

Off-Base Drinking Water Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Figure, SDG J17859-1

Naval Air Station Oceana Virginia Beach, Virginia

July 2019



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-17859-1

Client Project/Site: CTO WE7G PFC Sampling

For:

CH2M Hill, Inc. 5701 Cleveland Street Suite 200 Virginia Beach, Virginia 23462

Attn: Laurie George

2 G. Tyn

Authorized for release by: 4/1/2016 4:44:41 PM

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----- LINKS -----

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Client: CH2M Hill, Inc. Project/Site: CTO WE7G PFC Sampling TestAmerica Job ID: 320-17859-1

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Definitions/Glossary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

TestAmerica Job ID: 320-17859-1

Qualifiers

LCMS

Qualitier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
В	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	Manual integrated compound.
D	The reported value is from a dilution.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

TEF TEQ

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

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Case Narrative

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Job ID: 320-17859-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: CTO WE7G PFC Sampling

Report Number: 320-17859-1

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.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

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.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Receipt

The samples were received on 3/22/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

Receipt Exceptions

The sample ID for the following sample was corrected at the request of the client. The document with the request is included with the chain of custody in the report.

OF-HP01P-0316 (320-17859-5)

PFC PFC

TestAmerica Sacramento

TestAmerica Job ID: 320-17859-1

Case Narrative

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Job ID: 320-17859-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Samples OF-FB07-0316 (320-17859-1), OF-RW07-0316 (320-17859-2), OF-HPFB01-0316 (320-17859-3), OF-HP01-0316 (320-17859-4) and OF-HP01P-0316 (320-17859-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 03/28/2016 and analyzed on 03/29/2016 and 03/31/2016.

Perfluorocctanoic acid (PFOA) was detected in method blank MB 320-104553/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Perfluorooctanesulfonic acid (PFOS) failed the recovery criteria low for the MS/MSD of sample OF-HP01-0316MS (320-17859-4) in batch 320-105043. Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) failed the recovery criteria high.

Samples OF-HP01-0316 (320-17859-4)[5X] and OF-HP01P-0316 (320-17859-5)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so 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. (ICV 320-104824/11) and (ICV 320-105043/11)

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

Organic Prep

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

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Detection Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Client Sample ID: OF-FB07-0316

TestAmerica Job ID: 320-17859-1

Lab Sample ID: 320-17859-1

No Detections.

Client Sample ID: OF-RW07-0316 Lab Sample ID: 320-17859-2

Analyte	Result Qualifier	LOQ	DL Unit	Dil Fac D Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.00072 JB	0.0023	0.00069 ug/L	1 WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0011 J	0.0023	0.00085 ug/L	1 WS-LC-0025	Total/NA

Client Sample ID: OF-HPFB01-0316 Lab Sample ID: 320-17859-3

Analyte	Result Qualifier	LOQ	DL Unit	Dil Fac D Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0015 J	0.0024	0.00087 ug/L	1 WS-LC-0025	Total/NA

Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L		_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	MJ	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.62	DBJ	0.012	0.0035	ug/L	5		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	2.2	DMJ	0.019	0.0059	ug/L	5		WS-LC-0025	Total/NA

Client Sample ID: OF-HP01P-0316 Lab Sample ID: 320-17859-5

Analyte	Result C	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L	1	_	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.72 E	3	0.0023	0.00069	ug/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48 N	М	0.0023	0.00080	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9 [O M	0.018	0.0059	ug/L	5		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Client Sample ID: OF-FB07-0316

TestAmerica Job ID: 320-17859-1

Lab Sample ID: 320-17859-1

Matrix: Water

Date Collected: 03/21/16 09:25 Date Received: 03/22/16 10:00

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00082	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00076	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00067	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00093	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00089	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		03/28/16 10:11	03/29/16 21:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	125		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOA	127		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C5 PFNA	114		25 - 150				03/28/16 10:11	03/29/16 21:27	1
1802 PFHxS	100		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOS	119		25 - 150				03/28/16 10:11	03/29/16 21:27	1

Client Sample ID: OF-RW07-0316 Lab Sample ID: 320-17859-2

Date Collected: 03/21/16 09:30 Matrix: Water

Date Received: 03/22/16 10:00

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanoic acid (PFOA)	0.00072	JB	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		03/28/16 10:11	03/29/16 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	109		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOA	98		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C5 PFNA	81		25 - 150				03/28/16 10:11	03/29/16 21:49	1
1802 PFHxS	111		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOS	121		25 - 150				03/28/16 10:11	03/29/16 21:49	1

Client Sample ID: OF-HPFB01-0316 Lab Sample ID: 320-17859-3 Date Collected: 03/21/16 10:10 **Matrix: Water**

Date Received: 03/22/16 10:00

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.00082	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0012	ug/L		03/28/16 10:11	03/29/16 22:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	119		25 - 150				03/28/16 10:11	03/29/16 22:10	1
13C4 PFOA	113		25 - 150				03/28/16 10:11	03/29/16 22:10	1

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Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10 Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

Method: WS-LC-0025	- Perfluorinated Hy	ydrocarbons ((Continued)	
	0/5	.		

Isotope Dilution	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	95	25 - 150	03/28/16 10:11	03/29/16 22:10	1
1802 PFHxS	98	25 - 150	03/28/16 10:11	03/29/16 22:10	1
13C4 PFOS	111	25 - 150	03/28/16 10:11	03/29/16 22:10	1

Client Sample ID: OF-HP01-0316

Date Collected: 03/21/16 10:15 Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-4

Matrix: Water

Method: WS-I C-0025 - Perfluorinated Hydrocarbons

Wiethod. WS-LC-0025 - Perhuon	mateu nyurocarbon	5						
Analyte	Result Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.068	0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorononanoic acid (PFNA)	0.011	0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorobutanesulfonic acid (PFBS)	0.028	0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.45 M J	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 22:31	1

Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 13C4-PFHpA 81 25 - 150 03/28/16 10:11 03/29/16 22:31 13C4 PFOA 71 25 - 150 03/28/16 10:11 03/29/16 22:31 13C5 PFNA 65 25 - 150 03/28/16 10:11 03/29/16 22:31 1802 PFHxS 25 - 150 105 03/28/16 10:11 03/29/16 22:31 13C4 PFOS 25 - 150 03/28/16 10:11 03/29/16 22:31 62

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.62	DBJ	0.012	0.0035	ug/L		03/28/16 10:11	03/31/16 15:47	5
Perfluorooctanesulfonic acid (PFOS)	2.2	DMJ	0.019	0.0059	ug/L		03/28/16 10:11	03/31/16 15:47	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

Landana Biladian	0/5		D	A t	D# 5
Isotope Dilution	%Recovery Qualifie	r Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	111	25 - 150	03/28/16 10:11	03/31/16 15:47	5
13C4 PFOA	102	25 - 150	03/28/16 10:11	03/31/16 15:47	5
13C5 PFNA	97	25 - 150	03/28/16 10:11	03/31/16 15:47	5
1802 PFHxS	126	25 - 150	03/28/16 10:11	03/31/16 15:47	5
13C4 PFOS	86	25 - 150	03/28/16 10:11	03/31/16 15:47	5

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20 **Matrix: Water** Date Received: 03/22/16 10:00

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorooctanoic acid (PFOA)	0.72	В	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.00080	ug/L		03/28/16 10:11	03/29/16 23:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	87		25 - 150				03/28/16 10:11	03/29/16 23:35	
13C4 PFOA	72		25 - 150				03/28/16 10:11	03/29/16 23:35	1

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Lab Sample ID: 320-17859-5

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HP01P-0316 Lab Sample ID: 320-17859-5

Date Collected: 03/21/16 10:20 Date Received: 03/22/16 10:00

Matrix: Water

Method: WS-LC-0025 - Perfluo	rinated Hyd	drocarbons	s (Continued)			
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	70		25 - 150	03/28/16 10:11	03/29/16 23:35	1
1802 PFHxS	114		25 - 150	03/28/16 10:11	03/29/16 23:35	1
13C4 PFOS	65		25 - 150	03/28/16 10:11	03/29/16 23:35	1

Method: WS-LC-0025 - Perfl	ethod: WS-LC-0025 - Perfluorinated Hydrocarbons - DL												
Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac				
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.0059	ug/L		03/28/16 10:11	03/31/16 16:51	5				
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac				
13C4-PFHpA	104		25 - 150				03/28/16 10:11	03/31/16 16:51	5				
13C4 PFOA	107		25 - 150				03/28/16 10:11	03/31/16 16:51	5				
13C5 PFNA	76		25 - 150				03/28/16 10:11	03/31/16 16:51	5				
1802 PFHxS	139		25 - 150				03/28/16 10:11	03/31/16 16:51	5				
13C4 PFOS	101		25 - 150				03/28/16 10:11	03/31/16 16:51	5				

Isotope Dilution Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Accep
		3C4-PFHp	3C4 PFO	3C5 PFN/	BO2 PFHx	3C4 PFOS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-17859-1	OF-FB07-0316	125	127	114	100	119
320-17859-2	OF-RW07-0316	109	98	81	111	121
320-17859-3	OF-HPFB01-0316	119	113	95	98	111
320-17859-4	OF-HP01-0316	81	71	65	105	62
320-17859-4 - DL	OF-HP01-0316	111	102	97	126	86
320-17859-4 MS	OF-HP01-0316	85	64	69	99	62
320-17859-4 MS - DL	OF-HP01-0316	114	100	102	144	96
320-17859-4 MSD	OF-HP01-0316	84	62	61	106	59
320-17859-4 MSD - DL	OF-HP01-0316	107	83	91	128	90
320-17859-5	OF-HP01P-0316	87	72	70	114	65
320-17859-5 - DL	OF-HP01P-0316	104	107	76	139	101
.CS 320-104553/2-A	Lab Control Sample	109	104	112	94	116
MB 320-104553/1-A	Method Blank	123	109	116	110	128

Surrogate Legend

13C4-PFHpA = 13C4-PFHpA

13C4 PFOA = 13C4 PFOA

13C5 PFNA = 13C5 PFNA

1802 PFHxS = 1802 PFHxS

13C4 PFOS = 13C4 PFOS

TestAmerica Job ID: 320-17859-1

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-104553/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 104824 Prep Batch: 104553**

MB MB Analyte Result Qualifier LOQ DL Unit Prepared Analyzed Dil Fac Perfluoroheptanoic acid (PFHpA) 0.00080 ug/L 03/28/16 10:11 03/29/16 20:45 0.0020 U 0.0025 Perfluorooctanoic acid (PFOA) 03/28/16 10:11 03/29/16 20:45 0.00217 J 0.0025 0.00075 ug/L Perfluorononanoic acid (PFNA) 0.0025 0.00065 ug/L 03/28/16 10:11 03/29/16 20:45 0.0020 U Perfluorobutanesulfonic acid (PFBS) 0.0020 U 0.0025 0.00092 ug/L 03/28/16 10:11 03/29/16 20:45 Perfluorohexanesulfonic acid (PFHxS) 0.0020 U 0.0025 0.00087 ug/L 03/28/16 10:11 03/29/16 20:45 Perfluorooctanesulfonic acid (PFOS) 0.0030 U 0.0040 0.0013 ug/L 03/28/16 10:11 03/29/16 20:45

`	,		3		
	MB MB				
Isotope Dilution	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	123	25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C4 PFOA	109	25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C5 PFNA	116	25 - 150	03/28/16 10:11	03/29/16 20:45	1
1802 PFHxS	110	25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C4 PFOS	128	25 - 150	03/28/16 10:11	03/29/16 20:45	1

Lab Sample ID: LCS 320-104553/2-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Lab Control Sample Prep Type: Total/NA **Prep Batch: 104553** Cnika 100 100

	Бріке	LC2 LC3	3		%Rec.	
Analyte	Added	Result Qu	alifier Unit	D %Rec	Limits	
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0409	ug/L	102	60 - 140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0380	ug/L	95	60 - 140	
Perfluorononanoic acid (PFNA)	0.0400	0.0417	ug/L	104	60 - 140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0307	ug/L	87	50 - 150	
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0385	ug/L	102	60 - 140	
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0336	ug/L	88	60 - 140	
\···==/						

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
13C4-PFHpA	109		25 - 150
13C4 PFOA	104		25 - 150
13C5 PFNA	112		25 - 150
1802 PFHxS	94		25 - 150
13C4 PFOS	116		25 - 150

Lab Sample ID: 320-17859-4 MS Client Sample ID: OF-HP01-0316 **Matrix: Water**

Analysis Batch: 104824	Sample	Sample	Spike	MS	MS				Prep Ba %Rec.	tch: 104553
Analyte	•	Qualifier	Added		Qualifier	Unit	D	%Rec	Limits	
Perfluoroheptanoic acid (PFHpA)	0.068		0.0377	0.111		ug/L		115	60 - 140	
Perfluorononanoic acid (PFNA)	0.011		0.0377	0.0427		ug/L		84	60 - 140	
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0333	0.0591		ug/L		94	50 - 150	
Perfluorohexanesulfonic acid	0.45	M J	0.0357	0.552	M 4	ug/L		299	60 - 140	

(PFHxS) MS MS

Isotope Dilution Limits %Recovery Qualifier 13C4-PFHpA 85 25 - 150

TestAmerica Sacramento

Prep Type: Total/NA

Page 11 of 21

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

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

Lab Sample ID: 320-17859-4 MS Client Sample ID: OF-HP01-0316 **Matrix: Water Prep Type: Total/NA Prep Batch: 104553**

Analysis Batch: 104824

Client: CH2M Hill, Inc.

	IVIS .	WS	
Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFOA	64		25 - 150
13C5 PFNA	69		25 - 150
18O2 PFHxS	99		25 - 150
13C4 PFOS	62		25 - 150

Lab Sample ID: 320-17859-4 MSD Client Sample ID: OF-HP01-0316 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 104924

Analysis Batch: 104824									Prep Ba	itcn: 1t	J4553
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	0.068		0.0373	0.108	-	ug/L		109	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.011		0.0373	0.0520		ug/L		110	60 - 140	20	30
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0329	0.0549		ug/L		82	50 - 150	7	30
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0353	0.530	M 4	ug/L		239	60 - 140	4	30

MSD	MSD	
%Recovery	Qualifier	Limits
84		25 - 150
62		25 - 150
61		25 - 150
106		25 - 150
59		25 - 150
	%Recovery 84 62 61 106	62 61 106

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Lab Sample ID: 320-17859-4 N	IIS			Client Sample ID: OF-HP01-0316
Matrix: Water				Prep Type: Total/NA
Analysis Batch: 105043				Prep Batch: 104553
_	Sample Sample	Spike	MS MS	%Rec.

Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorooctanoic acid (PFOA) -	0.62	DBJ	0.0377	0.709	D 4	ug/L		247	60 - 140	
DL										
Perfluorooctanesulfonic acid	2.2	DMJ	0.0360	2.07	D M 4	ug/L		-314	60 - 140	
(PFOS) - DL										
	MS	MS								
Isotope Dilution	%Recovery	Qualifier	Limits							
13C4-PFHpA - DL	114		25 - 150							

Isotope Dilution	%Recovery	Qualifier Limits	
13C4-PFHpA - DL	114	25 - 150	-
13C4 PFOA - DL	100	25 - 150	
13C5 PFNA - DL	102	25 - 150	
1802 PFHxS - DL	144	25 - 150	
13C4 PFOS - DL	96	25 - 150	

Lab Sample ID: 320-17859-4 MSD Client Sample ID: OF-HP01-0316 **Prep Type: Total/NA**

Matrix: Water

Analysis Batch: 105043									Prep Ba	atch: 10	04553
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA) -	0.62	DBJ	0.0373	0.797	D 4	ug/L		487	60 - 140	12	30

DL

TestAmerica Sacramento

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QC Sample Results

Client: CH2M Hill, Inc. TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

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

Lab Sample ID: 320-17859 Matrix: Water	9-4 MSD						Clie	nt Sam	ple ID: OF Prep Ty		
Analysis Batch: 105043									Prep Ba	•	
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	DMJ	0.0356	2.19	D M 4	ug/L		41	60 - 140	6	30
(MSD	MSD									
Isotope Dilution	%Recovery	Qualifier	Limits								
13C4-PFHpA - DL	107		25 - 150								
13C4 PFOA - DL	83		25 - 150								
13C5 PFNA - DL	91		25 - 150								
1802 PFHxS - DL	128		25 - 150								
13C4 PFOS - DL	90		25 - 150								

QC Association Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

LCMS

Prep Batch: 104553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	3535	
320-17859-2	OF-RW07-0316	Total/NA	Water	3535	
320-17859-3	OF-HPFB01-0316	Total/NA	Water	3535	
320-17859-4	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	3535	
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	3535	
320-17859-5	OF-HP01P-0316	Total/NA	Water	3535	
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-104553/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 104824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-2	OF-RW07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-3	OF-HPFB01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	104553
MB 320-104553/1-A	Method Blank	Total/NA	Water	WS-LC-0025	104553

Analysis Batch: 105043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553

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Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316 Lab Sample ID: 320-17859-1

Date Collected: 03/21/16 09:25 Date Received: 03/22/16 10:00

Matrix: Water

Dil Initial Batch Batch **Batch** Final Prepared Method Number **Prep Type** Type Run **Factor** Amount Amount or Analyzed **Analyst** Lab 491 mL Total/NA Prep 3535 1.00 mL 104553 03/28/16 10:11 HJA TAL SAC Total/NA WS-LC-0025 491 mL 1.00 mL 104824 03/29/16 21:27 CBW TAL SAC Analysis 1

Client Sample ID: OF-RW07-0316 Lab Sample ID: 320-17859-2

Date Collected: 03/21/16 09:30 Date Received: 03/22/16 10:00

Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			539.1 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	539.1 mL	1.00 mL	104824	03/29/16 21:49	CBW	TAL SAC

Lab Sample ID: 320-17859-3 Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10 Date Received: 03/22/16 10:00

Matrix: Water

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA Prep 3535 527.9 mL 1.00 mL 104553 03/28/16 10:11 HJA TAL SAC Analysis Total/NA WS-LC-0025 527.9 mL 1.00 mL 104824 03/29/16 22:10 CBW TAL SAC

Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4

Date Collected: 03/21/16 10:15 Date Received: 03/22/16 10:00

Batch Batch Dil Initial Final Batch Prepared Method Amount Number Prep Type Type Run **Factor** Amount or Analyzed Analyst Lab Total/NA 3535 539.3 mL 104553 TAL SAC Prep 1.00 mL 03/28/16 10:11 HJA Total/NA Analysis WS-LC-0025 539.3 mL 1.00 mL 104824 03/29/16 22:31 CBW TAL SAC Total/NA Prep 3535 DL 539.3 mL 1.00 mL 104553 03/28/16 10:11 HJA TAL SAC DL Total/NA WS-LC-0025 5 539.3 mL 1.00 mL 105043 03/31/16 15:47 JRB TAL SAC Analysis

Client Sample ID: OF-HP01P-0316 Lab Sample ID: 320-17859-5

Date Collected: 03/21/16 10:20 Date Received: 03/22/16 10:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			541.2 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	541.2 mL	1.00 mL	104824	03/29/16 23:35	CBW	TAL SAC
Total/NA	Prep	3535	DL		541.2 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	541.2 mL	1.00 mL	105043	03/31/16 16:51	JRB	TAL SAC

Laboratory References:

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

TestAmerica Sacramento

10

Matrix: Water

Matrix: Water

4/1/2016

Certification Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	CA200005	01-29-17

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
Oregon	NELAP	10	4025	01-09-17

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Method Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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

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Sample Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17859-1	OF-FB07-0316	Water	03/21/16 09:25	03/22/16 10:00
320-17859-2	OF-RW07-0316	Water	03/21/16 09:30	03/22/16 10:00
320-17859-3	OF-HPFB01-0316	Water	03/21/16 10:10	03/22/16 10:00
320-17859-4	OF-HP01-0316	Water	03/21/16 10:15	03/22/16 10:00
320-17859-5	OF-HP01P-0316	Water	03/21/16 10:20	03/22/16 10:00

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Corrections to File

TO:

Laura Turpen

COPIES:

File

NALF_Fentress Perfluorinated Compound Investigation

FROM:

Juliana Dean

Chemist CH2M HILL

DATE:

March 23, 2016

This memo is to document corrections made to the sample IDs for NALF Fentress PFC SDG 320-17859.

Sample ID on Login/COC	Correct Sample ID	Date Collected	Time Collected	SDG	
OF-HP01D-0316	OF-HP01P-0316	3/22/16	10:20	320-17859	

Time

Date

3. Received By

Time

Date

3. Relinquished By

Comments

4/1/2016

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Special Instructions/ Conditions of Receipt (A fee may be assessed if samples are retained longer than 1 month) chain of Custody Number 283613 Page Analysis (Attach list if more space is needed) $/z_{\scriptscriptstyle OalbG}$ Lab Numl Months 320-17859 Chain of Custody ☐ Disposal By Lab ☐ Archive For OC Requirements (Specify) Containers & Preservatives 4 HOPN 1. Received By 2. Received By IOH Telephone Number (Area Code)/Fax Number

HF7-671-622
Site Contact Lab Contact EONH Drinking Water? Yes No No Project Manager Achnown tOSZH £ saudun ナ 11:45 Betum To Client Sample Disposal 110S Carrier/Waybill Number Matrix pas 03/12/60 刄 Ŧ X ን Site Contact 116 ☐ 21 Days ☐ Other 🗌 Ипкпомп 0930 0925 1020 Time 90 50 0(5 [0] State Zip Code 03/21/60 Poison B Date 5701 Cleveland St, Site 200 ☐ 14 Days TO WETG PFC Sampling 0001-2-10-1000 Sample I.D. No. and Description (Containers for each sample may be combined on one line) Skin Imtant ☐ 7 Days SM-1861-6316 SM-1861-6316 OF-1961-6316-50 SM-01861-0316-50 SM-01861-0316-50 OF - 17001D - 0316 Mice of a Beach | Flammable P-4W87-8316 WHY WHI OF-FBO7-0316 24 Hours | 48 Hours Possible Hazard Identification Turn Around Time Required 1. Relinquished By ☐ Non-Hazard TAL-4124 (1007)

D+ J+ D

Temperature on Receipt $f_{\mathcal{S}}$

Custody Record

Chain of

Client: CH2M Hill, Inc.

Job Number: 320-17859-1

Login Number: 17859 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Creator. Neison, Nym 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.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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4/1/2016



ANALYTICAL REPORT

Job Number: 320-17859-1

Job Description: CTO WE7G PFC Sampling

For: CH2M Hill, Inc. 5701 Cleveland Street Suite 200 Virginia Beach, VA 23462

Attention: Laurie George

Approved for release Laura Turpen Project Manager I 4/1/2016 4:49 PM

Laura Turpen, Project Manager I 880 Riverside Parkway, West Sacramento, CA, 95605 (916)374-4414 laura.turpen@testamericainc.com 04/01/2016

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.

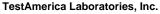


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Definitions/Glossary

Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

Qualifiers

LCMS

Qualifier Description
Undetected at the Limit of Detection.
Estimated: The analyte was positively identified; the quantitation is an estimation
Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
Manual integrated compound.
The reported value is from a dilution.
MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

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: CH2M Hill, Inc.

Project: CTO WE7G PFC Sampling

Report Number: 320-17859-1

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.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

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.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

Receipt

The samples were received on 3/22/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

Receipt Exceptions

The sample ID for the following sample was corrected at the request of the client. The document with the request is included with the chain of custody in the report.

OF-HP01P-0316 (320-17859-5)

PFC

Samples OF-FB07-0316 (320-17859-1), OF-RW07-0316 (320-17859-2), OF-HPFB01-0316 (320-17859-3), OF-HP01-0316 (320-17859-4) and OF-HP01P-0316 (320-17859-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 03/28/2016 and analyzed on 03/29/2016 and 03/31/2016.

Perfluorooctanoic acid (PFOA) was detected in method blank MB 320-104553/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Perfluorooctanesulfonic acid (PFOS) failed the recovery criteria low for the MS/MSD of sample OF-HP01-0316MS (320-17859-4) in batch 320-105043. Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) failed the recovery criteria high.

Samples OF-HP01-0316 (320-17859-4)[5X] and OF-HP01P-0316 (320-17859-5)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so 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. (ICV 320-104824/11) and (ICV 320-105043/11)

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

Organic Prep

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

Detection Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Lab Sample ID: 320-17859-1

Client Sample ID: OF-FB07-0316

No Detections.

Client Sample ID: OF-RW07-0316

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Lau	Sallible	ID.	320	-1/9	003-Z

Analyte	Result	Qualifier	LOQ	DL Unit	Dil Fac D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.00072	JB	0.0023	0.00069 ug/L		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085 ug/L	1	WS-LC-0025	Total/NA

Client Sample ID: OF-HPFB01-0316

Lab Sample ID: 320-17859-3

Analyte	Result Qualifier	LOQ	DL Unit	Dil Fac D Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0015 J	0.0024	0.00087 ug/L	1 WS-LC-0025	Total/NA

Client Sample ID: OF-HP01-0316

Lab Sample ID: 320-17859-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L		_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	ΜJ	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.62	DBJ	0.012	0.0035	ug/L	5		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	DMJ	0.019	0.0059	ug/L	5		WS-LC-0025	Total/NA

Client Sample ID: OF-HP01P-0316

Lab Sample ID: 320-17859-5

Analyte	Result Quali	fier LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.063	0.0023	0.00074	ug/L	1	_	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.72 B	0.0023	0.00069	ug/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.012	0.0023	0.00060	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.027	0.0023	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48 M	0.0023	0.00080	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DI	1.9 DM	0.018	0.0059	ug/L	5		WS-LC-0025	Total/NA

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Lab Sample ID: 320-17859-1

Client Sample ID: OF-FB07-0316 Date Collected: 03/21/16 09:25 **Matrix: Water** Date Received: 03/22/16 10:00

Method: WS-LC-0025 - Perfluc	orinated Hy	drocarbon	S						
Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00082	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00076	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00067	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00093	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00089	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		03/28/16 10:11	03/29/16 21:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	125		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOA	127		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C5 PFNA	114		25 - 150				03/28/16 10:11	03/29/16 21:27	1
1802 PFHxS	100		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOS	119		25 - 150				03/28/16 10:11	03/29/16 21:27	1

Client Sample ID: OF-RW07-0316 Lab Sample ID: 320-17859-2

Date Collected: 03/21/16 09:30 **Matrix: Water**

Date Received: 03/22/16 10:00

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanoic acid (PFOA)	0.00072	JB	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		03/28/16 10:11	03/29/16 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	109		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOA	98		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C5 PFNA	81		25 - 150				03/28/16 10:11	03/29/16 21:49	1
1802 PFHxS	111		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOS	121		25 - 150				03/28/16 10:11	03/29/16 21:49	1

Lab Sample ID: 320-17859-3 Client Sample ID: OF-HPFB01-0316

Date Received: 03/22/16 10:00

Date Collected: 03/21/16 10:10

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.00082	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0012	ug/L		03/28/16 10:11	03/29/16 22:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	119		25 - 150				03/28/16 10:11	03/29/16 22:10	1
13C4 PFOA	113		25 - 150				03/28/16 10:11	03/29/16 22:10	1

TestAmerica Sacramento

Matrix: Water

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10 Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

Method: WS-LC-0025 - Perfluo						
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	95		25 - 150	03/28/16 10:11	03/29/16 22:10	1
1802 PFHxS	98		25 - 150	03/28/16 10:11	03/29/16 22:10	1
13C4 PFOS	111		25 - 150	03/28/16 10:11	03/29/16 22:10	1

Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4

Date Collected: 03/21/16 10:15 Date Received: 03/22/16 10:00

13C4 PFOS

13C4 PFOS

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

03/28/16 10:11 03/29/16 22:31

03/28/16 10:11 03/31/16 15:47

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.45	MJ	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 22:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	81	-	25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C4 PFOA	71		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C5 PFNA	65		25 - 150				03/28/16 10:11	03/29/16 22:31	1
18O2 PFHxS	105		25 - 150				03/28/16 10:11	03/29/16 22:31	1

25 - 150

Method: WS-LC-0025 - Perflu	orinated Hy	drocarbon	s - DL						
Analyte		Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.62	DBJ	0.012	0.0035	ug/L		03/28/16 10:11	03/31/16 15:47	5
Perfluorooctanesulfonic acid (PFOS)	2.2	DMJ	0.019	0.0059	ug/L		03/28/16 10:11	03/31/16 15:47	5
I 4 Dili	a								
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	%Recovery 111	Qualifier	25 ₋ 150				Prepared 03/28/16 10:11	Analyzed 03/31/16 15:47	Dil Fac 5
'	_ <u> </u>							03/31/16 15:47	
13C4-PFHpA	111		25 - 150				03/28/16 10:11	03/31/16 15:47 03/31/16 15:47	5

25 - 150

Lab Sample ID: 320-17859-5 Client Sample ID: OF-HP01P-0316

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Date Collected: 03/21/16 10:20 Date Received: 03/22/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons Analyte Result Qualifier LOQ **DL** Unit Dil Fac Prepared Analyzed Perfluoroheptanoic acid (PFHpA) 0.063 0.0023 0.00074 ug/L 03/28/16 10:11 03/29/16 23:35 Perfluorooctanoic acid (PFOA) 0.0023 0.00069 ug/L 03/28/16 10:11 03/29/16 23:35 1 0.72 B Perfluorononanoic acid (PFNA) 0.012 0.0023 0.00060 ug/L 03/28/16 10:11 03/29/16 23:35 1 Perfluorobutanesulfonic acid 0.027 0.0023 0.00085 ug/L 03/28/16 10:11 03/29/16 23:35 (PFBS) 0.00080 ug/L Perfluorohexanesulfonic acid 0.48 M 0.0023 03/28/16 10:11 03/29/16 23:35 (PFHxS) Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 13C4-PFHpA 87 25 - 150 03/28/16 10:11 03/29/16 23:35 25 - 150 03/28/16 10:11 03/29/16 23:35 13C4 PFOA 72

TestAmerica Sacramento

Matrix: Water

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Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

Client Sample ID: OF-HP01P-0316 Lab Sample ID: 320-17859-5

Date Collected: 03/21/16 10:20 Matrix: Water Date Received: 03/22/16 10:00

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

Isotope Dilution	%Recovery Quality	ifier Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	70	25 - 150	03/28/16 10:11	03/29/16 23:35	1
1802 PFHxS	114	25 - 150	03/28/16 10:11	03/29/16 23:35	1
13C4 PFOS	65	25 - 150	03/28/16 10:11	03/29/16 23:35	1

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.0059	ug/L		03/28/16 10:11	03/31/16 16:51	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	104		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C4 PFOA	107		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C5 PFNA	76		25 - 150				03/28/16 10:11	03/31/16 16:51	5
1802 PFHxS	139		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C4 PFOS	101		25 - 150				03/28/16 10:11	03/31/16 16:51	5

Default Detection Limits

Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	0.0025	0.00092	ug/L	WS-LC-0025
Perfluoroheptanoic acid (PFHpA)	0.0025	0.00080	ug/L	WS-LC-0025
Perfluorohexanesulfonic acid (PFHxS)	0.0025	0.00087	ug/L	WS-LC-0025
Perfluorononanoic acid (PFNA)	0.0025	0.00065	ug/L	WS-LC-0025
Perfluorooctanesulfonic acid (PFOS)	0.0040	0.0013	ug/L	WS-LC-0025
Perfluorooctanoic acid (PFOA)	0.0025	0.00075	ug/L	WS-LC-0025

Isotope Dilution Summary

Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water Prep Type: Total/NA

_			Perce	ent Isotope	Dilution Re	covery (Ac
		3C4-PFHp	3C4 PFO	3C5 PFN/	3O2 PFHx	3C4 PFOS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-17859-1	OF-FB07-0316	125	127	114	100	119
320-17859-2	OF-RW07-0316	109	98	81	111	121
320-17859-3	OF-HPFB01-0316	119	113	95	98	111
320-17859-4	OF-HP01-0316	81	71	65	105	62
320-17859-4 - DL	OF-HP01-0316	111	102	97	126	86
320-17859-4 MS	OF-HP01-0316	85	64	69	99	62
320-17859-4 MS - DL	OF-HP01-0316	114	100	102	144	96
320-17859-4 MSD	OF-HP01-0316	84	62	61	106	59
320-17859-4 MSD - DL	OF-HP01-0316	107	83	91	128	90
320-17859-5	OF-HP01P-0316	87	72	70	114	65
320-17859-5 - DL	OF-HP01P-0316	104	107	76	139	101
LCS 320-104553/2-A	Lab Control Sample	109	104	112	94	116
MB 320-104553/1-A	Method Blank	123	109	116	110	128

Surrogate Legend

13C4-PFHpA = 13C4-PFHpA

13C4 PFOA = 13C4 PFOA

13C5 PFNA = 13C5 PFNA

18O2 PFHxS = 18O2 PFHxS

13C4 PFOS = 13C4 PFOS

QC Sample Results

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-104553/1-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 104553

	MB	MR							
Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanoic acid (PFOA)	0.00217	J	0.0025	0.00075	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		03/28/16 10:11	03/29/16 20:45	1
	MB	MB							

%Recovery Qualifier Isotope Dilution Limits Prepared Analyzed Dil Fac 13C4-PFHpA 123 25 - 150 03/28/16 10:11 03/29/16 20:45 13C4 PFOA 109 25 - 150 03/28/16 10:11 03/29/16 20:45 13C5 PFNA 116 25 - 150 03/28/16 10:11 03/29/16 20:45 1 1802 PFHxS 110 25 - 150 03/28/16 10:11 03/29/16 20:45 25 - 150 13C4 PFOS 03/28/16 10:11 03/29/16 20:45 1 128

Lab Sample ID: LCS 320-104553/2-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Lab Control Sample

%Poc

Prep Type: Total/NA Prep Batch: 104553

		Spike	LUS	LUS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroheptanoic acid (PFHpA)		0.0400	0.0409	1	ug/L		102	60 - 140	
Perfluorooctanoic acid (PFOA)		0.0400	0.0380		ug/L		95	60 - 140	
Perfluorononanoic acid (PFNA)		0.0400	0.0417		ug/L		104	60 - 140	
Perfluorobutanesulfonic acid (PFBS)		0.0354	0.0307		ug/L		87	50 - 150	
Perfluorohexanesulfonic acid (PFHxS)		0.0378	0.0385		ug/L		102	60 - 140	
Perfluorooctanesulfonic acid (PFOS)		0.0382	0.0336		ug/L		88	60 - 140	
,	LCS LCS								

100 100

Snika

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
13C4-PFHpA	109		25 - 150
13C4 PFOA	104		25 - 150
13C5 PFNA	112		25 - 150
1802 PFHxS	94		25 - 150
13C4 PFOS	116		25 - 150

85

Lab Sample ID: 320-17859-4 MS Client Sample ID: OF-HP01-0316

Matrix: Water

13C4-PFHpA

Analysis Batch: 104824

Prep Type: Total/NA Prep Batch: 104553

,	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.068		0.0377	0.111		ug/L		115	60 - 140
Perfluorononanoic acid (PFNA)	0.011		0.0377	0.0427		ug/L		84	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0333	0.0591		ug/L		94	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0357	0.552	M 4	ug/L		299	60 - 140
	MS	MS							
Isotope Dilution	%Recovery	Qualifier	Limits						

TestAmerica Sacramento

25 - 150

QC Sample Results

Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1 Project/Site: CTO WE7G PFC Sampling

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

MS MS

MCD MCD

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFOA	64		25 - 150
13C5 PFNA	69		25 - 150
1802 PFHxS	99		25 - 150
13C4 PFOS	62		25 - 150

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA Prep Batch: 104553

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	0.068		0.0373	0.108		ug/L		109	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.011		0.0373	0.0520		ug/L		110	60 - 140	20	30
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0329	0.0549		ug/L		82	50 - 150	7	30
Perfluorohexanesulfonic acid (PEHxS)	0.45	M J	0.0353	0.530	M 4	ug/L		239	60 - 140	4	30

	INISD	MSD	
Isotope Dilution	%Recovery	Qualifier	Limits
13C4-PFHpA	84		25 - 150
13C4 PFOA	62		25 - 150
13C5 PFNA	61		25 - 150
18O2 PFHxS	106		25 - 150
13C4 PFOS	59		25 - 150

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Lab Sample ID: 320-17859-4	MS						Clie	nt Sam	ple ID: OF-HP01-0316
Matrix: Water									Prep Type: Total/NA
Analysis Batch: 105043									Prep Batch: 104553
-	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits

Perfluorooctanoic acid (PFOA) -	0.62	DBJ	0.0377	0.709	D 4	ug/L	 247	60 - 140	
DL									
Perfluorooctanesulfonic acid	2.2	DMJ	0.0360	2.07	D M 4	ug/L	-314	60 - 140	
(PFOS) - DL									
	MS	MS							

	MS	MS						
Isotope Dilution	%Recovery	Qualifier	Limits					
13C4-PFHpA - DL	114		25 - 150					
13C4 PFOA - DL	100		25 - 150					
13C5 PFNA - DL	102		25 - 150					
18O2 PFHxS - DL	144		25 - 150					
13C4 PFOS - DL	96		25 - 150					

Lab Sample ID: 320-17859-4 MSD

Matrix: Water									Prep Type: Total/NA				
Analysis Batch: 105043									Prep Ba)4553			
-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit		
Perfluorooctanoic acid (PFOA) -	0.62	DBJ	0.0373	0.797	D 4	ug/L		487	60 - 140	12	30		

TestAmerica Sacramento

Client Sample ID: OF-HP01-0316

QC Sample Results

Client: CH2M Hill, Inc.

TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

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

Lab Sample ID: 320-17859 Matrix: Water	9-4 MSD						Clie	nt Sam	ple ID: Of Prep Ty		
Analysis Batch: 105043									Prep Ba		04553
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.0356	2.19	D M 4	ug/L		41	60 - 140	6	30
,	MSD	MSD									
Isotope Dilution	%Recovery	Qualifier	Limits								
13C4-PFHpA - DL	107		25 - 150								
13C4 PFOA - DL	83		25 - 150								
13C5 PFNA - DL	91		25 - 150								
1802 PFHxS - DL	128		25 - 150								
13C4 PFOS - DL	90		25 - 150								

QC Association Summary

Client: CH2M Hill, Inc. Project/Site: CTO WE7G PFC Sampling

LCMS

Prep Batch: 104553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	3535	
320-17859-2	OF-RW07-0316	Total/NA	Water	3535	
320-17859-3	OF-HPFB01-0316	Total/NA	Water	3535	
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-5	OF-HP01P-0316	Total/NA	Water	3535	
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	3535	
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-104553/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 104824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-2	OF-RW07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-3	OF-HPFB01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	104553
MB 320-104553/1-A	Method Blank	Total/NA	Water	WS-LC-0025	104553

Analysis Batch: 105043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553

TestAmerica Job ID: 320-17859-1

Lab Chronicle

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-1 Date Collected: 03/21/16 09:25 **Matrix: Water**

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 21:27	CBW	TAL SAC

Client Sample ID: OF-RW07-0316

Lab Sample ID: 320-17859-2

Date Collected: 03/21/16 09:30 Matrix: Water Date Received: 03/22/16 10:00

Batch Batch Dilution Batch Prepared Number Method Run **Factor** Analyst **Prep Type** Type or Analyzed Lab Total/NA Prep 3535 104553 03/28/16 10:11 HJA TAL SAC Total/NA Analysis WS-LC-0025 1 104824 03/29/16 21:49 CBW TAL SAC

Client Sample ID: OF-HPFB01-0316 Lab Sample ID: 320-17859-3

Date Collected: 03/21/16 10:10 **Matrix: Water**

Date Received: 03/22/16 10:00

Batch Batch Dilution Batch **Prepared** Type Method Run Factor Number or Analyzed Analyst **Prep Type** Lab 3535 TAL SAC Total/NA Prep 104553 03/28/16 10:11 HJA WS-LC-0025 Total/NA Analysis 1 104824 03/29/16 22:10 CBW TAL SAC

Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4

Date Collected: 03/21/16 10:15 **Matrix: Water**

Date Received: 03/22/16 10:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 22:31	CBW	TAL SAC
Total/NA	Prep	3535	DL		104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	105043	03/31/16 15:47	JRB	TAL SAC

Lab Sample ID: 320-17859-5 Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20 **Matrix: Water**

Date Received: 03/22/16 10:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 23:35	CBW	TAL SAC
Total/NA	Prep	3535	DL		104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	105043	03/31/16 16:51	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill, Inc. TestAmerica Job ID: 320-17859-1

Project/Site: CTO WE7G PFC Sampling

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	CA200005	01-29-17

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
Oregon	NELAP	10	4025	01-09-17

Method Summary

Client: CH2M Hill, Inc.

Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

NA - 4 lo - al	Mathed Description	Duntanal	l abauatam.
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: CH2M Hill, Inc. Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

-			
Lab Sample ID	Client Sample ID	Matrix	Collected Received
320-17859-1	OF-FB07-0316	Water	03/21/16 09:25 03/22/16 10:00
320-17859-2	OF-RW07-0316	Water	03/21/16 09:30 03/22/16 10:00
320-17859-3	OF-HPFB01-0316	Water	03/21/16 10:10 03/22/16 10:00
320-17859-4	OF-HP01-0316	Water	03/21/16 10:15 03/22/16 10:00
320-17859-5	OF-HP01P-0316	Water	03/21/16 10:20 03/22/16 10:00

Lab Name: TestAmerica Sacramento	Job No	.: 320-17859-1			
SDG No.:					
Instrument ID: A6	Analys	is Batch Number: 104824			
Lab Sample ID: STD 320-104824/3 IC	Client	Sample ID:			
Date Analyzed: 03/28/16 18:22	Lab Fi	le ID: 28MAR2016A6A_004b.d	GC Colum	n: Acquity	ID: 2.1 (mm)
COMPOUND NAME	RETENTION	MANUAL INT	EGRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorodecane Sulfonic acid	12.65	Assign Peak	westendor fc	03/30/16 14:58	
Lab Sample ID: 320-17859-4	Client	Sample ID: OF-HP01-0316			
Date Analyzed: 03/29/16 22:31	Lab Fi	le ID: <u>28MAR2016A6A_083b.d</u>	GC Colum	nn: Acquity	ID: <u>2.1(mm)</u>
COMPOUND NAME	RETENTION	MANUAL INT			
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:45	
Lab Sample ID: 320-17859-4 MS	Client	Sample ID: OF-HP01-0316 MS			
Date Analyzed: 03/29/16 22:52	Lab Fi	le ID: <u>28MAR2016A6A_084b.d</u>	GC Colum	nn: Acquity	ID: 2.1 (mm)
COMPOUND NAME	RETENTION		EGRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:45	
Lab Sample ID: 320-17859-4 MSD	Client	Sample ID: OF-HP01-0316 MSD			
Date Analyzed: 03/29/16 23:14	Lab Fi	le ID: <u>28MAR2016A6A_085b.d</u>	GC Colum	nn: Acquity	ID: 2.1 (mm)
COMPOUND NAME	RETENTION	MANUAL INT	EGRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:44	

WS-LC-0025

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Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 104824

Lab Sample ID: 320-17859-5

Client Sample ID: OF-HP01P-0316

COMPOUND NAME	RETENTION	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:46

Lab Name: TestAmerica Sacramento									
SDG No.:									
Instrument ID: A6 Analysis Batch Number: 105043									
Lab Sample ID: STD 320-105043/3 IC	Lab Sample ID: STD 320-105043/3 IC Client Sample ID:								
Date Analyzed: 03/31/16 12:36	Lab Fi	le ID: 31MAR2016B6B_003.d	GC Colum	n: Acquity	ID: 2.1(mm)				
COMPOUND NAME	RETENTION	MANUAL INTE	EGRATION						
	TIME	REASON	ANALYST	DATE					
Perfluorooctanoic acid (PFOA)	10.20	Assign Peak	westendor fc	03/31/16 15:13					
Perfluoroheptanesulfonic Acid (PFHpS)		Assign Peak	fc	03/31/16 15:13					
Perfluorodecane Sulfonic acid	12.66	Assign Peak	westendor fc	03/31/16 15:13					
Lab Sample ID: STD 320-105043/4 IC	Client	Sample ID:							
Date Analyzed: 03/31/16 12:57	Lab Fi	le ID: 31MAR2016B6B_004.d	GC Colum	nn: Acquity	ID: <u>2.1(mm)</u>				
COMPOUND NAME	RETENTION	MANUAL INTE	EGRATION	RATION					
	TIME	REASON	ANALYST	DATE					
Perfluorodecane Sulfonic acid	12.64	Assign Peak	westendor fc	03/31/16 15:13					
Lab Sample ID: 320-17859-4 DL	Client	Sample ID: OF-HP01-0316 DL							
Date Analyzed: 03/31/16 15:47	Lab Fi	le ID: 31MAR2016B6B_012.d	GC Colum	nn: Acquity	ID: <u>2.1(mm)</u>				
COMPOUND NAME	RETENTION	MANUAL INTEGRATION			1				
	IUITINITION	MANUAL INIE	LGRATION						
	TIME	REASON	ANALYST	DATE					
Perfluorooctanesulfonic acid (PFOS)	TIME		ANALYST	DATE 04/01/16 09:17					
	TIME 11.15	REASON	ANALYST westendor						
(PFOS)	TIME 11.15 Client	REASON	ANALYST westendor fc	04/01/16 09:17	ID: 2.1 (mm)				
(PFOS) Lab Sample ID: 320-17859-4 MS DL	TIME 11.15 Client Lab Fi RETENTION	REASON Isomers Sample ID: OF-HP01-0316 MS DL le ID: 31MAR2016B6B_013.d MANUAL INTE	ANALYST westendor fc GC Colum	04/01/16 09:17 m: Acquity	ID: 2.1 (mm)				
(PFOS) Lab Sample ID: 320-17859-4 MS DL Date Analyzed: 03/31/16 16:08	TIME 11.15 Client Lab Fi	REASON Isomers Sample ID: OF-HP01-0316 MS DL le ID: 31MAR2016B6B_013.d	ANALYST westendor fc GC Colum EGRATION ANALYST	04/01/16 09:17	ID: 2.1 (mm)				

WS-LC-0025

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Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 105043

Lab Sample ID: 320-17859-4 MSD DL Client Sample ID: OF-HP01-0316 MSD DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:19

Lab Sample ID: 320-17859-5 DL Client Sample ID: OF-HP01P-0316 DL

COMPOUND NAME	RETENTION	ON MANUAL INTEGRATION				
	TIME	REASON	ANALYST	DATE		
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:19		

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1	
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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCMPFCSU_00032	09/22/16	03/22/16	Methanol, Lot Baker 115491	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA 00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA 00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA 00006	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00005		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00007		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00005	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00004	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA 00009		13C4 PFOA	1 ug/mL
					LCMPFOS 00011		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00006		13C2 PFUnA	1 ug/mL
.LCM2PFHxDA 00004	01/07/21	Wellingt	on Laboratories, Lot M2P	FHxDA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA 00004			on Laboratories, Lot M2P		(Purchased Rea	agent)	13C2-PFTeDA	50 ug/mL
.LCM4PFHPA 00004	05/22/20		on Laboratories, Lot M4E		(Purchased Rea		13C4-PFHpA	50 ug/mL
.LCM5PFPEA 00005	05/22/20		on Laboratories, Lot M5E		(Purchased Rea	agent)	13C5-PFPeA	50 ug/mL
.LCM8FOSA 00008	12/22/17		on Laboratories, Lot M8E		(Purchased Rea		13C8 FOSA	50 ug/mL
.LCMPFBA 00005	10/31/19		ton Laboratories, Lot ME		(Purchased Rea		13C4 PFBA	50 ug/mL
.LCMPFDA 00006	08/19/20		gton Laboratories, Lot ME		(Purchased Rea		13C2 PFDA	50 ug/mL
.LCMPFDoA 00005	07/17/19				(Purchased Rea		13C2 PFDoA	50 ug/mL
.LCMPFHxA 00007	04/09/20		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/mL
.LCMPFHxS 00005	08/23/20		ton Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/mL
.LCMPFNA 00004	04/13/19		ton Laboratories, Lot ME		(Purchased Rea		13C5 PFNA	50 ug/mL
.LCMPFOA 00009	01/22/21		ton Laboratories, Lot ME		(Purchased Rea		13C4 PFOA	50 ug/mL
.LCMPFOS 00011	01/22/21	Welling	gton Laboratories, Lot ME		(Purchased Rea		13C4 PFOS	47.8 ug/mL
.LCMPFUdA 00006	10/31/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018			MeOH/H2O, Lot 90285	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 50 ng/mL
							13C4 PFOA 13C4 PFOS	
								47.8 ng/mL
					TODDOOD 00040	0.5	13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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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 (PFHpA)	0.5 ng/mL
							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 (PFOS)	0.478 ng/mL
							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
					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		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
T 01/0 D 71/1 D 7 0 0 0 0 0	11/00/0=			00000 00000	LCMPFUdA_00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003			on Laboratories, Lot M		(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17		on Laboratories, Lot M		(Purchased Read	<i></i>	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20		ton Laboratories, Lot M		(Purchased Read		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		ton Laboratories, Lot M		(Purchased Read		13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16 10/31/19		ton Laboratories, Lot N		(Purchased Read		13C8 FOSA 13C4 PFBA	50 ug/mL
			gton Laboratories, Lot		-			50 ug/mL
LCMPFDA_00004 LCMPFDoA_00004	04/13/19		gton Laboratories, Lot ton Laboratories, Lot		(Purchased Read		13C2 PFDA 13C2 PFDoA	50 ug/mL 50 ug/mL
LCMPFHxA 00005	04/13/19		ton Laboratories, Lot		(Purchased Read		13C2 PFDOA 13C2 PFHxA	50 ug/mL
LCMPFHXA_00005	07/25/18		ton Laboratories, Lot		(Purchased Read		1802 PFHXS	47.3 ug/mL
LCMPFHXS_00004	04/13/19		gton Laboratories, Lot		(Purchased Read		13C5 PFNA	50 ug/mL
LCMPFNA 00003	04/13/19		gton Laboratories, Lot		(Purchased Read		13C4 PFOA	50 ug/mL
LCMPFOS 00007	05/15/20		gton Laboratories, Lot		(Purchased Read		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19		ton Laboratories, Lot		(Purchased Read		13C4 FF03	50 ug/mL
LCMFFUUA_UUUUJ	10/31/19	Merring	con Laboratories, Lot	MFFUUAIUI4	(ruichased Read	Actif)	IJCZ FFUIIA	JU ug/IIIL

Lab Name:	TestAmerica	Sacramento	Job No.:	320-178	59-1
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				Reagent	Parent Reag	gent		
	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)	0 1 . /
							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
							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 ug/mL
							Perfluoropentanoic acid	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 mL	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	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	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 mT.	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
					_		(PFOS)	
					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
	03/05/18		gton Laboratories, Lot PE		(Purchased Rea	agent)	Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	ton Laboratories, Lot LP	FBS1014	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

					Reagent	Parent Reager	nt		
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 Reag	ent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18	Welling	ton Laboratories,	Lot	PFDoA0113	(Purchased Reag	ent)	Perfluorododecanoic acid	50 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	PFHpA0514	(Purchased Reag	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17		ton Laboratories,			(Purchased Reag	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	ton Laboratories,	Lot	PFHxA0514	(Purchased Reag	ent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories,			(Purchased Reag	ent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories,	Lot :	LPFHxS0514	(Purchased Reag	ent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19		gton Laboratories,			(Purchased Reag	ent)	Perfluorononanoic acid (PFNA)	50 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		ston Laboratories,			(Purchased Reag	ent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories,	Lot	LPFOS0614	(Purchased Reag	ent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18	Welling	ston Laboratories,	Lot	FOSA0714I	(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18	Welling	ston Laboratories,	Lot	PFPeA0113	(Purchased Reag	ent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18	Welling	ton Laboratories,	Lot	PFTeDA0613	(Purchased Reag	ent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories,	Lot	PFTrDA1213	(Purchased Reag	ent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ston Laboratories,	Lot	PFUdA0613	(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2 00019	06/29/16	01/08/16	MeOH/H2O, Lot 090	285	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	50 uL	Perfluorobutyric acid	1 ng/mL
								Perfluorobutanesulfonic acid	0.884 ng/mL
								(PFBS)	
								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 (PFHxS)	0.946 ng/mL
								Perfluorononanoic acid (PFNA)	1 ng/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Reage	nt		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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	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 M	2PFHxDA1112	(Purchased Read	gent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17		on Laboratories, Lot M		(Purchased Read		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20	Wellingt	on Laboratories, Lot M	14PFHpA0515	(Purchased Read	gent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		on Laboratories, Lot M		(Purchased Read	gent)	13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M	18FOSA1214I	(Purchased Read	gent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19		ton Laboratories, Lot		(Purchased Read		13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	gton Laboratories, Lot	MPFDA0414	(Purchased Read	gent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00004	07/17/19	Welling	ton Laboratories, Lot I	MPFDoA0714	(Purchased Read		13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19	Welling	ton Laboratories, Lot I	MPFHxA0414	(Purchased Read		13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18		ton Laboratories, Lot I		(Purchased Read		1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19	Welling	ton Laboratories, Lot	MPFNA0414	(Purchased Read	gent)	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20	Welling	gton Laboratories, Lot	MPFOA0415	(Purchased Read		13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20	Welling	gton Laboratories, Lot	MPFOS0515	(Purchased Read	gent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19	Welling	ton Laboratories, Lot I	MPFUdA1014	(Purchased Read		13C2 PFUnA	50 ug/mL
.LCPFCSP 00040	06/30/16		Methanol, Lot 090285	5 mL	LCPFCSP_00039		Perfluorobutyric acid	0.1 ug/mL
		, ,	,				Perfluorobutanesulfonic acid	0.0884 ug/mL
							(PFBS)	J.
							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

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Read	gent		
	Exp	Prep	Dilutant	Final		Volume	_	
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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 . /
								0.1 ug/mL
							Perfluoropentanoic acid Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL 0.1 ug/mL
							Perfluorotridecanoic acid Perfluoroundecanoic acid	0.1 ug/mL 0.1 ug/mL
Tabean 00000	06/20/16	10/20/15	Methanol, Lot 090285	F	T G D D D A 0 0 0 0 2	0 1		J .
LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003		Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					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	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	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		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	Wellin	gton Laboratories, Lot P	FBA0313	(Purchased Re	agent)	Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	gton Laboratories, Lot LE	PFBS1014	(Purchased Re	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lot P	FDA0613	(Purchased Re	agent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18		ton Laboratories, Lot PF		(Purchased Re		Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18		ton Laboratories, Lot LE		(Purchased Re		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19		gton Laboratories, Lot PF		(Purchased Re		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lot LP	FHpS1112	(Purchased Re	agent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19		ton Laboratories, Lot PA		(Purchased Re		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories, Lot PF		(Purchased Re		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot LP		(Purchased Re		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No	o.: 32	20-178	359-1	

				Decemb	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Reagent ID	Volume Added	- Analyte	Concentration
LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot	PFNA0514	(Purchased Reag	ent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18		gton Laboratories, Lot		(Purchased Reag	ent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	ston Laboratories, Lot	PFODA0807	(Purchased Reag	ent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot	LPFOS0614	(Purchased Reag	ent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Welling	ston Laboratories, Lot	FOSA0714I	(Purchased Reag	ent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18	Welling	gton Laboratories, Lot	PFPeA0113	(Purchased Reag		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18	Welling	ton Laboratories, Lot	PFTeDA0613	(Purchased Reag	ent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA 00003	12/10/18	Welling	ton Laboratories, Lot	PFTrDA1213	(Purchased Reag	ent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ston Laboratories, Lot	PFUdA0613	(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uI	13C2-PFHxDA 13C2-PFTeDA 13C4-PFHpA	50 ng/mL 50 ng/mL 50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA 13C4 PFBA	50 ng/mL 50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFHXA	50 ng/mL
							1802 PFHXS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOA	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP 00040	250 117	Perfluorobutyric acid	5 ng/mL
					TCFFC3F_00040	230 ul	Perfluorobutanesulfonic acid	4.42 ng/mL
							(PFBS)	
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid Perfluoroheptanoic acid	4.82 ng/mL 5 ng/mL
							(PFHpA)	4.76 / -
							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

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Reag	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
.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		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004		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 M2P1	FHxDA1112	(Purchased Rea	agent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17		on Laboratories, Lot M2P1		(Purchased Rea	agent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20	Wellingt	on Laboratories, Lot M4P	FHpA0515	(Purchased Rea	agent)	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	agent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19		ton Laboratories, Lot MP		(Purchased Rea	agent)	13C4 PFBA	50 ug/mL
LCMPFDA 00004	04/13/19	Welling	ton Laboratories, Lot MP	FDA0414	(Purchased Rea	agent)	13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19	Welling	ton Laboratories, Lot MP1	FDoA0714	(Purchased Rea	agent)	13C2 PFDoA	50 ug/mL
LCMPFHxA_00005	04/13/19	Welling	ton Laboratories, Lot MP1	FHxA0414	(Purchased Rea	agent)	13C2 PFHxA	50 ug/mL
LCMPFHxS_00004	07/25/18		ton Laboratories, Lot MP1	FHxS0713	(Purchased Rea	agent)	1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19		ton Laboratories, Lot MP		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA_00007	04/10/20		ton Laboratories, Lot MP		(Purchased Rea	-	13C4 PFOA	50 ug/mL
LCMPFOS_00009	05/15/20		ton Laboratories, Lot MP		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00005	10/31/19		ton Laboratories, Lot MP1		(Purchased Rea	agent)	13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL		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 (PFHpA)	0.1 ug/mL
							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	0.0956 ug/mL
							(PFOS) Perfluorooctane Sulfonamide	0.1 ug/mL
		I		I			retituotooctane Sultonamide	l o.i ug/mL

Lab	Name: TestAmerica	Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							Perfluoropentanoic acid	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 ₁	LCPFBA 00003	0.1 mT.	Perfluorobutyric acid	1 ug/mL
		,,			LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
							(PFBS)	
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	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	0.1 mL	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	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		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		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot P		(Purchased Rea	,	Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	ton Laboratories, Lot LE	PFBS1014	(Purchased Rea	gent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00003	06/18/18		gton Laboratories, Lot P		(Purchased Rea		Perfluorodecanoic acid	50 ug/mL
LCPFDoA_00003	01/03/18		ton Laboratories, Lot PE		(Purchased Rea	.gent)	Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001	09/13/18		ton Laboratories, Lot LE		(Purchased Rea	.gent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	_	ton Laboratories, Lot PF	_	(Purchased Rea	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA_00001	11/21/17		on Laboratories, Lot LP		(Purchased Rea		Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA_00003	05/09/19		ton Laboratories, Lot PE		(Purchased Rea	gent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		on Laboratories, Lot PF.		(Purchased Rea	-	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Wellingt	ton Laboratories, Lot LP	FHxS0514	(Purchased Rea	gent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Welling	gton Laboratories, Lot P	FNA0514	(Purchased Rea	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18		gton Laboratories, Lot P		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		ton Laboratories, Lot PE		(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot LE	PFOS0614	(Purchased Rea	gent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Welling	ton Laboratories, Lot FC	DSA0714I	(Purchased Rea	gent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18		ton Laboratories, Lot PE		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18	Wellingt	on Laboratories, Lot PF	TeDA0613	(Purchased Rea	gent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA 00003	12/10/18	Wellingt	on Laboratories, Lot PF	TrDA1213	(Purchased Rea	gent)	Perfluorotridecanoic acid	50 ug/mL

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				Reagent	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lot P	FUdA0613	(Purchased Rea	igent)	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)]			
					Perfluorodecanoic acid	20 ng/mL		
				Perfluorododecanoic acid	20 ng/mL			
							Perfluorodecane Sulfonic acid	19.28 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							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		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00006	0.2 mL	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

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				Reagent	Parent Reag	ent		
	Erm	Dwan	Dilutant	Final		Volume		
December ID	Exp	Prep	Used	Volume	December ID		7	C
Reagent ID	Date	Date	Usea	volume	Reagent ID	Added	Analyte	Concentration
					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 M2F		(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot M2F		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20	Wellingt	on Laboratories, Lot M4	PFHpA0515	(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00004	05/22/20		on Laboratories, Lot M5		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16		on Laboratories, Lot M8		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19		gton Laboratories, Lot M		(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19	-	gton Laboratories, Lot M		(Purchased Rea	-	13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot ME		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA_00005	04/13/19		ton Laboratories, Lot ME		(Purchased Rea	-	13C2 PFHxA	50 ug/mL
LCMPFHxS_00004	07/25/18	Welling	ton Laboratories, Lot ME	PFHxS0713	(Purchased Rea	agent)	1802 PFHxS	47.3 ug/mL
LCMPFNA_00003	04/13/19		gton Laboratories, Lot M		(Purchased Rea	agent)	13C5 PFNA	50 ug/mL
LCMPFOA_00007	04/10/20		gton Laboratories, Lot M		(Purchased Rea	agent)	13C4 PFOA	50 ug/mL
LCMPFOS_00009	05/15/20		gton Laboratories, Lot M		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00005	10/31/19	Welling	ton Laboratories, Lot ME		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003		Perfluorobutyric acid	1 ug/mL
_					LCPFBSA 00001	0.1 mL	Perfluorobutanesulfonic acid	0.884 ug/mL
					_		(PFBS)	
					LCPFDA_00003		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	0.1 mL	Perfluoroheptanoic acid	1 ug/mL
							(PFHpA)	
					LCPFHpSA_00001		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	0.1 mL	Perfluorohexanesulfonic acid	0.946 ug/mL
							(PFHxS)	
					LCPFNA_00004		Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid	0.956 ug/mL
							(PFOS)	
					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		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot E		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	ton Laboratories, Lot L	PFBS1014	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lot F	PFDA0613	(Purchased Rea	agent)	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

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				Reagent	Parent Reagen	ıt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFHpA_00004	05/09/19	Welling	ton Laboratories, I	Lot PFHpA0514	(Purchased Reage	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, L	ot LPFHpS1112	(Purchased Reage	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	gton Laboratories, I	Lot PFHxA0514	(Purchased Reage		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		ton Laboratories, L		(Purchased Reage		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, L		(Purchased Reage		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories,		(Purchased Reage		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00004	10/11/18		gton Laboratories,		(Purchased Reage		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		gton Laboratories, I		(Purchased Reage		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	-	gton Laboratories, I		(Purchased Reage		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18		gton Laboratories, I		(Purchased Reage		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18		gton Laboratories, I		(Purchased Reage		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, L		(Purchased Reage		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, L		(Purchased Reage		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18		gton Laboratories, I		(Purchased Reage		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00016	06/29/16	12/30/15	MeOH/H2O, Lot 0902	85 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 18O2 PFHxS	50 ng/mL 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	250 uT	Perfluorobutyric acid	50 ng/mL
						200 42	Perfluorobutanesulfonic acid	44.2 ng/mL
							(PFBS)	1 111 119, 111
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							Perfluorodecane Sulfonic acid	48.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	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

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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							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	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		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		Wellingto	on Laboratories, Lot M2P1	FHxDA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot M2P1		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20		on Laboratories, Lot M4P		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00004	05/22/20		on Laboratories, Lot M5F		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16		on Laboratories, Lot M8F		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19		ton Laboratories, Lot MF		(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDA 13C2 PFDoA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDOA 13C2 PFHxA	50 ug/mL
LCMPFHxA_00005 LCMPFHxS_00004	04/13/19 07/25/18		ton Laboratories, Lot MP ton Laboratories, Lot MP		(Purchased Rea		1802 PFHXS	50 ug/mL 47.3 ug/mL
LCMPFNA 00003	04/13/19		ton Laboratories, Lot MF		(Purchased Rea (Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00003	04/13/19		ton Laboratories, Lot MP		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOA 00007	05/15/20		ton Laboratories, Lot MF		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039			Methanol, Lot 090285	5 mL				1 ug/mL
	00/30/10	12/30/13	nechanor, noe 090203	3 11111	LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
					_		(PFBS)	
					LCPFDA_00003		Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003 LCPFDSA 00001		Perfluorododecanoic acid Perfluorodecane Sulfonic acid	1 ug/mL 0.964 ug/mL
							Perfluorodecane Sulfonic acid Perfluoroheptanoic acid	0.964 ug/mL 1 ug/mL
					LCPFHpA_00004		(PFHpA)	
					LCPFHpSA_00001		Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003		Perfluorohexanoic acid	1 ug/mL
				[LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No.:	320-17859-1	
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Prep Date Date	_	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004		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		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
	00/05/40				LCPFUdA 00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot I		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	=	gton Laboratories, Lot L		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00003	06/18/18		gton Laboratories, Lot 1		(Purchased Rea		Perfluorodecanoic acid	50 ug/mL
LCPFDoA_00003	01/03/18		gton Laboratories, Lot P		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001	09/13/18		gton 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 (PFHpA)	50 ug/mL
LCPFHpSA_00001	11/21/17		ton Laboratories, Lot LI		(Purchased Rea		Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA_00003	05/09/19		gton Laboratories, Lot P		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		ton Laboratories, Lot PI		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot LI		(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories, Lot I		(Purchased Rea		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00004	10/11/18		gton Laboratories, Lot I		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		gton Laboratories, Lot P		(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	-	gton Laboratories, Lot L		(Purchased Rea	-	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18		gton Laboratories, Lot F		(Purchased Rea		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00003	01/03/18		gton Laboratories, Lot P		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot PI		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, Lot PI		(Purchased Rea		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lot P		(Purchased Rea	gent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 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
				1			13C4 PFOS	47.8 ng/mL

Lab	Name:	TestAmerica	Sacramento	Job No.:	: 320-17859-1
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				Danasah	Parent Reage	ent		
	Exp	Prep	Dilutant	Reagent Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	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	200 ng/mL
							Perfluorooctanesulfonic acid (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
							Perfluoroundecanoic acid	200 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 LCMPFDoA_00004		13C2 PFDA	1 ug/mL
					LCMPFHxA 00005		13C2 PFDoA 13C2 PFHxA	1 ug/mL 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
					LCMPFOS 00009		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00005		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00003	11/29/17	Wellingt	n Laboratories, Lot M2P1	FHxDA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00003	11/29/17		on Laboratories, Lot M2P1		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00003	05/22/20		on Laboratories, Lot M4F		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		on Laboratories, Lot M5F		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16		on Laboratories, Lot M8F		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19	Welling	ton Laboratories, Lot MP	FBA1014	(Purchased Rea	gent)	13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19	Welling	ton Laboratories, Lot MF	FDA0414	(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

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Reag	ent		
Reagent ID		Prep Dilutant Date Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration	
LCMPFHxS 00004	07/25/18	Welling	ton Laboratories, Lot	MPFH×S0713	(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		gton Laboratories, Lot		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		ton Laboratories, Lot		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19		ton Laboratories, Lot		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00039			Methanol, Lot 090285	5 mL		0.1 mL		1 ug/mL
.1011001_0003	00/00/10	12/00/10	nechanor, nec 030203	J 1112	LCPFBSA_00001		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		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	0 1 mT.	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001		Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	0 1 mT.	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00004	0.1 mL	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 mL	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	: PFBA0313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	gton Laboratories, Lot	LPFBS1014	(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		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18	Welling	gton Laboratories, Lot	LPFDS0913	(Purchased Rea	agent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	gton Laboratories, Lot	PFHpA0514	(Purchased Rea		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		gton Laboratories, Lot		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17	Welling	ton Laboratories, Lot	PFHxDA0707	(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot		(Purchased Rea		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	Wellin	gton Laboratories, Lot	PFOA1013	(Purchased Rea	agent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	gton Laboratories, Lot	PFODA0807	(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	gton Laboratories, Lot	LPFOS0614	(Purchased Rea		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00005	07/31/18	Welling	gton Laboratories, Lot	FOSA0714T	(Purchased Rea	agent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18		ton Laboratories, Lot		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18		ton Laboratories, Lot		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No.: 320-17859-1	

				Reagent	Parent Re	agent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFTrDA 00003	12/10/18	Welling	l ton Laboratories, Lot PF'	 	(Purchased F	Reagent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA 00003	06/19/18	1	gton Laboratories, Lot PF		(Purchased F		Perfluoroundecanoic acid	50 ug/mL
_		_						
LCPFC-L7_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 1111	LCMPFCSU_00024	100 uL	13C2-PFHxDA 13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL 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	800 uL	Perfluorobutyric acid	400 ng/mL
					_		Perfluorobutanesulfonic acid	353.6 ng/mL
							(PFBS)	J.
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluorohexanoic acid	400 ng/mL
							Perfluorohexadecanoic acid	400 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	378.4 ng/mL
							Perfluorononanoic acid (PFNA)	400 ng/mL
							Perfluorooctanoic acid (PFOA)	400 ng/mL
							Perfluorooctandecanoic acid	400 ng/mL
							Perfluorooctanesulfonic acid	382.4 ng/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	400 ng/mL
							Perfluoropentanoic acid	400 ng/mL
							Perfluorotetradecanoic acid	400 ng/mL
							Perfluorotridecanoic acid	400 ng/mL
TOMPERON OCCU	06/00/116	10/00/15	Marilla and Table 2	10 =	TOMODEL BY COCC	0 0 -	Perfluoroundecanoic acid	400 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	0.2 mL	13C2 PFDoA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1	
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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					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		on Laboratories, Lot		(Purchased Rea	igent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00003	11/29/17		on Laboratories, Lot		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00003	05/22/20		ton Laboratories, Lot		(Purchased Rea	igent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA_00004	05/22/20	Wellingt	ton Laboratories, Lot	M5PFPeA0515	(Purchased Rea	igent)	13C5-PFPeA	50 ug/mL
LCM8FOSA_00006	12/15/16	Wellingt	ton Laboratories, Lot	M8FOSA1214I	(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00004	10/31/19	Welling	gton Laboratories, Lo	t MPFBA1014	(Purchased Rea	igent)	13C4 PFBA	50 ug/mL
LCMPFDA_00004	04/13/19		gton Laboratories, Lo		(Purchased Rea	igent)	13C2 PFDA	50 ug/mL
LCMPFDoA_00004	07/17/19		ton Laboratories, Lot		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA 00005	04/13/19	Welling	ton Laboratories, Lot	MPFHxA0414	(Purchased Rea	igent)	13C2 PFHxA	50 ug/mL
LCMPFHxS_00004	07/25/18	Welling	ton Laboratories, Lot	MPFHxS0713	(Purchased Rea	igent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00003	04/13/19	Welling	gton Laboratories, Lo	t MPFNA0414	(Purchased Rea	igent)	13C5 PFNA	50 ug/mL
LCMPFOA 00007	04/10/20		gton Laboratories, Lo		(Purchased Rea	igent)	13C4 PFOA	50 ug/mL
LCMPFOS 00009	05/15/20		gton Laboratories, Lo		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00005	10/31/19	Welling	ton Laboratories, Lot	MPFUdA1014	(Purchased Rea	igent)	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	0.884 ug/mL
					_		(PFBS)	
					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 (PFHpA)	1 ug/mL
					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	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	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00005	0.1 mL	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, Lo	ot PFBA0313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA 00001	10/09/19	Welling	gton Laboratories, Lo	t LPFBS1014	(Purchased Rea		Perfluorobutanesulfonic acid	44.2 ug/mL
	,,		,		, , , , , , , , , , , , , , , , , , , ,	J : -/	(PFBS)	
LCPFDA 00003	06/18/18	Wellin	gton Laboratories, Lo	ot PFDA0613	(Purchased Rea	igent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00003	01/03/18		gton Laboratories, Lo		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL

Lab Name:	TestAmerica	Sacramento	Job No.:	320-178	59-1
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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFDSA 00001	09/13/18	Welling	ton Laboratories, I	Lot LPFDS0913	(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories, I	Lot PFHpA0514	(Purchased Rea	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, L	ot LPFHpS1112	(Purchased Rea	gent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19		ton Laboratories, I		(Purchased Rea	gent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17	Welling	ton Laboratories, L	ot PFHxDA0707	(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories, L	ot LPFHxS0514	(Purchased Rea	gent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Wellin	gton Laboratories,	Lot PFNA0514	(Purchased Rea	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00004	10/11/18	Wellin	gton Laboratories,	Lot PFOA1013	(Purchased Rea	gent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	ton Laboratories, I	Lot PFODA0807	(Purchased Rea	gent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, I	Lot LPFOS0614	(Purchased Rea		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00005	07/31/18		gton Laboratories, I		(Purchased Rea	gent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00003	01/03/18	Welling	gton Laboratories, I	Lot PFPeA0113	(Purchased Rea	gent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18	Welling	ton Laboratories, L	ot PFTeDA0613	(Purchased Rea	gent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories, L	ot PFTrDA1213	(Purchased Rea	gent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, I	Lot PFUdA0613	(Purchased Rea	gent)	Perfluoroundecanoic acid	50 ug/mL
LCPFCIC 00016	06/16/16	12/22/15	MeOH/H2O, Lot 0928	5 5 mL	LCMPFCSU 00023	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
					LCPFACMXB_00008	125 uL	Perfluorobutanesulfonic acid	44.25 ng/mL
							(PFBS)	
							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_00023	06/21/16	12/21/15	Methanol, Lot Bake 115491	r 5 mL	LCM2PFHxDA_00002		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	0.1 mL	13C8 FOSA	1 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				1	T-			<u> </u>
				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
					LCMPFBA 00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA 00005		13C2 PFDA	1 ug/mL
					LCMPFDoA 00003		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00006	0.1 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	0.1 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA 00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00009	0.1 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00004	0.1 mL	13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00002	11/29/17	Wellingto	on Laboratories, Lot M2P	FHxDA1112	(Purchased Rea	igent)	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 M41	PFHpA0515	(Purchased Rea	igent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA 00004	05/22/20		on Laboratories, Lot M5		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA 00006	12/15/16	Wellingt	on Laboratories, Lot M81	FOSA1214I	(Purchased Rea	igent)	13C8 FOSA	50 ug/mL
LCMPFBA 00004	10/31/19		ton Laboratories, Lot M		(Purchased Rea	igent)	13C4 PFBA	50 ug/mL
LCMPFDA 00005	04/13/19	Welling	ton Laboratories, Lot M	PFDA0414	(Purchased Rea	igent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00003	07/17/19	Welling	ton Laboratories, Lot MP	FDoA0714	(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA 00006	04/13/19	Welling	ton Laboratories, Lot MP	FHxA0414	(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS 00004	07/25/18	Welling	ton Laboratories, Lot MP	FHxS0713	(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 00004	10/31/19		ton Laboratories, Lot MP		(Purchased Rea	-	13C2 PFUnA	50 ug/mL
.LCPFACMXB 00008	06/20/19		on Laboratories, Lot PF		(Purchased Rea	-	Perfluorobutanesulfonic acid	1.77 ug/mL
_							(PFBS)	
							Perfluoroheptanoic acid	2 ug/mL
							(PFHpA) Perfluorohexanesulfonic acid	1.89 ug/mL
							(PFHxS)	1.69 ug/III
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid	1.91 ug/mL
							(PFOS)	
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA 00003	200 uL	Perfluorobutyric acid	1 ug/mL
_					LCPFBS 00003	200 uL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 11T.	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004		Perfluorododecanoic acid	1 ug/mL
					LCPFDoS 00003	200 uL		0.968 ug/mL
						200 41	(Perflouro-1-dodecanesulfonate	
					LCPFDS 00003	200 uL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA 00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS 00005	200 עדי	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA 00001		Perfluoroheptanesulfonic Acid	0.952 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
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				Reagent	Parent Reag	ent			
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration	Concentration
-					LCPFHxA 00003	200 uL	Perfluorohexanoic acid	1 ug/mL	
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL	
					LCPFHxS 00003	200 uL	Perfluorohexane Sulfonate	0.946 ug/mL	
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL	
					LCPFNA 00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL	
					LCPFNS_00002	200 uL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL	
					LCPFOA 00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL	
					LCPFODA 00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL	
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL	
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL	
					LCPFPeA_00004		Perfluoropentanoic acid	1 ug/mL	
					LCPFPeS_00002	200 uL		0.938 ug/mL	
							(Perflouro-1-pentanesulfonate)		
					LCPFTeDA_00003		Perfluorotetradecanoic acid	1 ug/mL	
					LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mL	
T CDED 7 00000	02/05/10	r.r. 1 1 1 1		L DED 7 0 2 1 2	LCPFUdA_00003 (Purchased Rea		Perfluoroundecanoic acid	1 ug/mL	
.LCPFBA 00003	03/05/18 10/09/19		gton Laboratories, Lo ton Laboratories, Lot		(Purchased Rea		Perfluorobutyric acid Perfluorobutane Sulfonate	50 ug/mL 44.2 ug/mL	
.LCPFBSA 00001	10/09/19		ton Laboratories, Lot		(Purchased Rea		Perfluorobutane suffonic acid	44.2 ug/mL 44.2 ug/mL	
_		_				_	(PFBS)		
.LCPFDA_00004	07/02/20		gton Laboratories, Lo		(Purchased Rea		Perfluorodecanoic acid	50 ug/mL	
.LCPFDoA_00004	01/30/20		ton Laboratories, Lot		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL	
.LCPFDoS_00003	10/06/16	Wellingt	ton Laboratories, Lot	: LPFDoS1011	(Purchased Rea	agent)	PFDoS (Perflouro-1-dodecanesulfonate	48.4 ug/mL	
.LCPFDS 00003	09/13/18	Welling	ton Laboratories, Lot	t LPFDS0913	(Purchased Rea	agent)	Perfluorodecane Sulfonate	48.2 ug/mL	
.LCPFDSA 00001	09/13/18	Welling	ton Laboratories, Lot	t LPFDS0913	(Purchased Rea	agent)	Perfluorodecane Sulfonic acid	48.2 ug/mL	
.LCPFHpA_00004	05/09/19	Welling	ton Laboratories, Lot	t PFHpA0514	(Purchased Rea	agent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL	
.LCPFHpS_00005	01/28/19	Wellingt	on Laboratories, Lot	LPFHpS0114	(Purchased Rea		Perfluoroheptane Sulfonate	47.6 ug/mL	
.LCPFHpSA_00001	11/21/17	Wellingt	on Laboratories, Lot	LPFHpS1112	(Purchased Rea		Perfluoroheptanesulfonic Acid	47.6 ug/mL	
.LCPFHxA_00003	05/09/19		ton Laboratories, Lot		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL	
.LCPFHxDA_00004	11/28/17		on Laboratories, Lot		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL	
.LCPFHxS_00003	05/09/19		on Laboratories, Lot		(Purchased Rea		Perfluorohexane Sulfonate	47.3 ug/mL	
.LCPFHxSA_00001	05/09/19	_	ton Laboratories, Lot		(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL	
.LCPFNA_00004	05/09/19		gton Laboratories, Lo		(Purchased Rea		Perfluorononanoic acid (PFNA)	50 ug/mL	
.LCPFNS_00002	07/04/17		ton Laboratories, Lot		(Purchased Rea		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL	
.LCPFOA_00005	11/06/20		gton Laboratories, Lo		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL	
.LCPFODA_00004	04/25/17		ton Laboratories, Lot		(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL	
.LCPFOS_00004	06/20/19		ton Laboratories, Lot		(Purchased Rea		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL	
.LCPFOSA_00006	09/02/17		ton Laboratories, Lot		(Purchased Rea		Perfluorooctane Sulfonamide	50 ug/mL	
.LCPFPeA_00004	01/30/20	Welling	ton Laboratories, Lot	t PFPeA0115	(Purchased Rea	agent)	Perfluoropentanoic acid	50 ug/mL	

Lab	Name:	TestAmerica	Sacramento	Job No.:	320-17859-1
SDG	No.:				

				Reagent	Parent Reagent			
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
.LCPFPeS 00002	07/04/17	Welling	ton Laboratories, Lot LPH	PeS0712	(Purchased Reagent)		PFPeS	46.9 ug/mL
_							(Perflouro-1-pentanesulfonate)	
.LCPFTeDA 00003	06/19/18	Welling	ton Laboratories, Lot PF	TeDA0613	(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA 00003	12/10/18	Welling	ton Laboratories, Lot PF	rDA1213	(Purchased Reag	ent)	Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA 00003	06/19/18	Welling	ton Laboratories, Lot PF	UdA0613	(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

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Reagent

LCM2PFHxDA_00002

Rec: Gli4/14 SK





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

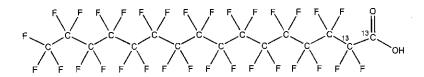
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₁₄HF₃₁O₂

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

816.11

SOLVENT(S):

Methanol

≥99% ¹³C

(1,2-13C₂)

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

11/29/2012

EXPIRY DATE: (mm/ed/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.

Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 01/10/2013

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, $u_n(y)$, 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:

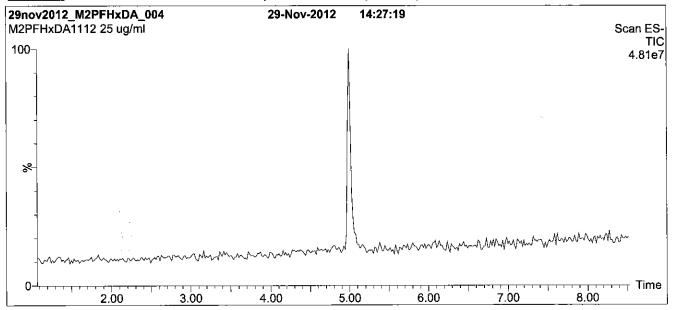
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

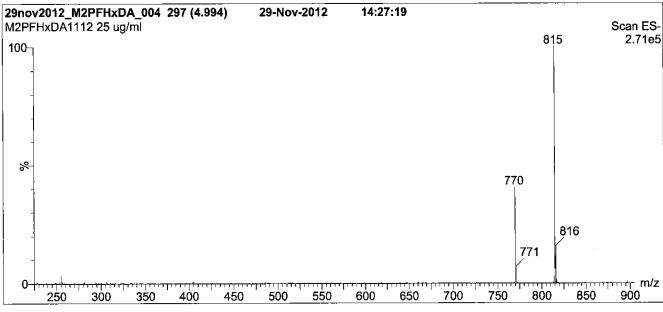




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





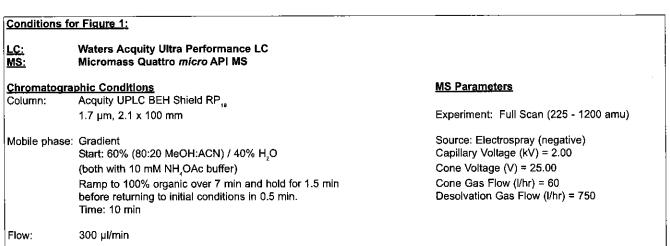
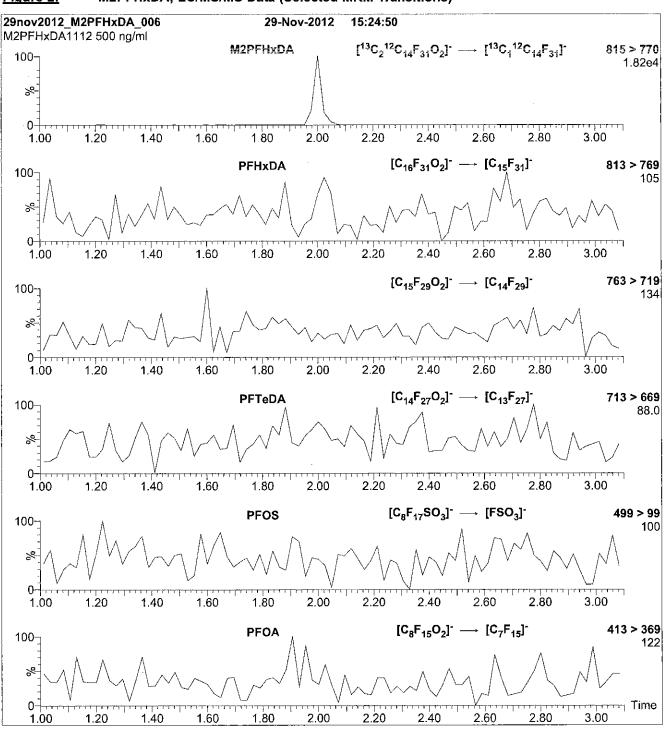
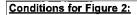


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





Flow:

Direct loop injection

10 μl (500 ng/ml M2PFHxDA)

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

LCM2PFHxDA_00003



PRODUCT CODE:

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

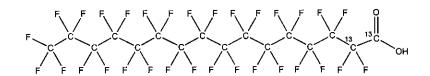
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₁₄HF₃₁O₂

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

816.11

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%) >99% ¹³C

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

CHEMICAL PURITY:

>98%

11/29/2012

LAST TESTED: (mm/dd/yyyy)

11/20/2012

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.

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:

<u> 04/01/2015</u>

(mm/dd/yyyy)

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, u_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:

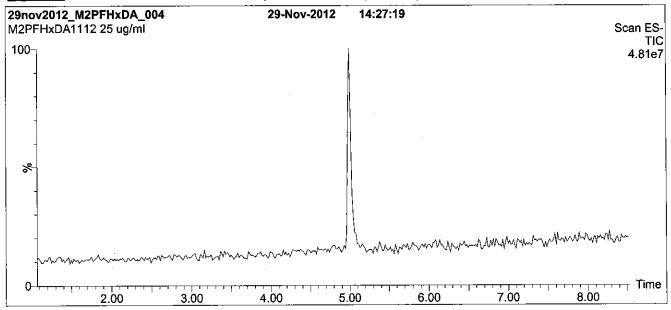
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

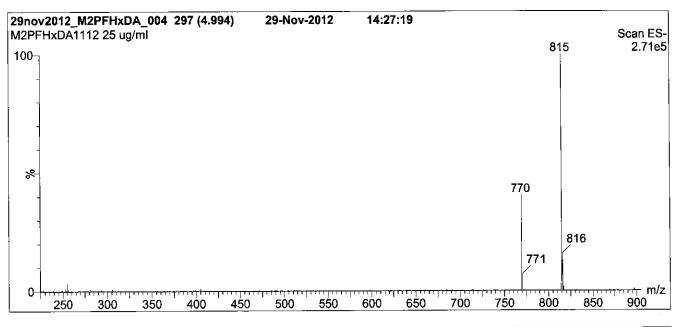




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





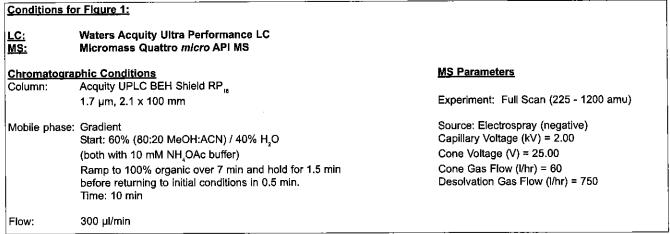
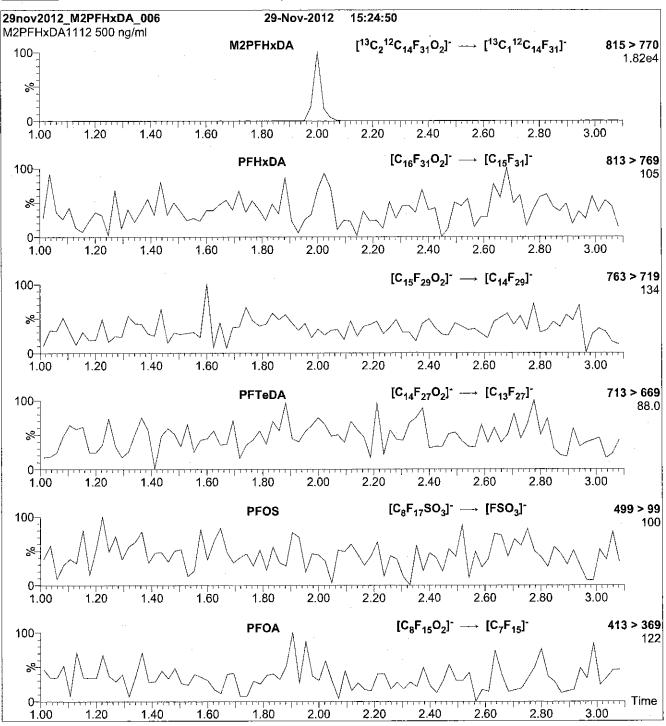
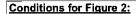


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





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

LCM2PFTeDA_00003



PRODUCT CODE:

M2PFTeDA

LOT NUMBER:

M2PFTeDA1112

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₁₂HF₂₇O₂

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

SOLVENT(S):

716.10

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

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:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

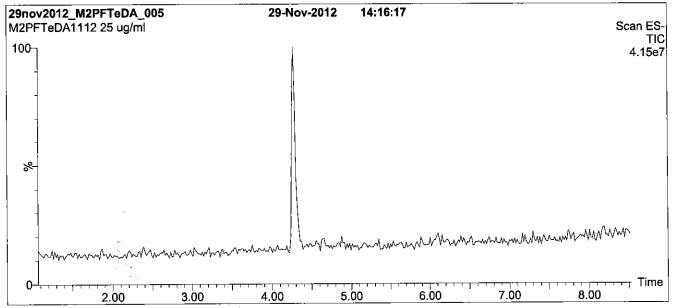
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

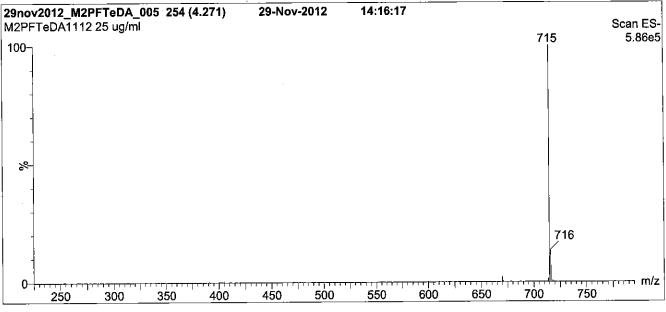




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Figure 1: M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)





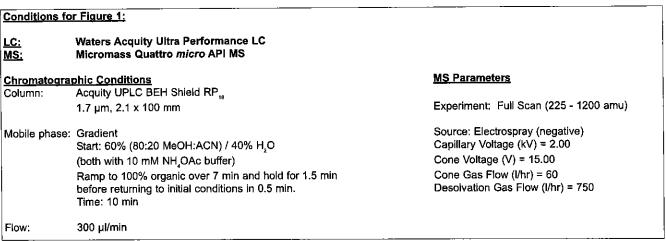
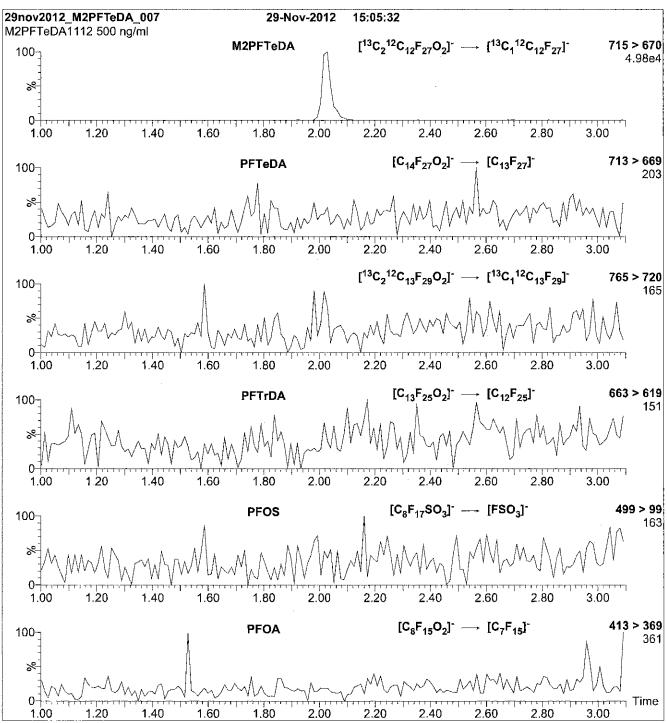
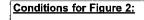


Figure 2: M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





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

LCM4PFHPA_00003



PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0515

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₃HF₁₃O₂

MOLECULAR WEIGHT:

368.03

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

70 70

ISOTOPIC PURITY:

≥99%¹³C (1,2,3,4-¹³C₂)

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:

B.G. Chittim

Date:

<u>05/25/2015_</u>

(mm/dd/yy

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

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

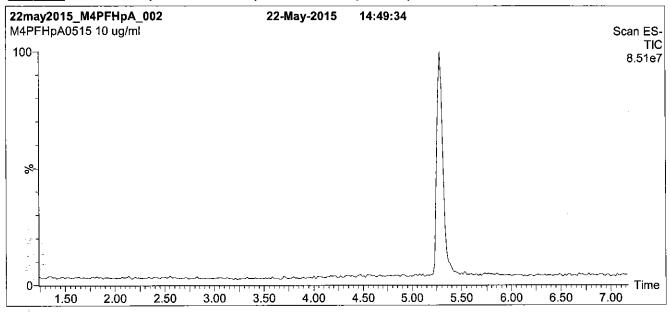
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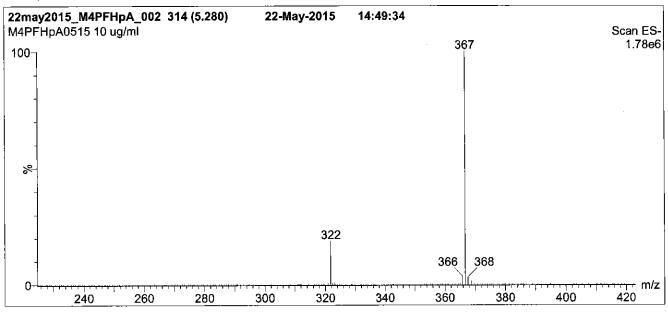




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Figure 1: M4PFHpA; LC/MS Data (TIC and Mass Spectrum)





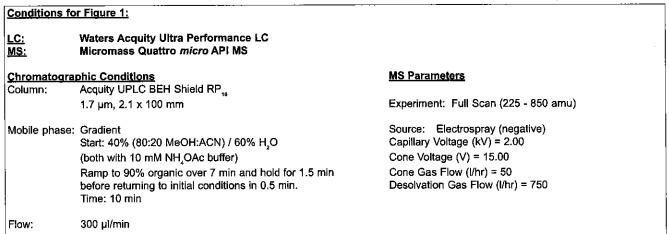
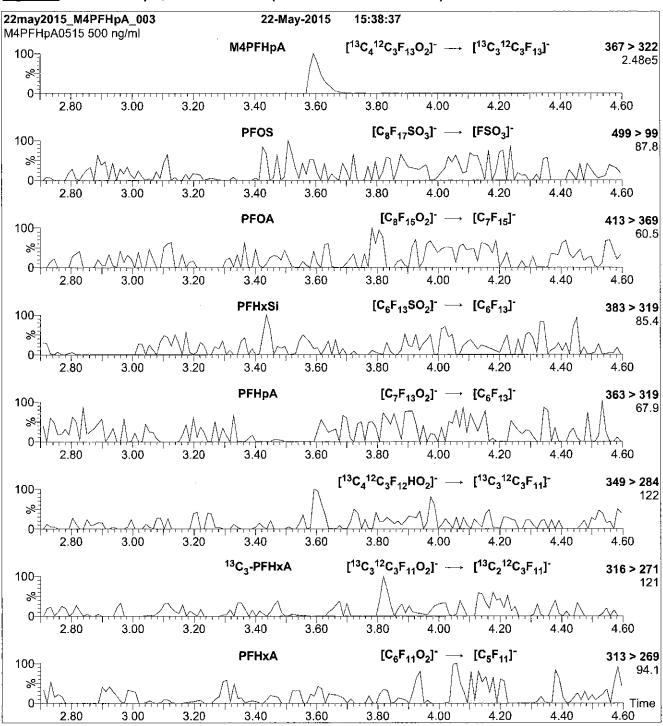
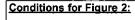


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μl (500 ng/ml M4PFHpA)

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) = 11

LCM5PFPEA_00004



PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA0515

COMPOUND:

Perfluoro-n-[13C_a]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: _

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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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

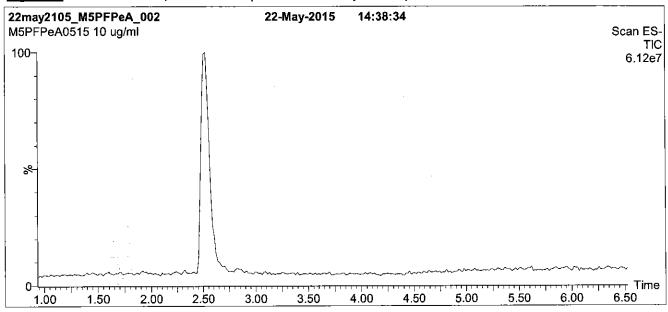
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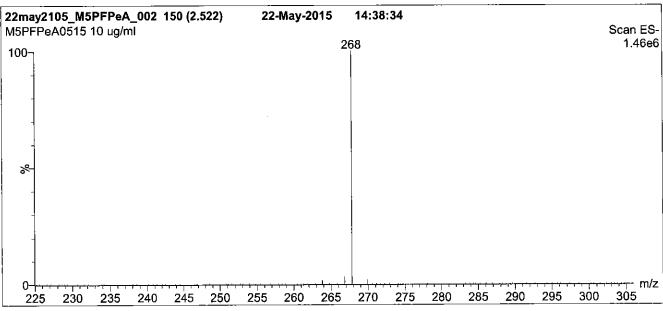




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Figure 1: M5PFPeA; LC/MS Data (TIC and Mass Spectrum)





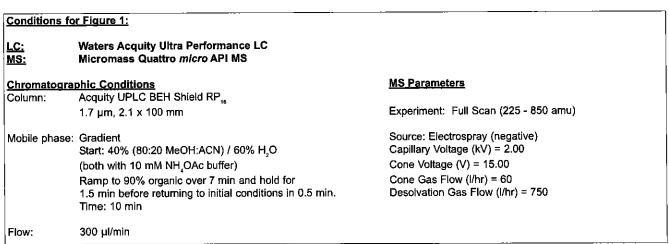
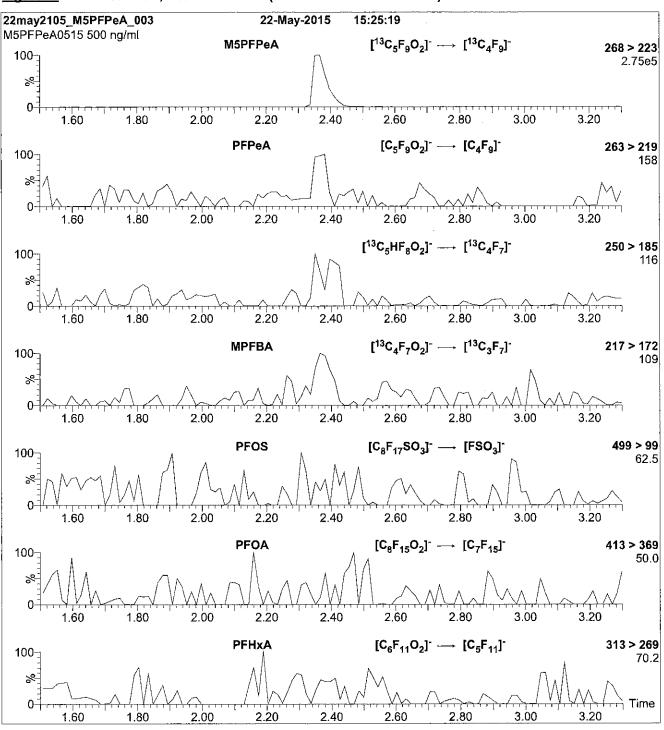
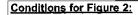


Figure 2: M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)





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:

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

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:

SOLVENT(S):

507.09 Isopropanol

ISOTOPIC PURITY:

≥99% ¹³C

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

DOCUMENTATION/ DATA ATTACHED:

Figure 1: 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.C. Chittim

Date: 04/01/2019

(mm/dd/yyyy

<u>INTENDED USE:</u>

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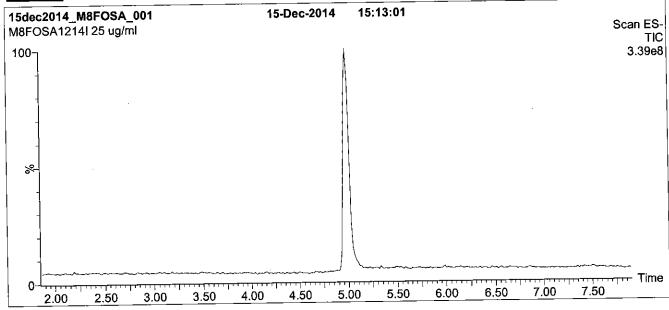
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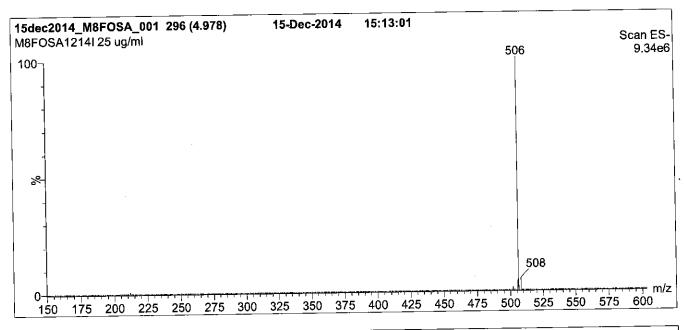


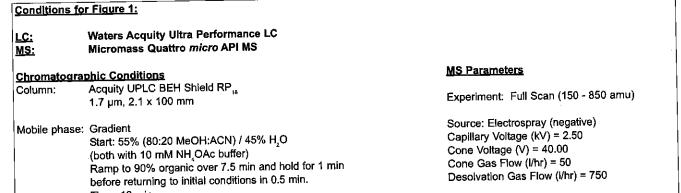


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Figure 1: M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)



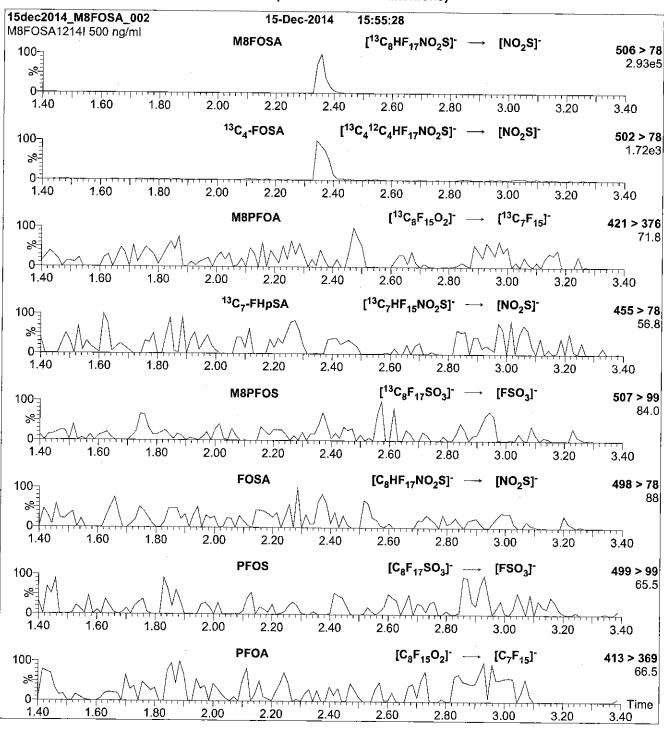


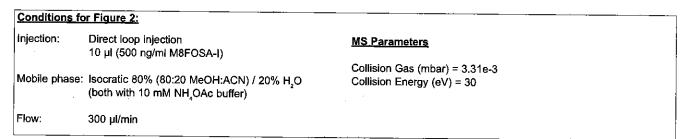


Time: 10 min

Flow: 300 µl/min

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

LAST TESTED: (mm/dd/yyyy)

10/31/2014

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

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:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, u(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:

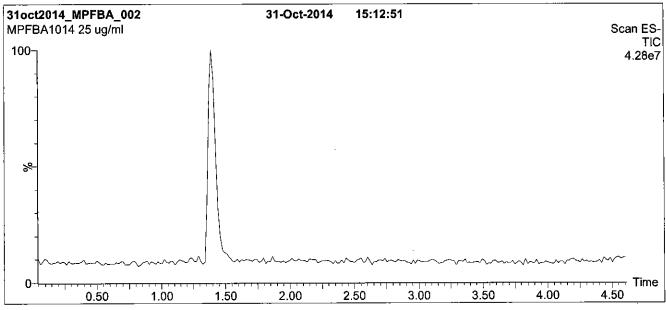
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

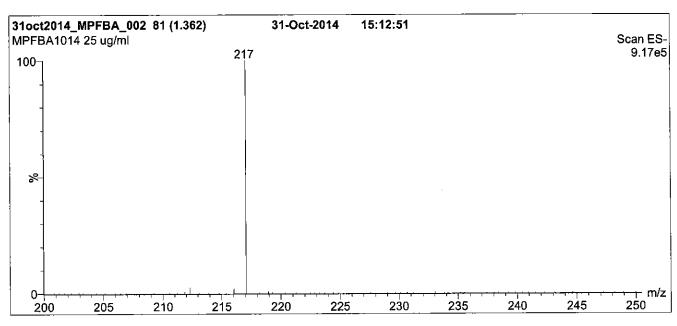




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





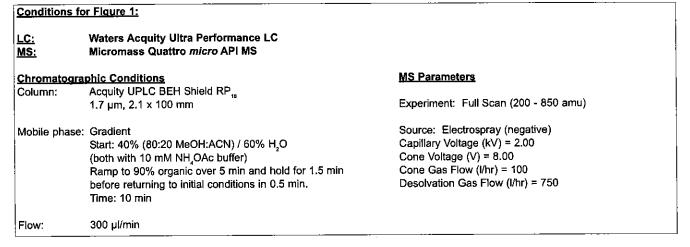
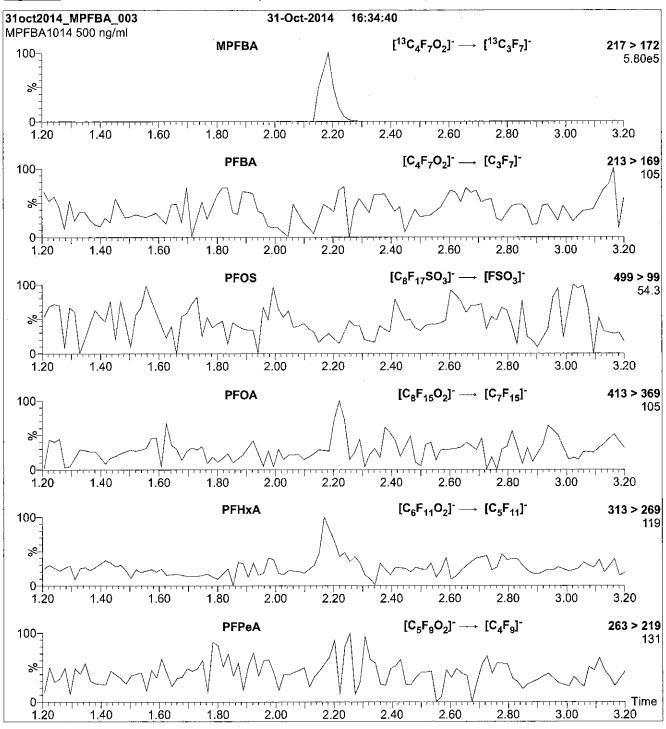
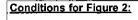


Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μl (500 ng/ml MPFBA)

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

LCMPFDA_00004





12LCMS0242

LCMPFDA-00001

PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0411

COMPOUND:

Perfluoro-n-[1,2-13C₂]decanoic acid

STRUCTURE:

CAS#

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₉O₂

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

516.07

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%) ≥99% ¹³C

(1,2-13C₂)

CHEMICAL PURITY:

EXPIRY DATE: (mm/dd/yyyy)

RECOMMENDED STORAGE:

>98%

LAST TESTED: (mm/dd/yyyy)

04/07/2011

04/07/2014

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

Contains ~ 0.1% of ¹³C₁-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

Form#:27, Issued 2004-11-10 Revision#:1, Revised 2010-07-26 MPFDA0411 (1 of 4)

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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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.

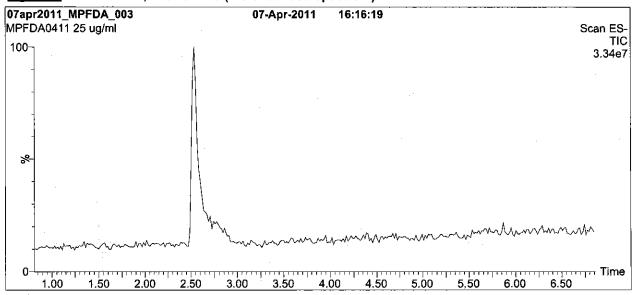
LIMITED WARRANTY:

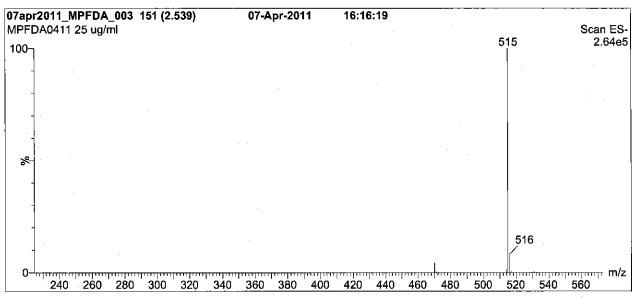
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

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

Form#:27, Issued 2004-11-10 Revision#:1, Revised 2010-07-26 MPFDA0411 (2 of 4)







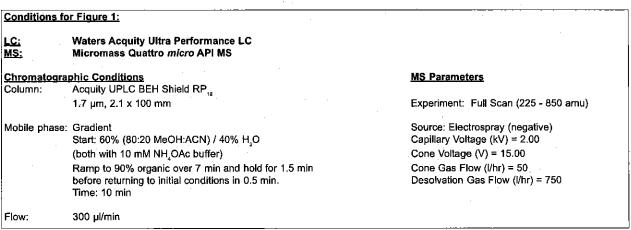
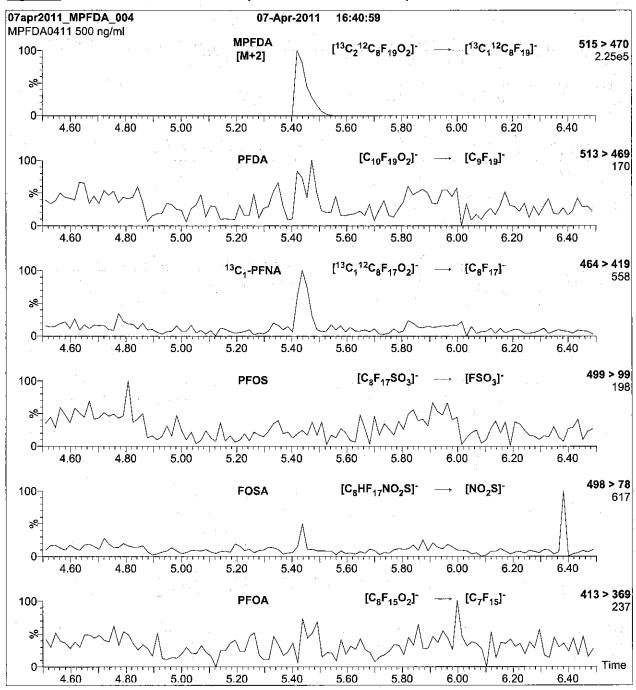
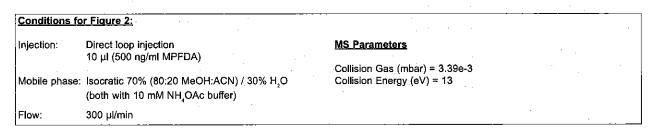


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





Form#:27, Issued 2004-11-10 Revision#:1, Revised 2010-07-26 MPFDA0411 (4 of 4) rev0

LCMPFDA_00005



PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0414

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

13C212CHF19O2

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) >99% 13C

LAST TESTED: (mm/dd/yyyy)

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

EXPIRY DATE: (mm/dd/yyyy)

04/13/2014

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 ¹³C,-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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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SYNTHESIS / CHARACTERIZATION:

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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.

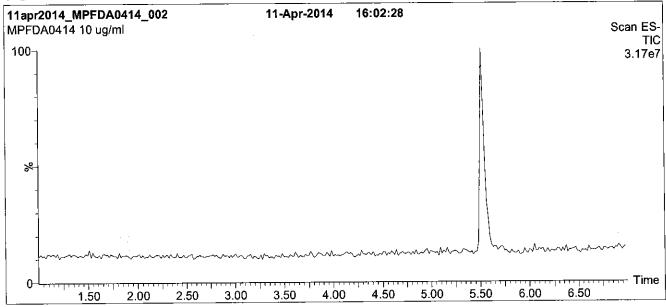
QUALITY MANAGEMENT:

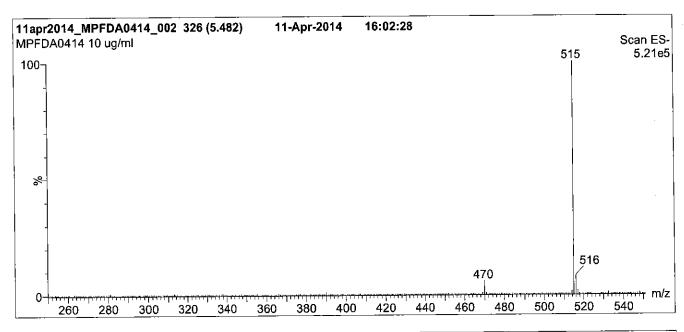
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





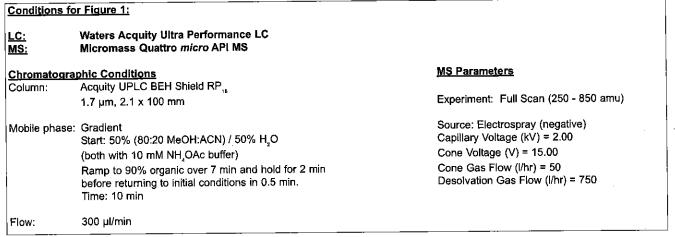
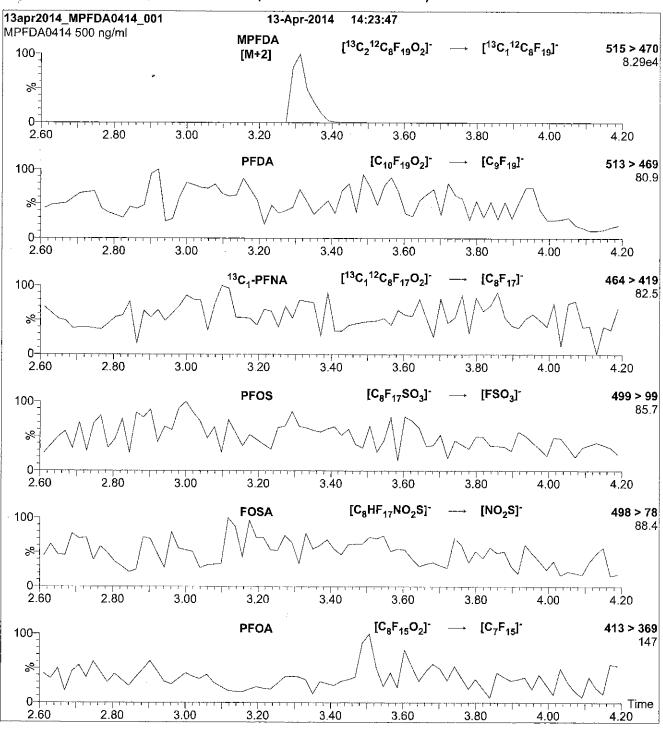
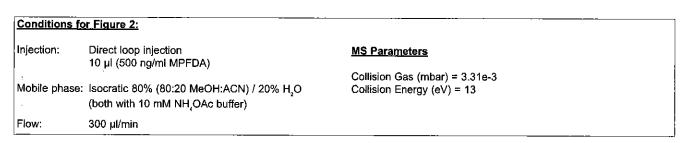


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFDA_00006





PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0815

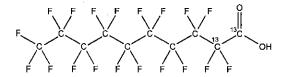
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₉O₂

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

ISOTOPIC PURITY:

Water (<1%) >99% 13C

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

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.G. Chittim

Date: <u>0</u>

1012 1120 13

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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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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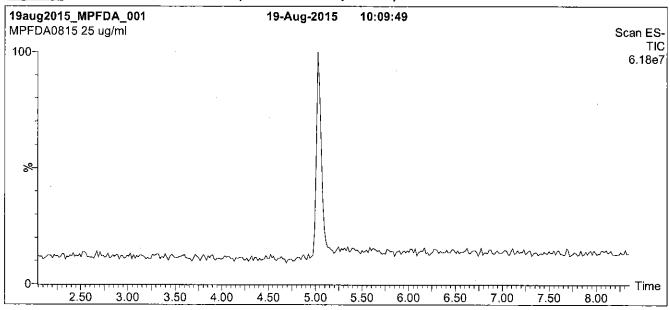
QUALITY MANAGEMENT:

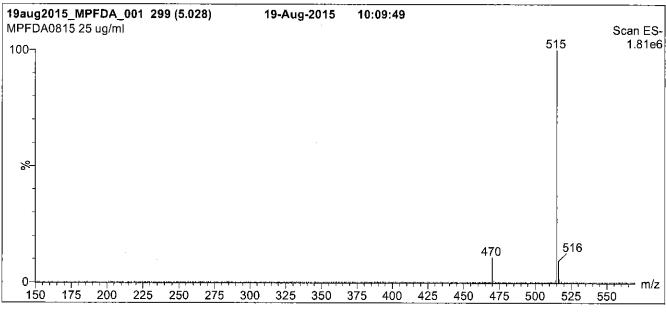
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Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)





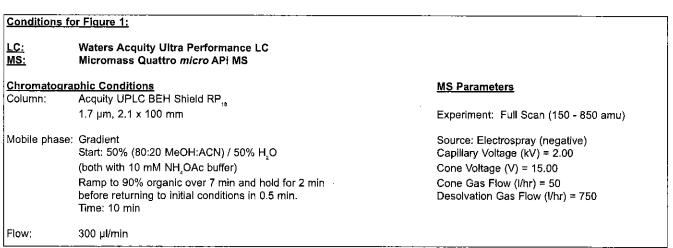
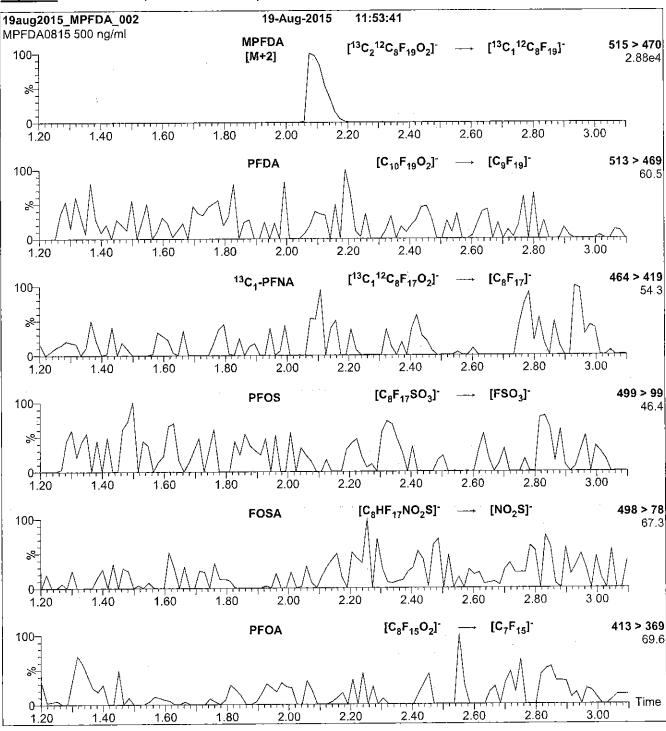
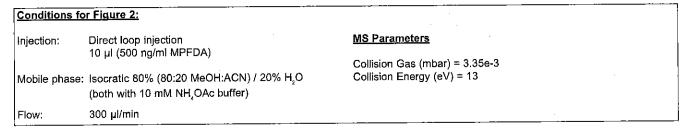


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFDoA_00003



PRODUCT CODE:

MPFDoA

LOT NUMBER:

MPFDoA0714

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₂¹²C₁₀HF₂₃O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

616.08

SOLVENT(S):

Methanol

≥99% 13C

(1,2-13C₂)

Water (<1%)

CHEMICAL PURITY:

>98%

07/17/2014

LAST TESTED: (mm/dd/yyyy)

EXPIRY DATE: (mm/dd/yyyy)

07/17/2019

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:

07/21/2014

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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.

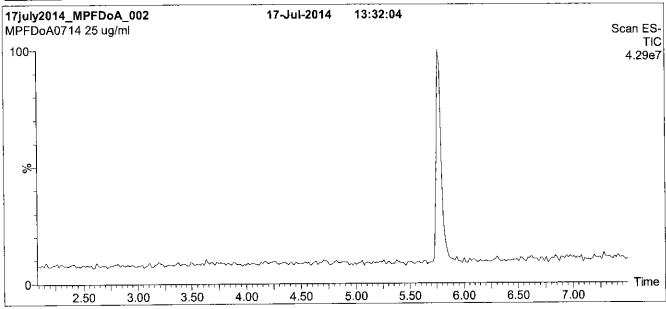
QUALITY MANAGEMENT:

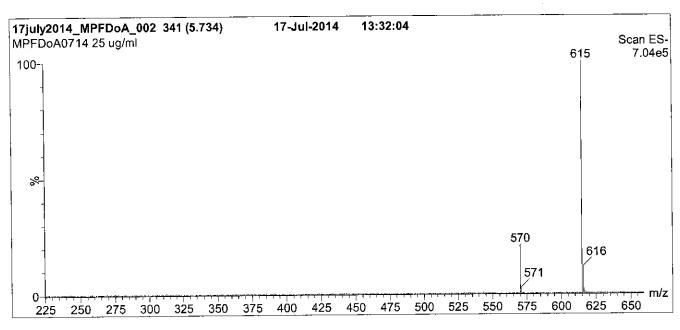
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).











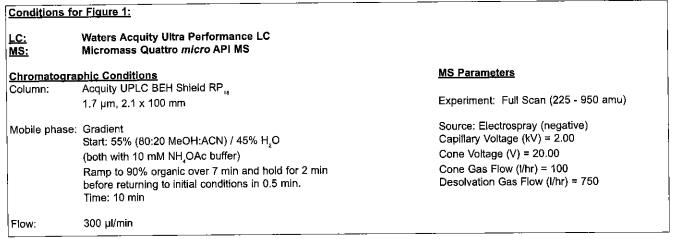
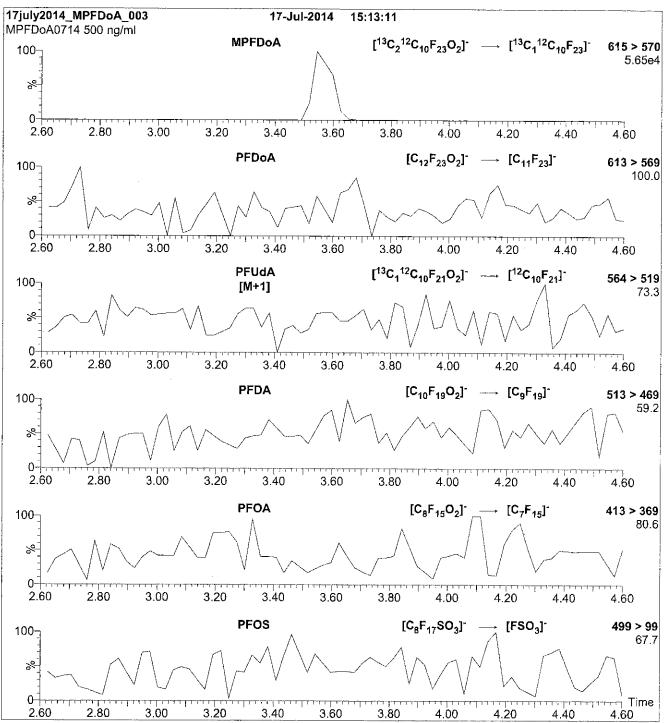
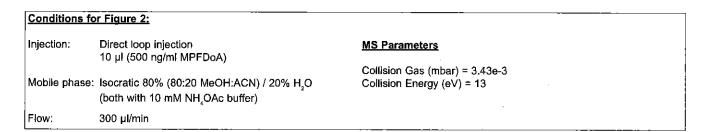


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





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:

ISOTOPIC PURITY:

616.08

CONCENTRATION:

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

SOLVENT(S):

Methanol

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

Water (<1%) ≥99% ¹³C

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/17/2014

EXPIRY DATE: (mm/dd/yyyy)

07/17/2019

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

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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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

 $x_*, x_0, ... x_n$ on which it depends is:

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

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

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

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LIMITED WARRANTY:

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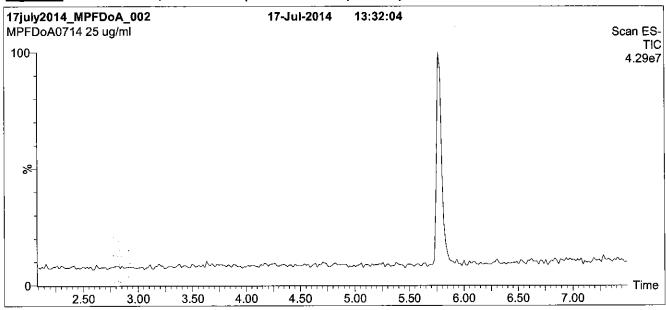
QUALITY MANAGEMENT:

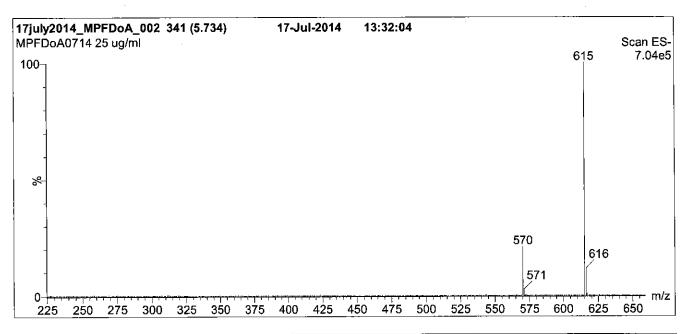
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





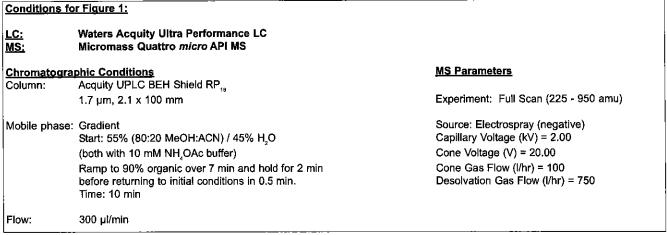
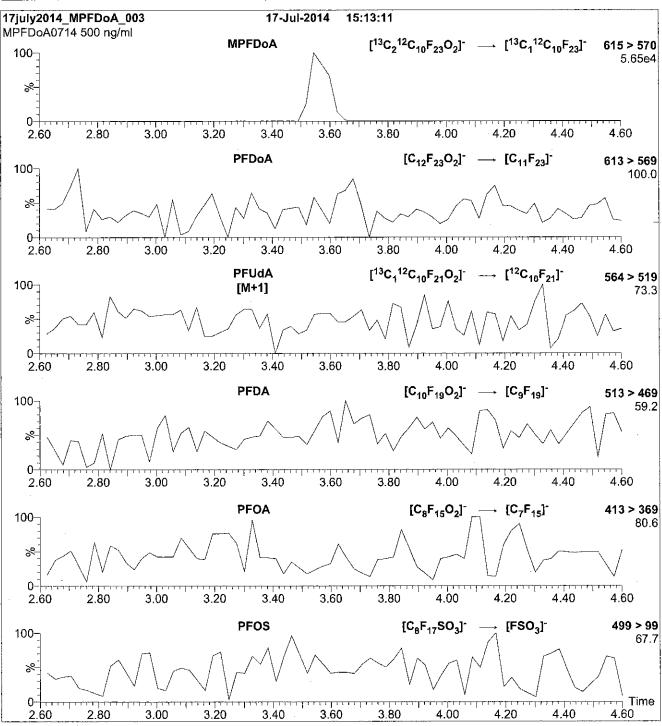
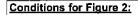


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFDoA)

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

(both with 10 mM NH,OAc buffer)

Flow:

300 µ1/min

MS Parameters

Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 13

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>

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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

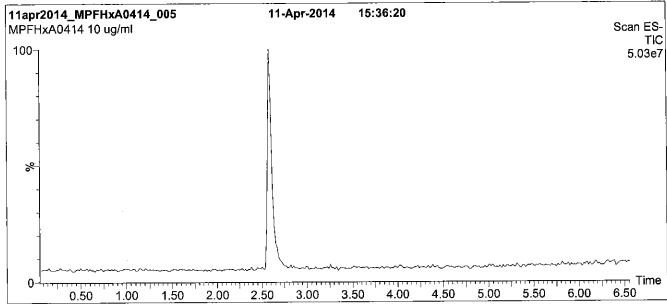
QUALITY MANAGEMENT:

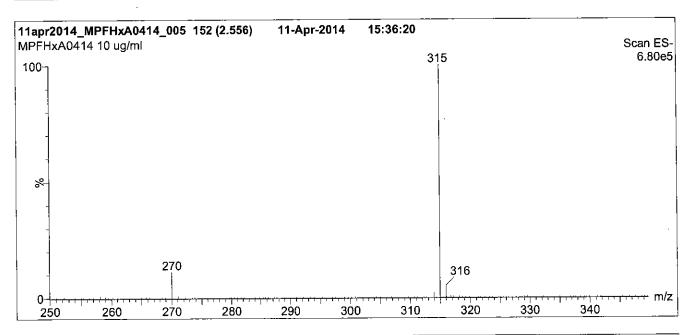
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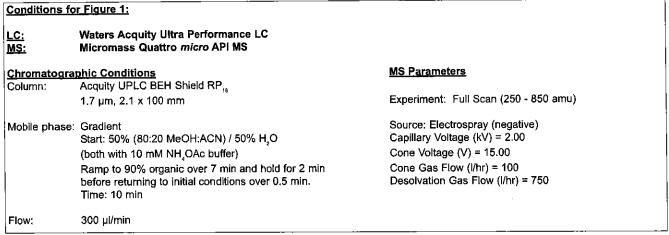




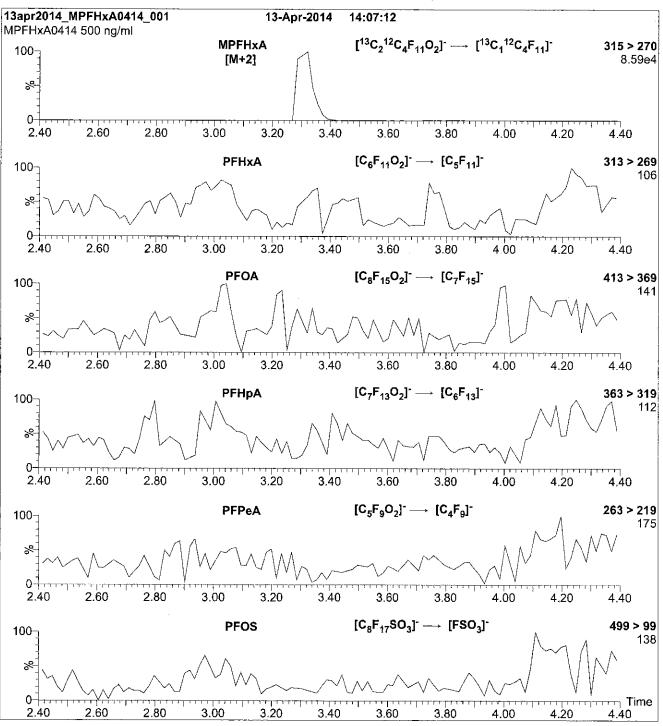


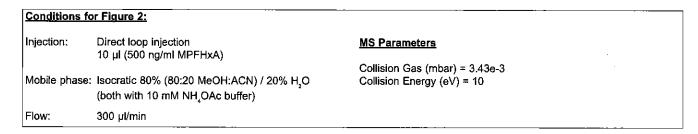






<u>Figure 2:</u> MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





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

≥99%13C

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

ISOTOPIC PURITY:

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

Water (<1%)

EXPIRY DATE: (mm/dd/yyyy)

04/09/2015

RECOMMENDED STORAGE:

04/09/2020 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.

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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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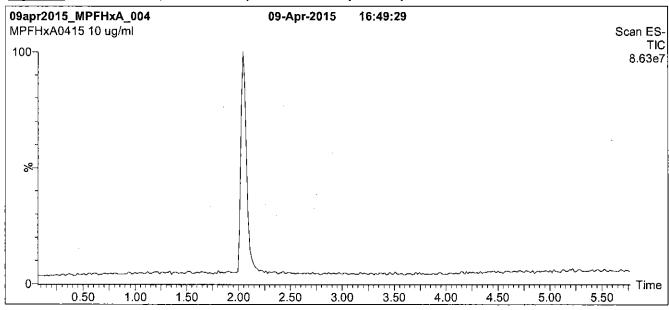
QUALITY MANAGEMENT:

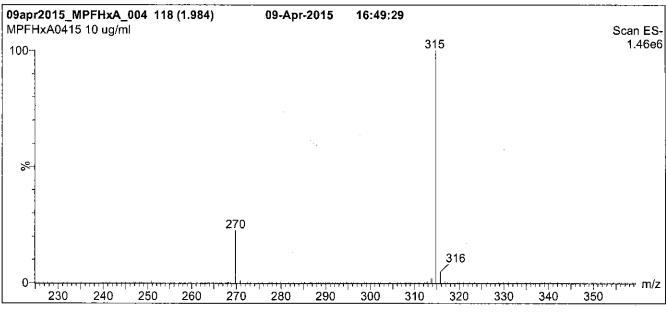
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Figure 1: MPFHxA; LC/MS Data (TIC and Mass Spectrum)





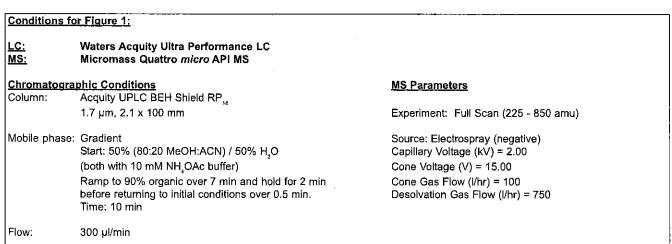
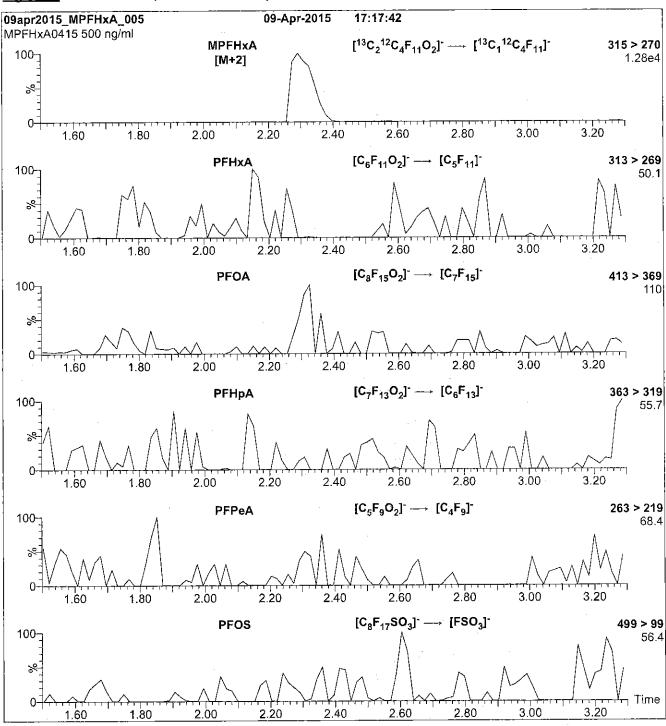
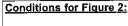


Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFHxA)

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) = 3.20e-3 Collision Energy (eV) = 10

LCMPFHxS_00004



PRODUCT CODE:

MPFHxS

LOT NUMBER:

MPFHxS0713

COMPOUND:

Sodium perfluoro-1-hexane[18O]sulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₆F₁₃S¹⁸O₂¹⁶ONa

MOLECULAR WEIGHT:

426.10

CONCENTRATION:

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

SOLVENT(S):

Methanol

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

ISOTOPIC PURITY:

>94% (18O₃)

CHEMICAL PURITY:

>98%

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

DOCUMENTATION/ DATA ATTACHED:

Figure 1: 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 (C₆F₁₃S¹⁶O₂¹⁶O⁷) has been observed to be up to 10% lower than for PFHxS (C₆F₁₃S¹⁶O₃⁷) when both compounds are injected together. This difference may vary between instruments.

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

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

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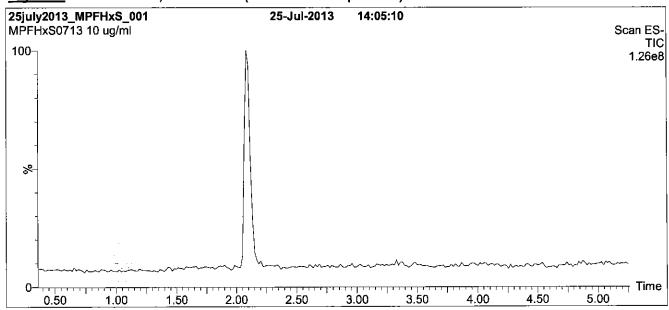
QUALITY MANAGEMENT:

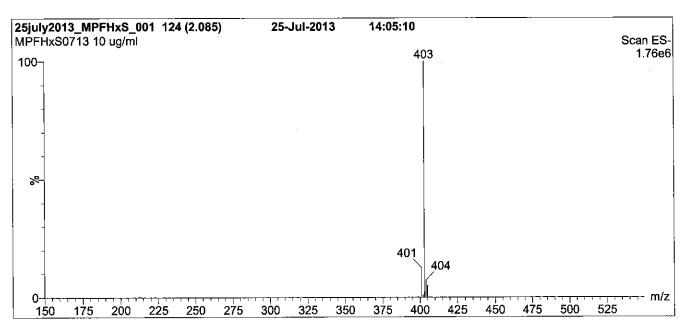
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Figure 1: MPFHxS; LC/MS Data (TIC and Mass Spectrum)





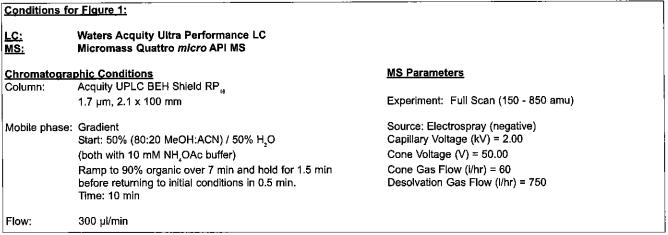
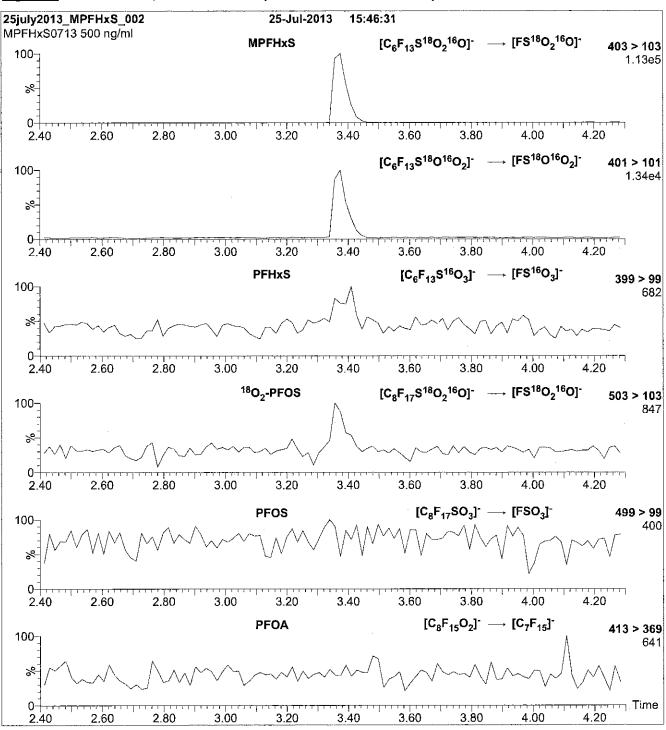
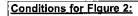


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





Injection: D

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

LCMPFNA_00003



PRODUCT CODE:

MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:

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

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₅¹²C₄HF₁₇O₂

 $50 \pm 2.5 \mu g/ml$

MOLECULAR WEIGHT:

469.04

SOLVENT(S):

Methanol

≥99%13C

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>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

ISOTOPIC PURITY:

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

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 04/13/2014

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, $u_s(y)$, 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.

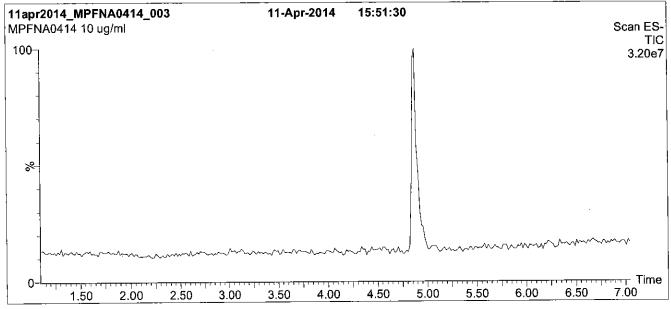
QUALITY MANAGEMENT:

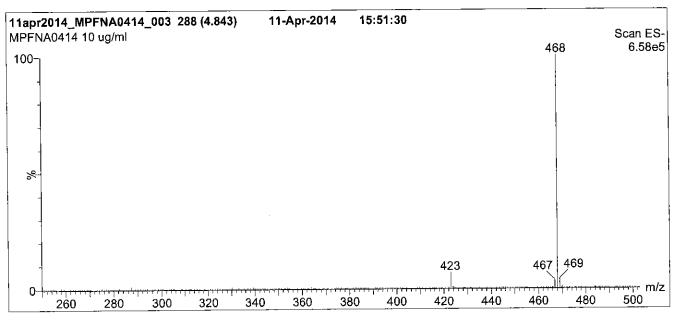
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).











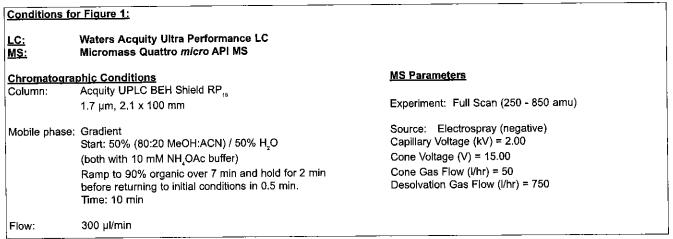
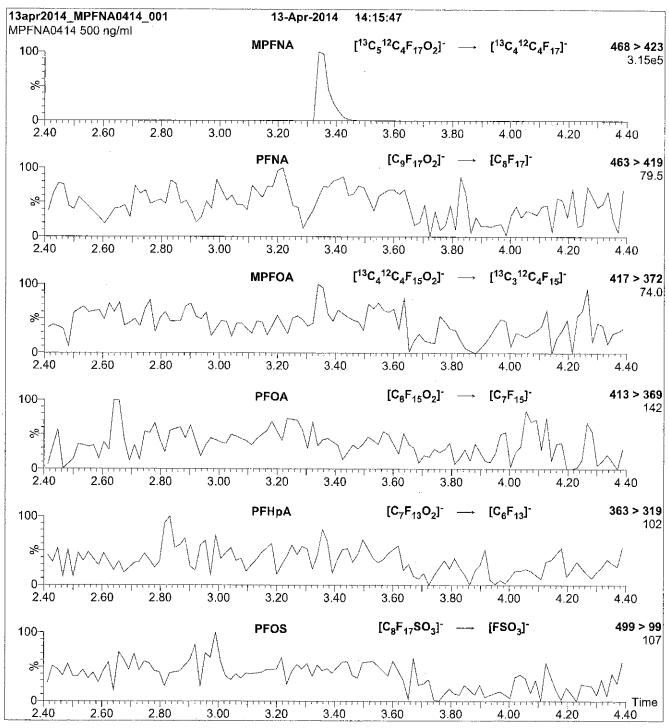
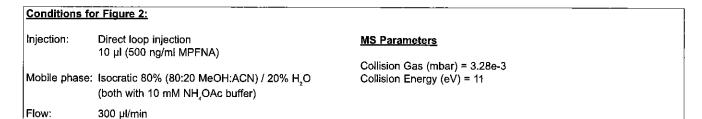


Figure 2: MPFNA; LC/MS/MS Data (Selected MRM Transitions)





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:

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

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

469.04

SOLVENT(S):

Methanol

>99%13C

Water (<1%)

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

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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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

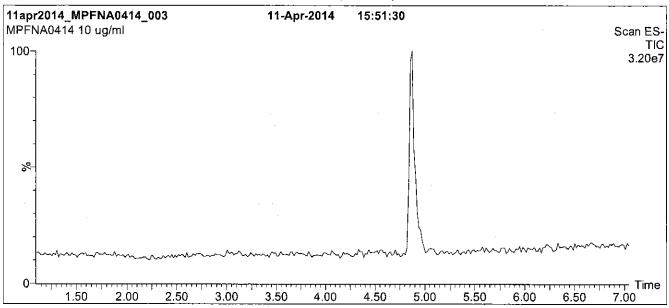
QUALITY MANAGEMENT:

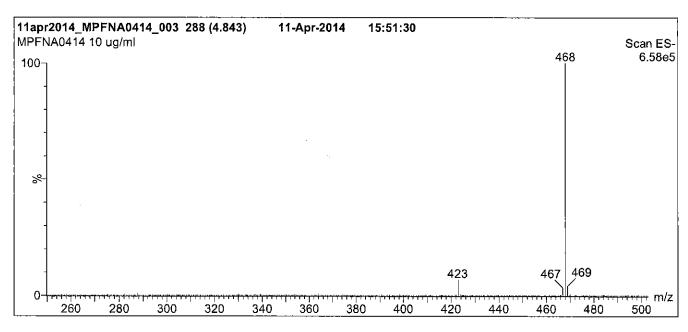
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

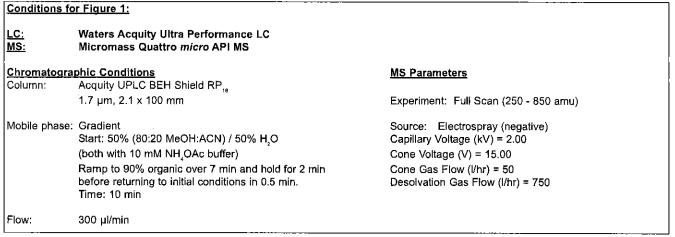




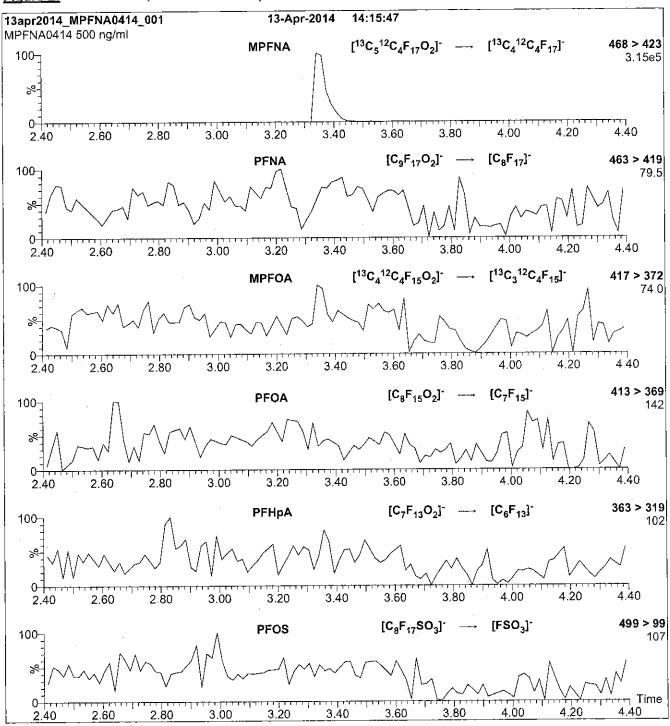
Figure 1: MPFNA; LC/MS Data (TIC and Mass Spectrum)







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





Injection:

Flow:

Direct loop injection

10 μl (500 ng/ml MPFNA)

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) = 3.28e-3 Collision Energy (eV) = 11

LCMPFOA 00007

V: 9/5/5 8V



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

Water (<1%) >99% 13C

(1,2,3,4-13C₄)

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>

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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 ±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.

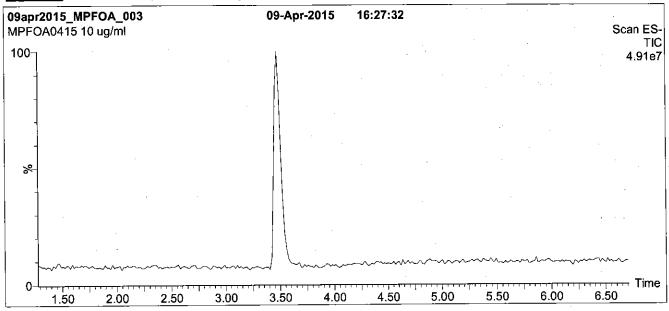
QUALITY MANAGEMENT:

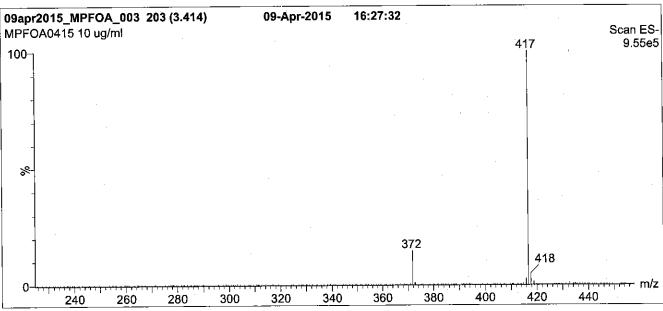
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





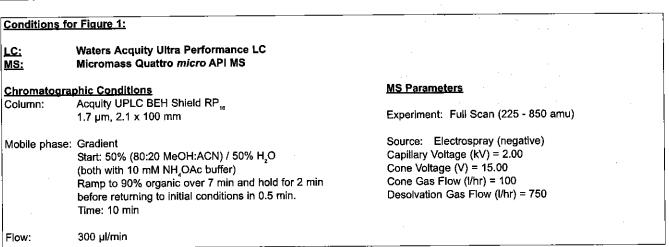
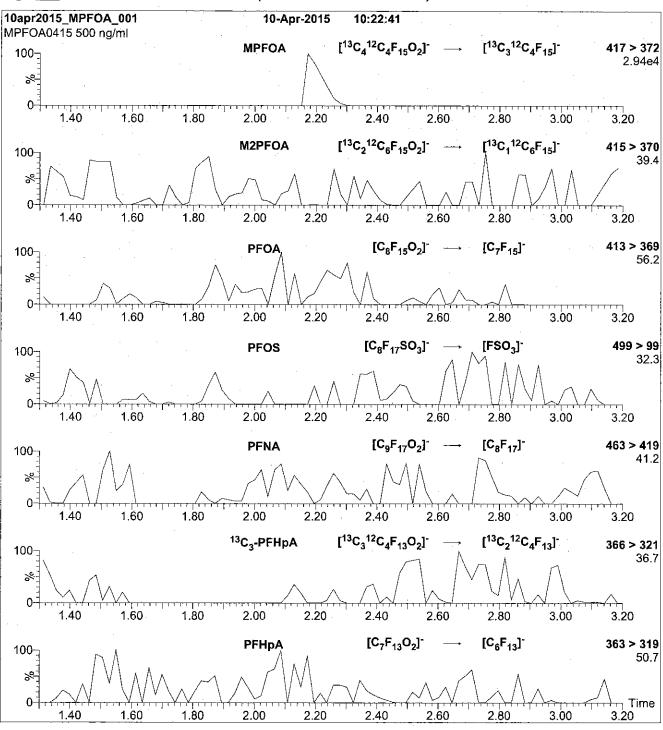
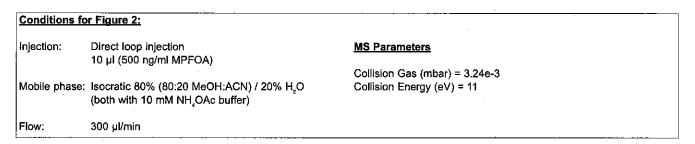


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





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:

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

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

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

05/15/2015

(1,2,3,4-13C₄)

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:

D C Skittim

Date: 05/28/2015

(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:

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 $X_1, X_2,...X_n$ on which it depends is:

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

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

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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.

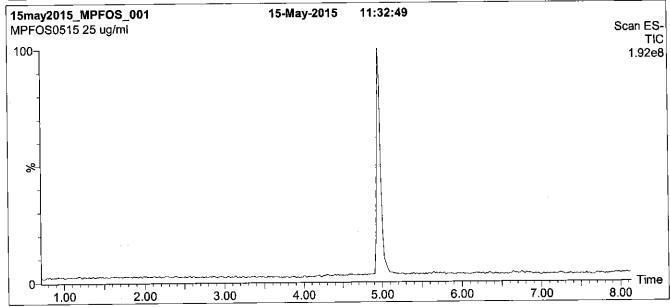
QUALITY MANAGEMENT:

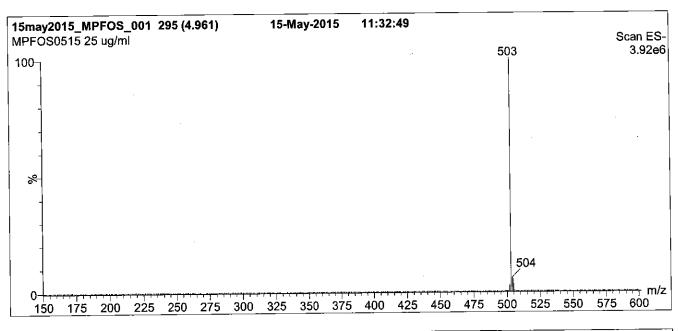
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





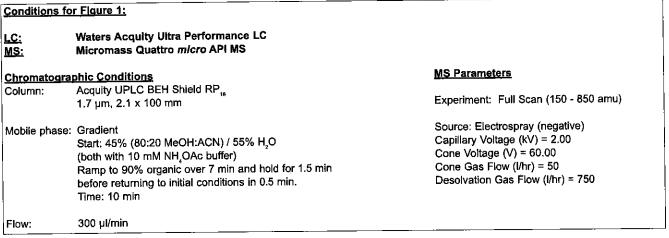
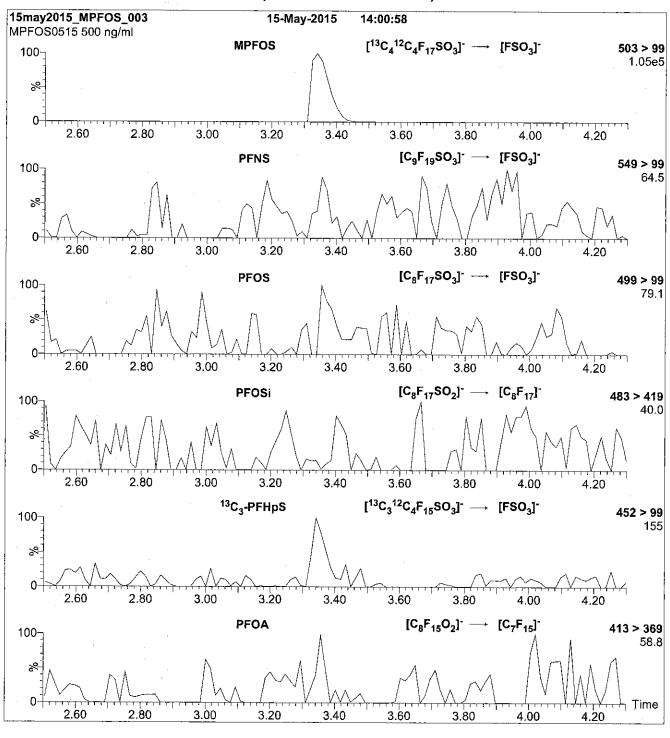
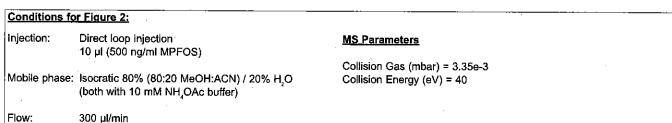


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFUdA_00004



PRODUCT CODE:

MPFUdA

LOT NUMBER:

MPFUdA1014

COMPOUND:

Perfluoro-n-[1,2-13C₂]undecanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

13C, 12C, HF, O,

MOLECULAR WEIGHT:

566.08

CONCENTRATION: $50 \pm 2.5 \,\mu\text{g/ml}$

SOLVENT(S):

Methanol

ISOTOPIC PURITY:

Water (<1%) ≥99% ¹³C (1,2-¹³C₂)

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 1-13C₁-PFUdA (~1%; see Figure 2), 2-13C₁-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the 13C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

1/03/2014

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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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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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.

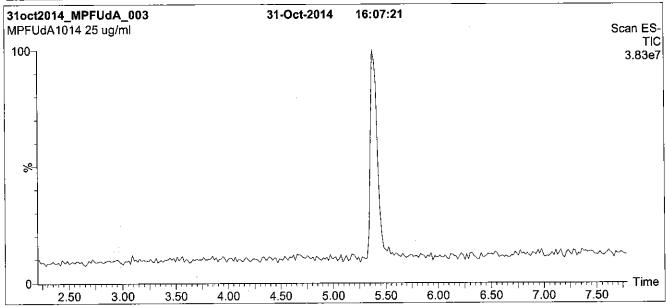
QUALITY MANAGEMENT:

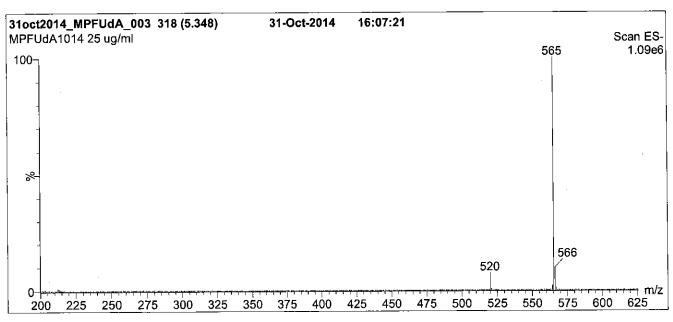
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





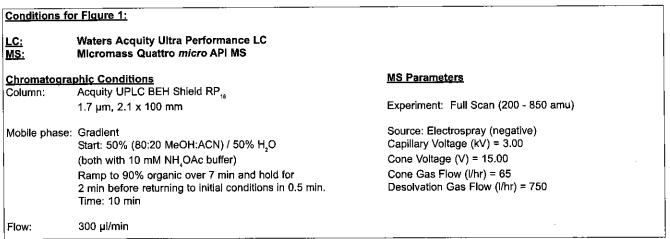
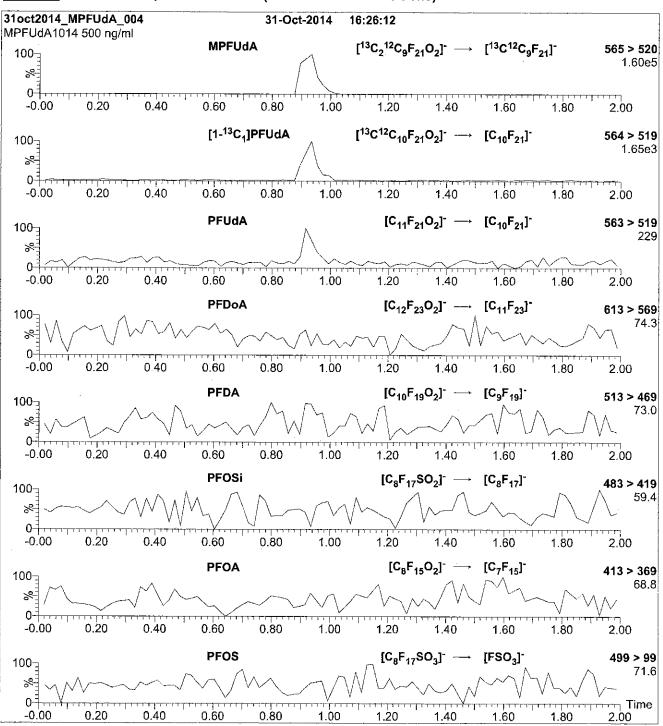
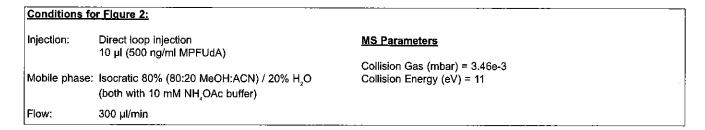


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





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:

 $50 \pm 2.5 \mu g/ml$

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

SOLVENT(S):

566.08

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

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:

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.

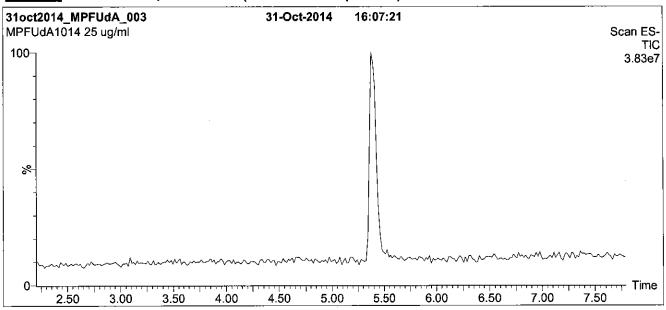
QUALITY MANAGEMENT:

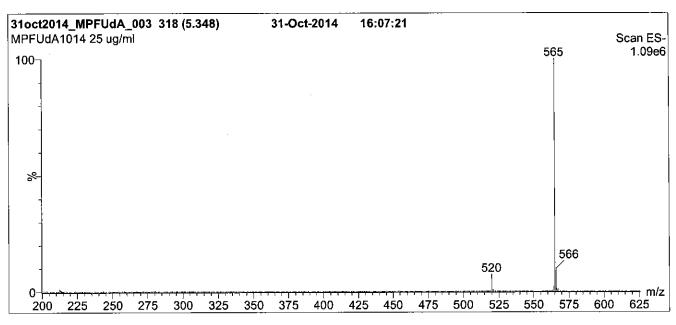
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).











