NAVFAC
Naval Facilities Engineering Command

Drinking Water Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, Sample Location Report, SDG 1804167

NAS

Chase Field TX

December 2020

January 02, 2019

Vista Work Order No. 1804167

Ms. Nia Nikmanesh
KMEA
2423 Hoover Avenue
National City, CA 91950

Dear Ms. Nikmanesh,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 21, 2018 under your Project Name 'Chase Field NAS'.

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

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

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1804167
Case Narrative

Sample Condition on Receipt:

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

Analytical Notes:

EPA Method 537, Rev. 1.1

The samples were extracted using EPA Method 537, Rev. 1.1. As requested, sample "PW2-122018-DW" was analyzed for a selected list of PFAS.

Holding Times

The samples were extracted within the method hold time. Sample "PW2-122018-DW" was analyzed within the method hold times. The extract of sample "PW2-122018-FB" was placed on hold.

Quality Control

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

Two Laboratory Fortified Blanks (LFB/LFBD) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank above 1/2 the LOQ. The LFB/LFBD recoveries were within the method acceptance criteria.

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

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1804167-01	PW2-122018-DW	20-Dec-18 09:38	21-Dec-18 13:24	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1804167-02	PW2-122018-FB	20-Dec-18 09:40	21-Dec-18 13:24	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

Vista Project: 1804167

Client Project: Chase Field NAS

ANALYTICAL RESULTS

Sample ID: LRB **EPA Method 537**

Client Data
Name: KMEA
Project: Chase Field NAS
Matrix: Aqueous

Laboratory Data
Lab Sample: B8L0193-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFHxA	307-24-4	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFHpA	375-85-9	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFHxS	355-46-4	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFOA	335-67-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFNA	375-95-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFOS	1763-23-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFDA	335-76-2	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
MeFOSAA	2355-31-9	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
EtFOSAA	2991-50-6	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFUnA	2058-94-8	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFDoA	307-55-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFTrDA	72629-94-8	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFTeDA	376-06-7	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	92.3	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
13C2-PFDA	SURR	95.3	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
d5-EtFOSAA	SURR	86.1	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: LFBD **EPA Method 537**

Name:	KMEA	Lab Sample:	B8L0193-BS1/B8L0193-BSD1
Project:	Chase Field NAS	QC Batch:	B8L0193
Matrix:	Aqueous	Samp Size:	0.250/0.250 L
		Date Extracted:	27-Dec-18
		Column:	BEH C18

Analyte	CAS Number	LFB (ug/L)	LFB Spike Amt	LFB % Rec	LFB Quals	LFBD (ug/L)	LFBD Spike Amt	LFBD % Rec	RPD	LFBD Quals	%Rec Limits	RPD Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
PFBS	375-73-5	0.0344	0.0354	97.1		0.0398	0.0354	112	14.6		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHxA	307-24-4	0.0388	0.0400	96.9		0.0415	0.0400	104	6.84		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHpA	375-85-9	0.0392	0.0400	98.0		0.0420	0.0400	105	7.06		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHxS	355-46-4	0.0335	0.0364	92.0		0.0372	0.0364	102	10.3		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFOA	335-67-1	0.0403	0.0400	101		0.0412	0.0400	103	2.15		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFNA	375-95-1	0.0401	0.0400	100		0.0433	0.0400	108	7.68		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFOS	1763-23-1	0.0335	0.0370	90.6		0.0403	0.0370	109	18.2		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFDA	335-76-2	0.0441	0.0400	110		0.0455	0.0400	114	3.03		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
MeFOSAA	2355-31-9	0.0394	0.0400	98.4		0.0404	0.0400	101	2.70		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
EtFOSAA	2991-50-6	0.0367	0.0400	91.9		0.0381	0.0400	95.3	3.70		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFUnA	2058-94-8	0.0405	0.0400	101		0.0403	0.0400	101	0.479		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFDoA	307-55-1	0.0386	0.0400	96.5		0.0389	0.0400	97.1	0.633		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFTrDA	72629-94-8	0.0326	0.0400	81.6		0.0327	0.0400	81.7	0.122		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFTeDA	376-06-7	0.0289	0.0400	72.4		0.0287	0.0400	71.6	0.997		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1

Labeled Standards	Type	LFB % Rec	LFB Quals	LFBD % Rec	LFBD Quals	Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
13C2-PFHxA	SURR	99.3		105		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1
13C2-PFDA	SURR	100		104		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1
d5-EtFOSAA	SURR	95.5		91.4		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1

Sample ID: PW2-122018-DW

EPA Method 537

Client Data

Name: KMEA
Project: Chase Field NAS
Matrix: Drinking Water
Date Collected: 20-Dec-18 09:38

Laboratory Data

Lab Sample: 1804167-01
Date Received: 21-Dec-18 13:24
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHxA	307-24-4	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHpA	375-85-9	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHxS	355-46-4	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFOA	335-67-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFNA	375-95-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFOS	1763-23-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFDA	335-76-2	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
MeFOSAA	2355-31-9	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
EtFOSAA	2991-50-6	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFUnA	2058-94-8	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFDoA	307-55-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFTrDA	72629-94-8	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFTeDA	376-06-7	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	104	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
13C2-PFDA	SURR	101	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
d5-EtFOSAA	SURR	87.6	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank**
Conc.	**Concentration**
D	**Dilution**
DL	**Detection limit**
E	**The associated compound concentration exceeded the calibration range of the instrument**
H	**Recovery and/or RPD was outside laboratory acceptance limits**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ**
LOD	**Limits of Detection**
LOQ	**Limits of Quantitation**
M	**Estimated Maximum Possible Concentration (CA Region 2 projects only)**
NA	**Not applicable**
ND	**Not Detected**
Q	**Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)**
TEQ	**Toxic Equivalency**
U	**Not Detected (specific projects only)**
*****	**See Cover Letter**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-18-9
Virginia Department of General Services	9618
Washington Department of Ecology	C584-18
Wisconsin Department of Natural Resources	998036160

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

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Rev. No.: 0
Rev. Date: 06/27/2017

ID: LR - 537COC

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1804167 Temp: 0.7 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

Project ID: Chase Field NAS PO#: PO934 Sampler: Brian Gieselman (name)

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

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Kevin Olness/Kelli Miller	Wood	9210 Sky Park Court, Suite 200	San Diego	CA	858-633-2804	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Brian Gieselman/Brian Gieselman	12/20/18	16:30	Isabella Filigenzi/Isabella Filigenzi	12/21/18	13:24

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

Method of Shipment:

ATTN: Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s): Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/PFOS	UCMR3 PFAS List:6	537 List: 14	Full List of 26	Other: Please List Below	EPA Method 537(DW only): PFOA/PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
PW2-122018-DW	12/20/18	0938	Preservative: TZ	2	P	DW								X	
PW2-122018-FB	"	0940	"	2	P	DW								X	Extraction Only

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:
Name: Kevin Olness/Kelli Miller (above)
Company:
Address:
City: State: Zip:
Phone: Fax:
Email:

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Page: 1 of 1

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1804167 TAT 7

Samples Arrival:	**Date/Time** 12/21/18 13:24	**Initials:** QF	**Location:** ~~WR~~ QF 12/21/18 WR-2 **Shelf/Rack:** N/A
Logged In:	**Date/Time** 12/21/18 1421	**Initials:** JBS	**Location:** WR-2 **Shelf/Rack:** B4

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

Temp °C: ~~1.7~~ 0.8 QF 12/21/18 (uncorrected)	**Probe used:** Y / (N)	**Thermometer ID:** IR-4
Temp °C: 0.7 (corrected)		

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill — Trk # 7845 8886 8057	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	

If Chlorinated or Drinking Water Samples, Acceptable Preservation?					✓		1
Preservation Documented:	$Na_2S_2O_3$	(Trizma)	None	Other	(Yes)	No	NA
Shipping Container	Vista	Client	Retain	Return		Dispose	

Comments:

January 02, 2019

Vista Work Order No. 1804167

Ms. Nia Nikmanesh
KMEA
2423 Hoover Avenue
National City, CA 91950

Dear Ms. Nikmanesh,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 21, 2018 under your Project Name 'Chase Field NAS'.

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

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

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1804167
Case Narrative

Sample Condition on Receipt:

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

Analytical Notes:

EPA Method 537, Rev. 1.1

The samples were extracted using EPA Method 537, Rev. 1.1. As requested, sample "PW2-122018-DW" was analyzed for a selected list of PFAS.

Holding Times

The samples were extracted within the method hold time. Sample "PW2-122018-DW" was analyzed within the method hold times. The extract of sample "PW2-122018-FB" was placed on hold.

Quality Control

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

Two Laboratory Fortified Blanks (LFB/LFBD) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank above 1/2 the LOQ. The LFB/LFBD recoveries were within the method acceptance criteria.

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

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				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: LRB **EPA Method 537**

Client Data

Name: KMEA
Project: Chase Field NAS
Matrix: Aqueous

Laboratory Data

Lab Sample: B8L0193-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
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PFHpA	375-85-9	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFHxS	355-46-4	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFOA	335-67-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFNA	375-95-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFOS	1763-23-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFDA	335-76-2	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
MeFOSAA	2355-31-9	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
EtFOSAA	2991-50-6	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFUnA	2058-94-8	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFDoA	307-55-1	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFTrDA	72629-94-8	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
PFTeDA	376-06-7	ND	0.00304	0.00500	0.0100		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	92.3	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
13C2-PFDA	SURR	95.3	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1
d5-EtFOSAA	SURR	86.1	70 - 130		B8L0193	27-Dec-18	0.250 L	30-Dec-18 16:43	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: LFBD **EPA Method 537**

Name:	KMEA	Lab Sample:	B8L0193-BS1/B8L0193-BSD1
Project:	Chase Field NAS	QC Batch:	B8L0193
Matrix:	Aqueous	Samp Size:	0.250/0.250 L
		Date Extracted:	27-Dec-18
		Column:	BEH C18

Analyte	CAS Number	LFB (ug/L)	LFB Spike Amt	LFB % Rec	LFB Quals	LFBD (ug/L)	LFBD Spike Amt	LFBD % Rec	RPD	LFBD Quals	%Rec Limits	RPD Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
PFBS	375-73-5	0.0344	0.0354	97.1		0.0398	0.0354	112	14.6		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHxA	307-24-4	0.0388	0.0400	96.9		0.0415	0.0400	104	6.84		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHpA	375-85-9	0.0392	0.0400	98.0		0.0420	0.0400	105	7.06		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFHxS	355-46-4	0.0335	0.0364	92.0		0.0372	0.0364	102	10.3		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFOA	335-67-1	0.0403	0.0400	101		0.0412	0.0400	103	2.15		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFNA	375-95-1	0.0401	0.0400	100		0.0433	0.0400	108	7.68		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFOS	1763-23-1	0.0335	0.0370	90.6		0.0403	0.0370	109	18.2		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFDA	335-76-2	0.0441	0.0400	110		0.0455	0.0400	114	3.03		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
MeFOSAA	2355-31-9	0.0394	0.0400	98.4		0.0404	0.0400	101	2.70		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
EtFOSAA	2991-50-6	0.0367	0.0400	91.9		0.0381	0.0400	95.3	3.70		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFUnA	2058-94-8	0.0405	0.0400	101		0.0403	0.0400	101	0.479		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFDoA	307-55-1	0.0386	0.0400	96.5		0.0389	0.0400	97.1	0.633		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFTrDA	72629-94-8	0.0326	0.0400	81.6		0.0327	0.0400	81.7	0.122		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1
PFTeDA	376-06-7	0.0289	0.0400	72.4		0.0287	0.0400	71.6	0.997		70-130	30	30-Dec-18 16:21	1	30-Dec-18 16:32	1

Labeled Standards	Type	LFB % Rec	LFB Quals	LFBD % Rec	LFBD Quals	Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
13C2-PFHxA	SURR	99.3		105		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1
13C2-PFDA	SURR	100		104		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1
d5-EtFOSAA	SURR	95.5		91.4		70-130	30-Dec-18 16:21	1	30-Dec-18 16:32	1

Sample ID: PW2-122018-DW

EPA Method 537

Client Data

Name: KMEA
Project: Chase Field NAS
Matrix: Drinking Water
Date Collected: 20-Dec-18 09:38

Laboratory Data

Lab Sample: 1804167-01
Date Received: 21-Dec-18 13:24
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHxA	307-24-4	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHpA	375-85-9	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFHxS	355-46-4	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFOA	335-67-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFNA	375-95-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFOS	1763-23-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFDA	335-76-2	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
MeFOSAA	2355-31-9	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
EtFOSAA	2991-50-6	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFUnA	2058-94-8	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFDoA	307-55-1	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFTrDA	72629-94-8	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
PFTeDA	376-06-7	ND	0.00308	0.00508	0.0101		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	104	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
13C2-PFDA	SURR	101	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1
d5-EtFOSAA	SURR	87.6	70 - 130		B8L0193	27-Dec-18	0.246 L	30-Dec-18 20:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank**
Conc.	**Concentration**
D	**Dilution**
DL	**Detection limit**
E	**The associated compound concentration exceeded the calibration range of the instrument**
H	**Recovery and/or RPD was outside laboratory acceptance limits**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ**
LOD	**Limits of Detection**
LOQ	**Limits of Quantitation**
M	**Estimated Maximum Possible Concentration (CA Region 2 projects only)**
NA	**Not applicable**
ND	**Not Detected**
Q	**Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)**
TEQ	**Toxic Equivalency**
U	**Not Detected (specific projects only)**
*****	**See Cover Letter**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-18-9
Virginia Department of General Services	9618
Washington Department of Ecology	C584-18
Wisconsin Department of Natural Resources	998036160

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

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Rev. No.: 0
Rev. Date: 06/27/2017

ID: LR - 537COC

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1804167 Temp: 0.7 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

Project ID: Chase Field NAS PO#: PO934 Sampler: Brian Gieselman (name)

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

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Kevin Olness/Kelli Miller	Wood	9210 Sky Park Court, Suite 200	San Diego	CA	858-633-2804	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Brian Gieselman/Brian Gieselman	12/20/18	16:30	Isabella Filigenzi/Isabella Filigenzi	12/21/18	13:24

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

Method of Shipment:

ATTN: Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s): Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/PFOS	UCMR3 PFAS List:6	537 List: 14	Full List of 26	Other: Please List Below	EPA Method 537(DW only): PFOA/PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
PW2-122018-DW	12/20/18	0938	Preservative: TZ	2	P	DW								X	
PW2-122018-FB	11	0940	11	2	P	DW								X	Extraction Only

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:
Name: Kevin Olness/Kelli Miller (above)
Company:
Address:
City: State: Zip:
Phone: Fax:
Email:

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Page: 1 of 1

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1804167 TAT 7

Samples Arrival:	**Date/Time** 12/21/18 13:24	**Initials:** QF	**Location:** ~~WR~~ QF 12/21/18 WR-2 **Shelf/Rack:** N/A
Logged In:	**Date/Time** 12/21/18 1421	**Initials:** BLB	**Location:** WR-2 **Shelf/Rack:** B4

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

Temp °C: ~~1.7~~ 0.8 QF 12/21/18 (uncorrected)	**Probe used:** Y / (N)	**Thermometer ID:** IR-4
Temp °C: 0.7 (corrected)		

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Shipping Documentation Present?	✓		
Airbill — Trk # 7845 8886 8057	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	

If Chlorinated or Drinking Water Samples, Acceptable Preservation?					✓		1
Preservation Documented:	$Na_2S_2O_3$	(Trizma)	None	Other	(Yes)	No	NA
Shipping Container	Vista	Client	Retain	Return		Dispose	

Comments:

EXTRACTION INFORMATION

RUSH

Process Sheet

Workorder: 1804167

Prep Expiration: 2019-Jan-03
Client: KMEA

Workorder Due: 02-Jan-19 00:00

TAT: 12

Method: **537 PFAS DW DoD Unmodified**
Matrix: **Aqueous**

Prep Batch: BSL0193

Prep Data Entered: 12/28/18 MAC
Date and Initials

Version: 14 Analyte DW (Full List)
DoD: DoD QSM 5.1

Initial Sequence: _____

LabSampID	A/B	Prep Rec	Spike Rec	ClientSampleID	Comments	Location	Container
1804167-01	"A"	☑	☑	PW2-122018-DW		WR-2 B-4	HDPE Bottle, 250 mL
1804167-02	*	☑	☑	PW2-122018-FB		WR-2 B-4	HDPE Bottle, 250 mL

* Extract and hold.

12/21/18

Pre-Prep Check Out: FR 12/27/18
Pre-Prep Check In: NA

Prep Check Out: NA
Prep Check In: NA

Prep Reconciled Initals/Date: MAC 12/27/18
Spike Reconciled Initals/Date: AE 12/27/18
VialBoxID: Hem Rack

PREPARATION BENCH SHEET

B8L0193

Matrix: Aqueous

Method: 537 PFAS DW DoD Unmodified
Method: 537 PFAS DW Unmodified MI Sp Sig Digs

Prepared using: LCMS - SPE Extraction-LCMS

Chemist: MAC
Prep Date: 12/27/18
Prep Time: 0850

BalanceID: HRMS - 9

Cen	VISTA Sample ID	Bottle + Sample (g) AE 12/27/18	Bottle Only (g)	Sample Amt. (L)	SS/NS CHEM/WIT DATE	SPE	IS CHEM/WIT DATE
☐	B8L0193-BLK1 (A)	NA	NA	(0.250)	MAC MJ 12/27/18	MAC 12/27/18	MAC HN 12/28/18
☐	B8L0193-BS1	↓	↓	(0.250)	↓	↓	↓
☐	B8L0193-BSD1	↓	↓	(0.250)	↓	↓	↓
☐	1803885-01RE1	268.32	26.90	0.24142	↓	↓	↓
☐	1803887-01RE1	252.43	27.30	0.22513	↓	↓	↓
☒	1804129-01	266.06	26.56	0.23950	↓	↓	↓
☐	1804129-02	274.51	27.12	0.24739	↓	↓	↓
☒	1804129-03	267.80	26.72	0.24108	↓	↓	↓
☐	1804129-04	267.05	26.75	0.24030	↓	↓	↓
☒	1804129-05	259.38	27.38	0.23200	↓	↓	↓
☐	1804129-06	272.73	26.64	0.24609	↓	↓	↓
☒	1804129-07	269.36	26.71	0.24265	↓	↓	↓
☐	1804129-08	272.83	26.92	0.24591	↓	↓	↓
☐	1804140-01	253.06	27.40	0.22566	↓	↓	↓
☐	1804140-02	263.14	27.12	0.23602	↓	↓	↓
☐	1804140-03	267.24	26.75	0.24049	↓	↓	↓

SS/IS: (X) ~~18I26~~ 18I2508, 10µL (V1)
NS: 18H1311, 10µL (V1)
IS/RS: 18J1402, 10µL (V1)

SPE Chem: Strata X 33 µm 500 mg / 6 mL
Lot#:
Ele SOLV: MeOH
Lot#:
Final Volume(s) 1 mL

Notes:
(A) Trizma added to QC samples 12/27/18 AE
(X) MAC 12/27/18

Comments: Assume 1 g = 1 mL
Cen = Centrifuged

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537 PFAS DW DoD Unmodified
Method: 537 PFAS DW Unmodified MI Sp Sig Digs

B8L0193

Chemist: MAC
Prep Date: 12/27/18
Prep Time: 0850

Prepared using: LCMS - SPE Extraction-LCMS

BalanceID: HRMS-9

Cen	VISTA Sample ID	Bottle + Sample (g) ae 12/27/18	Bottle Only (g)	Sample Amt. (L)	SS/NS CHEM/WIT DATE	SPE	IS CHEM/WIT DATE
☐	1804140-04	268.47	26.58	0.24189	MAC 12/27/18	MAC 12/27/18	MAC H/N 12/28/18
☐	1804165-01 12/27/18 ae	~~274.40~~ 274.33	27.50	0.23683			
☐	1804166-01 12/27/18 ae	~~257.17~~ 258.36	27.05	0.23131			
☐	1804167-01	274.39	28.03	0.24636 ✓			
☐	1804167-02	257.17	26.65	0.23052 ✓			

SS/IS: 18I2508, 10µL (V1)
NS: 18H1311, 10µL (V1)
IS/RS: 18I1102, 10µL (V1)

SPE Chem: Strata X 33µm 500 mg/6mL
Lot#:
Ele SOLV: MeOH
Lot#:
Final Volume(s) 1 mL

Notes:

Comments: Assume 1 g = 1 mL
Cen = Centrifuged

Batch: B8L0193

Matrix: Aqueous

LabNumber	WetWeight (Initial)	% Solids (Extraction Solids)	DryWeight	Final	Extracted	Ext By	Spike	SpikeAmount	ClientMatrix	Analysis
1803885-01RE1	0.24142 ✓	NA	NA	1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1803887-01RE1	0.22513 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804129-01	0.2395 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-02	0.24739 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-03	0.24108 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-04	0.2403 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-05	0.232 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-06	0.26409 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-07	0.24265 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804129-08	0.24591 ✓			1000	27-Dec-18 08:50	MAC			Aqueous	537 PFAS DW DoD Unmo
1804140-01	0.22566 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804140-02	0.23602 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804140-03	0.24049 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804140-04	0.24189 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804165-01	0.23683 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804166-01	0.23131 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW Unmodified
1804167-01	0.24636 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW DoD Unmo
1804167-02	0.23052 ✓			1000	27-Dec-18 08:50	MAC			Drinking Water	537 PFAS DW DoD Unmo
B8L0193-BLK1	0.25 ✓			1000	27-Dec-18 08:50	MAC				QC
B8L0193-BS1	0.25 ✓			1000	27-Dec-18 08:50	MAC	18H1311 ✓	10 ✓		QC
B8L0193-BSD1	0.25 ✓			1000	27-Dec-18 08:50	MAC	18H1311 ✓	10 ✓		QC

MAC 12/28/18

Printed: 12/28/2018 10:02:01AM

SAMPLE DATA –EPA METHOD 537

Vista Analytical Laboratory

MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-17.qld

Last Altered: Wednesday, January 02, 2019 11:24:09 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:25:33 Pacific Standard Time

Name: 181230P1_17, Date: 30-Dec-2018, Time: 16:43:51, ID: B8L0193-BLK1 LRB 0.25, Description: LRB

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0		3131.097	0.250		3.51				
2	2	PFHxA	313.1 > 269.1		6687.353	0.250		3.81				
3	3	PFHpA	363 > 319		6687.353	0.250		4.26				
4	4	PFHxS	399 > 80.0		3131.097	0.250		4.39				
5	5	PFOA	413 > 369		6687.353	0.250		4.65				
6	19	13C4-PFOS	503.0 > 80	3131.097	3131.097	0.250	1.000	5.02	5.01	28.7	115	100.0
7	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
8	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
9	19	13C4-PFOS	503.0 > 80	3131.097	3131.097	0.250	1.000	5.02	5.01	28.7	115	100.0
10	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
11	-1											
12	6	PFNA	463 > 419		6687.353	0.250		4.95				
13	7	PFOS	499 >80.0	1.505	3131.097	0.250		5.01	5.02	0.0138	0.0665	
14	8	PFDA	513 > 469		6687.353	0.250		5.22				
15	9	N-MeFOSAA	570 > 419.1		11792.506	0.250		5.33				
16	10	N-EtFOSAA	584.0 >419.1		11792.506	0.250		5.43				
17	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
18	19	13C4-PFOS	503.0 > 80	3131.097	3131.097	0.250	1.000	5.02	5.01	28.7	115	100.0
19	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11792.506	11792.506	0.250	1.000	5.33	5.33	40.0	160	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11792.506	11792.506	0.250	1.000	5.33	5.33	40.0	160	100.0
22	-1											
23	11	PFUnA	563 > 519		6687.353	0.250		5.43				
24	12	PFDoA	613 > 569		6687.353	0.250		5.63				
25	13	PFTrDA	662.9 > 619		6687.353	0.250		5.81				
26	14	PFTeDA	712.9 > 669		6687.353	0.250		5.95				
27	15	13C2-PFHxA	315.1 > 270	5358.038	6687.353	0.250	0.868	3.81	3.82	8.01	36.9	92.3
28	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
29	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
30	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
31	18	13C2-PFOA	415 > 370	6687.353	6687.353	0.250	1.000	4.66	4.65	10.0	40.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7784.740	6687.353	0.250	1.221	5.22	5.22	11.6	38.1	95.3
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	11496.323	11792.506	0.250	1.132	5.43	5.43	39.0	138	86.1

GM 1/2/2019

Vista Analytical Laboratory

MM 1/2/2019

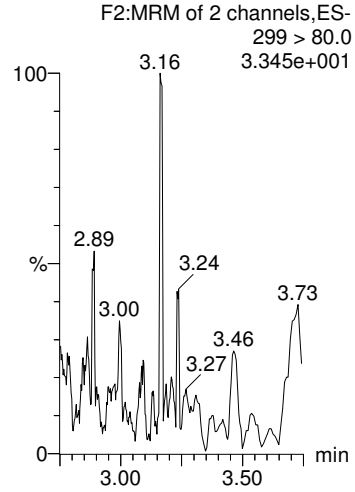
Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-17.qld

Last Altered: Wednesday, January 02, 2019 11:24:09 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:25:33 Pacific Standard Time

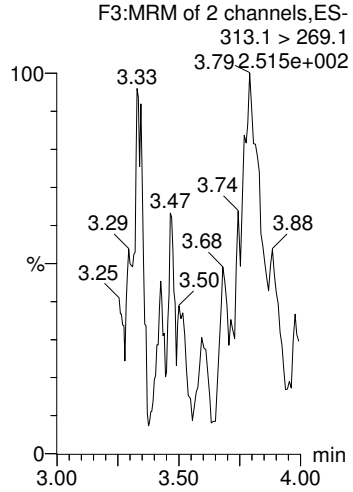
Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 31 Dec 2018 09:01:13
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_17, Date: 30-Dec-2018, Time: 16:43:51, ID: B8L0193-BLK1 LRB 0.25, Description: LRB

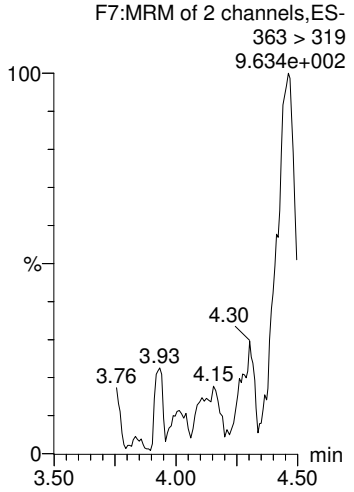
PFBS



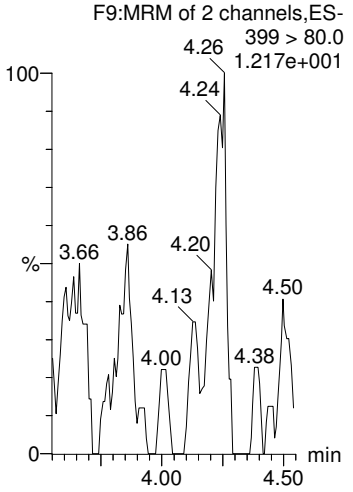
PFHxA



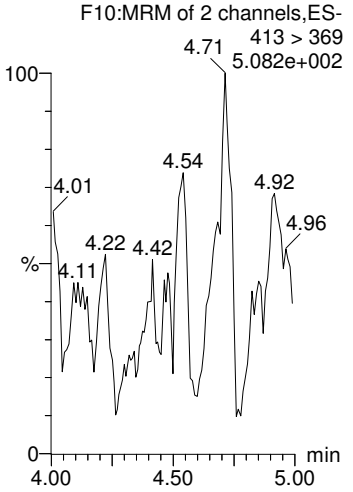
PFHpA



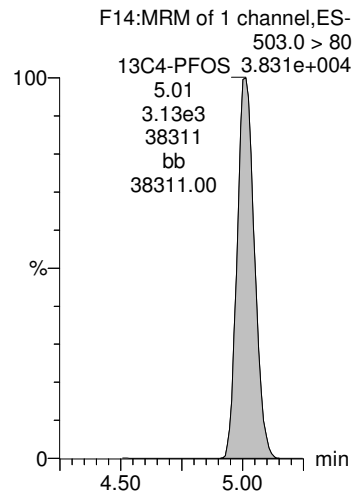
PFHxS



PFOA



13C4-PFOS



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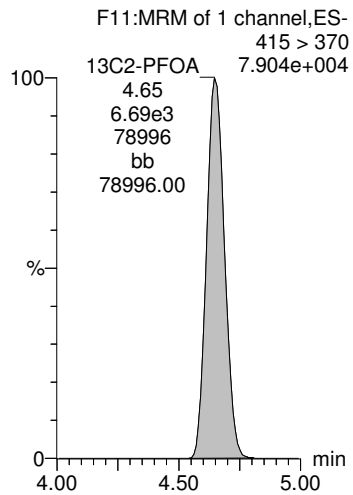

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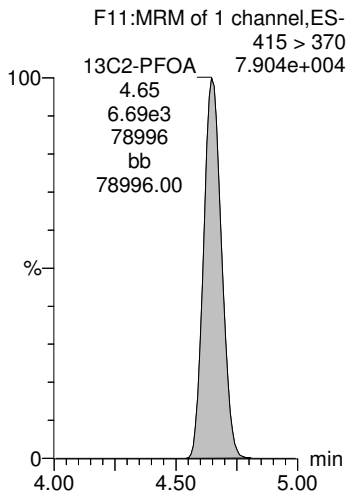

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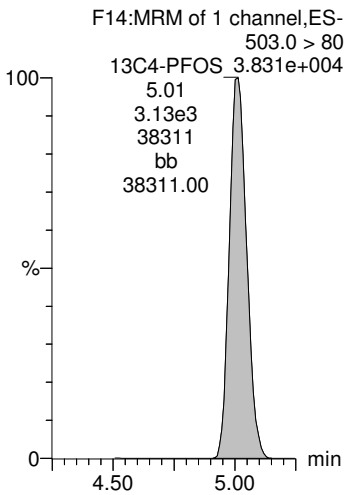

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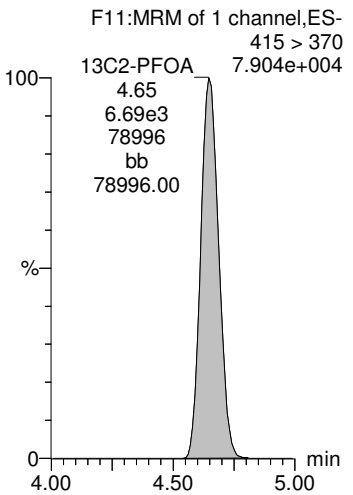


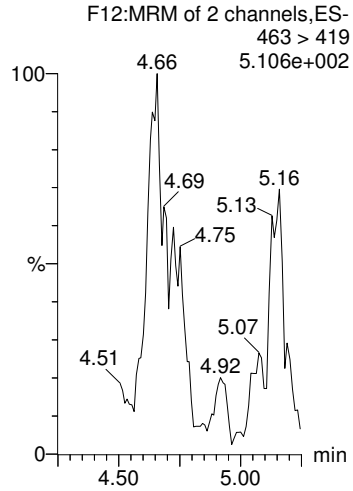
GM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-17.qld

Last Altered: Wednesday, January 02, 2019 11:24:09 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:25:33 Pacific Standard Time

Name: 181230P1_17, Date: 30-Dec-2018, Time: 16:43:51, ID: B8L0193-BLK1 LRB 0.25, Description: LRB

PFNA



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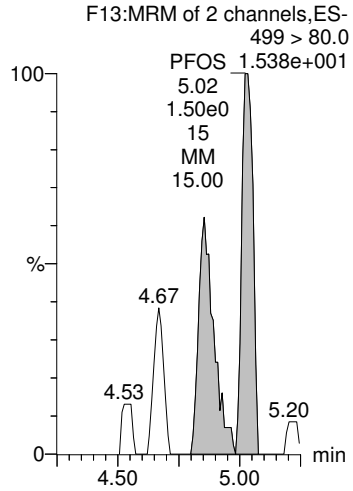

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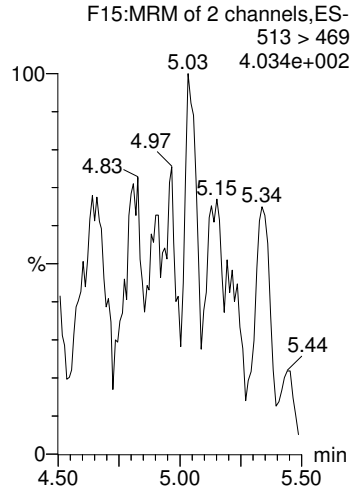
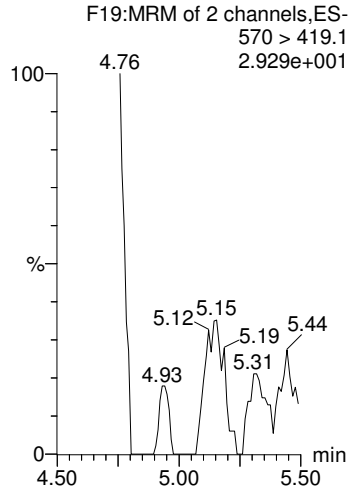


N-MeFOSAA



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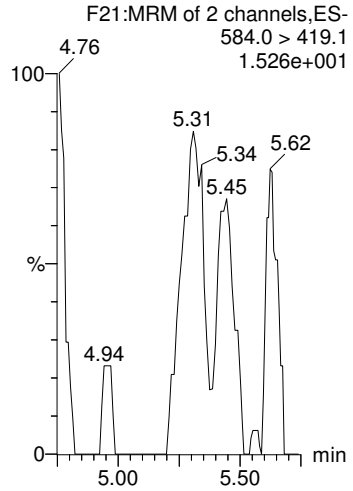

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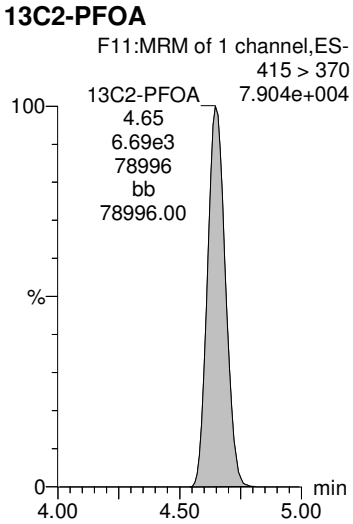

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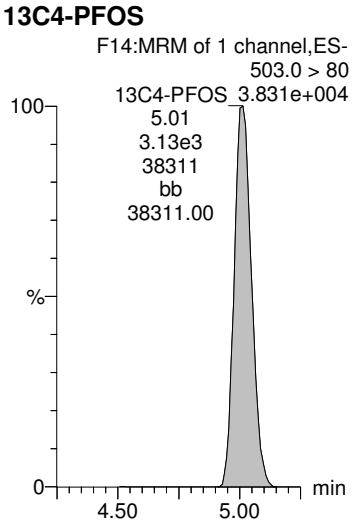

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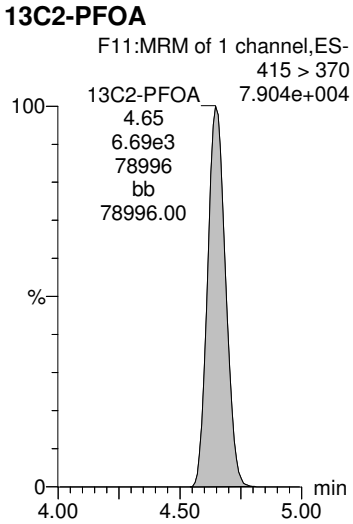

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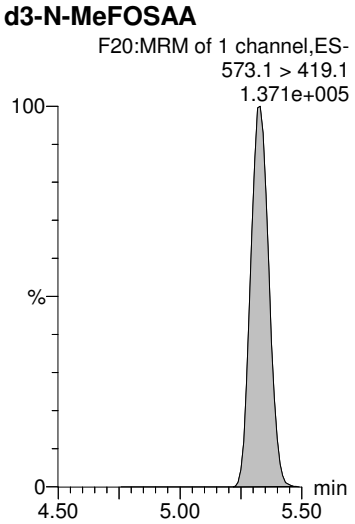

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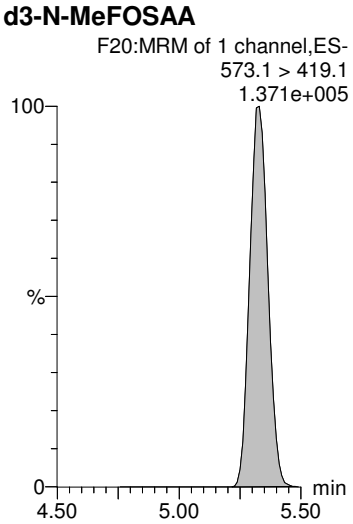


GM 1/2/2019

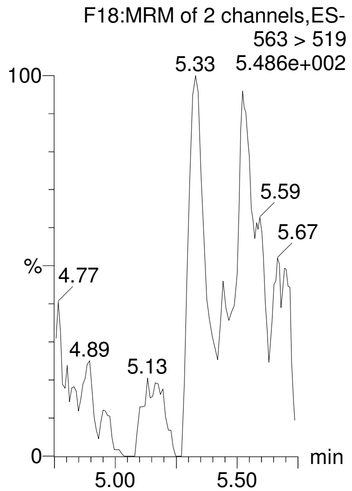
MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-17.qld

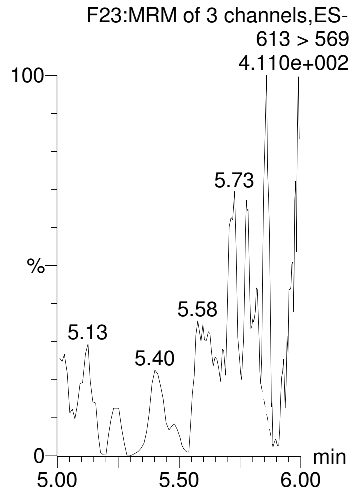
Last Altered: Wednesday, January 02, 2019 11:24:09 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:25:33 Pacific Standard Time

Name: 181230P1_17, Date: 30-Dec-2018, Time: 16:43:51, ID: B8L0193-BLK1 LRB 0.25, Description: LRB

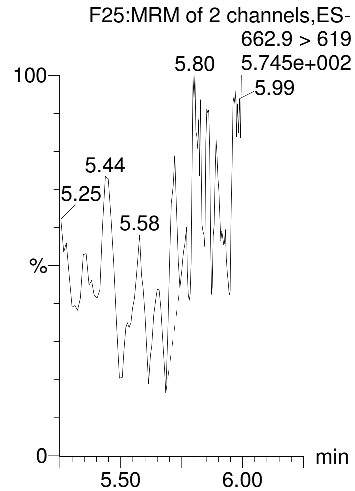
PFUnA



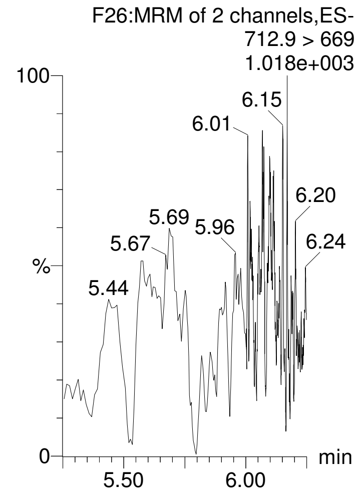
PFDoA



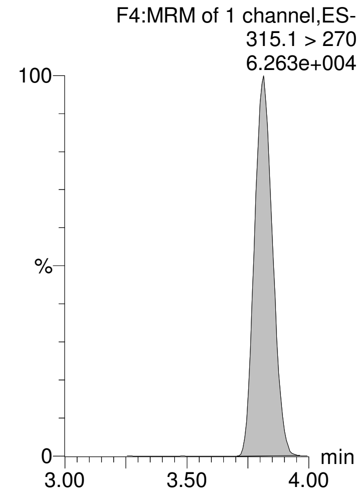
PFTrDA



PFTeDA



13C2-PFHxA



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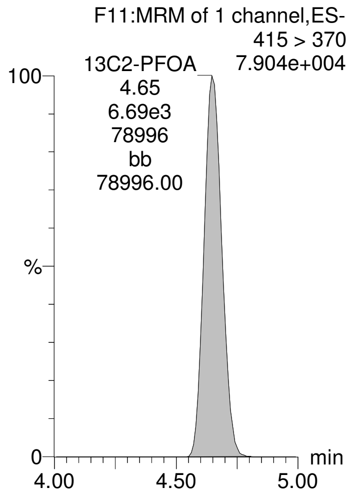

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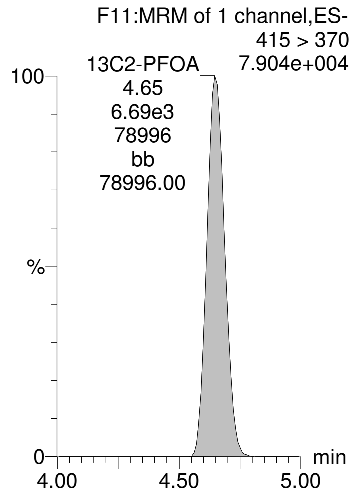

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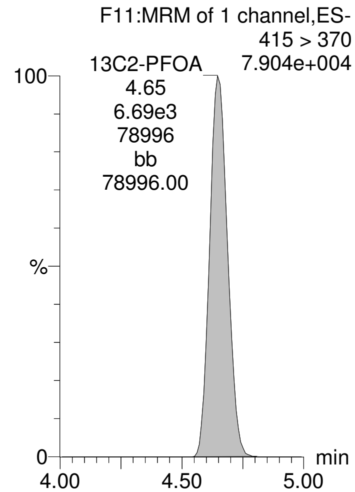
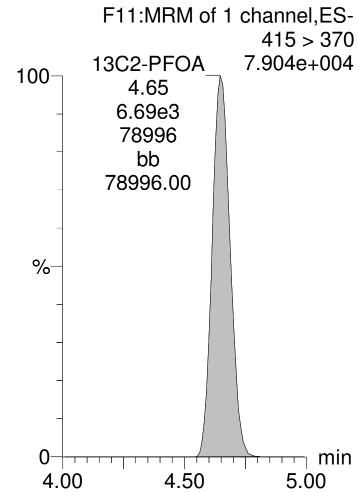
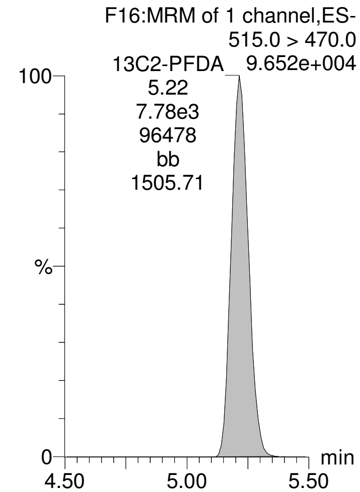


13C2-PFOA



13C2-PFDA



GM 1/2/2019

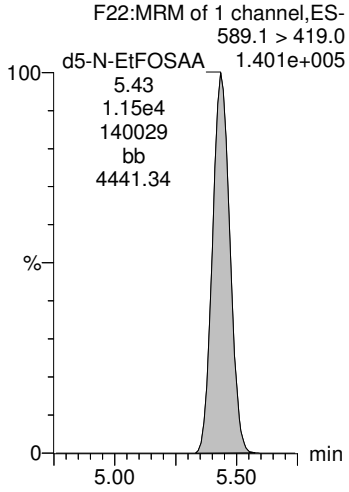
MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-17.qld

Last Altered: Wednesday, January 02, 2019 11:24:09 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:25:33 Pacific Standard Time

Name: 181230P1_17, Date: 30-Dec-2018, Time: 16:43:51, ID: B8L0193-BLK1 LRB 0.25, Description: LRB

d5-N-EtFOSAA



GM 1/2/2019

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MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181231P1\181231P1-15.qld

Last Altered: Wednesday, January 02, 2019 10:47:37 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:01:11 Pacific Standard Time

Name: 181230P1_15, Date: 30-Dec-2018, Time: 16:21:29, ID: B8L0193-BS1 LFB 0.25, Description: LFB

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0	755.675	3129.382	0.250		3.52	3.49	6.93	34.4	97.2
2	2	PFHxA	313.1 > 269.1	4256.118	6446.945	0.250		3.81	3.81	6.60	38.8	96.9
3	3	PFHpA	363 > 319	6381.961	6446.945	0.250		4.27	4.29	9.90	39.2	98.0
4	4	PFHxS	399 > 80.0	764.700	3129.382	0.250		4.40	4.41	7.01	33.5	91.8
5	5	PFOA	413 > 369	6923.221	6446.945	0.250		4.66	4.67	10.7	40.3	100.8
6	19	13C4-PFOS	503.0 > 80	3129.382	3129.382	0.250	1.000	5.02	5.02	28.7	115	100.0
7	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
8	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
9	19	13C4-PFOS	503.0 > 80	3129.382	3129.382	0.250	1.000	5.02	5.02	28.7	115	100.0
10	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
11	-1											
12	6	PFNA	463 > 419	6816.739	6446.945	0.250		4.96	4.96	10.6	40.1	100.2
13	7	PFOS	499 >80.0	758.896	3129.382	0.250		5.02	5.03	6.96	33.5	90.7
14	8	PFDA	513 > 469	7021.589	6446.945	0.250		5.23	5.23	10.9	44.1	110.3
15	9	N-MeFOSAA	570 > 419.1	2582.394	11492.279	0.250		5.34	5.34	8.99	39.4	98.4
16	10	N-EtFOSAA	584.0 >419.1	2252.995	11492.279	0.250		5.45	5.45	7.84	36.7	91.9
17	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
18	19	13C4-PFOS	503.0 > 80	3129.382	3129.382	0.250	1.000	5.02	5.02	28.7	115	100.0
19	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11492.279	11492.279	0.250	1.000	5.33	5.34	40.0	160	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11492.279	11492.279	0.250	1.000	5.33	5.34	40.0	160	100.0
22	-1											
23	11	PFUnA	563 > 519	7934.257	6446.945	0.250		5.44	5.45	12.3	40.5	101.2
24	12	PFDoA	613 > 569	9565.912	6446.945	0.250		5.64	5.65	14.8	38.6	96.5
25	13	PFTrDA	662.9 > 619	7899.318	6446.945	0.250		5.82	5.82	12.3	32.6	81.6
26	14	PFTeDA	712.9 > 669	6272.464	6446.945	0.250		5.96	5.97	9.73	28.9	72.4
27	15	13C2-PFHxA	315.1 > 270	5553.257	6446.945	0.250	0.868	3.82	3.82	8.61	39.7	99.3
28	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
29	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
30	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
31	18	13C2-PFOA	415 > 370	6446.945	6446.945	0.250	1.000	4.66	4.66	10.0	40.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7896.834	6446.945	0.250	1.221	5.23	5.23	12.2	40.1	100.3
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	12422.298	11492.279	0.250	1.132	5.44	5.45	43.2	153	95.5

GM 1/2/2019

Vista Analytical Laboratory

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Dataset: D:\PFAS.PRO\RESULTS\181231P1\181231P1-15.qld

Last Altered: Wednesday, January 02, 2019 10:47:37 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:01:11 Pacific Standard Time

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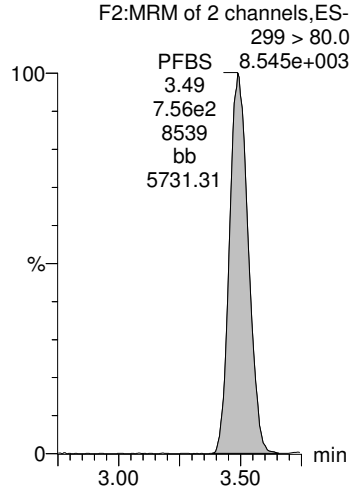
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_15, Date: 30-Dec-2018, Time: 16:21:29, ID: B8L0193-BS1 LFB 0.25, Description: LFB

PFBS



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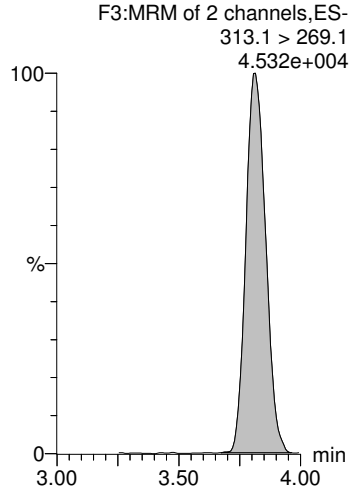

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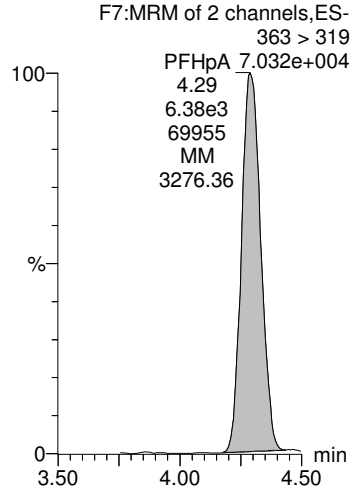

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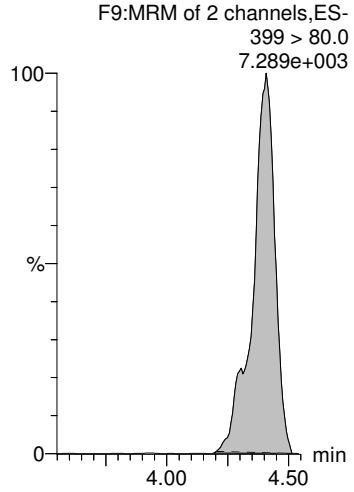

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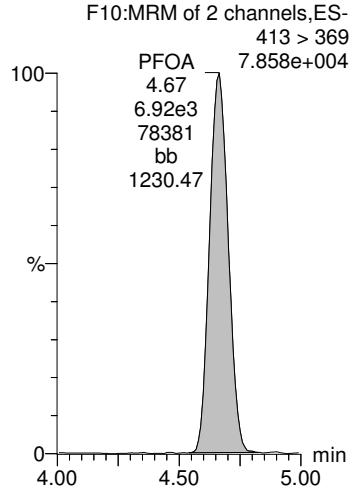

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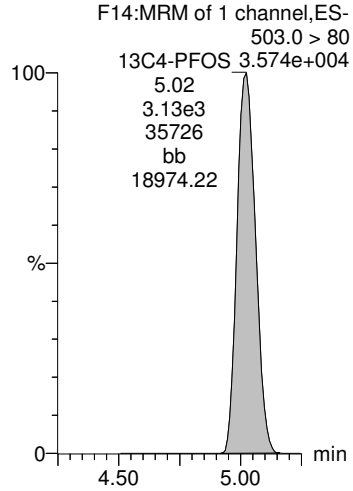

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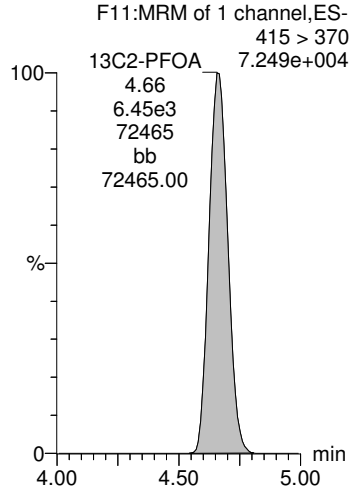

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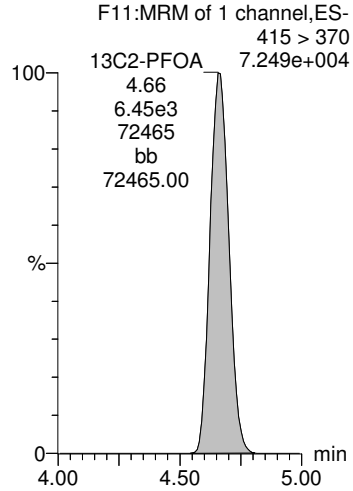

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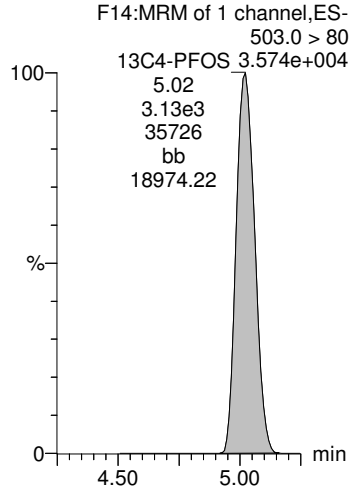

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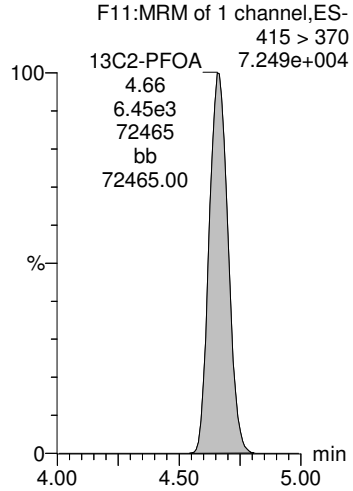

GM 1/2/2019

MM 1/2/2019

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Last Altered: Wednesday, January 02, 2019 10:47:37 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:01:11 Pacific Standard Time

Name: 181230P1_15, Date: 30-Dec-2018, Time: 16:21:29, ID: B8L0193-BS1 LFB 0.25, Description: LFB

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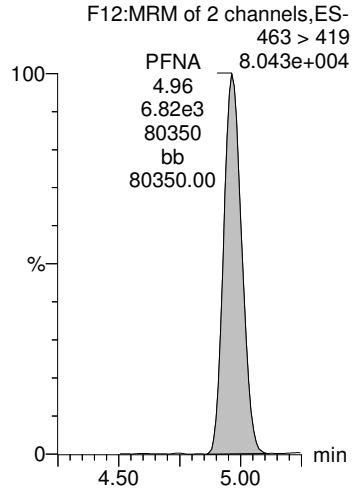

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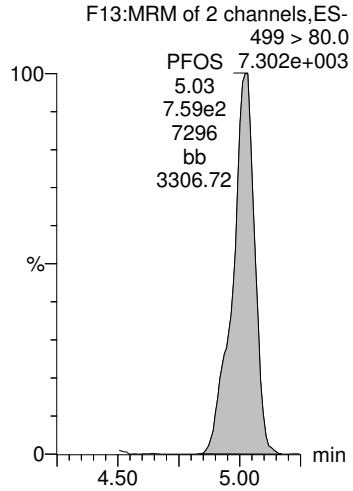

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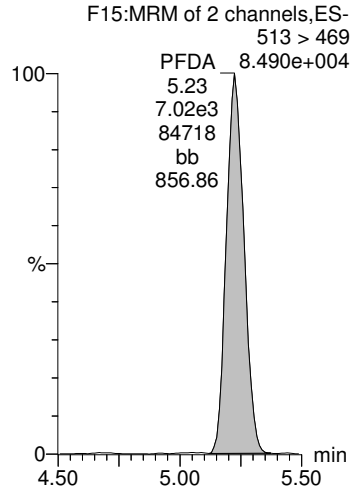

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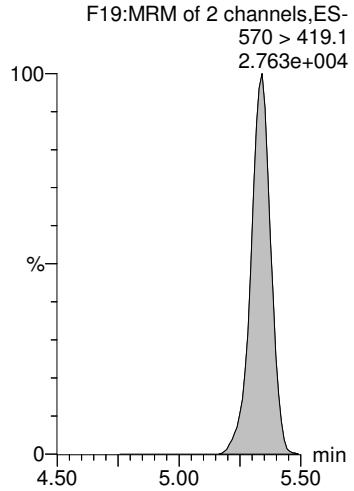

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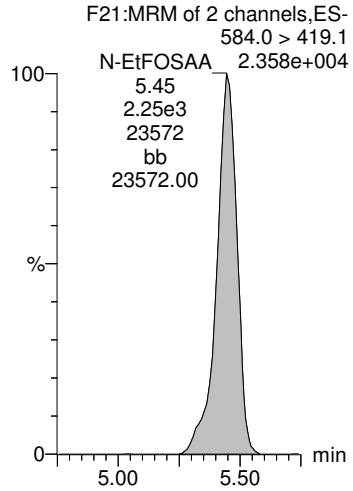

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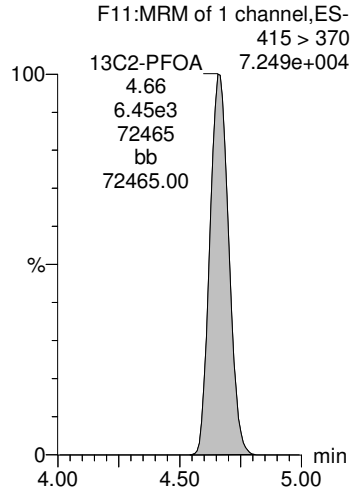

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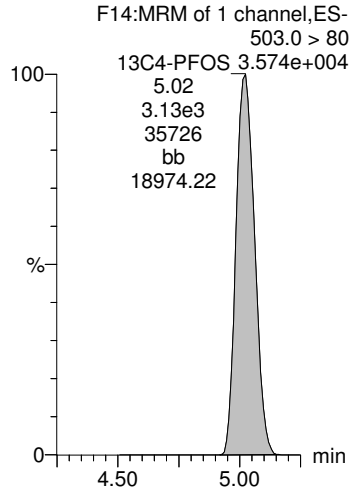

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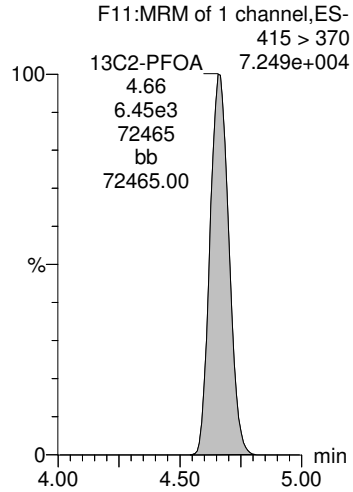

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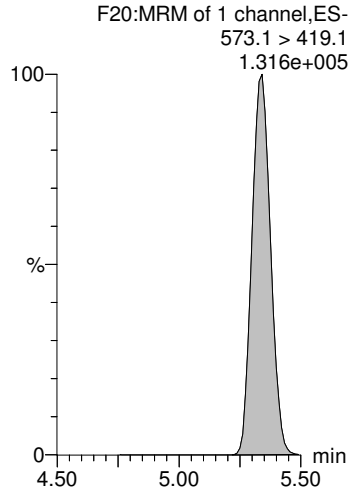

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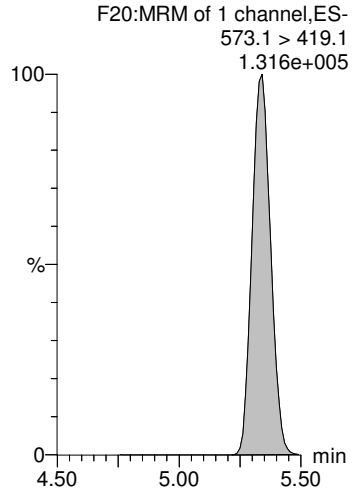

GM 1/2/2019

MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181231P1\181231P1-15.qld

Last Altered: Wednesday, January 02, 2019 10:47:37 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:01:11 Pacific Standard Time

Name: 181230P1_15, Date: 30-Dec-2018, Time: 16:21:29, ID: B8L0193-BS1 LFB 0.25, Description: LFB

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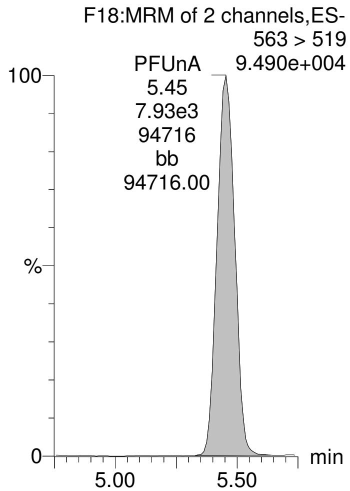

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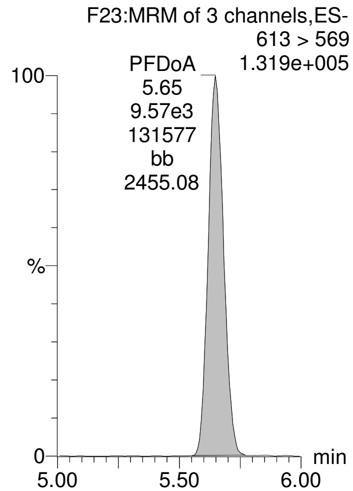

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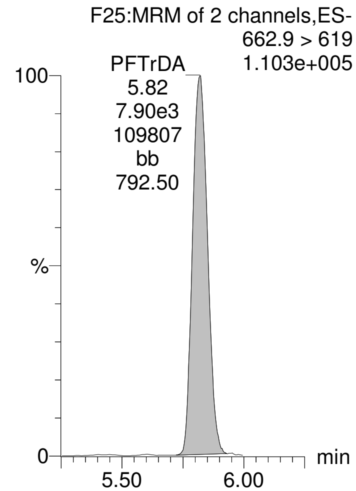

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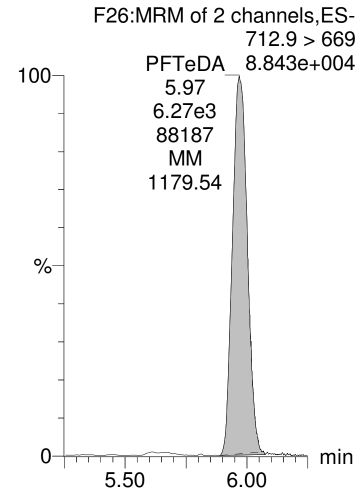

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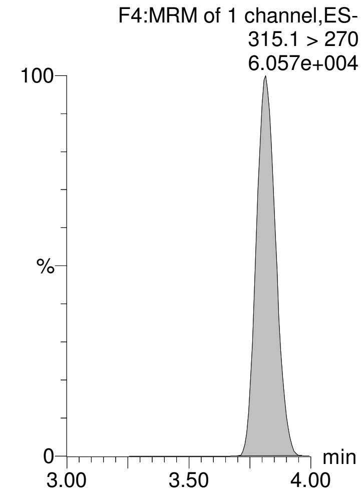

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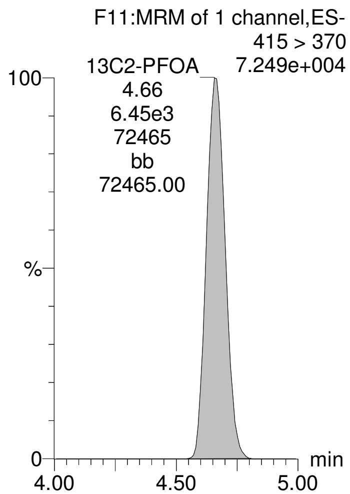

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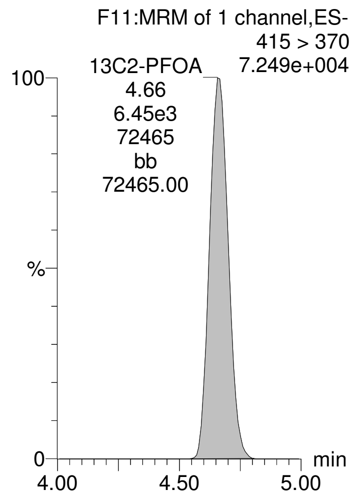

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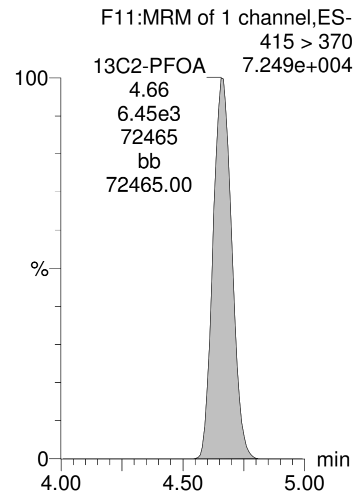

