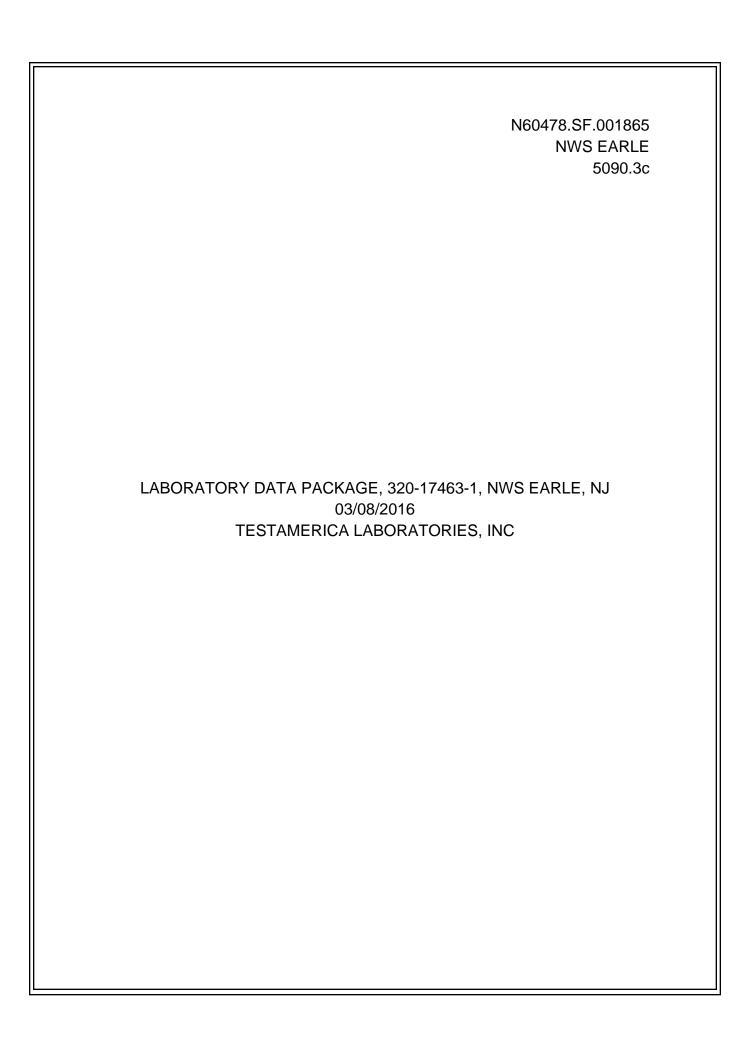


Off-Base Drinking Water Sample Results,
Combined Level 2 and Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Figure, SDG 320-17463-1

Naval Weapons Station Earle Colts Neck, New Jersey

July 2019





ANALYTICAL REPORT

Job Number: 320-17463-1

Job Description: Ensafe--NWS-Earle, NJ PFCs Potable Water

For: Earth Toxics, Inc PO BOX 3382 Logan, UT 84321

Attention: Mike Dryden

Approved for release Michelle A Johnston Project Manager II 3/8/2016 1:31 PM

Michelle A Johnston, Project Manager II 4955 Yarrow Street, Arvada, CO, 80002 (303)736-0110 michelle.johnston@testamericainc.com 03/08/2016

Michelle A. Johns

Ms. Tina Cantwell
Ms. Nicole Loos
Ms. Jennifer O'Keefe

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway, West Sacramento, CA 95605 Tel (916) 373-5600 Fax (916) 372-1059 www.testamericainc.com



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Definitions/Glossary

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Qualifiers

LCMS

Qualifier	Qualifier Description
В	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

CASE NARRATIVE

Client: Earth Toxics, Inc.

Project: Ensafe--NWS-Earle, NJ PFCs Potable Water Report Number: 320-17463-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Sample Receipt

The samples were received on 2/27/2016 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6°C.

The chain of custody does not indicate a requested analysis for sample DUP_022616 (320-17463-8). The laboratory has logged the sample for PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFBS per predetermined scope of work and will proceed unless instructed otherwise. The client was notified on 2/29/2016.

No other anomalies were encountered during sample receipt.

Perfluorinated Hydrocarbons (PFCs)

Samples BC_02_26_16 (320-17463-1), DW-18 (320-17463-2), DW-18FB (320-17463-3), DW-78 (320-17463-4), DW-78FB (320-17463-5), DW-100 (320-17463-6), DW-100FB (320-17463-7) and DUP_022616 (320-17463-8) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with WS-LC-0025. The samples were prepared on 03/02/2016 and analyzed on 03/03/2016.

Reporting limits and method detection limits have been adjusted accordingly for the initial volumes extracted.

Perfluorobutanesulfonic acid (PFBS) was detected in method blank MB 320-102166/1-A at a level that was less than the reporting limit. The value should be considered an estimate, and has been flagged "J" in accordance with the DOD QSM. As the associated samples do not contain any detectable concentrations for PFBS greater than the LOD, corrective action is deemed unnecessary. If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged.

MS/MSD analyses for prep batch 320-102166 were not requested.

The level 1 standard from the ICAL (ICV 320-102384/10) is used to evaluate the tune criteria. The instrument mass windows are set at +/ -0.5 amu. Detection of the analyte serves as verification that the assigned mass is within +/-0.5 amu of the true value, which meets the DOD tune criterion.

Levels six and seven of the calibration curve for PFOA were dropped due to 13C4-PFOA exceeding the %Drift criteria for these points. As a result, PFOA in the Initial Calibration Verification (ICV 320-102384/10) is spiked at the highest level in the calibration curve and was detected marginally above the calibration range. PFOA met recovery criteria in the ICV; therefore, there is no impact on the data.

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

Detection Summary

Client: Earth Toxics, Inc.

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: BC 02 26 16 Lab Sample ID: 320-17463-1 Analyte Result Qualifier LOQ LOD DL Unit Dil Fac D Method Prep Type 1.4 JB 2.1 1.7 0.79 ng/L 1 WS-LC-0025 Total/NA Perfluorobutanesulfonic acid (PFBS) 0.64 J WS-LC-0025 Perfluorononanoic acid 2.1 1.7 0.56 ng/L 1 Total/NA (PFNA) Client Sample ID: DW-18 Lab Sample ID: 320-17463-2 Analyte Result Qualifier LOQ LOD DL Unit Dil Fac D Method Prep Type 1.2 JB 2.2 1.8 0.82 ng/L WS-LC-0025 Total/NA Perfluorobutanesulfonic acid (PFBS) Client Sample ID: DW-18FB Lab Sample ID: 320-17463-3 Analyte **Result Qualifier** LOQ LOD DL Unit Dil Fac D Method Prep Type 2.3 1.8 WS-LC-0025 1.3 JB 0.83 na/L Total/NA Perfluorobutanesulfonic acid (PFBS) Client Sample ID: DW-78 Lab Sample ID: 320-17463-4 **Analyte** Result Qualifier LOQ LOD **DL** Unit Dil Fac D Method Prep Type Perfluorobutanesulfonic 1.3 JB 2.4 1.9 0.88 ng/L WS-LC-0025 Total/NA acid (PFBS) Client Sample ID: DW-78FB Lab Sample ID: 320-17463-5 LOQ **Analyte** Result Qualifier LOD DL Unit Dil Fac D Method Prep Type 1.2 JB 2.2 0.80 na/L WS-LC-0025 Total/NA Perfluorobutanesulfonic 1.7 acid (PFBS) Lab Sample ID: 320-17463-6 Client Sample ID: DW-100 **Analyte** Result Qualifier LOQ LOD **DL** Unit Dil Fac D Method Prep Type 1.0 JB 2.5 2.0 0.90 ng/L 1 WS-LC-0025 Total/NA Perfluorobutanesulfonic acid (PFBS) Client Sample ID: DW-100FB Lab Sample ID: 320-17463-7 Analyte Result Qualifier LOQ LOD DL Unit Dil Fac D Method Prep Type 2.3 1.3 JB 1.9 WS-LC-0025 Total/NA Perfluorobutanesulfonic 0.86 ng/L acid (PFBS) 0.63 J 2.3 1.9 0.61 ng/L 1 WS-LC-0025 Total/NA Perfluorononanoic acid (PFNA) Lab Sample ID: 320-17463-8 Client Sample ID: DUP 022616 Analyte **Result Qualifier** LOQ LOD DL Unit Dil Fac D Method **Prep Type** 1.1 JB 2.4 1.9 1 WS-LC-0025 0.88 ng/L Total/NA Perfluorobutanesulfonic acid (PFBS)

This Detection Summary does not include radiochemical test results.

TestAmerica Job ID: 320-17463-1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Date Collected: 02/26/16 13:50 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Resi	ult	Qualifier	L	.OQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)) 1	.4	JB		2.1	1.7	0.79	ng/L	_	03/03/16 20:54	1
Perfluoroheptanoic acid (PFHpA)	1	.7	U		2.1	1.7	0.69	ng/L		03/03/16 20:54	1
Perfluorohexanesulfonic acid (PFHxS)	1	.7	U		2.1	1.7	0.75	ng/L		03/03/16 20:54	1
Perfluorononanoic acid (PFNA)	0.0	64	J		2.1	1.7	0.56	ng/L		03/03/16 20:54	1
Perfluorooctanesulfonic acid (PFOS)	2	2.6	U		3.4	2.6	1.1	ng/L		03/03/16 20:54	1
Perfluorooctanoic acid (PFOA)	1	.7	U		2.1	1.7	0.64	ng/L		03/03/16 20:54	1
Isotope Dilution	%Recovery	Qua	alifier	Limits				Prepared		Analyzed	Dil Fac
13C2 PFHxA	103			25 - 150	_			03/02/16 12:0	14	03/03/16 20:54	1
13C4 PFOA	107			25 - 150				03/02/16 12:0	14	03/03/16 20:54	1
13C4 PFOS	97			25 - 150				03/02/16 12:0	14	03/03/16 20:54	1
13C4-PFHpA	110			25 - 150				03/02/16 12:0	14	03/03/16 20:54	1
13C5 PFNA	109			25 - 150				03/02/16 12:0	14	03/03/16 20:54	1
1802 PFHxS	99			25 - 150				03/02/16 12:0)4	03/03/16 20:54	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-18 Lab Sample ID: 320-17463-2

Date Collected: 02/26/16 13:50 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Res	ult	Qualifier	L	.OQ	LO	D	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	-	1.2	JB		2.2	1.	8	0.82	ng/L	_	03/03/16 21:15	1
Perfluoroheptanoic acid (PFHpA)	•	1.8	U		2.2	1.	8	0.72	ng/L		03/03/16 21:15	1
Perfluorohexanesulfonic acid (PFHxS)	•	1.8	U		2.2	1.	8	0.78	ng/L		03/03/16 21:15	1
Perfluorononanoic acid (PFNA)		1.8	U		2.2	1.	8	0.59	ng/L		03/03/16 21:15	1
Perfluorooctanesulfonic acid (PFOS)	2	2.7	U		3.6	2.	7	1.1	ng/L		03/03/16 21:15	1
Perfluorooctanoic acid (PFOA)		1.8	U		2.2	1.	8	0.67	ng/L		03/03/16 21:15	1
Isotope Dilution	%Recovery	Qι	ıalifier	Limits					Prepared		Analyzed	Dil Fac
13C2 PFHxA	87			25 - 150	=				03/02/16 12:0)5	03/03/16 21:15	1
13C4 PFOA	79			25 - 150					03/02/16 12:0)5	03/03/16 21:15	1
13C4 PFOS	92			25 - 150					03/02/16 12:0)5	03/03/16 21:15	1
13C4-PFHpA	84			25 - 150					03/02/16 12:0)5	03/03/16 21:15	1
13C5 PFNA	88			25 - 150					03/02/16 12:0)5	03/03/16 21:15	1
1802 PFHxS	111			25 - 150					03/02/16 12:0)5	03/03/16 21:15	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-18FB Lab Sample ID: 320-17463-3

Date Collected: 02/26/16 13:20 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Res	ult	Qualifier	L	.OQ	LOD) DL	. Uni	t D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1	1.3	JB	_	2.3	1.8	0.83	ng/L		03/03/16 21:36	1
Perfluoroheptanoic acid (PFHpA)	•	1.8	U		2.3	1.8	0.73	ng/L	-	03/03/16 21:36	1
Perfluorohexanesulfonic acid (PFHxS)	•	1.8	U		2.3	1.8	0.79	ng/L	-	03/03/16 21:36	1
Perfluorononanoic acid (PFNA)		1.8	U		2.3	1.8	0.59	ng/L		03/03/16 21:36	1
Perfluorooctanesulfonic acid (PFOS)	2	2.7	U		3.6	2.7	7 1.2	ng/L	-	03/03/16 21:36	1
Perfluorooctanoic acid (PFOA)	•	1.8	U		2.3	1.8	0.68	ng/L	=	03/03/16 21:36	1
Isotope Dilution	%Recovery	Qu	ıalifier	Limits					Prepared	Analyzed	Dil Fac
13C2 PFHxA	108			25 - 150	=			03	3/02/16 12:05	03/03/16 21:36	1
13C4 PFOA	103			25 - 150				03	3/02/16 12:05	03/03/16 21:36	1
13C4 PFOS	94			25 - 150				03	3/02/16 12:05	03/03/16 21:36	1
13C4-PFHpA	105			25 - 150				03	3/02/16 12:05	03/03/16 21:36	1
13C5 PFNA	107			25 - 150				03	3/02/16 12:05	03/03/16 21:36	1
1802 PFHxS	104			25 - 150				03	3/02/16 12:05	03/03/16 21:36	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-78 Lab Sample ID: 320-17463-4

Date Collected: 02/26/16 11:50 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Resu	lt Qualifier	LO	Q	LOD	DL	Unit [D Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.	3 JB	2	4	1.9	0.88	ng/L	03/03/16 21:58	1
Perfluoroheptanoic acid (PFHpA)	1.	9 U	2	.4	1.9	0.77	ng/L	03/03/16 21:58	1
Perfluorohexanesulfonic acid (PFHxS)	1.	9 U	2	.4	1.9	0.84	ng/L	03/03/16 21:58	1
Perfluorononanoic acid (PFNA)	1.	9 U	2	.4	1.9	0.63	ng/L	03/03/16 21:58	1
Perfluorooctanesulfonic acid (PFOS)	2.	9 U	3	8.8	2.9	1.2	ng/L	03/03/16 21:58	1
Perfluorooctanoic acid (PFOA)	1.	9 U	2	.4	1.9	0.72	ng/L	03/03/16 21:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	87		25 - 150				03/02/16 12:0	5 03/03/16 21:58	1
13C4 PFOA	76		25 - 150				03/02/16 12:0	5 03/03/16 21:58	1
13C4 PFOS	91		25 - 150				03/02/16 12:0	5 03/03/16 21:58	1
13C4-PFHpA	87		25 - 150				03/02/16 12:0	5 03/03/16 21:58	1
13C5 PFNA	68		25 - 150				03/02/16 12:0	5 03/03/16 21:58	1
18O2 PFHxS	109		25 - 150				02/02/16 12:0	5 03/03/16 21:58	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-78FB Lab Sample ID: 320-17463-5

Date Collected: 02/26/16 11:40 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Res	ult	Qualifier	L	OQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)) 1	.2	J B		2.2	1.7	0.80	ng/L		03/03/16 22:19	1
Perfluoroheptanoic acid (PFHpA)	•	1.7	U		2.2	1.7	0.70	ng/L		03/03/16 22:19	1
Perfluorohexanesulfonic acid (PFHxS)	•	1.7	U		2.2	1.7	0.76	ng/L		03/03/16 22:19	1
Perfluorononanoic acid (PFNA)		1.7	U		2.2	1.7	0.57	ng/L		03/03/16 22:19	1
Perfluorooctanesulfonic acid (PFOS)	2	2.6	U		3.5	2.6	1.1	ng/L		03/03/16 22:19	1
Perfluorooctanoic acid (PFOA)	•	1.7	U		2.2	1.7	0.65	ng/L		03/03/16 22:19	1
Isotope Dilution	%Recovery	Qua	alifier	Limits				Prepared		Analyzed	Dil Fac
13C2 PFHxA	101			25 - 150				03/02/16 12:0	5	03/03/16 22:19	1
13C4 PFOA	109			25 - 150				03/02/16 12:0	5	03/03/16 22:19	1
13C4 PFOS	91			25 - 150				03/02/16 12:0	5	03/03/16 22:19	1
13C4-PFHpA	107			25 - 150				03/02/16 12:0	5	03/03/16 22:19	1
								00/00/40 40 0	. –		
13C5 PFNA	110			25 - 150				03/02/16 12:0	15	03/03/16 22:19	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-100 Lab Sample ID: 320-17463-6

Date Collected: 02/26/16 12:35

Date Received: 02/27/16 09:00

Matrix: Water

Analyte	Res	ult	Qualifier	L	_OQ	LOD) [L	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<u> </u>	1.0	J B		2.5	2.0	0.0	90	ng/L	_	03/03/16 22:40	1
Perfluoroheptanoic acid (PFHpA)	:	2.0	U		2.5	2.0	0.7	79	ng/L		03/03/16 22:40	1
Perfluorohexanesulfonic acid (PFHxS)	:	2.0	U		2.5	2.0	0.8	35	ng/L		03/03/16 22:40	1
Perfluorononanoic acid (PFNA)	2	2.0	U		2.5	2.0	0.6	34	ng/L		03/03/16 22:40	1
Perfluorooctanesulfonic acid (PFOS)	2	2.9	U		3.9	2.9	9 1	.3	ng/L		03/03/16 22:40	1
Perfluorooctanoic acid (PFOA)	2	2.0	U		2.5	2.0	0.7	73	ng/L		03/03/16 22:40	1
Isotope Dilution	%Recovery	Qu	ıalifier	Limits					Prepared		Analyzed	Dil Fac
13C2 PFHxA	85			25 - 150	_				03/02/16 12:0)5	03/03/16 22:40	1
13C4 PFOA	70			25 - 150					03/02/16 12:0)5	03/03/16 22:40	1
13C4 PFOS	112			25 - 150					03/02/16 12:0)5	03/03/16 22:40	1
13C4-PFHpA	87			25 - 150					03/02/16 12:0)5	03/03/16 22:40	1
13C5 PFNA	59			25 - 150					03/02/16 12:0)5	03/03/16 22:40	1
18O2 PFHxS	110			25 - 150					03/02/16 12:0)5	03/03/16 22:40	1

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DW-100FB Lab Sample ID: 320-17463-7

Date Collected: 02/26/16 12:30 Matrix: Water

Date Received: 02/27/16 09:00

Analyte	Resu	lt Qualifier	LO	OQ	LOD	DL	Unit D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1	3 JB		2.3	1.9	0.86	ng/L	03/03/16 23:01	1
Perfluoroheptanoic acid (PFHpA)	1	9 U	;	2.3	1.9	0.75	ng/L	03/03/16 23:01	1
Perfluorohexanesulfonic acid (PFHxS)	1	9 U	;	2.3	1.9	0.81	ng/L	03/03/16 23:01	1
Perfluorononanoic acid (PFNA)	0.6	3 J		2.3	1.9	0.61	ng/L	03/03/16 23:01	1
Perfluorooctanesulfonic acid (PFOS)	2	8 U	;	3.7	2.8	1.2	ng/L	03/03/16 23:01	1
Perfluorooctanoic acid (PFOA)	1	9 U	:	2.3	1.9	0.70	ng/L	03/03/16 23:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	107		25 - 150				03/02/16 12:05	03/03/16 23:01	1
13C4 PFOA	107		25 - 150				03/02/16 12:05	03/03/16 23:01	1
13C4 PFOS	124		25 - 150				03/02/16 12:05	03/03/16 23:01	1
13C4-PFHpA	109		25 - 150				03/02/16 12:05	03/03/16 23:01	1
13C5 PFNA	107		25 - 150				03/02/16 12:05	03/03/16 23:01	1
			25 ₋ 150				03/02/16 12:05	03/03/16 23:01	

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: DUP_022616 Lab Sample ID: 320-17463-8

Date Collected: 02/26/16 12:40 Matrix: Water Date Received: 02/27/16 09:00

Analyte	Res	ult	Qualifier	L	.OQ	LO	D	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	-	1.1	JB	_	2.4	1.	9	0.88	ng/L	_	03/03/16 23:43	1
Perfluoroheptanoic acid (PFHpA)	•	1.9	U		2.4	1.	9	0.77	ng/L		03/03/16 23:43	1
Perfluorohexanesulfonic acid (PFHxS)	•	1.9	U		2.4	1.	9	0.83	ng/L		03/03/16 23:43	1
Perfluorononanoic acid (PFNA)		1.9	U		2.4	1.	9	0.62	ng/L		03/03/16 23:43	1
Perfluorooctanesulfonic acid (PFOS)	2	2.9	U		3.8	2.	9	1.2	ng/L		03/03/16 23:43	1
Perfluorooctanoic acid (PFOA)		1.9	U		2.4	1.	9	0.71	ng/L		03/03/16 23:43	1
Isotope Dilution	%Recovery	Qι	ıalifier	Limits					Prepared		Analyzed	Dil Fac
13C2 PFHxA	83			25 - 150	=				03/02/16 12:0	25	03/03/16 23:43	1
13C4 PFOA	77			25 - 150					03/02/16 12:0	25	03/03/16 23:43	1
13C4 PFOS	77			25 - 150					03/02/16 12:0	25	03/03/16 23:43	1
13C4-PFHpA	90			25 - 150					03/02/16 12:0	25	03/03/16 23:43	1
13C5 PFNA	65			25 - 150					03/02/16 12:0	25	03/03/16 23:43	1
18O2 PFHxS	99			25 - 150					03/02/16 12:0	25	03/03/16 23:43	1

Default Detection Limits

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	2.5	0.92	ng/L	WS-LC-0025
Perfluoroheptanoic acid (PFHpA)	2.5	0.80	ng/L	WS-LC-0025
Perfluorohexanesulfonic acid (PFHxS)	2.5	0.87	ng/L	WS-LC-0025
Perfluorononanoic acid (PFNA)	2.5	0.65	ng/L	WS-LC-0025
Perfluorooctanesulfonic acid (PFOS)	4.0	1.3	ng/L	WS-LC-0025
Perfluorooctanoic acid (PFOA)	2.5	0.75	ng/L	WS-LC-0025

Isotope Dilution Summary

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L
		3C2 PFHx	3C4 PFO	3C4 PFOS	3C4-PFHp	3C5 PFN/	3O2 PFHx
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
0-17463-1	BC_02_26_16	103	107	97	110	109	99
0-17463-2	DW-18	87	79	92	84	88	111
20-17463-3	DW-18FB	108	103	94	105	107	104
20-17463-4	DW-78	87	76	91	87	68	109
20-17463-5	DW-78FB	101	109	91	107	110	102
-17463-6	DW-100	85	70	112	87	59	110
-17463-7	DW-100FB	107	107	124	109	107	113
-17463-8	DUP_022616	83	77	77	90	65	99
S 320-102166/2-A	Lab Control Sample	97	92	88	100	95	100
SD 320-102166/3-A	Lab Control Sample Dup	99	93	92	101	96	103
B 320-102166/1-A	Method Blank	107	101	100	108	106	106

Surrogate Legend

13C2 PFHxA = 13C2 PFHxA

13C4 PFOA = 13C4 PFOA

13C4 PFOS = 13C4 PFOS

13C4-PFHpA = 13C4-PFHpA

13C5 PFNA = 13C5 PFNA

18O2 PFHxS = 18O2 PFHxS

QC Sample Results

Client: Earth Toxics, Inc

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-102166/1-A

Matrix: Water

Analysis Batch: 102384

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

TestAmerica Job ID: 320-17463-1

Prep Batch: 102166

	IVID	IVID							
Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.37	J	2.5	2.0	0.92	ng/L		03/03/16 19:51	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80	ng/L		03/03/16 19:51	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87	ng/L		03/03/16 19:51	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		03/03/16 19:51	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		03/03/16 19:51	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75	ng/L		03/03/16 19:51	1

MB MB

MP MP

Isotope Dilution	%Recovery Qu	ualifier Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	107	25 - 150	03/02/16 12:04	03/03/16 19:51	1
13C4 PFOA	101	25 - 150	03/02/16 12:04	03/03/16 19:51	1
13C4 PFOS	100	25 - 150	03/02/16 12:04	03/03/16 19:51	1
13C4-PFHpA	108	25 - 150	03/02/16 12:04	03/03/16 19:51	1
13C5 PFNA	106	25 - 150	03/02/16 12:04	03/03/16 19:51	1
1802 PFHxS	106	25 - 150	03/02/16 12:04	03/03/16 19:51	1

Lab Sample ID: LCS 320-102166/2-A

Matrix: Water

Matrix: Water

Analysis Batch: 102384

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 102166

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid	35.4	36.0	-	ng/L		102	50 - 150	
(PFBS)								
Perfluoroheptanoic acid (PFHpA)	40.0	37.5		ng/L		94	60 - 140	
Perfluorohexanesulfonic acid	37.8	36.0		ng/L		95	60 - 140	
(PFHxS)								
Perfluorononanoic acid (PFNA)	40.0	40.8		ng/L		102	60 - 140	
Perfluorooctanesulfonic acid	38.2	47.8		ng/L		125	60 - 140	
(PFOS)								
Perfluorooctanoic acid (PFOA)	40.0	39.8		ng/L		99	60 - 140	

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	97		25 - 150
13C4 PFOA	92		25 - 150
13C4 PFOS	88		25 - 150
13C4-PFHpA	100		25 - 150
13C5 PFNA	95		25 - 150
1802 PFHxS	100		25 - 150

Lab Sample ID: LCSD 320-102166/3-A

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA Prep Batch: 102166

Analysis Batch: 102384 Spike LCSD LCSD %Rec. RPD Added Limit Result Qualifier Unit Limits **RPD** Analyte D %Rec Perfluorobutanesulfonic acid 35.4 36.2 ng/L 102 50 - 150 0 30 (PFBS) Perfluoroheptanoic acid (PFHpA) 40.0 38.8 ng/L 97 60 - 140 3 30 39.0 60 - 140 8 30 Perfluorohexanesulfonic acid 37.8 ng/L 103 (PFHxS) 40.8 30 Perfluorononanoic acid (PFNA) 40.0 102 60 - 140 0 ng/L

QC Sample Results

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCSD 320 Matrix: Water)-102166/3-A	L			C	Client Sa	ample	ID: Lab	Control		
Analysis Batch: 102384									Prep Ba	tch: 10	02166
			Spike	LCSD	LCSD				%Rec.		RPD
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limi
Perfluorooctanesulfonic acid (PFOS)			38.2	50.1		ng/L		131	60 - 140	5	30
Perfluorooctanoic acid (PFOA)			40.0	38.5		ng/L		96	60 - 140	3	30
	LCSD	LCSD									
Isotope Dilution	%Recovery	Qualifier	Limits								
13C2 PFHxA	99		25 - 150								
13C4 PFOA	93		25 - 150								
13C4 PFOS	92		25 - 150								
13C4-PFHpA	101		25 - 150								
13C5 PFNA	96		25 - 150								
1802 PFHxS	103		25 - 150								

QC Association Summary

Client: Earth Toxics, Inc

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

LCMS

Prep Batch: 102166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17463-1	BC_02_26_16	Total/NA	Water	3535	
320-17463-2	DW-18	Total/NA	Water	3535	
320-17463-3	DW-18FB	Total/NA	Water	3535	
320-17463-4	DW-78	Total/NA	Water	3535	
320-17463-5	DW-78FB	Total/NA	Water	3535	
320-17463-6	DW-100	Total/NA	Water	3535	
320-17463-7	DW-100FB	Total/NA	Water	3535	
320-17463-8	DUP_022616	Total/NA	Water	3535	
LCS 320-102166/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-102166/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-102166/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 102384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17463-1	BC_02_26_16	Total/NA	Water	WS-LC-0025	102166
320-17463-2	DW-18	Total/NA	Water	WS-LC-0025	102166
320-17463-3	DW-18FB	Total/NA	Water	WS-LC-0025	102166
320-17463-4	DW-78	Total/NA	Water	WS-LC-0025	102166
320-17463-5	DW-78FB	Total/NA	Water	WS-LC-0025	102166
320-17463-6	DW-100	Total/NA	Water	WS-LC-0025	102166
320-17463-7	DW-100FB	Total/NA	Water	WS-LC-0025	102166
320-17463-8	DUP_022616	Total/NA	Water	WS-LC-0025	102166
LCS 320-102166/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	102166
LCSD 320-102166/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	102166
MB 320-102166/1-A	Method Blank	Total/NA	Water	WS-LC-0025	102166

TestAmerica Sacramento

TestAmerica Job ID: 320-17463-1

Lab Chronicle

Client: Earth Toxics, Inc.

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Client Sample ID: BC_02_26_16 Lab Sample ID: 320-17463-1

Date Collected: 02/26/16 13:50 Matrix: Water

Date Received: 02/27/16 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			582.5 mL	1.00 mL	102166	03/02/16 12:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	582.5 mL	1.00 mL	102384	03/03/16 20:54	CBW	TAL SAC
	Instrume	nt ID: A4								

Client Sample ID: DW-18

Date Collected: 02/26/16 13:50

Lab Sample ID: 320-17463-2

Matrix: Water

Date Collected: 02/26/16 13:50 Date Received: 02/27/16 09:00

Batch Batch Dil Initial Final Batch **Prepared Prep Type** Type Method Run **Factor** Amount **Amount** Number or Analyzed Lab Analyst Total/NA Prep 3535 102166 03/02/16 12:05 JER TAL SAC 558.1 mL 1.00 mL Total/NA Analysis WS-LC-0025 558.1 mL 1.00 mL 102384 03/03/16 21:15 CBW TAL SAC Instrument ID: A4

Client Sample ID: DW-18FB Lab Sample ID: 320-17463-3

Date Collected: 02/26/16 13:20

Date Received: 02/27/16 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			552.9 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	552.9 mL	1.00 mL	102384	03/03/16 21:36	CBW	TAL SAC
	Instrume	nt ID: A4								

Client Sample ID: DW-78 Lab Sample ID: 320-17463-4

Date Collected: 02/26/16 11:50

Date Received: 02/27/16 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			519.6 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	519.6 mL	1.00 mL	102384	03/03/16 21:58	CBW	TAL SAC
	Instrume	nt ID: A4								

Client Sample ID: DW-78FB Lab Sample ID: 320-17463-5

Date Collected: 02/26/16 11:40

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			572.1 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	572.1 mL	1.00 mL	102384	03/03/16 22:19	CBW	TAL SAC
	Instrume	nt ID: A4								

TestAmerica Job ID: 320-17463-1

Matrix: Water

Matrix: Water

Matrix: Water

Lab Chronicle

Client: Earth Toxics, Inc.

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

03/03/16 23:01 CBW

TestAmerica Job ID: 320-17463-1

Client Sample ID: DW-100 Lab Sample ID: 320-17463-6 Date Collected: 02/26/16 12:35

Matrix: Water

Date Received: 02/27/16 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			510.2 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	510.2 mL	1.00 mL	102384	03/03/16 22:40	CBW	TAL SAC
	Instrume	nt ID: A4								

Client Sample ID: DW-100FB Lab Sample ID: 320-17463-7

Date Collected: 02/26/16 12:30 Date Received: 02/27/16 09:00

Matrix: Water

TAL SAC

Matrix: Water

Batch Batch Dil Initial Final Batch **Prepared** Method Number **Prep Type** Type Run **Factor** Amount Amount or Analyzed Analyst Lab Total/NA 3535 Prep 536.8 mL 102166 03/02/16 12:05 JER TAL SAC 1.00 mL

Instrument ID: A4

WS-LC-0025

Analysis

Client Sample ID: DUP_022616 Lab Sample ID: 320-17463-8

536.8 mL

102384

1.00 mL

Date Collected: 02/26/16 12:40

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			523.4 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	523.4 mL	1.00 mL	102384	03/03/16 23:43	CBW	TAL SAC
	Instrume	nt ID: A4								

Laboratory References:

Total/NA

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

Certification Summary

Client: Earth Toxics, Inc TestAmerica Job ID: 320-17463-1

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority A2LA	Program DoD ELAP	EPA Region	Certification ID 2928-01	Expiration Date 01-31-17
New Jersey	NELAP	2	CA005	06-30-16

Laboratory: TestAmerica Denver The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP	· ·	2907.01	10-31-17
New Jersey	NELAP	2	CO004	06-30-16

Method Summary

Client: Earth Toxics, Inc

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17463-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025	Perfluorinated Hydrocarbons	TAL SOP	TAL SAC

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: Earth Toxics, Inc

Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Lab Sample ID	Client Sample ID	Matrix	Collected R	eceived
320-17463-1	BC_02_26_16	Water	02/26/16 13:50 02/2	27/16 09:00
320-17463-2	DW-18	Water	02/26/16 13:50 02/2	27/16 09:00
320-17463-3	DW-18FB	Water	02/26/16 13:20 02/2	27/16 09:00
320-17463-4	DW-78	Water	02/26/16 11:50 02/2	27/16 09:00
320-17463-5	DW-78FB	Water	02/26/16 11:40 02/2	27/16 09:00
320-17463-6	DW-100	Water	02/26/16 12:35 02/2	27/16 09:00
320-17463-7	DW-100FB	Water	02/26/16 12:30 02/2	27/16 09:00
320-17463-8	DUP 022616	Water	02/26/16 12:40 02/2	27/16 09:00

TestAmerica Job ID: 320-17463-1

Lab 1	Name:	TestAmerica	Sacramento	Job No.: 320-17463-1
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				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCMPFCSU_00029	08/29/16	02/29/16	Methanol, Lot Baker 115491	10000 uL	LCM2PFHxDA_00003	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00003	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00003	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00004	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA 00007	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA 00004	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA 00006	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00004	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00007	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00004		13C5 PFNA	1 ug/mL
					LCMPFOA 00008	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS 00010	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005	200 uL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA 00003	11/29/17	Wellingt	on Laboratories, Lot M	I2PFHxDA1112	(Purchased Reag	ent)	13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA 00003	11/29/17	Wellingt	on Laboratories, Lot M	I2PFTeDA1112	(Purchased Reag	ent)	13C2-PFTeDA	50 ug/mL
.LCM4PFHPA 00003	05/22/20		ton Laboratories, Lot N		(Purchased Reag	ent)	13C4-PFHpA	50 ug/mL
.LCM5PFPEA 00004	05/22/20	Welling	ton Laboratories, Lot N	M5PFPeA0515	(Purchased Reag	ent)	13C5-PFPeA	50 ug/mL
.LCM8FOSA 00007	12/15/16		ton Laboratories, Lot N		(Purchased Reag		13C8 FOSA	50 ug/mL
.LCMPFBA 00004	10/31/19		gton Laboratories, Lot		(Purchased Reag	ent)	13C4 PFBA	50 ug/mL
.LCMPFDA 00006	08/19/20		gton Laboratories, Lot		(Purchased Reag		13C2 PFDA	50 ug/mL
.LCMPFDoA 00004	07/17/19		ton Laboratories, Lot		(Purchased Reag		13C2 PFDoA	50 ug/mL
.LCMPFHxA 00007	04/09/20		ton Laboratories, Lot		(Purchased Reag		13C2 PFHxA	50 ug/mL
.LCMPFHxS 00004	07/25/18		ton Laboratories, Lot		(Purchased Reag	ent)	1802 PFHxS	47.3 ug/mL
.LCMPFNA 00004	04/13/19		gton Laboratories, Lot		(Purchased Reag		13C5 PFNA	50 ug/mL
.LCMPFOA 00008	04/10/20		gton Laboratories, Lot		(Purchased Reag		13C4 PFOA	50 ug/mL
.LCMPFOS 00010	05/15/20		gton Laboratories, Lot	MPFOS0515	(Purchased Reag		13C4 PFOS	47.8 ug/mL
.LCMPFUdA 00005	10/31/19		ton Laboratories, Lot		(Purchased Reag		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018		_	MeOH/H2O, Lot 90285		LCMPFCSU 00024		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
							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
					LCPFCSP 00040	2.5 11T.	Perfluorobutyric acid	0.5 ng/mL
						25 41	Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

Lab Name: TestAmerica Sacramento J	Job No.: 320-17463-1
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				Reagent	Parent Reage:	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid	0.5 ng/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.473 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctandecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid	0.478 ng/mL
							(PFOS)	0.470 119711111
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
			113431		LCM2PFTeDA 00003	0 2 mT.	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00003		13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00004		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00006		13C8 FOSA	1 ug/mL
					LCMPFBA 00004		13C4 PFBA	1 ug/mL
					LCMPFDA 00004		13C2 PFDA	1 ug/mL
					LCMPFDoA 00004		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00005		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004		1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003		13C5 PFNA	1 ug/mL
					LCMPFOA 00007		13C4 PFOA	1 ug/mL
					LCMPFOS 00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P	FHxDA1112	(Purchased Read	gent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P	FTeDA1112	(Purchased Read	gent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20		on Laboratories, Lot M41		(Purchased Read	gent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		on Laboratories, Lot M51		(Purchased Read	gent)	13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M81	FOSA1214I	(Purchased Read	gent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19		gton Laboratories, Lot MI	PFBA1014	(Purchased Read	gent)	13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	gton Laboratories, Lot MI	PFDA0414	(Purchased Read	gent)	13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot MP		(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19		ton Laboratories, Lot MP	FHxA0414	(Purchased Read	, , , , , , , , , , , , , , , , , , ,	13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18		ton Laboratories, Lot MP		(Purchased Read		1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19		gton Laboratories, Lot MI		(Purchased Read	, ,	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20		gton Laboratories, Lot MI		(Purchased Read		13C4 PFOA	50 ug/mL
LCMPFOS_00009	05/15/20	Welling	gton Laboratories, Lot MI	PFOS0515	(Purchased Read		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00005	10/31/19	Welling	ton Laboratories, Lot MP	FUdA1014	(Purchased Read	gent)	13C2 PFUnA	50 ug/mL

Lab Name: TestAmerica Sacramento Job No	o.: 320-17463-1

			Reagent	Parent Reag	ent		
	Exp Prep	Dilutant	Final		Volume		
Reagent ID	Date Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
.LCPFCSP 00040	06/30/16 12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP 00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
		,				Perfluorobutanesulfonic acid	0.0884 ug/mL
						(PFBS)	
						Perfluorodecanoic acid	0.1 ug/mL
						Perfluorododecanoic acid	0.1 ug/mL
						Perfluorodecane Sulfonic acid	0.0964 ug/mL
						Perfluoroheptanoic acid	0.1 ug/mL
						(PFHpA)	
						Perfluoroheptanesulfonic Acid	0.0952 ug/mL
						Perfluorohexanoic acid	0.1 ug/mL
						Perfluorohexadecanoic acid	0.1 ug/mL
						Perfluorohexanesulfonic acid	0.0946 ug/mL
						(PFHxS)	
						Perfluorononanoic acid (PFNA)	0.1 ug/mL
						Perfluorooctanoic acid (PFOA)	0.1 ug/mL
						Perfluorooctandecanoic acid	0.1 ug/mL
						Perfluorooctanesulfonic acid	0.0956 ug/mL
						(PFOS) Perfluorooctane Sulfonamide	0 1 110 /mT
						Perfluoropentanoic acid	0.1 ug/mL 0.1 ug/mL
						Perfluorotetradecanoic acid	0.1 ug/mL
						Perfluorotridecanoic acid	0.1 ug/mL
						Perfluoroundecanoic acid	0.1 ug/mL
LCPFCSP 00039	06/30/16 12/30/15	Methanol, Lot 090285	5 mT.	LCPFBA 00003	0 1 mT.	Perfluorobutyric acid	1 ug/mL
	00/30/10 12/30/13	rechanor, not 030203	J 1111	LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
					0.1 1112	(PFBS)	0.001 49/1112
				LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
				LCPFDoA 00003		Perfluorododecanoic acid	1 ug/mL
				LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
				LCPFHpA_00004		Perfluoroheptanoic acid	1 ug/mL
						(PFHpA)	
				LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
				LCPFHxA_00003		Perfluorohexanoic acid	1 ug/mL
				LCPFHxDA_00004		Perfluorohexadecanoic acid	1 ug/mL
				LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
				LCPFNA 00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
				LCPFOA 00004		Perfluorooctanoic acid (PFOA)	1 ug/mL
				LCPFODA 00004		Perfluorooctandecanoic acid	1 ug/mL
				LCPFOS_00004		Perfluorooctanesulfonic acid	0.956 ug/mL
				T GD TO G T	0 1 -	(PFOS)	1 / -
				LCPFOSA_00005		Perfluorooctane Sulfonamide	1 ug/mL
				LCPFPeA_00003		Perfluoropentanoic acid	1 ug/mL
				LCPFTeDA_00003		Perfluorotetradecanoic acid	1 ug/mL
				LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mL
T 07777 00000	02/05/10			LCPFUdA_00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003		gton Laboratories, Lot PI		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19 Welling	gton Laboratories, Lot LP	'FBS1014	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL

Lab Name: TestAmerica Sacramento J	Job No.: 320-17463-1
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					Reagent	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used		Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFDA 00003	06/18/18	Wellin	gton Laboratories,	Lot	PFDA0613	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18	Welling	ton Laboratories,	Lot	PFDoA0113	(Purchased Rea	agent)	Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18	Welling	ton Laboratories,	Lot	LPFDS0913	(Purchased Rea	agent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories,	Lot	PFHpA0514	(Purchased Rea	igent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories,	Lot	LPFHpS1112	(Purchased Rea	agent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	ton Laboratories,	Lot	PFHxA0514	(Purchased Rea	agent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17	Welling	ton Laboratories,	Lot	PFHxDA0707	(Purchased Rea	agent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	_	ton Laboratories,			(Purchased Rea	igent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Wellin	gton Laboratories,	, Lot	PFNA0514	(Purchased Rea	agent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18		gton Laboratories,			(Purchased Rea	igent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	ton Laboratories,	Lot	PFODA0807	(Purchased Rea	agent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories,	Lot	LPFOS0614	(Purchased Rea	igent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18	Welling	gton Laboratories,	Lot	FOSA0714I	(Purchased Rea	igent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18		gton Laboratories,			(Purchased Rea	igent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories,			(Purchased Rea	igent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories,	Lot	PFTrDA1213	(Purchased Rea	agent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ton Laboratories,	Lot	PFUdA0613	(Purchased Rea	agent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2 00018	06/29/16	12/30/15	MeOH/H2O, Lot 090)285	5 mL	LCMPFCSU 00024	250 uI	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
								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
						LCPFCSP_00040	50 uI	Perfluorobutyric acid	1 ng/mL
								Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
								Perfluorodecanoic acid	1 ng/mL
								Perfluorododecanoic acid	1 ng/mL
								Perfluorodecane Sulfonic acid	0.964 ng/mL
								Perfluoroheptanoic acid (PFHpA)	1 ng/mL
								Perfluoroheptanesulfonic Acid	0.952 ng/mL
								Perfluorohexanoic acid	1 ng/mL
								Perfluorohexadecanoic acid	1 ng/mL
								Perfluorohexanesulfonic acid	0.946 ng/mL
								(PFHxS)	
					1			Perfluorononanoic acid (PFNA)	1 ng/mL

Lab 1	Name:	TestAmerica	Sacramento	Job No.: 320-17463-1
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctandecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.956 ng/mL
							Perfluorooctane Sulfonamide	1 ng/mL
							Perfluoropentanoic acid	1 ng/mL
							Perfluorotetradecanoic acid	1 ng/mL
							Perfluorotridecanoic acid	1 ng/mL
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00006		13C8 FOSA	1 ug/mL
					LCMPFBA_00004		13C4 PFBA	1 ug/mL
					LCMPFDA 00004		13C2 PFDA	1 ug/mL
					LCMPFDoA_00004		13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005		13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003		13C5 PFNA	1 ug/mL
					LCMPFOA 00007		13C4 PFOA	1 ug/mL
					LCMPFOS_00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA_00003			on Laboratories, Lot M2P		(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot M2P		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20		ton Laboratories, Lot M41		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00004	05/22/20		ton Laboratories, Lot M5H		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16		ton Laboratories, Lot M81		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19		gton Laboratories, Lot MI		(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19		gton Laboratories, Lot MI		(Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA_00005	04/13/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS_00004	07/25/18		ton Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19		gton Laboratories, Lot MI		(Purchased Rea	<i></i>	13C5 PFNA	50 ug/mL
LCMPFOA_00007	04/10/20		gton Laboratories, Lot MI		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS_00009	05/15/20		gton Laboratories, Lot MI		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00005	10/31/19	Welling	ton Laboratories, Lot MP	FUdA1014	(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento J	Job No.: 320-17463-1
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				Reagent	Parent Reag	ent		
	Erro	Dwan	Dilutant	Final		Volume		
Reagent ID	Exp Date	Prep Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
Reagent 1D	Date	Date	Usea	VOIUME	Reagent ID	Added	_	
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.0946 ug/mL
							(PFHxS)	0 1 / 7
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	
								0.1 ug/mL
LCPFCSP 00039	06/20/16	10/20/15	Methanol, Lot 090285	E T	LCPFBA 00003	0 1 T	Perfluoroundecanoic acid	0.1 ug/mL
LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 ML			Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	U.I ML	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00003	0 1 mT	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluorodecane Suffonic acid	1 ug/mL
					LCFFnpA_00004	0.1 1111	(PFHpA)	I ug/IIIL
					LCPFHpSA 00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid	0.946 ug/mL
					LCPFNA 00004	0 1 mT	(PFHxS) Perfluorononanoic acid (PFNA)	1
					LCPFOA 00004		Perfluorooctanoic acid (PFOA)	1 ug/mL 1 ug/mL
					_		, ,	
					LCPFODA 00004		Perfluorooctandecanoic acid Perfluorooctanesulfonic acid	1 ug/mL 0.956 ug/mL
					LCPFOS_00004		(PFOS)	0.956 ug/mL
					LCPFOSA_00005		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18	Wellin	gton Laboratories, Lot E	FBA0313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	gton Laboratories, Lot L	PFBS1014	(Purchased Rea	igent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lot E	FDA0613	(Purchased Rea	igent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18		ton Laboratories, Lot P.		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18		ton Laboratories, Lot L		(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19		gton Laboratories, Lot P.		(Purchased Rea		Perfluoroheptanoic acid	50 ug/mL
			<u>. </u>	<u> </u>			(PFHpA)	
LCPFHpSA_00001	11/21/17	Welling	ton Laboratories, Lot LE	FHpS1112	(Purchased Rea	igent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA_00003	05/09/19	Welling	gton Laboratories, Lot P	FHxA0514	(Purchased Rea	igent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17	Welling	ton Laboratories, Lot PF	HxDA0707	(Purchased Rea	igent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories, Lot LE	FHxS0514	(Purchased Rea	igent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL

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SDG No	·:		

				Reagent	Parent Reagen	t		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot P	FNA0514	(Purchased Reage	ent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18		gton Laboratories, Lot P	FOA1013	(Purchased Reage	ent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	ton Laboratories, Lot PE	FODA0807	(Purchased Reage	ent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot LE	PFOS0614	(Purchased Reage	ent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Welling	ton Laboratories, Lot FC	SA0714I	(Purchased Reage	ent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18	Welling	gton Laboratories, Lot PE	PeA0113	(Purchased Reage	ent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18	Welling	ton Laboratories, Lot PF	TeDA0613	(Purchased Reage	ent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA 00003	12/10/18	Welling	ton Laboratories, Lot PF	TrDA1213	(Purchased Reage	ent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lot PE	TUdA0613	(Purchased Reage	ent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU 00024	250 uL	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
							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
					LCPFCSP 00040	2.50 uT	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctandecanoic acid	5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.78 ng/mL
							Perfluorooctane Sulfonamide	5 ng/mL
							Perfluoropentanoic acid	5 ng/mL
							Perfluorotetradecanoic acid	5 ng/mL
							Perfluorotridecanoic acid	5 ng/mL
							Perfluoroundecanoic acid	5 ng/mL

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				Reagent	Parent Reagent			Concentration
Reagent ID	Exp Prep Date Date	Dilutant F	Final Volume	Reagent ID	Volume Added			
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA 00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA 00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA 00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	0.2 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA 00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005	0.2 mL	13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P	FHxDA1112	(Purchased Rea	gent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P	FTeDA1112	(Purchased Rea	gent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20	Wellingt	on Laboratories, Lot M41	PFHpA0515	(Purchased Rea	gent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20	Wellingt	on Laboratories, Lot M51	PFPeA0515	(Purchased Rea	gent)	13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M81	FOSA1214I	(Purchased Rea	gent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19	Welling	ton Laboratories, Lot M	PFBA1014	(Purchased Rea	gent)	13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	ton Laboratories, Lot M	PFDA0414	(Purchased Rea	gent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00004	07/17/19	Welling	ton Laboratories, Lot MP	FDoA0714	(Purchased Rea	gent)	13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19	Welling	ton Laboratories, Lot MP	FHxA0414	(Purchased Rea	gent)	13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18	Welling	ton Laboratories, Lot MP	FHxS0713	(Purchased Rea	gent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19	Welling	ton Laboratories, Lot M	PFNA0414	(Purchased Rea	gent)	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20	Welling	ton Laboratories, Lot M	PFOA0415	(Purchased Rea	gent)	13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20	Welling	ton Laboratories, Lot M	PFOS0515	(Purchased Rea	gent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP 00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
-					_		Perfluorobutanesulfonic acid	0.0884 ug/mI
							(PFBS)	
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid	0.1 ug/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
	1			1	1	1	(++00)	1

Lab	Name:	TestAmerica	Sacrament	to Job No.: 320-17463-1	

				Reagent	Parent Reagent			
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
riougone 12	2000			70141110	Itougono 12	114454	Perfluoropentanoic acid	
							Perfluorotetradecanoic acid	0.1 ug/mL 0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
LCPFCSP 00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mT	LCPFBA 00003	0 1 mT	Perfluorobutyric acid	1 ug/mL
1.1611631_00039	00/30/10	12/30/13	Mechanol, Loc 050205	Januar	LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
					_		(PFBS)	
					LCPFDA_00003		Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001		Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00005		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot Pl		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001	09/13/18	Welling	ton Laboratories, Lot LP	PFDS0913	(Purchased Rea	gent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories, Lot PF	'HpA0514	(Purchased Rea	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA_00001	11/21/17	Wellingt	ton Laboratories, Lot LP1	FHpS1112	(Purchased Rea	gent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA_00003	05/09/19		ton Laboratories, Lot PF		(Purchased Rea	gent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17	Wellingt	ton Laboratories, Lot PFN	HxDA0707	(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Wellingt	ton Laboratories, Lot LP1	FHxS0514	(Purchased Rea	gent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Welling	gton Laboratories, Lot Pl	FNA0514	(Purchased Rea	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18		gton Laboratories, Lot Pl		(Purchased Rea	gent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	ton Laboratories, Lot PF	ODA0807	(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19		ton Laboratories, Lot LP		(Purchased Rea	gent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Welling	ton Laboratories, Lot FO	SA0714I	(Purchased Rea	gent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18		ton Laboratories, Lot PF		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18		ton Laboratories, Lot PF		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA 00003	12/10/18		ton Laboratories, Lot PF		(Purchased Rea		Perfluorotridecanoic acid	50 ug/mL

ab Name: TestAmerica Sacramento	Job No.: 320-17463-1
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				Reagent	Parent Reagent			
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFUdA_00003	06/19/18	Wellin	gton Laboratories, Lot	PFUdA0613	(Purchased Read	pent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00017	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU 00024	250 uL	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
							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
					LCPFCSP 00039	100 uL	Perfluorobutyric acid	20 ng/mL
					_		Perfluorobutanesulfonic acid	17.68 ng/mL
							(PFBS)	J.
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							Perfluorodecane Sulfonic acid	19.28 ng/mL
							Perfluoroheptanoic acid	20 ng/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctandecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid	19.12 ng/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							Perfluorotetradecanoic acid	20 ng/mL
							Perfluorotridecanoic acid	20 ng/mL
							Perfluoroundecanoic acid	20 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA 00004		13C2 PFDA	1 ug/mL
					LCMPFDoA 00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00005	0.2 mL	13C2 PFHxA	1 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No.: 320-17463-1

				Reagent	Parent Reag	gent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Dongont ID	Added	Analyte	Concentration
Reagent 1D	Date	Date	Usea	VOTUILLE	Reagent ID		=	
					LCMPFHxS_00004		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003		13C5 PFNA	1 ug/mL
					LCMPFOA_00007		13C4 PFOA	1 ug/mL
					LCMPFOS_00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA_00003			on Laboratories, Lot M		(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot M		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20		ton Laboratories, Lot M		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00004	05/22/20	Wellingt	ton Laboratories, Lot M	15PFPeA0515	(Purchased Rea	agent)	13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16	Wellingt	on Laboratories, Lot M	18FOSA1214I	(Purchased Rea	agent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19		gton Laboratories, Lot		(Purchased Rea	agent)	13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	gton Laboratories, Lot	MPFDA0414	(Purchased Rea	agent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00004	07/17/19	Welling	ton Laboratories, Lot I	MPFDoA0714	(Purchased Rea	agent)	13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19	Welling	ton Laboratories, Lot I	MPFHxA0414	(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18	Welling	ton Laboratories, Lot I	MPFHxS0713	(Purchased Rea	agent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19	,	ton Laboratories, Lot		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20		ton Laboratories, Lot		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		gton Laboratories, Lot		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19		ton Laboratories, Lot 1		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039			Methanol, Lot 090285		LCPFBA 00003		Perfluorobutyric acid	1 ug/mL
. Herrest_00033	00/30/10	12/30/13	riccitation, Lot 030203	3 11111	LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
					LCFFBSA_00001	0.1 1111	(PFBS)	0.004 ug/IIIL
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA 00004		Perfluoroheptanoic acid	1 ug/mL
							(PFHpA)	
					LCPFHpSA 00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA 00001		Perfluorohexanesulfonic acid	0.946 ug/mL
							(PFHxS)	
					LCPFNA 00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00004		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS 00004		Perfluorooctanesulfonic acid	0.956 ug/mL
						0.1	(PFOS)	0.300 ag/
					LCPFOSA 00005	() . 1 mT.	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00003	03/05/18	Wellin	<u> </u> gton Laboratories, Lot	DEBVU313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA 00003	10/09/19		gton Laboratories, Lot		(Purchased Rea		Perfluorobutyric acid	44.2 ug/mL
HCLLDOW_00001	10/09/19	werrrnd	grow haboratories, LOT	TLLD91014	(Fulchased Rea	ayenc)	(PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lot	PFDA0613	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18		ton Laboratories, Lot		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18		gton Laboratories, Lot		(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
••=====================================	05/15/10	MCTTTII	,con Laboracorico, Hot	T11D00011	(Larchabea Nec	agenc,	I CITTAGIO GCCANC DATIONIC ACIA	10.2 ug/IIII

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	- Analyte	Concentration
LCPFHpA_00004	05/09/19	Welling	gton Laboratories, Lot	PFHpA0514	(Purchased Reag	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lot	LPFHpS1112	(Purchased Reag	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	gton Laboratories, Lot	PFHxA0514	(Purchased Reag	ent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		ton Laboratories, Lot		(Purchased Reag		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot		(Purchased Reag		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories, Lot		(Purchased Reag		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00004	10/11/18		gton Laboratories, Lot		(Purchased Reag		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		gton Laboratories, Lot		(Purchased Reag		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19		gton Laboratories, Lot		(Purchased Reag		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18		gton Laboratories, Lot		(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18		gton Laboratories, Lot		(Purchased Reag		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot		(Purchased Reag		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, Lot		(Purchased Reag		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lot		(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uI	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
							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
					T. G.D. D. G.	0.5.0	13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	250 ul	Perfluorobutyric acid	50 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							Perfluorodecane Sulfonic acid	48.2 ng/mL
							Perfluoroheptanoic acid	50 ng/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid Perfluorohexadecanoic acid	50 ng/mL
								50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctandecanoic acid	50 ng/mL

Lab Name: TestAmerica Sacramento Job I	No.: 320-17463-1

				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
Reagent 1D	Date	Date	usea	vorune	Reagent 1D	Added	-	
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00003		13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00004		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00006		13C8 FOSA	1 ug/mL
					LCMPFBA 00004		13C4 PFBA	1 ug/mL
					LCMPFDA 00004		13C2 PFDA	1 ug/mL
					LCMPFDoA 00004		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00005		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004		1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003		13C5 PFNA	1 ug/mL
					LCMPFOA 00007		13C4 PFOA	1 ug/mL
					LCMPFOS 00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P1	HxDA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17		on Laboratories, Lot M2P		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20	Wellingt	on Laboratories, Lot M4F	FHpA0515	(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20	Wellingt	on Laboratories, Lot M5P	FPeA0515	(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M8F	OSA1214I	(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19	Welling	ton Laboratories, Lot MF	FBA1014	(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDoA 00004	07/17/19	Welling	ton Laboratories, Lot MP	FDoA0714	(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19	Welling	ton Laboratories, Lot MP	FHxA0414	(Purchased Rea	igent)	13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18	Welling	ton Laboratories, Lot MP	FHxS0713	(Purchased Rea	igent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19		ton Laboratories, Lot MP	FNA0414	(Purchased Rea	igent)	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20	Welling	ton Laboratories, Lot MP	FOA0415	(Purchased Rea	igent)	13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		ton Laboratories, Lot MP	FOS0515	(Purchased Rea	igent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19	Welling	ton Laboratories, Lot MP	FUdA1014	(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA 00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
_					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003		Perfluorododecanoic acid	1 ug/mL
		1			LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
							iciliadioaccane ballonic acia	
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid	
						0.1 mL 0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-17463-1
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				Reagent	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mI
					LCPFNA_00004		Perfluorononanoic acid (PFNA)	1 ug/mI
					LCPFOA 00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mI
					LCPFODA_00004		Perfluorooctandecanoic acid	1 ug/mI
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mI
					LCPFOSA_00005		Perfluorooctane Sulfonamide	1 ug/mI
					LCPFPeA_00003		Perfluoropentanoic acid	1 ug/mI
					LCPFTeDA_00003		Perfluorotetradecanoic acid	1 ug/mI
					LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mI
					LCPFUdA_00003		Perfluoroundecanoic acid	1 ug/mI
LCPFBA_00003	03/05/18		gton Laboratories, Lot B		(Purchased Rea		Perfluorobutyric acid	50 ug/mI
LCPFBSA_00001	10/09/19		gton Laboratories, Lot L		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mI
LCPFDA_00003	06/18/18		gton Laboratories, Lot B		(Purchased Rea		Perfluorodecanoic acid	50 ug/mI
LCPFDoA_00003	01/03/18		gton Laboratories, Lot P		(Purchased Rea	-	Perfluorododecanoic acid	50 ug/mI
LCPFDSA_00001	09/13/18		gton Laboratories, Lot L		(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mI
LCPFHpA_00004	05/09/19		gton Laboratories, Lot P	-	(Purchased Rea		Perfluoroheptanoic acid (PFHpA)	50 ug/mI
LCPFHpSA_00001	11/21/17		ton Laboratories, Lot L		(Purchased Rea		Perfluoroheptanesulfonic Acid	47.6 ug/mI
LCPFHxA_00003	05/09/19		gton Laboratories, Lot P		(Purchased Rea		Perfluorohexanoic acid	50 ug/mI
LCPFHxDA_00004	11/28/17		ton Laboratories, Lot PF		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mI
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot LE		(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mI
LCPFNA_00004	05/09/19		gton Laboratories, Lot B		(Purchased Rea	<u></u>	Perfluorononanoic acid (PFNA)	50 ug/mI
LCPFOA_00004	10/11/18		gton Laboratories, Lot B		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mI
LCPFODA_00004	04/25/17		gton Laboratories, Lot P		(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mI
LCPFOS_00004	06/20/19	Welling	gton Laboratories, Lot L	PFOS0614	(Purchased Rea	igent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mI
LCPFOSA_00005	07/31/18		gton Laboratories, Lot F		(Purchased Rea		Perfluorooctane Sulfonamide	50 ug/mI
LCPFPeA_00003	01/03/18		gton Laboratories, Lot P		(Purchased Rea		Perfluoropentanoic acid	50 ug/mI
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot PI		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mI
LCPFTrDA_00003	12/10/18		ton Laboratories, Lot PI		(Purchased Rea		Perfluorotridecanoic acid	50 ug/mI
LCPFUdA_00003	06/19/18		gton Laboratories, Lot P		(Purchased Rea	<u> </u>	Perfluoroundecanoic acid	50 ug/mI
LCPFC-L6_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mI
							13C2-PFTeDA	50 ng/mI
							13C4-PFHpA	50 ng/mI
							13C5-PFPeA	50 ng/mI
							13C8 FOSA	50 ng/mI
							13C4 PFBA	50 ng/mI
							13C2 PFDA	50 ng/mI
							13C2 PFDoA	50 ng/mI
							13C2 PFHxA	50 ng/mI
							1802 PFHxS	47.3 ng/mI
							13C5 PFNA 13C4 PFOA	50 ng/mI
1							13C4 PFOA 13C4 PFOS	50 ng/mI 47.8 ng/mI