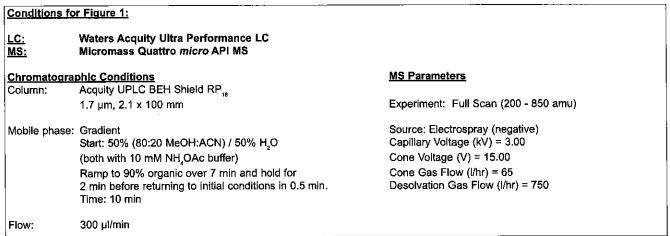
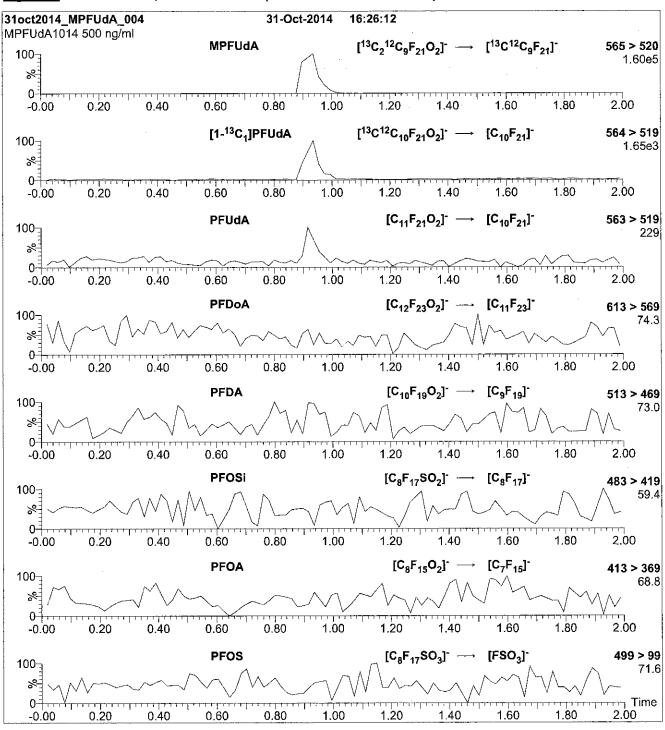
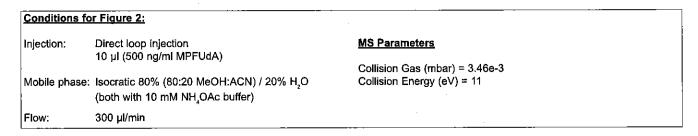


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





LCPFBA_00003



PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0313

COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4

F F F F

MOLECULAR FORMULA:

C₄HF₂O₃

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: 03/06/

(mm/dd/yyyy)

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

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LIMITED WARRANTY:

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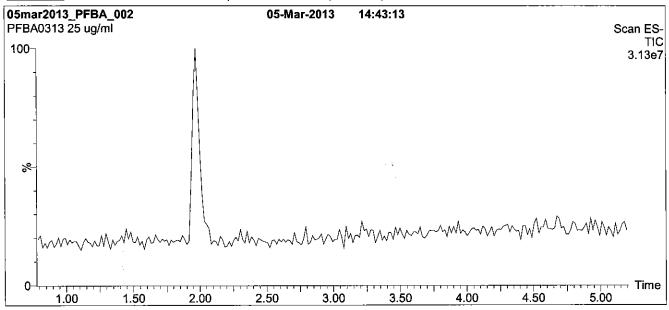
QUALITY MANAGEMENT:

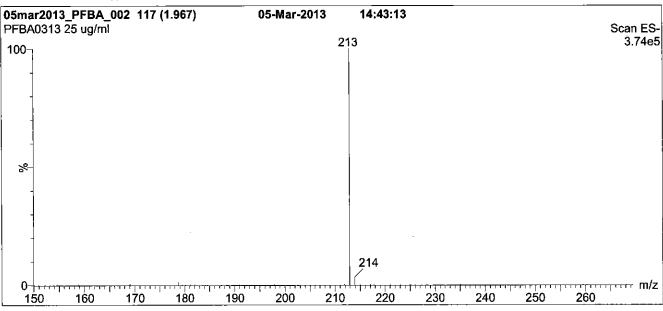
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Figure 1: PFBA; LC/MS Data (TIC and Mass Spectrum)





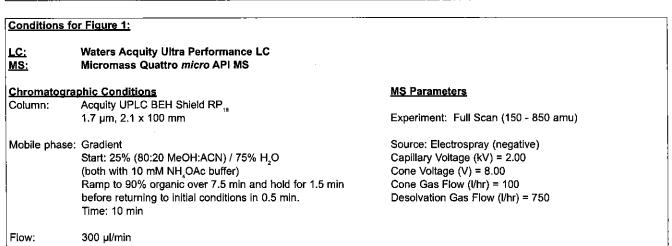
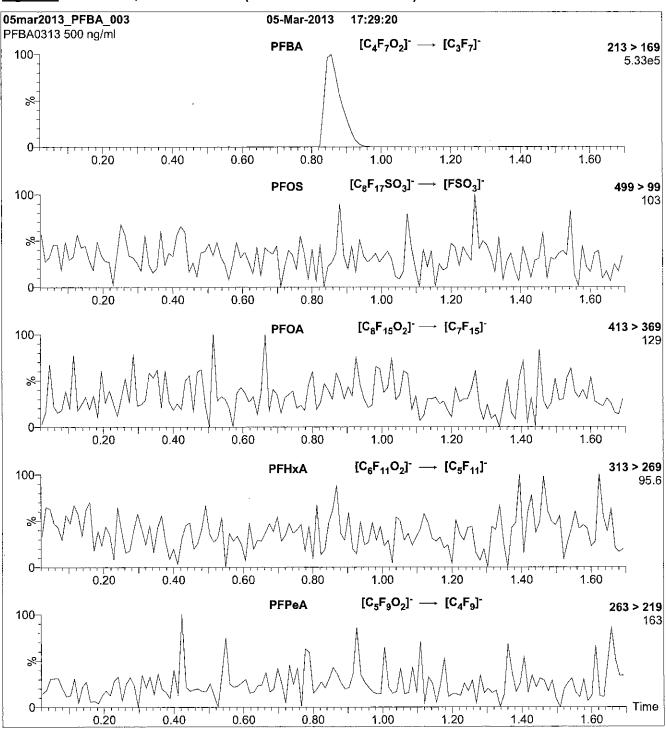
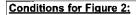


Figure 2: PFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFBA)

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

(both with 10 mM NH, OAc 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:

LPFBS1014

COMPOUND:

Potassium perfluoro-1-butanesulfonate

STRUCTURE:

CAS #:

29420-49-3

F F F F F

MOLECULAR FORMULA:

C₄F₄SO₃K

C₄F₉3O₃N

MOLECULAR WEIGHT: SOLVENT(S): 338.19 Methanol

CONCENTRATION:

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

44.2 ± 2.2 µg/ml (PFBS anion)

CHEMICAL PURITY:

>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:

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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:

<u> 10/17/2014</u>

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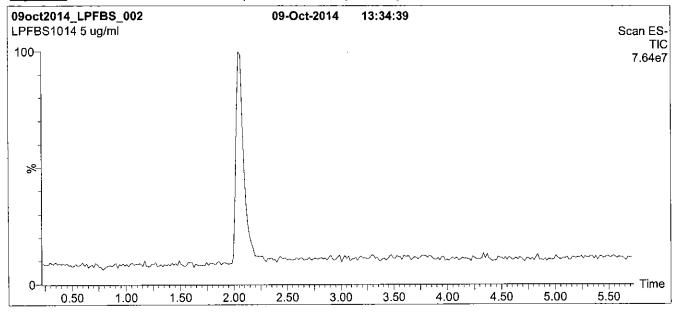
QUALITY MANAGEMENT:

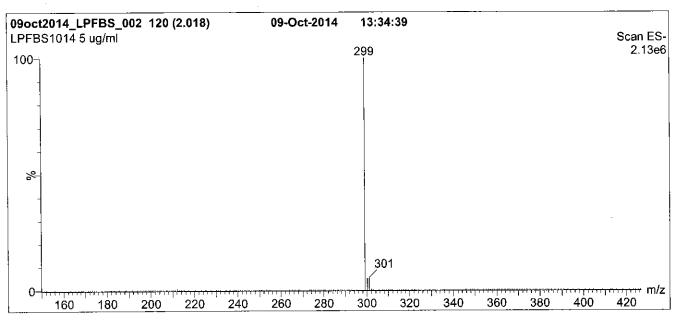
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Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)





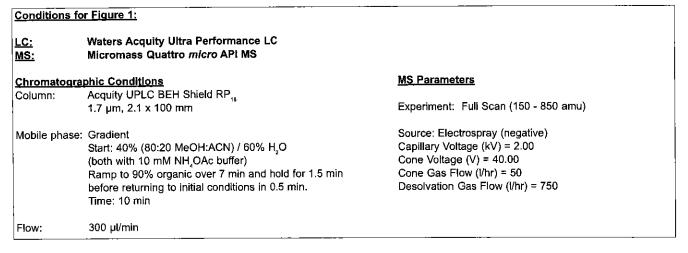
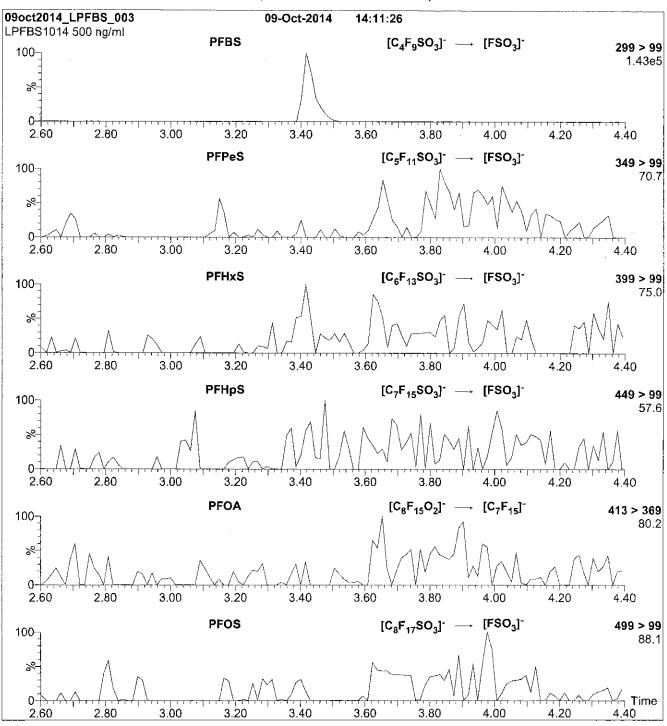
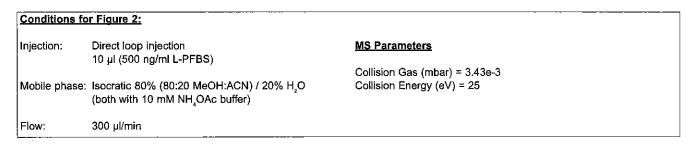


Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)





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 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:

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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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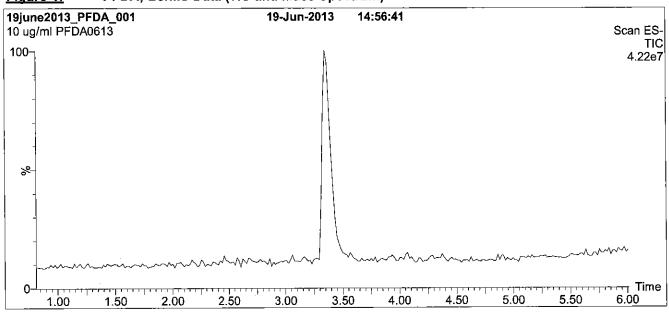
QUALITY MANAGEMENT:

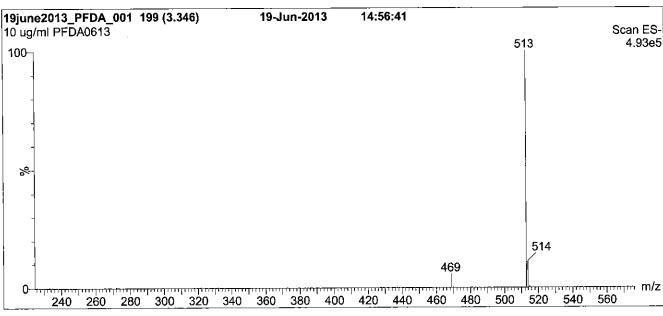
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Figure 1: PFDA; LC/MS Data (TIC and Mass Spectrum)





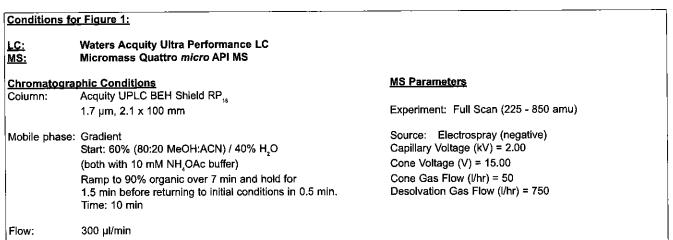
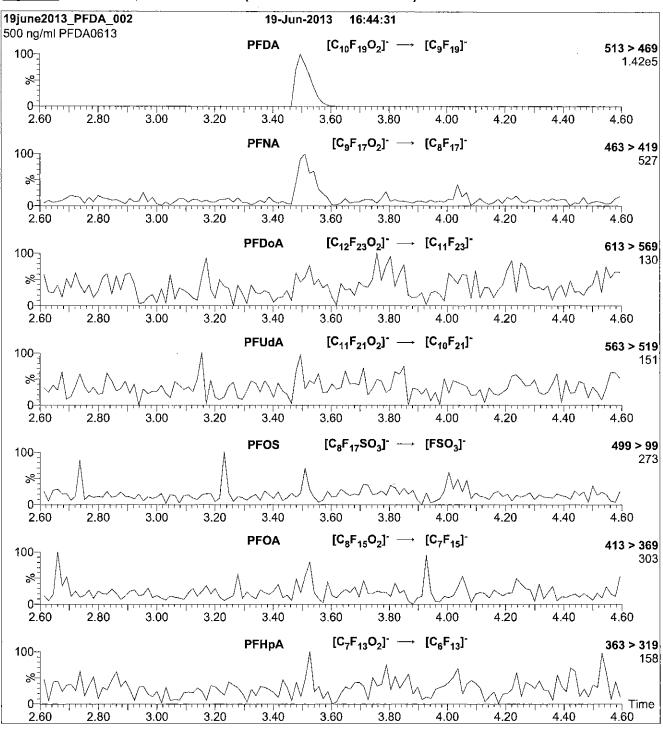
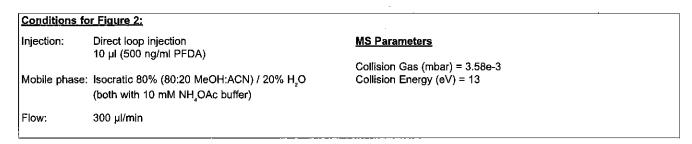


Figure 2: PFDA; LC/MS/MS Data (Selected MRM Transitions)





LCPFDA_00004



PRODUCT CODE:

PFDA

LOT NUMBER:

PFDA0615

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:

CAS #:

335-76-2

MOLECULAR FORMULA:

C₁₀HF₁₉O₂

50 ± 2.5 μg/ml

MOLECULAR WEIGHT:

514.08

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

07/02/2015

EXPIRY DATE: (mm/dd/yyyy)

07/02/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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

Contains ~ 0.6% PFNA and ~ 0.3% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>07/24/2015</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.

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

UNCERTAINTY:

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

The combined relative standard uncertainty, $u_n(y)$, 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.

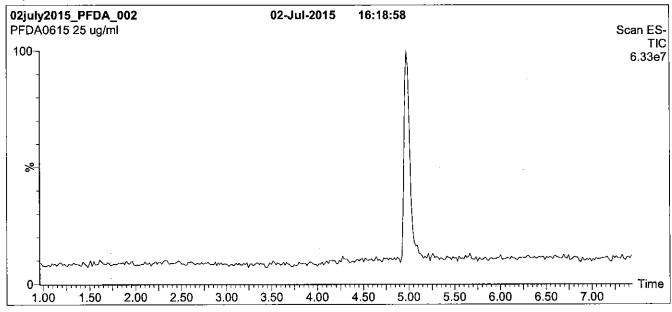
QUALITY MANAGEMENT:

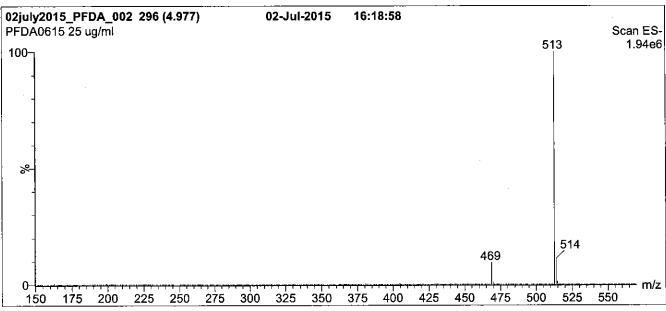
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Figure 1: PFDA; LC/MS Data (TIC and Mass Spectrum)





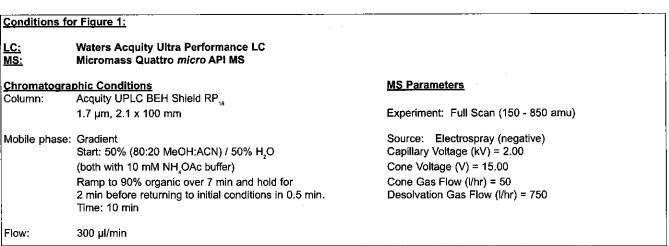
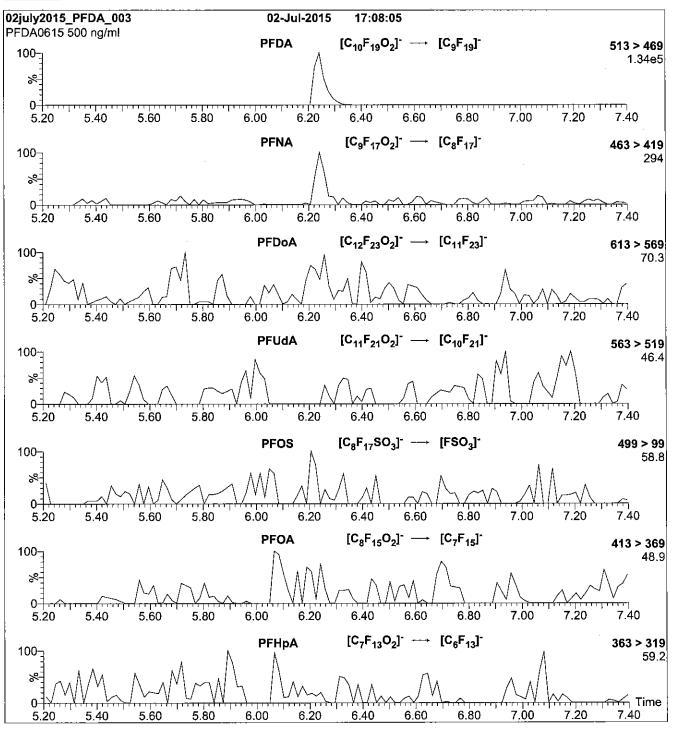
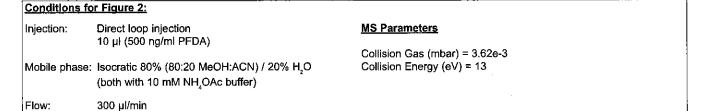


Figure 2: PFDA; LC/MS/MS Data (Selected MRM Transitions)





LCPFDoA_00003



PRODUCT CODE:

PFDoA

LOT NUMBER:

PFDoA0113

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:

CAS #:

307-55-1

MOLECULAR FORMULA:

C₁₂HF₂₃O₂

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

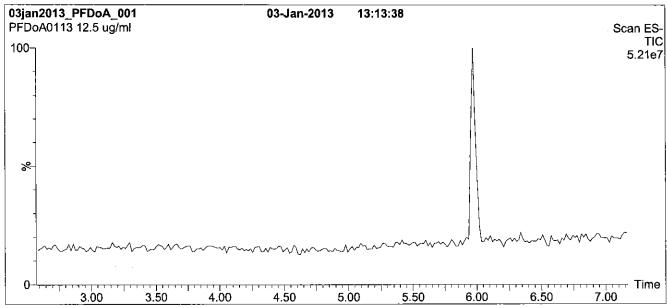
Certified By:

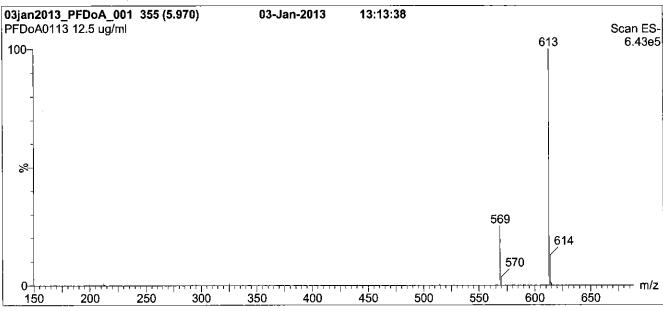
B.G. Chittim

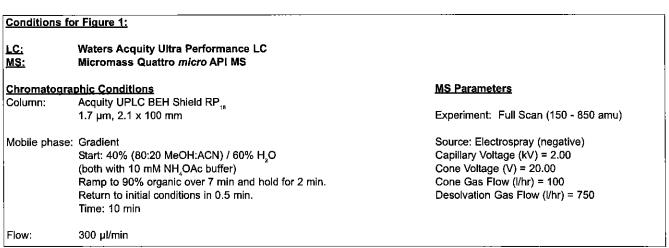
Date: (

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

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







LCPFDoA_00004



PRODUCT CODE:

PFDoA

LOT NUMBER:

COMPOUND:

Perfluoro-n-dodecanoic acid

PFDoA0115

STRUCTURE:

CAS #:

307-55-1

MOLECULAR FORMULA:

C,2HF,3O,2

MOLECULAR WEIGHT:

614.10

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mm/dd/yyyy)

01/30/2020

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.

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Certified By:

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HAZARDS:

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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.

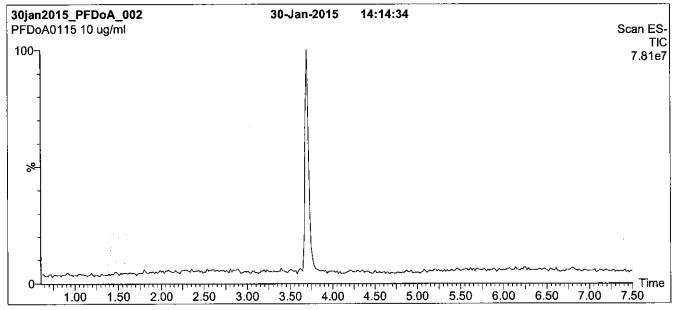
QUALITY MANAGEMENT:

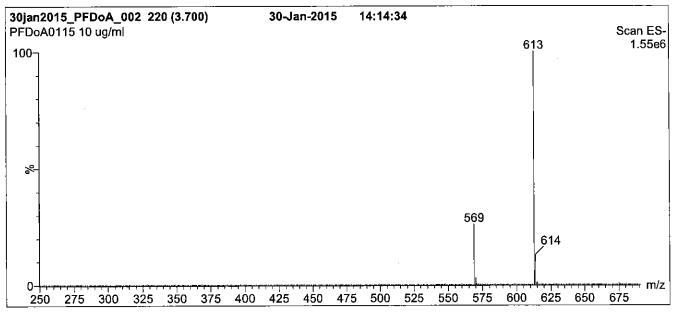
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





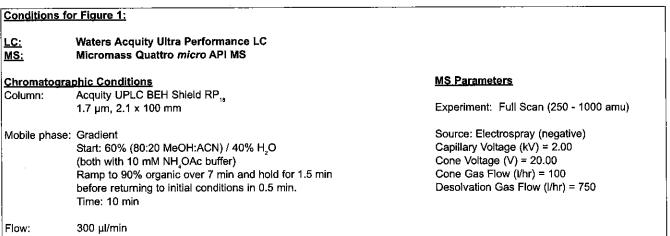
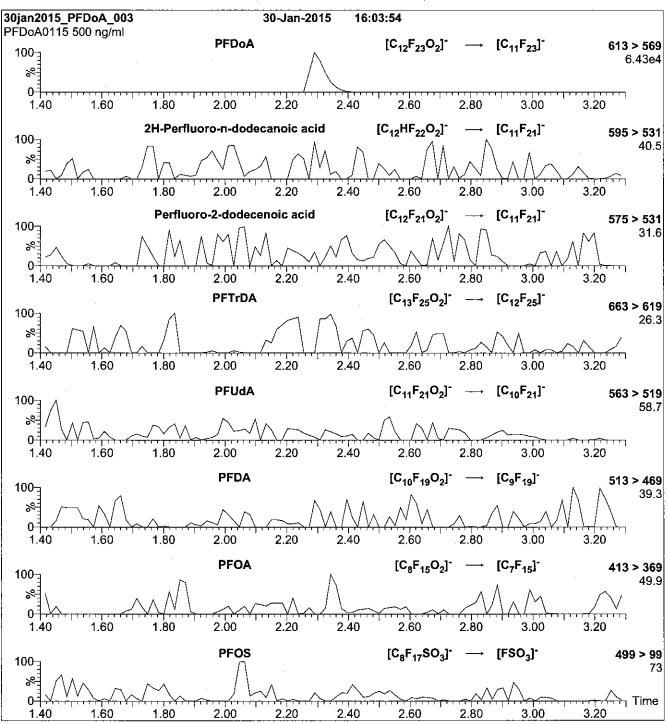
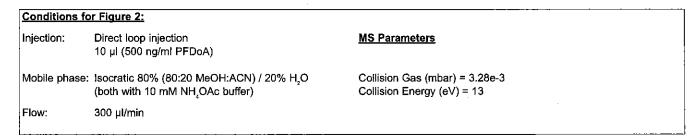


Figure 2: PFDoA; LC/MS/MS Data (Selected MRM Transitions)





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/yaay)

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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UNCERTAINTY:

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

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LIMITED WARRANTY:

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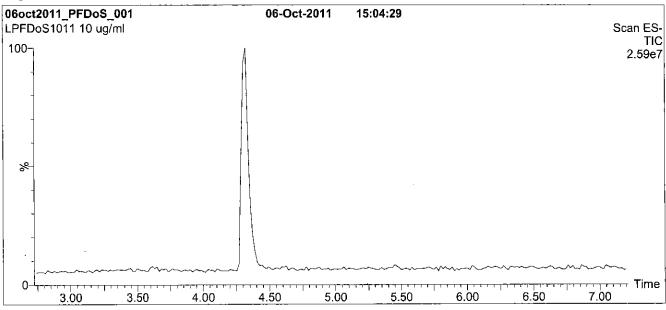
QUALITY MANAGEMENT:

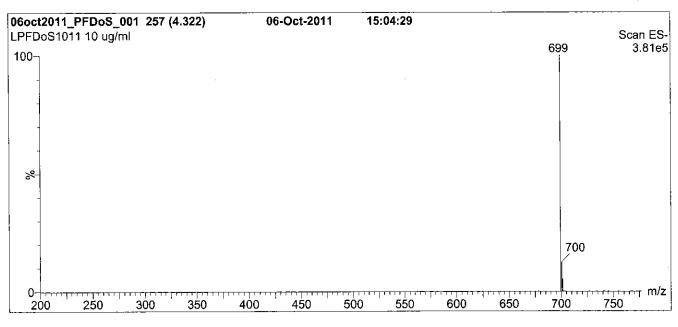
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Figure 1: L-PFDoS; LC/MS Data (TIC and Mass Spectrum)





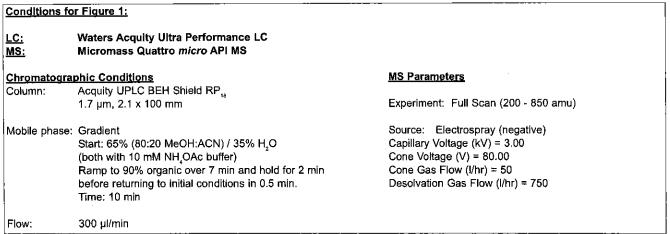
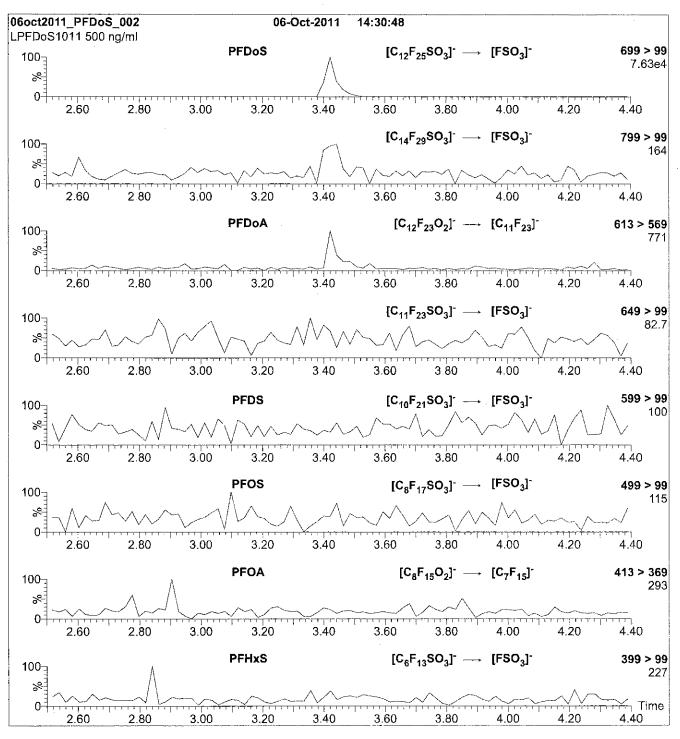
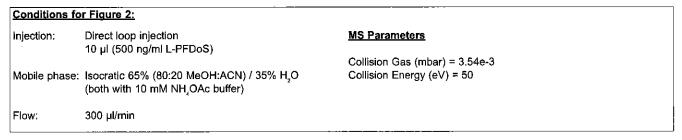


Figure 2: L-PFDoS; LC/MS/MS Data (Selected MRM Transitions)





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

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

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

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

09/13/2013

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

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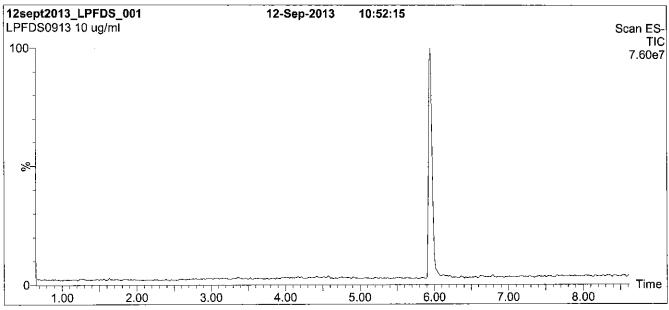
QUALITY MANAGEMENT:

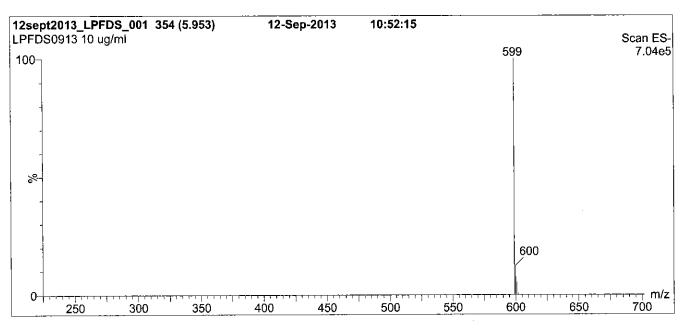
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Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)





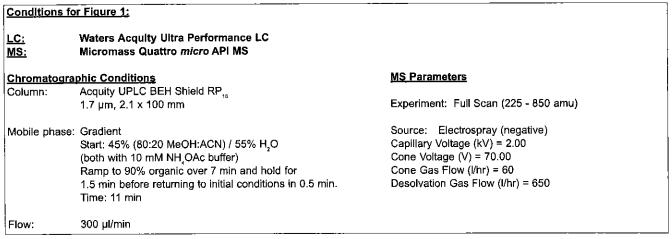
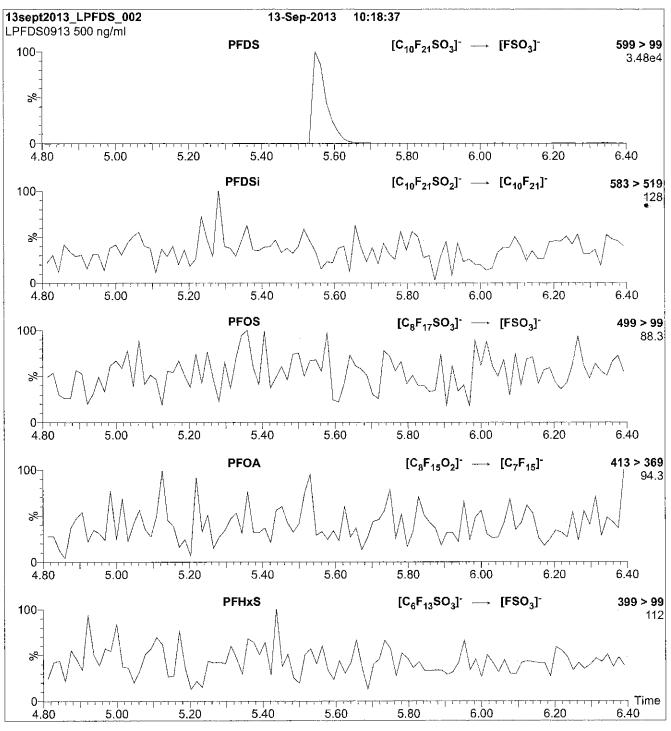
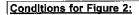


Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)





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

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:

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.

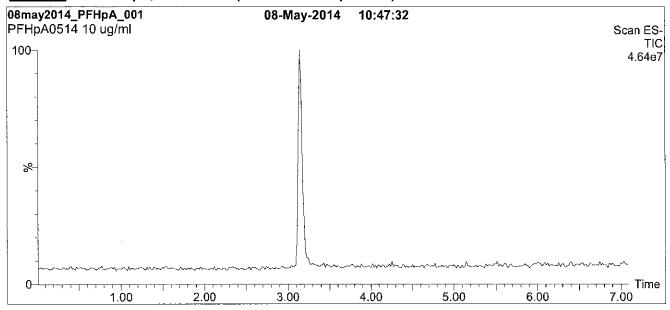
QUALITY MANAGEMENT:

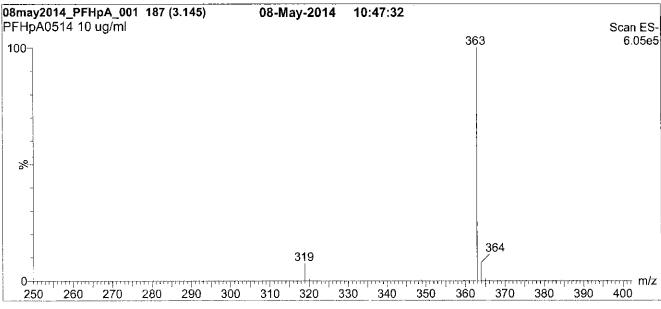
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





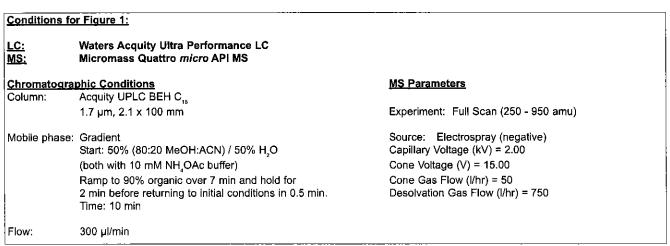
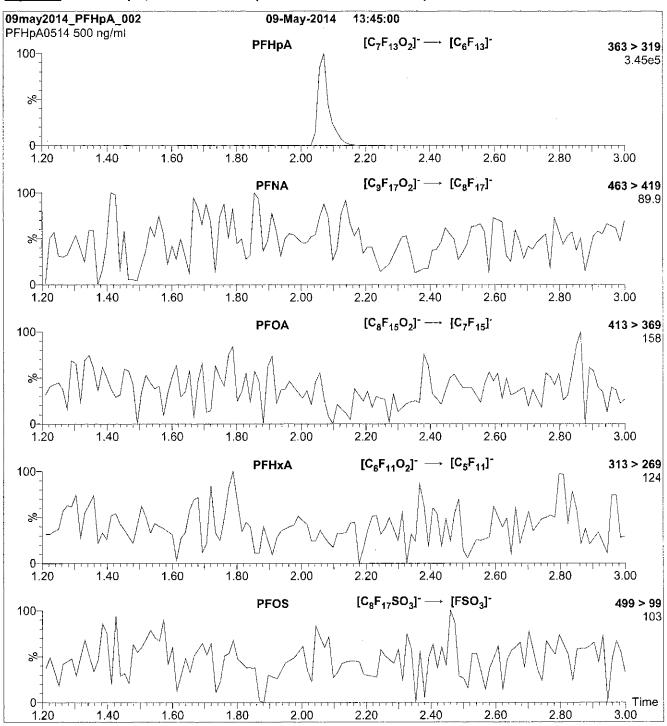
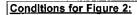


Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)





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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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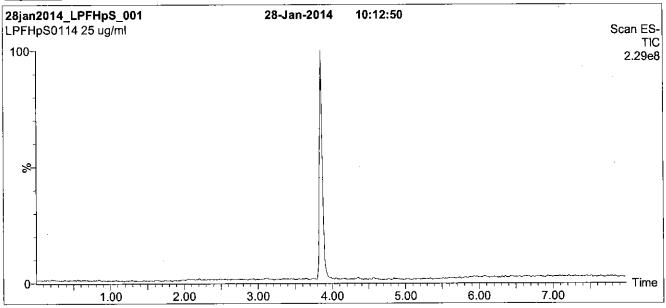
QUALITY MANAGEMENT:

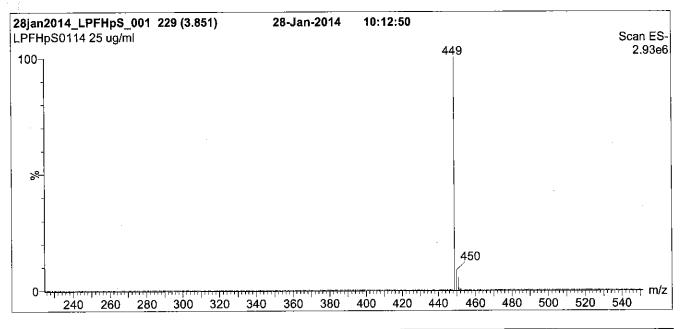
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





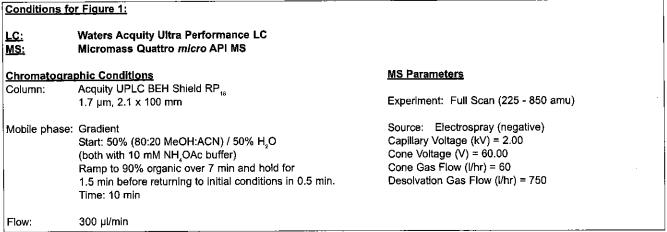
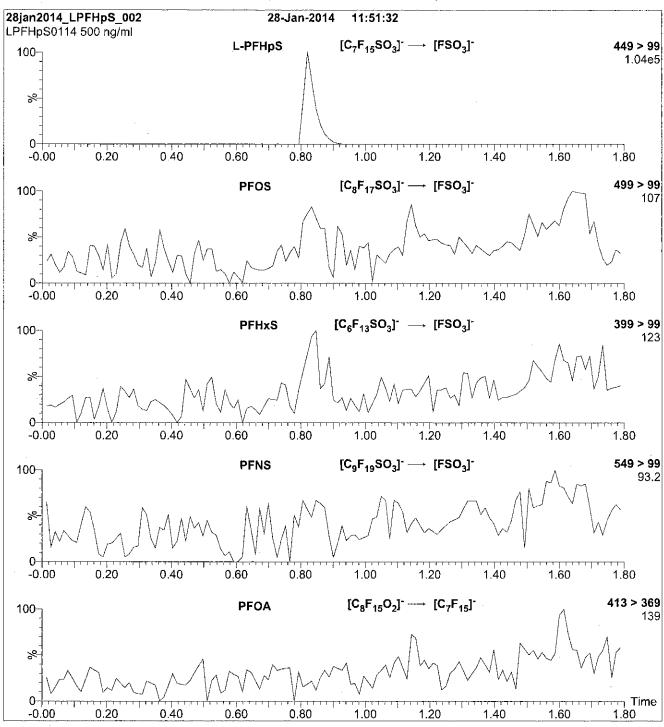
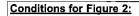


Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)





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:

SOLVENT(S):

314.05

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

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>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.

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LIMITED WARRANTY:

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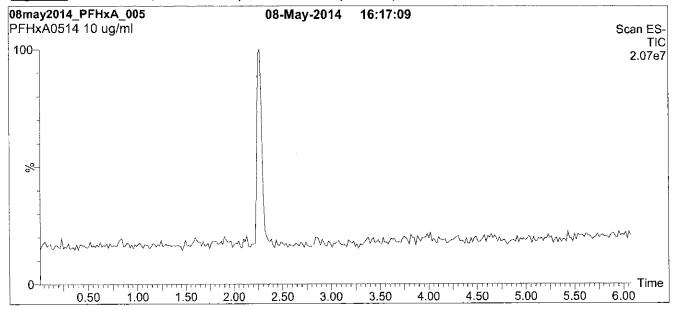
QUALITY MANAGEMENT:

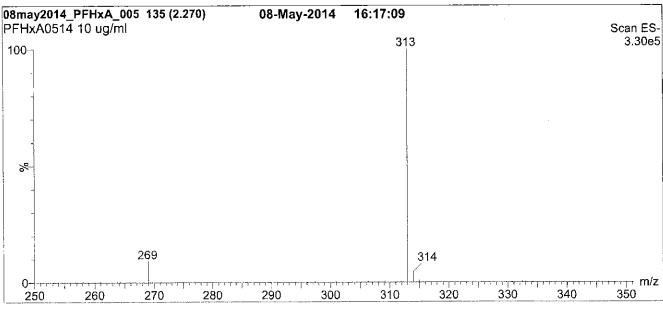
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Figure 1: PFHxA; LC/MS Data (TIC and Mass Spectrum)





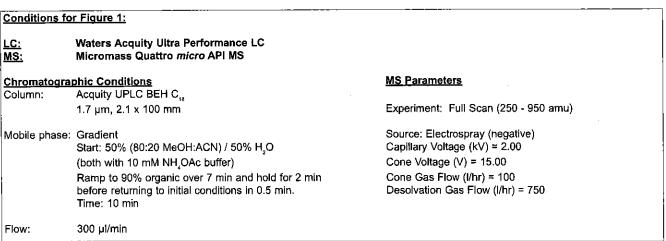
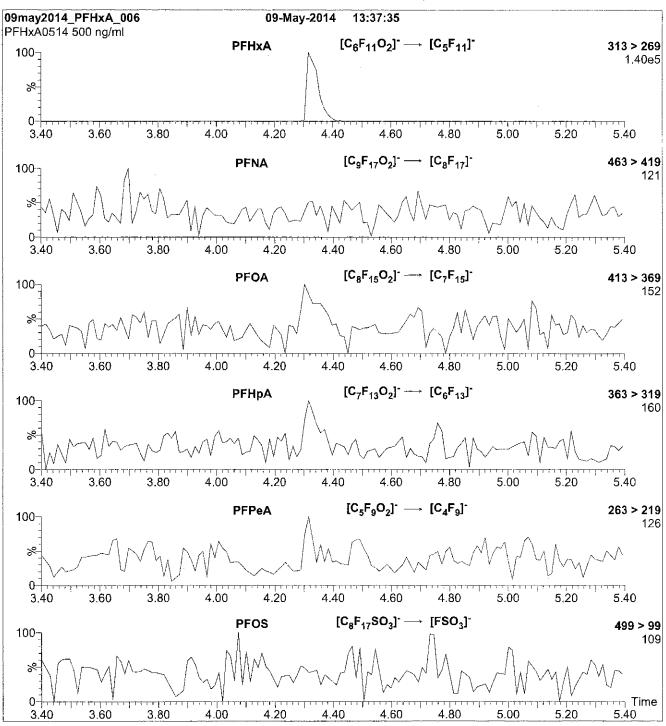
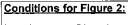


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





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

 $47.3 \pm 2.4 \mu g/ml$ (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>

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:

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.

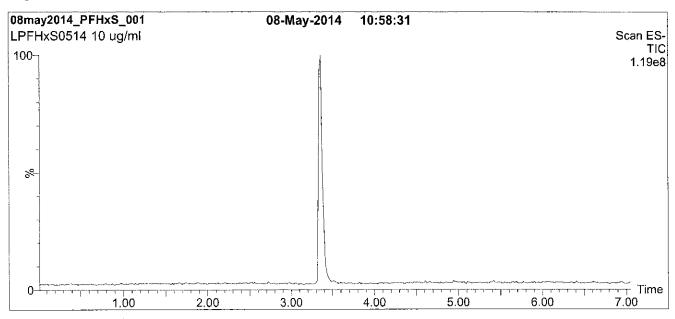
QUALITY MANAGEMENT:

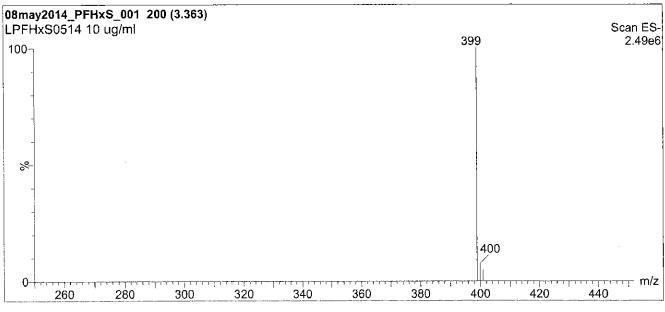
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Figure 1: L-PFHxS; LC/MS Data (TIC and Mass Spectrum)





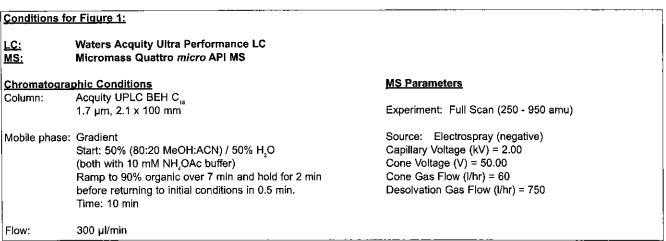
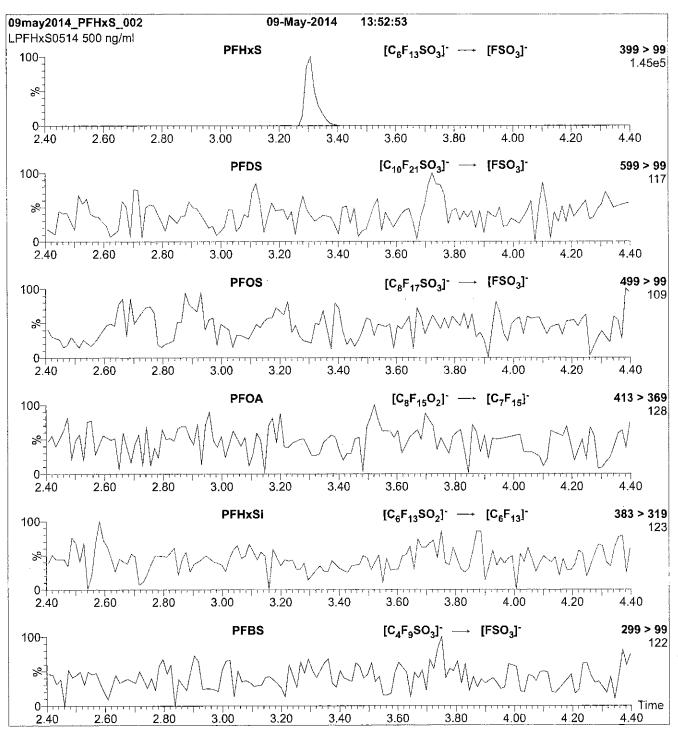
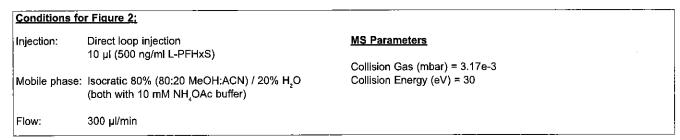


Figure 2: L-PFHxS; LC/MS/MS Data (Selected MRM Transitions)





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 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:

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DOCUMENTATION/ DATA ATTACHED:

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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:

(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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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.

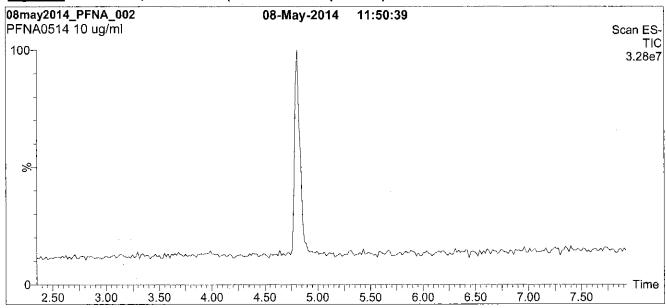
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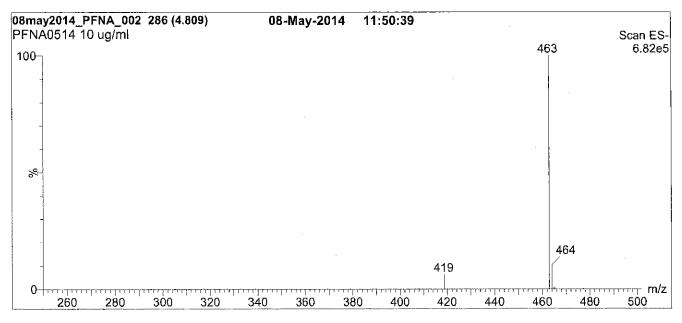
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).











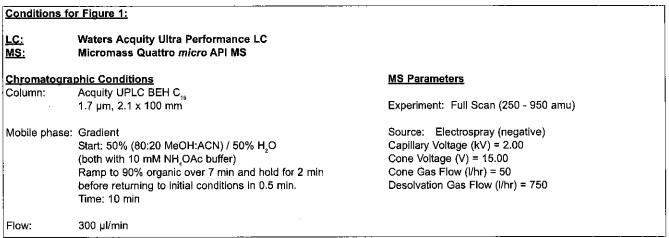
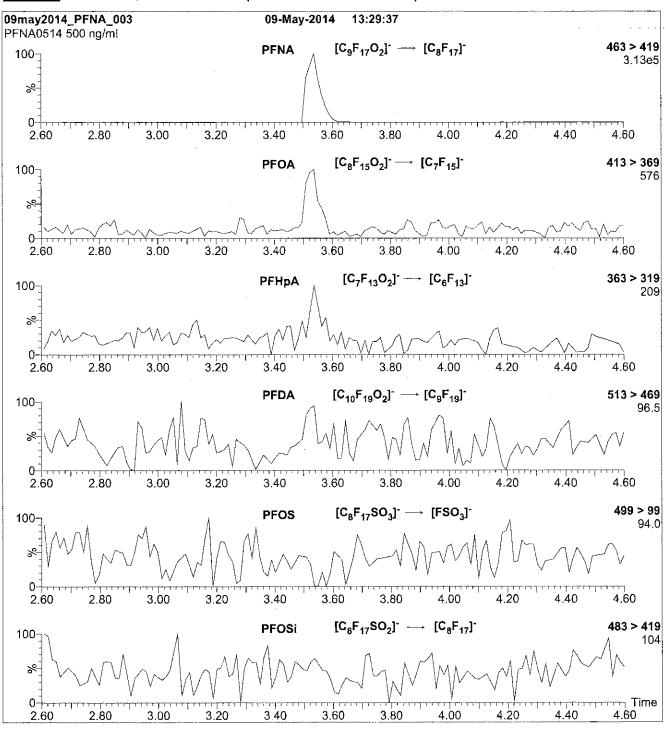
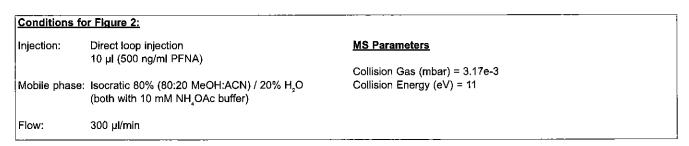


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





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:

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

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

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

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

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

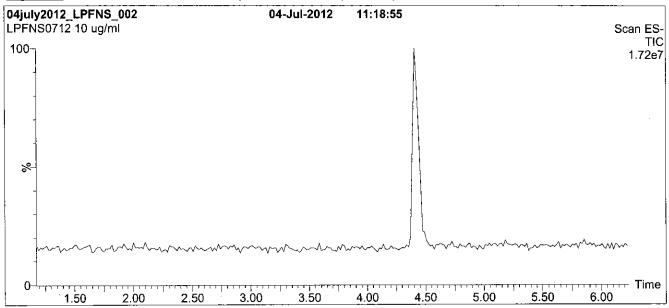
QUALITY MANAGEMENT:

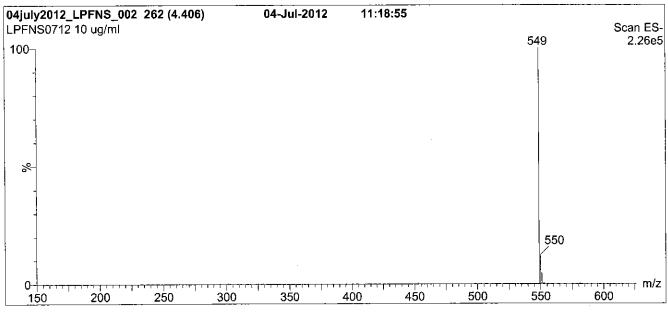
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





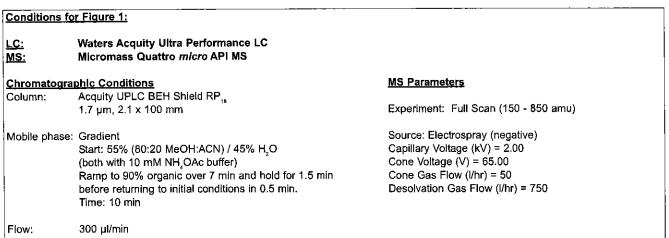
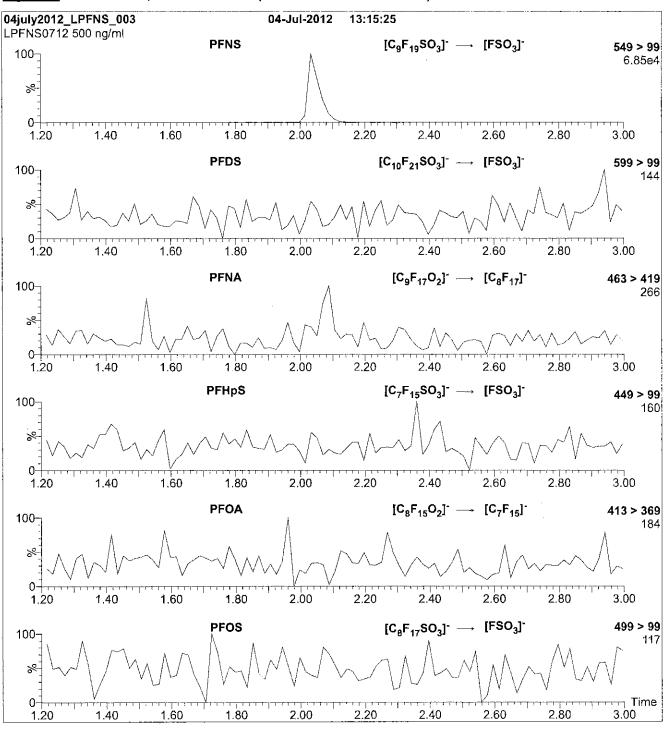
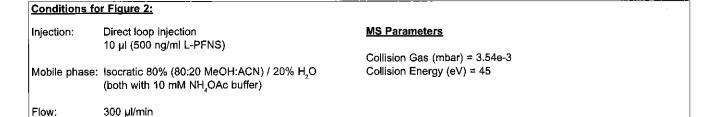


Figure 2: L-PFNS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOA_00004



PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1013

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1

MOLECULAR FORMULA:

50

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

MOLECULAR WEIGHT:

414.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>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: 1

(mm/dd/yyyy)

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

The products prepared by Wellington Laboratories Inc. are for laboratory use only. 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

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

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

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.

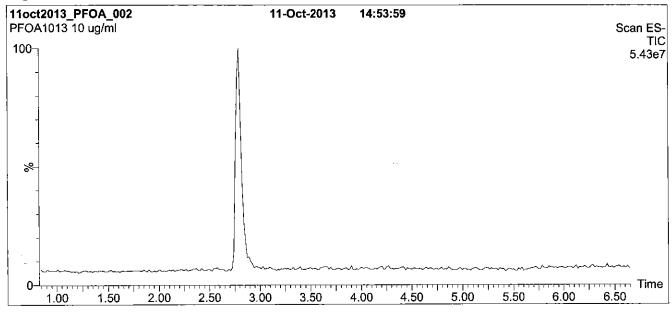
QUALITY MANAGEMENT:

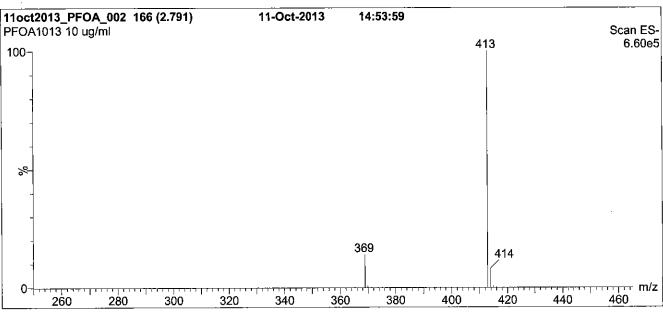
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





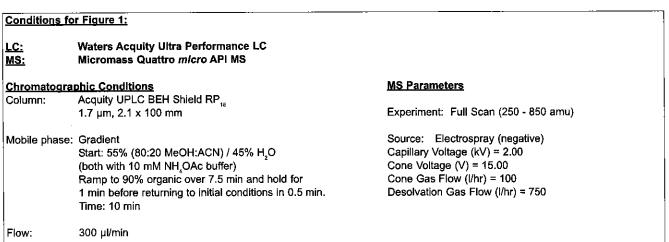
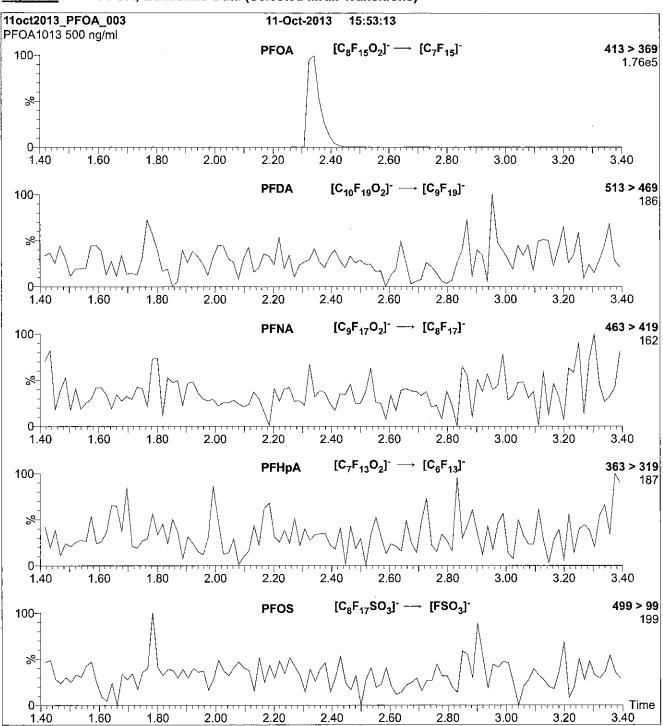
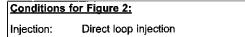


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





10 μl (500 ng/ml PFOA)

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

(both with 10 mM NH₄OAc buffer)

MS Parameters

Collision Gas (mbar) = 3.28e-3 Collision Energy (eV) = 11

Flow:

300 µl/min

LCPFOA_00005



PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1115

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1

MOLECULAR FORMULA:

C, HF, O,

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

414.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

11/06/2015

EXPIRY DATE: (mm/dd/yyyy)

11/06/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 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:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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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.

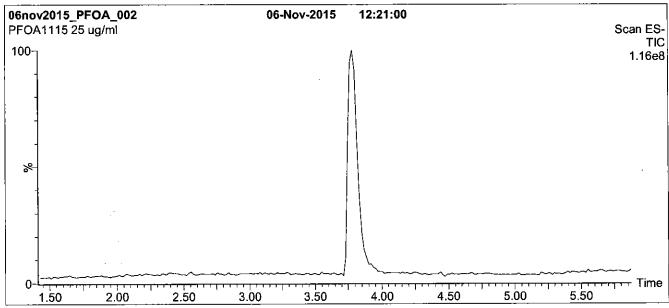
QUALITY MANAGEMENT:

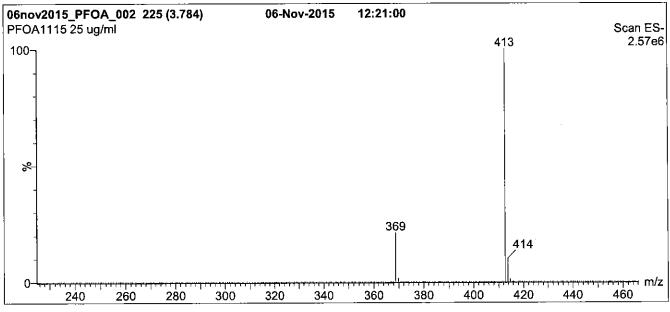
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





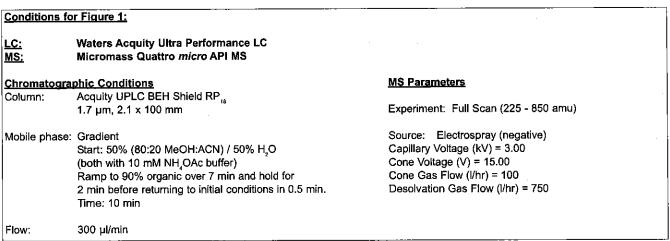
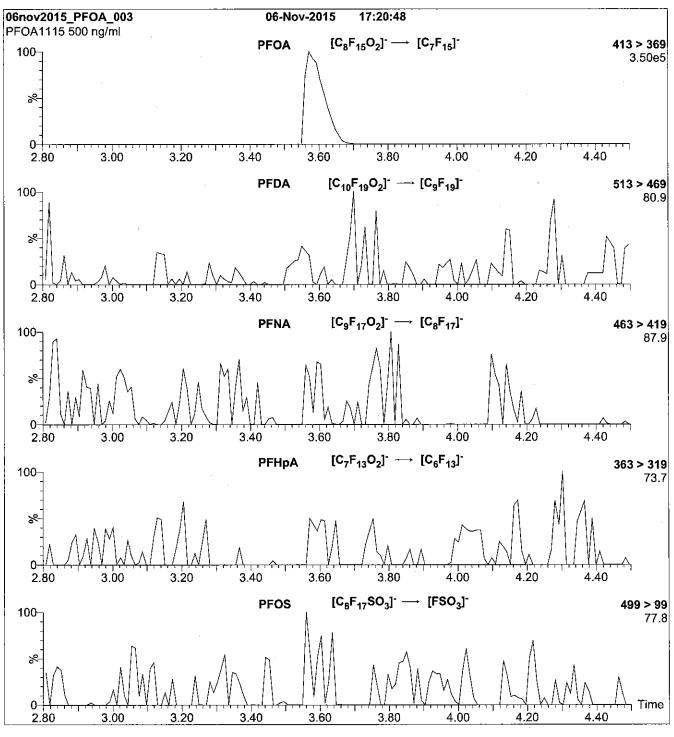
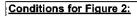


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFOA)

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

(both with 10 mM NH₂OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3 Collision Energy (eV) = 10

LCPFODA_00004



PRODUCT CODE:

PFODA

LOT NUMBER:

PFODA0807

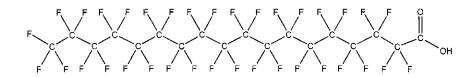
COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:

CAS #:

16517-11-6



MOLECULAR FORMULA:

C18HF35O2

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: j

<u>04/28/2014 </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:

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SYNTHESIS / CHARACTERIZATION:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration 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:

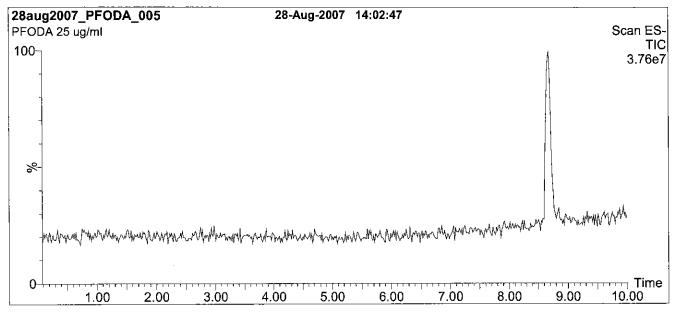
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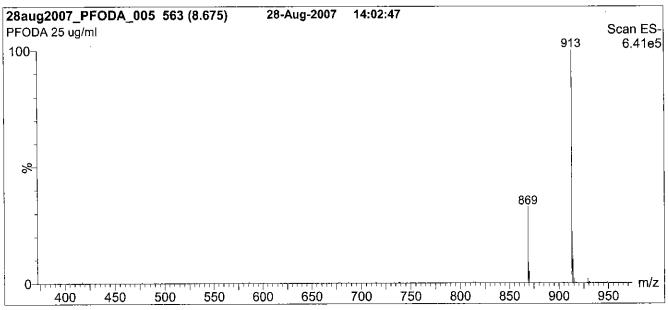




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





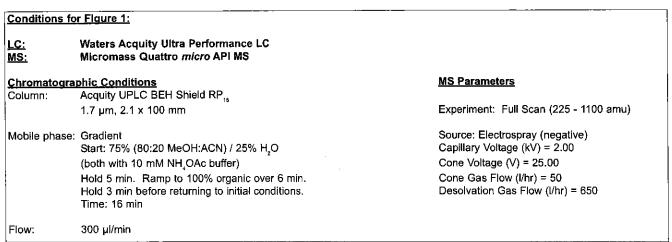
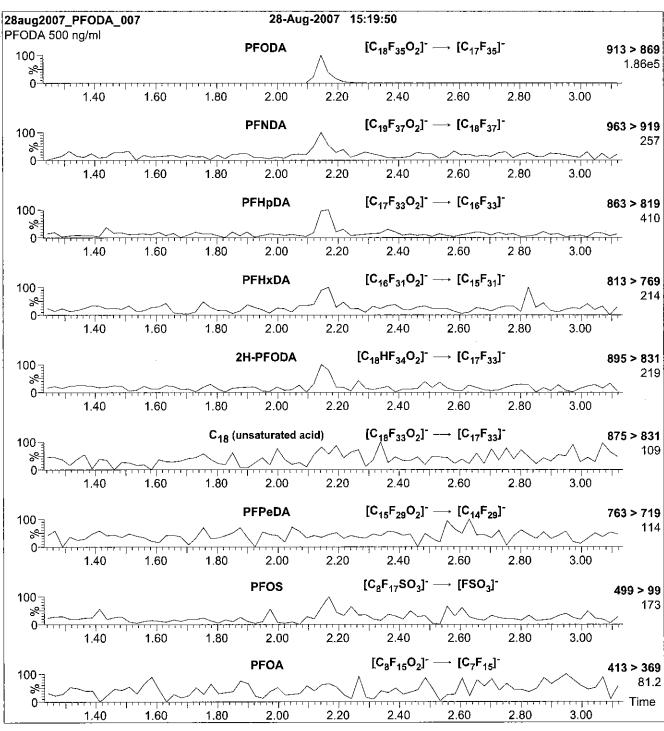
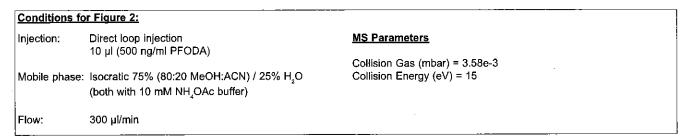


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





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

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

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

CHEMICAL PURITY:

CONCENTRATION:

LAST TESTED: (mm/dd/yyyy)

EXPIRY DATE: (mm/dd/yyyy)

RECOMMENDED STORAGE:

>98% 06/20/2014

06/20/2019

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: 10/27/2014

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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SYNTHESIS / CHARACTERIZATION:

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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 our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration 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.

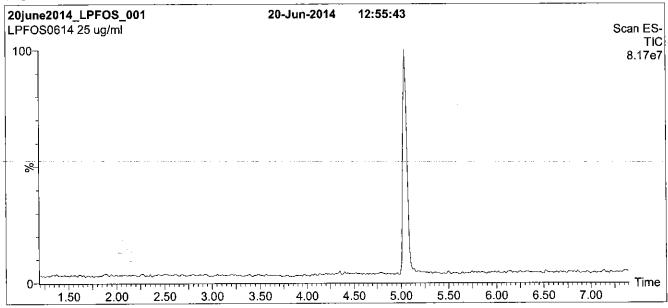
QUALITY MANAGEMENT:

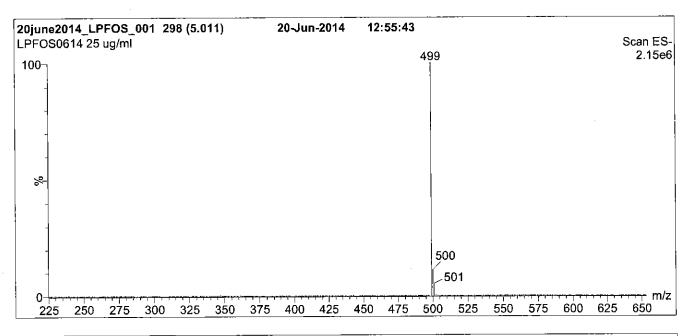
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





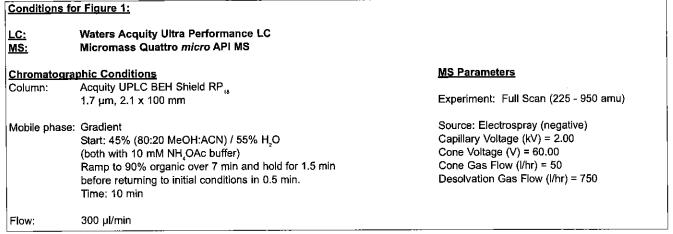
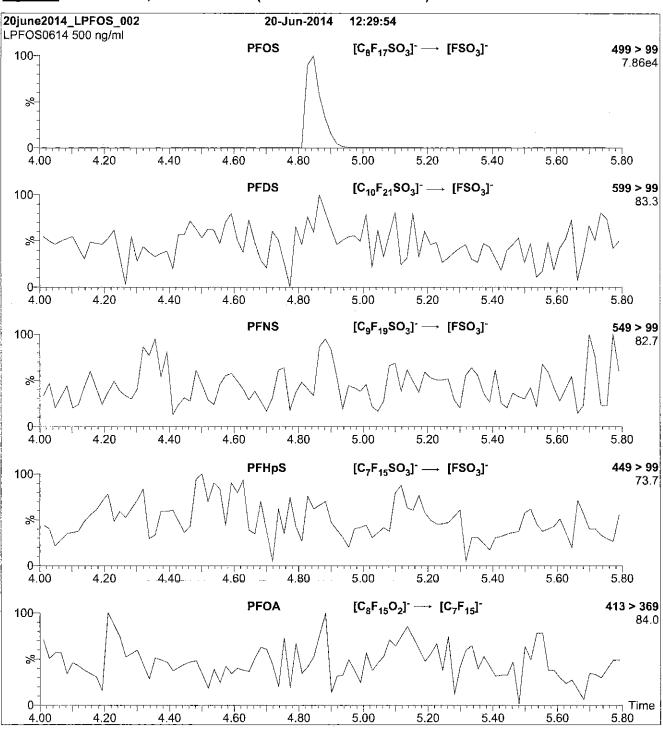
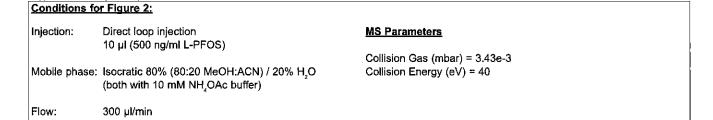


Figure 2: L-PFOS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOSA_00005



PRODUCT CODE:

FOSA-I

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

FOSA0714I

499.14

Isopropanol

COMPOUND:

Perfluoro-1-octanesulfonamide

STRUCTURE:

CAS #:

754-91-6

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:

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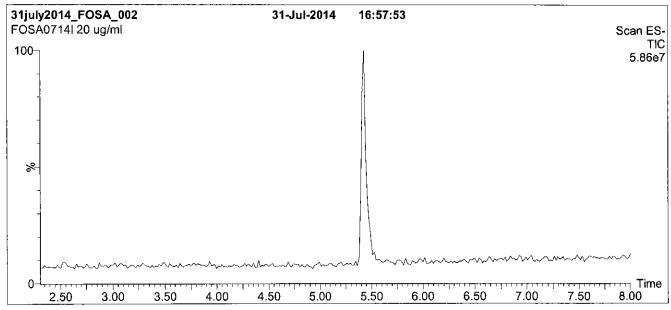
QUALITY MANAGEMENT:

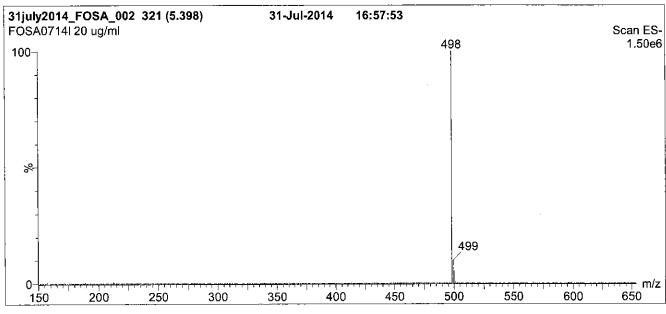
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Figure 1: FOSA-I; LC/MS Data (TIC and Mass Spectrum)





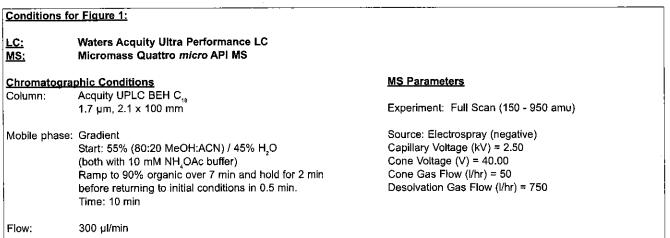
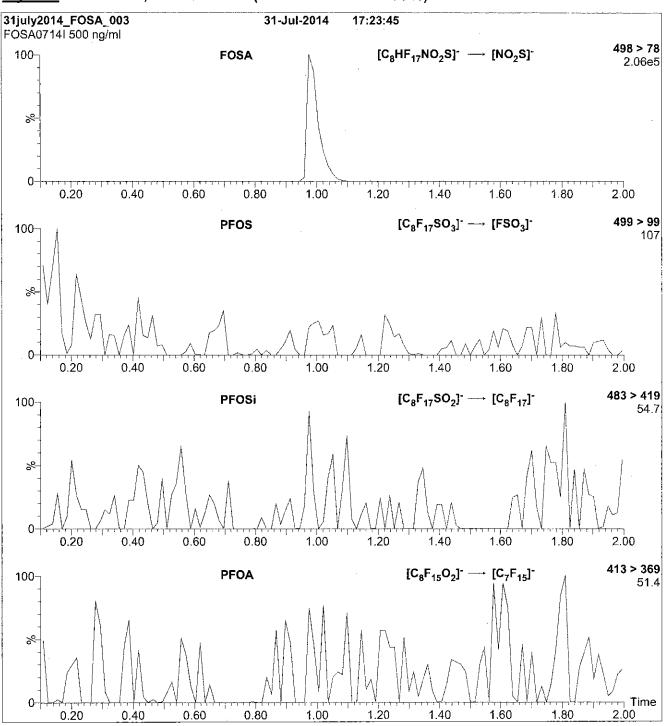


Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





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

LCPFOSA_00006



PRODUCT CODE:

FOSA-I

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

FOSA0815I

COMPOUND:

Perfluoro-1-octanesulfonamide

CAS #:

754-91-6

499.14

Isopropanol

STRUCTURE:

F F F F F F F

MOLECULAR FORMULA:

C,H,F,,NO,S

CONCENTRATION:

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

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/02/2015

EXPIRY DATE: (mm/dd/yyyy)

09/02/2017

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

(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

<u>INTENDED USE:</u>

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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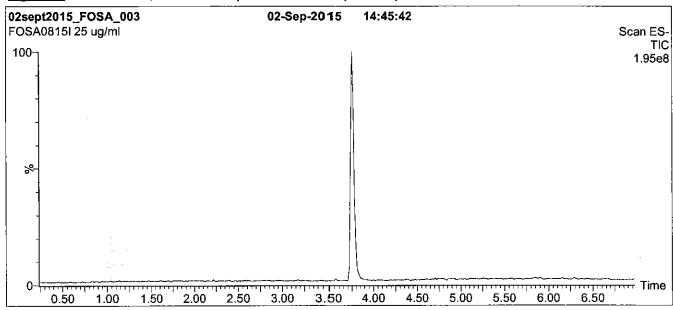
QUALITY MANAGEMENT:

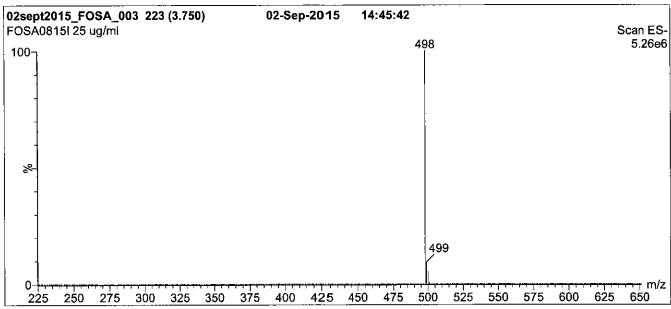
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





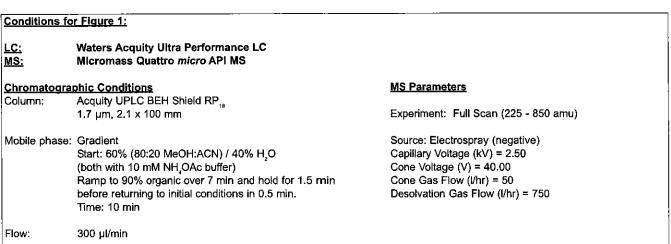
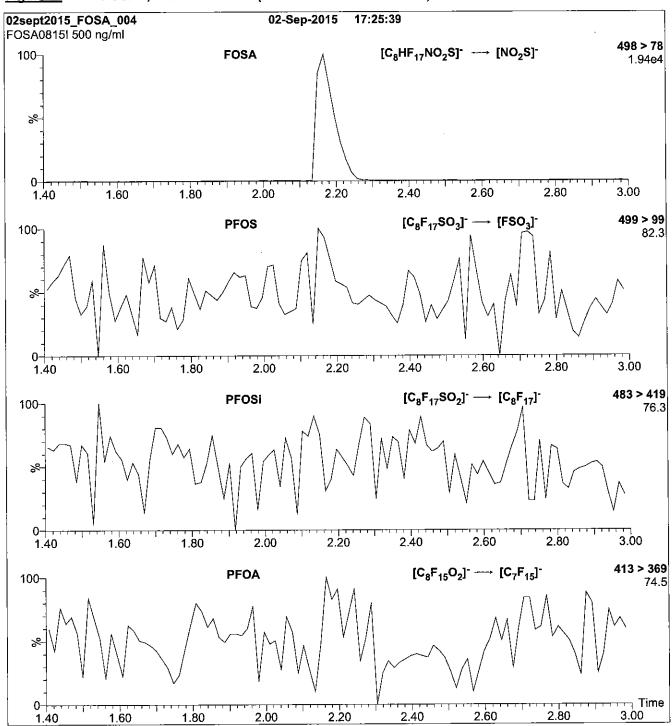
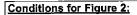


Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml FOSA-I)

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

(both with 10 mM NH OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFPeA_00003



PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0113

COMPOUND:

Perfluoro-n-pentanoic acid

CAS #:

2706-90-3

STRUCTURE:

F F F F

MOLECULAR FORMULA:

C_tHF₀O₂

O₅1 11 9O₂

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

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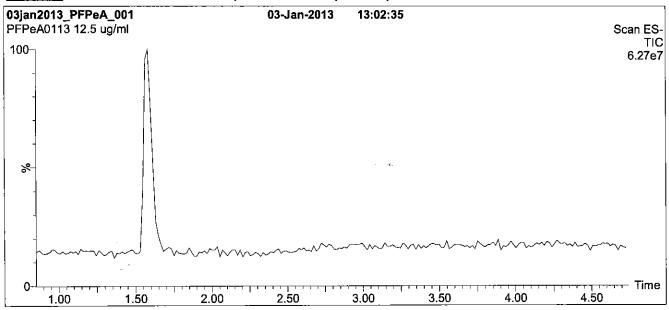
QUALITY MANAGEMENT:

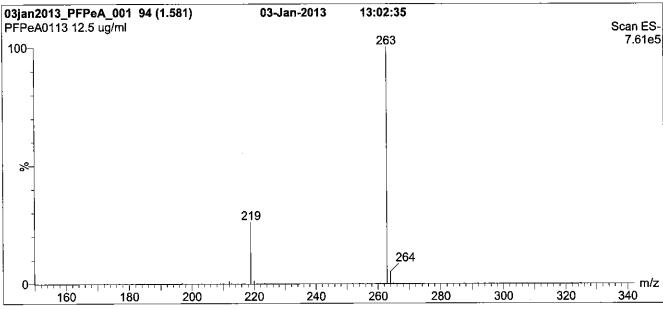
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Figure 1: PFPeA; LC/MS Data (TIC and Mass Spectrum)





