NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG 1601464

Marine Corps Air Station Yuma
Yuma, Arizona

November 2019

December 19, 2016

Vista Work Order No. 1601464

Mr. Curtis Moss
AMEC Foster Wheeler
9210 Sky Park Court Suite 200
San Diego, CA 92123

Dear Mr. Moss,

Enclosed are the amended results for the sample set received at Vista Analytical Laboratory on November 17, 2016. This sample set was analyzed on a rush turn-around time, under your Project Name 'MCAS Yuma, AZ TO 105'.

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,

Karen Lopez for

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1601464
Case Narrative

Sample Condition on Receipt:

Eleven 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. This report was amended on December 19, 2016 to correct the sample IDs to "OUA1" to match the Chain of Custody.

Analytical Notes:

Modified EPA Method 537

The aqueous samples were extracted and analyzed for PFOA, PFOS and PFBS using Modified EPA Method 537.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

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

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria

The labeled standard 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
1601464-01	EB03-20161116	16-Nov-16 14:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-02	OUA1-MW53-20161116	16-Nov-16 08:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-03	OUA1-MW54-20161116	16-Nov-16 09:00	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-04	OUA1-MW42-20161116	16-Nov-16 09:55	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-05	OUA1-MW01-20161116	16-Nov-16 10:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-06	OUA1-MW31-20161116	16-Nov-16 11:15	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-07	OUA1-PZ19-20161116	16-Nov-16 11:45	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-08	OUA1-MW52-20161116	16-Nov-16 12:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-09	OUA1-MW04-20161116	16-Nov-16 13:25	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-10	OUA1-MW04A-20161116	16-Nov-16 13:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-11	OUA1-MW05-20161116	16-Nov-16 14:15	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL

Vista Project: 1601464

Client Project: MCAS Yuma, AZ TO 105

ANALYTICAL RESULTS

Sample ID: Method Blank — Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0164	Lab Sample:	B6K0164-BLK1
Sample Size:	0.125 L	Date Extracted:	28-Nov-2016 9:21	Date Analyzed:	29-Nov-16 22:02 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.79	4.00	8.00	
PFOA	0.916	0.651	2.00	8.00	J
PFOS	ND	0.807	0.900	8.00	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	115	60 - 150	
IS	13C2-PFOA	89.7	60 - 150	
IS	13C8-PFOS	93.3	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OPR

Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0164	Lab Sample:	B6K0164-BS1
Sample Size:	0.125 L	Date Extracted:	28-Nov-2016 9:21	Date Analyzed:	29-Nov-16 21:37 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	%R	Limits
PFBS	93.1	80.0	116	60 - 130
PFOA	89.3	80.0	112	70 - 130
PFOS	84.7	80.0	106	70 - 130

	Labeled Standard	%R	LCL-UCL
IS	13C3-PFBS	123	60 - 150
IS	13C2-PFOA	85.9	60 - 150
IS	13C8-PFOS	94.2	60 - 150

LCL-UCL - Lower control limit - upper control limit

Sample ID: EB03-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 14:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.128 L

Laboratory Data

Lab Sample: 1601464-01 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 19:59 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.75	3.91	7.84	
PFOA	0.837	0.638	1.95	7.84	J, B
PFOS	ND	0.790	0.879	7.84	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	119	60 - 150	
IS	13C2-PFOA	89.7	60 - 150	
IS	13C8-PFOS	92.5	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW53-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 8:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.127 L

Laboratory Data

Lab Sample: 1601464-02 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:12 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	681	1.76	3.94	7.85	
PFOA	67.5	0.639	1.97	7.85	B
PFOS	7.08	0.792	0.886	7.85	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	87.1	60 - 150	
IS	13C8-PFOS	96.4	60 - 150	

DL - Detection limit
RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit
Results reported to DL.
When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW54-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 9:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.124 L

Laboratory Data

Lab Sample: 1601464-03 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:24 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	329	1.80	4.03	8.04	
PFOA	35.3	0.654	2.02	8.04	B
PFOS	7.09	0.811	0.907	8.04	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	110	60 - 150	
IS	13C2-PFOA	86.1	60 - 150	
IS	13C8-PFOS	92.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW42-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 9:55
Location:

Sample Data

Matrix: Water
Sample Size: 0.129 L

Laboratory Data

Lab Sample: 1601464-04 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:36 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	332	1.73	3.88	7.74	
PFOA	29.6	0.630	1.94	7.74	B
PFOS	4.52	0.781	0.872	7.74	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	104	60 - 150	
IS	13C2-PFOA	86.3	60 - 150	
IS	13C8-PFOS	84.8	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW01-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 10:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.128 L

Laboratory Data

Lab Sample: 1601464-05 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:48 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	45.6	1.74	3.91	7.79	
PFOA	1.40	0.634	1.95	7.79	J, B
PFOS	ND	0.786	0.879	7.79	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	110	60 - 150	
IS	13C2-PFOA	89.0	60 - 150	
IS	13C8-PFOS	87.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW31-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 11:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601464-06 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:14 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	120	1.71	3.82	7.65	
PFOA	9.01	0.623	1.91	7.65	B
PFOS	ND	0.772	0.859	7.65	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	85.9	60 - 150	
IS	13C8-PFOS	92.2	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-PZ19-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 11:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.125 L

Laboratory Data

Lab Sample: 1601464-07 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:26 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	57.8	1.80	4.00	8.03	
PFOA	21.1	0.653	2.00	8.03	B
PFOS	6.15	0.810	0.900	8.03	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	87.5	60 - 150	
IS	13C8-PFOS	101	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW52-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 12:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601464-08 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:38 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	64.9	1.73	3.85	7.72	
PFOA	5.38	0.628	1.92	7.72	J, B
PFOS	ND	0.778	0.865	7.72	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	102	60 - 150	
IS	13C2-PFOA	93.1	60 - 150	
IS	13C8-PFOS	88.7	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW04-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 13:25
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601464-09 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:51 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	157	1.71	3.82	7.66	
PFOA	20.0	0.623	1.91	7.66	B
PFOS	2.50	0.773	0.859	7.66	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	105	60 - 150	
IS	13C2-PFOA	91.0	60 - 150	
IS	13C8-PFOS	93.0	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW04A-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 13:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.120 L

Laboratory Data

Lab Sample: 1601464-10 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 23:03 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	162	1.87	4.17	8.34	
PFOA	22.1	0.678	2.08	8.34	B
PFOS	2.83	0.841	0.938	8.34	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	109	60 - 150	
IS	13C2-PFOA	82.5	60 - 150	
IS	13C8-PFOS	85.8	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW05-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 14:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.129 L

Laboratory Data

Lab Sample: 1601464-11 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 23:15 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	30.5	1.74	3.88	7.78	
PFOA	0.859	0.633	1.94	7.78	J, B
PFOS	0.937	0.784	0.872	7.78	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	111	60 - 150	
IS	13C2-PFOA	82.6	60 - 150	
IS	13C8-PFOS	83.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS 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.**
D	**Dilution**
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.**
M	**Estimated Maximum Possible Concentration. (CA Region 2 projects only)**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

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

CERTIFICATIONS

Accrediting Authority	Certificate Number
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	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
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

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
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

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	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
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

Vista Analytical

1104 Windfield Way
El Dorado Hills, CA 95762
TEL: 916-673-1520

Vista PM: Karen Lopez 1601464 0.2°C

CHAIN OF CUSTODY RECORD

DATE: 11/16/2016 - B

PAGE: 1 OF 2

LABORATORY CLIENT: AMEC Foster Wheeler E & I, Inc.		CLIENT PROJECT NAME / NUMBER: MCAS Yuma, AZ TO 105	P.O. NO.: TO 105
ADDRESS: 9210 Sky Park Court		PROJECT CONTACT: Medora Hackler/Marina Mitchell	CONTRACT NO.: N62473-12-D-2012
CITY: San Diego, CA 92123		SAMPLER(S): (SIGNATURE) LM Rute	LAB USE ONLY
TEL: 503.639.3400	E-Mail: medora.hackler@amecfw.com	E-MAIL: marina.mitchell@amecfw.com	

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	QC Level	PFOA, PFOS, and PFBS (U.S. EPA 537 Mod.)
	EB03 - 2016 11 16	11/16/16	14:30	W	2		X
	OUA1 - MW53 - 2016 11 16		8:10		2		X
	OUA1 - MW54 - 2016 11 16		9:00		2		X
	OUA1 - MW42 - 2016 11 16		9:55		2		X
	OUA1 - MW01 - 2016 11 16		10:30		2		X
	OUA1 - MW31 - 2016 11 16		11:15		2		X
	OUA1 - PZ19 - 2016 11 16		11:45		2		X
	OUA1 - MW52 - 2016 11 16		12:30		2		X
	OUA1 - MW04 - 2016 11 16		13:25		2		X
	OUA1 - MW04A - 2016 11 16		13:30		2		X

Relinquished by: (Signature) LM Rute	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1998	Date: 11/16/16	Time: 16:30
Relinquished by: (Signature) Fed Ex	Received by: (Signature) MSparks	Date: 11/17/16	Time: 0932
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Vista Analytical

1104 Windfield Way
El Dorado Hills, CA 95762
TEL: 916-673-1520

Vista PM: Karen Lopez

1601464

CHAIN OF CUSTODY RECORD

DATE: 11/16/2016 – B

PAGE: 2 OF 2

LABORATORY CLIENT: AMEC Foster Wheeler E & I, Inc.	CLIENT PROJECT NAME / NUMBER: MCAS Yuma, AZ TO 105
ADDRESS: 9210 Sky Park Court	PROJECT CONTACT: Medora Hackler/Marina Mitchell
CITY: San Diego, CA 92123	SAMPLER(S): (SIGNATURE)
TEL: 503.639.3400	E-Mail: medora.hackler@amecfw.com
E-MAIL: marina.mitchell@amecfw.com	P.O. NO.: TO 105
CONTRACT NO.: N62473-12-D-2012	LAB USE ONLY

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	QC Level	PFOA, PFOS, and PFBS (U.S. EPA 537 Mod.)
	OUAI-MW05-20161116	11/16/16	14:15	W	2		X

Relinquished by: (Signature)	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1998	Date: 11/16/16	Time: 16:30
Relinquished by: (Signature) Fed Ex	Received by: (Signature)	Date: 11/17/16	Time: 0932
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601464 **TAT** Std

Samples Arrival:	**Date/Time** 11/17/16 0922	**Initials:** MWS	**Location:** WR-2 **Shelf/Rack:** N/a
Logged In:	**Date/Time** ~~11/18/16~~ 11/17/16 1219	**Initials:** BSB	**Location:** WR-8 **Shelf/Rack:** F4

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

Temp °C: 0.5	(uncorrected)	**Time:** 0931	**Thermometer ID:** IR-1
Temp °C: 0.2	(corrected)	**Probe used:** Yes☐ No☒	

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill — Trk # 8101 0952 1998	✓		
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?						✓
Preservation Documented:	$Na_2S_2O_3$	Trizma			Yes	No	NA
Shipping Container	Vista	Client	Retain	Return	Dispose		

Comments:

December 19, 2016

Vista Work Order No. 1601464

Mr. Curtis Moss
AMEC Foster Wheeler
9210 Sky Park Court Suite 200
San Diego, CA 92123

Dear Mr. Moss,

Enclosed are the amended results for the sample set received at Vista Analytical Laboratory on November 17, 2016. This sample set was analyzed on a rush turn-around time, under your Project Name 'MCAS Yuma, AZ TO 105'.

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,

Karen Lopez for

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1601464
Case Narrative

Sample Condition on Receipt:

Eleven 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. This report was amended on December 19, 2016 to correct the sample IDs to "OUA1" to match the Chain of Custody.

Analytical Notes:

Modified EPA Method 537

The aqueous samples were extracted and analyzed for PFOA, PFOS and PFBS using Modified EPA Method 537.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

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

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria

The labeled standard 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
1601464-01	EB03-20161116	16-Nov-16 14:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-02	OUA1-MW53-20161116	16-Nov-16 08:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-03	OUA1-MW54-20161116	16-Nov-16 09:00	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-04	OUA1-MW42-20161116	16-Nov-16 09:55	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-05	OUA1-MW01-20161116	16-Nov-16 10:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-06	OUA1-MW31-20161116	16-Nov-16 11:15	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-07	OUA1-PZ19-20161116	16-Nov-16 11:45	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-08	OUA1-MW52-20161116	16-Nov-16 12:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-09	OUA1-MW04-20161116	16-Nov-16 13:25	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-10	OUA1-MW04A-20161116	16-Nov-16 13:30	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1601464-11	OUA1-MW05-20161116	16-Nov-16 14:15	17-Nov-16 09:22	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL

Vista Project: 1601464

Client Project: MCAS Yuma, AZ TO 105

ANALYTICAL RESULTS

Sample ID: Method Blank — Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0164	Lab Sample:	B6K0164-BLK1
Sample Size:	0.125 L	Date Extracted:	28-Nov-2016 9:21	Date Analyzed:	29-Nov-16 22:02 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.79	4.00	8.00	
PFOA	0.916	0.651	2.00	8.00	J
PFOS	ND	0.807	0.900	8.00	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	115	60 - 150	
IS	13C2-PFOA	89.7	60 - 150	
IS	13C8-PFOS	93.3	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OPR

Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0164	Lab Sample:	B6K0164-BS1
Sample Size:	0.125 L	Date Extracted:	28-Nov-2016 9:21	Date Analyzed:	29-Nov-16 21:37 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	%R	Limits
PFBS	93.1	80.0	116	60 - 130
PFOA	89.3	80.0	112	70 - 130
PFOS	84.7	80.0	106	70 - 130

	Labeled Standard	%R	LCL-UCL
IS	13C3-PFBS	123	60 - 150
IS	13C2-PFOA	85.9	60 - 150
IS	13C8-PFOS	94.2	60 - 150

LCL-UCL - Lower control limit - upper control limit

Sample ID: EB03-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 14:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.128 L

Laboratory Data

Lab Sample: 1601464-01 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 19:59 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.75	3.91	7.84	
PFOA	0.837	0.638	1.95	7.84	J, B
PFOS	ND	0.790	0.879	7.84	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	119	60 - 150	
IS	13C2-PFOA	89.7	60 - 150	
IS	13C8-PFOS	92.5	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW53-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 8:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.127 L

Laboratory Data

Lab Sample: 1601464-02 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:12 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	681	1.76	3.94	7.85	
PFOA	67.5	0.639	1.97	7.85	B
PFOS	7.08	0.792	0.886	7.85	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	87.1	60 - 150	
IS	13C8-PFOS	96.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW54-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 9:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.124 L

Laboratory Data

Lab Sample: 1601464-03 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:24 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	329	1.80	4.03	8.04	
PFOA	35.3	0.654	2.02	8.04	B
PFOS	7.09	0.811	0.907	8.04	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	110	60 - 150	
IS	13C2-PFOA	86.1	60 - 150	
IS	13C8-PFOS	92.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW42-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 9:55
Location:

Sample Data

Matrix: Water
Sample Size: 0.129 L

Laboratory Data

Lab Sample: 1601464-04 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:36 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	332	1.73	3.88	7.74	
PFOA	29.6	0.630	1.94	7.74	B
PFOS	4.52	0.781	0.872	7.74	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	104	60 - 150	
IS	13C2-PFOA	86.3	60 - 150	
IS	13C8-PFOS	84.8	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW01-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 10:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.128 L

Laboratory Data

Lab Sample: 1601464-05 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 20:48 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	45.6	1.74	3.91	7.79	
PFOA	1.40	0.634	1.95	7.79	J, B
PFOS	ND	0.786	0.879	7.79	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	110	60 - 150	
IS	13C2-PFOA	89.0	60 - 150	
IS	13C8-PFOS	87.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW31-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 11:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601464-06 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:14 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	120	1.71	3.82	7.65	
PFOA	9.01	0.623	1.91	7.65	B
PFOS	ND	0.772	0.859	7.65	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	85.9	60 - 150	
IS	13C8-PFOS	92.2	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-PZ19-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 11:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.125 L

Laboratory Data

Lab Sample: 1601464-07 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:26 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	57.8	1.80	4.00	8.03	
PFOA	21.1	0.653	2.00	8.03	B
PFOS	6.15	0.810	0.900	8.03	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	106	60 - 150	
IS	13C2-PFOA	87.5	60 - 150	
IS	13C8-PFOS	101	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW52-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 12:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601464-08 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:38 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	64.9	1.73	3.85	7.72	
PFOA	5.38	0.628	1.92	7.72	J, B
PFOS	ND	0.778	0.865	7.72	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	102	60 - 150	
IS	13C2-PFOA	93.1	60 - 150	
IS	13C8-PFOS	88.7	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW04-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 13:25
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601464-09 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 22:51 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	157	1.71	3.82	7.66	
PFOA	20.0	0.623	1.91	7.66	B
PFOS	2.50	0.773	0.859	7.66	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	105	60 - 150	
IS	13C2-PFOA	91.0	60 - 150	
IS	13C8-PFOS	93.0	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW04A-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 13:30
Location:

Sample Data

Matrix: Water
Sample Size: 0.120 L

Laboratory Data

Lab Sample: 1601464-10 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 23:03 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	162	1.87	4.17	8.34	
PFOA	22.1	0.678	2.08	8.34	B
PFOS	2.83	0.841	0.938	8.34	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	109	60 - 150	
IS	13C2-PFOA	82.5	60 - 150	
IS	13C8-PFOS	85.8	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: OUA1-MW05-20161116

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 16-Nov-2016 14:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.129 L

Laboratory Data

Lab Sample: 1601464-11 Date Received: 17-Nov-2016 9:22
QC Batch: B6K0164 Date Extracted: 28-Nov-2016 9:21
Date Analyzed: 29-Nov-16 23:15 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	30.5	1.74	3.88	7.78	
PFOA	0.859	0.633	1.94	7.78	J, B
PFOS	0.937	0.784	0.872	7.78	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	111	60 - 150	
IS	13C2-PFOA	82.6	60 - 150	
IS	13C8-PFOS	83.4	60 - 150	

DL - Detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

Results reported to DL.

When reported, PFBS, PFHxS, PFOA and PFOS 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.**
D	**Dilution**
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.**
M	**Estimated Maximum Possible Concentration. (CA Region 2 projects only)**
*****	**See Cover Letter**
Conc.	**Concentration**
NA	**Not applicable**
ND	**Not Detected**
TEQ	**Toxic Equivalency**

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

CERTIFICATIONS

Accrediting Authority	Certificate Number
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	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
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

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
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

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	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
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

Vista Analytical

1104 Windfield Way
El Dorado Hills, CA 95762
TEL: 916-673-1520

Vista PM: Karen Lopez 1601464 0.2°C

CHAIN OF CUSTODY RECORD

DATE: 11/16/2016 - B

PAGE: 1 OF 2

LABORATORY CLIENT: AMEC Foster Wheeler E & I, Inc.		CLIENT PROJECT NAME / NUMBER: MCAS Yuma, AZ TO 105	P.O. NO.: TO 105
ADDRESS: 9210 Sky Park Court		PROJECT CONTACT: Medora Hackler/Marina Mitchell	CONTRACT NO.: N62473-12-D-2012
CITY: San Diego, CA 92123		SAMPLER(S): (SIGNATURE) LM Rute	LAB USE ONLY
TEL: 503.639.3400	E-Mail: medora.hackler@amecfw.com	E-MAIL: marina.mitchell@amecfw.com	

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	QC Level	PFOA, PFOS, and PFBS (U.S. EPA 537 Mod.)
	EB03 - 2016 11 16	11/16/16	14:30	W	2		X
	OUA1 - MW53 - 2016 11 16		8:10		2		X
	OUA1 - MW54 - 2016 11 16		9:00		2		X
	OUA1 - MW42 - 2016 11 16		9:55		2		X
	OUA1 - MW01 - 2016 11 16		10:30		2		X
	OUA1 - MW31 - 2016 11 16		11:15		2		X
	OUA1 - PZ19 - 2016 11 16		11:45		2		X
	OUA1 - MW52 - 2016 11 16		12:30		2		X
	OUA1 - MW04 - 2016 11 16		13:25		2		X
	OUA1 - MW04A - 2016 11 16		13:30		2		X

Relinquished by: (Signature) LM Rute	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1998	Date: 11/16/16	Time: 16:30
Relinquished by: (Signature) Fed Ex	Received by: (Signature) MSparks	Date: 11/17/16	Time: 0932
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Vista Analytical

1104 Windfield Way
El Dorado Hills, CA 95762
TEL: 916-673-1520

Vista PM: Karen Lopez

1601464

CHAIN OF CUSTODY RECORD

DATE: 11/16/2016 – B

PAGE: 2 OF 2

LABORATORY CLIENT: AMEC Foster Wheeler E & I, Inc.	CLIENT PROJECT NAME / NUMBER: MCAS Yuma, AZ TO 105	P.O. NO.: TO 105
ADDRESS: 9210 Sky Park Court	PROJECT CONTACT: Medora Hackler/Marina Mitchell	CONTRACT NO.: N62473-12-D-2012
CITY: San Diego, CA 92123	SAMPLER(S): (SIGNATURE)	LAB USE ONLY
TEL: 503.639.3400 / E-Mail: medora.hackler@amecfw.com / E-MAIL: marina.mitchell@amecfw.com		

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	QC Level	PFOA, PFOS, and PFBS (U.S. EPA 537 Mod.)
	OUAI-MW05-20161116	11/16/16	14:15	W	2		X

Relinquished by: (Signature)	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1998	Date: 11/16/16	Time: 16:30
Relinquished by: (Signature) Fed Ex	Received by: (Signature)	Date: 11/17/16	Time: 0932
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601464 **TAT** Std

Samples Arrival:	**Date/Time** 11/17/16 0922	**Initials:** MWS	**Location:** WR-2 **Shelf/Rack:** N/a
Logged In:	**Date/Time** ~~11/18/16~~ 11/17/16 1219	**Initials:** BSB	**Location:** WR-2 **Shelf/Rack:** F4

Delivered By:	(FedEx)	UPS	On Trac	DHL	Hand Delivered	Other
Preservation:	(Ice)	Blue Ice		Dry Ice	None	
Temp °C: 0.5 (uncorrected)	**Time:** 0931				**Thermometer ID:** IR-1	
Temp °C: 0.2 (corrected)	**Probe used:** Yes☐ No☒					

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill — Trk # 8101 0952 1998	✓		
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?						✓
Preservation Documented:	$Na_2S_2O_3$	Trizma			Yes	No	(NA)
Shipping Container	Vista	(Client)	Retain	(Return)	Dispose	

Comments:

EXTRACTION INFORMATION

Process Sheet

Workorder: 1601464

Prep Expiration: 11/30/2016

Client: AMEC Foster Wheeler

Workorder Due: 01-Dec-16 00:00

TAT: 14

Method: **537 PFAS DOD (LOQ as mRL)**

Matrix: **Aqueous**

Prep Batch: BQK0164

Prep Data Entered: 11/29/16 JS
Date and Initials

Version: PFOA, PFOS, and PFBS only

Initial Sequence:

LabSampleID	Recon	ClientSampleID	Date Received	Location	Comments
1601464-01 "A"	☑	EB03-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-02	☑	OUAI-MW53-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-03	☑	OUAI-MW54-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-04	☑	OUAI-MW42-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-05	☑	OUAI-MW01-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-06	☑	OUAI-MW31-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-07	☑	OUAI-PZ19-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-08	☑	OUAI-MW52-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-09	☑	OUAI-MW04-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-10	☑	OUAI-MW04A-20161116	17-Nov-16 09:22	WR-2 F-4	
1601464-11	☑	OUAI-MW05-20161116	17-Nov-16 09:22	WR-2 F-4	

WO Comments: **DoD**
PFOA/PFOS/PFBS only
MS/MSD per analytical batch

Vista PM:Martha Maier

Vial Box ID: Method

Sample Reconciled By: 11/27/16

Page 1 of 1

Percent Solids

Vista Analytical Laboratory

Project: B6K0164 **Balance ID:** NA

Sample ID	Chemist: NA Date: ↓ Time: ↓ Boat Wt.	Sample + Boat Wt.	Chemist: NA Date: ↓ Time: ↓ Residue + Boat Wt.	Chemist/Date em 11/27/16 pH before	pH* after	Cl
1601464-1 A				5	2 (A)	0
-2				7	2	0
-3				7	2	0
-4				7	2	0
-5				7	2	0
-6				7	2	0
-7				7	2	0
-8				7	2	0
-9			em 11/27/16	7	2	0
-10				7	2	0
-11				7	2	0
1601472-01				7	2	0
-02				7	2	0
-03				7	2	0
-04				7	2	0
-04 B				7	2	0
-04 C				7	2	0

Procedure:

- Tare the balance.
- Record Boat Weight.
- Add 2 - 10 g of sample.
- Record Wet Wt. + Boat Wt.
- Dry in oven overnight at 107°C.
- Tare the balance.
- Record Residue + Boat Wt.

Notes:

(A) pH adjusted with 2 drops of Hcl. em 11/27/16

* pH adjusted with 3 drops of Hcl. em 11/27/16

- *Methods 8280, 613, 1613, 8290, 1614 – pH <9*
- *Methods 1668/PCN – pH 2-3*
- *NCASI 551 – pH 1*

%Solids rmh 5/2011

Matrix: Aqueous

Method: 537 PFAS DOD (LOO as mRL)

PREPARATION BENCH SHEET

B6K0164

Chemist: ~~G. Mendiola~~ ~~G. Mendiola~~ dm 11/27/16

Prep Date/Time: ~~27-Nov-16 10:17~~ 28-NOV-16 09:21

Prepared using: LCMS - SPE Extraction-LCMS

C	VISTA Sample ID	Bottle + Sample (g)	Bottle Only (g)	Sample Amt. (L)	IS/NS CHEM/WIT DATE	SPE CLK0139	RS CHEM/WIT DATE
☐	B6K0164-BLK1	NA	NA	(0.125)	dm JS 11/28/16	dm 11/28/16	dm JS 11/28/16
☐	B6K0164-BS1	↓	↓	↓	↓	↓	↓
☐	B6K0164-MS1 1601472-04	155.58	26.97	0.12861			
☐	B6K0164-MSD1 1601472-04	162.02	27.01	0.13501			
☐	1601464-01	154.65	27.04	0.12761			
☐	1601464-02	154.39	27.06	0.12733			
☐	1601464-03	151.73	27.31	0.12442			
☐	1601464-04	156.46	27.29	0.12919			
☐	1601464-05	155.56	27.24	0.12832			
☐	1601464-06	158.9	27.30	0.13071			
☐	1601464-07	151.48	26.94	0.12454			
☐	1601464-08	156.64	27.03	0.12961			
☐	1601464-09	157.54	27.01	0.13053			
☐	1601464-10	146.99	27.03	0.11996			
☐	1601464-11	155.52	26.91	0.12861			
☐	1601472-01	146.92	27.21	0.11971			

IS Name: 16Z16604, 10 uL (V2)

NS Name: 16Z11601, 10 uL (V1)

RS Name: 16K1105, 10uL (V4)

SPE Chem: Strata XAW 33mm 200mg/6mL

Ele SOLV: MeOH + 0.5% NH4OH in MeOH

Final Volume(s): 1mL

Check Out: Chemist/Date: dm 11/28/16

Check In: Chemist/Date: empty

Balance ID: HRMS-2

Comments: Assume 1 g = 1 mL

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537 PFAS DOD (LOO as mRL)

B6K0164

Chemist: ~~G. Mend~~ G. Mendiola
~~dm 11/27/16~~

Prep Date/Time: ~~27-Nov-16 10:17~~ 28-NOV-16 09:21

Prepared using: LCMS - SPE Extraction-LCMS

CCK0139

C	VISTA Sample ID	Bottle + Sample (g)	Bottle Only (g)	Sample Amt. (L)	IS/NS CHEM/WIT DATE	SPE	RS CHEM/WIT DATE
☐	1601472-02	154.67	26.98	0.1276A	dm JS 11/28/16	dm 11/28/16	dm JS 11/28/16
☐	1601472-03	158.74	26.97	0.13177	↓	↓	↓
☐	1601472-04	153.43	27.00	0.12643	↓	↓	↓

IS Name	NS Name	RS Name		
16F2404, 1V (V2)	16F1601, 10 (V1)	16K1105, 10 (V4)	SPE Chem: Strata XAW 33um 200mg/6mL Ele SOLV: MeOH + 0.5% NH4OH in MeOH Final Volume(s): 1mL	Check Out: Chemist/Date: dm 11/28/16 Check In: Chemist/Date: empty Balance ID: HTLHS-1

Comments: Assume 1 g = 1 mL

SAMPLE DATA – MODIFIED EPA METHOD 537

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_38.qld

Last Altered: Wednesday, November 30, 2016 14:28:42 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:29:42 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BLK1, Description: Method Blank, Name: 161129J1_38.wiff, Date: 29-Nov-2016, Time: 22:02:14

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90		6.349e3		0.125			
2	8	PFOA	368.90	6.514e1	5.765e3		0.125	4.67	0.916	
3	10	PFOS	79.92		3.260e3		0.125			
4	15	13C3-PFBS	79.95	6.349e3	9.756e3	0.564	0.125	3.40	115	115
5	16	13C2-PFHxA	269.90	3.255e3	9.756e3	0.907	0.125	3.80	36.8	91.9
6	17	13C4-PFHpA	321.90	5.690e3	9.756e3	0.742	0.125	4.28	78.6	78.6
7	18	18O2-PFHxS	102.90	1.082e3	4.702e3	0.271	0.125	4.39	84.9	84.9
8	19	13C2-6:2 FTS	408.90	1.713e3	9.874e3	0.224	0.125	4.63	77.6	77.6
9	20	13C2-PFOA	369.90	5.765e3	9.874e3	0.651	0.125	4.67	89.7	89.7
10	21	13C5-PFNA	422.90	4.079e3	4.942e3	1.002	0.125	5.00	82.4	82.4
11	22	13C8-PFOS	79.93	3.260e3	3.675e3	0.950	0.125	5.06	93.3	93.3
12	25	13C4-PFBA	171.90	9.883e3	9.883e3	1.000	0.125	1.93	100	100
13	26	13C5-PFHxA	273.00	9.756e3	9.756e3	1.000	0.125	3.80	100	100
14	27	13C3-PFHxS	80.01	4.702e3	4.702e3	1.000	0.125	4.39	100	100
15	28	13C8-PFOA	375.90	9.874e3	9.874e3	1.000	0.125	4.67	100	100
16	29	13C4-PFOS	79.94	3.675e3	3.675e3	1.000	0.125	5.06	100	100
17	30	13C9-PFNA	427.00	4.942e3	4.942e3	1.000	0.125	4.99	100	100
18	31	13C6-PFDA	474.00	4.548e3	4.548e3	1.000	0.125	5.28	100	100
19	32	Total PFBS	79.90		6.349e3		0.125			
20	34	Total PFOA	368.90		5.765e3		0.125		0.916	
21	35	Total PFOS	79.92		3.260e3		0.125		0.109	

Rev'd: MM 12/1/16 pw 11/30/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_38.qld

Last Altered: Wednesday, November 30, 2016 14:28:42 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:29:42 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BLK1, Description: Method Blank, Name: 161129J1_38.wiff, Date: 29-Nov-2016, Time: 22:02:14

Total PFBS

	#	Name	Trace	RT	Area	IS Area	Conc.
1							

Total PFHxS

	#	Name	Trace	RT	Area	IS Area	Conc.
1	6	PFHxS	79.91	4.40	13.341	1082.133	1.3

Total PFOA

	#	Name	Trace	RT	Area	IS Area	Conc.
1	8	PFOA	368.90	4.67	65.145	5764.815	0.9

Total PFOS

	#	Name	Trace	RT	Area	IS Area	Conc.
1	35	Total PFOS	79.92	4.98	9.762	3259.676	0.1

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_38.qld

Last Altered: Wednesday, November 30, 2016 14:28:42 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:29:42 Pacific Standard Time

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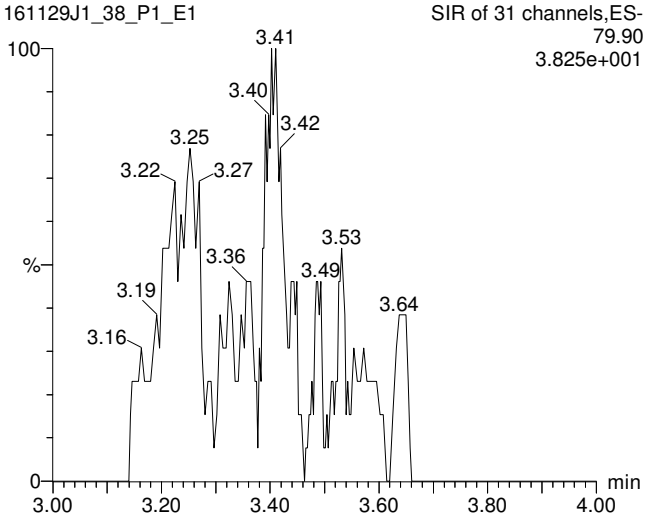
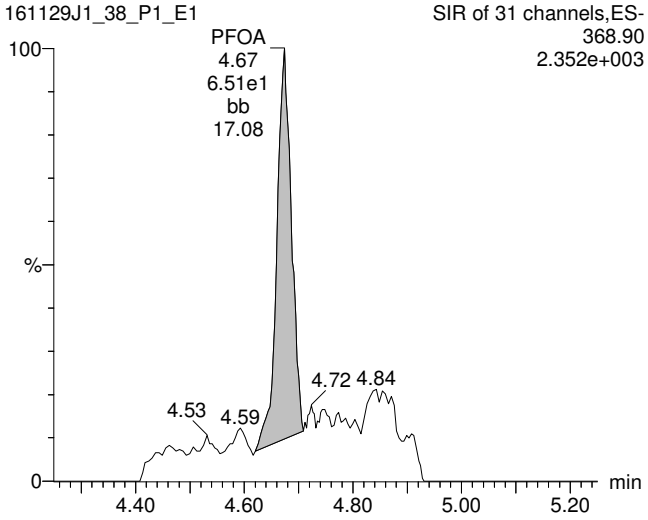
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BLK1, Description: Method Blank, Name: 161129J1_38.wiff, Date: 29-Nov-2016, Time: 22:02:14, Instrument: , Lab: ©PE-SCIEX, User: sciex

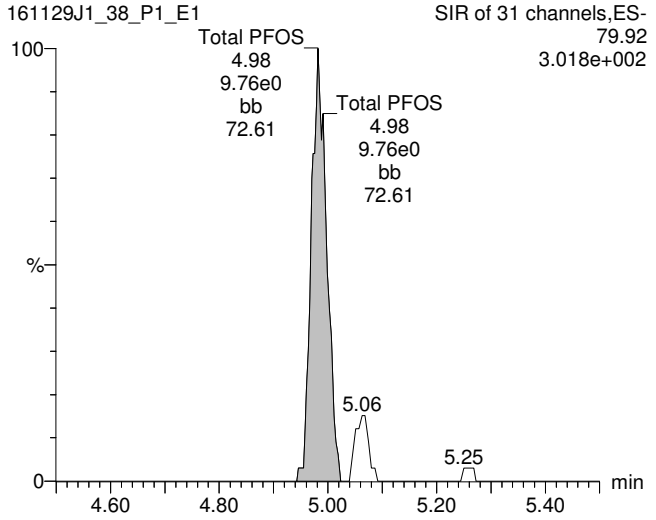
Total PFBS



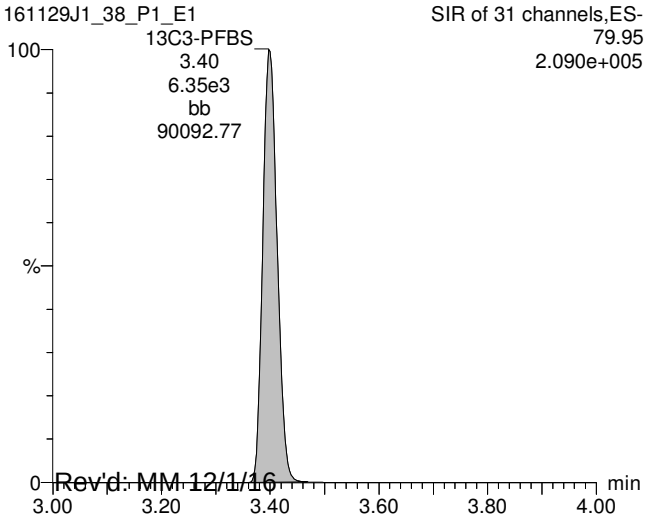
Total PFOA



Total PFOS



13C3-PFBS



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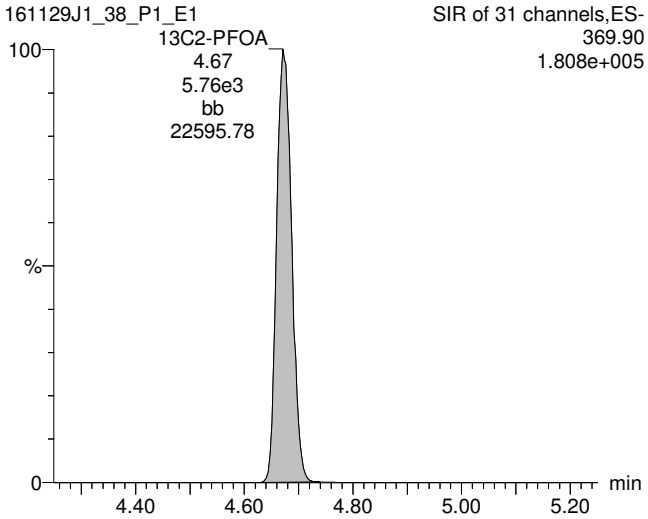
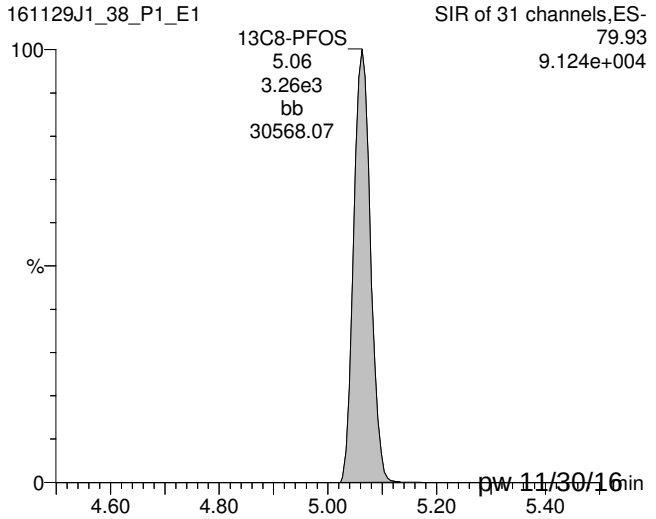


13C8-PFOS



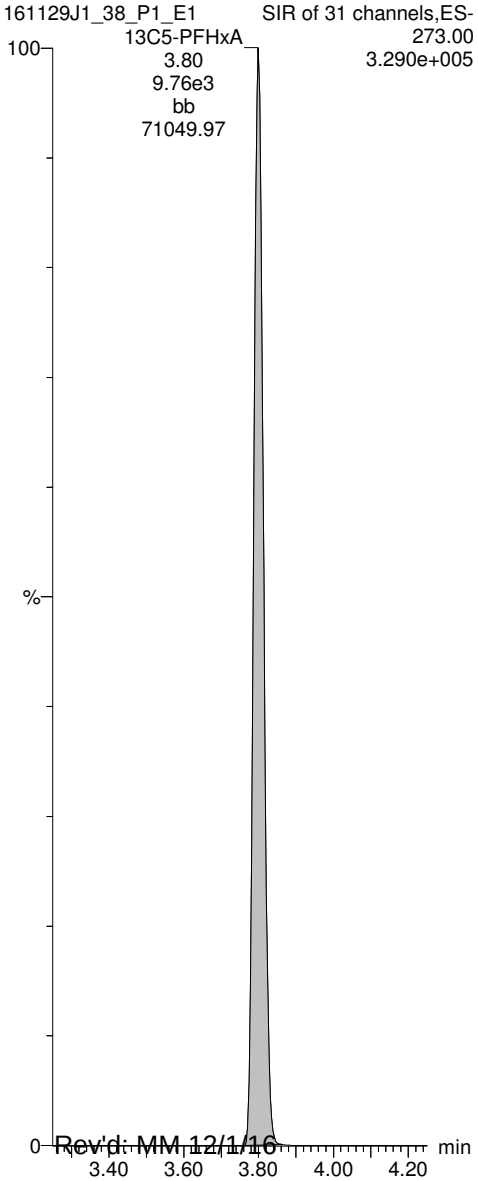
Rev'd: MM 12/1/16 pw 11/30/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_38.qld

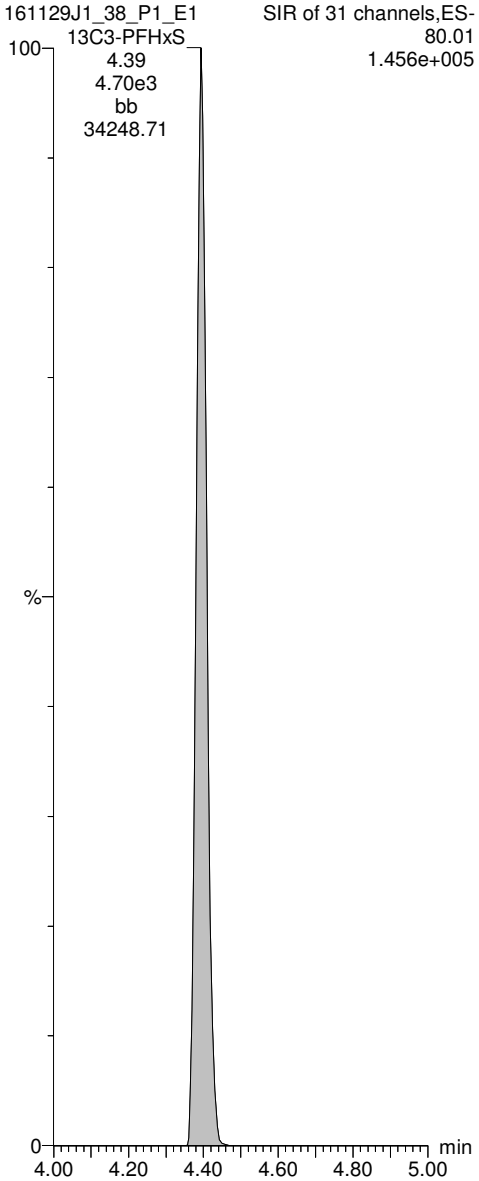
Last Altered: Wednesday, November 30, 2016 14:28:42 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:29:42 Pacific Standard Time

ID: B6K0164-BLK1, Description: Method Blank, Name: 161129J1_38.wiff, Date: 29-Nov-2016, Time: 22:02:14, Instrument: , Lab: ©PE-SCIEX, User: sciex

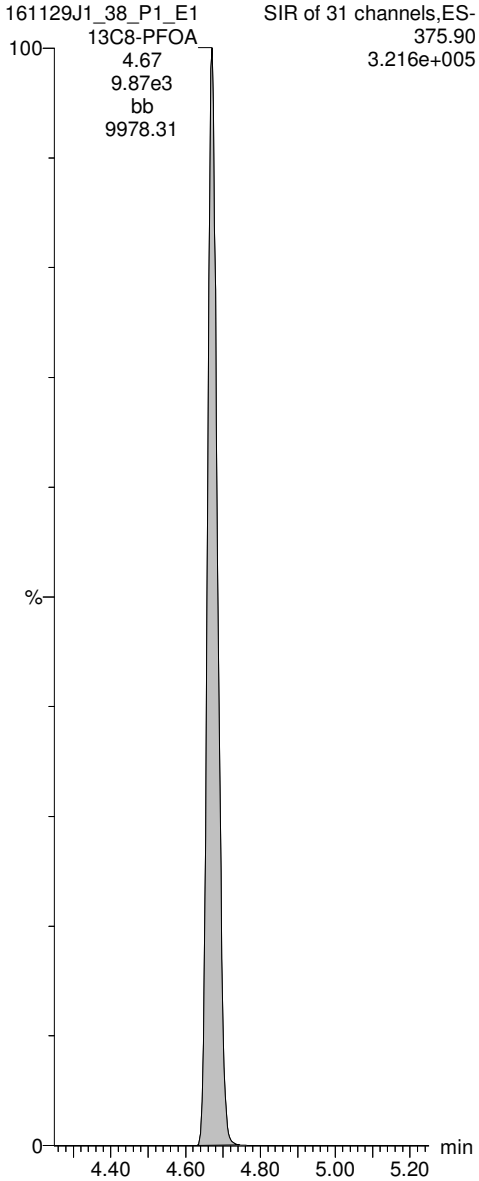
13C5-PFHxA



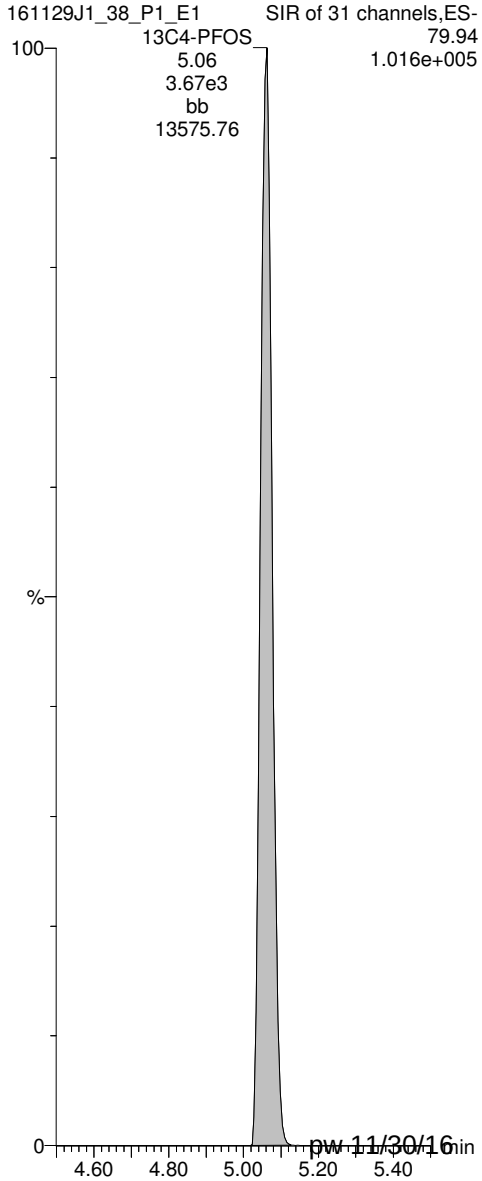
13C3-PFHxS



13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 11/30/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_36.qld

Last Altered: Wednesday, November 30, 2016 14:27:40 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:28:04 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BS1, Description: OPR, Name: 161129J1_36.wiff, Date: 29-Nov-2016, Time: 21:37:45

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	5.194e3	7.218e3		0.125	3.40	93.1	116
2	8	PFOA	368.90	7.130e3	6.290e3		0.125	4.68	89.3	112
3	10	PFOS	79.92	3.483e3	3.569e3		0.125	5.07	84.7	106
4	15	13C3-PFBS	79.95	7.218e3	1.043e4	0.564	0.125	3.40	123	123
5	16	13C2-PFHxA	269.90	3.892e3	1.043e4	0.907	0.125	3.80	41.1	103
6	17	13C4-PFHpA	321.90	7.263e3	1.043e4	0.742	0.125	4.28	93.9	93.9
7	18	18O2-PFHxS	102.90	1.348e3	4.922e3	0.271	0.125	4.39	101	101
8	19	13C2-6:2 FTS	408.90	2.018e3	1.124e4	0.224	0.125	4.63	80.2	80.2
9	20	13C2-PFOA	369.90	6.290e3	1.124e4	0.651	0.125	4.68	85.9	85.9
10	21	13C5-PFNA	422.90	4.399e3	5.637e3	1.002	0.125	5.01	77.9	77.9
11	22	13C8-PFOS	79.93	3.569e3	3.988e3	0.950	0.125	5.07	94.2	94.2
12	25	13C4-PFBA	171.90	1.133e4	1.133e4	1.000	0.125	1.92	100	100
13	26	13C5-PFHxA	273.00	1.043e4	1.043e4	1.000	0.125	3.80	100	100
14	27	13C3-PFHxS	80.01	4.922e3	4.922e3	1.000	0.125	4.39	100	100
15	28	13C8-PFOA	375.90	1.124e4	1.124e4	1.000	0.125	4.67	100	100
16	29	13C4-PFOS	79.94	3.988e3	3.988e3	1.000	0.125	5.07	100	100
17	30	13C9-PFNA	427.00	5.637e3	5.637e3	1.000	0.125	5.00	100	100
18	31	13C6-PFDA	474.00	4.767e3	4.767e3	1.000	0.125	5.29	100	100
19	32	Total PFBS	79.90		7.218e3		0.125		93.1	
20	34	Total PFOA	368.90		6.290e3		0.125		89.3	
21	35	Total PFOS	79.92		3.569e3		0.125		84.7	

pw 11/30/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_36.qld

Last Altered: Wednesday, November 30, 2016 14:27:40 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:28:04 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BS1, Description: OPR, Name: 161129J1_36.wiff, Date: 29-Nov-2016, Time: 21:37:45

Total PFBS

	#	Name	Trace	RT	Area	IS Area	Conc.
1	3	PFBS	79.90	3.40	5193.683	7218.484	93.1

Total PFHxS

	#	Name	Trace	RT	Area	IS Area	Conc.
1	6	PFHxS	79.91	4.40	3950.831	1348.480	89.1

Total PFOA

	#	Name	Trace	RT	Area	IS Area	Conc.
1	8	PFOA	368.90	4.68	7130.243	6289.707	89.3

Total PFOS

	#	Name	Trace	RT	Area	IS Area	Conc.
1	10	PFOS	79.92	5.07	3483.217	3569.334	84.7

pw 11/30/16

Vista Analytical Laboratory Q1

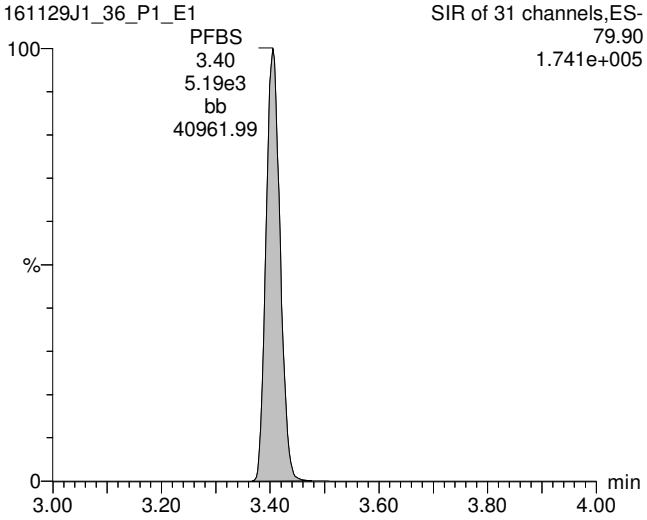
Dataset: U:\Q2.PRO\Results\161129J1\161129J1_36.qld

Last Altered: Wednesday, November 30, 2016 14:27:40 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:28:04 Pacific Standard Time

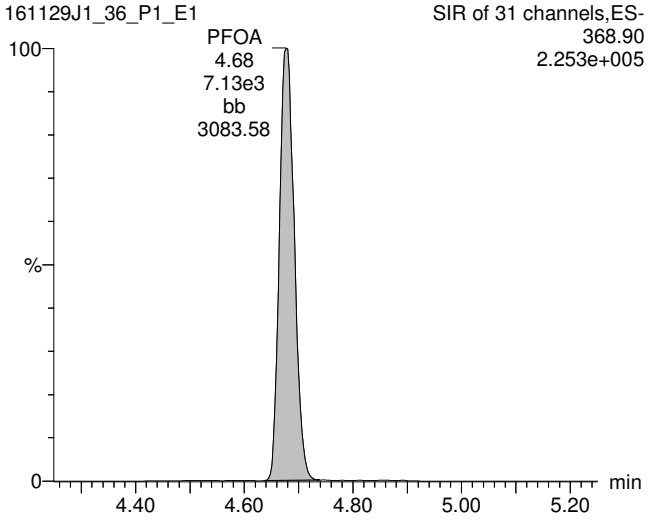
Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: B6K0164-BS1, Description: OPR, Name: 161129J1_36.wiff, Date: 29-Nov-2016, Time: 21:37:45, Instrument: , Lab: ©PE-SCIEX, User: sciex

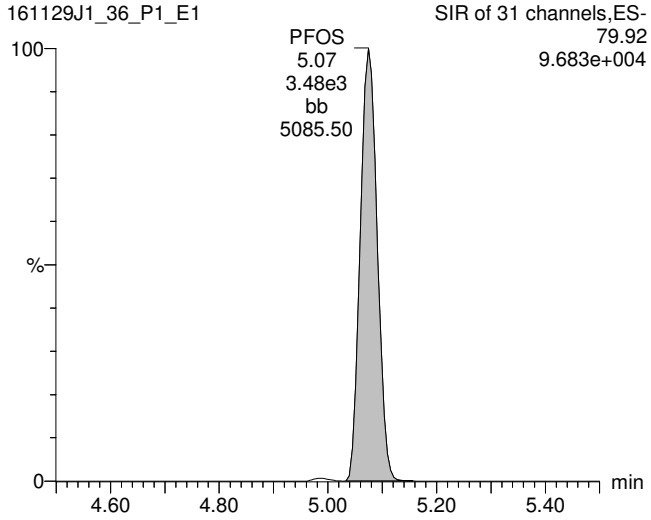
Total PFBS



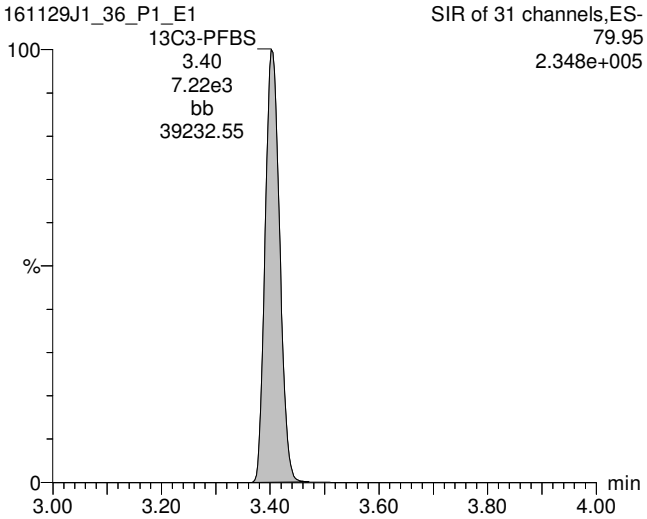
Total PFOA



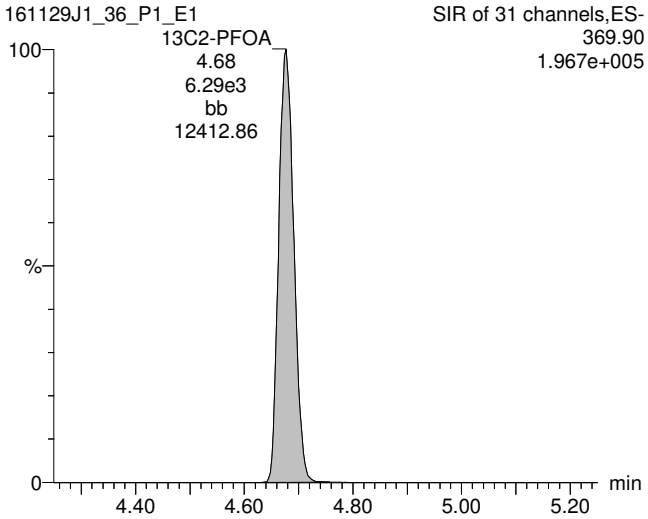
Total PFOS



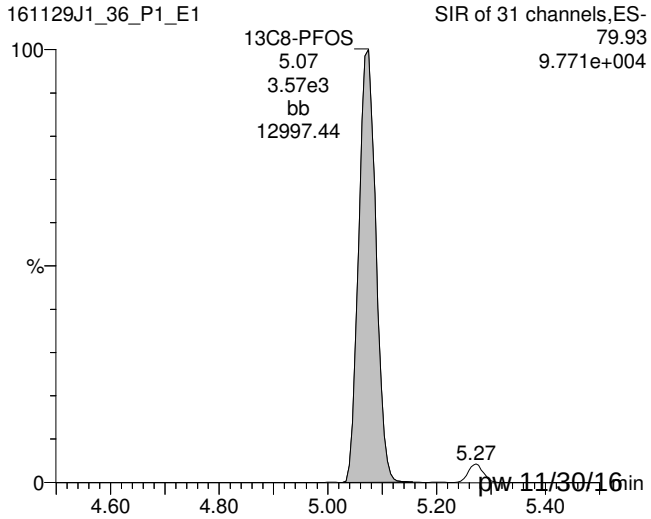
13C3-PFBS



13C2-PFOA



13C8-PFOS



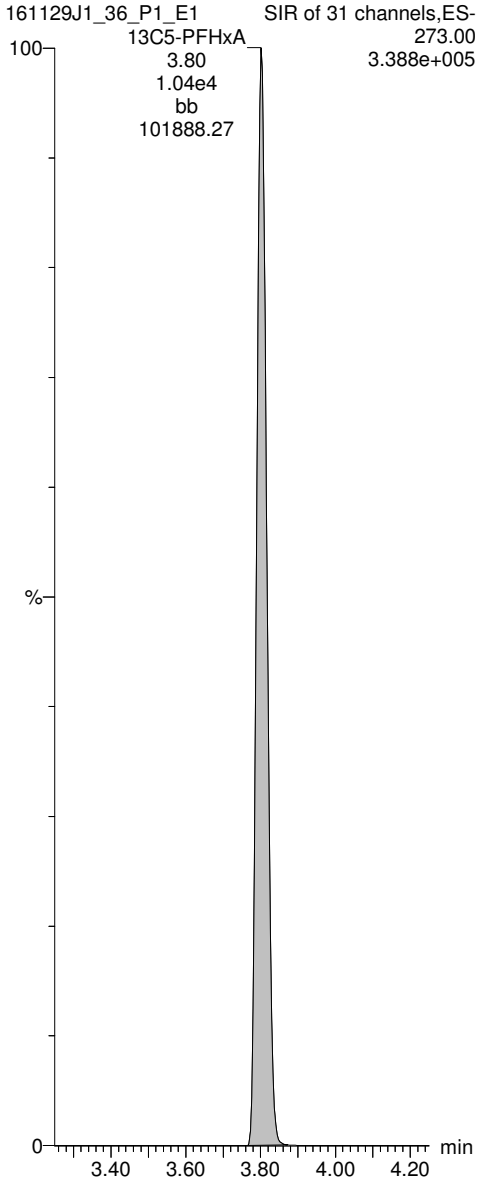
pw 11/30/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_36.qld

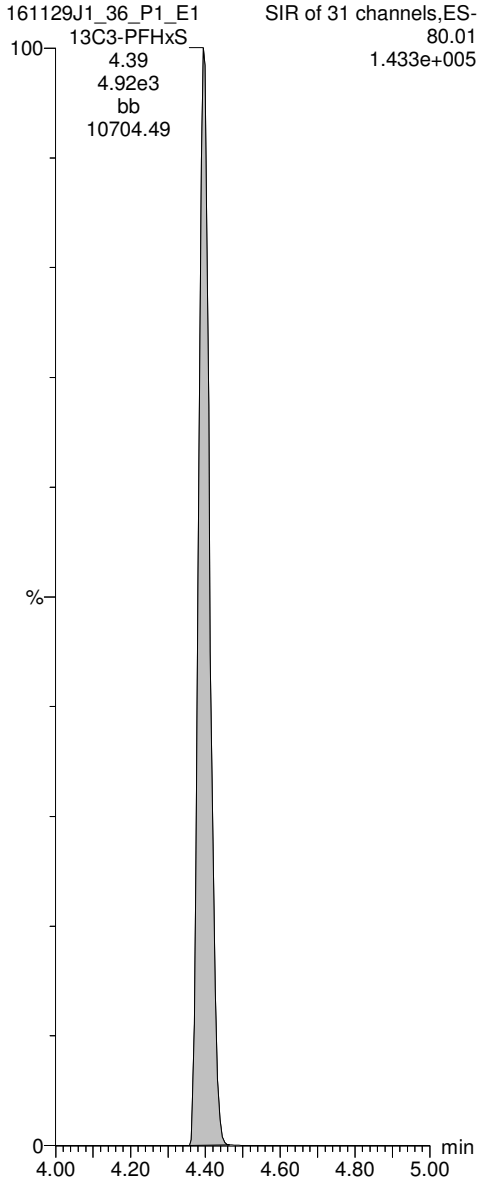
Last Altered: Wednesday, November 30, 2016 14:27:40 Pacific Standard Time
Printed: Wednesday, November 30, 2016 14:28:04 Pacific Standard Time

ID: B6K0164-BS1, Description: OPR, Name: 161129J1_36.wiff, Date: 29-Nov-2016, Time: 21:37:45, Instrument: , Lab: ©PE-SCIEX, User: sciex

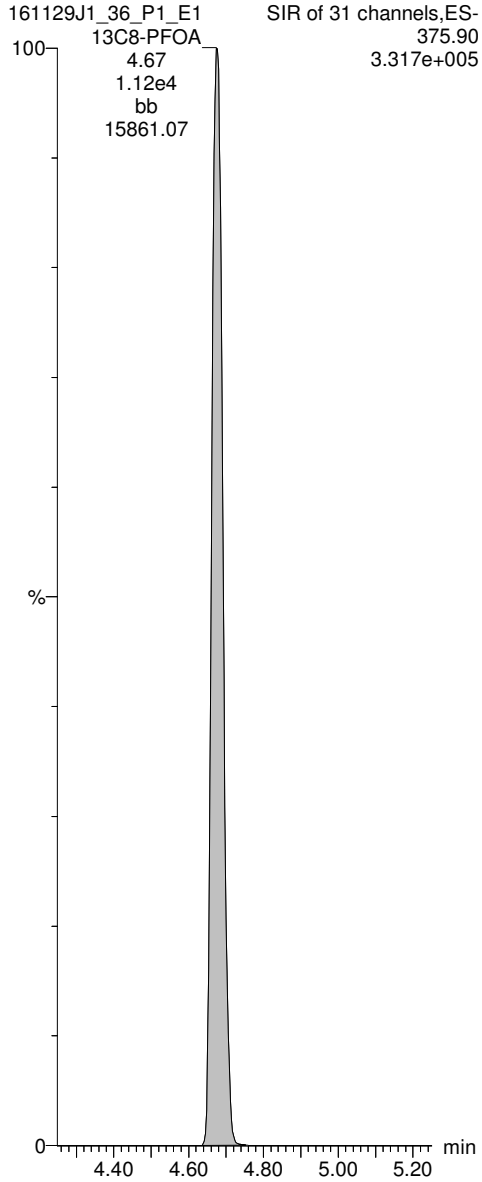
13C5-PFHxA



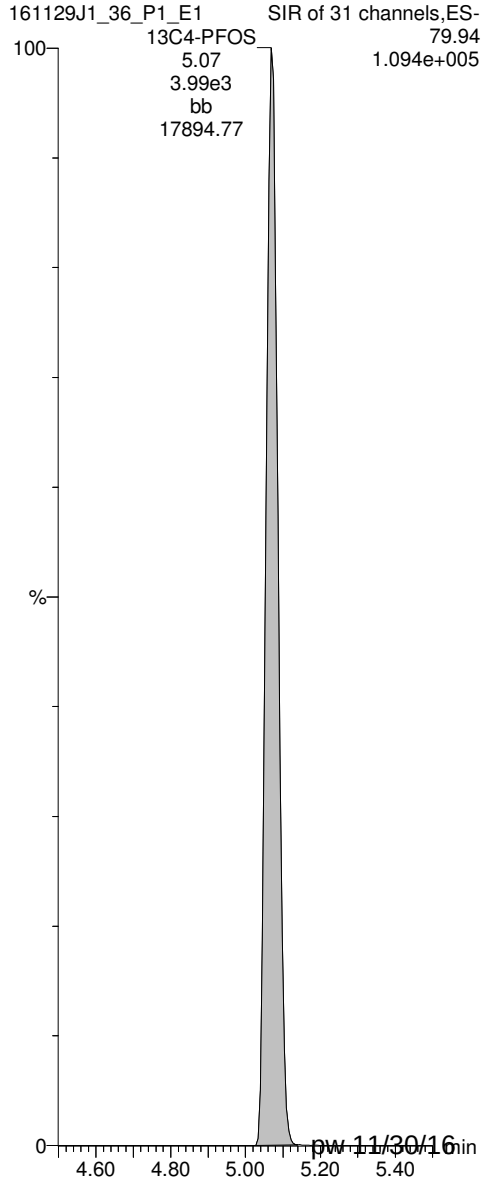
13C3-PFHxS



13C8-PFOA



13C4-PFOS



pw 11/30/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_28.qld

Last Altered: Thursday, December 01, 2016 11:01:48 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:02:27 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-01, Description: EB03-20161116, Name: 161129J1_28.wiff, Date: 29-Nov-2016, Time: 19:59:43

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90		6.926e3		0.128			
2	8	PFOA	368.90	6.492e1	6.188e3		0.128	4.67	0.837	
3	10	PFOS	79.92	3.481e0	2.915e3		0.128	5.08		
4	15	13C3-PFBS	79.95	6.926e3	1.033e4	0.564	0.128	3.40	116	119
5	16	13C2-PFHxA	269.90	3.718e3	1.033e4	0.907	0.128	3.80	38.9	99.2
6	17	13C4-PFHpA	321.90	7.058e3	1.033e4	0.742	0.128	4.27	90.2	92.1
7	18	18O2-PFHxS	102.90	1.255e3	4.557e3	0.271	0.128	4.39	99.5	102
8	19	13C2-6:2 FTS	408.90	1.897e3	1.059e4	0.224	0.128	4.62	78.5	80.1
9	20	13C2-PFOA	369.90	6.188e3	1.059e4	0.651	0.128	4.67	87.9	89.7
10	21	13C5-PFNA	422.90	4.318e3	5.247e3	1.002	0.128	5.01	80.5	82.1
11	22	13C8-PFOS	79.93	2.915e3	3.317e3	0.950	0.128	5.07	90.6	92.5
12	25	13C4-PFBA	171.90	1.050e4	1.050e4	1.000	0.128	1.92	98.0	100
13	26	13C5-PFHxA	273.00	1.033e4	1.033e4	1.000	0.128	3.80	98.0	100
14	27	13C3-PFHxS	80.01	4.557e3	4.557e3	1.000	0.128	4.39	98.0	100
15	28	13C8-PFOA	375.90	1.059e4	1.059e4	1.000	0.128	4.67	98.0	100
16	29	13C4-PFOS	79.94	3.317e3	3.317e3	1.000	0.128	5.07	98.0	100
17	30	13C9-PFNA	427.00	5.247e3	5.247e3	1.000	0.128	5.01	98.0	100
18	31	13C6-PFDA	474.00	4.665e3	4.665e3	1.000	0.128	5.30	98.0	100
19	32	Total PFBS	79.90		6.926e3		0.128			
20	34	Total PFOA	368.90		6.188e3		0.128		0.837	
21	35	Total PFOS	79.92		2.915e3		0.128		0.136	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

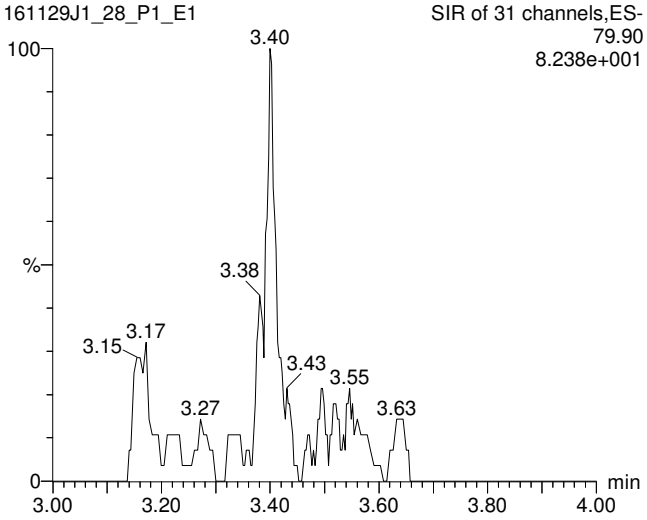
Dataset: U:\Q2.PRO\Results\161129J1\161129J1_28.qld

Last Altered: Thursday, December 01, 2016 11:01:48 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:02:27 Pacific Standard Time

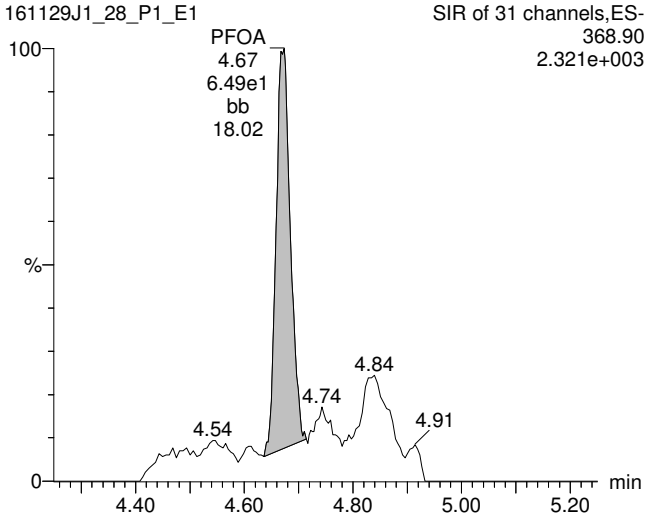
Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 30 Nov 2016 13:32:31
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-01, Description: EB03-20161116, Name: 161129J1_28.wiff, Date: 29-Nov-2016, Time: 19:59:43, Instrument: , Lab: ©PE-SCIEX, User: sciex

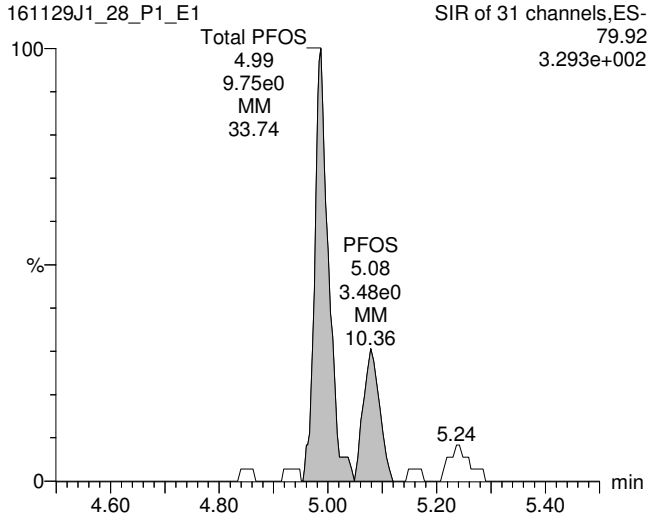
Total PFBS



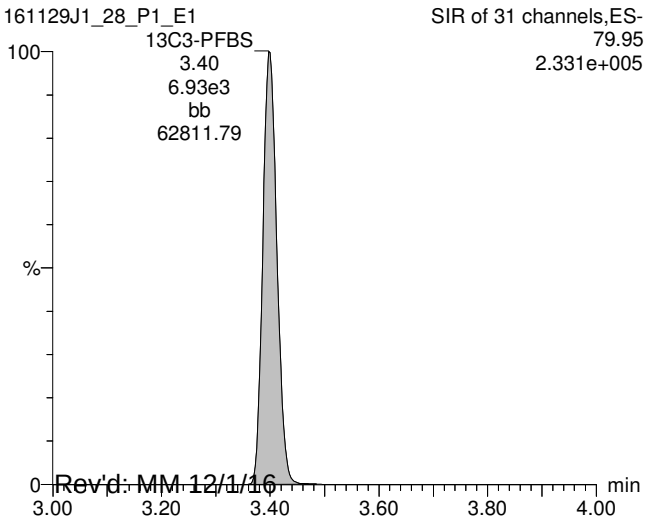
Total PFOA



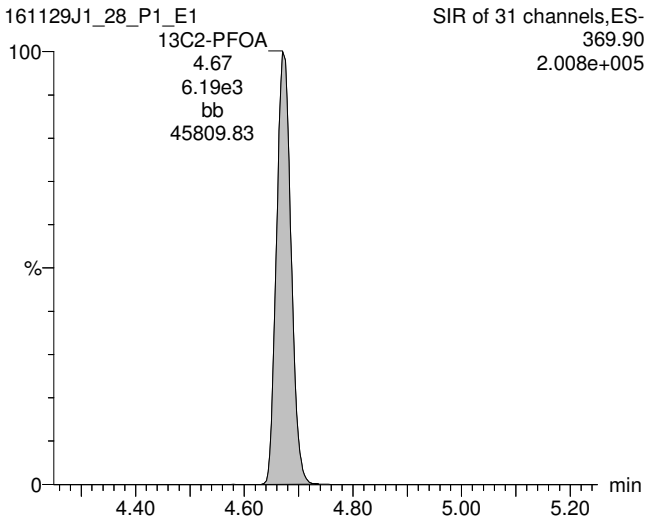
Total PFOS



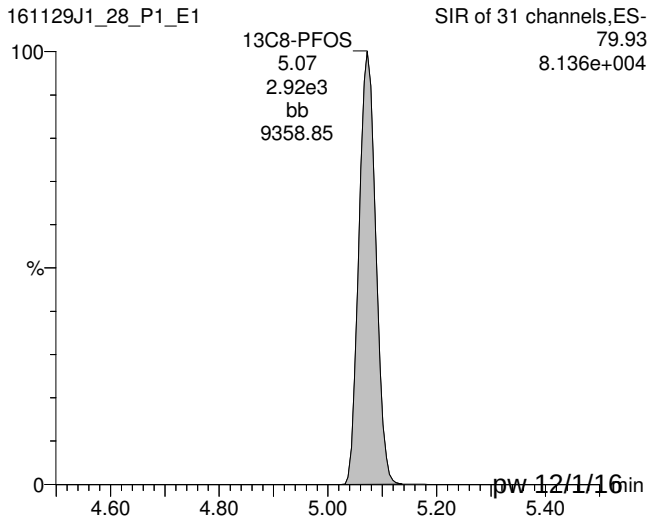
13C3-PFBS



13C2-PFOA



13C8-PFOS



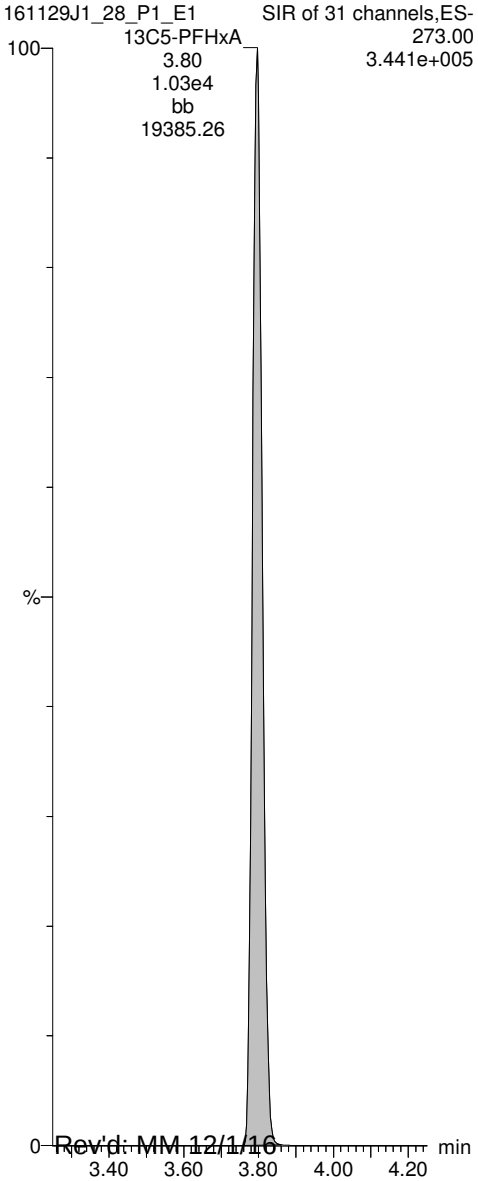
Rev'd: MM 12/1/16 pw 12/1/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_28.qld

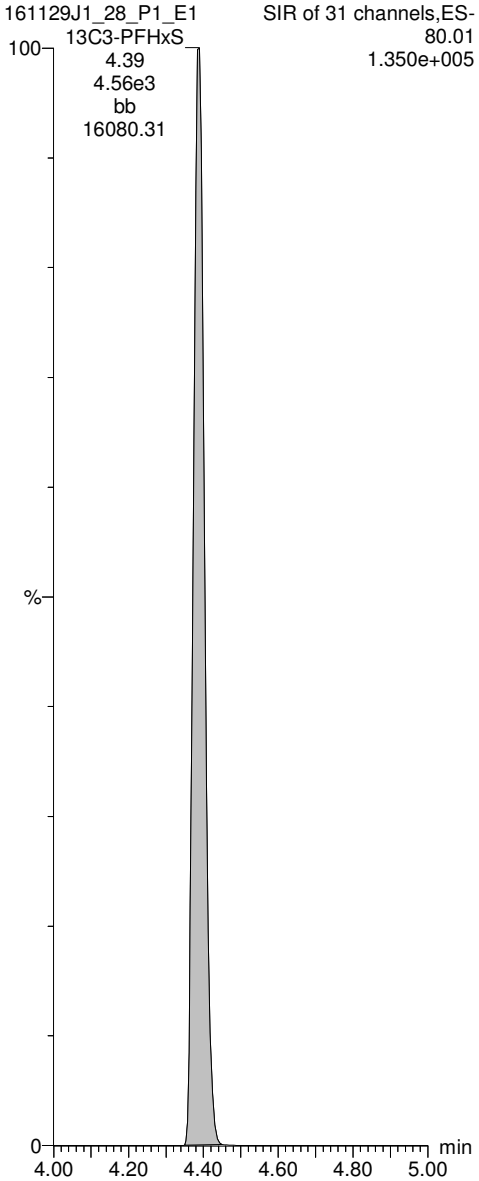
Last Altered: Thursday, December 01, 2016 11:01:48 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:02:27 Pacific Standard Time

ID: 1601464-01, Description: EB03-20161116, Name: 161129J1_28.wiff, Date: 29-Nov-2016, Time: 19:59:43, Instrument: , Lab: ©PE-SCIEX, User: sciex

13C5-PFHxA



13C3-PFHxS



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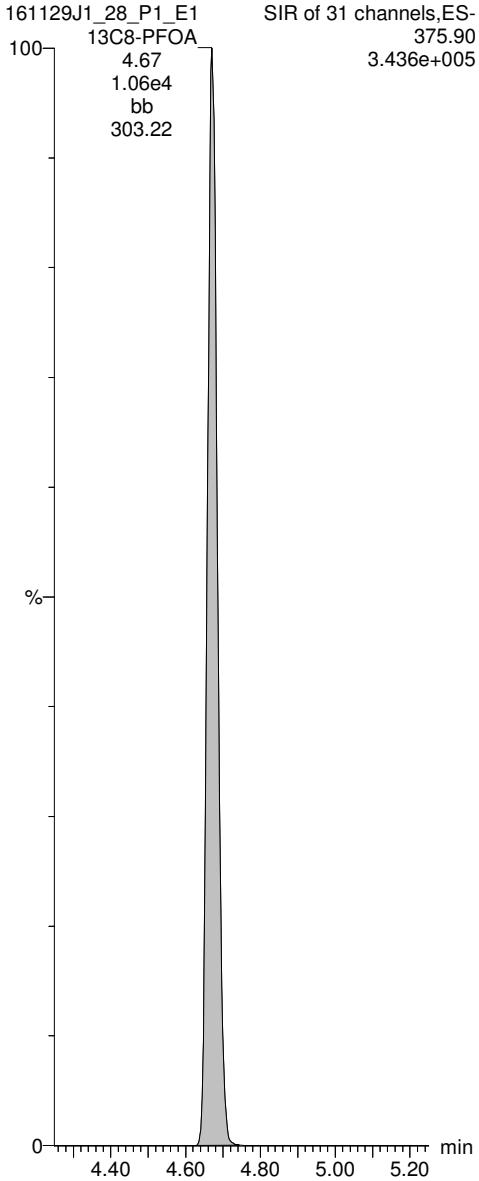
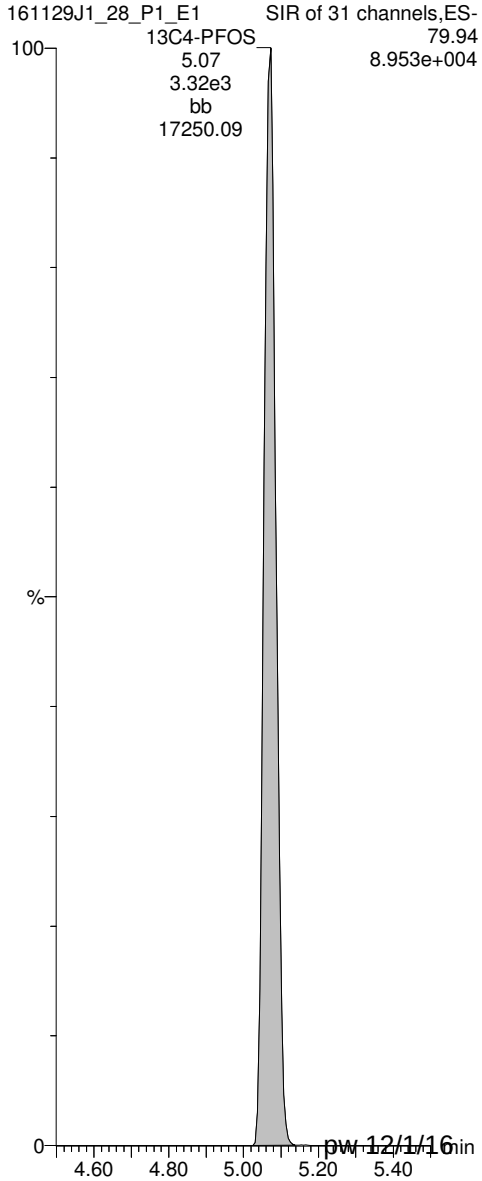


13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_29.qld

Last Altered: Thursday, December 01, 2016 11:14:04 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:15:11 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 01 Dec 2016 11:10:17
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-02, Description: OUAI-MW53-20161116, Name: 161129J1_29.wiff, Date: 29-Nov-2016, Time: 20:12:00

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	3.171e4	6.042e3		0.127	3.40	665	
2	8	PFOA	368.90	4.259e3	6.314e3		0.127	4.68	51.6	
3	10	PFOS	79.92	6.630e1	3.387e3		0.127	5.08	1.52	
4	15	13C3-PFBS	79.95	6.042e3	1.007e4	0.564	0.127	3.40	104	106
5	16	13C2-PFHxA	269.90	3.530e3	1.007e4	0.907	0.127	3.80	37.9	96.6
6	17	13C4-PFHpA	321.90	7.503e3	1.007e4	0.742	0.127	4.27	98.6	100
7	18	18O2-PFHxS	102.90	1.211e3	4.774e3	0.271	0.127	4.39	91.8	93.6
8	19	13C2-6:2 FTS	408.90	2.283e3	1.113e4	0.224	0.127	4.63	90.0	91.7
9	20	13C2-PFOA	369.90	6.314e3	1.113e4	0.651	0.127	4.67	85.5	87.1
10	21	13C5-PFNA	422.90	5.149e3	5.721e3	1.002	0.127	5.01	88.2	89.8
11	22	13C8-PFOS	79.93	3.387e3	3.699e3	0.950	0.127	5.08	94.6	96.4
12	25	13C4-PFBA	171.90	1.155e4	1.155e4	1.000	0.127	1.92	98.2	100
13	26	13C5-PFHxA	273.00	1.007e4	1.007e4	1.000	0.127	3.79	98.2	100
14	27	13C3-PFHxS	80.01	4.774e3	4.774e3	1.000	0.127	4.39	98.2	100
15	28	13C8-PFOA	375.90	1.113e4	1.113e4	1.000	0.127	4.67	98.2	100
16	29	13C4-PFOS	79.94	3.699e3	3.699e3	1.000	0.127	5.08	98.2	100
17	30	13C9-PFNA	427.00	5.721e3	5.721e3	1.000	0.127	5.01	98.2	100
18	31	13C6-PFDA	474.00	4.697e3	4.697e3	1.000	0.127	5.30	98.2	100
19	32	Total PFBS	79.90		6.042e3		0.127		681	
20	34	Total PFOA	368.90		6.314e3		0.127		67.5	
21	35	Total PFOS	79.92		3.387e3		0.127		7.08	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_29.qld

Last Altered: Thursday, December 01, 2016 11:14:04 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:15:11 Pacific Standard Time

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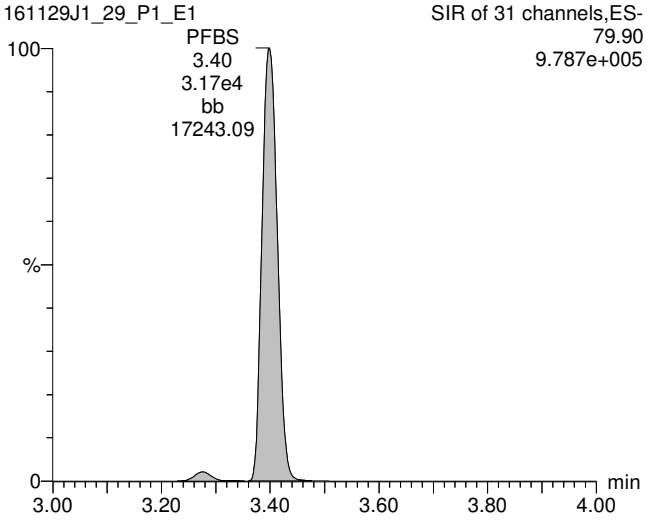
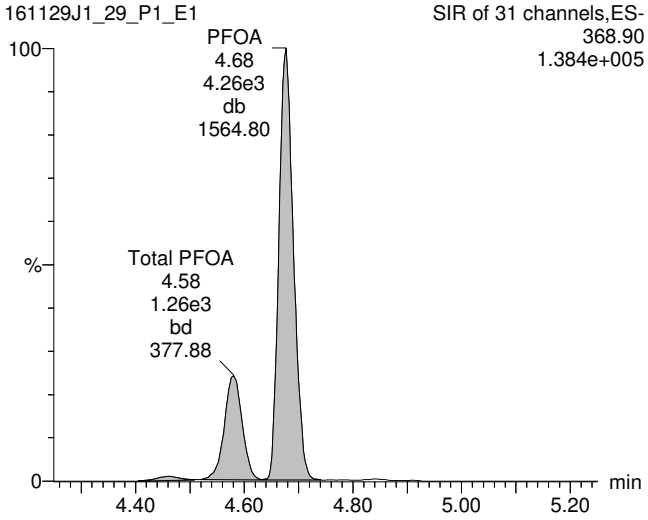
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-02, Description: OUAI-MW53-20161116, Name: 161129J1_29.wiff, Date: 29-Nov-2016, Time: 20:12:00, Instrument: , Lab: ©PE-SCIEX, User: sciex

Total PFBS



Total PFOA



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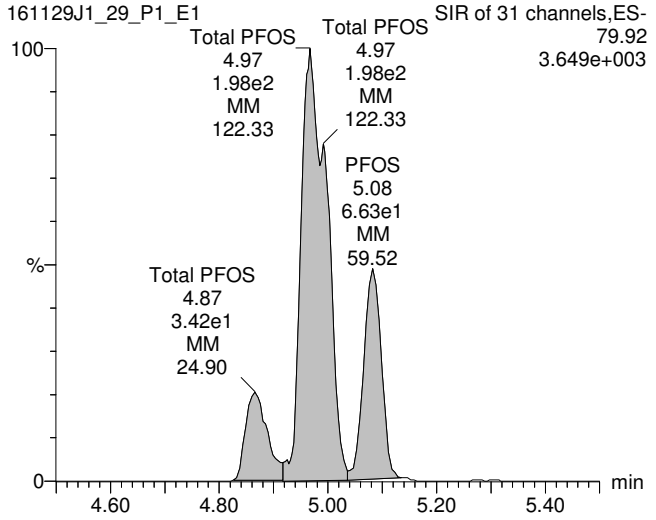
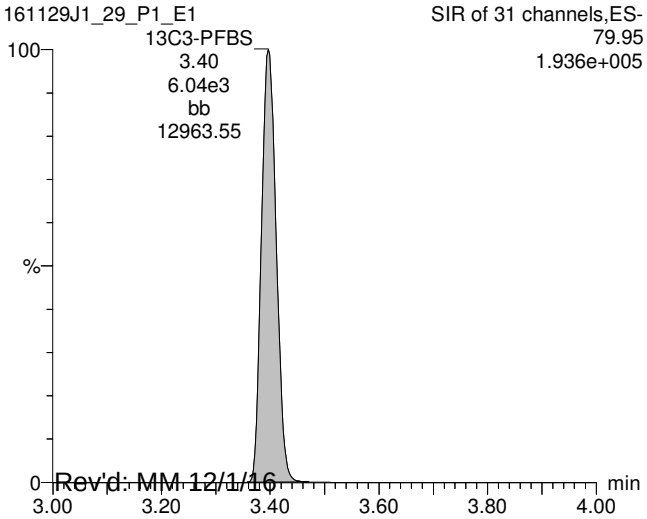
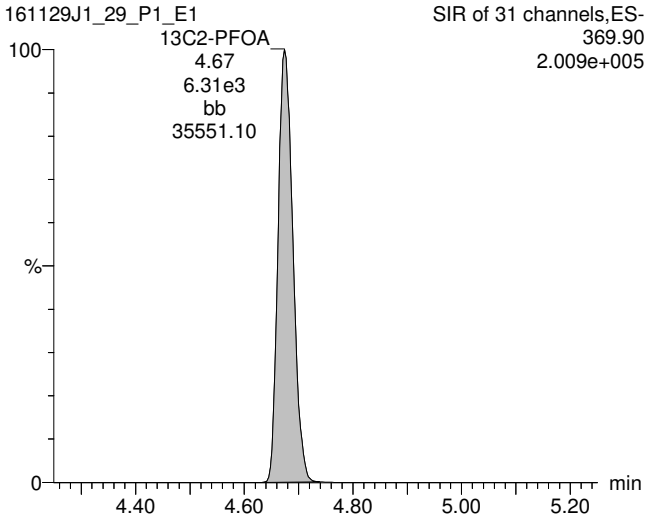


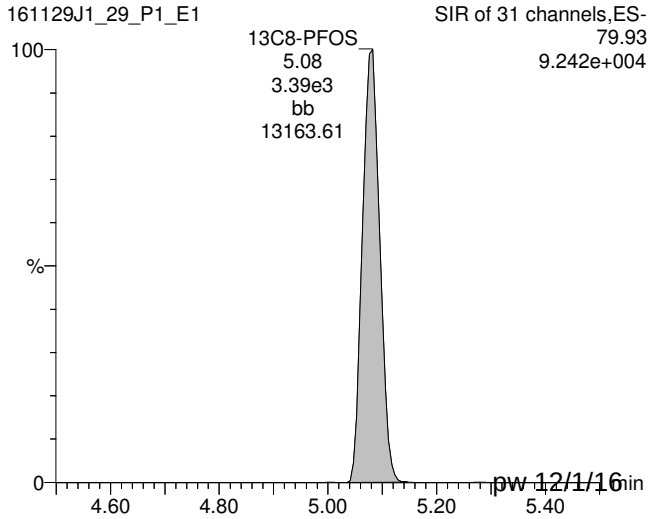
13C3-PFBS



13C2-PFOA



13C8-PFOS



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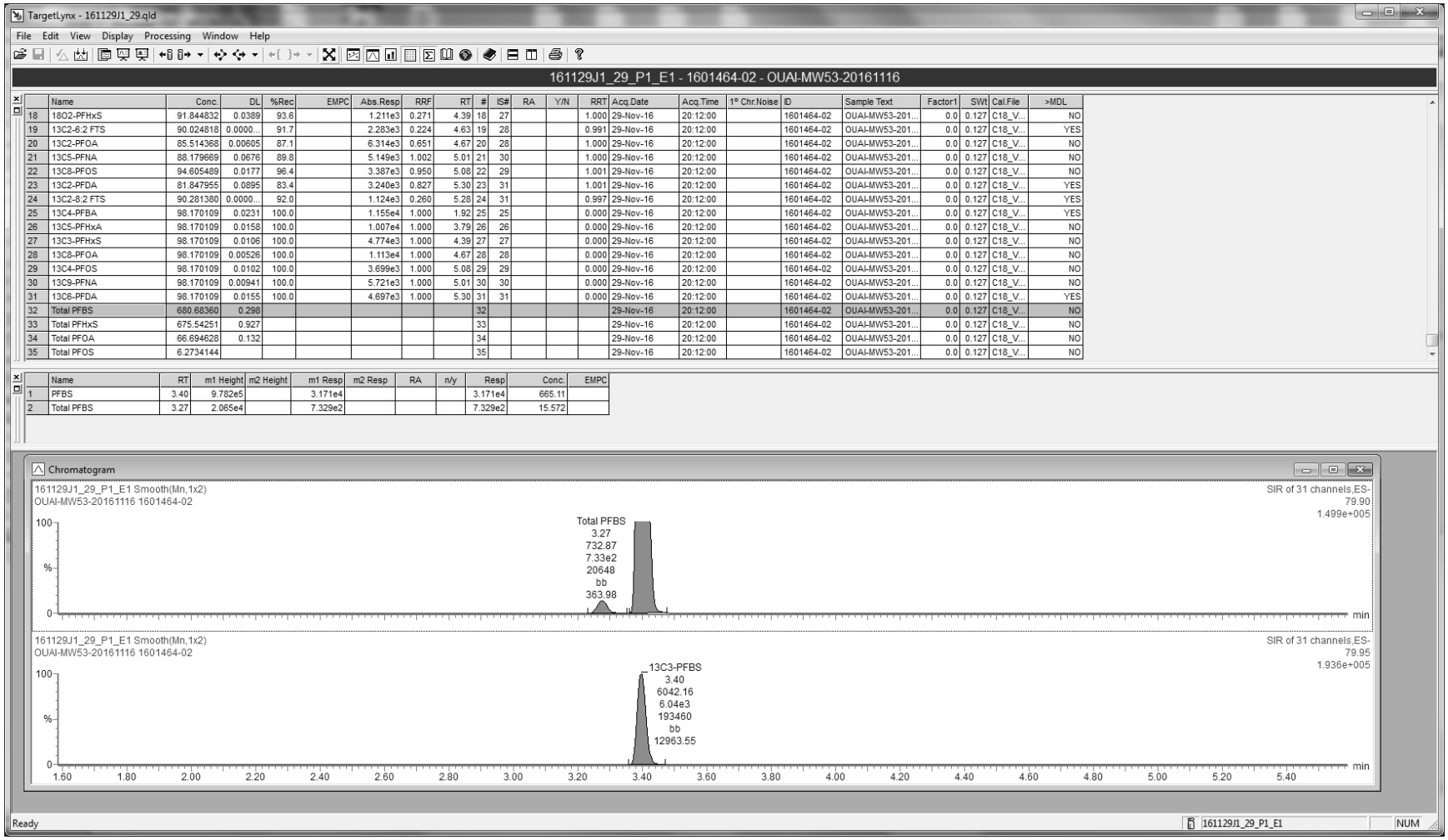

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18	18O2-PFHxS	91.844832	0.0389	93.6		1.211e3	0.271	4.39	18	27			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
19	13C2-6:2 FTS	90.024818	0.0000...	91.7		2.283e3	0.224	4.63	19	28			0.991	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
20	13C2-PFOA	85.514368	0.00605	87.1		6.314e3	0.651	4.67	20	28			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
21	13C5-PFNA	88.179669	0.0676	89.8		5.149e3	1.002	5.01	21	30			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
22	13C8-PFOS	94.605489	0.0177	96.4		3.387e3	0.950	5.08	22	29			1.001	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
23	13C2-PFDA	81.847955	0.0895	83.4		3.240e3	0.827	5.30	23	31			1.001	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
24	13C2-8:2 FTS	90.281380	0.0000...	92.0		1.124e3	0.260	5.28	24	31			0.997	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
25	13C4-PFBA	98.170109	0.0231	100.0		1.155e4	1.000	1.92	25	25			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
26	13C5-PFHxA	98.170109	0.0158	100.0		1.007e4	1.000	3.79	26	26			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
27	13C3-PFHxS	98.170109	0.0106	100.0		4.774e3	1.000	4.39	27	27			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
28	13C8-PFOA	98.170109	0.00526	100.0		1.113e4	1.000	4.67	28	28			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
29	13C4-PFOS	98.170109	0.0102	100.0		3.699e3	1.000	5.08	29	29			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
30	13C9-PFNA	98.170109	0.00941	100.0		5.721e3	1.000	5.01	30	30			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
31	13C6-PFDA	98.170109	0.0155	100.0		4.697e3	1.000	5.30	31	31			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
32	Total PFBS	680.68360	0.298						32					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
33	Total PFHxS	675.54251	0.927						33					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
34	Total PFOA	66.694628	0.132						34					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
35	Total PFOS	6.2734144							35					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.40	9.782e5		3.171e4				3.171e4	665.11	
2	Total PFBS	3.27	2.065e4		7.329e2				7.329e2	15.572	

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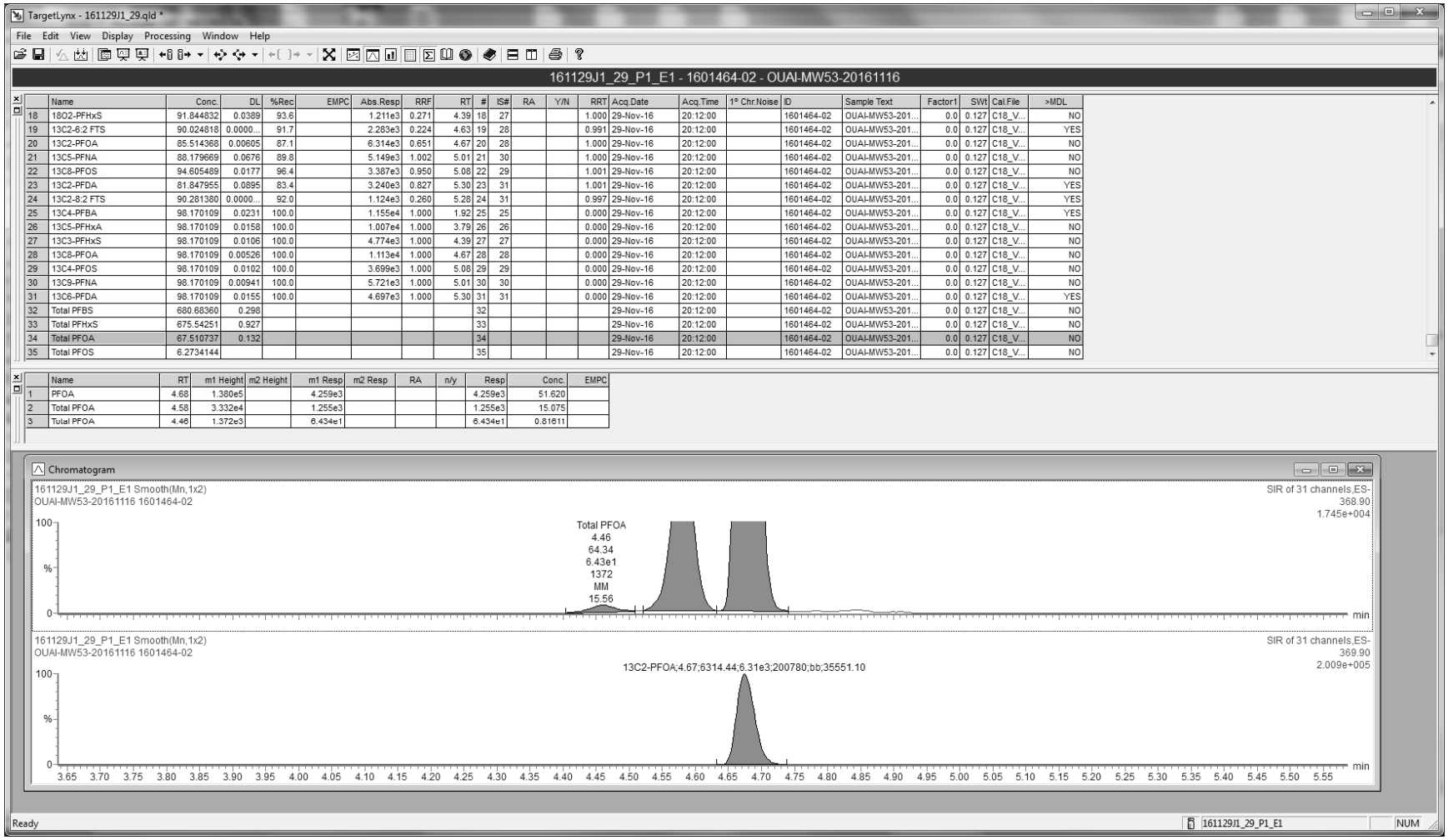

