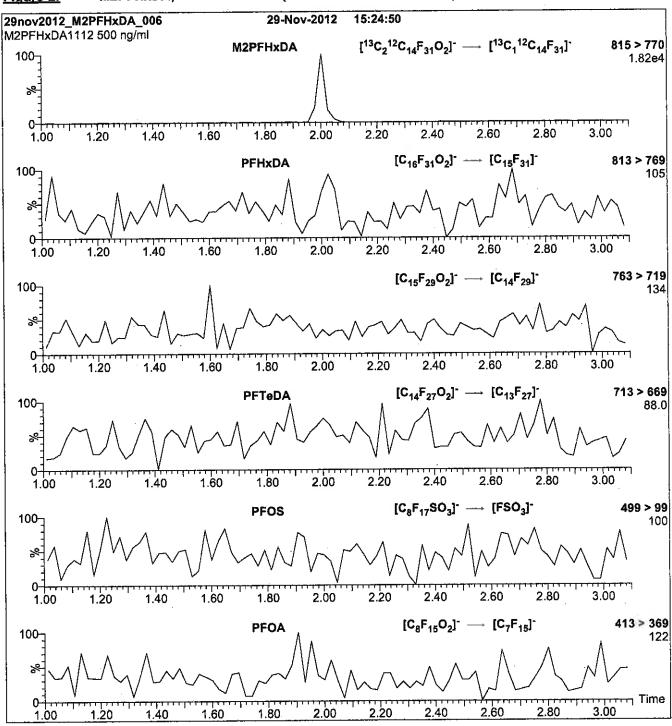
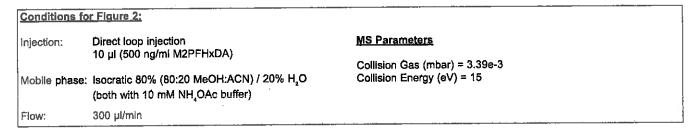


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





# LCM2PFOA\_00005



PRODUCT CODE:

M2PFOA

**LOT NUMBER:** 

M2PFOA0613

**COMPOUND:** 

Perfluoro-n-[1,2-13C] octanoic acid

STRUCTURE:

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>6</sub>HF<sub>15</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

**ISOTOPIC PURITY:** 

416.05

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

>99%13C

 $(1,2^{-13}C_2)$ 

Water (<1%)

**CHEMICAL PURITY:** 

>98%

06/19/2013

LAST TESTED: (mm/dd/yyyy) EXPIRY DATE: (mm/dd/yyyy)

06/19/2018

**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:

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

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

### **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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/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(y), of a value y and the uncertainty of the independent parameters

 $x_{4}, x_{2},...,x_{n}$  on which it depends is:

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

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 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 17025:2005 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 for the period of time specified by the 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:

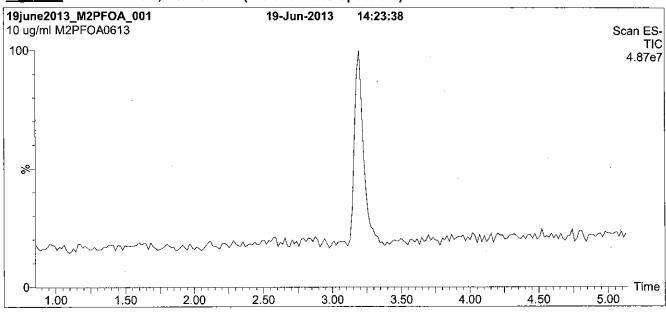
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

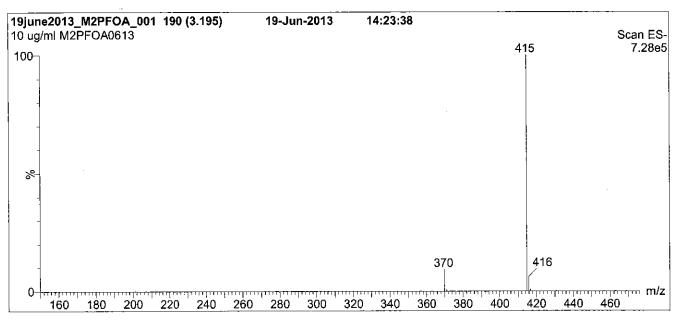




<sup>\*\*</sup>For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





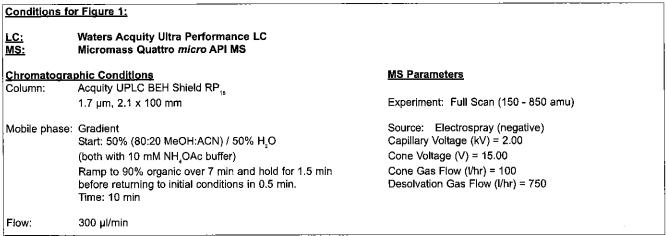
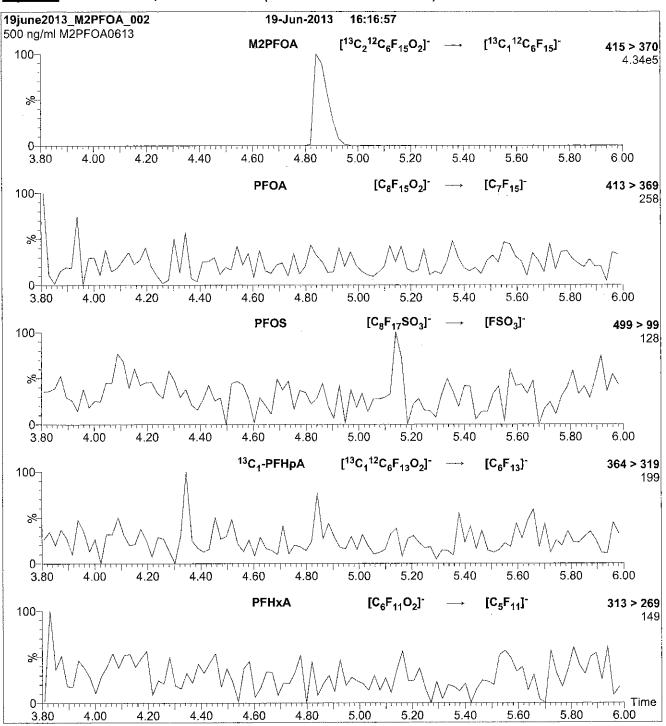
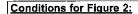


Figure 2: M2PFOA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>2</sub>OAc buffer)

Flow:

300 µl/min

### MS Parameters

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

# LCM2PFOA\_00006



# WELLINGTON LABORATORIES

### CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

M2PFOA

COMPOUND:

Perfluoro-n-[1,2-13C] octanoic acid

LOT NUMBER:

M2PFOA0216

**STRUCTURE:** 

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

**CONCENTRATION:** 

**CHEMICAL PURITY:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>6</sub>HF<sub>15</sub>O<sub>2</sub>

 $50 \pm 2.5 \, \mu g/ml$ 

**MOLECULAR WEIGHT:** 

416.05

Methanol

**ISOTOPIC PURITY:** 

SOLVENT(S):

Water (<1%) ≥99%<sup>13</sup>C

LAST TESTED: (mm/dd/yyyy)

>98%

02/12/2016

EXPIRY DATE: (mm/dd/yyyy) **RECOMMENDED STORAGE:**  02/12/2021

Store ampoule in a cool, dark place

(1,2-13C<sub>a</sub>)

### **DOCUMENTATION/ DATA ATTACHED:**

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

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

### **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 02/24/2016

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

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### LIMITED WARRANTY:

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

### QUALITY MANAGEMENT:

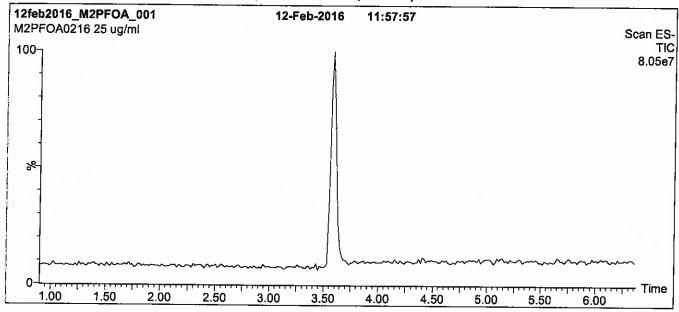
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

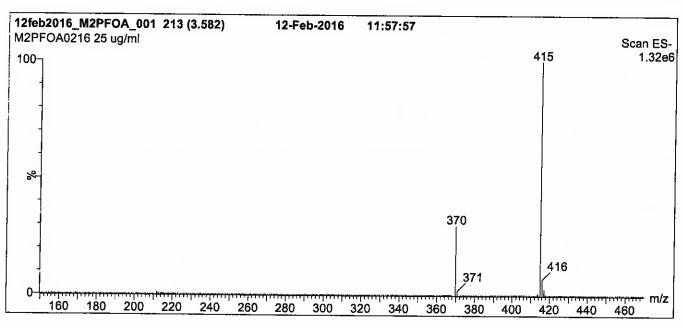




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Figure 1: M2PFOA; LC/MS Data (TIC and Mass Spectrum)





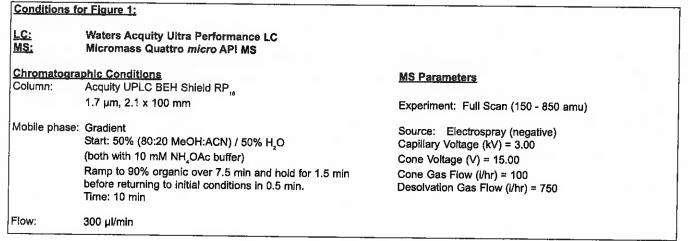
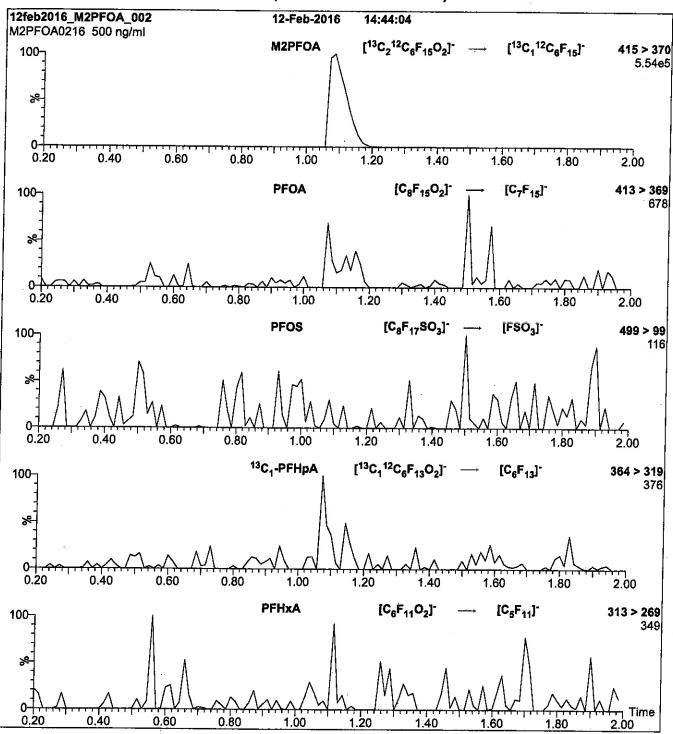
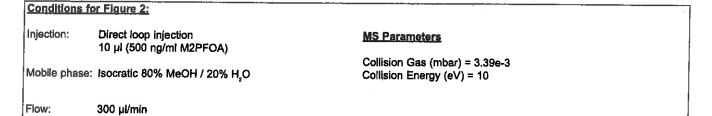


Figure 2: M2PFOA; LC/MS/MS Data (Selected MRM Transitions)





# LCM2PFTeDA\_00009



**PRODUCT CODE:** 

M2PFTeDA

LOT NUMBER:

M2PFTeDA0217

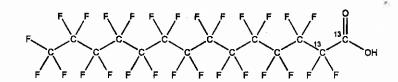
**COMPOUND:** 

Perfluoro-n-[1,2-13C,]tetradecanoic acid

STRUCTURE:

**CAS #:** 

Not available



**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>12</sub>HF<sub>27</sub>O<sub>2</sub>

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

**MOLECULAR WEIGHT:** 

**ISOTOPIC PURITY:** 

SOLVENT(S):

716.10

Methanol

Water (<1%) ≥99% 13C

(1,2-13C<sub>2</sub>)

**CHEMICAL PURITY:** 

>98%

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

#### HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_1, x_2, ... x_n$$
 on which it depends is: 
$$u_c(y(x_1, x_2, ... x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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

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

### TRACEABILITY:

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### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

### QUALITY MANAGEMENT:

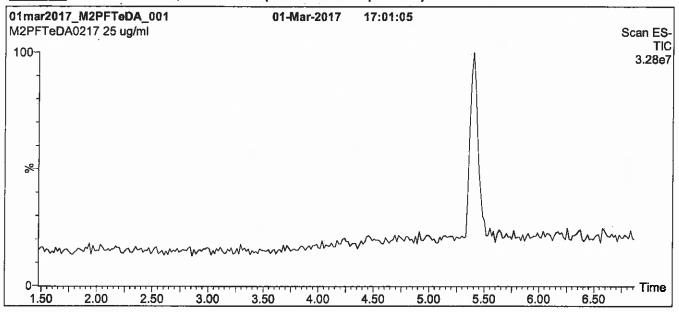
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

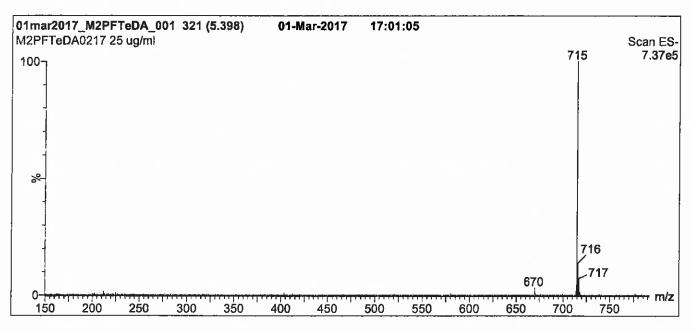




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Figure 1: M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)





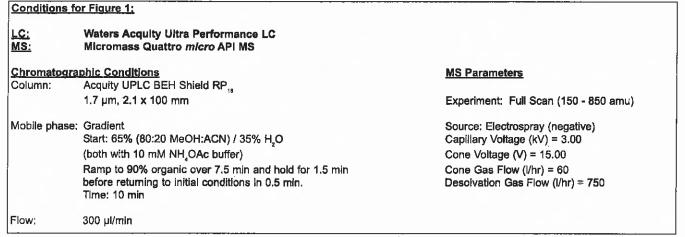
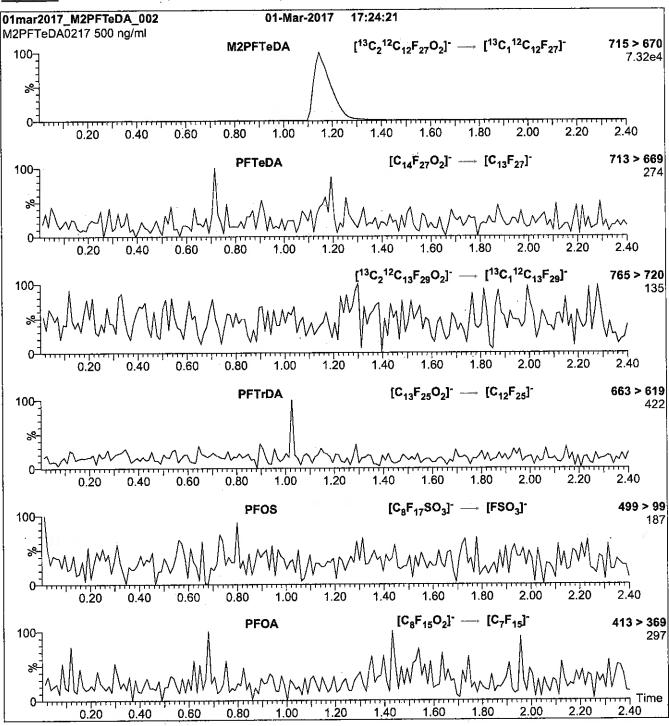
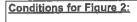


Figure 2: M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml M2PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

### **MS Parameters**

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

# LCM2PFTeDA\_00010



**PRODUCT CODE:** 

M2PFTeDA

LOT NUMBER:

M2PFTeDA0217

COMPOUND:

Perfluoro-n-[1,2-13C,]tetradecanoic acid

STRUCTURE:

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>12</sub>HF<sub>27</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

716.10

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/m!$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

Water (<1%) ≥99% <sup>13</sup>C

(1,2-13C<sub>2</sub>)

LAST TESTED: (mm/oddyyyy)

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 03/07/2017

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

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

### **HAZARDS**;

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

### SYNTHESIS / CHARACTERIZATION:

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

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

### **UNCERTAINTY:**

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

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### TRACEABILITY:

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### **EXPIRY DATE / PERIOD OF VALIDITY:**

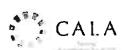
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

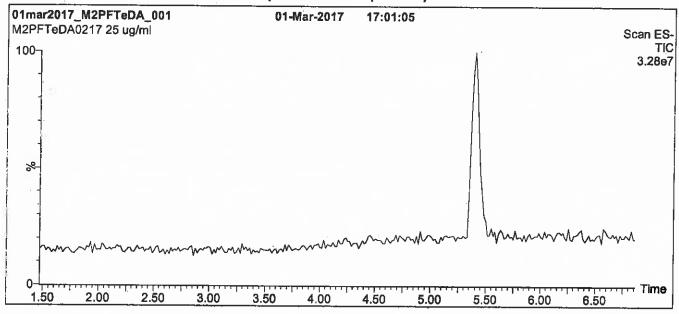
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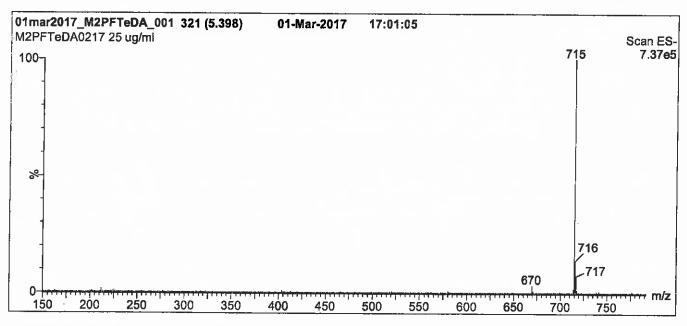




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Figure 1: M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)





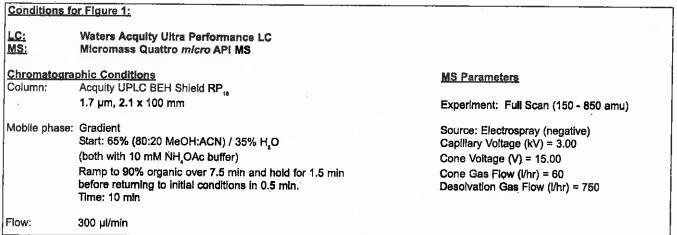
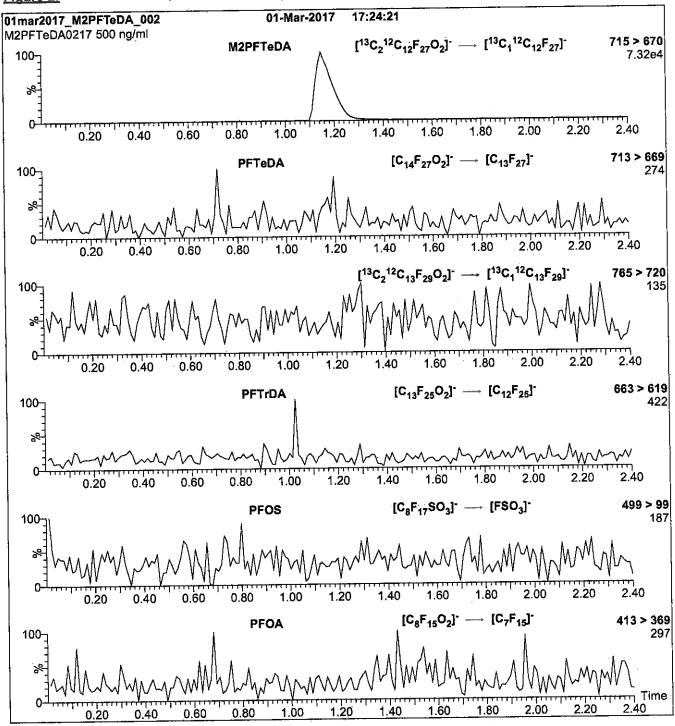
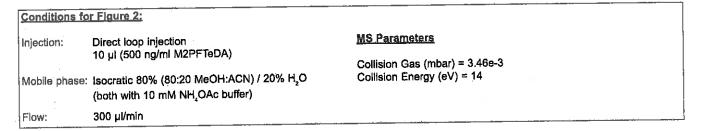


Figure 2: M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





## LCM4PFHPA\_00009



PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0516

**COMPOUND:** 

Perfluoro-n-[1,2,3,4-13C]heptanoic acid

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>3</sub>HF<sub>13</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

368.03

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanoi

**CHEMICAL PURITY:** 

>98%

Water (<1%)

LAST TESTED: (mm/dd/yyyy)

**ISOTOPIC PURITY:** 

≥99%13C (1,2,3,4-13C<sub>4</sub>)

EXPIRY DATE: (mm/dd/yyyy)

05/27/2016 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:

Date: <u>07/05/2016</u>

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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### TRACEABILITY:

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### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

### **QUALITY MANAGEMENT:**

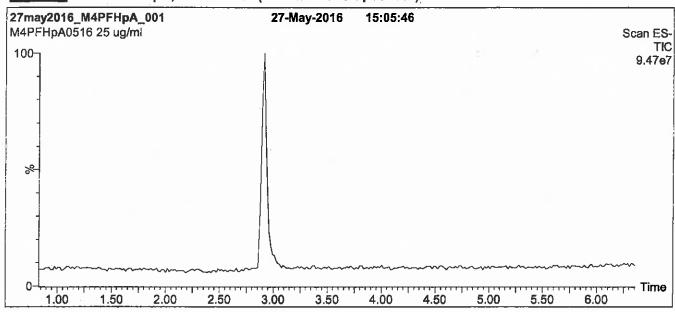
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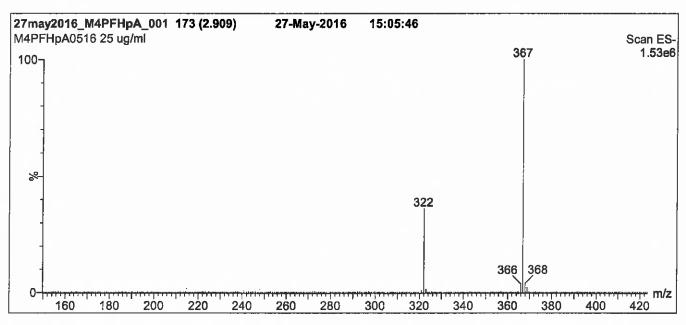




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Figure 1: M4PFHpA; LC/MS Data (TIC and Mass Spectrum)





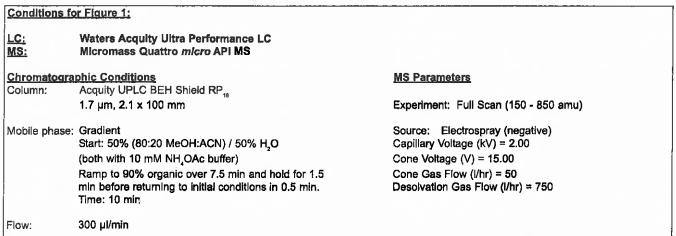
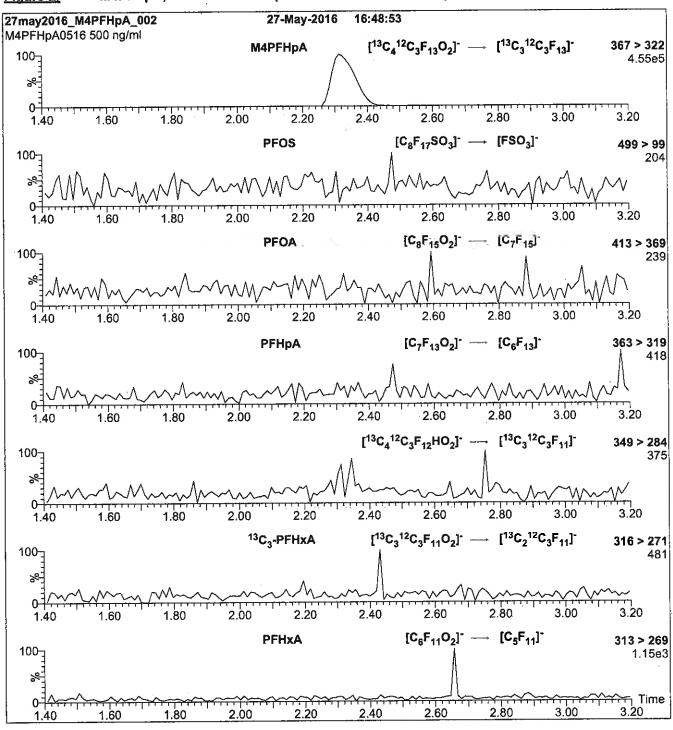
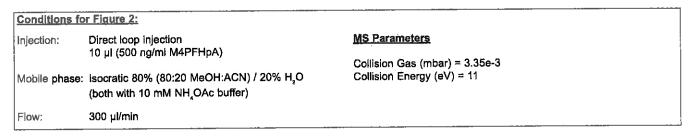


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





# LCM4PFHPA\_00010



PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0517

COMPOUND:

Perfluoro-n-[1,2,3,4-13C]heptanoic acid

STRUCTURE:

**CAS #:** 

Not available

F C C 13 13 C 13 13 C OH

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub> <sup>12</sup>C<sub>3</sub>HF<sub>13</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

368.03

**CONCENTRATION:** 

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

05/03/2017

**ISOTOPIC PURITY:** 

≥99%13C (1,2,3,4-13C<sub>4</sub>)

EXPIRY DATE: (mm/dd/yyyy)

05/03/2022

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

### **DOCUMENTATION/ DATA ATTACHED:**

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

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

### **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

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#### QUALITY MANAGEMENT:

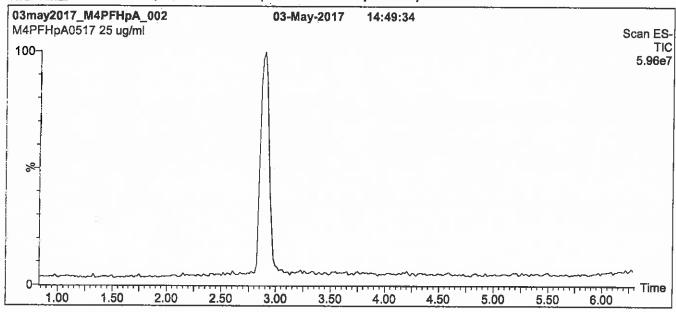
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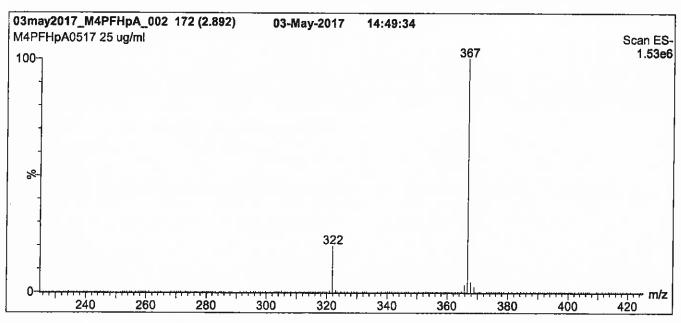




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Figure 1: M4PFHpA; LC/MS Data (TIC and Mass Spectrum)





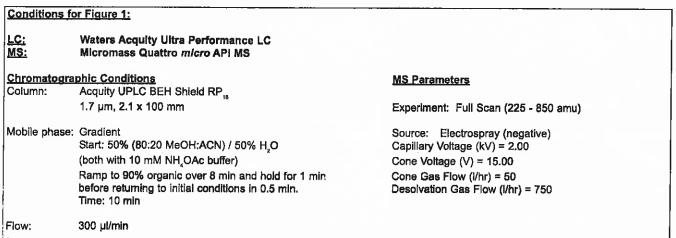
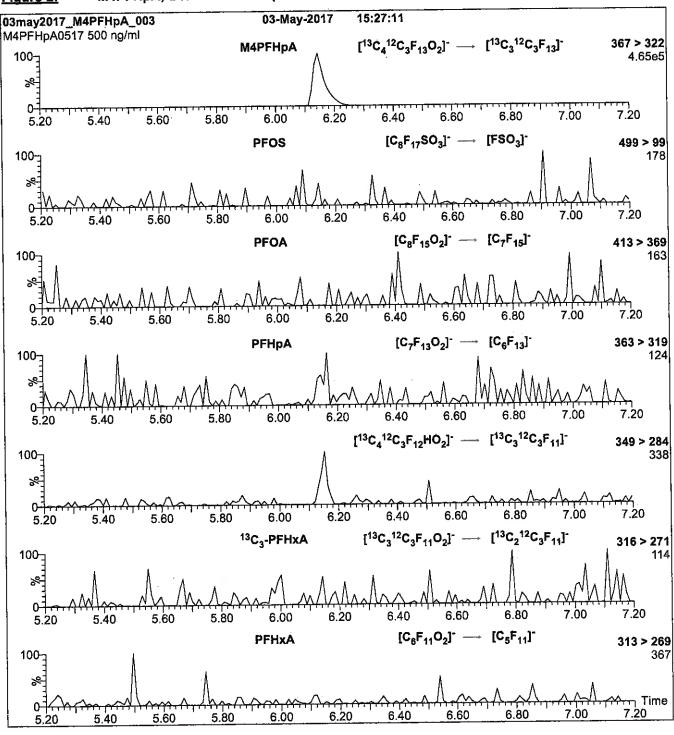
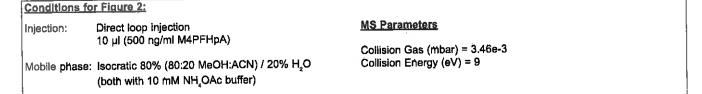


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Flow:

300 µl/min

# LCM5PFPEA\_00010



PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA1116

**COMPOUND:** 

Perfluoro-n-[13C]pentanoic acid

STRUCTURE:

CAS #:

Not available

<sup>13</sup>C<sub>5</sub>HF<sub>8</sub>O<sub>3</sub>

**MOLECULAR WEIGHT:** 

269.01

**CONCENTRATION:** 

**MOLECULAR FORMULA:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

Water (<1%) ≥99% <sup>13</sup>C

(13C<sub>c</sub>)

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:

Date: 12/09/2016

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### QUALITY MANAGEMENT:

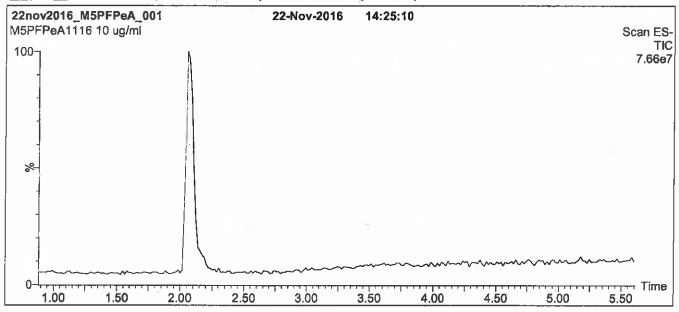
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

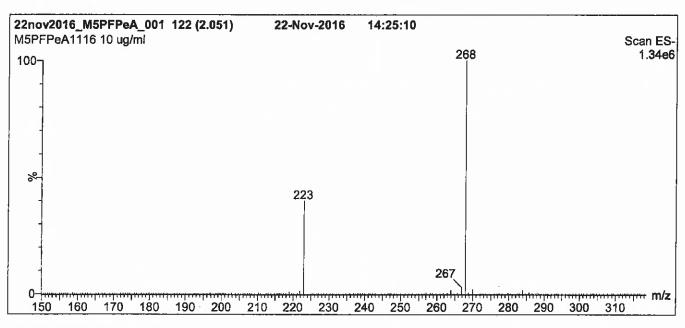




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="mailto:www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





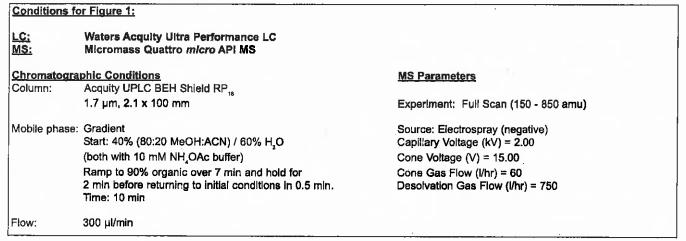
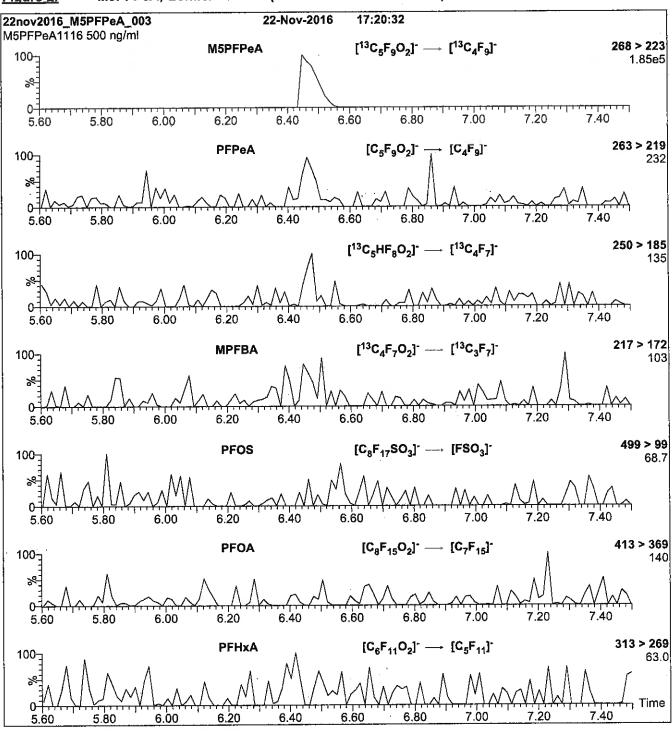
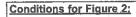


Figure 2: M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml M5PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

#### **MS Parameters**

Collision Gas (mbar) = 3.46e-3 Collision Energy (eV) = 9

# LCM5PFPEA\_00011



PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA1116

**COMPOUND:** 

Perfluoro-n-[13C]pentanoic acid

STRUCTURE:

**CAS #:** 

Not available

F F F F

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>z</sub>HF<sub>a</sub>O<sub>z</sub>

O<sub>5</sub>1 11 9 O<sub>2</sub>

**MOLECULAR WEIGHT:** 

269.01

**CONCENTRATION:** 

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>99% <sup>13</sup>C

(13C<sub>c</sub>)

LAST TESTED: (mm/dd/yyyy)

11/22/2016

(9)

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.</li>

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B G Chiltim

Date: 12,

<u>12/09/2016</u>

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

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 furne 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,  $u_a(y)$ , 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

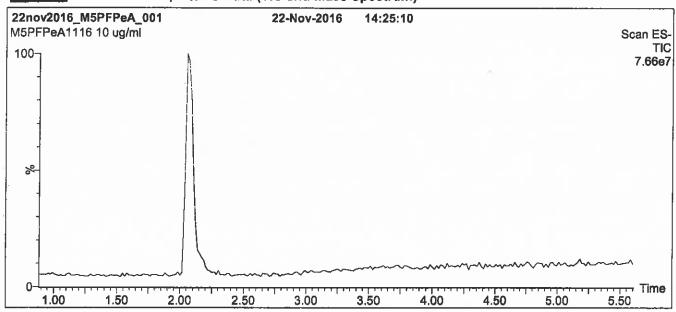
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

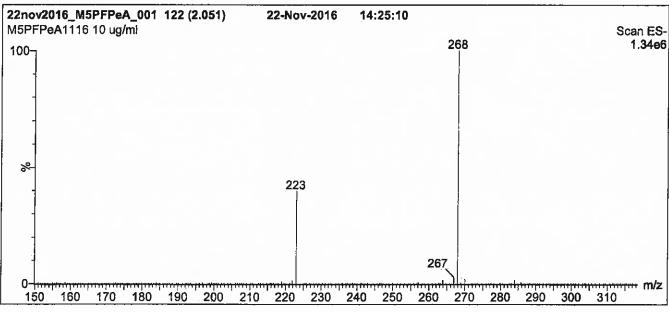




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Figure 1: M5PFPeA; LC/MS Data (TIC and Mass Spectrum)





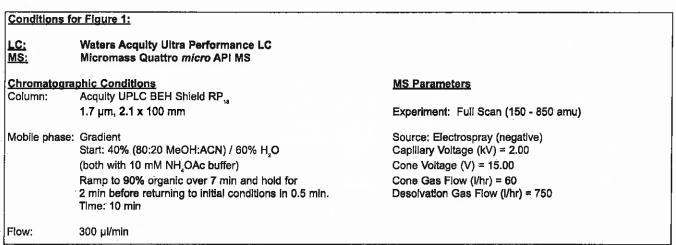
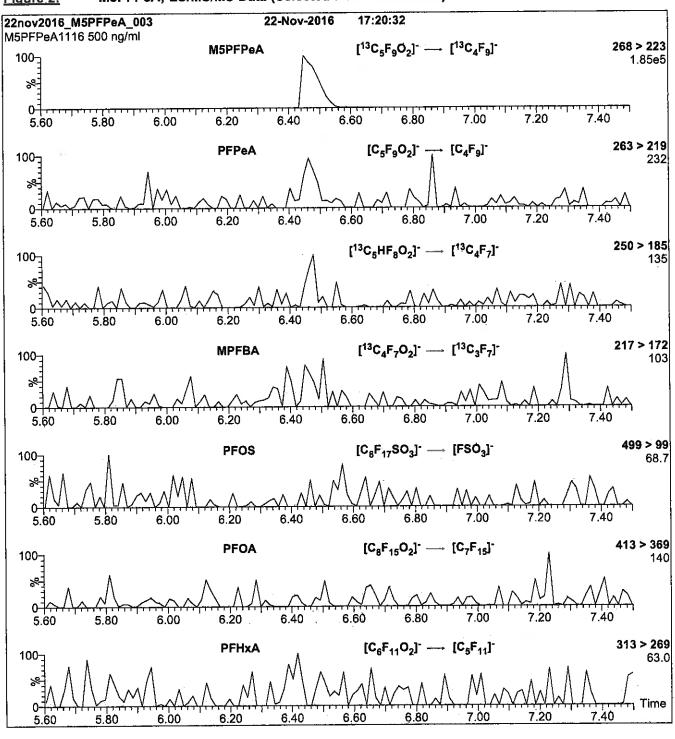
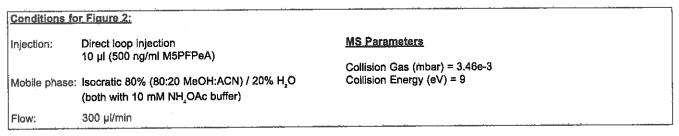


Figure 2: M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)





# LCM8FOSA\_00013



PRODUCT CODE:

M8FOSA-I

**LOT NUMBER:** 

M8FOSA1215I

**COMPOUND:** 

**STRUCTURE:** 

Perfluoro-1-[13C] octanesulfonamide

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>8</sub>H<sub>2</sub>F<sub>17</sub>NO<sub>2</sub>S

**CONCENTRATION:** 

50 ± 2.5 µg/ml

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

12/22/2015

EXPIRY DATE: (mm/dd/yyyy)

12/22/2020

**RECOMMENDED STORAGE:** 

Refrigerate ampoule

**MOLECULAR WEIGHT:** 

SOLVENT(S):

Isopropanol

507.09

**ISOTOPIC PURITY:** 

≥99% <sup>13</sup>C

(13C<sub>a</sub>)

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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: 12/13/2016

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

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

#### **HAZARDS:**

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

#### **SYNTHESIS / CHARACTERIZATION:**

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

#### **UNCERTAINTY:**

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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:

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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 explry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

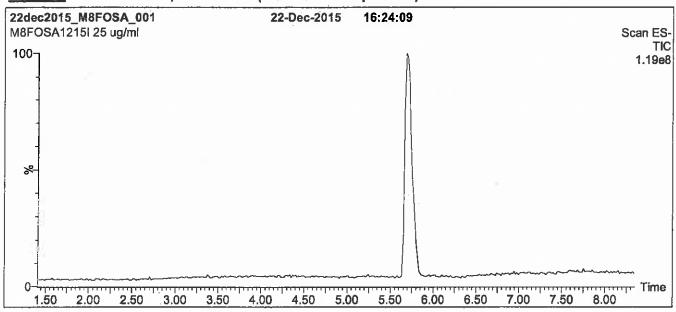
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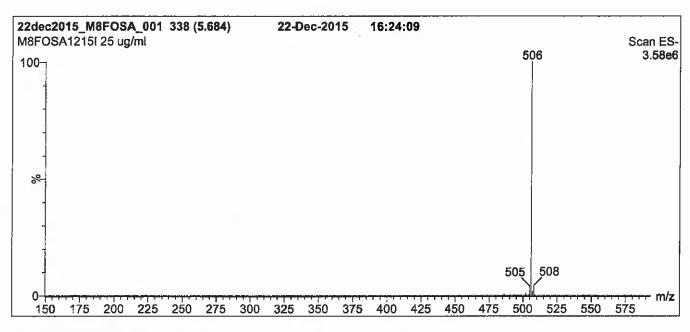




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Figure 1: M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)





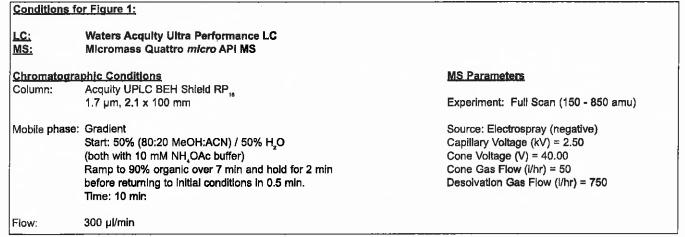
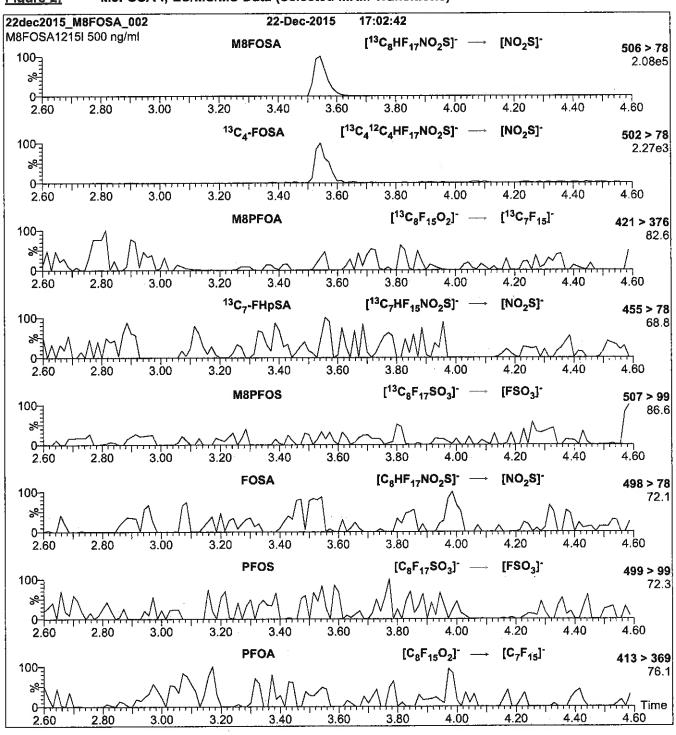
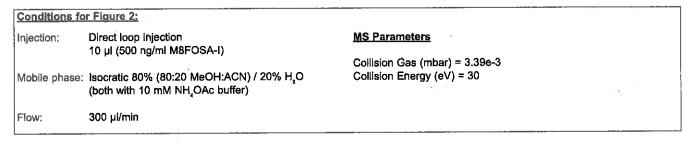


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





# LCM8FOSA\_00014



PRODUCT CODE:

M8FOSA-I

LOT NUMBER:

M8FOSA0417I

**COMPOUND:** 

Perfluoro-1-[13C\_]octanesulfonamide

**STRUCTURE:** 

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

13C8H2F17NO2S

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

04/20/2017

EXPIRY DATE: (mm/dd/yyyy)

04/20/2022

RECOMMENDED STORAGE:

Refrigerate ampoule

**MOLECULAR WEIGHT:** 

SOLVENT(S):

Isopropanol

507.09

**ISOTOPIC PURITY:** 

≥99% <sup>13</sup>C

(13C<sub>n</sub>)

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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-[13C] octanesulfonamide and ~ 0.01% of perfluoro-1-[13C,]heptanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: 05/04/2017

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

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.

#### HOMOGENELTY:

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,  $u_x(y)$ , of a value y and the uncertainty of the independent parameters

$$x_1, x_2,...x_n$$
 on which it depends is: 
$$u_c(y(x_1,x_2,...x_n)) = \sqrt{\sum_{i=1}^n u(y,x_i)^2}$$

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

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#### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

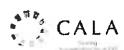
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

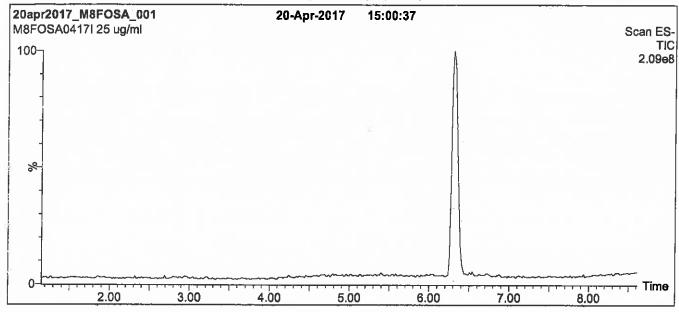
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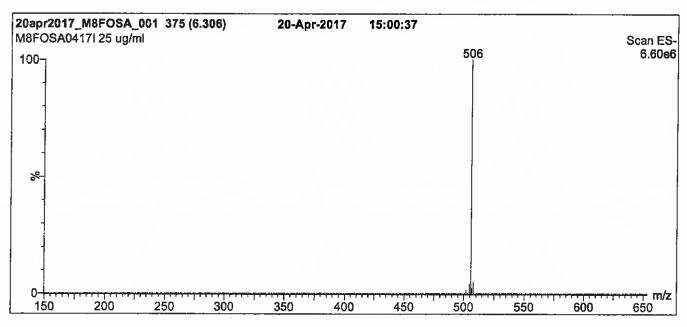




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Figure 1: M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)





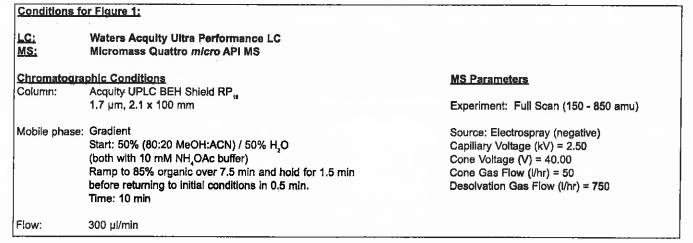
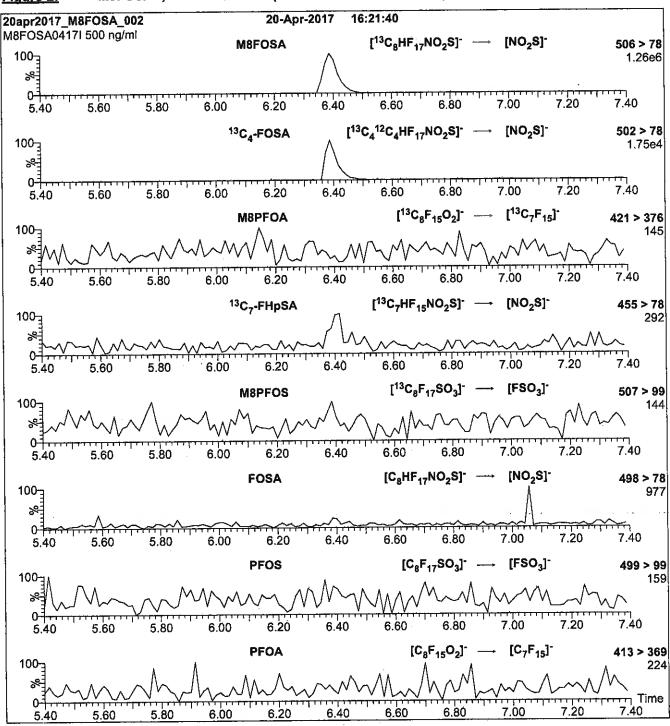
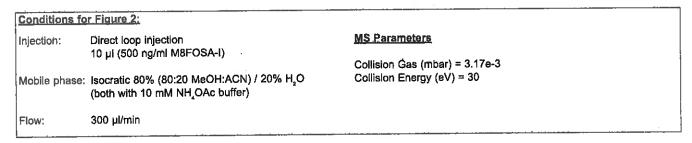


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFBA\_00010



PRODUCT CODE:

**MPFBA** 

LOT NUMBER:

**MPFBA0516** 

**COMPOUND:** 

Perfluoro-n-[1,2,3,4-13C] butanoic acid

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub>HF<sub>2</sub>O<sub>3</sub>

**MOLECULAR WEIGHT:** 

218.01

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99%13C

LAST TESTED: (mm/dd/yyyy)

05/24/2016

(1,2,3,4-13C<sub>4</sub>)

EXPIRY DATE: (mrv/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:

Date: 05/30/2016

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

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.

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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:**

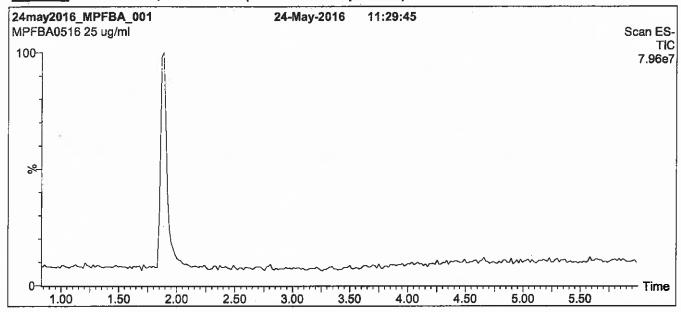
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

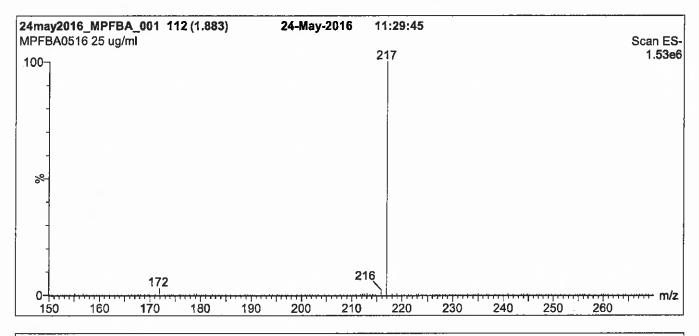


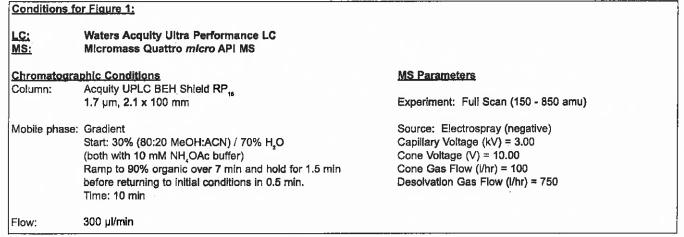


\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.weil-labs.com">www.weil-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

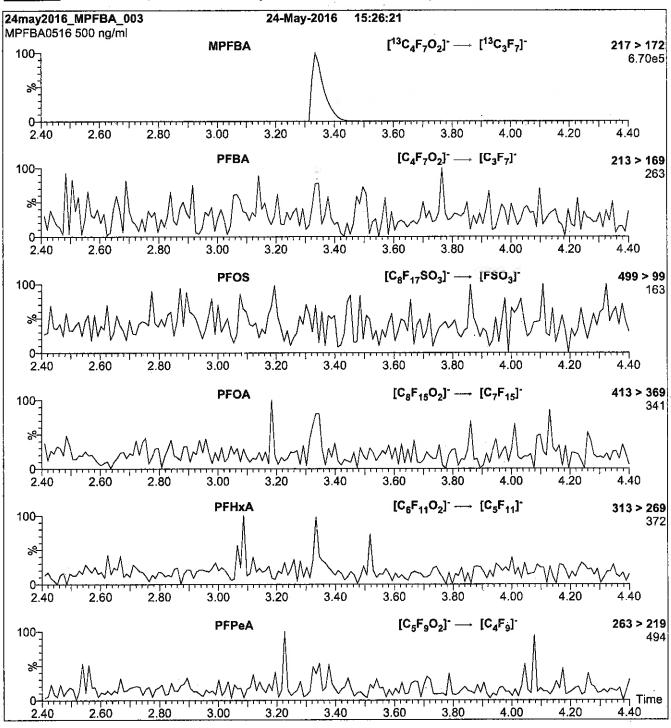
Figure 1: MPFBA; LC/MS Data (TIC and Mass Spectrum)

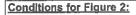






MPFBA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 μl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

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

# LCMPFBA\_00011



PRODUCT CODE:

**MPFBA** 

**LOT NUMBER:** 

**MPFBA0417** 

COMPOUND:

Perfluoro-n-[1,2,3,4-13C] butanoic acid

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub>HF<sub>2</sub>O<sub>3</sub>

**CONCENTRATION:** 

**MOLECULAR WEIGHT:** 

218.01

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol-Water (<1%)

**ISOTOPIC PURITY:** 

>99%13C (1,2,3,4-13C<sub>4</sub>)

CHEMICAL PURITY: LAST TESTED: (mm/dd/yyyy) >98%

04/12/2017

EXPIRY DATE: (mm/dd/yyyy)

04/12/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

#### **DOCUMENTATION/ DATA ATTACHED:**

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

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

#### **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

#### **HAZARDS**;

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_i(y)$ , of a value y and the uncertainty of the independent parameters

$$x_1, x_2,...x_n$$
 on which it depends is: 
$$u_c(y(x_1,x_2,...x_n)) = \sqrt{\sum_{i=1}^n u(y,x_i)^2}$$

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

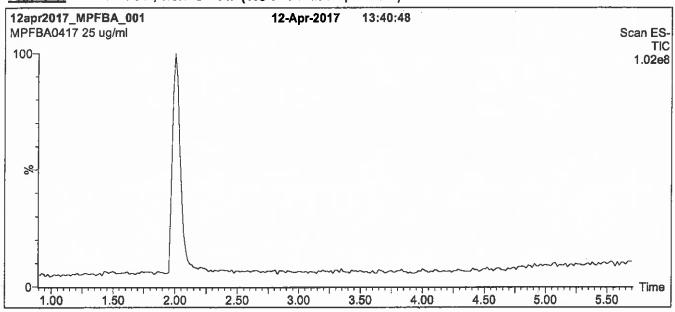
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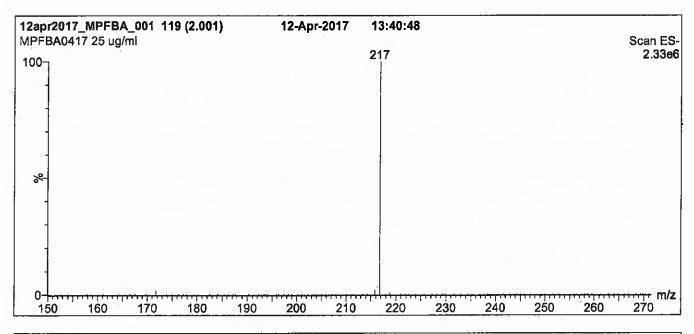




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Figure 1: MPFBA; LC/MS Data (TIC and Mass Spectrum)





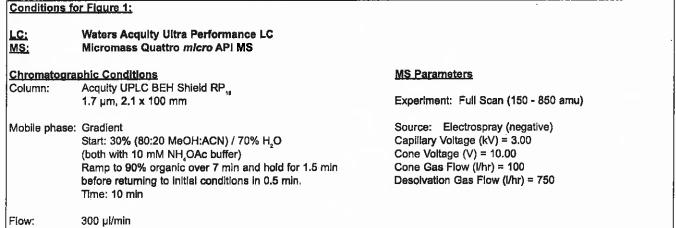
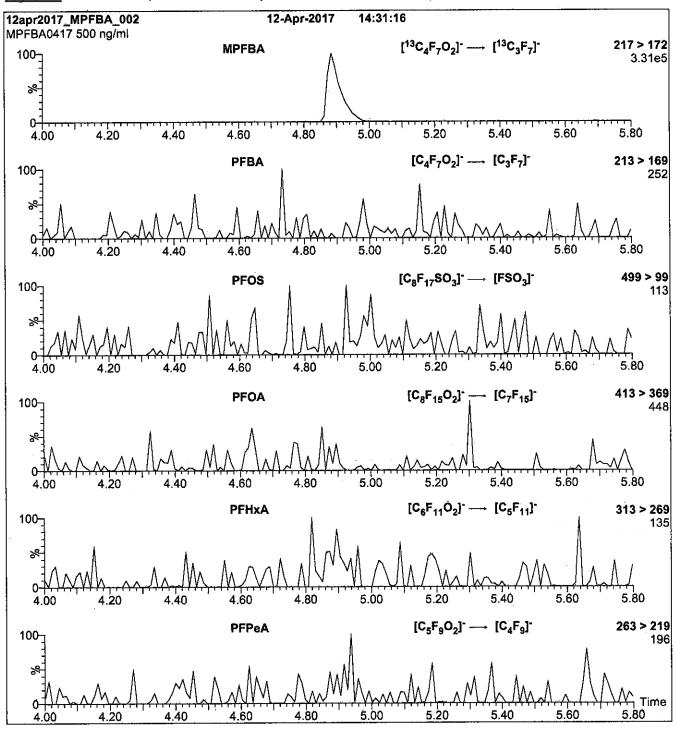
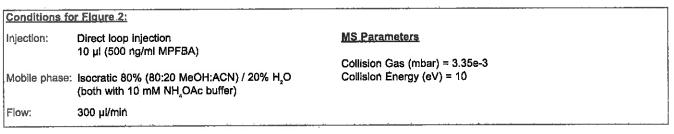


Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFBS\_00003



PRODUCT CODE:

M3PFBS

**LOT NUMBER:** 

M3PFBS0815

**COMPOUND:** 

Sodium perfluoro-1-[2,3,4-13C,]butanesulfonate

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C, <sup>12</sup>CF<sub>a</sub>SO,Na

**MOLECULAR WEIGHT:** 

325.06

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99% 13C

LAST TESTED: (mm/dd/yyyy)

08/02/2016

(2,3,4-13C<sub>3</sub>)

EXPIRY DATE: (mm/dd/yyyy)

08/02/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $46.5 \pm 2.3 \,\mu\text{g/ml}$  (M3PFBS anion)

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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 Bv:

Date: 08/05/2016

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:

$$u_{r}(y(x_{1}, x_{2}, ... x_{n})) = \sqrt{\sum_{i=1}^{n} u(y, x_{i})^{2}}$$

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

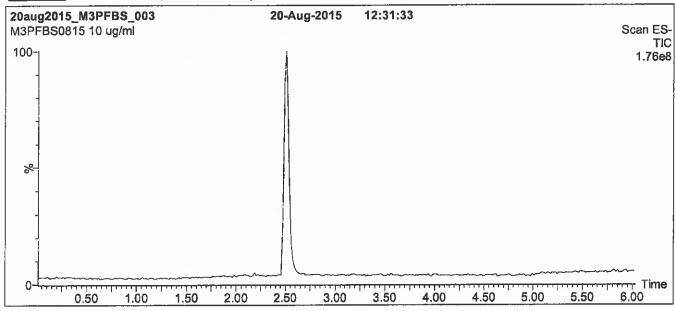
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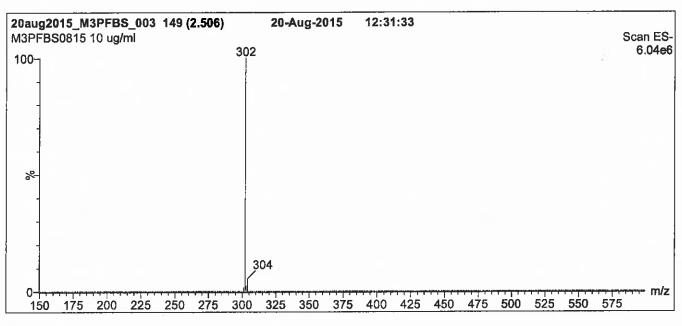




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Figure 1: M3PFBS; LC/MS Data (TIC and Mass Spectrum)





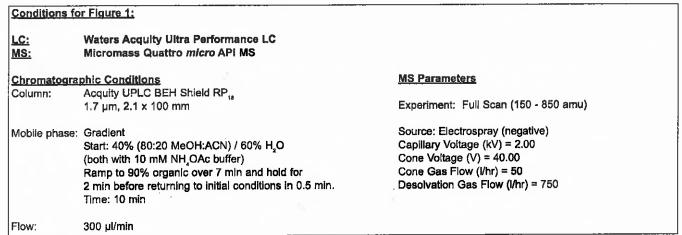
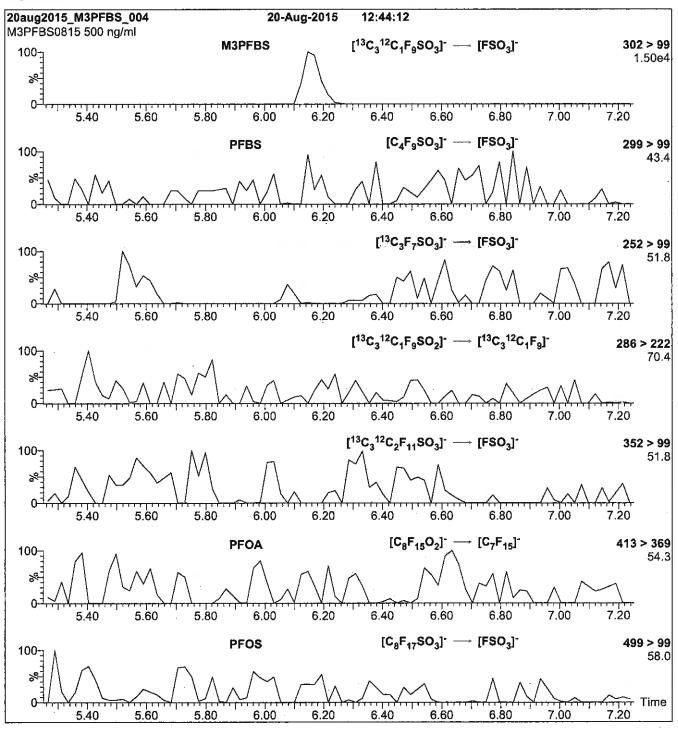
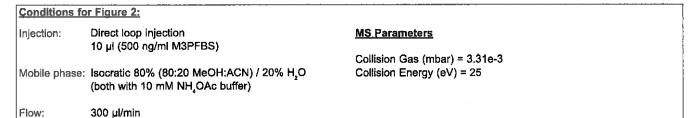


Figure 2: M3PFBS; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFBS\_00004



**PRODUCT CODE:** 

M3PFBS

LOT NUMBER:

M3PFBS0815

**COMPOUND:** 

Sodium perfluoro-1-[2,3,4-13C,]butanesulfonate

**STRUCTURE:** 

**CAS #:** 

Not available

F F F F

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>3</sub><sup>12</sup>CF<sub>9</sub>SO<sub>3</sub>Na

MOLECULAR WEIGHT:

325.06

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% <sup>13</sup>C (2,3,4-<sup>13</sup>C<sub>4</sub>)

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

46.5 ± 2.3 µg/ml (M3PFBS anion)

#### **DOCUMENTATION/ DATA ATTACHED:**

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

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

#### **ADDITIONAL INFORMATION:**

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

05/25/2017

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

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:

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$$x_i, x_2,...x_n$$
 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:

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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:

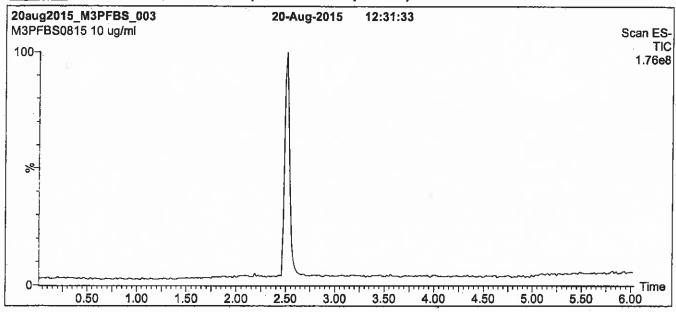
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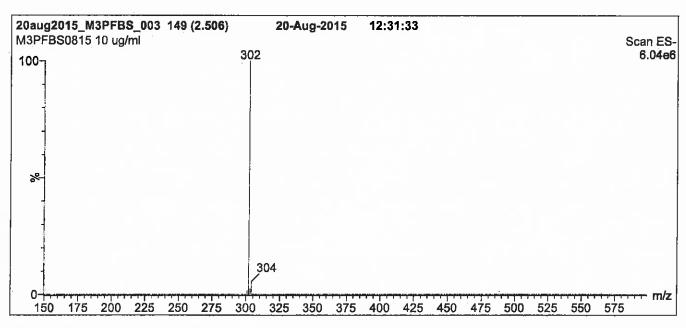




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Figure 1: M3PFBS; LC/MS Data (TiC and Mass Spectrum)





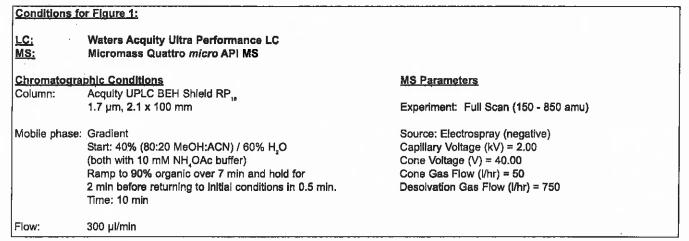
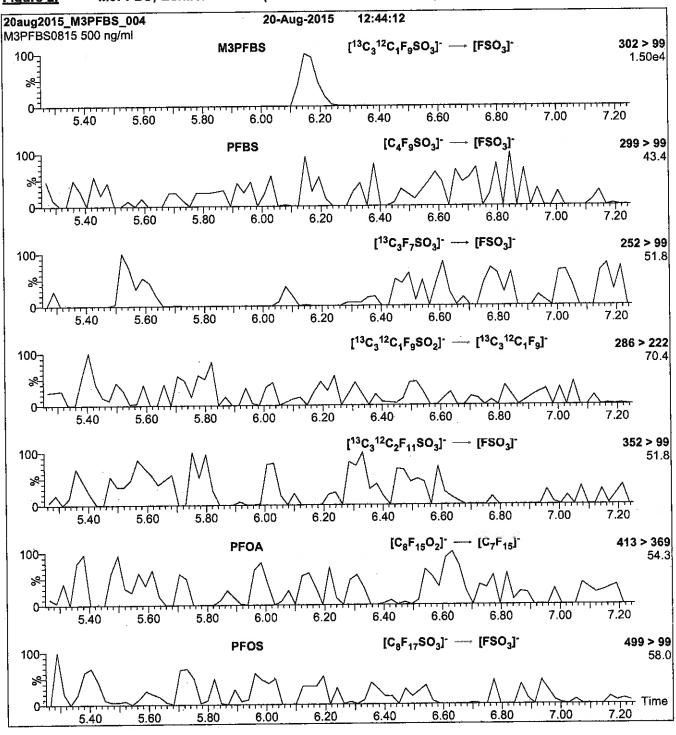
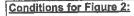


Figure 2: M3PFBS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µI (500 ng/ml M3PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH OAc buffer)

(2011)

#### MS Parameters

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

Flow:

300 µl/min

# LCMPFDA\_00015



PRODUCT CODE:

**MPFDA** 

**LOT NUMBER:** 

MPFDA0916

**COMPOUND:** 

Perfluoro-n-[1,2-13C] decanoic acid

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

13C, 12C, HF, 9O,

**MOLECULAR WEIGHT:** 

516.07

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/m!$ 

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

>99% 13C

LAST TESTED: (mm/dd/yyyy)

09/30/2016

**ISOTOPIC PURITY:** 

(1,2-13C<sub>a</sub>)

EXPIRY DATE: (mm/did/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 <sup>13</sup>C,-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/07/2016

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.

#### UNCERTAINTY:

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

The combined relative standard uncertainty, u<sub>c</sub>(y), of a value y and the uncertainty of the independent parameters

$$x_a, x_a, ...x_a$$
 on which it depends is:

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

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

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#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

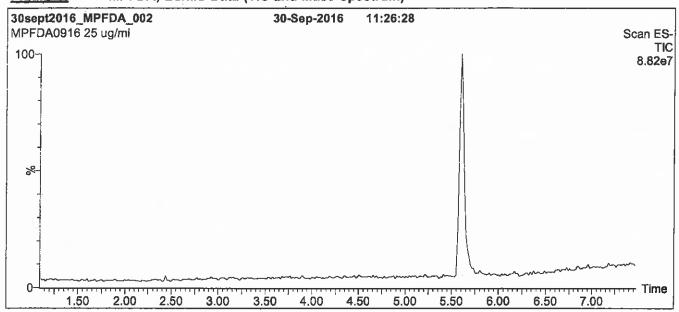
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

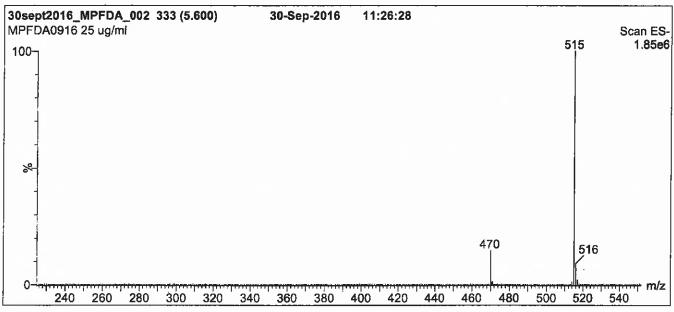




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Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)





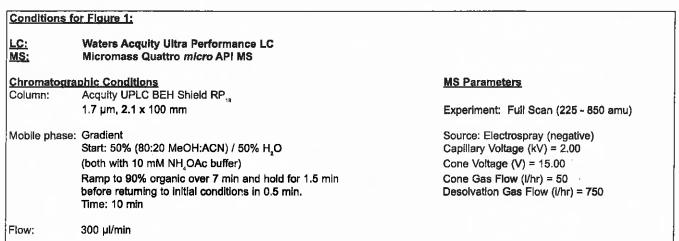
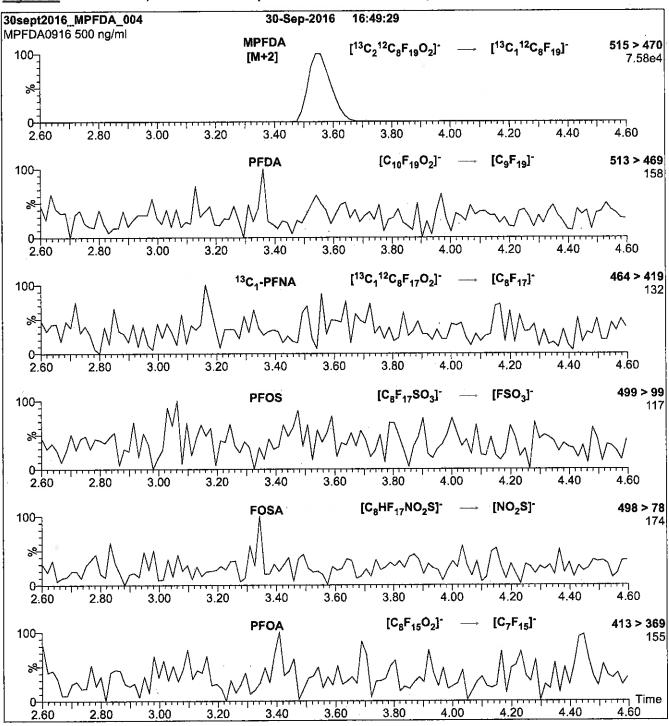
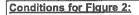


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

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

# LCMPFDA\_00016



PRODUCT CODE:

**MPFDA** 

**LOT NUMBER:** 

MPFDA0916

COMPOUND:

Perfluoro-n-[1,2-13C2]decanoic acid

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub> <sup>12</sup>C<sub>8</sub>HF<sub>19</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** SOLVENT(S):

516.07

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99% 13C (1,2-13C<sub>2</sub>)

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 <sup>13</sup>C,-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

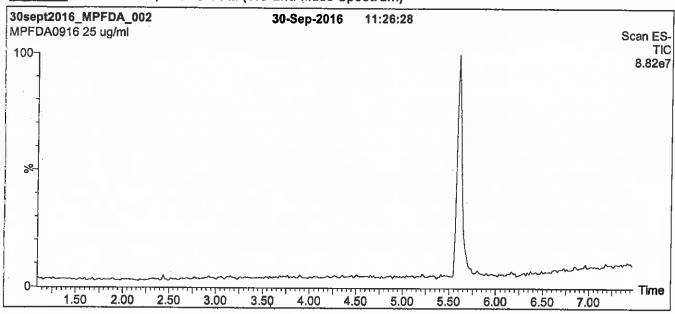
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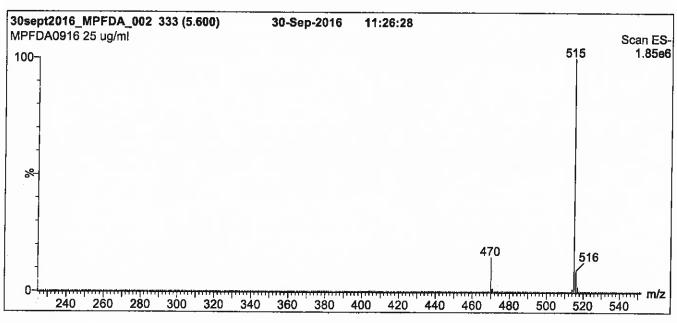




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Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)





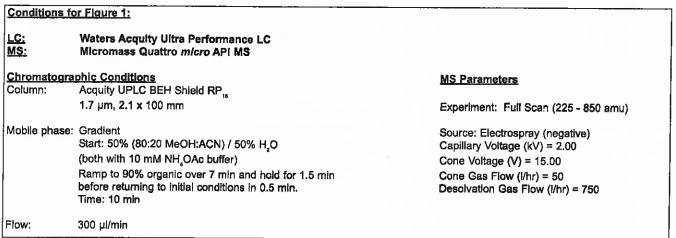
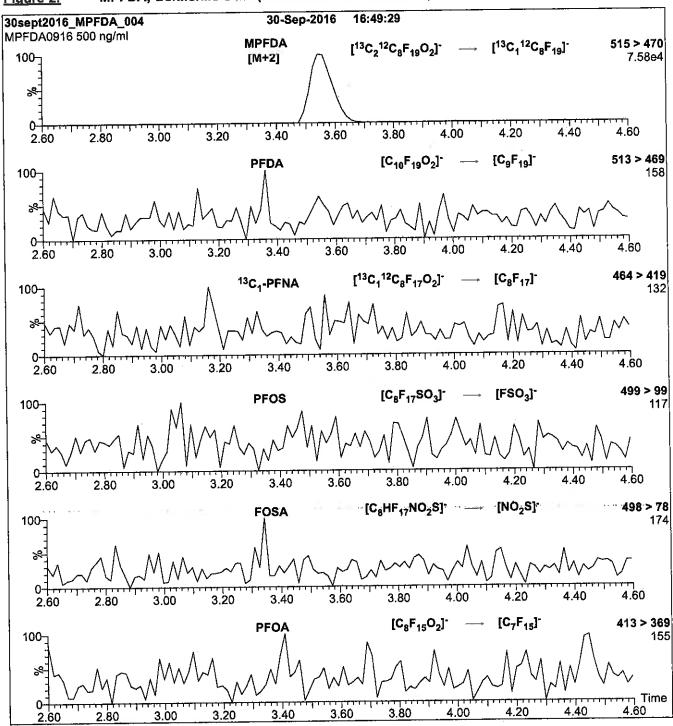
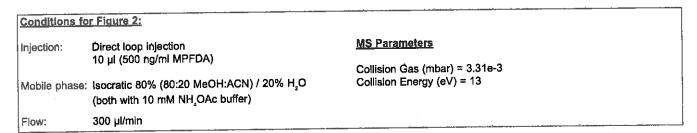


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFDoA\_00010



PRODUCT CODE:

**MPFDoA** 

LOT NUMBER:

MPFDoA0416

COMPOUND:

Perfluoro-n-[1,2-13C,]dodecanoic acid

**STRUCTURE:** 

CAS #:

Not available

MOLECULAR FORMULA:

 $^{13}C_{2}^{12}C_{10}HF_{23}O_{2}$ 

MOLECULAR WEIGHT: SOLVENT(S):

616.08

**CONCENTRATION:** 

50 ± 2.5 µg/ml

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) >99% <sup>13</sup>C

(1,2-13C<sub>a</sub>)

LAST TESTED: (mm/od/yyyy)

0.4/0.0/0

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: \_(

: <u>04/15/2016</u>

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,  $u_{x}(y)$ , 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

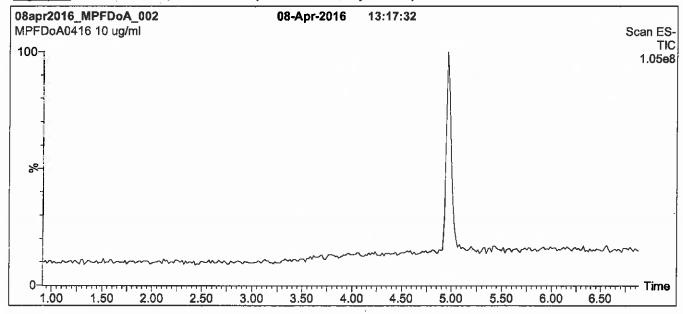
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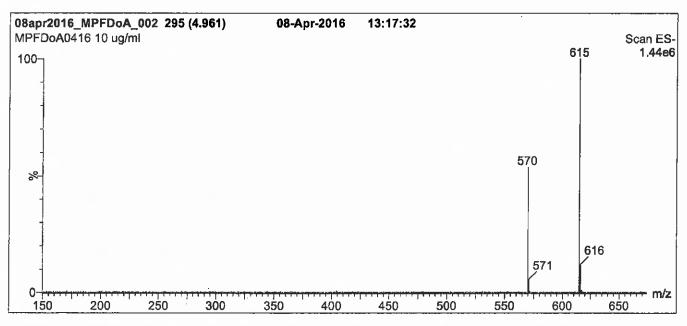




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Figure 1: MPFDoA; LC/MS Data (TIC and Mass Spectrum)





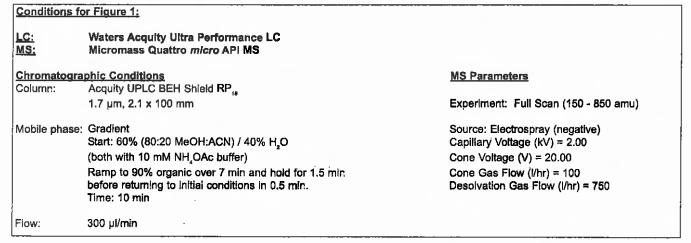
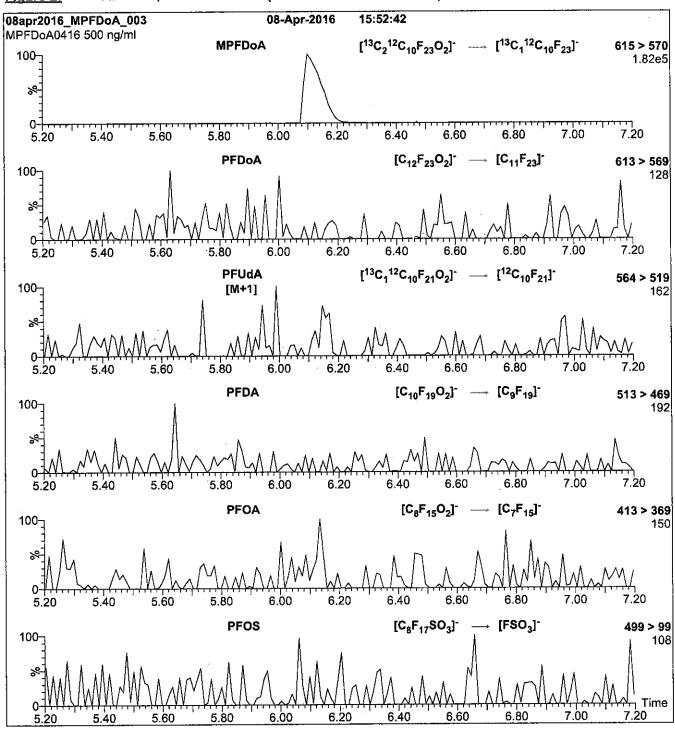
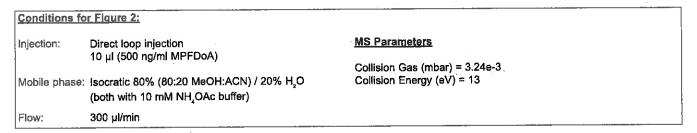


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFDoA\_00011



PRODUCT CODE:

**MPFDoA** 

**LOT NUMBER:** 

MPFDoA0517

**COMPOUND:** 

Perfluoro-n-[1,2-13C] dodecanoic acid

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub> <sup>12</sup>C<sub>10</sub>HF<sub>23</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

616.08

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

Water (<1%) ≥99% <sup>13</sup>C

(1,2-13C<sub>2</sub>)

LAST TESTED: (mm/dd/yyyy)

05/23/2017

EXPIRY DATE: (mm/dd/yyyy)

05/23/2022

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

#### **DOCUMENTATION/ DATA ATTACHED:**

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

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

#### **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

#### **HAZARDS:**

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty, u<sub>i</sub>(y), of a value y and the uncertainty of the independent parameters

$$x_1, x_2,...x_n$$
 on which it depends is: 
$$u_c(y(x_1,x_2,...x_n)) = \sqrt{\sum_{i=1}^n u(y,x_i)^2}$$

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED.WARRANTY:

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

#### QUALITY MANAGEMENT:

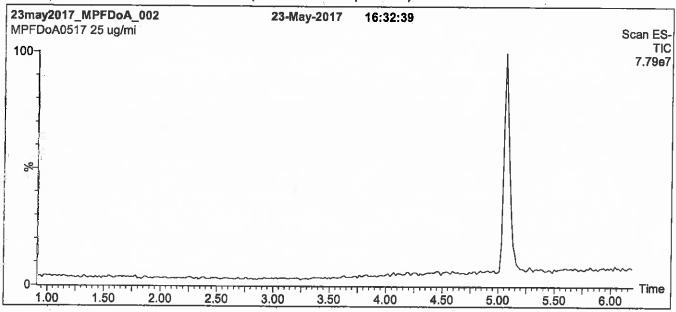
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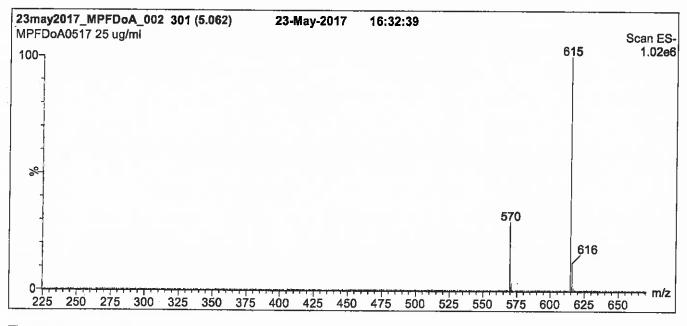




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Figure 1: MPFDoA; LC/MS Data (TIC and Mass Spectrum)





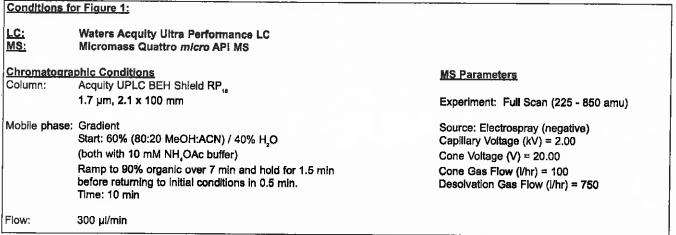
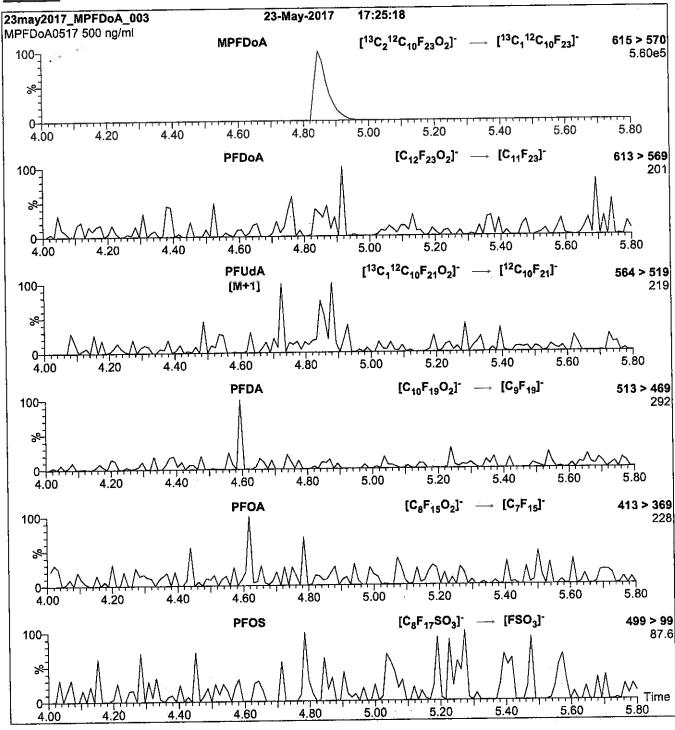
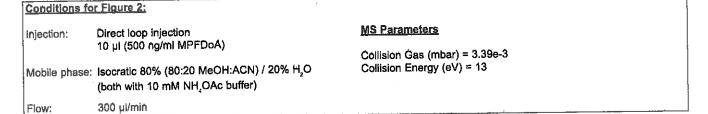


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFHxA\_00016



PRODUCT CODE:

MPFHxA

LOT NUMBER:

MPFHxA1116

**COMPOUND:** 

Perfluoro-n-[1,2-13C] hexanoic acid

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>4</sub>HF<sub>11</sub>O<sub>2</sub>

 $50 \pm 2.5 \, \mu g/ml$ 

**MOLECULAR WEIGHT:** 

316.04

**CONCENTRATION:** 

SOLVENT(S):

Methanol Water (<1%)

CHEMICAL PURITY;

>98%

**ISOTOPIC PURITY:** 

≥99%13C (1,2-13C<sub>a</sub>)

LAST TESTED: (mm/dd/yyyy)

11/22/2016

EXPIRY DATE: (mm/dd/yyw)

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-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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.