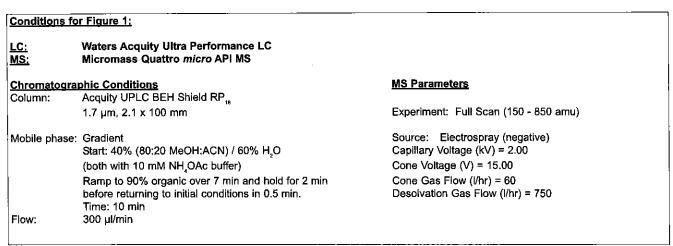
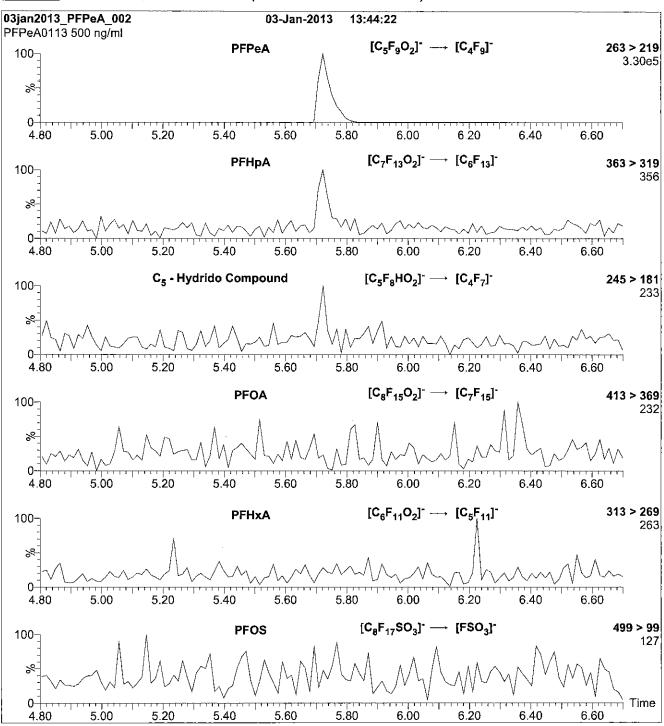
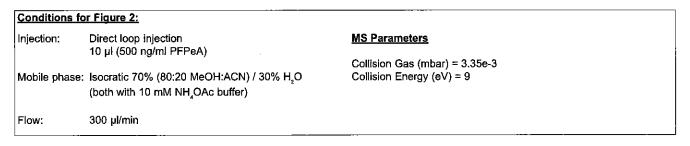


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





LCPFPeA_00004



PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0115

COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:

CAS #:

2706-90-3

MOLECULAR FORMULA:

C,HF,O,

MOLECULAR WEIGHT:

264.05

50 ± 2.5 μg/ml **SOLVENT(S)**:

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mrn/dd/yyyy)

01/30/2020

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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Certified By:

B G Chittim

Date:

<u>U3/26/2U1</u>

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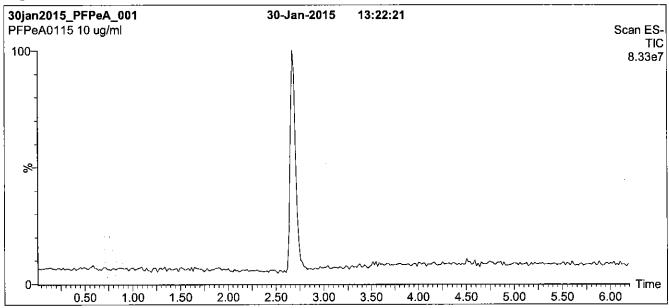
QUALITY MANAGEMENT:

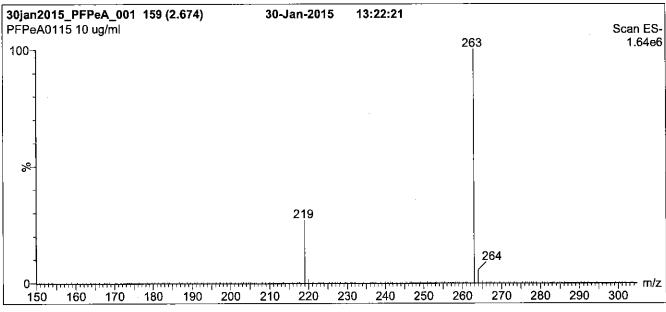
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





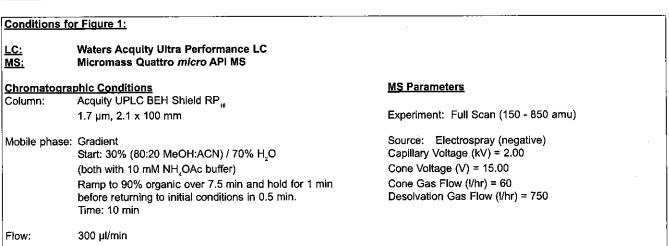
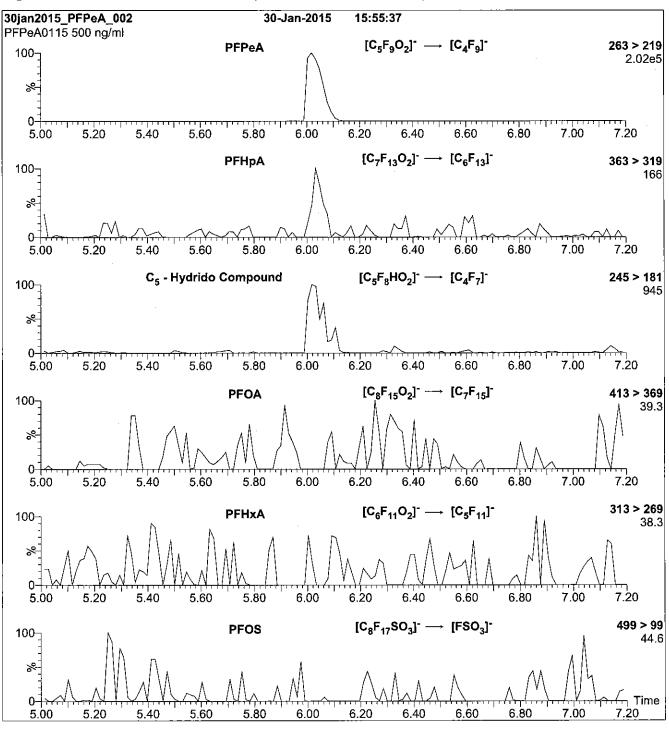


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFPeA)

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

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:

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

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

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

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

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

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

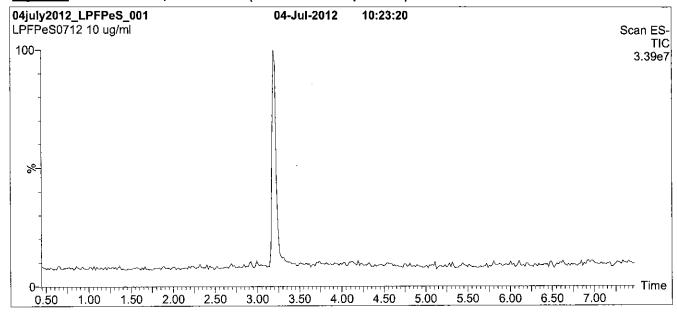
QUALITY MANAGEMENT:

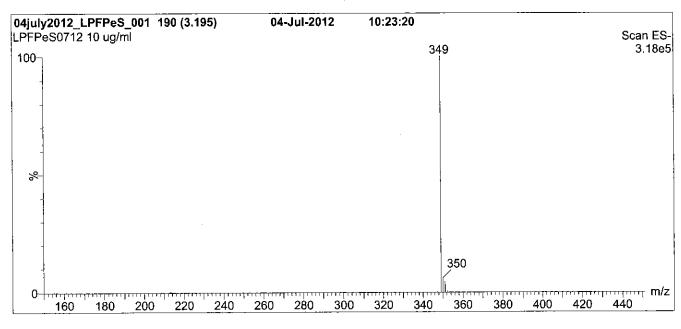
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Figure 1: L-PFPeS; LC/MS Data (TIC and Mass Spectrum)





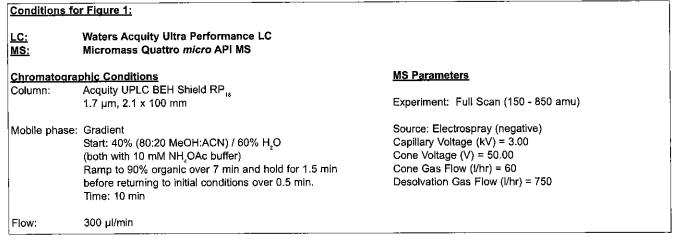
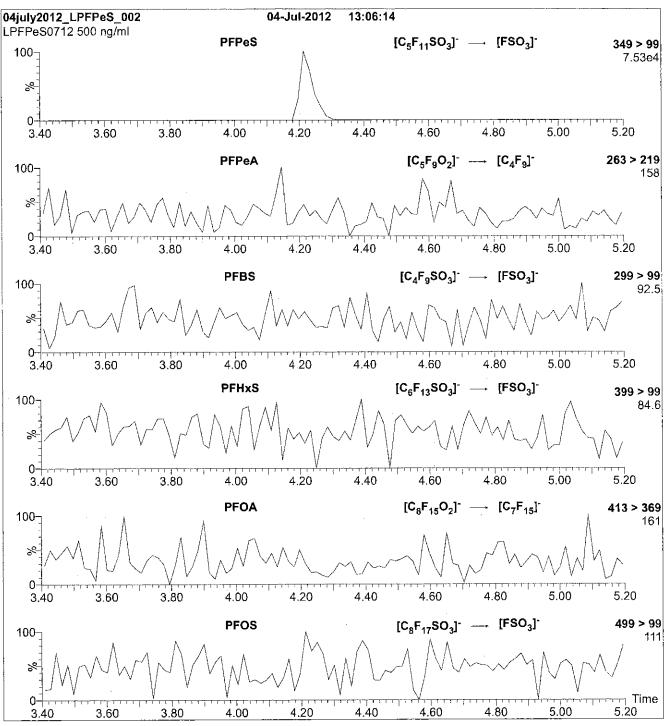
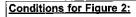


Figure 2: L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

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)

Flow:

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,4HF,27O,

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 $\sim 0.2\%$ of PFDoA (C₁₂HF₂₃O₂) and $\sim 0.2\%$ of PFPeDA (C₁₅HF₂₉O₂).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 07/17/2013

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:

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

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

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

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

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:

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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:

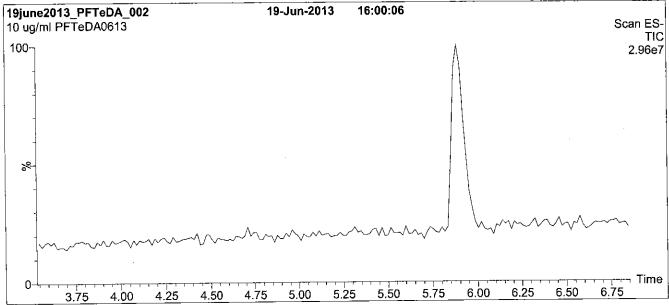
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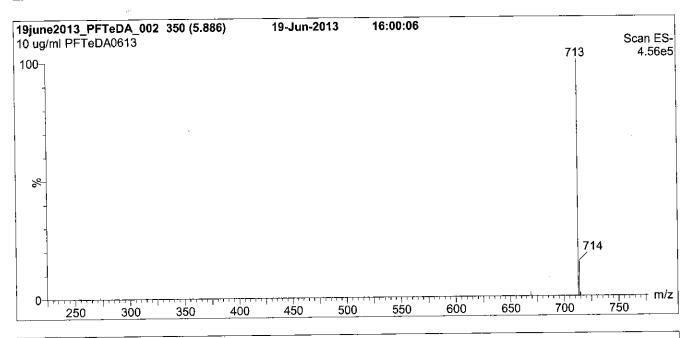




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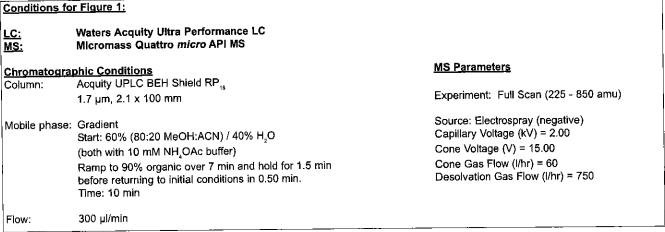
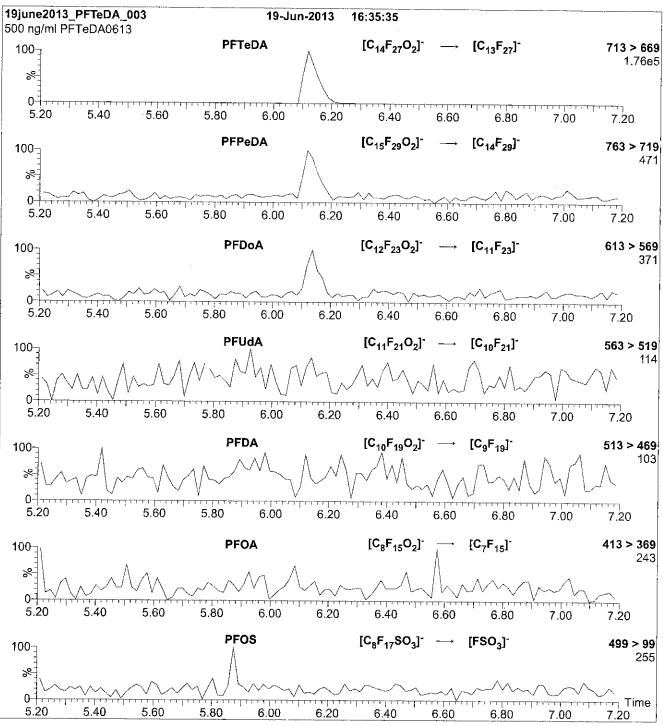
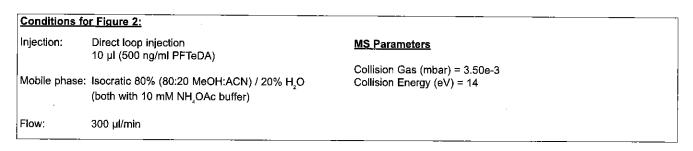


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





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:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS 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.

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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:

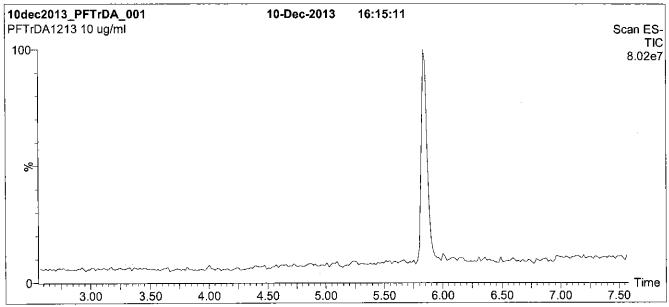
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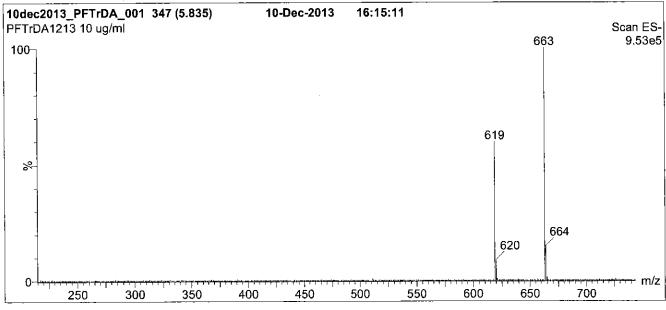




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





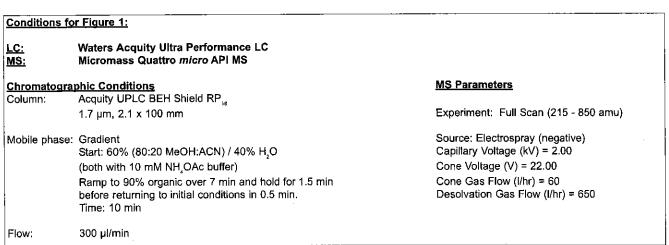
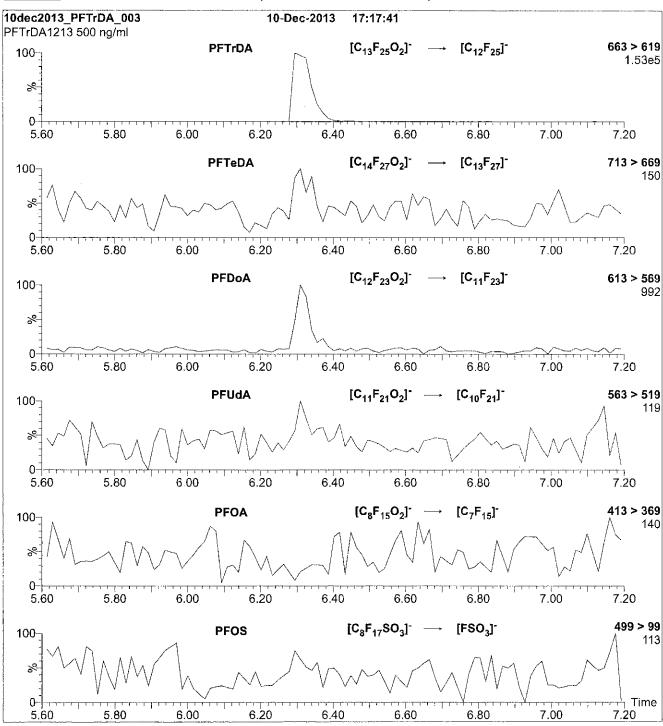
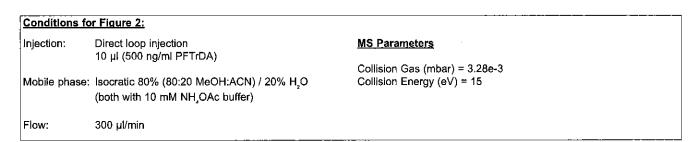


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





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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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

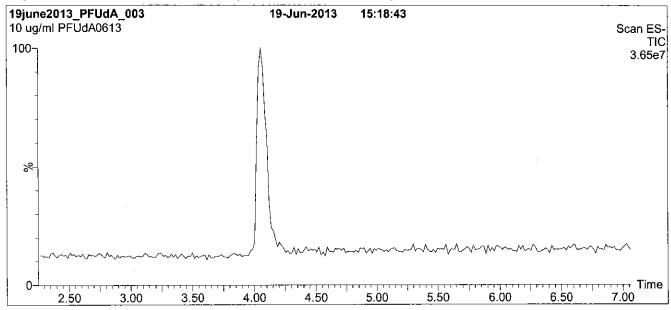
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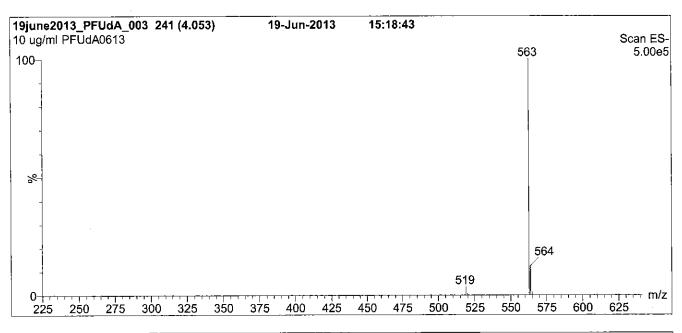




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





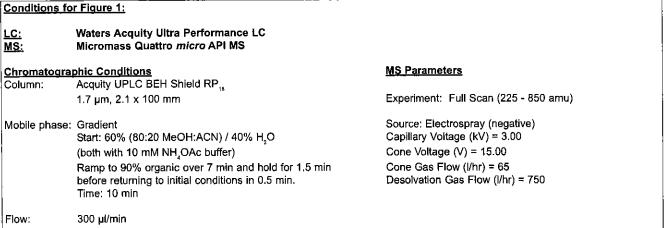
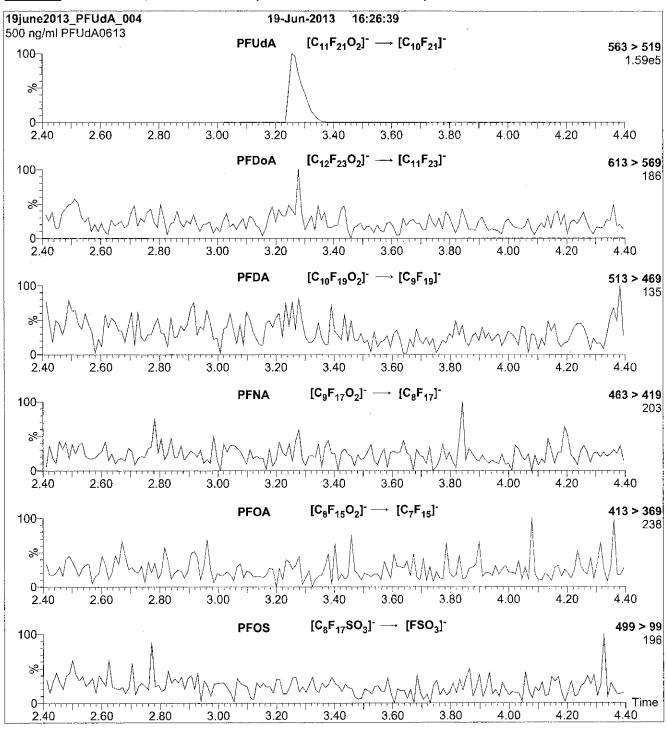
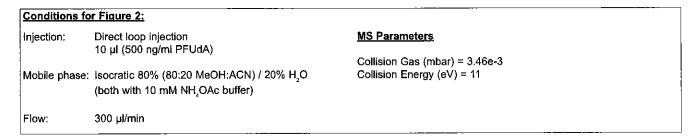


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17859	}−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	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
OF-FB07-0316	320-17859-1	125	100	127	119	114
OF-RW07-0316	320-17859-2	109	111	98	121	81
OF-HPFB01-0316	320-17859-3	119	98	113	111	95
OF-HP01-0316	320-17859-4	81	105	71	62	65
OF-HP01-0316 DL	320-17859-4 DL	111	126	102	86	97
OF-HP01P-0316	320-17859-5	87	114	72	65	70
OF-HP01P-0316 DL	320-17859-5 DL	104	139	107	101	76
	MB 320-104553/1-A	123	110	109	128	116
	LCS 320-104553/2-A	109	94	104	116	112
OF-HP01-0316 MS	320-17859-4 MS	85	99	64	62	69
OF-HP01-0316 MS DL	320-17859-4 MS DL	114	144	100	96	102
OF-HP01-0316 MSD	320-17859-4 MSD	84	106	62	59	61
OF-HP01-0316 MSD DL	320-17859-4 MSD DL	107	128	83	90	91

QC LIMITS
25-150
25-150
25-150
25-150
25-150

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

FORM III LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name	ab Name: TestAmerica Sacramento		Job No.: 32	0-17859-1
SDG No.	:			
Matrix:	Water	Level: Low	Lab File ID	: 28MAR2016A6A_079b.d
Lab ID:	LCS 320-104553/2-A		Client ID:	

	SPIKE ADDED	LCS CONCENTRATION	LCS %	QC LIMITS	#
COMPOUND	(ug/L)	(ug/L)	REC	REC	
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0409	102	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0380	95	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0417	104	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0307	87	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0385	102	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0336	88	60-140	
13C4-PFHpA	0.100	0.109	109	25-150	
13C4 PFOA	0.100	0.104	104	25-150	
13C5 PFNA	0.100	0.112	112	25-150	
1802 PFHxS	0.0946	0.0886	94	25-150	
13C4 PFOS	0.0956	0.110	116	25-150	

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

FORM III LCMS MATRIX SPIKE RECOVERY

Lab Nai	me: 7	TestAmerica	Sacramento	Job	No.:	320-17859-1
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SDG No.:

Matrix: Water Level: Low Lab File ID: 28MAR2016A6A_084b.d

Lab ID: 320-17859-4 MS Client ID: OF-HP01-0316 MS

	SPIKE ADDED	SAMPLE CONCENTRATION	MS CONCENTRATION	MS %	QC LIMITS	#
COMPOUND	(ug/L)	(ug/L)	(ug/L)	REC	REC	
Perfluoroheptanoic acid (PFHpA)	0.0377	0.068	0.111	115	60-140	
Perfluorononanoic acid (PFNA)	0.0377	0.011	0.0427	84	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0333	0.028	0.0591	94	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0357	0.45	0.552	299	60-140	M 4
13C4-PFHpA	0.0942	0.075	0.0802	85	25-150	
13C4 PFOA	0.0942	0.066	0.0603	64	25-150	
13C5 PFNA	0.0942	0.061	0.0651	69	25-150	
1802 PFHxS	0.0891	0.092	0.0881	99	25-150	
13C4 PFOS	0.0901	0.055	0.0556	62	25-150	

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

FORM III LCMS MATRIX SPIKE RECOVERY

Lab Name	ab Name: TestAmerica Sacramento		Job No.: 320-17859-1	
SDG No.	:			
Matrix:	Water	Level: Low	Lab File ID: 31MAR2016B6B_013.d	
Lab ID:	320-17859-4 MS DL		Client ID: OF-HP01-0316 MS DL	

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	0.0377	0.62	0.709	247	60-140	D 4
Perfluorooctanesulfonic acid (PFOS)	0.0360	2.2	2.07	-314	60-140	D M 4
13C4-PFHpA	0.0942	0.10	0.107	114	25-150	
13C4 PFOA	0.0942	0.095	0.0941	100	25-150	
13C5 PFNA	0.0942	0.089	0.0959	102	25-150	
1802 PFHxS	0.0891	0.11	0.128	144	25-150	
13C4 PFOS	0.0901	0.076	0.0867	96	25-150	

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

FORM III LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab	Name:	TestAmerica Sacramento	Job No.:	320-17859-1			
SDG	No.:						

Matrix: Water Level: Low Lab File ID: 28MAR2016A6A_085b.d

Lab ID: 320-17859-4 MSD Client ID: <u>OF-HP01-0316 MSD</u>

	SPIKE ADDED	MSD CONCENTRATION	MSD	olo	QC L1	IMITS	#
COMPOUND	(ug/L)	(ug/L)	REC	∘ RPD	RPD	REC	#
Perfluoroheptanoic acid	0.0373	0.108	109		30	60-140	
(PFHpA)							
Perfluorononanoic acid (PFNA)	0.0373	0.0520	110	20	30	60-140	
Perfluorobutanesulfonic acid	0.0329	0.0549	82	7	30	50-150	
(PFBS)							
Perfluorohexanesulfonic acid (PFHxS)	0.0353	0.530	239	4	30	60-140	M 4
13C4-PFHpA	0.0932	0.0785	84			25-150	
13C4 PFOA	0.0932	0.0581	62			25-150	
13C5 PFNA	0.0932	0.0569	61			25-150	
1802 PFHxS	0.0881	0.0937	106			25-150	
13C4 PFOS	0.0891	0.0522	59			25-150	

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

FORM III LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Nam	Name: TestAmerica Sacramento		Job No.: 320-17859-1
SDG No.	:		
Matrix:	Water	Level: Low	Lab File ID: 31MAR2016B6B_014.d
Lab ID:	320-17859-4 MSD DL		Client ID: OF-HP01-0316 MSD DL

	SPIKE	MSD			QC L		
	ADDED	CONCENTRATION	용	%			+
COMPOUND	(ug/L)	(ug/L)	REC	RPD	RPD	REC	
Perfluorooctanoic acid (PFOA)	0.0373	0.797	487	12	30	60-140	D 4
Perfluorooctanesulfonic acid (PFOS)	0.0356	2.19	41	6	30	60-140	D M 4
13C4-PFHpA	0.0932	0.0994	107			25-150	
13C4 PFOA	0.0932	0.0775	83			25-150	
13C5 PFNA	0.0932	0.0844	91			25-150	
1802 PFHxS	0.0881	0.113	128			25-150	
13C4 PFOS	0.0891	0.0799	90			25-150	

 $[\]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.: <u>320-17859-1</u>
SDG No.:	
Lab File ID: 28MAR2016A6A_078b.d	Lab Sample ID: MB 320-104553/1-A
Matrix: Water	Date Extracted: 03/28/2016 10:11
Instrument ID: A6	Date Analyzed: 03/29/2016 20:45
Level:(Low/Med) Low	

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

		LAB	
CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALYZED
	LCS 320-104553/2-A	28MAR2016A6 A 079b.d	03/29/2016 21:06
OF-FB07-0316	320-17859-1	28MAR2016A6 A 080b.d	03/29/2016 21:27
OF-RW07-0316	320-17859-2	28MAR2016A6 A 081b.d	03/29/2016 21:49
OF-HPFB01-0316	320-17859-3	28MAR2016A6 A 082b.d	03/29/2016 22:10
OF-HP01-0316	320-17859-4	28MAR2016A6 A 083b.d	03/29/2016 22:31
OF-HP01-0316 MS	320-17859-4 MS	28MAR2016A6 A 084b.d	03/29/2016 22:52
OF-HP01-0316 MSD	320-17859-4 MSD	28MAR2016A6 A 085b.d	03/29/2016 23:14
OF-HP01P-0316	320-17859-5	28MAR2016A6 A 086b.d	03/29/2016 23:35
OF-HP01-0316 DL	320-17859-4 DL	31MAR2016B6 B 012.d	03/31/2016 15:47
OF-HP01-0316 MS DL	320-17859-4 MS DL	31MAR2016B6 B 013.d	03/31/2016 16:08
OF-HP01-0316 MSD DL	320-17859-4 MSD DL	31MAR2016B6 B_014.d	03/31/2016 16:30
OF-HP01P-0316 DL	320-17859-5 DL	31MAR2016B6 B_015.d	03/31/2016 16:51

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-FB07-0316 Lab Sample ID: 320-17859-1

Matrix: Water Lab File ID: 28MAR2016A6A_080b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 09:25

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 491(mL) Date Analyzed: 03/29/2016 21:27

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00082
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	Ū	0.0025	0.0020	0.00076
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	Ū	0.0025	0.0020	0.00089
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0031	Ū	0.0041	0.0031	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	125		25-150
STL00990	13C4 PFOA	127		25-150
STL00995	13C5 PFNA	114		25-150
STL00994	1802 PFHxS	100		25-150
STL00991	13C4 PFOS	119		25-150

Report Date: 01-Apr-2016 09:57:38 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_080b.d

Lims ID: 320-17859-A-1-A Lab Sample ID: 320-17859-1

Client ID: OF-FB07-0316

Sample Type: Client

Inject. Date: 29-Mar-2016 21:27:56 ALS Bottle#: 8 Worklist Smp#: 79

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-1-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags	
D 8 13C4-PFHpA											
•	9.088	9.101	-0.013		910971	62.5		125	81856		
D 11 1802 PFH	xS										
403.0 > 84.0	9.123	9.135	-0.012		448470	47.1		99.6	38808		
41 Perfluorohexanesulfonic acid											
399.0 > 80.0	9.152	9.138	0.014	1.000	85	0.2530					
D 12 13C4 PFO	Α										
417.0 > 372.0	10.196	10.214	-0.018		995039	63.4		127	78788		
D 16 13C4 PFO	S										
503.0 > 80.0	11.146	11.160	-0.014		874255	56.8		119	68657		
D 17 13C5 PFN	A										
468.0 > 423.0	11.168	11.183	-0.015		745964	56.9		114	59387		
18 Perfluorono	nanoic a	cid									
463.0 > 419.0	11.393	11.184	0.209	1.000	1174	0.2162			7.9		

Report Date: 01-Apr-2016 09:57:38 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_080b.d **Injection Date:** 29-Mar-2016 21:27:56 Instrument ID: Α6 Lims ID: 320-17859-A-1-A Lab Sample ID: 320-17859-1 Client ID: OF-FB07-0316 Operator ID: **JRB** ALS Bottle#: 8 Worklist Smp#: 79 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA 9 Perfluoroheptanoic acid (ND) F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 10 21 (024° 00020 X) 16° Y (X100) ∑₁₅-12 6.3 7.5 9.3 9.9 8.7 9.3 9.9 5.7 6.9 8.1 8.7 8.1 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 18-× (×10000) 9.1 9.4 9.7 9.7 8.8 9.1 9.4 9.6 10.2 10.8 8.5 8.8 10.0 8.5 9.0 11.4 D 16 13C4 PFOS 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 63 0001 0020 56- 54 <u>6</u>48 € ×45 ∑₁₆ ×40 ≻₃₂-27 24 18 16 9.8 10.4 9.8 11.0 11.2 11.0 9.2 10.4 10.0 10.6 11.8 9.2 17 13C5 PFNA 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) D F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 28 84 0024 0020 ×20 (012 X) X) 8 72 60 _16 **≻**48 12

36⁻ 24⁻ 12⁻

0

10.1

10.7 Page 290h of 526

11.9

11.3

0

10.1

10.7

11.3

04/01/2016

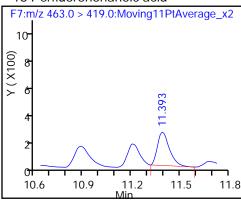
11.9

0

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10.7

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-RW07-0316 Lab Sample ID: 320-17859-2

Matrix: Water Lab File ID: 28MAR2016A6A_081b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 09:30

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 539.1(mL) Date Analyzed: 03/29/2016 21:49

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.: 104824 Units: ug/L

CAC NO	COMPOUND NAME	DEGIH E		T.00	1.00	DI
CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.00072	ЈВ	0.0023	0.0019	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	Ū	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.0019	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.0019	0.00081
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	109		25-150
STL00990	13C4 PFOA	98		25-150
STL00995	13C5 PFNA	81		25-150
STL00994	1802 PFHxS	111		25-150
STL00991	13C4 PFOS	121		25-150

Report Date: 01-Apr-2016 09:57:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_081b.d

Lims ID: 320-17859-A-2-A Lab Sample ID: 320-17859-2

Client ID: OF-RW07-0316

Sample Type: Client

Inject. Date: 29-Mar-2016 21:49:11 ALS Bottle#: 9 Worklist Smp#: 80

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-2-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

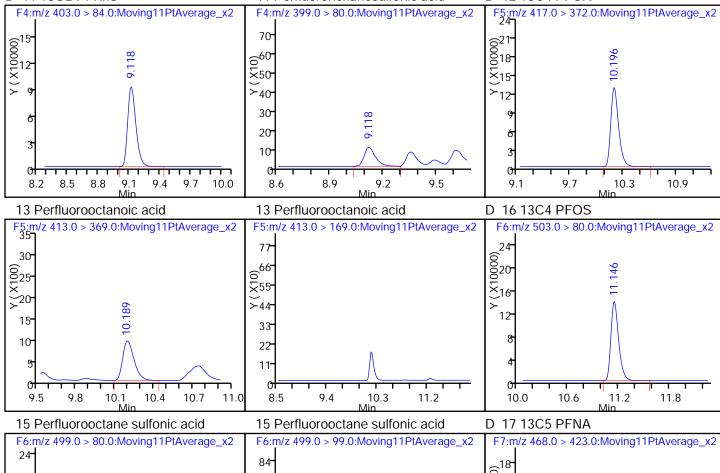
Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

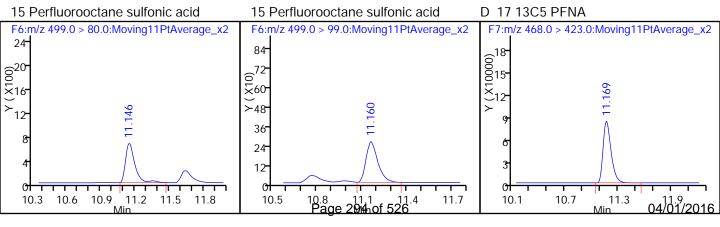
Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:40:28

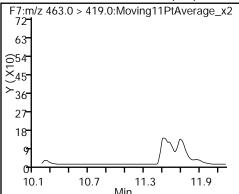
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
-	40 Perfluorobu	tanesulfo	onic acid								
	298.9 > 80.0	7.030	6.787	0.243	1.000	4267	0.5820				
I	D 8 13C4-PFHp	Α									
	367.0 > 322.0	9.082	9.101	-0.019		795209	54.6		109	70991	
	9 Perfluorohep				4 000	21/2	0.4.54			- 4	
	363.0 > 319.0		9.102	-0.002	1.000	2168	0.1454			7.1	
	D 11 18O2 PFH: 403.0 > 84.0		9.135	0.017		501187	52.6		111	44558	
	41 Perfluorohe					301107	32.0		111	44550	
	399.0 > 80.0		9.138		1.000	468	0.3133				
	D 12 13C4 PFO										
	417.0 > 372.0		10.214	-0.018		767256	48.9		97.7	62087	
	13 Perfluorooc	tanoic ac	id								
	413.0 > 369.0	10.189	10.216	-0.027	1.000	5690	0.3859			13.4	
	D 16 13C4 PFO										
	503.0 > 80.0	11.146	11.160	-0.014		890429	57.9		121	69482	
	15 Perfluorooci				4 000	2000	0.4050			44 (
	499.0 > 80.0 499.0 > 99.0	11.146 11.160			1.000 1.001	3802 1389	0.4259	2.74(0.00-0.00)		41.6 84.3	
	4 7 7 .0		11.103	-0.003	1.001	1307		2.74(0.00-0.00)		04.0	
		11.169	11.183	-0.014		528013	40.3		80.5	41696	

Report Date: 01-Apr-2016 09:57:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_081b.d **Injection Date:** 29-Mar-2016 21:49:11 Instrument ID: Α6 Lims ID: 320-17859-A-2-A Lab Sample ID: 320-17859-2 Client ID: OF-RW07-0316 Operator ID: **JRB** ALS Bottle#: 9 Worklist Smp#: 80 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 9 Perfluoroheptanoic acid 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 024 0020 ×20 8₂₀ <u>ම</u>18 ×15 ∑16- 12 12 6.9 9.3 9.9 8.9 9.2 6.6 7.2 8.1 8.7 8.6 9.5 D 11 1802 PFHxS 12 13C4 PFOA 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 (000012 ×) > 9 70 621- 6218-⊙⁶⁰ ∑50 **≻**40 30 20 10 8.9 9.7 9.1





18 Perfluorononanoic acid (ND)



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HPFB01-0316 Lab Sample ID: 320-17859-3

Matrix: Water Lab File ID: 28MAR2016A6A_082b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:10

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 527.9(mL) Date Analyzed: 03/29/2016 22:10

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.0019	0.00076
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	Ū	0.0024	0.0019	0.00071
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	Ū	0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.0019	0.00087
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.0019	0.00082
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	119		25-150
STL00990	13C4 PFOA	113		25-150
STL00995	13C5 PFNA	95		25-150
STL00994	1802 PFHxS	98		25-150
STL00991	13C4 PFOS	111		25-150

Report Date: 01-Apr-2016 09:57:40 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_082b.d

Lims ID: 320-17859-A-3-A Lab Sample ID: 320-17859-3

Client ID: OF-HPFB01-0316

Sample Type: Client

Inject. Date: 29-Mar-2016 22:10:25 ALS Bottle#: 10 Worklist Smp#: 81

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-3-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

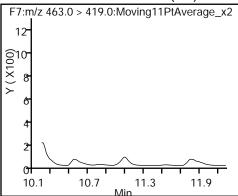
Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags	
40 Perfluorobutanesulfonic acid											
298.9 > 80.0	7.026	6.787	0.239	1.000	5470	0.7829					
D 8 13C4-PFHpA											
367.0 > 322.0	9.088	9.101	-0.013		863587	59.3		119	77368		
D 11 1802 PFH	lxS										
403.0 > 84.0	9.117	9.135	-0.018		442114	46.4		98.2	39351		
D 12 13C4 PFC	Α										
417.0 > 372.0	10.196	10.214	-0.018		889361	56.6		113	71569		
D 16 13C4 PFC	S										
503.0 > 80.0	11.146	11.160	-0.014		817380	53.1		111	63791		
D 17 13C5 PFN	D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		623036	47.5		95.0	48043		

Report Date: 01-Apr-2016 09:57:40 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_082b.d **Injection Date:** 29-Mar-2016 22:10:25 Instrument ID: Α6 Lims ID: 320-17859-A-3-A Lab Sample ID: 320-17859-3 Client ID: OF-HPFB01-0316 Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 81 Injection Vol: Dil. Factor: 15.0 ul 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid (ND) F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 024 0020 ×20 ()¹⁵ () () () 8₂₀ ∑16- 12 12 6.8 7.1 7.9 8.5 9.1 9.7 8.7 9.3 9.9 6.5 10.3 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (ND) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage x221 624 6020 (000010° × (×100000) × (×10000) 8 ()18⁻ ()015⁻ ()15⁻ 9.3 9.9 9.7 8.6 9.2 9.8 8.7 10.9 8.0 8.1 9.1 10.3 D 16 13C4 PFOS 13 Perfluorooctanoic acid (ND) 13 Perfluorooctanoic acid (ND) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 24 30 (0) 20-20-42 ©35 ∑₁₆- $\stackrel{\cdot}{\simeq}_{20}$ ∑₂₈ 12 15- 21 10 9.8 10.4 11.0 9.8 10.4 11.0 10.0 11.2 9.2 9.2 10.6 11.8 12.4 17 13C5 PFNA 15 Perfluorooctane sulfonic acid (ND) 15 Perfluorooctane sulfonic acid (ND) D F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 18 70 (XInfinity) 0015 ×12 60 50 >40 30 20 10 $^{\circ}$ $^{\circ}$ 10.1 10.7 11.3 11.9 10.1 10.7 Page 298 of 526 11.9 10.1 10.7 11.3 04/01/2016

18 Perfluorononanoic acid (ND)



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4

Matrix: Water Lab File ID: 28MAR2016A6A_083b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 539.3(mL) Date Analyzed: 03/29/2016 22:31

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.0019	0.00074
375-95-1	Perfluorononanoic acid (PFNA)	0.011		0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.0019	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.45	МЈ	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	81		25-150
STL00990	13C4 PFOA	71		25-150
STL00995	13C5 PFNA	65		25-150
STL00994	1802 PFHxS	105		25-150
STL00991	13C4 PFOS	62		25-150

Report Date: 01-Apr-2016 09:57:41 Chrom Revision: 2.2 04-Mar-2016 14:36:24

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d

Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Sample Type: Client

Inject. Date: 29-Mar-2016 22:31:39 ALS Bottle#: 11 Worklist Smp#: 82

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-4-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: **JRB** Instrument ID: Α6

Method: \\ChromNA\\Sacramento\ChromData\A6\20160330-29478.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

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

Last ICal File:

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

XAWRK016 Process Host:

00.14 004/45 40.47

First Level Reviewer: westendorfc					Date: 30-Mar-2016 15:42:17			7		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	A									
217.0 > 172.0	5.568	5.587	-0.019		158437	20.4		40.7	12593	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.571	5.590	-0.019	1.000	126353	30.3			21.5	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.647	6.672	-0.025		524786	34.5		69.1	25745	
4 Perfluoroper										
262.9 > 219.0	6.647	6.674	-0.027	1.000	570893	57.3			55.8	
5 Perfluorobut										
298.9 > 80.0	6.762	6.787	-0.025	1.000	135278	NC	. == ()		18.2	
298.9 > 99.0	6.758	6.787	-0.029	0.999	76601		1.77(0.00-0.00)		59.2	
40 Perfluorobu				4 000	105070	45.0				
	6.762	6.787	-0.025	1.000	135278	15.0				
D 6 13C2 PFHx		7.000	0.004		400400	00.0		74.0	4.4.00	
315.0 > 270.0		7.892	-0.021		493439	38.0		76.0	44492	
7 Perfluorohex			0.000	1 000	1441740	140.1			220	
		7.894		1.000	1441740	142.1			229	
22 PFPeS (Per 349.0 > 80.0		·pentan∈ 8.099		0.872	127220	NC			100	
		8.099	-0.151	0.872	127339	NC			183	
D 8 13C4-PFH _k 367.0 > 322.0		9.101	-0.019		589717	40.5		80.9	50256	
			-0.019		309/1/	40.3		00.9	30236	
9 Perfluoroher 363.0 > 319.0	9.082		-0.020	1.000	403967	36.5			227	
		9.102	-0.020	1.000	403907	30.3			221	
D 11 18O2 PFH 403.0 > 84.0		9.135	-0.023		473300	49.7		105	41627	
			-0.023		473300	47.1		105	71021	N //
10 Perfluorohe 399.0 > 80.0		9.138	0.0	1.000	0	NC			2879	M M
41 Perfluorohe				1.000	J	NC			2019	M
399.0 > 80.0		9.138		1.000	Page 3984 of 5	526 240 3			04/0	1/2 ¹ 016
0,7.0 > 00.0	7.112	7.130	5.020	1.000	rage~swit0l:	020 240.0			04/0	1/ 2 'U 10

Data File: \(\text{ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d}\)										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO										
	A 10.189	10 214	-0.025		556946	35.5		70.9	42397	
13 Perfluorooct			0.020		000710	00.0		70.7	12077	
	10.189		-0.027	1.000	4178919	390.4			85.4	
413.0 > 169.0	10.196	10.216	-0.020	1.001	1169067		3.57(0.00-0.00)		35.3	
38 Perfluorohe	-									
449.0 > 80.0	10.196	10.218	-0.022	1.000	91600	25.7				
14 Perfluorohe				4 000	01/00	NO			50.0	
	10.196	10.218	-0.022	1.000	91600	NC			59.9	
D 16 13C4 PFO: 503.0 > 80.0	S 11.146	11 160	0.014		457631	29.7		62.2	2476	
					437031	29.1		02.2	2470	LV
15 Perfluorooct 499.0 > 80.0	iane suii 11.146			1.000	9969574	1104.7			10892	EM EM
	11.146			1.000	4502893	1104.7	2.21(0.00-0.00)		8935	M
D 17 13C5 PFN	A						,			
468.0 > 423.0	11.168	11.183	-0.015		429498	32.7		65.5	4409	
18 Perfluorono	nanoic a	cid								
463.0 > 419.0	11.168	11.184	-0.016	1.000	41219	5.99			374	
D 19 13C2 PFD										
	12.000		-0.009		593338	35.1		70.1	41073	
20 Perfluorode			0.040	4 000	40570	4.04			004	
	12.000			1.000	13570	1.21			881	
39 Perfluorode 599.0 > 80.0	cane Sul 12.641			1.000	5503	1.73				
25 Perfluorode			-0.010	1.000	3303	1.73				
599.0 > 80.0			-0.018	1.000	5503	NC			19.9	
D 23 13C8 FOS			0.0.0						. , . ,	
	12.660	12.660	0.0		114905	3.87		7.7	6973	
D 26 13C2 PFUi	nA									
565.0 > 520.0	12.692	12.708	-0.016		603009	33.4		66.7	36833	
27 Perfluoroun	decanoio	c acid								
563.0 > 519.0	12.692	12.708	-0.016	1.000	6488	0.4725			203	
D 28 13C2 PFD	Ac									
615.0 > 570.0	13.283	13.305	-0.022		671568	32.4		64.8	20927	
D 33 13C2-PFT6										
715.0 > 670.0			-0.020		361124	16.8		33.6	2730	
34 Perfluorohe:			0.010	1 000	02100	0.07			1071	
813.0 > 769.0		14.88/	-0.018	1.000	93199	-8.27			1871	
D 35 13C2-PFH: 815.0 > 770.0		1// 227	-0 025		433554	11.9		23.9	11370	
013.0 > 110.0	14.002	14.007	-0.025		433334	11.7		23.7	11370	

Report Date: 01-Apr-2016 09:57:41

OC Flag Legend Processing Flags

NC - Not Calibrated

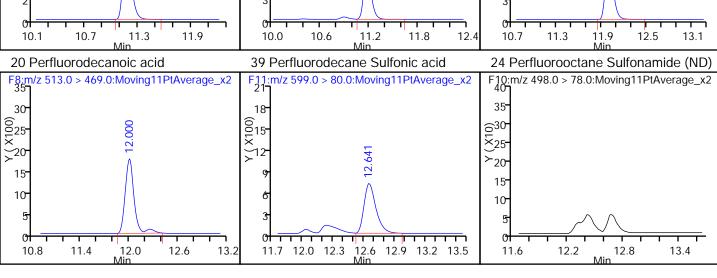
E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01-Apr-2016 09:57:41 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_083b.d **Injection Date:** 29-Mar-2016 22:31:39 Instrument ID: Α6 Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4 OF-HP01-0316 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 82 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 5.568 49 0642 √35 842 ∑35 -28 ≻28 21 21 14 5.9 5.3 5.2 5.5 5.9 6.2 5.6 5.8 6.1 6.5 6.8 7.1 7.4 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 (00015-X)12-42 (00012 ×) > 9 <u>8</u>36 ∑30-**≻24** 18 12 6.7 7.0 7.0 7.3 7.9 8.2 8.5 6.4 7.3 6.4 6.7 7.0 7.3 7.6 8.8 6.1 8 13C4-PFHpA 7 Perfluorohexanoic acid D 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 (0012 0012 X10 × (×10000) <u>8</u>48) × × × 32 24 01 7.7 8.0 8.3 7.9 8.5 9.1 9.7 10.3 8.6 8.9 9.2 9.5 7.4 8.6 8.3 D 12 13C4 PFOA 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 630 625 × (×10000) × (×10000) 0012 100 X100 \S_20 10 0 0 8.5 8.8 9.1 9.4 9.7 7.5 8.4 Page 304h of 526 10.2 9.1 9.7 10.3 04/01/2016 8.2 10.0



15.4

16.0

33- 22- 11-

14.2

14.8

14.0 14.3

14.6

14.9 15.2 15.5 15.8

Report Date: 01-Apr-2016 09:57:41 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d

Injection Date: 29-Mar-2016 22:31:39 Instrument ID: A6

Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 82

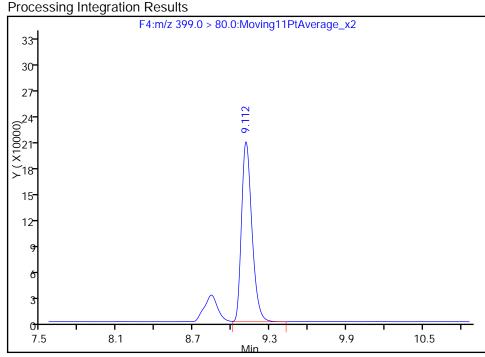
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

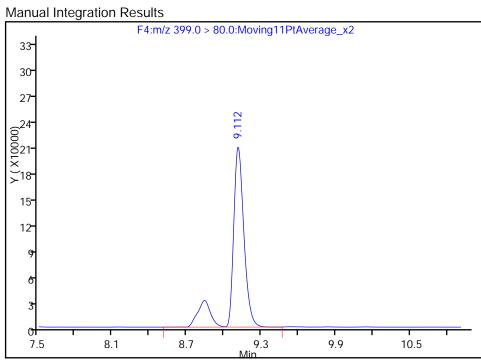
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

RT: 9.11 Area: 1180559 Amount: 202.2334 Amount Units: ng/ml



RT: 9.11 Area: 1403084 Amount: 240.3078 Amount Units: ng/ml



Reviewer: westendorfc, 30-Mar-2016 15:45:09

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 DL Lab Sample ID: 320-17859-4 DL

Matrix: Water Lab File ID: 31MAR2016B6B_012.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 539.3(mL) Date Analyzed: 03/31/2016 15:47

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

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

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

Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.62	DBJ	0.012	0.0093	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.2	DMJ	0.019	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	111		25-150
STL00990	13C4 PFOA	102		25-150
STL00995	13C5 PFNA	97		25-150
STL00994	1802 PFHxS	126		25-150
STL00991	13C4 PFOS	86		25-150

Report Date: 01-Apr-2016 09:48:17 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d

Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Sample Type: Client

Inject. Date: 31-Mar-2016 15:47:33 ALS Bottle#: 12 Worklist Smp#: 12

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-17859-A-4-A 5x SD

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 09:17:51

First Level Revie	wer: wes	stendorfo	2		Date:	()1-Apr-2016	1		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	vric acid									
212.9 > 169.0	5.598	5.599	-0.001	1.000	35003	5.93			13.4	
D 113C4 PFBA	٨									
217.0 > 172.0	5.595	5.600	-0.005		50945	7.28		14.6	4532	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.675	6.681	-0.006	1.000	143897	11.9			58.9	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.671	6.681	-0.010		135621	10.3		20.7	3987	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	6.781		-0.012	1.000	25755	NC			22.0	
298.9 > 99.0	6.777		-0.016	0.999	11580		2.22(0.00-0.00)		35.4	
40 Perfluorobu										
298.9 > 80.0		6.793	-0.012	1.000	25755	2.94				
7 Perfluorohex			0.014	4 000	440077	00.0			050	
	7.883	7.897	-0.014	1.000	412877	33.0			253	
D 6 13C2 PFHx		7 007	0.000		120222	11.0		22.7	11720	
315.0 > 270.0	7.888	7.897			130233	11.3		22.6	11738	
22 PFPeS (Per 349.0 > 80.0		pentane 8.099		0.872	17337	NC			333	
			-0.140	0.672	17337	NC			333	
9 Perfluorohep 363.0 > 319.0		9.096	-0 008	1.000	109269	8.53			284	
D 8 13C4-PFH _k		9.090	-0.000	1.000	107207	0.55			204	
367.0 > 322.0	9.088	9.097	-0.009		145883	11.1		22.2	13371	
D 11 1802 PFH		7.077	0.007		1 10000			22.2	10071	
403.0 > 84.0	9.123	9.130	-0.007		93037	11.9		25.1	8696	
10 Perfluorohe										
399.0 > 80.0		9.137	-0.019	1.000	238512	NC			1176	
41 Perfluorohe										М
399.0 > 80.0	9.118	9.137		1.000	Page 300 of 5	526 47.3			04/01	<i>M</i> 2016
						· - •			0 ., 0	

Data File:	\\Chr	omina\Sa	acramen	to\Chrom	Data\A6\20160	331-29534.k	o\31MAR2016B6B_	012.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorood	etanoic a	rid								
	10.196		-0 008	1.000	886076	66.4			95.4	
	10.196			1.000	329506	00.1	2.69(0.00-0.00)		65.1	
D 12 13C4 PFC							,			
417.0 > 372.0		10.205	-0.009		130031	10.2		20.5	5161	
38 Perfluorohe	entanesul	lfonic Aci	id							
	10.210			1.000	15103	4.25				
14 Perfluorohe	eptane Su	ulfonate								
449.0 > 80.0	•	10.208	0.002	1.000	15103	NC			73.2	
D 16 13C4 PFC)S									
503.0 > 80.0		11.149	-0.003		110805	8.22		17.2	380	
15 Perfluorood	ctane sulf	onic acid	d							M
499.0 > 80.0	11.146	11.152	-0.006	1.000	2329517	235.0			18854	М
499.0 > 99.0	11.146	11.152	-0.006	1.000	1163854		2.00(0.00-0.00)		65656	M
D 17 13C5 PFN	ΙA									
468.0 > 423.0	11.162	11.171	-0.009		98172	9.65		19.3	7883	
18 Perfluorono	onanoic a	ıcid								
463.0 > 419.0	11.169	11.178	-0.009	1.000	12481	2.13			198	
D 19 13C2 PFD	PΑ									
515.0 > 470.0	11.990	11.999	-0.009		138809	10.4		20.9	9628	
20 Perfluorode	ecanoic a	cid								
513.0 > 469.0	11.990	12.004	-0.014	1.000	2483	0.7370			183	
D 23 13C8 FOS	SA									
506.0 > 78.0	12.639	12.644	-0.005		28802	1.17		2.3	1775	
24 Perfluorood	ctane Sul	fonamide	9							
498.0 > 78.0	12.649	12.646	0.003	1.000	5298	1.45			324	
D 26 13C2 PFU	JnA									
565.0 > 520.0	12.682	12.692	-0.010		136180	9.02		18.0	926	
27 Perfluorour	ndecanoi	c acid								
563.0 > 519.0			-0.011	1.000	5280	-0.0755			169	
29 Perfluorodo	odecanoi	c acid								
613.0 > 569.0	13.268	13.287	-0.019	1.000	1646	0.3510			69.5	
D 28 13C2 PFD	OoA									
615.0 > 570.0		13.289	-0.006		126686	7.03		14.1	9474	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0			-0.005	1.000	2565	0.2032			73.0	
D 33 13C2-PFT	eDA									
715.0 > 670.0		14.215	-0.006		94669	5.42		10.8	7622	
D 35 13C2-PFH										
815.0 > 770.0		14.866	-0.004		133803	4.56		9.1	12372	
34 Perfluorohe										
813.0 > 769.0			-0.004	1.000	24126	-3.52			379	
36 Perfluorood				-					•	
913.0 > 869.0			-0.004	1.000	19141	0.8189			132	

Report Date: 01-Apr-2016 09:48:17

OC Flag Legend Processing Flags NC - Not Calibrated

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01-Apr-2016 09:48:17 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_012.d **Injection Date:** 31-Mar-2016 15:47:33 Instrument ID: Α6 Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4 OF-HP01-0316 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 12 Injection Vol: 15.0 ul Dil. Factor: 5.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid 1 13C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 $F1:m/z 217.0 > 172.0:Moving11PtAverage_x2$ 10 (00010 (00010 (00010 Y (X1000) ∑30-≥30-18 12 5.7 5.3 5.9 6.2 6.8 5.1 5.4 6.0 5.0 5.6 6.5 7.1 7.4 40 Perfluorobutanesulfonic acid D 3 13C5-PFPeA 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 961 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 V (X10000) 30 84 ©25**-** $\stackrel{\cdot}{\succeq}_{20}$ ×60-≻₄₈-15 36 10 24 12 6.5 7.1 7.4 6.5 6.8 7.1 7.4 7.8 6.2 6.8 7.2 7.5 8.1 8.4 6.2 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 49 35 30 6 25 <u>6</u>42 830 ¥35 ×25 ×₂₀ **≻**20 ≻28 15 21 15 10 10 7.7 8.0 8.9 9.2 9.5 8.8 9.1 9.4 9.7 7.4 8.3 8.6 8.6 8.5 8.3 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) 13 Perfluorooctanoic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 24 63- 0 0 20 (30⁻ (25⁻ ∑₁₆ ×45 ≻₃₆-15 27 10 18

0

7.5

8.4 Page 3M2 of 526 10.2

9.1

9.7

10.3

04/01/2016

0

8.3

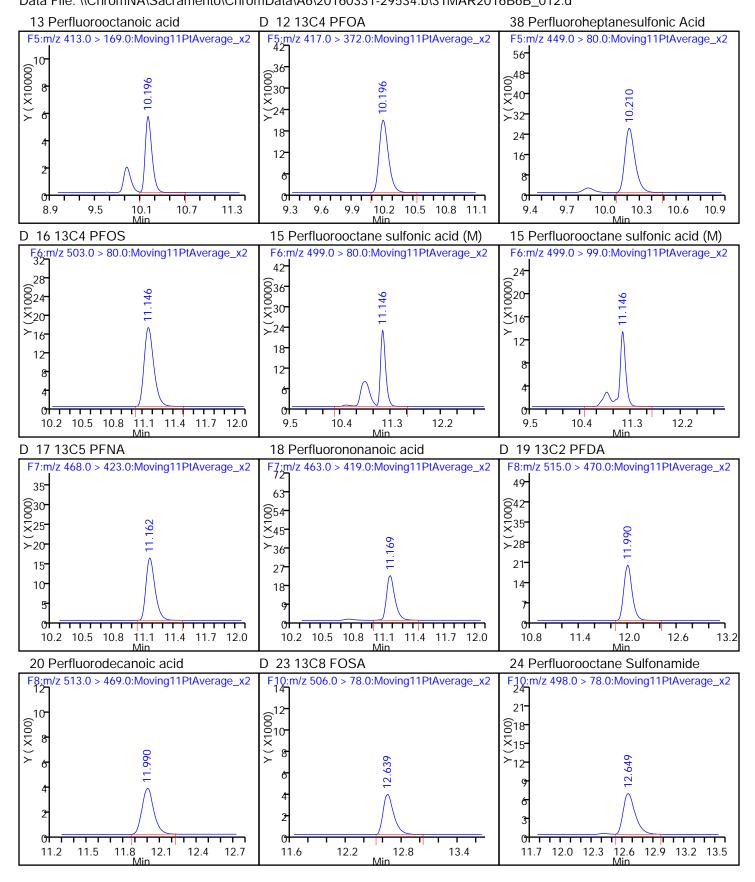
8.9

8.6

9.2

9.5

9.8



39 Perfluorodecane Sulfonic acid (ND) D 26 13C2 PFUnA 27 Perfluoroundecanoic acid F11:m/z 565.0 > 520.0:Moving11PtAverage_x2 F11:m/z 599.0 > 80.0:Moving11PtAverage_x2 F11:m/z 563.0 > 519.0:Moving11PtAverage_x2 (00015-×)28-10 618 ×15 21 14 11.7 12.3 12.9 13.5 11.7 12.3 12.9 13.5 11.7 12.3 12.9 13.5 29 Perfluorododecanoic acid D 28 13C2 PFDoA 30 Perfluorotridecanoic acid F12:m/z 613.0 > 569.0:Moving11PtAverage_x2 F12:m/z 615.0 > 570.0:Moving11PtAverage_x2 F12:m/z 663.0 > 619.0:Moving11PtAverage_x2 91 ×30 636 78- 65-×65-∑65 **≻**52 **≻**52 18 39 39 26 12 26 13 13 12.8 13.1 13.4 13.7 12.2 12.8 13.4 14.0 13.3 13.9 14.2 13.6 Min D 33 13C2-PFTeDA 32 Perfluorotetradecanoic acid (ND) D 35 13C2-PFHxDA F12:m/z 713.0 > 669.0:Moving11PtAverage_x2 F12:m/z 715.0 > 670.0:Moving11PtAverage_x2 F13:m/z 815.0 > 770.0:Moving11PtAverage_x2 656**-**(0001 ×)24 0010 × 8 ×40 32 18 24 16 13.8 13.8 14.4 15.0 15.0 15.0 13.2 13.2 14.4 14.1 14.4 14.7 15.3 15.6 34 Perfluorohexadecanoic acid 36 Perfluorooctandecanoic acid F13:m/z 813.0 > 769.0:Moving11PtAverage_x2 F13:m/z 913.0 > 869.0:Moving11PtAverage_x2 14 91 678 ×65 -52 39 26- 13 14.3 14.6 14.9 15.2 15.5 14.8 15.4 15.7 14.5

Report Date: 01-Apr-2016 09:48:17 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d

Injection Date: 31-Mar-2016 15:47:33 Instrument ID: A6

Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 12

Injection Vol: 15.0 ul Dil. Factor: 5.0000

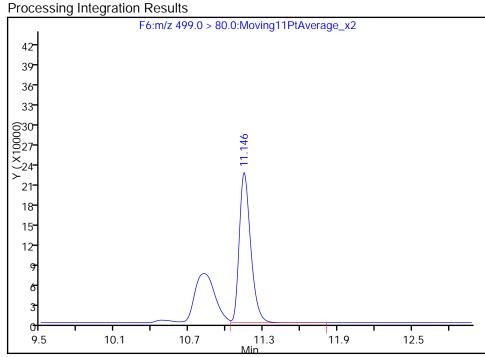
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

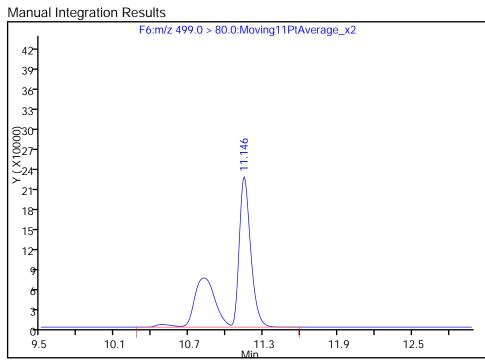
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 1454312 Amount: 146.6936

Amount Units: ng/ml



RT: 11.15 Area: 2329517 Amount: 234.9667 Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:17:51

Audit Action: Manually Integrated

Audit Reason: Isomers

Report Date: 01-Apr-2016 09:48:17 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_012.d

Injection Date: 31-Mar-2016 15:47:33 Instrument ID: A6

Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 12

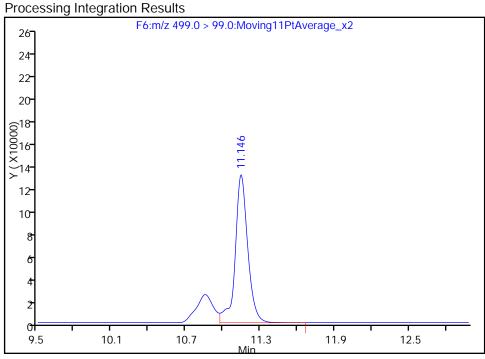
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

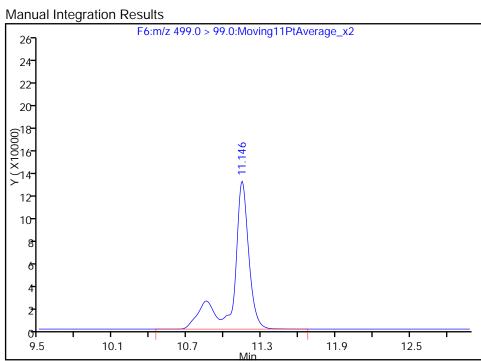
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 924440 Amount: 146.6936 Amount Units: ng/ml



RT: 11.15 Area: 1163854 Amount: 234.9667 Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:17:51

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01P-0316 Lab Sample ID: 320-17859-5

Matrix: Water Lab File ID: 28MAR2016A6A_086b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:20

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 541.2(mL) Date Analyzed: 03/29/2016 23:35

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.0018	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.72	В	0.0023	0.0018	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.012		0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.0018	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.48	М	0.0023	0.0018	0.00080

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	87		25-150
STL00990	13C4 PFOA	72		25-150
STL00995	13C5 PFNA	70		25-150
STL00994	1802 PFHxS	114		25-150
STL00991	13C4 PFOS	65		25-150

Report Date: 01-Apr-2016 09:57:44 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_086b.d

Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Sample Type: Client

Inject. Date: 29-Mar-2016 23:35:19 ALS Bottle#: 14 Worklist Smp#: 85

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-5-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:44:04

First Level Revie	ewer. we:	steriuorit	•		Date.	ა	10-171a1-2010 13.44.0	4		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	tanesulf	onic acid	I							
298.9 > 80.0	6.762	6.787		1.000	140498	14.4				
D 8 13C4-PFH _I	οΑ									
367.0 > 322.0		9.101	-0.025		636369	43.7		87.3	12205	
9 Perfluorohe	otanoic a	cid								
363.0 > 319.0		9.102	-0.020	1.000	403801	33.8			179	
D 11 18O2 PFH	xS									
403.0 > 84.0	9.111	9.135	-0.024		513635	54.0		114	30292	
41 Perfluorohe	xanesulf	onic acid	d							M
399.0 > 80.0	9.111	9.138	-0.027	1.000	1632200	257.6				M
D 12 13C4 PFO										
417.0 > 372.0	10.189	10.214	-0.025		563683	35.9		71.8	17329	
13 Perfluorooc										
	10.196			1.000	4244162	391.8			108	
413.0 > 169.0	10.189	10.216	-0.027	0.999	1460469		2.91(0.00-0.00)		66.5	
D 16 13C4 PFO		11 1/0	0.014		47/075	24.0		0	1700	
	11.146				476875	31.0		64.8	1709	
15 Perfluorooc 499.0 > 80.0	tane sulf 11.146			1.000	107/1707	1144.4			8519	EM EM
499.0 > 80.0 499.0 > 99.0	11.146			1.000	10761787 4848215	1144.4	2.22(0.00-0.00)		6482	⊏ivi M
D 17 13C5 PFN		11.105	-0.017	1.000	4040213		2.22(0.00-0.00)		0402	IVI
	A 11.168	11 183	-0.015		457206	34.9		69.7	34988	
18 Perfluorono			5.015		707200	54.7		37.1	54700	
			-0.016	1 000	48228	6.57			424	
100.0 / 417.0			5.010	1.000	40220	0.07			747	

Report Date: 01-Apr-2016 09:57:44

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01-Apr-2016 09:57:44 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_086b.d **Injection Date:** 29-Mar-2016 23:35:19 Instrument ID: Α6 Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5 Client ID: OF-HP01P-0316 Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 85 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 9 Perfluoroheptanoic acid 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 $F4:m/z 367.0 > 322.0:Moving11PtAverage_x2$ 42 ,(X10000) % 00015 X12 ©36**-**×30 ≻₂₄-18 12 6.8 9.2 9.3 9.9 6.5 7.1 8.0 8.6 9.8 8.1 8.7 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 14 (00012 ×) > 9 635- (000012-X) X 8 ×25 ≻₂₀ 15 10 9.4 9.7 8.4 9.3 9.1 10.2 9.7 10.3 10.9 8.5 8.8 10.0 7.5 9.1 13 Perfluorooctanoic acid 13 Perfluorooctanoic acid D 16 13C4 PFOS F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 42 X (X100000) (12 (×10000) 8 Š30∙ Ç₂₄ 18 12 9.8 10.4 9.4 10.0 9.9 12.3 9.2 11.0 8.8 10.6 11.2 10.5 11.1 11.7 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 88**1** F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 (0000012 (0000012) > 9 677<u>-</u> (014 00012 X10 ×55 >₄₄ 33 22 11 0 $^{\circ}$ 0

9.5

10.4

11.3

12.2

9.5

10.4 11.3 Page 320hof 526 12.2

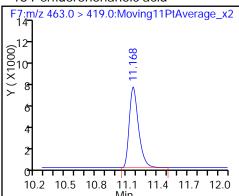
10.1

10.7

11.3

04/01/2016

18 Perfluorononanoic acid



Report Date: 01-Apr-2016 09:57:44 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_086b.d

Injection Date: 29-Mar-2016 23:35:19 Instrument ID: A6

Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 85

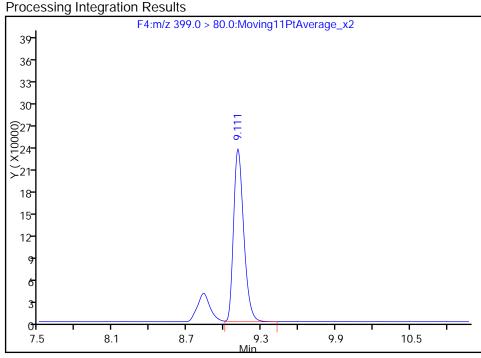
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

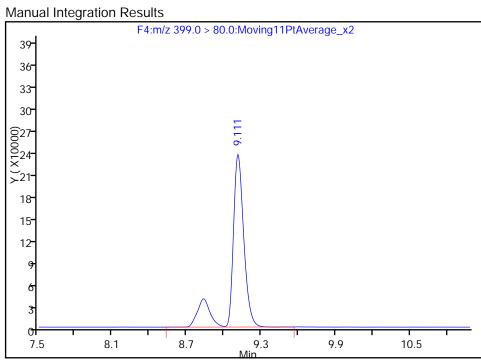
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

RT: 9.11
Area: 1357535
Amount: 214.2740
Amount Units: ng/ml



RT: 9.11
Area: 1632200
Amount: 257.5792
Amount Units: ng/ml



Reviewer: westendorfc, 30-Mar-2016 15:46:06

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01P-0316 DL Lab Sample ID: 320-17859-5 DL

Matrix: Water Lab File ID: 31MAR2016B6B_015.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:20

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 541.2(mL) Date Analyzed: 03/31/2016 16:51

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

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

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

Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	104		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	76		25-150
STL00994	1802 PFHxS	139		25-150
STL00991	13C4 PFOS	101		25-150

Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_015.d

Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Sample Type: Client

Inject. Date: 31-Mar-2016 16:51:16 ALS Bottle#: 15 Worklist Smp#: 15

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-17859-A-5-A 5x SD

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 09:19:55

First Level Revie	ewer: wes	stendorio	;		Date: 01-Apr-2016 09:19:55					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	ıtanesulfo	nnic acid								
298.9 > 80.0		6.793		1.000	23596	2.44				
9 Perfluorohe			0.0.0		20070					
363.0 > 319.0		9.096	-0 008	1.000	91182	7.59			167	
D 8 13C4-PFH _I		7.070	0.000	1.000	71102	7.07				
	9.088	9.097	-0 009		136987	10.4		20.8	23499	
D 11 18O2 PFH		7.077	0.007		100707	10.1		20.0	20177	
403.0 > 84.0		9.130	-0.007		102649	13.1		27.7	8678	
41 Perfluorohe					102017	10.1		27.7	0070	M
399.0 > 80.0		9.137		1.000	292638	46.2				M
13 Perfluorooc			0.020	1.000	272030	40.2				IVI
413.0 > 369.0	10.196		-0.008	1.000	927991	66.3			74.2	
413.0 > 169.0	10.203			1.001	289955	00.5	3.20(0.00-0.00)		48.8	
D 12 13C4 PFO		. 0.20 .	0.00.		207700		0.20(0.00 0.00)		.0.0	
417.0 > 372.0		10 205	-0 009		136386	10.7		21.5	10750	
D 16 13C4 PFO		10.200	0.007		100000			21.0	10700	
	11.146	11 149	-0.003		130485	9.68		20.2	20389	
15 Perfluorooc					100100	7.00		20.2	20007	M
499.0 > 80.0		11.152		1.000	2445789	209.5			58779	M
499.0 > 99.0	11.146			1.000	1148539	207.0	2.13(0.00-0.00)		32012	M
D 17 13C5 PFN							,			
468.0 > 423.0	11.162	11.171	-0.009		77025	7.57		15.1	6239	
18 Perfluorono					3_0					
	11.190		0.012	1.000	5001	1.33			258	
100.0 / 117.0		, 0	5.012		0001	1.00			200	

Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24

QC Flag Legend Review Flags

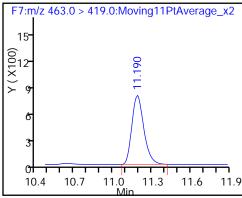
M - Manually Integrated

Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_015.d 31-Mar-2016 16:51:16 **Injection Date:** Instrument ID: Α6 Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5 OF-HP01P-0316 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 15 Injection Vol: Dil. Factor: 15.0 ul 5.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: D 813C4-PFHpA 40 Perfluorobutanesulfonic acid 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 630 8 25 ×25 ×30-**6**54 ×45 ∑20⁻ ~24° >36 15- 18 27 10 18 7.0 9.2 8.5 9.1 6.4 6.7 7.3 8.0 8.6 9.8 8.8 9.4 9.7 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 413.0 > 369.0:Moving11PtAverage x263 30⁻ 624- 654 000 ×45 ×₂₀) ≻36- 15 27 10 18 8.9 9.2 9.3 9.5 9.8 8.4 10.2 9.9 10.2 10.5 10.8 8.3 7.5 9.3 9.6 8.6 D 12 13C4 PFOA D 16 13C4 PFOS 13 Perfluorooctanoic acid F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 35 672 <u>830</u> ×25 ×60 >₄₈ ≻20 15 36 10 24 12 9.8 10.4 11.0 9.8 10.4 10.7 11.9 9.2 11.0 10.1 11.3 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 24 42 28 X30-0020 ×16 ©24**-**×20-<u>></u>24 -16' 12 18 12 12 $^{\circ}$ 09.5 10.4 11.3 12.2 9.5 10.4 11.3 Page 326 of 526 12.2 10.2 10.8 11.4

Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_015.d

18 Perfluorononanoic acid



Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_015.d

Injection Date: 31-Mar-2016 16:51:16 Instrument ID: A6

Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 15

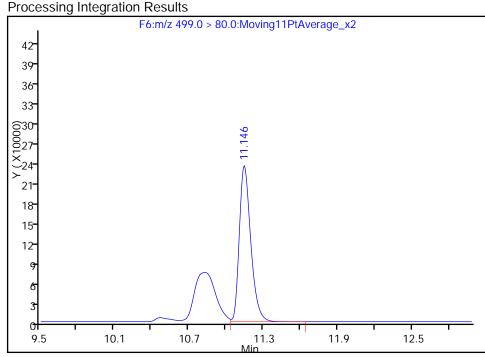
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

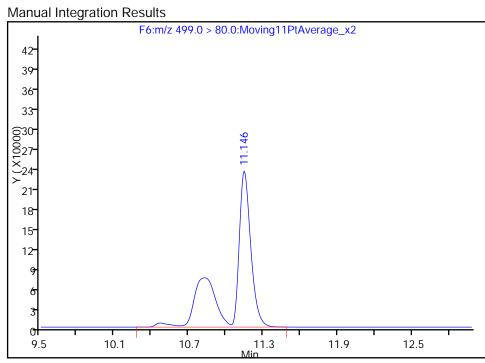
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 1515526 Amount: 129.8136 Amount Units: ng/ml



RT: 11.15
Area: 2445789
Amount: 209.4888
Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:19:55

Audit Action: Manually Integrated

Audit Reason: Isomers

Report Date: 01-Apr-2016 09:48:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_015.d

Injection Date: 31-Mar-2016 16:51:16 Instrument ID: A6

Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 15

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Manual Integration Results

10.1

10.7

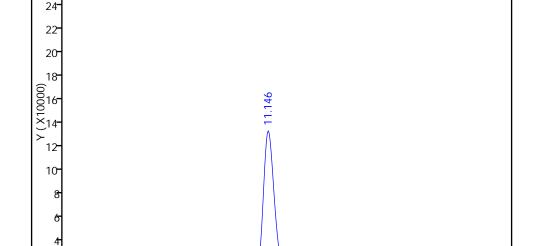
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 906038 Amount: 129.8136

Amount Units: ng/ml

RT: 11.15 Area: 1148539 Amount: 209.4888 Amount Units: ng/ml



11.3

F6:m/z 499.0 > 99.0:Moving11PtAverage_x2

Reviewer: westendorfc, 01-Apr-2016 09:19:55

Audit Action: Manually Integrated

Audit Reason: Isomers

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11.9

12.5

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A6

GC Column: Acquity

Calibration Start Date: 03/28/2016 18:22

Calibration End Date: 03/28/2016 20:29

Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A 004b.d
Level 2	STD 320-104824/4	28MAR2016A6A 005b.d
Level 3	STD 320-104824/5	28MAR2016A6A 006b.d
Level 4	STD 320-104824/6	28MAR2016A6A 007b.d
Level 5	STD 320-104824/7	28MAR2016A6A 008b.d
Level 6	STD 320-104824/8	28MAR2016A6A 009b.d
Level 7	STD 320-104824/9	28MAR2016A6A 010b.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7		RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.595	5.598	5.586	5.585	5.592	5.586	5.589		5.340 - 5.840	5.590
Perfluoropentanoic acid (PFPeA)	6.675	6.675	6.675	6.675	6.671	6.675	6.671		6.424 - 6.924	6.674
Perfluorobutanesulfonic acid (PFBS)	+++++	6.799	6.781	6.790	6.786	6.785	6.786		6.537 - 7.037	6.788
Perfluorohexanoic acid (PFHxA)	+++++	7.893	7.899	7.893	7.893	7.893	7.895		7.644 - 8.144	7.894
Perfluoroheptanoic acid (PFHpA)	9.106	9.094	9.106	9.106	9.106	9.100	9.098		8.852 - 9.352	9.102
Perfluorohexanesulfonic acid (PFHxS)	9.147	9.141	9.135	9.135	9.135	9.135	9.139		8.888 - 9.388	9.138
Perfluorooctanoic acid (PFOA)	+++++	10.217	10.216	10.217	10.216	10.210	10.213		9.966 - 10.466	10.215
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.224	10.223	10.217	10.216	10.216	10.220		9.968 - 10.468	10.219
Perfluorooctanesulfonic acid (PFOS)	+++++	11.175	11.167	11.160	11.160	11.160	11.157		10.913 - 11.413	11.163
Perfluorononanoic acid (PFNA)	+++++	11.183	11.183	11.183	11.183	11.183	11.187		10.934 - 11.434	11.184
Perfluorodecanoic acid (PFDA)	12.007	12.008	12.015	12.015	12.008	12.007	+++++		11.760 - 12.260	12.010
Perfluorodecane Sulfonic acid	12.651	12.651	12.661	12.660	12.661	12.661	12.657		12.407 - 12.907	12.657
Perfluorooctane Sulfonamide (FOSA)	12.660	12.660	12.659	12.659	12.660	12.660	12.665		12.410 - 12.910	12.660
Perfluoroundecanoic acid (PFUnA)	+++++	12.713	12.712	12.702	12.702	12.703	12.708		12.458 - 12.958	12.707
Perfluorododecanoic acid (PFDoA)	+++++	13.307	13.306	13.305	13.306	13.306	13.301		13.055 - 13.555	13.305
Perfluorotridecanoic Acid (PFTriA)	+++++	13.809	13.808	13.808	13.809	13.809	13.804		13.557 - 14.057	13.808
Perfluorotetradecanoic acid (PFTeA)	+++++	14.240	14.239	14.239	14.232	14.232	14.235		13.987 - 14.487	14.236
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	14.889	14.888	14.888	14.888	14.882	14.885		14.637 - 15.137	14.887
Perfluoro-n-octandecanoic acid (PFODA)	+++++	15.216	15.216	15.213	15.216	15.211	15.214		14.964 - 15.464	15.214
13C4 PFBA	5.586	5.586	5.586	5.585	5.586	5.586	5.592		5.337 - 5.837	5.587
13C5-PFPeA	6.675	6.675	6.670	6.670	6.671	6.670	6.671		6.422 - 6.922	6.672
13C2 PFHxA	7.893	7.893	7.893	7.893	7.893	7.893	7.889		7.642 - 8.142	7.892
13C4-PFHpA	9.106	9.100	9.100	9.106	9.100	9.100	9.098		8.851 - 9.351	9.101
1802 PFHxS	9.135	9.135	9.135	9.135	9.135	9.135	9.133		8.885 - 9.385	9.135
13C4 PFOA	10.217	10.217	10.216	10.217	10.209	10.210	10.213		9.964 - 10.464	10.214
13C4 PFOS	11.160	11.161	11.160	11.160	11.160	11.160	11.157		10.910 - 11.410	11.160
13C5 PFNA	11.183	11.183	11.183	11.183	11.183	11.183	11.180		10.933 - 11.433	11.183
13C2 PFDA	12.007	12.008	12.007	12.015	12.008	12.007	+++++		11.759 - 12.259	12.009
13C8 FOSA	12.660	12.660	12.659	12.659	12.660	12.660	12.665		12.410 - 12.910	12.660
13C2 PFUnA	12.713	12.703	12.712	12.712	12.702	12.703	12.708		12.458 - 12.958	12.708
13C2 PFDoA	13.306	13.307	13.306	13.305	13.306	13.306	13.301		13.055 - 13.555	13.305
13C2-PFTeDA	14.240	14.240	14.239	14.239	14.232	14.232	14.235		13.987 - 14.487	14.237
13C2-PFHxDA	14.888	14.889	14.888	14.888	14.888	14.882	14.885		14.637 - 15.137	14.887