	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	91.844832	0.0389	93.6		1.211e3	0.271	4.39	18	27			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
19	13C2-6:2 FTS	90.024818	0.0000...	91.7		2.283e3	0.224	4.63	19	28			0.991	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
20	13C2-PFOA	85.514368	0.00605	87.1		6.314e3	0.651	4.67	20	28			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
21	13C5-PFNA	88.179669	0.0676	89.8		5.149e3	1.002	5.01	21	30			1.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
22	13C8-PFOS	94.605489	0.0177	96.4		3.387e3	0.950	5.08	22	29			1.001	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
23	13C2-PFDA	81.847955	0.0895	83.4		3.240e3	0.827	5.30	23	31			1.001	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
24	13C2-8:2 FTS	90.281380	0.0000...	92.0		1.124e3	0.260	5.28	24	31			0.997	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
25	13C4-PFBA	98.170109	0.0231	100.0		1.155e4	1.000	1.92	25	25			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
26	13C5-PFHxA	98.170109	0.0158	100.0		1.007e4	1.000	3.79	26	26			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
27	13C3-PFHxS	98.170109	0.0106	100.0		4.774e3	1.000	4.39	27	27			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
28	13C8-PFOA	98.170109	0.00526	100.0		1.113e4	1.000	4.67	28	28			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
29	13C4-PFOS	98.170109	0.0102	100.0		3.699e3	1.000	5.08	29	29			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
30	13C9-PFNA	98.170109	0.00941	100.0		5.721e3	1.000	5.01	30	30			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
31	13C6-PFDA	98.170109	0.0155	100.0		4.697e3	1.000	5.30	31	31			0.000	29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	YES
32	Total PFBS	680.68360	0.298						32					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
33	Total PFHxS	675.54251	0.927						33					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
34	Total PFOA	67.510737	0.132						34					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO
35	Total PFOS	6.2734144							35					29-Nov-16	20:12:00		1601464-02	OUAI-MW53-201...	0.0	0.127	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFOA	4.68	1.380e5		4.259e3				4.259e3	51.620	
2	Total PFOA	4.58	3.332e4		1.255e3				1.255e3	15.075	
3	Total PFOA	4.46	1.372e3		6.434e1				6.434e1	0.81611	

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Last Altered: Thursday, December 01, 2016 11:14:04 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:15:11 Pacific Standard Time

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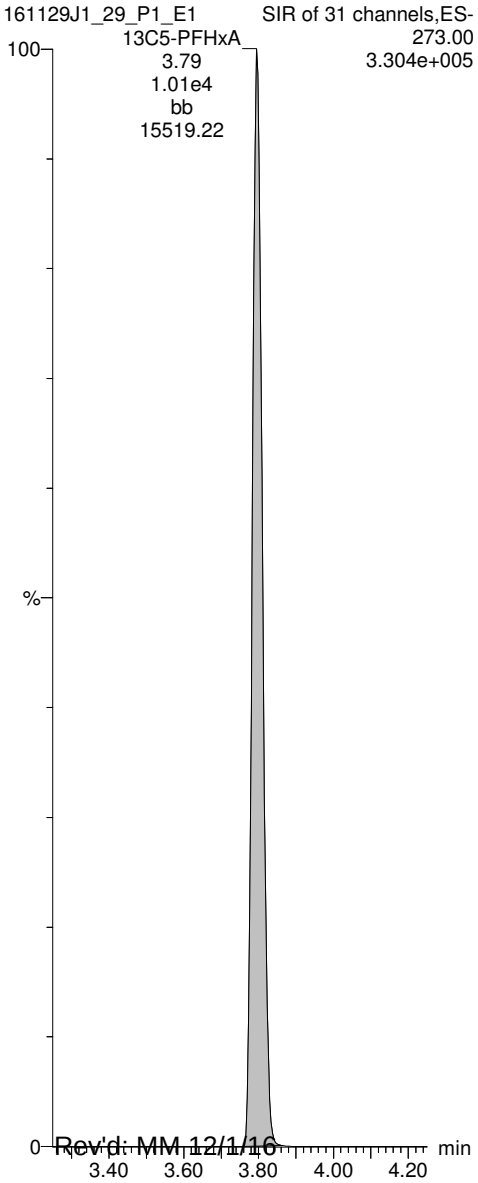
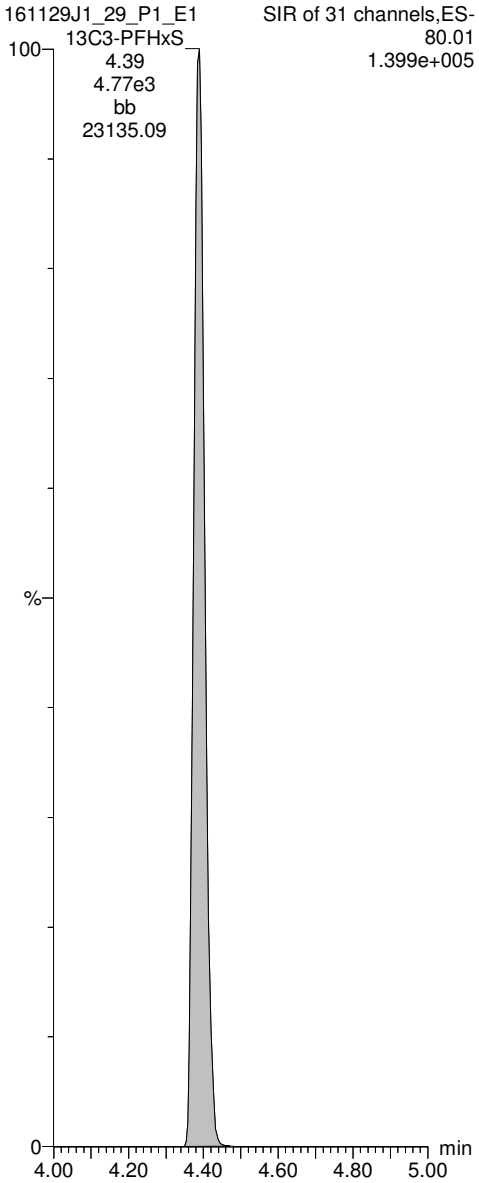
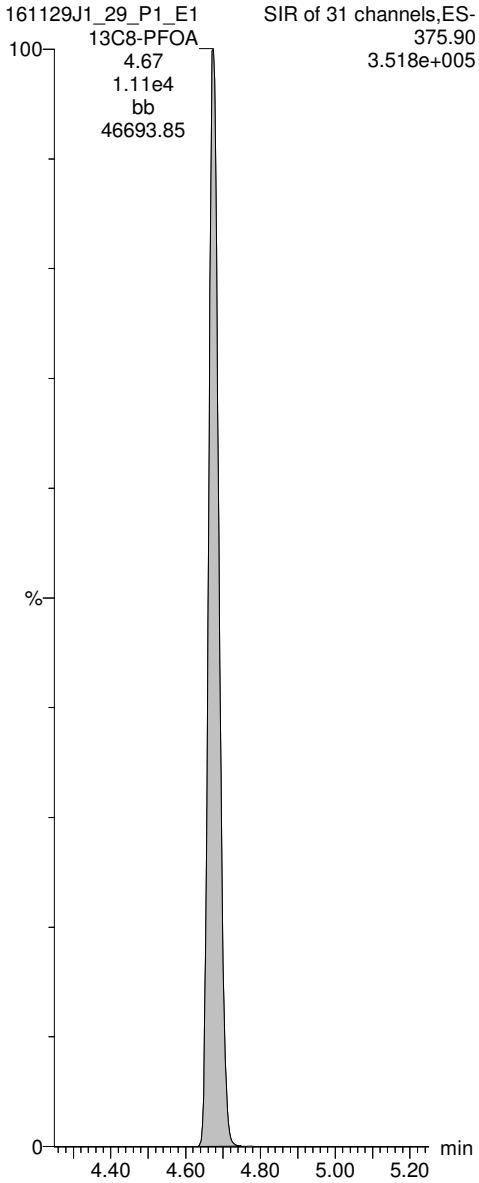
13C5-PFHxA



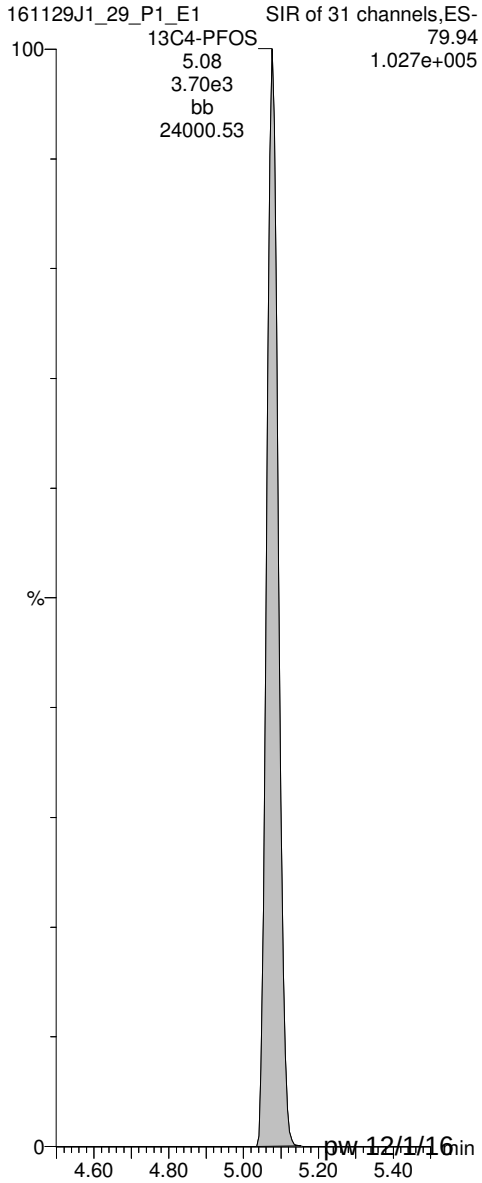
13C3-PFHxS



13C8-PFOA



13C4-PFOS



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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_30.qld

Last Altered: Thursday, December 01, 2016 11:20:32 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:21:26 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-03, Description: OUAI-MW54-20161116, Name: 161129J1_30.wiff, Date: 29-Nov-2016, Time: 20:24:14

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	1.443e4	5.819e3		0.124	3.41	322	
2	8	PFOA	368.90	1.913e3	5.395e3		0.124	4.68	27.6	
3	10	PFOS	79.92	4.757e1	2.593e3		0.124	5.09	1.45	
4	15	13C3-PFBS	79.95	5.819e3	9.352e3	0.564	0.124	3.41	111	110
5	16	13C2-PFHxA	269.90	3.373e3	9.352e3	0.907	0.124	3.81	39.9	99.4
6	17	13C4-PFHpA	321.90	6.256e3	9.352e3	0.742	0.124	4.28	90.6	90.2
7	18	18O2-PFHxS	102.90	1.125e3	4.062e3	0.271	0.124	4.40	103	102
8	19	13C2-6:2 FTS	408.90	1.847e3	9.628e3	0.224	0.124	4.64	86.2	85.8
9	20	13C2-PFOA	369.90	5.395e3	9.628e3	0.651	0.124	4.68	86.5	86.1
10	21	13C5-PFNA	422.90	4.166e3	4.455e3	1.002	0.124	5.02	93.8	93.3
11	22	13C8-PFOS	79.93	2.593e3	2.953e3	0.950	0.124	5.09	92.8	92.4
12	25	13C4-PFBA	171.90	9.963e3	9.963e3	1.000	0.124	1.93	100	100
13	26	13C5-PFHxA	273.00	9.352e3	9.352e3	1.000	0.124	3.81	100	100
14	27	13C3-PFHxS	80.01	4.062e3	4.062e3	1.000	0.124	4.39	100	100
15	28	13C8-PFOA	375.90	9.628e3	9.628e3	1.000	0.124	4.68	100	100
16	29	13C4-PFOS	79.94	2.953e3	2.953e3	1.000	0.124	5.08	100	100
17	30	13C9-PFNA	427.00	4.455e3	4.455e3	1.000	0.124	5.02	100	100
18	31	13C6-PFDA	474.00	4.042e3	4.042e3	1.000	0.124	5.30	100	100
19	32	Total PFBS	79.90		5.819e3		0.124		329	
20	34	Total PFOA	368.90		5.395e3		0.124		35.3	
21	35	Total PFOS	79.92		2.593e3		0.124		7.09	

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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_30.qld

Last Altered: Thursday, December 01, 2016 11:20:32 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:21:26 Pacific Standard Time

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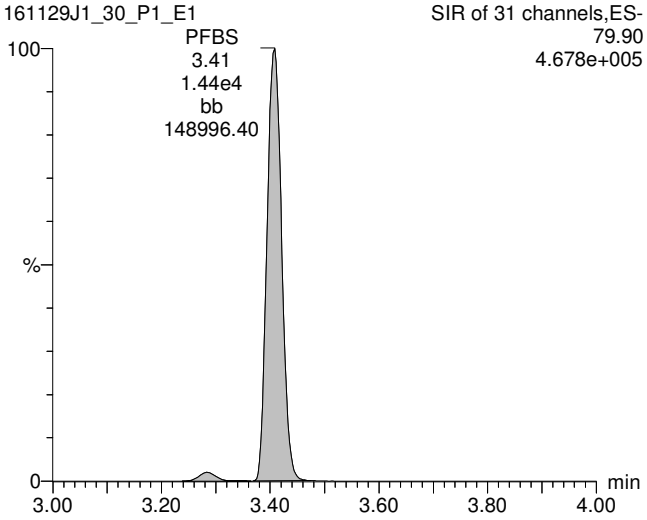
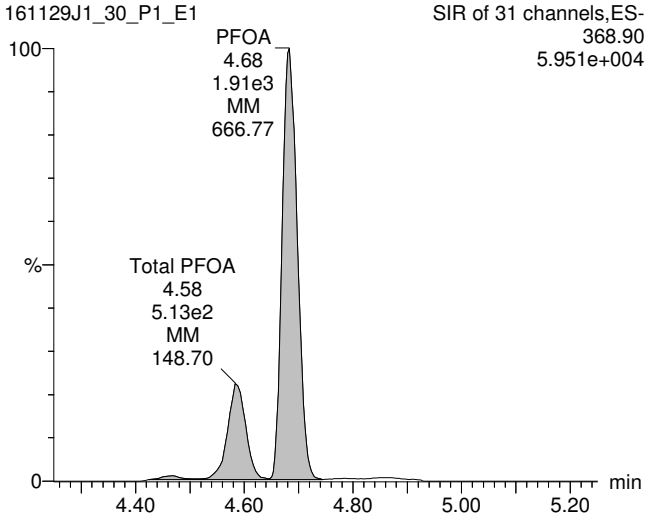
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-03, Description: OUAI-MW54-20161116, Name: 161129J1_30.wiff, Date: 29-Nov-2016, Time: 20:24:14, Instrument: , Lab: ©PE-SCIEX, User: sciex

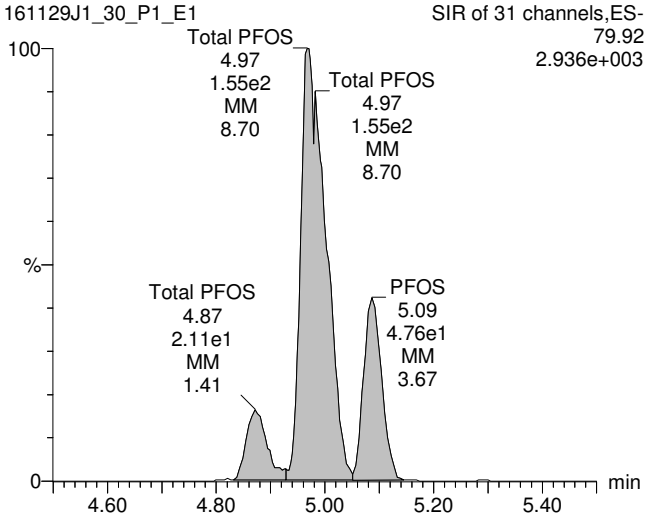
Total PFBS



Total PFOA



Total PFOS



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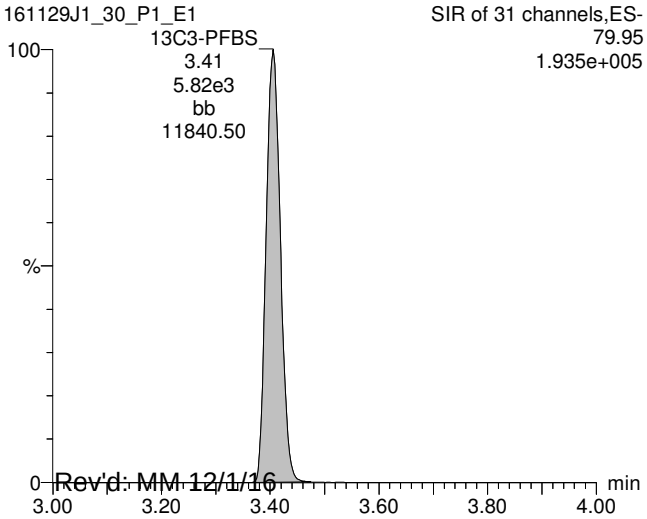
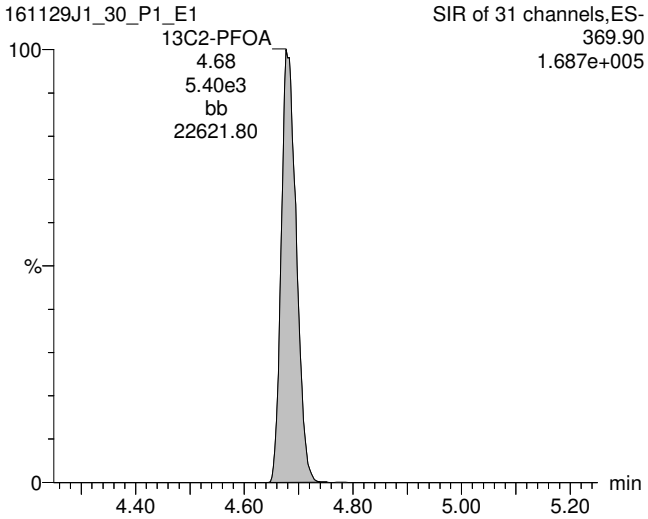
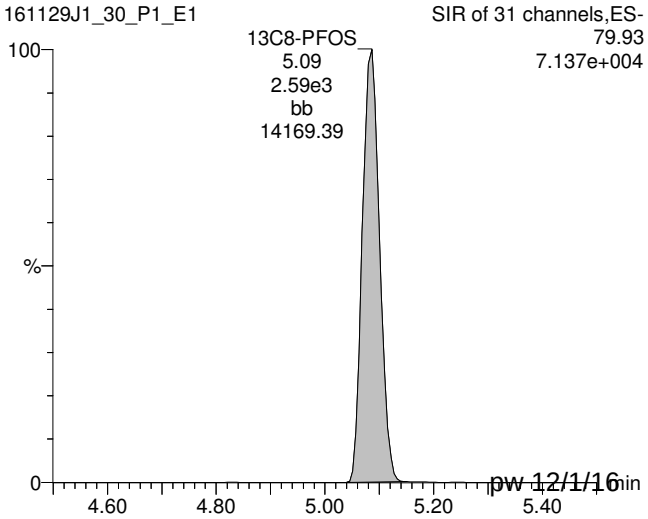


13C2-PFOA



13C8-PFOS



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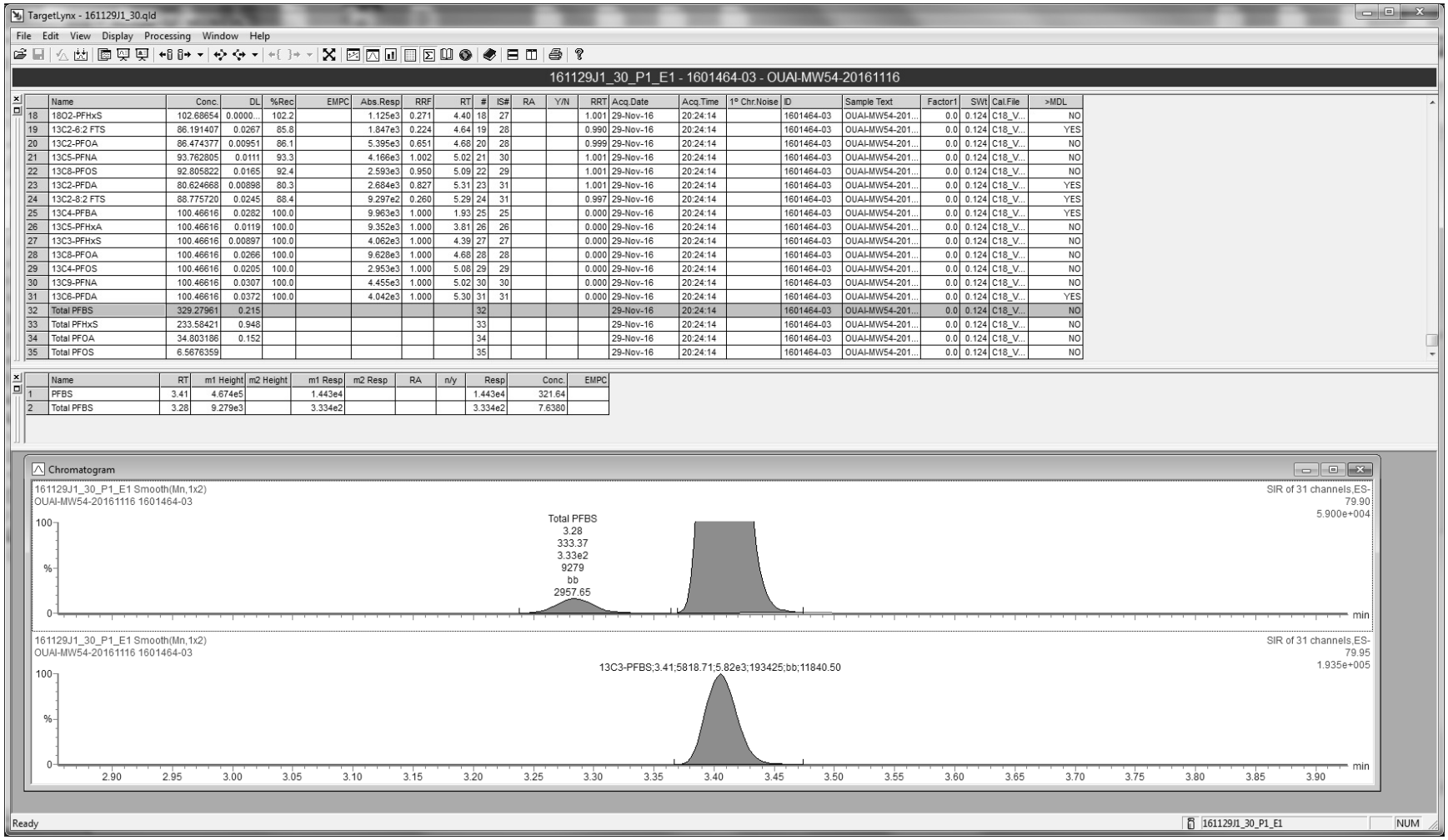

	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	102.68654	0.0000...	102.2		1.125e3	0.271	4.40	18	27			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
19	13C2-6:2 FTS	86.191407	0.0267	85.8		1.847e3	0.224	4.64	19	28			0.990	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
20	13C2-PFOA	86.474377	0.00951	86.1		5.395e3	0.651	4.68	20	28			0.999	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
21	13C5-PFNA	93.762805	0.0111	93.3		4.166e3	1.002	5.02	21	30			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
22	13C8-PFOS	92.805822	0.0165	92.4		2.593e3	0.950	5.09	22	29			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
23	13C2-PFDA	80.624668	0.00898	80.3		2.684e3	0.827	5.31	23	31			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
24	13C2-8:2 FTS	88.775720	0.0245	88.4		9.297e2	0.260	5.29	24	31			0.997	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
25	13C4-PFBA	100.46616	0.0282	100.0		9.963e3	1.000	1.93	25	25			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
26	13C5-PFHxA	100.46616	0.0119	100.0		9.352e3	1.000	3.81	26	26			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
27	13C3-PFHxS	100.46616	0.00897	100.0		4.062e3	1.000	4.39	27	27			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
28	13C8-PFOA	100.46616	0.0266	100.0		9.628e3	1.000	4.68	28	28			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
29	13C4-PFOS	100.46616	0.0205	100.0		2.953e3	1.000	5.08	29	29			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
30	13C9-PFNA	100.46616	0.0307	100.0		4.455e3	1.000	5.02	30	30			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
31	13C6-PFDA	100.46616	0.0372	100.0		4.042e3	1.000	5.30	31	31			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
32	Total PFBS	329.27961	0.215						32					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
33	Total PFHxS	233.58421	0.948						33					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
34	Total PFOA	34.803186	0.152						34					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
35	Total PFOS	6.5676359							35					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.41	4.674e5		1.443e4				1.443e4	321.64	
2	Total PFBS	3.28	9.279e3		3.334e2				3.334e2	7.6380	

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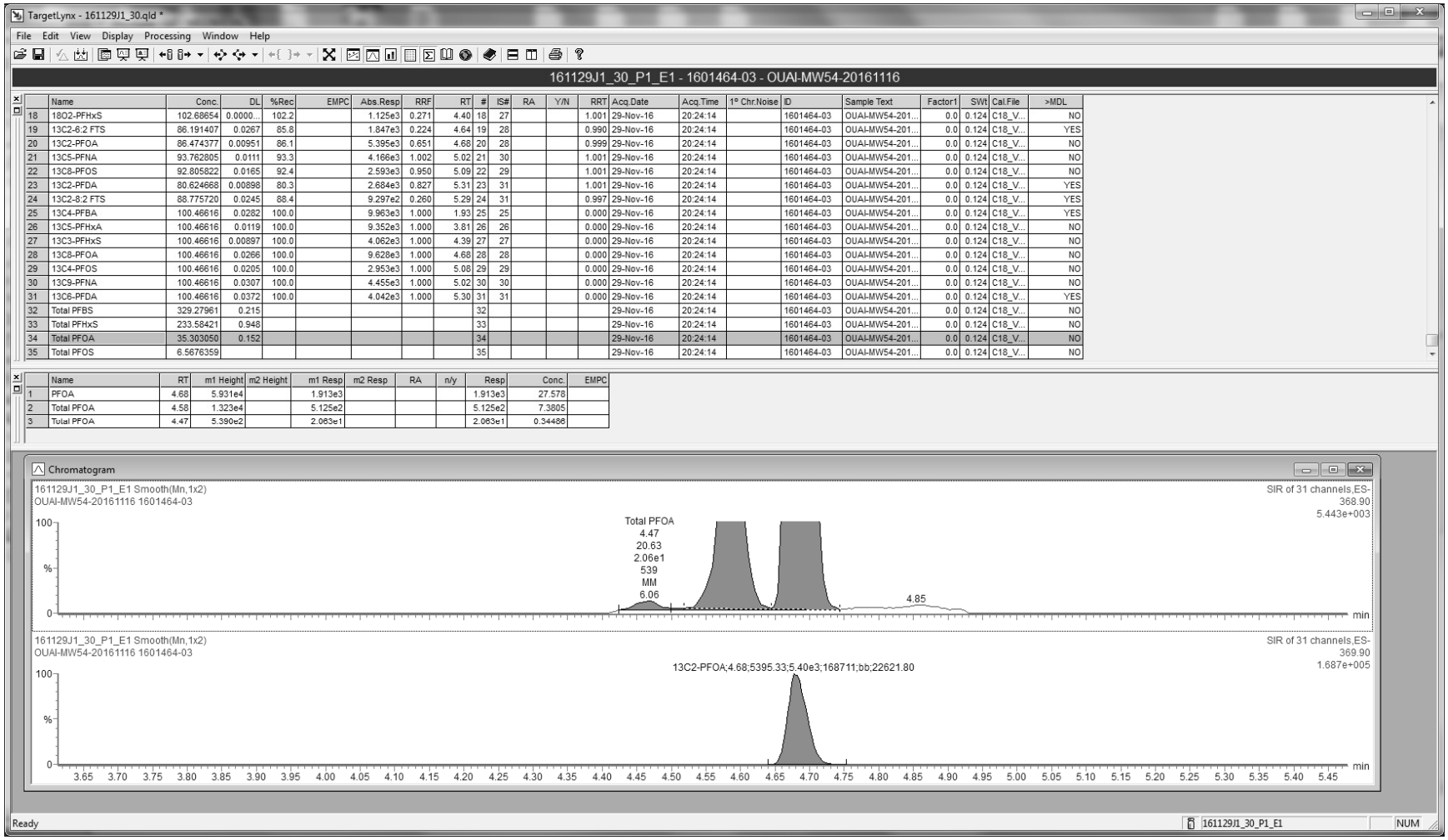

	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	102.68654	0.0000...	102.2		1.125e3	0.271	4.40	18	27			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
19	13C2-6:2 FTS	86.191407	0.0267	85.8		1.847e3	0.224	4.64	19	28			0.990	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
20	13C2-PFOA	86.474377	0.00951	86.1		5.395e3	0.651	4.68	20	28			0.999	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
21	13C5-PFNA	93.762805	0.0111	93.3		4.166e3	1.002	5.02	21	30			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
22	13C8-PFOS	92.805822	0.0165	92.4		2.593e3	0.950	5.09	22	29			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
23	13C2-PFDA	80.624668	0.00898	80.3		2.684e3	0.827	5.31	23	31			1.001	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
24	13C2-8:2 FTS	88.775720	0.0245	88.4		9.297e2	0.260	5.29	24	31			0.997	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
25	13C4-PFBA	100.46616	0.0282	100.0		9.963e3	1.000	1.93	25	25			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
26	13C5-PFHxA	100.46616	0.0119	100.0		9.352e3	1.000	3.81	26	26			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
27	13C3-PFHxS	100.46616	0.00897	100.0		4.062e3	1.000	4.39	27	27			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
28	13C8-PFOA	100.46616	0.0266	100.0		9.628e3	1.000	4.68	28	28			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
29	13C4-PFOS	100.46616	0.0205	100.0		2.953e3	1.000	5.08	29	29			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
30	13C9-PFNA	100.46616	0.0307	100.0		4.455e3	1.000	5.02	30	30			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
31	13C6-PFDA	100.46616	0.0372	100.0		4.042e3	1.000	5.30	31	31			0.000	29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	YES
32	Total PFBS	329.27961	0.215						32					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
33	Total PFHxS	233.58421	0.948						33					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
34	Total PFOA	35.303050	0.152						34					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO
35	Total PFOS	6.5676359							35					29-Nov-16	20:24:14		1601464-03	OUAI-MW54-201...	0.0	0.124	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFOA	4.68	5.931e4		1.913e3				1.913e3	27.578	
2	Total PFOA	4.58	1.323e4		5.125e2				5.125e2	7.3805	
3	Total PFOA	4.47	5.390e2		2.063e1				2.063e1	0.34486	

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Printed: Thursday, December 01, 2016 11:21:26 Pacific Standard Time

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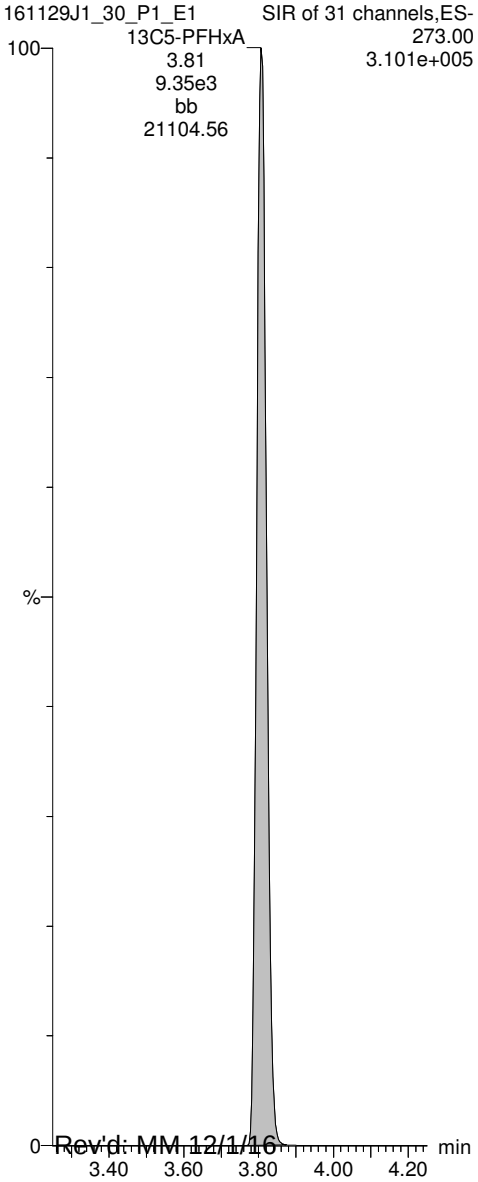
13C5-PFHxA



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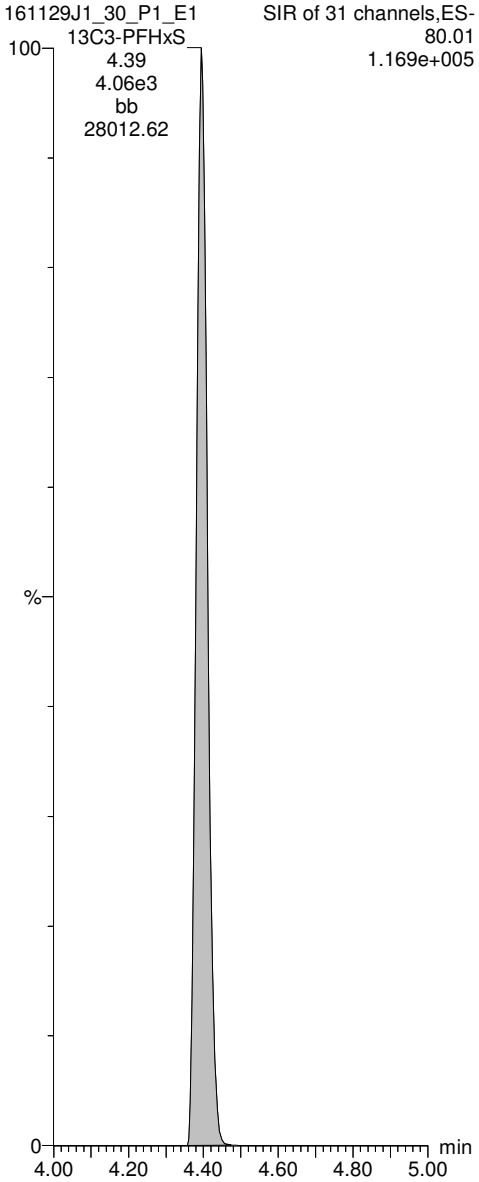

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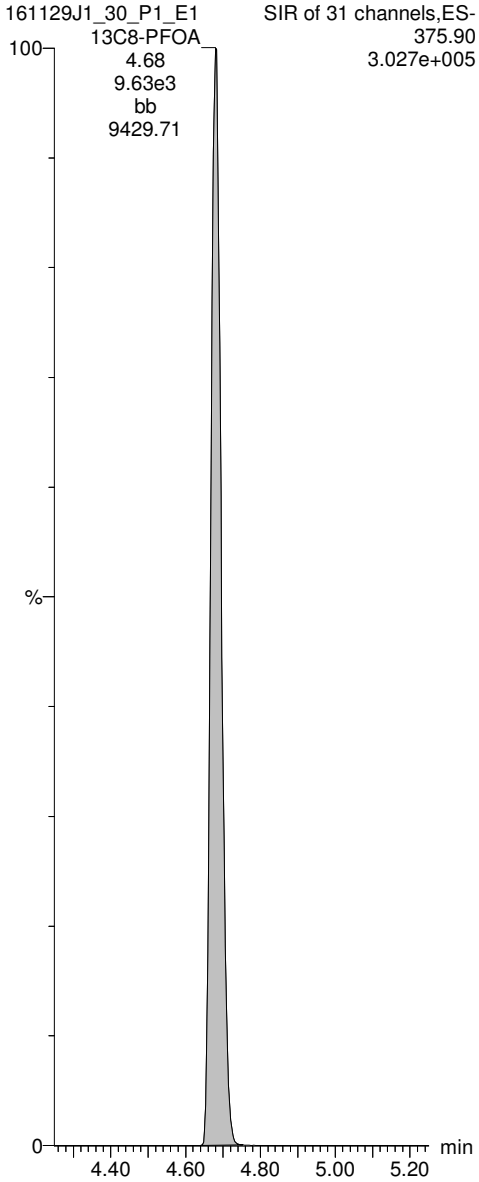
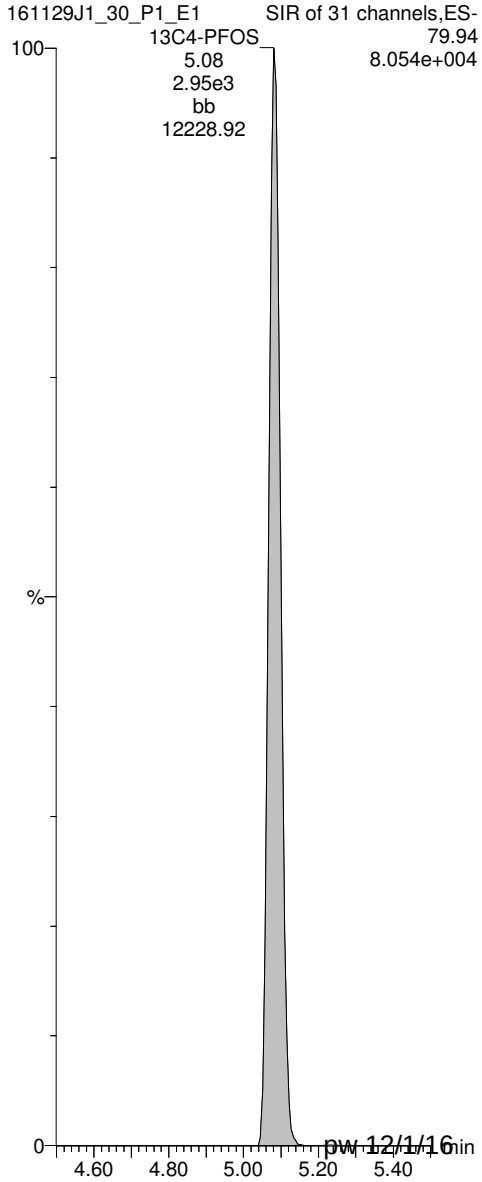


13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_31.qld

Last Altered: Thursday, December 01, 2016 11:28:32 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:29:06 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-04, Description: OUAI-MW42-20161116, Name: 161129J1_31.wiff, Date: 29-Nov-2016, Time: 20:36:29

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	1.624e4	6.268e3		0.129	3.41	324	
2	8	PFOA	368.90	1.973e3	6.130e3		0.129	4.67	24.1	
3	10	PFOS	79.92	2.545e1	3.071e3		0.129	5.06	0.550	
4	15	13C3-PFBS	79.95	6.268e3	1.069e4	0.564	0.129	3.40	101	104
5	16	13C2-PFHxA	269.90	3.649e3	1.069e4	0.907	0.129	3.80	36.4	94.0
6	17	13C4-PFHpA	321.90	7.514e3	1.069e4	0.742	0.129	4.27	91.7	94.7
7	18	18O2-PFHxS	102.90	1.141e3	4.451e3	0.271	0.129	4.39	91.5	94.6
8	19	13C2-6:2 FTS	408.90	1.867e3	1.091e4	0.224	0.129	4.62	74.1	76.5
9	20	13C2-PFOA	369.90	6.130e3	1.091e4	0.651	0.129	4.67	83.5	86.3
10	21	13C5-PFNA	422.90	4.930e3	5.526e3	1.002	0.129	4.99	86.2	89.0
11	22	13C8-PFOS	79.93	3.071e3	3.813e3	0.950	0.129	5.06	82.0	84.8
12	25	13C4-PFBA	171.90	1.135e4	1.135e4	1.000	0.129	1.92	96.8	100
13	26	13C5-PFHxA	273.00	1.069e4	1.069e4	1.000	0.129	3.80	96.8	100
14	27	13C3-PFHxS	80.01	4.451e3	4.451e3	1.000	0.129	4.39	96.8	100
15	28	13C8-PFOA	375.90	1.091e4	1.091e4	1.000	0.129	4.67	96.8	100
16	29	13C4-PFOS	79.94	3.813e3	3.813e3	1.000	0.129	5.06	96.8	100
17	30	13C9-PFNA	427.00	5.526e3	5.526e3	1.000	0.129	4.99	96.8	100
18	31	13C6-PFDA	474.00	5.155e3	5.155e3	1.000	0.129	5.27	96.8	100
19	32	Total PFBS	79.90		6.268e3		0.129		332	
20	34	Total PFOA	368.90		6.130e3		0.129		29.6	
21	35	Total PFOS	79.92		3.071e3		0.129		4.52	

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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_31.qld

Last Altered: Thursday, December 01, 2016 11:28:32 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:29:06 Pacific Standard Time

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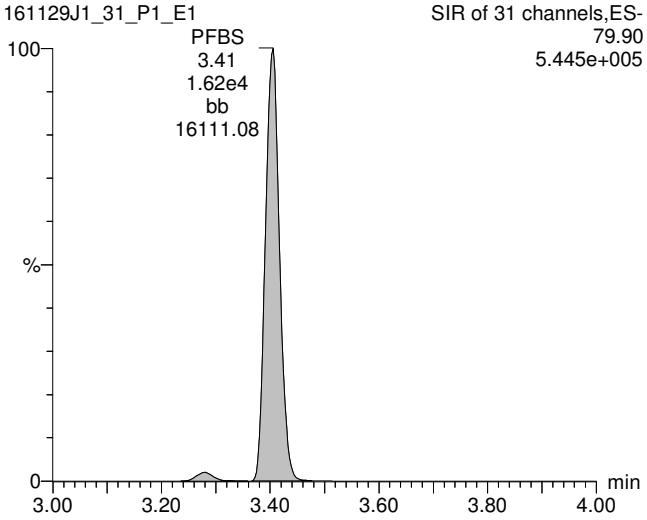
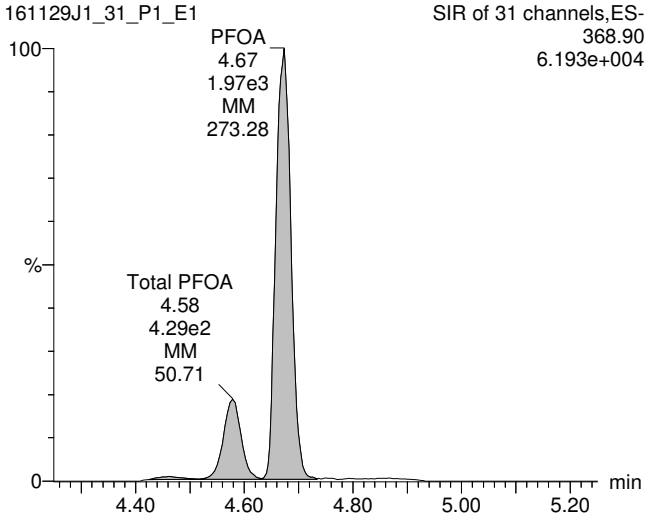
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-04, Description: OUAI-MW42-20161116, Name: 161129J1_31.wiff, Date: 29-Nov-2016, Time: 20:36:29, Instrument: , Lab: ©PE-SCIEX, User: sciex

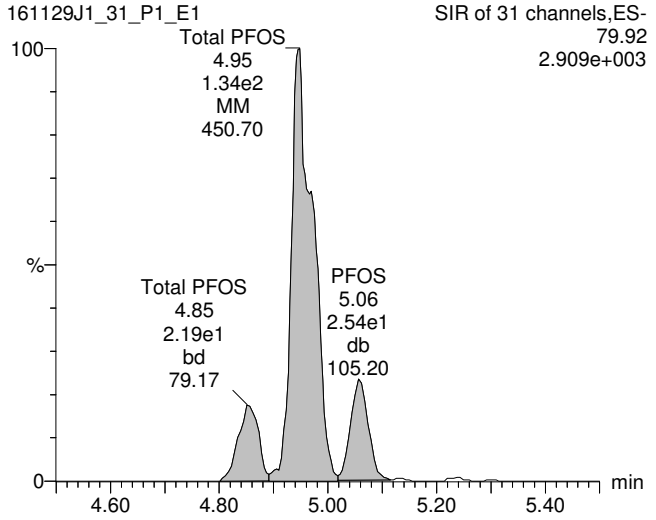
Total PFBS



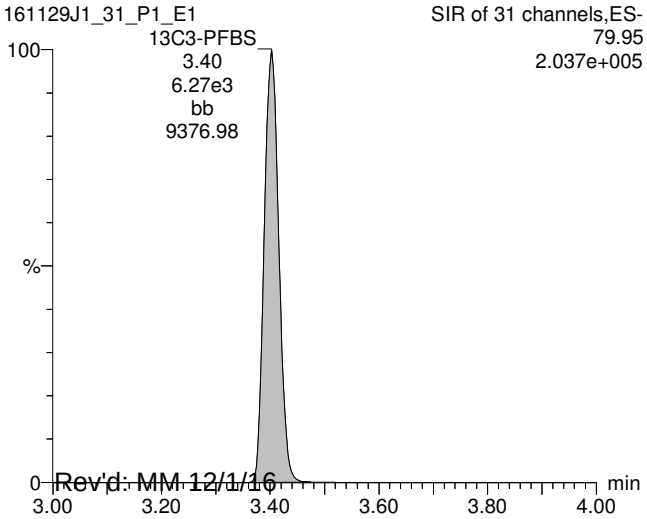
Total PFOA



Total PFOS



13C3-PFBS



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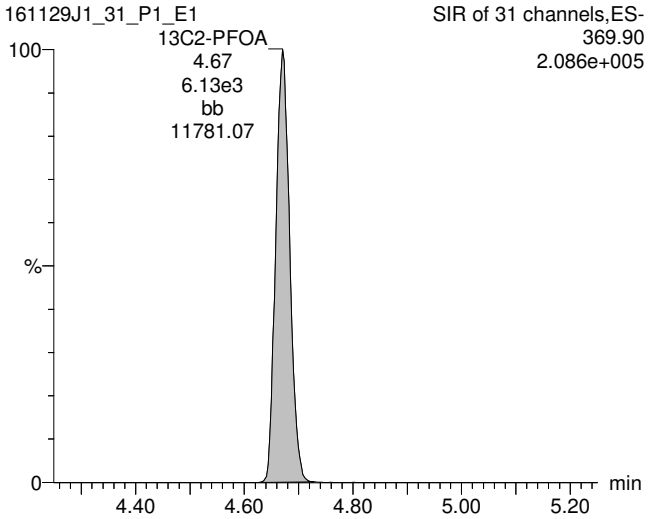
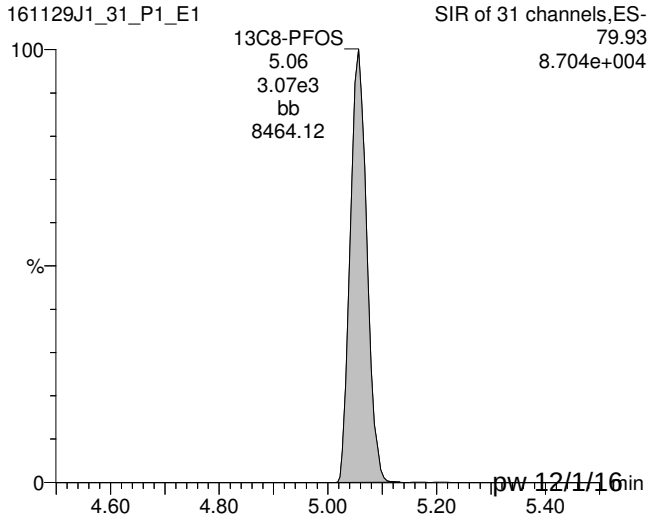
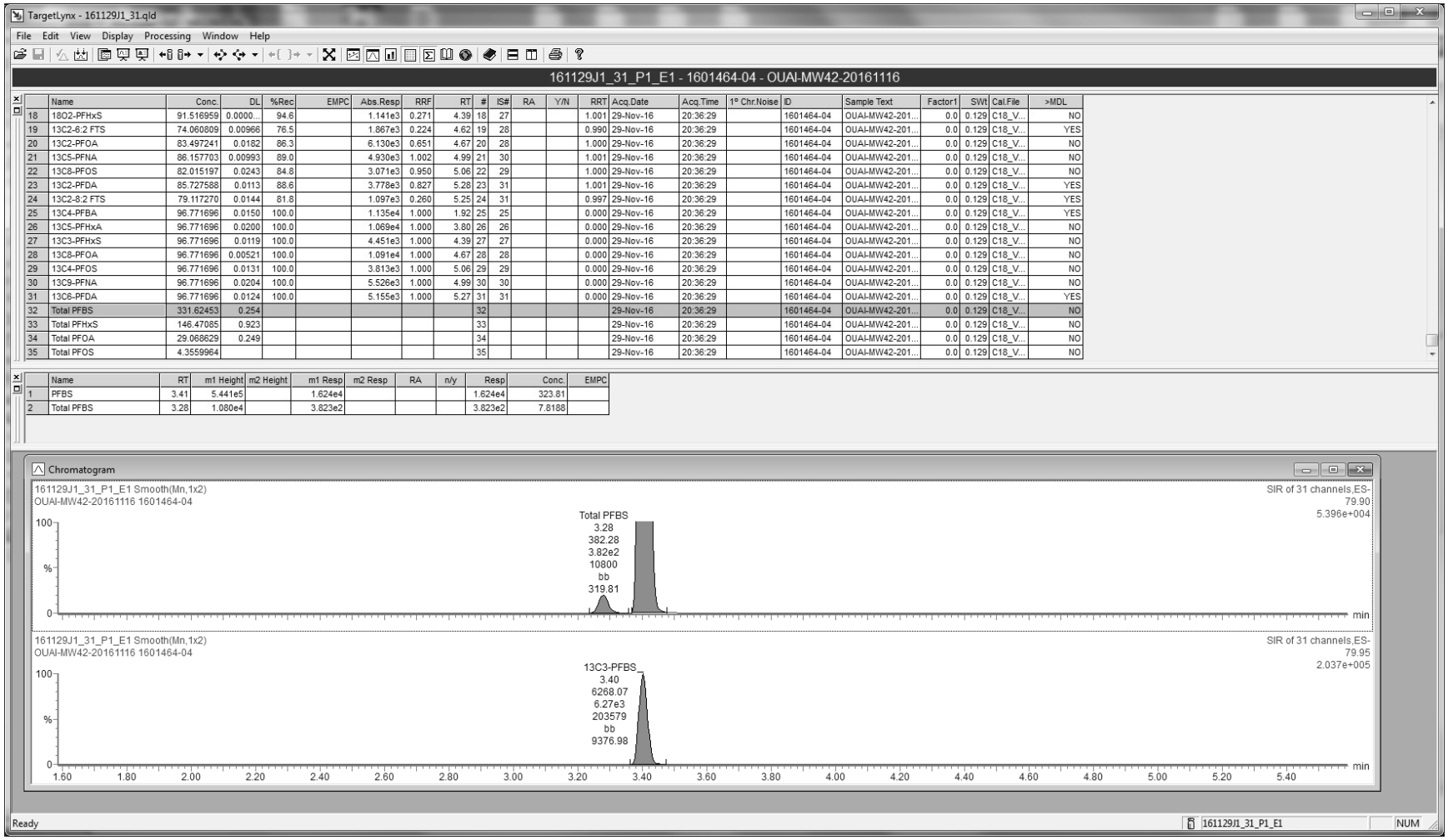


13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	91.516959	0.0000...	94.6		1.141e3	0.271	4.39	18	27			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
19	13C2-6:2 FTS	74.060809	0.00966	76.5		1.867e3	0.224	4.62	19	28			0.990	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
20	13C2-PFOA	83.497241	0.0182	86.3		6.130e3	0.651	4.67	20	28			1.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
21	13C5-PFNA	86.157703	0.00993	89.0		4.930e3	1.002	4.99	21	30			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
22	13C8-PFOS	82.015197	0.0243	84.8		3.071e3	0.950	5.06	22	29			1.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
23	13C2-PFDA	85.727588	0.0113	88.6		3.778e3	0.827	5.28	23	31			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
24	13C2-8:2 FTS	79.117270	0.0144	81.8		1.097e3	0.260	5.25	24	31			0.997	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
25	13C4-PFBA	96.771696	0.0150	100.0		1.135e4	1.000	1.92	25	25			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
26	13C5-PFHxA	96.771696	0.0200	100.0		1.069e4	1.000	3.80	26	26			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
27	13C3-PFHxS	96.771696	0.0119	100.0		4.451e3	1.000	4.39	27	27			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
28	13C8-PFOA	96.771696	0.00521	100.0		1.091e4	1.000	4.67	28	28			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
29	13C4-PFOS	96.771696	0.0131	100.0		3.813e3	1.000	5.06	29	29			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
30	13C9-PFNA	96.771696	0.0204	100.0		5.526e3	1.000	4.99	30	30			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
31	13C6-PFDA	96.771696	0.0124	100.0		5.155e3	1.000	5.27	31	31			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
32	Total PFBS	331.62453	0.254						32					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
33	Total PFHxS	146.47085	0.923						33					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
34	Total PFOA	29.068629	0.249						34					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
35	Total PFOS	4.3559964							35					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.41	5.441e5		1.624e4				1.624e4	323.81	
2	Total PFBS	3.28	1.080e4		3.823e2				3.823e2	7.8188	

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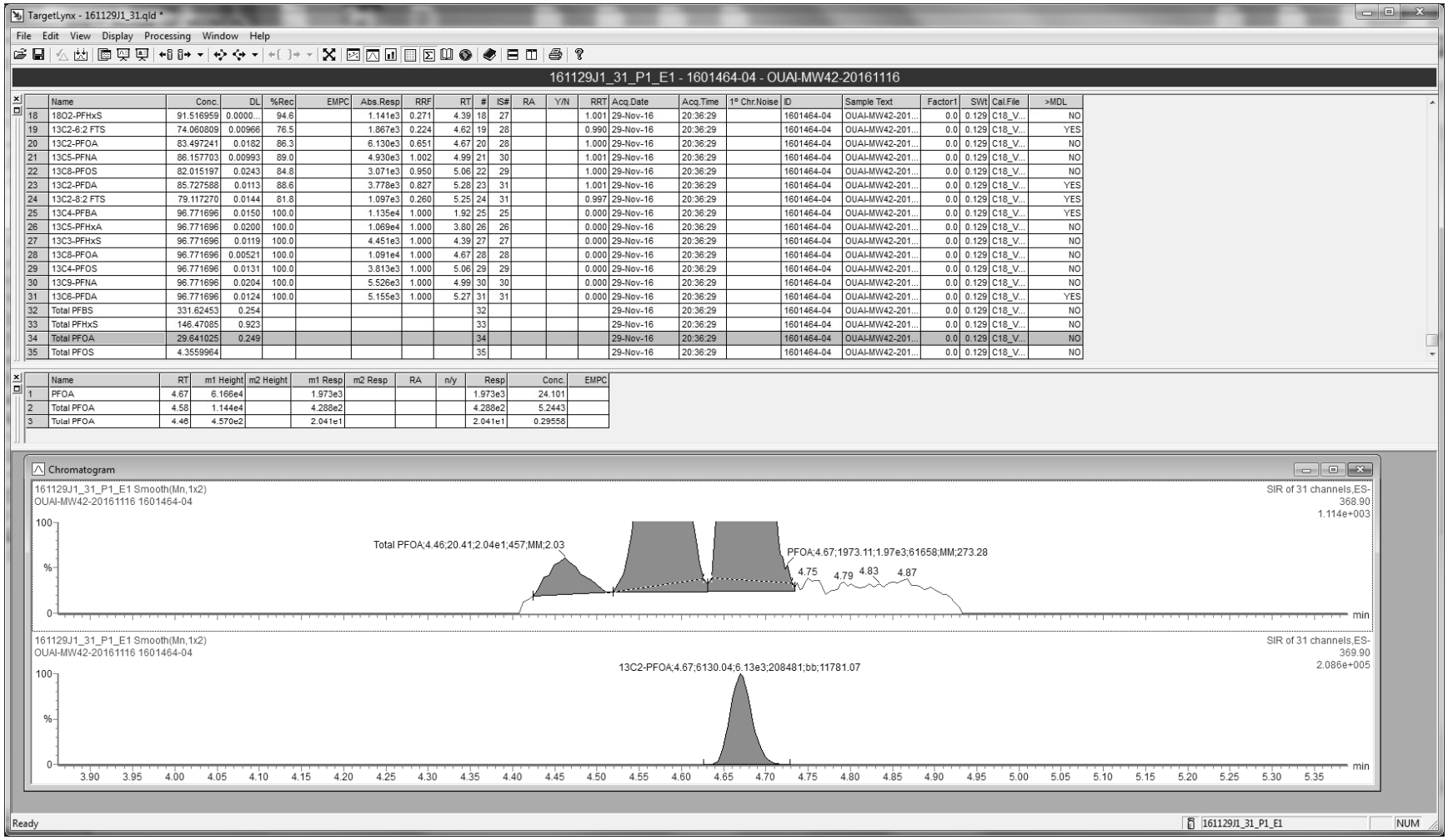

	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	91.516959	0.0000...	94.6		1.141e3	0.271	4.39	18	27			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
19	13C2-6:2 FTS	74.060809	0.00966	76.5		1.867e3	0.224	4.62	19	28			0.990	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
20	13C2-PFOA	83.497241	0.0182	86.3		6.130e3	0.651	4.67	20	28			1.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
21	13C5-PFNA	86.157703	0.00993	89.0		4.930e3	1.002	4.99	21	30			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
22	13C8-PFOS	82.015197	0.0243	84.8		3.071e3	0.950	5.06	22	29			1.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
23	13C2-PFDA	85.727588	0.0113	88.6		3.778e3	0.827	5.28	23	31			1.001	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
24	13C2-8:2 FTS	79.117270	0.0144	81.8		1.097e3	0.260	5.25	24	31			0.997	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
25	13C4-PFBA	96.771696	0.0150	100.0		1.135e4	1.000	1.92	25	25			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
26	13C5-PFHxA	96.771696	0.0200	100.0		1.069e4	1.000	3.80	26	26			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
27	13C3-PFHxS	96.771696	0.0119	100.0		4.451e3	1.000	4.39	27	27			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
28	13C8-PFOA	96.771696	0.00521	100.0		1.091e4	1.000	4.67	28	28			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
29	13C4-PFOS	96.771696	0.0131	100.0		3.813e3	1.000	5.06	29	29			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
30	13C9-PFNA	96.771696	0.0204	100.0		5.526e3	1.000	4.99	30	30			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
31	13C6-PFDA	96.771696	0.0124	100.0		5.155e3	1.000	5.27	31	31			0.000	29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	YES
32	Total PFBS	331.62453	0.254						32					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
33	Total PFHxS	146.47085	0.923						33					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
34	Total PFOA	29.641025	0.249						34					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO
35	Total PFOS	4.3559964							35					29-Nov-16	20:36:29		1601464-04	OUAI-MW42-201...	0.0	0.129	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFOA	4.67	6.166e4		1.973e3				1.973e3	24.101	
2	Total PFOA	4.58	1.144e4		4.288e2				4.288e2	5.2443	
3	Total PFOA	4.46	4.570e2		2.041e1				2.041e1	0.29558	

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Dataset: U:\Q2.PRO\Results\161129J1\161129J1_31.qld

Last Altered: Thursday, December 01, 2016 11:28:32 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:29:06 Pacific Standard Time

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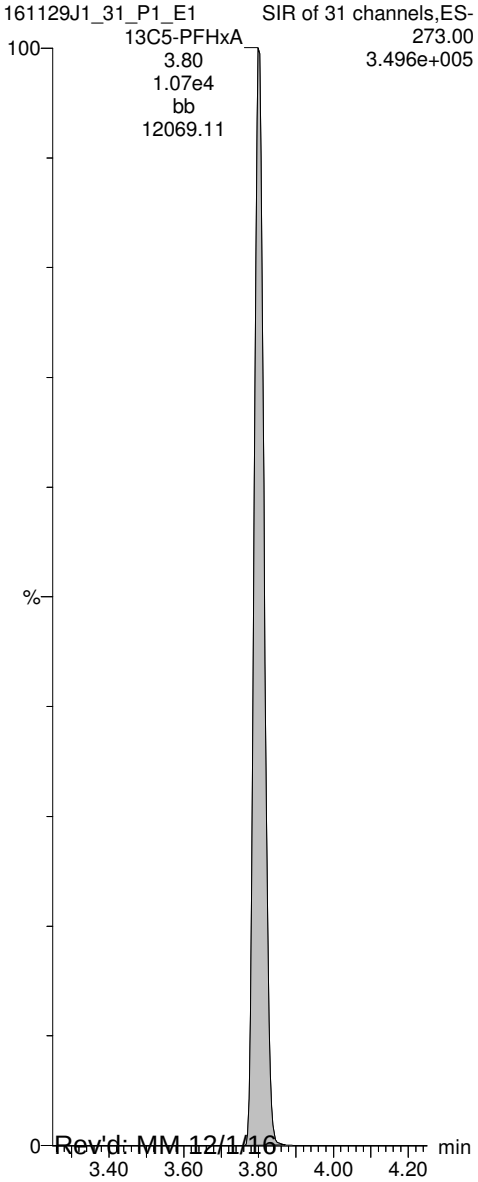
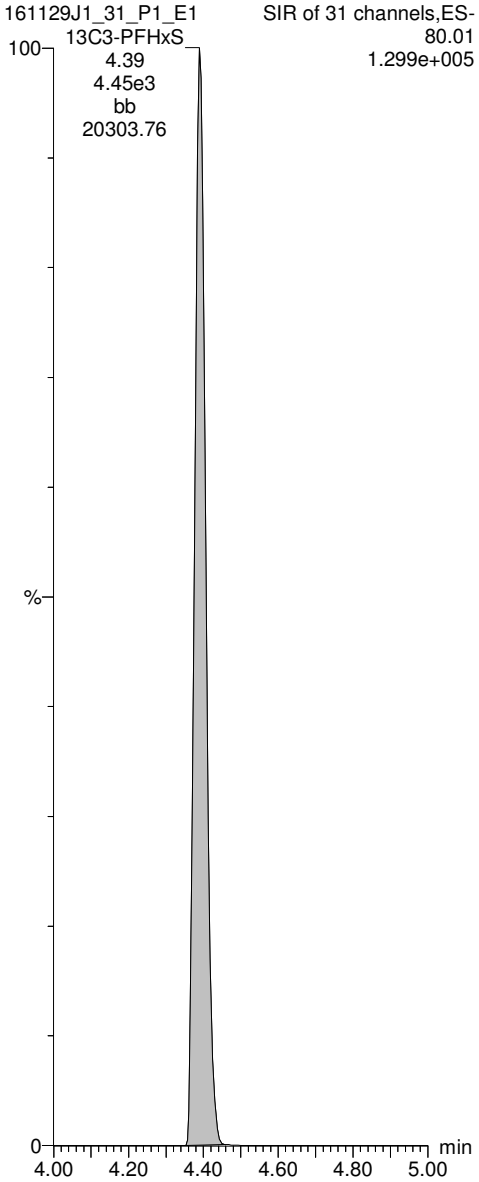
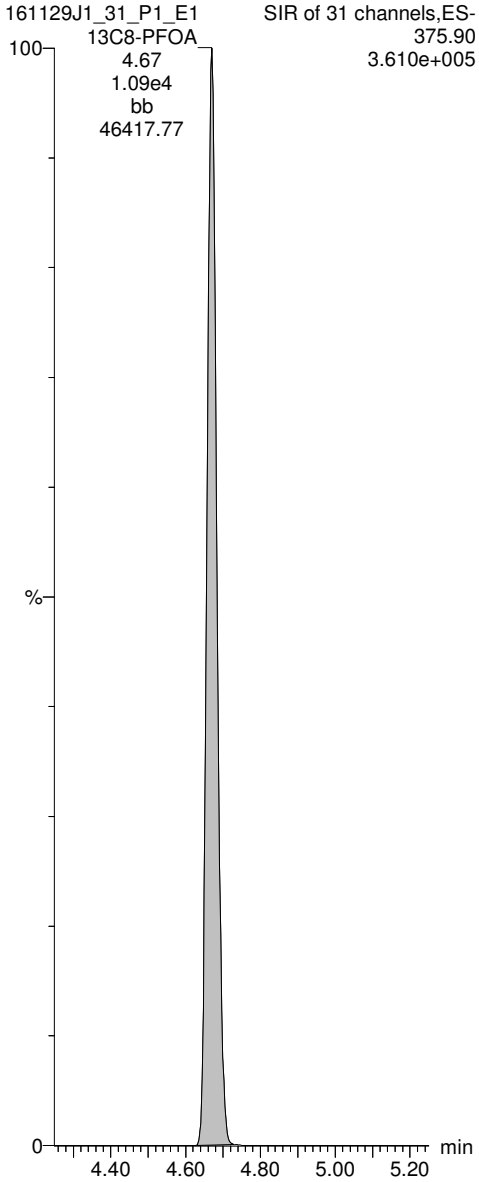
13C5-PFHxA



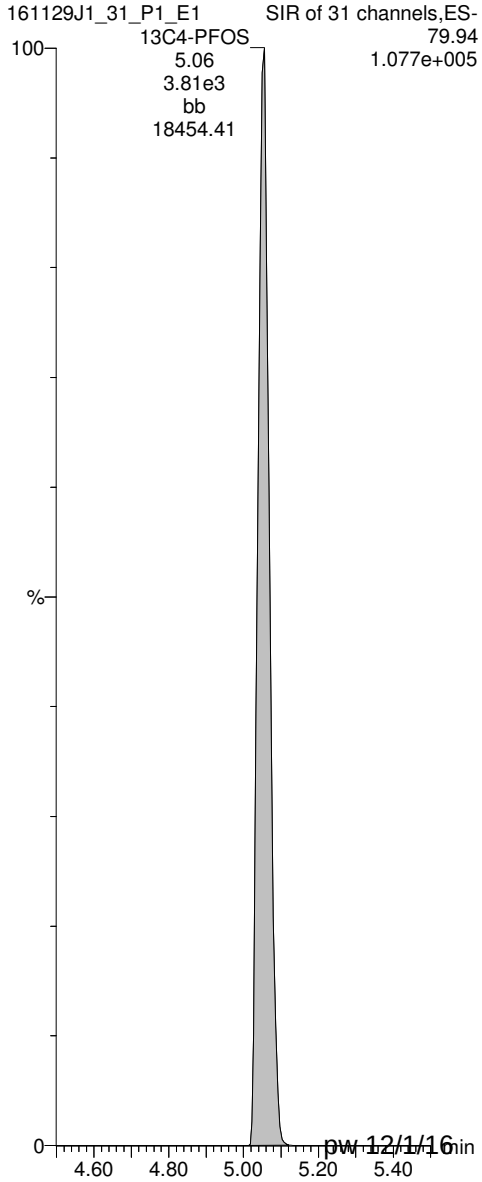
13C3-PFHxS



13C8-PFOA



13C4-PFOS



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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_32.qld

Last Altered: Thursday, December 01, 2016 11:32:30 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:33:18 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-05, Description: OUAI-MW01-20161116, Name: 161129J1_32.wiff, Date: 29-Nov-2016, Time: 20:48:43

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	2.299e3	6.615e3		0.128	3.40	43.9	
2	8	PFOA	368.90	6.638e1	6.133e3		0.128	4.67	0.857	
3	10	PFOS	79.92	6.345e0	3.350e3		0.128	5.07	0.0125	
4	15	13C3-PFBS	79.95	6.615e3	1.064e4	0.564	0.128	3.40	107	110
5	16	13C2-PFHxA	269.90	3.651e3	1.064e4	0.907	0.128	3.80	36.8	94.6
6	17	13C4-PFHpA	321.90	6.399e3	1.064e4	0.742	0.128	4.27	79.0	81.1
7	18	18O2-PFHxS	102.90	1.132e3	4.749e3	0.271	0.128	4.38	85.6	87.9
8	19	13C2-6:2 FTS	408.90	2.060e3	1.059e4	0.224	0.128	4.63	84.8	87.0
9	20	13C2-PFOA	369.90	6.133e3	1.059e4	0.651	0.128	4.67	86.7	89.0
10	21	13C5-PFNA	422.90	3.817e3	4.605e3	1.002	0.128	5.01	80.6	82.7
11	22	13C8-PFOS	79.93	3.350e3	4.034e3	0.950	0.128	5.07	85.1	87.4
12	25	13C4-PFBA	171.90	1.052e4	1.052e4	1.000	0.128	1.93	97.4	100
13	26	13C5-PFHxA	273.00	1.064e4	1.064e4	1.000	0.128	3.80	97.4	100
14	27	13C3-PFHxS	80.01	4.749e3	4.749e3	1.000	0.128	4.38	97.4	100
15	28	13C8-PFOA	375.90	1.059e4	1.059e4	1.000	0.128	4.67	97.4	100
16	29	13C4-PFOS	79.94	4.034e3	4.034e3	1.000	0.128	5.07	97.4	100
17	30	13C9-PFNA	427.00	4.605e3	4.605e3	1.000	0.128	5.01	97.4	100
18	31	13C6-PFDA	474.00	4.827e3	4.827e3	1.000	0.128	5.30	97.4	100
19	32	Total PFBS	79.90		6.615e3		0.128		45.6	
20	34	Total PFOA	368.90		6.133e3		0.128		1.40	
21	35	Total PFOS	79.92		3.350e3		0.128		0.111	

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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_32.qld

Last Altered: Thursday, December 01, 2016 11:32:30 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:33:18 Pacific Standard Time

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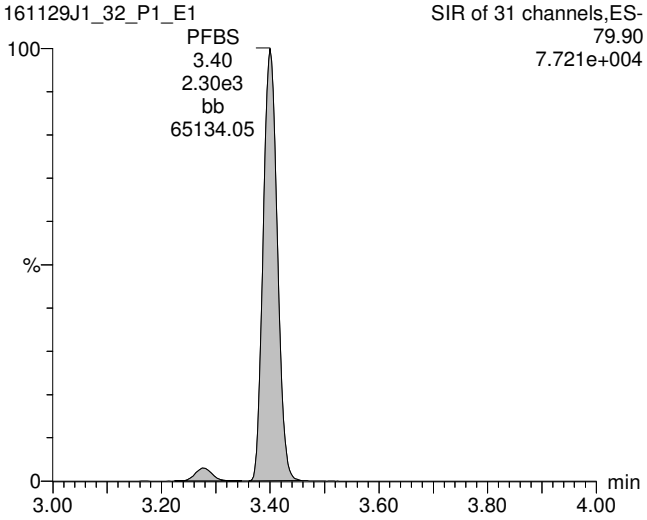
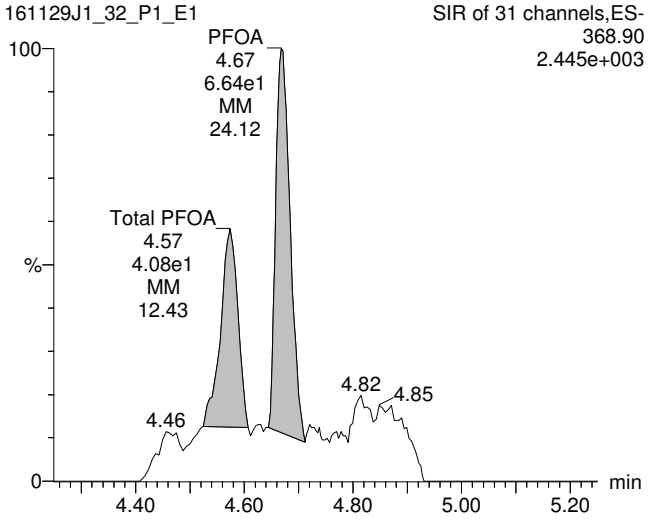
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-05, Description: OUAI-MW01-20161116, Name: 161129J1_32.wiff, Date: 29-Nov-2016, Time: 20:48:43, Instrument: , Lab: ©PE-SCIEX, User: sciex

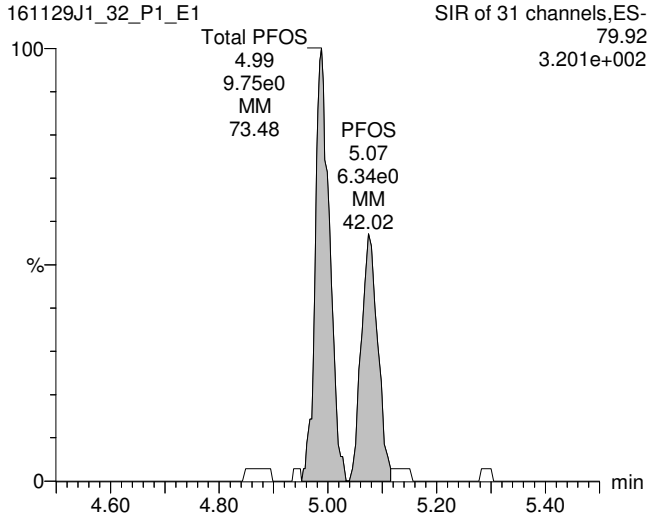
Total PFBS



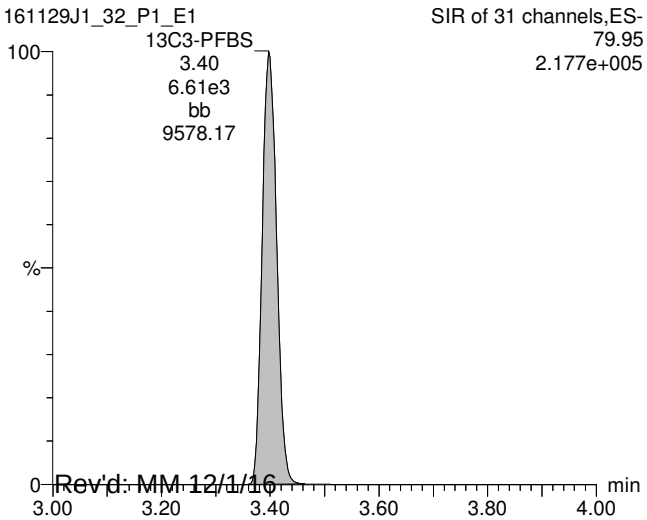
Total PFOA



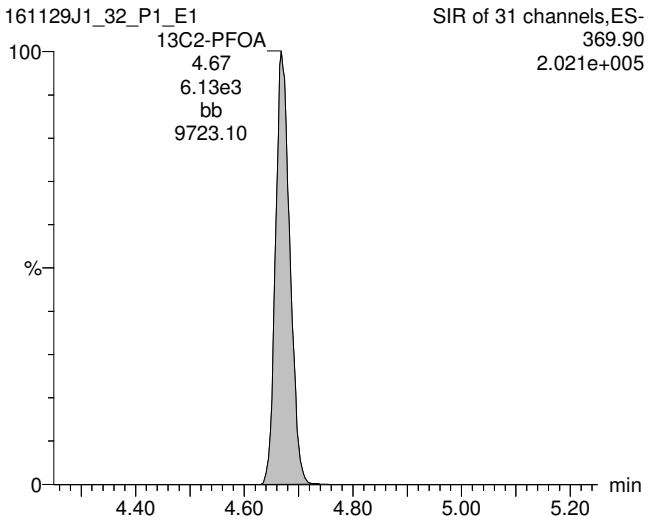
Total PFOS



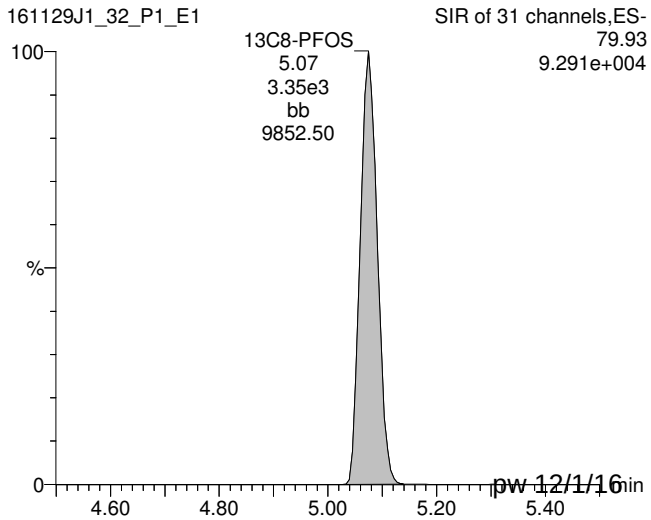
13C3-PFBS



13C2-PFOA



13C8-PFOS



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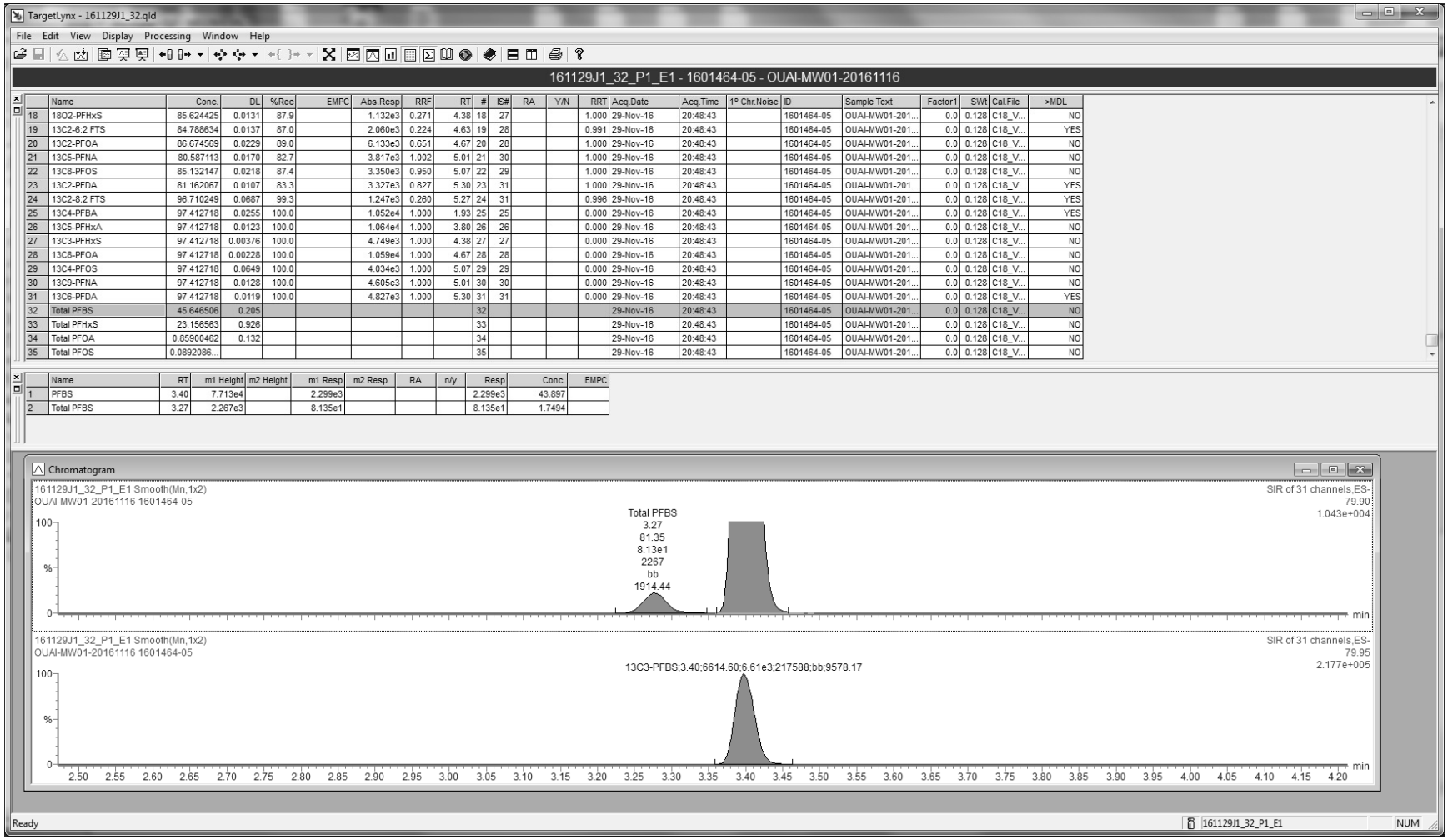
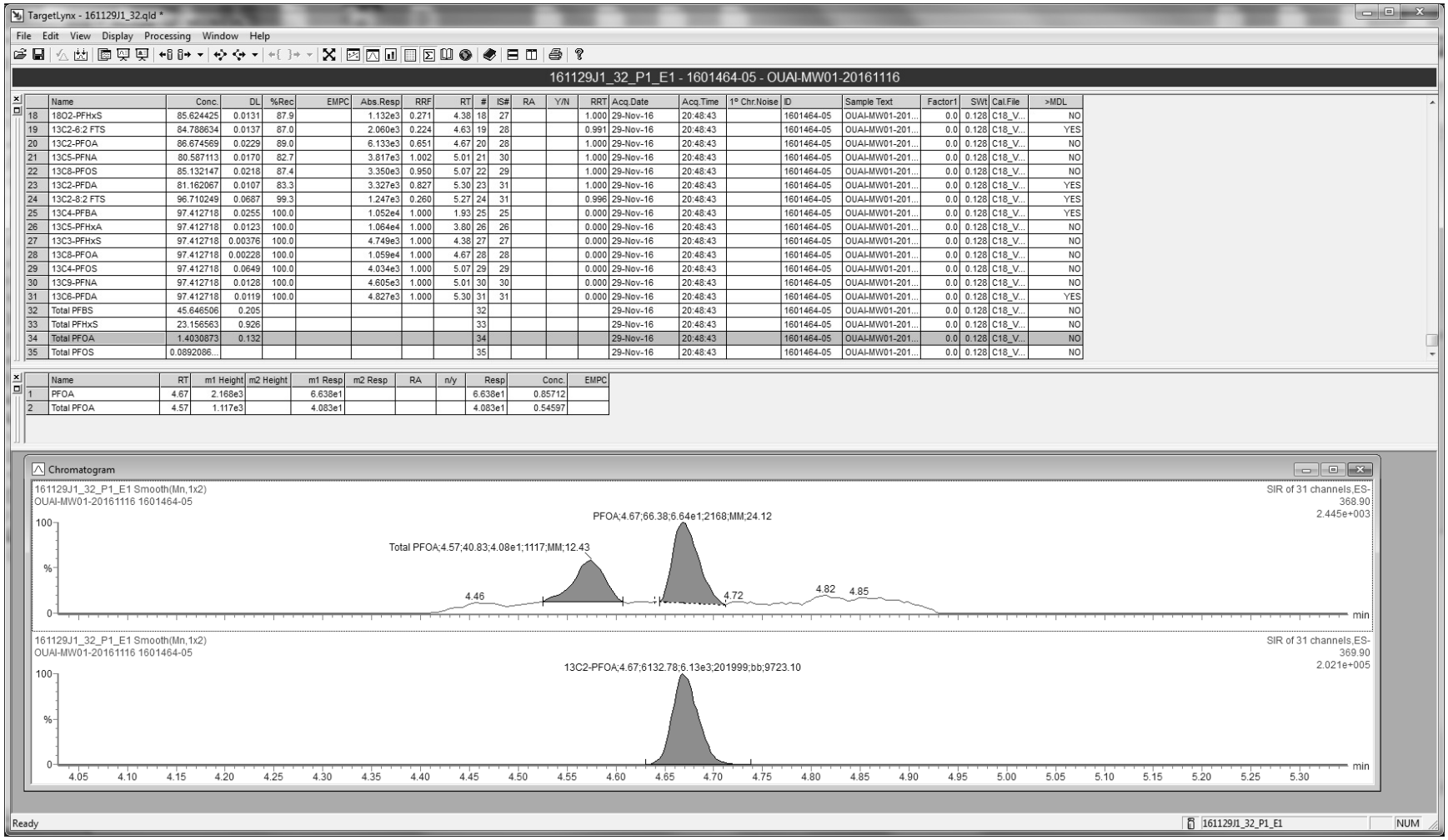


	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	85.624425	0.0131	87.9		1.132e3	0.271	4.38	18	27			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
19	13C2-6:2 FTS	84.788634	0.0137	87.0		2.060e3	0.224	4.63	19	28			0.991	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
20	13C2-PFOA	86.674569	0.0229	89.0		6.133e3	0.651	4.67	20	28			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
21	13C5-PFNA	80.587113	0.0170	82.7		3.817e3	1.002	5.01	21	30			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
22	13C8-PFOS	85.132147	0.0218	87.4		3.350e3	0.950	5.07	22	29			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
23	13C2-PFDA	81.162067	0.0107	83.3		3.327e3	0.827	5.30	23	31			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
24	13C2-8:2 FTS	96.710249	0.0687	99.3		1.247e3	0.260	5.27	24	31			0.996	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
25	13C4-PFBA	97.412718	0.0255	100.0		1.052e4	1.000	1.93	25	25			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
26	13C5-PFHxA	97.412718	0.0123	100.0		1.064e4	1.000	3.80	26	26			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
27	13C3-PFHxS	97.412718	0.00376	100.0		4.749e3	1.000	4.38	27	27			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
28	13C8-PFOA	97.412718	0.00228	100.0		1.059e4	1.000	4.67	28	28			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
29	13C4-PFOS	97.412718	0.0649	100.0		4.034e3	1.000	5.07	29	29			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
30	13C9-PFNA	97.412718	0.0128	100.0		4.605e3	1.000	5.01	30	30			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
31	13C6-PFDA	97.412718	0.0119	100.0		4.827e3	1.000	5.30	31	31			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
32	Total PFBS	45.646506	0.205						32					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
33	Total PFHxS	23.156563	0.926						33					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
34	Total PFOA	0.85900462	0.132						34					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
35	Total PFOS	0.0892086...							35					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.40	7.713e4		2.299e3				2.299e3	43.897	
2	Total PFBS	3.27	2.267e3		8.135e1				8.135e1	1.7494	



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	85.624425	0.0131	87.9		1.132e3	0.271	4.38	18	27			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
19	13C2-6:2 FTS	84.788634	0.0137	87.0		2.060e3	0.224	4.63	19	28			0.991	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
20	13C2-PFOA	86.674569	0.0229	89.0		6.133e3	0.651	4.67	20	28			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
21	13C5-PFNA	80.587113	0.0170	82.7		3.817e3	1.002	5.01	21	30			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
22	13C8-PFOS	85.132147	0.0218	87.4		3.350e3	0.950	5.07	22	29			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
23	13C2-PFDA	81.162067	0.0107	83.3		3.327e3	0.827	5.30	23	31			1.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
24	13C2-8:2 FTS	96.710249	0.0687	99.3		1.247e3	0.260	5.27	24	31			0.996	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
25	13C4-PFBA	97.412718	0.0255	100.0		1.052e4	1.000	1.93	25	25			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
26	13C5-PFHxA	97.412718	0.0123	100.0		1.064e4	1.000	3.80	26	26			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
27	13C3-PFHxS	97.412718	0.00376	100.0		4.749e3	1.000	4.38	27	27			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
28	13C8-PFOA	97.412718	0.00228	100.0		1.059e4	1.000	4.67	28	28			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
29	13C4-PFOS	97.412718	0.0649	100.0		4.034e3	1.000	5.07	29	29			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
30	13C9-PFNA	97.412718	0.0128	100.0		4.605e3	1.000	5.01	30	30			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
31	13C6-PFDA	97.412718	0.0119	100.0		4.827e3	1.000	5.30	31	31			0.000	29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	YES
32	Total PFBS	45.646506	0.205						32					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
33	Total PFHxS	23.156563	0.926						33					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
34	Total PFOA	1.4030873	0.132						34					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO
35	Total PFOS	0.0892086...							35					29-Nov-16	20:48:43		1601464-05	OUAI-MW01-201...	0.0	0.128	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFOA	4.67	2.168e3		6.638e1				6.638e1	0.85712	
2	Total PFOA	4.57	1.117e3		4.083e1				4.083e1	0.54597	

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Last Altered: Thursday, December 01, 2016 11:32:30 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:33:18 Pacific Standard Time

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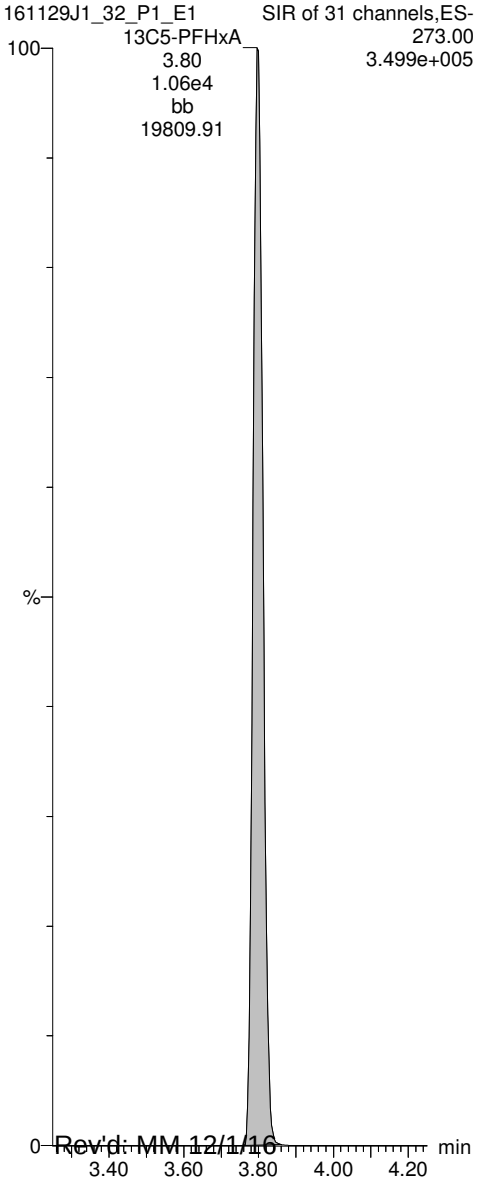
13C5-PFHxA



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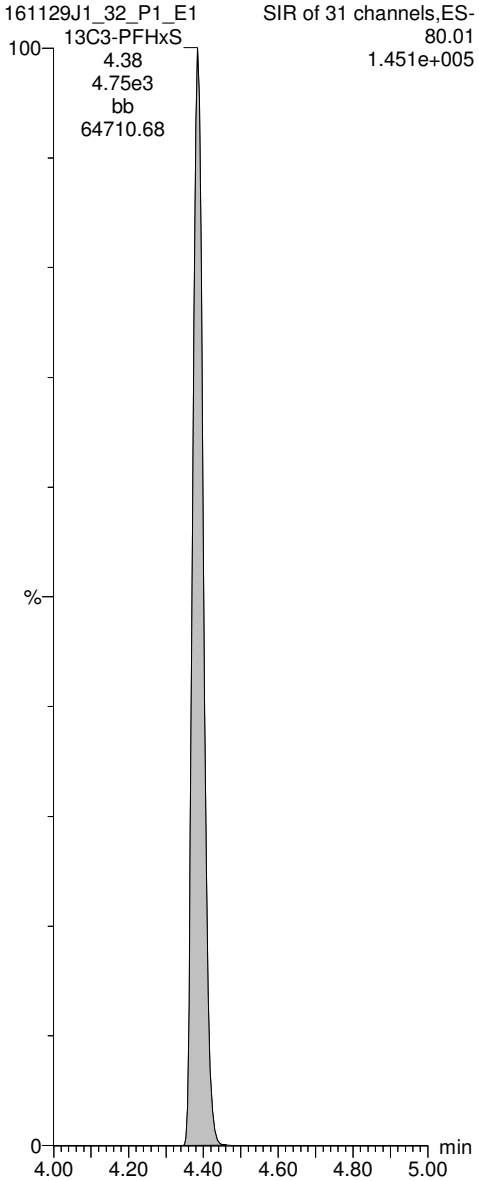
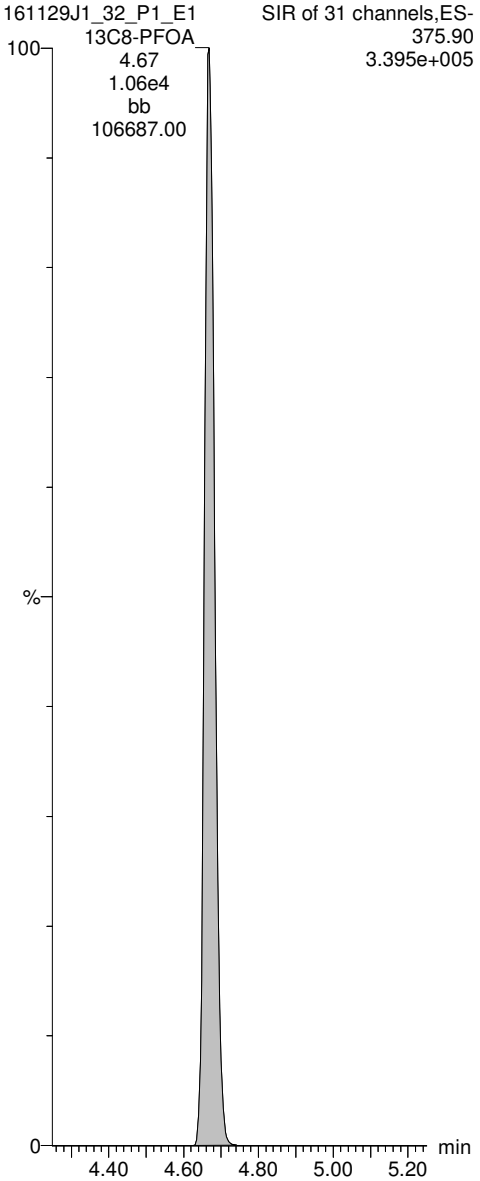
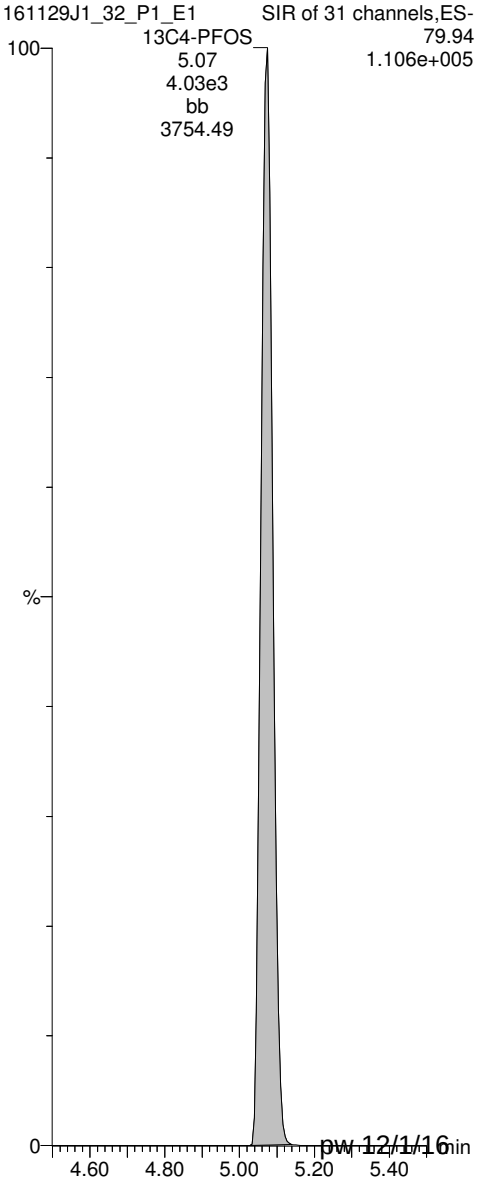


13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_39.qld

Last Altered: Thursday, December 01, 2016 11:35:16 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:35:50 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-06, Description: OUAI-MW31-20161116, Name: 161129J1_39.wiff, Date: 29-Nov-2016, Time: 22:14:30

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	6.151e3	6.563e3		0.131	3.40	116	
2	8	PFOA	368.90	5.816e2	6.316e3		0.131	4.67	6.81	
3	10	PFOS	79.92		3.220e3		0.131			
4	15	13C3-PFBS	79.95	6.563e3	1.103e4	0.564	0.131	3.40	101	105
5	16	13C2-PFHxA	269.90	4.013e3	1.103e4	0.907	0.131	3.80	38.3	100
6	17	13C4-PFHpA	321.90	7.071e3	1.103e4	0.742	0.131	4.27	82.6	86.4
7	18	18O2-PFHxS	102.90	1.168e3	4.541e3	0.271	0.131	4.39	90.7	94.9
8	19	13C2-6:2 FTS	408.90	1.757e3	1.129e4	0.224	0.131	4.62	66.6	69.6
9	20	13C2-PFOA	369.90	6.316e3	1.129e4	0.651	0.131	4.67	82.2	85.9
10	21	13C5-PFNA	422.90	4.967e3	5.540e3	1.002	0.131	4.99	85.6	89.5
11	22	13C8-PFOS	79.93	3.220e3	3.677e3	0.950	0.131	5.06	88.1	92.2
12	25	13C4-PFBA	171.90	1.147e4	1.147e4	1.000	0.131	1.93	95.6	100
13	26	13C5-PFHxA	273.00	1.103e4	1.103e4	1.000	0.131	3.80	95.6	100
14	27	13C3-PFHxS	80.01	4.541e3	4.541e3	1.000	0.131	4.39	95.6	100
15	28	13C8-PFOA	375.90	1.129e4	1.129e4	1.000	0.131	4.66	95.6	100
16	29	13C4-PFOS	79.94	3.677e3	3.677e3	1.000	0.131	5.06	95.6	100
17	30	13C9-PFNA	427.00	5.540e3	5.540e3	1.000	0.131	4.99	95.6	100
18	31	13C6-PFDA	474.00	5.047e3	5.047e3	1.000	0.131	5.28	95.6	100
19	32	Total PFBS	79.90		6.563e3		0.131		120	
20	34	Total PFOA	368.90		6.316e3		0.131		9.01	
21	35	Total PFOS	79.92		3.220e3		0.131		0.391	

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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_39.qld

Last Altered: Thursday, December 01, 2016 11:35:16 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:35:50 Pacific Standard Time