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### **TRACEABILITY:**

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

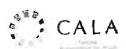
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### **LIMITED WARRANTY:**

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

#### QUALITY MANAGEMENT:

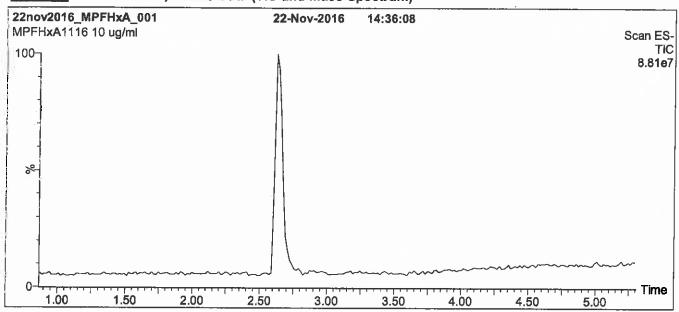
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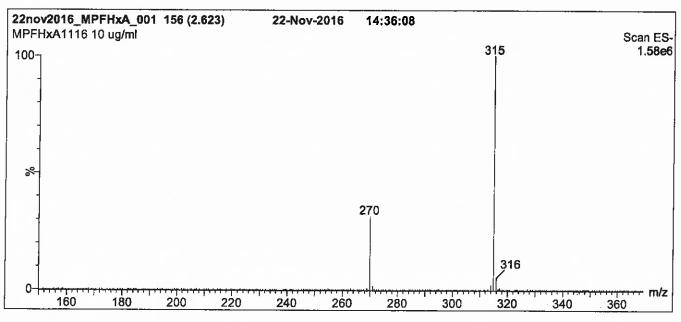




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com\*\*

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





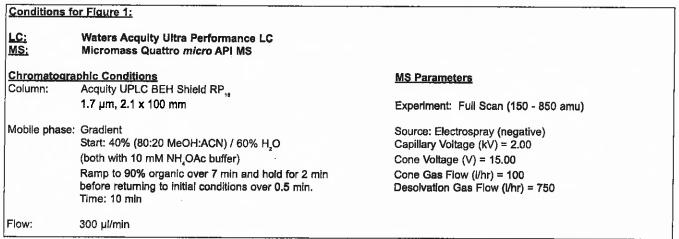
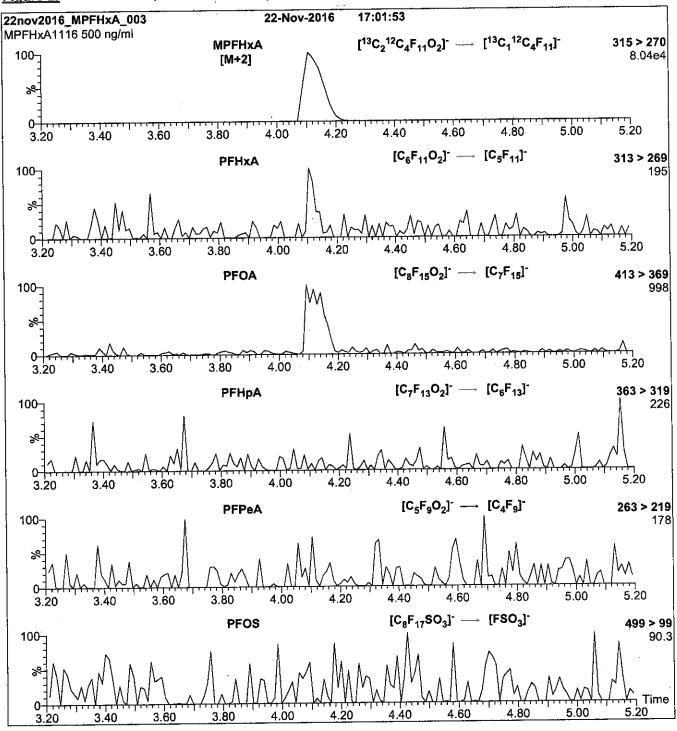
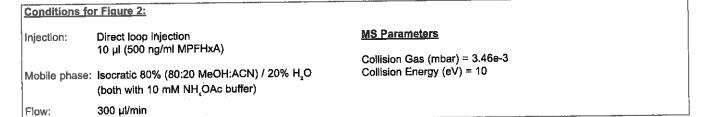


Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFHxA\_00017



PRODUCT CODE:

**MPFHxA** 

**LOT NUMBER:** 

MPFHxA1116

COMPOUND:

Perfluoro-n-[1,2-13C] hexanoic acid

**STRUCTURE:** 

CAS #:

Not available

MOLECULAR FORMULA:

<sup>13</sup>C<sub>2</sub> <sup>12</sup>C<sub>4</sub>HF<sub>11</sub>O<sub>2</sub>

MOLECULAR WEIGHT:

316.04

**CONCENTRATION:** 

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99%¹³C (1,2-¹³C。)

LAST TESTED: (mm/dd/yyyy)

11/22/2016

1/22/2010

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-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.</li>

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

\_\_\_

Date: \_

(mm/ad/y)

Page 249 of 764

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,  $u_{\nu}(y)$ , 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:

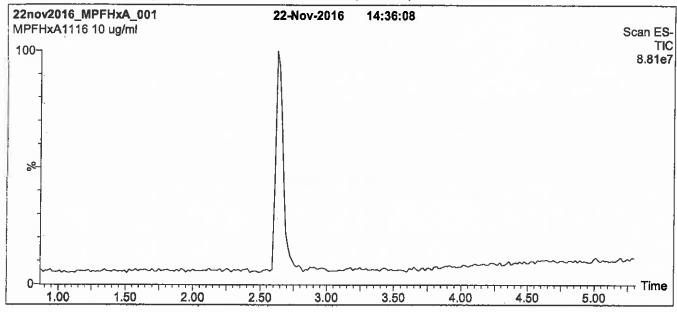
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

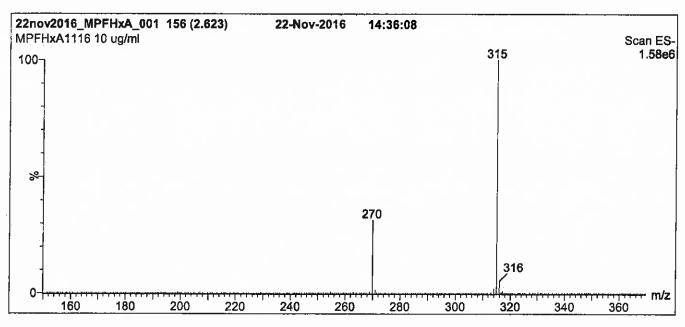




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Figure 1: MPFHxA; LC/MS Data (TIC and Mass Spectrum)





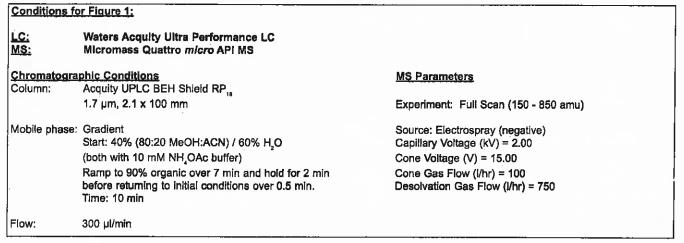
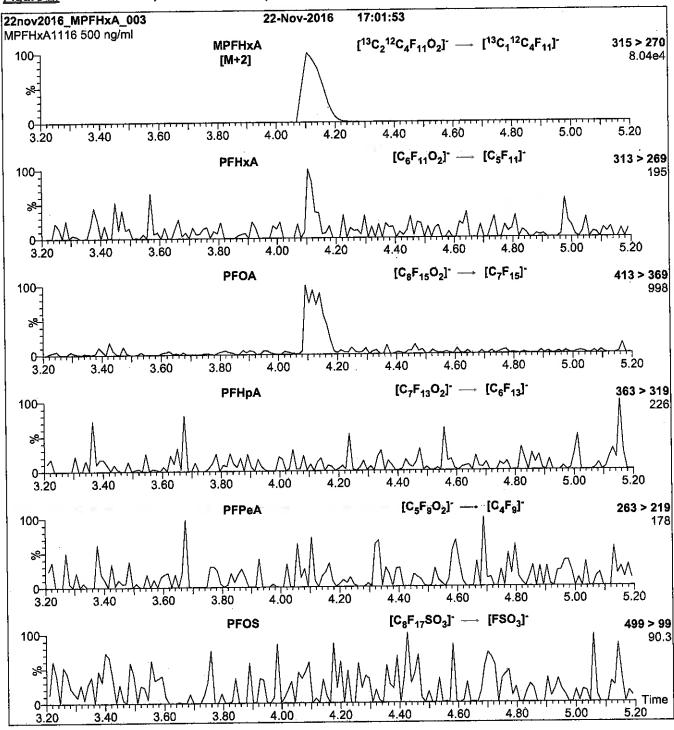
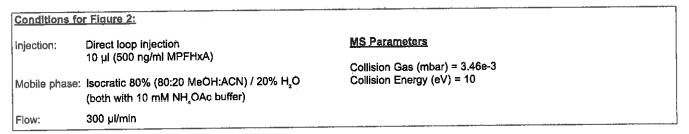


Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFHxS\_00010



PRODUCT CODE:

**MPFHxS** 

**LOT NUMBER:** 

MPFHxS0217

COMPOUND:

Sodium perfluoro-1-hexane[18O<sub>3</sub>]sulfonate

**STRUCTURE:** 

**CAS #:** 

Not available

MOLECULAR FORMULA:

C<sub>8</sub>F<sub>13</sub>S<sup>16</sup>O<sub>2</sub><sup>16</sup>ONa

**MOLECULAR WEIGHT:** 

426.10

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$  (Na sait)

SOLVENT(S):

**ISOTOPIC PURITY:** 

Methanol

>94% (<sup>11</sup>O<sub>2</sub>)

**CHEMICAL PURITY:** 

>98%

02/17/2017

LAST TESTED: (mm/dd/yyyy) EXPIRY DATE; (mm/dd/yyyy)

02/17/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.3 \pm 2.4 \mu g/ml$  (MPFHxS anion)

## **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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<sub>8</sub>F<sub>13</sub>S<sup>18</sup>O<sub>2</sub><sup>16</sup>O<sup>-</sup>) has been observed to be up to 10% lower than for PFHxS (C<sub>s</sub>F<sub>13</sub>S<sup>16</sup>O<sub>3</sub>) when both compounds are injected together. This difference may vary between instruments.

Contains ~ 1.0% of sodium perfluoro-1-octane[18O2]sulfonate (18O2-PFOS).

Due to the isotopic purity of the starting material (18O<sub>2</sub> >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:

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 tume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

#### SYNTHESIS / CHARACTERIZATION:

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#### **HOMOGENEITY:**

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#### **UNCERTAINTY:**

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

$$x_i, \ x_2, ... x_n$$
 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

## **EXPIRY DATE / PERIOD OF VALIDITY:**

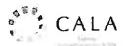
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

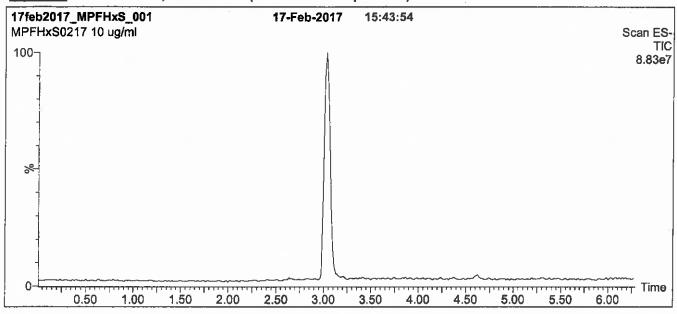
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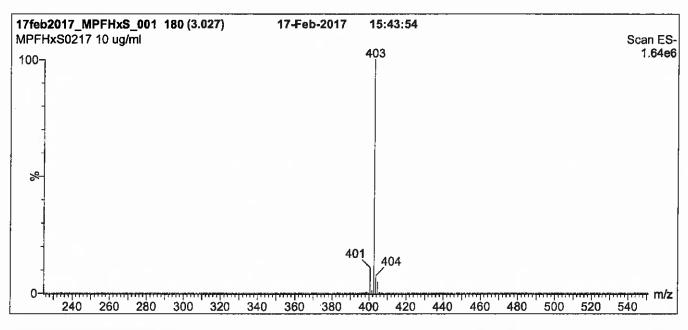




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Figure 1: MPFHxS; LC/MS Data (TIC and Mass Spectrum)





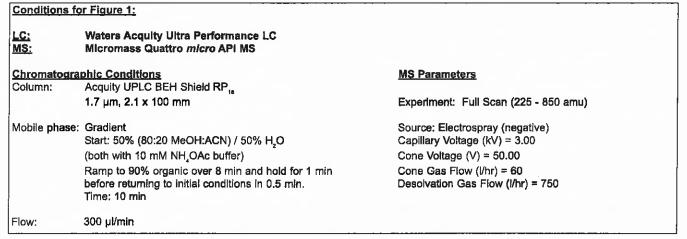
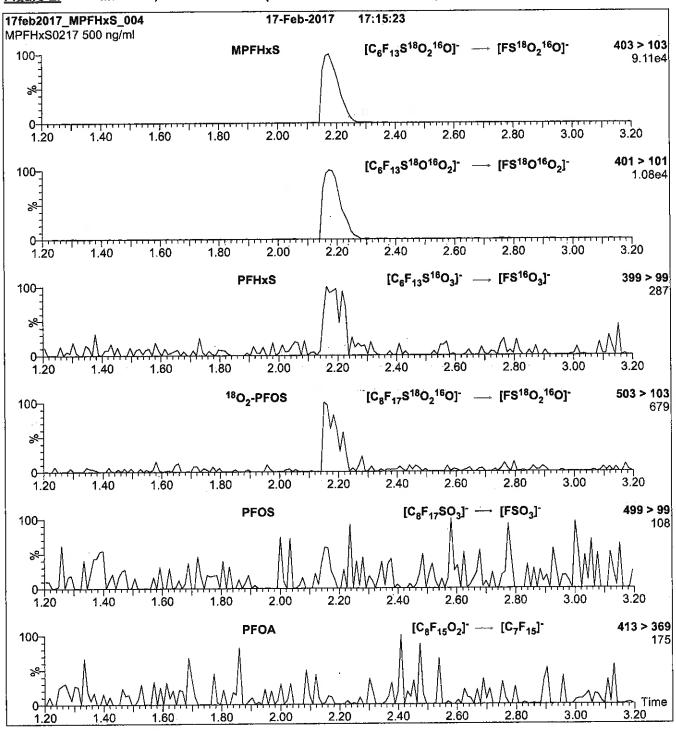


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH OAc buffer)

Flow:

300 µl/min

## MS Parameters

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

# LCMPFHxS\_00011



PRODUCT CODE:

**MPFHxS** 

**LOT NUMBER:** 

MPFHxS0217

**COMPOUND:** 

Sodium perfluoro-1-hexane[18O,]sulfonate

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA: CONCENTRATION:** 

C<sub>6</sub>F<sub>13</sub>S<sup>18</sup>O<sub>2</sub><sup>16</sup>ONa  $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

**MOLECULAR WEIGHT:** SOLVENT(S):

**ISOTOPIC PURITY:** 

426.10

>94% (18O<sub>2</sub>)

 $47.3 \pm 2.4 \mu g/ml$  (MPFHxS anion)

Methanol

CHEMICAL PURITY:

>98%

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 ( $C_{_{0}}F_{_{13}}S^{16}O_{_{2}}^{\phantom{16}}O$ ) has been observed to be up to 10% lower than for PFHxS (C<sub>5</sub>F<sub>13</sub>S<sup>16</sup>O<sub>3</sub>) when both compounds are injected together. This difference may vary between instruments.

Contains ~ 1.0% of sodium perfluoro-1-octane[ $^{16}O_2$ ]sulfonate ( $^{16}O_2$ -PFOS).

Due to the isotopic purity of the starting material (18O2 >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

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

## TRACEABILITY:

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

## EXPIRY DATE / PERIOD OF VALIDITY:

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

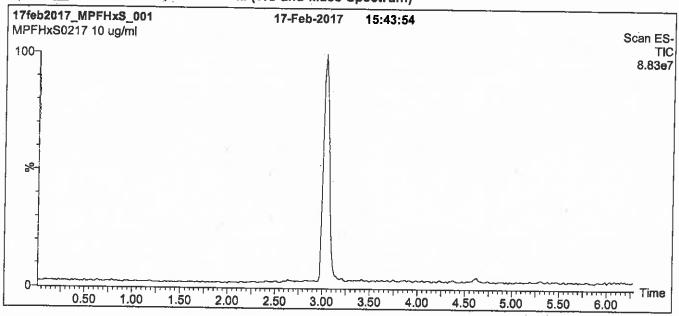
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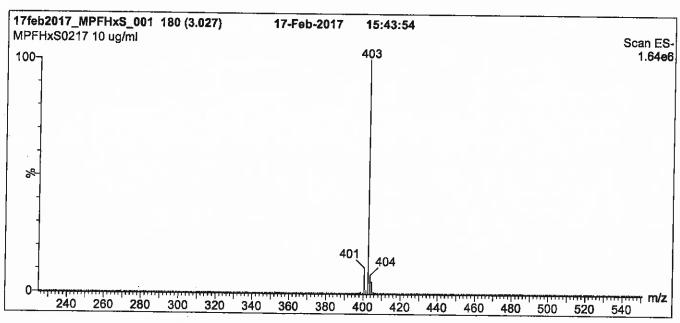




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Figure 1: MPFHxS; LC/MS Data (TIC and Mass Spectrum)





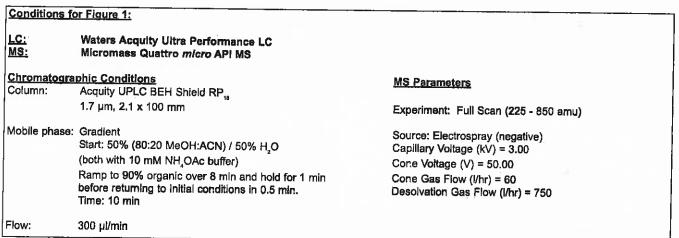
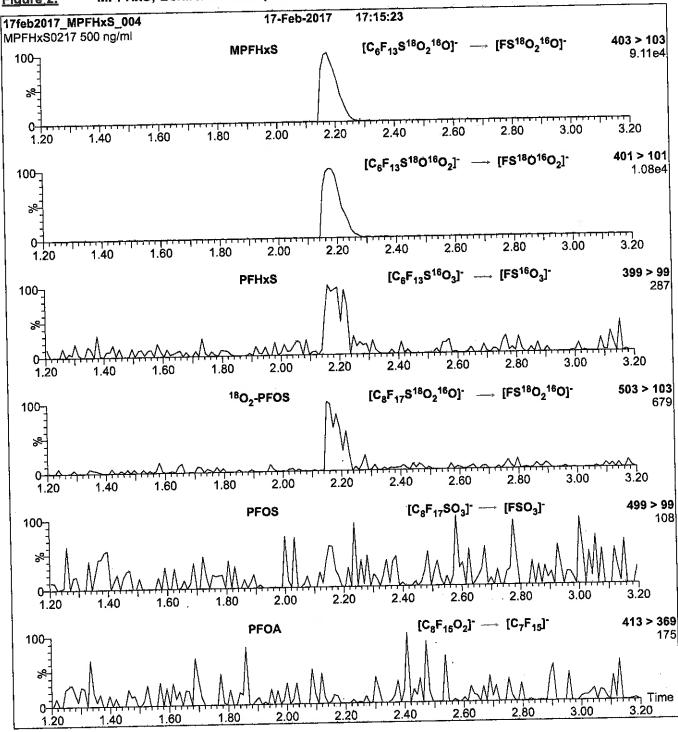
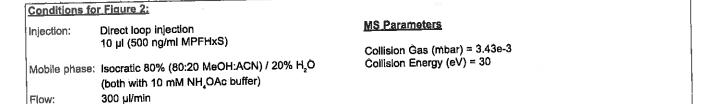


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFNA\_00010



PRODUCT CODE:

**MPFNA** 

**LOT NUMBER:** 

**MPFNA0916** 

COMPOUND:

Perfluoro-n-[1,2,3,4,5-13C<sub>s</sub>]nonanoic acid

**CAS #:** 

Not available

STRUCTURE:

MOLECULAR FORMULA: CONCENTRATION:

<sup>13</sup>C<sub>5</sub><sup>12</sup>C<sub>4</sub>HF<sub>17</sub>O<sub>2</sub>

50 ± 2.5 µg/ml

**MOLECULAR WEIGHT:** 

SOLVENT(S):

469.04

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

**ISOTOPIC PURITY:** 

≥99%<sup>13</sup>C (1,2,3,4,5-<sup>13</sup>C<sub>e</sub>)

**DOCUMENTATION/ DATA ATTACHED:** 

Figure 1: 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: <u>10/1</u>1

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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#### **UNCERTAINTY:**

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#### **QUALITY MANAGEMENT:**

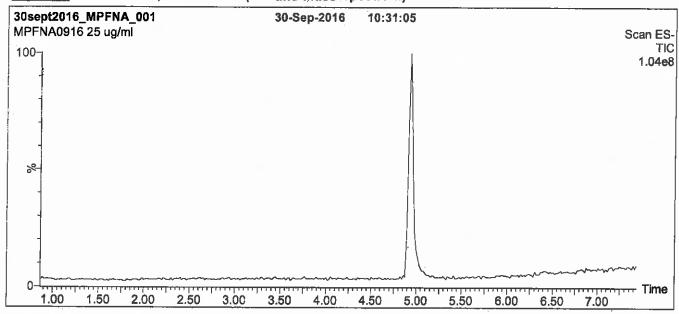
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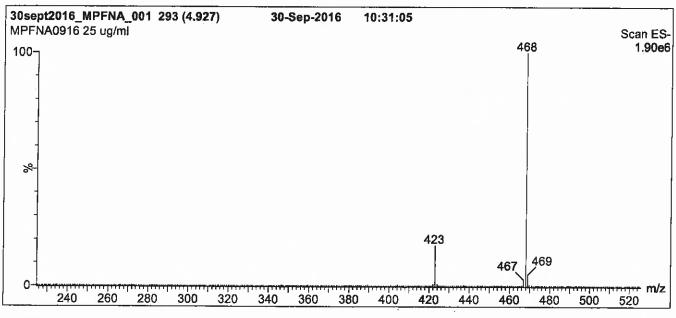




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:lnfo@well-labs.com">lnfo@well-labs.com</a>\*\*

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





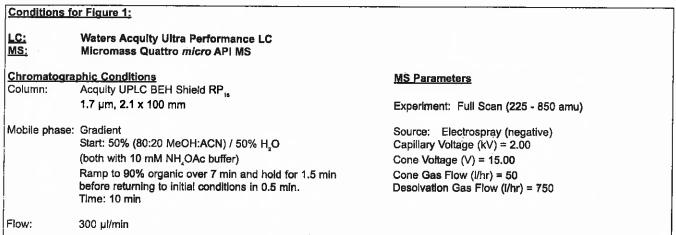
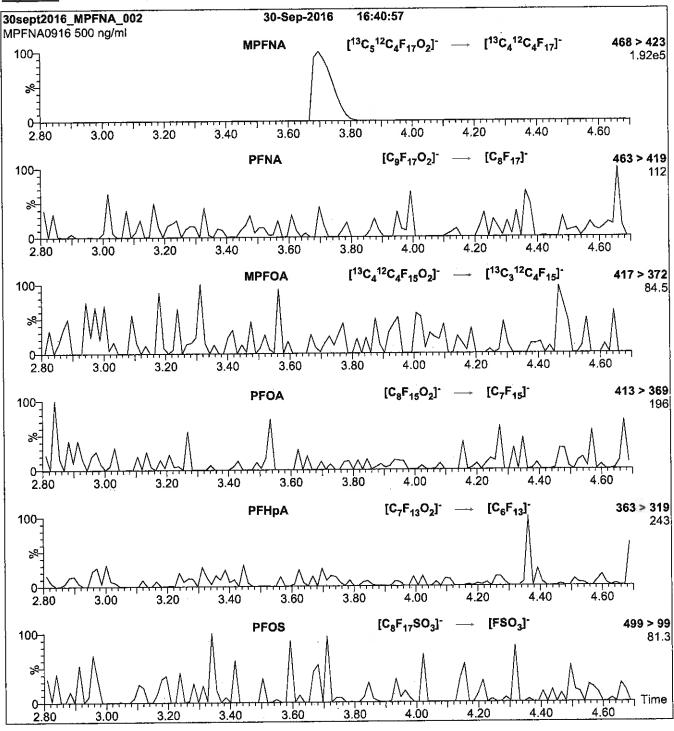
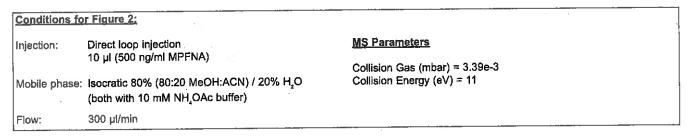


Figure 2: MPFNA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFNA\_00011



PRODUCT CODE:

**MPFNA** 

**LOT NUMBER:** 

MPFNA0916

**COMPOUND:** 

Perfluoro-n-[1,2,3,4,5-13C]nonanoic acid

CAS #:

Not available

STRUCTURE:

**MOLECULAR FORMULA:** 

13C, 12C, HF,,O,

**MOLECULAR WEIGHT:** 

SOLVENT(S):

469.04

50 ± 2.5 µg/ml

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>98%

**ISOTOPIC PURITY:** 

≥99%13C  $(1,2,3,4,5^{-13}C_{5})$ 

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

### **DOCUMENTATION/ DATA ATTACHED:**

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

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

## **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/11/2016

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:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

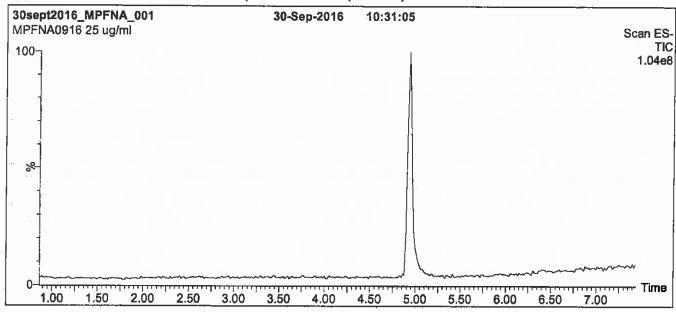
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA, A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

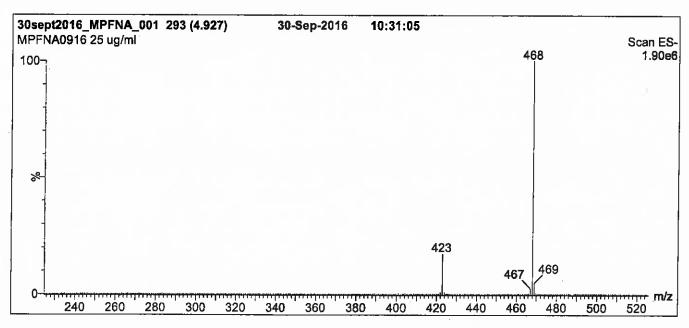




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Figure 1: MPFNA; LC/MS Data (TIC and Mass Spectrum)





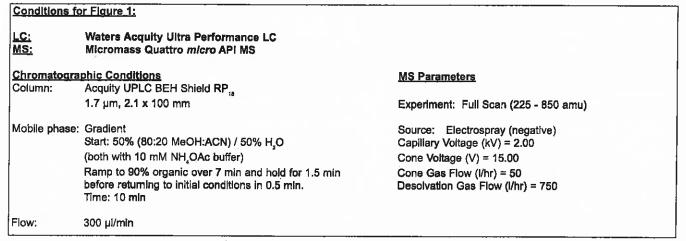
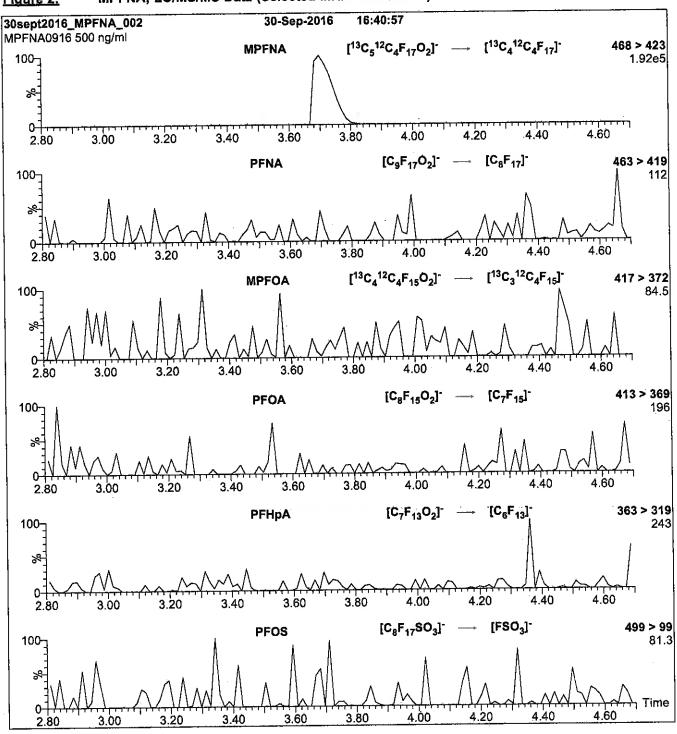
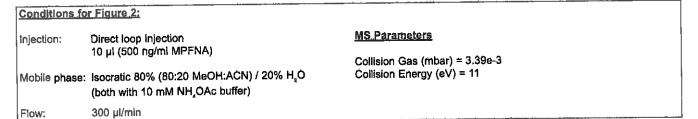


Figure 2: MPFNA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFOA 00014



**PRODUCT CODE:** 

**MPFOA** 

**LOT NUMBER:** 

MPFOA0417

COMPOUND:

Perfluoro-n-[1,2,3,4-13C] octanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

<sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>4</sub>HF<sub>15</sub>O<sub>2</sub>

MOLECULAR WEIGHT:

418.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

Water (<1%) ≥99% ¹³C

 $(1,2,3,4^{-13}C_{\lambda})$ 

LAST TESTED: (mm/dd/yyyy)

- 00 /0

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:

B.G. Chittim, General Manager

Date:

04/28/2017

(mm/dd/yyy

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

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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The combined relative standard uncertainty, u(y), of a value y and the uncertainty of the independent parameters

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

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

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

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

#### **TRACEABILITY:**

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

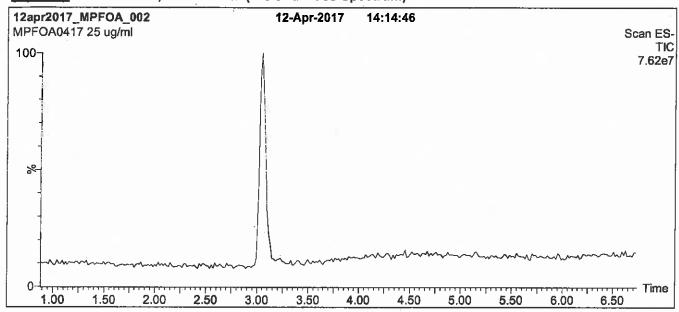
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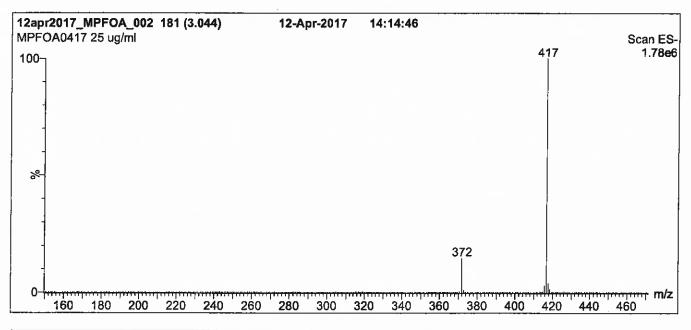




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





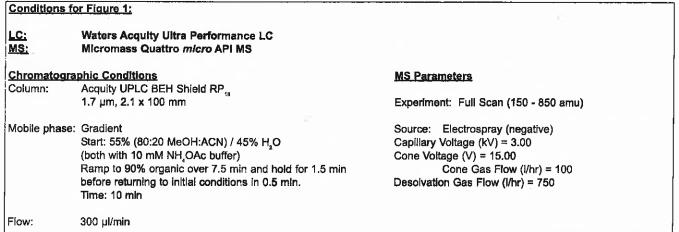
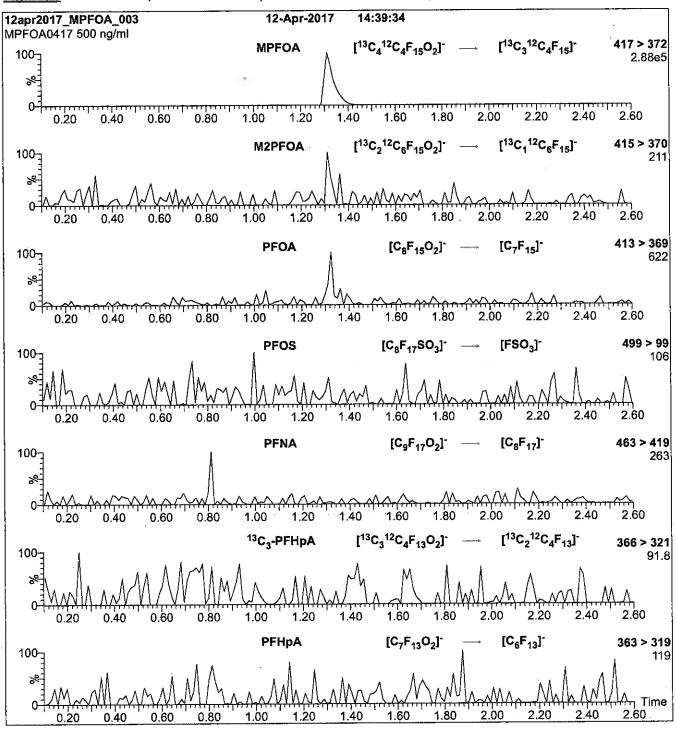
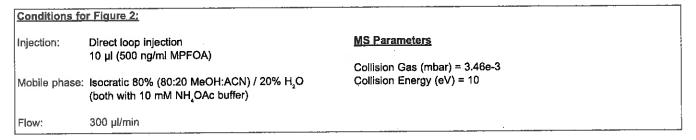


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFOA\_00015



PRODUCT CODE:

**MPFOA** 

**LOT NUMBER:** 

MPFOA0417

**COMPOUND:** 

Perfluoro-n-[1,2,3,4-13C] octanoic acid

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

13C, 12C, HF, O,

**MOLECULAR WEIGHT:** 

418.04

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

**SOLVENT(S):** 

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

>99% 13C

LAST TESTED: (mm/dd/yyyy)

04/12/2017

(1,2,3,4-13C<sub>4</sub>)

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

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

#### **HAZARDS:**

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#### **SYNTHESIS / CHARACTERIZATION:**

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

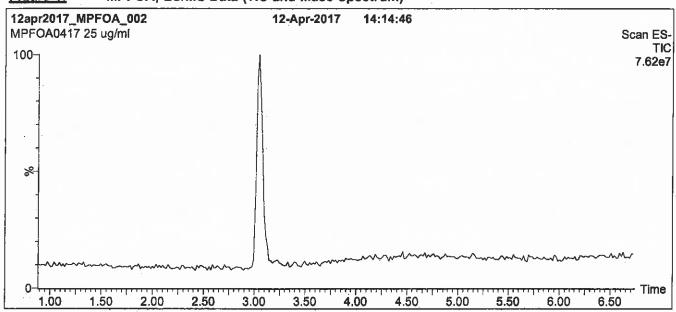
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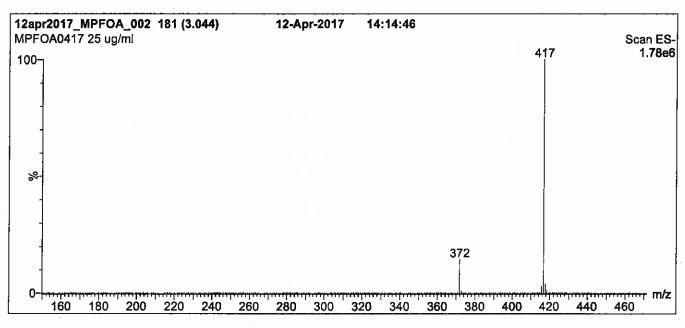




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





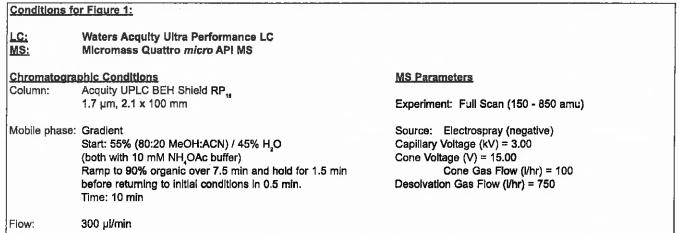
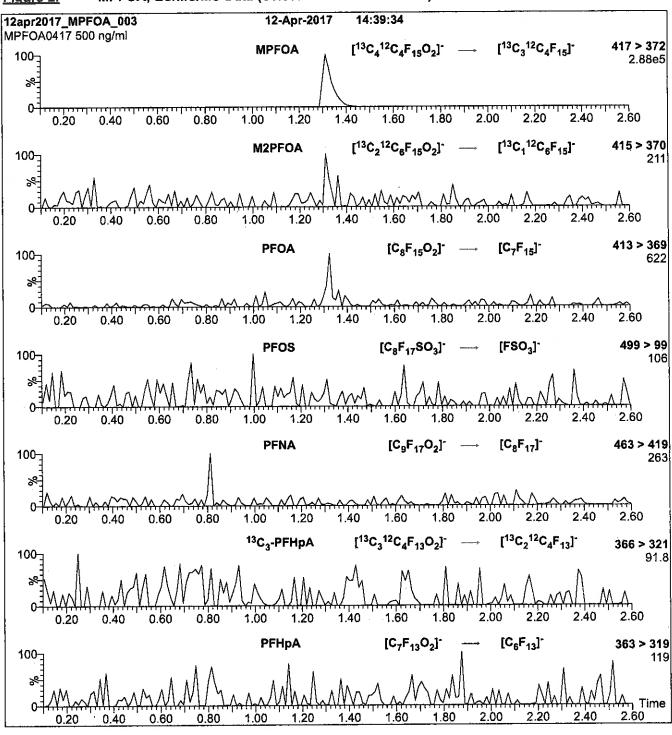
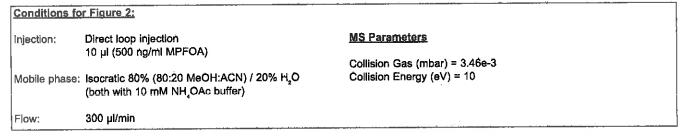


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFOS\_00022



PRODUCT CODE:

**MPFOS** 

LOT NUMBER:

**MPFOS1216** 

COMPOUND:

Sodium perfluoro-1-[1,2,3,4-13C<sub>4</sub>]octanesulfonate

STRUCTURE:

CAS #:

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>4</sub>F<sub>4</sub>,SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

526.08

**CONCENTRATION:** 

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99% <sup>13</sup>C

(1,2,3,4-13C<sub>4</sub>)

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

 $47.8 \pm 2.4 \mu g/ml$  (MPFOS anion)

# **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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-[1,2,3-13C]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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#### **QUALITY MANAGEMENT:**

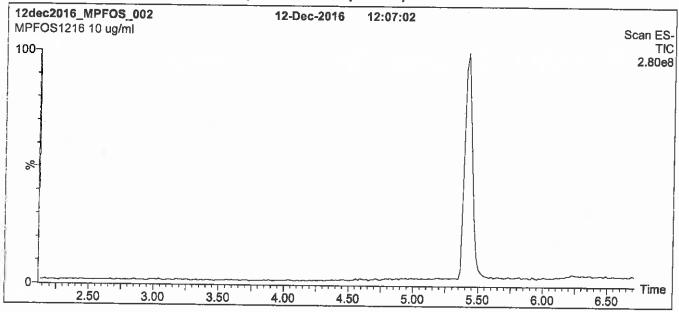
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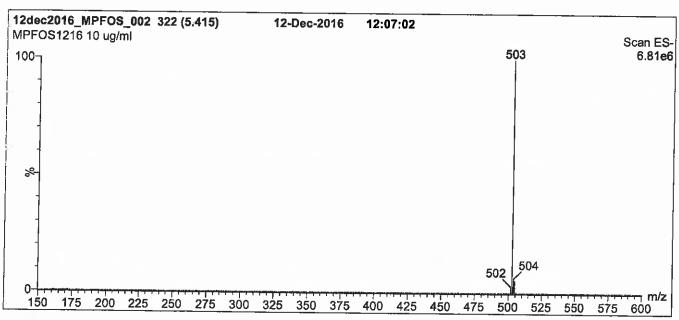


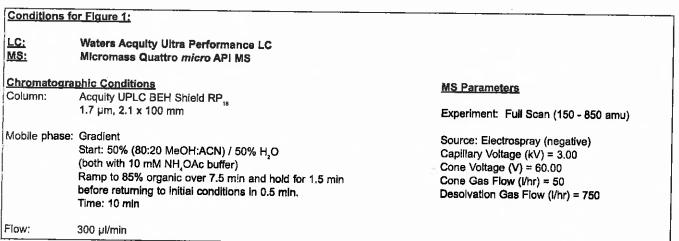


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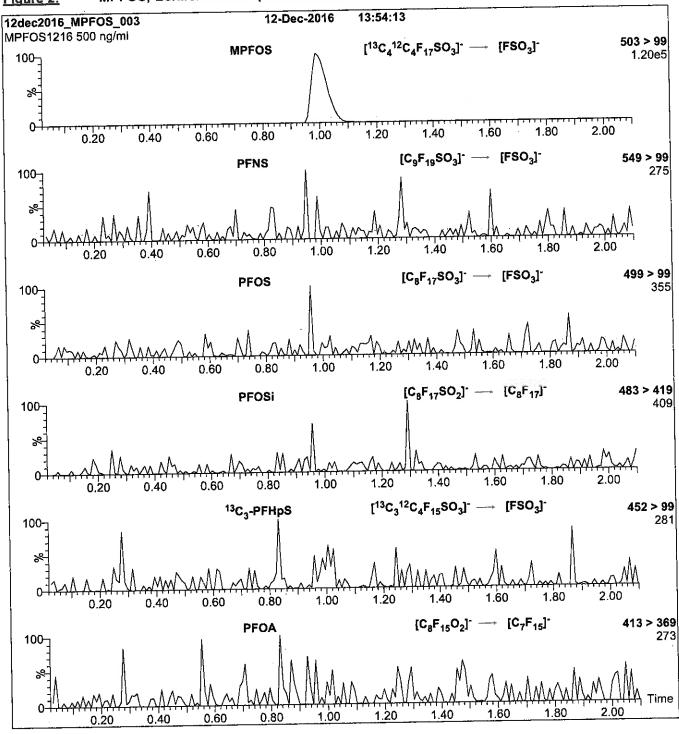


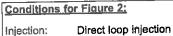






MPFOS; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





10 µl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

#### **MS Parameters**

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

Flow:

300 µl/min

# LCMPFOS\_00023



**PRODUCT CODE:** 

**MPFOS** 

LOT NUMBER:

MPFOS0517

**COMPOUND:** 

Sodium perfiuoro-1-[1,2,3,4-13C,]octanesulfonate

**STRUCTURE:** 

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

<sup>13</sup>C<sub>4</sub> <sup>12</sup>C<sub>4</sub>F<sub>4</sub>,SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

526.08

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu\text{g/mi}$  (Na sait)

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

>99% 13C

(1,2,3,4-13C<sub>4</sub>)

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

 $47.8 \pm 2.4 \mu g/ml$  (MPFOS anion)

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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-[1,2,3-13C,]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date: <u>05/30/2017</u>

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

#### **HAZARDS:**

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_1, x_2,...x_n$$
 on which it depends is: 
$$u_c(y(x_1,x_2,...x_n)) = \sqrt{\sum_{i=1}^n u(y,x_i)^2}$$

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

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

#### TRACEABILITY:

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

#### EXPIRY DATE / PERIOD OF VALIDITY:

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

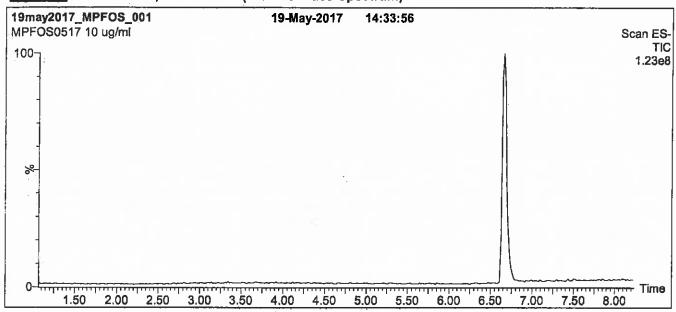
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

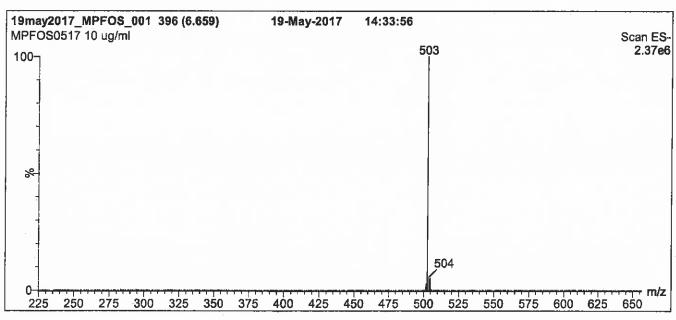




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Figure 1: MPFOS; LC/MS Data (TIC and Mass Spectrum)





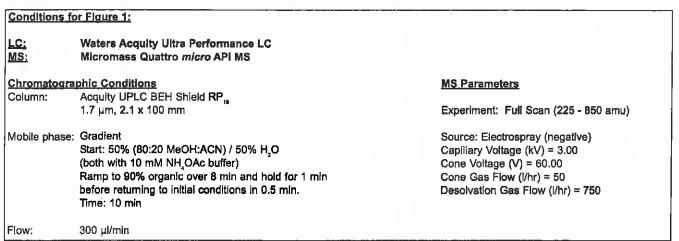
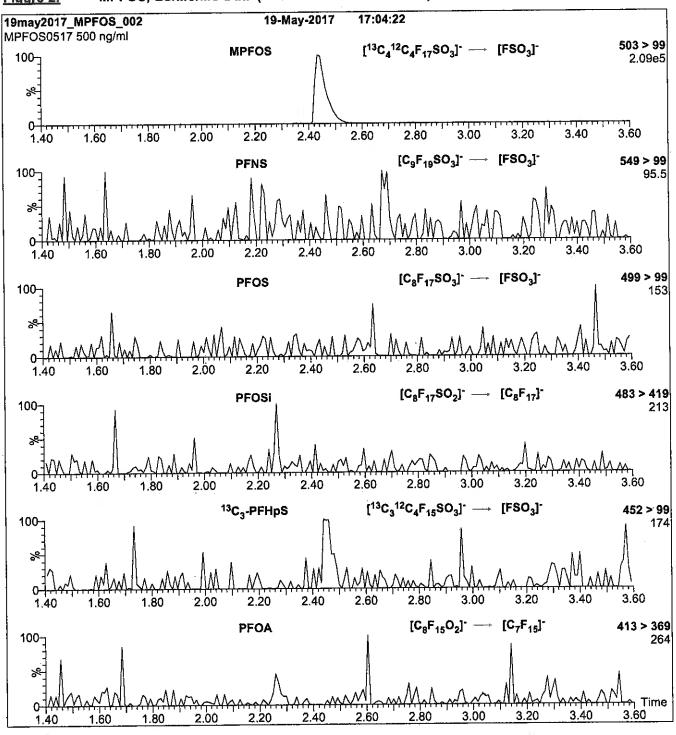
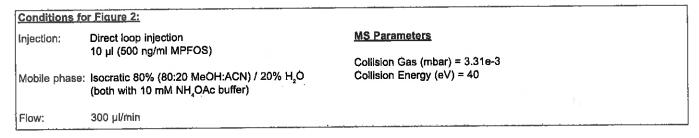


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFUdA\_00011



**PRODUCT CODE:** 

**MPFUdA** 

LOT NUMBER:

MPFUdA1116

COMPOUND:

Perfluoro-n-[1,2-13C]undecanoic acid

STRUCTURE:

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

 $^{13}C_{_{2}}^{_{12}}C_{_{9}}HF_{_{21}}O_{_{2}}$ 

**MOLECULAR WEIGHT:** 

566.08

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

ISOTOPIC PURITY:

≥99% <sup>13</sup>C (1,2-<sup>13</sup>C<sub>2</sub>)

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 1-13C<sub>1</sub>-PFUdA (~1%; see Figure 2), 2-13C<sub>1</sub>-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the 13C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chiltim

Date: 12/07/2016

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

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.

#### **UNCERTAINTY**;

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

The combined relative standard uncertainty,  $u_x(y)$ , of a value y and the uncertainty of the independent parameters

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

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

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

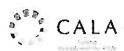
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

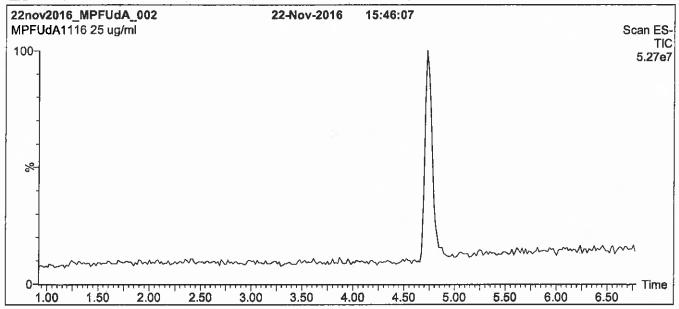
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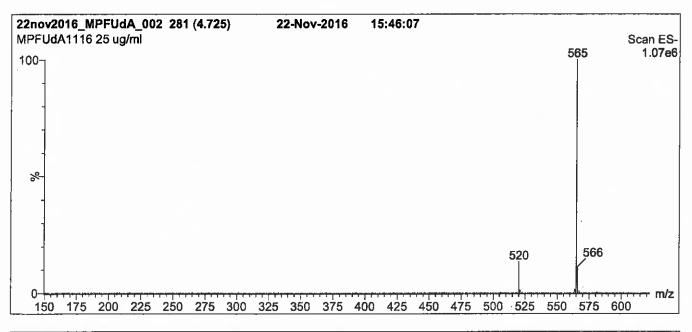




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Figure 1: MPFUdA; LC/MS Data (TIC and Mass Spectrum)





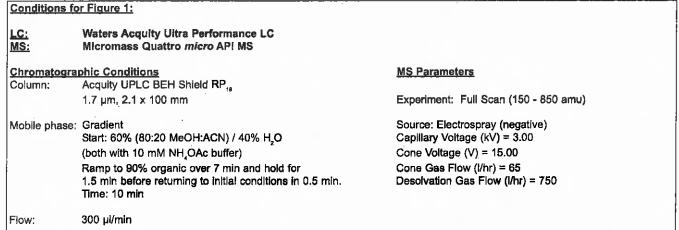
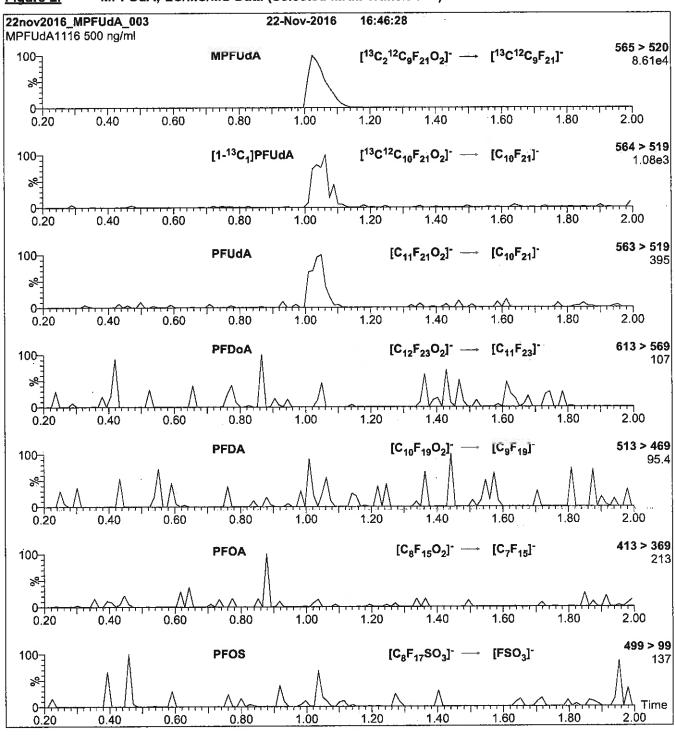
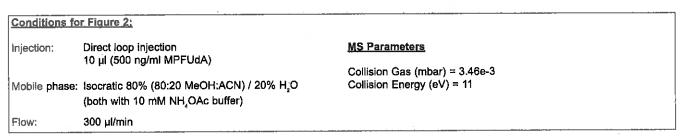


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





# LCMPFUdA\_00012



PRODUCT CODE:

MPFUdA

LOT NUMBER:

MPFUdA1116

**COMPOUND:** 

Perfluoro-n-[1,2-13C<sub>3</sub>]undecanoic acid

STRUCTURE:

CAS #:

Not available

F - C - C - 13

**MOLECULAR FORMULA:** 

13C212C8HE31O3

MOLECULAR WEIGHT:

566.08

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/m!$ 

SOLVENT(S):

Methanol

**CHEMICAL PURITY:** 

>98%

**ISOTOPIC PURITY:** 

≥99% 13C (1,2-13C<sub>2</sub>)

Water (<1%)

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 1-13C,-PFUdA (~1%; see Figure 2), 2-13C,-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the <sup>13</sup>C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

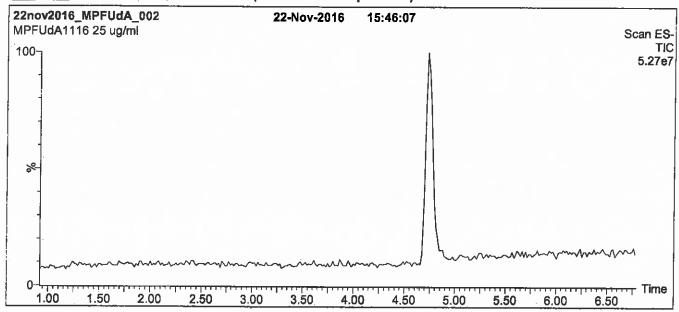
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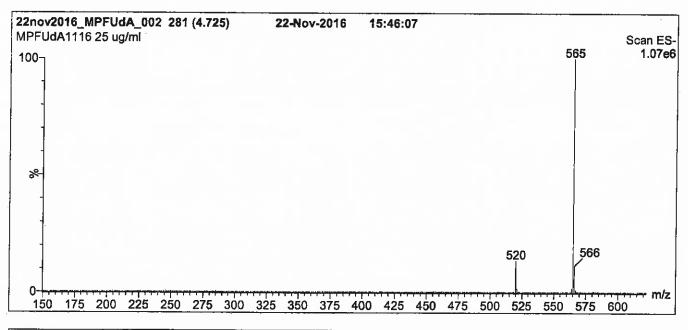




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Figure 1: MPFUdA; LC/MS Data (TIC and Mass Spectrum)





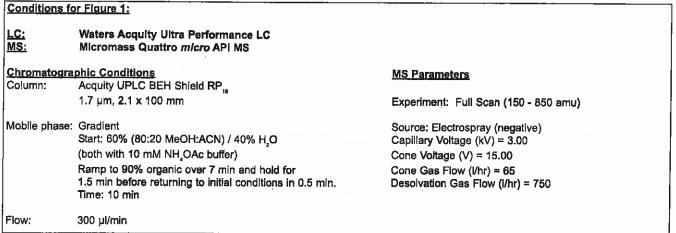
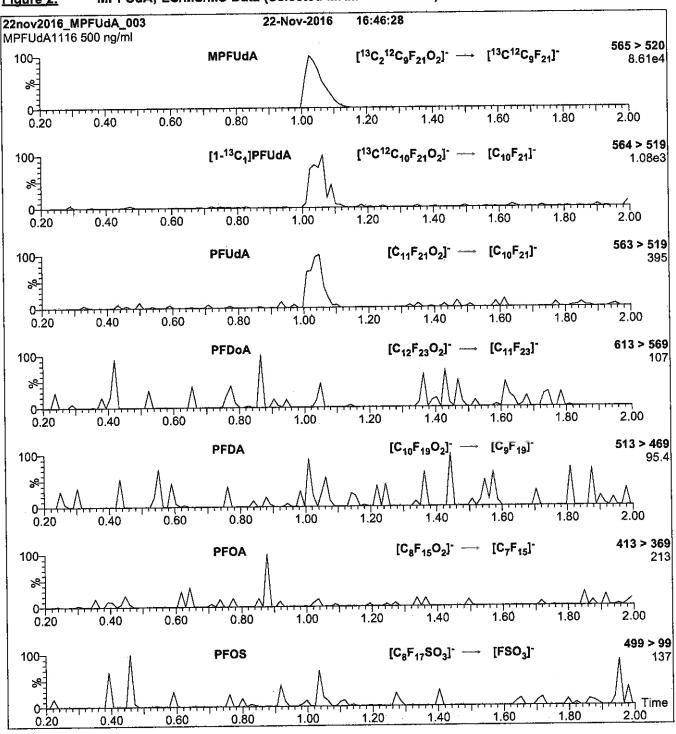
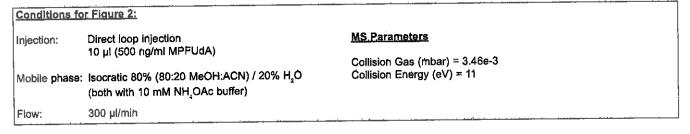


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





# LCN-EtFOSA-M\_00004



PRODUCT CODE:

N-EtFOSA-M

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

NEtFOSA0516M

527.20

Methanol

**COMPOUND:** 

N-ethylperfluoro-1-octanesulfonamide

**CAS #:** 

4151-50-2

STRUCTURE:

**MOLECULAR FORMULA:** 

C,H,F,NO2S

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

**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:

Date: 05/27/2016

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

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SYNTHESIS / CHARACTERIZATION:

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**HOMOGENEITY:** 

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**EXPIRY DATE / PERIOD OF VALIDITY:** 

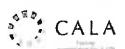
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**LIMITED WARRANTY:** 

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**QUALITY MANAGEMENT:** 

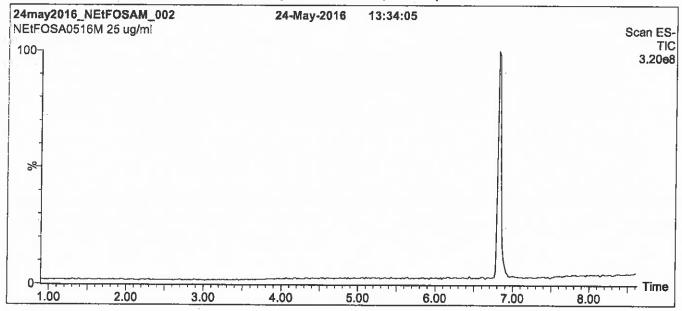
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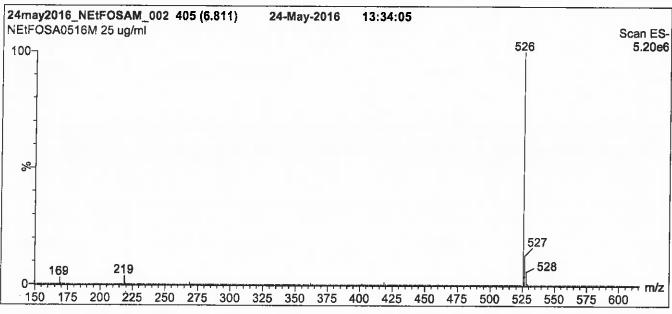


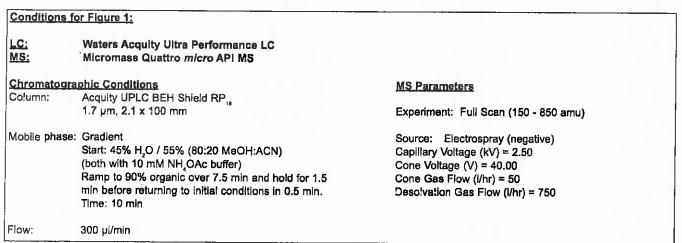


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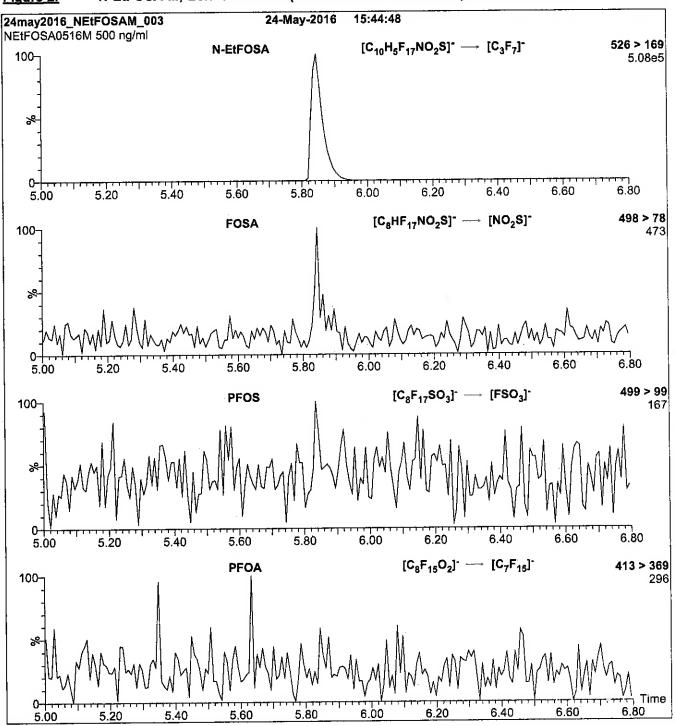
Figure 1: N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)

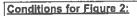






N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>o</sub>O

(both with 10 mM NH OAc buffer)

Flow: 300 µl/min

#### MS Parameters

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

# LCN-EtFOSA-M\_00005



PRODUCT CODE:

N-EtFOSA-M

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

NEtFOSA0516M

527.20

Methanol

**COMPOUND:** 

N-ethylperfluoro-1-octanesulfonamide

STRUCTURE:

**CAS #:** 

4151-50-2

**MOLECULAR FORMULA:** 

C,H,F,NO2S

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

**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:

Date: 05/27/2016

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

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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

**EXPIRY DATE / PERIOD OF VALIDITY:** 

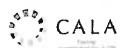
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:** 

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

**QUALITY MANAGEMENT:** 

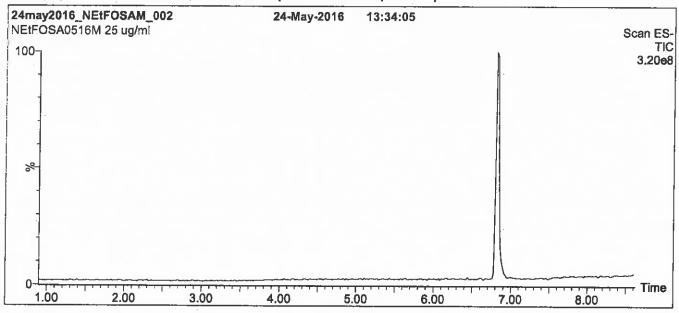
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

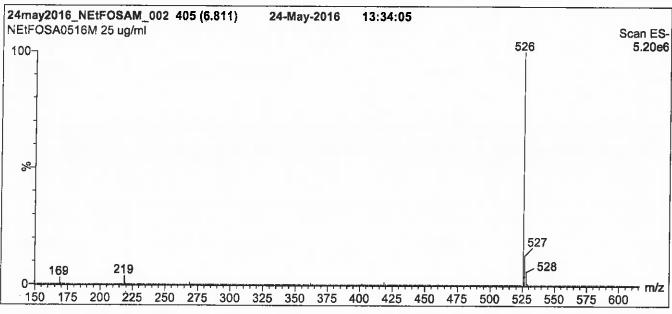




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





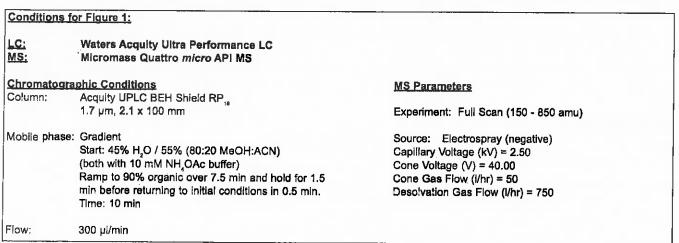
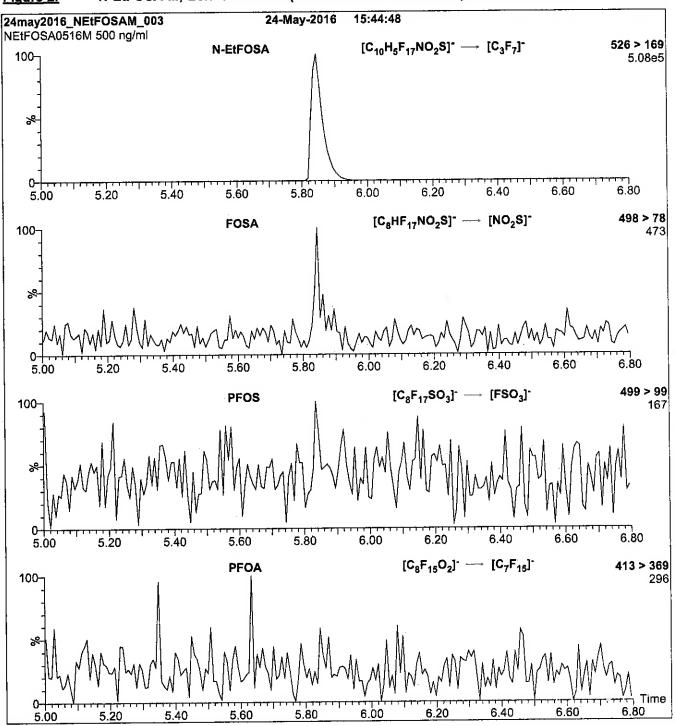
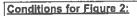


Figure 2: N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH OAc buffer)

Flow:

300  $\mu$ l/min

#### MS Parameters

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

# LCN-EtFOSAA\_00002





PRODUCT CODE:

N-EtFOSAA

**LOT NUMBER:** 

NEtFOSAA0116

**COMPOUND:** 

N-ethylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE:

CAS #:

2991-50-6

**MOLECULAR FORMULA:** 

C<sub>12</sub>H<sub>8</sub>F<sub>17</sub>NO<sub>4</sub>S

**MOLECULAR WEIGHT:** 

585.23

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

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 molety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

#### **HAZARDS**;

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

#### **SYNTHESIS / CHARACTERIZATION:**

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

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

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

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

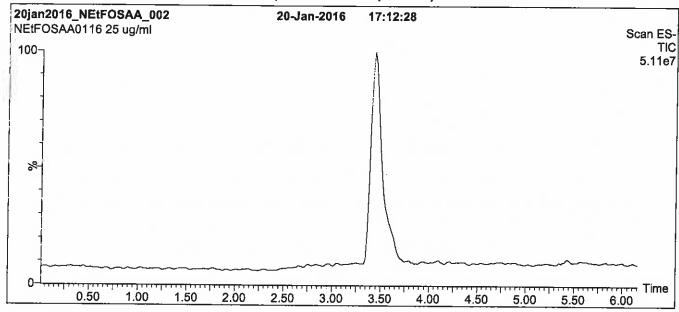
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

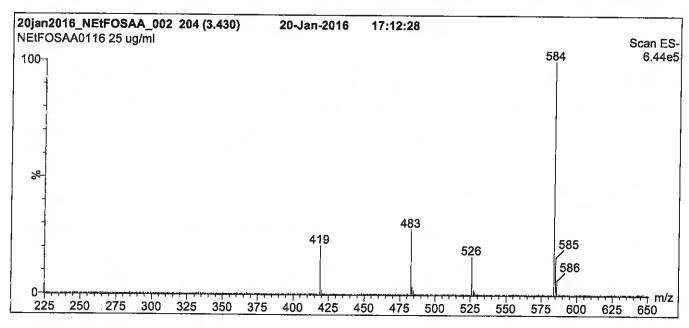


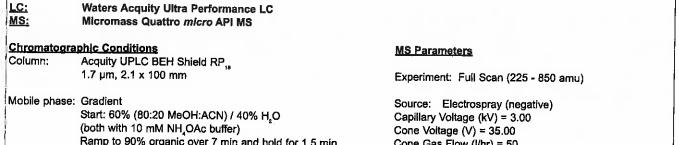


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Figure 1: N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)







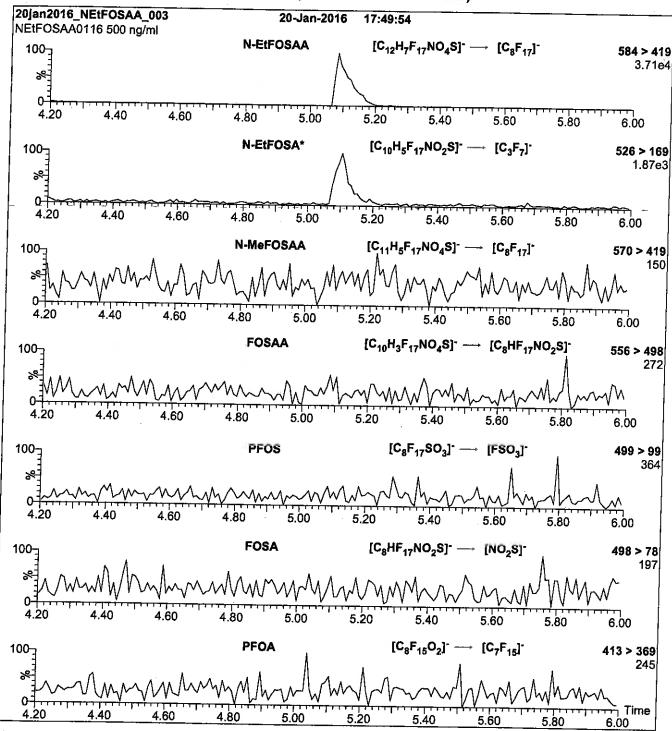
Ramp to 90% organic over 7 min and hold for 1.5 min Cone Gas Flow (l/hr) = 50 before returning to initial conditions in 0.5 min. Desolvation Gas Flow (I/hr) = 750 Time: 10 min

300 µl/min

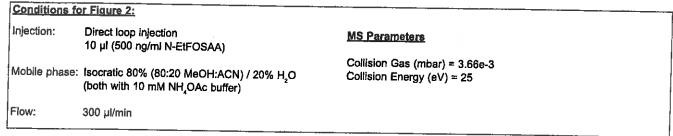
Flow:

Conditions for Figure 1:

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



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



# LCN-EtFOSAA\_00004



**PRODUCT CODE:** 

N-EtFOSAA

**LOT NUMBER:** 

NEtFOSAA0916

COMPOUND:

N-ethylperfluoro-1-octanesulfonamidoacetic acid

**STRUCTURE:** 

CAS #:

2991-50-6

**MOLECULAR FORMULA:** 

C<sub>12</sub>H<sub>8</sub>F<sub>17</sub>NO<sub>4</sub>S

**MOLECULAR WEIGHT:** 

585.23

**CONCENTRATION:** 

 $50 \pm 2.5 \mu g/m!$ 

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:

P.C. Christian

Date: 10/07/2016

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:**

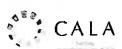
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

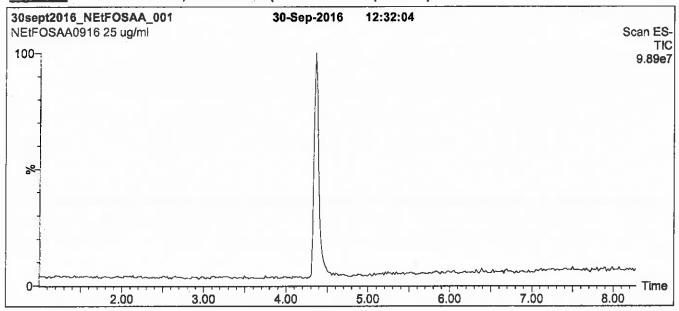
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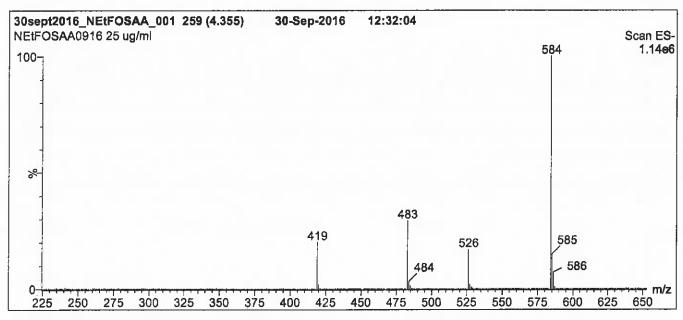




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Figure 1: N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)





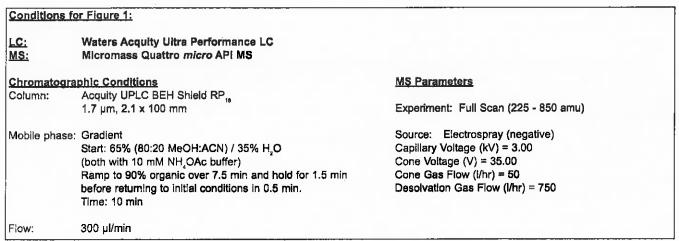
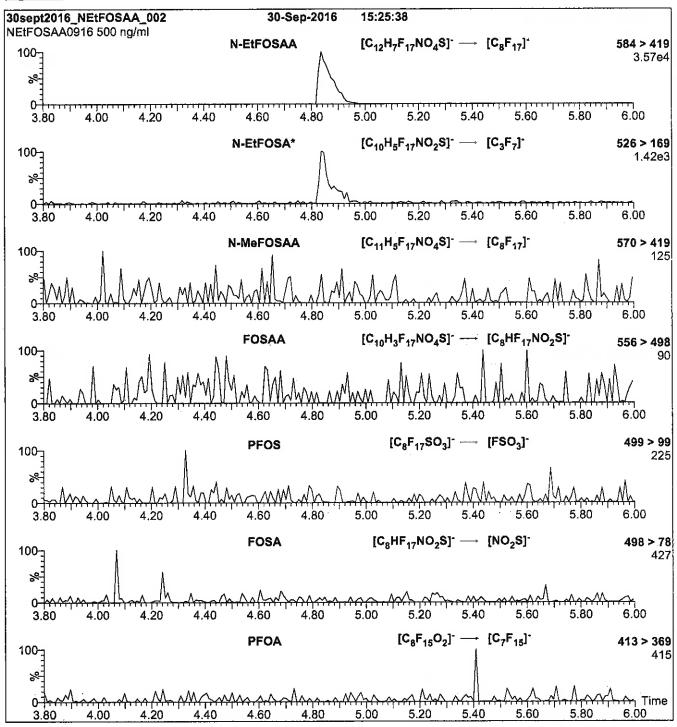
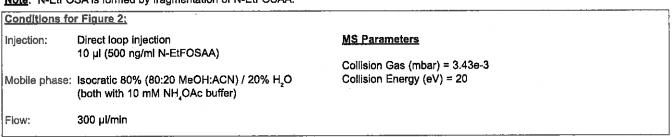


Figure 2: N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)



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



# LCN-MeFOSA-M\_00003



### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

N-MeFOSA-M

N-methylperfluoro-1-octanesulfonamide

**LOT NUMBER:** 

NMeFOSA0516M

STRUCTURE:

**COMPOUND:** 

CAS #:

31506-32-8

**MOLECULAR FORMULA:** 

C<sub>8</sub>H<sub>4</sub>F<sub>17</sub>NO<sub>2</sub>S

**CONCENTRATION:** 

50 ± 2.5 µg/ml

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

05/24/2016

EXPIRY DATE: (mm/dd/ywy)

05/24/2021

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 

513.17

SOLVENT(S):

Methanol

#### **DOCUMENTATION/ DATA ATTACHED:**

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

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

#### **ADDITIONAL INFORMATION:**

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 05/26/2016

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:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

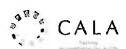
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### 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:**

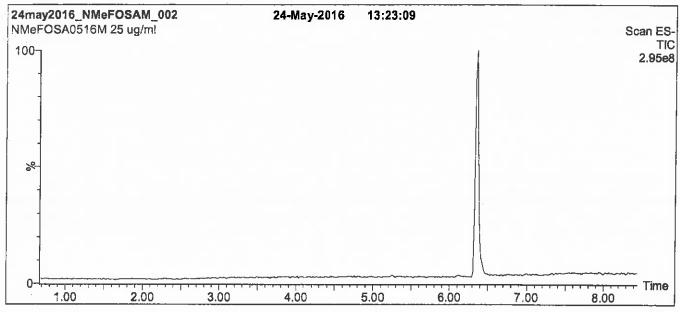
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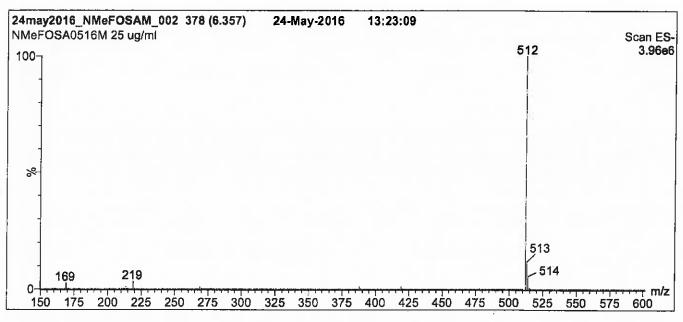


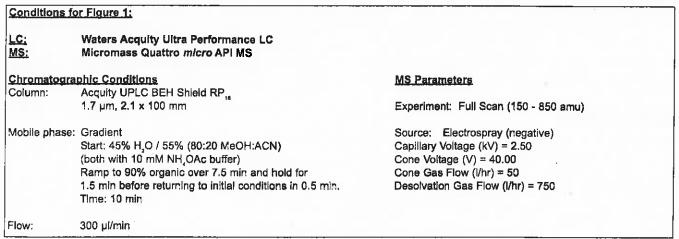


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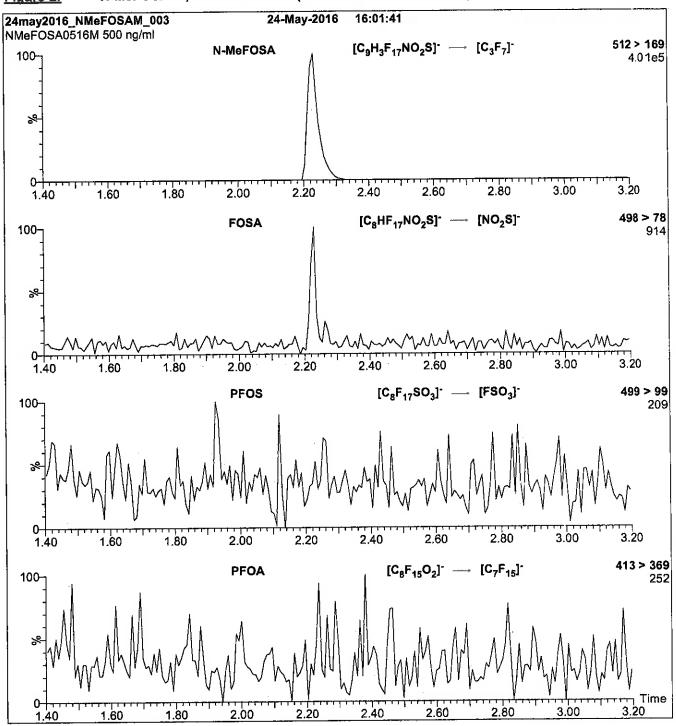


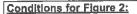






N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

#### MS Parameters

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

# LCN-MeFOSA-M\_00004



### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

N-MeFOSA-M

N-methylperfluoro-1-octanesulfonamide

**LOT NUMBER:** 

NMeFOSA0516M

STRUCTURE:

**COMPOUND:** 

CAS #:

31506-32-8

**MOLECULAR FORMULA:** C<sub>8</sub>H<sub>4</sub>F<sub>17</sub>NO<sub>2</sub>S **CONCENTRATION:** 50 ± 2.5 µg/ml

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy) EXPIRY DATE: (mm/dd/ywy)

05/24/2016 05/24/2021

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 

513.17

SOLVENT(S):

Methanol

#### **DOCUMENTATION/ DATA ATTACHED:**

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

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

#### **ADDITIONAL INFORMATION:**

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 05/26/2016

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,  $u_i(y)$ , 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:**

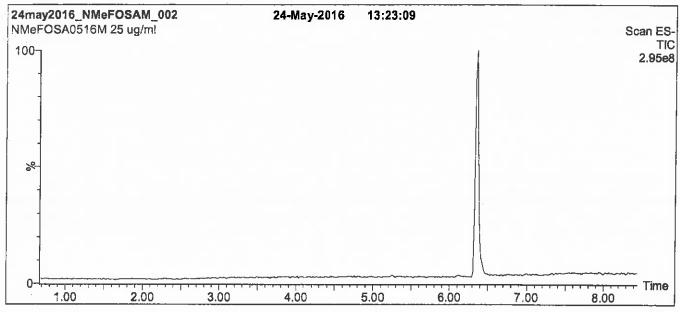
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

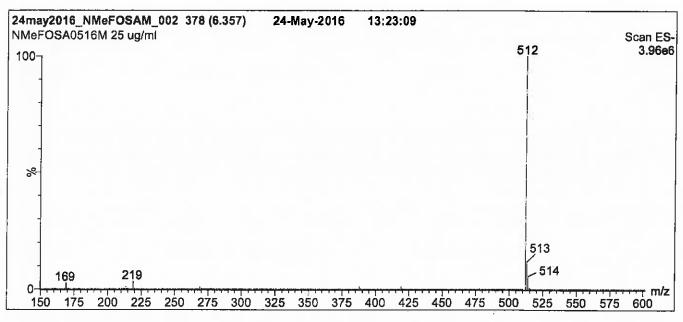


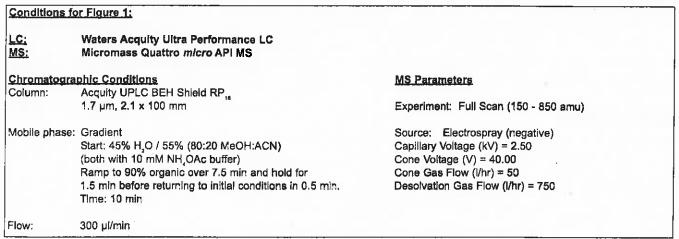


\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

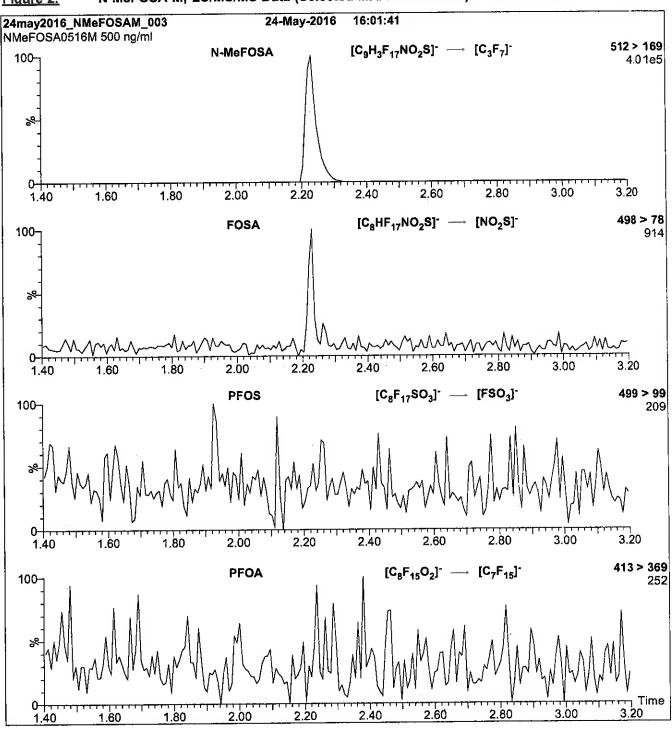


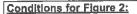






N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

#### MS Parameters

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

300 µl/min

# LCN-MeFOSAA\_00003



ID: LCN-MeFOSAA\_00003 Exp: 01/20/21 Prpd: SBC N-MeFOSAA



### **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<sub>11</sub>H<sub>6</sub>F<sub>17</sub>NO<sub>4</sub>S

**MOLECULAR WEIGHT:** 

571.21

**CONCENTRATION:** 

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyv)

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 01/21/2016

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

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.