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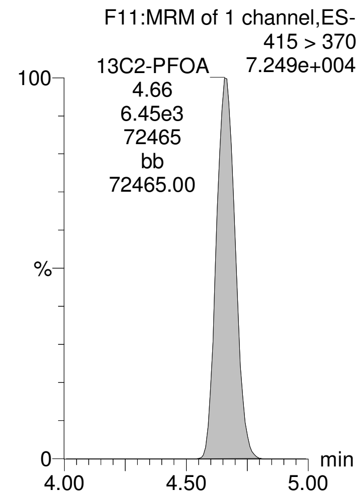

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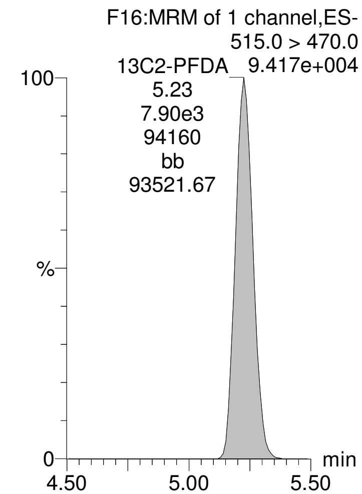

GM 1/2/2019

MM 1/2/2019

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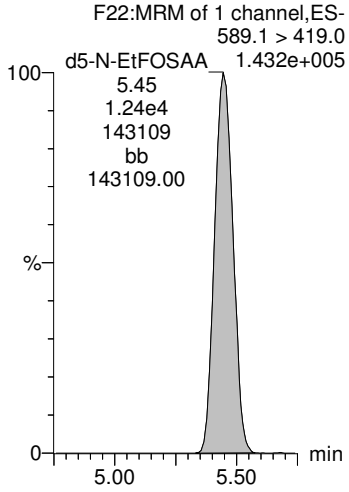
Name: 181230P1_15, Date: 30-Dec-2018, Time: 16:21:29, ID: B8L0193-BS1 LFB 0.25, Description: LFB

d5-N-EtFOSAA



GM 1/2/2019

Vista Analytical Laboratory

MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-16.qld

Last Altered: Wednesday, January 02, 2019 11:02:35 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:04:07 Pacific Standard Time

Name: 181230P1_16, Date: 30-Dec-2018, Time: 16:32:41, ID: B8L0193-BSD1 LFBD 0.25, Description: LFBD

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0	779.859	2791.141	0.250		3.51	3.52	8.02	39.8	112.5
2	2	PFHxA	313.1 > 269.1	4305.174	6089.929	0.250		3.81	3.82	7.07	41.5	103.8
3	3	PFHpA	363 > 319	6469.498	6089.929	0.250		4.27	4.28	10.6	42.0	105.1
4	4	PFHxS	399 > 80.0	756.443	2791.141	0.250		4.39	4.40	7.78	37.2	101.9
5	5	PFOA	413 > 369	6682.251	6089.929	0.250		4.66	4.66	11.0	41.2	103.0
6	19	13C4-PFOS	503.0 > 80	2791.141	2791.141	0.250	1.000	5.02	5.01	28.7	115	100.0
7	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
8	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
9	19	13C4-PFOS	503.0 > 80	2791.141	2791.141	0.250	1.000	5.02	5.01	28.7	115	100.0
10	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
11	-1											
12	6	PFNA	463 > 419	6953.548	6089.929	0.250		4.96	4.95	11.4	43.3	108.2
13	7	PFOS	499 >80.0	812.652	2791.141	0.250		5.01	5.01	8.36	40.3	108.9
14	8	PFDA	513 > 469	6840.057	6089.929	0.250		5.22	5.21	11.2	45.5	113.7
15	9	N-MeFOSAA	570 > 419.1	2586.188	11199.874	0.250		5.33	5.33	9.24	40.4	101.1
16	10	N-EtFOSAA	584.0 >419.1	2278.508	11199.874	0.250		5.43	5.45	8.14	38.1	95.3
17	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
18	19	13C4-PFOS	503.0 > 80	2791.141	2791.141	0.250	1.000	5.02	5.01	28.7	115	100.0
19	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11199.874	11199.874	0.250	1.000	5.33	5.33	40.0	160	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11199.874	11199.874	0.250	1.000	5.33	5.33	40.0	160	100.0
22	-1											
23	11	PFUnA	563 > 519	7459.105	6089.929	0.250		5.44	5.44	12.2	40.3	100.7
24	12	PFDoA	613 > 569	9093.516	6089.929	0.250		5.64	5.65	14.9	38.9	97.1
25	13	PFTrDA	662.9 > 619	7470.978	6089.929	0.250		5.82	5.81	12.3	32.7	81.7
26	14	PFTeDA	712.9 > 669	5865.774	6089.929	0.250		5.96	5.96	9.63	28.7	71.6
27	15	13C2-PFHxA	315.1 > 270	5537.590	6089.929	0.250	0.868	3.82	3.82	9.09	41.9	104.8
28	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
29	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
30	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
31	18	13C2-PFOA	415 > 370	6089.929	6089.929	0.250	1.000	4.66	4.66	10.0	40.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7698.794	6089.929	0.250	1.221	5.23	5.22	12.6	41.4	103.5
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	11592.415	11199.874	0.250	1.132	5.43	5.43	41.4	146	91.4

GM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-16.qld

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Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

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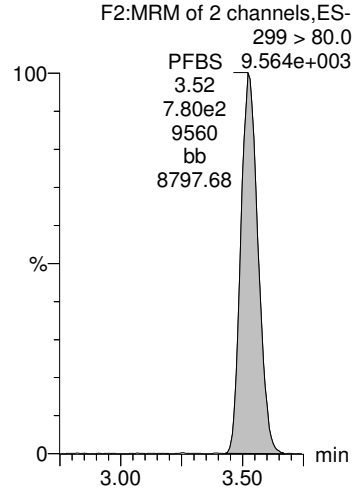

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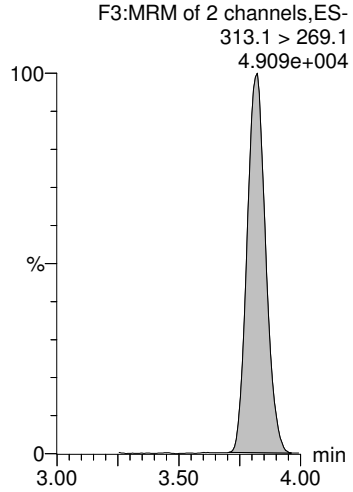

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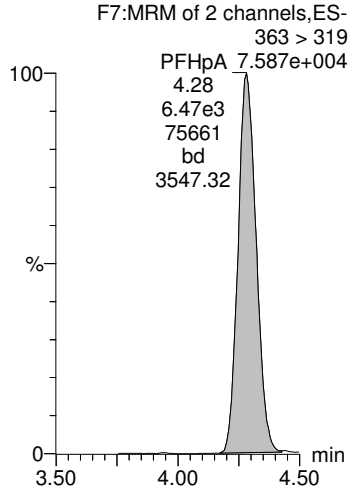

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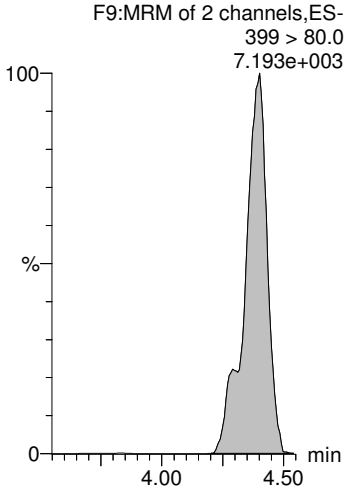
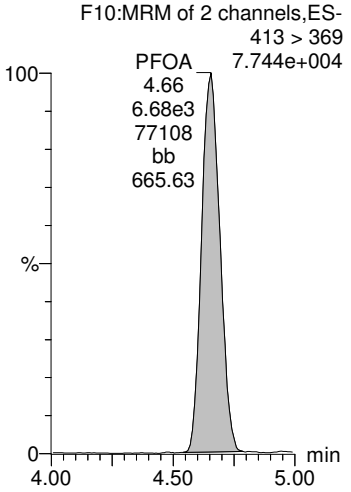
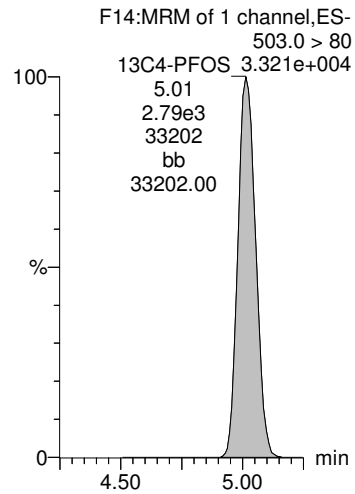


PFOA



13C4-PFOS



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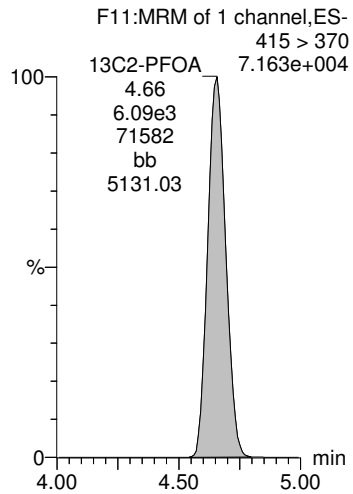

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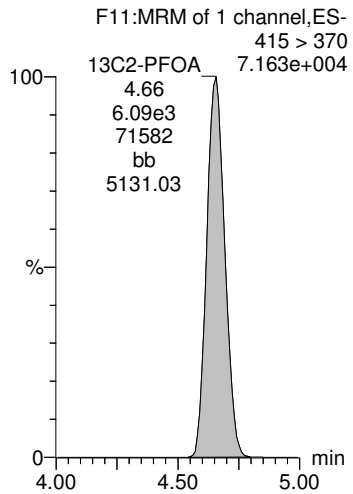

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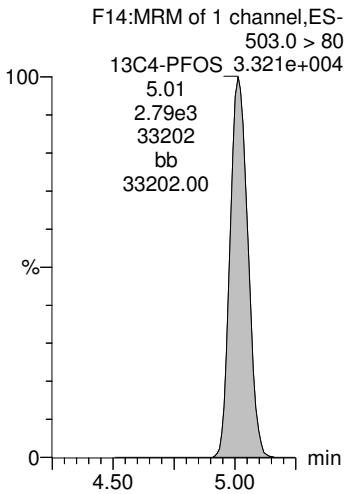

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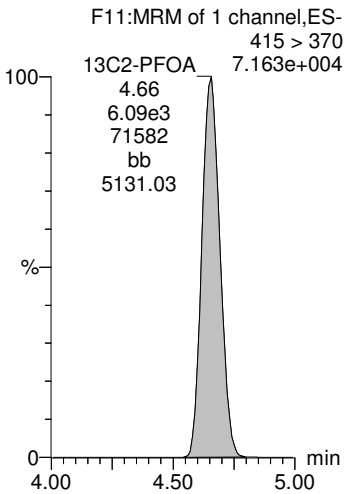

GM 1/2/2019

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Printed: Wednesday, January 02, 2019 11:04:07 Pacific Standard Time

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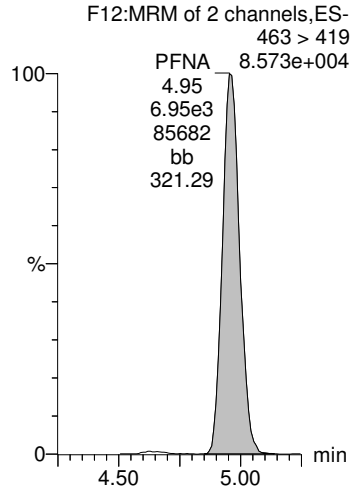

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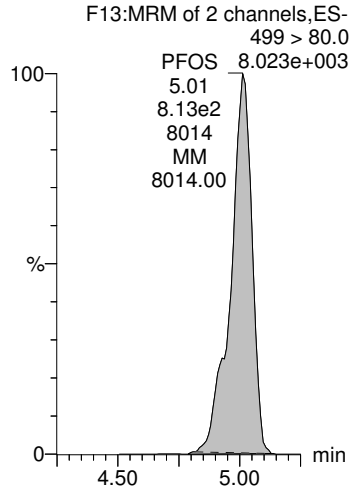

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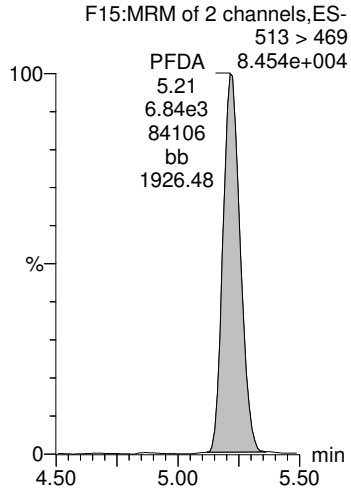

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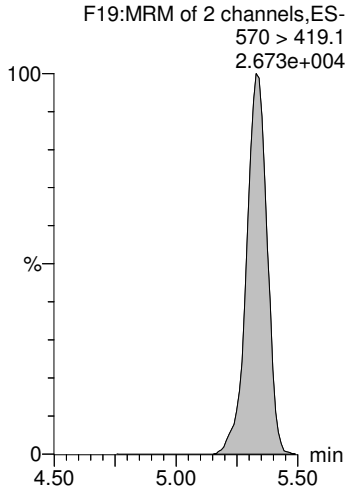

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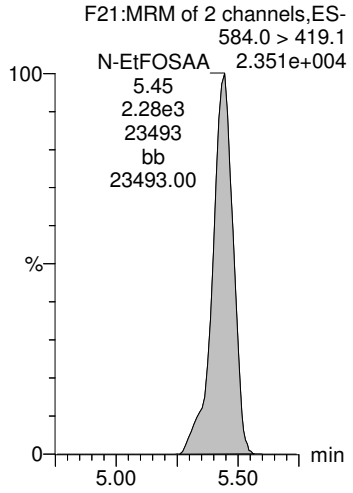

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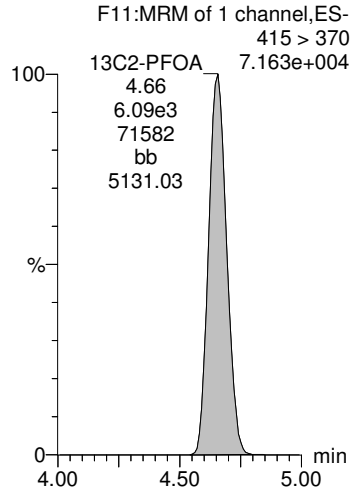

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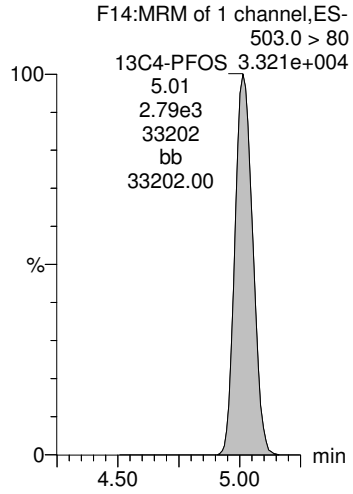

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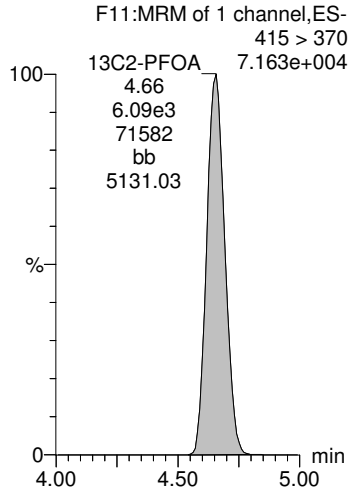

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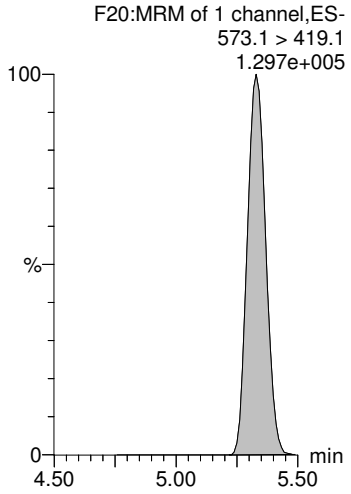

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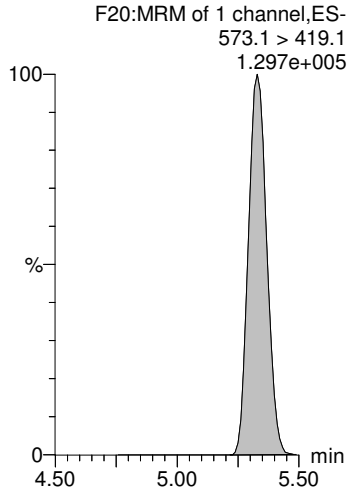

GM 1/2/2019

MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-16.qld

Last Altered: Wednesday, January 02, 2019 11:02:35 Pacific Standard Time
Printed: Wednesday, January 02, 2019 11:04:07 Pacific Standard Time

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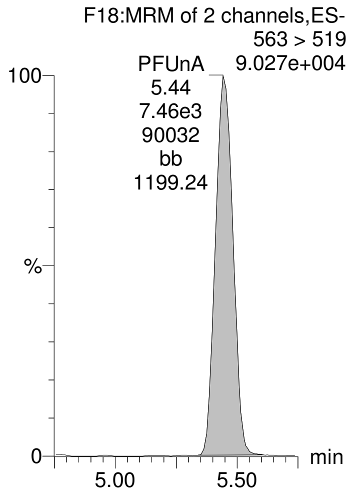

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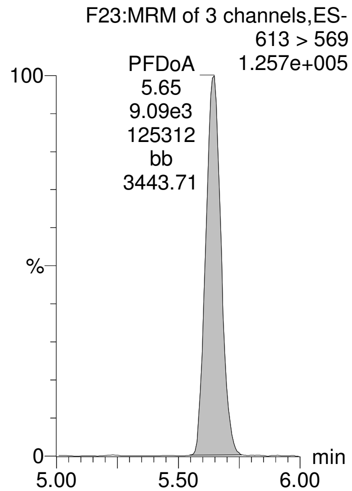

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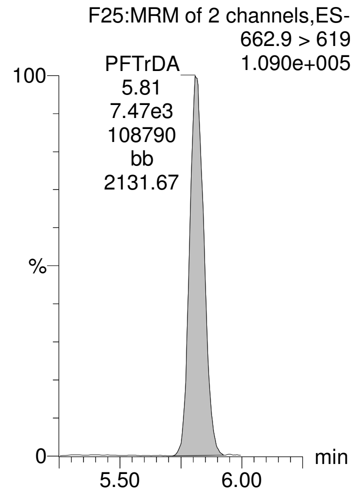

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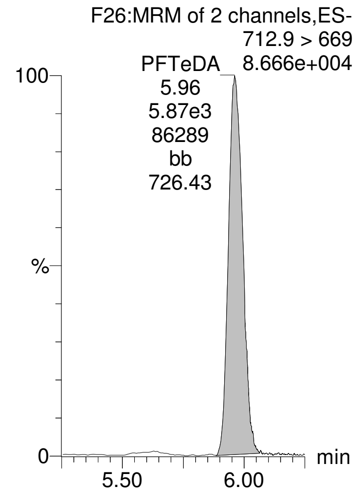

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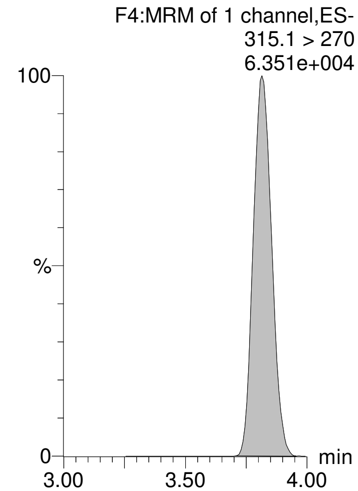

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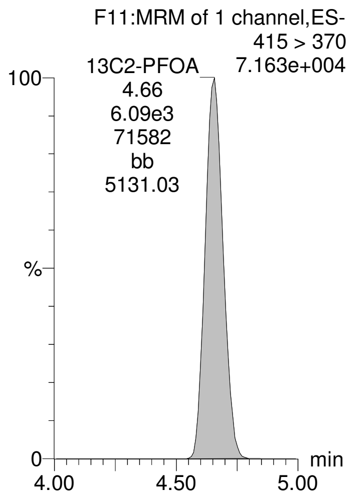

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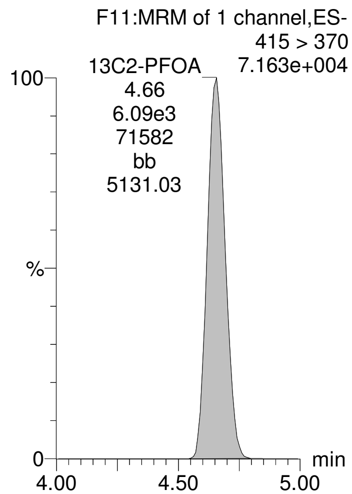

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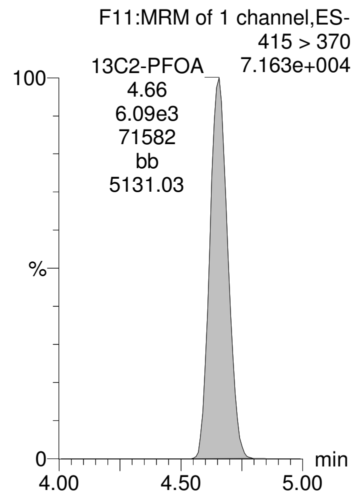

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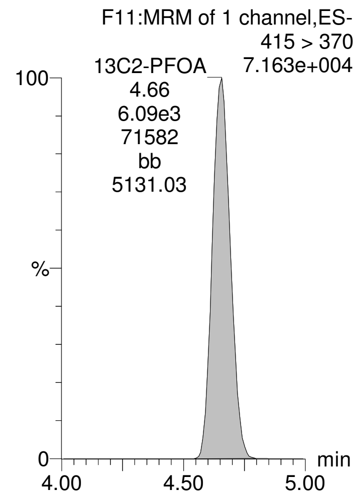

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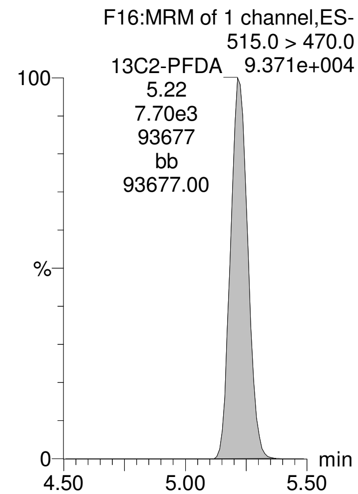

GM 1/2/2019

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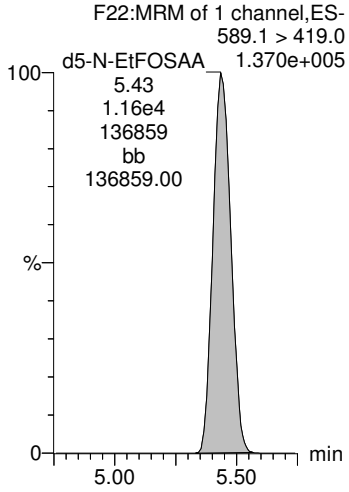
Name: 181230P1_16, Date: 30-Dec-2018, Time: 16:32:41, ID: B8L0193-BSD1 LFBD 0.25, Description: LFBD

d5-N-EtFOSAA



GM 1/2/2019

Vista Analytical Laboratory

MM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-36.qld

Last Altered: Wednesday, January 02, 2019 12:46:56 Pacific Standard Time
Printed: Wednesday, January 02, 2019 12:47:23 Pacific Standard Time

Name: 181230P1_36, Date: 30-Dec-2018, Time: 20:16:24, ID: 1804167-01 PW2-122018-DW 0.24636, Description: PW2-122018-DW

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0		2821.636	0.246		3.49				
2	2	PFHxA	313.1 > 269.1		5852.651	0.246		3.78				
3	3	PFHpA	363 > 319		5852.651	0.246		4.25				
4	4	PFHxS	399 > 80.0		2821.636	0.246		4.37				
5	5	PFOA	413 > 369		5852.651	0.246		4.64				
6	19	13C4-PFOS	503.0 > 80	2821.636	2821.636	0.246	1.000	5.02	4.99	28.7	116	100.0
7	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
8	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
9	19	13C4-PFOS	503.0 > 80	2821.636	2821.636	0.246	1.000	5.02	4.99	28.7	116	100.0
10	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
11	-1											
12	6	PFNA	463 > 419		5852.651	0.246		4.94				
13	7	PFOS	499 >80.0	1.290	2821.636	0.246		4.99	4.83	0.0131	0.0641	
14	8	PFDA	513 > 469		5852.651	0.246		5.20				
15	9	N-MeFOSAA	570 > 419.1		11030.449	0.246		5.32				
16	10	N-EtFOSAA	584.0 >419.1		11030.449	0.246		5.42				
17	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
18	19	13C4-PFOS	503.0 > 80	2821.636	2821.636	0.246	1.000	5.02	4.99	28.7	116	100.0
19	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11030.449	11030.449	0.246	1.000	5.33	5.32	40.0	162	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11030.449	11030.449	0.246	1.000	5.33	5.32	40.0	162	100.0
22	-1											
23	11	PFUnA	563 > 519		5852.651	0.246		5.42				
24	12	PFDoA	613 > 569		5852.651	0.246		5.62				
25	13	PFTrDA	662.9 > 619		5852.651	0.246		5.80				
26	14	PFTeDA	712.9 > 669		5852.651	0.246		5.94				
27	15	13C2-PFHxA	315.1 > 270	5261.734	5852.651	0.246	0.868	3.80	3.79	8.99	42.1	103.6
28	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
29	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
30	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
31	18	13C2-PFOA	415 > 370	5852.651	5852.651	0.246	1.000	4.66	4.64	10.0	40.6	100.0
32	16	13C2-PFDA	515.0 > 470.0	7207.769	5852.651	0.246	1.221	5.21	5.20	12.3	40.9	100.9
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	10946.202	11030.449	0.246	1.132	5.42	5.42	39.7	142	87.6

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Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-36.qld

Last Altered: Wednesday, January 02, 2019 12:46:56 Pacific Standard Time
Printed: Wednesday, January 02, 2019 12:47:23 Pacific Standard Time

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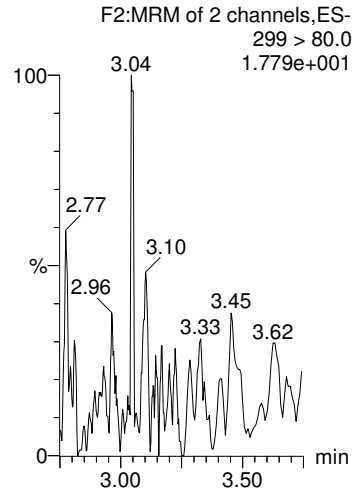
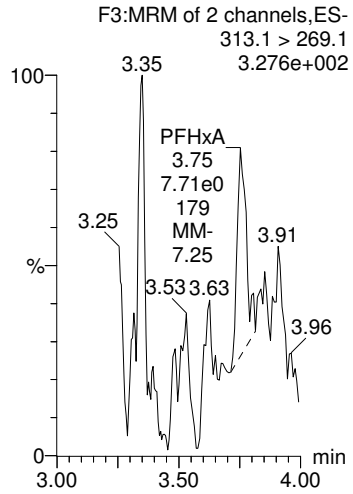
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_36, Date: 30-Dec-2018, Time: 20:16:24, ID: 1804167-01 PW2-122018-DW 0.24636, Description: PW2-122018-DW

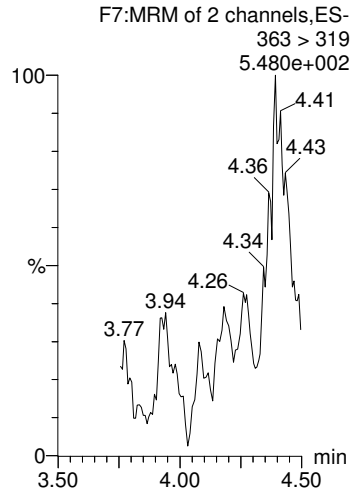
PFBS



PFHxA



PFHpA



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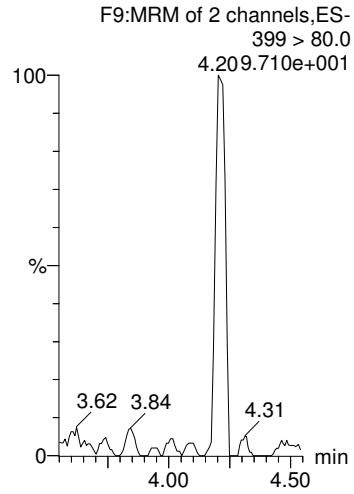

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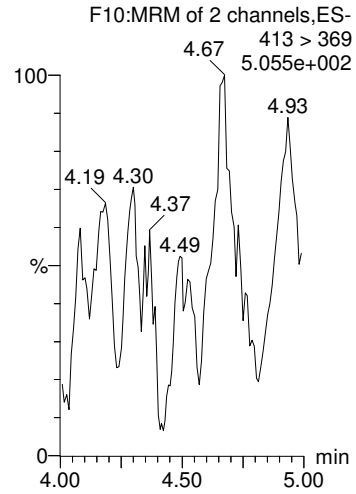

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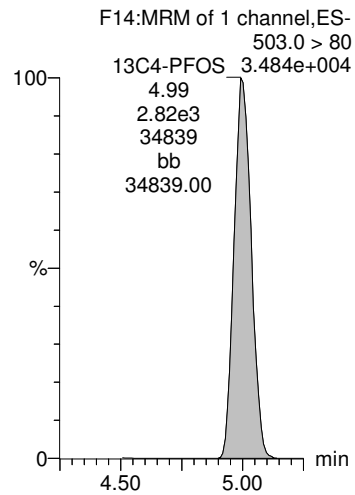

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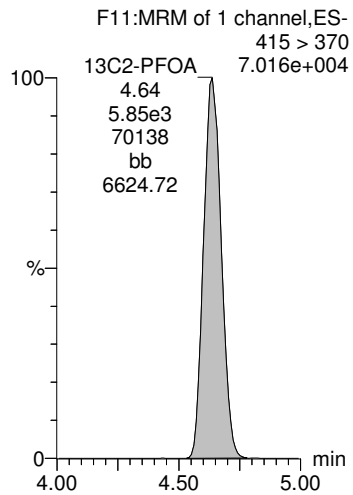

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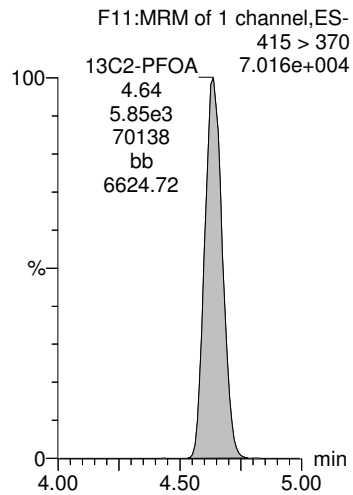

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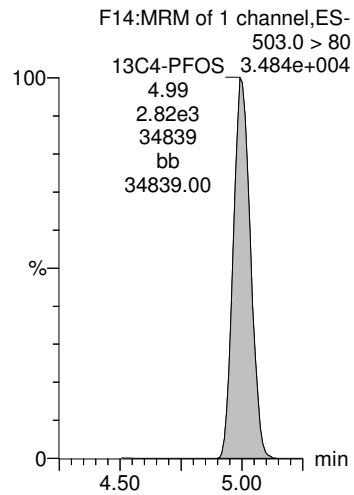

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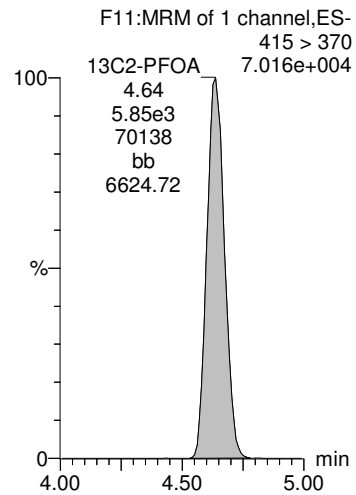

GM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-36.qld

Last Altered: Wednesday, January 02, 2019 12:46:56 Pacific Standard Time
Printed: Wednesday, January 02, 2019 12:47:23 Pacific Standard Time

Name: 181230P1_36, Date: 30-Dec-2018, Time: 20:16:24, ID: 1804167-01 PW2-122018-DW 0.24636, Description: PW2-122018-DW

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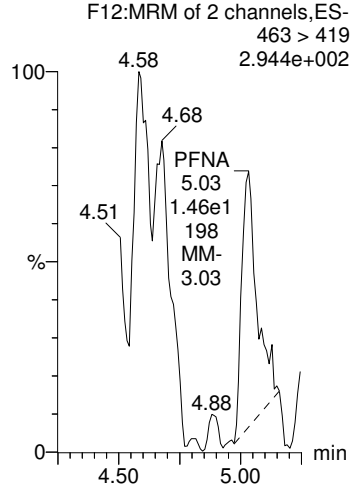

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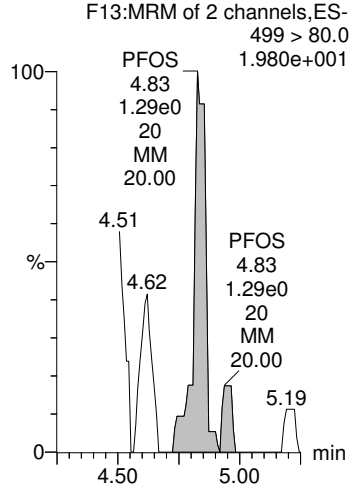

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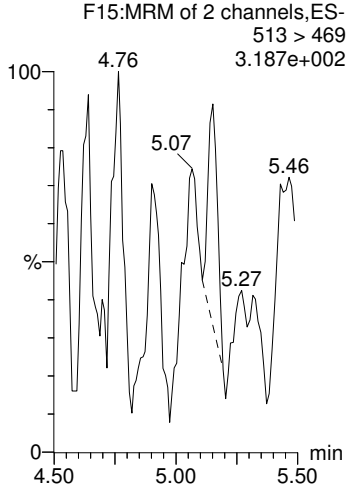

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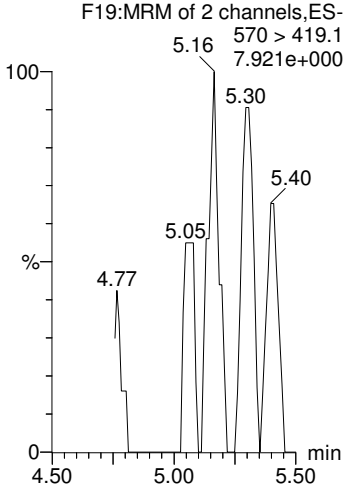

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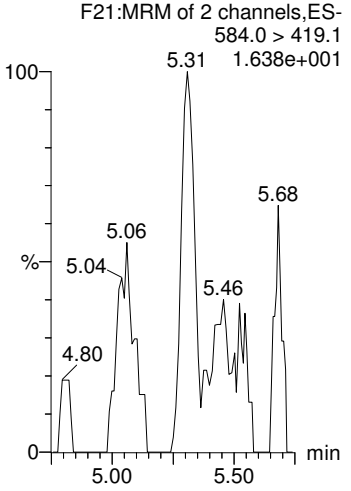
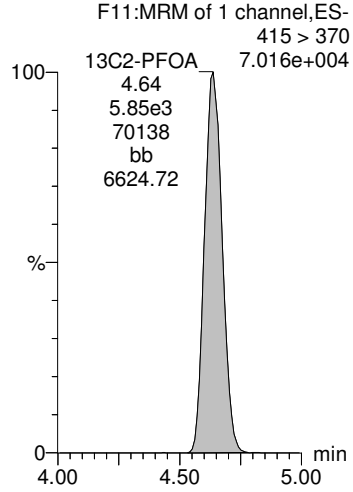
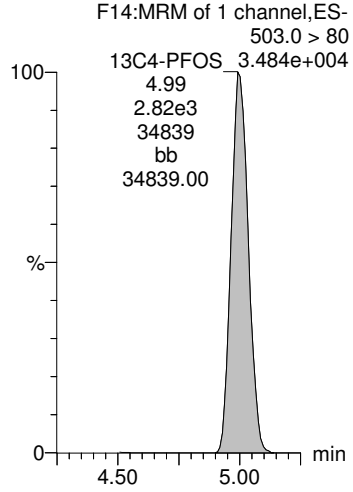


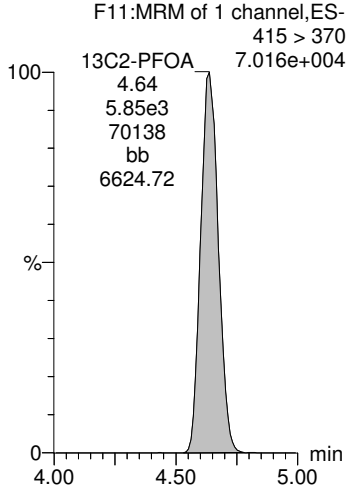
13C2-PFOA



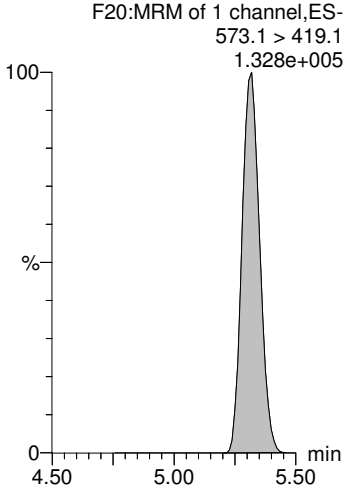
13C4-PFOS



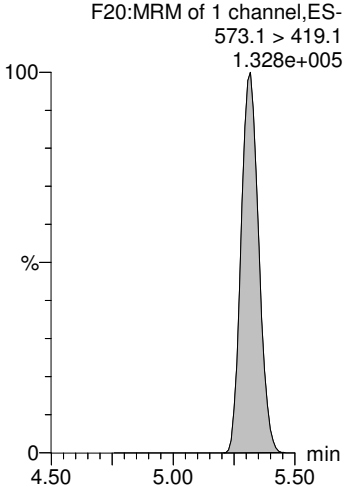
13C2-PFOA



d3-N-MeFOSAA



d3-N-MeFOSAA



GM 1/2/2019

MM 1/2/2019

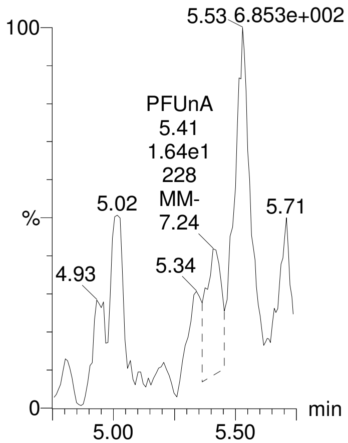
Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-36.qld

Last Altered: Wednesday, January 02, 2019 12:46:56 Pacific Standard Time
Printed: Wednesday, January 02, 2019 12:47:23 Pacific Standard Time

Name: 181230P1_36, Date: 30-Dec-2018, Time: 20:16:24, ID: 1804167-01 PW2-122018-DW 0.24636, Description: PW2-122018-DW

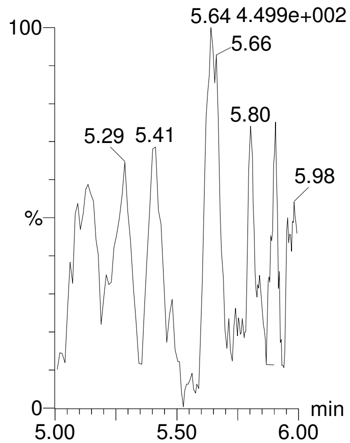
PFUnA

F18:MRM of 2 channels,ES-
563 > 519



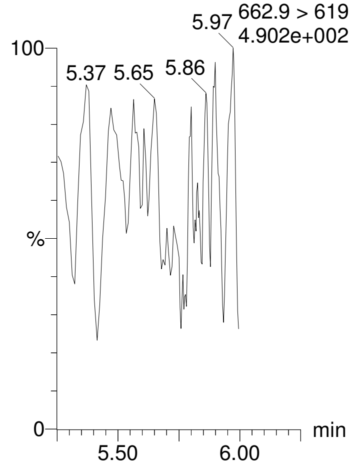
PFDoA

F23:MRM of 3 channels,ES-
613 > 569



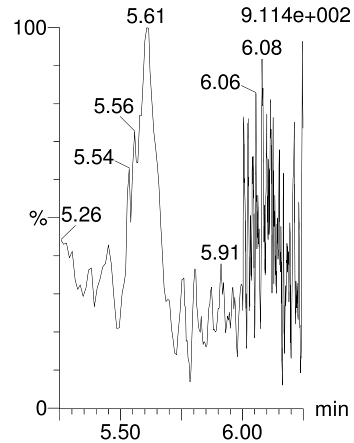
PFTrDA

F25:MRM of 2 channels,ES-
662.9 > 619



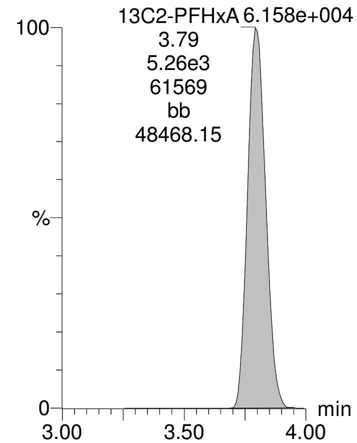
PFTeDA

F26:MRM of 2 channels,ES-
712.9 > 669



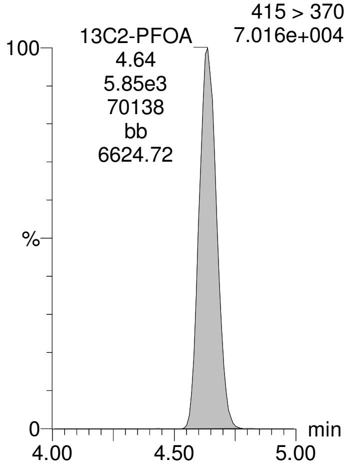
13C2-PFHxA

F4:MRM of 1 channel,ES-
315.1 > 270



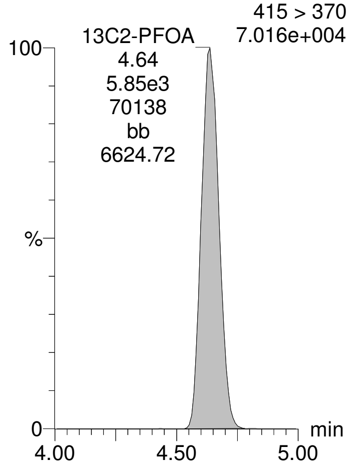
13C2-PFOA

F11:MRM of 1 channel,ES-
415 > 370



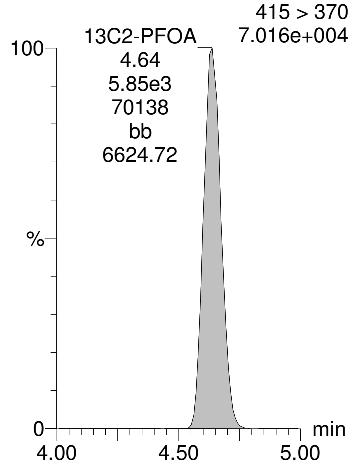
13C2-PFOA

F11:MRM of 1 channel,ES-
415 > 370



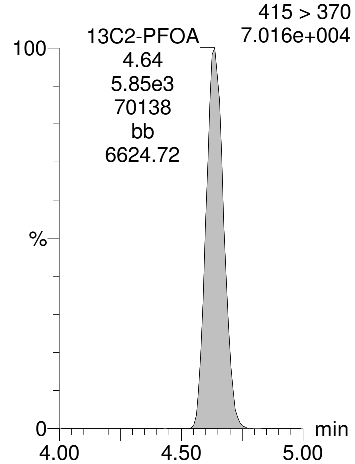
13C2-PFOA

F11:MRM of 1 channel,ES-
415 > 370



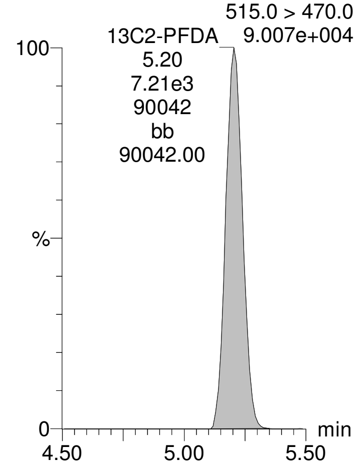
13C2-PFOA

F11:MRM of 1 channel,ES-
415 > 370



13C2-PFDA

F16:MRM of 1 channel,ES-
515.0 > 470.0



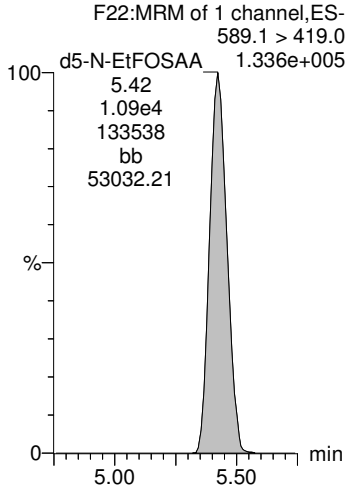
GM 1/2/2019

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-36.qld

Last Altered: Wednesday, January 02, 2019 12:46:56 Pacific Standard Time
Printed: Wednesday, January 02, 2019 12:47:23 Pacific Standard Time

Name: 181230P1_36, Date: 30-Dec-2018, Time: 20:16:24, ID: 1804167-01 PW2-122018-DW 0.24636, Description: PW2-122018-DW

d5-N-EtFOSAA



GM 1/2/2019

INJECTION INTERNAL STANDARD (IIS) AREAS,

AND

CONTINUTING CALIBRATION VERIFICATIONS CCV)

IIS Area

Ical

Compound 18: 13C2-PFOA

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ical Area	Area %
1	B8L0193-BS1 LFB 0.25	181230P1_	Analyte	10	4.66	6446.945	6446.945	5922.806	108.85
2	B8L0193-BSD1 LFBD 0.25	181230P1_	Analyte	10	4.66	6089.929	6089.929	5922.806	102.82
3	B8L0193-BLK1 LRB 0.25	181230P1_	Analyte	10	4.65	6687.353	6687.353	5922.806	112.91
4	1803885-01RE1 GWNT1811300900GGA 0.2414	181230P1_	Analyte	10	4.64	5941.599	5941.599	5922.806	100.32
5	1803887-01RE1 GWNT1811301500GGA 0.2251	181230P1_	Analyte	10	4.65	5961.82	5961.82	5922.806	100.66
6	1804129-01 DAYTANK-PFOS 0.2395	181230P1_	Analyte	10	4.65	5884.897	5884.897	5922.806	99.36
7	1804129-02 DAYTANK-Blank 0.24739	181230P1_	Analyte	10	4.65	6477.418	6477.418	5922.806	109.36
8	1804129-03 JTC-PFOS 0.24108	181230P1_	Analyte	10	4.64	6220.847	6220.847	5922.806	105.03
9	1804129-04 JTC-Blank 0.2403	181230P1_	Analyte	10	4.64	6528.531	6528.531	5922.806	110.23
10	1804129-05 SWMV1-PFOS 0.232	181230P1_	Analyte	10	4.64	6425.632	6425.632	5922.806	108.49
11	1804129-06 SWMV1-Blank 0.26409	181230P1_	Analyte	10	4.64	6247.653	6247.653	5922.806	105.48
12	1804129-07 FITWING-PFOS 0.24265	181230P1_	Analyte	10	4.64	5555.628	5555.628	5922.806	93.80
13	1804129-08 FITWING-Blank 0.24591	181230P1_	Analyte	10	4.65	6018.908	6018.908	5922.806	101.62
14	1804140-01 WR1812141300JLB 0.22566	181230P1_	Analyte	10	4.64	6028.499	6028.499	5922.806	101.78
15	1804140-02 WR1812141340JLB 0.23602	181230P1_	Analyte	10	4.64	6116.434	6116.434	5922.806	103.27
16	1804140-03 WR1812141405JLB 0.24049	181230P1_	Analyte	10	4.65	5690.047	5690.047	5922.806	96.07
17	1804140-04 WR1812141405JLB-FD 0.24189	181230P1_	Analyte	10	4.64	5841.774	5841.774	5922.806	98.63
18	IPA	181230P1_	Analyte	10				5922.806	0.00
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	10	4.64	6350.39	6350.39	5922.806	107.22
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	10	4.63	6631.153	6631.153	5922.806	111.96
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	10	4.64	6389.975	6389.975	5922.806	107.89
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	10	4.64	5852.651	5852.651	5922.806	98.82
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	10	4.63	6261.448	6261.448	5922.806	105.72
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	10	4.64	5238.532	5238.532	5922.806	88.45
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	10	4.63	5510.755	5510.755	5922.806	93.04
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	10	4.63	5480.786	5480.786	5922.806	92.54
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	10	4.62	6182.421	6182.421	5922.806	104.38

28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	10	4.63	5267.355	5267.355	5922.806	88.93
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	10	4.63	5462.015	5462.015	5922.806	92.22
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	10	4.63	5595.955	5595.955	5922.806	94.48
31	IPA	181230P1_	Analyte	10				5922.806	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	10	4.62	6227.253	6227.253	5922.806	105.14
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	10	4.63	5733.856	5733.856	5922.806	96.81
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	10	4.62	6286.409	6286.409	5922.806	106.14
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	10	4.63	5449.633	5449.633	5922.806	92.01
36	1804122-04@10X WIN1812121115MK 0.25	181230P1_	Analyte	10	4.63	994.741	994.741	5922.806	16.80
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_	Analyte	10	4.62	281.557	281.557	5922.806	4.75
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_	Analyte	10	4.62	1456.323	1456.323	5922.806	24.59
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_	Analyte	10	4.61	175.592	175.592	5922.806	2.96
40	IPA	181230P1_	Analyte	10				5922.806	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_	Analyte	10	4.62	5981.179	5981.179	5922.806	100.99

Compound 19: 13C4-PFOS

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ical Area	Area %
1	B8L0193-BS1 LFB 0.25	181230P1_	Analyte	28.7	5.02	3129.382	3129.382	2770.725	112.94
2	B8L0193-BSD1 LFBD 0.25	181230P1_	Analyte	28.7	5.01	2791.141	2791.141	2770.725	100.74
3	B8L0193-BLK1 LRB 0.25	181230P1_	Analyte	28.7	5.01	3131.097	3131.097	2770.725	113.01
4	1803885-01RE1 GWNT1811300900GGA 0.2414	181230P1_	Analyte	28.7	5	2750.122	2750.122	2770.725	99.26
5	1803887-01RE1 GWNT1811301500GGA 0.2251	181230P1_	Analyte	28.7	5	2949.545	2949.545	2770.725	106.45
6	1804129-01 DAYTANK-PFOS 0.2395	181230P1_	Analyte	28.7	5	2609.524	2609.524	2770.725	94.18
7	1804129-02 DAYTANK-Blank 0.24739	181230P1_	Analyte	28.7	5	3046.158	3046.158	2770.725	109.94
8	1804129-03 JTC-PFOS 0.24108	181230P1_	Analyte	28.7	5	3028.676	3028.676	2770.725	109.31
9	1804129-04 JTC-Blank 0.2403	181230P1_	Analyte	28.7	5	2883.716	2883.716	2770.725	104.08
10	1804129-05 SWMV1-PFOS 0.232	181230P1_	Analyte	28.7	4.99	1813.264	1813.264	2770.725	65.44
11	1804129-06 SWMV1-Blank 0.26409	181230P1_	Analyte	28.7	5	2986.434	2986.434	2770.725	107.79
12	1804129-07 FITWING-PFOS 0.24265	181230P1_	Analyte	28.7	4.99	2646.719	2646.719	2770.725	95.52
13	1804129-08 FITWING-Blank 0.24591	181230P1_	Analyte	28.7	5	2800.633	2800.633	2770.725	101.08
14	1804140-01 WR1812141300JLB 0.22566	181230P1_	Analyte	28.7	5	3091.144	3091.144	2770.725	111.56

15	1804140-02 WR1812141340JLB 0.23602	181230P1_	Analyte	28.7	4.99	2959.212	2959.212	2770.725	106.80
16	1804140-03 WR1812141405JLB 0.24049	181230P1_	Analyte	28.7	5	2838.893	2838.893	2770.725	102.46
17	1804140-04 WR1812141405JLB-FD 0.24189	181230P1_	Analyte	28.7	4.99	2728.104	2728.104	2770.725	98.46
18	IPA	181230P1_	Analyte	28.7				2770.725	0.00
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	28.7	4.99	3073.515	3073.515	2770.725	110.93
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	28.7	4.99	3044.407	3044.407	2770.725	109.88
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	28.7	5	2957.452	2957.452	2770.725	106.74
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	28.7	4.99	2821.636	2821.636	2770.725	101.84
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	28.7	4.99	3156.963	3156.963	2770.725	113.94
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	28.7	5	2506.324	2506.324	2770.725	90.46
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	28.7	4.98	2583.816	2583.816	2770.725	93.25
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	28.7	4.99	2842.471	2842.471	2770.725	102.59
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	28.7	4.98	2898.497	2898.497	2770.725	104.61
28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	28.7	4.98	2598.901	2598.901	2770.725	93.80
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	28.7	4.99	2358.994	2358.994	2770.725	85.14
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	28.7	4.99	2681.74	2681.74	2770.725	96.79
31	IPA	181230P1_	Analyte	28.7				2770.725	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	28.7	4.98	2942.671	2942.671	2770.725	106.21
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	28.7	4.99	2715.892	2715.892	2770.725	98.02
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	28.7	4.98	3032.107	3032.107	2770.725	109.43
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	28.7	4.98	2781.443	2781.443	2770.725	100.39
36	1804122-04@10X WIN1812121115MK 0.25	181230P1_	Analyte	28.7	4.98	446.451	446.451	2770.725	16.11
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_	Analyte	28.7	4.98	146.941	146.941	2770.725	5.30
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_	Analyte	28.7	4.98	597.395	597.395	2770.725	21.56
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_	Analyte	28.7	4.97	99.196	99.196	2770.725	3.58
40	IPA	181230P1_	Analyte	28.7				2770.725	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_	Analyte	28.7	4.98	2940.205	2940.205	2770.725	106.12

Compound 20: d3-N-MeFOSAA

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ical Area	Area %
1	B8L0193-BS1 LFB 0.25	181230P1_	Analyte	40	5.34	11492.28	11492.28	10441.54	110.06

2	B8L0193-BSD1 LFBD 0.25	181230P1_	Analyte	40	5.33	11199.87	11199.87	10441.54	107.26
3	B8L0193-BLK1 LRB 0.25	181230P1_	Analyte	40	5.33	11792.51	11792.51	10441.54	112.94
4	1803885-01RE1 GWNT1811300900GGA 0.2414	181230P1_	Analyte	40	5.32	10271.09	10271.09	10441.54	98.37
5	1803887-01RE1 GWNT1811301500GGA 0.2251	181230P1_	Analyte	40	5.33	10808.16	10808.16	10441.54	103.51
6	1804129-01 DAYTANK-PFOS 0.2395	181230P1_	Analyte	40	5.32	10527.41	10527.41	10441.54	100.82
7	1804129-02 DAYTANK-Blank 0.24739	181230P1_	Analyte	40	5.33	11055.17	11055.17	10441.54	105.88
8	1804129-03 JTC-PFOS 0.24108	181230P1_	Analyte	40	5.32	10431.12	10431.12	10441.54	99.90
9	1804129-04 JTC-Blank 0.2403	181230P1_	Analyte	40	5.32	11082.18	11082.18	10441.54	106.14
10	1804129-05 SWMV1-PFOS 0.232	181230P1_	Analyte	40	5.32	11127.18	11127.18	10441.54	106.57
11	1804129-06 SWMV1-Blank 0.26409	181230P1_	Analyte	40	5.32	11423.71	11423.71	10441.54	109.41
12	1804129-07 FITWING-PFOS 0.24265	181230P1_	Analyte	40	5.32	8576.749	8576.749	10441.54	82.14
13	1804129-08 FITWING-Blank 0.24591	181230P1_	Analyte	40	5.32	11046.1	11046.1	10441.54	105.79
14	1804140-01 WR1812141300JLB 0.22566	181230P1_	Analyte	40	5.31	11743.04	11743.04	10441.54	112.46
15	1804140-02 WR1812141340JLB 0.23602	181230P1_	Analyte	40	5.32	10994.33	10994.33	10441.54	105.29
16	1804140-03 WR1812141405JLB 0.24049	181230P1_	Analyte	40	5.32	10438.34	10438.34	10441.54	99.97
17	1804140-04 WR1812141405JLB-FD 0.24189	181230P1_	Analyte	40	5.31	10311.02	10311.02	10441.54	98.75
18	IPA	181230P1_	Analyte	40				10441.54	0.00
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	40	5.32	11207.17	11207.17	10441.54	107.33
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	40	5.31	11822.73	11822.73	10441.54	113.23
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	40	5.32	11222.95	11222.95	10441.54	107.48
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	40	5.32	11030.45	11030.45	10441.54	105.64
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	40	5.31	11743.43	11743.43	10441.54	112.47
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	40	5.32	9435.262	9435.262	10441.54	90.36
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	40	5.31	9961.688	9961.688	10441.54	95.40
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	40	5.31	10678.63	10678.63	10441.54	102.27
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	40	5.31	11147.41	11147.41	10441.54	106.76
28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	40	5.31	10047.99	10047.99	10441.54	96.23
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	40	5.31	9360.906	9360.906	10441.54	89.65
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	40	5.31	10230.55	10230.55	10441.54	97.98
31	IPA	181230P1_	Analyte	40				10441.54	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	40	5.31	11020.4	11020.4	10441.54	105.54
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	40	5.31	10224.77	10224.77	10441.54	97.92
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	40	5.31	11545.42	11545.42	10441.54	110.57
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	40	5.31	10145.08	10145.08	10441.54	97.16

36	1804122-04@10X WIN1812121115MK 0.25	181230P1_	Analyte	40	5.3	1940.37	1940.37	10441.54	18.58
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_	Analyte	40	5.3	523.944	523.944	10441.54	5.02
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_	Analyte	40	5.31	2683.458	2683.458	10441.54	25.70
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_	Analyte	40	5.3	431.048	431.048	10441.54	4.13
40	IPA	181230P1_	Analyte	40				10441.54	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_	Analyte	40	5.3	10987.21	10987.21	10441.54	105.23

Ccal

Compound 18: 13C2-PFOA ST181230P1-11 PFC CS1 537 18L2617

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	10	4.64	6350.39	6350.39	6350.39	100.00
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	10	4.63	6631.153	6631.153	6350.39	104.42
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	10	4.64	6389.975	6389.975	6350.39	100.62
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	10	4.64	5852.651	5852.651	6350.39	92.16
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	10	4.63	6261.448	6261.448	6350.39	98.60
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	10	4.64	5238.532	5238.532	6350.39	82.49
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	10	4.63	5510.755	5510.755	6350.39	86.78
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	10	4.63	5480.786	5480.786	6350.39	86.31
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	10	4.62	6182.421	6182.421	6350.39	97.35
28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	10	4.63	5267.355	5267.355	6350.39	82.95
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	10	4.63	5462.015	5462.015	6350.39	86.01
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	10	4.63	5595.955	5595.955	6350.39	88.12
31	IPA	181230P1_	Analyte	10				6350.39	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	10	4.62	6227.253	6227.253	6350.39	98.06

ST181230P1-12 PFC CS3 537 18L2619

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	10	4.62	6227.253	6227.253	6227.253	100.00
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	10	4.63	5733.856	5733.856	6227.253	92.08
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	10	4.62	6286.409	6286.409	6227.253	100.95
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	10	4.63	5449.633	5449.633	6227.253	87.51

36	1804122-04@10X WIN1812121115MK 0.25	181230P1_	Analyte	10	4.63	994.741	994.741	6227.253	15.97
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_	Analyte	10	4.62	281.557	281.557	6227.253	4.52
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_	Analyte	10	4.62	1456.323	1456.323	6227.253	23.39
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_	Analyte	10	4.61	175.592	175.592	6227.253	2.82
40	IPA	181230P1_	Analyte	10				6227.253	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_	Analyte	10	4.62	5981.179	5981.179	6227.253	96.05

Compound 19: 13C4-PFOS ST181230P1-11 PFC CS1 537 18L2617

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	28.7	4.99	3073.515	3073.515	3073.515	100.00
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	28.7	4.99	3044.407	3044.407	3073.515	99.05
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	28.7	5	2957.452	2957.452	3073.515	96.22
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	28.7	4.99	2821.636	2821.636	3073.515	91.80
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	28.7	4.99	3156.963	3156.963	3073.515	102.72
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	28.7	5	2506.324	2506.324	3073.515	81.55
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	28.7	4.98	2583.816	2583.816	3073.515	84.07
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	28.7	4.99	2842.471	2842.471	3073.515	92.48
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	28.7	4.98	2898.497	2898.497	3073.515	94.31
28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	28.7	4.98	2598.901	2598.901	3073.515	84.56
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	28.7	4.99	2358.994	2358.994	3073.515	76.75
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	28.7	4.99	2681.74	2681.74	3073.515	87.25
31	IPA	181230P1_	Analyte	28.7				3073.515	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	28.7	4.98	2942.671	2942.671	3073.515	95.74

ST181230P1-12 PFC CS3 537 18L2619

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	28.7	4.98	2942.671	2942.671	2942.671	100.00
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	28.7	4.99	2715.892	2715.892	2942.671	92.29
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	28.7	4.98	3032.107	3032.107	2942.671	103.04
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	28.7	4.98	2781.443	2781.443	2942.671	94.52

36	1804122-04@10X WIN1812121115MK 0.25	181230P1_	Analyte	28.7	4.98	446.451	446.451	2942.671	15.17
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_	Analyte	28.7	4.98	146.941	146.941	2942.671	4.99
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_	Analyte	28.7	4.98	597.395	597.395	2942.671	20.30
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_	Analyte	28.7	4.97	99.196	99.196	2942.671	3.37
40	IPA	181230P1_	Analyte	28.7				2942.671	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_	Analyte	28.7	4.98	2940.205	2940.205	2942.671	99.92

Compound 20: d3-N-MeFOSAA ST181230P1-11 PFC CS1 537 18L2617

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
19	ST181230P1-11 PFC CS1 537 18L2617	181230P1_	Analyte	40	5.32	11207.17	11207.17	11207.17	100.00
20	1804165-01 GWEF1812190920LEM 0.23683	181230P1_	Analyte	40	5.31	11822.73	11822.73	11207.17	105.49
21	1804166-01 GWNT1812200905LEM 0.23131	181230P1_	Analyte	40	5.32	11222.95	11222.95	11207.17	100.14
22	1804167-01 PW2-122018-DW 0.24636	181230P1_	Analyte	40	5.32	11030.45	11030.45	11207.17	98.42
23	1804167-02 PW2-122018-FB 0.23052	181230P1_	Analyte	40	5.31	11743.43	11743.43	11207.17	104.79
24	B8L0199-BLK8 LRB 0.125	181230P1_	Analyte	40	5.32	9435.262	9435.262	11207.17	84.19
25	B8L0199-BS7 LFB 0.125	181230P1_	Analyte	40	5.31	9961.688	9961.688	11207.17	88.89
26	B8L0199-BS8 LFB 0.125	181230P1_	Analyte	40	5.31	10678.63	10678.63	11207.17	95.28
27	1804087-01 GWNT1812070920KER 0.24854	181230P1_	Analyte	40	5.31	11147.41	11147.41	11207.17	99.47
28	1804089-01 GWEF1812100915KER 0.24551	181230P1_	Analyte	40	5.31	10047.99	10047.99	11207.17	89.66
29	1804092-01 GWNT1812101050KER 0.24556	181230P1_	Analyte	40	5.31	9360.906	9360.906	11207.17	83.53
30	1804093-01 GWEF1812101140KER 0.24891	181230P1_	Analyte	40	5.31	10230.55	10230.55	11207.17	91.29
31	IPA	181230P1_	Analyte	40				11207.17	0.00
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	40	5.31	11020.4	11020.4	11207.17	98.33