Lab	Name:	TestAmerica	Sacrament	o Job No.: 320-17463-1

				Reagent	Parent Reage	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							13C2 PFUnA	50 ng/mL
					LCPFCSP 00039	400 uL	Perfluorobutyric acid	200 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							Perfluorodecane Sulfonic acid	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid	189.2 ng/mL
							(PFHxS)	
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctandecanoic acid Perfluorooctanesulfonic acid	200 ng/mL
							(PFOS)	191.2 ng/mL
							Perfluorooctane Sulfonamide	200 ng/mL
							Perfluoropentanoic acid	200 ng/mL
							Perfluorotetradecanoic acid	200 ng/mL
							Perfluorotridecanoic acid	200 ng/mL
TOMBECCH 00004	06/20/16	10/00/15	Methanol, Lot Baker	10 T	LCM2PFHxDA 00003	0 0 T	Perfluoroundecanoic acid	200 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	115491	10 111	_			1 ug/mL
					LCM2PFTeDA_00003		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00003		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004		13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006		13C8 FOSA	1 ug/mL
					LCMPFBA_00004		13C4 PFBA 13C2 PFDA	1 ug/mL
					LCMPFDA_00004		13C2 PFDA	1 ug/mL 1 ug/mL
					LCMPFHxA 00005		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004		1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003		13C5 PFNA	1 ug/mL
					LCMPFOA 00007		13C4 PFOA	1 ug/mL
					LCMPFOS 00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003	11/29/17	Wellingt	on Laboratories, Lot M2P	FHxDA1112	(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot M2P		(Purchased Read	gent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20		ton Laboratories, Lot M41		(Purchased Read	gent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		ton Laboratories, Lot M51		(Purchased Read		13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16		ton Laboratories, Lot M81		(Purchased Read		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19		gton Laboratories, Lot MI		(Purchased Read		13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19		gton Laboratories, Lot MI		(Purchased Read		13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot MP		(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA_00005	04/13/19	Welling	ton Laboratories, Lot MP	FHxA0414	(Purchased Read	gent)	13C2 PFHxA	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
LCMPFHxS 00004	07/25/18	Wellingt	on Laboratories,	Lot MPFHxS0713	(Purchased Rea	igent)	1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19	Wellingt	on Laboratories,	Lot MPFNA0414	(Purchased Rea	igent)	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20	Wellingt	on Laboratories,	Lot MPFOA0415	(Purchased Rea	igent)	13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		on Laboratories,		(Purchased Rea	igent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19	Wellingt	on Laboratories,	Lot MPFUdA1014	(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039	06/30/16	12/30/15	Methanol, Lot 090	285 5 mL	LCPFBA 00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00003	03/05/18	Welling	ton Laboratories,	Lot PFBA0313	(Purchased Rea	igent)	Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Wellingt	on Laboratories,	Lot LPFBS1014	(Purchased Rea	igent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Welling	ton Laboratories,	Lot PFDA0613	(Purchased Rea	igent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18	Wellingt	on Laboratories,	Lot PFDoA0113	(Purchased Rea	igent)	Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18	Wellingt	on Laboratories,	Lot LPFDS0913	(Purchased Rea	igent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Wellingt	on Laboratories,	Lot PFHpA0514	(Purchased Rea	igent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Wellingt	on Laboratories,	Lot LPFHpS1112	(Purchased Rea	igent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Wellingt	on Laboratories,	Lot PFHxA0514	(Purchased Rea	igent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17	Wellingt	on Laboratories,	Lot PFHxDA0707	(Purchased Rea	igent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Wellingt	on Laboratories,	Lot LPFHxS0514	(Purchased Rea	igent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Welling	ton Laboratories,	Lot PFNA0514	(Purchased Rea	igent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18	Welling	ton Laboratories,	Lot PFOA1013	(Purchased Rea	igent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17		on Laboratories,		(Purchased Rea	igent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Wellingt	on Laboratories,	Lot LPFOS0614	(Purchased Rea	igent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Wellinat	on Laboratories,	Lot FOSA0714I	(Purchased Rea	igent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18		on Laboratories,		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18		on Laboratories,		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL

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			Dilutant Used	Reagent Final Volume	Parent Reagent			
Reagent ID	Exp Date	Prep Date			Reagent ID	Volume Added	Analyte	Concentration
LCPFTrDA 00003	12/10/18	Welling	ton Laboratories, Lot	t PFTrDA1213	(Purchased Rea	agent)	Perfluorotridecanoic acid	50 ug/mI
LCPFUdA_00003	06/19/18	Wellin	gton Laboratories, Lo	t PFUdA0613	(Purchased Rea	agent)	Perfluoroundecanoic acid	50 ug/mI
LCPFC-L7 00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 2 mT	LCMPFCSU 00024	100 uT.	13C2-PFHxDA	50 ng/mI
		, ,	, , ,				13C2-PFTeDA	50 ng/mI
							13C4-PFHpA	50 ng/mI
							13C5-PFPeA	50 ng/mI
							13C8 FOSA	50 ng/mI
							13C4 PFBA	50 ng/mI
							13C2 PFDA	50 ng/mI
							13C2 PFDoA	50 ng/mI
							13C2 PFHxA	50 ng/mI
							1802 PFHxS	47.3 ng/mI
							13C5 PFNA	50 ng/mI
							13C4 PFOA	50 ng/mI
							13C4 PFOS	47.8 ng/mI
							13C2 PFUnA	50 ng/mI
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mI
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mI
							Perfluorodecanoic acid	400 ng/mI
							Perfluorododecanoic acid	400 ng/mI
							Perfluorodecane Sulfonic acid	385.6 ng/mI
							Perfluoroheptanoic acid (PFHpA)	400 ng/mI
							Perfluoroheptanesulfonic Acid	380.8 ng/mI
							Perfluorohexanoic acid	400 ng/mI
							Perfluorohexadecanoic acid	400 ng/mI
							Perfluorohexanesulfonic acid (PFHxS)	378.4 ng/mI
							Perfluorononanoic acid (PFNA)	400 ng/mI
							Perfluorooctanoic acid (PFOA)	400 ng/mI
							Perfluorooctandecanoic acid	400 ng/mI
							Perfluorooctanesulfonic acid (PFOS)	382.4 ng/mI
							Perfluorooctane Sulfonamide	400 ng/mI
							Perfluoropentanoic acid	400 ng/mI
							Perfluorotetradecanoic acid	400 ng/mI
							Perfluorotridecanoic acid	400 ng/mI
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker	10 mL	LCM2PFHxDA_00003	0.2 mL	Perfluoroundecanoic acid 13C2-PFHxDA	400 ng/mI 1 ug/mI
			115491		TCM2DEmoDa 00002	0 2	1202 DEMODA	1/
					LCM2PFTeDA_00003 LCM4PFHPA 00003		13C2-PFTeDA	1 ug/mI
							13C4-PFHpA	1 ug/mI
					LCM5PFPEA_00004 LCM8FOSA 00006		13C5-PFPeA	1 ug/mI 1 ug/mI
					LCM8FOSA_00006		13C8 FOSA	1 ug/ml 1 ug/ml
					LCMPFBA_00004		13C4 PFBA 13C2 PFDA	1 ug/mI 1 ug/mI
					LCMPFDoA 00004		13C2 PFDA 13C2 PFDOA	1 ug/mI 1 ug/mI

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				Reagent	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCMPFHxA 00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	0.2 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA 00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005	0.2 mL	13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003			on Laboratories, Lot M2		(Purchased Rea	agent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17 1	Wellingt	on Laboratories, Lot M2	PFTeDA1112	(Purchased Rea	agent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20	Wellingt	on Laboratories, Lot M4	APFHpA0515	(Purchased Rea	agent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004			on Laboratories, Lot M5		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M8	BFOSA1214I	(Purchased Rea	agent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19	Welling	ton Laboratories, Lot M	MPFBA1014	(Purchased Rea	agent)	13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	ton Laboratories, Lot M	MPFDA0414	(Purchased Rea	agent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00004	07/17/19	Welling	ton Laboratories, Lot M	PFDoA0714	(Purchased Rea	agent)	13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19		ton Laboratories, Lot M		(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18		ton Laboratories, Lot M		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19		ton Laboratories, Lot M		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20		ton Laboratories, Lot M		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		ton Laboratories, Lot M		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19	Welling	ton Laboratories, Lot M	PFUdA1014	(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039			Methanol, Lot 090285		LCPFBA 00003		Perfluorobutyric acid	1 ug/mL
			,		LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA 00004		Perfluoroheptanoic acid	1 ug/mL
						0.1	(PFHpA)	2 49/112
					LCPFHpSA 00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001		Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00004		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00005	0.1 mT.	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00003	03/05/18	Wellin	gton Laboratories, Lot	PFBA0313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19		ton Laboratories, Lot I		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lot	PFDA0613	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18		ton Laboratories, Lot E		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1	
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				Reagent	Parent Reage:	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFDSA 00001	09/13/18	Welling	ton Laboratories, Lot	LPFDS0913	(Purchased Read	gent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories, Lot	PFHpA0514	(Purchased Read	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lot	LPFHpS1112	(Purchased Read	gent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	ton Laboratories, Lot	PFHxA0514	(Purchased Read		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories, Lot		(Purchased Read		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	_	ton Laboratories, Lot		(Purchased Reag	,	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories, Lot		(Purchased Read	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00004	10/11/18		gton Laboratories, Lot		(Purchased Read		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		ton Laboratories, Lot		(Purchased Read		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	_	ton Laboratories, Lot		(Purchased Reag		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18	Welling	ton Laboratories, Lot	FOSA0714I	(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18		ton Laboratories, Lot		(Purchased Read		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot		(Purchased Read		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, Lot		(Purchased Read		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ton Laboratories, Lot	PFUdA0613	(Purchased Reag	gent)	Perfluoroundecanoic acid	50 ug/mL
LCPFCIC_00014	03/15/16	09/15/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00018	250 uL	13C4-PFHpA	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
					LCPFACMXB_00006	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00018	03/15/16	09/15/15	Methanol, Lot Fisher 153635	10 mL	LCM4PFHPA_00002		13C4-PFHpA	1 ug/mL
					LCMPFHxA_00006		13C2 PFHxA	1 ug/mL
					LCMPFHxS_00003		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003		13C5 PFNA	1 ug/mL
					LCMPFOA_00007		13C4 PFOA	1 ug/mL
	10/11/11				LCMPFOS_00007		13C4 PFOS	0.956 ug/mL
LCM4PFHPA_00002	12/10/18		on Laboratories, Lot N		(Purchased Reag		13C4-PFHpA	50 ug/mL
LCMPFHxA_00006	04/13/19		ton Laboratories, Lot		(Purchased Read	, <u>, , , , , , , , , , , , , , , , , , </u>	13C2 PFHxA	50 ug/mL
LCMPFHxS_00003	07/25/18		ton Laboratories, Lot		(Purchased Reag	, <u>, , , , , , , , , , , , , , , , , , </u>	1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19		ton Laboratories, Lot		(Purchased Reag	, <u>, , , , , , , , , , , , , , , , , , </u>	13C5 PFNA	50 ug/mL
LCMPFOA_00007	04/10/20		ton Laboratories, Lot		(Purchased Read		13C4 PFOA	50 ug/mL
LCMPFOS_00007	10/09/19	werring	ton Laboratories, Lot	MPFUSIU14	(Purchased Read	jent)	13C4 PFOS	47.8 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No.: 320-17463-1	

			Reagent	Parent Reag	ent		
	Exp Prep	Dilutant	Final		Volume		
Reagent ID	Date Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
.LCPFACMXB_00006	01/08/18 Welling	ton Laboratories, Lot P	FACMXB0312	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
						Perfluoroheptanoic acid (PFHpA)	2 ug/mL
						Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
						Perfluorononanoic acid (PFNA)	2 ug/mL
						Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
						Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP 00041	08/11/16 02/11/16	Methanol, Lot 090285	5 mL	LCPFBA 00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
_				LCPFBS 00003	0.1 mL	Perfluorobutane Sulfonate	0.884 ug/mL
				LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
				LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mI
				LCPFDoA 00003	0.1 mL	Perfluorododecanoic acid	1 ug/mI
				LCPFDoS_00003	0.1 mL	PFDoS (Perflouro-1-dodecanesulfonate	0.968 ug/mL
				LCPFDS 00003	0.1 mL	Perfluorodecane Sulfonate	0.964 ug/mL
				LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mI
				LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
				LCPFHpS 00005	0.1 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
				LCPFHpSA_00001		Perfluoroheptanesulfonic Acid	0.952 ug/mI
				LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mI
				LCPFHxDA_00004		Perfluorohexadecanoic acid	1 ug/mI
				LCPFHxS_00003		Perfluorohexane Sulfonate	0.946 ug/mI
				LCPFHxSA_00001		Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mI
				LCPFNA_00004		Perfluorononanoic acid (PFNA)	1 ug/mI
				LCPFNS_00002	0.1 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mI
				LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mI
				LCPFODA_00004		Perfluorooctandecanoic acid	1 ug/mI
				LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mI
				LCPFOSA_00005		Perfluorooctane Sulfonamide	1 ug/mL
				LCPFPeA_00003		Perfluoropentanoic acid	1 ug/mL
				LCPFPeS_00002	0.1 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
				LCPFTeDA 00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
				LCPFTrDA 00003	0.1 mL		1 ug/mL
				LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00003	03/05/18 Wellir	gton Laboratories, Lot	PFBA0313	(Purchased Rea	agent)	Perfluorobutyric acid	50 ug/mL
.LCPFBS_00003	10/09/19 Wellin	gton Laboratories, Lot		(Purchased Rea	agent)	Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19 Wellin	gton Laboratories, Lot	LPFBS1014	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA 00003	06/18/18 Wellir	ngton Laboratories, Lot	PFDA0613	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1	
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				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	- Analyte	Concentration
.LCPFDoA 00003	01/03/18	Welling	ton Laboratories, Lot	PFDoA0113	(Purchased Reag	ent)	Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00003	10/06/16	Welling	ton Laboratories, Lot I	PFDoS1011	(Purchased Reag	ent)	PFDoS (Perflouro-1-dodecanesulfonate	48.4 ug/mL
.LCPFDS 00003	09/13/18	Welling	ton Laboratories, Lot	LPFDS0913	(Purchased Reag	ent)	Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFDSA 00001	09/13/18	Welling	ton Laboratories, Lot	LPFDS0913	(Purchased Reag	ent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00004	05/09/19	Welling	ton Laboratories, Lot 1	PFHpA0514	(Purchased Reag		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS 00005	01/28/19	Welling	ton Laboratories, Lot I	PFHpS0114	(Purchased Reag		Perfluoroheptane Sulfonate	47.6 ug/mL
.LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lot I	PFHpS1112	(Purchased Reag	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA 00003	05/09/19	Welling	ton Laboratories, Lot	PFHxA0514	(Purchased Reag		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA 00004	11/28/17	Welling	ton Laboratories, Lot P	FHxDA0707	(Purchased Reag		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS_00003	05/09/19	Welling	ton Laboratories, Lot L	JPFHxS0514	(Purchased Reag	ent)	Perfluorohexane Sulfonate	47.3 ug/mL
.LCPFHxSA_00001	05/09/19	Welling	ton Laboratories, Lot I	JPFHxS0514	(Purchased Reag	ent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
.LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot	PFNA0514	(Purchased Reag	ent)	Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17	Welling	ton Laboratories, Lot 1	LPFNS0712	(Purchased Reag	rent)	PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA 00004	10/11/18	Wellin	gton Laboratories, Lot	PFOA1013	(Purchased Reag	ent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00004	04/25/17	Welling	ton Laboratories, Lot	PFODA0807	(Purchased Reag	ent)	Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot 1	LPFOS0614	(Purchased Reag	ent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
.LCPFOSA_00005	07/31/18	Welling	ton Laboratories, Lot	FOSA0714I	(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA 00003	01/03/18	Welling	ton Laboratories, Lot	PFPeA0113	(Purchased Reag	ent)	Perfluoropentanoic acid	50 ug/mL
.LCPFPeS_00002	07/04/17		ton Laboratories, Lot I		(Purchased Reag	•	PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA_00003	06/19/18	Welling	ton Laboratories, Lot P	FTeDA0613	(Purchased Reag	ent)	Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00003	12/10/18	Welling	ton Laboratories, Lot P	FTrDA1213	(Purchased Reag	ent)	Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00003	06/19/18	Welling	ton Laboratories, Lot	PFUdA0613	(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

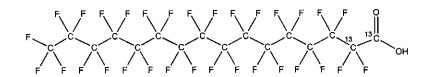
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

 $^{13}\mathrm{C_{2}}^{12}\mathrm{C_{14}HF_{31}O_{2}}$

MOLECULAR WEIGHT:

816.11

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

<u>ISOTOPIC PURITY:</u>

≥99% ¹³C (1,2-¹³C₂)

<u>LAST TESTED:</u> (mm/dd/yyyy)

EXPIRY DATE: (mm/dd/yyyy)

11/29/2012 11/29/2017

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:

04/01/2015

(mm/dd/yyy

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, u_z(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:

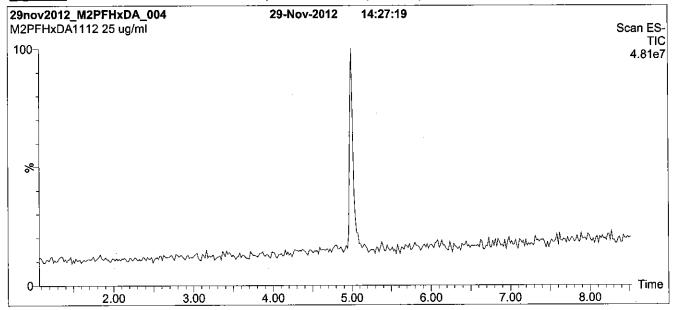
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

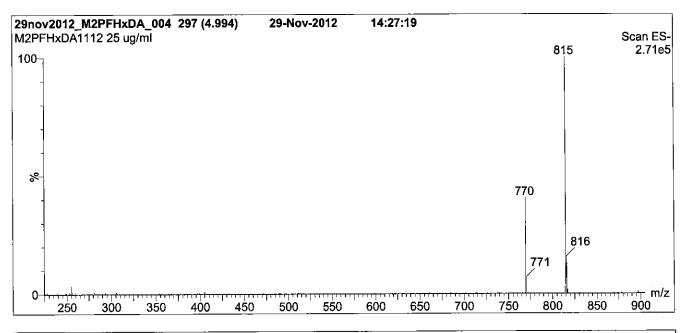




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





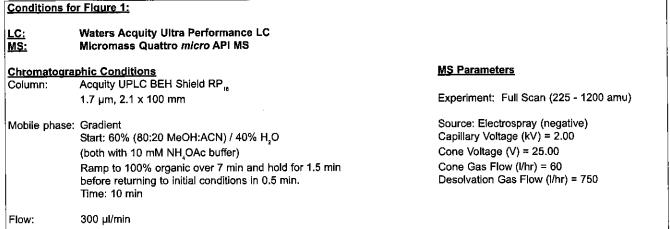
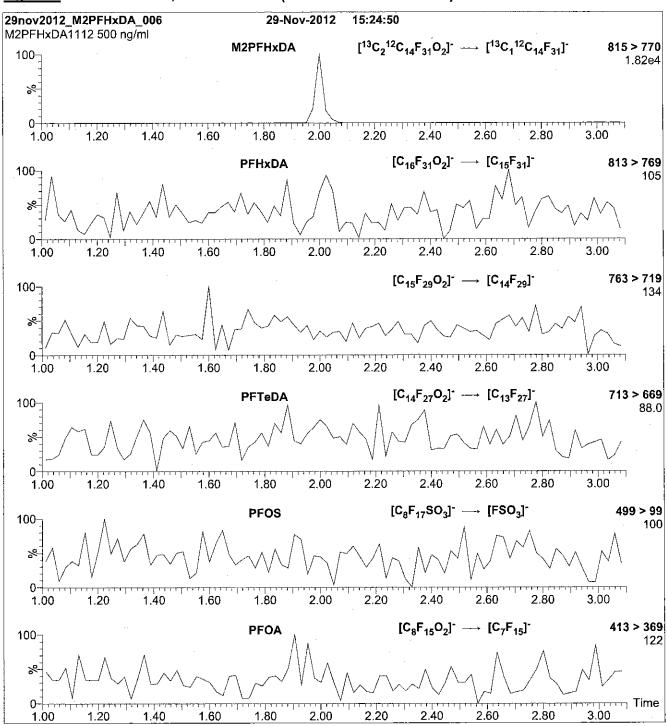


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





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,OAc buffer)

Flow: 300 µl/min

MS Parameters

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

M2PFHxDA1112 (4 of 4)

Reagent

LCM2PFTeDA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFTeDA

LOT NUMBER:

M2PFTeDA1112

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₁₂HF₂₇O₂

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

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

716.10

μg/ml <u>SOLVENT(S):</u>

Methanol

>99% 13C

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

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

11/29/2012

EXPIRY DATE: (mm/dd/yyyy)

11/29/2017

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> 04/01/2018</u>

(mm/dd/yyy

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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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:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

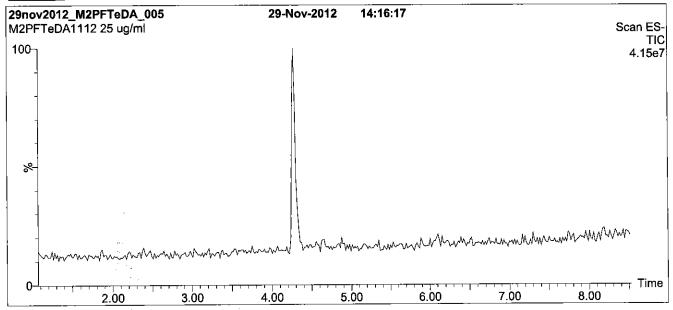
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

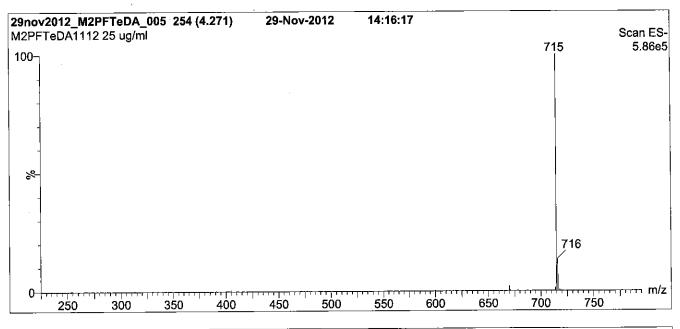




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Figure 1: M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)





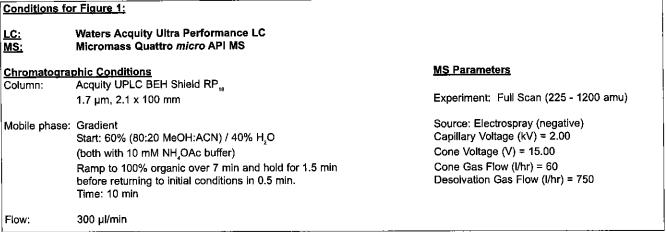
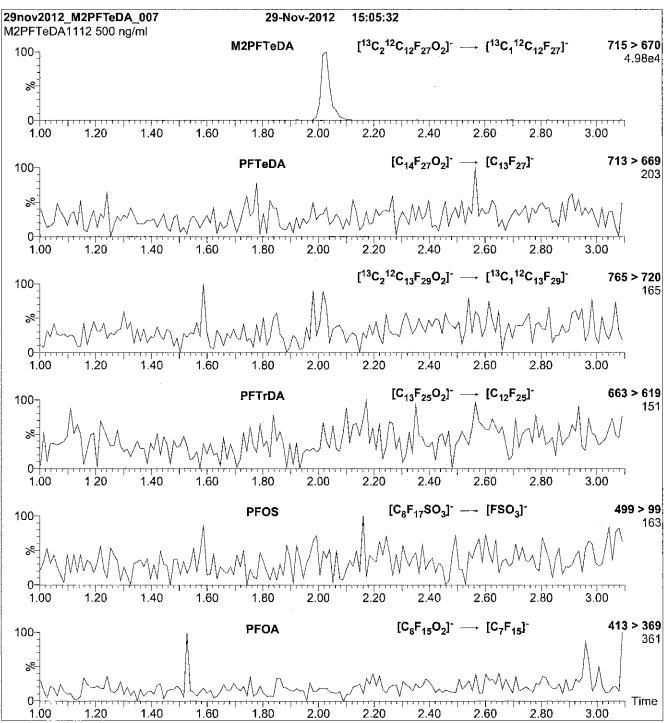
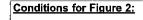


Figure 2: M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μI (500 ng/ml M2PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3

Collision Energy (eV) = 14

Reagent

LCM4PFHPA_00002

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA1213

COMPOUND:

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

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₄¹²C₃HF₁₃O₂

MOLECULAR WEIGHT:

368.03

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

(1,2,3,4-13C₄)

Water (<1%) ≥99%13C **ISOTOPIC PURITY:**

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

12/10/2013

EXPIRY DATE: (mm/dd/yyyy)

12/10/2018

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:

INTENDED USE:

The products prepared by Weilington 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, $u_{x}(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

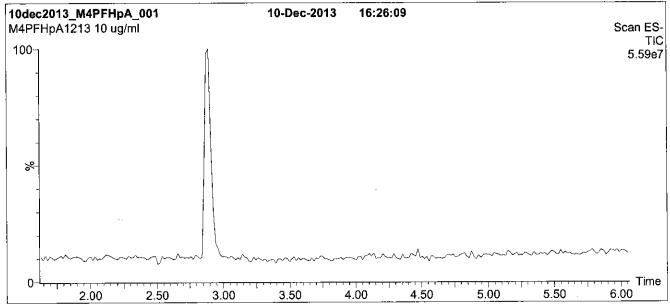
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

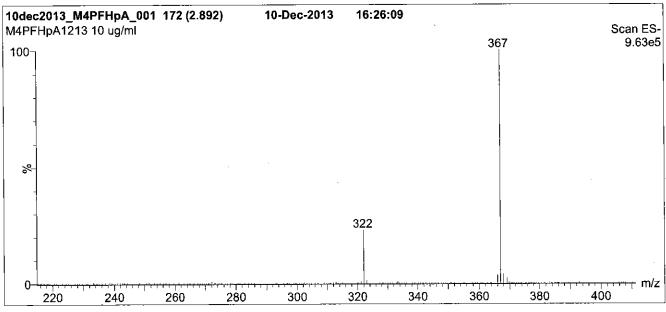




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





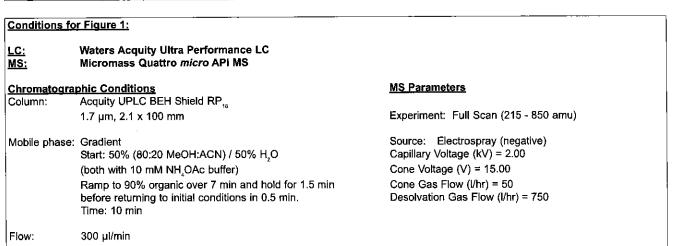
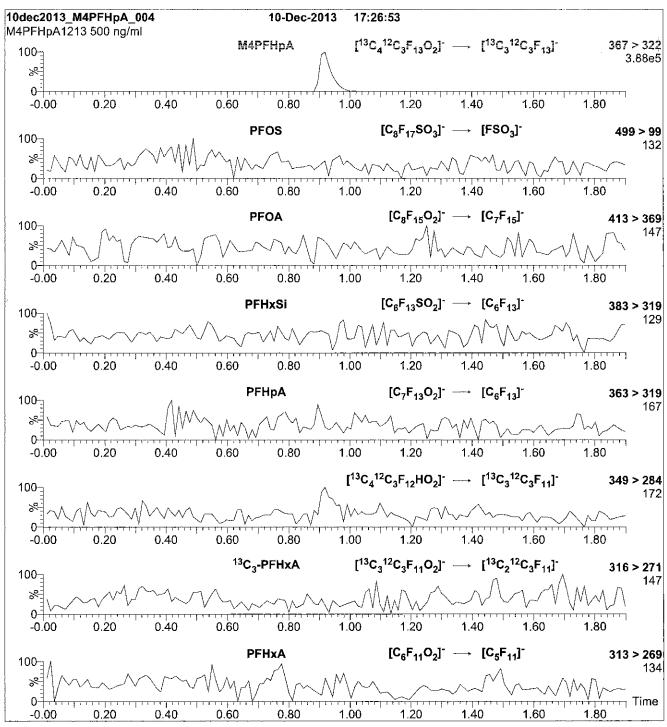
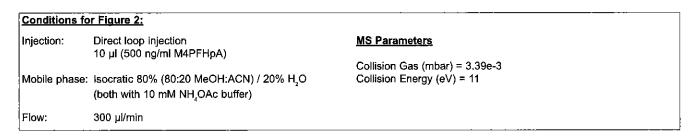


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCM4PFHPA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0515

COMPOUND:

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

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₄¹²C₃HF₁₃O₂

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

368.03

CONCENTRATION:

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

SOLVENT(S):

Methanol

≥99%¹³C

Water (<1%)

(1,2,3,4-13C₂)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/22/2015

EXPIRY DATE: (mm/dd/yyyy)

05/22/2020

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

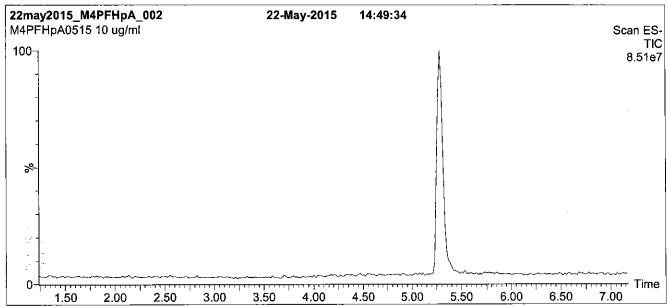
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

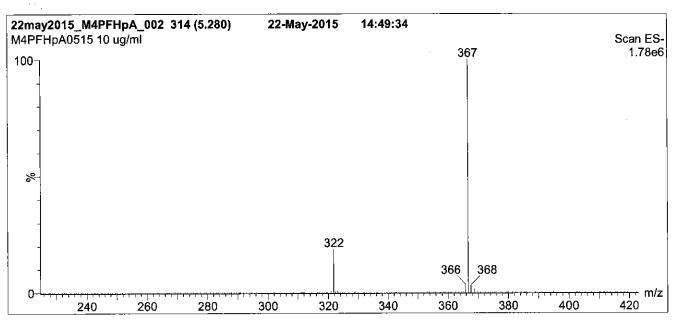




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Figure 1: M4PFHpA; LC/MS Data (TIC and Mass Spectrum)





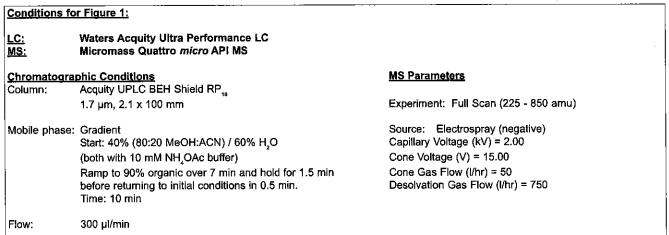
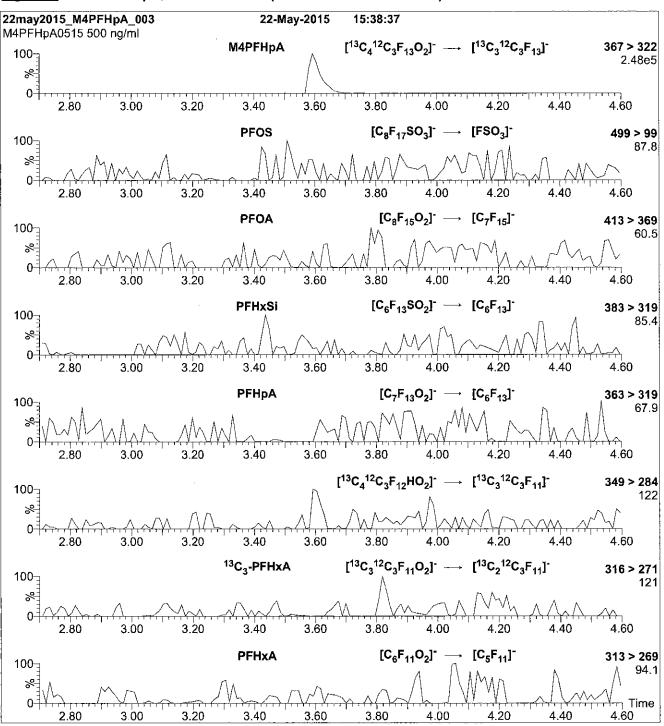
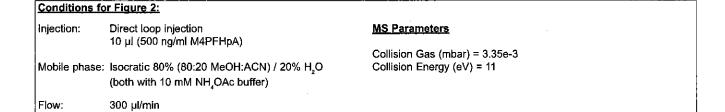


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCM5PFPEA_00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA0515

COMPOUND:

Perfluoro-n-[13C_x]pentanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

13C,HF,O,

MOLECULAR WEIGHT:

269.01

 $(^{13}C_{5})$

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

05/22/2015

EXPIRY DATE: (mm/dd/yyyy)

05/22/2020

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 < 0.1% of perfluoro-n-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: _

/mm/dd/ssss)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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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:

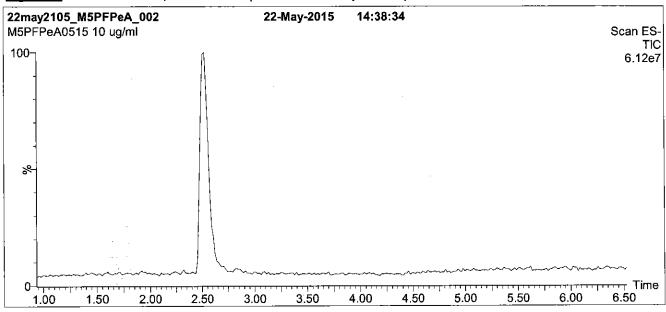
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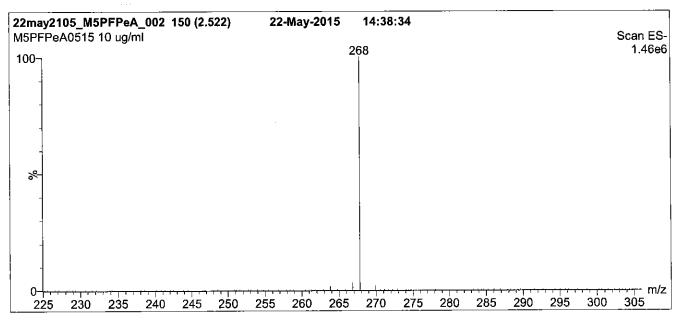




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Figure 1: M5PFPeA; LC/MS Data (TIC and Mass Spectrum)





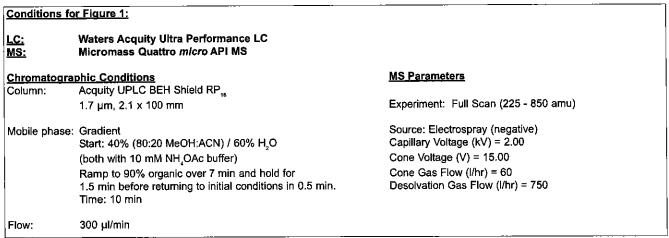
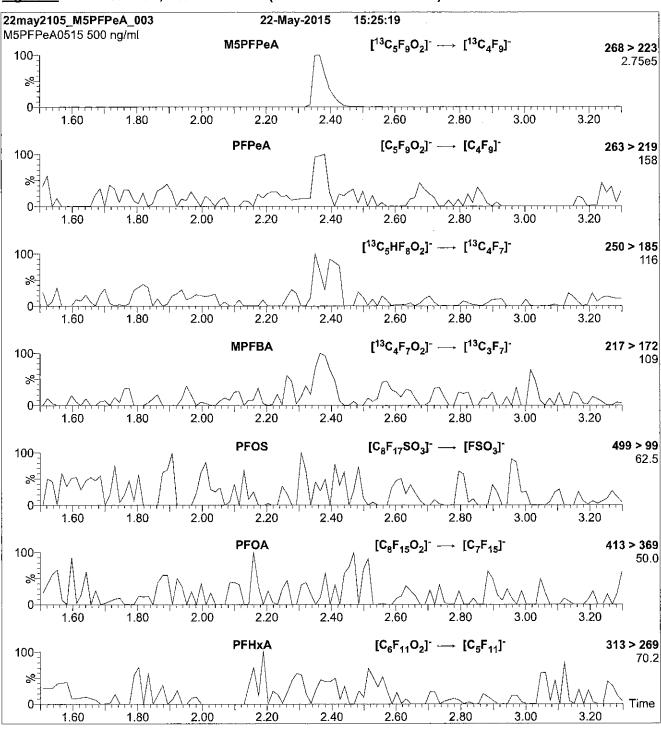
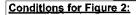


Figure 2: M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml M5PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 9

LCM8FOSA_00006



PRODUCT CODE:

M8FOSA-I

LOT NUMBER:

M8FOSA1214I

COMPOUND:

Perfluoro-1-[13C] octanesulfonamide

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₈H₂F₁₇NO₂S

CONCENTRATION:

50 ± 2.5 μg/ml

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/15/2014

EXPIRY DATE: (mm/dd/yyyy)

12/15/2016

RECOMMENDED STORAGE:

Refrigerate ampoule

MOLECULAR WEIGHT:

SOLVENT(S):

Isopropanol

507.09

ISOTOPIC PURITY:

≥99% ¹³C

 $(^{13}C_{_8})$

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

R C Chittim

Date: 04/01/2015

(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:

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

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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.

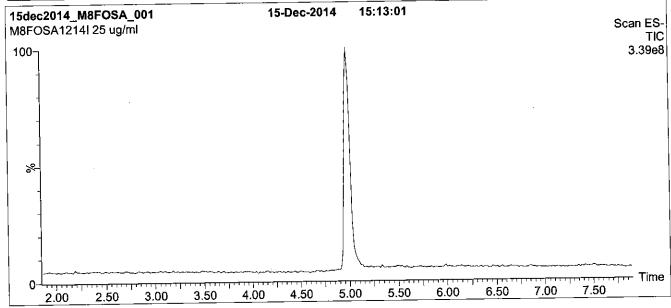
QUALITY MANAGEMENT:

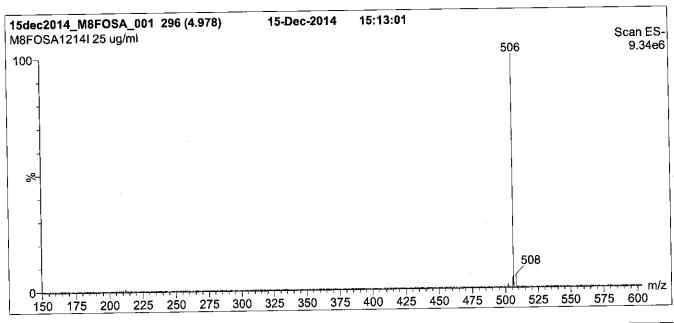
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Figure 1: M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)





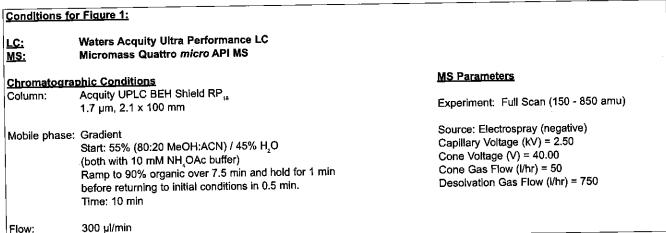
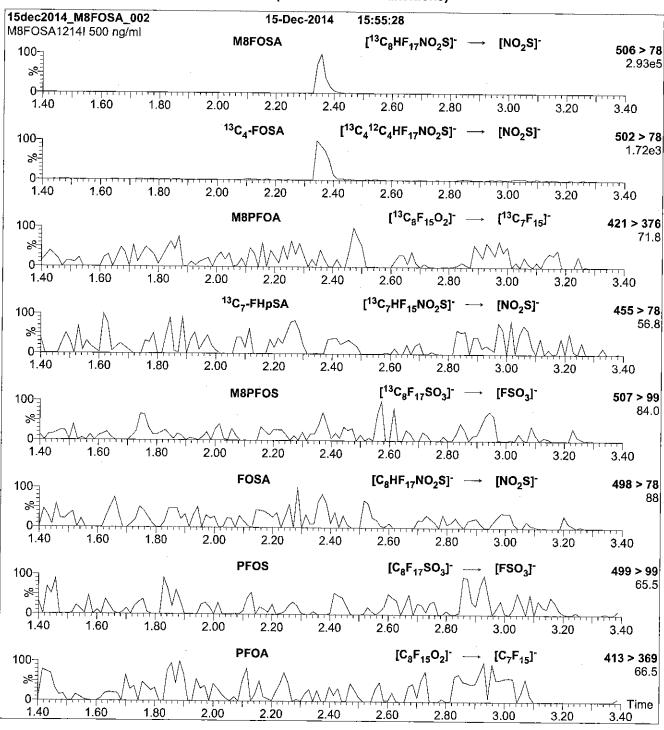
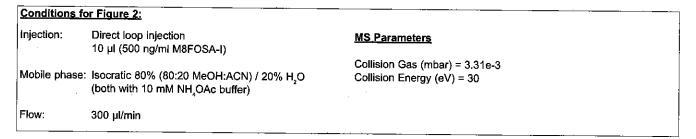


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





LCM8FOSA_00007



572887

ID: LCM8FOSA_00007 Exp. 12/15/16 Prpd: CBW 13C8-Perfluorooctanesulf R: 1/25/16

S:



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M8FOSA-I

LOT NUMBER:

M8FOSA1214I

COMPOUND:

Perfluoro-1-[13C]]octanesulfonamide

CAS#:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₈H₉F₁₇NO₂S

CONCENTRATION:

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

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/15/2014

EXPIRY DATE: (mm/dd/yyyy)

12/15/2016

RECOMMENDED STORAGE:

Refrigerate ampoule

MOLECULAR WEIGHT:

507.09

SOLVENT(S):

Isopropanol

ISOTOPIC PURITY:

≥99% ¹³C

 $(^{13}C_{8})$

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>04/01/2015</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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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

 $x_4, x_2,...x_n$ 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.

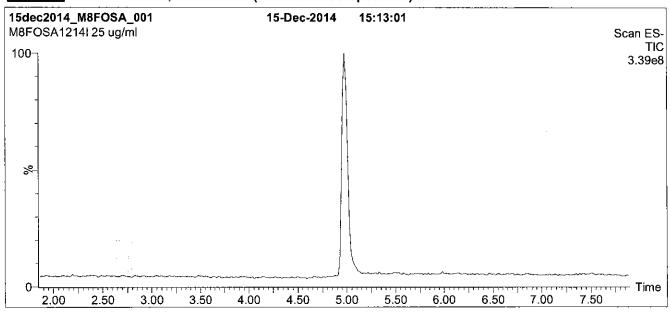
QUALITY MANAGEMENT:

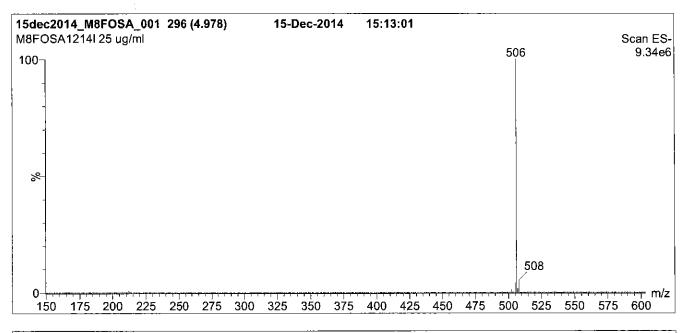
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





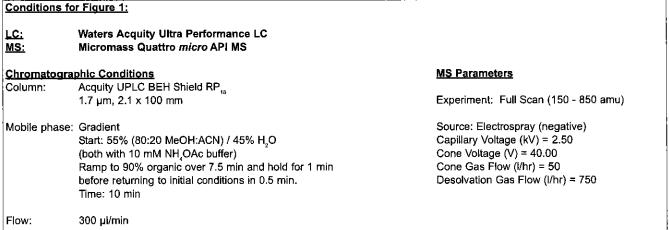
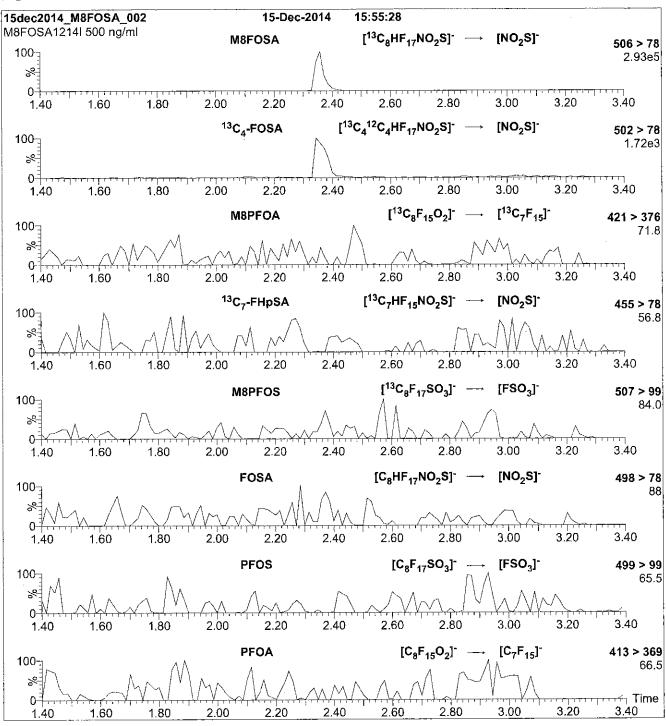
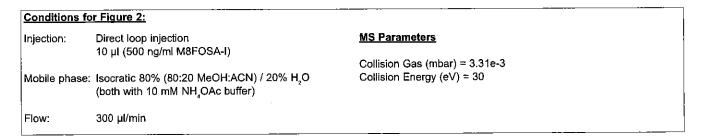


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





LCMPFBA_00004



PRODUCT CODE:

MPFBA

LOT NUMBER:

MPFBA1014

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄HF,O₂

MOLECULAR WEIGHT:

218.01

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%¹³C (1,2,3,4-¹³C₂)

LAST TESTED: (mm/dd/yyyy)

10/31/2014

EXPIRY DATE: (mm/dd/yyyy)

10/31/2019

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:

P.C. Chittim

vate: _

(mm/dd/yyy)

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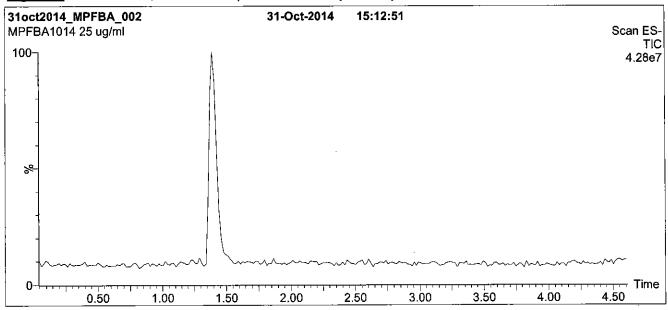
QUALITY MANAGEMENT:

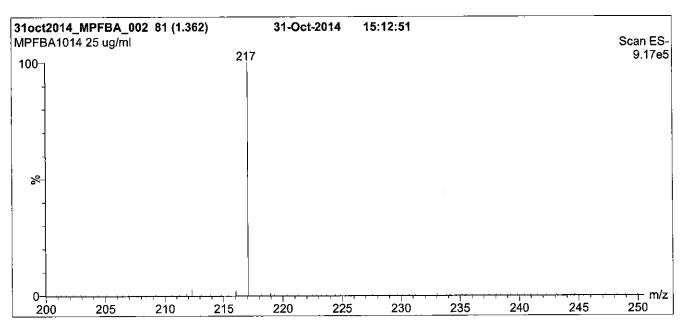
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Figure 1: MPFBA; LC/MS Data (TIC and Mass Spectrum)





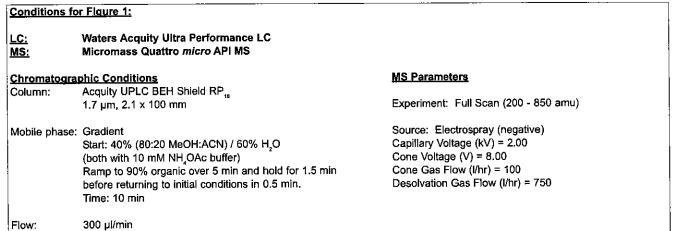
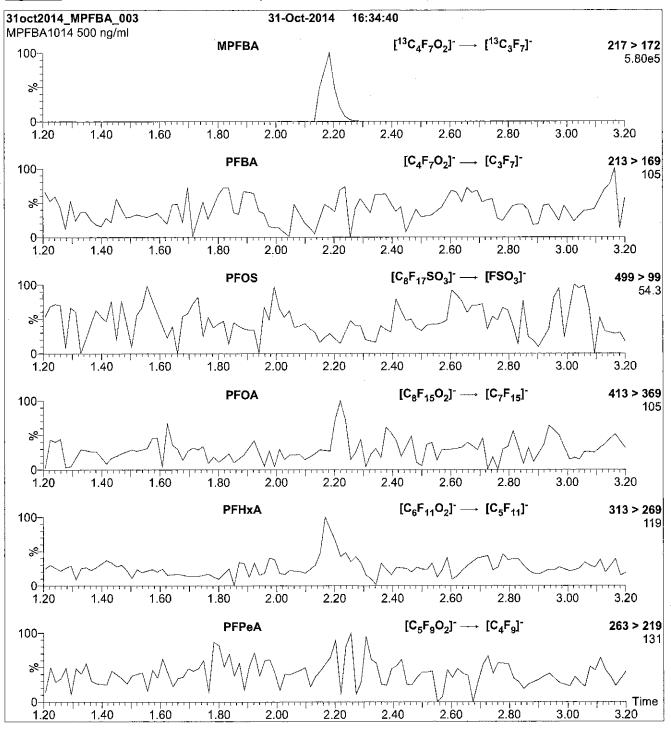
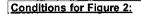


Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% $\rm H_2O$

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3 Collision Energy (eV) = 10

LCMPFDA_00004



12LCm50262

LCMPFDA - 00001

PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0411

COMPOUND:

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

STRUCTURE:

CAS#

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₉O₂

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol

SOLVENIO

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C (1,2-¹³C₂)

LAST TESTED: (mm/dd/yyyy)

04/07/2011

EXPIRY DATE: (mm/dd/yyyy)

04/07/2014

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 ¹³C₄-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>)4/19/2011</u>

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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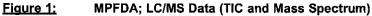
EXPIRY DATE / PERIOD OF VALIDITY:

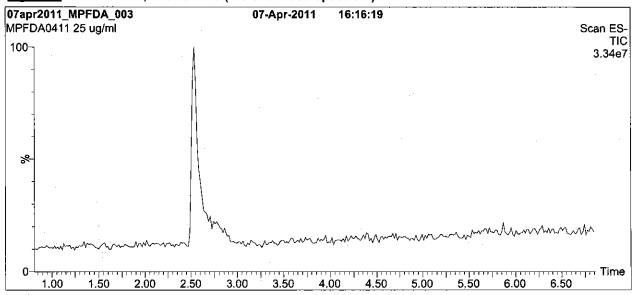
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

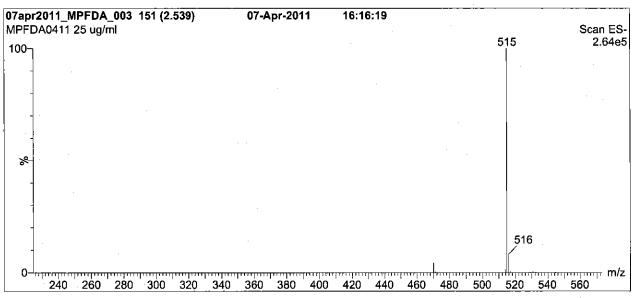
LIMITED WARRANTY:

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.

^{**}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**







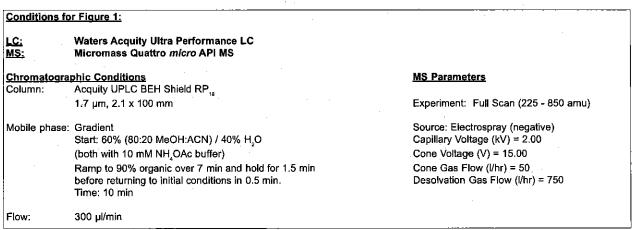
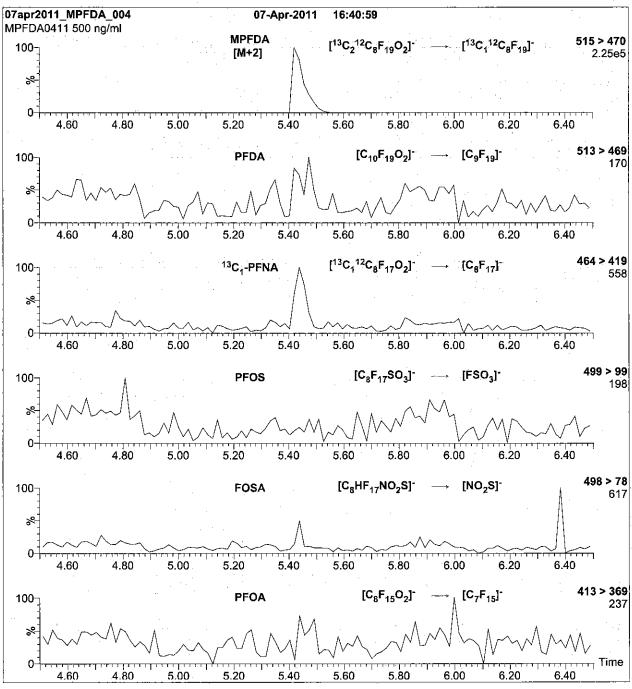
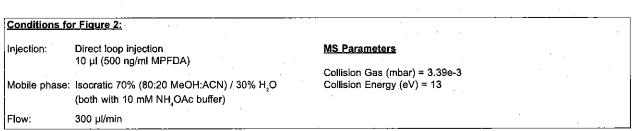


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFDA_00006





PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0815

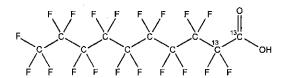
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₉O₂

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

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

SOLVENT(S):

Methanol

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

ISOTOPIC PURITY:

Water (<1%) >99% 13C

CHEMICAL PURITY:

>98%

08/19/2015

LAST TESTED: (mm/dd/yyyy)

00/19/2013

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.

Contains < 0.1% of ¹³C₄-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.C. Chittim

Date: _

(mm/dd/www)

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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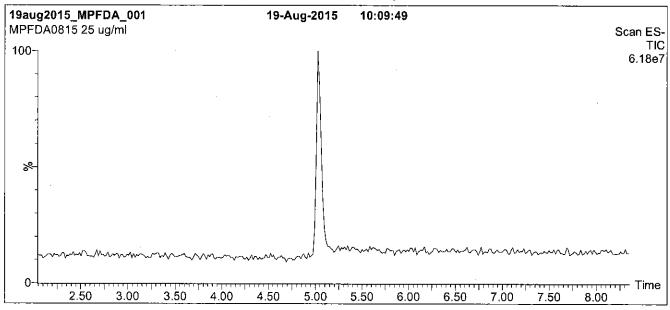
QUALITY MANAGEMENT:

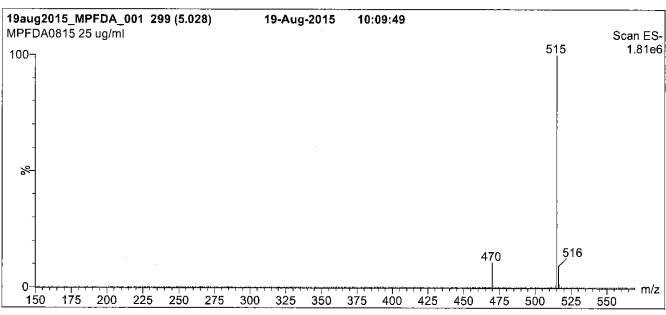
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Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)





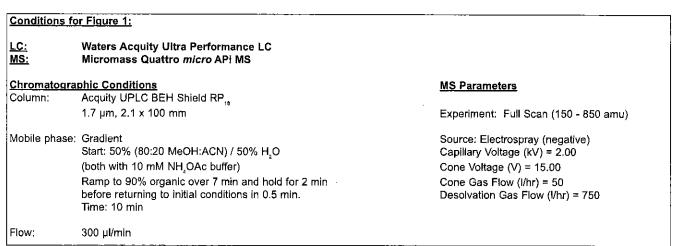
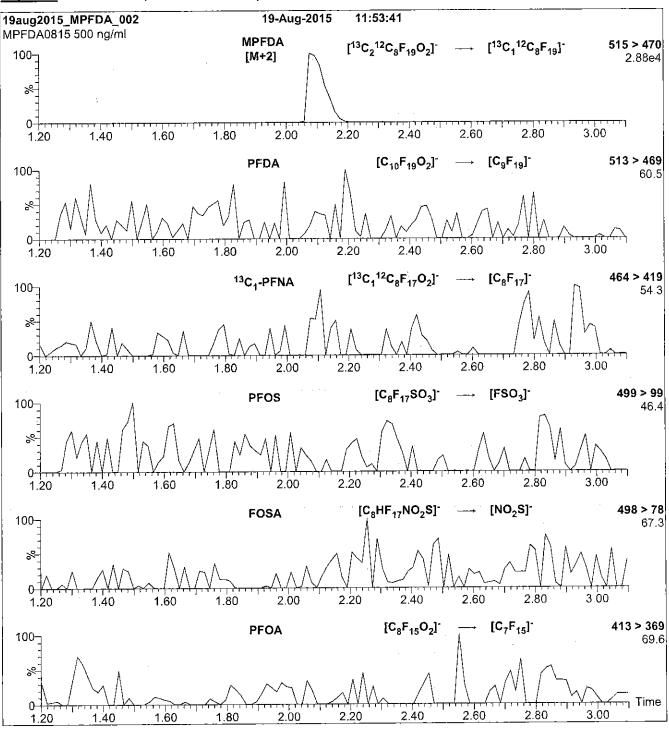
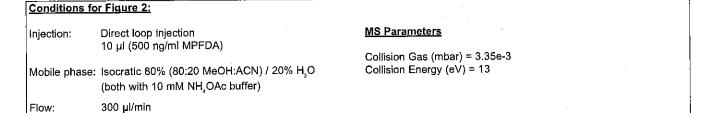


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFDoA_00004



PRODUCT CODE:

MPFDoA

LOT NUMBER:

MPFDoA0714

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₁₀HF₂₃O₂

MOLECULAR WEIGHT:

616.08

CONCENTRATION: $50 \pm 2.5 \,\mu g/ml$ SOLVENT(S):

ISOTOPIC PURITY:

Methanol

≥99% ¹³C

 $(1,2^{-13}C_{o})$

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/17/2014

EXPIRY DATE: (mm/dd/yyyy)

07/17/2019

RECOMMENDED STORAGE:

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DOCUMENTATION/ DATA ATTACHED:

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

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See page 2 for further details.

