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 1601451

Marine Corps Air Station Yuma
Yuma, Arizona

November 2019

December 19, 2016

Vista Work Order No. 1601451

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 15, 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. 1601451
Case Narrative

Sample Condition on Receipt:

Ten aqueous 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 QAPP acceptance criteria.

As requested, an MS/MSD was performed on sample "OUAI-HS03-20161114".

Table of Contents

Sample Inventory Report

Vista Sample ID	Client Sample ID		Sampled	Received	Components/Containers
1601451-01	SB01-20161114		14-Nov-16 14:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-02	EB01-20161114		14-Nov-16 14:30	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-03	OUA1-MW13-20161114		14-Nov-16 08:15	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-04	OUA1-MW37-20161114		14-Nov-16 09:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-05	OUA1-MW37A-20161114		14-Nov-16 09:05	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-06	OUA1-HS03-20161114	MS/MSD	14-Nov-16 10:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
1601451-07	OUA1-MW19-20161114		14-Nov-16 11:10	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-08	OUA1-MW18-20161114		14-Nov-16 11:45	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-09	OUA1-MW08-20161114		14-Nov-16 12:45	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-10	OUA1-MW06-20161114		14-Nov-16 13:50	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL

Vista Project: 1601451

Client Project: MCAS Yuma, AZ TO 105

ANALYTICAL RESULTS

Sample ID: Method Blank — Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0143	Lab Sample:	B6K0143-BLK1
Sample Size:	0.125 L	Date Extracted:	22-Nov-2016 7:59	Date Analyzed:	27-Nov-16 15:44 Column: BEH C18

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

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	116	60 - 150	
IS	13C2-PFOA	97.1	60 - 150	
IS	13C8-PFOS	90.0	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: OPR

Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0143	Lab Sample:	B6K0143-BS1
Sample Size:	0.125 L	Date Extracted:	22-Nov-2016 7:59	Date Analyzed:	27-Nov-16 14:41 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	%R	Limits
PFBS	78.9	80.0	98.6	60 - 130
PFOA	86.0	80.0	107	70 - 130
PFOS	74.4	80.0	93.0	70 - 130

	Labeled Standard	%R	LCL-UCL
IS	13C3-PFBS	116	60 - 150
IS	13C2-PFOA	106	60 - 150
IS	13C8-PFOS	126	60 - 150

LCL-UCL - Lower control limit - upper control limit

Sample ID: SB01-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 14:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.122 L

Laboratory Data

Lab Sample: 1601451-01 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 19:44 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.83	4.10	8.17	
PFOA	ND	0.665	2.05	8.17	
PFOS	ND	0.824	0.922	8.17	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	122	60 - 150	
IS	13C2-PFOA	106	60 - 150	
IS	13C8-PFOS	124	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: EB01-20161114

Modified EPA Method 537

Client Data

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

Sample Data

Matrix: Water
Sample Size: 0.126 L

Laboratory Data

Lab Sample: 1601451-02 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 19:57 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.77	3.97	7.91	
PFOA	ND	0.644	1.98	7.91	
PFOS	ND	0.798	0.893	7.91	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	113	60 - 150	
IS	13C2-PFOA	99.7	60 - 150	
IS	13C8-PFOS	107	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-MW13-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 8:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-03 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:09 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	275	1.71	3.85	7.66	
PFOA	62.5	0.624	1.92	7.66	
PFOS	71.6	0.773	0.865	7.66	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	128	60 - 150	
IS	13C2-PFOA	98.0	60 - 150	
IS	13C8-PFOS	122	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-MW37-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 9:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601451-04 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:22 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	145	1.71	3.82	7.64	
PFOA	26.2	0.622	1.91	7.64	
PFOS	25.0	0.771	0.859	7.64	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	130	60 - 150	
IS	13C2-PFOA	100	60 - 150	
IS	13C8-PFOS	129	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-MW37A-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 9:05
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-05 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:34 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	139	1.72	3.85	7.67	
PFOA	28.9	0.624	1.92	7.67	
PFOS	27.8	0.774	0.865	7.67	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	133	60 - 150	
IS	13C2-PFOA	109	60 - 150	
IS	13C8-PFOS	114	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-HS03-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 10:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-06 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:47 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	289	1.72	3.85	7.70	
PFOA	36.3	0.627	1.92	7.70	
PFOS	ND	0.777	0.865	7.70	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	137	60 - 150	
IS	13C2-PFOA	98.4	60 - 150	
IS	13C8-PFOS	117	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.

Matrix Spike Results

Modified EPA Method 537

Source Client ID: OUA1-HS03-20161114
Source LabNumber: 1601451-06
Matrix: Aqueous
Sample Size: 0.126/0.127 L

QC Batch: B6K0143
Date Extracted: 22-Nov-2016 7:59

Lab Sample: B6K0143-MS1/B6K0143-MSD1
Date Analyzed: 27-Nov-16 21:00 Column: BEH C18
27-Nov-16 21:12 Column: BEH C18

Analyte	Spike-MS (ng/L)	MS %R	MS Qual.	Spike-MSD (ng/L)	MSD %R	RPD	MSD Qual.	%R Limit	%RPD Limit
PFBS	79.3	98.0		78.9	99.0	1.02		60 - 130	25
PFOA	79.3	97.5		78.9	100	2.53		70 - 130	25
PFOS	79.3	86.5		78.9	87.7	1.38		70 - 130	25

	Labeled Standard	MS %R	MS Qualifiers	MSD %R	MS Qual.
IS	13C3-PFBS	140		138	
IS	13C2-PFOA	104		101	
IS	13C8-PFOS	118		117	

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-MW19-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 11:10
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601451-07 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 21:25 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	14.6	1.71	3.82	7.65	
PFOA	79.3	0.623	1.91	7.65	
PFOS	106	0.772	0.859	7.65	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	137	60 - 150	
IS	13C2-PFOA	103	60 - 150	
IS	13C8-PFOS	121	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-MW18-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 11:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.124 L

Laboratory Data

Lab Sample: 1601451-08 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 21:37 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	12.1	1.80	4.03	8.06	
PFOA	2.58	0.656	2.02	8.06	J
PFOS	12.2	0.813	0.907	8.06	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	128	60 - 150	
IS	13C2-PFOA	108	60 - 150	
IS	13C8-PFOS	111	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-MW08-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 12:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.126 L

Laboratory Data

Lab Sample: 1601451-09 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 22:28 Column: BEH C18
28-Nov-16 10:22 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	2540	8.85	19.8	39.5	D
PFOA	145	0.643	1.98	7.91	
PFOS	13.6	0.798	0.893	7.91	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	135	60 - 150	D
IS	13C2-PFOA	108	60 - 150	
IS	13C8-PFOS	134	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-MW06-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 13:50
Location:

Sample Data

Matrix: Water
Sample Size: 0.123 L

Laboratory Data

Lab Sample: 1601451-10 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 22:41 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	121	1.82	4.07	8.15	
PFOA	113	0.663	2.03	8.15	
PFOS	4.38	0.822	0.915	8.15	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	118	60 - 150	
IS	13C2-PFOA	106	60 - 150	
IS	13C8-PFOS	102	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

CHAIN OF CUSTODY RECORD

DATE: 11/14/2016 – B

Vista PM: Karen Lopez 1601451 08C

PAGE: 1 OF 1

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) Wes 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.)
	SB01 – 2016 11 14	11/14/16	14:00	W	2		X
	EB01 – 2016 11 14		14:30		2		X
	OUA1 – MW13 – 20161114		8:15		2		X
	OUA1 – MW37 – 2016 11 14		9:00		2		X
	OUA1 – MW37A – 2016 11 14		9:05		2		X
	OUA1 – HS03 – 2016 11 14		10:00		6		X MS/MSD
	OUA1 – MW19 – 2016 11 14		11:10		2		X
	OUA1 – MW18 – 2016 1114		11:45		2	IV	X
	OUA1 – MW08 – 2016 11 14		12:45		2		X
	OUA1 – MW06 – 2016 11 14		13:50		2		X

Relinquished by: (Signature) Wes Rute	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1943	Date: 11/14/16	Time: 16:30
Relinquished by: (Signature) FedEx	Received by: (Signature) Beth Bennett	Date: 11/15/16	Time: 1059
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601451 **TAT** Std

Samples Arrival:	**Date/Time** 11/15/16 1048	**Initials:** [illegible]	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 11/15/16 1303	**Initials:** [illegible]	**Location:** WR-2 **Shelf/Rack:** A 4

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

Temp °C: 0.3	(uncorrected)	**Time:** 1100	**Thermometer ID:** IR-1
Temp °C: 0.0	(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 1943	✓		
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:

BLA 09/06/2016

December 19, 2016

Vista Work Order No. 1601451

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 15, 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. 1601451
Case Narrative

Sample Condition on Receipt:

Ten aqueous 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 QAPP acceptance criteria.

As requested, an MS/MSD was performed on sample "OUAI-HS03-20161114".