#### **UNCERTAINTY:**

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The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

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

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

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

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

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

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

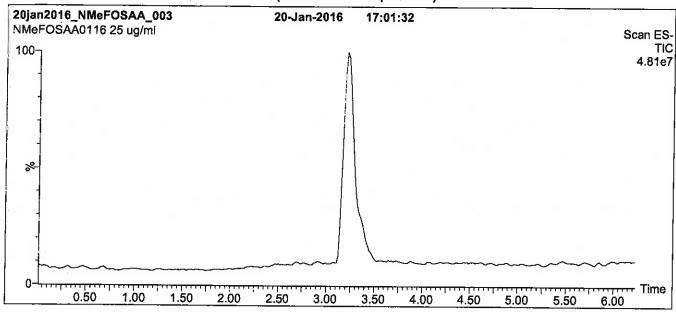


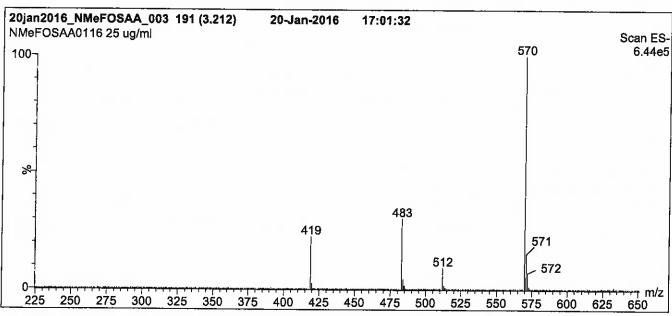


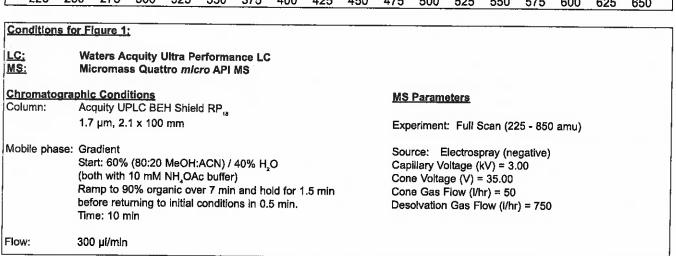
\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="mailto:www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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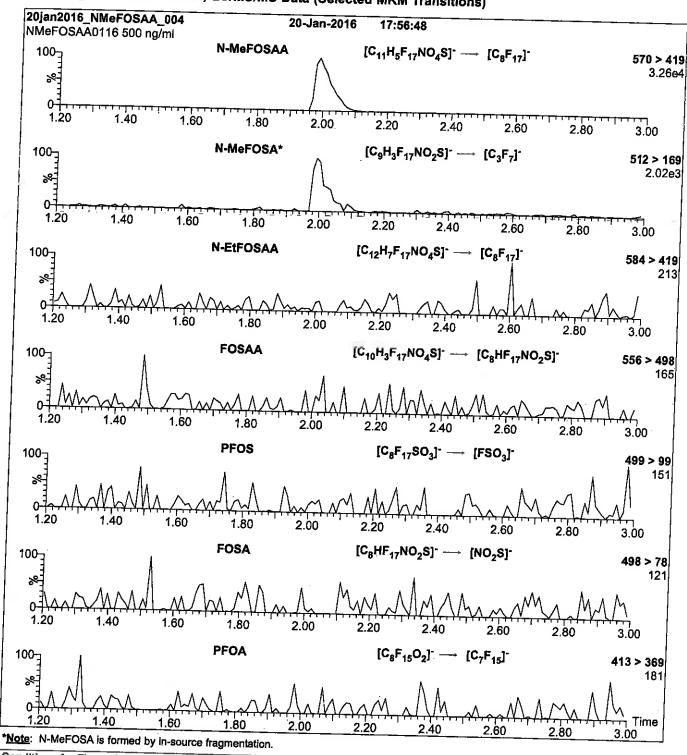
Figure 1: N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)







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





Injection:

Direct loop injection

10 µl (500 ng/ml N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H.O.

(both with 10 mM NH OAc buffer)

Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 25

**MS Parameters** 

Flow:

300 µi/min

# LCN-MeFOSAA\_00004



### 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,H,F,,NO,S

**MOLECULAR WEIGHT:** 

571.21

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

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:

Date: 10/25/2016

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

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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**EXPIRY DATE / PERIOD OF VALIDITY:** 

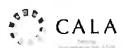
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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**QUALITY MANAGEMENT:** 

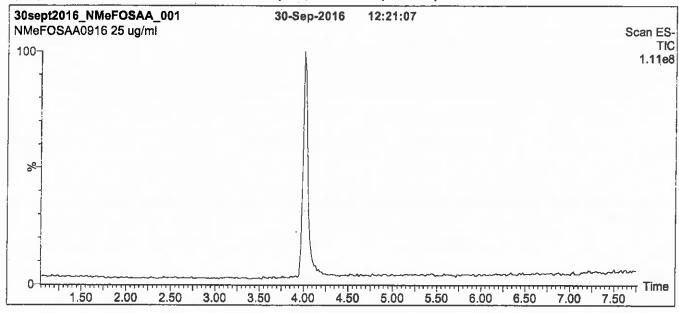
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA, A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

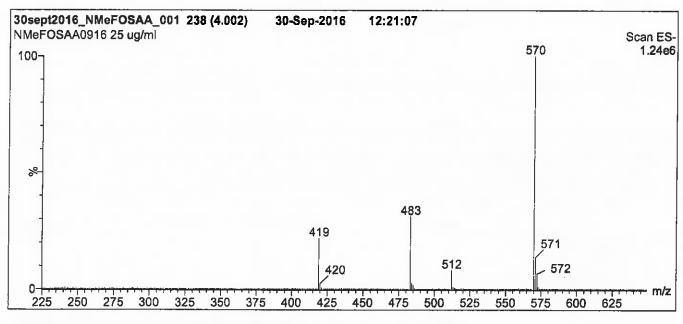




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





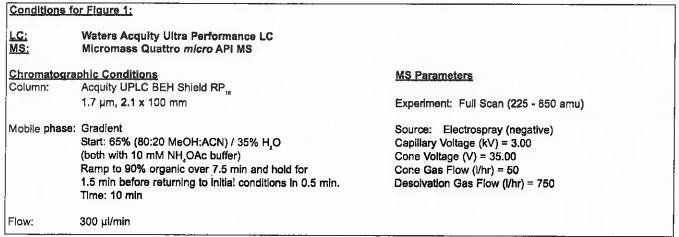
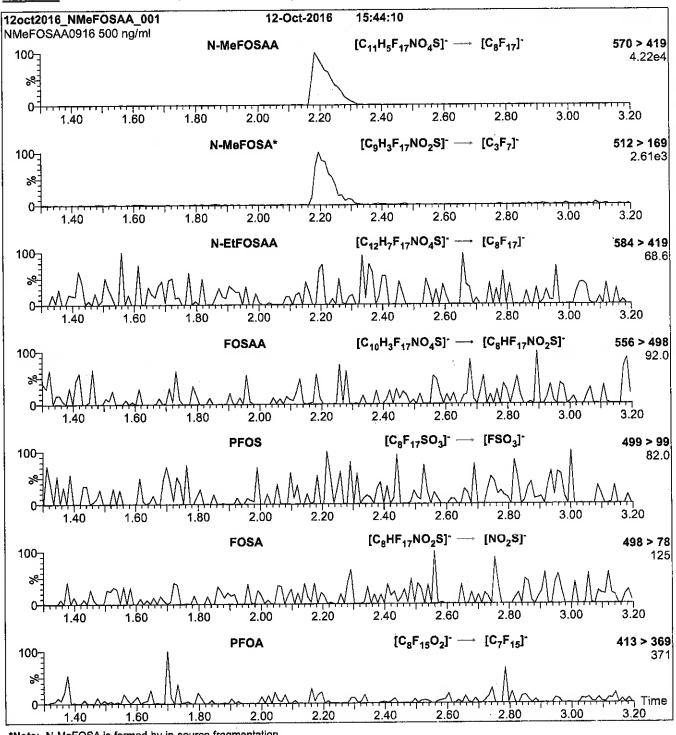
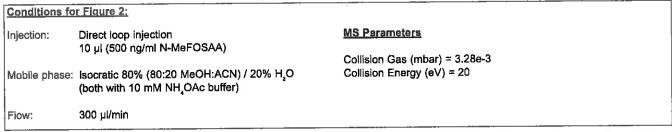


Figure 2: N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)



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



# LCPFBA 00006

P:8BC 9/13/16







### **CERTIFICATE OF ANALYSIS** DOCUMENTATION

**PRODUCT CODE:** 

**PFBA** 

**LOT NUMBER:** 

PFBA0516

**COMPOUND:** 

Perfluoro-n-butanoic acid

STRUCTURE:

**CAS #:** 

375-22-4

**MOLECULAR FORMULA:** 

C<sub>4</sub>HF<sub>2</sub>O<sub>2</sub>

 $50 \pm 2.5 \, \mu g/ml$ 

**MOLECULAR WEIGHT:** 

SOLVENT(S):

214.04

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>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:

Date: 05/31/2016

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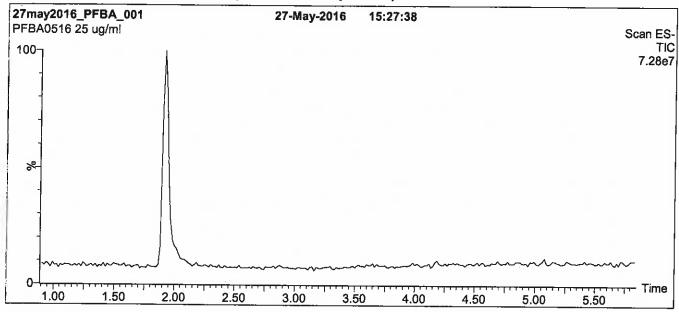


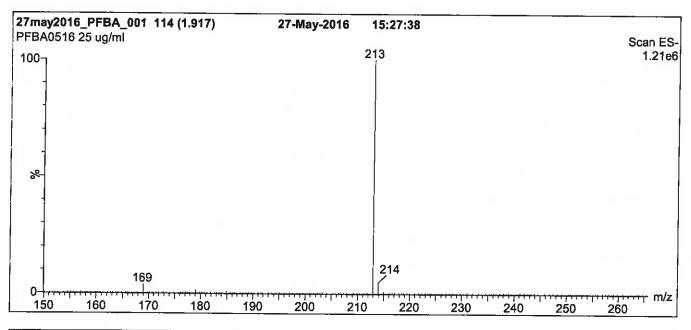


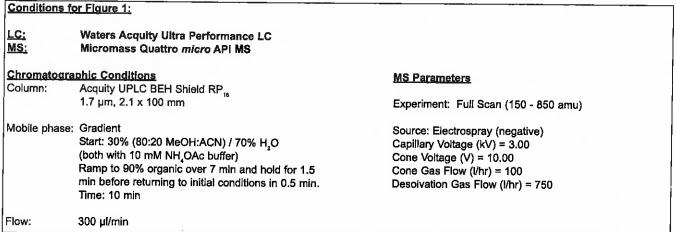
\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="mailto:www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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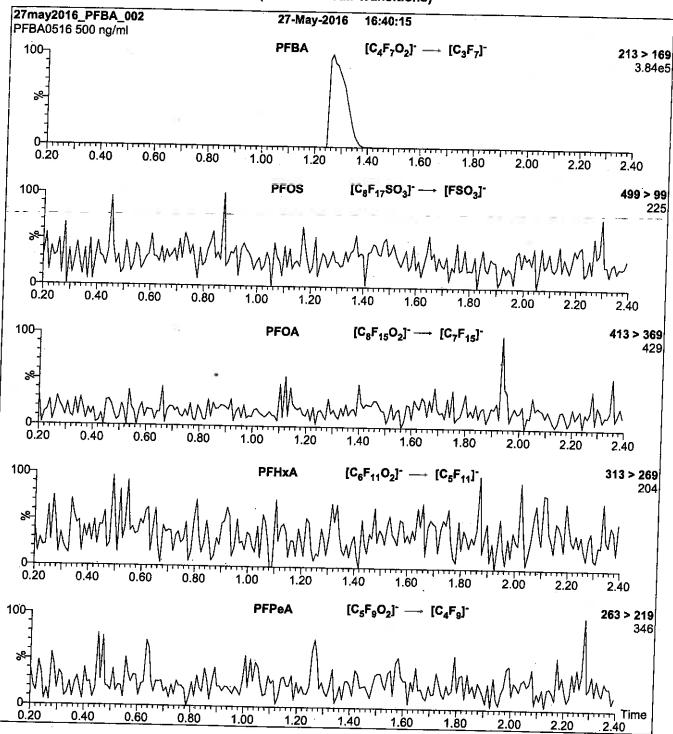
Figure 1: PFBA; LC/MS Data (TIC and Mass Spectrum)

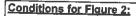






PFBA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Flow:

Direct loop injection

10 µl (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O (both with 10 mM NH<sub>4</sub>OAc buffer)

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.62e-3

Collision Energy (eV) = 10

# LCPFBA 00007



### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

**PFBA** 

**LOT NUMBER:** 

PFBA0516

**COMPOUND:** 

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4

**MOLECULAR FORMULA:** 

C,HF,O,

**MOLECULAR WEIGHT:** 

214.04

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

SOLVENT(S):

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/odd/yyyy)

05/27/2016

EXPIRY DATE: (mmidd/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:

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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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,  $u_x(y)$ , 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 96%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

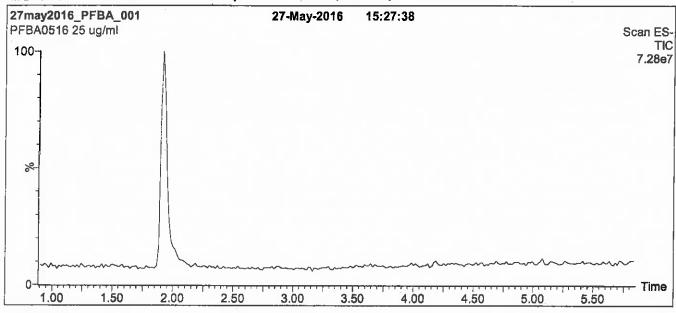
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

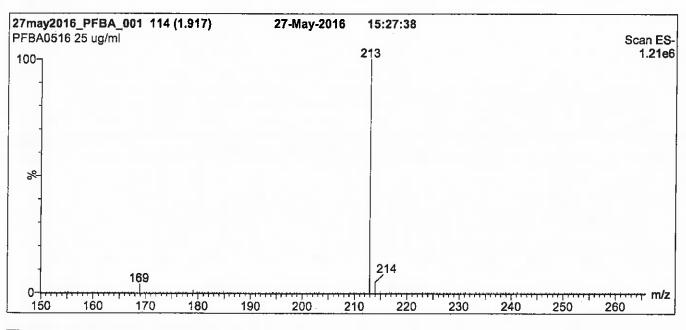




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





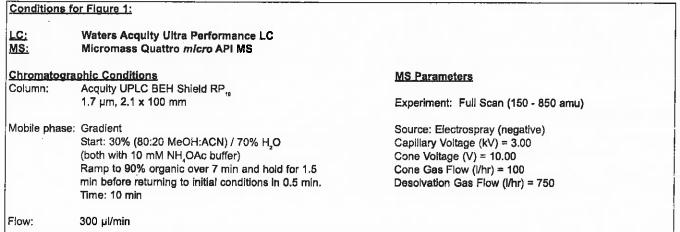
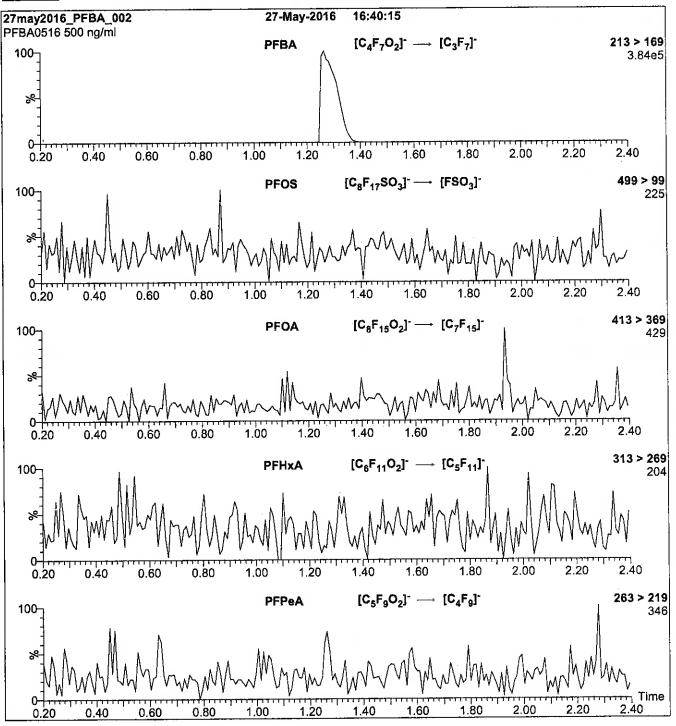
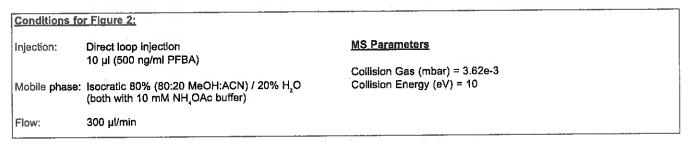


Figure 2: PFBA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFBS\_00006



ID: LCPFBS\_00005 Exp: 03/15/21 Prpd: SBC PF-1-butanesulfonate K sa



ID: LCPFBS\_00006 Exp: 03/15/21 Prpd: SBC PF-1-butanesulfonate K sa



# VELLINGTON ABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFBS

**LOT NUMBER:** 

**MOLECULAR WEIGHT:** 

SOLVENT(S):

LPFBS0316

**COMPOUND:** 

Potassium perfluoro-1-butanesulfonate

**STRUCTURE:** 

CAS #:

29420-49-3

338.19

Methanol

**MOLECULAR FORMULA:** 

C<sub>4</sub>F<sub>6</sub>SO<sub>5</sub>K

50.0 ± 2.5 μg/ml (K salt)

 $44.2 \pm 2.2 \mu g/ml$  (PFBS anion)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>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:

Date: 03/21/2016

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

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 meiting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

#### **UNCERTAINTY:**

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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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

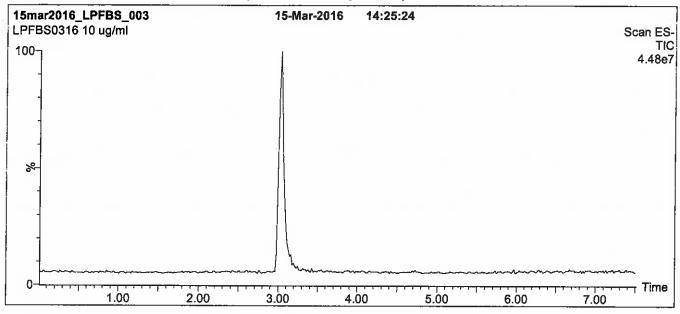
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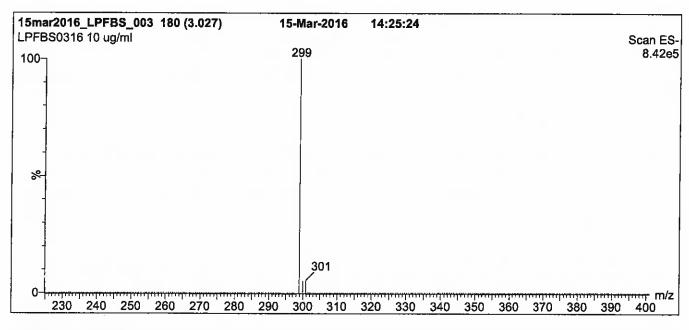


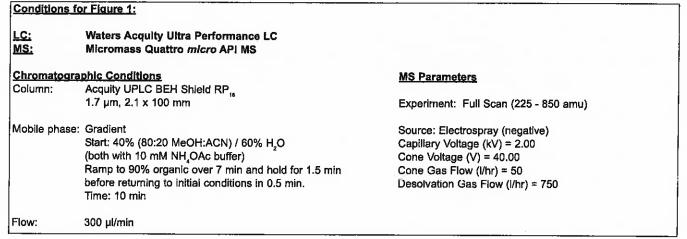


\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="https://www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

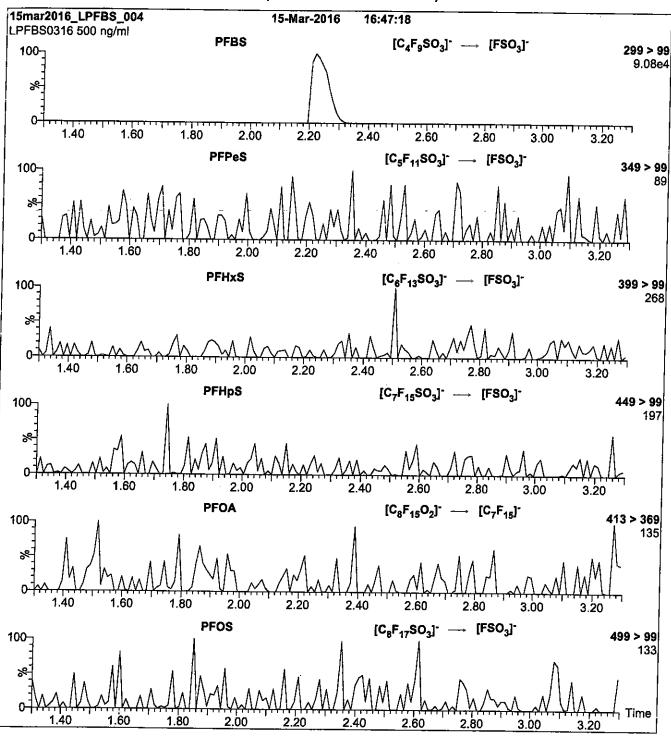
Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)

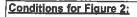






L-PFBS; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Flow:

Direct loop injection

10 μl (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>a</sub>O

(both with 10 mM NH<sub>2</sub>OAc buffer)

300 µl/min

#### **MS Parameters**

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

# LCPFBS 00008

R: 8BC 9/13/16



ID: LCPFBS\_00007 Exp: 03/15/21 Prpd: SBC PF-1-butanesulfonate K sa



ID: LCPFBS\_00008 Exp: 03/15/21 Prpd: SBC PF-1-butanesulfonate K sa



**CERTIFICATE OF ANALYSIS** DOCUMENTATION

**PRODUCT CODE:** 

L-PFBS

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

LPFBS0316

**COMPOUND:** 

Potassium perfluoro-1-butanesulfonate

29420-49-3

338.19

Methanol

**STRUCTURE:** 

CAS #:

**MOLECULAR FORMULA:** 

C,F,SO,K

50.0 ± 2.5 μg/ml (K salt)

 $44.2 \pm 2.2 \mu g/ml$  (PFBS anion)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

LAST TESTED: (mm/dd/yyyy)

EXPIRY DATE: (mm/dd/yyyy)

>98%

03/15/2016

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:

Date: 03/21/2016

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

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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#### TRACEABILITY:

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### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### QUALITY MANAGEMENT:

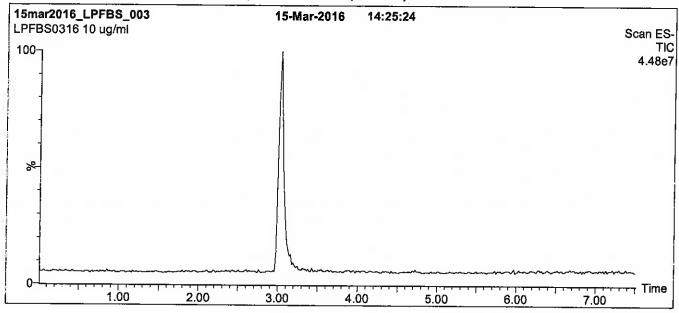
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

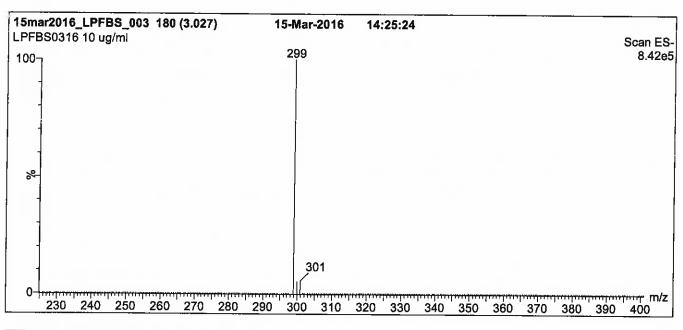




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="mailto:www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

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





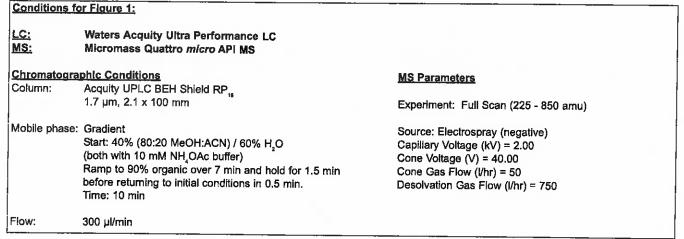
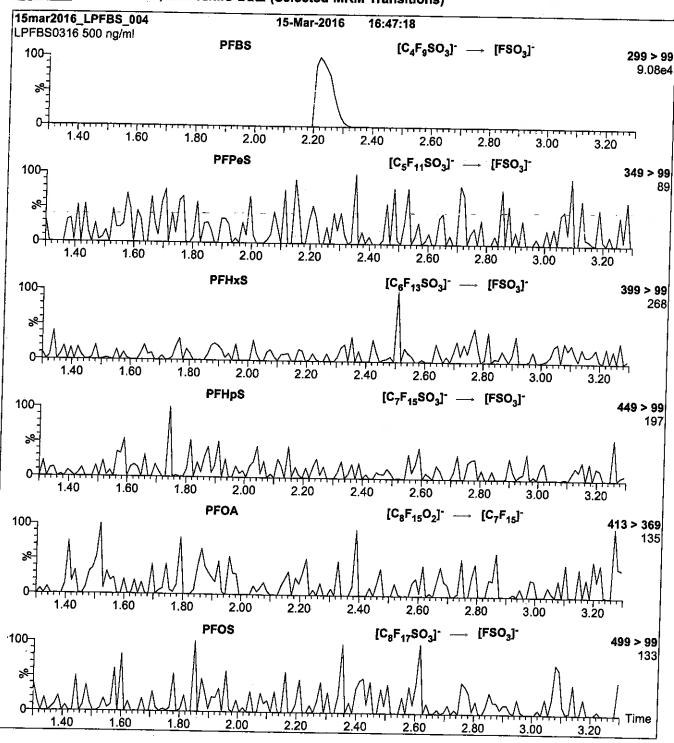
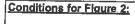


Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH,OAc buffer)

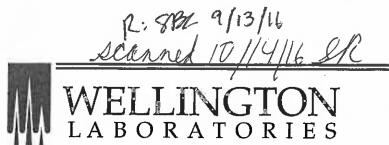
Flow:

300 µl/min

#### MS Parameters

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

# LCPFDA 00006







## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

**PFDA** 

**LOT NUMBER:** 

PFDA0516

**COMPOUND:** 

**STRUCTURE:** 

Perfluoro-n-decanoic acid

CAS #:

335-76-2

**MOLECULAR FORMULA:** 

C,HF,O,

**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:

Date: <u>06/13/2016</u>

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

The products prepared by Weilington 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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#### **UNCERTAINTY:**

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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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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

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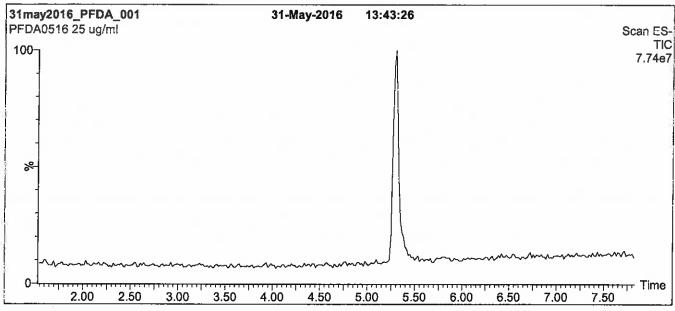


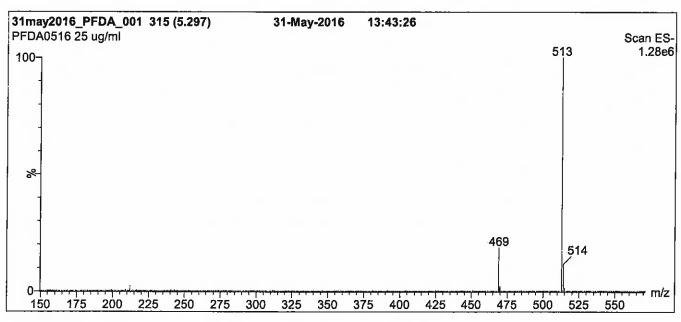


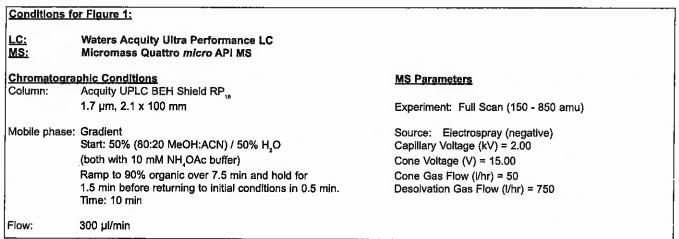
\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

revo

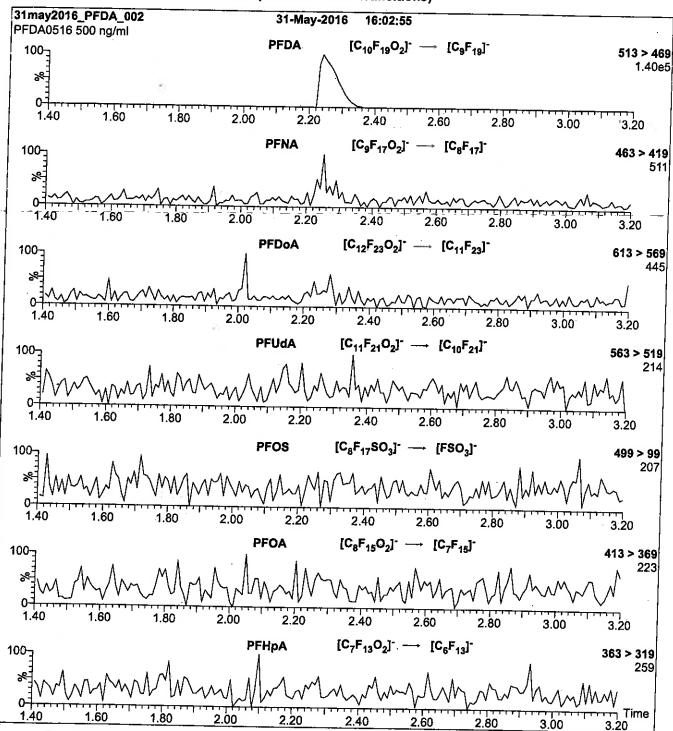
Figure 1: PFDA; LC/MS Data (TIC and Mass Spectrum)







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





Injection:

Direct loop injection

10 μl (500 ng/ml PFDA)

(both with 10 mM NH,OAc buffer)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

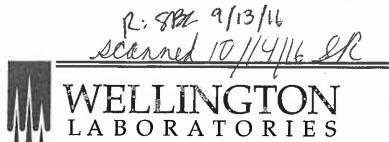
Flow:

300 µl/min

#### **MS Parameters**

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

# LCPFDA 00007





ID: LCPFDA\_00007 Exp: 05/31/21 Prpd: SBC

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

**PFDA** 

**LOT NUMBER:** 

PFDA0516

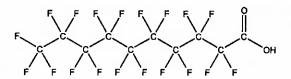
**COMPOUND:** 

Perfluoro-n-decanoic acid

**STRUCTURE:** 

CAS #:

335-76-2



**MOLECULAR FORMULA:** 

C,HF,O,

**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:

Date: <u>06/13/2016</u>

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

The products prepared by Weilington 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,  $u_o(y)$ , 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

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

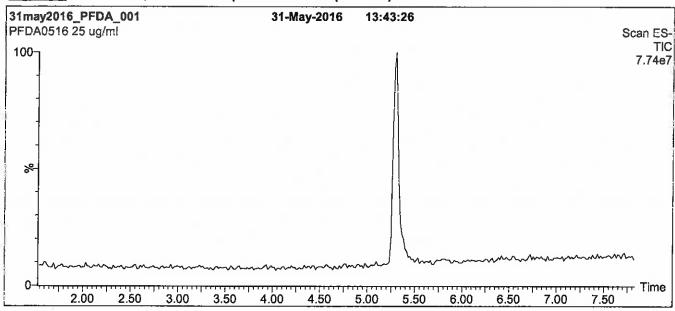


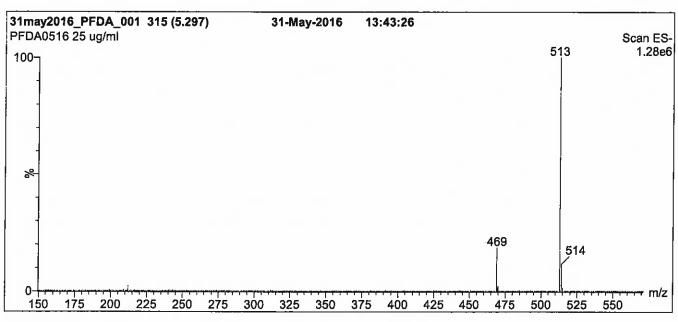


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Figure 1: PFDA; LC/MS Data (TIC and Mass Spectrum)





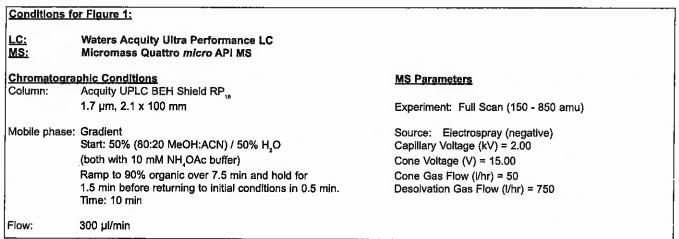
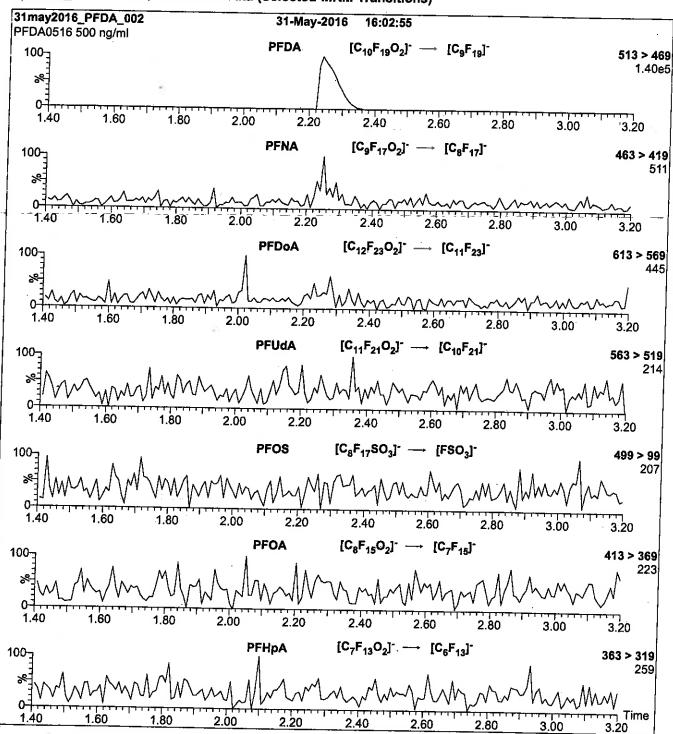


Figure 2; PFDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>s</sub>O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

#### MS Parameters

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

# LCPFDoA\_00006



### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

**PFDoA** 

LOT NUMBER: PFDoA0516

**COMPOUND:** 

Perfluoro-n-dodecanoic acid

STRUCTURE:

CAS #:

307-55-1

**MOLECULAR FORMULA:** 

C,HF,O,

**MOLECULAR WEIGHT:** 

614,10

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED; (mm/dd/yyyy)

05/31/2016

EXPIRY DATE: (mm/dd/yyy)

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:

Date: 06/02/2016

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

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#### **LIMITED WARRANTY:**

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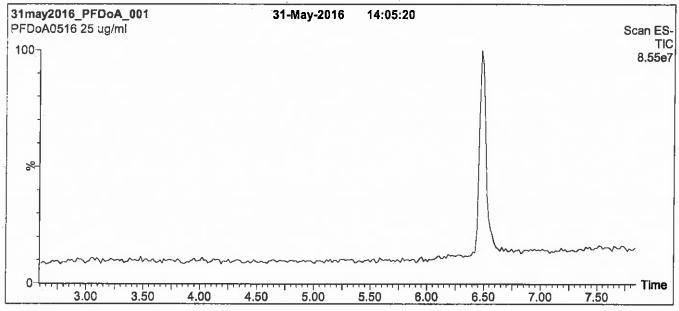


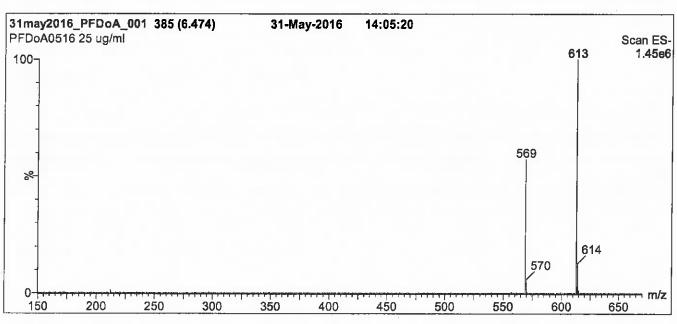


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Figure 1: PFDoA; LC/MS Data (TIC and Mass Spectrum)

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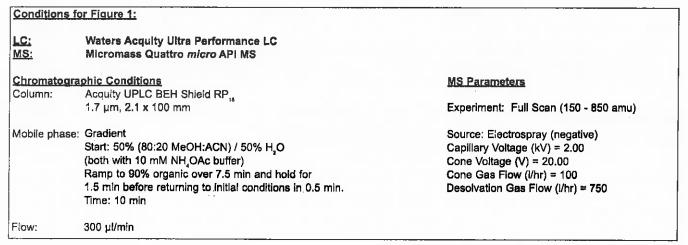
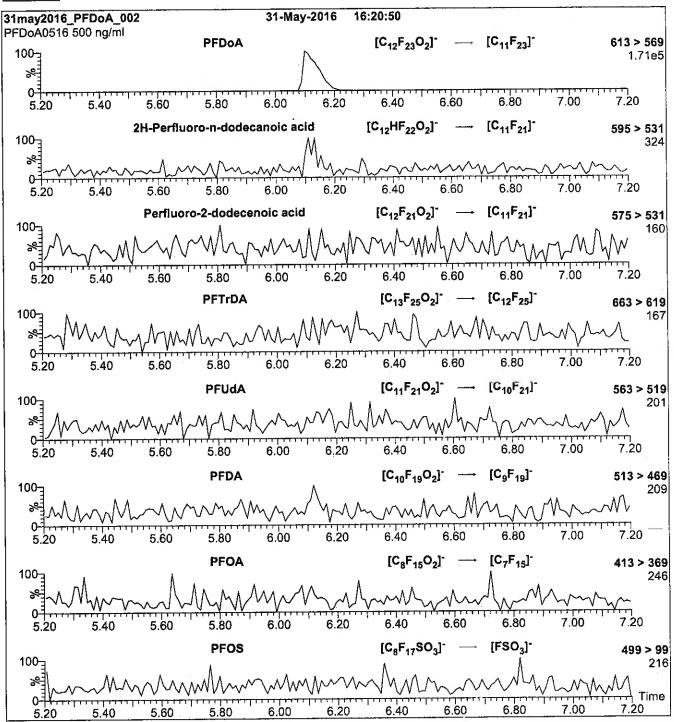
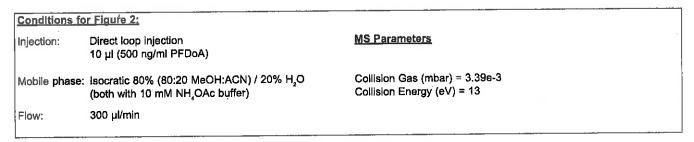


Figure 2: PFDoA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFDoA\_00007



### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

**PFDoA** 

LOT NUMBER: PFDoA0516

**COMPOUND:** 

Perfluoro-n-dodecanoic acid

STRUCTURE:

CAS #:

307-55-1



**MOLECULAR FORMULA:** 

C,HF,O,

**MOLECULAR WEIGHT:** 

614,10

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED; (mm/dd/yyyy)

05/31/2016

EXPIRY DATE: (mm/dd/yyy)

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:

Date: 06/02/2016

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.

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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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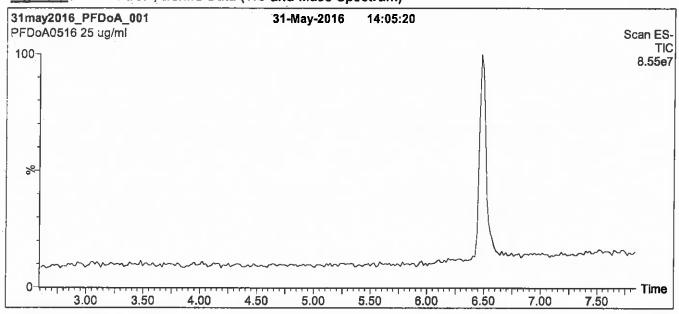


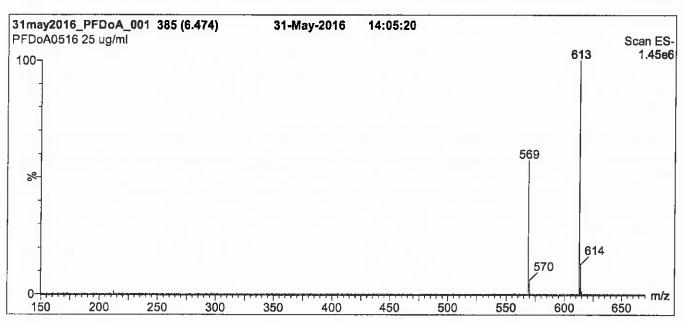


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Figure 1: PFDoA; LC/MS Data (TIC and Mass Spectrum)

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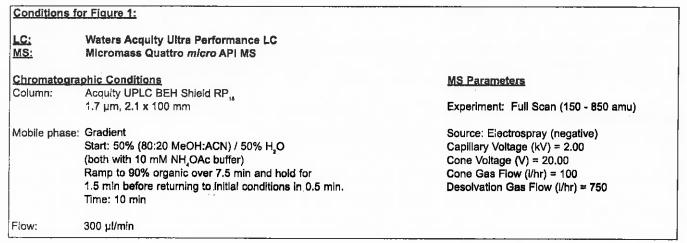
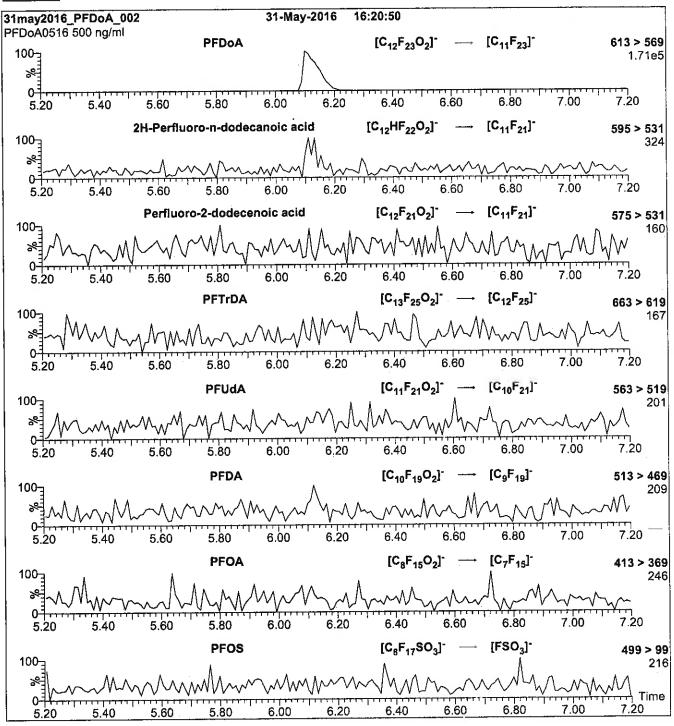
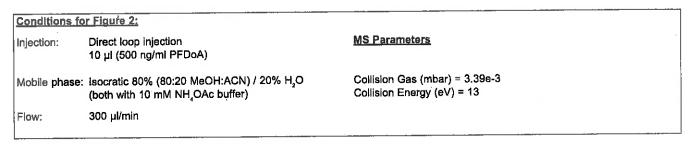


Figure 2: PFDoA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFDS 00005

ID: LCPFDS\_00005 Exp: 07/02/20 Prpd; CBW PF-1-decanesulfonate sodi



### CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

L-PFDS

LOT NUMBER:

**MOLECULAR WEIGHT:** 

SOLVENT(S):

LPFDS0615

**COMPOUND:** 

Sodium perfluoro-1-decanesulfonate

**CAS #:** 

2806-15-7

622,13

Methanol

STRUCTURE:

**MOLECULAR FORMULA:** 

C<sub>10</sub>F<sub>21</sub>SO<sub>3</sub>Na

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

 $48.2 \pm 2.4 \mu g/ml$  (PFDS anion)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>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:

Date: 12/07/2015

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

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.

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 $x_4, x_2,...x_n$  on which it depends is:

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#### **LIMITED WARRANTY:**

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#### **QUALITY MANAGEMENT:**

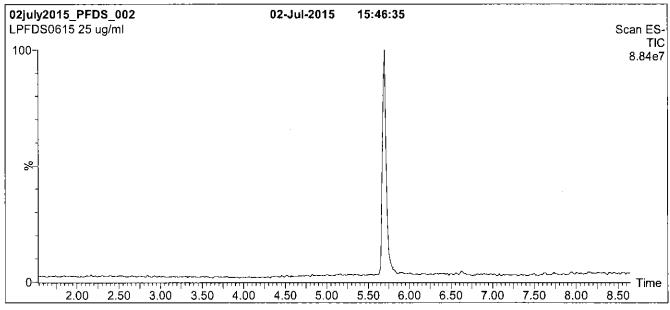
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

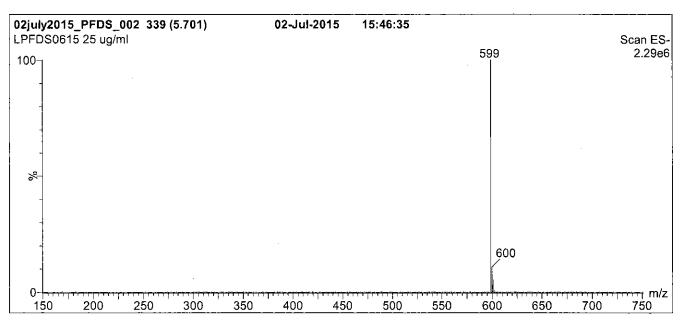




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Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)





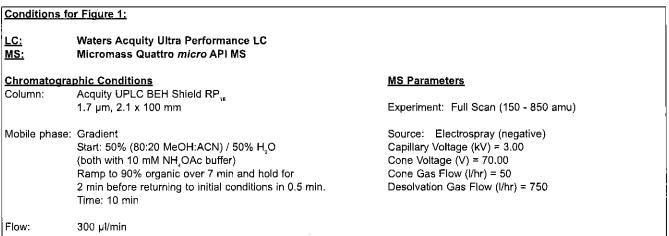
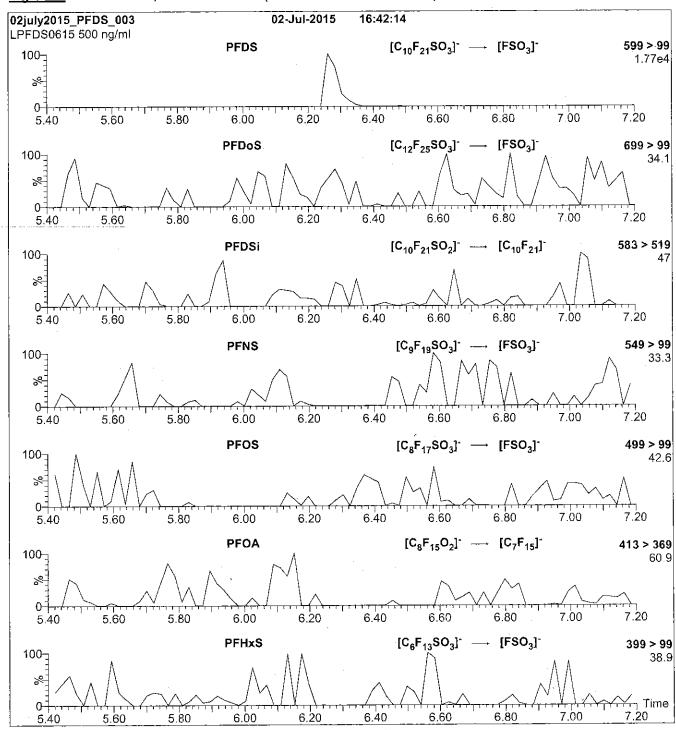
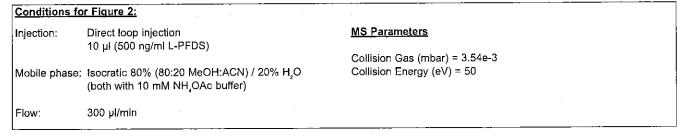


Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)





# LCPFDSA\_00002



## CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFDS

**LOT NUMBER:** 

LPFDS0516

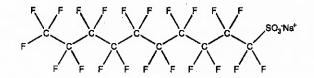
COMPOUND:

Sodium perfluoro-1-decanesulfonate

**STRUCTURE:** 

CAS #:

2806-15-7



**MOLECULAR FORMULA:** 

C<sub>10</sub>F<sub>2</sub>,SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

622.13

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

 $48.2 \pm 2.4 \mu g/ml$  (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

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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$$x_1, x_2, ... x_n$$
 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).

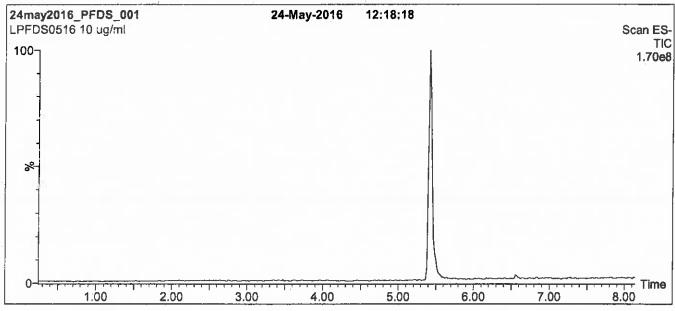


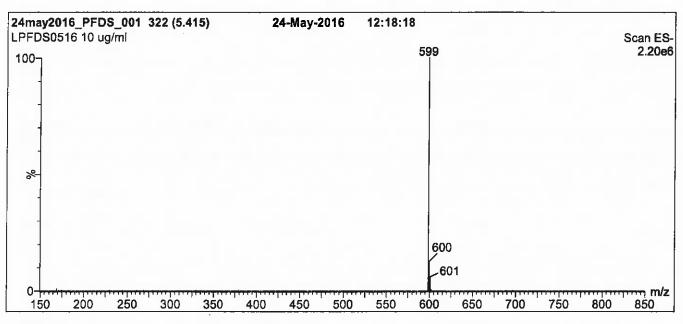


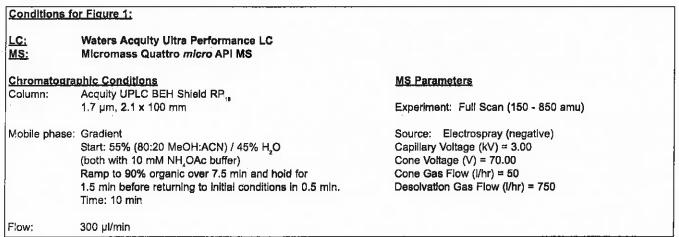
\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*



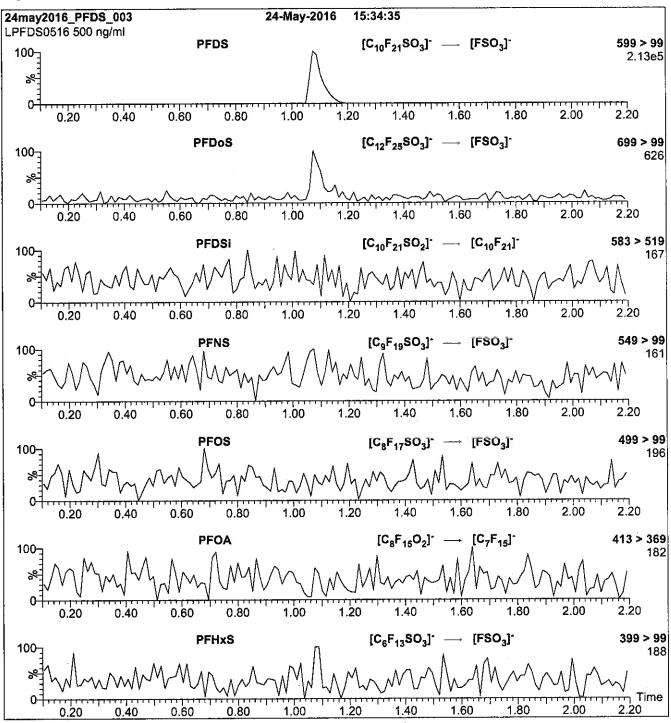
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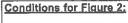






L-PFDS; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 μl (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O (both with 10 mM NH,OAc buffer)

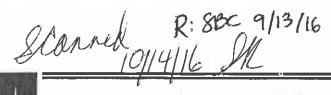
**MS Parameters** 

Collision Gas (mbar) = 3.70e-3 Collision Energy (eV) = 50

Flow:

300. µl/min

# LCPFHpA\_00006



730517
ID: LCPFHpA\_00006
Exp: 01/22/21 Pryol: SBC
PF-n-heptanoic acid

730518

ID: LCPFHpA\_00007

Exp: 31/22/21 Prpd: SBC
PF-n-heptanoic acid



LABORATORIES

PRODUCT CODE:

**PFHpA** 

Perfluoro-n-heptanoic acid

LOT NUMBER:

PFHpA0116

STRUCTURE:

**COMPOUND:** 

CAS #:

375-85-9

F F F F F F

**MOLECULAR FORMULA:** 

C,HF13O2

**CONCENTRATION:** 

50 ± 2.5 μg/ml

**MOLECULAR WEIGHT:** 

SOLVENT(S):

364.06

Methanol Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/22/2016 01/22/2021

EXPIRY DATE: (mm/dd/yyyy)

**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. Chillim

Date:

<u>02/02/2016</u>

(mm/dd/yyyy)

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

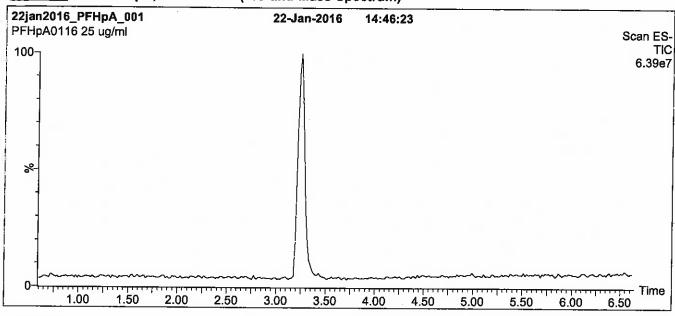
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

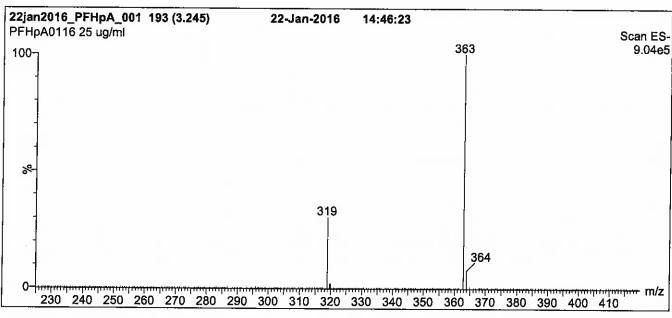


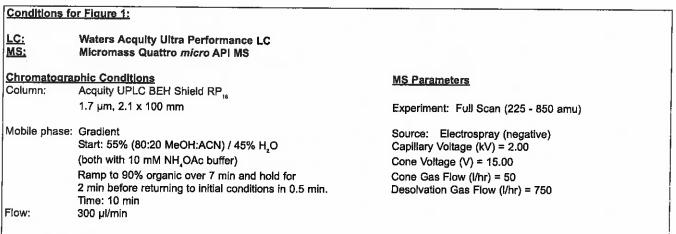


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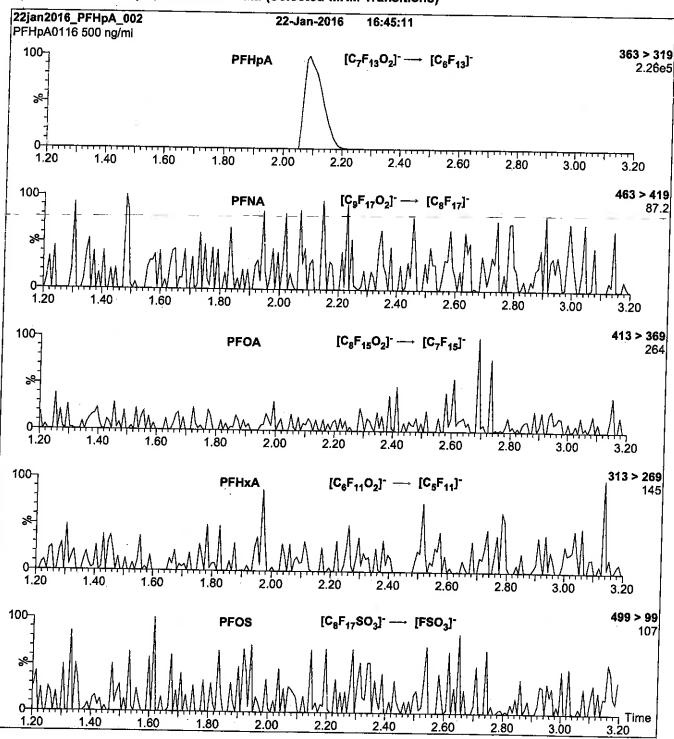
Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)

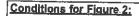






PFHpA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

Collision Gas (mbar) = 3.50e-3 Collision Energy (eV) = 11

# LCPFHpA\_00008



### CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

**PFHpA** 

LOT NUMBER:

PFHpA1216

COMPOUND:

Perfluoro-n-heptanoic acid

**STRUCTURE:** 

CAS #:

375-85-9

F C C C C C C C O

**MOLECULAR FORMULA:** 

C,HF,O,

1302

**MOLECULAR WEIGHT:** 

364.06

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyy)

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:

C Striking

Date: 12/12/2016

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

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.

#### **UNCERTAINTY:**

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

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

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

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

#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

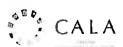
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT.**

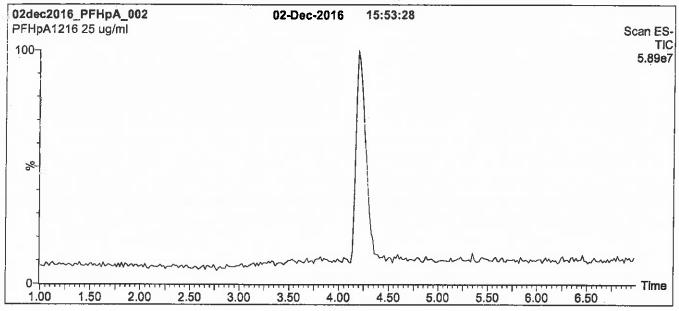
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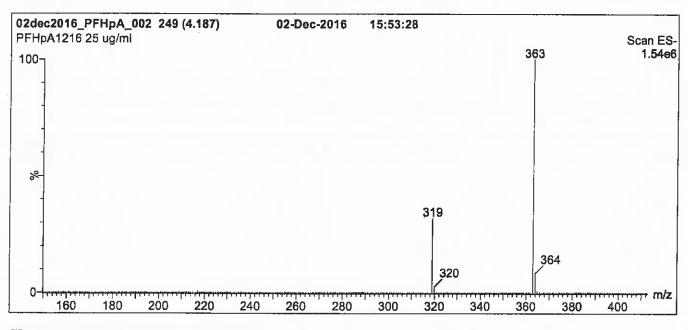




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Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)





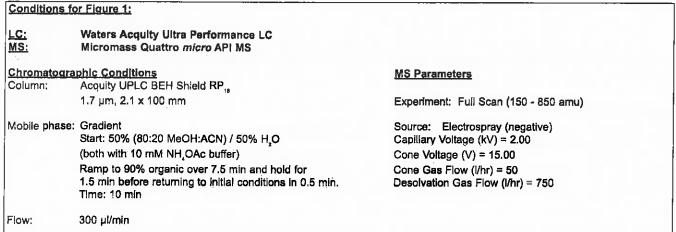
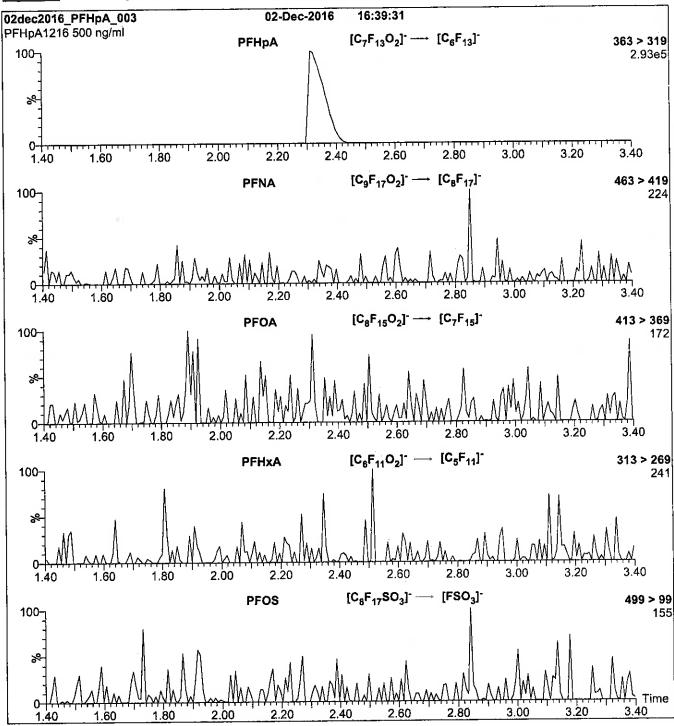
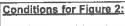


Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300 µl/min

#### MS Parameters

Collision Gas (mbar) = 3.50e-3 Collision Energy (eV) = 11

# LCPFHpS\_00010

Scarred R: 8BC 9/13/16







### CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** 

L-PFHpS

**LOT NUMBER:** 

LPFHpS1115

COMPOUND:

Sodium perfluoro-1-heptanesulfonate

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C<sub>7</sub>F<sub>15</sub>SO<sub>3</sub>Na

**MOLECULAR WEIGHT:** 

472.10

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (m:r/dd/yyyy)

11/06/2015

EXPIRY DATE: (mm/dd/yyyy)

11/06/2020

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

47.6 ± 2.4 µg/ml (PFHpS anion)

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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<sub>x</sub>F<sub>13</sub>SO<sub>3</sub>Na) and ~ 0.2% of L-PFOS (C<sub>x</sub>F<sub>13</sub>SO<sub>3</sub>Na).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.C. Chiftim

Date:

11/09/2015

(mm/dd/yyy)

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

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

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#### **TRACEABILITY:**

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

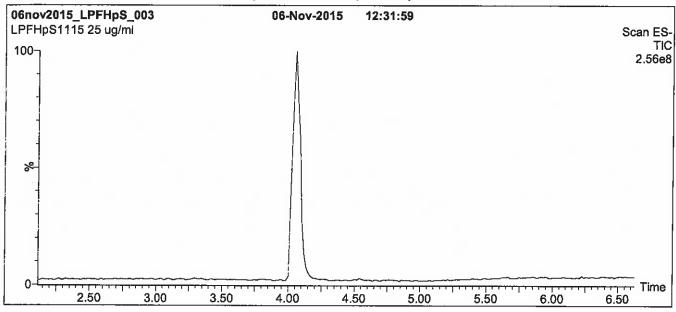
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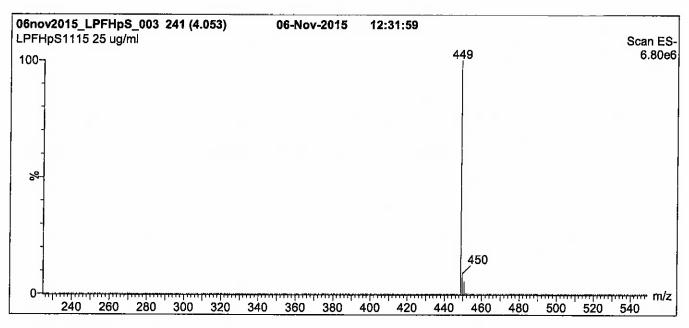




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Figure 1: L-PFHpS; LC/MS Data (TIC and Mass Spectrum)





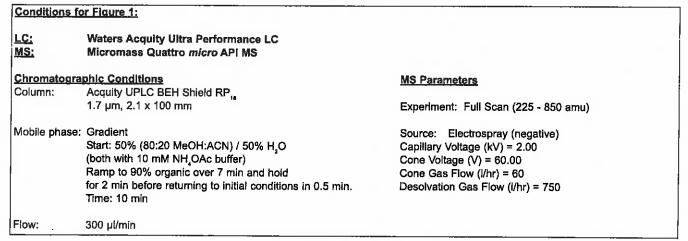
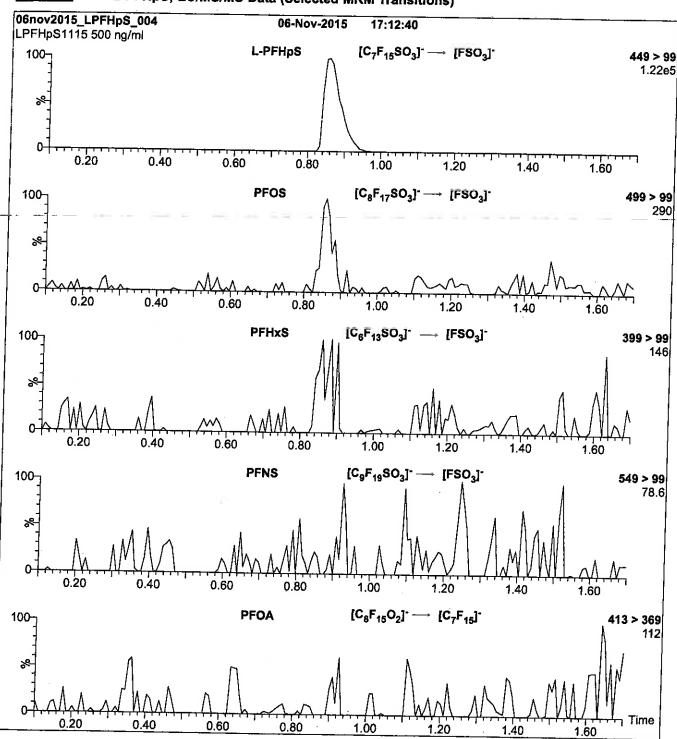
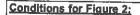


Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O (both with 10 mM NH<sub>2</sub>OAc buffer)

**MS Parameters** 

Collision Gas (mbar) = 3.31e-3 Collision Energy (eV) = 35

Flow:

300 µl/min

# LCPFHpSA\_00002



#### **CERTIFICATE OF ANALYSIS** DOCUMENTATION

PRODUCT CODE:

L-PFHpS

LOT NUMBER:

LPFHpS1016

COMPOUND:

Sodium perfluoro-1-heptanesulfonate

**STRUCTURE:** 

CAS #:

Not available

**MOLECULAR FORMULA:** 

C,F,SO,Na

**MOLECULAR WEIGHT:** 

472.10

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

 $47.6 \pm 2.4 \mu g/ml$  (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 ( $C_aF_{13}SO_3Na$ ) and ~ 0.1% of L-PFOS ( $C_aF_{17}SO_3Na$ ).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/20/2016

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.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_i(y)$ , 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:**

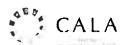
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

#### **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:

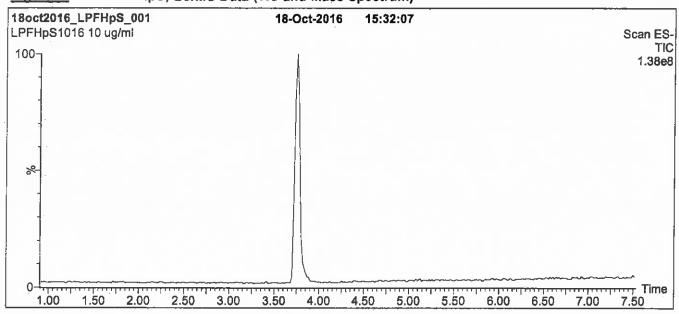
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

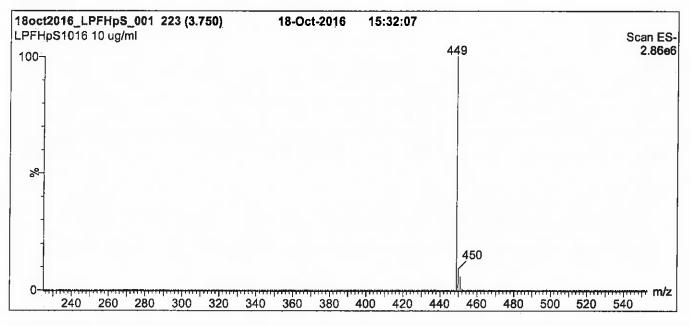




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Figure 1: L-PFHpS; LC/MS Data (TIC and Mass Spectrum)





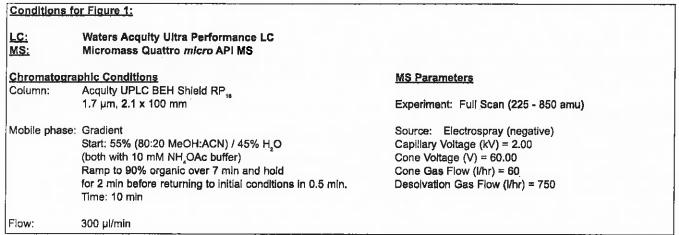
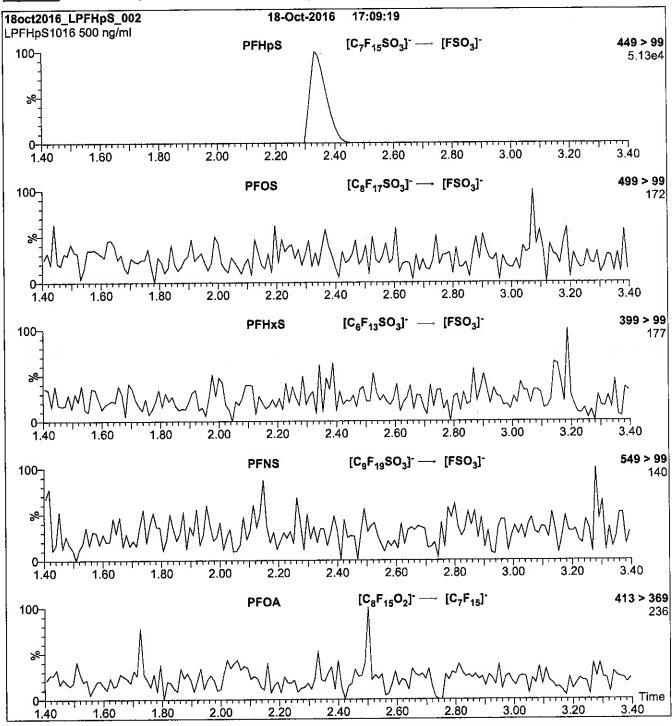
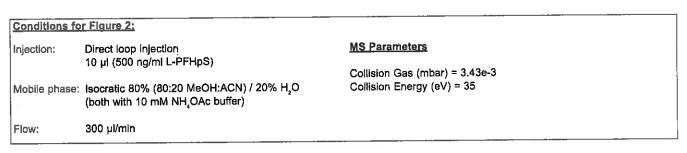


Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)





## LCPFHpSA\_00003



#### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFHpS

LOT NUMBER:

LPFHpS0817

**COMPOUND:** 

Sodium perfluoro-1-heptanesulfonate

STRUCTURE;

**CAS #:** 

Not available

**MOLECULAR FORMULA:** 

C,F,SO,Na

**MOLECULAR WEIGHT:** 472.10

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu g/ml$  (Na salt)

 $47.6 \pm 2.4 \mu g/ml$  (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 ( $C_8F_{13}SO_3Na$ ) 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

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

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

#### **HAZARDS:**

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

#### SYNTHESIS / CHARACTERIZATION:

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_{i}, x_{2},...x_{n}$$
 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

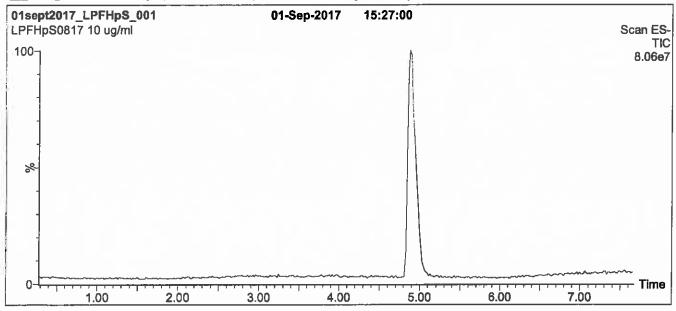
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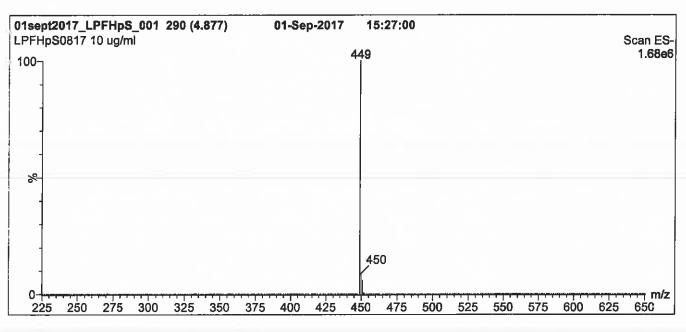




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Figure 1: L-PFHpS; LC/MS Data (TIC and Mass Spectrum)





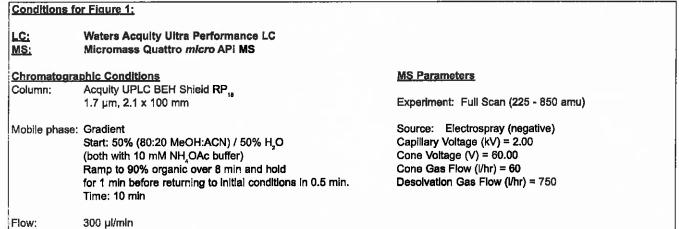
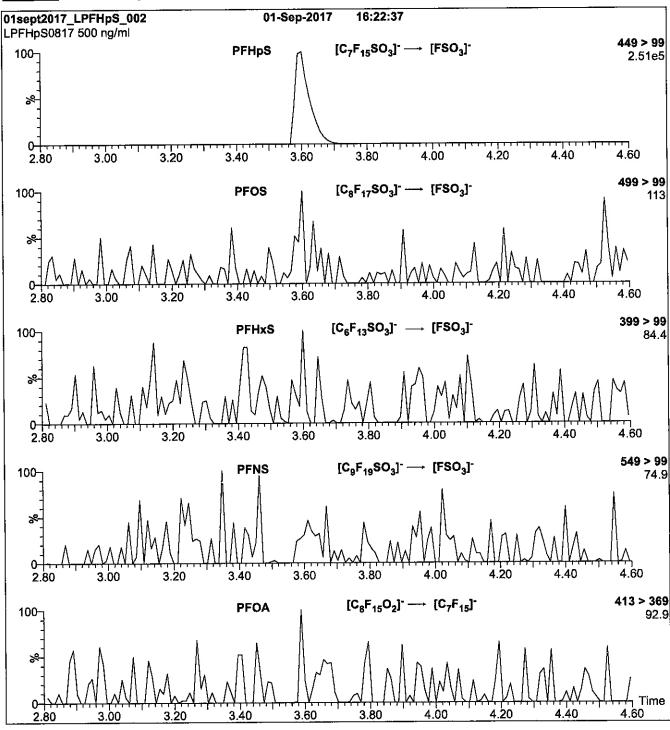


Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow:

300 µl/min

#### MS Parameters

Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 35

## LCPFHxA 00005

R: 8Be 9/13/16



iD: LCPFHxA\_00005 Exp: 12/22/20 Prpd; SBC PF-n-hexanoic acid



ID: LCPFHxA\_00006 Exp: 12/22/20 Prpd: SBC PF-n-hexanoic acid



**CERTIFICATE OF ANALYSIS DOCUMENTATION** 

**PRODUCT CODE:** 

**PFHxA** 

**LOT NUMBER:** 

PFHxA1215

**COMPOUND:** 

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4

**MOLECULAR FORMULA:** 

C,HF,O,

 $50 \pm 2.5 \, \mu g/ml$ 

MOLECULAR WEIGHT:

314.05

SOLVENT(S):

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>98%

LAST TESTED: (mm/dd/yyyr)

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

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

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

#### **HAZARDS:**

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

#### **SYNTHESIS / CHARACTERIZATION:**

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

#### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

#### **UNCERTAINTY:**

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 $X_1, X_2, ... X_n$  on which it depends is:

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#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

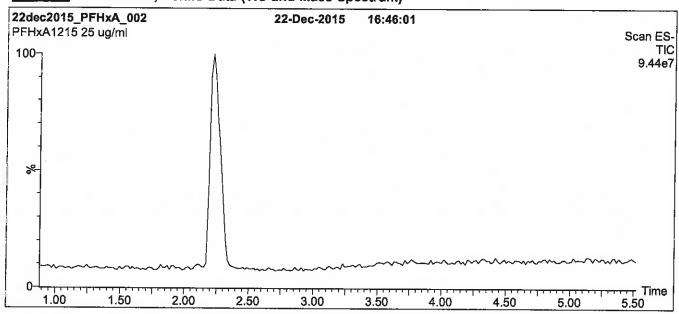
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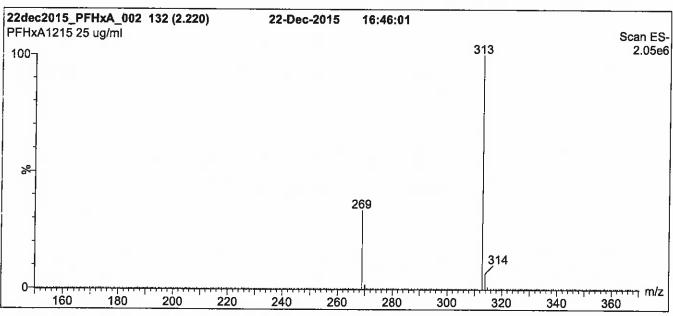




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Figure 1: PFHxA; LC/MS Data (TIC and Mass Spectrum)





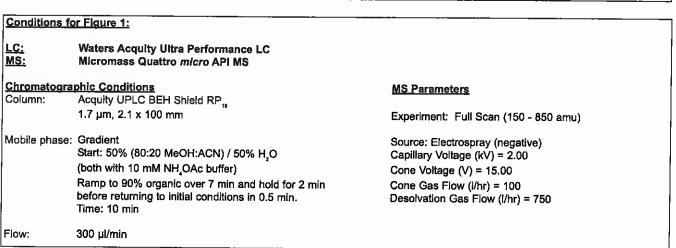
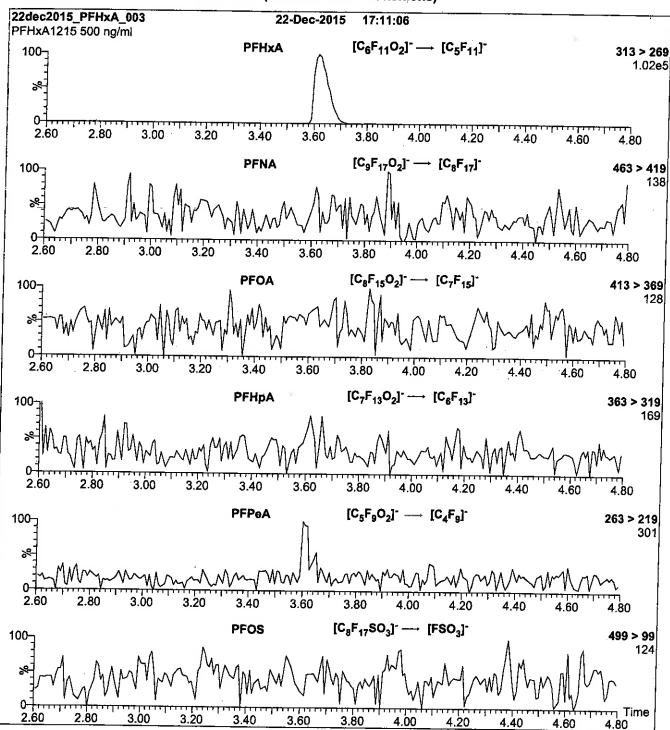
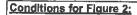


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>a</sub>O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 10

## LCPFHxA\_00007



#### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFHxA** 

**LOT NUMBER:** 

PFHxA1215

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4

MOLECULAR FORMULA:

CHF,O,

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$ 

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:

Date: 12/23/2015

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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#### **UNCERTAINTY:**

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

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

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

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#### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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#### LIMITED WARRANTY:

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#### **QUALITY MANAGEMENT:**

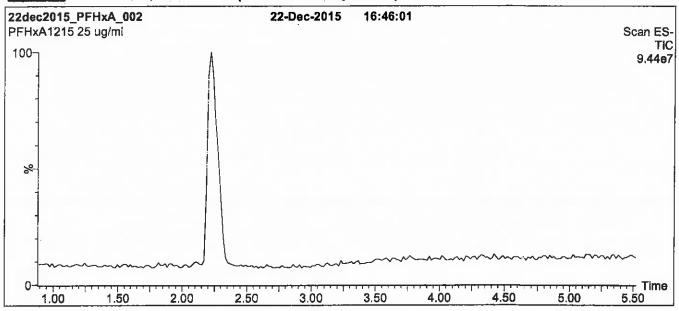
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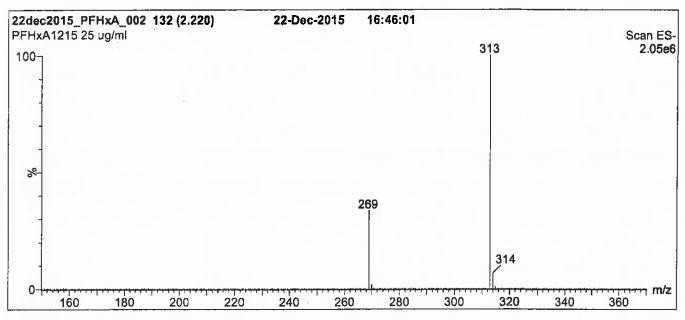




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Figure 1: PFHxA; LC/MS Data (TIC and Mass Spectrum)





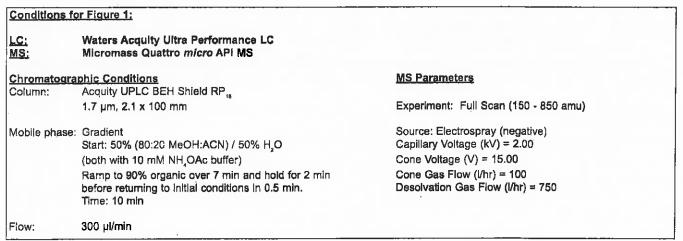
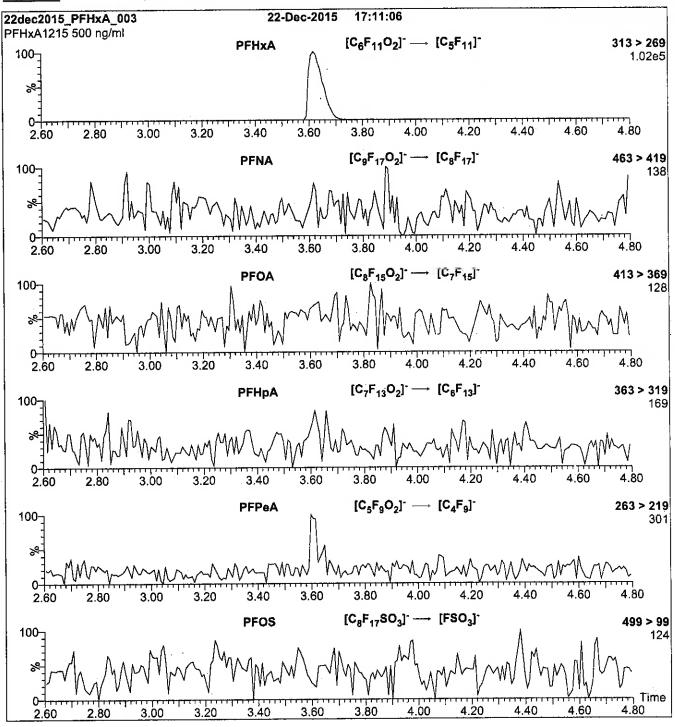


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

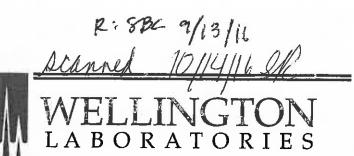
(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

#### MS Parameters

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 10

## LCPFHxDA\_00007



ID: LCPFHxDA\_00006 Exp: 05/25/21 Prpd: SBC PFHxDA stock 50ug/mL

ID: LCPFHxDA\_00007 Exp: 05/25/21 Prpd: SBC PFHxOA stock 50ug/ml.

#### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

**PFHxDA** 

**LOT NUMBER:** 

PFHxDA0516

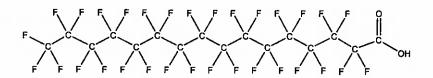
**COMPOUND:** 

STRUCTURE:

Perfluoro-n-hexadecanoic acid

**CAS #:** 

67905-19-5



**MOLECULAR FORMULA:** 

C,HF,O,

50 ± 2.5 µg/mi

MOLECULAR WEIGHT:

SOLVENT(S):

814.13 Methanol

Water (<1%)

**CHEMICAL PURITY:** 

**CONCENTRATION:** 

>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:

Date: 05/27/2016

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:**

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

#### **HOMOGENEITY:**

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#### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_{c}(y)$ , of a value y and the uncertainty of the independent parameters

 $X_1, X_2, ..., X_n$  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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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

#### **QUALITY MANAGEMENT:**

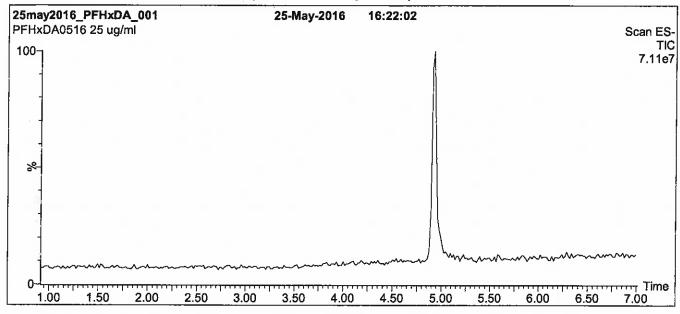
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

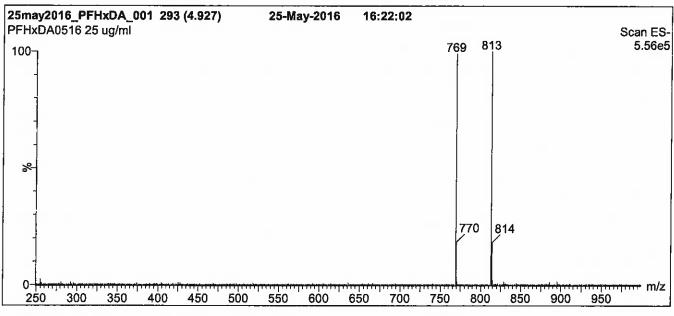




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#### Figure 1: PFHxDA; LC/MS Data (TIC and Mass Spectrum)





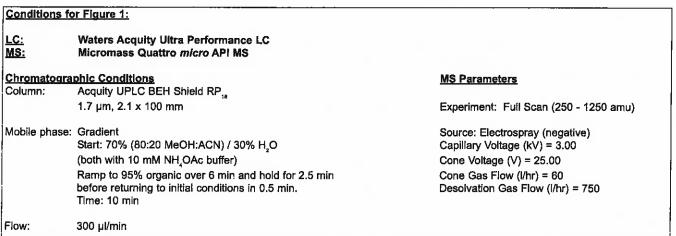
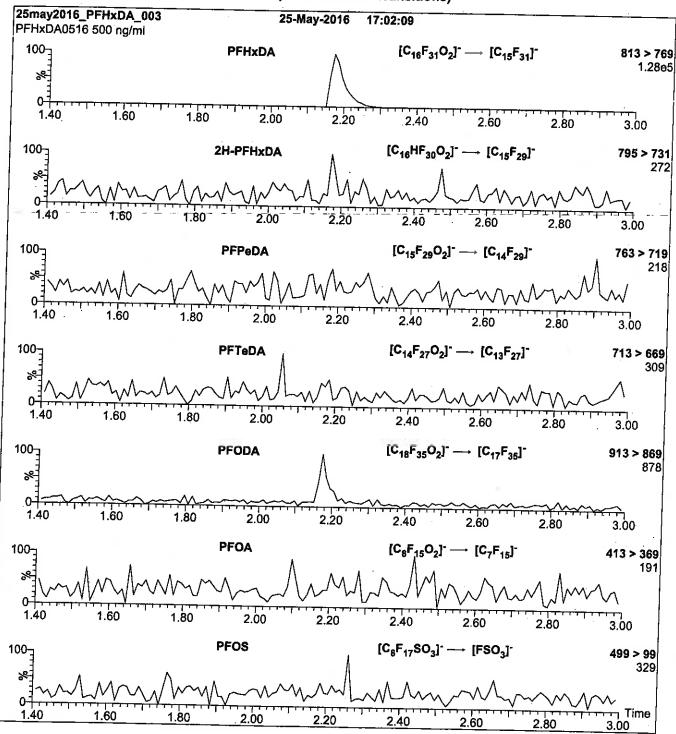
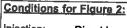


Figure 2: PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH<sub>2</sub>OAc buffer)

Flow: 300 µl/min

### **MS Parameters**

Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 15

# LCPFHxDA\_00008



### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFHxDA** 

LOT NUMBER:

PFHxDA0516

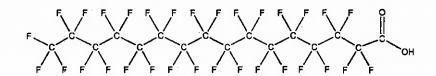
COMPOUND:

Perfluoro-n-hexadecanoic acid

**STRUCTURE:** 

**CAS #:** 

67905-19-5



**MOLECULAR FORMULA:** 

C, HF, O,

**MOLECULAR WEIGHT:** 

814.13

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

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:

D. C. Ordeline

Date: 05/27/2016

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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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### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### LIMITED WARRANTY:

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### **QUALITY MANAGEMENT:**

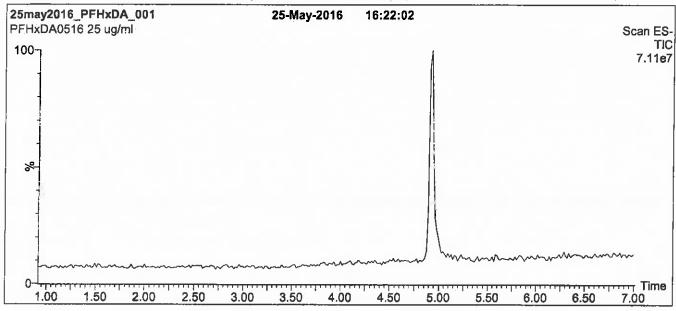
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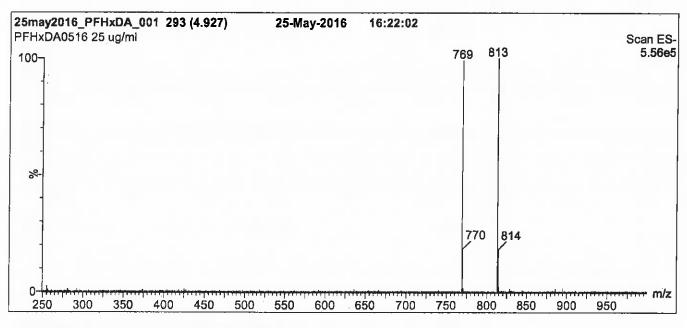




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Figure 1: PFHxDA; LC/MS Data (TIC and Mass Spectrum)





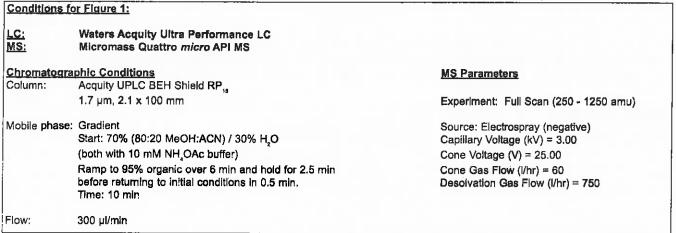
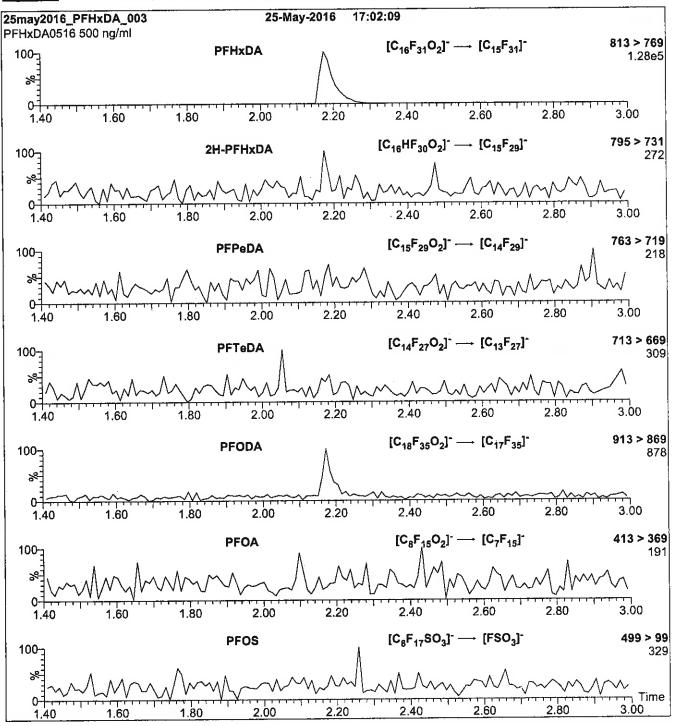
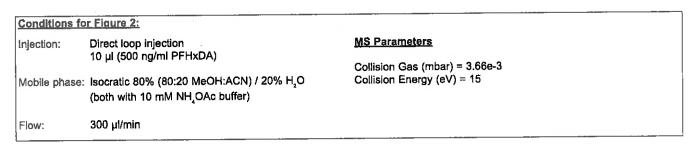
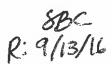


Figure 2: PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





LCPFHxS-br\_00003





ID: LCPFHxS-br\_00002 exp: 07/03/20 Prpd: SBC Potassium Perfluorchexane



ID: LCPFHxS-br\_00003
Exp: 07/03/20 Prpd: SBC
Potassium Perfluorohexane

CERTIFICATE OF ANALYSIS
DOCUMENTATION



### WELLINGTON LABORATORIES

### br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

**PRODUCT CODE:** 

br-PFHxSK

**LOT NUMBER:** 

brPFHxSK0615

**CONCENTRATION:** 

 $50.0 \pm 2.5 \,\mu\text{g/ml}$  (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: (mrv/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 19F-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).

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

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### SYNTHESIS / CHARACTERIZATION:

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### **HOMOGENEITY:**

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

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### LIMITED WARRANTY:

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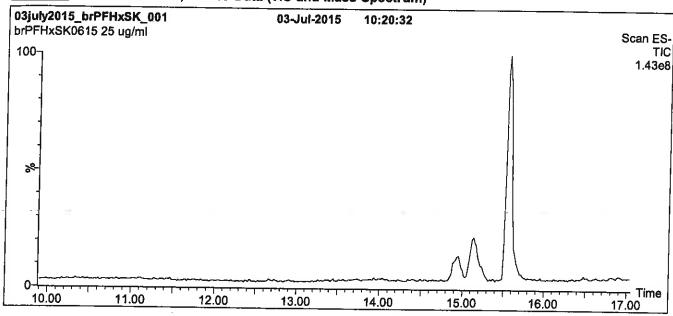
Table A: br-PFHxSK; Isomeric Components and Percent Composition (by 19F-NMR)\*

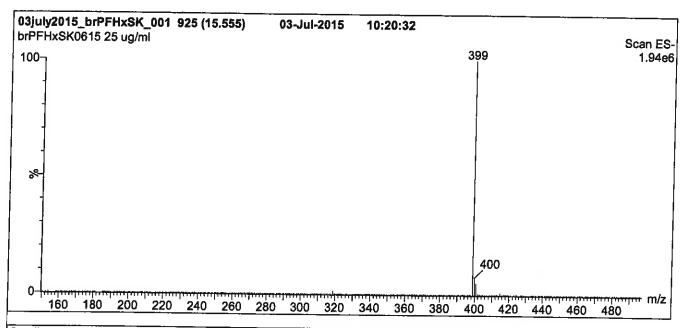
Isomer	Name	Structure	Percent Composition by <sup>19</sup> F-NMR
1	Potassium perfluoro-1-hexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K+	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K+ CF <sub>3</sub>	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K <sup>+</sup> CF <sub>3</sub>	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K+ CF <sub>3</sub>	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K+ CF <sub>3</sub>	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	CF <sub>3</sub> CF <sub>3</sub> CCF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K <sup>+</sup> CF <sub>3</sub>	0.2
7	Other Unidentified Isomers		0.5

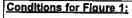
Percent of total perfluorohexanesulfonate isomers only.
 Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: Date: 07/15/2015

Figure 1: br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)







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

### Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP14

1.7 µm, 2.1 x 100 mm

### Mobile phase: Gradient

Start: 20% (80:20 MeOH:ACN) / 80% H<sub>2</sub>O (both with 10 mM NH<sub>4</sub>OAc 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

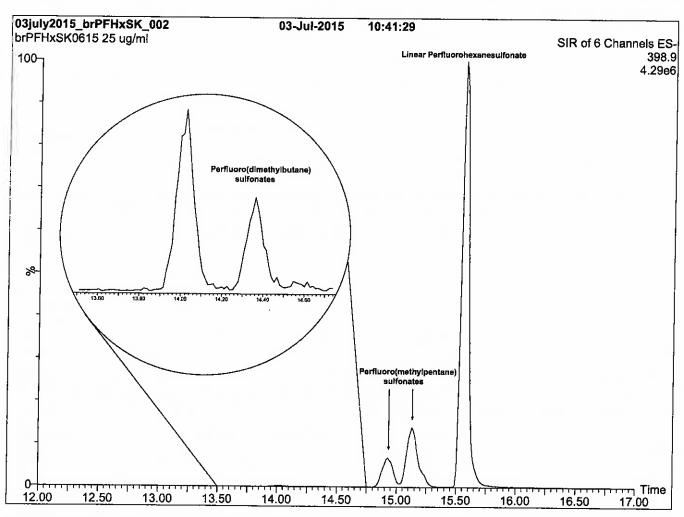
Flow: 300 µl/min

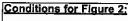
### **MS Parameters**

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





MS:

Waters Acquity Ultra Performance LC Micromass Quattro micro API MS

### Chromatographic Conditions

Column:

Acquity UPLC BEH Shield RP,

1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient

Start: 20% (80:20 MeOH:ACN) / 80% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc 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:

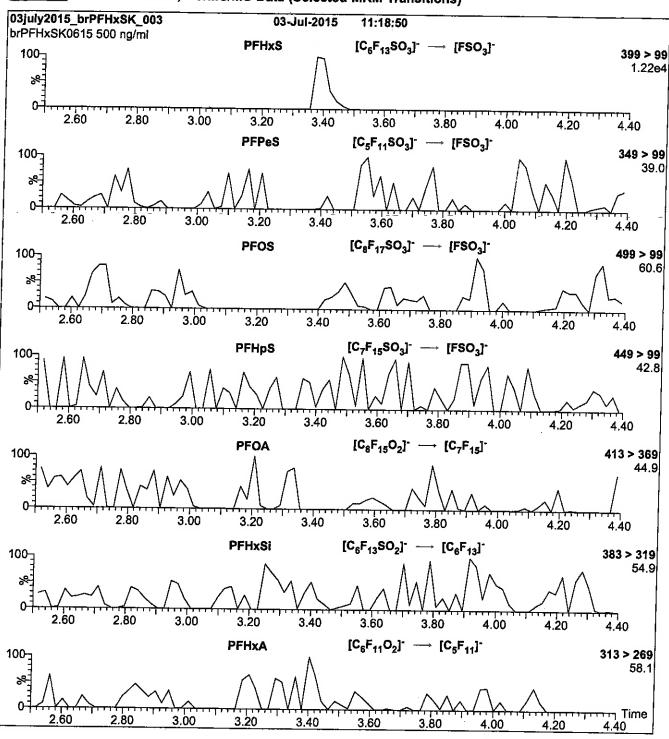
300 µl/min

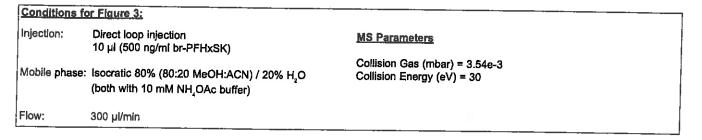
### **MS Parameters**

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)





LCPFHxS-br\_00004



### CERTIFICATE OF ANALYSIS DOCUMENTATION

### br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:

br-PFHxSK

**LOT NUMBER:** 

brPFHxSK0615

**CONCENTRATION:** 

 $50.0 \pm 2.5 \mu g/ml$  (total potassium salt)

 $45.5 \pm 2.3 \,\mu\text{g/ml}$  (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)

vvv) 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 19F-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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### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

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





\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

### <u>Table A:</u> br-PFHxSK; Isomeric Components and Percent Composition (by <sup>19</sup>F-NMR)\*

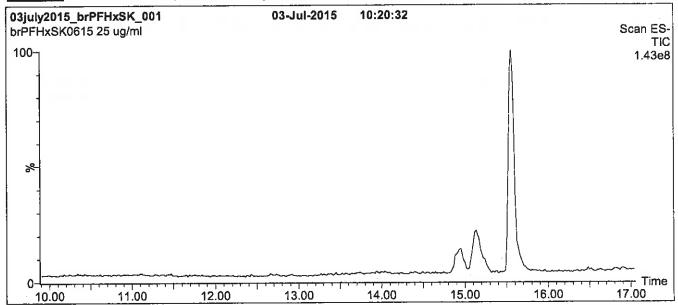
isomer	Name	Structure	Percent Composition by <sup>19</sup> F-NMR
1	Potassium perfluoro-1-hexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K <sup>+</sup>	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CFSO <sub>3</sub> -K <sup>+</sup> CF <sub>3</sub>	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CFCF <sub>2</sub> SO <sub>3</sub> ·K <sup>+</sup> CF <sub>3</sub>	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CFCF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K <sup>+</sup> CF <sub>3</sub>	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CFCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> ·K <sup>+</sup> CF <sub>3</sub>	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	CF <sub>3</sub> CF <sub>3</sub> CCF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> -K <sup>+</sup> CF <sub>3</sub>	0.2
7	Other Unidentified Isomers		0.5

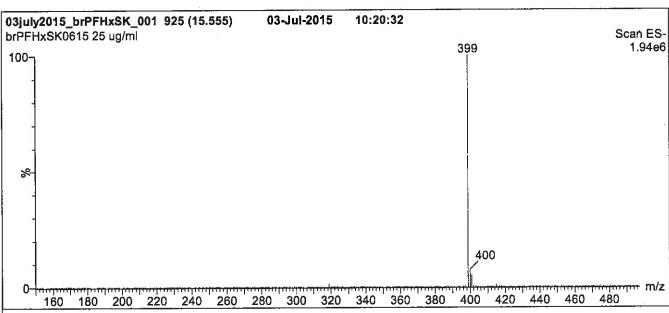
Percent of total perfluorohexanesulfonate isomers only.
 Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By:

Date: 09/27/2016 (mm/dd/yyyy)

Figure 1: br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)





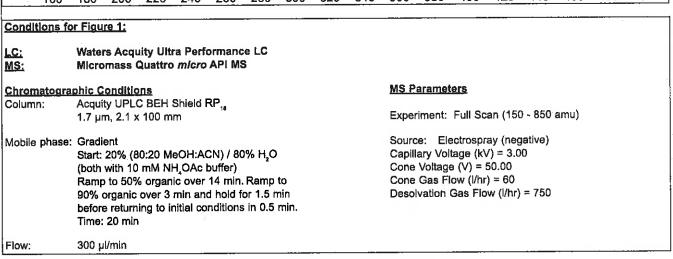
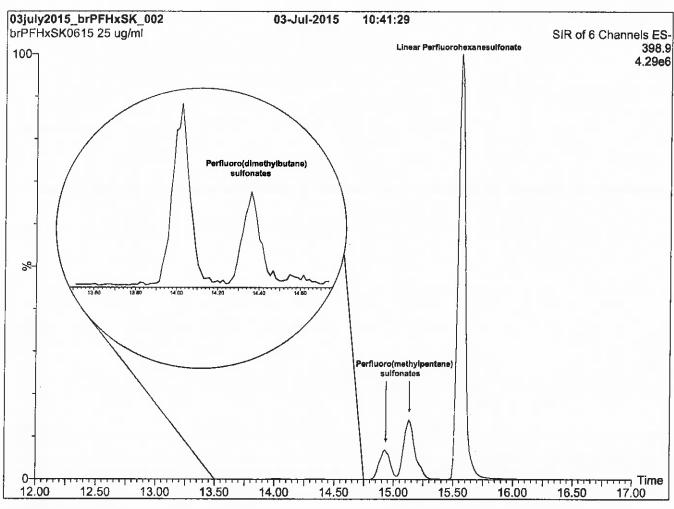


Figure 2: br-PFHxSK; LC/MS Data



### Conditions for Figure 2:

LC: MS:

Waters Acquity Ultra Performance LC

Micromass Quattro micro API MS

### Chromatographic Conditions

Calumn:

Acquity UPLC BEH Shleid RP 18

1.7  $\mu m$ , 2.1  $\times$  100 mm

Mobile phase: Gradient

Start: 20% (80:20 MeOH:ACN) / 80% H<sub>2</sub>O

(both with 10 mM NH OAc 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:

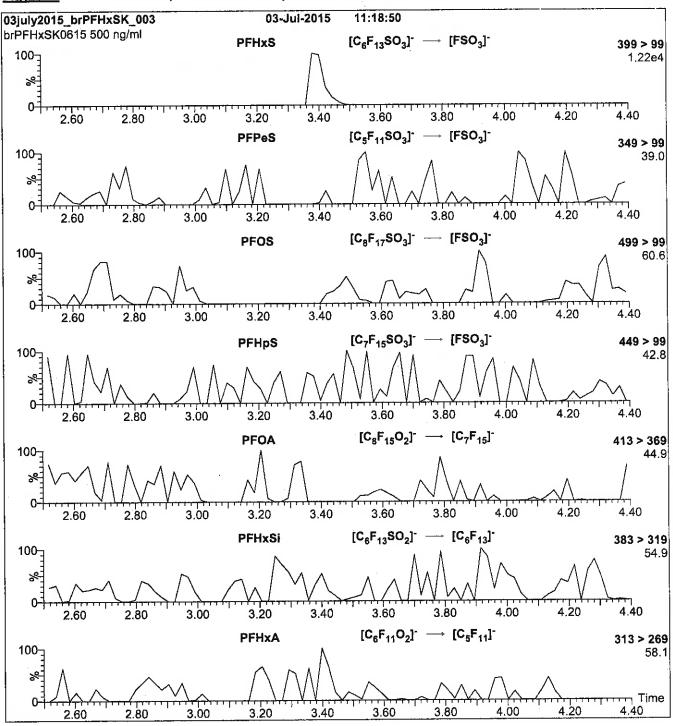
300 µl/min

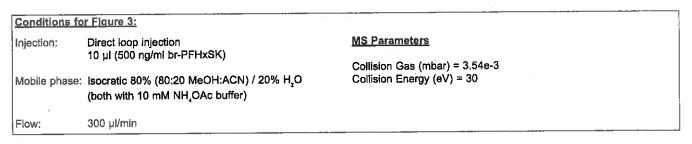
#### **MS Parameters**

Experiment: SIR (6 channels)

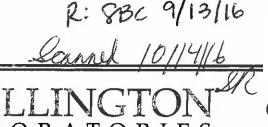
Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 3: br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)





# LCPFNA 00007





ID: LCPFNA\_00006 Exp: 10/23/20 Prpd: SBC PF-n-nonanoic acid



ID: LCPFNA\_00007 Exp: 10/23/20 Prpti: SBC PF-n-nonanoic acid

### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFNA** 

**LOT NUMBER:** 

PFNA1015

**COMPOUND:** 

Perfluoro-n-nonanoic acid

CAS #:

375-95-1

**STRUCTURE:** 

**MOLECULAR FORMULA:** 

C,HF,O,

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

**MOLECULAR WEIGHT:** 

SOLVENT(S):

464.08

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:

Date:

10/30/2015

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

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 welf 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,  $u_i(y)$ , 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

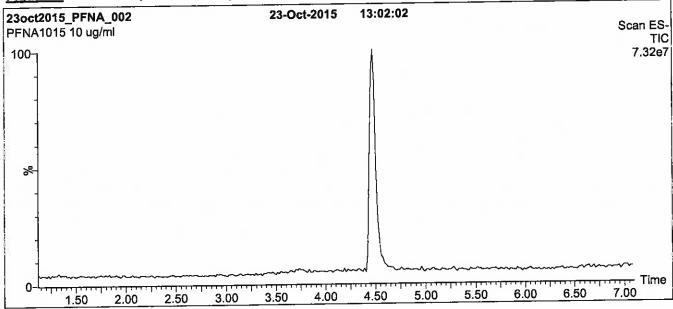
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

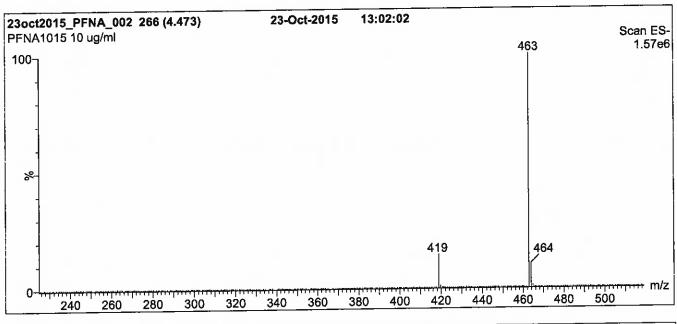




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="https://www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*







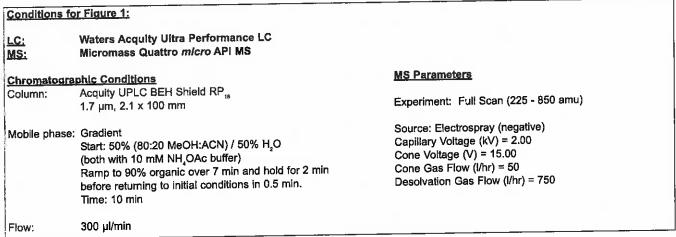
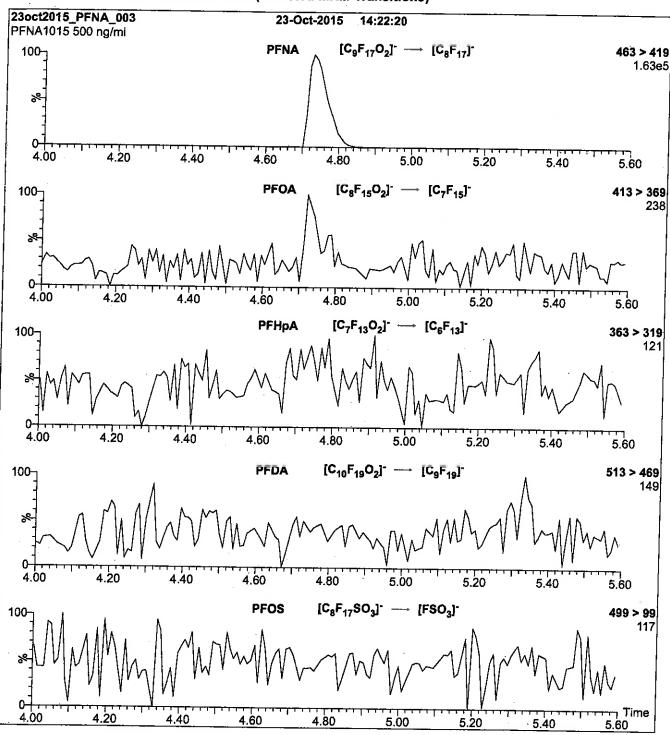
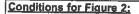


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>o</sub>O

(both with 10 mM NH OAc buffer)

**MS Parameters** 

Collision Gas (mbar) = 3.28e-3 Collision Energy (eV) = 11

Flow:

300 µl/min

# LCPFNA 00009



### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFNA** 

**LOT NUMBER:** 

PFNA0717

COMPOUND:

Perfluoro-n-nonanoic acid

**STRUCTURE:** 

CAS #:

375-95-1

F F F F F F F

**MOLECULAR FORMULA:** 

C,HF,O,

**CONCENTRATION:** 

50 ± 2.5 μg/ml

**MOLECULAR WEIGHT:** 

SOLVENT(S):

Methanol

Water (<1%)

464.08

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

07/20/2017

EXPIRY DATE: (mm/dd/yyyy)

07/20/2022

**RECOMMENDED STORAGE:** 

Store ampoule in a cool, dark place

### **DOCUMENTATION/ DATA ATTACHED:**

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

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

### **ADDITIONAL INFORMATION:**

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA), < 0.1% of perfluoro-n-heptanoic acid (PFHpA), and < 0.1% of perfluoro-n-undecanoic acid (PFUdA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

<u>07/24/2017</u>

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

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

### **HAZARDS:**

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

### SYNTHESIS / CHARACTERIZATION:

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

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value y and the uncertainty of the independent parameters

$$x_1, x_2, ... x_n$$
 on which it depends is: 
$$u_c(y(x_1, x_2, ... x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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

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

### TRACEABILITY:

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

### QUALITY MANAGEMENT:

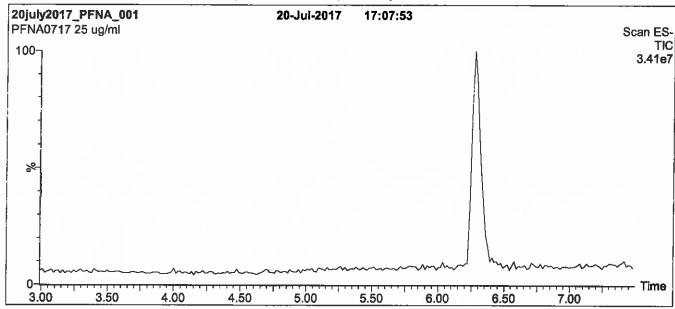
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

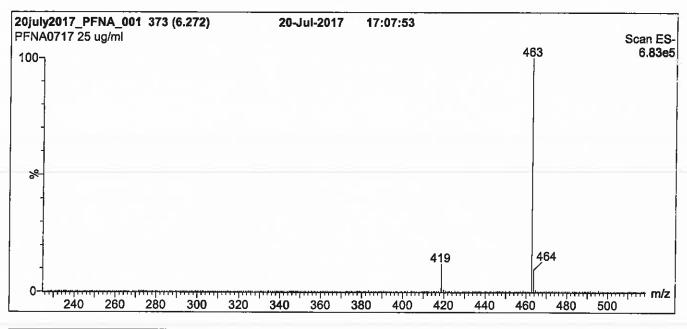




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Figure 1: PFNA; LC/MS Data (TIC and Mass Spectrum)





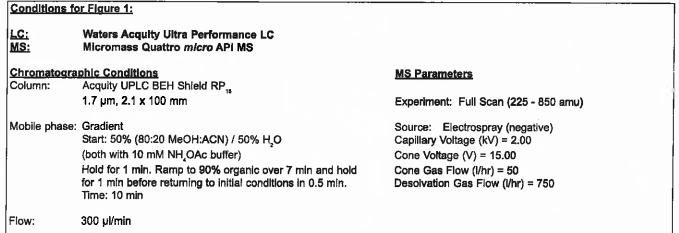
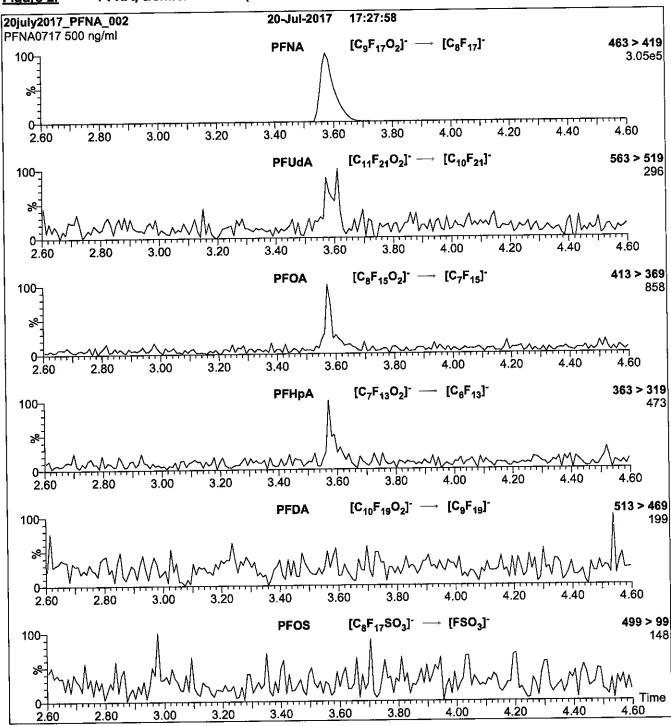
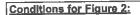


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow:

300 µl/min

#### **MS Parameters**

Collision Gas (mbar) = 3.50e-3 Collision Energy (eV) = 11

# LCPFOA\_00007



### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA0716

COMPOUND: STRUCTURE: Perfluoro-n-octanoic acid

CAS #:

335-67-1

**MOLECULAR FORMULA:** 

CaHFIGO,

**CONCENTRATION:** 

50 ± 2.5 µg/ml

**MOLECULAR WEIGHT:** 

SOLVENT(S):

414.07

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

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:

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:

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

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

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

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### TRACEABILITY:

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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

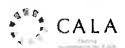
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

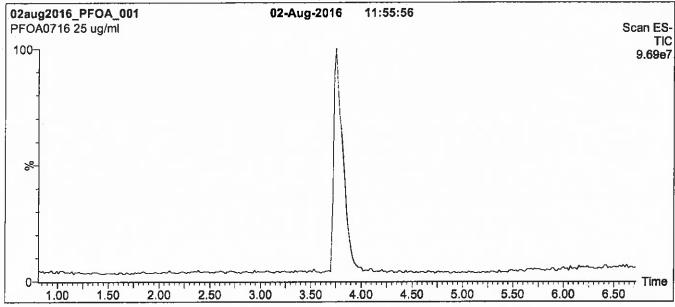
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

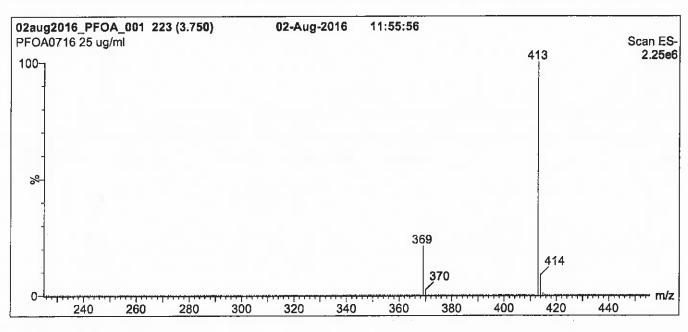




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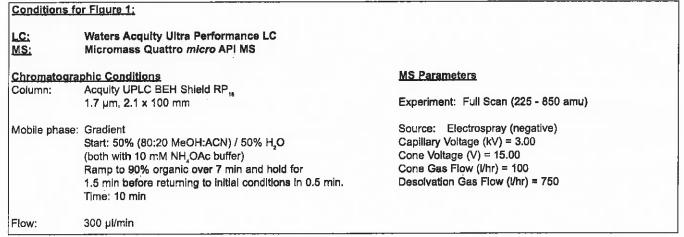
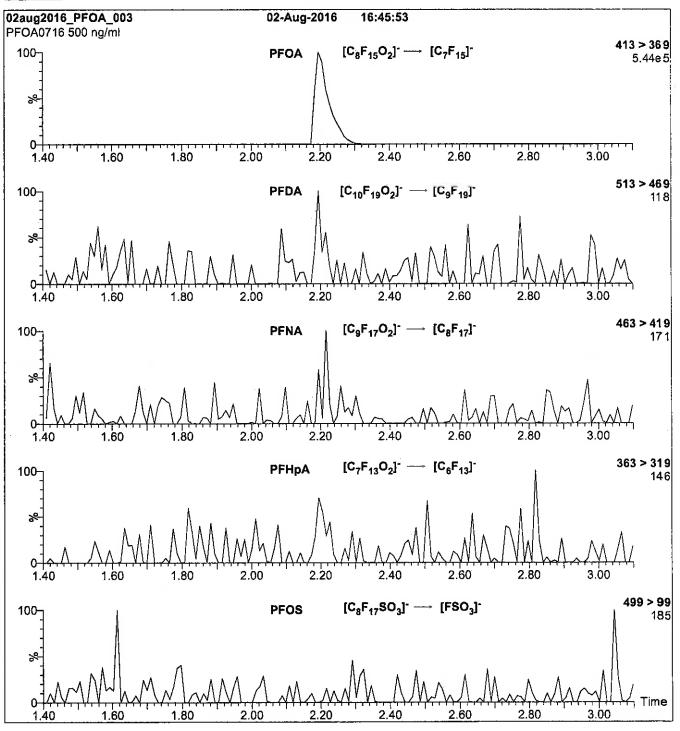
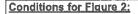


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





injection:

Direct loop injection

10 μl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH OAc buffer)

Flow:

300 µl/min

### **MS Parameters**

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 10

# LCPFOA\_00008



PRODUCT CODE:

**PFOA** 

Perfluoro-n-octanoic acid

**STRUCTURE:** 

**COMPOUND:** 

CAS #:

**LOT NUMBER:** 

335-67-1

PFOA0716

**MOLECULAR FORMULA:** 

**CONCENTRATION:** 

C,HF,O,

 $50 \pm 2.5 \, \mu g/ml$ 

**MOLECULAR WEIGHT:** 

SOLVENT(S):

414.07

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:

Date: 08/05/2016

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

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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$$x_1, x_2, ..., x_n$$
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#### **EXPIRY DATE / PERIOD OF VALIDITY:**

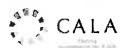
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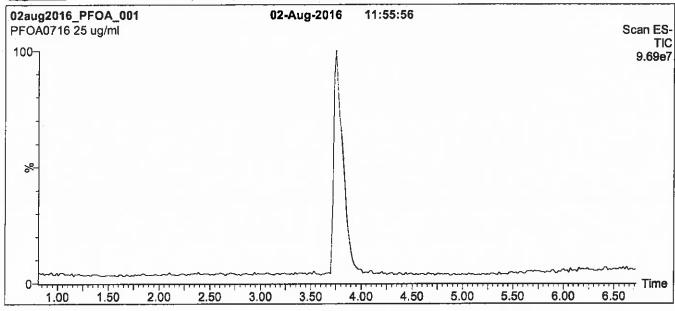
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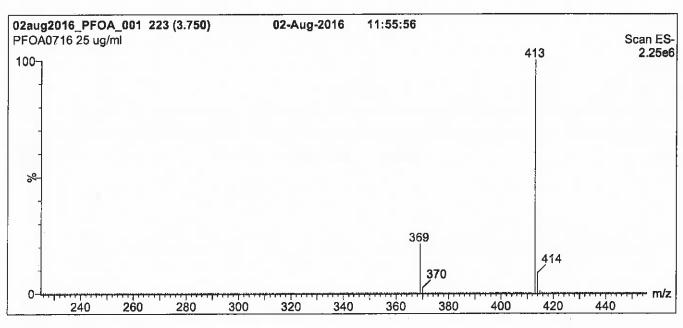




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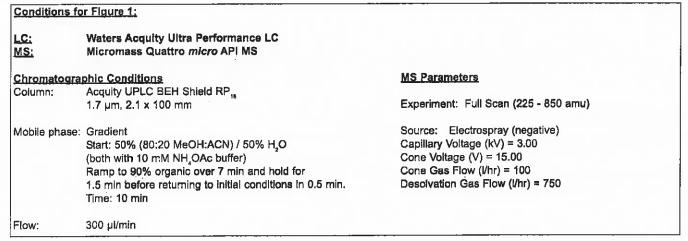
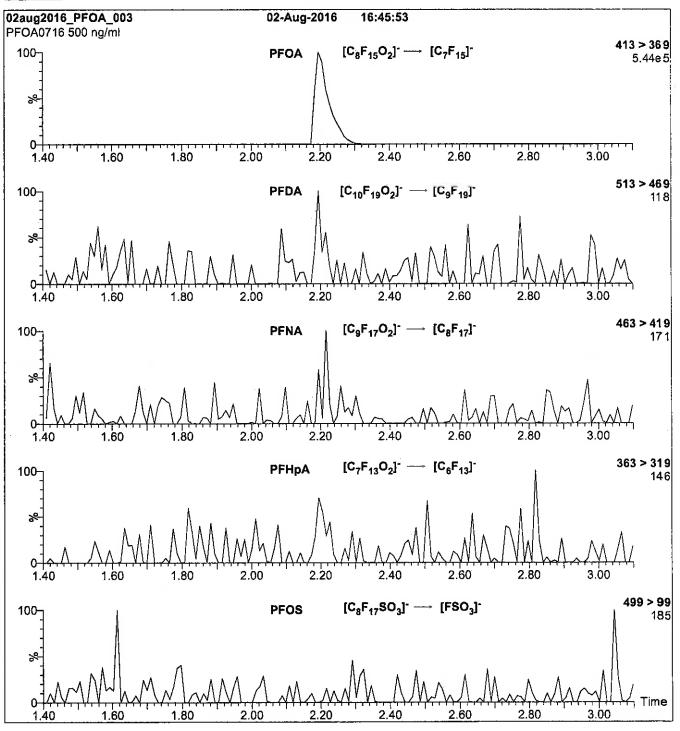


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





injection:

Direct loop injection

10 μl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

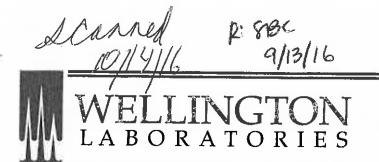
(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

## **MS Parameters**

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 10

# LCPFODA\_00007





PRODUCT CODE:

**PFODA** 

**LOT NUMBER:** 

**COMPOUND:** 

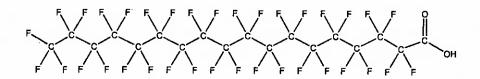
Perfluoro-n-octadecanoic acid

PFODA0416

**STRUCTURE:** 

CAS #:

16517-11-6



**MOLECULAR FORMULA:** 

C<sub>18</sub>HF<sub>35</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:** 

914.14

**CONCENTRATION:** 

 $50 \pm 2.5 \,\mu g/ml$ 

SOLVENT(S):

Methanoi

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.

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 $X_1, X_2,...X_n$  on which it depends is:

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#### **QUALITY MANAGEMENT:**

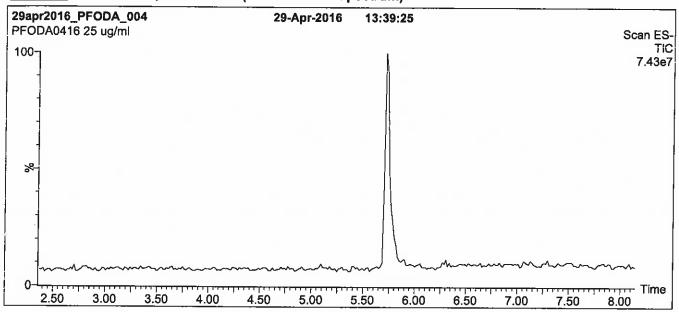
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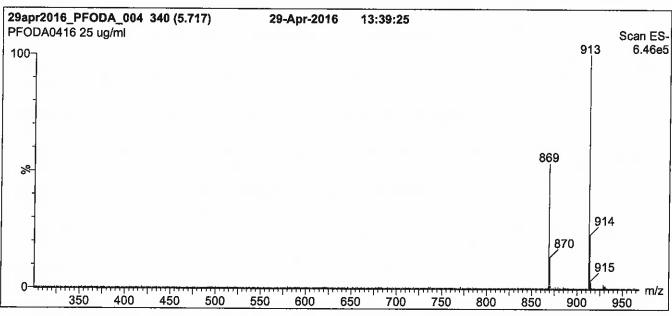




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Figure 1: PFODA; LC/MS Data (TIC and Mass Spectrum)





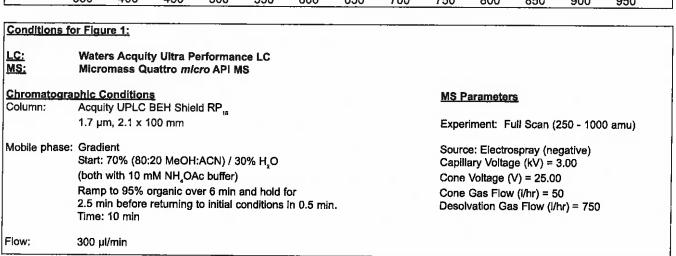
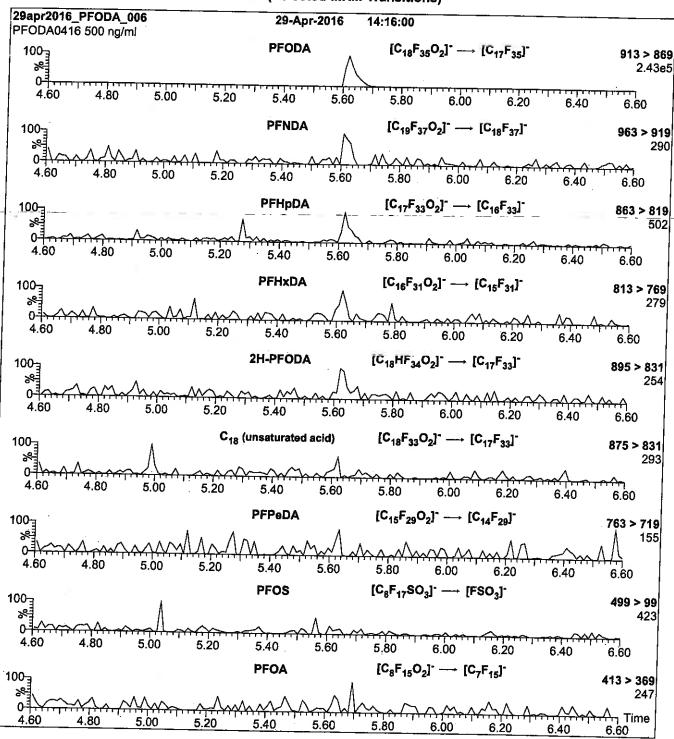
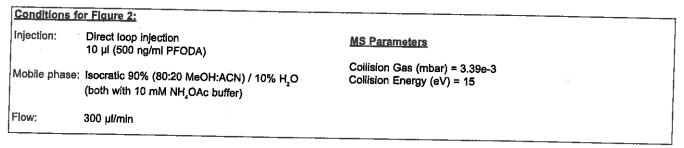


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFODA\_00008



**PRODUCT CODE:** 

**PFODA** 

LOT NUMBER:

PFODA0416

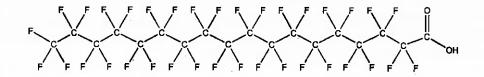
COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:

**CAS #:** 

16517-11-6



**MOLECULAR FORMULA:** 

C, HF, O,

**MOLECULAR WEIGHT:** 

914.14

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyw)

04/29/2016

EXPIRY DATE: (mm/dd/yyyy)

04/29/2021

RECOMMENDED STORAGE:

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## **DOCUMENTATION/ DATA ATTACHED:**

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

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

## **ADDITIONAL INFORMATION:**

See page 2 for further details.

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Certified By:

Date: 05/20/2016

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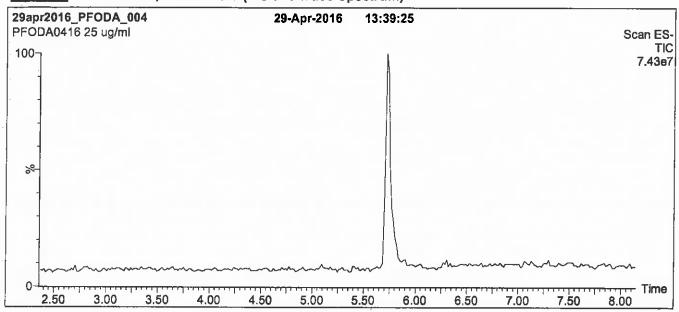
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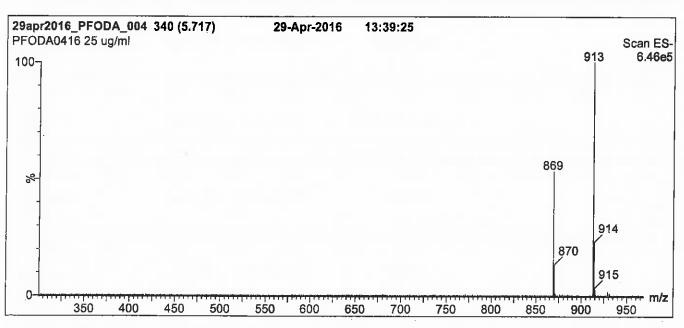




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Figure 1: PFODA; LC/MS Data (TIC and Mass Spectrum)





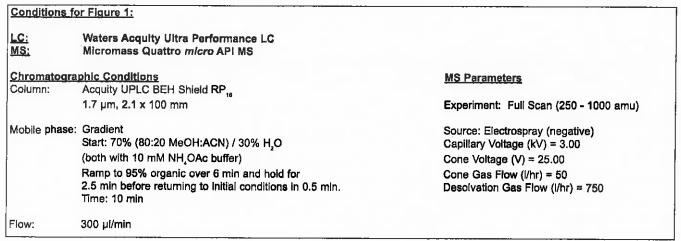
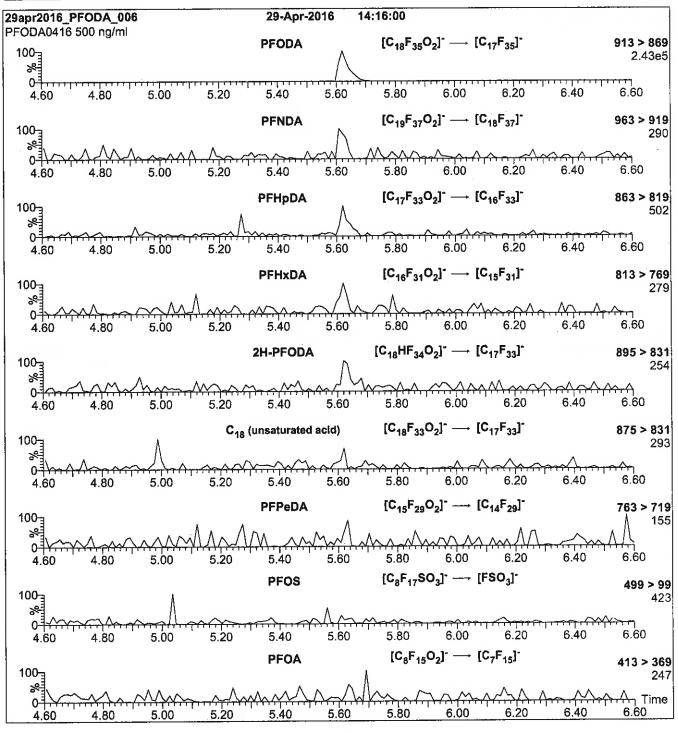
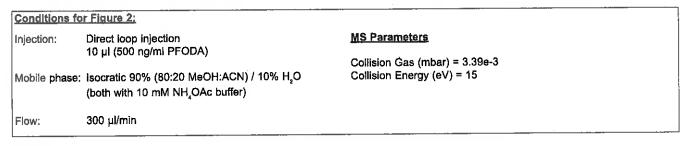
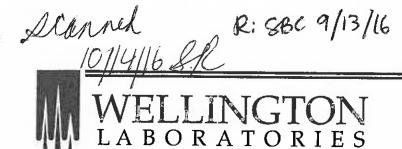


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





LCPFOS-br\_00003





ID: LCPFOS-br\_00002 Exp: 10/14/20 Prpd: SBC Potassium Perfluorocctane



ID: LCPFOS-br\_00003

Exp: 10/14/20 Prpd: SBC

Potassium Perfluorooctane

## 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/yyy)

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 19F-NMR

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

Figure 2: LC/MS Data (SIR)

Figure 3: LC/MS/MS Data (Selected MRM Transitions)

## **ADDITIONAL INFORMATION:**

See page 2 for further details.

 A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.

CAS#: 2795-39-3 (for linear isomer; potassium salt).

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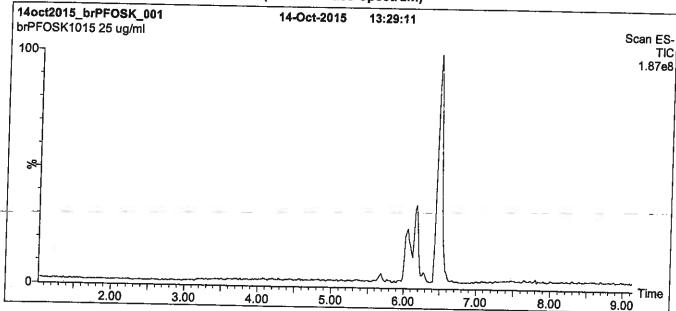
Table A: br-PFOSK; Isomeric Components and Percent Composition (by 19F-NMR)\*

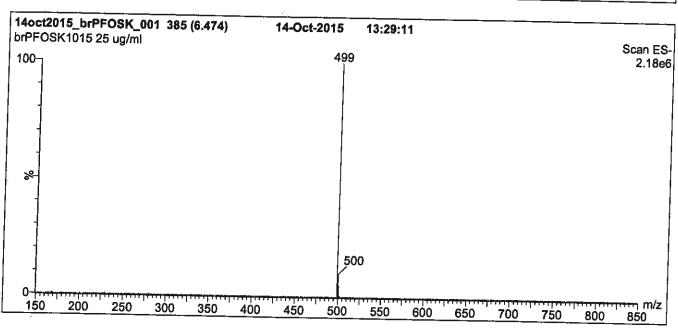
Isomer	Name	Structure	Percent Composition by ¹ºF-NMR
1	Potassium perfluoro-1-octanesulfonate	CF <sub>3</sub> CF <sub>2</sub> SO <sub>3</sub> K*	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>3</sub>	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>4</sup> CF <sub>3</sub>	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>4</sup> CF <sub>3</sub>	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CFCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CFCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>4</sup> CF <sub>3</sub>	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>3</sub> -CCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>3</sub> CF <sub>2</sub> —C—CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> —CF—CF—CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>↑</sup> CF <sub>3</sub> CF <sub>3</sub>	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> -CF-CF <sub>2</sub> -CF-CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub> CF <sub>3</sub>	0.07

<sup>\*</sup> Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2. 
\*\* Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: Date: 10/15/2015







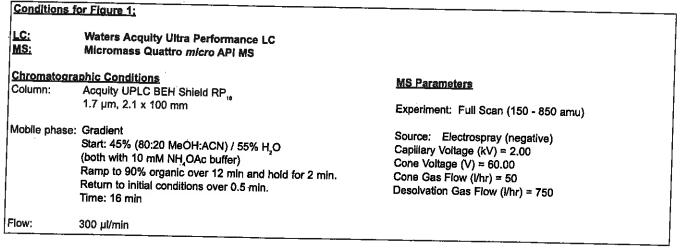
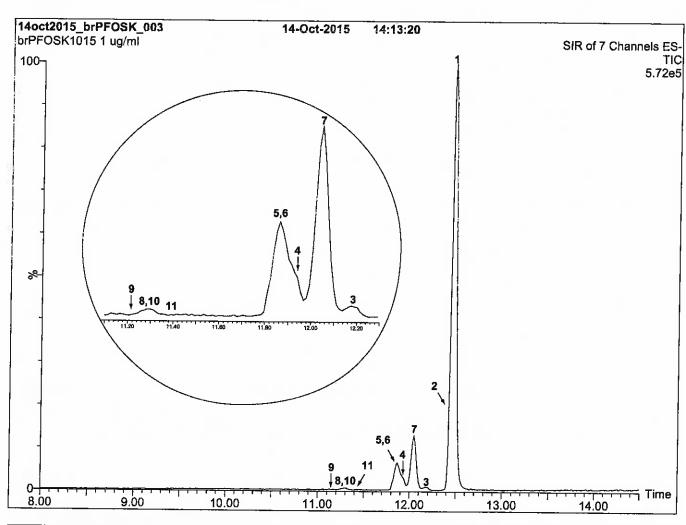


Figure 2: br-PFOSK; LC/MS Data (SIR)



## 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  $\mu$ m, 2.1 x 100 mm)

Injection:

1.0 µg/ml of br-PFOSK

Mobile Phase:

Gradient

45% (80:20 MeOH:ACN) / 55%  $\rm{H_2O}$  (both with 10 mM NH<sub>4</sub>OAc 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:

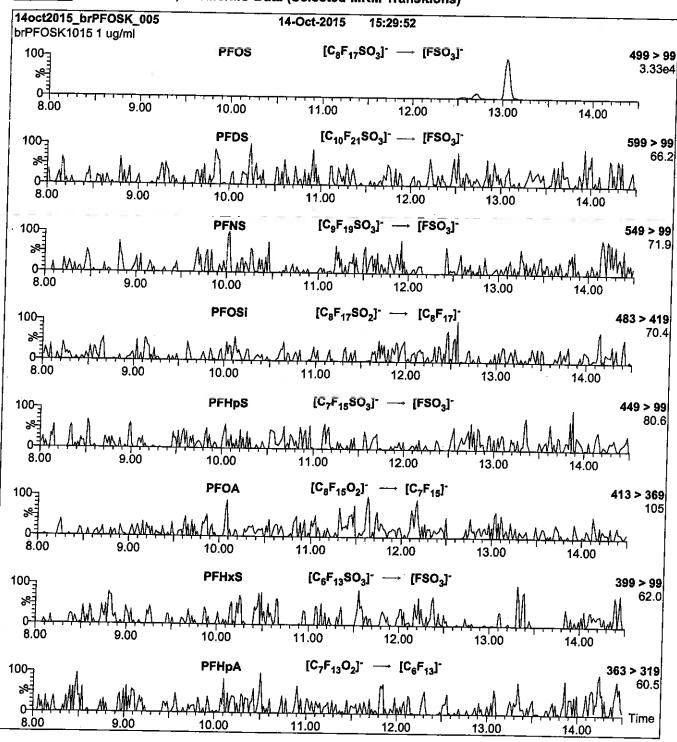
SIR (ES)

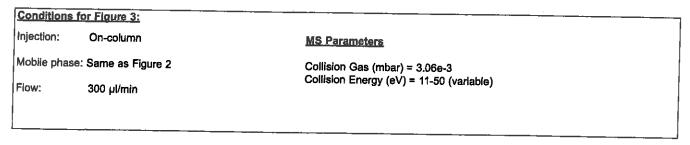
Source = 110 °C

Desolvation = 325 °C

Cone Voltage = 60V

Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)





LCPFOS-br\_00004



## br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

**PRODUCT CODE:** 

br-PFOSK

LOT NUMBER:

brPFOSK1015

**CONCENTRATION:** 

 $50 \pm 2.5 \mu g/ml$  (total potassium sait)

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/yyy)

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 19F-NMR

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

Figure 2: LC/MS Data (SIR)

Figure 3: LC/MS/MS Data (Selected MRM Transitions)

## **ADDITIONAL INFORMATION:**

See page 2 for further details.

A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.

CAS#: 2795-39-3 (for linear isomer; potassium salt).

## 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

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

## TRACEABILITY:

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

## **EXPIRY DATE / PERIOD OF VALIDITY:**

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

## LIMITED WARRANTY:

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

## QUALITY MANAGEMENT:

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





\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.weil-labs.com">www.weil-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

Table A: br-PFOSK; Isomeric Components and Percent Composition (by 19F-NMR)\*

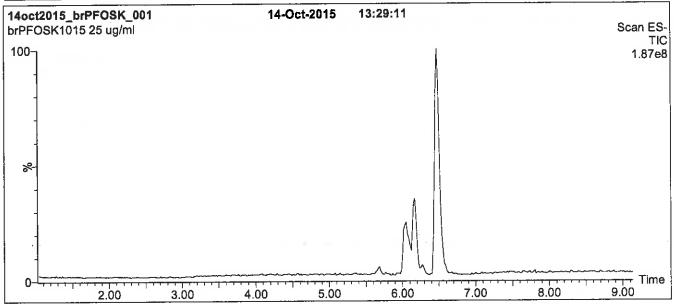
Isomer	Name	Structure	Percent Composition by "F-NMR
1	Potassium perfluoro-1-octanesulfonate	CF <sub>3</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup>	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CFSO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CFCF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K* CF <sub>3</sub>	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>C</sub> F <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>C</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CFCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>3</sub> -CCF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K* CF <sub>3</sub>	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub>	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> -CF-CF-CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> K <sup>+</sup> CF <sub>3</sub> CF <sub>3</sub>	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesuifonate	CF <sub>3</sub> CFCF <sub>2</sub> CF <sub>2</sub>	0.07

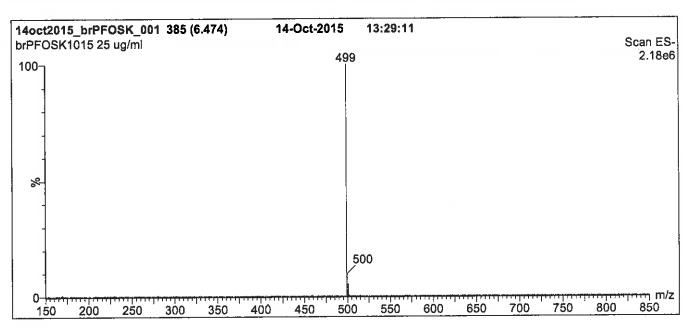
Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
 Systematic Name: Potassium perfluorooctane-2-sulfonate.

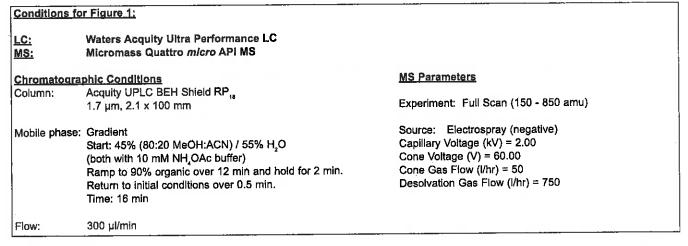
Certified By: Date: 10/15/2015

B.G. Chittim

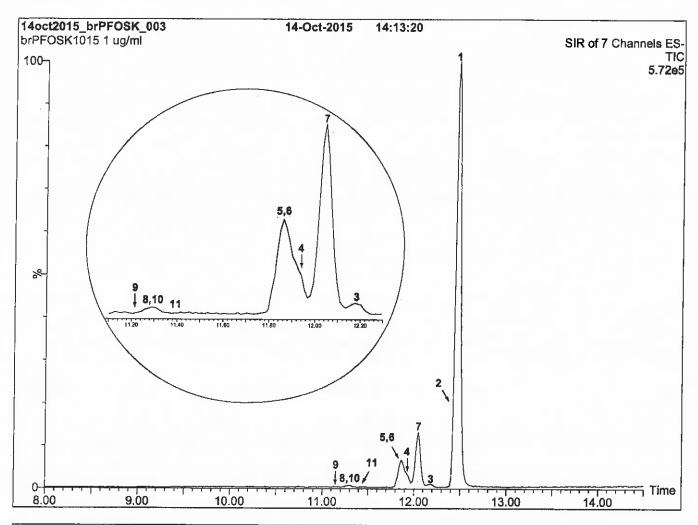
Figure 1: br-PFOSK; LC/MS Data (TIC and Mass Spectrum)







## 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

Acquity UPLC BEH Shield RP  $_{18}$  (1.7  $\mu m_{\rm r}$  2.1 x 100 mm)

Injection:

1.0 µg/ml of br-PFOSK

Mobile Phase:

Gradient

45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O (both with 10 mM NH<sub>4</sub>OAc buffer)

Ramp to 90% organic over 15 min and hold for 3 min.

Return to initial conditions over 1 min.

Time: 20 min

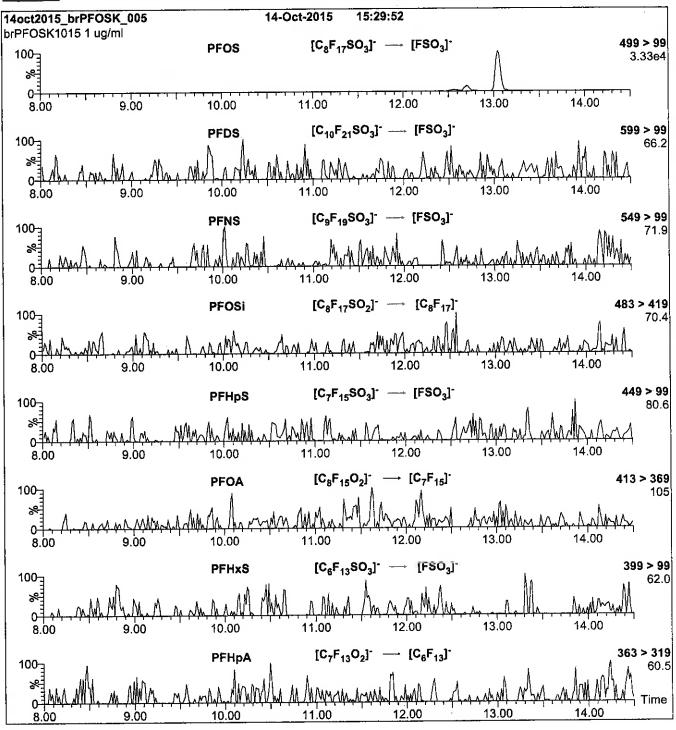
Flow:

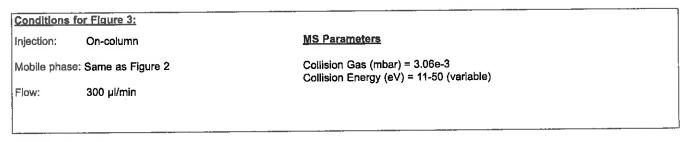
300 µl/min

### MS Conditions:

SIR (ES<sup>-</sup>) Source = 110 °C Desolvation = 325 °C Cone Voltage = 60V

Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)





# LCPFOSA\_00010



PRODUCT CODE:

FOSA-I

Perfluoro-1-octanesulfonamide

LOT NUMBER: FOSA0916I

STRUCTURE:

**COMPOUND:** 

CAS #:

754-91-6

**MOLECULAR FORMULA:** 

**CONCENTRATION:** 

CaHaFi,NO2S  $50 \pm 2.5 \,\mu g/ml$ 

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/yyyy)

09/30/2016

EXPIRY DATE: (mm/dd/yyy)

09/30/2021

**RECOMMENDED STORAGE:** 

Refrigerate ampoule

**MOLECULAR WEIGHT:** 

SOLVENT(S):

Isopropano!