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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.

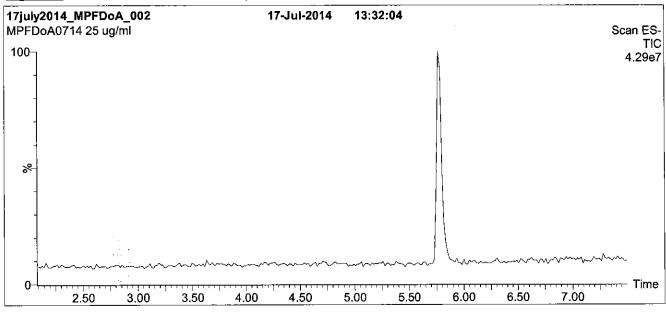
QUALITY MANAGEMENT:

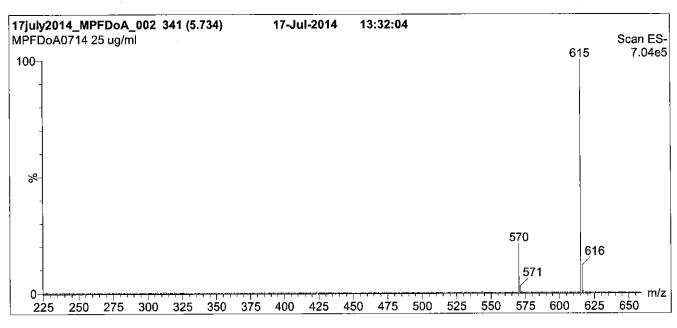
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





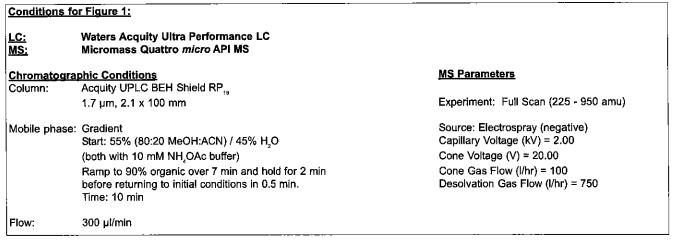
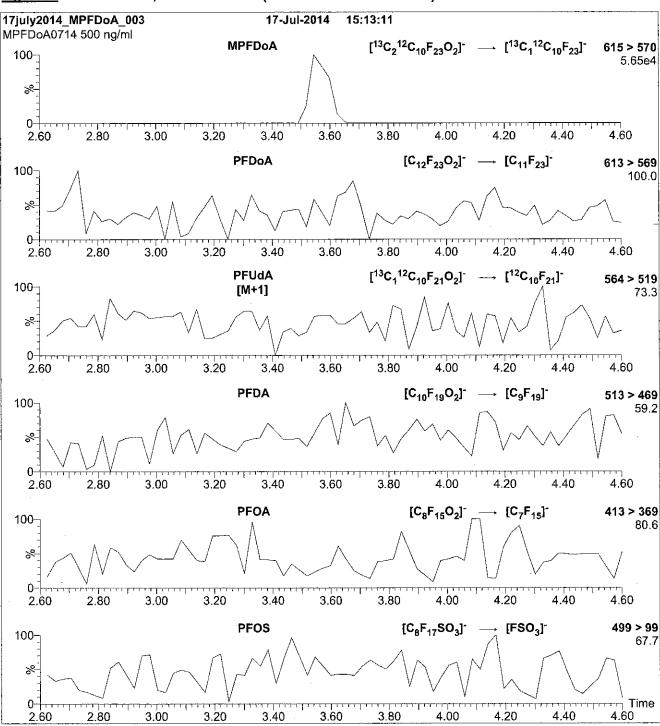
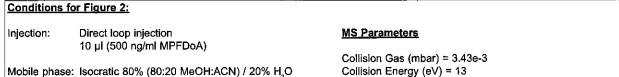


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





(both with 10 mM NH,OAc buffer)

Flow: 300 µ1/min

LCMPFHxA_00006



PRODUCT CODE:

MPFHxA

LOT NUMBER:

MPFHxA0414

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

13C212C4HF4O2

MOLECULAR WEIGHT:

316.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%) >99%13C

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

(1,2-13C₂)

LAST TESTED: (mm/dd/yyyy)

04/13/2014

EXPIRY DATE: (mm/dd/yyyy)

04/13/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

Contains < 0.1% of perfluoro-n-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>04/15/2014</u>

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, $u_z(y)$, 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 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.

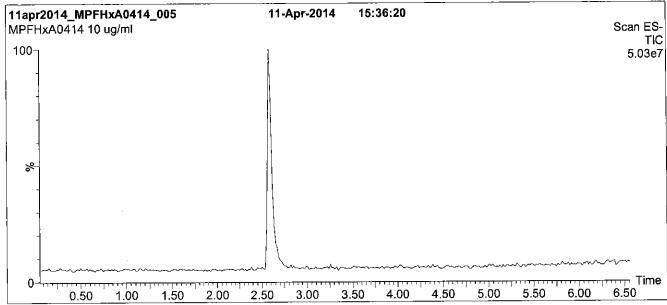
QUALITY MANAGEMENT:

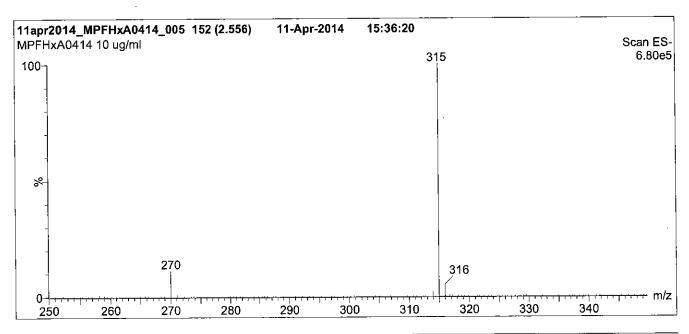
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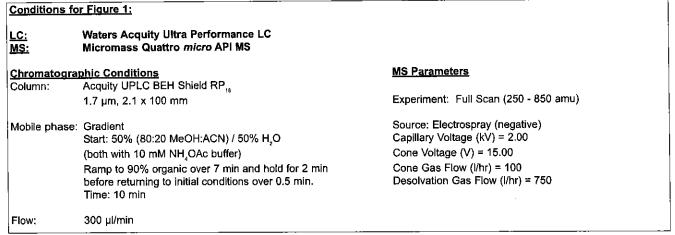




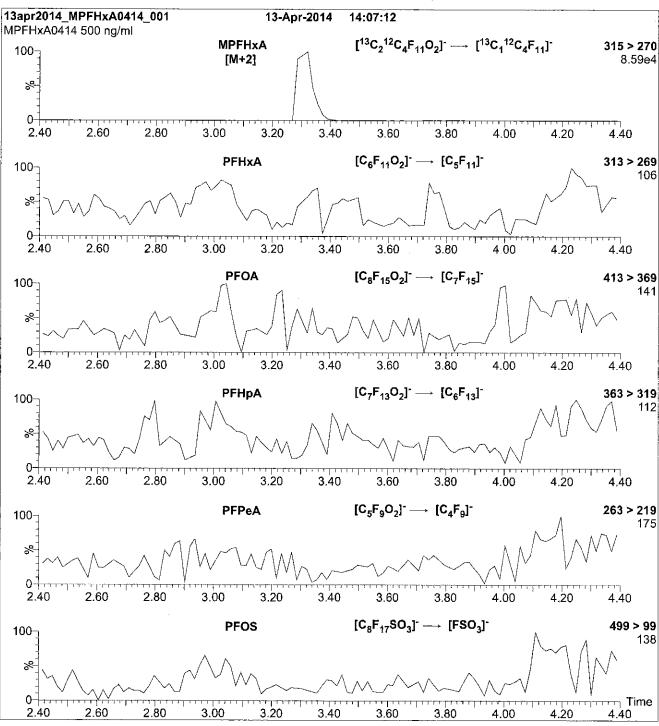


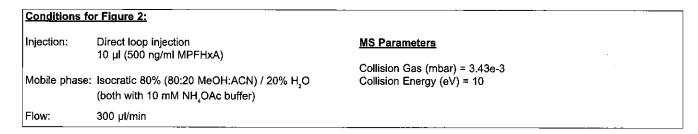






<u>Figure 2:</u> MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFHxA_00007



ID: LCMPFHxA 00007 Exp:04/09/20 Prpd;CBW Opn:02/25/16 13C2-Perfluorohexanoic ac



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxA

LOT NUMBER:

MPFHxA0415

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₄HF₁₁O₂

MOLECULAR WEIGHT:

316.04

CONCENTRATION:

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

SOLVENT(S):

Methanol Water (<1%)

≥99%13C

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

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

LAST TESTED: (mm/dd/yyyy)

04/09/2015

EXPIRY DATE: (mm/dd/yyyy)

04/09/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

Contains < 0.1% 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:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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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:

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

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 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:

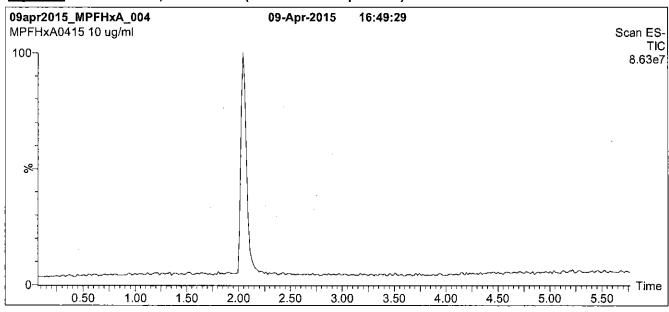
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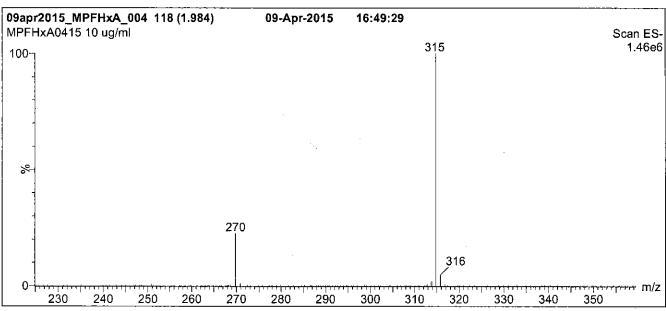




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





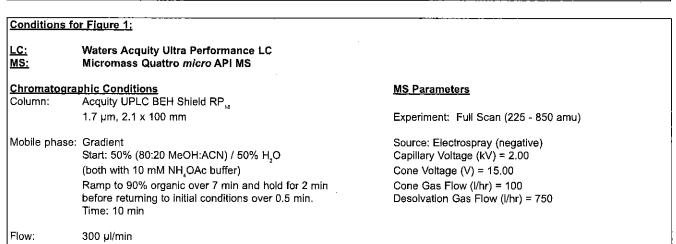
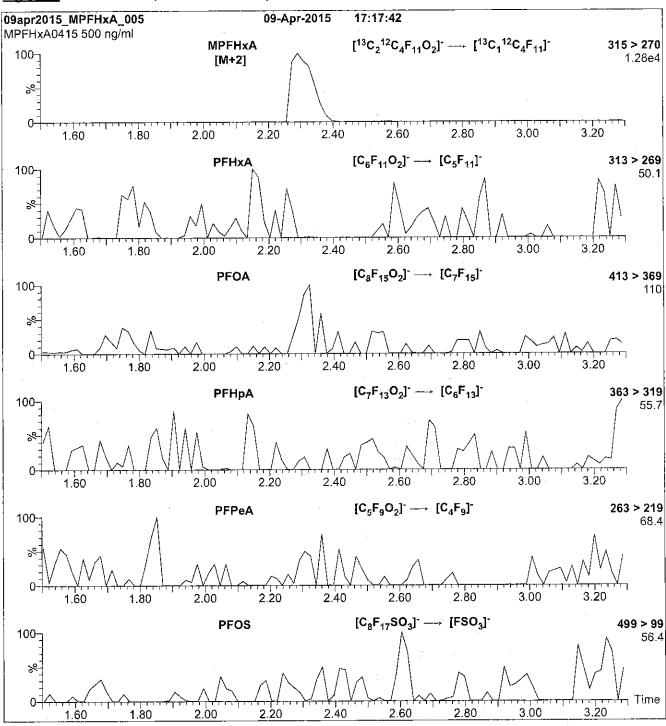
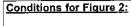


Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFHxA)

MS Parameters

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

Collision Gas (mbar) = 3,20e-3 Collision Energy (eV) = 10

(both with 10 mM NH₂OAc buffer)

Flow:

300 µl/min

LCMPFHxS_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxS

LOT NUMBER:

MPFHxS0713

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

F F F F F F

MOLECULAR FORMULA:

C₆F₁₃S¹⁸O₂¹⁶ONa

MOLECULAR WEIGHT:

426.10

CONCENTRATION:

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>94% (18O₂)

LAST TESTED: (mm/dd/yyyy)

07/25/2013

EXPIRY DATE: (mm/dd/yyyy)

07/25/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.3 \pm 2.4 \,\mu\text{g/ml}$ (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 (C₆F₁₃S¹⁶O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C₆F₁₃S¹⁶O₃⁻) when both compounds are injected together. This difference may vary between instruments.

Due to the isotopic purity of the starting material (¹⁶O₂ >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:

P.C. Phittim

Date:

<u>04/15/2014</u>

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

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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 x_{ij} x_{ij} ... x_{ij} on which it depends is:

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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 17025:2005 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:

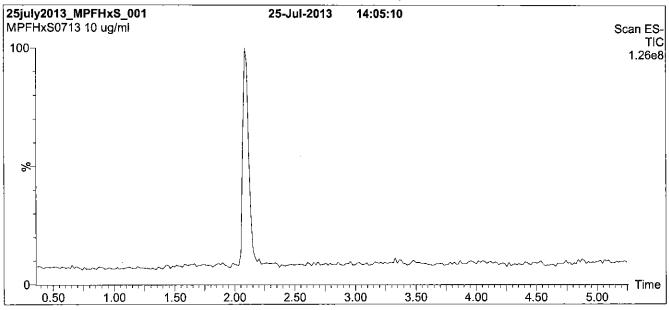
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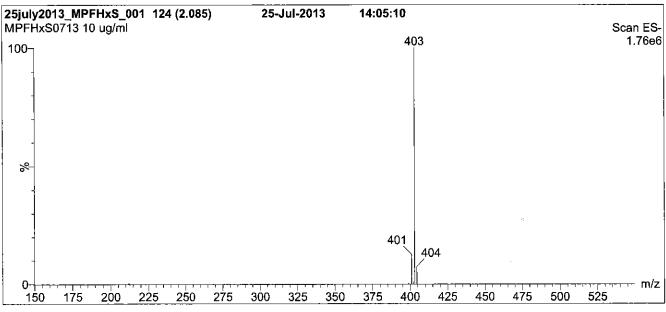




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





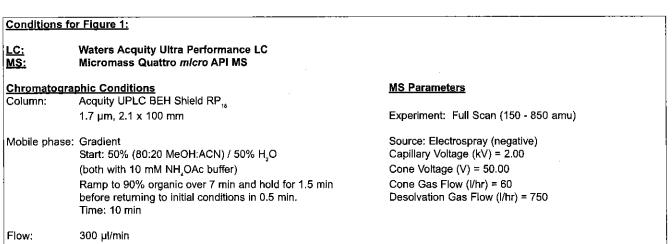
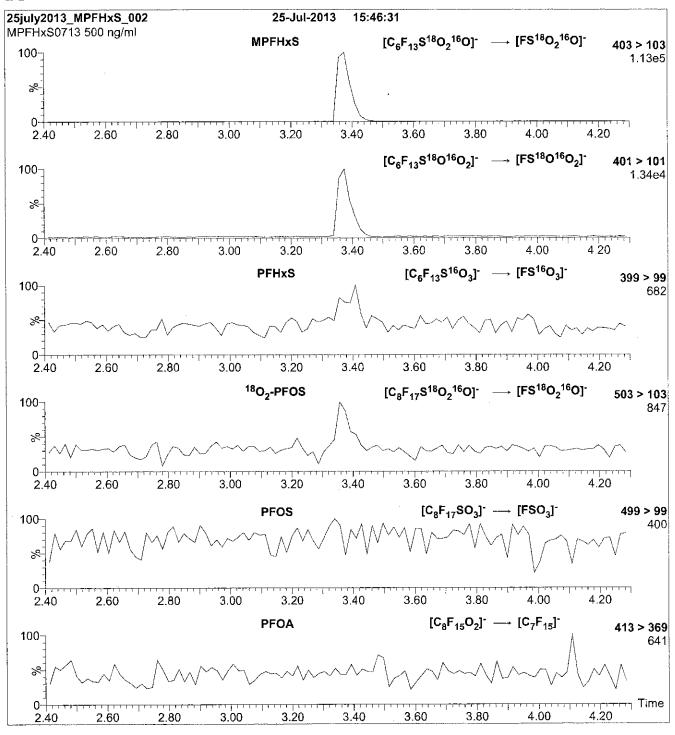
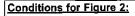


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3 Collision Energy (eV) = 30

LCMPFHxS_00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxS

LOT NUMBER:

MPFHxS0713

COMPOUND:

Sodium perfluoro-1-hexane[18O2]sulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₆F₁₃S¹⁸O₂¹⁶ONa

426.10

CONCENTRATION:

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

MOLECULAR WEIGHT:

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>94% (18O₃)

LAST TESTED: (mm/dd/yyyy)

07/25/2013

EXPIRY DATE: (mm/dd/yyyy)

07/25/2018

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 ($C_eF_{13}S^{16}O_2^{-16}O^-$) has been observed to be up to 10% lower than for PFHxS (C₈F₁₃S¹⁶O₃) when both compounds are injected together. This difference may vary between instruments.

Due to the isotopic purity of the starting material (160, >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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

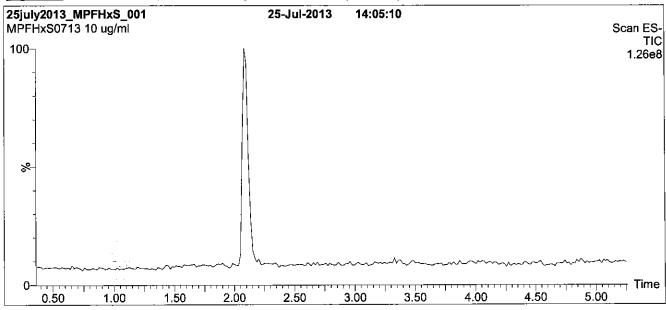
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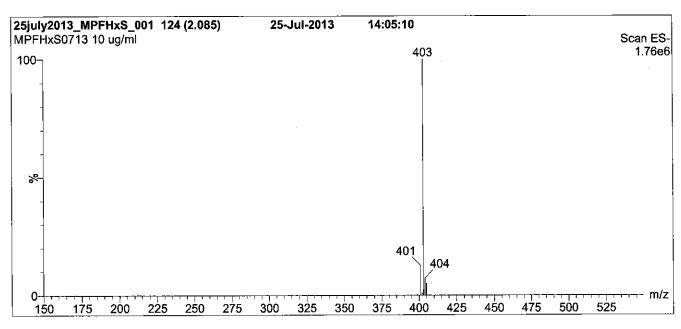




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





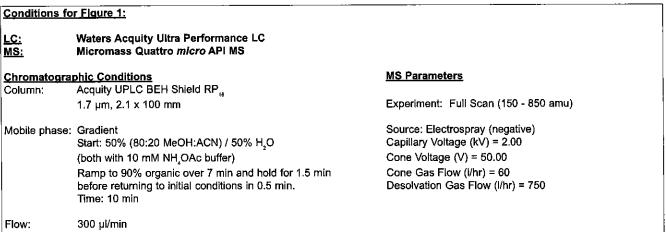
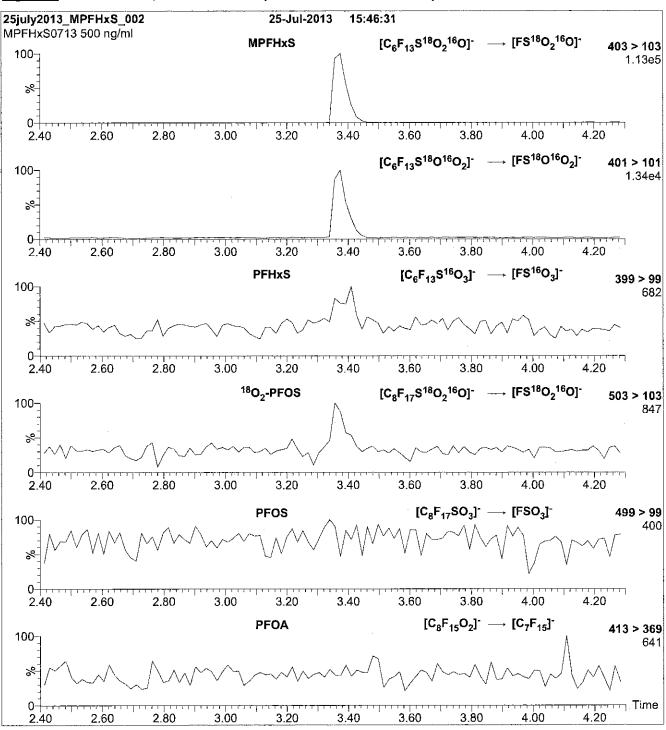
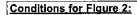


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





Injection: Direct loop injection

10 μl (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% $\rm H_{\scriptscriptstyle 2}O$

(both with 10 mM NH₂OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3 Collision Energy (eV) = 30

LCMPFNA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₅¹²C₄HF₁₇O₂

MOLECULAR WEIGHT:

469.04

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol

Water (<1%)

 $(1,2,3,4,5^{-13}C_{5})$

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%¹³C

LAST TESTED: (mm/dd/yyyy)

04/13/2014

EXPIRY DATE: (mm/dd/yyyy)

04/13/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/13/2014

(mm/dd/yy

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_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 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).

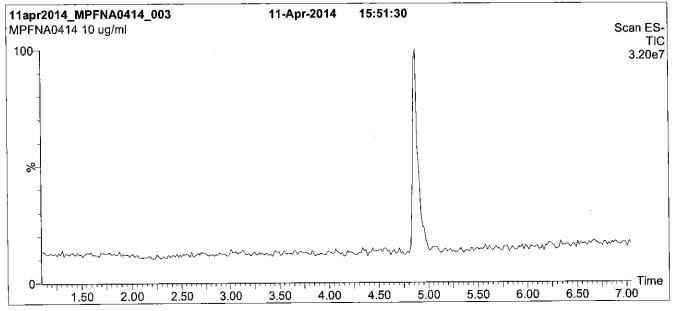


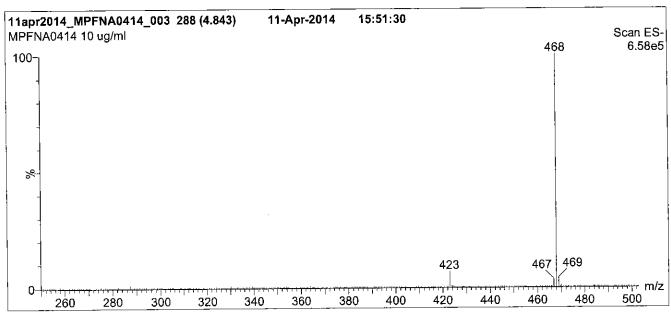


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Figure 1: MPFNA; LC/MS Data (TIC and Mass Spectrum)

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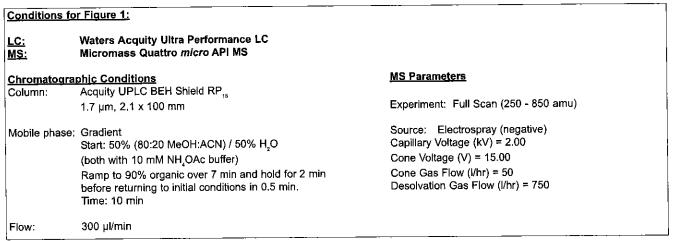
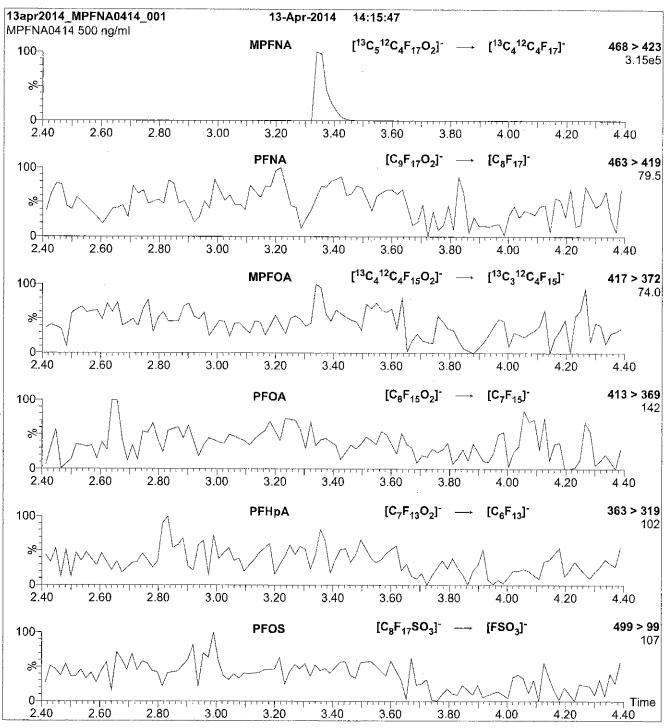
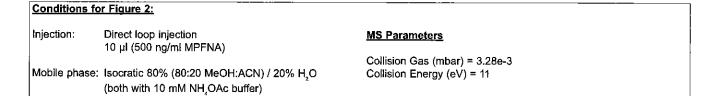


Figure 2: MPFNA; LC/MS/MS Data (Selected MRM Transitions)





Form#:27, Issued 2004-11-10 Revision#:2, Revised 2012-06-13

300 µl/min

Flow:

LCMPFNA_00004



13C5-Perfluornonanoic aci



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₅¹²C₄HF₁₇O₇

CONCENTRATION:

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

SOLVENT(S):

469.04

ISOTOPIC PURITY:

MOLECULAR WEIGHT:

Methanol

Water (<1%) ≥99%13C

 $(1,2,3,4,5^{-13}C_{5})$

CHEMICAL PURITY:

>98%

04/13/2014

LAST TESTED: (mm/dd/yyyy)

EXPIRY DATE: (mm/dd/yyyy)

04/13/2019

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. 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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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:

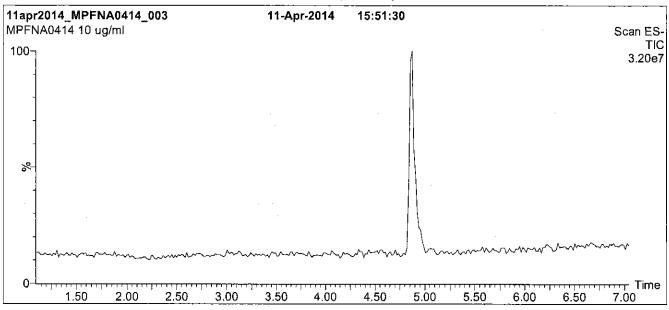
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

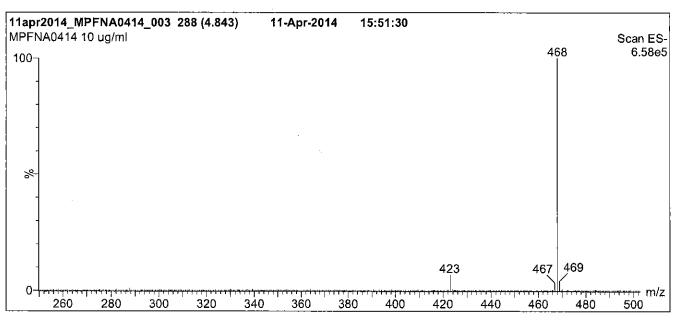


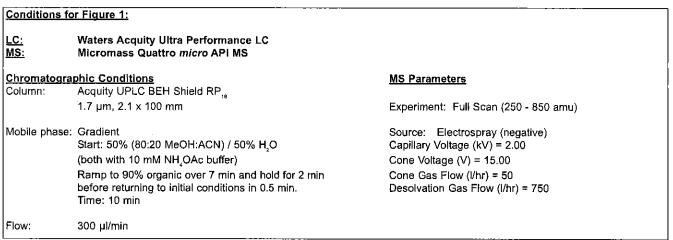


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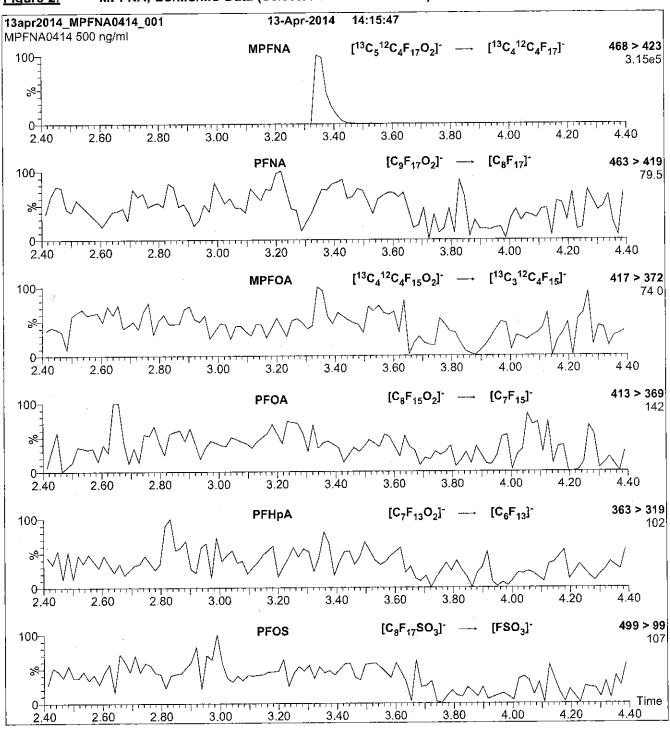
Figure 1: MPFNA; LC/MS Data (TIC and Mass Spectrum)







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





Injection:

Direct loop injection

10 μl (500 ng/ml MPFNA)

Collision Gas (mbar) = 3.28e-3

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Energy (eV) = 11

LCMPFOA 00007



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFOA

LOT NUMBER:

MPFOA0415

COMPOUND:

Perfluoro-n-[1,2,3,4-12C₄]octanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄HF₁₅O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

418.04

SOLVENT(S):

Methanol

(1,2,3,4-13C₄)

Water (<1%) >99% 13C

CHEMICAL PURITY:

>98%

04/10/2015

LAST TESTED: (mm/dd/yyyy)

EXPIRY DATE: (mm/sd/yyyy)

04/10/2020

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 native perfluoro-n-octanoic acid (PFOA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 04/1<u>0/2015</u>

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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:

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:

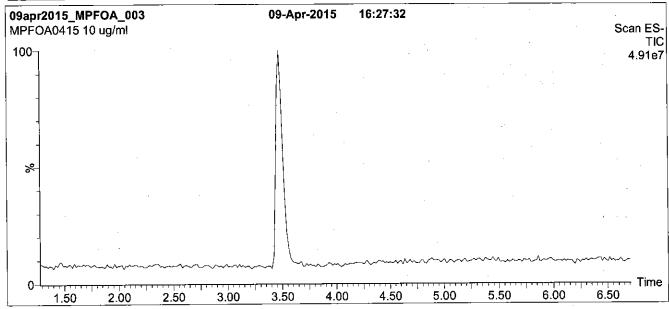
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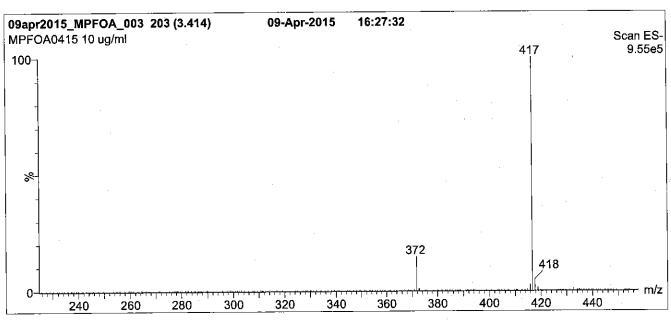




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





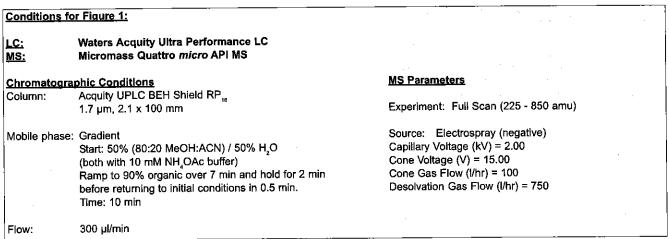
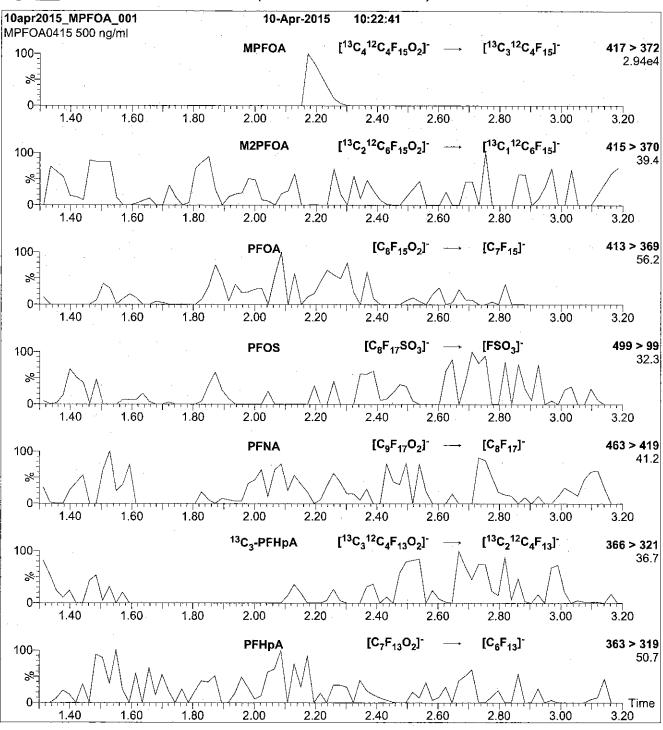
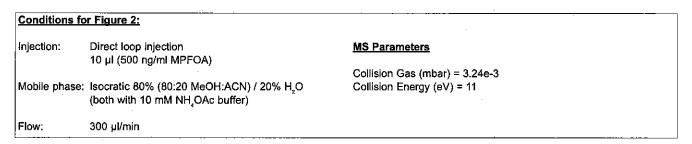


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)

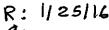




LCMPFOA_00008



ID: LCMPFOA_00008 Exp. 04/10/20 Prod; CBW 13C4-Perfluorocctanoic ac





CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFOA

LOT NUMBER:

MPFOA0415

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄HF₁₅O₂

MOLECULAR WEIGHT:

418.04

CONCENTRATION:

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

ISOTOPIC PURITY:

Water (<1%)

LAST TESTED: (mm/dd/yyyy)

>98%

≥99% ¹³C $(1,2,3,4^{-13}C_{4})$

04/10/2015

EXPIRY DATE: (mm/dd/yyyy)

04/10/2020

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 native perfluoro-n-octanoic acid (PFOA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>04/10/2015</u>

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QUALITY MANAGEMENT:

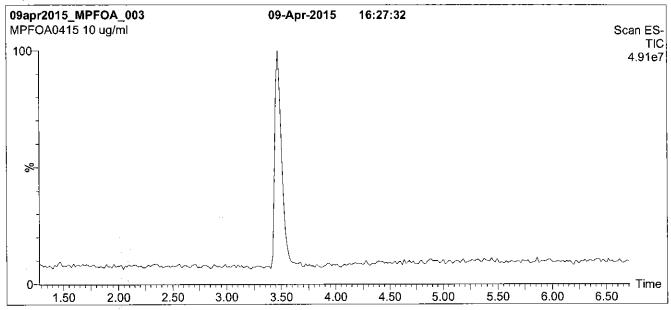
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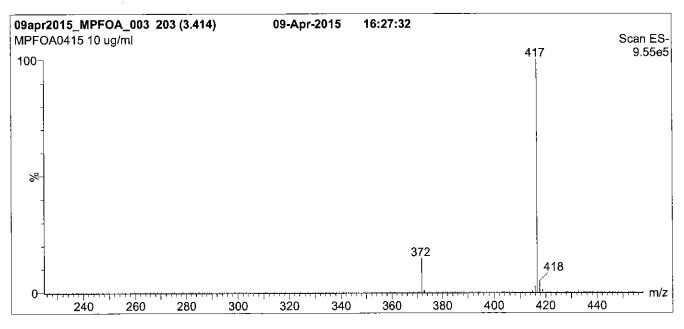




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





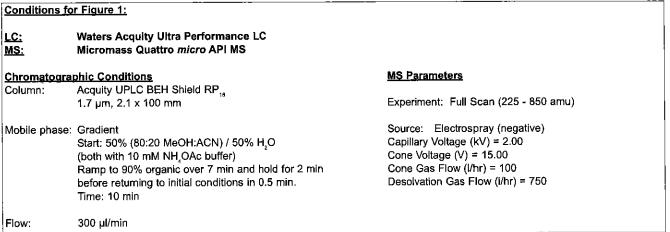
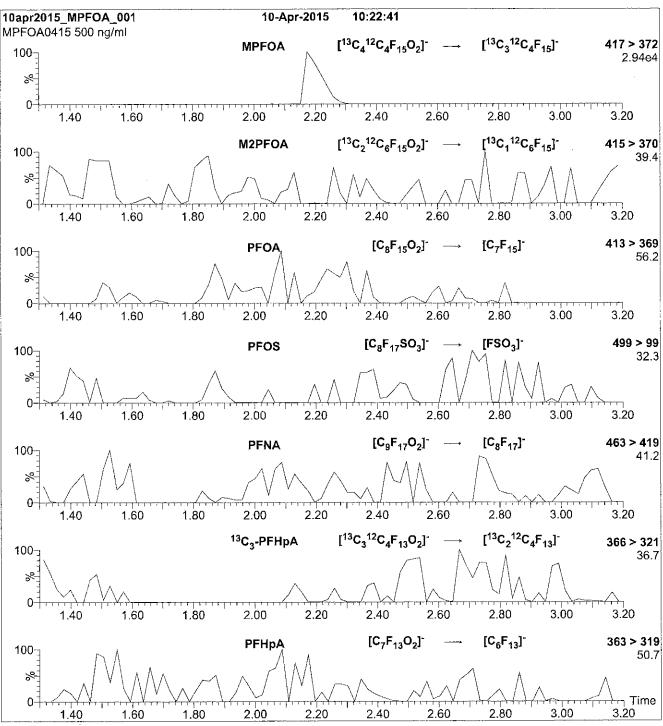
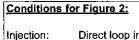


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μI (500 ng/mI MPFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

MS Parameters

Collision Gas (mbar) = 3.24e-3 Collision Energy (eV) = 11

Flow:

300 µl/min

LCMPFOS 00007



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFOS

LOT NUMBER:

MPFOS1014

COMPOUND:

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

STRUCTURE:

CAS#:

Not available

F F F F F F F F

MOLECULAR FORMULA:

¹³C₄¹²C₄F₁₇SO₃Na

MOLECULAR WEIGHT:

526.08

CONCENTRATION:

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

SOLVENT(S):

Methanol

JONOLINI KANON.

47.8 ± 2.4 μg/ml (MPFOS anion)

SOLATIALISI'

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C (1,2,3,4-¹³C₄)

LAST TESTED: (mm/dd/yyyy)

10/09/2014

EXPIRY DATE: (mm/dd/yyyy)

10/09/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-13C] heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B G Chiftim

Date:

10/17/2014

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:

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

$$x_{s}, x_{s}, \dots x_{s}$$
 on which it depends is:

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

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.

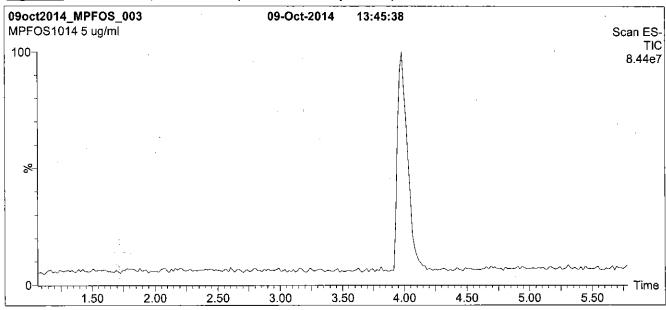
QUALITY MANAGEMENT:

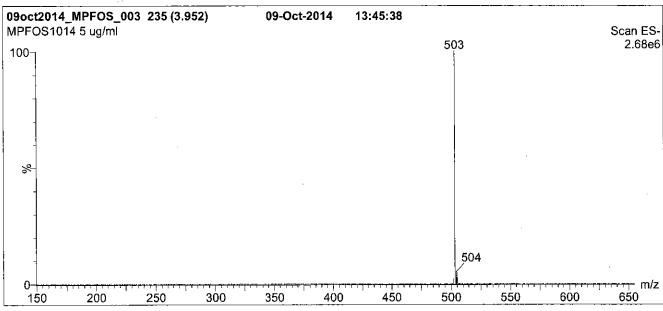
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





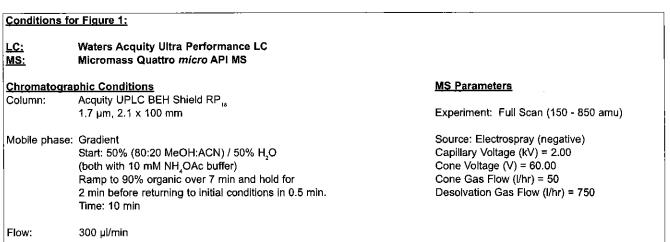
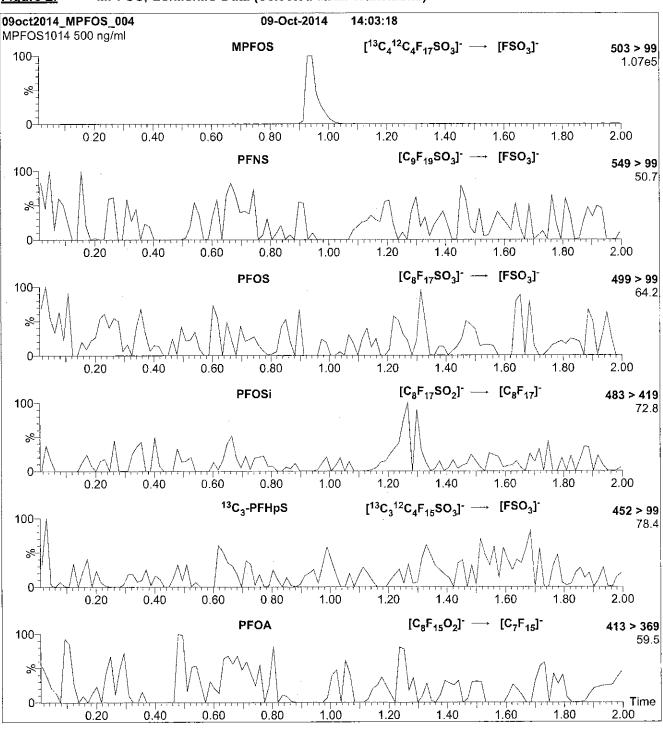
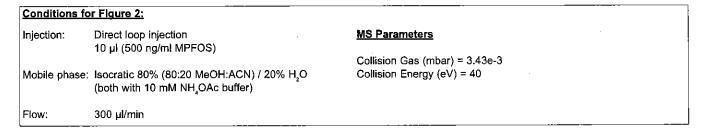


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFOS 00009



PRODUCT CODE:

MPFOS

LOT NUMBER:

MPFOS0515

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄F₁₇SO₃Na

MOLECULAR WEIGHT:

526.08

CONCENTRATION:

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

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C (1,2,3,4-13C₄)

LAST TESTED: (mm/dd/yyyy)

05/15/2015

EXPIRY DATE: (mm/dd/yyyy)

05/15/2020

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 ~ 0.8% Sodium perfluoro-1-[1,2,3-13C,]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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HAZARDS:

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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.

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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.

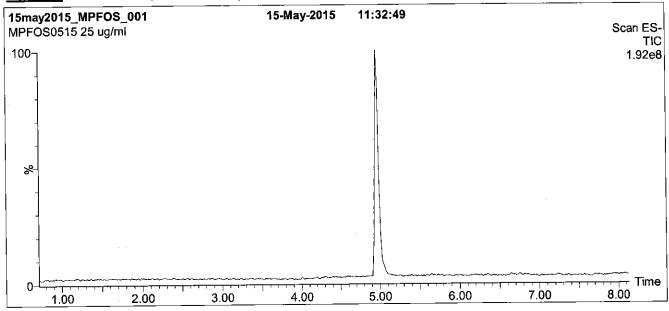
QUALITY MANAGEMENT:

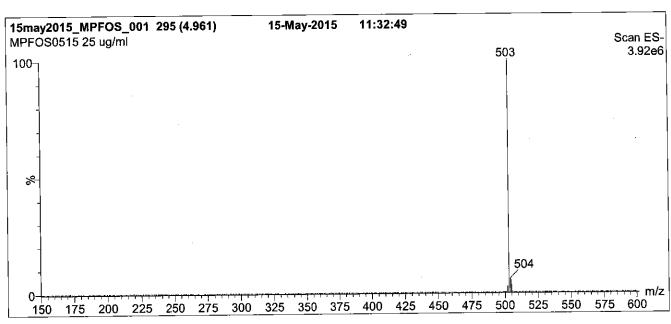
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





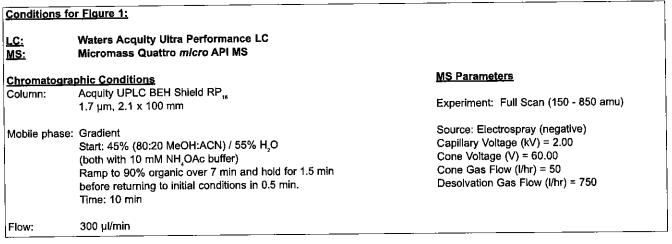
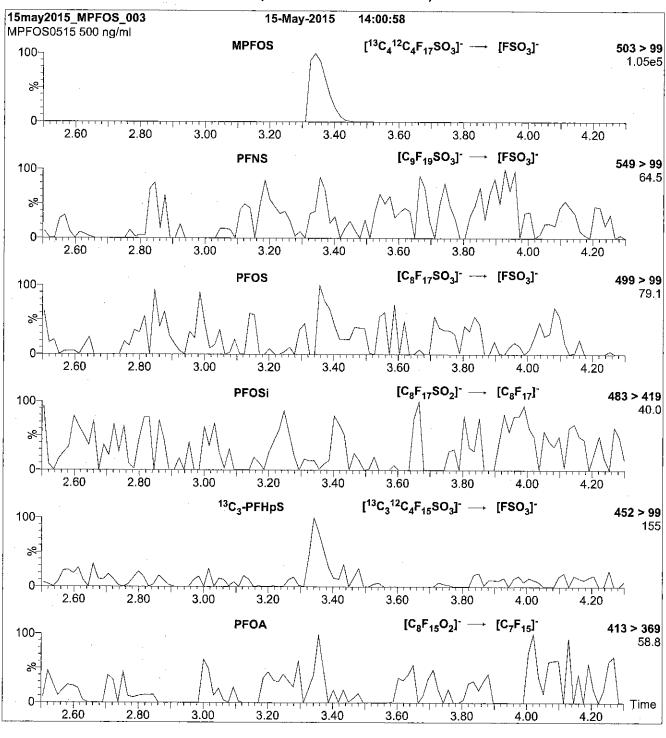
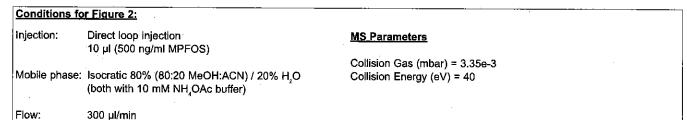


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFOS 00010



ID: LCMPEOS 00010 Exp: 05/15/20 Prpd: CBW 13C4-Perfluorooctanesullo R: 1/25/16



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFOS

LOT NUMBER:

MPFOS0515

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄F₁₇SO₃Na

MOLECULAR WEIGHT:

526.08

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>99% 13C (1,2,3,4-13C₄)

LAST TESTED: (mm/dd/yyyy)

05/15/2015

EXPIRY DATE: (mm/dd/yyyy)

05/15/2020

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:

Chittim

Date:

05/28/2015

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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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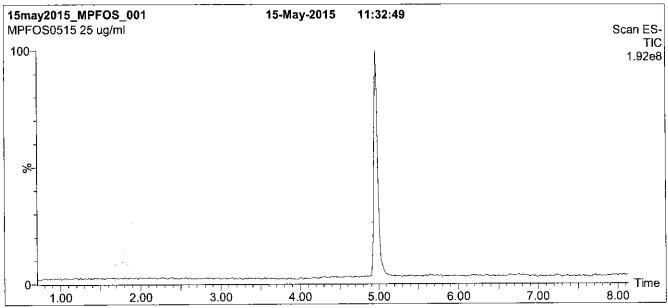
QUALITY MANAGEMENT:

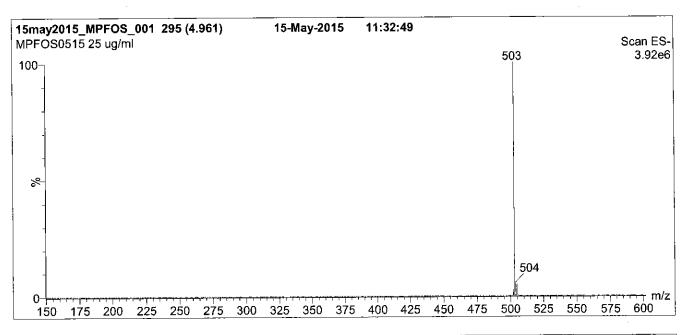
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





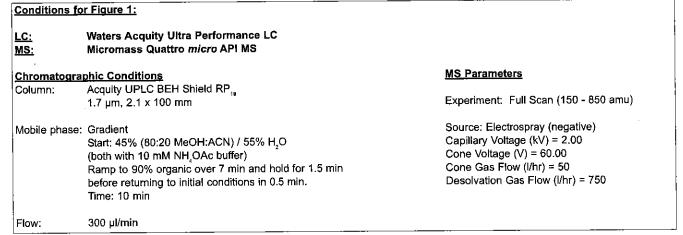
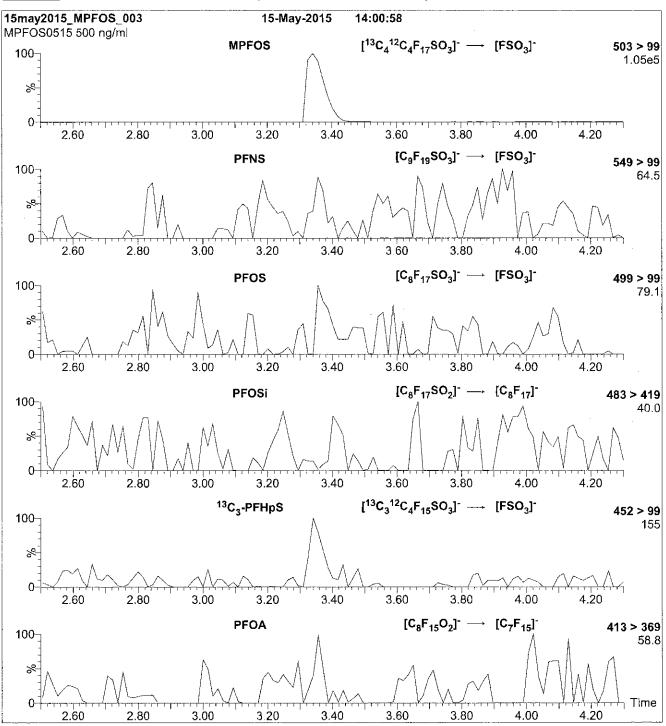
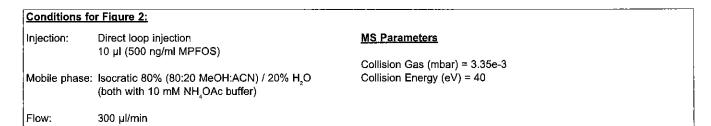


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFUdA_00005



PRODUCT CODE:

MPFUdA

LOT NUMBER:

MPFUdA1014

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

13C, 12C, HF, O,

CONCENTRATION:

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

SOLVENT(S):

566.08

 $50 \pm 2.5 \mu g/ml$

Methanol

>99% 13C

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

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/31/2014

EXPIRY DATE: (mm/dd/yyyy)

10/31/2019

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 ¹³C-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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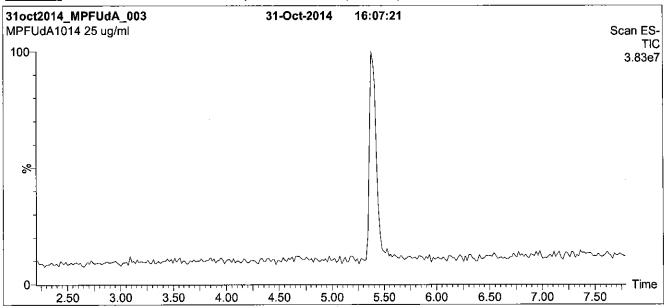
QUALITY MANAGEMENT:

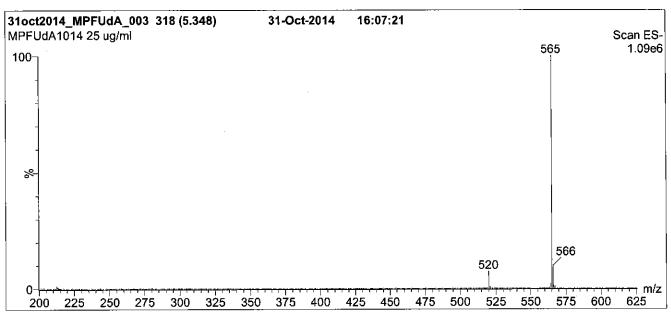
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Figure 1: MPFUdA; LC/MS Data (TIC and Mass Spectrum)





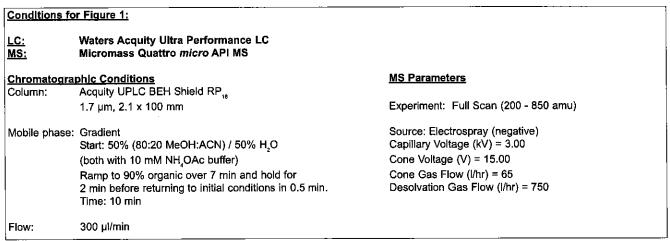
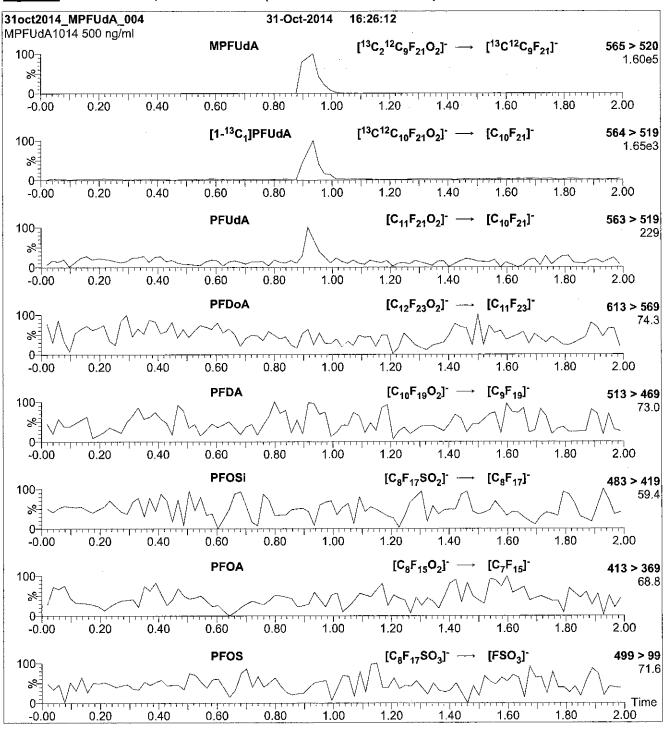
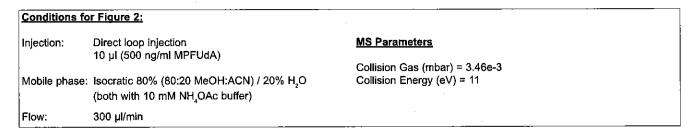


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





LCPFBA 00003



PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0313

COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4

F F F F

MOLECULAR FORMULA:

C₄HF₂O₂

MOLECULAR WEIGHT:

214.04

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

03/05/2013

EXPIRY DATE: (mm/dd/yyyy)

03/05/2018

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:

B.G. Chittim

Date: 0:

<u>3/06/2013</u>

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

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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

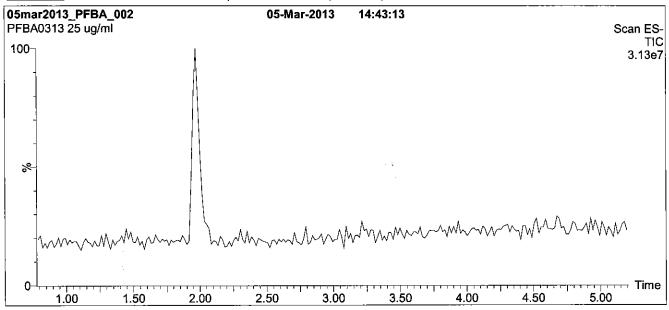
QUALITY MANAGEMENT:

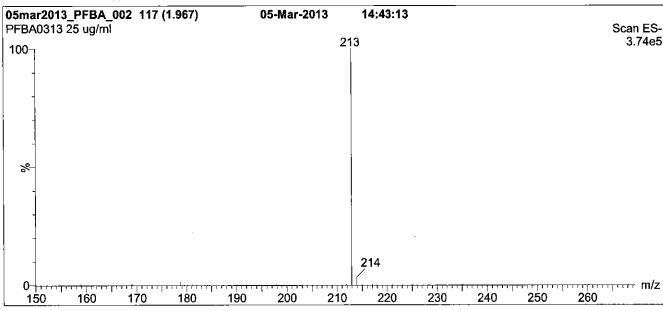
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





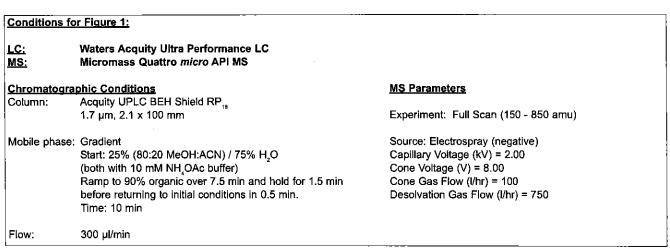
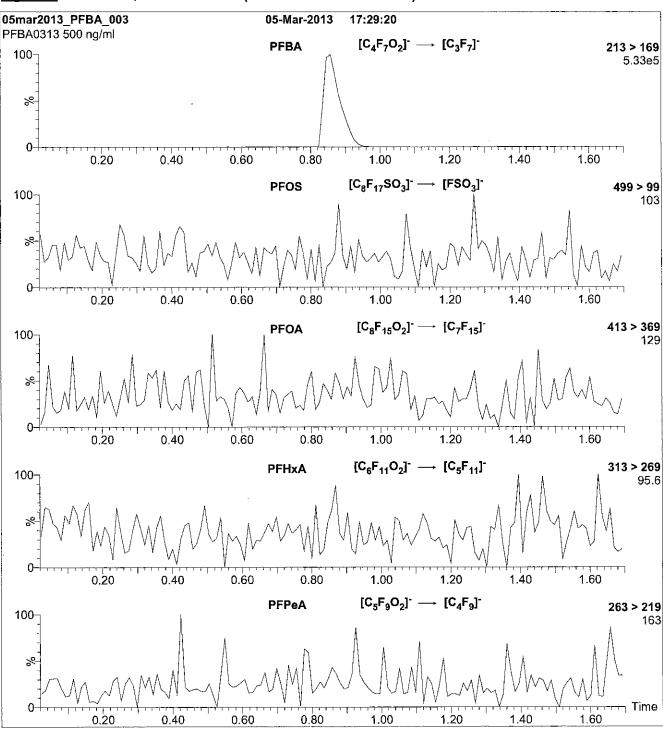
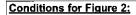


Figure 2: PFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFBA)

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

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.70e-3 Collision Energy (eV) = 10

LCPFBS_00003



PRODUCT CODE:

L-PFBS

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

LPFBS1014

COMPOUND:

Potassium perfluoro-1-butanesulfonate

STRUCTURE:

CAS #:

29420-49-3

338.19

Methanol

MOLECULAR FORMULA:

C₄F₄SO₃K

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

 $44.2 \pm 2.2 \,\mu\text{g/ml}$ (PFBS anion)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

10/09/2014

EXPIRY DATE: (mm/dd/yyyy)

10/09/2019

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:

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:

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HOMOGENEITY:

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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.