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Sacramento	JOD_NO.: 32U-1/859-1	Analy Batch No.: 104824
SDG No.:		
Instrument ID: A6	GC Column: Acquity ID: 2.1(mm)	Heated Purge: (Y/N) N
Calibration Start Date: 03/28/2016 18:22	Calibration End Date: 03/28/2016 20:29	Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	STD 320-104824/3	28MAR2016A6A 004b.d	
Level 2	STD 320-104824/4	28MAR2016A6A 005b.d	
Level 3	STD 320-104824/5	28MAR2016A6A 006b.d	
Level 4	STD 320-104824/6	28MAR2016A6A 007b.d	
Level 5	STD 320-104824/7	28MAR2016A6A 008b.d	
Level 6	STD 320-104824/8	28MAR2016A6A 009b.d	
Level 7	STD 320-104824/9	28MAR2016A6A 010b.d	

ANALYTE		CF	ī		CURVE		COEFFICIENT	#	MIN CF	%RSD		AX	R^2	 MIN R^2
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2			18	RSD	OR COD	OR COD
13C4 PFBA	7864.7 9078.9	8627.2 6752.3	8862.7 5707.1	7552.0	Ave		7777.83143			15.7	50	0.0		
13C5-PFPeA	15638 17079	17426 12828	16278 10999	16118	Ave		15195.2657			15.7	50	0.0		
13C2 PFHxA	13283 14334	14833 12265	13360 10070	12777	Ave		12988.7971			12.0	5(0.0		
13C4-PFHpA	14013 15862	16826 13478	16046 11622	14179	Ave		14574.9143			12.3	50	0.0		
1802 PFHxS	9579.7 10171	11045 8937.6	10002 7582.3	9318.5	Ave		9519.32347			11.4	50	0.0		
13C4 PFOA	16544 14773	19926 13952	19345 11040	14358	Ave		15705.5743			20.0	50	0.0		
13C4 PFOS	16337 17428	18302 13861	15828 10812	15123	Ave		15384.3933			16.2	50	0.0		
13C5 PFNA	15300 14297	14628 10741	14023 9939.7	12887	Ave		13116.5629			15.6	50	0.0		
13C2 PFDA	16895 17537	19561 13151	20031	14357	Ave		16921.9400			16.3	5(0.0		
13C8 FOSA	31724 31558	35418 25791	33789 21419	28300	Ave		29714.1686			16.4	50	0.0		
13C2 PFUnA	17989 19209	22674 16662	19921 12830	17267	Ave		18078.9086			16.9	50	0.0		
13C2 PFDoA	21402 23516	24558 16977	22207 15660	20802	Ave		20731.7543			15.9	50	0.0		
13C2-PFTeDA	21681 23015	23407 20034	23929 17977	20493	Ave		21505.0600			9.9	50	0.0		
13C2-PFHxDA	33945 38494	40717 34520	38447 32691	35463	Ave		36325.2743			8.1	5(0.0		

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

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

ANALYTE			RRF			CURVE		COEFFICIE	INT	# M	MIN RRF	%RSD	#	MAX	R^2		IN R^2
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M1 M2					%RSD	OR COD	0	OR COD
Perfluorobutanoic acid (PFBA)	2806.0 9412.5	8511.0 8314.4	9575.4	9508.7	11418	L2ID	-0.465	1.3310							0.9920		0.9900
Perfluoropentanoic acid (PFPeA)	13654 12209	19208 9299.4	16516	15144	15849	L2ID	0.0023	0.9496							0.9900	(0.9900
Perfluorobutanesulfonic acid (PFBS)	+++++ 7233.1	8488.7 6379.6		9439.6	10215	L2ID		0.9085							0.9900	(0.9900
Perfluorohexanoic acid (PFHxA)	+++++ 12373	12421 10500	14676			L2ID		1.0293							0.9970	-	0.9900
Perfluoroheptanoic acid (PFHpA)	15092 12446	16101 10502	12481	13639		AveID		0.9376				9.5		35.0			
Perfluorohexanesulfonic acid (PFHxS)	2558.1 4718.5	5329.8 4291.2		5673.2	6097.5			0.5841							0.9960		0.9900
Perfluorooctanoic acid (PFOA)	+++++ 12900	15215 9614.6	16762	16036		AveID		0.9610				18.1		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 4989.1	3634.5 4234.2	5287.2	5619.9	6670.3	L2ID	-0.172	0.3783							0.9990	-	0.9900
Perfluorooctanesulfonic acid (PFOS)	+++++ 12449	13350 10057	14617	15019	16006	L2ID	-0.197	0.9428							0.9980	(0.9900
Perfluorononanoic acid (PFNA)	+++++ 8127.7	10244 7550.3	12560	10112	12610	L2ID	-0.098	0.8173							0.9930	(0.9900
Perfluorodecanoic acid (PFDA)	12438 11752	19591 ++++	16168	15737	19807	AveID		0.9440				16.8		35.0			
Perfluorodecane Sulfonic acid	985.48 5489.6	4200.2 4676.1	7342.3	6298.3	7402.7	L1ID	-0.156	0.4220							0.9980	(0.9900
Perfluorooctane Sulfonamide (FOSA)	36502 27831	36839 23071	39456	38184	36748	AveID		1.1469				8.9		35.0			
Perfluoroundecanoic acid (PFUnA)	+++++ 12837	22001 10527	17430	16010	15611			0.8318							0.9960		0.9900
Perfluorododecanoic acid (PFDoA)	+++++ 14736	10902 12026	17338	16216	18230			0.8007							0.9970		0.9900
Perfluorotridecanoic Acid (PFTriA)	+++++ 19413	26831 16407	30982	27495		AveID		1.1854				11.8		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 10148	18325 9298.6	13913	12421		L2ID		0.5801							0.9980		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++ 32112	581407 28303		52433	47656			1.7420							0.9980		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	+++++ 38313	51464 34906	49653	40748	49105	L1ID	-0.366	2.2219							0.9990		0.9900

Note: The ml 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.:
 320-17859-1
 Analy Batch No.:
 104824

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A 004b.d
Level 2	STD 320-104824/4	28MAR2016A6A 005b.d
Level 3	STD 320-104824/5	28MAR2016A6A 006b.d
Level 4	STD 320-104824/6	28MAR2016A6A 007b.d
Level 5	STD 320-104824/7	28MAR2016A6A 008b.d
Level 6	STD 320-104824/8	28MAR2016A6A 009b.d
Level 7	STD 320-104824/9	28MAR2016A6A 010b.d

ANALYTE	CURVE			RESPONSE		CONCENTRATION (NG/ML)					
	TYPE	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	393234 337616	431358 285354	443133	377600	453946	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	781924 641399	871323 549934	813892	805909	853962	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	664149 613264	741633 503488	667978	638854	716713	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	700626 673875	841292 581079	802297	708932	793119	50.0 50.0	50.0 50.0	50.0	50.0	50.0
1802 PFHxS	Ave	453120 422749	522414 358644	473082	440763	481076	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	827181 697624	996297 552024	967256	717902	738667	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	780905 662555	874846 516813	756566	722861	833072	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	765017 537027	731415 496987	701155	644346	714850	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	844757 657548	978044 ++++	1001537	717841	876855	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C8 FOSA	Ave	1586219 1289527	1770920 1070973	1689440	1414975	1577905	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	899437 833088	1133724 641506	996034	863361	960468	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	1070097 848868	1227910 782997	1110333	1040087	1175822	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	1084050 1001676	1170349 898868	1196438	1024659	1150731	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1697262 1726006	2035841 1634569	1922338	1773154	1924676	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.: 320-17859-1 Analy Batch No.: 104824

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB	S SAMPLE ID:	LAB FILE ID:
Level 1	STD	320-104824/3	28MAR2016A6A 004b.d
Level 2	STD	320-104824/4	28MAR2016A6A 005b.d
Level 3	STD	320-104824/5	28MAR2016A6A 006b.d
Level 4	STD	320-104824/6	28MAR2016A6A 007b.d
Level 5	STD	320-104824/7	28MAR2016A6A 008b.d
Level 6	STD	320-104824/8	28MAR2016A6A 009b.d
Level 7	STD	320-104824/9	28MAR2016A6A 010b.d

ANALYTE	IS CURVE			RESPONSE				CONCEN	ITRATION (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
Perfluorobutanoic acid (PFBA)	L2ID	1403 1882506	8511 3325742	47877	190174	570880	0.500 200	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	L2ID	6827 2441841	19208 3719753	82579	302889	792466	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	L2ID	+++++ 1278818	7504 2255842	36779	166893	451512	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)	L2ID	+++++ 2474552	12421 4199820	73381	252004	702391	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	AveID	7546 2489157	16101 4200915	62406	272771	763206	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID	1210 892748	5042 1623787	26292	107337	288410	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)	AveID	+++++ 2580057	15215 3845848	83812	320724	903707	+++++ 200	1.00	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID	+++++ 949931	3460 1612399	25167	107003	317508	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	L2ID	+++++ 2380281	12763 3845883	69869	287157	765092	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)	L2ID	+++++ 1625549	10244 3020123	62798	202235	630492	+++++ 200	1.00	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)	AveID	6219 2350326	19591 ++++	80842	314739	990328	0.500 200	1.00	5.00	20.0	50.0
Perfluorodecane Sulfonic acid	L1ID	475 1058403	4049 1803122	35390	121432	356812	0.482 193	0.964 386	4.82	19.3	48.2
Perfluorooctane Sulfonamide (FOSA)	AveID	18251 5566146	36839 9228296	197282	763677	1837394	0.500 200	1.00	5.00	20.0	50.0
Perfluoroundecanoic acid (PFUnA)	L2ID	+++++ 2567457	22001 4210768	87152	320192	780531	+++++	1.00	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)	L1ID	+++++ 2947182	10902 4810328	86690	324319	911475	+++++ 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

ANALYTE	IS REF	CURVE			RESPONSE				CONCEN	ITRATION (1	NG/ML)	
		TYPE	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	+++++ 3882659	26831 6562902	154908	549893	1307459	+++++ 200	1.00	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L2ID	+++++ 2029561	18325 3719426	69564	248414	627950	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 6422320	581407 11321267	644253	1048656	2382808	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		L1ID	+++++ 7662532	51464 13962510	248267	814956	2455264	+++++ 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution

L1ID = Linear 1/conc IsoDil

L2ID = Linear 1/conc^2 IsoDil

Report Date: 01-Apr-2016 09:55:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_004b.d

Lims ID: Std L1

Client ID:

Sample Type: IC Calib Level: 1

Inject. Date: 28-Mar-2016 18:22:16 ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L1

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:55:38 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 14:58:09

First Level Revie	wer: wes	stendorfo			Date:	30	0-Mar-2016 14:58:0)9		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	1									
217.0 > 172.0	、 5.586	5.587	-0.001		393234	50.6		101	46223	
2 Perfluorobut										
212.9 > 169.0	5.595	5.590	0.005	1.000	1403	0.4838		96.8	174	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.675	6.672	0.003		781924	51.5		103	73909	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.675	6.674	0.001	1.000	6827	0.4573		91.5	8.5	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	6.781	6.787	-0.006	1.000	1669	NC			4.0	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	6.781	6.787	-0.006	1.000	1669	0.3305		74.8		
D 613C2 PFHx										
315.0 > 270.0	7.893	7.892	0.001		664149	51.1		102	59240	
7 Perfluorohex										
313.0 > 269.0	7.893	7.894	-0.001	1.000	8505	0.7909		158	328	
D 8 13C4-PFHp										
367.0 > 322.0	9.106	9.101	0.005		700626	48.1		96.1	60422	
9 Perfluorohep										
363.0 > 319.0		9.102	0.004	1.000	7546	0.5744		115	17.8	
D 11 1802 PFH										
403.0 > 84.0		9.135	0.0		453120	47.6		101	39948	
10 Perfluorohe				1 000	1010					
399.0 > 80.0	9.147		0.009	1.000	1210	NC			8.3	
41 Perfluorohe				1 000	1010	0.4520		07.0		
399.0 > 80.0		9.138	0.009	1.000	1210	0.4539		96.0		
D 12 13C4 PFO		10 21 4	0.000		_ 007404			105	/ 12 11	
417.0 > 372.0	10.217	10.214	0.003		Page 396 of	526 ^{52.7}		105	6424101	1/2016

Data File:	\\Chrc	omina\Sa	acramen	to\Chrom	1Data\A6\20160	330-294/8.k	\28MAR2016A6A_	UU4b.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooct	tannic ac	·id								
	10.224		0.008	1.000	6845	0.4306		86.1	32.9	
38 Perfluorohe	ptanesul	fonic Ac	id							
	10.210			1.000	2052	0.7878		166		
14 Perfluorohe	ptane Su	ulfonate								
449.0 > 80.0	10.210	10.218	-0.008	1.000	2052	NC			186	
D 16 13C4 PFO										
503.0 > 80.0		11.160			780905	50.8		106	60380	
15 Perfluorooct				4 000	054.4	0.7/00		450	400	
	11.160 11.175			1.000 1.001	8514 2138	0.7622	3.98(0.00-0.00)	159 159	122 121	
D 17 13C5 PFN		11.103	0.012	1.001	2130		3.70(0.00-0.00)	137	121	
	11.183	11.183	0.0		765017	58.3		117	60548	
18 Perfluorono										
	11.183		-0.001	1.000	9578	0.8858		177	51.4	
D 19 13C2 PFD	Α									
515.0 > 470.0	12.007	12.009	-0.002		844757	49.9		99.8	58697	
20 Perfluorode	canoic a	cid								
513.0 > 469.0	12.007	12.010	-0.003	1.000	6219	0.3899		78.0	858	
39 Perfluorode										M
599.0 > 80.0		12.657		1.000	475	0.4387		91.0		M
24 Perfluorooct				1 000	10051	0.5017		100	1110	
	12.660	12.660	0.0	1.000	18251	0.5016		100	1140	
D 23 13C8 FOS	A 12.660	12 660	0.0		1586219	53.4		107	4050	
D 26 13C2 PFU		12.000	0.0		1300219	55.4		107	4030	
	12.713	12.708	0.005		899437	49.8		99.5	35992	
27 Perfluoroun										
563.0 > 519.0			0.005	1.000	20333	1.18		237	90.3	
D 28 13C2 PFD	οA									
615.0 > 570.0	13.306	13.305	0.001		1070097	51.6		103	82713	
29 Perfluorodo	decanoio	c acid								
613.0 > 569.0	13.306	13.305	0.001	1.000	7469	0.8162		163	107	
30 Perfluorotric										
663.0 > 619.0	13.800	13.807	-0.007	1.000	6430	0.2534		50.7	45.7	
D 33 13C2-PFT6										
715.0 > 670.0			0.003		1084050	50.4		101	33967	
32 Perfluoroteti			0.002	1 000	11/02	0 / 44/		100	10.0	
713.0 > 669.0			0.003	1.000	11603	0.6446		129	12.0	
34 Perfluorohe: 813.0 > 769.0			0.001	1.000	427234	-0.7950			2866	
D 35 13C2-PFH:		14.00/	0.001	1.000	421234	-0.7700			2000	
815.0 > 770.0		14 887	0.001		1697262	46.7		93.4	43555	
36 Perfluorooct					.07,202	10.7		70.4	.5555	
913.0 > 869.0				1.000	17235	0.5270		105	61.6	
	-	,		-	-	-		-	-	

Report Date: 01-Apr-2016 09:55:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24

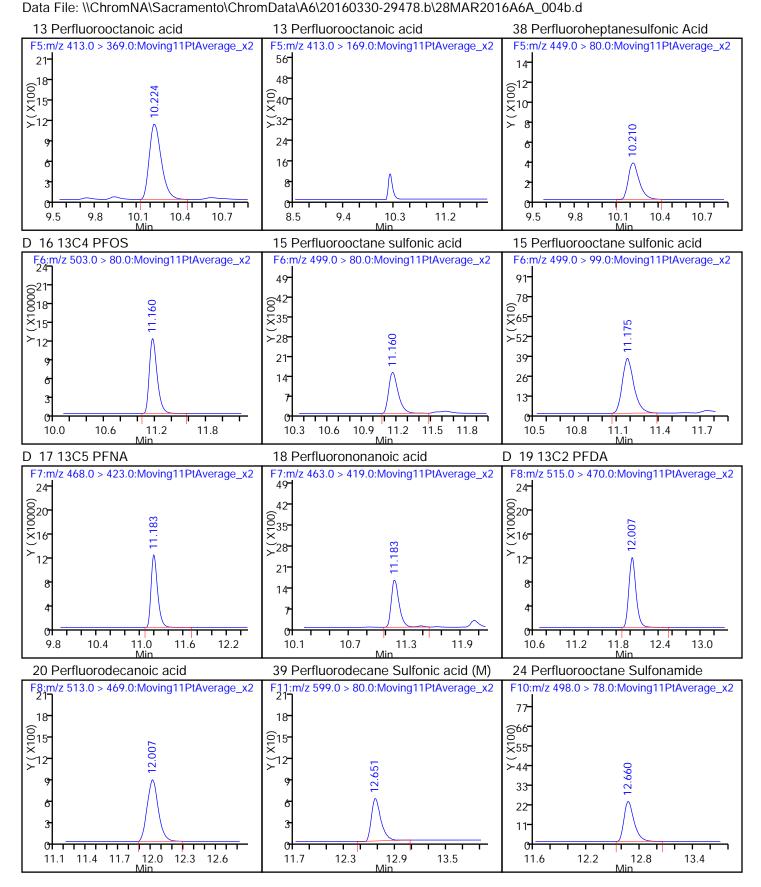
OC Flag Legend
Processing Flags
NC - Not Calibrated
Review Flags

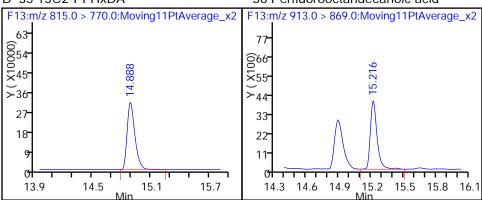
M - Manually Integrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:55:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_004b.d **Injection Date:** 28-Mar-2016 18:22:16 Instrument ID: Α6 Lims ID: Std L1 Client ID: Operator ID: **JRB** ALS Bottle#: 9 Worklist Smp#: 3 15.0 ul Dil. Factor: 1.0000 Injection Vol: Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 (12° ×) ×) × (10000) × (10° ×) × (10° ×) (0018-15-(18⁻ (0)₁₅-(2) (12⁻ 5.595 5.2 6.9 5.5 5.8 6.1 5.2 5.5 5.8 6.0 6.3 6.6 7.2 40 Perfluorobutanesulfonic acid 6 13C2 PFHxA 4 Perfluoropentanoic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage x2F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 21⁻ 00018⁻ ×15⁻ 28 36 <u>6</u>24 830 ∑20 ×₂₄ ≻16- 18 12 12 6.5 6.9 7.3 6.8 7.1 6.6 7.2 6.7 7.9 8.5 6.3 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 21 35- 35 0018-15-12-930 830 ×25 ×25 ≻₂₀ ≻20 15 15 10 10 01 7.6 7.9 8.2 8.0 8.6 9.2 8.7 9.0 9.3 9.6 7.3 8.5 9.8 8.4 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 24 63 × (×10000) × (×10000) 0020 ×16 6⁵⁴ ×45 **≻**36- 12 27 18 0 0 0 10.3 8.5 8.8 9.1 9.4 9.7 8.4 8.7 Page 389hof 526 9.6 9.1 9.7 04/01/2016 8.2 10.0





Report Date: 01-Apr-2016 09:55:39 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_004b.d

Injection Date: 28-Mar-2016 18:22:16 Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

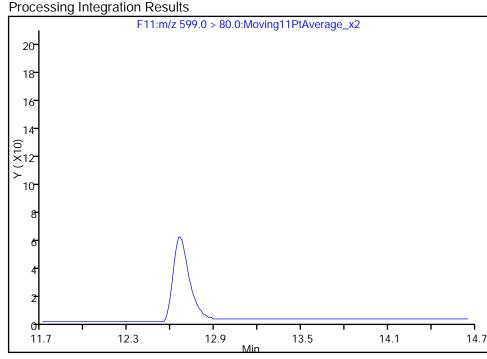
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

39 Perfluorodecane Sulfonic acid, CAS: 335-77-3

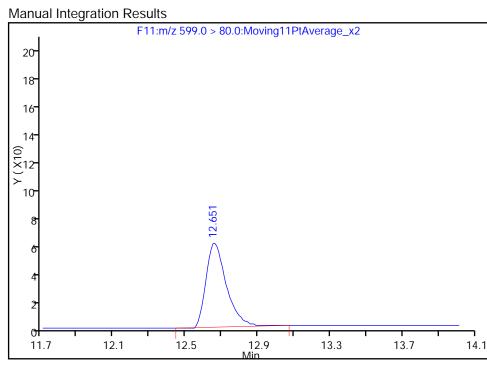
Not Detected

Expected RT: 12.66



RT: 12.65 Area: 475

Amount: 0.438685 Amount Units: ng/ml



Reviewer: westendorfc, 30-Mar-2016 14:58:09

Audit Action: Manually Integrated Audit Reason: Assign Peak

04/01/2016

Report Date: 01-Apr-2016 09:55:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_005b.d

Lims ID: Std L2

Client ID:

Sample Type: IC Calib Level: 2

Inject. Date: 28-Mar-2016 18:43:29 ALS Bottle#: 10 Worklist Smp#: 4

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L2

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:55:42 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Process Host:	XAWI	RK016								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.586	5.587	-0.001		431358	55.5		111	99772	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.598	5.590	0.008	1.000	8511	1.09		109	1046	
D 3 13C5-PFP6										
267.9 > 223.0	6.675	6.672	0.003		871323	57.3		115	84499	
4 Perfluoroper										
		6.674	0.001	1.000	19208	1.16		116	14.7	
5 Perfluorobut			0.040	1 000	7504	NO			44.0	
298.9 > 80.0 298.9 > 99.0	6.799 6.785	6.787 6.787	0.012	1.000 0.998	7504 3977	NC	1.89(0.00-0.00)		11.2 13.3	
40 Perfluorobu				0.996	3911		1.69(0.00-0.00)		13.3	
298.9 > 80.0		6.787	0.012	1.000	7504	0.8866		100		
D 6 13C2 PFHx		0.707	0.012	1.000	7504	0.0000		100		
315.0 > 270.0	7.893	7.892	0.001		741633	57.1		114	65983	
7 Perfluorohex										
		7.894	-0.001	1.000	12421	0.9824		98.2	1240	
D 8 13C4-PFH _k	Α									
•		9.101	-0.001		841292	57.7		115	72598	
9 Perfluoroher	otanoic a	cid								
363.0 > 319.0	9.094	9.102	-0.008	1.000	16101	1.02		102	78.8	
D 11 1802 PFH	xS									
403.0 > 84.0	9.135	9.135	0.0		522414	54.9		116	46726	
10 Perfluorohe	xane Sul	lfonate								
399.0 > 80.0	9.141	9.138	0.003	1.000	5042	NC			91.2	
41 Perfluorohe										
399.0 > 80.0	9.141	9.138	0.003	1.000	5042	1.02		108		
D 12 13C4 PFO										
417.0 > 372.0	10.217	10.214	0.003		996297 Page 343 of	63.4 526		127	17445 04/01	1/2016
					ŭ					

Report Date: 01-Apr-2016 09:55:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			to\Chrom			04-Mar-2016 14:36 \\28MAR2016A6A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
413.0 > 169.0	10.217 10.224	10.216 10.216	0.008	1.000 1.001	15215 2519	0.7946	6.04(0.00-0.00)	79.5 79.5	149 34.4	
38 Perfluorohe 449.0 > 80.0	10.224	10.218		1.000	3460	0.9555		100		
14 Perfluorohe 449.0 > 80.0	•	ılfonate 10.218	0.006	1.000	3460	NC			329	
D 16 13C4 PFO 503.0 > 80.0		11.160	0.001		874846	56.9		119	67596	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.175	onic acio 11.163 11.163	0.012	1.000 0.999	12763 4387	0.9491	2.91(0.00-0.00)	99.3 99.3	364 68.7	
D 17 13C5 PFN 468.0 > 423.0	A 11.183	11.183	0.0		731415	55.8		112	56229	
18 Perfluorono 463.0 > 419.0	nanoic a 11.183		-0.001	1.000	10244	0.9767		97.7	51.9	
D 19 13C2 PFD 515.0 > 470.0	A 12.008	12.009	-0.001		978044	57.8		116	68257	
20 Perfluorode 513.0 > 469.0		cid 12.010	-0.002	1.000	19591	1.06		106	1331	
39 Perfluorode 599.0 > 80.0		lfonic aci 12.654		1.000	4049	0.8940		92.7		
25 Perfluorode 599.0 > 80.0		lfonate 12.659	-0.008	1.000	4049	NC			258	
24 Perfluorooc 498.0 > 78.0	tane Sulf 12.660			1.000	36839	0.9069		90.7	2234	
D 23 13C8 FOS 506.0 > 78.0		12.660	0.0		1770920	59.6		119	3354	
D 26 13C2 PFU 565.0 > 520.0		12.708	-0.005		1133724	62.7		125	68736	
27 Perfluoroun 563.0 > 519.0	ndecanoio 12.713		0.005	1.000	22001	0.99		99.2	127	
D 28 13C2 PFD 615.0 > 570.0		13.305	0.002		1227910	59.2		118	94807	
29 Perfluorodo 613.0 > 569.0			0.002	1.000	10902	0.9347		93.5	267	
30 Perfluorotrio 663.0 > 619.0			0.002	1.000	26831	0.9216		92.2	24.7	
D 33 13C2-PFT 715.0 > 670.0		14.237	0.003		1170349	54.4		109	30612	
32 Perfluorotet 713.0 > 669.0	tradecan	oic acid		1.000	18325	1.00		99.6	15.3	
34 Perfluorohe 813.0 > 769.0	xadecan	oic acid		1.000	581407	1.34		134	649	
D 35 13C2-PFH 815.0 > 770.0	IxDA				2035841	56.0		112	17495	
36 Perfluorooc	tandecar	noic acid		1 000						
913.0 > 869.0	15.210	15.214	0.002	1.000	Page 344 of	526 1.11		111	134/01	1/2016

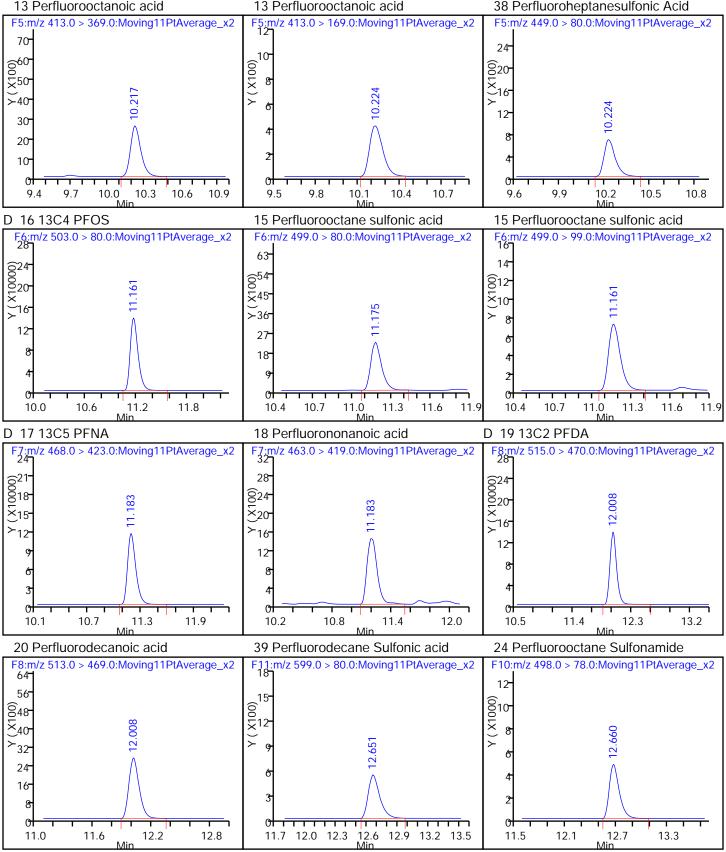
Report Date: 01-Apr-2016 09:55:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24

OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L2_00019 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:55:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_005b.d **Injection Date:** 28-Mar-2016 18:43:29 Instrument ID: Α6 Lims ID: Std L2 Client ID: Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 X (X10000) Y 36- 024 024 ©30-× × 24-∑20 **≻**16 18 12 5.2 5.5 5.8 6.1 5.1 5.4 5.7 6.0 6.1 6.4 6.7 7.0 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 70 21⁻ 00018⁻ ×15⁻ 42 ×100 50 50 ×30− >40 **≻**24 30 18 20 12 10 6.4 6.7 7.0 7.3 6.5 7.9 8.2 8.5 6.2 6.8 7.1 7.0 7.3 7.6 8.8 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 42 63 24 (0) (0) (2) (0) 654**-**845**-**×30 ∑₁₆-×24 -36 12 18 27 18 12 7.9 8.2 8.7 9.3 9.9 8.7 9.0 9.3 7.3 7.6 8.5 8.1 8.4 9.6 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 (000012 ×) > 9 628 624 (15⁻ (00 X) 12⁻ 16 0 0| 8.5 8.8 9.1 9.4 Page 346 of 526 8.7 9.3 9.9 8.2 9.7 9.1 9.7 10.3 04/01/2016 8.1



14.3 14.6

14.9

15.2 15.5 15.8 16.1

30 20 10

14.0 14.3 14.6

14.9 15.2 15.5 15.8

Report Date: 01-Apr-2016 09:55:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_006b.d

Lims ID: Std L3

Client ID:

Sample Type: IC Calib Level: 3

Inject. Date: 28-Mar-2016 19:04:41 ALS Bottle#: 11 Worklist Smp#: 5

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L3

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:55:45 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:00:35

First Level Reviewer: westendorfc					Date: 30-Mar-2016 15:00:35					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	A									
217.0 > 172.0	5.586	5.587	-0.001		443133	57.0		114	97670	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.586		-0.004	1.000	47877	4.41		88.2	5495	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.670	6.672	-0.002		813892	53.6		107	154464	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.675	6.674	0.001	1.000	82579	5.34		107	85.2	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	6.781	6.787	-0.006	1.000	36779	NC			87.3	
298.9 > 99.0	6.790	6.787	0.003	1.001	19318		1.90(0.00-0.00)		95.5	
40 Perfluorobu				1 000	0.4770			0.4.7		
	6.781	6.787	-0.006	1.000	36779	4.19		94.7		
D 6 13C2 PFHx		7.000	0.001		//7070	E4.4		100	F00//	
315.0 > 270.0		7.892	0.001		667978	51.4		103	59066	
7 Perfluorohex			0.005	1 000	72201	Г Г1		110	2/02	
313.0 > 269.0	7.899	7.894	0.005	1.000	73381	5.51		110	2603	
D 8 13C4-PFH _k 367.0 > 322.0		0 101	-0.001		802297	55.0		110	67866	
			-0.001		002297	55.0		110	07000	
9 Perfluoroher 363.0 > 319.0		9.102	0.004	1.000	62406	4.15		83.0	71.2	
D 11 1802 PFH		7.102	0.004	1.000	02400	4.13		03.0	71.2	
403.0 > 84.0		9.135	0.0		473082	49.7		105	41795	
10 Perfluorohe			0.0		473002	77.7		103	41773	
399.0 > 80.0			-0.003	1.000	26292	NC			278	
41 Perfluorohe				7.000	20272	110			2,0	
399.0 > 80.0	9.135		-0.003	1.000	26292	4.74		100		
277.0	700		2.300		Do == 240 of /			. 30	04/04	1/2046

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04/01/2016

Report Date: 01-Apr-2016 09:55:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			o\Chrom			04-Mar-2016 14:36: \\28MAR2016A6A_0			
	,,,,,,,	EXP	DLT	REL		Amount				
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO	Α									
417.0 > 372.0	10.216	10.214	0.002		967256	61.6		123	76462	
13 Perfluorooc			0.0	1 000	00010	4.54		00.0	000	
413.0 > 369.0 413.0 > 169.0	10.216 10.223			1.000 1.001	83812 21500	4.51	3.90(0.00-0.00)	90.2 90.2	209 1830	
38 Perfluorohe				1.001	21300		3.70(0.00-0.00)	70.2	1030	
	10.223			1.000	25167	4.66		97.9		
14 Perfluorohe	ptane Su	lfonate								
449.0 > 80.0	10.223	10.218	0.005	1.000	25167	NC			2030	
D 16 13C4 PFO										
503.0 > 80.0	11.160				756566	49.2		103	13080	
15 Perfluorooc				1 000	(00/0	4.00		100	000	
499.0 > 80.0 499.0 > 99.0	11.167 11.167			1.000 1.000	69869 36487	4.89	1.91(0.00-0.00)	102 102	829 1822	
D 17 13C5 PFN		11.103	0.004	1.000	30407		1.91(0.00-0.00)	102	1022	
	11.183	11.183	0.0		701155	53.5		107	54769	
18 Perfluorono										
	11.183		-0.001	1.000	62798	5.60		112	1132	
D 19 13C2 PFD	Α									
515.0 > 470.0	12.007	12.009	-0.002		1001537	59.2		118	70528	
20 Perfluorode										
513.0 > 469.0	12.015	12.010	0.005	1.000	80842	4.28		85.5	1418	
39 Perfluorode				1 000	25200	F / 7		110		
599.0 > 80.0	12.661		0.005	1.000	35390	5.67		118		
25 Perfluorode 599.0 > 80.0	cane Sul 12.661		0.002	1.000	35390	NC			2182	
24 Perfluorooc				1.000	33370	NC			2102	
498.0 > 78.0				1.000	197282	5.09		102	5893	
D 23 13C8 FOS										
506.0 > 78.0	12.659	12.660	-0.001		1689440	56.9		114	3303	
D 26 13C2 PFU	nA									
565.0 > 520.0	12.712	12.708	0.004		996034	55.1		110	6395	
27 Perfluoroun	decanoic	acid								
563.0 > 519.0	12.712	12.708	0.004	1.000	87152	5.09		102	931	
D 28 13C2 PFD										
615.0 > 570.0			0.001		1110333	53.6		107	84668	
29 Perfluorodo			0.001	1 000	0//00	F 2/		105	1500	
613.0 > 569.0			0.001	1.000	86690	5.26		105	1593	
30 Perfluorotrio 663.0 > 619.0			0.001	1.000	154908	5.88		118	113	
D 33 13C2-PFT		13.007	0.001	1.000	134700	5.00		110	113	
715.0 > 670.0		14.237	0.002		1196438	55.6		111	26865	
32 Perfluorotet			0.002			23.0				
713.0 > 669.0			0.002	1.000	69564	5.11		102	83.1	
34 Perfluorohe										
813.0 > 769.0			0.001	1.000	644253	4.40		88.0	3230	
D 35 13C2-PFH	xDA									
815.0 > 770.0	14.888	14.887	0.001		Page 350 of 526	52.9		106	²⁴ 64%1	/2016
					•					

Report Date: 01-Apr-2016 09:55:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

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

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.216 15.214 0.002 5.20 104 1.000 248267 676

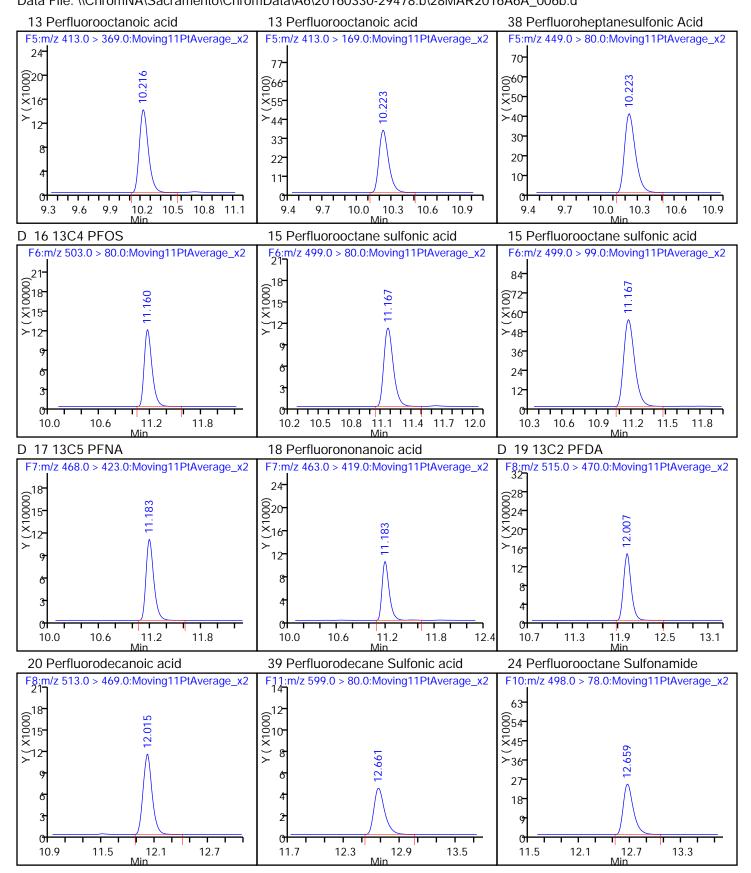
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:55:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_006b.d **Injection Date:** 28-Mar-2016 19:04:41 Instrument ID: Α6 Lims ID: Std L3 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 5 15.0 ul Dil. Factor: Injection Vol: 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 $F_{2,m}/z 267.9 > 223.0:Moving11PtAverage_x2$ X (X10000) X (X10000) (00012 X) X 5.2 5.5 5.8 6.1 5.0 5.3 5.6 5.9 6.1 6.4 6.7 7.0 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D 6 13C2 PFHxA F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 24 6.675 (00015 X <u>0</u>20 6.3 6.9 7.2 6.5 6.8 7.1 7.3 7.9 6.2 7.4 6.7 8.5 6.0 6.6 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 24 18 18 0020 ×16 ©15 ×12 © 215 12 7.7 8.0 9.3 9.9 8.8 9.1 9.4 9.7 7.4 8.3 8.6 8.7 8.2 8.5 10.0 7.1 8.1 D 12 13C4 PFOA 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 28 (X10000) × (X10000) × (X10000) ©24-0020-×20-672 ×60-_16 ≻48- 12 36 24 12 0 0 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 35% of 526 9.9 9.1 9.7 10.3 04/01/2016 8.2



15.2 15.5 15.8 16.1

14.3 14.6

14.9

27⁻ 18⁻

13.8

14.4

15.0

15.6

Report Date: 01-Apr-2016 10:38:45 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_007b.d

Lims ID: Std L4

Client ID:

Sample Type: IC Calib Level: 4

Inject. Date: 28-Mar-2016 19:25:54 ALS Bottle#: 12 Worklist Smp#: 6

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 10:38:45 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 14:57:51

First Level Revie	ewer: wes	stendorf	0		Date: 30-Mar-2016 14:57:51					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	Δ									
217.0 > 172.0	、 5.585	5.587	-0.002		377600	48.5		97.1	41939	
2 Perfluorobut	tyric acid									
212.9 > 169.0	•		-0.005	1.000	190174	19.3		96.3	11448	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.670	6.672	-0.002		805909	53.0		106	79877	
4 Perfluoropei	ntanoic a	cid								
262.9 > 219.0	6.675	6.674	0.001	1.000	302889	19.8		98.9	268	
5 Perfluorobut										
298.9 > 80.0	6.790	6.787	0.003	1.000	166893	NC	4 (0(0 00 0 00)		499	
298.9 > 99.0	6.785	6.787	-0.002	0.999	104138		1.60(0.00-0.00)		354	
40 Perfluorobu				1 000	1//002	10.0		110		
298.9 > 80.0	6.790	6.787	0.003	1.000	166893	19.9		112		
D 6 13C2 PFHx 315.0 > 270.0		7.892	0.001		638854	49.2		98.4	57441	
7 Perfluorohe			0.001		030034	47.2		90.4	37441	
313.0 > 269.0		7.894	-0.001	1.000	252004	19.3		96.7	11038	
D 8 13C4-PFH _I		7.074	0.001	1.000	202004	17.5		70.7	11000	
	9.106	9.101	0.005		708932	48.6		97.3	41405	
9 Perfluorohe										
363.0 > 319.0		9.102	0.004	1.000	272771	20.5		103	1005	
D 11 1802 PFH	lxS									
403.0 > 84.0	9.135	9.135	0.0		440763	46.3		97.9	39419	
10 Perfluorohe	xane Su	lfonate								
399.0 > 80.0	9.135	9.138	-0.003	1.000	107337	NC			3700	
41 Perfluorohe	xanesulf	onic acid	d							
399.0 > 80.0	9.135	9.138	-0.003	1.000	107337	20.0		105		
					Page 355 of 9	526			04/01	1/2016

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Report Date: 01-Apr-2016 10:38:45 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01-Apr-2016 10:38:45										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFC 417.0 > 372.0	A 10.217	10.214	0.003		717902	43.6		87.1	37121	
	tanoic ac 10.217 10.217	10.216		1.000 1.000	320724 90955	23.3	3.53(0.00-0.00)	116 116	1407 6993	
38 Perfluorohe 449.0 > 80.0	eptanesul 10.217			1.000	107003	19.2		101		
14 Perfluorohe 449.0 > 80.0	eptane Su 10.217		-0.001	1.000	107003	NC			8503	
D 16 13C4 PFC 503.0 > 80.0)S 11.160	11.160	0.0		722861	47.0		98.3	56142	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	11.160 11.160	11.163	-0.003	1.000 1.000	287157 168055	20.4	1.71(0.00-0.00)	106 106	418 8881	
D 17 13C5 PFN 468.0 > 423.0	IA 11.183	11.183	0.0		644346	49.1		98.2	5008	
18 Perfluorono 463.0 > 419.0			-0.001	1.000	202235	19.3		96.6	868	
D 19 13C2 PFD 515.0 > 470.0	A 12.015	12.009	0.006		717841	42.4		84.8	49709	
20 Perfluorode 513.0 > 469.0	ecanoic ad 12.015		0.005	1.000	314739	23.2		116	22408	
39 Perfluorode 599.0 > 80.0	ecane Sul 12.660			1.000	121432	19.4		101		
25 Perfluorode 599.0 > 80.0	ecane Sul 12.660		0.001	1.000	121432	NC			7306	
24 Perfluorood 498.0 > 78.0				1.000	763677	23.5		118	7606	
D 23 13C8 FOS 506.0 > 78.0	SA 12.659	12.660	-0.001		1414975	47.6		95.2	2734	
D 26 13C2 PFU 565.0 > 520.0		12.708	0.004		863361	47.8		95.5	14914	
27 Perfluorour 563.0 > 519.0	ndecanoic	acid		1.000	320192	22.1		111	2166	
D 28 13C2 PFD	ОΟΑ			1.000						
615.0 > 570.0 29 Perfluorodo	odecanoic	acid			1040087	50.2		100	26842	
613.0 > 569.0 30 Perfluorotri			0.0	1.000	324319	19.9		99.3	4950	
663.0 > 619.0 D 33 13C2-PFT		13.807	0.001	1.000	549893	22.3		111	835	
715.0 > 670.0	14.239		0.002		1024659	47.6		95.3	7957	
32 Perfluorote 713.0 > 669.0	14.239	14.237	0.002	1.000	248414	20.3		101	306	
34 Perfluorohe 813.0 > 769.0	14.888		0.001	1.000	1048656	16.7		83.4	4613	
D 35 13C2-PFH 815.0 > 770.0		14.887	0.001		Page 356 of 52	6 ^{48.8}		97.6	1538 <u>4</u> 01	/2016

Report Date: 01-Apr-2016 10:38:45 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:

36 Perfluorooctandecanoic acid

17.8 89.0 814956 2138

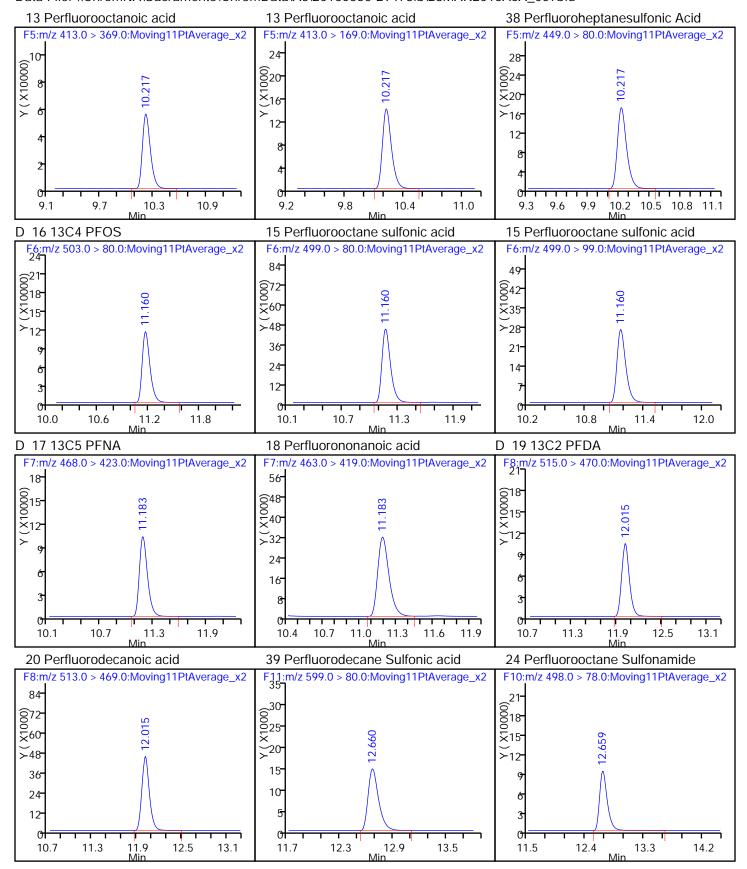
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 10:38:45 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_007b.d **Injection Date:** 28-Mar-2016 19:25:54 Instrument ID: Α6 Lims ID: Std L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 Y (X10000) 70 860 ∑50 ≻40 30 20 10 5.7 5.3 5.9 6.9 5.1 5.4 6.0 5.0 5.6 5.7 6.3 7.5 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X10000) 49 (00015 12 12 12 13 6.675 ∑35- ≻28 21 14 6.4 6.7 7.0 6.5 6.8 7.1 7.0 7.9 8.2 6.2 7.4 7.3 7.6 8.5 8.8 8 13C4-PFHpA 7 Perfluorohexanoic acid D 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 72 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 621- 6218-63 854 603 854 ×15 ×45 \times 45 ≻₃₆-≻₃₆-12 27 27 18 18 01 7.6 7.9 8.2 8.5 8.7 9.3 9.9 8.8 9.1 9.4 9.7 7.3 8.1 8.5 10.0 8.2 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 21 28 × (×10000) × (×10000) 0018 0015 15 ©24**-**×20 ≻₁₆-12 0 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 35% of 526 9.9 9.1 9.7 10.3 04/01/2016 8.2



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Report Date: 01-Apr-2016 10:35:13 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_008b.d

Lims ID: Std L5

Client ID:

Sample Type: IC Calib Level: 5

Inject. Date: 28-Mar-2016 19:47:08 ALS Bottle#: 13 Worklist Smp#: 7

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 10:35:12 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 10:35:11

First Level Reviewer: westendorfc					Date: 01-Apr-2016 10:35:1			1		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	Δ									
217.0 > 172.0	5.586	5.587	-0.001		453946	58.4		117	6138	
2 Perfluorobut	tyric acid									
212.9 > 169.0	5.592	5.590	0.002	1.000	570880	47.6		95.2	40973	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.671	6.672	-0.001		853962	56.2		112	82917	
4 Perfluorope										
262.9 > 219.0	6.671	6.674	-0.003	1.000	792466	48.9		97.7	754	
5 Perfluorobut										
298.9 > 80.0	6.786	6.787	-0.001	1.000	451512	NC	1 (0(0 00 0 00)		645	
298.9 > 99.0	6.786		-0.001	1.000	281409		1.60(0.00-0.00)		906	
40 Perfluorobu 298.9 > 80.0	itanesuito 6.786		ı -0.001	1.000	451512	49.0		111		
D 6 13C2 PFH		0.707	-0.001	1.000	431312	47.0				
315.0 > 270.0		7.892	0.001		716713	55.2		110	43530	
7 Perfluorohe			0.00.		, , , , , ,	00.2			.0000	
313.0 > 269.0		7.894	-0.001	1.000	702391	47.8		95.6	2586	
D 8 13C4-PFH	pΑ									
	•	9.101	-0.001		793119	54.4		109	69597	
9 Perfluorohe	ptanoic a	cid								
363.0 > 319.0	9.106	9.102	0.004	1.000	763206	51.3		103	1387	
D 11 1802 PFH	lxS									
403.0 > 84.0	9.135	9.135	0.0		481076	50.5		107	41720	
10 Perfluorohe		lfonate								
399.0 > 80.0	9.135	9.138	-0.003	1.000	288410	NC			4207	
41 Perfluorohe										
399.0 > 80.0	9.135	9.138	-0.003	1.000	288410	48.8		103		
					Page 361 of 9	526			04/01	1/2016

Page 361 of 526

Report Date: 01- Data File:				Chrom Revision: 2.2 04-Mar-2016 14:36:24 ento\ChromData\A6\20160330-29478.b\28MAR2016A6A_008b.d						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.209	10.214	-0.005		738667	47.0		94.1	28046	
	tanoic ad 10.216 10.216	10.216		1.000 1.000	903707 296497	62.5	3.05(0.00-0.00)	125 125	2190 23899	
38 Perfluorohe 449.0 > 80.0	10.216	10.218		1.000	317508	48.6		102		
14 Perfluorohe 449.0 > 80.0	10.216		-0.002	1.000	317508	NC			24686	
D 16 13C4 PFO 503.0 > 80.0	11.160				833072	54.2		113	63622	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.160 11.160	11.163	-0.003	1.000 1.000	765092 470267	46.8	1.63(0.00-0.00)	97.9 97.9	328 36170	
D 17 13C5 PFN 468.0 > 423.0	A 11.183	11.183	0.0		714850	54.5		109	54732	
18 Perfluorono 463.0 > 419.0	nanoic a 11.183		-0.001	1.000	630492	54.1		108	6903	
D 19 13C2 PFD 515.0 > 470.0	A 12.008	12.009	-0.001		876855	51.8		104	41125	
20 Perfluorode 513.0 > 469.0	canoic a 12.008		-0.002	1.000	990328	59.8		120	70164	
39 Perfluorode 599.0 > 80.0	cane Sul 12.661			1.000	356812	48.9		101		
25 Perfluorode 599.0 > 80.0	cane Sul 12.661		0.002	1.000	356812	NC			21726	
24 Perfluorooc 498.0 > 78.0	tane Sulf 12.660			1.000	1837394	50.8		102	1702	
D 23 13C8 FOS 506.0 > 78.0	A 12.660	12.660	0.0		1577905	53.1		106	3758	
D 26 13C2 PFU 565.0 > 520.0		12.708	-0.006		960468	53.1		106	16493	
27 Perfluoroun 563.0 > 519.0			-0.006	1.000	780531	48.7		97.3	4693	
D 28 13C2 PFD 615.0 > 570.0		13.305	0.001		1175822	56.7		113	11258	
29 Perfluorodo 613.0 > 569.0			0.001	1.000	911475	48.8		97.6	17169	
30 Perfluorotrio 663.0 > 619.0			0.002	1.000	1307459	46.9		93.8	4899	
D 33 13C2-PFT 715.0 > 670.0	eDA				1150731	53.5		107	10529	
32 Perfluorotet 713.0 > 669.0	radecand	oic acid		1 000	627950	45.7		91.5	565	
34 Perfluorohe 813.0 > 769.0	xadecan	oic acid			2382808	45.9		91.8	7205	
D 35 13C2-PFH	xDA					52 O			16227	

Page 362 of 526 53.0

106 16237_{01/2016}

Report Date: 01-Apr-2016 10:35:13 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:

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

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.216 15.214 0.002 47.2 1.000 2455264 94.3 4369

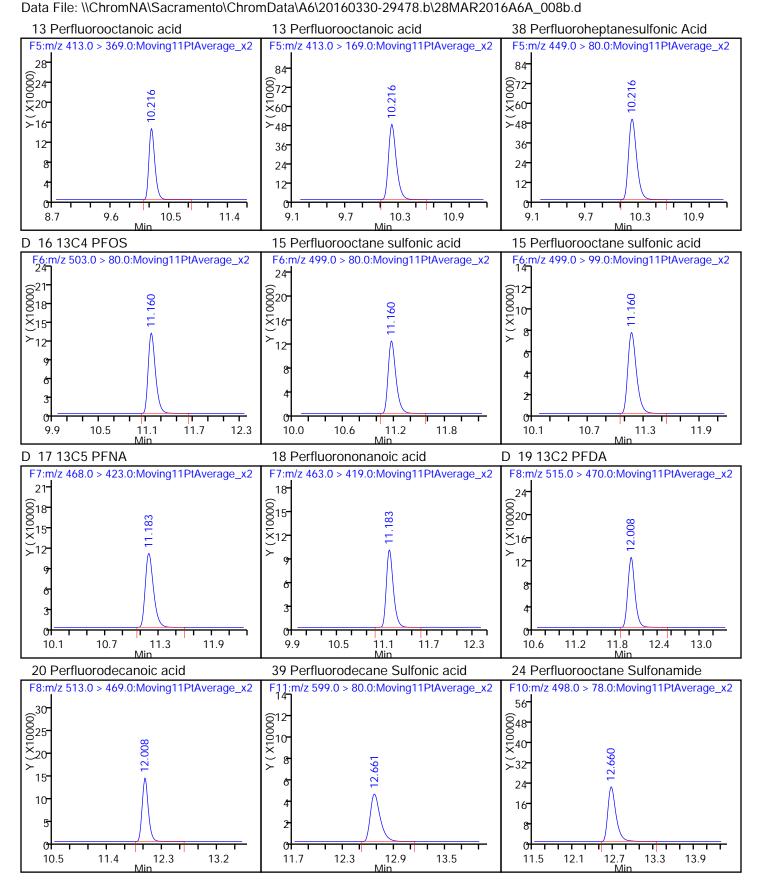
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 10:35:14 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_008b.d **Injection Date:** 28-Mar-2016 19:47:08 Instrument ID: Α6 Lims ID: Std L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 7 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 (000012 X) > 9 X (X10000) 0024 20 20 <u>≻</u>16 12 5.9 5.3 5.6 4.8 5.1 5.4 5.7 6.0 6.1 6.4 6.7 7.0 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 21 24 ©20 (00001X) X 0018 15 ∑₁₆ 6.9 7.2 6.7 7.4 8.0 6.3 6.6 6.4 7.0 7.3 6.8 8.6 6.0 6.1 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 24 (00015-00015-012-(015° ∑₁₆-12 7.8 8.1 7.9 9.1 9.7 10.3 8.8 9.1 9.4 9.7 7.5 8.4 8.5 8.2 8.5 7.2 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 77-(18⁻ 000 15⁻ (X10000) × (X10000) × (X10000) 066 ×55 <u>~</u>44⁼ 33 22 0 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 364h of 526 9.9 9.1 9.7 10.3 04/01/201 8.2



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Report Date: 01-Apr-2016 09:55:54 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_009b.d

Lims ID: Std L6

Client ID:

Sample Type: IC Calib Level: 6

Inject. Date: 28-Mar-2016 20:08:22 ALS Bottle#: 14 Worklist Smp#: 8

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L6

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:55:54 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Process Host:	XAWI	RK016								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.586	5.587	-0.001		337616	43.4		86.8	36792	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.586	5.590	-0.004	1.000	1882506	209.8		105	69986	
D 3 13C5-PFP6										
267.9 > 223.0	6.670		-0.002		641399	42.2		84.4	60403	
4 Perfluoroper			0.001	1 000	2441041	200.4		100	1577	
		6.674	0.001	1.000	2441841	200.4		100	1577	
5 Perfluorobut 298.9 > 80.0	ane Sulf 6.785	onate 6.787	-0.002	1.000	1278818	NC			1696	
298.9 > 99.0	6.785	6.787	-0.002	1.000	774043	NC	1.65(0.00-0.00)		3219	
40 Perfluorobu									02.7	
298.9 > 80.0		6.787		1.000	1278818	157.6		89.2		
D 6 13C2 PFHx	κA									
315.0 > 270.0	7.893	7.892	0.001		613264	47.2		94.4	56035	
7 Perfluorohex	kanoic ac	cid								
313.0 > 269.0	7.893	7.894	-0.001	1.000	2474552	196.2		98.1	4579	
D 8 13C4-PFHp										
367.0 > 322.0	9.100	9.101	-0.001		673875	46.2		92.5	57546	
9 Perfluorohep										
		9.102	-0.002	1.000	2489157	197.0		98.5	2341	
D 11 18O2 PFH		0.405	0.0		400740	44.4		02.0	2/7/2	
403.0 > 84.0	9.135	9.135	0.0		422749	44.4		93.9	36743	
10 Perfluorohe 399.0 > 80.0			-0.003	1.000	892748	NC			5495	
41 Perfluorohe				1.000	072740	NC			3473	
399.0 > 80.0		9.138		1.000	892748	171.3		90.5		
D 12 13C4 PFO			2.300		0,2,10			, 5.0		
	10.210	10.214	-0.004		697624	44.4		88.8	54377	
					Page 367 of	526			04/01	/2016

Report Date: 01-Apr-2016 09:55:54 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:	•			:o\Chrom			04-Mar-2016 14:36 \28MAR2016A6A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc 413.0 > 369.0 413.0 > 169.0	10.210 10.216	10.216 10.216	0.0	1.000 1.001	2580057 705159	192.4	3.66(0.00-0.00)	96.2 96.2	10991 52807	
38 Perfluorohe 449.0 > 80.0	10.216	10.218		1.000	949931	181.6		95.4		
14 Perfluorohe 449.0 > 80.0	10.216	ulfonate 10.218	-0.002	1.000	949931	NC			73690	
D 16 13C4 PFO 503.0 > 80.0		11.160	0.0		662555	43.1		90.1	50116	
15 Perfluorooc 499.0 > 80.0	11.160	11.163	-0.003	1.000	2380281	182.4	1.75(0.00.0.00)	95.4	357	
499.0 > 99.0 D 17 13C5 PFN		11.163	-0.003	1.000	1356813		1.75(0.00-0.00)	95.4	17163	
	11.183		0.0		537027	40.9		81.9	41605	
463.0 > 419.0	11.183		-0.001	1.000	1625549	185.3		92.6	17198	
	12.007		-0.002		657548	38.9		77.7	30084	
20 Perfluorode 513.0 > 469.0		cid 12.010	-0.003	1.000	2350326	189.3		94.7	35452	
39 Perfluorode 599.0 > 80.0		lfonic aci 12.657		1.000	1058403	181.3		94.0		
25 Perfluorode 599.0 > 80.0		lfonate 12.659	0.002	1.000	1058403	NC			63738	
24 Perfluorooc 498.0 > 78.0		fonamide 12.660		1.000	5566146	188.2		94.1	526	
D 23 13C8 FOS 506.0 > 78.0		12.660	0.0		1289527	43.4		86.8	3570	
D 26 13C2 PFU 565.0 > 520.0		12.708	-0.005		833088	46.1		92.2	14382	
27 Perfluoroun		c acid		1.000	2567457	185.1		92.5	10664	
D 28 13C2 PFD	οΑ			1.000						
615.0 > 570.0 29 Perfluorodo			0.001		848868	40.9		81.9	21119	
613.0 > 569.0 30 Perfluorotrio	13.306	13.305	0.001	1.000	2947182	217.2		109	14925	
663.0 > 619.0	13.809		0.002	1.000	3882659	192.9		96.5	14426	
D 33 13C2-PFT 715.0 > 670.0		14.237	-0.005		1001676	46.6		93.2	11837	
32 Perfluorotel 713.0 > 669.0			-0.005	1.000	2029561	205.8		103	1809	
34 Perfluorohe 813.0 > 769.0			-0.005	1.000	6422320	204.9		102	6666	
D 35 13C2-PFH 815.0 > 770.0	IxDA				1726006	47.5		95.0	8754	
36 Perfluorooc	tandecar	noic acid								
913.0 > 869.0	15.211	15.214	-0.003	1.000	Page 368 of	526 ^{203.3}		102	7947 _{/0} 7	1/2016

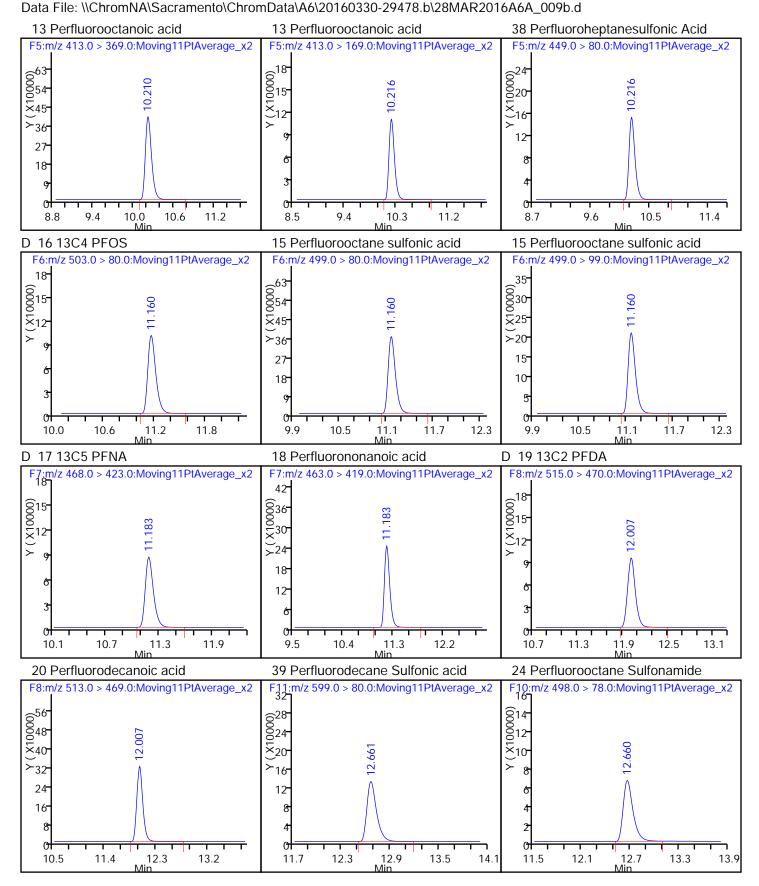
Report Date: 01-Apr-2016 09:55:54 Chrom Revision: 2.2 04-Mar-2016 14:36:24

OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:55:55 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_009b.d **Injection Date:** 28-Mar-2016 20:08:22 Instrument ID: Α6 Lims ID: Std L6 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 8 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 V (X10000) 56**-**00048 × 40-<u>></u>32 24 16 5.2 5.9 6.9 5.5 5.8 6.1 5.0 5.3 5.6 6.2 5.7 6.3 7.5 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 18-63 00054 ×45 635- ×25 **≻**36 ≻₂₀ 27 15 10 6.9 7.2 7.5 7.8 8.1 6.3 6.6 6.2 6.5 6.8 7.1 7.4 7.2 8.4 8.7 8 13C4-PFHpA 7 Perfluorohexanoic acid D 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 88 ©70 960 (00015-X) 677 666 \times_{55} ×50 >₄₀ 44 30 33 20 22 10 7.4 8.0 9.2 8.8 9.1 9.4 9.7 8.0 8.6 9.8 8.5 10.0 6.8 8.6 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 21 24 × (×10000) × (×10000) 0018 0015 15 ∑₁₆ 12 0 08.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 3**™**0hof 526 9.9 9.1 9.7 10.3 04/01/2016 8.2 10.0



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Report Date: 01-Apr-2016 09:55:58 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Lims ID: Std L7

Client ID:

Sample Type: IC Calib Level: 7

Inject. Date: 28-Mar-2016 20:29:35 ALS Bottle#: 15 Worklist Smp#: 9

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L7

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:55:57 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

<u> </u>	Process Host:	XAVVI	KKU16								
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
ı	D 113C4 PFBA										
	217.0 > 172.0	5.592	5.587	0.005		285354	36.7		73.4	30750	
	2 Perfluorobut	yric acid									
	212.9 > 169.0	5.589	5.590	-0.001	1.000	3325742	438.2		110	6047	
I	O 3 13C5-PFPe	eΑ									
	267.9 > 223.0	6.671	6.672	-0.001		549934	36.2		72.4	51109	
	4 Perfluoropen										
		6.671	6.674	-0.003	1.000	3719753	356.1		89.0	2175	
	5 Perfluorobuta			0.004	1 000	0055040	NO			.7.0	
	298.9 > 80.0 298.9 > 99.0	6.786 6.786	6.787 6.787	-0.001 -0.001	1.000 1.000	2255842 1368127	NC	1.65(0.00-0.00)		6762 3668	
	40 Perfluorobut				1.000	1300127		1.03(0.00-0.00)		3000	
	298.9 > 80.0		6.787		1.000	2255842	327.6		92.7		
	D 613C2 PFHx		0.707	0.001	1.000	22000 12	027.0		, 2. ,		
	315.0 > 270.0		7.892	-0.003		503488	38.8		77.5	29918	
	7 Perfluorohex										
			7.894	0.001	1.000	4199820	405.4		101	2114	
I	D 8 13C4-PFHp	Α									
	367.0 > 322.0	9.098	9.101	-0.003		581079	39.9		79.7	49133	
	9 Perfluorohep	tanoic a	cid								
	363.0 > 319.0	9.098	9.102	-0.004	1.000	4200915	385.5		96.4	2546	
	D 11 1802 PFH:										
	403.0 > 84.0		9.135	-0.002		358644	37.7		79.7	30547	
	10 Perfluorohe										
	399.0 > 80.0	9.139		0.001	1.000	1623787	NC			7698	
	41 Perfluorohe				1 000	1/22707	2// 0		07.0		
	399.0 > 80.0	9.139	9.138	0.001	1.000	1623787	366.9		97.0		
	D 12 13C4 PFO 417.0 > 372.0	A 10.213	10 214	0.001		552024	25.1		70.2	12411	
	411.0 > 3/2.0	10.213	10.214	-0.001		Page 373 of	35.1 526		70.3	42641 04/01	1/2016

Report Date: 01-Apr-2016 09:55:58 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc 413.0 > 369.0 413.0 > 169.0	10.213 10.213	10.216 10.216	-0.003	1.000 1.000	3845848 1186732	362.5	3.24(0.00-0.00)	90.6 90.6	14073 19332	
38 Perfluorohe 449.0 > 80.0	10.220	10.218		1.000	1612399	394.6		104		
14 Perfluorohe 449.0 > 80.0	•	ulfonate 10.218	0.002	1.000	1612399	NC			24415	
D 16 13C4 PFO 503.0 > 80.0		11.160	-0.003		516813	33.6		70.3	38702	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.157		-0.006	1.000 1.000	3845883 2169862	377.5	1.77(0.00-0.00)	98.7 98.7	196 4936	
D 17 13C5 PFN 468.0 > 423.0	A 11.180	11.183	-0.003		496987	37.9		75.8	10768	
18 Perfluorono 463.0 > 419.0	nanoic a 11.187		0.003	1.000	3020123	371.9		93.0	13154	
D 19 13C2 PFD 515.0 > 470.0	A 12.011	12.009	0.002		561197	33.2		66.3	38328	
20 Perfluorode 513.0 > 469.0	canoic a 12.011		0.001	1.000	4453029	420.3		105	29115	
39 Perfluorode 599.0 > 80.0		lfonic aci 12.658		1.000	1803122	395.6		103		
25 Perfluorode 599.0 > 80.0	ecane Sul 12.657		-0.002	1.000	1803122	NC			72871	
24 Perfluorooc 498.0 > 78.0	tane Sulf 12.665			1.000	9228296	375.7		93.9	497	
D 23 13C8 FOS 506.0 > 78.0		12.660	0.005		1070973	36.0		72.1	5220	
D 26 13C2 PFU 565.0 > 520.0		12.708	0.0		641506	35.5		71.0	25619	
27 Perfluoroun 563.0 > 519.0	ndecanoio 12.708		0.0	1.000	4210768	394.4		98.6	7587	
D 28 13C2 PFD 615.0 > 570.0		13.305	-0.004		782997	37.8		75.5	39306	
29 Perfluorodo 613.0 > 569.0	decanoio	c acid		1.000	4810328	384.0		96.0	12759	
30 Perfluorotrio 663.0 > 619.0	decanoic	acid		1.000	6562902	353.5		88.4	10654	
D 33 13C2-PFT 715.0 > 670.0	eDA			1.000	898868	41.8		83.6	11656	
32 Perfluorotet	tradecan	oic acid		1 000						
713.0 > 669.0 34 Perfluorohe	xadecan	oic acid		1.000	3719426	409.2		102	4906	
813.0 > 769.0 D 35 13C2-PFH	IxDA			1.000	11321267	402.8		101	5253	
815.0 > 770.0 36 Perfluorooc	tandecar	noic acid			1634569	45.0		90.0	16030	
913.0 > 869.0	15.214	15.214	0.0	1.000	13962510 Page 374 of	526 ^{401.4}		100	5768/01	1/2016

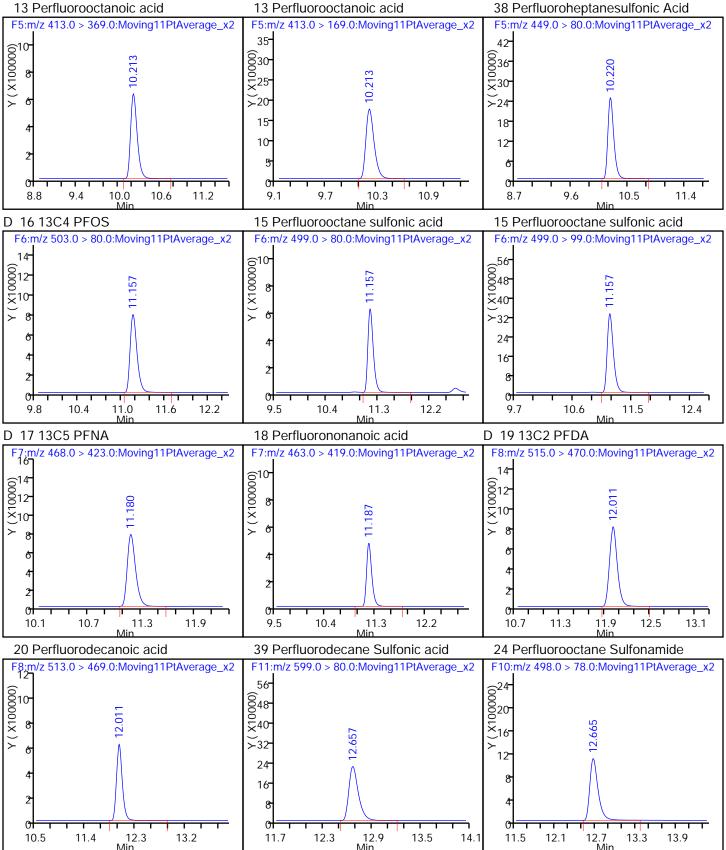
Report Date: 01-Apr-2016 09:55:58 Chrom Revision: 2.2 04-Mar-2016 14:36:24

OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:55:58 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_010b.d **Injection Date:** 28-Mar-2016 20:29:35 Instrument ID: Α6 Lims ID: Std L7 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 9 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 84 684 672 6014° 6012° ©72 ×60 ×60 ≻₄₈-36 36 24 24 5.2 5.5 5.2 6.9 5.8 6.1 5.5 5.8 6.1 5.7 6.3 7.5 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 84 656**-**6048**-**0012-00012-00012-0012-012-072 072 ∑60 ×40• ≻48 ≻₃₂-36 24 24 16 12 6.9 7.5 7.0 6.3 6.4 7.6 7.5 8.1 8.4 5.8 7.2 7.8 8.7 5.7 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 (12 X 1000001) (12 X 1000001) X (X100000) (000012 X) > 9 7.4 8.0 8.7 9.3 9.9 8.8 9.1 9.4 9.7 6.8 8.2 8.5 10.0 8.6 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 V (X10000) (42- (0036- 00015 X12 X) ∑30-**≻**24 18 12 0 04/01/2016 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 3**7/6**₀of 526 9.9 9.1 9.7 10.3 8.2 10.0



15.4

16.0

14.8

21

14

14.2

27

18

13.9

14.5

15.1

15.7

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A6

GC Column: Acquity

Calibration Start Date: 03/31/2016 12:36

Calibration End Date: 03/31/2016 14:43

Analy Batch No.: 105043

The part of the part

Calibration Files:

LAB SAMPLE ID:	LAB FILE ID:
STD 320-105043/3	31MAR2016B6B 003.d
STD 320-105043/4	31MAR2016B6B 004.d
STD 320-105043/5	31MAR2016B6B 005.d
STD 320-105043/6	31MAR2016B6B 006.d
STD 320-105043/7	31MAR2016B6B 007.d
STD 320-105043/8	31MAR2016B6B 008.d
STD 320-105043/9	31MAR2016B6B 009.d
	STD 320-105043/3 STD 320-105043/4 STD 320-105043/5 STD 320-105043/6 STD 320-105043/7 STD 320-105043/8

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.597	5.586	5.601	5.598	5.601	5.604	5.604	5.349 - 5.849	5.599
Perfluoropentanoic acid (PFPeA)	+++++	6.675	6.680	6.684	6.684	6.684	6.679	6.431 - 6.931	6.681
Perfluorobutanesulfonic acid (PFBS)	+++++	6.790	6.795	6.794	6.794	6.799	6.789	6.543 - 7.043	6.794
Perfluorohexanoic acid (PFHxA)	+++++	7.898	7.904	7.898	7.893	7.898	7.893	7.647 - 8.147	7.897
Perfluoroheptanoic acid (PFHpA)	+++++	9.094	9.100	9.100	9.094	9.100	9.088	8.846 - 9.346	9.096
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.153	9.141	9.129	9.129	9.135	9.129	8.887 - 9.387	9.136
Perfluorooctanoic acid (PFOA)	+++++	10.217	10.203	10.203	10.203	10.203	10.203	9.954 - 10.454	10.205
Perfluoroheptanesulfonic Acid (PFHpS)	10.210	10.210	10.210	10.210	10.203	10.210	10.203	9.958 - 10.458	10.208
Perfluorooctanesulfonic acid (PFOS)	11.161	11.153	11.153	11.146	11.153	11.153	11.146	10.902 - 11.402	11.152
Perfluorononanoic acid (PFNA)	+++++	11.183	11.176	11.176	11.176	11.176	11.169	10.928 - 11.428	11.176
Perfluorodecanoic acid (PFDA)	+++++	12.008	12.000	12.008	12.000	12.000	12.001	11.754 - 12.254	12.003
Perfluorodecane Sulfonic acid	+++++	12.641	12.641	12.640	12.651	12.641	12.644	12.396 - 12.896	12.643
Perfluorooctane Sulfonamide (FOSA)	+++++	12.650	12.639	12.649	12.650	12.640	12.642	12.396 - 12.896	12.645
Perfluoroundecanoic acid (PFUnA)	+++++	12.692	12.693	12.692	12.693	12.693	+++++	12.443 - 12.943	12.693
Perfluorododecanoic acid (PFDoA)	13.284	13.283	13.291	13.283	13.292	13.291	13.285	13.037 - 13.537	13.287
Perfluorotridecanoic Acid (PFTriA)	13.791	13.782	13.782	13.781	13.791	13.791	13.784	13.536 - 14.036	13.786
Perfluorotetradecanoic acid (PFTeA)	+++++	14.217	14.217	14.217	14.217	14.217	14.212	13.967 - 14.467	14.216
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	14.863	14.869	14.862	14.869	14.863	14.865	14.616 - 15.116	14.865
Perfluoro-n-octandecanoic acid (PFODA)	15.201	15.201	15.201	15.196	15.201	15.196	15.198	14.949 - 15.449	15.199
13C4 PFBA	5.597	5.598	5.604	5.598	5.598	5.604	5.601	5.350 - 5.850	5.600
13C5-PFPeA	6.683	6.680	6.680	6.684	6.684	6.679	6.679	6.431 - 6.931	6.681
13C2 PFHxA	7.903	7.898	7.893	7.898	7.893	7.898	7.893	7.647 - 8.147	7.897
13C4-PFHpA	9.100	9.100	9.100	9.100	9.100	9.094	9.088	8.847 - 9.347	9.097
1802 PFHxS	9.135	9.129	9.129	9.129	9.129	9.129	9.129	8.880 - 9.380	9.130
13C4 PFOA	10.210	10.203	10.203	10.203	10.203	10.210	10.203	9.955 - 10.455	10.205
13C4 PFOS	11.153	11.146	11.153	11.146	11.146	11.153	11.146	10.899 - 11.399	11.149
13C5 PFNA	11.176	11.169	11.169	11.169	11.169	11.176	11.169	10.921 - 11.421	11.171
13C2 PFDA	12.000	12.000	12.000	12.000	12.000	12.000	11.991	11.749 - 12.249	11.999
13C8 FOSA	12.650	12.639	12.650	12.639	12.650	12.640	12.642	12.394 - 12.894	12.644
13C2 PFUnA	12.693	12.692	12.693	12.692	12.693	12.693	+++++	12.442 - 12.942	12.693
13C2 PFDoA	13.292	13.291	13.291	13.283	13.292	13.291	+++++	13.039 - 13.539	13.290
13C2-PFTeDA	14.218	14.217	14.217	14.217	14.217	14.210	14.212	13.965 - 14.465	14.215
13C2-PFHxDA	14.870	14.863	14.869	14.862	14.869	14.863	14.865	14.616 - 15.116	14.866

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name:	TestAmerica Sacramento	Job No.:	320-17859-1	Analy Batch No.:	105043
CDC No.				•	

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	STD 320-105043/3	31MAR2016B6B 003.d	
Level 2	STD 320-105043/4	31MAR2016B6B 004.d	
Level 3	STD 320-105043/5	31MAR2016B6B 005.d	
Level 4	STD 320-105043/6	31MAR2016B6B 006.d	
Level 5	STD 320-105043/7	31MAR2016B6B 007.d	
Level 6	STD 320-105043/8	31MAR2016B6B 008.d	
Level 7	STD 320-105043/9	31MAR2016B6B_009.d	

ANALYTE		CF	יִּ		CURVE		COEFFICIENT	#	MIN CF	%RSD			# MIN	
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	В М1				%RS	D OR COD	OR C	מטג
13C4 PFBA	6518.8 7774.7	7551.8 6924.0	7124.7 5974.7	7101.4	Ave		6995.73429			8.7	50.	0		
13C5-PFPeA	12287 14021	15424 11129	13642 11229	14007	Ave		13105.3000			12.2	50.	0		
13C2 PFHxA	9947.1 12882	13162 10514	11825 10581	11804	Ave		11530.6400			10.7	50.	0		
13C4-PFHpA	14222 14464	14908 12176	13160 9899.4	13280	Ave		13158.3514			13.0	50.	0		
1802 PFHxS	7369.2 8784.8	8809.9 6847.5	7938.1 6956.8	8122.3	Ave		7832.66687			10.3	50.	0		
13C4 PFOA	13132 12514	14358 10383	13687 10165	14619	Ave		12693.9429			14.2	50.	0		
13C4 PFOS	13161 14973	15329 11210	13797 10761	15149	Ave		13482.8571			13.9	50.	0		
13C5 PFNA	11336 11388	12003 7500.5	10171 8456.1	10350	Ave		10172.0029			16.2	50.	0		
13C2 PFDA	14639 13731	16128 11187	13982 10503	12882	Ave		13293.2800			14.7	50.	0		
13C8 FOSA	23205 25527	28242 21688	25152 21486	27635	Ave		24705.0171			10.9	50.	0		
13C2 PFUnA	14851 16851	15582 11932	15071 ++++	16292	Ave		15096.6433			11.4	50.	0		
13C2 PFDoA	15613 18633	21629 15400	18728 +++++	18186	Ave		18031.4833			12.8	50.	0		
13C2-PFTeDA	16589 19617	20241 15424	17469 14839	18101	Ave		17468.4886			11.6	50.	0		
13C2-PFHxDA	23789 35205	32547 23744	29198 28595	32258	Ave		29333.7229			15.0	50.	0		