ST181230P1-12 PFC CS3 537 18L2619

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Ccal Area	Area %
32	ST181230P1-12 PFC CS3 537 18L2619	181230P1_	Analyte	40	5.31	11020.4	11020.4	11020.4	100.00
33	1804094-01 GWNT1812101245KER 0.24648	181230P1_	Analyte	40	5.31	10224.77	10224.77	11020.4	92.78
34	1804104-01 GWEF1812111150KER 0.24882	181230P1_	Analyte	40	5.31	11545.42	11545.42	11020.4	104.76
35	1804109-01 GWEF1812111500KER 0.24715	181230P1_	Analyte	40	5.31	10145.08	10145.08	11020.4	92.06

36	1804122-04@10X WIN1812121115MK 0.25	181230P1_ Analyte	40	5.3	1940.37	1940.37	11020.4	17.61
37	1804122-07@100X WIN1812131720MK 0.25	181230P1_ Analyte	40	5.3	523.944	523.944	11020.4	4.75
38	1804122-10@5X WIN1812131845MK 0.25	181230P1_ Analyte	40	5.31	2683.458	2683.458	11020.4	24.35
39	1804122-15@100X WIN1812140948MK 0.25	181230P1_ Analyte	40	5.3	431.048	431.048	11020.4	3.91
40	IPA	181230P1_ Analyte	40				11020.4	0.00
41	ST181230P1-13 PFC CS-1 537 18L2615	181230P1_ Analyte	40	5.3	10987.21	10987.21	11020.4	99.70

LC Calibration Standards Review Checklist Q5

		ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manual Integrations	M
Calibration ID: ST181230PI-11	L M H (M circled)	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -12	L M H (H circled)	☐	☑	☑	☑	☑	☑	☐
Calibration ID: -13	L M H (L circled)	☐	☑	☑	☑	☑	☑	☑
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 12/30/18

Run Log Present: ☑

# of Samples per Sequence Checked: ☑

Instrument Blank Saved ☐ N/A

IIS Area Saved ☑

Reviewed By: AD 12/31/18
Initials/Date

Comments:

ID: LR - LCSRC   Rev. No.: 1   Rev. Date: 02/06/2018   Page: 1 of 1

Vista Analytical Laboratory

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-33.qld

Last Altered: Monday, December 31, 2018 10:46:16 Pacific Standard Time
Printed: Monday, December 31, 2018 10:46:46 Pacific Standard Time

JAD 12/31/18

Name: 181230P1_33, Date: 30-Dec-2018, Time: 19:42:52, ID: ST181230P1-11 PFC CS1 537 18L2617, Description: PFC CS1 537 18L2617

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0	659.812	3073.515	1.00		3.49	3.50	6.16	7.64	86.4
2	2	PFHxA	313.1 > 269.1	3965.308	6350.390	1.00		3.79	3.80	6.24	9.16	91.6
3	3	PFHpA	363 > 319	5653.958	6350.390	1.00		4.25	4.27	8.90	8.81	88.1
4	4	PFHxS	399 > 80.0	743.541	3073.515	1.00		4.37	4.38	6.94	8.29	90.9
5	5	PFOA	413 > 369	5841.098	6350.390	1.00		4.64	4.64	9.20	8.64	86.4
6	19	13C4-PFOS	503.0 > 80	3073.515	3073.515	1.00	1.000	5.02	4.99	28.7	28.7	100.0
7	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
8	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
9	19	13C4-PFOS	503.0 > 80	3073.515	3073.515	1.00	1.000	5.02	4.99	28.7	28.7	100.0
10	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
11	-1											
12	6	PFNA	463 > 419	5679.455	6350.390	1.00		4.94	4.95	8.94	8.47	84.7
13	7	PFOS	499 >80.0	700.536	3073.515	1.00		4.99	5.00	6.54	7.88	85.3
14	8	PFDA	513 > 469	6125.263	6350.390	1.00		5.20	5.20	9.65	9.78	97.8
15	9	N-MeFOSAA	570 > 419.1	2437.915	11207.165	1.00		5.32	5.32	8.70	9.53	95.3
16	10	N-EtFOSAA	584.0 >419.1	2236.978	11207.165	1.00		5.42	5.43	7.98	9.35	93.5
17	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
18	19	13C4-PFOS	503.0 > 80	3073.515	3073.515	1.00	1.000	5.02	4.99	28.7	28.7	100.0
19	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11207.165	11207.165	1.00	1.000	5.33	5.32	40.0	40.0	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11207.165	11207.165	1.00	1.000	5.33	5.32	40.0	40.0	100.0
22	-1											
23	11	PFUnA	563 > 519	6349.484	6350.390	1.00		5.42	5.43	10.0	8.22	82.2
24	12	PFDoA	613 > 569	8556.031	6350.390	1.00		5.62	5.63	13.5	8.77	87.7
25	13	PFTrDA	662.9 > 619	8209.716	6350.390	1.00		5.80	5.80	12.9	8.61	86.1
26	14	PFTeDA	712.9 > 669	8015.281	6350.390	1.00		5.94	5.95	12.6	9.36	93.6
27	15	13C2-PFHxA	315.1 > 270	5540.416	6350.390	1.00	0.868	3.80	3.80	8.72	10.1	100.5
28	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
29	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
30	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
31	18	13C2-PFOA	415 > 370	6350.390	6350.390	1.00	1.000	4.66	4.64	10.0	10.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7660.173	6350.390	1.00	1.221	5.21	5.20	12.1	9.88	98.8
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	12166.903	11207.165	1.00	1.132	5.42	5.42	43.4	38.4	95.9

12/31/18

Dataset: Untitled

Last Altered: Monday, December 31, 2018 10:55:54 Pacific Standard Time
Printed: Monday, December 31, 2018 10:56:23 Pacific Standard Time

Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 31 Dec 2018 09:01:13
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Compound name: PFBS

	#	Name	ID	Acq.Date	Acq.Time
1	1	181230P1_1	IPA	30-Dec-18	13:37:01
2	2	181230P1_2	ST181230P1-1 PFC CS-4 537 18L2612	30-Dec-18	13:48:14
3	3	181230P1_3	ST181230P1-2 PFC CS-3 537 18L2613	30-Dec-18	13:59:24
4	4	181230P1_4	ST181230P1-3 PFC CS-2 537 18L2614	30-Dec-18	14:10:35
5	5	181230P1_5	ST181230P1-4 PFC CS-1 537 18L2615	30-Dec-18	14:21:45
6	6	181230P1_6	ST181230P1-5 PFC CS0 537 18L2616	30-Dec-18	14:32:56
7	7	181230P1_7	ST181230P1-6 PFC CS1 537 18L2617	30-Dec-18	14:44:07
8	8	181230P1_8	ST181230P1-7 PFC CS2 537 18L2618	30-Dec-18	14:55:18
9	9	181230P1_9	ST181230P1-8 PFC CS3 537 18L2619	30-Dec-18	15:06:29
10	10	181230P1_10	ST181230P1-9 PFC CS4 537 18L2620	30-Dec-18	15:17:39
11	11	181230P1_11	ST181230P1-10 PFC CS5 537 18L2621	30-Dec-18	15:28:50
12	12	181230P1_12	IPA	30-Dec-18	15:40:00
13	13	181230P1_13	ST181230P1-1 PFC ICV 537 18L2622	30-Dec-18	15:51:12
14	14	181230P1_14	IPA	30-Dec-18	16:02:22
15	15	181230P1_15	B8L0193-BS1 LFB 0.25	30-Dec-18	16:21:29
16	16	181230P1_16	B8L0193-BSD1 LFBD 0.25	30-Dec-18	16:32:41
17	17	181230P1_17	B8L0193-BLK1 LRB 0.25	30-Dec-18	16:43:51
18	18	181230P1_18	1803885-01RE1 GWNT1811300900GGA 0.24142	30-Dec-18	16:55:02
19	19	181230P1_19	1803887-01RE1 GWNT1811301500GGA 0.22513	30-Dec-18	17:06:13
20	20	181230P1_20	1804129-01 DAYTANK-PFOS 0.2395	30-Dec-18	17:17:23
21	21	181230P1_21	1804129-02 DAYTANK-Blank 0.24739	30-Dec-18	17:28:35
22	22	181230P1_22	1804129-03 JTC-PFOS 0.24108	30-Dec-18	17:39:45
23	23	181230P1_23	1804129-04 JTC-Blank 0.2403	30-Dec-18	17:50:55
24	24	181230P1_24	1804129-05 SWMV1-PFOS 0.232	30-Dec-18	18:02:07
25	25	181230P1_25	1804129-06 SWMV1-Blank 0.26409	30-Dec-18	18:13:17
26	26	181230P1_26	1804129-07 FITWING-PFOS 0.24265	30-Dec-18	18:24:36
27	27	181230P1_27	1804129-08 FITWING-Blank 0.24591	30-Dec-18	18:35:48
28	28	181230P1_28	1804140-01 WR1812141300JLB 0.22566	30-Dec-18	18:46:58
29	29	181230P1_29	1804140-02 WR1812141340JLB 0.23602	30-Dec-18	18:58:09
30	30	181230P1_30	1804140-03 WR1812141405JLB 0.24049	30-Dec-18	19:09:20
31	31	181230P1_31	1804140-04 WR1812141405JLB-FD 0.24189	30-Dec-18	19:20:31

Dataset: Untitled

Last Altered: Monday, December 31, 2018 10:55:54 Pacific Standard Time
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Compound name: PFBS

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32	32	181230P1_32	IPA	30-Dec-18	19:31:41
33	33	181230P1_33	ST181230P1-11 PFC CS1 537 18L2617	30-Dec-18	19:42:52
34	34	181230P1_34	1804165-01 GWEF1812190920LEM 0.23683	30-Dec-18	19:54:03
35	35	181230P1_35	1804166-01 GWNT1812200905LEM 0.23131	30-Dec-18	20:05:13
36	36	181230P1_36	1804167-01 PW2-122018-DW 0.24636	30-Dec-18	20:16:24
37	37	181230P1_37	1804167-02 PW2-122018-FB 0.23052	30-Dec-18	20:27:35
38	38	181230P1_38	B8L0199-BLK8 LRB 0.125	30-Dec-18	20:38:45
39	39	181230P1_39	B8L0199-BS7 LFB 0.125	30-Dec-18	20:49:56
40	40	181230P1_40	B8L0199-BS8 LFB 0.125	30-Dec-18	21:01:07
41	41	181230P1_41	1804087-01 GWNT1812070920KER 0.24854	30-Dec-18	21:12:18
42	42	181230P1_42	1804089-01 GWEF1812100915KER 0.24551	30-Dec-18	21:23:29
43	43	181230P1_43	1804092-01 GWNT1812101050KER 0.24556	30-Dec-18	21:34:39
44	44	181230P1_44	1804093-01 GWEF1812101140KER 0.24891	30-Dec-18	21:45:50
45	45	181230P1_45	IPA	30-Dec-18	21:57:01
46	46	181230P1_46	ST181230P1-12 PFC CS3 537 18L2619	30-Dec-18	22:08:11
47	47	181230P1_47	1804094-01 GWNT1812101245KER 0.24648	30-Dec-18	22:19:22
48	48	181230P1_48	1804104-01 GWEF1812111150KER 0.24882	30-Dec-18	22:30:33
49	49	181230P1_49	1804109-01 GWEF1812111500KER 0.24715	30-Dec-18	22:41:43
50	50	181230P1_50	1804122-04@10X WIN1812121115MK 0.25	30-Dec-18	22:52:54
51	51	181230P1_51	1804122-07@100X WIN1812131720MK 0.25	30-Dec-18	23:04:05
52	52	181230P1_52	1804122-10@5X WIN1812131845MK 0.25	30-Dec-18	23:15:15
53	53	181230P1_53	1804122-15@100X WIN1812140948MK 0.25	30-Dec-18	23:26:27
54	54	181230P1_54	IPA	30-Dec-18	23:37:37
55	55	181230P1_55	ST181230P1-13 PFC CS-1 537 18L2615	30-Dec-18	23:48:48

Vista Analytical Laboratory

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-33.qld

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Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_33, Date: 30-Dec-2018, Time: 19:42:52, ID: ST181230P1-11 PFC CS1 537 18L2617, Description: PFC CS1 537 18L2617

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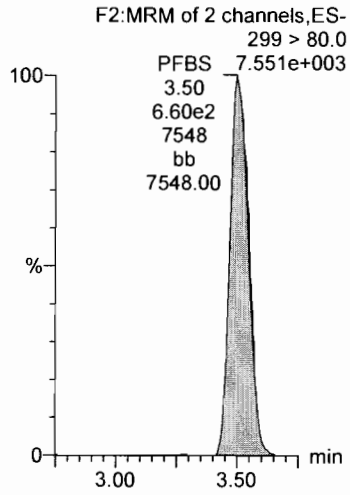

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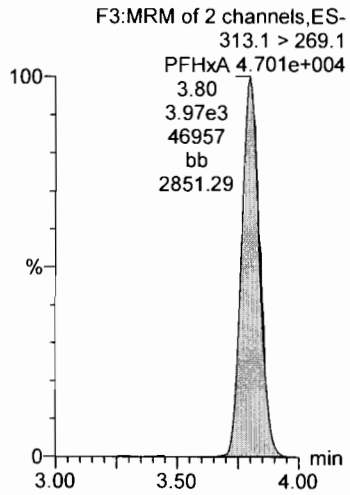

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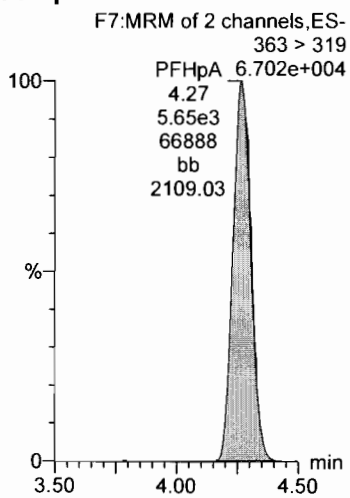

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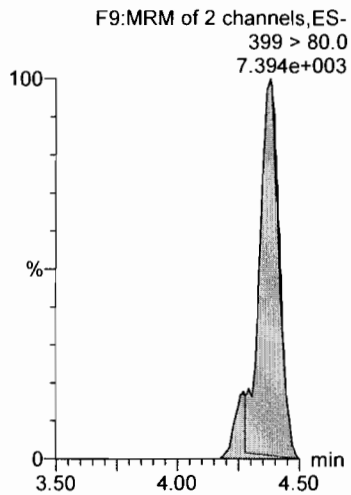

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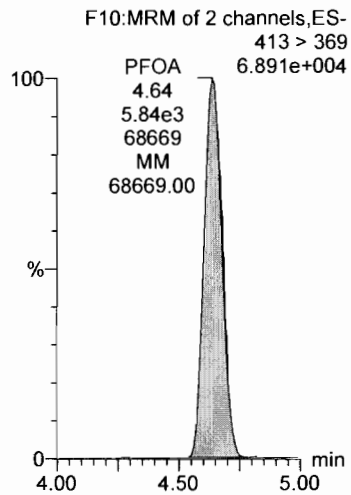

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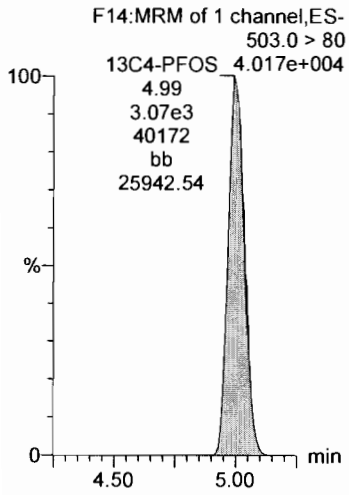

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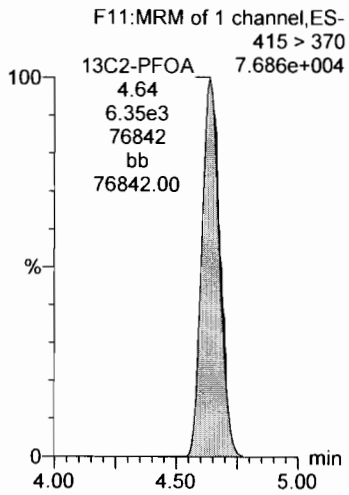

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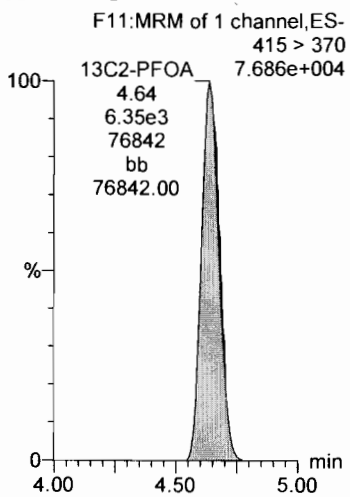

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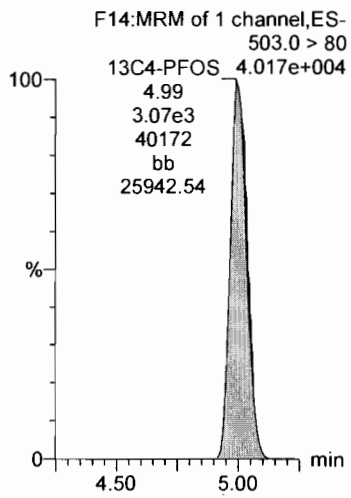

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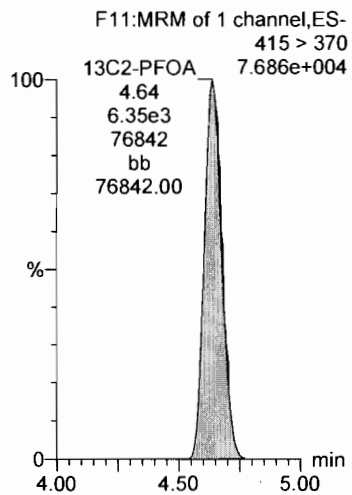

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Name: 181230P1_33, Date: 30-Dec-2018, Time: 19:42:52, ID: ST181230P1-11 PFC CS1 537 18L2617, Description: PFC CS1 537 18L2617

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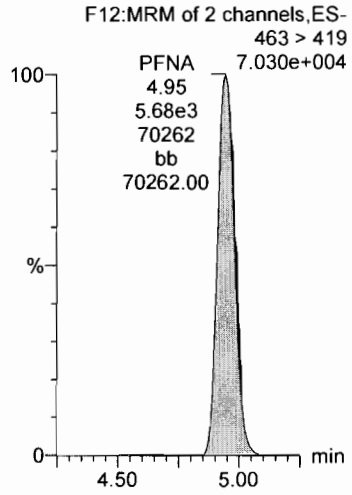

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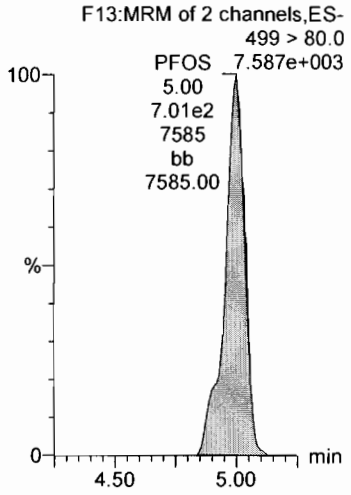

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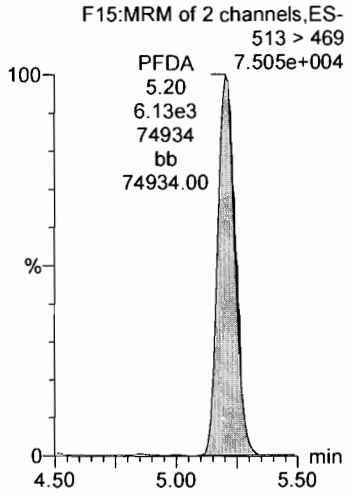

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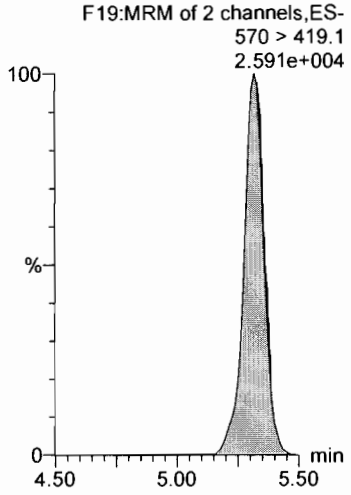

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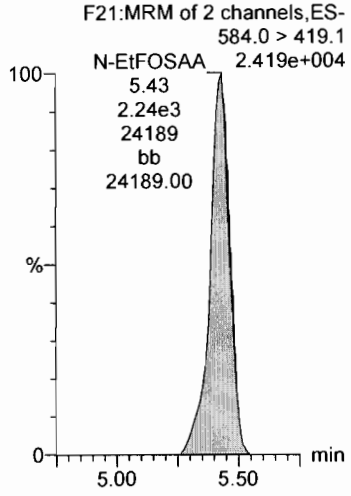

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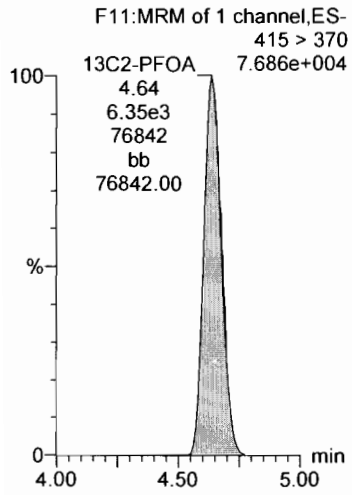

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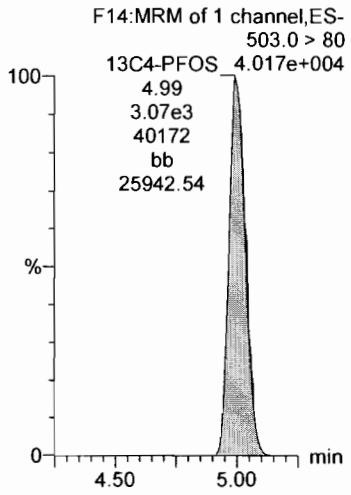

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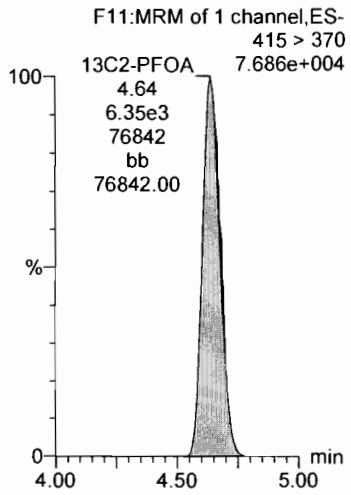

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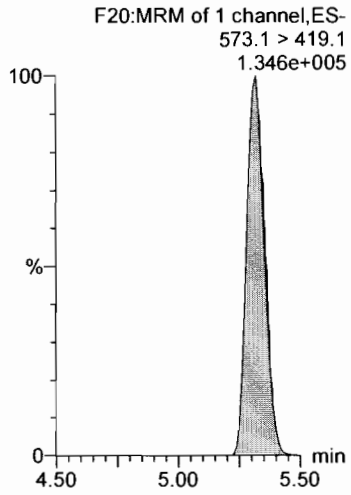

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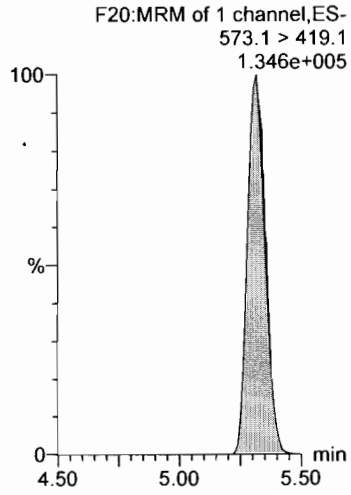

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Name: 181230P1_33, Date: 30-Dec-2018, Time: 19:42:52, ID: ST181230P1-11 PFC CS1 537 18L2617, Description: PFC CS1 537 18L2617

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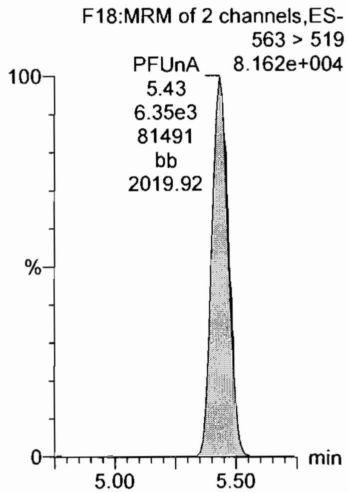

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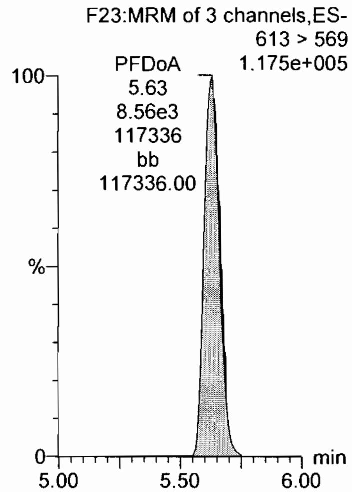

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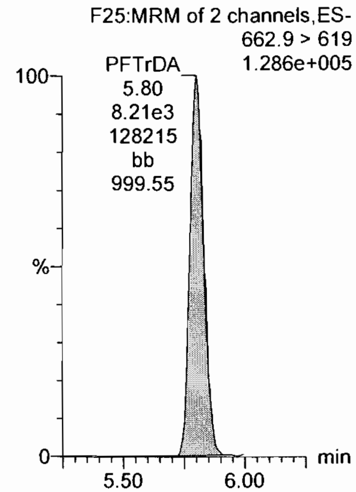

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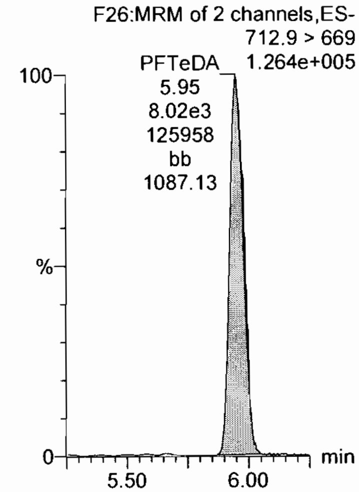

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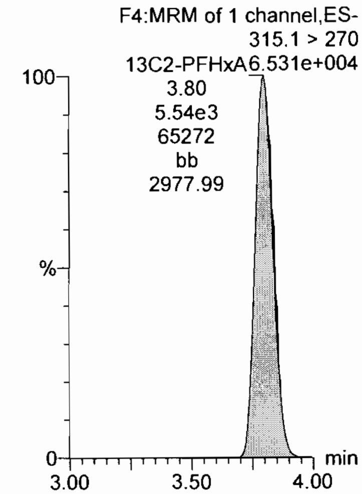

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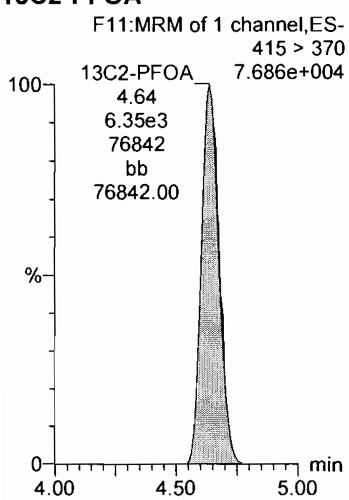

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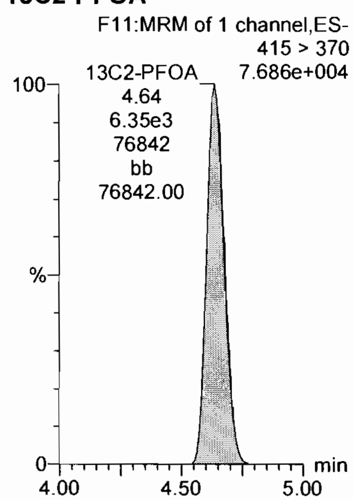

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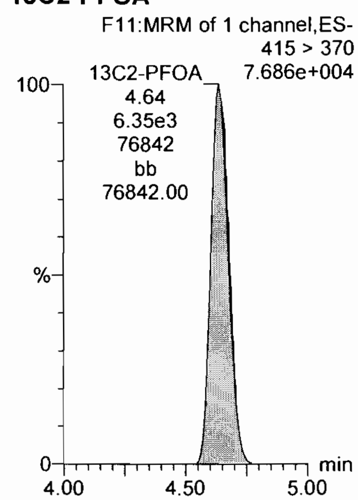

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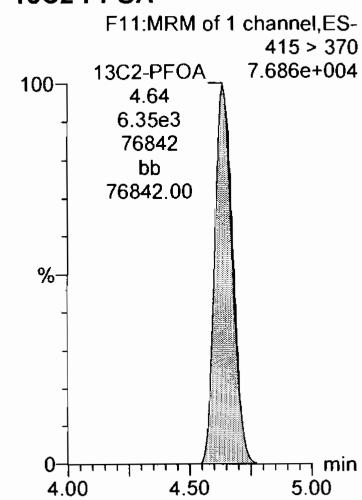

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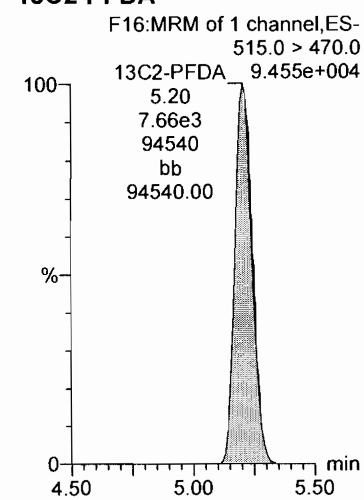

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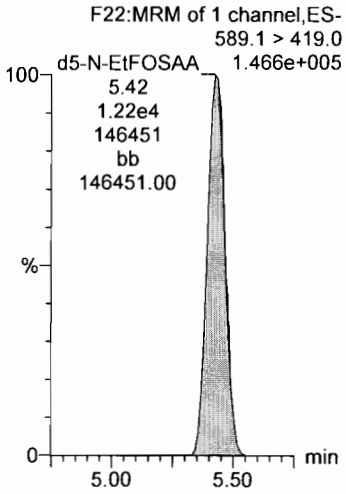
d5-N-EtFOSAA



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VAD 12/31/18

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	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0	3853.323	2942.671	1.00		3.48	3.48	37.6	46.6	105.4
2	2	PFHxA	313.1 > 269.1	21487.707	6227.253	1.00		3.77	3.78	34.5	50.6	101.3
3	3	PFHpA	363 > 319	32221.135	6227.253	1.00		4.23	4.25	51.7	51.2	102.4
4	4	PFHxS	399 > 80.0	4052.443	2942.671	1.00		4.36	4.36	39.5	47.2	103.7
5	5	PFOA	413 > 369	32746.537	6227.253	1.00		4.62	4.62	52.6	49.4	98.8
6	19	13C4-PFOS	503.0 > 80	2942.671	2942.671	1.00	1.000	5.02	4.98	28.7	28.7	100.0
7	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
8	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
9	19	13C4-PFOS	503.0 > 80	2942.671	2942.671	1.00	1.000	5.02	4.98	28.7	28.7	100.0
10	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
11	-1											
12	6	PFNA	463 > 419	32464.467	6227.253	1.00		4.92	4.93	52.1	49.4	98.8
13	7	PFOS	499 >80.0	4066.768	2942.671	1.00		4.98	4.98	39.7	47.8	103.4
14	8	PFDA	513 > 469	33413.746	6227.253	1.00		5.19	5.19	53.7	51.7	103.4
15	9	N-MeFOSAA	570 > 419.1	13598.554	11020.402	1.00		5.31	5.31	49.4	52.3	104.5
16	10	N-EtFOSAA	584.0 >419.1	12138.113	11020.402	1.00		5.41	5.41	44.1	51.6	103.2
17	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
18	19	13C4-PFOS	503.0 > 80	2942.671	2942.671	1.00	1.000	5.02	4.98	28.7	28.7	100.0
19	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	11020.402	11020.402	1.00	1.000	5.33	5.31	40.0	40.0	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	11020.402	11020.402	1.00	1.000	5.33	5.31	40.0	40.0	100.0
22	-1											
23	11	PFUnA	563 > 519	37349.613	6227.253	1.00		5.40	5.42	60.0	49.3	98.6
24	12	PFDoA	613 > 569	48431.207	6227.253	1.00		5.60	5.62	77.8	50.6	101.2
25	13	PFTrDA	662.9 > 619	46737.355	6227.253	1.00		5.78	5.79	75.1	50.0	100.0
26	14	PFTeDA	712.9 > 669	45167.855	6227.253	1.00		5.92	5.94	72.5	51.1	102.2
27	15	13C2-PFHxA	315.1 > 270	5490.044	6227.253	1.00	0.868	3.78	3.78	8.82	10.2	101.6
28	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
29	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
30	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
31	18	13C2-PFOA	415 > 370	6227.253	6227.253	1.00	1.000	4.66	4.62	10.0	10.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7515.462	6227.253	1.00	1.221	5.19	5.19	12.1	9.88	98.8
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	12298.896	11020.402	1.00	1.132	5.41	5.41	44.6	39.4	98.6

12/31/18

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, December 31, 2018 10:55:54 Pacific Standard Time
Printed: Monday, December 31, 2018 10:56:27 Pacific Standard Time

Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 31 Dec 2018 09:01:13
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Compound name: PFBS

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1	1	181230P1_1	IPA	30-Dec-18	13:37:01
2	2	181230P1_2	ST181230P1-1 PFC CS-4 537 18L2612	30-Dec-18	13:48:14
3	3	181230P1_3	ST181230P1-2 PFC CS-3 537 18L2613	30-Dec-18	13:59:24
4	4	181230P1_4	ST181230P1-3 PFC CS-2 537 18L2614	30-Dec-18	14:10:35
5	5	181230P1_5	ST181230P1-4 PFC CS-1 537 18L2615	30-Dec-18	14:21:45
6	6	181230P1_6	ST181230P1-5 PFC CS0 537 18L2616	30-Dec-18	14:32:56
7	7	181230P1_7	ST181230P1-6 PFC CS1 537 18L2617	30-Dec-18	14:44:07
8	8	181230P1_8	ST181230P1-7 PFC CS2 537 18L2618	30-Dec-18	14:55:18
9	9	181230P1_9	ST181230P1-8 PFC CS3 537 18L2619	30-Dec-18	15:06:29
10	10	181230P1_10	ST181230P1-9 PFC CS4 537 18L2620	30-Dec-18	15:17:39
11	11	181230P1_11	ST181230P1-10 PFC CS5 537 18L2621	30-Dec-18	15:28:50
12	12	181230P1_12	IPA	30-Dec-18	15:40:00
13	13	181230P1_13	ST181230P1-1 PFC ICV 537 18L2622	30-Dec-18	15:51:12
14	14	181230P1_14	IPA	30-Dec-18	16:02:22
15	15	181230P1_15	B8L0193-BS1 LFB 0.25	30-Dec-18	16:21:29
16	16	181230P1_16	B8L0193-BSD1 LFBD 0.25	30-Dec-18	16:32:41
17	17	181230P1_17	B8L0193-BLK1 LRB 0.25	30-Dec-18	16:43:51
18	18	181230P1_18	1803885-01RE1 GWNT1811300900GGA 0.24142	30-Dec-18	16:55:02
19	19	181230P1_19	1803887-01RE1 GWNT1811301500GGA 0.22513	30-Dec-18	17:06:13
20	20	181230P1_20	1804129-01 DAYTANK-PFOS 0.2395	30-Dec-18	17:17:23
21	21	181230P1_21	1804129-02 DAYTANK-Blank 0.24739	30-Dec-18	17:28:35
22	22	181230P1_22	1804129-03 JTC-PFOS 0.24108	30-Dec-18	17:39:45
23	23	181230P1_23	1804129-04 JTC-Blank 0.2403	30-Dec-18	17:50:55
24	24	181230P1_24	1804129-05 SWMV1-PFOS 0.232	30-Dec-18	18:02:07
25	25	181230P1_25	1804129-06 SWMV1-Blank 0.26409	30-Dec-18	18:13:17
26	26	181230P1_26	1804129-07 FITWING-PFOS 0.24265	30-Dec-18	18:24:36
27	27	181230P1_27	1804129-08 FITWING-Blank 0.24591	30-Dec-18	18:35:48
28	28	181230P1_28	1804140-01 WR1812141300JLB 0.22566	30-Dec-18	18:46:58
29	29	181230P1_29	1804140-02 WR1812141340JLB 0.23602	30-Dec-18	18:58:09
30	30	181230P1_30	1804140-03 WR1812141405JLB 0.24049	30-Dec-18	19:09:20
31	31	181230P1_31	1804140-04 WR1812141405JLB-FD 0.24189	30-Dec-18	19:20:31

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Monday, December 31, 2018 10:55:54 Pacific Standard Time
Printed: Monday, December 31, 2018 10:56:27 Pacific Standard Time

Compound name: PFBS

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34	34	181230P1_34	1804165-01 GWEF1812190920LEM 0.23683	30-Dec-18	19:54:03
35	35	181230P1_35	1804166-01 GWNT1812200905LEM 0.23131	30-Dec-18	20:05:13
36	36	181230P1_36	1804167-01 PW2-122018-DW 0.24636	30-Dec-18	20:16:24
37	37	181230P1_37	1804167-02 PW2-122018-FB 0.23052	30-Dec-18	20:27:35
38	38	181230P1_38	B8L0199-BLK8 LRB 0.125	30-Dec-18	20:38:45
39	39	181230P1_39	B8L0199-BS7 LFB 0.125	30-Dec-18	20:49:56
40	40	181230P1_40	B8L0199-BS8 LFB 0.125	30-Dec-18	21:01:07
41	41	181230P1_41	1804087-01 GWNT1812070920KER 0.24854	30-Dec-18	21:12:18
42	42	181230P1_42	1804089-01 GWEF1812100915KER 0.24551	30-Dec-18	21:23:29
43	43	181230P1_43	1804092-01 GWNT1812101050KER 0.24556	30-Dec-18	21:34:39
44	44	181230P1_44	1804093-01 GWEF1812101140KER 0.24891	30-Dec-18	21:45:50
45	45	181230P1_45	IPA	30-Dec-18	21:57:01
46	46	181230P1_46	ST181230P1-12 PFC CS3 537 18L2619	30-Dec-18	22:08:11
47	47	181230P1_47	1804094-01 GWNT1812101245KER 0.24648	30-Dec-18	22:19:22
48	48	181230P1_48	1804104-01 GWEF1812111150KER 0.24882	30-Dec-18	22:30:33
49	49	181230P1_49	1804109-01 GWEF1812111500KER 0.24715	30-Dec-18	22:41:43
50	50	181230P1_50	1804122-04@10X WIN1812121115MK 0.25	30-Dec-18	22:52:54
51	51	181230P1_51	1804122-07@100X WIN1812131720MK 0.25	30-Dec-18	23:04:05
52	52	181230P1_52	1804122-10@5X WIN1812131845MK 0.25	30-Dec-18	23:15:15
53	53	181230P1_53	1804122-15@100X WIN1812140948MK 0.25	30-Dec-18	23:26:27
54	54	181230P1_54	IPA	30-Dec-18	23:37:37
55	55	181230P1_55	ST181230P1-13 PFC CS-1 537 18L2615	30-Dec-18	23:48:48

Vista Analytical Laboratory

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-46.qld

Last Altered: Monday, December 31, 2018 10:47:32 Pacific Standard Time
Printed: Monday, December 31, 2018 10:49:24 Pacific Standard Time

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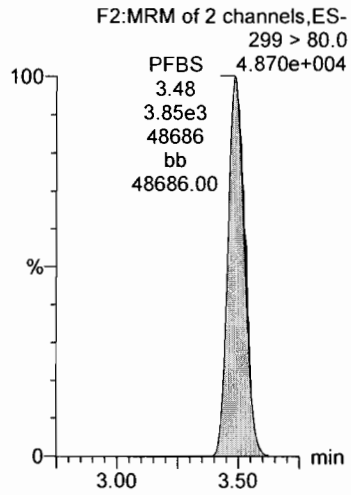
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_46, Date: 30-Dec-2018, Time: 22:08:11, ID: ST181230P1-12 PFC CS3 537 18L2619, Description: PFC CS3 537 18L2619

PFBS



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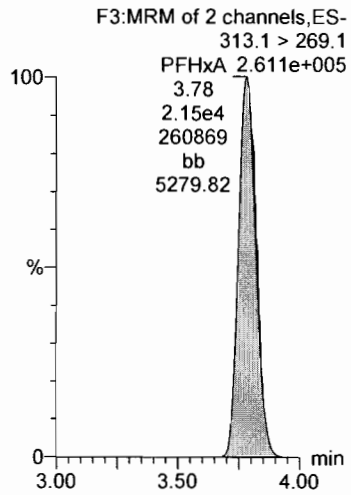

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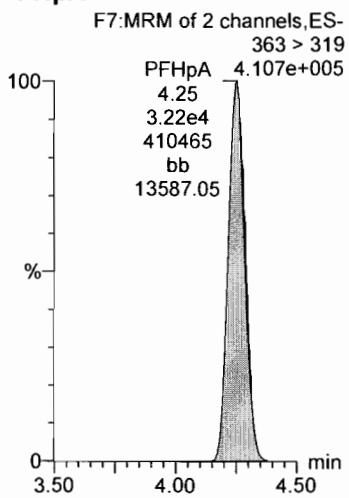

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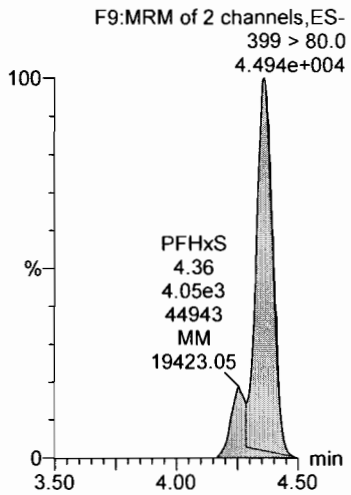
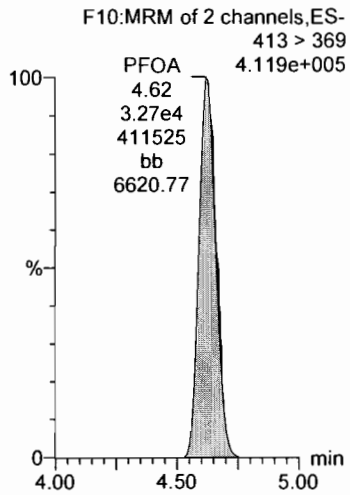
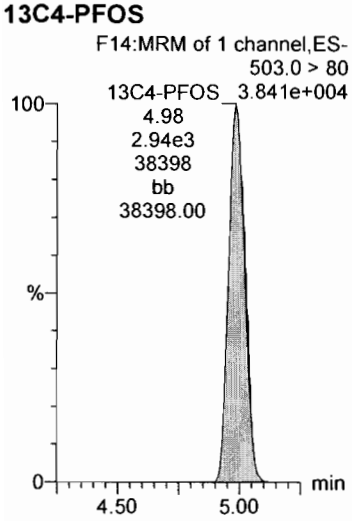


PFOA



13C4-PFOS



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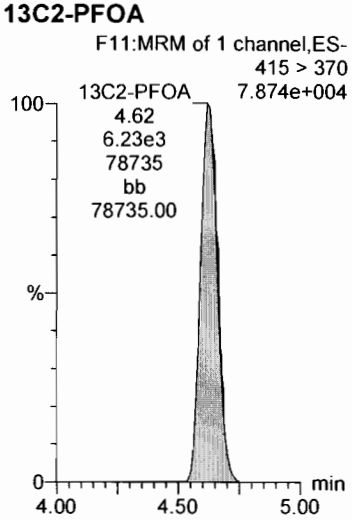

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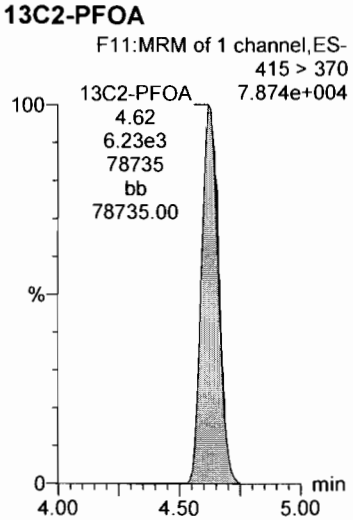

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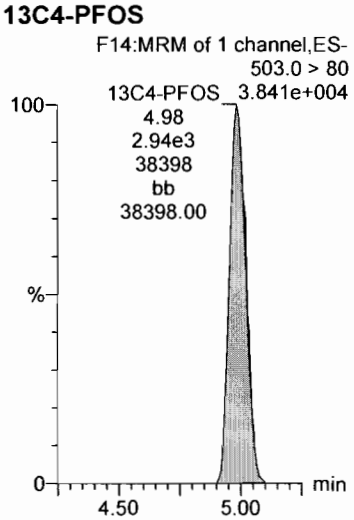

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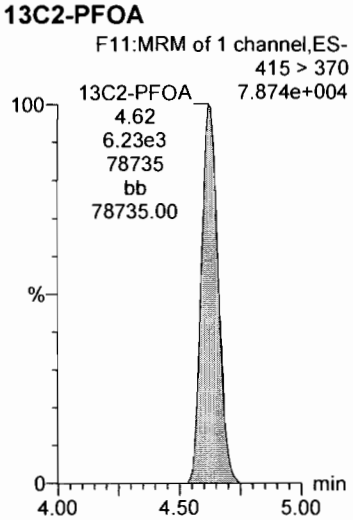

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-46.qld

Last Altered: Monday, December 31, 2018 10:47:32 Pacific Standard Time
Printed: Monday, December 31, 2018 10:49:24 Pacific Standard Time

Name: 181230P1_46, Date: 30-Dec-2018, Time: 22:08:11, ID: ST181230P1-12 PFC CS3 537 18L2619, Description: PFC CS3 537 18L2619

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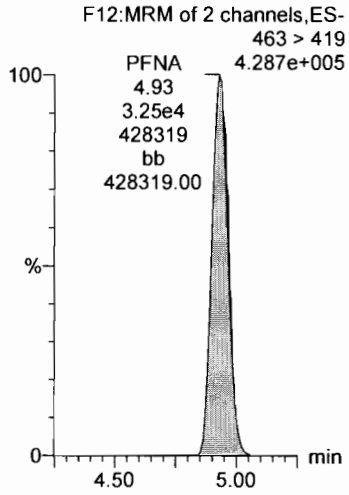
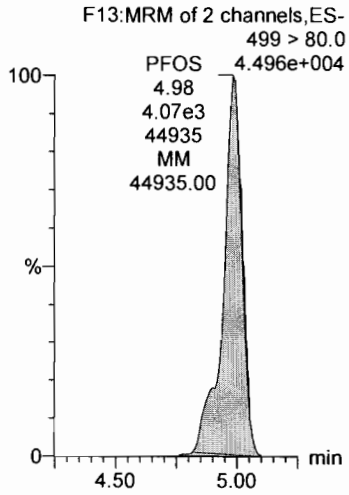


PFOS



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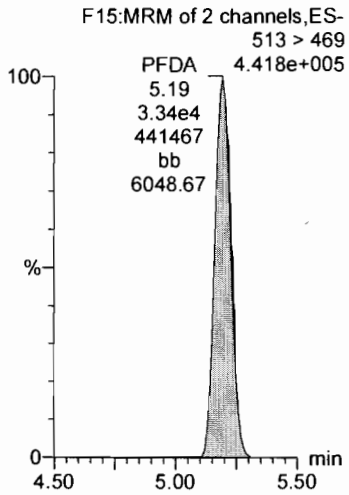

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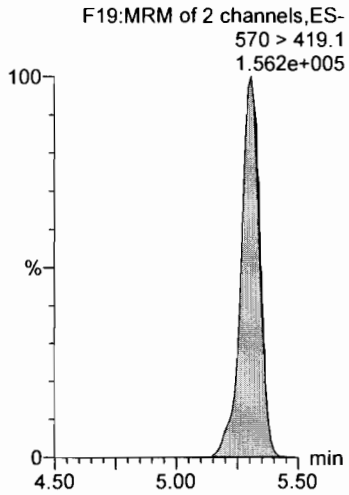

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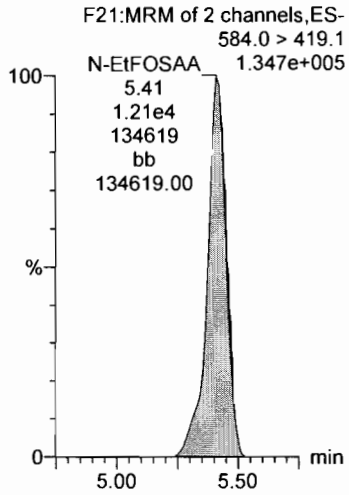

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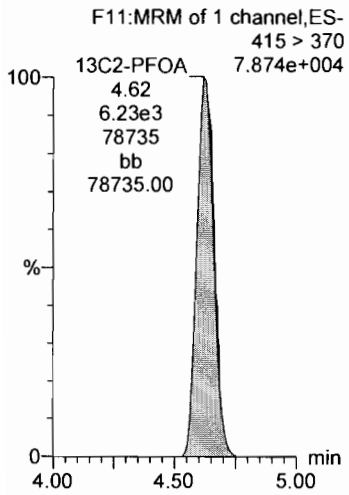

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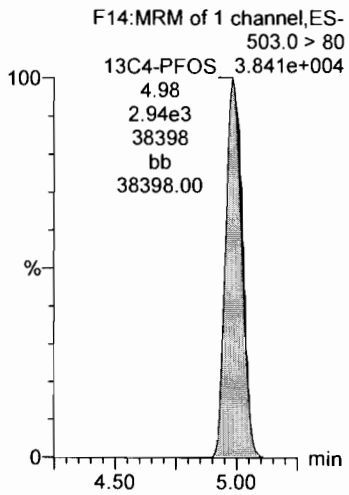

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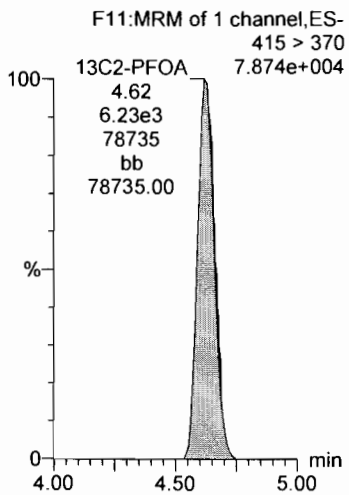

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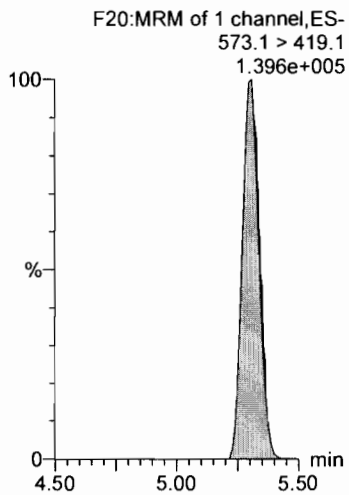

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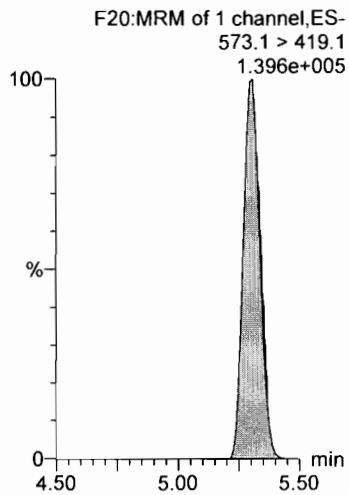

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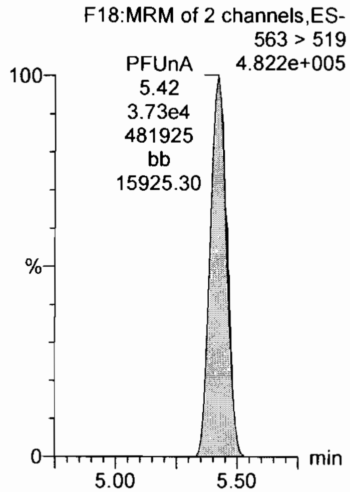
Last Altered: Monday, December 31, 2018 10:47:32 Pacific Standard Time
Printed: Monday, December 31, 2018 10:49:24 Pacific Standard Time

Name: 181230P1_46, Date: 30-Dec-2018, Time: 22:08:11, ID: ST181230P1-12 PFC CS3 537 18L2619, Description: PFC CS3 537 18L2619

PFUnA



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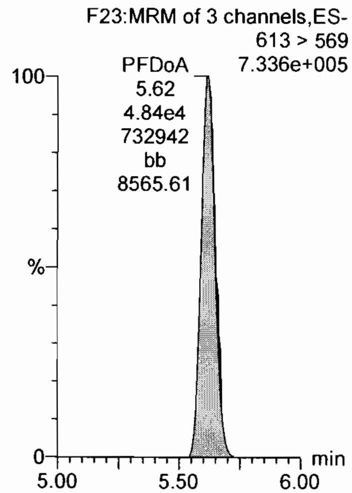

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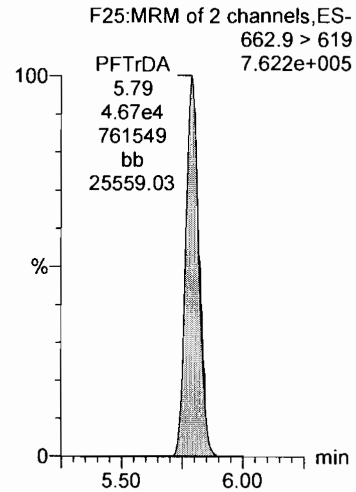
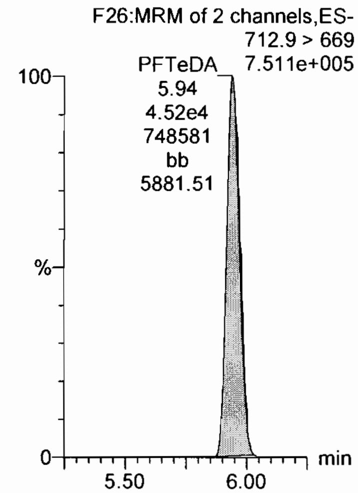


PFTeDA



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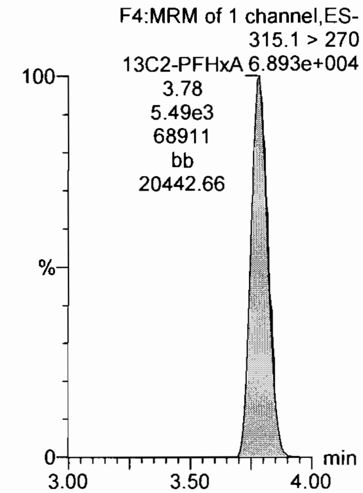

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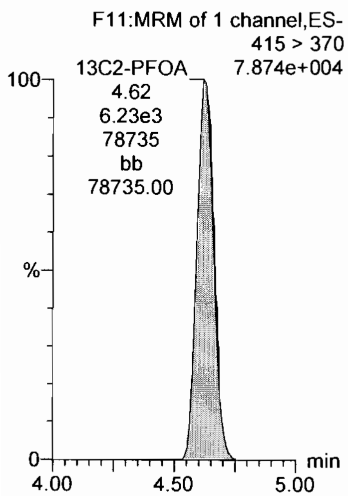

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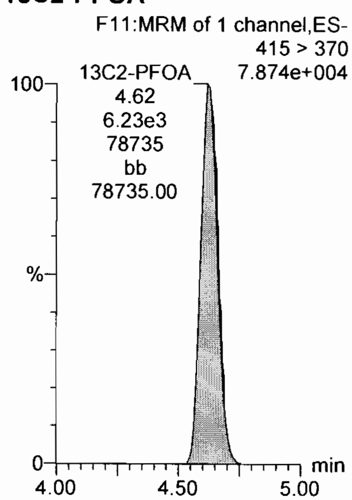

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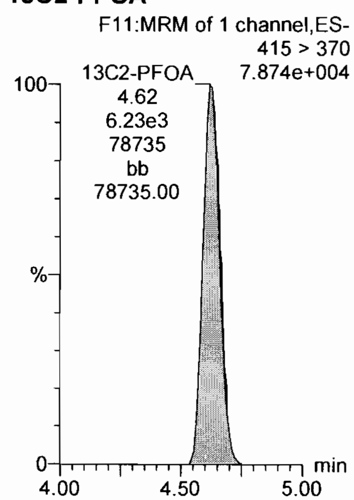

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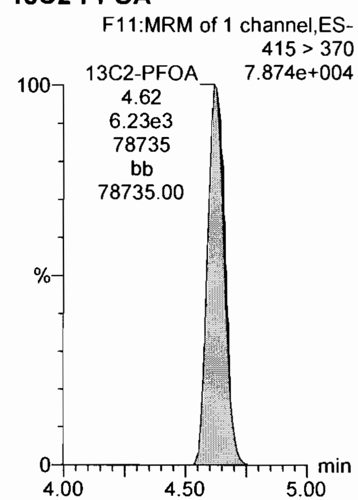

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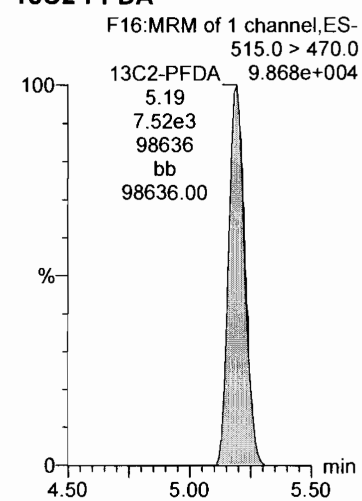

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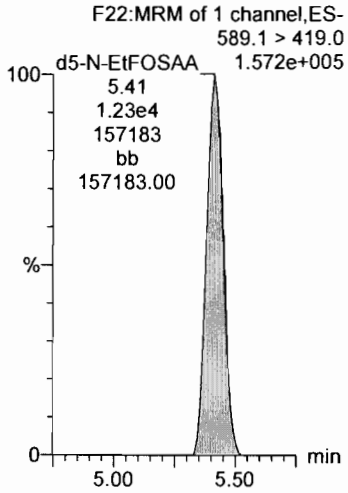
Last Altered: Monday, December 31, 2018 10:47:32 Pacific Standard Time
Printed: Monday, December 31, 2018 10:49:24 Pacific Standard Time

Name: 181230P1_46, Date: 30-Dec-2018, Time: 22:08:11, ID: ST181230P1-12 PFC CS3 537 18L2619, Description: PFC CS3 537 18L2619

d5-N-EtFOSAA



INITIAL CALIBRATION (ICAL)

INCLUDING ASSOCIATED

INITIAL CALIBRATION VERIFICATION (ICV)

high pt
no high pts dropped.

low pt
PFHxS = 0.456
PFOS = 0.464
MPFHxA = 0.5

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:33:18 Pacific Standard Time

Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 30 Dec 2018 16:18:17

AD 12/31/18

AM 12/31/18

Compound name: PFBS
Coefficient of Determination: R^2 = 0.998689
Calibration curve: 0.806436 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.222	3.49	13.601	2632.376	0.148	0.2	-17.2	NO	0.999	NO	bb
2	2	181230P1_3	Standard	0.444	3.53	36.558	2623.565	0.400	0.5	11.7	NO	0.999	NO	bb
3	3	181230P1_4	Standard	0.888	3.51	63.499	2639.479	0.690	0.9	-3.6	NO	0.999	NO	bb
4	4	181230P1_5	Standard	1.780	3.51	126.265	2819.248	1.285	1.6	-10.5	NO	0.999	NO	bb
5	5	181230P1_6	Standard	4.440	3.52	327.246	2804.555	3.349	4.2	-6.5	NO	0.999	NO	bb
6	6	181230P1_7	Standard	8.840	3.51	674.796	2919.058	6.635	8.2	-6.9	NO	0.999	NO	bb
7	7	181230P1_8	Standard	22.100	3.52	1560.260	2596.775	17.244	21.4	-3.2	NO	0.999	NO	bb
8	8	181230P1_9	Standard	44.200	3.52	3528.968	2695.050	37.581	46.6	5.4	NO	0.999	NO	bb
9	9	181230P1_10	Standard	66.400	3.52	5489.170	3014.795	52.255	64.8	-2.4	NO	0.999	NO	bb
10	10	181230P1_11	Standard	88.500	3.52	7451.723	2962.348	72.194	89.5	1.2	NO	0.999	NO	bb

Compound name: PFHxA
Coefficient of Determination: R^2 = 0.997429
Calibration curve: 0.681317 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	3.79	95.990	5573.088	0.172	0.3	1.1	NO	0.997	NO	bb
2	2	181230P1_3	Standard	0.500	3.84	180.171	5638.912	0.320	0.5	-6.2	NO	0.997	NO	bb
3	3	181230P1_4	Standard	1.000	3.82	352.268	5899.166	0.597	0.9	-12.4	NO	0.997	NO	bb
4	4	181230P1_5	Standard	2.000	3.81	771.764	5967.691	1.293	1.9	-5.1	NO	0.997	NO	bb
5	5	181230P1_6	Standard	5.000	3.81	1875.844	5779.052	3.246	4.8	-4.7	NO	0.997	NO	bb
6	6	181230P1_7	Standard	10.000	3.82	3616.851	6308.302	5.733	8.4	-15.8	NO	0.997	NO	bb
7	7	181230P1_8	Standard	25.000	3.82	8991.103	5895.777	15.250	22.4	-10.5	NO	0.997	NO	bb
8	8	181230P1_9	Standard	50.000	3.82	20455.373	5938.605	34.445	50.6	1.1	NO	0.997	NO	bb
9	9	181230P1_10	Standard	75.000	3.81	31396.596	5989.329	52.421	76.9	2.6	NO	0.997	NO	bb
10	10	181230P1_11	Standard	100.000	3.81	43434.063	6238.142	69.627	102.2	2.2	NO	0.997	NO	bb

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Compound name: PFHpA
Coefficient of Determination: R^2 = 0.997736
Calibration curve: 1.01057 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	4.27	143.744	5573.088	0.258	0.3	2.1	NO	0.998	NO	MM
2	2	181230P1_3	Standard	0.500	4.29	253.735	5638.912	0.450	0.4	-10.9	NO	0.998	NO	bb
3	3	181230P1_4	Standard	1.000	4.29	520.049	5899.166	0.882	0.9	-12.8	NO	0.998	NO	bb
4	4	181230P1_5	Standard	2.000	4.28	1080.107	5967.691	1.810	1.8	-10.4	NO	0.998	NO	bb
5	5	181230P1_6	Standard	5.000	4.27	2754.115	5779.052	4.766	4.7	-5.7	NO	0.998	NO	bb
6	6	181230P1_7	Standard	10.000	4.28	5466.148	6308.302	8.665	8.6	-14.3	NO	0.998	NO	db
7	7	181230P1_8	Standard	25.000	4.28	13523.449	5895.777	22.938	22.7	-9.2	NO	0.998	NO	bb
8	8	181230P1_9	Standard	50.000	4.28	30307.438	5938.605	51.035	50.5	1.0	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	4.28	46919.457	5989.329	78.338	77.5	3.4	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	4.27	63909.059	6238.142	102.449	101.4	1.4	NO	0.998	NO	bb