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

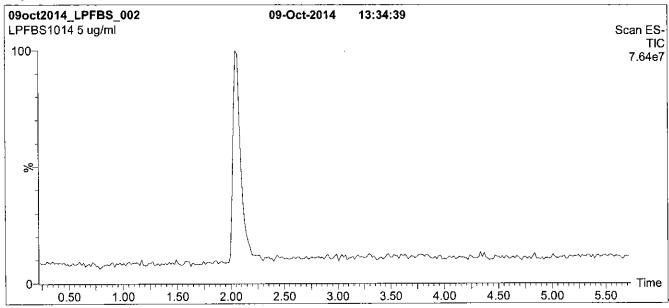
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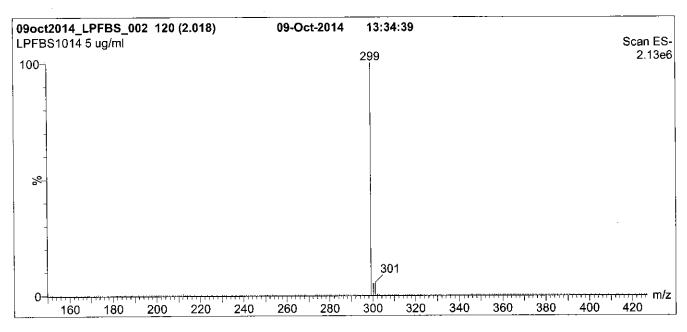




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Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)





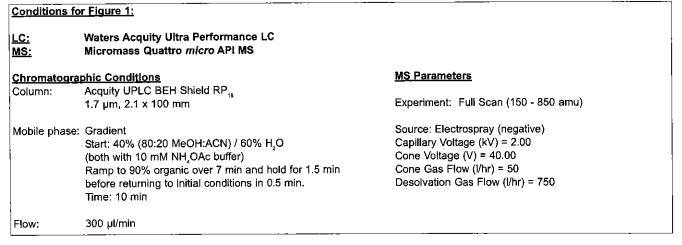
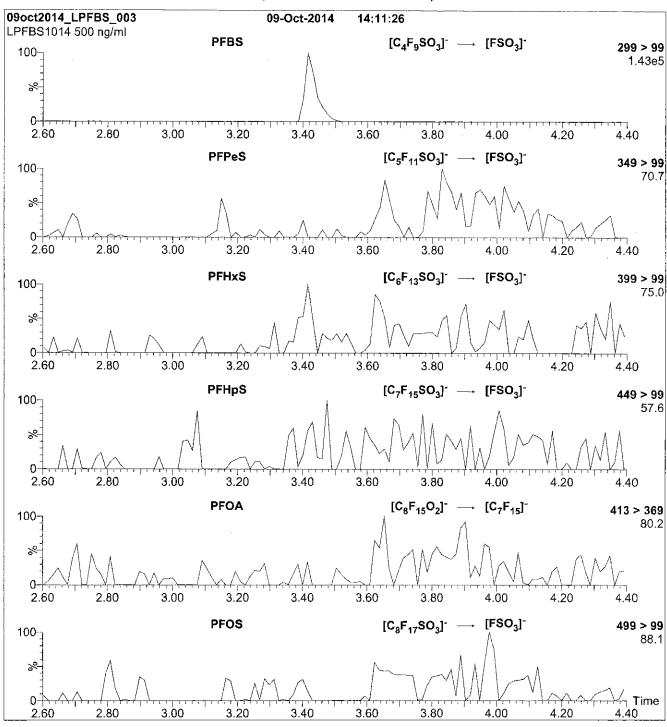
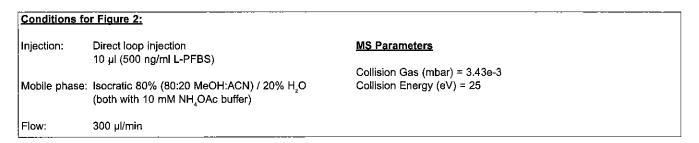


Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)





LCPFDA_00003



PRODUCT CODE:

PFDA

LOT NUMBER:

PFDA0613

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:

CAS #:

335-76-2

F C C C C C C C OH

MOLECULAR FORMULA:

C₁₀HF₁₉O₂

MOLECULAR WEIGHT:

514.08

CONCENTRATION:

 $50 \pm 2.5 \mu g/ml$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/19/2013

EXPIRY DATE: (mm/dd/yyyy)

06/19/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: 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% PFNA and ~ 0.1% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: _

(mm/dd/ssss)

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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:

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QUALITY MANAGEMENT:

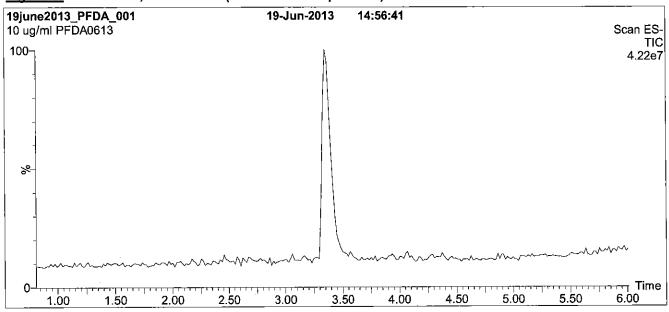
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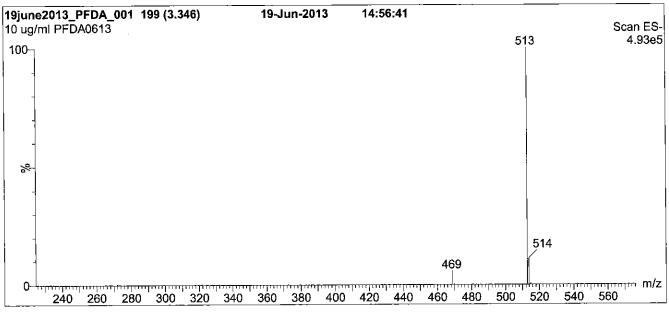




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Figure 1: PFDA; LC/MS Data (TIC and Mass Spectrum)





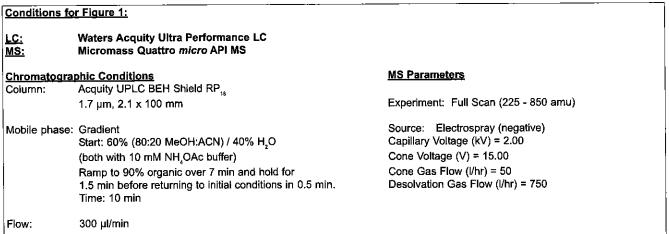
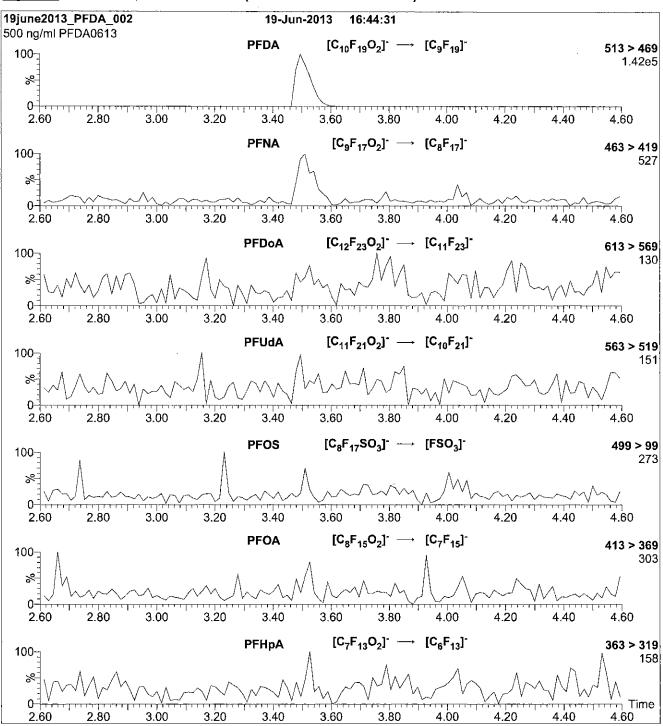
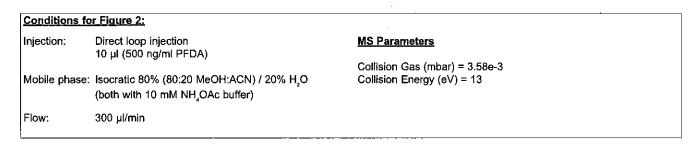


Figure 2: PFDA; LC/MS/MS Data (Selected MRM Transitions)





LCPFDoA_00003



PRODUCT CODE:

PFDoA

LOT NUMBER:

PFDoA0113

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:

CAS #:

307-55-1

MOLECULAR FORMULA:

C, HF, O,

MOLECULAR WEIGHT:

614.10

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/03/2013

EXPIRY DATE: (mm/dd/yyyy)

01/03/2018

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:

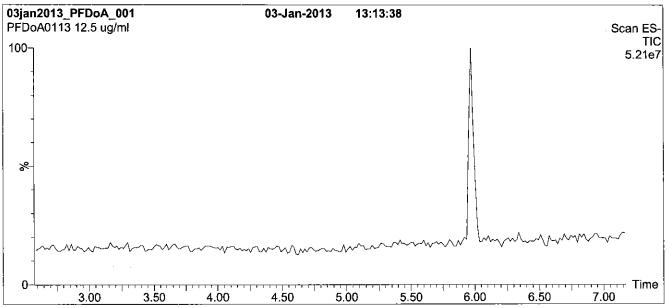
B.C. Chittim

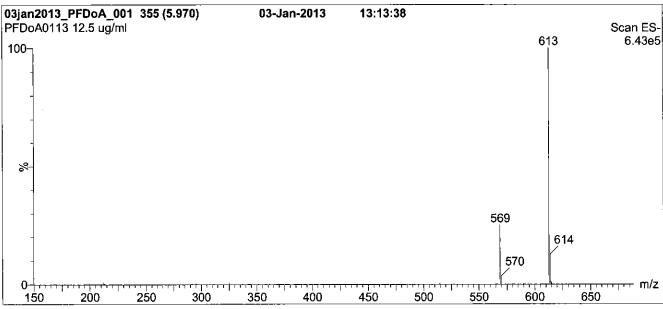
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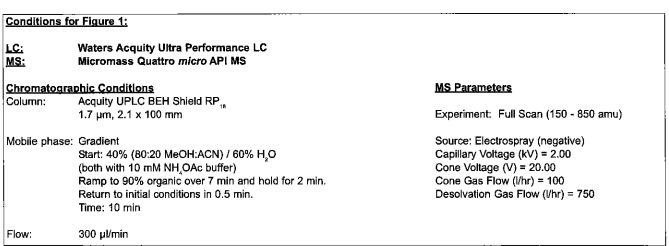
<u>2/01/2013</u>

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







LCPFDoS_00003



PRODUCT CODE:

L-PFDoS

LOT NUMBER:

LPFDoS1011

COMPOUND:

Sodium perfluoro-1-dodecanesulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₁₂F₂₅SO₃Na

MOLECULAR WEIGHT:

722.14

CONCENTRATION:

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

 $48.4 \pm 2.4 \mu g/ml$ (PFDoS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/06/2011

EXPIRY DATE: (mm/dd/yyyy)

10/06/2016

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

 Contains ~ 0.3% of sodium perfluoro-1-tetradecanesulfonate and ~ 0.8% of perfluoro-n-dodecanoic acid (PFDoA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

/mm/dd/sees/

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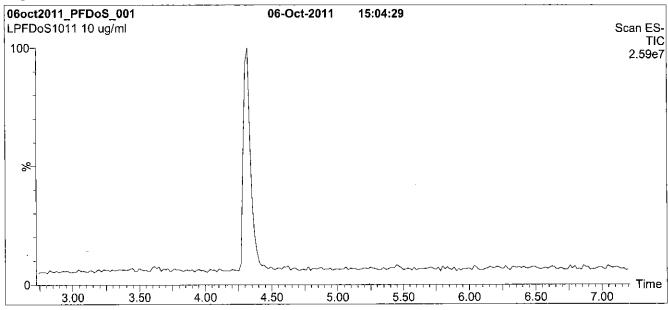
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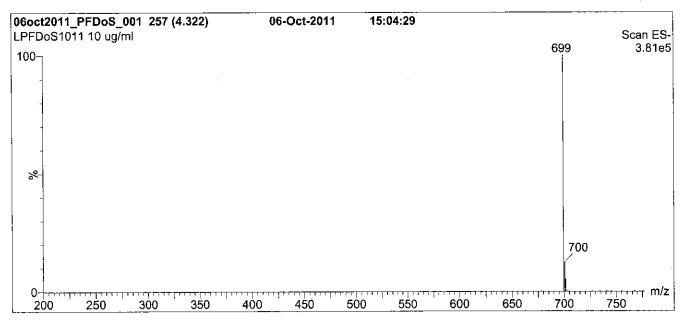




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Figure 1: L-PFDoS; LC/MS Data (TIC and Mass Spectrum)





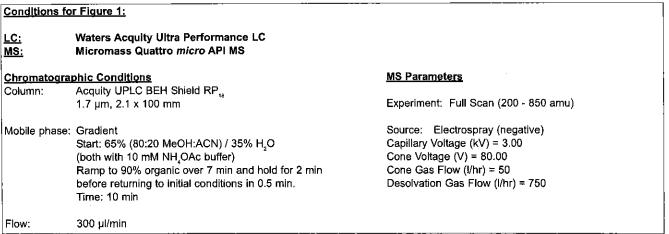
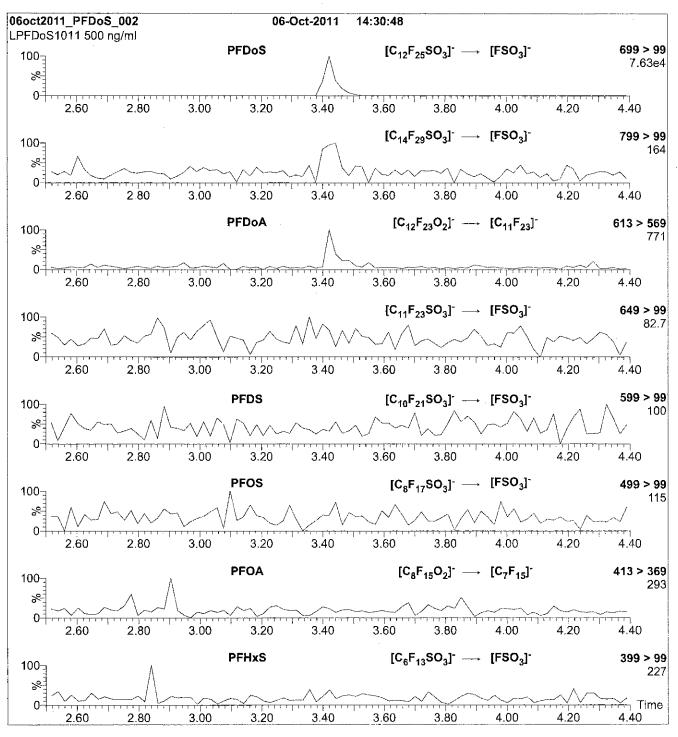
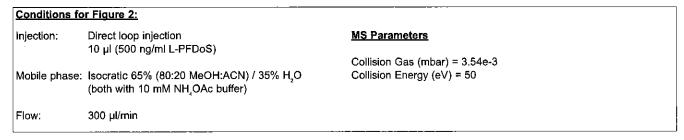


Figure 2: L-PFDoS; LC/MS/MS Data (Selected MRM Transitions)





LCPFDS_00003



PRODUCT CODE:

L-PFDS

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

LPFDS0913

COMPOUND:

Sodium perfluoro-1-decanesulfonate

STRUCTURE:

CAS #:

Not available

622.13

Methanol

MOLECULAR FORMULA:

C₁₀F₂₁SO₃Na

50.0 ± 2.5 μg/ml (Na salt)

19.2 + 2.4 us/ml (DEDS anion)

 $48.2 \pm 2.4 \mu g/ml$ (PFDS anion)

CHEMICAL PURITY:

CONCENTRATION:

LAST TESTED: (mm/dd/yyyy)

09/13/2013

>98%

EXPIRY DATE: (mm/dd/yyyy)

09/13/2018

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: _

(mm/dd/ssss)

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

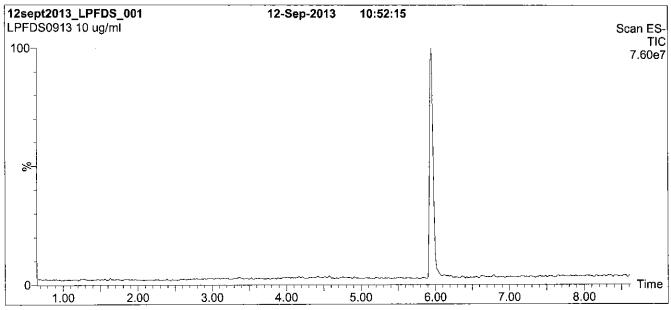
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

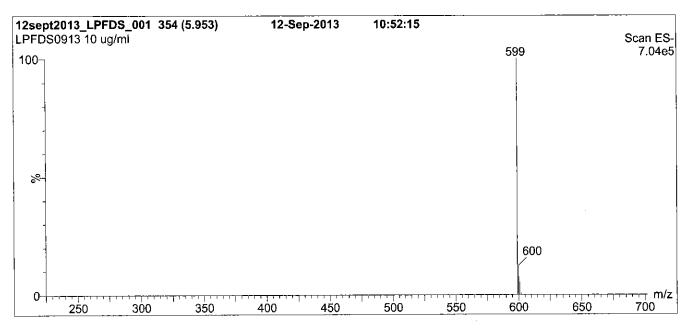




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Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)





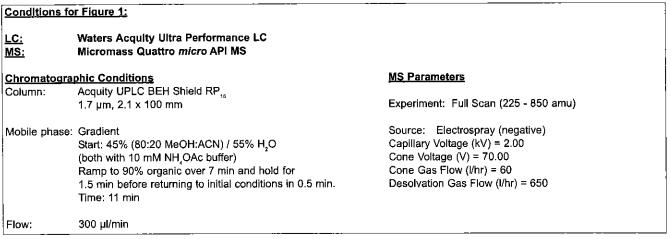
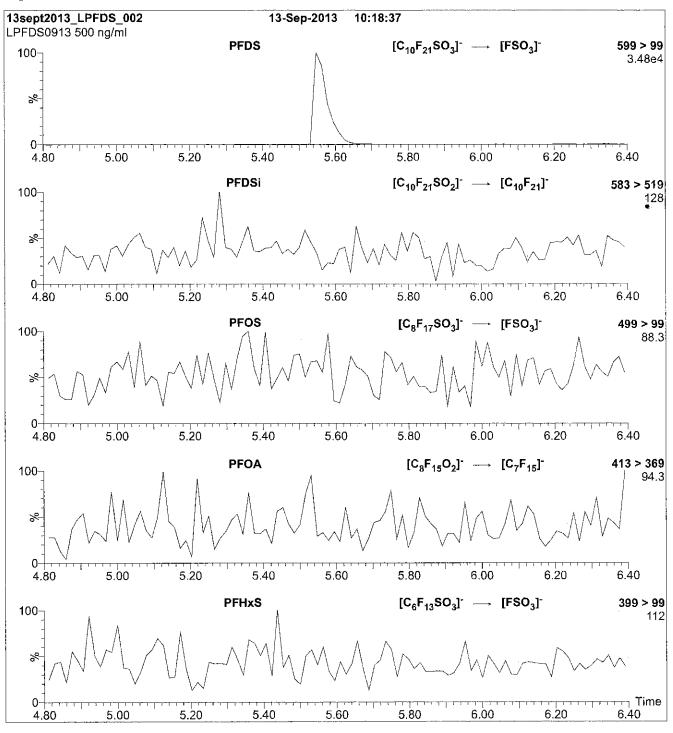
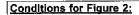


Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μI (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H2O

(both with 10 mM NH₂OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.78e-3 Collision Energy (eV) = 50

LCPFHpA_00004



PRODUCT CODE:

PFHpA

LOT NUMBER:

PFHpA0514

COMPOUND:

Perfluoro-n-heptanoic acid

STRUCTURE:

CAS #:

375-85-9

F F F F F

MOLECULAR FORMULA:

C,HF,O,

CONCENTRATION:

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

MOLECULAR WEIGHT:

364.06

.5 μg/ml SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/09/2014 05/09/2019

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. Chittim

Date:

<u>05/22/2014</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. 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, $u_c(y)$, of a value y and the uncertainty of the independent parameters

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

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

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:

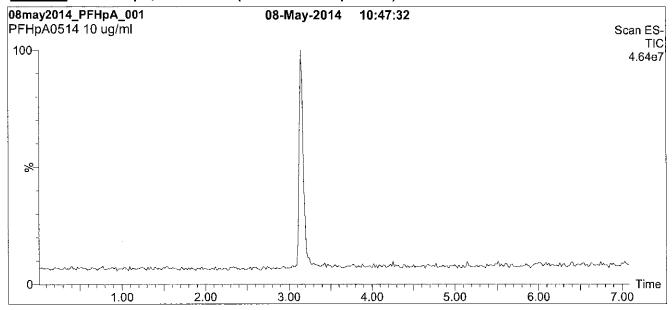
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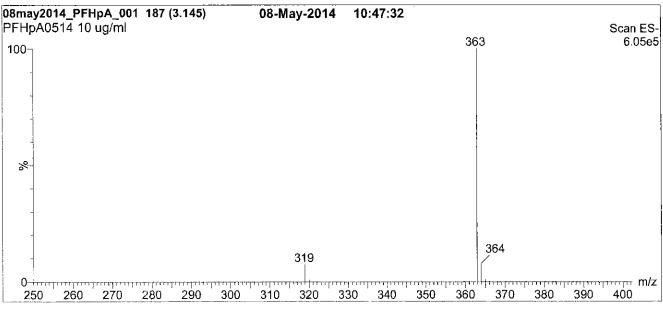




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Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)





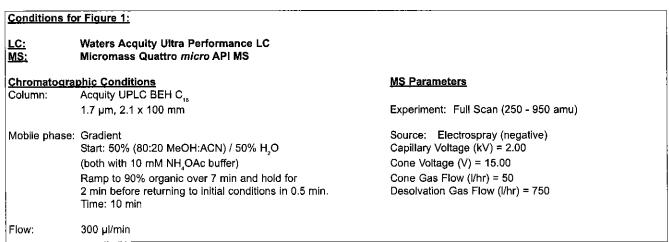
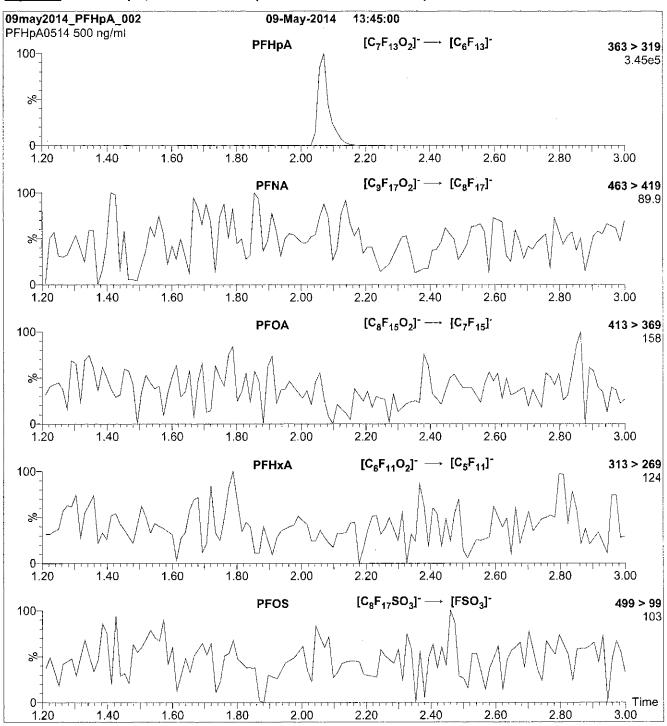
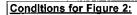


Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₂OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3 Collision Energy (eV) = 11

LCPFHpS_00005



PRODUCT CODE:

L-PFHpS

LOT NUMBER:

LPFHpS0114

COMPOUND:

Sodium perfluoro-1-heptanesulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₇F₁₅SO₃Na

MOLECULAR WEIGHT:

472.10

CONCENTRATION:

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/28/2014

EXPIRY DATE: (mm/dd/yyyy)

01/28/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.6 \pm 2.4 \mu g/m!$ (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 (C₈F₁₃SO₃Na) and ~ 0.2% of L-PFOS (C₈F₁₇SO₃Na).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

03/27/2015

(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, $u_{x}(y)$, 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:

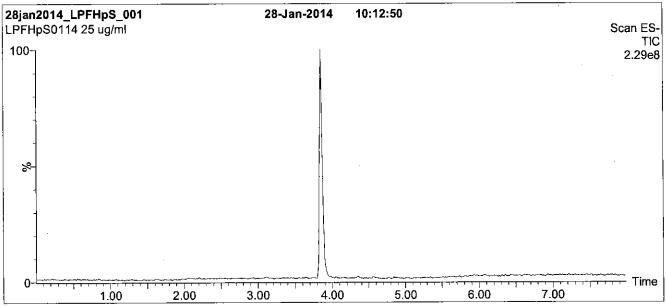
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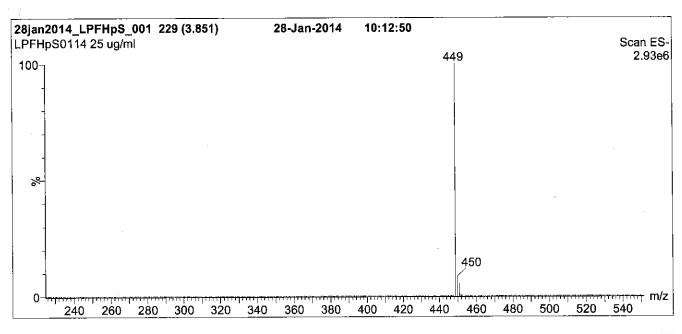




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Figure 1: L-PFHpS; LC/MS Data (TIC and Mass Spectrum)





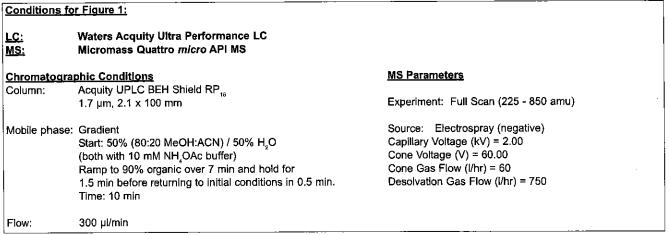
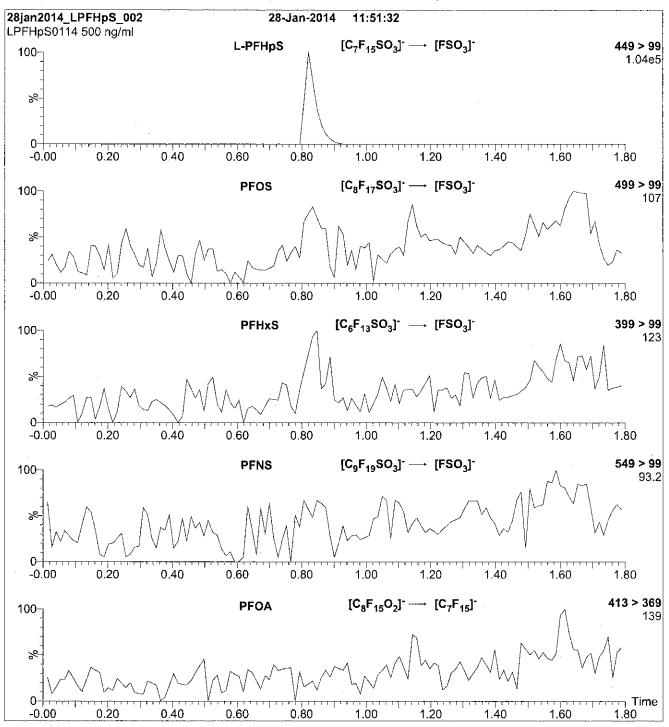
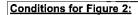


Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 35

LCPFHxA_00003



PRODUCT CODE:

PFHxA

LOT NUMBER:

PFHxA0514

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4

MOLECULAR FORMULA:

C₆HF₄O₂

MOLECULAR WEIGHT:

314.05

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/09/2014

EXPIRY DATE: (mm/dd/yyyy)

05/09/2019

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: _

0/22/2014

(mm/dd/yyyy

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:

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UNCERTAINTY:

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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.

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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 17025:2005 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:

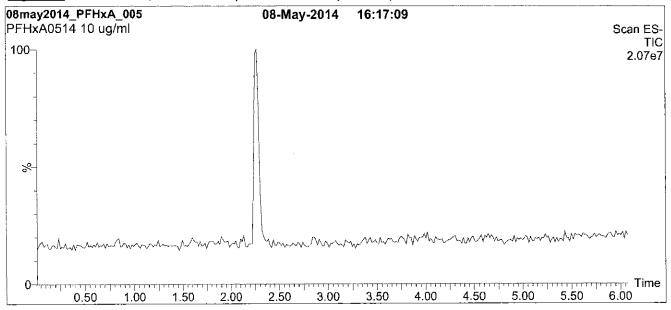
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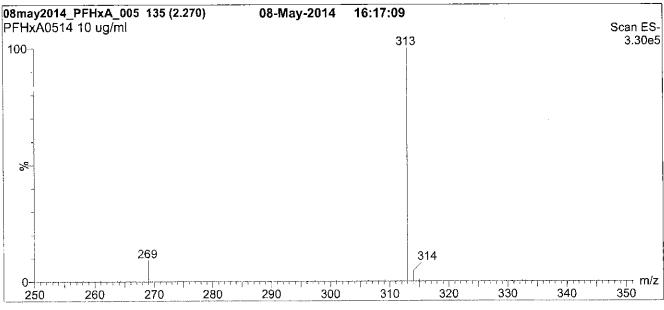




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Figure 1: PFHxA; LC/MS Data (TIC and Mass Spectrum)





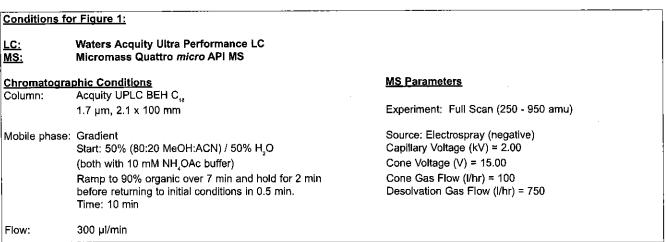
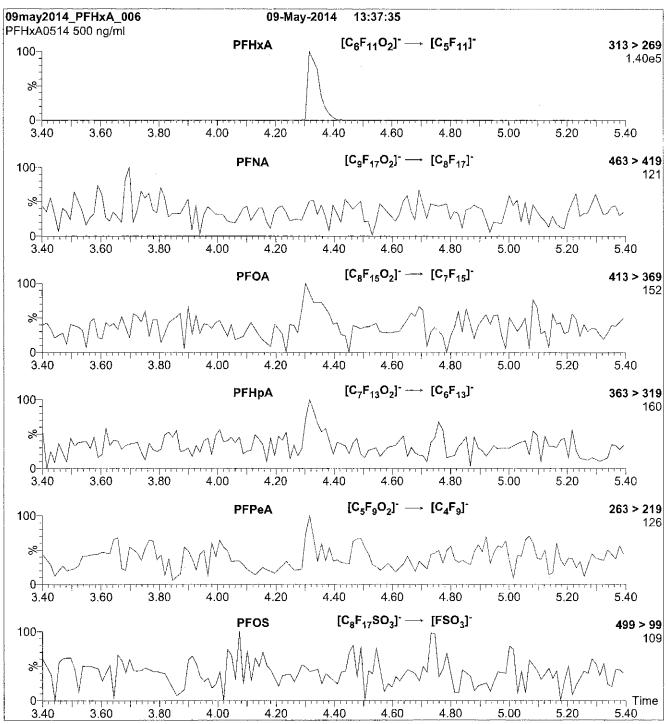
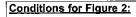


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3 Collision Energy (eV) = 10

LCPFHxS_00003



PRODUCT CODE:

L-PFHxS

LOT NUMBER:

LPFHxS0514

COMPOUND:

Sodium perfluoro-1-hexanesulfonate

STRUCTURE:

CAS #:

82382-12-5

MOLECULAR FORMULA:

C₆F₁₃SO₃Na

MOLECULAR WEIGHT:

422.10

CONCENTRATION:

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/09/2014

EXPIRY DATE: (mm/dd/yyyy)

05/09/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.3 \pm 2.4 \,\mu\text{g/ml}$ (PFHxS 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:

Date: <u>05/16/2014</u>

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:

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

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

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 17025:2005 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:

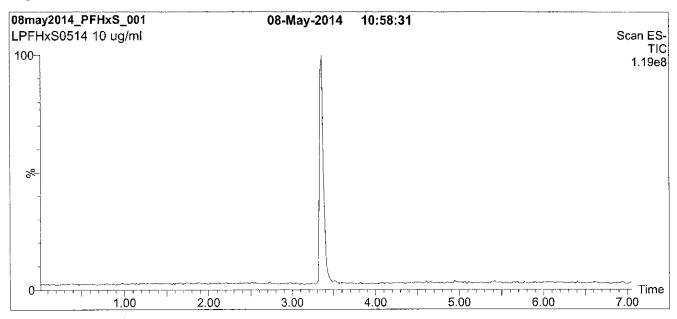
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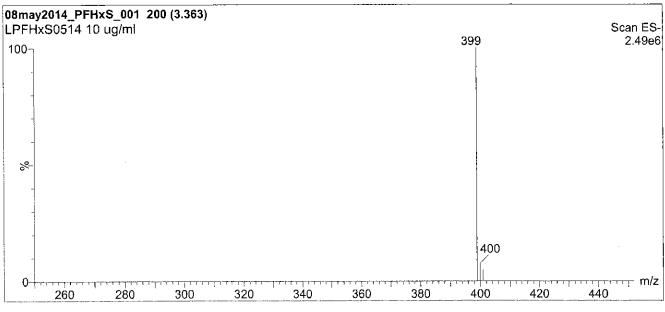




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Figure 1: L-PFHxS; LC/MS Data (TIC and Mass Spectrum)





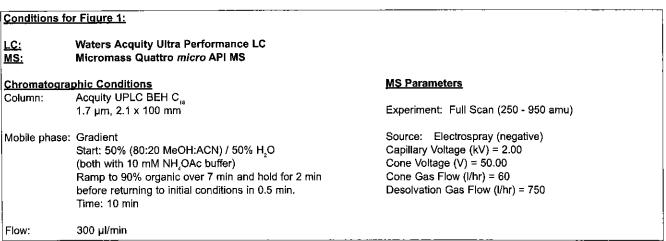
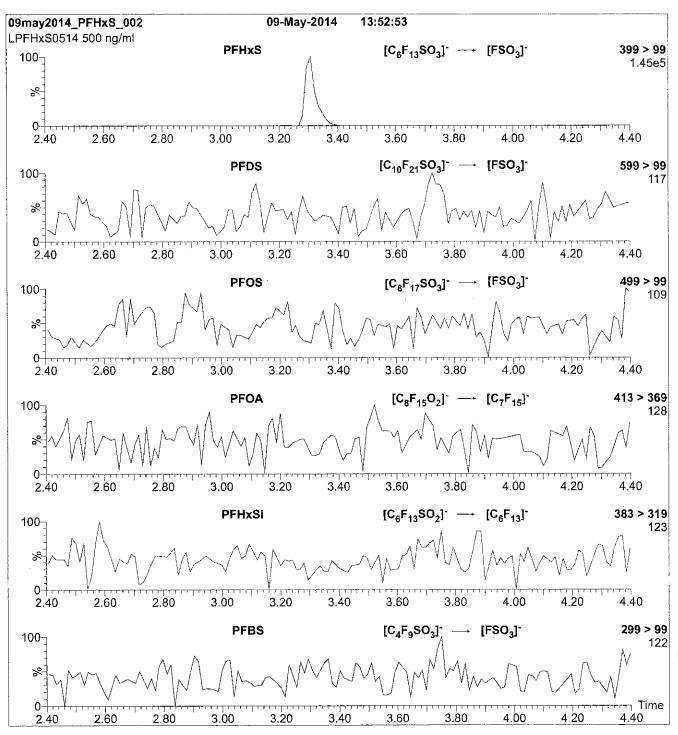
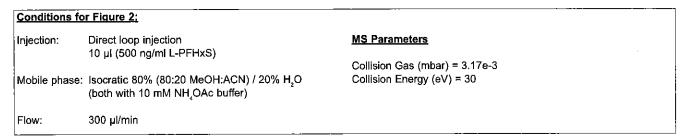


Figure 2: L-PFHxS; LC/MS/MS Data (Selected MRM Transitions)





LCPFNA_00004

: 8



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

PFNA0514

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:

CAS #:

375-95-1

F F F F F F

MOLECULAR FORMULA:

 $C_9HF_{17}O_2$

CONCENTRATION:

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

MOLECULAR WEIGHT:

464.08

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/09/2014

EXPIRY DATE: (mm/dd/yyyy)

05/09/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

 Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>05/22/2014</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. 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.

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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:

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

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 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 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:

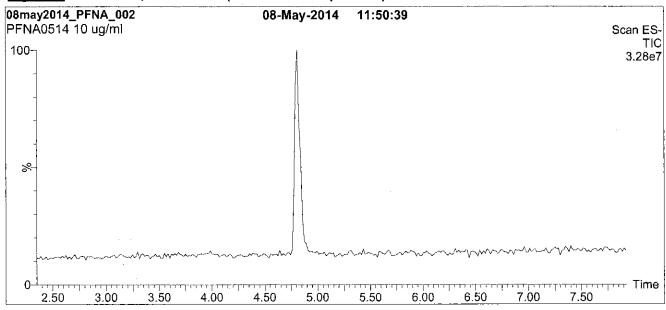
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

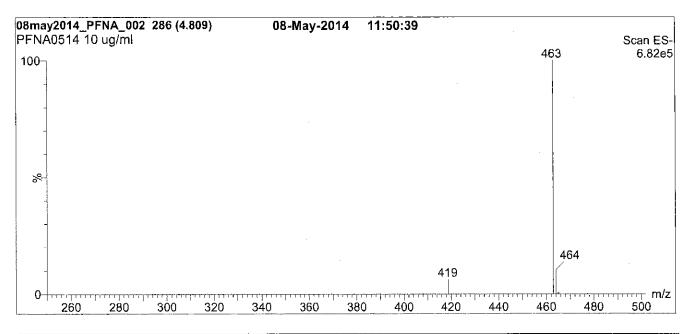




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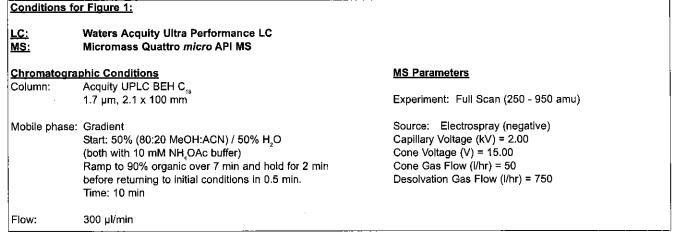
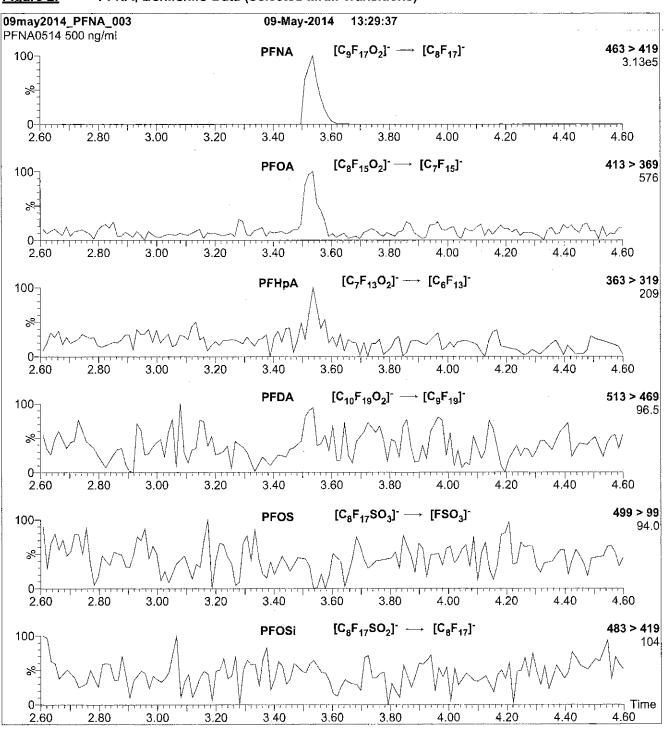
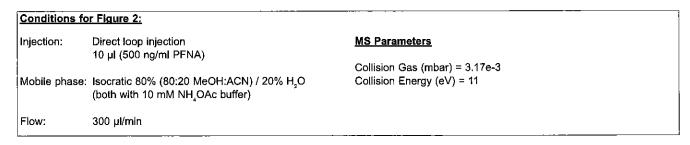


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





LCPFNS_00002



PRODUCT CODE:

L-PFNS

LOT NUMBER:

LPFNS0712

COMPOUND:

Sodium perfluoro-1-nonanesulfonate

STRUCTURE:

CAS #:

98789-57-2

MOLECULAR FORMULA:

C_aF₁₉SO₃Na

MOLECULAR WEIGHT:

572.12

CONCENTRATION:

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

 $48.0 \pm 2.4 \mu g/ml$ (PFNS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/04/2012

EXPIRY DATE: (mm/dd/yyyy)

07/04/2017

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: 01/15/2013

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:

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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 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.

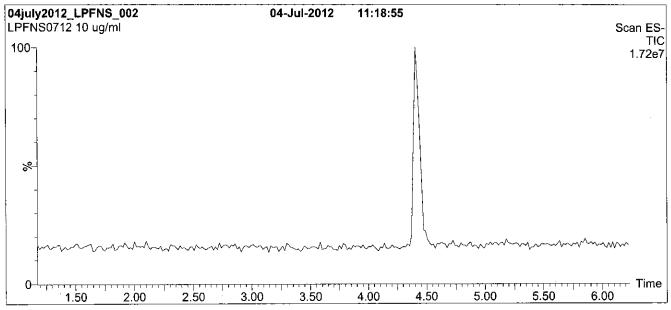
QUALITY MANAGEMENT:

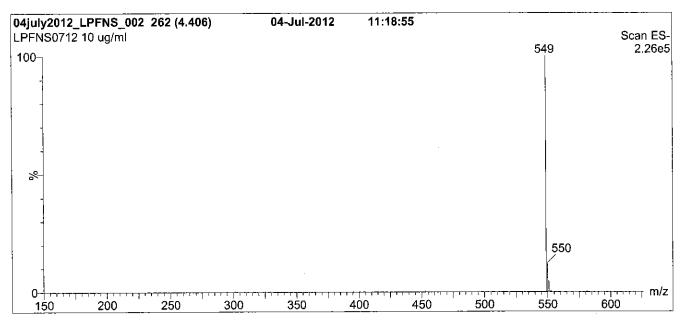
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Figure 1: L-PFNS; LC/MS Data (TIC and Mass Spectrum)





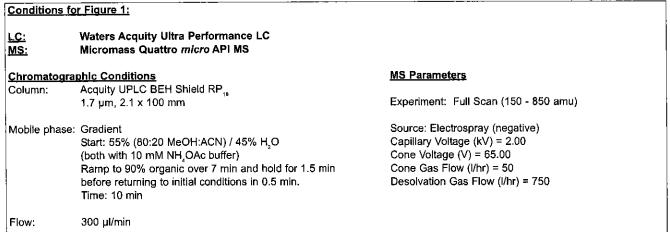
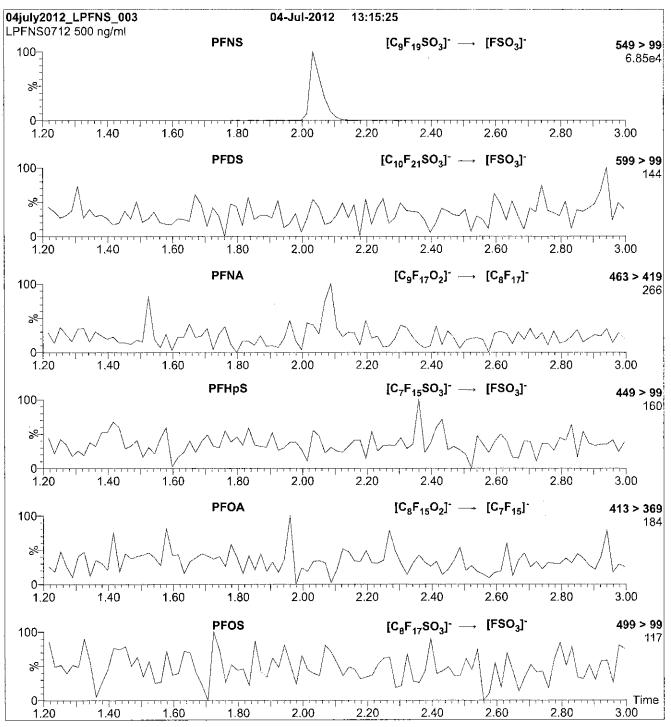
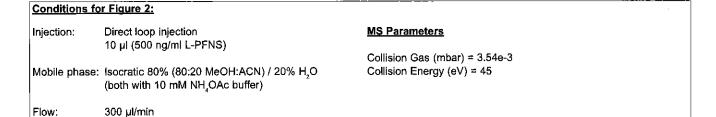


Figure 2: L-PFNS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOA_00004



PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1013

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1

MOLECULAR FORMULA:

C,HF,O,

MOLECULAR WEIGHT:

414.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/11/2013

EXPIRY DATE: (mm/dd/yyyy)

10/11/2018

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:

B.G. Chittim

Date: -

<u>0/18/2013</u>

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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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

 $x_{11} x_{22} ... x_{n}$ on which it depends is:

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

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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:

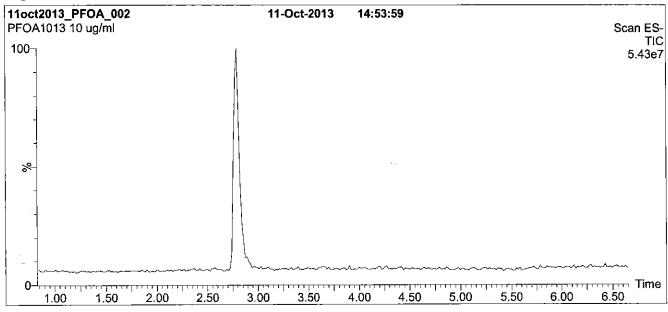
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

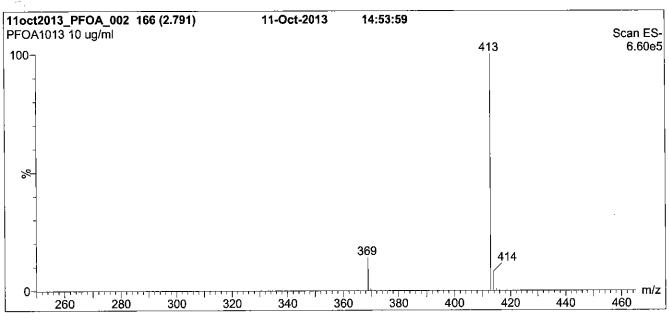




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





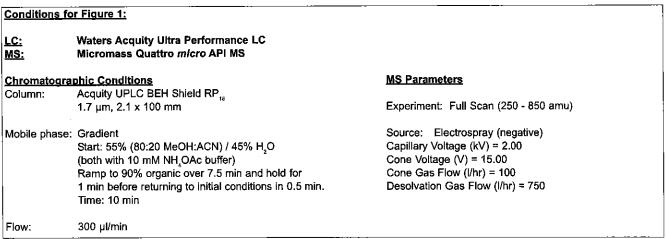
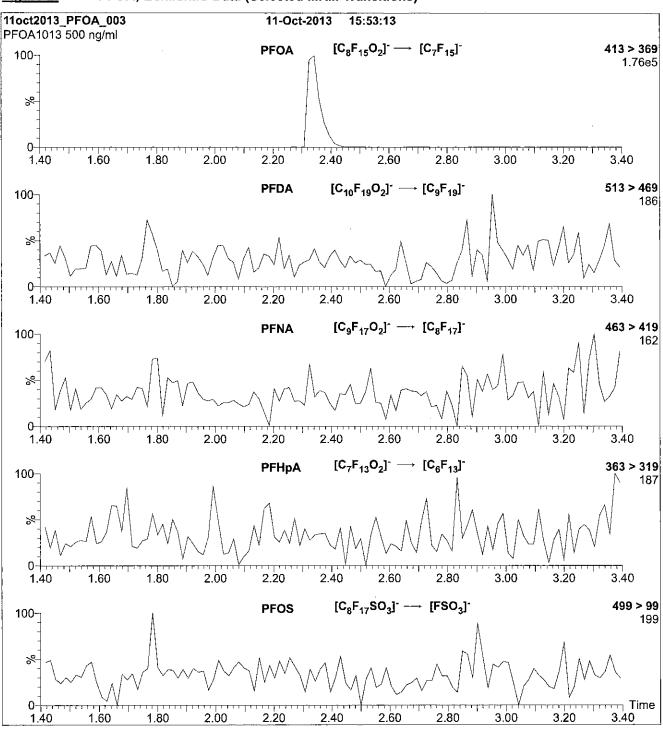
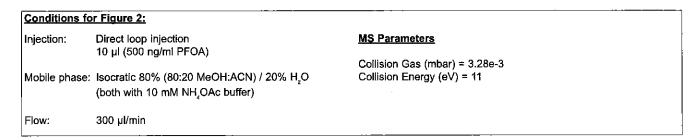


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





LCPFODA_00004



PRODUCT CODE:

PFODA

LOT NUMBER:

PFODA0807

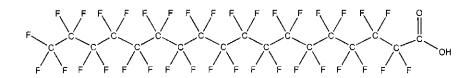
COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:

CAS #:

16517-11-6



MOLECULAR FORMULA:

C, HF, O,

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

914.15

SOLVENT(S):

Methanol

Water (4%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

04/25/2014

EXPIRY DATE: (mm/dd/yyyy)

04/25/2017

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

04/28/2014

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LIMITED WARRANTY:

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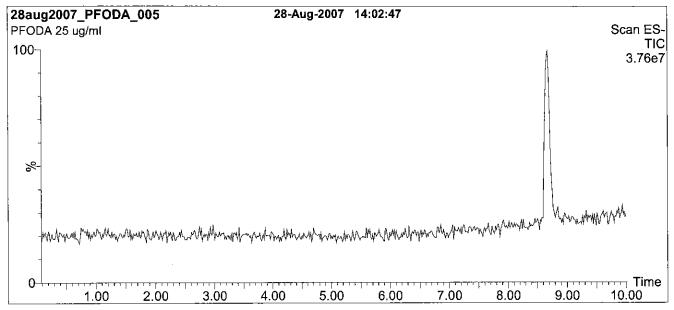
QUALITY MANAGEMENT:

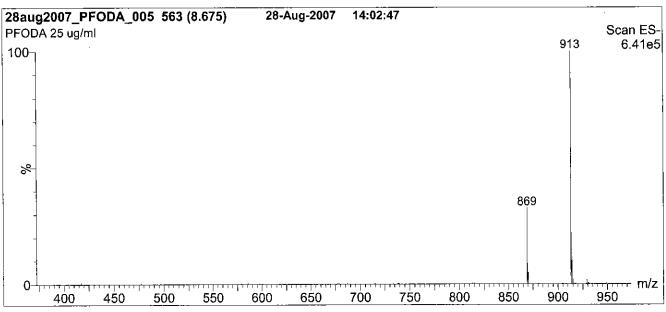
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Figure 1: PFODA; LC/MS Data (TIC and Mass Spectrum)





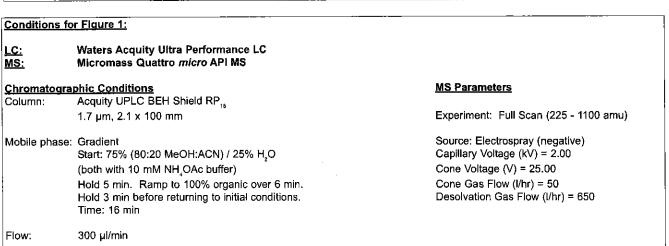
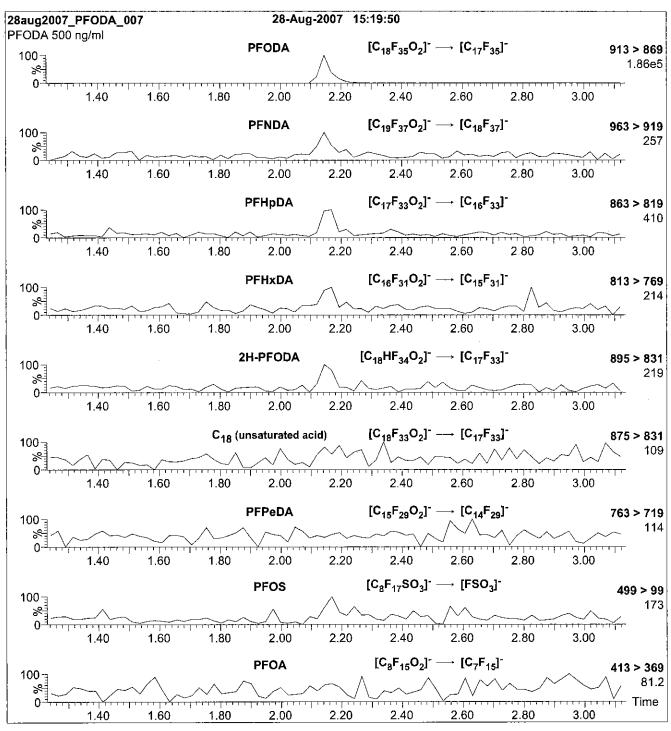
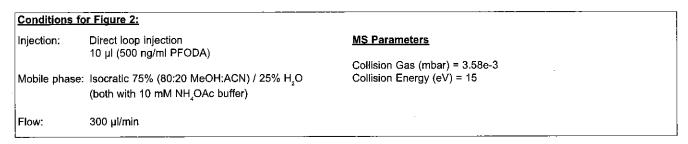


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





LCPFOS_00004



PRODUCT CODE:

L-PFOS

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

LPFOS0614

COMPOUND:

Sodium perfluoro-1-octanesulfonate

CAS #:

4021-47-0

522.11

Methanol

STRUCTURE:

MOLECULAR FORMULA:

C_xF₁₇SO₃Na

CONCENTRATION:

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

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

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/20/2014

EXPIRY DATE: (mm/dd/yyyy)

06/20/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/27/2014

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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.

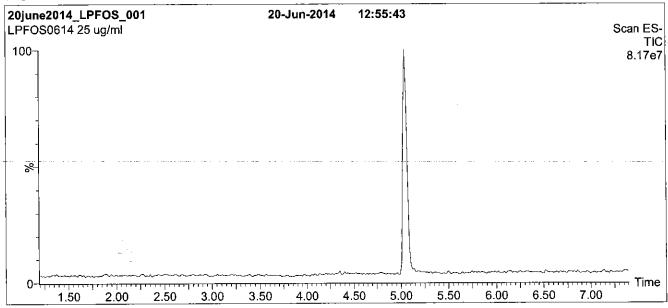
QUALITY MANAGEMENT:

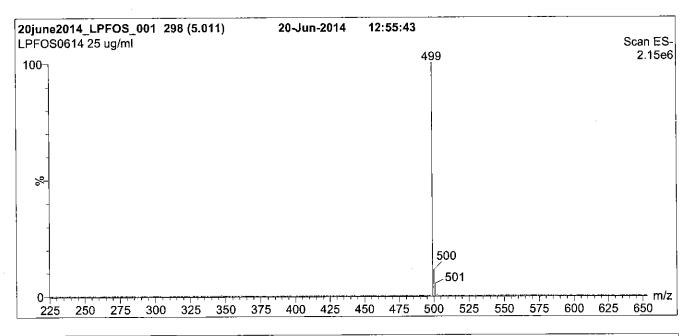
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





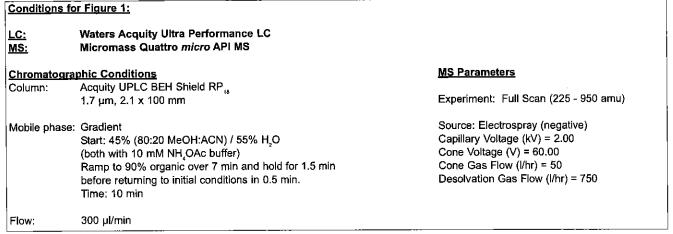
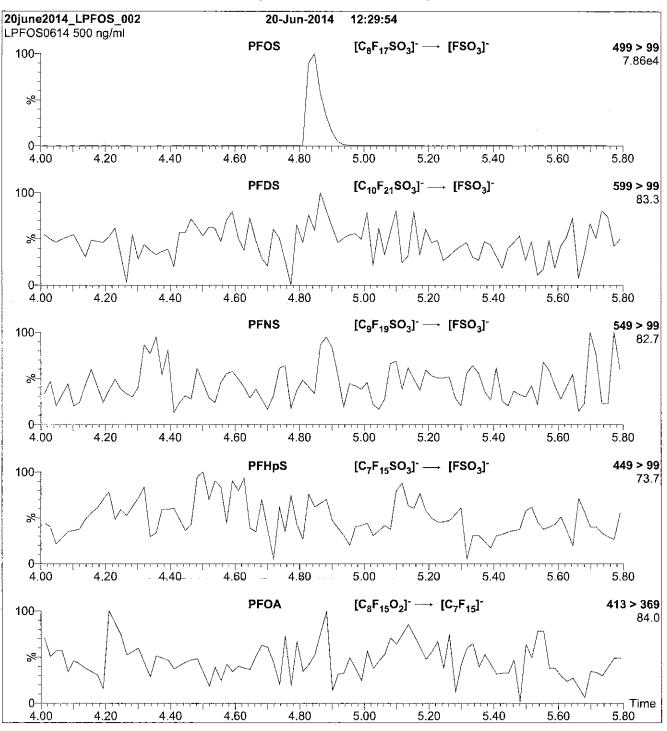
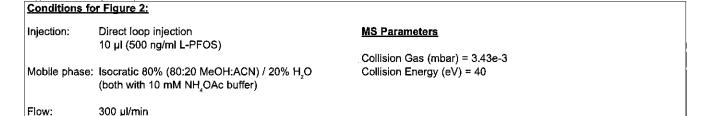


Figure 2: L-PFOS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOSA_00005



PRODUCT CODE:

FOSA-I

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

FOSA0714I

COMPOUND:

Perfluoro-1-octanesulfonamide

STRUCTURE:

CAS #:

754-91-6

499.14

Isopropanol

MOLECULAR FORMULA:

 $C_BH_2F_{17}NO_2S$

CONCENTRATION:

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

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/31/2014

EXPIRY DATE: (mm/dd/yyyy)

Stability studies ongoing

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: 08/05/2014

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 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. 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, $u_x(y)$, 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 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.