499.14

## **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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: 10/07/2016

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,  $u_{\epsilon}(y)$ , of a value y and the uncertainty of the independent parameters

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

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

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

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## TRACEABILITY:

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## **EXPIRY DATE / PERIOD OF VALIDITY:**

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

## **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

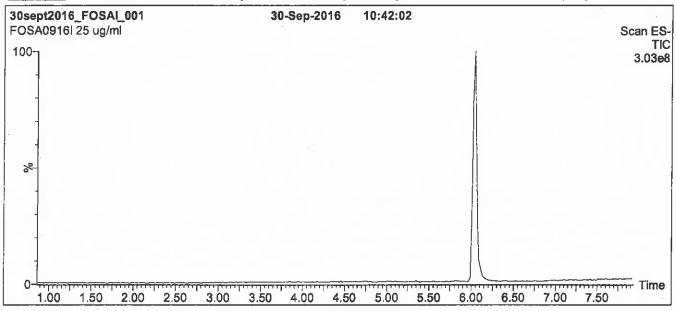
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

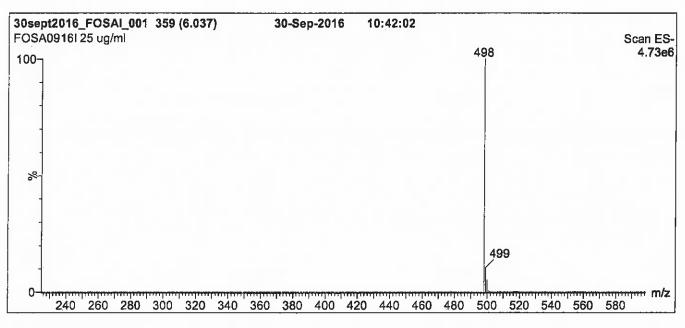


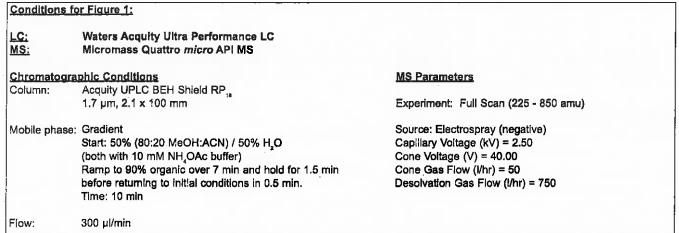


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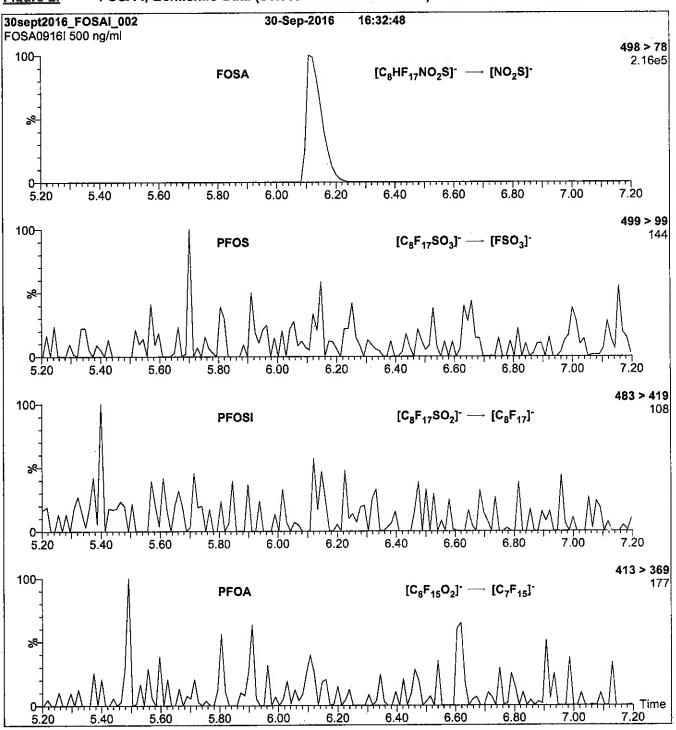
Figure 1: FOSA-I; LC/MS Data (TIC and Mass Spectrum)

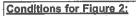






FOSA-I; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 μl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O (both with 10 mM NH<sub>2</sub>OAc buffer)

Flow: 300 µl/min

## MS Parameters

Collision Gas (mbar) = 3.20e-3 Collision Energy (eV) = 30

# LCPFPeA\_00006



**PRODUCT CODE:** 

**PFPeA** 

**LOT NUMBER:** 

PFPeA0516

COMPOUND:

Perfluoro-n-pentanoic acid

**STRUCTURE:** 

CAS #:

2706-90-3

F F F

MOLECULAR FORMULA:

C,HF,O,

**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  $\sim 0.3\%$  of Perfluoro-n-heptanoic acid (PFHpA) and  $\sim 0.2\%$  of  $C_sH_2F_sO_2$  (hydrido - derivative) as measured by <sup>19</sup>F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 06/02/2016

(mm/dd/vw

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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## **LIMITED WARRANTY:**

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## **QUALITY MANAGEMENT:**

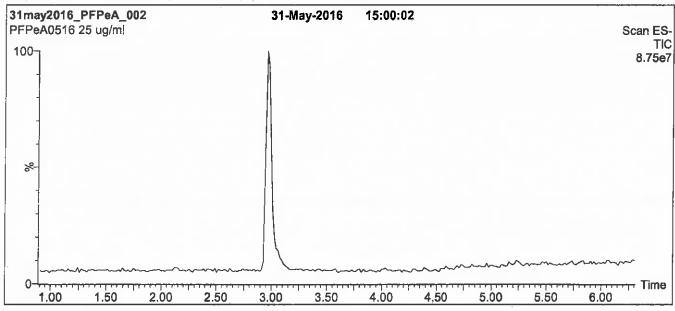
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

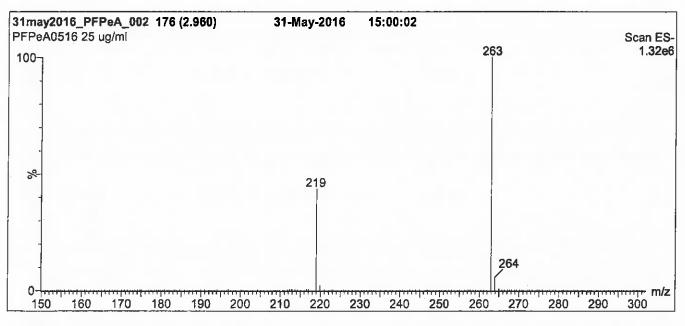




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at <a href="www.well-labs.com">www.well-labs.com</a> or contact us directly at <a href="mailto:info@well-labs.com">info@well-labs.com</a>\*\*

#### Figure 1: PFPeA; LC/MS Data (TIC and Mass Spectrum)





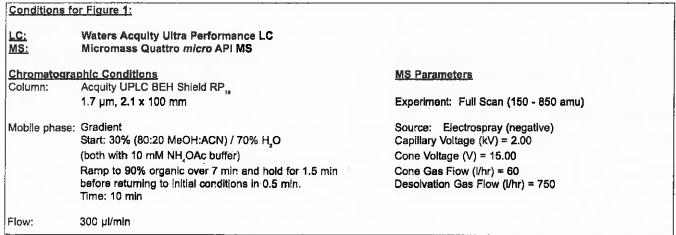
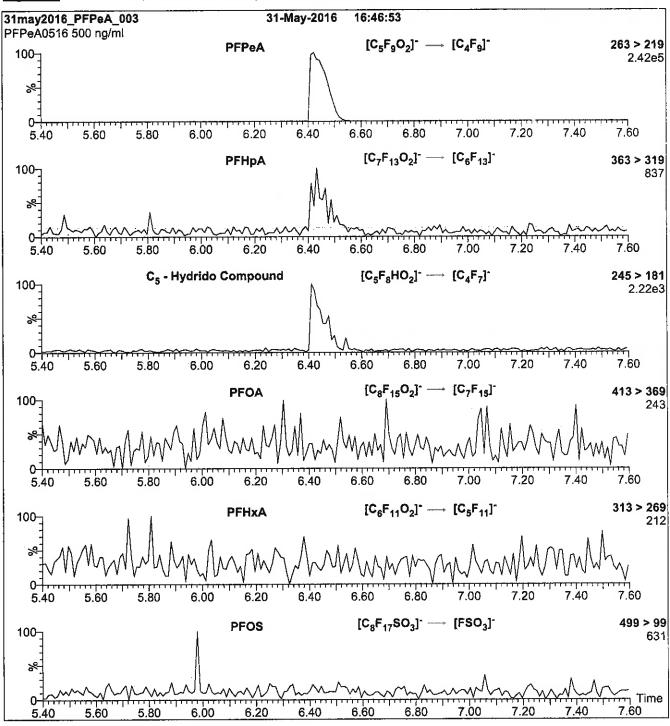
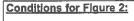


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Flow:

Direct loop injection

10 μI (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O

(both with 10 mM NH,OAc buffer)

300 µl/min

#### MS Parameters

Collision Gas (mbar) = 3.20e-3 Collision Energy (eV) = 9

# LCPFPeA\_00007



#### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFPeA** 

Perfluoro-n-pentanoic acid

**LOT NUMBER:** 

PFPeA0516

**STRUCTURE:** 

**COMPOUND:** 

CAS #:

2706-90-3

**MOLECULAR FORMULA:** 

**CONCENTRATION:** 

C,HF,O,

 $50 \pm 2.5 \, \mu g/ml$ 

MOLECULAR WEIGHT:

SOLVENT(S):

264.05

Methanol

Water (<1%)

**CHEMICAL PURITY:** 

>98%

LAST TESTED: (mm/dd/ywy)

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<sub>5</sub>H<sub>2</sub>F<sub>5</sub>O<sub>3</sub> (hydrido - derivative) as measured by 19F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 06/02/2016

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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

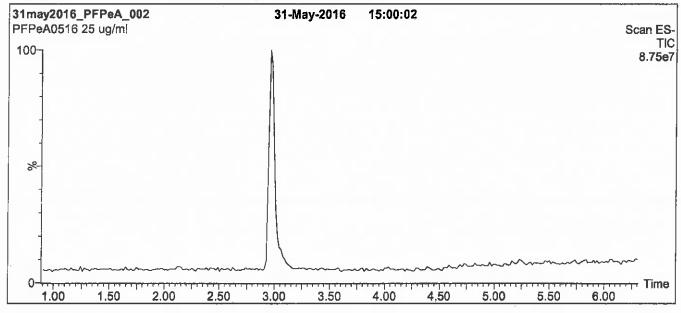
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

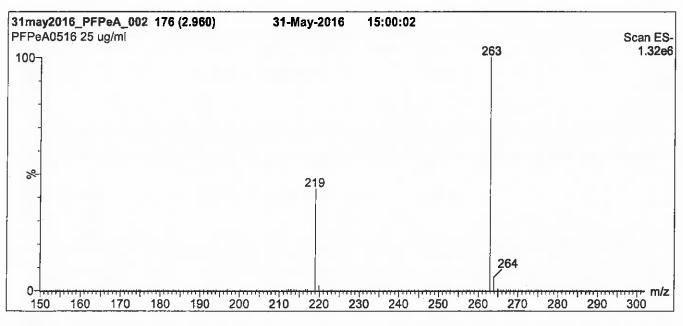




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#### Figure 1: PFPeA; LC/MS Data (TIC and Mass Spectrum)





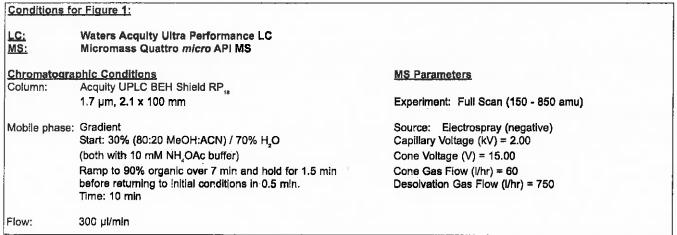
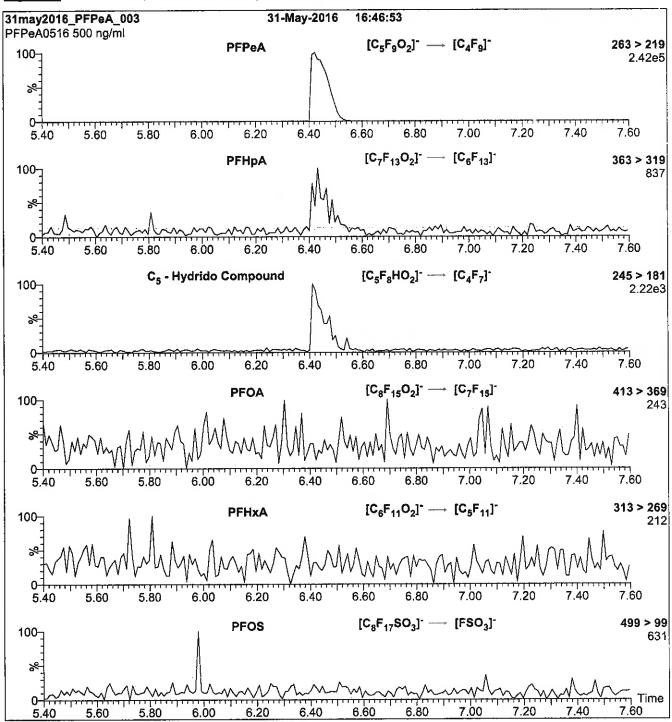
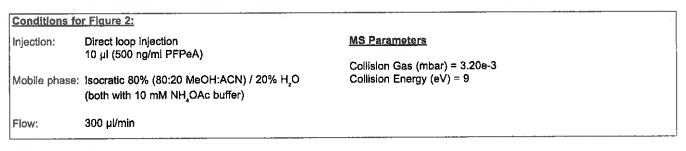


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFTeDA\_00005



ID: LCPFTeDA\_00005 Exp: 12/09/20 Prpd: \$8C PF-n-tetradecanoic acid



ID: LCPFTeDA\_00006





# VELLINGTON ABORATORIES

#### **CERTIFICATE OF ANALYSIS DOCUMENTATION**

PRODUCT CODE:

**PFTeDA** 

**LOT NUMBER:** 

PFTeDA1215

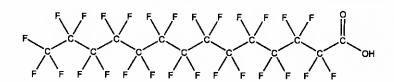
**COMPOUND:** 

**STRUCTURE:** 

Perfluoro-n-tetradecanoic acid

**CAS #:** 

376-06-7



**MOLECULAR FORMULA:** 

C, HF, O,

**MOLECULAR WEIGHT:** 

714.11

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

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  $\sim 0.2\%$  of PFDoA (C<sub>15</sub>HF<sub>28</sub>O<sub>2</sub>) and  $\sim 0.2\%$  of PFPeDA (C<sub>15</sub>HF<sub>28</sub>O<sub>2</sub>).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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/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,  $u_{\underline{i}}(y)$ , 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:**

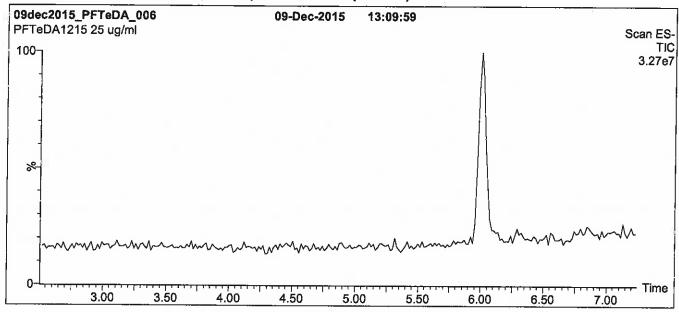
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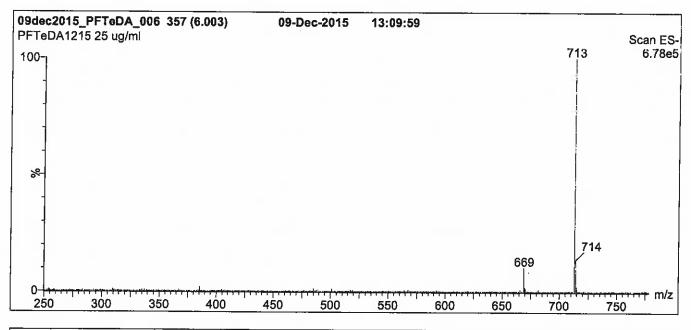




\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com\*\*

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





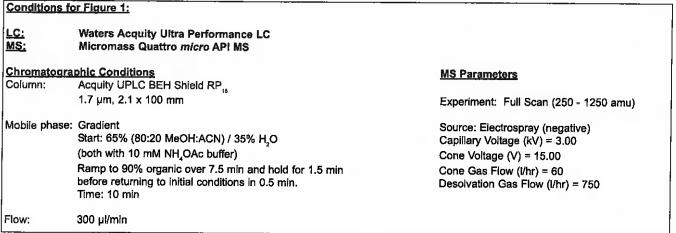
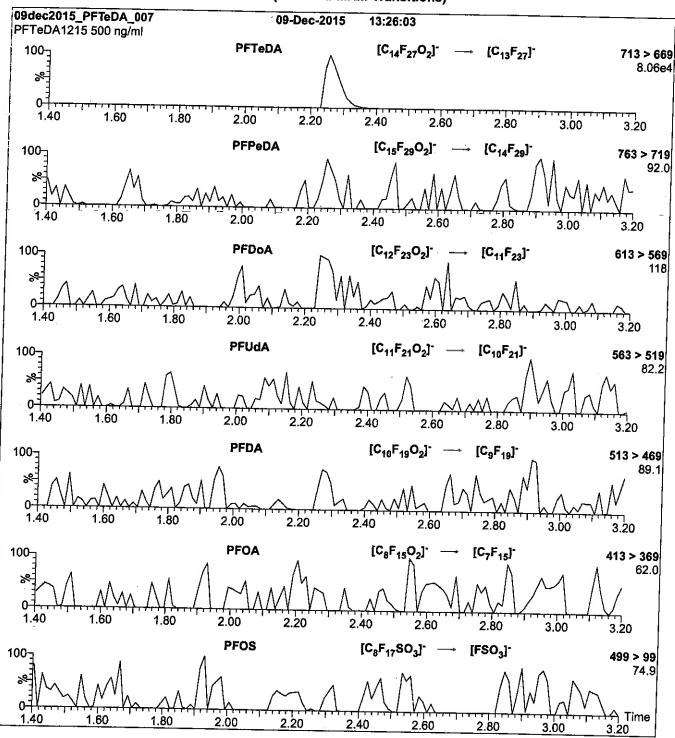
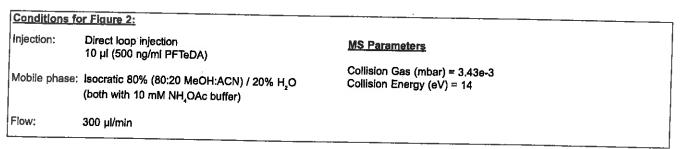


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFTeDA\_00007



#### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFTeDA** 

**LOT NUMBER:** 

PFTeDA0916

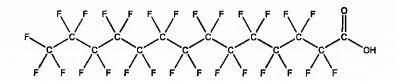
**COMPOUND:** 

Perfluoro-n-tetradecanoic acid

STRUCTURE:

**CAS #:** 

376-06-7



**MOLECULAR FORMULA:** 

C14HF27O2

**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.

Contains ~ 0.2% of PFDoA ( $C_{19}HF_{23}O_{2}$ ) and ~ 0.2% of PFPeDA ( $C_{15}HF_{29}O_{2}$ ).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/05/2016

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

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,  $u_x(y)$ , 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  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

#### TRACEABILITY:

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

#### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT**

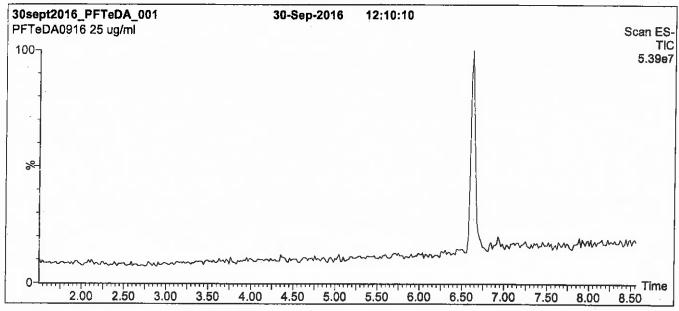
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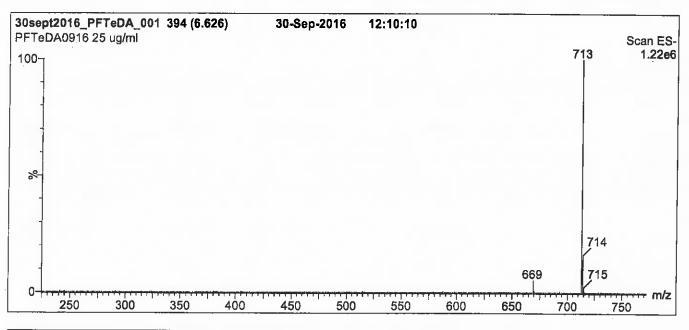




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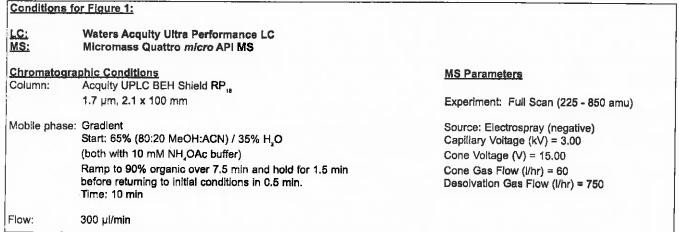
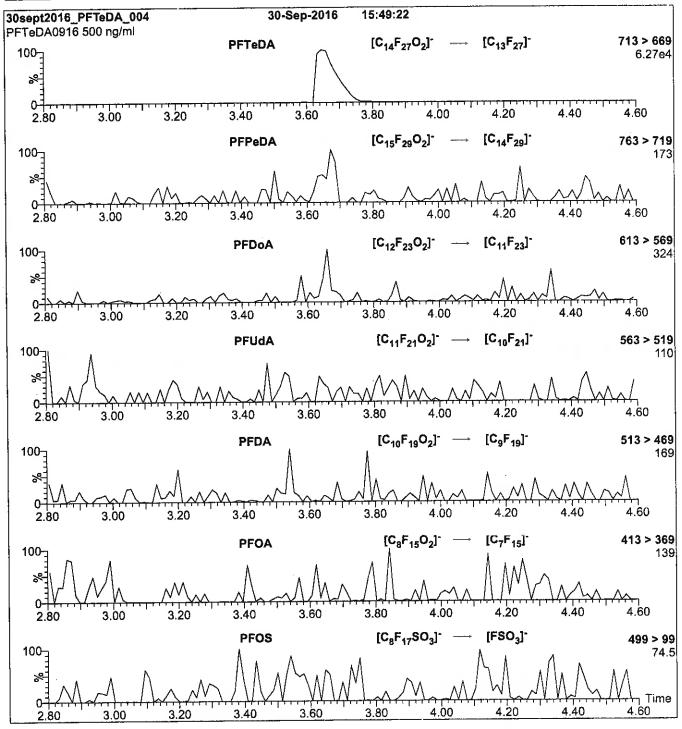
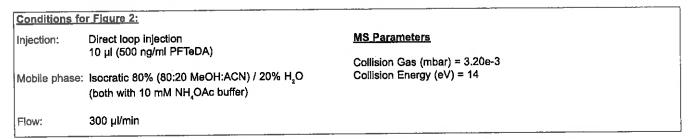


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFTrDA\_00005



ID: LCPFTrDA\_00005 Exp: 02/12/21 Prpd: SBC PF-n-tridecanoic acid



ID: LCPFTrDA\_00006 Exp: 02/12/21 Prpd: SBC PF-n-tridecanoic acid



# VELLINGTON ABORATORIES

#### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFTrDA** 

LOT NUMBER:

PFTrDA0216

**COMPOUND:** 

**STRUCTURE:** 

Perfluoro-n-tridecanoic acid

**CAS #:** 

72629-94-8



**MOLECULAR FORMULA:** 

C13HF25O2

**MOLECULAR WEIGHT:** 

664.11

**CONCENTRATION:** 

 $50 \pm 2.5 \, \mu g/ml$ 

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

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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<sub>14</sub>HF<sub>27</sub>O<sub>2</sub>).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>02/16/2016</u>

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

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

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

#### TRACEABILITY:

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#### **LIMITED WARRANTY:**

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#### **QUALITY MANAGEMENT:**

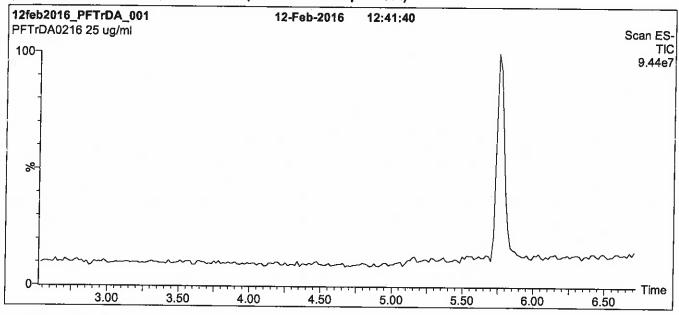
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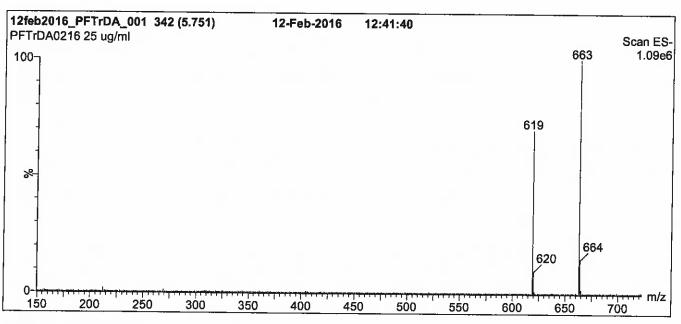




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Figure 1: PFTrDA; LC/MS Data (TIC and Mass Spectrum)





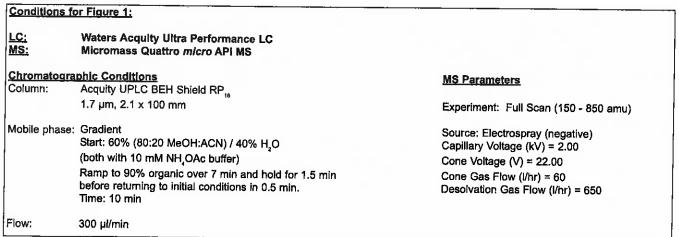
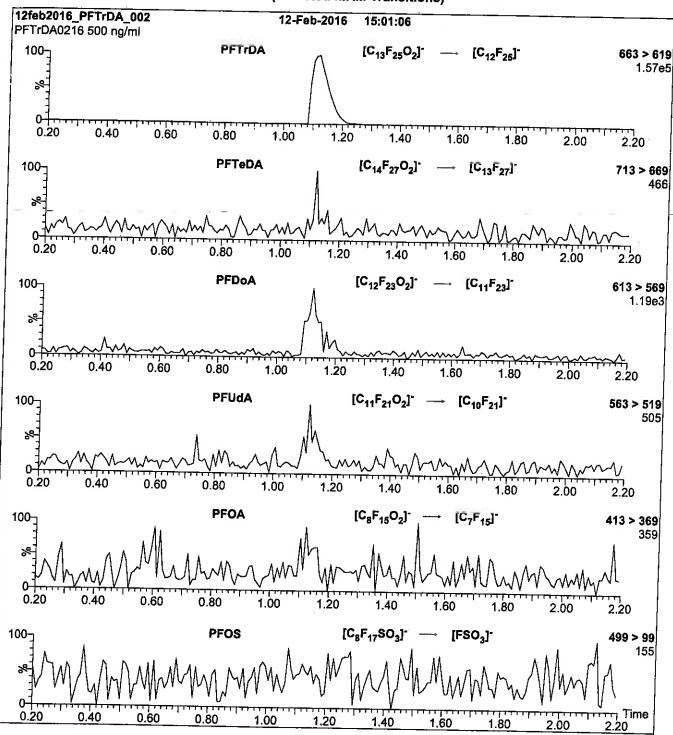


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% MeOH / 20% H<sub>2</sub>O

Flow:

· 300 µl/mln

#### MS Parameters

Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 15

# LCPFTrDA\_00007



### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFTrDA** 

**LOT NUMBER:** 

PFTrDA0216

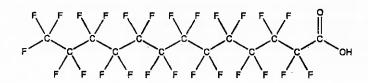
COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:

CAS #:

72629-94-8



**MOLECULAR FORMULA:** 

C, HF, O,

**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

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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

519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

Certified By:

R G Chittim

Date: <u>02/</u>

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

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,  $u_x(y)$ , 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:**

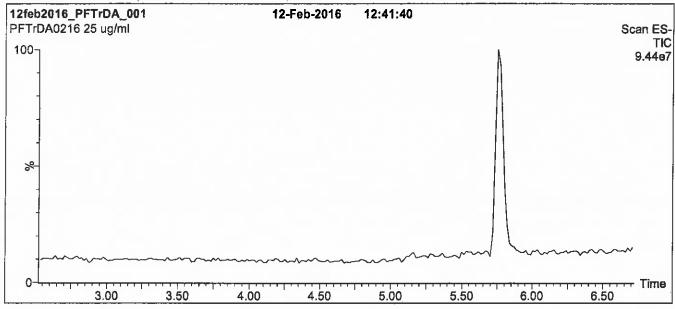
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

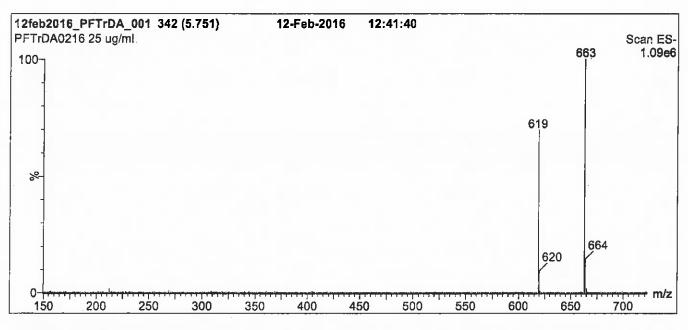




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#### Figure 1: PFTrDA; LC/MS Data (TIC and Mass Spectrum)





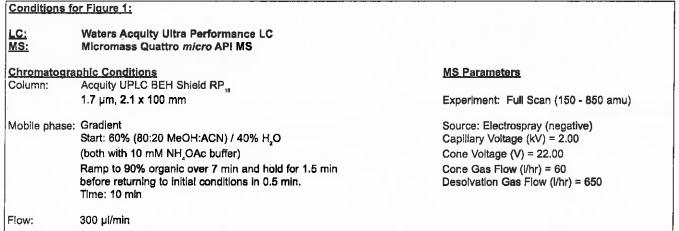
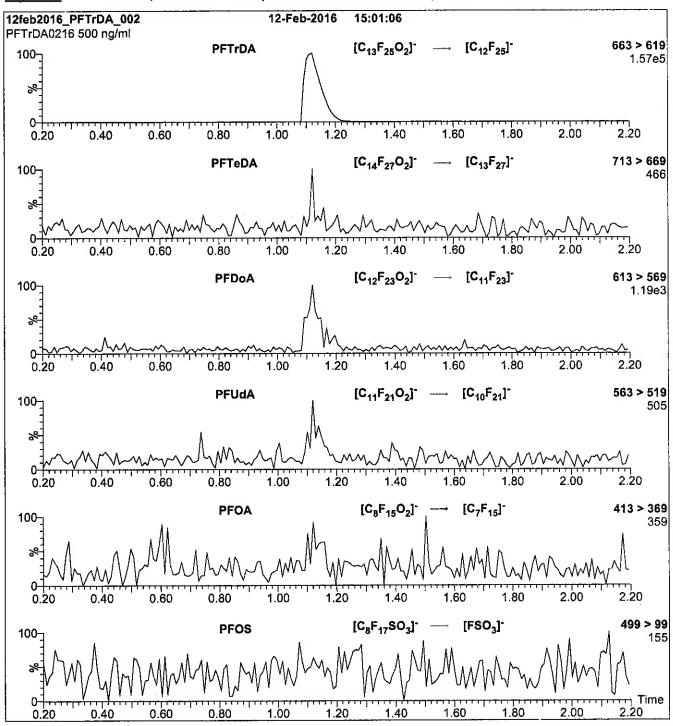
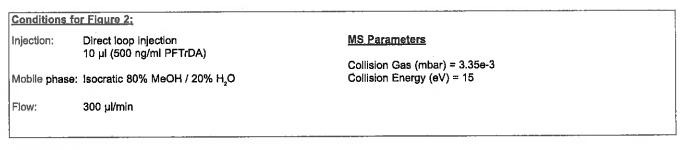
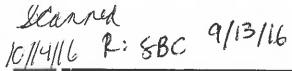


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





## LCPFUdA\_00006





ID: LCPFUdA\_00005

Exp: 08/19/20 Prpd: SBC

PF-ri-undecanoic acid



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

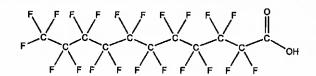
COMPOUND:

Perfluoro-n-undecanoic acid

**STRUCTURE:** 

CAS #:

2058-94-8



**MOLECULAR FORMULA:** 

C, HF, O,

**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 Phittim

Date:

(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

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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Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solutility 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.

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#### **TRACEABILITY:**

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#### EXPIRY DATE / PERIOD OF VALIDITY:

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

#### **LIMITED WARRANTY:**

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

#### **QUALITY MANAGEMENT:**

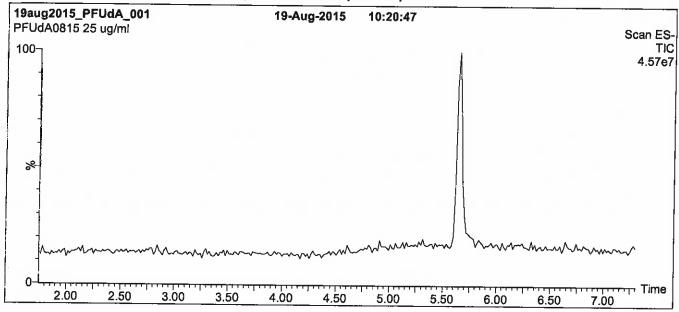
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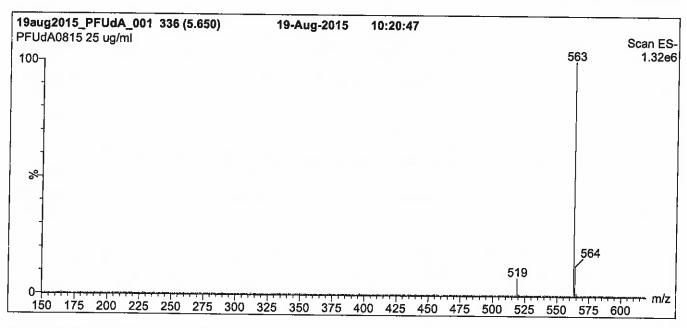




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





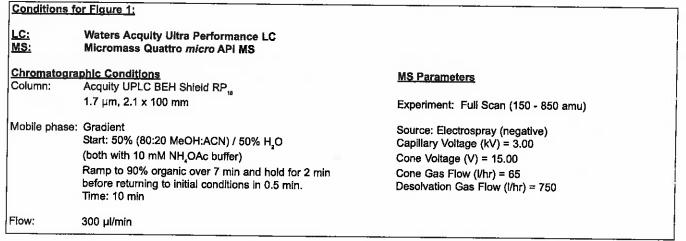
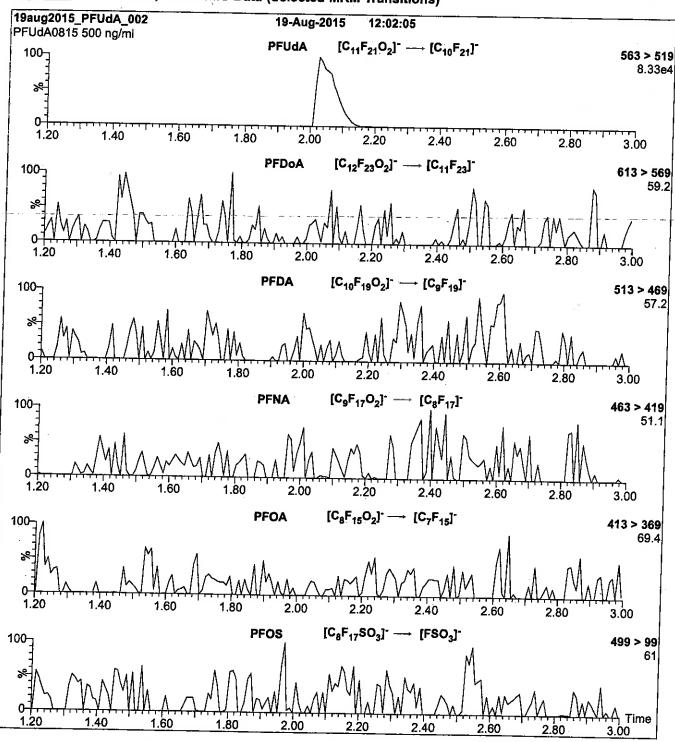
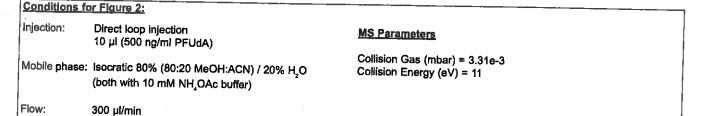


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





# LCPFUdA\_00007



### CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

**PFUdA** 

LOT NUMBER:

PFUdA1016

**COMPOUND:** 

Perfluoro-n-undecanoic acid

STRUCTURE:

CAS #:

2058-94-8

**MOLECULAR FORMULA:** 

C,HF,O,

MOLECULAR WEIGHT:

564.09

**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

#### **DOCUMENTATION/ DATA ATTACHED:**

Figure 1: 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: 10/19/2010

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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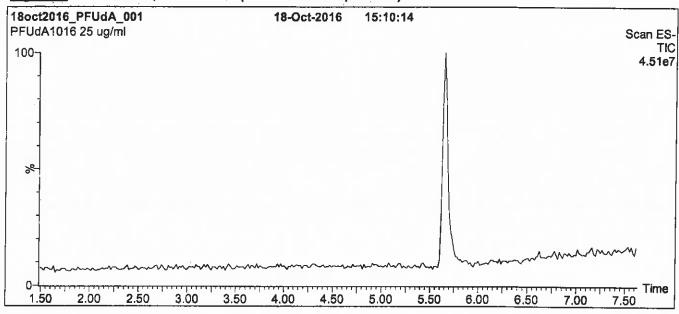
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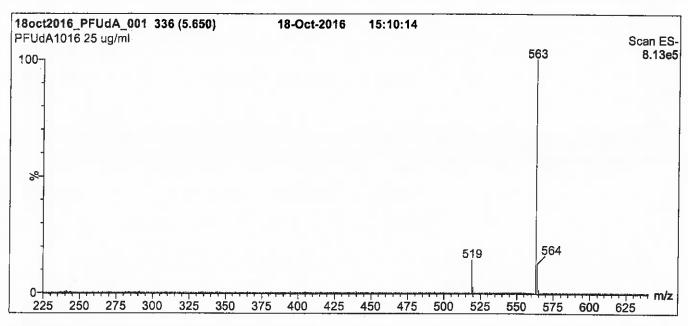




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





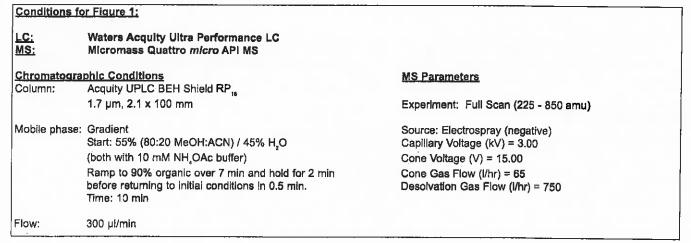
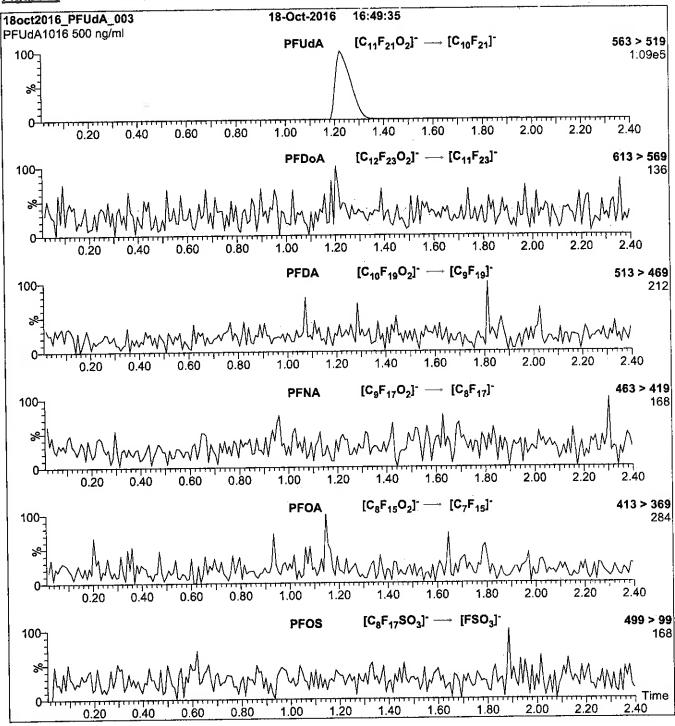
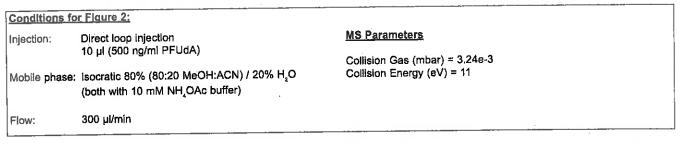


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





# 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
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SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	3C3-PFB:#	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-CAR BON	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 = 1802 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFNA = 13C5 PFNA	25-150

 $\ensuremath{\text{\#}}$  Column to be used to flag recovery values

FORM II 537 (modified)

# FORM II LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-3	2321-1	Ĺ
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SDG No.: \_\_\_\_

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

	1						
Client Sample ID	Lab Sample ID	PFOS #	PFDA #	PFOSA #	PFUnA #	PFDoA #	PFTDA #
TP-PFC-022-TPI	320-32321-1	103	79	4 Ç	73	75	97
TP-PFC-022-TPI DL	320-32321-1 DL	114	76	6 Ç	77	79	96
TP-PFC-022-TPE	320-32321-2	95	66	4 Ç	69	69	84
TP-PFC-022-MID-CAR BON	320-32321-3	98	81	3 С	79	84	97
TP-PFC-022-TPE-D	320-32321-4	96	88	2 Ç	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

 $\ensuremath{\text{\#}}$  Column to be used to flag recovery values

FORM II 537 (modified)

# FORM III LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name	e: TestAmerica Sacr	amento	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  Perfluorobutanoic acid (PFBA)  Perfluoropentanoic acid	ADDED (ng/L)	CONCENTRATION	용	LIMITS	11
Perfluorobutanoic acid (PFBA)	_	/ / <del>T</del> \		TIMITI2	#
		(ng/L)	REC	REC	
Perfluoropentanoic acid	40.0	43.6	109	89-128	
I SI I I A SI	40.0	41.1	103	66-136	
(PFPeA)					
Perfluorohexanoic acid (PFHxA)	40.0	40.7	102		
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	40.0	40.7	102	91-133	
(FOSA) 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		
1802 PFHxS	94.6	106	112	25-150	
13C4 PFOS	95.6	104	109		
13C2-PFTeDA	100	107	107	25-150	
13C4-PFHpA	100	118	118	25-150	
13C5 PFPeA	100	109	109		
13C3-PFBS	93.0	102	110		

<sup>#</sup> 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		camento	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:

	SPIKE	LCSD	LCSD	0	QC LI	IMITS	,,
COMPOUND	ADDED (ng/L)	CONCENTRATION (ng/L)	% REC	% RPD	RPD	REC	#
Perfluorobutanoic acid (PFBA)	40.0	43.9	110		30	89-128	
Perfluoropentanoic acid	40.0	40.8	102		30	66-136	
(PFPeA)	40.0	40.0	102	1	30	00-130	
Perfluorohexanoic acid (PFHxA)	40.0	41.1	103	1	30	86-126	
Perfluoroheptanoic acid	40.0	42.4	106	2	30	89-127	
(PFHpA)							
Perfluorooctanoic acid (PFOA)	40.0	41.7	104		30	80-120	
Perfluorononanoic acid (PFNA)	40.0	41.5	104		30	77-137	
Perfluorodecanoic acid (PFDA)	40.0	41.3	103	I	30	84-123	I
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	I		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	I		25-150	
13C2 PFDoA	100	96.9	97			25-150	
1802 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	

<sup>#</sup> 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:

		LAB	
CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALYZED
	LCS 320-190551/2-A	2017.10.30A	10/31/2017 02:18
		AA 018.d	
	LCSD 320-190551/3-A	2017.10.30A	10/31/2017 02:25
		AA 019.d	
TP-PFC-022-TPI DL	320-32321-1 DL	2017.10.30A	10/31/2017 02:32
		AA 020.d	
TP-PFC-022-TPE	320-32321-2	2017.10.30A	10/31/2017 02:39
		AA 021.d	
TP-PFC-022-MID-CARBON	320-32321-3	2017.10.30A	10/31/2017 02:46
		AA 022.d	
TP-PFC-022-TPE-D	320-32321-4	2017.10.30A	10/31/2017 02:52
		AA 023.d	
TP-PFC-022-TPI	320-32321-1	2017.10.30A	10/31/2017 04:01
		AA_033.d	

## 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	1802 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

Report Date: 31-Oct-2017 10:14:38 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

FIISt Level Review	wer: pno	msopna	l l		Date:	3	11-0Ct-2017 10:14:3	3		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA 217.00 > 172.00	1.528	1.536	-0.008		12286002	35.0		70.1	16943	
2 Perfluorobuty 212.90 > 169.00 4 Perfluoropen	1.537	1.536	0.001	1.000	7726918	33.0			272	M M
262.90 > 219.00 D 3 13C5-PFPe	1.727	1.736	-0.009	1.000	19184805	93.8			2787	
267.90 > 223.00 D 47 13C3-PFBS	1.727	1.736	-0.009		9521686	42.2		84.4	34923	
301.90 > 83.00 5 Perfluorobuta	1.745	1.754	-0.009		249302	49.6		107	1971	
298.90 > 80.00 298.90 > 99.00	1.755	1.754 1.754	0.001 0.001	1.000 1.000	12353232 5680288	31.8	2.17(0.00-0.00)		3781 3592	
6 Perfluorohex 313.00 > 269.00	1.983	id 1.994	-0.011	1.000	31856624	160.6			6120	
D 7 13C2 PFHx. 315.00 > 270.00 10 Perfluoroher	1.983	1.994	-0.011		10377940	42.8		85.7	21022	
363.00 > 319.00 D 9 13C4-PFHp	2.297		-0.011	1.000	9051602	43.0			3560	
367.00 > 322.00 8 Perfluorohex	2.297	2.308			10870325	44.6		89.2	18601	E
399.00 > 80.00 D 11 1802 PFHx	2.318	2.318		1.000	61450717	190.9			5188	E
403.00 > 84.00 * 62 13C2-PFOA	2.318	2.318	0.0		14728565	48.9		103	20723	
415.00 > 370.00		2.644	-0.007		10451412	50.0			16735	

Data File:	\\Chr	omNa\Sa	acrament	to\Chrom	Data\A8_N\201	71031-4978	4.b\2017.10.30AAA	_033.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooc										EM
413.00 > 369.00 413.00 > 169.00		2.651 2.651	-0.006 -0.006	1.000 1.000	105563840 78442582	650.7	1.35(0.90-1.10)		2725 2166	E M
D 14 13C4 PFO		2.001	-0.000	1.000	70442302		1.55(0.70-1.10)		2100	IVI
417.00 > 372.00		2.651	-0.006		7550652	31.6		63.3	13850	
16 Perfluorohe	•									
449.00 > 80.00		2.658	-0.006	1.000	1250701	4.86			124	
D 18 13C4 PFO 503.00 > 80.00		3.015	-0.009		10477626	49.4		103	10205	
17 Perfluorooc	tane sulf	fonic acid	d							E
499.00 > 80.00			-0.009	1.000	43321191	190.0	4 20/0 00 1 10)		3245	E
499.00 > 99.00 20 Perfluorono		3.015	-0.009	1.000	10101541		4.29(0.90-1.10)		5281	
463.00 > 419.00			-0.009	1.000	218906	1.43			154	
D 19 13C5 PFN		2.045	0.000		704 4050	20.0		70.4	11100	
468.00 > 423.00 D 21 13C8 FOS		3.015	-0.009		7914250	39.2		78.4	11402	
506.00 > 78.00		3.372	-0.008		627932	2.02		4.0	3714	
D 23 13C2 PFD										
515.00 > 470.00			-0.008		7245615	39.7		79.4	15303	
24 Perfluorode 513.00 > 469.00			-0.008	1.000	77379	0.5685			191	
22 Perfluorooc										
498.00 > 78.00		3.372		1.000	28690	2.42			298	
29 Perfluorode 599.00 > 80.00		Ifonic ac 3.680		1.000	15075	0.1062			66.3	
31 Perfluoroun										
563.00 > 519.00	3.692		-0.007	1.000	32064	0.2818			140	
D 30 13C2 PFU 565.00 > 520.00		3 600	-0.007		5331400	36.6		73.2	5705	
D 36 13C2 PFD		3.077	-0.007		3331400	30.0		75.2	3703	
615.00 > 570.00		3.990	-0.005		6269940	37.3		74.7	7160	
37 Perfluorodo										
613.00 > 569.00			-0.005	1.000	27919	0.2421			190	
41 Perfluorotrio 663.00 > 619.00		acid 4.257	-0.006	1.000	43902	0.3388			45.4	
42 Perfluorotet	radecan	oic acid								
713.00 > 169.00		4.480	0.001	1.000	14497	0.3291			351	
713.00 > 219.00		4.480	0.010	1.002	10915		1.33(0.00-0.00)		251	
D 43 13C2-PFT6 715.00 > 670.00		4.489	-0.007		9908211	48.4		96.8	17956	
, 10.00 / 070.00	7.701	7.70/	0.007		7700211	<b>∃</b> U. <b>T</b>		70.0	17750	

Report Date: 31-Oct-2017 10:14:38

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

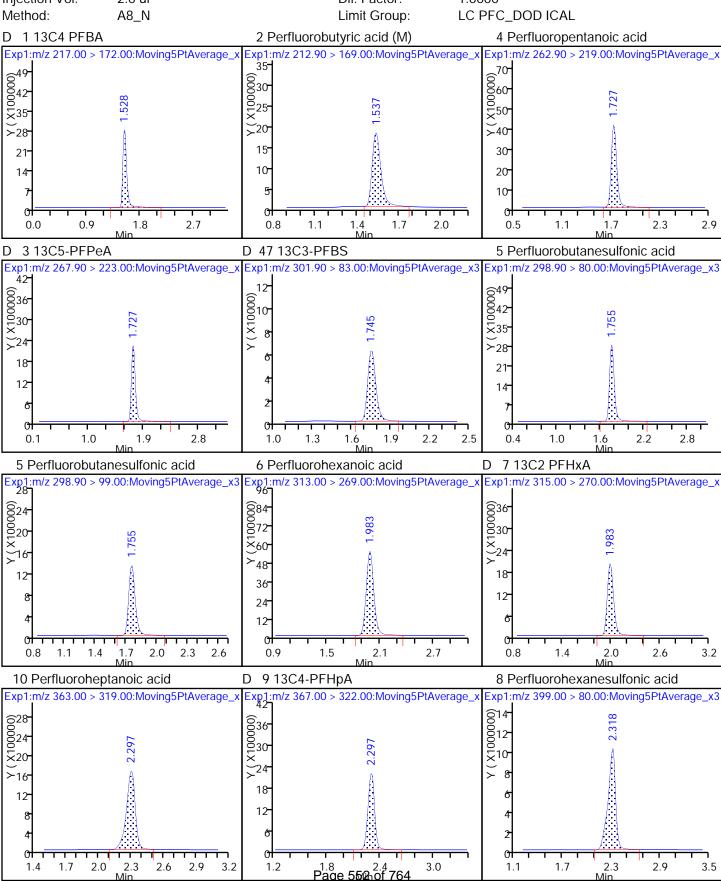
Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 10:14:38 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_033.d Data File: **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: Dil. Factor: 2.0 ul 1.0000



2.8

2.5

3.1

3.4

2.1

2.4

2.7

3.0

3.3

3.6

3.9

2.7

3.0

3.6

3.9

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_033.d D 23 13C2 PFDA 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 (00001×) 16-(0001×) 16-12 8 2.3 2.9 3.5 4.1 2.8 3.1 3.4 3.7 4.0 2.9 3.2 3.5 29 Perfluorodecane Sulfonic acid 31 Perfluoroundecanoic acid D 30 13C2 PFUnA Exp1:m/z 563.00 > 519.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 565.00 > 520.00:Moving5PtAverage\_ 70 618 600 15 (00010 (X) X <u>6</u>60 <del>∑</del>50 ≻40 30 20 10 3.5 3.8 3.4 3.7 3.3 3.6 4.0 3.0 D 36 13C2 PFDoA 37 Perfluorododecanoic acid 41 Perfluorotridecanoic acid Exp1:m/z 613.00 > 569.00:Moving5PtAverage\_x Exp1:m/z 615.00 > 570.00:Moving5PtAverage\_> Exp1:m/z 663.00 > 619.00:Moving5PtAverage\_> 18 (000001 X16 (X1000) (X1000) ©15 ×12 3.7 3.8 4.0 4.3 3.4 4.0 4.3 4.6 3.5 4.1 3.7 4.6 3.1 D 43 13C2-PFTeDA 42 Perfluorotetradecanoic acid 42 Perfluorotetradecanoic acid Exp1:m/z 713.00 > 169.00:Moving5PtAverage\_x 56**1** Exp1:m/z 713.00 > 219.00:Moving5PtAverage\_x Exp1:m/z 715.00 > 670.00:Moving5PtAverage\_) (35<sup>-</sup> (00030 (30<sup>-</sup> (25<sup>-</sup> 49 48 6<sup>42</sup> ×35 0040 × × × 32 ≻28<del>-</del> <del>∑</del>20 24 21 15 16 10 14 0 4.0 4.3 4.6 4.9 4.0 4.3 4.6 4.9 3.7 4.9 5.5 3.1

Report Date: 31-Oct-2017 10:14:38

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 10:14:38 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Manual Integration/User Assign Peak Report

#### TestAmerica Sacramento

Data File: \ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_033.d

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

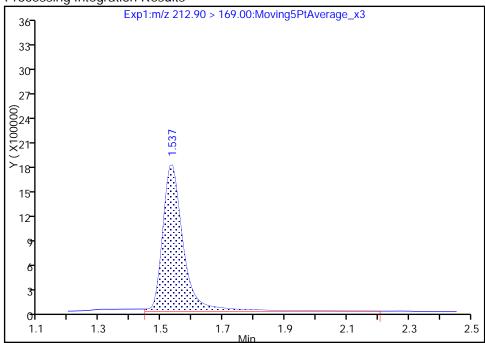
Column: Detector EXP1

#### 2 Perfluorobutyric acid, CAS: 375-22-4

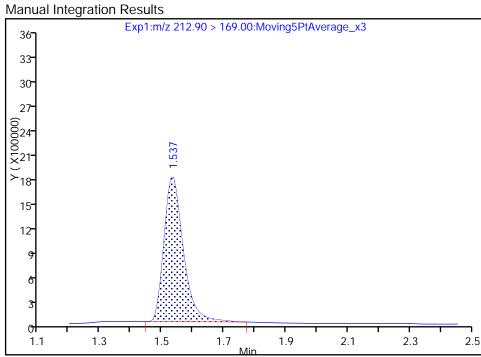
Signal: 1

RT: 1.54
Area: 8569586
Amount: 36.625144
Amount Units: ng/ml

**Processing 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

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Report Date: 31-Oct-2017 10:14:38 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Manual Integration/User Assign Peak Report

#### TestAmerica Sacramento

Data File: \ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_033.d

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

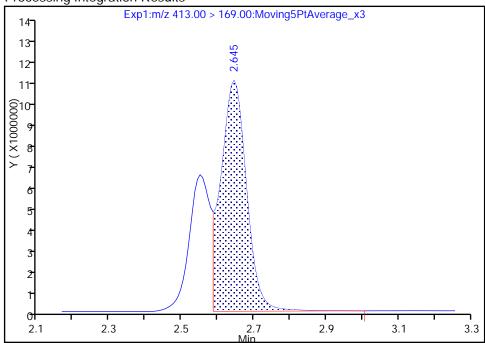
Column: Detector EXP1

#### 15 Perfluorooctanoic acid, CAS: 335-67-1

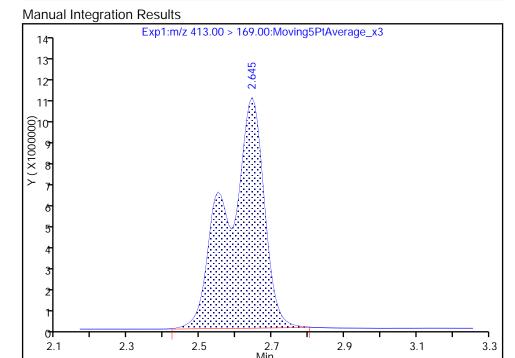
Signal: 2

RT: 2.64
Area: 53239780
Amount: 650.7215
Amount Units: ng/ml

**Processing 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

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## 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
275 00 4				0.4	9.5	4 4
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	JD	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	JD	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	1802 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

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

_ [	First Level Revie	wer: pno	msopna	IL		Date:	3	31-001-2017 09:49:5			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	D 113C4 PFBA 217.00 > 172.00		1.529	0.010		2110777	6.02		12.0	2621	
	2 Perfluorobuty 212.90 > 169.00	1.539	1.537	0.002	1.000	1401657	3.49			156	
	4 Perfluoropen 262.90 > 219.00 3 13C5-PFPe	1.738	1.737	0.001	1.000	2634452	10.1			1743	
	267.90 > 223.00 D 47 13C3-PFB9	1.738	1.737	0.001		1208816	5.36		10.7	5889	
	301.90 > 83.00 5 Perfluorobuta	1.757	1.755 nic acid	0.002		27294	5.43		11.7	1087	
	298.90 > 80.00 298.90 > 99.00	1.766 1.757	1.755 1.755	0.011 0.002	1.000 0.995	1480242 641267	3.48	2.31(0.00-0.00)		2034 1838	
	6 Perfluorohex 313.00 > 269.00	1.987	id 1.984	0.002	1.000	4713011	18.7			3455	
	7 13C2 PFHx 315.00 > 270.00 10 Perfluorohe	1.998	1.984	0.014		1318405	5.44		10.9	5191	
	363.00 > 319.00 3 9 13C4-PFHp	2.305		-0.003	1.000	1122499	4.01			1200	
	367.00 > 322.00 8 Perfluorohex	2.305		-0.003		1446735	5.94		11.9	6733	
I	399.00 > 80.00 D 11 18O2 PFH	xS	2.318	0.003	1.000	10046871	24.4			6001	
,	403.00 > 84.00 62 13C2-PFOA	4	2.318	0.003		1884615	6.26		13.2	12144	
	415.00 > 370.00	2.644	2.644	0.0		1488440	5.00			5215	

Data File:	\\Chr	omNa\S	acramen	to\Chrom	Data\A8_N\201	71031-4978	4.b\2017.10.30AAA	_020.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooc	tanoic ad	cid								М
413.00 > 369.00		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 PFO	Α									
417.00 > 372.00	2.651	2.644	0.007		1143966	4.79		9.6	5961	
16 Perfluorohe	ptanesu	lfonic Ac	cid							
449.00 > 80.00	2.658	2.651	0.007	1.000	173401	0.6119			162	
D 18 13C4 PFO	S									
503.00 > 80.00	3.015	3.014	0.001		1154704	5.45		11.4	5570	
17 Perfluorooc	tane sulf	onic aci	d							
499.00 > 80.00		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 Perfluorono										
463.00 > 419.00	3.015	3.014	0.001	1.000	37958	0.2182			48.3	
D 19 13C5 PFN										
468.00 > 423.00	3.015	3.014	0.001		898229	4.45		8.9	4370	
D 21 13C8 FOS										
506.00 > 78.00	3.372	3.372	0.0		90550	0.2910		0.6	906	
D 23 13C2 PFD										
515.00 > 470.00	3.372	3.372	0.0		697434	3.82		7.6	4211	
24 Perfluorode	canoic a	cid								
513.00 > 469.00	3.372	3.372	0.0	1.000	20166	0.1539			69.3	
22 Perfluorooc	tane Sul	fonamid	е							
498.00 > 78.00	3.364	3.372	-0.008	1.000	9894	0.5797			134	
29 Perfluorode	cane Su	Ifonic ac	cid							
599.00 > 80.00	3.690	3.679	0.011	1.000	10503	0.0671			178	
31 Perfluoroun	decanoi	c acid								
563.00 > 519.00	3.700	3.698	0.002	1.000	14673	0.1230			42.5	
D 30 13C2 PFU	nA									
565.00 > 520.00	3.700	3.698	0.002		559134	3.84		7.7	2518	
D 36 13C2 PFD	οA									
615.00 > 570.00	3.990	3.989	0.001		660877	3.94		7.9	3342	
37 Perfluorodo	decanoi	c acid								
613.00 > 569.00	3.990	3.995	-0.005	1.000	12931	0.1064			51.6	
41 Perfluorotrio	decanoic	acid								
663.00 > 619.00	4.257	4.257	0.0	1.000	17525	0.1283			25.4	
42 Perfluorotet	radecan	oic acid								
713.00 > 169.00		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-PFT	eDA									
715.00 > 670.00	4.497	4.488	0.009		982909	4.80		9.6	2362	

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46

QC Flag Legend Review Flags

M - Manually Integrated

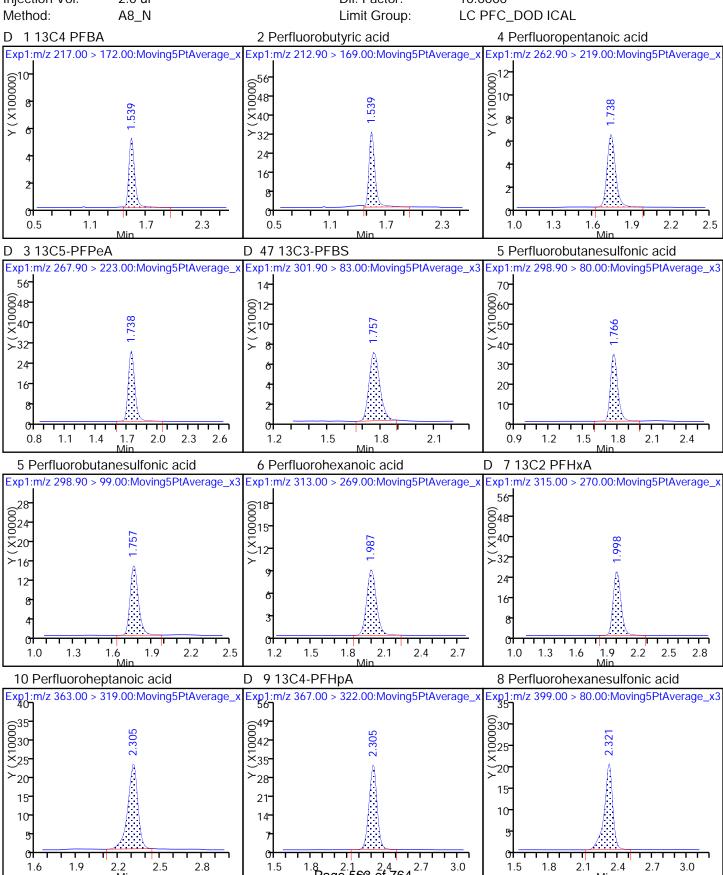
Injection Date: 31-Oct-2017 02:32:17 Instrument ID: A8\_N

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



3.0

3.3

3.6

2.8

3.1

3.4 Min 3.7

4.0

2.9

2.6

3.2

2.4

2.7

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46 D 23 13C2 PFDA 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 (00020-×)16-36 × 20. ∑44**⁻** 18 33 22 12 2.9 3.2 3.5 3.8 4.1 2.9 3.2 3.5 3.8 2.9 3.2 3.5 2.6 D 30 13C2 PFUnA 29 Perfluorodecane Sulfonic acid 31 Perfluoroundecanoic acid Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 563.00 > 519.00:Moving5PtAverage\_x Exp1:m/z 565.00 > 520.00:Moving5PtAverage\_> 21 56 35 0018 15 X 830 <del>2</del>40  $\Sigma_{25}$ ≻<sub>20</sub>-**≻**32 24 15 16 10 3.5 3.8 3.5 3.3 3.9 4.1 3.8 4.1 D 36 13C2 PFDoA 37 Perfluorododecanoic acid 41 Perfluorotridecanoic acid Exp1:m/z 663.00 > 619.00:Moving5PtAverage\_x Exp1:m/z 615.00 > 570.00:Moving5PtAverage\_x Exp1:m/z 613.00 > 569.00:Moving5PtAverage\_> 49 72 624 000 20 6<sup>42</sup> ×35 862 **≻28** 21 32 22 3.5 3.8 3.9 4.2 4.1 3.2 4.1 4.4 4.4 4.7 3.6 3.8 D 43 13C2-PFTeDA 42 Perfluorotetradecanoic acid 42 Perfluorotetradecanoic acid Exp1:m/z 713.00 > 169.00:Moving5PtAverage\_x 21 18 635<del>-</del> (00 X) 12 (0015 X12 X12 ×25  $\succ$ 20 15 10 0 4.4 4.7 4.1 4.4 4.7 4.0 4.3 4.6 4.9 5.2 4.1 3.7

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Manual Integration/User Assign Peak Report

#### TestAmerica Sacramento

Data File: \ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_020.d

Client ID: TP-PFC-022-TPI

Operator ID: SACINSTLCMS01 ALS Bottle#: 17 Worklist Smp#: 6

Injection Vol: 2.0 ul Dil. Factor: 10.0000

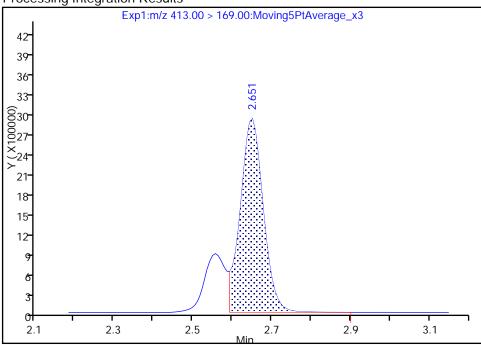
Method: A8\_N Limit Group: LC PFC\_DOD ICAL

Column: Detector EXP1

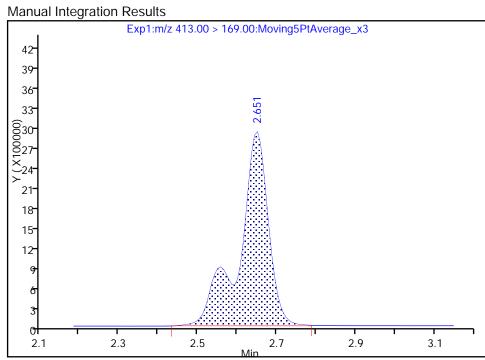
#### 15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

RT: 2.65 Area: 11783714 Amount: 96.905216 Amount Units: ng/ml **Processing 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

Page 567 of 764

## 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	Ū	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	Ū	2.4	1.9	0.84
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	Ū	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	Ū	3.9	2.9	1.2
335-77-3	Perfluorodecanesulfonic acid (PFDS)	2.9	Ū	3.9	2.9	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	1.9	Ū	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	1802 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

Report Date: 31-Oct-2017 09:50:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	wer: pho	msopha	at		Date:	3	31-Oct-2017 09:50:5	4		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.00 > 172.00		1.529	-0.001		13241344	37.8		75.5	34812	
2 Perfluorobut	vric acid									
212.90 > 169.00	•	1.537	0.0	1.000	16909221	67.1			1616	
4 Perfluoroper	ntanoic a	cid								
262.90 > 219.00			-0.019	1.000	4994844	24.9			5120	
D 3 13C5-PFPe	eΑ									
267.90 > 223.00		1.737	-0.001		9325690	41.3		82.7	67630	
D 47 13C3-PFB	S									
301.90 > 83.00		1.755	0.0		232824	46.3		99.6	7750	
5 Perfluorobut	anesulfo	nic acid								
298.90 > 80.00		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 Perfluorohex	canoic ac	cid								
313.00 > 269.00	1.972	1.984	-0.012	1.000	899376	4.44			818	
D 7 13C2 PFHx	:A									
315.00 > 270.00	1.983	1.984	-0.001		10600115	43.7		87.5	32192	
D 9 13C4-PFHp	Α									
367.00 > 322.00		2.308	-0.008		11292655	46.3		92.7	26876	
8 Perfluorohex	anesulfo	onic acid	I							
399.00 > 80.00	2.322	2.318	0.004	1.000	102380	0.3077			481	
D 11 1802 PFH:	xS									
403.00 > 84.00		2.318	0.004		15222353	50.6		107	22751	
* 62 13C2-PFO	Ą									
415.00 > 370.00	2.644	2.644	0.0		13721196	50.0			26292	
15 Perfluorooct	tanoic ac	cid								
413.00 > 369.00		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	
					Dogg E70 of	76.4				

Report Date: 31-Oct-2017 09:50:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_021.d

Data File.	//CITIC	Jiliya	acramen	OCHIOIII	Data AO_N\ZUT	71031-4970	14.0\2017.10.30AAA	_02 i.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
Jigilai	IXI	IXI	IXI	IXI	Response	rig/iiii	Ratio(Limits)	701100	3/11	1 lags
D 14 13C4 PFO	4									
417.00 > 372.00	2.644	2.644	0.0		10201567	42.7		85.5	17854	
D 18 13C4 PFOS	S									
503.00 > 80.00	3.014	3.014	0.0		9575042	45.2		94.5	11567	
20 Perfluoronor	nanoic a	cid								
463.00 > 419.00	3.014	3.014	0.0	1.000	3565	0.0255			7.8	
D 19 13C5 PFNA	4									
468.00 > 423.00	3.014	3.014	0.0		7211142	35.7		71.5	9701	
D 21 13C8 FOSA	Д									
506.00 > 78.00	3.370	3.372	-0.002		643049	2.07		4.1	5258	
D 23 13C2 PFD/	4									
515.00 > 470.00	3.370	3.372	-0.002		6056237	33.2		66.4	26558	
24 Perfluorodeo		cid								
513.00 > 469.00	3.378	3.372	0.006	1.000	3981	0.0350			30.5	
22 Perfluorooct	ane Sulf	fonamid	е							
498.00 > 78.00	3.370	3.372	-0.002	1.000	3706	0.3058			80.5	
29 Perfluorodeo	cane Su	lfonic ac	cid							
599.00 > 80.00	3.685	3.679	0.006	1.000	1540	0.0119			9.9	
31 Perfluoround	decanoid	c acid								
563.00 > 519.00	3.695	3.698	-0.003	1.000	12543	0.1166			76.5	
D 30 13C2 PFUr	nΑ									
565.00 > 520.00	3.704	3.698	0.006		5041047	34.6		69.2	10148	
D 36 13C2 PFD	ρA									
615.00 > 570.00	3.993	3.989	0.004		5772883	34.4		68.8	12731	
37 Perfluorodoo	decanoio	c acid								
613.00 > 569.00	3.993	3.995	-0.002	1.000	3334	0.0314			35.7	
41 Perfluorotrid	lecanoic	acid								
663.00 > 619.00	4.261	4.257	0.004	1.000	5481	0.0459			7.0	
42 Perfluorotetr	adecan	oic 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-PFT6	eDA									
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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_021.d Data File: **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: Dil. Factor: 2.0 ul 1.0000 Method: LC PFC\_DOD ICAL  $A8_N$ Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x (000012 1000012 ©49 00 00 042 063 0054 ×35 ×45 ≻<sub>36</sub>-≻<sub>28</sub> 21 27 18 14 0.9 2.7 0.9 0.0 1.8 0.0 1.8 2.7 2.0 5 Perfluorobutanesulfonic acid D 313C5-PFPeA D 47 13C3-PFBS Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x 18-000036 X 24 Y (X10000) 18 12 2.9 2.3 2.0 1.4 1.7 2.0 1.2 1.5 0.2 1.1 1.1 1.8 2.1 5 Perfluorobutanesulfonic acid 6 Perfluorohexanoic acid 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x (32 (00036 (30 (30 6<sup>21</sup> 6<sup>18</sup> 84 <u>872</u> ₹<sub>15</sub>-×60 ><sub>48</sub> **≻**24 18 36 12 24 12 01 1.6 1.9 2.2 1.9 2.2 2.5 1.4 2.0 1.3 1.6 0.8 2.6 3.2 10 Perfluoroheptanoic acid (ND) 9 13C4-PFHpA 8 Perfluorohexanesulfonic acid Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_x Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 399.00 > 80.00:Moving5PtAverage\_x3 042 0036 36 630 630 266 ×55 ×30 <del>-</del>44 **≻**24 18 33 18 12 22 12 0 0 0

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1.8 Page 57/2 of 764 3.0

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Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 09:50:55

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0

4.1

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4.7

## 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

			1	1		
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	Ū	2.5	2.0	0.79
335-67-1	Perfluorooctanoic acid (PFOA)	0.83	JМ	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	Ū	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	1802 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

Report Date: 31-Oct-2017 10:01:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	wer: pho	msopha	at		Date:	3	31-Oct-2017 10:01:3	3		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.00 > 172.00		1.529	0.008		14513603	41.4		82.8	28089	
2 Perfluorobut										
212.90 > 169.00	•	1.537	0.008	1.000	20610779	74.6			1221	
4 Perfluoroper	ntanoic a	cid								
262.90 > 219.00		1.737	-0.010	1.000	6899780	31.7			6436	
D 3 13C5-PFPe	eΑ									
267.90 > 223.00		1.737	-0.001		10119181	44.9		89.7	70447	
D 47 13C3-PFB	S									
301.90 > 83.00		1.755	0.009		238013	47.3		102	6814	
5 Perfluorobut	anesulfo	nic acid								
298.90 > 80.00		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 Perfluorohex	anoic ac	cid								
313.00 > 269.00	1.960	1.984	-0.024	1.000	619842	2.79			509	
D 7 13C2 PFHx	A									
315.00 > 270.00	1.994	1.984	0.010		11625591	48.0		96.0	44209	
D 9 13C4-PFHp	Α									
367.00 > 322.00		2.308	0.004		11856721	48.6		97.3	24245	
8 Perfluorohex	anesulfo	onic acio	I							
399.00 > 80.00	2.331	2.318	0.013	1.000	54369	0.1632			274	
D 11 1802 PFH:	xS									
403.00 > 84.00		2.318	0.005		15238857	50.6		107	23837	
* 62 13C2-PFO	Ą									
415.00 > 370.00	2.647	2.644	0.003		13774754	50.0			15938	
15 Perfluorooct	tanoic ac	cid								M
413.00 > 369.00		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
					Dogg F70 of -	76.4				

Report Date: 31-Oct-2017 10:01:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File:	\\Chr	\\ChromNa\Sacramento\ChromData\A8_N\20171031-49784.b\2017.10.30AAA_022.d										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags		
D 14 13C4 PFO. 417.00 > 372.00	2.654	2.644	0.010		10787688	45.2		90.4	13913			
D 18 13C4 PFO 503.00 > 80.00	3.018	3.014	0.004		9889723	46.7		97.6	8266			
D 19 13C5 PFN. 468.00 > 423.00		3.014	0.004		8520876	42.2		84.5	10810			
D 21 13C8 FOS 506.00 > 78.00	3.373	3.372	0.001		395935	1.27		2.5	3664			
D 23 13C2 PFD. 515.00 > 470.00		3.372	0.001		7389012	40.5		81.0	10970			
24 Perfluorode 513.00 > 469.00			0.001	1.000	1789	0.0129			17.2			
31 Perfluoroun 563.00 > 519.00		acid 3.698	0.012	1.000	13744	0.1113			97.0			
D 30 13C2 PFU 565.00 > 520.00		3.698	0.002		5786119	39.7		79.4	4450			

7085462

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3735

2492

1780

9951926

42.2

0.0272

0.0255

0.0563

48.6

1.40(0.00-0.00)

84.4

97.3

5502

39.4

5.3

98.5

54.9

19289

QC Flag Legend Review Flags

D 36 13C2 PFDoA 615.00 > 570.00 3.997

37 Perfluorododecanoic acid

41 Perfluorotridecanoic acid 663.00 > 619.00 4.258 4.257

42 Perfluorotetradecanoic acid

613.00 > 569.00 3.997

713.00 > 169.00 4.489

713.00 > 219.00 4.498

D 43 13C2-PFTeDA 715.00 > 670.00 4.498 3.989

3.995

4.488

4.488

4.488 0.010

0.008

0.002

0.001

0.001

0.010

1.000

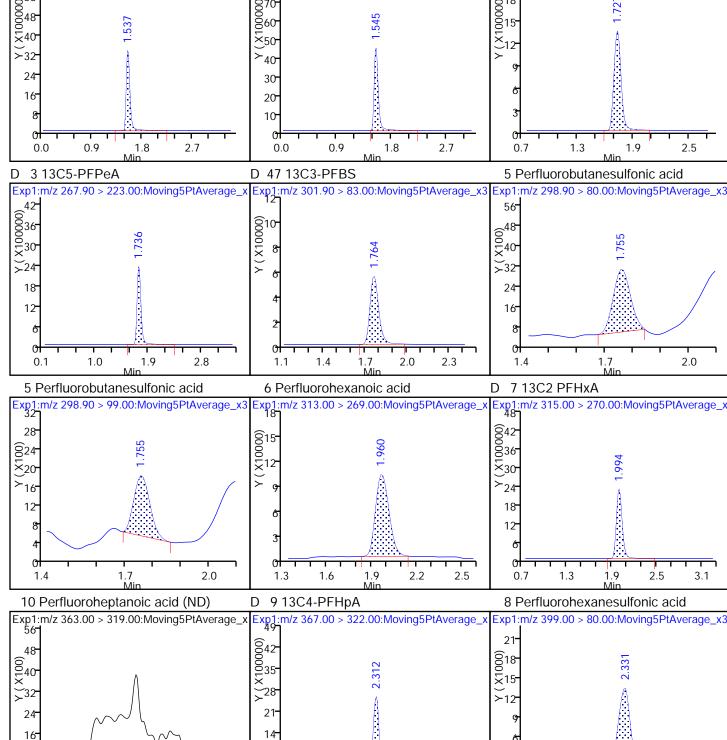
1.000

1.000

1.002

M - Manually Integrated

Report Date: 31-Oct-2017 10:01:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_022.d Data File: **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 Dil. Factor: Injection Vol: 2.0 ul 1.0000 LC PFC\_DOD ICAL Method:  $A8_N$ Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_> (000001 40 × 40 ©70 960 (018 000015 X 12  $\stackrel{\smile}{\times}_{50}$ ≻<sub>40</sub> 24 30 16 20 10 0.9 0.9 0.0 1.8 2.7 0.0 1.8 2.7 0.7 1.3 1.9 2.5 D 313C5-PFPeA D 47 13C3-PFBS 5 Perfluorobutanesulfonic acid Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x 56<del>-</del> Y (X10000) 6040 ×40 18 24 12 16 1.0 1.9 2.8 1.4 2.0 2.3 1.7 2.0 1.1 1.4



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1.8 Page 580hof 764

3.0

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Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 10:01:34

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Report Date: 31-Oct-2017 10:01:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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

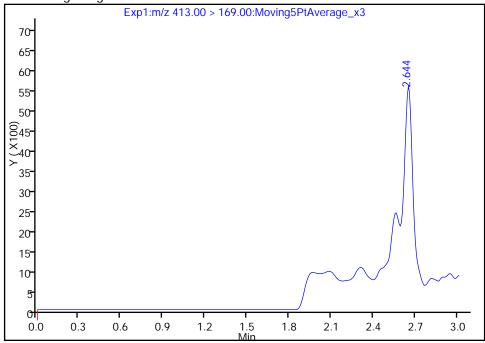
Column: Detector EXP1

### 15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

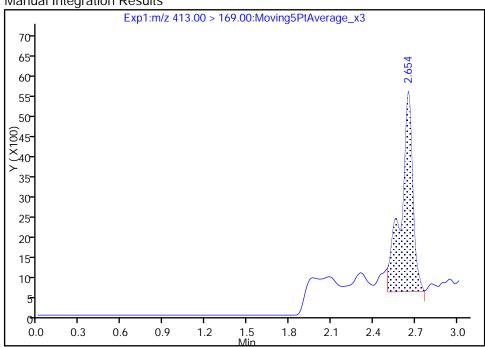
RT: 2.64 Area: 0

Amount: 0.418810 Amount Units: ng/ml **Processing Integration Results** 



RT: 2.65
Area: 29060
Amount: 0.418810
Amount Units: ng/ml

Manual Integration Results



Reviewer: phomsophat, 31-Oct-2017 09:51:32

Audit Action: Manually Integrated

Audit Reason: Assign Peak

Page 584 of 764

## 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	1802 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

Report Date: 31-Oct-2017 09:56:54 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

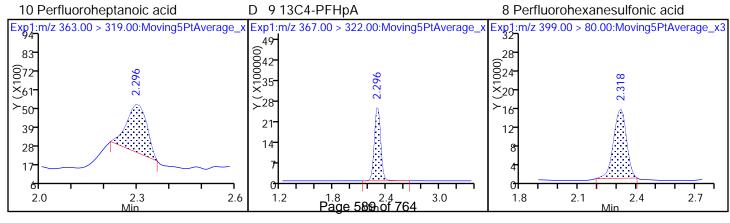
First Level Reviewer: phomsophat Date: 31-Oct-2017 09:56:53

First Level Revie	First Level Reviewer: phornsophat			Date:	3	11-001-2017 09:56:5	3			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA		1 500	0.004		1440/470	44.4		00.0	17000	
217.00 > 172.00 2 Perfluorobut		1.529	0.004		14406472	41.1		82.2	17323	
212.90 > 169.00		1.537	-0.004	1.000	18242642	66.5			1025	
4 Perfluoroper 262.90 > 219.00		cid 1.737	-0.013	1.000	5198719	23.6			5292	
D 3 13C5-PFPe 267.90 > 223.00		1 737	-0.004		10250486	45.4		90.9	59312	
D 47 13C3-PFB		1.737	-0.004		10230400	45.4		70.7	37312	
301.90 > 83.00 5 Perfluorobut			-0.004		233624	46.5		99.9	6712	
298.90 > 80.00	1.751	1.755	-0.004	1.000	40947	0.1124			101	
298.90 > 99.00 6 Perfluorohex		1.755 aid	-0.004	1.000	20677		1.98(0.00-0.00)		72.3	
313.00 > 269.00	1.968	1.984	-0.016	1.000	929811	4.29			801	
D 7 13C2 PFHx 315.00 > 270.00		1.984	0.007		11346758	46.8		93.6	28358	
10 Perfluorohe			0.010	1 000	10055	0.0521			17 /	
363.00 > 319.00 D 9 13C4-PFHp		2.308	-0.012	1.000	12355	0.0521			17.6	
367.00 > 322.00					12250526	50.3		101	25093	
8 Perfluorohex 399.00 > 80.00		2.318		1.000	67267	0.2038			404	
D 11 1802 PFH: 403.00 > 84.00		2.318	0.0		15102812	50.2		106	34037	
* 62 13C2-PFO	A	2.510	5.0		10102012	30.2		100	J-1007	
415.00 > 370.00	2.637	2.644	-0.007		13237930	50.0			15724	

Report Date: 31-Oct-2017 09:56:54 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File:

Data File. (ICHIOHINA/Sacramento/ChiohiData/A6_N/2017103						7 103 1-4770	4.0\2017.10.30AAA	_023.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooct	anoic ac	hir								
413.00 > 369.00		2.644	0.001	1.000	93190	0.3909			47.6	
413.00 > 169.00		2.644	0.001	1.000	58718	0.0707	1.59(0.90-1.10)		71.5	
D 14 13C4 PFO							,			
417.00 > 372.00		2.644	0.001		11097362	46.5		93.0	15231	
D 18 13C4 PFOS		2.011	0.001		11077002	10.0		70.0	10201	
503.00 > 80.00		3 014	-0.008		9701189	45.8		95.8	10092	
20 Perfluoronor			0.000		7701107	40.0		75.0	10072	
463.00 > 419.00		3.014	-0 008	1.000	32529	0.1907			85.4	
		3.014	-0.000	1.000	32327	0.1707			03.4	
D 19 13C5 PFNA 468.00 > 423.00		2 014	-0.008		8805983	43.6		87.3	9261	
		3.014	-0.006		0003703	43.0		07.3	9201	
D 21 13C8 FOSA		2 272	0.000		227072	0.7618		1 5	2415	
506.00 > 78.00		3.372	-0.002		237073	0.7618		1.5	3415	
D 23 13C2 PFD/		2 272	0.000		0071/70	44.0		00.4	0710	
515.00 > 470.00		3.372	-0.002		8071678	44.2		88.4	9712	
24 Perfluorodeo			0.010	4 000	10171	0.0474			70.4	
513.00 > 469.00		3.372	-0.010	1.000	10171	0.0671			70.1	
31 Perfluoround										
563.00 > 519.00	3.695	3.698	-0.003	1.000	43131	0.3442			113	
D 30 13C2 PFUr										
565.00 > 520.00	3.695	3.698	-0.003		5872042	40.3		80.6	4275	
D 36 13C2 PFD	ρA									
615.00 > 570.00	3.993	3.989	0.004		6399928	38.1		76.2	6147	
37 Perfluorodoo	decanoio	acid								
613.00 > 569.00	3.993	3.995	-0.002	1.000	4684	0.0398			45.4	
41 Perfluorotrid	ecanoic	acid								
663.00 > 619.00		4.257	-0.005	1.000	5978	0.0452			6.5	
42 Perfluorotetr	adecan	oic acid								
713.00 > 169.00		4.488	-0.006	1.000	3575	0.0867			211	
713.00 > 219.00		4.488	0.003	1.002	1948		1.84(0.00-0.00)		67.0	
D 43 13C2-PFTe							•			
715.00 > 670.00		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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_023.d Data File: **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: Dil. Factor: 2.0 ul 1.0000 Method: LC PFC\_DOD ICAL  $A8_N$ Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x ©56 00 48 663 654 0014 0012 <del>×</del>40 **≻**32 36 24 27 16 18 0.9 2.7 0.9 0.0 1.8 0.0 1.8 2.7 2.0 5 Perfluorobutanesulfonic acid D 313C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 042 0036 Y (X10000) (0001X) X) ×30 18 12 2.9 2.3 1.9 1.1 2.0 1.4 1.7 2.0 0.2 1.1 1.3 1.6 2.2 5 Perfluorobutanesulfonic acid 6 Perfluorohexanoic acid 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_ Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x 91 21<sup>-</sup> 00018 ×15<sup>-</sup> 0042 0035 X ê<sup>78</sup> <del>∑</del>65 28 ≻52 21 39 26 13 01 1.5 1.5 1.8 2.1 2.7 1.4 2.0 1.8 2.1 1.2 2.4 0.8 2.6 3.2