Table of Contents

Sample Inventory Report

Vista Sample ID	Client Sample ID		Sampled	Received	Components/Containers
1601451-01	SB01-20161114		14-Nov-16 14:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-02	EB01-20161114		14-Nov-16 14:30	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-03	OUA1-MW13-20161114		14-Nov-16 08:15	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-04	OUA1-MW37-20161114		14-Nov-16 09:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-05	OUA1-MW37A-20161114		14-Nov-16 09:05	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-06	OUA1-HS03-20161114	MS/MSD	14-Nov-16 10:00	15-Nov-16 10:48	HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
		MS/MSD			HDPE Bottle, 125 mL
1601451-07	OUA1-MW19-20161114		14-Nov-16 11:10	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-08	OUA1-MW18-20161114		14-Nov-16 11:45	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-09	OUA1-MW08-20161114		14-Nov-16 12:45	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL
1601451-10	OUA1-MW06-20161114		14-Nov-16 13:50	15-Nov-16 10:48	HDPE Bottle, 125 mL
					HDPE Bottle, 125 mL

ANALYTICAL RESULTS

Sample ID: Method Blank — Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0143
Sample Size:	0.125 L	Date Extracted:	22-Nov-2016 7:59
Lab Sample:	B6K0143-BLK1		
Date Analyzed:	27-Nov-16 15:44 Column: BEH C18		

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

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	116	60 - 150	
IS	13C2-PFOA	97.1	60 - 150	
IS	13C8-PFOS	90.0	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: OPR

Modified EPA Method 537

Matrix:	Aqueous	QC Batch:	B6K0143	Lab Sample:	B6K0143-BS1
Sample Size:	0.125 L	Date Extracted:	22-Nov-2016 7:59	Date Analyzed:	27-Nov-16 14:41 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	%R	Limits
PFBS	78.9	80.0	98.6	60 - 130
PFOA	86.0	80.0	107	70 - 130
PFOS	74.4	80.0	93.0	70 - 130

	Labeled Standard	%R	LCL-UCL
IS	13C3-PFBS	116	60 - 150
IS	13C2-PFOA	106	60 - 150
IS	13C8-PFOS	126	60 - 150

LCL-UCL - Lower control limit - upper control limit

Sample ID: SB01-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 14:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.122 L

Laboratory Data

Lab Sample: 1601451-01 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 19:44 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.83	4.10	8.17	
PFOA	ND	0.665	2.05	8.17	
PFOS	ND	0.824	0.922	8.17	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	122	60 - 150	
IS	13C2-PFOA	106	60 - 150	
IS	13C8-PFOS	124	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: EB01-20161114

Modified EPA Method 537

Client Data

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

Sample Data

Matrix: Water
Sample Size: 0.126 L

Laboratory Data

Lab Sample: 1601451-02 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 19:57 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	ND	1.77	3.97	7.91	
PFOA	ND	0.644	1.98	7.91	
PFOS	ND	0.798	0.893	7.91	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	113	60 - 150	
IS	13C2-PFOA	99.7	60 - 150	
IS	13C8-PFOS	107	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-MW13-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 8:15
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-03 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:09 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	275	1.71	3.85	7.66	
PFOA	62.5	0.624	1.92	7.66	
PFOS	71.6	0.773	0.865	7.66	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	128	60 - 150	
IS	13C2-PFOA	98.0	60 - 150	
IS	13C8-PFOS	122	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-MW37-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 9:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601451-04 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:22 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	145	1.71	3.82	7.64	
PFOA	26.2	0.622	1.91	7.64	
PFOS	25.0	0.771	0.859	7.64	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	130	60 - 150	
IS	13C2-PFOA	100	60 - 150	
IS	13C8-PFOS	129	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-MW37A-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 9:05
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-05 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:34 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	139	1.72	3.85	7.67	
PFOA	28.9	0.624	1.92	7.67	
PFOS	27.8	0.774	0.865	7.67	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	133	60 - 150	
IS	13C2-PFOA	109	60 - 150	
IS	13C8-PFOS	114	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-HS03-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 10:00
Location:

Sample Data

Matrix: Water
Sample Size: 0.130 L

Laboratory Data

Lab Sample: 1601451-06 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 20:47 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	289	1.72	3.85	7.70	
PFOA	36.3	0.627	1.92	7.70	
PFOS	ND	0.777	0.865	7.70	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	137	60 - 150	
IS	13C2-PFOA	98.4	60 - 150	
IS	13C8-PFOS	117	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.

Matrix Spike Results

Modified EPA Method 537

Source Client ID: OUA1-HS03-20161114
Source LabNumber: 1601451-06
Matrix: Aqueous
Sample Size: 0.126/0.127 L

QC Batch: B6K0143
Date Extracted: 22-Nov-2016 7:59

Lab Sample: B6K0143-MS1/B6K0143-MSD1
Date Analyzed: 27-Nov-16 21:00 Column: BEH C18
27-Nov-16 21:12 Column: BEH C18

Analyte	Spike-MS (ng/L)	MS %R	MS Qual.	Spike-MSD (ng/L)	MSD %R	RPD	MSD Qual.	%R Limit	%RPD Limit
PFBS	79.3	98.0		78.9	99.0	1.02		60 - 130	25
PFOA	79.3	97.5		78.9	100	2.53		70 - 130	25
PFOS	79.3	86.5		78.9	87.7	1.38		70 - 130	25

	Labeled Standard	MS %R	MS Qualifiers	MSD %R	MS Qual.
IS	13C3-PFBS	140		138	
IS	13C2-PFOA	104		101	
IS	13C8-PFOS	118		117	

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-MW19-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 11:10
Location:

Sample Data

Matrix: Water
Sample Size: 0.131 L

Laboratory Data

Lab Sample: 1601451-07 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 21:25 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	14.6	1.71	3.82	7.65	
PFOA	79.3	0.623	1.91	7.65	
PFOS	106	0.772	0.859	7.65	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	137	60 - 150	
IS	13C2-PFOA	103	60 - 150	
IS	13C8-PFOS	121	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-MW18-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 11:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.124 L

Laboratory Data

Lab Sample: 1601451-08 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 21:37 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	12.1	1.80	4.03	8.06	
PFOA	2.58	0.656	2.02	8.06	J
PFOS	12.2	0.813	0.907	8.06	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	128	60 - 150	
IS	13C2-PFOA	108	60 - 150	
IS	13C8-PFOS	111	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-MW08-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 12:45
Location:

Sample Data

Matrix: Water
Sample Size: 0.126 L

Laboratory Data

Lab Sample: 1601451-09 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 22:28 Column: BEH C18
28-Nov-16 10:22 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	2540	8.85	19.8	39.5	D
PFOA	145	0.643	1.98	7.91	
PFOS	13.6	0.798	0.893	7.91	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	135	60 - 150	D
IS	13C2-PFOA	108	60 - 150	
IS	13C8-PFOS	134	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-MW06-20161114

Modified EPA Method 537

Client Data

Name: AMEC Foster Wheeler
Project: MCAS Yuma, AZ TO 105
Date Collected: 14-Nov-2016 13:50
Location:

Sample Data

Matrix: Water
Sample Size: 0.123 L

Laboratory Data

Lab Sample: 1601451-10 Date Received: 15-Nov-2016 10:48
QC Batch: B6K0143 Date Extracted: 22-Nov-2016 7:59
Date Analyzed: 27-Nov-16 22:41 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers
PFBS	121	1.82	4.07	8.15	
PFOA	113	0.663	2.03	8.15	
PFOS	4.38	0.822	0.915	8.15	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C3-PFBS	118	60 - 150	
IS	13C2-PFOA	106	60 - 150	
IS	13C8-PFOS	102	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

CHAIN OF CUSTODY RECORD

DATE: 11/14/2016 – B

Vista PM: Karen Lopez 1601451 08C

PAGE: 1 OF 1

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) Wes 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.)
	SB01 – 2016 11 14	11/14/16	14:00	W	2		X
	EB01 – 2016 11 14		14:30		2		X
	OUA1 – MW13 – 20161114		8:15		2		X
	OUA1 – MW37 – 2016 11 14		9:00		2		X
	OUA1 – MW37A – 2016 11 14		9:05		2		X
	OUA1 – HS03 – 2016 11 14		10:00		6		X MS/MSD
	OUA1 – MW19 – 2016 11 14		11:10		2		X
	OUA1 – MW18 – 2016 1114		11:45		2	IV	X
	OUA1 – MW08 – 2016 11 14		12:45		2		X
	OUA1 – MW06 – 2016 11 14		13:50		2		X

Relinquished by: (Signature) Wes Rute	Received by: (Signature) / Carrier Tracking Number FedEx 8101 0952 1943	Date: 11/14/16	Time: 16:30
Relinquished by: (Signature) FedEx	Received by: (Signature) Beth Bennett	Date: 11/15/16	Time: 1059
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

Vista Project #: 1601451 **TAT** Std

Samples Arrival:	**Date/Time** 11/15/16 1048	**Initials:** [illegible]	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 11/15/16 1303	**Initials:** [illegible]	**Location:** WR-2 **Shelf/Rack:** A 4

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

Temp °C: 0.3	(uncorrected)	**Time:** 1100	**Thermometer ID:** IR-1
Temp °C: 0.0	(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 1943	✓		
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: 1601451

Prep Expiration: 11/28/2016

Client: AMEC Foster Wheeler

Workorder Due: 29-Nov-16 00:00

TAT: 14

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

Matrix: **Aqueous**

Prep Batch: B6K0143

Prep Data Entered: 11/23/16 JS (Date and Initials)

Version: PFOA, PFOS, and PFBS only

Initial Sequence: S6K0071

LabSampleID	Recon	ClientSampleID	Date Received	Location	Comments
1601451-01	☑	SB01-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-02	☑	EB01-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-03	☑	OUAI-MW13-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-04	☑	OUAI-MW37-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-05	☑	OUAI-MW37A-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-06	☑	OUAI-HS03-20161114	15-Nov-16 10:48	WR-2 A-4	**MS/MSD**
1601451-07	☑	OUAI-MW19-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-08	☑	OUAI-MW18-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-09	☑	OUAI-MW08-20161114	15-Nov-16 10:48	WR-2 A-4	
1601451-10	☑	OUAI-MW06-20161114	15-Nov-16 10:48	WR-2 A-4	

WO Comments: **DoD**

MS/MSD per analytical batch

Vista PM:Martha Maier

Vial Box ID: Turkey

Sample Reconciled By: [signature] 11/21/16

Page 1 of 1

Percent Solids

Vista Analytical Laboratory

Project: B4K0143 *Balance ID:* HRMS-1

Sample ID	Chemist: NA Date: ↓ Time: ↓ Boat Wt.	Sample + Boat Wt.	Chemist: NA Date: ↓ Time: ↓ Residue + Boat Wt.	Chemist/Date on 11/21/16 pH before	pH* after	Cl
1601451-01 A				5	2 (A)	0
-02				5	2 (A)	0
-03				7	2 (B)	0
-04				7	2 (B)	0
-05				7	2	0
-06				7	2	0
-06 B				7	2	0
-06 C				7	2	0
-07 A				7	2	0
-08				7	2	0
-09				7	2	0
-10				7	2 (B)	0
1601481-01 A (on 11/21/16)				5	2 (A)	0
-02				7	2	0
-03				7	2	0
-04				7	2 (B)	0
-05				7	2 (B)	0
-06				7	2	0
-07				7	2	0
-08				7	2 (B)	0

on 11/21/16

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 through 2 drops of HCl. on 11/21/16