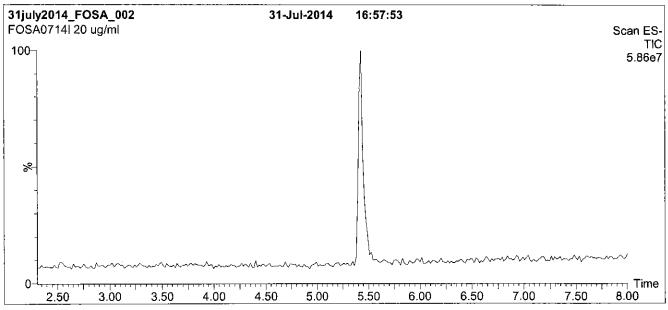
QUALITY MANAGEMENT:

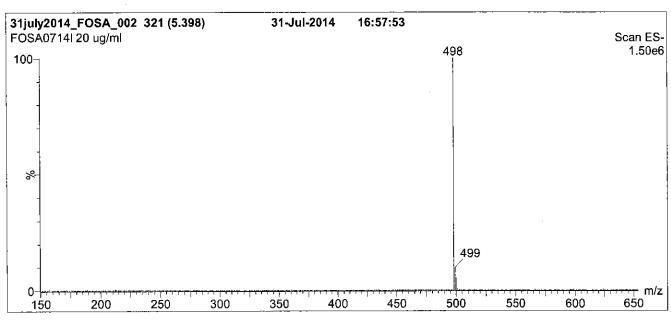
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





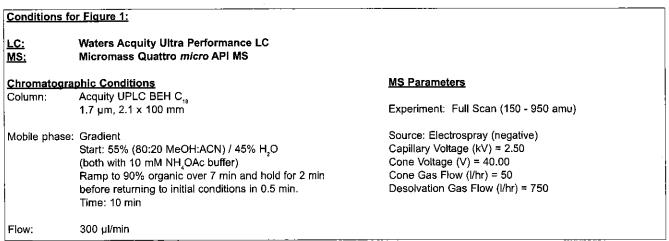
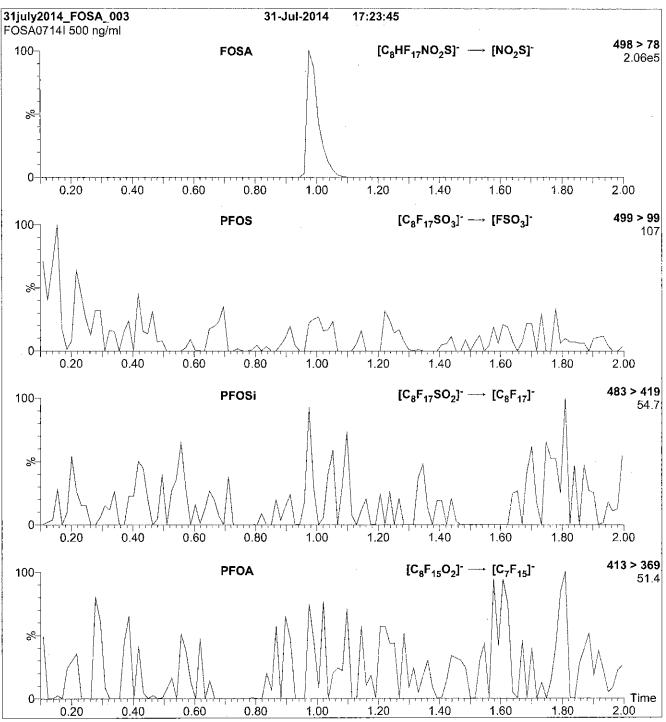


Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml FOSA-I)

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) = 3.58e-3 Collision Energy (eV) = 30

LCPFPeA_00003



PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0113

COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:

CAS #:

2706-90-3

MOLECULAR FORMULA:

C_tHF₀O₂

MOLECULAR WEIGHT:

264.05

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/03/2013

EXPIRY DATE: (mm/dd/yyyy)

01/03/2018

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.

• Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of C₅H₂F₈O₂ (hydrido - derivative) as measured by ¹⁹F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

(mm/dd/vvvv)

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, $u_x(y)$, 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 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.

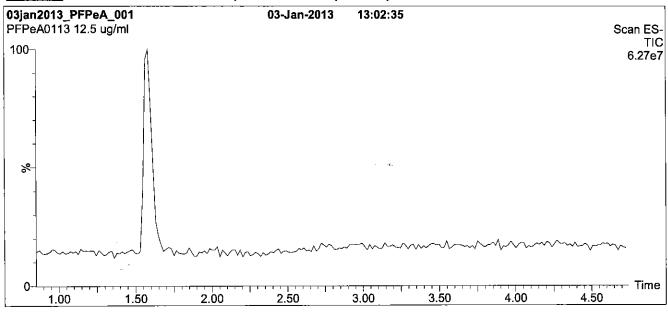
QUALITY MANAGEMENT:

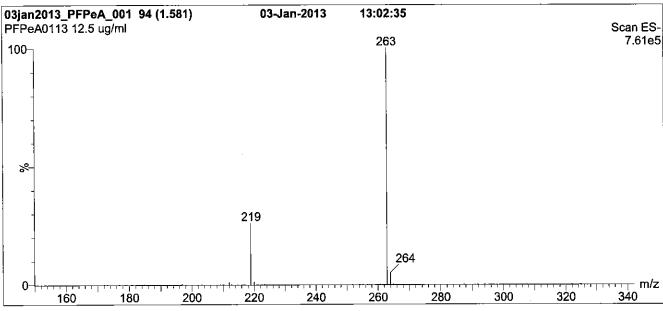
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





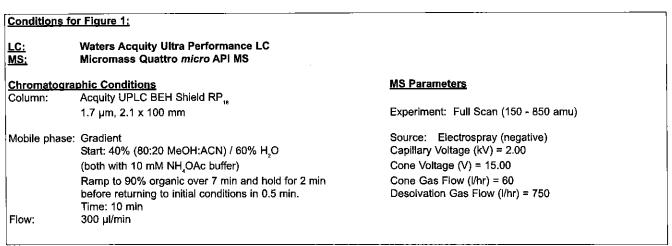
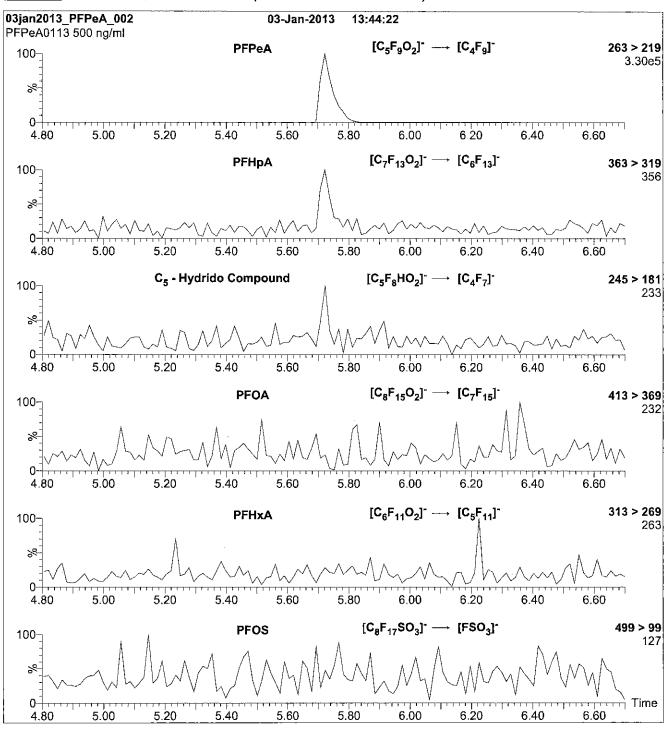
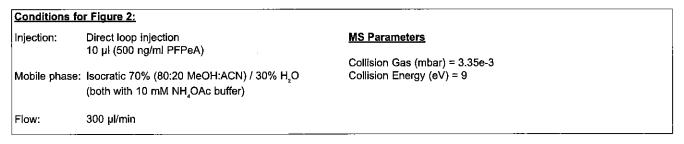


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





LCPFPeS_00002



PRODUCT CODE:

L-PFPe\$

LOT NUMBER:

LPFPeS0712

COMPOUND:

Sodium perfluoro-1-pentanesulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₅F₄SO₃Na

MOLECULAR WEIGHT:

372.09

CONCENTRATION:

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

 $46.9 \pm 2.3 \mu g/ml$ (PFPeS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/04/2012

EXPIRY DATE: (mm/dd/yyyy)

07/04/2017

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: 01/15/2013

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:

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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.

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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.

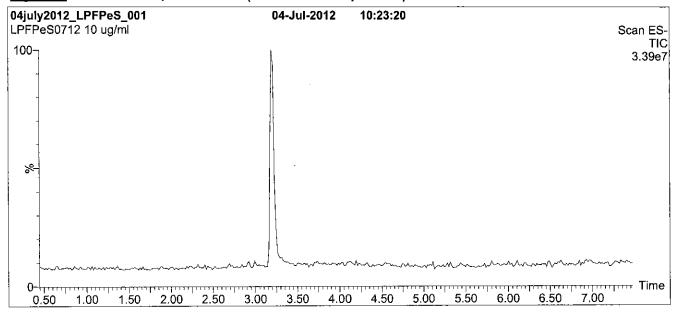
QUALITY MANAGEMENT:

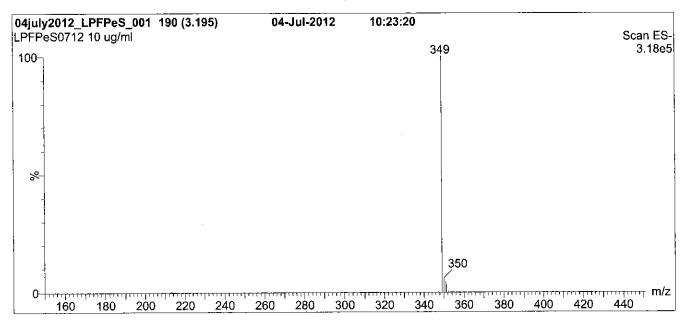
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





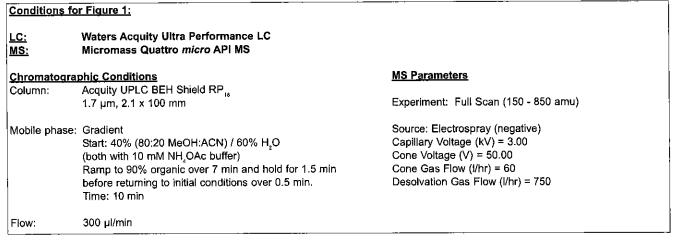
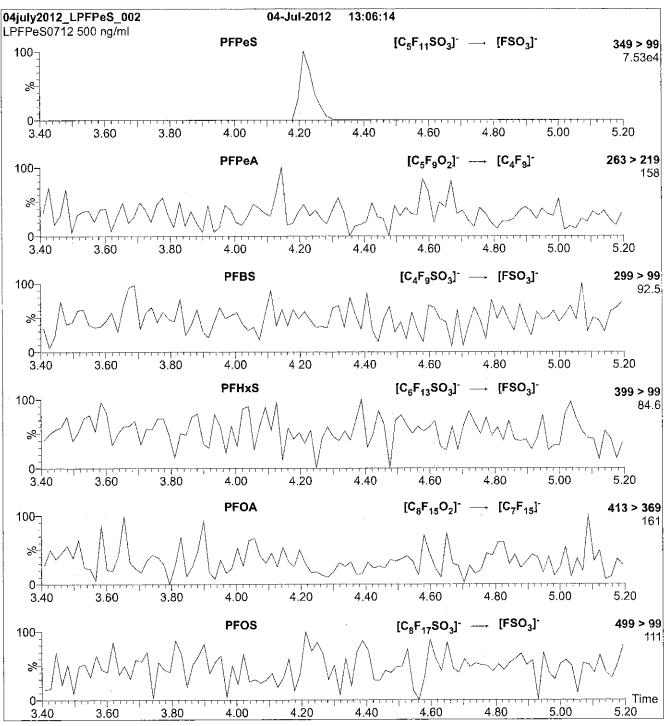
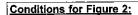


Figure 2: L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Flow:

Direct loop injection

10 μl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

•

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 30

LCPFTeDA_00003



PRODUCT CODE:

PFTeDA

LOT NUMBER:

PFTeDA0613

COMPOUND:

Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #:

376-06-7

MOLECULAR FORMULA:

 $C_{14}HF_{27}O_{2}$

MOLECULAR WEIGHT:

714.11

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/19/2013

EXPIRY DATE: (mm/dd/yyyy)

06/19/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

• Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/17/2013

(mm/ddbusss)

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. 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:

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

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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 ±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:

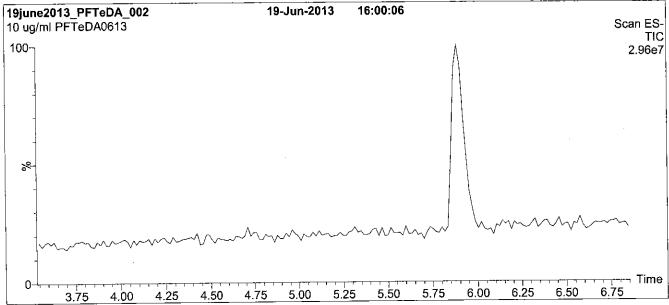
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

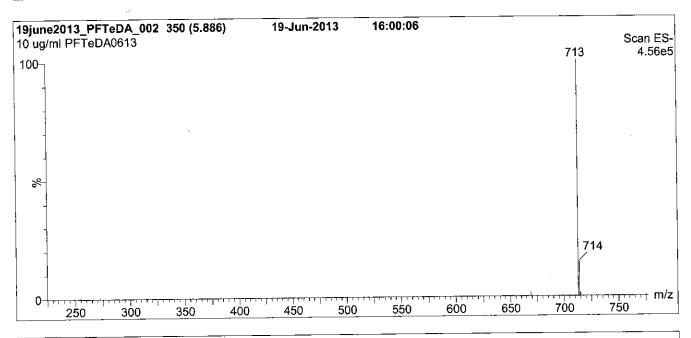




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**







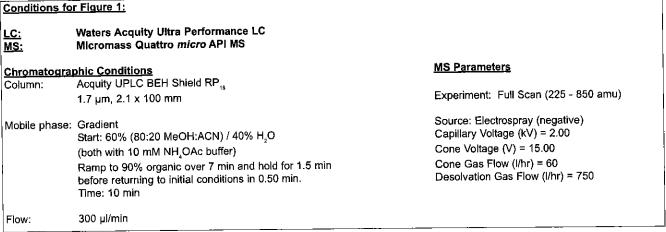
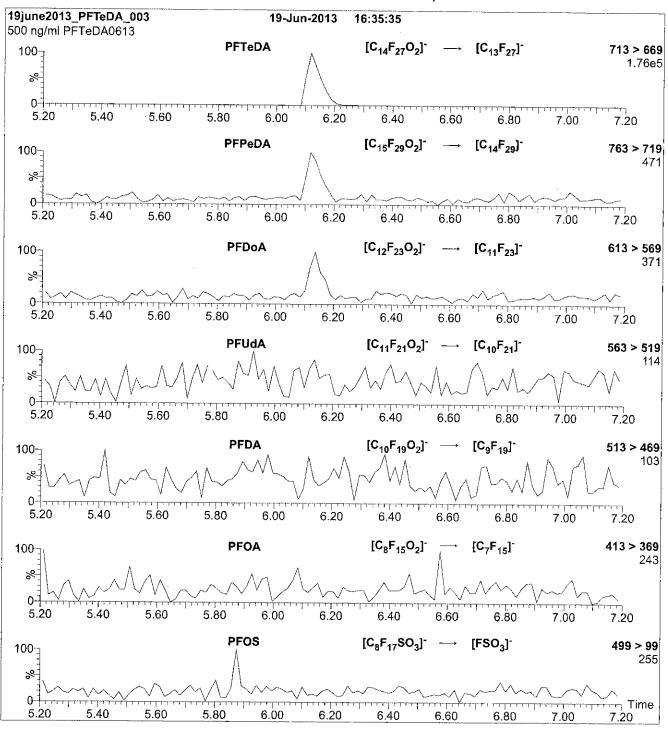
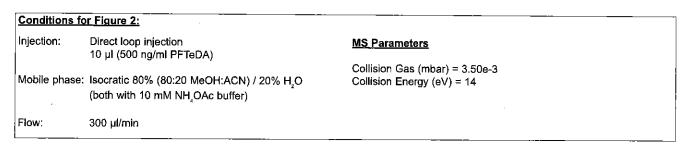


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCPFTrDA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTrDA

LOT NUMBER:

PFTrDA1213

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)

12/10/2013

EXPIRY DATE: (mm/dd/yyyy)

12/10/2018

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.

Contains ~ 0.1% of PFUdA (C₁₁HF₂₁O₂), ~ 0.4% of PFDoA (C₁₂HF₂₃O₂), and ~ 0.1% of PFTeDA $(C_{14}HF_{27}O_2).$

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/11/2013

INTENDED USE:

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, $u_{x}(y)$, 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 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:

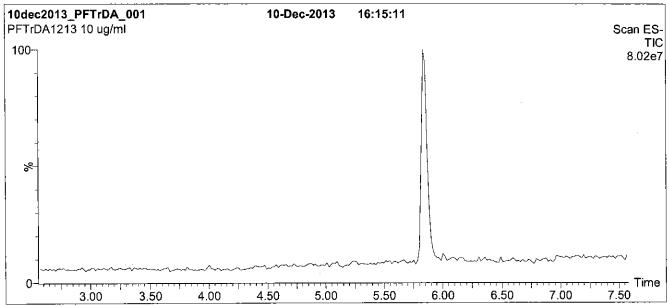
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

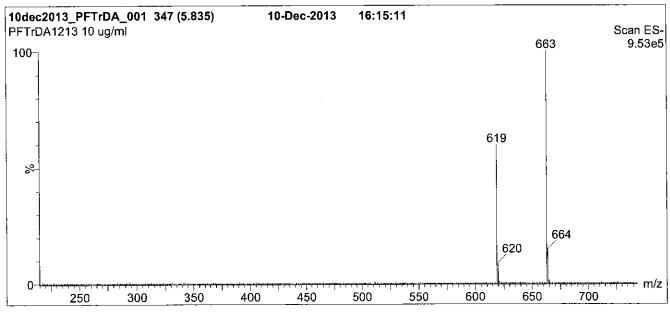




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





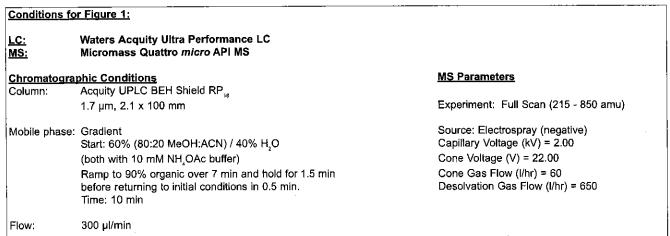
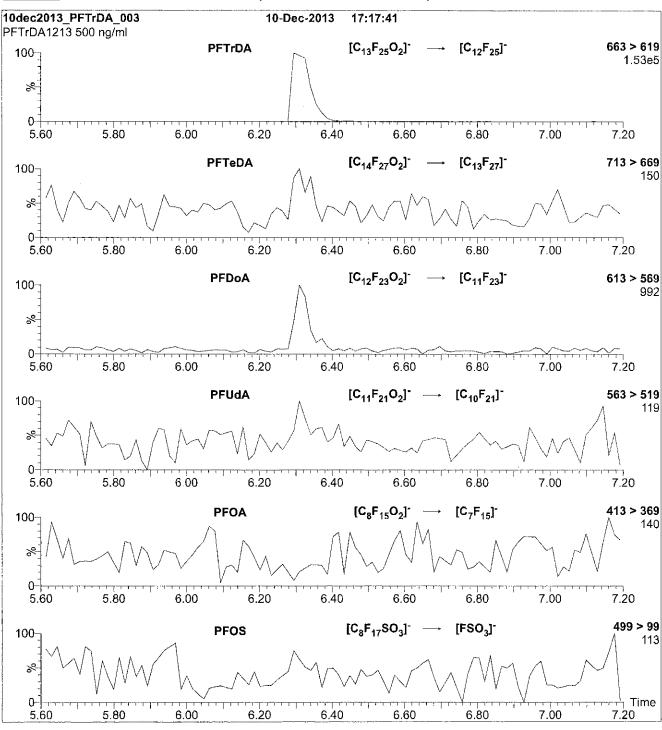
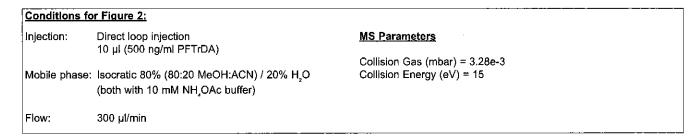


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCPFUdA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFUdA

LOT NUMBER:

PFUdA0613

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)

06/19/2013

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:

Date: <u>07/03/2013</u>

INTENDED USE:

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HAZARDS:

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 $x_{*}, x_{*}, \dots x_{*}$ 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 our products.

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QUALITY MANAGEMENT:

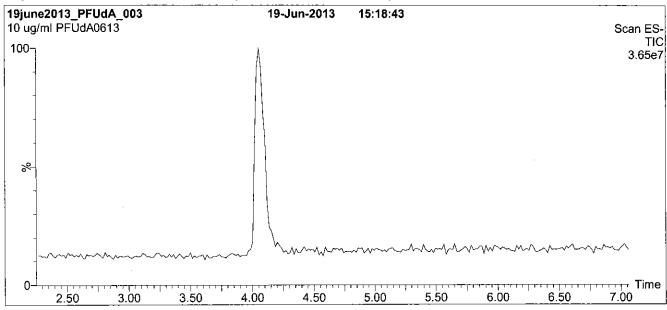
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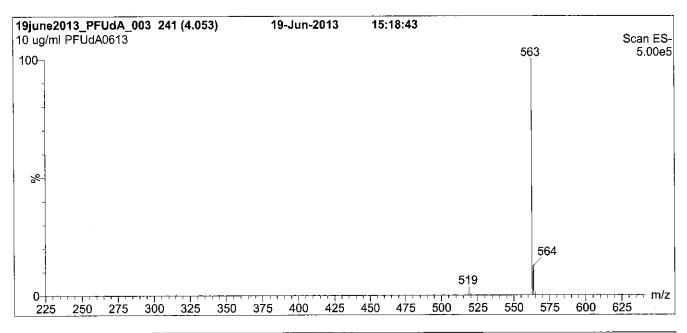




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





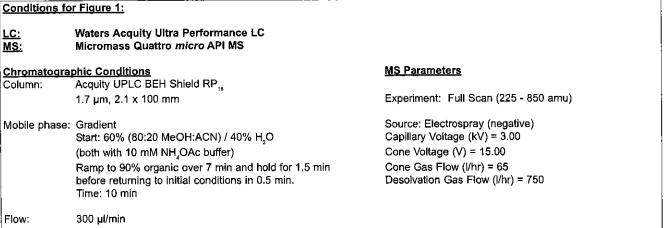
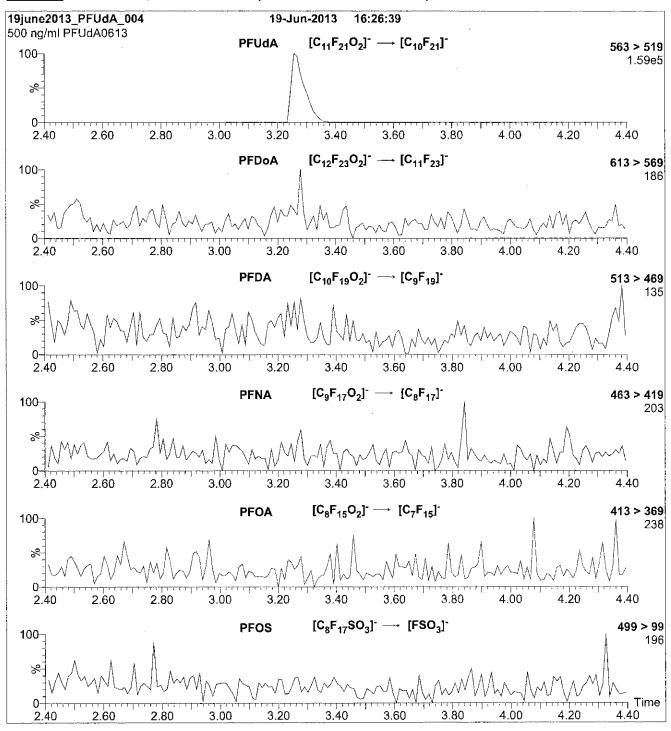
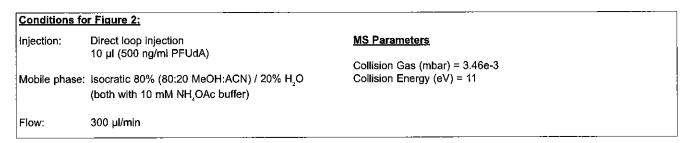


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II LCMS SURROGATE RECOVERY

Lab 1	Name:	TestAmerica	Sacramento	Job No.:	320-17463-1
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SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	PFHxA #	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA :
BC_02_26_16	320-17463-1	103	110	99	107	97	109
DW-18	320-17463-2	87	84	111	79	92	88
DW-18FB	320-17463-3	108	105	104	103	94	107
DW-78	320-17463-4	87	87	109	76	91	68
DW-78FB	320-17463-5	101	107	102	109	91	110
DW-100	320-17463-6	85	87	110	70	112	59
DW-100FB	320-17463-7	107	109	113	107	124	107
DUP_022616	320-17463-8	83	90	99	77	77	65
	MB 320-102166/1-A	107	108	106	101	100	106
	LCS 320-102166/2-A	97	100	100	92	88	95
	LCSD 320-102166/3-A	99	101	103	93	92	96

	QC LIMITS
PFHxA = 13C2 PFHxA	25-150
13CHpA = 13C4-PFHpA	25-150
PFHxS = 1802 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150
PFNA = 13C5 PFNA	25-150

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM III LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name	Name: TestAmerica Sacramento		Job No.: 320-17463-1					
SDG No.	:							
Matrix:	Water	Level: Low	Lab File ID:	03MAR2016A4A_013.d				
Lab ID:	LCS 320-102166/2-A		Client ID:					

	SPIKE	LCS	LCS	QC	
	ADDED	CONCENTRATION	왕	LIMITS	#
COMPOUND	(ng/L)	(ng/L)	REC	REC	
13C2 PFHxA	100	97.2	97	25-150	
13C4 PFOA	100	92.2	92	25-150	
13C4 PFOS	95.6	84.6	88	25-150	
13C4-PFHpA	100	99.9	100	25-150	
13C5 PFNA	100	95.2	95	25-150	
1802 PFHxS	94.6	94.8	100	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0	102	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	37.5	94	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	36.0	95	60-140	
Perfluorononanoic acid (PFNA)	40.0	40.8	102	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	47.8	125	60-140	
Perfluorooctanoic acid (PFOA)	40.0	39.8	99	60-140	

 $[\]mbox{\#}$ Column to be used to flag recovery and RPD values FORM III WS-LC-0025

FORM III LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Nam	e: <u>TestAmerica Sacr</u>	ramento	Job No.: 320	-17463-1
SDG No.	:			
Matrix:	Water	Level: Low	Lab File ID:	03MAR2016A4A_014.d
Lab ID:	LCSD 320-102166/3-	- A	Client ID:	

	SPIKE ADDED	LCSD CONCENTRATION	LCSD %	0/0	QC LIMITS		#
COMPOUND	(ng/L)	(ng/L)	REC	RPD	RPD	REC	
13C2 PFHxA	100	99.5	99			25-150	
13C4 PFOA	100	92.7	93			25-150	
13C4 PFOS	95.6	87.6	92			25-150	
13C4-PFHpA	100	101	101			25-150	
13C5 PFNA	100	95.7	96			25-150	
1802 PFHxS	94.6	97.4	103			25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.2	102	0	30	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	38.8	97	3	30	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	39.0	103	8	30	60-140	
Perfluorononanoic acid (PFNA)	40.0	40.8	102	0	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	50.1	131	5	30	60-140	
Perfluorooctanoic acid (PFOA)	40.0	38.5	96	3	30	60-140	

 $[\]mbox{\#}$ Column to be used to flag recovery and RPD values FORM III WS-LC-0025

FORM IV LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento	Job No.: 320-17463-1
SDG No.:	
Lab File ID: 03MAR2016A4A_012.d	Lab Sample ID: MB 320-102166/1-A
Matrix: Water	Date Extracted: 03/02/2016 12:04
Instrument ID: A4	Date Analyzed: 03/03/2016 19:51
Level:(Low/Med) Low	

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

		LAB		
CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALY	ZED
	LCS 320-102166/2-A	03MAR2016A4	03/03/2016	20:12
		A 013.d		
	LCSD 320-102166/3-A	03MAR2016A4	03/03/2016	20:33
		A_014.d		
BC_02_26_16	320-17463-1	03MAR2016A4	03/03/2016	20:54
		A_015.d		
DW-18	320-17463-2	03MAR2016A4	03/03/2016	21:15
		A_016.d		
DW-18FB	320-17463-3	03MAR2016A4	03/03/2016	21:36
		A_017.d		
DW-78	320-17463-4	03MAR2016A4	03/03/2016	21:58
		A_018.d		
DW-78FB	320-17463-5	03MAR2016A4	03/03/2016	22:19
		A_019.d		
DW-100	320-17463-6	03MAR2016A4	03/03/2016	22:40
		A_020.d		
DW-100FB	320-17463-7	03MAR2016A4	03/03/2016	23:01
		A 021.d		
DUP_022616	320-17463-8	03MAR2016A4	03/03/2016	23:43
		A_023.d		

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Matrix: Water Lab File ID: 03MAR2016A4A_015.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 13:50

Extraction Method: 3535 Date Extracted: 03/02/2016 12:04

Sample wt/vol: 582.5(mL) Date Analyzed: 03/03/2016 20:54

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.4	ЈВ	2.1	1.7	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	U	2.1	1.7	0.69
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.1	1.7	0.75
375-95-1	Perfluorononanoic acid (PFNA)	0.64	J	2.1	1.7	0.56
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.4	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.7	U	2.1	1.7	0.64

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	103		25-150
STL00990	13C4 PFOA	107		25-150
STL00991	13C4 PFOS	97		25-150
STL01892	13C4-PFHpA	110		25-150
STL00995	13C5 PFNA	109		25-150
STL00994	1802 PFHxS	99		25-150

Report Date: 04-Mar-2016 15:24:33 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_015.d

Lims ID: 320-17463-B-1-A Lab Sample ID: 320-17463-1

Client ID: BC_02_26_16

Sample Type: Client

Inject. Date: 03-Mar-2016 20:54:30 ALS Bottle#: 28 Worklist Smp#: 14

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-1-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

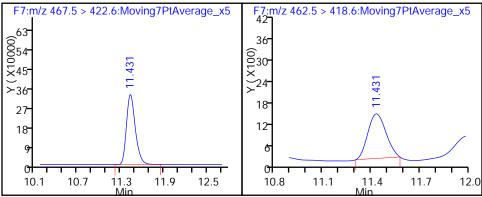
First Level Reviewer: westendorfc Date: 04-Mar-2016 15:17:58

I II St Level Kevi	CWCI. WC.	steriuorit	,		Date.	04-10101-201013.17.30				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.047	7.031	0.016	1.000	14179	0.8291				
D 613C2 PFH	хA									
314.6 > 269.7	8.160	8.151	0.009		3108947	51.5		103	7112	
D 813C4-PFH	•									
366.6 > 321.6	9.372	9.361	0.011		2718299	55.1		110	5268	
9 Perfluorohe	•									
362.8 > 318.7				1.000	7040	0.2350			15.4	
58 Perfluorohe				1 000	0.1.0.0	0.0440				
		9.399	0.005	1.000	8102	0.3660				
D 11 18O2 PFF 402.5 > 83.6		9.399	0.005		1244244	46.9		99.2	3043	
	9.404	9.399	0.005		1246246	40.9		99.2	3043	
D 12 13C4 PFC 416.5 > 371.6		10 466	-0.001		3387964	53.5		107	7317	
13 Perfluoroo			-0.001		3301704	55.5		107	7317	
	10.474		0.006	1.000	6282	0.1599			11.7	
	10.465			0.999	3250	0.1077	1.93(0.00-0.00)		7.8	
D 16 13C4 PFC)S									
502.4 > 79.7	11.412	11.420	-0.008		708969	46.5		97.3	1957	
15 Perfluorood	ctane sulf	onic acid	k							
498.3 > 79.2	11.421	11.421	0.0	1.000	1487	0.0374			4.4	
D 17 13C5 PFN	IA									
467.5 > 422.6	11.431	11.441	-0.010		2816530	54.7		109	6150	
18 Perfluoron										
462.5 > 418.6	11.431	11.441	-0.010	1.000	9717	0.3702			15.9	

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:33 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_015.d **Injection Date:** 03-Mar-2016 20:54:30 Instrument ID: Lims ID: 320-17463-B-1-A Lab Sample ID: 320-17463-1 Client ID: BC 02 26 16 Operator ID: **JRB** ALS Bottle#: 28 Worklist Smp#: 14 Injection Vol: Dil. Factor: 1.0000 15.0 ul PFAC A4 LC PFC_DOD ICAL Method: Limit Group: 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA D 813C4-PFHpA F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 56- 63- 0054 545 545 648 ×40 ×45 -32 ≻₃₆-**≻**36 24 27 27 18 18 6.7 7.0 7.5 8.7 9.3 8.2 7.3 7.6 8.1 8.8 9.4 10.0 11 1802 PFHxS 9 Perfluoroheptanoic acid 58 Perfluorohexanesulfonic acid F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F4:m/z 398.3 > 79.2:Moving7PtAverage x5 F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 28 28 21 0024- ×20-©24-0020-×20-<u>@</u>18 ∑₁₅-∑16- -16 12 9.2 Min 9.0 9.6 8.9 9.5 9.8 9.0 9.3 9.6 9.9 10.2 10.1 8.7 8.6 12 13C4 PFOA 13 Perfluorooctanoic acid 13 Perfluorooctanoic acid F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 24 30 ©77-966-8₂₅-×₂₀ <u>×</u>16-×55 12 15 33 10 22 9.9 10.5 10.0 10.3 10.6 10.9 9.9 10.2 10.5 10.8 11.1 11.1 9.3 D 16 13C4 PFOS 15 Perfluorooctane sulfonic acid 15 Perfluorooctane sulfonic acid F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 18 (000012 X) > 9 28 ©15 ×12 <u>6</u>24 ×20 ≻16- 12 00 10.4 11.0 12.2 11.1 11.7 9.5 10.7 11.9 13.1 11.6 Page 21/1n of 406

D 17 13C5 PFNA

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-18 Lab Sample ID: 320-17463-2

Matrix: Water Lab File ID: 03MAR2016A4A_016.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 13:50

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 558.1(mL) Date Analyzed: 03/03/2016 21:15

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	ЈВ	2.2	1.8	0.82
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	Ū	2.2	1.8	0.72
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	79		25-150
STL00991	13C4 PFOS	92		25-150
STL01892	13C4-PFHpA	84		25-150
STL00995	13C5 PFNA	88		25-150
STL00994	1802 PFHxS	111		25-150

Report Date: 04-Mar-2016 15:24:35 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_016.d

Lims ID: 320-17463-A-2-A Lab Sample ID: 320-17463-2

Client ID: DW-18 Sample Type: Client

Inject. Date: 03-Mar-2016 21:15:41 ALS Bottle#: 29 Worklist Smp#: 15

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-a-2-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:18:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobu	ıtanesulfo	onic acid								
298.8 > 79.6	7.111	7.031	0.080	1.000	12501	0.6526				
D 6 13C2 PFH	κA									
314.6 > 269.7	8.231	8.151	0.080		2616425	43.3		86.7	7429	
D 813C4-PFH										
366.6 > 321.6	9.427	9.361	0.066		2077055	42.1		84.2	3885	
9 Perfluorohe	•		0.045	4 000	00.47	0.4507				
362.8 > 318.7			0.065	1.000	3347	0.1507			4.4	
58 Perfluorohe				1 000	(202	0.0500				
398.3 > 79.2	9.482	9.399	0.083	1.000	6292	0.2538				
D 11 18O2 PFF 402.5 > 83.6	9.466	9.399	0.067		1395924	52.6		111	3591	
D 12 13C4 PFC		7.577	0.007		13/3/24	32.0			3371	
416.5 > 371.6		10.466	0.042		2499220	39.5		79.0	4904	
D 16 13C4 PFC										
502.4 > 79.7		11.420	0.020		672609	44.1		92.4	1509	
D 17 13C5 PFN	Α									
467.5 > 422.6	11.459	11.441	0.018		2275878	44.2		88.5	4032	
18 Perfluorono	nanoic a	cid								
462.5 > 418.6	11.441	11.441	0.0	1.000	1227	0.2432			2.0	

Report Date: 04-Mar-2016 15:24:35 Chrom Revision: 2.2 02-Dec-2015 11:51:48 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_016.d **Injection Date:** 03-Mar-2016 21:15:41 Instrument ID: Lims ID: 320-17463-A-2-A Lab Sample ID: 320-17463-2 Client ID: **DW-18** Operator ID: **JRB** ALS Bottle#: 29 Worklist Smp#: 15 Injection Vol: Dil. Factor: 15.0 ul 1.0000 PFAC A4 LC PFC_DOD ICAL Method: Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 8 13C4-PFHpA F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 56 49 042 0035 × 0048 1000 140 140 <u>@</u>42 ×35- <u></u>32− ≻28 21 24 21 14 16 6.9 7.2 8.2 8.9 6.6 7.5 7.0 7.6 8.8 8.3 9.5 10.1 11 18O2 PFHxS 9 Perfluoroheptanoic acid 58 Perfluorohexanesulfonic acid D $F4:m/z \ 362.8 > 318.7:Moving7PtAverage \ x5$ F4:m/z 398.3 > 79.2:Moving7PtAverage x5 F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 24 21 630 625 (0) 15-12-©²⁰ ×16 9.427 12 15 10 9.0 9.1 9.4 9.7 9.0 9.3 9.9 9.6 10.2 8.7 9.6 8.8 D 12 13C4 PFOA 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 12 30⁻ 0025⁻ ×20⁻ <u>9</u>48 (X100) X (X100) 10.508) × × × 32 24 15 10 10.0 10.6 11.2 10.0 11.2 10.6 9.4 10.0 10.6 11.2 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 21 (a) 14⁻ (b) 12⁻ 21 (2)18 √15 <u>@</u>18 ∑₁₀ ∑₁₅-≻₁₂ 0 0 o

10.9

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12.2

217/5n of 406

10.4

11.0

11.6

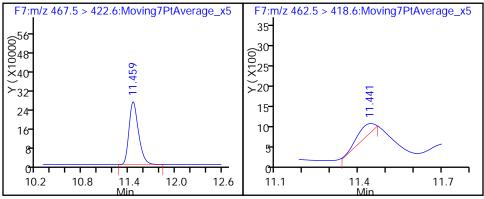
Min

12.2

10.3

D 17 13C5 PFNA

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-18FB Lab Sample ID: 320-17463-3

Matrix: Water Lab File ID: 03MAR2016A4A_017.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 13:20

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 552.9(mL) Date Analyzed: 03/03/2016 21:36

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ЈВ	2.3	1.8	0.83
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	Ū	2.3	1.8	0.73
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.3	1.8	0.79
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.3	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.3	1.8	0.68

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	108		25-150
STL00990	13C4 PFOA	103		25-150
STL00991	13C4 PFOS	94		25-150
STL01892	13C4-PFHpA	105		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	1802 PFHxS	104		25-150

Report Date: 04-Mar-2016 15:24:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_017.d

Lims ID: 320-17463-A-3-A Lab Sample ID: 320-17463-3

Client ID: DW-18FB Sample Type: Client

Inject. Date: 03-Mar-2016 21:36:51 ALS Bottle#: 30 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-a-3-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:18:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobu	tanesulfo	onic acid								
298.8 > 79.6	7.065	7.031	0.034	1.000	12861	0.7160				
D 6 13C2 PFHx	κA									
314.6 > 269.7	8.182	8.151	0.031		3259439	54.0		108	7369	
D 8 13C4-PFHp										
366.6 > 321.6	9.380	9.361	0.019		2597113	52.6		105	4596	
58 Perfluorohe				4 000	1010	0.00/0				
398.3 > 79.2	9.419	9.399	0.020	1.000	4810	0.2069				
D 11 1802 PFH		0.200	0.012		1200071	40.2		104	2277	
402.5 > 83.6	9.411	9.399	0.012		1309071	49.3		104	3377	
D 12 13C4 PFO 416.5 > 371.6		10 466	-0.001		3273766	51.7		103	6793	
13 Perfluorooc			0.001		3273700	31.7		103	0775	
		10.468	-0.003	1.000	5386	0.1419			11.1	
D 16 13C4 PFO										
		11.420	-0.017		687508	45.1		94.4	2673	
D 17 13C5 PFN	Α									
467.5 > 422.6	11.422	11.441	-0.019		2759024	53.6		107	5081	

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:37 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_017.d **Injection Date:** 03-Mar-2016 21:36:51 Instrument ID: Lims ID: 320-17463-A-3-A Lab Sample ID: 320-17463-3 DW-18FB Client ID: Operator ID: **JRB** ALS Bottle#: 30 Worklist Smp#: 16 Dil. Factor: Injection Vol: 15.0 ul 1.0000 Method: PFAC A4 LC PFC_DOD ICAL Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 813C4-PFHpA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 63 0060 X50 42 0035-×)28-× -36 ≻40 21 30 27 20 18 10 6.7 7.0 8.2 8.9 9.5 7.3 7.6 7.0 7.6 8.8 8.3 10.1 11 1802 PFHxS 9 Perfluoroheptanoic acid (ND) 58 Perfluorohexanesulfonic acid F4:m/z 362.8 > 318.7:Moving7PtAverage x5F4:m/z 398.3 > 79.2:Moving7PtAverage x5 F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 35- 30⁻ 00025⁻ 18 6³⁰ ×25 015- × 12-≻ ∑₂₀ ∑20 9.419 15 15 10 10 8.9 9.0 9.6 9.5 9.1 9.4 9.7 10.2 10.1 8.8 10.0 8.4 8.3 D 12 13C4 PFOA 13 Perfluorooctanoic acid 13 Perfluorooctanoic acid F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 70 14 21 (00001× 50° × 40° (012 ×10 × 8 <u>8</u>18 ∑15- ≻₁₂-30 20 01 01 9.9 10.5 10.1 10.4 9.7 11.1 9.8 10.7 11.0 8.5 10.9 12.1 9.3 D 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 82 (000012 X) > 9 14 71 <u>@</u>12 60 ×60 ∑₁₀ -49 8 38 27 16

0

10.4

11.0 Page 27% of 406 12.2

10.4

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12.2

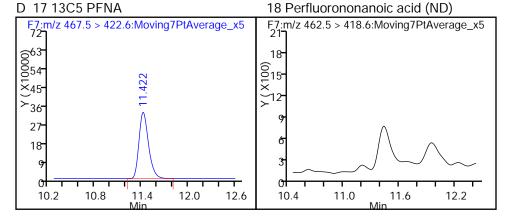
11.6

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11.0

Report Date: 04-Mar-2016 15:24:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

 $Data\ File: \verb|\ChromNA| Sacramento \verb|\ChromData| A4 \verb|\20160304-28858.b| 03 MAR 2016A4A_017.d| description of the property o$



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-78 Lab Sample ID: 320-17463-4

Matrix: Water Lab File ID: 03MAR2016A4A_018.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 11:50

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 519.6(mL) Date Analyzed: 03/03/2016 21:58

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ЈВ	2.4	1.9	0.88
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	76		25-150
STL00991	13C4 PFOS	91		25-150
STL01892	13C4-PFHpA	87		25-150
STL00995	13C5 PFNA	68		25-150
STL00994	1802 PFHxS	109		25-150

Report Date: 04-Mar-2016 15:24:39 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_018.d

Lims ID: 320-17463-B-4-A Lab Sample ID: 320-17463-4

Client ID: DW-78 Sample Type: Client

Inject. Date: 03-Mar-2016 21:58:02 ALS Bottle#: 31 Worklist Smp#: 17

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-4-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

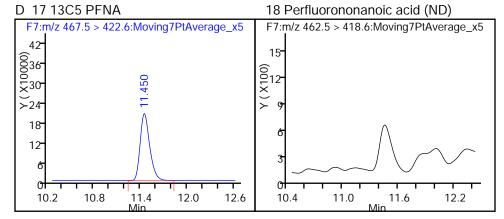
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:19:21

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobu	ıtanesulfo	onic acid								
298.8 > 79.6	7.120	7.031	0.089	1.000	12462	0.6654				
D 613C2 PFH	κA									
314.6 > 269.7	8.242	8.151	0.091		2632417	43.6		87.2	8715	
D 8 13C4-PFH										
	9.435	9.361	0.074		2148607	43.5		87.1	3563	
58 Perfluorohe				4 000	4/57	0.4004				
398.3 > 79.2	9.466	9.399	0.067	1.000	4657	0.1921				
D 11 1802 PFH		0.200	0.047		1244044	E1 /		100	4221	
402.5 > 83.6	9.466	9.399	0.067		1364966	51.4		109	4221	
D 12 13C4 PFC 416.5 > 371.6		10 466	0.042		2400229	37.9		75.9	5285	
D 16 13C4 PFC		10.400	0.042		2400227	37.7		75.7	3203	
502.4 > 79.7		11.420	0.010		663432	43.5		91.1	2198	
15 Perfluorood										
498.3 > 79.2		11.421		1.000	7050	0.1894			16.6	
D 17 13C5 PFN	Α									
467.5 > 422.6	11.450	11.441	0.009		1741806	33.9		67.7	3549	

Report Date: 04-Mar-2016 15:24:39 Chrom Revision: 2.2 02-Dec-2015 11:51:48 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_018.d **Injection Date:** 03-Mar-2016 21:58:02 Instrument ID: A4 Lims ID: 320-17463-B-4-A Lab Sample ID: 320-17463-4 Client ID: **DW-78** Operator ID: **JRB** ALS Bottle#: 31 Worklist Smp#: 17 Injection Vol: Dil. Factor: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A4 Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 813C4-PFHpA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 (56⁻ (0048⁻ 0042 ×35 648-540-540-×40 <u>></u>32 ≻28 **≻**32 24 21 24 16 16 14 6.9 7.5 8.9 8.9 6.6 7.2 7.1 7.7 8.3 8.3 9.5 10.1 11 1802 PFHxS 9 Perfluoroheptanoic acid (ND) 58 Perfluorohexanesulfonic acid F4:m/z 398.3 > 79.2:Moving7PtAverage_x5 F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage x524 630 625 18 20° ×16° \S_20 15 10 8.9 8.9 9.5 10.1 9.1 9.4 9.5 10.1 8.8 9.7 10.0 8.3 8.3 D 12 13C4 PFOA 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 21 (56⁻ (0048⁻ (18-(0015-(×) (×) (×) (0) X) 12 X) 508 ×40 **≻**32-24 16 01 10.0 10.6 11.2 10.0 10.0 9.4 10.6 11.2 10.6 11.2 15 Perfluorooctane sulfonic acid 16 13C4 PFOS 15 Perfluorooctane sulfonic acid F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 (a) 14⁻ (b) 12⁻ 21 30 <u>25</u> ∑₂₀ ∑₁₀ ∑₁₅ 15 10 0 $^{\circ}$ o 10.9 10.3 11.5 12.1 10.9 11.2 11.5 Page 286 of 406 11.8 9.5 10.7 11.9 13.1

Report Date: 04-Mar-2016 15:24:39 Chrom Revision: 2.2 02-Dec-2015 11:51:48



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Con. Extract Vol.: 1.00(mL)

Client Sample ID: DW-78FB Lab Sample ID: 320-17463-5

Matrix: Water Lab File ID: 03MAR2016A4A_019.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 11:40

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 572.1(mL) Date Analyzed: 03/03/2016 22:19

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

Dilution Factor: 1

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	ЈВ	2.2	1.7	0.80
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	U	2.2	1.7	0.70
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.2	1.7	0.76
375-95-1	Perfluorononanoic acid (PFNA)	1.7	U	2.2	1.7	0.57
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.7	U	2.2	1.7	0.65

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	101		25-150
STL00990	13C4 PFOA	109		25-150
STL00991	13C4 PFOS	91		25-150
STL01892	13C4-PFHpA	107		25-150
STL00995	13C5 PFNA	110		25-150
STL00994	1802 PFHxS	102		25-150

Report Date: 04-Mar-2016 15:24:40 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_019.d

Lims ID: 320-17463-B-5-A Lab Sample ID: 320-17463-5

Client ID: DW-78FB Sample Type: Client

Inject. Date: 03-Mar-2016 22:19:14 ALS Bottle#: 32 Worklist Smp#: 18

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-5-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

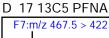
Process Host: XAWRK027

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
,	51 Perfluorobut	tanesulfo	nic acid								
	298.8 > 79.6	7.014	7.031	-0.017	1.000	11781	0.6723				
	D 613C2 PFHx	Α									
	314.6 > 269.7	8.133	8.151	-0.018		3062759	50.7		101	6999	
	D 8 13C4-PFHp	Α									
	366.6 > 321.6	9.326	9.361	-0.035		2644861	53.6		107	5781	
	9 Perfluorohep										
	362.8 > 318.7	9.310	9.362	-0.052	1.000	3075	0.1120			9.3	
	58 Perfluorohe:			-							
	398.3 > 79.2	9.372	9.399	-0.027	1.000	3374	0.1488				
	D 11 1802 PFH:										
	402.5 > 83.6	9.365	9.399	-0.034		1276986	48.1		102	3674	
	D 12 13C4 PFO										
	416.5 > 371.6	10.431	10.466	-0.035		3441986	54.4		109	5993	
	D 16 13C4 PFO										
	502.4 > 79.7	11.375	11.420	-0.045		665297	43.7		91.4	2262	
	D 17 13C5 PFN										
	467.5 > 422.6	11.395	11.441	-0.046		2820830	54.8		110	4485	
	18 Perfluorono										
	462.5 > 418.6	11.395	11.441	-0.046	1.000	6612	0.3220			11.8	

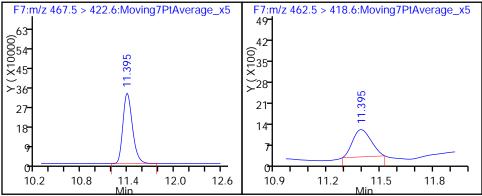
Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:40 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_019.d **Injection Date:** 03-Mar-2016 22:19:14 Instrument ID: Lims ID: 320-17463-B-5-A Lab Sample ID: 320-17463-5 Client ID: DW-78FB Operator ID: **JRB** ALS Bottle#: 32 Worklist Smp#: 18 Injection Vol: 15.0 ul Dil. Factor: 1.0000 Method: PFAC A4 LC PFC_DOD ICAL Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 813C4-PFHpA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 56- 70⁻ 49 0048 0048 ×40 <u>8</u>42 ×35 ∑50 -32 ≻₂₈-≻40 24 30 21 20 16 14 10 6.7 7.0 7.7 8.3 8.9 7.3 7.6 7.1 8.2 8.8 9.4 10.0 11 1802 PFHxS 9 Perfluoroheptanoic acid 58 Perfluorohexanesulfonic acid F4:m/z 362.8 > 318.7:Moving7PtAverage x5F4:m/z 398.3 > 79.2:Moving7PtAverage x5F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 42 28 21 0024**-**36 9.365 618 ×15 630 630 ∑₂₄-∑16⁻ 9.310 18 12 12 9.4 8.9 9.1 9.4 9.7 9.1 9.7 10.0 8.3 9.5 10.1 8.8 8.8 D 12 13C4 PFOA 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 24 12 ©77- (X100) X (X100) ×55 12 33 8 22 9.8 10.4 11.0 10.0 11.2 11.2 11.6 9.4 10.6 10.0 10.6 9.2 15 Perfluorooctane sulfonic acid (ND) D 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 <u>F6:</u>m/z 498.3 > 79.2:Moving7PtAverage_x5 (000012 X) > 9 ۲ (X100) Y (X100) 00 $^{\circ}$ 10.4 11.0 12.2 10.4 12.2 10.4 11.0 11.6 12.2 11.6 2877n of 406

Report Date: 04-Mar-2016 15:24:40 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_019.d



18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-100 Lab Sample ID: 320-17463-6

Matrix: Water Lab File ID: 03MAR2016A4A_020.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 12:35

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 510.2(mL) Date Analyzed: 03/03/2016 22:40

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	COMPOUND NAME RESULT Q		LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.0	ЈВ	2.5	2.0	0.90
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.85
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.64
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.73

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	85		25-150
STL00990	13C4 PFOA	70		25-150
STL00991	13C4 PFOS	112		25-150
STL01892	13C4-PFHpA	87		25-150
STL00995	13C5 PFNA	59		25-150
STL00994	1802 PFHxS	110		25-150

Report Date: 04-Mar-2016 15:24:41 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_020.d

Lims ID: 320-17463-B-6-A Lab Sample ID: 320-17463-6

Client ID: DW-100 Sample Type: Client

Inject. Date: 03-Mar-2016 22:40:25 ALS Bottle#: 33 Worklist Smp#: 19

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-6-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobu	tanesulfo	onic acid								
298.8 > 79.6	7.079	7.031	0.048	1.000	9938	0.5236				
D 613C2 PFH	κA									
314.6 > 269.7	8.193	8.151	0.042		2570629	42.6		85.2	7200	
D 813C4-PFH										
366.6 > 321.6	9.388	9.361	0.027		2149108	43.5		87.1	6664	
9 Perfluoroher										
362.8 > 318.7			0.026	1.000	5433	0.2296			4.0	
58 Perfluorohe				1 000	4710	0.1017				
398.3 > 79.2	9.427	9.399	0.028	1.000	4710	0.1917				
D 11 18O2 PFH 402.5 > 83.6	xS 9.419	9.399	0.020		1383146	52.1		110	3168	
D 12 13C4 PFO		7.377	0.020		1303140	52.1		110	3100	
416.5 > 371.6		10 466	-0.001		2214136	35.0		70.0	3709	
13 Perfluorooc			0.001		2214100	33.0		70.0	3707	
	10.474		0.006	1.000	4233	0.1648			6.2	
D 1613C4 PFOS										
	11.403	11.420	-0.017		813058	53.4		112	2513	
D 17 13C5 PFN	A									
467.5 > 422.6	11.422	11.441	-0.019		1518018	29.5		59.0	4212	

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:41 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A4\\20160304-28858.b\\03MAR2016A4A_020.d **Injection Date:** 03-Mar-2016 22:40:25 Instrument ID: Lims ID: 320-17463-B-6-A Lab Sample ID: 320-17463-6 Client ID: DW-100 Operator ID: **JRB** ALS Bottle#: 33 Worklist Smp#: 19 Injection Vol: Dil. Factor: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A4 Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 813C4-PFHpA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 56- 0048 ×40 042 08 35 36 7.079 001 × × × 24 <u></u>∠28 -32 18 24 21 12 16 14 7.0 8.2 6.7 7.3 7.0 7.6 8.8 8.2 8.8 9.4 10.0 11 1802 PFHxS 9 Perfluoroheptanoic acid 58 Perfluorohexanesulfonic acid F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 F4:m/z 398.3 > 79.2:Moving7PtAverage x5F4:m/z 362.8 > 318.7:Moving7PtAverage x521 30 630 625 (0) 15-12-\S_{20} . ≥20-15- 15 10 10 9.3 Mir 9.0 9.0 9.6 9.9 8.9 9.2 9.5 9.6 10.2 9.8 10.1 8.7 8.6 D 12 13C4 PFOA 13 Perfluorooctanoic acid 13 Perfluorooctanoic acid F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 49 12 21 0042 ×35 × (×100) <u>8</u>18 ∑15- -28 ≻₁₂-21 14 01 10.0 10.6 11.2 9.7 9.8 10.1 10.4 8.5 10.9 12.1 10.7 11.0 D 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 18 × (×100) (00015⁻ X12⁻ 12 0010 X 8 0 0 0

10.9

11.5

12.1

10.4

Page

12.2

10.4

11.0

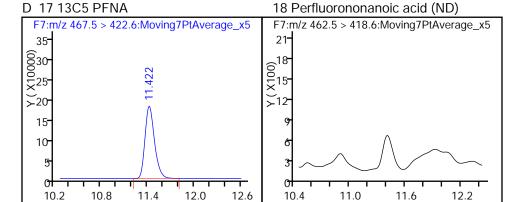
11.6

12.2

10.3

Report Date: 04-Mar-2016 15:24:42 Chrom Revision: 2.2 02-Dec-2015 11:51:48

 $Data\ File: \verb|\ChromNA| Sacramento \verb|\ChromData| A4 \verb|\20160304-28858.b| 03 MAR 2016A4A_020.d|$



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-100FB Lab Sample ID: 320-17463-7

Matrix: Water Lab File ID: 03MAR2016A4A_021.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 12:30

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 536.8(mL) Date Analyzed: 03/03/2016 23:01

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	COMPOUND NAME RESULT Q		LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ЈВ	2.3	1.9	0.86
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	Ū	2.3	1.9	0.75
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.3	1.9	0.81
375-95-1	Perfluorononanoic acid (PFNA)	0.63	J	2.3	1.9	0.61
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	U	3.7	2.8	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	Ū	2.3	1.9	0.70