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### 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 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	3.555	3.562	3.554	3.548	3.557	3.545	3.549	3.303 - 3.803	3.553
acid (NMeFOSAA)									
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
1802 PFHxS	2.334	2.337	2.333	2.335	2.336	2.333	2.324	2.083 - 2.583	2.333

## 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

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

## 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 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	יָּ		CURVE		COEFFICIENT	#	MIN CF	%RSD			# MIN R^2
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2			%RSI	OR COD	OR COD
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	)	
1802 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

ANALYTE		CF	7		CURVE		COEFFICIENT		#	MIN CF	%RSD	#	MAX R^2 # MIN R^2
	LVL 1	LVL 2	LVL 3	LVL 4	TYPE	В	M1	M2					%RSD OR COD OR COD
	LVL 5	LVL 6	LVL 7										
d5-NEtFOSAA	92322	91775	90115	80691	Ave		83981.6057				10.2		50.0
	86792	75965	70212										
13C2 PFUnA	154125	157265	155792	144359	Ave		145752.240				8.5		50.0
	150589	133581	124554										
d-N-MeFOSA-M	89055	89086	91517	84265	Ave		90599.4429				4.3		50.0
	95610	89734	94929										
13C2 PFDoA	171903	171388	178894	163730	Ave		167891.409				5.1		50.0
	173314	162739	153273										
d-N-EtFOSA-M	85399	84840	85727	79791	Ave		86831.1857				5.0		50.0
	92065	88170	91826										
13C2-PFTeDA	212525	213382	213836	199780	Ave		204610.654				5.3		50.0
	211748	189599	191404										
13C2-PFHxDA	316335	315575	321643	285897	Ave		306397.771				5.2		50.0
	321624	294845	288866										

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

ANALYTE			RRF			CURVE		COEFFICI	ENT	#	MIN RRF	%RSD		R^2	# MIN R^2
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M2				%RSD	OR COD	OR COD
Perfluorobutanoic acid (PFBA)	1.0179	0.9710	1.0228			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	1.2487		1.1994				1.2149				2.4	35.0		
Perfluorohexanoic acid (PFHxA)	1.0535 0.9048	0.7653		1.0135				0.9555				10.5	35.0		
Perfluoroheptanoic acid (PFHpA)	1.0722 0.9138	0.8127		0.9826				0.9678				8.8	35.0		
Perfluorohexanesulfonic acid (PFHxS)	+++++ 0.9647	0.8876		1.0622				1.0338				9.7	35.0		
6:2FTS	1.3246 1.2449	1.2525		1.2100				1.2452				3.2	35.0		
Perfluorooctanoic acid (PFOA)	1.2601	0.8515		1.0816				1.0743				12.7	35.0		
Perfluoroheptanesulfonic Acid (PFHpS)	1.2670 1.0787	1.2537 0.9245			1.1947			1.1732				10.9	50.0		
Perfluorooctanesulfonic acid (PFOS)	1.0915 1.0175			1.0219		AveID		1.0401				3.2	35.0	)	
Perfluorononanoic acid (PFNA)	1.0866 0.9130	0.8449						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			1.0814				1.1123				2.7	35.0	)	
Perfluorodecanoic acid (PFDA)	1.0481		0.9579	0.9349	0.9452	AveID		0.9393				7.3	35.0	)	
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	1.0493 0.9205	0.9397		0.9337				0.9354				6.1	35.0		
Perfluorodecanesulfonic acid (PFDS)	0.6419 0.6562	0.5867						0.6479				4.9	50.0	)	
Perfluoroundecanoic acid (PFUnA)	1.2610 1.0152		1.0643	1.0261	1.0353	AveID		1.0671				9.5	35.0	)	
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	0.8302 0.8496		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		COEFFICI	ENT	#	MIN RRF	%RSD	 MAX	R^2	# MIN R^2
	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M2				%RSD	OR COD	OR COD
	LVL 6	LVL 7													
MeFOSA	0.9077	0.9049	0.9020	0.8866	0.8774	AveID		0.8921				2.7	35.0		
	0.9189	0.8473													
Perfluorododecanoic acid (PFDoA)	0.9797	0.9515	0.9211	0.9103	0.9498	AveID		0.9195				5.4	35.0		
	0.8959	0.8282													
N-EtFOSA-M	0.9658	0.9421	0.9523	0.9320	0.9125	AveID		0.9298				3.1	35.0		
	0.9276	0.8766													
Perfluorotridecanoic Acid (PFTriA)	1.1377	1.0442	1.0465	1.0092	1.0927	AveID		1.0333				7.0	50.0		
	0.9876	0.9155													
Perfluorotetradecanoic acid (PFTeA)	0.2420	0.2236	0.2200	0.2115	0.2212	AveID		0.2223				4.8	50.0		
	0.2277	0.2100													
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	1.3010	0.9673	0.9210	0.8877	L2ID	0.4413	0.8642						0.9980	0.9900
	0.8086	+++++													
Perfluoro-n-octadecanoic acid (PFODA)	1.1230	1.0058	0.9977	0.9816	0.9217	AveID		0.9506				12.5	50.0		
	0.8809	0.7433													

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

## 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 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			RESPONSE				CONCEN	NTRATION (N	IG/ML)	
	TYPE	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
1802 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
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
d5-NEtFOSAA	Ave	4616095 3798242	4588738 3510602	4505726	4034536	4339623	50.0 50.0	50.0 50.0	50.0	50.0	50.0

## LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A8\_N

GC Column: GeminiC18 3 ID: 3 (mm)

Calibration Start Date: 10/30/2017 17:59

Calibration End Date: 10/30/2017 18:47

Calibration ID: 35592

ANALYTE	CURVE			RESPONSE				CONCE	NTRATION (1	NG/ML)	
	TYPE	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

## 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 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		VE		RESPONSE				CONCE	NTRATION (N	G/ML)	
	REF TY	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)	Av	ID 181930 26228900		1845411	6872498	16852992	0.500	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	Av	ID 150164 20413300		1327357	4966682	12771661	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	Av	ID 177995 25688097		1805379	6535299	16549064	0.442 88.4	0.884	4.42	17.7	44.2
4:2 FTS	Av	ID 39150 7574658		409149	1524770	4321214	0.467 93.4	0.934 187	4.67	18.7	46.7
Perfluorohexanoic acid (PFHxA)	Av	ID 130877 20561075		1302471	4796137	12269212	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	Av	ID 138618 20248813		1361815	4869377	12433273	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	Av	25548500		1556248	5700596	15184106	+++++ 91.0	0.910 182	4.55	18.2	45.5
6:2FTS	Av	ID 45012 7770479		427077	1561284	4323097	0.474 94.8	0.948 190	4.74	19.0	47.4
Perfluorooctanoic acid (PFOA)	Av	ID 156326 22026634			4990434	12964935	0.500 100	1.00 200	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	Av	ID 132244 20944569		1307067	4839750	12616457	0.476 95.2	0.952 190	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	Av	ID 111053 19258573		1078764	3889485	10938097	0.464 92.8	0.928 186	4.64	18.6	46.4
Perfluorononanoic acid (PFNA)	Av	ID 112564 1764175			3822275	10166844	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)	Av	ID 170696 25353469		1655149	5989035	15657067	0.500 100	1.00 200	5.00	20.0	50.0
8:2FTS	Av	ID 41639 7224840		431491	1455859	4041494	0.479 95.8	0.958 192	4.79	19.2	47.9
Perfluorodecanoic acid (PFDA)	Av	ID 97971 15755129		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.:

Heated Purge: (Y/N) N GC Column: GeminiC18 3 ID: 3 (mm) Instrument ID: A8 N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	IS	CURVE			RESPONSE				CONCEN	NTRATION (N	IG/ML)	
	REF	TYPE	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	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	+++++	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

## 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 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			PERCEN'	r error				Pl	ERCENT EF	ROR LIMI	Т	
	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)	+++++		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

ANALYTE			PERCENT	PERCENT ERROR LIMIT								
	LVL 1 #	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

Report Date: 31-Oct-2017 15:19:29 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Reviewer: phomsophat					Date:	Date: 30-Oct-2017 18:26:				
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		1.537	0.0		17872710	51.0		102	27345	
2 Perfluorobuty	yric acid									
212.90 > 169.00	1.537	1.537	0.0	1.000	181930	0.5345		107	49.1	
D 3 13C5-PFPe										
267.90 > 223.00		1.739	-0.003		11482582	50.9		102	184744	
4 Perfluoropen			0.005	1 000	1501//	0.4007		100	1.10	
262.90 > 219.00		1.741	-0.005	1.000	150164	0.6087		122	140	
D 47 13C3-PFB9 301.90 > 83.00		1.763	0.001		243441	48.4		104	5599	
			0.001		243441	40.4		104	5599	
5 Perfluorobuta 298.90 > 80.00	anesulio 1.764	1.764	0.0	1.000	177995	0.4691		106	653	
	1.764	1.764	0.0	1.000	71801	0.1071	2.48(0.00-0.00)	106	534	
61 Sodium 1H,	1H,2H,2	H-perflu	orohexar	ne						
327.00 > 307.00		1.961		1.000	39150	0.4495		96.2	2572	
D 7 13C2 PFHx	A									
315.00 > 270.00	1.995	1.998	-0.003		12423043	51.3		103	37770	
6 Perfluorohex										
313.00 > 269.00		1.998	-0.003	1.000	130877	0.5513		110	231	
10 Perfluorohe	•		0.004	1 000	100/10	0.5500			070	
363.00 > 319.00		2.319	-0.001	1.000	138618	0.5539		111	270	
D 9 13C4-PFHp		2 210	0.001		120207/4	F2.0		10/	25074	
367.00 > 322.00		2.319			12928764	53.0		106	25064	
8 Perfluorohex 399.00 > 80.00		onic acio 2.333	0.001	1.000	198484	0.6231		137	1323	
D 11 18O2 PFH:		۷.۵۵۵	0.001	1.000	170404	0.0231		137	1020	
403.00 > 84.00		2.333	0.001		14576214	48.4		102	28468	
					Page 605 of					

Page 605 of 764

Report Date: 31-Oct-2017 15:19:29 Data File: REL EXP DLT Amount Signal RT RT RT Response ng/ml Ratio(Limits) %Rec S/N Flags

Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 M2-6:2FTS	`									
429.00 > 81.00		2.641	0.002		3405451	48.9		103	13050	
13 Sodium 1H,				e						
427.00 > 407.00		-		1.000	45012	0.5042		106	1355	
* 62 13C2-PFO	Ą									
415.00 > 370.00		2.655	0.010		12313014	50.0			25965	
D 14 13C4 PFO	Α									
417.00 > 372.00	2.665	2.664	0.001		12405416	52.0		104	20502	
15 Perfluorooc	tanoic ac	cid								
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 Perfluorohe	•									
449.00 > 80.00		2.672	0.0	1.000	132244	0.5141		108	2981	
D 18 13C4 PFO										
503.00 > 80.00		3.030	0.003		10481446	49.5		103	18912	
17 Perfluorooc										M
499.00 > 80.00		3.031	0.002	1.000	111053	0.4869	4.01(0.00.1.10)	105	78.2	Ν.Δ.
499.00 > 99.00		3.031	0.002	1.000	22603		4.91(0.90-1.10)	105	86.3	M
D 19 13C5 PFN. 468.00 > 423.00		3.031	0.002		10359275	51.3		103	13268	
			0.002		10339273	31.3		103	13200	
20 Perfluorono 463.00 > 419.00		3.033	0.0	1.000	112564	0.5610		112	113	
		3.033	0.0	1.000	112304	0.3010		112	113	
D 21 13C8 FOS. 506.00 > 78.00		3 377	-0 003		16049178	51.6		103	8814	
22 Perfluorooc					10047170	31.0		103	0014	
498.00 > 78.00			0.003	1.000	170696	0.5643		113	2588	
25 Sodium 1H,					170070	0.0010		110	2000	
527.00 > 507.00		•	0.001	1.000	41639	0.5003		104	982	
D 26 M2-8:2FTS		0.001	0.001	1.000	11007	0.0000		101	702	
529.00 > 81.00		3.381	0.001		3584296	49.6		104	6848	
D 23 13C2 PFD		0.00.	0.00.		000.270	.,			33.3	
515.00 > 470.00		3.391	0.0		9347060	51.2		102	13247	
24 Perfluorode										
513.00 > 469.00		3.391	0.0	1.000	97971	0.5579		112	341	
D 27 d3-NMeFC										
573.00 > 419.00		3.547	-0.002		4033450	49.4		98.8	6042	
28 N-methyl pe										
570.00 > 419.00		3.553	0.002	1.003	42323	0.5609		112	153	
29 Perfluorode										
599.00 > 80.00		3.705		1.000	67840	0.4775		99.1	1436	
D 32 d5-NEtFOS										
589.00 > 419.00		3.715	-0.003		4616095	55.0		110	5382	
D 30 13C2 PFU					<del>-</del>	<del>-</del>		-	<del>-</del>	
565.00 > 520.00		3.722	0.0		7706271	52.9		106	10780	
31 Perfluoroun								-		
563.00 > 519.00			0.0	1.000	97179	0.5909		118	319	
33 N-ethyl perf										
584.00 > 419.00				1.003	Page 606 of 7	0.4917		98.3	737	
					rage 606 of 7	υ4				

Report Date: 31-Oct-2017 15:19:29

Data File:	\\Chrc	mNa\Sa	acrament	o\Chrom	Data\A8_N\201	71030-4977	3.b\2017.10.30ICAL	003.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOS	SA-M									
515.00 > 169.00		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 PFDo.	Α									
615.00 > 570.00	4.013	4.015	-0.002		8595136	51.2		102	9324	
37 Perfluorodod	lecanoic	acid								
613.00 > 569.00	4.013	4.016	-0.003	1.000	84204	0.5327		107	88.9	
D 38 d-N-EtFOSA	4-M									
531.00 > 169.00	4.065	4.068	-0.003		4269967	49.2		98.4	2818	
39 N-ethylperflu	oro-1-o	ctanesul	lfonami							
526.00 > 169.00	4.074	4.074	0.0	1.000	41241	0.5194		104	1100	
41 Perfluorotride	ecanoic	acid								
663.00 > 619.00	4.285	4.281	0.004	1.000	97785	0.5505		110	40.7	
42 Perfluorotetra		oic acid								
713.00 > 169.00		4.510	-0.001	1.000	25717	0.5444		109	903	
713.00 > 219.00		4.510	0.008	1.002	21625		1.19(0.00-0.00)	109	644	
D 43 13C2-PFTe										
715.00 > 670.00		4.516	0.002		10626247	51.9		104	9952	
D 44 13C2-PFHx										
815.00 > 770.00		4.929	0.002		15816734	51.6		103	4368	
45 Perfluorohex										
813.00 > 769.00	4.931	4.929	0.002	1.000	284601	0.5305		106	27.9	
46 Perfluoroocta										
913.00 > 869.00	5.285	5.281	0.004	1.000	177628	0.5907		118	16.8	
OC Flag Log	ond									

## 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 \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_003.d Data File: 30-Oct-2017 17:59:31 **Injection Date:** 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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (70 00060 X 50 77 00042 0001 35 666<u>-</u> <del>∑</del>55<del>-</del> 28 ≻40 21 30 33 14 20 22 10 11 0.9 1.3 1.9 1.8 2.7 1.0 1.6 0.0 0.9 1.8 2.7 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 77 63 Y (X10000) 066-×55-©54<del>-</del> ×45 ≻<sub>36</sub>-<del>-</del>44 33 27 22 18 11-1.7 2.0 2.3 1.5 1.8 2.1 1.4 1.5 1.2 1.2 1.8 2.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexable 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x | Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x 18 (049-0042-1235-30 6 25 0015 ×12 >28 15 21 10 14 1.5 1.8 2.1 1.7 2.0 1.3 1.9 2.5 1.2 1.4 2.3 0.7 3.1 6 Perfluorohexanoic acid 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_ 56<del>-</del> 56 0042 00035 × 048 0040 ×40 048 ×40 28 <u></u>32⁻ 21 24 24 14 16 16 0 0 01.5 1.8 2.1 2.4 1.8 2.1 Page 60% of 764 2.7 1.2 1.8 2.4 3.0

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:19:29

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_003.d D 19 13C5 PFNA 20 Perfluorononanoic acid D 21 13C8 FOSA Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x (56<del>-</del> (00048-(40-(40-(00001 25 (00001 (00001 (00001) (000001) (000001) (000001) (000001) (000001) (000001) (000001) (000001) (0000001) (0000001) (0 3.033 3.374 ×30-≻20 24 15 18 16 12 10 3.0 2.4 2.7 3.3 3.6 3.9 2.4 2.7 3.0 3.3 3.6 2.5 2.8 3.1 3.4 3.7 4.0 25 Sodium 1H,1H,2H,2H-perfluorodecaDe26 M2-8:2FTS 22 Perfluorooctane Sulfonamide Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 721 Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (000001X) 8 18 63 854 © 815  $\Sigma_{45}$ ≻<sub>36</sub> 27 18  $\mathbf{o}$ 3.3 3.9 3.0 2.9 3.2 3.5 3.8 2.9 3.5 3.6 3.8 4.1 D 23 13C2 PFDA 24 Perfluorodecanoic acid D 27 d3-NMeFOSAA Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_> Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_> 030 025 35<del>-</del> 0014 0012 830 ×25 <u>×</u>10  $\stackrel{\cdot}{\succeq}_{20}$ ≻20 15 15 10 10 0 0 2.9 4.1 3.0 3.9 3.1 3.7 4.3 2.3 3.5 2.7 3.3 3.6 2.5 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x 28 000015 X12 6024 0020 X 0012 ∑<sub>10</sub>-\_ ≻16<del>-</del> 12 0 3.0 3.3 3.6 3.9 3.1 3.4 3.7 4.0 4.3 2.7 3.0 3.3 3.6 3.9 4.2 4.5

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:19:29

4.6

4.9

4.3

10

4.0

4.3

4.6

4.9

12

4.0

0<del>1</del> 3.7

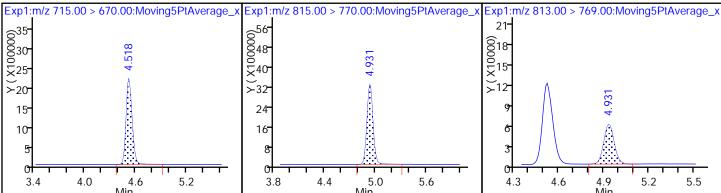
4.0

4.3

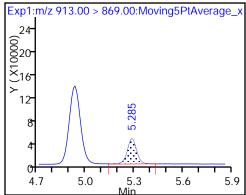
4.6

Report Date: 31-Oct-2017 15:19:29 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_003.d

D 43 13C2-PFTeDA D 44 13C2-PFHxDA 45 Perfluorohexadecanoic acid Exp1:m/z 715.00 > 670.00:Moving5PtAverage\_x Exp1:m/z 815.00 > 770.00:Moving5PtAverage\_x



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:19:30 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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

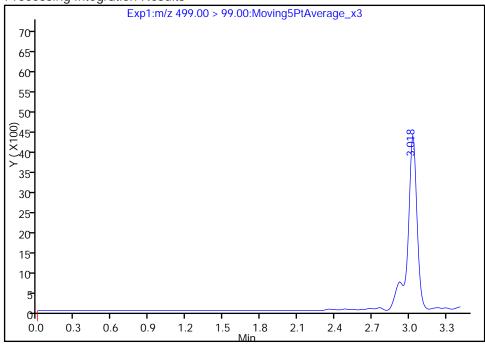
Column: Detector EXP1

### 17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

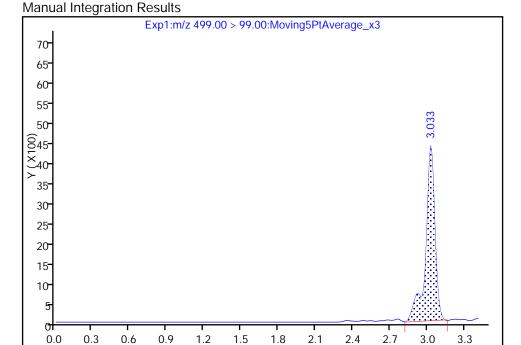
Signal: 2

RT: 3.02 Area: 0

Amount: 0.483253 Amount Units: ng/ml Processing 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

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Report Date: 31-Oct-2017 15:19:36 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Reviewer: pnomsopnat						Date:	3	30-Oct-2017 22:46:5	5		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	2 Perfluorobuty	yric acid									
	212.90 > 169.00	•	1.537	0.0	1.000	351349	1.02		102	87.3	
	D 113C4 PFBA										
	217.00 > 172.00		1.537	0.0		18091732	51.6		103	22433	
	D 3 13C5-PFPe 267.90 > 223.00		1.739	0.007		11646212	51.6		103	152571	
	4 Perfluoropen			0.007		11040212	0.10		103	132371	
	262.90 > 219.00		1.741	0.005	1.000	268577	1.07		107	258	
	D 47 13C3-PFBS	S									
	301.90 > 83.00	1.764	1.763	0.001		239859	47.7		103	7784	
	5 Perfluorobuta										
		1.764	1.764	0.0	1.000	339771	0.9088	2 20/0 00 0 00)	103	944	
		1.764	1.764	0.0	1.000	142401		2.39(0.00-0.00)	103	1205	
	61 Sodium 1H, 327.00 > 307.00		•		1.000	83727	0.9157		98.0	4058	
	6 Perfluorohex			0.00.		33727	017.107		70.0	.000	
	313.00 > 269.00		1.998	0.008	1.000	245774	1.03		103	428	
	D 7 13C2 PFHx	Α									
	315.00 > 270.00	2.006	1.998	0.008		12533747	51.7		103	28766	
	D 9 13C4-PFHp										
	367.00 > 322.00		2.319	0.001		12927656	53.0		106	25030	
	10 Perfluoroher 363.00 > 319.00		acid 2.319	0.001	1.000	253519	1.01		101	516	
	D 11 18O2 PFH)		2.317	0.001	1.000	255519	1.01		101	510	
	403.00 > 84.00		2.333	0.004		14626159	48.6		103	22687	
	8 Perfluorohex										
	399.00 > 80.00	2.337	2.333	0.004	1.000	332754	1.04		114	1959	
						Page 614 of <sup>2</sup>	764				

Data File:	\\Cnrc	Jiiiva\Sa	icrameni	O/Chrom	Data\A8_N\201	/1030-49//	3.b\2017.10.30ICA	L_004.a		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,	1H.2H.2	H-perflu	orooctan	е						
427.00 > 407.00			0.006	1.000	85870	0.9162		96.7	2253	
D 12 M2-6:2FTS	5									
429.00 > 81.00	2.647	2.641	0.006		3574947	51.4		108	12690	
* 62 13C2-PFOA	A									
415.00 > 370.00	2.669	2.655	0.014		12780795	50.0			15425	
D 14 13C4 PFO	A									
417.00 > 372.00	2.669	2.664	0.005		13024434	54.6		109	24852	
15 Perfluorooct										
413.00 > 369.00		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 Perfluorohe <sub>l</sub>	•									
449.00 > 80.00		2.672	0.004	1.000	261088	1.02		107	4092	
D 18 13C4 PFO										
503.00 > 80.00	3.035	3.030	0.005		10456339	49.3		103	12740	
D 19 13C5 PFN										
468.00 > 423.00	3.035	3.031	0.004		10570529	52.4		105	11270	
17 Perfluorooct			d							M
499.00 > 80.00		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 Perfluoronoi										
463.00 > 419.00	3.035	3.033	0.002	1.000	212119	1.04		104	224	
D 21 13C8 FOS										
506.00 > 78.00	3.380	3.377	0.003		16441468	52.8		106	16739	
22 Perfluorooct										
498.00 > 78.00	3.388	3.379	0.009	1.000	319607	1.03		103	3300	
D 26 M2-8:2FTS	5									
529.00 > 81.00	3.388	3.381	0.007		3568424	49.4		103	8557	
25 Sodium 1H,	1H,2H,2	H-perflu	orodecar	ne						
527.00 > 507.00	3.388	3.381	0.007	1.000	77968	0.9410		98.2	1327	
24 Perfluorodeo	canoic a	cid								
513.00 > 469.00	3.396	3.391	0.005	1.000	186086	1.03		103	583	
D 23 13C2 PFD/	Д									
515.00 > 470.00	3.396	3.391	0.005		9642702	52.8		106	11815	
D 27 d3-NMeFO	SAA									
573.00 > 419.00	3.552	3.547	0.005		4142746	50.7		101	5419	
28 N-methyl pe	rfluoroo	ctane sul	lfonami							
570.00 > 419.00	3.562	3.553	0.009	1.003	72427	0.9345		93.5	213	
29 Perfluorodeo	cane Sul	lfonic aci	d							
599.00 > 80.00	3.710	3.705	0.005	1.000	135804	0.9583		99.4	2409	
D 32 d5-NEtFOS	SAA									
589.00 > 419.00		3.715	0.004		4588738	54.6		109	4086	
31 Perfluoround	decanoio	c acid								
563.00 > 519.00		3.722	0.007	1.000	176741	1.05		105	525	
D 30 13C2 PFUr				-	-	-		-	•	
565.00 > 520.00		3.722	0.007		7863227	53.9		108	5846	
33 N-ethyl perfl					<del>-</del> ·					
584.00 > 419.00		3.723	0.006	1.003	Page 615 of	<b>-</b> 0.9484		94.8	1080	
	·				Page 675 of	704				

Report Date: 31-Oct-2017 15:19:36 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File:	\\ChromNa\Sacramento\ChromDat	ta\A8_	N\20171030	-49773.b\2017.1	0.30ICAL_004.d

Data File.	1101110	Jilliva	acramen	to to till otti	Data / 10_111201	71030 4777	3.612017.10.301071	00+.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFO	SA-M									
515.00 > 169.00		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 PFD	Ac									
615.00 > 570.00	4.018	4.015	0.003		8569420	51.0		102	12186	
37 Perfluorodo	decanoio	c acid								
613.00 > 569.00	4.018	4.016	0.002	1.000	163075	1.03		103	164	
D 38 d-N-EtFOS	A-M									
531.00 > 169.00	4.073	4.068	0.005		4241996	48.9		97.7	3334	
39 N-ethylperflu	uoro-1-o	ctanesu	lfonami							
526.00 > 169.00	4.073	4.074	-0.001	1.000	79926	1.01		101	1439	
41 Perfluorotrid	lecanoic	acid								
663.00 > 619.00	4.285	4.281	0.004	1.000	178964	1.01		101	71.9	
42 Perfluoroteti	radecan	oic acid								
713.00 > 169.00			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-PFT6										
715.00 > 670.00	4.517	4.516	0.001		10669124	52.1		104	17484	
45 Perfluorohe										
813.00 > 769.00	4.931	4.929	0.002	1.000	410574	0.99		99.5	40.8	
D 44 13C2-PFH										
815.00 > 770.00		4.929	0.002		15778734	51.5		103	9833	
46 Perfluorooct										
913.00 > 869.00	5.285	5.281	0.004	1.000	317418	1.06		106	31.5	
	a o o ol									

# OC 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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171030-49773.b\\2017.10.30ICAL\_004.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (70<sup>-</sup> (0060-(00042 ×35 <del>∑</del>50 ≻40 ≻28 30 21 20 14 10 1.2 1.5 1.8 0.9 2.1 0.0 1.8 2.7 0.1 1.0 2.8 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 (000012 ×) × 9 (000010° × (×100000) × (×10000) 8 Y (X10000) 2.3 1.4 1.7 2.0 2.0 2.3 1.2 1.5 1.8 1.1 1.4 2.1 2.4 1.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan Perfluorohexanoic acid Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x 35<del>-</del> Y (X10000) 6 848 830 ×25 ×40 ≻<sub>32</sub> ≻<sub>20</sub> 15 10 16 01 1.9 1.4 1.7 2.3 2.2 2.5 1.5 1.8 2.4 2.0 1.3 1.6 2.1 1.1 7 13C2 PFHxA 9 13C4-PFHpA 10 Perfluoroheptanoic acid Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_) Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ (X10000) 649 000 42 042 0036 **×**35 ≻28 ≻<sub>24</sub>· 21 18 12 0 0 0 8.0 1.4 2.0 2.6 3.2 1.7 Page 6Mnof 764 2.9 3.5 1.7 2.0 2.3 2.6 2.9 1.1

3.0 11in 3.6

4.2

0

2.0

2.6

3.2

3.8

2.2

2.5

2.8

3.1

3.4

3.7

1.8

3.7

4.0

4.3

2.8

3.1

3.4

4.0

4.3

4.6

0<del>1</del> 2.9

3.2

3.8

4.1

3.1

4.6

4.9

4.0

4.3

4.6

4.9

0

3.7

4.0

4.3

4.6

4.9

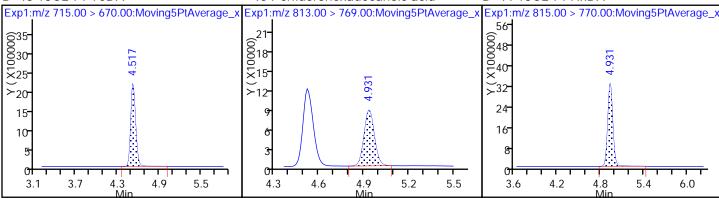
4.0

Report Date: 31-Oct-2017 15:19:36 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_004.d

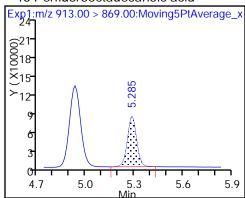
D 43 13C2-PFTeDA

45 Perfluorohexadecanoic acid

D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:19:37 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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:

SACINSTLCMS01 ALS Bottle#: 29 Operator ID: Worklist Smp#: 4

Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8\_N Limit Group: LC PFC\_DOD ICAL

Column: Detector EXP1

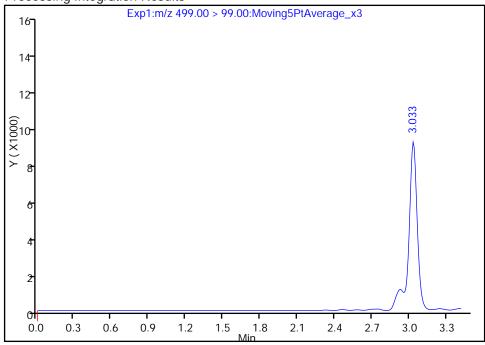
# 17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 3.03 Area: 0

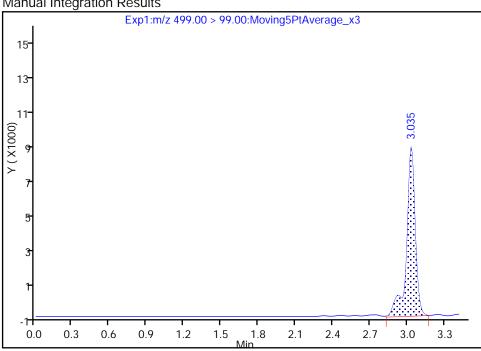
Amount: 0.911227 Amount Units: ng/ml





RT: 3.04 Area: 45102 Amount: 0.918171 Amount Units: ng/ml

#### Manual Integration Results



Reviewer: phomsophat, 30-Oct-2017 22:46:30

Audit Action: Manually Integrated

Audit Reason: Assign Peak

Page 622 of 764

Report Date: 31-Oct-2017 15:19:46 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

FIRST Level Revie	wer: pno	msopna	IL		Date:		30-Oct-2017 22:48:C	12		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	١									
217.00 > 172.00	1.537	1.537	0.0		18042358	51.5		103	28423	
2 Perfluorobut	•									
212.90 > 169.00		1.537	0.0	1.000	1845411	5.37		107	524	
D 3 13C5-PFPe		4 700	0.007		110/0010	F0.4		407	450447	
267.90 > 223.00		1.739	0.007		11968018	53.1		106	158446	
4 Perfluoroper 262.90 > 219.00		cid 1.741	0.005	1.000	1327357	5.16		103	1245	
D 47 13C3-PFB		1./41	0.003	1.000	1327337	5.10		103	1245	
301.90 > 83.00		1.763	0.001		249974	49.7		107	8199	
5 Perfluorobut										
298.90 > 80.00		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,		•								
327.00 > 307.00		1.961	-0.001	1.000	409149	4.69		100	15641	
D 7 13C2 PFHx		1 000	0.000		10400114	F4 F		100	20075	
315.00 > 270.00		1.998	0.008		12490114	51.5		103	29975	
6 Perfluorohex 313.00 > 269.00		ad 1.998	0.008	1.000	1302471	5.46		109	2198	
10 Perfluorohe			0.000	1.000	1302471	3.40		107	2170	
363.00 > 319.00	•	2.319	0.006	1.000	1361815	5.39		108	2280	
D 913C4-PFHp										
367.00 > 322.00		2.319	0.006		13063724	53.6		107	17987	
8 Perfluorohex	anesulfo	nic acid								
399.00 > 80.00	2.333	2.333	0.0	1.000	1556248	4.70		103	3982	
D 11 18O2 PFH										
403.00 > 84.00	2.333	2.333	0.0		15142641	50.3		106	20726	
					Page 623 of -	764				

Report Date: 31-Oct-2017 15:19:46

Data File:

Data File.	NOTIF	JIIIVa\Sc	acrament	OCHION	Dala (Ao_IN (2017	1030-4977	3.D\2017.10.30ICAL	_005.u		
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		2.641	0.002		3410618	49.0		103	11471	
13 Sodium 1H, 427.00 > 407.00		H-perflu 2.641		e 1.000	427077	4.78		101	6231	
* 62 13C2-PFOA 415.00 > 370.00		2/55	0.000		12125017	F0.0			24012	
		2.655	0.009		12125916	50.0			24012	
D 14 13C4 PFO 417.00 > 372.00		2.664	0.0		12154092	50.9		102	27110	
15 Perfluorooc										
413.00 > 369.00 413.00 > 169.00		2.666 2.666		1.000 1.000	1358217 702616	5.20	1.93(0.90-1.10)	104 104	527 2191	
16 Perfluorohe	ptanesul	fonic Ac	id							
449.00 > 80.00	2.671	2.672		1.000	1307067	5.09		107	8328	
D 18 13C4 PFO 503.00 > 80.00		3.030	0.001		10466308	49.4		103	18225	
17 Perfluorooc									. 0220	
499.00 > 80.00		3.031	0.0	1.000	1078764	4.74		102	628	
499.00 > 99.00		3.031	0.0	1.000	227223		4.75(0.90-1.10)	102	770	
D 19 13C5 PFN	A									
468.00 > 423.00	3.039	3.031	0.008		10642051	52.7		105	19695	
20 Perfluorono										
463.00 > 419.00 D 21 13C8 FOS		3.033	0.006	1.000	1052198	5.10		102	975	
506.00 > 78.00		3.377	0.004		16339148	52.5		105	106737	
22 Perfluorooc	tane Sulf	onamide	Э							
498.00 > 78.00			0.002	1.000	1655149	5.37		107	8693	
25 Sodium 1H, 527.00 > 507.00		H-perflu 3.381		ne 1.000	431491	4.90		102	4615	
D 26 M2-8:2FTS	6									
529.00 > 81.00		3.381	0.0		3788998	52.4		109	7224	
D 23 13C2 PFD. 515.00 > 470.00		3.391	0.007		9510123	52.1		104	10230	
24 Perfluorode										
513.00 > 469.00		3.391	0.007	1.000	910996	5.10		102	2401	
D 27 d3-NMeFC 573.00 > 419.00		3.547	0.007		4152012	50.8		102	5575	
28 N-methyl pe			lfonami							
570.00 > 419.00			0.001	1.000	391751	5.04		101	939	
29 Perfluorode				1 000	712504	F 02		104	/ OF 4	
599.00 > 80.00 D 32 d5-NEtFOS		3.705	0.006	1.000	713584	5.03		104	6254	
589.00 > 419.00		3.715	0.006		4505726	53.7		107	5240	
D 30 13C2 PFU										
565.00 > 520.00		3.722	0.009		7789622	53.4		107	8200	
31 Perfluoroun 563.00 > 519.00		3.722	0.009	1.000	829066	4.99		99.7	1976	
33 N-ethyl perf	luoroocta	ane sulfo								
584.00 > 419.00	3.731	3.723	0.008	1.003	Page 624 of 76	5.07 5.07		101	2949	

Report Date: 31-Oct-2017 15:19:46

Data File:

Data File.	WOTH	milia	acramen	OTOTILOTTI	Data / 10_111201	71000 4777	5.012017.10.301CAL	000.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFOS	SA-M									_
515.00 > 169.00		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 PFD	ρA									
615.00 > 570.00	4.020	4.015	0.005		8944676	53.3		107	22379	
37 Perfluorodoo										
613.00 > 569.00		4.016	0.004	1.000	823879	5.01		100	728	
D 38 d-N-EtFOS										
531.00 > 169.00		4.068	0.006		4286339	49.4		98.7	2576	
39 N-ethylperflu				1 000	400000	F 40		100	0150	
526.00 > 169.00			0.0	1.000	408209	5.12		102	2159	
41 Perfluorotrid 663.00 > 619.00			0.005	1.000	936032	5.06		101	368	
42 Perfluorotetr			0.005	1.000	930032	5.00		101	300	
713.00 > 169.00		4.510	0.001	1.000	235213	4.95		99.0	2901	
713.00 > 219.00		4.510	0.010	1.002	178542	1.70	1.32(0.00-0.00)	99.0	2637	
D 43 13C2-PFTe	eDA						,			
715.00 > 670.00		4.516	0.004		10691814	52.3		105	10247	
D 44 13C2-PFH)	хDА									
815.00 > 770.00	4.933	4.929	0.004		16082155	52.5		105	7116	
45 Perfluorohex	xadecan	oic acid								
813.00 > 769.00	4.933	4.929	0.004	1.000	1555603	5.09		102	136	
46 Perfluorooct										
913.00 > 869.00	5.287	5.281	0.006	1.000	1604499	5.25		105	140	
Reagents:										
LCPFC_FULL-L3	3_00005		Δ	mount A	dded: 1.00	Units	:: mL			

Report Date: 31-Oct-2017 15:19:46 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_005.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (00000 X) (00000 X) (77<del>-</del> 049 0642 0642 ×55 ×35 >40 ≻28 30 21 33 20 22 14 10 11 0.9 2.7 2.3 2.9 0.0 1.8 0.5 1.1 1.7 0.2 1.1 2.0 D 47 13C3-PFBS 5 Perfluorobutanesulfonic acid 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 12 (000010 X ) X 63 77<del>.</del> 0066 00054 ×1000545 <del>×</del>55 <del>-</del>36 33 18 22 11 2.3 1.4 1.7 2.0 1.0 1.3 1.9 2.2 2.5 2.0 2.3 1.6 1.4 1.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexable 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x | Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x 18 630 625 00015<sup>-</sup> X12 .28 15 21 10 01 1.9 2.5 2.0 1.4 2.0 1.0 1.3 1.6 2.2 1.4 1.7 2.3 2.6 0.8 2.6 3.2 1.1 6 Perfluorohexanoic acid 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ 56**1** Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x 56 042 036 0648<del>-</del> 0048 ×10001 ×10001 ≻<sub>24</sub> 24 24 18 16 16 12 0 0 1.6 1.9 2.2 2.5 1.7 2.9 1.7 2.0 2.3 2.6 2.9 3.2 1.3 2.6 1.4

Report Date: 31-Oct-2017 15:19:46

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_005.d D 19 13C5 PFNA 20 Perfluorononanoic acid D 21 13C8 FOSA Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x 56<del>-</del> (35<sup>-</sup> 00030 00048 40 40 6<sup>35</sup> ×25 ×25 ≻20 ≻<sub>20</sub> 15 15 16 10 10 3.1 2.9 1.9 2.5 3.7 2.3 2.6 3.2 3.5 3.8 1.9 2.5 3.1 3.7 4.3 25 Sodium 1H,1H,2H,2H-perfluorodecaDe26 M2-8:2FTS 22 Perfluorooctane Sulfonamide Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (000012 1000012 1000012 (56<sup>-</sup> (0048<sup>-</sup> (000012 × 9 **×**40 **≻**32 16 3.3 3.9 3.4 3.0 2.9 3.5 2.8 3.7 4.0 3.6 3.8 4.1 D 23 13C2 PFDA 24 Perfluorodecanoic acid D 27 d3-NMeFOSAA Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_> Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_> Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_> 35 0015 12 X 030 0025 0030 ×25 \S\_{20} <del>∑</del>20 15 15 10 10 0 2.8 4.0 3.0 3.3 3.9 2.9 3.2 3.1 3.4 3.7 4.3 2.7 3.6 3.5 3.8 4.1 4.4 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x 14 (0000012 × ) > 9 (00001× ) 16-(X10000) X (X10000) 0 2.9 3.2 3.5 3.8 4.1 2.9 3.2 3.5 3.8 4.1 4.4 3.0 3.3 3.6 3.9 4.2 4.5

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:19:46

4.4

4.7

5.0

3.9

4.2

4.8

5.1

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3.7

4.0

4.3

4.6

4.9

3.8

Report Date: 31-Oct-2017 15:19:46 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_005.d

4.2

3.6

D 43 13C2-PFTeDA D 44 13C2-PFHxDA 45 Perfluorohexadecanoic acid Exp1:m/z 715.00 > 670.00:Moving5PtAverage\_x Exp1:m/z 815.00 > 770.00:Moving5PtAverage\_x Exp1:m/z 813.00 > 769.00:Moving5PtAverage\_x 56-(000001X 56 (35<sup>-</sup> (3 (00001X) ⊃ ≻32-×<sub>20</sub> 24 24 15 16<del>-</del> 16 10 0 0 0 4.8

5.4

6.0

4.3

4.6

4.9

5.2

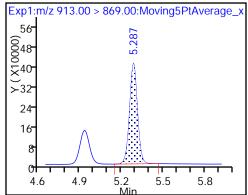
5.5

46 Perfluorooctadecanoic acid

4.6

5.2

4.0



Report Date: 31-Oct-2017 15:19:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

riisi Level Reviewel, prioriisopriat						Date.		0-001-2017 22.46.5	7		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
•	2 Perfluorobut	vric acid									
	212.90 > 169.00	•	1.537	-0.001	1.000	6872498	21.1		106	1728	
I	D 113C4 PFBA	<b>\</b>									
	217.00 > 172.00	1.536	1.537	-0.001		17067362	48.7		97.4	32424	
	D 3 13C5-PFPe										
	267.90 > 223.00	1.736	1.739	-0.003		11267831	50.0		99.9	159596	
	4 Perfluoropen										
	262.90 > 219.00		1.741	-0.005	1.000	4966682	20.5		103	4199	
	D 47 13C3-PFB		. =								
	301.90 > 83.00		1.763	0.001		227541	45.3		97.3	5798	
	5 Perfluorobuta			0.0	4 000	(505000	40.4		404	40446	
	298.90 > 80.00 298.90 > 99.00	1.764 1.764	1.764 1.764	0.0	1.000 1.000	6535299 2749098	18.4	2.38(0.00-0.00)	104 104	13143 14341	
						2147070		2.30(0.00-0.00)	104	14041	
	61 Sodium 1H, 327.00 > 307.00			-0.001	1.000	1524770	18.4		98.7	24492	
	6 Perfluorohex			0.001	1.000	102 1770	10.4		70.7	-11/2	
	313.00 > 269.00			-0.004	1.000	4796137	21.2		106	6485	
	D 7 13C2 PFHx										
	315.00 > 270.00		1.998	-0.004		11830628	48.8		97.6	30278	
ı	D 9 13C4-PFHp	А									
	367.00 > 322.00		2.319	0.0		12388693	50.8		102	22303	
	10 Perfluorohe	ptanoic a	acid								
	363.00 > 319.00	-		0.0	1.000	4869377	20.3		102	5436	
I	D 11 1802 PFH	xS									
	403.00 > 84.00	2.335	2.333	0.002		13947567	46.3		98.0	20191	
	8 Perfluorohex	anesulfo	nic acid								
	399.00 > 80.00	2.335	2.333	0.002	1.000	5700596	18.7		103	5582	
						Dama C24 of :	704				

Report Date: 31-Oct-2017 15:19:57

Data File:

Data File:	\\Chrc	mNa\Sa	acrament	o\Cnrom	Data\A8_N\201/1	030-4977	3.b\2017.10.30ICAL	006.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H,	1H.2H.2	H-perflu	orooctan	e						
427.00 > 407.00		•		1.000	1561284	18.4		97.2	10348	
D 12 M2-6:2FTS	5									
429.00 > 81.00	2.640	2.641	-0.001		3232615	46.4		97.8	13110	
* 62 13C2-PFO	A									
415.00 > 370.00	2.662	2.655	0.007		11421330	50.0			15064	
D 14 13C4 PFO	A									
417.00 > 372.00	2.669	2.664	0.005		11534754	48.3		96.7	15363	
15 Perfluorooct										
413.00 > 369.00		2.666	0.003	1.000	4990434	20.1		101	1789	
413.00 > 169.00		2.666	0.003	1.000	2591422		1.93(0.90-1.10)	101	4621	
16 Perfluorohe										
449.00 > 80.00		2.672	0.004	1.000	4839750	20.1		106	13203	
D 18 13C4 PFO		0.000	0.0		0000057	44.0		04.0	40507	
503.00 > 80.00		3.030	0.0		9802057	46.3		96.8	12526	
D 19 13C5 PFN/		2 024	0.001		07.47004	40.0		0//	0.450	
468.00 > 423.00		3.031			9747291	48.3		96.6	9452	
17 Perfluorooct				1 000	2000405	10.0		00.0	1/10	M
499.00 > 80.00 499.00 > 99.00		3.031 3.031	-0.001 -0.001	1.000 1.000	3889485 846582	18.2	4.59(0.90-1.10)	98.3 98.3	1613 1980	M
			-0.001	1.000	040302		4.59(0.90-1.10)	90.3	1900	
20 Perfluoronoi 463.00 > 419.00		3.033	0.005	1.000	3822275	20.2		101	3219	
		3.033	0.003	1.000	3022273	20.2		101	3217	
D 21 13C8 FOSA 506.00 > 78.00		3.377	-0.001		14992145	48.2		96.4	16020	
22 Perfluorooct					14772143	40.2		70.4	10020	
498.00 > 78.00		3.379		1.000	5989035	21.2		106	9085	
D 26 M2-8:2FTS		3.377	-0.003	1.000	3707033	21.2		100	7003	
529.00 > 81.00		3.381	0.003		3365770	46.6		97.3	5672	
				10	3303770	40.0		77.5	3072	
25 Sodium 1H, 527.00 > 507.00		•	0.003	1.000	1455859	18.6		97.2	6644	
24 Perfluorode			0.000	1.000	1433037	10.0		71.2	0044	
513.00 > 469.00		3.391	0.001	1.000	3286997	19.9		99.5	5613	
D 23 13C2 PFD		3.371	0.001	1.000	3200771	17.7		77.5	3013	
515.00 > 470.00		3.391	0.001		8789284	48.2		96.3	9387	
D 27 d3-NMeFO		3.371	0.001		0707204	70.2		70.5	7507	
573.00 > 419.00		3.547	0.001		3821639	46.8		93.6	4021	
28 N-methyl pe					3021037	40.0		75.0	4021	
570.00 > 419.00				1.000	1427297	20.0		99.8	2214	
29 Perfluorode				1.000	142/2//	20.0		77.0	2217	
599.00 > 80.00			0.001	1.000	2545089	19.2		99.4	5193	
		3.703	0.001	1.000	2545007	17.2		77.4	3173	
D 32 d5-NEtFOS 589.00 > 419.00		3.715	0.0		4034536	48.0		96.1	2632	
			0.0		4034330	40.0		70.1	2032	
31 Perfluoround 563.00 > 519.00			0.007	1.000	2962400	19.2		96.2	3791	
		J.122	-0.007	1.000	Z 7UZ4UU	17.∠		7U.Z	J/71	
D 30 13C2 PFUr 565.00 > 520.00		3.722	-0 007		7217943	49.5		99.0	6399	
					1411743	47.0		77.U	0377	
33 N-ethyl perfl 584.00 > 419.00				1.000	1271561	20 1		101	3446	
JU4.UU / 417.UU	5.715	J. 1 Z J	-0.006	1.000	Page 632 of 764	1 20.1		101	5440	

Report Date: 31-Oct-2017 15:19:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File:	\\ChromNa\Sacramento\ChromData	1\A8_	_N\2017103	0-49773.b\	2017.10.	30ICAL_	_006.d

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFO	SA-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 PFD										
615.00 > 570.00	4.009	4.015	-0.006		8186478	48.8		97.5	10551	
37 Perfluorodo										
613.00 > 569.00		4.016	0.0	1.000	2980875	19.8		99.0	2457	
D 38 d-N-EtFOS			0.007		0000510	45.0		04.0	0.4.00	
531.00 > 169.00			-0.007		3989568	45.9		91.9	2639	
39 N-ethylperflu				1 000	14070//	20.0		100	0700	
526.00 > 169.00			-0.004	1.000	1487266	20.0		100	2789	
41 Perfluorotrid 663.00 > 619.00			-0.007	1.000	3304558	19.5		97.7	1029	
			-0.007	1.000	3304336	19.5		91.1	1029	
42 Perfluorotetr 713.00 > 169.00		4.510	-0.003	1.000	845237	19.0		95.2	3737	
713.00 > 107.00		4.510	0.006	1.000	665315	17.0	1.27(0.00-0.00)	95.2	4567	
D 43 13C2-PFTe							(111111)			
715.00 > 670.00		4.516	0.0		9989003	48.8		97.6	27889	
45 Perfluorohe	xadecan	oic acid								
813.00 > 769.00		4.929	0.0	1.000	5266453	20.8		104	410	
D 44 13C2-PFH	xDA									
815.00 > 770.00	4.929	4.929	0.0		14294873	46.7		93.3	4876	
46 Perfluorooct	tadecand	oic acid								
913.00 > 869.00	5.280	5.281	-0.001	1.000	5612557	20.7		103	421	
00.51										

# **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 \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_006.d Data File: **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 LC PFC\_DOD ICAL Method:  $A8_N$ Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 3 13C5-PFPeA Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (30 00 025 663 654 00042 X  $\sum_{20}$ ′ንጸ 36 21 27 10 18 0.9 0.8 2.0 2.6 0.0 1.8 2.7 0.1 1.0 1.9 2.8 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_> Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 28-00024-20-(21<sup>-</sup> 00018 ×15 Y (X10000) >162.4 2.0 2.3 1.2 1.5 2.1 1.4 1.7 0.9 1.2 2.1 1.8 1.1 1.5 1.8 2.4 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x 64**1** Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 (12 (X100000) X (X100000) X (X100000) 000015 × )12 656 648 ×40-≻<sub>32</sub>-24 16 1.5 1.8 1.9 1.5 1.8 2.1 2.7 0.9 1.2 2.1 2.4 1.3 1.6 2.2 2.5 2.4 7 13C2 PFHxA D 9 13C4-PFHpA 10 Perfluoroheptanoic acid Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_> Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ (018 000015 X 12 0042 000035 × × 28 042 0036 ×30 ≻<sub>24</sub>· 18 14 12 00 0 2.0 8.0 1.4 2.6 1.2 1.8 Page 68% of 764 3.0 1.9 2.2 2.5 2.8 1.6

Chrom Revision: 2.2 16-Aug-2017 16:24:46 Report Date: 31-Oct-2017 15:19:57 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_006.d D 11 1802 PFHxS 8 Perfluorohexanesulfonic acid 13 Sodium 1H,1H,2H,2H-perfluorooctane Exp1:m/z 403.00 > 84.00:Moving5PtAverage\_x3 Exp1:m/z 399.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 427.00 > 407.00:Moving5PtAverage\_x 618 1000015 00042 00001 ×35 ×28 60 60 648 <del>×</del>40 21 24 16 2.4 1.2 1.8 3.0 1.5 1.8 2.1 2.4 2.7 3.0 1.9 2.2 2.5 2.8 3.1 3.4 D 12 M2-6:2FTS 62 13C2-PFOA D 14 13C4 PFOA Exp1:m/z 415.00 > 370.00:Moving5PtAverage\_> Exp1:m/z 429.00 > 81.00:Moving5PtAverage\_x3 Exp1:m/z 417.00 > 372.00:Moving5PtAverage\_x (12 X (X100000) X (X100000) X (X100000) (036-30-30-(000001X) X 18 18 12 12 2.2 2.7 2.7 2.5 3.1 3.4 2.4 3.0 15 Perfluorooctanoic acid 15 Perfluorooctanoic acid 16 Perfluoroheptanesulfonic Acid Exp1:m/z 413.00 > 169.00:Moving5PtAverage\_)
967 Exp1:m/z 413.00 > 369.00:Moving5PtAverage\_> Exp1:m/z 449.00 > 80.00:Moving5PtAverage\_x3 (0000015 X12 00015 X 12 684**-**672-×60 36 24 2.6 2.9 2.7 2.2 2.5 2.0 2.3 3.2 3.5 1.8 2.1 2.4 3.0 3.3 1.9 2.8 3.1 3.4 D 18 13C4 PFOS D 19 13C5 PFNA 17 Perfluorooctane sulfonic acid (M) Exp1:m/z 499.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 503.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x 35 35 (000001 X100001 X 00030-25-X (X100000) <u></u>∑20 15 15 10 10

2.0

2.6

3.2

3.8

2.2

2.5

2.8

3.1

3.4

3.7

2.0

2.6

3.2

3.1

2.8

3.4

3.7

4.0

4.3

2.9

3.2

3.5

3.8

4.1

4.4

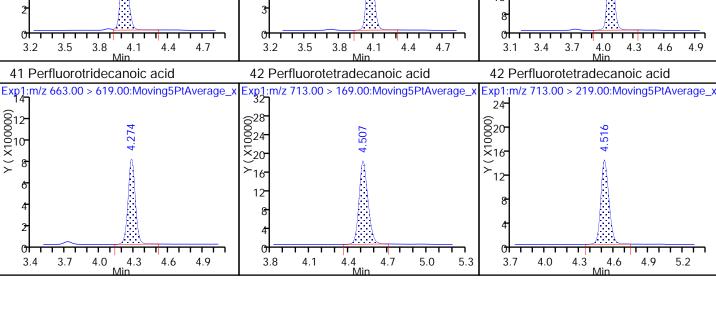
3.0

3.3

3.6

3.9

4.2

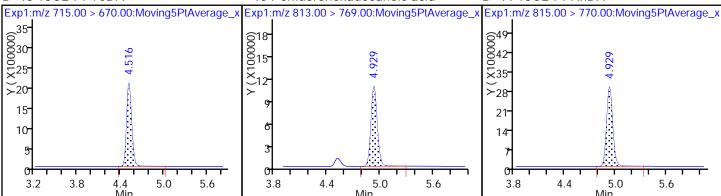


Report Date: 31-Oct-2017 15:19:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_006.d

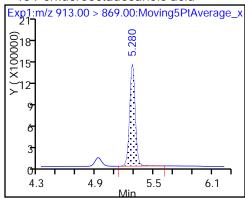
D 43 13C2-PFTeDA

45 Perfluorohexadecanoic acid

D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:19:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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

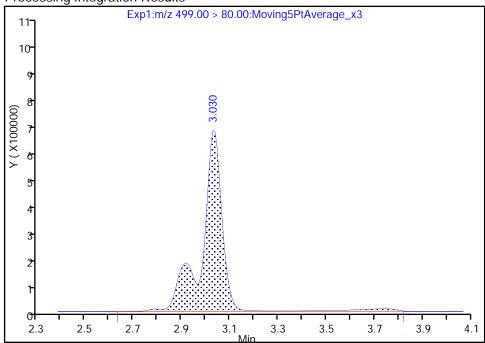
Method: A8\_N Limit Group: LC PFC\_DOD ICAL

Column: Detector EXP1

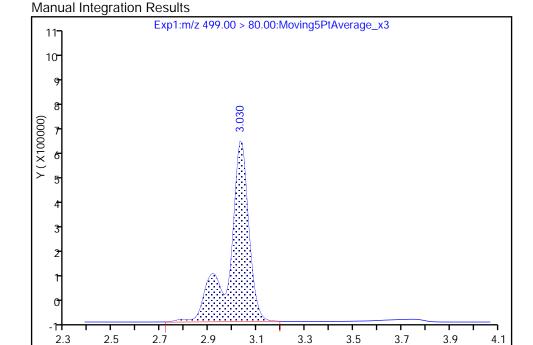
## 17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 3.03 Area: 4020308 Amount: 18.707163 Amount Units: ng/ml **Processing 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

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Audit Reason: Assign Peak

Report Date: 31-Oct-2017 15:20:04 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	omsopha	<u>it</u>		Date:	3	30-Oct-2017 22:49:4	8			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	\									
217.00 > 172.00	1.539	1.537	0.002		18385602	52.4		105	23625	
2 Perfluorobut	•									
212.90 > 169.00		1.537	0.002	1.000	16852992	48.1		96.3	2150	
D 3 13C5-PFP6		4 700	0.0		44774704	F0.0		101	4.5005	
267.90 > 223.00		1.739	0.0		11771734	52.2		104	145325	
4 Perfluoroper 262.90 > 219.00		cia 1.741	0.007	1.000	12771661	50.5		101	11158	
D 47 13C3-PFB		1.7 7 1	0.007	1.000	12771001	30.3		101	11130	
301.90 > 83.00		1.763	0.003		245067	48.7		105	7041	
5 Perfluorobut	anesulfo	nic 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,										
327.00 > 307.00		1.961	0.003	1.000	4321214	47.8		102	34780	
D 7 13C2 PFHx		1 000	0.0		122225/1	<b>54</b> /		100	20007	
315.00 > 270.00		1.998	0.0		13222561	54.6		109	30087	
6 Perfluorohex 313.00 > 269.00		1.998	0.0	1.000	12269212	48.6		97.1	12021	
10 Perfluorohe			0.0	1.000	12207212	40.0		77.1	12021	
363.00 > 319.00	•	2.319	0.008	1.000	12433273	50.1		100	7718	
D 9 13C4-PFHp	А									
367.00 > 322.00		2.319	0.008		12812432	52.6		105	17152	
8 Perfluorohex	anesulfo	onic acid								
399.00 > 80.00	2.336	2.333	0.003	1.000	15184106	45.6		100	5936	
D 11 1802 PFH										
403.00 > 84.00	2.336	2.333	0.003		15220009	50.6		107	17136	
					Page 640 of 7	764				

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Report Date: 31-Oct-2017 15:20:04

ct-2017 15:20:04 Chrom Revision: 2.2 16-Aug-2017 16:24:46 \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d Data File:

Data File.	\\CIIIC	illiva	Crament	OCHION	Dala Mo_IN 2017	1030-4777	3.D\ZU17.10.3UICA	L_007.u		
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		2.641	-0.004		3532601	50.8		107	11253	
13 Sodium 1H, 427.00 > 407.00		•		e 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 PFO 417.00 > 372.00	2.666		0.002		12589825	52.7		105	10436	
15 Perfluorooct 413.00 > 369.00 413.00 > 169.00	2.666	id 2.666 2.666	0.0	1.000 1.000	12964935 7227313	47.9	1.79(0.90-1.10)	95.9 95.9	3183 6045	
16 Perfluorohe 449.00 > 80.00	-		id 0.001	1.000	12616457	48.5		102	11433	
D 18 13C4 PFOS 503.00 > 80.00	3.027		-0.003		10604507	50.0		105	8444	
17 Perfluorooct 499.00 > 80.00 499.00 > 99.00	3.036	onic acio 3.031 3.031	0.005 -0.004	1.000 0.997	10938097 2315579	47.4	4.72(0.90-1.10)	102 102	2609 3556	
D 19 13C5 PFN/ 468.00 > 423.00		3.031	-0.004		10560316	52.3		105	9265	
20 Perfluoronoi 463.00 > 419.00			0.003	1.000	10166844	49.7		99.4	4155	
D 21 13C8 FOS	3.382		0.005		16407213	52.7		105	9720	
22 Perfluorooct 498.00 > 78.00	3.382	3.379	0.003	1.000	15657067	50.6		101	10097	
25 Sodium 1H, 527.00 > 507.00	3.382	•	orodecar 0.001	ne 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 PFD/ 515.00 > 470.00	3.390	3.391	-0.001		9640984	52.8		106	9380	
24 Perfluorodeo 513.00 > 469.00	3.390	3.391	-0.001	1.000	9112657	50.3		101	8551	
D 27 d3-NMeFO 573.00 > 419.00	3.546	3.547			4376084	53.6		107	4490	
28 N-methyl pe 570.00 > 419.00	3.557	3.553	0.004	1.003	3881322	47.4		94.8	2875	
29 Perfluorode 599.00 > 80.00	3.705	3.705		1.000	7338718	51.1		106	5571	
D 32 d5-NEtFOS 589.00 > 419.00	3.714	3.715	-0.001		4339623	51.7		103	4019	
D 30 13C2 PFUt 565.00 > 520.00	3.724	3.722	0.002		7529471	51.7		103	5292	
31 Perfluoround 563.00 > 519.00 33 N-ethyl perfl	3.724	3.722	0.002	1.000	7795195	48.5		97.0	5198	
584.00 > 419.00			0.001	1.003	Page 641 of 70	64 <sup>50.9</sup>		102	4853	

Report Date: 31-Oct-2017 15:20:04 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d

Data File. //CITOTINA/Saciamento/CitotiData/A6_N/20171030-49773.0/2017.10.30/CAL_007.d										
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 PFD										
615.00 > 570.00		4.015	0.002		8665686	51.6		103	7656	
37 Perfluorodo										
613.00 > 569.00		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		4.510	-0.002	1.000	2341628	49.7		99.5	5212	
713.00 > 219.00		4.510	0.007	1.002	1800740		1.30(0.00-0.00)	99.5	4181	
D 43 13C2-PFT										
715.00 > 670.00		4.516	0.001		10587380	51.7		103	8090	
D 44 13C2-PFH										
815.00 > 770.00		4.929	0.004		16081211	52.5		105	3322	
45 Perfluorohexadecanoic acid										
813.00 > 769.00		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 \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (00060 (00060 063 0054 00042 0001 35 <del>∑</del>50 ×45 <sup>28</sup> ≻<sub>36</sub>-≻40 21 30 27 14 20 18 10 0.9 0.9 2.7 0.9 1.8 2.7 0.0 1.8 0.0 1.8 2.7 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 56<del>-</del> 63<del>-</del> 60054-(000001 40-40-Y (X10000) ×45 **≻**36 24 27 16 18 2.5 2.0 2.3 1.3 1.9 1.4 1.7 2.9 1.1 0.2 1.1 2.0 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexable 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x 35 (000015 X)12 (349-(000042-(35-830 Ö<sub>25</sub>-× × × ≻28 15 21 10 14 01 01 1.3 0.9 1.5 2.1 2.0 1.9 2.5 2.7 8.0 1.4 2.6 3.2 0.7 6 Perfluorohexanoic acid 10 Perfluoroheptanoic acid D 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_; Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_> 042 0036 042 0036 042 036 ×30 ×30 ×30 **≻**24 ≻<sub>24</sub>· ≻<sub>24</sub>· 18 18 18 12 12 12 0 0 0 1.0 1.6 2.2 2.8 1.8 2.1 2.4 Page 64/3 of 764 3.0 1.8 2.4 3.0 1.5 1.2

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:20:04

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d D 19 13C5 PFNA 20 Perfluorononanoic acid D 21 13C8 FOSA Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x (000001X) (000001X) 000030 0030 049 0642 **≥**25 <u>~</u>20 ≻<sub>20</sub> 28 15 15 21 10 14 10 0 3.0 2.9 2.9 2.1 2.4 2.7 3.3 3.6 3.9 2.3 2.6 3.2 3.5 3.8 2.3 3.5 4.1 25 Sodium 1H,1H,2H,2H-perfluorodecaDe26 M2-8:2FTS 22 Perfluorooctane Sulfonamide Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (0000012 (0000012 (0000012) (12<sup>-</sup> (12000010) (12<sup>-</sup> 649 00042 **∑**35 ≻28 21 14 2.9 3.5 2.8 3.0 4.2 4.1 3.1 3.6 Min D 23 13C2 PFDA 24 Perfluorodecanoic acid D 27 d3-NMeFOSAA Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_> Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x 630 00 00 25 0015 12 X 030 025 \S\_{20} ×<sub>20</sub> 15 15 10 10 0 2.9 4.1 2.9 2.9 3.2 2.3 3.5 2.3 3.5 4.1 3.5 3.8 4.1 4.4 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x (0000012 (X) X) X 0014 000012 X10 ∑16 12 0 2.8 3.1 3.4 3.7 4.0 4.3 2.8 3.1 3.4 3.7 4.0 4.3 4.6 3.0 3.3 3.6 3.9 4.2 4.5

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:20:04

Chrom Revision: 2.2 16-Aug-2017 16:24:46 Report Date: 31-Oct-2017 15:20:04 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d D 30 13C2 PFUnA 31 Perfluoroundecanoic acid 33 N-ethyl perfluorooctane sulfonamid Exp1:m/z 584.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 565.00 > 520.00:Moving5PtAverage\_x Exp1:m/z 563.00 > 519.00:Moving5PtAverage\_x (X) X (X100000) X (X) X 024 0020 024 0020 ∑<sub>16</sub>-×<sub>16</sub> 12 12 3.7 3.7 3.1 3.4 4.0 4.3 3.0 3.3 3.6 3.9 4.2 2.8 3.1 3.4 4.0 4.3 4.6 D 34 d-N-MeFOSA-M 35 MeFOSA D 36 13C2 PFDoA Exp1:m/z 615.00 > 570.00:Moving5PtAverage\_x Exp1:m/z 515.00 > 169.00:Moving5PtAverage\_x Exp1:m/z 512.00 > 169.00:Moving5PtAverage\_x (000015 X12 (000015 X) X ©28 ©24  $\succeq_{20}$ 12 3.9 3.3 3.6 2.8 3.4 4.0 4.6 3.6 4.8 37 Perfluorododecanoic acid D 38 d-N-EtFOSA-M 39 N-ethylperfluoro-1-octanesulfonami Exp1:m/z 531.00 > 169.00:Moving5PtAverage\_x Exp1:m/z 613.00 > 569.00:Moving5PtAverage\_> Exp1:m/z 526.00 > 169.00:Moving5PtAverage\_x (18-(0000015-(12-(28° (00024° (20° (20°) (000015 X ) ≻16 0 3.7 3.7 3.7 3.4 4.0 4.3 4.0 4.3 4.6 3.4 4.0 4.3 4.6 4.9 4.6 3.4 41 Perfluorotridecanoic acid 42 Perfluorotetradecanoic acid 42 Perfluorotetradecanoic acid Exp1:m/z 713.00 > 219.00:Moving5PtAverage\_x Exp1:m/z 713.00 > 169.00:Moving5PtAverage\_x 88**1** Exp1:m/z 663.00 > 619.00:Moving5PtAverage\_x (00001 (00001 (00001 (00001 (00001) (0 656 648 677 666 ×<sub>55</sub>- $\times_{40}$ ><sub>44</sub>-32 15 33 24 10 22 16

4.7

5.3

3.9

4.2

4.5

4.8

5.1

5.4

4.1

11

3.5

3.6

3.9

4.2

4.5

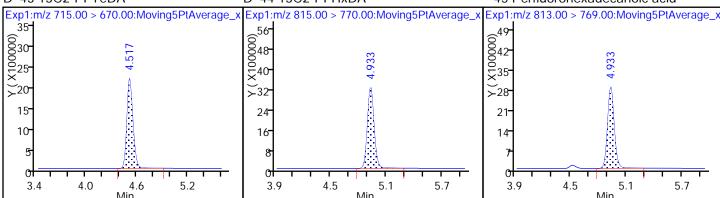
4.8

Report Date: 31-Oct-2017 15:20:04 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_007.d

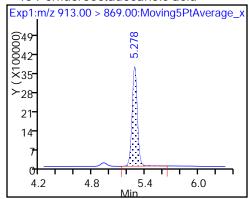
D 43 13C2-PFTeDA

D 44 13C2-PFHxDA

45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:20:16 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Reviewer: pnomsopnat					Date: 30-Oct-2017 2			0-Oct-2017 22:50:5	00:55			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags	
	2 Perfluorobuty	vric acid										
	212.90 > 169.00	•	1.537	0.0	1.000	26228900	81.7		81.7	2699		
[	D 113C4 PFBA											
	217.00 > 172.00	1.537	1.537	0.0		16850593	48.1		96.1	16260		
[	O 3 13C5-PFPe	A										
	267.90 > 223.00	1.737	1.739	-0.002		10796893	47.9		95.7	133503		
	4 Perfluoropen											
	262.90 > 219.00	1.737	1.741	-0.004	1.000	20413300	88.0		88.0	18550		
	O 47 13C3-PFB											
	301.90 > 83.00		1.763	0.001		221874	44.1		94.9	6371		
	5 Perfluorobuta											
	298.90 > 80.00		1.764	0.0	1.000	25688097	74.3	1 0//0 00 0 00)	84.0	230315		
		1.764	1.764	0.0	1.000	13085894		1.96(0.00-0.00)	84.0	208610		
	61 Sodium 1H,		•			7574/50	04.7		101	20721		
	327.00 > 307.00			-0.001	1.000	7574658	94.7		101	29721		
	6 Perfluorohex			0.002	1 000	205/1075	04.7		04.7	1 47/ 4		
	313.00 > 269.00		1.998	-0.003	1.000	20561075	94.7		94.7	14764		
	O 7 13C2 PFHx 315.00 > 270.00		1.998	-0.003		11362658	46.9		93.8	24438		
			1.998	-0.003		11302038	40.9		93.8	24438		
	O 9 13C4-PFHp 367.00 > 322.00		2.319	-0.008		11078906	45.5		90.9	17130		
				-0.008		11076900	45.5		90.9	17130		
	10 Perfluorohe <sub>l</sub> 363.00 > 319.00		2.319	-0 008	1.000	20248813	94.4		94.4	7877		
	003.00 / 317.00 D 11 1802 PFH:		2.517	-0.000	1.000	20240013	74.4		74.4	7077		
	3 11 1802 PFH) 403.00 > 84.00		2 333	0.0		13765700	45.7		96.7	17739		
	8 Perfluorohex					13703700	TJ.1		70.7	17737		
	399.00 > 80.00		2.333		1.000	25548500	84.9		93.3	5712		
	377.00 / 00.00	2.000	2.000	0.0	1.000				75.5	3712		
						Page 648 of 7	/K/I					

Page 648 of 764

Report Date: 31-Oct-2017 15:20:16 Data File: EXP DLT REL Amount

	Signal	RT	RT RT	RT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1	3 Sodium 1H,	1H,2H,2I	H-perflu	orooctan	е						
	7.00 > 407.00		2.641	-0.005	1.000	7770479	94.8		100.0	13970	
	12 M2-6:2FTS		0 / 11	0.005		2127517	44.0		047	11104	
	9.00 > 81.00 2 13C2-PFO <i>F</i>		2.641	-0.005		3127517	44.9		94.6	11184	
	5.00 > 370.00		2.655	0.003		11137395	50.0			17587	
D ·	14 13C4 PFO	Α									
41	7.00 > 372.00	2.658	2.664	-0.006		11225726	47.0		94.1	16613	
	5 Perfluorooct			0.001	1 000	0000//01	04.0		04.0	4500	
	3.00 > 369.00 3.00 > 169.00		2.666 2.666	-0.001 -0.008	1.000 0.997	22026634 12526713	91.3	1.76(0.90-1.10)	91.3 91.3	4588 7440	
	6 Perfluorohe				0.777	12320713		1.70(0.70-1.10)	71.5	7440	
	9.00 > 80.00		2.672		1.000	20944569	87.5		91.9	11319	
D ·	18 13C4 PFO	S									
50	3.00 > 80.00	3.026	3.030	-0.004		9749248	46.0		96.2	10806	
	19 13C5 PFN		0.004	0.005		0//00/7	47.0		05.0	100/0	
	8.00 > 423.00		3.031	-0.005		9660967	47.9		95.8	10362	N 4
	7 Perfluorooct 9.00 > 80.00		3.031	ג -0.005	1.000	19258573	90.8		97.8	2906	M M
	9.00 > 99.00		3.031	-0.005	1.000	4296938	70.0	4.48(0.90-1.10)	97.8	5814	
2	0 Perfluorono	nanoic a	cid								
46	3.00 > 419.00	3.026	3.033	-0.007	1.000	17641757	94.3		94.3	9041	
	21 13C8 FOS		2 277	0.005		1450/200	47.0		00.7	10150	
	6.00 > 78.00		3.377	-0.005		14586209	46.9		93.7	12153	
	2 Perfluorooct 8.00 > 78.00		3.379		1.000	25353469	92.2		92.2	11535	
	26 M2-8:2FTS										
	9.00 > 81.00		3.381	-0.009		3241827	44.9		93.7	7183	
	5 Sodium 1H,										
	7.00 > 507.00			-0.009	1.000	7224840	96.0		100	8388	
	4 Perfluorode			0.002	1 000	15755120	96.1		04 1	10052	
	3.00 > 469.00 23 13C2 PFD		3.391	-0.002	1.000	15755129	90. I		96.1	10952	
	5.00 > 470.00		3.391	-0.002		8726152	47.8		95.6	12345	
D :	27 d3-NMeFO	SAA									
57	3.00 > 419.00	3.545	3.547	-0.002		4079711	50.0		99.9	5919	
	8 N-methyl pe										
	0.00 > 419.00				1.000	7510668	98.4		98.4	4289	
	9 Perfluorode 9.00 > 80.00		fonic aci 3.705		1.000	12902020	97.6		101	8909	
	9.00 > 60.00 32 d5-NEtFOS		3.703	-0.001	1.000	12902020	97.0		101	0909	
	9.00 > 419.00		3.715	-0.001		3798242	45.2		90.5	3839	
	1 Perfluoround										
	3.00 > 519.00			-0.008	1.000	13560915	95.1		95.1	6073	
	30 13C2 PFUr										
	5.00 > 520.00					6679039	45.8		91.6	7053	
	3 N-ethyl perfl 4.00 > 419.00				1.003	6454004	100 6		101	5379	
20	7.UU > 417.UU	5.125	5.725	0.0	1.003	Page 649 of 7	764 100.0		101	0017	

Report Date: 31-Oct-2017 15:20:16 Chrom Revision: 2.2 16-Aug-2017 16:24:46

•		•
Data File:	\\ChromNa\Sacramento\ChromData\A8_	_N\20171030-49773.b\2017.10.30ICAL_008.d

Data File:	NChr	omiva\S	acrameni	OCHROM	Data(A8_N\201	/1030-49//	3.D\2017.10.30ICAL	UU8.a		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
Olgilai	141	141	141	141	rtosponso	119/1111	rtatio (Eirinto)	701100	Ont	riago
D 34 d-N-MeFOS										
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 PFDc										
615.00 > 570.00	4.016	4.015	0.001		8136951	48.5		96.9	11666	
37 Perfluorodoo										
613.00 > 569.00	4.016	4.016	0.0	1.000	14579972	97.4		97.4	7999	
D 38 d-N-EtFOS										
531.00 > 169.00	4.070	4.068	0.002		4408487	50.8		102	2086	
39 N-ethylperflu										
526.00 > 169.00	4.079	4.074	0.005	1.000	8178532	99.8		99.8	3476	
41 Perfluorotrid										
663.00 > 619.00	4.277	4.281	-0.004	1.000	16072205	95.6		95.6	3023	
42 Perfluorotetr										
713.00 > 169.00		4.510	-0.001	1.000	4317118	102.4		102	6266	
713.00 > 219.00		4.510	0.008	1.002	3294450		1.31(0.00-0.00)	102	6386	
D 43 13C2-PFT6										
715.00 > 670.00					9479964	46.3		92.7	8431	
45 Perfluorohex										
813.00 > 769.00	4.924	4.929	-0.005	1.000	23840509	93.1		93.1	925	
D 44 13C2-PFH										
815.00 > 770.00	4.924	4.929	-0.005		14742231	48.1		96.2	3521	
46 Perfluorooct										
913.00 > 869.00	5.279	5.281	-0.002	1.000	25973108	92.7		92.7	1272	
OC Flor Loo	u o m ol									

# OC 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 \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_008.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (91<del>-</del> (0078-(55-642 0036 ×30 (063 00054 ×45 <del>-</del>52 ≻<sub>36</sub>-39 18 27 26 12 18 13 0.9 1.8 0.9 2.7 2.7 3.6 0.0 1.8 0.0 0.9 1.8 2.7 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 V (X10000) (91<del>-</del> 0078-×65-77-00066-×55-**≻**44 39 33 22 26 11 13 1.7 2.3 2.9 0.9 1.1 1.7 2.0 2.3 1.8 2.7 1.1 1.4 0.0 0.5 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x | Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x ()70 ()60 ()60 ©28**-**0024**-**<u>8</u>48 001 × × × 32 <del>∑</del>50 ×20 ≻<sub>16</sub>-≻40 24 30 12 20 10 01 1.0 1.9 0.9 1.5 2.1 2.7 2.8 2.8 1.6 2.2 0.1 1.0 7 13C2 PFHxA D 9 13C4-PFHpA 10 Perfluoroheptanoic acid Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ 42 70-0060-50-(42<sup>-</sup> 00036<sup>-</sup> 1×30<sup>-</sup> X1000030-<del>-</del>40 18 30 18 12 12 20 10 0 0 08.0 1.4 2.0 2.6 3.2 1.2 1.8 Page 65/1n of 764 3.0 1.8 2.1 2.4 2.7 3.0 1.5

Chrom Revision: 2.2 16-Aug-2017 16:24:46 Report Date: 31-Oct-2017 15:20:16 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_008.d D 11 1802 PFHxS 8 Perfluorohexanesulfonic acid 13 Sodium 1H,1H,2H,2H-perfluorooctane Exp1:m/z 403.00 > 84.00:Moving5PtAverage\_x3 Exp1:m/z 399.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 427.00 > 407.00:Moving5PtAverage\_x 70-0060-50-628 624 000042 X X 28 **∑**20 \_40<del>-</del> ≻16<sup>-</sup> 21 30 12 20 10 2.4 1.9 2.7 1.2 1.8 3.0 2.5 3.1 1.8 2.1 2.4 3.0 3.3 1.3 D 12 M2-6:2FTS 62 13C2-PFOA D 14 13C4 PFOA Exp1:m/z 429.00 > 81.00:Moving5PtAverage\_x3 Exp1:m/z 415.00 > 370.00:Moving5PtAverage\_x Exp1:m/z 417.00 > 372.00:Moving5PtAverage\_> (X100000). 035<u>-</u> 2.636 036<del>-</del>  $\stackrel{\textstyle \smile}{\sim}_{24}$  $\Sigma_{25}$ ≻<sub>20</sub>-18 15 10 2.7 2.2 2.8 2.3 2.1 2.4 3.0 3.3 3.4 2.0 2.6 15 Perfluorooctanoic acid 15 Perfluorooctanoic acid 16 Perfluoroheptanesulfonic Acid Exp1:m/z 449.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 413.00 > 369.00:Moving5PtAverage\_> Exp1:m/z 413.00 > 169.00:Moving5PtAverage\_> (70° (00001× (50° (42 00036 X30 063 0054 ×45 >40 >24 30 18 27 20 12 18 10 2.2 3.4 2.0 2.3 2.6 3.2 2.7 2.8 2.9 3.5 1.8 2.1 2.4 3.0 3.3 1.6 3.6 D 18 13C4 PFOS D 19 13C5 PFNA 17 Perfluorooctane sulfonic acid (M) Exp1:m/z 499.00 > 80.00:Moving5PtAverage\_x3 (0030-00001× )20-00042 00035 030 025 <u></u>∠28 15 15 21 10 10 14

2.4

2.1

2.7

3.0

3.3

3.6

3.9

2.0

2.6

3.2

3.8

2.4

2.7

3.0

3.3

3.6

3.9

4.2

4.5

3.0

3.3

3.6

3.9

4.2

4.5

3.0

3.3

3.0

2.7

3.3

3.6

3.9

4.6

5.2

3.5

4.1

4.7

5.3

0

3.4

4.0

5.5

0

3.1

3.7

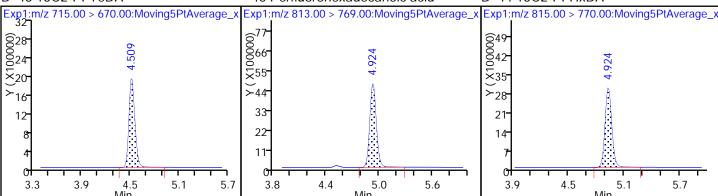
4.3

Report Date: 31-Oct-2017 15:20:16 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_008.d

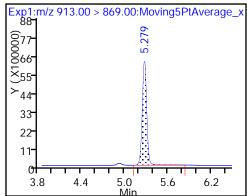
D 43 13C2-PFTeDA

45 Perfluorohexadecanoic acid

D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:20:17 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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