(B) pH adjusted with 4 drops of HCl. on 11/21/16

* pH adjusted with 3 drops of HCl. on 11/21/16

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

%Solids rmh 5/2011

Percent Solids

Vista Analytical Laboratory

Project: DLK0143 *Balance ID:* NA

Sample ID	Chemist: NA Date: ↓ Time:	Chemist: NA Date: ↓ Time:	Chemist/Date lm 11/21/16		
	Boat Wt.	Sample + Boat Wt.	Residue + Boat Wt.	pH before	pH* after	Cl
1601461 -09A		lm 11/21/16		7	2(B)	0
↓ -10				2	2(B)	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:

(B) pH adjusted with 4 drops of HCl. lm 11/21/16

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

%Solids rmh 5/2011

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537 PFAS DOD (LOO as mRL)

B6K0143

Chemist: G. Mendiola

Prep Date/Time: ~~21-Nov-16 09:44~~ 22-Nov-16 09:59

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 C16K0122	RS CHEM/WIT DATE
☐	B6K0143-BLK1	NA	NA	(0.125)	AMSC 11/22/16	11/22/16	INJ 11/22/16
☐	B6K0143-BS1 AC 11/22/16	↓	↓	↓			
☐	B6K0143-MS1 1601451-06	153.02	26.97	0.12605			
☐	B6K0143-MSD1 1601451-06	153.68	26.87	0.12681			
☐	1601451-01	149.37	27.01	0.12236 ✓			
☐	1601451-02	154.71	28.29	0.12642 ✓			
☐	1601451-03	157.59	27.11	0.13048 ✓			
☐	1601451-04	157.07	27.04	0.13083 ✓			
☐	1601451-05	157.41	27.04	0.13037 ✓			
☐	1601451-06	156.82	26.97	0.12985 ✓			
☐	1601451-07	157.69	27.03	0.13066 ✓			
☐	1601451-08	151.13	27.04	0.12409 ✓			
☐	1601451-09	153.49	27.02	0.12647 ✓			
☐	1601451-10	150.01	27.30	0.12271 ✓			
☐	1601461-01	155.95	27.36	0.12859			
☐	1601461-02	155.07	27.12	0.12795			

IS Name (V3) 167260H,10 mL

NS Name (V1) 167160I,10 mL

RS Name 16K1105,10 mL (V4)

SPE Chem: ~~Strata~~ Strata XAW 33um 200mg/6mL

Ele SOLV: 0.5% NH4OH in MeOH + MeOH

Final Volume(s) 1 mL

Check Out: Chemist/Date: 11/21/16

Check In: Chemist/Date: empty

Balance ID: HBAS-9

Comments: Assume 1 g = 1 mL

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537 PFAS DOD (LOO as mRL)

B6K0143

Chemist: G Mendiola

Prep Date/Time: ~~21-Nov-16 09:44~~ 22-NOV-16 09:59

Prepared using: LCMS - SPE Extraction-LCMS

C	VISTA Sample ID	Bottle + Sample (g)	Bottle Only (g)	Sample Amt. (L)	IS/NS CHEM/WIT DATE	C6K0122 SPE	RS CHEM/WIT DATE
☐	1601461-03	156.72	27.04	0.12968	AMSC 11/22/16	11/22/16	INJ 11/22/16
☐	1601461-04	154.55	27.13	0.12742			
☐	1601461-05	153.06	27.04	0.12602			
☐	1601461-06	154.20	27.11	0.12709			
☐	1601461-07	149.12	27.08	0.12204			
☐	1601461-08	156.62	26.96	0.12966			
☐	1601461-09	147.01	27.10	0.11991			
☐	1601461-10	155.92	27.02	0.12890			

11/22/16

IS Name	NS Name	RS Name		
1607204, 10ml (V3)	1607160, 10ml (V1)	1601/1105, 10 ml (V4)	SPE Chem: Strata-X-AW 33um 200mg/6mL Ele SOLV: 0.5% NH4OH in MeOH + MeOH Final Volume(s): 1mL	Check Out: Chemist/Date: 11/21/16 Check In: Chemist/Date: empty Balance ID: HPMS-89 11/21/16

Comments: Assume 1 g = 1 mL

SAMPLE DATA – MODIFIED EPA METHOD 537

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-12.qld

Last Altered: Monday, November 28, 2016 10:26:23 AM Pacific Standard Time
Printed: Monday, November 28, 2016 10:26:36 AM Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-BLK1 Method Blank 0.125, Description: Method Blank, Name: 161127G1_12, Date: 27-Nov-2016, Time: 15:44:49

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	4.069e0	6.265e3		0.125	3.08	0.687	
2	8	PFOA	413 > 368.7	2.161e2	1.671e4		0.125	4.36	0.621	
3	10	PFOS	499 >79.9		5.022e3		0.125			
4	16	13C3-PFBS	302.0 > 98.8	6.265e3	1.794e4	0.302	0.125	3.08	116	116
5	17	13C2-PFHxA	315 > 269.8	4.621e3	1.794e4	0.620	0.125	3.44	41.6	104
6	18	13C4-PFHpA	367.2 > 321.8	1.167e4	9.450e3	1.139	0.125	3.95	108	108
7	19	18O2-PFHxS	403 > 102.6	4.901e3	9.450e3	0.449	0.125	4.07	115	115
8	20	13C2-6:2 FTS	429.1 > 408.9	2.814e3	4.173e3	1.073	0.125	4.31	62.8	62.8
9	21	13C2-PFOA	414.9 > 369.7	1.671e4	7.609e3	2.262	0.125	4.36	97.1	97.1
10	22	13C8-PFOS	507.0 > 79.9	5.022e3	5.914e3	0.944	0.125	4.76	90.0	90.0
11	23	13C5-PFNA	468.2 > 422.9	7.812e3	9.213e3	1.082	0.125	4.69	78.4	78.4
12	24	13C2-PFDA	515.1 > 469.9	6.302e3	8.233e3	1.019	0.125	5.00	75.1	75.1
13	25	13C2-8:2 FTS	529.1 > 508.7	2.883e3	4.173e3	0.569	0.125	4.97	121	121
14	26	13C4-PFBA	217 > 171.8	1.706e4	1.706e4	1.000	0.125	1.84	100	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.173e3	4.173e3	1.000	0.125	3.35	100	100
16	28	13C5-PFHxA	318.0 > 272.9	1.794e4	1.794e4	1.000	0.125	3.44	100	100
17	29	13C3-PFHxS	401.9 > 79.9	9.450e3	9.450e3	1.000	0.125	4.07	100	100
18	30	13C8-PFOA	421.3 > 376	7.609e3	7.609e3	1.000	0.125	4.35	100	100
19	31	13C4-PFOS	503.0 > 79.9	5.914e3	5.914e3	1.000	0.125	4.76	100	100
20	34	Total PFBS	299 > 79.7		4.901e3		0.125		0.687	
21	36	Total PFOA	413 > 368.7		1.671e4		0.125		0.621	
22	37	Total PFOS	499 > 79.9		5.022e3		0.125			

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-12.qld

Last Altered: Monday, November 28, 2016 10:26:23 AM Pacific Standard Time
Printed: Monday, November 28, 2016 10:26:36 AM Pacific Standard Time

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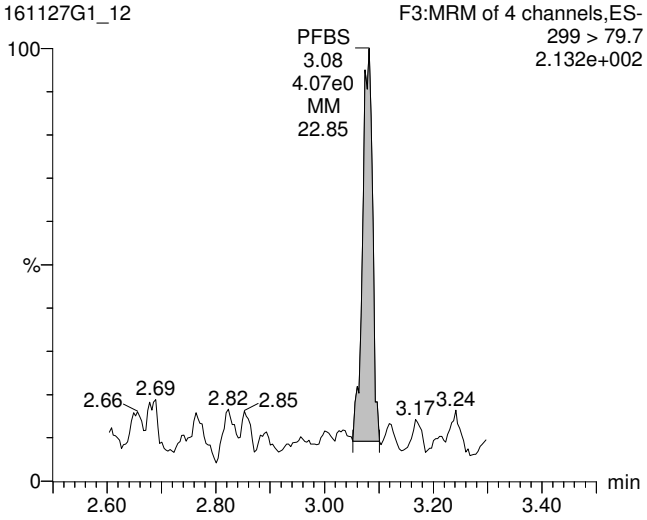
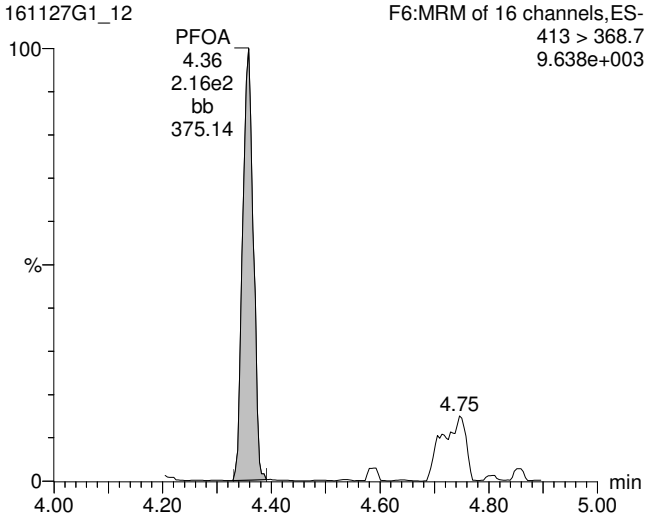
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-BLK1 Method Blank 0.125, Description: Method Blank, Name: 161127G1_12, Date: 27-Nov-2016, Time: 15:44:49, Instrument: , Lab: , User:

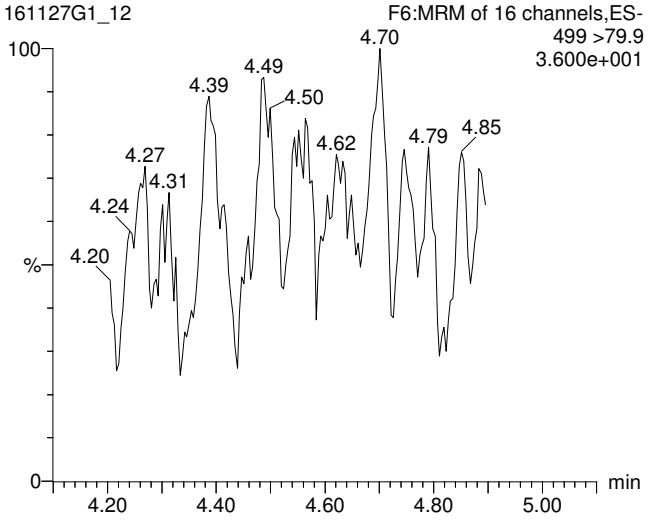
Total PFBS



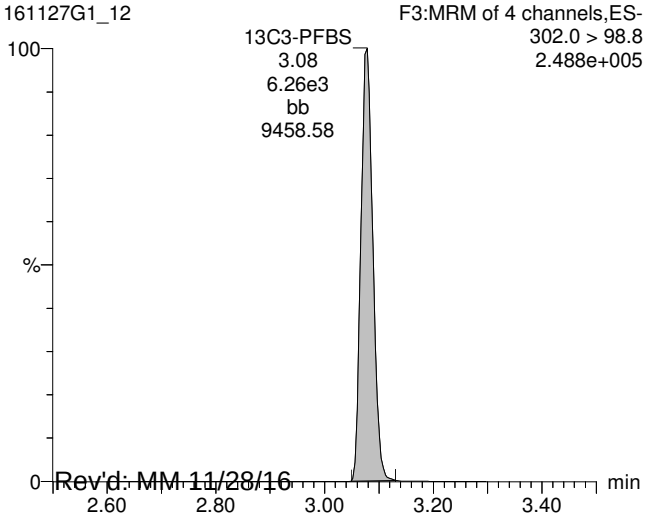
Total PFOA



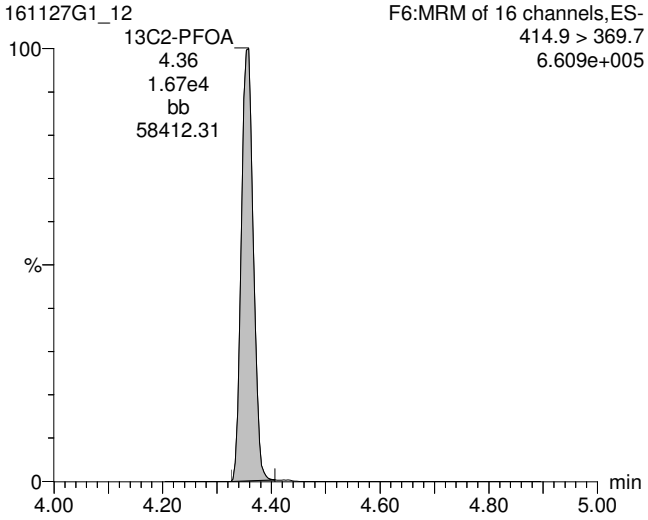
Total PFOS



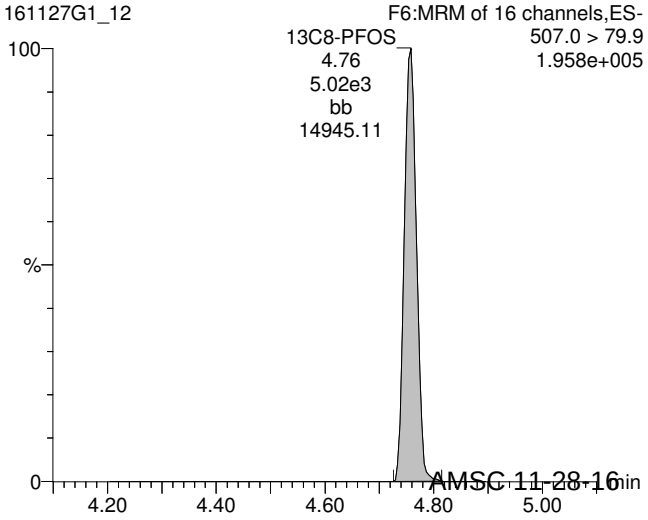
13C3-PFBS



13C2-PFOA



13C8-PFOS



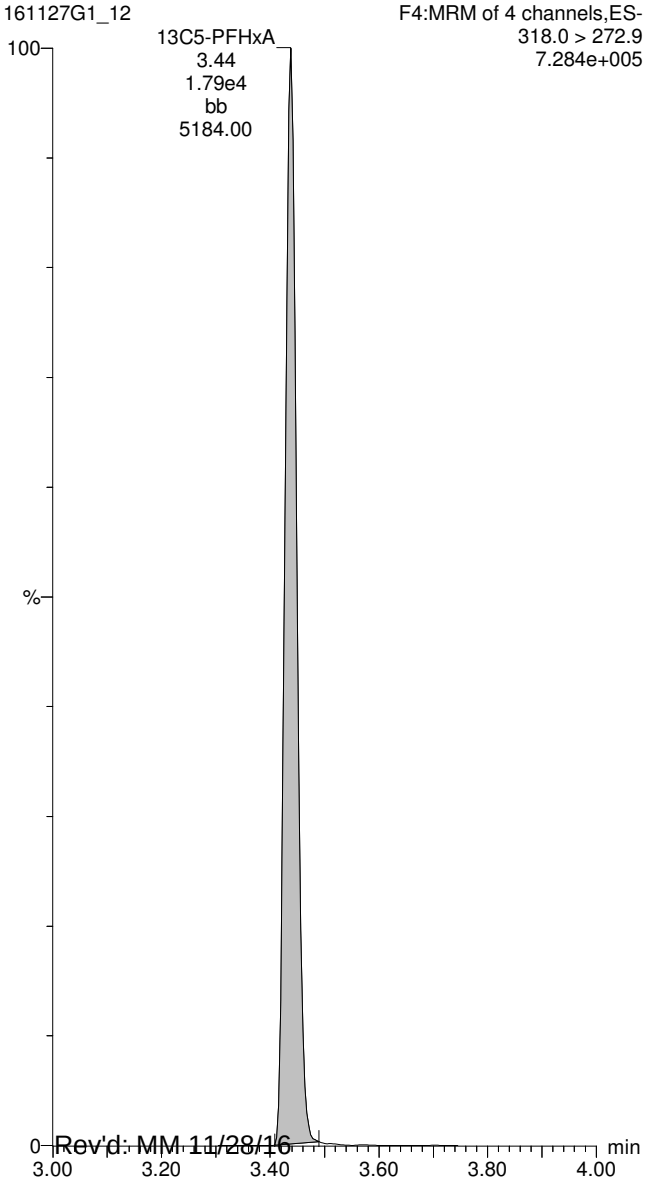
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-12.qld

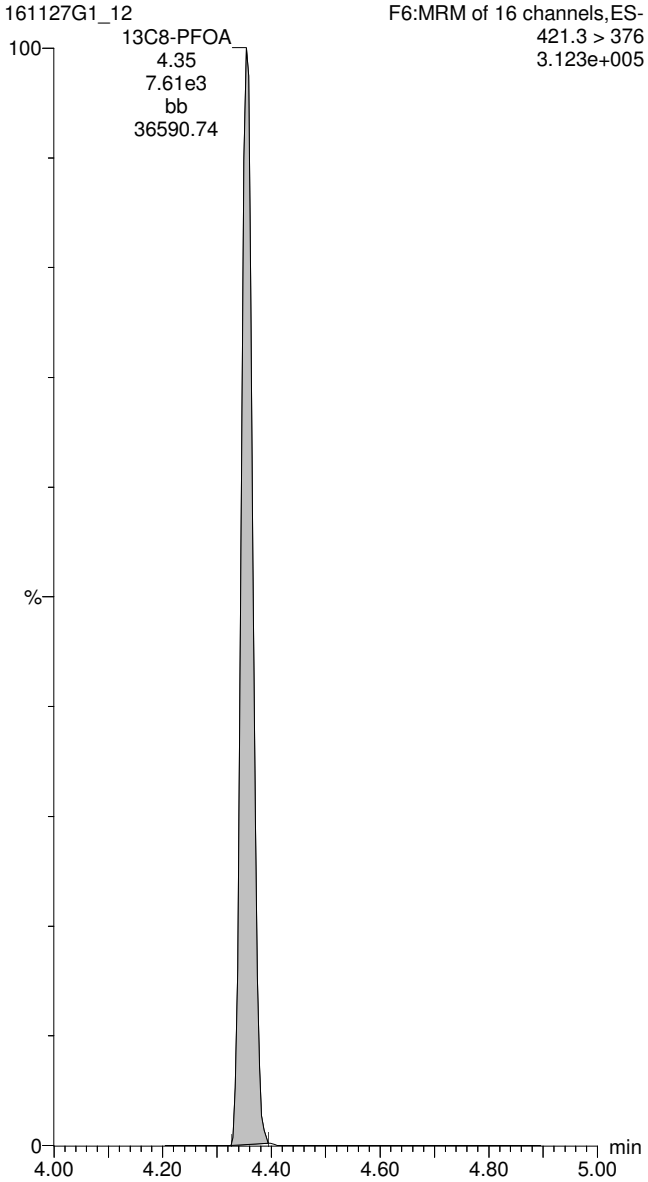
Last Altered: Monday, November 28, 2016 10:26:23 AM Pacific Standard Time
Printed: Monday, November 28, 2016 10:26:36 AM Pacific Standard Time