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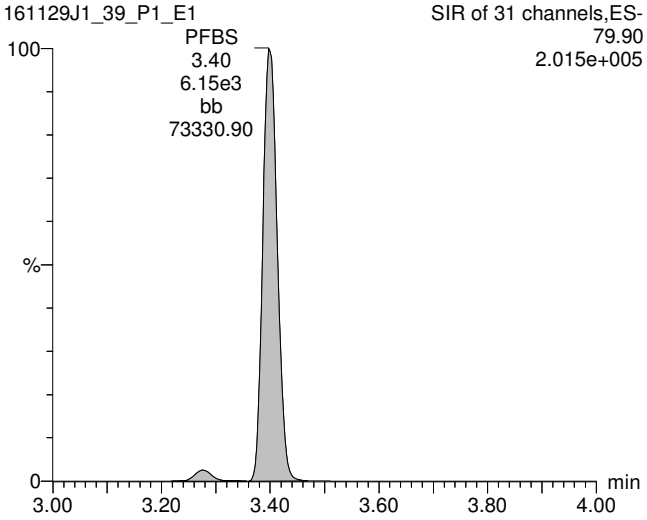
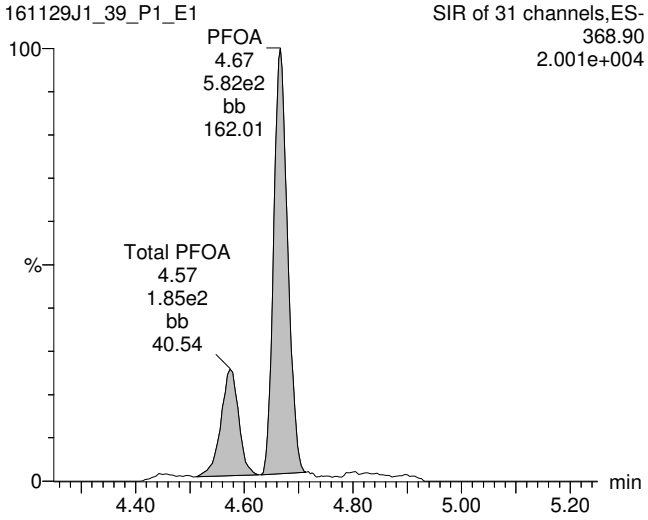
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-06, Description: OUAI-MW31-20161116, Name: 161129J1_39.wiff, Date: 29-Nov-2016, Time: 22:14:30, Instrument: , Lab: ©PE-SCIEX, User: sciex

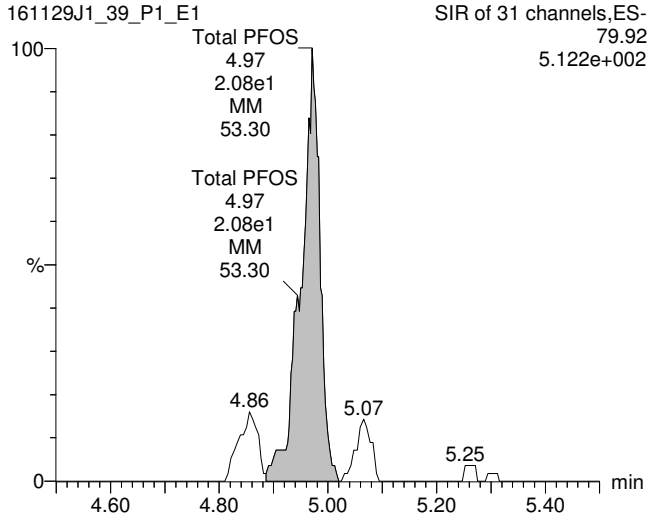
Total PFBS



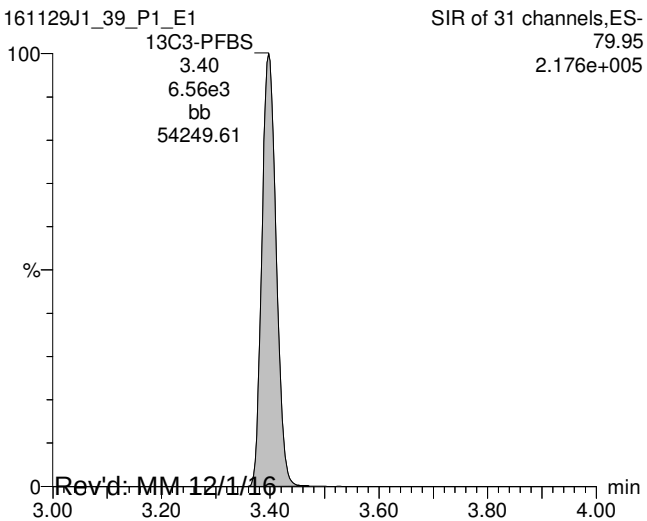
Total PFOA



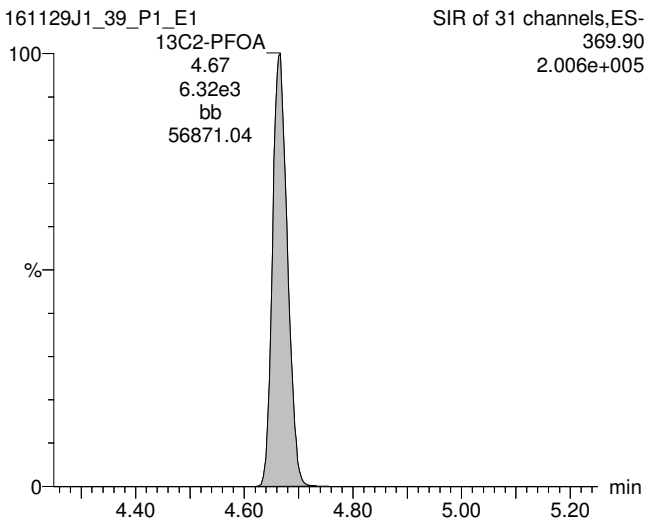
Total PFOS



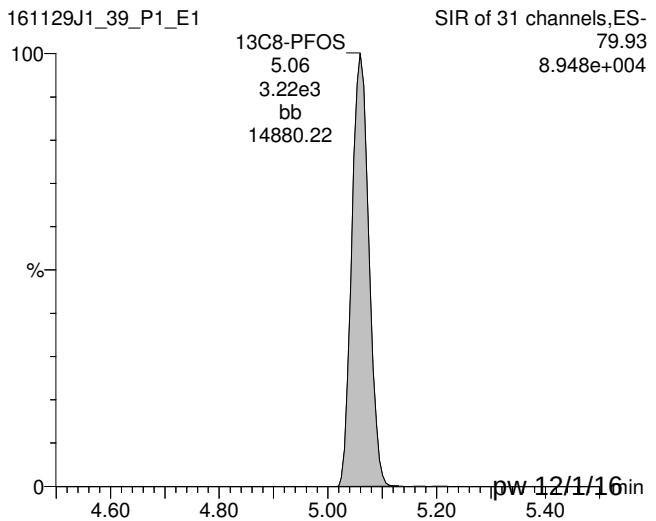
13C3-PFBS



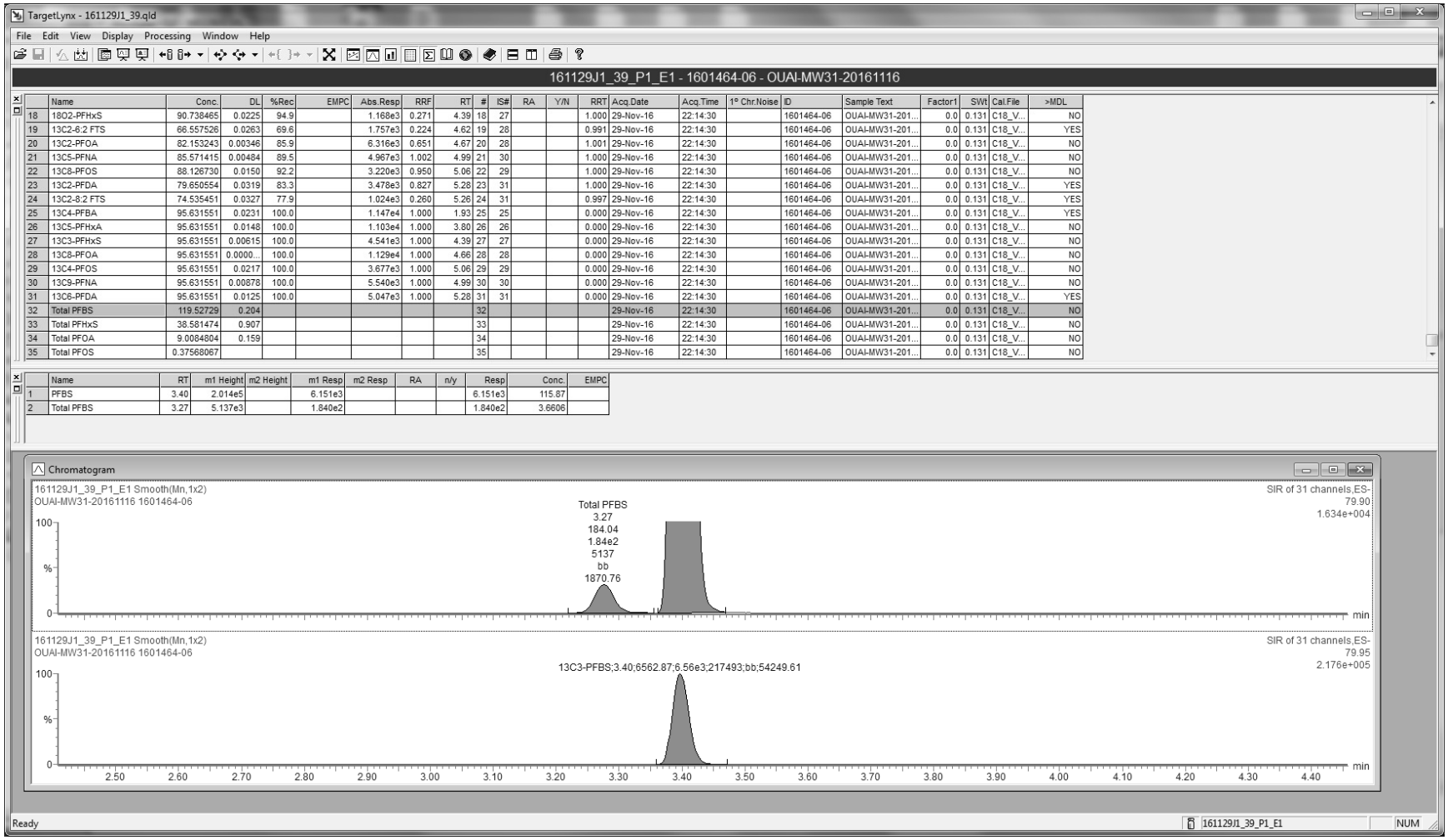
13C2-PFOA



13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	90.738465	0.0225	94.9		1.168e3	0.271	4.39	18	27			1.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
19	13C2-6:2 FTS	66.557526	0.0263	69.6		1.757e3	0.224	4.62	19	28			0.991	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	YES
20	13C2-PFOA	82.153243	0.00346	85.9		6.316e3	0.651	4.67	20	28			1.001	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
21	13C5-PFNA	85.571415	0.00484	89.5		4.967e3	1.002	4.99	21	30			1.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
22	13C8-PFOS	88.126730	0.0150	92.2		3.220e3	0.950	5.06	22	29			1.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
23	13C2-PFDA	79.650554	0.0319	83.3		3.478e3	0.827	5.28	23	31			1.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	YES
24	13C2-8:2 FTS	74.535451	0.0327	77.9		1.024e3	0.260	5.26	24	31			0.997	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	YES
25	13C4-PFBA	95.631551	0.0231	100.0		1.147e4	1.000	1.93	25	25			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	YES
26	13C5-PFHxA	95.631551	0.0148	100.0		1.103e4	1.000	3.80	26	26			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
27	13C3-PFHxS	95.631551	0.00615	100.0		4.541e3	1.000	4.39	27	27			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
28	13C8-PFOA	95.631551	0.0000...	100.0		1.129e4	1.000	4.66	28	28			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
29	13C4-PFOS	95.631551	0.0217	100.0		3.677e3	1.000	5.06	29	29			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
30	13C9-PFNA	95.631551	0.00878	100.0		5.540e3	1.000	4.99	30	30			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
31	13C6-PFDA	95.631551	0.0125	100.0		5.047e3	1.000	5.28	31	31			0.000	29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	YES
32	Total PFBS	119.52729	0.204						32					29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
33	Total PFHxS	38.581474	0.907						33					29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
34	Total PFOA	9.0084804	0.159						34					29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO
35	Total PFOS	0.37568067							35					29-Nov-16	22:14:30		1601464-06	OUAI-MW31-201...	0.0	0.131	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.40	2.014e5		6.151e3				6.151e3	115.87	
2	Total PFBS	3.27	5.137e3		1.840e2				1.840e2	3.6606	

Rev'd: MM 12/1/16

pw 12/1/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_39.qld

Last Altered: Thursday, December 01, 2016 11:35:16 Pacific Standard Time
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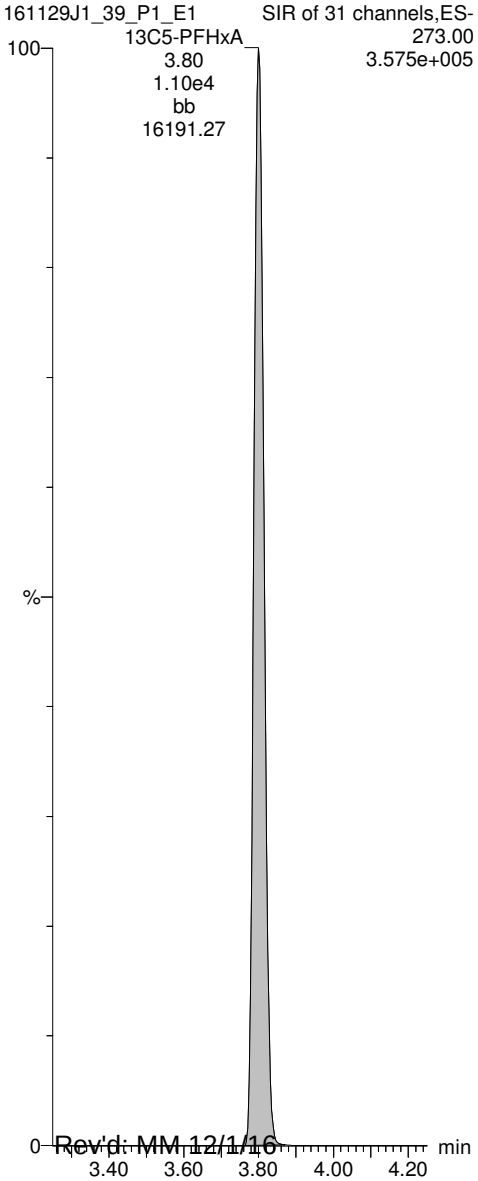
13C5-PFHxA



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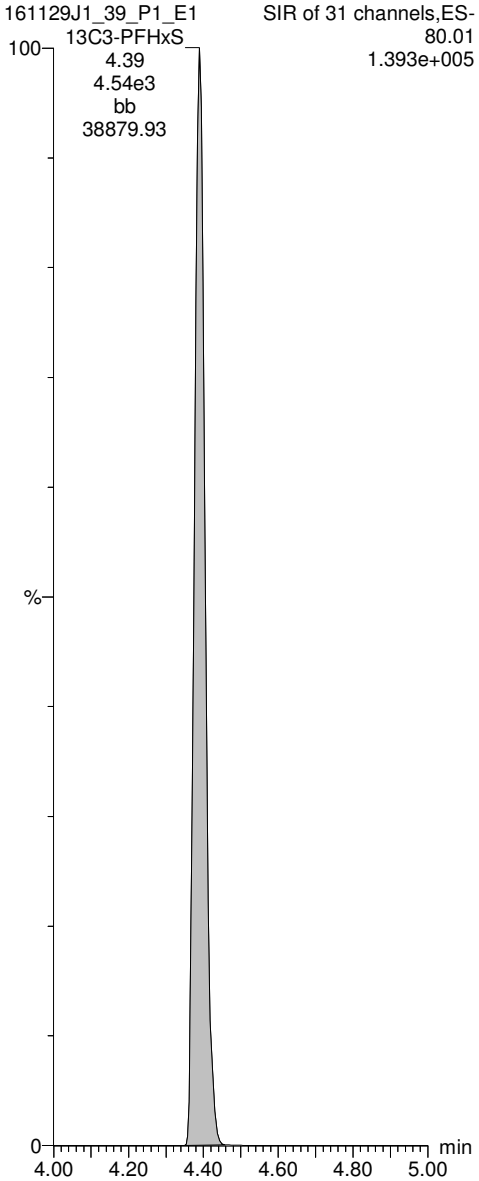
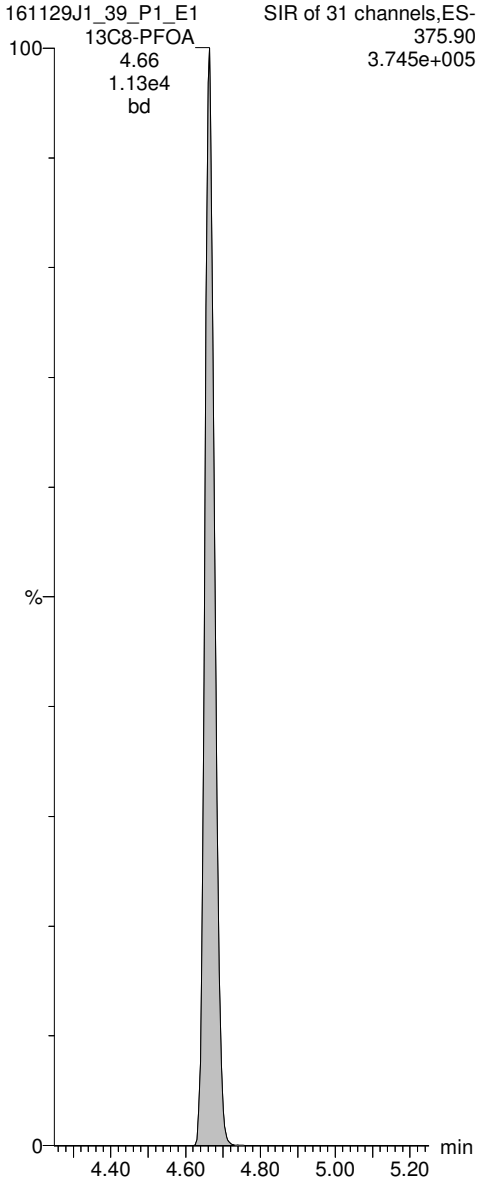
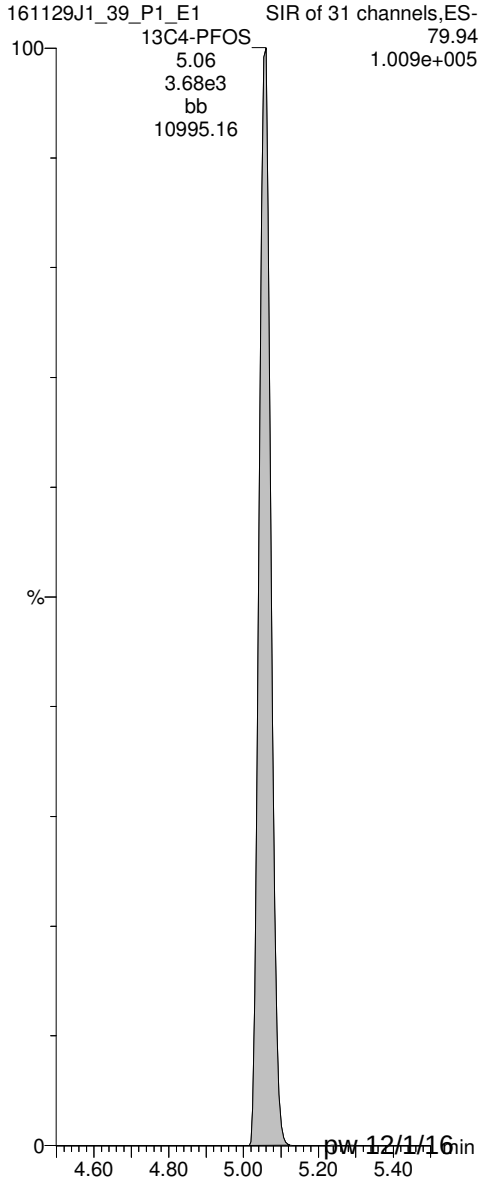


13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_40.qld

Last Altered: Thursday, December 01, 2016 11:38:06 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:38:29 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 01 Dec 2016 11:10:17
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-07, Description: OUAI-PZ19-20161116, Name: 161129J1_40.wiff, Date: 29-Nov-2016, Time: 22:26:45

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	2.644e3	6.115e3		0.125	3.40	56.2	
2	8	PFOA	368.90	1.354e3	5.990e3		0.125	4.67	17.5	
3	10	PFOS	79.92	4.526e1	2.960e3		0.125	5.07	1.18	
4	15	13C3-PFBS	79.95	6.115e3	1.019e4	0.564	0.125	3.40	107	106
5	16	13C2-PFHxA	269.90	3.594e3	1.019e4	0.907	0.125	3.80	39.0	97.2
6	17	13C4-PFHpA	321.90	6.664e3	1.019e4	0.742	0.125	4.27	88.5	88.1
7	18	18O2-PFHxS	102.90	1.084e3	4.186e3	0.271	0.125	4.38	95.9	95.6
8	19	13C2-6:2 FTS	408.90	1.739e3	1.052e4	0.224	0.125	4.62	74.2	73.9
9	20	13C2-PFOA	369.90	5.990e3	1.052e4	0.651	0.125	4.66	87.8	87.5
10	21	13C5-PFNA	422.90	4.653e3	4.780e3	1.002	0.125	5.00	97.5	97.1
11	22	13C8-PFOS	79.93	2.960e3	3.073e3	0.950	0.125	5.07	102	101
12	25	13C4-PFBA	171.90	1.059e4	1.059e4	1.000	0.125	1.93	100	100
13	26	13C5-PFHxA	273.00	1.019e4	1.019e4	1.000	0.125	3.79	100	100
14	27	13C3-PFHxS	80.01	4.186e3	4.186e3	1.000	0.125	4.38	100	100
15	28	13C8-PFOA	375.90	1.052e4	1.052e4	1.000	0.125	4.66	100	100
16	29	13C4-PFOS	79.94	3.073e3	3.073e3	1.000	0.125	5.06	100	100
17	30	13C9-PFNA	427.00	4.780e3	4.780e3	1.000	0.125	5.00	100	100
18	31	13C6-PFDA	474.00	4.811e3	4.811e3	1.000	0.125	5.29	100	100
19	32	Total PFBS	79.90		6.115e3		0.125		57.8	
20	34	Total PFOA	368.90		5.990e3		0.125		21.1	
21	35	Total PFOS	79.92		2.960e3		0.125		6.15	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_40.qld

Last Altered: Thursday, December 01, 2016 11:38:06 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:38:29 Pacific Standard Time

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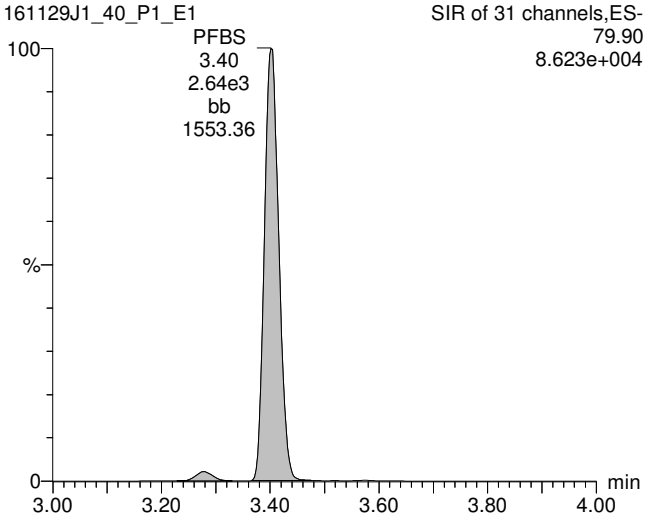
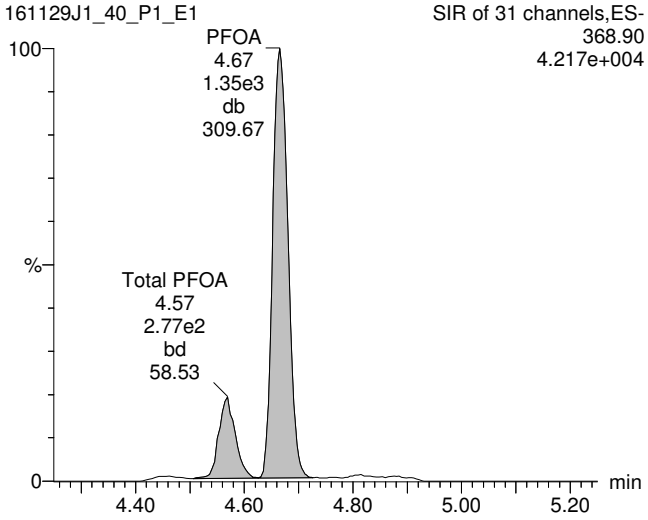
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-07, Description: OUAI-PZ19-20161116, Name: 161129J1_40.wiff, Date: 29-Nov-2016, Time: 22:26:45, Instrument: , Lab: ©PE-SCIEX, User: sciex

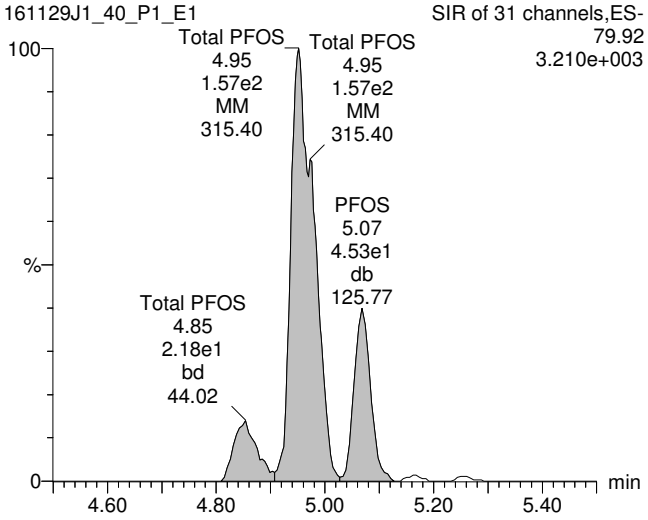
Total PFBS



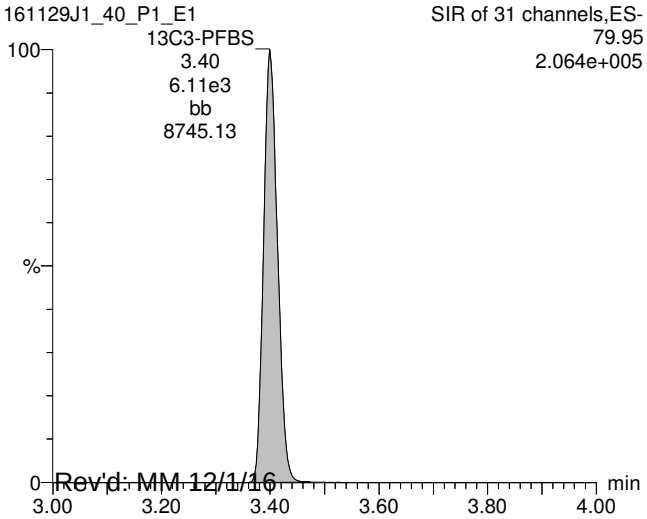
Total PFOA



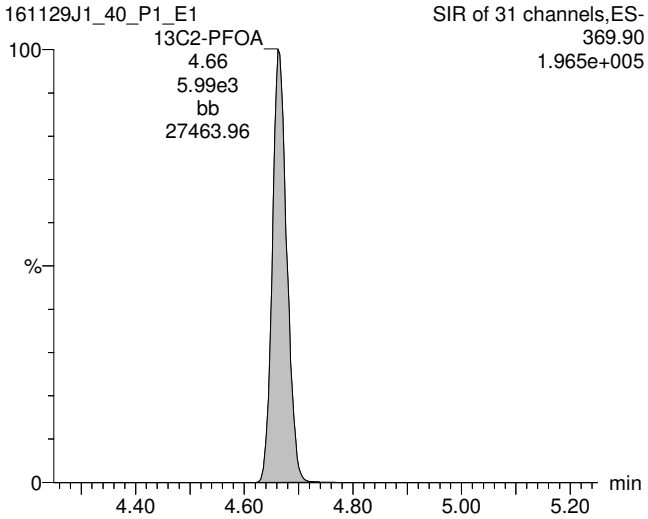
Total PFOS



13C3-PFBS



13C2-PFOA



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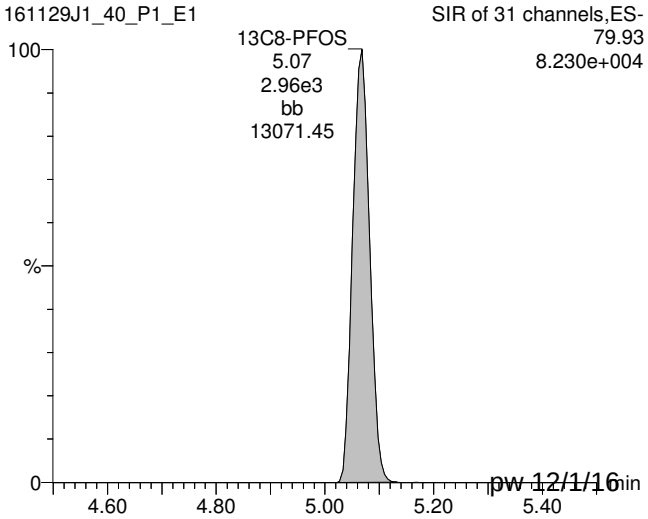
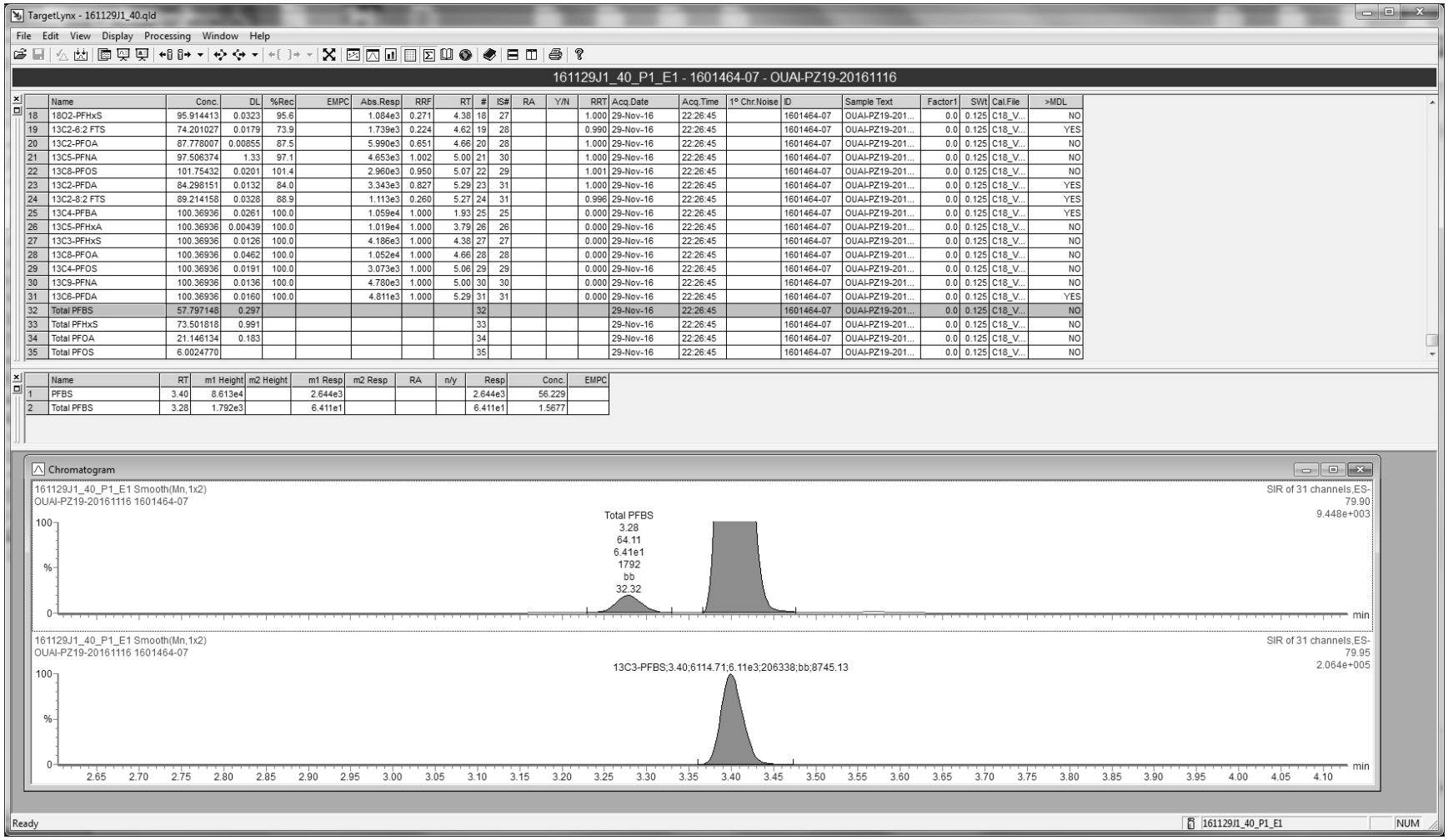


Rev'd: MM 12/1/16 pw 12/1/16



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18	18O2-PFHxS	95.914413	0.0323	95.6		1.084e3	0.271	4.38	18	27			1.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
19	13C2-6:2 FTS	74.201027	0.0179	73.9		1.739e3	0.224	4.62	19	28			0.990	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	YES
20	13C2-PFOA	87.778007	0.00855	87.5		5.990e3	0.651	4.66	20	28			1.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
21	13C5-PFNA	97.506374	1.33	97.1		4.653e3	1.002	5.00	21	30			1.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
22	13C8-PFOS	101.75432	0.0201	101.4		2.960e3	0.950	5.07	22	29			1.001	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
23	13C2-PFDA	84.298151	0.0132	84.0		3.343e3	0.827	5.29	23	31			1.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	YES
24	13C2-8:2 FTS	89.214158	0.0328	88.9		1.113e3	0.260	5.27	24	31			0.996	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	YES
25	13C4-PFBA	100.36936	0.0261	100.0		1.059e4	1.000	1.93	25	25			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	YES
26	13C5-PFHxA	100.36936	0.00439	100.0		1.019e4	1.000	3.79	26	26			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
27	13C3-PFHxS	100.36936	0.0126	100.0		4.186e3	1.000	4.38	27	27			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
28	13C8-PFOA	100.36936	0.0462	100.0		1.052e4	1.000	4.66	28	28			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
29	13C4-PFOS	100.36936	0.0191	100.0		3.073e3	1.000	5.06	29	29			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
30	13C9-PFNA	100.36936	0.0136	100.0		4.780e3	1.000	5.00	30	30			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
31	13C6-PFDA	100.36936	0.0160	100.0		4.811e3	1.000	5.29	31	31			0.000	29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	YES
32	Total PFBS	57.797148	0.297						32					29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
33	Total PFHxS	73.501818	0.991						33					29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
34	Total PFOA	21.146134	0.183						34					29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO
35	Total PFOS	6.0024770							35					29-Nov-16	22:26:45		1601464-07	OUAI-PZ19-201...	0.0	0.125	C18_V...	NO

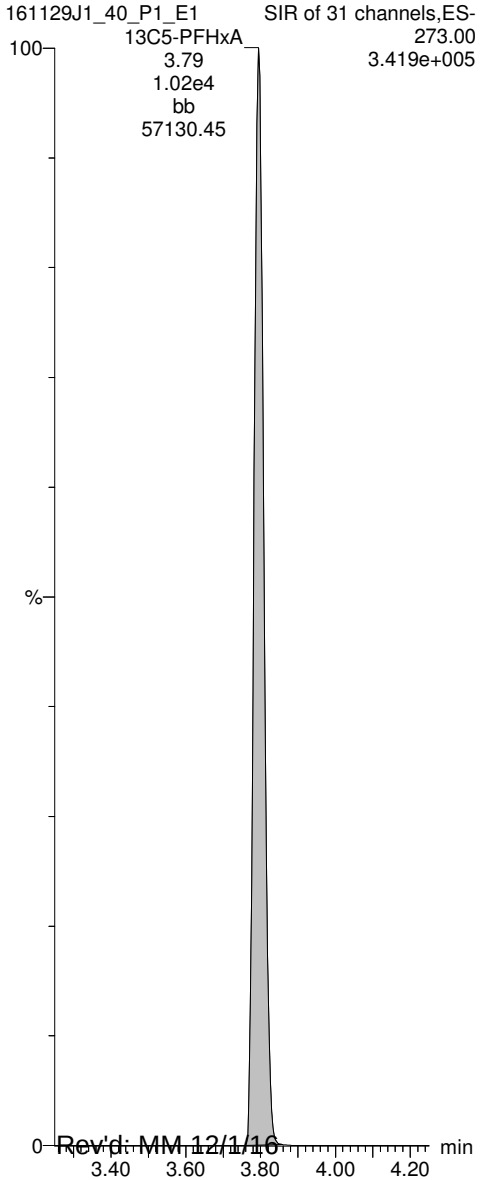
	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.40	8.613e4		2.644e3				2.644e3	56.229	
2	Total PFBS	3.28	1.792e3		6.411e1				6.411e1	1.5677	

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_40.qld

Last Altered: Thursday, December 01, 2016 11:38:06 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:38:29 Pacific Standard Time

ID: 1601464-07, Description: OUAI-PZ19-20161116, Name: 161129J1_40.wiff, Date: 29-Nov-2016, Time: 22:26:45, Instrument: , Lab: ©PE-SCIEX, User: sciex

13C5-PFHxA



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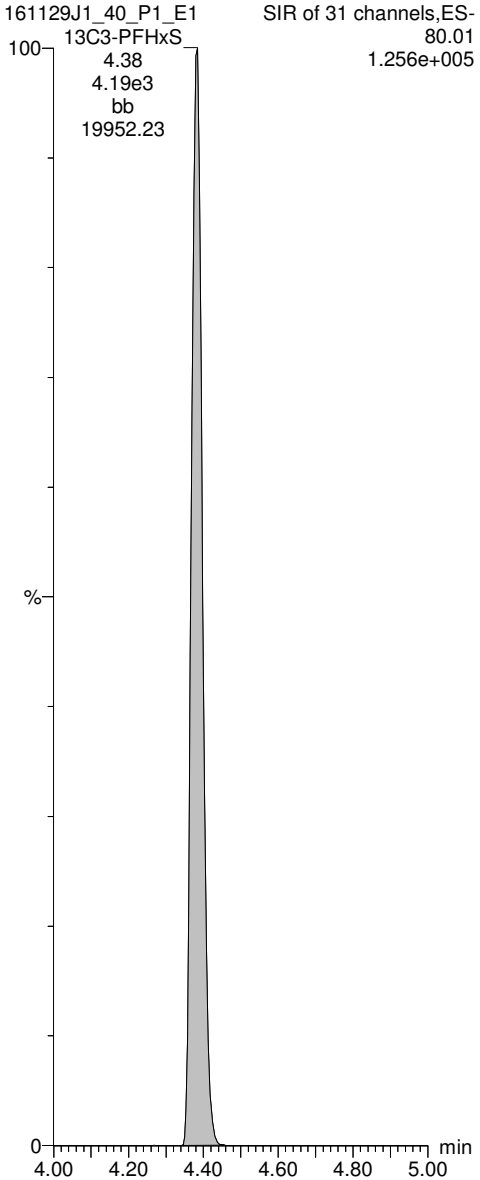
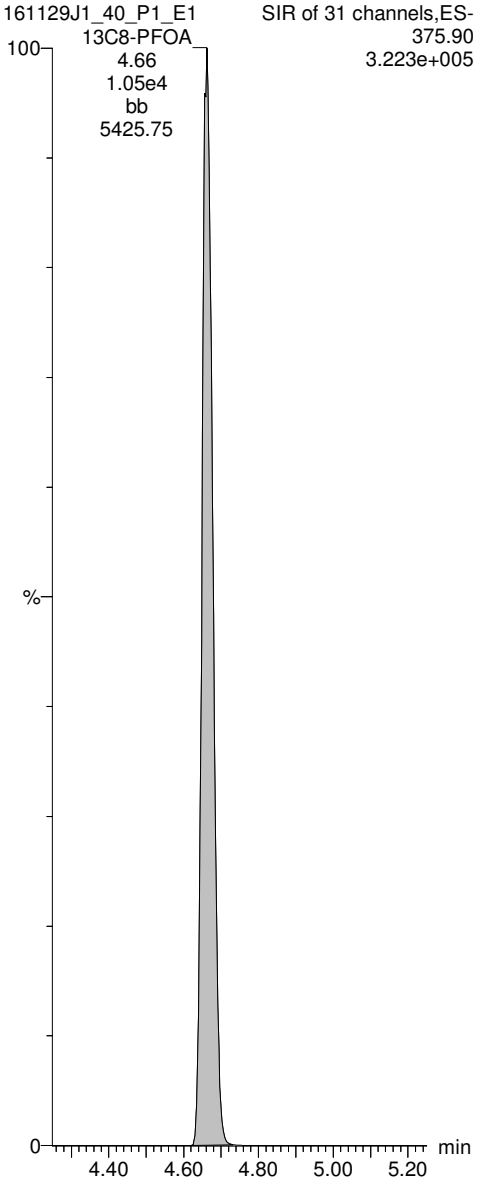
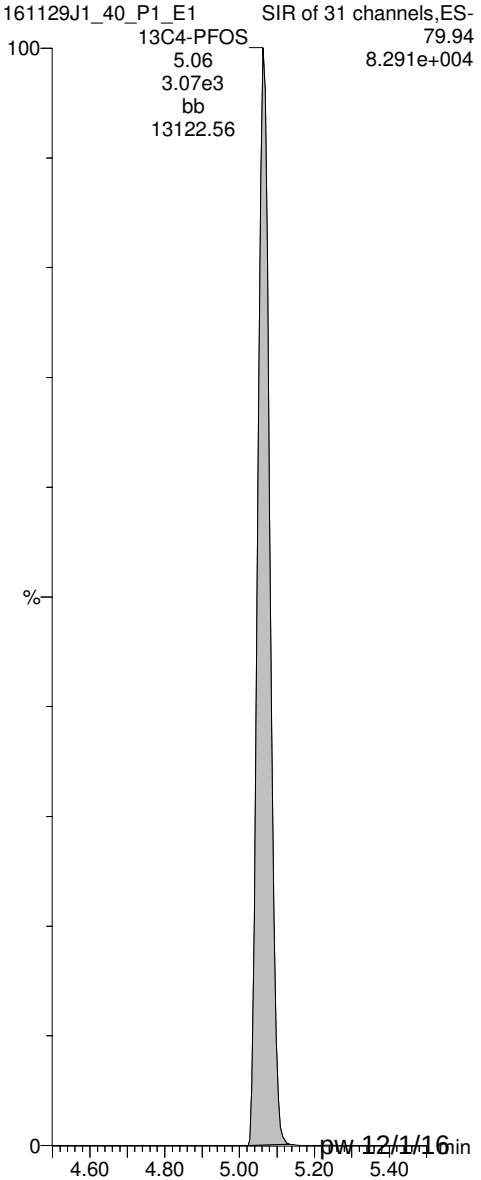


13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_41.qld

Last Altered: Thursday, December 01, 2016 11:41:28 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:41:59 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 01 Dec 2016 11:10:17
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-08, Description: OUAI-MW52-20161116, Name: 161129J1_41.wiff, Date: 29-Nov-2016, Time: 22:38:58

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	3.086e3	6.170e3		0.130	3.41	62.4	
2	8	PFOA	368.90	3.656e2	6.220e3		0.130	4.69	4.40	
3	10	PFOS	79.92	6.163e0	3.222e3		0.130	5.08	0.0140	
4	15	13C3-PFBS	79.95	6.170e3	1.069e4	0.564	0.130	3.40	98.7	102
5	16	13C2-PFHxA	269.90	3.713e3	1.069e4	0.907	0.130	3.80	36.9	95.7
6	17	13C4-PFHpA	321.90	6.589e3	1.069e4	0.742	0.130	4.28	80.1	83.1
7	18	18O2-PFHxS	102.90	1.115e3	4.419e3	0.271	0.130	4.40	89.7	93.0
8	19	13C2-6:2 FTS	408.90	1.669e3	1.026e4	0.224	0.130	4.64	70.2	72.8
9	20	13C2-PFOA	369.90	6.220e3	1.026e4	0.651	0.130	4.68	89.8	93.1
10	21	13C5-PFNA	422.90	4.643e3	5.607e3	1.002	0.130	5.02	79.7	82.6
11	22	13C8-PFOS	79.93	3.222e3	3.822e3	0.950	0.130	5.08	85.5	88.7
12	25	13C4-PFBA	171.90	1.106e4	1.106e4	1.000	0.130	1.93	96.4	100
13	26	13C5-PFHxA	273.00	1.069e4	1.069e4	1.000	0.130	3.80	96.4	100
14	27	13C3-PFHxS	80.01	4.419e3	4.419e3	1.000	0.130	4.40	96.4	100
15	28	13C8-PFOA	375.90	1.026e4	1.026e4	1.000	0.130	4.69	96.4	100
16	29	13C4-PFOS	79.94	3.822e3	3.822e3	1.000	0.130	5.08	96.4	100
17	30	13C9-PFNA	427.00	5.607e3	5.607e3	1.000	0.130	5.02	96.4	100
18	31	13C6-PFDA	474.00	4.771e3	4.771e3	1.000	0.130	5.30	96.4	100
19	32	Total PFBS	79.90		6.170e3		0.130		64.9	
20	34	Total PFOA	368.90		6.220e3		0.130		5.38	
21	35	Total PFOS	79.92		3.222e3		0.130		0.406	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_41.qld

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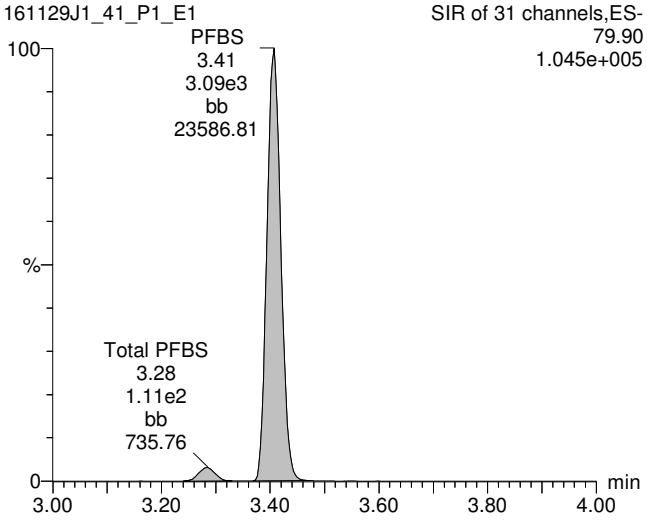
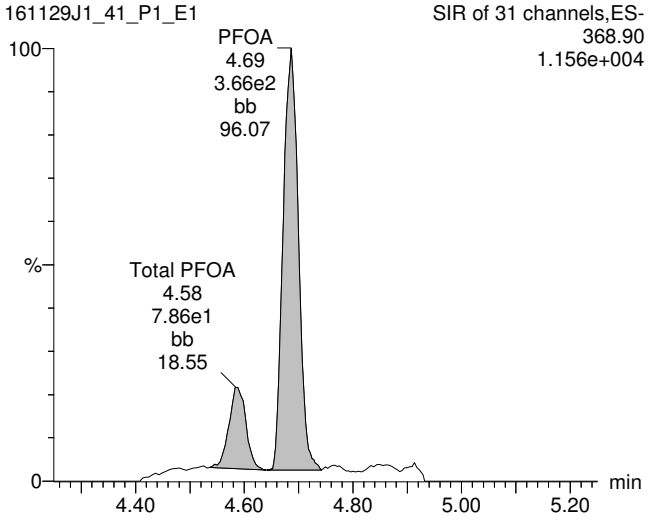
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-08, Description: OUAI-MW52-20161116, Name: 161129J1_41.wiff, Date: 29-Nov-2016, Time: 22:38:58, Instrument: , Lab: ©PE-SCIEX, User: sciex

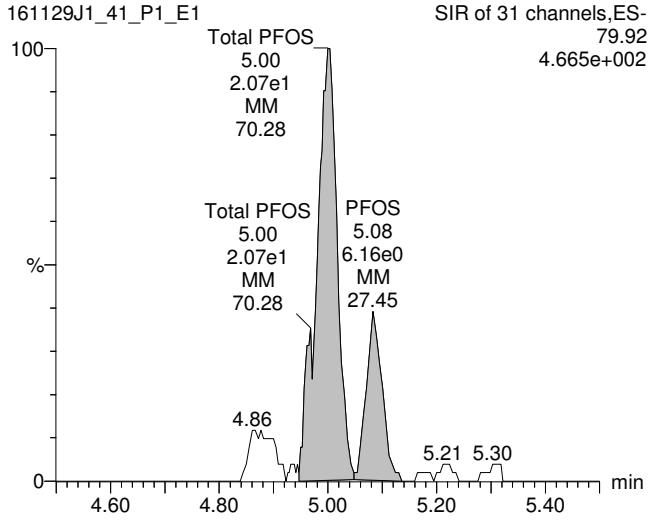
Total PFBS



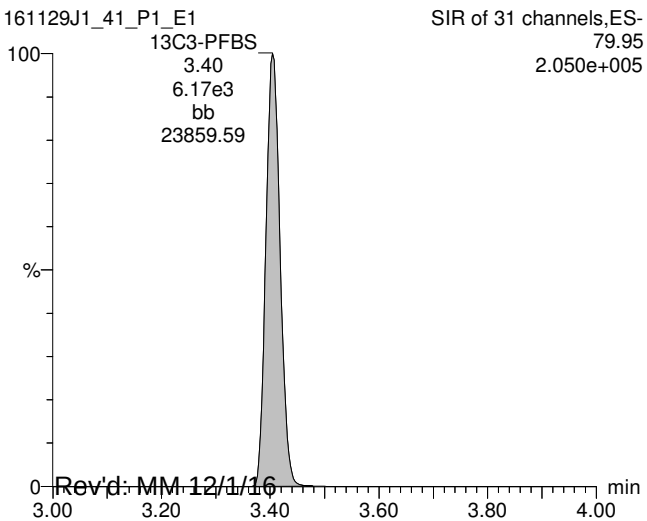
Total PFOA



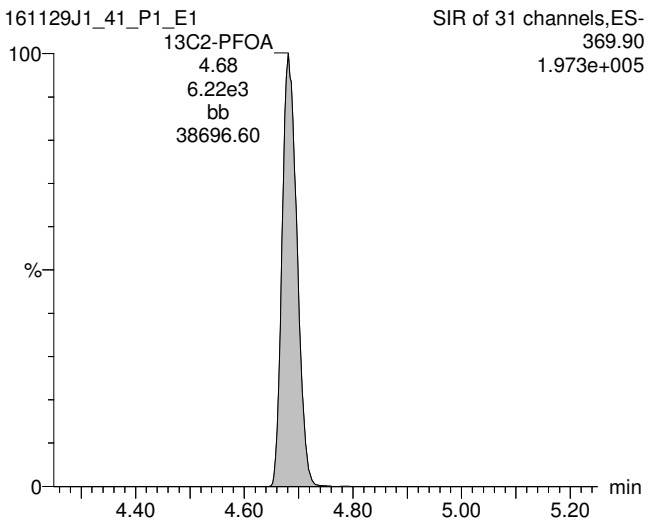
Total PFOS



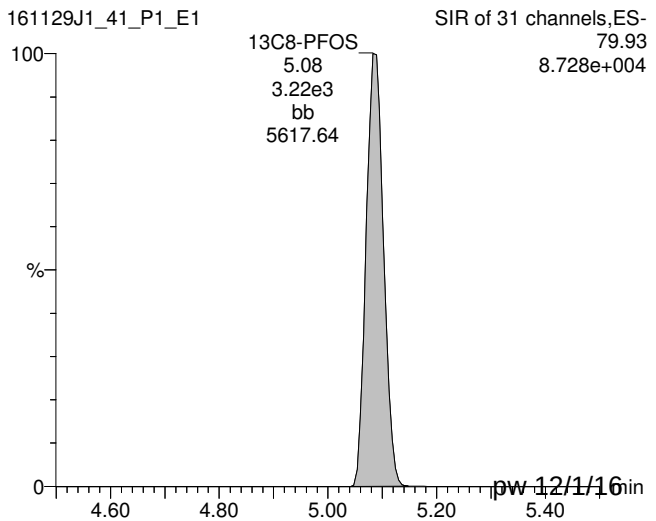
13C3-PFBS



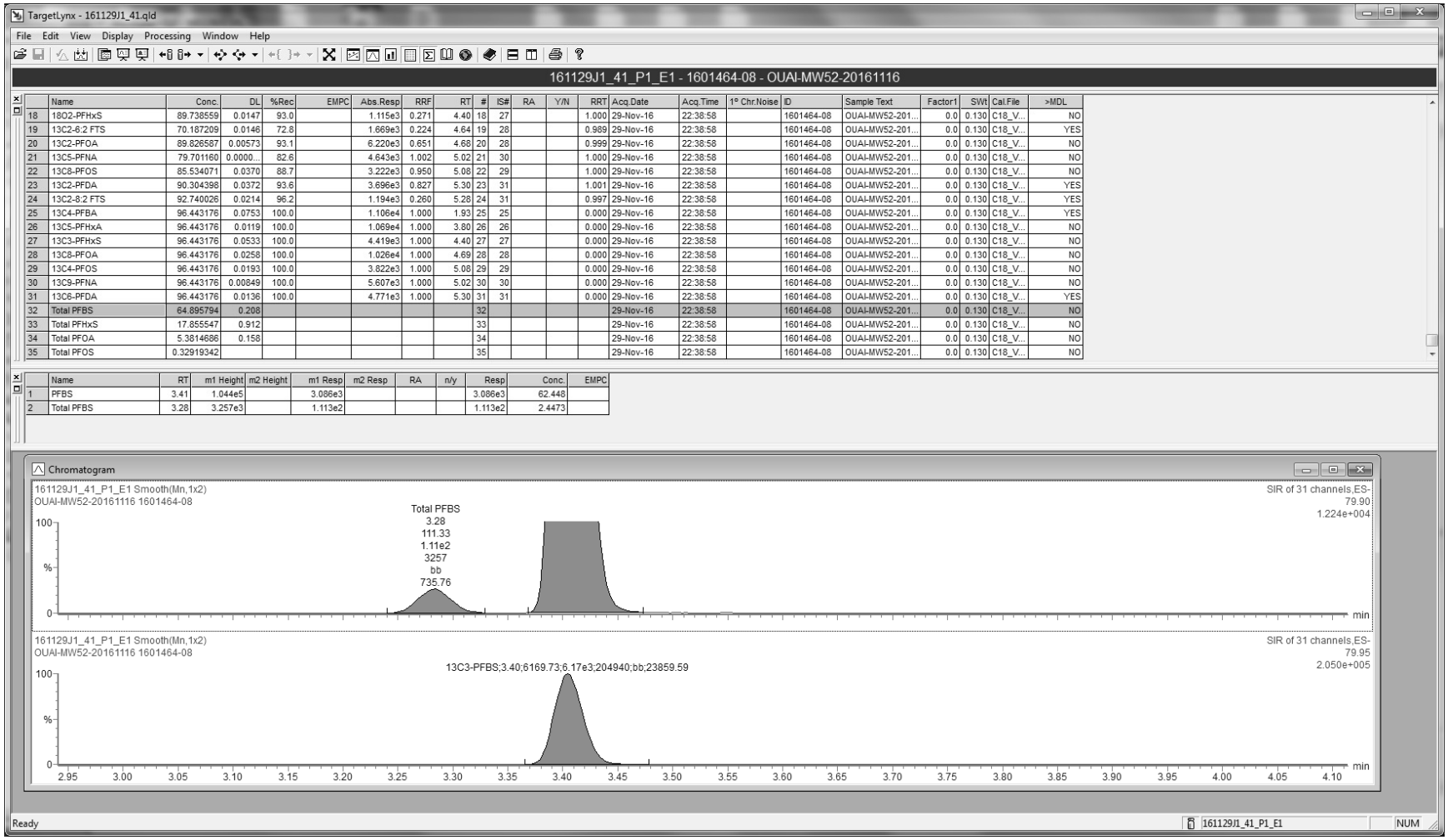
13C2-PFOA



13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	89.738559	0.0147	93.0		1.115e3	0.271	4.40	18	27			1.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
19	13C2-6:2 FTS	70.187209	0.0146	72.8		1.669e3	0.224	4.64	19	28			0.989	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	YES
20	13C2-PFOA	89.826587	0.00573	93.1		6.220e3	0.651	4.68	20	28			0.999	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
21	13C5-PFNA	79.701160	0.0000...	82.6		4.643e3	1.002	5.02	21	30			1.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
22	13C8-PFOS	85.534071	0.0370	88.7		3.222e3	0.950	5.08	22	29			1.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
23	13C2-PFDA	90.304398	0.0372	93.6		3.696e3	0.827	5.30	23	31			1.001	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	YES
24	13C2-8:2 FTS	92.740026	0.0214	96.2		1.194e3	0.260	5.28	24	31			0.997	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	YES
25	13C4-PFBA	96.443176	0.0753	100.0		1.106e4	1.000	1.93	25	25			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	YES
26	13C5-PFHxA	96.443176	0.0119	100.0		1.069e4	1.000	3.80	26	26			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
27	13C3-PFHxS	96.443176	0.0533	100.0		4.419e3	1.000	4.40	27	27			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
28	13C8-PFOA	96.443176	0.0258	100.0		1.026e4	1.000	4.69	28	28			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
29	13C4-PFOS	96.443176	0.0193	100.0		3.822e3	1.000	5.08	29	29			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
30	13C9-PFNA	96.443176	0.00849	100.0		5.607e3	1.000	5.02	30	30			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
31	13C6-PFDA	96.443176	0.0136	100.0		4.771e3	1.000	5.30	31	31			0.000	29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	YES
32	Total PFBS	64.895794	0.208						32					29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
33	Total PFHxS	17.855547	0.912						33					29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
34	Total PFOA	5.3814686	0.158						34					29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO
35	Total PFOS	0.32919342							35					29-Nov-16	22:38:58		1601464-08	OUAI-MW52-201...	0.0	0.130	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.41	1.044e5		3.086e3				3.086e3	62.448	
2	Total PFBS	3.28	3.257e3		1.113e2				1.113e2	2.4473	

Rev'd: MM 12/1/16

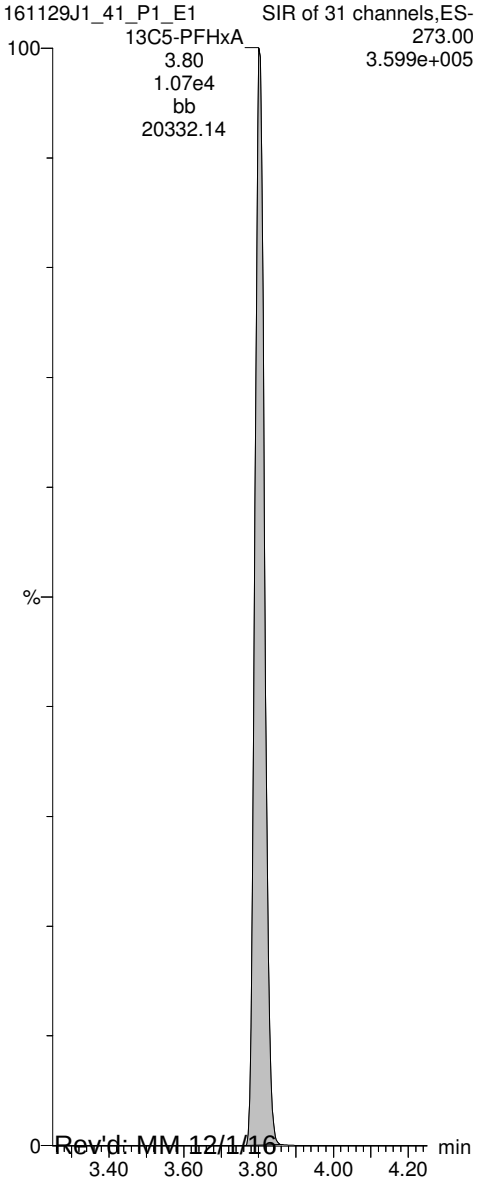
pw 12/1/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_41.qld

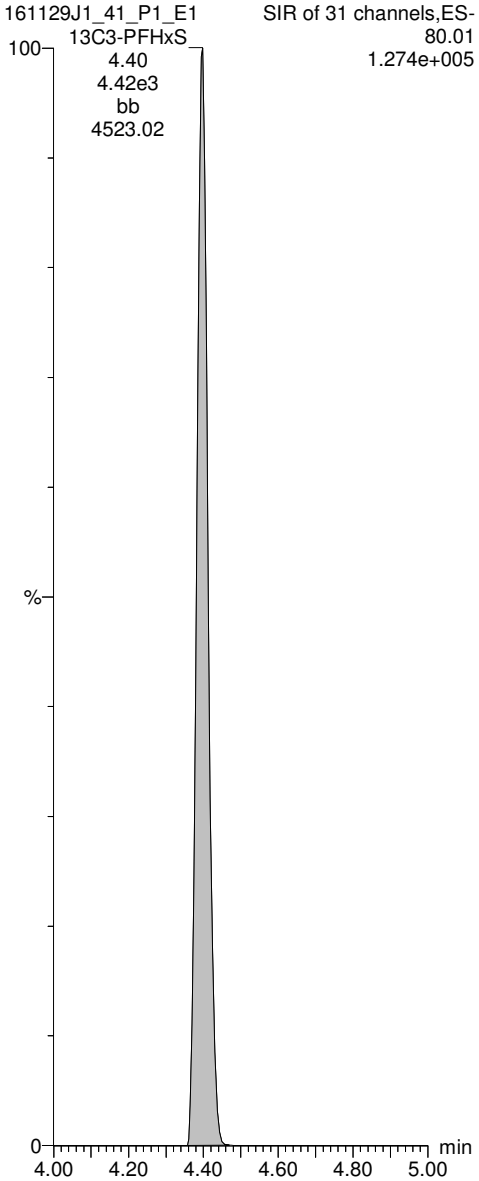
Last Altered: Thursday, December 01, 2016 11:41:28 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:41:59 Pacific Standard Time

ID: 1601464-08, Description: OUAI-MW52-20161116, Name: 161129J1_41.wiff, Date: 29-Nov-2016, Time: 22:38:58, Instrument: , Lab: ©PE-SCIEX, User: sciex

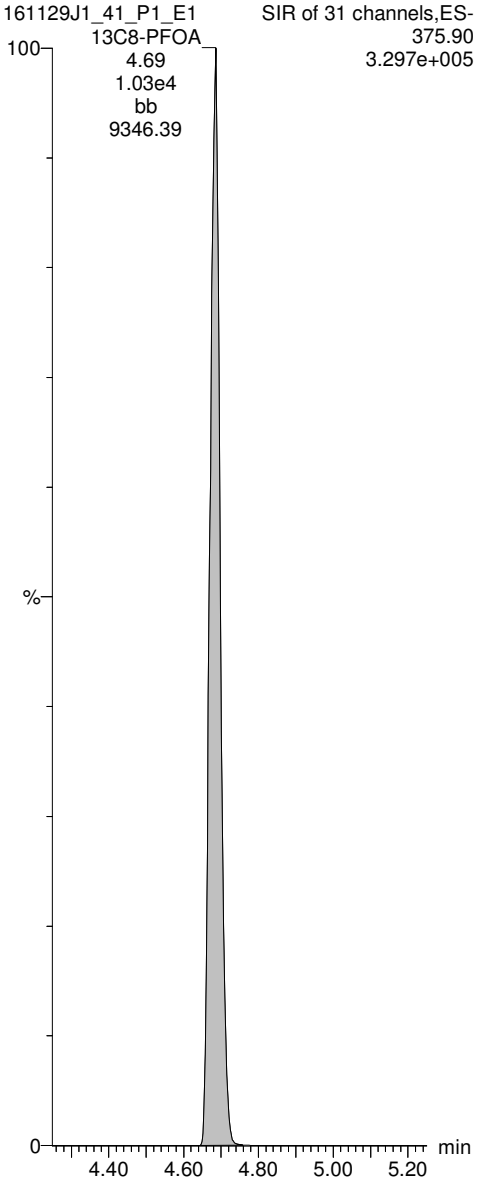
13C5-PFHxA



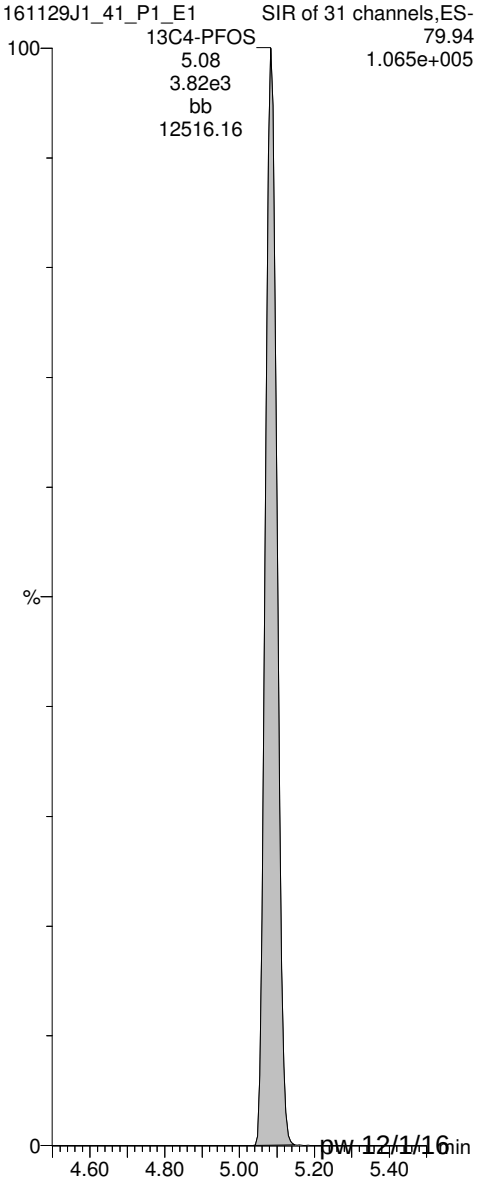
13C3-PFHxS



13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_42.qld

Last Altered: Thursday, December 01, 2016 11:43:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:44:21 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 01 Dec 2016 11:10:17
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-09, Description: OUAI-MW04-20161116, Name: 161129J1_42.wiff, Date: 29-Nov-2016, Time: 22:51:14

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	7.827e3	6.337e3		0.131	3.40	153	
2	8	PFOA	368.90	1.366e3	6.326e3		0.131	4.68	16.0	
3	10	PFOS	79.92	1.723e1	3.602e3		0.131	5.08	0.253	
4	15	13C3-PFBS	79.95	6.337e3	1.076e4	0.564	0.131	3.40	100	104
5	16	13C2-PFHxA	269.90	3.867e3	1.076e4	0.907	0.131	3.80	37.9	99.1
6	17	13C4-PFHpA	321.90	6.770e3	1.076e4	0.742	0.131	4.28	81.3	84.8
7	18	18O2-PFHxS	102.90	1.233e3	4.630e3	0.271	0.131	4.39	94.1	98.2
8	19	13C2-6:2 FTS	408.90	1.894e3	1.068e4	0.224	0.131	4.63	76.0	79.3
9	20	13C2-PFOA	369.90	6.326e3	1.068e4	0.651	0.131	4.68	87.2	91.0
10	21	13C5-PFNA	422.90	4.223e3	5.013e3	1.002	0.131	5.01	80.5	84.1
11	22	13C8-PFOS	79.93	3.602e3	4.074e3	0.950	0.131	5.08	89.1	93.0
12	25	13C4-PFBA	171.90	1.091e4	1.091e4	1.000	0.131	1.93	95.8	100
13	26	13C5-PFHxA	273.00	1.076e4	1.076e4	1.000	0.131	3.80	95.8	100
14	27	13C3-PFHxS	80.01	4.630e3	4.630e3	1.000	0.131	4.39	95.8	100
15	28	13C8-PFOA	375.90	1.068e4	1.068e4	1.000	0.131	4.68	95.8	100
16	29	13C4-PFOS	79.94	4.074e3	4.074e3	1.000	0.131	5.08	95.8	100
17	30	13C9-PFNA	427.00	5.013e3	5.013e3	1.000	0.131	5.01	95.8	100
18	31	13C6-PFDA	474.00	5.338e3	5.338e3	1.000	0.131	5.30	95.8	100
19	32	Total PFBS	79.90		6.337e3		0.131		157	
20	34	Total PFOA	368.90		6.326e3		0.131		20.0	
21	35	Total PFOS	79.92		3.602e3		0.131		2.50	

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Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_42.qld

Last Altered: Thursday, December 01, 2016 11:43:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:44:21 Pacific Standard Time

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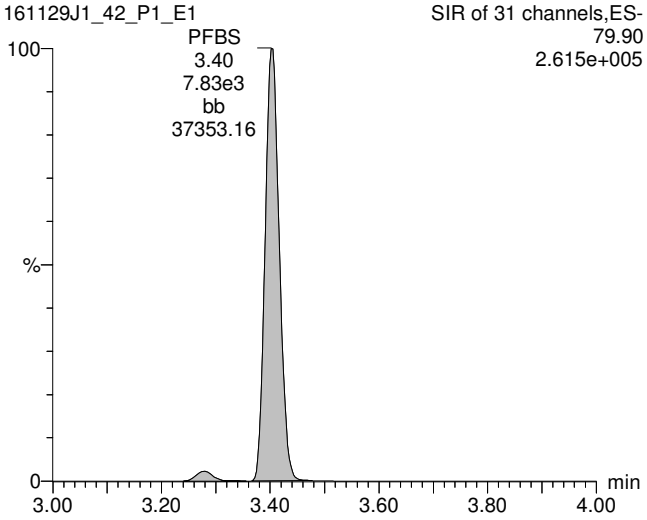
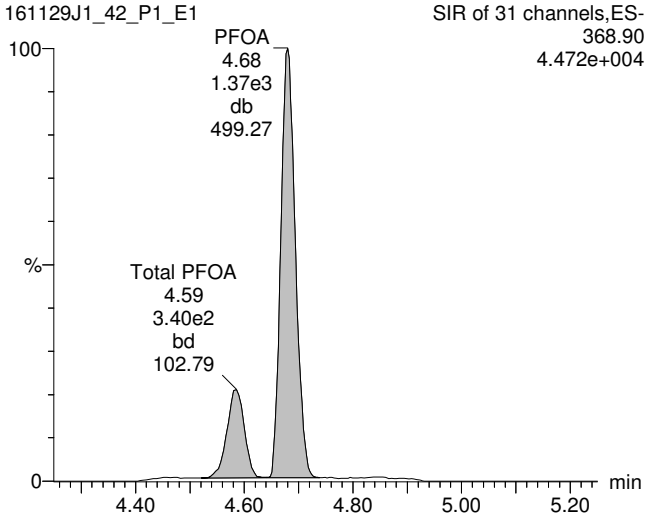
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-09, Description: OUAI-MW04-20161116, Name: 161129J1_42.wiff, Date: 29-Nov-2016, Time: 22:51:14, Instrument: , Lab: ©PE-SCIEX, User: sciex

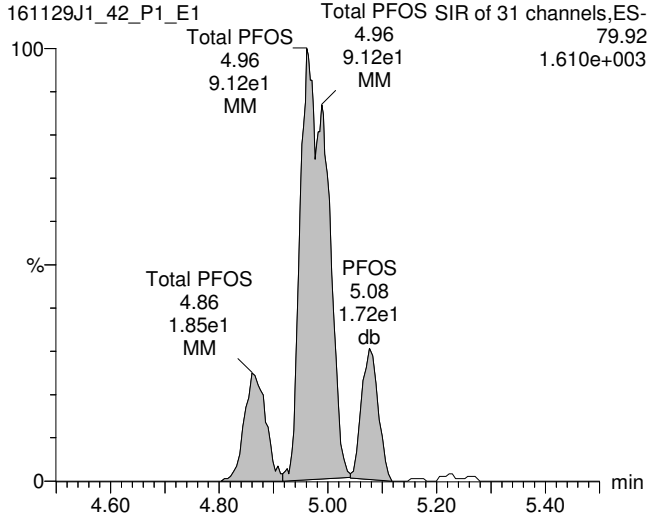
Total PFBS



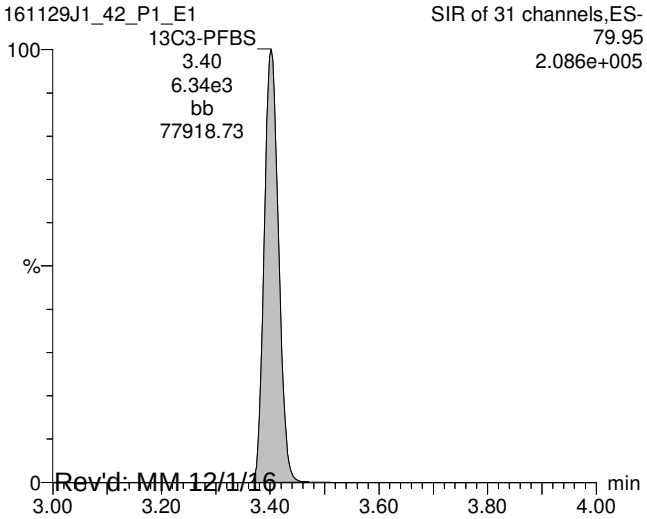
Total PFOA



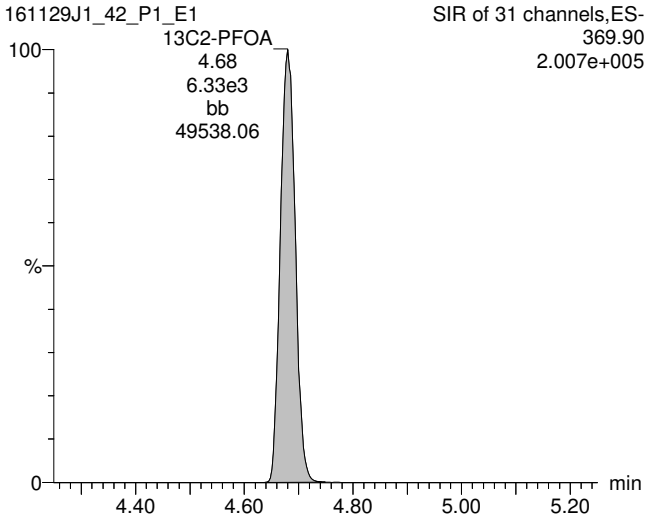
Total PFOS



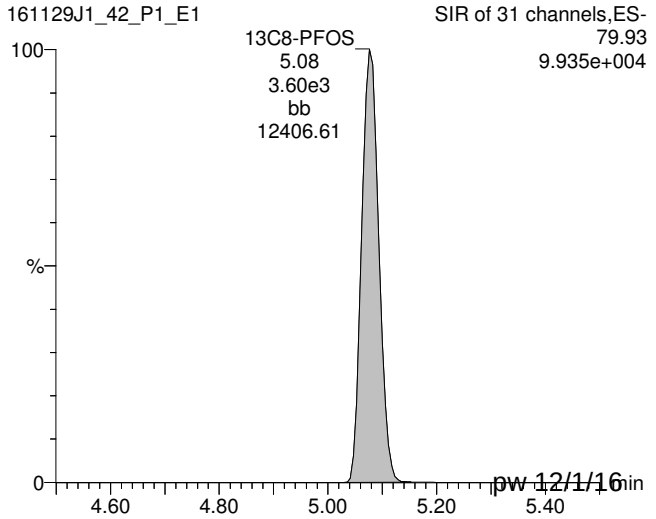
13C3-PFBS



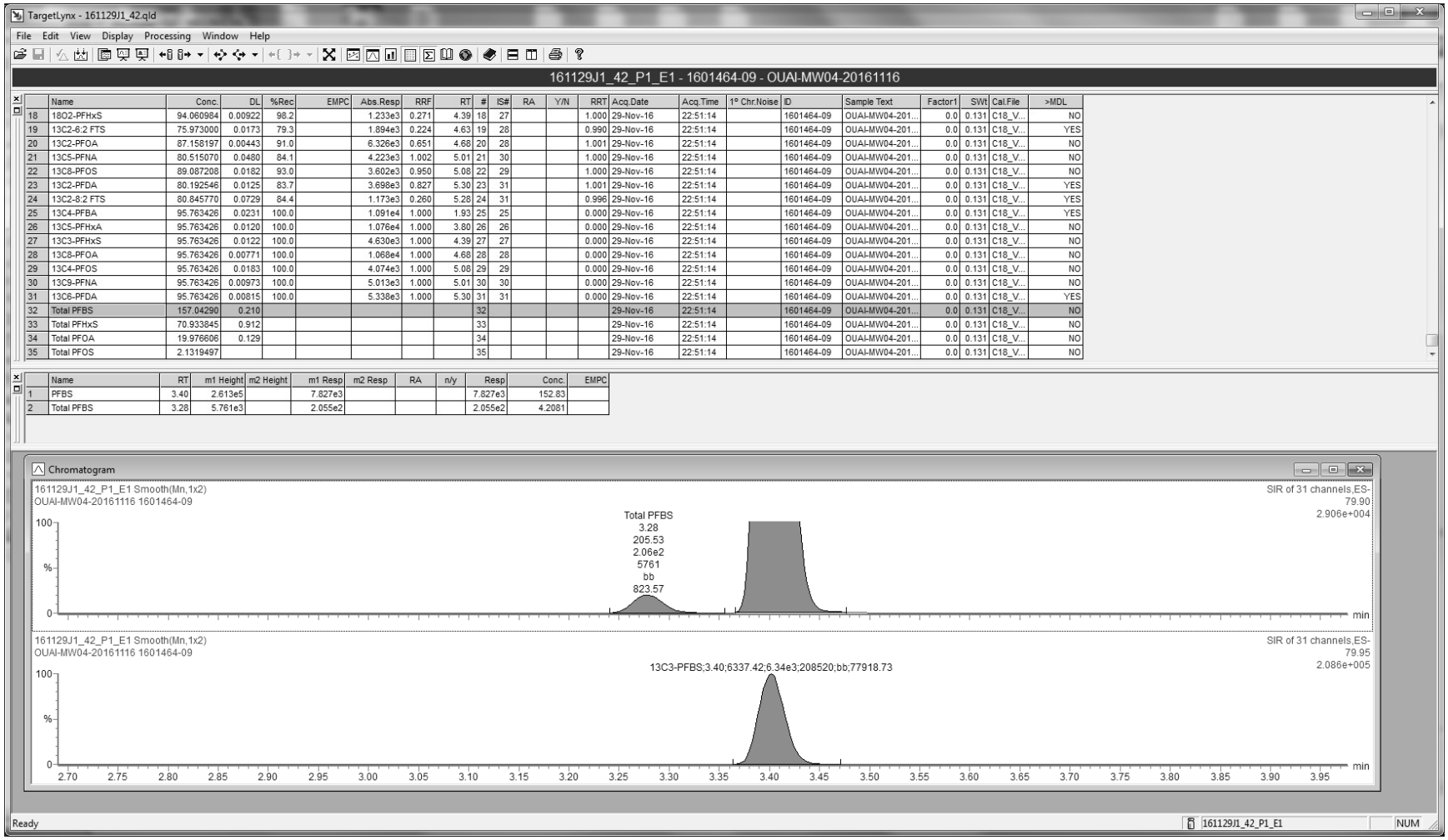
13C2-PFOA



13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	94.060984	0.00922	98.2		1.233e3	0.271	4.39	18	27			1.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
19	13C2-6:2 FTS	75.973000	0.0173	79.3		1.894e3	0.224	4.63	19	28			0.990	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	YES
20	13C2-PFOA	87.158197	0.00443	91.0		6.326e3	0.651	4.68	20	28			1.001	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
21	13C5-PFNA	80.515070	0.0480	84.1		4.223e3	1.002	5.01	21	30			1.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
22	13C8-PFOS	89.087208	0.0182	93.0		3.602e3	0.950	5.08	22	29			1.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
23	13C2-PFDA	80.192546	0.0125	83.7		3.698e3	0.827	5.30	23	31			1.001	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	YES
24	13C2-8:2 FTS	80.845770	0.0729	84.4		1.173e3	0.260	5.28	24	31			0.996	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	YES
25	13C4-PFBA	95.763426	0.0231	100.0		1.091e4	1.000	1.93	25	25			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	YES
26	13C5-PFHxA	95.763426	0.0120	100.0		1.076e4	1.000	3.80	26	26			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
27	13C3-PFHxS	95.763426	0.0122	100.0		4.630e3	1.000	4.39	27	27			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
28	13C8-PFOA	95.763426	0.00771	100.0		1.068e4	1.000	4.68	28	28			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
29	13C4-PFOS	95.763426	0.0183	100.0		4.074e3	1.000	5.08	29	29			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
30	13C9-PFNA	95.763426	0.00973	100.0		5.013e3	1.000	5.01	30	30			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
31	13C6-PFDA	95.763426	0.00815	100.0		5.338e3	1.000	5.30	31	31			0.000	29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	YES
32	Total PFBS	157.04290	0.210						32					29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
33	Total PFHxS	70.933845	0.912						33					29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
34	Total PFOA	19.976606	0.129						34					29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO
35	Total PFOS	2.1319497							35					29-Nov-16	22:51:14		1601464-09	OUAI-MW04-201...	0.0	0.131	C18_V...	NO

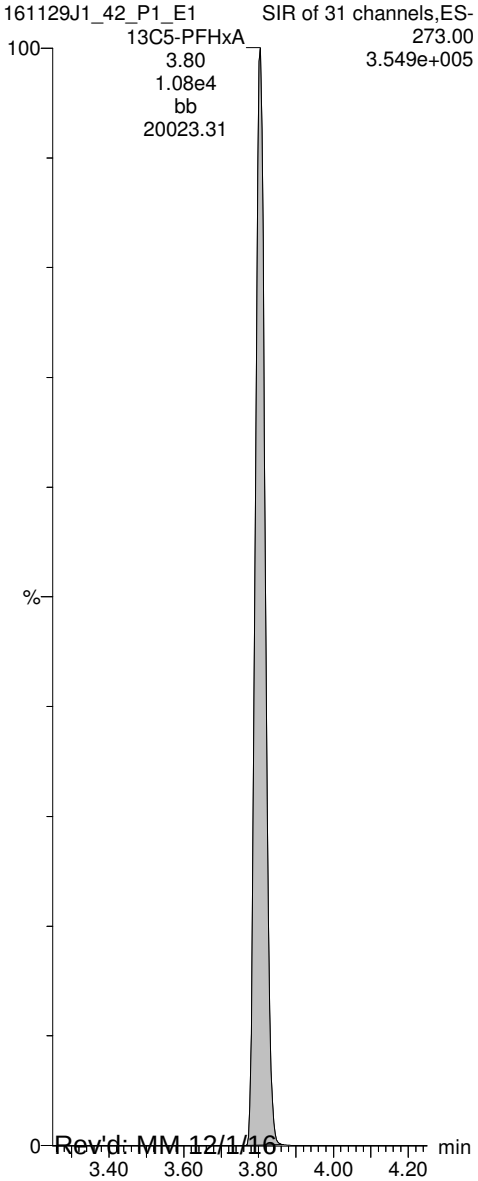
	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.40	2.613e5		7.827e3				7.827e3	152.83	
2	Total PFBS	3.28	5.761e3		2.055e2				2.055e2	4.2081	

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_42.qld

Last Altered: Thursday, December 01, 2016 11:43:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:44:21 Pacific Standard Time

ID: 1601464-09, Description: OUAI-MW04-20161116, Name: 161129J1_42.wiff, Date: 29-Nov-2016, Time: 22:51:14, Instrument: , Lab: ©PE-SCIEX, User: sciex

13C5-PFHxA



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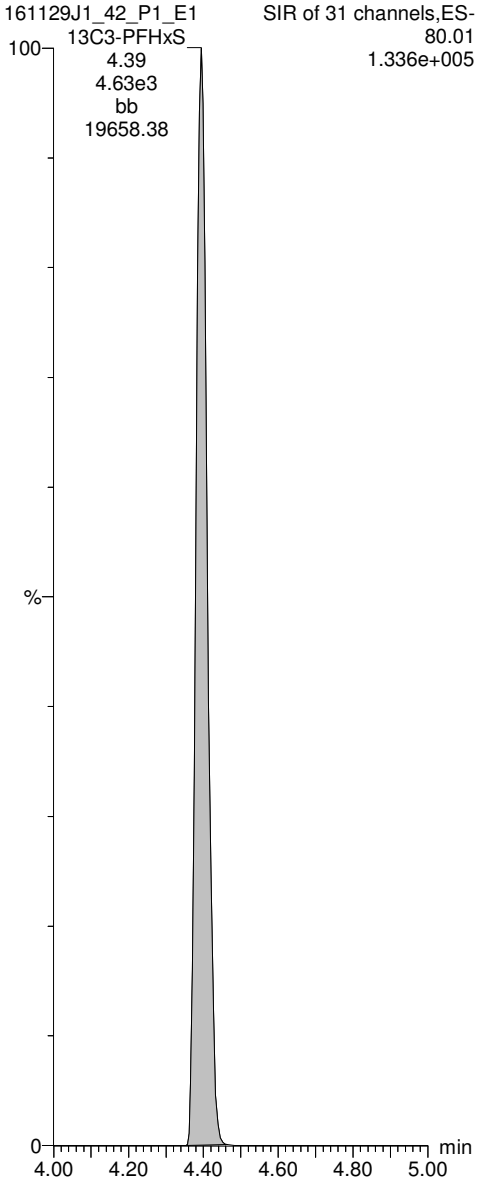
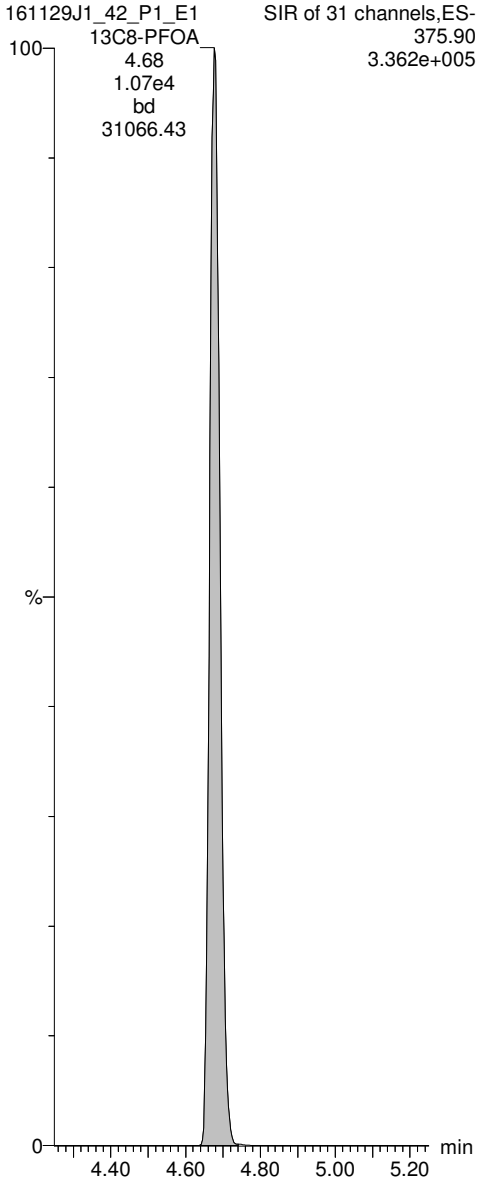
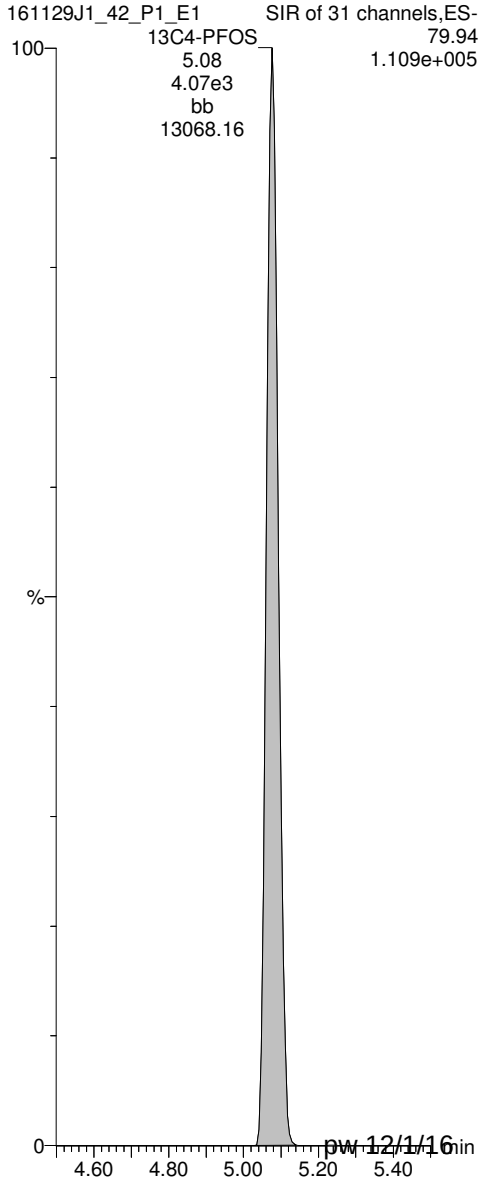


13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_43.qld

Last Altered: Thursday, December 01, 2016 11:45:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:46:28 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-10, Description: OUAI-MW04A-20161116, Name: 161129J1_43.wiff, Date: 29-Nov-2016, Time: 23:03:30

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	7.179e3	6.125e3		0.120	3.41	158	
2	8	PFOA	368.90	1.205e3	5.459e3		0.120	4.68	17.8	
3	10	PFOS	79.92	1.552e1	2.835e3		0.120	5.07	0.338	
4	15	13C3-PFBS	79.95	6.125e3	9.978e3	0.564	0.120	3.40	113	109
5	16	13C2-PFHxA	269.90	3.628e3	9.978e3	0.907	0.120	3.81	41.8	100
6	17	13C4-PFHpA	321.90	6.674e3	9.978e3	0.742	0.120	4.28	94.0	90.2
7	18	18O2-PFHxS	102.90	1.097e3	4.473e3	0.271	0.120	4.39	94.3	90.5
8	19	13C2-6:2 FTS	408.90	1.763e3	1.016e4	0.224	0.120	4.63	80.8	77.6
9	20	13C2-PFOA	369.90	5.459e3	1.016e4	0.651	0.120	4.68	86.0	82.5
10	21	13C5-PFNA	422.90	4.297e3	4.773e3	1.002	0.120	5.01	93.6	89.9
11	22	13C8-PFOS	79.93	2.835e3	3.475e3	0.950	0.120	5.07	89.4	85.8
12	25	13C4-PFBA	171.90	1.020e4	1.020e4	1.000	0.120	1.93	104	100
13	26	13C5-PFHxA	273.00	9.978e3	9.978e3	1.000	0.120	3.80	104	100
14	27	13C3-PFHxS	80.01	4.473e3	4.473e3	1.000	0.120	4.39	104	100
15	28	13C8-PFOA	375.90	1.016e4	1.016e4	1.000	0.120	4.68	104	100
16	29	13C4-PFOS	79.94	3.475e3	3.475e3	1.000	0.120	5.07	104	100
17	30	13C9-PFNA	427.00	4.773e3	4.773e3	1.000	0.120	5.01	104	100
18	31	13C6-PFDA	474.00	4.382e3	4.382e3	1.000	0.120	5.29	104	100
19	32	Total PFBS	79.90		6.125e3		0.120		162	
20	34	Total PFOA	368.90		5.459e3		0.120		22.1	
21	35	Total PFOS	79.92		2.835e3		0.120		2.83	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_43.qld

Last Altered: Thursday, December 01, 2016 11:45:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:46:28 Pacific Standard Time

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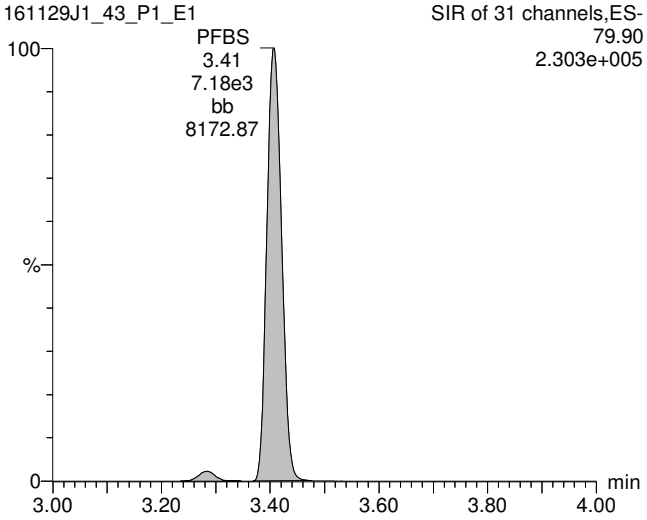
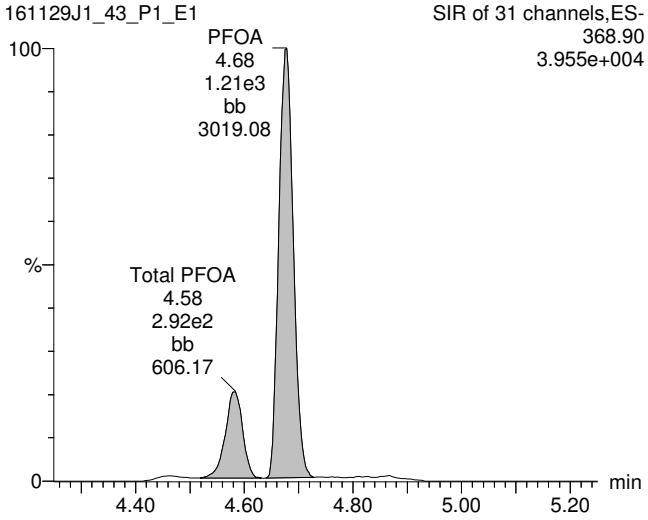
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-10, Description: OUAI-MW04A-20161116, Name: 161129J1_43.wiff, Date: 29-Nov-2016, Time: 23:03:30, Instrument: , Lab: ©PE-SCIEX, User: sciex

Total PFBS



Total PFOA



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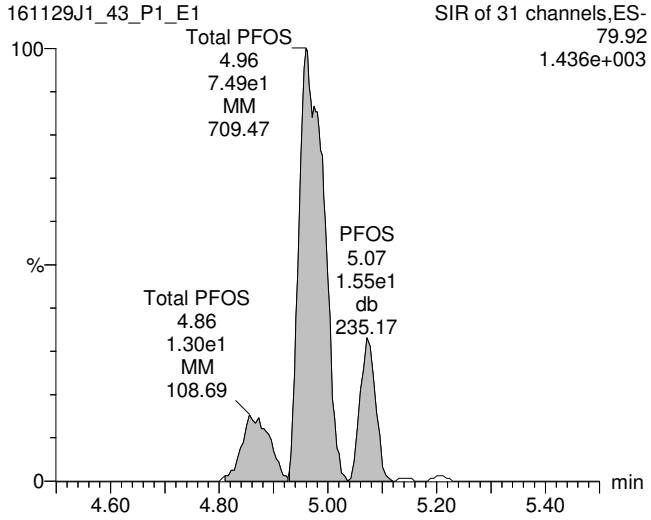
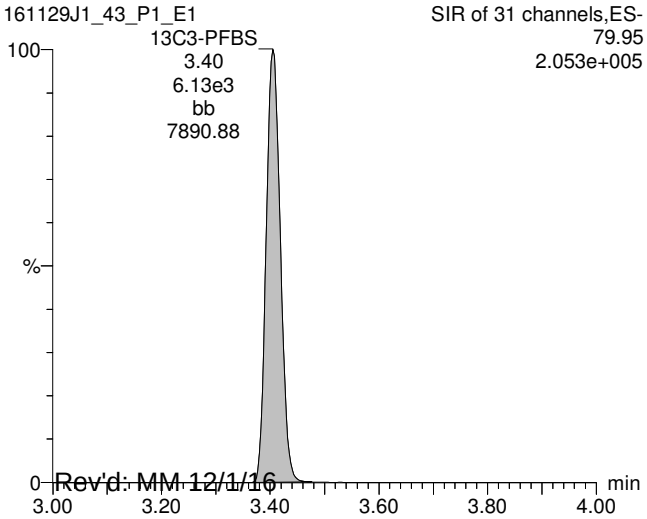


13C3-PFBS



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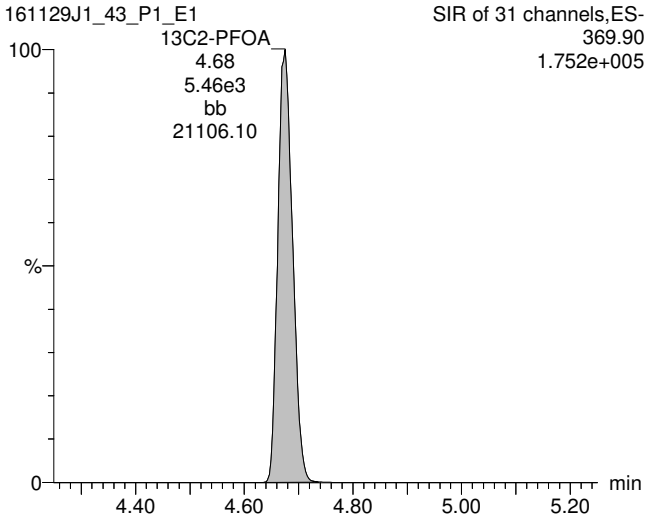
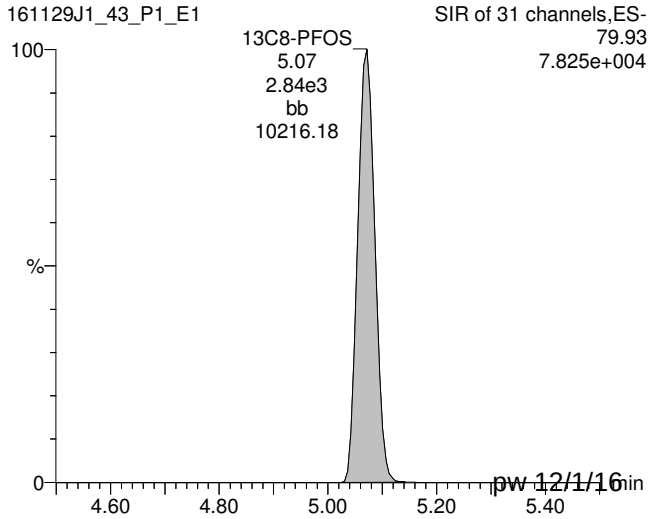
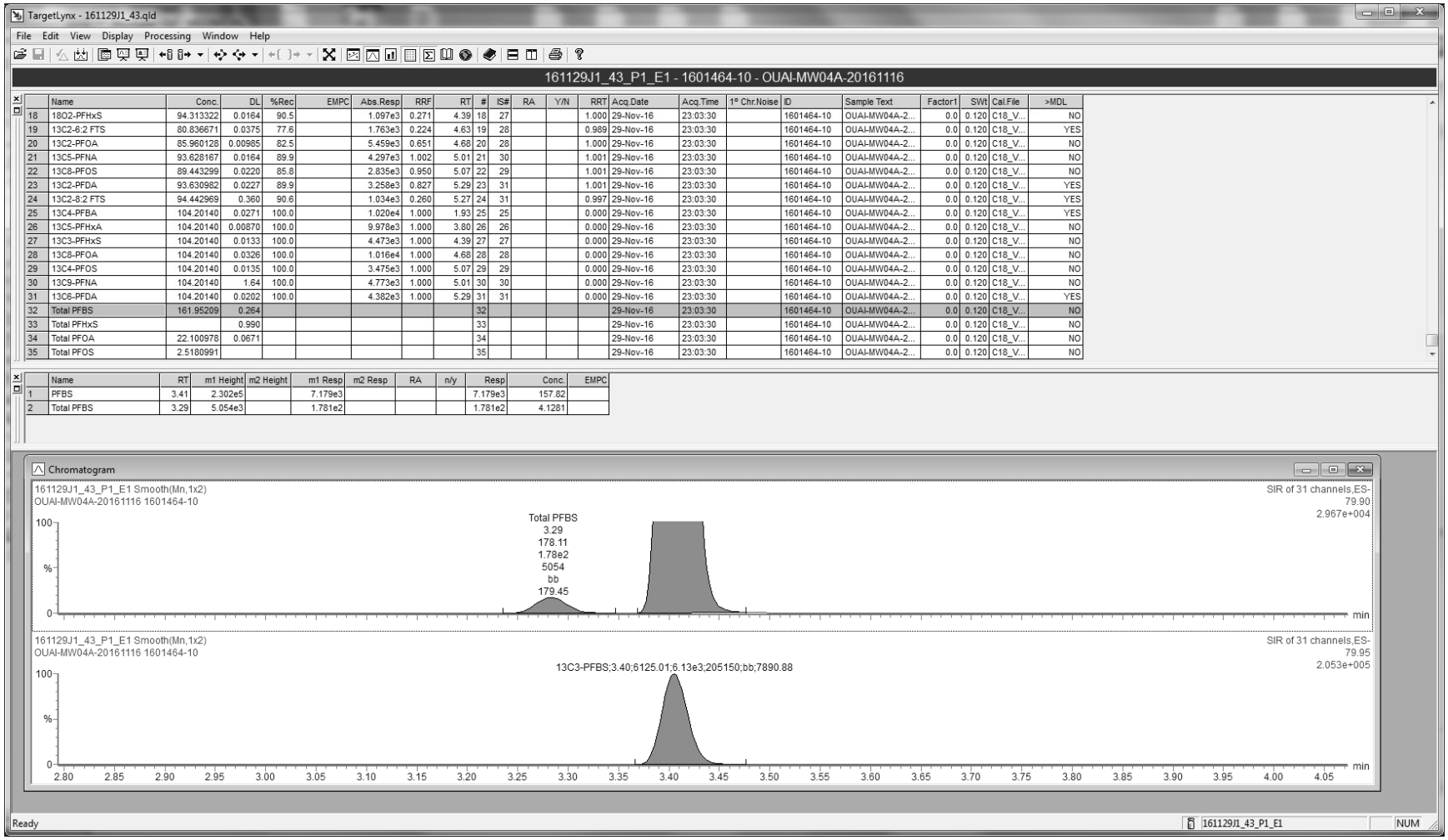