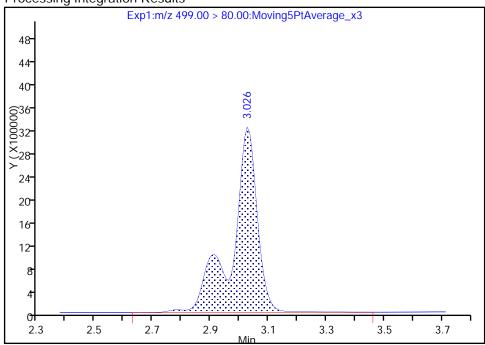
Method: A8\_N Limit Group: LC PFC\_DOD ICAL

Column: Detector EXP1

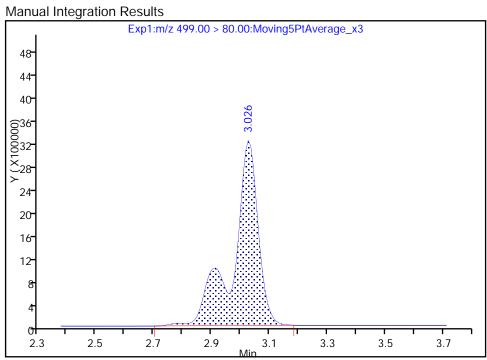
#### 17 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 3.03 Area: 19658133 Amount: 92.400994 Amount Units: ng/ml **Processing 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

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Report Date: 31-Oct-2017 15:20:22 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

That Ecver Neviewer, priorital						Date.		0 Oct 2017 22:51:2			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
Е	) 1 13C4 PFBA	١									
	217.00 > 172.00		1.537	0.0		16408424	46.8		93.6	27338	
	2 Perfluorobuty	yric acid									
2	212.90 > 169.00	1.537	1.537	0.0	1.000	41832393	133.9		66.9	2762	
	3 13C5-PFPe										
2	267.90 > 223.00		1.739	-0.003		10006745	44.4		88.7	123502	
	4 Perfluoropen										
	262.90 > 219.00		1.741	-0.005	1.000	32740106	152.3		76.1	57658	
	47 13C3-PFB		1 7/0	0.000		200045	41 /		00.4	F001	
	301.90 > 83.00		1.763	-0.008		208945	41.6		89.4	5901	
,	5 Perfluorobuta 298.90 > 80.00		nic acid 1.764	0.0	1.000	40469998	124.3		70.3	41738	
	298.90 > 99.00		1.764		1.000	22327969	124.3	1.81(0.00-0.00)	70.3	302817	
	61 Sodium 1H,							(			
3	327.00 > 307.00		•		1.000	14040224	192.0		103	30045	
Е	7 13C2 PFHx	A									
3	315.00 > 270.00	1.994	1.998	-0.004		10950785	45.2		90.4	24951	
	6 Perfluorohex	anoic ac	id								
3	313.00 > 269.00	1.994	1.998	-0.004	1.000	33523091	160.2		80.1	14483	
	10 Perfluorohe	-									
3	363.00 > 319.00	2.311	2.319	-0.008	1.000	32847152	167.9		84.0	11973	
	9 13C4-PFHp										
3	367.00 > 322.00		2.319			10104592	41.5		82.9	17251	
,	8 Perfluorohex				1 000	40040440	45/0		05.0	F700	
	399.00 > 80.00		2.333	-0.009	1.000	42243112	156.3		85.9	5720	
	) 11 18O2 PFH:		ງງາງ	0.000		12240012	/1 1		04.0	1420E	
	103.00 > 84.00	2.324	2.333	-0.009		12368812	41.1		86.9	16295	
						Page 657 of 7	764				

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Data File:	\\Chr	omNa\Sa	acrament	to\Chrom	Data\A8_N\201	71030-4977	3.b\2017.10.30ICAL	009.d		
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		2.641	-0.003		2859084	41.1		86.5	12215	
13 Sodium 1H,				e						
427.00 > 407.00		•	-0.003		14294286	190.7		101	15508	
* 62 13C2-PFOA	Ą									
415.00 > 370.00	2.659	2.655	0.004		10310552	50.0			19417	
D 14 13C4 PFO	A									
417.00 > 372.00	2.659	2.664	-0.005		10606146	44.4		88.9	23508	
15 Perfluorooct	tanoic ad	cid								
413.00 > 369.00		2.666		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 Perfluorohe										
449.00 > 80.00	2.667	2.672	-0.006	1.000	34435082	150.0		78.8	16058	
D 18 13C4 PFO										
503.00 > 80.00	3.027	3.030	-0.003		9351352	44.1		92.3	8702	
17 Perfluorooct										
499.00 > 80.00		3.031	-0.004	1.000	36170703	177.8	4.00(0.00.4.40)	95.8	4459	
499.00 > 99.00		3.031	-0.004	1.000	8547284		4.23(0.90-1.10)	95.8	6620	
D 19 13C5 PFN/		2 021	0.004		0007007	45.0		00.1	12000	
468.00 > 423.00		3.031	-0.004		9087907	45.0		90.1	13880	
20 Perfluorono			0.007	1 000	2071470/	171 -		07.0	11050	
463.00 > 419.00		3.033	-0.006	1.000	30714706	174.5		87.2	11853	
D 21 13C8 FOSA 506.00 > 78.00		2 277	-0.002		14000720	45.3		90.6	12501	
					14098730	45.3		90.6	12584	
22 Perfluorooct 498.00 > 78.00			e -0.004	1.000	40961582	154.1		77.1	9214	
					40901362	134.1		77.1	9214	
25 Sodium 1H, 527.00 > 507.00		•			13205694	186.6		97.4	10729	
		3.301	-0.006	1.000	13203094	100.0		97.4	10729	
D 26 M2-8:2FTS 529.00 > 81.00		3.381	-0.006		2047225	42.2		88.1	8508	
		3.301	-0.006		3047225	42.2		00.1	0000	
D 23 13C2 PFD/ 515.00 > 470.00		2 201	-0.008		0220200	1E 1		00.2	12227	
		3.391	-0.006		8230300	45.1		90.2	12221	
24 Perfluorodeo 513.00 > 469.00		3.391	-0.008	1.000	27033900	174.8		87.4	9519	
		3.371	-0.006	1.000	27033900	174.0		07.4	9519	
D 27 d3-NMeFO 573.00 > 419.00		2 5/17	-0.008		3979428	48.7		97.4	5679	
					39/9420	40.7		97.4	3079	
28 N-methyl pe 570.00 > 419.00			-0.004	1.003	14958318	200.9		100	4383	
				1.003	14930310	200.9		100	4303	
29 Perfluorodeo 599.00 > 80.00			-0.008	1.000	22131027	174.6		90.6	8483	
		3.703	-0.006	1.000	22131027	174.0		90.0	0403	
D 32 d5-NEtFOS		2 715	0.000		2510702	41.0		02.7	2005	
589.00 > 419.00		3./15	-0.008		3510602	41.8		83.6	3985	
D 30 13C2 PFU		2 722	0.005		/ <u> </u>	40.7		05.5	<b>422</b> 5	
565.00 > 520.00			-0.005		6227711	42.7		85.5	6335	
31 Perfluoround			0.005	1 000	22510201	17/0		00.4	E 4 4 0	
563.00 > 519.00			-0.005	1.000	23510391	176.9		88.4	5442	
33 N-ethyl perfl				1 000	10100400	2047		100	EEO4	
584.00 > 419.00	ა./1/	J.125	-0.006	1.003	Page 658 of	764 <sup>204.6</sup>		102	5584	

Report Date: 31-Oct-2017 15:20:22

Data File:

Data File.	WCIIIC	JIIIVa\3	acramen	COCHION	Dala MO_IN 20 I	11030-4911	3.0\2017.10.30ICA	L_009.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFO	SA-M									
515.00 > 169.00		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 PFD										
615.00 > 570.00			-0.002		7663646	45.6		91.3	6850	
37 Perfluorodo			0.000	1 000	25207040	100.1		00.1	F02F	
613.00 > 569.00		4.016	-0.003	1.000	25387048	180.1		90.1	5925	
D 38 d-N-EtFOS 531.00 > 169.00		4 N68	-0.003		4591296	52.9		106	2045	
39 N-ethylperflu					4371270	52.7		100	2043	
526.00 > 169.00				1.000	16098373	188.5		94.3	4325	
41 Perfluorotrio			0.0		.0070070	.00.0		76	.020	
663.00 > 619.00		4.281	-0.001	1.000	28065123	177.2		88.6	2505	
42 Perfluoroteti	radecan	oic acid								
713.00 > 169.00	4.506	4.510		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-PFT6										
715.00 > 670.00		4.516	-0.001		9570197	46.8		93.5	8807	
D 44 13C2-PFH:					1.1.1.0000	47.4		0.4.0	0.4.0	
815.00 > 770.00			-0.008		14443282	47.1		94.3	3462	
45 Perfluorohe				1 000	20220425	154.4		70.2	1004	
813.00 > 769.00			-0.008	1.000	39228425	156.6		78.3	1006	
46 Perfluorooct 913.00 > 869.00			-0.011	1.000	42943723	156.4		78.2	1706	
Reagents:	5.270	J.ZU I	0.011	1.000	72/73/23	130.4		70.2	1700	
LCPFC_FULL-L7	7 00004		Д	Amount A	dded: 1.00	Units	:: mL			
	_55551		•			Office	·· ···-			

Report Date: 31-Oct-2017 15:20:22 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_009.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_> (X) X X30-056 048  $\stackrel{\smile}{\times}_{40}$ 18 24 12 16 1.2 1.2 0.0 2.4 3.6 0.0 2.4 3.6 0.0 0.9 1.8 2.7 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS 4 Perfluoropentanoic acid Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 (014-10-10-10-(X1000000) X 84 872<sup>-</sup> <del>∑</del>60 \_ ≻48<del>-</del> 36 24 12 0.9 2.7 2.0 2.3 2.9 1.8 1.4 1.7 0.2 2.0 0.0 1.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexable 7 13C2 PFHxA Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x (000001 (00048 (00048 6000072 560 560 636-636-636->48 >32 18 36 24 12 24 16 01 0.9 1.8 2.7 1.4 2.0 1.4 2.0 0.0 0.8 2.6 8.0 2.6 3.2 6 Perfluorohexanoic acid 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_> Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_> (X1000000) (X1000000) Y 635 630 30 ×25 ≻20 15 10 0 0 0 0.9 1.5 2.1 2.7 1.2 1.8 Page 660 of 764 3.0 1.7 2.3 2.9 3.5 1.1

Report Date: 31-Oct-2017 15:20:22

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_009.d D 19 13C5 PFNA 20 Perfluorononanoic acid D 21 13C8 FOSA Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x (00024 00001 X) 684<sup>-</sup> 0072<sup>-</sup> 042 036 3.375 <del>∑</del>60 **≻**48 12 36<del>-</del> 18 24 12 12 2.9 3.4 2.0 2.6 3.2 3.8 1.7 2.3 3.5 4.1 2.2 2.8 4.0 22 Perfluorooctane Sulfonamide 25 Sodium 1H,1H,2H,2H-perfluorodecaDe26 M2-8:2FTS Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x | Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (0000001X) X Y (X100000) (042 0036 ×30 ≻<sub>24</sub>· 18 12 3.3 3.9 2.7 4.5 2.9 3.5 2.9 3.5 4.1 2.3 4.1 D 23 13C2 PFDA 24 Perfluorodecanoic acid D 27 d3-NMeFOSAA Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_> Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x (000012 1000012 1000012 677<del>-</del> 00001 000020 ×55 33 22 11 0 2.9 4.1 2.8 2.9 3.2 2.3 3.5 2.2 3.4 4.0 3.5 3.8 4.1 4.4 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x (00042 ×35 (X100000) X 663 654 ×45-≻28 ≻<sub>36</sub>-21 27 18 3.0 3.3 3.6 3.9 4.2 3.0 3.3 3.9 4.2 4.5 3.0 3.3 3.6 3.9 4.2 4.5 2.7

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 15:20:22

Chrom Revision: 2.2 16-Aug-2017 16:24:46 Report Date: 31-Oct-2017 15:20:22 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_009.d D 30 13C2 PFUnA 31 Perfluoroundecanoic acid 33 N-ethyl perfluorooctane sulfonamid Exp1:m/z 565.00 > 520.00:Moving5PtAverage\_x Exp1:m/z 563.00 > 519.00:Moving5PtAverage\_x Exp1:m/z 584.00 > 419.00:Moving5PtAverage\_x (70° 0060° (21<del>-</del>000018-15-635 630 30 ∑50• ×25 ≻40 **≻**20 30 15 20 10 10 3.9 3.9 2.7 3.3 4.5 2.7 3.3 4.5 3.0 3.3 3.6 3.9 4.2 D 34 d-N-MeFOSA-M 35 MeFOSA D 36 13C2 PFDoA Exp1:m/z 515.00 > 169.00:Moving5PtAverage\_x Exp1:m/z 512.00 > 169.00:Moving5PtAverage\_> Exp1:m/z 615.00 > 570.00:Moving5PtAverage\_x 28 (056<del>-</del> 00048-618 600 15 0024 00024 20 ∑<sub>12</sub> ×40<sup>-</sup> **≻**32 24 16<del>-</del> 8 0 3.9 3.4 3.7 4.0 3.3 4.5 3.7 4.0 4.3 3.4 4.3 37 Perfluorododecanoic acid D 38 d-N-EtFOSA-M 39 N-ethylperfluoro-1-octanesulfonami Exp1:m/z 526.00 > 169.00:Moving5PtAverage\_x Exp1:m/z 613.00 > 569.00:Moving5PtAverage\_x Exp1:m/z 531.00 > 169.00:Moving5PtAverage\_> (77-(00066-×)55-(000015<sup>-</sup> 056-0648-×<sub>12</sub> ×40 -4433 24 22 16 11 0 3.5 4.7 3.7 4.0 4.3 2.9 3.5 2.9 4.1 4.6 4.1 4.7 5.3 3.4 41 Perfluorotridecanoic acid 42 Perfluorotetradecanoic acid 42 Perfluorotetradecanoic acid Exp1:m/z 663.00 > 619.00:Moving5PtAverage\_x 88**1** Exp1:m/z 713.00 > 169.00:Moving5PtAverage\_x Exp1:m/z 713.00 > 219.00:Moving5PtAverage\_x 21 (00018 (000015 X) 12 (0024-0000120-× )16-0077-0066-×<sub>55</sub> ><sub>44</sub> 12 33 22

4.5

5.1

5.7

3.2

3.8

4.4

5.0

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3.7

3.4

4.0

4.3

4.6

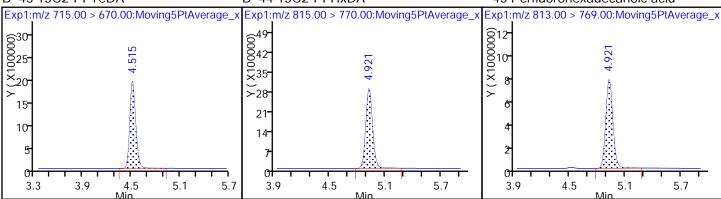
4.9

3.3

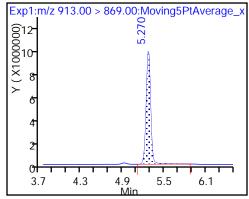
D 43 13C2-PFTeDA

D 44 13C2-PFHxDA

45 Perfluorohexadecanoic acid



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 15:20:33 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

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	١									
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

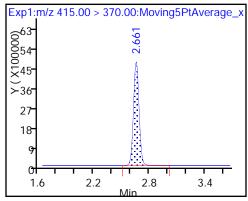
Client ID:

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: <u>ICV 320-191992/12</u> Calibration Date: <u>10/30/2017 19:01</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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	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
1802 PFHxS	Ave	300958	284601		44.7	47.3	-5.4	50.0

## FORM VII LCMS CONTINUING CALIBRATION DATA

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

SDG No.:

Lab Sample ID: <u>ICV 320-191992/12</u> Calibration Date: <u>10/30/2017 19:01</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

FIRST Level Revie	insopna	IL		Date:	3	0-Oct-2017 23:11:5	4			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	vric acid									
212.90 > 169.00	•	1.537	0.0	1.000	15530327	48.4			3392	
D 113C4 PFBA	١									
217.00 > 172.00	1.537	1.537	0.0		16835407	48.0		96.0	21040	
D 3 13C5-PFPe	eΑ									
267.90 > 223.00	1.736	1.739	-0.003		10624773	47.1		94.2	126408	
4 Perfluoroper	ntanoic a	cid								
262.90 > 219.00	1.736	1.741	-0.005	1.000	11823403	51.8			9631	
D 47 13C3-PFB										
301.90 > 83.00	1.755	1.763	-0.008		221842	44.1		94.9	7264	
5 Perfluorobut										
298.90 > 80.00		1.764	0.0	1.000	15357473	44.4	0.00(0.00.0.00)		32185	
	1.764			1.000	6973089		2.20(0.00-0.00)		28855	
61 Sodium 1H,		•			4000504	F0.4			20/24	
327.00 > 307.00			-0.001	1.000	4200584	53.1			38634	
6 Perfluorohex			0.002	1 000	11040277	E2 7			12200	
313.00 > 269.00		1.998	-0.003	1.000	11868377	52.7			12309	
D 7 13C2 PFHx 315.00 > 270.00		1.998	-0.003		11782650	48.6		97.2	49787	
		1.990	-0.003		11762000	40.0		91.2	49/0/	
D 9 13C4-PFHp 367.00 > 322.00		2.319	-0.008		11288532	46.3		92.6	18671	
			-0.000		11200332	40.5		72.0	10071	
10 Perfluorohe 363.00 > 319.00	•		-0.008	1.000	11871875	54.3			7791	
D 11 1802 PFH:		2.517	0.000	1.000	11071073	04.0			,,,,	
403.00 > 84.00		2.333	-0.002		13461639	44.7		94.6	19293	
8 Perfluorohex									.,_,0	
399.00 > 80.00			-0.002	1.000	14356642	48.8			7022	
217.00			3.332		Page 660 of <sup>3</sup>					

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Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31- Data File:				o\Chrom			16-Aug-2017 16:24: 3.b\2017.10.30ICAL			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H, 427.00 > 407.00	2.629	•			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 D 14 13C4 PFO	2.651	2.655	-0.004		11923381	50.0			13806	
417.00 > 372.00 15 Perfluorooc	2.658	2.664	-0.006		11369325	47.6		95.3	20344	
413.00 > 369.00 413.00 > 169.00	2.658	2.666 2.666	-0.008 -0.008	1.000 1.000	12796602 6698303	52.4	1.91(0.90-1.10)		3711 7033	
16 Perfluorohe 449.00 > 80.00	2.665	fonic Aci 2.672		1.000	10853636	45.7			12533	
D 18 13C4 PFO 503.00 > 80.00	3.025	3.030	-0.005		9680186	45.7		95.6	13603	
D 19 13C5 PFN 468.00 > 423.00 17 Perfluorooc	3.025		-0.006		9255966	45.9		91.7	14772	
499.00 > 80.00 499.00 > 99.00	3.025	3.031 3.031	-0.006 -0.006	1.000 1.000	9639206 2223076	45.8	4.34(0.90-1.10)		4757 4076	
20 Perfluorono 463.00 > 419.00	3.025	cid 3.033	-0.008	1.000	9723044	54.2			5903	
D 21 13C8 FOS 506.00 > 78.00 22 Perfluorooc	3.368	3.377			14301331	46.0		91.9	21091	
498.00 > 78.00 D 26 M2-8:2FTS	3.368	3.379		1.000	13500882	50.1			22278	
529.00 > 81.00 25 Sodium 1H,	3.368			ne	3243780	44.9		93.7	8317	
527.00 > 507.00 24 Perfluorode	3.368	3.381		1.000	3961836	52.6			8903	
513.00 > 469.00 D 23 13C2 PFD	A		-0.014	1.000	8920651	53.5			11128	
515.00 > 470.00 D 27 d3-NMeFC	SAA	3.391			8868531	48.6		97.2	25535	
573.00 > 419.00 28 N-methyl pe 570.00 > 419.00	erfluorood		lfonami	1 000	3772244 3683979	46.2 52.2		92.4	5656 3689	
29 Perfluorode 599.00 > 80.00	cane Sul		d	1.000	6959758	53.0			7596	
D 32 d5-NEtFOS 589.00 > 419.00	SAA	3.715		1.000	3761052	44.8		89.6	3624	
31 Perfluoroun 563.00 > 519.00	decanoio	acid		1.000	7641324	52.1			6131	
D 30 13C2 PFU 565.00 > 520.00		3.722	-0.016		6868026	47.1		94.2	7803	
33 N-ethyl perf 584.00 > 419.00				1.003	Page 670 of 76	4 <sup>56.7</sup>			7296	

Report Date: 31-Oct-2017 15:21:02

Data File:

Data File.	NOTIF	JIIIVa\3	acramen	COCHION	Dala MO_IN 20 I	71030-4977	3.b\2017.10.30ICAI	012.0		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 34 d-N-MeFO	SA-M									
515.00 > 169.00	3.874	3.881	-0.007		4301040	47.5		94.9	1604	
35 MeFOSA	2.002	2.005	0.000	1 000	407/004	F2 1			47.25	
512.00 > 169.00 D 36 13C2 PFD0		3.885	-0.002	1.000	4076884	53.1			4635	
615.00 > 570.00		4.015	-0.013		7697856	45.9		91.7	7830	
37 Perfluorodo	decanoio	c acid								
613.00 > 569.00	4.002	4.016	-0.014	1.000	7778489	54.9			5744	
D 38 d-N-EtFOS		40/0	0.000		0000440	45.0		04.0	0005	
531.00 > 169.00		4.068			3989440	45.9		91.9	2235	
39 N-ethylperflu 526.00 > 169.00				1.000	4013063	54.1			2987	
41 Perfluorotrio										
663.00 > 619.00	4.274	4.281	-0.007	1.000	9168861	57.6			2193	
42 Perfluoroteti										
713.00 > 169.00 713.00 > 219.00			-0.013 -0.004	1.000 1.002	2308578 1760253	53.5	1.31(0.00-0.00)		5386 4760	
D 43 13C2-PFT		4.510	-0.004	1.002	1700233		1.31(0.00-0.00)		4700	
715.00 > 670.00		4.516	-0.010		9707005	47.4		94.9	9598	
45 Perfluorohe	xadecan	oic acid								
813.00 > 769.00		4.929	-0.009	1.000	13568160	54.5			772	
D 44 13C2-PFH:		4.000	0.000		14070000	47.7		02.1	2572	
815.00 > 770.00 46 Perfluorooct			-0.009		14270022	46.6		93.1	3573	
913.00 > 869.00			-0.013	1.000	14497704	53.4			790	
Reagents:										
LCPFCIC_FULL	_00007		A	Amount A	dded: 1.00	Units	: mL			

Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_012.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x (000054 X) 663 00054 042 0036 ×45  $\approx$ 30 >36 **≻**36 27 27 18 18 18 12 1.3 1.9 2.5 0.9 0.7 0.0 1.8 2.7 0.1 1.0 2.8 4 Perfluoropentanoic acid 5 Perfluorobutanesulfonic acid D 47 13C3-PFBS Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 V (X10000) 63-(000054-(0054-45-(000001x) 35 <del>-</del>28 27 21 18 14 2.3 2.0 2.3 1.4 1.7 2.0 1.3 1.9 2.5 1.1 1.4 1.7 1.1 0.7 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x 481 Exp1:m/z 298.90 > 99.00:Moving5PtAverage x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x (18-(0000015-12-030 025 642 636  $\times$ 30  $\succ_{24}$ 15 18 10 12 1.7 0.9 1.5 2.1 2.7 1.7 2.0 2.6 1.4 2.0 2.3 1.4 2.3 1.1 9 13C4-PFHpA 7 13C2 PFHxA 10 Perfluoroheptanoic acid Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ 642 0036 0042 00035 × 042 036 ∑30-≥30 28 **≻**24  $\succ_{24}$ 21 18 18 14 12 0 0 00.6 1.2 1.8 2.4 3.0 1.7 Page 67/20 of 764 2.9 3.5 1.8 2.1 2.4 2.7 3.0 1.1 1.5

Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_012.d D 11 1802 PFHxS 8 Perfluorohexanesulfonic acid 13 Sodium 1H,1H,2H,2H-perfluorooctane Exp1:m/z 403.00 > 84.00:Moving5PtAverage\_x3 Exp1:m/z 399.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 427.00 > 407.00:Moving5PtAverage\_x 649 000 42 00042 000035 × × >28 (0000012 X) × **∑**35 **≻**28 21 21 14 14 2.4 1.9 2.2 2.7 1.2 1.8 3.0 2.5 2.8 1.8 2.1 2.4 3.0 3.3 1.6 D 12 M2-6:2FTS 62 13C2-PFOA D 14 13C4 PFOA Exp1:m/z 429.00 > 81.00:Moving5PtAverage\_x3 Exp1:m/z 415.00 > 370.00:Moving5PtAverage\_x Exp1:m/z 417.00 > 372.00:Moving5PtAverage\_x (42<sup>-</sup> (0036<sup>-</sup> (30<sup>-</sup> (X100000) X (000001X) X 2.629 18 18 12 12 2.7 2.7 2.2 2.8 2.1 3.0 3.3 2.4 3.0 3.3 3.4 15 Perfluorooctanoic acid 15 Perfluorooctanoic acid 16 Perfluoroheptanesulfonic Acid Exp1:m/z 449.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 413.00 > 369.00:Moving5PtAverage\_> Exp1:m/z 413.00 > 169.00:Moving5PtAverage\_> (00001X16 042 0036 ×30 000030<del>-</del> **≻**24 18 18 12 2.2 2.8 3.4 2.1 2.7 3.0 3.3 2.2 2.5 1.8 2.4 2.8 3.1 3.4 1.6 D 18 13C4 PFOS D 19 13C5 PFNA 17 Perfluorooctane sulfonic acid Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 503.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 499.00 > 80.00:Moving5PtAverage\_x3 (00001 (00001 (00001 (00001 (00001) (0 028<del>-</del> 030 025 ×20 ≻<sub>16</sub>-15 15 12 10

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Chrom Revision: 2.2 16-Aug-2017 16:24:46 Report Date: 31-Oct-2017 15:21:02 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_012.d 17 Perfluorooctane sulfonic acid 20 Perfluorononanoic acid D 21 13C8 FOSA Exp1:m/z 499.00 > 99.00:Moving5PtAverage\_x3 49 630 60 25 0042 0035 X 066 <del>×</del>55 <del>∠</del>28 15 21 33 10 22 3.3 2.5 2.8 3.1 3.4 3.7 2.1 2.4 2.7 3.0 3.3 3.6 3.9 2.1 2.7 3.9 4.5 2.2 22 Perfluorooctane Sulfonamide D 26 M2-8:2FTS 25 Sodium 1H,1H,2H,2H-perfluorodecane Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (X100000) (00001X) >28 0014 00012 21 3.3 2.7 3.9 4.5 2.8 3.4 2.8 3.1 3.7 3.7 24 Perfluorodecanoic acid D 23 13C2 PFDA D 27 d3-NMeFOSAA Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_> (30 000 25 630 00 00 25 00012 1000010 X ×<sub>20</sub> 15 15 10 10 0 3.3 2.9 4.1 2.7 3.9 4.5 2.9 3.2 2.3 3.5 2.1 2.6 3.5 3.8 4.1 4.4 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x (012 (0100000) (0100000) (0100 (000012 X) 8 024 020 20 ∑<sub>16</sub>-

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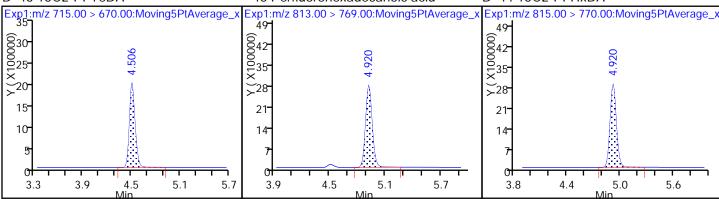
4.4

Report Date: 31-Oct-2017 15:21:02 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171030-49773.b\2017.10.30ICAL\_012.d

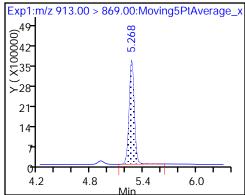
D 43 13C2-PFTeDA

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  $3 \times 100$  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
1802 PFHxS	Ave	300958	313834		49.3	47.3	4.3	50.0

### FORM VII LCMS CONTINUING CALIBRATION DATA

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

SDG No.:

Lab Sample ID: CCV 320-192039/1 Calibration Date: 10/31/2017 01:57

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

Report Date: 31-Oct-2017 09:38:00 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Reviewer: pnomsopnat				Date:	3	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 113C4 PFBA	· _									
217.00 > 172.00		1.529	0.0		18140570	51.7		103	18884	
2 Perfluorobut	yric acid									
212.90 > 169.00	,	1.537	0.0	1.000	7501380	21.7		109	1864	
4 Perfluoroper	ntanoic a	cid								
262.90 > 219.00	1.737	1.737	0.0	1.000	5318087	21.1		105	4970	
D 3 13C5-PFPe	eΑ									
267.90 > 223.00	1.737	1.737	0.0		11755461	52.1		104	79592	
D 47 13C3-PFB										
301.90 > 83.00	1.755	1.755	0.0		247829	49.3		106	8232	
5 Perfluorobut		nic acid								
	1.755	1.755	0.0	1.000	7017912	18.2		103	13594	
	1.755	1.755	0.0	1.000	2953982		2.38(0.00-0.00)		11950	
61 Sodium 1H,		•								
327.00 > 307.00			0.0	1.000	1471155	18.7		100	26068	
6 Perfluorohex				1 000	5440000	00.7		100	4000	
313.00 > 269.00		1.984	0.0	1.000	5110303	20.7		103	4309	
D 7 13C2 PFHx		4 00 4	0.0		40005740	F0.4		407	00740	
315.00 > 270.00		1.984	0.0		12935642	53.4		107	29743	
10 Perfluorohe	•		0.0	1 000	F44///7	24.4		107	4050	
363.00 > 319.00		2.308	0.0	1.000	5116667	21.4		107	4252	
D 9 13C4-PFHp		0.000	0.0		10000400	FO /		101	17000	
367.00 > 322.00		2.308			12328483	50.6		101	17802	
8 Perfluorohex				1 000	/2002//	10.4		107	F/10	
399.00 > 80.00		2.318	0.0	1.000	6299264	19.4		107	5618	
D 11 1802 PFH		0.010	0.0		14044242	40.0		104	25004	
403.00 > 84.00	2.318	2.318	0.0		14844340	49.3		104	25894	
					Page 670 of 7	76.4				

Page 679 of 764

Report Date: 31-Oct-2017 09:38:00

Data File:

Data File.	· · · · · · · · · · · · · · · · · · ·	illiva (Sc	·	OCHIOIII	Data (AO_N\2017	1031-4770	+.b(2017.10.30AAA	_010.0		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H, 427.00 > 407.00		•		e 1.000	1484495	18.6		98.2	9904	
D 12 M2-6:2FTS 429.00 > 81.00	5	2.622			3076999	44.2		93.1	15591	
* 62 13C2-PFOA	4									
415.00 > 370.00 15 Perfluorooct		2.644 cid	0.0		12196546	50.0		100	13292	
413.00 > 369.00 413.00 > 169.00		2.644 2.644		1.000 1.000	5419156 2811029	20.7	1.93(0.90-1.10)	104	1738 3977	
D 14 13C4 PFO	A					F1 0	, ((0.,, 0)	100		
417.00 > 372.00 16 Perfluorohe		2.644 fonic Ac			12168993	51.0		102	14574	
449.00 > 80.00 D 18 13C4 PFOS		2.651	0.0	1.000	5215759	20.2		106	11008	
503.00 > 80.00	3.014	3.014			10536469	49.7		104	10639	
17 Perfluorooct 499.00 > 80.00		onic acio 3.014		1.000	4269116	18.6		100	1838	
499.00 > 99.00 20 Perfluoronoi			0.0	1.000	893166		4.78(0.90-1.10)		2127	
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	0.0		10524223	52.2		104	10438	
D 26 M2-8:2FTS 529.00 > 81.00		3.355	0.0		3302484	45.7		95.4	8420	
25 Sodium 1H,	1H,2H,2I	H-perflu	orodecar							
527.00 > 507.00 D 21 13C8 FOSA		3.364	0.0	1.002	1419805	18.5		96.6	6330	
506.00 > 78.00 D 23 13C2 PFDA		3.372	0.0		15406915	49.5		99.0	13792	
515.00 > 470.00	3.372		0.0		9633884	52.8		106	18749	
24 Perfluorodeo 513.00 > 469.00			0.0	1.000	3616334	20.0		99.9	7162	
22 Perfluorooct 498.00 > 78.00		onamide 3.372		1.000	6253563	21.5		108	8221	
D 27 d3-NMeFO	SAA			1.000						
573.00 > 419.00 28 N-methyl pe		3.522 ctane su			4542961	55.6		111	5716	
570.00 > 419.00	3.532	3.532	0.0	1.003	1589691	18.7		93.5	2356	
29 Perfluorodeo 599.00 > 80.00		3.679		1.000	2918398	20.4		106	7515	
D 32 d5-NEtFOS 589.00 > 419.00		3.689	0.0		4668635	55.6		111	4821	
31 Perfluoround 563.00 > 519.00		acid 3.698	0.0	1.000	3051783	19.4		96.9	3781	
33 N-ethyl perfl	luoroocta	ane sulfo	onamid							
584.00 > 419.00 D 30 13C2 PFUr		3.698	0.0	1.003	1513864	19.2		96.0	3535	
565.00 > 520.00	3.698	3.698	0.0		Page 680 of 76	4 50.6		101	9419	

Report Date: 31-Oct-2017 09:38:00 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File:			o\Chrom			4.b\2017.10.30AAA_		
Data File.	//CIIIOIIIVa/36	cramen	OCHION	Data A0_11/201	71031-4770	4.0\2017.10.30AAA_	_010.u	_
	EXP	DLT	REL		Amount			

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-MeFOS	SA-M									
515.00 > 169.00		3.876	0.0		4776126	52.7		105	2752	
D 36 13C2 PFD										
615.00 > 570.00		3.989	0.0		8268918	49.3		98.5	9653	
37 Perfluorodoo 613.00 > 569.00		acid 3.995	0.0	1.000	2000224	20.4		102	2441	
		3.993	0.0	1.000	3099226	20.4		102	2441	
D 38 d-N-EtFOS 531.00 > 169.00		4.060	0.0		4524689	52.1		104	2900	
39 N-ethylperflu					102 1007	02.1		101	2700	
526.00 > 169.00		4.070		1.000	1627758	19.3		96.7	2997	
41 Perfluorotrid	lecanoic	acid								
663.00 > 619.00	4.257	4.257	0.0	1.000	3733191	21.8		109	1227	
42 Perfluorotetr	radecan	oic acid								
713.00 > 169.00		4.488	0.0	1.000	955423	20.1		101	3993	
713.00 > 219.00		4.488	0.009	1.002	711368		1.34(0.00-0.00)		3598	
D 43 13C2-PFT6		4 400	0.0		10/754/7	F0.0		104	10507	
715.00 > 670.00		4.488	0.0		10675467	52.2		104	10597	
45 Perfluorohex 813.00 > 769.00		oic acid 4.897	0.0	1.000	6215712	21.4		107	467	
D 44 13C2-PFH		4.077	0.0	1.000	0213712	21.4		107	407	
815.00 > 770.00		4.897	0.0		16440187	53.7		107	4040	
46 Perfluorooct										
913.00 > 869.00		5.246	0.0	1.000	6712876	21.5		107	454	
Reagents:										
LCPFC_FULL-L4	1_00008		А	mount A	.dded: 1.00	Units	: mL			

Report Date: 31-Oct-2017 09:38:00 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_016.d Data File: **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 Limit Group: LC PFC\_DOD ICAL Method:  $A8_N$ 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x (70 00060 X 50 ©30 ©25 (00020 X16 \. \. \. 20 ≻40 15 30 10 20 10 0.9 1.8 2.7 0.9 1.8 2.7 0.0 3.6 2.0 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 049 0042 0 ©28-024-Y (X10000) ×35 21 12 0.9 1.7 2.0 2.3 1.8 2.7 1.4 8.0 1.4 1.7 2.0 2.3 0.0 1.1 1.1 2.6 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x 21 63 (0000012° X (X10000012° (00018 (000015 (000015 (00018) (00018 (00018) (00054<del>-</del> ×45<del>-</del> **≻**36 27 18 1.2 1.5 1.8 0.9 1.5 2.0 0.9 2.1 2.4 2.1 2.7 1.4 1.7 2.3 2.6 1.1 7 13C2 PFHxA 10 Perfluoroheptanoic acid D 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ (018-100015-042 036 ≻<sub>24</sub> 21 18 14 12 0 0 0 1.3 1.9 2.5 3.1 1.9 Page 6822 of 764 2.8 1.8 2.4 3.0 0.7 1.6 1.2

3.0

3.9

4.8

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2.5

3.1

3.7

2.4

2.1

2.7

3.0

3.3

3.6

3.9

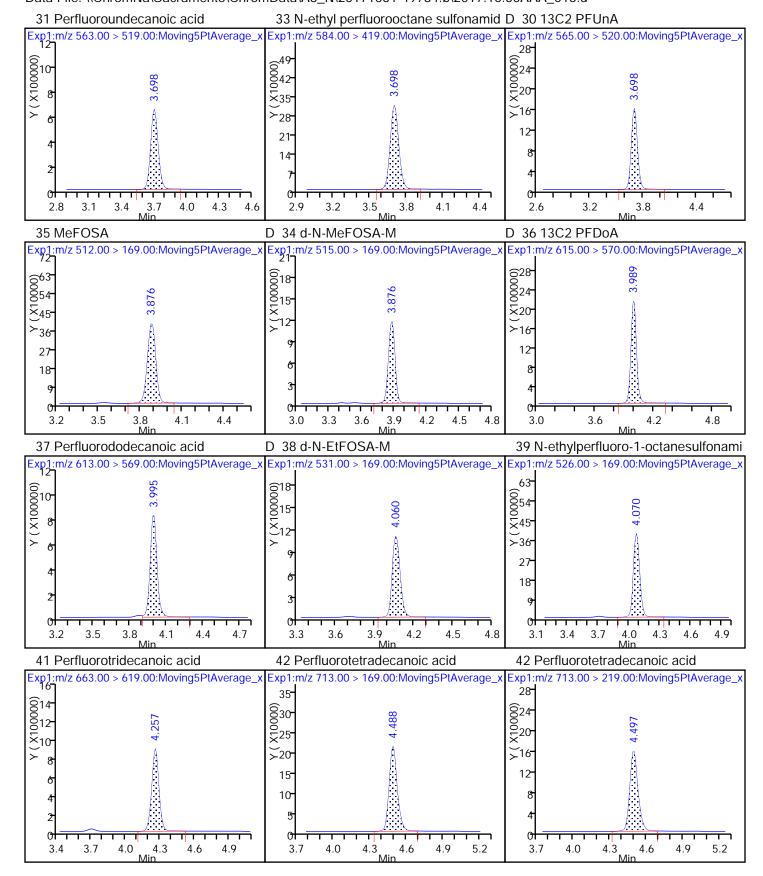
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Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_016.d 20 Perfluorononanoic acid D 19 13C5 PFNA D 26 M2-8:2FTS Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 635 630 30 0014 00012 3.014 ∑<sub>10</sub> ×25 ≻<sub>20</sub> 15 10 0 3.0 2.1 2.4 2.7 3.3 3.6 3.9 2.2 2.5 2.8 3.1 3.4 3.7 2.5 2.8 3.1 3.4 3.7 4.0 25 Sodium 1H,1H,2H,2H-perfluorodecabe21 13C8 FOSA D 23 13C2 PFDA Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 56-1 Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_> 35 00000 40-0030 0025 X 649 842  $\Sigma_{35}$ <del>\_</del>20 24 15 21 10 16 3.3 3.0 3.9 2.9 3.5 2.8 3.4 3.6 4.1 4.0 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide D 27 d3-NMeFOSAA Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x (21<sup>-</sup> (000018<sup>-</sup> (×15<sup>-</sup> 0015 12 X (0000012 X) 0 2.7 3.0 3.6 2.9 3.2 3.8 2.5 3.1 3.7 4.3 3.3 3.9 2.6 3.5 4.1 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x 56**-**X ( X100000) (0000012 × ) > 9 00001X X 24 16 0 3.1 3.4 3.7 4.0 4.3 2.8 3.1 3.4 3.7 4.0 4.3 4.6 3.0 3.3 3.6 3.9 4.2 4.5 2.8

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 09:38:00

Report Date: 31-Oct-2017 09:38:01 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_016.d

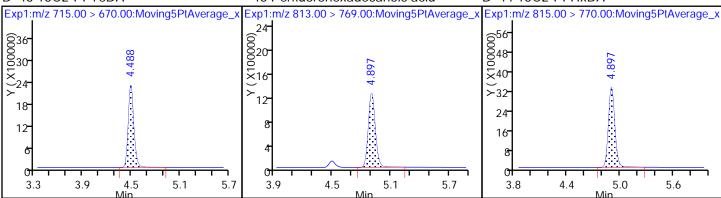


Report Date: 31-Oct-2017 09:38:01 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_016.d

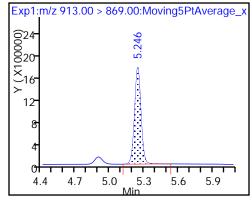
D 43 13C2-PFTeDA

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: <u>CCV 320-192039/12</u> Calibration Date: <u>10/31/2017</u> 03:13

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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
1802 PFHxS	Ave	300958	317495		49.9	47.3	5.5	50.0

### FORM VII LCMS CONTINUING CALIBRATION DATA

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/12</u> Calibration Date: <u>10/31/2017</u> 03:13

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

Report Date: 31-Oct-2017 09:59:56 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

FIRST Level Revie	wer: pno	msopna	IL		Date:	3	31-OCI-2017 09:59:5	0		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	1									
217.00 > 172.00		1.537	0.0		19507558	55.6		111	32134	
2 Perfluorobuty	yric acid									
212.90 > 169.00	1.537	1.537	0.0	1.000	17842241	48.0		96.1	1909	
4 Perfluoropen										
262.90 > 219.00	1.737	1.737	0.0	1.000	13134618	49.2		98.4	9261	
D 3 13C5-PFPe										
267.90 > 223.00		1.737	0.0		12422205	55.1		110	77095	
D 47 13C3-PFB										
301.90 > 83.00		1.755	0.0		261407	52.0		112	7450	
5 Perfluorobuta			0.0	4 000	47044000	40.0		05.7	107/01	
298.90 > 80.00 298.90 > 99.00	1.764 1.764	1.764 1.764	0.0	1.000 1.000	17214293 8017309	42.2	2.15(0.00-0.00)	95.6	197601 118527	
					0017309		2.13(0.00-0.00)		110327	
61 Sodium 1H, 327.00 > 307.00		•		1.000	4037328	49.7		106	55344	
6 Perfluorohex			0.0	1.000	1007020	17.7		100	00011	
313.00 > 269.00		1.995	0.0	1.000	12728963	49.2		98.4	8599	
D 7 13C2 PFHx										
315.00 > 270.00		1.995	0.0		13537495	55.9		112	29710	
10 Perfluorohe	ptanoic a	ncid								
363.00 > 319.00		2.298	0.0	1.000	12352419	51.2		102	6581	
D 9 13C4-PFHp	Α									
367.00 > 322.00		2.298	0.0		12473153	51.2		102	15090	
8 Perfluorohex	anesulfo	nic acid								
399.00 > 80.00	2.322	2.322	0.0	1.000	15144562	46.1		101	5456	
D 11 1802 PFH	xS									
403.00 > 84.00	2.322	2.322	0.0		15017532	49.9		105	16534	
					Page 680 of 7	764				

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Report Date: 31-Oct-2017 09:59:56 Chrom Revision: 2.2 16-Aug-2017 16:24:46 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_026.d Data File: **FXP REL** DLT **Amount** Signal **RT** RT **RT RT** Response 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 47.7 1.000 101 12185 3924803 D 12 M2-6:2FTS 429.00 > 81.00 2.623 2.623 0.0 3178914 45.7 96.2 15307 \* 62 13C2-PFOA 2.637 415.00 > 370.00 2.637 0.0 12652569 50.0 100 21080 15 Perfluorooctanoic acid 413.00 > 369.00 2.645 49.2 98.3 3292 2.645 0.0 1.000 13567052 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 53.8 108 12697 2.645 0.0 12842834 16 Perfluoroheptanesulfonic Acid 449.00 > 80.00 2.652 2.652 0.0 1.000 12908191 48.8 102 11143

10787953

11217481

2368331

10915234

10851028

3372120

3715660

16262142

9954447

9302706

15742327

4596175

4436539

7660209

4643870

8163908

3914845

Page 690 of 764 52.0

50.9

47.8

51.9

53.8

46.7

47.5

52.3

54.5

49.7

51.4

56.3

51.6

52.4

55.3

50.4

49.9

4.74(0.90-1.10)

106

103

104

108

97.4

99.1

105

109

99.5

103

113

103

109

111

101

99.9

104

13102

2665

2957

6567

9167

4693

5220

8199

8576

7927

8893

3446

2913

5453

3216

3891

2477

4190

D 18 13C4 PFOS

499.00 > 80.00

499.00 > 99.00

D 19 13C5 PFNA

D 26 M2-8:2FTS

D 21 13C8 FOSA 506.00 > 78.00 3.365

D 23 13C2 PFDA

468.00 > 423.00 3.008

529.00 > 81.00 3.357

527.00 > 507.00 3.357

515.00 > 470.00 3.365

498.00 > 78.00 3.373

570.00 > 419.00 3.523

599.00 > 80.00 3.680

563.00 > 519.00 3.699

584.00 > 419.00 3.699

565.00 > 520.00 3.699

D 30 13C2 PFUnA

D 32 d5-NEtFOSAA 589.00 > 419.00 3.690

D 27 d3-NMeFOSAA

24 Perfluorodecanoic acid 513.00 > 469.00 3.365 3.

22 Perfluorooctane Sulfonamide

573.00 > 419.00 3.523 3.523 0.0

29 Perfluorodecane Sulfonic acid

31 Perfluoroundecanoic acid

28 N-methyl perfluorooctane sulfonami

33 N-ethyl perfluorooctane sulfonamid

503.00 > 80.00 3.008

17 Perfluorooctane sulfonic acid

20 Perfluorononanoic acid 463.00 > 419.00 3.008 3.

3.008

3.008

25 Sodium 1H,1H,2H,2H-perfluorodecane

3.008 0.0

3.008 0.0

0.0

0.0

0.0

0.0

0.0

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.003

3.008

3.008

3.008

3.357

3.365

3.365

3.365

3.373

3.523 0.0

3.680 0.0

3.699 0.0

3.699 0.0

3.699 0.0

0.0

3.690

3.357 0.0

LCPFC\_FULL-L5\_00008

Data File.	NCIIIC	JIIIVa	acrament	OCHIOH	Dala (Ao_IN)20 I	71031-4970	4.D\2017.10.30AAA_	_026.u		
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-MeFO	SA-M									
515.00 > 169.00		3.877	0.0		4985166	55.0		110	2367	
D 36 13C2 PFD	οA									
615.00 > 570.00	3.990	3.990	0.0		8548863	50.9		102	8112	
37 Perfluorodo	decanoio	acid								
613.00 > 569.00	3.990	3.990	0.0	1.000	8041051	51.1		102	4922	
D 38 d-N-EtFOS	A-M									
531.00 > 169.00	4.061	4.061	0.0		4822249	55.5		111	1879	
39 N-ethylperflu										
526.00 > 169.00	4.071	4.071	0.0	1.000	4381668	48.9		97.7	2229	
41 Perfluorotrid										
663.00 > 619.00		4.257	0.0	1.000	9805504	55.5		111	1829	
42 Perfluoroteti			0.0	4 000	0.457000	40.0		00.7	(004	
713.00 > 169.00 713.00 > 219.00		4.489 4.489	0.0	1.000 1.000	2457230 1870088	49.9	1.31(0.00-0.00)	99.7	6031 4413	
		4.409	0.0	1.000	1670066		1.31(0.00-0.00)		4413	
D 43 13C2-PFTe 715.00 > 670.00		4.489	0.0		11083196	54.2		108	8974	
45 Perfluorohe			0.0		11003170	54.2		100	0774	
813.00 > 769.00		4.899	0.0	1.000	15508230	50.3		101	949	
D 44 13C2-PFH										
815.00 > 770.00		4.899	0.0		17644904	57.6		115	6851	
46 Perfluorooct										
913.00 > 869.00		5.245	0.0	1.000	16611686	49.5		99.0	956	
Reagents:										
_										

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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_026.d Data File: **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 Limit Group: LC PFC\_DOD ICAL Method:  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x ©70 0060 063 054 (00048 0048 140 140 ×50  $\stackrel{\smile}{\times}_{45}$ <u></u>32 ><sub>40</sub> 24 30 27 16 20 18 10 0.9 2.7 0.9 2.7 0.0 1.8 0.0 1.8 0.7 1.3 1.9 2.5 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x 56**1** Exp1:m/z 298.90 > 80.00:Moving5PtAverage x3 Exp1:m/z 301.90 > 83.00:Moving5PtAverage x370-(000001X 00048 × 32 × 32 <u>~</u>40 24 30 16 20 10 1.0 1.0 1.9 2.8 1.7 2.0 2.3 1.9 2.8 1.1 1.4 0.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x (18 (0000015 (12) (00001×) 25-20-(00042 00001 ×35 <del>-</del>28 15 21 10 14 ol 01 1.1 2.9 1.3 1.9 2.5 3.1 2.2 2.8 0.2 2.0 0.7 1.0 1.6 7 13C2 PFHxA 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_> Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_) Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_x 00048 × × × 32 0042 0000 35 0642 0035 ′28<del>-</del> 28 21 21 24 16 14 14 00 08.0 1.4 2.0 2.6 3.2 1.5 3.0 1.2 1.8 2.4 3.0

2.9 Min 3.8

4.7

2.0

1.9

2.5

3.1

3.7

1.1

10

1.7

2.3

2.9

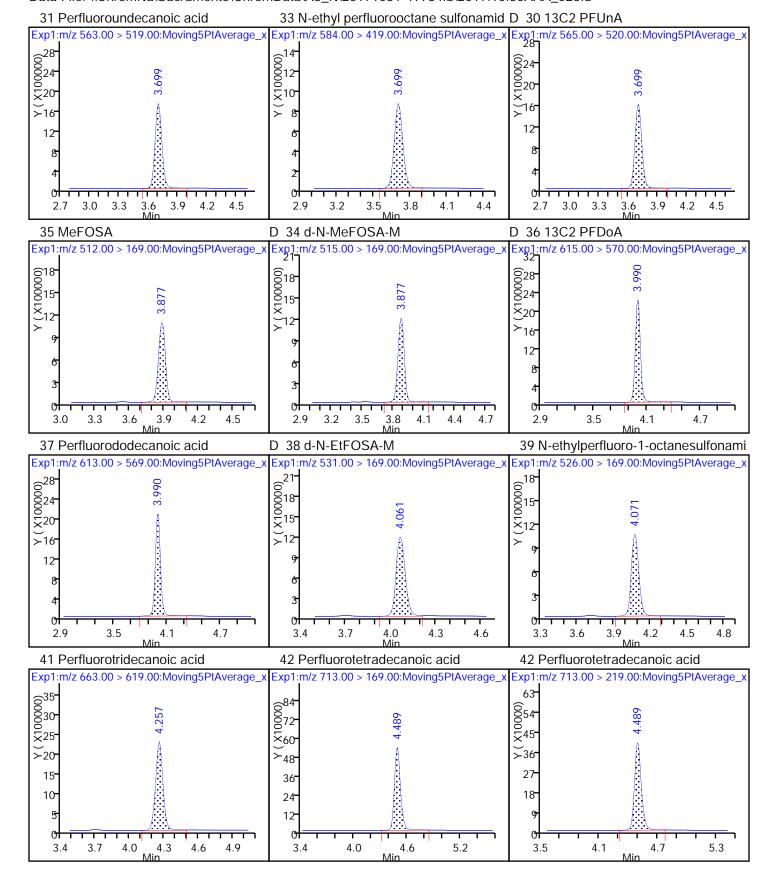
3.5

4.1

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_026.d 20 Perfluorononanoic acid D 19 13C5 PFNA D 26 M2-8:2FTS Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (12 (X) X (X) (X) X (X) 035<del>-</del> 036<del>-</del> 3.008 **≥**25 ≻<sub>20</sub> 18 15 12 10 3.0 2.4 2.7 3.3 3.6 3.9 2.1 2.4 2.7 3.0 3.3 3.6 3.9 2.6 2.9 3.2 3.5 3.8 4.1 2.1 25 Sodium 1H,1H,2H,2H-perfluorodecabe21 13C8 FOSA D 23 13C2 PFDA Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x 35 (X100000) (X100000) (X100000) 649 642 642 0030 0025 X ×35<del>-</del> <del>\_</del>20 ≻28<del>-</del> 15 21 10 14  $\mathbf{o}$ 2.9 3.2 2.9 3.5 2.9 3.5 3.8 4.1 4.1 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide D 27 d3-NMeFOSAA Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x (30 00025 049 0042 0015 12 X ×35 ≻28<del>-</del> 15 21 10 14 0 2.9 4.1 2.2 2.8 3.0 3.9 4.2 2.3 3.5 3.4 4.0 3.3 3.6 2.7 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x (0000012<sup>-</sup> × ) > 9 000015 X 12 ∑16 12 3.0 3.3 3.6 3.9 4.2 3.0 3.3 3.6 3.9 4.2 3.0 3.3 3.6 3.9 4.2 4.5 2.7

Chrom Revision: 2.2 16-Aug-2017 16:24:46

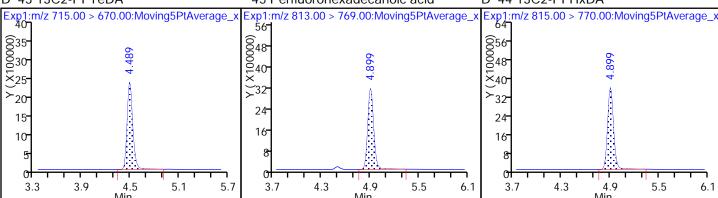
Report Date: 31-Oct-2017 09:59:56



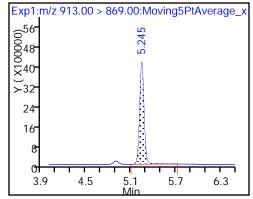
D 43 13C2-PFTeDA

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: <u>CCV 320-192039/18</u> Calibration Date: <u>10/31/2017</u> 03:55

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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
1802 PFHxS	Ave	300958	331577		52.1	47.3	10.2	50.0

# FORM VII LCMS CONTINUING CALIBRATION DATA

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/18</u> Calibration Date: <u>10/31/2017 03:55</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

riist Level Revie	irst Level Reviewer: pnomsopnat						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 113C4 PFBA	١										
217.00 > 172.00		1.536	0.0		18636318	53.2		106	36479		
2 Perfluorobut	yric acid										
212.90 > 169.00	1.536	1.536	0.0	1.000	7579157	21.4		107	1893		
4 Perfluoroper											
262.90 > 219.00	1.736	1.736	0.0	1.000	5291247	20.7		104	5554		
D 3 13C5-PFP6											
267.90 > 223.00		1.736	0.0		11889813	52.7		105	70279		
D 47 13C3-PFB		4 75 4	0.0		050005	<b>54 5</b>		444			
301.90 > 83.00		1.754	0.0		258925	51.5		111	6686		
5 Perfluorobut			0.0	1 000	70774/0	17 5		00.0	12000		
298.90 > 80.00 298.90 > 99.00	1.754 1.754	1.754 1.754	0.0	1.000 1.000	7077460 3041962	17.5	2.33(0.00-0.00)	99.2	13008 19351		
61 Sodium 1H,					3041702		2.33(0.00-0.00)		17331		
327.00 > 307.00		•		1.000	1438988	18.5		98.9	27569		
6 Perfluorohex			0.0	1.000	1100700	10.0		70.7	2,00,		
313.00 > 269.00		1.994	0.0	1.000	5055077	20.0		100	4984		
D 7 13C2 PFHx											
315.00 > 270.00		1.994	0.0		13205377	54.5		109	36491		
10 Perfluorohe	ptanoic a	acid									
363.00 > 319.00	•		0.0	1.000	5211200	21.1		105	4391		
D 9 13C4-PFHp	Α										
367.00 > 322.00	2.308	2.308	0.0		12777128	52.4		105	15058		
8 Perfluorohex	kanesulfo	nic acid									
399.00 > 80.00	2.318	2.318	0.0	1.000	6478407	18.9		104	6074		
D 11 1802 PFH											
403.00 > 84.00	2.318	2.318	0.0		15683601	52.1		110	30104		
					Page 600 of 7	764					

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Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_032.d Data File: **FXP REL** DLT **Amount** Signal **RT** RT **RT** Response ng/ml Ratio(Limits) %Rec S/N Flags RT 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 12354171 415.00 > 370.00 2.644 2.644 0.0 50.0 100 27926 15 Perfluorooctanoic acid 413.00 > 369.00 2.651 20.1 100 1679 2.651 0.0 1.000 5432595 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 12604359 52.8 2.651 0.0 106 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 49.9 503.00 > 80.00 3.015 3.015 0.0 10574165 104 12912 17 Perfluorooctane sulfonic acid 3.015 0.0 19.2 1864 499.00 > 80.00 3.015 1.000 4415152 103 499.00 > 99.00 3.015 3.015 0.0 1.000 931525 4.74(0.90-1.10) 2340 20 Perfluorononanoic acid 4050 463.00 > 419.00 3.015 3.015 0.0 1.000 4229642 20.1 101 D 19 13C5 PFNA 10852008 53.8 15832 468.00 > 423.00 3.015 3.015 0.0 108 D 26 M2-8:2FTS 529.00 > 81.00 3.364 3.364 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 50.8 102 20822 15822494 D 23 13C2 PFDA 19231 515.00 > 470.00 3.372 3.372 0.0 10199432 55.9 112 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 8359 4616573 56.5 113 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 19.9 99.4 5294 1.000 3215656

19.6

97.8

104

3661

11883

33 N-ethyl perfluorooctane sulfonamid

3.699 0.0

3.699 0.0

1.003

1521168

Page 700 of 764 52.0

584.00 > 419.00 3.699

565.00 > 520.00 3.699

D 30 13C2 PFUnA

Report Date: 31-Oct-2017 10:12:57

Data File:

Data File.	Data File. //CII/OHINA/SacialHelito/CII/OHIData/Ao_N/2017/1031-49764.b/2017.10.30AAA_032.d									
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-MeFO	SA-M									
515.00 > 169.00	3.877	3.877	0.0		4883295	53.9		108	2872	
D 36 13C2 PFD	οA									
615.00 > 570.00	3.990	3.990	0.0		8524776	50.8		102	19203	
37 Perfluorodo	decanoi	c acid								
613.00 > 569.00	3.990	3.990	0.0	1.000	3163604	20.2		101	3036	
D 38 d-N-EtFOS										
531.00 > 169.00		4.061			4639249	53.4		107	3832	
39 N-ethylperflu				1 000	1700001	40.0		00.7	0101	
526.00 > 169.00		4.071	0.0	1.000	1720334	19.9		99.7	3134	
41 Perfluorotrio 663.00 > 619.00		acid 4.257	0.0	1.000	3882890	22.0		110	1240	
			0.0	1.000	3882890	22.0		110	1360	
42 Perfluoroteti 713.00 > 169.00		oic acid 4.480	0.0	1.000	968975	19.7		98.4	5342	
713.00 > 104.00		4.480	0.008	1.000	740598	17.7	1.31(0.00-0.00)	70.4	4606	
D 43 13C2-PFT			0.000		, , , , , ,				.000	
715.00 > 670.00		4.489	0.0		11073379	54.1		108	15365	
45 Perfluorohe	xadecan	oic acid								
813.00 > 769.00		4.897	0.0	1.000	6219619	21.4		107	505	
D 44 13C2-PFH	xDA									
815.00 > 770.00	4.897	4.897	0.0		16401259	53.5		107	4961	
46 Perfluorooct	tadecand	oic acid								
913.00 > 869.00	5.246	5.246	0.0	1.000	6541683	21.0		105	491	
Reagents:										
LCPFC_FULL-L4	4_00008		A	mount A	dded: 1.00	Units	: mL			

Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_032.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x (70 00060 X 50 00000 0000 25 (00020 X16 , <u>\.</u> ≻40 15 30 10 20 10 0.9 1.8 2.7 0.9 1.8 3.6 0.0 2.7 2.0 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 (000010° (000010° (000010° (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) 630 60 25 049 0042 0 ×35 15 21 10 2.9 1.9 2.5 1.1 2.0 1.0 1.3 2.2 0.9 1.2 1.5 2.1 0.2 1.6 1.8 2.4 61 Sodium 1H,1H,2H,2H-perfluorohexan Perfluorohexanoic acid 5 Perfluorobutanesulfonic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 (0000012 (0000012) × 8 (21°00018° ×15° 656 648 ×40-≻<sub>32</sub>-24 16 ol 0 1.3 1.9 0.9 1.5 2.1 2.7 1.5 1.8 2.1 2.7 0.7 2.5 1.2 2.4 7 13C2 PFHxA 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_> Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_ (000018 (000015) (49<sup>-</sup> (00042<sup>-</sup> (35<sup>-</sup> 049 0042 ×35 <sub>-</sub>12 <del>-</del>28 ≻28 21 21 14 0 0 0 1.9 <u>2.2</u> Page 702hof 764 1.3 1.9 2.5 3.1 2.8 1.3 1.9 2.5 3.1 0.7 1.6

3.1

4.0

2.2

1.6

3.4

4.0

2.4

2.1

2.7

3.0

3.3

3.6

3.9

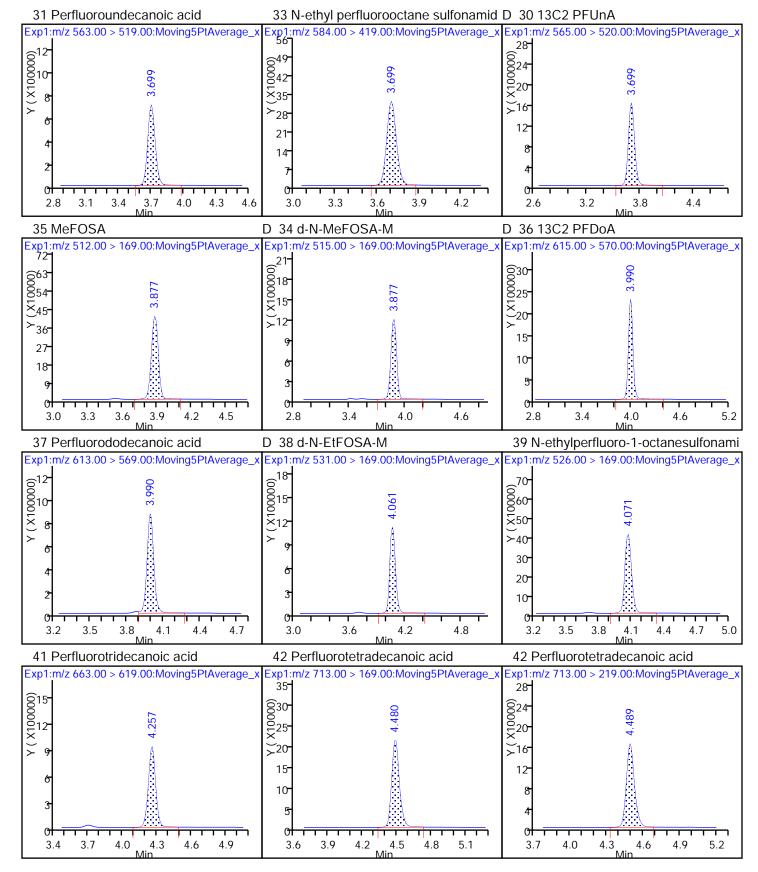
1.3

2.2

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 10:12:57

Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_032.d

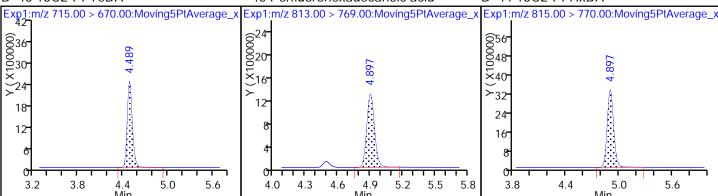


Report Date: 31-Oct-2017 10:12:57 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_032.d

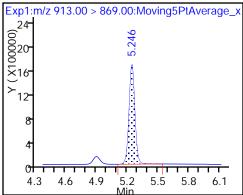
D 43 13C2-PFTeDA

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: <u>CCV 320-192039/25</u> Calibration Date: <u>10/31/2017</u> 04:43

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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
1802 PFHxS	Ave	300958	332065		52.2	47.3	10.3	50.0

# FORM VII LCMS CONTINUING CALIBRATION DATA

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/25</u> Calibration Date: <u>10/31/2017</u> 04:43

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

Report Date: 31-Oct-2017 10:41:54 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	wer: pho	msopha	ıt		Date:	3	31-Oct-2017 10:41:5	4		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.00 > 172.00		1.528	0.0		19793349	56.5		113	43059	
2 Perfluorobuty	yric acid									
212.90 > 169.00	1.528	1.528	0.0	1.000	18313764	48.6		97.2	2253	
4 Perfluoropen	ntanoic a	cid								
262.90 > 219.00	1.727	1.727	0.0	1.000	13929731	50.6		101	16531	
D 3 13C5-PFPe										
267.90 > 223.00	1.727	1.727	0.0		12806148	56.8		114	86434	
D 47 13C3-PFB										
301.90 > 83.00	1.755	1.755	0.0		269330	53.6		115	6227	
5 Perfluorobuta										
	1.755	1.755	0.0	1.000	17503821	41.7	2 14(0 00 0 00)	94.3	482618	
	1.755	1.755	0.0	1.000	8192210		2.14(0.00-0.00)		205023	
61 Sodium 1H, 327.00 > 307.00		•		ne 1.000	3842084	46.0		98.5	39185	
			0.0	1.000	3042004	40.0		90.3	39100	
6 Perfluorohex 313.00 > 269.00		1.983	0.0	1.000	13621376	52.0		104	10749	
D 7 13C2 PFHx		1.703	0.0	1.000	13021370	32.0		104	10749	
315.00 > 270.00		1.983	0.0		13713929	56.6		113	28651	
10 Perfluorohe			0.0		10710727	00.0		110	20001	
363.00 > 319.00	•	2.297	0.0	1.000	13023137	51.3		103	7313	
D 913C4-PFHp										
367.00 > 322.00		2.297	0.0		13114978	53.8		108	18180	
8 Perfluorohex										
399.00 > 80.00		2.321		1.000	15931038	46.4		102	5831	
D 11 18O2 PFH:	xS									
403.00 > 84.00		2.321	0.0		15706676	52.2		110	21325	
					Page 709 of 7	764				

Page 709 of 764

Report Date: 31-0 Data File:				:o\Chrom			16-Aug-2017 16:24 4.b\2017.10.30AAA			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Sodium 1H, 127.00 > 407.00		•		e 1.000	3900138	46.1		97.3	14641	
) 12 M2-6:2FTS 129.00 > 81.00	2.620	2.620	0.0		3265118	46.9		98.8	15002	
62 13C2-PFOA 15.00 > 370.00	2.642		0.0		13266981	50.0		100	14542	
15 Perfluorooct 13.00 > 369.00 13.00 > 169.00	2.649 2.649	2.649 2.649		1.000 1.000	14017862 7824973	47.3	1.79(0.90-1.10)	94.7	3379 5759	
14 13C4 PFO 117.00 > 372.00	2.649	2.649			13783965	57.7		115	18041	
16 Perfluorohej 49.00 > 80.00	2.656			1.000	13633491	48.9		103	21332	
18 13C4 PFOS 503.00 > 80.00	3.011	3.011			11353920	53.6		112	9599	
17 Perfluorooct 99.00 > 80.00 99.00 > 99.00		3.011 3.011 3.011	0.0 0.0	1.000 1.000	11884630 2545795	48.1	4.67(0.90-1.10)	104	4132 4385	
20 Perfluoronor 163.00 > 419.00		cid 3.011	0.0	1.000	11390873	50.0		100	7193	
19 13C5 PFNA 68.00 > 423.00	3.011	3.011	0.0		11760951	58.3		117	18996	
26 M2-8:2FTS 529.00 > 81.00	3.353	3.353			3528889	48.8		102	10598	
25 Sodium 1H, 527.00 > 507.00	3.353	H-perflu 3.353		ne 1.000	3883079	47.4		98.9	10354	
0 21 13C8 FOS 006.00 > 78.00	3.370	3.370	0.0		16798484	54.0		108	15715	
23 13C2 PFDA 515.00 > 470.00	3.370	3.370	0.0		10528131	57.7		115	21269	
24 Perfluorodeo 513.00 > 469.00	3.370	3.370		1.000	9967029	50.4		101	16405	
22 Perfluorooct 198.00 > 78.00	3.370	onamid 3.370		1.000	16210132	51.2		102	31070	
27 d3-NMeFO 573.00 > 419.00	3.519	3.519			4918529	60.2		120	6940	
28 N-methyl pe 570.00 > 419.00	3.529	3.529	0.0	1.003	4515490	49.1		98.1	4543	
29 Perfluorodeo 599.00 > 80.00	3.675	fonic ac 3.675		1.000	7975899	51.8		108	9725	
32 d5-NEtFOS 589.00 > 419.00		3.685	0.0		5007629	59.6		119	4830	
31 Perfluoround 563.00 > 519.00		acid 3.695	0.0	1.000	8532385	49.4		98.8	7936	

33 N-ethyl perfluorooctane sulfonamid

3.695 0.0

3.695 0.0

1.003

4090770

Page 7 10 of 764  $^{55.5}$ 

48.4

96.8

111

6463

9266

584.00 > 419.00 3.695

565.00 > 520.00 3.695

D 30 13C2 PFUnA

LCPFC\_FULL-L5\_00008

Data File:	File: \(\Cnrom\va\Sacramento\Cnrom\Data\A8_\\\20171031-49784.b\\2017.10.30AAA_039.d									
Ciam al	рт	EXP	DLT	REL	D	Amount	Datie (Linette)	0/ D	C/N	Поло
Signal	RT	RT	RT	RT	Response	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-MeFO	SA-M									
515.00 > 169.00	3.873	3.873	0.0		5459324	60.3		121	3819	
D 36 13C2 PFD	οA									
615.00 > 570.00	3.987	3.987	0.0		9015056	53.7		107	13299	
37 Perfluorodo										
613.00 > 569.00		3.987	0.0	1.000	8608550	51.9		104	8896	
D 38 d-N-EtFOS										
531.00 > 169.00		4.056			5113354	58.9		118	2528	
39 N-ethylperflu				4 000	47.4007.0	40.0		07.7	0001	
526.00 > 169.00		4.065	0.0	1.000	4643960	48.8		97.7	3906	
41 Perfluorotrid			0.0	1.000	10142000	F 4 - 4		100	2401	
663.00 > 619.00			0.0	1.000	10142898	54.4		109	2491	
42 Perfluorotetr 713.00 > 169.00		4.483	0.0	1.000	2656269	51.3		103	6620	
713.00 > 104.00		4.483	0.008	1.000	1931600	51.5	1.38(0.00-0.00)	103	5510	
D 43 13C2-PFTe			0.000		.,0.000		(0.00 0.00)		00.0	
715.00 > 670.00		4.491	0.0		11644790	56.9		114	11661	
45 Perfluorohe	xadecan	oic acid								
813.00 > 769.00		4.901	0.0	1.000	15730090	50.6		101	963	
D 44 13C2-PFH	xDA									
815.00 > 770.00	4.891	4.891	0.0		17803273	58.1		116	8521	
46 Perfluorooct	adecano	oic acid								
913.00 > 869.00	5.241	5.241	0.0	1.000	17380937	51.4		103	1035	
Reagents:										

Units: mL

Amount Added: 1.00

Report Date: 31-Oct-2017 10:41:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46 TestAmerica Sacramento \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_039.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x (70° (00000) 50° (70°) (0000 48 40 40 970 960  $\stackrel{\smile}{\times}_{50}$ \_ ≻40 **≻**32 30 24 30 20 16 20 10 10 1.2 0.9 1.8 2.7 1.7 2.3 0.0 2.4 3.6 0.0 3.6 0.5 1.1 2.9 D 47 13C3-PFBS 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 72 Exp1:m/z 267.90 > 223.00:Moving5PtAverage Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 (000010° (000010° (000010° (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) 049 0042 0 663 654 ×35 36 21 27 18 1.0 2.0 2.3 1.0 1.9 2.8 1.4 1.7 1.9 2.8 1.1 0.1 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan& Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x (00030 X25 (015<sup>-</sup> 049 0042 042  $\times$ 35 ≻20 ≻28 15 21 10 ol 01 1.1 2.9 0.8 1.4 2.0 2.2 2.8 0.2 2.0 2.6 1.0 1.6 7 13C2 PFHxA 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_ 49 000042 X35 0642 0035 049 0042 ×35 <del>\_</del>28− 28 ≻28 21 21 21 14 14 0 0 01.3 1.9 2.5 3.1 1.8 2.1 2.4 Page 71/2 of 764 3.0 1.2 1.8 2.4 3.0 0.7 1.5

3.4

4.6

2.2

2.2

2.5

2.8

3.1

3.4

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1.0

10

1.8

2.4

3.0

3.6

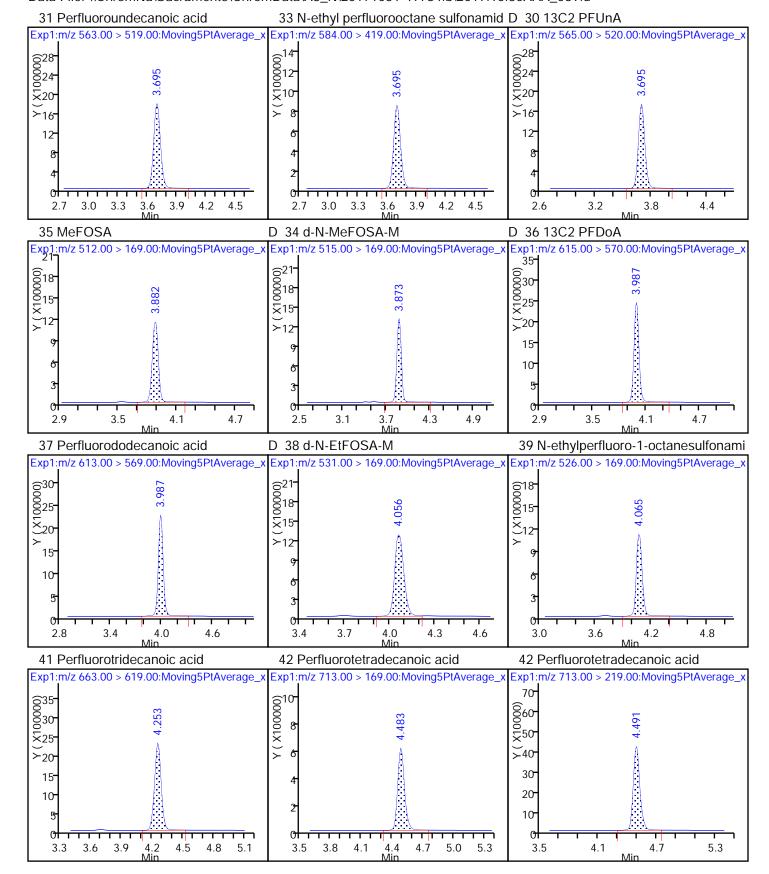
4.2

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_039.d 20 Perfluorononanoic acid D 19 13C5 PFNA D 26 M2-8:2FTS Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 00001× ×)24-(0000010 X) 00001 0036 3.011 18 18 12 12 3.1 2.2 2.5 2.8 3.4 3.7 1.9 2.5 3.1 3.7 2.7 3.0 3.3 3.6 3.9 4.2 25 Sodium 1H,1H,2H,2H-perfluorodecabe21 13C8 FOSA D 23 13C2 PFDA Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x (000001X (0000012) (X) 35 0030 0025 X <del>\_</del>20 <u></u>32− 15<del>-</del> 24 10 16<del>-</del> 8 2.8 3.4 2.9 3.5 2.8 3.7 4.1 3.4 4.0 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide D 27 d3-NMeFOSAA Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x 049 0042 0015 12 X 0000 0000 25 ×35 ≻28<del>-</del> 15 21 10 14 0 3.2 2.8 3.4 4.0 3.8 4.4 3.7 4.3 2.2 2.0 2.6 2.5 3.1 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x 28-00024-20-20-(000012 X) > 8 000015 X 12 <del>-</del>16 2.9 3.2 3.5 3.8 4.1 3.0 3.3 3.6 3.9 4.2 3.0 3.3 3.6 3.9 4.2 4.5

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 10:41:55

Report Date: 31-Oct-2017 10:41:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_039.d

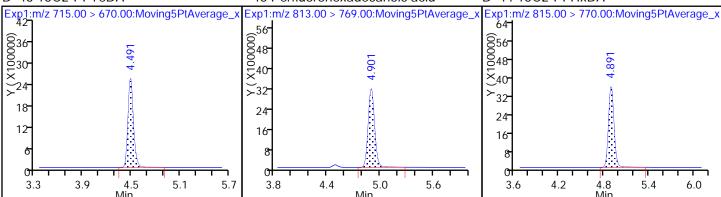


Report Date: 31-Oct-2017 10:41:55 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_039.d

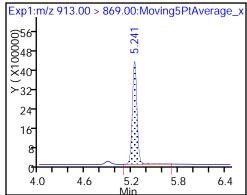
D 43 13C2-PFTeDA

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	Ilnits: na/I.