Compound name: PFHxS
Coefficient of Determination: R^2 = 0.995224
Calibration curve: 0.83734 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.228	4.34	14.343	2632.376	0.156	0.2	-18.1	NO	0.995	NO	MMX
2	2	181230P1_3	Standard	0.456	4.41	21.065	2623.565	0.230	0.3	-39.6	NO	0.995	NO	MM
3	3	181230P1_4	Standard	0.912	4.39	72.775	2639.479	0.791	0.9	3.6	NO	0.995	NO	MM
4	4	181230P1_5	Standard	1.820	4.38	116.191	2819.248	1.183	1.4	-22.4	NO	0.995	NO	MM
5	5	181230P1_6	Standard	4.560	4.40	349.074	2804.555	3.572	4.3	-6.4	NO	0.995	NO	MM
6	6	181230P1_7	Standard	9.120	4.40	589.022	2919.058	5.791	6.9	-24.2	NO	0.995	NO	MM
7	7	181230P1_8	Standard	22.800	4.39	1697.021	2596.775	18.756	22.4	-1.8	NO	0.995	NO	MM
8	8	181230P1_9	Standard	45.500	4.39	3820.370	2695.050	40.684	48.6	6.8	NO	0.995	NO	MM
9	9	181230P1_10	Standard	68.200	4.39	5789.517	3014.795	55.115	65.8	-3.5	NO	0.995	NO	MM
10	10	181230P1_11	Standard	91.000	4.39	8102.279	2962.348	78.497	93.7	3.0	NO	0.995	NO	MM

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Compound name: PFOA
Coefficient of Determination: R^2 = 0.997882
Calibration curve: 1.06493 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	4.63	129.576	5573.088	0.233	0.2	-12.7	NO	0.998	NO	MM
2	2	181230P1_3	Standard	0.500	4.66	270.576	5638.912	0.480	0.5	-9.9	NO	0.998	NO	bb
3	3	181230P1_4	Standard	1.000	4.67	574.224	5899.166	0.973	0.9	-8.6	NO	0.998	NO	MM
4	4	181230P1_5	Standard	2.000	4.66	1148.635	5967.691	1.925	1.8	-9.6	NO	0.998	NO	bb
5	5	181230P1_6	Standard	5.000	4.66	3005.353	5779.052	5.200	4.9	-2.3	NO	0.998	NO	bb
6	6	181230P1_7	Standard	10.000	4.66	5773.218	6308.302	9.152	8.6	-14.1	NO	0.998	NO	bb
7	7	181230P1_8	Standard	25.000	4.66	14219.778	5895.777	24.119	22.6	-9.4	NO	0.998	NO	bd
8	8	181230P1_9	Standard	50.000	4.66	31825.170	5938.605	53.590	50.3	0.6	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	4.66	48798.469	5989.329	81.476	76.5	2.0	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	4.66	68028.906	6238.142	109.053	102.4	2.4	NO	0.998	NO	bb

Compound name: PFNA
Coefficient of Determination: R^2 = 0.997911
Calibration curve: 1.05568 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	4.95	142.627	5573.088	0.256	0.2	-3.0	NO	0.998	NO	bd
2	2	181230P1_3	Standard	0.500	4.95	271.570	5638.912	0.482	0.5	-8.8	NO	0.998	NO	db
3	3	181230P1_4	Standard	1.000	4.95	587.612	5899.166	0.996	0.9	-5.6	NO	0.998	NO	MM
4	4	181230P1_5	Standard	2.000	4.95	1231.754	5967.691	2.064	2.0	-2.2	NO	0.998	NO	bb
5	5	181230P1_6	Standard	5.000	4.96	2723.071	5779.052	4.712	4.5	-10.7	NO	0.998	NO	bb
6	6	181230P1_7	Standard	10.000	4.95	5976.188	6308.302	9.474	9.0	-10.3	NO	0.998	NO	bb
7	7	181230P1_8	Standard	25.000	4.96	13939.851	5895.777	23.644	22.4	-10.4	NO	0.998	NO	bb
8	8	181230P1_9	Standard	50.000	4.96	32001.943	5938.605	53.888	51.0	2.1	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	4.95	48779.320	5989.329	81.444	77.1	2.9	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	4.95	66595.844	6238.142	106.756	101.1	1.1	NO	0.998	NO	bb

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Compound name: PFOS
Coefficient of Determination: R^2 = 0.997459
Calibration curve: 0.83026 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.232	4.98	7.192	2632.376	0.078	0.1	-59.3	NO	0.997	NO	MMX
2	2	181230P1_3	Standard	0.464	5.03	25.562	2623.565	0.280	0.3	-27.4	NO	0.997	NO	bb
3	3	181230P1_4	Standard	0.928	5.02	82.790	2639.479	0.900	1.1	16.8	NO	0.997	NO	MM
4	4	181230P1_5	Standard	1.860	5.01	132.513	2819.248	1.349	1.6	-12.6	NO	0.997	NO	MM
5	5	181230P1_6	Standard	4.640	5.02	325.976	2804.555	3.336	4.0	-13.4	NO	0.997	NO	MM
6	6	181230P1_7	Standard	9.240	5.02	692.764	2919.058	6.811	8.2	-11.2	NO	0.997	NO	MM
7	7	181230P1_8	Standard	23.100	5.02	1647.591	2596.775	18.209	21.9	-5.1	NO	0.997	NO	MM
8	8	181230P1_9	Standard	46.200	5.01	3784.652	2695.050	40.303	48.5	5.1	NO	0.997	NO	MM
9	9	181230P1_10	Standard	69.400	5.01	5890.691	3014.795	56.078	67.5	-2.7	NO	0.997	NO	bb
10	10	181230P1_11	Standard	92.500	5.01	8145.300	2962.348	78.914	95.0	2.8	NO	0.997	NO	MM

Compound name: PFDA
Coefficient of Determination: R^2 = 0.999214
Calibration curve: 0.00124422 * x^2 + 0.973674 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.20	188.859	5573.088	0.339	0.3	39.2	NO	0.999	NO	bb
2	2	181230P1_3	Standard	0.500	5.23	248.436	5638.912	0.441	0.5	-9.6	NO	0.999	NO	MM
3	3	181230P1_4	Standard	1.000	5.23	491.951	5899.166	0.834	0.9	-14.4	NO	0.999	NO	MM
4	4	181230P1_5	Standard	2.000	5.23	1121.153	5967.691	1.879	1.9	-3.8	NO	0.999	NO	bb
5	5	181230P1_6	Standard	5.000	5.23	2798.996	5779.052	4.843	4.9	-1.1	NO	0.999	NO	MM
6	6	181230P1_7	Standard	10.000	5.23	5932.626	6308.302	9.404	9.5	-4.6	NO	0.999	NO	bd
7	7	181230P1_8	Standard	25.000	5.23	14352.256	5895.777	24.343	24.3	-3.0	NO	0.999	NO	bb
8	8	181230P1_9	Standard	50.000	5.23	31703.445	5938.605	53.385	51.4	2.9	NO	0.999	NO	bb
9	9	181230P1_10	Standard	75.000	5.21	48920.598	5989.329	81.680	76.4	1.9	NO	0.999	NO	bb
10	10	181230P1_11	Standard	100.000	5.21	67383.070	6238.142	108.018	98.5	-1.5	NO	0.999	NO	bb

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Compound name: N-MeFOSAA
Coefficient of Determination: R^2 = 0.999429
Calibration curve: 0.000722284 * x^2 + 0.906439 * x
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.33	25.773	9950.888	0.104	0.1	-54.3	NO	0.999	NO	bbX
2	2	181230P1_3	Standard	0.500	5.33	117.034	9708.704	0.482	0.5	6.3	NO	0.999	NO	bb
3	3	181230P1_4	Standard	1.000	5.34	194.518	9924.369	0.784	0.9	-13.6	NO	0.999	NO	bb
4	4	181230P1_5	Standard	2.000	5.34	455.510	10705.199	1.702	1.9	-6.3	NO	0.999	NO	bb
5	5	181230P1_6	Standard	5.000	5.33	1158.698	10569.619	4.385	4.8	-3.6	NO	0.999	NO	bb
6	6	181230P1_7	Standard	10.000	5.34	2339.710	10949.670	8.547	9.4	-6.4	NO	0.999	NO	bb
7	7	181230P1_8	Standard	25.000	5.33	5889.433	10208.498	23.077	25.0	-0.2	NO	0.999	NO	bb
8	8	181230P1_9	Standard	50.000	5.33	12821.864	10512.338	48.788	51.7	3.4	NO	0.999	NO	bb
9	9	181230P1_10	Standard	75.000	5.33	19566.246	10809.808	72.402	75.4	0.5	NO	0.999	NO	bb
10	10	181230P1_11	Standard	100.000	5.33	26818.178	11076.275	96.849	99.0	-1.0	NO	0.999	NO	bb

Compound name: N-EtFOSAA
Coefficient of Determination: R^2 = 0.998606
Calibration curve: 0.85367 * x
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.42	50.774	9950.888	0.204	0.2	-4.4	NO	0.999	NO	bb
2	2	181230P1_3	Standard	0.500	5.43	84.040	9708.704	0.346	0.4	-18.9	NO	0.999	NO	MM
3	3	181230P1_4	Standard	1.000	5.46	173.547	9924.369	0.699	0.8	-18.1	NO	0.999	NO	bb
4	4	181230P1_5	Standard	2.000	5.45	357.853	10705.199	1.337	1.6	-21.7	NO	0.999	NO	bb
5	5	181230P1_6	Standard	5.000	5.45	1099.822	10569.619	4.162	4.9	-2.5	NO	0.999	NO	bb
6	6	181230P1_7	Standard	10.000	5.45	2113.126	10949.670	7.719	9.0	-9.6	NO	0.999	NO	bb
7	7	181230P1_8	Standard	25.000	5.45	5205.042	10208.498	20.395	23.9	-4.4	NO	0.999	NO	bb
8	8	181230P1_9	Standard	50.000	5.45	11582.647	10512.338	44.073	51.6	3.3	NO	0.999	NO	bb
9	9	181230P1_10	Standard	75.000	5.43	17569.838	10809.808	65.014	76.2	1.5	NO	0.999	NO	bb
10	10	181230P1_11	Standard	100.000	5.45	23668.137	11076.275	85.473	100.1	0.1	NO	0.999	NO	bb

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Compound name: PFUnA
Coefficient of Determination: R^2 = 0.997034
Calibration curve: 1.21658 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.44	193.973	5573.088	0.348	0.3	14.4	NO	0.997	NO	bb
2	2	181230P1_3	Standard	0.500	5.45	297.196	5638.912	0.527	0.4	-13.4	NO	0.997	NO	bb
3	3	181230P1_4	Standard	1.000	5.45	610.625	5899.166	1.035	0.9	-14.9	NO	0.997	NO	bb
4	4	181230P1_5	Standard	2.000	5.44	1209.625	5967.691	2.027	1.7	-16.7	NO	0.997	NO	MM
5	5	181230P1_6	Standard	5.000	5.44	3269.024	5779.052	5.657	4.6	-7.0	NO	0.997	NO	bb
6	6	181230P1_7	Standard	10.000	5.44	6487.664	6308.302	10.284	8.5	-15.5	NO	0.997	NO	bb
7	7	181230P1_8	Standard	25.000	5.44	16124.760	5895.777	27.350	22.5	-10.1	NO	0.997	NO	bb
8	8	181230P1_9	Standard	50.000	5.45	36874.734	5938.605	62.093	51.0	2.1	NO	0.997	NO	bb
9	9	181230P1_10	Standard	75.000	5.44	56910.289	5989.329	95.019	78.1	4.1	NO	0.997	NO	bb
10	10	181230P1_11	Standard	100.000	5.44	76489.500	6238.142	122.616	100.8	0.8	NO	0.997	NO	bb

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.998164
Calibration curve: 1.53708 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.63	204.682	5573.088	0.367	0.2	-4.4	NO	0.998	NO	bb
2	2	181230P1_3	Standard	0.500	5.66	445.604	5638.912	0.790	0.5	2.8	NO	0.998	NO	MM
3	3	181230P1_4	Standard	1.000	5.66	824.822	5899.166	1.398	0.9	-9.0	NO	0.998	NO	bb
4	4	181230P1_5	Standard	2.000	5.65	1723.800	5967.691	2.889	1.9	-6.0	NO	0.998	NO	MM
5	5	181230P1_6	Standard	5.000	5.64	4204.056	5779.052	7.275	4.7	-5.3	NO	0.998	NO	bb
6	6	181230P1_7	Standard	10.000	5.65	8651.673	6308.302	13.715	8.9	-10.8	NO	0.998	NO	bb
7	7	181230P1_8	Standard	25.000	5.65	20582.332	5895.777	34.910	22.7	-9.2	NO	0.998	NO	bb
8	8	181230P1_9	Standard	50.000	5.65	46251.703	5938.605	77.883	50.7	1.3	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	5.63	71647.938	5989.329	119.626	77.8	3.8	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	5.64	96214.969	6238.142	154.237	100.3	0.3	NO	0.998	NO	bb

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Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Monday, December 31, 2018 08:50:24 Pacific Standard Time
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Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.997542
Calibration curve: 1.50164 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.80	120.064	5573.088	0.215	0.1	-42.6	NO	0.998	NO	MM
2	2	181230P1_3	Standard	0.500	5.83	332.128	5638.912	0.589	0.4	-21.6	NO	0.998	NO	bb
3	3	181230P1_4	Standard	1.000	5.82	817.067	5899.166	1.385	0.9	-7.8	NO	0.998	NO	bb
4	4	181230P1_5	Standard	2.000	5.82	1639.599	5967.691	2.747	1.8	-8.5	NO	0.998	NO	bb
5	5	181230P1_6	Standard	5.000	5.82	4073.647	5779.052	7.049	4.7	-6.1	NO	0.998	NO	db
6	6	181230P1_7	Standard	10.000	5.81	8078.682	6308.302	12.806	8.5	-14.7	NO	0.998	NO	db
7	7	181230P1_8	Standard	25.000	5.81	20192.105	5895.777	34.248	22.8	-8.8	NO	0.998	NO	bb
8	8	181230P1_9	Standard	50.000	5.82	44769.316	5938.605	75.387	50.2	0.4	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	5.81	69861.227	5989.329	116.643	77.7	3.6	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	5.81	95129.211	6238.142	152.496	101.6	1.6	NO	0.998	NO	bb

Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.998236
Calibration curve: 0.00170648 * x^2 + 1.33217 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	0.250	5.95	193.263	5573.088	0.347	0.3	4.1	NO	0.998	NO	MM
2	2	181230P1_3	Standard	0.500	5.97	319.980	5638.912	0.567	0.4	-14.9	NO	0.998	NO	MM
3	3	181230P1_4	Standard	1.000	5.97	729.093	5899.166	1.236	0.9	-7.3	NO	0.998	NO	MM
4	4	181230P1_5	Standard	2.000	5.98	1498.453	5967.691	2.511	1.9	-6.0	NO	0.998	NO	bb
5	5	181230P1_6	Standard	5.000	5.96	3990.876	5779.052	6.906	5.1	3.0	NO	0.998	NO	bb
6	6	181230P1_7	Standard	10.000	5.96	7731.739	6308.302	12.256	9.1	-9.1	NO	0.998	NO	bb
7	7	181230P1_8	Standard	25.000	5.97	19090.654	5895.777	32.380	23.6	-5.6	NO	0.998	NO	bb
8	8	181230P1_9	Standard	50.000	5.96	44299.563	5938.605	74.596	52.5	4.9	NO	0.998	NO	bb
9	9	181230P1_10	Standard	75.000	5.96	67725.750	5989.329	113.077	77.2	3.0	NO	0.998	NO	bb
10	10	181230P1_11	Standard	100.000	5.96	91303.086	6238.142	146.363	97.7	-2.3	NO	0.998	NO	bb

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Compound name: 13C2-PFHxA
Response Factor: 0.867743
RRF SD: 0.0244362, Relative SD: 2.81606
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	10.000	3.79	5036.359	5573.088	9.037	10.4	4.1	NO		NO	bb
2	2	181230P1_3	Standard	10.000	3.82	5061.975	5638.912	8.977	10.3	3.5	NO		NO	bb
3	3	181230P1_4	Standard	10.000	3.82	5029.178	5899.166	8.525	9.8	-1.8	NO		NO	bb
4	4	181230P1_5	Standard	10.000	3.82	5101.264	5967.691	8.548	9.9	-1.5	NO		NO	bb
5	5	181230P1_6	Standard	10.000	3.82	5128.709	5779.052	8.875	10.2	2.3	NO		NO	bb
6	6	181230P1_7	Standard	10.000	3.82	5187.664	6308.302	8.224	9.5	-5.2	NO		NO	bb
7	7	181230P1_8	Standard	10.000	3.82	5112.104	5895.777	8.671	10.0	-0.1	NO		NO	bb
8	8	181230P1_9	Standard	10.000	3.82	5085.239	5938.605	8.563	9.9	-1.3	NO		NO	bb
9	9	181230P1_10	Standard	10.000	3.82	5258.057	5989.329	8.779	10.1	1.2	NO		NO	bb
10	10	181230P1_11	Standard	10.000	3.82	5349.882	6238.142	8.576	9.9	-1.2	NO		NO	bb

Compound name: 13C2-PFDA
Response Factor: 1.22114
RRF SD: 0.0175497, Relative SD: 1.43715
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	10.000	5.20	6875.375	5573.088	12.337	10.1	1.0	NO		NO	bb
2	2	181230P1_3	Standard	10.000	5.23	6986.515	5638.912	12.390	10.1	1.5	NO		NO	bb
3	3	181230P1_4	Standard	10.000	5.23	7046.281	5899.166	11.945	9.8	-2.2	NO		NO	bb
4	4	181230P1_5	Standard	10.000	5.22	7241.191	5967.691	12.134	9.9	-0.6	NO		NO	bb
5	5	181230P1_6	Standard	10.000	5.22	7094.073	5779.052	12.275	10.1	0.5	NO		NO	bb
6	6	181230P1_7	Standard	10.000	5.23	7589.887	6308.302	12.032	9.9	-1.5	NO		NO	bb
7	7	181230P1_8	Standard	10.000	5.22	7168.175	5895.777	12.158	10.0	-0.4	NO		NO	bb
8	8	181230P1_9	Standard	10.000	5.23	7151.031	5938.605	12.042	9.9	-1.4	NO		NO	bb
9	9	181230P1_10	Standard	10.000	5.22	7474.413	5989.329	12.480	10.2	2.2	NO		NO	bb
10	10	181230P1_11	Standard	10.000	5.22	7687.180	6238.142	12.323	10.1	0.9	NO		NO	bb

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Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

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Compound name: d5-N-EtFOSAA
Response Factor: 1.13233
RRF SD: 0.0384501, Relative SD: 3.39565
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	40.000	5.42	11820.006	9950.888	47.513	42.0	4.9	NO		NO	bb
2	2	181230P1_3	Standard	40.000	5.45	11503.706	9708.704	47.395	41.9	4.6	NO		NO	bb
3	3	181230P1_4	Standard	40.000	5.45	11416.604	9924.369	46.014	40.6	1.6	NO		NO	bb
4	4	181230P1_5	Standard	40.000	5.45	11986.597	10705.199	44.788	39.6	-1.1	NO		NO	bb
5	5	181230P1_6	Standard	40.000	5.45	12055.415	10569.619	45.623	40.3	0.7	NO		NO	bb
6	6	181230P1_7	Standard	40.000	5.45	12134.782	10949.670	44.329	39.1	-2.1	NO		NO	bb
7	7	181230P1_8	Standard	40.000	5.45	11841.498	10208.498	46.399	41.0	2.4	NO		NO	bb
8	8	181230P1_9	Standard	40.000	5.45	11563.926	10512.338	44.001	38.9	-2.9	NO		NO	bb
9	9	181230P1_10	Standard	40.000	5.43	11628.436	10809.808	43.029	38.0	-5.0	NO		NO	bb
10	10	181230P1_11	Standard	40.000	5.43	12139.690	11076.275	43.840	38.7	-3.2	NO		NO	bb

Compound name: 13C2-PFOA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	10.000	4.63	5573.088	5573.088	10.000	10.0	0.0	NO		NO	bb
2	2	181230P1_3	Standard	10.000	4.66	5638.912	5638.912	10.000	10.0	0.0	NO		NO	bb
3	3	181230P1_4	Standard	10.000	4.66	5899.166	5899.166	10.000	10.0	0.0	NO		NO	bb
4	4	181230P1_5	Standard	10.000	4.66	5967.691	5967.691	10.000	10.0	0.0	NO		NO	bb
5	5	181230P1_6	Standard	10.000	4.66	5779.052	5779.052	10.000	10.0	0.0	NO		NO	bb
6	6	181230P1_7	Standard	10.000	4.66	6308.302	6308.302	10.000	10.0	0.0	NO		NO	bb
7	7	181230P1_8	Standard	10.000	4.66	5895.777	5895.777	10.000	10.0	0.0	NO		NO	bb
8	8	181230P1_9	Standard	10.000	4.66	5938.605	5938.605	10.000	10.0	0.0	NO		NO	bb
9	9	181230P1_10	Standard	10.000	4.65	5989.329	5989.329	10.000	10.0	0.0	NO		NO	bb
10	10	181230P1_11	Standard	10.000	4.65	6238.142	6238.142	10.000	10.0	0.0	NO		NO	bb

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Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	28.700	4.99	2632.376	2632.376	28.700	28.7	0.0	NO		NO	bb
2	2	181230P1_3	Standard	28.700	5.02	2623.565	2623.565	28.700	28.7	0.0	NO		NO	bb
3	3	181230P1_4	Standard	28.700	5.02	2639.479	2639.479	28.700	28.7	0.0	NO		NO	bb
4	4	181230P1_5	Standard	28.700	5.01	2819.248	2819.248	28.700	28.7	0.0	NO		NO	bb
5	5	181230P1_6	Standard	28.700	5.01	2804.555	2804.555	28.700	28.7	0.0	NO		NO	bb
6	6	181230P1_7	Standard	28.700	5.01	2919.058	2919.058	28.700	28.7	0.0	NO		NO	bb
7	7	181230P1_8	Standard	28.700	5.01	2596.775	2596.775	28.700	28.7	0.0	NO		NO	bb
8	8	181230P1_9	Standard	28.700	5.01	2695.050	2695.050	28.700	28.7	0.0	NO		NO	bb
9	9	181230P1_10	Standard	28.700	5.01	3014.795	3014.795	28.700	28.7	0.0	NO		NO	bb
10	10	181230P1_11	Standard	28.700	5.01	2962.348	2962.348	28.700	28.7	0.0	NO		NO	bb

Compound name: d3-N-MeFOSAA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	181230P1_2	Standard	40.000	5.31	9950.888	9950.888	40.000	40.0	0.0	NO		NO	bb
2	2	181230P1_3	Standard	40.000	5.33	9708.704	9708.704	40.000	40.0	0.0	NO		NO	bb
3	3	181230P1_4	Standard	40.000	5.33	9924.369	9924.369	40.000	40.0	0.0	NO		NO	bb
4	4	181230P1_5	Standard	40.000	5.33	10705.199	10705.199	40.000	40.0	0.0	NO		NO	bb
5	5	181230P1_6	Standard	40.000	5.33	10569.619	10569.619	40.000	40.0	0.0	NO		NO	bb
6	6	181230P1_7	Standard	40.000	5.33	10949.670	10949.670	40.000	40.0	0.0	NO		NO	bb
7	7	181230P1_8	Standard	40.000	5.33	10208.498	10208.498	40.000	40.0	0.0	NO		NO	bb
8	8	181230P1_9	Standard	40.000	5.33	10512.338	10512.338	40.000	40.0	0.0	NO		NO	bb
9	9	181230P1_10	Standard	40.000	5.33	10809.808	10809.808	40.000	40.0	0.0	NO		NO	bb
10	10	181230P1_11	Standard	40.000	5.33	11076.275	11076.275	40.000	40.0	0.0	NO		NO	bb

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Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Monday, December 31, 2018 08:50:24 Pacific Standard Time
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Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Name: 181230P1_2, Date: 30-Dec-2018, Time: 13:48:14, ID: ST181230P1-1 PFC CS-4 537 18L2612, Description: PFC CS-4 537 18L2612

	#	Name	IS#	CoD	CoD Flag	%RSD
1	1	PFBS	19	0.9987	NO	
2	2	PFHxA	18	0.9974	NO	
3	3	PFHpA	18	0.9977	NO	
4	4	PFHxS	19	0.9952	NO	
5	5	PFOA	18	0.9979	NO	
6	6	PFNA	18	0.9979	NO	
7	7	PFOS	19	0.9975	NO	
8	8	PFDA	18	0.9992	NO	
9	9	N-MeFOSAA	20	0.9994	NO	
10	10	N-EtFOSAA	20	0.9986	NO	
11	11	PFUnA	18	0.9970	NO	
12	12	PFDoA	18	0.9982	NO	
13	13	PFTrDA	18	0.9975	NO	
14	14	PFTeDA	18	0.9982	NO	
15	15	13C2-PFHxA	18		NO	2.816
16	16	13C2-PFDA	18		NO	1.437
17	17	d5-N-EtFOSAA	20		NO	3.396
18	18	13C2-PFOA	18		NO	0.000
19	19	13C4-PFOS	19		NO	0.000
20	20	d3-N-MeFOSAA	20		NO	0.000

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Dataset: Untitled

Last Altered: Monday, December 31, 2018 08:09:56 Pacific Standard Time
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Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 30 Dec 2018 16:18:17

Compound name: PFBS

	#	Name	ID	Acq.Date	Acq.Time
1	1	181230P1_1	IPA	30-Dec-18	13:37:01
2	2	181230P1_2	ST181230P1-1 PFC CS-4 537 18L2612	30-Dec-18	13:48:14
3	3	181230P1_3	ST181230P1-2 PFC CS-3 537 18L2613	30-Dec-18	13:59:24
4	4	181230P1_4	ST181230P1-3 PFC CS-2 537 18L2614	30-Dec-18	14:10:35
5	5	181230P1_5	ST181230P1-4 PFC CS-1 537 18L2615	30-Dec-18	14:21:45
6	6	181230P1_6	ST181230P1-5 PFC CS0 537 18L2616	30-Dec-18	14:32:56
7	7	181230P1_7	ST181230P1-6 PFC CS1 537 18L2617	30-Dec-18	14:44:07
8	8	181230P1_8	ST181230P1-7 PFC CS2 537 18L2618	30-Dec-18	14:55:18
9	9	181230P1_9	ST181230P1-8 PFC CS3 537 18L2619	30-Dec-18	15:06:29
10	10	181230P1_10	ST181230P1-9 PFC CS4 537 18L2620	30-Dec-18	15:17:39
11	11	181230P1_11	ST181230P1-10 PFC CS5 537 18L2621	30-Dec-18	15:28:50
12	12	181230P1_12	IPA	30-Dec-18	15:40:00
13	13	181230P1_13	ST181230P1-1 PFC ICV 537 18L2622	30-Dec-18	15:51:12
14	14	181230P1_14	IPA	30-Dec-18	16:02:22

Ical RPD

Compound 18: 13C2-PFOA

high 6308.302 rpd
low 5573.088 12.37589

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Primary Flags
1	ST181230P1-1 PFC CS-4 537 18L2612	181230P1_	Standard	10	4.63	5573.088	5573.088	bb
2	ST181230P1-2 PFC CS-3 537 18L2613	181230P1_	Standard	10	4.66	5638.912	5638.912	bb
3	ST181230P1-3 PFC CS-2 537 18L2614	181230P1_	Standard	10	4.66	5899.166	5899.166	bb
4	ST181230P1-4 PFC CS-1 537 18L2615	181230P1_	Standard	10	4.66	5967.691	5967.691	bb
5	ST181230P1-5 PFC CS0 537 18L2616	181230P1_	Standard	10	4.66	5779.052	5779.052	bb
6	ST181230P1-6 PFC CS1 537 18L2617	181230P1_	Standard	10	4.66	6308.302	6308.302	bb
7	ST181230P1-7 PFC CS2 537 18L2618	181230P1_	Standard	10	4.66	5895.777	5895.777	bb
8	ST181230P1-8 PFC CS3 537 18L2619	181230P1_	Standard	10	4.66	5938.605	5938.605	bb
9	ST181230P1-9 PFC CS4 537 18L2620	181230P1_	Standard	10	4.65	5989.329	5989.329	bb
10	ST181230P1-10 PFC CS5 537 18L2621	181230P1_	Standard	10	4.65	6238.142	6238.142	bb
						average	5922.806	

Compound 19: 13C4-PFOS

high 3014.795 rpd
low 2596.775 14.8985

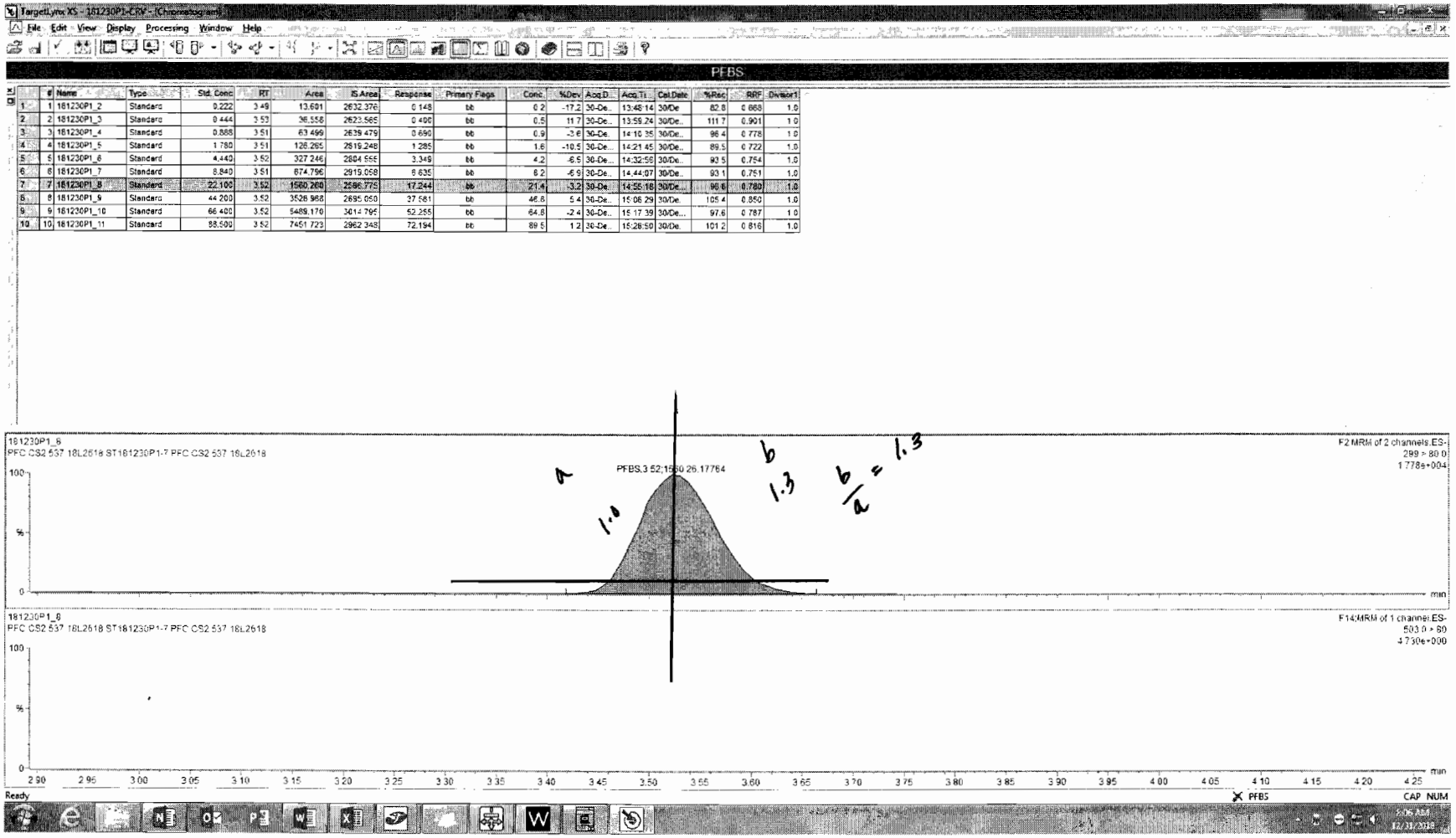
	ID	Name	Type	Std. Conc	RT	Area	IS Area	Primary Flags
1	ST181230P1-1 PFC CS-4 537 18L2612	181230P1_	Standard	28.7	4.99	2632.376	2632.376	bb
2	ST181230P1-2 PFC CS-3 537 18L2613	181230P1_	Standard	28.7	5.02	2623.565	2623.565	bb
3	ST181230P1-3 PFC CS-2 537 18L2614	181230P1_	Standard	28.7	5.02	2639.479	2639.479	bb
4	ST181230P1-4 PFC CS-1 537 18L2615	181230P1_	Standard	28.7	5.01	2819.248	2819.248	bb
5	ST181230P1-5 PFC CS0 537 18L2616	181230P1_	Standard	28.7	5.01	2804.555	2804.555	bb
6	ST181230P1-6 PFC CS1 537 18L2617	181230P1_	Standard	28.7	5.01	2919.058	2919.058	bb
7	ST181230P1-7 PFC CS2 537 18L2618	181230P1_	Standard	28.7	5.01	2596.775	2596.775	bb
8	ST181230P1-8 PFC CS3 537 18L2619	181230P1_	Standard	28.7	5.01	2695.050	2695.050	bb
9	ST181230P1-9 PFC CS4 537 18L2620	181230P1_	Standard	28.7	5.01	3014.795	3014.795	bb
10	ST181230P1-10 PFC CS5 537 18L2621	181230P1_	Standard	28.7	5.01	2962.348	2962.348	bb

						average	2770.725	

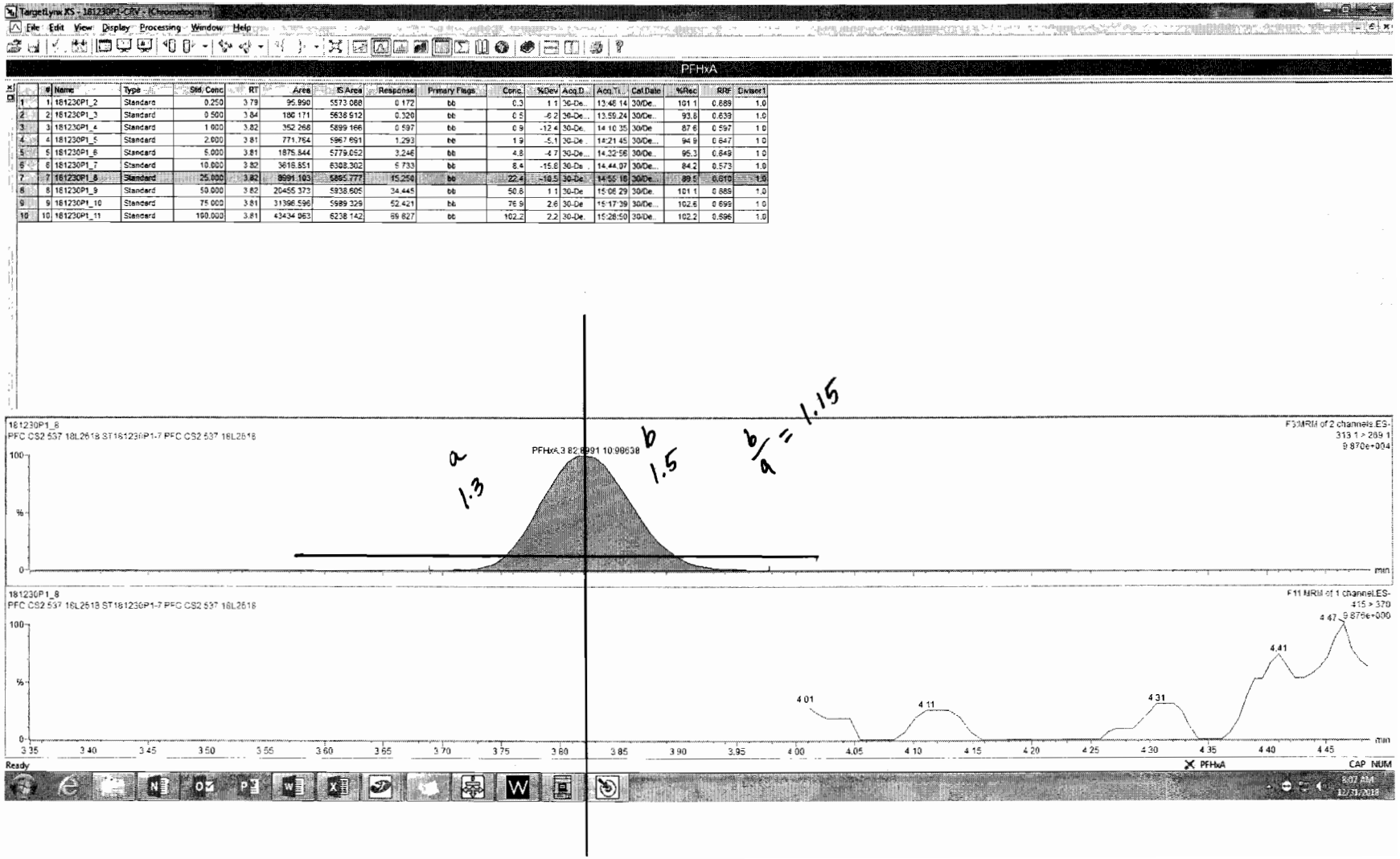
Compound 20: d3-N-MeFOSAA

high	11076.28	rpd	
low	9708.704	13.15922	

	ID	Name	Type	Std. Conc	RT	Area	IS Area	Primary Flags
1	ST181230P1-1 PFC CS-4 537 18L2612	181230P1_	Standard	40	5.31	9950.888	9950.888	bb
2	ST181230P1-2 PFC CS-3 537 18L2613	181230P1_	Standard	40	5.33	9708.704	9708.704	bb
3	ST181230P1-3 PFC CS-2 537 18L2614	181230P1_	Standard	40	5.33	9924.369	9924.369	bb
4	ST181230P1-4 PFC CS-1 537 18L2615	181230P1_	Standard	40	5.33	10705.20	10705.20	bb
5	ST181230P1-5 PFC CS0 537 18L2616	181230P1_	Standard	40	5.33	10569.62	10569.62	bb
6	ST181230P1-6 PFC CS1 537 18L2617	181230P1_	Standard	40	5.33	10949.67	10949.67	bb
7	ST181230P1-7 PFC CS2 537 18L2618	181230P1_	Standard	40	5.33	10208.50	10208.50	bb
8	ST181230P1-8 PFC CS3 537 18L2619	181230P1_	Standard	40	5.33	10512.34	10512.34	bb
9	ST181230P1-9 PFC CS4 537 18L2620	181230P1_	Standard	40	5.33	10809.81	10809.81	bb
10	ST181230P1-10 PFC CS5 537 18L2621	181230P1_	Standard	40	5.33	11076.28	11076.28	bb
						average	10441.54	



	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Primary Flags	Conc.	%Dev	Acq.D...	Acq.Ti...	Cal.Date	%Rec	RRF	Divisor1
1	1	181230P1_2	Standard	0.222	3.49	13.691	2632.376	0.148	bb	0.2	-17.2	30-De...	13:48:14	30/De	82.8	0.668	1.0
2	2	181230P1_3	Standard	0.444	3.53	36.558	2623.565	0.490	bb	0.5	11.7	30-De...	13:59:24	30/De...	111.7	0.901	1.0
3	3	181230P1_4	Standard	0.888	3.51	63.499	2639.479	0.690	bb	0.9	-3.6	30-De...	14:10:35	30/De...	96.4	0.778	1.0
4	4	181230P1_5	Standard	1.780	3.51	126.265	2619.248	1.285	bb	1.6	-10.5	30-De...	14:21:45	30/De...	89.5	0.722	1.0
5	5	181230P1_6	Standard	4.440	3.52	327.246	2604.555	3.349	bb	4.2	-6.5	30-De...	14:32:56	30/De...	93.5	0.754	1.0
6	6	181230P1_7	Standard	8.840	3.51	674.796	2919.058	8.635	bb	8.2	-6.9	30-De...	14:44:07	30/De...	93.1	0.751	1.0
7	7	181230P1_8	Standard	22.100	3.52	1560.260	2586.775	17.244	bb	21.4	-3.2	30-De...	14:55:18	30/De...	96.8	0.780	1.0
8	8	181230P1_9	Standard	44.200	3.52	3528.968	2695.050	37.581	bb	46.8	5.4	30-De...	15:06:29	30/De...	105.4	0.850	1.0
9	9	181230P1_10	Standard	66.400	3.52	5489.170	3014.795	52.255	bb	64.8	-2.4	30-De...	15:17:39	30/De...	97.6	0.787	1.0
10	10	181230P1_11	Standard	88.500	3.52	7451.723	2962.348	72.194	bb	89.5	1.2	30-De...	15:28:50	30/De...	101.2	0.816	1.0


TargetLynx XS - 181230P1-CRV - [Chromatogram]
File Edit View Display Processing Window Help
PFHxA
181230P1_6
PFC CS2 537 18L2618 ST181230P1-7 PFC CS2 537 18L2618
F3MRM of 2 channels ES-
313 1 > 269 1
9 870e+004
PFHxA 3 82 8991 10 98638
a
1.3
b
1.5
b/a = 1.15
100
%
0
min
181230P1_8
PFC CS2 537 18L2618 ST181230P1-7 PFC CS2 537 18L2618
F11 MRM of 1 channel ES-
419 > 370
9 875e+000
4 47
4.41
4 31
4 11
4 01
3 35
3 40
3 45
3 50
3 55
3 60
3 65
3 70
3 75
3 80
3 85
3 90
3 95
4 00
4 05
4 10
4 15
4 20
4 25
4 30
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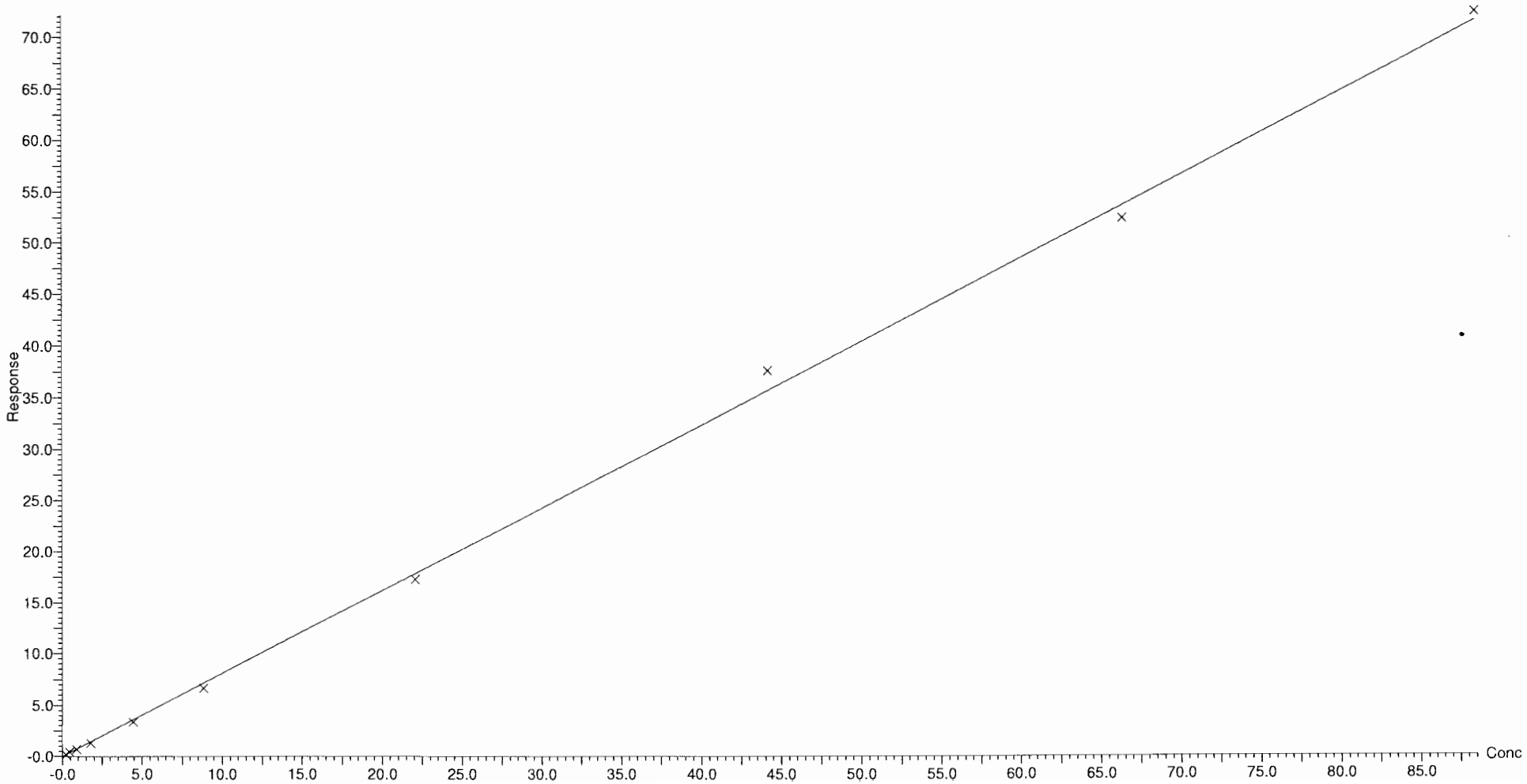
4 40
4 45
Ready
PFHxA
CAP NUM
8:07 AM
12/31/2018

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 30 Dec 2018 16:18:17

Compound name: PFBS
Coefficient of Determination: R^2 = 0.998689
Calibration curve: 0.806436 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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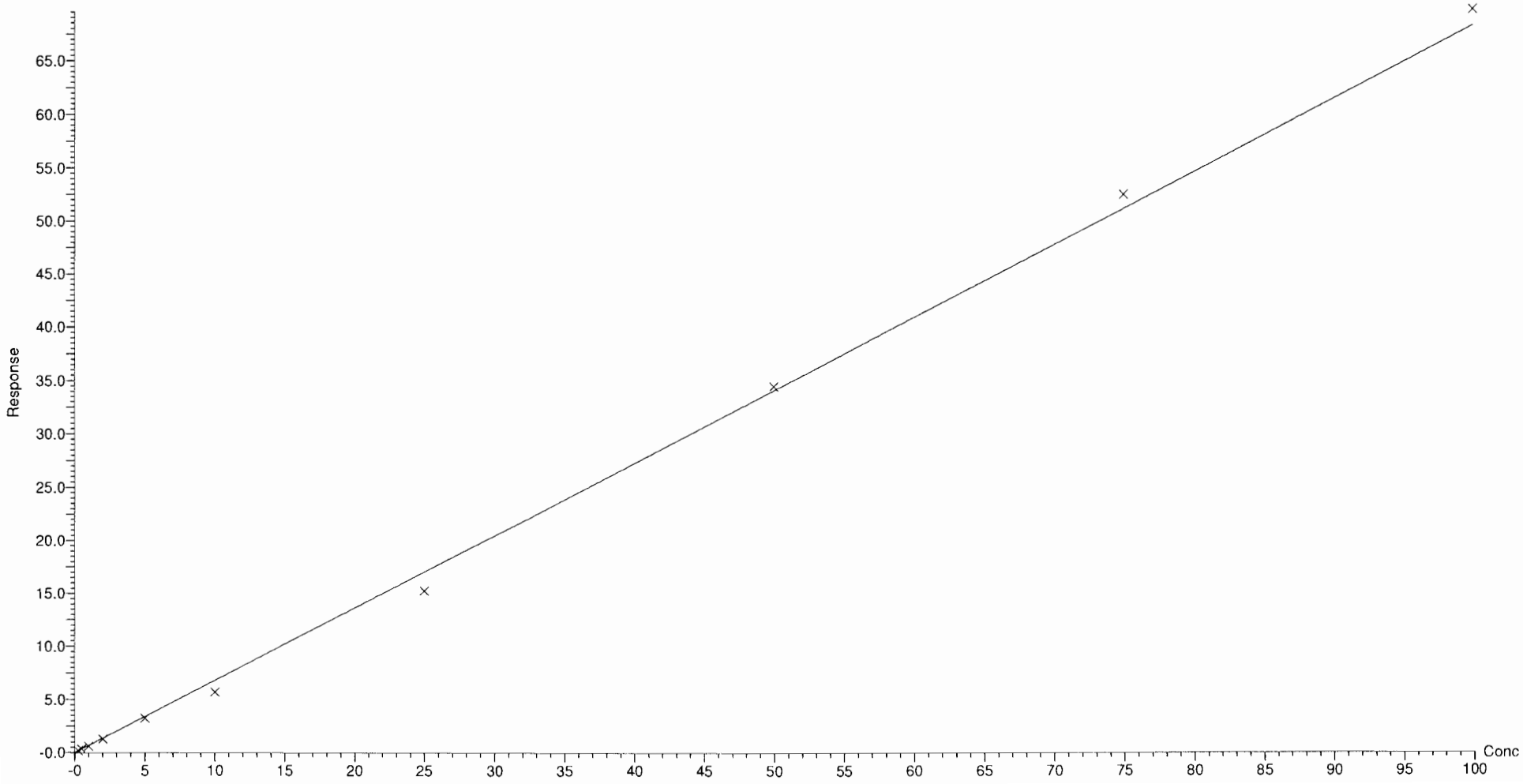
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

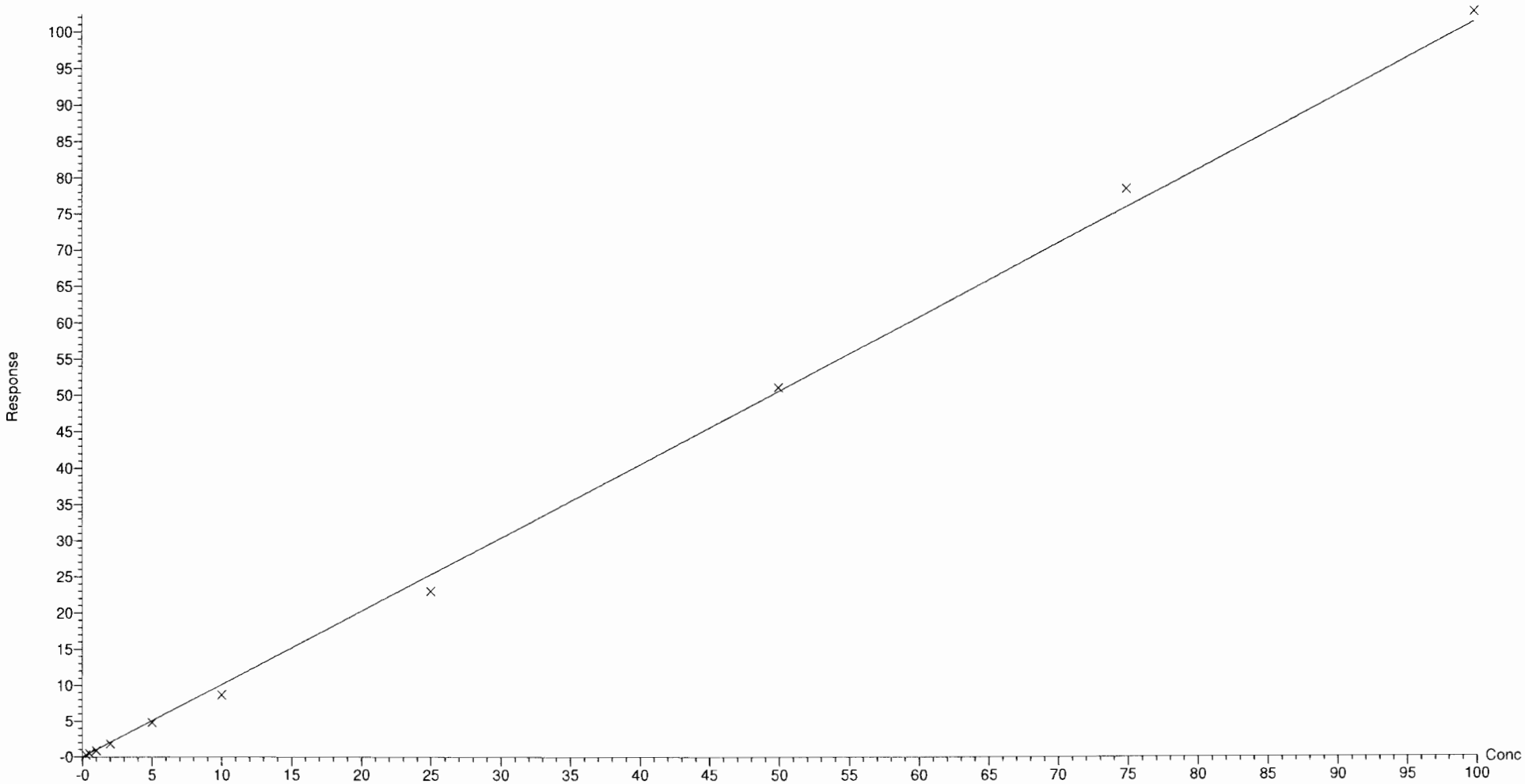
Compound name: PFHxA
Coefficient of Determination: R^2 = 0.997429
Calibration curve: 0.681317 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

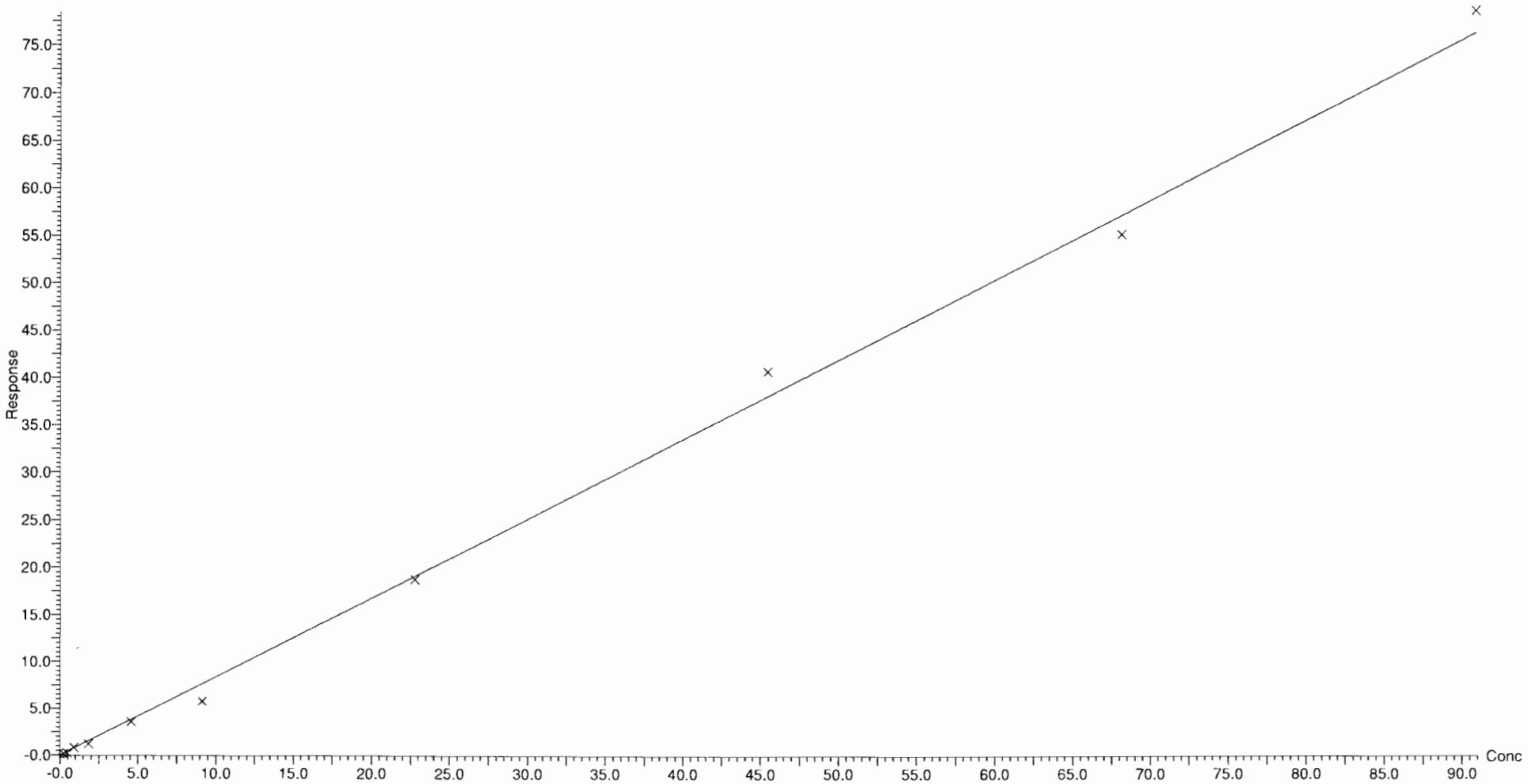
Compound name: PFHpA
Coefficient of Determination: R^2 = 0.997736
Calibration curve: 1.01057 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFHxS
Coefficient of Determination: R^2 = 0.995224
Calibration curve: 0.83734 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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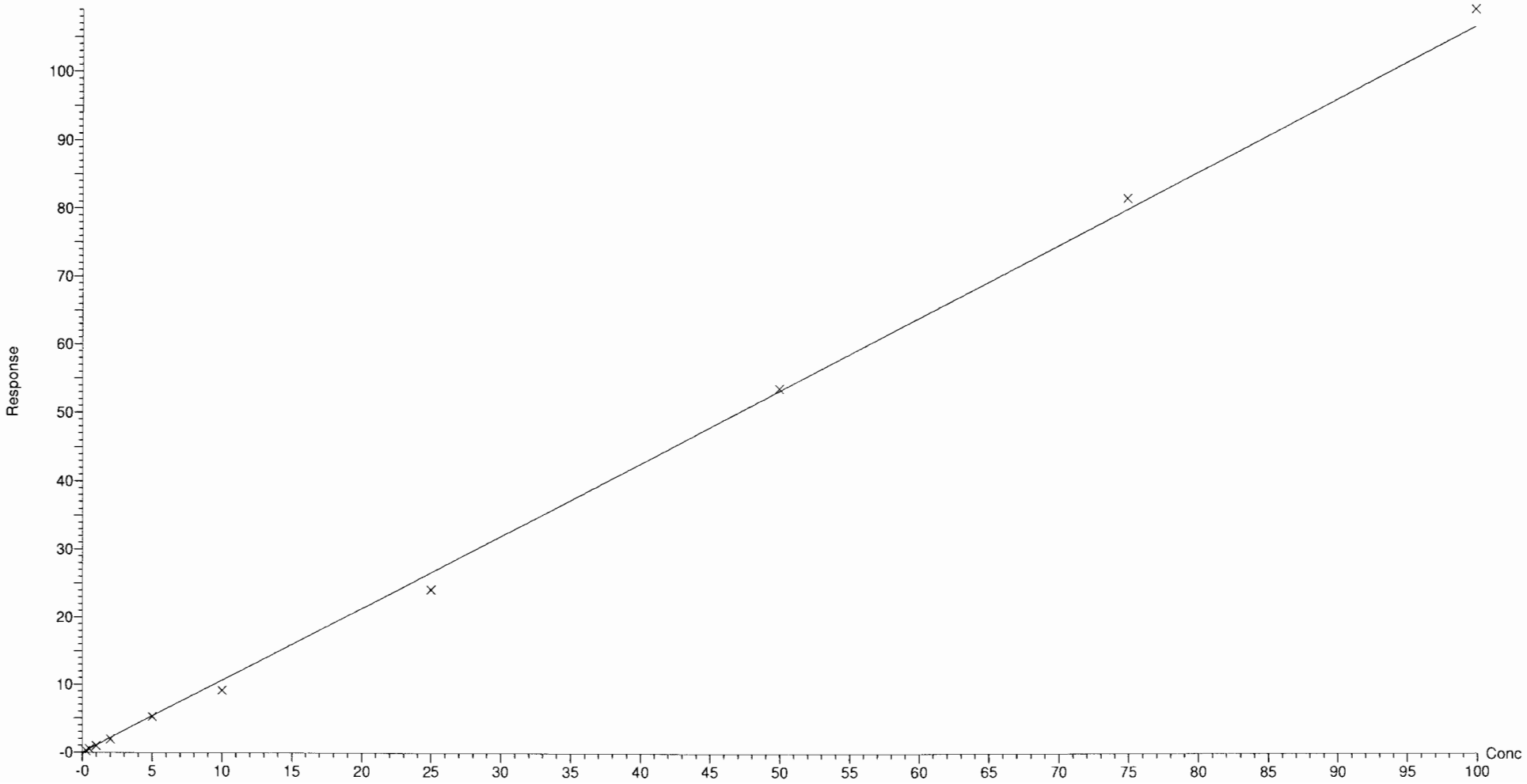
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFOA
Coefficient of Determination: R^2 = 0.997882
Calibration curve: 1.06493 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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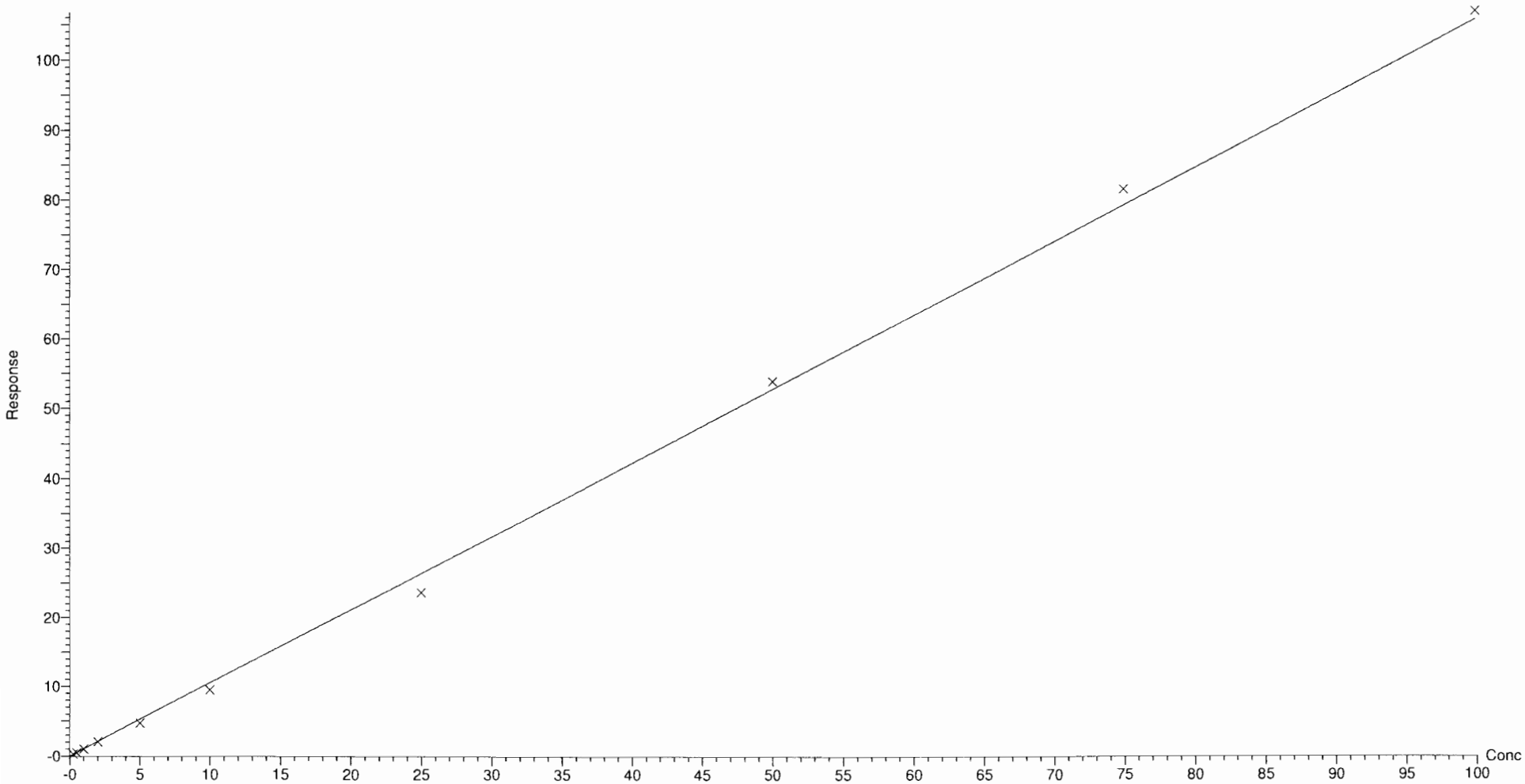
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFNA
Coefficient of Determination: R^2 = 0.997911
Calibration curve: 1.05568 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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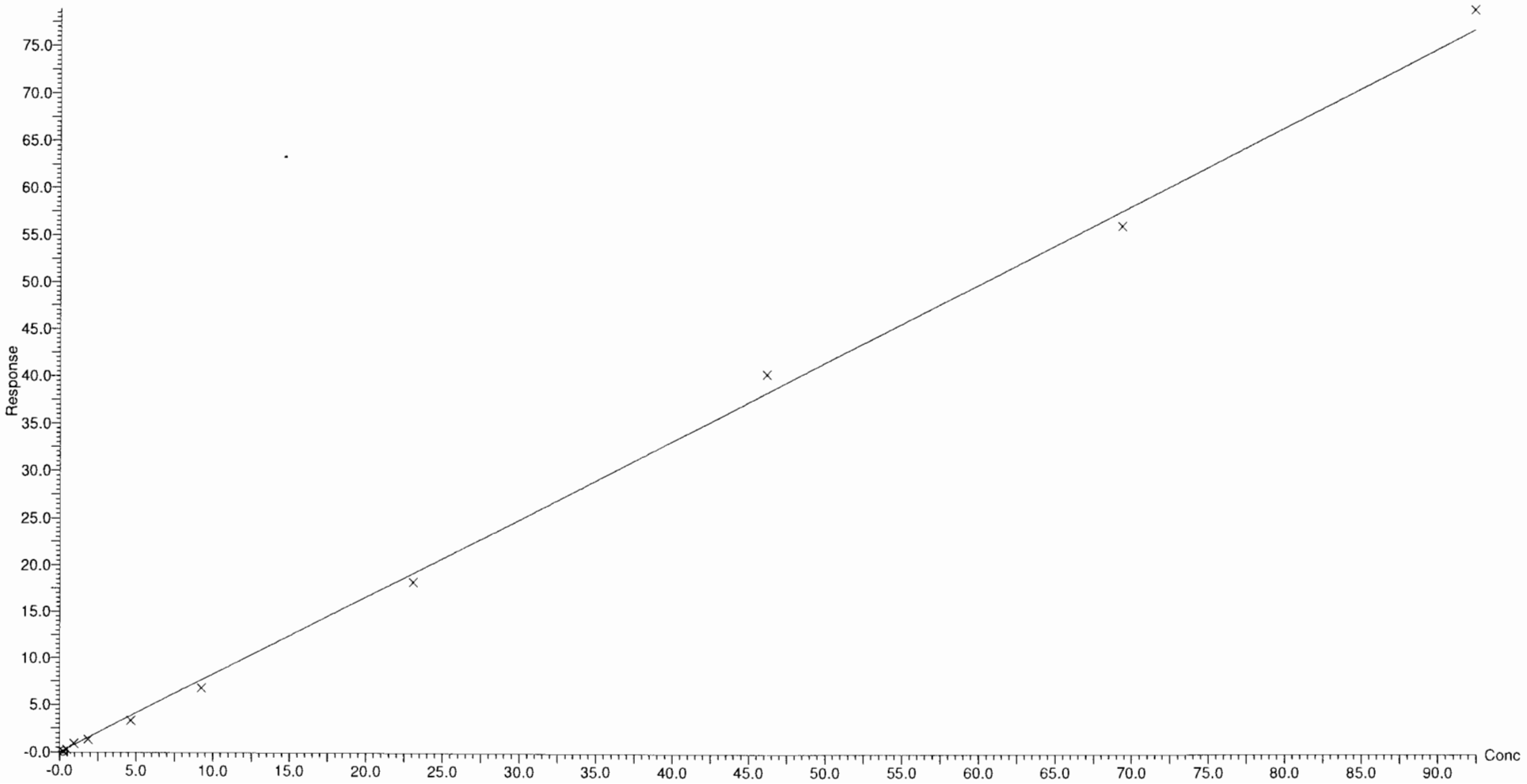
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFOS
Coefficient of Determination: R^2 = 0.997459
Calibration curve: 0.83026 * x
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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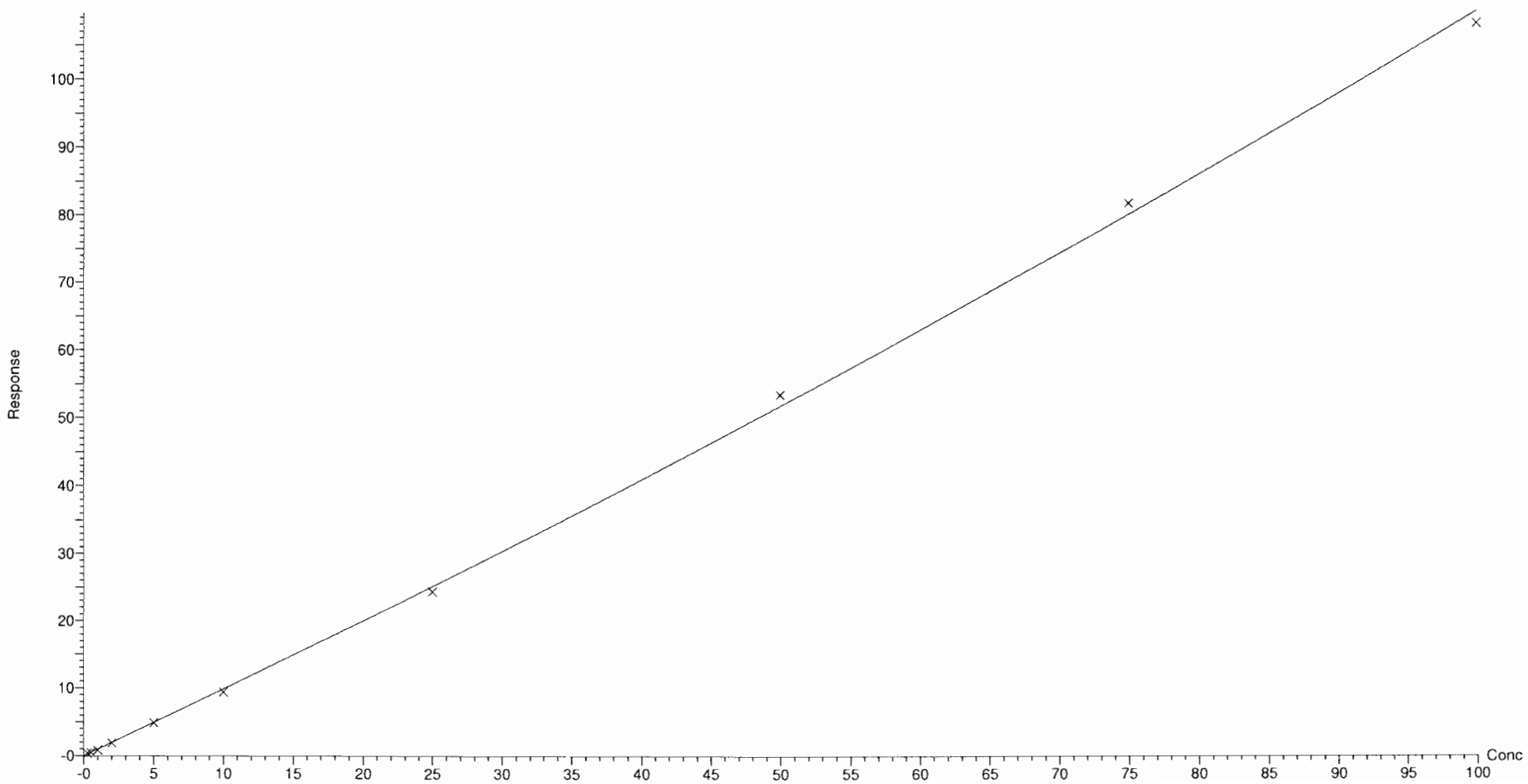
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFDA
Coefficient of Determination: R^2 = 0.999214
Calibration curve: 0.00124422 * x^2 + 0.973674 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None