13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	94.313322	0.0164	90.5		1.097e3	0.271	4.39	18	27			1.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
19	13C2-6:2 FTS	80.836671	0.0375	77.6		1.763e3	0.224	4.63	19	28			0.989	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	YES
20	13C2-PFOA	85.960128	0.00985	82.5		5.459e3	0.651	4.68	20	28			1.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
21	13C5-PFNA	93.628167	0.0164	89.9		4.297e3	1.002	5.01	21	30			1.001	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
22	13C8-PFOS	89.443299	0.0220	85.8		2.835e3	0.950	5.07	22	29			1.001	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
23	13C2-PFDA	93.630982	0.0227	89.9		3.258e3	0.827	5.29	23	31			1.001	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	YES
24	13C2-8:2 FTS	94.442969	0.360	90.6		1.034e3	0.260	5.27	24	31			0.997	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	YES
25	13C4-PFBA	104.20140	0.0271	100.0		1.020e4	1.000	1.93	25	25			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	YES
26	13C5-PFHxA	104.20140	0.00870	100.0		9.978e3	1.000	3.80	26	26			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
27	13C3-PFHxS	104.20140	0.0133	100.0		4.473e3	1.000	4.39	27	27			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
28	13C8-PFOA	104.20140	0.0326	100.0		1.016e4	1.000	4.68	28	28			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
29	13C4-PFOS	104.20140	0.0135	100.0		3.475e3	1.000	5.07	29	29			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
30	13C9-PFNA	104.20140	1.64	100.0		4.773e3	1.000	5.01	30	30			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
31	13C6-PFDA	104.20140	0.0202	100.0		4.382e3	1.000	5.29	31	31			0.000	29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	YES
32	Total PFBS	161.95209	0.264						32					29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
33	Total PFHxS		0.990						33					29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
34	Total PFOA	22.100978	0.0671						34					29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO
35	Total PFOS	2.5180991							35					29-Nov-16	23:03:30		1601464-10	OUAI-MW04A-2...	0.0	0.120	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.41	2.302e5		7.179e3				7.179e3	157.82	
2	Total PFBS	3.29	5.054e3		1.781e2				1.781e2	4.1281	

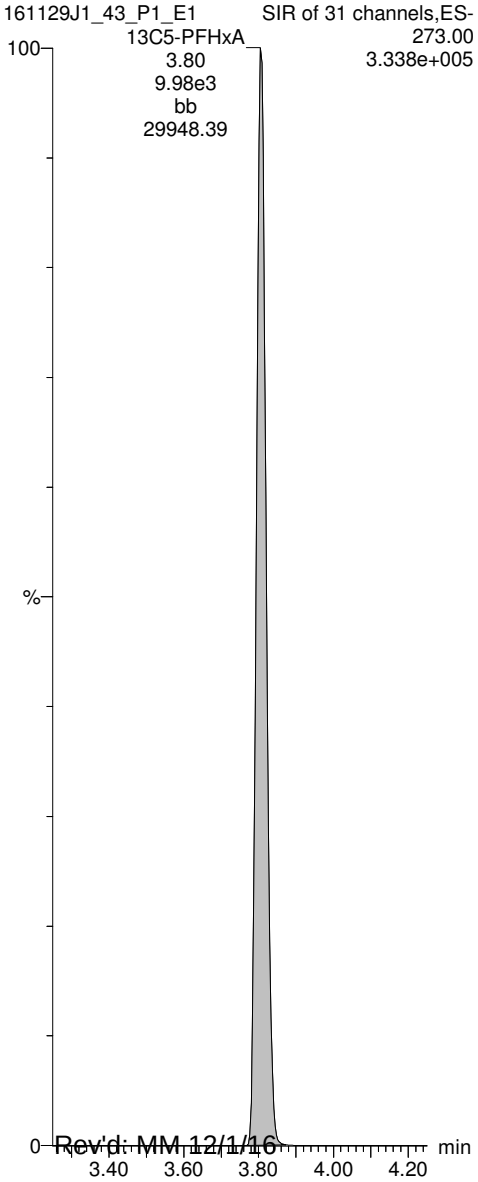
Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_43.qld

Last Altered: Thursday, December 01, 2016 11:45:59 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:46:28 Pacific Standard Time

ID: 1601464-10, Description: OUAI-MW04A-20161116, Name: 161129J1_43.wiff, Date: 29-Nov-2016, Time: 23:03:30, Instrument: , Lab: ©PE-SCIEX, User: sciex

13C5-PFHxA



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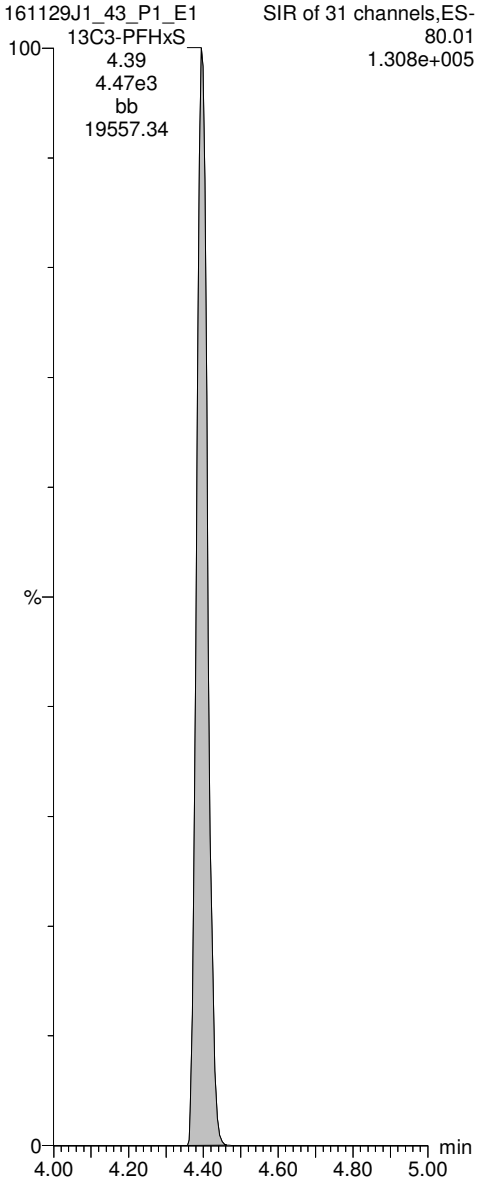

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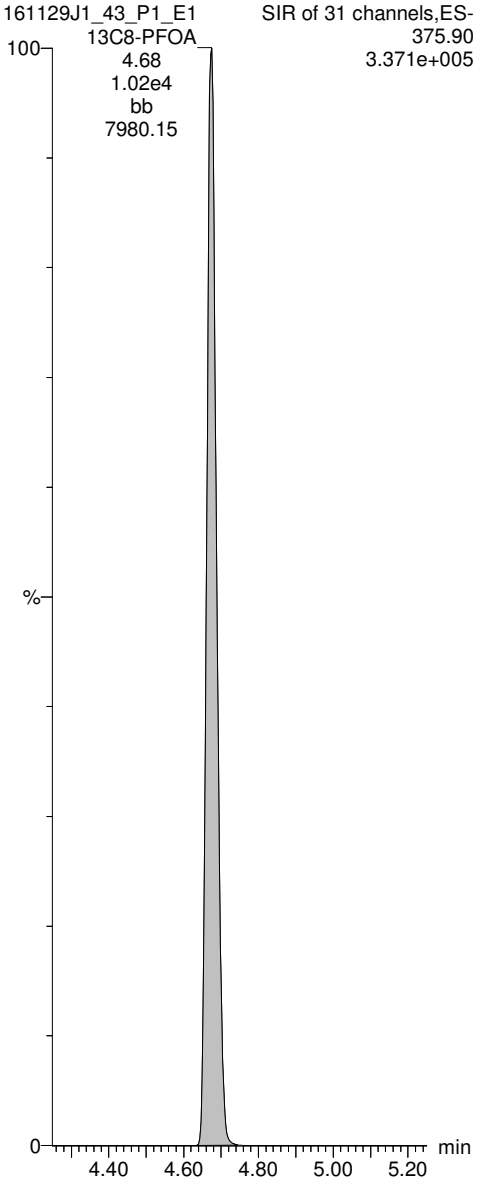
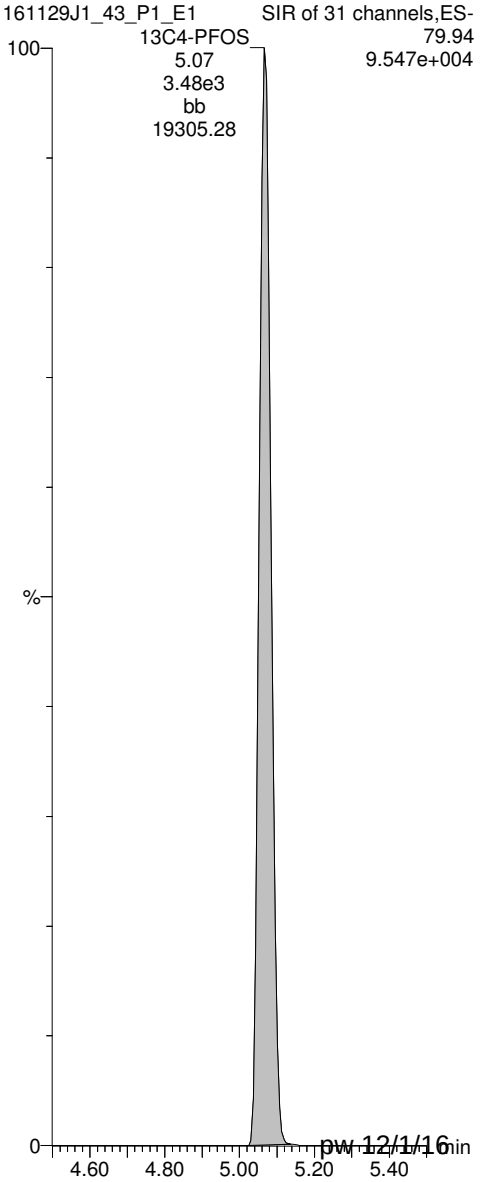


13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_44.qld

Last Altered: Thursday, December 01, 2016 11:48:27 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:48:53 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 01 Dec 2016 11:10:17
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-11, Description: OUAI-MW05-20161116, Name: 161129J1_44.wiff, Date: 29-Nov-2016, Time: 23:15:44

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	79.90	1.516e3	6.675e3		0.129	3.41	28.7	
2	8	PFOA	368.90	5.631e1	5.178e3		0.129	4.67	0.859	
3	10	PFOS	79.92	1.983e1	2.950e3		0.129	5.05	0.421	
4	15	13C3-PFBS	79.95	6.675e3	1.068e4	0.564	0.129	3.41	108	111
5	16	13C2-PFHxA	269.90	3.782e3	1.068e4	0.907	0.129	3.80	37.9	97.6
6	17	13C4-PFHpA	321.90	6.739e3	1.068e4	0.742	0.129	4.28	82.7	85.1
7	18	18O2-PFHxS	102.90	1.130e3	4.675e3	0.271	0.129	4.39	86.7	89.2
8	19	13C2-6:2 FTS	408.90	1.965e3	9.635e3	0.224	0.129	4.63	88.6	91.2
9	20	13C2-PFOA	369.90	5.178e3	9.635e3	0.651	0.129	4.67	80.2	82.6
10	21	13C5-PFNA	422.90	4.155e3	5.347e3	1.002	0.129	4.99	75.4	77.6
11	22	13C8-PFOS	79.93	2.950e3	3.721e3	0.950	0.129	5.05	81.1	83.4
12	25	13C4-PFBA	171.90	1.095e4	1.095e4	1.000	0.129	1.93	97.2	100
13	26	13C5-PFHxA	273.00	1.068e4	1.068e4	1.000	0.129	3.80	97.2	100
14	27	13C3-PFHxS	80.01	4.675e3	4.675e3	1.000	0.129	4.39	97.2	100
15	28	13C8-PFOA	375.90	9.635e3	9.635e3	1.000	0.129	4.67	97.2	100
16	29	13C4-PFOS	79.94	3.721e3	3.721e3	1.000	0.129	5.05	97.2	100
17	30	13C9-PFNA	427.00	5.347e3	5.347e3	1.000	0.129	4.99	97.2	100
18	31	13C6-PFDA	474.00	4.499e3	4.499e3	1.000	0.129	5.27	97.2	100
19	32	Total PFBS	79.90		6.675e3		0.129		30.5	
20	34	Total PFOA	368.90		5.178e3		0.129		0.859	
21	35	Total PFOS	79.92		2.950e3		0.129		0.937	

Rev'd: MM 12/1/16 pw 12/1/16

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_44.qld

Last Altered: Thursday, December 01, 2016 11:48:27 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:48:53 Pacific Standard Time

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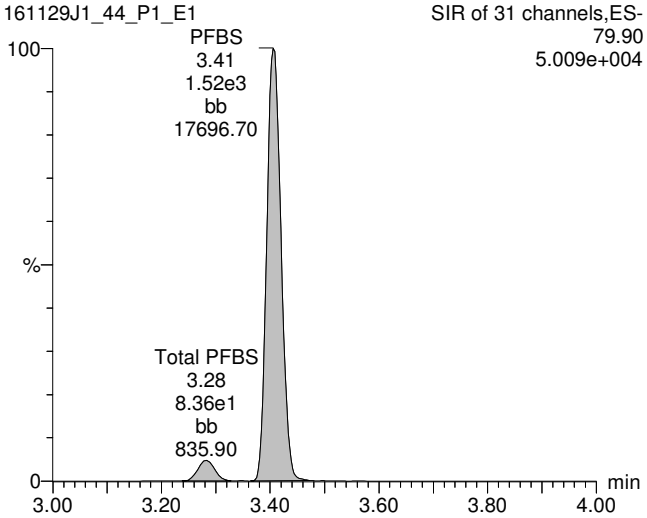
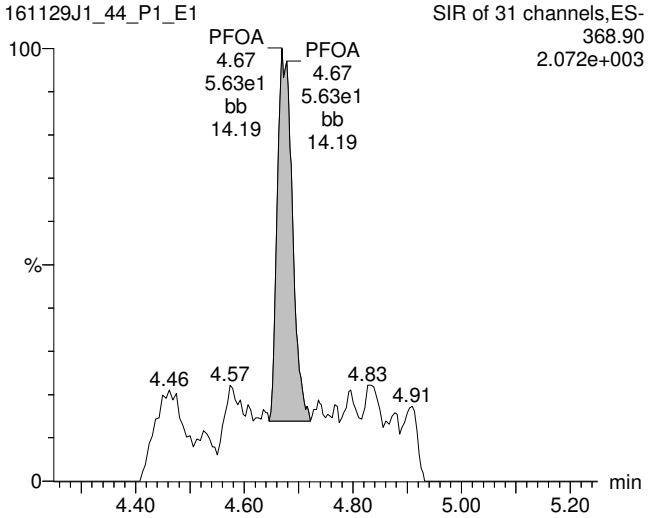
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

ID: 1601464-11, Description: OUAI-MW05-20161116, Name: 161129J1_44.wiff, Date: 29-Nov-2016, Time: 23:15:44, Instrument: , Lab: ©PE-SCIEX, User: sciex

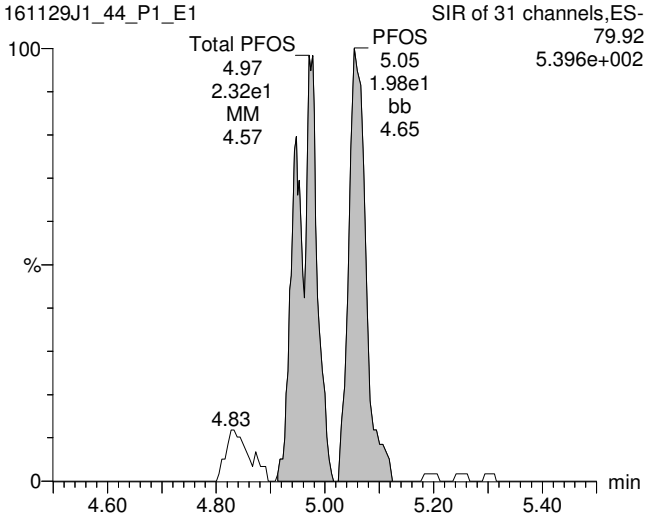
Total PFBS



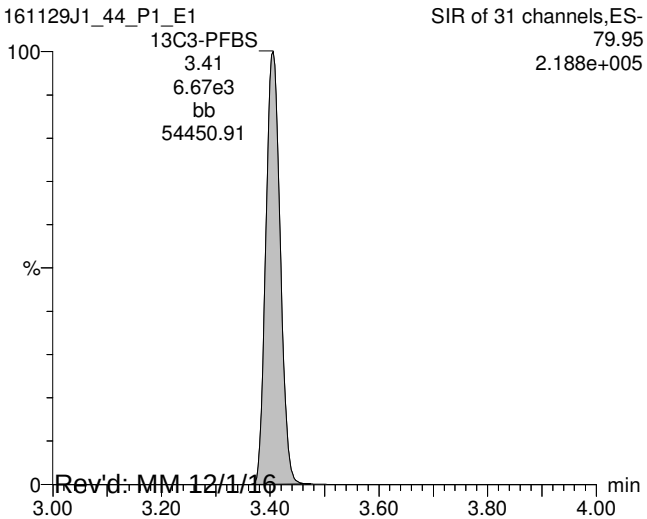
Total PFOA



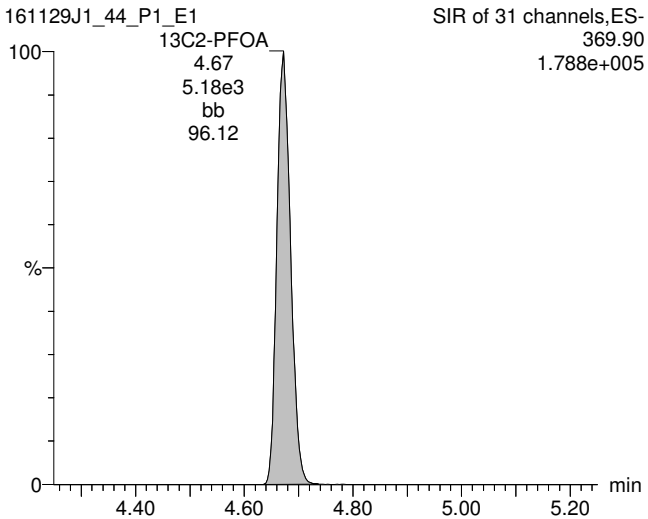
Total PFOS



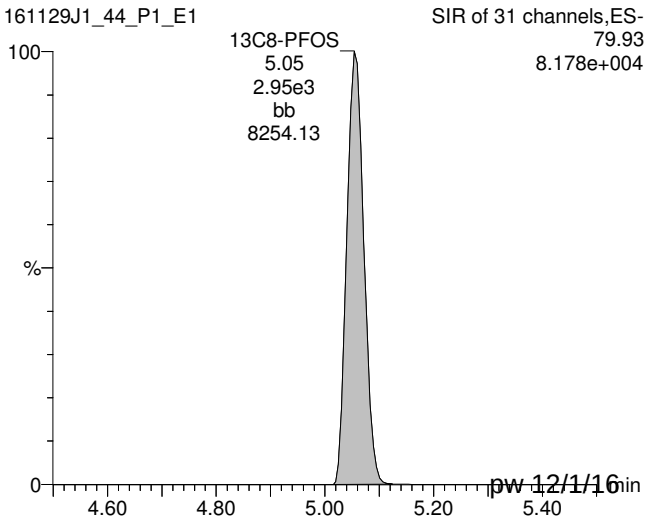
13C3-PFBS



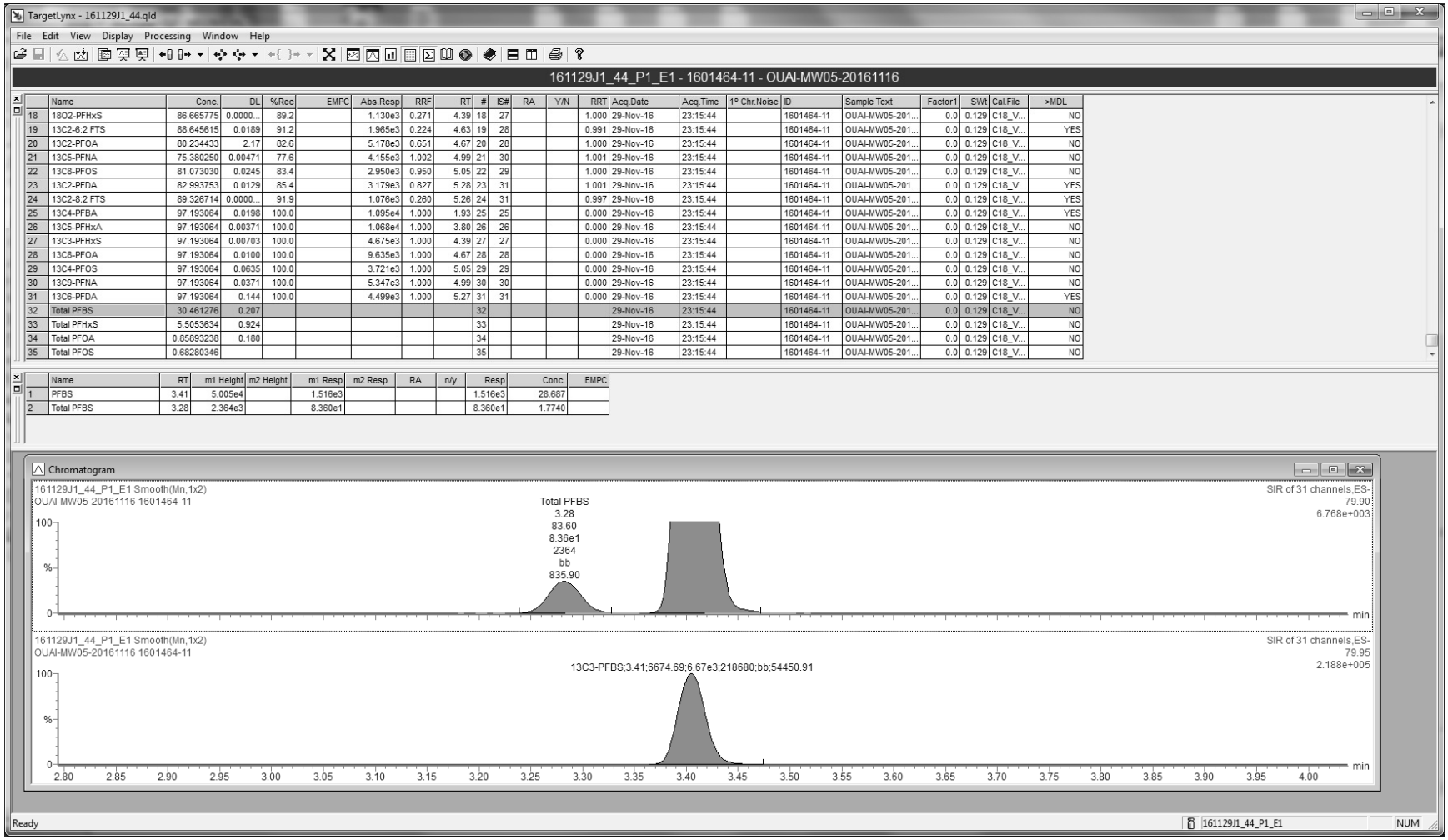
13C2-PFOA



13C8-PFOS



Rev'd: MM 12/1/16 pw 12/1/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
18	18O2-PFHxS	86.665775	0.0000...	89.2		1.130e3	0.271	4.39	18	27			1.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
19	13C2-6:2 FTS	88.645615	0.0189	91.2		1.965e3	0.224	4.63	19	28			0.991	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	YES
20	13C2-PFOA	80.234433	2.17	82.6		5.178e3	0.651	4.67	20	28			1.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
21	13C5-PFNA	75.380250	0.00471	77.6		4.155e3	1.002	4.99	21	30			1.001	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
22	13C8-PFOS	81.073030	0.0245	83.4		2.950e3	0.950	5.05	22	29			1.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
23	13C2-PFDA	82.993753	0.0129	85.4		3.179e3	0.827	5.28	23	31			1.001	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	YES
24	13C2-8:2 FTS	89.326714	0.0000...	91.9		1.076e3	0.260	5.26	24	31			0.997	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	YES
25	13C4-PFBA	97.193064	0.0198	100.0		1.095e4	1.000	1.93	25	25			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	YES
26	13C5-PFHxA	97.193064	0.00371	100.0		1.068e4	1.000	3.80	26	26			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
27	13C3-PFHxS	97.193064	0.00703	100.0		4.675e3	1.000	4.39	27	27			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
28	13C8-PFOA	97.193064	0.0100	100.0		9.635e3	1.000	4.67	28	28			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
29	13C4-PFOS	97.193064	0.0635	100.0		3.721e3	1.000	5.05	29	29			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
30	13C9-PFNA	97.193064	0.0371	100.0		5.347e3	1.000	4.99	30	30			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
31	13C6-PFDA	97.193064	0.144	100.0		4.499e3	1.000	5.27	31	31			0.000	29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	YES
32	Total PFBS	30.461276	0.207						32					29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
33	Total PFHxS	5.5053634	0.924						33					29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
34	Total PFOA	0.85893238	0.180						34					29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO
35	Total PFOS	0.68280346							35					29-Nov-16	23:15:44		1601464-11	OUAI-MW05-201...	0.0	0.129	C18_V...	NO

	Name	RT	m1 Height	m2 Height	m1 Resp	m2 Resp	RA	n/y	Resp	Conc.	EMPC
1	PFBS	3.41	5.005e4		1.516e3				1.516e3	28.687	
2	Total PFBS	3.28	2.364e3		8.360e1				8.360e1	1.7740	

Rev'd: MM 12/1/16

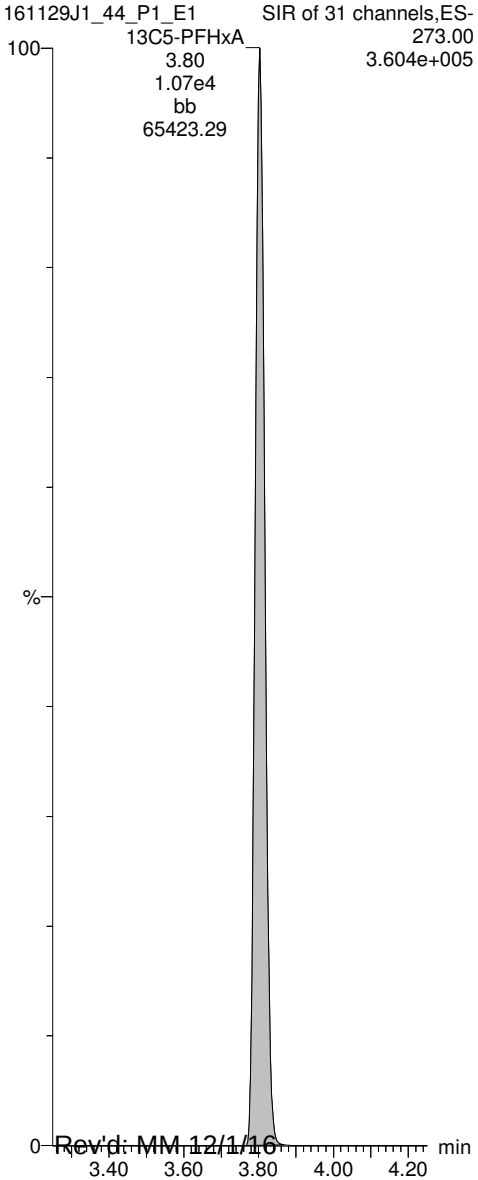
pw 12/1/16

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_44.qld

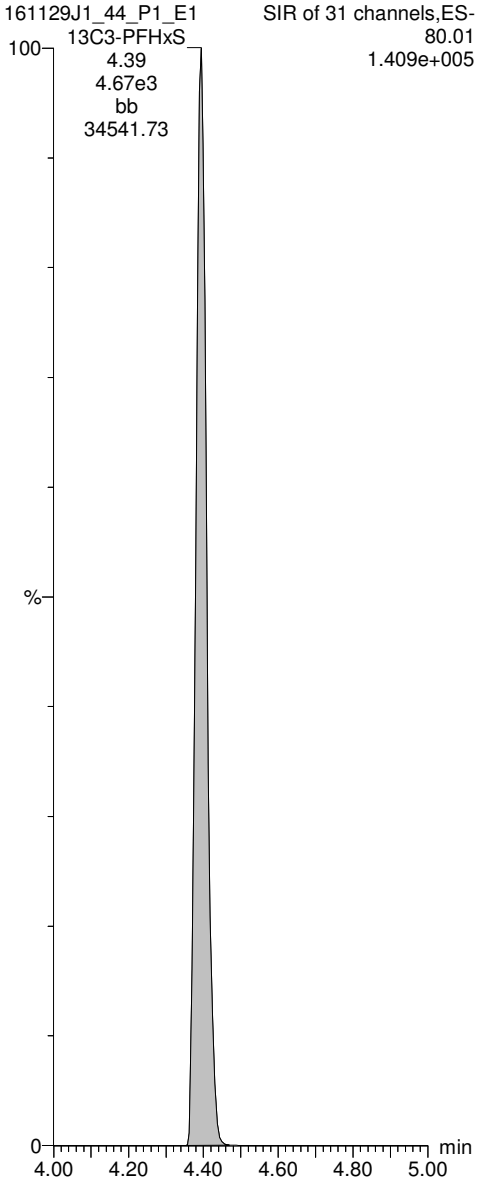
Last Altered: Thursday, December 01, 2016 11:48:27 Pacific Standard Time
Printed: Thursday, December 01, 2016 11:48:53 Pacific Standard Time

ID: 1601464-11, Description: OUAI-MW05-20161116, Name: 161129J1_44.wiff, Date: 29-Nov-2016, Time: 23:15:44, Instrument: , Lab: ©PE-SCIEX, User: sciex

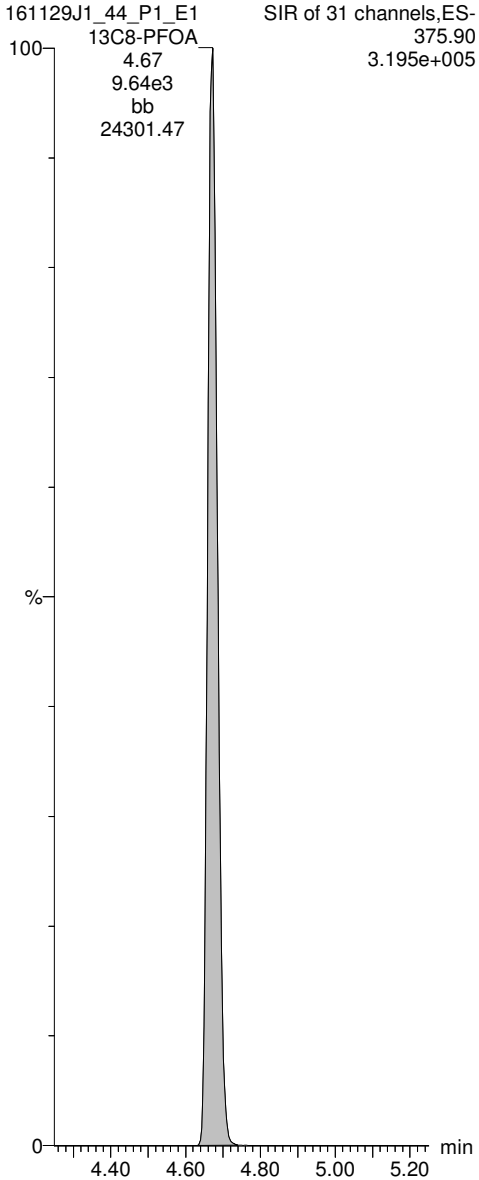
13C5-PFHxA



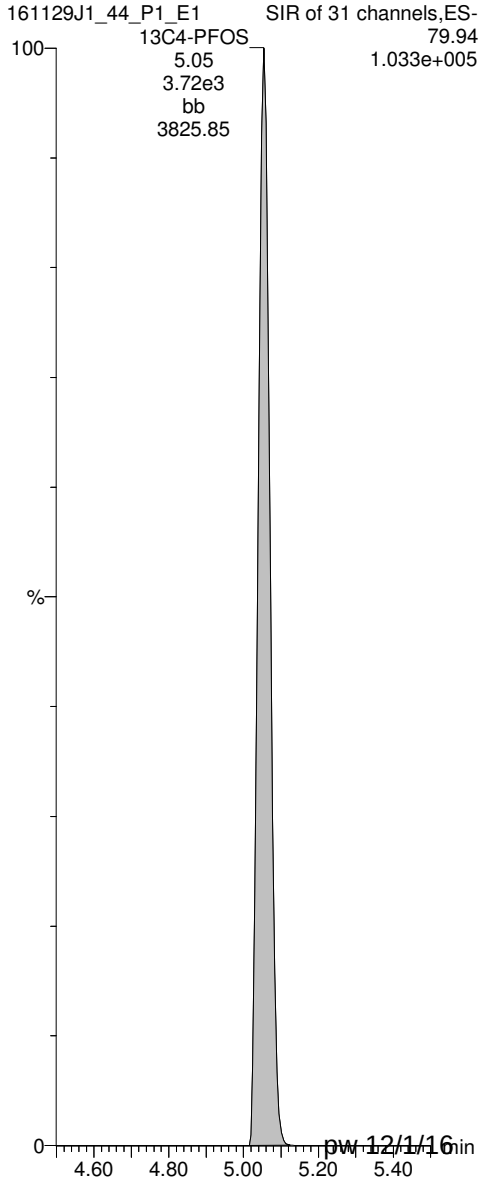
13C3-PFHxS



13C8-PFOA



13C4-PFOS



Rev'd: MM 12/1/16 pw 12/1/16

CONTINUING CALIBRATION

Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_19.qld

Last Altered: Wednesday, November 30, 2016 13:27:58 Pacific Standard Time
Printed: Wednesday, November 30, 2016 13:28:37 Pacific Standard Time

Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 25 Nov 2016 08:57:09
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161129J1_19.wiff, Date: 29-Nov-2016, Time: 18:09:35, ID: ST161129J1-2 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec	
1	1	PFBA	168.90	2.14e4	1.02e4		1.000	1.93	26.6	106.5	75-125
2	2	PFPeA	218.90	2.20e4	1.16e4		1.000	3.12	27.4	109.7	
3	3	PFBS	79.90	1.12e4	6.80e3		1.000	3.41	26.5	106.1	
4	4	PFHxA	268.90	1.79e4	4.19e3		1.000	3.81	25.7	103.0	
5	5	PFHpA	318.90	1.38e4	7.94e3		1.000	4.28	26.3	105.0	
6	6	PFHxS	79.91	8.32e3	1.28e3		1.000	4.40	25.0	100.0	
7	7	6:2 FTS	406.90	3.52e3	1.97e3		1.000	4.64	23.2	92.8	
8	8	PFOA	368.90	1.68e4	7.15e3		1.000	4.68	23.8	95.3	
9	9	PFNA	419.00	1.25e4	5.73e3		1.000	5.02	33.3	(A) 133.0	
10	10	PFOS	79.92	9.15e3	3.96e3		1.000	5.08	25.1	100.5	
11	11	PFDA	469.00	9.61e3	4.63e3		1.000	5.31	26.2	104.7	
12	12	8:2 FTS	506.90	2.27e3	1.12e3		1.000	5.28	28.6	114.2	
13	13	13C3-PFBA	172.00	1.02e4	1.11e4	0.867	1.000	1.93	13.2	106.0	60-150
14	14	13C3-PFPeA	221.90	1.16e4	1.06e4	0.994	1.000	3.11	13.8	110.7	
15	15	13C3-PFBS	79.95	6.80e3	1.06e4	0.564	1.000	3.40	14.3	114.1	
16	16	13C2-PFHxA	269.90	4.19e3	1.06e4	0.907	1.000	3.81	5.46	109.2	
17	17	13C4-PFHpA	321.90	7.94e3	1.06e4	0.742	1.000	4.28	12.6	101.2	
18	18	18O2-PFHxS	102.90	1.28e3	4.38e3	0.271	1.000	4.40	13.4	107.3	
19	19	13C2-6:2 FTS	408.90	1.97e3	1.12e4	0.224	1.000	4.64	9.87	78.9	40-150
20	20	13C2-PFOA	369.90	7.15e3	1.12e4	0.651	1.000	4.68	12.3	98.3	60-150
21	21	13C5-PFNA	422.90	5.73e3	5.71e3	1.002	1.000	5.02	12.5	100.2	50-150
22	22	13C8-PFOS	79.93	3.96e3	4.16e3	0.950	1.000	5.08	12.5	100.2	60-150
23	23	13C2-PFDA	470.00	4.63e3	4.97e3	0.827	1.000	5.30	14.1	112.6	
24	24	13C2-8:2 FTS	508.70	1.12e3	4.97e3	0.260	1.000	5.28	10.8	86.2	40-150
25	25	13C4-PFBA	171.90	1.11e4	1.11e4	1.000	1.000	1.93	12.5	100.0	
26	26	13C5-PFHxA	273.00	1.06e4	1.06e4	1.000	1.000	3.80	12.5	100.0	
27	27	13C3-PFHxS	80.01	4.38e3	4.38e3	1.000	1.000	4.40	12.5	100.0	
28	28	13C8-PFOA	375.90	1.12e4	1.12e4	1.000	1.000	4.68	12.5	100.0	
29	29	13C4-PFOS	79.94	4.16e3	4.16e3	1.000	1.000	5.08	12.5	100.0	
30	30	13C9-PFNA	427.00	5.71e3	5.71e3	1.000	1.000	5.02	12.5	100.0	
31	31	13C6-PFDA	474.00	4.97e3	4.97e3	1.000	1.000	5.30	12.5	100.0	

PW 11/30/16
11/29
PW
11/30/16

(A) outside Criteria
PW
11/30/16

✓AC 11/30/16

	Sample Name	Acquisition Date	Sample ID	Sample Comment
1	161129J1_01	11/29/2016 14:29:06	IPA	IPA
2	161129J1_02	11/29/2016 14:41:22	ST161129J1-1 PFC C3.5 16K2902	PFC C3.5 16K2902 A
3	161129J1_03	11/29/2016 14:53:37	IPA	IPA
4	161129J1_04	11/29/2016 15:05:52	B6K0139-BS1	OPR
5	161129J1_05	11/29/2016 15:18:05	B6K0139-BSD1	LCS Dup
6	161129J1_06	11/29/2016 15:30:21	IPA	IPA
7	161129J1_07	11/29/2016 15:42:35	B6K0139-BLK1	Method Blank
8	161129J1_08	11/29/2016 15:54:51	1601456-01	PFAS-SW39-111416
9	161129J1_09	11/29/2016 16:07:03	1601456-02	PFAS-SW32-111416
10	161129J1_10	11/29/2016 16:19:18	1601456-03	PFAS-SW29-111416
11	161129J1_11	11/29/2016 16:31:35	1601456-04	PFAS-SW38-111416
12	161129J1_12	11/29/2016 16:43:48	1601456-05	PFAS-SW28-111416
13	161129J1_13	11/29/2016 16:56:04	1601456-06	PFAS-WS-DUP3-111416
14	161129J1_14	11/29/2016 17:08:18	1601456-07	EB2-WS-111016
15	161129J1_15	11/29/2016 17:20:34	1601456-08	EB2-SED-110916
16	161129J1_16	11/29/2016 17:32:49	1601456-09	EB3-WS-111116
17	161129J1_17	11/29/2016 17:45:05	1601456-10	EB3-WG-110916
18	161129J1_18	11/29/2016 17:57:20	IPA	IPA
19	161129J1_19	11/29/2016 18:09:35	ST161129J1-2 PFC C3.5 16K2902	PFC C3.5 16K2902 A
20	161129J1_20	11/29/2016 18:21:49	IPA	IPA
21	161129J1_21	11/29/2016 18:34:05	1601456-11	EB4-WG-111116
22	161129J1_22	11/29/2016 18:46:19	1601456-12	EB3-SED-111016
23	161129J1_23	11/29/2016 18:58:35	1601456-13	EB4-SED-111116
24	161129J1_24	11/29/2016 19:10:48	1601456-14	EB4-WS-111416
25	161129J1_25	11/29/2016 19:23:02	1601456-15	EB5-SED-111416
26	161129J1_26	11/29/2016 19:35:15	B6K0139-MS1	Matrix Spike
27	161129J1_27	11/29/2016 19:47:28	B6K0139-MSD1	Matrix Spike Dup
28	161129J1_28	11/29/2016 19:59:43	1601464-01	EB03-20161116
29	161129J1_29	11/29/2016 20:12:00	1601464-02	OUAI-MW53-20161116
30	161129J1_30	11/29/2016 20:24:14	1601464-03	OUAI-MW54-20161116
31	161129J1_31	11/29/2016 20:36:29	1601464-04	OUAI-MW42-20161116
32	161129J1_32	11/29/2016 20:48:43	1601464-05	OUAI-MW01-20161116
33	161129J1_33	11/29/2016 21:00:59	IPA	IPA
34	161129J1_34	11/29/2016 21:13:14	ST161129J1-3 PFC C3.5 16K2902	PFC C3.5 16K2902 A
35	161129J1_35	11/29/2016 21:25:29	IPA	IPA
36	161129J1_36	11/29/2016 21:37:45	B6K0164-BS1	OPR
37	161129J1_37	11/29/2016 21:50:00	IPA	IPA
38	161129J1_38	11/29/2016 22:02:14	B6K0164-BLK1	Method Blank
39	161129J1_39	11/29/2016 22:14:30	1601464-06	OUAI-MW31-20161116
40	161129J1_40	11/29/2016 22:26:45	1601464-07	OUAI-PZ19-20161116
41	161129J1_41	11/29/2016 22:38:58	1601464-08	OUAI-MW52-20161116
42	161129J1_42	11/29/2016 22:51:14	1601464-09	OUAI-MW04-20161116
43	161129J1_43	11/29/2016 23:03:30	1601464-10	OUAI-MW04A-20161116
44	161129J1_44	11/29/2016 23:15:44	1601464-11	OUAI-MW05-20161116
45	161129J1_45	11/29/2016 23:27:59	1601472-01	EB04-20161117
46	161129J1_46	11/29/2016 23:40:10	1601472-02	OUAI-MW51-20161117
47	161129J1_47	11/29/2016 23:52:24	1601472-03	OUAI-MW50-20161117
48	161129J1_48	11/30/2016 00:04:38	1601472-04	OUAI-MW49-20161117
49	161129J1_49	11/30/2016 00:16:53	B6K0164-MS1	Matrix Spike
50	161129J1_50	11/30/2016 00:29:08	B6K0164-MSD1	Matrix Spike Dup
51	161129J1_51	11/30/2016 00:41:22	IPA	IPA
52	161129J1_52	11/30/2016 00:53:34	ST161129J1-4 PFC C3.5 16K2902	PFC C3.5 16K2902 A
53	161129J1_53	11/30/2016 01:05:50	IPA	IPA
54	161129J1_54	11/30/2016 01:18:03	161128-QC1	Milk QC
55	161129J1_55	11/30/2016 01:30:18	161128-QC2	Milk QC
56	161129J1_56	11/30/2016 01:42:33	1601432-09@5x	WURTS-VAS15009-18-21_FD
57	161129J1_57	11/30/2016 01:54:48	1601432-09@40x	WURTS-VAS15009-18-21_FD

Printing Time: 13:55:41
Printing Date: Wednesday, November 30, 2016

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58	161129J1_58	11/30/2016 02:07:04	B6K0133-MS2@5x	WURTS-VAS15009-18-21_FD
59	161129J1_59	11/30/2016 02:19:19	B6K0133-MS2@40x	WURTS-VAS15009-18-21_FD
60	161129J1_60	11/30/2016 02:31:33	B6K0133-MSD2@5x	WURTS-VAS15009-28-31
61	161129J1_61	11/30/2016 02:43:48	B6K0133-MSD2@40x	WURTS-VAS15009-28-31
62	161129J1_62	11/30/2016 02:56:03	IPA	IPA
63	161129J1_63	11/30/2016 03:08:18	ST161129J1-5 PFC C3.5 16K2902	PFC C3.5 16K2902 A
64	161129J1_64	11/30/2016 03:20:33	IPA	IPA

Vista Analytical Laboratory Q2

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Printed: Wednesday, November 30, 2016 13:29:08 Pacific Standard Time

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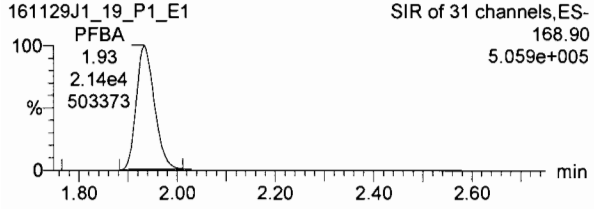
Name: 161129J1_19.wiff, Date: 29-Nov-2016, Time: 18:09:35, ID: ST161129J1-2 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

PFBA



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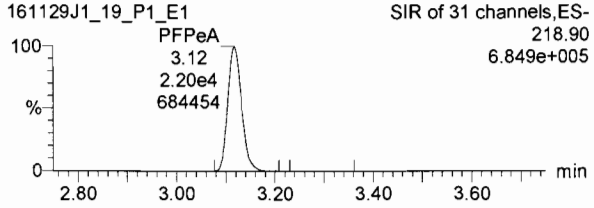
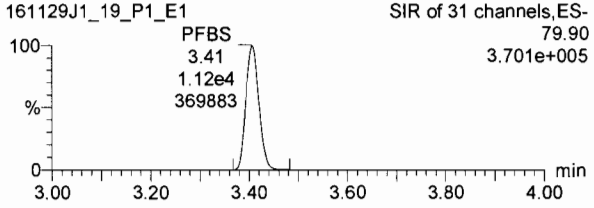
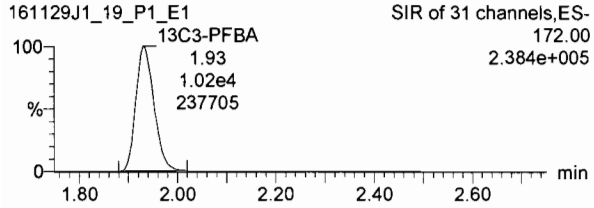


PFBS



13C3-PFBA



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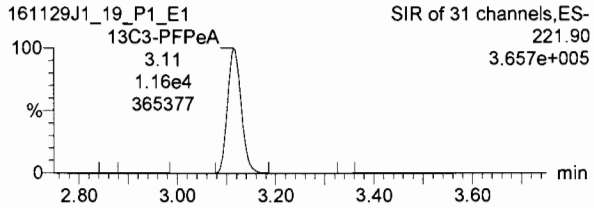
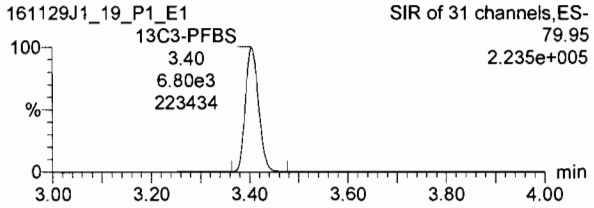
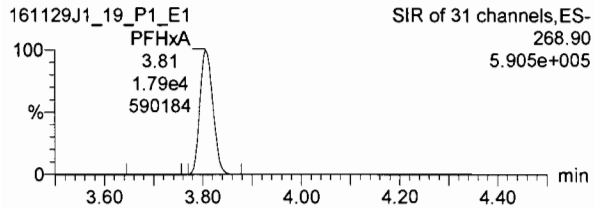


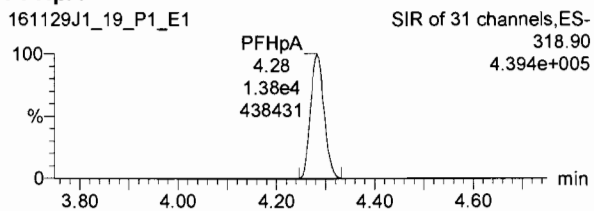
13C3-PFBS



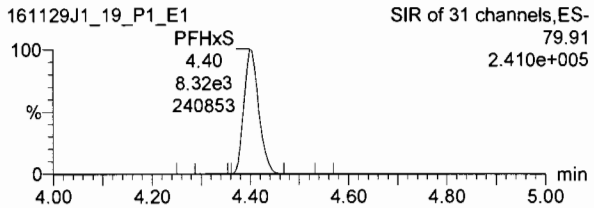
PFHxA



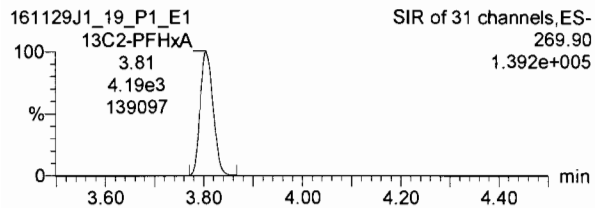
PFHpA



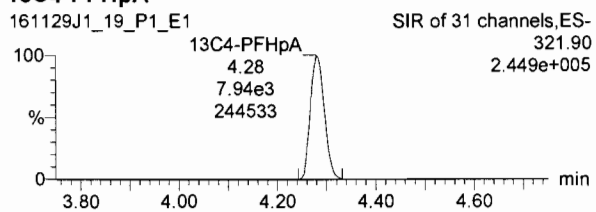
PFHxS



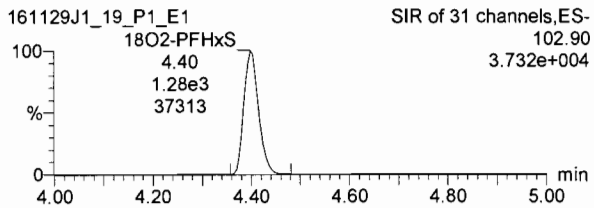
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



Vista Analytical Laboratory Q2

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_19.qld

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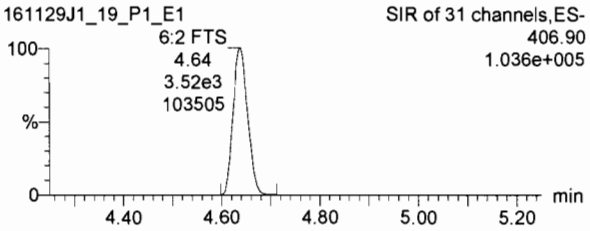
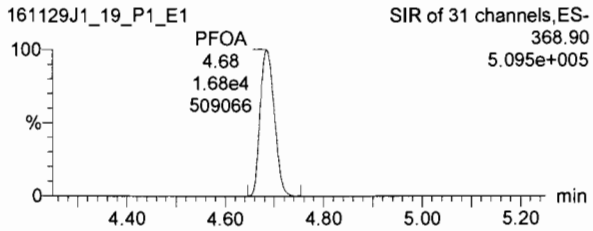
Printed: Wednesday, November 30, 2016 13:29:08 Pacific Standard Time

Name: 161129J1_19.wiff, Date: 29-Nov-2016, Time: 18:09:35, ID: ST161129J1-2 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

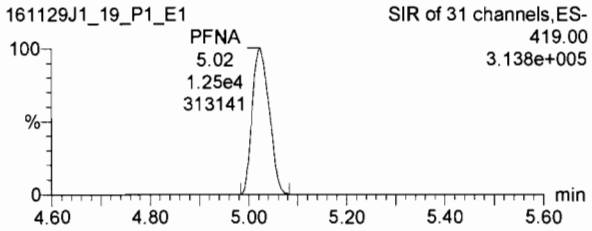
6:2 FTS



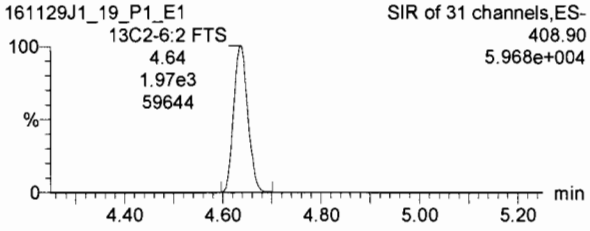
PFOA



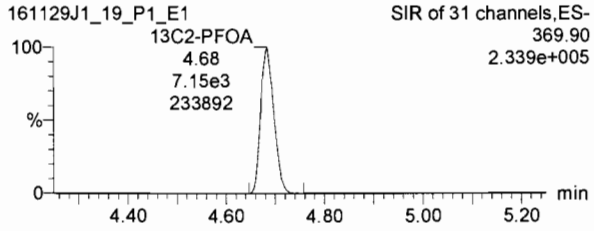
PFNA



13C2-6:2 FTS



13C2-PFOA



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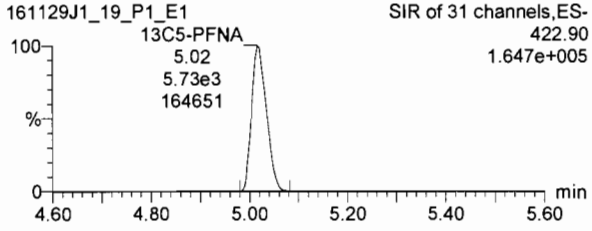
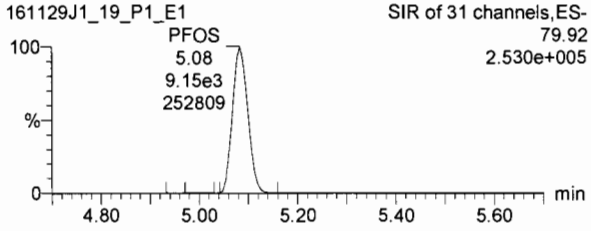
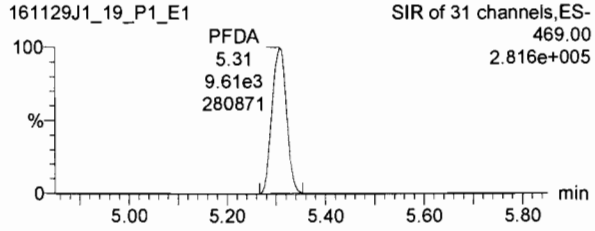


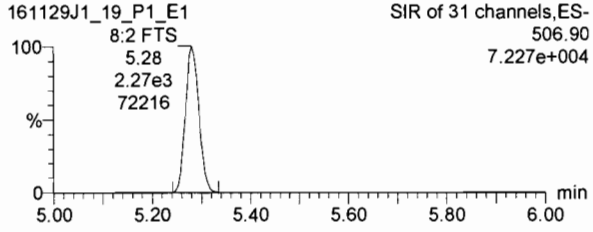
PFOS



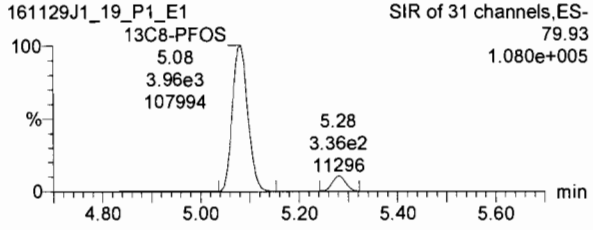
PFDA



8:2 FTS



13C8-PFOS



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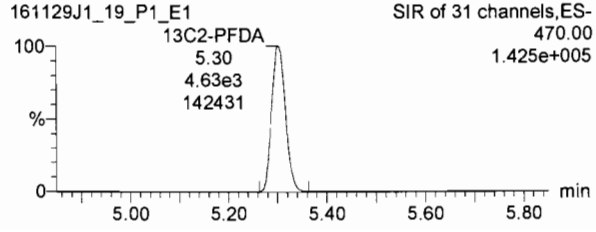

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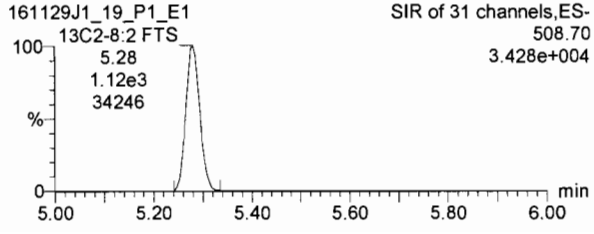

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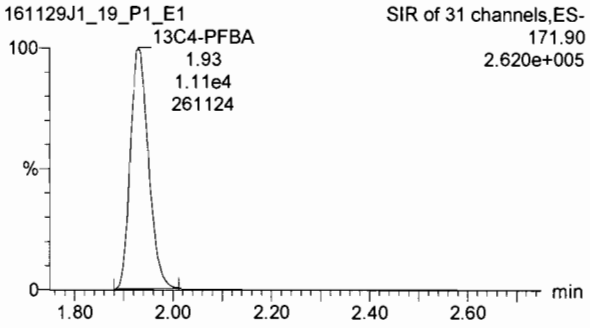
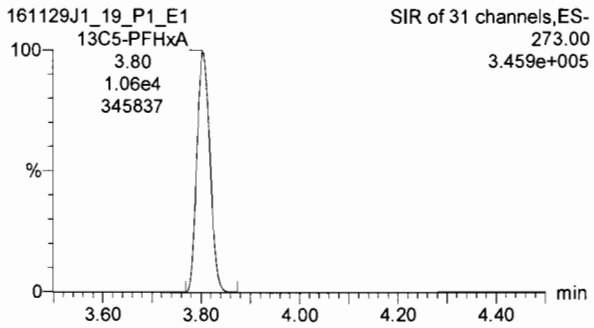
Printed: Wednesday, November 30, 2016 13:29:08 Pacific Standard Time

Name: 161129J1_19.wiff, Date: 29-Nov-2016, Time: 18:09:35, ID: ST161129J1-2 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

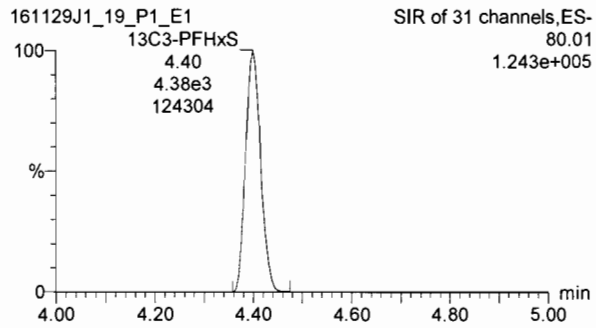
13C4-PFBA



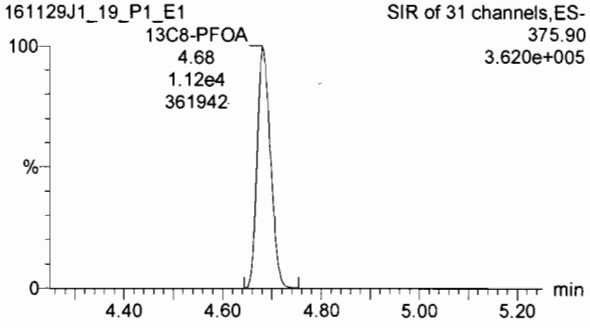
13C5-PFHxA



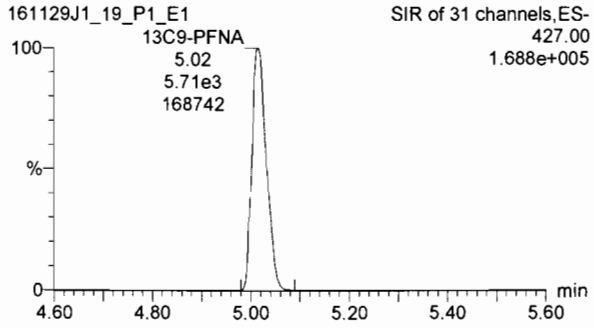
13C3-PFHxS



13C8-PFOA



13C9-PFNA



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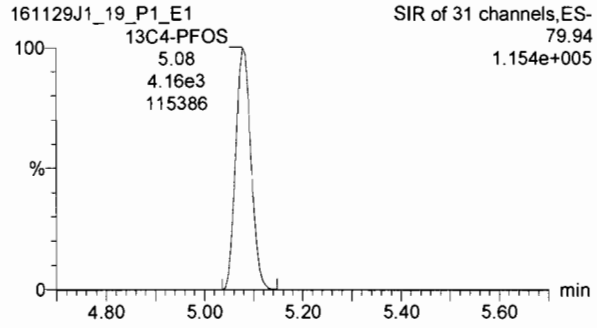
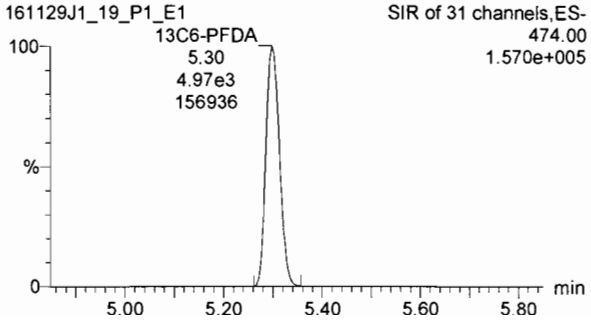


13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_34.qld

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Printed: Wednesday, November 30, 2016 13:39:00 Pacific Standard Time

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Name: 161129J1_34.wiff, Date: 29-Nov-2016, Time: 21:13:14, ID: ST161129J1-3 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1	PFBA	168.90	2.15e4	1.02e4		1.000	1.94	26.9	107.5
2	2	PFPeA	218.90	2.18e4	1.17e4		1.000	3.11	27.0	108.1
3	3	PFBS	79.90	1.10e4	6.46e3		1.000	3.40	27.4	109.6
4	4	PFHxA	268.90	1.74e4	4.22e3		1.000	3.80	24.8	99.3
5	5	PFHpA	318.90	1.36e4	8.01e3		1.000	4.28	25.6	102.6
6	6	PFHxS	79.91	8.12e3	1.23e3		1.000	4.39	25.3	101.2
7	7	6:2 FTS	406.90	3.78e3	1.89e3		1.000	4.62	26.3	105.2
8	8	PFOA	368.90	1.60e4	7.05e3		1.000	4.67	23.0	91.9
9	9	PFNA	419.00	1.12e4	5.82e3		1.000	4.99	29.5	118.0
10	10	PFOS	79.92	9.11e3	3.95e3		1.000	5.06	25.0	100.1
11	11	PFDA	469.00	7.99e3	4.02e3		1.000	5.29	25.0	99.9
12	12	8:2 FTS	506.90	2.13e3	9.75e2		1.000	5.27	30.9	123.7
13	13	13C3-PFBA	172.00	1.02e4	1.10e4	0.867	1.000	1.94	13.4	106.9
14	14	13C3-PFPeA	221.90	1.17e4	1.05e4	0.994	1.000	3.11	14.0	112.4
15	15	13C3-PFBS	79.95	6.46e3	1.05e4	0.564	1.000	3.40	13.7	109.3
16	16	13C2-PFHxA	269.90	4.22e3	1.05e4	0.907	1.000	3.80	5.55	111.0
17	17	13C4-PFHpA	321.90	8.01e3	1.05e4	0.742	1.000	4.28	12.9	103.1
18	18	18O2-PFHxS	102.90	1.23e3	4.31e3	0.271	1.000	4.39	13.2	105.3
19	19	13C2-6:2 FTS	408.90	1.89e3	1.04e4	0.224	1.000	4.62	10.1	81.1
20	20	13C2-PFOA	369.90	7.05e3	1.04e4	0.651	1.000	4.66	13.0	103.9
21	21	13C5-PFNA	422.90	5.82e3	6.06e3	1.002	1.000	4.99	12.0	95.9
22	22	13C8-PFOS	79.93	3.95e3	4.10e3	0.950	1.000	5.06	12.7	101.4
23	23	13C2-PFDA	470.00	4.02e3	4.64e3	0.827	1.000	5.28	13.1	104.6
24	24	13C2-8:2 FTS	508.70	9.75e2	4.64e3	0.260	1.000	5.26	10.1	80.6
25	25	13C4-PFBA	171.90	1.10e4	1.10e4	1.000	1.000	1.94	12.5	100.0
26	26	13C5-PFHxA	273.00	1.05e4	1.05e4	1.000	1.000	3.80	12.5	100.0
27	27	13C3-PFHxS	80.01	4.31e3	4.31e3	1.000	1.000	4.39	12.5	100.0
28	28	13C8-PFOA	375.90	1.04e4	1.04e4	1.000	1.000	4.66	12.5	100.0
29	29	13C4-PFOS	79.94	4.10e3	4.10e3	1.000	1.000	5.06	12.5	100.0
30	30	13C9-PFNA	427.00	6.06e3	6.06e3	1.000	1.000	4.99	12.5	100.0
31	31	13C6-PFDA	474.00	4.64e3	4.64e3	1.000	1.000	5.28	12.5	100.0

75-125
60-150
40-150
60-150
50-150
60-150
40-150

PW 11/30/16
✓AC 11/30/16

Printing Time: 13:55:41
Printing Date: Wednesday, November 30, 2016

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3	161129J1_03	11/29/2016 14:53:37	IPA	IPA
4	161129J1_04	11/29/2016 15:05:52	B6K0139-BS1	OPR
5	161129J1_05	11/29/2016 15:18:05	B6K0139-BSD1	LCS Dup
6	161129J1_06	11/29/2016 15:30:21	IPA	IPA
7	161129J1_07	11/29/2016 15:42:35	B6K0139-BLK1	Method Blank
8	161129J1_08	11/29/2016 15:54:51	1601456-01	PFAS-SW39-111416
9	161129J1_09	11/29/2016 16:07:03	1601456-02	PFAS-SW32-111416
10	161129J1_10	11/29/2016 16:19:18	1601456-03	PFAS-SW29-111416
11	161129J1_11	11/29/2016 16:31:35	1601456-04	PFAS-SW38-111416
12	161129J1_12	11/29/2016 16:43:48	1601456-05	PFAS-SW28-111416
13	161129J1_13	11/29/2016 16:56:04	1601456-06	PFAS-WS-DUP3-111416
14	161129J1_14	11/29/2016 17:08:18	1601456-07	EB2-WS-111016
15	161129J1_15	11/29/2016 17:20:34	1601456-08	EB2-SED-110916
16	161129J1_16	11/29/2016 17:32:49	1601456-09	EB3-WS-111116
17	161129J1_17	11/29/2016 17:45:05	1601456-10	EB3-WG-110916
18	161129J1_18	11/29/2016 17:57:20	IPA	IPA
19	161129J1_19	11/29/2016 18:09:35	ST161129J1-2 PFC C3.5 16K2902	PFC C3.5 16K2902 A
20	161129J1_20	11/29/2016 18:21:49	IPA	IPA
21	161129J1_21	11/29/2016 18:34:05	1601456-11	EB4-WG-111116
22	161129J1_22	11/29/2016 18:46:19	1601456-12	EB3-SED-111016
23	161129J1_23	11/29/2016 18:58:35	1601456-13	EB4-SED-111116
24	161129J1_24	11/29/2016 19:10:48	1601456-14	EB4-WS-111416
25	161129J1_25	11/29/2016 19:23:02	1601456-15	EB5-SED-111416
26	161129J1_26	11/29/2016 19:35:15	B6K0139-MS1	Matrix Spike
27	161129J1_27	11/29/2016 19:47:28	B6K0139-MSD1	Matrix Spike Dup
28	161129J1_28	11/29/2016 19:59:43	1601464-01	EB03-20161116
29	161129J1_29	11/29/2016 20:12:00	1601464-02	OUAI-MW53-20161116
30	161129J1_30	11/29/2016 20:24:14	1601464-03	OUAI-MW54-20161116
31	161129J1_31	11/29/2016 20:36:29	1601464-04	OUAI-MW42-20161116
32	161129J1_32	11/29/2016 20:48:43	1601464-05	OUAI-MW01-20161116
33	161129J1_33	11/29/2016 21:00:59	IPA	IPA
34	161129J1_34	11/29/2016 21:13:14	ST161129J1-3 PFC C3.5 16K2902	PFC C3.5 16K2902 A
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37	161129J1_37	11/29/2016 21:50:00	IPA	IPA
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40	161129J1_40	11/29/2016 22:26:45	1601464-07	OUAI-PZ19-20161116
41	161129J1_41	11/29/2016 22:38:58	1601464-08	OUAI-MW52-20161116
42	161129J1_42	11/29/2016 22:51:14	1601464-09	OUAI-MW04-20161116
43	161129J1_43	11/29/2016 23:03:30	1601464-10	OUAI-MW04A-20161116
44	161129J1_44	11/29/2016 23:15:44	1601464-11	OUAI-MW05-20161116
45	161129J1_45	11/29/2016 23:27:59	1601472-01	EB04-20161117
46	161129J1_46	11/29/2016 23:40:10	1601472-02	OUAI-MW51-20161117
47	161129J1_47	11/29/2016 23:52:24	1601472-03	OUAI-MW50-20161117
48	161129J1_48	11/30/2016 00:04:38	1601472-04	OUAI-MW49-20161117
49	161129J1_49	11/30/2016 00:16:53	B6K0164-MS1	Matrix Spike
50	161129J1_50	11/30/2016 00:29:08	B6K0164-MSD1	Matrix Spike Dup
51	161129J1_51	11/30/2016 00:41:22	IPA	IPA
52	161129J1_52	11/30/2016 00:53:34	ST161129J1-4 PFC C3.5 16K2902	PFC C3.5 16K2902 A
53	161129J1_53	11/30/2016 01:05:50	IPA	IPA
54	161129J1_54	11/30/2016 01:18:03	161128-QC1	Milk QC
55	161129J1_55	11/30/2016 01:30:18	161128-QC2	Milk QC
56	161129J1_56	11/30/2016 01:42:33	1601432-09@5x	WURTS-VAS15009-18-21_FD
57	161129J1_57	11/30/2016 01:54:48	1601432-09@40x	WURTS-VAS15009-18-21_FD

	Sample Name	Acquisition Date	Sample ID	Sample Comment
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60	161129J1_60	11/30/2016 02:31:33	B6K0133-MSD2@5x	WURTS-VAS15009-28-31
61	161129J1_61	11/30/2016 02:43:48	B6K0133-MSD2@40x	WURTS-VAS15009-28-31
62	161129J1_62	11/30/2016 02:56:03	IPA	IPA
63	161129J1_63	11/30/2016 03:08:18	ST161129J1-5 PFC C3.5 16K2902	PFC C3.5 16K2902 A
64	161129J1_64	11/30/2016 03:20:33	IPA	IPA

Vista Analytical Laboratory Q2

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_34.qld

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Printed: Wednesday, November 30, 2016 13:38:36 Pacific Standard Time

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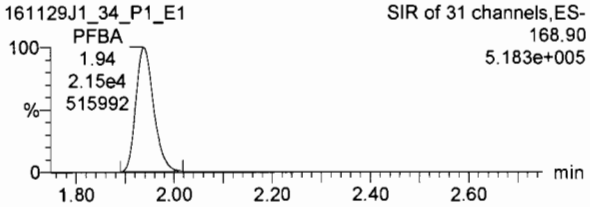
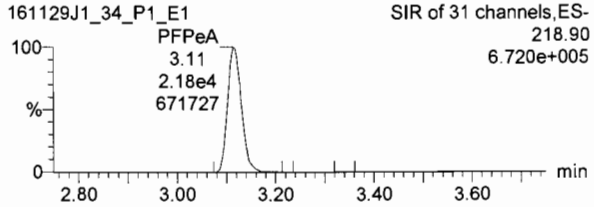
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161129J1_34.wiff, Date: 29-Nov-2016, Time: 21:13:14, ID: ST161129J1-3 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

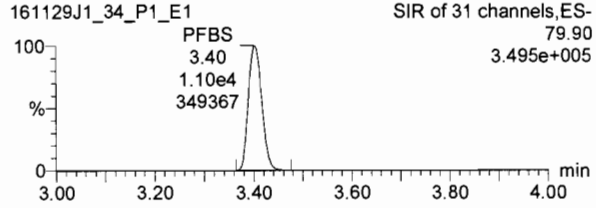
PFBA



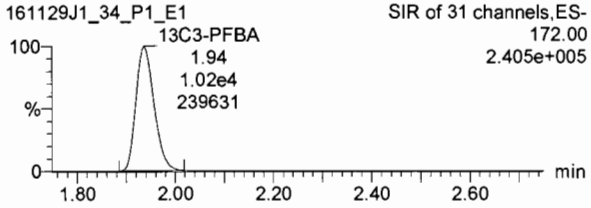
PFPeA



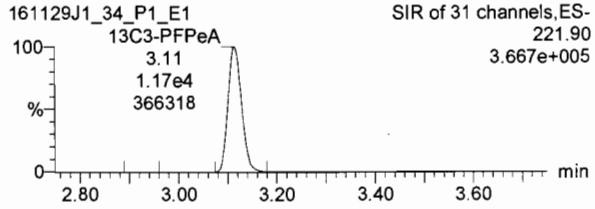
PFBS



13C3-PFBA



13C3-PFPeA



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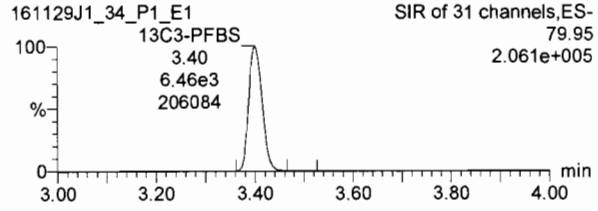
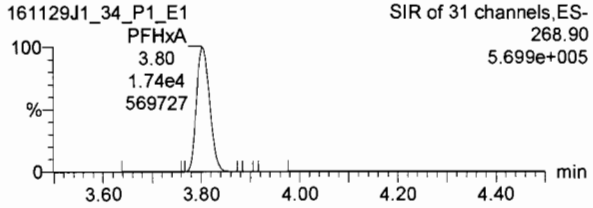
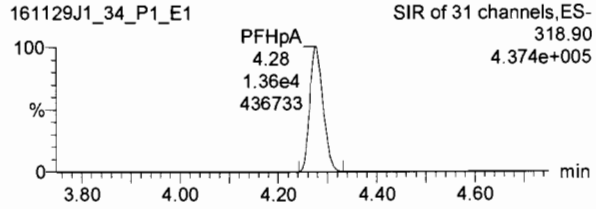


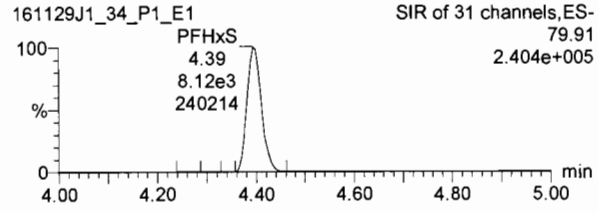
PFHxA



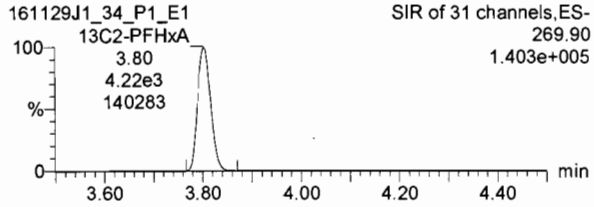
PFHpA



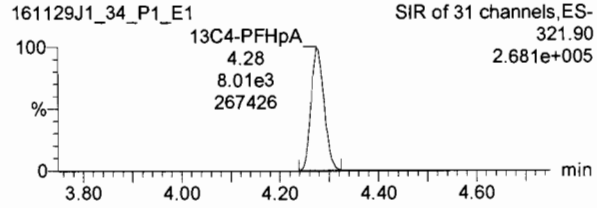
PFHxS



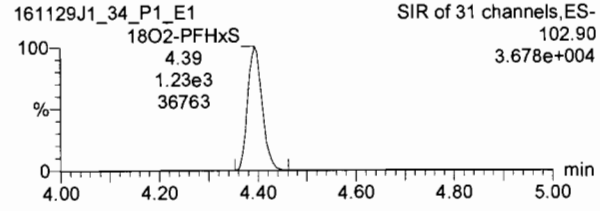
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



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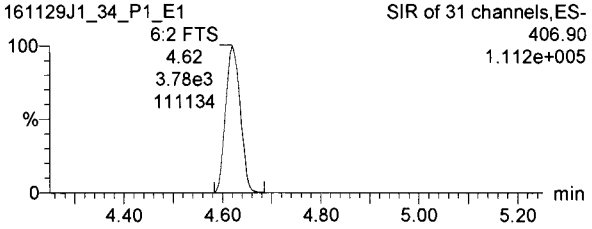
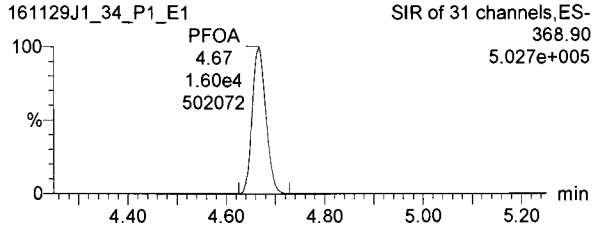
Printed: Wednesday, November 30, 2016 13:38:36 Pacific Standard Time

Name: 161129J1_34.wiff, Date: 29-Nov-2016, Time: 21:13:14, ID: ST161129J1-3 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

6:2 FTS



PFOA



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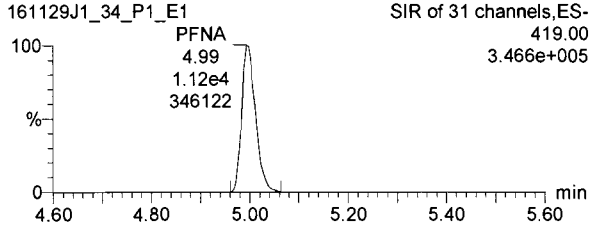
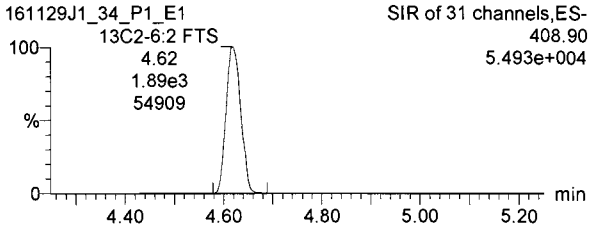
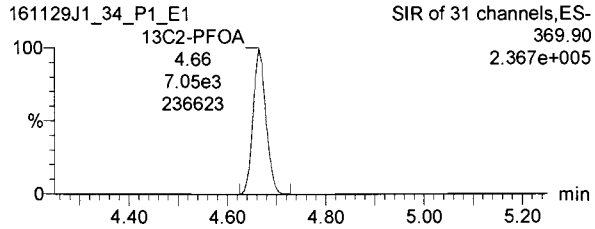


13C2-6:2 FTS



13C2-PFOA



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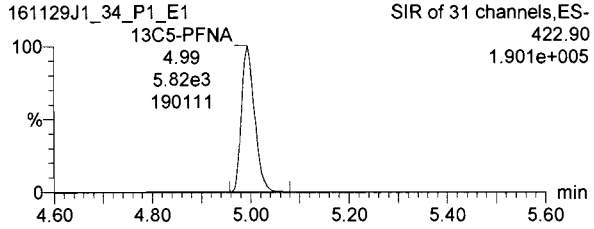
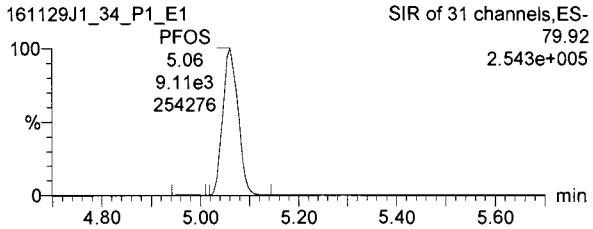
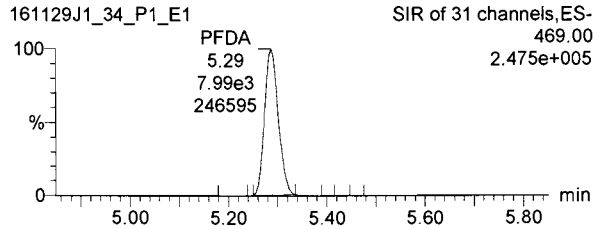


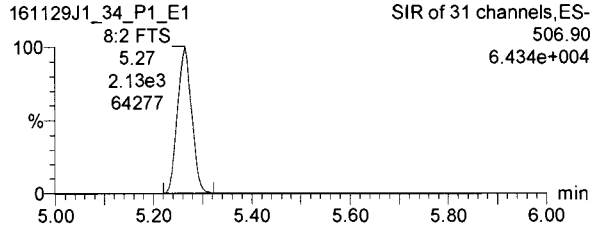
PFOS



PFDA



8:2 FTS



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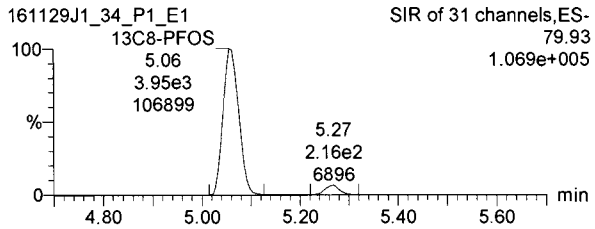

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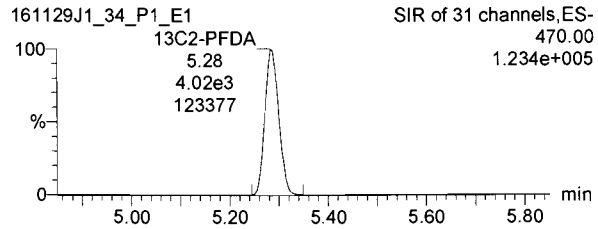
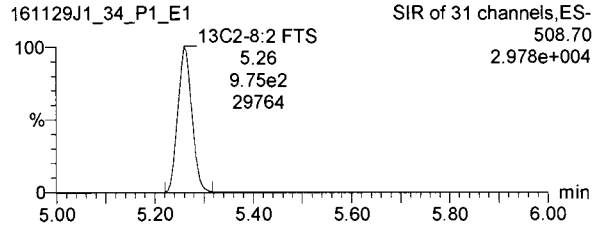


13C2-8:2 FTS



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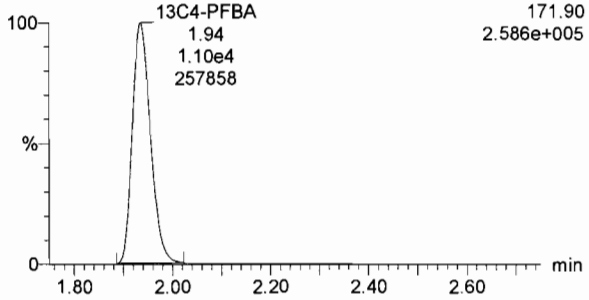
Printed: Wednesday, November 30, 2016 13:38:36 Pacific Standard Time

Name: 161129J1_34.wiff, Date: 29-Nov-2016, Time: 21:13:14, ID: ST161129J1-3 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

13C4-PFBA



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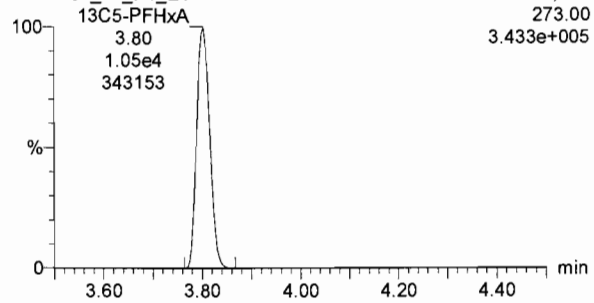

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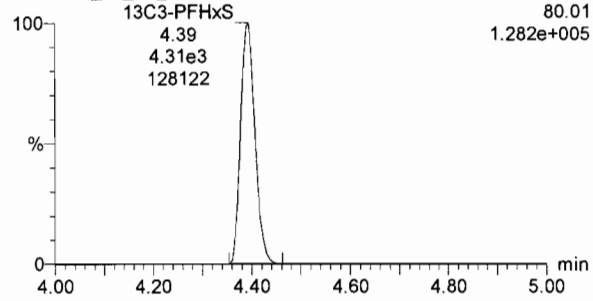

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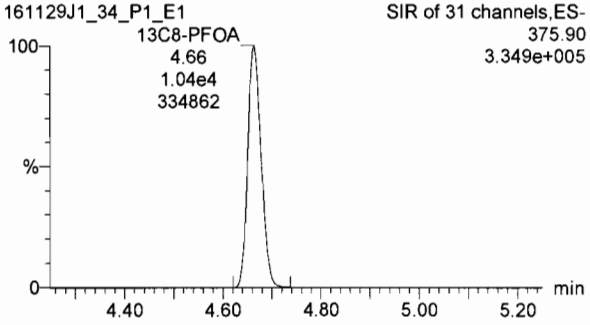

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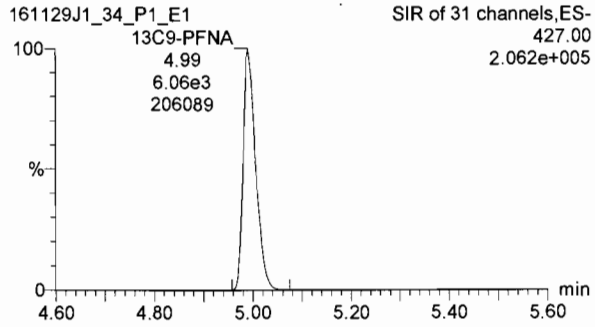

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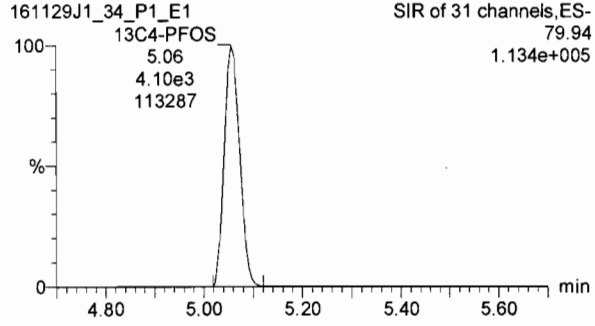
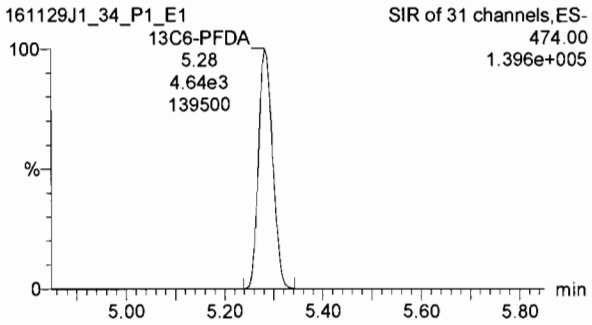


13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_52.qld

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Name: 161129J1_52.wiff, Date: 30-Nov-2016, Time: 00:53:34, ID: ST161129J1-4 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

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1	1	PFBA	168.90	2.16e4	1.03e4		1.000	1.94	26.7	106.8
2	2	PFPeA	218.90	2.14e4	1.16e4		1.000	3.12	26.8	107.0
3	3	PFBS	79.90	1.07e4	6.57e3		1.000	3.40	26.3	105.2
4	4	PFHxA	268.90	1.80e4	3.99e3		1.000	3.80	27.2	109.0
5	5	PFHpA	318.90	1.32e4	7.97e3		1.000	4.27	25.1	100.5
6	6	PFHxS	79.91	7.74e3	1.32e3		1.000	4.39	22.5	89.9
7	7	6:2 FTS	406.90	3.53e3	1.95e3		1.000	4.63	23.6	94.3
8	8	PFOA	368.90	1.72e4	7.11e3		1.000	4.67	24.6	98.5
9	9	PFNA	419.00	1.26e4	5.95e3		1.000	5.01	32.3 (A)	129.4
10	10	PFOS	79.92	8.76e3	3.98e3		1.000	5.07	23.9	95.6
11	11	PFDA	469.00	8.27e3	4.12e3		1.000	5.30	25.2	100.9
12	12	8:2 FTS	506.90	2.12e3	1.03e3		1.000	5.27	28.9	115.5
13	13	13C3-PFBA	172.00	1.03e4	1.11e4	0.867	1.000	1.94	13.4	107.0
14	14	13C3-PFPeA	221.90	1.16e4	1.04e4	0.994	1.000	3.12	14.0	111.9
15	15	13C3-PFBS	79.95	6.57e3	1.04e4	0.564	1.000	3.40	14.0	111.7
16	16	13C2-PFHxA	269.90	3.99e3	1.04e4	0.907	1.000	3.80	5.27	105.4
17	17	13C4-PFHpA	321.90	7.97e3	1.04e4	0.742	1.000	4.27	12.9	103.0
18	18	18O2-PFHxS	102.90	1.32e3	4.24e3	0.271	1.000	4.39	14.3	114.8
19	19	13C2-6:2 FTS	408.90	1.95e3	1.09e4	0.224	1.000	4.62	10.0	80.0
20	20	13C2-PFOA	369.90	7.11e3	1.09e4	0.651	1.000	4.67	12.5	100.1
21	21	13C5-PFNA	422.90	5.95e3	5.33e3	1.002	1.000	5.01	13.9	111.4
22	22	13C8-PFOS	79.93	3.98e3	3.93e3	0.950	1.000	5.07	13.3	106.7
23	23	13C2-PFDA	470.00	4.12e3	4.43e3	0.827	1.000	5.30	14.1	112.5
24	24	13C2-8:2 FTS	508.70	1.03e3	4.43e3	0.260	1.000	5.27	11.2	89.7
25	25	13C4-PFBA	171.90	1.11e4	1.11e4	1.000	1.000	1.94	12.5	100.0
26	26	13C5-PFHxA	273.00	1.04e4	1.04e4	1.000	1.000	3.80	12.5	100.0
27	27	13C3-PFHxS	80.01	4.24e3	4.24e3	1.000	1.000	4.38	12.5	100.0
28	28	13C8-PFOA	375.90	1.09e4	1.09e4	1.000	1.000	4.67	12.5	100.0
29	29	13C4-PFOS	79.94	3.93e3	3.93e3	1.000	1.000	5.07	12.5	100.0
30	30	13C9-PFNA	427.00	5.33e3	5.33e3	1.000	1.000	5.00	12.5	100.0
31	31	13C6-PFDA	474.00	4.43e3	4.43e3	1.000	1.000	5.30	12.5	100.0

75-125
PW 11/30/16
60-150
40-150
60-150
50-150
60-150
40-150

PW 11/30/16
✓ AC 11/30/16

(A) outside criteria
PW 11/30/16

Printing Time: 13:55:41
Printing Date: Wednesday, November 30, 2016

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3	161129J1_03	11/29/2016 14:53:37	IPA	IPA
4	161129J1_04	11/29/2016 15:05:52	B6K0139-BS1	OPR
5	161129J1_05	11/29/2016 15:18:05	B6K0139-BSD1	LCS Dup
6	161129J1_06	11/29/2016 15:30:21	IPA	IPA
7	161129J1_07	11/29/2016 15:42:35	B6K0139-BLK1	Method Blank
8	161129J1_08	11/29/2016 15:54:51	1601456-01	PFAS-SW39-111416
9	161129J1_09	11/29/2016 16:07:03	1601456-02	PFAS-SW32-111416
10	161129J1_10	11/29/2016 16:19:18	1601456-03	PFAS-SW29-111416
11	161129J1_11	11/29/2016 16:31:35	1601456-04	PFAS-SW38-111416
12	161129J1_12	11/29/2016 16:43:48	1601456-05	PFAS-SW28-111416
13	161129J1_13	11/29/2016 16:56:04	1601456-06	PFAS-WS-DUP3-111416
14	161129J1_14	11/29/2016 17:08:18	1601456-07	EB2-WS-111016
15	161129J1_15	11/29/2016 17:20:34	1601456-08	EB2-SED-110916
16	161129J1_16	11/29/2016 17:32:49	1601456-09	EB3-WS-111116
17	161129J1_17	11/29/2016 17:45:05	1601456-10	EB3-WG-110916
18	161129J1_18	11/29/2016 17:57:20	IPA	IPA
19	161129J1_19	11/29/2016 18:09:35	ST161129J1-2 PFC C3.5 16K2902	PFC C3.5 16K2902 A
20	161129J1_20	11/29/2016 18:21:49	IPA	IPA
21	161129J1_21	11/29/2016 18:34:05	1601456-11	EB4-WG-111116
22	161129J1_22	11/29/2016 18:46:19	1601456-12	EB3-SED-111016
23	161129J1_23	11/29/2016 18:58:35	1601456-13	EB4-SED-111116
24	161129J1_24	11/29/2016 19:10:48	1601456-14	EB4-WS-111416
25	161129J1_25	11/29/2016 19:23:02	1601456-15	EB5-SED-111416
26	161129J1_26	11/29/2016 19:35:15	B6K0139-MS1	Matrix Spike
27	161129J1_27	11/29/2016 19:47:28	B6K0139-MSD1	Matrix Spike Dup
28	161129J1_28	11/29/2016 19:59:43	1601464-01	EB03-20161116
29	161129J1_29	11/29/2016 20:12:00	1601464-02	OUAI-MW53-20161116
30	161129J1_30	11/29/2016 20:24:14	1601464-03	OUAI-MW54-20161116
31	161129J1_31	11/29/2016 20:36:29	1601464-04	OUAI-MW42-20161116
32	161129J1_32	11/29/2016 20:48:43	1601464-05	OUAI-MW01-20161116
33	161129J1_33	11/29/2016 21:00:59	IPA	IPA
34	161129J1_34	11/29/2016 21:13:14	ST161129J1-3 PFC C3.5 16K2902	PFC C3.5 16K2902 A
35	161129J1_35	11/29/2016 21:25:29	IPA	IPA
36	161129J1_36	11/29/2016 21:37:45	B6K0164-BS1	OPR
37	161129J1_37	11/29/2016 21:50:00	IPA	IPA
38	161129J1_38	11/29/2016 22:02:14	B6K0164-BLK1	Method Blank
39	161129J1_39	11/29/2016 22:14:30	1601464-06	OUAI-MW31-20161116
40	161129J1_40	11/29/2016 22:26:45	1601464-07	OUAI-PZ19-20161116
41	161129J1_41	11/29/2016 22:38:58	1601464-08	OUAI-MW52-20161116
42	161129J1_42	11/29/2016 22:51:14	1601464-09	OUAI-MW04-20161116
43	161129J1_43	11/29/2016 23:03:30	1601464-10	OUAI-MW04A-20161116
44	161129J1_44	11/29/2016 23:15:44	1601464-11	OUAI-MW05-20161116
45	161129J1_45	11/29/2016 23:27:59	1601472-01	EB04-20161117
46	161129J1_46	11/29/2016 23:40:10	1601472-02	OUAI-MW51-20161117
47	161129J1_47	11/29/2016 23:52:24	1601472-03	OUAI-MW50-20161117
48	161129J1_48	11/30/2016 00:04:38	1601472-04	OUAI-MW49-20161117
49	161129J1_49	11/30/2016 00:16:53	B6K0164-MS1	Matrix Spike
50	161129J1_50	11/30/2016 00:29:08	B6K0164-MSD1	Matrix Spike Dup
51	161129J1_51	11/30/2016 00:41:22	IPA	IPA
52	161129J1_52	11/30/2016 00:53:34	ST161129J1-4 PFC C3.5 16K2902	PFC C3.5 16K2902 A
53	161129J1_53	11/30/2016 01:05:50	IPA	IPA
54	161129J1_54	11/30/2016 01:18:03	161128-QC1	Milk QC
55	161129J1_55	11/30/2016 01:30:18	161128-QC2	Milk QC
56	161129J1_56	11/30/2016 01:42:33	1601432-09@5x	WURTS-VAS15009-18-21_FD
57	161129J1_57	11/30/2016 01:54:48	1601432-09@40x	WURTS-VAS15009-18-21_FD

	Sample Name	Acquisition Date	Sample ID	Sample Comment
58	161129J1_58	11/30/2016 02:07:04	B6K0133-MS2@5x	WURTS-VAS15009-18-21_FD
59	161129J1_59	11/30/2016 02:19:19	B6K0133-MS2@40x	WURTS-VAS15009-18-21_FD
60	161129J1_60	11/30/2016 02:31:33	B6K0133-MSD2@5x	WURTS-VAS15009-28-31
61	161129J1_61	11/30/2016 02:43:48	B6K0133-MSD2@40x	WURTS-VAS15009-28-31
62	161129J1_62	11/30/2016 02:56:03	IPA	IPA
63	161129J1_63	11/30/2016 03:08:18	ST161129J1-5 PFC C3.5 16K2902	PFC C3.5 16K2902 A
64	161129J1_64	11/30/2016 03:20:33	IPA	IPA

Vista Analytical Laboratory Q2

Dataset: U:\Q2.PRO\Results\161129J1\161129J1_52.qld

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Printed: Wednesday, November 30, 2016 13:41:08 Pacific Standard Time

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Name: 161129J1_52.wiff, Date: 30-Nov-2016, Time: 00:53:34, ID: ST161129J1-4 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

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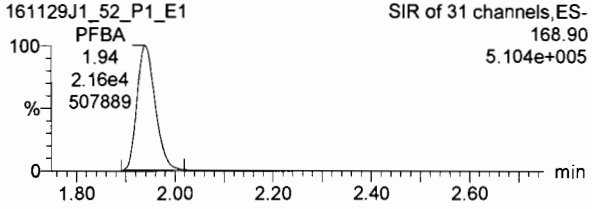
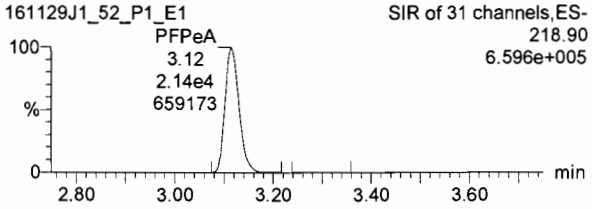
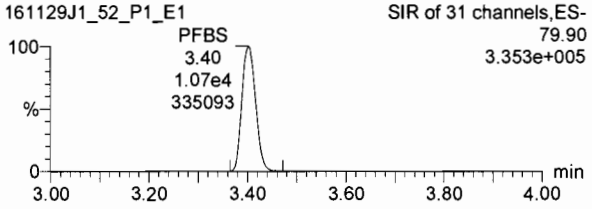