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

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

ANALYTE			RRF			CURVE		COEFFICIE	INT	#	MIN 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
Perfluorobutanoic acid (PFBA)	4822.0 7631.2	4842.0 7293.5	7903.6	10309	10247	L1ID	-0.250	1.2002							0.9960		0.9900
Perfluoropentanoic acid (PFPeA)	+++++ 9527.3	15616 10025		13581	11975			0.8776							0.9960		0.9900
Perfluorobutanesulfonic acid (PFBS)	++++ 5460.7	6041.9 6024.9		8988.1	9242.3			0.8897				18.0		50.0			
Perfluorohexanoic acid (PFHxA)	+++++ 9427.7	7874.0 9618.5		11649		L2ID		0.9709							0.9950		0.9900
Perfluoroheptanoic acid (PFHpA)	+++++ 9471.2	12054 9231.8		12579				0.8885							0.9920		0.9900
Perfluorohexanesulfonic acid (PFHxS)	++++ 3828.5	2138.5 3733.5		5102.1	5164.0			0.5909							0.9950		0.9900
Perfluorooctanoic acid (PFOA)	+++++ 10378	7636.0 10134		13978		L2ID		1.0344							0.9930		0.9900
Perfluoroheptanesulfonic Acid (PFHpS)	1668.1 3704.6	3938.0 3646.6		4808.6	5268.4			0.3368							0.9990		0.9900
Perfluorooctanesulfonic acid (PFOS)	11709 9695.9	11397 9680.6		13254		L2ID		0.8554							0.9940		0.9900
Perfluorononanoic acid (PFNA)	+++++ 6084.8	4830.0 6285.1		7901.6	9494.3			0.7821							0.9960		0.9900
Perfluorodecanoic acid (PFDA)	+++++ 9703.9	6897.0 9812.9		11194	14731			0.9463							0.9930		0.9900
Perfluorodecane Sulfonic acid	+++++ 4162.6	1845.4 3802.0		5887.7	5626.5		-0.245	0.3690							0.9950		0.9900
Perfluorooctane Sulfonamide (FOSA)	+++++ 25106	37224 22536		35807		AveID		1.2656				10.7		35.0			
Perfluoroundecanoic acid (PFUnA)	+++++ 10080	19156 ++++		13494	13317			0.8303							0.9990		0.9900
Perfluorododecanoic acid (PFDoA)	9578.0 11617	9032.0 11333		15893	15691		-0.152	0.8041							0.9980		0.9900
Perfluorotridecanoic Acid (PFTriA)	11790 14423	13868 13249		23586		AveID		0.9962				24.5		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 8322.4	17628 7234.3		11024	11404			0.5786							0.9930		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 22359	196345 23534		36855	34577			1.5824							0.9930		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	27514 22444	33537 27383	33900	37861	42370	AveID		1.8451				15.7		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.: 320-17859-1 Analy Batch No.: 105043

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB	SAMPLE ID:	LAB FILE ID:
Level 1	STD	320-105043/3	31MAR2016B6B 003.d
Level 2	STD	320-105043/4	31MAR2016B6B 004.d
Level 3	STD	320-105043/5	31MAR2016B6B 005.d
Level 4	STD	320-105043/6	31MAR2016B6B 006.d
Level 5	STD	320-105043/7	31MAR2016B6B 007.d
Level 6	STD	320-105043/8	31MAR2016B6B 008.d
Level 7	STD	320-105043/9	31MAR2016B6B 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	325942 346202	377588 298735	356234	355070	388736	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	614334 556447	771185 561435	682086	700336	701032	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	497354 525682	658076 529029	591262	590209	644112	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	711104 608787	745413 494968	657978	663983	723190	50.0 50.0	50.0 50.0	50.0	50.0	50.0
1802 PFHxS	Ave	348565 323888	416706 329057	375474	384184	415522	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	656595 519155	717904 508247	684349	730930	625700	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	629093 535839	732714 514368	659513	724132	715705	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	566783 375023	600136 422803	508529	517518	569409	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	731962 559338	806406 525166	699119	644108	686549	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	1160231 1084424	1412111 1074291	1257579	1381759	1276361	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	742568 596616	779093 ++++	753554	814617	842545	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C2 PFDoA	Ave	780629 770001	1081463	936416	909288	931648	50.0 50.0	50.0 ++++	50.0	50.0	50.0
13C2-PFTeDA	Ave	829453 771194	1012061 741943	873436	905033	980851	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1189437 1187195	1627366 1429743	1459923	1612888	1760251	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.: 320-17859-1 Analy Batch No.: 105043

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105043/3	31MAR2016B6B 003.d
Level 2	STD 320-105043/4	31MAR2016B6B 004.d
Level 3	STD 320-105043/5	31MAR2016B6B 005.d
Level 4	STD 320-105043/6	31MAR2016B6B 006.d
Level 5	STD 320-105043/7	31MAR2016B6B 007.d
Level 6	STD 320-105043/8	31MAR2016B6B 008.d
Level 7	STD 320-105043/9	31MAR2016B6B 009.d

ANALYTE	IS CURVE			RESPONSE				CONCEN	ITRATION (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
Perfluorobutanoic acid (PFBA)	L1ID	2411 1526240	4842 2917389	39518	206176	512346	0.500 200	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	L2ID	+++++ 1905457	15616 4009997	57438	271612	598747	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	AveID	+++++ 965447	5341 2130394	29119	158909	408510	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)	L2ID	+++++ 1885536	7874 3847410	52963	232989	686869	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	L2ID	+++++ 1894236	12054 3692715	51969	251579	692517	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID	+++++ 724359	2023 1412746	20953	96531	244257	+++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)	L2ID	+++++ 2075688	7636 4053493	60791	279566	738732	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	L1ID	794 705356	3749 1388629	12618	91555	250774	0.476 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	L2ID	5597 1853860	10896 3701867	52571	253422	632317	0.478 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)	L2ID	+++++ 1216965	4830 2514039	32465	158032	474714	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)	L2ID	+++++ 1940778	6897 3925152	59015	223873	736547	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid	L2ID	+++++ 802547	1779 1466045	18577	113514	271197	+++++ 193	0.964 386	4.82	19.3	48.2
Perfluorooctane Sulfonamide (FOSA)	AveID	+++++ 5021200	37224 9014580	171763	716135	1796546	++++ 200	1.00	5.00	20.0	50.0
Perfluoroundecanoic acid (PFUnA)	L1ID	+++++ 2015971	19156 ++++	77863	269877	665862	++++	1.00	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)	L1ID	4789 2323348	9032 4533029	75762	317850	784540	0.500 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.:

Instrument ID: $\underline{A6}$ GC Column: $\underline{Acquity}$ ID: $\underline{2.1(mm)}$ Heated Purge: $\underline{(Y/N)}$ \underline{N}

ANALYTE	IS REF	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	
Perfluorotridecanoic Acid (PFTriA)		AveID	5895	13868	112418	471710	1104013	0.500	1.00	5.00	20.0	50.0	
Perfluorotetradecanoic acid (PFTeA)		L2ID	2884687	5299566 17628	65104	220478	570206	200	1.00	5.00	20.0	50.0	
Perfluoro-n-hexadecanoic acid		L2ID	1664485	2893730 196345	273863	737097	1728856	200	1.00	5.00	20.0	50.0	
(PFHxDA)			4471758	9413683				200	400				
Perfluoro-n-octandecanoic acid (PFODA)		AveID	13757 4488877	33537 10953255	169499	757226	2118488	0.500 200	1.00 400	5.00	20.0	50.0	

Curve Type Legend:

AveID = Average isotope dilution

L1ID = Linear 1/conc IsoDil

L2ID = Linear 1/conc^2 IsoDil

Report Date: 01-Apr-2016 09:44:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_003.d

Lims ID: Std L1

Client ID:

Sample Type: IC Calib Level: 1

Inject. Date: 31-Mar-2016 12:36:33 ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L1

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:44:50 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 31-Mar-2016 15:13:40

	First Level Revie	wei. wes	steriuuri			Date.	აა	31-Wai-2010 13.13.40					
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags		
	2 Perfluorobut	vric acid											
	212.9 > 169.0	•	5.599	-0.002	1.000	2411	0.5163		103	267			
ı	D 113C4 PFBA	١											
	217.0 > 172.0	5.597	5.600	-0.003		325942	46.6		93.2	8295			
	4 Perfluoroper	ntanoic a	cid										
	262.9 > 219.0	6.679	6.681	-0.002	1.000	7239	0.5273		105	7.9			
	D 3 13C5-PFPe												
		6.683		0.002		614334	46.9		93.8	59876			
	5 Perfluorobut				1 000	1005				10.0			
	298.9 > 80.0	6.789			1.000	1285	NC			10.3			
	40 Perfluorobu				1 000	1005	0.10/0		44.0				
		6.789		-0.004	1.000	1285	0.1960		44.3				
	7 Perfluorohex 313.0 > 269.0			0.004	1.000	2341	0.6231		125	225			
	513.0 > 209.0 D 6 13C2 PFHx		7.077	-0.004	1.000	2341	0.0231		123	223			
		7.903	7.897	0.006		497354	43.1		86.3	44929			
	9 Perfluorohep			0.000					00.0	,_,			
	363.0 > 319.0			0.004	1.000	5503	0.5389		108	578			
ı	D 8 13C4-PFHp	А											
	367.0 > 322.0		9.097	0.003		711104	54.0		108	65069			
ı	D 11 18O2 PFH:	xS											
	403.0 > 84.0	9.135	9.130	0.005		348565	44.5		94.1	30470			
	10 Perfluorohe	xane Sul	fonate										
	399.0 > 80.0	9.147	9.137	0.010	1.000	1214	NC			57.0			
	41 Perfluorohe												
	399.0 > 80.0	9.147	9.137	0.010	1.000	1214	0.8210		174				

Data File:	NChro	MIVA\S	acramen	tolChron	1Data\A6\20160	331-29534.K	0\3 1MAR20 16B6B_	003.a		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooct	tanoic ac	hi.								М
	10.196		-0.008	1.000	1889	0.6332		127	7.2	IVI
	10.203			1.001	753	0.0002	2.51(0.00-0.00)	127	25.0	M
D 12 13C4 PFO							,			
	10.210	10.205	0.005		656595	51.7		103	52039	
38 Perfluorohe										M
· · · · · · · · · · · · · · · · · · ·	10.210			1.000	794	0.5612		118		M
14 Perfluorohe										
	10.210		0.0	1.000	794	NC			67.0	
D 16 13C4 PFO	S									
	11.153	11.149	0.004		629093	46.7		97.6	48980	
15 Perfluorooct										
	11.161			1.000	5597	0.5090		106	36.6	
	11.161			1.000	3208		1.74(0.00-0.00)	106	272	
D 17 13C5 PFN							, ,			
	11.176	11.171	0.005		566783	55.7		111	44457	
18 Perfluorono										
	11.191		0.013	1.000	6547	1.24		248	40.2	
D 19 13C2 PFD			0.0.0	1.000	3317			2.10	10.2	
	12.000	11 999	0.001		731962	55.1		110	51210	
20 Perfluorode			0.001		701702	00.1		110	01210	
	12.008		0.004	1.000	4727	0.8892		178	142	
			0.004	1.000	4727	0.0072		170	142	
25 Perfluorode 599.0 > 80.0	cane Sui 12.662		0.011	1.000	661	NC			22.0	
		12.001	0.011	1.000	001	NC			22.0	
D 23 13C8 FOS		12 4 4 4	0.004		1160231	47.0		93.9	2739	
	12.650				1100231	47.0		93.9	2739	
39 Perfluorode				1 000	//1	0.0010		1//		M
	12.662			1.000	661	0.8010		166		M
24 Perfluorooct				1 000	45.477	0.5070		405	050	
498.0 > 78.0	12.650	12.646	0.004	1.000	15476	0.5270		105	959	
D 26 13C2 PFU										
565.0 > 520.0	12.693	12.692	0.001		742568	49.2		98.4	17867	
27 Perfluoroun										
563.0 > 519.0	12.693	12.693	0.0	1.000	15416	0.7077		142	106	
29 Perfluorodo	decanoio	acid								
613.0 > 569.0	13.284	13.287	-0.003	1.000	4789	0.5708		114	38.6	
D 28 13C2 PFD	οΑ									
615.0 > 570.0	13.292	13.289	0.003		780629	43.3		86.6	4632	
30 Perfluorotric	decanoic	acid								
663.0 > 619.0	13.791	13.786	0.005	1.000	5895	0.3790		75.8	32.5	
D 33 13C2-PFT	≘DA									
715.0 > 670.0		14.215	0.003		829453	47.5		95.0	33071	
32 Perfluoroteti										
713.0 > 669.0			0 008	1.000	7565	0.4042		80.8	4.5	
		17.41/	0.000	1.000	7303	0.7072		50.0	7.0	
D 35 13C2-PFH: 815.0 > 770.0	14.870	11 044	0.004		1100/27	40.5		81.1	14255	
			0.004		1189437	40.5		01.1	14235	
34 Perfluorohe:			0.004	1 000	10/470	0 4110			110	
813.0 > 769.0	14.0/0	14.000	0.004	1.000	Page 386 of	526 ^{0.4113}			' 64/0	1/2016

Report Date: 01-Apr-2016 09:44:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d EXP DLT **REL** Amount Signal RT RT Response ng/ml Ratio(Limits) %Rec S/N Flags RT RT

36 Perfluorooctandecanoic acid

1.000 0.4776 95.5 13757 43.2

OC Flag Legend Processing Flags

NC - Not Calibrated

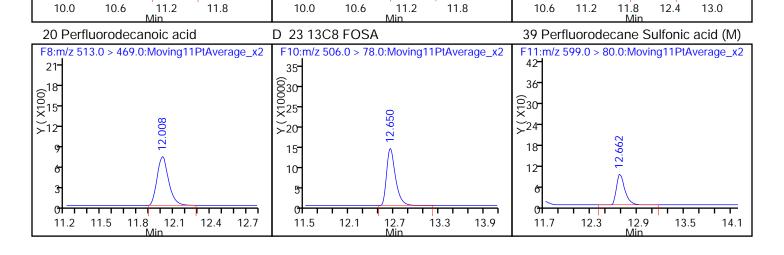
Review Flags

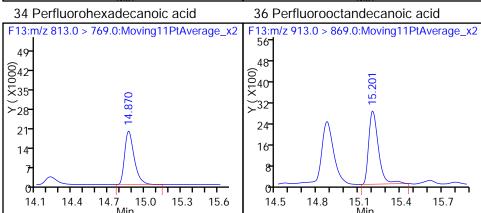
M - Manually Integrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:44:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_003.d **Injection Date:** 31-Mar-2016 12:36:33 Instrument ID: Α6 Lims ID: Std L1 Client ID: Operator ID: **JRB** ALS Bottle#: 9 Worklist Smp#: 3 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 X (X10000) (012 X) X) 8 842 ×35• 28 21 14 5.5 5.2 5.8 5.8 5.5 6.1 6.4 6.7 7.0 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 77-(00015-X)12-21 . 66 6.683 ∑55 ×15 >44 33 22 11-6.9 7.9 7.0 7.3 6.6 7.2 8.2 5.8 6.4 6.7 6.3 7.6 6.1 7.3 8.5 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 35- 6²⁴ 620 (000012⁻ 6³⁰ ×25 ∑₁₀ ∑₁₆->20 15 10 7.6 7.9 8.2 8.5 8.8 9.1 9.4 8.8 9.1 9.4 9.7 7.3 8.5 8.2 8.5 10.0 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 V (X10000) 56- 18 648-40-©15- ×₁₂-**≻**32 24 16 0 0 8.6 8.9 9.2 9.5 Page 3866 of 526 8.5 8.8 9.1 9.4 9.7 8.3 9.8 9.6 9.9 10.2 8.2 10.0 10.5 04/01/201





Report Date: 01-Apr-2016 09:44:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d

Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

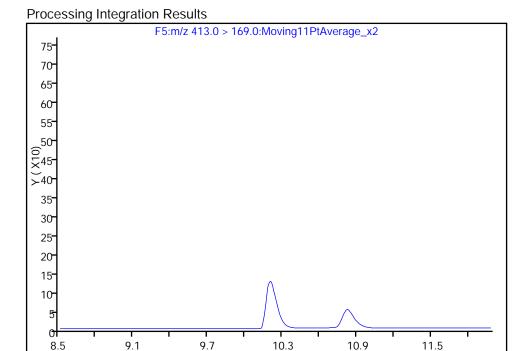
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

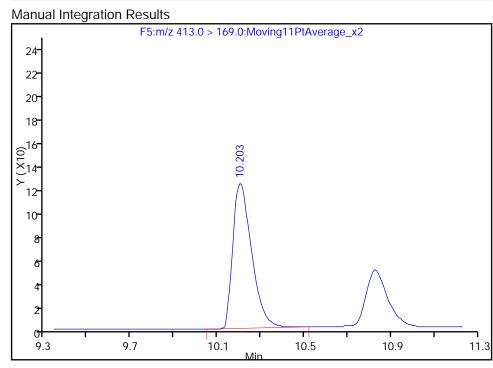
13 Perfluorooctanoic acid, CAS: 335-67-1

Not Detected

Expected RT: 10.20



RT: 10.20
Area: 753
Amount: 0.633170
Amount Units: ng/ml



Reviewer: westendorfc, 31-Mar-2016 15:13:40

Report Date: 01-Apr-2016 09:44:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d

Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

38 Perfluoroheptanesulfonic Acid, CAS: 375-92-8

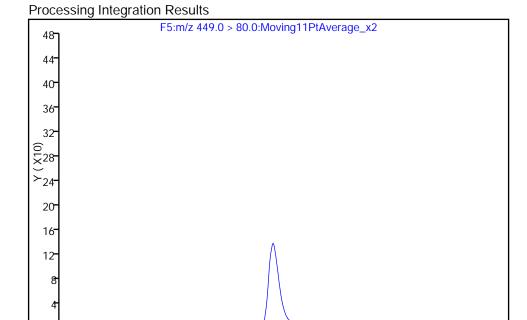
01 = 8.5

9.1

9.7

Not Detected

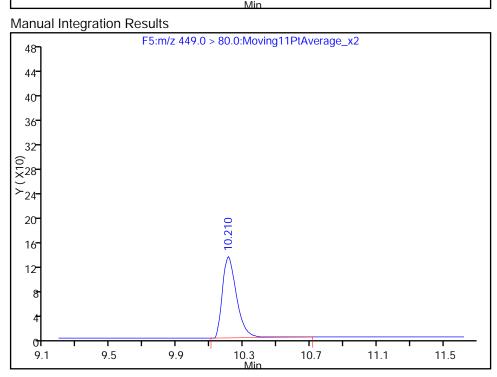
Expected RT: 10.21



RT: 10.21 Area: 794

Amount: 0.561152 Amount Units: ng/ml

52



10.3

10.9

11.5

Reviewer: westendorfc, 31-Mar-2016 15:13:40

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d

Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

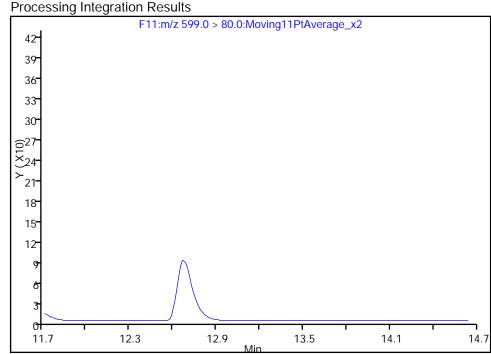
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

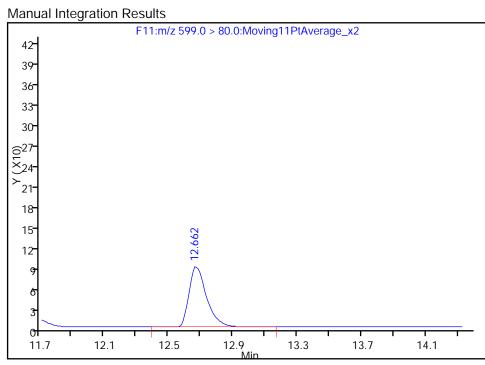
39 Perfluorodecane Sulfonic acid, CAS: 335-77-3

Not Detected

Expected RT: 12.65



RT: 12.66 Area: 661 Amount: 0.801034 Amount Units: ng/ml



Reviewer: westendorfc, 31-Mar-2016 15:13:40

Report Date: 01-Apr-2016 09:44:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_004.d

Lims ID: Std L2

Client ID:

Sample Type: IC Calib Level: 2

Inject. Date: 31-Mar-2016 12:57:46 ALS Bottle#: 10 Worklist Smp#: 4

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L2

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:44:52 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 31-Mar-2016 15:13:53

First Level Reviewer, westernoone						Date.	აა	1-10101-2010 15.15.55			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	2 Perfluorobut	vric acid									
	212.9 > 169.0	•	5.599	-0.013	1.000	4842	0.7424		74.2	257	
ı	D 113C4 PFBA	١									
	217.0 > 172.0	5.598	5.600	-0.002		377588	54.0		108	5159	
	4 Perfluoroper	ntanoic a	cid								
	262.9 > 219.0	6.675	6.681	-0.006	1.000	15616	1.01		101	12.3	
	D 3 13C5-PFPe										
	267.9 > 223.0	6.680	6.681	-0.001		771185	58.8		118	151386	
	5 Perfluorobut										
	298.9 > 80.0	6.790			1.000	5341	NC			15.6	
	40 Perfluorobu				1 000	E0.44	0 (015		77.4		
		6.790		-0.003	1.000	5341	0.6815		77.1		
	7 Perfluorohex 313.0 > 269.0			0.001	1.000	7874	1.00		99.7	240	
			7.097	0.001	1.000	7074	1.00		99.1	240	
	D 6 13C2 PFHx 315.0 > 270.0	.A 7.898	7 897	0.001		658076	57.1		114	39615	
	9 Perfluorohep			0.001		000070	07.1			07010	
	363.0 > 319.0			-0.002	1.000	12054	1.01		101	1162	
	D 8 13C4-PFHp										
	367.0 > 322.0		9.097	0.003		745413	56.6		113	10795	
ı	D 11 18O2 PFH:	xS									
	403.0 > 84.0	9.129	9.130	-0.001		416706	53.2		112	37334	
	10 Perfluorohe	xane Sul	fonate								
	399.0 > 80.0	9.153	9.137	0.016	1.000	2023	NC			21.8	
	41 Perfluorohe										
	399.0 > 80.0	9.153	9.137	0.016	1.000	2023	0.9308		98.4		

Report Date: 01-Apr-2016 09:44:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24

\\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_004.d Data File: **FXP** DLT REL **Amount** Signal **RT** RT RT Response ng/ml Ratio(Limits) %Rec S/N Flags RT 13 Perfluorooctanoic acid 10.217 10.204 0.013 413.0 > 369.0 7636 1.01 101 1.000 33.2 413.0 > 169.0 10.203 10.204 -0.001 0.999 1393 5.48(0.00-0.00) 11.9 101 D 12 13C4 PFOA 417.0 > 372.0 10.203 10.205 -0.002 717904 37945 56.6 113 38 Perfluoroheptanesulfonic Acid 449.0 > 80.0 10.210 10.208 0.002 1.000 3749 1.11 116 14 Perfluoroheptane Sulfonate 449.0 > 80.0 10.210 10.210 0.0 1.000 3749 NC 333 D 16 13C4 PFOS 503.0 > 80.0 11.146 11.149 -0.003 22760 732714 54.3 114 15 Perfluorooctane sulfonic acid 499.0 > 80.0 11.153 11.152 0.001 10896 0.8428 88.2 856 1.000 399 499.0 > 99.0 11.153 11.152 0.001 1.000 4716 2.31(0.00-0.00) 88.2 D 17 13C5 PFNA 468.0 > 423.0 11.169 11.171 -0.002 600136 59.0 31117 118 18 Perfluorononanoic acid 463.0 > 419.0 11.183 11.178 0.005 1.000 4830 1.02 102 35.8 D 19 13C2 PFDA 12.000 11.999 0.001 515.0 > 470.0 806406 60.7 121 55535 20 Perfluorodecanoic acid 12.008 12.004 0.004 1.000 1.00 100 475 513.0 > 469.0 6897 25 Perfluorodecane Sulfonate 599.0 > 80.0 12.641 12.648 -0.007 1.000 1779 NC 113 D 23 13C8 FOSA 506.0 > 78.0 12.639 12.644 -0.005 1412111 57.2 114 4358 39 Perfluorodecane Sulfonic acid Μ 599.0 > 80.0 12.641 12.646 -0.005 1779 0.9794 M 1.000 102 24 Perfluorooctane Sulfonamide 498.0 > 78.0 12.650 12.646 0.004 1.000 37224 1.04 104 2308 D 26 13C2 PFUnA 565.0 > 520.0 12.692 12.692 0.0 779093 51.6 103 47384 27 Perfluoroundecanoic acid 563.0 > 519.0 12.692 12.693 -0.001 19156 0.9382 93.8 105 1.000 29 Perfluorododecanoic acid 0.7087 70.9 57.6 613.0 > 569.0 13.283 13.287 -0.004 1.000 9032 D 28 13C2 PFDoA 615.0 > 570.0 13.291 13.289 0.002 1081463 60.0 120 41593 30 Perfluorotridecanoic acid 663.0 > 619.0 13.782 13.786 -0.004 13868 0.6436 64.4 68.9 1.000 D 33 13C2-PFTeDA 715.0 > 670.0 14.217 14.215 0.002 1012061 57.9 116 39599 32 Perfluorotetradecanoic acid 713.0 > 669.0 14.217 14.217 0.0 97.5 1.000 17628 0.9753 13.5 D 35 13C2-PFHxDA 815.0 > 770.0 14.863 14.866 -0.003 17014 1627366 55.5 111 34 Perfluorohexadecanoic acid

Page 395 of 526 1.02

1084/01/2016

102

14.863 14.866 -0.003

813.0 > 769.0

Report Date: 01-Apr-2016 09:44:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_004.d

Signal RT RT RT REL Amount		S/N Flags
----------------------------	--	-----------

36 Perfluorooctandecanoic acid

87.0 33537 0.8404 84.0

QC Flag Legend Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

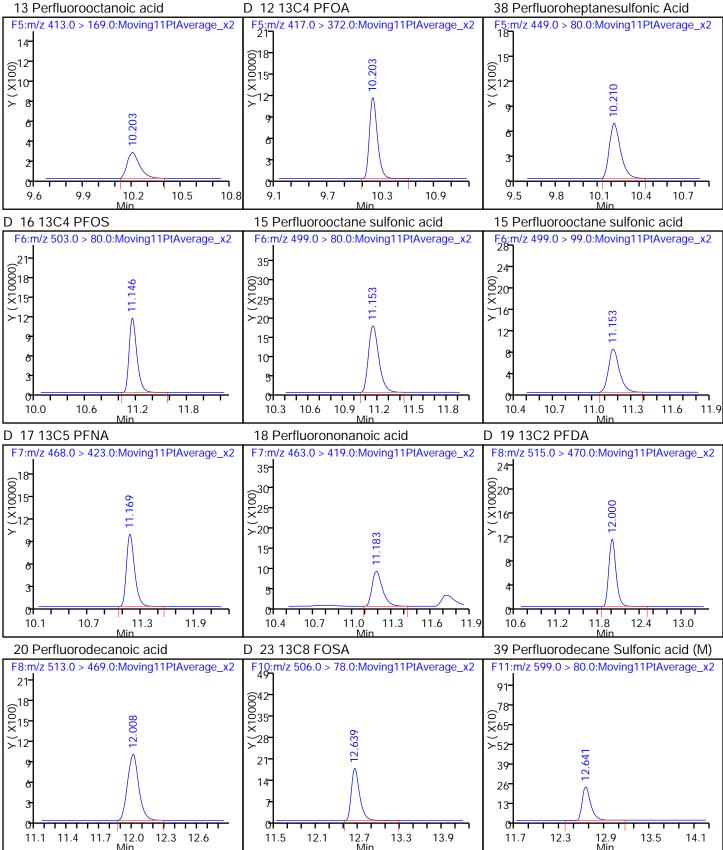
Reagents:

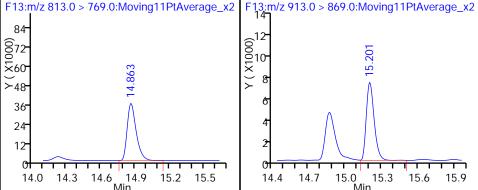
LCPFC-L2_00019 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:44:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_004.d **Injection Date:** 31-Mar-2016 12:57:46 Instrument ID: Α6 Lims ID: Std L2 Client ID: Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 X (X10000) 36 630 ×25 × 30-<u>></u>20 18 15 12 10 4.9 5.2 5.3 5.6 5.9 5.8 6.1 5.9 6.2 6.5 6.8 7.1 7.4 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 42 24 21 0020 36- (C) 30 <u>ම</u>18 ∑₁₆ ×15 18 12 6.9 7.2 7.0 7.3 6.6 5.8 6.4 6.7 6.3 7.2 7.5 7.8 8.1 8.4 6.1 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 21 21-56 (00001X) 12 0018 00015 ×12 <u>8</u>48 ×40 ≻₃₂-24 16 7.6 7.9 8.2 8.5 8.4 9.0 9.3 8.7 9.3 9.9 7.3 8.7 8.1 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 35- 10 (X10000) × (X10000) × (X10000) ³⁰ ×25 Y (X100) ≻20 15 10 0 0| 8.5 8.8 9.1 9.4 Page 3976 of 526 10.4 04/01/201 8.5 8.8 9.1 9.4 9.7 8.2 9.7 10.0 9.5 9.8 10.1

8.2

10.0





Report Date: 01-Apr-2016 09:44:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_004.d

Injection Date: 31-Mar-2016 12:57:46 Instrument ID: A6

Lims ID: Std L2

Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 4

Injection Vol: 15.0 ul Dil. Factor: 1.0000

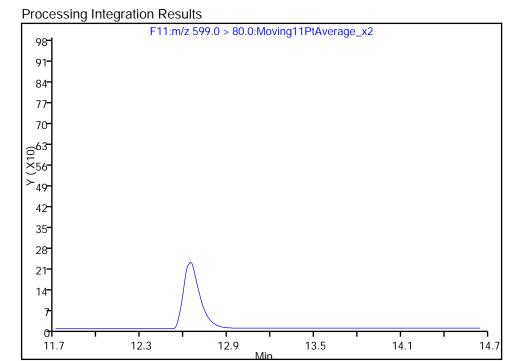
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

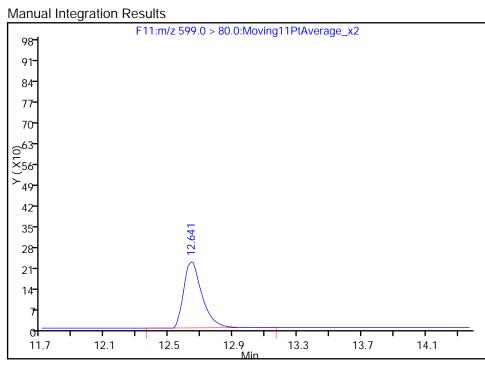
39 Perfluorodecane Sulfonic acid, CAS: 335-77-3

Not Detected

Expected RT: 12.65



RT: 12.64
Area: 1779
Amount: 0.979446
Amount Units: ng/ml



Reviewer: westendorfc, 31-Mar-2016 15:13:53

Report Date: 01-Apr-2016 09:44:56 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_005.d

Lims ID: Std L3

Client ID:

Sample Type: IC Calib Level: 3

Inject. Date: 31-Mar-2016 13:19:00 ALS Bottle#: 11 Worklist Smp#: 5

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L3

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:44:56 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 31-Mar-2016 15:18:49

FIrst Level Reviewer: Westendoric					Date: 31-Mar-2016 15:1				:49			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags		
2 Perfluorobut	vric acid											
212.9 > 169.0	5.601	5.599	0.002	1.000	39518	4.83		96.6	3300			
D 113C4 PFBA	A											
217.0 > 172.0	5.604	5.600	0.004		356234	50.9		102	40019			
4 Perfluoroper	ntanoic a	cid										
262.9 > 219.0	6.680	6.681	-0.001	1.000	57438	4.65		93.1	54.1			
D 3 13C5-PFP6												
267.9 > 223.0	6.680	6.681	-0.001		682086	52.0		104	32561			
5 Perfluorobut												
298.9 > 80.0 298.9 > 99.0	6.795 6.790	6.793 6.793	0.002	1.000 0.999	29119	NC	1.87(0.00-0.00)		166 362			
				0.999	15593		1.67(0.00-0.00)		302			
40 Perfluorobu 298.9 > 80.0		6.793	ı 0.002	1.000	29119	4.12		93.3				
7 Perfluorohex			0.002	1.000	27117	7.12		70.0				
		7.897	0.007	1.000	52963	4.99		99.9	1278			
D 6 13C2 PFHx												
		7.897	-0.004		591262	51.3		103	53847			
9 Perfluoroher	otanoic a	cid										
363.0 > 319.0	9.100	9.096	0.004	1.000	51969	4.55		91.0	9743			
D 8 13C4-PFHp	οA											
367.0 > 322.0	9.100	9.097	0.003		657978	50.0		100	56889			
D 11 18O2 PFH	xS											
403.0 > 84.0	9.129	9.130	-0.001		375474	47.9		101	32998			
10 Perfluorohe												
399.0 > 80.0	9.141		0.004	1.000	20953	NC			490			
41 Perfluorohe												
399.0 > 80.0	9.141	9.137	0.004	1.000	20953	5.01		106				
					Page 401 of	526			04/04	1/2016		

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04/01/2016

Report Date: 01-Apr-2016 09:44:56 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01 Data File:				o\Chroml			04-Mar-2016 14:36: \\31MAR2016B6B_0			
Data i iic.	((01))	EXP	DLT	REL		Amount	101011011111111111111111111111111111111	700.u		
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooct	tanoic ac	id								
	10.203			1.000	60791	4.79	0.00(0.00.0.00)	95.8	700	
413.0 > 169.0 D 12 13C4 PFO	10.210	10.204	0.006	1.001	18237		3.33(0.00-0.00)	95.8	1515	
417.0 > 372.0	10.203				684349	53.9		108	54551	
38 Perfluorohe 449.0 > 80.0	ptanesulf 10.210			1.000	12618	3.10		65.1		
14 Perfluorohe			0.002	1.000	12010	3.10		03.1		
	10.210		0.0	1.000	12618	NC			2064	
D 16 13C4 PFO										
	11.153				659513	48.9		102	51641	
15 Perfluorooct 499.0 > 80.0	tane sulfo 11.153			1.000	52571	4.47		93.4	947	
	11.153			1.000	20064	4.47	2.62(0.00-0.00)	93.4	545	
D 17 13C5 PFN							,			
468.0 > 423.0	11.169	11.171	-0.002		508529	50.0		100.0	39457	
18 Perfluorono										
	11.176	11.178	-0.002	1.000	32465	4.58		91.6	332	
D 19 13C2 PFD. 515.0 > 470.0	A 12.000	11 000	0.001		699119	52.6		105	49010	
20 Perfluorode			0.001		077117	32.0		103	47010	
513.0 > 469.0			-0.004	1.000	59015	5.01		100	816	
D 23 13C8 FOS	A									
506.0 > 78.0	12.650	12.644	0.006		1257579	50.9		102	3089	
39 Perfluorode				1 000	10577	4.01		00.5		
	12.641			1.000	18577	4.31		89.5		
24 Perfluorooct 498.0 > 78.0				1.000	171763	5.40		108	6960	
25 Perfluorode			0.007		.,.,	00			0,00	
	12.641		-0.007	1.000	18577	NC			1122	
D 26 13C2 PFU										
565.0 > 520.0			0.001		753554	49.9		99.8	45488	
27 Perfluoroun 563.0 > 519.0			0.0	1.000	77863	5.68		114	320	
29 Perfluorodo			0.0	1.000	77603	0.00		114	320	
613.0 > 569.0			0.004	1.000	75762	5.22		104	1209	
D 28 13C2 PFD	οA									
615.0 > 570.0	13.291	13.289	0.002		936416	51.9		104	48069	
30 Perfluorotric										
	13.782	13.786	-0.004	1.000	112418	6.03		121	702	
D 33 13C2-PFTe 715.0 > 670.0	eDA 14.217	14 21 5	0.002		873436	50.0		100	13711	
32 Perfluoroteti			0.002		673430	50.0		100	13/11	
713.0 > 669.0			0.0	1.000	65104	5.57		111	57.9	
D 35 13C2-PFH:										
815.0 > 770.0	14.869	14.866	0.003		1459923	49.8		99.5	16498	
34 Perfluorohe:										
813.0 > 769.0	14.869	14.866	0.003	1.000	Page 402 of 52	3 ^{4.52}		90.4	1210 04/01	/2016

Report Date: 01-Apr-2016 09:44:56 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_005.d

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

36 Perfluorooctandecanoic acid

1.000 169499 4.91 98.1 590

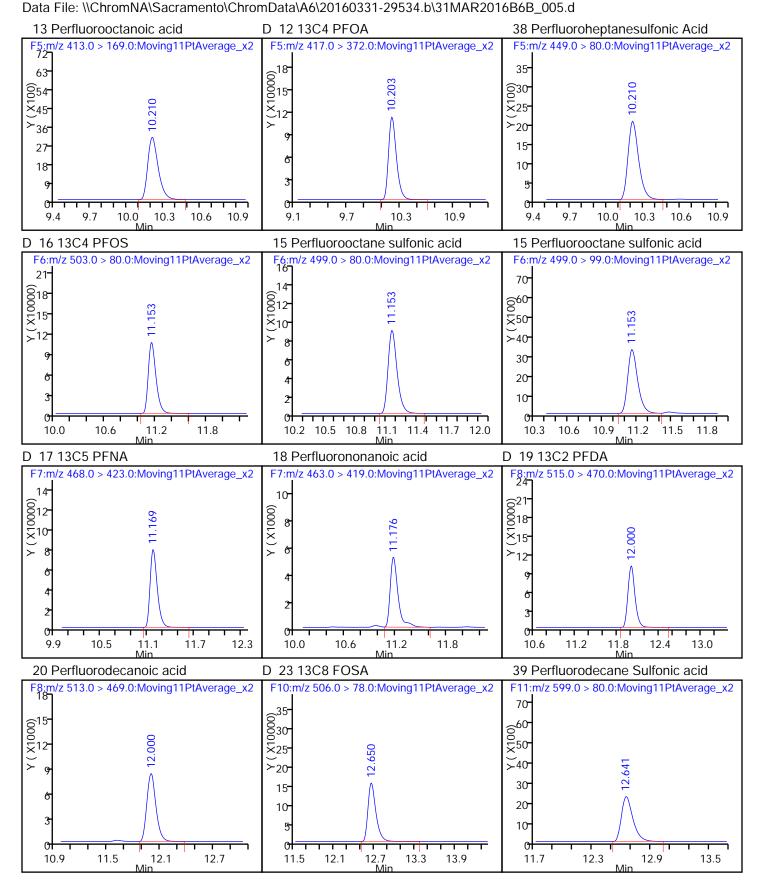
OC Flag Legend Processing Flags

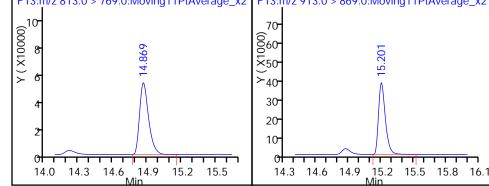
NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:44:57 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_005.d **Injection Date:** 31-Mar-2016 13:19:00 Instrument ID: Α6 Lims ID: Std L3 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 5 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid 1 13C4 PFBA 4 Perfluoropentanoic acid F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 0012 X X X 8 ()15 ()2 ()2 ()12 () ×60 36 24 5.9 5.3 5.6 5.1 5.4 5.7 6.0 5.9 6.2 6.5 6.8 7.1 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 12 (12⁻ (00010⁻ (2) 8 0020 X (X1000) ∑₁₆ 7.7 6.9 7.2 6.5 6.8 7.1 7.4 8.0 6.3 6.6 6.2 7.1 7.4 8.3 8.6 6.0 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (00015 ×12 (000015 X) 12 (00015 X) > 0 7.6 7.9 8.2 8.9 9.2 9.5 9.3 9.9 7.3 8.5 8.3 8.6 8.7 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 18 12 (X10000) (X10000) ©15 ×12 966 -55- >-44 33 22 11 0| 0 10.5 **04** 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 404h of 526 9.9 9.3 9.6 9.9 10.2 8.2 10.0





Report Date: 01-Apr-2016 09:44:59 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_006.d

Lims ID: Std L4

Client ID:

Sample Type: IC Calib Level: 4

Inject. Date: 31-Mar-2016 13:40:12 ALS Bottle#: 12 Worklist Smp#: 6

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:44:58 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 31-Mar-2016 15:15:28

First Level Reviewer: westendorfc					Date: 31-Mar-2016 15:15:28			.8		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	vric acid									_
212.9 > 169.0	5.598	5.599	-0.001	1.000	206176	24.4		122	23428	
D 113C4 PFBA	4									
217.0 > 172.0	5.598	5.600	-0.002		355070	50.8		102	38269	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.684	6.681	0.003	1.000	271612	22.0		110	275	
D 3 13C5-PFP6										
267.9 > 223.0	6.684	6.681	0.003		700336	53.4		107	68471	
5 Perfluorobut			0.004	1 000	150000				400	
298.9 > 80.0 298.9 > 99.0	6.794 6.789	6.793 6.793	0.001	1.000 0.999	158909 102451	NC	1.55(0.00-0.00)		420 575	
40 Perfluorobu				0.999	102451		1.55(0.00-0.00)		373	
298.9 > 80.0		6.793	0.001	1.000	158909	22.0		124		
7 Perfluorohex			0.001	1.000	100707	22.0				
		7.897	0.001	1.000	232989	20.7		104	3226	
D 6 13C2 PFHx										
315.0 > 270.0	7.898	7.897	0.001		590209	51.2		102	35145	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0	9.100	9.096	0.004	1.000	251579	21.4		107	21197	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.100	9.097	0.003		663983	50.5		101	56336	
D 11 1802 PFH										
403.0 > 84.0	9.129	9.130	-0.001		384184	49.0		104	33484	
10 Perfluorohe										
399.0 > 80.0		9.137		1.000	96531	NC			4097	
41 Perfluorohe				1 000	0/501	20.7		100		
399.0 > 80.0	9.129	9.137	-0.008	1.000	96531	20.7		109		
					Page 407 of	526			04/01	1/2016

Report Date: 01- Data File:				Chrom Revision: 2.2 04-Mar-2016 14:36:24 hto\ChromData\A6\20160331-29534.b\31MAR2016B6B_006.d						
Signal	RT	EXP RT	DLT RT	REL RT		Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc										
413.0 > 369.0 413.0 > 169.0	10.203 10.210			1.000 1.001	279566 87029	19.0	3.21(0.00-0.00)	94.9 94.9	986 1549	
D 12 13C4 PFO			0.000		0,02,		0.2 (0.00 0.00)	,		
417.0 > 372.0	10.203				730930	57.6		115	58244	
38 Perfluorohe 449.0 > 80.0	ptanesul 10.210			1.000	91555	18.3		96.3		
14 Perfluorohe	•		0.0	1 000	04555	NO			7050	
449.0 > 80.0 D 16 13C4 PFO		10.210	0.0	1.000	91555	NC			7258	
503.0 > 80.0	ა 11.146	11.149	-0.003		724132	53.7		112	56575	
15 Perfluorooc										
499.0 > 80.0	11.146			1.000	253422	19.6		102	929	
499.0 > 99.0	11.153	11.152	0.001	1.001	156130		1.62(0.00-0.00)	102	6003	
D 17 13C5 PFN. 468.0 > 423.0	A 11.169	11 171	-0.002		517518	50.9		102	40182	
18 Perfluorono			-0.002		317310	30.7		102	40102	
	11.176		-0.002	1.000	158032	20.0		100	1350	
D 19 13C2 PFD										
515.0 > 470.0	12.000		0.001		644108	48.5		96.9	44605	
20 Perfluorode 513.0 > 469.0	canoic a 12.008		0.004	1.000	223873	18.9		94.6	15160	
D 23 13C8 FOS		10 / 44	0.005		1201750	FF 0		110	1/40	
506.0 > 78.0 39 Perfluorode	12.639				1381759	55.9		112	1642	
	12.640			1.000	113514	21.0		109		
24 Perfluorooc				1 000	71/105	20.5		100	2210	
	12.649		0.003	1.000	716135	20.5		102	2219	
25 Perfluorode 599.0 > 80.0	tane Sui 12.640		-0.006	1.000	113514	NC			4592	
D 26 13C2 PFU	nA									
565.0 > 520.0	12.692	12.692	0.0		814617	54.0		108	32669	
27 Perfluoroun			0.004	1 000	0/0077	10.1		07.0	4045	
	12.692		-0.001	1.000	269877	19.4		97.0	1915	
29 Perfluorodo 613.0 > 569.0			-0.004	1.000	317850	21.9		110	1094	
D 28 13C2 PFD										
615.0 > 570.0	13.283	13.289	-0.006		909288	50.4		101	5381	
30 Perfluorotrio										
663.0 > 619.0		13.786	-0.005	1.000	471710	26.0		130	2528	
D 33 13C2-PFT6 715.0 > 670.0		14.215	0.002		905033	51.8		104	47067	
32 Perfluorotet										
	14.217	14.217	0.0	1.000	220478	20.5		103	180	
D 35 13C2-PFH 815.0 > 770.0		14.866	-0.004		1612888	55.0		110	12168	
34 Perfluorohe			0.00:	1.000	707007	00.0		40:	4440	
813.0 > 769.0	14.862	14.866	-0.004	1.000	Page 408 of 526	20.9		104	1140/01	/2016

Report Date: 01-Apr-2016 09:44:59 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_006.d

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

36 Perfluorooctandecanoic acid

1.000 22.6 757226 113 2183

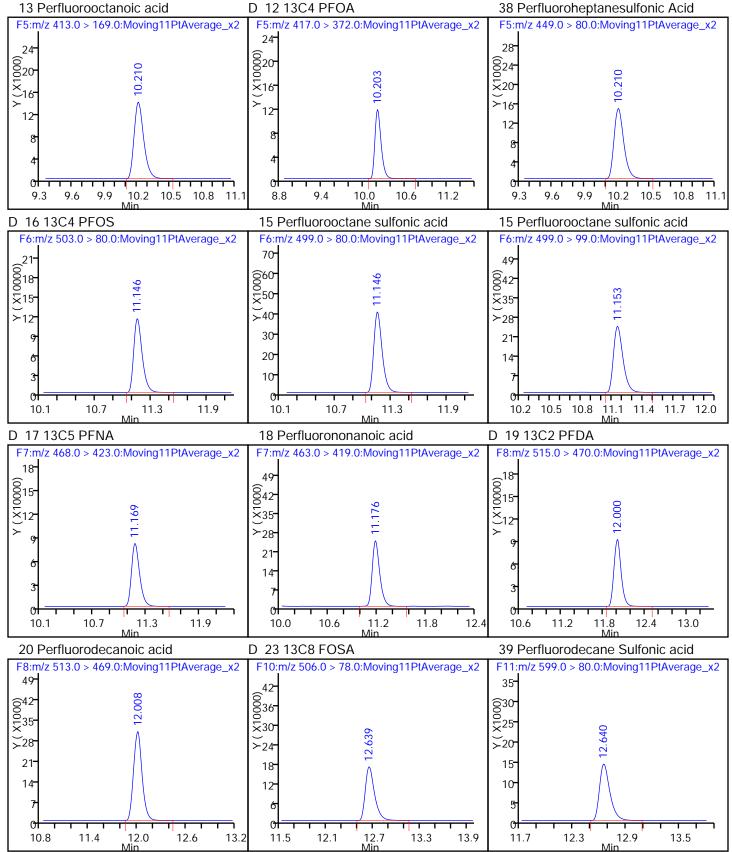
OC Flag Legend Processing Flags

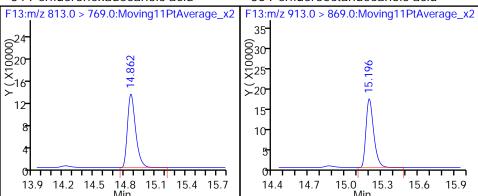
NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:44:59 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_006.d **Injection Date:** 31-Mar-2016 13:40:12 Instrument ID: Α6 Lims ID: Std L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 V (X10000) 63 70 0054 ×45 660 550 **≻**36 −40 27 30 20 10 5.2 5.2 5.5 5.8 6.1 5.5 5.8 6.1 6.7 7.0 3 13C5-PFPeA D 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 70 (000015 X) 12 6⁴² 0₃₅ <u>6</u>60 ∑50 <u>~28</u> **≻**40 21 30 20 10 7.7 7.0 7.3 6.5 6.8 7.1 7.4 8.0 5.8 6.4 6.7 6.2 7.4 8.3 8.6 6.1 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 63 (18⁻ 000 15⁻ (00015-00015-012-654**-**-45 **≻**36 27 18 7.7 8.0 8.8 9.1 9.4 9.7 8.8 9.1 9.4 9.7 7.4 8.3 8.6 8.5 8.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 V (X10000) 77-24- 666 ×55 ∑₁₆--44 33 22 0 $^{\circ}$ 8.6 8.9 9.2 9.5 Page 41/0hof 526 8.5 8.8 9.1 9.4 9.7 8.3 9.8 9.2 9.8 10.4 8.2 10.0





Report Date: 01-Apr-2016 09:45:02 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_007.d

Lims ID: Std L5

Client ID:

Sample Type: IC Calib Level: 5

Inject. Date: 31-Mar-2016 14:01:25 ALS Bottle#: 13 Worklist Smp#: 7

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:45:01 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	yric acid									
212.9 > 169.0		5.599	0.002	1.000	512346	55.1		110	9998	
D 113C4 PFBA		5 (00			000704	/			10.100	
217.0 > 172.0	5.598	5.600	-0.002		388736	55.6		111	42492	
4 Perfluoroper 262.9 > 219.0	ntanoic a 6.684	cid 6.681	0.003	1.000	598747	48.5		97.0	619	
D 3 13C5-PFP6		0.001	0.003	1.000	390747	40.5		97.0	019	
267.9 > 223.0	6.684	6.681	0.003		701032	53.5		107	33385	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	6.794	6.793	0.001	1.000	408510	NC			835	
298.9 > 99.0	6.790	6.793	-0.003	0.999	265920		1.54(0.00-0.00)		1198	
40 Perfluorobu										
298.9 > 80.0	6.794		0.001	1.000	408510	52.3		118		
7 Perfluorohex 313.0 > 269.0		id 7.897	-0.004	1.000	686869	55.3		111	6455	
D 6 13C2 PFHx		7.097	-0.004	1.000	000009	33.3		111	0433	
315.0 > 270.0		7.897	-0.004		644112	55.9		112	58390	
9 Perfluoroher										
		9.096	-0.002	1.000	692517	54.0		108	5775	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.100	9.097	0.003		723190	55.0		110	127196	
D 11 18O2 PFH										
403.0 > 84.0		9.130	-0.001		415522	53.0		112	36493	
10 Perfluorohe			0.000	4 000	044057	NO			0000	
399.0 > 80.0	9.129		-0.008	1.000	244257	NC			2882	
41 Perfluorohe 399.0 > 80.0		onic acio 9.137		1.000	244257	47.6		101		
377.0 > 00.0	7.127	7.13/	-0.006	1.000	244207	47.0		101		

Report Date: 01- Data File:				to\Chrom			04-Mar-2016 14:36 0\31MAR2016B6B_			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanoic ac	id								
413.0 > 369.0	10.203			1.000	738732	57.6		115	2513	
413.0 > 169.0	10.203	10.204	-0.001	1.000	258638		2.86(0.00-0.00)	115	20181	
D 12 13C4 PFO		40.005	0.000		(05700	40.0		00.4	40770	
417.0 > 372.0	10.203				625700	49.3		98.6	49663	
38 Perfluorohe 449.0 > 80.0	eptanesul 10.203			1.000	250774	50.1		105		
14 Perfluorohe			-0.003	1.000	230774	50.1		103		
449.0 > 80.0	10.203		-0.007	1.000	250774	NC			19867	
D 16 13C4 PFO										
503.0 > 80.0	11.146	11.149	-0.003		715705	53.1		111	56050	
15 Perfluorooc	tane sulf	onic acio	t							
499.0 > 80.0	11.153	11.152	0.001	1.000	632317	49.4		103	348	
499.0 > 99.0	11.153	11.152	0.001	1.000	375378		1.68(0.00-0.00)	103	28897	
D 17 13C5 PFN										
468.0 > 423.0	11.169		-0.002		569409	56.0		112	5423	
18 Perfluorono			0.000	1 000	47.474.4	F2.0		100	2222	
	11.176	11.178	-0.002	1.000	474714	53.8		108	3333	
D 19 13C2 PFD 515.0 > 470.0	12.000	11 000	0.001		686549	51.6		103	47534	
			0.001		000349	31.0		103	47334	
20 Perfluorode 513.0 > 469.0	2.000 a		-0.004	1.000	736547	57.2		114	51150	
D 23 13C8 FOS		12.004	-0.004	1.000	730347	37.2		114	31130	
506.0 > 78.0	12.650	12.644	0.006		1276361	51.7		103	1457	
39 Perfluorode										
599.0 > 80.0		12.647		1.000	271197	49.8		103		
24 Perfluorooc										
498.0 > 78.0	12.650			1.000	1796546	55.6		111	1440	
25 Perfluorode	cane Sul	lfonate								
599.0 > 80.0	12.651	12.646	0.005	1.000	271197	NC			16583	
D 26 13C2 PFU	nA									
565.0 > 520.0	12.693	12.692	0.001		842545	55.8		112	11381	
27 Perfluoroun										
563.0 > 519.0	12.693	12.693	0.0	1.000	665862	47.0		94.1	7945	
29 Perfluorodo										
613.0 > 569.0		13.287	0.005	1.000	784540	52.6		105	4762	
D 28 13C2 PFD										
615.0 > 570.0			0.003		931648	51.7		103	70640	
30 Perfluorotrio			0.005	1 000	1104010	F0 F		440	(001	
663.0 > 619.0		13.786	0.005	1.000	1104013	59.5		119	6226	
D 33 13C2-PFT		14045	0.000		000054	F/ 4		440	27074	
	14.217		0.002		980851	56.1		112	37871	
32 Perfluorotet 713.0 > 669.0			0.0	1.000	570206	52.5		105	222	
713.0 > 009.0		14.21/	0.0	1.000	570200	52.5		103	~ ~ ~ ~	

1760251

Page 414 of 526 53.9

60.0

120

108

5232

²⁷84/01/2016

D 35 13C2-PFHxDA

815.0 > 770.0 14.869 14.866 0.003

34 Perfluorohexadecanoic acid

Report Date: 01-Apr-2016 09:45:02 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_007.d

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

36 Perfluorooctandecanoic acid

15.201 15.199 0.002 913.0 > 869.0 1.000 61.6 123 4001 2118488

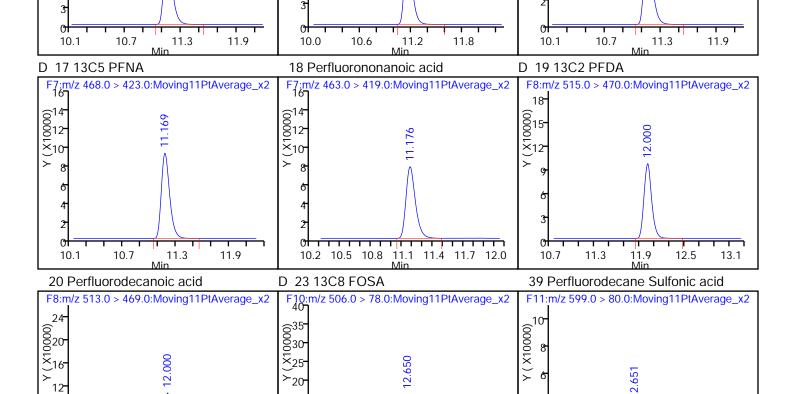
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:45:02 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_007.d **Injection Date:** 31-Mar-2016 14:01:25 Instrument ID: Α6 Lims ID: Std L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 7 15.0 ul Dil. Factor: Injection Vol: 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 2 Perfluorobutyric acid 1 13C4 PFBA 4 Perfluoropentanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 Y (X10000) (X10000) X (X10000) X (8 5.2 5.9 5.5 5.8 6.1 5.0 5.3 5.6 5.8 6.1 6.4 6.7 7.0 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 21 21 00018-15-12-(00001X) X 0018 15 6.9 6.5 6.8 7.1 7.4 7.9 8.5 6.6 7.2 6.2 7.0 7.3 7.6 8.2 8.8 6.0 6.3 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 0001 0020 (000015⁻¹ ×) > 0 (000015 X) 12 ×₁₆ 7.6 7.9 8.2 9.3 9.9 8.8 9.1 9.4 9.7 7.3 8.5 8.1 8.7 8.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 21- 0018-15- 70 0012 X 10 ×50 ≻₄₀ 30 20 10 0 8.5 8.8 9.1 9.4 9.7 8.1 8.7 Page 4M6 of 526 9.9 9.0 9.6 10.2 8.2 10.8 04/01/2016



12.7

13.3

11.7

12.3

12.9

15-

11.5

12.1

10.7

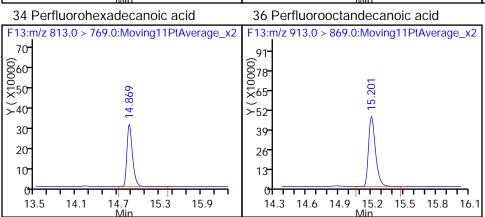
11.3

11.9

12.5

13.1

13.5



Report Date: 01-Apr-2016 09:45:10 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_008.d

Lims ID: Std L6

Client ID:

Sample Type: IC Calib Level: 6

Inject. Date: 31-Mar-2016 14:22:38 ALS Bottle#: 14 Worklist Smp#: 8

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L6

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:45:10 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	yric acid									
212.9 > 169.0	5.604	5.599	0.005	1.000	1526240	183.9		91.9	33947	
D 113C4 PFBA										
217.0 > 172.0	5.604	5.600	0.004		346202	49.5		99.0	78952	
4 Perfluoroper			0.002	1 000	1005457	105.0		07.5	1000	
	6.684	6.681	0.003	1.000	1905457	195.0		97.5	1888	
D 3 13C5-PFP6 267.9 > 223.0	6.679	6 681	-0.002		556447	42.5		84.9	107673	
5 Perfluorobut			0.002		000117	12.0		01.7	107070	
298.9 > 80.0	6.799	6.793	0.006	1.000	965447	NC			9554	
298.9 > 99.0	6.794	6.793	0.001	0.999	666549		1.45(0.00-0.00)		3094	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	6.799	6.793	0.006	1.000	965447	158.5		89.6		
7 Perfluorohex										
313.0 > 269.0		7.897	0.001	1.000	1885536	185.1		92.6	3972	
D 6 13C2 PFHx 315.0 > 270.0	:A 7.898	7.897	0.001		525682	45.6		91.2	95556	
			0.001		525062	45.0		91.2	90000	
9 Perfluorohep 363.0 > 319.0		9.096	0.004	1.000	1894236	175.2		87.6	53944	
D 8 13C4-PFH _R		7.070	0.00.		.07.200	.,		07.0	007	
367.0 > 322.0		9.097	-0.003		608787	46.3		92.5	53270	
D 11 18O2 PFH	xS									
403.0 > 84.0	9.129	9.130	-0.001		323888	41.4		87.4	28464	
10 Perfluorohe										
399.0 > 80.0	9.135	9.137	-0.002	1.000	724359	NC			12530	
41 Perfluorohe				4 005	70.4050	170 (0.4.0		
399.0 > 80.0	9.135	9.137	-0.002	1.000	724359	179.6		94.9		

Report Date: 01-Apr-2016 09:45:10 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			to\Chrom			04-Mar-2016 14:36 \\31MAR2016B6B_(
		EXP	DLT	REL		Amount				
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanoic ac	cid								
413.0 > 369.0		10.204	-0.001	1.000	2075688	193.8		96.9	4463	
413.0 > 169.0	10.203	10.204	-0.001	1.000	599964		3.46(0.00-0.00)	96.9	45064	
D 12 13C4 PFO										
	10.210				519155	40.9		81.8	39489	
38 Perfluorohe	•			1 000	705257	107.0		00.2		
	10.210		0.001	1.000	705356	187.2		98.3		
14 Perfluorohe 449.0 > 80.0	ptane St 10.210		0.002	1.000	705356	NC			13760	
D 16 13C4 PFO		10.200	0.002	1.000	700000	140			13700	
503.0 > 80.0		11.149	0.004		535839	39.7		83.1	80686	
15 Perfluorooc	tane sulf	onic acid	l							
499.0 > 80.0	11.153	11.152	0.001	1.000	1853860	193.3		101	318	
499.0 > 99.0	11.153	11.152	0.001	1.000	1099931		1.69(0.00-0.00)	101	42028	
D 17 13C5 PFN										
	11.176		0.005		375023	36.9		73.7	5119	
18 Perfluorono			0.000	1 000	101/0/5	200.0		101	4044	
	11.176	11.178	-0.002	1.000	1216965	208.0		104	4311	
D 19 13C2 PFD 515.0 > 470.0	12.000	11 000	0.001		559338	42.1		84.2	38511	
20 Perfluorode			0.001		337330	42.1		04.2	30311	
	12.000		-0.004	1.000	1940778	183.9		91.9	21764	
D 23 13C8 FOS										
506.0 > 78.0		12.644	-0.004		1084424	43.9		87.8	3131	
39 Perfluorode	cane Sul	lfonic aci	d							
599.0 > 80.0	12.641	12.646	-0.005	1.000	802547	194.7		101		
24 Perfluorooc	tane Sulf	fonamide)							
498.0 > 78.0	12.640	12.646	-0.006	1.000	5021200	182.9		91.5	1150	
25 Perfluorode										
	12.641	12.647	-0.006	1.000	802547	NC			48967	
D 26 13C2 PFU		12 (02	0.001		F0//1/	20 F		70.0	12050	
	12.693		0.001		596616	39.5		79.0	12058	
27 Perfluoroun 563.0 > 519.0			0.0	1.000	2015971	202.9		101	8063	
29 Perfluorodo			0.0	1.000	2010771	202.7		101	0003	
	13.291		0.004	1.000	2323348	187.8		93.9	12140	
D 28 13C2 PFD										
	13.291	13.289	0.002		770001	42.7		85.4	57475	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0	13.791	13.786	0.005	1.000	2884687	188.0		94.0	14226	
D 33 13C2-PFT	eDA									
715.0 > 670.0	14.210	14.215	-0.005		771194	44.1		88.3	9221	
32 Perfluorotel								_	_	
713.0 > 669.0		14.217	0.0	1.000	1664485	186.4		93.2	2103	
D 35 13C2-PFH		140//	0.000		1107105	40.5		00.0	10040	
815.0 > 770.0			-0.003		1187195	40.5		80.9	19242	
34 Perfluorohe 813.0 > 769.0			-U UU3	1.000	_ ///71750	17Ω Ω		89.4	5/100	
3.3.0 > 707.0	1 1.000	1 1.000	0.000	1.000	Page 420 of 5	26 170.0		57.7	5488/01	1/2016

Report Date: 01-Apr-2016 09:45:10 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_008.d

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

36 Perfluorooctandecanoic acid

1.000 79.0 4488877 158.0 6652

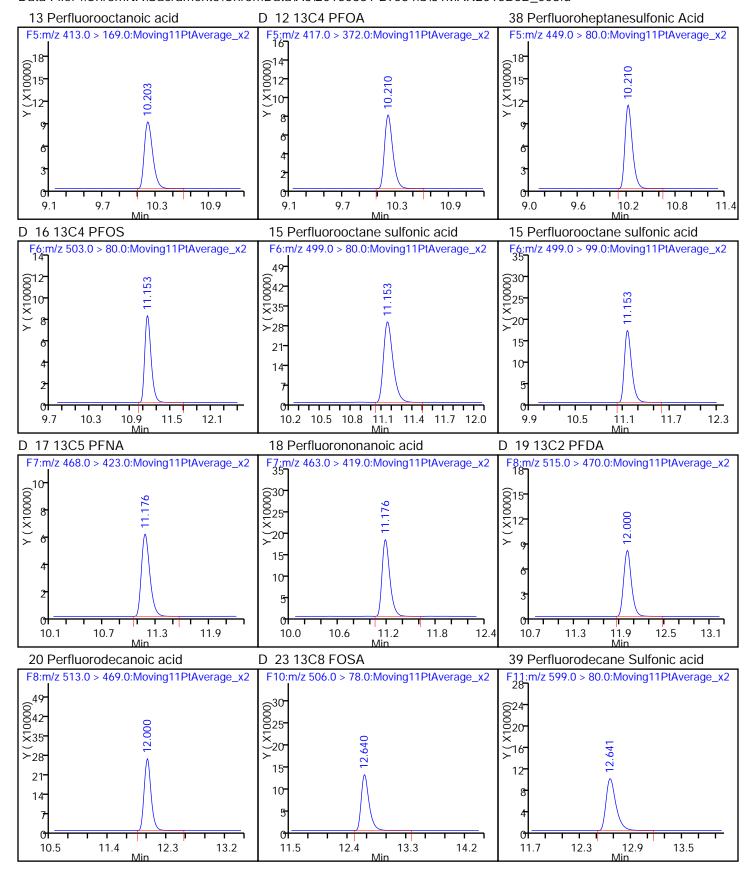
OC Flag Legend Processing Flags

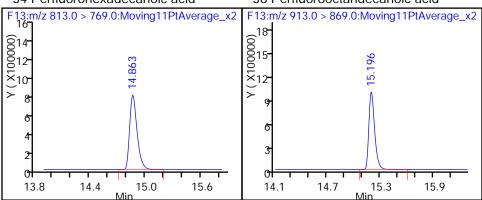
NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:45:10 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_008.d **Injection Date:** 31-Mar-2016 14:22:38 Instrument ID: Α6 Lims ID: Std L6 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 8 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid 1 13C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 Y (X10000) 6036**-**048- 040-040-≥30 ∑32 ≻₂₄-24 18 16 12 5.2 5.3 5.9 6.9 5.8 6.4 5.0 5.6 5.7 6.3 7.5 3 13C5-PFPeA D 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 24 (00012 ×10 ©20-×16-≻28 21 7.0 6.2 6.5 7.1 7.4 6.4 7.6 7.3 7.9 5.9 6.8 5.8 8.5 9.1 6.7 8 13C4-PFHpA 6 13C2 PFHxA 9 Perfluoroheptanoic acid F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 49 (000012⁻ (000015 ×)12 0042 X35 ∑₁₀ **≻28** 21 14 7.4 8.0 9.2 8.1 8.7 9.3 9.9 6.8 8.0 8.6 9.8 8.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 V (X10000) 56 (000015-X) 0048 0048 ×40 _32 24 16 0 8.5 8.8 9.1 9.4 9.7 7.8 10.2 8.9 9.5 10.1 10.7 04/01/201 8.2 10.0





Report Date: 01-Apr-2016 09:45:23 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Lims ID: Std L7

Client ID:

Sample Type: IC Calib Level: 7

Inject. Date: 31-Mar-2016 14:43:51 ALS Bottle#: 15 Worklist Smp#: 9

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L7

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:45:22 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 31-Mar-2016 15:50:14

First Level Reviewer: westendorfc					Date: 31-Mar-2016 15:50:14			14		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobu	tvric acid									
212.9 > 169.0	5.604	5.599	0.005	1.000	2917389	407.0		102	57015	
D 113C4 PFB/	4									
217.0 > 172.0	5.601	5.600	0.001		298735	42.7		85.4	30904	
4 Perfluorope										
		6.681	-0.002	1.000	4009997	406.8		102	3020	
D 3 13C5-PFP										
267.9 > 223.0	6.679		-0.002		561435	42.8		85.7	52832	
5 Perfluorobu			0.004	1 000	2120204	NC			4627	
298.9 > 80.0 298.9 > 99.0	6.789 6.794	6.793 6.793	-0.004 0.001	1.000 1.001	2130394 1294908	NC	1.65(0.00-0.00)		462 <i>1</i> 9838	
40 Perfluorobu				1.001	1274700		1.03(0.00 0.00)		7000	
298.9 > 80.0		6.793		1.000	2130394	344.2		97.3		
7 Perfluorohe										
		7.897	-0.004	1.000	3847410	374.9		93.7	1382	
D 6 13C2 PFH	xΑ									
315.0 > 270.0	7.893	7.897	-0.004		529029	45.9		91.8	18752	
9 Perfluorohe										
363.0 > 319.0	9.088	9.096	-0.008	1.000	3692715	419.9		105	19348	
D 8 13C4-PFH	•									
	9.088	9.097	-0.009		494968	37.6		75.2	13946	
D 11 1802 PFH		0.400	0.001		222257	40.0		00.0	10101	
403.0 > 84.0		9.130	-0.001		329057	42.0		88.8	19101	
10 Perfluorohe 399.0 > 80.0		9.137	-0 009	1.000	1412746	NC			11495	
41 Perfluorohe				1.000	1412/40	NC			11475	
399.0 > 80.0	9.129		и -0.008	1.000	1412746	344.2		91.0		
277.07 00.0	,,	7.107	3.000		Page 425 of			, 1.0	04/04	1/2016
					F AUG 420 () 3	U_U			U4/U	1/2010

Page 425 of 526

04/01/2016

Report Date: 01-Apr-2016 09:45:23 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			to\Chrom			04-Mar-2016 14:36 0\31MAR2016B6B_			
Data File.	1,01110	EXP	DLT	REL	154(4)/(0/20100	Amount	101011111111111111111111111111111111111	,007.u		
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanoic ac	id								
413.0 > 369.0	10.203	10.204		1.000	4053493	386.0		96.5	17458	
	10.203	10.204	-0.001	1.000	1121007		3.62(0.00-0.00)	96.5	9388	
	10.203				508247	40.0		80.1	39095	
38 Perfluorohe	•			1 000	1200420	202.4		101		
449.0 > 80.0		10.208	-0.005	1.000	1388629	383.6		101		
14 Perfluorohe 449.0 > 80.0	:ptane 3t 10.203		-0.006	1.000	1388629	NC			30400	
D 16 13C4 PFO										
503.0 > 80.0	11.146	11.149	-0.003		514368	38.1		79.8	38774	
15 Perfluorooc	tane sulf	onic acio	k							
499.0 > 80.0	11.146			1.000	3701867	402.2		105	250	
499.0 > 99.0	11.146	11.152	-0.006	1.000	2052967		1.80(0.00-0.00)	105	6166	
D 17 13C5 PFN		11 171	0.000		422002	41 /		00.1	22//0	
	11.169		-0.002		422803	41.6		83.1	32668	
18 Perfluorono 463.0 > 419.0	nanoic a 11.169		-0 000	1.000	2514039	380.6		95.2	4209	
D 19 13C2 PFD		11.170	-0.009	1.000	2314037	300.0		75.2	4207	
	11.991	11.999	-0.008		525166	39.5		79.0	35584	
20 Perfluorode										
513.0 > 469.0			-0.003	1.000	3925152	395.5		98.9	48471	
D 23 13C8 FOS	SA.									
506.0 > 78.0	12.642	12.644	-0.002		1074291	43.5		87.0	1306	
24 Perfluorooc										
498.0 > 78.0	12.642			1.000	9014580	331.5		82.9	500	
39 Perfluorode				1 000	4444045	0.400		05.0		
	12.644		-0.002	1.000	1466045	369.9		95.9		
25 Perfluorode			0.000	1 000	14//045	NC			88384	
599.0 > 80.0	12.644	12.040	-0.002	1.000	1466045	NC			88384	
D 26 13C2 PFU 565.0 > 520.0		12 602	-0.007		603916	40.0		80.0	18352	
27 Perfluoroun			-0.007		003710	40.0		00.0	10332	
563.0 > 519.0			0.003	1.000	3414909	340.0		85.0	13023	
29 Perfluorodo										
613.0 > 569.0			-0.002	1.000	4533029	407.7		102	15440	
D 28 13C2 PFD	οΑ									
615.0 > 570.0	13.285	13.289	-0.004		691641	38.4		76.7	51730	
30 Perfluorotrio	decanoic	acid								
663.0 > 619.0	13.784	13.786	-0.002	1.000	5299566	384.6		96.1	8182	
D 33 13C2-PFT										
715.0 > 670.0			-0.003		741943	42.5		84.9	5438	
32 Perfluorotet			0.005	1 000	0000700	0/4.4			0.404	
713.0 > 669.0		14.217	-0.005	1.000	2893730	361.1		90.3	2636	
D 35 13C2-PFH		1/0//	0.001		1420742	40.7		07.5	1/757	
815.0 > 770.0			-U.UU I		1429743	48.7		97.5	14757	
34 Perfluorohe 813.0 > 769.0			-O OO1	1.000	_9/13/82	125.2		106	<u> 4</u> 1/12	
010.0 / 107.0	17.000	17.000	0.001	1.000	Page 426 of	526 723.3		100	4148/01	1/2016

Report Date: 01-Apr-2016 09:45:23 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

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

36 Perfluorooctandecanoic acid

1.000 429.2 107 10953255 4824

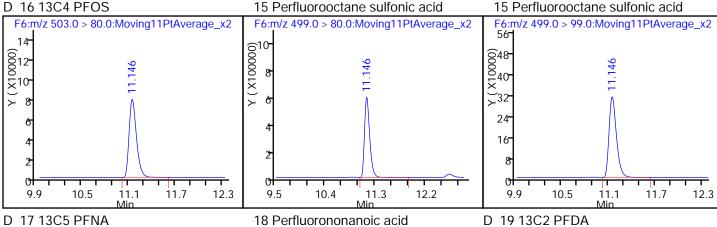
OC Flag Legend Processing Flags

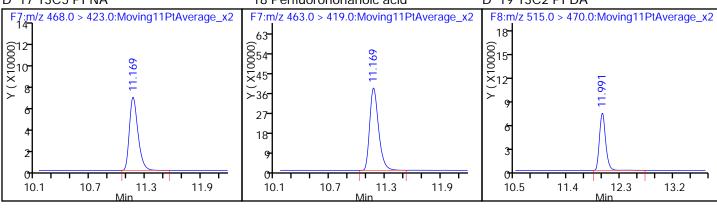
NC - Not Calibrated

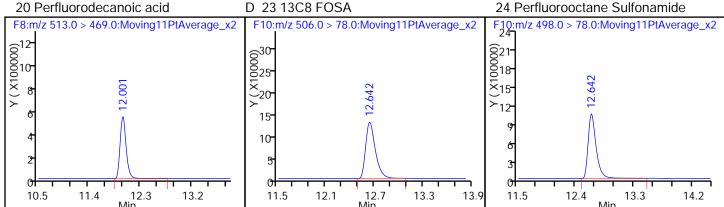
Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

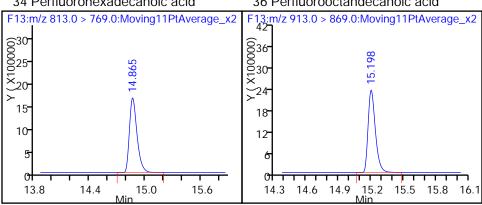
Report Date: 01-Apr-2016 09:45:23 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_009.d **Injection Date:** 31-Mar-2016 14:43:51 Instrument ID: Α6 Lims ID: Std L7 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 9 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 (X100000) 77- 672 260 260 ×55 ≻48- 36 33 22 24 11 12 5.2 5.2 6.9 5.8 6.4 5.5 5.8 6.1 5.7 6.3 7.5 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 56- Y (X100000) (000012 ×) > 9 6.679 <u>@</u>48 8 × 40 <u></u>32 24 16 7.0 6.9 7.2 6.4 7.6 7.2 9.0 6.3 6.6 7.5 5.8 7.8 8.4 6.0 6.6 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 14 (X100000) X (X) (X) (X) (X) 0010° × (×1000 × (×1000 7.6 7.9 8.2 8.5 8.7 9.3 8.8 9.1 9.4 9.7 7.3 8.1 8.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 630<u>-</u> 872° ≻48 18 36 12 00 8.2 8.8 9.1 9.4 9.7 8.2 8.5 8.5 9.4 10.3 8.5 10.0 04/01/2016







11.4



FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Lab Sample ID: <u>ICV 320-104824/11</u> Calibration Date: <u>03/28/2016</u> 21:12

Instrument ID: A6 Calib Start Date: 03/28/2016 18:22

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29

Lab File ID: 28MAR2016A6A_012b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.440		54.4	50.0	8.9	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9395		49.5	50.0	-1.1	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9562		46.7	44.3	5.6	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9033		44.1	50.0	-11.9	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	1.053		56.2	50.0	12.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.5644		45.9	47.3	-2.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	1.178		61.3	50.0	22.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.4111		52.2	47.6	9.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.066		54.2	47.8	13.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8847		54.2	50.0	8.5	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	1.091		57.8	50.0	15.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.350		58.8	50.0	17.7	25.0
Perfluorodecane Sulfonic acid	L1ID		0.4319		49.8	48.3	3.1	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8438		50.5	50.0	1.1	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.7627		48.0	50.0	-4.0	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.153		48.6	50.0	-2.8	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5242		44.9	50.0	-10.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.999		45.1	50.0	-9.8	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		1.645		37.2	50.0	-25.6*	25.0

Report Date: 01-Apr-2016 09:57:52 Chrom Revision: 2.2 04-Mar-2016 14:36:24

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File:

Lims ID: **ICV**

Client ID:

Sample Type: **ICV**

Inject. Date: 28-Mar-2016 21:12:02 ALS Bottle#: 16 Worklist Smp#: 11

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: **ICV**

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: **JRB** Instrument ID: Α6

Sublist: chrom-PFAC_A4*sub6

\\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m Method:

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:51 Calib Date: 28-Mar-2016 20:29:35

Picker Integrator:

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

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Acquity BEH C18 (2.10 mm) Column 1: Det: F1:MRM

XAWRK016 Process Host:

20 1/0- 2014 15,20,00

First Level Revie	ewer: wes	stendorf	С		Date: 30-Mar-2016 15:39:00					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	4									
217.0 > 172.0	5.592	5.587	0.005		315960	40.6		81.2	37292	
2 Perfluorobut	tyric acid									
212.9 > 169.0	5.589	5.590	-0.001	1.000	454994	54.4			15450	
D 3 13C5-PFP										
267.9 > 223.0		6.672	0.002		681898	44.9		89.8	44259	
4 Perfluorope			0.0	1 000	/ 40/ 15	40 F			F10	
262.9 > 219.0		6.674	0.0	1.000	640615	49.5			519	
5 Perfluorobut 298.9 > 80.0	6.785		-0.002	1.000	332065	NC			580	
298.9 > 99.0	6.785		-0.002	1.000	197513	110	1.68(0.00-0.00)		2641	
40 Perfluorobu	ıtanesulfo						,			
298.9 > 80.0	6.785	6.787	-0.002	1.000	332065	46.7				
D 613C2 PFH	xΑ									
315.0 > 270.0	7.893	7.892	0.001		575839	44.3		88.7	25101	
7 Perfluorohe										
		7.894		1.000	520170	44.1			6901	
22 PFPeS (Pe		•			004405	NO			10/10	
349.0 > 80.0		8.099	-0.130	0.872	201135	NC			18640	
D 8 13C4-PFH ₁ 367.0 > 322.0		0.101	-0.001		560221	38.4		76.9	47531	
			-0.001		360221	30.4		70.9	4/331	
9 Perfluorohe 363.0 > 319.0	9.100 9.100		-0.002	1.000	589977	56.2			957	
D 11 1802 PFH		7.102	0.002	1.000	307711	30.2			757	
403.0 > 84.0		9.135	0.0		371213	39.0		82.4	32994	
10 Perfluorohe		lfonate								
399.0 > 80.0			-0.003	1.000	209284	NC			3664	
					Page 432 of 5	526			04/01	/2016

Page 432 of 526

Da	ta File:	\\Chr	mNA\Sa	acrament	o\ChromI	Data\A6\2016033	0-29478.b	\28MAR2016A6A_0	12b.d		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
4	1 Perfluorohe:	xanesulf	onic acid	d							
	9.0 > 80.0		9.138		1.000	209284	45.9				
D	12 13C4 PFO	Α									
41	7.0 > 372.0	10.210	10.214	-0.004		655266	41.7		83.4	50881	
1	3 Perfluorooct	tanoic ac	cid								
		10.210			1.000	772075	61.3			2794	
		10.216			1.001	210581		3.67(0.00-0.00)		2517	
	8 Perfluorohe 9.0 > 80.0	-			1 000	246022	E2 2				
		10.216		-0.002	1.000	240022	52.2				
	4 Perfluorohe 9.0 > 80.0	piane St 10.216		-0.002	1.000	246022	NC			19843	
	7.0 × 00.0 16 13C4 PFO:		10.210	0.002	1.000	240022	110			17043	
		11.160	11.160	0.0		601012	39.1		81.7	46583	
	5 Perfluorooct					00.0.2	07		C	.0000	
		11.160			1.000	639767	54.2			367	
49	9.0 > 99.0	11.160	11.163	-0.003	1.000	355486		1.80(0.00-0.00)		54707	
D	17 13C5 PFN	A									
46	8.0 > 423.0	11.183	11.183	0.0		530418	40.4		80.9	41216	
1	8 Perfluorono	nanoic a	cid								
46	3.0 > 419.0	11.183	11.184	-0.001	1.000	469246	54.2			6380	
	19 13C2 PFD										
		12.007		-0.002		705590	41.7		83.4	49476	
	0 Perfluorode			0.000	1 000	7/0/22	57.0			07440	
	3.0 > 469.0				1.000	769633	57.8			27119	
	1 PFNS (Perfl 9.0 > 80.0	louro-1-r 11.970			1.000	224220	NC			15143	
					1.000	224220	NC			13143	
	9 Perfluorode 9.0 > 80.0	12.661			1.000	262019	49.8				
	5 Perfluorode			0.004	1.000	202017	47.0				
		12.661		0.002	1.000	262019	NC			16019	
	4 Perfluorooct										
		12.659			1.000	1610766	58.8			2119	
	23 13C8 FOS										
		12.659	12.660	-0.001		1193253	40.2		80.3	3730	
D :	26 13C2 PFUi	nA									
56	5.0 > 520.0	12.702	12.708	-0.006		822239	45.5		91.0	49559	
2	7 Perfluoroun	decanoio	c acid								
56	3.0 > 519.0	12.702	12.708	-0.006	1.000	693790	50.5			4237	
D :	28 13C2 PFD	οA									
61	5.0 > 570.0	13.299	13.305	-0.006		911665	44.0		87.9	70294	
2	9 Perfluorodo	decanoio	c acid								
61	3.0 > 569.0	13.299	13.305	-0.006	1.000	695291	48.0			5034	
3	1 PFDoS (Per	flouro-1-	-dodecar								
69	9.0 > 80.0	13.745	13.626	0.119	1.000	294179	NC			19888	
	0 Perfluorotric										
	3.0 > 619.0		13.807	-0.007	1.000	1050824	48.6			2216	
	33 13C2-PFT		4400=	0.05=		000005	40.0		0.4.5	0547	
/1	5.0 > 670.0	14.232	14.23/	-0.005		Page 433 of 526	3 42.0		84.1	35 ₀ 4% ₁	/2016