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		25-150
STL00990	13C4 PFOA	107		25-150
STL00991	13C4 PFOS	124		25-150
STL01892	13C4-PFHpA	109		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	1802 PFHxS	113		25-150

Report Date: 04-Mar-2016 15:24:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_021.d

Lims ID: 320-17463-B-7-A Lab Sample ID: 320-17463-7

Client ID: DW-100FB

Sample Type: Client

Inject. Date: 03-Mar-2016 23:01:33 ALS Bottle#: 34 Worklist Smp#: 20

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-7-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:18

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	51 Perfluorobu	tanesulfo	onic acid								
	298.8 > 79.6	6.973	7.031	-0.058	1.000	13495	0.6949				
-	D 613C2 PFHx	:A									
	314.6 > 269.7	8.100	8.151	-0.051		3240701	53.7		107	6421	
	D 813C4-PFHp	ρA									
	366.6 > 321.6	9.310	9.361	-0.051		2685053	54.4		109	4679	
	58 Perfluorohe			-							
	398.3 > 79.2	9.357	9.399	-0.042	1.000	5709	0.2271				
	D 11 18O2 PFH		0.000	0.050		4.445050	F0.0		440	0054	
	402.5 > 83.6	9.349	9.399	-0.050		1415352	53.3		113	3254	
	D 12 13C4 PFO		10 4//	0.042		2202004	F2 F		107	722/	
	416.5 > 371.6			-0.043		3383994	53.5		107	7326	
	13 Perfluorooci 412.8 > 368.8			0.062	1.000	3408	0.0868			9.5	
			10.406	-0.002	1.000	3400	0.0000			9.3	
	D 16 13C4 PFO 502.4 > 79.7	5 11.384	11 /20	-0 036		904892	59.4		124	3794	
	D 17 13C5 PFN		11.420	-0.030		704072	37.4		124	3774	
	467.5 > 422.6		11 441	-0.037		2756792	53.6		107	7436	
18 Perfluorononanoic acid									. 100		
	462.5 > 418.6			-0.037	1.000	7355	0.3361			14.1	
	.52.5			0.007		. 500	0.0001				

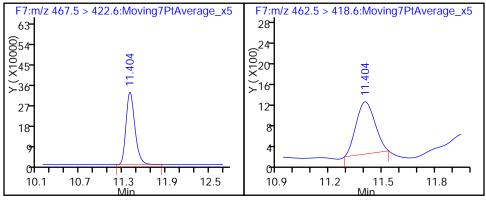
Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:43 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_021.d **Injection Date:** 03-Mar-2016 23:01:33 Instrument ID: Lims ID: 320-17463-B-7-A Lab Sample ID: 320-17463-7 Client ID: **DW-100FB** Operator ID: **JRB** ALS Bottle#: 34 Worklist Smp#: 20 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A4 Limit Group: 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA D 8 13C4-PFHpA F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 721 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 8.100 63° 854° 6⁵⁶ 648 48 0040 × × 32 \succeq_{45} ×40 6.973 36 24 24 27 16 18 16 6.9 8.3 8.9 6.6 7.2 7.5 7.1 7.7 8.2 8.8 9.4 10.0 11 1802 PFHxS 9 Perfluoroheptanoic acid (ND) 58 Perfluorohexanesulfonic acid F4:m/z 398.3 > 79.2:Moving7PtAverage_x5 F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage x521 630 625 18 618 ×15 \S_{20} 15 10 9.0 9.6 8.9 9.0 9.3 9.9 10.2 9.5 10.1 8.7 9.6 8.3 D 12 13C4 PFOA 13 Perfluorooctanoic acid 13 Perfluorooctanoic acid F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 18 14 (70⁻ (0)60⁻ (012 X) X) 8 ()¹⁵ ×12 10.406 ×50 $>_{40}$ 30 20 10 01 10.0 10.6 11.2 9.9 10.2 9.7 10.5 10.8 11.1 8.5 10.9 12.1 9.4 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 82 621- 14 [']ව⁷¹ <u>@</u>12 ∑₁₅ ∑₁₀ ×60 ≻₁₂-≻49 8 38 27 16 0 0 10.9 10.3 11.5 12.1 10.4 11.0 **Page** 12.2 10.4 11.0 11.6 12.2

Report Date: 04-Mar-2016 15:24:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_021.d

D 17 13C5 PFNA

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DUP_022616 Lab Sample ID: 320-17463-8

Matrix: Water Lab File ID: 03MAR2016A4A_023.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 12:40

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 523.4(mL) Date Analyzed: 03/03/2016 23:43

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.1	ЈВ	2.4	1.9	0.88
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.83
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.62
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.71

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		25-150
STL00990	13C4 PFOA	77		25-150
STL00991	13C4 PFOS	77		25-150
STL01892	13C4-PFHpA	90		25-150
STL00995	13C5 PFNA	65		25-150
STL00994	1802 PFHxS	99		25-150

Report Date: 04-Mar-2016 15:24:48 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_023.d

Lims ID: 320-17463-B-8-A Lab Sample ID: 320-17463-8

Client ID: DUP_022616

Sample Type: Client

Inject. Date: 03-Mar-2016 23:43:56 ALS Bottle#: 35 Worklist Smp#: 22

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17463-b-8-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:45 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

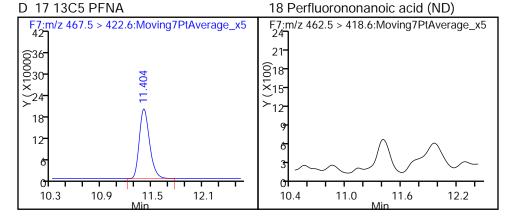
First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:33

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	51 Perfluorobu	tanesulfo	onic acid								
	298.8 > 79.6	7.028	7.031	-0.003	1.000	9802	0.5765				
I	O 6 13C2 PFHx	Α									
	314.6 > 269.7	8.149	8.151	-0.002		2517601	41.7		83.4	5856	
I	0 8 13C4-PFHp	Α									
	366.6 > 321.6	9.349	9.361	-0.012		2213741	44.9		89.7	5312	
	58 Perfluorohe	xanesulf	onic acio	d							
	398.3 > 79.2	9.380	9.399	-0.019	1.000	3054	0.1388				
I	D 11 18O2 PFH:	xS									
	402.5 > 83.6	9.388	9.399	-0.011		1239176	46.7		98.7	3483	
	D 12 13C4 PFO										
	416.5 > 371.6	10.448	10.466	-0.018		2426258	38.3		76.7	5381	
	D 16 13C4 PFO										
	502.4 > 79.7	11.384	11.420	-0.036		563893	37.0		77.4	1940	
	D 17 13C5 PFN										
	467.5 > 422.6	11.404	11.441	-0.037		1677905	32.6		65.2	3790	

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:48 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_023.d **Injection Date:** 03-Mar-2016 23:43:56 Instrument ID: Lims ID: 320-17463-B-8-A Lab Sample ID: 320-17463-8 Client ID: DUP_022616 Operator ID: **JRB** ALS Bottle#: 35 Worklist Smp#: 22 Injection Vol: Dil. Factor: 15.0 ul 1.0000 Method: PFAC A4 LC PFC_DOD ICAL Limit Group: D 613C2 PFHxA 51 Perfluorobutanesulfonic acid D 8 13C4-PFHpA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 56- (000048-1240-048 040 × 836 7.028 ∑30 ≻32 ≻₂₄ 24 24 18 16 16 12 7.1 7.7 8.9 8.9 6.8 7.4 7.1 8.3 8.3 9.5 10.1 9 Perfluoroheptanoic acid (ND) 11 1802 PFHxS 58 Perfluorohexanesulfonic acid F4:m/z 362.8 > 318.7:Moving7PtAverage x5F4:m/z 402.5 > 83.6:Moving7PtAverage_x5 F4:m/z 398.3 > 79.2:Moving7PtAverage x5 42 18-28 0024- ×20-36 (015 ×12 × 2 630-000--16 9.380 18 12 9.2 8.9 8.9 9.5 10.1 8.9 9.5 9.8 9.5 10.1 8.3 8.3 D 12 13C4 PFOA 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 416.5 > 371.6:Moving7PtAverage_x5 F5:m/z 412.8 > 368.8:Moving7PtAverage_x5 F5:m/z 412.8 > 168.7:Moving7PtAverage_x5 28 (049⁻ 0042⁻ 80 <u>24</u> 669 ×35 ×20 ×58 ≻16- ≻₂₈-≻₄₇ 12 21 36 8 25 14 10.0 10.6 11.2 10.0 11.2 10.6 10.0 10.6 11.2 D 16 13C4 PFOS 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) F6:m/z 498.3 > 79.2:Moving7PtAverage_x5 F6:m/z 502.4 > 79.7:Moving7PtAverage_x5 F6:m/z 498.3 > 98.2:Moving7PtAverage_x5 14 12 (0012 X) 18 0015 X 0 0 $^{\circ}$ 10.4 11.0 12.2 10.4 11.0 **Page** 12.2 10.4 11.0 11.6 12.2 11.6 299n of 406

Report Date: 04-Mar-2016 15:24:48 Chrom Revision: 2.2 02-Dec-2015 11:51:48

 $Data\ File: \verb|\ChromNA| Sacramento \verb|\ChromData| A4 \verb|\20160304-28858.b| 03 MAR 2016A4A_023.d|$



LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A4

Calibration Start Date: 03/03/2016 16:40

GD No.: 320-17463-1

Analy Batch No.: 102384

ID: 2.1(mm)

Heated Purge: (Y/N) N

Calibration End Date: 03/03/2016 18:47

Calibration ID: 19536

Calibration Files:

LAB SAMPLE ID:	LAB FILE ID:
STD 320-102384/2	03MAR2016A4A 003.d
STD 320-102384/3	03MAR2016A4A 004.d
STD 320-102384/4	03MAR2016A4A 005.d
STD 320-102384/5	03MAR2016A4A 006.d
STD 320-102384/6	03MAR2016A4A 007.d
STD 320-102384/7	03MAR2016A4A 008.d
STD 320-102384/8	03MAR2016A4A 009.d
	STD 320-102384/2 STD 320-102384/3 STD 320-102384/4 STD 320-102384/5 STD 320-102384/6 STD 320-102384/7

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	RT WINDOW	AVG RT
Perfluoro-n-hexadecanoic acid (PFHxDA)	5.806	5.815	5.843	5.843	5.824	5.827	5.824	5.576 - 6.076	5.826
Perfluoro-n-octandecanoic acid (PFODA)	5.806	5.815	5.843	5.843	5.824	5.827	5.824	5.576 - 6.076	5.826
Perfluorobutanoic acid (PFBA)	5.806	5.815	5.843	5.843	5.824	5.827	+++++	5.576 - 6.076	5.826
Perfluoropentanoic acid (PFPeA)	+++++	6.904	6.941	6.945	6.913	6.923	+++++	6.668 - 7.168	6.925
Perfluorobutanesulfonic acid (PFBS)	+++++	7.014	7.056	7.060	7.028	7.038	+++++	6.781 - 7.281	7.039
Perfluorohexanoic acid (PFHxA)	+++++	8.144	8.176	8.182	8.149	8.154	+++++	7.902 - 8.402	8.161
Perfluoroheptanoic acid (PFHpA)	9.318	9.365	9.380	9.388	9.357	9.365	+++++	9.112 - 9.612	9.362
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.396	9.411	9.427	9.396	9.404	+++++	9.149 - 9.649	9.407
Perfluorooctanoic acid (PFOA)	10.431	10.474	10.474	10.482	10.465	+++++	+++++	10.218 - 10.718	10.465
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.474	10.482	10.491	10.474	10.482	+++++	10.225 - 10.725	10.481
Perfluorooctanesulfonic acid (PFOS)	+++++	11.430	11.430	11.430	11.421	11.421	+++++	11.171 - 11.671	11.426
Perfluorononanoic acid (PFNA)	+++++	11.450	11.441	11.450	11.441	11.441	+++++	11.191 - 11.691	11.445
Perfluorodecanoic acid (PFDA)	12.248	12.285	12.270	12.270	12.270	12.283	+++++	12.023 - 12.523	12.271
Perfluorooctane Sulfonamide (FOSA)	12.795	12.820	12.817	12.818	12.817	12.818	12.820	12.565 - 13.065	12.815
Perfluorodecane Sulfonic acid	+++++	12.961	12.933	12.946	12.933	12.946	+++++	12.692 - 13.192	12.944
Perfluoroundecanoic acid (PFUnA)	+++++	13.010	12.996	12.997	12.996	12.997	+++++	12.746 - 13.246	12.999
Perfluorododecanoic acid (PFDoA)	+++++	13.603	13.587	13.587	13.587	13.599	13.603	13.342 - 13.842	13.594
Perfluorotridecanoic Acid (PFTriA)	+++++	14.130	14.105	14.105	14.105	14.116	14.119	13.861 - 14.361	14.113
Perfluorotetradecanoic acid (PFTeA)	+++++	14.561	14.547	14.547	14.547	14.556	14.561	14.302 - 14.802	14.553
13C4 PFBA	5.800	5.812	5.840	5.843	5.821	5.827	+++++	5.574 - 6.074	5.824
13C2-PFHxDA	5.806	5.815	5.843	5.843	5.824	5.827	5.824	5.576 - 6.076	5.826
13C5-PFPeA	6.877	6.904	6.941	6.945	6.913	6.923	+++++	6.667 - 7.167	6.917
13C2 PFHxA	8.106	8.144	8.171	8.182	8.149	8.154	+++++	7.901 - 8.401	8.151
13C4-PFHpA	9.318	9.357	9.380	9.388	9.357	9.365	+++++	9.111 - 9.611	9.361
1802 PFHxS	9.357	9.396	9.411	9.427	9.396	9.404	+++++	9.149 - 9.649	9.399
13C4 PFOA	10.431	10.474	10.474	10.482	10.465	+++++	+++++	10.216 - 10.716	10.465
13C4 PFOS	+++++	11.430	11.421	11.430	11.421	11.421	+++++	11.170 - 11.670	11.425
13C5 PFNA	11.413	11.450	11.441	11.450	11.441	11.441	+++++	11.191 - 11.691	11.439
13C2 PFDA	12.248	12.285	12.270	12.283	12.270	12.270	+++++	12.023 - 12.523	12.271
13C8 FOSA	12.795	12.833	12.817	12.818	12.817	12.818	12.820	12.567 - 13.067	12.817
13C2 PFUnA	+++++	12.999	12.984	12.997	12.984	12.997	+++++	12.741 - 13.241	12.992
13C2 PFDoA	13.579	13.603	13.587	13.587	13.587	13.599	13.603	13.342 - 13.842	13.592
13C2-PFTeDA	14.543	14.561	14.547	14.547	14.547	14.556	14.561	14.302 - 14.802	14.552

FORM VI LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	STD 320-102384/2	03MAR2016A4A 003.d	
Level 2	STD 320-102384/3	03MAR2016A4A 004.d	
Level 3	STD 320-102384/4	03MAR2016A4A 005.d	
Level 4	STD 320-102384/5	03MAR2016A4A 006.d	
Level 5	STD 320-102384/6	03MAR2016A4A 007.d	
Level 6	STD 320-102384/7	03MAR2016A4A 008.d	
Level 7	STD 320-102384/8	03MAR2016A4A 009.d	

ANALYTE	CF I.VI. 1 I.VI. 2 I.VI. 3 I.VI. 4						COEFFICIENT	#	MIN CF	%RSD		MAX	R^2	 MIN R^2
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2				RSD	OR COD	OR COD
13C4 PFBA	75129 64949	79754 54558	68074 ++++	69176	Ave		68606.5033			12.7		50.0		
13C2-PFHxDA	335.32 34839	763.32 116790	3645.6 191297	14642	Ave		51758.8314			.43.1	*	50.0		
13C5-PFPeA	46318 39867	48620 33427	41699 +++++	44584	Ave		42419.3167			12.7		50.0		
13C2 PFHxA	66756 55570	69458 47016	60878 ++++	62545	Ave		60370.4200			13.5		50.0		
13C4-PFHpA	55233 46121	56920 35946	50844 ++++	51063	Ave		49354.4667			15.4		50.0		
1802 PFHxS	30322 24639	30548 18775	27289 +++++	27729	Ave		26550.3030			16.5		50.0		
13C4 PFOA	66799 51380	74824 ++++	61750 +++++	61625	Ave		63275.6480			13.5		50.0		
13C4 PFOS	+++++ 15060	17852 10672	16181 +++++	16414	Ave		15235.7531			18.0		50.0		
13C5 PFNA	55517 45837	60462 40385	54613 +++++	51876	Ave		51448.2900			14.1		50.0		
13C2 PFDA	68324 53084	77723 43957	62821 +++++	61981	Ave		61314.8867			19.2		50.0		
13C8 FOSA	91398 73823	98914 65405	80521 58509	84859	Ave		79061.4829			18.0		50.0		
13C2 PFUnA	++++ 56888	80737 44689	65797 +++++	64573	Ave		62536.9360			21.1		50.0		
13C2 PFDoA	72328 60468	80192 56810	69846 45592	68919	Ave		64879.3943			17.7		50.0		
13C2-PFTeDA	58661 51337	63583 45757	53326 40487	54493	Ave		52520.6029			14.7		50.0		

Note: The m1 coefficient is the same as Ave CF for an Ave curve type.

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

ANALYTE			RRF			CURVE		COEFFICIE	NT	# MI	N RRF	%RSD	#	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
Perfluoro-n-hexadecanoic acid (PFHxDA)	33532 29197	38166 23912	36456	36605	34839	AveID		0.5153				7.2		50.0		\Box	
Perfluoro-n-octandecanoic acid (PFODA)	33532 29197	38166 23912	36456	36605	34839	AveID		0.5153				7.2		50.0			
Perfluorobutanoic acid (PFBA)	33532 29197	38166 ++++	36456	36605	34839	AveID		0.5102				7.5		35.0			
Perfluoropentanoic acid (PFPeA)	+++++ 15808	25577 ++++	19814	20959	18890	AveID		0.4836				4.9		35.0			
Perfluorobutanesulfonic acid (PFBS)	+++++ 13457	17869 ++++	15959	18624	16929	AveID		0.6490				9.4		50.0			
Perfluorohexanoic acid (PFHxA)	+++++ 20933	27528 ++++	24047	26825		AveID		0.4224				6.0		35.0			
Perfluoroheptanoic acid (PFHpA)	32354 21636	30888	27013	32498	25959	L2ID	-0.007	0.5806							0.9940		0.9900
Perfluorohexanesulfonic acid (PFHxS)	+++++ 16547	25249 ++++	23389	22456	20340	AveID		0.8401				3.4		35.0			
Perfluorooctanoic acid (PFOA)	44708	38520 ++++	37233	33928	28870	AveID		0.5799				10.2		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 16726	29786 ++++	23941	27816	22263	AveID		1.5777				6.5		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 28953	45911 ++++	44737	44845	39547	AveID		2.6815				3.0		35.0			
Perfluorononanoic acid (PFNA)	+++++ 45007	54211 ++++	58734	61187	52521	L2ID	-0.252	1.1466							0.9990		0.9900
Perfluorodecanoic acid (PFDA)	65992 41136	59441 ++++	63998	60130	49432	AveID		0.9311				9.4		35.0			
Perfluorooctane Sulfonamide (FOSA)	80106 64743	90449 55964	82546	81425	77254	AveID		0.9669				6.2		35.0			
Perfluorodecane Sulfonic acid	+++++ 12106	21904	21610	19494	16668	AveID		1.1983				7.5		50.0			
Perfluoroundecanoic acid (PFUnA)	+++++ 47660	74520 ++++	70639	65169	56288	AveID		1.0123				6.1		35.0			
Perfluorododecanoic acid (PFDoA)	+++++ 44697	62492 38072	62235	58806	53860	AveID		0.8394				5.8		35.0			
Perfluorotridecanoic Acid (PFTriA)	+++++ 36942	63587 31065	58850	56223	45354	AveID		0.7555				10.1		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 18790	31663 15993	21907	23952	22111	AveID		0.3505				8.0		50.0			

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.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A 003.d
Level 2	STD 320-102384/3	03MAR2016A4A 004.d
Level 3	STD 320-102384/4	03MAR2016A4A 005.d
Level 4	STD 320-102384/5	03MAR2016A4A 006.d
Level 5	STD 320-102384/6	03MAR2016A4A 007.d
Level 6	STD 320-102384/7	03MAR2016A4A 008.d
Level 7	STD 320-102384/8	03MAR2016A4A 009.d

ANALYTE	CURVE			RESPONSE				CONCEN	TRATION (N	G/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	3756444 2727876	3987722	3403684	3458781	3247444	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C2-PFHxDA	Ave	16766 5839475	38166 9564843	182280	732094	1741967	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	2315896 1671362	2430982	2084964	2229224	1993367	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C2 PFH×A	Ave	3337791 2350780	3472895 ++++	3043888	3127264	2778508	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C4-PFHpA	Ave	2761640 1797278	2846011	2542223	2553159	2306029	50.0 50.0	50.0 ++++	50.0	50.0	50.0
1802 PFHxS	Ave	1434236 888040	1444922	1290755	1311598	1165425	47.3 47.3	47.3 ++++	47.3	47.3	47.3
13C4 PFOA	Ave	3339964	3741203 +++++	3087503	3081233	2569009	50.0	50.0 ++++	50.0	50.0	50.0
13C4 PFOS	Ave	++++ 510106	853325 ++++	773447	784578	719889	+++++ 47.8	47.8 ++++	47.8	47.8	47.8
13C5 PFNA	Ave	2775861 2019249	3023095 ++++	2730637	2593805	2291840	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C2 PFDA	Ave	3416188 2197844	3886162 ++++	3141030	3099060	2654182	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C8 FOSA	Ave	4569922 3270240	4945710 2925469	4026057	4242957	3691164	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	+++++ 2234445	4036863	3289865	3228647	2844414	+++++ 50.0	50.0 ++++	50.0	50.0	50.0
13C2 PFDoA	Ave	3616395 2840522	4009603 2279583	3492320	3445960	3023405	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	2933060 2287873	3179138 2024367	2666291	2724642	2566840	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:

Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A 003.d
Level 2	STD 320-102384/3	03MAR2016A4A 004.d
Level 3	STD 320-102384/4	03MAR2016A4A 005.d
Level 4	STD 320-102384/5	03MAR2016A4A 006.d
Level 5	STD 320-102384/6	03MAR2016A4A 007.d
Level 6	STD 320-102384/7	03MAR2016A4A 008.d
Level 7	STD 320-102384/8	03MAR2016A4A 009.d

ANALYTE	IS CURVE			RESPONSE				CONCEN	TRATION (N	G/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
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveII	16766 5839475	38166 9564843	182280	732094	1741967	0.500 200	1.00	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)	AveII	16766 5839475	38166 9564843	182280	732094	1741967	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanoic acid (PFBA)	AveII	16766 5839475	38166 ++++	182280	732094	1741967	0.500 200	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	AveII	+++++ 3161534	25577 ++++	99069	419179	944495	+++++ 200	1.00	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	AveII	+++++ 2379117	15796 ++++	70538	329273	748256	+++++ 177	0.884	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)	AveII	+++++ 4186622	27528 ++++	120237	536494	1241321	+++++ 200	1.00	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	L2ID	16177 4327277	30888	135065	649957	1297963	0.500	1.00	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	AveII	+++++ 3130736	23886	110632	424868	962096	+++++ 189	0.946	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)	AveII	22354	38520 ++++	186164	678552	1443481	0.500	1.00	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveII	+++++ 3184565	28356 ++++	113960	529621	1059711	+++++ 190	0.952	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	AveII	+++++ 5535835	43891 +++++	213841	857430	1890326	+++++ 191	0.956 ++++	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)	L2ID	+++++ 9001481	54211 +++++	293668	1223745	2626071	+++++	1.00	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)	AveII		59441 ++++	319989	1202602	2471584	0.500	1.00	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)	AveII	40053 12948614	90449 22385482	412731	1628495	3862717	0.500	1.00	5.00	20.0	50.0
Perfluorodecane Sulfonic acid	AveII	+++++ 2334127	21115 ++++	104160	375837	803408	+++++ 193	0.964	4.82	19.3	48.2

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

ANALYTE	IS	CURVE			RESPONSE			CONCENTRATION (NG/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		
Perfluoroundecanoic acid (PFUnA)		AveID	+++++	74520	353195	1303386	2814383	+++++	1.00	5.00	20.0	50.0		
			9531921	++++				200	++++					
Perfluorododecanoic acid (PFDoA)		AveID	++++	62492	311175	1176110	2692998	+++++	1.00	5.00	20.0	50.0		
			8939456	15228731				200	400					
Perfluorotridecanoic Acid (PFTriA)		AveID	++++	63587	294250	1124451	2267709	+++++	1.00	5.00	20.0	50.0		
			7388406	12425833				200	400					
Perfluorotetradecanoic acid (PFTeA)		AveID	++++	31663	109534	479035	1105532	+++++	1.00	5.00	20.0	50.0		
			3758091	6397059				200	400					

Curve Type Legend:

AveID = Average isotope dilution

L2ID = Linear 1/conc^2 IsoDil

Report Date: 07-Mar-2016 09:30:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_003.d

Lims ID: Std L1

Client ID:

Sample Type: IC Calib Level: 1

Inject. Date: 03-Mar-2016 16:40:21 ALS Bottle#: 10 Worklist Smp#: 2

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L1

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:30:42 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK004

Process Host:	XAWI	RK004								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
216.7 > 171.5	5.800	5.824	-0.024		3756444	54.8		110	11701	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4498		90.0	73.6	
2 Perfluorobut	,									
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4374		87.5	73.6	
D 35 13C2-PFH		F 00/	0.000		4/7//	0.0000		0.7	70 (
212.7 > 168.6	5.806	5.826			16766	0.3239		0.6	73.6	
36 Perfluorooc				1 000	1/7//	0.4400		00.0	70 /	
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4498		90.0	73.6	
D 3 13C5-PFP6 267.6 > 222.7	eA 6.877	6.917	0.040		2315896	54.6		109	9713	
			-0.040		2313090	54.0		109	9/13	
4 Perfluoroper 262.9 > 218.7	6.877		-0.041	1.000	13430	0.5996		120	10.4	
5 Perfluorobut			-0.041	1.000	13430	0.3770		120	10.4	
298.8 > 79.6		7.031	-0.049	1.000	10673	NC			9.4	
298.8 > 98.6	6.987	7.031	-0.044	1.001	8259	110	1.29(0.00-0.00)		8.6	
51 Perfluorobu	tanesulfo	onic acid								
298.8 > 79.6		7.031		1.000	10673	0.5423		123		
D 6 13C2 PFHx	κA									
314.6 > 269.7	8.106	8.151	-0.045		3337791	55.3		111	9733	
7 Perfluorohex	kanoic ac	id								
312.9 > 268.7	8.106	8.152	-0.046	1.000	16800	0.5957		119	91.5	
D 8 13C4-PFHp	PΑ									
366.6 > 321.6	9.318	9.361	-0.043		2761640	56.0		112	5144	
9 Perfluoroher										
362.8 > 318.7			-0.044	1.000	16177	0.5164		103	37.3	
10 Perfluorohe										
398.3 > 79.2	9.357	9.399	-0.042	1.000	15449 Page 307 of	NC 406			23.0	
					3.9.2.2.2.					

Report Date: 07-Mar-2016 09:30:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Report Date: 07- Data File:				to\Chrom			02-Dec-2015 11:51 \\03MAR2016A4A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe 398.3 > 79.2	xanesulf 9.357		d -0.042	1.000	15449	0.6065		128		
D 11 18O2 PFH 402.5 > 83.6	9.357	9.399	-0.042		1434236	54.0		114	2044	
D 12 13C4 PFO 416.5 > 371.6 13 Perfluorooc	10.431		-0.035		3339964	52.8		106	7458	
412.8 > 368.8	10.431 10.440	10.468		1.000 1.001	22354 7808	0.5771	2.86(0.00-0.00)	115 115	39.5 33.5	
	10.440	10.475		1.000	14150	0.5092		107		
14 Perfluorohe 448.3 > 79.2 D 16 13C4 PFO	10.440		-0.035	1.000	14150	NC			75.0	
502.4 > 79.7 15 Perfluorooc	11.394				841956	55.3		116	1830	
498.3 > 79.2 498.3 > 98.2	11.394 11.384	11.421	-0.027	1.000 0.999	20771 13294	0.4398	1.56(0.00-0.00)	92.0 92.0	46.3 40.6	
D 17 13C5 PFN 467.5 > 422.6	11.413		-0.028		2775861	54.0		108	4379	
18 Perfluorono 462.5 > 418.6 20 Perfluorode	11.413	11.441	-0.028	1.000	37285	0.8055		161	63.2	
512.5 > 468.5 D 19 13C2 PFD	12.248		-0.025	1.000	32996	0.5187		104	54.5	
	12.248				3416188	55.7		111	4816	
497.5 > 77.6 D 23 13C8 FOS		12.815	-0.020	1.000	40053	0.4532		90.6	139	
49 Perfluorode		lfonic aci	id		4569922	57.8		116	3546	
25 Perfluorode		lfonate			7896	0.3741		77.6		
598.4 > 79.6 D 26 13C2 PFU 564.3 > 519.5	nA			1.000	7896 3687193	NC 59.0		118	24.63993	
27 Perfluoroun 562.4 > 518.5	decanoio	acid		1 000	49947	0.6690		134	96.8	
29 Perfluorodo 612.4 > 568.6	decanoio	acid			23478	0.3867		77.3	11.5	
D 28 13C2 PFD 614.4 > 569.4	οΑ				3616395	55.7		111	4104	
30 Perfluorotrio 662.4 > 618.5	decanoic	acid		1.000	30578	0.5596		112	20.7	
32 Perfluorotet 712.6 > 668.5			-0.009	1.000	24947	0.9840		197	22.7	
D 33 13C2-PFT 714.5 > 669.5		14.552	-0.009		Page 308 of	406 ^{55.8}		112	3741	

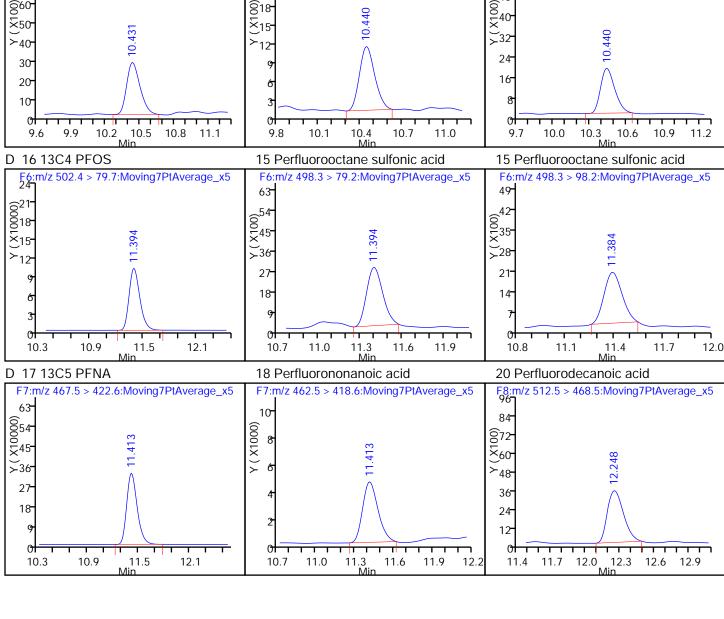
Report Date: 07-Mar-2016 09:30:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:30:43 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_003.d **Injection Date:** 03-Mar-2016 16:40:21 Instrument ID: A4 Lims ID: Std L1 Client ID: Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 2 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: 1 13C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 721 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 670 860 63 63 854**-**854 5.806 5.806 \sum_{50} ×₄₅ $\stackrel{\sim}{\scriptstyle_{45}}$ ≻₄₀ ≻₃₆-36 30 27 27 18 20 18 10 5.3 5.9 5.9 5.9 6.5 5.3 5.6 6.2 5.3 5.6 6.2 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 72 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 721 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 (00042 (00042 (35 63 63 <u>8</u>54 854 5.806 ×45-×₄₅-≻₃₆-≻₃₆-≻28 21 27 27 18 18 5.9 5.9 5.6 6.2 5.6 6.2 6.5 7.1 7.7 5.3 5.9 5.3 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 70 49 42 **8**36 842 6.877 ×30-×35->₂₄ ≻40 ≻₂₈-30 18 21 20 14 12 10 6.5 6.8 7.1 7.7 6.9 7.2 7.5 8.1 8.7 9.3 7.4 6.3 6.6 7.5 7.8 7 Perfluorohexanoic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 63⁶³ 654 ©42 ×35 666 ×55-×45 **≻28**-≻₃₆-**≻44** 21 33 27 22 18 11 0 007.8 8.1 8.4 8.7 8.2 8.8 Page 3Mhof 406 10.0 9.0 9.3 9.6 9.9 7.5 8.7



14.5

15.1

15.7

13.9

13.3

14.0

14.3

14.6

14.9

15.2

Report Date: 07-Mar-2016 09:30:59 Chrom Revision: 2.2 02-Dec-2015 11:51:48

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_004.d

Lims ID: Std L2

Client ID:

Sample Type: IC Calib Level: 2

Inject. Date: 03-Mar-2016 17:01:31 ALS Bottle#: 11 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L2

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm, T=35C

Operator ID: **JRB** Instrument ID: Α4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\\Sacramento\ChromData\A4\20160304-28858.b\\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:30:57 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

VAMPROOA

Process Host:	XAWI	RK004								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.812	5.824	-0.012		3987722	58.1		116	13893	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9236		92.4	128	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9380		93.8	128	
D 35 13C2-PFH	xDA									
212.7 > 168.6	5.815	5.826	-0.011		38166	0.7374		1.5	128	
36 Perfluorooct										
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9236		92.4	128	
D 3 13C5-PFPe										
	6.904	6.917	-0.013		2430982	57.3		115	7178	
4 Perfluoroper										
262.9 > 218.7			-0.014	1.000	25577	1.09		109	16.9	
5 Perfluorobut			0.047	4 000	45707	NO			10.0	
298.8 > 79.6 298.8 > 98.6	7.014 7.019	7.031 7.031	-0.017 -0.012	1.000 1.001	15796 14903	NC	1.06(0.00-0.00)		12.9 18.1	
				1.001	14903		1.00(0.00-0.00)		10.1	
51 Perfluorobut 298.8 > 79.6		7.031		1.000	15796	0.7967		90.1		
D 6 13C2 PFHx		7.031	-0.017	1.000	13770	0.7707		70.1		
	8.144	8 151	-0.007		3472895	57.5		115	7126	
7 Perfluorohex			0.007		0172070	07.0		110	7120	
312.9 > 268.7			-0.008	1.000	27528	0.9382		93.8	139	
D 8 13C4-PFHp										
•		9.361	-0.004		2846011	57.7		115	3542	
9 Perfluorohep	tanoic a	cid								
•	9.365		0.003	1.000	30888	0.9466		94.7	71.6	
10 Perfluorohe										
398.3 > 79.2	9.396	9.399	-0.003	1.000	23886 Page 313 of 4	NC 106			23.0	

Report Date: 07-Mar-2016 09:30:59 Chrom Revision: 2.2 02-Dec-2015 11:51:48 $\verb|\ChromNA| Sacramento \\ ChromData \\ A4 \\ 20160304-28858. \\ b \\ 03MAR2016A4A_004. \\ d$ Data File:

Data File.	NCIIIC	JIIIVA\Sa	acramen	to/Cilion	1Data\A4\20100	304-20030.L	0.03NIAR2010A4A_	004.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe 398.3 > 79.2	xanesulfo 9.396	onic acio 9.399		1.000	23886	0.9308		98.4		
D 11 18O2 PFH. 402.5 > 83.6	xS 9.396	9.399	-0.003		1444922	54.4		115	3140	
D 12 13C4 PFO 416.5 > 371.6	A 10.474	10.466	0.008		3741203	59.1		118	6663	
	10.474	10.468		1.000	38520	0.8878		88.8	71.6	
412.8 > 168.7 39 Perfluorohe	ptanesul	fonic Aci	id	0.999	10897	1.01	3.53(0.00-0.00)	88.8	28.9	
14 Perfluorohe	•	ılfonate		1.000	28356	1.01		106	10/	
D 16 13C4 PFO	10.474 S 11.430			1.000	28356 853325	NC 56.0		117	126 2771	
15 Perfluorooc		onic acid	d	1.000	43891	0.9169		95.9	133	
	11.440			1.001	22644	0.7107	1.94(0.00-0.00)	95.9	65.6	
	11.450		0.009		3023095	58.8		118	5067	
462.5 > 418.6 20 Perfluorode	11.450	11.441	0.009	1.000	54211	1.00		100	76.5	
	12.285		0.012	1.000	59441	0.8214		82.1	146	
514.4 > 469.5 24 Perfluorooc	12.285 tane Sulf				3886162	63.4		127	4383	
497.5 > 77.6 D 23 13C8 FOS	12.820 A	12.815	0.005	1.000	90449	0.9457		94.6	232	
505.4 > 77.6 49 Perfluorode	12.833 cane Sul				4945710	62.6		125	3354	
598.4 > 79.6 25 Perfluorode	12.961 cane Sul		0.019		21115	0.9871		102		
D 26 13C2 PFU				1.000	21115	NC			86.0	
564.3 > 519.5 27 Perfluoroun	decanoio	acid			4036863	64.6		129	4668	
29 Perfluorodo		acid		1.000	74520	0.9117		91.2	195	
612.4 > 568.6 D 28 13C2 PFD0	οA			1.000	62492	0.9284		92.8	38.5	
614.4 > 569.4 30 Perfluorotric	decanoic	acid		1 000	4009603	61.8		124	3804	
662.4 > 618.5 32 Perfluorotet	radecand	oic acid		1.000	63587	1.05		105	42.3	
D 33 13C2-PFT				1.000	31663	1.13		113	27.5	
714.5 > 669.5	14.56 l	14.552	0.009		Page 314 of	406 ^{6U.5}		121	3584	

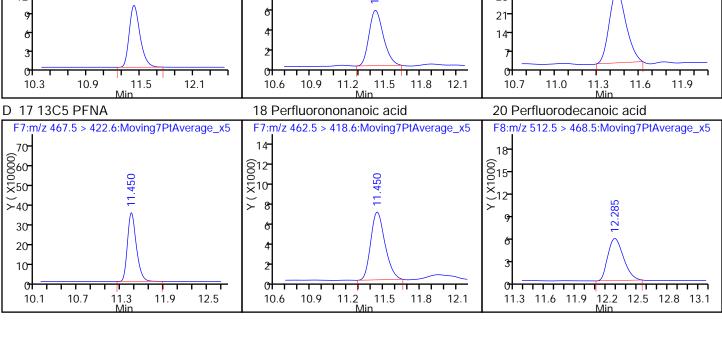
Report Date: 07-Mar-2016 09:30:59 Chrom Revision: 2.2 02-Dec-2015 11:51:48

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L2_00018 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:30:59 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_004.d 03-Mar-2016 17:01:31 **Injection Date:** Instrument ID: A4 Lims ID: Std L2 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 3 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A4 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 84 ©72 5.815 ۲ (X1000) (X1000) X (X1000) ∑60 ≻48 36 24 12 5.3 5.9 5.3 5.9 5.0 5.3 5.9 6.2 6.5 5.6 6.2 6.5 5.6 6.5 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 (00042 (00042 (35 12 12 815 815 (X1000) X (X1000) X (X1000) ≻28 21 5.9 5.0 5.3 5.6 5.9 6.5 7.1 7.7 5.0 5.3 5.6 6.2 6.2 5.9 6.5 6.5 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 56 63 6.904 6⁴⁸ ×40 **6**54 ×45 ×50 ≻₃₆->32 ≻₄₀ 24 27 30 16 20 18 10 6.9 7.2 7.5 6.9 7.2 7.5 7.6 8.2 6.6 6.3 6.6 8.8 6.3 7.0 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid 8 13C4-PFHpA F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 (56- 0048-77 866 866 ×40 ×55 **∑**55 ×32- \succ_{44} 24 33 33 16 22 22 11 0 0 07.7 8.0 8.3 8.6 8.3 8.9 Page 3M6 of 406 10.1 8.8 9.1 9.4 9.7 10.0 8.5 7.4



14.4

15.0

15.6

12

13.2

13.8

14.5 14.8 15.1 15.4

13.6 13.9 14.2

Report Date: 07-Mar-2016 09:31:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_005.d

Lims ID: Std L3

Client ID:

Sample Type: IC Calib Level: 3

Inject. Date: 03-Mar-2016 17:22:43 ALS Bottle#: 12 Worklist Smp#: 4

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L3

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:31:07 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK004

Process Host:	XAWI	RK004								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
216.7 > 171.5	5.840	5.824	0.016		3403684	49.6		99.2	10650	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.06		101	659	
2 Perfluorobut	9									
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.25		105	659	
D 35 13C2-PFH		F 00/	0.047		100000	0.50		7.0		
212.7 > 168.6	5.843	5.826	0.017		182280	3.52		7.0	659	
36 Perfluorooc				1 000	102200	F 0/		101	450	
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.06		101	659	
D 3 13C5-PFP6 267.6 > 222.7	eA 6.941	6.917	0.024		2084964	49.2		98.3	6351	
4 Perfluoroper			0.024		2004704	47.2		70.3	0331	
262.9 > 218.7	6.941	6.918	0.023	1.000	99069	4.91		98.3	89.5	
5 Perfluorobut			0.023	1.000	77007	7.71		70.0	07.0	
298.8 > 79.6	7.056	7.031	0.025	1.000	70538	NC			71.0	
298.8 > 98.6	7.051	7.031	0.020	0.999	58897		1.20(0.00-0.00)		62.7	
51 Perfluorobu	tanesulfo	onic acid								
298.8 > 79.6	7.056	7.031	0.025	1.000	70538	3.98		90.1		
D 6 13C2 PFHx	κA									
314.6 > 269.7	8.171	8.151	0.020		3043888	50.4		101	6375	
7 Perfluorohex	kanoic ac	id								
312.9 > 268.7	8.176	8.152	0.024	1.000	120237	4.68		93.5	494	
D 8 13C4-PFHp	PΑ									
366.6 > 321.6	9.380	9.361	0.019		2542223	51.5		103	5315	
9 Perfluoroher										
		9.362	0.018	1.000	135065	4.59		91.7	381	
10 Perfluorohe										
398.3 > 79.2	9.411	9.399	0.012	1.000	110632 Page 319 of 4	NC .06			126	
					J					

Report Date: 07-Mar-2016 09:31:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_005.d **FXP REL** DLT Amount Signal **RT** RT RT **RT** Response ng/ml Ratio(Limits) %Rec S/N Flags 58 Perfluorohexanesulfonic acid 398.3 > 79.2 9.399 0.012 9.411 1.000 110632 4.83 102 D 11 1802 PFHxS 2906 402.5 > 83.6 9.399 0.012 1290755 48.6 103 9.411 D 12 13C4 PFOA 3087503 416.5 > 371.6 10.474 10.466 0.008 48.8 97.6 5496 13 Perfluorooctanoic acid 10.474 10.468 0.006 5.20 334 412.8 > 368.8 1.000 186164 104 412.8 > 168.7 10.482 10.468 0.014 1.001 67396 2.76(0.00-0.00) 104 176 39 Perfluoroheptanesulfonic Acid

113960

113960

773447

213841

120186

2730637

293668

319989

3141030

412731

4026057

104160

104160

3289865

353195

311175

3492320

294250

109534

Page 320 of 406 50.8

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

1.000

4.46

NC

50.8

4.93

53.1

4.91

5.47

51.2

5.30

50.9

5.37

NC

52.6

5.30

5.31

53.8

5.58

4.47

1.78(0.00-0.00)

93.8

106

103

103

106

98.2

109

102

106

102

111

105

106

106

108

112

89.5

102

849

1462

574

320

3872

419

532

4498

1005

3466

398

3666

488

210

4350

195

85.6

2749

448.3 > 79.2

448.3 > 79.2

498.3 > 79.2

498.3 > 98.2

D 17 13C5 PFNA

467.5 > 422.6

462.5 > 418.6

512.5 > 468.5

497.5 > 77.6

598.4 > 79.6

598.4 > 79.6

562.4 > 518.5

612.4 > 568.6

662.4 > 618.5

712.6 > 668.5

D 33 13C2-PFTeDA 714.5 > 669.5 14.5

D 28 13C2 PFDoA 614.4 > 569.4 13

D 26 13C2 PFUnA 564.3 > 519.5 12

D 19 13C2 PFDA 514.4 > 469.5 1

D 23 13C8 FOSA 505.4 > 77.6 1

D 16 13C4 PFOS 502.4 > 79.7 1

14 Perfluoroheptane Sulfonate

15 Perfluorooctane sulfonic acid

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

24 Perfluorooctane Sulfonamide

49 Perfluorodecane Sulfonic acid

25 Perfluorodecane Sulfonate

27 Perfluoroundecanoic acid

29 Perfluorododecanoic acid

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

10.482 10.475 0.007

10.482 10.475 0.007

11.421 11.420 0.001

11.430 11.421 0.009

11.430 11.421 0.009

11.441 11.441 0.0

11.441 11.441 0.0

12.270 12.273 -0.003

12.270 12.273 -0.003

12.817 12.815 0.002

12.933 12.942 -0.009

12.933 12.942 -0.009

12.984 12.991 -0.007

12.996 12.996 0.0

13.587 13.592 -0.005

13.587 13.592 -0.005

14.105 14.111 -0.006

14.547 14.552 -0.005

14.547 14.552 -0.005

12.817 12.817 0.0

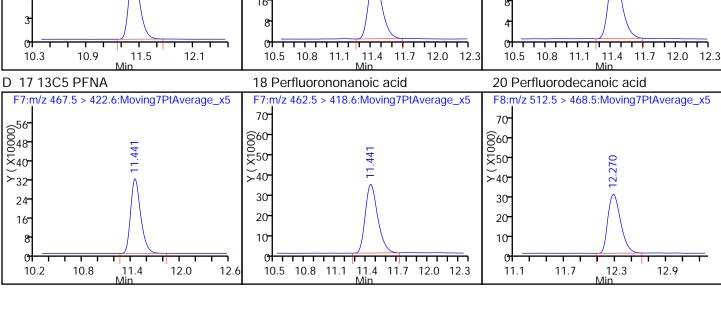
Report Date: 07-Mar-2016 09:31:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:31:09 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_005.d **Injection Date:** 03-Mar-2016 17:22:43 Instrument ID: A4 Lims ID: Std L3 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 (70° (060° 630 630 ×50 >₄₀ 18 18 30 12 20 5.2 5.5 5.8 6.1 6.4 5.2 5.5 5.8 6.1 5.2 5.5 5.8 6.1 3 13C5-PFPeA D 35 13C2-PFHxDA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 642 6036 630<u>-</u> 0230- \approx 30 18 18 18 12 12 5.5 7.5 5.2 5.5 5.8 5.2 5.8 6.3 6.6 6.9 7.2 6.1 6.1 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 18 24 63 654 ©15 <u>20</u> ×12 <u>×</u>16- \times 45 ≻₃₆-18 6.9 6.8 7.1 7.7 6.6 7.2 7.5 6.5 7.4 7.5 7.8 8.1 8.4 8.7 6.3 6.2 7 Perfluorohexanoic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 28 6⁵⁶ 848 ×30-<u>8</u>24 ∑20 \times_{40} ≻16- ≻32 18 12 24 12 16 0 0 7.7 8.0 8.3 8.2 8.8 Page 3226 of 406 10.0 8.7 9.0 9.3 9.6 9.9 7.4 8.6 8.4



15.2

14.0

10

13.4

0

13.5

14.1

14.7

Report Date: 07-Mar-2016 09:31:11 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_006.d

Lims ID: Std L4

Client ID:

Sample Type: IC Calib Level: 4

Inject. Date: 03-Mar-2016 17:43:54 ALS Bottle#: 13 Worklist Smp#: 5

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L4

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:31:10 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK004

First Level Reviewer: westendorfc Date: 07-Mar-2016 09:29:19

FIRST Level Revie	ewer: wes	stendorio	;		Date:	C	77-Mar-2016 09:29:1	. 9		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB	4									
216.7 > 171.5	5.843	5.824	0.019		3458781	50.4		101	11551	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.6		103	2713	
2 Perfluorobut	tyric acid									
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.7		104	2713	
D 35 13C2-PFH										
212.7 > 168.6	5.843	5.826	0.017		732094	14.1		28.3	2713	
36 Perfluorood										
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.6		103	2713	
D 3 13C5-PFP6		. 017	0.000		2222224	FO /		105	(0.44	
267.6 > 222.7	6.945	6.917	0.028		2229224	52.6		105	6041	
4 Perfluoroper 262.9 > 218.7			0.027	1.000	419179	19.4		97.2	288	
			0.027	1.000	419179	19.4		91.2	200	
5 Perfluorobut 298.8 > 79.6	7.060	onate 7.031	0.029	1.000	329273	NC			310	
298.8 > 98.6	7.060	7.031	0.027	1.000	235833	NO	1.40(0.00-0.00)		242	
51 Perfluorobu							,			
298.8 > 79.6	7.060	7.031	0.029	1.000	329273	18.3		103		
D 6 13C2 PFH	κA									
314.6 > 269.7	8.182	8.151	0.031		3127264	51.8		104	8949	
7 Perfluorohe	xanoic ad	cid								
312.9 > 268.7	8.182	8.152	0.030	1.000	536494	20.3		102	1857	
D 8 13C4-PFH	рΑ									
366.6 > 321.6	9.388	9.361	0.027		2553159	51.7		103	6684	
9 Perfluorohe	ptanoic a	cid								
362.8 > 318.7	9.388	9.362	0.026	1.000	649957	21.9		110	1311	
					Page 325 of	406				

Report Date: 07-Mar-2016 09:31:11 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Data File:				to\Chrom			02-Dec-2015 11:51 \03MAR2016A4A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohe 398.3 > 79.2		lfonate 9.399	0.028	1.000	424868	NC			626	
58 Perfluorohe 398.3 > 79.2	9.427	onic acid 9.399	0.028	1.000	424868	18.2		96.4		
D 11 18O2 PFH 402.5 > 83.6	9.427	9.399	0.028		1311598	49.4		104	3543	
D 12 13C4 PFO 416.5 > 371.6 13 Perfluorooc	10.482		0.016		3081233	48.7		97.4	5432	
	10.482			1.000 1.001	678552 267415	19.0	2.54(0.00-0.00)	94.9 94.9	1102 1041	
39 Perfluorohe 448.3 > 79.2	eptanesul 10.491			1.000	529621	20.5		107		
14 Perfluorohe 448.3 > 79.2	eptane Su 10.491		0.016	1.000	529621	NC			1517	
D 16 13C4 PFO 502.4 > 79.7		11.420	0.010		784578	51.5		108	1448	
15 Perfluorooc 498.3 > 79.2 498.3 > 98.2		11.421	0.009 0.009	1.000 1.000	857430 485646	19.5	1.77(0.00-0.00)	102 102	1588 1077	
D 17 13C5 PFN			0.007	1.000	2593805	50.4	1.77(0.00-0.00)	101	6052	
18 Perfluorono		cid		1.000	1223745	20.8		104	1005	
20 Perfluorode 512.5 > 468.5			-0.003	1.000	1202602	20.8		104	2014	
D 19 13C2 PFD 514.4 > 469.5		12.273	0.010		3099060	50.5		101	3678	
24 Perfluorooc 497.5 > 77.6	12.818			1.000	1628495	19.8		99.2	2000	
	12.818				4242957	53.7		107	3250	
49 Perfluorode 598.4 > 79.6	12.946	12.942		1.000	375837	19.1		99.1		
25 Perfluorode 598.4 > 79.6 D 26 13C2 PFU	12.946		0.004	1.000	375837	NC			1266	
564.3 > 519.5 27 Perfluoroun	12.997		0.006		3228647	51.6		103	4112	
562.4 > 518.5 29 Perfluorodo	12.997	12.996	0.001	1.000	1303386	19.9		99.7	1577	
612.4 > 568.6 D 28 13C2 PFD	13.587		-0.005	1.000	1176110	20.3		102	640	
614.4 > 569.4 30 Perfluorotrio			-0.005		3445960	53.1		106	2877	
662.4 > 618.5 32 Perfluorotet	tradecan	oic acid		1.000	1124451	21.6		108	664	
712.6 > 668.5	14.547	14.552	-0.005	1.000	Page 326 of 40	6 ^{19.8}		99.1	450	

Report Date: 07-Mar-2016 09:31:11 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File:

EXP DLT **REL** Amount RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT RT Response

D 33 13C2-PFTeDA

51.9 104 2724642 2832

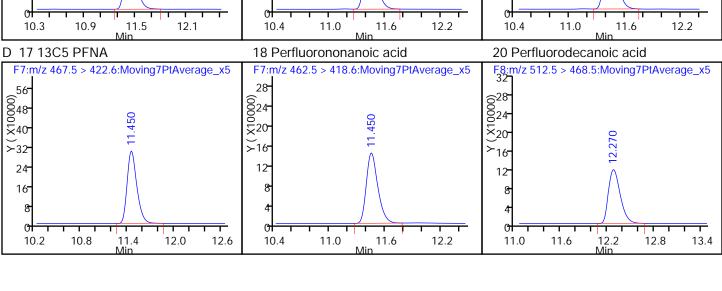
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:31:11 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_006.d **Injection Date:** 03-Mar-2016 17:43:54 Instrument ID: A4 Lims ID: Std L4 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 5 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 18 00015 ×12 00015- ×12-060 ∑50 ≻40 30 20 10 5.9 5.3 5.9 5.3 5.6 6.2 6.5 5.6 5.9 6.2 5.3 5.6 6.2 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 18 18 00015 X12 042 0035 × 0 0 15 28 21 5.6 5.9 5.0 5.6 5.9 6.5 7.7 5.3 6.2 6.5 5.3 6.2 5.9 7.1 6.5 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 80 91 77- 866 670 660 <u>8</u>78 ×65 ×55 \times_{50} ≻52 ≻₄₀-39 33 30 26 22 20 10 13 6.8 6.9 7.2 7.8 7.4 8.0 9.2 6.5 7.1 7.4 7.5 8.6 6.3 6.6 6.8 6.2 8 13C4-PFHpA 7 Perfluorohexanoic acid D 9 Perfluoroheptanoic acid F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 56-(00001 (000010 X) 8 00015 X12 X) \ 40 **≻**32 24 16 0 0 7.6 7.9 8.2 8.5 8.8 8.2 8.8 Page 326 of 406 10.0 8.4 9.0 9.6 10.2 7.3



14.9

15.5

10

13.1

13.7

13.9

13.3

14.5

15.1

Report Date: 07-Mar-2016 09:31:18 Chrom Revision: 2.2 02-Dec-2015 11:51:48

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_007.d

Lims ID: Std L5

Client ID:

Sample Type: IC Calib Level: 5

Inject. Date: 03-Mar-2016 18:05:04 ALS Bottle#: 14 Worklist Smp#: 6

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L5

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm, T=35C

Operator ID: **JRB** Instrument ID: Α4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\\Sacramento\ChromData\A4\20160304-28858.b\\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:31:17 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

VAMPROOA

Process Host:	XAWI	RK004								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
216.7 > 171.5	5.821	5.824	-0.003		3247444	47.3		94.7	10197	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	55.9		112	6222	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	52.6		105	6222	
D 35 13C2-PFH										
212.7 > 168.6	5.824	5.826	-0.002		1741967	33.7		67.3	6222	
36 Perfluorooct										
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	55.9		112	6222	
D 3 13C5-PFPe										
	6.913	6.917	-0.004		1993367	47.0		94.0	5478	
4 Perfluoroper			0.005	4 000	044405	40.0		00.0	0.1.1	
	6.913		-0.005	1.000	944495	49.0		98.0	811	
5 Perfluorobut			0.000	1 000	740057	NO			F04	
298.8 > 79.6 298.8 > 98.6	7.028 7.028	7.031 7.031	-0.003 -0.003	1.000 1.000	748256 523353	NC	1.43(0.00-0.00)		521 472	
				1.000	323333		1.43(0.00-0.00)		4/2	
51 Perfluorobut 298.8 > 79.6		7.031		1.000	748256	46.8		106		
D 6 13C2 PFHx		7.001	0.000	1.000	7 10200	10.0		100		
314.6 > 269.7	8.149	8.151	-0.002		2778508	46.0		92.0	6437	
7 Perfluorohex										
312.9 > 268.7			-0.003	1.000	1241321	52.9		106	2318	
D 8 13C4-PFHp										
366.6 > 321.6		9.361	-0.004		2306029	46.7		93.4	5069	
9 Perfluorohep	tanoic a	cid								
362.8 > 318.7	9.357		-0.005	1.000	1297963	48.5		97.0	1737	
10 Perfluorohe	xane Sul	fonate								
398.3 > 79.2	9.396	9.399	-0.003	1.000	962096 Page 331 of 40	NC 6			1186	

Report Date: 07- Data File:				to\Chrom			02-Dec-2015 11:5° 0\03MAR2016A4A_			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe 398.3 > 79.2	exanesulf 9.396	onic acid		1.000	962096	46.5		98.3		
D 11 1802 PFH		7.077	0.000	1.000	702070	10.0		70.0		
402.5 > 83.6	9.396	9.399	-0.003		1165425	43.9		92.8	2477	
D 12 13C4 PFC										
416.5 > 371.6	10.465		-0.001		2569009	40.6		81.2	3273	
13 Perfluorood 412.8 > 368.8	tanoic ac 10.465		-0.003	1.000	1443481	48.4		96.9	1839	
412.8 > 168.7	10.465			1.000	553790	40.4	2.61(0.00-0.00)	96.9	1096	
39 Perfluorohe	eptanesul	fonic Ac	id				,			
448.3 > 79.2	10.474	10.475	-0.001	1.000	1059711	44.6		93.7		
14 Perfluorohe	•									
	10.474	10.475	-0.001	1.000	1059711	NC			2687	
D 16 13C4 PFC		11 420	0.001		710000	47.0		00.0	1524	
502.4 > 79.7	11.421				719889	47.2		98.8	1536	
15 Perfluorood 498.3 > 79.2		11.421		1.000	1890326	46.8		97.9	2314	
498.3 > 98.2		11.421		1.000	1083873	10.0	1.74(0.00-0.00)	97.9	1474	
D 17 13C5 PFN	IA									
467.5 > 422.6	11.441	11.441	0.0		2291840	44.5		89.1	4380	
18 Perfluorono										
	11.441		0.0	1.000	2626071	50.2		100	2190	
20 Perfluorode			0.003	1 000	2471584	E0 0		100	2020	
	12.270	12.273	-0.003	1.000	2471584	50.0		100	2829	
D 19 13C2 PFD 514.4 > 469.5	12.270	12.273	-0.003		2654182	43.3		86.6	3401	
24 Perfluoroog					20002			00.0	0.0.	
497.5 > 77.6				1.000	3862717	54.1		108	3392	
D 23 13C8 FOS	SA									
505.4 > 77.6	12.817	12.817	0.0		3691164	46.7		93.4	3371	
49 Perfluorode										
	12.933		-0.009	1.000	803408	44.5		92.4		
25 Perfluorode			0.000	1 000	002400	NC			1057	
598.4 > 79.6		12.942	-0.009	1.000	803408	NC			1857	
D 26 13C2 PFU 564.3 > 519.5		12 991	-0.007		2844414	45.5		91.0	3410	
27 Perfluorour			0.007		2011111	10.0		71.0	0110	
562.4 > 518.5			0.0	1.000	2814383	48.9		97.7	2607	
29 Perfluorodo	decanoio	c acid								
612.4 > 568.6	13.587	13.592	-0.005	1.000	2692998	53.1		106	1387	
D 28 13C2 PFD										
614.4 > 569.4			-0.005		3023405	46.6		93.2	3468	
30 Perfluorotri			0.007	1 000	22/7700	40.7		00.2	1400	
662.4 > 618.5			-0.006	1.000	2267709	49.6		99.3	1402	
32 Perfluorote 712.6 > 668.5			-0 005	1 000	1105532	52.2		104	905	
112.0 / 000.0	17.04/	17.002	-0.005	1.000	1100002	JZ.Z		104	703	