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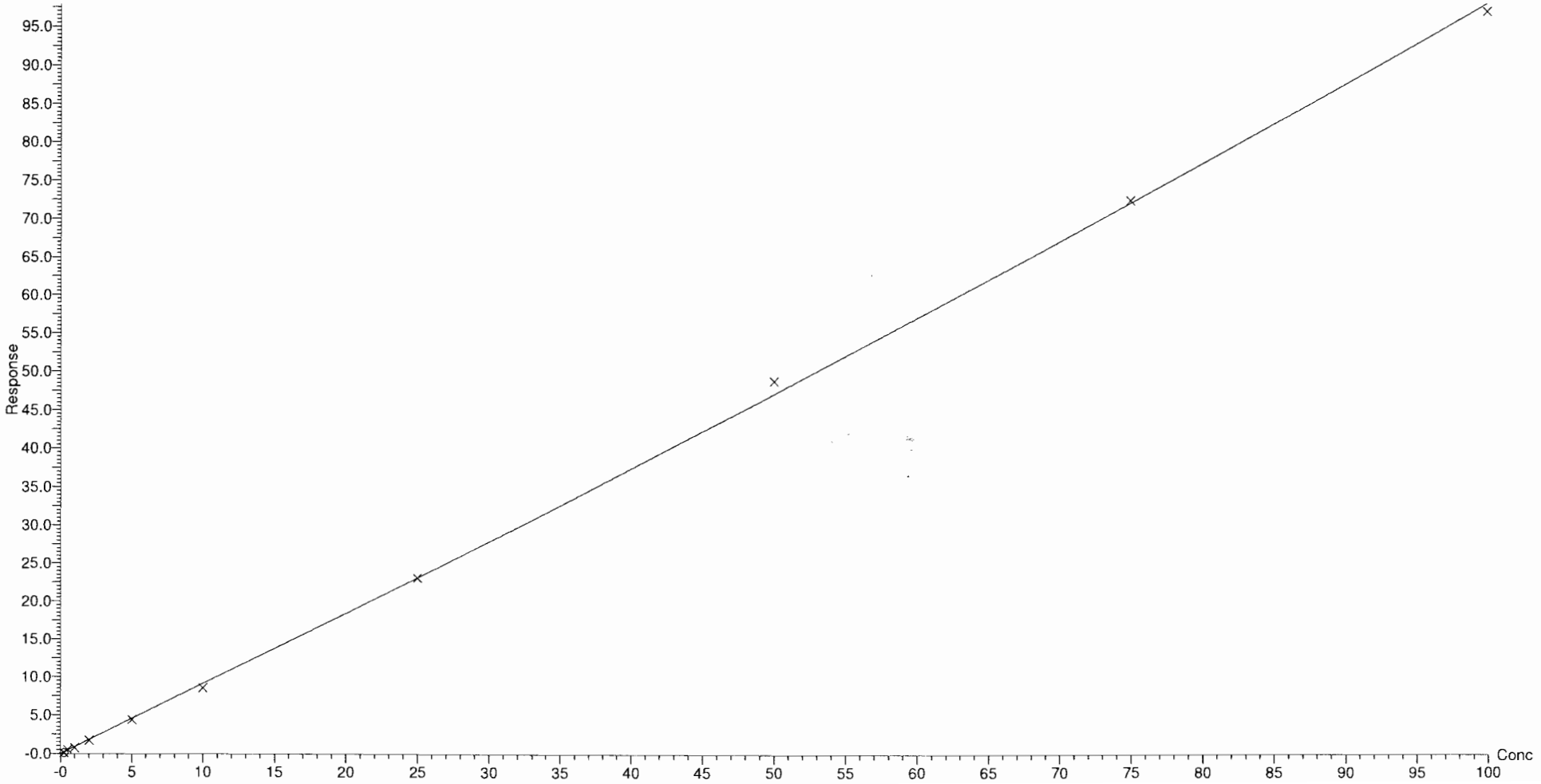
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: N-MeFOSAA
Coefficient of Determination: R^2 = 0.999429
Calibration curve: 0.000722284 * x^2 + 0.906439 * x
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None



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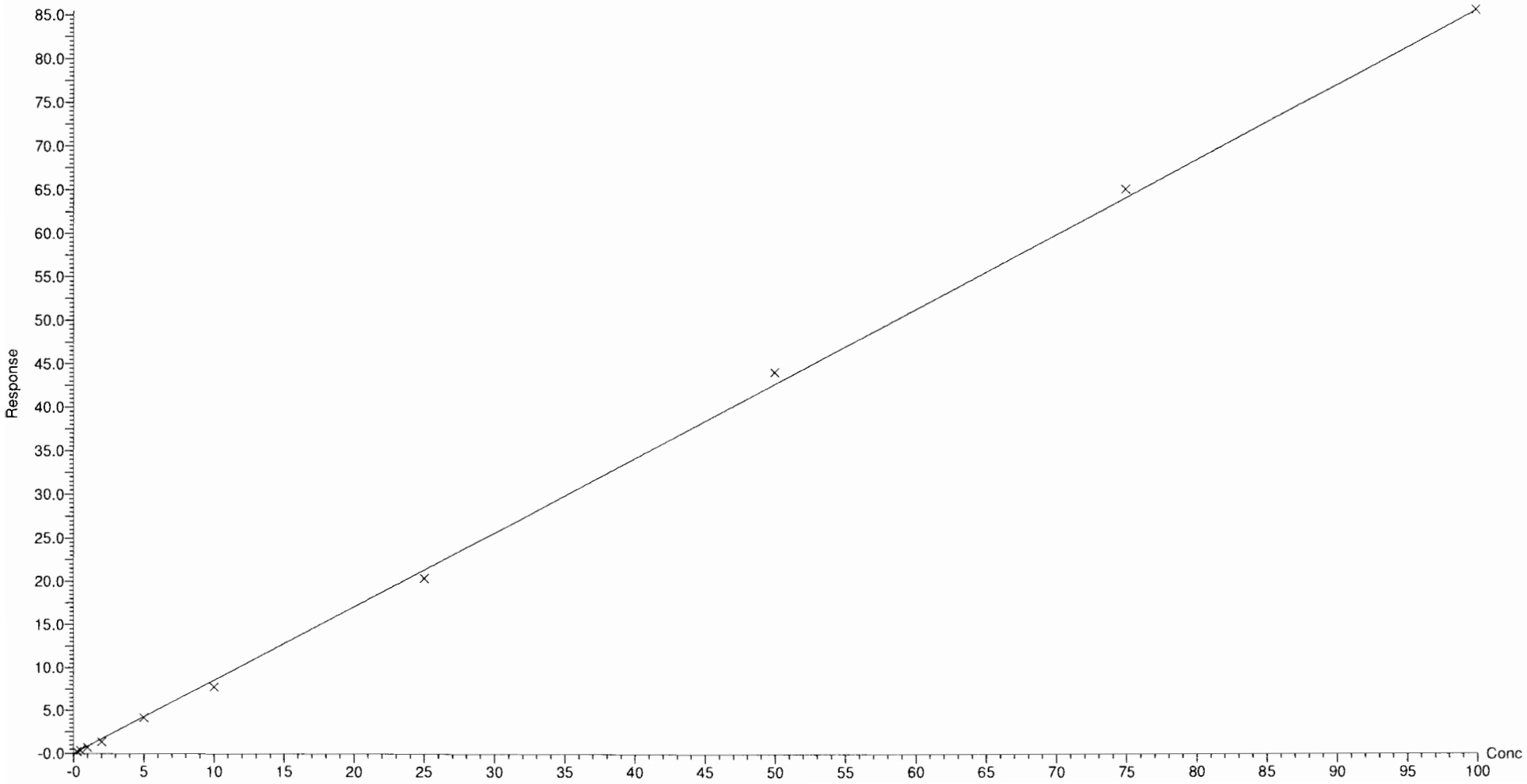
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: N-EtFOSAA
Coefficient of Determination: R^2 = 0.998606
Calibration curve: 0.85367 * x
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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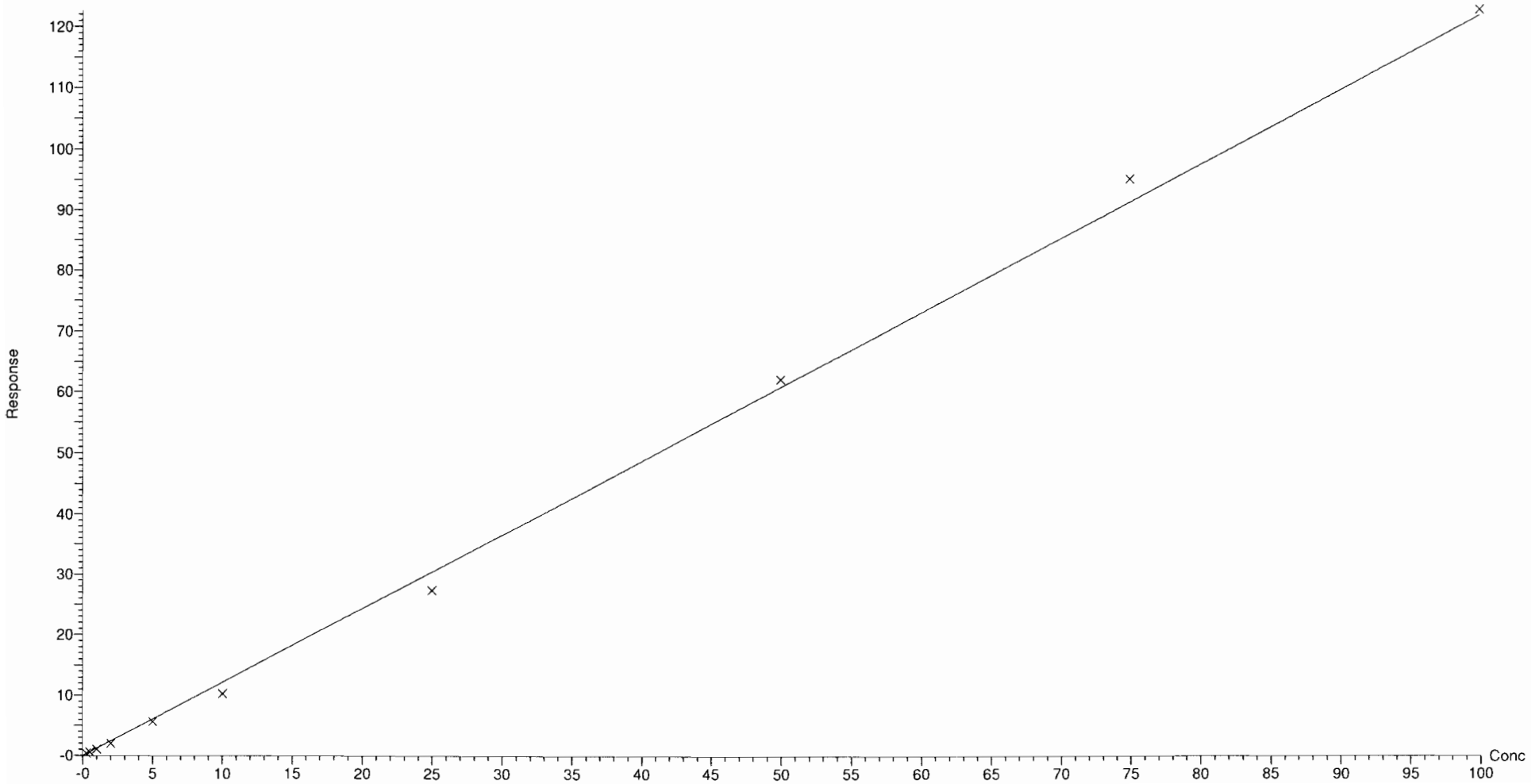
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFUnA
Coefficient of Determination: R^2 = 0.997034
Calibration curve: 1.21658 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



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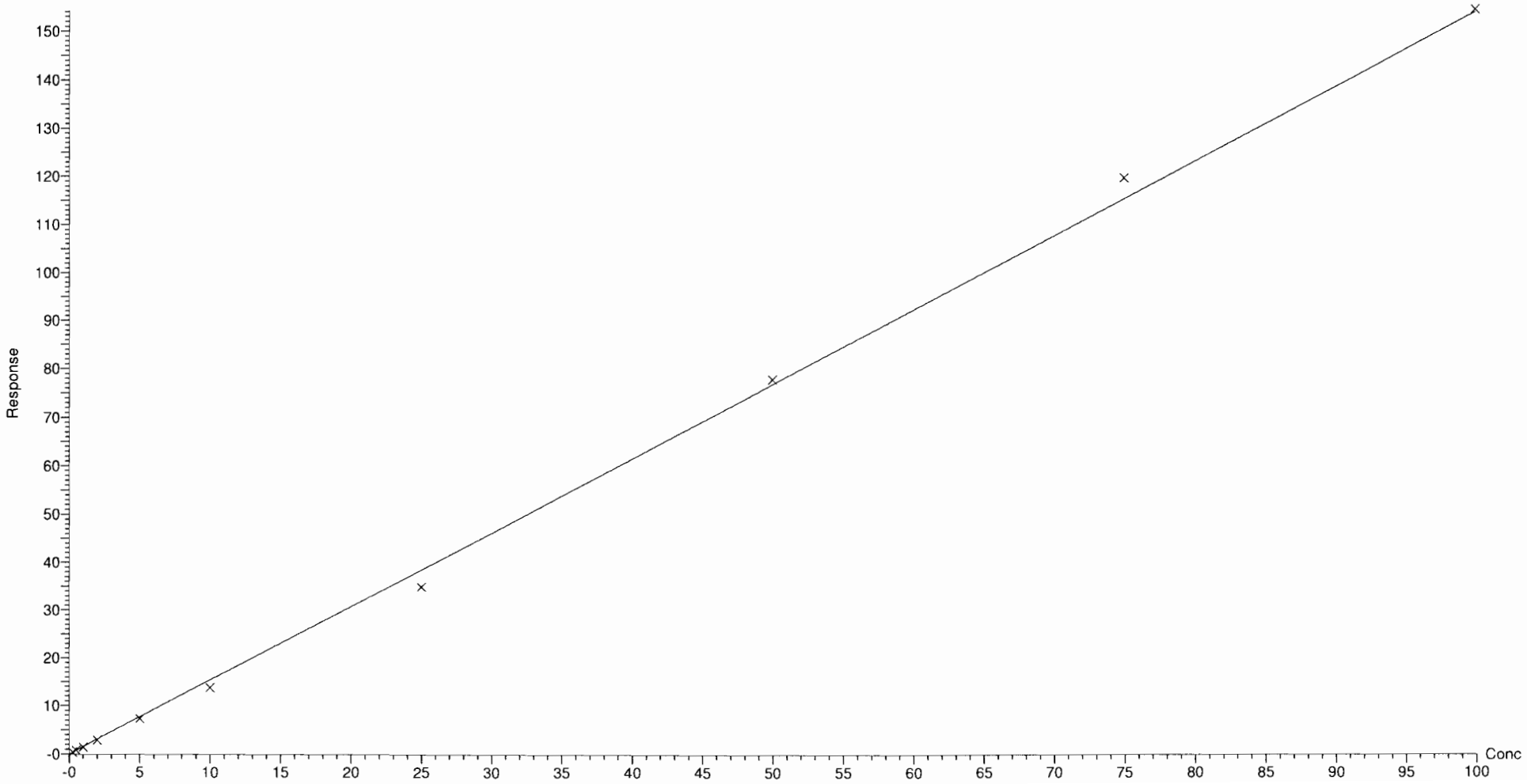
Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.998164
Calibration curve: 1.53708 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None

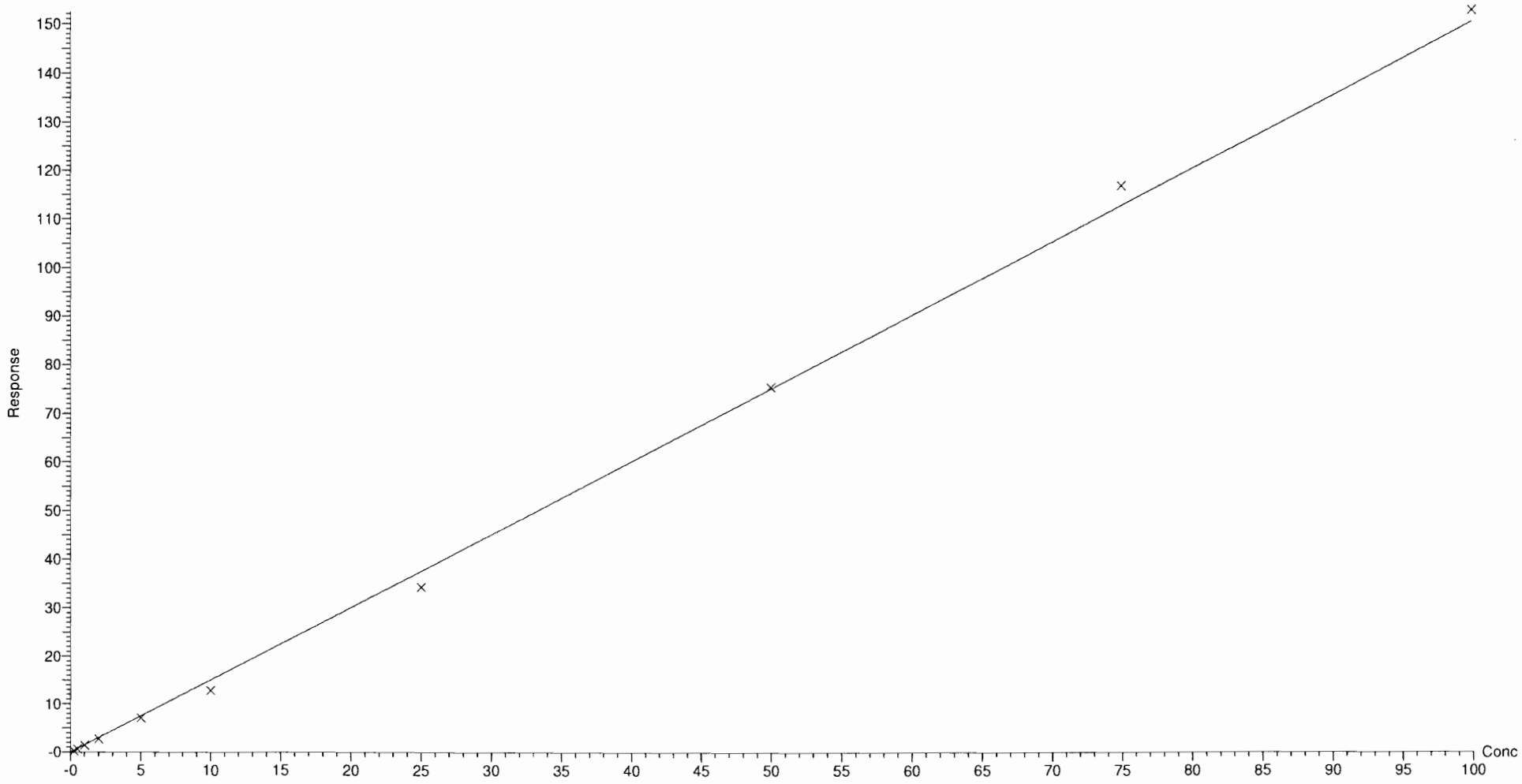


Vista Analytical Laboratory Q1

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-CRV.qld

Last Altered: Sunday, December 30, 2018 16:18:17 Pacific Standard Time
Printed: Monday, December 31, 2018 07:32:40 Pacific Standard Time

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.997542
Calibration curve: 1.50164 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Force, Weighting: 1/x, Axis trans: None



Vista Analytical Laboratory Q1

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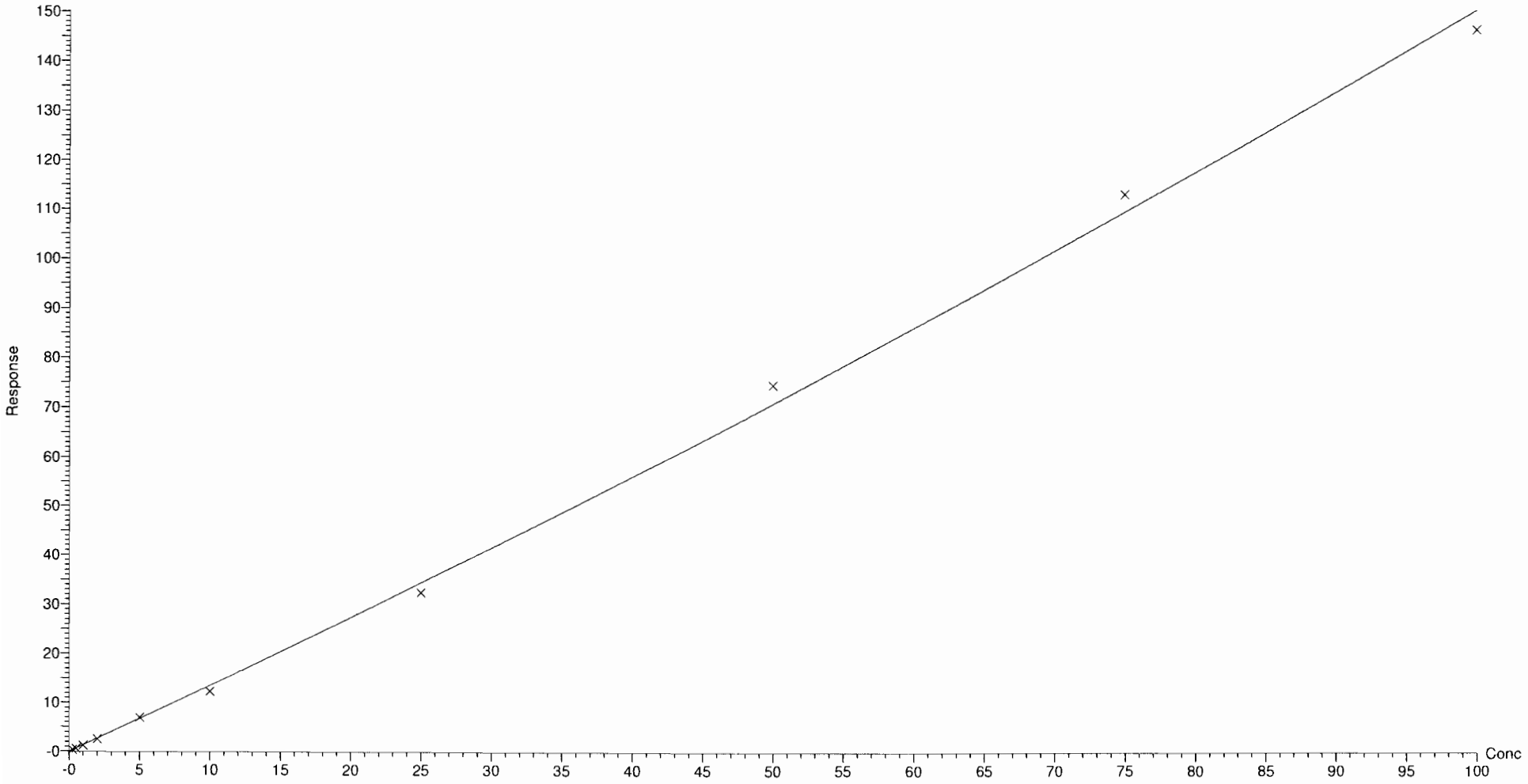
Printed: Monday, December 31, 2018 08:50:55 Pacific Standard Time

Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: D:\PFAS.PRO\CurveDB\C18_537_Q5_12-30-18_L14.cdb 31 Dec 2018 08:50:24

Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.998236
Calibration curve: 0.00170648 * x^2 + 1.33217 * x
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Force, Weighting: 1/x, Axis trans: None



Vista Analytical Laboratory

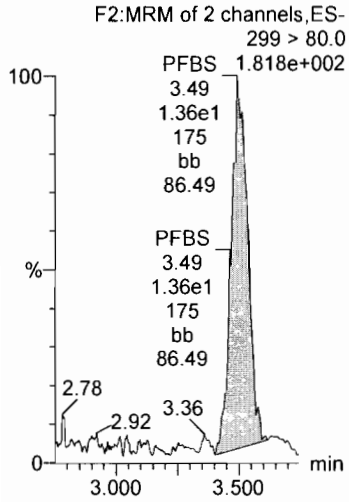
Dataset: Untitled

Last Altered: Sunday, December 30, 2018 16:08:41 Pacific Standard Time
Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

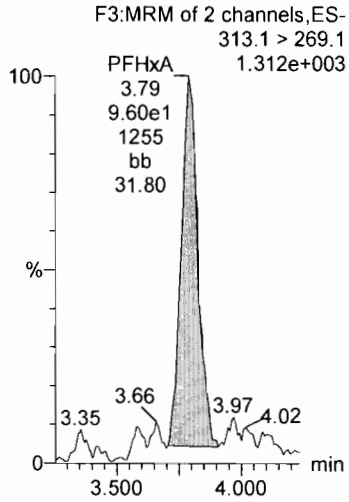
Method: D:\PFAS.PRO\MethDB\PFAS_DW_L14_123018.mdb 30 Dec 2018 14:58:59
Calibration: 30 Dec 2018 16:08:41

Name: 181230P1_2, Date: 30-Dec-2018, Time: 13:48:14, ID: ST181230P1-1 PFC CS-4 537 18L2612, Description: PFC CS-4 537 18L2612

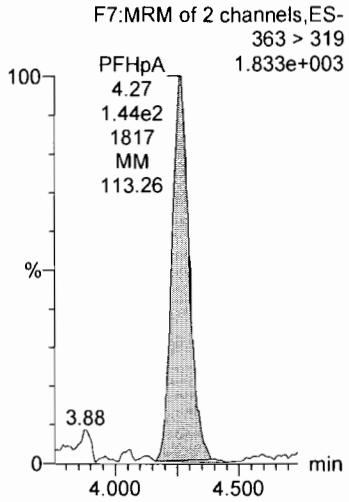
PFBS



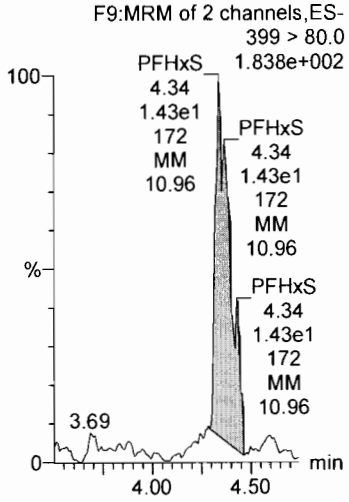
PFHxA



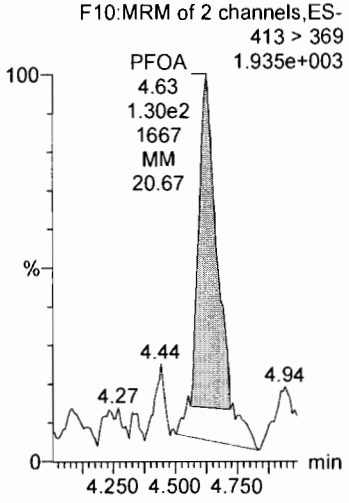
PFHpA



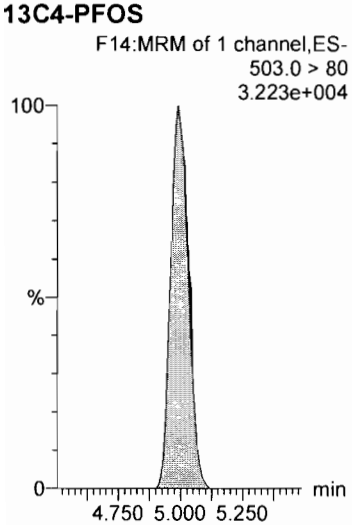
PFHxS



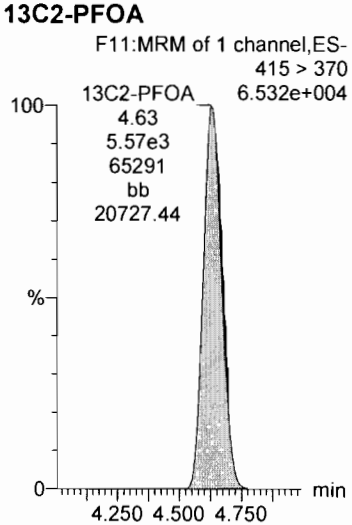
PFOA



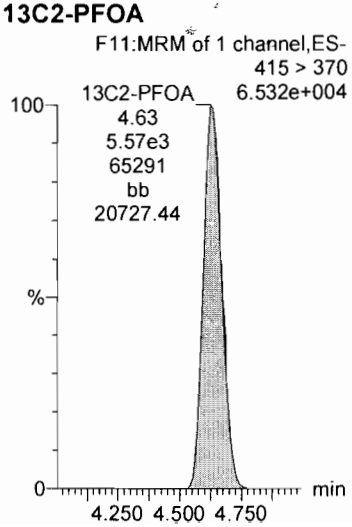
13C4-PFOS



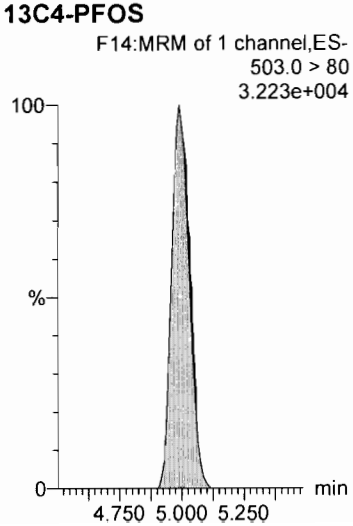
13C2-PFOA



13C2-PFOA



13C4-PFOS



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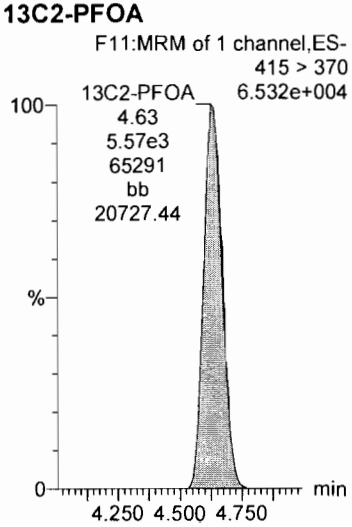

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Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_2, Date: 30-Dec-2018, Time: 13:48:14, ID: ST181230P1-1 PFC CS-4 537 18L2612, Description: PFC CS-4 537 18L2612

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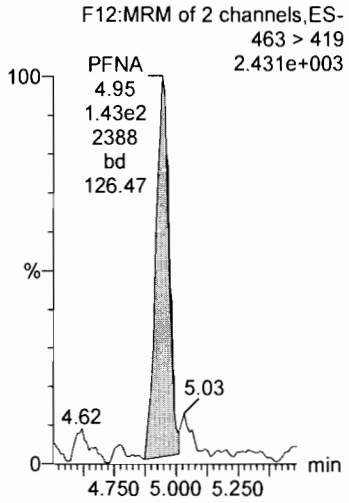

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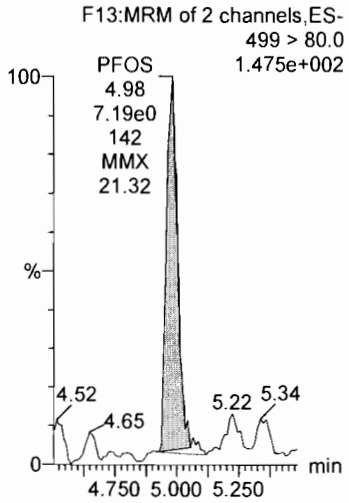

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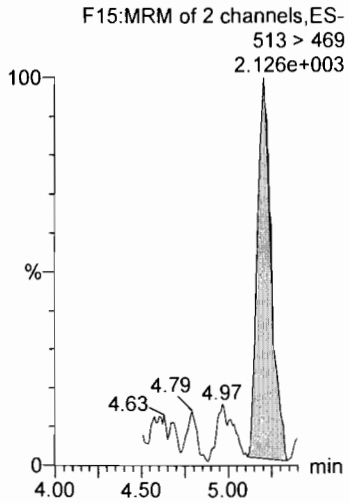

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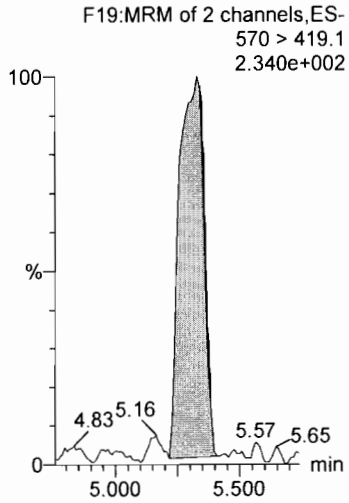

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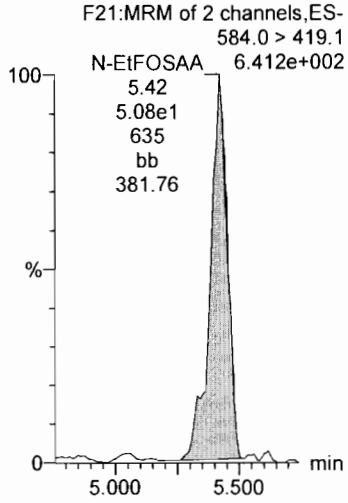

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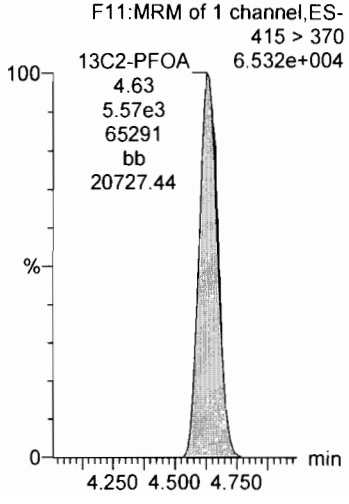

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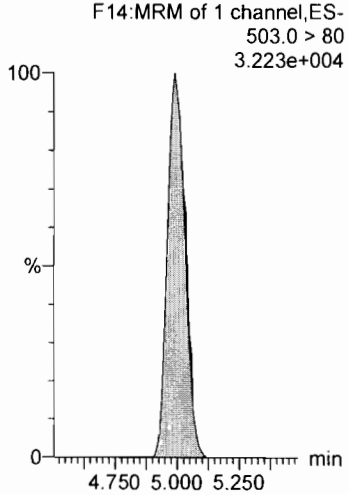

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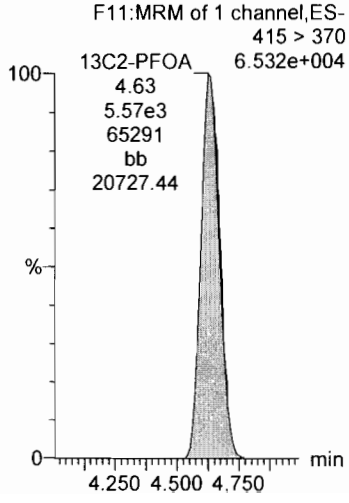

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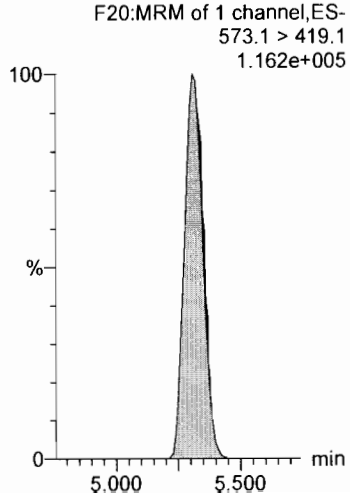

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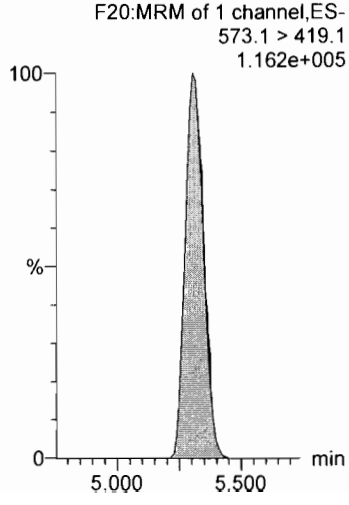

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Name: 181230P1_2, Date: 30-Dec-2018, Time: 13:48:14, ID: ST181230P1-1 PFC CS-4 537 18L2612, Description: PFC CS-4 537 18L2612

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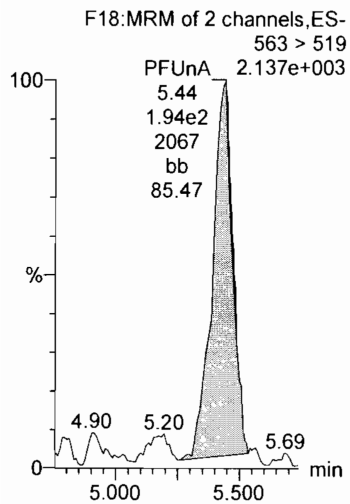

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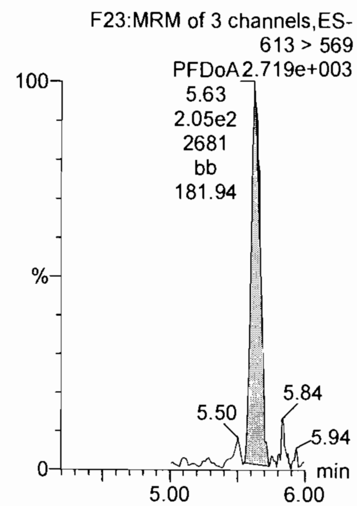

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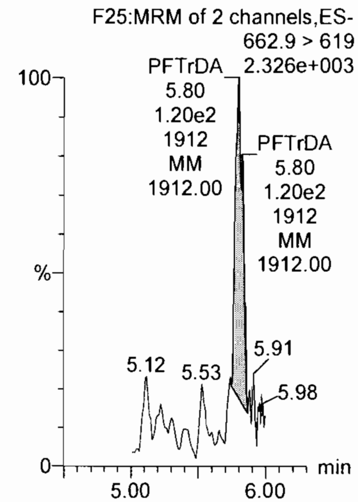

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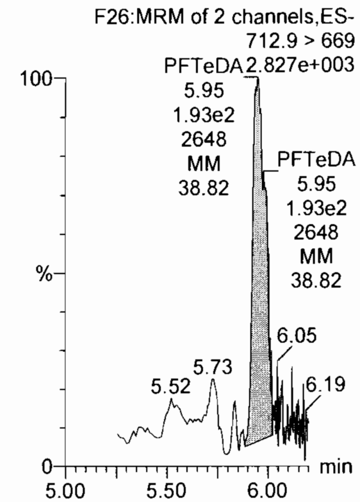

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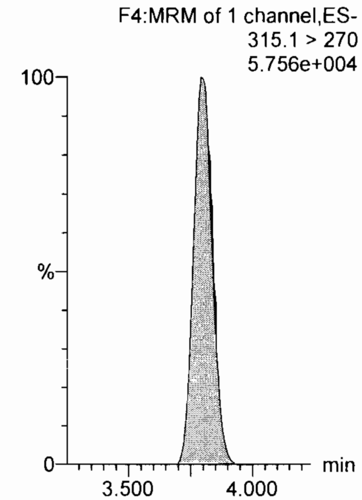

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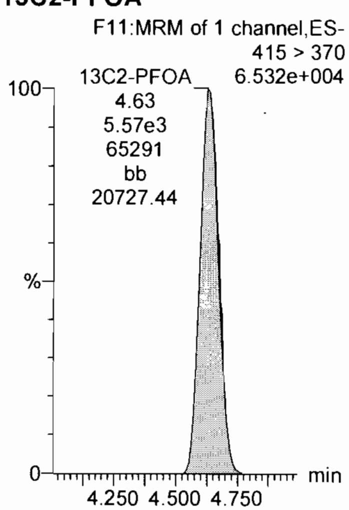

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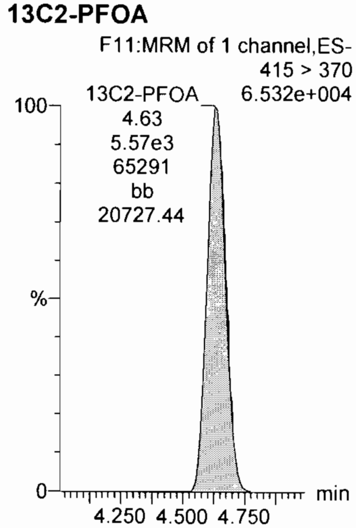

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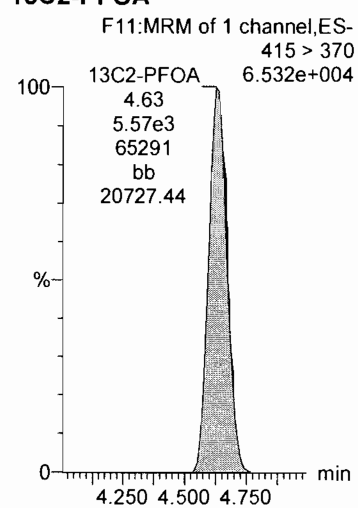

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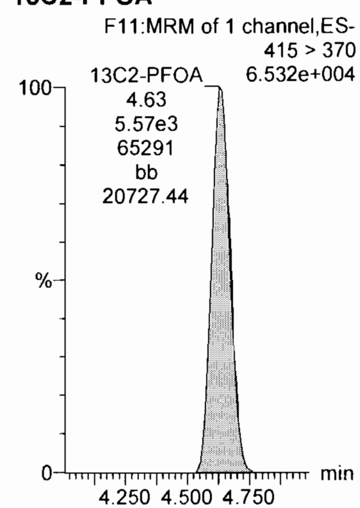

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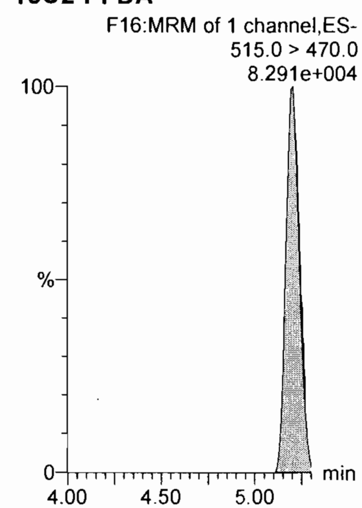

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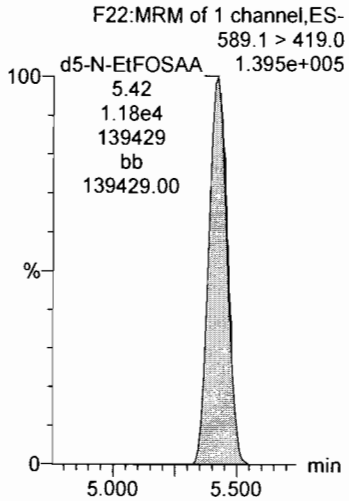

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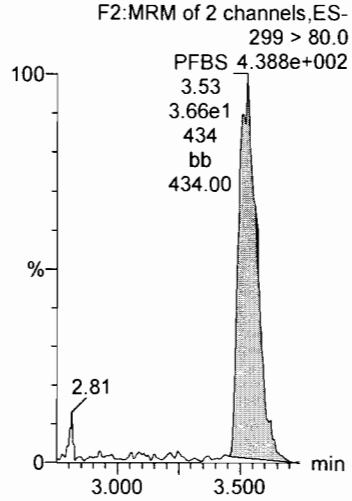

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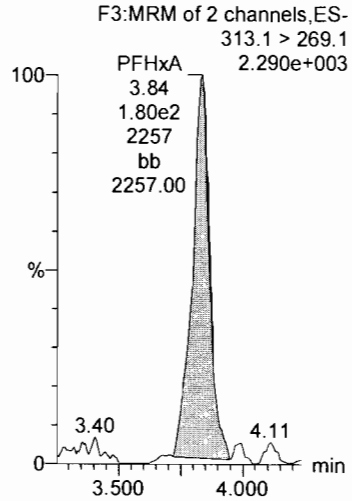

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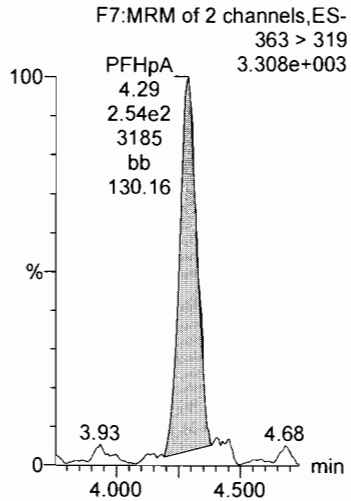

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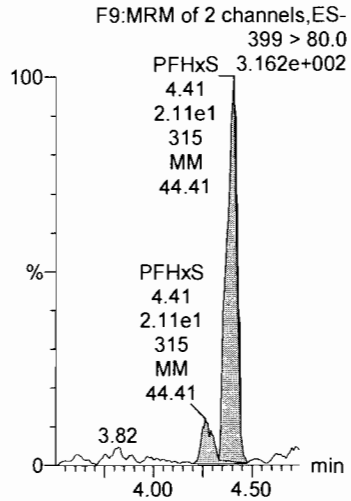

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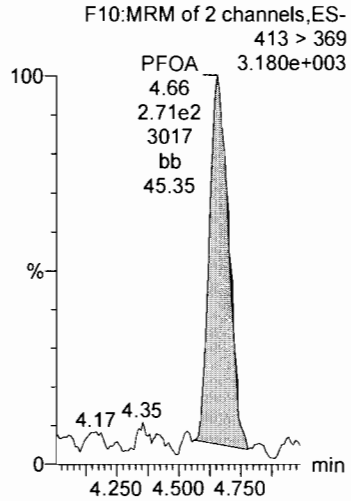

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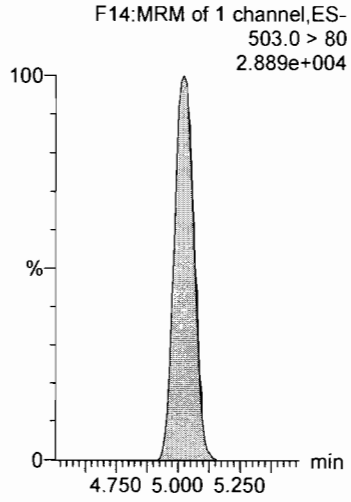

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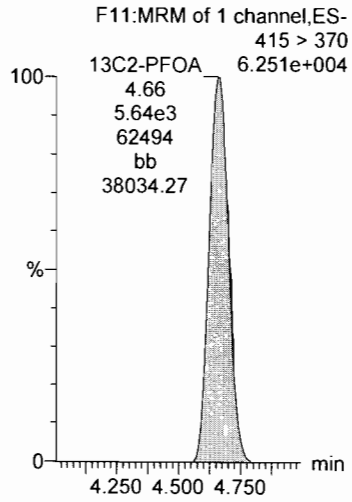

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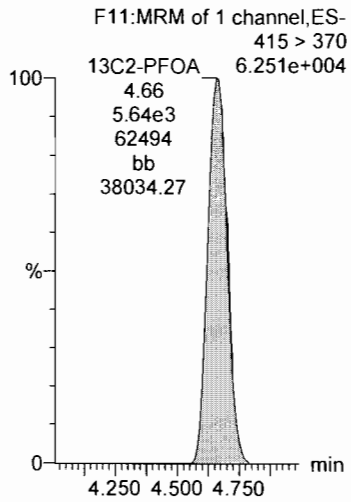

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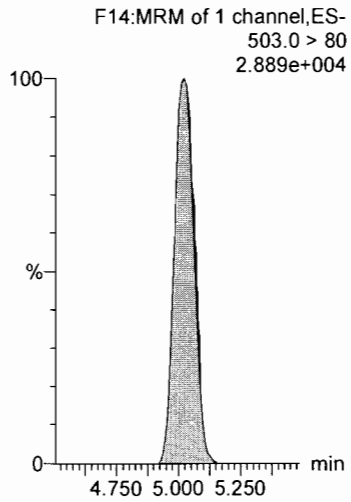

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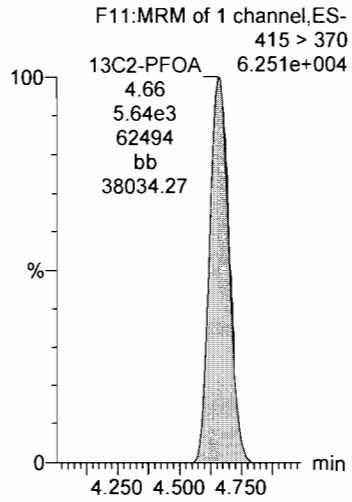

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Name: 181230P1_3, Date: 30-Dec-2018, Time: 13:59:24, ID: ST181230P1-2 PFC CS-3 537 18L2613, Description: PFC CS-3 537 18L2613

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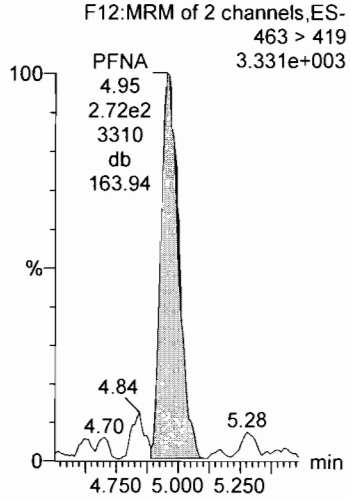

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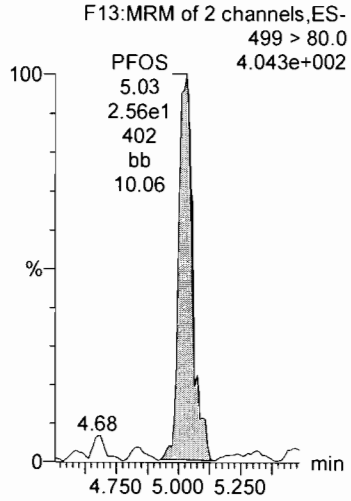

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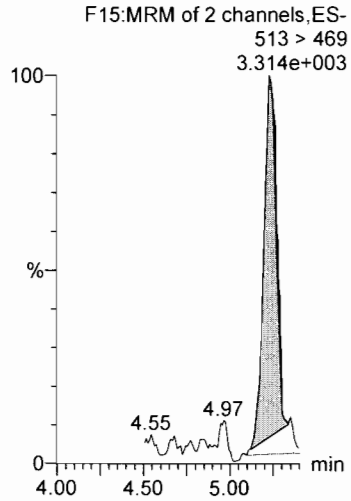

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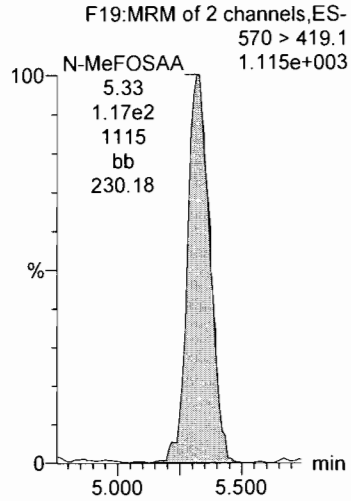

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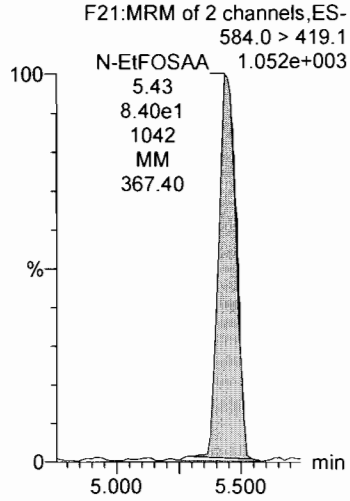

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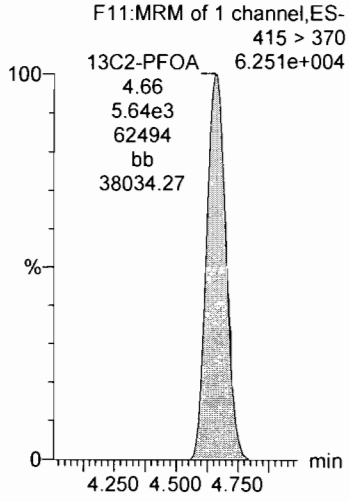

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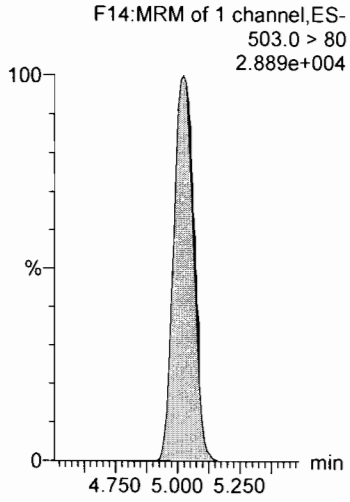

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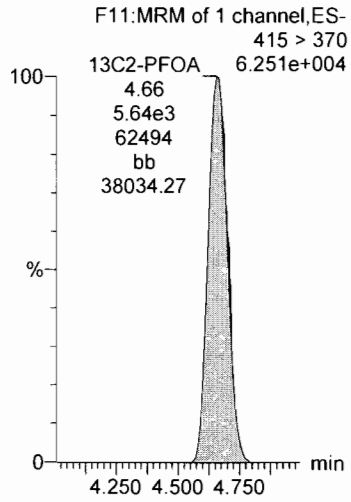

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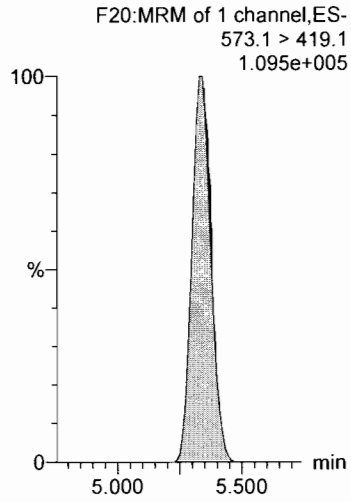

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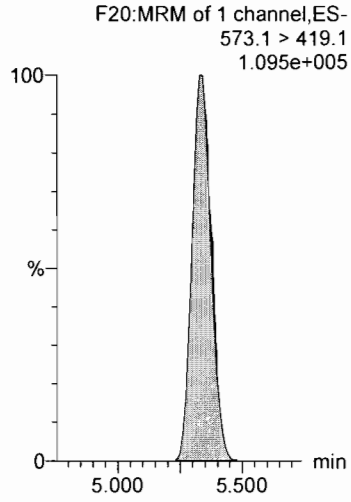

Vista Analytical Laboratory

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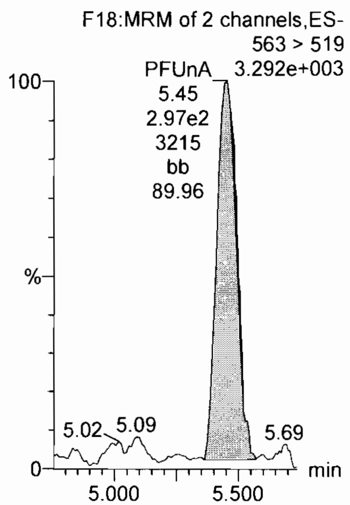

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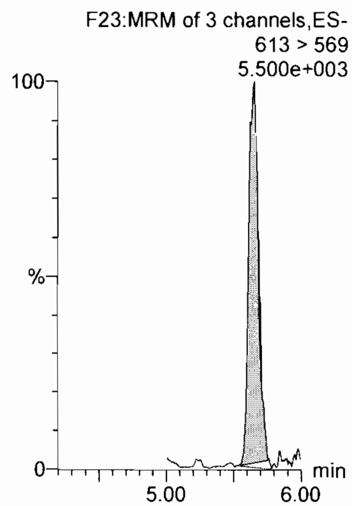

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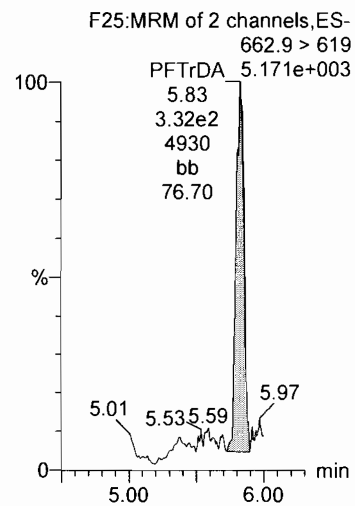