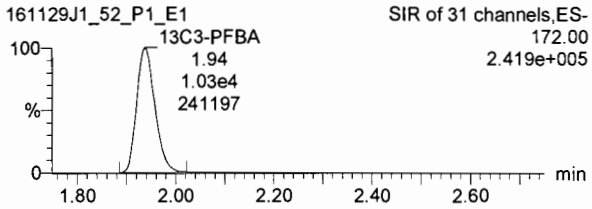
PFPeA



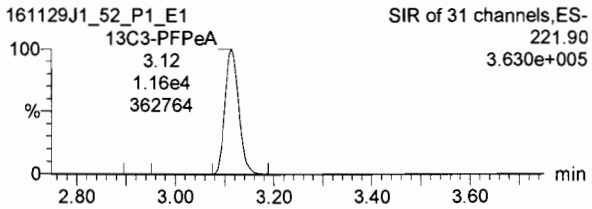
PFBS



13C3-PFBA



13C3-PFPeA



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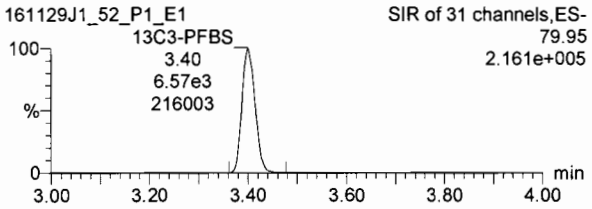
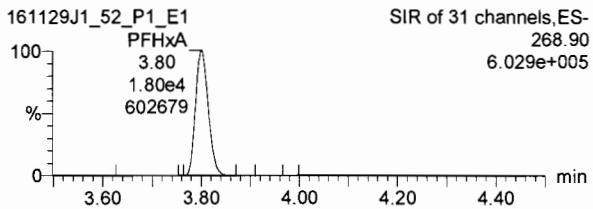
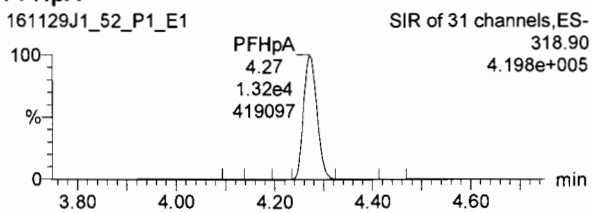


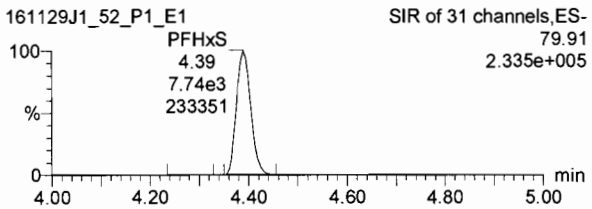
PFHxA



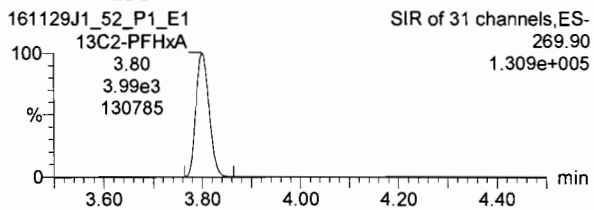
PFHpA



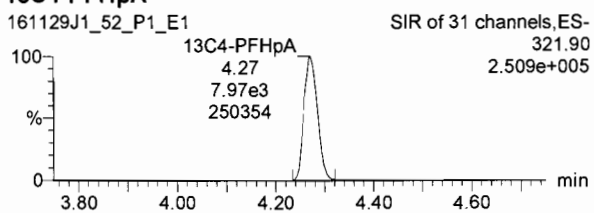
PFHxS



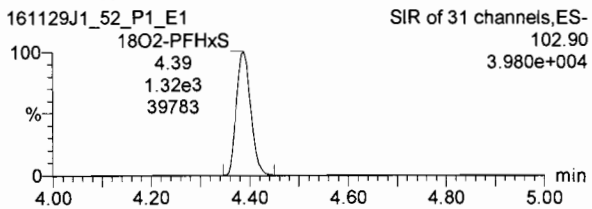
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



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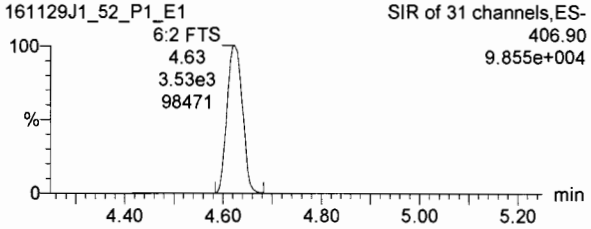
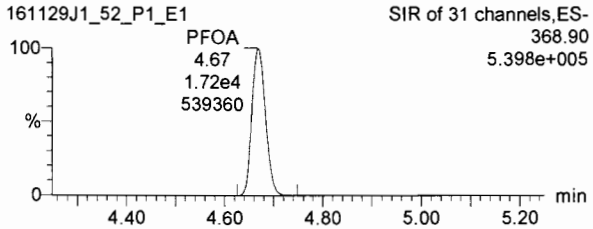
Printed: Wednesday, November 30, 2016 13:41:08 Pacific Standard Time

Name: 161129J1_52.wiff, Date: 30-Nov-2016, Time: 00:53:34, ID: ST161129J1-4 PFC C3.5 16K2902, Description: PFC C3.5 16K2902 A

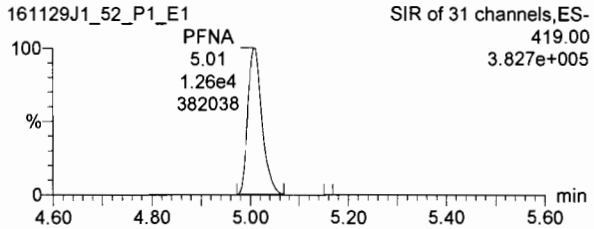
6:2 FTS



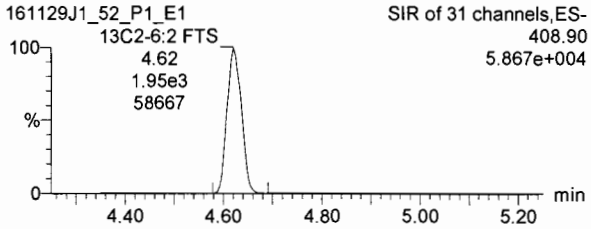
PFOA



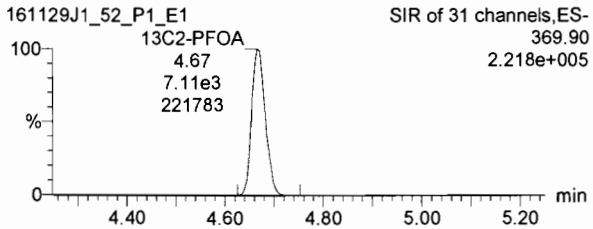
PFNA



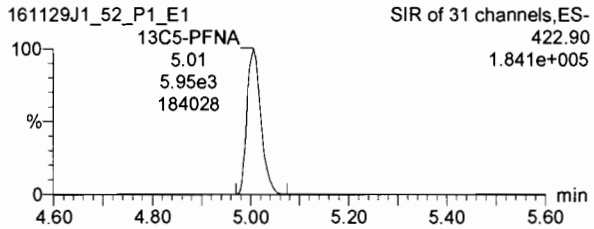
13C2-6:2 FTS



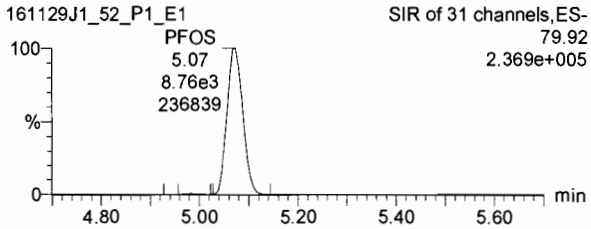
13C2-PFOA



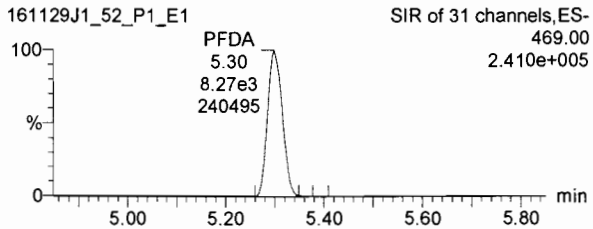
13C5-PFNA



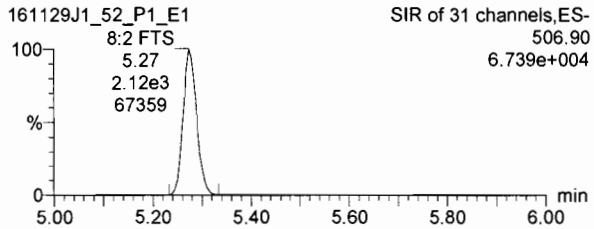
PFOS



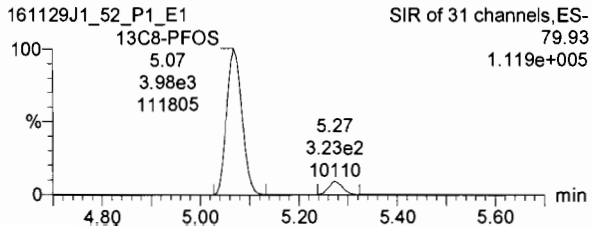
PFDA



8:2 FTS



13C8-PFOS



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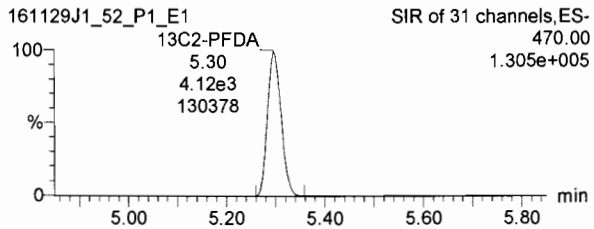
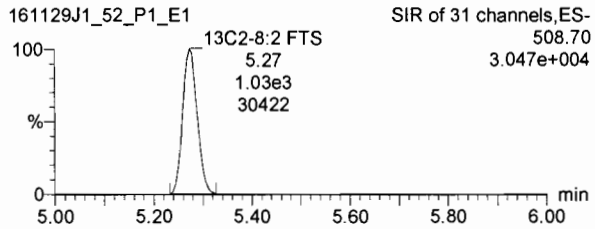


13C2-8:2 FTS



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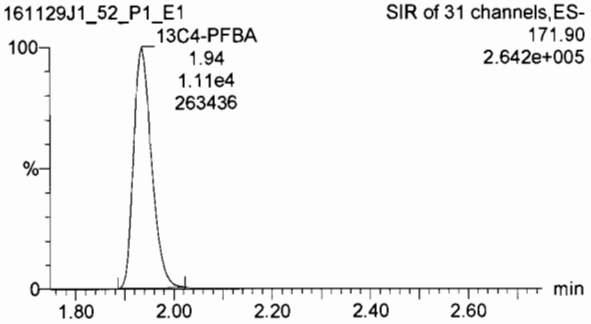
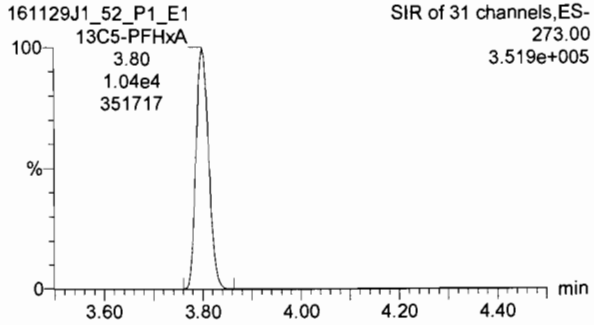
13C4-PFBA



13C5-PFHxA



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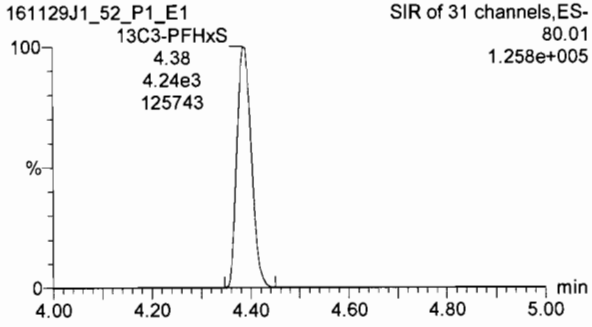

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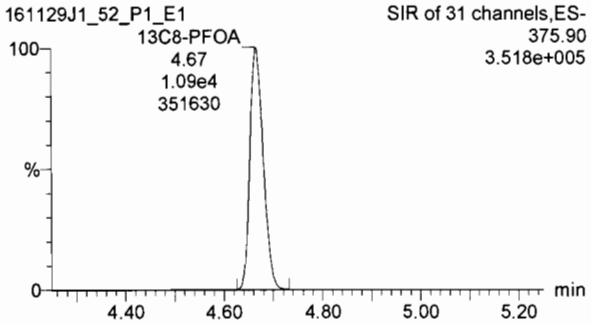

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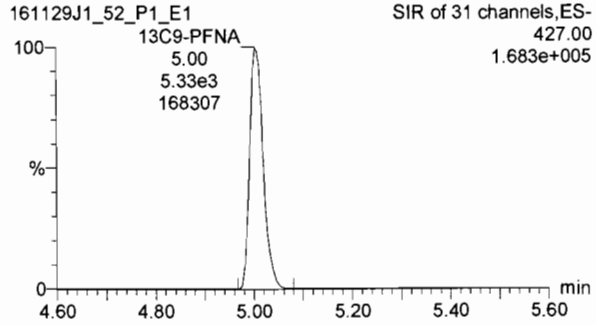
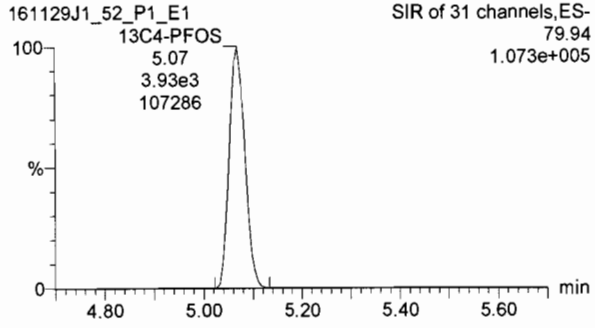
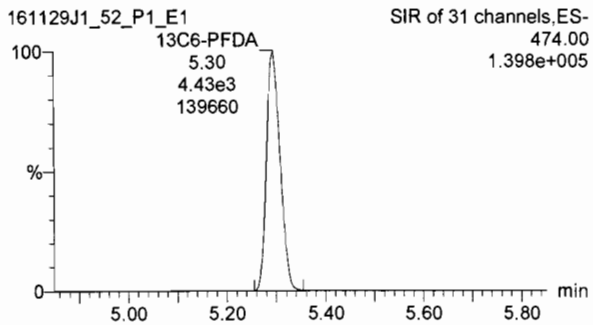


13C4-PFOS



13C6-PFDA



INITIAL CALIBRATION

Vista Analytical Laboratory Q2

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Printed: Saturday, November 19, 2016 12:59:09 Pacific Standard Time

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Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Compound name: PFBA
Correlation coefficient: r = 0.999219, r^2 = 0.998438
Calibration curve: 0.982791 * x + 0.0230635
Response type: Internal Std (Ref 13), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
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2	2	161118J2_04_P1_E1	1.00	1.91	7.90e2	1.01e4	0.972	-2.8	0.978
3	3	161118J2_05_P1_E1	2.00	1.91	1.58e3	1.05e4	1.88	-6.0	0.936
4	4	161118J2_06_P1_E1	5.00	1.91	3.59e3	9.99e3	4.55	-9.1	0.898
5	5	161118J2_07_P1_E1	10.0	1.91	8.91e3	1.04e4	10.9	9.2	1.08
6	6	161118J2_08_P1_E1	25.0	1.91	1.96e4	9.20e3	27.1	8.5	1.07
7	7	161118J2_09_P1_E1	50.0	1.91	3.98e4	9.95e3	50.8	1.7	1.00
8	8	161118J2_10_P1_E1	75.0	1.91	6.13e4	1.06e4	73.2	-2.4	0.960
9	9	161118J2_11_P1_E1	100	1.90	7.16e4	9.24e3	98.4	-1.6	0.968

AC 11/19/16

PW 11/21/16

Compound name: PFPeA
Correlation coefficient: r = 0.998741, r^2 = 0.997484
Calibration curve: 0.85968 * x + 0.0362224
Response type: Internal Std (Ref 14), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	3.11	4.30e2	1.11e4	0.524	4.7	0.973
2	2	161118J2_04_P1_E1	1.00	3.10	7.66e2	1.13e4	0.945	-5.5	0.848
3	3	161118J2_05_P1_E1	2.00	3.11	1.58e3	1.17e4	1.92	-4.1	0.842
4	4	161118J2_06_P1_E1	5.00	3.11	3.65e3	1.13e4	4.65	-6.9	0.807
5	5	161118J2_07_P1_E1	10.0	3.11	8.91e3	1.15e4	11.2	12.1	0.968
6	6	161118J2_08_P1_E1	25.0	3.11	1.96e4	1.02e4	27.9	11.8	0.962
7	7	161118J2_09_P1_E1	50.0	3.11	3.82e4	1.10e4	50.5	1.0	0.869
8	8	161118J2_10_P1_E1	75.0	3.10	5.94e4	1.17e4	73.8	-1.6	0.846
9	9	161118J2_11_P1_E1	100	3.11	6.78e4	1.02e4	97.0	-3.0	0.835

SS reinjected. Both injections are included.

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: PFBS
Correlation coefficient: r = 0.999357, r^2 = 0.998715
Calibration curve: 0.774866 * x + -0.0202219
Response type: Internal Std (Ref 15), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	3.40	2.02e2	6.31e3	0.543	8.7	0.802
2	2	161118J2_04_P1_E1	1.00	3.40	3.70e2	6.41e3	0.957	-4.3	0.722
3	3	161118J2_05_P1_E1	2.00	3.40	7.47e2	6.75e3	1.81	-9.5	0.691
4	4	161118J2_06_P1_E1	5.00	3.40	1.76e3	6.54e3	4.36	-12.8	0.672
5	5	161118J2_07_P1_E1	10.0	3.40	4.41e3	6.60e3	10.8	7.9	0.834
6	6	161118J2_08_P1_E1	25.0	3.40	9.83e3	6.03e3	26.4	5.4	0.816
7	7	161118J2_09_P1_E1	50.0	3.40	1.92e4	6.06e3	51.3	2.5	0.794
8	8	161118J2_10_P1_E1	75.0	3.40	2.90e4	6.40e3	73.1	-2.6	0.755
9	9	161118J2_11_P1_E1	100	3.40	3.44e4	5.59e3	99.3	-0.7	0.770

Compound name: PFHxA
Correlation coefficient: r = 0.998535, r^2 = 0.997072
Calibration curve: 0.829371 * x + 0.0163807
Response type: Internal Std (Ref 16), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	3.80	3.69e2	4.09e3	0.524	4.8	0.902
2	2	161118J2_04_P1_E1	1.00	3.80	6.83e2	4.14e3	0.977	-2.3	0.826
3	3	161118J2_05_P1_E1	2.00	3.80	1.34e3	4.46e3	1.79	-10.3	0.752
4	4	161118J2_06_P1_E1	5.00	3.80	3.15e3	4.17e3	4.52	-9.5	0.754
5	5	161118J2_07_P1_E1	10.0	3.80	7.88e3	4.20e3	11.3	13.0	0.939
6	6	161118J2_08_P1_E1	25.0	3.80	1.70e4	3.62e3	28.3	13.2	0.940
7	7	161118J2_09_P1_E1	50.0	3.80	3.29e4	4.00e3	49.6	-0.8	0.823
8	8	161118J2_10_P1_E1	75.0	3.80	5.07e4	4.17e3	73.3	-2.3	0.810
9	9	161118J2_11_P1_E1	100	3.80	5.96e4	3.66e3	98.2	-1.8	0.815

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: PFHpA
Correlation coefficient: r = 0.999224, r^2 = 0.998449
Calibration curve: 0.825598 * x + -0.00188587
Response type: Internal Std (Ref 17), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	4.28	2.89e2	7.89e3	0.557	11.4	0.916
2	2	161118J2_04_P1_E1	1.00	4.27	5.60e2	7.91e3	1.08	7.6	0.886
3	3	161118J2_05_P1_E1	2.00	4.27	1.03e3	8.97e3	1.75	-12.6	0.720
4	4	161118J2_06_P1_E1	5.00	4.28	2.40e3	8.54e3	4.25	-15.0	0.701
5	5	161118J2_07_P1_E1	10.0	4.27	6.00e3	8.73e3	10.4	4.1	0.860
6	6	161118J2_08_P1_E1	25.0	4.28	1.36e4	7.71e3	26.7	6.8	0.881
7	7	161118J2_09_P1_E1	50.0	4.27	2.72e4	8.57e3	48.1	-3.9	0.794
8	8	161118J2_10_P1_E1	75.0	4.27	4.38e4	8.67e3	76.4	1.9	0.841
9	9	161118J2_11_P1_E1	100	4.27	4.99e4	7.61e3	99.3	-0.7	0.820

Compound name: PFHxS
Coefficient of Determination: R^2 = 0.997308
Calibration curve: -0.00339694 * x^2 + 3.36003 * x + -0.393288
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	4.39	1.60e2	1.21e3	0.610	22.0	3.31
2	2	161118J2_04_P1_E1	1.00	4.40	3.00e2	1.22e3	1.03	3.1	3.07
3	3	161118J2_05_P1_E1	2.00	4.40	5.85e2	1.28e3	1.81	-9.3	2.85
4	4	161118J2_06_P1_E1	5.00	4.40	1.28e3	1.29e3	3.83	-23.4	2.48
5	5	161118J2_07_P1_E1	10.0	4.39	3.33e3	1.24e3	10.2	1.7	3.34
6	6	161118J2_08_P1_E1	25.0	4.40	7.64e3	1.10e3	26.6	6.4	3.46
7	7	161118J2_09_P1_E1	50.0	4.40	1.57e4	1.21e3	51.4	2.7	3.26
8	8	161118J2_10_P1_E1	75.0	4.39	2.39e4	1.35e3	71.5	-4.7	2.97
9	9	161118J2_11_P1_E1	100	4.39	2.78e4	1.13e3	102	1.6	3.06

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.997896
Calibration curve: -0.00379453 * x^2 + 1.05162 * x + -0.0537721
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	4.63	8.82e1	2.25e3	0.518	3.6	0.980
2	2	161118J2_04_P1_E1	1.00	4.63	1.70e2	2.23e3	0.961	-3.9	0.953
3	3	161118J2_05_P1_E1	2.00	4.63	3.64e2	2.36e3	1.90	-5.0	0.966
4	4	161118J2_06_P1_E1	5.00	4.63	8.22e2	2.08e3	4.84	-3.2	0.989
5	5	161118J2_07_P1_E1	10.0	4.62	2.16e3	2.34e3	11.5	14.7	1.15
6	6	161118J2_08_P1_E1	25.0	4.64	4.19e3	2.35e3	23.2	-7.3	0.892
7	7	161118J2_09_P1_E1	50.0	4.63	9.45e3	2.73e3	50.5	0.9	0.867
8	8	161118J2_10_P1_E1	75.0	4.62	1.32e4	2.87e3	75.2	0.3	0.768
9	9	161118J2_11_P1_E1	100	4.62	1.58e4	2.93e3	100	0.1	0.672

Compound name: PFOA
Coefficient of Determination: R^2 = 0.997857
Calibration curve: -0.00316403 * x^2 + 1.30489 * x + -0.00818696
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	4.67	4.20e2	6.73e3	0.604	20.9	1.56
2	2	161118J2_04_P1_E1	1.00	4.67	6.86e2	7.03e3	0.944	-5.6	1.22
3	3	161118J2_05_P1_E1	2.00	4.68	1.42e3	7.65e3	1.79	-10.6	1.16
4	4	161118J2_06_P1_E1	5.00	4.67	3.16e3	7.34e3	4.17	-16.5	1.08
5	5	161118J2_07_P1_E1	10.0	4.66	7.24e3	6.63e3	10.7	7.4	1.36
6	6	161118J2_08_P1_E1	25.0	4.68	1.80e4	6.89e3	26.8	7.1	1.31
7	7	161118J2_09_P1_E1	50.0	4.67	3.40e4	7.68e3	48.0	-4.0	1.11
8	8	161118J2_10_P1_E1	75.0	4.67	4.86e4	7.62e3	74.4	-0.7	1.06
9	9	161118J2_11_P1_E1	100	4.67	5.64e4	7.07e3	101	1.2	0.997

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Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: PFNA
Correlation coefficient: r = 0.999117, r^2 = 0.998235
Calibration curve: 0.818566 * x + -0.00476162
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	5.01	2.12e2	5.85e3	0.558	11.6	0.904
2	2	161118J2_04_P1_E1	1.00	5.00	3.84e2	6.59e3	0.896	-10.4	0.728
3	3	161118J2_05_P1_E1	2.00	5.02	8.03e2	6.89e3	1.78	-10.8	0.728
4	4	161118J2_06_P1_E1	5.00	5.00	1.89e3	5.98e3	4.82	-3.6	0.788
5	5	161118J2_07_P1_E1	10.0	4.99	4.85e3	6.45e3	11.5	14.9	0.940
6	6	161118J2_08_P1_E1	25.0	5.01	1.07e4	6.86e3	23.9	-4.4	0.782
7	7	161118J2_09_P1_E1	50.0	5.01	2.28e4	6.69e3	52.1	4.3	0.854
8	8	161118J2_10_P1_E1	75.0	4.99	3.67e4	7.65e3	73.3	-2.3	0.800
9	9	161118J2_11_P1_E1	100	5.00	4.09e4	6.27e3	99.6	-0.4	0.816

Compound name: PFOS
Correlation coefficient: r = 0.997516, r^2 = 0.995038
Calibration curve: 1.14981 * x + 0.021829
Response type: Internal Std (Ref 22), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	5.07	1.47e2	3.06e3	0.501	0.2	1.20
2	2	161118J2_04_P1_E1	1.00	5.06	3.11e2	3.35e3	0.988	-1.2	1.16
3	3	161118J2_05_P1_E1	2.00	5.08	6.07e2	3.38e3	1.94	-3.2	1.12
4	4	161118J2_06_P1_E1	5.00	5.06	1.46e3	3.64e3	4.35	-13.0	1.00
5	5	161118J2_07_P1_E1	10.0	5.05	3.76e3	3.74e3	10.9	9.0	1.26
6	6	161118J2_08_P1_E1	25.0	5.07	8.96e3	3.27e3	29.7	19.0	1.37
7	7	161118J2_09_P1_E1	50.0	5.08	1.61e4	3.68e3	47.7	-4.6	1.10
8	8	161118J2_10_P1_E1	75.0	5.05	2.98e4	4.29e3	75.4	0.5	1.16
9	9	161118J2_11_P1_E1	100	5.06	3.07e4	3.44e3	97.0	-3.0	1.12

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: PFDA
Coefficient of Determination: R^2 = 0.994991
Calibration curve: -0.00347007 * x^2 + 1.08566 * x + -0.0891482
Response type: Internal Std (Ref 23), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	5.30	1.24e2	2.90e3	0.573	14.6	1.06
2	2	161118J2_04_P1_E1	1.00	5.28	2.45e2	3.23e3	0.957	-4.3	0.947
3	3	161118J2_05_P1_E1	2.00	5.31	4.89e2	3.43e3	1.73	-13.3	0.891
4	4	161118J2_06_P1_E1	5.00	5.29	1.19e3	3.48e3	4.09	-18.3	0.858
5	5	161118J2_07_P1_E1	10.0	5.28	3.03e3	3.83e3	9.49	-5.1	0.990
6	6	161118J2_08_P1_E1	25.0	5.29	8.23e3	3.72e3	28.0	12.2	1.11
7	7	161118J2_09_P1_E1	50.0	5.30	1.73e4	4.61e3	51.8	3.6	0.936
8	8	161118J2_10_P1_E1	75.0	5.27	2.38e4	5.18e3	67.7	-9.7	0.767
9	9	161118J2_11_P1_E1	100	5.28	2.69e4	4.43e3	105	5.3	0.758

Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.996754
Calibration curve: -0.0034291 * x^2 + 0.988926 * x + -0.0486443
Response type: Internal Std (Ref 24), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	0.500	5.27	3.13e1	9.39e2	0.471	-5.8	0.833
2	2	161118J2_04_P1_E1	1.00	5.26	7.68e1	9.83e2	1.04	4.0	0.976
3	3	161118J2_05_P1_E1	2.00	5.28	1.39e2	1.07e3	1.70	-15.2	0.809
4	4	161118J2_06_P1_E1	5.00	5.26	3.98e2	1.10e3	4.69	-6.2	0.903
5	5	161118J2_07_P1_E1	10.0	5.26	9.60e2	1.10e3	11.6	15.7	1.09
6	6	161118J2_08_P1_E1	25.0	5.27	2.18e3	1.18e3	25.8	3.1	0.927
7	7	161118J2_09_P1_E1	50.0	5.28	4.62e3	1.52e3	45.7	-8.5	0.760
8	8	161118J2_10_P1_E1	75.0	5.25	7.29e3	1.64e3	76.8	2.4	0.742
9	9	161118J2_11_P1_E1	100	5.26	7.46e3	1.43e3	102	1.7	0.651

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Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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Compound name: 13C3-PFBA
Response Factor: 0.866891
RRF SD: 0.0236312, Relative SD: 2.72597
Response type: Internal Std (Ref 25), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	1.90	9.66e3	1.15e4	12.1	-3.4	0.838
2	2	161118J2_04_P1_E1	12.5	1.90	1.01e4	1.16e4	12.6	0.6	0.872
3	3	161118J2_05_P1_E1	12.5	1.90	1.05e4	1.16e4	13.1	5.1	0.911
4	4	161118J2_06_P1_E1	12.5	1.90	9.99e3	1.18e4	12.2	-2.0	0.849
5	5	161118J2_07_P1_E1	12.5	1.91	1.04e4	1.17e4	12.7	1.9	0.883
6	6	161118J2_08_P1_E1	12.5	1.90	9.20e3	1.06e4	12.5	0.2	0.868
7	7	161118J2_09_P1_E1	12.5	1.90	9.95e3	1.16e4	12.4	-1.0	0.858
8	8	161118J2_10_P1_E1	12.5	1.91	1.06e4	1.21e4	12.7	1.8	0.883
9	9	161118J2_11_P1_E1	12.5	1.90	9.24e3	1.10e4	12.1	-3.1	0.840

Compound name: 13C3-PFPeA
Response Factor: 0.994106
RRF SD: 0.0301656, Relative SD: 3.03445
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	3.10	1.11e4	1.12e4	12.4	-0.7	0.987
2	2	161118J2_04_P1_E1	12.5	3.10	1.13e4	1.09e4	13.0	4.2	1.04
3	3	161118J2_05_P1_E1	12.5	3.10	1.17e4	1.15e4	12.9	3.0	1.02
4	4	161118J2_06_P1_E1	12.5	3.11	1.13e4	1.15e4	12.3	-1.2	0.982
5	5	161118J2_07_P1_E1	12.5	3.10	1.15e4	1.17e4	12.4	-0.8	0.986
6	6	161118J2_08_P1_E1	12.5	3.11	1.02e4	1.03e4	12.5	-0.3	0.991
7	7	161118J2_09_P1_E1	12.5	3.10	1.10e4	1.12e4	12.3	-1.5	0.979
8	8	161118J2_10_P1_E1	12.5	3.10	1.17e4	1.14e4	12.9	3.1	1.02
9	9	161118J2_11_P1_E1	12.5	3.10	1.02e4	1.08e4	11.8	-5.7	0.937

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Compound name: 13C3-PFBS
Response Factor: 0.563832
RRF SD: 0.0242321, Relative SD: 4.29775
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	3.40	6.31e3	1.12e4	12.5	-0.2	0.563
2	2	161118J2_04_P1_E1	12.5	3.40	6.41e3	1.09e4	13.0	4.4	0.589
3	3	161118J2_05_P1_E1	12.5	3.40	6.75e3	1.15e4	13.1	4.4	0.589
4	4	161118J2_06_P1_E1	12.5	3.40	6.54e3	1.15e4	12.6	0.8	0.568
5	5	161118J2_07_P1_E1	12.5	3.40	6.60e3	1.17e4	12.5	0.3	0.566
6	6	161118J2_08_P1_E1	12.5	3.40	6.03e3	1.03e4	13.0	3.9	0.586
7	7	161118J2_09_P1_E1	12.5	3.40	6.06e3	1.12e4	12.0	-4.4	0.539
8	8	161118J2_10_P1_E1	12.5	3.40	6.40e3	1.14e4	12.4	-0.7	0.560
9	9	161118J2_11_P1_E1	12.5	3.40	5.59e3	1.08e4	11.4	-8.6	0.516

Compound name: 13C2-PFHxA
Response Factor: 0.907083
RRF SD: 0.0372162, Relative SD: 4.10285
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	5.00	3.80	4.09e3	1.12e4	5.03	0.5	0.912
2	2	161118J2_04_P1_E1	5.00	3.80	4.14e3	1.09e4	5.23	4.6	0.948
3	3	161118J2_05_P1_E1	5.00	3.79	4.46e3	1.15e4	5.36	7.1	0.972
4	4	161118J2_06_P1_E1	5.00	3.80	4.17e3	1.15e4	5.00	0.0	0.907
5	5	161118J2_07_P1_E1	5.00	3.80	4.20e3	1.17e4	4.95	-0.9	0.898
6	6	161118J2_08_P1_E1	5.00	3.80	3.62e3	1.03e4	4.85	-3.1	0.879
7	7	161118J2_09_P1_E1	5.00	3.80	4.00e3	1.12e4	4.91	-1.8	0.890
8	8	161118J2_10_P1_E1	5.00	3.79	4.17e3	1.14e4	5.03	0.6	0.913
9	9	161118J2_11_P1_E1	5.00	3.80	3.66e3	1.08e4	4.65	-7.0	0.844

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Compound name: 13C4-PFHpA
Response Factor: 0.741732
RRF SD: 0.0267417, Relative SD: 3.60531
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.27	7.89e3	1.12e4	11.9	-5.1	0.704
2	2	161118J2_04_P1_E1	12.5	4.27	7.91e3	1.09e4	12.2	-2.2	0.725
3	3	161118J2_05_P1_E1	12.5	4.27	8.97e3	1.15e4	13.2	5.5	0.782
4	4	161118J2_06_P1_E1	12.5	4.28	8.54e3	1.15e4	12.5	0.1	0.742
5	5	161118J2_07_P1_E1	12.5	4.27	8.73e3	1.17e4	12.6	0.8	0.747
6	6	161118J2_08_P1_E1	12.5	4.28	7.71e3	1.03e4	12.6	1.1	0.750
7	7	161118J2_09_P1_E1	12.5	4.27	8.57e3	1.12e4	12.9	2.9	0.763
8	8	161118J2_10_P1_E1	12.5	4.27	8.67e3	1.14e4	12.8	2.3	0.759
9	9	161118J2_11_P1_E1	12.5	4.27	7.61e3	1.08e4	11.8	-5.3	0.702

Compound name: 18O2-PFHxS
Response Factor: 0.271084
RRF SD: 0.0155398, Relative SD: 5.73246
Response type: Internal Std (Ref 27), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.39	1.21e3	4.58e3	12.2	-2.8	0.264
2	2	161118J2_04_P1_E1	12.5	4.39	1.22e3	4.43e3	12.7	1.8	0.276
3	3	161118J2_05_P1_E1	12.5	4.39	1.28e3	4.57e3	13.0	3.7	0.281
4	4	161118J2_06_P1_E1	12.5	4.40	1.29e3	4.57e3	13.0	4.2	0.283
5	5	161118J2_07_P1_E1	12.5	4.39	1.24e3	4.83e3	11.9	-5.0	0.258
6	6	161118J2_08_P1_E1	12.5	4.40	1.10e3	4.35e3	11.7	-6.6	0.253
7	7	161118J2_09_P1_E1	12.5	4.39	1.21e3	4.71e3	11.8	-5.5	0.256
8	8	161118J2_10_P1_E1	12.5	4.39	1.35e3	4.47e3	13.9	11.0	0.301
9	9	161118J2_11_P1_E1	12.5	4.39	1.13e3	4.22e3	12.4	-0.8	0.269

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Compound name: 13C2-6:2 FTS
Response Factor: 0.223576
RRF SD: 0.0338864, Relative SD: 15.1566
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.63	2.25e3	1.13e4	11.1	-11.0	0.199
2	2	161118J2_04_P1_E1	12.5	4.63	2.23e3	1.00e4	12.5	-0.1	0.223
3	3	161118J2_05_P1_E1	12.5	4.63	2.36e3	1.28e4	10.3	-17.3	0.185
4	4	161118J2_06_P1_E1	12.5	4.63	2.08e3	1.16e4	10.0	-20.0	0.179
5	5	161118J2_07_P1_E1	12.5	4.62	2.34e3	9.79e3	13.4	7.0	0.239
6	6	161118J2_08_P1_E1	12.5	4.63	2.35e3	1.11e4	11.8	-5.8	0.211
7	7	161118J2_09_P1_E1	12.5	4.63	2.73e3	1.16e4	13.1	5.0	0.235
8	8	161118J2_10_P1_E1	12.5	4.62	2.87e3	1.08e4	14.8	18.4	0.265
9	9	161118J2_11_P1_E1	12.5	4.62	2.93e3	1.06e4	15.5	23.9	0.277

Compound name: 13C2-PFOA
Response Factor: 0.651033
RRF SD: 0.0415144, Relative SD: 6.3767
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.67	6.73e3	1.13e4	11.4	-8.6	0.595
2	2	161118J2_04_P1_E1	12.5	4.67	7.03e3	1.00e4	13.5	7.9	0.703
3	3	161118J2_05_P1_E1	12.5	4.68	7.65e3	1.28e4	11.5	-7.8	0.600
4	4	161118J2_06_P1_E1	12.5	4.67	7.34e3	1.16e4	12.1	-2.9	0.632
5	5	161118J2_07_P1_E1	12.5	4.66	6.63e3	9.79e3	13.0	4.1	0.678
6	6	161118J2_08_P1_E1	12.5	4.68	6.89e3	1.11e4	11.9	-5.0	0.618
7	7	161118J2_09_P1_E1	12.5	4.67	7.68e3	1.16e4	12.7	1.6	0.662
8	8	161118J2_10_P1_E1	12.5	4.66	7.62e3	1.08e4	13.5	8.1	0.704
9	9	161118J2_11_P1_E1	12.5	4.67	7.07e3	1.06e4	12.8	2.6	0.668

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Compound name: 13C5-PFNA
Response Factor: 1.00196
RRF SD: 0.0611671, Relative SD: 6.10474
Response type: Internal Std (Ref 30), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.00	5.85e3	6.09e3	12.0	-4.1	0.961
2	2	161118J2_04_P1_E1	12.5	4.99	6.59e3	6.13e3	13.4	7.3	1.07
3	3	161118J2_05_P1_E1	12.5	5.01	6.89e3	6.68e3	12.9	3.0	1.03
4	4	161118J2_06_P1_E1	12.5	5.00	5.98e3	6.62e3	11.3	-9.7	0.904
5	5	161118J2_07_P1_E1	12.5	4.99	6.45e3	6.34e3	12.7	1.6	1.02
6	6	161118J2_08_P1_E1	12.5	5.01	6.86e3	6.45e3	13.3	6.2	1.06
7	7	161118J2_09_P1_E1	12.5	5.01	6.69e3	6.76e3	12.3	-1.2	0.990
8	8	161118J2_10_P1_E1	12.5	4.99	7.65e3	7.29e3	13.1	4.7	1.05
9	9	161118J2_11_P1_E1	12.5	5.00	6.27e3	6.78e3	11.5	-7.7	0.925

Compound name: 13C8-PFOS
Response Factor: 0.950357
RRF SD: 0.0485013, Relative SD: 5.10348
Response type: Internal Std (Ref 29), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.07	3.06e3	3.20e3	12.6	0.9	0.959
2	2	161118J2_04_P1_E1	12.5	5.05	3.35e3	3.59e3	12.3	-1.8	0.933
3	3	161118J2_05_P1_E1	12.5	5.08	3.38e3	3.93e3	11.3	-9.5	0.860
4	4	161118J2_06_P1_E1	12.5	5.06	3.64e3	3.66e3	13.1	4.5	0.993
5	5	161118J2_07_P1_E1	12.5	5.05	3.74e3	3.92e3	12.6	0.5	0.955
6	6	161118J2_08_P1_E1	12.5	5.07	3.27e3	3.50e3	12.3	-1.6	0.935
7	7	161118J2_09_P1_E1	12.5	5.07	3.68e3	3.55e3	13.6	9.0	1.04
8	8	161118J2_10_P1_E1	12.5	5.05	4.29e3	4.48e3	12.6	0.9	0.959
9	9	161118J2_11_P1_E1	12.5	5.06	3.44e3	3.73e3	12.1	-2.9	0.923

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Compound name: 13C2-PFDA
Response Factor: 0.827364
RRF SD: 0.0452081, Relative SD: 5.46412
Response type: Internal Std (Ref 31), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.29	2.90e3	3.19e3	13.8	10.2	0.912
2	2	161118J2_04_P1_E1	12.5	5.28	3.23e3	3.86e3	12.7	1.2	0.837
3	3	161118J2_05_P1_E1	12.5	5.31	3.43e3	4.26e3	12.1	-2.8	0.804
4	4	161118J2_06_P1_E1	12.5	5.28	3.48e3	4.40e3	11.9	-4.4	0.791
5	5	161118J2_07_P1_E1	12.5	5.28	3.83e3	4.78e3	12.1	-3.1	0.801
6	6	161118J2_08_P1_E1	12.5	5.29	3.72e3	4.92e3	11.4	-8.6	0.756
7	7	161118J2_09_P1_E1	12.5	5.30	4.61e3	5.39e3	12.9	3.4	0.855
8	8	161118J2_10_P1_E1	12.5	5.27	5.18e3	6.20e3	12.6	0.9	0.835
9	9	161118J2_11_P1_E1	12.5	5.28	4.43e3	5.19e3	12.9	3.3	0.855

Compound name: 13C2-8:2 FTS
Response Factor: 0.26028
RRF SD: 0.0208158, Relative SD: 7.99747
Response type: Internal Std (Ref 31), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.27	9.39e2	3.19e3	14.1	13.2	0.295
2	2	161118J2_04_P1_E1	12.5	5.26	9.83e2	3.86e3	12.2	-2.1	0.255
3	3	161118J2_05_P1_E1	12.5	5.28	1.07e3	4.26e3	12.1	-3.4	0.252
4	4	161118J2_06_P1_E1	12.5	5.26	1.10e3	4.40e3	12.0	-3.8	0.250
5	5	161118J2_07_P1_E1	12.5	5.26	1.10e3	4.78e3	11.0	-11.7	0.230
6	6	161118J2_08_P1_E1	12.5	5.27	1.18e3	4.92e3	11.5	-8.0	0.239
7	7	161118J2_09_P1_E1	12.5	5.27	1.52e3	5.39e3	13.5	8.2	0.282
8	8	161118J2_10_P1_E1	12.5	5.25	1.64e3	6.20e3	12.7	1.5	0.264
9	9	161118J2_11_P1_E1	12.5	5.26	1.43e3	5.19e3	13.3	6.1	0.276

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Compound name: 13C4-PFBA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 25), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	1.90	1.15e4	1.15e4	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	1.90	1.16e4	1.16e4	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	1.90	1.16e4	1.16e4	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	1.90	1.18e4	1.18e4	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	1.91	1.17e4	1.17e4	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	1.90	1.06e4	1.06e4	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	1.90	1.16e4	1.16e4	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	1.90	1.21e4	1.21e4	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	1.90	1.10e4	1.10e4	12.5	0.0	1.00

Compound name: 13C5-PFHxA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	3.80	1.12e4	1.12e4	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	3.80	1.09e4	1.09e4	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	3.79	1.15e4	1.15e4	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	3.79	1.15e4	1.15e4	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	3.79	1.17e4	1.17e4	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	3.80	1.03e4	1.03e4	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	3.79	1.12e4	1.12e4	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	3.79	1.14e4	1.14e4	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	3.80	1.08e4	1.08e4	12.5	0.0	1.00

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Compound name: 13C3-PFHxS
Response Factor: 1
RRF SD: 5.55112e-017, Relative SD: 5.55112e-015
Response type: Internal Std (Ref 27), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.39	4.58e3	4.58e3	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	4.39	4.43e3	4.43e3	12.5	-0.0	1.00
3	3	161118J2_05_P1_E1	12.5	4.39	4.57e3	4.57e3	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	4.40	4.57e3	4.57e3	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	4.38	4.83e3	4.83e3	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	4.40	4.35e3	4.35e3	12.5	-0.0	1.00
7	7	161118J2_09_P1_E1	12.5	4.39	4.71e3	4.71e3	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	4.39	4.47e3	4.47e3	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	4.39	4.22e3	4.22e3	12.5	0.0	1.00

Compound name: 13C8-PFOA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	4.67	1.13e4	1.13e4	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	4.67	1.00e4	1.00e4	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	4.68	1.28e4	1.28e4	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	4.67	1.16e4	1.16e4	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	4.66	9.79e3	9.79e3	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	4.68	1.11e4	1.11e4	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	4.67	1.16e4	1.16e4	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	4.66	1.08e4	1.08e4	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	4.67	1.06e4	1.06e4	12.5	0.0	1.00

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 1.35974e-016, Relative SD: 1.35974e-014
Response type: Internal Std (Ref 29), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.07	3.20e3	3.20e3	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	5.05	3.59e3	3.59e3	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	5.08	3.93e3	3.93e3	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	5.06	3.66e3	3.66e3	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	5.05	3.92e3	3.92e3	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	5.07	3.50e3	3.50e3	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	5.07	3.55e3	3.55e3	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	5.05	4.48e3	4.48e3	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	5.05	3.73e3	3.73e3	12.5	0.0	1.00

Compound name: 13C9-PFNA
Response Factor: 1
RRF SD: 3.92523e-017, Relative SD: 3.92523e-015
Response type: Internal Std (Ref 30), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.01	6.09e3	6.09e3	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	4.99	6.13e3	6.13e3	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	5.02	6.68e3	6.68e3	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	5.00	6.62e3	6.62e3	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	4.99	6.34e3	6.34e3	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	5.01	6.45e3	6.45e3	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	5.01	6.76e3	6.76e3	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	4.99	7.29e3	7.29e3	12.5	-0.0	1.00
9	9	161118J2_11_P1_E1	12.5	5.00	6.78e3	6.78e3	12.5	0.0	1.00

Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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Compound name: 13C6-PFDA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 31), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Std. Conc	RT	Resp	IS Resp	Conc.	%Dev	RRF
1	1	161118J2_03_P1_E1	12.5	5.29	3.19e3	3.19e3	12.5	0.0	1.00
2	2	161118J2_04_P1_E1	12.5	5.28	3.86e3	3.86e3	12.5	0.0	1.00
3	3	161118J2_05_P1_E1	12.5	5.31	4.26e3	4.26e3	12.5	0.0	1.00
4	4	161118J2_06_P1_E1	12.5	5.28	4.40e3	4.40e3	12.5	0.0	1.00
5	5	161118J2_07_P1_E1	12.5	5.28	4.78e3	4.78e3	12.5	0.0	1.00
6	6	161118J2_08_P1_E1	12.5	5.29	4.92e3	4.92e3	12.5	0.0	1.00
7	7	161118J2_09_P1_E1	12.5	5.30	5.39e3	5.39e3	12.5	0.0	1.00
8	8	161118J2_10_P1_E1	12.5	5.27	6.20e3	6.20e3	12.5	0.0	1.00
9	9	161118J2_11_P1_E1	12.5	5.28	5.19e3	5.19e3	12.5	0.0	1.00

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Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

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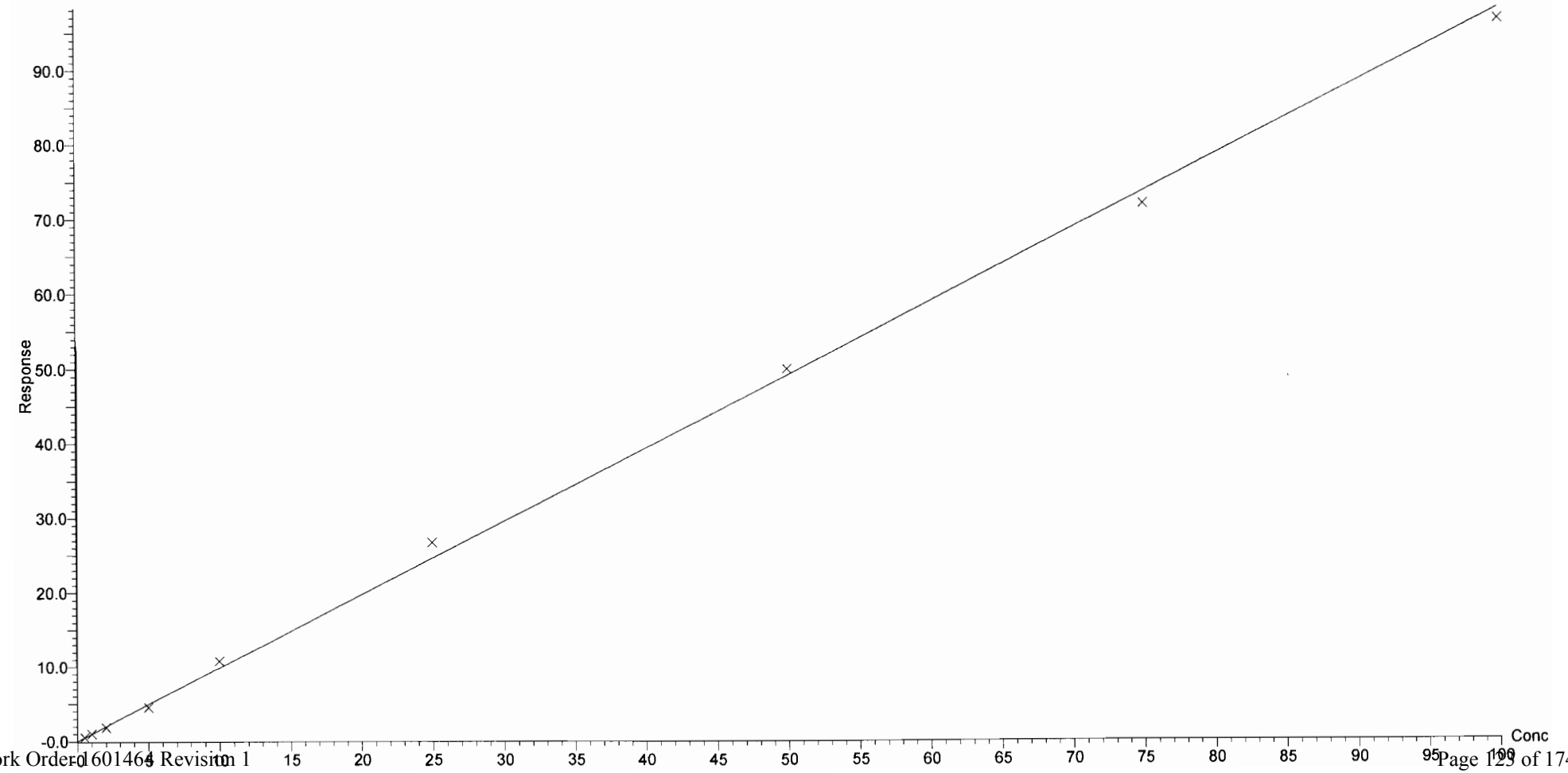
Method: U:\Q2.PRO\MethDB\PFC List 18_A No4-2FTS_161118.mdb 19 Nov 2016 12:55:02
Calibration: U:\Q2.PRO\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

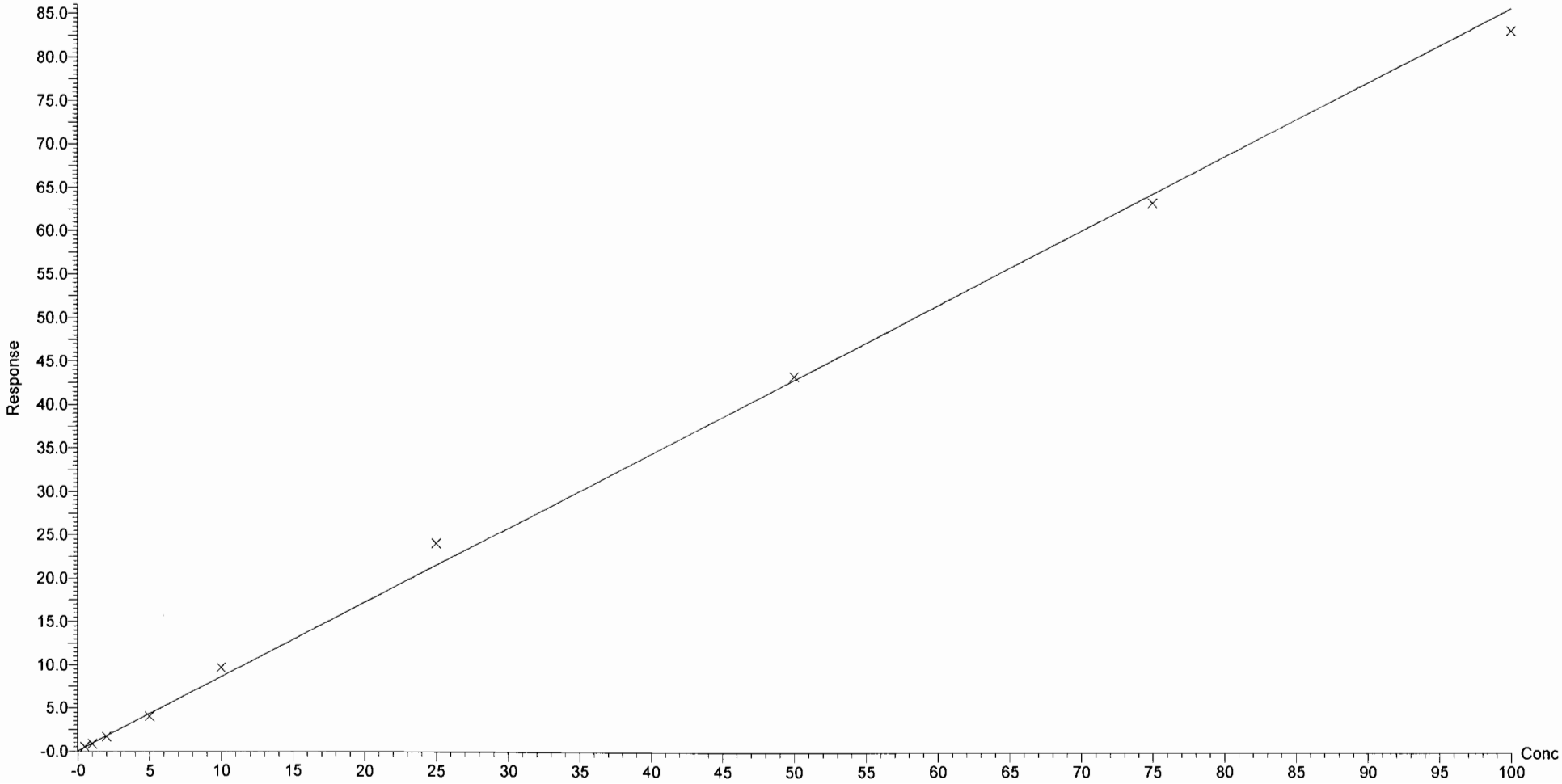
Compound name: PFBA
Correlation coefficient: r = 0.999219, r^2 = 0.998438
Calibration curve: 0.982791 * x + 0.0230635
Response type: Internal Std (Ref 13), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
Printed: Saturday, November 19, 2016 12:57:59 Pacific Standard Time

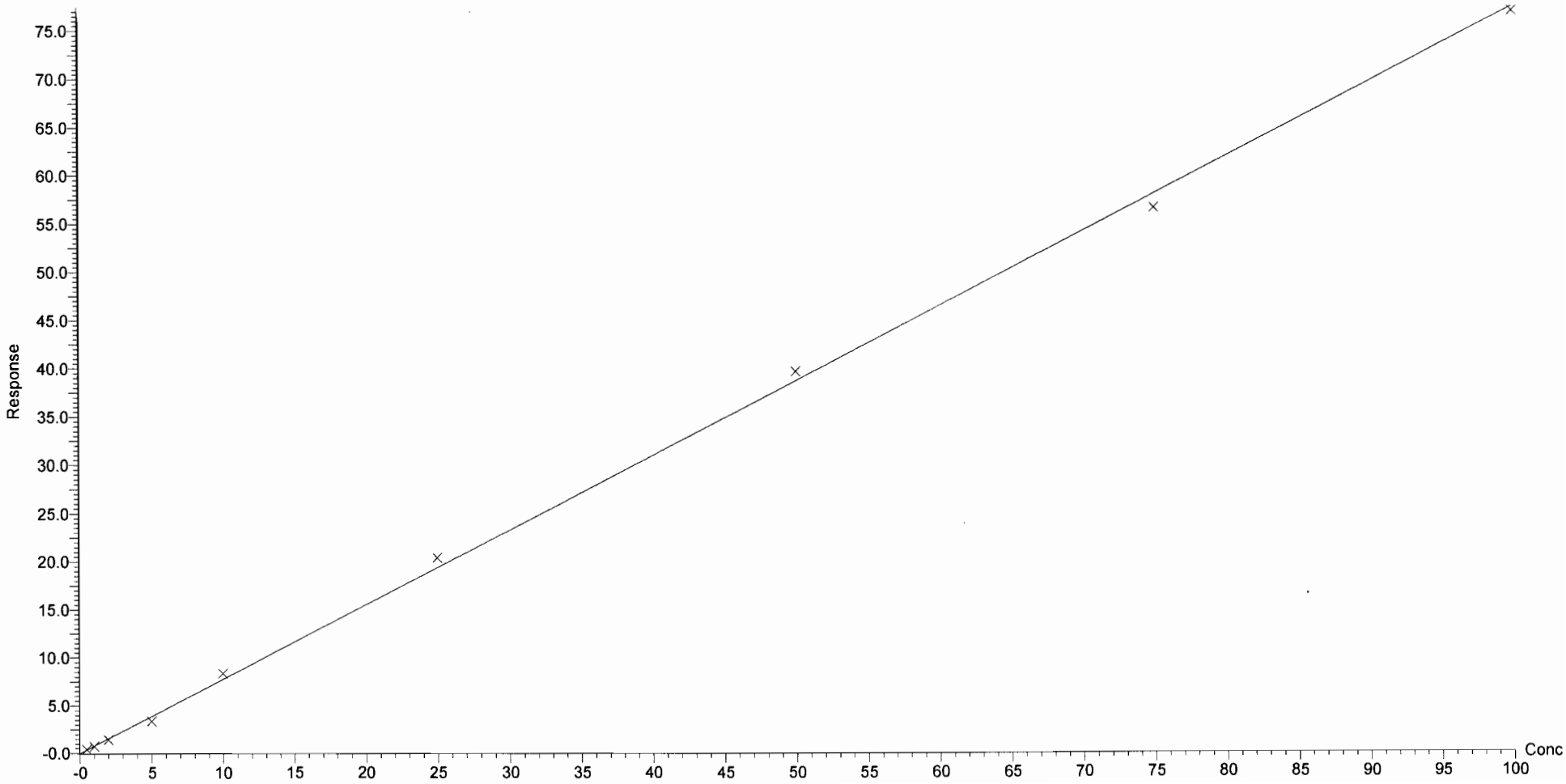
Compound name: PFPeA
Correlation coefficient: r = 0.998741, r^2 = 0.997484
Calibration curve: 0.85968 * x + 0.0362224
Response type: Internal Std (Ref 14), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
Printed: Saturday, November 19, 2016 12:57:59 Pacific Standard Time

Compound name: PFBS
Correlation coefficient: r = 0.999357, r^2 = 0.998715
Calibration curve: 0.774866 * x + -0.0202219
Response type: Internal Std (Ref 15), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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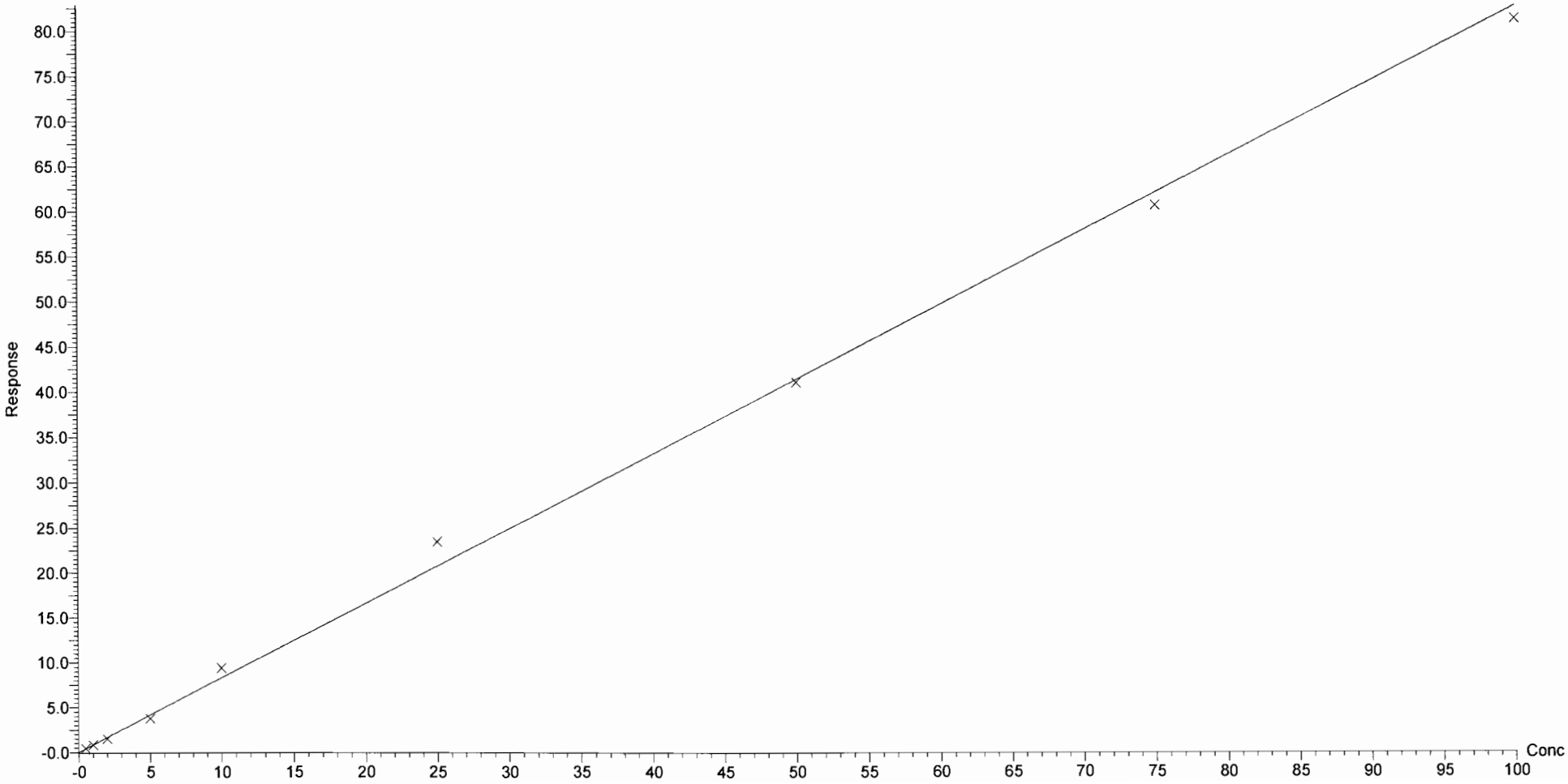
Compound name: PFHxA
Correlation coefficient: r = 0.998535, r^2 = 0.997072
Calibration curve: 0.829371 * x + 0.0163807
Response type: Internal Std (Ref 16), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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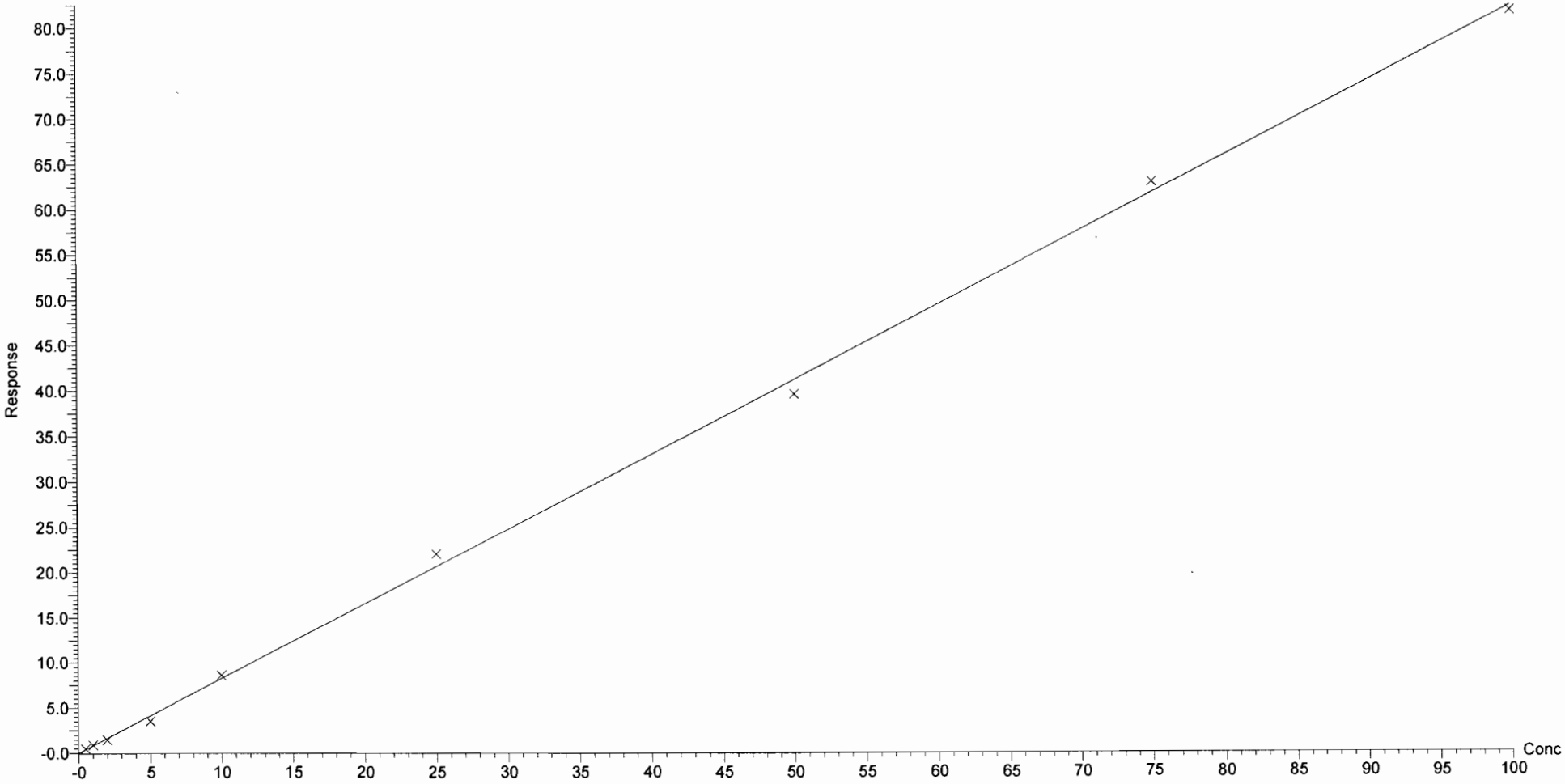
Compound name: PFHpA
Correlation coefficient: r = 0.999224, r^2 = 0.998449
Calibration curve: 0.825598 * x + -0.00188587
Response type: Internal Std (Ref 17), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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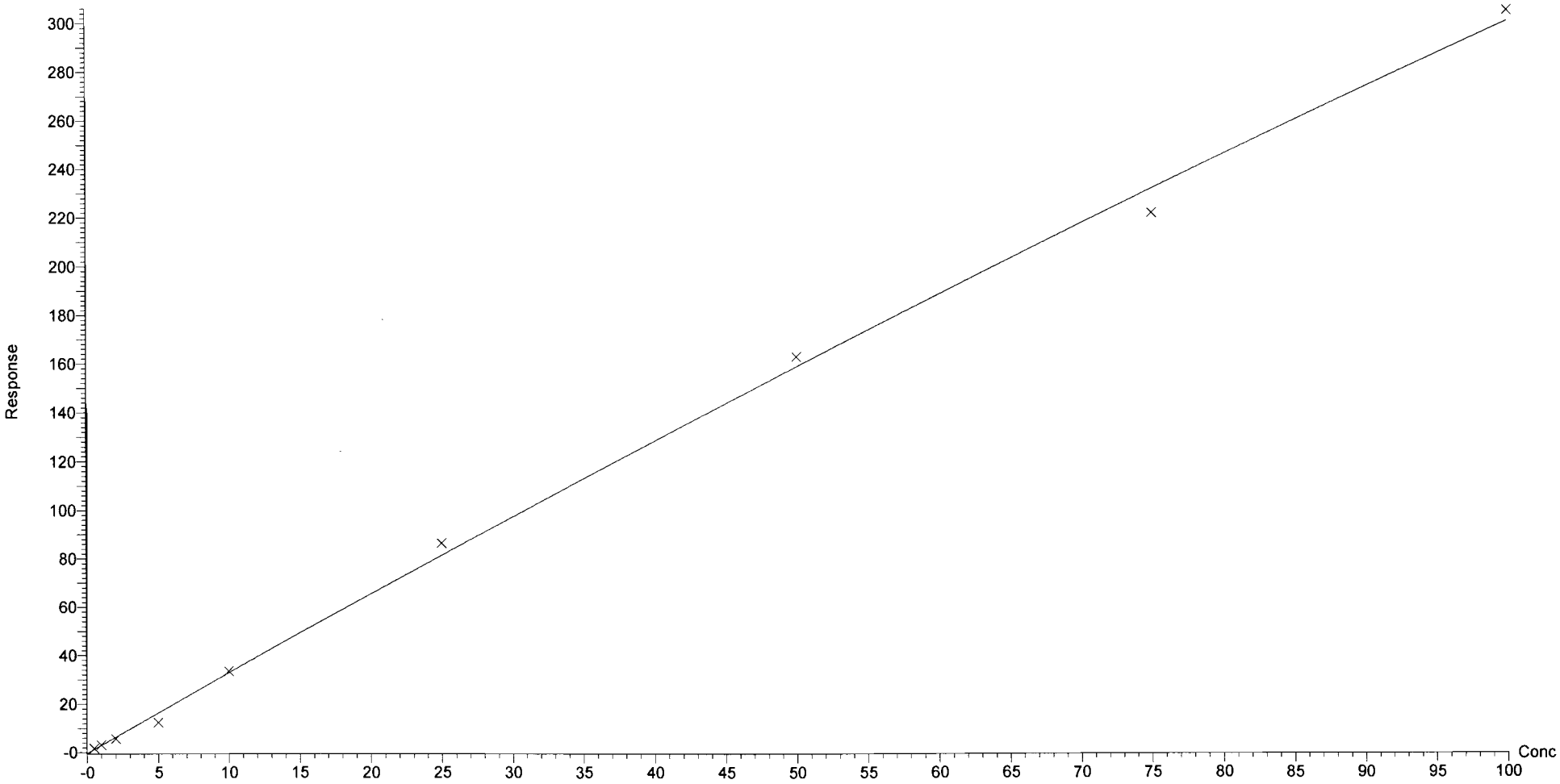
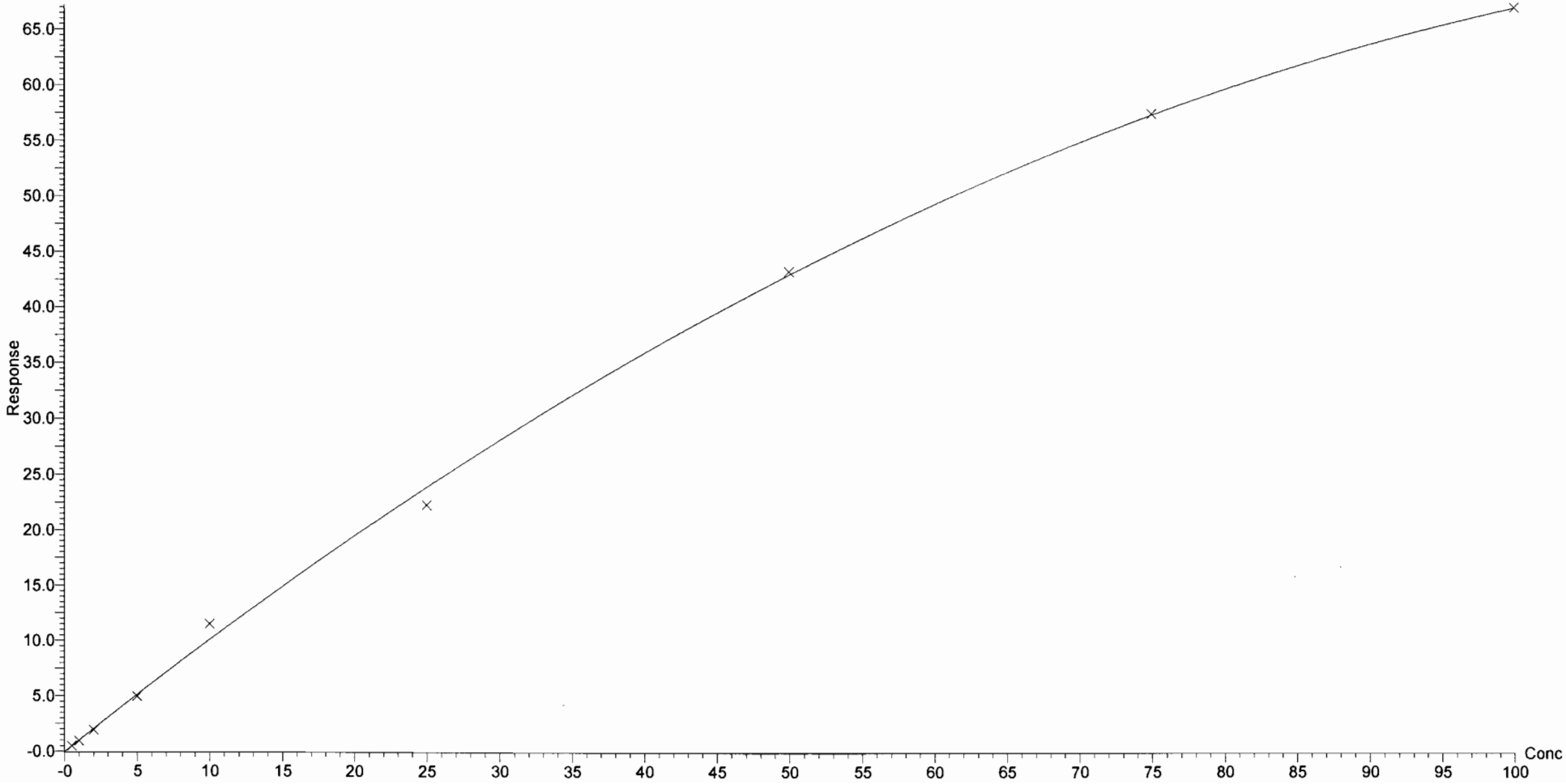
Compound name: PFHxS
Coefficient of Determination: R^2 = 0.997308
Calibration curve: -0.00339694 * x^2 + 3.36003 * x + -0.393288
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
Printed: Saturday, November 19, 2016 12:57:59 Pacific Standard Time

Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.997896
Calibration curve: -0.00379453 * x^2 + 1.05162 * x + -0.0537721
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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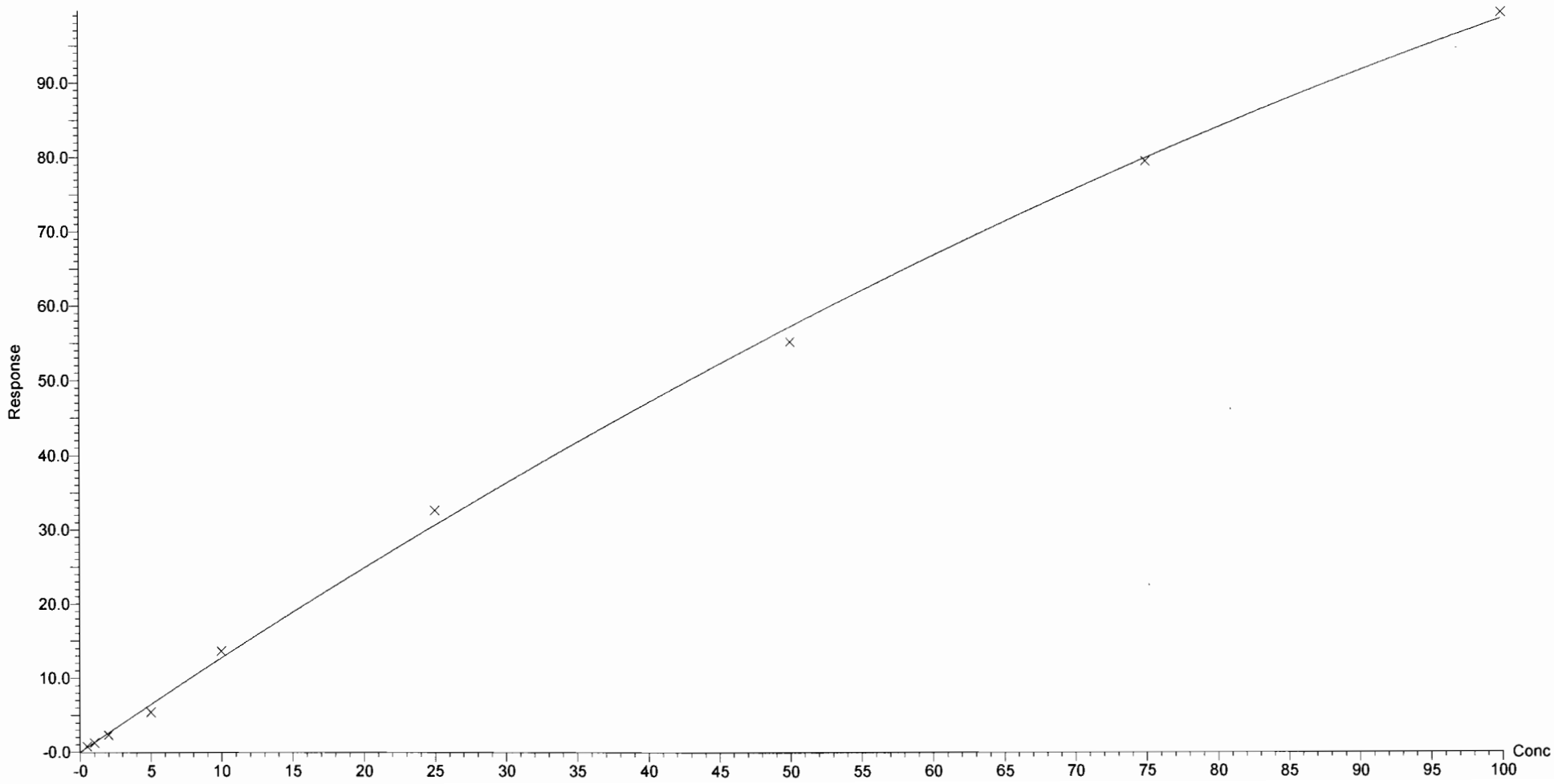
Compound name: PFOA
Coefficient of Determination: R^2 = 0.997857
Calibration curve: -0.00316403 * x^2 + 1.30489 * x + -0.00818696
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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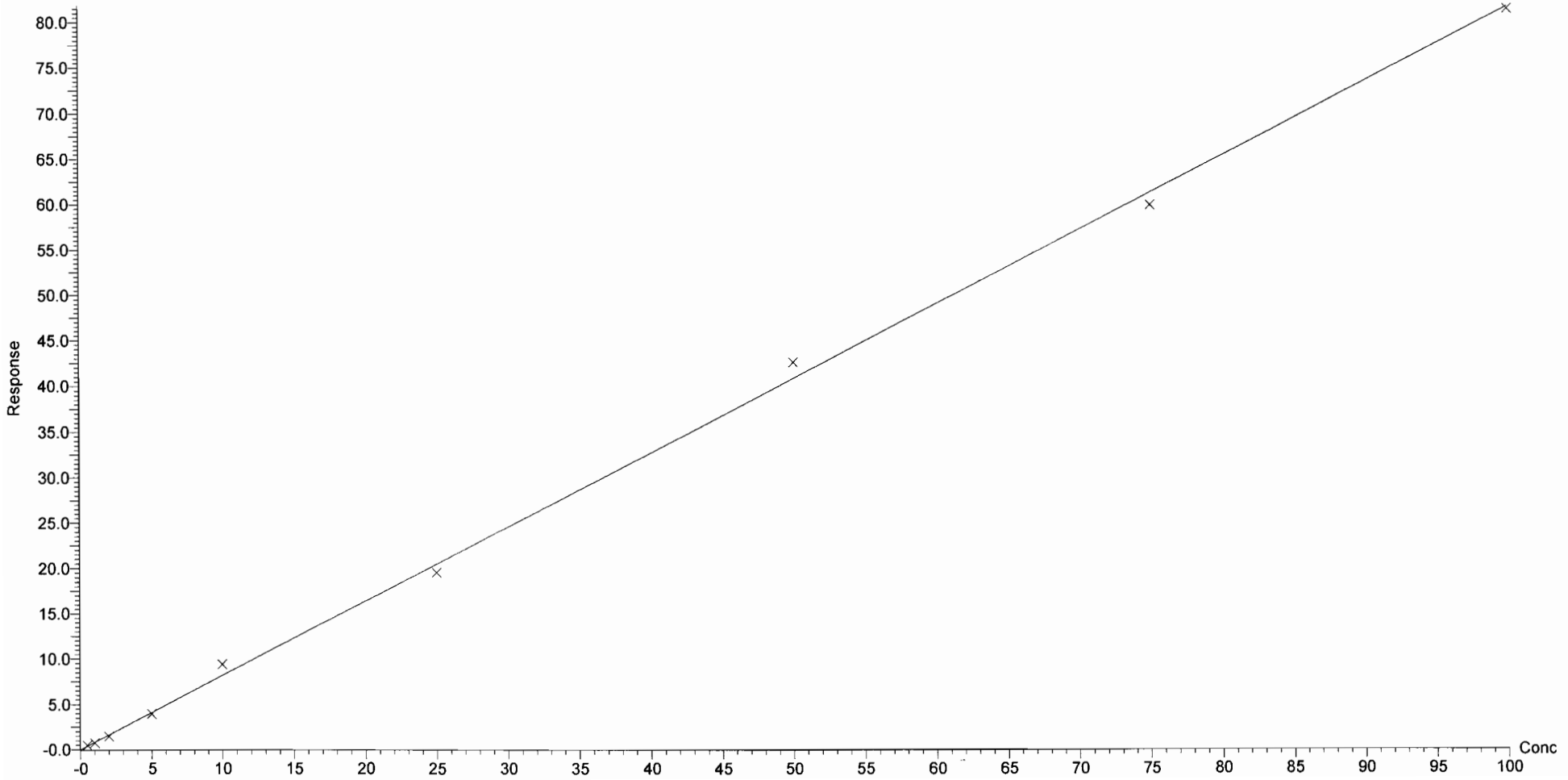
Compound name: PFNA
Correlation coefficient: r = 0.999117, r^2 = 0.998235
Calibration curve: 0.818566 * x + -0.00476162
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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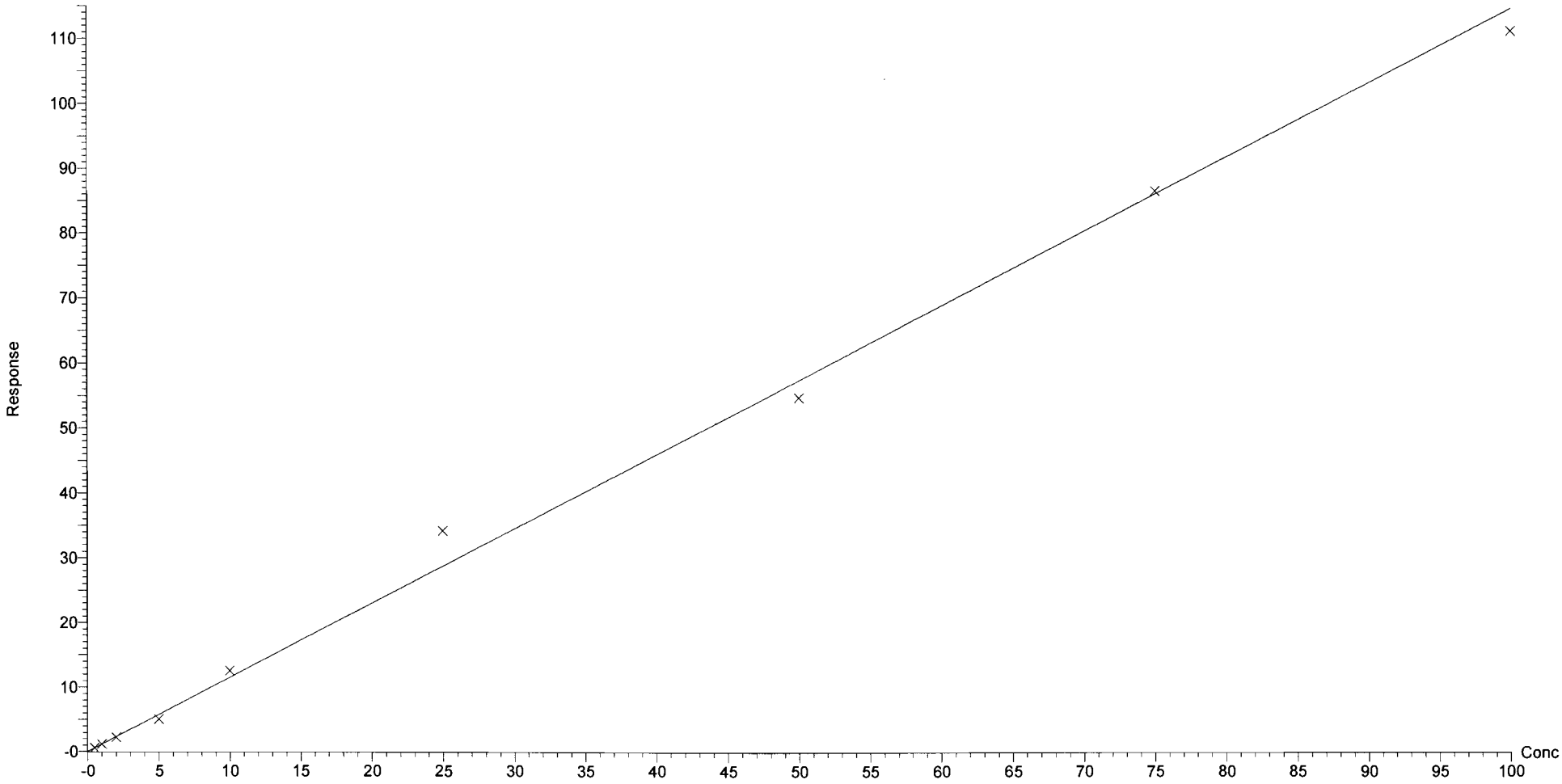
Compound name: PFOS
Correlation coefficient: r = 0.997516, r^2 = 0.995038
Calibration curve: 1.14981 * x + 0.021829
Response type: Internal Std (Ref 22), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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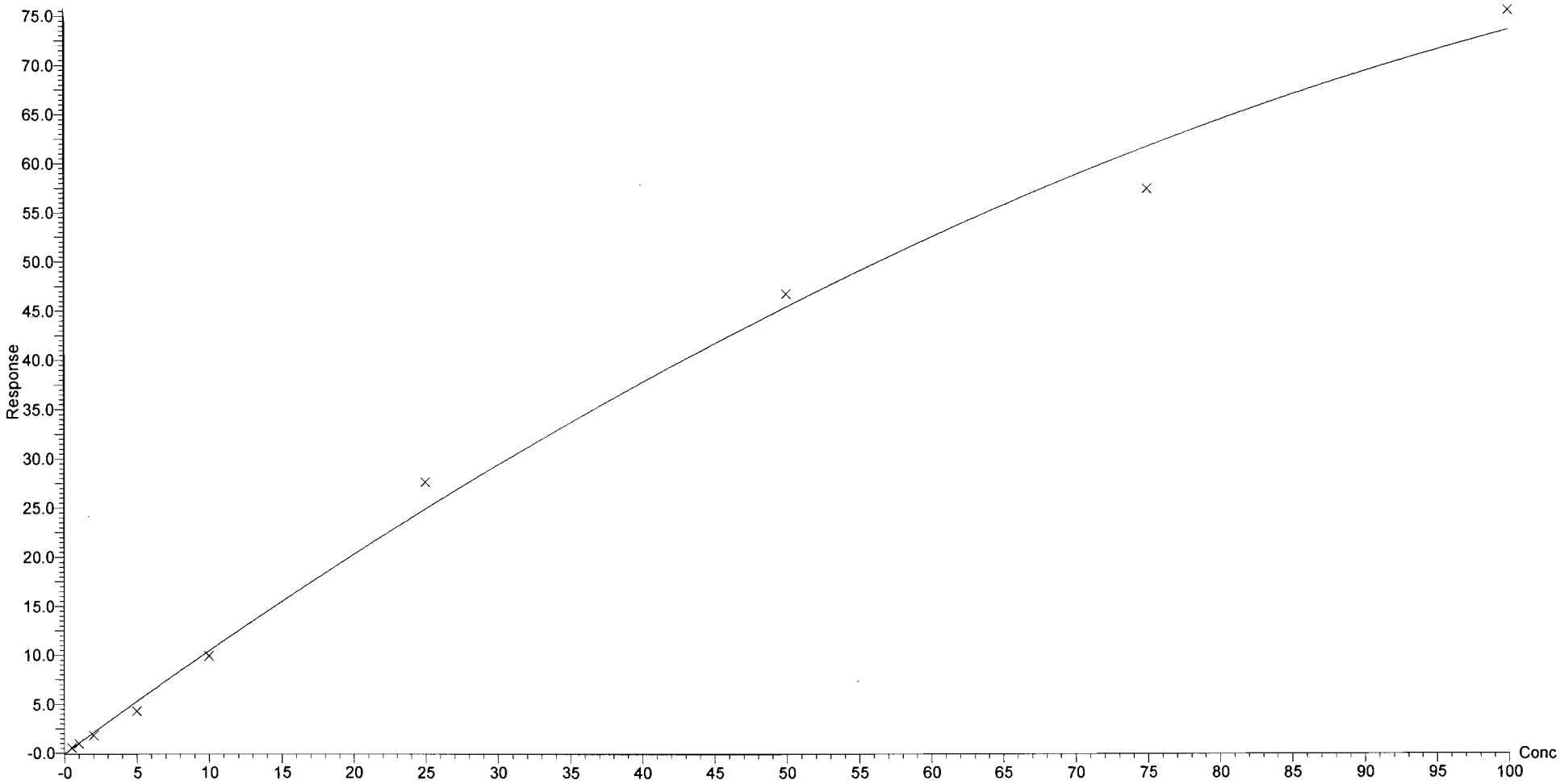
Compound name: PFDA
Coefficient of Determination: R^2 = 0.994991
Calibration curve: -0.00347007 * x^2 + 1.08566 * x + -0.0891482
Response type: Internal Std (Ref 23), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: U:\Q2.PRO\Results\161118J2\161118J2-CRV.qld

Last Altered: Saturday, November 19, 2016 12:55:25 Pacific Standard Time
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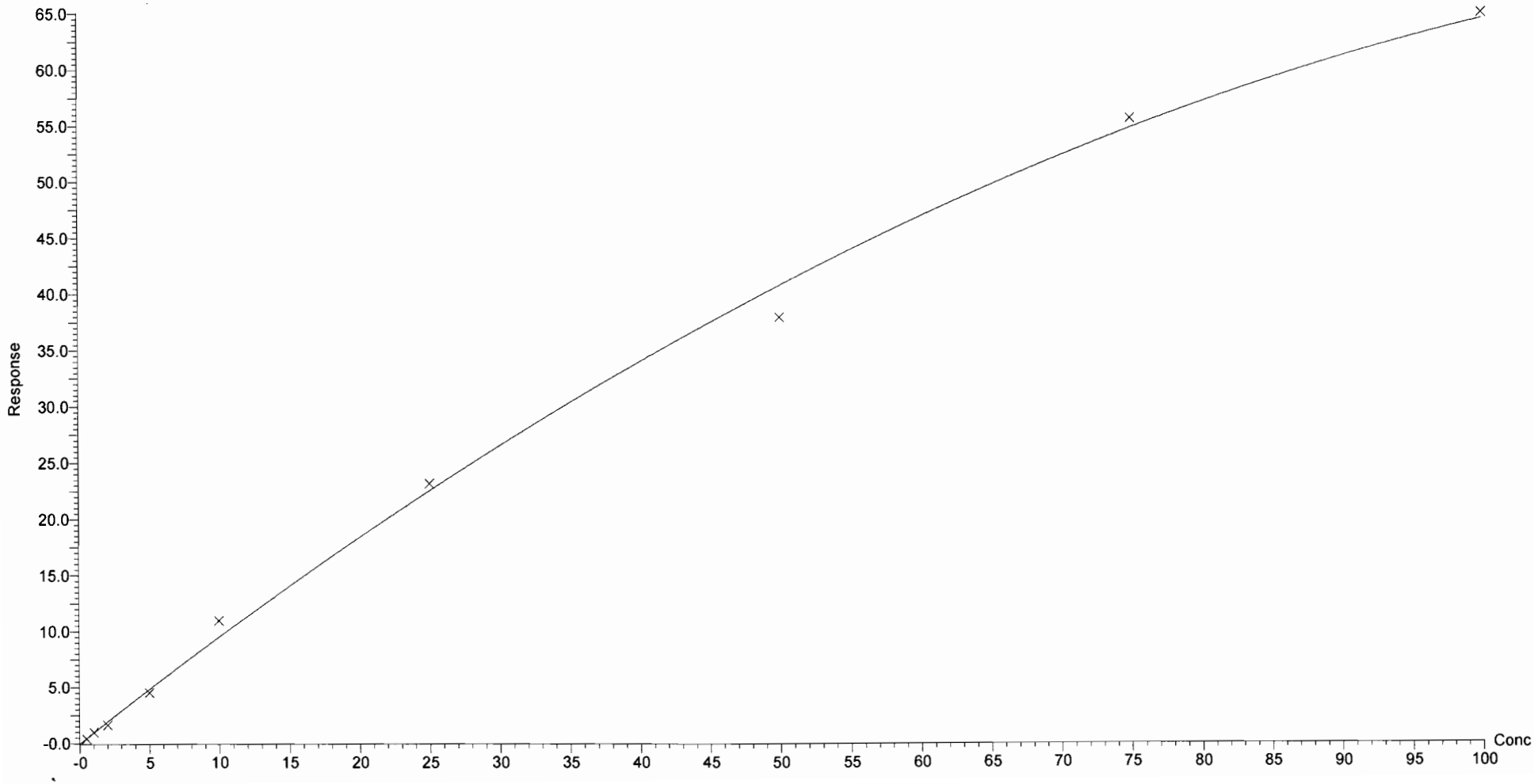
Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.996754
Calibration curve: -0.0034291 * x^2 + 0.988926 * x + -0.0486443
Response type: Internal Std (Ref 24), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



	Sample Name	Acquisition Date	Sample ID	Sample Comment
1	161118J2_01	11/18/2016 17:01:53	IPA	IPA
2	161118J2_02	11/18/2016 17:14:07	ST161118J2-1 PFC C-2 16K1714	PFC C-2 16K1714 A
3	161118J2_03	11/18/2016 17:26:18	ST161118J2-2 PFC C-1 16K1715	PFC C-1 16K1715 A
4	161118J2_04	11/18/2016 17:38:30	ST161118J2-3 PFC C0 16K1716	PFC C0 16K1716 A
5	161118J2_05	11/18/2016 17:50:45	ST161118J2-4 PFC C1 16K1717	PFC C1 16K1717 A
6	161118J2_06	11/18/2016 18:03:03	ST161118J2-5 PFC C2 16K1718	PFC C2 16K1718 A
7	161118J2_07	11/18/2016 18:15:16	ST161118J2-6 PFC C3 16K1719	PFC C3 16K1719 A
8	161118J2_08	11/18/2016 18:27:31	ST161118J2-7 PFC C3.5 16K1720	PFC C3.5 16K1720 A
9	161118J2_09	11/18/2016 18:39:42	ST161118J2-8 PFC C4 16K1721	PFC C4 16K1721 A
10	161118J2_10	11/18/2016 18:51:58	ST161118J2-9 PFC C4.5 16K1722	PFC C4.5 16K1722 A
11	161118J2_11	11/18/2016 19:04:12	ST161118J2-10 PFC C5 16K1723	PFC C5 16K1723 A
12	161118J2_12	11/18/2016 19:16:24	IPA	IPA
13	161118J2_13	11/18/2016 19:28:40	SS161118J2-1 PFC SSS 16J1810	PFC SSS 16J1810 A
14	161118J2_14	11/18/2016 19:40:55	IPA	IPA
15	161118J2_15	11/18/2016 19:53:06	B6J0127-BS1	OPR
16	161118J2_16	11/18/2016 20:05:18	B6J0168-BS1	OPR
17	161118J2_17	11/18/2016 20:17:34	B6K0037-BS1	OPR
18	161118J2_18	11/18/2016 20:29:47	B6K0110-BS1	OPR
19	161118J2_19	11/18/2016 20:42:02	B6K0117-BS1	OPR
20	161118J2_20	11/18/2016 20:54:16	B6K0117-BSD1	OPR Dup
21	161118J2_21	11/18/2016 21:06:30	B6K0111-BS1	OPR
22	161118J2_22	11/18/2016 21:18:45	IPA	IPA
23	161118J2_23	11/18/2016 21:30:57	B6J0127-BLK1	Method Blank
24	161118J2_24	11/18/2016 21:43:12	B6J0168-BLK1	Method Blank
25	161118J2_25	11/18/2016 21:55:28	B6K0037-BLK1	Method Blank
26	161118J2_26	11/18/2016 22:07:40	B6K0110-BLK1	Method Blank
27	161118J2_27	11/18/2016 22:19:56	B6K0117-BLK1	Method Blank
28	161118J2_28	11/18/2016 22:32:10	B6K0111-BLK1	Method Blank
29	161118J2_29	11/18/2016 22:44:24	IPA	IPA
30	161118J2_30	11/18/2016 22:56:38	1601299-01	Sample No. I
31	161118J2_31	11/18/2016 23:08:49	1601299-02	Sample No. II
32	161118J2_32	11/18/2016 23:21:05	1601299-03	Sample No. III
33	161118J2_33	11/18/2016 23:33:20	1601299-04	Sample No. IV
34	161118J2_34	11/18/2016 23:45:31	1601299-06	Sample No. VI
35	161118J2_35	11/18/2016 23:57:48	1601299-07	Sample No. VII
36	161118J2_36	11/19/2016 00:10:03	1601299-05RE1	Sample No. V
37	161118J2_37	11/19/2016 00:22:16	1601379-01@20X	Sample #1
38	161118J2_38	11/19/2016 00:34:31	1601379-02@20X	Sample #2
39	161118J2_39	11/19/2016 00:46:45	1601379-03@20X	Sample #3
40	161118J2_40	11/19/2016 00:58:58	IPA	IPA
41	161118J2_41	11/19/2016 01:11:14	ST161118J2-11 PFC C3.5 16K1720	PFC C3.5 16K1720A
42	161118J2_42	11/19/2016 01:23:28	IPA	IPA
43	161118J2_43	11/19/2016 01:35:40	1601379-01	Sample #1
44	161118J2_44	11/19/2016 01:47:56	1601379-02	Sample #2
45	161118J2_45	11/19/2016 02:00:10	1601379-03	Sample #3
46	161118J2_46	11/19/2016 02:12:22	1601410-01	WURTS-EB008JH-110216
47	161118J2_47	11/19/2016 02:24:39	1601410-02	WURTS-VAS04006-32-35_FD
48	161118J2_48	11/19/2016 02:36:53	1601410-03	WURTS-VAS04006-42-45
49	161118J2_49	11/19/2016 02:49:08	1601410-04	WURTS-VAS04006-52-55
50	161118J2_50	11/19/2016 03:01:23	1601410-05	WURTS-VAS17001-21-24
51	161118J2_51	11/19/2016 03:13:40	1601410-06	WURTS-VAS17001-21-24_FD
52	161118J2_52	11/19/2016 03:25:55	1601410-07	WURTS-VAS17001-31-34
53	161118J2_53	11/19/2016 03:38:09	IPA	IPA
54	161118J2_54	11/19/2016 03:50:25	ST161118J2-12 PFC C3.5 16K1720	PFC C3.5 16K1720A
55	161118J2_55	11/19/2016 04:02:39	IPA	IPA
56	161118J2_56	11/19/2016 04:14:55	1601410-08	WURTS-VAS17001-41-44
57	161118J2_57	11/19/2016 04:27:09	1601410-09	WURTS-VAS17003-22-25