Report Date: 01-Apr-2016 09:57:52 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotet 713.0 > 669.0		3.0 0.0.0	-0.005	1.000	477918	44.9			314	
34 Perfluorohe 813.0 > 769.0			-0.005	1.000	1822160	45.1			7622	
D 35 13C2-PFH 815.0 > 770.0		14.887	-0.005		1598415	44.0		88.0	35635	
36 Perfluorooc		noic acid		1.000	1499583	37.2			4841	

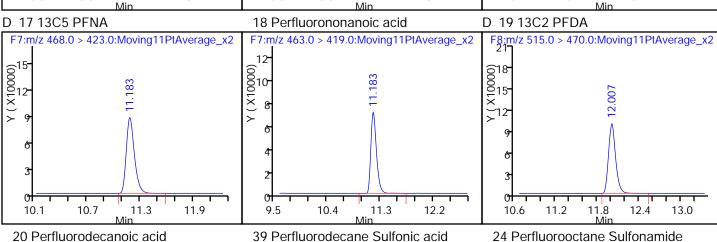
QC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:57:52 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_012b.d **Injection Date:** 28-Mar-2016 21:12:02 Instrument ID: Α6 Lims ID: **ICV** Client ID: Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 11 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 Y (X10000) (000012 X) > 9 5.2 5.9 5.8 5.5 5.8 6.1 5.0 5.3 5.6 6.1 6.4 6.7 7.0 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage x2F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 91 21⁻ 00018 ×15⁻ (00012 ×) > 9 878- ∑65 ∑52- 26 13 6.7 7.3 7.9 6.7 7.0 7.3 7.5 8.1 6.1 6.4 7.2 7.8 8.4 5.5 6.1 7 Perfluorohexanoic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 14 12 7 (X10000) 8 1 (00012 X10 0012 00012 X10 01 7.6 7.9 8.2 8.5 8.7 9.3 9.9 9.3 9.9 7.3 8.1 8.7 8.1 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 56 Y (X10000) (018 000 15 X ⁶48- 540- -32 24 16 0 04/01/201 8.5 8.8 9.1 9.4 Page 485 of 526 8.5 8.8 9.1 9.4 9.7 8.2 9.1 9.7 10.3 8.2 10.0



11.2

11.8

11.2

10.0

10.6

11.8

10.0

10.6

24⁻ 12⁻

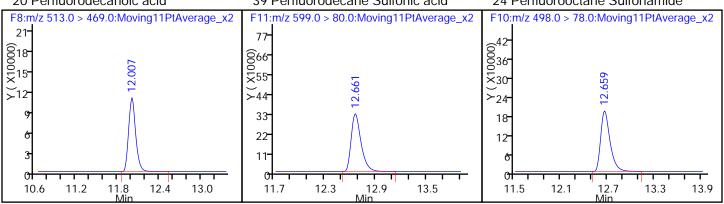
10.1

10.7

12.4

11.3

11.9



27

18

14.4

14.7

15.0

15.3

15.6

15.9

24⁻ 16⁻

13.9

14.5

15.1

15.7

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Lab Sample ID: <u>CCV 320-104824/76</u> Calibration Date: <u>03/29/2016</u> 20:24

Instrument ID: A6 Calib Start Date: 03/28/2016 18:22

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29

Lab File ID: 28MAR2016A6A_077b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.286		48.7	50.0	-2.7	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9416		49.6	50.0	-0.8	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9647		47.1	44.2	6.5	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.000		48.7	50.0	-2.5	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	0.9497		50.6	50.0	1.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6046		49.2	47.3	4.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	1.116		58.1	50.0	16.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.3533		44.9	47.6	-5.7	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9304		47.4	47.8	-0.9	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8971		55.0	50.0	10.0	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	0.8919		47.2	50.0	-5.5	25.0
Perfluorodecane Sulfonic acid	L1ID		0.3993		46.0	48.2	-4.6	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.347		58.7	50.0	17.4	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8878		53.2	50.0	6.4	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8384		52.7	50.0	5.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.153		48.6	50.0	-2.7	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5938		50.9	50.0	1.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		2.015		45.6	50.0	-8.8	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		1.892		42.8	50.0	-14.5	25.0

Report Date: 01-Apr-2016 09:57:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_077b.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 29-Mar-2016 20:24:14 ALS Bottle#: 13 Worklist Smp#: 76

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Process Host:	XAWI	RK016								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.576	5.587	-0.011		449273	57.8		116	49770	
2 Perfluorobuty	yric acid									
212.9 > 169.0	5.585	5.590	-0.005	1.000	577847	48.7		97.3	32671	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.666	6.672	-0.006		845431	55.6		111	53495	
4 Perfluoropen										
262.9 > 219.0	6.666	6.674	-0.008	1.000	796086	49.6		99.2	741	
5 Perfluorobuta										
298.9 > 80.0	6.780	6.787	-0.007	1.000	426740	NC	4.44(0.00.0.00)		816	
298.9 > 99.0	6.776	6.787	-0.011	0.999	291880		1.46(0.00-0.00)		2915	
40 Perfluorobut				4 000	10/710	47.4		407		
298.9 > 80.0	6.780	6.787	-0.007	1.000	426740	47.1		107		
D 6 13C2 PFHx		7.000	0.010		7/0014	FO 0		110	(0004	
		7.892	-0.010		768814	59.2		118	68994	
7 Perfluorohex		7.894	0.012	1 000	768564	48.7		97.5	4712	
313.0 > 269.0				1.000	708004	48.7		97.5	4/12	
22 PFPeS (Per 349.0 > 80.0			-0.141	0 072	276820	NC			25827	
		0.099	-0.141	0.672	270620	IVC			23027	
D 8 13C4-PFHp 367.0 > 322.0		9.101	-0.013		817588	56.1		112	71154	
			-0.013		017500	50.1		112	71154	
9 Perfluorohep 363.0 > 319.0	9.088	9.102	-0.014	1.000	776439	50.6		101	1584	
D 11 1802 PFH		7.102	-0.014	1.000	770437	30.0		101	1304	
403.0 > 84.0	9.123	9 135	-0.012		473365	49.7		105	41446	
10 Perfluorohe			0.012		470000	77.7		100	71770	
399.0 > 80.0		9.138	-0.015	1.000	286211	NC			1137	
41 Perfluorohe				1.000	200211	140			1137	
399.0 > 80.0		9.138		1.000	286211	49.2		104		
0,7.0 / 00.0	7.120	7.100	5.010		Page 439 of 52	6		101	04/01	/2016

Report Date: 01-Apr-2016 09:57:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_077b.d										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFC 417.0 > 372.0	DA 10.196	10.214	-0.018		802501	51.1		102	61629	
13 Perfluorood 413.0 > 369.0	ctanoic ac 10.196		-0.020	1.000	895847	58.1		116	2842	
413.0 > 169.0 38 Perfluorohe	10.196 eptanesul			1.000	276012		3.25(0.00-0.00)		20598	
449.0 > 80.0 14 Perfluorohe		10.218 ulfonate	-0.016	1.000	305072	44.9		94.3		
D 16 13C4 PFC				1.000	305072	NC			24326	
15 Perfluorood		onic acid	d		867061	56.4		118	66078	
499.0 > 80.0 499.0 > 99.0	11.146	11.163 11.163		1.000 1.000	806717 481676	47.4	1.67(0.00-0.00)	99.1	432 37388	
	11.169		-0.014		630098	48.0		96.1	46798	
	11.169		-0.015	1.000	565240	55.0		110	3625	
D 19 13C2 PFD 515.0 > 470.0	12.000		-0.009		901513	53.3		107	62253	
20 Perfluorode 513.0 > 469.0 21 PFNS (Per	12.000	12.010		1.000	804049	47.2		94.5	21910	
•	11.960	12.145	-0.185	1.000	297423	NC			19600	
599.0 > 80.0 25 Perfluorode	12.651	12.657		1.000	349123	46.0		95.4		
599.0 > 80.0 24 Perfluorood	12.651	12.659		1.000	349123	NC			21310	
	12.660			1.000	2095661	58.7		117	2716	
506.0 > 78.0 D 26 13C2 PFU	12.660	12.660	0.0		1556227	52.4		105	2638	
565.0 > 520.0 27 Perfluorour	12.692		-0.016		982530	54.3		109	29258	
563.0 > 519.0 D 28 13C2 PFD	12.692		-0.016	1.000	872334	53.2		106	15061	
615.0 > 570.0 29 Perfluorodo	13.291		-0.014		1149738	55.5		111	87389	
613.0 > 569.0 31 PFDoS (Pe	13.291	13.305			963939	52.7		105	3740	
699.0 > 80.0 30 Perfluorotri	13.735	13.626	0.109		355010	NC			24289	
663.0 > 619.0 D 33 13C2-PFT	13.790		-0.017	1.000	1325676	48.6		97.3	1378	
715.0 > 670.0 32 Perfluorote	14.216		-0.021		1180923	54.9		110	14171	
713.0 > 669.0			-0.021	1.000	Page 440 of 526	50.9		102	³ 34/01	1/2016

Report Date: 01-Apr-2016 09:57:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohe 813.0 > 769.0	xadecan 14.868		-0.019	1.000	2317152	45.6		91.2	7734	
D 35 13C2-PFH 815.0 > 770.0	14.868	14.887	-0.019		2018242	55.6		111	13919	
36 Perfluorood 913.0 > 869.0	tandecar 15.198			1.000	2175821	42.8		85.5	6479	

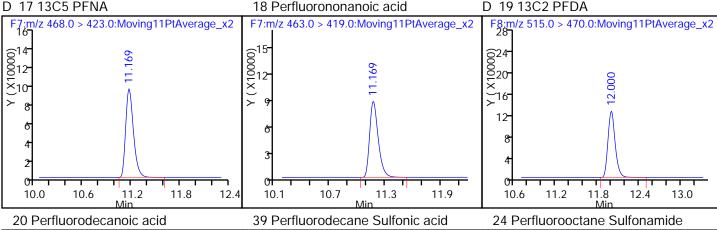
QC Flag Legend Processing Flags

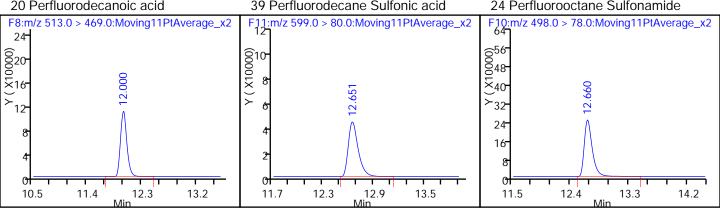
NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:57:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_077b.d **Injection Date:** 29-Mar-2016 20:24:14 Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 76 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 $F_{2,m}/z 267.9 > 223.0:Moving11PtAverage_x2$ (015 X) × 9 5.2 5.5 5.8 6.1 5.1 5.4 5.7 6.0 6.1 6.4 6.7 7.0 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 24 (000015 X) 12 6.3 6.6 6.9 7.2 6.2 6.5 6.8 7.1 7.4 7.2 7.5 7.8 8.1 8.4 6.0 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 24 21⁻ 00018 ×15⁻ 0001 0020 0 20 ×16 ×₁₆ 01 7.8 8.1 9.3 9.9 8.8 9.1 9.4 9.7 6.9 7.2 7.5 8.4 8.7 8.5 8.1 8.2 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 88**1** F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 21 (a) 14⁻ (b) 12⁻ 77- 0018 15-15-∑₁₀ ×55 44 33 22 0 0 8.7 9.3 9.9 8.2 9.1 9.7 10.3 04/01/2016 8.1





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13.5

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15.3

15.9

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Lab Sample ID: <u>CCV 320-104824/86</u> Calibration Date: <u>03/29/2016</u> 23:56

Instrument ID: A6 Calib Start Date: 03/28/2016 18:22

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29

Lab File ID: 28MAR2016A6A_087b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.404		21.4	20.0	7.2	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		1.003		21.1	20.0	5.6	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.019		20.0	17.7	13.0	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.082		21.2	20.0	6.0	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	0.9873		21.1	20.0	5.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6465		21.2	18.9	12.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	0.9577		19.9	20.0	-0.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.4474		23.0	19.0	20.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.019		20.9	19.1	9.1	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.7122		17.5	20.0	-12.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	1.054		22.3	20.0	11.6	25.0
Perfluorodecane Sulfonic acid	L1ID		0.4252		19.8	19.3	2.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.183		20.6	20.0	3.1	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8043		19.2	20.0	-4.2	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8546		21.7	20.0	8.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.041		17.6	20.0	-12.2	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.6085		20.7	20.0	3.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		2.846		20.4	20.0	2.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		2.700		24.5	20.0	22.3	25.0

Report Date: 01-Apr-2016 09:57:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_087b.d

Lims ID: CCV L4

Client ID:

Sample Type: CCV

Inject. Date: 29-Mar-2016 23:56:34 ALS Bottle#: 12 Worklist Smp#: 86

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: **JRB** Instrument ID: Α6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\\Sacramento\ChromData\A6\20160330-29478.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:45 Calib Date: 28-Mar-2016 20:29:35

Picker Integrator:

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

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host:	XAWI	RK016								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.583	5.587	-0.004		377004	48.5		96.9	20236	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.580	5.590	-0.010	1.000	211711	21.4		107	1219	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.661	6.672	-0.011		775659	51.0		102	6924	
4 Perfluoroper										
262.9 > 219.0	6.661	6.674	-0.013	1.000	311255	21.1		106	180	
5 Perfluorobut										
298.9 > 80.0		6.787	-0.011	1.000	182020	NC	1 47/0 00 0 00)		307	
298.9 > 99.0	6.776		-0.011	1.000	124078		1.47(0.00-0.00)		453	
40 Perfluorobu 298.9 > 80.0		onic acid 6.787		1.000	182020	20.0		110		
	6.776	0.787	-0.011	1.000	182020	20.0		113		
D 6 13C2 PFHx 315.0 > 270.0		7.892	0.010		640926	49.3		98.7	58124	
7 Perfluorohex			-0.010		040720	47.5		70.7	30124	
313.0 > 269.0		7.894	-0.012	1.000	277474	21.2		106	2147	
22 PFPeS (Per				1.000	2,,,,,	21.2		100	2	
349.0 > 80.0			-0.141	0.872	122813	NC			11103	
D 8 13C4-PFHp										
•		9.101	-0.013		745566	51.2		102	12037	
9 Perfluorohep	tanoic a	cid								
•		9.102	-0.008	1.000	294447	21.1		105	555	
D 11 1802 PFH	xS									
403.0 > 84.0	9.123	9.135	-0.012		477794	50.2		106	42375	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.138	-0.015	1.000	123566	NC			4464	
41 Perfluorohe	xanesulf	onic acio	t							
399.0 > 80.0	9.123	9.138	-0.015	1.000	123566 Page 446 of 52	21.2		112	04/01	/2016
					1 ago ++0 01 32	•			U -1 /U I	/2010

Report Date: 01-Apr-2016 09:57:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 0 Data File:	•			to\Chrom			04-Mar-2016 14:36 0\28MAR2016A6A_(
		EXP	DLT	REL		Amount				
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PF	OA									
417.0 > 372.0	10.196	10.214	-0.018		700033	44.6		89.1	18723	
13 Perfluoro			0.000	1 000	2/01/0	10.0		00.7	1020	
413.0 > 369.0 413.0 > 169.0		10.216		1.000 1.000	268168 80187	19.9	3.34(0.00-0.00)	99.7	1029 4228	
38 Perfluoro				1.000	00107		0.01(0.00 0.00)		1220	
449.0 > 80.0	10.203			1.000	120153	23.0		121		
14 Perfluoro	heptane Su	ulfonate								
449.0 > 80.0	10.203	10.218	-0.015	1.000	120153	NC			9573	
D 16 13C4 PF										
503.0 > 80.0		11.160			674260	43.8		91.7	52755	
15 Perfluoro				1 000	274712	20.0		100	207	
499.0 > 80.0 499.0 > 99.0		11.163 11.163		1.000 1.000	274712 143286	20.9	1.92(0.00-0.00)	109	297 11203	
D 17 13C5 PF		11.103	0.017	1.000	140200		1.72(0.00 0.00)		11200	
468.0 > 423.0		11.183	-0.014		571193	43.5		87.1	44225	
18 Perfluoro	nonanoic a	cid								
463.0 > 419.0	11.169	11.184	-0.015	1.000	162724	17.5		87.7	3604	
D 19 13C2 PF										
515.0 > 470.0	12.000	12.009	-0.009		573532	33.9		67.8	80371	
20 Perfluoro										
513.0 > 469.0				1.000	241740	22.3		112	8494	
21 PFNS (Pe 549.0 > 80.0		nonanesı 12.145		1.000	111860	NC			7385	
39 Perfluoro				1.000	111600	NC			7365	
599.0 > 80.0		12.657		1.000	115646	19.8		103		
25 Perfluoro			0.000			.,,,				
599.0 > 80.0			-0.008	1.000	115646	NC			7046	
24 Perfluoro	octane Sul	fonamide	9							
498.0 > 78.0	12.660	12.660	0.0	1.000	503924	20.6		103	6062	
D 23 13C8 FC	OSA									
506.0 > 78.0	12.660	12.660	0.0		1064969	35.8		71.7	2183	
D 26 13C2 PF										
565.0 > 520.0			-0.015		745440	41.2		82.5	30374	
27 Perfluoro			0.015	1 000	220025	10.0		05.0	021	
563.0 > 519.0		12.708	-0.015	1.000	239825	19.2		95.8	831	
D 28 13C2 PF 615.0 > 570.0		13 305	-0.013		801463	38.7		77.3	61898	
29 Perfluoro			0.013		001403	30.7		77.0	01070	
613.0 > 569.0			-0.013	1.000	273964	21.7		109	1932	
31 PFDoS (F										
699.0 > 80.0		13.626		1.000	136790	NC			9443	
30 Perfluoro	tridecanoic	acid								
663.0 > 619.0	13.791	13.807	-0.016	1.000	333789	17.6		87.8	1323	
D 33 13C2-PF										
715.0 > 670.0	14.218	14.237	-0.019		863844	40.2		80.3	7617	
32 Perfluoro			0.040	1 000	105070	00.7		400	222	
713.0 > 669.0	14.218	14.23/	-0.019	1.000	Page 447 of 52	26 ^{20.7}		103	² 32/01	/2016

Report Date: 01-Apr-2016 09:57:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohe 813.0 > 769.0	exadecan 14.870		-0.017	1.000	912366	20.4		102	4810	
D 35 13C2-PFH 815.0 > 770.0	IxDA 14.870	14.887	-0.017		1473454	40.6		81.1	11097	
36 Perfluorood 913.0 > 869.0	tandecar 15.197			1.000	865597	24.5		122	2319	

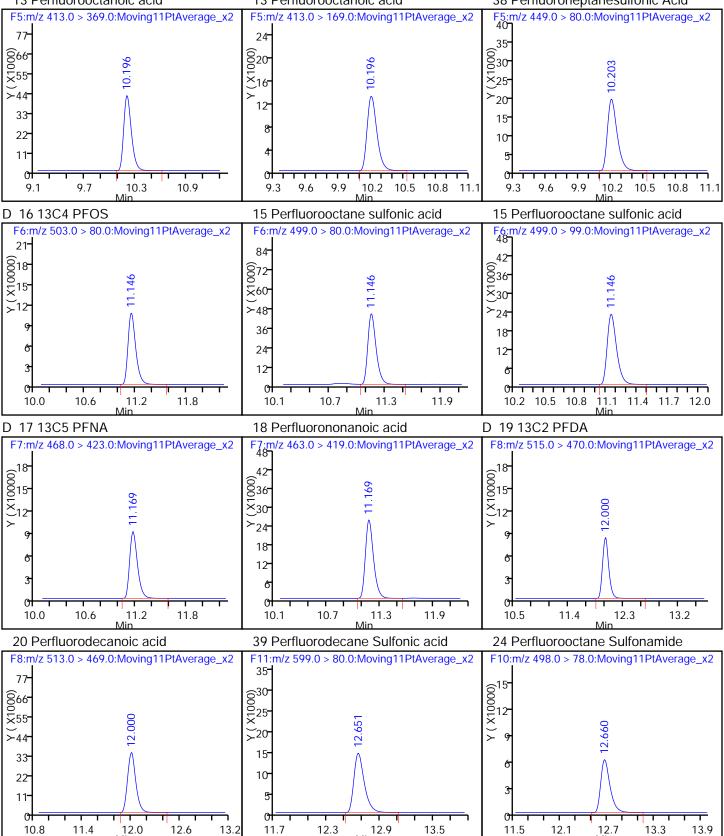
QC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:57:46 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_087b.d **Injection Date:** 29-Mar-2016 23:56:34 Instrument ID: Α6 Lims ID: CCV L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 86 15.0 ul Dil. Factor: Injection Vol: 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 63 621- 818-Y (X10000) 654 654 ×45 **≻**36 27 18 5.9 5.3 5.6 5.1 5.4 5.7 6.0 5.8 6.1 6.4 6.7 7.0 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage x2F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 56- 21 (X10000) 0018 15 (0048-0040-0040-<u></u>32 24 16 6.3 6.9 7.2 6.5 6.8 7.9 6.2 7.1 7.4 7.0 7.3 7.6 8.2 8.5 8.8 6.0 6.6 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 77 (24⁻ (00020-) 16⁻ 6'' 866 <u>666</u> ×55 \times 55 12 33 33 22 22 7.7 8.0 7.9 9.1 9.7 8.6 8.9 9.2 9.5 9.8 7.4 8.3 8.6 8.5 10.3 8.3 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 24 (14⁻ (20) (12⁻ 35 0 0 20 830**-**∑₁₀ ∑16 ×25 ≻20 12 15 10 0 0 04/01/201 8.5 8.8 9.1 9.4 Page 449 of 526 8.5 8.8 9.1 9.4 9.7 8.2 9.1 9.7 10.3 8.2 10.0



12

14.4

14.7

15.0

15.3

15.6

15.9

24

16

13.8

14.4

15.0

15.6

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Lab Sample ID: <u>ICV 320-105043/11</u> Calibration Date: <u>03/31/2016</u> 15:26

Instrument ID: A6 Calib Start Date: 03/31/2016 12:36

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/31/2016 14:43

Lab File ID: 31MAR2016B6B_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L1ID		1.276		53.4	50.0	6.8	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9112		51.8	50.0	3.5	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.022		53.0	50.0	6.0	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.003		56.6	50.0	13.1	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6275		50.7	47.3	7.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L1ID		0.3291		46.9	47.6	-1.5	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.072		52.3	50.0	4.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9618		53.7	47.8	12.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.9362		60.4	50.0	20.7	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.054		56.2	50.0	12.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.266	1.360		53.7	50.0	7.4	25.0
Perfluorodecane Sulfonic acid	L2ID		0.3603		47.8	48.3	-1.0	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8716		51.9	50.0	3.9	25.0
Perfluorododecanoic acid (PFDoA)	L1ID	0.7184	0.7962		49.7	50.0	-0.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.003	1.086		54.5	50.0	8.4	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID	0.6538	0.6429		55.1	50.0	10.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID	3.467	1.540		43.9	50.0	-12.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.823	1.594		43.2	50.0	-12.5	25.0

Report Date: 01-Apr-2016 09:48:01 Chrom Revision: 2.2 04-Mar-2016 14:36:24

> TestAmerica Sacramento **Target Compound Quantitation Report**

\\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_011.d Data File:

Lims ID: **ICV**

Client ID:

Sample Type: **ICV**

Inject. Date: 31-Mar-2016 15:26:19 ALS Bottle#: 16 Worklist Smp#: 11

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: **ICV**

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: **JRB** Instrument ID: Α6

Sublist: chrom-PFAC_A4*sub6

\\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\PFAC_A6.m Method:

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51

Picker Integrator:

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

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

Acquity BEH C18 (2.10 mm) Column 1: Det: F1:MRM

XAWRK016 Process Host:

2017 00.12.21

First Level Revie	wer: wes	stendorf	С		Date:	C	1-Apr-2016 09:13:3	1		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	yric acid									
212.9 > 169.0	5.610	5.599	0.011	1.000	363336	53.4			16460	
D 113C4 PFBA	Ą									
217.0 > 172.0	5.604	5.600	0.004		284687	40.7		81.4	33785	
4 Perfluoroper										
		6.681	-0.002	1.000	480170	51.8			641	
D 3 13C5-PFP6		4 401	0.002		F24042	40.2		00.4	24244	
267.9 > 223.0 5 Perfluorobut	6.679		-0.002		526962	40.2		80.4	34244	
298.9 > 80.0	ane Suii 6.790		-0.003	1.000	272913	NC			1870	
298.9 > 99.0		6.793		1.000	169586	110	1.61(0.00-0.00)		854	
40 Perfluorobu	tanesulfo	onic acid	d				,			
298.9 > 80.0	6.790	6.793	-0.003	1.000	272913	47.0				
7 Perfluorohex	kanoic ac	cid								
313.0 > 269.0	7.894	7.897	-0.003	1.000	513094	53.0			3430	
D 6 13C2 PFHx										
315.0 > 270.0	7.894	7.897			501967	43.5		87.1	45702	
22 PFPeS (Per		•		0.072	174071	NIC			15004	
349.0 > 80.0			-0.129	0.873	174071	NC			15884	
9 Perfluoroher 363.0 > 319.0	otanoic a 9.094		-0.002	1.000	528069	56.6			44236	
D 8 13C4-PFH		7.070	-0.002	1.000	320007	30.0			44230	
•	9.094	9.097	-0.003		526349	40.0		80.0	90530	
D 11 1802 PFH										
403.0 > 84.0		9.130	-0.001		308704	39.4		83.3	26642	
10 Perfluorohe	xane Su	lfonate								
399.0 > 80.0	9.123	9.137	-0.014	1.000	193506	NC			6798	
					Page 453 of \$	526			04/01	1/2016

Page 453 of 526

Report Date: 01-Apr-2016 09:48:01 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			o\ChromI			04-Mar-2016 14:36: \31MAR2016B6B_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
41 Perfluorohe 399.0 > 80.0	9.123	9.137		1.000	193506	50.7				
413.0 > 169.0	10.203 10.203	10.204		1.000 1.000	566745 205762	52.3	2.75(0.00-0.00)		1923 15991	
D 12 13C4 PFO 417.0 > 372.0	A 10.203	10.205	-0.002		528917	41.7		83.3	41436	
38 Perfluorohe 449.0 > 80.0	ptanesult 10.203			1.000	175422	46.9				
14 Perfluorohe 449.0 > 80.0	ptane Su 10.203		-0.005	1.000	175422	NC			13768	
D 16 13C4 PFO 503.0 > 80.0	S 11.146	11.149	-0.003		535284	39.7		83.1	0.0	
15 Perfluorooc					000201	07.7		00	0.0	
	11.146 11.146	11.152	-0.006	1.000 1.000	514312 301770	53.7	1.70(0.00-0.00)		461 24172	
D 17 13C5 PFN 468.0 > 423.0	A 11.169	11.171	-0.002		449526	44.2		88.4	34904	
18 Perfluorono 463.0 > 419.0			-0.009	1.000	420835	60.4			1463	
D 19 13C2 PFD 515.0 > 470.0	A 12.000	11.999	0.001		556159	41.8		83.7	77046	
20 Perfluorode 513.0 > 469.0	canoic ad		-0.014	1.000	586289	56.2			40184	
21 PFNS (Perf	louro-1-n	onanesı	ulfonate)							
549.0 > 80.0 D 23 13C8 FOS	11.951		-	1.000	179243	NC			11887	
506.0 > 78.0	12.640				990117	40.1		80.2	2963	
24 Perfluorooc 498.0 > 78.0	tane Sult 12.640			1.000	1346266	53.7			2451	
39 Perfluorode 599.0 > 80.0	cane Sul 12.641			1.000	194654	47.8				
25 Perfluorode 599.0 > 80.0	cane Sul 12.641		-0.005	1.000	194654	NC			11925	
D 26 13C2 PFU 565.0 > 520.0		12 602	0.001		645700	42.8		85.5	38731	
27 Perfluoroun	decanoic	acid						03.3		
563.0 > 519.0 29 Perfluorodo			0.0	1.000	562777	51.9			2000	
613.0 > 569.0		13.287	0.005	1.000	575575	49.7			7900	
D 28 13C2 PFD 615.0 > 570.0	13.284				722952	40.1		80.2	22172	
31 PFDoS (Per 699.0 > 80.0	rflouro-1- 13.727			1.000	205785	NC			14111	
30 Perfluorotrio 663.0 > 619.0			-0.004	1.000	785417	54.5			3143	
D 33 13C2-PFT 715.0 > 670.0		14.215	-0.005		759032 Page 454 of 52	6 ^{43.5}		86.9	¹³ 04501	/2016
									, • !	

Report Date: 01-Apr-2016 09:48:01 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorote	tradecand	oic acid								
713.0 > 669.0	14.210	14.217	-0.007	1.000	464752	55.1			334	
D 35 13C2-PFH	IxDA									
815.0 > 770.0	14.863	14.866	-0.003		1228247	41.9		83.7	17092	
34 Perfluorohe	xadecan	oic acid								
813.0 > 769.0	14.863	14.866	-0.003	1.000	1113398	43.9			3325	
36 Perfluorooc	tandecar	noic acid								
913.0 > 869.0	15.197	15.199	-0.002	1.000	1152589	43.2			3255	

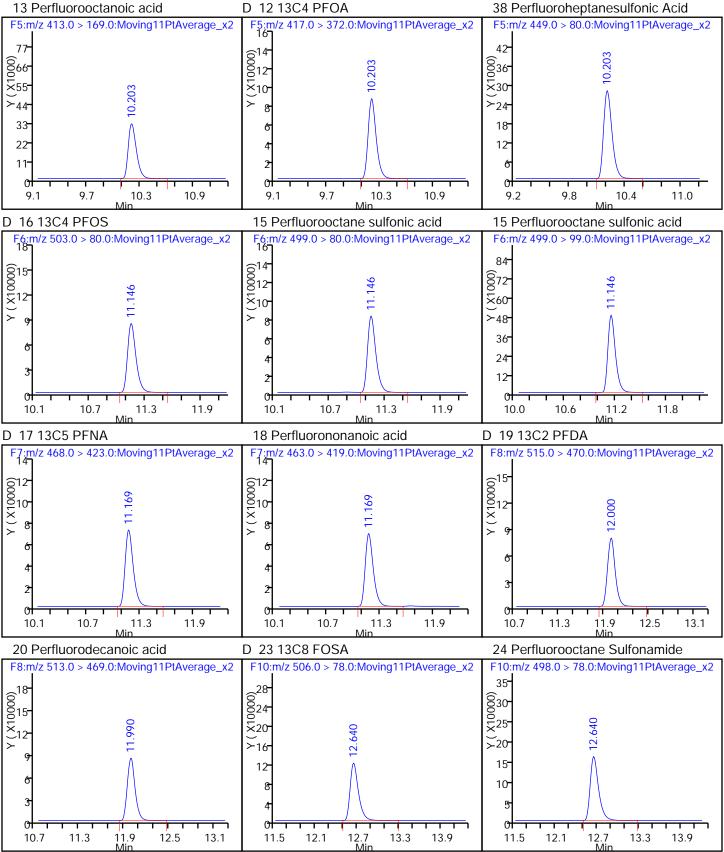
QC Flag Legend Processing Flags

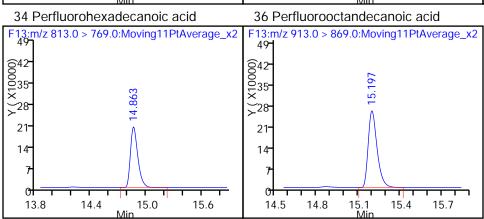
NC - Not Calibrated

Reagents:

LCPFCIC_00016 Amount Added: 1.00 Units: mL

Report Date: 01-Apr-2016 09:48:01 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_011.d **Injection Date:** 31-Mar-2016 15:26:19 Instrument ID: Α6 Lims ID: **ICV** Client ID: Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 11 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2;m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 V (X10000) Y (X10000) 6014° 6012° 5.2 5.9 5.9 6.2 5.5 5.8 6.1 5.0 5.3 5.6 6.5 6.8 7.1 7.4 D 3 13C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 18 × (×10000) × (×100000) 8 ×55 33 22 11 6.9 6.3 7.5 6.5 6.8 7.1 7.4 7.9 8.2 8.5 7.0 7.3 7.6 8.8 5.7 6.2 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 14 14 (00001. 100001 (00001x) × (0012 X) 7.6 7.9 8.8 9.1 9.7 8.8 9.1 9.4 9.7 7.3 8.2 8.5 8.5 9.4 8.2 8.5 8.2 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 13 Perfluorooctanoic acid F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 84 (18⁻ 000 15⁻ 56 ©72 6 8 48 ×60 \times_{40} ×48 ≻32 36 24 24 16 0 0 8.6 8.9 9.2 9.5 Page 456 of 526 8.8 9.1 9.4 9.7 8.3 9.8 8.7 9.6 10.5 8.2 8.5 10.0





FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Lab Sample ID: <u>CCV 320-105043/16</u> Calibration Date: <u>03/31/2016</u> 17:12

Instrument ID: A6 Calib Start Date: 03/31/2016 12:36

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/31/2016 14:43

Lab File ID: 31MAR2016B6B_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L1ID		1.368		23.0	20.0	15.0	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9192		20.8	20.0	4.0	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9272		19.5	20.0	-2.6	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.8669		19.6	20.0	-1.9	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6234		20.5	18.9	8.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L1ID		0.3781		21.8	19.0	14.3	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.076		21.3	20.0	6.4	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9298		20.8	19.1	8.8	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.9571		25.0	20.0	24.9	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.106		23.9	20.0	19.6	25.0
Perfluorodecane Sulfonic	L2ID		0.3723		20.1	19.3	4.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.266	1.256		19.8	20.0	-0.8	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		1.031		24.3	20.0	21.4	25.0
Perfluorododecanoic acid (PFDoA)	L1ID	0.7184	0.7606		19.1	20.0	-4.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.003	1.048		21.0	20.0	4.5	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID	0.6538	0.5842		19.8	20.0	-1.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID	3.467	2.019		20.8	20.0	4.0	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.823	2.307		25.0	20.0	26.6*	25.0

Report Date: 01-Apr-2016 09:48:49 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_016.d

Lims ID: CCV L4

Client ID:

Sample Type: CCV

Inject. Date: 31-Mar-2016 17:12:31 ALS Bottle#: 12 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:48 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Revie	wer: wes	stendorf	2		Date: 01-Apr-2016 09:03:59					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	vric acid									
212.9 > 169.0	5.598	5.599	-0.001	1.000	198026	23.0		115	8693	
D 113C4 PFBA	Ą									
217.0 > 172.0	5.601	5.600	0.001		361848	51.7		103	77601	
4 Perfluoroper										
262.9 > 219.0	6.684	6.681	0.003	1.000	243489	20.8		104	213	
D 3 13C5-PFP6										
267.9 > 223.0	6.679	6.681	-0.002		662263	50.5		101	62126	
5 Perfluorobut				1 000	100070	NO			000	
298.9 > 80.0 298.9 > 99.0	6.789 6.789	6.793 6.793	-0.004 -0.004	1.000 1.000	182372 112410	NC	1 (2(0 00 0 00)		989 513	
				1.000	112410		1.62(0.00-0.00)		313	
40 Perfluorobu 298.9 > 80.0	6.789			1.000	182372	23.3		132		
7 Perfluorohex			-0.004	1.000	102372	23.3		132		
313.0 > 269.0		7.897	-0.010	1.000	223810	19.5		97.4	3011	
D 6 13C2 PFHx		,,,,,,	0.0.0			. , , ,				
315.0 > 270.0	7.893	7.897	-0.004		603454	52.3		105	54667	
22 PFPeS (Per	rflouro-1-	pentane	sulfonat							
349.0 > 80.0		•	-0.130	0.873	101019	NC			9264	
9 Perfluoroher	otanoic a	cid								
363.0 > 319.0	9.094	9.096	-0.002	1.000	249606	19.6		98.1	14408	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.094	9.097	-0.003		719801	54.7		109	64250	
D 11 18O2 PFH	xS									
403.0 > 84.0	9.129	9.130	-0.001		416138	53.1		112	36712	
10 Perfluorohe										
399.0 > 80.0	9.129	9.137	-0.008	1.000	103766	NC			0.0	
					Page 460 of 5	526			04/01	1/2016

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04/01/2016

Report Date: 01-Apr-2016 09:48:49 Chrom Revision: 2.2 04-Mar-2016 14:36:24

\\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_016.d Data File: **FXP** DI T REL **Amount** Signal **RT** RT Response ng/ml Ratio(Limits) %Rec S/N Flags RT RT 41 Perfluorohexanesulfonic acid 399.0 > 80.0 9.129 9.137 -0.008 103766 20.5 108 1.000 13 Perfluorooctanoic acid 277134 21.3 10.203 10.204 -0.001 106 1214 413.0 > 369.0 1.000 10.203 10.204 -0.001 77045 3.60(0.00-0.00) 6077 413.0 > 169.0 1.000 D 12 13C4 PFOA 417.0 > 372.0 10.203 10.205 -0.002 644187 50.7 101 50720 38 Perfluoroheptanesulfonic Acid 449.0 > 80.0 10.203 10.208 -0.005 1.000 103018 21.8 114 14 Perfluoroheptane Sulfonate 10.203 10.208 -0.005 NC 8303 449.0 > 80.0 1.000 103018 D 16 13C4 PFOS 503.0 > 80.0 11.146 11.149 -0.003 50.7 53828 683957 106 15 Perfluorooctane sulfonic acid 11.153 11.152 0.001 20.8 109 448 499.0 > 80.0 1.000 254377 499.0 > 99.0 11.146 11.152 -0.006 0.999 131337 1.94(0.00-0.00) 1584 D 17 13C5 PFNA 468.0 > 423.0 11.169 11.171 -0.002 505178 49.7 99.3 39442 18 Perfluorononanoic acid 915 463.0 > 419.0 11.169 11.178 -0.009 1.000 193411 25.0 125 D 19 13C2 PFDA 12.001 11.999 0.002 27528 515.0 > 470.0 589595 44.4 88.7 20 Perfluorodecanoic acid 513.0 > 469.0 12.001 12.004 -0.003 1.000 260896 23.9 120 4011 21 PFNS (Perflouro-1-nonanesulfonate) 549.0 > 80.0 11.951 12.145 -0.194 88801 NC 5776 1.000 D 23 13C8 FOSA 506.0 > 78.0 12.639 12.644 -0.005 93.7 2618 1157608 46.9 24 Perfluorooctane Sulfonamide 581374 498.0 > 78.0 12.650 12.646 0.004 1.000 19.8 99.2 2905 39 Perfluorodecane Sulfonic acid 599.0 > 80.0 12.641 12.646 -0.005 1.000 102701 20.1 104 25 Perfluorodecane Sulfonate 599.0 > 80.0 12.641 12.646 -0.005 102701 NC 6392 1.000 D 26 13C2 PFUnA 565.0 > 520.0 12.693 12.692 0.001 665802 44.1 88.2 6733 27 Perfluoroundecanoic acid 12.693 12.693 0.0 563.0 > 519.0 1.000 274507 24.3 121 2080 29 Perfluorododecanoic acid 613.0 > 569.0 13.284 13.287 -0.003 1.000 261876 19.1 95.5 8009 D 28 13C2 PFDoA 615.0 > 570.0 13.284 13.289 -0.005 860767 47.7 95.5 33587 31 PFDoS (Perflouro-1-dodecanesulfona 699.0 > 80.0 13.727 13.626 0.101 NC 8704 1.000 125875 30 Perfluorotridecanoic acid 13.782 13.786 -0.004 663.0 > 619.0 1.000 360767 21.0 105 3499 D 33 13C2-PFTeDA Page 461 of 526 50.5 1522/01/2016 715.0 > 670.0 14.210 14.215 -0.005 101

Report Date: 01-Apr-2016 09:48:49 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotet 713.0 > 669.0			-0.007	1.000	201145	19.8		98.8	175	
D 35 13C2-PFH 815.0 > 770.0		14.866	-0.003		1667231	56.8		114	10800	
34 Perfluorohe 813.0 > 769.0		0.0 0.0.0	-0.003	1.000	695227	20.8		104	1178	
36 Perfluorooc 913.0 > 869.0	tandecar 15.196			1.000	794206	25.0		125	2388	

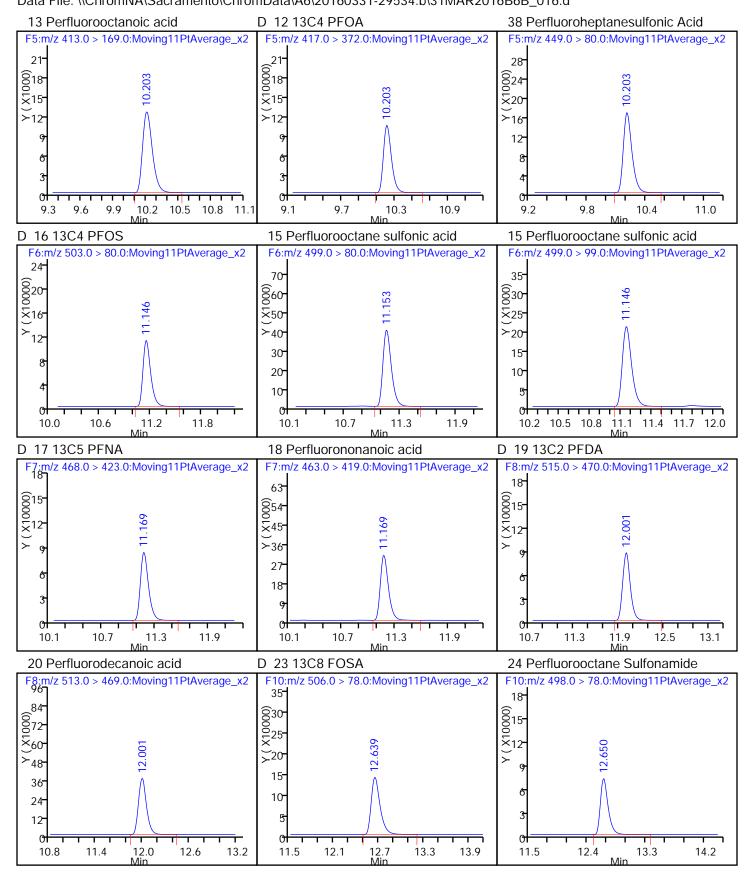
QC Flag Legend Processing Flags

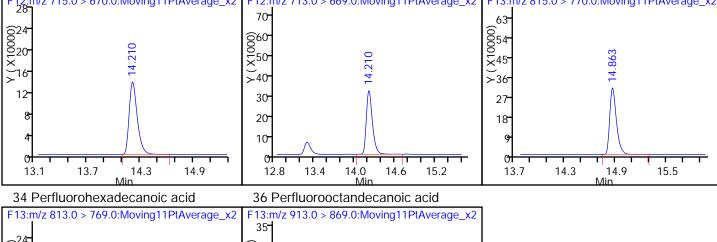
NC - Not Calibrated

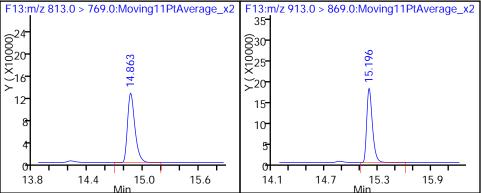
Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 04-Mar-2016 14:36:24 Report Date: 01-Apr-2016 09:48:49 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_016.d **Injection Date:** 31-Mar-2016 17:12:31 Instrument ID: Α6 Lims ID: CCV L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 16 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA 4 Perfluoropentanoic acid F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 V (X10000) 048 0048 ×40 <u></u>32⁺ 24 24 16 16 5.9 5.3 5.9 5.3 5.6 5.0 5.6 6.0 6.3 6.9 7.2 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid D 3 13C5-PFPeA F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 63 63 (00015-X)12-6.679 0054 ×45 054**-**1×45**-**<u>~</u>36- **≻**36 18 18 6.5 6.8 7.1 7.4 6.3 6.9 7.2 7.5 7.9 8.2 8.5 6.2 6.0 6.6 7.0 7.3 7.6 8.8 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 70 (18⁻ 000 15⁻ 6²⁴ 620 660-50-×50-×₁₆-∑40⁻ 30 20 7.6 7.9 8.2 8.5 8.8 9.1 9.4 9.7 8.7 9.3 9.9 7.3 8.5 8.1 D 11 1802 PFHxS 13 Perfluorooctanoic acid 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 12 30 (X10000) (X10000) 8₂₅ ×55 ×20-**≻**44 15 33 10 22 11 0| 0 $^{\circ}$ 8.5 8.8 9.1 9.4 9.7 8.0 8.6 Page 466h of 526 9.8 9.2 9.8 10.4 04/01/201 8.2 10.0







FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 SDG No.: Lab Sample ID: MB 320-104553/1-A Client Sample ID: Matrix: Water Lab File ID: 28MAR2016A6A_078b.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 03/28/2016 10:11 Extraction Method: 3535 Sample wt/vol: 500(mL) Date Analyzed: 03/29/2016 20:45 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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.00217	J	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	Ū	0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	Ū	0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	123		25-150
STL00990	13C4 PFOA	109		25-150
STL00995	13C5 PFNA	116		25-150
STL00994	1802 PFHxS	110		25-150
STL00991	13C4 PFOS	128		25-150

Report Date: 01-Apr-2016 10:39:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_078b.d

Lims ID: MB 320-104553/1-A

Client ID:

Sample Type: MB

Inject. Date: 29-Mar-2016 20:45:27 ALS Bottle#: 6 Worklist Smp#: 77

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: mb 320-104553/1-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 10:38:45 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 10:33:17

FIRST Level Revi	ewer: wes	stendone	C		Date:	Date: 01-Apr-2016 10:33:17				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB	Α									
217.0 > 172.0	5.582	5.587	-0.005		391584	50.3		101	44870	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.665	6.672	-0.007		838741	55.2		110	80070	
4 Perfluorope										
262.9 > 219.0		6.674	-0.009	1.000	7551	0.4716			7.1	
5 Perfluorobu			0.005	1 000	0.405	NO			F 0	
298.9 > 80.0 298.9 > 99.0	6.762 6.762	6.787 6.787	-0.025	1.000 1.000	2435 1053	NC	2.31(0.00-0.00)		5.0 17.4	
40 Perfluorobi				1.000	1055		2.31(0.00-0.00)		17.4	
298.9 > 80.0		6.787		1.000	2435	0.3945				
D 613C2 PFH		0.707	0.020	1.000	2.00	0.0710				
315.0 > 270.0		7.892	-0.005		707472	54.5		109	62612	
7 Perfluorohe	xanoic ac	cid								
313.0 > 269.0	7.887	7.894	-0.007	1.000	2573	0.3455			259	
D 8 13C4-PFH	pA									
367.0 > 322.0	9.088	9.101	-0.013		899937	61.7		123	3504	
9 Perfluorohe	•									
363.0 > 319.0		9.102	-0.002	1.000	2657	0.1574			11.0	
D 11 1802 PFF		0.405	0.010		105///	50.4		440		
403.0 > 84.0		9.135	-0.012		495664	52.1		110	6226	
10 Perfluorohe			0.003	1 000	191	NC			2./	
399.0 > 80.0		9.138		1.000	191	NC			2.6	
41 Perfluorohe 399.0 > 80.0				1.000	191	0.2689				
D 12 13C4 PFC		7.130	-0.003	1.000	171	0.2007				
417.0 > 372.0		10 214	-0.018		901068	54.7		109	69492	
117.0 > 072.0	10.170	10.217	3.010		701000	01.7		107	0,1,2	

Report Date: 01-Apr-2016 10:39:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24

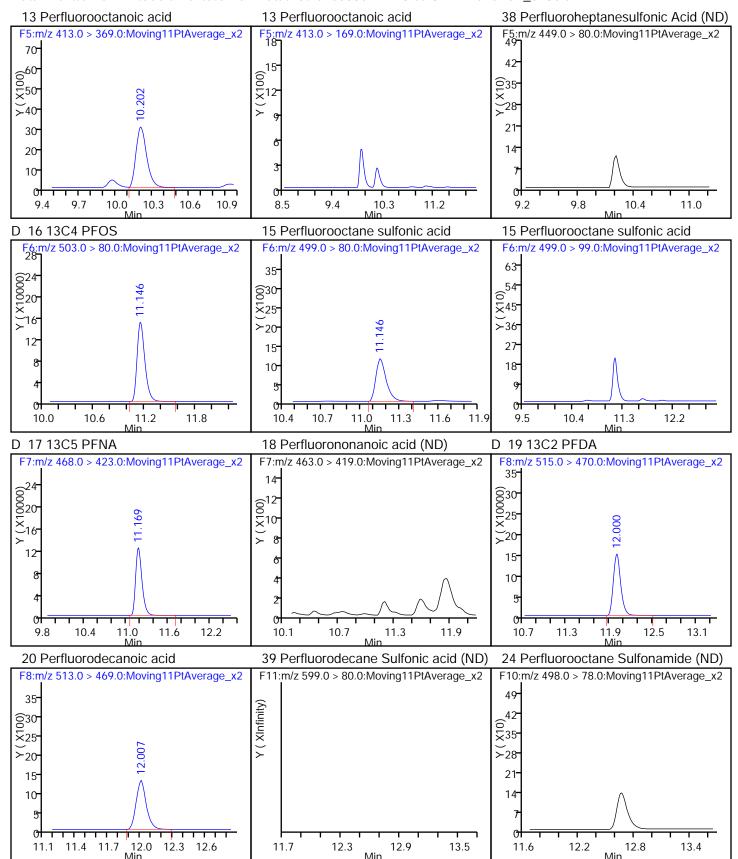
report bate, or A	01 2010 10.07.00	OHIOHI ICVIS	1011. Z.Z 0+ Wa	1 2010 17.5	0.27
Data File:	\\ChromNA\Sacramento\C	hromData\A6\20160330-	-29478.b\28MA	R2016A6A_	_078b.d

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanoic ac	id								
413.0 > 369.0	10.202	10.216	-0.014	1.000	18793	1.09			49.8	
D 16 13C4 PFO										
	11.146				944295	61.4		128	48902	
15 Perfluorooc				1 000	10/1	0.5457			107	
	11.146	11.163	-0.017	1.000	6261	0.5456			187	
D 17 13C5 PFN. 468.0 > 423.0	A 11.169	11 102	0.014		763557	58.2		116	59649	
19 13C2 PFD		11.103	-0.014		703337	30.2		110	37047	
	12.000	12.009	-0.009		1047092	61.9		124	73319	
20 Perfluorode										
513.0 > 469.0			-0.003	1.000	8386	0.4242			64.2	
D 23 13C8 FOS	Α									
506.0 > 78.0	12.660	12.660	0.0		682846	23.0		46.0	9186	
D 26 13C2 PFU										
	12.692		-0.016		1011080	55.9		112	61210	
27 Perfluoroun			0.047	4 000	7.400	0.0470				
563.0 > 519.0		12.708	-0.016	1.000	7438	0.2679			34.4	
D 28 13C2 PFD 615.0 > 570.0		12 205	0.014		1165685	56.2		112	59964	
D 33 13C2-PFT		13.303	-0.014		1103003	30.2		112	37704	
715.0 > 670.0		14.237	-0.020		1125994	52.4		105	44278	
32 Perfluorotet			0.020		,	02				
	14.217		-0.020	1.000	5110	0.0878			3.7	
34 Perfluorohe	xadecan	oic acid								
813.0 > 769.0	14.868	14.887	-0.019	1.000	411645	-2.12			1846	
D 35 13C2-PFH	xDA									
815.0 > 770.0	14.868	14.887	-0.019		1835336	50.5		101	23787	
36 Perfluorooc										
913.0 > 869.0	15.200	15.214	-0.014	1.000	12342	0.4028			41.2	

OC Flag Legend Processing Flags

NC - Not Calibrated

Report Date: 01-Apr-2016 10:39:53 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_078b.d **Injection Date:** 29-Mar-2016 20:45:27 Instrument ID: Α6 Lims ID: MB 320-104553/1-A Client ID: Operator ID: **JRB** ALS Bottle#: 6 Worklist Smp#: 77 Injection Vol: 15.0 ul Dil. Factor: 1.0000 Method: PFAC_A6 LC PFC_DOD ICAL Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid (ND) D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 ()12 ()100010 (X) X 66 6 ×55 ∑44[.] 33 22 11 5.7 6.3 6.9 5.1 5.4 6.0 5.1 5.7 6.3 5.7 7.5 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 (00015 X)12 30 15- (0012-× × × 9 825 15 10 6.9 7.9 6.5 7.1 6.6 7.2 8.2 8.5 6.8 6.3 7.0 7.3 7.6 8.8 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 10 28-0024-18 <u>2</u>15 Y (X100) ×20 12 7.6 7.9 8.2 8.7 9.3 8.8 9.1 9.4 7.3 8.5 8.1 8.5 D 12 13C4 PFOA 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 49 24 × (×10000) × (×10000) 0020 ×16 42 © ×35 ∑28- 12 21 14 0 0 8.5 8.8 9.1 9.4 9.7 8.3 8.6 8.9 9.2 Page 469 of 526 9.5 9.8 9.1 9.7 10.3 04/01/2016 8.2 10.0



15.1

15.4

15.7

16.0

27

18

14.5

14.8

27-

13.6

14.2

14.8

15.4

16.0

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 SDG No.: Lab Sample ID: LCS 320-104553/2-A Client Sample ID: Matrix: Water Lab File ID: 28MAR2016A6A_079b.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 03/28/2016 10:11 Extraction Method: 3535 Sample wt/vol: 500(mL) Date Analyzed: 03/29/2016 21:06 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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0409		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0380		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0417		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0307		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0385		0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0336		0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	109		25-150
STL00990	13C4 PFOA	104		25-150
STL00995	13C5 PFNA	112		25-150
STL00994	1802 PFHxS	94		25-150
STL00991	13C4 PFOS	116		25-150

Report Date: 01-Apr-2016 09:57:37 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_079b.d

Lims ID: LCS 320-104553/2-A

Client ID:

Sample Type: LCS

Inject. Date: 29-Mar-2016 21:06:42 ALS Bottle#: 7 Worklist Smp#: 78

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: lcs 320-104553/2-a

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	1									
217.0 > 172.0	5.580	5.587	-0.007		395246	50.8		102	41494	
2 Perfluorobut	yric acid									
212.9 > 169.0	•	5.590	-0.010	1.000	211640	20.5		102	23472	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.661	6.672	-0.011		829646	54.6		109	78263	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.661	6.674	-0.013	1.000	299900	19.0		95.2	300	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0			-0.010	1.000	123042	NC			343	
298.9 > 99.0			-0.010	1.000	84981		1.45(0.00-0.00)		401	
40 Perfluorobu				4 000	100010	45.0		0.4 7		
298.9 > 80.0		6.787	-0.010	1.000	123042	15.3		86.7		
D 6 13C2 PFHx		7.000	0.010		404000	F0.0		10/	(00/0	
		7.892	-0.010		686230	52.8		106	62969	
7 Perfluorohex			0.010	1 000	2/1752	10.7		02.5	//11	
	7.882			1.000	261753	18.7		93.5	6611	
22 PFPeS (Per 349.0 > 80.0		•	sultonat -0.140	0.072	99839	NC			9316	
		8.099	-0.140	0.873	99839	IVC			9316	
D 8 13C4-PFH _k 367.0 > 322.0		9.101	-0.013		796487	54.6		109	69519	
			-0.013		790407	34.0		109	09319	
9 Perfluoroher 363.0 > 319.0			-0.014	1.000	305157	20.4		102	977	
		9.102	-0.014	1.000	303137	20.4		102	911	
D 11 18O2 PFH 403.0 > 84.0	x5 9.117	0 125	-0.018		421723	44.3		93.7	37376	
			-0.010		421723	44.5		73.7	37370	
10 Perfluorohe 399.0 > 80.0		9.138	-0.015	1.000	98950	NC			2931	
41 Perfluorohe				1.000	70730	IVC			Z 7 J I	
399.0 > 80.0		9.138		1.000	98950	19.2		102		
377.07 00.0	7.120	7.100	5.015	1.000	70700	17.2		102		

Report Date: 01-Apr-2016 09:57:37 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:				o\ChromI			\28MAR2016A6A_0	79b.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0		10.214	-0.018		815667	51.9		104	63014	
	tanoic ad 10.202 10.202	10.216		1.000 1.000	298144 111413	19.0	2.68(0.00-0.00)	95.1	1860 1951	
38 Perfluorohe 449.0 > 80.0	•	fonic Aci 10.218		1.000	105111	16.1	,	84.5		
	10.202		-0.016	1.000	105111	NC			8594	
D 16 13C4 PFO 503.0 > 80.0 15 Perfluorooc	11.146				849559	55.2		116	44694	
499.0 > 80.0 499.0 > 99.0	11.146 11.146	11.163 11.163	-0.017	1.000 1.000	277703 155988	16.8	1.78(0.00-0.00)	87.8	871 8275	
	11.168		-0.015		731318	55.8		112	28497	
18 Perfluorono 463.0 > 419.0 D 19 13C2 PFD	11.168		-0.016	1.000	247886	20.9		104	657	
515.0 > 470.0 20 Perfluorode	11.999		-0.010		866080	51.2		102	39795	
	11.999	12.010		1.000	332644	20.3		102	22793	
549.0 > 80.0 39 Perfluorode	11.960	12.145	-0.185	1.000	114778	NC			7714	
599.0 > 80.0 25 Perfluorode	12.650	12.657		1.000	123579	16.8		87.4		
599.0 > 80.0 24 Perfluorooc		12.659 fonamide		1.000	123579	NC			7567	
498.0 > 78.0 D 23 13C8 FOS	12.659 6A	12.660	-0.001	1.000	428249	23.6		118	5104	
506.0 > 78.0 D 26 13C2 PFU	12.659 nA	12.660	-0.001		791817	26.6		53.3	1729	
565.0 > 520.0 27 Perfluoroun	decanoio	c acid			915570	50.6		101	36841	
563.0 > 519.0 D 28 13C2 PFD	οΑ			1.000	353229	23.0		115	2072	
615.0 > 570.0 29 Perfluorodo	decanoio	c acid			1158253	55.9		112	9812	
613.0 > 569.0 31 PFDoS (Pe	rflouro-1-	-dodecar	nesulfona		373836	20.5		103	3618	
30 Perfluorotrio		acid		1.000	133119	NC		0.4.4	9188	
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	518302	18.9		94.4	366	
715.0 > 670.0 32 Perfluorotel	tradecan	oic acid		1 000	1099560	51.1		102	34423	
713.0 > 669.0	14.216	14.23/	-U.UZ I	1.000	Page 474 of 526) ZU.U		99.8	² 08/01	1/2016

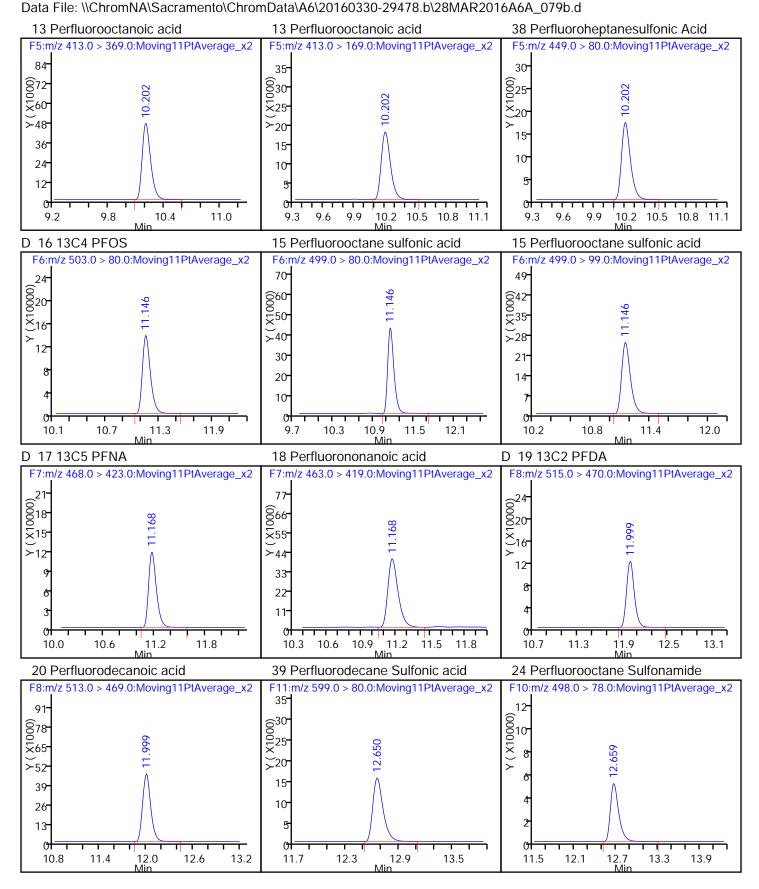
Report Date: 01-Apr-2016 09:57:37 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A 079b.d

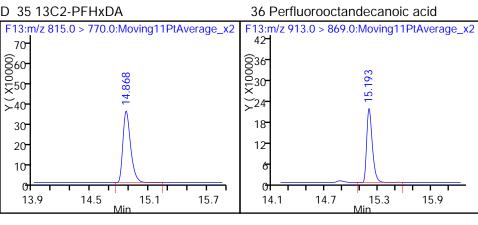
Data i iie.	WOTH	JIIIVA	aciamen	COCHION	IDala (AU)20 100	1330-27470.D	1201VIANZUTUAUA_C	77 7D.U		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohe 813.0 > 769.0	exadecan 14.868		-0.019	1.000	1120974	15.5		77.6	4396	
D 35 13C2-PFH 815.0 > 770.0	14.868	14.887	-0.019		1967522	54.2		108	11074	
36 Perfluorooc 913.0 > 869.0	tandecar 15.193			1.000	942386	18.5		92.4	2041	

QC Flag Legend Processing Flags

NC - Not Calibrated

Report Date: 01-Apr-2016 09:57:37 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_079b.d **Injection Date:** 29-Mar-2016 21:06:42 Instrument ID: Α6 Lims ID: LCS 320-104553/2-A Client ID: Operator ID: **JRB** ALS Bottle#: 7 Worklist Smp#: 78 15.0 ul Dil. Factor: 1.0000 Injection Vol: LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2;m/z 267.9 > 223.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 56- √ (X10000) % 621° 6218° <u>648</u> ∑40 **≻**32 24 16 5.2 5.5 5.8 6.1 5.8 6.1 6.1 6.4 6.7 7.0 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 21-00018 ×15 70 35 <u>830</u> 860 ×50 ×25- ≻40 **≻20** 30 15 20 10 10 6.9 7.2 6.8 7.9 6.3 6.2 6.5 7.1 7.0 7.3 7.6 8.2 8.5 8.8 7 Perfluorohexanoic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 63 024 0020 84 ©54**-**872 ×45 ×₁₆-×60 **≻**36 27 36 18 24 12 7.9 9.3 8.9 9.2 9.5 9.8 7.3 7.6 8.2 8.5 8.7 8.6 8.1 8.3 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 28 6²¹ 6218 (X10000) × (X10000) × (X10000) 6001 ×20-∑16⁻ 12 0 0 8.6 8.9 9.2 9.5 Page 4766 of 526 8.5 8.8 9.1 9.4 9.7 8.3 9.8 9.1 9.7 10.3 04/01/201 8.2 10.0





FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 MS Lab Sample ID: 320-17859-4 MS

Matrix: Water Lab File ID: 28MAR2016A6A_084b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 530.7(mL) Date Analyzed: 03/29/2016 22:52

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.111		0.0024	0.0019	0.00076
375-95-1	Perfluorononanoic acid (PFNA)	0.0427		0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0591		0.0024	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.552	M 4	0.0024	0.0019	0.00082

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	85		25-150
STL00990	13C4 PFOA	64		25-150
STL00995	13C5 PFNA	69		25-150
STL00994	1802 PFHxS	99		25-150
STL00991	13C4 PFOS	62		25-150

Report Date: 01-Apr-2016 09:57:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_084b.d

Lims ID: 320-17859-A-4-B MS Client ID: 0F-HP01-0316

Sample Type: MS

Inject. Date: 29-Mar-2016 22:52:52 ALS Bottle#: 12 Worklist Smp#: 83

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-4-B MS

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:43:09

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:43:09)9				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.570	5.587	-0.017		164582	21.2		42.3	20456	
2 Perfluorobut	yric acid									
•	5.570	5.590	-0.020	1.000	217734	50.0		250	36.4	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.648	6.672	-0.024		550540	36.2		72.5	4796	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.643	6.674	-0.031	1.000	771438	73.8		369	81.7	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0		6.787	-0.029	1.000	267269	NC			35.0	
298.9 > 99.0	6.758	6.787	-0.029	1.000	155411		1.72(0.00-0.00)		138	
40 Perfluorobu										
298.9 > 80.0	6.758	6.787	-0.029	1.000	267269	31.4		178		
D 613C2 PFHx										
		7.892	-0.022		528247	40.7		81.3	48872	
7 Perfluorohex				1 000	1750015	4/0.0		0.1.0		
313.0 > 269.0		7.894		1.000	1759345	162.0		810	277	
22 PFPeS (Per					005000	NO				
		8.099	-0.153	0.872	235200	NC			690	
D 8 13C4-PFHp		0.404	0.004		/ 20 44 7	40.7		05.4	FF4FF	
	9.077		-0.024		620417	42.6		85.1	55155	
9 Perfluorohep			0.005	1 000	10////	F0.0		205	240	
		9.102	-0.025	1.000	686666	59.0		295	349	
D 11 18O2 PFH:		0.125	0.000		445204	47.0		00.0	20252	
403.0 > 84.0	9.112		-0.023		445284	46.8		98.9	39253	
10 Perfluorohe:			0.0	1 000	0	NIC			115	M
399.0 > 80.0		9.138		1.000	0	NC			115	M
41 Perfluorohe:				1 000	51600750 ·	-00 202 0		1540	0.41=	M
399.0 > 80.0	7.112	9.138	-0.026	1.000	Page 9480 of s	526 ^{233.0}		1549	04/01	1/2/016

Data File:	\\Chr	omNA\Sa	acrament	to\Chrom	Data\A6\2016033	0-29478.b)\28MAR2016A6A_(084b.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO										
417.0 > 372.0 13 Perfluorooc	10.189 tanoic ac		-0.025		502951	32.0		64.0	808	E
413.0 > 369.0		10.216		1.000 1.000	3911575 1297591	404.7	3.01(0.00-0.00)	2023	96.0 36.0	E
38 Perfluorohe	ptanesul	lfonic Ac	id				3.01(0.00 0.00)		30.0	
449.0 > 80.0 14 Perfluorohe	10.196		-0.022	1.000	198829	55.8		293		
	10.196		-0.022	1.000	198829	NC			186	
D 16 13C4 PFO 503.0 > 80.0		11.160	-0.014		453741	29.5		61.7	17184	
15 Perfluorooc	tane sulf	onic acid	k							EM
	11.146 11.146			1.000 1.000	10675587 4699752	1193.1	2.27(0.00-0.00)	6240	10614 6282	EM M
D 17 13C5 PFN	Α				450004	0.4.5	,	(0.4	47/50	
468.0 > 423.0 18 Perfluorono	11.169 nanoic a		-0.014		452934	34.5		69.1	17658	
463.0 > 419.0	11.162		-0.022	1.000	167062	22.7		113	6385	
D 19 13C2 PFD 515.0 > 470.0		12.009	-0.009		558868	33.0		66.1	15553	
20 Perfluorode 513.0 > 469.0	canoic a 12.000		-0.010	1.000	236010	22.4		112	3606	
21 PFNS (Perf				1.000	230010	22.7		112	3000	
549.0 > 80.0		12.145		1.000	136971	NC			87.6	
39 Perfluorode 599.0 > 80.0	cane Su 12.641			1.000	116517	29.5		153		
25 Perfluorode 599.0 > 80.0	cane Su 12.641		0.019	1.000	116517	NC			1022	
24 Perfluorooc				1.000	110317	NC			1022	
498.0 > 78.0		12.660	0.0	1.000	55133	17.8		88.8	3399	
D 23 13C8 FOS 506.0 > 78.0		12.660	0.0		135349	4.56		9.1	8279	
D 26 13C2 PFU 565.0 > 520.0		12.708	-0.015		599223	33.1		66.3	36639	
27 Perfluoroun	decanoio	c acid								
563.0 > 519.0 D 28 13C2 PFD		12.708	-0.015	1.000	214761	21.4		107	6558	
615.0 > 570.0	13.291		-0.014		562407	27.1		54.3	28742	
29 Perfluorodo 613.0 > 569.0			-0.022	1.000	184597	20.9		104	7358	
31 PFDoS (Per										
699.0 > 80.0 30 Perfluorotrio	13.726 decanoic		0.100	1.000	71616	NC			216	
663.0 > 619.0	13.781		-0.026	1.000	224958	16.9		84.4	1930	
D 33 13C2-PFT6 715.0 > 670.0		14.237	-0.020		381360	17.7		35.5	6697	
32 Perfluorotet			0.000	1 000	07/0/	147		70.4	200	
713.0 > 669.0	14.21/	14.23/	-0.020	1.000	Page 481 of 52	6 14./		73.4	² 84/0	1/2016

Report Date: 01-Apr-2016 09:57:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

Bata i noi	1101110	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	aoi airioi i		ibata ii to ibo i oo	000 27 17 0.0	1201111 11 120 101 101 1_0	70 1D.G		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohe 813.0 > 769.0			-0.018	1.000	304602	3.29		16.5	2494	
D 35 13C2-PFF 815.0 > 770.0		14.887	-0.025		503351	13.9		27.7	7699	
36 Perfluorood 913.0 > 869.0				1.000	185389	7.58		37.9	1106	

OC Flag Legend Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

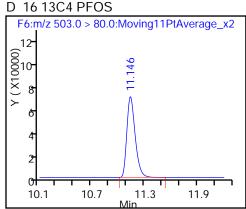
Review Flags

M - Manually Integrated

Report Date: 01-Apr-2016 09:57:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_084b.d **Injection Date:** 29-Mar-2016 22:52:52 Instrument ID: Α6 Lims ID: 320-17859-A-4-B MS Client ID: OF-HP01-0316 Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 83 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 63 654-001 ×45-6 848 $\stackrel{\smile}{\times}_{40}$ ∑36**-**27 24 18 16 5.9 5.3 5.6 5.1 5.4 5.7 6.0 6.1 6.4 6.7 7.0 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 18 0024 0020 70 060 ×50 ≻₄₀-30 20 10 6.5 7.1 6.8 7.9 6.2 6.8 7.4 6.5 7.1 7.4 7.0 7.3 7.6 8.2 8.5 8.8 6.2 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 ©⁵⁶ ©48 (00015-X) (00015-00015-012-×40 ≻₃₂-16 01 7.7 8.0 8.7 9.3 9.9 9.0 9.3 7.4 8.3 8.6 8.4 8.7 9.6 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 12 ©35 ©30 (X10000) (X10000) (6)14° (6)12° (1)2° ×25 ≻20 15 10 0 0 0 8.5 8.8 9.1 9.4 9.7 7.5 8.4 Page 486 of 526 10.2 9.4 10.0 10.6 8.2 10.0 8.8

9.8

9.2

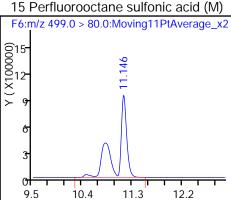


9.3

9.6

9.9

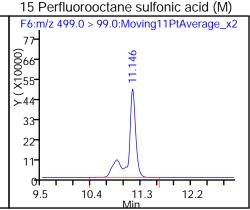
10.2 10.5 10.8 11.1



10.4

11.0

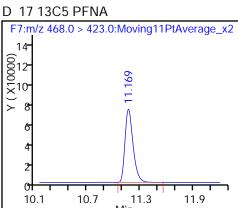
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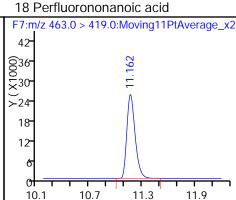


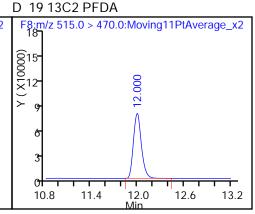
10.4

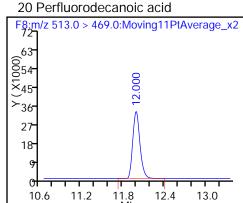
11.0

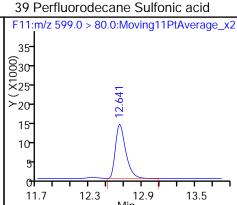
9.8

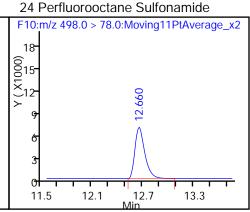












36-24-12-

14.3 14.6

14.9

15.2 15.5 15.8 16.1

14.0 14.3

14.6

14.9 15.2 15.5 15.8

Report Date: 01-Apr-2016 09:57:42 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_084b.d

Injection Date: 29-Mar-2016 22:52:52 Instrument ID: A6

Lims ID: 320-17859-A-4-B MS Client ID: 0F-HP01-0316

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 83

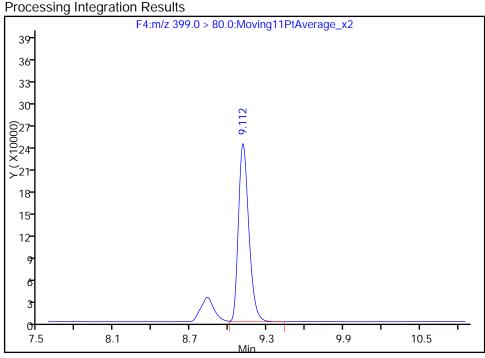
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

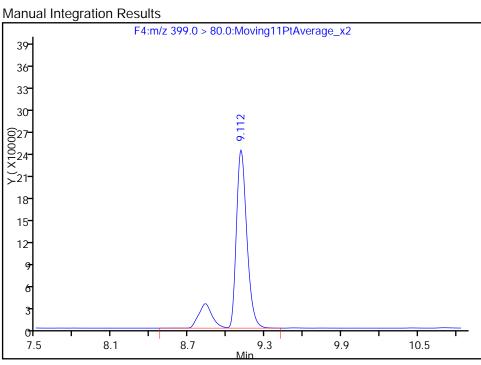
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

RT: 9.11 Area: 1368257 Amount: 249.0785 Amount Units: ng/ml



RT: 9.11
Area: 1609729
Amount: 292.9943
Amount Units: ng/ml



Reviewer: westendorfc, 30-Mar-2016 15:45:37

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 MS DL Lab Sample ID: 320-17859-4 MS DL

Matrix: Water Lab File ID: 31MAR2016B6B_013.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 530.7(mL) Date Analyzed: 03/31/2016 16:08

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

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

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

Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.709	D 4	0.012	0.0094	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.07	D M 4	0.019	0.014	0.0060

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	114		25-150
STL00990	13C4 PFOA	100		25-150
STL00995	13C5 PFNA	102		25-150
STL00994	1802 PFHxS	144		25-150
STL00991	13C4 PFOS	96		25-150

Report Date: 01-Apr-2016 09:48:27 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d

Lims ID: 320-17859-A-4-B MS Client ID: 0F-HP01-0316

Sample Type: MS

Inject. Date: 31-Mar-2016 16:08:47 ALS Bottle#: 13 Worklist Smp#: 13

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-17859-A-4-B MS5x SD

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 09:18:27

First Level Revie	wer: wes	stendorfo			Date:	0)1-Apr-2016 09:18:2	7		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobut	vric acid									
212.9 > 169.0	5.597	5.599	-0.002	1.000	79357	13.5		337	28.0	
D 113C4 PFBA										
217.0 > 172.0	、 5.591	5.600	-0.009		49758	7.11		14.2	4695	
4 Perfluoroper	ntanoic a	cid								
•	6.672	6.681	-0.009	1.000	171927	13.9		349	76.8	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.672	6.681	-0.009		139032	10.6		21.2	2123	
5 Perfluorobut	ane Sulfo	onate								
298.9 > 80.0	6.779		-0.014	1.000	51272	NC			49.0	
298.9 > 99.0	6.779	6.793	-0.014	1.000	33413		1.53(0.00-0.00)		86.2	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	6.779	6.793	-0.014	1.000	51272	5.11		144		
7 Perfluorohex	anoic ac	id								
313.0 > 269.0	7.887	7.897	-0.010	1.000	430003	38.5		961	238	
D 613C2 PFHx	:Α									
315.0 > 270.0	7.892	7.897	-0.005		116313	10.1		20.2	4780	
22 PFPeS (Per	flouro-1-	pentane	sulfonat							
349.0 > 80.0	7.963	8.099	-0.136	0.873	39711	NC			1769	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0	9.095	9.096	-0.001	1.000	162520	12.3		308	344	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.095	9.097	-0.002		149539	11.4		22.7	13331	
D 11 1802 PFH	xS									
403.0 > 84.0	9.124	9.130	-0.006		106704	13.6		28.8	18240	
10 Perfluorohe	xane Sul	fonate								
399.0 > 80.0	9.124	9.137	-0.013	1.000	272398	NC			3648	
41 Perfluorohe										M
399.0 > 80.0	9.124	9.137	-0.013	1.000	Page 488 of 52	26 47.2		1247	04/01	<i>№</i> 016

Report Date: 01- Data File:				to\Chrom			04-Mar-2016 14:36 0\31MAR2016B6B_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc 413.0 > 369.0 413.0 > 169.0	10.204			1.000 1.000	979990 323178	75.2	3.03(0.00-0.00)	1880	74.2 53.9	
D 12 13C4 PFO 417.0 > 372.0		10.205	-0.008		126796	9.99		20.0	9883	
38 Perfluorohe 449.0 > 80.0	•	fonic Aci 10.208		1.000	35832	8.58		225		
14 Perfluorohe 449.0 > 80.0	•	ulfonate 10.208	-0.004	1.000	35832	NC			343	
D 16 13C4 PFO 503.0 > 80.0		11.149	0.005		124096	9.20		19.3	9423	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.147 11.147	onic acid 11.152 11.152	-0.005	1.000 1.000	2434207 1149998	219.2	2.12(0.00-0.00)	5733	77426 13102	M M M
D 17 13C5 PFN 468.0 > 423.0	A 11.170	11.171	-0.001		103531	10.2		20.4	7960	
18 Perfluorono 463.0 > 419.0	nanoic a 11.170		-0.008	1.000	38520	5.26		131	1035	
D 19 13C2 PFD 515.0 > 470.0	A 11.991	11.999	-0.008		104324	7.85		15.7	6981	
20 Perfluorode 513.0 > 469.0	canoic a 12.001		-0.003	1.000	48322	5.44		136	3469	
21 PFNS (Perf 549.0 > 80.0		nonanesu 12.145	-	1.000	16634	NC			254	
D 23 13C8 FOS 506.0 > 78.0		12.644	-0.001		35465	1.44		2.9	1489	
24 Perfluorooc 498.0 > 78.0	tane Sulf 12.653			1.000	18494	4.12		103	1138	
39 Perfluorode 599.0 > 80.0		lfonic aci 12.646		1.000	25577	6.00		156		
25 Perfluorode 599.0 > 80.0		lfonate 12.646	-0.001	1.000	25577	NC			1077	
D 26 13C2 PFU 565.0 > 520.0	nA 12.686	12.692	-0.006		96994	6.42		12.8	5947	
27 Perfluoroun 563.0 > 519.0			0.003	1.000	51187	5.81		145	2071	
29 Perfluorodo 613.0 > 569.0	decanoio	c acid		1.000	31432	3.53		88.3	1224	
D 28 13C2 PFD	οΑ			1.000						
615.0 > 570.0 31 PFDoS (Pe				a	116922	6.48		13.0	4583	
699.0 > 80.0 30 Perfluorotrio	13.737 decanoic		0.111	1.000	11247	NC			372	
663.0 > 619.0 D 33 13C2-PFT	13.783		-0.003	1.000	45690	3.92		98.1	705	
715.0 > 670.0	14.211		-0.004		84847	4.86		9.7	6625	
32 Perfluorotet 713.0 > 669.0			0.001	1.000	Page 489 of 52	26 ^{2.24}		56.0	189/0	1/2016

Report Date: 01-Apr-2016 09:48:27 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFF 815.0 > 770.0		14.866	-0.003		116515	3.97		7.9	5335	
34 Perfluoroho 813.0 > 769.0			-0.003	1.000	54581	-1.77		-44.3	2596	
36 Perfluorood 913.0 > 869.0	ctandecar 15.197			1.000	54978	2.55		63.7	274	