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	Ū	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	Ū	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	Ū	2.5	2.0	0.92
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	Ū	2.5	2.0	0.87
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	2.0	Ū	2.5	2.0	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	Ū	4.0	3.0	1.3
335-77-3	Perfluorodecanesulfonic acid (PFDS)	3.0	Ū	4.0	3.0	1.2
754-91-6	Perfluorooctane Sulfonamide (FOSA)	2.0	Ū	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	1802 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

Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

i iist Level Keviewel, prioriisopriat				Date.	ა						
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	D 113C4 PFBA										
	217.00 > 172.00	1.537	1.529	0.008		18329891	52.3		105	44464	
	2 Perfluorobuty	ric acid									
	212.90 > 169.00	1.537	1.537	0.0	1.000	76541	0.2193			7.5	
	4 Perfluoropen										
	262.90 > 219.00	1.737	1.737	0.0	1.000	17077	0.0690			13.3	
	D 3 13C5-PFPe										
	267.90 > 223.00		1.737	0.0		11518808	51.1		102	99705	
	D 47 13C3-PFBS		4 755	0.0		004444	47.7		400	4000	
	301.90 > 83.00		1.755	0.0		234411	46.6		100	4880	
	6 Perfluorohex			0.011	1 000	12250	0.0550			10 /	
	313.00 > 269.00		1.984	0.011	1.000	13258	0.0550			13.6	
	D 7 13C2 PFHx. 315.00 > 270.00		1.984	0.011		12614862	52.1		104	33395	
			1.904	0.011		12014002	32.1		104	33373	
	D 9 13C4-PFHp 367.00 > 322.00		2.308	0.001		13905539	57.1		114	24410	
	8 Perfluorohex					13703337	57.1			24410	
	399.00 > 80.00		2.318		1.000	49795	0.1479			386	
	D 11 1802 PFH										
	403.00 > 84.00		2.318	0.0		15406692	51.2		108	20243	
	13 Sodium 1H,	IH,2H,2I	H-perflu	orooctan	е						
	427.00 > 407.00		•		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	

Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46

Data File:				:o\Chrom			4.b\2017.10.30AAA			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooc	tanoic ad	cid								M
413.00 > 369.00		2.644	0.0	1.000	33442	0.1238			10.7	101
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 PFO										
417.00 > 372.00		2.644	0.007		12571924	52.7		105	24519	
D 18 13C4 PFO 503.00 > 80.00		3.014	0.0		10430446	49.2		103	13440	
20 Perfluorono										
463.00 > 419.00		3.014	0.0	1.000	29476	0.1478			29.7	
D 19 13C5 PFN		0.014	0.0		1000/01/	F4 0		100	40477	
468.00 > 423.00		3.014	0.0		10296214	51.0		102	12166	
D 26 M2-8:2FT5 529.00 > 81.00		3.355	0.007		3812076	52.8		110	9119	
25 Sodium 1H,		•		ne						
527.00 > 507.00	3.362	3.364	-0.002	1.000	1919	0.0217			64.9	
D 21 13C8 FOS										
506.00 > 78.00		3.372	-0.002		7780337	25.0		50.0	14542	
D 23 13C2 PFD		0.070	0.000		10000/0/	FF 0		110	40505	
515.00 > 470.00			-0.002		10208636	55.9		112	13525	
24 Perfluorode 513.00 > 469.00			0.002	1.000	10723	0.0559			29.0	
				1.000	10723	0.0559			29.0	
22 Perfluorooc 498.00 > 78.00			e -0.002	1.000	38524	0.2627			748	
D 27 d3-NMeFC		3.372	0.002	1.000	30324	0.2027			740	
573.00 > 419.00		3.522	0.007		3807482	46.6		93.2	5973	
28 N-methyl pe										
570.00 > 419.00			-0.003	1.000	8688	0.1220			29.8	
29 Perfluorode	cane Su	Ifonic ac	id							
599.00 > 80.00			0.006	1.000	4089	0.0289			82.9	
D 32 d5-NEtFO	SAA									
589.00 > 419.00	3.695	3.689	0.006		3945973	47.0		94.0	4028	
31 Perfluoroun	decanoi	c acid								
563.00 > 519.00	3.695	3.698	-0.003	1.000	23686	0.1517			37.1	
33 N-ethyl perf										
584.00 > 419.00	3.695	3.698	-0.003	1.000	14776	0.2218			209	
D 30 13C2 PFU										
565.00 > 520.00		3.698	-0.003		7318298	50.2		100	11514	
D 34 d-N-MeFO		0.07/			5000	0.0507			<b>5</b> 0	
515.00 > 169.00		3.876	0.006		5320	0.0587		0.1	5.2	
D 36 13C2 PFD		2.000	0.004		770//07	47.4		00.0	11110	
615.00 > 570.00		3.989	0.004		7786687	46.4		92.8	11148	
37 Perfluorodo			0.000	1 000	10527	0.12/4			FF 0	
613.00 > 569.00		3.995	-0.002	1.000	19537	0.1364			55.0	
D 38 d-N-EtFOS 531.00 > 169.00		4.060	0.005		3855	0.0444		0.1	6.0	
			0.003		3600	0.0444		U. I	0.0	
41 Perfluorotrio 663.00 > 619.00			0.004	1.000	39844	0.2476			17.9	
303.00 > 019.00	7.201	7.201	0.004	1.000	570 <del>74</del>	0.2770			17.7	

Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
42 Perfluorotetr	adecan	oic 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-PFTe	eDA									
715.00 > 670.00	4.491	4.488	0.003		10193043	49.8		99.6	6080	
45 Perfluorohex	kadecan	oic acid								
813.00 > 769.00	4.899	4.897	0.002	1.000	181000	0.1965			23.1	
D 44 13C2-PFH)	κDA									
815.00 > 770.00	4.899	4.897	0.002		14808414	48.3		96.7	4685	
46 Perfluorooct	adecano	oic 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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_017.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ 4 Perfluoropentanoic acid D 113C4 PFBA 2 Perfluorobutyric acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x (70 00060 X 50 31 Y (X1000) ≻40 16 30 11 20 10 0.9 2.7 1.9 0.0 1.8 1.4 1.7 2.0 1.3 1.6 5 Perfluorobutanesulfonic acid (ND) D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x 35<del>-</del> (000042 35 Y (X10000) ∑28 >20 21 15 14 10 2.9 2.3 1.1 2.0 1.4 1.7 2.0 1.3 1.9 2.5 0.2 1.1 0.7 5 Perfluorobutanesulfonic acid (ND) 61 Sodium 1H,1H,2H,2H-perfluorohexan&(Rental fluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 42 71 18 36 0015 × × 12 662 ×30. <del>×</del>53 **≻24 ≻**44 18 35 12 26 ol 1.3 1.9 0.9 1.5 2.1 0.7 2.5 2.7 1.9 2.2 1.6 7 13C2 PFHxA 10 Perfluoroheptanoic acid (ND) 9 13C4-PFHpA Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_x | Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x | 561 Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_x (00001× (00001× (35) 56<del>-</del> 00048<del>-</del> 00040 × 648-540-<u></u>32 24 24 21 16 14 16 0 0 0 1.4 2.0 2.6 3.2 1.3 1.9 Page 7220 of 764 3.1 1.2 1.8 2.4 3.0 0.8

3.2

3.8

2.0

2.6

3.2

3.8

10

2.1

2.4

2.7

3.0

3.3

3.6

3.9

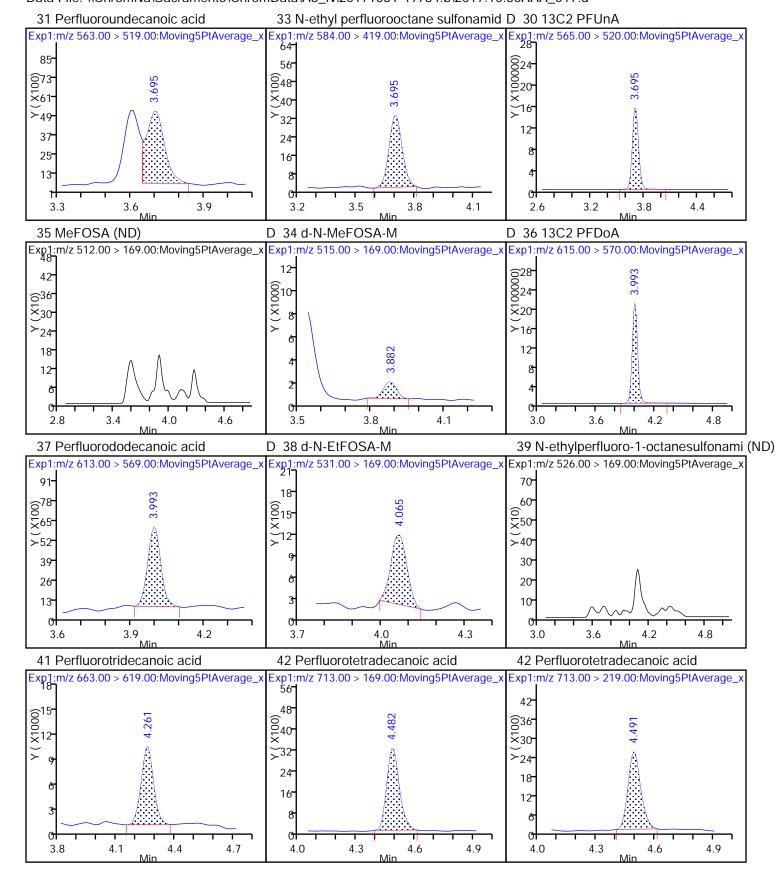
2.0

2.6

Report Date: 31-Oct-2017 09:39:34

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_017.d

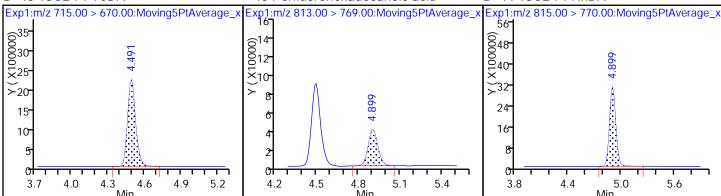


Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_017.d

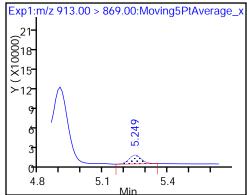
D 43 13C2-PFTeDA

45 Perfluorohexadecanoic acid

D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



Report Date: 31-Oct-2017 09:39:34 Chrom Revision: 2.2 16-Aug-2017 16:24:46 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

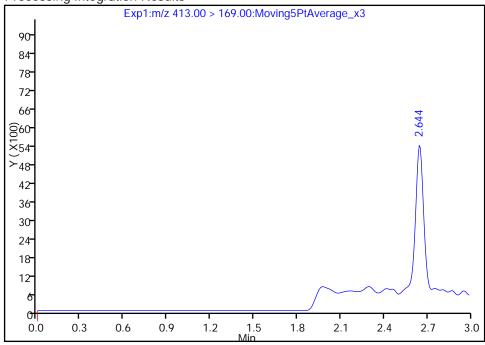
Column: Detector EXP1

## 15 Perfluorooctanoic acid, CAS: 335-67-1

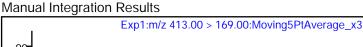
Signal: 2

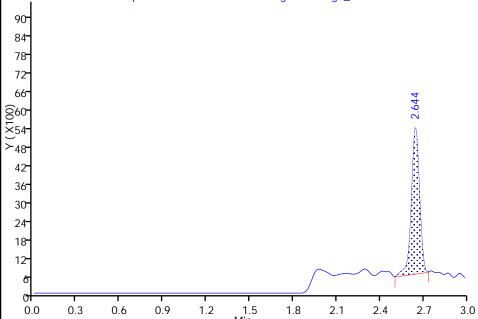
RT: 2.64 Area: 0

Amount: 0.123810 Amount Units: ng/ml **Processing 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

Page 727 of 764

## 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	1802 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

Report Date: 31-Oct-2017 09:40:26 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

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 113C4 PFBA										
217.00 > 172.00		1.529	-0.001		19417225	55.4		111	32704	
2 Perfluorobut 212.90 > 169.00	•	1.537	0.0	1.000	8053668	21.8		109	1120	
4 Perfluoroper			0.0	1.000	0000000	21.0		107	1120	
262.90 > 219.00		1.737	-0.010	1.000	5414142	20.5		103	4238	
D 3 13C5-PFPe										
267.90 > 223.00		1.737	-0.010		12275519	54.4		109	83396	
D 47 13C3-PFB: 301.90 > 83.00		1.755	0.0		257109	51.1		110	5391	
5 Perfluorobut										
298.90 > 80.00		1.755	0.0	1.000	7530043	18.8		106	15228	
298.90 > 99.00			0.0	1.000	3280830		2.30(0.00-0.00)		9621	
61 Sodium 1H, 327.00 > 307.00		•		ne 1.000	1786098	19.3		103	13272	
6 Perfluorohex			0.0	1.000	1700070	17.5		100	10272	
313.00 > 269.00		1.984	-0.001	1.000	5172660	20.3		102	4741	
D 7 13C2 PFHx										
315.00 > 270.00		1.984	-0.001		13303815	54.9		110	41323	
10 Perfluorohe 363.00 > 319.00	-	acid 2.308	-0 012	1.000	5779907	20.8		104	4879	
D 9 13C4-PFHp		2.300	-0.012	1.000	3777707	20.0		104	4077	
367.00 > 322.00		2.308	-0.012		14354078	58.9		118	25301	
8 Perfluorohex										
399.00 > 80.00		2.318	-0.001	1.000	6602893	18.9		104	6119	
D 11 18O2 PFH: 403.00 > 84.00		2.318	-0 001		15965490	53.0		112	23651	
13 Sodium 1H,				e	13703470	55.0		112	20001	
427.00 > 407.00		•		1.000	Page4730 of 76	4 20.5		108	12881	
					•					

Report Date: 31-Oct-2017 09:40:26 Data File:

Data File:	\\Cnrc	omiva\Sa	acrament	o\Cnrom	Data\A8_N\2017	1031-4978	4.b\2017.10.30AAA	_018.a		
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		2.644	-0.008		14538085	50.0		100	25675	
15 Perfluorooct	tanoic ac	cid								
413.00 > 369.00 413.00 > 169.00		2.644 2.644	-0.001 -0.001	1.000 1.000	5848221 3143984	20.1	1.86(0.90-1.10)	101	1822 4240	
D 14 13C4 PFO							,			
417.00 > 372.00	2.643	2.644			13509633	56.6		113	16410	
16 Perfluorohe										
449.00 > 80.00 D 18 13C4 PFO		2.651	-0.001	1.000	5770591	21.3		112	13604	
503.00 > 80.00	3.004				11059269	52.2		109	12578	
17 Perfluorooct										
499.00 > 80.00			-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 Perfluoronoi 463.00 > 419.00			-0.010	1.000	4165751	19.3		96.3	3920	
D 19 13C5 PFN/										
468.00 > 423.00		3.014	-0.010		11169940	55.4		111	13393	
D 26 M2-8:2FTS										
529.00 > 81.00		3.355			4019595	55.6		116	6846	
25 Sodium 1H, 527.00 > 507.00		•			1020042	19.6		102	4700	
D 21 13C8 FOS		3.304	-0.010	1.000	1828062	19.0		102	6790	
506.00 > 78.00		3.372	-0.009		7509204	24.1		48.3	9251	
D 23 13C2 PFD/		2 272	0.000		10/44010	E0.2		117	11/00	
515.00 > 470.00 24 Perfluorodeo			-0.009		10644219	58.3		117	11698	
513.00 > 469.00		3.372	-0.009	1.000	4083167	20.4		102	6563	
22 Perfluorooct	ane Sulf	fonamide	Э							
498.00 > 78.00		3.372	-0.009	1.000	2882373	20.4		102	7524	
D 27 d3-NMeFO 573.00 > 419.00		3.522	-0.002		4213247	51.6		103	6423	
28 N-methyl pe	rfluoroo	ctane su	lfonami							
570.00 > 419.00				1.000	1584313	20.1		100	2725	
29 Perfluorode				1 000	2045/0/	10.0		00.5	720/	
599.00 > 80.00		3.679	-0.003	1.000	2845696	19.0		98.5	7296	
D 32 d5-NEtFOS 589.00 > 419.00		3.689	-0.003		4198178	50.0		100.0	3631	
31 Perfluoround	decanoio	c acid								
563.00 > 519.00		3.698		1.000	3176637	19.4		96.9	3818	
33 N-ethyl perfl 584.00 > 419.00		ane sulfo 3.698		1.003	1439957	20.3		102	3880	
D 30 13C2 PFU		-	•	-		-			-	
565.00 > 520.00		3.698	-0.012		7682295	52.7		105	9211	
D 36 13C2 PFD		2.000	0.000		0202554	40.5		00.0	150//	
615.00 > 570.00	3.987	3.989	-0.002		Page 731 of 76	64 <sup>49.5</sup>		98.9	15366	

Report Date: 31-Oct-2017 09:40:26 Chrom Revision: 2.2 16-Aug-2017 16:24:46

report bate. 31-00	51-2017 07.40.20	CHIOTH IXCVISIO	011. 2.2	10-Aug-2017 10.24.40
Data File:	\\ChromNa\Sacramento\ChromData\\	\8_N\2017103	1-4978	4.b\2017.10.30AAA_018.d

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
37 Perfluorodo	decanoio	acid								
613.00 > 569.00	3.987	3.995	-0.008	1.000	3189048	20.9		104	4263	
D 38 d-N-EtFOS	A-M									
531.00 > 169.00	4.253	4.060	0.193		6021	0.0693		0.1	8.1	
41 Perfluorotrio	lecanoic	acid								
663.00 > 619.00	4.245	4.257	-0.012	1.000	3963238	23.1		115	1434	
42 Perfluoroteti										
713.00 > 169.00		4.488	-0.012	1.000	993501	20.4	1 00 (0 00 0 00)	102	6015	
713.00 > 219.00		4.488	-0.004	1.002	764542		1.30(0.00-0.00)		4959	
D 43 13C2-PFT6		4 400	0.004		40040007	F0 F		407	(700	
715.00 > 670.00		4.488	-0.004		10948836	53.5		107	6788	
45 Perfluorohe			0.000	4 000	5700404	00.7		404	E40	
813.00 > 769.00		4.897	-0.008	1.000	5793131	20.7		104	519	
D 44 13C2-PFH		4.007	0.000		15700007	F1 /		100	4070	
815.00 > 770.00		4.897	-0.008		15798297	51.6		103	4879	
46 Perfluorooct			0.000	1 000	/101000	20.4		100	F10	
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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_018.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x 35<sup>-</sup> 00030 ×25<sup>-</sup> (24° 00020 0020 ©70 0060  $\stackrel{\smile}{\times}_{50}$ ∑20 15 30 10 20 0.9 0.9 1.5 0.9 1.2 1.8 2.7 0.3 2.1 1.5 1.8 2.1 2.4 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage x3 35 12 (X10000) X (X10000) X (X10000) 0030-0025-× 049 0042 0 ×35 15 21 10 1.0 1.7 2.0 2.3 1.9 2.8 1.4 0.9 1.2 1.5 2.1 1.8 2.4 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan & Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x 21 (0000012 × ) > 9 (70-(060-(00018 (000015 (000015 (00018) (00018 (00018) <del>×</del>50 30 20 10 1.2 1.5 1.8 2.0 2.0 0.9 2.1 2.4 1.4 1.7 2.3 1.4 1.7 2.3 1.1 7 13C2 PFHxA 10 Perfluoroheptanoic acid 9 13C4-PFHpA Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_x Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_x Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_> 000042 ×35 ©21<del>-</del> 049 0642 <del>-</del>28 28 21 21 14 0 0 1.9 <u>2.2</u> Page 786hof 764 0.6 1.2 1.8 2.4 3.0 2.8 1.2 1.8 2.4 3.0 1.6

3.0

3.9

4.8

1.8

2.4

3.0

3.6

4.2

0

1.2

2.1

2.4

2.1

2.7

3.0

3.3

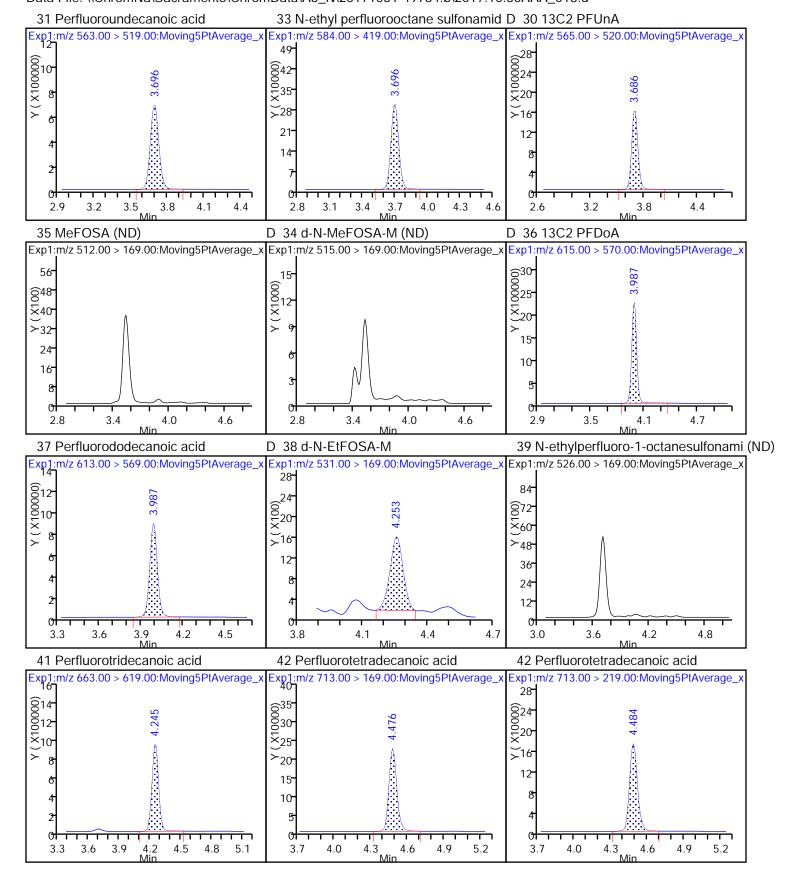
3.6

3.9

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_018.d 20 Perfluorononanoic acid D 19 13C5 PFNA D 26 M2-8:2FTS \_\_\_\_\_ Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x 161 Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 (000012 X) 0014 00012 00001 0036 ∑<sub>10</sub> 18 12 2.2 2.5 2.8 3.1 3.4 2.1 2.4 2.7 3.0 3.3 3.6 3.9 2.6 2.9 3.2 3.5 3.8 4.1 25 Sodium 1H,1H,2H,2H-perfluorodecabe21 13C8 FOSA D 23 13C2 PFDA Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 56<del>-</del> 628 6024 (0000 30 30 0 0 48 <del>-</del>40 ≻16 18 24 12 16 3.2 2.9 3.4 3.4 3.8 2.8 2.8 3.7 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide D 27 d3-NMeFOSAA Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 (X100000) 0014 00012 X10 0014 0012 0 2.9 3.2 2.9 3.2 3.5 3.8 2.9 3.2 3.5 3.8 4.1 2.6 4.1 3.5 3.8 4.1 2.6 4.4 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x (X100000) 0014 00012 649 0042 ×35 ≻<sub>28</sub>-21 3.0 3.3 3.6 3.9 4.2 2.8 3.1 3.4 3.7 4.0 4.3 2.8 3.1 3.4 3.7 4.0 4.3 2.7

Chrom Revision: 2.2 16-Aug-2017 16:24:46

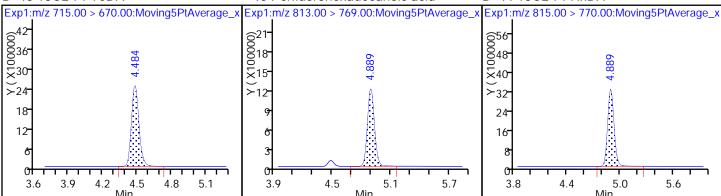
Report Date: 31-Oct-2017 09:40:26



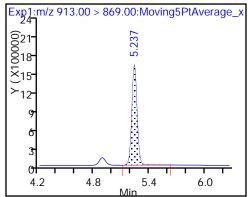
D 43 13C2-PFTeDA

45 Perfluorohexadecanoic acid

D 44 13C2-PFHxDA



46 Perfluorooctadecanoic acid



## FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento	Job No.: <u>320-32321-1</u>
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	IInits: na/I.

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	1802 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

Report Date: 31-Oct-2017 09:41:41 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	wer: pho	msopha	t		Date:	3	31-Oct-2017 09:41:4	0		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.00 > 172.00		1.529	0.008		18709847	53.4		107	49254	
2 Perfluorobuty										
212.90 > 169.00	•	1.537	0.0	1.000	7828782	22.0		110	840	
4 Perfluoropen	itanoic a	cid								
262.90 > 219.00		1.737	-0.001	1.000	5037846	20.4		102	4527	
D 3 13C5-PFPe	A									
267.90 > 223.00	1.736	1.737	-0.001		11491014	50.9		102	75599	
D 47 13C3-PFB	S									
301.90 > 83.00	1.755	1.755	0.0		246736	49.1		106	6314	
5 Perfluorobuta	anesulfo	nic 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,		•								
327.00 > 307.00	1.949	1.949	0.0	1.000	1762018	20.2		108	9932	
6 Perfluorohex										
313.00 > 269.00	1.995	1.984	0.011	1.000	4946941	20.6		103	4319	
D 7 13C2 PFHx										
315.00 > 270.00	1.983	1.984	-0.001		12590059	52.0		104	28677	
10 Perfluorohe <sub>l</sub>										
363.00 > 319.00	2.309	2.308	0.001	1.000	5573117	21.2		106	4526	
D 9 13C4-PFHp										
367.00 > 322.00	2.309	2.308	0.001		13576387	55.7		111	23056	
8 Perfluorohex										
399.00 > 80.00		2.318	0.001	1.000	6545496	19.2		105	5705	
D 11 1802 PFH										
403.00 > 84.00		2.318	0.001		15620680	51.9		110	20584	
13 Sodium 1H,		-								
427.00 > 407.00	2.623	2.622	0.001	1.000	Page 249 of 76	4 20.9		110	10341	

Data File.	NOTIC	JIIINa\3a	acrament	.0101110111	Dala Mo_IN 2017	1031-49704	4.D\2017.10.30AAA	_019.0		
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		2.644	0.001		13868978	50.0		100	20911	
15 Perfluorooct	anoic ac	id								
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 PFO										
417.00 > 372.00			0.001		12607923	52.8		106	13314	
16 Perfluorohe										
449.00 > 80.00		2.651	0.001	1.000	5517792	22.0		116	13954	
D 18 13C4 PFO		0.014	0.007		1000001	40.4		101	10510	
503.00 > 80.00					10203394	48.1		101	10543	
17 Perfluorooct				4 000	4005074	40.0		407	1000	
499.00 > 80.00 499.00 > 99.00			-0.006 -0.006	1.000 1.000	4395374 910203	19.8	4.83(0.90-1.10)	107	1888 2080	
			-0.006	1.000	910203		4.63(0.90-1.10)		2000	
20 Perfluoronoi 463.00 > 419.00			0.006	1.000	4120696	20.7		104	3309	
		3.014	-0.006	1.000	4120090	20.7		104	3309	
D 19 13C5 PFN/ 468.00 > 423.00		2 01/	-0.006		10262526	50.9		102	13286	
		3.014	-0.000		10202320	30.7		102	13200	
D 26 M2-8:2FTS 529.00 > 81.00		3.355	0.002		4054445	56.1		117	10001	
				• •	4034443	50.1		117	10001	
25 Sodium 1H, 527.00 > 507.00		•			1880719	20.0		104	6309	
D 21 13C8 FOS		3.304	-0.007	1.000	1000717	20.0		104	0307	
506.00 > 78.00		3.372	-0.007		8641260	27.8		55.5	9599	
		3.372	-0.007		0041200	27.0		33.3	7377	
D 23 13C2 PFD/ 515.00 > 470.00		3.372	-0.007		10250518	56.2		112	15461	
			-0.007		10230310	30.2		112	13401	
24 Perfluorodeo 513.00 > 469.00		3.372	-0.007	1.000	3978069	20.7		103	7921	
22 Perfluorooct				1.000	3770007	20.7		103	7 72 1	
498.00 > 78.00		3.372		1.000	3385595	20.8		104	8014	
		3.372	-0.007	1.000	3303373	20.0		104	0014	
D 27 d3-NMeFO 573.00 > 419.00		3.522	0.001		4111264	50.3		101	5182	
28 N-methyl pe					4111204	50.5		101	3102	
570.00 > 419.00				1.000	1595056	20.7		104	2811	
29 Perfluorode				1.000	1373030	20.7		104	2011	
599.00 > 80.00		3.679		1.000	2752353	19.9		103	5222	
		3.077	0.001	1.000	2732333	17.7		103	JZZZ	
D 32 d5-NEtFOS 589.00 > 419.00		3.689	0.001		4063607	48.4		96.8	3861	
			0.001		4003007	40.4		70.0	3001	
31 Perfluorouno 563.00 > 519.00		3.698	0.002	1.000	3099874	19.7		98.7	3416	
				1.000	3099074	19.7		90.7	3410	
33 N-ethyl perfl 584.00 > 419.00		ane suirc 3.698	0.002	1.003	1407722	21.8		109	4130	
		3.090	0.002	1.003	1497733	21.0		109	4130	
D 30 13C2 PFU		2 400	0.002		7250210	EO E		101	6450	
565.00 > 520.00		3.698	0.002		7358218	50.5		101	6650	
D 36 13C2 PFD6 615.00 > 570.00		2 000	0.0		0120510	10 1		96.9	12376	
015.00 > 570.00	J.707	3.989	U.U		Page 741 of 76	64 <sup>40.4</sup>		70.7	123/0	

Report Date: 31-Oct-2017 09:41:41

Data File:

Bata Filot	1101110	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	aoi airioin	.0 10111 0111	Bata # 10_11201	7 1001 1770	1.012017.10.0071717	_0 . ,		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
37 Perfluorodo	decanoio	r acid								
613.00 > 569.00		3.995	-0.006	1.000	3173004	21.2		106	4805	
D 38 d-N-EtFOS	A-M									
531.00 > 169.00	4.257	4.060	0.197		5094	0.0587		0.1	6.9	
41 Perfluorotrio	lecanoic	acid								
663.00 > 619.00	4.257	4.257	0.0	1.000	4039074	24.0		120	1367	
42 Perfluorotet	radecan	oic 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-PFT	eDA									
715.00 > 670.00	4.488	4.488	0.0		10803603	52.8		106	4890	
45 Perfluorohe:	xadecan	oic acid								
813.00 > 769.00	4.906	4.897	0.009	1.000	5336087	20.6		103	492	
D 44 13C2-PFH	xDA									
815.00 > 770.00	4.896	4.897	-0.001		14598910	47.6		95.3	6318	
46 Perfluorooct	tadecand	oic 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 \\ChromNa\\Sacramento\\ChromData\\A8\_N\\20171031-49784.b\\2017.10.30AAA\_019.d Data File: **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: Limit Group: LC PFC\_DOD ICAL  $A8_N$ D 113C4 PFBA 2 Perfluorobutyric acid 4 Perfluoropentanoic acid Exp1:m/z 217.00 > 172.00:Moving5PtAverage\_x Exp1:m/z 212.90 > 169.00:Moving5PtAverage\_x Exp1:m/z 262.90 > 219.00:Moving5PtAverage\_x 35<del>-</del> ©70 0060 00000 0000 25 (00020 X16 ×50 20 ><sub>40</sub> 15 30 10 20 10 1.2 0.9 2.7 1.9 0.0 2.4 3.6 0.0 1.8 0.7 1.3 2.5 5 Perfluorobutanesulfonic acid D 3 13C5-PFPeA D 47 13C3-PFBS Exp1:m/z 267.90 > 223.00:Moving5PtAverage\_x Exp1:m/z 301.90 > 83.00:Moving5PtAverage\_x3 Exp1:m/z 298.90 > 80.00:Moving5PtAverage\_x3 (000010° (000010° (000010° (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) (000010°) 630 60 25 (000042 35 ∑28 15 21 10 14 1.0 2.1 1.9 2.8 1.5 1.8 2.4 0.9 1.2 1.5 1.8 2.1 2.4 1.2 5 Perfluorobutanesulfonic acid 61 Sodium 1H,1H,2H,2H-perfluorohexan & Perfluorohexanoic acid Exp1:m/z 298.90 > 99.00:Moving5PtAverage\_x3 Exp1:m/z 327.00 > 307.00:Moving5PtAverage\_x | Exp1:m/z 313.00 > 269.00:Moving5PtAverage\_x 21 77-0066-×55-(000012° X (X10000012° (00018 (000015 ×)12 >44 33 22 1.2 1.5 1.8 2.0 1.5 1.8 2.1 2.7 0.9 2.1 2.4 1.4 1.7 2.3 2.6 1.2 2.4 9 13C4-PFHpA 7 13C2 PFHxA 10 Perfluoroheptanoic acid Exp1:m/z 315.00 > 270.00:Moving5PtAverage\_> Exp1:m/z 363.00 > 319.00:Moving5PtAverage\_> Exp1:m/z 367.00 > 322.00:Moving5PtAverage\_ (00042 (00042 (35 (49<sup>-</sup> (00042<sup>-</sup> (35<sup>-</sup> (21-00018-15-<del>-</del>28 21 21 14 14 <del>0|</del> 0 01.9 <u>2.2</u> Page 7406 of 764 8.0 1.4 2.0 2.6 3.2 2.8 1.2 1.8 2.4 3.0 1.6

3.2

4.1

1.8

2.4

3.0

3.6

4.2

2.3

1.4

2.5

2.2

2.8

3.1

3.4

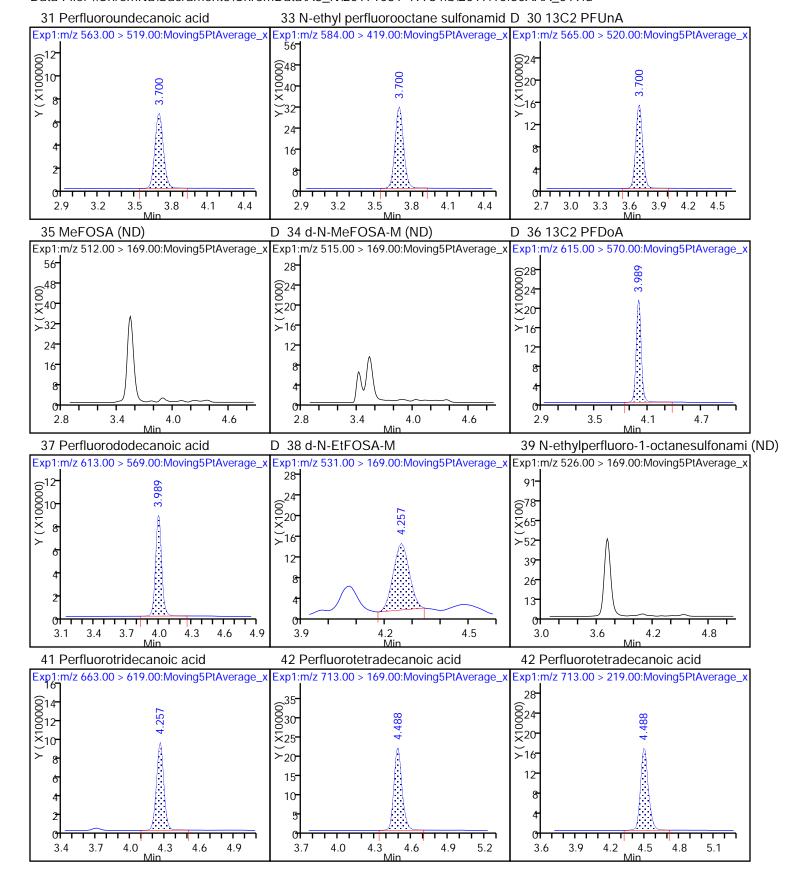
3.7

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_019.d 20 Perfluorononanoic acid D 19 13C5 PFNA D 26 M2-8:2FTS Exp1:m/z 463.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 529.00 > 81.00:Moving5PtAverage\_x3 Exp1:m/z 468.00 > 423.00:Moving5PtAverage\_x (35<sup>-</sup> 0030 0014 00012 014 0012 ∑<sub>10</sub> ≻20 15<del>-</del> 10 2.2 2.5 2.8 3.1 3.4 2.0 2.6 3.2 3.8 2.7 3.0 3.3 3.6 3.9 4.2 25 Sodium 1H,1H,2H,2H-perfluorodecaDe21 13C8 FOSA D 23 13C2 PFDA Exp1:m/z 515.00 > 470.00:Moving5PtAverage\_x Exp1:m/z 506.00 > 78.00:Moving5PtAverage\_x3 321 Exp1:m/z 527.00 > 507.00:Moving5PtAverage\_> ©28 ©24 035<u>-</u> 63 00 54 ×45  $\Sigma_{25}$ ×20 ≻<sub>36</sub>-27 12 15 18 10 2.9 3.2 3.8 3.4 2.9 3.5 2.8 4.1 24 Perfluorodecanoic acid 22 Perfluorooctane Sulfonamide D 27 d3-NMeFOSAA Exp1:m/z 573.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 498.00 > 78.00:Moving5PtAverage\_x3 Exp1:m/z 513.00 > 469.00:Moving5PtAverage\_x (0000012 (X) (0000012 (X100000) (X100000) 8 0014 0012 <u>`</u>10 3.0 3.6 3.0 3.9 4.2 2.7 3.3 3.9 2.5 2.8 3.1 3.4 3.7 4.0 2.7 3.3 3.6 28 N-methyl perfluorooctane sulfonami 29 Perfluorodecane Sulfonic acid D 32 d5-NEtFOSAA Exp1:m/z 599.00 > 80.00:Moving5PtAverage\_x3 Exp1:m/z 589.00 > 419.00:Moving5PtAverage\_x Exp1:m/z 570.00 > 419.00:Moving5PtAverage\_x Y (X100000) 56<del>-</del> 014 0012 (0048 ×40 ≻32 24 2.9 3.2 3.5 3.8 4.1 2.9 3.2 3.5 3.8 4.1 4.4 2.8 3.1 3.4 3.7 4.0 4.3

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Report Date: 31-Oct-2017 09:41:41

Report Date: 31-Oct-2017 09:41:41 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_019.d

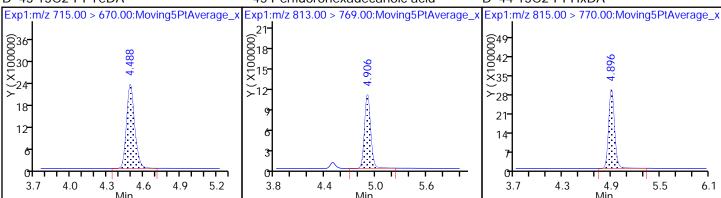


Report Date: 31-Oct-2017 09:41:41 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b\2017.10.30AAA\_019.d

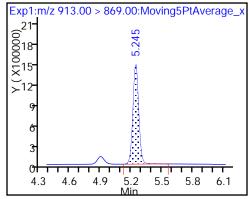
D 43 13C2-PFTeDA

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_	GeminiC18 3x100 3(mm)
IC 320-191992/4		10/30/2017 18:06	1	003.d 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)

### LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento	Job No.: <u>320-32321-1</u>
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	LAB FILE ID	COLUMN ID
			FACTOR		
CCV 320-192039/1		10/31/2017 01:57	1	2017.10.30AAA_0 16.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_0 17.d	GeminiC18 3x100 3 (mm)
LCS 320-190551/2-A		10/31/2017 02:18	1	2017.10.30AAA_0 18.d	GeminiC18 3x100 3 (mm)
LCSD 320-190551/3-A		10/31/2017 02:25	1	18.d 2017.10.30AAA_0 19.d 2017.10.30AAA_0	GeminiC18 3x100 3 (mm)
320-32321-1 DL		10/31/2017 02:32	10	I 20.d	GeminiC18 3x100 3 (mm)
320-32321-2		10/31/2017 02:39	1	2017.10.30AAA_0 21.d 2017.10.30AAA_0	GeminiC18 3x100 3(mm)
320-32321-3		10/31/2017 02:46	1	22.d	GeminiC18 3x100 3 (mm)
320-32321-4		10/31/2017 02:52	1	2017.10.30AAA_0 23.d	GeminiC18 3x100 3(mm)
CCV 320-192039/12		10/31/2017 03:13	1	2017.10.30AAA_0 26.d	GeminiC18 3x100 3(mm)
CCV 320-192039/18		10/31/2017 03:55	1	2017.10.30AAA_0 32.d	GeminiC18 3x100 3 (mm)
320-32321-1		10/31/2017 04:01	1	2017.10.30AAA_0 33.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_0 39.d	GeminiC18 3x100 3(mm)

#### 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)	Т	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)	Т	285.12 g	25.93 g	259.2 mL	0.50 mL	500 uL	100 uL
320-32321-A-3	TP-PFC-022-MID-C ARBON	3535, 537 (modified)	Т	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)	Т	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		3535, 537		500 uL			
320-190551/2		(modified)					
LCSD		3535, 537		500 uL			
320-190551/3		(modified)					
320-32321-A-1	TP-PFC-022-TPI	3535 <b>,</b> 537	T				
		(modified)					
320-32321-A-2	TP-PFC-022-TPE	3535, 537	Т				
		(modified)					
320-32321-A-3	TP-PFC-022-MID-C	3535, 537	Т				
	ARBON	(modified)					
320-32321-A-4	TP-PFC-022-TPE-D	3535 <b>,</b> 537	Т				
		(modified)					

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.

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

Bato	h 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
Т	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.



## West Sacramento

# **HPLC/LCMS Data Review Checklist**

Job Number(s): 320-3236	Work List ID(s): <b>ี่ ฯ</b>	784		
Extraction Batch: 190 561			10.030 10	na NUT
Extraction Batch. 110 691	Analysis Batch(es):_!	190008, 19	2051, 1	12090
Delivery Rank 2/4	Due Date: lojz	7/17		
A. Calibration/Instrument Run QC		1 <sup>st</sup> Level	2 <sup>nd</sup> Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 191	992, 191993		V	
2. ICAL, CCV Frequency & Criteria met.		V		
<ul> <li>RF<sub>average</sub> criteria appropriate for the method.</li> </ul>		1/	_	
<ul> <li>Linear Regression criteria appropriate if required</li> </ul>	(r ≥ 0.995).	1	1	
<ul> <li>Quadratic fit criteria appropriate if required (r<sup>2</sup> ≥ 0</li> </ul>				7
<ul> <li>For Linear Regression and Quadratic fit – Does t</li> </ul>		-	,	
1/2 the reporting limit as described in CA-Q-S-005			V.	
<ul> <li>All curve points show calculated concentrations.</li> </ul>		1/		
Peaks correctly ID'd by data system.		1/		
5. Tune check frequency & criteria met and Tune check	report attached.			$\overline{}$
B. QA/QC				
Are all QC samples properly linked in TALS?		./	/	
2. Method blank, LCS/LCSD and MS/SD frequencies me	t.	1/	V. 1	
3. LCS/LCSD and MB data are within control limits. If no			-//	
4. Are MS/MSD recoveries and RPD within control limits'		1/		
5. Holding Times were met for prep and analytical.	·	1/	/	
6. IS/Surrogate recoveries meet criteria or properly noted	<u></u>		7	
C. Sample Analysis			V	
1. Was correct analysis performed and were project instr	uctions followed?		/	
2. If required, are compounds within RT windows?		1	-	
3. If required, are positive hits confirmed and >40% RPD	flagged?			
4. Manual Integrations reviewed and appropriate.		1/		
5. All analytes correctly reported. (Primary, secondary, ac	cceptable status)		1/	
6. Correct reporting limits used. (based on client request				
dilutions)	, , , , , , , , , , , , , , , , , , , ,			
D. Documentation NCM: 105791 105803.105799 1	MY 93. 105784	11 17 10		
D. Documentation WH: 105791, 105803, 105799, 1.  1. Are all non-conformances documented/attached? NC	V# 105789 105790		1	
2. Do results make sense (e.g. dilutions, etc.)?			1	
3. Have all flags been reviewed for appropriateness?		1/	./	
4. For level 3 and 4 reports, have forms and raw data be	en reviewed?		/	
5. Was QC Checker run for this job?		V		-
*Upon completion of this checklist, the reviewer must scen	and attach the checklis	t to the TAL	S job.	
1 <sup>st</sup> Level (Analyst):	Date: 10/2	31/17		
2 <sup>nd</sup> Level Reviewer:	Date:	12017		

Report Date: 31-Oct-2017 09:05:10

Chrom Revision: 2.2 16-Aug-2017 16:24:46

Page: 1

## TestAmerica Laboratories Worklist QC Batch Report

Worklist Name:

30OCT2017F\_PFC

Worklist Number:

49784 A8\_N

Instrument Name: A8\_N Data Directory:

Chrom Method:

\\ChromNa\Sacramento\ChromData\A8\_N\20171031-49784.b

QC Batching:

Disabled

Limit Group Batching: Enabled

	QC Batch; 1	LC PFC_DOD ICAL	LC PFC ICAL	LC PFC_QSM5-1 ICAL	LC PFAS ICAL
	4,5	Raw Batch 192039	Raw Batch 192040	Raw Batch. 192041	Raw Batch 192042
# 1	CCV L4	# 1 CCV L4	<del></del>	#1 CCV L4	
		#2 RINSE		#2 RINSE	
# 3		1	# 3 MB 320-190551/1-A	J	
# 4	LCS 320-190551/2-A	# 4 LCS 320-190551/2-A	#4 LCS 320-190551/2-A		
# 5	LCSD	#5 LCSD	#5 LCSD		ĺ
		320-190551/3-A	320-190551/3-A		
# 6	320-32321-A-1-A	# 6 320-32321-A-1-A -16	at low		
		# 7 320-32321-A-2-A	f		
1		# 8 320-32321-A-3-A			
		# 9 320-32321-A-4-A V	1		#10 320-32038-B-2-A
	320-32038 <b>-</b> B-2-A			PV	#11 320-32041-B-1-A
	320-32041-B-1-A			#12 CCV L5	
1			#12 CCV L5		#13 320-32261-A-1-A
1	320-32261-A-1-A	1	#13 320-32261-A-1-A		#14 320-32261-A-2-A
	320-32261-A-2-A		#14 320-32261-A-2-A		#15 320-32261-A-3-A
	320-32261-A-3-A		#15 320-32261-A-3-A	IF	#16 320-32261-A-4-A
	320-32261-A-4-A		#16 320-32261-A-4-A	1.6	#17 320-32261-A-5-A
	320-32261-A-5-A			<b>∌</b> 18 CCV L4	
			#18 CCV L4		
	320-32321-A-1-A	#19 320-32321-A-1-A	DA 1000		
		#20 320-32321-A-1-A 🗲			
		#21 RINSE #22 320-32321-A-2-A	#21 RINSE		
1		#23 320-32321-A-2-A #23 320-32321-A-3-A		i	
		#24 320-32321-A-4-A	]	#25 CCV L5	
			#25 CCV L5	#20 CCV L0	
723	OUV LU	mZJ CCV LJ	#20 CCV L0		



# Test America - Sacramento

# Sample Dilution Record

Method ID PFC IDA	Job# 320-32321
Analyst (Print Name) Amani Royce/ Qu	Moranalyst Initials Oak /- (P
Date 10/26/17	

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
320-32521-1	500	30	300	lox
				<u> </u>
	-			
				-
		<del></del>		

Comments:		
	<del></del>	 

53

Batch Number: 320-190551

Method Code: 320-3535\_PFC-320

2X-lowFoGa

**Aqueous Extraction Analysis Sheet** 

(To Accompany Samples to Instruments)

Analyst: Branscum, Cassie

A8 10/25/17 A8 10/26/17 A8 10/30/17

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	Rcvd	PHs Adj1	Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-190551/1 N/A	N/A		250 mL 0.50 mL	. — .			N/A	N/A	N/A		
2	LCS~320-190551/2 N/A	N/A		250 mL	_			N/A	N/A	N/A		
3	LCSD~320-190551/3 N/A	N/A		0.50 mL 250 mL		-		N/A	N/A	N/A		
Page 755	320-32321-A-1 (PFC_IDA_DOD5)	N/A (320-32321-1)	288.15 g 26.29 g	0.50 mL 261.9 mL 0.50 mL	_			10/27/17	16_Days	4	10%	
5 01 764	320-32321-A-2 (PFC_IDA_DOD5)	N/A (320-32321-1)	285.12 g 25.93 g	259.2 mL 0.50 mL				10/27/17	16_Days	4	1017	
,	320-32321-A-3 (PFC_IDA_DOD5)	N/A (320-32321-1)	279.09 g 25.98 g	253.1 mL 0.50 mL				10/27/17	16_Days	4		3 2 6 - 3 2 3 2 1 - A - 3 - A
	320-32321-A-4 (PFC_IDA_DOD5)	N/A (320-32321-1)	283.78 g 26.47 g	257.3 mL 0.50 mL				10/27/17	16_Days	4	Curlaun	
ŀ	320-32038-B-2 (PFC_IDA)	N/A (320-32038-1)	276.52 g 26.03 g	250.5 mL 0.50 mL				10/24/17	16_Days	4	Green color	X National in the state of the
ŀ	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	
ŀ	320-32261-A-1 (PFC_IDA)	N/A (320-32261-1)	25.92 g 283.66 g 26.04 g	0.50 mL 257.6 mL 0.50 mL		_		10/26/17	12_Days	2	kn I	
ŀ	9						:					

Printed 10/24/2017

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TestAmerica Sacramento

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Batch End: 10/24/2017 7:54:00PM

11	320-32261-A-2 (PFC_IDA)	N/A (320-32261-1)	285.25 g	259.3 mL			10/26/17	12_Days	2	
L			25.96 g	0.50 mL						THIN 3 2 B - 3 2 2 6 1 - A - 2 - A HIN
12	320-32261-A-3 (PFC_IDA)	N/A (320-32261-1)	289.11 g	262.9 mL			10/26/17	12_Days	2	
L			26.21 g	0.50 mL						1881 3 2 Ø - 3 2 2 6 1 - A - 3 - A1 MI
13	320-32261-A-4 (PFC_IDA)	N/A (320-32261-1)	295.77 g	269.1 mL			10/26/17	12_Days	2	
L		<u>                                     </u>	26.71 g	0.50 mL	ļ	1				1UM 3 2 0 - 3 2 2 6 1 - A - 4 - ATIM
14	320-32261-A-5 (PFC_IDA)	N/A (320-32261-1)	284.08 g	258 mL			10/26/17	12_Days	2	
L		<u> </u>	26.08 g	0.50 mL						JIIII 3 2 Ø - 3 2 2 6 1 - A - 5 - A IIIII

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Printed: 10/24/2017

(To Accompany Samples to Instruments)

Analyst: Branscum, Cassie

Batch Number: 320-190551

Method Code: 320-3535\_PFC-320

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 Balance ID H2O ID Pipette 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	ССВ
Analyst ID - SU Reagent Drop	ССВ
Analyst ID - SU Reagent Drop Witness	
Acid Name	
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
Analyst ID - IS Reagent Drop	TWL

(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:

Analyst ID - IS Reagent Drop Witness	ABH
Internal Standard ID#	
Analyst ID - Concentration	CCB/ ABL
Analyst ID - Aliquot Step	TAT
Analyst ID - Final Volume Step	ABH
SOP Number	WS-LC-0025
Batch Comment	414
<u> </u>	1, 7

Comments

320-32038-B-2

Rework Comments: Low 13C8-FOSA recovery (<1%)

320-32041-B-1

Rework Comments: Low 13C8-FOSA recovery (<1%)

(To Accompany Samples to Instruments)

Analyst: Branscum, Cassie

Batch Open: 10/23/2017 8:13:00AM

Batch End:

#### **Reagent Additions Worksheet**

	Lab ID	Reagent Code	Amount Added	Final Amount	Ву	Witness
	MB 320-190551/1	LCMPFC_ALL_SU_00014	500 uL	0.50 mL	Cel 10-23-17	jus volusta
	LCS 320-190551/2	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		1
	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		
Page	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		
759 of 764	320-32321-A-3	LCMPFC_ALL_SU_00014	500 uL	0.50 mL		
764	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	7	1

Batch Number: 320-190551

Method Code: 320-3535\_PFC-320

(To Accompany Samples to Instruments)

Batch Number: 320-190551

Analyst: Branscum, Cassie

Method Code: 320-3535\_PFC-320

Batch Open: 10/23/2017 8:13:00AM

Batch End:

		Other Reagents:	
Reagent		Amount/Units	Lot#:
IS: 1068480	100 PL	LCPFC-IS_00009	Splked: Two 10/29/17 Witness: ABI+ D/2
			10/24/17

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# Sacramento Preparation Data Review Checklist

Preparation Batch Number(s) 19055 j	Test 3535 _ PFC
Earliest Holding Time 10/13/17	

	1 <sup>st</sup> Level	2 <sup>nd</sup> Level
Batch Information	Reviewer	Reviewer
Date and time accurate and entered into TALS correctly	V /	
All necessary batch information complete and entered into TALS correctly	V	-
BD, FV, and AL initials are transcribed into the batch comment		
	1 <sup>st</sup> Level	2 <sup>nd</sup> Level
Sample List Tab	Reviewer	Reviewer
Samples identified to the correct method	V	/
Holding time violation NCM filed		
MS/MSD or MS/DU NCM filed	V	/
NCM for any anomalies filed	V	1/
All NCMs include method code, matrix, and prep batch		V
Method/sample/login/QAS checked and correct		V
Batch contains no more than 20 live samples	/	V
	1 <sup>st</sup> Level	2 <sup>nd</sup> Level
Worksheet Tab	Reviewer	Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted		V.
All additional test requirements performed, documented, and uploaded to TALS	,	V
correctly (e.g. final amount, initial amount, turbidity, and CI Check)	<b>✓</b>	
The pH is transcribed properly in TALS	NA	NA
All additional information is transcribed into TALS and is correct and raw data is	1	_
attached	V /	V
Comments/Observations are transcribed correctly in TALS		V
	1 <sup>st</sup> Level	2 <sup>nd</sup> Level
Reagents Tab	Reviewer	Reviewer
All necessary reagents not expired and checked into TALS	-	V
All spike amounts correct and added to necessary samples and QC	V	
Internal Standard is added to the reagents	V/	V
All units are correctly transcribed into TALS	1	V
T. 7	(n. Ed. /, ')	
1 <sup>st</sup> Level Reviewer: TW 7	27/1/	
2 <sup>nd</sup> Level Reviewer:Date:	10/24/	רוו
Comments:	<del> </del>	

# Shipping and Receiving Documents

#### TestAmerica Sacramento 880 Riverside Parkuau

West Sacramento, CA 95605

Chain of Custody Record 241871

**TestAmerica** 

TestAmerica Laboratories, Inc.

Phone: 916.373.5600 Fax: Regulatory Program: DW NPDES RCRA Other: TAL-8210 (0713) Project Manager: Jeff Orient Site Contact: Kein Leanting Date: 10/10/2017 COC No: 241871 Client Contact Tel/Fax: 16412) 921-8778 Lab Contact: Ruch Alltricke Carrier: COCs Company Name: Tetra Tech teller Address: **Analysis Turnaround Time** Sampler: notion Dr. PFLLF-11 L3+) LL/NB/MS City/State/Zip: P: Hbb-s PA CALENDAR DAYS WORKING DAYS For Lab Use Only: 16170 Phone: 1412) 924- 8778 Walk-in Client: Filtered Sample (Y/N)
Perform MS / MSD (Y / N) TAT if different from Below Fax: Lab Sampling: 2 weeks Project Name: 1 week Site: Former NAS Brunnick GIVETS Job / SDG No.: 2 days PO# 112608005- WEZI 1 day Sample Type Sample Sample # of (C=Comp, Time Cont. Sample Identification G=Grab) Matrix Sample Specific Notes: TP-PFC-022-TPI TP-PFC-022- TPE PFC-022-MID-CARBON 10/10/17/1745 -PFC-OZZ-TPE-D 0000 Q Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) 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. V Non-Hazard Skin Irritant Poison B Unknown Return to Client \_\_\_ Archive for\_ Flammable Months Special Instructions/QC Requirements & Comments: Custody Seal No. Cooler Temp. ("C): Obs'd: Corr'd: Therm ID No. AK-OZ Custody Seals Intact: No Relinguished by Company: Date/Time: Received by: Date/Time: 0930 Tetra Tech 10/10/17 1730 Relinguished by: Company: Date/Time: Received by: Company 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 Source: TestAmerica Sacramento

List Number: 1

Creator: Aguayo, Alonso

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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
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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", "", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "10.50", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.5", "95.
"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", "1802
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
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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
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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
"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-
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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","","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.50","1.
"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",""
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"TP-PFC-022-TPE-D", "537 (modified)", "RES", "320-32321-4", "TALSAC", "335-76-2", "Perfluorodecanoic acid

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(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", "1802
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
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(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", "", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5", "1.5
"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",""
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"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","LOO","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 320-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-190551/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-19051/2-1905
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
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(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
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- (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", "1802 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", "", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00", "1.00
"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","","1.4.0","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
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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", "1802
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", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", "", "100", ", "100", "", "100", "", "100", "", "100", "100", "", "100", "100", "", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", "100", 
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"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",""
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192039","320-32321-1","10/11/2017 09:30","10/12/2017 13:25",""
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(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", ""
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#### 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:

Action Level
Limit of Quantitation

Concentration (ng/L)

0.627

Action Level
Limit of Quantitation
(LOQ) > or <

Analyte
Perfluorotetradecanoic acid (PFTeA) (1)

TO: J. ORIENT PAGE 2

SDGs: 320-32321-1

(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 rereanalyses 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.

TO: J. ORIENT PAGE 3

SDGs: 320-32321-1

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** 

Michelle J. ah

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-M	IID-CAR	RBON	TP-PFC-022-1	PE		TP-PFC-022-T	PE-D		TP-PFC-022-T	PI		
SDG: 320-32321-1	LAB_ID	320-32321-3 10/10/2017			320-32321-2 10/10/2017			320-32321-4	320-32321-4 10/10/2017			320-32321-1 10/10/2017		
FRACTION: PFAS	SAMP_DATE							10/10/2017						
MEDIA: WATER	QC_TYPE	NM			NM			FD	FD			NM		
	UNITS	NG/L			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	
PENTADECAFLUOROOCT	ANOIC ACID	0.83	J	Р	1.4	J	Р	0.76	J	Р				
PERFLUOROBUTANESUL	FONIC ACID	2	U		1.9	U		1.9	U		61			
PERFLUOROBUTANOIC A	CID	150			130			130			63			
PERFLUORODECANE SUI	FONIC ACID	3	U		2.9	U		2.9	U		2.9	U		
PERFLUORODECANOIC A	CID	0.99	U		0.96	U		0.97	U		1.1	J	Р	
PERFLUORODODECANOI	C ACID	2	U		1.9	U		1.9	U		1.9	U		
PERFLUOROHEPTANESU	LFONIC ACID	2	U		1.9	U		1.9	U		9.3			
PERFLUOROHEPTANOIC	ACID	2	U		1.9	U		1.9	U		82			
PERFLUOROHEXANESUL	FONIC ACID	2	U		1.9	U		1.9	U					
PERFLUOROHEXANOIC A	CID	5.5			8.6			8.3			310			
PERFLUORONONANOIC A	ACID		U		1.9	-		1.9	U		2.7			
PERFLUOROOCTANE SUI	FONAMIDE	2	UR	R	1.9	UR	R	1.9	UR	R	4.6	J	PR	
PERFLUOROOCTANE SUI	FONIC ACID		U		2.9	U		2.9	U					
PERFLUOROPENTANOIC	ACID	63			48			46			180			
PERFLUOROTETRADECA	NOIC ACID	0.99			0.96	U		0.97	U		0.63	U	Α	
PERFLUOROTRIDECANO	C ACID		U		1.9	U		1.9			0.65	J	Р	
PERFLUOROUNDECANOL	C ACID	2	U		1.9	U		1.9	U		1.9	U		

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PROJ_NO: 08005-WE21	NSAMPLE	TP-PFC-022-T	PI-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			
PENTADECAFLUOROOCT	ANOIC ACID	1900					
PERFLUOROBUTANESULI	FONIC ACID						
PERFLUOROBUTANOIC A	CID						
PERFLUORODECANE SUL	FONIC ACID						
PERFLUORODECANOIC A	CID						
PERFLUORODODECANOI	C ACID						
PERFLUOROHEPTANESU	LFONIC ACID						
PERFLUOROHEPTANOIC	ACID						
PERFLUOROHEXANESUL	FONIC ACID						
PERFLUOROHEXANOIC A	CID	360					
PERFLUORONONANOIC A	CID						
PERFLUOROOCTANE SUL	FONAMIDE						
PERFLUOROOCTANE SUL	FONIC ACID	360					
PERFLUOROPENTANOIC	ACID						
PERFLUOROTETRADECA	NOIC ACID						
PERFLUOROTRIDECANOI	C ACID						
PERFLUOROUNDECANOI	C ACID						

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#### APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

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

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

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

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	1802 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

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

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
275 00 4				0.4	9.5	4 4
375-22-4	Perfluorobutanoic acid (PFBA)	67	D	24		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	JD	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	JD	380	19	6.1

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

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	1802 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

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

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	Ū	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	Ū	2.4	1.9	0.84
375-92-8	Perfluoroheptanesulfonic Acid (PFHpS)	1.9	Ū	2.4	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	Ū	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	Ū	39	1.9	0.62

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

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	1802 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

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

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	JМ	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

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

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	1802 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

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

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	Ū	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	Perfluoroctane Sulfonamide (FOSA)	1.9	U	39	1.9	0.62

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

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	1802 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 (μΙ)	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)

Report Date: 31-Oct-2017 09:49:53 Chrom Revision: 2.2 16-Aug-2017 16:24:46

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

First Level Revie	wer: pho	msopha	ıt		Date:	3	1-Oct-2017 09:49:5	2		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.00 > 172.00		1.529	0.010		2110777	6.02		12.0	2621	
2 Perfluorobuty		1.027	0.010		2110777	0.02		12.0	202.	
212.90 > 169.00	,	1.537	0.002	1.000	1401657	3.49			156	
4 Perfluoropen			0.002	1.000	1101007	0.17			100	
262.90 > 219.00		1.737	0.001	1.000	2634452	10.1			1743	
D 3 13C5-PFPe										
267.90 > 223.00		1.737	0.001		1208816	5.36		10.7	5889	
D 47 13C3-PFB										
301.90 > 83.00		1.755	0.002		27294	5.43		11.7	1087	
5 Perfluorobuta	anesulfo	nic acid								
298.90 > 80.00		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 Perfluorohex	anoic ac	cid								
313.00 > 269.00	1.987	1.984	0.002	1.000	4713011	18.7			3455	
D 7 13C2 PFHx	Α									
315.00 > 270.00	1.998	1.984	0.014		1318405	5.44		10.9	5191	
10 Perfluorohe	ptanoic a	acid								
363.00 > 319.00	2.305	2.308	-0.003	1.000	1122499	4.01			1200	
D 913C4-PFHp	Α									
367.00 > 322.00	2.305	2.308	-0.003		1446735	5.94		11.9	6733	
8 Perfluorohex	anesulfo	onic acid								
399.00 > 80.00	2.321	2.318	0.003	1.000	10046871	24.4			6001	
D 11 1802 PFH	xS									
403.00 > 84.00	2.321	2.318	0.003		1884615	6.26		13.2	12144	
* 62 13C2-PFOA	Ą									
415.00 > 370.00	2.644	2.644	0.0		1488440	5.00			5215	

Data File:	\\Chr	omNa\S	acramen	to\Chrom	Data\A8_N\201	71031-4978	4.b\2017.10.30AAA	_020.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooc	tanoic ad	cid								М
413.00 > 369.00		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 PFO	Α									
417.00 > 372.00	2.651	2.644	0.007		1143966	4.79		9.6	5961	
16 Perfluorohe	ptanesu	Ifonic Ac	cid							
449.00 > 80.00	2.658	2.651	0.007	1.000	173401	0.6119			162	
D 18 13C4 PFO										
503.00 > 80.00	3.015	3.014	0.001		1154704	5.45		11.4	5570	
17 Perfluorooc										
499.00 > 80.00		3.014	0.001	1.000	4735298	18.8	4 50/0 00 1 10)		1369	
499.00 > 99.00		3.014	-0.008	0.997	1032848		4.58(0.90-1.10)		1758	
20 Perfluorono			0.001	1 000	27050	0.2102			40.2	
463.00 > 419.00		3.014	0.001	1.000	37958	0.2182			48.3	
D 19 13C5 PFN. 468.00 > 423.00		3.014	0.001		898229	4.45		8.9	4370	
		3.014	0.001		090229	4.43		0.9	4370	
D 21 13C8 FOS. 506.00 > 78.00		3.372	0.0		90550	0.2910		0.6	906	
		3.372	0.0		90550	0.2910		0.0	900	
D 23 13C2 PFD. 515.00 > 470.00		3.372	0.0		697434	3.82		7.6	4211	
24 Perfluorode			0.0		077434	3.02		7.0	7211	
513.00 > 469.00			0.0	1.000	20166	0.1539			69.3	
22 Perfluorooc				1.000	20.00	0.1007			07.0	
498.00 > 78.00			-0.008	1.000	9894	0.5797			134	
29 Perfluorode					707.	0.0.7.				
599.00 > 80.00			0.011	1.000	10503	0.0671			178	
31 Perfluoroun										
563.00 > 519.00			0.002	1.000	14673	0.1230			42.5	
D 30 13C2 PFU	nA									
565.00 > 520.00		3.698	0.002		559134	3.84		7.7	2518	
D 36 13C2 PFD	οA									
615.00 > 570.00		3.989	0.001		660877	3.94		7.9	3342	
37 Perfluorodo	decanoi	c acid								
613.00 > 569.00		3.995	-0.005	1.000	12931	0.1064			51.6	
41 Perfluorotrio	decanoic	acid								
663.00 > 619.00	4.257	4.257	0.0	1.000	17525	0.1283			25.4	
42 Perfluorotet	radecan	oic 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-PFT	eDA									
715.00 > 670.00	4.497	4.488	0.009		982909	4.80		9.6	2362	

ANALYTE	ORIGINAL	DUPLICATE	RL	RPD	RPD > 30%
PENTADECAFLUOROOCTANOIC ACID	1.4	0.76	1.9	59.26	TRUE
PERFLUOROBUTANOIC ACID	130	130	0.96	0.00	FALSE
PERFLUOROHEXANOIC ACID	8.6	8.3	1.9	3.55	FALSE
PERFLUOROPENTANOIC ACID	48	46	1.9	4.26	FALSE

ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2xRL
FALSE	FALSE	FALSE
TRUE	TRUE	FALSE
TRUE	TRUE	FALSE
TRUE	TRUE	FALSE

SDG 320-32321-1 TP-PFC-022-TPE/TP-PFC-022-TPE-D

## TestAmerica Sacramento 880 Riverside Parkuay

Chain of Custody Record 241871

llest	Sà	cr	an	e	nto	,	CA	95	6	0	5
Phone											

TestAmerica Laboratories, Inc.

1 Marie. 220, 272. 2000 1 GK.	Regul	atory Pro	gram:	DW [	NPDES		RCRA		Other:											TAL	-8210 (0713)
Client Contact	Project Ma	anager:	SEFFC	vien		Site	Conta	ict: V	2vi n	1	rost	D	ate: \	0/10	120	VI		1	COC No: 24	1871	
Company Name: Tetry Tech			121-85			Lab	Conta			AN	tuck	4- C	arrier:	Fe	JE	*				COC	S
Address: Gol Anderson Dr.			urnaround	Time		T	1							T		T			Sampler:		
City/State/Zip: P. Hobos PA 15226	CALEN	DAR DAYS	☐ wor	RKING DAY	S		35		1						11			1	For Lab Use On	ly:	
Phone: 1412) 921-8778	TA	if different fr	om Below			2	2	1				1	1	1		1	1	1	Walk-in Client:		
Fax:	V	2	2 weeks					1			1 1		1 1		1 1		1		Lab Sampling:		
Project Name:		1	week			515	- 3					1					40.0				
Site: Former NAS Brussick GUETS		2	2 days			le (	1		1								1		Job / SDG No.:		
PO# 112G08005-WEZI		1	l day			d o	F-11 L3+)		1												
			Sample			Sa	1 1			1		- 1					1	1			
	Sample	Sample	Type (C=Comp,		# of	Sec 2	3			1								1 1			
Sample Identification	Date	Time	G=Grab)	Matrix	Cont.	Filtered Sample (Y/N)	PEL			1									Sample S	pecific No	ites:
TP-PFC-072-TPI	lokola	1240	G	W	4	M	V7				1							П			
TP-PFC-022- TPE	10/10/17	1250	G	w	4	W	VT				1	V	24								
TP-PFC-012-MID-CARBON	wholn		6	W	4	NA	17					1									
	whole		G	10	4	4						1			$\top$						
PP-PFC-022-TPE-D	MAL	acco	01	-	7	H	12	-	++	-	1	-	1		++	+	+	-			
									+	1111111	111111111				11111111						
763									I						Ш						
0						+	+	-	+	Ш				Ш	Ш						
				-			$\pm$		1												
764						+	+-	-	+	320-3	32321	Cha	n of C	ustody	1541 1441						
						H	1	+	+ 1	1	1	1	1 1	1	LVI	1	1	1 1			
					-	+	+	-		-	-		-	-	-		+		-		-
					_	H	+	+	+	+	-	-	+	+	$\vdash$	1	+	-			
				-												-	1				
			-			11	1			-	-		-	+	+	-	1				
Preservation Used: 1= Ice, 2= HCI; 3= H2SO4; 4=HNO3	5=NaOH;	6= Other				1		54 6										1			
Possible Hazard Identification:						5	Sampl	e Disp	osal	( A fe	e may	be a	ssess	ed if s	ample	s are	reta	ined	longer than 1 m	nonth)	
Are any samples from a listed EPA Hazardous Waste? Plea Comments Section if the lab is to dispose of the sample.	se List any I	EPA Waste	e Codes for	the sam	ple in th	е															
Non-Hazard Flammable Skin Irritant	Poisor	n В	Unkr	nown			□ R	eturn to	Client		Ī	Disp	osal by I	ab		Arc	chive f	or	Months		
Special Instructions/QC Requirements & Comments:											15-1						110				
								- 10		-	700	01 1			<u> </u>					-	
Custody Seals Intact: Yes No	Custody S			In.		-	7		oler	Temp.	( C):	Obs'	1. 2.		Corr'c	1;	_	_		+ K-02	
Relinquished by:	Company:			Date/T			Receiv	ed by:		2.3	7			Comp	any:	~			Date/Time:	093	20
Relinguished by:	Company:			Date/T	17 17		Receiv		VY	200					•	>	-		10/11/17 Date/Time:	01	
remindulated by,	Company.			Date	mile.	1	receiv	ou by.						Comp	arry.				Date/Title:		
Relinquished by:	Company			Date/T	ime:	F	Receiv	ed in L	abora	atory t	by:			Comp	any:				Date/Time:		

## **Login Sample Receipt Checklist**

Client: Tetra Tech, Inc.

Job Number: 320-32321-1

Login Number: 32321 List Source: TestAmerica Sacramento

List Number: 1

Creator: Aguayo, Alonso

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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 2.9° 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.

## **Definitions/Glossary**

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32321-1

Project/Site: TT: PFAS, Brunswick, Discharge

## 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

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

TestAmerica Job ID: 320-32321-1

## **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
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SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	3C3-PFB:#	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-CAR BON	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 = 1802 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFNA = 13C5 PFNA	25-150

 $\ensuremath{\text{\#}}$  Column to be used to flag recovery values

FORM II 537 (modified)

# FORM II LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento	321	-	1	
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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-CAR BON	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

 $\ensuremath{\text{\#}}$  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:

		LAB	
CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALYZED
	LCS 320-190551/2-A	2017.10.30A	10/31/2017 02:18
		AA 018.d	
	LCSD 320-190551/3-A	2017.10.30A	10/31/2017 02:25
		AA 019.d	
TP-PFC-022-TPI DL	320-32321-1 DL	2017.10.30A	10/31/2017 02:32
		AA 020.d	
TP-PFC-022-TPE	320-32321-2	2017.10.30A	10/31/2017 02:39
		AA 021.d	
TP-PFC-022-MID-CARBON	320-32321-3	2017.10.30A	10/31/2017 02:46
		AA 022.d	
TP-PFC-022-TPE-D	320-32321-4	2017.10.30A	10/31/2017 02:52
		AA 023.d	
TP-PFC-022-TPI	320-32321-1	2017.10.30A	10/31/2017 04:01
		AA_033.d	

Lab Name: TestAmerica Sacramento	JOD 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 Ratch No • 192039	IInite: ng/I

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

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	1802 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	e: TestAmerica Sacr	amento	Job No.: 3	320-32321-1
SDG No.	:			
Matrix:	Water	Level: Low	Lab File I	D: 2017.10.30AAA_018.d
Lab ID:	LCS 320-190551/2-A		Client ID:	

	SPIKE	LCS	LCS	QC	
	ADDED	CONCENTRATION	용	LIMITS	#
COMPOUND	(ng/L)	(ng/L)	REC	REC	
Perfluorobutanoic acid (PFBA)	40.0	43.6	109	89-128	
Perfluoropentanoic acid	40.0	41.1	103	66-136	
(PFPeA)					
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	40.0	38.8	97	73-122	
(PFUnA) Perfluorododecanoic acid	40.0	41.8	104	82-122	
(PFDoA)	40.0	41.0	104	02-122	
Perfluorotridecanoic Acid	40.0	46.2	115	56-163	
(PFTriA)					
Perfluorotetradecanoic acid	40.0	40.8	102	66-120	
(PFTeA)					
Perfluorobutanesulfonic acid	35.4	37.6	106	88-130	
(PFBS)					
Perfluorohexanesulfonic acid	36.4	37.8	104	87-126	
(PFHxS) Perfluoroheptanesulfonic Acid	38.1	42.5	110	92-135	
(PFHpS)	38.1	42.5	112	92-135	
Perfluorooctanesulfonic acid	37.1	37.6	101	83-126	
(PFOS)	37.1	37.0	101	03 120	
Perfluorodecanesulfonic acid	38.6	38.0	98	80-129	
(PFDS)					
Perfluorooctane Sulfonamide	40.0	40.7	102	91-133	
(FOSA)					
13C8 FOSA	100	48.3	48		
13C4 PFBA	100	111	111	l	
13C2 PFHxA	100	110	110	25-150	
13C4 PFOA	100	113	113	l	
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	
1802 PFHxS	94.6	106	112		
13C4 PFOS	95.6	104	109		
13C2-PFTeDA	100	107	107		
13C4-PFHpA	100	118	118		
13C5 PFPeA	100	109	109		
13C3-PFBS	93.0	102	110		
1000 1100	33.0	102			

<sup>#</sup> 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 Sacr	amento	Job No.: 320-32321-1
SDG No.:			
Matrix: V	Nater	Level: Low	Lab File ID: 2017.10.30AAA_019.d
Lab ID: I	LCSD 320-190551/3-	 A	Client ID:

	SPIKE ADDED	LCSD CONCENTRATION	LCSD	olc .	QC L1	IMITS	#
COMPOUND	(ng/L)	(ng/L)	REC	RPD	RPD	REC	"
Perfluorobutanoic acid (PFBA)	40.0	43.9	110	1	30	89-128	
Perfluoropentanoic acid	40.0	40.8	102	1	30	66-136	
(PFPeA)							
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	40.0	39.5	99	2	30	73-122	
(PFUnA)							
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	38.6	39.8	103	5	30	80-129	
(PFDS) 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	104	104			25-150	
13C4 FFOA 13C5 PFNA	100	100	100			25-150	
13C2 PFDA	100	112	112			25-150	
13C2 PFDA 13C2 PFUnA	100	101	101	l 1		25-150	
13C2 PFUNA 13C2 PFDOA	100	96.9	97	l 1			I
						25-150 25-150	
1802 PFHxS	94.6	104	110			25-150	
13C4 PFOS	95.6	96.3	101				
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	

<sup>#</sup> 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_	GeminiC18 3x100 3(mm)
IC 320-191992/4		10/30/2017 18:06	1	003.d 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)

## 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 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					CF						COEFFICIENT # MIN CF				# MIN R^2
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2			%RS	D OR COD	OR COD				
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			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					
1802 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	7		CURVE					MIN CF	%RSD	#	MAX R^2 # MIN R^2
	LVL 1	LVL 2	LVL 3	LVL 4	TYPE	В	M1	M2					%RSD OR COD OR COD
	LVL 5	LVL 6	LVL 7										
d5-NEtFOSAA	92322	91775	90115	80691	Ave		83981.6057				10.2		50.0
	86792	75965	70212										
13C2 PFUnA	154125	157265	155792	144359	Ave		145752.240				8.5		50.0
	150589	133581	124554										
d-N-MeFOSA-M	89055	89086	91517	84265	Ave		90599.4429				4.3		50.0
	95610	89734	94929										
13C2 PFDoA	171903	171388	178894	163730	Ave		167891.409				5.1		50.0
	173314	162739	153273										
d-N-EtFOSA-M	85399	84840	85727	79791	Ave		86831.1857				5.0		50.0
	92065	88170	91826										
13C2-PFTeDA	212525	213382	213836	199780	Ave		204610.654				5.3		50.0
	211748	189599	191404										
13C2-PFHxDA	316335	315575	321643	285897	Ave		306397.771				5.2		50.0
	321624	294845	288866										

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.:

ANALYTE			RRF			CURVE		COEFFICIE	NT	# MIN RRF	%RSD	1 "	MAX	R^2	#	MIN R^2
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	TYPE -	В	M1	M2				&RSD	OR COD		OR COD
Perfluorobutanoic acid (PFBA)	1.0179	0.9710	1.0228	1.0067	0.9166	AveID		0.9522			9.9		35.0			
Perfluoropentanoic acid (PFPeA)	1.3078 0.9453	1.1531	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		1.2202	1.1994	1.2442	AveID		1.2149			2.4		35.0			
Perfluorohexanoic acid (PFHxA)	1.0535 0.9048		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		1.2548	1.2100	1.2264	AveID		1.2452			3.2		35.0			
Perfluorooctanoic acid (PFOA)	1.2601			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	1.0618	1.0219	1.0626	AveID		1.0401			3.2		35.0			
Perfluorononanoic acid (PFNA)	1.0866 0.9130	1.0034	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		1.1388	1.0814	1.1138	AveID		1.1123			2.7		35.0			
Perfluorodecanoic acid (PFDA)	1.0481		0.9579	0.9349	0.9452	AveID		0.9393			7.3		35.0			
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	1.0493	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		1.0643	1.0261	1.0353	AveID		1.0671			9.5		35.0			
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	0.8302	0.8007	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

ANALYTE			RRF			CURVE				#	MIN RRF	%RSD	#	MAX	R^2	 MIN R^2
	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M2					%RSD	OR COD	OR COD
	LVL 6	LVL 7														
MeFOSA	0.9077		0.9020	0.8866	0.8774	AveID		0.8921				2.7		35.0		
De Classical de la constant de CDED 2		0.8473		0 0100	0 0400	3 - TD		0.0105				F 4		25.0		
Perfluorododecanoic acid (PFDoA)	0.9797 0.8959		0.9211	0.9103	0.9498	Avein		0.9195				5.4		35.0		
N-EtFOSA-M	0.9658			0.9320	0.9125	AveID		0.9298				3.1		35.0		
	0.9276															
Perfluorotridecanoic Acid (PFTriA)	1.1377			1.0092	1.0927	AveID		1.0333				7.0		50.0		
Perfluorotetradecanoic acid (PFTeA)	0.2420			0.2115	0.2212	AveID		0.2223				4.8		50.0		
	0.2277	0.2100														
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	1.3010	0.9673	0.9210	0.8877	L2ID	0.4413	0.8642							0.9980	0.9900
	0.8086	+++++														
Perfluoro-n-octadecanoic acid (PFODA)	1.1230	1.0058	0.9977	0.9816	0.9217	AveID		0.9506				12.5		50.0		
	0.8809	0.7433														

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

## 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 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			RESPONSE				CONCEN	NTRATION (N	ATION (NG/ML)				
	TYPE	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			
1802 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			
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			
d5-NEtFOSAA	Ave	4616095 3798242	4588738 3510602	4505726	4034536	4339623	50.0 50.0	50.0 50.0	50.0	50.0	50.0			

## LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A8\_N

GC Column: GeminiC18 3 ID: 3(mm)

Calibration Start Date: 10/30/2017 17:59

Calibration End Date: 10/30/2017 18:47

Calibration ID: 35592

	ANALYTE CURVE				RESPONSE		CONCENTRATION (NG/ML)							
		TYPE	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

# 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 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 CURV			RESPONSE				CONCEN	TRATION (N	G/ML)	
	REF TYP	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)	Avel	D 181930 26228900	351349 ++++	1845411	6872498	16852992	0.500	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	Avel	D 150164 20413300	268577 32740106	1327357	4966682	12771661	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	Avel	D 177995 25688097	339771 ++++	1805379	6535299	16549064	0.442 88.4	0.884	4.42	17.7	44.2
4:2 FTS	Avel	D 39150 7574658	83727 14040224	409149	1524770	4321214	0.467 93.4	0.934 187	4.67	18.7	46.7
Perfluorohexanoic acid (PFHxA)	Avel	D 130877 20561075	245774 33523091	1302471	4796137	12269212	0.500	1.00	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	Avel	D 138618 20248813	253519 32847152	1361815	4869377	12433273	0.500	1.00	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	Avel	D +++++ 25548500	332754 42243112	1556248	5700596	15184106	+++++ 91.0	0.910 182	4.55	18.2	45.5
6:2FTS	Avel	D 45012 7770479	85870 14294286	427077	1561284	4323097	0.474 94.8	0.948	4.74	19.0	47.4
Perfluorooctanoic acid (PFOA)	Avel	D 156326 22026634	312091 36125926	1358217	4990434	12964935	0.500	1.00	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	Avel	D 132244 20944569	261088 34435082	1307067	4839750	12616457	0.476 95.2	0.952 190	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	Avel	D 111053 19258573	208901 36170703	1078764	3889485	10938097	0.464 92.8	0.928 186	4.64	18.6	46.4
Perfluorononanoic acid (PFNA)	Avel	D 112564 17641757	212119 30714706	1052198	3822275	10166844	0.500 100	1.00 200	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)	Avel	D 170696 25353469	319607 40961582	1655149	5989035	15657067	0.500 100	1.00 200	5.00	20.0	50.0
8:2FTS	Avel	D 41639 7224840	77968 13205694	431491	1455859	4041494	0.479 95.8	0.958 192	4.79	19.2	47.9
Perfluorodecanoic acid (PFDA)	Avel	D 97971 15755129	186086 27033900	910996	3286997	9112657	0.500	1.00	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.:

Heated Purge: (Y/N) N GC Column: GeminiC18 3 ID: 3 (mm) Instrument ID: A8 N

Calibration Start Date: 10/30/2017 17:59 Calibration End Date: 10/30/2017 18:47 Calibration ID: 35592

ANALYTE	IS	CURVE			RESPONSE				CONCEN	NTRATION (N	IG/ML)	
	REF	TYPE	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	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

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

SDG No.:

Lab Sample ID: <u>ICV 320-191992/12</u> Calibration Date: <u>10/30/2017 19:01</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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	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
1802 PFHxS	Ave	300958	284601		44.7	47.3	-5.4	50.0

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

SDG No.:

Lab Sample ID: <u>ICV 320-191992/12</u> Calibration Date: <u>10/30/2017 19:01</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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	LAB FILE ID	COLUMN ID
			FACTOR		
CCV 320-192039/1		10/31/2017 01:57	1	2017.10.30AAA_0 16.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_0 17.d	GeminiC18 3x100 3 (mm)
LCS 320-190551/2-A		10/31/2017 02:18	1	2017.10.30AAA_0 18.d	GeminiC18 3x100 3 (mm)
LCSD 320-190551/3-A		10/31/2017 02:25	1	18.d 2017.10.30AAA_0 19.d 2017.10.30AAA_0	GeminiC18 3x100 3 (mm)
320-32321-1 DL		10/31/2017 02:32	10	L 20.d	GeminiC18 3x100 3 (mm)
320-32321-2		10/31/2017 02:39	1	2017.10.30AAA_0 21.d 2017.10.30AAA_0	GeminiC18 3x100 3(mm)
320-32321-3		10/31/2017 02:46	1	22.d	GeminiC18 3x100 3 (mm)
320-32321-4		10/31/2017 02:52	1	2017.10.30AAA_0 23.d	GeminiC18 3x100 3(mm)
CCV 320-192039/12		10/31/2017 03:13	1	2017.10.30AAA_0 26.d	GeminiC18 3x100 3(mm)
CCV 320-192039/18		10/31/2017 03:55	1	2017.10.30AAA_0 32.d	GeminiC18 3x100 3 (mm)
320-32321-1		10/31/2017 04:01	1	2017.10.30AAA_0 33.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_0 39.d	GeminiC18 3x100 3(mm)

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  $3 \times 100$  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
1802 PFHxS	Ave	300958	313834		49.3	47.3	4.3	50.0

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  $3 \times 100$  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

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  $3 \times 100$  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
1802 PFHxS	Ave	300958	317495		49.9	47.3	5.5	50.0

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/12</u> Calibration Date: <u>10/31/2017</u> 03:13

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/18</u> Calibration Date: <u>10/31/2017 03:55</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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
1802 PFHxS	Ave	300958	331577	<u> </u>	52.1	47.3	10.2	50.0

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/18</u> Calibration Date: <u>10/31/2017 03:55</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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

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

SDG No.:

Lab Sample ID: <u>CCV 320-192039/25</u> Calibration Date: <u>10/31/2017 04:43</u>

Instrument ID: A8\_N Calib Start Date: 10/30/2017 17:59

GC Column: GeminiC18  $3 \times 100$  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
1802 PFHxS	Ave	300958	332065		52.2	47.3	10.3	50.0

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  $3 \times 100$  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)	Т	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)	Т	285.12 g	25.93 g	259.2 mL	0.50 mL	500 uL	100 uL
320-32321-A-3	TP-PFC-022-MID-C ARBON	3535, 537 (modified)	Т	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)	Т	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		3535, 537		500 uL			
320-190551/2		(modified)					
LCSD		3535, 537		500 uL			
320-190551/3		(modified)					
320-32321-A-1	TP-PFC-022-TPI	3535 <b>,</b> 537	T				
		(modified)					
320-32321-A-2	TP-PFC-022-TPE	3535, 537	T				
		(modified)					
320-32321-A-3	TP-PFC-022-MID-C	3535, 537	T				
	ARBON	(modified)					
320-32321-A-4	TP-PFC-022-TPE-D	3535, 537	T				
		(modified)					

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.

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

	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	АВН
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
Т	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