	Sample Name	Acquisition Date	Sample ID	Sample Comment
58	161118J2_58	11/19/2016 04:39:19	1601410-10	WURTS-VAS17003-32-35
59	161118J2_59	11/19/2016 04:51:36	1601410-11	WURTS-VAS17003-42-45
60	161118J2_60	11/19/2016 05:03:50	1601410-12	WURTS-VAS17003-52-55
61	161118J2_61	11/19/2016 05:16:02	1601413-01	PFAS-ABT-MW-58-110316
62	161118J2_62	11/19/2016 05:28:17	1601413-02	PFAS-MW01-62-110316
63	161118J2_63	11/19/2016 05:40:32	1601413-03	PFAS-BW-MW-30-110316
64	161118J2_64	11/19/2016 05:52:47	1601413-04	PFAS-B82-MW-105-110316
65	161118J2_65	11/19/2016 06:04:59	1601413-05	PFAS-WG-DUP2-110416
66	161118J2_66	11/19/2016 06:17:15	IPA	IPA
67	161118J2_67	11/19/2016 06:29:31	ST161118J2-13 PFC C3.5 16K1720	PFC C3.5 16K1720A
68	161118J2_68	11/19/2016 06:41:45	IPA	IPA
69	161118J2_69	11/19/2016 06:54:01	1601413-06	PFAS-B82-MW-11D-110416
70	161118J2_70	11/19/2016 07:06:17	1601413-07	PFAS-B82-MW-11S-110416
71	161118J2_71	11/19/2016 07:18:32	1601413-08	PFAS-B82-MW-10D-110316
72	161118J2_72	11/19/2016 07:30:59	1601413-09	PFAS-B82-MW-09D-110316
73	161118J2_73	11/19/2016 07:43:18	1601413-10	PFAS-B82-MW-09S-110316
74	161118J2_74	11/19/2016 07:55:41	1601413-11	PFAS-B81-MW-46S-110416
75	161118J2_75	11/19/2016 08:07:55	1601413-12	EB1-WG-110316
76	161118J2_76	11/19/2016 08:20:11	1601413-13	PFAS-MW11-093-110416
77	161118J2_77	11/19/2016 08:32:43	1601413-14	PFAS-MW11-095-110416
78	161118J2_78	11/19/2016 08:45:15	1601413-15	PFAS-ABT-36-110416
79	161118J2_79	11/19/2016 08:57:48	IPA	IPA
80	161118J2_80	11/19/2016 09:10:17	ST161118J2-14 PFC C3.5 16K1720	PFC C3.5 16K1720A
81	161118J2_81	11/19/2016 09:22:47	IPA	IPA
82	161118J2_82	11/19/2016 09:35:19	1601413-16	PFAS-B81-MW-215-110416
83	161118J2_83	11/19/2016 09:47:51	1601413-17	PFAS-ABT-MW-20-110416
84	161118J2_84	11/19/2016 10:00:22	1601413-18	PFAS-WS-DUP1-110416
85	161118J2_85	11/19/2016 10:12:56	1601413-19	EB2-WG-110416
86	161118J2_86	11/19/2016 10:25:12	1601413-20	PFAS-B24-MW-03-110416
87	161118J2_87	11/19/2016 10:37:27	1601437-01	OW11-MW9-1016
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89	161118J2_89	11/19/2016 11:01:53	1601437-03	OW11-MW1-1016
90	161118J2_90	11/19/2016 11:14:05	1601437-04	OW11-MW7-1016
91	161118J2_91	11/19/2016 11:26:21	1601437-05	OW11-MW5-1016
92	161118J2_92	11/19/2016 11:38:32	IPA	IPA
93	161118J2_93	11/19/2016 11:50:49	ST161118J2-15 PFC C3.5 16K1720	PFC C3.5 16K1720A
94	161118J2_94	11/19/2016 12:03:03	IPA	IPA
95	161118J2_95	11/19/2016 12:15:18	1601437-06	OW11-MW6-1016
96	161118J2_96	11/19/2016 12:27:29	1601437-07	OW11-MW4-1016
97	161118J2_97	11/19/2016 12:39:45	B6K0117-MS1	Matrix Spike
98	161118J2_98	11/19/2016 12:51:58	B6K0117-MSD1	Matrix Spike Dup
99	161118J2_99	11/19/2016 13:04:12	B6K0111-MS1	Matrix Spike
100	161118J2_100	11/19/2016 13:16:23	B6K0111-MSD1	Matrix Spike Dup
101	161118J2_101	11/19/2016 13:28:39	IPA	IPA
102	161118J2_102	11/19/2016 13:40:50	ST161118J2-16 PFC C3.5 16K1720	PFC C3.5 16K1720A
103	161118J2_103	11/19/2016 13:53:06	IPA	IPA

Vista Analytical Laboratory Q2

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Calibration: 19 Nov 2016 12:55:25

Name: 161118J2_03.wiff, Date: 18-Nov-2016, Time: 17:26:18, ID: ST161118J2-2 PFC C-1 16K1715, Description: PFC C-1 16K1715 A

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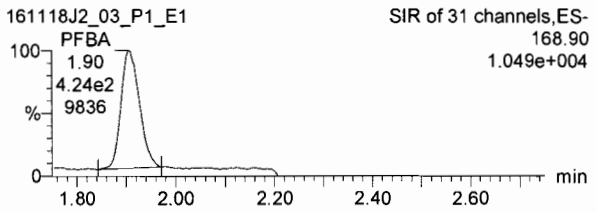

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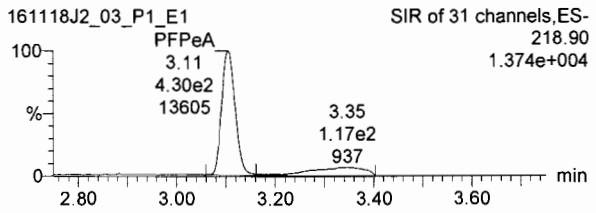

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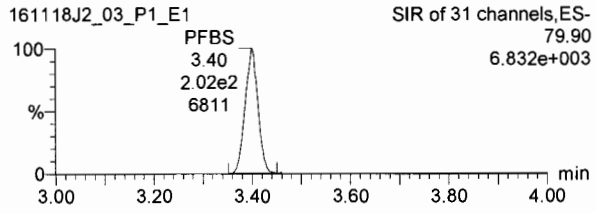

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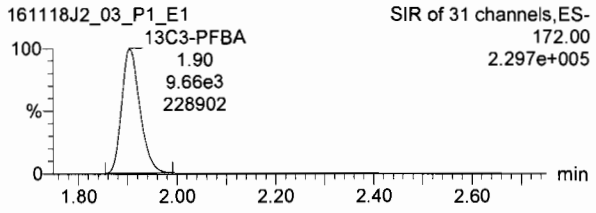

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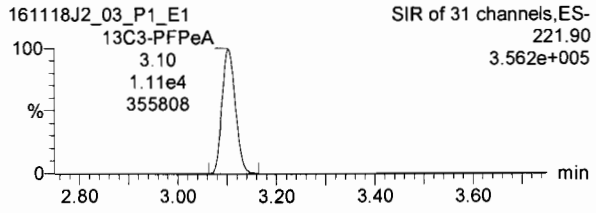

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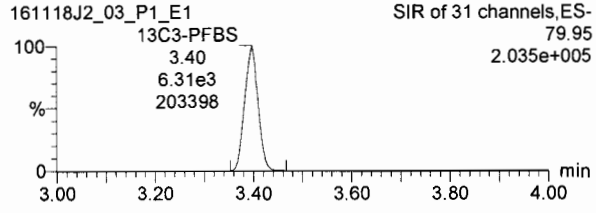

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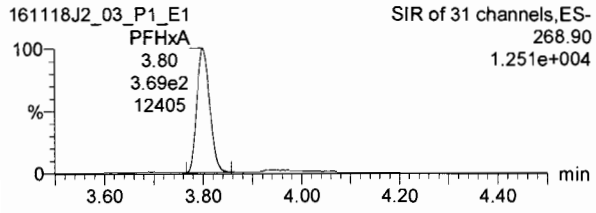

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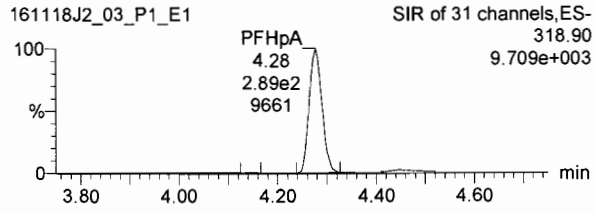

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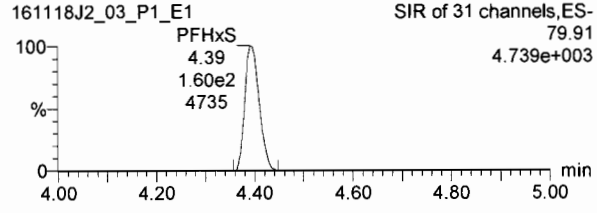

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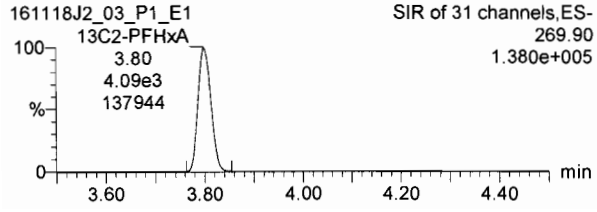

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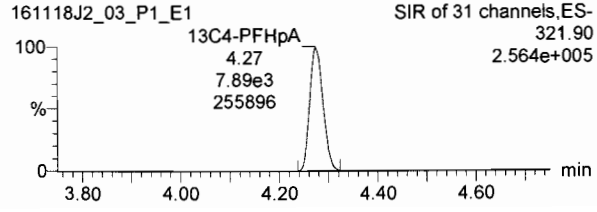

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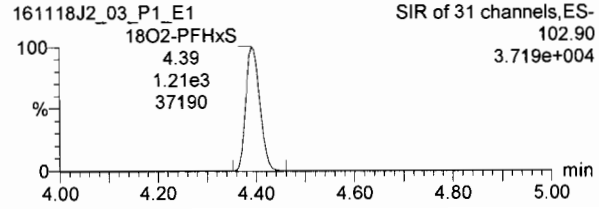

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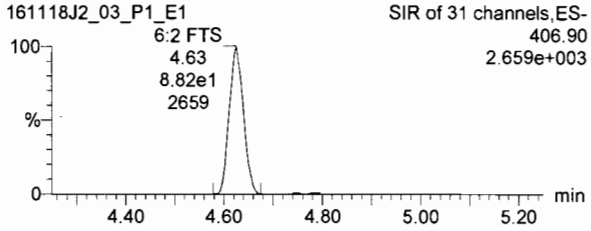

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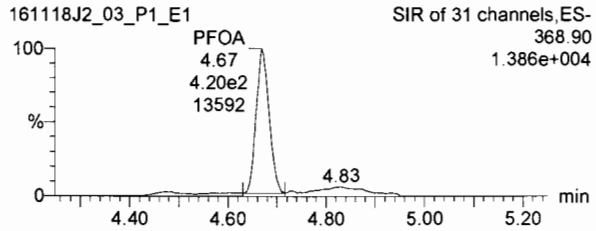

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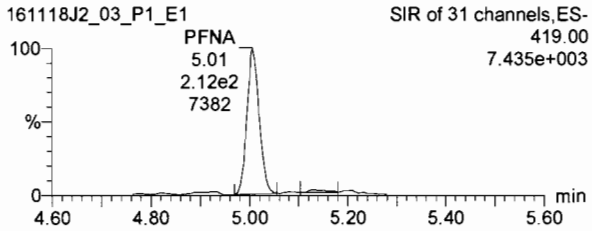

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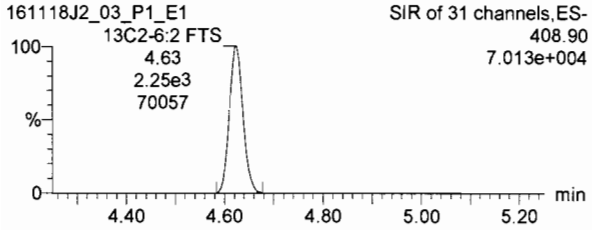

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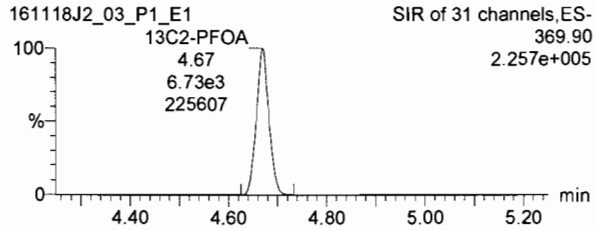

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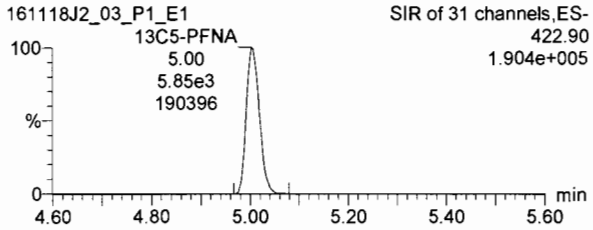

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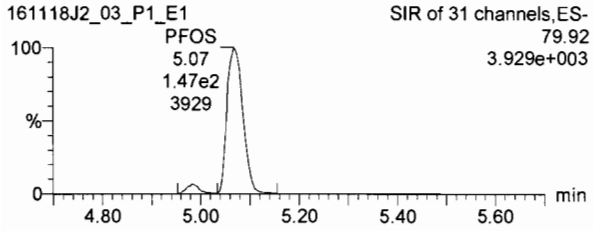

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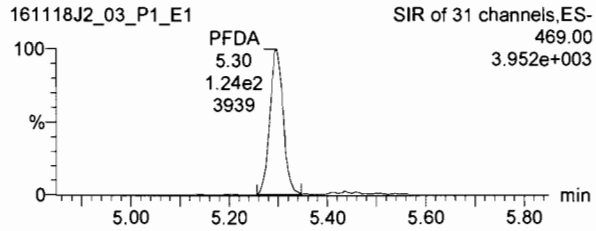
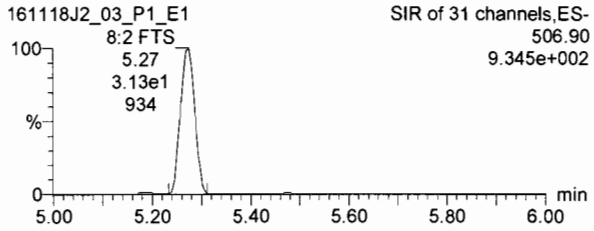


8:2 FTS



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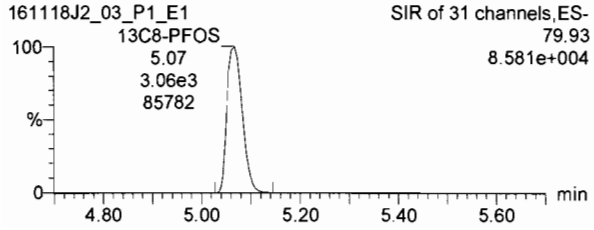

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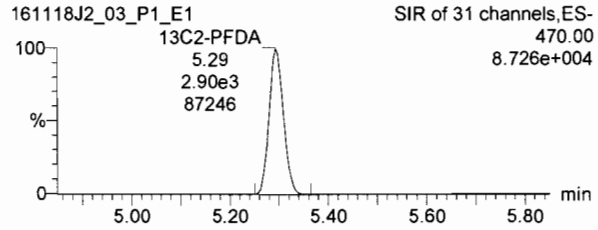

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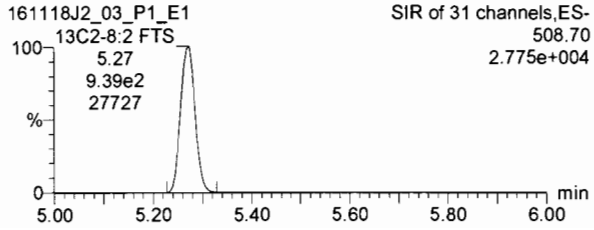

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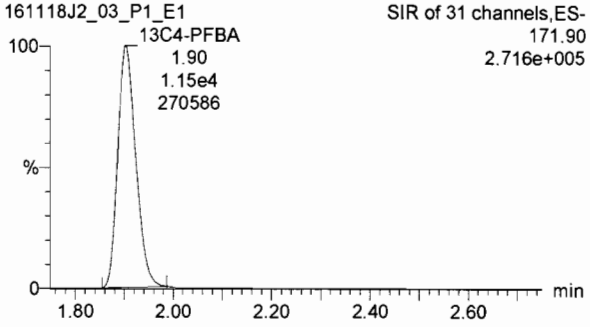

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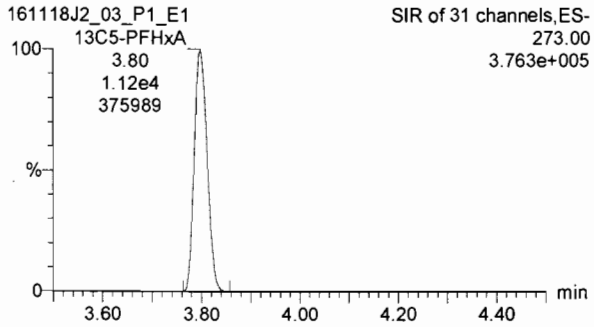

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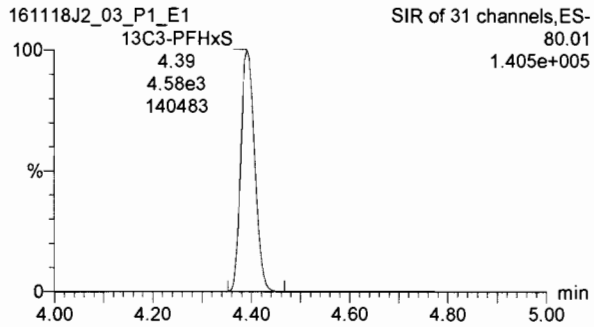

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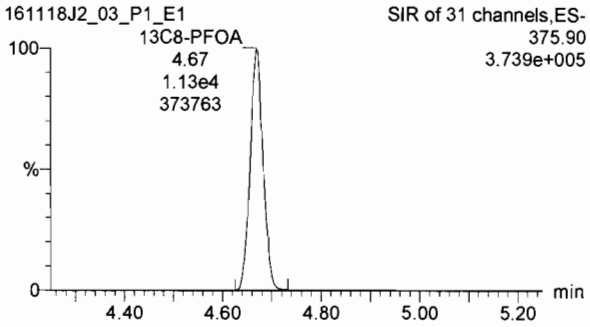

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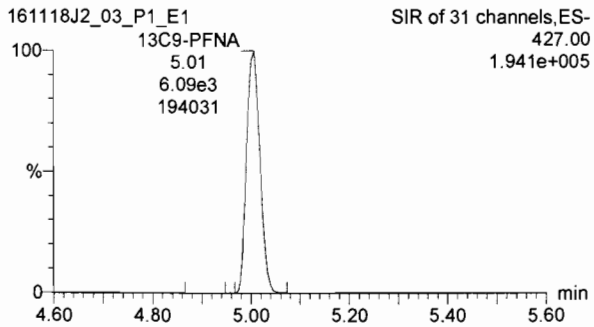

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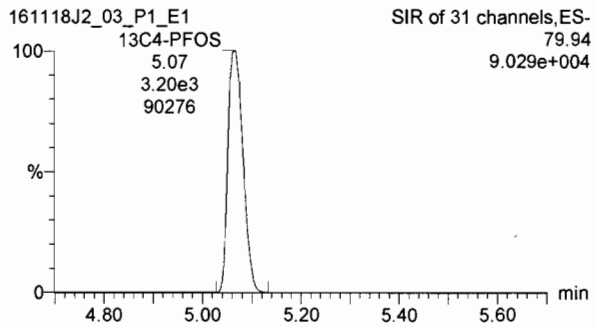

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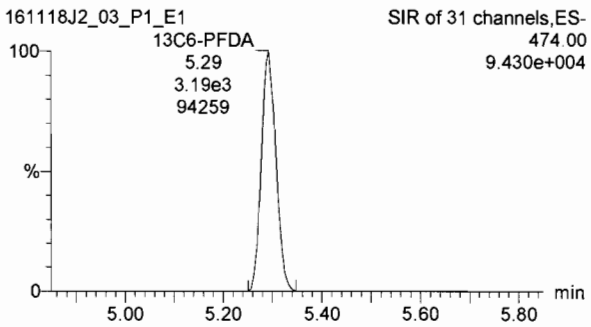

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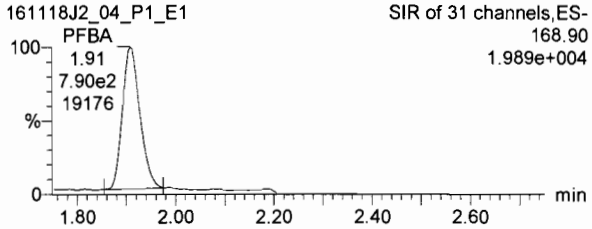

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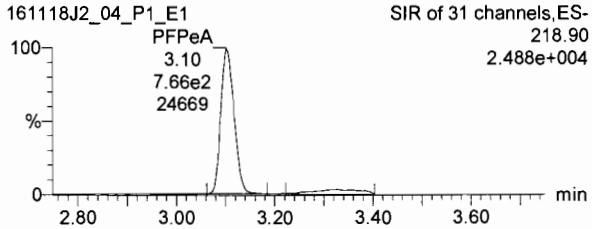

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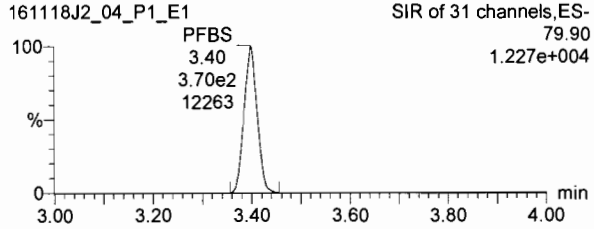

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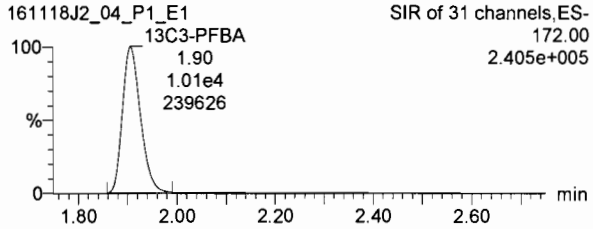

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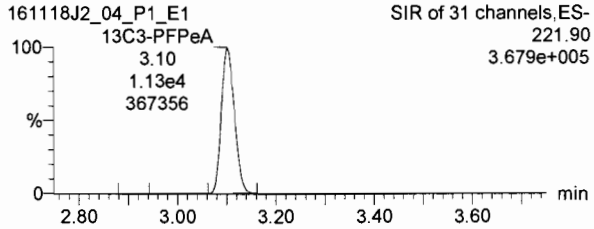

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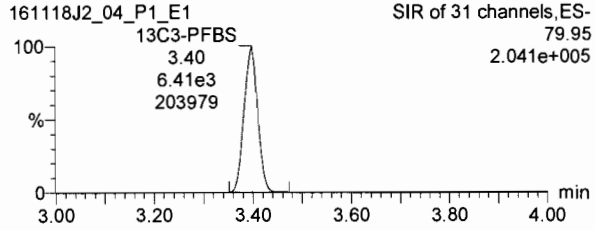

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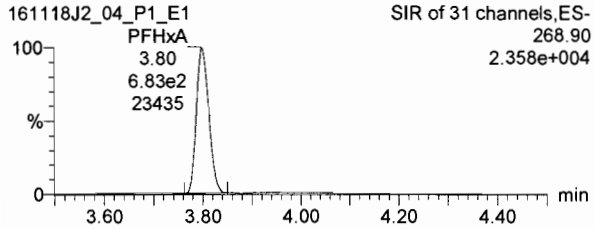

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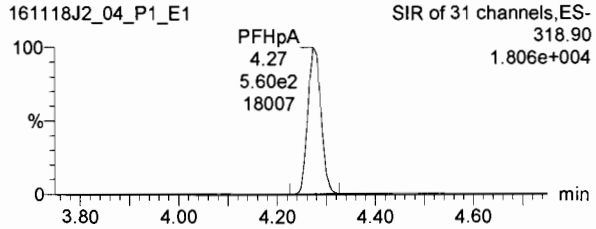

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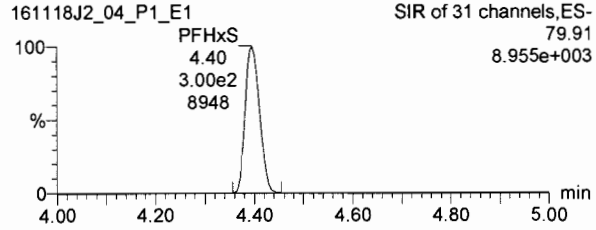

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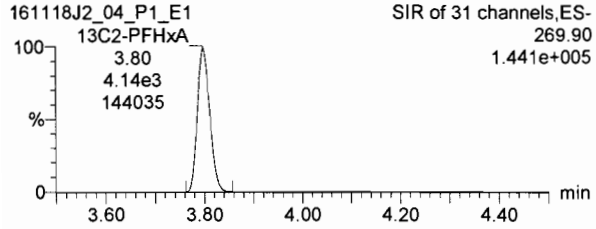

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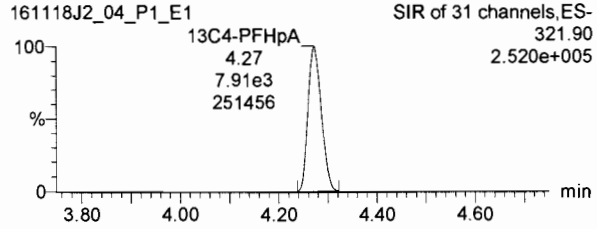

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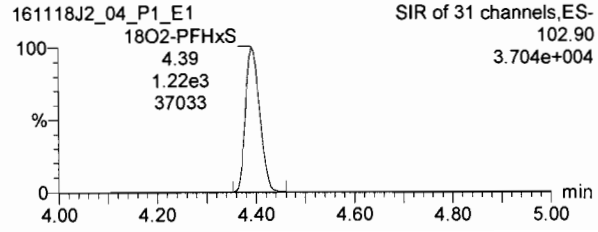

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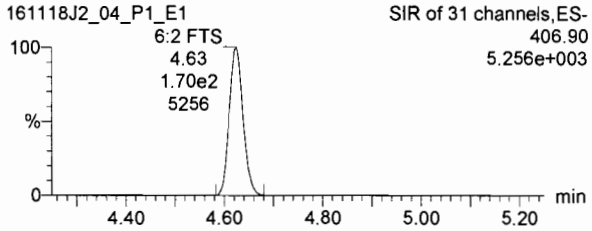

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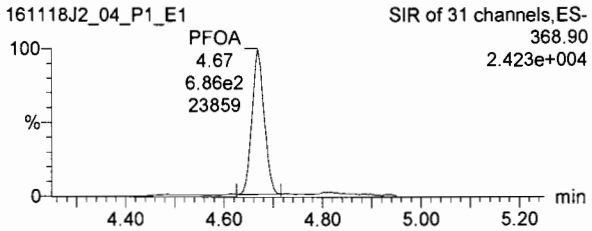

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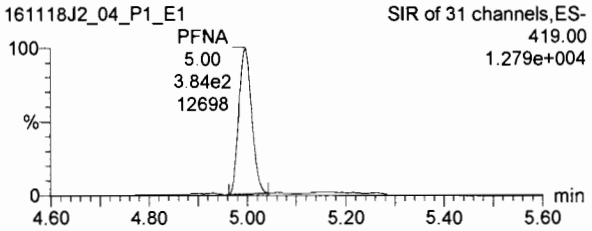

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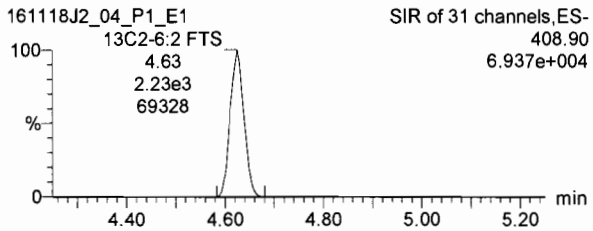

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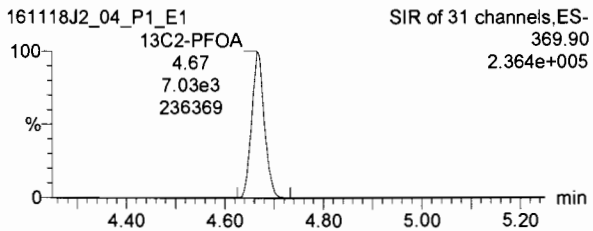

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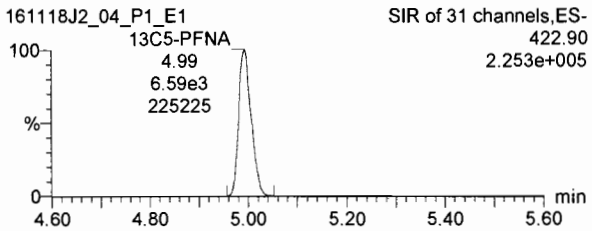

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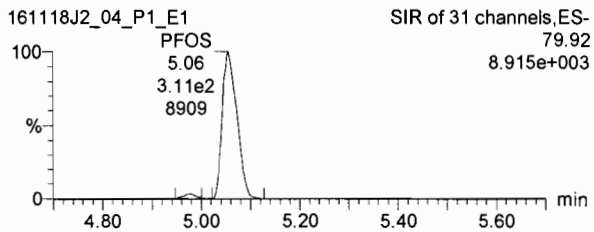

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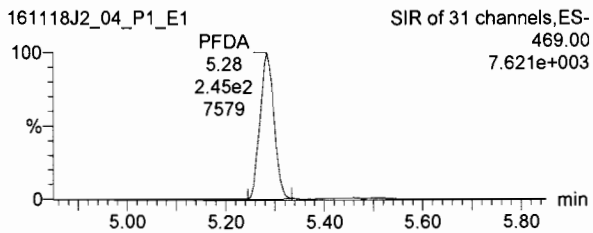

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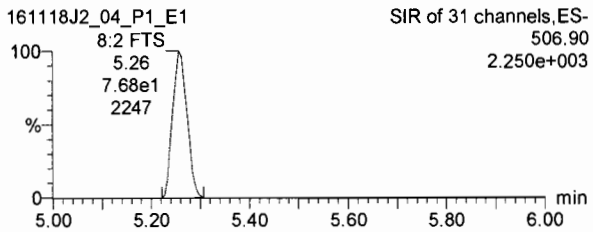

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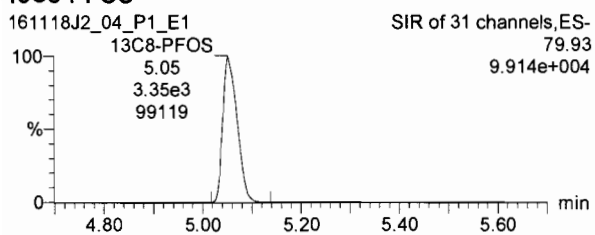

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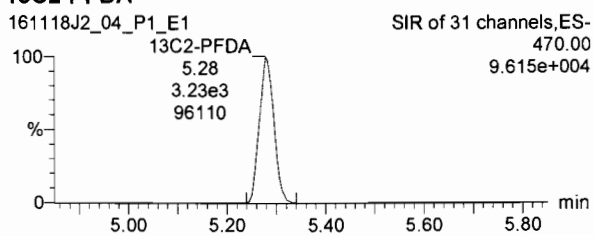

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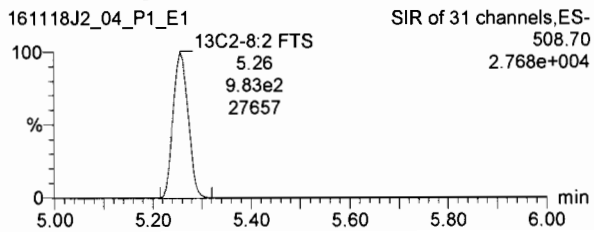

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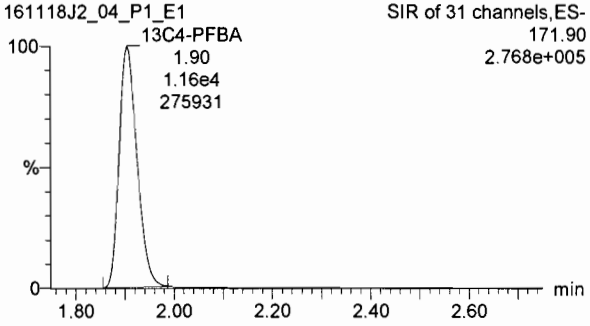

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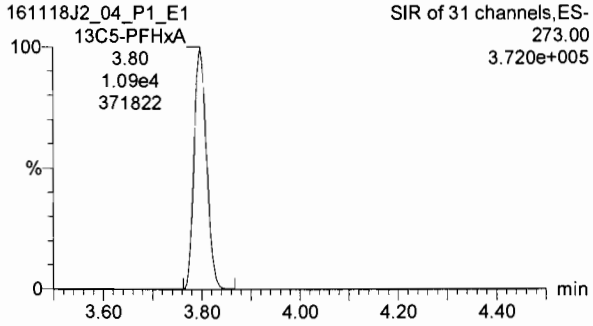

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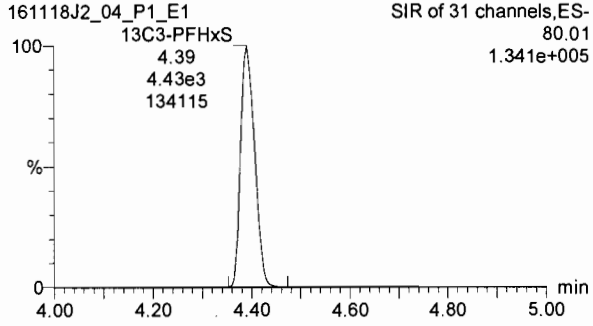

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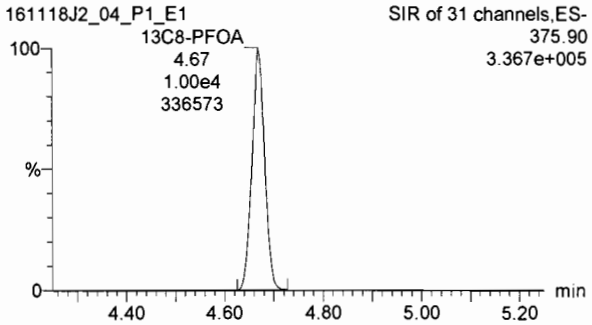

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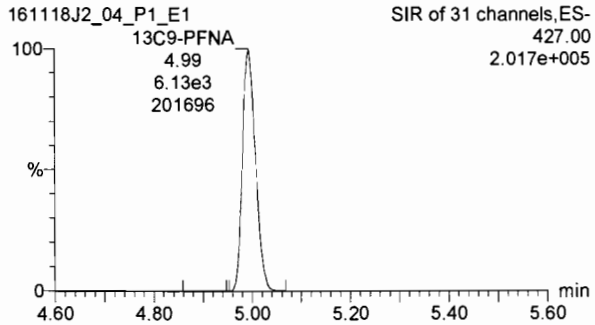

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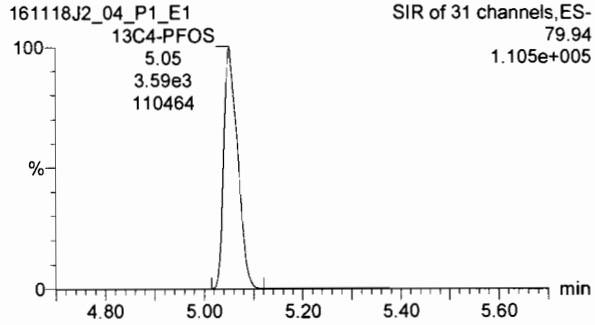

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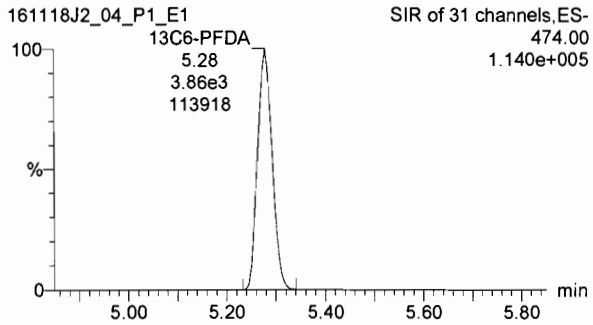

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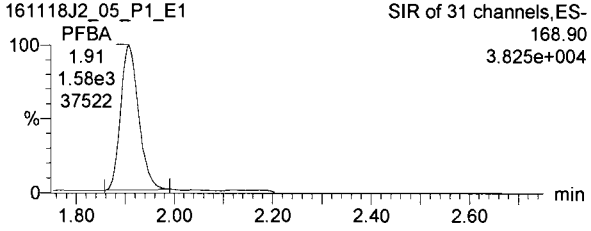

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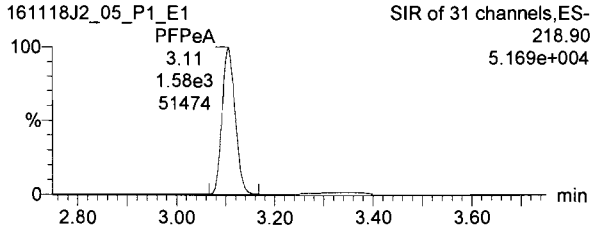

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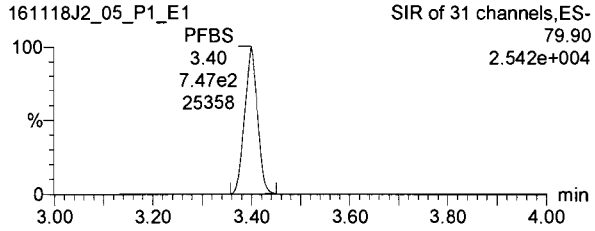

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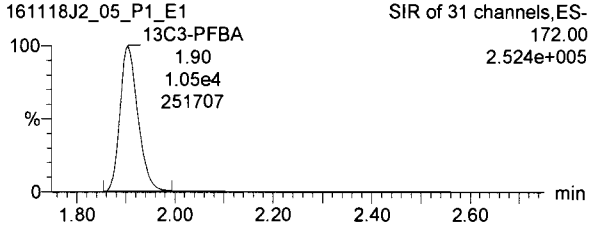

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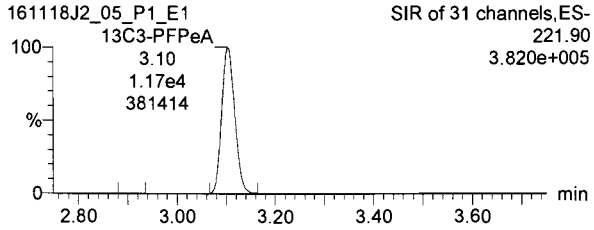

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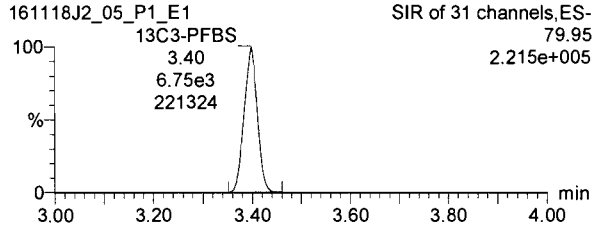

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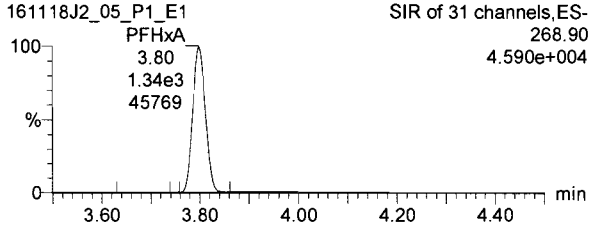

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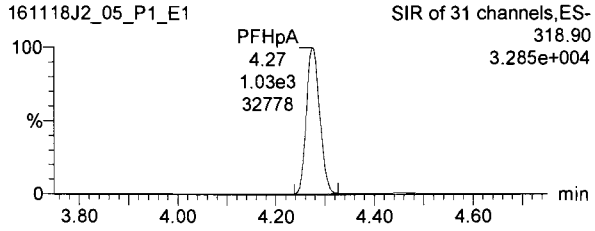

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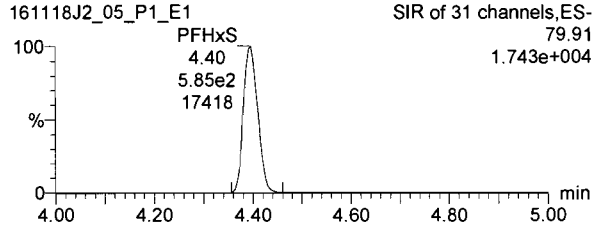

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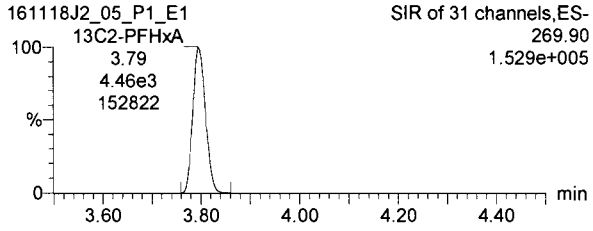

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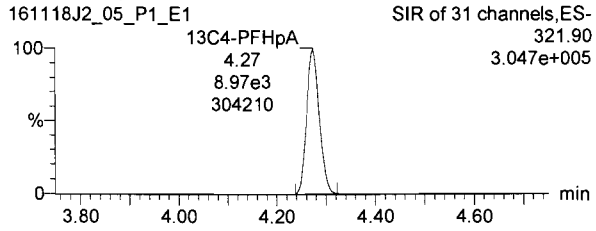

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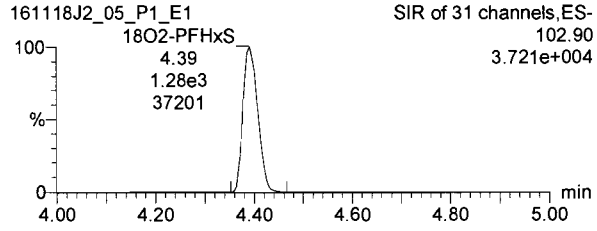

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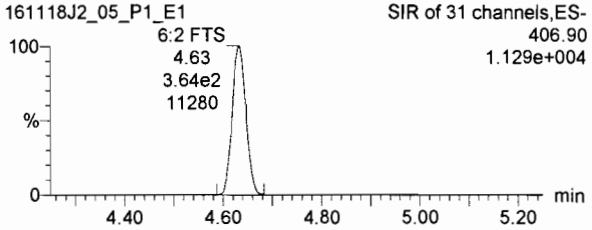

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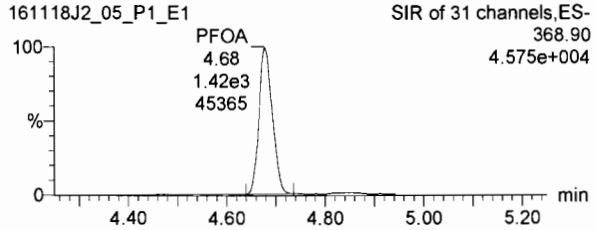

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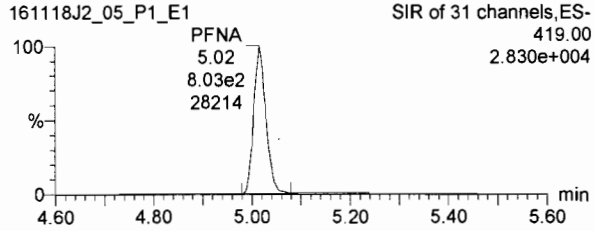

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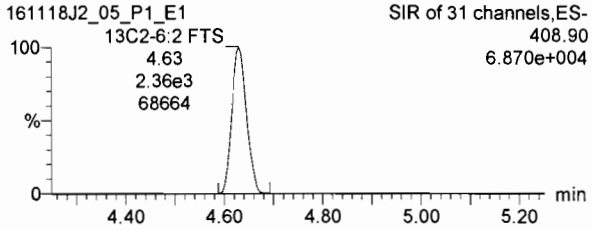

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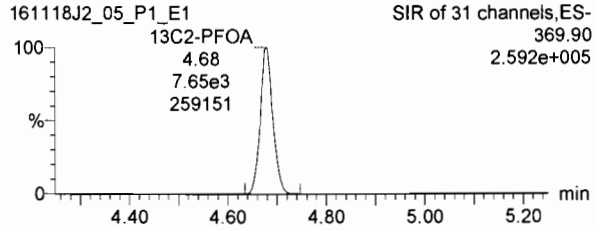

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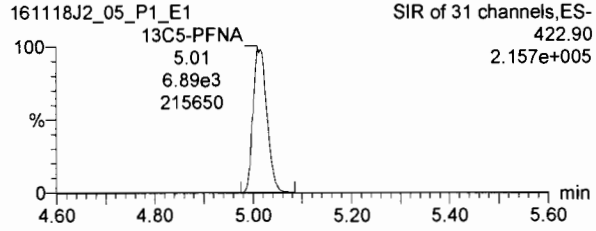

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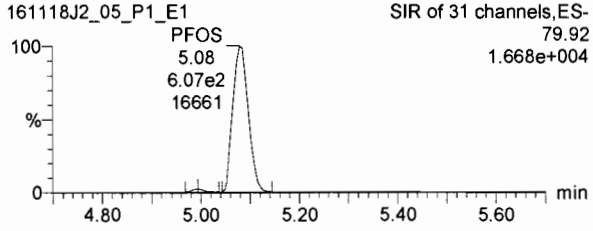

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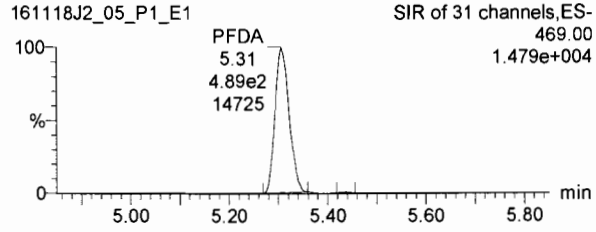

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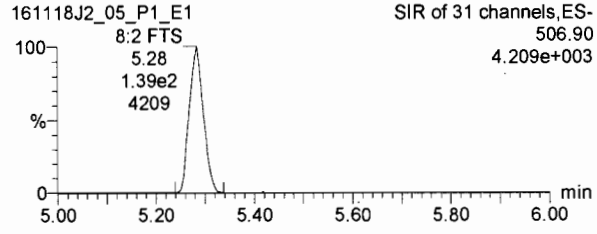

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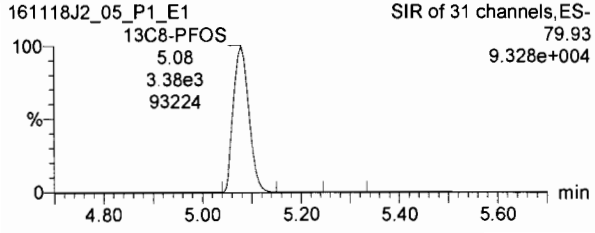

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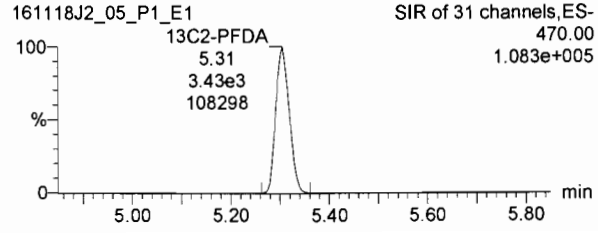

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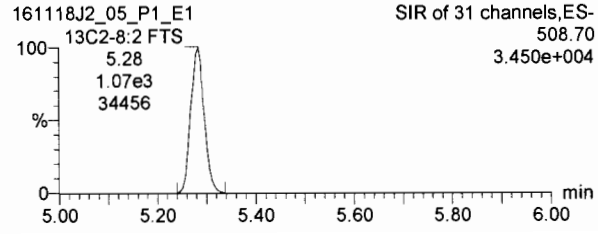

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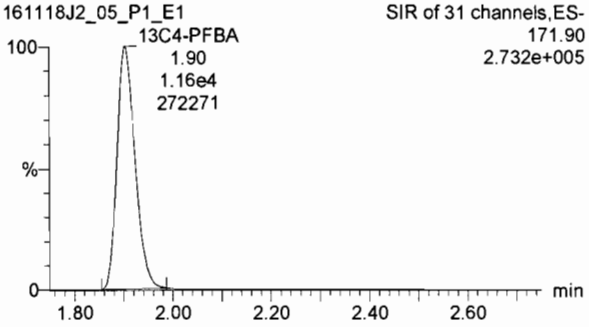

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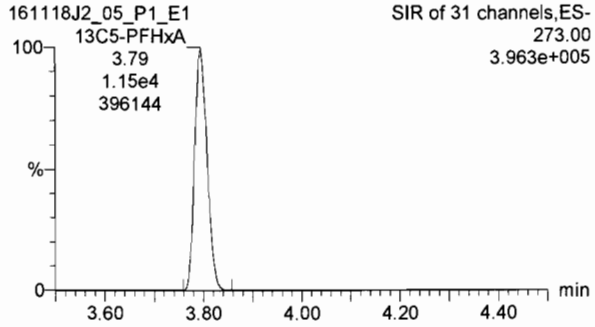

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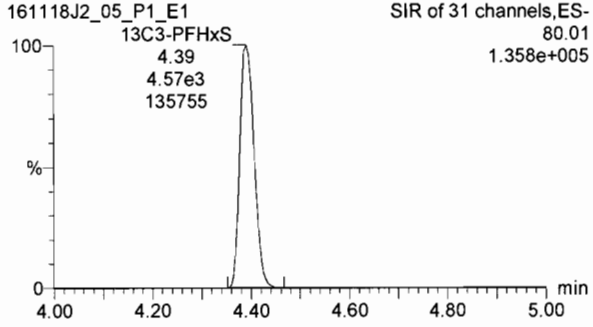

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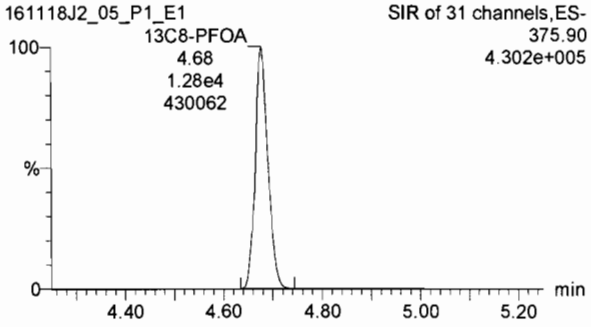

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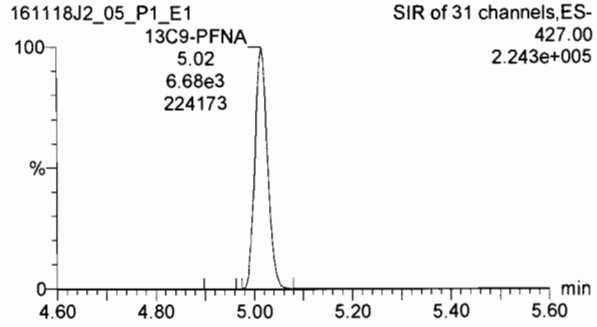

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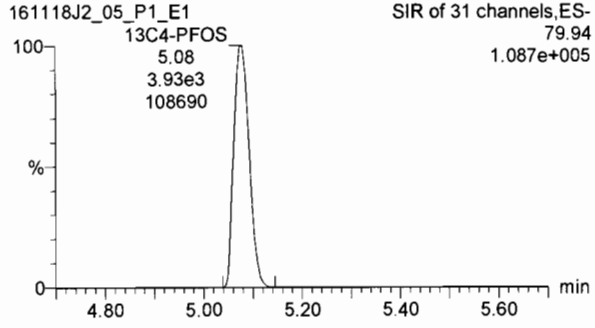

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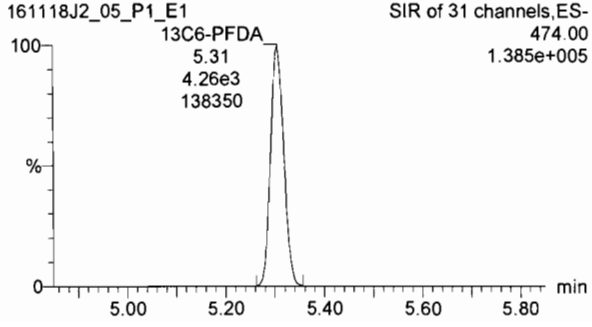

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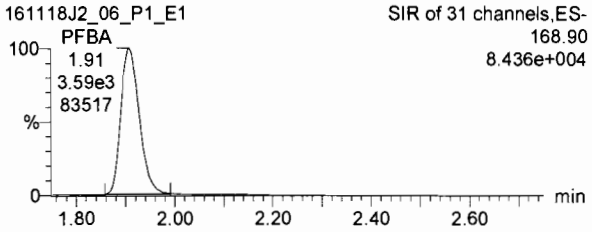

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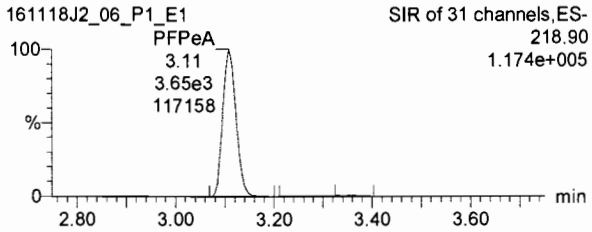

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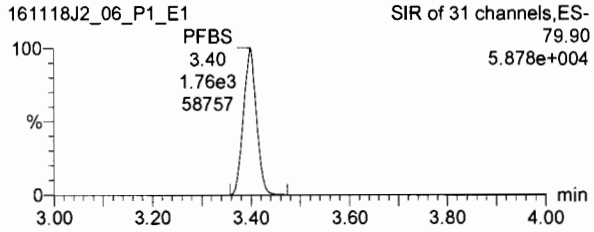

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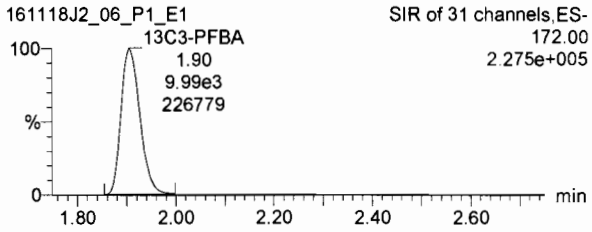

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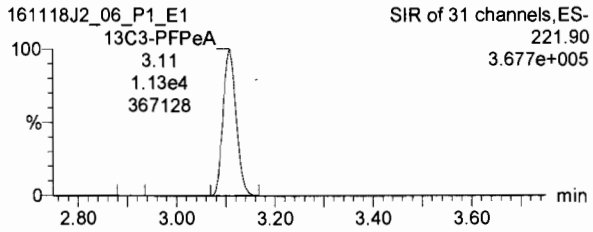

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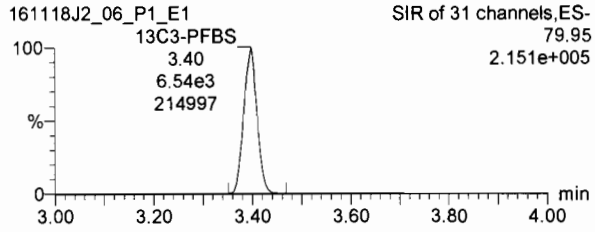

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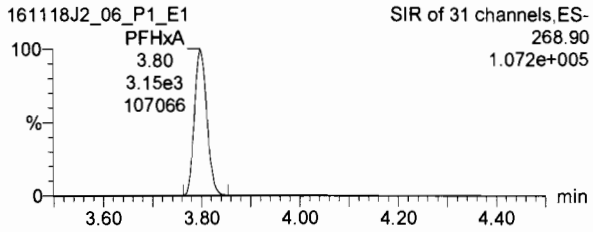

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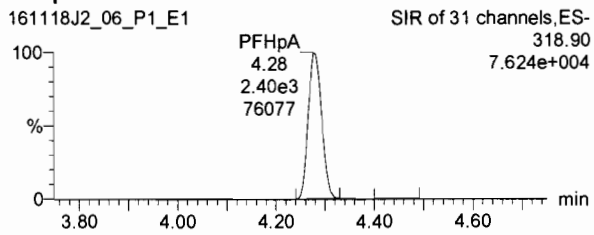

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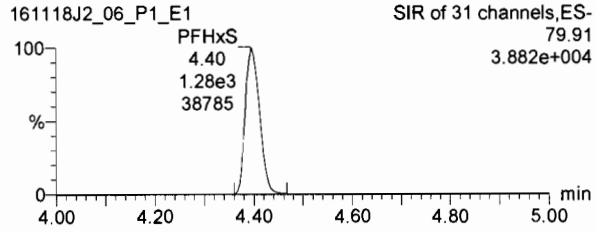

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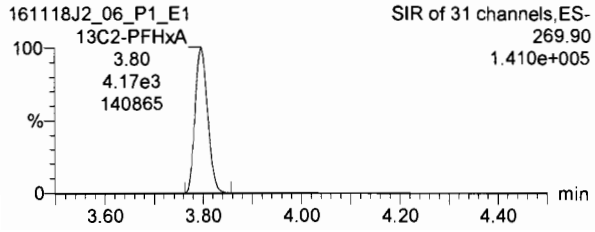

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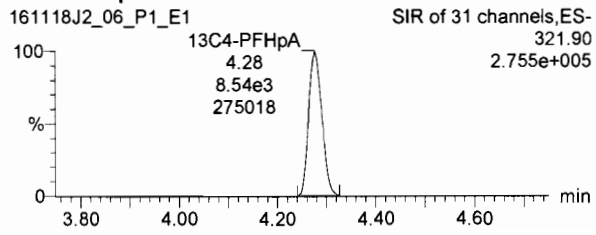

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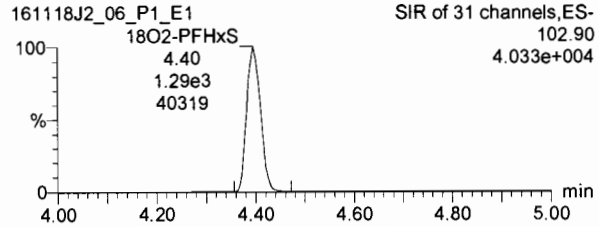

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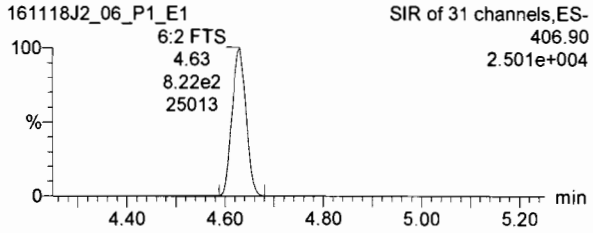

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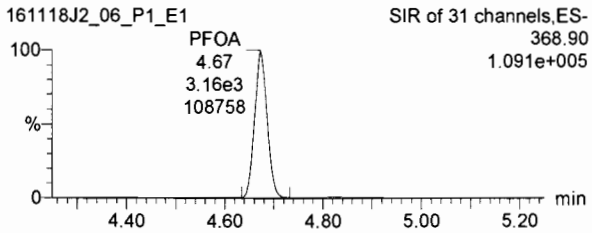

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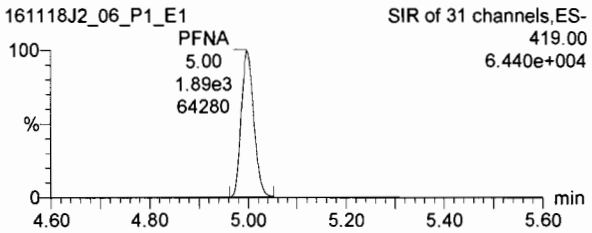

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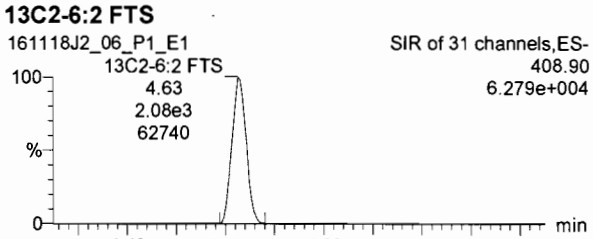

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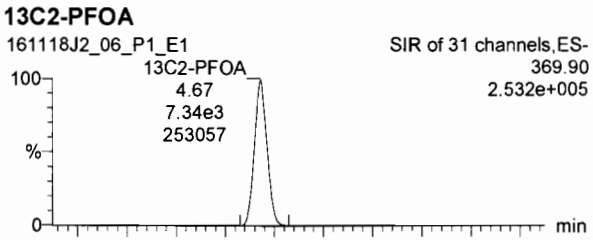

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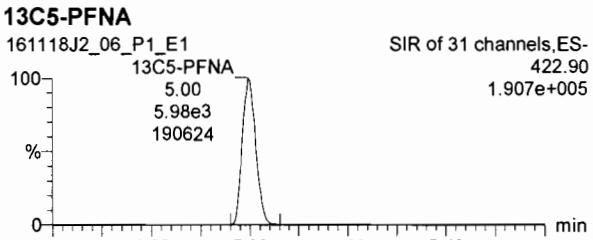

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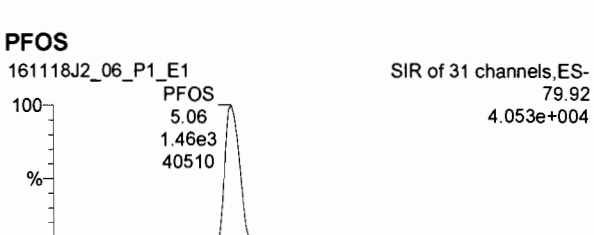

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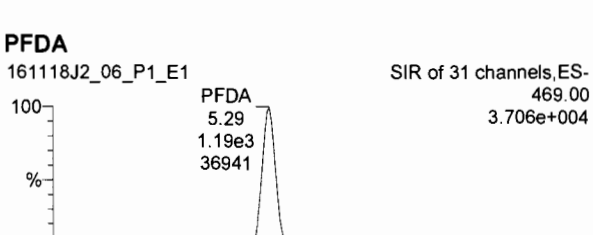
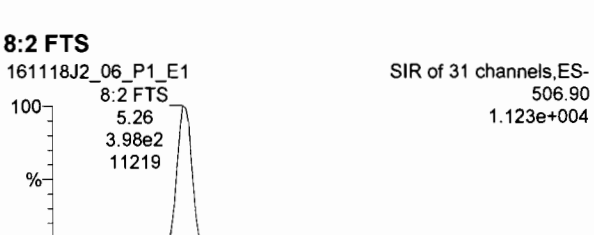


8:2 FTS



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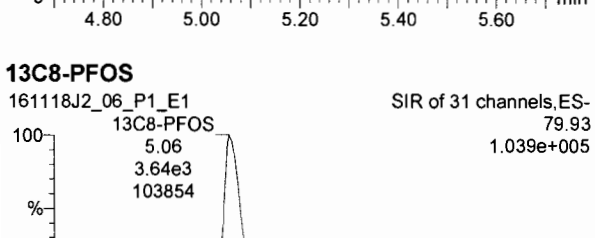

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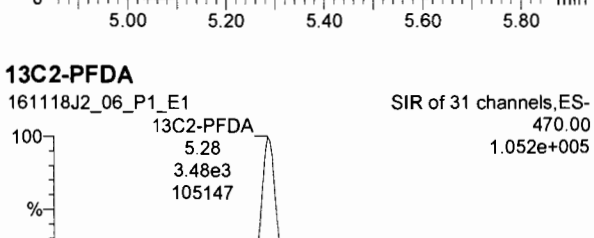

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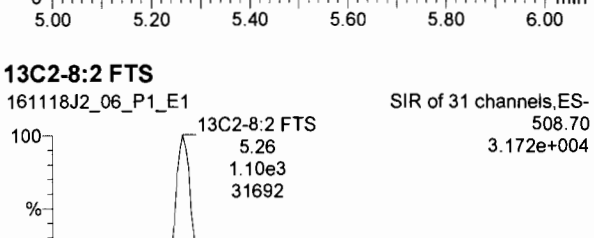

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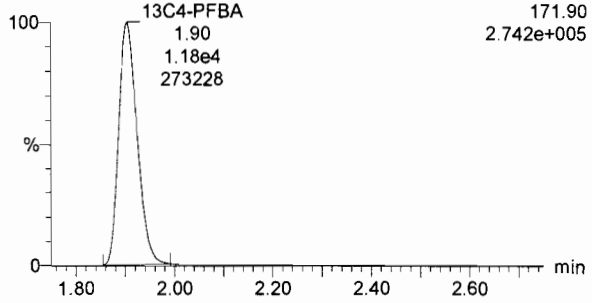

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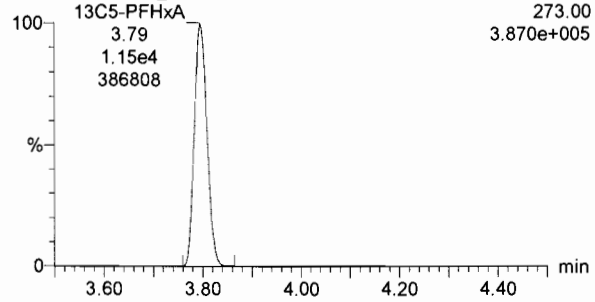

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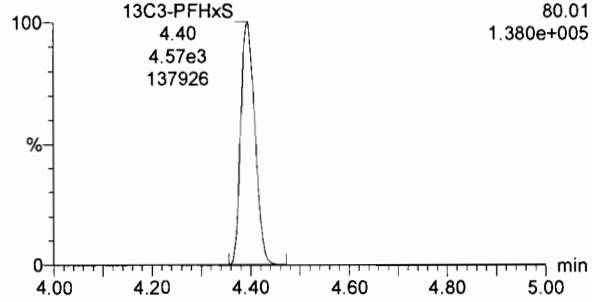

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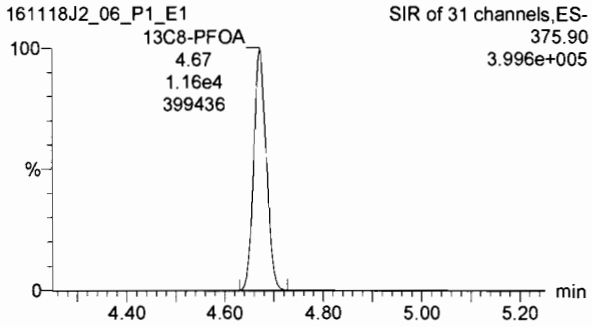

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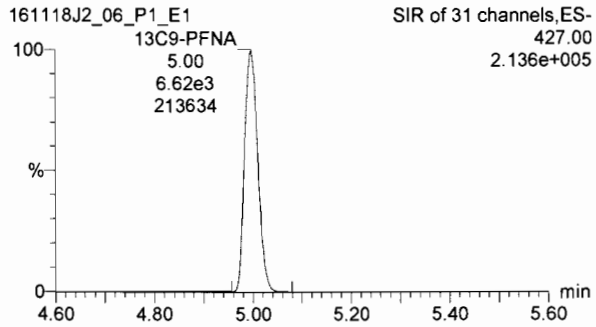

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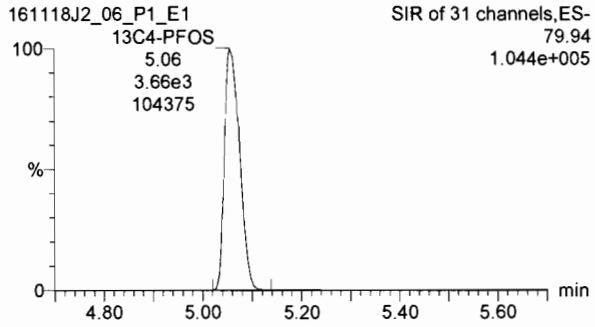

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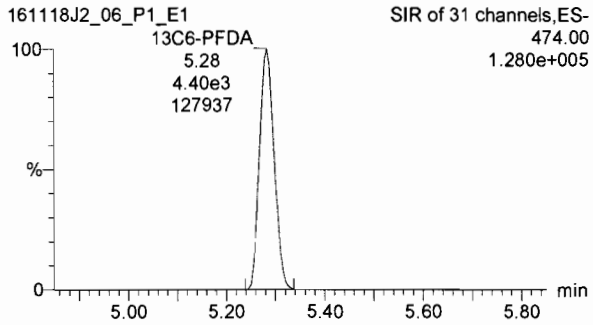

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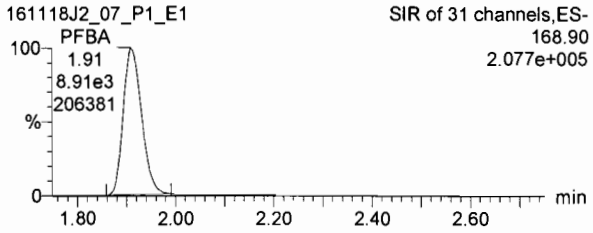

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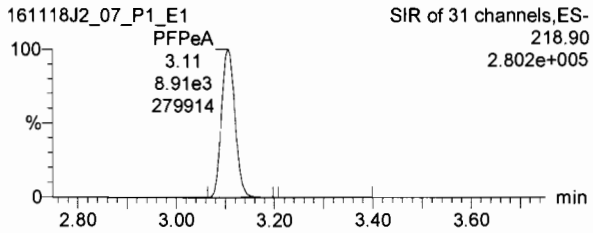

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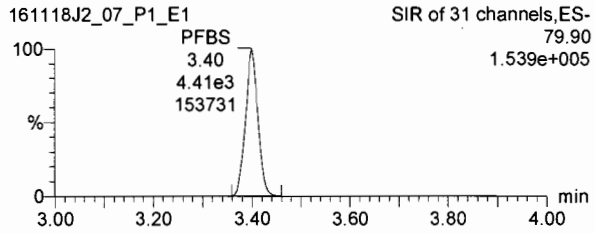

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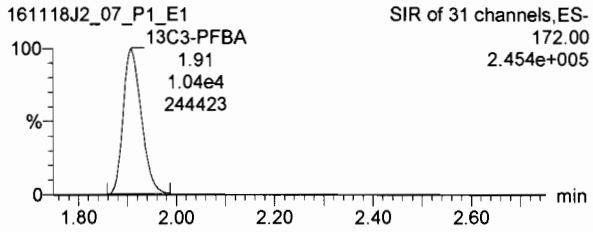

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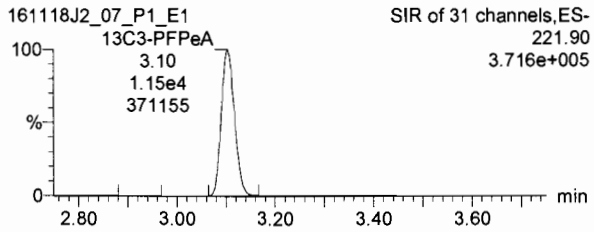

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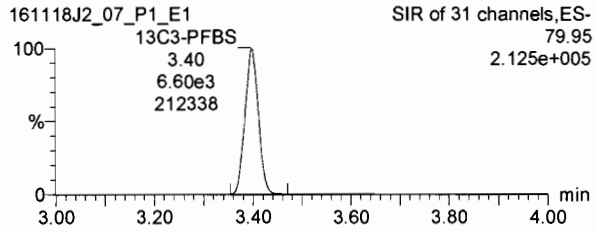

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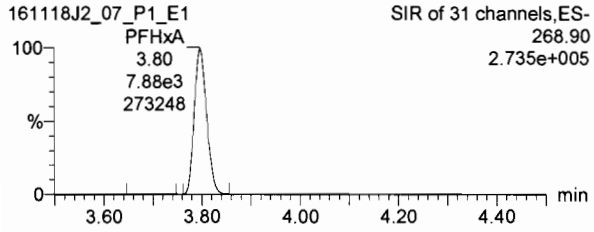

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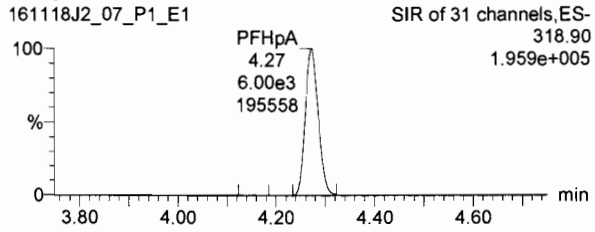

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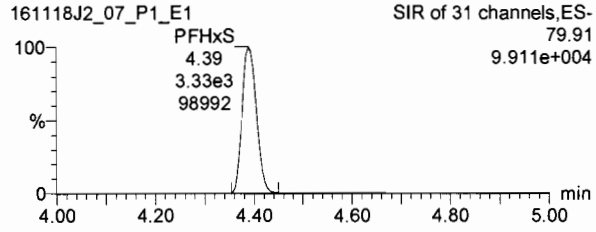

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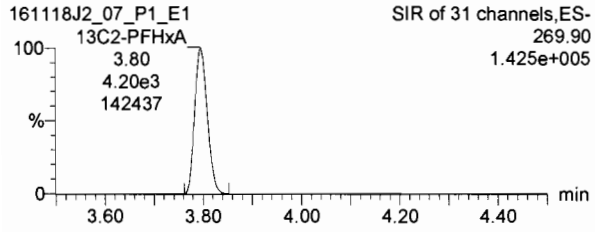

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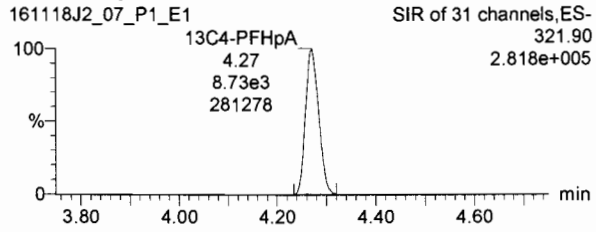

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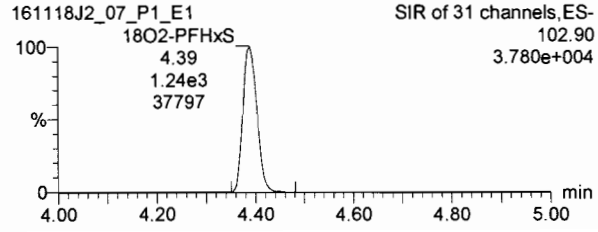

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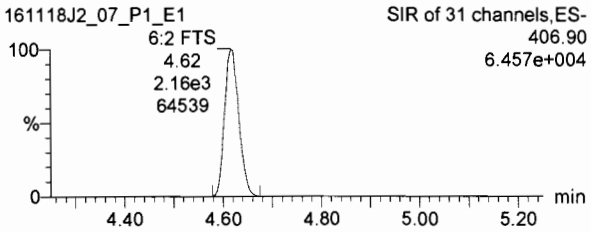

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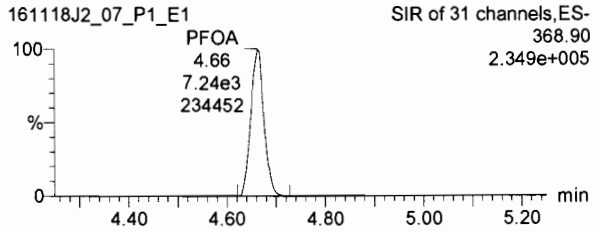

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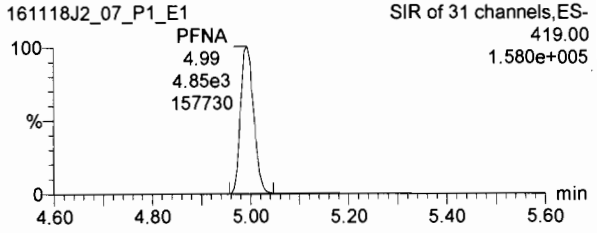

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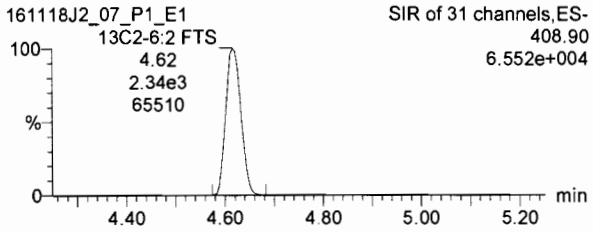

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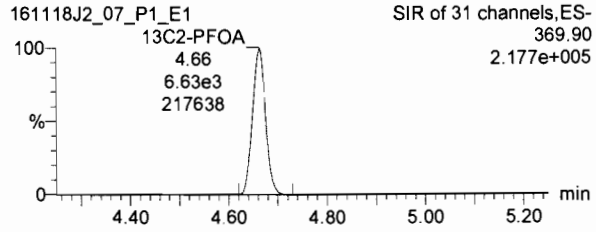

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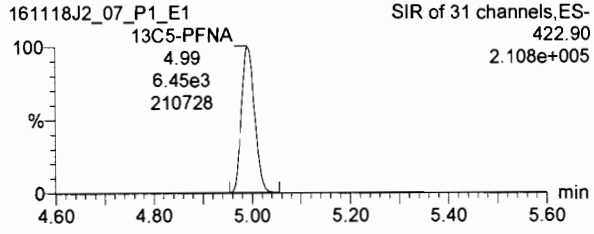

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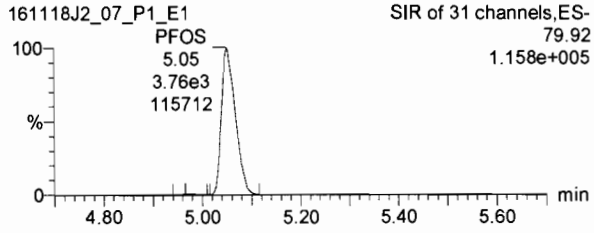

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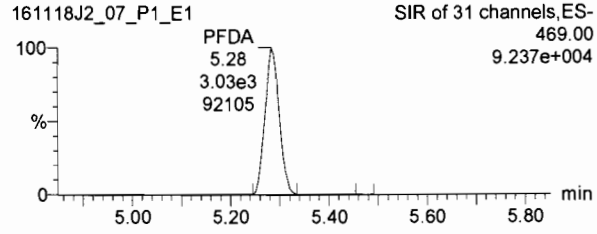

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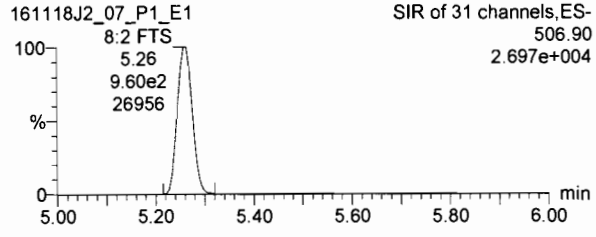

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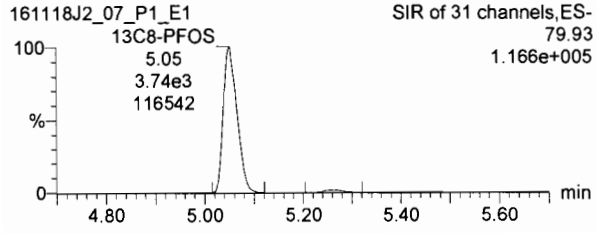

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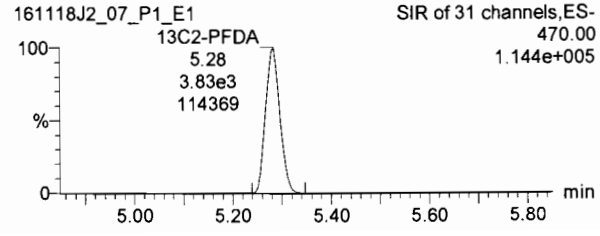

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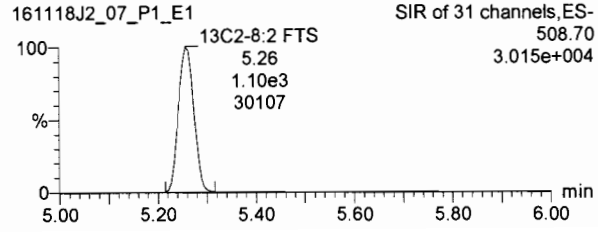

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Name: 161118J2_07.wiff, Date: 18-Nov-2016, Time: 18:15:16, ID: ST161118J2-6 PFC C3 16K1719, Description: PFC C3 16K1719 A

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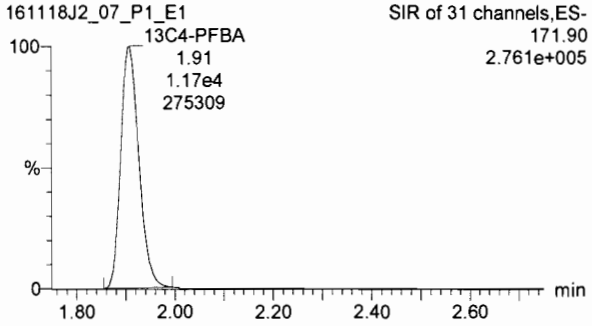

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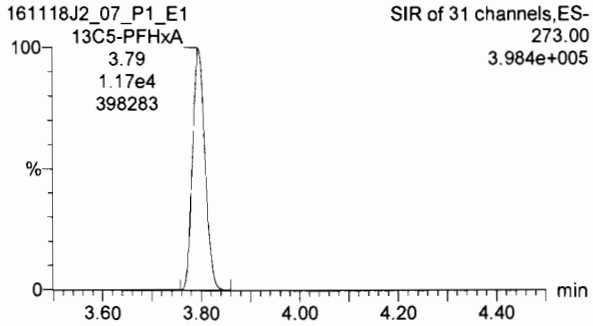

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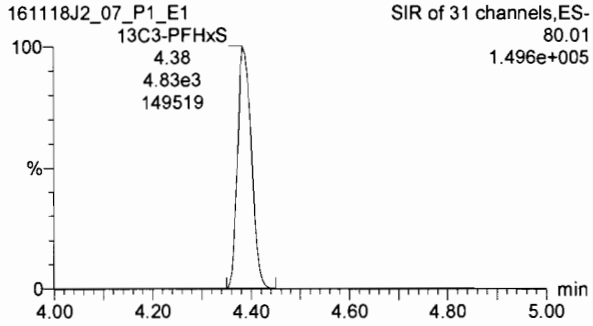

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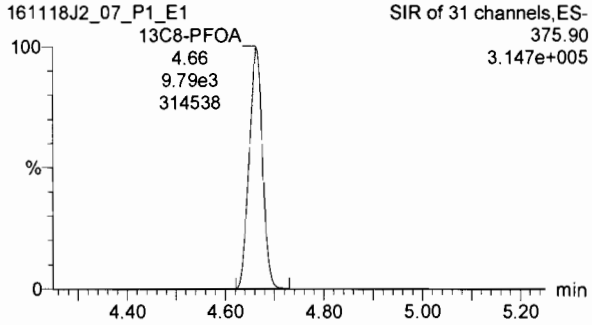

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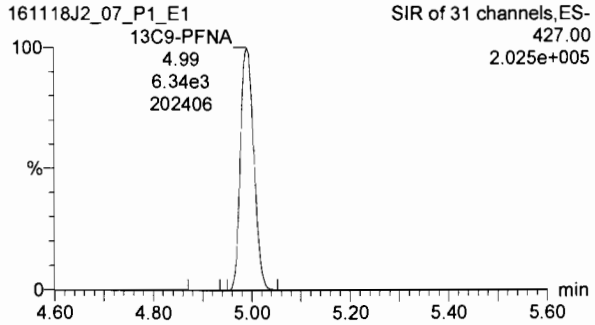

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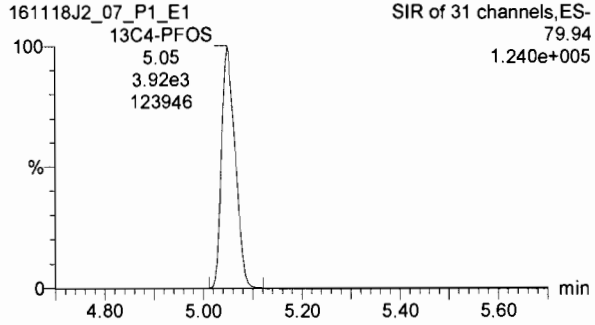

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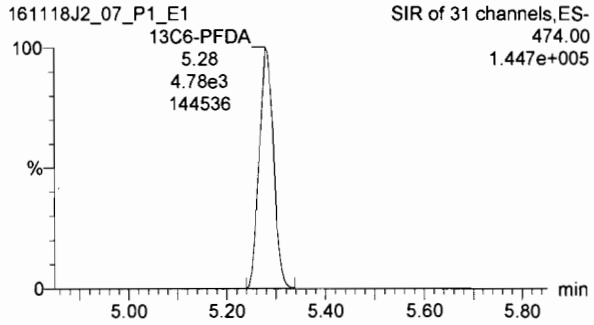

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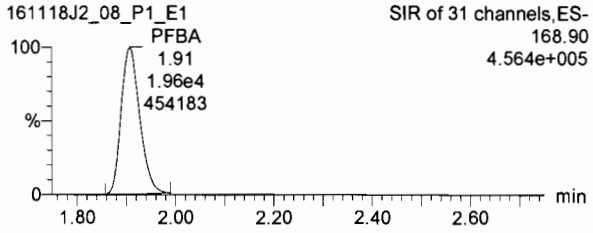

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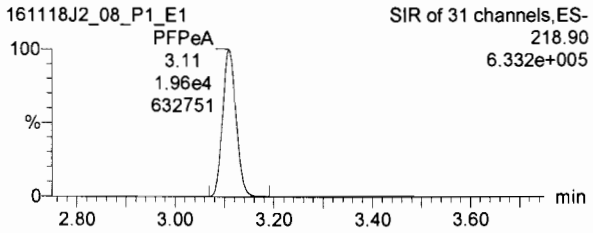

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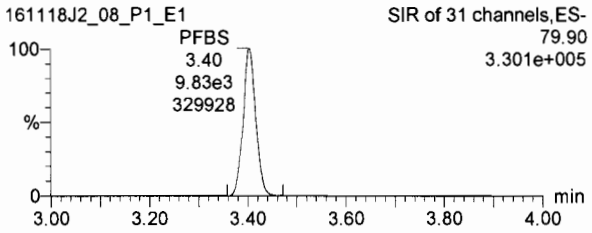

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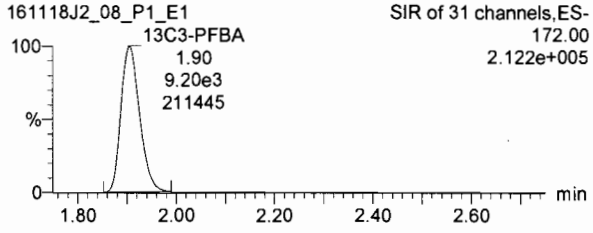

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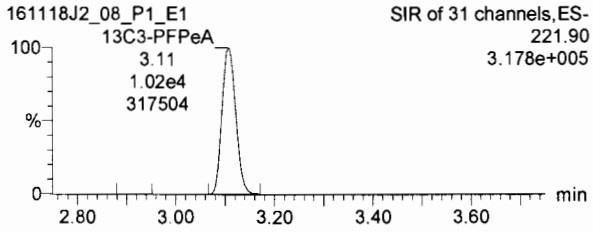

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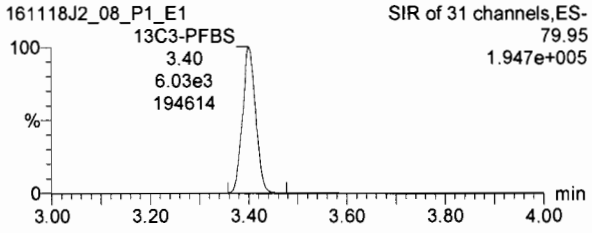

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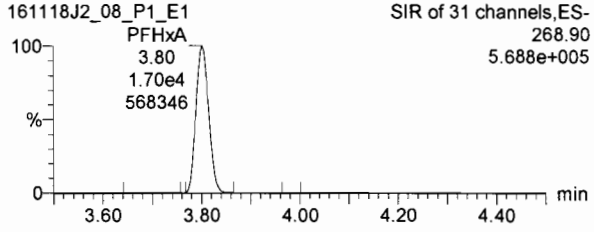

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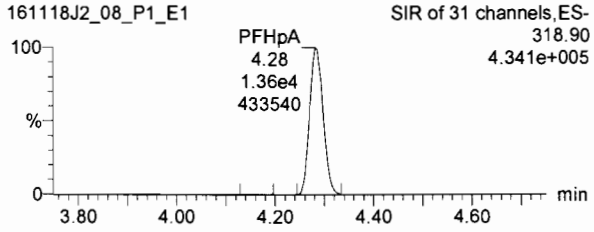

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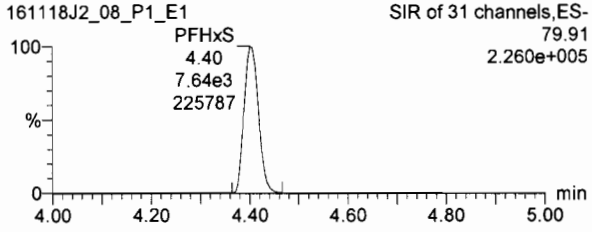

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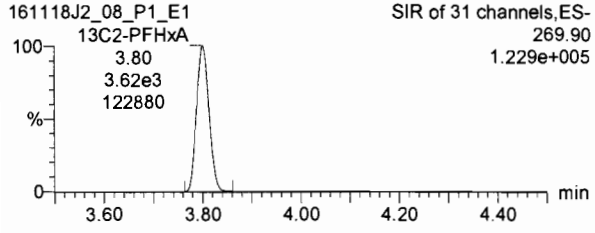

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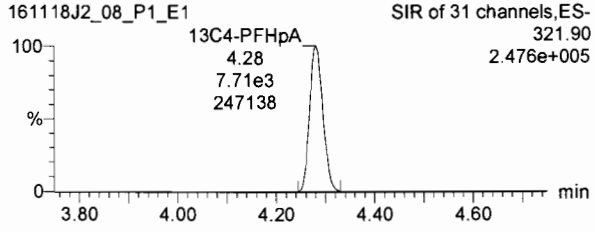

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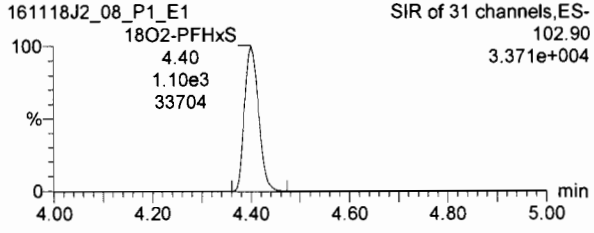

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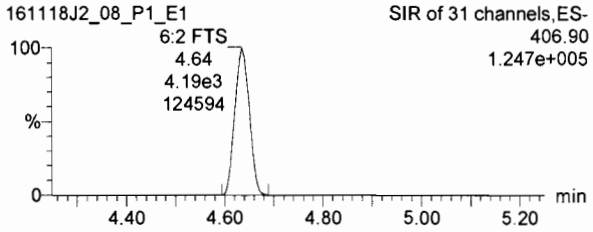

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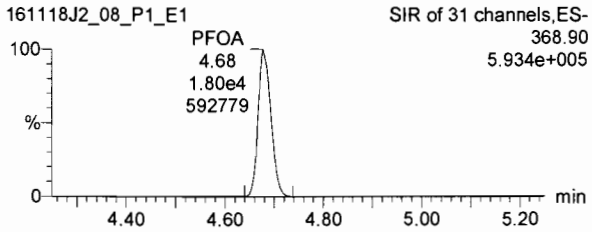

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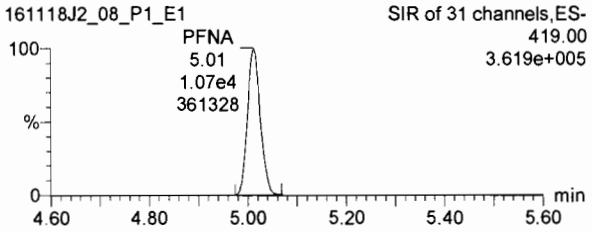

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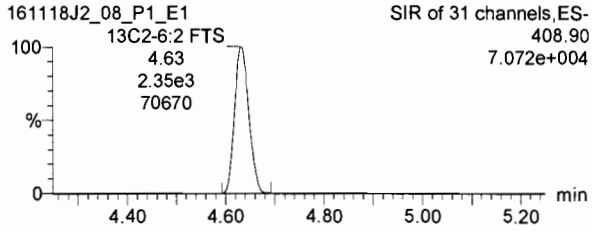

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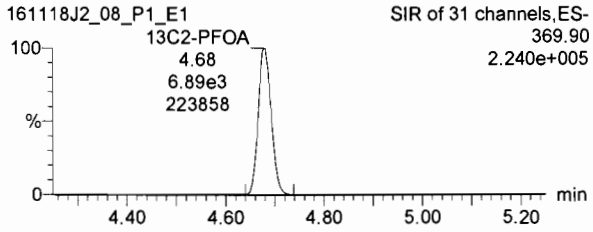

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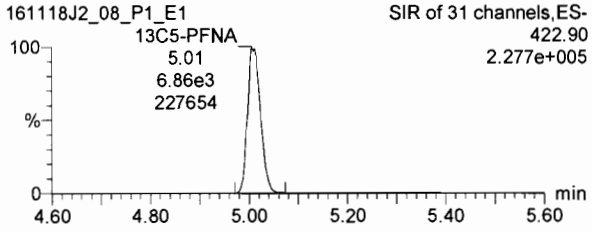
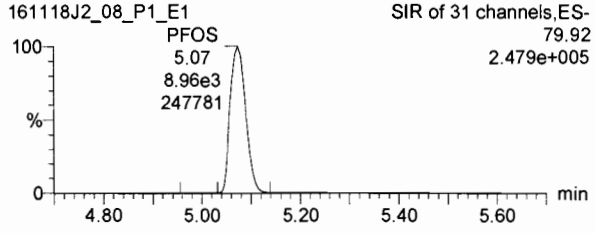


PFOS



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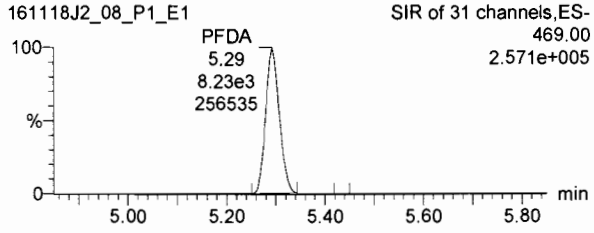

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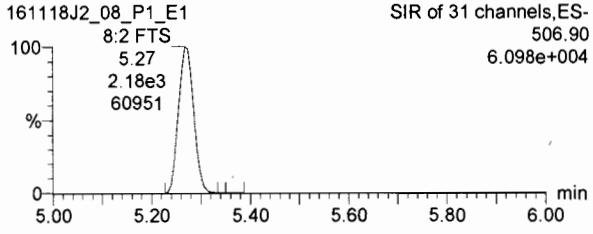

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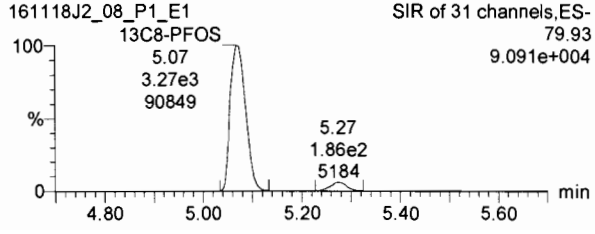

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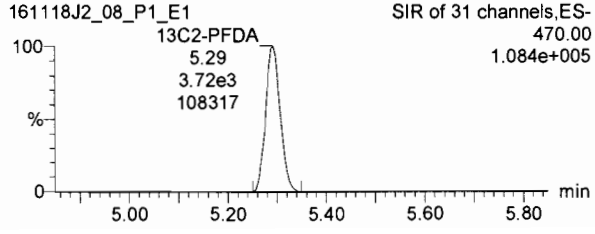

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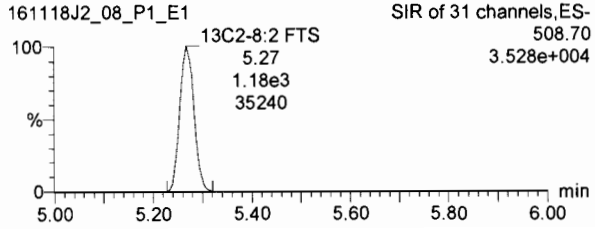

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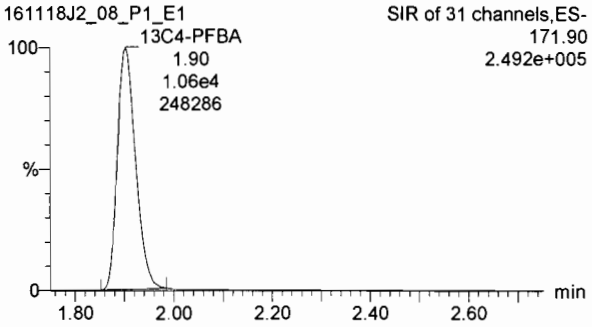

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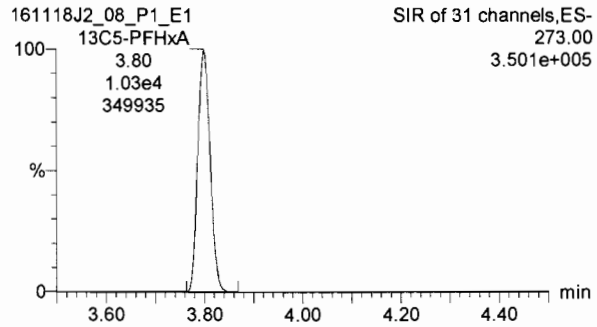

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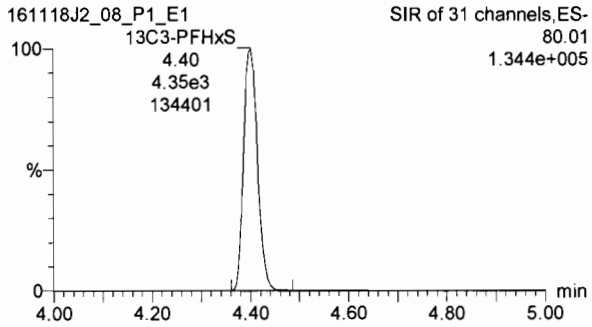