ID: B6K0143-BLK1 Method Blank 0.125, Description: Method Blank, Name: 161127G1_12, Date: 27-Nov-2016, Time: 15:44:49, Instrument: , Lab: , User:

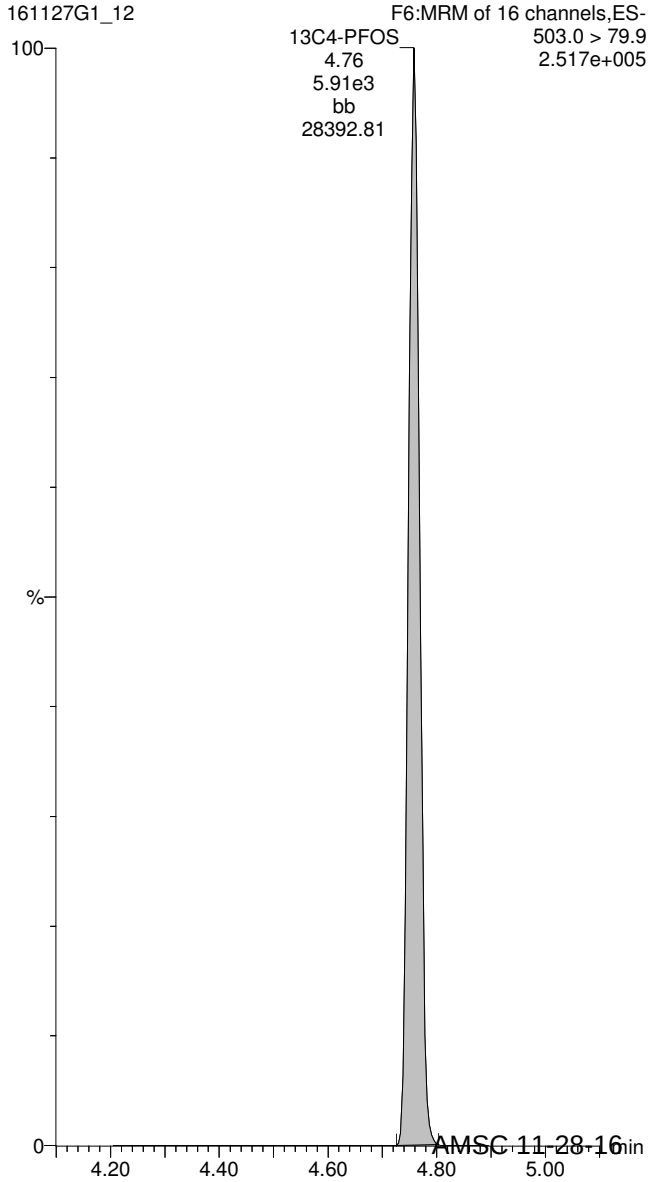
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-7.qld

Last Altered: Monday, November 28, 2016 10:16:33 AM Pacific Standard Time
Printed: Monday, November 28, 2016 10:18:02 AM Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-BS1 OPR 0.125, Description: OPR, Name: 161127G1_7, Date: 27-Nov-2016, Time: 14:41:38

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	8.109e3	5.781e3		0.125	3.08	78.9	98.6
2	8	PFOA	413 > 368.7	1.208e4	1.547e4		0.125	4.35	86.0	107
3	10	PFOS	499 >79.9	3.619e3	5.956e3		0.125	4.76	74.4	93.0
4	16	13C3-PFBS	302.0 > 98.8	5.781e3	1.648e4	0.302	0.125	3.07	116	116
5	17	13C2-PFHxA	315 > 269.8	4.459e3	1.648e4	0.620	0.125	3.44	43.7	109
6	18	13C4-PFHpA	367.2 > 321.8	1.141e4	9.012e3	1.139	0.125	3.95	111	111
7	19	18O2-PFHxS	403 > 102.6	4.635e3	9.012e3	0.449	0.125	4.07	114	114
8	20	13C2-6:2 FTS	429.1 > 408.9	2.560e3	4.814e3	1.073	0.125	4.31	49.5	49.5
9	21	13C2-PFOA	414.9 > 369.7	1.547e4	6.437e3	2.262	0.125	4.35	106	106
10	22	13C8-PFOS	507.0 > 79.9	5.956e3	5.026e3	0.944	0.125	4.76	126	126
11	23	13C5-PFNA	468.2 > 422.9	8.214e3	7.663e3	1.082	0.125	4.69	99.1	99.1
12	24	13C2-PFDA	515.1 > 469.9	5.428e3	6.784e3	1.019	0.125	5.00	78.5	78.5
13	25	13C2-8:2 FTS	529.1 > 508.7	2.978e3	4.814e3	0.569	0.125	4.97	109	109
14	26	13C4-PFBA	217 > 171.8	1.586e4	1.586e4	1.000	0.125	1.85	100	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.814e3	4.814e3	1.000	0.125	3.34	100	100
16	28	13C5-PFHxA	318.0 > 272.9	1.648e4	1.648e4	1.000	0.125	3.44	100	100
17	29	13C3-PFHxS	401.9 > 79.9	9.012e3	9.012e3	1.000	0.125	4.07	100	100
18	30	13C8-PFOA	421.3 > 376	6.437e3	6.437e3	1.000	0.125	4.35	100	100
19	31	13C4-PFOS	503.0 > 79.9	5.026e3	5.026e3	1.000	0.125	4.76	100	100
20	34	Total PFBS	299 > 79.7		4.635e3		0.125		78.9	
21	36	Total PFOA	413 > 368.7		1.547e4		0.125		86.0	
22	37	Total PFOS	499 > 79.9		5.956e3		0.125		74.4	

Vista Analytical Laboratory Q1

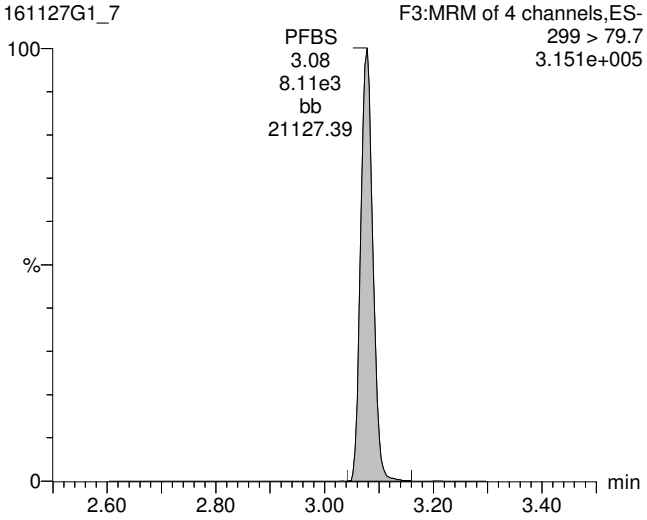
Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-7.qld

Last Altered: Monday, November 28, 2016 10:16:33 AM Pacific Standard Time
Printed: Monday, November 28, 2016 10:18:02 AM Pacific Standard Time

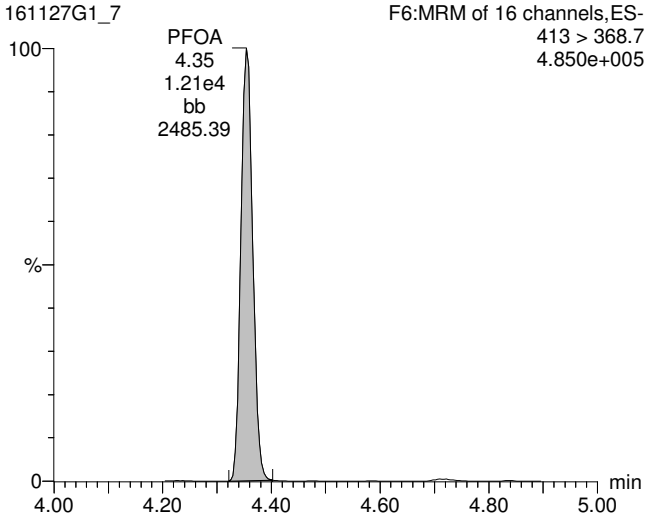
Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-BS1 OPR 0.125, Description: OPR, Name: 161127G1_7, Date: 27-Nov-2016, Time: 14:41:38, Instrument: , Lab: , User:

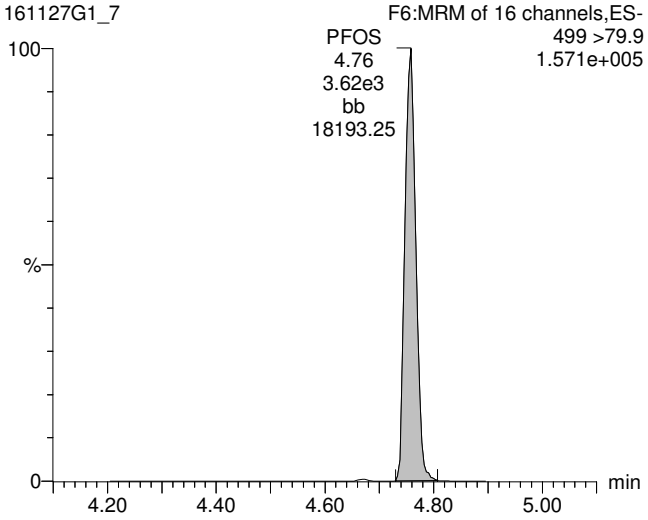
Total PFBS



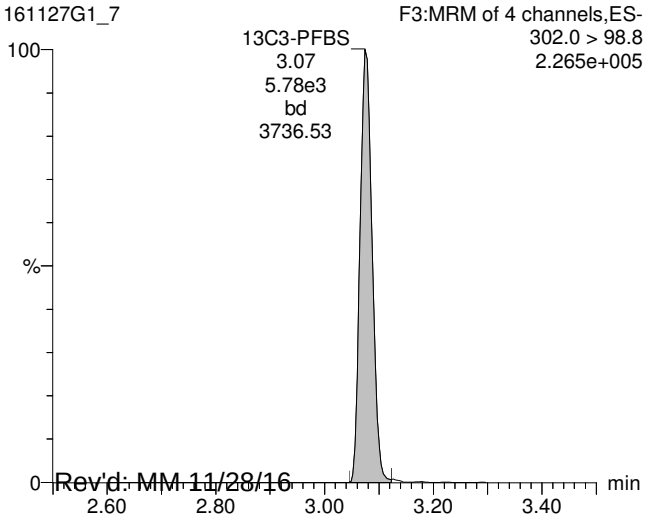
Total PFOA



Total PFOS



13C3-PFBS



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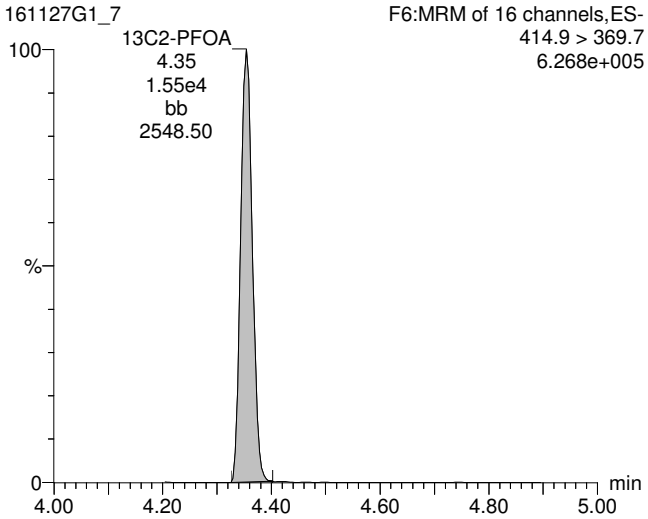
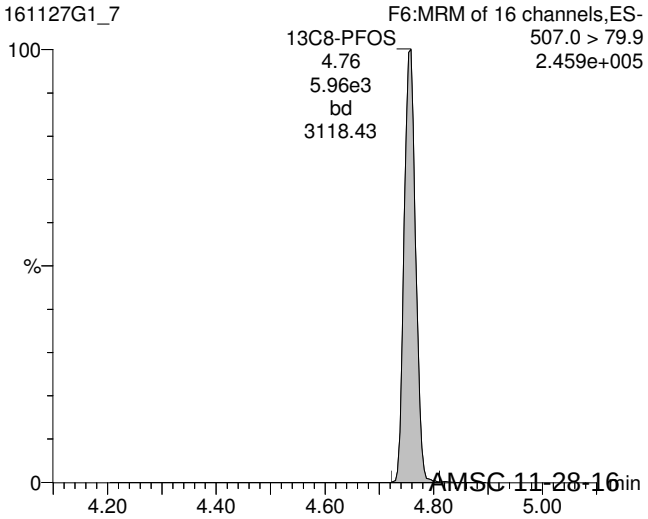


13C8-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-7.qld

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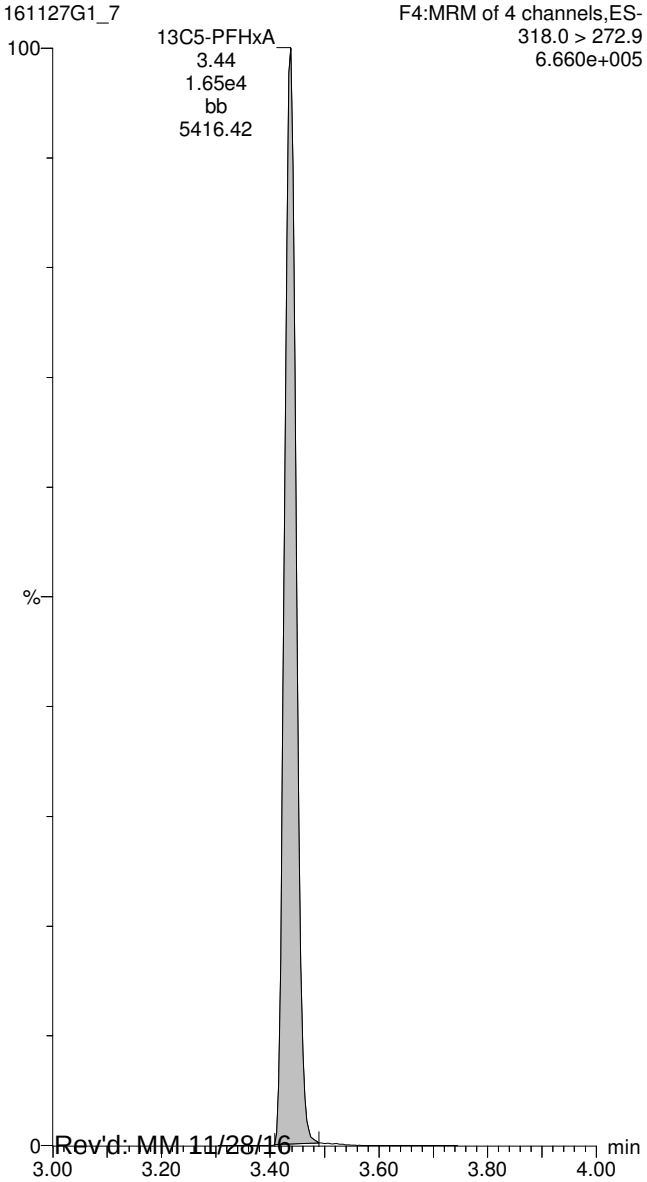
Printed: Monday, November 28, 2016 10:18:02 AM Pacific Standard Time

ID: B6K0143-BS1 OPR 0.125, Description: OPR, Name: 161127G1_7, Date: 27-Nov-2016, Time: 14:41:38, Instrument: , Lab: , User:

13C5-PFHxA



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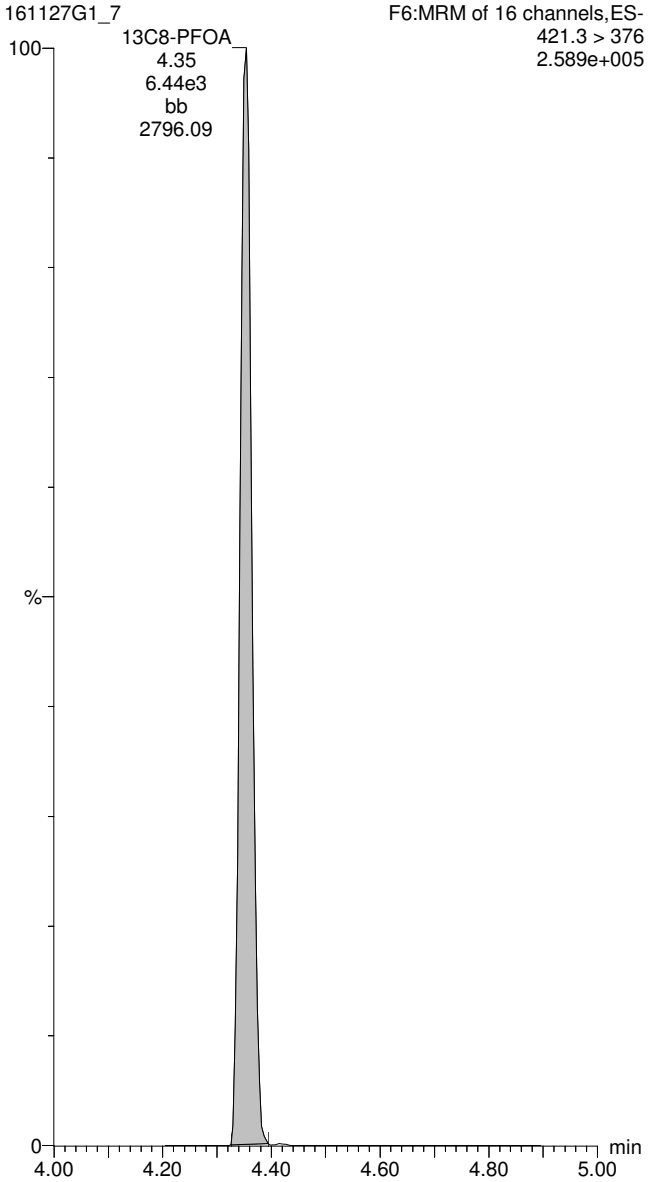

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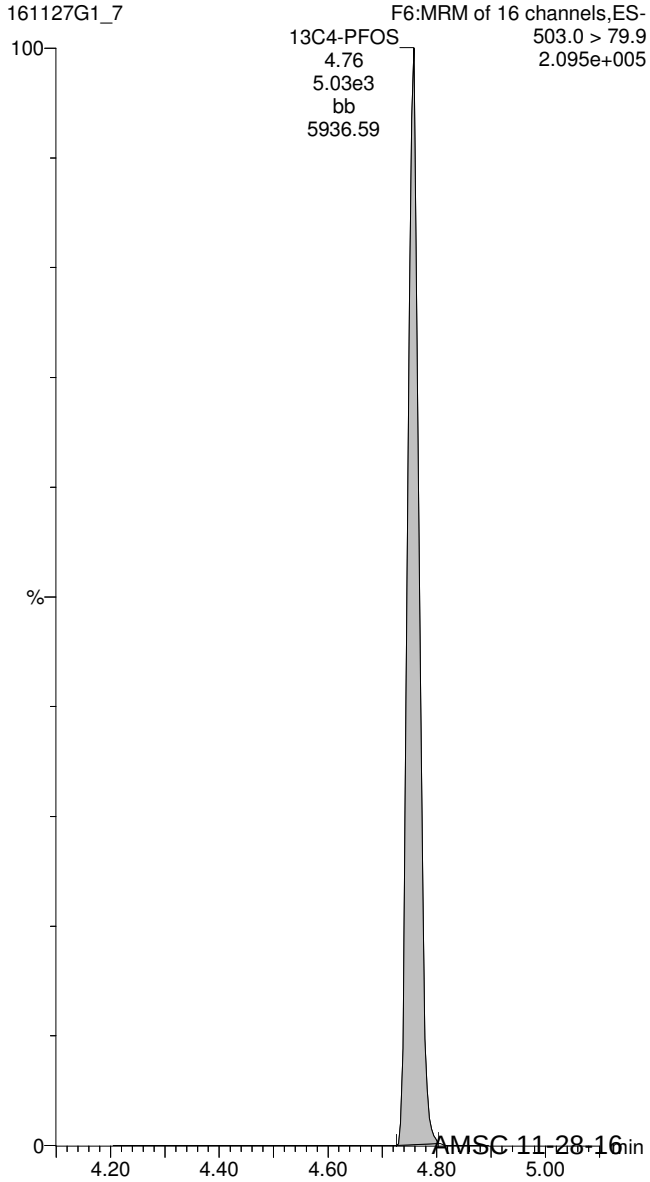

Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-31.qld

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Printed: Monday, November 28, 2016 13:57:42 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-01 SB01-20161114 0.12236, Description: SB01-20161114, Name: 161127G1_31, Date: 27-Nov-2016, Time: 19:44:30

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	6.662e0	6.743e3		0.122	3.09	0.721	
2	8	PFOA	413 > 368.7	2.107e2	1.822e4		0.122	4.36	0.480	
3	10	PFOS	499 >79.9		6.101e3		0.122			
4	16	13C3-PFBS	302.0 > 98.8	6.743e3	1.824e4	0.302	0.122	3.08	125	122
5	17	13C2-PFHxA	315 > 269.8	4.835e3	1.824e4	0.620	0.122	3.45	43.7	107
6	18	13C4-PFHpA	367.2 > 321.8	1.225e4	1.008e4	1.139	0.122	3.96	109	107
7	19	18O2-PFHxS	403 > 102.6	5.182e3	1.008e4	0.449	0.122	4.07	117	114
8	20	13C2-6:2 FTS	429.1 > 408.9	2.232e3	4.773e3	1.073	0.122	4.31	44.5	43.6
9	21	13C2-PFOA	414.9 > 369.7	1.822e4	7.611e3	2.262	0.122	4.36	108	106
10	22	13C8-PFOS	507.0 > 79.9	6.101e3	5.215e3	0.944	0.122	4.76	127	124
11	23	13C5-PFNA	468.2 > 422.9	8.015e3	8.204e3	1.082	0.122	4.70	92.2	90.3
12	24	13C2-PFDA	515.1 > 469.9	7.470e3	7.857e3	1.019	0.122	5.00	95.3	93.3
13	25	13C2-8:2 FTS	529.1 > 508.7	3.090e3	4.773e3	0.569	0.122	4.97	116	114
14	26	13C4-PFBA	217 > 171.8	1.699e4	1.699e4	1.000	0.122	1.85	102	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.773e3	4.773e3	1.000	0.122	3.35	102	100
16	28	13C5-PFHxA	318.0 > 272.9	1.824e4	1.824e4	1.000	0.122	3.45	102	100
17	29	13C3-PFHxS	401.9 > 79.9	1.008e4	1.008e4	1.000	0.122	4.07	102	100
18	30	13C8-PFOA	421.3 > 376	7.611e3	7.611e3	1.000	0.122	4.36	102	100
19	31	13C4-PFOS	503.0 > 79.9	5.215e3	5.215e3	1.000	0.122	4.76	102	100
20	34	Total PFBS	299 > 79.7		5.182e3		0.122		0.721	
21	36	Total PFOA	413 > 368.7		1.822e4		0.122		0.480	
22	37	Total PFOS	499 > 79.9		6.101e3		0.122			

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Last Altered: Monday, November 28, 2016 13:56:05 Pacific Standard Time
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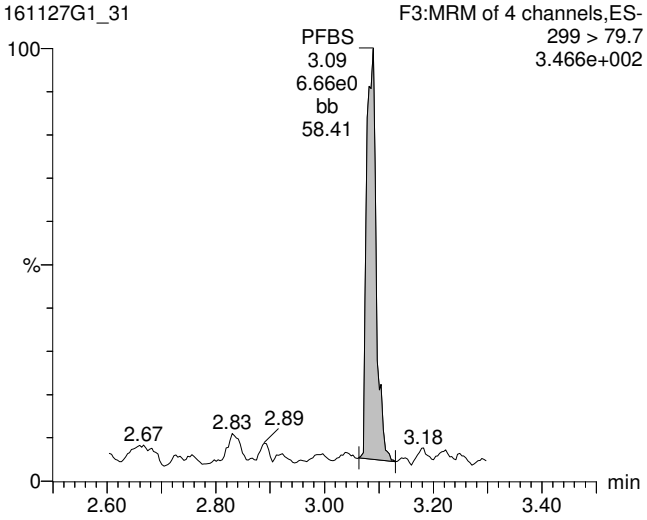
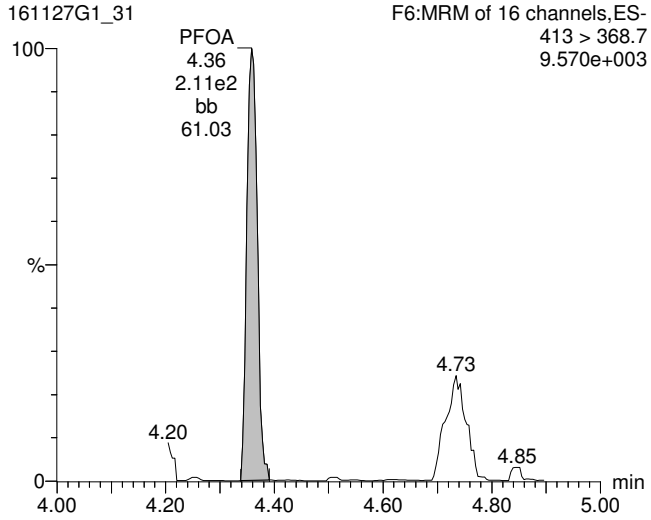
ID: 1601451-01 SB01-20161114 0.12236, Description: SB01-20161114, Name: 161127G1_31, Date: 27-Nov-2016, Time: 19:44:30, Instrument: , Lab: , User:

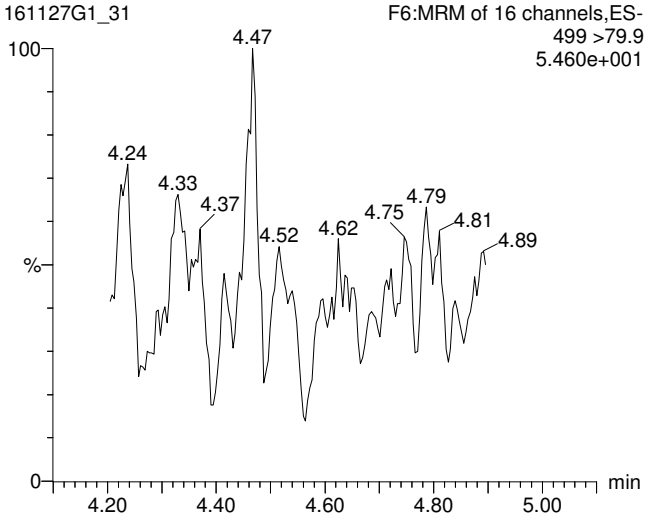
Total PFBS



Total PFOA



Total PFOS



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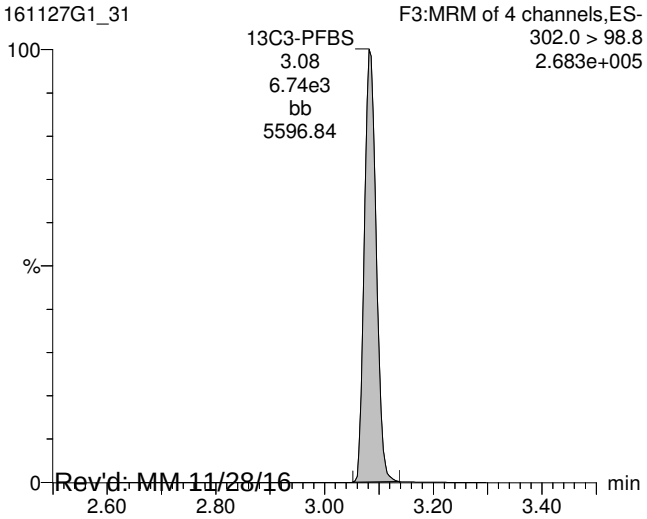

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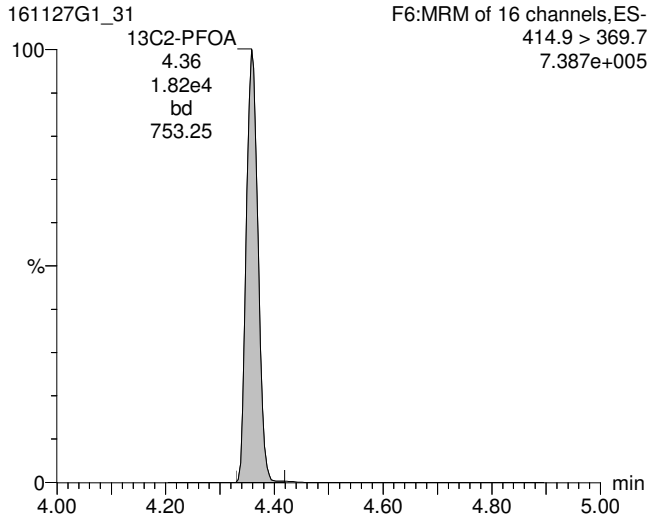
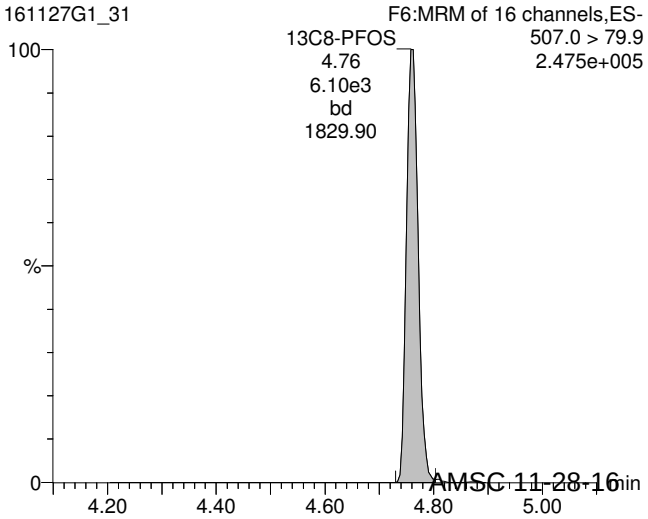