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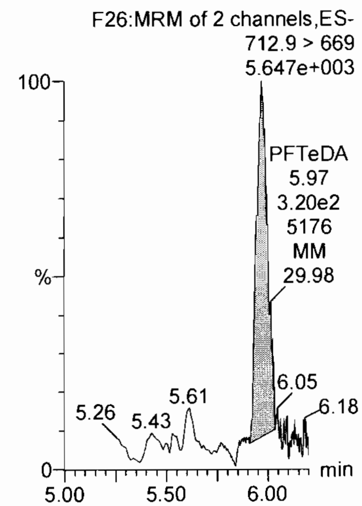

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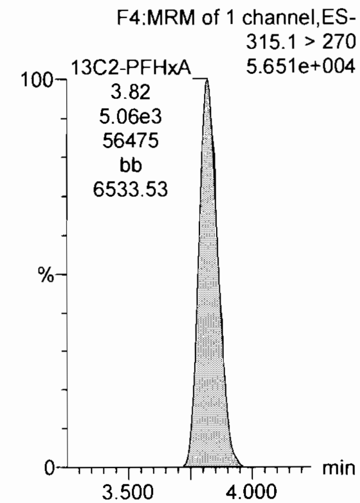

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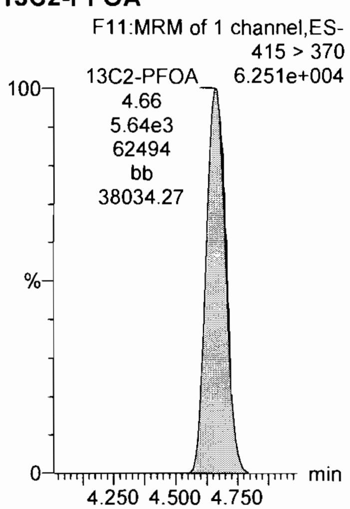

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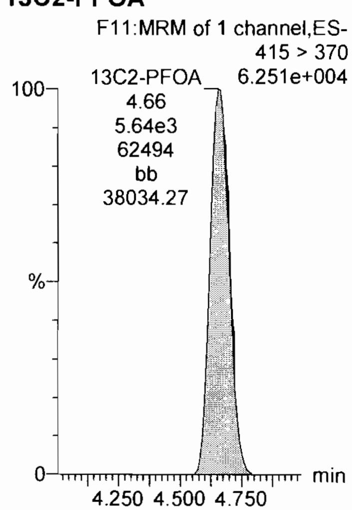

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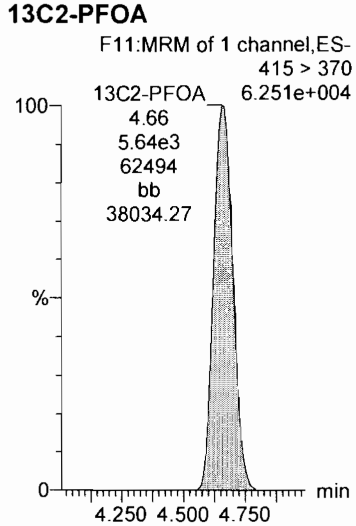

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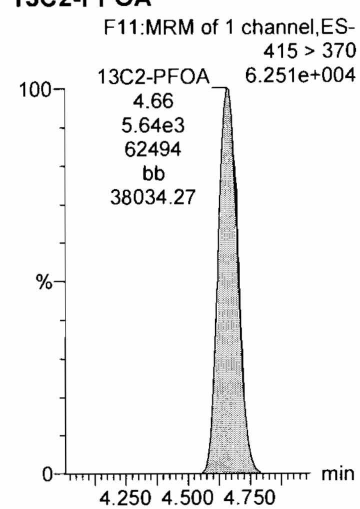

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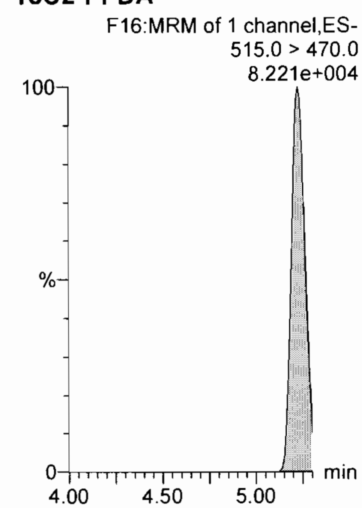

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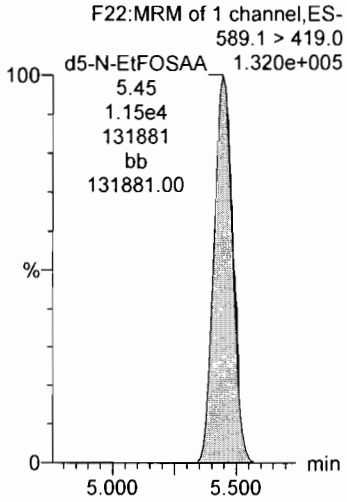

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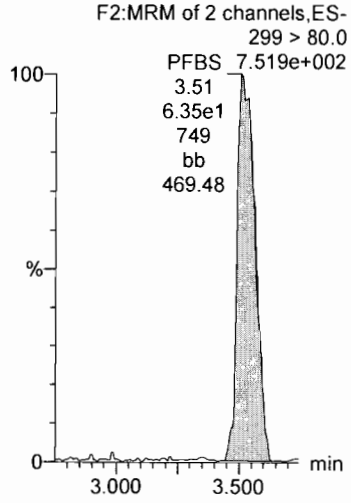
PFBS



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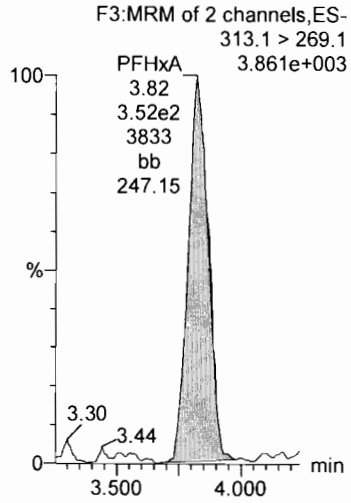

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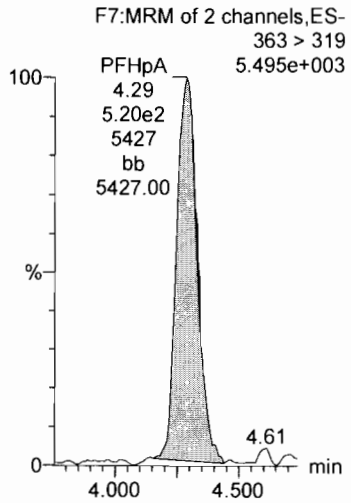

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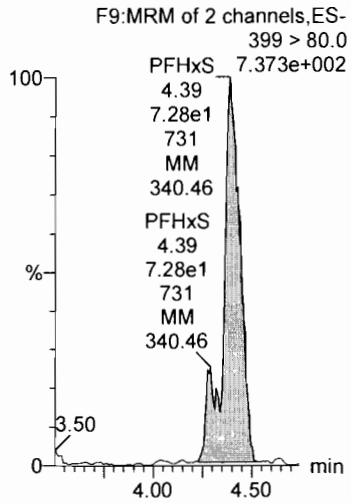

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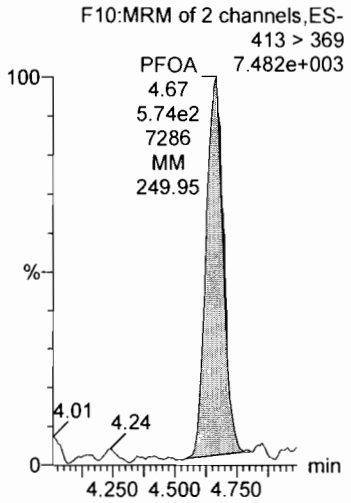

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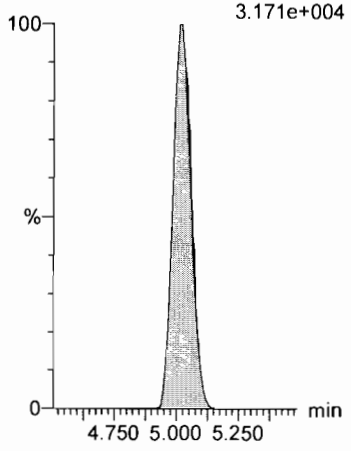

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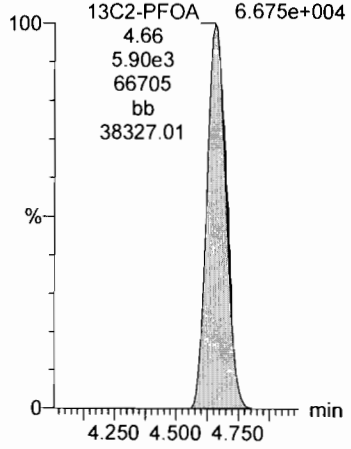

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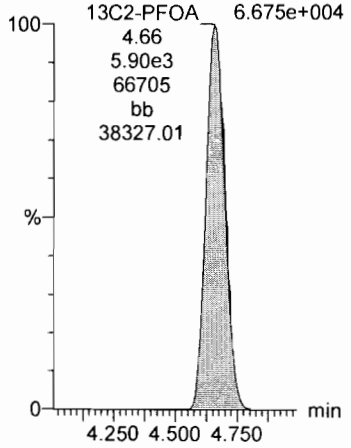

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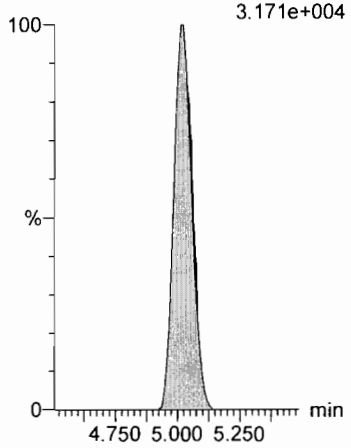

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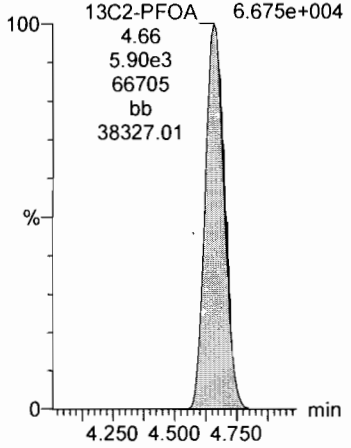

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Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_4, Date: 30-Dec-2018, Time: 14:10:35, ID: ST181230P1-3 PFC CS-2 537 18L2614, Description: PFC CS-2 537 18L2614

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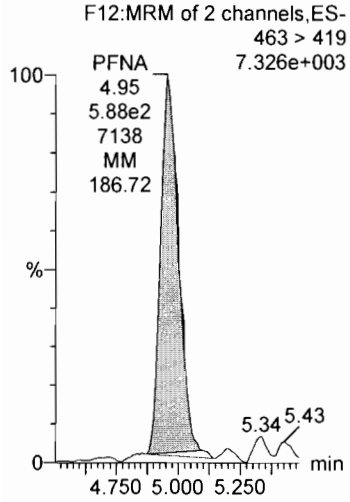

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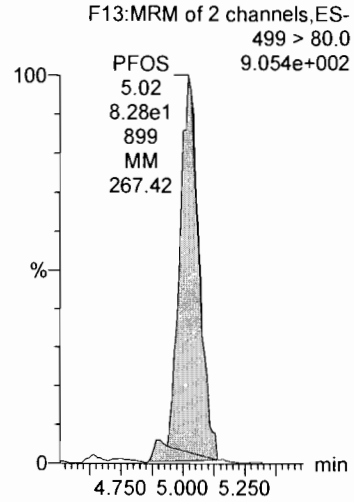

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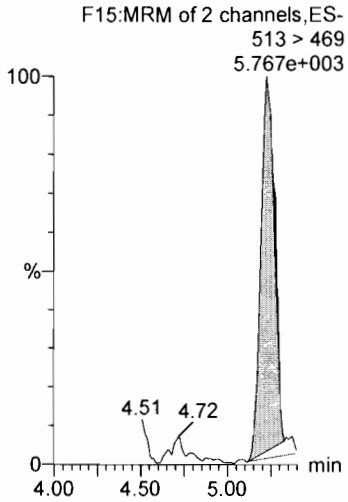

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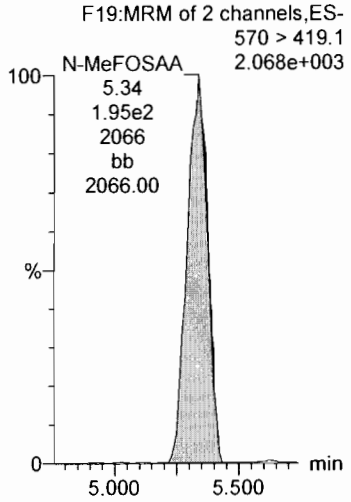

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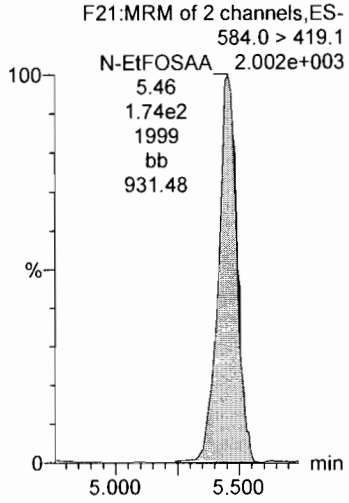

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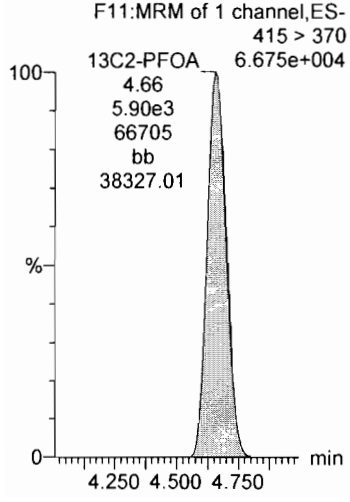

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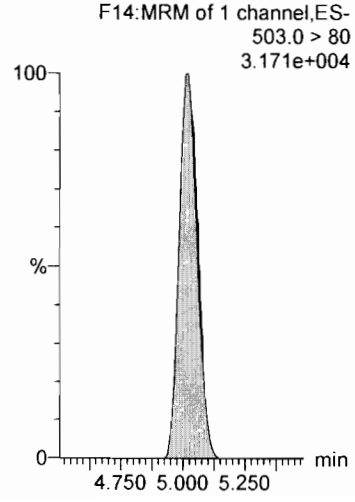

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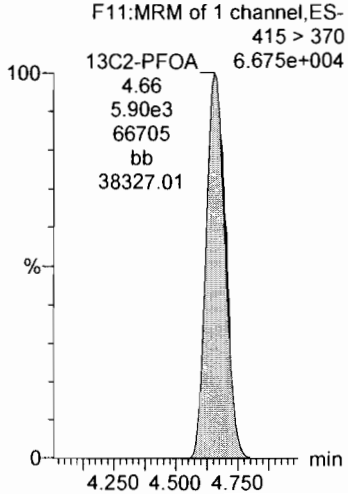

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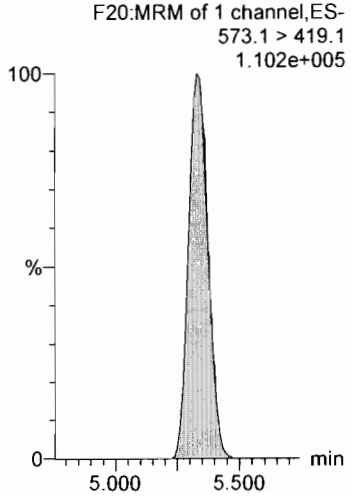

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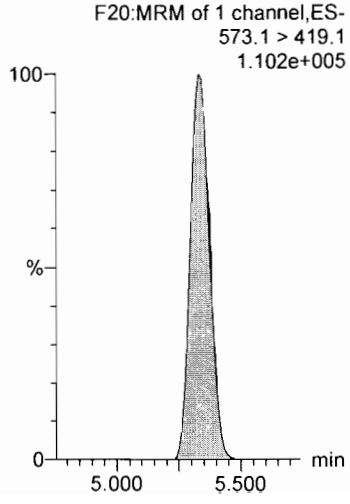

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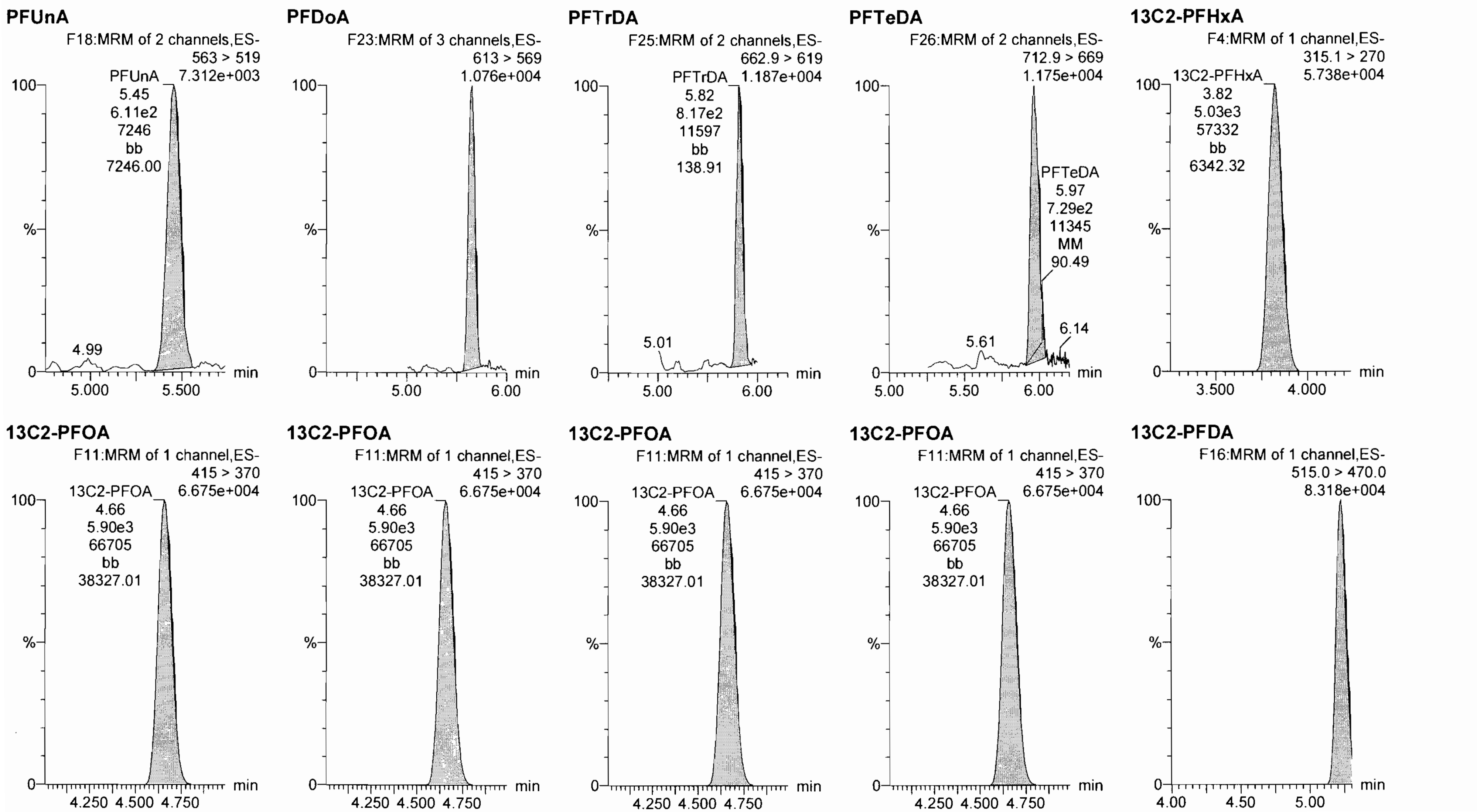

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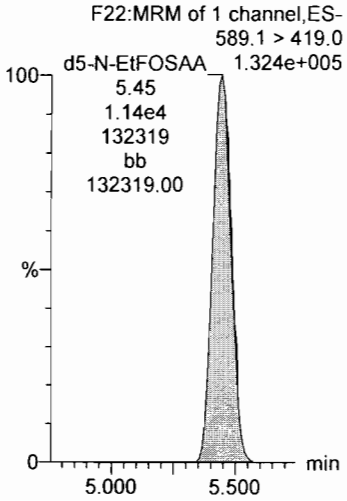

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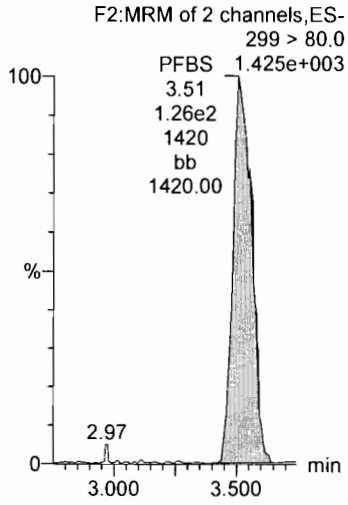

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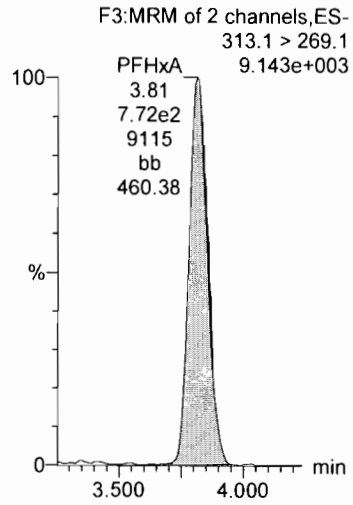

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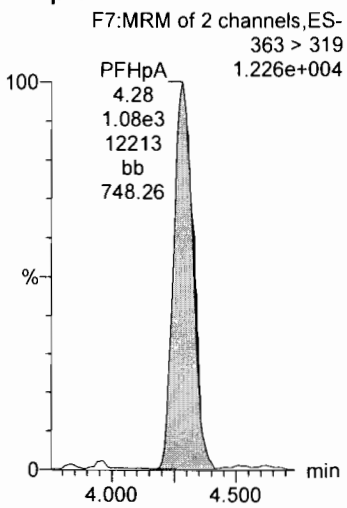

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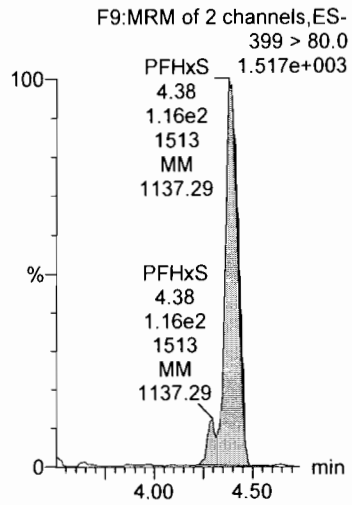

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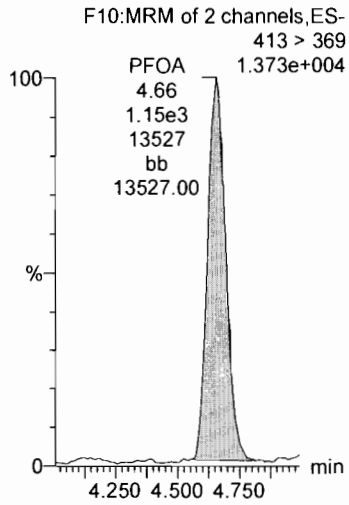

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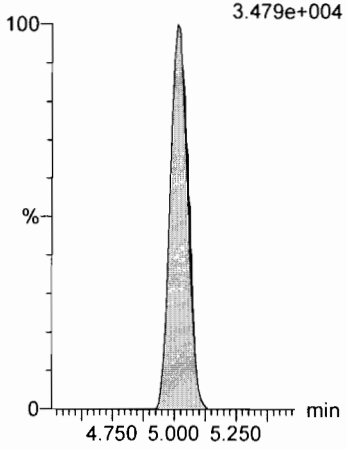

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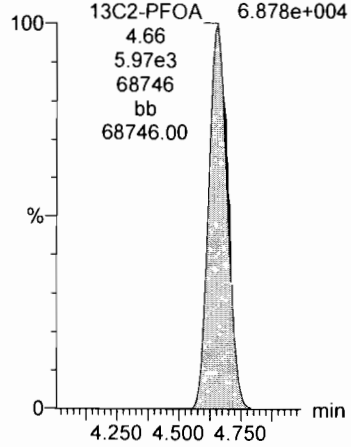

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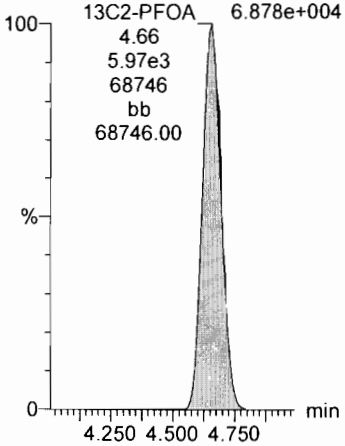

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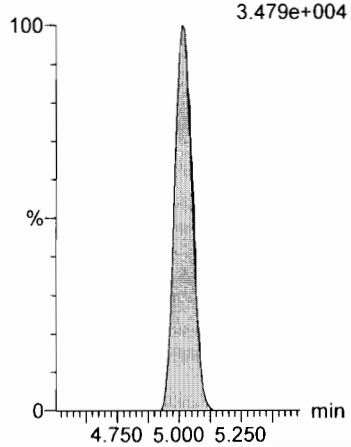

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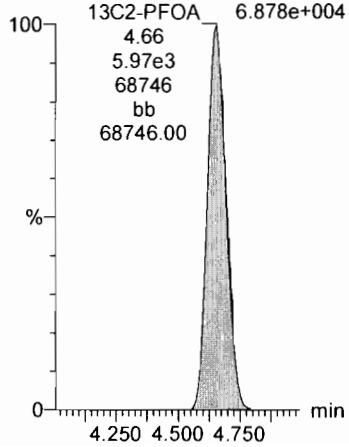

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Name: 181230P1_5, Date: 30-Dec-2018, Time: 14:21:45, ID: ST181230P1-4 PFC CS-1 537 18L2615, Description: PFC CS-1 537 18L2615

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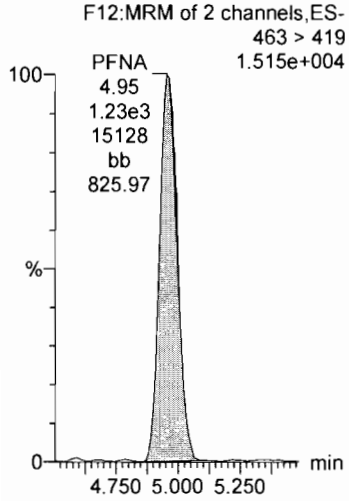

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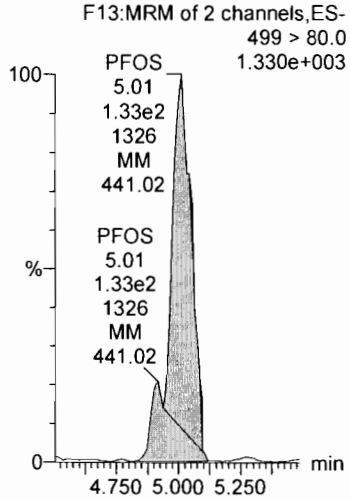

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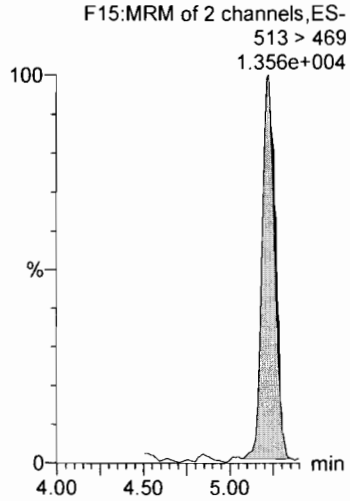

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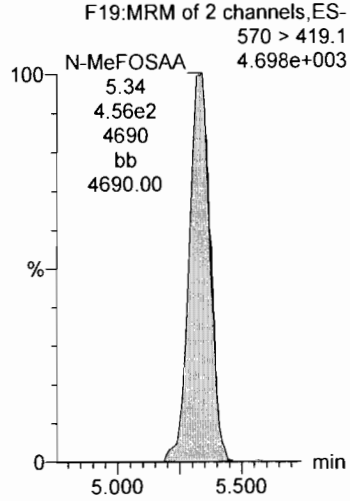

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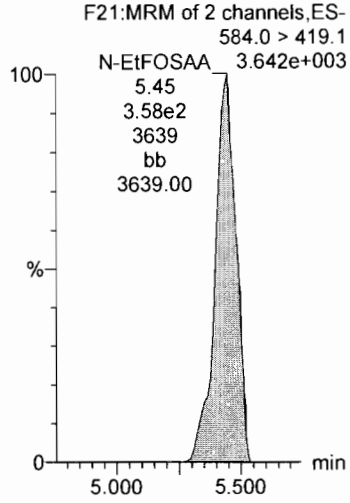

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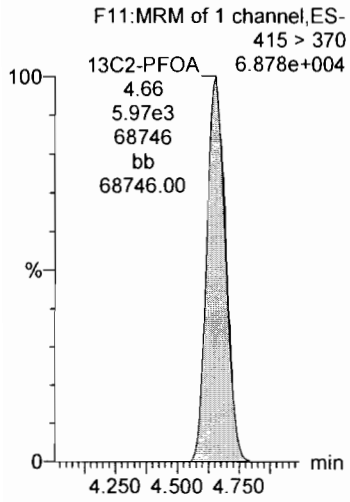

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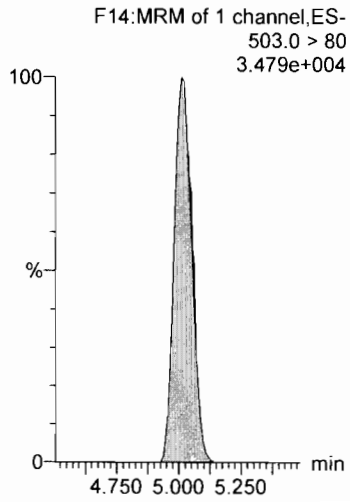

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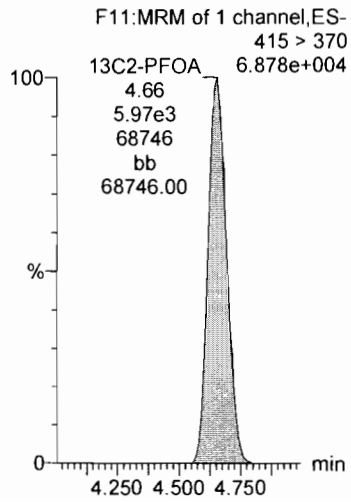

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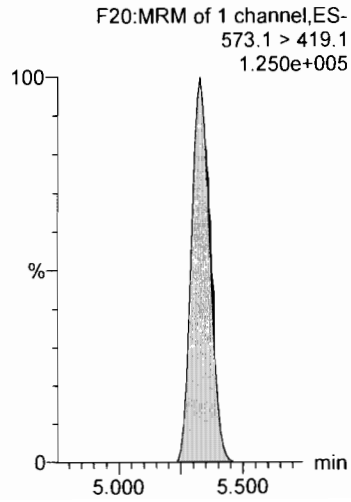

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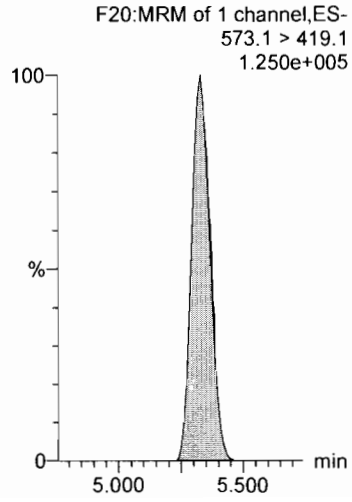

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Name: 181230P1_5, Date: 30-Dec-2018, Time: 14:21:45, ID: ST181230P1-4 PFC CS-1 537 18L2615, Description: PFC CS-1 537 18L2615

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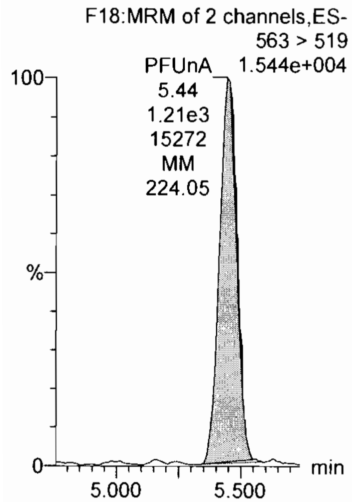

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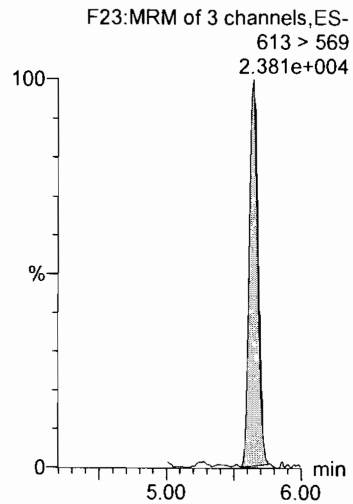

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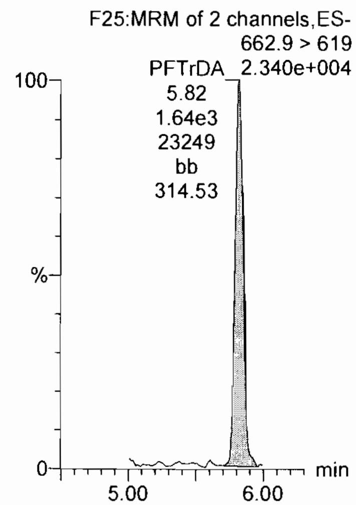

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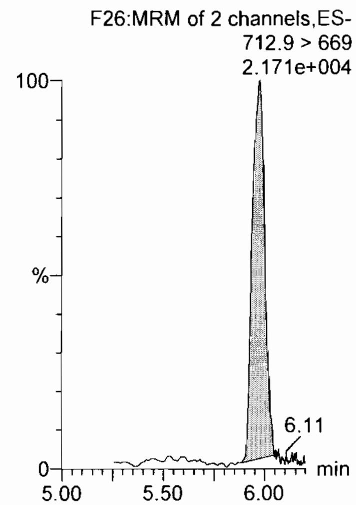

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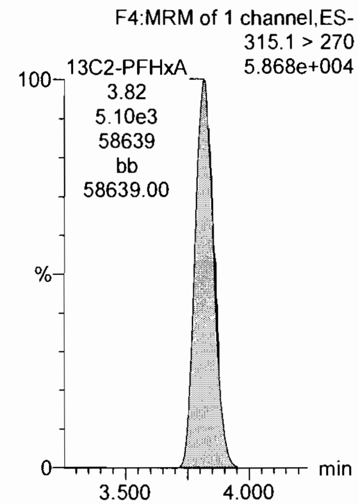

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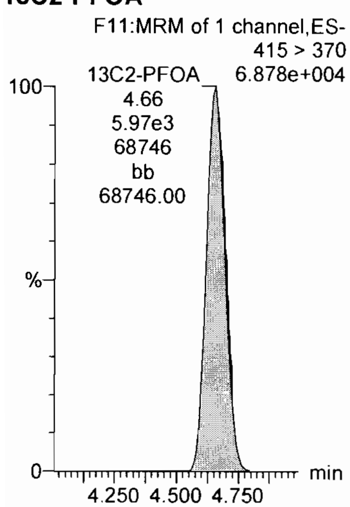

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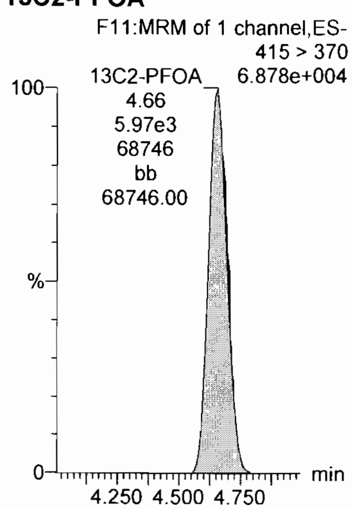

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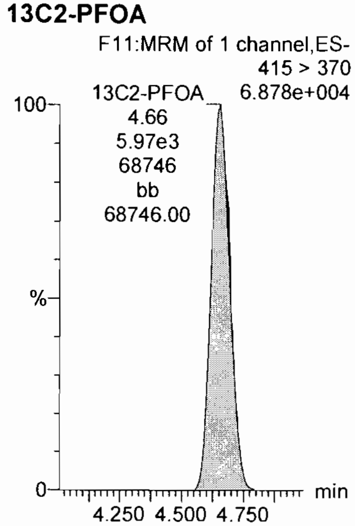

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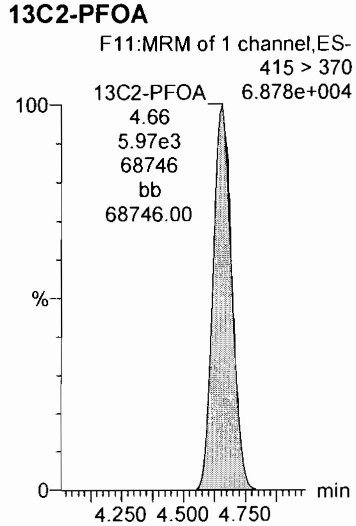

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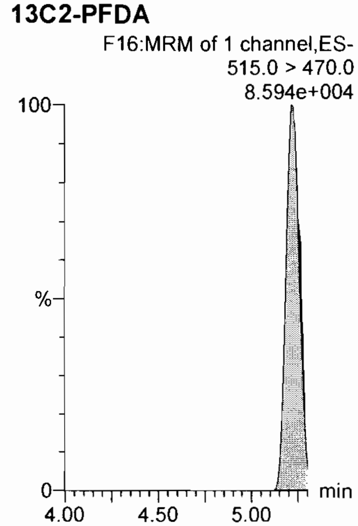

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Name: 181230P1_5, Date: 30-Dec-2018, Time: 14:21:45, ID: ST181230P1-4 PFC CS-1 537 18L2615, Description: PFC CS-1 537 18L2615

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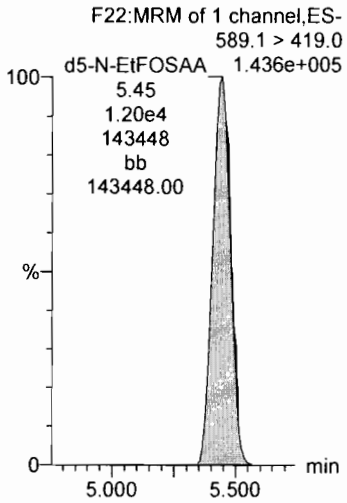

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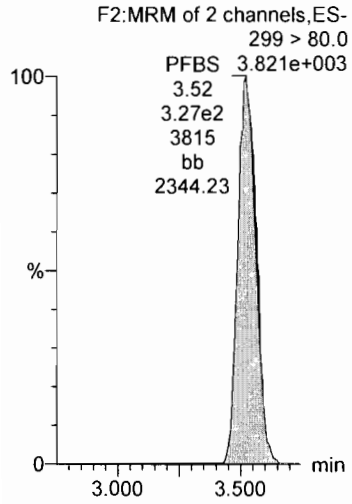

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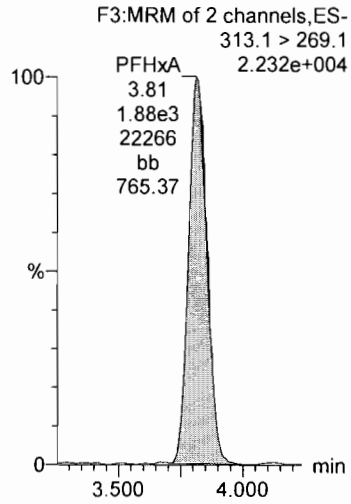

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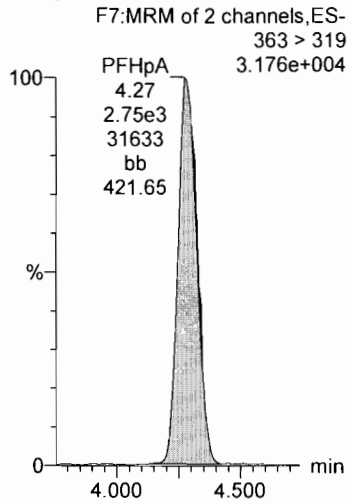

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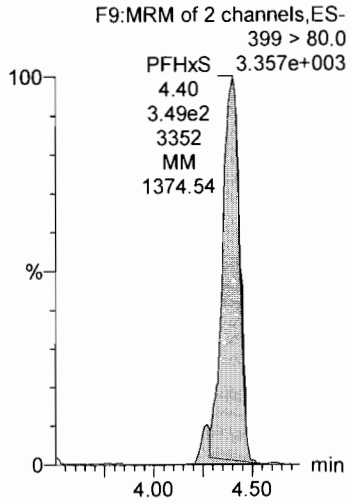

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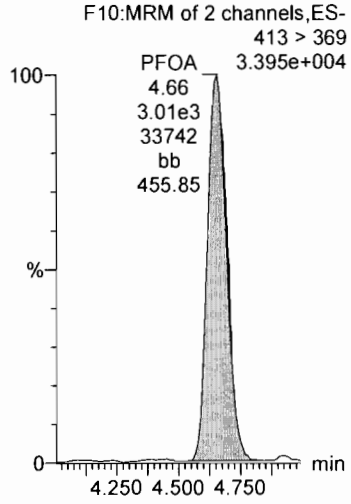

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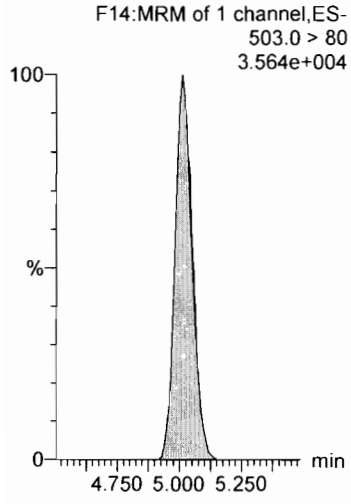

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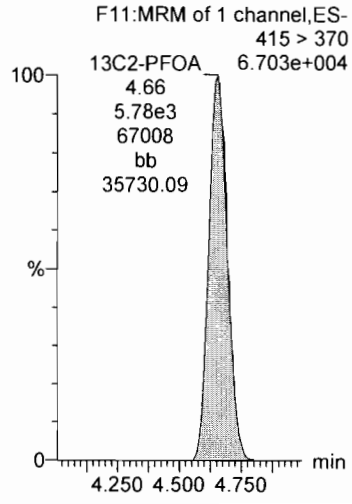

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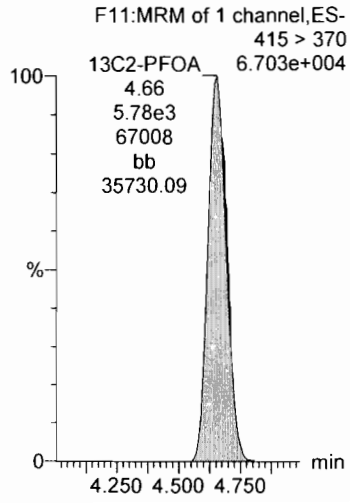

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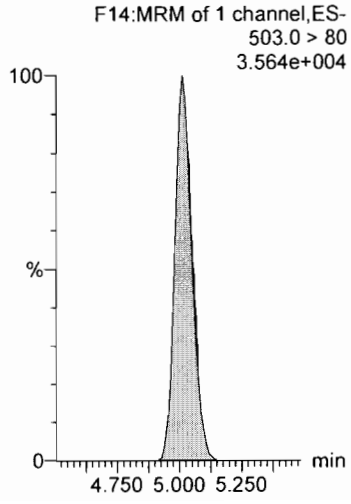

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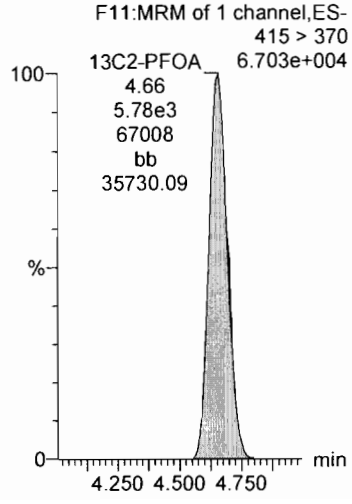

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Name: 181230P1_6, Date: 30-Dec-2018, Time: 14:32:56, ID: ST181230P1-5 PFC CS0 537 18L2616, Description: PFC CS0 537 18L2616

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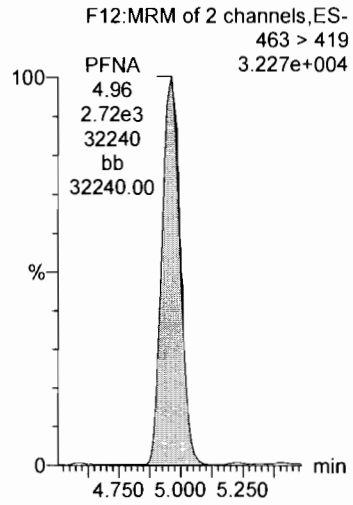

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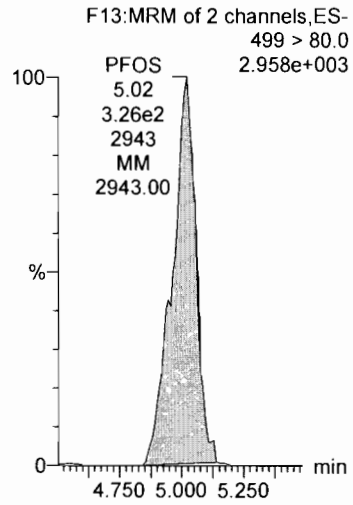

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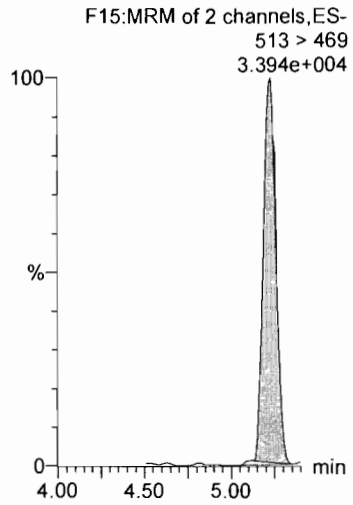

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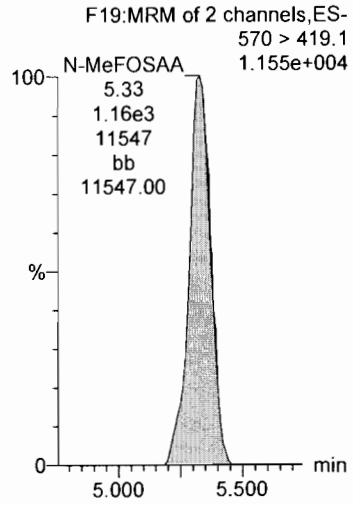

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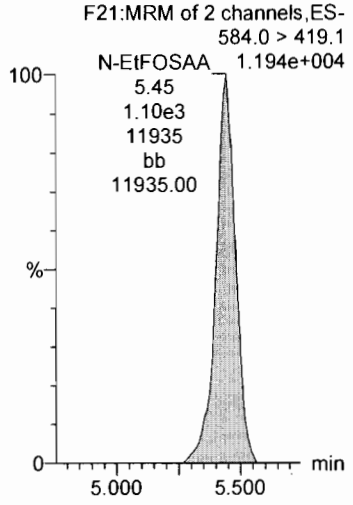

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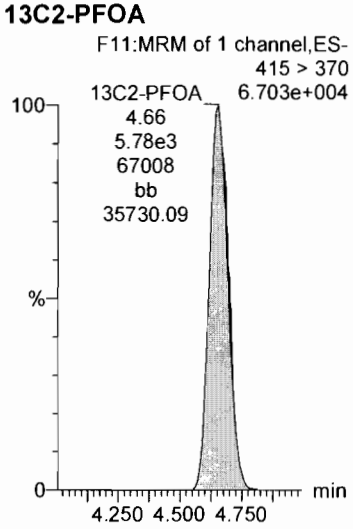

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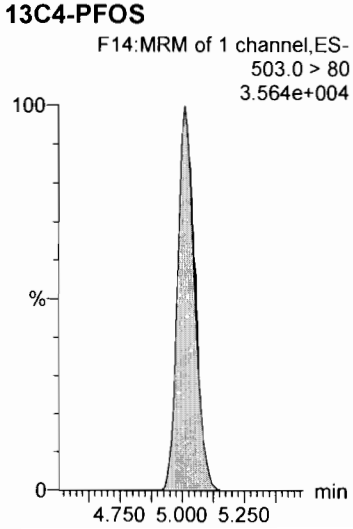

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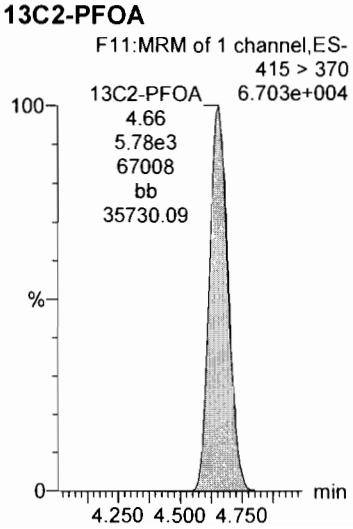

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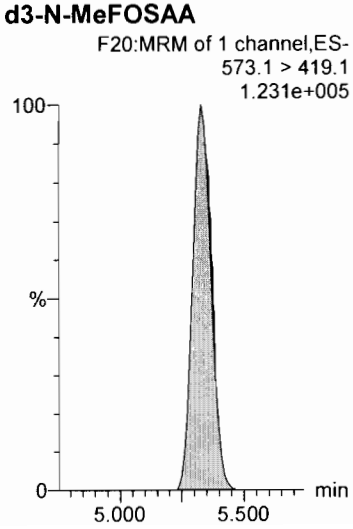

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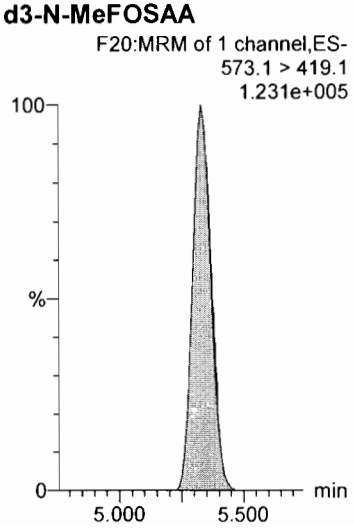

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Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_6, Date: 30-Dec-2018, Time: 14:32:56, ID: ST181230P1-5 PFC CS0 537 18L2616, Description: PFC CS0 537 18L2616

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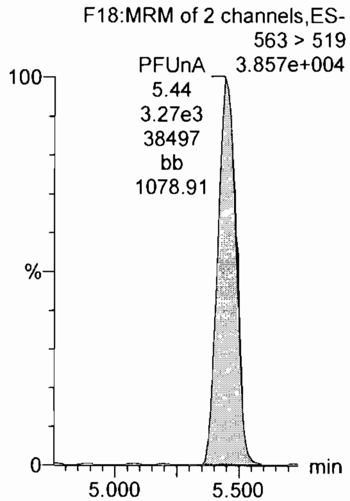

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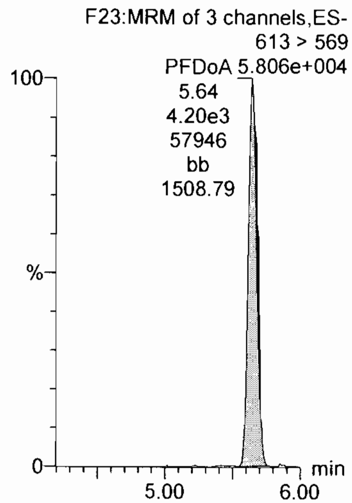

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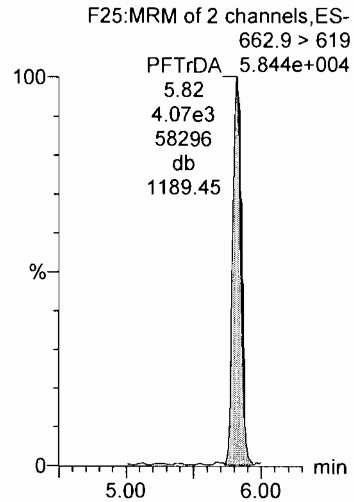

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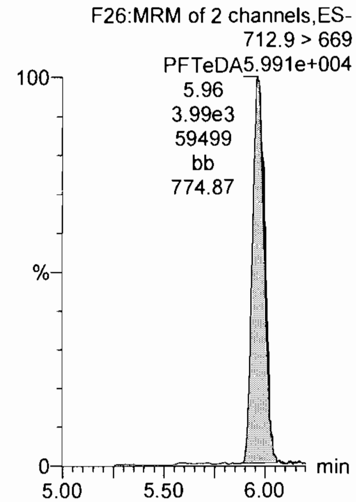

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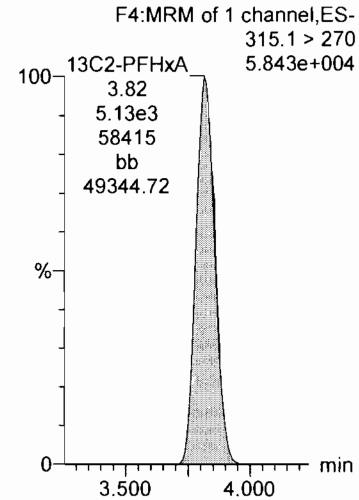

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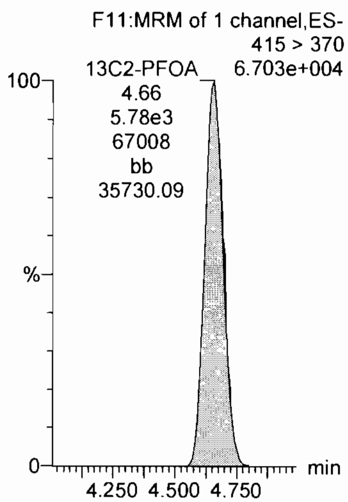

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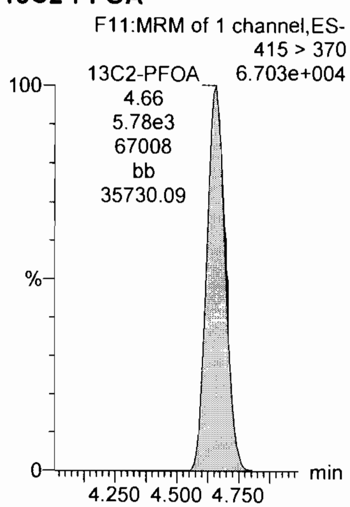

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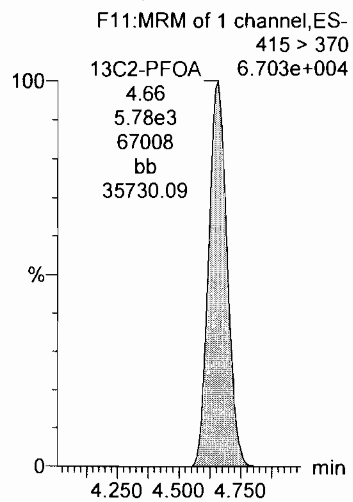

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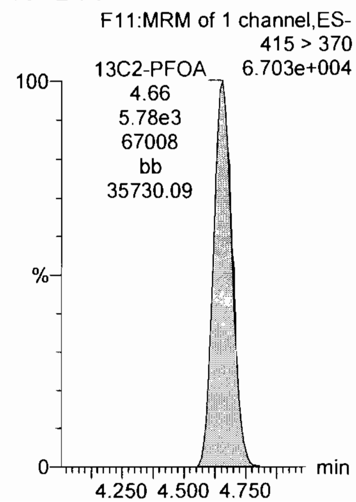

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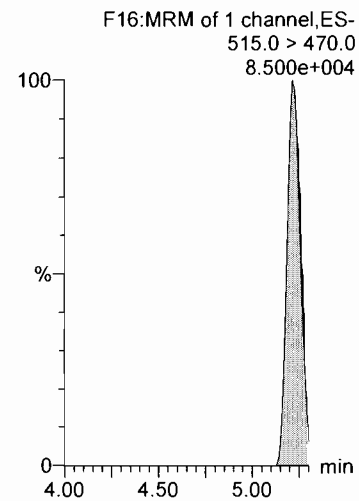

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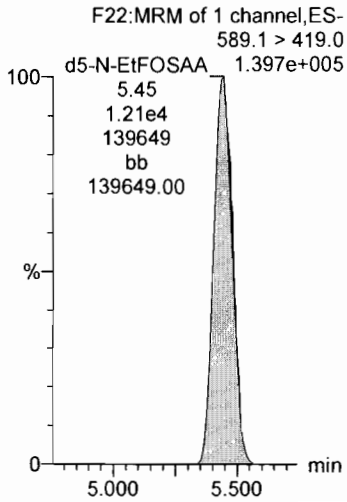

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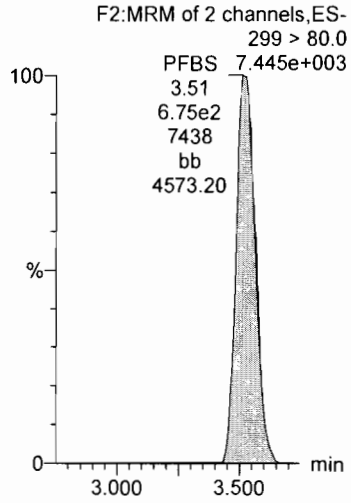

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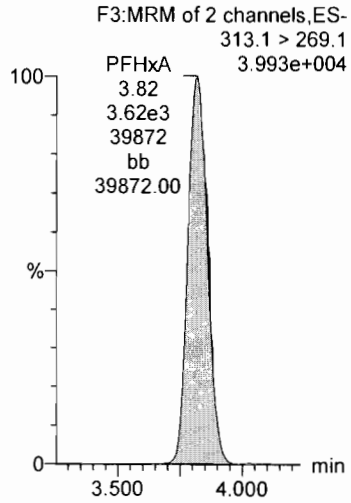

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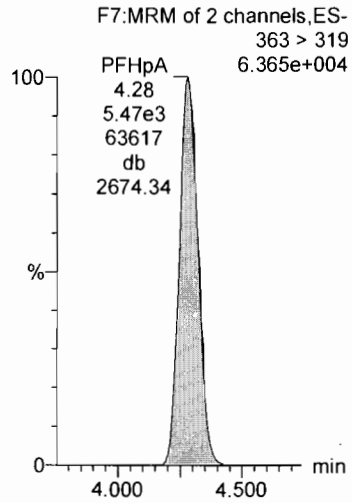

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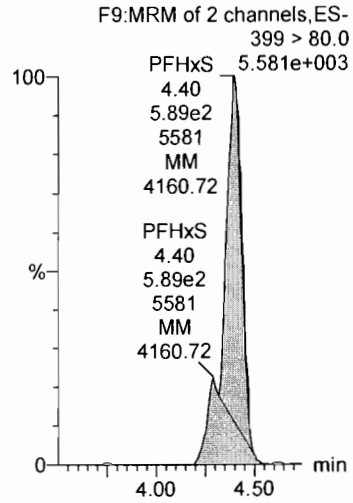

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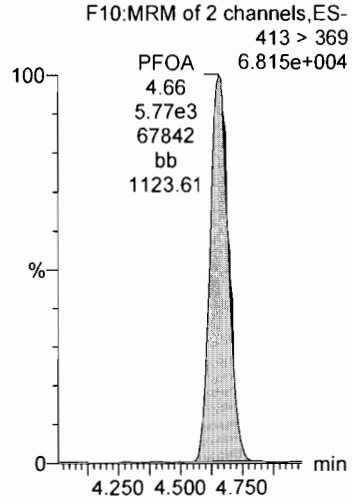

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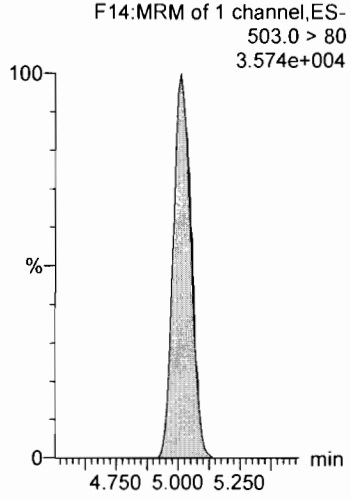

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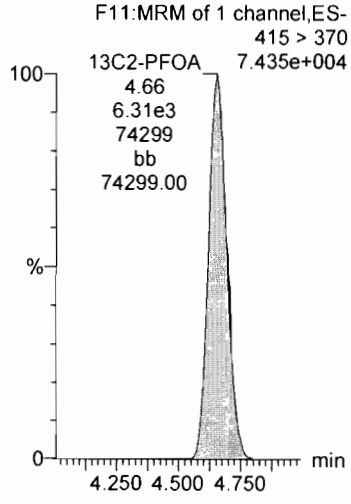

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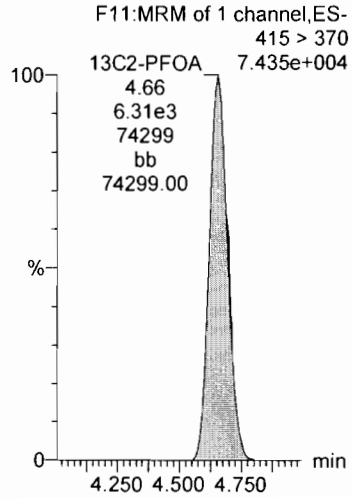

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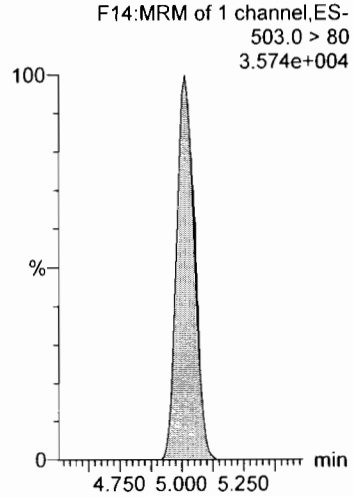

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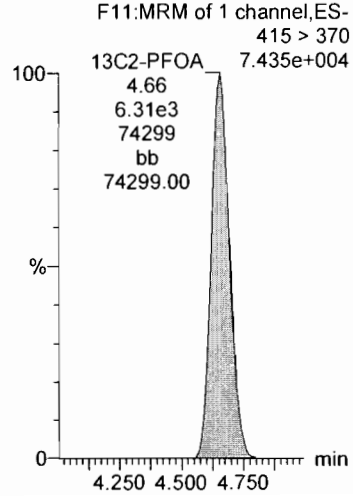

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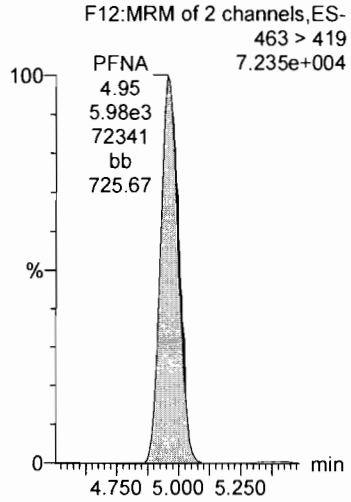