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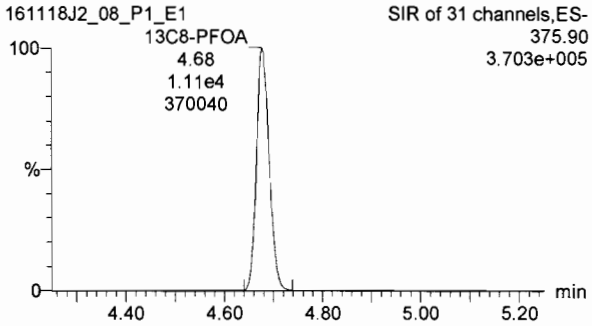

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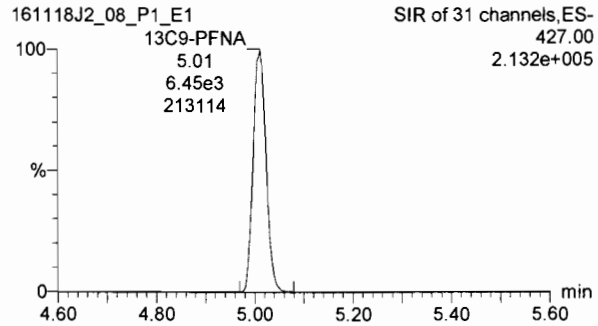

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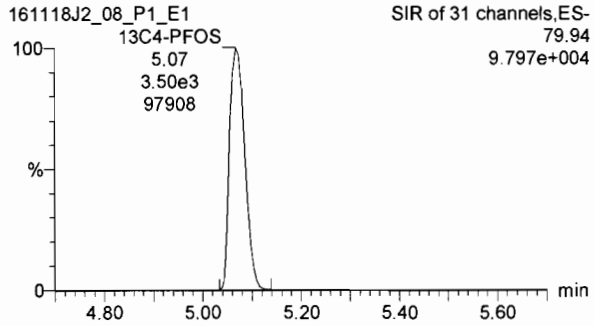

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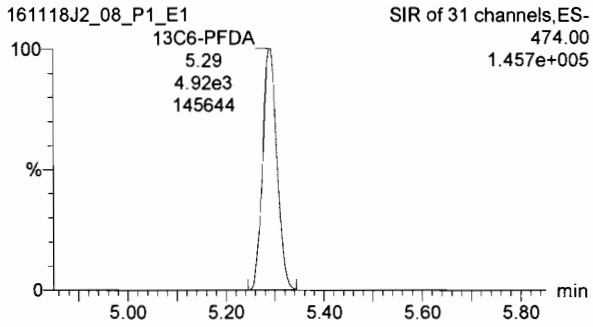

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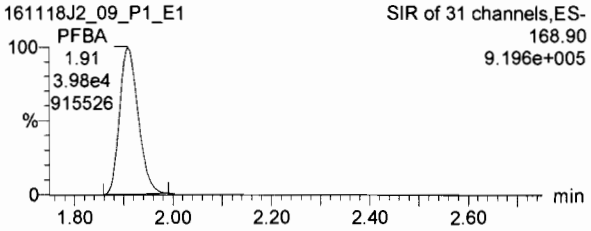

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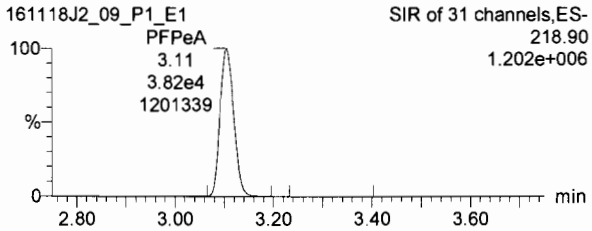

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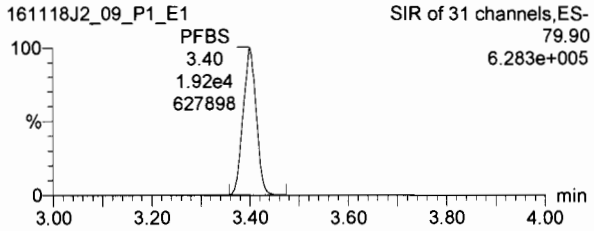

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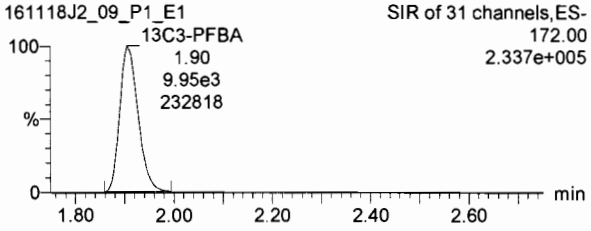

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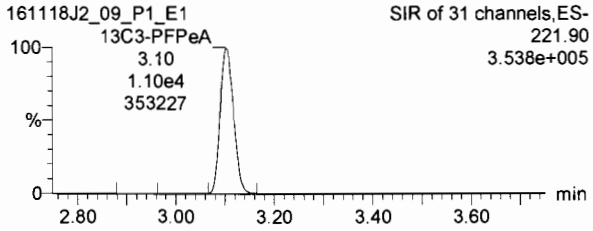

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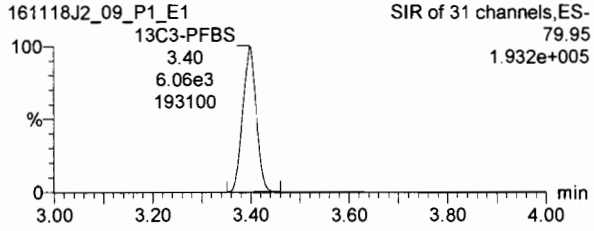

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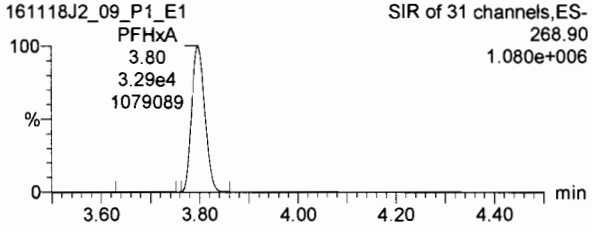

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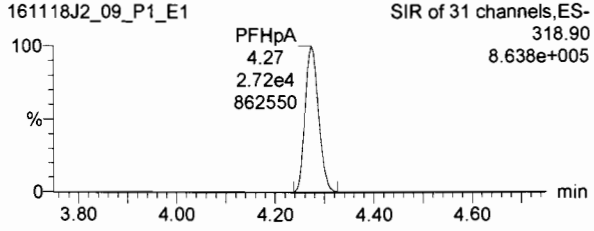

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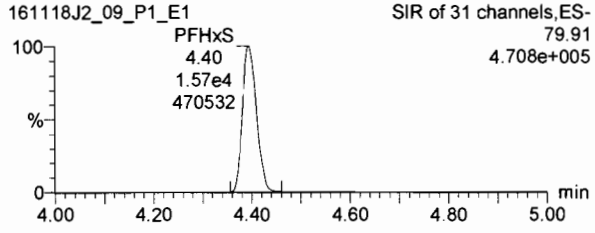

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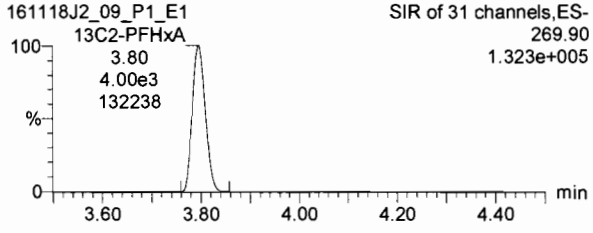

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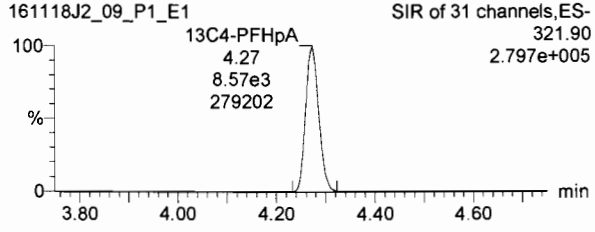

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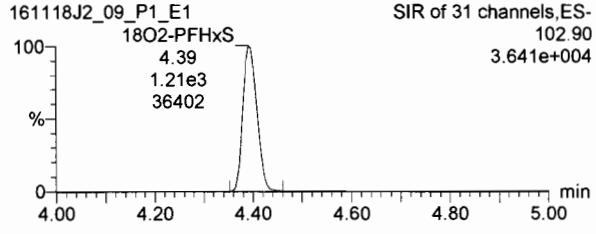

Vista Analytical Laboratory Q2

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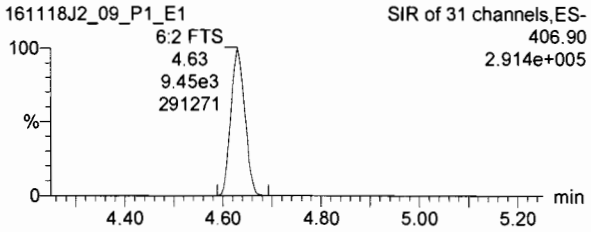

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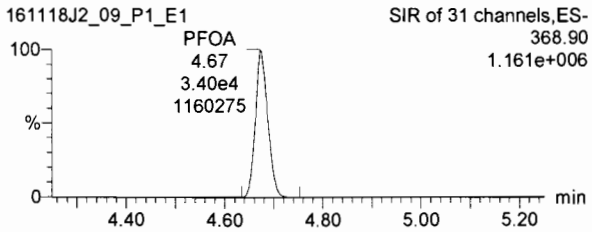

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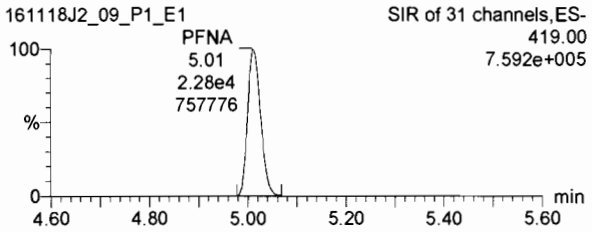

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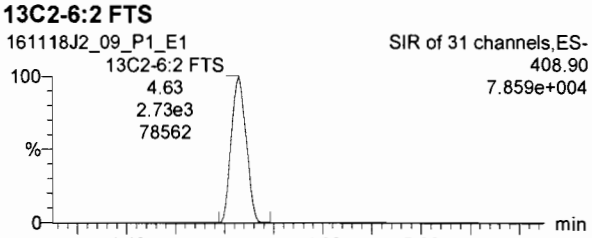

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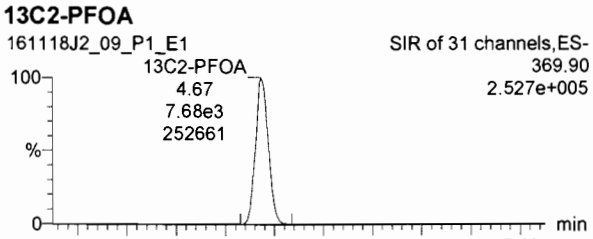

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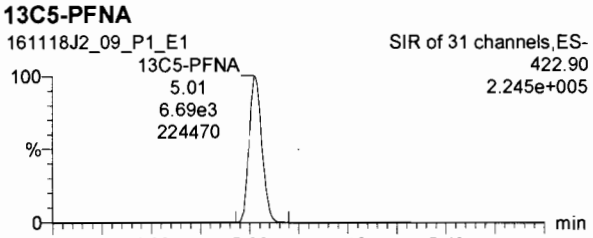

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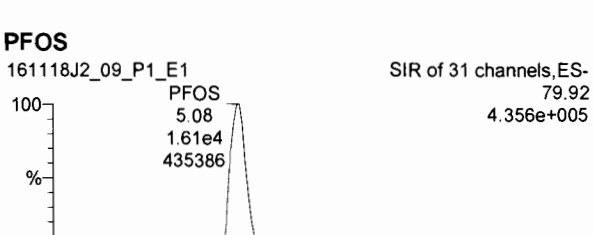

PFDA

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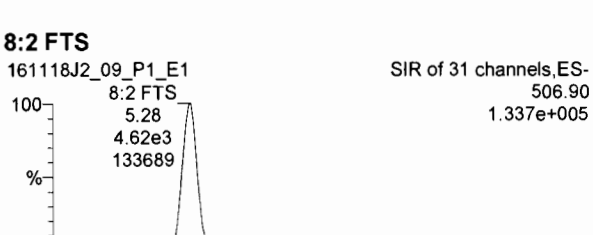

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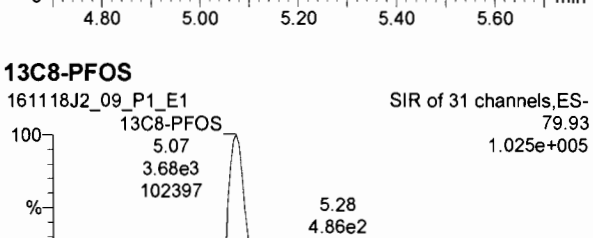

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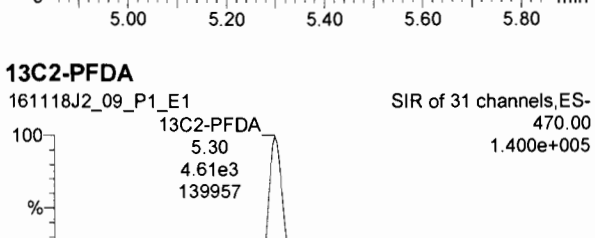

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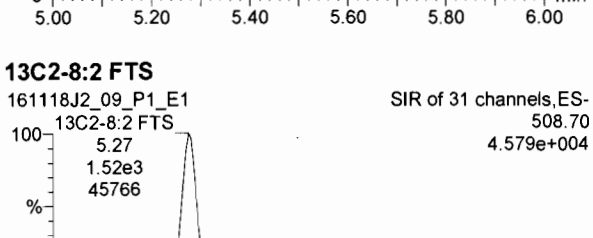

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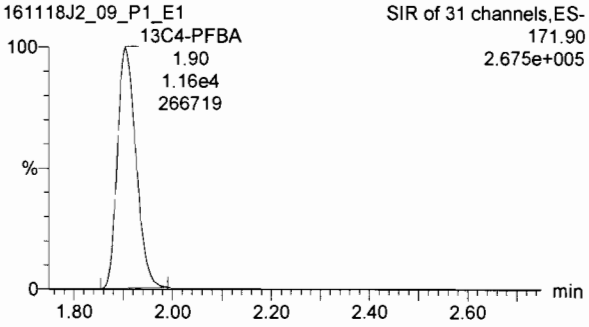

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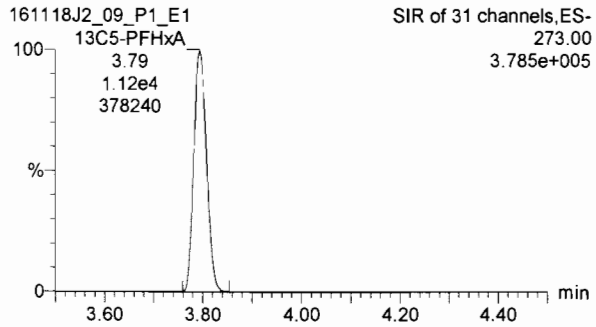

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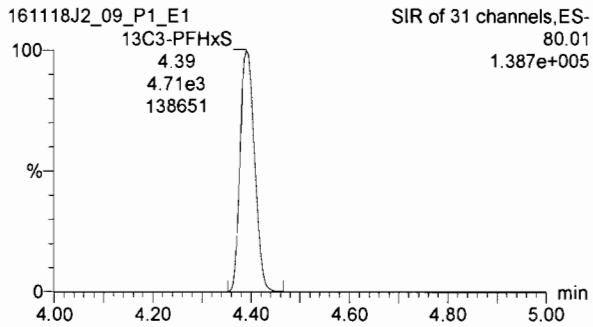

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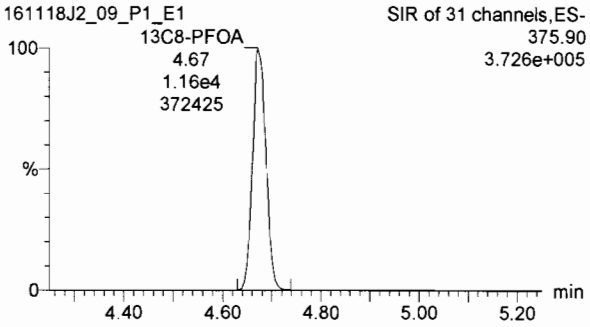

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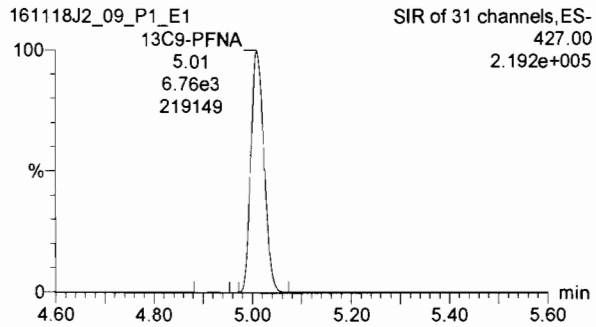

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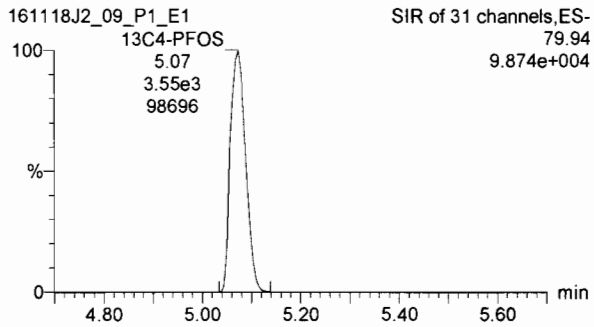

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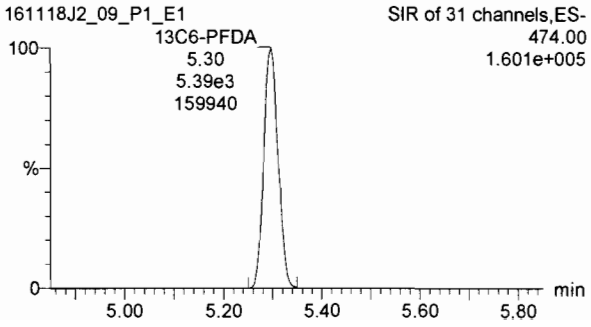

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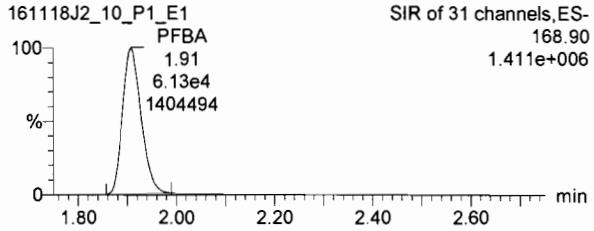

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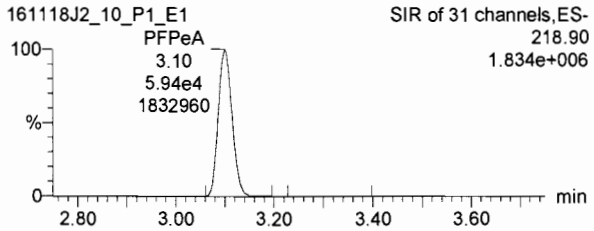

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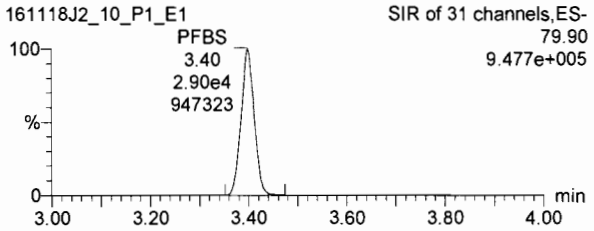

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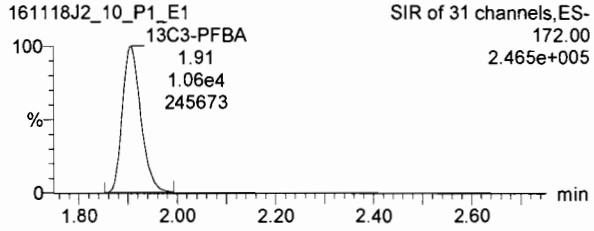

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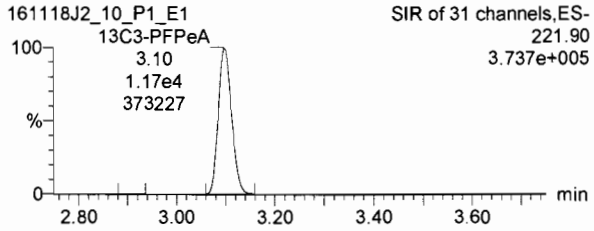

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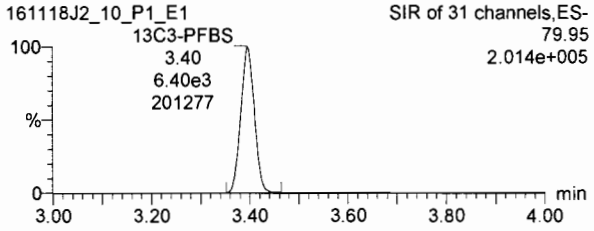

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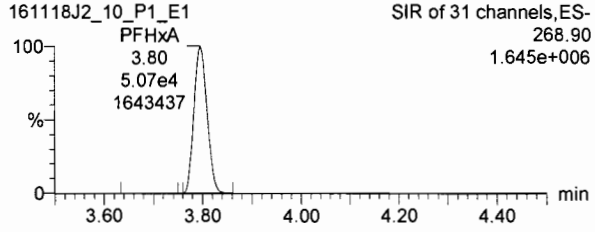

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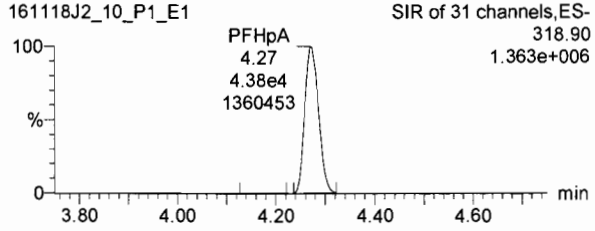

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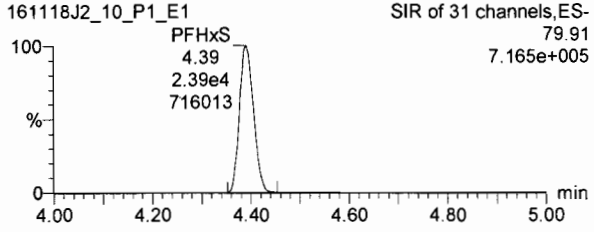

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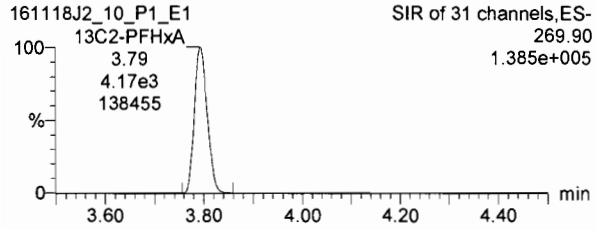

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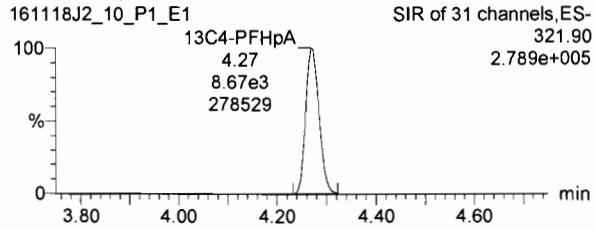

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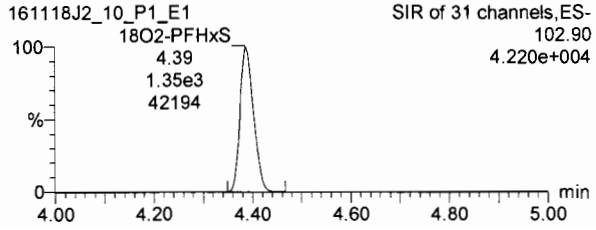

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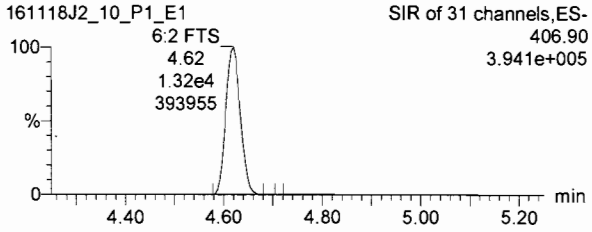

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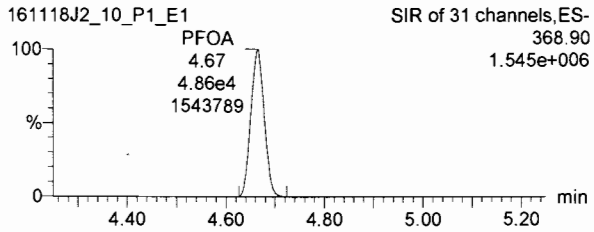

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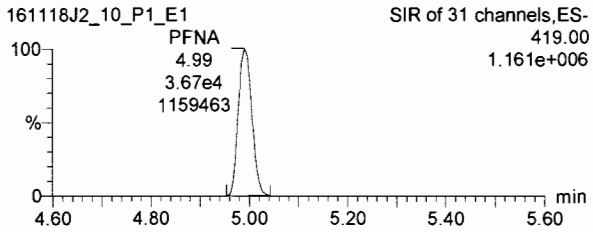

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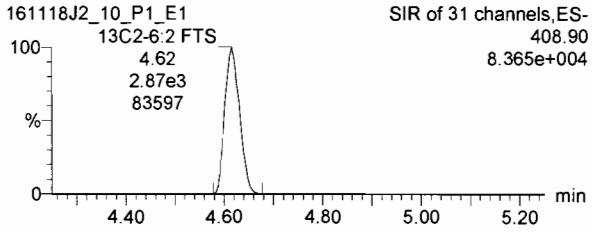

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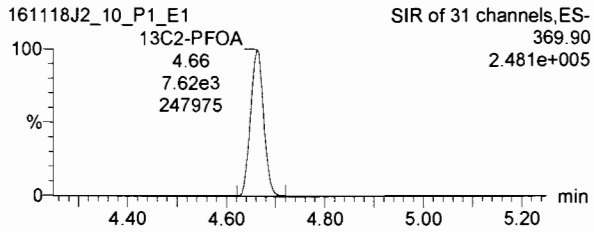

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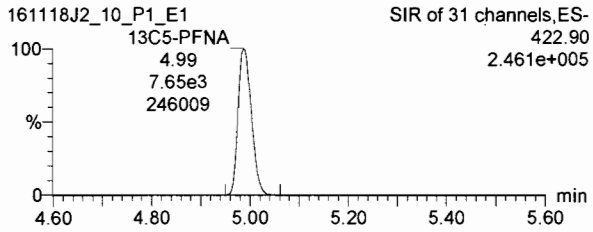

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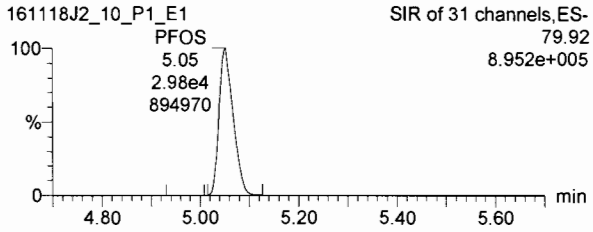

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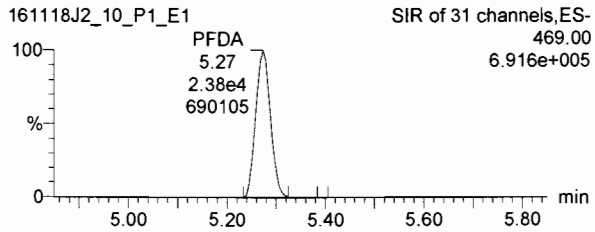

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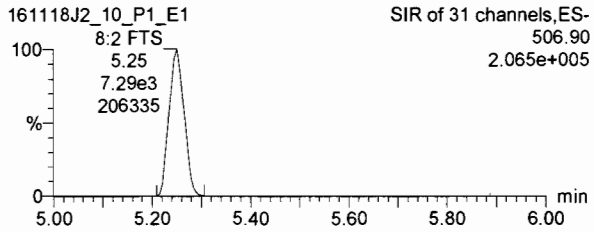

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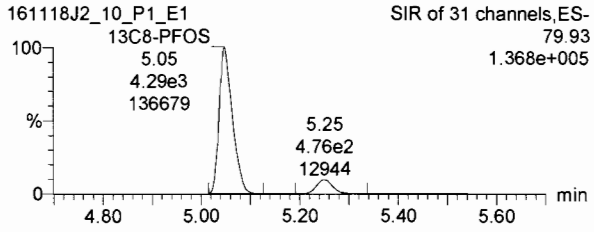

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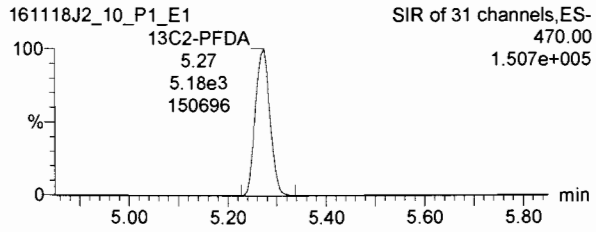

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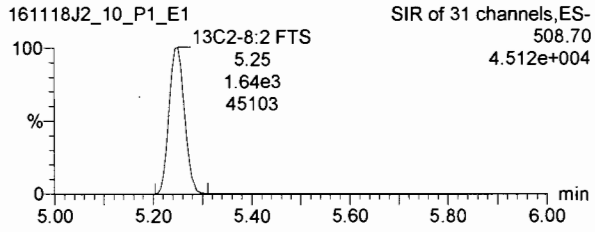

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Name: 161118J2_10.wiff, Date: 18-Nov-2016, Time: 18:51:58, ID: ST161118J2-9 PFC C4.5 16K1722, Description: PFC C4.5 16K1722 A

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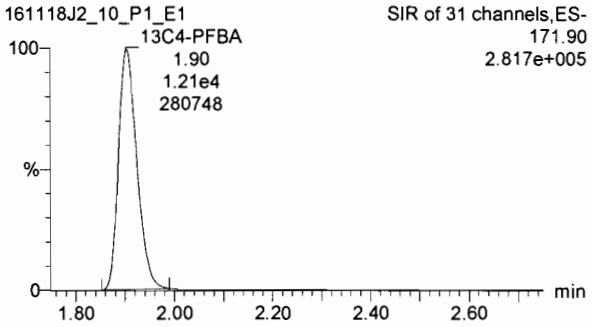

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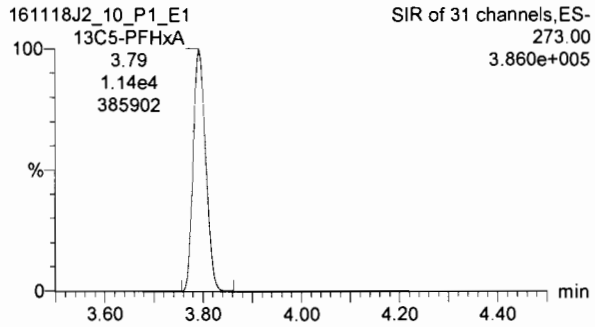

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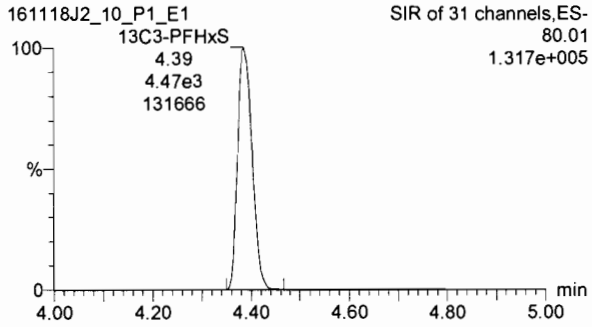

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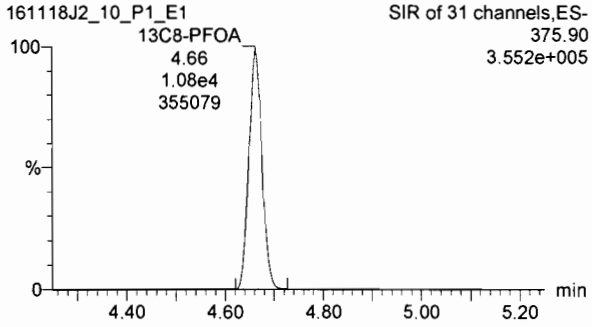

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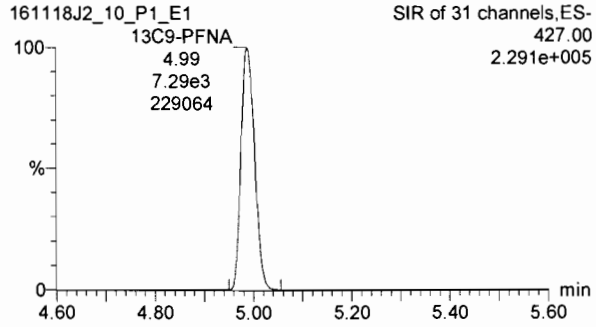

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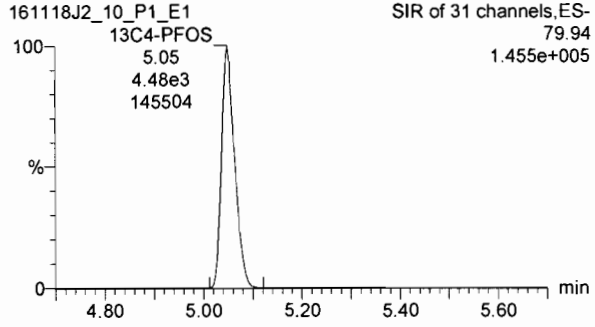

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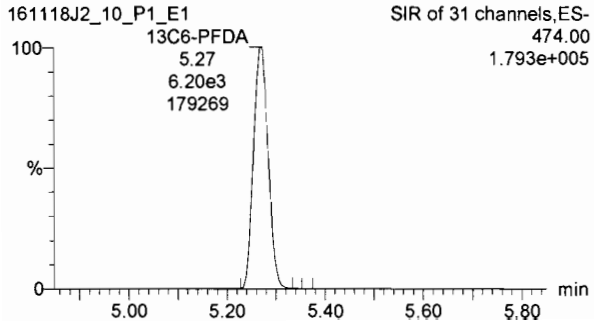

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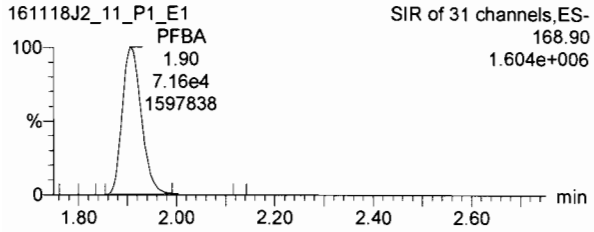

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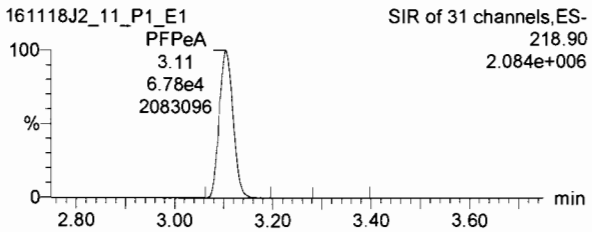

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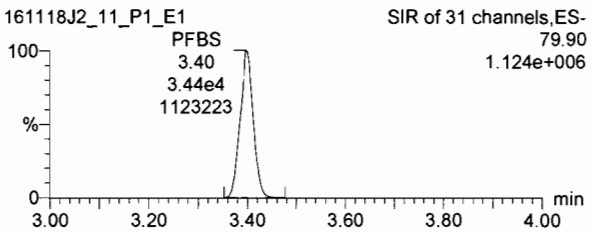

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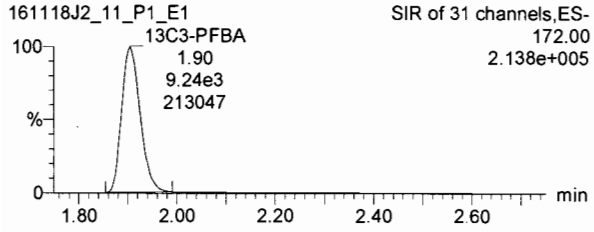

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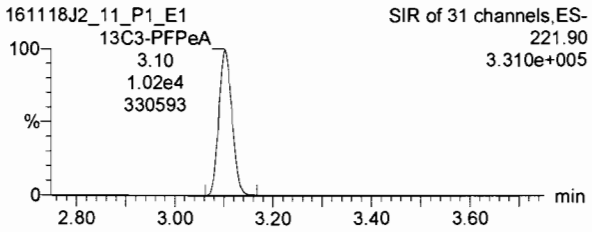

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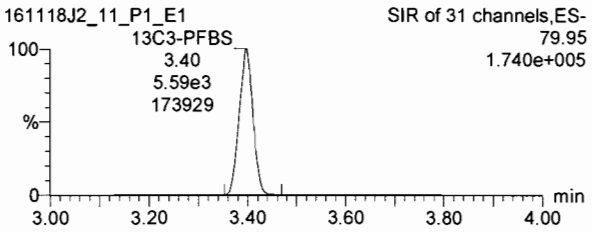

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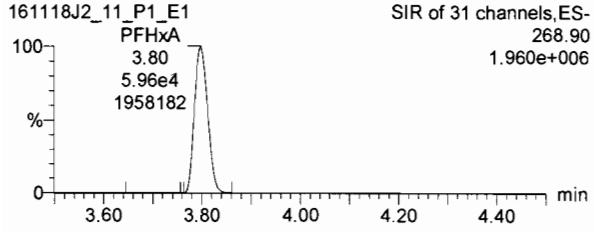

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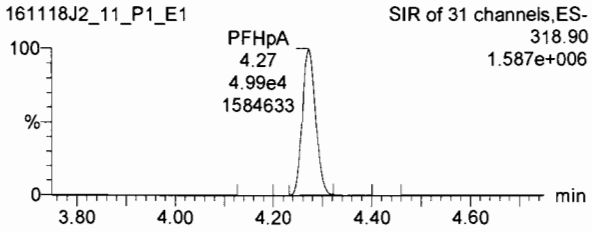

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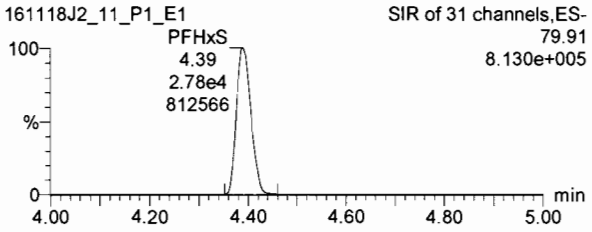

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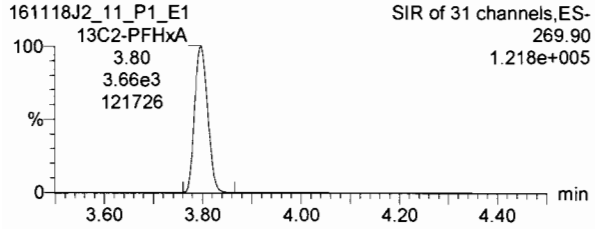

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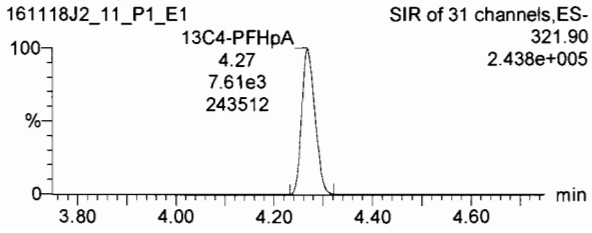

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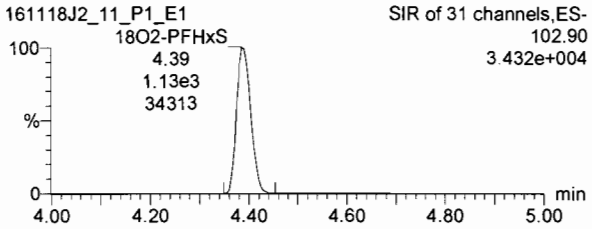

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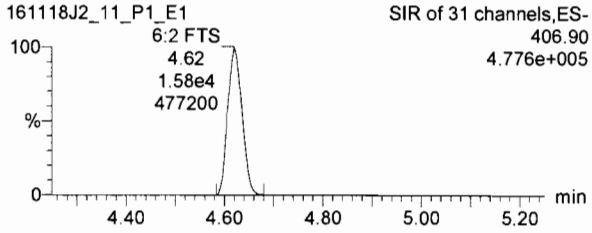
6:2 FTS



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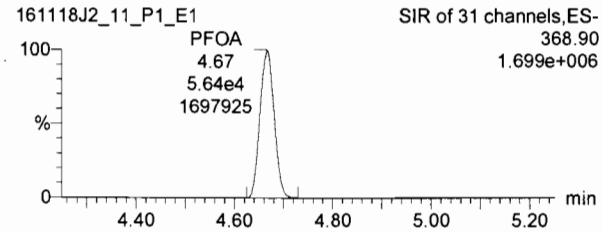

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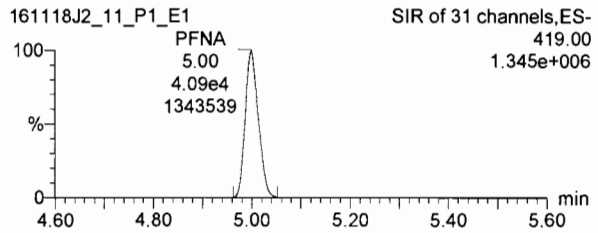

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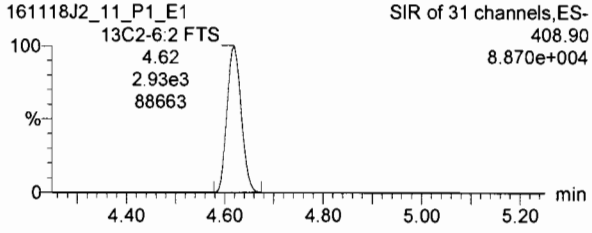

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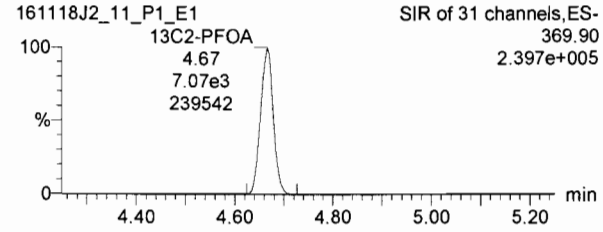

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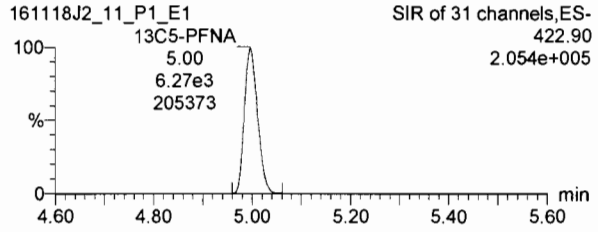

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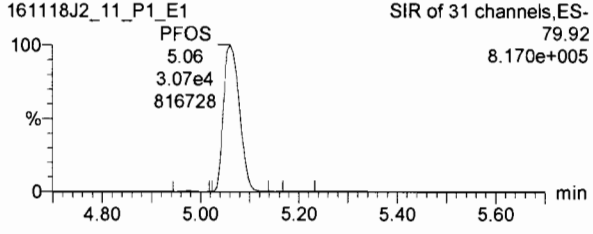

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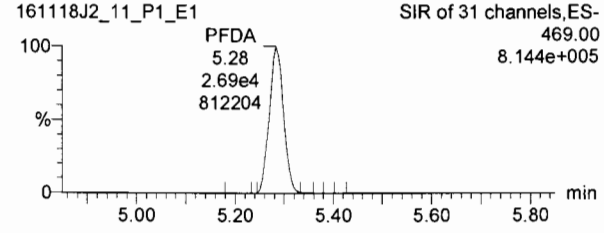

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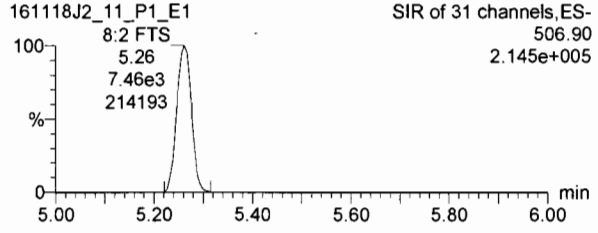
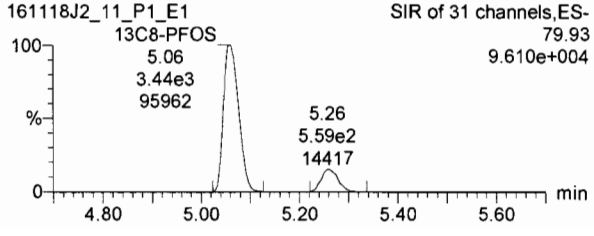


13C8-PFOS



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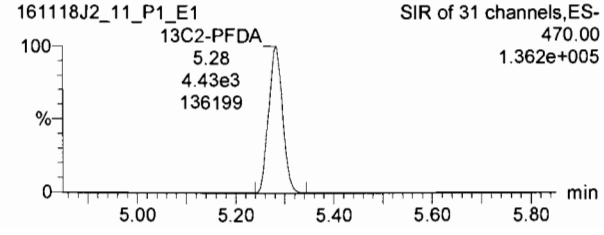
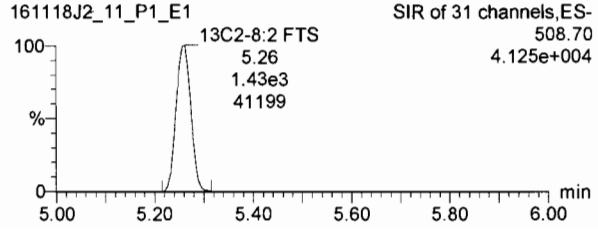


13C2-8:2 FTS



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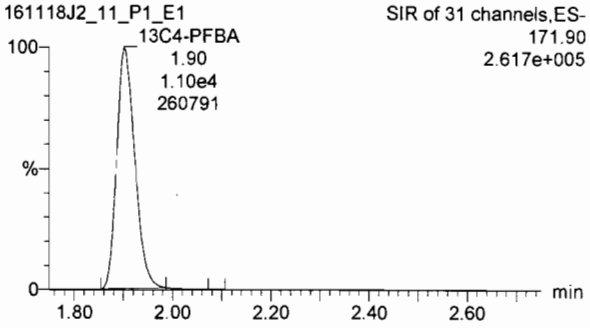
13C4-PFBA



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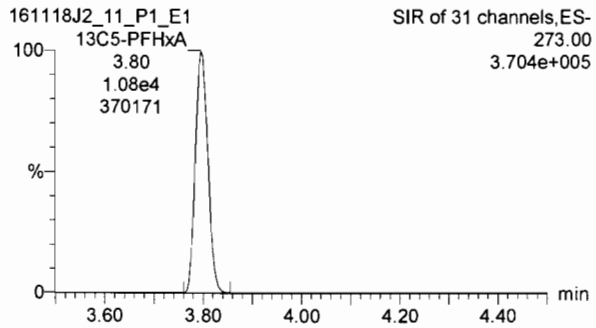

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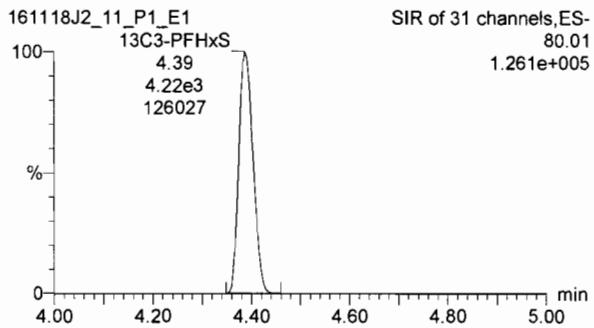

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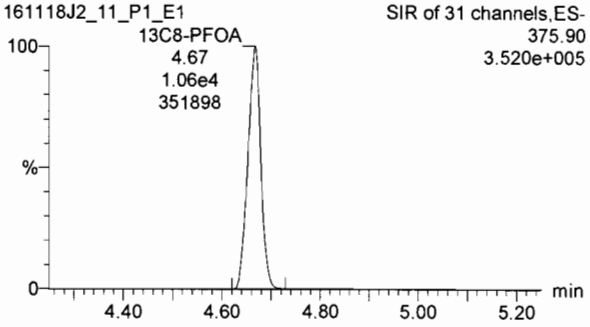

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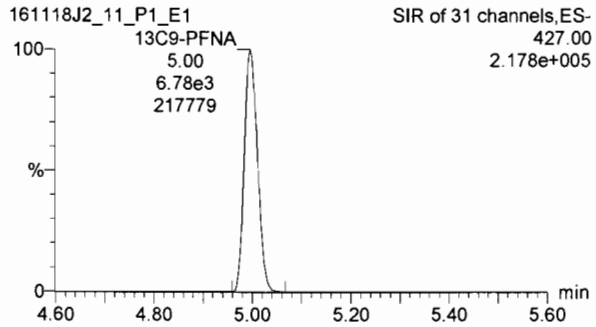
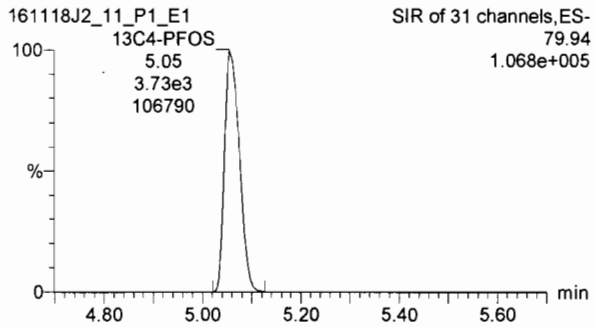
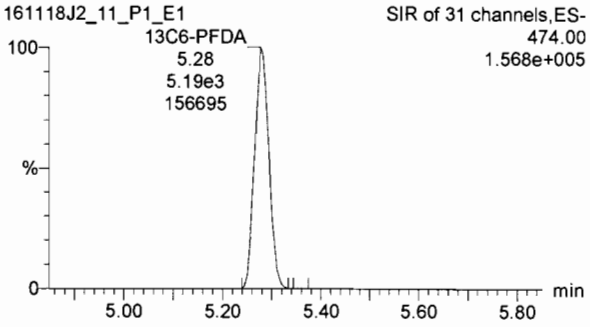


13C4-PFOS



13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161118J2\161118J2_13.qld

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Calibration: U:\Q2.pro\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161118J2_13.wiff, Date: 18-Nov-2016, Time: 19:28:40, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1	PFBA	168.90	2.63e4	1.10e4		1.000	1.91	30.4	121.4
2	2	PFPeA	218.90	2.00e4	1.26e4		1.000	3.11	23.1	92.5
3	3	PFBS	79.90	1.17e4	6.92e3		1.000	3.40	27.2	108.7
4	4	PFHxA	268.90	2.22e4	4.28e3		1.000	3.80	31.2	124.8
5	5	PFHpA	318.90	1.84e4	8.37e3		1.000	4.28	33.2	132.8 (A)
6	6	PFHxS	79.91	6.70e3	1.12e3		1.000	4.40	22.9	91.7
7	7	6:2 FTS	406.90	4.86e3	2.41e3		1.000	4.63	26.6	106.3
8	8	PFOA	368.90	1.49e4	6.69e3		1.000	4.67	22.6	90.3
9	9	PFNA	419.00	1.14e4	5.85e3		1.000	5.01	29.8	119.2
10	10	PFOS	79.92	5.24e3	2.56e3		1.000	5.06	22.2	88.9
11	11	PFDA	469.00	4.84e3	2.16e3		1.000	5.29	28.5	113.9
12	12	8:2 FTS	506.90	1.30e3	6.66e2		1.000	5.27	27.4	109.5
13	13	13C3-PFBA	172.00	1.10e4	1.26e4	0.867	1.000	1.91	12.6	100.4
14	14	13C3-PFPeA	221.90	1.26e4	1.21e4	0.994	1.000	3.11	13.0	104.1
15	15	13C3-PFBS	79.95	6.92e3	1.21e4	0.564	1.000	3.40	12.6	101.1
16	16	13C2-PFHxA	269.90	4.28e3	1.21e4	0.907	1.000	3.80	4.86	97.1
17	17	13C4-PFHpA	321.90	8.37e3	1.21e4	0.742	1.000	4.28	11.6	92.9
18	18	18O2-PFHxS	102.90	1.12e3	4.29e3	0.271	1.000	4.40	12.0	96.2
19	19	13C2-6:2 FTS	408.90	2.41e3	1.00e4	0.224	1.000	4.63	13.4	107.3
20	20	13C2-PFOA	369.90	6.69e3	1.00e4	0.651	1.000	4.67	12.8	102.2
21	21	13C5-PFNA	422.90	5.85e3	5.95e3	1.002	1.000	5.00	12.3	98.2
22	22	13C8-PFOS	79.93	2.56e3	2.54e3	0.950	1.000	5.06	13.3	106.0
23	23	13C2-PFDA	470.00	2.16e3	2.56e3	0.827	1.000	5.29	12.8	102.1
24	24	13C2-8:2 FTS	508.70	6.66e2	2.56e3	0.260	1.000	5.26	12.5	100.0
25	25	13C4-PFBA	171.90	1.26e4	1.26e4	1.000	1.000	1.91	12.5	100.0
26	26	13C5-PFHxA	273.00	1.21e4	1.21e4	1.000	1.000	3.80	12.5	100.0
27	27	13C3-PFHxS	80.01	4.29e3	4.29e3	1.000	1.000	4.39	12.5	100.0
28	28	13C8-PFOA	375.90	1.00e4	1.00e4	1.000	1.000	4.67	12.5	100.0
29	29	13C4-PFOS	79.94	2.54e3	2.54e3	1.000	1.000	5.06	12.5	100.0
30	30	13C9-PFNA	427.00	5.95e3	5.95e3	1.000	1.000	5.00	12.5	100.0
31	31	13C8-PFDA	474.00	2.56e3	2.56e3	1.000	1.000	5.28	12.5	100.0

75-125

(A) outside method limits.
AC 11/21/16

Vista Analytical Laboratory Q2

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Printed: Monday, November 21, 2016 15:51:59 Pacific Standard Time

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Calibration: U:\Q2.pro\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161118J2_13.wiff, Date: 18-Nov-2016, Time: 19:28:40, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

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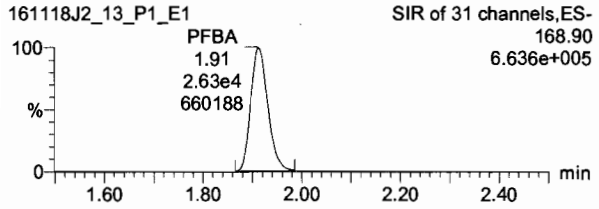
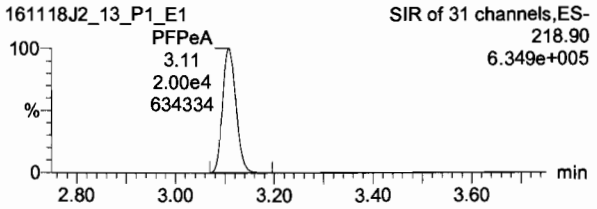
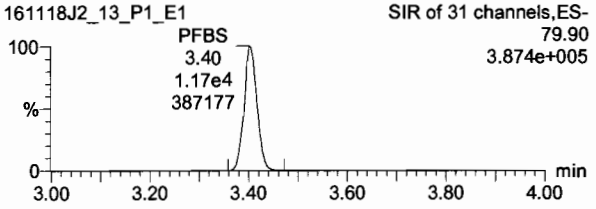


PFPeA



PFBS



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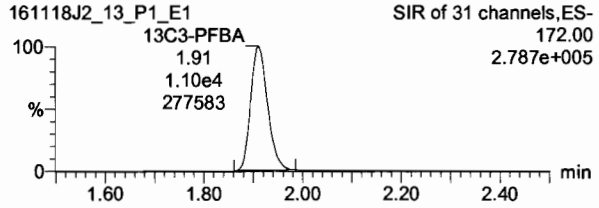

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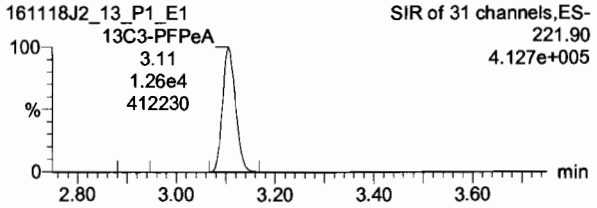

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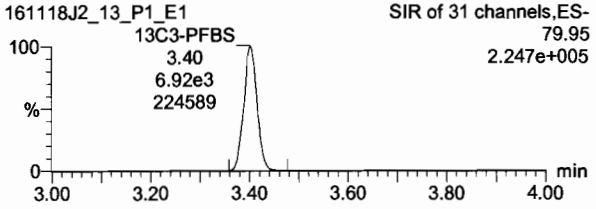

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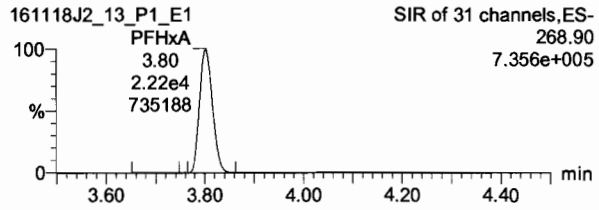

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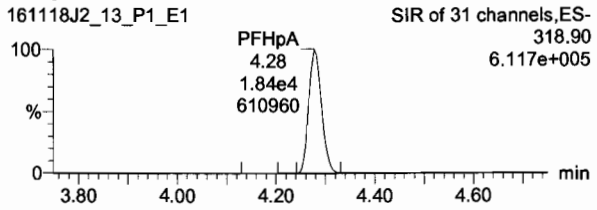
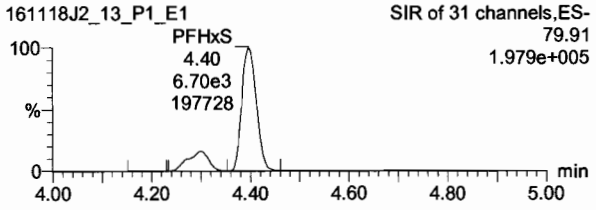


PFHxS



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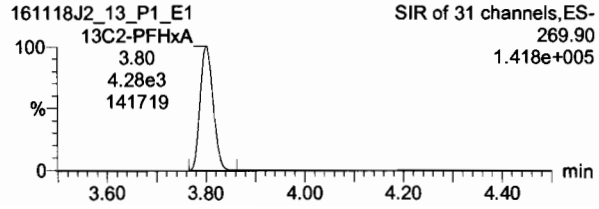
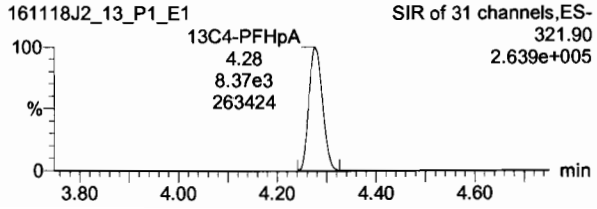
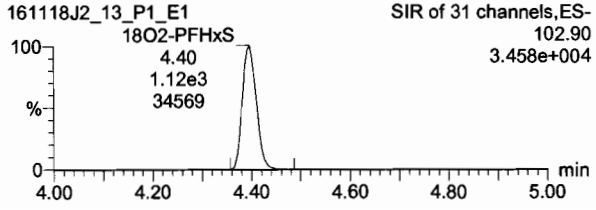


13C4-PFHpA



18O2-PFHxS



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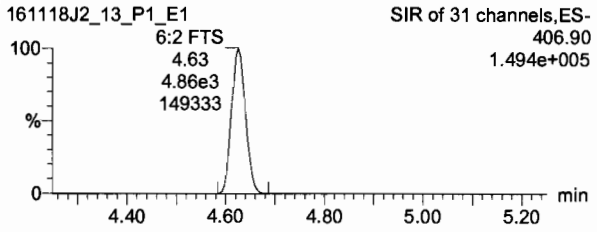

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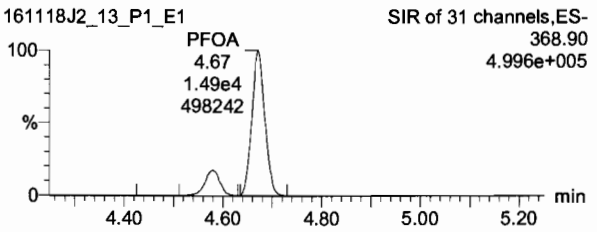

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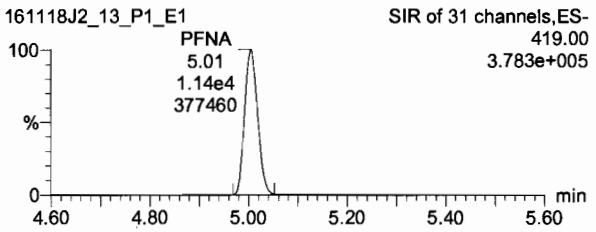

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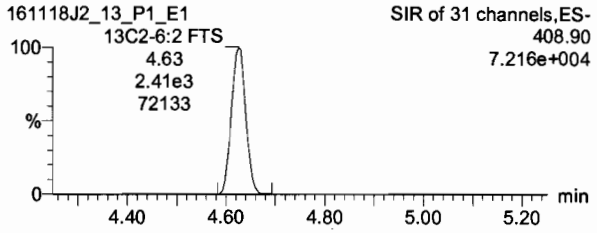

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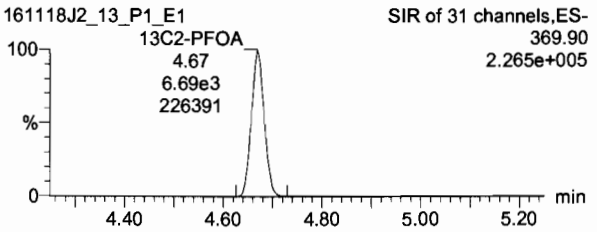

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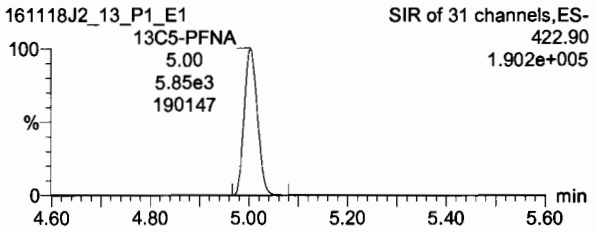
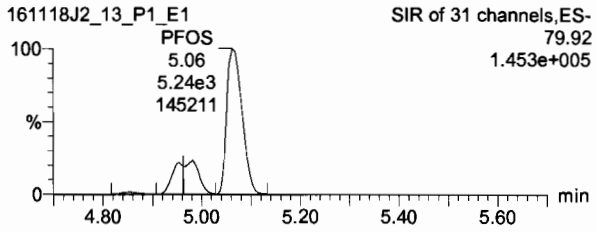


PFOS



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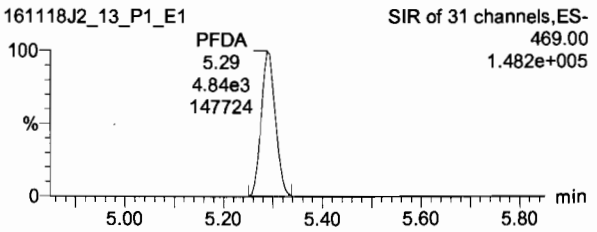

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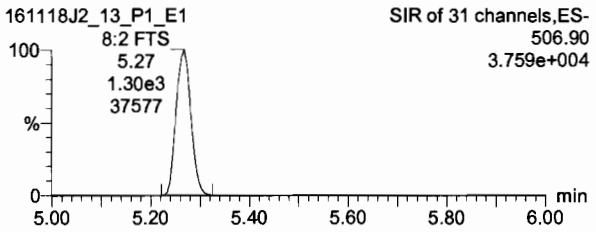
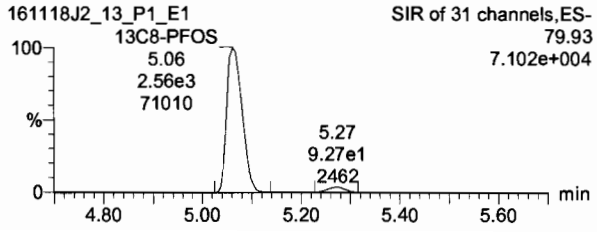
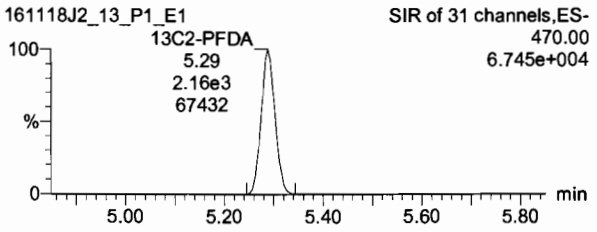


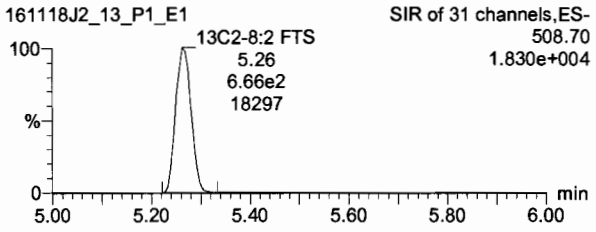
13C8-PFOS



13C2-PFDA



13C2-8:2 FTS



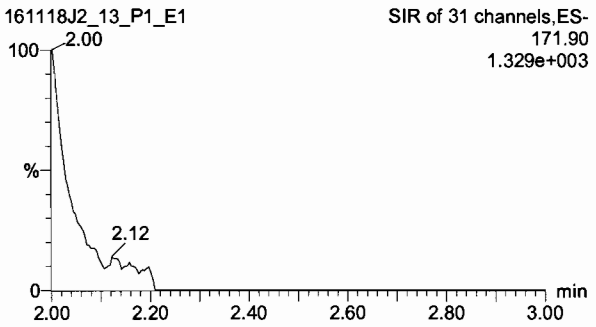
Vista Analytical Laboratory Q2

Dataset: Untitled

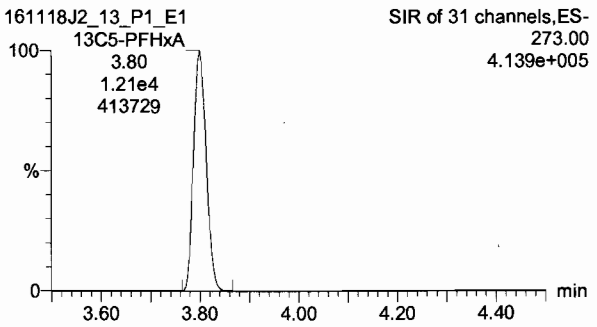
Last Altered: Monday, November 21, 2016 15:51:43 Pacific Standard Time
Printed: Monday, November 21, 2016 15:51:59 Pacific Standard Time

Name: 161118J2_13.wiff, Date: 18-Nov-2016, Time: 19:28:40, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

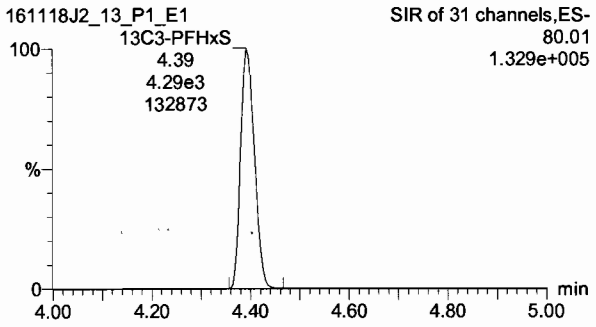
13C4-PFBA



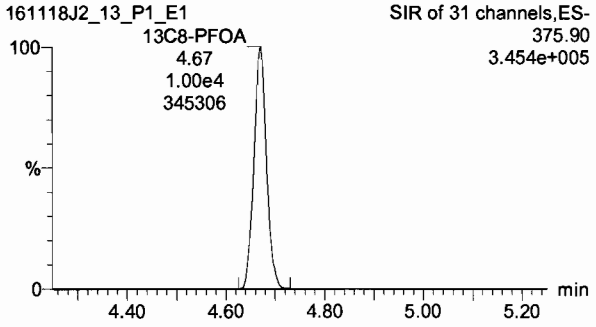
13C5-PFHxA



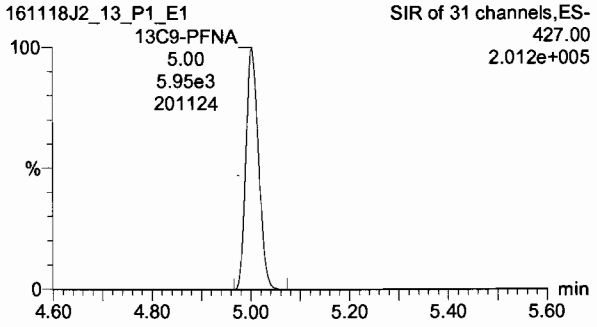
13C3-PFHxS



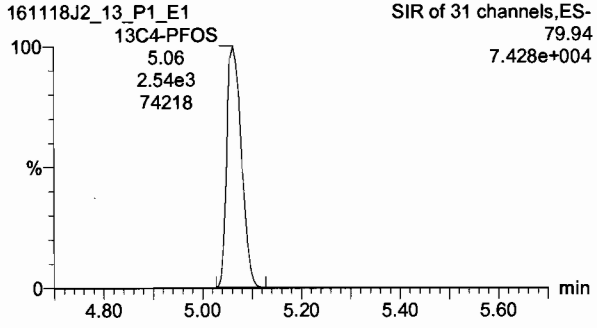
13C8-PFOA



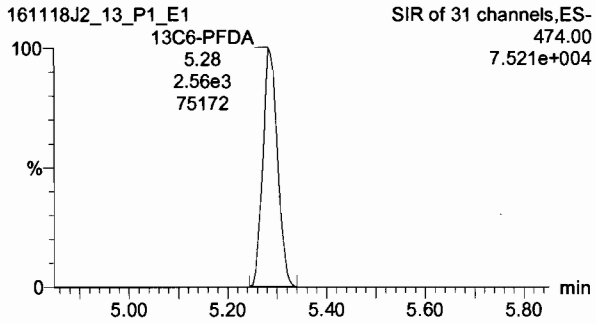
13C9-PFNA



13C4-PFOS



13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\Q2.PRO\Results\161121J4\161121J4_04.qld

Last Altered: Tuesday, November 22, 2016 08:55:40 Pacific Standard Time
Printed: Tuesday, November 22, 2016 10:09:28 Pacific Standard Time

Method: U:\Q2.pro\MethDB\PFC List 18_A No4-2FTS_161118.mdb 19 Nov 2016 12:55:02
Calibration: U:\Q2.pro\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161121J4_04.wiff, Date: 21-Nov-2016, Time: 12:25:30, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1	PFBA	168.90	2.81e4	1.15e4		1.000	1.85	30.9	123.7
2	2	PFPeA	218.90	2.17e4	1.38e4		1.000	3.07	22.8	91.2
3	3	PFBS	79.90	1.26e4	7.52e3		1.000	3.38	27.0	108.0
4	4	PFHxA	268.90	2.43e4	4.88e3		1.000	3.78	30.0	119.9
5	5	PFHpA	318.90	2.15e4	1.04e4		1.000	4.25	31.2	124.9
6	6	PFHxS	79.91	8.48e3	1.52e3		1.000	4.37	21.4	105.5 ~~85.0~~ (A)
7	7	6:2 FTS	406.90	5.93e3	2.88e3		1.000	4.60	27.2	109.0
8	8	PFOA	368.90	1.80e4	8.36e3		1.000	4.65	21.8	110.4 ~~87.2~~ (A)
9	9	PFNA	419.00	1.28e4	6.34e3		1.000	4.97	30.8	123.3
10	10	PFOS	79.92	5.20e3	2.47e3		1.000	5.03	22.8	115.9 ~~91.3~~ (A)
11	11	PFDA	469.00	4.19e3	1.94e3		1.000	5.26	27.4	109.6
12	12	8:2 FTS	506.90	1.24e3	6.02e2		1.000	5.23	28.9	115.5
13	13	13C3-PFBA	172.00	1.15e4	1.29e4	0.867	1.000	1.85	12.9	103.5
14	14	13C3-PFPeA	221.90	1.38e4	1.38e4	0.994	1.000	3.07	12.5	100.3
15	15	13C3-PFBS	79.95	7.52e3	1.38e4	0.564	1.000	3.37	12.0	96.3
16	16	13C2-PFHxA	269.90	4.88e3	1.38e4	0.907	1.000	3.78	4.86	97.2
17	17	13C4-PFHpA	321.90	1.04e4	1.38e4	0.742	1.000	4.25	12.7	101.4
18	18	18O2-PFHxS	102.90	1.52e3	5.28e3	0.271	1.000	4.37	13.2	106.0
19	19	13C2-6:2 FTS	408.90	2.88e3	9.25e3	0.224	1.000	4.60	17.4	139.0
20	20	13C2-PFOA	369.90	8.36e3	9.25e3	0.651	1.000	4.64	17.3	138.8
21	21	13C5-PFNA	422.90	6.34e3	6.66e3	1.002	1.000	4.97	11.9	94.9
22	22	13C8-PFOS	79.93	2.47e3	2.59e3	0.950	1.000	5.03	12.6	100.6
23	23	13C2-PFDA	470.00	1.94e3	2.51e3	0.827	1.000	5.26	11.6	93.1
24	24	13C2-8:2 FTS	508.70	6.02e2	2.51e3	0.260	1.000	5.23	11.5	92.1
25	25	13C4-PFBA	171.90	1.29e4	1.29e4	1.000	1.000	1.85	12.5	100.0
26	26	13C5-PFHxA	273.00	1.38e4	1.38e4	1.000	1.000	3.78	12.5	100.0
27	27	13C3-PFHxS	80.01	5.28e3	5.28e3	1.000	1.000	4.37	12.5	100.0
28	28	13C8-PFOA	375.90	9.25e3	9.25e3	1.000	1.000	4.64	12.5	100.0
29	29	13C4-PFOS	79.94	2.59e3	2.59e3	1.000	1.000	5.03	12.5	100.0
30	30	13C9-PFNA	427.00	6.66e3	6.66e3	1.000	1.000	4.97	12.5	100.0
31	31	13C8-PFDA	474.00	2.51e3	2.51e3	1.000	1.000	5.25	12.5	100.0

75-125

(A) % recovery based on linear isomer only.

AC 11/22/16

Printing Time: 10:01:36
Printing Date: Tuesday, November 22, 2016

	Sample Name	Acquisition Date	Sample ID	Sample Comment
1	161121J4_01	11/21/2016 11:48:45	IPA	IPA
2	161121J4_02	11/21/2016 12:01:00	ST161120J2-1 PFC C3.5 16K1421	PFC C3.5 16K1421 A
3	161121J4_03	11/21/2016 12:13:14	IPA	IPA
4	161121J4_04	11/21/2016 12:25:30	SS161118J2-1 PFC SSS 16J1810	PFC SSS 16J1810 A
5	161121J4_05	11/21/2016 12:37:43	IPA	IPA
6	161121J4_06	11/21/2016 12:49:58	B6K0124-BS1	OPR
7	161121J4_07	11/21/2016 13:02:12	B6K0124-BSD1	OPR Dup
8	161121J4_08	11/21/2016 13:14:25	IPA	IPA
9	161121J4_09	11/21/2016 13:26:39	B6K0124-BLK1	Method Blank
10	161121J4_10	11/21/2016 13:38:53	IPA	IPA
11	161121J4_11	11/21/2016 13:51:06	1601447-01	OF-INF01-111116
12	161121J4_12	11/21/2016 14:03:22	1601447-02	OF-GAC-EFF01-111116
13	161121J4_13	11/21/2016 14:15:40	IPA	IPA
14	161121J4_14	11/21/2016 14:27:55	ST161120J2-2 PFC C3.5 16K1421	PFC C3.5 16K1421 A
15	161121J4_15	11/21/2016 14:40:09	IPA	IPA

Vista Analytical Laboratory Q2

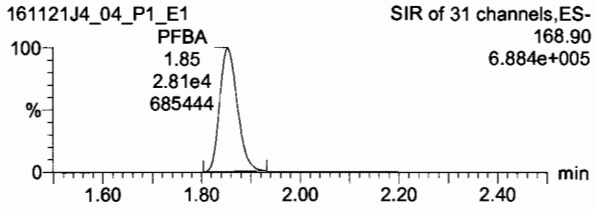
Dataset: Untitled

Last Altered: Tuesday, November 22, 2016 08:53:22 Pacific Standard Time
Printed: Tuesday, November 22, 2016 08:53:36 Pacific Standard Time

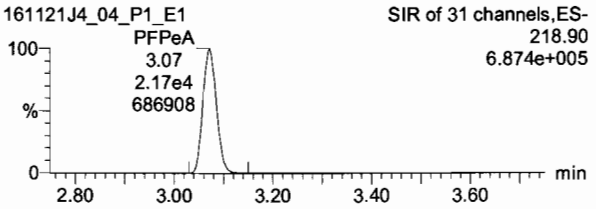
Method: U:\Q2.pro\MethDB\PFC List 18_A No4-2FTS_161118.mdb 19 Nov 2016 12:55:02
Calibration: U:\Q2.pro\CurveDB\C18_VAL-PFC_Q2_11-18-16_L18_A.cdb 19 Nov 2016 12:55:25

Name: 161121J4_04.wiff, Date: 21-Nov-2016, Time: 12:25:30, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

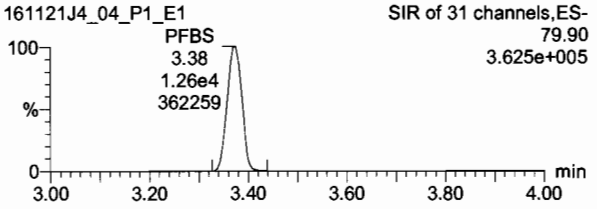
PFBA



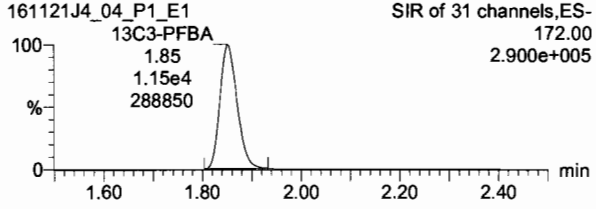
PFPeA



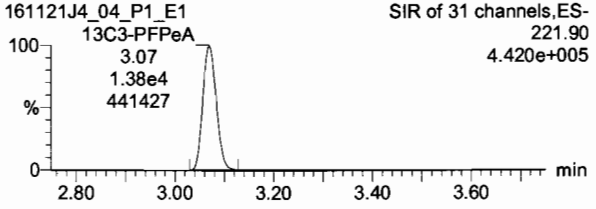
PFBS



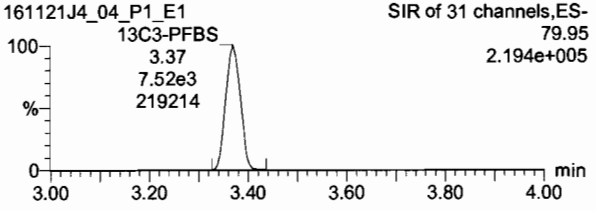
13C3-PFBA



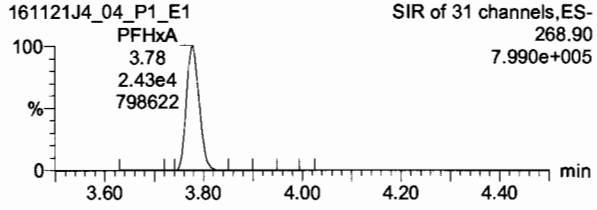
13C3-PFPeA



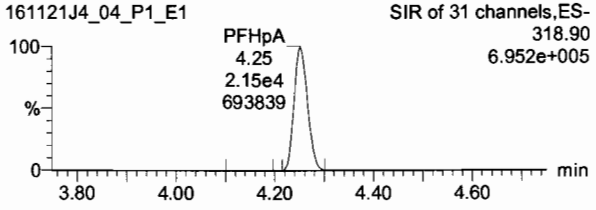
13C3-PFBS



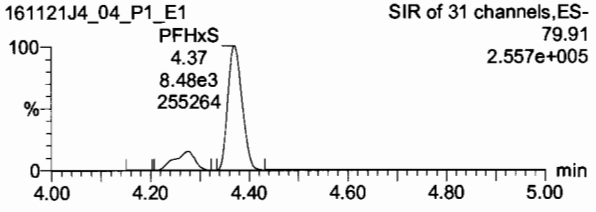
PFHxA



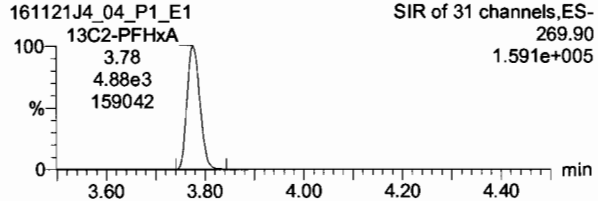
PFHpA



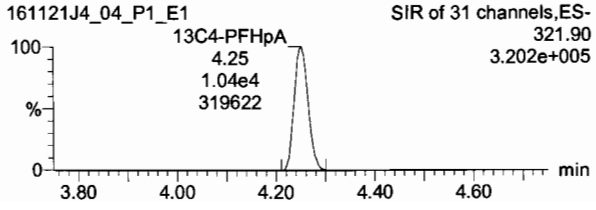
PFHxS



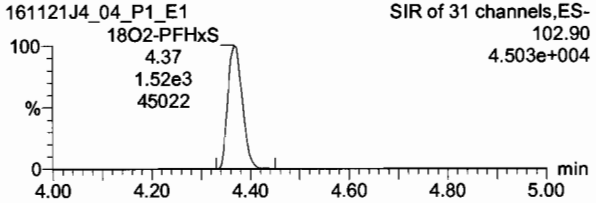
13C2-PFHxA

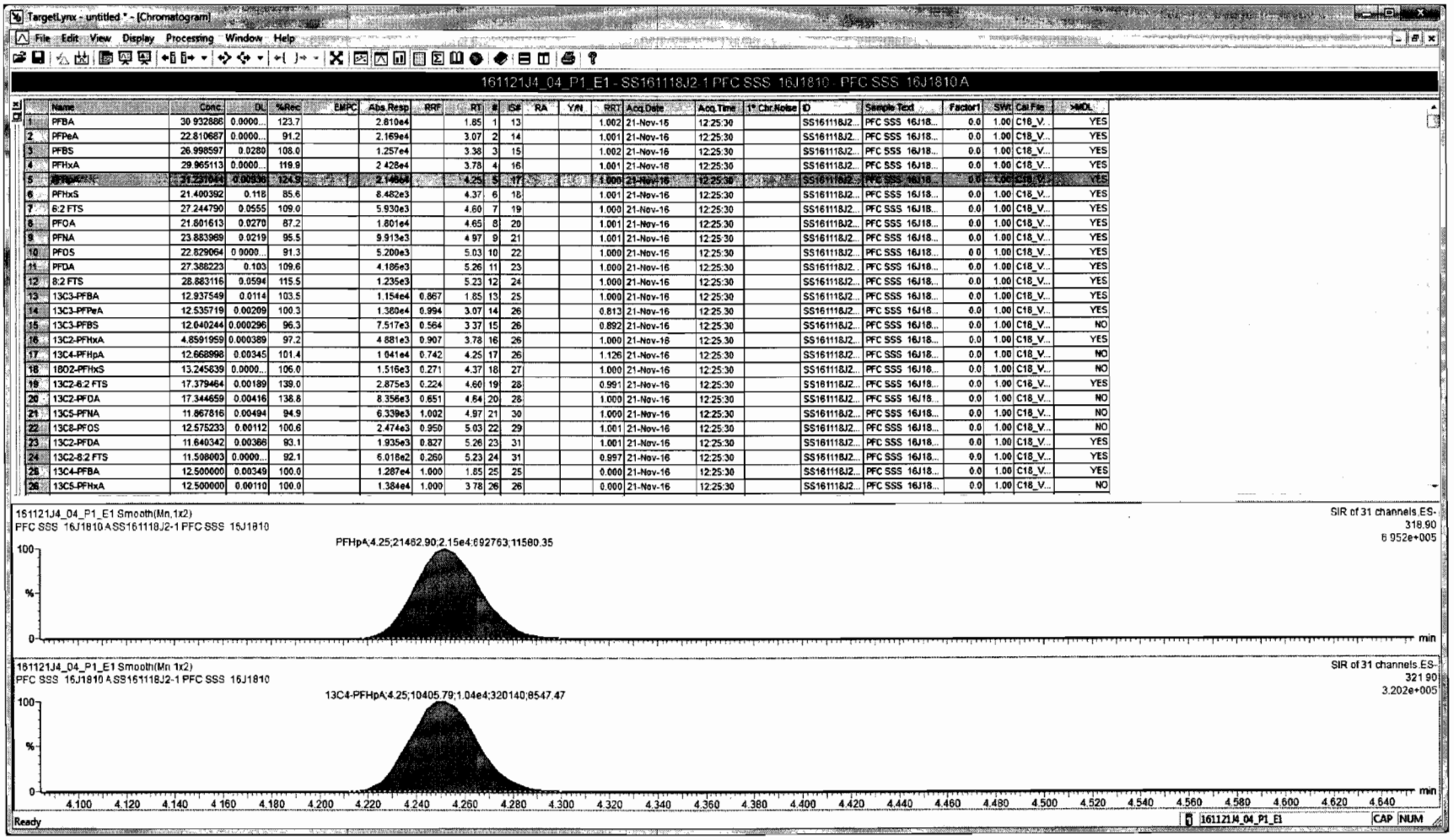


13C4-PFHpA



18O2-PFHxS





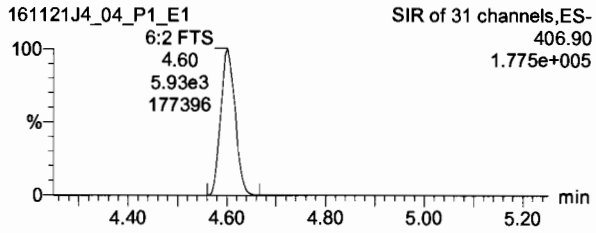
	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID	Sample Text	Factor1	SWt	Cal.File	>MDL
1	PFBA	30.932886	0.0000...	123.7		2.810e4		1.85	1	13			1.002	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
2	PFPeA	22.810687	0.0000...	91.2		2.169e4		3.07	2	14			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
3	PFBS	26.998597	0.0280	108.0		1.257e4		3.38	3	15			1.002	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
4	PFHxA	29.965113	0.0000...	119.9		2.428e4		3.78	4	16			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
5	PFHpA	31.231040	0.00936	124.9		2.148e4		4.25	5	17			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
6	PFHxS	21.400392	0.118	85.6		8.482e3		4.37	6	18			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
7	6:2 FTS	27.244790	0.0555	109.0		5.930e3		4.60	7	19			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
8	PFOA	21.801613	0.0270	87.2		1.801e4		4.65	8	20			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
9	PFNA	23.883969	0.0219	95.5		9.913e3		4.97	9	21			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
10	PFDS	22.829064	0.0000...	91.3		5.200e3		5.03	10	22			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
11	PFDA	27.388223	0.103	109.6		4.186e3		5.26	11	23			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
12	8:2 FTS	28.883116	0.0594	115.5		1.235e3		5.23	12	24			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
13	13C3-PFBA	12.937549	0.0114	103.5		1.154e4	0.867	1.85	13	25			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
14	13C3-PFPeA	12.535719	0.00209	100.3		1.360e4	0.994	3.07	14	26			0.813	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
15	13C3-PFBS	12.040244	0.000296	96.3		7.517e3	0.564	3.37	15	26			0.892	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
16	13C2-PFHxA	4.8591959	0.000389	97.2		4.881e3	0.907	3.78	16	26			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
17	13C4-PFHpA	12.668998	0.00345	101.4		1.041e4	0.742	4.25	17	26			1.126	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
18	18O2-PFHxS	13.245639	0.0000...	106.0		1.516e3	0.271	4.37	18	27			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
19	13C2-6:2 FTS	17.379464	0.00189	139.0		2.875e3	0.224	4.60	19	28			0.991	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
20	13C2-PFDA	17.344659	0.00416	138.8		8.356e3	0.651	4.64	20	28			1.009	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
21	13C5-PFNA	11.867816	0.00494	94.9		6.339e3	1.002	4.97	21	30			1.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
22	13C8-PFOS	12.575233	0.00112	100.6		2.474e3	0.950	5.03	22	29			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO
23	13C2-PFDA	11.640342	0.00366	93.1		1.935e3	0.827	5.26	23	31			1.001	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
24	13C2-8:2 FTS	11.508003	0.0000...	92.1		6.018e2	0.260	5.23	24	31			0.997	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
25	13C4-PFBA	12.500000	0.00349	100.0		1.287e4	1.000	1.85	25	25			0.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	YES
26	13C5-PFHxA	12.500000	0.00110	100.0		1.384e4	1.000	3.78	26	26			0.000	21-Nov-16	12:25:30		SS161118J2...	PFC SSS 16J18...	0.0	1.00	C18_V...	NO

Dataset: Untitled

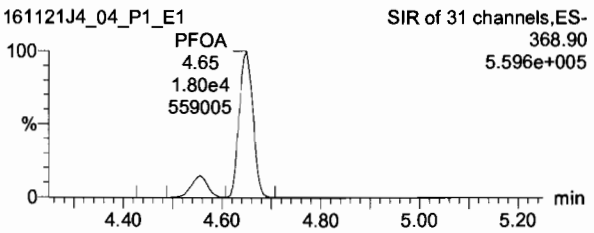
Last Altered: Tuesday, November 22, 2016 08:53:22 Pacific Standard Time
Printed: Tuesday, November 22, 2016 08:53:36 Pacific Standard Time

Name: 161121J4_04.wiff, Date: 21-Nov-2016, Time: 12:25:30, ID: SS161118J2-1 PFC SSS 16J1810, Description: PFC SSS 16J1810 A

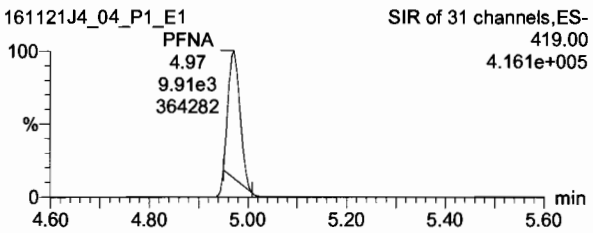
6:2 FTS



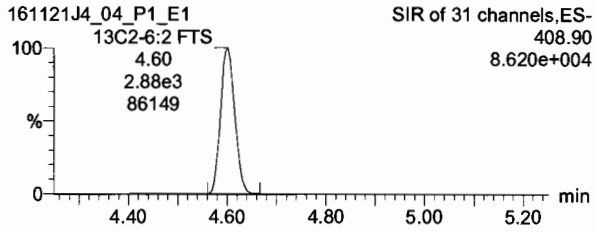
PFOA



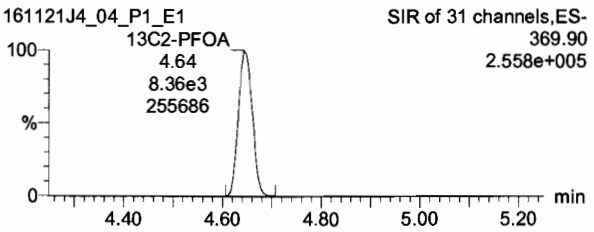
PFNA



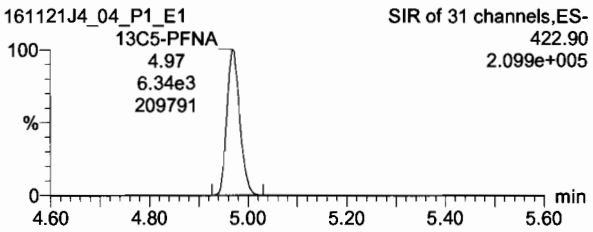
13C2-6:2 FTS



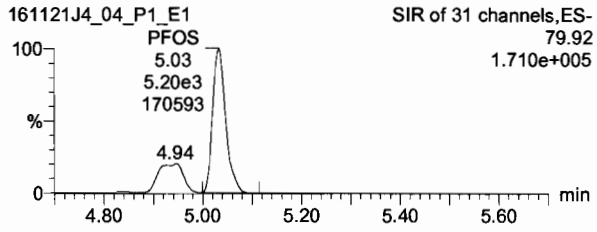
13C2-PFOA



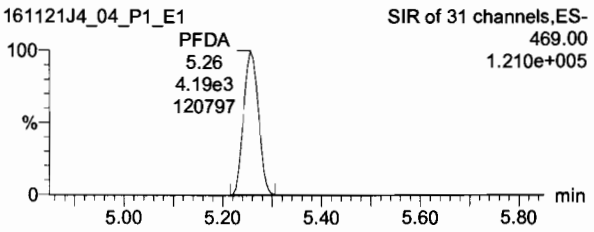
13C5-PFNA



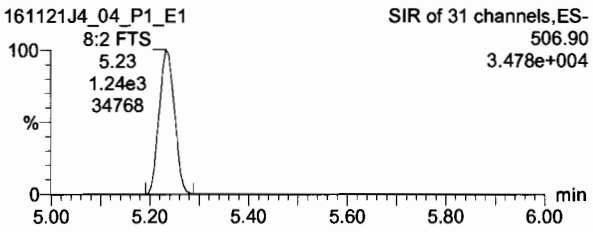
PFOS



PFDA



8:2 FTS



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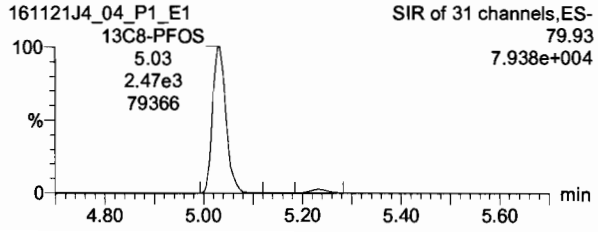

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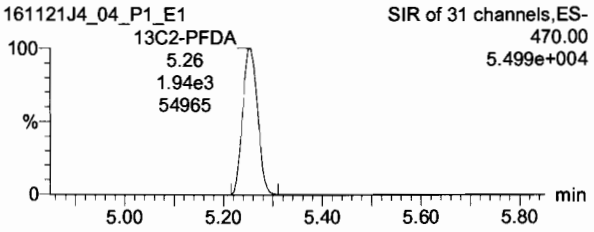
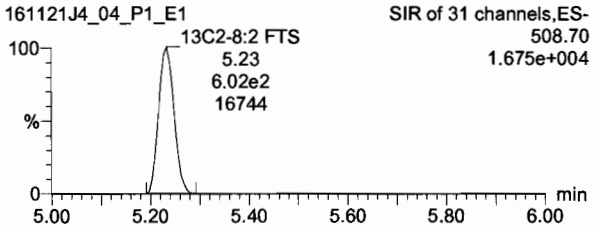
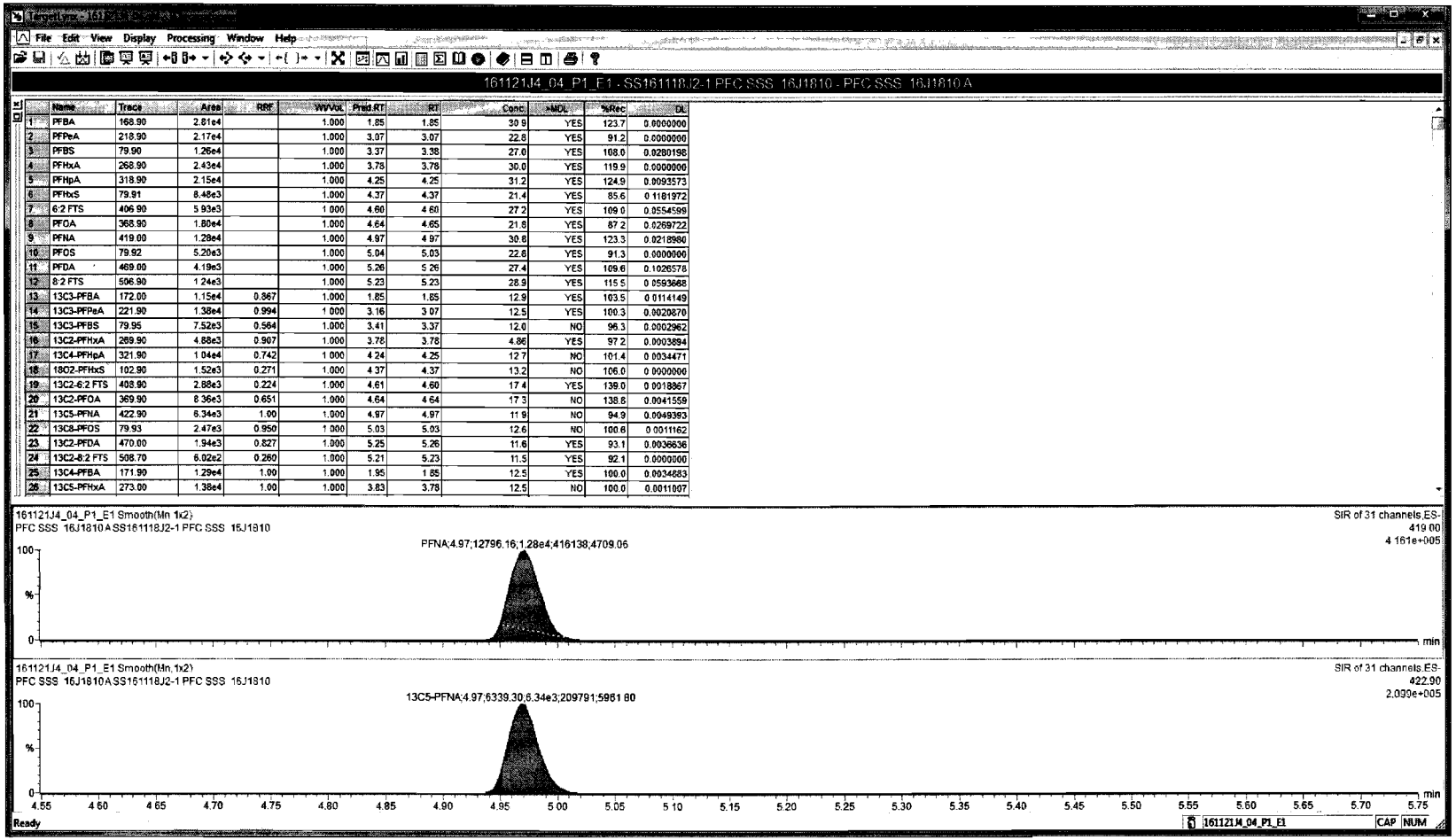