QC Flag Legend Processing Flags

NC - Not Calibrated

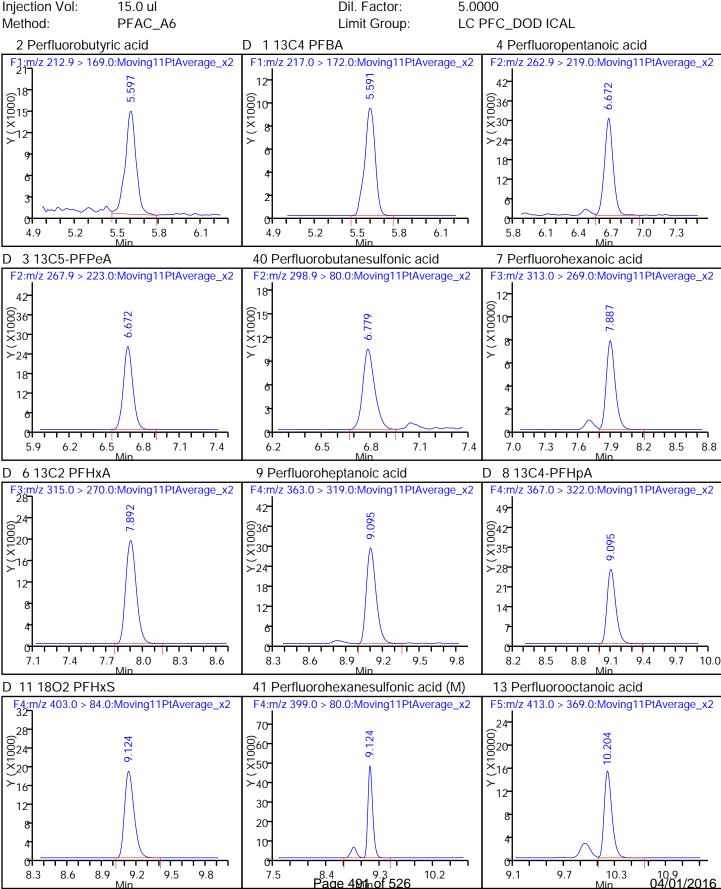
Review Flags

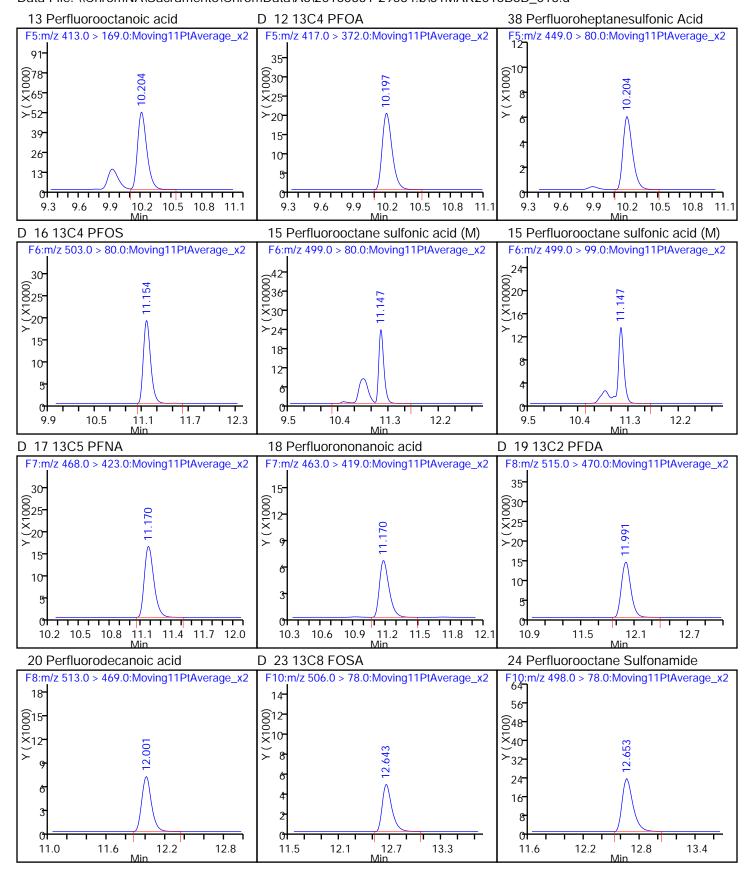
M - Manually Integrated

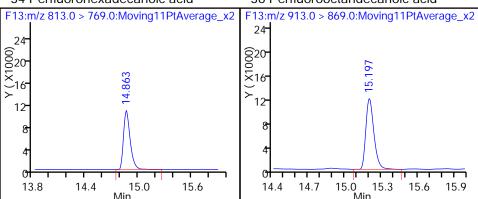
Report Date: 01-Apr-2016 09:48:27 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160331-29534.b\\31MAR2016B6B_013.d **Injection Date:** 31-Mar-2016 16:08:47 Instrument ID: Α6 Lims ID: 320-17859-A-4-B MS Client ID: OF-HP01-0316

Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 13

Dil. Factor: Injection Vol: 15.0 ul 5.0000







Report Date: 01-Apr-2016 09:48:27 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d

Injection Date: 31-Mar-2016 16:08:47 Instrument ID: A6

Lims ID: 320-17859-A-4-B MS Client ID: 0F-HP01-0316

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 13

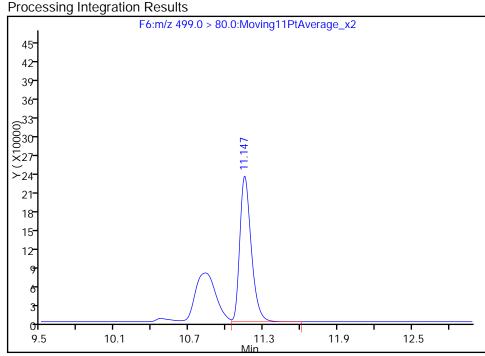
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

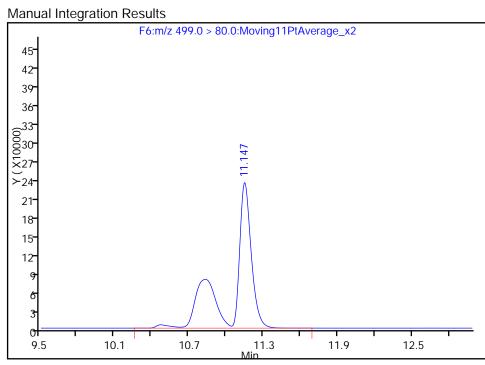
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 1494690 Amount: 134.6200 Amount Units: ng/ml



RT: 11.15
Area: 2434207
Amount: 219.2306
Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:18:27

Audit Action: Manually Integrated

Audit Reason: Isomers

Report Date: 01-Apr-2016 09:48:27 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d

Injection Date: 31-Mar-2016 16:08:47 Instrument ID: A6

Lims ID: 320-17859-A-4-B MS

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 13

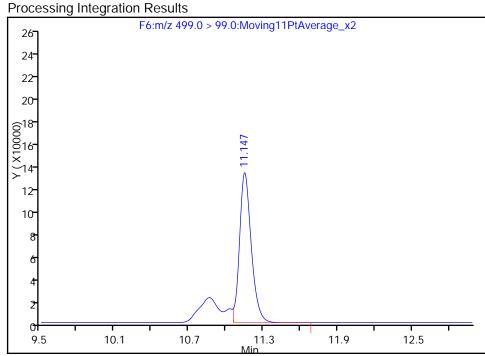
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

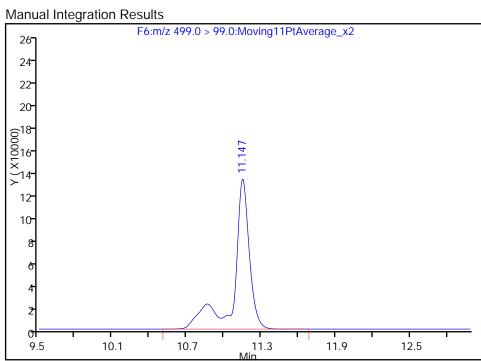
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 863094 Amount: 134.6200 Amount Units: ng/ml



RT: 11.15
Area: 1149998
Amount: 219.2306
Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:18:27

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 MSD Lab Sample ID: 320-17859-4 MSD

Matrix: Water Lab File ID: 28MAR2016A6A_085b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 536.6(mL) Date Analyzed: 03/29/2016 23:14

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.108		0.0023	0.0019	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0520		0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0549		0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.530	M 4	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	84		25-150
STL00990	13C4 PFOA	62		25-150
STL00995	13C5 PFNA	61		25-150
STL00994	1802 PFHxS	106		25-150
STL00991	13C4 PFOS	59		25-150

Report Date: 01-Apr-2016 09:57:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_085b.d

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Sample Type: MSD

Inject. Date: 29-Mar-2016 23:14:05 ALS Bottle#: 13 Worklist Smp#: 84

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-17859-a-4-C MSD

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 30-Mar-2016 15:43:37

First Level Revie	wer: wes	stendorfo			Date:	3	30-Mar-2016 15:43:3	37		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.567	5.587	-0.020		156109	20.1		40.1	6248	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.564		-0.026	1.000	230243	55.8		279	37.3	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.642	6.672	-0.030		590347	38.9		77.7	6265	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.647	6.674	-0.027	1.000	810918	72.3		362	86.5	
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	6.757	6.787	-0.030	1.000	269649	NC			35.0	
298.9 > 99.0	6.757	6.787	-0.030	1.000	162785		1.66(0.00-0.00)		165	
40 Perfluorobu	tanesulfo									
298.9 > 80.0	6.757	6.787	-0.030	1.000	269649	29.5		167		
D 613C2 PFHx	κA									
315.0 > 270.0	7.871	7.892	-0.021		492530	37.9		75.8	30404	
7 Perfluorohex										
313.0 > 269.0	7.871	7.894	-0.023	1.000	1746745	172.5		862	263	
22 PFPeS (Per		•								
349.0 > 80.0	7.947	8.099	-0.152	0.872	247769	NC			840	
D 8 13C4-PFHp	PΑ									
367.0 > 322.0	9.082	9.101	-0.019		613672	42.1		84.2	36259	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0	9.082	9.102	-0.020	1.000	668898	58.1		291	332	
D 11 1802 PFH	xS									
403.0 > 84.0	9.112	9.135	-0.023		478771	50.3		106	42326	
10 Perfluorohe	xane Sul	lfonate								M
399.0 > 80.0	9.138	9.138	0.0	1.000	0	NC			144	M
41 Perfluorohe	xanesulf	onic acid	k							M
399.0 > 80.0	9.112	9.138	-0.026	1.000	Page94919 of 9	526 284.3		1503	04/0	12016

Report Date: 01-Apr-2016 09:57:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Data File:	•			to\Chrom			04-Mar-2016 14:36: 0\28MAR2016A6A_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFC 417.0 > 372.0	A 10.189	10.214	-0.025		489600	31.2		62.3	12652	
413.0 > 169.0	10.189 10.189	10.216 10.216	-0.027	1.000 1.000	3828575 1442419	406.9	2.65(0.00-0.00)	2034	79.3 44.2	E E
38 Perfluorohe 449.0 > 80.0	eptanesul 10.196			1.000	192185	56.8		298		
14 Perfluorohe 449.0 > 80.0	eptane Su 10.196		-0.022	1.000	192185	NC			55.6	
D 16 13C4 PFC 503.0 > 80.0)S 11.146	11.160	-0.014		431090	28.0		58.6	32155	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	11.146 11.146	11.163	-0.017	1.000 1.000	10670815 4818846	1255.2	2.21(0.00-0.00)	6565	5022 14450	EM EM M
D 17 13C5 PFN 468.0 > 423.0	IA 11.162	11.183	-0.021		400272	30.5		61.0	30376	
18 Perfluorono 463.0 > 419.0			-0.022	1.000	181861	27.9		140	774	
D 19 13C2 PFD 515.0 > 470.0	A 11.990	12.009	-0.019		544273	32.2		64.3	37520	
20 Perfluorode 513.0 > 469.0	ecanoic a 11.990		-0.020	1.000	233702	22.7		114	1445	
21 PFNS (Perf 549.0 > 80.0	flouro-1-n 11.951		•	1.000	131204	NC			121	
39 Perfluorode 599.0 > 80.0	ecane Sul 12.640			1.000	113027	30.1		156		
25 Perfluorode 599.0 > 80.0			-0.019	1.000	113027	NC			583	
24 Perfluorood 498.0 > 78.0	tane Sulf 12.659			1.000	26966	15.1		75.3	1625	
D 23 13C8 FOS 506.0 > 78.0	SA 12.659	12.660	-0.001		78015	2.63		5.3	2446	
D 26 13C2 PFU 565.0 > 520.0		12.708	-0.016		541429	29.9		59.9	32680	
27 Perfluorour 563.0 > 519.0			-0.016	1.000	201105	22.2		111	3080	
D 28 13C2 PFD 615.0 > 570.0		13.305	-0.022		559255	27.0		54.0	5059	
29 Perfluorodo 613.0 > 569.0	odecanoio	acid		1 000	169184	19.3		96.4	12895	
31 PFDoS (Pe	rflouro-1-	-dodecar	nesulfona	a				70.4		
30 Perfluorotri		acid		1.000	69484	NC		00.0	334	
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	263183	19.8		99.2	1475	
715.0 > 670.0 32 Perfluorote			-0.020		399511	18.6		37.2	20929	
713.0 > 669.0	14.217	14.237	-0.020	1.000	Page 498 of 52	.6 ^{14.2}		71.2	1734/0	1/2016

Report Date: 01-Apr-2016 09:57:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

2414 1 1101	,,,,,,,,									
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohe 813.0 > 769.0			-0.025	1.000	312819	3.80		19.0	8206	
D 35 13C2-PFH 815.0 > 770.0		14.887	-0.025		493259	13.6		27.2	22686	
36 Perfluorood 913.0 > 869.0	tandecar 15.196			1.000	221939	9.09		45.5	1404	

QC Flag Legend Processing Flags

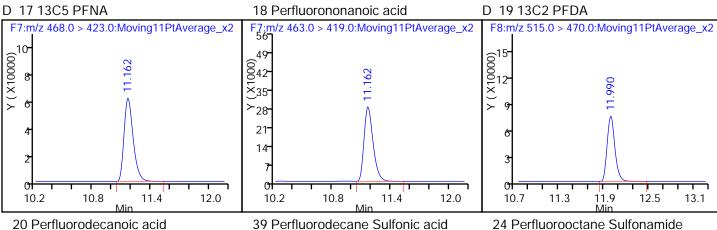
NC - Not Calibrated

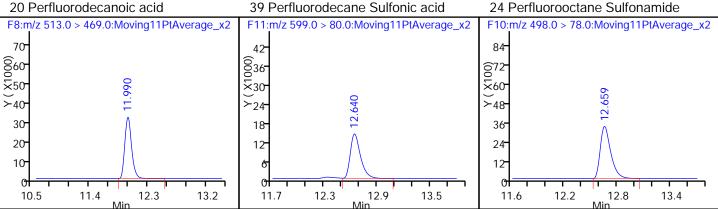
E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Report Date: 01-Apr-2016 09:57:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\\ChromData\\A6\\20160330-29478.b\\28MAR2016A6A_085b.d **Injection Date:** 29-Mar-2016 23:14:05 Instrument ID: Α6 Lims ID: 320-17859-A-4-C MSD Client ID: OF-HP01-0316 Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 84 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 5.564 ©⁵⁶ ©48 0018-15-X 860 ×50- \succeq_{40} ≻₃₂ \sim 40 30 24 20 10 5.9 5.3 5.6 5.0 5.3 5.6 5.9 6.1 6.4 6.7 7.0 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 77- 624 620 20 (00015 X120000 X) ≻ • ×55 33 22 11-6.5 7.1 6.8 7.3 7.9 6.2 6.8 7.4 6.5 7.1 7.4 6.7 8.5 9.1 6.2 9 Perfluoroheptanoic acid 7 Perfluorohexanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 21 642 0036 6²¹ 618 0018-15-12-×30 ×15 18 12 01 7.7 8.0 9.0 8.6 8.9 9.2 9.5 9.8 7.4 8.3 8.6 7.8 8.4 9.6 10.2 8.3 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 42 0012 X 10 × 30 0036 (12 (1000010 (10 ×) 18 12 0 0 0 8.5 8.8 9.1 9.4 9.7 7.5 8.4 Page 500h of 526 10.2 9.0 9.6 10.2 8.2 10.0





13.8

14.4

15.0

15.6

14.3 14.6

14.9

15.2 15.5 15.8 16.1

Report Date: 01-Apr-2016 09:57:43 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_085b.d

Injection Date: 29-Mar-2016 23:14:05 Instrument ID: A6

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 84

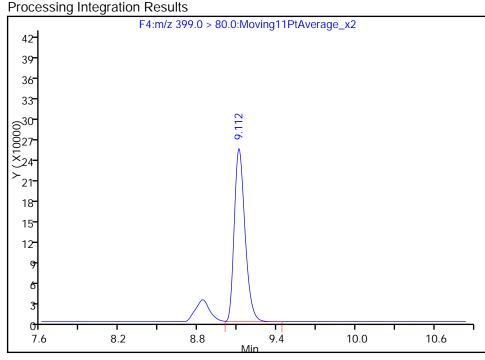
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

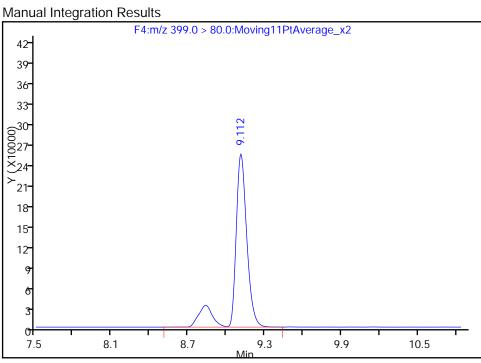
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

RT: 9.11 Area: 1436940 Amount: 243.2911 Amount Units: ng/ml



RT: 9.11
Area: 1679330
Amount: 284.2906
Amount Units: ng/ml



Reviewer: westendorfc, 30-Mar-2016 15:44:36

Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Client Sample ID: OF-HP01-0316 MSD DL Lab Sample ID: 320-17859-4 MSD DL

Matrix: Water Lab File ID: 31MAR2016B6B_014.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 536.6(mL) Date Analyzed: 03/31/2016 16:30

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

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

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

Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.797	D 4	0.012	0.0093	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.19	D M 4	0.019	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	107		25-150
STL00990	13C4 PFOA	83		25-150
STL00995	13C5 PFNA	91		25-150
STL00994	1802 PFHxS	128		25-150
STL00991	13C4 PFOS	90		25-150

Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Sample Type: MSD

Inject. Date: 31-Mar-2016 16:30:01 ALS Bottle#: 14 Worklist Smp#: 14

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-17859-A-4-C MSD 5x SD

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK016

First Level Reviewer: westendorfc Date: 01-Apr-2016 09:19:03

First Level Revie	First Level Reviewer: westendorfc Date: 0							01-Apr-2016 09:19:03						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags				
2 Perfluorobut	vric acid													
212.9 > 169.0	5.589		-0.010	1.000	76793	13.7		343	38.8					
D 113C4 PFBA	A													
217.0 > 172.0	5.592	5.600	-0.008		47340	6.77		13.5	2146					
4 Perfluoroper	ntanoic a	cid												
262.9 > 219.0	6.670	6.681	-0.011	1.000	176345	14.1		354	66.4					
D 3 13C5-PFP6	eΑ													
267.9 > 223.0	6.666	6.681	-0.015		140632	10.7		21.5	8161					
5 Perfluorobut														
298.9 > 80.0	6.785	6.793	-0.008	1.000	54462	NC			33.7					
298.9 > 99.0	6.785		-0.008	1.000	38245		1.42(0.00-0.00)		120					
	40 Perfluorobutanesulfonic acid		544/0			470								
298.9 > 80.0		6.793	-0.008	1.000	54462	6.11		173						
7 Perfluorohex			0.010	1.000	202224	34.9		872	225					
		7.897	-0.010	1.000	392336	34.9		872	225					
D 6 13C2 PFHx 315.0 > 270.0	7.887	7.897	-0.010		117154	10.2		20.3	10104					
					117154	10.2		20.5	10104					
22 PFPeS (Per 349.0 > 80.0		·рептапе 8.099		0.873	39039	NC			3633					
9 Perfluoroher			0.100	0.070	0,00,	110			0000					
363.0 > 319.0		9.096	-0.002	1.000	147338	11.9		298	415					
D 8 13C4-PFH _R														
	9.094	9.097	-0.003		140424	10.7		21.3	12933					
D 11 18O2 PFH	xS													
403.0 > 84.0	9.123	9.130	-0.007		94711	12.1		25.6	8174					
10 Perfluorohe	xane Sul	lfonate												
399.0 > 80.0		9.137	-0.014	1.000	280674	NC			9862					
41 Perfluorohe	xanesulf	onic acid	t							М				
399.0 > 80.0	9.123	9.137	-0.014	1.000	Page 508 of 5	26 54.2		1433	04/01	M2016				

Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

Report Date: 01- Data File:	•			o\Chrom			04-Mar-2016 14:36: \\31MAR2016B6B_0			
	EXP DLT REL				Amount					
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanoic ac	id								
413.0 > 369.0	10.203	10.204	-0.001	1.000	929021	85.5		2138	98.6	
413.0 > 169.0	10.203	10.204	-0.001	1.000	304472		3.05(0.00-0.00)		44.3	
D 12 13C4 PFO										
	10.196				105638	8.32		16.6	8211	
38 Perfluorohe	•			1 000	44700	10 (
	10.203		-0.005	1.000	41782	10.6		280		
14 Perfluorohe	•		0.005	1 000	41700	NC			170	
	10.203	10.208	-0.005	1.000	41782	NC			173	
D 16 13C4 PFO 503.0 > 80.0	S 11.146	11 1/0	0 003		115550	8.57		17.9	5995	
15 Perfluorooct					113330	0.57		17.7	3773	N /I
499.0 > 80.0	11.146			1.000	2433338	235.4		6155	33944	M M
499.0 > 99.0	11.146			1.000	1134962	200.4	2.14(0.00-0.00)	0100	65585	M
D 17 13C5 PFN							, (1 1 1 1 1 1)			
	11.169	11.171	-0.002		92112	9.06		18.1	7386	
18 Perfluorono	nanoic a	cid								
	11.169		-0.009	1.000	38998	5.91		148	219	
D 19 13C2 PFD	A									
515.0 > 470.0	12.001	11.999	0.002		103430	7.78		15.6	7116	
20 Perfluorode	canoic ad	cid								
513.0 > 469.0	11.991	12.004	-0.013	1.000	42508	4.89		122	2973	
21 PFNS (Perfl	louro-1-n	onanesu	ılfonate)							
549.0 > 80.0	11.951	12.145	-0.194	1.000	17862	NC			53.6	
D 23 13C8 FOS	A									
506.0 > 78.0	12.643	12.644	-0.001		13247	0.5362		1.1	792	
24 Perfluorooc	tane Sulf	onamide	;							
498.0 > 78.0	12.643	12.646	-0.003	1.000	5253	3.13		78.3	325	
39 Perfluorode										
599.0 > 80.0	12.644	12.646	-0.002	1.000	17433	4.57		119		
25 Perfluorode										
	12.644	12.646	-0.002	1.000	17433	NC			1102	
D 26 13C2 PFU										
	12.686		-0.006		119566	7.92		15.8	7309	
27 Perfluoroun				1 000	45000	4.00		404		
	12.686		-0.007	1.000	45300	4.02		101	634	
29 Perfluorodo			0.001	1 000	40017	4 47		110	1110	
613.0 > 569.0		13.287	-0.001	1.000	42316	4.47		112	1119	
D 28 13C2 PFD		10 000	0.000		1000/0	. 01		10 /	10410	
615.0 > 570.0					122869	6.81		13.6	19418	
31 PFDoS (Per					104/1	NO			402	
	13.739		0.113	1.000	10461	NC			493	
30 Perfluorotrio			0.001	1 000	20251	2 4 4		<u> </u>	2150	
663.0 > 619.0		13.786	-U.UU I	1.000	32351	2.64		66.1	2159	
D 33 13C2-PFT		14 215	0.000		72771	4.22		0.4	2070	
715.0 > 670.0			-0.002		73771	4.22		8.4	2879	
32 Perfluorotet 713.0 > 669.0			0.003	1.000	15006	1 40		41.9	104	
, 13.0 / 007.0	17.220	17.41/	0.003	1.000	Page 506 of 52	6 1.00		71.7	' 04/0 <i>′</i>	1/2016

Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Data File:

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags			
	35 13C2-PFH 5.0 > 770.0	xDA 14.859	14.866	-0.007		108699	3.71		7.4	3302				
_	4 Perfluorohe 3.0 > 769.0	xadecan 14.859		-0.007	1.000	48747	-2.21		-55.3	917				
	6 Perfluorooc 3.0 > 869.0				1.000	51760	2.28		57.1	333				

QC Flag Legend Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\\31MAR2016B6B_014.d **Injection Date:** 31-Mar-2016 16:30:01 Instrument ID: Α6 Lims ID: 320-17859-A-4-C MSD Client ID: OF-HP01-0316 Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 14 Dil. Factor: Injection Vol: 15.0 ul 5.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 2 Perfluorobutyric acid 1 13C4 PFBA 4 Perfluoropentanoic acid F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 5.592 (18 (00015 X) 12 630 (X1000) $\stackrel{\smile}{\times}_{25}$ 15 10 5.9 4.9 5.2 5.8 6.9 5.3 5.6 5.5 6.1 6.3 6.6 7.2 D 313C5-PFPeA 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 14 35 91-0012 ×10° × 8 ©30 ×25 (F) 78 (F ×65 ⁻20 15 39 26 13

6.5 7.1 7.4 6.5 6.8 7.1 7.4 7.9 8.2 8.5 6.2 6.8 6.2 7.3 7.6 8.8 6 13C2 PFHxA 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 49 49 (36 (0030 (30 642 00 35 0642 ×35- ∑₂₄->28 18 21 21 12 14 7.7 8.0 9.2 8.8 9.1 9.4 9.7 7.4 8.3 8.6 8.0 8.6 9.8 8.5 10.0 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) 13 Perfluorooctanoic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2

F4:m/z 399.0 > 80.0:Moving11PtAverage_x2

Page 50% of 526

84

∑60 ≻48

> 36 24 12

> > 0

7.6

0001 × × 16

0

8.3

8.6

8.9

9.2

9.5

9.8

F5:m/z 413.0 > 369.0:Moving11PtAverage_x2

10.3

04/01/2016

24

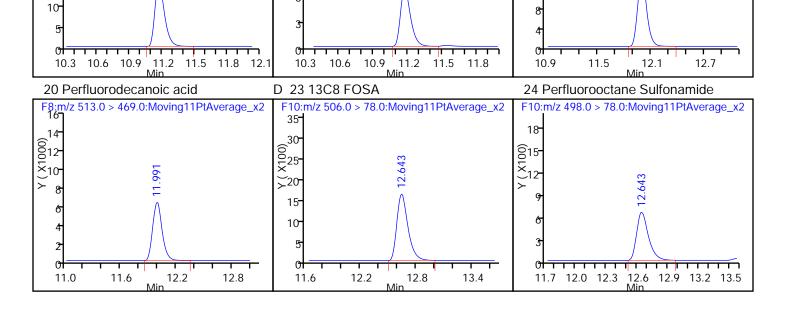
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12

9.1

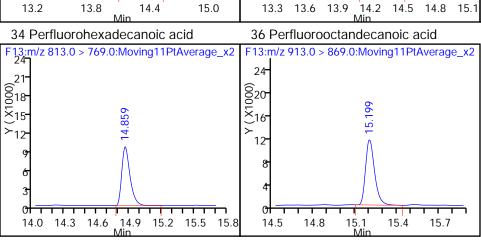
9.7

10.3



12

15



Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d

Injection Date: 31-Mar-2016 16:30:01 Instrument ID: A6

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 14

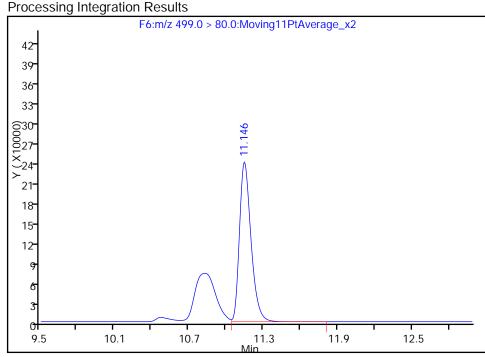
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

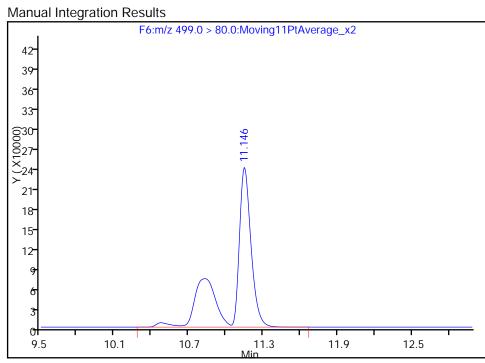
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 1541900 Amount: 149.1416 Amount Units: ng/ml



RT: 11.15 Area: 2433338 Amount: 235.3598 Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:19:03

Audit Action: Manually Integrated

Audit Reason: Isomers

Report Date: 01-Apr-2016 09:48:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d

Injection Date: 31-Mar-2016 16:30:01 Instrument ID: A6

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 14

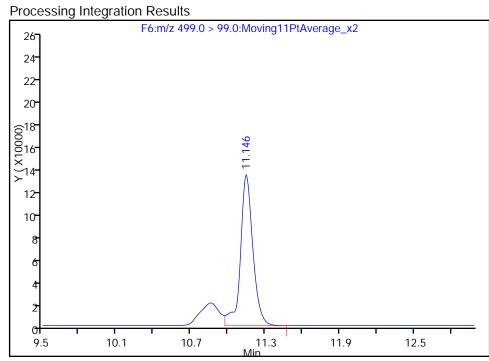
Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

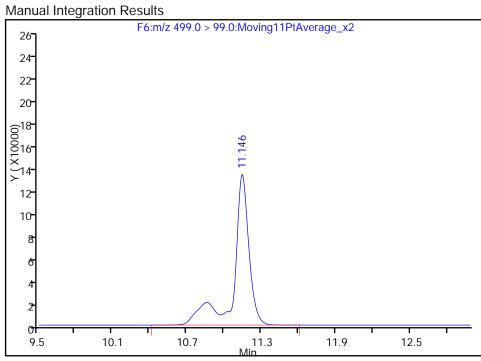
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

RT: 11.15 Area: 918830 Amount: 149.1416 Amount Units: ng/ml



RT: 11.15 Area: 1134962 Amount: 235.3598 Amount Units: ng/ml



Reviewer: westendorfc, 01-Apr-2016 09:19:03

Audit Action: Manually Integrated

Audit Reason: Isomers

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1							
SDG No.:								
Instrument ID: A6	Start Date: 03/28/2016 18:22							
Analysis Batch Number: 104824	End Date: 03/29/2016 23:56							

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-104824/3 IC		03/28/2016 18:22	1	28MAR2016A6A_00 4b.d	Acquity 2.1 (mm)
STD 320-104824/4 IC		03/28/2016 18:43	1	28MAR2016A6A_00 5b.d	Acquity 2.1 (mm)
STD 320-104824/5 IC		03/28/2016 19:04	1	5b.d 28MAR2016A6A_00 6b.d	Acquity 2.1 (mm)
STD 320-104824/6 IC		03/28/2016 19:25	1	6b.d 28MAR2016A6A_00 7b.d	Acquity 2.1 (mm)
STD 320-104824/7 IC		03/28/2016 19:47	1	28MAR2016A6A 00	Acquity 2.1 (mm)
STD 320-104824/8 IC		03/28/2016 20:08	1	8b.d 28MAR2016A6A_00 9b.d	Acquity 2.1 (mm)
STD 320-104824/9 IC		03/28/2016 20:29	1	28MAR2016A6A_01 0b.d	Acquity 2.1 (mm)
ZZZZZ		03/28/2016 20:50	1	02.4	Acquity 2.1(mm)
ICV 320-104824/11		03/28/2016 21:12	1	28MAR2016A6A_01 2b.d	Acquity 2.1 (mm)
CCV 320-104824/76		03/29/2016 20:24	1	28MAR2016A6A 07	Acquity 2.1 (mm)
MB 320-104553/1-A		03/29/2016 20:45	1	7b.d 28MAR2016A6A_07 8b.d	Acquity 2.1(mm)
LCS 320-104553/2-A		03/29/2016 21:06	1	28MAR2016A6A_07 9b.d	Acquity 2.1(mm)
320-17859-1		03/29/2016 21:27	1	28MAR2016A6A 08	Acquity 2.1(mm)
320-17859-2		03/29/2016 21:49	1	0b.d 28MAR2016A6A_08 1b.d	Acquity 2.1(mm)
320-17859-3		03/29/2016 22:10	1	28MAR2016A6A_08 2b.d	Acquity 2.1(mm)
320-17859-4		03/29/2016 22:31	1	28MAR2016A6A 08	Acquity 2.1(mm)
320-17859-4 MS		03/29/2016 22:52	1	3b.d 28MAR2016A6A_08 4b.d	Acquity 2.1 (mm)
320-17859-4 MSD		03/29/2016 23:14	1	28MAR2016A6A_08 5b.d	Acquity 2.1(mm)
320-17859-5		03/29/2016 23:35	1	28MAR2016A6A_08 6b.d	Acquity 2.1 (mm)
CCV 320-104824/86		03/29/2016 23:56	1	28MAR2016A6A_08 7b.d	Acquity 2.1 (mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento	Job No.: 320-17859-1
SDG No.:	
Instrument ID: A6	Start Date: 03/31/2016 12:36
Analysis Batch Number: 105043	End Date: 03/31/2016 17:12

		1				
LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZ	ZED	DILUTION	LAB FILE ID	COLUMN ID
				FACTOR		
				1110101		
STD 320-105043/3 IC		03/31/2016 1	12:36	1	31MAR2016B6B 00	Acquity 2.1 (mm)
				_	3.d	, (,
STD 320-105043/4 IC		03/31/2016 1	12:57	1	31MAR2016B6B_00	Acquity 2.1 (mm)
000 105010/5		00/01/0016			4.d	
STD 320-105043/5 IC		03/31/2016 1	13:19	1	31MAR2016B6B_00 5.d	Acquity 2.1 (mm)
STD 320-105043/6 IC		03/31/2016 1	13.40	1	31MAR2016B6B 00	Acquity 2.1(mm)
012 020 1000137 0 10		03/31/2010 1	10.10		6.d	rioquity 2:1 (man)
STD 320-105043/7 IC		03/31/2016 1	14:01	1	31MAR2016B6B 00	Acquity 2.1 (mm)
					7.d	
STD 320-105043/8 IC		03/31/2016 1	14:22	1	31MAR2016B6B_00	Acquity 2.1 (mm)
STD 320-105043/9 IC		03/31/2016 1	14:43	1	8.d 31MAR2016B6B 00	Acquity 2.1 (mm)
310 320-103043/9 10		03/31/2010 1	14.43		9.d	Acquity 2.1 (mm)
ZZZZZ		03/31/2016 1	15:05	1		Acquity 2.1 (mm)
ICV 320-105043/11		03/31/2016 1	15:26	1	31MAR2016B6B 01	Acquity 2.1 (mm)
·					1.d -	1 1
320-17859-4 DL		03/31/2016 1	15:47	5	31MAR2016B6B_01	Acquity 2.1(mm)
000 45050 4		00/01/0016		_	2.d	
320-17859-4 MS DL		03/31/2016 1	16:08	5	31MAR2016B6B_01 3.d	Acquity 2.1(mm)
320-17859-4 MSD DL		03/31/2016 1	16:30	5	31MAR2016B6B 01	Acquity 2.1 (mm)
		00,01,2010	20.00		4.d	inoquio, in (man)
320-17859-5 DL		03/31/2016 1	16:51	5	31MAR2016B6B_01	Acquity 2.1 (mm)
					5.d	
CCV 320-105043/16		03/31/2016 1	17:12	1	31MAR2016B6B_01	Acquity 2.1 (mm)
					6.d	

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.:

Batch Number: 104553 Batch Start Date: 03/28/16 10:10 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 03/29/16 14:58

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00032	LCPFCSP 00044
MB 320-104553/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-104553/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17859-A-1	OF-FB07-0316	3535, WS-LC-0025	Т	534.76 g	43.75 g	491 mL	1.00 mL	50 uL	
320-17859-A-2	OF-RW07-0316	3535, WS-LC-0025	Т	583.52 g	44.42 g	539.1 mL	1.00 mL	50 uL	
320-17859-A-3	OF-HPFB01-0316	3535, WS-LC-0025	Т	572.00 g	44.12 g	527.9 mL	1.00 mL	50 uL	
320-17859-A-4	OF-HP01-0316	3535, WS-LC-0025	Т	584.62 g	45.36 g	539.3 mL	1.00 mL	50 uL	
320-17859-A-4 MS	OF-HP01-0316	3535, WS-LC-0025	Т	576.23 g	45.53 g	530.7 mL	1.00 mL	50 uL	20 uL
320-17859-A-4 MSD	OF-HP01-0316	3535, WS-LC-0025	Т	583.01 g	46.42 g	536.6 mL	1.00 mL	50 uL	20 uL
320-17859-A-5	OF-HP01P-0316	3535, WS-LC-0025	Т	586.29 g	45.12 g	541.2 mL	1.00 mL	50 uL	

Batch	Notes							
Balance ID	QA-070							
Batch Comment	0.1N NaOH/H2O: 602535; HEXANE: 0000125986; MeOH: 598620; Manifold 5,							
H2O ID	3/25/16							
Pipette ID	EC15219, EC15131							
Analyst ID - Reagent Drop	НЈА							
Analyst ID - SU Reagent Drop	НЈА							
Analyst ID - SU Reagent Drop Witness	SNE							
Solvent Lot #	602638							
Solvent Name	0.3% NH4OH/MeOH							
SOP Number	WS-LC-0025							
SPE Cartridge Type	WAX 500mg							
Solid Phase Extraction Disk ID	002636061A							

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.

WS-LC-0025 Page 1 of 1



West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-17859 Work List ID(s): 299	478, 29634						
Extraction Batch: 104553 Analysis Batch(es):	04824,10	05043					
Delivery Rank 4 Due Date: 3/24/I	6		_				
A Calibration/Instrument Run QC	1 st Level	2 nd Level	N/A				
1. ICAL locked in Chrom and TALS? ICAL Batch# 104824, 105043							
2. 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.	-						
Tune check frequency & criteria met and Tune check report attached.	NCM	-					
B. QA/QC	1707	nem	<u> </u>				
Are all QC samples properly linked in TALS?			* * * * *				
Method blank, LCS/LCSD and MS/SD frequencies met.		- ·					
LCS/LCSD and MB data are within control limits. If not, NCM is present.	 						
Are MS/MSD recoveries and RPD within control limits?	 	- ·					
Holding Times were met for prep and analytical.	 `/	 / -					
Is/Surrogate recoveries meet criteria or properly noted.	 		-				
C. Sample Analysis		/					
Was correct analysis performed and were project instructions followed?	77 - 17 - 17 - 17 - 17 - 17	/					
Was correct analysis performed and we're project instructions followed? If required, are compounds within RT windows?	 						
If required, are positive hits confirmed and >40% RPD flagged?	··		<u> </u>				
Manual Integrations reviewed and appropriate.							
Manual integrations reviewed and appropriate. All analytes correctly reported. (Primary, secondary, acceptable status)	- V	 					
Correct reporting limits used. (based on client request, prep factors, and	-	 					
dilutions)		/					
D. Documentation							
1. Are all non-conformances documented/attached? NCM# 5011,50113,501	111						
Do results make sense (e.g. dilutions, etc.)?		· · · · · · · · · · · · · · · · · · ·					
Have all flags been reviewed for appropriateness?	+	· · · · · · · · · · · · · · · · · · ·					
For level 3 and 4 reports, have forms and raw data been reviewed?		- 					
Was QC Checker run for this job?							
		·Ÿ					
*Upon completion of this checklist, the reviewer must scan and attach the checkl	list to the TAL	.S job.					
1 st Level (Analyst):	1-16						
2 nd Level Reviewer: MWy Date: 4(1)	2016.						

Box # 45

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Method Code: 320-3535_IVWT-320

Batch Number: 320-104553

Batch Open: 3/28/2016 10:10:52AM

Batch End:

39:116 01/1696

Solid-Phase Extraction (SPE)

	Output Sample Lab ID		1 - 1 8 4 5 5 3 <i>(</i> 1 - A.IIIII		ø - 1 0 4 5 5 3 <i>l</i> 2 ° - A⊓ull		7859 - A - 1 - AIIII		1814 - Z - A - B C S -				- A - A - B - A - B - B - B - B - B - B						7859-A-5-AIIII
	Output						2 Z Z Z						N 0		, , , , , , , , , , , , , , , , , , ,				- 0 Z & m
	Comments			,															
	DIv Rank	N/A		A/N		4		4		4		4	•	4		4		4	
	Analytical TAT	N/A		N/A		11_Days		11_Days		11_Days		11_Days		11_Days		11_Days		11_Days	
	Due Date	N/A		N/A		3/27/16		3/27/16	_	3/27/16		3/27/16		3/27/16		3/27/16		3/27/16	
	Adj2		_																
	PHs 1 Adj1							_											
	t Rcvd		_		_	_	_		T				_	_					
	InitAmnt FinAmnt	500 mL	1.00 mL	500 mL	1.00 mL	491 mL	1.00 mL	539.1 mL	1.00 mL	527.9 mL	1.00 mL	539.3 mL	1.00 mL	530.7 mL	1.00 mL	536.6 mL	1.00 mL	541.2 mL	1.00 mL
	GrossWt InitAmnt TareWt FinAmnt					534.76 g	43.75 g	583.52 g	44.42 g	572.00 g	44.12 g	584.62 g	45.36 g	576.23 g	45.53 g	583.01 g	46.42 g	586.29 g	45.12 g
	SDG (Job #)	A/N		N/A		N/A (320-17859-1)		N/A (320-17859-1)		N/A (320-17859-1)		N/A (320-17859-1)		N/A (320-17859-1)		N/A (320-17859-1)		N/A (320-17859-1)	
	Input Sample Lab ID (Analytical Method)	MB~320-104553/1 N/A		LCS~320-104553/2 N/A		320-17859-A-1 (PFC_IDA_DOD5)		320-17859-A-2 (PFC_IDA_DOD5)		320-17859-A-3 (PFC_IDA_DOD5)		320-17859-A-4 (PFC_IDA_DOD5)		320-17859-A-4~MS (PFC_IDA_DOD5)		320-17859-A-4~MSD (PFC_IDA_DOD5)		320-17859-A-5 (PFC_IDA_DOD5)	i
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TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Method Code: 320-3535_!VWT-320

Batch Number: 320-104553

racio J

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Page 2 of 5

Method Code: 320-3535_IVWT-320

Batch Number: 320-104553

Page 3 of 5

04/01/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Method Code: 320-3535_IVWT-320

Batch Number: 320-104553

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Reagent Additions Worksheet

L						
	Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
!	MB 320-104553/1	LCMPFCSU_00032	20 nF	1.00 mL	H5A 3-28-16	5/06 2/28/113
	LCS 320-104553/2	LCMPFCSU_00032	50 uL	1.00 mL		
	LCS 320-104553/2	LCPFCSP_00044	20 uL	1.00 mL		
	320-17859-A-1	LCMPFCSU_00032	50 uL	1.00 mL		
	320-17859-A-2	LCMPFCSU_00032	20 nF	1.00 mL		
	320-17859-A-3	LCMPFCSU_00032	50 uL	1.00 mL		
	320-17859-A-4	LCMPFCSU_00032	20 nF	1.00 mL		
	320-17859-A-4 MS	LCMPFCSU_00032	20 nF	1.00 mL		
	320-17859-A-4 MS	LCPFCSP_00044	20 nL	1.00 mL		
ļ	320-17859-A-4 MSD	LCMPFCSU_00032	20 nF	1.00 mL		
	320-17859-A-4 MSD	LCPFCSP_00044	20 nF	1.00 mL	,	
	320-17859-A-5	LCMPFCSU_00032	20 nL	1.00 mL	1>	

Page 4 of 5

Analyst: Arauz, Horacio J

Method Code: 320-3535_IVWT-320

Batch Number: 320-104553

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Lot#:			
Other Reagents: Amount/Units			
Reagent			

Printed: 3/28/2016

Page 5 of 5



Sacramento Preparation Data Review Checklist

Preparation Batch Number(s):320 - 104553 Test: PFC- L		
Earliest Holding Time: 3-28-16		
Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	7	
All necessary NCMs filed (including holding time)	NA	1/1/
Method/sample/login/QAS checked and correct		1011
Worksheef Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted		
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	/	
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached		/
Comments are transcribed correctly in TALS		V
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and entered into TALS		√
All spike amounts correct and added to necessary samples and QC		-
	1 st Level	2 nd Level

1 st Level Reviewer: VPM	Date: 3/09/14
2 nd Level Reviewer. SNE	Date: 3/29/16
Comments:	<u> </u>

Batch Information

All necessary 'batch information' complete and entered into TALS correctly

Date and time accurate and entered into TALS correctly

Reviewer

Reviewer

Shipping and Receiving Documents

CH2MHILL

Corrections to File

TO:

Laura Turpen

COPIES:

File

NALF_Fentress Perfluorinated Compound Investigation

FROM:

Juliana Dean

Chemist

CH2M HILL

DATE:

March 23, 2016

This memo is to document corrections made to the sample IDs for NALF Fentress PFC SDG 320-17859.

Sample ID on Login/COC	Correct Sample ID	Date Collected	Time Collected	SDG
OF-HP01D-0316	OF-HP01P-0316	3/22/16	10:20	320-17859

Custody Record Chain of

Temperature on Receipt 26

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	Ξ	≣		
Ξ	Ξ			
≣				320-17859 Chain of Custody
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		Ξ	1	20
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			Ξ	32

CLD MEHO

Special Instructions/ Conditions of Receipt (A fee may be assessed if samples are retained Months fonger than 1 month) Time Chain of Custody Number 283613 õ Page Date Date 01/16 Analysis (Attach list if more space is needed) Archive For _ OC Requirements (Specify) NOBN HOBN Disposal By Lab Containers & Preservatives HOEN 1. Received By 2. Received By 3. Received By IDH EONH Drinking Water? Yes No No Project Manager BILL Enternoun tOSZH F 7 ナ 11.45 Betum To Client Sample Disposal 110S Time Carrier/Waybill Number Matrix 4 У 1 X **ን** IJΥ ☐ Unknown Other. 0930 070 0925 Date 9(0 Тіте 1015 0(5 [0]5 ☐ 21 Days Mirrian Beach State 23462 ☐ Poison B 03/21/16 Date 5701 Clareland St, Suite 200 ☐ 14 Days CAD WETG PFC SUMPLING Contract Purchase Order/Quote No. PO # 10006-7-104000 Sample I.D. No. and Description (Containers for each sample may be combined on one line) Skin Irntant □ 7 Days 05-HPFB41-4316 05-HP41-0316-MS OF-HPØ1-4316-51) | Flammable MAN HILL D-4W87-8316 OF-FBO7-0316 ☐ 48 Hours Possible Hazard Identification Turn Around Time Required allen 04/01/2036 ☐ Non-Hazard 24 Hours TAL-4124 (1007) Client

DISTRIBUTION: WHITE - Returned to Client with Report, CANARY - Stays with the Sample, PINK - Field Copy

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-17859-1

Login Number: 17859 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.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

DESCRIPTIONS DESCRIPTIONS DOCAMA NO DEPOSITIONS	316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 16 NONS SVOA TA_WS-LC-0025 SVOA TAMER	de I ah Name II eachate Method Samole Basis Extraction	n Method Result Type I sh QC Type Sample Medium QC Level	DateTime Collected Date Received I eachate Date I eachate Time I	Extraction Date Extraction Time Analysis Date Analysis Time! ah Samnle ID Dibution Run Number Percent Moisture Percent Linid C	hom Name Analyte ID Analyte Value Orig	inal Analyte Value Result Units II ah Qualifier Validator Qualifier IGC Column Tyne Analysis Result Tyne Result Narrative IG	Control Link Cole Cont
Column	116 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016	Extraction Date Extraction Time Analysis Date Analysis Time Lab Sample ID Dilution Run Number Percent Moisture Percent Lipid C 20160328 10:11:00 20160329 21:27:00 320-17895-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	erfluoroheptanoic acid (PFHpA) 375-85-9 0.00	20 UG L U PR TRG	00000000 0.0025 5.0 0.0082 0.002 0.002 320-17859-1 120-104824
EXECUTION PROPERTY		Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016	20160328 10:11:00 20160329 21:27:00 320-17699-1 1 1 P	artitudroccianoic acid (PPCA) 335-67-1 0.00 artitudrononanoic acid (PPNA) 375-95-1 0.00	20 UG L U PR TRG	00000000 000005 5.0 0.00007 0.0020 30.0025 32.0 17894-1 320-104024 00000000 0.0025 5.0 0.00007 0.0020 320-17895-1 320-104024
COLUMN C		Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016 03/21/2016 09:25 03/22/2016	20160328 10:11:00 20160329 21:27:00 320-17859-1 1 1 1 P 20160328 10:11:00 20160329 21:27:00 320-17859-1 1 1	arfluorobutanesulfonic acid (PFBS) 375-73-5 0.00 arfluorobutanesulfonic acid (PFHxS) 355-48-4 0.00 erfluoroctane Sulfonate (PFOS) 1763-23-1 0.00 100 PENDA 100 PEND	20 UG L U PR TRG 20 UG L U PR TRG	
COLUMN C	151	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016	20160328 10:11:00 20160329 21:27:00 320-17859-1 1 1 F	erfluorooctane Sulfonate (PFOS) 1763-23-1 0.00	31 UG L U PR TRG	00000000 0.0041 5.0 0.0031 0.0031 0.0041 320-17859-1 320-104824
SECURITION SECURITION SOCIAL MANY SECURITION SE	.16 NONS SVOA TA.WS-LC-0025 SVOA TAMER .316 NONS SVOA TA.WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016 03/21/2016 09:25 03/22/2016	20160328 10:11:00 20160329 21:27:00 320-17859-1 1 1 1 1 20160328 10:11:00 20160329 21:27:00 320-17859-1 1 1 1	IC4-PFHPA 13C4-PFHPA 125 IC4 PFOA 13C4 PFOA 127	PCT REC PR SURR S PCT REC PR SURR S	MA
Column	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016	09/00039 10/11/00 209/0039 2727/00 205-7186-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CS PFNA 13CS PFNA 114	PCT_REC PR SURR S	SLSA 150 25 00000000 5.0 320-17859-1 120-104824
SCHOOL S	316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:25 03/22/2016	20160328 10:11:00 20160329 21:27:00 320-17699-1 1 1 1 1	IG2 PPRAS 1802 PPRAS 100 IG4 PFOS 13C4 PFOS 119	PCT_REC PR SURR S	SLSA 150 25 00000000 5.0 (20.17859-1 120.104624 SLSA 150 25 00000000 5.0 (20.17859-1 120.104624 SLSA 150 25 00000000 5.0 (20.17859-1 120.104624 SLSA 150 25 000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 00000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 000000000 5.0 (20.17859-1 120.104624 SLSA 150 25 00000000 5.0 (20.17859-1 120.104624 SLSA 150 25 0000000 5.0 (20.17859-1 120.104624 SLSA 150 25 00000000 5.0 (20.17859-1 120.104625 SLSA 15
SECURITION SEC	3316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016	20160328 10:11:00 20160329 21:49:00 320-17859-2 1 1 F	erfluoroheptanoic acid (PFHpA) 375-85-9 0.00 erfluorooctanoic acid (PFOA) 335-67-1 0.00	19 UG L U PR TRG	0000000 0.0023 5.0 0.0074 0.019 0.0023 50-17859-1 320-104824
SCHOOL S	J316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016	20160328 10:11:00 20160329 21:49:00 320-17859-2 1 1	erfluorononanoic acid (PFNA) 375-95-1 0.00	19 UG_L U PR TRG	0000000 0.0023 5.0 0.0009 (0.0019) 0.0023 320-17809-1 320-104024
SCHOOL S	0316 NONS SVOA TA WSLC-0025 SVOA TAMER 0316 NONS SVOA TA WSLC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016	20160328 10:11:00 20:60329 21:40:00 320:7869-2 1 1 P P 20:60328 10:11:00 20:60329 21:40:00 320:7869-2 1 1 P P 20:60329 10:11:00 20:60329 21:40:00 320:7869-2 1 1 P P 20:60329 21:40:00 320:7869-2 1 P P 20:60329 21:40:	erfluorobutanesulfonic acid (PFBS) 375-73-5 0.00	11 UG L J PR TRG	0000000 0.0023 5.0 0.0085 0.0019 0.0023 50-12859-1320-14824
SOUTH COLUMN SOUT	J316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016 03/21/2016 09:30 03/22/2016	20160328 10:11:00 20160329 21:49:00 320-17699-2 1 1 P	artition octaine Sulfonate (PFOS) 1763-23-1 0.00 IC4-PFHPA 13C4-PFHPA 109	28 UG L U PR TRG	00000000 0.0023 3.0 0.0001 0.0012 0.0023 1.0004 0.0012 1.0004 0.0012 0.
MODEL MODE	-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016 03/21/2016 09:30 03/22/2016	00/00/2003 10/11/00 [09/00/200 214/00 00 [05/71/80-2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IC4-PFHPA 13C4-PFHPA 109 IC4-PFDA 13C4-PFHPA 98 IC4-PFDA 13C4-PFHPA 98	PCT_REC	SLSA 150 25 00000000 5.0 320-17859-1 320-104824 SLSA 150 25 00000000 5.0 320-17859-1 320-104824
NOTICE STORY NOTI	0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016 03/21/2016 09:30 03/22/2016 03/21/2016 09:30 03/22/2016	20160328 10:11:00 20160329 21:49:00 320-17859-2 1 1 1	13C5 PFNA 13C5 PFNA 81	PCT_REC PR SURR S	SLSA 150 25 00000000 5.0 (20.77854.1):20-104824 SLSA 150 25 00000000 5.0 (20.77854.1):20-104824
NOTICE STORY NOTI	.0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER .0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER .0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER .011-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 09:30 03/22/2016 03/21/2016 09:30 03/22/2016	20160328 10:11:00 20160329 21:49:00 320:17859-2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	C4 PEOS 13C4 PEOS 121	PCT_REC PR SURR S PCT_REC PR SURR S	SLSA 150 25 00000000 5.0 320-77899-1 120-104824 SLSA 150 25 00000000 5.0 5.0 320-77899-1 120-104824 SLSA 150 25 00000000 10.0024 5.0 00007810 0009 100042 120-17899-1 120-104824
MARCH MARC	1-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016	20160328 10:11:00 20160329 22:10:00 320-17859-3 1 1	arfluoroheptanoic acid (PFHpA) 375-85-9 0.00 arfluorocctanoic acid (PFOA) 335-67-1 0.00	19 UG_L U PR TRG	SLSA 150 25 00000000 1.0.024 5.0 0.00076 0.0019 0.0024 225-77859-1 225-104624 1.0.00076 0.0019 0.0024 225-77859-1 225-104624
Company Comp	11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016 03/21/2016 10:10 03/22/2016	201902328 10:11:00 201902329 22:10:00 320-17899-3 1 1 P 201902329 10:11:00 201902329 10:11:00 320-17899-3 1 1 P 201902329 10:11:00 320-17899-3 1 1 P 201902329 10:11:00 201902329 10:11:00 320-17899-3 1 1 P 201902329 10:11:00 201902329 10:11:00 320-17899-3 1 P 201902329 10:11:00 20190239 10:11:00 20190239 10:11:0	arfluorooctanoic acid (PFOA) 335-67-1 0.00 arfluorononanoic acid (PFNA) 375-95-1 0.00	19 UG_L U PR TRG	00000000 00004 5 0 0000000 00004 5 0 000000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 000000
MARTEN GROUP (N. 17)	1-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016	20160328 10:11:00 20160329 22:10:00 320-17859-3 1 1	erfluorobutanesulfonic acid (PFBS) 375-73-5 0.00 erfluorohexanesulfonic acid (PFHxS) 355-46-4 0.00	15 UG_L J PR TRG	00000000 0.0024 5.0 0.00087 0.0019 0.0024 320-17859-1 320-104824
MacCompress Method	11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 11-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016 D3/21/2016 D3/21/2016 D3/22/2016	20190239 10:11:00 20190239 22:10:00 320-17895-3 1 9 9 20190239 10:11:00 20190239 22:10:00 320-17895-3 1 9 9 20190239 22:10:00 320-17895-3 1 9 9 20190239 10:11:00 20190239 22:10:00 320-17895-3 1 9 9 20190239 10:11:00 20190239 22:10:00 320-17895-3 1 9 20190239 10:11:00 20190239 22:10:00 320-17895-3 1 9 20190239 22:10:10:10:10:10:10:10:10:10:10:10:10:10:	effuoronexanesunonic acid (PFHKS) 355-46-4 0.00	19 UG_L U PR ING	0000000 0.0004 5.0 0.00087 [0.019 [0.014 [20.1789.1] [20.14824] 00000000 10004 5.0 100087 [0.019 [0.014 [20.1789.1] [20.14824] 00000000 10008 5.0 10008 5.0 0.0012 [0.019 [0.014 [20.1789.1] [20.14824] 00000000 0.0008 5.0 0.0018 [0.019 [0.014 [20.1789.1] [20.14824] 00000000 0.0018 5.0 0.0018 [0.019 [0.014 [20.1789.1] [20.14824] 000000000 0.0018 5.0 0.0018 [0.019 [0.014 [20.1789.1] [20.14824] 000000000000000000000000000000000000
MARTEN GROUP (N. 17)	01-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER		000 REG W 4	03/21/2016 10:10 03/22/2016 03/21/2016 10:10 03/22/2016 03/21/2016 10:10 03/22/2016	20160328 10:11:00 20160329 22:10:00 320:17859-3 1 1 1 20160329 12:10:00 320:17859-3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	C4-PFHPA 13C4-PFHPA 119	PCT_REC PR SURR S	SLSA 150 25 0000000 5.0 0000000 5.0 00.17850-1 00.104024 N.S.A 150 25 00000000 N.O 0000000 N.O 00000000 N.O 00000000 N.O 000000000 N.O 000000000 N.O 000000000 N.O 0000000000
Decided Decide	-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER J1-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016 03/21/2016 10:10 03/22/2016	20160328 10:11:00 20160329 22:10:00 320-17859-3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IC4 PFOA 13C4 PFOA 113 IC5 PFNA 13C5 PFNA 96	PCT REC PR SURR S	SLSA 150 25 00000000 5.0 320-17894-1 320-104824 SLSA 150 25 00000000 5.0 320-17894-1 320-104824
DESCRIPTIONS PRES DESCRIPTION DESCRI	17-1516 NONS SVOA TA WS-LC-0025 SVOA TAMER 17-0516 NONS SVOA TA WS-LC-0025 SVOA TAMER 17-0516 NONS SVOA TA WS-LC-0025 SVOA TAMER 17-0516 NONS SVOA TAWS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016	00000000000000000000000000000000000000	02 PFHXS 1802 PFHXS 98	POT REC PR SURR	SLSA 150 25 00000000 5.0 200.17850-1 120.10424 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
SECTION Company Comp	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:10 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:31:00 320-17859-4 1 1	13C4 PFUS 13C4 PFUS 1111 orfluoroheptanoic acid (PFHpA) 375-85-9 0.06	8 U.G.L PR TRG	SLSA 150 25 00000000 5.0 S.U S20-17894-1 [520-104824 00000000 0.023 5.0 0.00074 [0.019 10.023 320-17895-1 [320-104824
DESCRIPTIONS PRICE DESCRIPTION DESCR	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:31:00 320-17859-4 1 1 1 P	#fluoroheptanoic acid (PFHpA) 375-85-9 0.05 #fluorononanoic acid (PFNA) 375-95-1 0.01 #fluorononanoic acid (PFNA) 375-95-1 0.01	1 UG L PR TRG	0000000 0 00023 5.0 0.00051 0.0019 0.0023 200.17859-1 222.104824
MICHAEL PROPERTY PR	0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:31:00 320-17859-4 1 1 F 20160328 10:11:00 20160329 22:31:00 320-17859-4 1 1 F	erfluorohexanesulfonic acid (PFHxS) 355-46-4 0.45	UG L MJ PR TRG	0000000 0.0023 5.0 0.00086 0.0019 0.0023 320-17858-1 320-104824 0.0000000 0.0023 5.0 0.00081 0.0019 0.0023 320-17859-1 320-104824 0.0000000 0.0023 5.0 0.00081 0.0019 0.0023 320-17859-1 320-104824 0.00000000 0.0023 0.00081 0.00081 0.0019 0.0023 0.0023 0.002
RECEIPT (RECEIPT (RECEIPT)	17-0319 (XVRS 570-A TA, WSLL-0203) SYGA TABBER (TELES 10-10) SYGA TABB	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:31:00 320-17859-4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	C4-PFHPA 13C4-PFHPA 81	PCT REC PR SURR S	
MINISTER	J316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:15 03/22/2016 03/22/2016	20160328 10:11:00 20160329 22:31:00 320-17699-4 1 1 1 1	ICS PFNA 19C5 PFNA 66	PCT REC PR SURR S	
MICHAEL PROPERTY MICHAEL PRO	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:31:00 320:17859-4 1 1 1 1 1	102 PFHXS 1802 PFHXS 105	POT REC PR SURVE S	SLSA 150 25 00000000 5.0 320.17859-1 130-104824 (10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.
DESCRIPTIONS PERFO DESCRIPTION DESCR	0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 NEG W 4	03/21/2016 10:15 03/22/2016 03/21/2016 03/22/2016	20160328 10:11:00 20160329 22:52:00 320-17699-4 1 1 1 P	erfluoroheptanoic acid (PFHpA) 375-85-9 115	PCT_REC PR TRG N	3C3m 150 25 00000000 5.0 0.0024 5.0 0.00000 0.0034 320-17895-1 320-104424 140 60 0000000 0.0024 5.0 0.00076 0.0019 0.0024 320-17895-1 320-104424
MARTHURST MICH	0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 MS W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:52:00 320-17859-4 1 1 F	#fluoroneptanoic acid (PFNA) 375-85-9 115 #fluoroneptanoic acid (PFNA) 375-95-1 84 #fluoroneptanoic acid (PFRS) 375-73-5 94	PCT REC	MSA 140 60 00000000 00.024 5.0 0.0002 (0.019) (0.024 52.1-1882-4 520-1982-4 5
SECRET S	0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 MS W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:52:00 320-17:090-4 1 1 P	effuorobutanesulfonic acid (PFHxS) 3/5-/3-5 94 erfluorohexanesulfonic acid (PFHxS) 355-46-4 299	PCT REC PR TRG N T	S.A. 100 25
SECRET S	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 MS W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	ZU160328 10.11.00 Z0160329 Z2.52.00 320-77894-4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	C4-PFHPA 13C4-PFHPA 85	PCT REC PR SURR S PCT REC PR SURR S	\$1.5A 150 25 00000000 5.0 120-17859-1 120-10824 \$1.5A 150 95 00000000 5.0 120-17859-1 120-10824 \$1.5A 150 95 00000000 5.0 120-17859-1 120-10824
SECURITY	.316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 MS W 4	03/21/2016 10:15 03/22/2016	201900228 1011100 20190229 22:52:00 202-17899-4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ICS PFNA 13CS PFNA 69	PCT_REC PR SURR S	\$1.5A 150 25 00000000 5.0 120-778591-120-10424 \$1.5A 150 25 00000000 5.0 120-778591-120-
DESCRIPTION DESCRIPTION	0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER		000 MS W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 1011100 20160329 225200 320-77894-4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1802 PFHXS 99 02 PFHXS 1802 PFHXS 99	PCT REC PR SURR S PCT REC PR SURR S PCT REC PR SURR S	SLSA 150 25 00000000 5.0 120-17859-1 120-10824 SLSA 150 95 00000000 5.0 120-17859-1 120-10824 SLSA 150 95 00000000 5.0 120-17859-1 120-10824
SEASON S	0316 NONS SVOA TA_WS-C-0025 SVOA TAMER	Test America NONE NA SW3535	000 MSD W 4	03/21/2016 10:15 03/22/2016	20160328 H0:11:00 20160329 I23:14:00 320-17859-4 H H	orfluoroheptanoic acid (PFHpA) 375-85-9 109	PCT REC DR TRO	SLAA 102 25 00000000 10 10 10 10 10
SECTION SECT	316 NONS SVOA TA WS-LC-0025 SVOA TAMER 3316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA RW3535	000 MSD W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 22:14:00 320:17859-4 1 1 P 20160328 10:11:00 20160329 22:14:00 320:17859-4 1 1 P 20160329 21:14:00 320:17859-4 1 1 P 30160329 21:14:00 320:17859-4 P 30160329 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:00 320:17859 21:14:14:14:14:14:14:14:14:14:14:14:14:14	arfluorononanoic acid (PFNA) 375-95-1 110 arfluorobutanesulfonic acid (PFBS) 375-73-5 82 arfluorobexanesulfonic acid (PFHxS) 355-46-4 239	PCT REC	MSP 140 60 00000000 0.0023 5.0 0.00061 0.0019 0.0023 320-17850-1 320-10424 MSP 150 50 0000000 0.0023 5.0 0.00061 0.0019 0.0023 320-17850-1 320-10424
Company Comp	US16 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 MSD W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 23:14:00 320-17859-4 1 1	erfluorohexanesulfonic acid (PFHxS) 355-46-4 239		MSP 140 80 00000000 0.0023 S.D 0.00001 0.0019 0.0023 22-17899-1 120-10424
Company Comp	316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 MSD W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 23:14:00 320-17859-4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	IC4-PFHPA 13C4-PFHPA 84 IC4-PFDA 13C4-PFDA 62	PCT REC M 4 PR ING N PCT REC PR SURR S PCT REC PR SURR S	SLSA 150 25 00000000 5.0 320-17859-1 320-164824 SLSA 150 25 00000000 5.0 320-17859-1 320-164824
RESERVED R	.316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	000 MSD W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160329 23:14:00 320-17859-4 1 1 1	C5 PFNA 19C5 PFNA 61	PCT_REC PR SURR S	8.55 25 25 25 25 25 25 25
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December 2015 Print December 2015 Dece	2018 NORS SYCA	Test America NONE NA SW3535	DL1 REG W 4	03/21/2016 10:15 03/22/2016	0010020 001100 0010020 0114.00 00110020 114.00 00111004 1 1	erfluorooctanoic acid (PFOA) 335-67-1 0.62	UG_L DBJ PR TRG	SAA 102 25 00000000
MARTHUR MART	316 NONS SVOA TA_WS-LC-0025 SVOA TAMER J316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	DL1 REG W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160331 15:47:00 320-17859-4 5 2 F 20160328 10:11:00 20160331 15:47:00 320-17859-4 5 2 1	orfluorooctane Sulfonate (PFOS) 1763-23-1 2.2 IC4-PFHPA 13C4-PFHPA 111	UG L D M J PR TRG PCT REC PR SURR S PCT REC PR SURR S	SLSA 150 25 00000000 0.019 S.0 0.009 0.014 0.019 250-17850-1 120-105043 SLSA 150 25 00000000 0.014 0.019 0.019 0.014 0.019 0.014 0.019 0.016 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.019 0.014 0.014 0.019 0.014 0.014 0.019 0.014 0.0
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SECURITIONS PROP. SOCIAL NO. SOCIAL	0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	DL1 REG W 4	03/21/2016 10:15 03/22/2016	20160328 10:11:00 20160331 15:47:00 320:17859-4 5 2 1 20160328 10:11:00 20160331 16:08:00 320:17859-4 5 2 P	IC4 PFOS 13C4 PFOS 86 erfluorocctanoic acid (PFOA) 335-67-1 247	PCT_REC PR SURR S	
DECEMBER PROPERTY DECEMBER	0316 NONS SVOA TA WS-LC-0025 SVOA TAMER 0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535	DL1 MS W 4	03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016 03/21/2016 10:15 03/22/2016	20160228 1011100 20160233 154.7:00 220-17895-4 5 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 2 1 1 2	artiurocctanios acid (PFOR) 335-97-1 247 artiurocctanio Sulfonate (PFOS) 1763-23-1 -314	PCT REC 04 PR SURV PR FIRG N PCT REC 044 PR TRG N PCT REC 044 PR TRG N PCT REC 066 PCT REC	MSA 140 80 00000000 10.10 2 5.0 0000000 0.019 5.0 0.009 0.014 0.019 5.0-1859-1 120-195043 MSA 140 80 00000000 0.019 5.0 0.009 0.014 0.019 5.0-1859-1 120-195043
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### CONTROL OF THE PROPERTY OF	-0316 NONS SVOA TA WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:20 03/22/2016 03/21/2016 03/21/2016 03/21/2016 03/22/2016	20160328 10:11:00 20160329 23:35:00 320-17894-5 1 1 F	ensororepsenoic acid (PFHpA) 375-85-9 0.06 effuorocctanoic acid (PFOA) 335-67-1 0.72	3 UG L PR TRG	00000000 0.0023 5.0 0.00074 (0.018 0.022 322-17859-1 320-104224 0.0000000 0.0023 5.0 0.0008 (0.018 0.023 320-17859-1 320-104824 0.0000000 0.000000 0.000000 0.0000000 0.000000
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GERBATHED ANT GOLDBAR AND DE HEFT DE SINCE STOCK	-0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER -0316 NONS SVOA TA_WS-LC-0025 SVOA TAMER	Test America NONE NA SW3535 Test America NONE NA SW3535	000 REG W 4	03/21/2016 10:20 03/22/2016 03/21/2016 10:20 03/22/2016	20160328 10:11:00 20160329 23:35:00 320-17859-5 1 1 1 1 20160328 10:11:00 20160329 23:35:00 320-17859-5 1 1 1 1	1802 PFHXS 1802 PFHXS 114	PCT REC PR SURR S PCT REC PR SURR S	SLSA 150 25 00000000 5.0 320-17859-1 320-104824
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MEMORANDUM CH2MHILL

Data Validation Summary

Oceana CTO-WE44, NALF Fentress

TO: Juliana Dean/VBO

Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: March 18, 2016

Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories and Maxxam Laboratories in the Sample Delivery Groups (SDGs) listed in the table below.

Samples were analyzed using the following analytical methods:

• WS-LC-0025 & 537 MOD Perfluorinated Hydrocarbons

The samples included in these SDGs are listed in the table below.

SDG	Sample Name	Matrix
320-17150	OF-RW42B-0216	Water
320-17150	OF-RW39-0216	Water
320-17150	OF-FB40-0216	Water
320-17150	OF-RW40-0216	Water
320-17150	OF-FB43-0216	Water
320-17150	OF-RW43-0216	Water
320-17150	OF-FB42B-0216	Water
320-17150	OF-RW42A-0216	Water
320-17150	OF-FB42A-0216	Water
320-17150	OF-RW35-0216	Water
320-17150	OF-FB35-0216	Water

SDG	Sample Name	Matrix
320-17150	OF-RW58-0216	Water
320-17150	OF-FB58-0216	Water
320-17150	OF-FB39-0216	Water
320-17154	OF-FB09-0216	Water
320-17154	OF-FB67-0216	Water
320-17154	OF-RW09-0216	Water
320-17154	OF-FB37-0216	Water
320-17154	OF-RW37-0216	Water
320-17154	OF-RW11-0216	Water
320-17154	OF-FB11-0216	Water
320-17154	OF-RW28-0216	Water
320-17154	OF-FB28-0216	Water
320-17154	OF-RW67-0216	Water
320-17183	OF-RW66-0216	Water
320-17183	OF-FB27-0216	Water
320-17183	OF-FB66-0216	Water
320-17183	OF-RW49-0216	Water
320-17183	OF-FB49-0216	Water
320-17183	OF-RW36A-0216	Water
320-17183	OF-FB36A-0216	Water
320-17183	OF-RW51A-0216	Water
320-17183	OF-FB51A-0216	Water
320-17183	OF-RW27-0216	Water
320-17184	OF-RW20-0216	Water
320-17184	OF-FB30-0216	Water
320-17184	OF-FB69-0216	Water
320-17184	OF-RW69-0216	Water
320-17184	OF-FB26-0216	Water
320-17184	OF-RW26-0216	Water
320-17184	OF-FB20-0216	Water
320-17184	OF-RW55-0216	Water
320-17184	OF-FB55-0216	Water
320-17184	OF-RW54-0216	Water
320-17184	OF-FB54-0216	Water
320-17184	OF-RW68-0216	Water
320-17184	OF-FB68-0216	Water
320-17184	OF-RW30-0216	Water
320-17185	OF-FB08-0216	Water
320-17185	OF-RW51-0216	Water
320-17185	OF-RW51P-0216	Water

SDG	Sample Name	Matrix
320-17185	OF-RW08-0216	Water
320-17185	OF-RW08P-0216	Water
320-17185	OF-FB41-0216	Water
320-17185	OF-RW41-0216	Water
320-17185	OF-RW41P-0216	Water
320-17185	OF-FB56-0216	Water
320-17185	OF-RW56-0216	Water
320-17185	OF-FB51-0216	Water
320-17190	OF-FB12-0216	Water
320-17190	OF-RW12-0216	Water
320-17190	OF-FB57-0216	Water
320-17190	OF-RW57-0216	Water
320-17190	OF-RW57P-0216	Water
320-17190	OF-FB25-0216	Water
320-17190	OF-RW25-0216	Water
320-17190	OF-FB16-0216	Water
320-17190	OF-RW16-0216	Water
320-17219	OF-FB47-0216	Water
320-17219	OF-RW47-0216	Water
320-17219	OF-FB47A-0216	Water
320-17219	OF-RW47A-0216	Water
320-17219	OF-FB48-0216	Water
320-17219	OF-RW48-0216	Water
320-17236	OF-FB70-0216	Water
320-17236	OF-RW70-0216	Water
320-17236	OF-FB44-0216	Water
320-17236	OF-RW44-0216	Water
320-17236	OF-RW44P-0216	Water
320-17236	OF-FB65-0216	Water
320-17236	OF-RW65-0216	Water
320-17236	OF-FB21-0216	Water
320-17236	OF-RW21-0216	Water
320-17241	OF-FB62-0216	Water
320-17241	OF-RW34-0216	Water
320-17241	OF-FB38-0216	Water
320-17241	OF-RW38-0216	Water
320-17241	OF-RW62-0216	Water
320-17241	OF-FB63-0216	Water
320-17241	OF-RW63-0216	Water
320-17241	OF-FB59-0216	Water

SDG	Sample Name	Matrix
320-17241	OF-RW59-0216	Water
320-17241	OF-FB50-0216	Water
320-17241	OF-RW50-0216	Water
320-17241	OF-FB34-0216	Water
320-17278	OF-FB24-0216	Water
320-17278	OF-RW24-0216	Water
320-17278	OF-FB31-0216	Water
320-17278	OF-RW31-0216	Water
320-17278	OF-FB60-0216	Water
320-17278	OF-RW60-0216	Water
320-17278	OF-RW60P-0216	Water
320-17278	OF-FB46-0216	Water
320-17278	OF-RW46-0216	Water
320-17321	OF-FB02-0216	Water
320-17321	OF-RW02-0216	Water
320-17321	OF-FB15-0216	Water
320-17321	OF-RW15-0216	Water
320-17321	OF-FB18-0216	Water
320-17321	OF-RW18-0216	Water
320-17859	OF-FB07-0316	Water
320-17859	OF-RW07-0316	Water
320-17859	OF-HPFB01-0316	Water
320-17859	OF-HP01-0316	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015) and National Functional Guidelines for Organic Data Review (August 2014) with Region 3 Modification (Use of 'B' qualifier) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks

- Internal Standards
- Laboratory Control Samples
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

Data Completeness

The SDG was received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 2/3/16 through 2/16/16. Samples were received at the laboratory 2/4/16 through 2/17/16. All sample preparation and analyses were performed within holding time requirements with the exception of the samples listed below. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW42B-0216	320-17150
OF-RW08-0216	320-17185
OF-RW08P-0216	320-17185
OF-FB62-0216	320-17241
OF-RW34-0216	320-17241
OF-FB38-0216	320-17241
OF-RW38-0216	320-17241
OF-RW62-0216	320-17241
OF-FB63-0216	320-17241
OF-RW63-0216	320-17241
OF-FB59-0216	320-17241

Sample Name	SDG
OF-RW59-0216	320-17241
OF-FB50-0216	320-17241
OF-RW50-0216	320-17241
OF-FB34-0216	320-17241

Blanks

Several compounds were detected in the field blanks and method blanks as listed below. Affected data are summarized in **Attachment 1**.

SDG	Blank ID	Compound	Conc.	Units
320-17183	OF-FB49-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00068	UG_L
320-17183	OF-FB36A-0216	Perfluorooctane Sulfonate (PFOS)	0.00042	UG_L
320-17185	OF-FB51-0216	Perfluorobutanesulfonic acid (PFBS)	0.00063	UG_L
320-17190	OF-FB12-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00079	UG_L
320-17190	OF-FB57-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00083	UG_L
320-17190	OF-FB25-0216	Perfluorobutanesulfonic acid (PFBS)	0.00092	UG_L
320-17190	OF-FB16-0216	Perfluorobutanesulfonic acid (PFBS)	0.0011	UG_L
320-17190	MB 320-100277/1-A	Perfluorobutanesulfonic acid (PFBS)	0.00103	UG_L
320-17190	MB 320-100277/1-A	Perfluorohexanesulfonic acid (PFHxS)	0.00102	UG_L
320-17190	MB 320-100277/1-A	Perfluorooctane Sulfonate (PFOS)	0.00144	UG_L
320-17859	MB 320-104553/1-A	Perfluorooctanoic acid (PFOA)	0.00217	UG_L

Field Duplicate Precision

Perfluoroheptanoic acid (PFHpA) did not meet required precision criteria in native sample OF-RW51-0216 and field duplicate OF-RW51P-0216. Affected data are summarized in **Attachment 1**.

Matrix Spike/Spike Duplicate

For spiked sample OF-RW56-0216 in SDG 320-17185, perfluorobutanesulfonic acid (PFBS) exhibited high recoveries in the MS/MSD. Affected data are summarized in **Attachment 1**.

Surrogates

Surrogates for the samples listed below exhibited low recoveries. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW67-0216	320-17154
OF-RW47-0216	320-17219
OF-RW70-0216	320-17236

Sample Name	SDG	
OF-RW24-0216	320-17278	

Internal Standards

Internal standards exhibited low recoveries for the samples listed below. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW37-0216	320-17154
OF-FB56-0216	320-17185

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,

Tiffany McGlynn

Qualification Flags

Exclude More appropriate data exist for this analyte.

R Data were rejected for use.

Analyte not detected, quantitation limit is potentially biased

UL low.

UJ Analyte not detected, estimated quantitation limit.

U Analyte not detected.

Not detected substantially above the level reported in

B laboratory or field blanks.

L Analyte present, estimated value potentially biased low.K Analyte present, estimated value potentially biased high.

Analyte identification presumptive; no second column analysis

N performed or GC/MS tentative identification.

J Analyte present, estimated value.

Analysis indicates the presence of an analyte that was

"tentatively identified" and the associated value represents its

NJ approximate concentration.

Placeholder for calculating quality control issues that do not

None require flagging.

Analyte was detected at a concentration greater than the

guantitation limit.

Qualifier Code Reference

Second Column – Poor Dual Column Reproducibility Second Source – Bad reproducibility between tandem detectors Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision BRL Below Reporting Limit BSH Blank Spike/LCS – High Recovery BSL Blank Spike/LCS – Low Recovery CC Continuing Calibration Continuing Calibration Blank COBL Continuing Calibration Verification – High Recovery Continuing Calibration Verification – Low Recovery CL Redundant Result – due to Dilution EBL Equipment Blank Contamination ESH Extraction Standard - High Recovery ESL Extraction Standard - Low Recovery FBL Field Blank Contamination FD Field Duplicate HT Holding Time Initial Calibration – Bad Linearity or Curve Function Initial Calibration – Bad Linearity or Curve Function Initial Calibration – Low Relative Response Factors IR15 Ion ratio exceeds +/- 15% difference ISH Internal Standard – Low Recovery ISL Internal Standard – Low Recovery Lab Duplicate Reproducibility LR Concentration Exceeds Linear Range MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision MI Matrix interference obscuring the raw data	Value	Description
Second Column – Poor Dual Column Reproducibility Second Source – Bad reproducibility between tandem detectors Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision BRL Below Reporting Limit BSH Blank Spike/LCS – High Recovery BSL Blank Spike/LCS – Low Recovery CC Continuing Calibration Continuing Calibration Blank COBL Continuing Calibration Verification – High Recovery Continuing Calibration Verification – Low Recovery DL Redundant Result – due to Dilution EBL Equipment Blank Contamination ESH Extraction Standard - High Recovery ESL Extraction Standard - Low Recovery FBL Field Blank Contamination FD Field Duplicate HT Holding Time Initial Calibration – Bad Linearity or Curve Function Initial Calibration – High Relative Response Factors Initial Calibration – Low Relative Response Factors Initial Calibration – Low Relative Response Factors Internal Standard – High Recovery ISL Internal Standard – High Recovery ISL Internal Standard – Low Recovery Lab Duplicate Reproducibility LR Concentration Exceeds Linear Range MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision		
2C Reproducibility Second Source – Bad reproducibility between tandem detectors Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision BRL Below Reporting Limit BSH Blank Spike/LCS – High Recovery BSL Blank Spike/LCS – Low Recovery CC Continuing Calibration Continuing Calibration Blank CCBL Continuing Calibration Verification – High Recovery Continuing Calibration Verification – Low Recovery Continuing Calibration Verification – Low Recovery DL Redundant Result – due to Dilution EBL Equipment Blank Contamination Estimated Possible Maximum Concentration ESH Extraction Standard - High Recovery ESL Extraction Standard - Low Recovery FBL Field Blank Contamination FD Field Duplicate HT Holding Time Initial Calibration – Bad Linearity or Curve Function Initial Calibration – High Relative Response Factors Initial Calibration – Low Relative Response Factors Initial Calibration – Low Relative Response Factors Internal Standard – High Recovery ISL Internal Standard – High Recovery ISL Internal Standard – Low Recovery Lab Duplicate Reproducibility LR Concentration Exceeds Linear Range MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision	%SOL	-
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ISL Internal Standard – Low Recovery LD Lab Duplicate Reproducibility LR Concentration Exceeds Linear Range MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision		
LD Lab Duplicate Reproducibility LR Concentration Exceeds Linear Range MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision		
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MBL Method Blank Contamination Matrix Spike/Matrix Spike Duplicate Precision		•
Matrix Spike/Matrix Spike Duplicate MDP Precision		
		Matrix Spike/Matrix Spike Duplicate

Value	Description
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune