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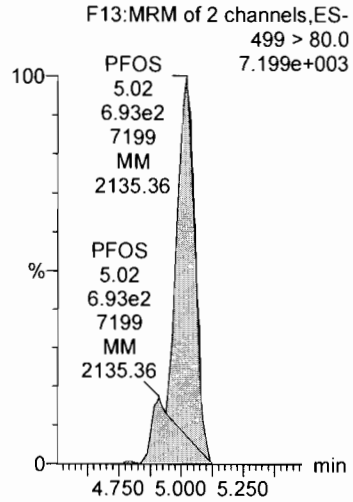

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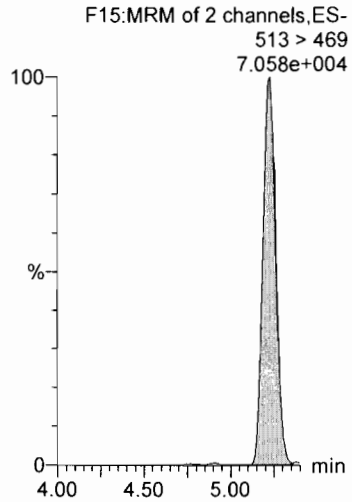

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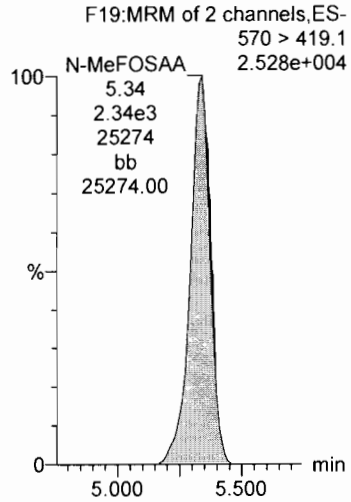

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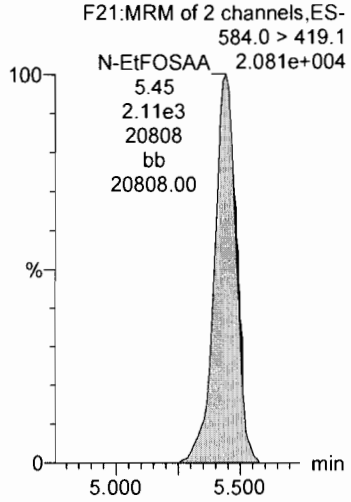

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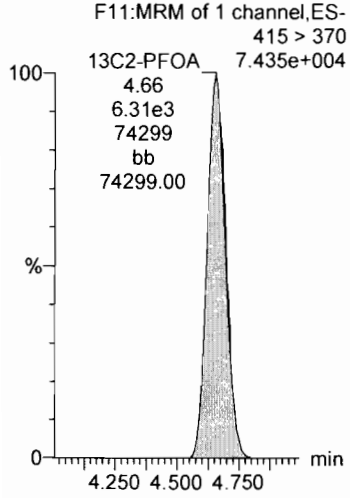

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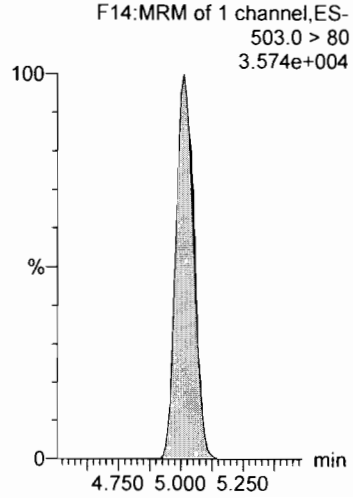

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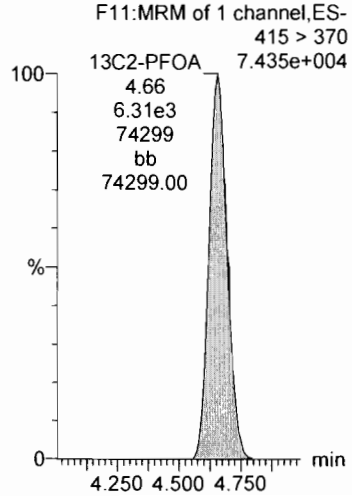

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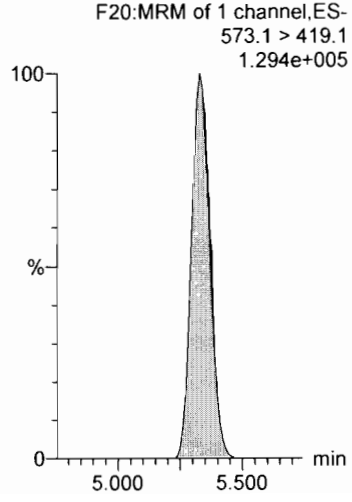

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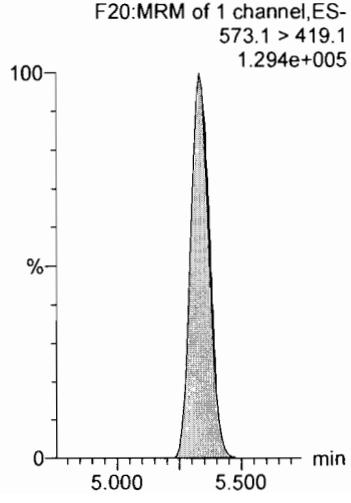

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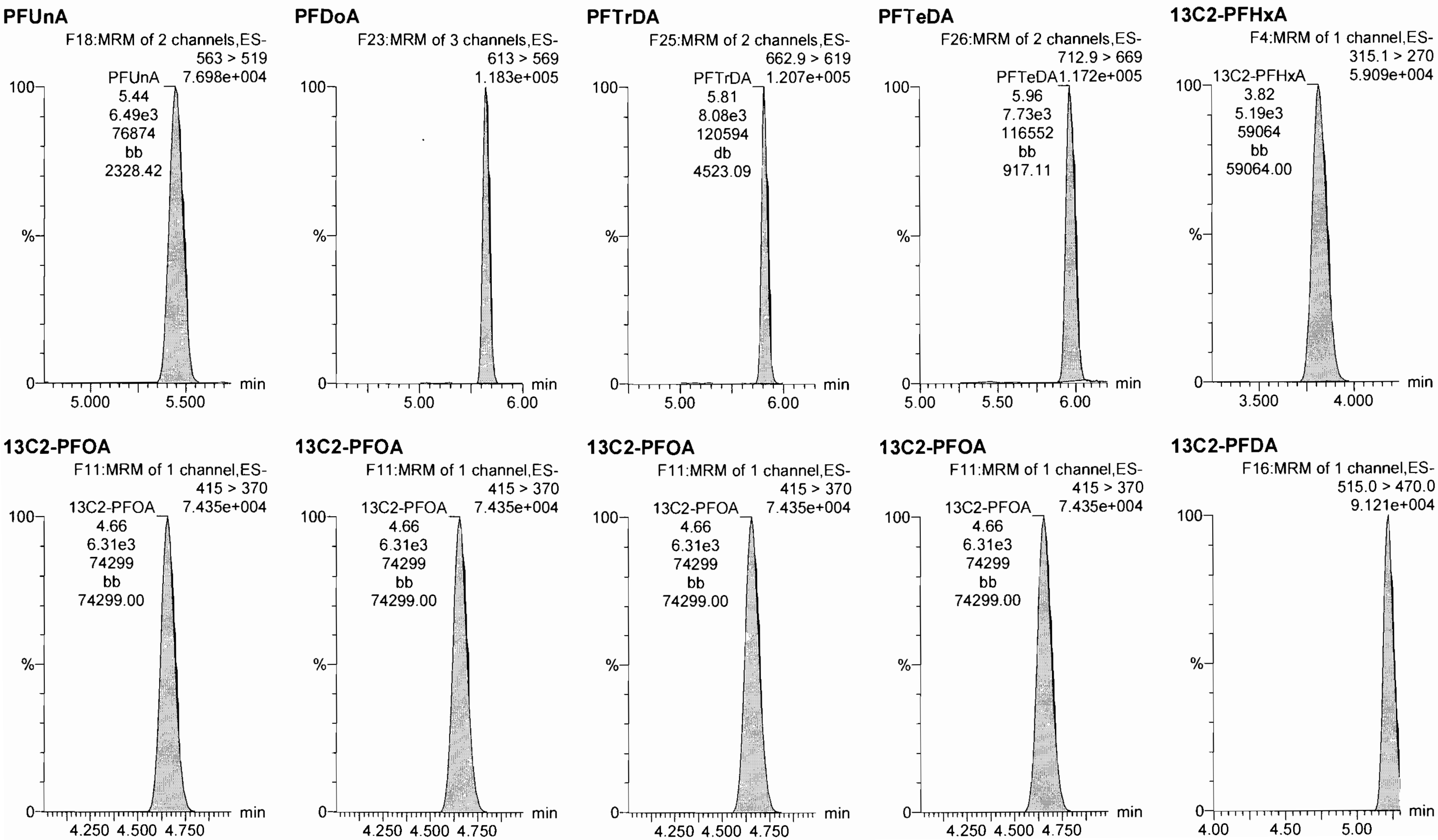

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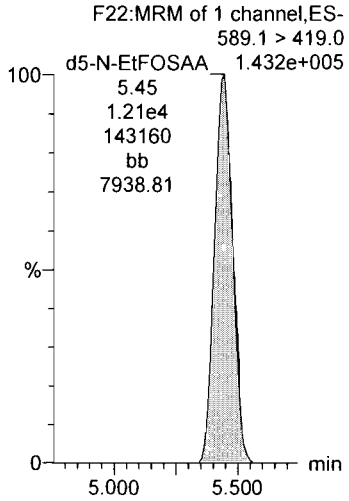

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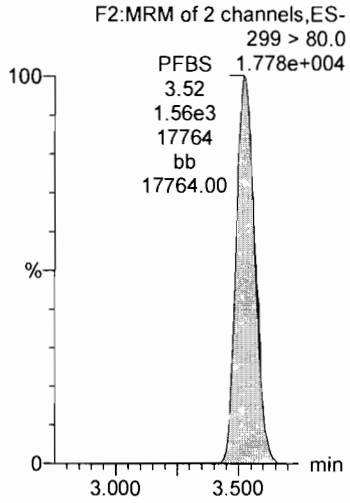

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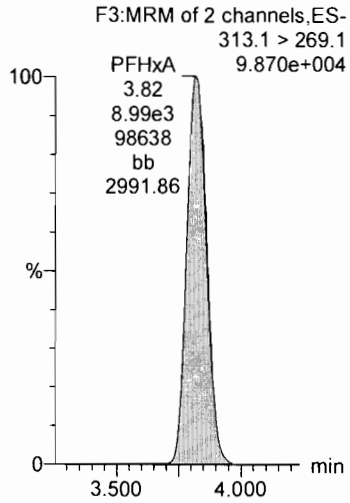

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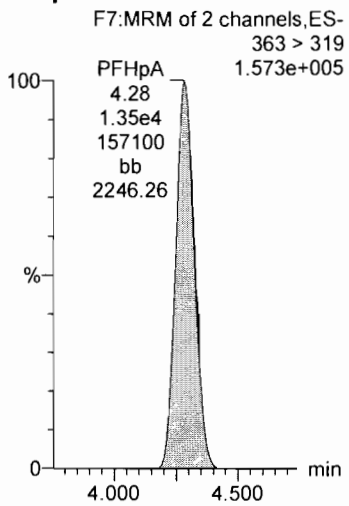

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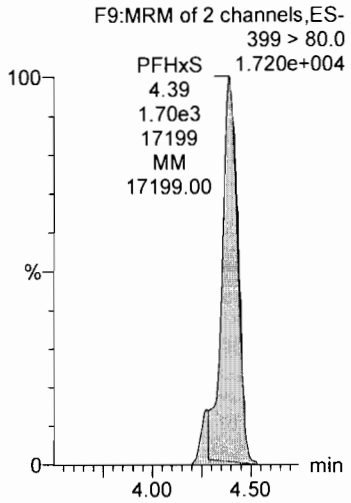

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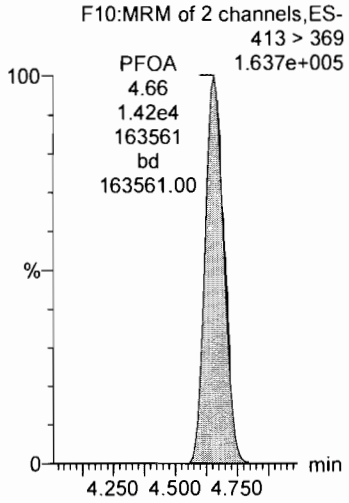

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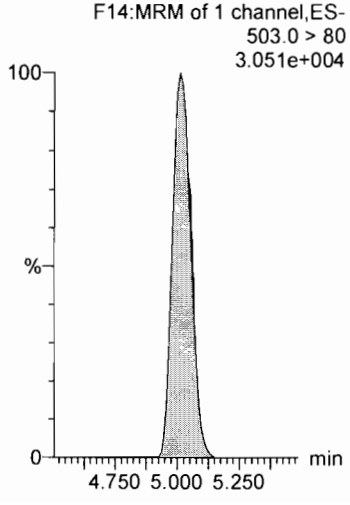

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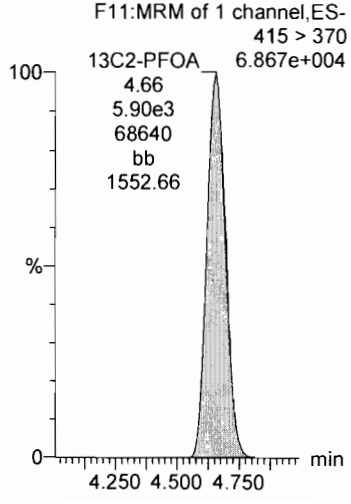

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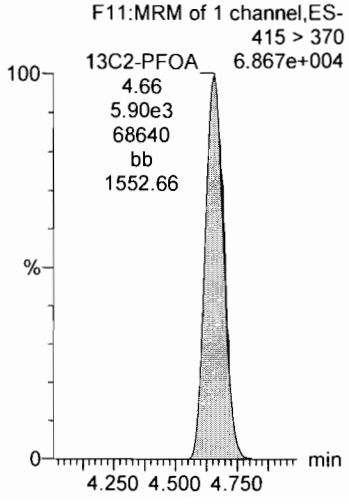

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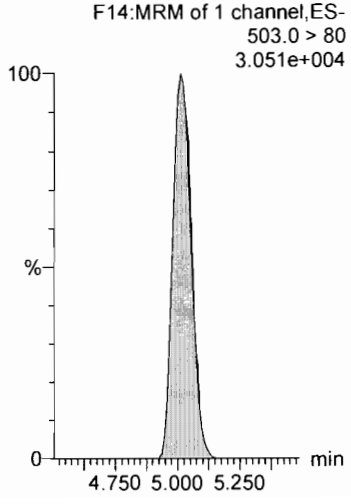

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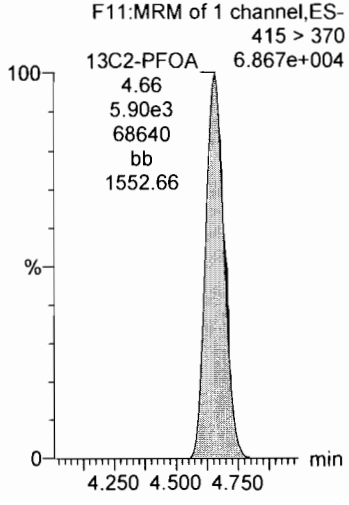

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Name: 181230P1_8, Date: 30-Dec-2018, Time: 14:55:18, ID: ST181230P1-7 PFC CS2 537 18L2618, Description: PFC CS2 537 18L2618

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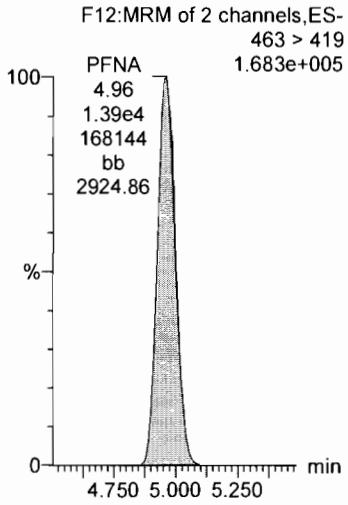

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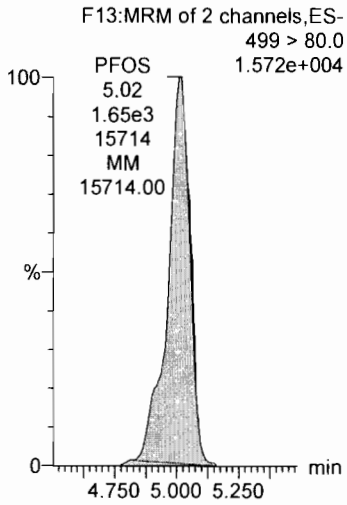

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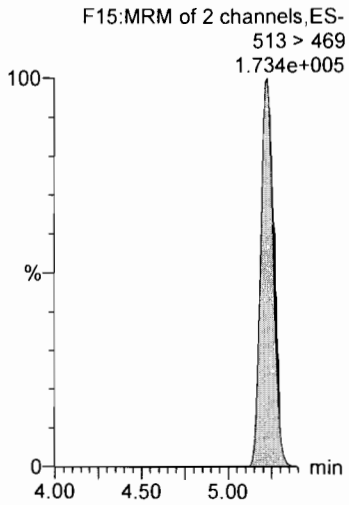

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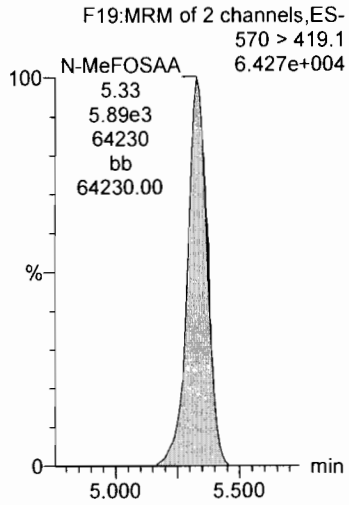

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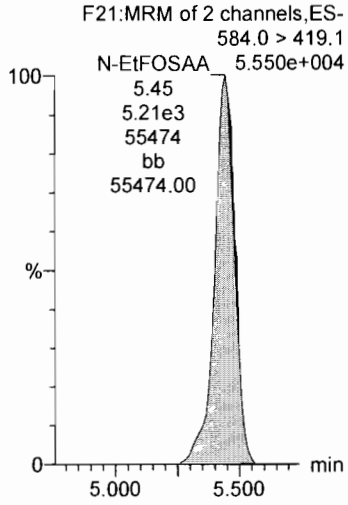

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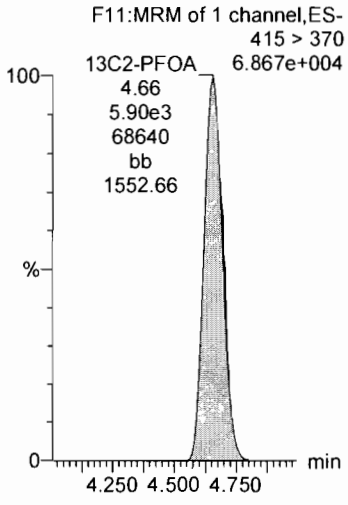

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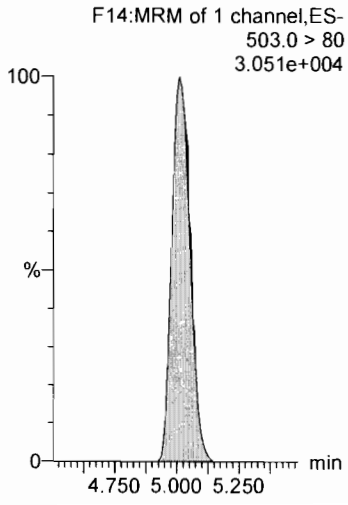

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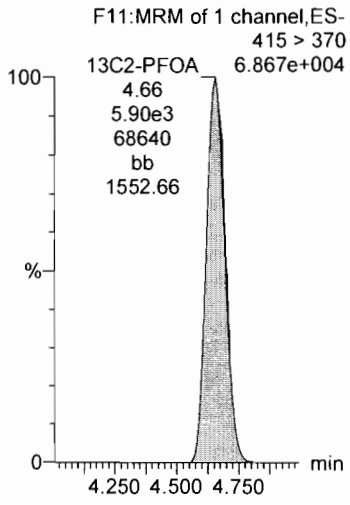

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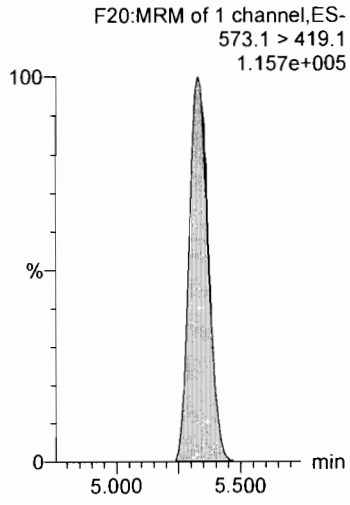

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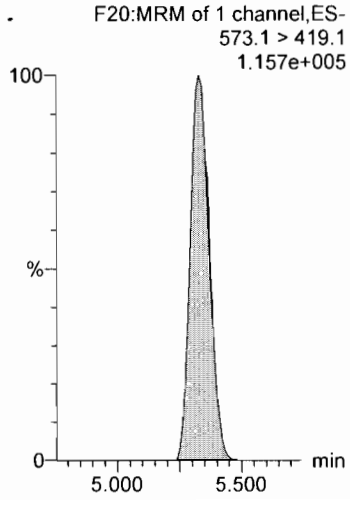

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Name: 181230P1_8, Date: 30-Dec-2018, Time: 14:55:18, ID: ST181230P1-7 PFC CS2 537 18L2618, Description: PFC CS2 537 18L2618

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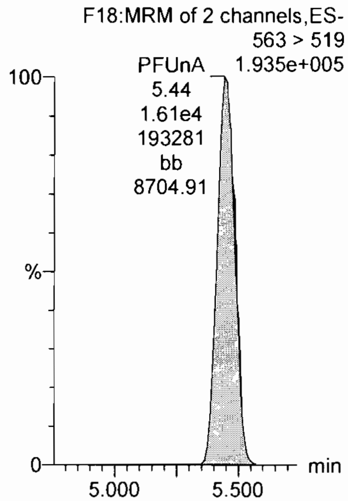

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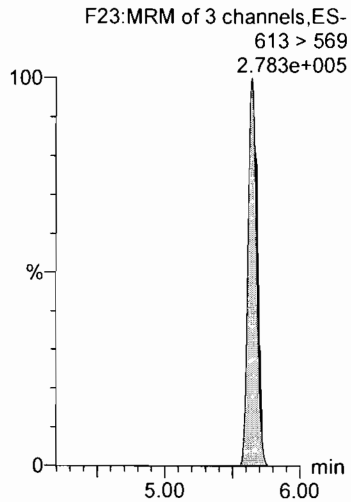

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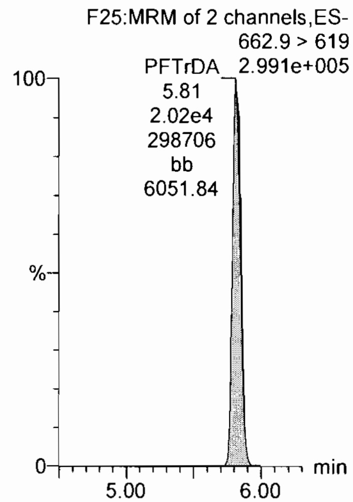

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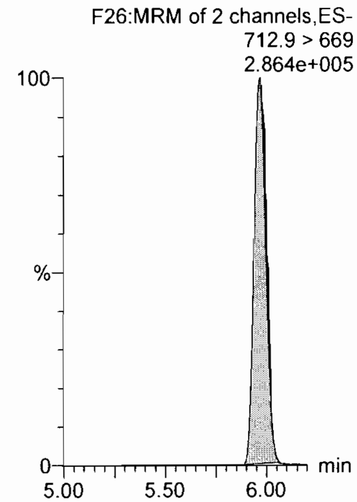

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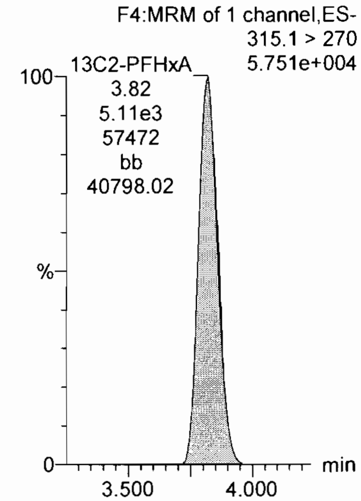

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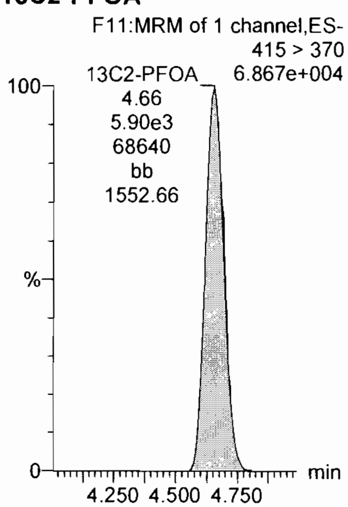

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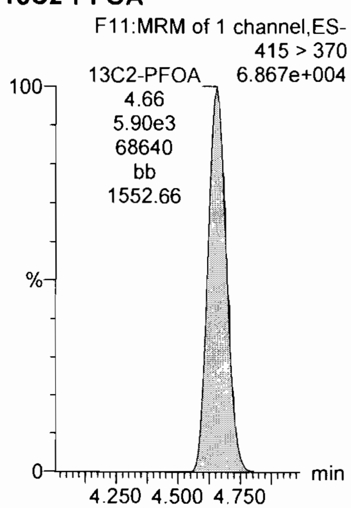

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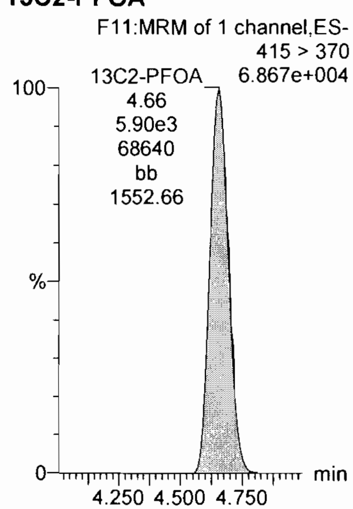

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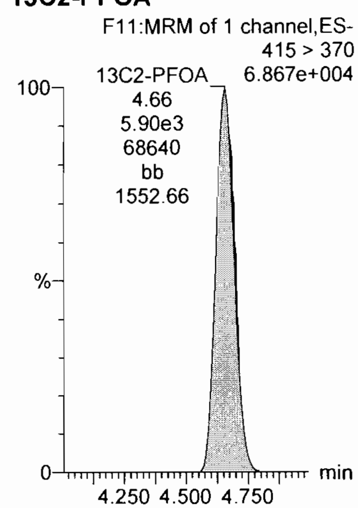

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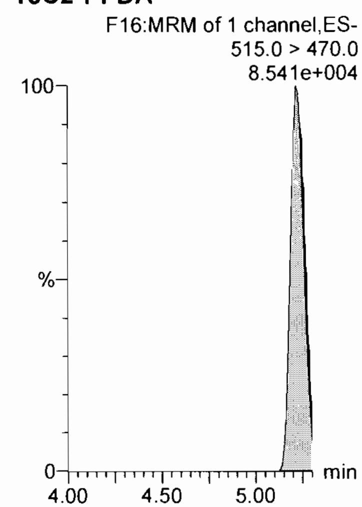

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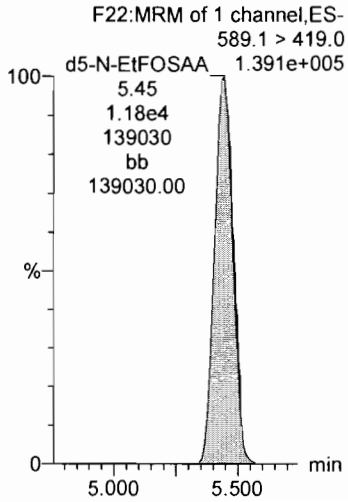
d5-N-EtFOSAA



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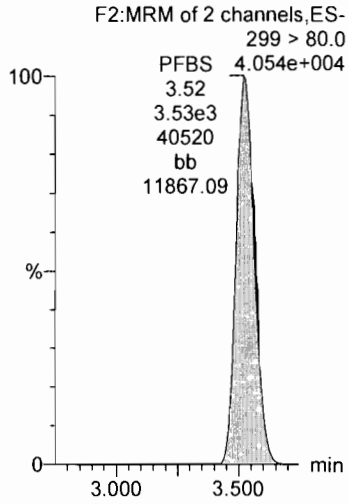

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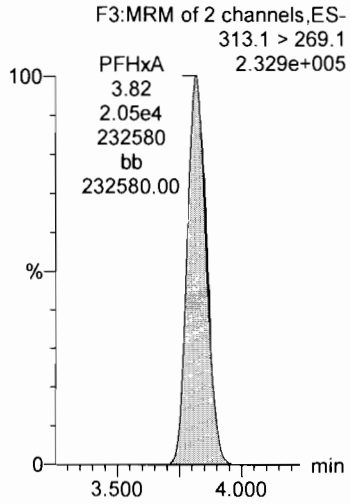

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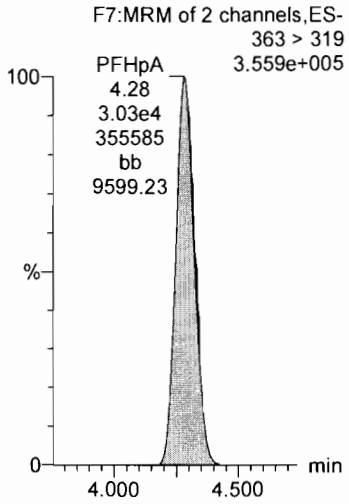

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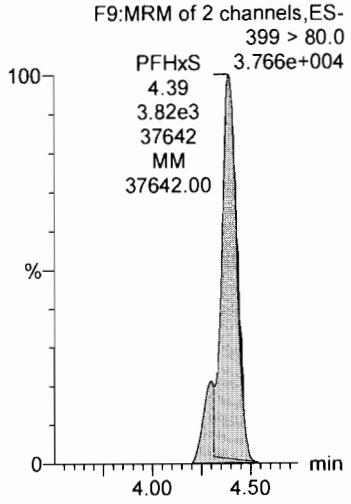

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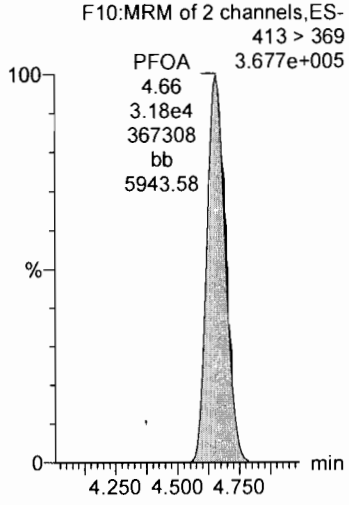

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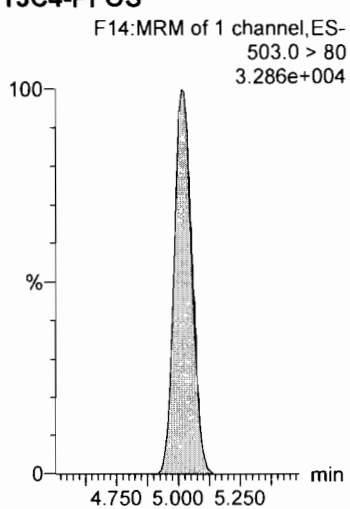

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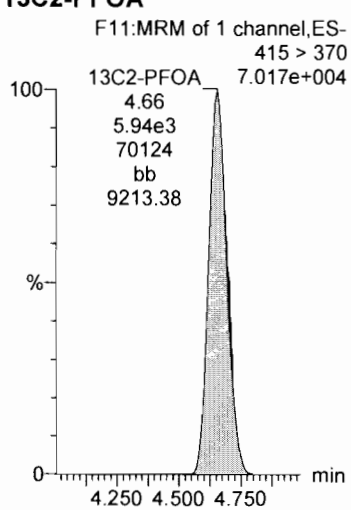

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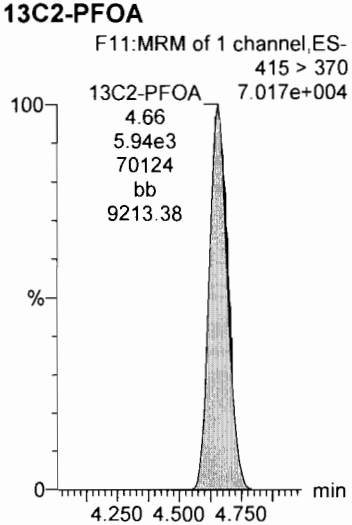

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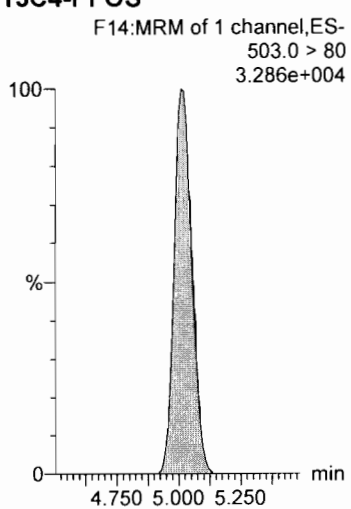

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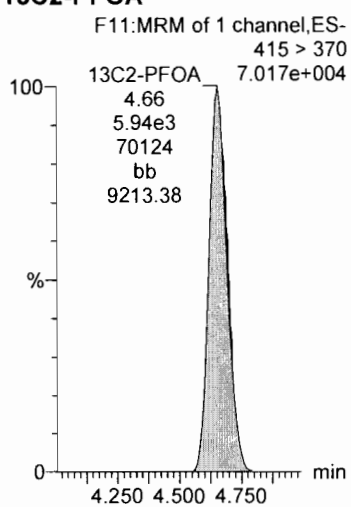

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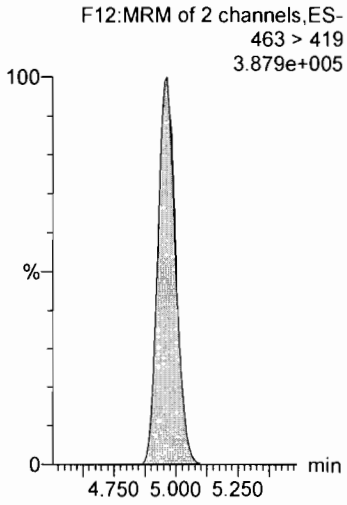

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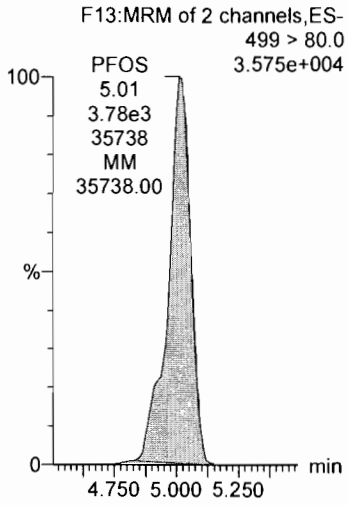

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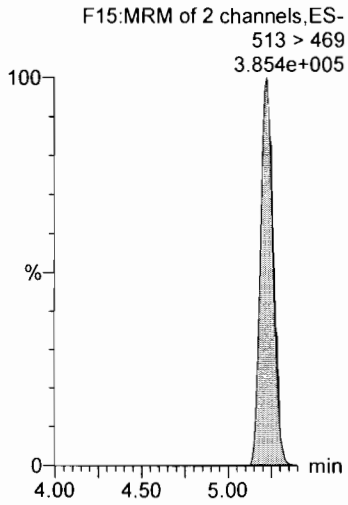

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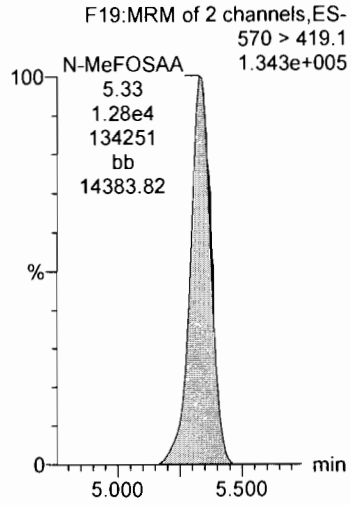

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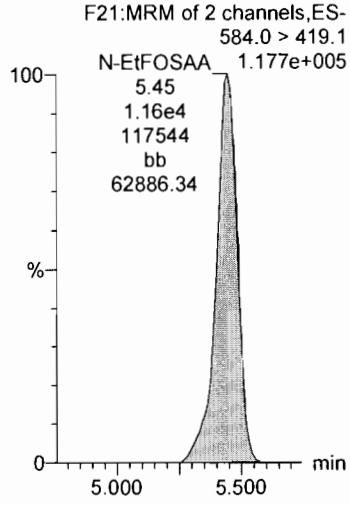

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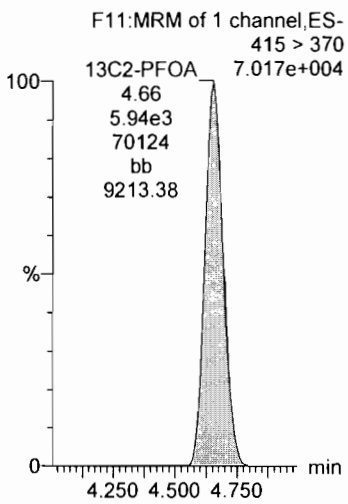

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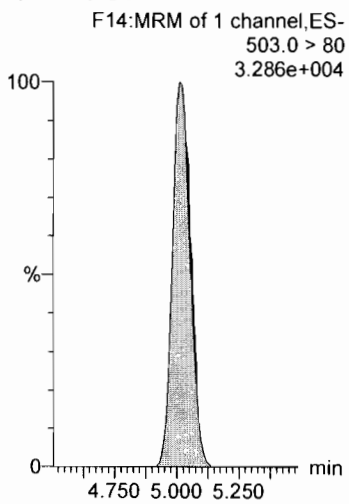

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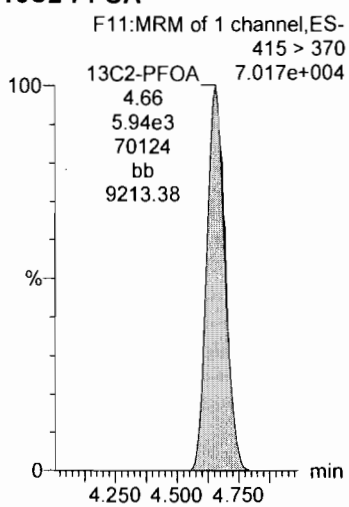

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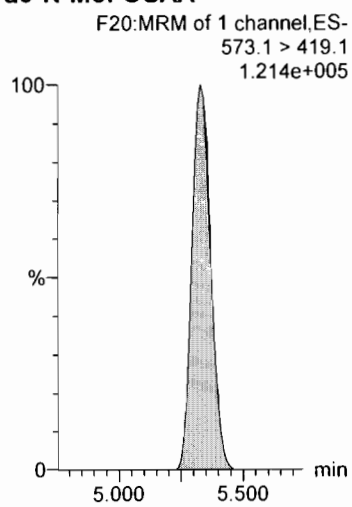

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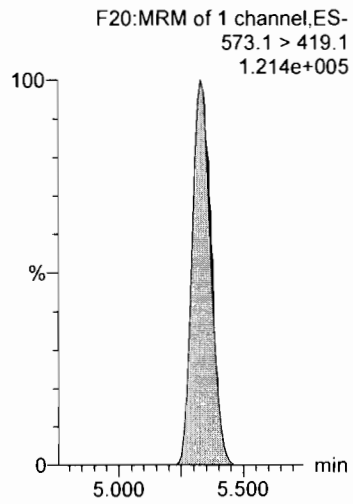

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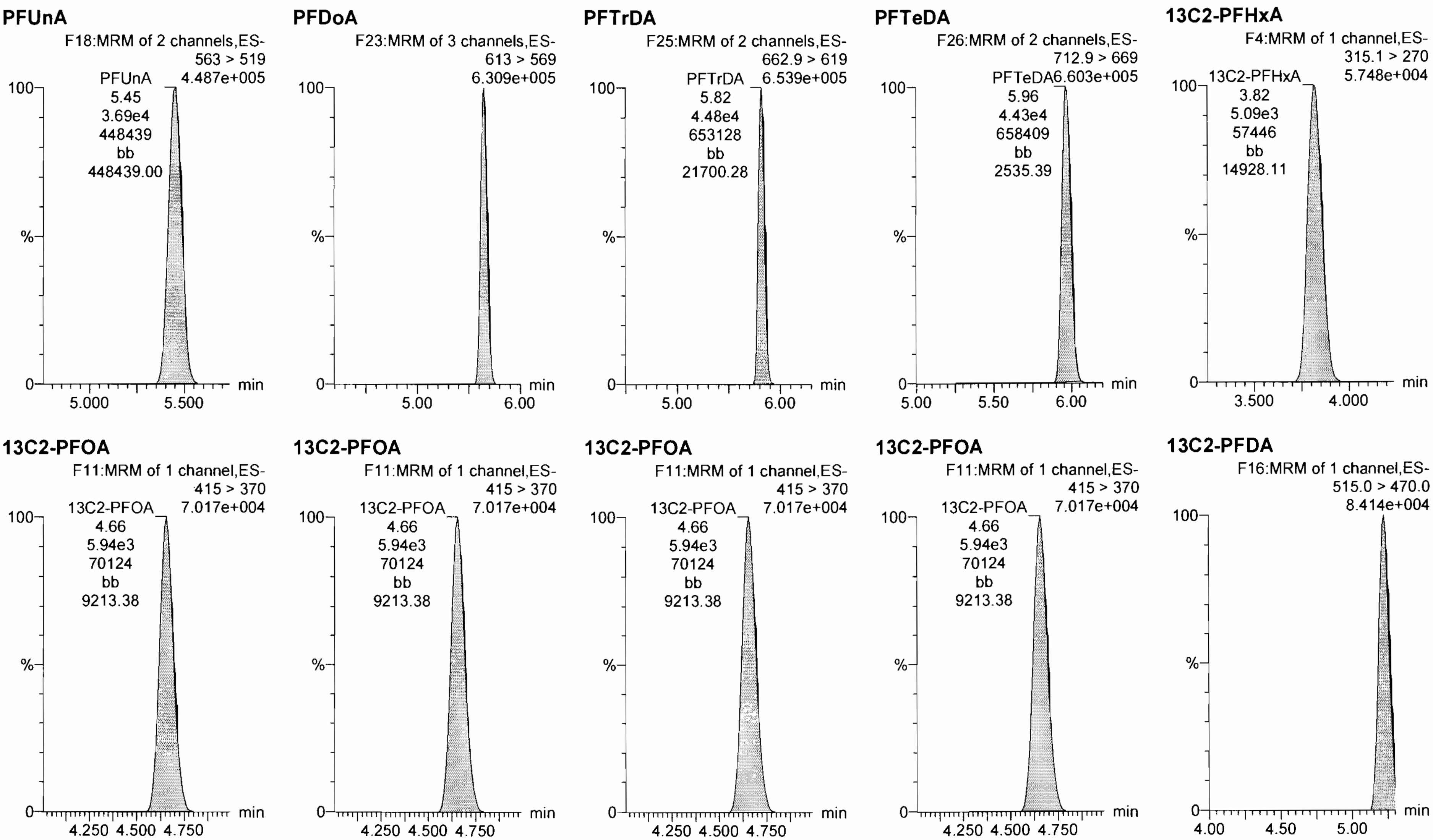

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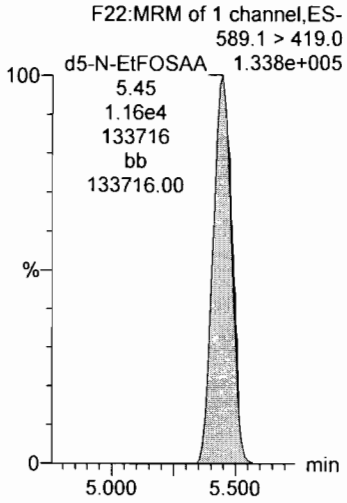

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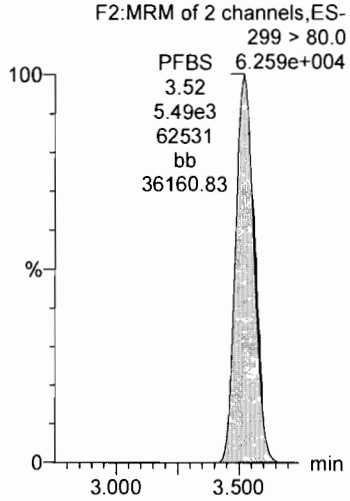

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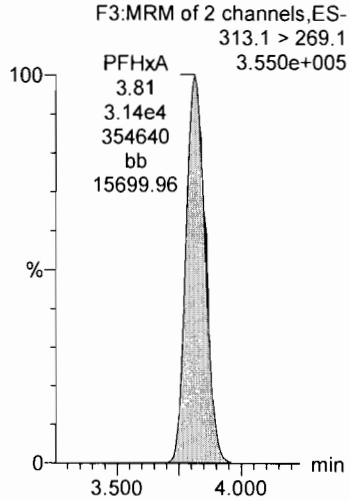

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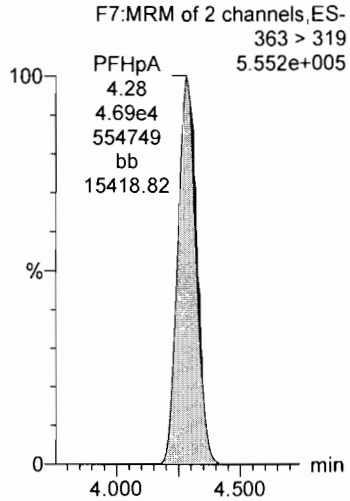

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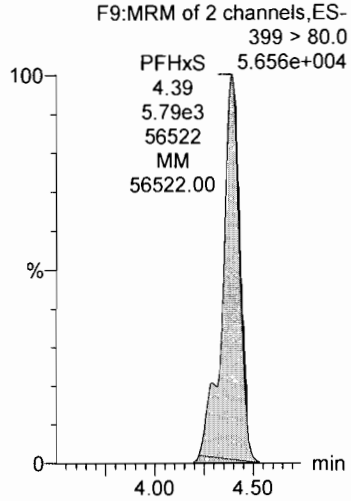

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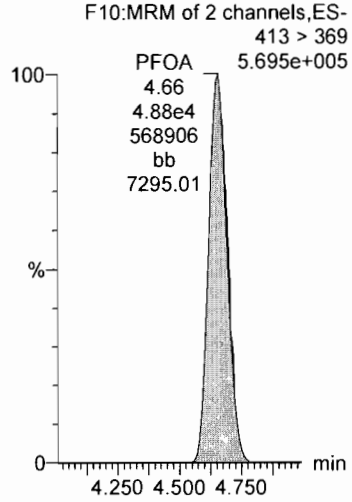

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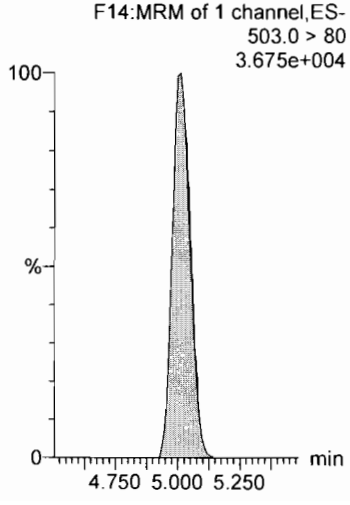

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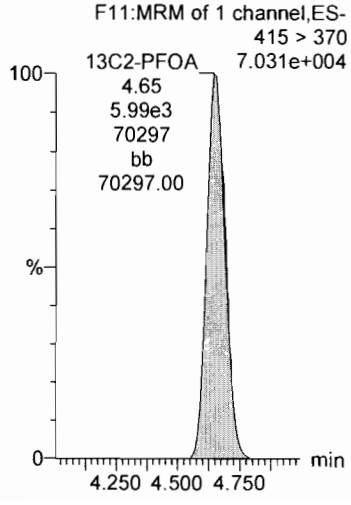

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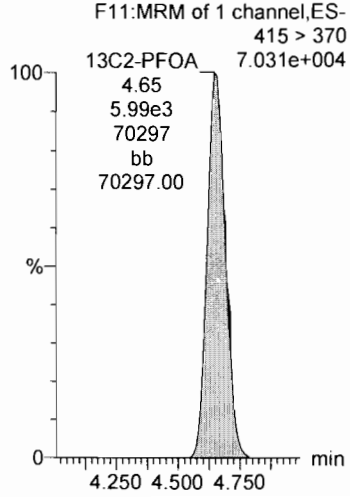

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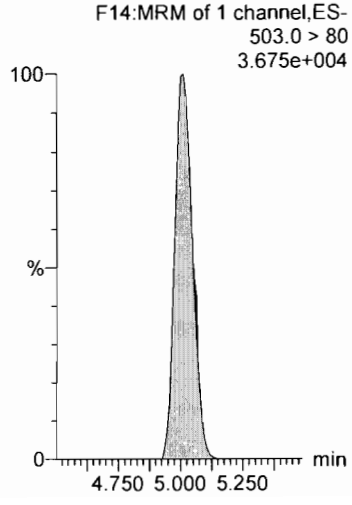

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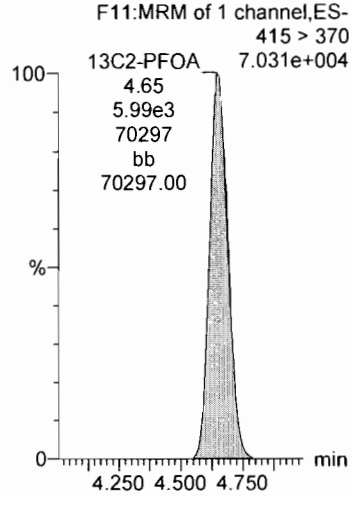

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Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_10, Date: 30-Dec-2018, Time: 15:17:39, ID: ST181230P1-9 PFC CS4 537 18L2620, Description: PFC CS4 537 18L2620

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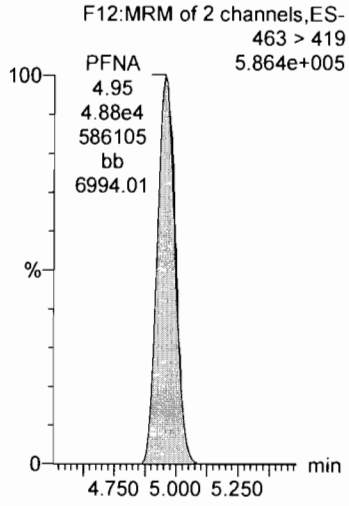

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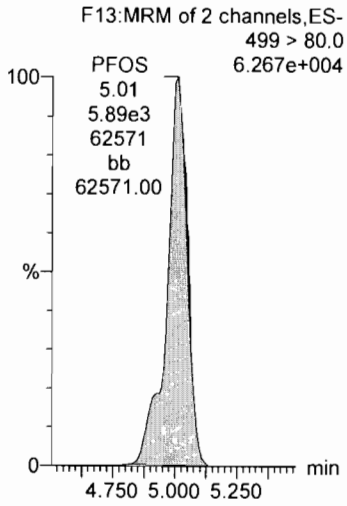

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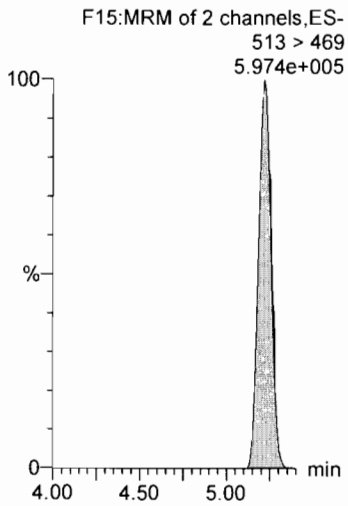

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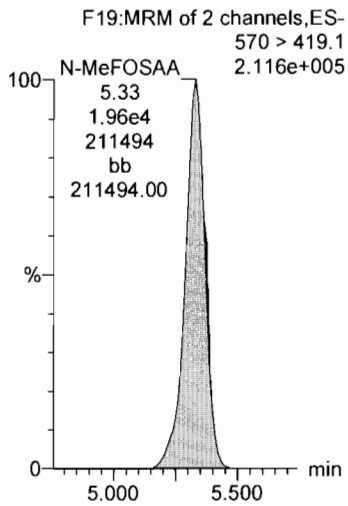

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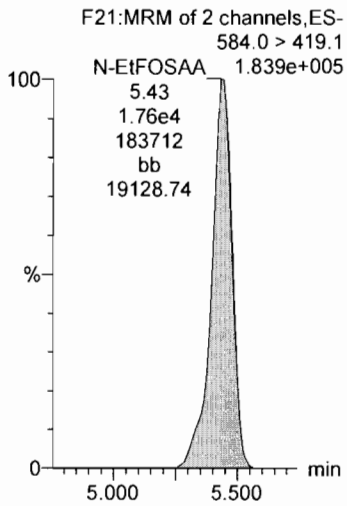

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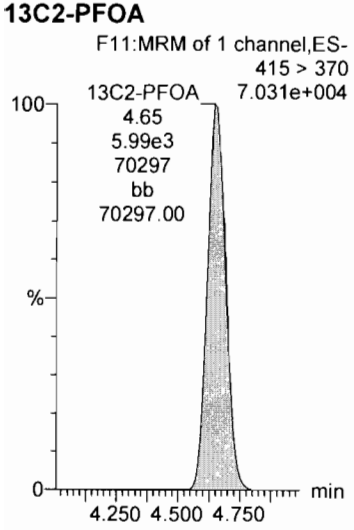

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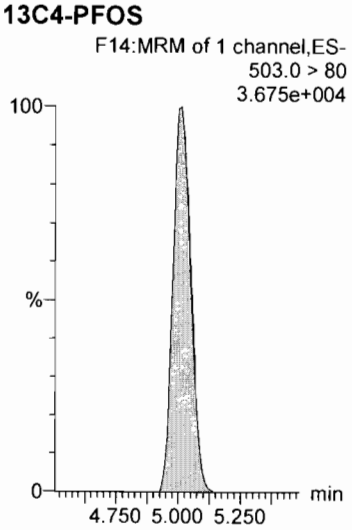

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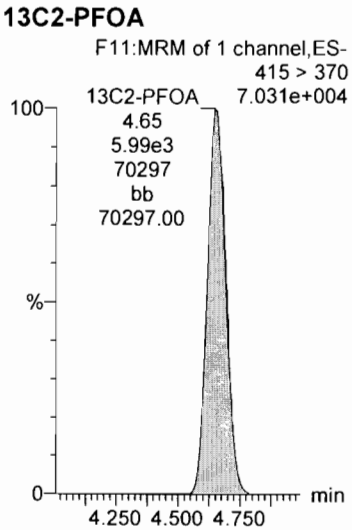

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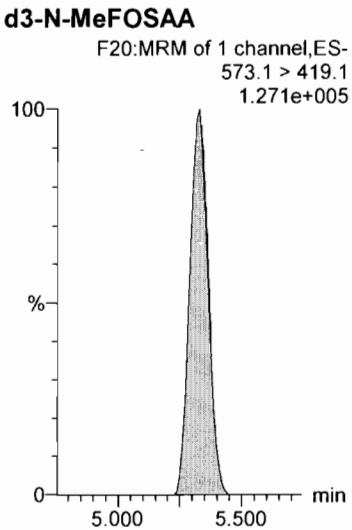

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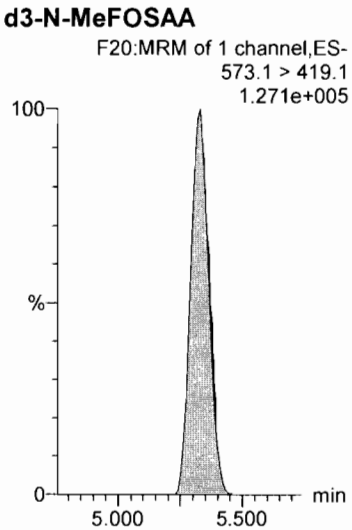

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Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_10, Date: 30-Dec-2018, Time: 15:17:39, ID: ST181230P1-9 PFC CS4 537 18L2620, Description: PFC CS4 537 18L2620

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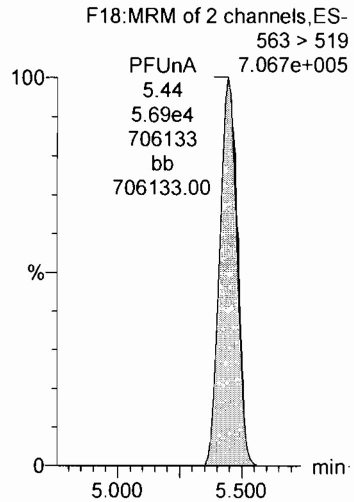

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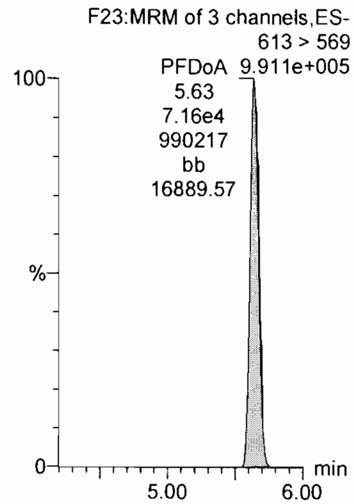

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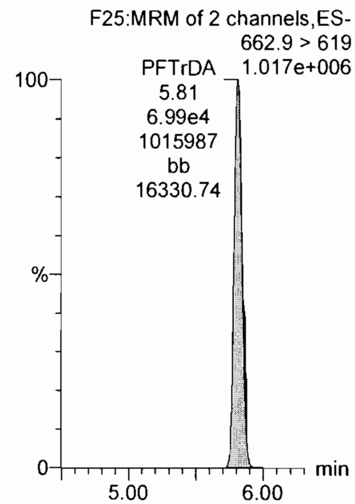

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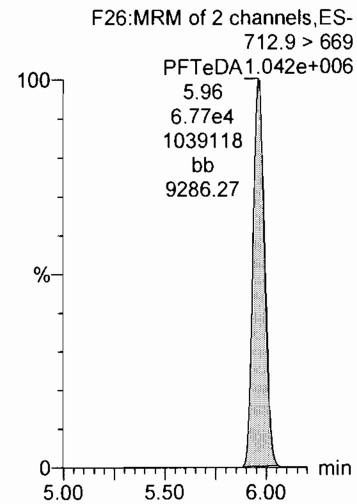

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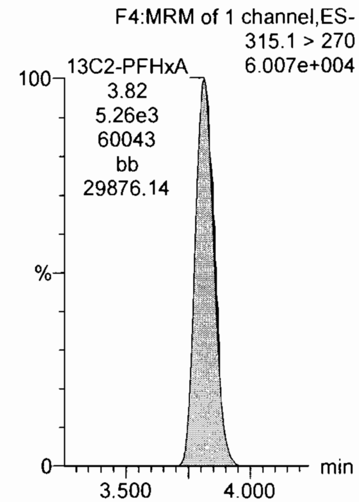

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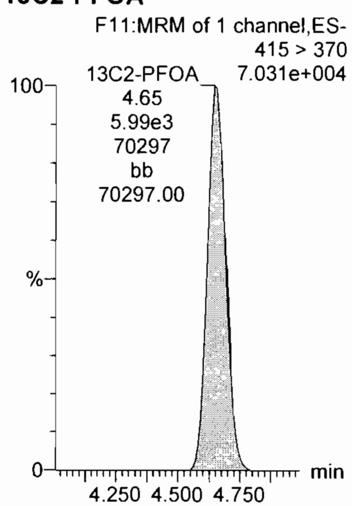

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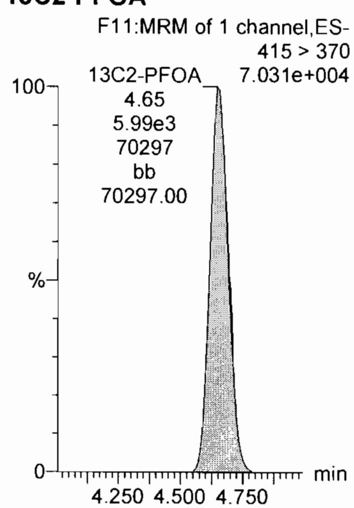

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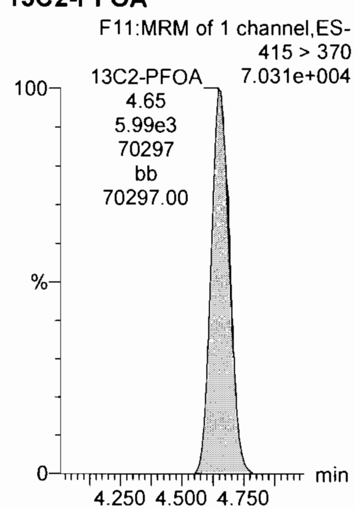

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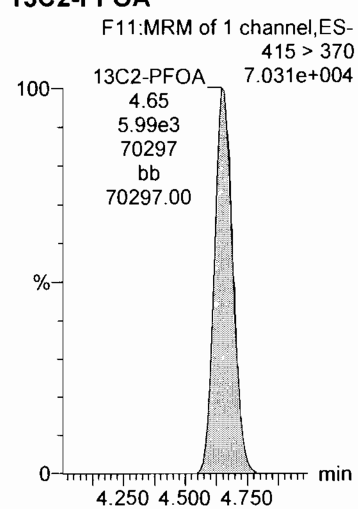

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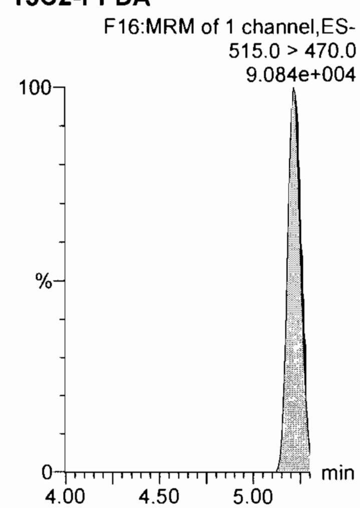

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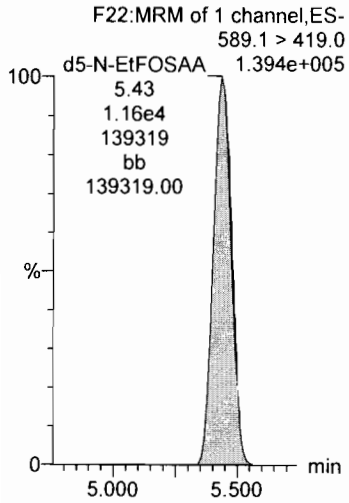

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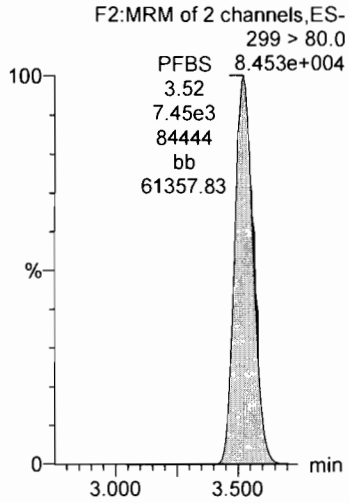

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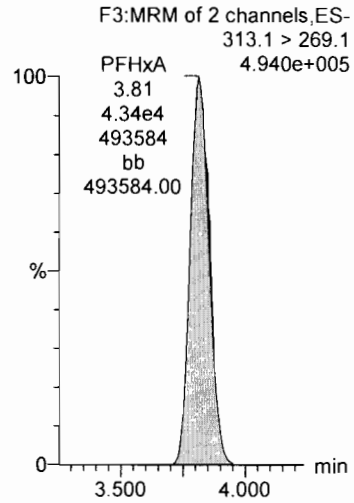