13C2-8:2 FTS





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1	PFBA	168.90	2.81e4		1.000	1.85	1.85	30 9	YES	123.7	0.0000000
2	PFPeA	218.90	2.17e4		1.000	3.07	3.07	22.8	YES	91.2	0.0000000
3	PFBS	79.90	1.26e4		1.000	3.37	3.38	27.0	YES	108.0	0.0280198
4	PFHxA	268.90	2.43e4		1.000	3.78	3.78	30.0	YES	119.9	0.0000000
5	PFHpA	318.90	2.15e4		1.000	4.25	4.25	31.2	YES	124.9	0.0093573
6	PFHxS	79.91	8.48e3		1.000	4.37	4.37	21.4	YES	85.6	0 1181972
7	6:2 FTS	406 90	5 93e3		1 000	4.60	4 60	27 2	YES	109 0	0.0554599
8	PFOA	368.90	1.80e4		1.000	4.64	4.65	21.8	YES	87 2	0.0269722
9	PFNA	419.00	1.28e4		1.000	4.97	4 97	30.8	YES	123.3	0.0218980
10	PFOS	79.92	5.20e3		1.000	5.04	5.03	22.8	YES	91.3	0.0000000
11	PFDA	469.00	4.19e3		1.000	5.26	5 26	27.4	YES	109.6	0.1026578
12	8:2 FTS	506.90	1 24e3		1.000	5.23	5.23	28.9	YES	115 5	0.0593668
13	13C3-PFBA	172.00	1.15e4	0.867	1.000	1.85	1.85	12.9	YES	103.5	0 0114149
14	13C3-PFPeA	221.90	1.38e4	0.994	1 000	3.16	3 07	12.5	YES	100.3	0.0020870
15	13C3-PFBS	79.95	7.52e3	0.564	1.000	3.41	3.37	12.0	NO	96.3	0.0002962
16	13C2-PFHxA	269.90	4.88e3	0.907	1.000	3.78	3.78	4.86	YES	97.2	0.0003894
17	13C4-PFHpA	321.90	1 04e4	0.742	1 000	4 24	4.25	12 7	NO	101.4	0 0034471
18	18O2-PFHxS	102.90	1.52e3	0.271	1.000	4 37	4.37	13.2	NO	106.0	0 0000000
19	13C2-6:2 FTS	408.90	2.88e3	0.224	1.000	4.61	4.60	17.4	YES	139.0	0 0018867
20	13C2-PFOA	369.90	8 36e3	0.651	1.000	4.64	4 64	17 3	NO	138.8	0.0041559
21	13C5-PFNA	422.90	6.34e3	1.00	1.000	4.97	4.97	11 9	NO	94.9	0.0049393
22	13C8-PFOS	79.93	2.47e3	0.950	1 000	5.03	5.03	12.6	NO	100.6	0 0011162
23	13C2-PFDA	470.00	1.94e3	0.827	1.000	5.25	5.26	11.6	YES	93.1	0.0036636
24	13C2-8:2 FTS	508.70	6.02e2	0.260	1.000	5.21	5.23	11.5	YES	92.1	0.0000000
25	13C4-PFBA	171.90	1.29e4	1.00	1.000	1.95	1 85	12.5	YES	100.0	0.0034883
26	13C5-PFHxA	273.00	1.38e4	1.00	1.000	3.83	3.78	12.5	NO	100.0	0.0011007

Vista Analytical Laboratory Q2

Dataset: Untitled

Last Altered: Tuesday, November 22, 2016 08:53:22 Pacific Standard Time
Printed: Tuesday, November 22, 2016 08:53:36 Pacific Standard Time

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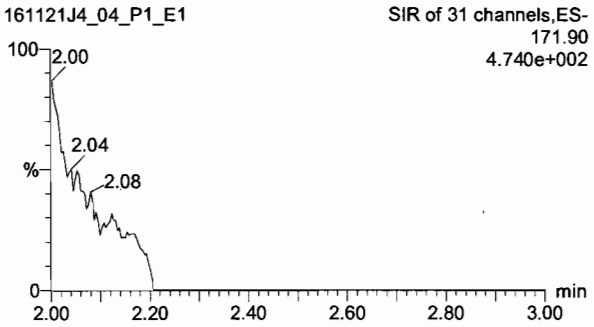
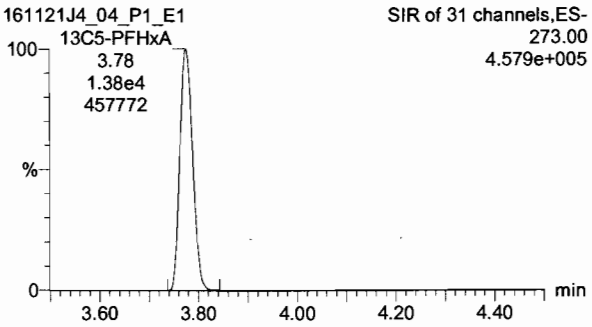
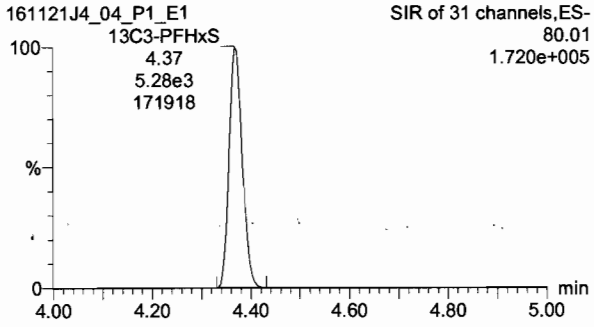
13C4-PFBA



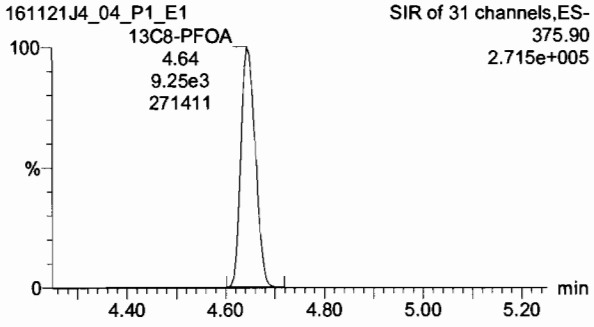
13C5-PFHxA



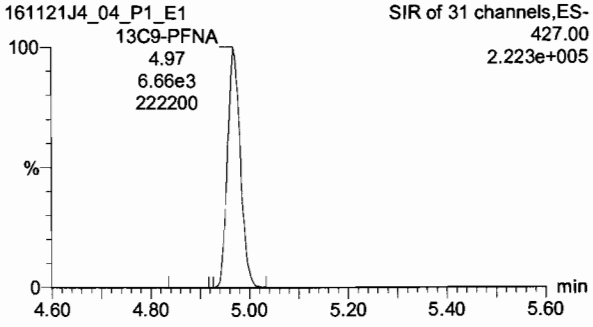
13C3-PFHxS



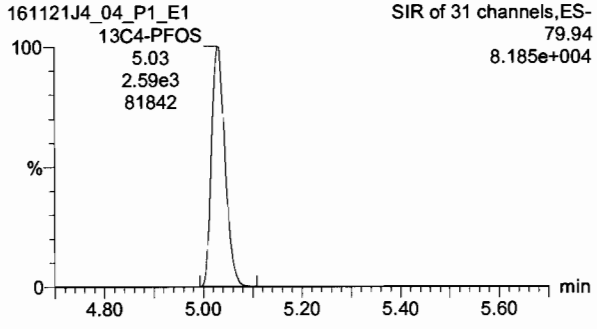
13C8-PFOA



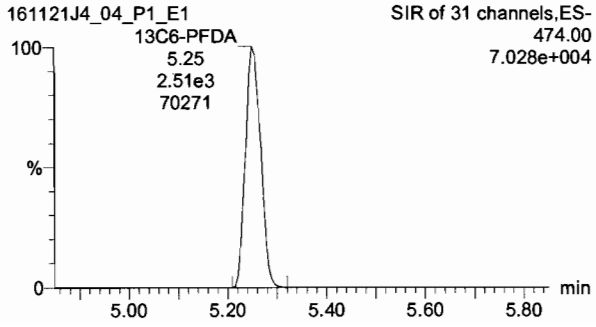
13C9-PFNA



13C4-PFOS



13C6-PFDA



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PFBS","104","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","104","104","","","","","","60","150","",""
,"",""
"OUAI-MW42-20161116","537_MOD","11/29/16","20:36","N","NA","000","13C2-PFOA","13C2-
PFOA","86.3","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","86.3","86.3","","","","","","60","150",""
,"","",""
"OUAI-MW42-20161116","537_MOD","11/29/16","20:36","N","NA","000","13C8-PFOS","13C8-
PFOS","84.8","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","84.8","84.8","","","","","","60","150","",
"","",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","375-73-
5","PFBS","45.6","","TRG","Yes","Y","","Y","1.74","3.91","7.79","NG_L","NG_L","","","","","","","","","","","","",""
,"","","",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","335-67-1","PERFLUOROOCTANOIC
ACID (PFOA)","1.40","","TRG","Yes","Y","J,
B","Y","0.634","1.95","7.79","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","","Y","0.786","0.879","7.79","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","13C3-PFBS","13C3-
PFBS","110","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","110","110","","","","","","60","150","",""
,"",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","13C2-PFOA","13C2-
PFOA","89.0","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","89.0","89.0","","","","","","60","150",""
,"","",""
"OUAI-MW01-20161116","537_MOD","11/29/16","20:48","N","NA","000","13C8-PFOS","13C8-
PFOS","87.4","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","87.4","87.4","","","","","","60","150","",
"","",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","375-73-
5","PFBS","120","","TRG","Yes","Y","","Y","1.71","3.82","7.65","NG_L","NG_L","","","","","","","","","","","","","",
"","","",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","335-67-1","PERFLUOROOCTANOIC

ACID
(PFOA)","9.01","","TRG","Yes","Y","B","Y","0.623","1.91","7.65","NG_L","NG_L","","","","","","","","","","","","","","
","","","",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","","Y","0.772","0.859","7.65","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","13C3-PFBS","13C3-
PFBS","106","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","106","106","","","","","","60","150","",""
,"",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","13C2-PFOA","13C2-
PFOA","85.9","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","85.9","85.9","","","","","","60","150",""
,"","",""
"OUAI-MW31-20161116","537_MOD","11/29/16","22:14","N","NA","000","13C8-PFOS","13C8-
PFOS","92.2","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","92.2","92.2","","","","","","60","150","",
"","",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","375-73-
5","PFBS","57.8","","TRG","Yes","Y","","Y","1.80","4.00","8.03","NG_L","NG_L","","","","","","","","","","","","",""
,"","","",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","335-67-1","PERFLUOROOCTANOIC
ACID
(PFOA)","21.1","","TRG","Yes","Y","B","Y","0.653","2.00","8.03","NG_L","NG_L","","","","","","","","","","","","","","
","","","",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","6.15","","TRG","Yes","Y","J","Y","0.810","0.900","8.03","NG_L","NG_L","","","","","","","","","","","","","","","",
"",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","13C3-PFBS","13C3-
PFBS","106","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","106","106","","","","","","60","150","",""
,"",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","13C2-PFOA","13C2-
PFOA","87.5","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","87.5","87.5","","","","","","60","150",""
,"","",""
"OUAI-PZ19-20161116","537_MOD","11/29/16","22:26","N","NA","000","13C8-PFOS","13C8-
PFOS","101","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","101","101","","","","","","60","150","",""
,"",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","375-73-
5","PFBS","64.9","","TRG","Yes","Y","","Y","1.73","3.85","7.72","NG_L","NG_L","","","","","","","","","","","","",""
,"","","",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","335-67-1","PERFLUOROOCTANOIC
ACID (PFOA)","5.38","","TRG","Yes","Y","J,
B","Y","0.628","1.92","7.72","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","","Y","0.778","0.865","7.72","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","13C3-PFBS","13C3-
PFBS","102","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","102","102","","","","","","60","150","",""
,"",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","13C2-PFOA","13C2-
PFOA","93.1","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","93.1","93.1","","","","","","60","150",""
,"","",""
"OUAI-MW52-20161116","537_MOD","11/29/16","22:38","N","NA","000","13C8-PFOS","13C8-
PFOS","88.7","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","88.7","88.7","","","","","","60","150","",
"","",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","375-73-

5","PFBS","157","","TRG","Yes","Y","","Y","1.71","3.82","7.66","NG_L","NG_L","","","","","","","","","","","","","","",
"","","",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID
(PFOA)","20.0","","TRG","Yes","Y","B","Y","0.623","1.91","7.66","NG_L","NG_L","","","","","","","","","","","","","
","","","",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","2.50","","TRG","Yes","Y","J","Y","0.773","0.859","7.66","NG_L","NG_L","","","","","","","","","","","","","","","",
"",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","13C3-PFBS","13C3-
PFBS","105","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","105","105","","","","","","60","150","",""
,"",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","13C2-PFOA","13C2-
PFOA","91.0","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","91.0","91.0","","","","","","60","150",""
,"","",""
"OUAI-MW04-20161116","537_MOD","11/29/16","22:51","N","NA","000","13C8-PFOS","13C8-
PFOS","93.0","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","93.0","93.0","","","","","","60","150","",
"","",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","375-73-
5","PFBS","162","","TRG","Yes","Y","","Y","1.87","4.17","8.34","NG_L","NG_L","","","","","","","","","","","","","",
"","","",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID
(PFOA)","22.1","","TRG","Yes","Y","B","Y","0.678","2.08","8.34","NG_L","NG_L","","","","","","","","","","","","","
","","","",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","2.83","","TRG","Yes","Y","J","Y","0.841","0.938","8.34","NG_L","NG_L","","","","","","","","","","","","","","","",
"",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","13C3-PFBS","13C3-
PFBS","109","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","109","109","","","","","","60","150","",""
,"",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","13C2-PFOA","13C2-
PFOA","82.5","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","82.5","82.5","","","","","","60","150",""
,"","",""
"OUAI-MW04A-20161116","537_MOD","11/29/16","23:03","N","NA","000","13C8-PFOS","13C8-
PFOS","85.8","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","85.8","85.8","","","","","","60","150","",
"","",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","375-73-
5","PFBS","30.5","","TRG","Yes","Y","","Y","1.74","3.88","7.78","NG_L","NG_L","","","","","","","","","","","","",""
,"","","",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","0.859","","TRG","Yes","Y","J,
B","Y","0.633","1.94","7.78","NG_L","NG_L","","","","","","","","","","","","","","","","","",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","0.937","","TRG","Yes","Y","J","Y","0.784","0.872","7.78","NG_L","NG_L","","","","","","","","","","","","","","",""
,"",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","13C3-PFBS","13C3-
PFBS","111","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","111","111","","","","","","60","150","",""
,"",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","13C2-PFOA","13C2-
PFOA","82.6","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","82.6","82.6","","","","","","60","150",""

,"","",""
"OUAI-MW05-20161116","537_MOD","11/29/16","23:15","N","NA","000","13C8-PFOS","13C8-PFOS","83.4","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","83.4","83.4","","","","","","60","150","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","375-73-5","PFBS","","","TRG","Yes","N","","Y","1.79","4.00","8.00","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","0.916","","TRG","Yes","Y","J","Y","0.651","2.00","8.00","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","","Y","0.807","0.900","8.00","NG_L","NG_L","","","","","","","","","","","","","","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","13C3-PFBS","13C3-PFBS","115","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","115","115","","","","","","60","150","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","13C2-PFOA","13C2-PFOA","89.7","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","89.7","89.7","","","","","","60","150","","","",""
"B6K0164-BLK1","537_MOD","11/29/16","22:02","N","NA","000","13C8-PFOS","13C8-PFOS","93.3","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","93.3","93.3","","","","","","60","150","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","375-73-5","PFBS","93.1","","TRG","Yes","Y","","Y","1.79","4.00","8.00","NG_L","NG_L","","","","80.0","93.1","116","","","","","","60","130","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","89.3","","TRG","Yes","Y","B","Y","0.651","2.00","8.00","NG_L","NG_L","","","","80.0","89.3","112","","","","","","70","130","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","84.7","","TRG","Yes","Y","","Y","0.807","0.900","8.00","NG_L","NG_L","","","","80.0","84.7","106","","","","","","70","130","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","13C3-PFBS","13C3-PFBS","123","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","123","123","","","","","","60","150","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","13C2-PFOA","13C2-PFOA","85.9","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","85.9","85.9","","","","","","60","150","","","",""
"B6K0164-BS1","537_MOD","11/29/16","21:37","N","NA","000","13C8-PFOS","13C8-PFOS","94.2","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","94.2","94.2","","","","","","60","150","","","",""

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AMEC Foster Wheeler, Inc.
7376 SW Durham Road
Portland, OR 97224
Attn: Ms. Marina Mitchell

February 2, 2017

SUBJECT: MCAS Yuma, Data Validation

Dear Ms. Mitchell,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 20, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #37797:

SDG #	Fraction
280-90987-1, 280-91067-1, 280-91122-1, 280-91192-1 1601451, 1601461, 1601464, 1601472	Volatiles, 1,4-Dioxane, Wet Chemistry, Perfluorinated Alkyl Acids

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Addendum 3 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona, February 2017
- Final Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona, September 2015
- Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona, May 2013
- Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona, May 2013
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0, July 2013
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, August 2014
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, August 2014
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

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

Sincerely,

Pei Geng
Project Manager/Senior Chemist

5,062 pages-SF

Attachment 1

90/10 (client select) EDD

LDC #37797 (AMEC Foster Wheeler-Portland, OR / MCAS Yuma)

LDC	SDG#	DATE REC'D	(2) DATE DUE	Short VOA (8260B)		1,4-Dioxane (8270C)		PFAs (537)		Cl,SO_4 NO_3-N (9056)		Fe II (3500-FE D)		pH (9040C)																									
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	280-90987-1	12/20/16	01/05/17	7	0	7	0	-	-	6	0	5	0	4	0																						
A	280-90987-1	12/20/16	01/05/17	1	0	1	0	-	-	1	0	1	0	1	0																						
B	280-91067-1	12/20/16	01/05/17	8	0	8	0	-	-	4	0	4	0	3	0																						
B	280-91067-1	12/20/16	01/05/17	1	0	1	0	-	-	1	0	1	0	1	0																						
C	280-91122-1	12/20/16	01/05/17	10	0	10	0	-	-	4	0	4	0	4	0																						
D	280-91192-1	12/20/16	01/05/17	2	0	2	0	-	-	2	0	2	0	2	0																						
D	280-91192-1	12/20/16	01/05/17	1	0	1	0	-	-	1	0	1	0	1	0																						
G	1601451	12/20/16	01/05/17	-	-	-	-	7	0	-	-	-	-	-	-																						
G	1601451	12/20/16	01/05/17	-	-	-	-	1	0	-	-	-	-	-	-																						
H	1601461	12/20/16	01/05/17	-	-	-	-	8	0	-	-	-	-	-	-																						
H	1601461	12/20/16	01/05/17	-	-	-	-	1	0	-	-	-	-	-	-																						
I	1601464	12/20/16	01/05/17	-	-	-	-	10	0	-	-	-	-	-	-																						
J	1601472	12/20/16	01/05/17	-	-	-	-	2	0	-	-	-	-	-	-																						
J	1601472	12/20/16	01/05/17	-	-	-	-	1	0	-	-	-	-	-	-																						
Total	T/PG			30	0	30	0	30	0	19	0	18	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	143

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.

L:\AMEC FW\Yuma\37797ST_Yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 6, 2017

Parameters: Volatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-90987-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW13-20161114	280-90987-4	Water	11/14/16
OUA1-MW37-20161114	280-90987-5	Water	11/14/16
OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
OUA1-HS03-20161114	280-90987-7	Water	11/14/16
OUA1-MW19-20161114	280-90987-8	Water	11/14/16
OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
OUA1-MW08-20161114	280-90987-10	Water	11/14/16
OUA1-MW06-20161114	280-90987-11	Water	11/14/16
OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect 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 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. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An 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 15.0%.

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.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample TB01-20161114 was identified as a trip blank. No contaminants were found.

Sample EB01-20161114 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
OUA1-MW13-20161114	Bromofluorobenzene	117 (85-114)	All compounds	J (all detects)	P
OUA1-MW37A-20161114	Bromofluorobenzene	116 (85-114)	All compounds	J (all detects)	P

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 within QC limits. Relative percent differences (RPD) were within QC limits.

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 OUA1-MW37-20161114 and OUA1-MW37A-20161114 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	OUA1-MW37-20161114	OUA1-MW37A-20161114				
1,1-Dichloroethene	0.76	0.78	-	0.02 (≤1.0)	-	-
Trichloroethene	1.7	1.8	6 (≤20)	-	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Due to surrogate %R, 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.

MCAS Yuma
Volatiles - Data Qualification Summary - SDG 280-90987-1

Sample	Compound	Flag	A or P	Reason
OUA1-MW13-20161114 OUA1-MW37A-20161114	All compounds	J (all detects)	P	Surrogates (%R)

MCAS Yuma
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

MCAS Yuma
Volatiles - Field Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

LDC #: 37797A1
SDG #: 280-90987-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 12/29/16
Page: 1 of 1
Reviewer: Q
2nd Reviewer: NC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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≤15% r² ICV≤20%
IV.	Continuing calibration 12hrdlegs	A	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	SB=1. EB=2. TB=3
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D=5+6
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~SB01-20161114~~	~~280-90987-1~~	~~Water~~	~~11/14/16~~
~~2~~	~~EB01-20161114~~	~~280-90987-2~~	~~Water~~	~~11/14/16~~
~~3~~	~~TB01-20161114~~	~~280-90987-3~~	~~Water~~	~~11/14/16~~
4	OUA1MW13-20161114	280-90987-4	Water	11/14/16
5	OUA1-MW37-20161114	280-90987-5	Water	11/14/16
6	OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
7	OUA1-HS03-20161114	280-90987-7	Water	11/14/16
8	OUA1-MW19-20161114	280-90987-8	Water	11/14/16
9	OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
10	OUA1-MW08-20161114	280-90987-10	Water	11/14/16
11	OUA1-MW06-20161114	280-90987-11	Water	11/14/16
12	OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
13	OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16

LDC #: 37767A1

VALIDATION FINDINGS CHECKLIST

Reviewer: CV
2nd Reviewer: JVE

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?		✓		

LDC #: 38797A1

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: JNG

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓		✓	
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 37197A1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y [✓ N] N/A Were all surrogate %R within QC limits?
Y [✓ N] N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)		Qualifications
		4	BFB	117	(85-114)	J dets/P (dets + ND)
					(↓)	↓
		6	BFB	116	(✓)	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
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					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene
(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

LDC#:37797A1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GCMS voa (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		(≤20) RPD	Difference	Limits	Qual
	5	6				
H	0.76	0.78		0.02	≤1.0	
S	1.7	1.8	6			

V:\FIELD DUPLICATES\37797A1.wpd

LDC #: 37797A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: JVG

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL (VMS_H)	11/25/16	S (1st internal standard)	0.6242	0.6242	0.6492	0.6492	6.8	6.8
			AA (2nd internal standard)	1.8423	1.8423	1.9091	1.9091	6.9	6.9
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

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

LDC #: 37797A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: CG
2nd Reviewer: SVG

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	H2165	11/28/16	S (1st internal standard)	0.6492	0.6532	0.6532	0.6	0.6
			AA (2nd internal standard)	1.9091	2.012	2.012	5.4	5.4
			(2nd internal standard)					
			(3rd internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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 #: 31197A1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: JVG

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 9

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	10.1	10.9	107	107	0
1,2-Dichloroethane-d4		9.54	94	94	
Toluene-d8	↓	9.87	97	97	↓
Bromofluorobenzene		10.8	107	107	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 37767A1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: JVB

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 concentration

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

MS/MSD sample: 12/13

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	2.8	7.81	7.79	100	100	100	100	0	0
Trichloroethene	↓	↓	3.7	8.42	8.67	95	94	100	99	3	3
Benzene											
Toluene											
Chlorobenzene											

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 #: 35767A1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 9
2nd Reviewer: JVG

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

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

LCS ID: 280-353224

Compound	Spike Added (µg/L)		Spiked Sample Concentration (µg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	5.29	NA	106	106				
Trichloroethene	↓	↓	5.00	↓	100	100				
Benzene										
Toluene										
Chlorobenzene										

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

LDC #: 37797A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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)

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. 9 , 5 :

Conc. = $\frac{(63677)(12.5)(1)}{(1054858)(0.6472)(\quad)(\quad)}$

= 1.16 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	9	5	1.2		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 6, 2017

Parameters: 1,4-Dioxane

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-90987-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW13-20161114	280-90987-4	Water	11/14/16
OUA1-MW37-20161114	280-90987-5	Water	11/14/16
OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
OUA1-HS03-20161114	280-90987-7	Water	11/14/16
OUA1-MW19-20161114	280-90987-8	Water	11/14/16
OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
OUA1-MW08-20161114	280-90987-10	Water	11/14/16
OUA1-MW06-20161114	280-90987-11	Water	11/14/16
OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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 not 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. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample EB01-20161114 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all 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 OUA1-HS03-20161114MS/MSD. No data were qualified since the parent sample results were greater than 4X the spiked concentration. Relative percent differences (RPD) were within QC limits.

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 OUA1-MW37-20161114 and OUA1-MW37A-20161114 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	OUA1-MW37-20161114	OUA1-MW37A-20161114				
1,4-Dioxane	5.6	5.7	2 (≤20)	-	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

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.

MCAS Yuma
1,4-Dioxane - Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Field Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

LDC #: 37797A2b

SDG #: 280-90987-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 12/9/16

Page: 1 of 1

Reviewer: 9

2nd Reviewer: JW

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270C)

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 ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration Lindsey	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	SB=1. EB = 2.
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	11/12 - 70 Rec ≥ 4x.
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D=4+5
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~SB01-20161114~~	~~280-90987-1~~	~~Water~~	~~11/14/16~~
~~2~~	~~EB01-20161114~~	~~280-90987-2~~	~~Water~~	~~11/14/16~~
3	OUA1-MW13-20161114	280-90987-4	Water	11/14/16
4	OUA1-MW37-20161114	280-90987-5	Water	11/14/16
5	OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
6	OUA1-HS03-20161114	280-90987-7	Water	11/14/16
7	OUA1-MW19-20161114	280-90987-8	Water	11/14/16
8	OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
9	OUA1-MW08-20161114	280-90987-10	Water	11/14/16
10	OUA1-MW06-20161114	280-90987-11	Water	11/14/16
11	OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
12	OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16
13				

LDC #: 37797A-6

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: JB

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each ICAL for each instrument?	✓			
Were all percent difference (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 37797A2b

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JB

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC#: 37797A2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GCMS svoa (EPA SW 846 Method 8270C)

Compound	Concentration (ug/L)		(≤20) RPD	Difference	Limits	Qual
	4	5				
1,4-Dioxane	5.6	5.7	2			

V:\FIELD DUPLICATES\37797A2b.wpd

LDC #: 37797A2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: T
2nd Reviewer: TM

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (5000 std)	Recalculated RRF (5000 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/14/16	1,4-Dioxane (1st internal standard)	0.5594	0.5594	0.5511	0.5511	3.6	3.6
	(SMS_G4)		1,2,4-Trichlorobenzene (2nd internal standard)						
			2,6-Dinitrotoluene (3rd internal standard)						
			Hexachlorobenzene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

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

LDC #: 37797A2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer: JVG

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G4_3626	11/25/16	1,4-Dioxane (1st internal standard)	0.5511	0.5008	0.5008	9.1	9.1
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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 #: 3T79T

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 8

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl	2500	1936.7	TT	TT	0
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 35179(X)2D

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: JB

METHOD: GC/MS PAH (EPA SW 846 Method 8270C)

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: 11/12

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene											
Pentachlorophenol											
Pyrene											
1,4-Dioxane	9.8	10.0	68	74.8	63.6	66	69	-46	-44	16	16

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 #: 31179B4/

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

Page: 1 of 1
Reviewer: Q
2nd Reviewer: JR

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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

LCS/LCSD samples: 280-75233B

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene										
Pentachlorophenol										
Pyrene										
1,4-Dioxane	10.0	NA	6.44	NA	64	64				

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 #: 31799A-6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: SVG

METHOD: GC/MS SVOA (EPA SW 846 Method 8270C)

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. 8, 1,4-Dioxane

Conc. = $\frac{(1=TG9)(4000.0)(2000)(\quad)(1)}{(20173)(0.551)(1)(1012.8)(1000)}$

= 0.909 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	8	1,4-Dioxane	0.91		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-90987-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW37-20161114	280-90987-5	Water	11/14/16
OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
OUA1-HS03-20161114	280-90987-7	Water	11/14/16
OUA1-MW19-20161114	280-90987-8	Water	11/14/16
OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
OUA1-MW08-20161114	280-90987-10	Water	11/14/16
OUA1-MW06-20161114	280-90987-11	Water	11/14/16
OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16
OUA1-HS03-20161114DUP	280-90987-7DUP	Water	11/14/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (August 2014). 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 methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056
Ferrous Iron by Standard Method 3500 FE D
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect 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.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
OUA1-MW37-20161114	pH	52.98 hours	48 hours	J (all detects)	P
OUA1-HS03-20161114	pH	52.05 hours	48 hours	J (all detects)	P
OUA1-MW18-20161114**	pH	50.38 hours	48 hours	J (all detects)	P
OUA1-MW08-20161114	pH	49.48 hours	48 hours	J (all detects)	P
OUA1-MW06-20161114	pH	48.48 hours	48 hours	J (all detects)	P
OUA1-MW37-20161114	Ferrous iron	78.43 hours	48 hours	UJ (all non-detects)	P
OUA1-MW37A-20161114	Ferrous iron	78.35 hours	48 hours	UJ (all non-detects)	P
OUA1-HS03-20161114	Ferrous iron	77.43 hours	48 hours	UJ (all non-detects)	P
OUA1-MW18-20161114**	Ferrous iron	75.68 hours	48 hours	UJ (all non-detects)	P
OUA1-MW08-20161114	Ferrous iron	74.68 hours	48 hours	UJ (all non-detects)	P
OUA1-MW06-20161114	Ferrous iron	73.60 hours	48 hours	UJ (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

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

V. Field Blanks

Sample EB01-20161114 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 was identified as a source blank. No contaminants were found.

VI. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. 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.

IX. Field Duplicates

Samples OUA1-MW37-20161114 and OUA1-MW37A-20161114 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)	Flag	A or P
	OUA1-MW37-20161114	OUA1-MW37A-20161114			
Chloride	630	630	0 (≤20)	-	-
Nitrate as N	6.3	6.3	0 (≤20)	-	-
Sulfate	1500	1500	0 (≤20)	-	-

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Due to technical holding time, data were qualified as estimated in six 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.

MCAS Yuma
Wet Chemistry - Data Qualification Summary - SDG 280-90987-1

Sample	Analyte	Flag	A or P	Reason
OUA1-MW37-20161114 OUA1-HS03-20161114 OUA1-MW18-20161114** OUA1-MW08-20161114 OUA1-MW06-20161114	pH	J (all detects)	P	Technical holding times
OUA1-MW37-20161114 OUA1-MW37A-20161114 OUA1-HS03-20161114 OUA1-MW18-20161114** OUA1-MW08-20161114 OUA1-MW06-20161114	Ferrous iron	UJ (all non-detects)	P	Technical holding times

MCAS Yuma
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

MCAS Yuma
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-90987-1

No Sample Data Qualified in this SDG

LDC #: 37797A6
SDG #: 280-90987-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 1/3/17
Page: 1 of 1
Reviewer: CA
2nd Reviewer: SM

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Ferrous Iron (3500-FE D) pH, (EPA SW846 Method 9040C)

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 SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	SB=1 EB=2
VI.	Matrix Spike/Matrix Spike Duplicates	A	
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	(3,4)
X.	Sample result verification	A	Not reviewed for Stage 2B validation.
XI	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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	SB01-20161114	280-90987-1	Water	11/14/16
2	EB01-20161114	280-90987-2	Water	11/14/16
3	OUA1-MW37-20161114	280-90987-5	Water	11/14/16
4	OUA1-MW37A-20161114	280-90987-6	Water	11/14/16
5	OUA1-HS03-20161114	280-90987-7	Water	11/14/16
6	OUA1-MW19-20161114	280-90987-8	Water	11/14/16
7	OUA1-MW18-20161114**	280-90987-9**	Water	11/14/16
8	OUA1-MW08-20161114	280-90987-10	Water	11/14/16
9	OUA1-MW06-20161114	280-90987-11	Water	11/14/16
10	OUA1-HS03-20161114MS	280-90987-7MS	Water	11/14/16
11	OUA1-HS03-20161114MSD	280-90987-7MSD	Water	11/14/16
12	OUA1-HS03-20161114DUP	280-90987-7DUP	Water	11/14/16
13				
14				
15				
16				

Notes:

LDC #: 37C17A6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: CT

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓	✓		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 37797A6

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.	✓		✓	
Target analytes were detected in the field blanks.		✓		

LDC #: 37797A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
3,5,7-9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Fe II+
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Fe II+
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 10,11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Fe II+
12		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Fe II+
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 37697A6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CA
2nd reviewer: CA

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	9040C				SM3500-FE_D			
Parameters:	pH				Ferrous Iron			
Technical holding time:	48 hrs				48 hrs			
Sample ID	Sampling date	Analysis date	Total Time (hrs)	Qualifier	Analysis date	Total Time (hrs)	Qualifier	
3	11/14/16 09:00	11/16/16 13:59	52.98	J/UJ/P(Det)				
5	10:00	14:03	52.05					
7	11:45	14:08	50.38					
8	12:45	14:14	49.48					
9	13:50	14:19	48.48	↓				
3	11/14/16 09:00	~~11/16/16~~ ~~16:28~~			11/17/16 16:26	78.43	J/UJ/P(ND)	
4	09:05					78.35		
5, 10, 11, 12	10:00					77.43		
7	11:45					75.68		
8	12:45					74.68		
9	13:50				↓	73.60	↓	

LDC#: 37797A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: OC
2nd Reviewer:

Inorganics, Method See Cover

Analyte	Concentration (mg/L)		RPD (≤20)	Qualification (Parent only)
	3	4		
Chloride	630	630	0	
Nitrate as N	6.3	6.3	0	
Sulfate	1500	1500	0	

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LDC #: 37797A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: A
2nd Reviewer: A

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Fe II was recalculated. Calibration date: 11/15/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Ferrous Iron	s1	0.0	0.002	*0.9990*	*0.9990*	Y
		s2	0.2	0.046			
		s3	0.5	0.103			
		s4	1	0.221			
		s5	2	0.432			
		s6	3	0.609			
Calibration verification	NO_3-N	CCV	4.00	Found 3.97	99	99	
Calibration verification	SO_4	CCV	100	100.8	101	101	
Calibration verification							

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

LDC #: 37777A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: CR

METHOD: Inorganics, Method see cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 / True Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| x 100 / (S+D)/2 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NO_3N	5.05	5	101	101	Y
10	Matrix spike sample	Fe^{II+}	(SSR-SR) 1.69	2.00	85	85	
12	Duplicate sample	Cl	434	427	1	1	✓

Comments: _____

TOTCLC.6

LDC #: 37717A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer:

METHOD: Inorganics, Method see cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $cf = 12277020x + 577503$

Recalculation: $\frac{38159460 - 577503}{12277020} \times 50 = 155.2 mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	7	pH (SU)	7.3	7.3	Y
		Cl	3100	3100	
		NO_3-N	9.9	9.9	
		SO_4	1600	1600	
		~~Fe II~~			

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: Volatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91067-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
OUA1-MW15-20161115	280-91067-4	Water	11/15/16
OUA1-MW07-20161115	280-91067-5	Water	11/15/16
OUA1-MW23-20161115	280-91067-6	Water	11/15/16
OUA1-MW55-20161115	280-91067-7	Water	11/15/16
OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
OUA1-MW27-20161115	280-91067-9	Water	11/15/16
OUA1-MW25-20161115	280-91067-10	Water	11/15/16
OUA1-MW11-20161115	280-91067-11	Water	11/15/16
OUA1-MW11-20161115RE	280-91067-11RE	Water	11/15/16
OUA1-MW14-20161115MS	280-91067-3MS	Water	11/15/16
OUA1-MW14-20161115MSD	280-91067-3MSD	Water	11/15/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect 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 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
OUA1-MW11-20161115RE	All compounds	27	14	J (all detects) UJ (all non-detects)	A

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An 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 15.0%.

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.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample TB02-20161115 was identified as a trip blank. No contaminants were found.

Sample EB02-20161115 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
OUA1-MW23-20161115	1,2-Dichloroethane-d4 Dibromofluoromethane	123 (81-118) 121 (80-119)	All compounds	NA	-
OUA1-MW55-20161115	1,2-Dichloroethane-d4	125 (81-118)	All compounds	NA	-
OUA1-MW55A-20161115	1,2-Dichloroethane-d4	124 (81-118)	All compounds	NA	-
OUA1-MW27-20161115	1,2-Dichloroethane-d4	121 (81-118)	All compounds	J (all detects)	P
OUA1-MW25-20161115	1,2-Dichloroethane-d4	125 (81-118)	All compounds	J (all detects)	P
OUA1-MW11-20161115	1,2-Dichloroethane-d4 Bromofluorobenzene	123 (81-118) 117 (85-114)	All compounds	J (all detects)	A

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 within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
OUA1-MW14-20161115MS/MSD (OUA1-MW14-20161115**)	Trichloroethene	136 (79-123)	141 (79-123)	J (all detects)	A

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
OUA1-MW14-20161115MS/MSD (OUA1-MW14-20161115**)	cis-1,2-Dichloroethene	-	127 (78-123)	NA	-

Relative percent differences (RPD) were within QC limits.

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 OUA1-MW55-20161115 and OUA1-MW55A-20161115 were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
OUA1-MW11-20161115RE	All compounds	R	A

Due to surrogate %R and MS/MSD %R, data were qualified as estimated in four 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.

MCAS Yuma
Volatiles - Data Qualification Summary - SDG 280-91067-1

Sample	Compound	Flag	A or P	Reason
OUA1-MW25-20161115 OUA1-MW27-20161115	All compounds	J (all detects)	P	Surrogates (%R)
OUA1-MW11-20161115	All compounds	J (all detects)	A	Surrogates (%R)
OUA1-MW14-20161115**	Trichloroethene	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
OUA1-MW11-20161115RE	All compounds	R	A	Overall assessment of data

MCAS Yuma
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

MCAS Yuma
Volatiles - Field Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

LDC #: 37797B1
SDG #: 280-91067-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 12/29/16
Page: 1 of 2
Reviewer: 9
2nd Reviewer: JR

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 / SW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 15%. r^2 ICV ≤ 20%
IV.	Continuing calibration / endrin	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1. TB=2. SB=SB01-[illegible]161114 (280-90987
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	ND	D=7+8
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
XV.	Overall assessment of data	SW	

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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~EB02-20161115~~	~~280-91067-1~~	~~Water~~	~~11/15/16~~
~~2~~	~~TB02-20161115~~	~~280-91067-2~~	~~Water~~	~~11/15/16~~
3	OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
4	OUA1-MW15-20161115	280-91067-4	Water	11/15/16
5	OUA1-MW07-20161115	280-91067-5	Water	11/15/16
6	OUA1-MW23-20161115	280-91067-6	Water	11/15/16
7	OUA1-MW55-20161115	280-91067-7	Water	11/15/16
8	OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
9	OUA1-MW27-20161115	280-91067-9	Water	11/15/16
10	OUA1-MW25-20161115	280-91067-10	Water	11/15/16
11	OUA1-MW11-20161115	280-91067-11	Water	11/15/16
12	OUA1-MW11-20161115RE	280-91067-11RE	Water	11/15/16
13	OUA1-MW14-20161115MS	280-91067-3MS	Water	11/15/16

LDC #: 37797B1

SDG #: 280-91067-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 1-26-16

Reviewer: CT

2nd Reviewer: JVE

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

	Client ID	Lab ID	Matrix	Date
14	OUA1-MW14-20161115MSD	280-91067-3MSD	Water	11/15/16
15				
16				
17				
18				
19				

Notes:

LDC #: 30797B1

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: JVC

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?		✓		
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?		✓		

LDC #: 37797B1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JVC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 31790B1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: a
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
Y (N) N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
12	W	Y	11-15-16		12-12-16	27	~~J~~ N/A
(dets+N(D))							

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 35799B1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: D
2nd Reviewer: JVC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y (N) N/A Were all surrogate %R within QC limits?

Y (N) N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		6	DCE	123 (81-118)	√ dets/P (ND)
			DFM	121 (80-119)	↓
				( )	
		7	DCE	125 (81-118)	√ dets/P (ND)
				( )	↓
		8	DCE	124 ( )	(ND)
				( )	
		9	DCE	121 ( )	(dets+ND)
				( )	↓
		10	DCE	125 ( )	
				( )	↓
		11	DCE	123 ( )	√ dets/A (dets+ND)
			BFB	117 (85-114)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene
(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

LDC #: 37797B1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: JVC

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(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?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		13/14	S	136 (79-123)	141 (79-123)	( )	3 (dets)	J dets/A
			QQQ	( )	127 (78-123)	( )	(ND)	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 37697B1

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Compound	Finding	Qualifications
		12	All		R/A

Comments: _____

OVR.1SB

LDC #: 37797B1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer: JVG

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL (VMS_G)	11/23/16	S (1st internal standard)	0.3967	0.3967	0.3984	0.3984	4.1	4.1
			AA (2nd internal standard)	1.2500	1.2500	1.2786	1.2786	6.1	6.1
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

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

LDC #: 37797B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G0848	11/28/16	S (1st internal standard)	0.3984	0.4098	0.4098	2.8	2.8
			AA (2nd internal standard)	1.2786	1.199	1.199	6.3	6.3
			(2nd internal standard)					
			(3rd internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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 #: 37791B1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	11.0	11.7	106	106	0
1,2-Dichloroethane-d4	↓	12.0	109	109	↓
Toluene-d8	↓	11.9	108	108	↓
Bromofluorobenzene	↓	11.2	102	102	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 37967B

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: JJZ

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 13/14

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	1.1	7.32	7.52	124	124	128	128	3	3
Trichloroethene	↓	↓	1.4	8.22	8.46	136	136	141	141	3	3
Benzene											
Toluene											
Chlorobenzene											

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 #: 31799B1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: Q
2nd Reviewer: JL

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

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

LCS ID: 280-353386

Compound	Spike Added (µg/L)		Spiked Sample Concentration (µg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	5.21	5.28	104	104	106	106	1	1
Trichloroethene	↓	↓	5.48	5.86	110	110	117	117	7	7
Benzene										
Toluene										
Chlorobenzene										

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

LDC #: 37976B

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: JM

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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)

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. 3 , S :

Conc. = $\frac{(32217)(12.5)(1)}{(70157)(0.3984)(\quad)(\quad)}$

= 1.42 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	3	S	1.4		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: 1,4-Dioxane

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91067-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
OUA1-MW15-20161115	280-91067-4	Water	11/15/16
OUA1-MW07-20161115	280-91067-5	Water	11/15/16
OUA1-MW23-20161115	280-91067-6	Water	11/15/16
OUA1-MW55-20161115	280-91067-7	Water	11/15/16
OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
OUA1-MW27-20161115	280-91067-9	Water	11/15/16
OUA1-MW25-20161115	280-91067-10	Water	11/15/16
OUA1-MW11-20161115	280-91067-11	Water	11/15/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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 not 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. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample EB02-20161115 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all 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 within QC limits. Relative percent differences (RPD) were within QC limits.

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 OUA1-MW55-20161115 and OUA1-MW55A-20161115 were identified as field duplicates. No results were detected in any of the samples.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

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.

MCAS Yuma
1,4-Dioxane - Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Field Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

LDC #: 37797B2b

SDG #: 280-91067-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 12/9/16

Page: 1 of 1

Reviewer:

2nd Reviewer: JG

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270C)

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 ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration Kndies	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1, SB=SB01-20161114 (280-90987-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	"A"
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	ND	D=6+7
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~EB02-20161115~~	~~280-91067-1~~	~~Water~~	~~11/15/16~~
2	OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
3	OUA1-MW15-20161115	280-91067-4	Water	11/15/16
4	OUA1-MW07-20161115	280-91067-5	Water	11/15/16
5	OUA1-MW23-20161115	280-91067-6	Water	11/15/16
6	OUA1-MW55-20161115	280-91067-7	Water	11/15/16
7	OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
8	OUA1-MW27-20161115	280-91067-9	Water	11/15/16
9	OUA1-MW25-20161115	280-91067-10	Water	11/15/16
10	OUA1-MW11-20161115	280-91067-11	Water	11/15/16
11				
12				
13				

LDC #: 37977B-b6

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: QW

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each ICAL for each instrument?	✓			
Were all percent difference (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 35797B2b

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: NC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

LDC #: 37797B2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: MR

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (5000 std)	Recalculated RRF (5000 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/14/16	1,4-Dioxane (1st internal standard)	0.5594	0.5594	0.5511	0.5511	3.6	3.6
	(SMS_G4)		1,2,4-Trichlorobenzene (2nd internal standard)						
			2,6-Dinitrotoluene (3rd internal standard)						
			Hexachlorobenzene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

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

LDC #: 37797B2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: CJ
2nd Reviewer: JM

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G4_3626	11/25/16	1,4-Dioxane (1st internal standard)	0.5511	0.5008	0.5008	9.1	9.1
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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 #: 35767B-6

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: A
2nd reviewer: NB

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl	2500.0	1816.1	T3	T3	0
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 21161B2D

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

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

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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

LCS/LCSD samples: 280-352338

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene										
Pentachlorophenol										
Pyrene										
1,4-Dioxane	10.0	NA	6.44	NA	64	64				

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 #: 31797B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: JD

METHOD: GC/MS SVOA (EPA SW 846 Method 8270C)

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. 2 , 1,4-Dioxane

Conc. = $\frac{(59822)(4000.0)(2)(1)(\quad)}{(22874)(0.5511)(1)(101.1)(\quad)}$

= 3.73 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
	2	1,4-Dioxane	3.7		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91067-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
OUA1-MW07-20161115	280-91067-5	Water	11/15/16
OUA1-MW55-20161115	280-91067-7	Water	11/15/16
OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
OUA1-MW27-20161115	280-91067-9	Water	11/15/16
OUA1-MW14-20161115DUP	280-91067-3DUP	Water	11/15/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (August 2014). 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 methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056
Ferrous Iron by Standard Method 3500 FE D
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect 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.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
OUA1-MW14-20161115**	pH	6 days	48 hours	J (all detects)	P
OUA1-MW07-20161115	pH	6 days	48 hours	J (all detects)	P
OUA1-MW55-20161115	pH	6 days	48 hours	J (all detects)	P
OUA1-MW27-20161115	pH	6 days	48 hours	J (all detects)	P
OUA1-MW14-20161115**	Ferrous iron	55.10 hours	48 hours	UJ (all non-detects)	P
OUA1-MW07-20161115	Ferrous iron	54.60 hours	48 hours	UJ (all non-detects)	P
OUA1-MW55-20161115	Ferrous iron	52.93 hours	48 hours	UJ (all non-detects)	P
OUA1-MW55A-20161115	Ferrous iron	52.77 hours	48 hours	UJ (all non-detects)	P
OUA1-MW27-20161115	Ferrous iron	51.27 hours	48 hours	UJ (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chloride Sulfate	0.391 mg/L 0.439 mg/L	All samples in SDG 280-91067-1

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Chloride Nitrate as N Sulfate	0.424 mg/L 0.109 mg/L 0.483 mg/L	All samples in SDG 280-91067-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

V. Field Blanks

Sample EB02-20161115 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EB02-20161115	11/15/16	Chloride Sulfate	0.39 mg/L 0.43 mg/L	All samples in SDG 280-91067-1

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

VI. 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.

VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. 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.

IX. Field Duplicates

Samples OUA1-MW55-20161115 and OUA1-MW55A-20161115 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)	Flag	A or P
	OUA1-MW55-20161115	OUA1-MW55A-20161115			
Chloride	520	520	0 (≤20)	-	-
Sulfate	120	120	0 (≤20)	-	-

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Due to technical holding time, data were qualified as estimated in five 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.

MCAS Yuma
Wet Chemistry - Data Qualification Summary - SDG 280-91067-1

Sample	Analyte	Flag	A or P	Reason
OUA1-MW14-20161115** OUA1-MW07-20161115 OUA1-MW55-20161115 OUA1-MW27-20161115	pH	J (all detects)	P	Technical holding times
OUA1-MW14-20161115** OUA1-MW07-20161115 OUA1-MW55-20161115 OUA1-MW55A-20161115 OUA1-MW27-20161115	Ferrous iron	UJ (all non-detects)	P	Technical holding times

MCAS Yuma
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

MCAS Yuma
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-91067-1

No Sample Data Qualified in this SDG

LDC #: 37797B6
SDG #: 280-91067-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 1/3/17
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Ferrous Iron (3500-FE D) pH, (EPA SW846 Method 9040C)

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 /SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	~~A~~SW	
V	Field blanks	SW	EB=1 SB=SB01-20161114(SDG: 280-90987-1)
VI.	Matrix Spike/Matrix Spike Duplicates	N	CS
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	(4,5)
X.	Sample result verification	A	Not reviewed for Stage 2B validation.
XI	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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	~~EB02-20161115~~	280-91067-1	Water	11/15/16
2	OUA1-MW14-20161115**	280-91067-3**	Water	11/15/16
3	OUA1-MW07-20161115	280-91067-5	Water	11/15/16
4	OUA1-MW55-20161115	280-91067-7	Water	11/15/16
5	OUA1-MW55A-20161115	280-91067-8	Water	11/15/16
6	OUA1-MW27-20161115	280-91067-9	Water	11/15/16
7	OUA1-MW14-20161115DUP	280-91067-3DUP	Water	11/15/16
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 37979B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 37476B6

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 37797B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
2-4,6		[✓ pH] TDS [✓ Cl] F [✓ NO_3] NO_2 [✓ SO_4] PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 [✓ Fe^{II+}] ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
5		pH TDS [✓ Cl] F [✓ NO_3] NO_2 [✓ SO_4] PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 [✓ Fe^{II+}] ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC:7		[✓ pH] TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 37797B6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: CR
2nd reviewer: CR

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	9040C			SM3500FE D		
Parameters:	pH			Ferrous Iron		
Technical holding time:	48hrs			48hrs		

Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time(hrs)	Qualifier
2,7	11/15/16 08:20	11/21/16 11:53	6days	J/UJ/P(Lot)			
3	09:50	12:03					
4	11:30	12:08					
6	13:10	12:13					
2	11/15/16 08:20				11/17/16 16:26	56.10	J/UJ/P(MD)
3	09:50					54.60	
4	11:30					52.93	
5	11:40					52.77	
6	13:10					51.27	

LDC #: 37797B6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** All

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No qual (>5x)								
Cl	0.391	0.424	2.12									
NO3-N		0.109	0.545									
SO4	0.439	0.483	2.415									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 37797B6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: a
2nd Reviewer: a

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units: mg/L**
Sampling date: 11/15/16 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All

Analyte	Blank ID	Action Limit	Sample Identification							
	EB02-20161115		No Qualifiers (>5x)							
Chloride	0.39	1.95								
Sulfate	0.43	2.15								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 37797B6

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

Analyte	Concentration (mg/L)		RPD (≤20)	Qualification (Parent only)
	4	5		
Chloride	520	520	0	
Sulfate	120	120	0	

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LDC #: 37797B6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer:
2nd Reviewer:

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of NO3N was recalculated. Calibration date: 10/19/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NO3N	s1	0.2	1590920	*1.000*	*0.998*	Y
		s2	0.5	4076842			
		s3	1	8789224			
		s4	4	40800587			
		s5	8	87082615			
		s6	10	110756388			
Calibration verification	SO4	CCV	100	Found 101.5	102	102	
Calibration verification	FeII+	CCV	1.00	1.08	108	108	
Calibration verification							

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

LDC #: 37276B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Fe II+	2.07	2.00	104	104	Y
N	Matrix spike sample		(SSR-SR)				
7	Duplicate sample	pH	7.8a 7.79	7.8a 7.76	0.4	0.4	Y

Comments: _____

LDC #: 37917B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of
Reviewer: CR
2nd reviewer:

METHOD: Inorganics, Method see cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for NO3N reported with a positive detect were recalculated and verified using the following equation:

Concentration = Area(9×10^{-8}) +0.17

Recalculation: 34350661$(A\times10^{8})$ +0.17 = 3.749 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	pH (SU)	7.8	7.8	Y
		Cl	300	300	
		NO3N	3.2	3.2	
		SO4	590	590	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91122-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW53-20161116	280-91122-3	Water	11/16/16
OUA1-MW54-20161116	280-91122-4	Water	11/16/16
OUA1-MW42-20161116	280-91122-5	Water	11/16/16
OUA1-MW01-20161116	280-91122-6	Water	11/16/16
OUA1-MW31-20161116	280-91122-7	Water	11/16/16
OUA1-PZ19-20161116	280-91122-8	Water	11/16/16
OUA1-MW52-20161116	280-91122-9	Water	11/16/16
OUA1-MW04-20161116	280-91122-10	Water	11/16/16
OUA1-MW04A-20161116	280-91122-11	Water	11/16/16
OUA1-MW05-20161116	280-91122-12	Water	11/16/16

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

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. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An 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 15.0%.

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.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending CCVs were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample TB03-20161116 was identified as a trip blank. No contaminants were found.

Sample EB03-20161116 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
OUA1-MW54-20161116	Bromofluorobenzene	84 (85-114)	All compounds	J (all detects) UJ (all non-detects)	P
OUA1-MW01-20161116	Bromofluorobenzene	84 (85-114)	All compounds	J (all detects) UJ (all non-detects)	P
OUA1-MW04-20161116	Bromofluorobenzene	83 (85-114)	All compounds	J (all detects) UJ (all non-detects)	P

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

Samples OUA1-MW04-20161116 and OUA1-MW04A-20161116 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	OUA1-MW04-20161116	OUA1-MW04A-20161116				
1,1-Dichloroethene	0.44	0.50	-	0.06 (≤1.0)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	OUA1-MW04-20161116	OUA1-MW04A-20161116				
Trichloroethene	0.40	0.49	-	0.09 (≤1.0)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Due to surrogate %R, data were qualified as estimated in three 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.

MCAS Yuma
Volatiles - Data Qualification Summary - SDG 280-91122-1

Sample	Compound	Flag	A or P	Reason
OUA1-MW54-20161116 OUA1-MW01-20161116 OUA1-MW04-20161116	All compounds	J (all detects) UJ (all non-detects)	P	Surrogates (%R)

MCAS Yuma
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

MCAS Yuma
Volatiles - Field Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

LDC #: 37797C1
SDG #: 280-91122-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 12/9/16
Page: 1 of 1
Reviewer: CV
2nd Reviewer: JNB

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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≤15%. r² ICV≤20%
IV.	Continuing calibration	A	CCV≤20/SD%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1. TB=2. SB=SB01-20161114 (=280-90987-1)
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D=10+11
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
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~~	~~EB03-20161116~~	~~280-91122-1~~	~~Water~~	~~11/16/16~~
~~2~~	~~TB03-20161116~~	~~280-91122-2~~	~~Water~~	~~11/16/16~~
3	OUA1-MW53-20161116	280-91122-3	Water	11/16/16
4	OUA1-MW54-20161116	280-91122-4	Water	11/16/16
5	OUA1-MW42-20161116	280-91122-5	Water	11/16/16
6	OUA1-MW01-20161116	280-91122-6	Water	11/16/16
7	OUA1-MW31-20161116	280-91122-7	Water	11/16/16
8	OUA1-PZ19-20161116	280-91122-8	Water	11/16/16
9	OUA1-MW52-20161116	280-91122-9	Water	11/16/16
10	OUA1-MW04-20161116	280-91122-10	Water	11/16/16
11	OUA1-MW04A-20161116	280-91122-11	Water	11/16/16
12	OUA1-MW05-20161116	280-91122-12	Water	11/16/16
13				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 35197e1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: (of 1
Reviewer: 9
2nd Reviewer: JM

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y (N) N/A Were all surrogate %R within QC limits?

Y (N) N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		2	BFB	81 (85-114)	J (all) P (ND) 9
				( )	
		4	BFB	84 (85-114)	J (all) P (det+ND)
				( )	
		6	BFB	84 ( )	
				( )	
		10	BFB	83 ( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	

(TOL) = Toluene-d8
(BFB) = Bromofluorobenzene
(DCE) = 1,2-Dichloroethane-d4
(DFM) = Dibromofluoromethane

LDC#: 37797C1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: JSC

METHOD: GCMS voa (EPA SW 846 Method 8260B)

Compound	Concentration (ug/L)		(≤20) RPD	Difference	Limits	Qual
	10	11				
H	0.44	0.50		0.06	≤1.0	
S	0.40	0.49		0.09	≤1.0	

V:\FIELD DUPLICATES\37797C1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91122-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW53-20161116	280-91122-3	Water	11/16/16
OUA1-MW54-20161116	280-91122-4	Water	11/16/16
OUA1-MW42-20161116	280-91122-5	Water	11/16/16
OUA1-MW01-20161116	280-91122-6	Water	11/16/16
OUA1-MW31-20161116	280-91122-7	Water	11/16/16
OUA1-PZ19-20161116	280-91122-8	Water	11/16/16
OUA1-MW52-20161116	280-91122-9	Water	11/16/16
OUA1-MW04-20161116	280-91122-10	Water	11/16/16
OUA1-MW04A-20161116	280-91122-11	Water	11/16/16
OUA1-MW05-20161116	280-91122-12	Water	11/16/16

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

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 not 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. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample EB03-20161116 was identified as an equipment blank. No contaminants were found.

Sample SB01-2016114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all 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 OUA1-MW04-20161116 and OUA1-MW04A-20161116 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
	OUA1-MW04-20161116	OUA1-MW04A-20161116				
1,4-Dioxane	2.5	1.8	33 (≤20)	-	J (all detects)	A

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Due to 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.

MCAS Yuma
1,4-Dioxane - Data Qualification Summary - SDG 280-91122-1

Sample	Compound	Flag	A or P	Reason
OUA1-MW04-20161116 OUA1-MW04A-20161116	1,4-Dioxane	J (all detects)	A	Field duplicates (RPD)

MCAS Yuma
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Field Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

LDC #: 37797C2b

SDG #: 280-91122-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 12-9-16

Page: 1 of 1

Reviewer:

2nd Reviewer: JM

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270C)

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 ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration /endlig	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1. SB=SB01-20161114 (280-90987-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	MS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=9+10
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
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~~	~~EB03-20161116~~	~~280-91122-1~~	~~Water~~	~~11/16/16~~
2	OUA1-MW53-20161116	280-91122-3	Water	11/16/16
3	OUA1-MW54-20161116	280-91122-4	Water	11/16/16
4	OUA1-MW42-20161116	280-91122-5	Water	11/16/16
5	OUA1-MW01-20161116	280-91122-6	Water	11/16/16
6	OUA1-MW31-20161116	280-91122-7	Water	11/16/16
7	OUA1-PZ19-20161116	280-91122-8	Water	11/16/16
8	OUA1-MW52-20161116	280-91122-9	Water	11/16/16
9	OUA1-MW04-20161116	280-91122-10	Water	11/16/16
10	OUA1-MW04A-20161116	280-91122-11	Water	11/16/16
11	OUA1-MW05-20161116	280-91122-12	Water	11/16/16
12				
13				

LDC#: 37797C2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: JRC

METHOD: GCMS svoa (EPA SW 846 Method 8270C)

Compound	Concentration (ug/L)		(≤20) RPD	Difference	Limits	Qual
	9	10				
1,4-Dioxane	2.5	1.8	33			

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91122-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW53-20161116	280-91122-3	Water	11/16/16
OUA1-MW54-20161116	280-91122-4	Water	11/16/16
OUA1-MW01-20161116	280-91122-6	Water	11/16/16
OUA1-MW52-20161116	280-91122-9	Water	11/16/16

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (August 2014). 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 methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056
Ferrous Iron by Standard Method 3500 FE D
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

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-detect 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.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
All samples in SDG 280-91122-1	pH	5 days	48 hours	J (all detects)	P
All samples in SDG 280-91122-1	Ferrous iron	9 days	48 hours	UJ (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

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

V. Field Blanks

Sample EB03-20161116 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VI. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Due to technical holding time, data were qualified as estimated in four 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.

MCAS Yuma
Wet Chemistry - Data Qualification Summary - SDG 280-91122-1

Sample	Analyte	Flag	A or P	Reason
OUA1-MW53-20161116 OUA1-MW54-20161116 OUA1-MW01-20161116 OUA1-MW52-20161116	pH	J (all detects)	P	Technical holding times
OUA1-MW53-20161116 OUA1-MW54-20161116 OUA1-MW01-20161116 OUA1-MW52-20161116	Ferrous iron	UJ (all non-detects)	P	Technical holding times

MCAS Yuma
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

MCAS Yuma
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-91122-1

No Sample Data Qualified in this SDG

LDC #: 37797C6
SDG #: 280-91122-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 1/3/17
Page: 1 of 1
Reviewer: a
2nd Reviewer: SM

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Ferrous Iron (3500-FE D) pH, (EPA SW846 Method 9040C)

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 SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=1 SB=SB01-20161114 (SDG: 280-90987-1)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	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	EB03-20161116	280-91122-1	Water	11/16/16
2	OUA1-MW53-20161116	280-91122-3	Water	11/16/16
3	OUA1-MW54-20161116	280-91122-4	Water	11/16/16
4	OUA1-MW01-20161116	280-91122-6	Water	11/16/16
5	OUA1-MW52-20161116	280-91122-9	Water	11/16/16
6	~~EB03-20161116MS~~	~~280-91122-1MS~~	~~Water~~	~~11/16/16~~
7	EB03-20161116MSD	280-91122-1MSD	Water	11/16/16
8	~~EB03-20161116DUP~~	~~280-91122-1DUP~~	~~Water~~	~~11/16/16~~
9				
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 377976

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Parameter
2-5	[✓ pH] TDS [✓ Cl] F [✓ NO_3] NO_2 [✓ SO_4] O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 [✓ Fe^{2+}]
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 37797C6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: CA
2nd reviewer: CA

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	~~SM~~ 9040C				SM3500-FE D		
Parameters:	pH				Ferrous Iron		
Technical holding time:	48 hrs				48 hrs		
Sample ID	**Sampling date**	**Analysis date**	**Total Time**	**Qualifier**	**Analysis date**	**Total Time**	**Qualifier**
All	11/16/16	11/21/16	5days	J/UJ/P(ND)	11/25/16	9days	J/UJ/P(ND)

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: Volatiles

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91192-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW51-20161117	280-91192-3	Water	11/17/16
OUA1-MW50-20161117	280-91192-4	Water	11/17/16
OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16
OUA1-MW49-20161117MS	280-91192-5MS	Water	11/17/16
OUA1-MW49-20161117MSD	280-91192-5MSD	Water	11/17/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect 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 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. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An 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 15.0%.

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.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample TB04-20161117 was identified as a trip blank. No contaminants were found.

Sample EB04-20161117 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all 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 within QC limits. Relative percent differences (RPD) were within QC limits.

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. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

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.

MCAS Yuma
Volatiles - Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

MCAS Yuma
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

MCAS Yuma
Volatiles - Field Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

LDC #: 37797D1
SDG #: 280-91192-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 12/9/16
Page: 1 of 1
Reviewer: Q
2nd Reviewer: NR

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 ≤ 15%. r^2 ICV ≤ 20%
IV.	Continuing calibration /endrin	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1. TB=2. SB01-20161114(280-90987-1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~EB04-20161117~~	~~280-91192-1~~	~~Water~~	~~11/17/16~~
~~2~~	~~TB04-20161117~~	~~280-91192-2~~	~~Water~~	~~11/17/16~~
3	OUA1-MW51-20161117	280-91192-3	Water	11/17/16
4	OUA1-MW50-20161117	280-91192-4	Water	11/17/16
5	OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16
6	OUA1-MW49-20161117MS	280-91192-5MS	Water	11/17/16
7	OUA1-MW49-20161117MSD	280-91192-5MSD	Water	11/17/16
8				
9				
10				

Notes:

LDC #: 31797D1

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: JBG

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	

LDC #: 31797D1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JB

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 31799D1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: JM6

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	11/25/16	S (1st internal standard)	0.3351	0.3351	0.3175	0.3175	3.3	3.3
			AA (2nd internal standard)	1.2757	1.2757	1.2176	1.2176	3.5	3.5
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

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

LDC #: 31797D 1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: JR

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	NSLT760	11/30/16	S (1st internal standard)	0.3175	0.3483	0.3483	9.7	9.7
			AA (2nd internal standard)	1.2176	1.248	1.248	2.5	2.5
			(3rd internal standard)					
			(4th internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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 #: 31197D1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer:
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 5

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	11.0	11.5	104	104	0
1,2-Dichloroethane-d4	|	12.4	113	113	|
Toluene-d8	|	10.9	99	99	|
Bromofluorobenzene	↓	10.7	98	98	✓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 31797D1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 concentration

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

MS/MSD sample: 6/7

Compound	Spike Added (µg/L)		Sample Concentration (µg/L)	Spiked Sample Concentration (µg/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	ND	5.20	5.36	104	104	107	107	3	3
Trichloroethene	V	V	0.27	5.13	5.18	97	97	98	98	1	1
Benzene											
Toluene											
Chlorobenzene											

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 #: 35777D1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: a
2nd Reviewer: SVC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

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

LCS ID: 280-353779

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	5.34	NA	107	107				
Trichloroethene	↓	↓	5.41	↓	108	108				
Benzene										
Toluene										
Chlorobenzene										

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

LDC #: 31910

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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)

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. 5 , 5 :

Conc. = $\frac{(12312)(12.5)(1)}{(180961)(0.3175)(\quad)(\quad)}$

= 20.2678 µL

#	Sample ID	Compound	Reported Concentration (µL)	Calculated Concentration ( )	Qualification
	5	5	0.27		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: 1,4-Dioxane

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91192-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW51-20161117	280-91192-3	Water	11/17/16
OUA1-MW50-20161117	280-91192-4	Water	11/17/16
OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16
OUA1-MW49-20161117MS	280-91192-5MS	Water	11/17/16
OUA1-MW49-20161117MSD	280-91192-5MSD	Water	11/17/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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 not 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
All samples in SDG 280-91192-1	All compounds	11	7	UJ (all non-detects)	P

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample EB04-20161117 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all 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 within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
OUA1-MW49-20161117MS/MSD (OUA1-MW49-20161117**)	1,4-Dioxane	35 (38-120)	36 (38-120)	UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits.

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. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

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

Due to technical holding time and MS/MSD %R, data were qualified as estimated in three 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.

MCAS Yuma
1,4-Dioxane - Data Qualification Summary - SDG 280-91192-1

Sample	Compound	Flag	A or P	Reason
OUA1-MW51-20161117 OUA1-MW50-20161117 OUA1-MW49-20161117**	All compounds	UJ (all non-detects)	P	Technical holding times
OUA1-MW49-20161117**	1,4-Dioxane	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

MCAS Yuma
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

MCAS Yuma
1,4-Dioxane - Field Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

LDC #: 37797D2b

SDG #: 280-91192-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 12/9/16

Page: 1 of 1

Reviewer:

2nd Reviewer: NG

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270C)

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 MW	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/20%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB-1. SB01-20161114 (280-90987-1)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	MW	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
~~1~~	~~EB04-20161117~~	~~280-91192-1~~	~~Water~~	~~11/17/16~~
2	OUA1-MW51-20161117	280-91192-3	Water	11/17/16
3	OUA1-MW50-20161117	280-91192-4	Water	11/17/16
4	OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16
5	OUA1-MW49-20161117MS	280-91192-5MS	Water	11/17/16
6	OUA1-MW49-20161117MSD	280-91192-5MSD	Water	11/17/16
7				
8				
9				
10				

Notes:

LDC #: 31990B4b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer:
2nd Reviewer: JVB

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?		✓		
Was cooler temperature criteria met?.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each ICAL for each instrument?	✓			
Were all percent difference (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 37977D2b

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JV

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
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. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

LDC #: 37797B-b

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : GC/MS BNA (EPA SW 846 Method 8270C)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
All (ND)	W		11-17-16	11-28-16		11	J/UJ

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 37790D2b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: Q
2nd Reviewer: JVG

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

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) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(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?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		5/6	1,4-Dioxane	35 (38-120)	36 (38-120)	( )	4 (ND)	J/UJ/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 37797D2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: Q
2nd Reviewer: JV2

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (5000 std)	Recalculated RRF (5000 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/14/16	1,4-Dioxane (1st internal standard)	0.5594	0.5594	0.5511	0.5511	3.6	3.6
	(SMS_G4)		1,2,4-Trichlorobenzene (2nd internal standard)						
			2,6-Dinitrotoluene (3rd internal standard)						
			Hexachlorobenzene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

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

LDC #: 37797D2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer: JM

METHOD: GC/MS SVOC (EPA SW 846 Method 8270C)

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G4_3718	12/5/16	1,4-Dioxane (1st internal standard)	0.5511	0.5128	0.5128	6.9	6.9
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2	G4_3766	12/6/16	1,4-Dioxane (1st internal standard)	0.5511	0.4945	0.4945	10.3	10.3
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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 #: 31797D-b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl	2500.0	2315.3	93	93	0
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #21191079

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: 2m

METHOD: GC/MS PAH (EPA SW 846 Method 8270C)

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: 5/6

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene											
Pentachlorophenol											
Pyrene											
1,4-Dioxane	9.65	9.81	ND	3.40	3.55	35	35	36	36	4	4

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 #: 31191O-V

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

Reviewer: [illegible]
2nd Reviewer: JM

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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: 280-353290

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene										
Pentachlorophenol										
Pyrene										
1,4-Dioxane	10.0	NA	T-26	NA	T3	T3				

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 #: 35779026

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: GC/MS SVOA (EPA SW 846 Method 8270C)

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. 4 , NB :

Conc. = ( )( )( )( )( ) / ( )( )( )( )( )

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-91192-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW51-20161117	280-91192-3	Water	11/17/16
OUA1-MW50-20161117	280-91192-4	Water	11/17/16
OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16

**Indicates sample underwent Stage 4 validation

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 Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (August 2014). 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 methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056
Ferrous Iron by Standard Method 3500 FE D
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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-detect 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.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
All samples in SDG 280-91192-1	pH	4 days	48 hours	J (all detects)	P
All samples in SDG 280-91192-1	Ferrous iron	8 days	48 hours	J (all detects) UJ (all non-detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

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

V. Field Blanks

Sample EB04-20161117 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 280-90987-1) was identified as a source blank. No contaminants were found.

VI. 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.

VII. Duplicates

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

VIII. 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.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Due to technical holding time, data were qualified as estimated in three 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.

MCAS Yuma
Wet Chemistry - Data Qualification Summary - SDG 280-91192-1

Sample	Analyte	Flag	A or P	Reason
OUA1-MW51-20161117 OUA1-MW50-20161117 OUA1-MW49-20161117**	pH	J (all detects)	P	Technical holding times
OUA1-MW51-20161117 OUA1-MW50-20161117 OUA1-MW49-20161117**	Ferrous iron	J (all detects) UJ (all non-detects)	P	Technical holding times

MCAS Yuma
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

MCAS Yuma
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-91192-1

No Sample Data Qualified in this SDG

LDC #: 37797D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/3/17
SDG #: 280-91192-1 Stage 2B/4 Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: CG
SM 2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Ferrous Iron (3500-FE D) pH, (EPA SW846 Method 9040C)

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/SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=1 SB=SB01-20161114 (SDG: 280-90987-1)
VI.	Matrix Spike/Matrix Spike Duplicates	N	CS
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for Stage 2B validation.
XI	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

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	EB04-20161117	280-91192-1	Water	11/17/16
2	OUA1-MW51-20161117	280-91192-3	Water	11/17/16
3	OUA1-MW50-20161117	280-91192-4	Water	11/17/16
4	OUA1-MW49-20161117**	280-91192-5**	Water	11/17/16
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 37797D6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer:

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓	✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 37797B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ______

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
2-4		[✓ pH] TDS [✓ Cl] F [✓ NO_3] NO_2 [✓ SO_4] PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 [✓ Fe^{II+}] ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments: ____

LDC #: 37197D6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: GQ
2nd reviewer:

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	9040				SM3500FE-D		
Parameters:	pH				Ferrous Iron		
Technical holding time:	48hrs				48 hrs		
Sample ID	Sampling date	Analysis date	Total Time	Qualifier	Analysis date	Total Time	Qualifier
All	11/17/16	11/21/16	4days	J/UJ/R(pH)	11/25/16	8days	J/UJ/P (Dup)

LDC #: 37907D6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 10/7/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cl	s1	1.0	18297919	*1.000*	*1.000*	Y
		s2	2.5	44595772			
		s3	5	89809352			
		s4	60	1129842185			
		s5	120	2243362063			
		s6	200	3718642140			
Calibration verification	SO_4	CCV	100	Found 101.4	101	101	
Calibration verification	Fe^{II+}	↓	1.00	1.02	102	102	↓
Calibration verification							

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

LDC #: 37797D6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: 4

METHOD: Inorganics, Method see cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Ferrous Fe	1.90	2.00	95	95	Y
N	Matrix spike sample		(SSR-SR)				
N	Duplicate sample						

Comments: _____

LDC #: 37797D6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer:

METHOD: Inorganics, Method see cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl reported with a positive detect were recalculated and verified using the following equation:

Concentration = Area($S_N 10^8$) - 0.09

Recalculation: 20 (84929047/($S_N 10^8$) - 0.09) = 910.4 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	4	pH (SU)	7.7	7.7	Y
		Cl	910	910	
		NO_3-N	3.4	3.4	
		SO_4	1400	1400	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 2B & 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1601451

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW13-20161114	1601451-03	Water	11/14/16
OUA1-MW37-20161114	1601451-04	Water	11/14/16
OUA1-MW37A-20161114	1601451-05	Water	11/14/16
OUA1-HS03-20161114	1601451-06	Water	11/14/16
OUA1-MW19-20161114	1601451-07	Water	11/14/16
OUA1-MW18-20161114**	1601451-08**	Water	11/14/16
OUA1-MW08-20161114	1601451-09	Water	11/14/16
OUA1-MW06-20161114	1601451-10	Water	11/14/16
OUA1-HS03-20161114MS	1601451-06MS	Water	11/14/16
OUA1-HS03-20161114MSD	1601451-06MSD	Water	11/14/16

**Indicates sample underwent Stage 4 validation

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 Addendum 3 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (February 2017), the Final Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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.

NJ (Presumptive and Estimated): The analysis indicates the presence of a compound or analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

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.

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

Continuing calibration was performed at required frequencies.

The percent differences (%D) 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 EB01-20161114 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 was identified as a source blank. No contaminants were found.

VII. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery Samples

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples OUA1-MW37-20161114 and OUA1-MW37A-20161114 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Differences (Limits)	Flag	A or P
	OUA1-MW37-20161114	OUA1-MW37A-20161114				
PFBS	145	139	4 (≤20)	-	-	-
PFOA	26.2	28.9	10 (≤20)	-	-	-
PFOS	25.0	27.8	11 (≤20)	-	-	-

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. 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.

MCAS Yuma
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1601451

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1601451

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1601451

No Sample Data Qualified in this SDG

LDC #: 37797G96 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/29/16
SDG #: 1601451 Stage 2B/4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: R
2nd Reviewer: JVB

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

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	N	
III.	Initial calibration/ICV	A A	RSD ≤ 30%. r^2 ICV ≤ 30%
IV.	Continuing calibration	A	RC limits <30%
V.	Laboratory Blanks	A	
VI.	Field blanks	NO	SB=1. EB = 2
~~VII.~~	~~Surrogate spikes~~		
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	OPR
X.	Field duplicates	SW	D=4+5
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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

** Indicates sample was underwent Stage 4 review

	Client ID	Lab ID	Matrix	Date
~~1~~	~~SB01-20161114~~	~~1601451-01~~	~~Water~~	~~11/14/16~~
~~2~~	~~EB01-20161114~~	~~1601451-02~~	~~Water~~	~~11/14/16~~
3	OUA1-MW13-20161114	1601451-03	Water	11/14/16
4	OUA1-MW37-20161114	1601451-04	Water	11/14/16
5	OUA1-MW37A-20161114	1601451-05	Water	11/14/16
6	OUA1-HS03-20161114	1601451-06	Water	11/14/16
7	OUA1-MW19-20161114	1601451-07	Water	11/14/16
8	OUA1-MW18-20161114**	1601451-08**	Water	11/14/16
9	OUA1-MW08-20161114	1601451-09	Water	11/14/16
10	OUA1-MW06-20161114	1601451-10	Water	11/14/16
11	OUA1-HS03-20161114MS	1601451-06MS	Water	11/14/16
12	OUA1-HS03-20161114MSD	1601451-06MSD	Water	11/14/16
13				
14				

LDC #: 37147G96

VALIDATION FINDINGS CHECKLIST

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

Method: LCMS (EPA Method 537)

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 specified criteria?			✓	
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < ~~15~~ 35%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration < ~~15%?~~ acents	✓			
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? If yes, please see the Blanks validation completeness worksheet.		✓		
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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 37196F96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: 9R

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. Internal standards				
Were internal standard area counts within ± ~~60%~~ QC limits of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC#: 37797G96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd Reviewer: JM

METHOD: LCMS PFCs (EPA Method 537)

Compound	Concentration (ng/L)		(≤20) RPD	Difference	Limits	Qual
	4	5				
PFBS	145	139	4			
PFOA	26.2	28.9	10			
PFOS	25.0	27.8	11			

V:\FIELD DUPLICATES\37797G96.wpd

LDC#: 37797G96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 2nd Reviewer:

Method: LC/MS/MS PFCs

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
11/22/2016	LCMS03	PFOA	0	0.5677075	0.50
			s1	0.9756087	1.00
			s2	1.8279562	2.00
			s3	4.0526312	5.00
			s4	9.8076912	10.00
			s5	23.514343	25.00
			s6	45.372340	50.00
			s7	68.277310	75.00
			s8	88.133640	100.00

Regression Output		***Reported***
Constant	*0.384668*	*0.091734*
Std Err of Y Est		
R Squared	*0.999416*	*0.999048*
Degrees of Freedom		
X Coefficient(s)	*0.890381*	*0.899906*
Std Err of Coef.		
Correlation Coefficient	*0.999708*	
Coefficient of Determination (r^2)	*0.999416*	*0.999048*

LDC #: 31796

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: A
2nd Reviewer: JC

METHOD: GC ____ / HPLC / LCMS

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

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	161127L2	11/27/16	PFOA	25.0	26.5	26.5	5.9	5.8
2	161127L2T	11/27/16	PFOA	25.0	26.3	26.3	5.1	5.0
3								
4								

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 #: 31797&96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: Q
2nd Reviewer: JM

METHOD: ___ GC ✓ HPLC KLS

The percent recoveries (%R) and relative percent differences (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 SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 11 / 12

Compound	Spike Added ( )		Sample Conc. ( )	Spike Sample Concentration ( )		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
PFOA	79.3	78.9	36.3	114	115	97.5	98.0	100	100	2.53	2.02

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 #: 31791E96

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

Reviewer: 9
2nd Reviewer: JB

METHOD: __ GC √ HPLC/MS

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* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: OPR

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
DEA	80.0	NA	86.0	NA	10T	10T				

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

LDC #: 31996

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: 9
2nd Reviewer: JVB

METHOD: __ GC √ HPLC LCMS

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% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 8 Compound Name PFOA

Concentration = $\frac{\left(\frac{1.245e2 \times 12.5}{2.382e4} - 0.091744\right)}{(0.899906)(0.124)}$

$= 2.585$ ng/L

#	Sample ID	Compound	Reported Concentrations (ng/L)	Recalculated Results Concentrations ( )	Qualifications
	8	PFOA	2.58		

omments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 2B & 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1601461

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW14-20161115**	1601461-02**	Water	11/15/16
OUA1-MW15-20161115	1601461-03	Water	11/15/16
OUA1-MW07-20161115	1601461-04	Water	11/15/16
OUA1-MW23-20161115	1601461-05	Water	11/15/16
OUA1-MW55-20161115	1601461-06	Water	11/15/16
OUA1-MW55A-20161115	1601461-07	Water	11/15/16
OUA1-MW27-20161115	1601461-08	Water	11/15/16
OUA1-MW25-20161115	1601461-09	Water	11/15/16
OUA1-MW11-20161115	1601461-10	Water	11/15/16

**Indicates sample underwent Stage 4 validation

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 Addendum 3 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (February 2017), the Final Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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.

NJ (Presumptive and Estimated): The analysis indicates the presence of a compound or analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

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.

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

Continuing calibration was performed at required frequencies.

The percent differences (%D) 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 EB02-20161115 was identified as an equipment blank. No contaminants were found.

Sample SB01-20161114 (from SDG 1601451) was identified as a source blank. No contaminants were found.

VII. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery Samples

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples OUA1-MW55-20161115 and OUA1-MW55A-20161115 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Differences (Limits)	Flag	A or P
	OUA1-MW55-20161115	OUA1-MW55A-20161115				
PFOS	5.39	5.33	-	0.06 (≤8.19)	-	-

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. 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.

MCAS Yuma
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1601461

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1601461

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1601461

No Sample Data Qualified in this SDG

LDC #: 37797H96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/9/16
SDG #: 1601461 Stage 2B/4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: JRC

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

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	N	
III.	Initial calibration/ICV	A/A	RSD ≤ 20% r² ≥ 0.99 ICV ≤ 30%
IV.	Continuing calibration	A	~~RS limits~~ ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB-1. SB01-20161114 (1601451)
~~VII.~~	~~Surrogate spikes~~		
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	OPR
X.	Field duplicates	SW	D = G+T
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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:

** Indicates sample was underwent Stage 4 review

	Client ID	Lab ID	Matrix	Date
1	~~EB02-20161115~~	~~1601461-01~~	~~Water~~	~~11/15/16~~
2	OUA1-MW14-20161115**	1601461-02**	Water	11/15/16
3	OUA1-MW15-20161115	1601461-03	Water	11/15/16
4	OUA1-MW07-20161115	1601461-04	Water	11/15/16
5	OUA1-MW23-20161115	1601461-05	Water	11/15/16
6	OUA1-MW55-20161115	1601461-06	Water	11/15/16
7	OUA1-MW55A-20161115	1601461-07	Water	11/15/16
8	OUA1-MW27-20161115	1601461-08	Water	11/15/16
9	OUA1-MW25-20161115	1601461-09	Water	11/15/16
10	OUA1-MW11-20161115	1601461-10	Water	11/15/16
11				
12				
13				
14				

LDC #: 35791#96

VALIDATION FINDINGS CHECKLIST

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

Method: LCMS (EPA Method 537)

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 specified criteria?			✓	
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 25%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 25%?	✓			
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? If yes, please see the Blanks validation completeness worksheet.		✓		
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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 35797H96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JZ

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. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC#: 37797H96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: JD

METHOD: LCMS PFCs (EPA Method 537)

Compound	Concentration (ng/L)		(≤20) RPD	Difference	Limits	Qual
	6	7				
PFOS	5.39	5.33		0.06	≤8.19	

V:\FIELD DUPLICATES\37797H96.wpd

LDC#: 37797H96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: MG

Method: LC/MS/MS PFCs

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
11/22/2016	LCMS03	PFOA	0	0.5677075	0.50
			s1	0.9756087	1.00
			s2	1.8279562	2.00
			s3	4.0526312	5.00
			s4	9.8076912	10.00
			s5	23.514343	25.00
			s6	45.372340	50.00
			s7	68.277310	75.00
			s8	88.133640	100.00

Regression Output		***Reported***
Constant	*0.384668*	*0.091734*
Std Err of Y Est		
R Squared	*0.999416*	*0.999048*
Degrees of Freedom		
X Coefficient(s)	*0.890381*	*0.899906*
Std Err of Coef.		
Correlation Coefficient	*0.999708*	
Coefficient of Determination (r^2)	*0.999416*	*0.999048*

LDC #: 31791H96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: JVB

METHOD: GC ✓ HPLC ~~✓~~ N/S

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

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	161212F1_2	11/6T/16	DFOA	25.0	26.5	26.5	5.9	5.8
2	161212F1_3	11/5T/16	DFOA	25.0	27.4	27.4	9.4	9.6
3								
4								

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 #: 31796H96

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

Reviewer: 9
2nd Reviewer: NC

METHOD: __ GC √ HPLC 8015

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* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: OPR

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/g)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
PFOA	80.0	NA	86.0	NA	107	107				

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

LDC #: 37961/96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: __ GC ✓ HPLC MS

(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% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. R Compound Name PFOA

Concentration = $\frac{\left(\frac{9.9\text{+e}3 \times 12.5}{2.61\text{+e}4} - 0.0917344\right)}{(0.899906)(0.128)} = 40.44 \text{ ng/L}$

Total = 46.9 ng/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

omments: _____

SAMPCALew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 4, 2017

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 2B

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1601464

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW53-20161116	1601464-02	Water	11/16/16
OUA1-MW54-20161116	1601464-03	Water	11/16/16
OUA1-MW42-20161116	1601464-04	Water	11/16/16
OUA1-MW01-20161116	1601464-05	Water	11/16/16
OUA1-MW31-20161116	1601464-06	Water	11/16/16
OUA1-PZ19-20161116	1601464-07	Water	11/16/16
OUA1-MW52-20161116	1601464-08	Water	11/16/16
OUA1-MW04-20161116	1601464-09	Water	11/16/16
OUA1-MW04A-20161116	1601464-10	Water	11/16/16
OUA1-MW05-20161116	1601464-11	Water	11/16/16

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 Addendum 3 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (February 2017), the Final Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

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.

NJ (Presumptive and Estimated): The analysis indicates the presence of a compound or analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

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 not required by the method.

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.

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

Continuing calibration was performed at required frequencies.

The percent differences (%D) 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 with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
B6K0164-BLK1	11/28/16	PFOA	0.916 ng/L	All samples in SDG 1601464

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
OUA1-MW01-20161116	PFOA	1.40 ng/L	1.95U ng/L
OUA1-MW05-20161116	PFOA	0.859 ng/L	1.94U ng/L

VI. Field Blanks

Sample EB03-20161116 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB03-20161116	11/16/16	PFOA	0.837 ng/L	All samples in SDG 1601464

Sample SB01-20161114 (from SDG 1601451) was identified as a source blank. No contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
OUA1-MW01-20161116	PFOA	1.40 ng/L	1.95U ng/L
OUA1-MW05-20161116	PFOA	0.859 ng/L	1.94U ng/L

VII. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery Samples

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples OUA1-MW04-20161116 and OUA1-MW04A-20161116 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
	OUA1-MW04-20161116	OUA1-MW04A-20161116				
PFBS	157	162	3 (≤20)	-	-	-
PFOA	20.0	22.1	10 (≤20)	-	-	-
PFOS	2.50	2.83	-	0.33 (≤8.34)	-	-

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected in two samples.

Due to equipment blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

MCAS Yuma
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1601464

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1601464

Sample	Compound	Modified Final Concentration	A or P
OUA1-MW01-20161116	PFOA	1.95U ng/L	A
OUA1-MW05-20161116	PFOA	1.94U ng/L	A

MCAS Yuma
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1601464

Sample	Compound	Modified Final Concentration	A or P
OUA1-MW01-20161116	PFOA	1.95U ng/L	A
OUA1-MW05-20161116	PFOA	1.94U ng/L	A

LDC #: 37797I96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/29/16

SDG #: 1601464 Stage 2B Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: [illegible]

2nd Reviewer: JR

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

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	N	
III.	Initial calibration/ICV	A/A	RSD ≤ 30% . r^2 ICV ≤ 30%
IV.	Continuing calibration	A	QC limits ≤ 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB=1. SB01-20161114 (1601451)
~~VII.~~	~~Surrogate spikes~~		
VIII.	Matrix spike/Matrix spike duplicates	AN	
IX.	Laboratory control samples	A	OPR
X.	Field duplicates	SW	D = 9+10
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
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	~~EB03-20161116~~	~~1601464-01~~	~~Water~~	~~11/16/16~~
2	OUA1-MW53-20161116	1601464-02	Water	11/16/16
3	OUA1-MW54-20161116	1601464-03	Water	11/16/16
4	OUA1-MW42-20161116	1601464-04	Water	11/16/16
5	OUA1-MW01-20161116	1601464-05	Water	11/16/16
6	OUA1-MW31-20161116	1601464-06	Water	11/16/16
7	OUA1-PZ19-20161116	1601464-07	Water	11/16/16
8	OUA1-MW52-20161116	1601464-08	Water	11/16/16
9	OUA1-MW04-20161116	1601464-09	Water	11/16/16
10	OUA1-MW04A-20161116	1601464-10	Water	11/16/16
11	OUA1-MW05-20161116	1601464-11	Water	11/16/16
12				
13				
14				

LDC #: 31797196

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CA
2nd Reviewer: JR

METHOD: √GC/ECDs

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

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 11/6/16 **Blank analysis date:** 11/8/16
Conc. units: ng/L **Associated samples:** all

Compound	Blank ID	Sample Identification								
	BLK0164-BA1 5x	5	11							
PFOA	0.916	4.58	1.40 / 1.95U	0.859 / 1.94U						

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 3T191196

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CO
2nd Reviewer: JB

METHOD: ~~GC~~ LC/MS

Y N N/A Field blanks were identified in this SDG.
Y N N/A Were target compounds detected in the field blanks?
Blank units: NS/L **Associated sample units:** NS/L
Sampling date: 11/16/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: ALL

Compound	Blank ID	Sample Identification								
	1	5X	5	11						
PFOA	0.83J	4.185	1.40/1.954	0.859/1.944						

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 37797I96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: JVC

METHOD: LCMS PFCs (EPA Method 537)

Compound	Concentration (ng/L)		(≤20) RPD	Difference	Limits	Qual
	9	10				
PFBS	157	162	3			
PFOA	20.0	22.1	10			
PFOS	2.50	2.83		0.33	≤8.34	

V:\FIELD DUPLICATES\37797I96.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma

LDC Report Date: January 5, 2017

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 2B & 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1601472

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUA1-MW51-20161117	1601472-02	Water	11/17/16
OUA1-MW50-20161117	1601472-03	Water	11/17/16
OUA1-MW49-20161117**	1601472-04**	Water	11/17/16
OUA1-MW49-20161117MS	1601472-04MS	Water	11/17/16
OUA1-MW49-20161117MSD	1601472-04MSD	Water	11/17/16

**Indicates sample underwent Stage 4 validation

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 Addendum 3 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (February 2017), the Final Addendum 2 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (September 2015), the Final Addendum 1 to the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, for Groundwater Long Term Monitoring and System Operation at Marine Corps Air Station Yuma, Yuma, Arizona (May 2013), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (August 2014). 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

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the 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.

NJ (Presumptive and Estimated): The analysis indicates the presence of a compound or analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

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.

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

Continuing calibration was performed at required frequencies.

The percent differences (%D) 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 with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
BLK0164-BLK1	11/28/16	PFOA	0.916 ng/L	All samples in SDG 1601472

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
OUA1-MW49-20161117**	PFOA	0.821 ng/L	1.98U ng/L

VI. Field Blanks

Sample EB04-20161117 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
EB04-20161117	11/17/16	PFOA	0.741 ng/L	All samples in SDG 1601472

Sample SB01-20161114 (from SDG 1601451) was identified as a source blank. No contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
OUA1-MW49-20161117**	PFOA	0.821 ng/L	1.98U ng/L

VII. 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 within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery Samples

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to equipment blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

MCAS Yuma
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1601472

No Sample Data Qualified in this SDG

MCAS Yuma
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1601472

Sample	Compound	Modified Final Concentration	A or P
OUA1-MW49-20161117**	PFOA	1.98U ng/L	A

MCAS Yuma
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1601472

Sample	Compound	Modified Final Concentration	A or P
OUA1-MW49-20161117**	PFOA	1.98U ng/L	A

LDC #: 37797J96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/29/16

SDG #: 1601472 Stage 2B/4 Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: 1

2nd Reviewer: JRC

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

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	N	
III.	Initial calibration/ICV	A A	RSD ≤ 20%. r² ICV ≤ 30%
IV.	Continuing calibration	A	RT limits ≤ 30%
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB-1. SB01—20161114(160451)
~~VII.~~	~~Surrogate spikes~~		
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	OPR
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Stage 2B validation.
XIII.	Target compound identification	A	Not reviewed for Stage 2B validation.
XIV.	System performance	A	Not reviewed for Stage 2B validation.
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

** Indicates sample was underwent Stage 4 review

	Client ID	Lab ID	Matrix	Date
~~1~~	~~EB04-20161117~~	~~1601472-01~~	~~Water~~	~~11/17/16~~
2	OUA1-MW51-20161117	1601472-02	Water	11/17/16
3	OUA1-MW50-20161117	1601472-03	Water	11/17/16
4	OUA1-MW49-20161117**	1601472-04**	Water	11/17/16
5	OUA1-MW49-20161117MS	1601472-04MS	Water	11/17/16
6	OUA1-MW49-20161117MSD	1601472-04MSD	Water	11/17/16
7				
8				
9				
10				

Notes:

LDC #: 38197196

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: JVB

Method: LCMS (EPA Method 537)

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 specified criteria?			✓	
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration ≤ 15%?	✓			
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? If yes, please see the Blanks validation completeness worksheet.	✓			
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 a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
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 for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 35797196

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: MC

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. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓ QC			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion 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 relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 31796N96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CA
2nd Reviewer: JM

METHOD: VOCs/MS

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

(Y) N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
(Y) N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

Blank extraction date: 11/28/16 **Blank analysis date:** 11/29/16
Conc. units: ng/L **Associated samples:** All

Compound	Blank ID	Sample Identification								
	BLK0164-BK1	4								
PFOA	0.916	0.821 / 1.984								

Blank extraction date: _____ **Blank analysis date:** _____ **Associated samples:** _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 31797J46

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: A
2nd Reviewer: JVC

METHOD: ~~GC~~ LC/MS

Y N N/A Field blanks were identified in this SDG.
Y N N/A Were target compounds detected in the field blanks?

Blank units: NS/L **Associated sample units:** NS/L
Sampling date: 11/17/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification								
	1	4 EB								
PFOA	0.741	0.821 / 1.984								

Blank units:_____ **Associated sample units:**_____
Sampling date:_____
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 37T9T196

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC ✓ HPLC NA

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

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	~~WI129J1-3A~~	11/29/16	PFOS	25.0	25.0	25.05	0.1	0.2
2								
3								
4								

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#: 37797J96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: JR

Method: LC/MS/MS PFCs

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
11/18/2016	LCMS03	PFOS	0	0.60049	0.50
			s1	1.1604475	1.00
			s2	2.2448212	2.00
			s3	5.0137362	5.00
			s4	12.566843	10.00
			s5	34.250763	25.00
			s6	54.687500	50.00
			s7	86.829836	75.00
			s8	111.555230	100.00

Regression Output

		Reported
Constant	*0.841659*	*0.021829*
Std Err of Y Est		
R Squared	*0.996818*	*0.995038*
Degrees of Freedom		
X Coefficient(s)	*1.122290*	*1.149810*
Std Err of Coef.		
Correlation Coefficient	*0.998408*	
Coefficient of Determination (r^2)	*0.996818*	*0.995038*

LDC #: 31971 96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: a
2nd Reviewer: JB

METHOD: ___ GC √ HPLC HPLC

The percent recoveries (%R) and relative percent differences (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 SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 5/6

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
PFOS	11.8	11.1	ND	8T.4	18.8	112	112	106	106	5.50	5.50

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 #: 37951 98

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

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

METHOD: __ GC V HPLC MS

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* (SSC-SC)/SA

RPD = | SSCLCS - SSCLCSD | * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: OPR

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
4605	80.0	NA	84.7	NA	106	106				

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

LDC #: 31191-96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: 9
2nd Reviewer: JR

METHOD: __ GC ✓ HPLC PFAS

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% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 4 Compound Name PFOA

$$\text{Concentration} = \frac{-1.30489 + \sqrt{(1.30489)^2 - [4 \times (-0.0031640 3)(\frac{6.349e1 \times 1.5}{624.1e1} - 0.00818696)]}}{2 \times (-0.0031640 3)(0.126)}$$

$$= 0.823 \text{ ng/L}$$

#	Sample ID	Compound	Reported Concentrations (ng/L)	Recalculated Results Concentrations ( )	Qualifications
	4	PFOA	0.821		

omments: _____

The zip file contains two files:

File	Format	Description	
1) Readme_Yuma_010617.docs	MS Word	A "Readme" file (this document).	
	MS Excel	A spreadsheet for the following SDGs:	
2) Validation Export_Nov2016_20161219.xlsx		280-90987-1	37797A
		280-91067-1	37797B
		280-91122-1	37797C
		280-91192-1	37797D
		1601451	37797G
		1601461	37797H
		1601464	37797I
		1601472	37797J
3) ValExp_Yuma_VCT_Nov2016_20161215.xlsx		280-91405-1	37797E
4) ValExp_Yuma_VCT_Nov2016PFAS_20161219.xlsx		1601443	37797F

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Pei Geng at (760) 827-1100 if you have any questions regarding this electronic data submittal.

LDC #: 37197

EDD POPULATION COMPLETENESS WORKSHEET

Date: 1/6/17
Page: 1 of 1
2nd Reviewer: BA

The LDC job number listed above was entered by JE.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	- 10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	—	
IIb.	- Reason Codes used? If so, note which codes.	Y	client
IIc.	- Additional Information (QC Level, Validator, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y	
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	Y	
IIId.	-Does the detect flag require changing for blank qualifier? If so, are all U results marked ND?	Y/Y	
IIIe.	- Do blank concentrations in report match EDD where data was qualified due to blank contamination?	Y	
IIIf.	- Were any results reported above calibration range? If so, were results qualified appropriately?	Y/Y	
IIIg.	-Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	Y	

Notes: *see discrepancy sheet

The zip file contains two files:

File	Format	Description	
1) Readme_Yuma_010617.docs	MS Word	A "Readme" file (this document).	
	MS Excel	A spreadsheet for the following SDGs:	
2) Validation Export_Nov2016_20161219.xlsx		280-90987-1	37797A
		280-91067-1	37797B
		280-91122-1	37797C
		280-91192-1	37797D
		1601451	37797G
		1601461	37797H
		1601464	37797I
		1601472	37797J
3) ValExp_Yuma_VCT_Nov2016_20161215.xlsx		280-91405-1	37797E
4) ValExp_Yuma_VCT_Nov2016PFAS_20161219.xlsx		1601443	37797F

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

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LDC #: 37197

EDD POPULATION COMPLETENESS WORKSHEET

Date: 1/6/17
Page: 1 of 1
2nd Reviewer: BA

The LDC job number listed above was entered by JE.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	- 10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	—	
IIb.	- Reason Codes used? If so, note which codes.	Y	client
IIc.	- Additional Information (QC Level, Validator, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y	
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	Y	
IIId.	-Does the detect flag require changing for blank qualifier? If so, are all U results marked ND?	Y/Y	
IIIe.	- Do blank concentrations in report match EDD where data was qualified due to blank contamination?	Y	
IIIf.	- Were any results reported above calibration range? If so, were results qualified appropriately?	Y/Y	
IIIg.	-Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	Y	

Notes: *see discrepancy sheet

INSTALLATION_ID	SDG	LOCATION-NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	COORD_X	COORD_Y	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIC_DESC	COLLECT_DATE	CHEMICAL_NAME
MCAS YUMA	1601464	A1-MW-05	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436301.6301	607443.138	OUA1-MW05-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-05	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436301.6301	607443.138	OUA1-MW05-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-05	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436301.6301	607443.138	OUA1-MW05-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04A-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04A-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-04	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436280.9228	607319.2492	OUA1-MW04A-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-PZ-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436357.6995	607259.7175	OUA1-PZ19-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-PZ-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436357.6995	607259.7175	OUA1-PZ19-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-PZ-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436357.6995	607259.7175	OUA1-PZ19-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-31	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436610.1639	607254.3576	OUA1-MW31-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-31	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436610.1639	607254.3576	OUA1-MW31-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-31	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436610.1639	607254.3576	OUA1-MW31-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-52	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436320.115	607239.298	OUA1-MW52-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-52	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436320.115	607239.298	OUA1-MW52-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-52	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436320.115	607239.298	OUA1-MW52-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-01	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436397.4025	607204.2176	OUA1-MW01-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-01	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436397.4025	607204.2176	OUA1-MW01-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-01	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436397.4025	607204.2176	OUA1-MW01-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-42	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436422.6597	607084.7952	OUA1-MW42-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-42	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436422.6597	607084.7952	OUA1-MW42-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-42	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	436422.6597	607084.7952	OUA1-MW42-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-54	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.456	606933.323	OUA1-MW54-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-54	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.456	606933.323	OUA1-MW54-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-54	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.456	606933.323	OUA1-MW54-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601464	A1-MW-53	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.185	606920.256	OUA1-MW53-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601464	A1-MW-53	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.185	606920.256	OUA1-MW53-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601464	A1-MW-53	OU 0000001 AREA 1	YUMA_MCAS	WLM	MONITORING WELL	436340.185	606920.256	OUA1-MW53-20161116	WG	GROUNDWATER	16-Nov-16	Perfluorobutanesulfonic Acid (PFBS)