Page 332 of 406 $^{48.9}$

D 33 13C2-PFTeDA

97.7

2784

Report Date: 07-Mar-2016 09:31:18 Chrom Revision: 2.2 02-Dec-2015 11:51:48

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:31:18 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_007.d 03-Mar-2016 18:05:04 **Injection Date:** Instrument ID: A4 Lims ID: Std L5 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 35- 35 70 030- 030-025-×25- \lesssim 50 >40 ∑20 ∑20 30 15- 15 20 10 10 10 5.9 5.3 5.6 6.2 6.5 5.2 5.5 5.8 6.1 5.2 5.5 5.8 6.1 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 35 35 0000 X 25 642 00 035 0030-×25-28 <u></u>20 21 15 15 10 10 5.5 5.8 6.1 5.5 6.9 7.2 5.2 6.4 5.2 5.8 6.1 6.4 6.0 6.3 7.5 6.6 7.8 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA _____F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 21-00018-X15-(00015 X)12 028 6⁵⁶ 648 \times 40 ≻₃₂-24 16 6.9 7.0 7.6 7.7 8.9 6.6 7.2 7.5 6.4 6.7 7.3 8.3 6.3 6.1 7.1 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid D 8 13C4-PFHpA F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 28 28 <u>8</u>48 ©24-0020-×20-0024 ×20 0 2 40 ∑16⁻ 24 12 12 16 0 0 07.7 8.3 8.9 8.2 8.8 Page 384hof 406 10.0 8.2 8.8 9.4 10.0 7.1

Page 335 of 406

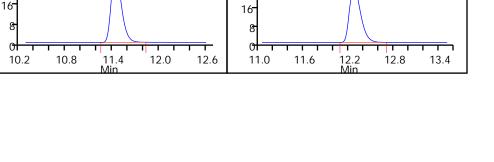
16

10.2

10.8

11.4

12.0



14.9

15.5

13.7

13.1

0

13.1

13.7

14.3

14.9

Report Date: 07-Mar-2016 09:31:27 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_008.d

Lims ID: Std L6

Client ID:

Sample Type: IC Calib Level: 6

Inject. Date: 03-Mar-2016 18:26:15 ALS Bottle#: 15 Worklist Smp#: 7

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L6

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:31:26 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK004

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:33:39

FIRST Level Revie	ewer: wes	stendorio	;		Date:	(04-Mar-2016 09:33:3	,9		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
216.7 > 171.5	5.827	5.824	0.003		2727876	39.8		79.5	8905	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	199.5		99.7	15629	
2 Perfluorobut	•									
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	209.8		105	15629	
D 35 13C2-PFH										
212.7 > 168.6	5.827	5.826	0.001		5839475	112.8		226	15629	
36 Perfluorooc				1 000	E02047E	100 F		00.7	15/00	
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	199.5		99.7	15629	
D 3 13C5-PFP6 267.6 > 222.7	eA 6.923	6.917	0.006		1671362	39.4		78.8	4699	
			0.000		1071302	37.4		70.0	4077	
4 Perfluoropei 262.9 > 218.7		6.918	0.005	1.000	3161534	195.6		97.8	2109	
5 Perfluorobut			0.000	1.000	0.0.00.	170.0		77.0	2107	
298.8 > 79.6	7.038	7.031	0.007	1.000	2379117	NC			1523	
298.8 > 98.6	7.038	7.031	0.007	1.000	1742062		1.37(0.00-0.00)		1338	
51 Perfluorobu	ıtanesulfo	onic acid								
298.8 > 79.6	7.038	7.031	0.007	1.000	2379117	195.2		110		
D 6 13C2 PFH	κA									
314.6 > 269.7	8.154	8.151	0.003		2350780	38.9		77.9	4704	
7 Perfluorohex		cid								
312.9 > 268.7	8.154	8.152	0.002	1.000	4186622	210.8		105	2103	
D 8 13C4-PFH _I										
366.6 > 321.6		9.361	0.004		1797278	36.4		72.8	2804	
9 Perfluorohe			0.655	4.0		0.5-		40.	1701	
362.8 > 318.7	9.365	9.362	0.003	1.000	4327277	207.4		104	4781	
					Dago 337 of	406				

Report Date: 07-Mar-2016 09:31:27 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Data File:					to\Chrom			02-Dec-2015 11:51 \03MAR2016A4A_(
Signa	l R	?T	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perflu 398.3 > 79	orohexane .2 9.4		fonate 9.399	0.005	1.000	3130736	NC			3503	
58 Perflu 398.3 > 79	orohexane .2 9.4		onic acio 9.399	d 0.005	1.000	3130736	198.5		105		
D 11 1802 402.5 > 83		04	9.399	0.005		888040	33.4		70.7	1673	
D 12 13C4 416.5 > 37		465	10.466	-0.001		2023788	32.0		64.0	3662	
13 Perflu 412.8 > 36 412.8 > 16		474	tid 10.468 10.468		1.000 1.000	4708825 1770138	200.6	2.66(0.00-0.00)	100 100	5277 2677	
39 Perflu 448.3 > 79	oroheptan .2 10.4		fonic Aci		1.000	3184565	189.1		99.3		
14 Perflu 448.3 > 79	oroheptan .2 10.4		ılfonate 10.475	0.007	1.000	3184565	NC			4038	
D 16 13C4 502.4 > 79		421	11.420	0.001		510106	33.5		70.0	1106	
15 Perflu 498.3 > 79	orooctane		onic acio 11.421		1.000	5535835	193.5		101	2515	
498.3 > 98 D 17 13C5		421	11.421	0.0	1.000	3289239		1.68(0.00-0.00)	101	2114	
467.5 > 42			11.441 cid	0.0		2019249	39.2		78.5	3231	
462.5 > 41		441	11.441	0.0	1.000	9001481	194.6		97.3	4772	
512.5 > 46 D 19 13C2	8.5 12.2			0.010	1.000	8227137	201.0		101	3884	
514.4 > 46						2197844	35.8		71.7	3418	
497.5 > 77 D 23 13C8	.6 12.8			0.003	1.000	12948614	204.8		102	3486	
505.4 > 77	.6 12.8		12.817			3270240	41.4		82.7	2569	
598.4 > 79		946	12.942		1.000	2334127	182.5		94.7		
598.4 > 79				0.004	1.000	2334127	NC			2725	
D 26 13C2 564.3 > 51	9.5 12.9			0.006		2234445	35.7		71.5	2190	
562.4 > 51		997	12.996	0.001	1.000	9531921	210.7		105	3746	
29 Perflu 612.4 > 56	orododeca 8.6 13.!			0.007	1.000	8939456	187.5		93.7	2553	
D 28 13C2 614.4 > 56		599	13.592	0.007		2840522	43.8		87.6	2169	
30 Perflu 662.4 > 61	orotrideca 8.5 14.		acid 14.111	0.005	1.000	7388406	172.1		86.1	2463	
32 Perflu 712.6 > 66	orotetrade 8.5 14.!			0.004	1.000	P ³⁷⁵⁸⁰⁹¹ Page 338 of 40	6 ^{188.7}		94.4	2004	

Report Date: 07-Mar-2016 09:31:27 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File:

EXP DLT **REL** Amount RT ng/ml Ratio(Limits) %Rec S/N Signal RT RT RT Response Flags

D 33 13C2-PFTeDA

43.6 2287873 87.1 2647

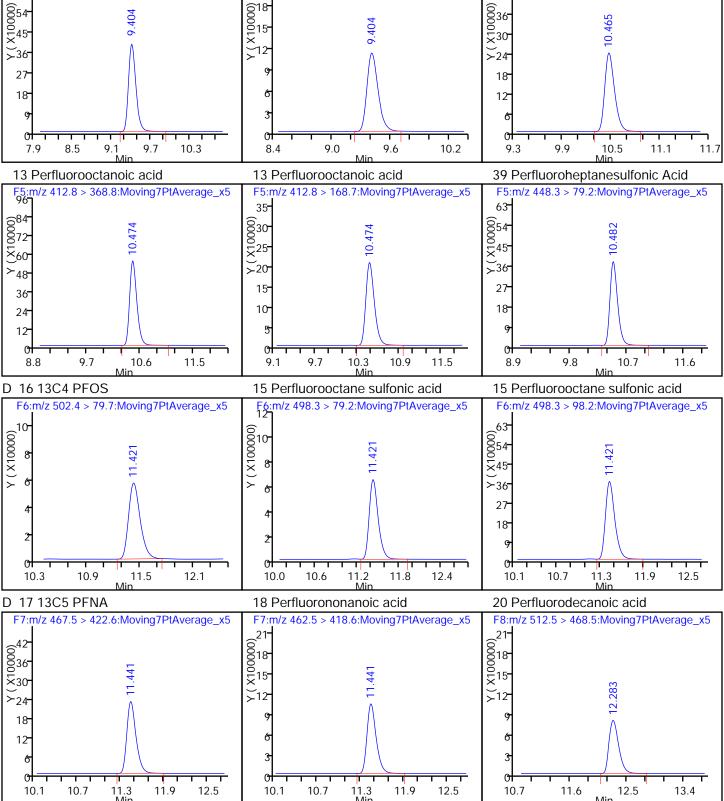
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:31:27 TestAmerica Sacramento Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_008.d **Injection Date:** 03-Mar-2016 18:26:15 Instrument ID: A4 Lims ID: Std L6 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 7 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A4 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 / (X100000) (X100000) 8 0042 ×35 _28 21 5.9 5.9 5.2 5.8 6.1 6.4 4.7 5.3 6.5 4.7 5.3 6.5 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 Y (X100000) Y (X100000) 630 625 20 15 10 5.3 5.3 5.9 6.5 5.9 6.5 6.5 7.7 4.7 5.9 7.1 4.7 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA _____ F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 567 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 (00042 ×35 63 6⁴⁹ 642 0054-×45-×35 -36 ≻28 ≻₂₈-27 21 21 18 14 7.0 7.0 7.3 7.6 7.6 8.2 5.8 6.4 7.6 6.4 6.7 7.0 8.8 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid D 8 13C4-PFHpA F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 42 (X100000) 84 6072 672 **8**36 ×30-×60 ≻48 18 36 12 24 00 7.0 7.6 8.2 8.8 8.2 8.8 Page 340hof 406 10.0 7.9 8.5 9.1 9.7 10.3



15.0

15.6

13.9

14.8

15.7

13.2

13.8

Report Date: 07-Mar-2016 09:31:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Lims ID: Std L7

Client ID:

Sample Type: IC Calib Level: 7

Inject. Date: 03-Mar-2016 18:47:27 ALS Bottle#: 16 Worklist Smp#: 8

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L7

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 07-Mar-2016 09:31:35 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK004

Process Host:	XAWI	RK004								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	A									
216.7 > 171.5	5.824	5.824	0.0		2203125	32.1		64.2	7317	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	407.1		102	17292	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	425.5		106	17292	
D 35 13C2-PFH										
212.7 > 168.6	5.824	5.826	-0.002		9564843	184.8		370	17292	
36 Perfluorooc										
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	407.1		102	17292	
D 3 13C5-PFP6										
267.6 > 222.7	6.918	6.917	0.001		1334182	31.5		62.9	3065	
4 Perfluoroper										
262.9 > 218.7	6.923	6.918	0.005	1.000	5212373	403.9		101	4473	
5 Perfluorobut										
298.8 > 79.6	7.038	7.031	0.007	1.000	3719460	NC	1 20/0 00 0 00)		1736	
298.8 > 98.6	7.033	7.031	0.002	0.999	2680005		1.39(0.00-0.00)		1635	
51 Perfluorobu				1 000	27104/0	404.1		444		
298.8 > 79.6	7.038	7.031	0.007	1.000	3719460	404.1		114		
D 6 13C2 PFHx		0.151	0.004		1010252	21 /		(2.2	4200	
314.6 > 269.7	8.155	8.151	0.004		1910352	31.6		63.3	4289	
7 Perfluorohex			0.002	1 000	//02174	400.1		100	1001	
312.9 > 268.7	8.155	8.152	0.003	1.000	6603174	409.1		102	1891	
D 8 13C4-PFH _k 366.6 > 321.6	9.365	9.361	0.004		1527680	31.0		61.9	2155	
			0.004		1327000	31.0		01.9	2100	
9 Perfluoroher 362.8 > 318.7	otanoic a 9.365		0.003	1.000	7081752	399.2		99.8	4848	
			0.003	1.000	7001732	377.2		77.0	4040	
10 Perfluorohe 398.3 > 79.2	9.404	9.399	0.005	1.000	4763496	NC			3855	
J7U.J / 17.Z	7.4U4	7.377	0.005	1.000	Page 343 of	406			3000	

 Report Date: 07-Mar-2016 09:31:37
 Chrom Revision: 2.2 02-Dec-2015 11:51:48

 Data File:
 \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

 EXP
 DLT
 REL
 Amount

 Circle
 DT
 DT
 REL
 Amount

Data File.	WOTH	MINANSE	cramen	CONCINION	1Data (A+120100	304-20030.L	NOSIVIAINZO TOA+A_	007.u		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe: 398.3 > 79.2	xanesulfo 9.404	onic acid		1.000	4763496	399.9		106		
D 11 18O2 PFH: 402.5 > 83.6	xS 9.404	9.399	0.005		670703	25.3		53.4	1971	
D 12 13C4 PFO 416.5 > 371.6		10.466	0.008		1631211	25.8		51.6	1684	
	10.474	10.468		1.000	7583946	400.9		100	5478	
412.8 > 168.7 39 Perfluorohe	ptanesul	fonic Aci	d	1.000	2864238		2.65(0.00-0.00)	100	3484	
14 Perfluorohe		ılfonate		1.000	4876887	412.0		108		
448.3 > 79.2 D 16 13C4 PFO	10.482 S	10.475	0.007	1.000	4876887	NC			3877	
502.4 > 79.7 15 Perfluorooct	11.421 tane sulfe				358682	23.5		49.3	995	
	11.421 11.430			1.000 1.001	8494640 5097370	422.2	1.67(0.00-0.00)	110 110	2035 2181	
D 17 13C5 PFN/ 467.5 > 422.6	A 11.450	11.441	0.009		1652260	32.1		64.2	2854	
18 Perfluoronoi 462.5 > 418.6	nanoic a 11.450		0.009	1.000	14498571	382.9		95.7	5197	
20 Perfluorodeo 512.5 > 468.5	canoic a 12.286		0.013	1.000	13213005	396.8		99.2	4099	
D 19 13C2 PFD/ 514.4 > 469.5	۹ 12.286	12.273	0.013		1787991	29.2		58.3	2561	
24 Perfluorooct 497.5 > 77.6	ane Sulf 12.820			1.000	22385482	395.7		98.9	3064	
D 23 13C8 FOS	A 12.820	12.817	0.003		2925469	37.0		74.0	3201	
49 Perfluorodeo 598.4 > 79.6				1.000	3501652	389.4		101		
25 Perfluorodeo 598.4 > 79.6	cane Sul 12.949		0.007	1.000	3501652	NC			2444	
D 26 13C2 PFUr 564.3 > 519.5		12.991	0.009		1927842	30.8		61.7	2019	
27 Perfluoround 562.4 > 518.5			0.004	1.000	16363587	419.2		105	4573	
29 Perfluorodo 612.4 > 568.6			0.011	1.000	15228731	398.0		99.5	2636	
D 28 13C2 PFD0 614.4 > 569.4		13.592	0.011		2279583	35.1		70.3	1946	
30 Perfluorotrid 662.4 > 618.5			0.008	1.000	12425833	360.8		90.2	2535	
32 Perfluoroteti 712.6 > 668.5			0.009	1.000	6397059	400.3		100	2650	
D 33 13C2-PFT6 714.5 > 669.5		14.552	0.009		Page 344 of	406 ^{38.5}		77.1	1968	
					. 490 044 01 -					

Report Date: 07-Mar-2016 09:31:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 07-Mar-2016 09:31:37 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A4\\20160304-28858.b\\03MAR2016A4A_009.d **Injection Date:** 03-Mar-2016 18:47:27 Instrument ID: A4 Lims ID: Std L7 Client ID: Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 8 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A4 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 (000015 X)12 636 630 636 18 5.3 5.9 5.3 5.9 5.2 5.8 6.1 6.4 4.7 6.5 4.7 6.5 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 (000015 X) X 0018 000015 X 624- 6020-16 5.3 5.9 5.3 5.9 6.7 6.5 6.5 7.0 4.7 6.4 7.3 7.6 6.1 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 Y (X100000) 70 (36 00001X)24 060 ×50 >40 18 30 12 20 6.2 7.1 6.8 7.1 7.4 7.7 7.6 8.2 8.0 6.5 7.0 8.8 5.3 8 13C4-PFHpA 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid D F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 (X100000) (X100000) 0014 00012 X10 630 625 ∑₂₀ 10 00 0 6.9 7.5 8.1 8.7 9.3 8.2 8.8 Page 346 of 406 10.0 8.0 8.6 9.2 9.8 10.4

12.6

10.6

11.5

12.4

13.3

10.8

10

9.9

12

10.2

10.8

11.4

12.0

15.0

15.6

ol = 12.8

13.7

14.6

15.5

13.2

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: <u>ICV 320-102384/10</u> Calibration Date: <u>03/03/2016</u> 19:29

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5805		56.9	50.0	13.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5895		57.2	50.0	14.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5895		57.2	50.0	14.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.5197		53.7	50.0	7.5	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.7383		50.3	44.3	13.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4539		53.7	50.0	7.4	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.6096		52.5	50.0	5.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.9434		53.1	47.3	12.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.804		54.4	47.6	14.3	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.5905		50.9	50.0	1.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.214		57.2	47.8	19.9	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.147		50.2	50.0	0.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.9546		51.3	50.0	2.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.996		51.5	50.0	3.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.425		57.4	48.3	19.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.088		53.8	50.0	7.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.9043		53.9	50.0	7.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.7930		52.5	50.0	5.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3491		49.8	50.0	-0.4	25.0

Report Date: 04-Mar-2016 15:24:23 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_011.d

Lims ID: ICV

Client ID:

Sample Type: ICV

Inject. Date: 03-Mar-2016 19:29:46 ALS Bottle#: 17 Worklist Smp#: 10

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: ICV

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:17:48

FIRST Level Revie	ewer: wes	stendorio	C		Date:	C)4-Mar-2016 09:17:4	18		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
216.7 > 171.5	5.818	5.824	-0.006		3166673	46.2		92.3	10576	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	57.2			6735	
2 Perfluorobut	•									
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	56.9			6735	
D 35 13C2-PFH										
212.7 > 168.6	5.818		-0.008		1838368	35.5		71.0	6735	
36 Perfluorooc				1 000	1020270	F7.0			470 E	
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	57.2			6735	
D 3 13C5-PFP6 267.6 > 222.7	eA 6.909	4 017	-0.008		1915472	45.2		90.3	4802	
			-0.006		1915472	43.2		90.3	4002	
4 Perfluoropei 262.9 > 218.7			-0.005	1.000	995532	53.7			722	
5 Perfluorobut			0.000	1.000	770002	33.7			722	
298.8 > 79.6	7.028	7.031	-0.003	1.000	753092	NC			613	
298.8 > 98.6	7.028	7.031	-0.003	1.000	540233		1.39(0.00-0.00)		501	
51 Perfluorobu	ıtanesulfo	onic acid	l							
298.8 > 79.6	7.028	7.031	-0.003	1.000	753092	50.3				
D 6 13C2 PFH	κA									
314.6 > 269.7	8.144	8.151	-0.007		2793911	46.3		92.6	6760	
7 Perfluorohe										
312.9 > 268.7	8.144	8.152	-0.008	1.000	1268134	53.7			1868	
D 8 13C4-PFH _I										
366.6 > 321.6			-0.004		2305020	46.7		93.4	4878	
9 Perfluorohej			0.00-	1 000	1.105.105	50.5			0.450	
362.8 > 318.7	9.357	9.362	-0.005	1.000	1405189	52.5			2450	
					Page 350 of	106				

Report Date: 04-Mar-2016 15:24:23 Chrom Revision: 2.2 02-Dec-2015 11:51:48

	Data File:				to\Chrom			\03MAR2016A4A_0			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
_	10 Perfluorohe	xane Sul	lfonate								
	398.3 > 79.2		9.399	-0.003	1.000	1027457	NC			1024	
	58 Perfluorohex	xanesulf	onic acid	t							
	398.3 > 79.2	9.396	9.399	-0.003	1.000	1027457	53.1				
	D 11 18O2 PFH	xS									
	402.5 > 83.6	9.396	9.399	-0.003		1090305	41.1		86.8	2269	
	D 12 13C4 PFO										
		10.465		-0.001		2621862	41.4		82.9	4836	
	13 Perfluorooct			0.000	1 000	15.40000	F0.0			0007	E
		10.465 10.465			1.000 1.000	1548089 554274	50.9	2.79(0.00-0.00)		2207 1361	E
					1.000	334274		2.79(0.00-0.00)		1301	
	39 Perfluorohej 448.3 > 79.2	ptariesui 10.465			1.000	1078429	54.4				
	14 Perfluorohe			0.010	1.000	1070427	54.4				
		10.465		-0.010	1.000	1078429	NC			2749	
	D 16 13C4 PFO										
		11.412	11.420	-0.008		600361	39.4		82.4	1543	
	15 Perfluorooct	ane sulf	onic acid	t							
	498.3 > 79.2	11.421	11.421	0.0	1.000	1927688	57.2			2091	
	498.3 > 98.2	11.421	11.421	0.0	1.000	1154190		1.67(0.00-0.00)		1736	
	D 17 13C5 PFN										
	467.5 > 422.6	11.431	11.441	-0.010		2401129	46.7		93.3	3907	
	18 Perfluoronoi										
		11.441		0.0	1.000	2753362	50.2			2267	
	20 Perfluorodeo				1 000	0/4//0/	54.0			0444	
		12.273	12.273	0.0	1.000	2646606	51.3			3146	
	D 19 13C2 PFD/		10 070	0.0		2772451	45.0		00.4	2/24	
		12.273				2772451	45.2		90.4	3634	
	24 Perfluorooct 497.5 > 77.6	ane Sult 12.820			1.000	3838297	51.5			2617	
			12.013	0.003	1.000	3030297	31.3			2017	
	D 23 13C8 FOS <i>i</i> 505.4 > 77.6	A 12.820	12 817	0.003		3854214	48.7		97.5	3903	
	49 Perfluorode					3034214	40.7		77.5	3703	
		12.936			1.000	863807	57.4				
	25 Perfluorode			0.000	1.000	000007	07.1				
		12.936		-0.006	1.000	863807	NC			1862	
	D 26 13C2 PFUr										
		12.987	12.991	-0.004		2797982	44.7		89.5	2972	
	27 Perfluoround	decanoio	c acid								
	562.4 > 518.5			-0.009	1.000	3045467	53.8			2342	
	29 Perfluorodo	decanoio	c acid								
	612.4 > 568.6	13.591	13.592	-0.001	1.000	2819890	53.9			1599	
	D 28 13C2 PFD	οA									
	614.4 > 569.4	13.591	13.592	-0.001		3118461	48.1		96.1	2926	
	30 Perfluorotrid	lecanoic	acid								
	662.4 > 618.5	14.109	14.111	-0.002	1.000	2472944	52.5			1270	
	32 Perfluorotetr	radecan	oic acid								
	712.6 > 668.5	14.552	14.552	0.0	1.000	Page 351 of 406	49.8			979	
						-					

Report Date: 04-Mar-2016 15:24:23 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_011.d

D 33 13C2-PFTeDA

2534906 96.5 3032 48.3

OC Flag Legend Processing Flags

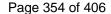
NC - Not Calibrated

E - Exceeded Maximum Amount

Reagents:

LCPFCIC_00014 Units: mL Amount Added: 1.00

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_011.d 03-Mar-2016 19:29:46 **Injection Date:** Instrument ID: A4 Lims ID: **ICV** Client ID: Operator ID: **JRB** ALS Bottle#: 17 Worklist Smp#: 10 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A4 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 63 (35- 630 630 055 0554 ∑45 ×25 >36 ≥ 20 \succ 20 27 15 15 18 10 10 5.2 5.8 5.2 5.8 5.2 5.5 5.8 6.1 4.6 6.4 4.6 6.4 7.0 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D $F1:m/z \ 212.7 > 168.6:Moving7PtAverage \ x5$ F1:m/z 212.7 > 168.6:Moving7PtAverage x5F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 ©35- (35- 42 ©36-×25 ∑30 ×25 **≻**24 \succ 20 **≻20** 18 15 15 10 10 5.2 5.2 5.8 6.4 7.0 5.8 7.0 6.5 7.7 6.4 5.9 7.1 4.6 4.6 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 21-00018-X15-656 648 (00015⁻ (00001x12-(00001x12-×40 32 24 16 ol 7.1 7.7 6.5 6.8 7.1 7.4 7.7 7.7 8.9 5.9 6.5 6.2 8.3 7.1 8 13C4-PFHpA 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid D F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 28 (56⁻ 0048⁻ 630 625 0024 X20 ×40 20 ≻32-15 12 24 10 16 0 0 0 8.9 7.7 8.3 8.9 8.2 8.8 Page 356 of 406 10.0 8.3 9.5 10.1 7.1 Min



12.0

27

18

10.2

10.8

27

18

10.9

11.5

12.7

13.3

12.6

24

16

10.2

10.8

11.4

12.0

14.9

15.5

13.7

13.1

0

13.1

13.7

14.3

14.9

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: <u>CCV 320-102384/21</u> Calibration Date: <u>03/03/2016</u> 23:22

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_022.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5391		21.1	20.0	5.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5465		21.2	20.0	6.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5465		21.2	20.0	6.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.4543		18.8	20.0	-6.1	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.6599		18.0	17.7	1.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4382		20.7	20.0	3.7	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.6996		24.1	20.0	20.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.8160		18.4	18.9	-2.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.6085		21.0	20.0	4.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.970		23.8	19.0	24.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.197		22.8	19.1	19.2	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.210		21.3	20.0	6.6	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.8912		19.1	20.0	-4.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.9862		20.4	20.0	2.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.366		22.0	19.3	14.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.064		21.0	20.0	5.1	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.8692		20.7	20.0	3.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.8338		22.1	20.0	10.4	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3360		19.2	20.0	-4.2	25.0

Report Date: 04-Mar-2016 15:24:46 Chrom Revision: 2.2 02-Dec-2015 11:51:48

> TestAmerica Sacramento **Target Compound Quantitation Report**

 $\verb|\ChromNA| Sacramento| ChromData | A4| 20160304-28858.b| 03MAR2016A4A_022.d|$ Data File:

Lims ID: CCV L4

Client ID:

Sample Type: CCV

Inject. Date: 03-Mar-2016 23:22:45 ALS Bottle#: 13 Worklist Smp#: 21

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L4

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: **JRB** Instrument ID: Α4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:45 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

04 Mar 2001 / 00 20 17

First Level Reviewer: westendorfc					Date:	04-Mar-2016 09:32:17				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
216.7 > 171.5	5.843	5.824	0.019		3471173	50.6		101	10873	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.2		106	2758	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.1		106	2758	
D 35 13C2-PFH	xDA									
212.7 > 168.6	5.840	5.826	0.014		748460	14.5		28.9	2758	
36 Perfluorooc	tandecar	noic acid								
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.2		106	2758	
D 3 13C5-PFP6										
267.6 > 222.7	6.936	6.917	0.019		2167930	51.1		102	5308	
4 Perfluoroper										
262.9 > 218.7	6.936		0.018	1.000	393950	18.8		93.9	277	
5 Perfluorobut										
298.8 > 79.6	7.051	7.031	0.020	1.000	305293	NC	4 07/0 00 0 00)		281	
298.8 > 98.6	7.051	7.031	0.020	1.000	223119		1.37(0.00-0.00)		224	
51 Perfluorobu				1 000	205202	10.0		100		
298.8 > 79.6	7.051	7.031	0.020	1.000	305293	18.0		102		
D 6 13C2 PFHx 314.6 > 269.7	(A 8.165	8.151	0.014		3020862	50.0		100	6225	
			0.014		3020002	30.0		100	0223	
7 Perfluorohex 312.9 > 268.7	8.165	8.152	0.013	1.000	529466	20.7		104	1654	
D 8 13C4-PFH _k		0.132	0.013	1.000	327400	20.7		104	1034	
	9.365	9.361	0.004		2427572	49.2		98.4	5455	
9 Perfluoroher			3.00 т		2121012	17.2		70.1	3 100	
362.8 > 318.7		9.362	0.010	1.000	679298	24.1		121	1072	
552.67 515.7	,	7.002	3.0.0		D 057 -f					

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_022.d									
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2		9.399	0.005	1.000	403970	NC			508	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	403970	18.4		97.1		
D 11 18O2 PFH	xS									
402.5 > 83.6	9.404	9.399	0.005		1237691	46.6		98.6	3536	
D 12 13C4 PFO										
		10.466	-0.001		2918405	46.1		92.2	5538	
13 Perfluorooc			0.000	4 000	74,0000	04.0		405	4700	
		10.468 10.468		1.000 1.000	710290 246901	21.0	2.88(0.00-0.00)	105	1702 1074	
				1.000	240701		2.00(0.00-0.00)		1074	
39 Perfluorohe 448.3 > 79.2	-	10.475		1.000	514367	23.8		125		
14 Perfluorohe			0.001	1.000	011007	20.0		120		
448.3 > 79.2	•	10.475	-0.001	1.000	514367	NC			1755	
D 16 13C4 PFO	S									
502.4 > 79.7		11.420	-0.008		655646	43.0		90.0	1728	
15 Perfluorooc	tane sulf	onic acid	ł							
498.3 > 79.2	11.412	11.421	-0.009	1.000	838483	22.8		119	1711	
498.3 > 98.2	11.412	11.421	-0.009	1.000	503758		1.66(0.00-0.00)		1111	
D 17 13C5 PFN										
		11.441	-0.010		2578369	50.1		100	4284	
18 Perfluorono			0.040	4 000	1010100	04.0		407	4000	
		11.441	-0.010	1.000	1248129	21.3		107	1320	
20 Perfluorode 512.5 > 468.5		12.273	0.012	1.000	1095986	19.1		95.7	1629	
D 19 13C2 PFD		12.273	-0.013	1.000	1093900	19.1		93.7	1029	
		12.273	-0.013		3074545	50.1		100	4497	
24 Perfluorooc					3074343	30.1		100	77//	
497.5 > 77.6		12.815		1 000	1593215	20.4		102	1913	
D 23 13C8 FOS			0.007		.0,02.0				.,.0	
505.4 > 77.6		12.817	-0.009		4038876	51.1		102	3463	
49 Perfluorode	cane Su	lfonic aci	id							
		12.942		1.000	361158	22.0		114		
25 Perfluorode	cane Su	lfonate								
598.4 > 79.6	12.923	12.942	-0.019	1.000	361158	NC			1037	
D 26 13C2 PFU	nA									
564.3 > 519.5	12.974	12.991	-0.017		2943400	47.1		94.1	4324	
27 Perfluoroun	decanoio	c acid								
562.4 > 518.5	12.974	12.996	-0.022	1.000	1252710	21.0		105	2121	
29 Perfluorodo										
612.4 > 568.6	13.568	13.592	-0.024	1.000	1190395	20.7		104	799	
D 28 13C2 PFD										
614.4 > 569.4			-0.024		3423902	52.8		106	3082	
30 Perfluorotrio			0.000	1.000	1111000	00.4		440	0.47	
		14.111	-0.023	1.000	1141992	22.1		110	846	
32 Perfluorotet			0.000	1 000	4/0112	10.0		05.0	400	
712.6 > 668.5	14.524	14.552	-∪.∪∠ၓ	1.000	Page 358 of 406) 17.2		95.8	402	

Report Date: 04-Mar-2016 15:24:46 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File:

EXP DLT **REL** Amount RT ng/ml Ratio(Limits) %Rec S/N Signal RT RT RT Response Flags

D 33 13C2-PFTeDA

48.1 2525658 96.2 2875

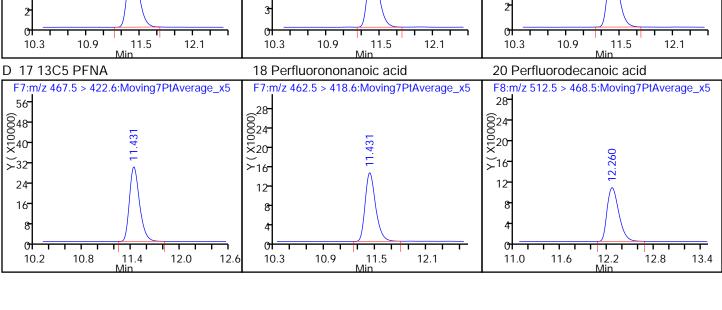
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_022.d **Injection Date:** 03-Mar-2016 23:22:45 Instrument ID: A4 Lims ID: CCV L4 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 21 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 63 854 $\stackrel{\smile}{\times}_{45}$ 18 5.9 5.4 6.0 6.6 5.3 5.6 5.9 6.2 5.3 5.6 6.2 3 13C5-PFPeA D 35 13C2-PFHxDA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 49 (015 X) × 3 (00015 X) > c -28 5.9 5.9 5.3 5.6 6.2 5.0 5.3 5.6 6.2 6.9 7.2 7.5 6.5 6.5 6.3 6.6 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 91 70 63 0054 <u>660</u> <u>8</u>78 ∑50 ×65 ×45 ≻52 ≻40 ≻₃₆-39 30 27 26 20 18 10 13 7.3 6.8 7.4 7.7 6.4 7.0 7.6 6.5 7.1 7.5 7.8 8.1 8.4 8.7 6.7 6.2 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 12 649 642 (X10000) X) 8 ()14° ()00 12° ×35 ≻28-21 0 7.9 8.2 8.5 8.8 8.2 8.8 Page 360h of 406 10.0 8.9 9.5 10.1 7.3 7.6 8.3



14.4

15.0

15.6

10

13.2

13.8

15.7

13.9

14.5

15.1

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: <u>CCV 320-102384/30</u> Calibration Date: <u>03/04/2016</u> 02:33

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_031.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5491		53.8	50.0	7.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5558		53.9	50.0	7.9	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5558		53.9	50.0	7.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.4689		48.5	50.0	-3.1	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.6239		42.5	44.2	-3.9	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4316		51.1	50.0	2.2	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.5546		47.8	50.0	-4.5	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.8833		49.7	47.3	5.1	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.5662		48.8	50.0	-2.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.974		59.6	47.6	25.1*	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.219		57.4	47.8	20.0	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.098		48.1	50.0	-3.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.8986		48.3	50.0	-3.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.9664		50.0	50.0	-0.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.366		55.0	48.2	14.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.113		55.0	50.0	9.9	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.8961		53.4	50.0	6.8	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.7839		51.9	50.0	3.8	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3521		50.2	50.0	0.5	25.0

Report Date: 04-Mar-2016 15:24:56 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_031.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 04-Mar-2016 02:33:20 ALS Bottle#: 14 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:56 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:29:26

FIRST Level Revie	rst Level Reviewer: Westendoric				Date:	C	14-Mar-2016 09:29:2	26		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	4									
216.7 > 171.5	5.846	5.824	0.022		3149754	45.9		91.8	9606	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.9		108	6404	
2 Perfluorobut	•									
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.8		108	6404	
D 35 13C2-PFH										
212.7 > 168.6	5.849	5.826	0.023		1729569	33.4		66.8	6404	
36 Perfluorooc				1 000	4700570	F0.0		400		
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.9		108	6404	
D 3 13C5-PFP6 267.6 > 222.7	eA 6.936	6.917	0.019		1000204	47.1		94.3	4502	
			0.019		1999386	47.1		94.3	4302	
4 Perfluoropei 262.9 > 218.7			0.023	1.000	937420	48.5		96.9	744	
5 Perfluorobut			0.023	1.000	737 420	40.0		70.7	, , , ,	
298.8 > 79.6	7.056	7.031	0.025	1.000	634715	NC			532	
298.8 > 98.6	7.051	7.031	0.020	0.999	459973		1.38(0.00-0.00)		484	
51 Perfluorobu	ıtanesulfo	onic acio	l							
298.8 > 79.6	7.056	7.031	0.025	1.000	634715	42.5		96.1		
D 6 13C2 PFH	κA									
314.6 > 269.7	8.165	8.151	0.014		2673956	44.3		88.6	6855	
7 Perfluorohe										
312.9 > 268.7	8.165	8.152	0.013	1.000	1154079	51.1		102	1615	
D 8 13C4-PFH _I										
366.6 > 321.6			-0.004		2296904	46.5		93.1	5873	
9 Perfluorohe										
362.8 > 318.7	9.357	9.362	-0.005	1.000	1273843	47.8		95.5	2279	
					Page 364 of	406				

Data File:	\\Chrc	mNA\Sa	acrament	to\Chrom	Data\A4\20160304	4-28858.b	\03MAR2016A4A_0)31.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohe	xane Sul	fonate		-						
398.3 > 79.2		9.399	-0.003	1.000	961626	NC			1140	
58 Perfluorohe	xanesulf	onic acio	i							
398.3 > 79.2	9.396	9.399	-0.003	1.000	961626	49.7		105		
D 11 18O2 PFH	xS									
402.5 > 83.6	9.396	9.399	-0.003		1088709	41.0		86.7	2678	
D 12 13C4 PFO										
		10.466	-0.018		2612145	41.3		82.6	5221	
13 Perfluorooct			0.000	1 000	4.470004	40.0		07.	0400	
		10.468 10.468		1.000 1.000	1479021 491426	48.8	3.01(0.00-0.00)	97.6	2128 1202	
				1.000	491420		3.01(0.00-0.00)		1202	
39 Perfluorohej 448.3 > 79.2		10.475		1.000	1065018	59.6		125		
14 Perfluorohe			0.010	1.000	1003010	37.0		123		
		10.475	-0.018	1.000	1065018	NC			2708	
D 16 13C4 PFO										
		11.420	-0.036		541729	35.6		74.4	1943	
15 Perfluorooct	ane sulf	onic acid	I							
498.3 > 79.2	11.384	11.421	-0.037	1.000	1743637	57.4		120	2314	
498.3 > 98.2	11.384	11.421	-0.037	1.000	1051542		1.66(0.00-0.00)		1740	
D 17 13C5 PFN/										
467.5 > 422.6	11.404	11.441	-0.037		2378392	46.2		92.5	4487	
18 Perfluoronoi					_,,					
		11.441	-0.037	1.000	2612339	48.1		96.2	3017	
20 Perfluorodeo			0.054	1 000	2447210	40.2		0/ 5	21/0	
		12.273	-0.054	1.000	2447218	48.3		96.5	3169	
D 19 13C2 PFD/ 514.4 > 469.5		12.273	0.054		2723467	44.4		88.8	4091	
					2723407	44.4		00.0	4071	
24 Perfluorooct 497.5 > 77.6		12.815		1 000	3448388	50.0		99.9	3862	
D 23 13C8 FOS		12.010	0.010	1.000	0110000	00.0		,,,,	0002	
		12.817	-0.050		3568475	45.1		90.3	3835	
49 Perfluorode										
		12.942		1.000	746458	55.0		114		
25 Perfluorodeo	cane Sul	fonate								
598.4 > 79.6			-0.060	1.000	746458	NC			1389	
D 26 13C2 PFUr	nΑ									
564.3 > 519.5	12.933	12.991	-0.058		2664413	42.6		85.2	2799	
27 Perfluoround	decanoio	acid								
562.4 > 518.5	12.933	12.996	-0.063	1.000	2964713	55.0		110	2604	
29 Perfluorodo	decanoio	acid								
612.4 > 568.6	13.540	13.592	-0.052	1.000	2788440	53.4		107	1584	
D 28 13C2 PFD	Ac									
614.4 > 569.4	13.540	13.592	-0.052		3111783	48.0		95.9	2917	
30 Perfluorotrid									=	
		14.111	-0.057	1.000	2439290	51.9		104	1670	
32 Perfluorotetr			0.075	4.00=	4005775	F.C. 0		400	000	
712.6 > 668.5	14.492	14.552	-0.060	1.000	Page 365 of 406	50.2		100	892	

Report Date: 04-Mar-2016 15:24:56 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File:

EXP DLT **REL** Amount RT ng/ml Ratio(Limits) %Rec S/N Signal RT RT RT Response Flags

D 33 13C2-PFTeDA

48.7 97.4 2558681 3074

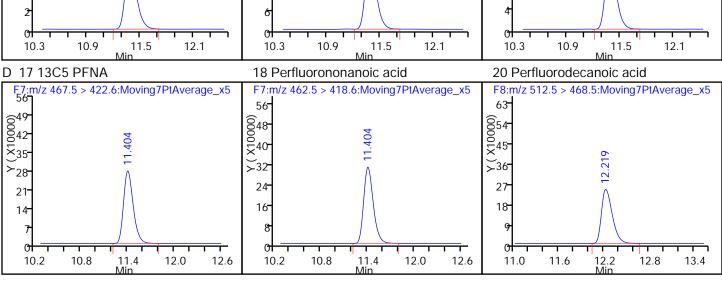
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:24:56 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_031.d **Injection Date:** 04-Mar-2016 02:33:20 Instrument ID: A4 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 30 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 ©56 0 0 48 (30 (25 , \(\S_{20} \) ×₄₀ ≻₃₂ 15 15 10 10 5.9 5.2 5.5 5.8 6.1 5.3 5.6 5.9 6.2 5.3 5.6 6.2 3 13C5-PFPeA D 35 13C2-PFHxDA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F₁:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 636-630-630 625 630 625 ∑₂₀-20 18 15 15 10 12 5.9 5.9 5.3 5.6 6.2 6.5 5.3 5.6 6.2 6.9 7.2 7.5 6.5 6.3 6.6 7.8 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 21 63 (00012 X10 0018-15-12-0054**-**0001× ∑36 27 18 01 7.3 6.8 7.4 7.7 8.7 9.3 6.4 6.7 7.0 7.6 6.5 7.1 7.5 8.1 6.2 7 Perfluorohexanoic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 28- 0020 0020 6⁵⁶ 848 ×20 \times_{40} ≻16 ≻32 12 24 16 0 0 07.0 7.6 8.2 8.8 8.2 8.8 Page 3676 of 406 10.0 8.8 9.4 10.0 10.6 8.2



14.4

15.0

15.6

10

13.2

13.8

0

13.2

13.8

15.0

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Job No.: 320-17463-1
Lab Sample ID: MB 320-102166/1-A
Lab File ID: 03MAR2016A4A_012.d
Date Collected:
Date Extracted: 03/02/2016 12:04
Date Analyzed: 03/03/2016 19:51
Dilution Factor: 1
GC Column: Acquity ID: 2.1(mm)
GPC Cleanup:(Y/N) N
Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.37	J	2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	Ū	2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	Ū	2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	2.0	Ū	2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	Ū	4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	Ū	2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		25-150
STL00990	13C4 PFOA	101		25-150
STL00991	13C4 PFOS	100		25-150
STL01892	13C4-PFHpA	108		25-150
STL00995	13C5 PFNA	106		25-150
STL00994	1802 PFHxS	106		25-150

Report Date: 04-Mar-2016 15:44:17 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_012.d

Lims ID: MB 320-102166/1-A

Client ID:

Sample Type: MB

Inject. Date: 03-Mar-2016 19:51:00 ALS Bottle#: 25 Worklist Smp#: 11

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: mb 320-102166/1-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:29:18 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:16:54

First Level Revie	First Level Reviewer: westendorfc				Date:	0)4-Mar-2016 15:16:5	4		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
216.7 > 171.5	5.824	5.824	0.0		3488953	50.9		102	14948	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2248			29.6	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2284			29.6	
D 35 13C2-PFH	xDA									
212.7 > 168.6	5.815	5.826	-0.011		8130	0.1571		0.3	29.6	
36 Perfluorooc										
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2248			29.6	
D 3 13C5-PFPe										
	6.918	6.917	0.001		2190440	51.6		103	6320	
5 Perfluorobut				4 000	40454	NO			10 5	
298.8 > 79.6	7.033	7.031 7.031	0.002	1.000 1.000	12451	NC	1 22(0 00 0 00)		12.5	
298.8 > 98.6	7.033		0.002	1.000	10163		1.23(0.00-0.00)		12.1	
51 Perfluorobu 298.8 > 79.6	tanesulto 7.033	onic acid 7.031	0.002	1.000	12451	0.6840				
		7.031	0.002	1.000	12431	0.0040				
D 6 13C2 PFHx 314.6 > 269.7	8.155	8.151	0.004		3244568	53.7		107	10310	
D 8 13C4-PFH _R		0.101	0.004		3244300	55.7		107	10310	
366.6 > 321.6	9.357	9 361	-0.004		2667444	54.0		108	5349	
10 Perfluorohe			0.001		2007111	01.0		100	0017	
398.3 > 79.2		9.399	-0.011	1.000	3051	NC			4.7	
58 Perfluorohe										
398.3 > 79.2	9.388	9.399		1.000	3051	0.1295				
D 11 1802 PFH	xS									
402.5 > 83.6	9.396	9.399	-0.003		1326496	50.0		106	4089	
D 12 13C4 PFO	A									
	10.465	10.466	-0.001		Page5985 of 40	06 50.4		101	6293	
					g. 2					

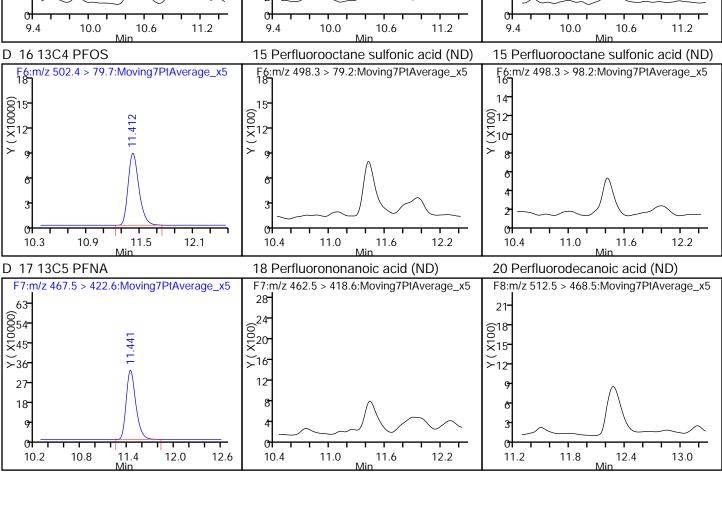
Report Date: 04-Mar-2016 15:44:17 Chrom Revision: 2.2 02-Dec-2015 11:51:48 Data File:

		EVE								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 16 13C4 PFO	S									
502.4 > 79.7	11.412	11.420	-0.008		731733	48.0		100	2665	
D 17 13C5 PFN										
467.5 > 422.6	11.441	11.441	0.0		2733415	53.1		106	4489	
D 19 13C2 PFD										
514.4 > 469.5		12.273	0.0		3444619	56.2		112	5560	
D 23 13C8 FOS		10 017	0.003		1201207	1/ F		22.0	1400	
	12.820	12.817	0.003		1301206	16.5		32.9	1499	
D 26 13C2 PFU 564.3 > 519.5		12 001	-0.004		3588845	57.4		115	3698	
27 Perfluoroun			-0.004		3300043	37.4		113	3070	
562.4 > 518.5			-0.009	1.000	17844	0.2456			30.0	
29 Perfluorodo										
612.4 > 568.6			-0.001	1.000	7066	0.1199			4.6	
D 28 13C2 PFD	оА									
614.4 > 569.4	13.591	13.592	-0.001		3509802	54.1		108	3083	
30 Perfluorotri	decanoic	acid								
662.4 > 618.5	14.109	14.111	-0.002	1.000	13735	0.2590			10.4	
32 Perfluorotet										
712.6 > 668.5		14.552	0.0	1.000	11045	0.4489			9.9	
D 33 13C2-PFT		44.550	0.000		04///-	44.0		00.5	0700	
714.5 > 669.5	14.543	14.552	-0.009		2166667	41.3		82.5	2723	

OC Flag Legend Processing Flags

NC - Not Calibrated

Chrom Revision: 2.2 02-Dec-2015 11:51:48 Report Date: 04-Mar-2016 15:44:17 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_012.d **Injection Date:** 03-Mar-2016 19:51:00 Instrument ID: A4 Lims ID: MB 320-102166/1-A Client ID: Operator ID: **JRB** ALS Bottle#: 25 Worklist Smp#: 11 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: 1 13C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 63° 854° 36-00 × 00 × 24-36 S₃₀ 5.815 5.815 $\stackrel{\smile}{\sim}_{45}$ ≻₃₆ 18 18 27 12 12 18 5.9 6.2 5.4 6.0 6.6 5.6 5.9 6.2 5.3 5.6 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D $F1:m/z \ 212.7 > 168.6:Moving7PtAverage \ x5$ F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 42 42 (49⁻ 36 36 630 630 ©30 × × ×24 5.815 5.815 ∑³⁰ ≻²⁴ ×35 ≻28 18 18 21 12 12 14 5.9 6.2 7.5 5.6 5.6 5.9 6.2 6.9 7.2 5.3 6.3 6.6 4 Perfluoropentanoic acid (ND) 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 77 49 35 (0) 66-55-<u>@</u>42 830 -35- ×25 **≻**28 ≻₂₀ >-44 21 33 14 22 10 11 ol 7.7 6.7 7.0 7.3 7.7 8.9 6.5 7.1 6.4 7.6 8.3 7 Perfluorohexanoic acid (ND) D 8 13C4-PFHpA 9 Perfluoroheptanoic acid (ND) F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 18 70 666 12 ©15 ×12 (0010° × (× 100) 8 ∑50 ≻40 30 20 10 0 0 $^{\circ}$ 8.9 7.7 8.3 8.2 8.8 Page 37/3h of 406 10.0 8.3 8.9 9.5 10.1 7.1 Min



Chrom Revision: 2.2 02-Dec-2015 11:51:48

14.4

15.0

15.6

14.1

13.8

14.4

14.7

15.0

15.3

13.2

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 SDG No.: Lab Sample ID: LCS 320-102166/2-A Client Sample ID: Matrix: Water Lab File ID: 03MAR2016A4A_013.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 03/02/2016 12:04 Extraction Method: 3535 Sample wt/vol: 500(mL) Date Analyzed: 03/03/2016 20:12 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm) % Moisture: GPC Cleanup:(Y/N) N Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.0		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	37.5		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	36.0		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	40.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	47.8		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	39.8		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		25-150
STL00990	13C4 PFOA	92		25-150
STL00991	13C4 PFOS	88		25-150
STL01892	13C4-PFHpA	100		25-150
STL00995	13C5 PFNA	95		25-150
STL00994	1802 PFHxS	100		25-150

Report Date: 04-Mar-2016 15:24:28 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_013.d

Lims ID: LCS 320-102166/2-A

Client ID:

Sample Type: LCS

Inject. Date: 03-Mar-2016 20:12:08 ALS Bottle#: 26 Worklist Smp#: 12

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: lcs 320-102166/2-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

	10003311031.	7/7/1/1	NO27								
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
Е) 113C4 PFBA										
	216.7 > 171.5	5.830	5.824	0.006		3380626	49.3		98.6	10093	
	34 Perfluorohe	xadecan	oic acid								
2	212.7 > 168.6	5.830	5.826	0.004	1.000	736256	20.7		104	2544	
	2 Perfluorobut	yric acid									
2	212.7 > 168.6	5.830	5.826	0.004	1.000	736256	21.3		107	2544	
	35 13C2-PFH										
2	212.7 > 168.6	5.830	5.826	0.004		736256	14.2		28.4	2544	
	36 Perfluorooct										
	212.7 > 168.6	5.830	5.826	0.004	1.000	736256	20.7		104	2544	
	3 13C5-PFPe			0.010		0000010	40.0		00.4		
-	267.6 > 222.7	6.927	6.917	0.010		2080248	49.0		98.1	5753	
	4 Perfluoroper			0.014	1 000	440200	21.0		100	222	
4	262.9 > 218.7			0.014	1.000	440289	21.9		109	322	
	5 Perfluorobuta 298.8 > 79.6	ane Suite 7.042	onate 7.031	0.011	1.000	310971	NC			305	
	298.8 > 98.6	7.042	7.031	0.011	1.000	233359	NC	1.33(0.00-0.00)		211	
•	51 Perfluorobu				1.001	200007		1.00(0.00 0.00)			
	298.8 > 79.6		7.031	0.011	1.000	310971	18.0		102		
	6 13C2 PFHx										
			8.151	0.009		2934403	48.6		97.2	6613	
	7 Perfluorohex	anoic ac	id								
,	312.9 > 268.7	8.160	8.152	0.008	1.000	499778	20.2		101	1428	
	8 13C4-PFHp	Α									
;	366.6 > 321.6	9.365	9.361	0.004		2465113	49.9		99.9	4844	
	9 Perfluorohep	tanoic a	cid								
;	362.8 > 318.7	9.365	9.362	0.003	1.000	536746	18.8		93.8	988	
	10 Perfluorohe										
;	398.3 > 79.2	9.404	9.399	0.005	1.000	401937	NC			600	

Report Date: 04-Mar-2016 15:24:28 Chrom Revision: 2.2 02-Dec-2015 11:51:48

Report Date: 04- Data File:				to\Chrom			02-Dec-2015 11:51: 0\03MAR2016A4A_0			
Signal	RT	EXP RT	DLT RT	REL RT		Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe 398.3 > 79.2	xanesulf 9.404	onic acid	d 0.005	1.000	401937	18.0		95.1		
D 11 18O2 PFH. 402.5 > 83.6	9.404	9.399	0.005		1257859	47.4		100	2559	
D 12 13C4 PFO 416.5 > 371.6 13 Perfluorooci	10.465	10.466	-0.001		2917714	46.1		92.2	6304	
412.8 > 368.8	10.465	10.468 10.468		1.000 1.001	672631 232660	19.9	2.89(0.00-0.00)	99.4	1042 717	
	10.474	10.475		1.000	503547	23.7		124		
	10.474	ulfonate 10.475	-0.001	1.000	503547	NC			1809	
D 16 13C4 PFO 502.4 > 79.7 15 Perfluorooci	11.412	11.420			644504	42.3		88.5	1530	
498.3 > 79.2 498.3 > 98.2	11.421	11.421 11.421	0.0	1.000 1.000	863711 538744	23.9	1.60(0.00-0.00)	125	1682 921	
	11.431	11.441	-0.010		2448582	47.6		95.2	5830	
18 Perfluorono 462.5 > 418.6 20 Perfluorode	11.441	11.441	0.0	1.000	1133400	20.4		102	995	
512.5 > 468.5 D 19 13C2 PFD	12.273		0.0	1.000	1249031	21.8		109	1543	
514.4 > 469.5 24 Perfluorooc		12.273 fonamide			3072341	50.1		100	4149	
D 23 13C8 FOS	A		-0.007	1.000	764961	20.0		100	1293	
505.4 > 77.6 49 Perfluorode 598.4 > 79.6	cane Su		id	1.000	1975212 387425	25.0 24.0		50.0 124	2664	
25 Perfluorode	cane Su	lfonate	-0.006		387425	NC		124	1030	
D 26 13C2 PFU 564.3 > 519.5	nA				3141051	50.2		100	3801	
27 Perfluoroun 562.4 > 518.5	12.987	12.996	-0.009	1.000	1374938	21.6		108	2042	
29 Perfluorodo 612.4 > 568.6	13.579		-0.013	1.000	1305966	22.6		113	946	
D 28 13C2 PFD6 614.4 > 569.4	13.591		-0.001		3448850	53.2		106	3708	
30 Perfluorotric 662.4 > 618.5 32 Perfluorotet	14.099	14.111	-0.012	1.000	970960	18.6		93.2	692	
712.6 > 668.5 D 33 13C2-PFT6	14.543		-0.009	1.000	383205	15.8		79.2	293	
714.5 > 669.5		14.552	-0.009		Page 378 of 40	6 42.4		84.9	2919	

Chrom Revision: 2.2 02-Dec-2015 11:51:48

Report Date: 04-Mar-2016 15:24:28

OC Flag Legend Processing Flags NC - Not Calibrated

Report Date: 04-Mar-2016 15:24:28 Chrom Revision: 2.2 02-Dec-2015 11:51:48 TestAmerica Sacramento Data File: \ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_013.d **Injection Date:** 03-Mar-2016 20:12:08 Instrument ID: A4 Lims ID: LCS 320-102166/2-A Client ID: Operator ID: **JRB** ALS Bottle#: 26 Worklist Smp#: 12 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 (14-00012-X10-(0054⁺ 6014 6012 ×45 ≻₃₆-27 18 5.2 5.2 5.8 6.1 5.2 5.5 5.8 6.1 5.5 5.8 6.1 D 35 13C2-PFHxDA 3 13C5-PFPeA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 49 (0014° 0012° 0042 X35 ∑₁₀ <u></u>28⁺ 5.5 5.8 5.5 5.8 6.9 5.2 6.1 5.2 6.1 6.3 7.2 7.5 6.6 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 Y (X10000) 63 70 0054 ×45 660-50-50->36 ≻40 30 27 20 18 7.0 7.1 7.4 7.7 8.1 8.7 9.3 5.8 6.4 7.6 6.5 6.8 7.5 7 Perfluorohexanoic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 (56- (0048-(X10000) 8 ×40-**≻**32 24 16 0

7.8

7.2

7.5

8.1

8.4

8.7

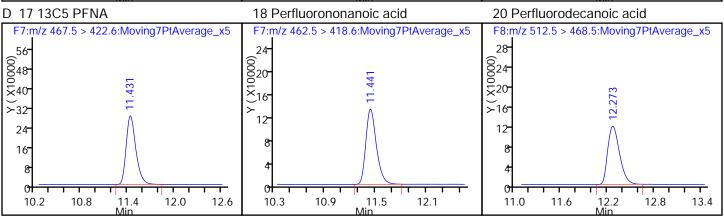
8.2

8.8 Page 380hof 406 10.0

8.3

8.9

9.5



14.4

15.0

15.6

13.9

13.3

14.5

15.1

15.7

13.2

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 SDG No.: Lab Sample ID: LCSD 320-102166/3-A Client Sample ID: Matrix: Water Lab File ID: 03MAR2016A4A_014.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 03/02/2016 12:04 Extraction Method: 3535 Sample wt/vol: 500(mL) Date Analyzed: 03/03/2016 20:33 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm) % Moisture: GPC Cleanup:(Y/N) N Analysis Batch No.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.2		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	38.8		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	39.0		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	40.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	50.1		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	38.5		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	99		25-150
STL00990	13C4 PFOA	93		25-150
STL00991	13C4 PFOS	92		25-150
STL01892	13C4-PFHpA	101		25-150
STL00995	13C5 PFNA	96		25-150
STL00994	1802 PFHxS	103		25-150

Report Date: 04-Mar-2016 15:24:31 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_014.d

Lims ID: LCSD 320-102166/3-A

Client ID:

Sample Type: LCSD

Inject. Date: 03-Mar-2016 20:33:19 ALS Bottle#: 27 Worklist Smp#: 13

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: lcsd 320-102166/3-a

Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C

Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m

Limit Group: LC PFC_DOD ICAL

Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\\03MAR2016A4A_009.d

Column 1: Det: F1:MRM

Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:17:04

First Level Revie	wer: wes	stendorfo	;		Date:	C	04-Mar-2016 09:17:0)4		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	1									
216.7 > 171.5	5.833	5.824	0.009		3464775	50.5		101	10969	
34 Perfluorohe	xadecan	oic acid								
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
2 Perfluorobut	yric acid									
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
D 35 13C2-PFH										
212.7 > 168.6	5.836	5.826	0.010		739130	14.3		28.6	2444	
36 Perfluorooct										
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
D 3 13C5-PFPe										
	6.932	6.917	0.015		2166830	51.1		102	6482	
4 Perfluoroper			0.014	1 000	412700	40.7		00.7	210	
262.9 > 218.7			0.014	1.000	413689	19.7		98.7	319	
5 Perfluorobut			0.011	1 000	221207	NO			204	
298.8 > 79.6 298.8 > 98.6	7.042 7.042	7.031 7.031	0.011 0.011	1.000 1.000	321296 240264	NC	1.34(0.00-0.00)		294 263	
51 Perfluorobu				1.000	240204		1.54(0.00-0.00)		203	
298.8 > 79.6		7.031	0.011	1.000	321296	18.1		102		
D 6 13C2 PFHx		7.001	0.011	1.000	021270	10.1		.02		
		8.151	0.014		3003022	49.7		99.5	7647	
7 Perfluorohex										
312.9 > 268.7		8.152	0.013	1.000	539945	21.3		106	1270	
D 8 13C4-PFHp										
366.6 > 321.6		9.361	0.011		2503006	50.7		101	4747	
9 Perfluorohep	otanoic a	cid								
362.8 > 318.7			0.010	1.000	563919	19.4		97.1	1155	
10 Perfluorohe	xane Sul	fonate								
398.3 > 79.2	9.411	9.399	0.012	1.000	Palgle 3894 of 40	6 NC			491	
					-					

Data File.	NOTIFO	IIIIVA\36	aciainem		iDala M4120 1003	JU4-20030.D	1031VIARZU10A4A_	U 14.U		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohe 398.3 > 79.2	xanesulfo 9.411	onic acio 9.399	d 0.012	1.000	447720	19.5		103		
D 11 18O2 PFH 402.5 > 83.6	xS 9.411	9.399	0.012		1293378	48.7		103	4556	
D 12 13C4 PFO	Α									
416.5 > 371.6 13 Perfluorooci			0.008		2932254	46.3		92.7	6347	
	10.474		0.006	1.000	655116	19.3		96.3	1236	
	10.474			1.000	224792		2.91(0.00-0.00)		673	
39 Perfluorohe	ptanesult	fonic Aci	id							
448.3 > 79.2	10.474	10.475	-0.001	1.000	553909	25.2		132		
14 Perfluorohe 448.3 > 79.2	ptane Su 10.474		-0.001	1.000	553909	NC			1542	
D 16 13C4 PFO										
502.4 > 79.7	11.421				667035	43.8		91.6	2291	
15 Perfluorooci				1 000	02/007	25.0		101	1555	
498.3 > 79.2 498.3 > 98.2	11.421 11.421			1.000 1.000	936987 523942	25.0	1.79(0.00-0.00)	131	1555 952	
D 17 13C5 PFN		11.721	0.0	1.000	323742		1.77(0.00 0.00)		752	
	11.441	11.441	0.0		2461849	47.9		95.7	3747	
18 Perfluorono	nanoic a	cid								
462.5 > 418.6			0.0	1.000	1140331	20.4		102	1207	
20 Perfluorode			0.010	4 000	10000/0	22.2			0507	
	12.260	12.273	-0.013	1.000	1302962	23.2		116	2597	
D 19 13C2 PFD. 514.4 > 469.5	A 12.260	12.273	-0.013		3016633	49.2		98.4	3715	
24 Perfluorooc										
	12.808	12.815	-0.007	1.000	412075	23.0		115	783	
D 23 13C8 FOS. 505.4 > 77.6	A 12.808	12 017	0.000		926845	11.7		23.4	1945	
49 Perfluorode					920043	11.7		23.4	1743	
	12.936			1.000	383750	22.9		119		
25 Perfluorode										
	12.936	12.942	-0.006	1.000	383750	NC			1180	
D 26 13C2 PFU 564.3 > 519.5		12.991	-0.017		3179566	50.8		102	3623	
27 Perfluoroun	decanoic	acid								
562.4 > 518.5	12.987	12.996	-0.009	1.000	1343502	20.9		104	1675	
29 Perfluorodo 612.4 > 568.6			-0.013	1.000	1176234	20.4		102	723	
D 28 13C2 PFD		10.072	0.013	1.000	1170254	20.4		102	725	
614.4 > 569.4		13.592	-0.013		3426620	52.8		106	3560	
30 Perfluorotrio										
662.4 > 618.5			-0.012	1.000	878545	17.0		84.8	594	
32 Perfluorotet 712.6 > 668.5			-0.019	1.000	366877	15.3		76.4	334	
D 33 13C2-PFT										
714.5 > 669.5		14.552	-0.019		Page 385 of 4	40.9		81.8	2947	

Chrom Revision: 2.2 02-Dec-2015 11:51:48

Report Date: 04-Mar-2016 15:24:31

OC Flag Legend Processing Flags NC - Not Calibrated

Report Date: 04-Mar-2016 15:24:31 Chrom Revision: 2.2 02-Dec-2015 11:51:48 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_014.d **Injection Date:** 03-Mar-2016 20:33:19 Instrument ID: A4 Lims ID: LCSD 320-102166/3-A Client ID: Operator ID: **JRB** ALS Bottle#: 27 Worklist Smp#: 13 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A4 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 34 Perfluorohexadecanoic acid 2 Perfluorobutyric acid F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 216.7 > 171.5:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 0015 00012 X12 Š54⁻ \succeq_{45} ≻₃₆ 27 5.2 5.5 5.8 6.1 5.2 5.5 5.8 6.1 5.2 5.5 5.8 6.1 3 13C5-PFPeA D 35 13C2-PFHxDA 36 Perfluorooctandecanoic acid D F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F1:m/z 212.7 > 168.6:Moving7PtAverage_x5 F2:m/z 267.6 > 222.7:Moving7PtAverage_x5 (015 X) × 3 (00015 X) > 9 642 00 035 **28** 5.5 5.8 5.5 5.2 6.1 5.2 5.8 6.1 6.9 7.2 7.5 6.3 6.6 4 Perfluoropentanoic acid 51 Perfluorobutanesulfonic acid 6 13C2 PFHxA F2:m/z 262.9 > 218.7:Moving7PtAverage_x5 F2:m/z 298.8 > 79.6:Moving7PtAverage_x5 F3:m/z 314.6 > 269.7:Moving7PtAverage_x5 84 70 63 0054 660 ©72 ×50 ×45 ×60 >₄₈ ≻₄₀ ≻36 36 30 27 20 24 18 10 12 6.9 6.8 7.1 7.4 7.2 7.5 6.5 7.7 7.6 8.2 6.3 6.6 6.2 7.0 8.8 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid F3:m/z 312.9 > 268.7:Moving7PtAverage_x5 F4:m/z 362.8 > 318.7:Moving7PtAverage_x5 F4:m/z 366.6 > 321.6:Moving7PtAverage_x5 56-(00001 (000010 X) 8 -40 **≻32** 24 16 0 0 7.7 8.0 8.3 8.2 8.8 Page 3876 of 406 10.0 8.9 9.5 10.1 7.4 8.6 8.3

11.5

12.1

10.9

16

10.2

11.4 Min

12.0

12.6

10.3

10.8

10

11.0

11.6

12.8

14.4

15.0

15.6

13.9

14.5

15.1

15.7

13.2

13.8

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento	Job No.: 320-17463-1
SDG No.:	
Instrument ID: A4	Start Date: 03/03/2016 16:40
Analysis Batch Number: 102384	End Date: 03/04/2016 18:11

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-102384/2 IC		03/03/2016 16:40	1	03MAR2016A4A_00 3.d	Acquity 2.1 (mm)
STD 320-102384/3 IC		03/03/2016 17:01	1	03MAR2016A4A_00 4.d	Acquity 2.1 (mm)
STD 320-102384/4 IC		03/03/2016 17:22	1	03MAR2016A4A_00 5.d	Acquity 2.1 (mm)
STD 320-102384/5 IC		03/03/2016 17:43	1	03MAR2016A4A_00 6.d	Acquity 2.1 (mm)
STD 320-102384/6 IC		03/03/2016 18:05	1	03MAR2016A4A_00 7.d	Acquity 2.1 (mm)
STD 320-102384/7 IC		03/03/2016 18:26	1	03MAR2016A4A_00 8.d	Acquity 2.1 (mm)
STD 320-102384/8 IC		03/03/2016 18:47	1	03MAR2016A4A_00 9.d	Acquity 2.1 (mm)
ZZZZZ		03/03/2016 19:08	1		Acquity 2.1 (mm)
ICV 320-102384/10		03/03/2016 19:29	1	03MAR2016A4A_01 1.d	Acquity 2.1 (mm)
MB 320-102166/1-A		03/03/2016 19:51	1	03MAR2016A4A_01 2.d	Acquity 2.1 (mm)
LCS 320-102166/2-A		03/03/2016 20:12	1	03MAR2016A4A_01 3.d	Acquity 2.1 (mm)
LCSD 320-102166/3-A		03/03/2016 20:33	1	03MAR2016A4A_01 4.d	Acquity 2.1 (mm)
320-17463-1		03/03/2016 20:54	1	03MAR2016A4A_01 5.d	Acquity 2.1 (mm)
320-17463-2		03/03/2016 21:15	1	03MAR2016A4A_01 6.d	Acquity 2.1 (mm)
320-17463-3		03/03/2016 21:36	1	03MAR2016A4A_01 7.d	Acquity 2.1 (mm)
320-17463-4		03/03/2016 21:58	1	03MAR2016A4A_01 8.d	Acquity 2.1 (mm)
320-17463-5		03/03/2016 22:19	1	03MAR2016A4A_01 9.d	Acquity 2.1 (mm)
320-17463-6		03/03/2016 22:40	1	03MAR2016A4A_02 0.d	Acquity 2.1 (mm)
320-17463-7		03/03/2016 23:01	1	03MAR2016A4A_02 1.d	Acquity 2.1 (mm)
CCV 320-102384/21		03/03/2016 23:22	1	03MAR2016A4A_02 2.d	Acquity 2.1 (mm)
320-17463-8		03/03/2016 23:43	1	03MAR2016A4A_02 3.d	Acquity 2.1 (mm)
CCV 320-102384/30		03/04/2016 02:33	1	03MAR2016A4A_03 1.d	Acquity 2.1 (mm)
ZZZZZ		03/04/2016 14:18	1		Acquity 2.1 (mm)
CCV 320-102384/68		03/04/2016 17:08	1		Acquity 2.1 (mm)
CCV 320-102384/76		03/04/2016 18:11	1		Acquity 2.1 (mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Batch Number: 102166 Batch Start Date: 03/02/16 12:04 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 03/03/16 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00029	LCPFCSP 00041
MB 320-102166/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-102166/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
LCSD 320-102166/3		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17463-B-1	BC_02_26_16	3535, WS-LC-0025	Т	626.5 g	44.00 g	582.5 mL	1.00 mL	50 uL	
320-17463-A-2	DW-18	3535, WS-LC-0025	Т	604.4 g	46.28 g	558.1 mL	1.00 mL	50 uL	
320-17463-A-3	DW-18FB	3535, WS-LC-0025	Т	599.38 g	46.48 g	552.9 mL	1.00 mL	50 uL	
320-17463-B-4	DW-78	3535, WS-LC-0025	Т	565.70 g	46.09 g	519.6 mL	1.00 mL	50 uL	
320-17463-B-5	DW-78FB	3535, WS-LC-0025	Т	615.8 g	43.69 g	572.1 mL	1.00 mL	50 uL	
320-17463-B-6	DW-100	3535, WS-LC-0025	Т	556.26 g	46.04 g	510.2 mL	1.00 mL	50 uL	
320-17463-B-7	DW-100FB	3535, WS-LC-0025	Т	582.87 g	46.05 g	536.8 mL	1.00 mL	50 uL	
320-17463-B-8	DUP_022616	3535, WS-LC-0025	Т	569.57 g	46.17 g	523.4 mL	1.00 mL	50 uL	

Batch Notes									
Balance ID	QA-070								
Batch Comment	Hexane 0000116331; 0.1N Sodium Hydrox/H20 588423; MeOH 582954								
H2O ID	3/1/16								
Pipette ID	EC15219; EC15131								
Analyst ID - Reagent Drop	JER								
Analyst ID - SU Reagent Drop	JER								
Analyst ID - SU Reagent Drop Witness	SNE								
Solvent Lot #	589283								
Solvent Name	0.3% Ammonium hydroxide/MeOH								
SOP Number	WS-LC-0025								
SPE Cartridge Type	Wax 500mg								
Solid Phase Extraction Disk ID	002635307A								

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Batch Number: 102166 Batch Start Date: 03/02/16 12:04 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 03/03/16 15:00

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

Extraction Batch: 103/66 Analysis Batch(es):		2 nd Level	
		2 nd Level	
	1 st Level	2 nd Level	
A. Calibration/Instrument Run QC	/		N/A
1. ICAL locked in Chrom and TALS? ICAL Batch#102384			
ICAL, CCV Frequency & Criteria met.			
RF _{average} criteria appropriate for the method.			
 Linear Regression criteria appropriate if required (r ≥ 0.995). 		/	
 Quadratic fit criteria appropriate if required (r² > 0.990). 			
For Linear Regression and Quadratic fit – Does the y-intercept support			
½ the reporting limit as described in CA-Q-S-005?		/	
All curve points show calculated concentrations.		./	
Peaks correctly ID'd by data system.			
5. Tune check frequency & criteria met and Tune check report attached.			
B, QA/QC	Y		11 Apr. 1
Are all QC samples properly linked in TALS?			
Method blank, LCS/LCSD and MS/SD frequencies met.			
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.			
4. Are MS/MSD recoveries and RPD within control limits?		<u>v</u>	
Holding Times were met for prep and analytical.			·
IS/Surrogate recoveries meet criteria or properly noted.			
C. Sample Analysis	V	- V	· · · · · · · · · · · · · · · · · · ·
Was correct analysis performed and were project instructions followed?			<u> </u>
If required, are compounds within RT windows?			
3 If required, are positive hits confirmed and >40% RPD flagged?	/		
Manual Integrations reviewed and appropriate.			<u> </u>
All analytes correctly reported. (Primary, secondary, acceptable status)			
Correct reporting limits used. (based on client request, prep factors, and	<u> </u>		-1-
dilutions)		/ /	
D. Documentation	- 1 G G G G	194 J. 181 1 1 1	No. 1
1. Are all non-conformances documented/attached? NCM#48517 402166			<u> </u>
2. Do results make sense (e.g. dilutions, etc.)?	Y		
Have all flags been reviewed for appropriateness?			~
4. For level 3 and 4 reports, have forms and raw data been reviewed?			
5. Was QC Checker run for this job?	- n teda lizija par - Net British	./	
*Upon completion of this checklist, the reviewer must scan and attach the checklis		S job.	
	7/16 7/2016		

Box #28

Method Code: 320-3535_IVWT-320

Batch Number: 320-102166

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Batch End: 3/3/16 15,00 Batch Open: 3/2/2016 12:04:00PM

Solid-Phase Extraction (SPE)

Output Sample Lab iD															3 2 9 1 7 4 6 3 - B 5 A				
Comments															=				
DIv Rank	N/A		N/A		N/A		4		4		4		4		4	, ,	4		4
Analyfical TAT	N/A		N/A		N/A		12_Days		12 Days										
Due Date	N/A		N/A		A/N		3/7/16		3/7/16		3/7/16		3/7/16		3/7/16		3/7/16		3/7/16
Adj2			<u>.</u>																
PHs Adj1						-							_						
Rcvd				_	<u></u>							_					-		
InitAmnt FinAmnt	500 mL	1.00 mL	500 mL	1.00 mL	500 mL	1.00 mL	582.5 mL	1.00 mL	558.1 mL	1.00 mL	552.9 mL	1.00 mL	519.6 mL	1.00 mL	572.1 mL	1.00 mL	510.2 mL	1.00 mL	536.8 mL
GrossWt InitAmnt TareWt FinAmnt							526.5 g	14.00 g	504.4 g	46.28 g	599.38 g	46.48 g	565.70 g	46.09 g	515.8 g	43.69 g	556.26 g	46.04 g	582.87 g
SDG (Job#)	N/A		N/A		A/N		N/A (320-17463-1)		N/A										
Input Sample Lab ID (Analytical Method)	MB~320-102166/1 N/A		LCS~320-102166/2 N/A		LCSD~320-102166/3 N/A		320-17463-B-1 (PFC_IDA_DOD5)		320-17463-A-2 (PFC_IDA_DOD5)		320-17463-A-3 (PFC_IDA_DOD5)		320-17463-B-4 (PFC_IDA_DOD5)		320-17463-B-5 (PFC_IDA_DOD5)		320-17463-B-6 (PFC_IDA_DOD5)		320-17463-B-7
			0		6	Pa	ag ę 3	94	of.40	6	9		_		9		6		9

Printed: 3/2/2016

3/7/16

536.8 mL

582.87 g 16.05 g

(320-17463-1)

(PFC_IDA_DOD5)

6

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments) Analyst: Reed, Jonathan E

Batch Number: 320-102166

Batch Open: 3/2/2016 12:04:00PM

Batch End:

Batch End:																
	4		4		4		4		4		4		4		4	
	12_Days		8_Day_Rush		8_Day_Rush		8_Day_Rush									
	3/7/16		3/3/16		3/7/16		3/7/16		3/7/16		3/7/16		3/7/16		3/7/16	
						-										
	523.4 mL	1.00 mL	498.3 mL	1.00 mL	558.1 mL	1.00 mL	503.4 mL	1.00 mL	497.9 mL	1,00 mL	553.9 mL	1.00 mL	562.2 mL	1.00 mL	554.2 mL	1.00 mL
	569.57 g	46.17 g	544.55 g	46.28 g	504.7 g	46.62 g	547.65 g	14.26 g	542.33 g	44.47 g	598.06 g	44.16 g	506.2 g	44.04 g	500.60 g	16.36 g
5_IVWT-320	N/A (320-17463-1)		N/A (480-95690-1)		N/A (480-95793-1)		N/A (480-95793-1)		N/A (480-95793-1)		N/A (480-95794-1)	- 	N/A (480-95794-1)		N/A (480-95794-1)	
Method Code: 320-3535_IVWT-320	320-17463-B-8 (PFC_IDA_DOD5)		480-95690-B-21 (PFC_IDA)		480-95793-A-21 (PFC_IDA)		480-95793-A-22 (PFC_IDA)		480-95793-A-23 (PFC_IDA)		480-95794-A-21 (PFC_IDA)		480-95794-A-22 (PFC_IDA)		480-95794-B-23 (PFC_IDA)	
Σ	<u>=</u>			,	<u>ε</u>				5	P	l aope 3	95	o <u>£</u> 40	6	<u>&</u>	

(To Accompany Samples to Instruments) Analyst: Reed, Jonathan E

Aqueous Extraction Analysis Sheet

Method Code: 320-3535_IVWT-320

Batch Number: 320-102166

Batch Open: 3/2/2016 12:04:00PM

Batch End:

Batch Notes	NA	₹N	QA-070	Wax 500mg	002635307A	3/1/16	Pipette ID EC15219; EC15131	Solvent Name 0.3% Ammonium hydroxide/MeOH	589283	JER	JER	SNE	AA	マス	NA AN	AA	NA	WS-LC-0025	Batch Comment Hexane 0000116331; 0.1N Sodium Hydrox/H20 588423; MeOH 582954	
	First Start time NA	First End time NA	Balance ID QA-070	SPE Cartridge Type Wax 500mg	Solid Phase Extraction Disk Lot 00	H2O Lot used 3/1/16	Pipette ID E	Solvent Name 0.	Solvent Lot # 589283	Analyst who added reagent JER	SU Reagent Drop JER	SU Reagent Drop Witness SNE	Acid Name NA	Acid Lot NA	Reagent ID NA	Reagent Lot Number NA	NaCl Lot # NA	SOP Number WS-LC-0025	Batch Comment H.	

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TestAmerica Sacramento

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-102166

Batch Open: 3/2/2016 12:04:00PM

Batch End:

Comments

OSBev111213 StdVarAnn 30day disposal		Q5Rev111213_StdVarApp_30day disposal		Q5Rev11213_StdVarApp_30day dtsposal		Q5Rev111213_StdVarApp_30day disposal		Q5Rev111213 StdVarApp 30day disposal		Q5Rev111213_StdVarApp_30day disposal		Q5Rev111213_StdVarApp_30day disposal		Q5Rev111213_StdVarApp_30day disposal		95690; L4Reviewed(Bito).n/a - all sub only.	Samples shipped from Albany to Sac, logged from chains in Buffalo;; L4Reviewed(Bflo):n/a - all sub only.	Shipped from Albany to Sac, logged from chains in Buffalo.; L4Reviewed(Bflo):n/a - all sub only.	
mments.		mments:	-	mments:		mments:		mments:		mments:		mments:		mments:	(()	95690:	95793:	95794:	
Method Comments:		Method Comments:	(- - -	Method Comments:		Method Comments:		Method Comments:	r	Method Comments:		Method Comments:		Method Comments:	•	Login Comments for Job	Login Comments for Job	Login Comments for Job	
320-17463-B-1	320-17463-A-2		320-17463-A-3		320-17463-B-4		320-17463-B-5		320-17463-B-6		320-17463-B-7		320-17463-B-8			Login Con	Login Con	Login Con	,

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Page 4 of 6

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-102166

Batch Open: 3/2/2016 12:04:00PM Batch End:

Reagent Additions Worksheet

Witness	SNE 3/2/16																	
Ву	1/20 3/0-116	40																>
Final Amount	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL
Amount Added	50 uL	20 nF	20 uL	7n 09	20 nF	50 uL	20 nF	20 nT	50 uL	7n 09	50 uL	7n 09	20 nF	20 nF	50 uL	20 nF	50 uL	50 uL
Reagent Code	LCMPFCSU_00029	LCMPFCSU_00029	LCPFCSP_00041	LCMPFCSU_00029	LCPFCSP_00041	LCMPFCSU_00029												
Lab ID	MB 320-102166/1	LCS 320-102166/2	LCS 320-102166/2	LCSD 320-102166/3	LCSD 320-102166/3	320-17463-B-1	320-17463-A-2	320-17463-A-3	320-17463-B-4	320-17463-B-5	320-17463-B-6	320-17463-B-7	320-17463-B-8	480-95690-B-21	480-95793-A-21	480-95793-A-22	480-95793-A-23	480-95794-A-21

TestAmerica Sacramento

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166

Method Code: 320-3535 |VWT-320

Analyst: Reed, Jonathan E

Batch Open: 3/2/2016 12:04:00PM

Batch End:

11/20 3/02/16 SNE 3/2/16	7		Lot#;				
1.00 mL	1.00 mL	Other Reagents:	Amount/Units				
50 uL	50 nF	Othe	Am			-	
LCMPFCSU_00029	LCMPFCSU_00029						
480-95794-A-22	480-95794-B-23		Reagent				

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Sacramento Preparation Data Review Checklist

Preparation Batch Number(s): 102166	Test: PFC- IDA	
Earliest Holding Time: 3	/3/16		

		,
	1 st Level	2 nd Level
Sample List Tab	Reviewer	Reviewer
Samples identified to the correct method	27	
All necessary NCMs filed (including holding time)		
Method/sample/login/QAS checked and correct	V	1
Worksheef Tab	1 st Level Reviewer	2 [™] Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	V	101)
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	1	~
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	V	<u> </u>
Comments are transcribed correctly in TALS	1	
	1 st Level	2 nd Level
Reagents Tab	Reviewer	Reviewer
All necessary reagents not expired and entered into TALS	ν	
All spike amounts correct and added to necessary samples and QC	U	
Batch Information	1 st Level Reviewer	2 nd Level Reviewer
Date and time accurate and entered into TALS correctly	¥	
All necessary 'batch information' complete and entered into TALS correctly		

1 ^{si} Level Reviewer:	Date: 3/03/16
2 nd Level Reviewer	Date:3/3//6
Comments:	

Shipping and Receiving Documents

O - AsivaO2
P - Na2O4S
Q - Na2O4S
Q - Na2SO3
R - Na2SSO4
T - TSP Dodecahydrate
U - Acetone
U - Acetone
W - MCAA
W - ph 4-5
Z - other (specify) **TestAmerica** THE LEADER IN ENVIRONMENTAL TESTING Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mont
Special Instructions/QC Requirements: 280-48902-18075 1 Preservation Codes: 320-17463 Chain of Custody G - Amchlor H - Ascorbic Acid Page: Page 1 of 2 Job# D - Nithic Acid E - NaHSO4 F - MeOH C - Zn Acetate J. DI Water K. EDTA L. EDA Date Time. J. 9. 0 द्रम्माद्रीमञ्जूलम् हत्।याम् प्रीवृत्स्य 🔀) // 9 7/ 7 Method of Shipment **Analysis Requested** Cooler Temperature(s) °C and Other Remarks michelle, johnston@testamericainc com Lab PM Johnston, Michelle A E-Mail. Received by. Chain of Custody Record РЕОЅ, РЕОА, РЕИА, РЕНХЅ, РЕНРА & РЕВЅ Company R FieldEllered Sample (Kes, dr. No) Type Secold.
(C=comp, BT-Tissue.
G=grab) A-Air)
PESSTATION GOG (W=water, S=solid, O=wasteroff, BT=Tissue, Courte O'Veet Radrological Sample 1506-019-609 Po #. Purchase Order Requested 22/16/1350 Sample 398415 Date. Unknown (AT Requested (days): Due Date Requested: Sample Date Project #. 28014493 SSOW# Poison B 461-SJSC 02-26-16 Skin Imitant Deliverable Requested: 1, II, III, IV, Other (specify) Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water Custody Seals Intact: Custody Seal No. Phone (916) 373-5600 Fax (303) 467-7248 TestAmerica Sacramento West Sacramento, CA 95605-1500 Sample Identification Possible Hazard Identification
Non-Hazard Flammable mdryden@earthtoxics com Empty Kit Relinquished by Client Information 880 Riverside Parkway Sompany Earth Toxics, Inc Address: PO BOX 3382 Mike Dryden elinquished by: elinquished by elinquished by State, Zip UT, 84321 ogan hone.

0 - AsnaO2 P - Na2O4S Q - Na2CSO3 R - Na2CSO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 THE LEADER IN ENVIRONMENTAL TESTING **TestAmerico** 2 - other (specify) Months Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon COC No 280-48902-18075,1 Preservation Codes: イフス Page 1 of 1 Job# Date(Timpe) Jate/Time Method of Shipment Analysis Requested Sooler Temperature(s) °C and Other Remarks. Special Instructions/QC Requirements michelle johnston@testamericainc.com Lab PM Johnston, Michelle A E-Mail Received by Received by Chain of Custody Record РГОЅ, РГОА, РГИА, РГНХЅ, РГНДА & РГВЅ Resolution īme (W=water, S=tolid, O=wasteloll, BT=Tissue, Radiological Type (C≈comp, Sample 0 606-010-200 Purchase Order Requested Sample Date Time 2/26/16 1320 Jewiter Sample Date Unknown 'AT Requested (days): Due Date Requested: 195/20 2 /3 6 Date/Time Project # 28014493 SSOW# Poison B 461-SJSC IFFB Skin Imtant Deliverable Requested 1, II, III, IV, Other (specify) Project Name. Ensafe-NWS - Earle, NJ PFCs Potable Water DW-Custody Seal No West Sacramento, CA 95605-1500 Phone (916) 373-5600 Fax (303) 467-7248 3 TestAmerica Sacramento Possible Hazard Identification Empty Kit Relinquished by. ndryden@earthtoxics com Custody Seals Intact:

A Yes A No 880 Riverside Parkway Client Information Company Earth Toxics, Inc Resinquished by Relinquished by Address PO BOX 3382 Client Contact Mike Dryden elinquished by. Logan State, Zip UT, 84321

0 - Asha02 P - Na204S Q - Na2S03 R - Na2S2S03 S - H2S04 T - TSP Dodecahydrate THE LEADER IN ENVIRONMENTAL TESTING **TestAmerica** U - Acetone V - MCAA W - ph 4-5 Z - other (specify) Сопрапу Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Trchive For Mon 280-48902-18075.1 reservation Codes: イクスー D - Nitrc Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid Page Page 1 of ≱ Job# I - Ice J - Di Waler K - EDTA L - EDA ែមកម្រាស់ទុវសម្រាល់ក្រៀវស Date/Time. Date/Time Method of Shipment Camer Tracking No(s **Analysis Requested** cooler Temperature(s) °C and Other Remarks Special Instructions/QC Requirements. michelle johnston@testamencainc com Lab PM Johnston, Michelle A E-Mail. eceived by Chain of Custody Record Ż PEOS, PEOA, PFNA, PFHXS, PFHpA & PFBS colubber Sample (w-water,
Type S-sand,
(C=Comp, BT-Itsswol,
G=grab) A-Atr) Jenniter O'Keet Phone. Radiological Sample Sample Date Time Porthase Order Requested 2/24/10 1150 0h1) Sample Jan ! Date. Unknown TAT Requested (days): Due Date Requested: 71110 2/26/10 Date Time Project # 28014493 SSOW#. Ъ Sampler Poison B 461-8JSC SW-78FB Skin Initant Deliverable Requested: I, II, III, IV, Other (specify) Project Name Ensafe-NWS - Earle, NJ PFCs Potable Water Custody Seal No. West Sacramento, CA 95605-1500 Phone (916) 373-5600 Fax (303) 467-7248 **TestAmerica Sacramento** 3 Flammable Possible Hazard Identification ndryden@earthtoxics.com Empty Kit Relinquished by Custody Seals Intact: Client Information 880 Riverside Parkway Sample Identification A Yes A No Non-Hazard Company. Earth Toxics, Inc Address PO BOX 3382 elinguished by elinquished by elinquished by. Mike Dryden Logan State, Zip: UT, 84321 hone

- In a Marine Will was a second to the

0 - AsNaO2
P Na2O45
Q - Na2O45
Q - Na2S5O3
R - Na2S5O4
T - TSP Dodecanydrate
U - Acetone
W - MCAA
W - ph 4-5
Z - other (specify) THE LEADER IN ENVIRONMENTAL TESTING **TestAmerica** pecial Instructions/Note: Compariy Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client

Rosposal By Lab

Archive For Month COC No: 280-48902-18075.1 Preservation Codes 7.7 Page. Page 1 of Job #. Gentames to remmit figur 1/92/2 Jate/Time. Aethod of Shipment Analysis Requested Sooler Temperature(s) °C and Other Remerks: Special Instructions/QC Requirements michelle, johnston@testamencainc com Lab PM Johnston, Michelle A E-Mail: eceived by Received by Chain of Custody Record PFOS, PFOA, PFNA, PFHXS, PFHpA & PFBS Sompany Colonial Con (W=water, S=solid, O=wastefoll, BT=Tissue, Sompany Sampler O'Vert C Radiological 166-010-50g Type (C≃comp, Sample O 7240 Purchase Order Requested Sample 1 day Unknown (AT Requested (days): Due Date Requested: Sample Date 2/16/16 2/26/16 2/26/16 Date/Time Project # 28014493 SSOW# Poison B 461-SJSC DW-100FB DUD-033616 3W-100 Skin Imtant Jeliverable Requested. I, II, III, IV, Other (specify) Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water Custody Seals Intact: Custody Seal No. West Sacramento, CA 95605-1500 Phone (916) 373-5600 Fax (303) 467-7248 **TestAmerica Sacramento** Possible Hazard Identification
Non-Hazard Flammable Empty Kit Relinquished by. ndryden@earthtoxics com Client Information 880 Riverside Parkway Company Earth Toxics, Inc Address PO BOX 3382 Slient Contact Mike Dryden elinquished by elinquished by alinquished by State, Zp UT, 84321 ogan

Login Sample Receipt Checklist

Client: Earth Toxics, Inc Job Number: 320-17463-1

Login Number: 17463 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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.	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Sample	Sample Name	Specific Method	CAS Number	Analyte	Result	Units	Qualifier	Limit	Reports To	Dilution	Result Basis	Batch	Sampled	Prepared	Analyzed	Analysis
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.4	ng/L	J B	0.79	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	ng/L	U	0.69	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	ng/L	U	0.75	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	0.64	ng/L	J	0.56	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.7	ng/L	U	0.64	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	ng/L	J B	0.82	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.72	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.78	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.59	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ng/L	J B	0.83	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.73	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.79	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC IDA DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.59	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC IDA DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.68	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ng/L	J B	0.88	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.84	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.63	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.72	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	ng/L	J B	0.80	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	ng/L	U	0.70	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	ng/L	U	0.76	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.7	ng/L	U	0.57	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.7	ng/L	U	0.65	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.0	ng/L	J B	0.90	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC IDA DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	ng/L	U	0.79	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC IDA DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	ng/L	U	0.85	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC IDA DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.0	ng/L	U	0.64	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.3	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.0	ng/L	U	0.73	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	ng/L	J B	0.86	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.75	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.81	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	375-95-1	Perfluorononanoic acid (PFNA)	0.63	ng/L	J	0.61	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC IDA DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.70	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC IDA DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.1	ng/L	Ј В	0.88	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC IDA DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC IDA DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.77	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.62	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP 022616	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	11	0.71	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	
320-17403-0	DOL_055010	LI C_IDW_DOD2	222-01-T	r emuorooctanoic acid (PPOA)	1.5	IIR/ L	U	0.71	IVIDL	1.0	TOLAT	102364	2/20/2010 12.40 PIVI	3/2/2010 12.03 PIVI	3/3/2010 11.43 FIVI	Perfluorinated Hydrocarbons



Naval Installation Restoration Information Solution (NIRIS) Environmental Restoration Program (ERP) Records Transmittal Form

Purpose

Complete one copy of this form to accompany the paper and electronic versions of Environmental Restoration Program (ERP) records submitted for inclusion to NIRIS.

Name:	
Organization:	
Email:	Phone:
rd Information:	
Installation:	
Program: ERN	BRAC Supporting: MRP LUC RAD PC
Document Title:	
AOC, SITE, SWMU, UST, UXO:	
Sample Delivery Groups (SDGs):	
Document Date:	Number of Pages:
Contract Number:	CTO/DO Number:
Author/Affiliation:	
Distribution/Availa	bility Statement: A B C D E
Sensitive Content	Yes No Cite Pages:
Recommended File	Type: Administrative Record Post Decision Site Fil
 s:	



DATA VALIDATION REPORT

Site Name: Naval Weapons Station Earle, Colts Neck, New Jersey, Site 46 —

Military Sealift Command Firefighting School

Laboratory: TestAmerica, Sacramento, California.

Sample Delivery Groups: 320-17363-1, 320-17376-1, 32017406-1, and 320-17463-1

Matrix: Potable Water

Data Quality Level: Stage 4, Electronic and Manual

Analysis: Select perfluorinated compounds (PFCs) via Method 537 Modified

This report summarizes data review findings for potable water samples collected in February 2016 using the following reference documents:

- Internal Draft Perfluorinated Compound Groundwater Investigation Sampling and Analysis Plan, Site 46 Military Sealift Command, Naval Weapons Station Earle Newport, Colts Neck, New Jersey, Resolution Consultants (December 2015).
- Laboratory standard operating procedure (SOP) Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified], TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015).
- Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data review, United States Environmental Protection Agency, (September 2011).
- Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0. (July 2013).

Validation was performed on potable water and quality control (QC) samples, summarized in Attachment A, Table A-1. Samples discussed in this validation report were analyzed and reported as definitive data. A full deliverable data packages, QC summaries and raw data, were submitted for data review.

The data were evaluated based on the following review elements:

* Data completeness
Sample receipt and preservation

Sample receipt and preservation

* Holding times* Initial calibration

* Initial calibration verification Continuing calibration verification

Laboratory control sample/laboratory control sample duplicate results

Isotope dilution recoveries Laboratory method blanks Field and trip blanks

Field duplicate precision
 Sample reporting issues

* Sample result transcriptions/recalculations

Acceptable data parameters for which all criteria were met, as indicated above with an asterisk (*), are not discussed further.



Sample Receipt and Preservation

All samples were received by the laboratory in good condition, properly preserved, and at the proper temperature of less than 4 degrees Celsius.

The chain-of-custody form for sample delivery group (SDG) 320-1736-1 did not document the collection time for DW-3; the time was corrected by the laboratory based on sampler's instructions the same day. In addition, the requested sample analyses, sample type, and matrix were inadvertently omitted for samples DW-84 and DW-84B. The laboratory logged these samples as specified on the purchase order/scope of work.

For SDG 320-17463-1, the requested sample analysis was omitted and the laboratory logged these samples as specified on the purchase order/scope of work.

No adverse effects to data quality are anticipated do to these chain-of-custody form oversights.

Continuing Calibration Outliers

Initial calibration demonstrates that the instrument is capable of acceptable performance and the results are used to quantitate sample values. Initial and continuing calibration verification checks satisfactory performance of the instrument on a day-to-day basis. If calibration results are close to the expected values, the reported analyte concentrations are assumed to be accurate. All initial calibration and initial calibration verification criteria were met.

The perfluorooctane sulfonic acid (PFOS) continuing calibration (CCV 320-101820/43) had a percent recovery of 27.2%, which was above the <25% control limit. The laboratory reanalyzed all samples associated with this calibration. The reanalyzed sample results met all QC criteria and are reported for interpretation.

Isotope Dilution Recoveries

The isotope dilution analytes consist of carbon-13 labeled analogs, oxygen-18 labeled analogs, or deuterated analogs of the compounds of interest, and they are spiked into every standard and sample at the time of extraction. This provides a correction for recovery of each corresponding native compound because the native compound and its labeled compound exhibit similar effects upon extraction, concentration, and analysis. By determining the ratio of these amounts, both the quantity and mass of the compound can be ascertained.

The field blank DW-80FB isotope dilution percent recovery (%R) for ¹³C₄-PFOS was 156%, which was above the 25-150% control limit. Since associated compound PFOS was not detected, no qualification transpired because the elevated %R indicated a high result bias.

All isotope dilution analytes were below the 25-150% control limit for sample DW-55 during an initial analysis. However, this sample was reanalyzed due to a PFOS calibration outlier and this was the only analyte reported from the reanalysis. The data reviewer contacted the laboratory and requested the reanalyzed sample results be reported for all analytes. The reanalyzed sample results met all QC criteria and are reported for interpretation.



Blanks

Blanks help determine how much, if any, contamination was introduced in the laboratory or the field. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

Laboratory method blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

For this project, two types of field-derived blanks were collected: trip blank and field blank. The trip blank, which was placed in every shipping cooler and never opened in the field, consisted of the same source water as the laboratory method blank and was primarily used to measure possible cross contamination of samples during shipping to and from the site. Field blanks consisted of laboratory blank water bottles that were opened in the field and transferred into another container at each sampling location; they were used to assess potential ambient conditions cross-contamination that could potentially affect the quality of the associated samples. The primary purpose of this type of blank was to provide an additional check on possible sources of contamination beyond that which was intended for trip blanks.

Laboratory Method Blank Outliers

Laboratory method blank MB 320-102166/1-A contained perfluorobutanesulfonic acid (PFBS) at a concentration of 1.37 nanograms per liter (ng/L). PFBS was detected below the limit of quantitation and was qualified as undetected "U" in the following samples due to laboratory blank contamination: BC_02_26_16, DUP_022616, DW-18, DW-18FB, DW-78, DW-78FB, DW-100, and DW-100FB.

Trip Blanks and Field Blanks

Table 1 summarizes sample results qualified due to trip blank and field blank artifacts per the validation guidelines. Sample results that were either undetected or greater than the limit of quantitation were not gualified when blank outliers were observed.

		Table 1 Trip and Field Blank	Outliers		
Blank	Blank Type	Analyte	Result (ng/L)	LOQ (ng/L)	Samples Qualified Undetected "U"
BC_02_26_16	Trip	Perfluorobutanesulfonic Acid (PFBS)	1.4	2.1	DUP_022616, DW-100, DW-100FB, DW-18, DW-18FB, DW-78, DW-78FB
BC_02_26_16	Trip	Perfluorononanoic Acid (PFNA)	0.64	2.1	DW-100FB
BC_2_20_16	Trip	Perfluorononanoic Acid (PFNA)	0.67	2.2	DW-3
DW-10FB	Field	Perfluorohexanesulfonic Acid (PFHXS)	0.80	2.2	None (a)
DW-18FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.3	2.3	DW-18
DW-29FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.7	2.3	None (a)
DW-48FB	Field	Perfluoroheptanoic Acid (PFHPA)	0.71	2.2	None (a)
DW-57FB	Field	Perfluorohexanesulfonic Acid (PFHXS)	1.1	2.2	None (b)



Table 1 **Trip and Field Blank Outliers** Blank Result Samples Qualified LOQ Type **Blank** Analyte Undetected "U" (ng/L) (ng/L) DW-57FB Field Perfluorooctane Sulfonic Acid 1.7 3.6 None (b) DW-78FB Field Perfluorobutanesulfonic Acid (PFBS) 1.2 2.2 DW-78 DW-87FB Field Perfluorohexanesulfonic Acid (PFHXS) None (a) 0.86 2.3 DW-87FB Field Perfluorononanoic Acid (PFNA) 0.78 2.3 None (a) Field Perfluorobutanesulfonic Acid (PFBS) DW-100 DW-100FB 2.3 1.3 DW-100FB Field Perfluorononanoic Acid (PFNA) 0.63 2.3 None (a)

Notes:

ng/L = Nanograms per liter LOQ = Limit of quantitation

(a) = The associated sample result was undetected and no adverse effects to data is expected.
 (b) = The associated sample result was greater than the limit of quantitation and was not qualified.

Sample Reporting Issues

Raw analytical data were reviewed with particular attention to manual integration. As stated in the laboratory's SOP, commercial sources of PFOS may produce several peaks in the PFOS chromatogram. These adjacent peaks are either completely resolved or not resolved but with a profound deflection that can be resolved during peak integration. The later of the peaks matches the retention time of the single labeled PFOS peak. Earlier peaks are branched isomers of PFOS, rather than a result of peak splitting. The earlier peak is included during peak integration.

The data reviewer noticed that three of the PFOS manual integrations were not performed consistently in accordance with the SOP and requested that the laboratory reassess the data. Based on this inquiry, PFOs for sample DW-68 and DW-95 were reintegrated and re-reported. The third sample (DW-57) was reported correctly and results were not changed.

Overall Assessment

The data from SDGs 320-17363-1, 320-17376-1, 32017406-1, and 320-17463-1 were reviewed independently from the laboratory to assess data quality. Several analytes were flagged as undetected during data review due to suspected cross-contamination from laboratory and/or field sources. The remaining results were acceptable without qualification; therefore, the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense quidelines. Attachment B provides final results after data review.

Attachment A Sample and Analysis Summary

		Table A-1 Sample Summar	-v	
Sample Delivery	Laboratory		Sample	
Group	Identification	Sample Date	Identification	Sample Type
320173631	320-17363-1	2/19/2016	BC2_19_16	Trip Blank
320173631	320-17363-10	2/19/2016	DW-10	Potable Water
320173631	320-17363-11	2/19/2016	DW-10FB	Field Blank
320173631	320-17363-12	2/19/2016	DW-63	Potable Water
320173631	320-17363-13	2/19/2016	DW-63FB	Field Blank
320173631	320-17363-14	2/19/2016	DW-87	Potable Water
320173631	320-17363-15	2/19/2016	DW-87FB	Field Blank
320173631	320-17363-16	2/19/2016	DW-23	Potable Water
320173631	320-17363-17	2/19/2016	DW-23FB	Field Blank
320173631	320-17363-18	2/19/2016	DUP-021916	Duplicate of DW-23
320173631	320-17363-2	2/19/2016	DW-57	Potable Water
320173631	320-17363-3	2/19/2016	DW-57FB	Field Blank
320173631	320-17363-4	2/19/2016	DW-48	Potable Water
320173631	320-17363-5	2/19/2016	DW-48FB	Field Blank
320173631	320-17363-6	2/19/2016	DW-59	Potable Water
320173631	320-17363-7	2/19/2016	DW-59FB	Field Blank
320173631	320-17363-8	2/19/2016	DW-88	Potable Water
320173631	320-17363-9	2/19/2016	DW-88FB	Field Blank
320173761	320-17376-1	2/20/2016	BC_2_20_16	Trip Blank
320173761	320-17376-10	2/20/2016	DW-84	Potable Water
320173761	320-17376-11	2/20/2016	DW-84FB	Field Blank
320173761	320-17376-12	2/20/2016	DW-91	Potable Water
320173761	320-17376-13	2/20/2016	DW-91FB	Field Blank
320173761	320-17376-14	2/20/2016	DUP022016	Duplicate of DW-91
320173761	320-17376-2	2/20/2016	DW-29	Potable Water
320173761	320-17376-3	2/20/2016	DW-29FB	Field Blank
320173761	320-17376-4	2/20/2016	DW-13	Potable Water
320173761	320-17376-5	2/20/2016	DW-13FB	Field Blank
320173761	320-17376-6	2/20/2016	DW-3	Potable Water
320173761	320-17376-7	2/20/2016	DW-3FB	Field Blank
320173761	320-17376-8	2/20/2016	DW-71	Potable Water
320173761	320-17376-9	2/20/2016	DW-71FB	Field Blank
320174061	320-17406-1	2/22/2016	BC_2_22_16	Trip Blank
320174061	320-17406-10	2/22/2016	DW-15	Potable Water
320174061	320-17406-11	2/22/2016	DW-15FB	Field Blank
320174061	320-17406-12	2/22/2016	DW-19	Potable Water
320174061	320-17406-13	2/22/2016	DW-19FB	Field Blank
320174061	320-17406-14	2/22/2016	DW-68	Potable Water
320174061	320-17406-15	2/22/2016	DW-68FB	Field Blank
320174061	320-17406-16	2/22/2016	DW-55	Potable Water
320174061	320-17406-17	2/22/2016	DW-55FB	Field Blank
320174061	320-17406-18	2/22/2016	DW-95	Potable Water
320174061	320-17406-19	2/22/2016	DW-95FB	Field Blank
320174061	320-17406-2	2/22/2016	DW-1	Potable Water
320174061	320-17406-20	2/22/2016	DW-6	Potable Water

		Table A-1 Sample Summar	ту	
Sample Delivery Group	Laboratory Identification	Sample Date	Sample Identification	Sample Type
320174061	320-17406-21	2/22/2016	DW-6FB	Field Blank
320174061	320-17406-22	2/22/2016	DW-37	Potable Water
320174061	320-17406-23	2/22/2016	DW-37FB	Field Blank
320174061	320-17406-24	2/22/2016	DUP-022216	Duplicate of DW-37
320174061	320-17406-3	2/22/2016	DW-1FB	Field Blank
320174061	320-17406-4	2/22/2016	DW-56	Potable Water
320174061	320-17406-5	2/22/2016	DW-56FB	Field Blank
320174061	320-17406-6	2/22/2016	DW-80	Potable Water
320174061	320-17406-7	2/22/2016	DW-80FB	Field Blank
320174061	320-17406-8	2/22/2016	DW-44	Potable Water
320174061	320-17406-9	2/22/2016	DW-44FB	Field Blank
320174631	320-17463-1	2/26/2016	BC_02_26_16	Trip Blank
320174631	320-17463-2	2/26/2016	DW-18	Potable Water
320174631	320-17463-3	2/26/2016	DW-18FB	Field Blank
320174631	320-17463-4	2/26/2016	DW-78	Potable Water
320174631	320-17463-5	2/26/2016	DW-78FB	Field Blank
320174631	320-17463-6	2/26/2016	DW-100	Potable Water
320174631	320-17463-7	2/26/2016	DW-100FB	Field Blank
320174631	320-17463-8	2/26/2016	DUP_022616	Duplicate of DW-100

Notes:

All samples were analyzed via laboratory standard operating procedure *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified],* TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015) for the following select list of analytes: Perfluorobutanesulfonic Acid (PFBS), Perfluoroheptanoic Acid (PFHA), Perfluorooctane Sulfonic Acid (PFOS), and Perfluorooctanoic Acid (PFOA).

Attachment B
Final Validated Results after Data Review

	Pe	rfluorin	ated Co		ole B	-	Febru	ıary	2016								
Sar	nple Delivery	Group	3201	173631		3201	173631		3201	73631		3201	73631		3201	173631	
		Lab ID	320-1	17363-	1	320-1	7363-1	0	320-1	7363-1	1	320-1	7363-1	2	320-1	7363-1	3
	Sample Po					D\	N-10		DW	-10FB		D۱	N-63		DW	'-63FB	
	le Date	2/19	9/2016		2/19	9/2016		2/19	/2016		2/19	9/2016		2/19	9/2016		
	le Type	Trip	Blank		Potab	le Wate	er	Field	Blank		Potab	le Wat	er	Field	Blank		
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.9	U		0.8	J		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.9	U		2.7	U		2.7	U		2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.9	U		1.8	J		1.8	U		1.8	U	

San	nple Delivery	Group	3201	173631		3201	73631		3201	73631		3201	73631		3201	73631	
		Lab ID	320-1	7363-1	4	320-1	7363-1	5	320-1	7363-1	6	320-1	7363-1	7	320-1	7363-1	8
	San	nple ID	D\	N-87		DW	-87FB		D۷	V-23		DW	-23FB		DUP-	021916	5
	Samp	le Date	2/19	9/2016		2/19	7/2016		2/19	/2016		2/19	9/2016		2/19	9/2016	
	Sample Ty Analyte CAS No. Un			le Wate	er	Field	l Blank		Potabl	e Wate	er	Field	l Blank		Duplicat	e (DW-	-23)
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	nesulfonic Acid (PFBS) 375-73-5 ng.			J		1.8	U		1.8	U		1.8	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	J		1.8	J		1.8	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		0.86	J		1.8	J		1.8	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		0.78	J		1.8	U		1.8	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	` ,			U		2.7	J		2.7	U		2.7	U		3	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		2	U	

Sai	mple Delivery	/ Group	3201	173631		3201	73631		3201	73631		3201	73631		3201	73631	
		Lab ID	320-1	17363-	2	320-1	7363-	3	320-1	7363-4	ļ	320-1	7363-	5	320-1	7363-6	ó
	Sar	nple ID	D\	N-57		DW	-57FB		D۷	V-48		DW	-48FB		D۱	V-59	
	Samp	le Date	2/19	9/2016		2/19	7/2016		2/19	/2016		2/19	9/2016		2/19	9/2016	
	Sample Type CAS No Units			le Wate	er	Field	l Blank		Potabl	e Wate	r	Field	l Blank		Potab	e Wate	۶r
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	J		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	4.5			1.8	J		1.8	U		0.71	J		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	41			1.1	J		0.83	J		1.8	U		0.83	J	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	3.4			1.8	J		1.8	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	200			1.7	J		2.6	U		2.6	U		2.7	U	
Perfluorooctanoic Acid (PFOA)	3					1.8	U		1.8	U		1.8	U		1.8	U	

	Pe	rfluorin	ated Co		ole B	-	Febru	ıary	2016								
Sar	nple Delivery	Group	3201	173631		3201	73631		3201	73631		3201	73761		3201	173761	
		Lab ID	320-1	17363-	7	320-1	17363-	8	320-1	7363-9	9	320-1	17376-	1	320-1	7376-1	0
	Sample D					D۱	N-88		DW	-88FB		BC_2	_20_1	6	D۱	N-84	
	le Date	2/19	9/2016		2/19	9/2016		2/19	/2016		2/20)/2016		2/20	0/2016		
	Sample T					Potab	le Wate	er	Field	Blank		Trip	Blank		Potab	le Wate	er
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	U		1.8	J		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		1.8	U		0.67	J		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.6	U		2.8	U		2.7	U		2.6	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	J		1.8	U		1.8	U	

San	nple Delivery	Group	3201	173761		3201	73761		3201	73761		3201	173761		3201	73761	
		Lab ID	320-1	7376-1	1	320-1	7376-1	2	320-1	7376-1	3	320-1	7376-1	4	320-1	17376-2	2
	San	nple ID	DW	'-84FB		D۱	V-91		DW	-91FB		DUP	022016)	D۱	N-29	
	Samp	le Date	2/20	0/2016		2/20)/2016		2/20)/2016		2/20	0/2016		2/20)/2016	
	Sample Ty			d Blank		Potabl	e Wate	er	Field	Blank		Duplicat	e (DW-	91)	Potab	le Wate	er
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	J		1.8	J		1.9	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	J		1.8	J		1.9	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.8	J		2.6	U		2.8	U		2.7	J	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		1.9	Ū		1.8	U	

Sar	nple Delivery	/ Group	320	173761		3201	73761		3201	73761		3201	73761		3201	173761	
		Lab ID	320-	17376-	3	320-1	7376-	4	320-1	7376-5	5	320-1	17376-0	6	320-1	17376-7	7
	Sar	nple ID	DW	/-29FB		D۱	V-13		DW	-13FB		D	W-3		DW	V-3FB	
	Samp	le Date	2/20	0/2016		2/20)/2016		2/20)/2016		2/20)/2016		2/20	0/2016	
	Samp	Field	d Blank		Potab	le Wat	er	Field	Blank		Potabl	le Wate	er	Field	d Blank		
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	J		1.8	U		1.8	U		1.4	J		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	J		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	J		1.8	U		0.97	J		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	J		1.8	U		1.8	U	bf	1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.7	U		2.7	U		16			2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		2	J		1.8	U	

	Pe	rfluorin	ated Co		ole B	-	Febru	ıary	2016								
Sar	nple Delivery	Group	320	173761		3201	173761		3201	74061		3201	74061		3201	174061	
		Lab ID	320-	17376-	8	320-1	17376-	9	320-1	7406-1	1	320-1	7406-1	0	320-1	7406-1	1
	Sample Po					DW	′-71FB		BC_2	_22_16	ó	D۱	N-15		DW	′-15FB	
	le Date	2/20	0/2016		2/20	0/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016		
	Sample T				er	Field	d Blank		Trip	Blank		Potab	le Wat	er	Field	d Blank	
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.8	U		3.1	U		2.6	U		3	U	
Perfluorooctanoic Acid (PFOA)	` '					1.9	U		2	U		1.7	U		2	U	

San	nple Delivery	Group	3201	174061		3201	74061		3201	74061		3201	74061		3201	174061	
		Lab ID	320-1	7406-1	2	320-1	7406-1	3	320-1	7406-1	4	320-1	7406-1	5	320-1	7406-1	6
	San	nple ID	D\	N-19		DW	-19FB		D۱	V-68		DW	-68FB		D۱	N-55	
	Samp	le Date	2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016	
	Sample Ty			le Wate	er	Field	l Blank		Potab	le Wate	er	Field	l Blank		Potab	le Wate	er
Analyte	CAS No	Units	Result	Qual	RC												
Perfluorobutanesulfonic Acid (PFBS)	J		1.8	U		1.8	U		1.8	U		1.8	U		1.9	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	J		6.1			1.8	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	J		4.7			1.8	U		1.1	J	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		2.7			1.8	U		1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	, ,			U		2.7	J		18			2.6	U		2.8	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		27			1.8	U		1.9	U	

Sar	nple Delivery	/ Group	3201	174061		3201	74061		3201	74061		3201	74061		3201	174061	
		Lab ID	320-1	7406-1	7	320-1	7406-1	18	320-1	7406-1	9	320-1	7406-2	2	320-1	7406-2	0
	Sar	nple ID	DW	'-55FB		D۱	V-95		DW	-95FB		D	W-1		D	W-6	
	Samp	le Date	2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016	
	Sample Typ			d Blank		Potab	le Wat	er	Field	l Blank		Potab	le Wate	er	Potab	le Wate	∍r
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.9	J		2.3	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		9.9			2.3	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		5.2			2.3	U		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.5	J		2.3	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		28			3.5	U		2.7	U		2.6	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		42			2.3	U		1.8	U		1.8	U	

	Pe	rfluorin	ated Co		ole B	-	Febru	ıary	2016								
Sar	nple Delivery	Group	3201	174061		3201	74061		3201	74061		3201	74061		3201	174061	
		Lab ID	320-1	7406-2	21	320-1	7406-2	2	320-1	7406-2	3	320-1	7406-2	24	320-1	17406-3	3
	Sample Sample D					D۱	N-37		DW	-37FB		DUP-	02221	6	DW	V-1FB	
	le Date	2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016		2/22	2/2016		
	Sample T					Potab	e Wate	er	Field	Blank		Duplicat	e (DW	-37)	Field	Blank	
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	2.3	U		2	J		2	U		1.9	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	2.3	U		2	J		2	U		1.9	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	2.3	U		2	J		2	U		1.9	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	3.4	U		3	U		3	U		2.8	U		3	U	
Perfluorooctanoic Acid (PFOA)						2	U		2	U		1.9	U		2	U	

Sample Delivery Group			3201	174061		3201	74061		320174061			320174061			320174061		
Lab ID			320-17406-4			320-17406-5			320-17406-6			320-17406-7			320-17406-8		
Sample ID			DW-56			DW-56FB			DW-80			DW-80FB			DW-44		
Sample Date			2/22/2016			2/22/2016			2/22/2016			2/22/2016			2/22/2016		
	Samp	Іе Туре	Potab	le Wate	er	Field	l Blank		Potabl	e Wate	er	Field	l Blank		Potab	le Wate	er
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.9	U		2	U		1.8	U		2	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	J		2	J		1.8	U		2	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.9	U		2	J		1.8	U		2	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.9	U		2	U		1.8	U		2	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.8	U		3	J		2.7	U		3	U		2.6	J	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.9	U		2	J		1.8	U		2	Ū		2.6		

Sample Delivery Group			320174061			320174631			320174631			320174631			320174631		
Lab ID			320-17406-9			320-17463-1			320-17463-2			320-17463-3			320-17463-4		4
Sample ID			DW-44FB			BC_02_26_16			DW-18			DW-18FB			DW-78		
Sample Date			2/22/2016			2/26/2016			2/26/2016			2/26/2016			2/26/2016		
	Sample Type		Field	Field Blank		Trip Blank			Potable Water			Field Blank			Potable Water		er
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	2	U		1.7	U	bl	1.8	U	bl	1.8	U	bl	1.9	U	bl
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	2	U		1.7	U		1.8	J		1.8	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	2	U		1.7	U		1.8	U		1.8	U		1.9	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	2	U		0.64	J		1.8	J		1.8	U		1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	3	U		2.6	U		2.7	U		2.7	U		2.9	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	2	U		1.7	U		1.8	U		1.8	U		1.9	U	

Table B-1 Perfluorinated Compound Results – February 2016														
Sample Delivery Group			320174631		320174631			320174631			320174631			
Lab ID			320-17463-5		320-17463-6			320-17463-7			320-17463-8			
	Sample ID		DW-78FB		DW-100			DW-100FB			DUP_022616			
	Sample Date		2/26/2016		2/26/2016			2/26/2016			2/26/2016			
	Sample Type		Field Blank		Potable Water			Field Blank			Duplicate (DW-100)			
Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	U	bl	2	U	bl	1.9	U	bl	1.9	U	bl
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.7	U		2	U		1.9	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.7	U		2	J		1.9	J		1.9	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.7	U		2	J		1.9	J	bf	1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.9	U		2.8	U		2.9	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.7	U		2	U		1.9	J		1.9	U	

Notes:

Identification ID ng/L Nanograms per liter Qual = Final qualifier

Data qualification reason code RC

 Undetected — The parameter was analyzed but undetected or was qualified as undetected during data review due to blank artifacts.
 Estimated Value — The analyte concentration was less than the limit of quantitation. U

Qualification Reason Codes

Result qualified as undetected due to field-derived blank results Result qualified as undetected due to laboratory blank results bf bl

Naval Weapons Station Earle