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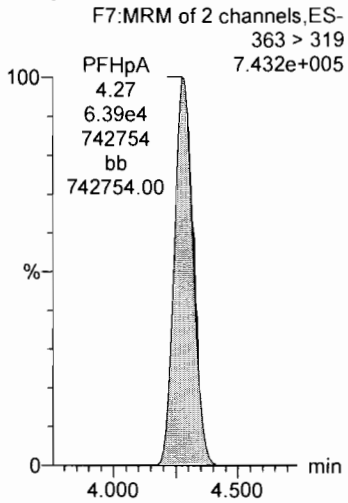

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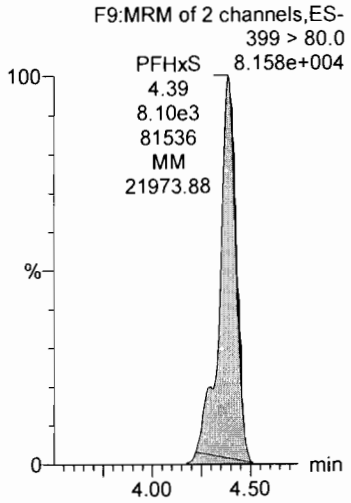

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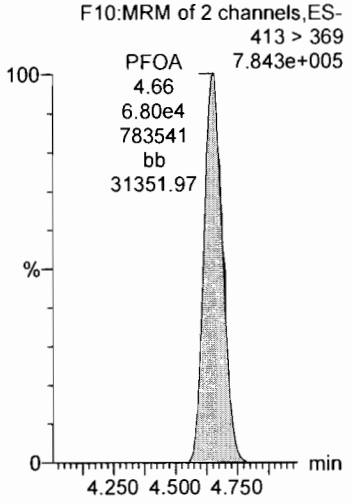

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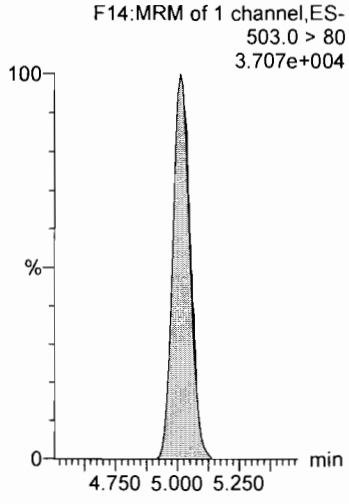

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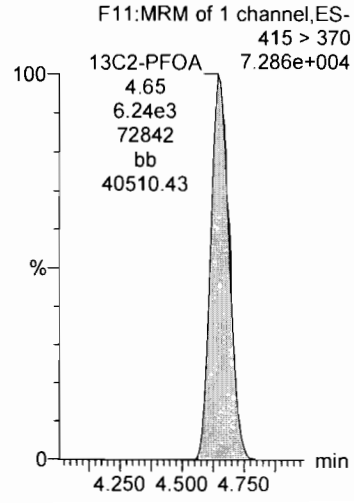

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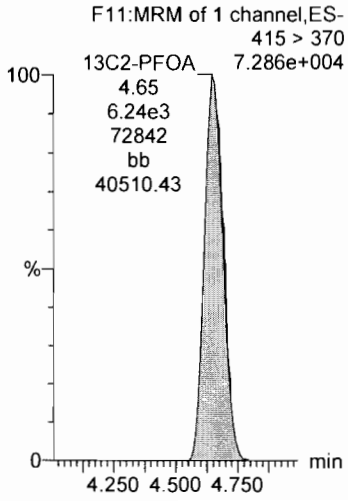

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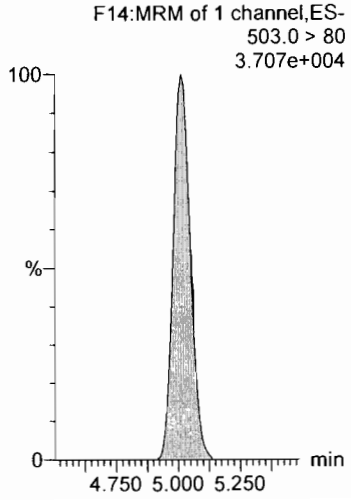

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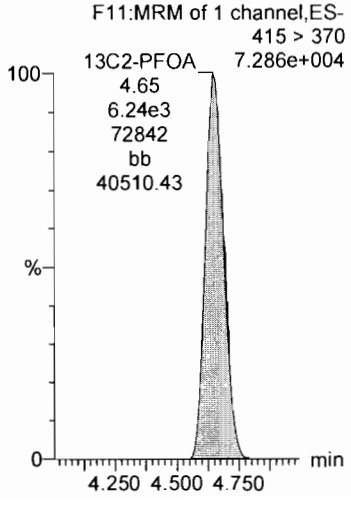

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Name: 181230P1_11, Date: 30-Dec-2018, Time: 15:28:50, ID: ST181230P1-10 PFC CS5 537 18L2621, Description: PFC CS5 537 18L2621

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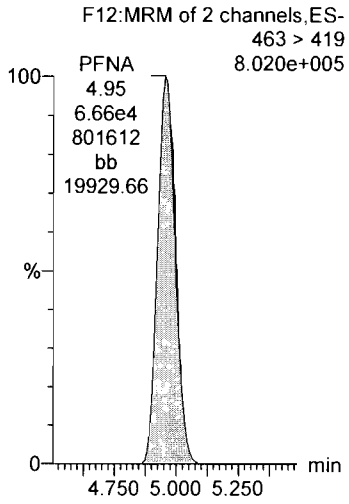

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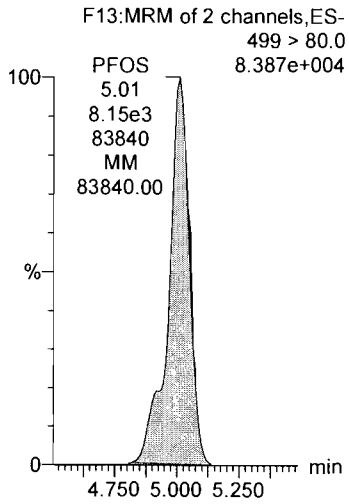

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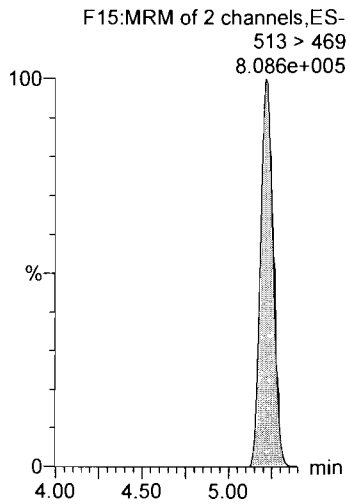

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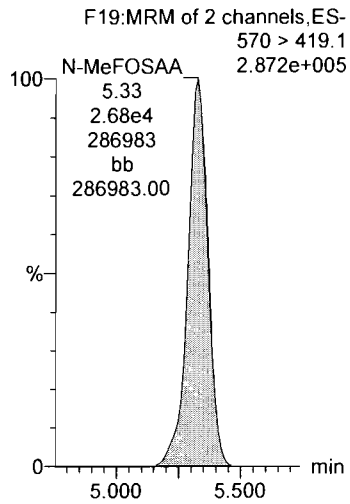

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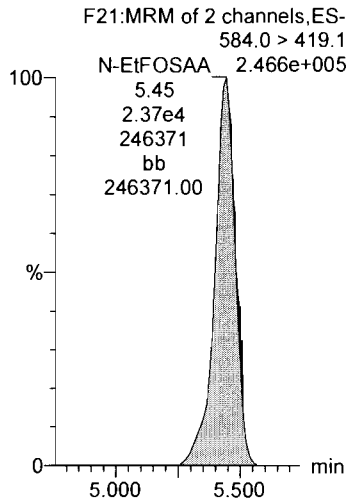

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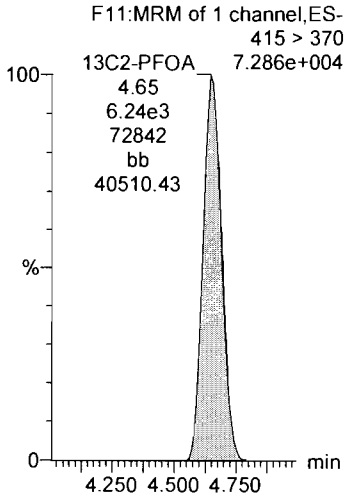

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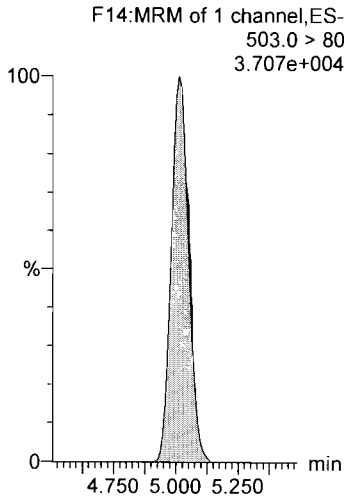

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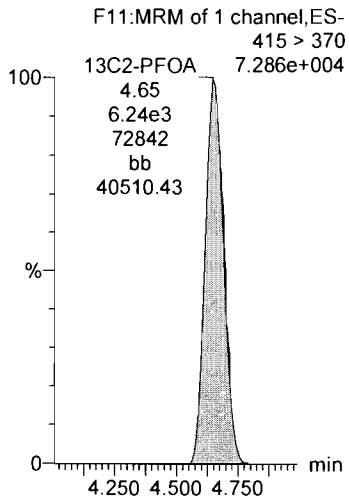

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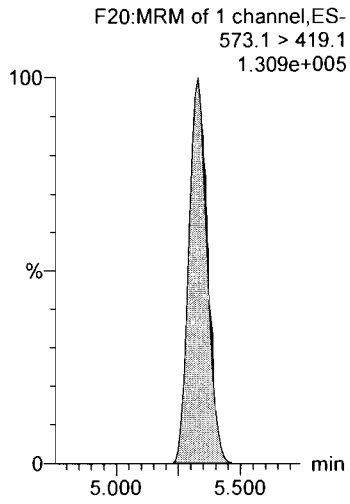

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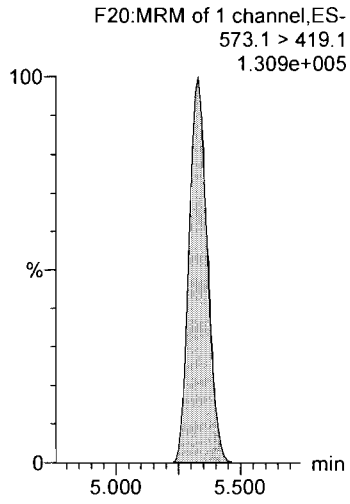

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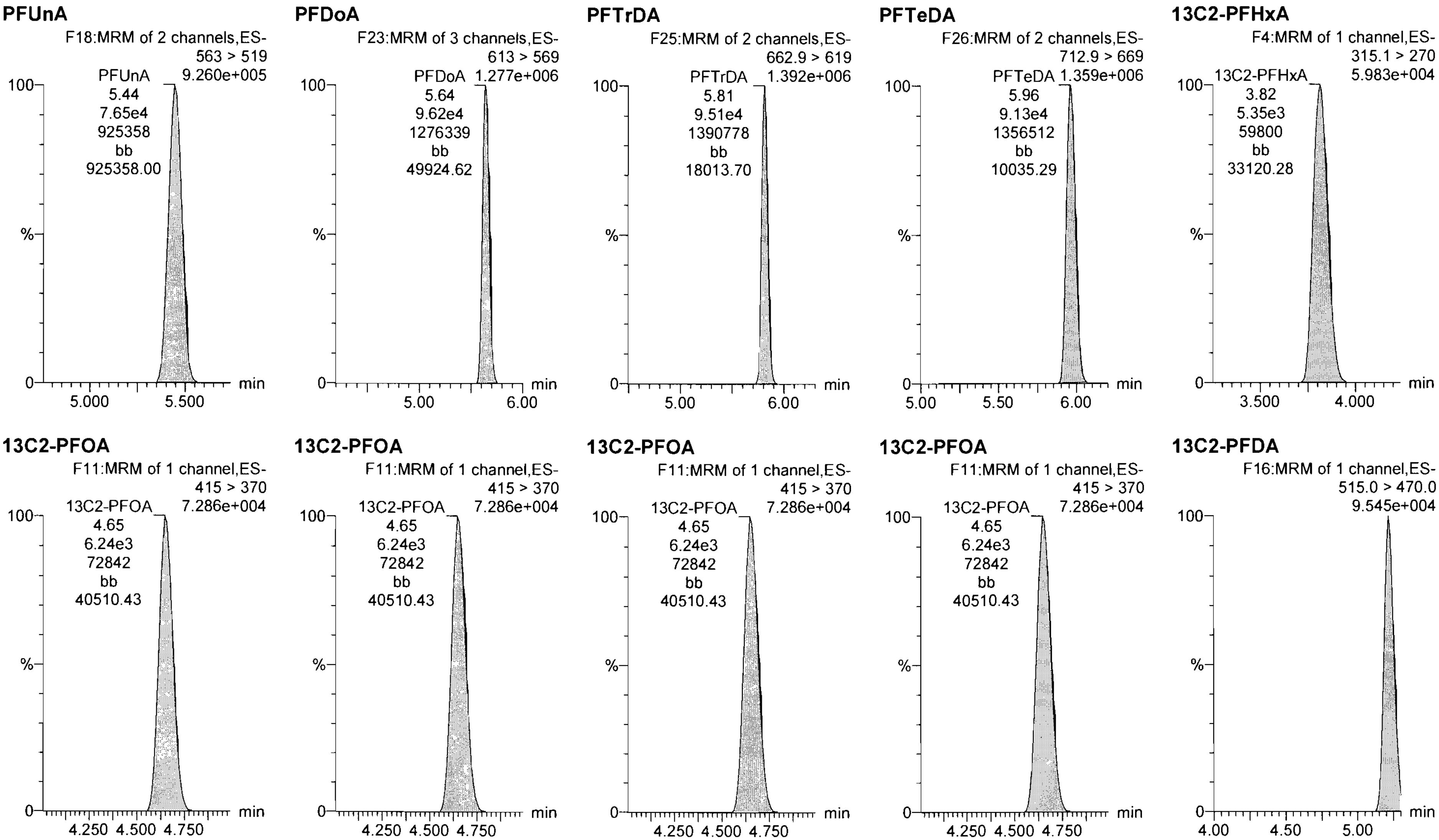
Printed: Sunday, December 30, 2018 16:17:29 Pacific Standard Time

Name: 181230P1_11, Date: 30-Dec-2018, Time: 15:28:50, ID: ST181230P1-10 PFC CS5 537 18L2621, Description: PFC CS5 537 18L2621



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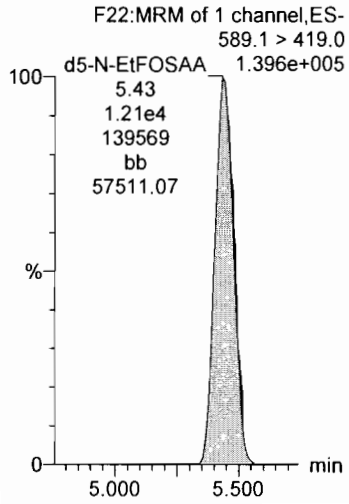

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Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-13.qld

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Printed: Monday, December 31, 2018 09:02:52 Pacific Standard Time

√AD 12/31/18

Name: 181230P1_13, Date: 30-Dec-2018, Time: 15:51:12, ID: ST181230P1-1 PFC ICV 537 18L2622, Description: PFC ICV 537 18L2622

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF Mean	Pred.RT	RT	y Axis Resp.	Conc.	%Rec
1	1	PFBS	299 > 80.0	758.848	2925.354	1.00		3.50	3.50	7.44	9.23	92.3
2	2	PFHxA	313.1 > 269.1	3837.645	6273.215	1.00		3.80	3.81	6.12	8.98	89.8
3	3	PFHpA	363 > 319	5715.832	6273.215	1.00		4.26	4.28	9.11	9.02	90.2
4	4	PFHxS	399 > 80.0	769.520	2925.354	1.00		4.38	4.39	7.55	9.02	90.2
5	5	PFOA	413 > 369	5961.082	6273.215	1.00		4.65	4.65	9.50	8.92	89.2
6	19	13C4-PFOS	503.0 > 80	2925.354	2925.354	1.00	1.000	5.02	5.00	28.7	28.7	100.0
7	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
8	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
9	19	13C4-PFOS	503.0 > 80	2925.354	2925.354	1.00	1.000	5.02	5.00	28.7	28.7	100.0
10	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
11	-1											
12	6	PFNA	463 > 419	6047.263	6273.215	1.00		4.95	4.95	9.64	9.13	91.3
13	7	PFOS	499 >80.0	796.067	2925.354	1.00		5.00	5.00	7.81	9.41	94.1
14	8	PFDA	513 > 469	5905.739	6273.215	1.00		5.22	5.21	9.41	9.55	95.5
15	9	N-MeFOSAA	570 > 419.1	2128.007	10956.793	1.00		5.33	5.32	7.77	8.51	85.1
16	10	N-EtFOSAA	584.0 >419.1	2050.558	10956.793	1.00		5.43	5.43	7.49	8.77	87.7
17	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
18	19	13C4-PFOS	503.0 > 80	2925.354	2925.354	1.00	1.000	5.02	5.00	28.7	28.7	100.0
19	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
20	20	d3-N-MeFOSAA	573.1 > 419.1	10956.793	10956.793	1.00	1.000	5.33	5.33	40.0	40.0	100.0
21	20	d3-N-MeFOSAA	573.1 > 419.1	10956.793	10956.793	1.00	1.000	5.33	5.33	40.0	40.0	100.0
22	-1											
23	11	PFUnA	563 > 519	6909.478	6273.215	1.00		5.43	5.44	11.0	9.05	90.5
24	12	PFDoA	613 > 569	8264.403	6273.215	1.00		5.63	5.64	13.2	8.57	85.7
25	13	PFTrDA	662.9 > 619	8392.109	6273.215	1.00		5.81	5.81	13.4	8.91	89.1
26	14	PFTeDA	712.9 > 669	8192.038	6273.215	1.00		5.95	5.96	13.1	9.68	96.8
27	15	13C2-PFHxA	315.1 > 270	5449.329	6273.215	1.00	0.868	3.81	3.81	8.69	10.0	100.1
28	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
29	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
30	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
31	18	13C2-PFOA	415 > 370	6273.215	6273.215	1.00	1.000	4.66	4.65	10.0	10.0	100.0
32	16	13C2-PFDA	515.0 > 470.0	7591.486	6273.215	1.00	1.221	5.22	5.22	12.1	9.91	99.1
33	-1											
34	17	d5-N-EtFOSAA	589.1 > 419.0	12179.162	10956.793	1.00	1.132	5.43	5.43	44.5	39.3	98.2

12/31/18

Dataset: D:\PFAS.PRO\RESULTS\181230P1\181230P1-13.qld

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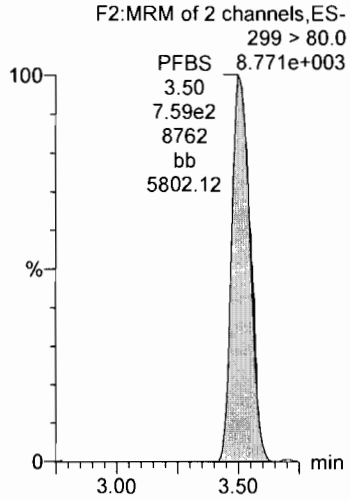
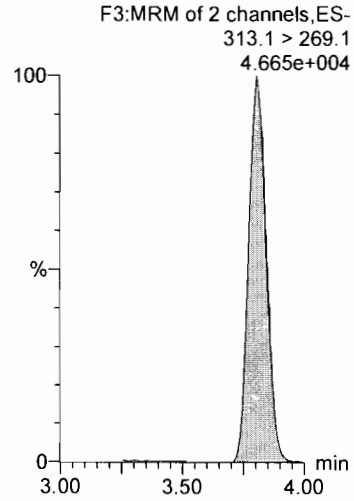


PFHxA



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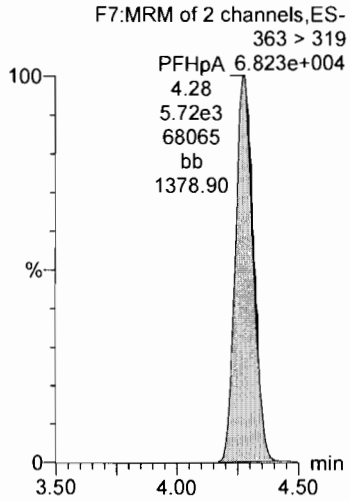

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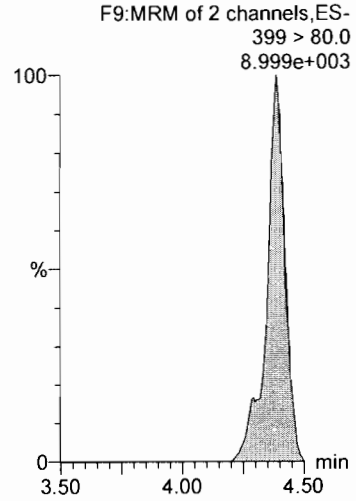
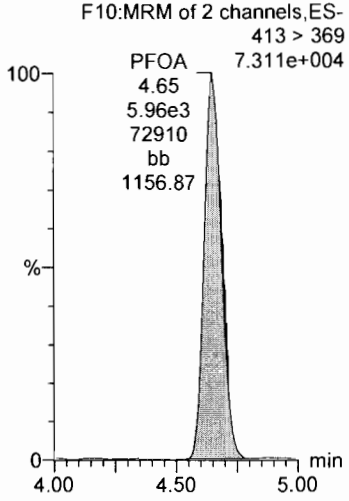


PFOA



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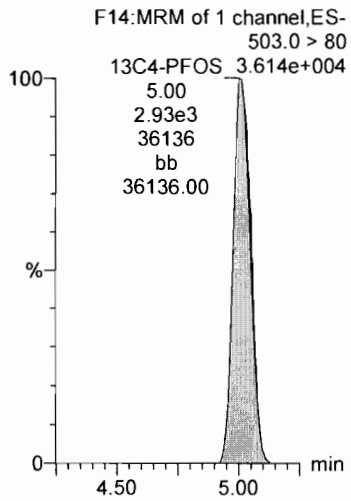

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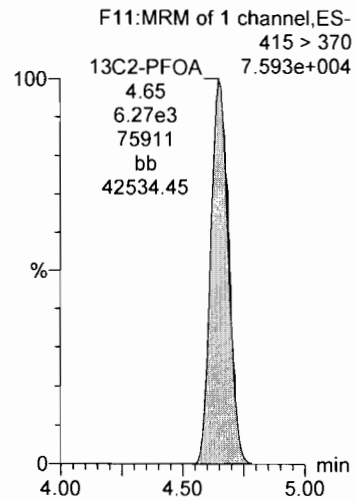

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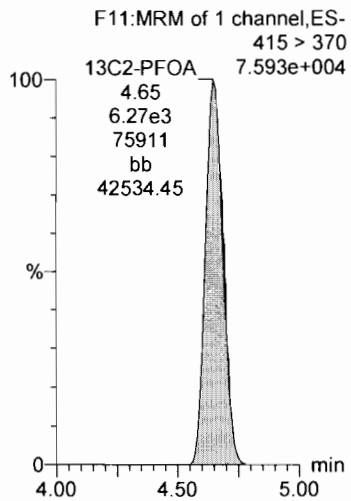

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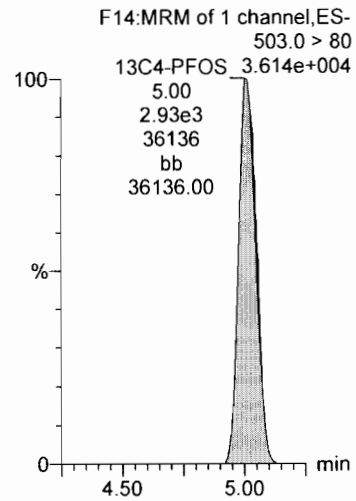

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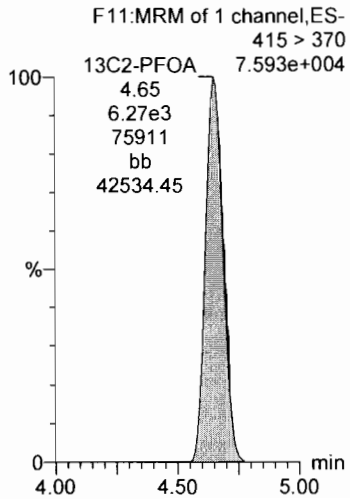

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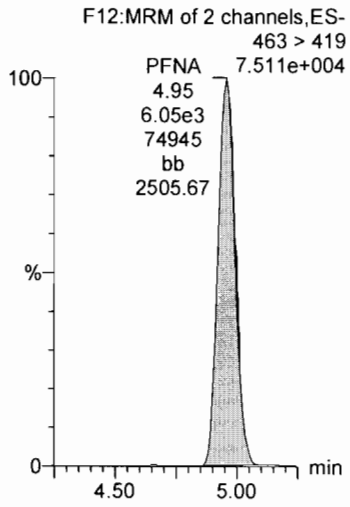

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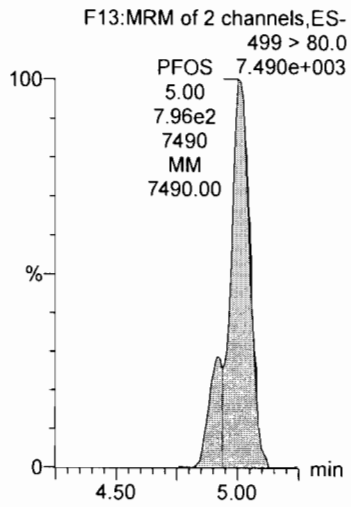

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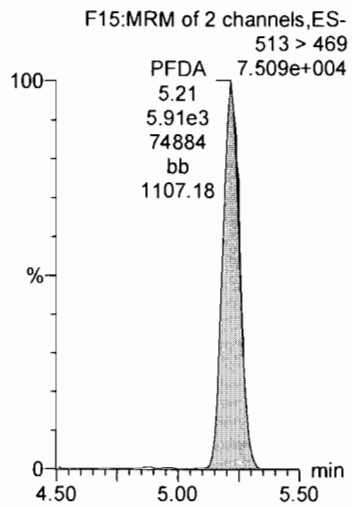

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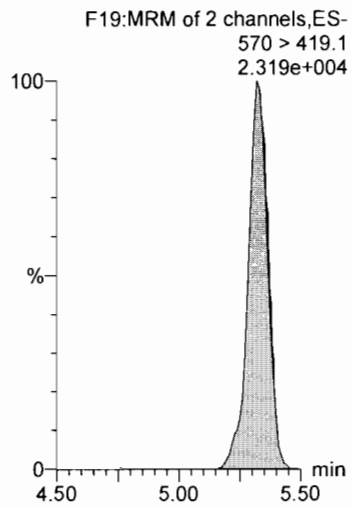

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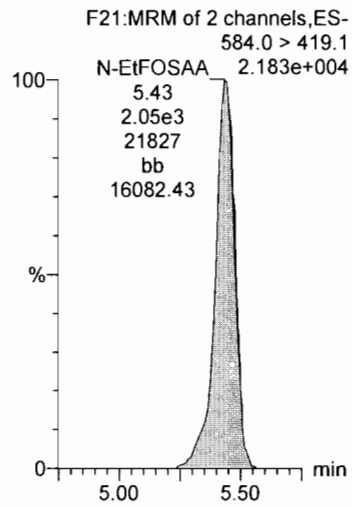

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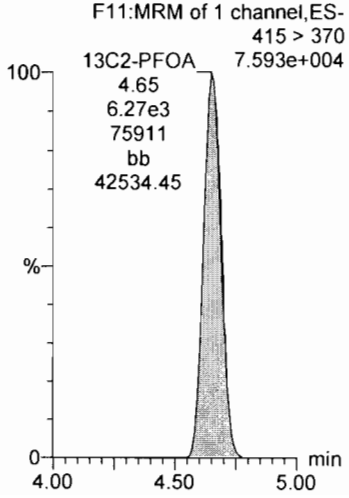

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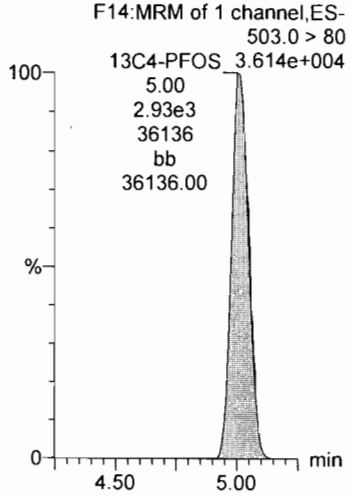

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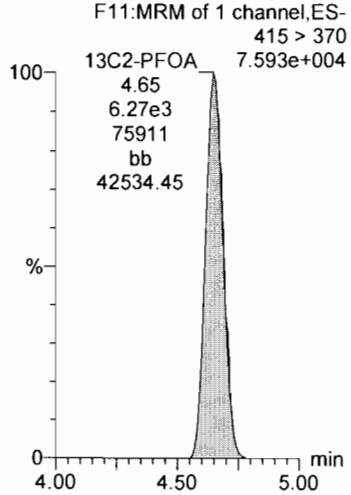

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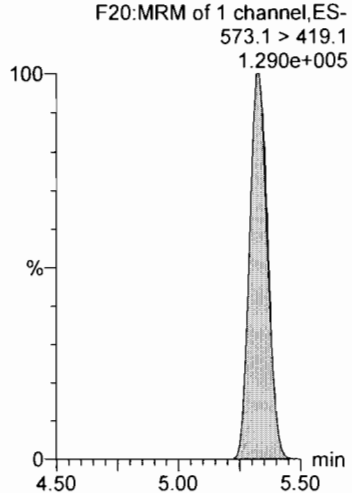

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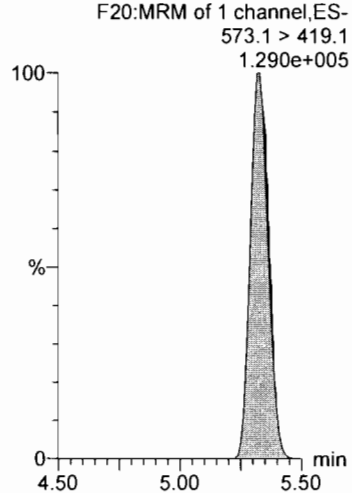

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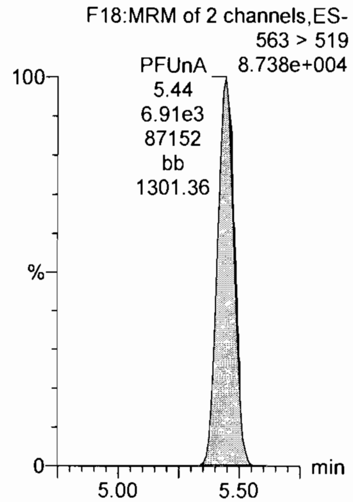

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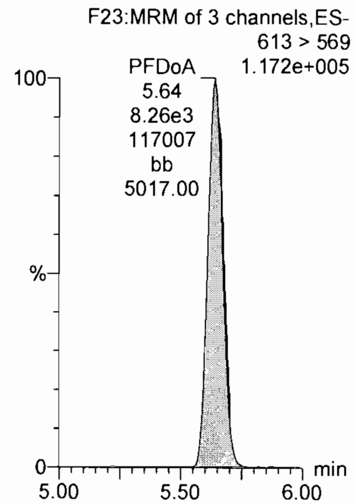

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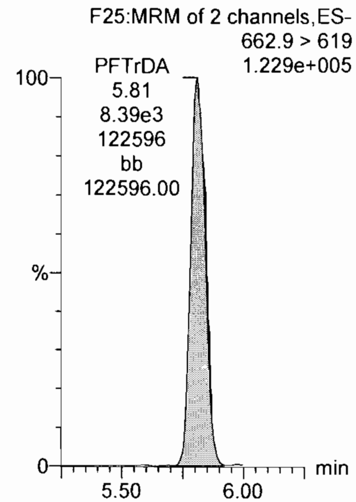

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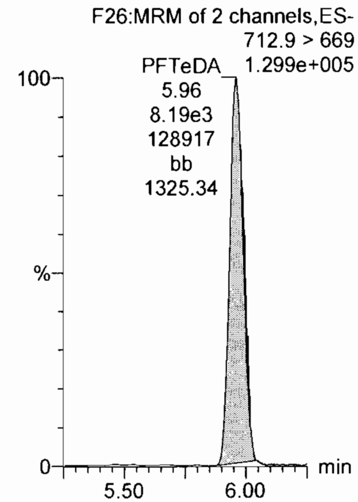

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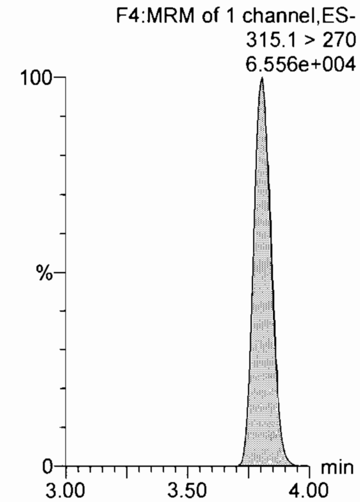

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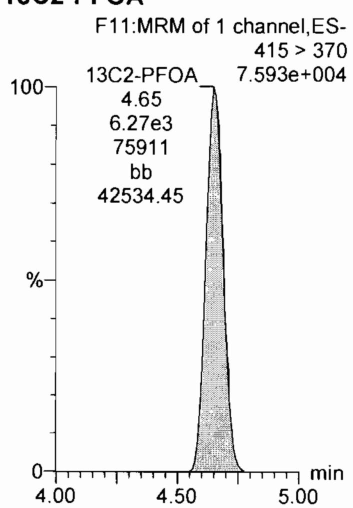

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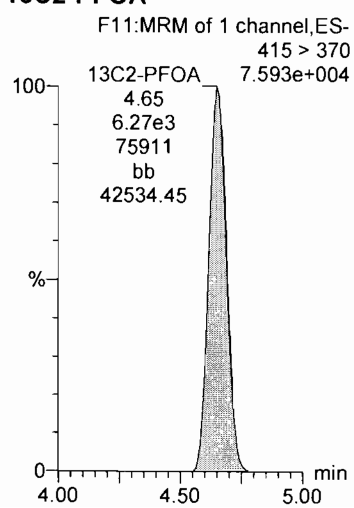

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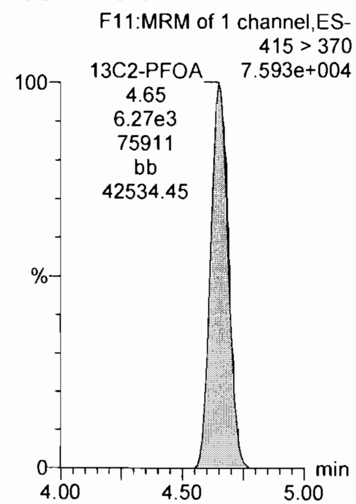

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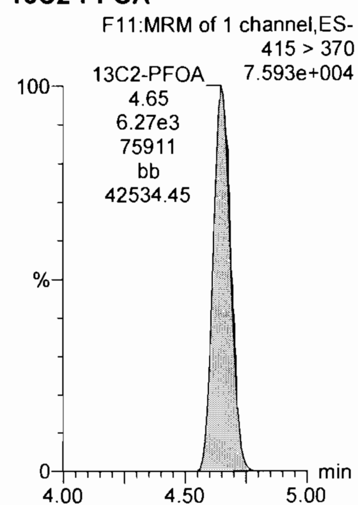

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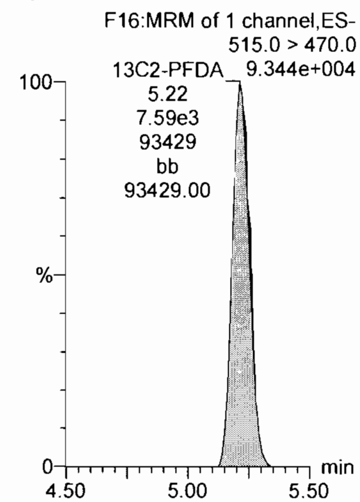

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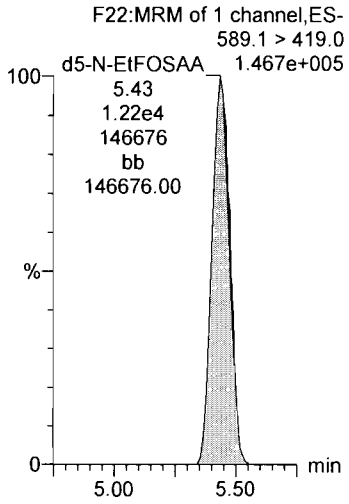
d5-N-EtFOSAA



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"","","",""
"PW2-122018-DW","537","12/30/18","20:16","N","NA","000","13C2-PFDA","13C2-
PFDA","101","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","101","101","","","","","","70","130","","
","","",""
"PW2-122018-DW","537","12/30/18","20:16","N","NA","000","d5-EtFOSAA","d5-
EtFOSAA","87.6","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","87.6","87.6","","","","","","70","130
","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","375-73-
5","PFBS","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","307-24-4","PERFLUOROHEXANOIC ACID
(PFHXA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","375-85-9","PERFLUOROHEPTANOIC ACID
(PFHPA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","355-46-4","PERFLUOROHEXANESULFONIC ACID
(PFHXS)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID
(PFOA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","375-95-1","PERFLUORONONANOIC ACID
(PFNA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","","","
","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","335-76-2","PERFLUORODECANOIC ACID
(PFDA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","2355-31-
9","MeFOSAA","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","
","","","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","2991-50-
6","EtFOSAA","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","
","","","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","2058-94-8","PERFLUOROUNDECANOIC ACID
(PFUNA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","307-55-1","PERFLUORODODECANOIC ACID
(PFDOA)","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","72629-94-
8","PFTrDA","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","376-06-
7","PFTeDA","","","TRG","Yes","N","U","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","","","","","","","","
","","","","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","13C2-PFHxA","13C2-
PFHxA","92.3","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","92.3","92.3","","","","","","70","130","
","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","13C2-PFDA","13C2-
```

PFDA","95.3","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","95.3","95.3","","","","","","70","130","","","","",""
"B8L0193-BLK1","537","12/30/18","16:43","N","NA","000","d5-EtFOSAA","d5-EtFOSAA","86.1","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","86.1","86.1","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","375-73-5","PFBS","0.0344","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0354","0.0344","97.1","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","307-24-4","PERFLUOROHEXANOIC ACID (PFHXA)","0.0388","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0388","96.9","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","375-85-9","PERFLUOROHEPTANOIC ACID (PFHPA)","0.0392","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0392","98.0","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","355-46-4","PERFLUOROHEXANESULFONIC ACID (PFHXS)","0.0335","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0364","0.0335","92.0","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","0.0403","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0403","101","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","375-95-1","PERFLUORONONANOIC ACID (PFNA)","0.0401","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0401","100","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION","0.0335","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0370","0.0335","90.6","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","335-76-2","PERFLUORODECANOIC ACID (PFDA)","0.0441","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0441","110","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","2355-31-9","MeFOSAA","0.0394","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0394","98.4","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","2991-50-6","EtFOSAA","0.0367","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0367","91.9","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","2058-94-8","PERFLUOROUNDECANOIC ACID (PFUNA)","0.0405","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0405","101","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","307-55-1","PERFLUORODODECANOIC ACID (PFDOA)","0.0386","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0386","96.5","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","72629-94-8","PFTrDA","0.0326","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0326","81.6","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","376-06-7","PFTeDA","0.0289","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0289","72.4","","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","13C2-PFHxA","13C2-PFHxA","99.3","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","99.3","99.3","","","","","","70","130","","","","",""
"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","13C2-PFDA","13C2-PFDA","100","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","100","100","","","","","","70","130","","","","",""

"B8L0193-BS1","537","12/30/18","16:21","N","NA","000","d5-EtFOSAA","d5-EtFOSAA","95.5","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","95.5","95.5","","","","","","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","375-73-5","PFBS","0.0398","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0354","0.0398","112","","","","","","14.6","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","307-24-4","PERFLUOROHEXANOIC ACID (PFHXA)","0.0415","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0415","104","","","","","","6.84","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","375-85-9","PERFLUOROHEPTANOIC ACID (PFHPA)","0.0420","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0420","105","","","","","","7.06","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","355-46-4","PERFLUOROHEXANESULFONIC ACID (PFHXS)","0.0372","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0364","0.0372","102","","","","","","10.3","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","0.0412","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0412","103","","","","","","2.15","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","375-95-1","PERFLUORONONANOIC ACID (PFNA)","0.0433","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0433","108","","","","","","7.68","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION","0.0403","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0370","0.0403","109","","","","","","18.2","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","335-76-2","PERFLUORODECANOIC ACID (PFDA)","0.0455","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0455","114","","","","","","3.03","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","2355-31-9","MeFOSAA","0.0404","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0404","101","","","","","","2.70","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","2991-50-6","EtFOSAA","0.0381","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0381","95.3","","","","","","3.70","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","2058-94-8","PERFLUOROUNDECANOIC ACID (PFUNA)","0.0403","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0403","101","","","","","","0.479","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","307-55-1","PERFLUORODODECANOIC ACID (PFDOA)","0.0389","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0389","97.1","","","","","","0.633","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","72629-94-8","PFTrDA","0.0327","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0327","81.7","","","","","","0.122","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","376-06-7","PFTeDA","0.0287","","TRG","Yes","Y","","Y","0.00304","0.00500","0.0100","UG_L","UG_L","","","","0.0400","0.0287","71.6","","","","","","0.997","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","13C2-PFHxA","13C2-PFHxA","105","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","","100","105","105","","","","","","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","13C2-PFDA","13C2-PFDA","104","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","","100","104","104","","","","","","70","130","","","","",""
"B8L0193-BSD1","537","12/30/18","16:32","N","NA","000","d5-EtFOSAA","d5-EtFOSAA","91.4","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","91.4","91.4","","","","","","70","130

LABORATORY DATA CONSULTANTS, INC.
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AMEC Foster Wheeler, Inc.
7376 SW Durham Road
Portland, OR 97224
Attn: Ms. Kimberly Shiroodi
Kimberly.Shiroodi@woodplc.com

May 23, 2019

SUBJECT: Former Chase Field, Data Validation

Dear Ms. Shiroodi,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on May 23, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #45129:

SDG #	Fraction
1803982, 1804167 1900154, 1900478	Perfluorinated Alkyl Acids

The data validation was performed under Stage 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan for Initial Assessment of Perfluorinated Compounds or Per- and Polyfluoroalkyl Substances, Sites at Various Base Realignment and Closure Installations; June 2017
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1, 2017
- USEPA, National Functional Guidelines for Organic Superfund Methods Data Review, January 2017

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng
Pgeng@lab-data.com.
Project Manager/Senior Chemist

746 pages-ADV ASAP Attachment 1

90/10 EDD

LDC #45129 (Wood Environment & Infrastructure Solutions, OR / Chase Field, TO 008)

KMEA PO000936

LDC	SDG#	DATE REC'D	(1) DATE DUE	PFAs (537M)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	1803982	05/23/19	ASAP	3	0																																
B	1804167	05/23/19	ASAP	1	0																																
C	1900154	05/23/19	ASAP	1	0																																
D	1900478	05/23/19	ASAP	1	0																																
Total	T/PG			6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B review). These sample counts do not include DL, RE, MS, MSD, or DUP's.

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Former Chase Field

LDC Report Date: May 23, 2019

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1803982

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
Big Field-DW-120618	1803982-01	Water	12/06/18
Behind the Base-DW-120618	1803982-03	Water	12/06/18
Shooting Range 1-DW-120618	1803982-05	Water	12/06/18
Shooting Range 1-DW-120618MS	1803982-05MS	Water	12/06/18
Shooting Range 1-DW-120618MSD	1803982-05MSD	Water	12/06/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Initial Assessment of Per-fluorinated Compounds (PFCS) or Per- and Polyfluoroalkyl Substances (PFAS) Sites at Various Base Realignment and Closure (BRAC) Installations (June 2017), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537, Revision 1.1

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration standard, except the lowest point, all compounds were within 70-130% of their true value. For the lowest calibration point, all compounds were within 50-150% of their true value.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration and Instrument Sensitivity Check

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample Source Blank was identified as a source blank. No contaminants were found.

Sample Shooting Range 1-FB-120618 was identified as a field blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all drinking water samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were not within the QC limits for Shooting Range 1-DW-120618MS/MSD. No data were qualified since the parent sample results were greater than the spiked concentration

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
Shooting Range 1-DW-120618MS/MSD (Shooting Range 1-DW-120618)	PFOA	43 (≤30)	J (all detects)	A

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples Shooting Range 1-DW-120618 and DUP-1 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	Shooting Range 1-DW-120618	DUP-1				
PFBS	34.2	32.0	-	2.2 (≤10.6)	-	-
PFHxA	213	194	9 (≤30)	-	-	-
PHHpA	87.2	76.0	14 (≤30)	-	-	-
PFHxS	362	299	19 (≤30)	-	-	-

Compound	Concentration (ng/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	Shooting Range 1-DW-120618	DUP-1				
PFOA	246	185	28 (≤30)	-	-	-
PFNA	21.7	15.7	-	6 (≤10.6)	-	-
PFOS	375	268	33 (≤30)	-	J (all detects)	A

XI. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAs are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD RPD and field duplicate RPD, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Former Chase Field
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1803982

Sample	Compound	Flag	A or P	Reason
Shooting Range 1-DW-120618	PFOA	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD)
Shooting Range 1-DW-120618 DUP-1	PFOS	J (all detects)	A	Field duplicates (RPD)

Former Chase Field
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1803982

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1803982

No Sample Data Qualified in this SDG

LDC #: 45129A96 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/2/19
SDG #: 1803982 Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer:
2nd Reviewer: JM

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537~~M~~, Rev.1.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	~~RSD~~ <20% r^2 True <30/50% (low) RF <30%
IV.	Continuing calibration /ISC	A	cc /ISC <30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	SB=5. FB=4
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D=3+6
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	Big Field-DW-120618	1803982-01	Water	12/06/18
2	Behind the Base-DW-120618	1803982-03	Water	12/06/18
3	Shooting Range 1-DW-120618	1803982-05	Water	12/06/18
~~4~~	~~Shooting Range 1-FB-120618~~	~~1803982-06~~	~~Water~~	~~12/06/18~~
~~5~~	~~Source Blank~~	~~1803982-07~~	~~Water~~	~~12/06/18~~
~~6~~	~~DUP 1~~	~~1803982-08~~	~~Water~~	~~12/06/18~~
7	Shooting Range 1-DW-120618MS	1803982-05MS	Water	12/06/18
8	Shooting Range 1-DW-120618MSD	1803982-05MSD	Water	12/06/18
9				
10				

Notes:

	BBL00T6-BK1						

LDC #: 45129A96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: JV

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			low ≤ 50% for drinking water
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

LDC #: 45179A96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: MG

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			
V. 1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)			

LDC #: 45296A96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JV6

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
Y N N/A Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		7/8	~~PFHpA~~	240 (50-150)	( )	( )	3 (dets)	No Qual (>1x)
			PFHxS	703 (↓)	187 (50-150)	( )		↓
			~~PFOA~~	1350 (↓)	420 (↓)	( )		
			~~PFNA~~	190 (↓)	(↓)	( )		
			~~PFOS~~	( )	378 (↓)	( )		
			~~PFHpA~~	( )	( )	50.7 (≤ 30)		~~dets~~ No Qual (>4x)
			~~PFHxS~~	( )	( )	116 (↓)		↓
			~~PFOA~~	( )	( )	105 ( )		
			~~PFNA~~	( )	( )	35.3 ( )		~~dets~~ / A
			~~PFOS~~	( )	( )	192 (↓)		No Qual (>4x)
				( )	( )	( )		
			~~PFOA~~	( )	( )	43 (≤ 30)	3 (dets)	~~dets~~ / A
				( )	( )	(Recal using conc)		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 45129A96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: MC

METHOD: PFCs (EPA Method 537, Rev.1.1))

Compound	Concentration (ng/L)		(≤30) RPD	Difference	Limits	Qual
	3	6				
PFBS	34.2	32.0		2.2	≤10.6	
PFHxA	213	194	9			
PHHpA	87.2	76.0	14			
PFHxS	362	299	19			
PFOA	246	185	28			
PFNA	21.7	15.7		6	≤10.6	
PFOS	375	268	33			J+ (all detects) A

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2019\45129A96_WOOD.wpd

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/14/2018	PFOS	1	0.232	0.1988737
		2	0.464	0.3287097
		3	0.928	0.7292670
		4	1.860	1.2784472
		5	4.640	3.7459125
		6	9.240	7.2972533
		7	23.100	21.6975380
		8	46.200	43.6619180
		9	69.400	63.9538080
		10	92.500	80.7597070

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.89864913*	0.899774
Correlation Coefficient	*0.999427*	0.99745
Coefficient of Determination (r^2)	*0.998854*	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/14/2018	PFOA	1	0.250	0.2171360
		2	0.500	0.0506222
		3	1.000	0.9565940
		4	2.000	1.7298860
		5	5.000	4.5899330
		6	10.000	9.5954070
		7	25.000	21.7876640
		8	50.000	48.7801400
		9	75.000	69.3161600
		10	100.000	89.8638830

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.91588519*	0.920346
Correlation Coefficient	*0.999562*	0.99867
Coefficient of Determination (r^2)	*0.999124*	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/16/2018	PFOA	1	0.250	0.2255790
		2	0.500	0.5356500
		3	1.000	1.0843630
		4	2.000	1.9421290
		5	5.000	5.2501000
		6	10.000	10.1869490
		7	25.000	26.3859800
		8	50.000	53.8977810
		9	75.000	74.5942910
		10	100.000	103.2234300

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*1.02778311*	1.031910
Correlation Coefficient	*0.999669*	0.99911
Coefficient of Determination (r^2)	*0.999338*	

LDC #: 45129A96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: MG

METHOD: LC/MS PFAS (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF	Recalculated RRF	Reported %D	Recalculated %D
1	18RIAP2.66	12/15/18	PFOA ($^{13}C_2$-PFOA)	10.0	9.63	9.63	3.7	3.7
			PFOS ($^{13}C_8$-PFOS)	9.24	7.75	7.75	16.1	16.1
2	18B1PP1_2	12/17/18	PFOA ($^{13}C_2$-PFOA)	2.00	2.18	2.18	9.1	9.1
			PFOS ($^{13}C_8$-PFOS)					
3			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
4			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45[illegible]90

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JV6

METHOD: LC/MS PFAS (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 7/8

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD (use for R)	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFOA	20.0	20.2	2.46	5.15	3.31	135	133	~~130~~ 105	121	105	106
PFOS	18.4	18.7	3.75	3.97	4.45	123	120	378	374	102	103

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 35279A96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer: JM6

METHOD: LC/MS PFAS (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BBL0076-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	20.0	NA	21.2	NA	106	106				
PFOS	18.5	↓	21.6	↓	117	117				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~45123A~~ 96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: NG

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured
A_{is} = Area of the characteristic ion (EICP) for the specific internal standard
I_s = Amount of internal standard added in nanograms (ng)
V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i = Volume of extract injected in microliters (ul)
V_t = Volume of the concentrated extract in microliters (ul)
Df = Dilution Factor.
%S = Percent solids, applicable to soil and solid matrices only.
2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 3 , PFOA

Conc. = (2630279)(10.0)( )(1)( ) / (4862.087)(0.920346)(0.239)

= 246.0 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	3	PFOA	246		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Former Chase Field

LDC Report Date: May 23, 2019

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1804167

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PW2-122018-DW	1804167-01	Water	12/20/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Initial Assessment of Per-fluorinated Compounds (PFCS) or Per- and Polyfluoroalkyl Substances (PFAS) Sites at Various Base Realignment and Closure (BRAC) Installations (June 2017), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537, Revision 1.1

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration standard, except the lowest point, all compounds were within 70-130% of their true value. For the lowest calibration point, all compounds were within 50-150% of their true value.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration and Instrument Sensitivity Check

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all drinking water samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAs are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Former Chase Field
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1804167

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1804167

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1804167

No Sample Data Qualified in this SDG

LDC #: 45129B96

SDG #: 1804167

Laboratory: Vista Analytical Laboratory

VALIDATION COMPLETENESS WORKSHEET

Stage 4

Date: 5/23/19

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Rev. 1.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20%. r². ThD ≤ 30/50 (low). ICV ≤ 30%
IV.	Continuing calibration /ISC	A	CCV ≤ 30/30%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PW2-122018-DW	1804167-01	Water	12/20/18
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	B8L0193-BK1						

LDC #: 45296B6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: JVP

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			<50% for lowest std
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			for dioxins W
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

LDC #: 45729B96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: DG

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			
V. 1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)			

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/30/2018	PFOA	1	0.250	0.2325030
		2	0.500	0.4798370
		3	1.000	0.9733980
		4	2.000	1.9247560
		5	5.000	5.2004250
		6	10.000	9.1517780
		7	25.000	24.118581
		8	50.000	53.590312
		9	75.000	81.475686
		10	100.000	109.05315

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*1.08160882*	1.064930
Correlation Coefficient	*0.999715*	0.99788
Coefficient of Determination (r^2)	*0.999431*	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/30/2018	PFOS	1	0.232	0.0784112
		2	0.464	0.2796298
		3	0.928	0.9002042
		4	1.860	1.3489832
		5	4.640	3.3358268
		6	9.240	6.8112131
		7	23.10	18.209455
		8	46.20	40.303338
		9	69.40	56.077719
		10	92.50	78.913789

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.83926116*	0.830260
Correlation Coefficient	*0.999501*	0.99746
Coefficient of Determination (r^2)	*0.999003*	

LDC #: 45129B96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JVG

METHOD: LC/MS PFAS (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF	Recalculated RRF	Reported %D	Recalculated %D
1	18130L-33	1/30/18	PFOA ($^{13}C_2$-PFOA)	10.0	864	8.64	~~13.9~~ 13.6	13.6
			PFOS ($^{13}C_8$-PFOS)	9.24	7.88	7.88	14.7	14.7
2			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
3			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
4			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45279B96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: MC

METHOD: LC/MS PFAS (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BBL0193-BS1/-BSD1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	0.0400	0.0400	0.0403	0.0412	101	101	103	103	2.15	2.22
PFOS	0.0370	0.0370	0.0335	0.0403	90.6	90.5	109	109	18.2	18.4

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45129B96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Q
2nd reviewer: JVG

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
(Y) N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. NO, PFOA
B8L0193-BS1

Conc. = (693.21)(10.0)( )( )( ) / (6446.915)(1.06493)(0.25)(1000)( )

= 0.0403 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	B8L0193-BS1	PFOA	0.0403		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Former Chase Field

LDC Report Date: May 23, 2019

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1900154

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PW4-011719-DW	1900154-01	Water	01/17/19

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Initial Assessment of Per-fluorinated Compounds (PFCS) or Per- and Polyfluoroalkyl Substances (PFAS) Sites at Various Base Realignment and Closure (BRAC) Installations (June 2017), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537, Revision 1.1

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration standard, except the lowest point, all compounds were within 70-130% of their true value. For the lowest calibration point, all compounds were within 50-150% of their true value.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration and Instrument Sensitivity Check

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all drinking water samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAs are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Former Chase Field
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1900154

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1900154

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1900154

No Sample Data Qualified in this SDG

LDC #: 45129C96 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/3/19
SDG #: 1900154 Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 1
2nd Reviewer: JM

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537~~(M)~~, Rev. 1.1.)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	RSD≤20% or r^2 TMC≤30/50%. ICV≤30%
IV.	Continuing calibration /BC	A	CCV/BC ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	MS
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Labeled Compounds	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PW4-011719-DW	1900154-01	Water	01/17/19
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	BAA0154-BK1						

LDC #: 45290B6

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: SVG

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			≤50% for lowest std (drinking W)
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

LDC #: 43129C96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: SVG

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			
V. 1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)			

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
1/25/2019	PFOA	1	0.250	0.2101130
		2	0.500	0.4714000
		3	1.000	0.8984130
		4	2.000	1.8618960
		5	5.000	4.4924390
		6	10.000	9.3954590
		7	25.000	24.368296
		8	50.000	47.758120
		9	75.000	73.077953
		10	100.000	94.537468

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.95618300*	0.956545
Correlation Coefficient	*0.999903*	0.99969
Coefficient of Determination (r^2)	*0.999805*	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
1/25/2019	PFOS	1	0.232	0.1832208
		2	0.464	0.4657522
		3	0.928	0.8556761
		4	1.860	1.6506001
		5	4.640	4.6646023
		6	9.240	9.4894971
		7	23.10	23.772614
		8	46.20	48.721777
		9	69.40	72.647365
		10	92.50	100.994340

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*1.07089390*	1.059870
Correlation Coefficient	*0.999772*	0.99909
Coefficient of Determination (r^2)	*0.999544*	

LDC #: 45179-96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: MV

METHOD: LC/MS PFAS (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF	Recalculated RRF	Reported %D	Recalculated %D
1	190125HZ_33	1/25/19	PFOA ($^{13}C_2$-PFOA)	10.0	10.2	10.2	1.8	1.8
			PFOS ($^{13}C_8$-PFOS)	9.34	9.14	9.14	1.1	1.1
2			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
3			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
4			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45292e96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer: JV6

METHOD: LC/MS PFAS (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BRA0154-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	0.0800	NA	0.0767	NA	95.8	95.9				
PFOS	0.0740	V	0.0666	V	90.0	90.0				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45129c96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: JV6

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. NO, PFOS
BQA0154-BS1

Conc. = $\frac{(4001.85)(28.7)(\quad)(\quad)(\quad)}{(659.85)(1.0598)(250)(\quad)(\quad)}$

= 0.0666 MS/L

#	Sample ID	Compound	Reported Concentration (MBA)	Calculated Concentration ( )	Qualification
	BQA0154-BS1	PFOS	0.0666		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Former Chase Field

LDC Report Date: May 23, 2019

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1900478

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
Charlie's Pasture-EW 031319	1900478-01	Water	03/13/19

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Initial Assessment of Per-fluorinated Compounds (PFCS) or Per- and Polyfluoroalkyl Substances (PFAS) Sites at Various Base Realignment and Closure (BRAC) Installations (June 2017), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537, Revision 1.1

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration standard, except the lowest point, all compounds were within 70-130% of their true value. For the lowest calibration point, all compounds were within 50-150% of their true value.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration and Instrument Sensitivity Check

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample Field Blank was identified as a field blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all drinking water samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples Charlie's Pasture-EW 031319 and Dup-1 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	Charlie's Pasture-EW 031319	Dup-1				
PFBS	0.0424	0.0444	-	0.002 (≤0.0101)	-	-
PFHxA	0.368	0.401	9 (≤30)	-	-	-
PHHpA	0.183	0.192	5 (≤30)	-	-	-
PFHxS	1.04	0.886	16 (≤30)	-	-	-
PFOA	0.807	0.827	2 (≤30)	-	-	-
PFNA	0.0280	0.0316	-	0.0036 (≤0.0101)	-	-
PFOS	1.52	1.38	10 (≤30)	-	-	-

XI. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAs are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Former Chase Field
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1900478

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1900478

No Sample Data Qualified in this SDG

Former Chase Field
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1900478

No Sample Data Qualified in this SDG

LDC #: 45129D96

SDG #: 1900478

Laboratory: Vista Analytical Laboratory

VALIDATION COMPLETENESS WORKSHEET
Stage 4

Date: 5/23/19
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 20%, r^2 TNL ≤ 30/50%, ICV ≤ 30%
IV.	Continuing calibration / ISC	A	CCV / ISC ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	FB = 3
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 1+2
XI.	Labeled Compounds	A	~~LCS/D~~
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note:
A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	Charlie's Pasture-EW 031319	1900478-01	Water	03/13/19
2	~~Dup-1~~	~~1900478-02~~	~~Water~~	~~03/13/19~~
3	~~Field Blank~~	~~1900478-03~~	~~Water~~	~~03/13/19~~
4				
5				
6				
7				
8				
9				

Notes:

	B9C0124-BLK1						

LDC #: 45190 96

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: JV6

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			≤50% for lowest std
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			for drinking W
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check ≤ 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			
V. 1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)			

LDC#45129D96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 1
2nd Reviewer: MC

METHOD: PFCs (EPA Method 537, Rev.1.1))

Compound	Concentration (ng/L)		(≤30) RPD	Difference	Limits	Qual
	1	2				
PFBS	0.0424	0.0444		0.002	≤0.0101	
PFHxA	0.368	0.401	9			
PHHpA	0.183	0.192	5			
PFHxS	1.04	0.886	16			
PFOA	0.807	0.827	2			
PFNA	0.0280	0.0316		0.0036	≤0.0101	
PFOS	1.52	1.38	10			

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
3/28/2019	PFOA	1	0.250	0.3114790
		2	0.500	0.4559950
		3	1.000	0.9430580
		4	2.000	1.8980310
		5	5.000	4.8326870
		6	10.000	9.8324550
		7	25.000	23.5652720
		8	50.000	48.8485250
		9	75.000	72.3284030
		10	100.000	97.7633500

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.97244451*	0.970341
Correlation Coefficient	*0.999965*	0.99978
Coefficient of Determination (r^2)	*0.999929*	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
3/28/2019	PFOS	1	0.232	0.2365741
		2	0.464	0.3770290
		3	0.928	0.6450009
		4	1.860	1.3866577
		5	4.640	3.7668348
		6	9.240	7.9072546
		7	23.10	18.761660
		8	46.20	40.878403
		9	69.40	62.960426
		10	92.50	80.724788

Linear through the origin

	calculated	***Reported***
Constant	*0.000000*	0.0000
X Coefficient(s)	*0.88238504*	0.875608
Correlation Coefficient	*0.999735*	0.99859
Coefficient of Determination (r^2)	*0.999469*	

LDC #: 45296D96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: JM6

METHOD: LC/MS PFAS (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF	Recalculated RRF	Reported %D	Recalculated %D
1	190328L-38	3/28/19	PFOA ($^{13}C_2$-PFOA)	10.0	10.1	10.1	0.6	0.8
			PFOS ($^{13}C_8$-PFOS)	9.24	8.71	8.69	5.8	5.9
2	190330L-2	3/30/19	PFOA ($^{13}C_2$-PFOA)	2.00	2.16	2.16	8	7.8
			PFOS ($^{13}C_8$-PFOS)	1.86	1.40	1.40	24.6	24.6
3			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					
4			PFOA ($^{13}C_2$-PFOA)					
			PFOS ($^{13}C_8$-PFOS)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45290096

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer: SVG

METHOD: LC/MS PFAS (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BQ60124-BS1/BSD1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	0.0800	0.0800	0.0832	0.0766	104	104	95.8	95.8	8.18	8.26
PFOS	0.0740	0.0740	0.0701	0.0715	94.8	94.7	96.6	96.6	1.89	1.98

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 45129896

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: a
2nd reviewer: NC

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOS:

Conc. = $\frac{(5.78e3)(28.7)(\quad)(\quad)(\quad)}{(4.97e2)(0.875608)(0.250)(1000)}$

= 1.52 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	PFOS	1.52		

INSTALLATION_ID	SITE_NAME	LOCATION_NAME	LOCATION_TYPE	LOCATION_TYPE_DESC	COORD_X*	COORD_Y*	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIX_DESC	COLLECT_DATE	ANALYTICAL_METHOD_GRP_DESC	SDG
CHASE_FIELD_NAS	TBC	PW2	DW	Domestic Well	-97.652942	28.364428	PW2-122018-DW	WP	Drinking Water	20-Dec-18	Perfluoroalkyl Compounds	1804167