13C8-PFOS



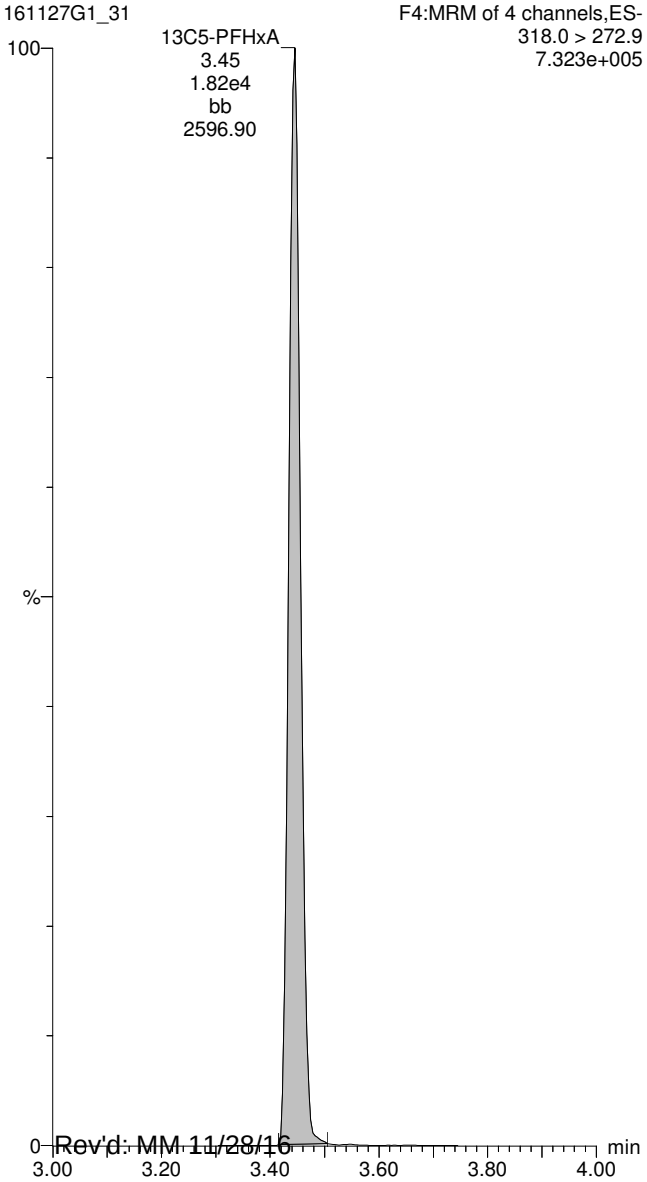
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-31.qld

Last Altered: Monday, November 28, 2016 13:56:05 Pacific Standard Time
Printed: Monday, November 28, 2016 13:57:42 Pacific Standard Time

ID: 1601451-01 SB01-20161114 0.12236, Description: SB01-20161114, Name: 161127G1_31, Date: 27-Nov-2016, Time: 19:44:30, Instrument: , Lab: , User:

13C5-PFHxA



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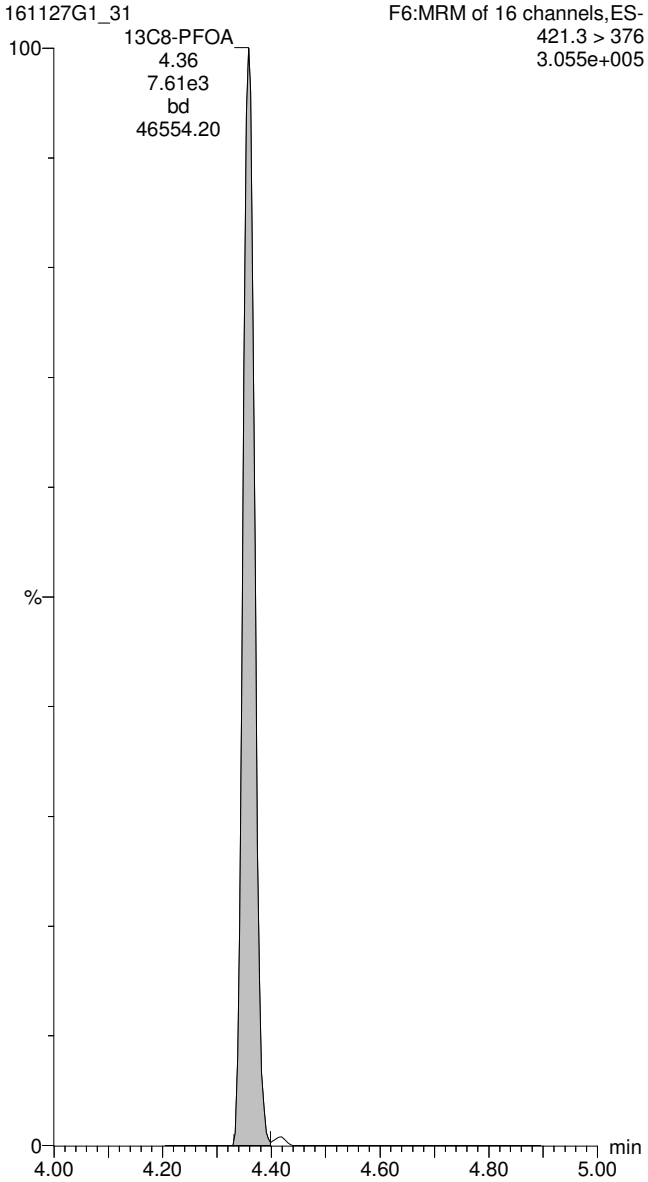

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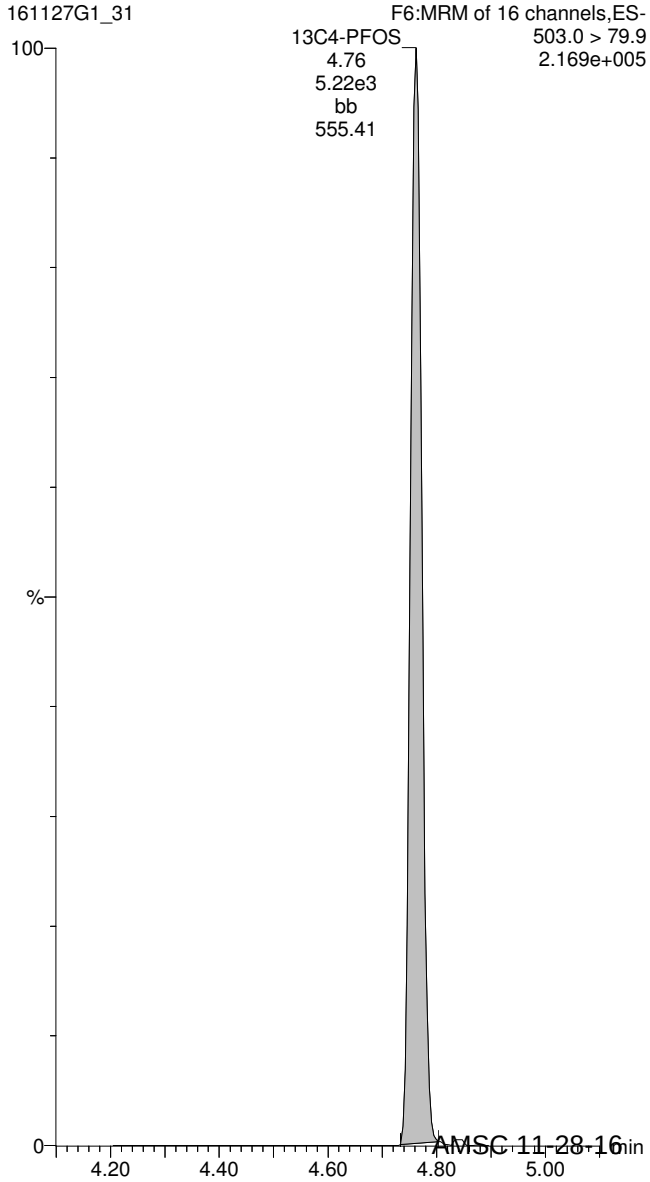

Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-32.qld

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Printed: Monday, November 28, 2016 14:01:02 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-02 EB01-20161114 0.12642, Description: EB01-20161114, Name: 161127G1_32, Date: 27-Nov-2016, Time: 19:57:06

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	4.195e0	6.307e3		0.126	3.09	0.680	
2	8	PFOA	413 > 368.7	1.579e2	1.637e4		0.126	4.36	0.254	
3	10	PFOS	499 >79.9		5.225e3		0.126			
4	16	13C3-PFBS	302.0 > 98.8	6.307e3	1.854e4	0.302	0.126	3.08	111	113
5	17	13C2-PFHxA	315 > 269.8	4.579e3	1.854e4	0.620	0.126	3.45	39.4	99.6
6	18	13C4-PFHpA	367.2 > 321.8	1.200e4	9.998e3	1.139	0.126	3.96	104	105
7	19	18O2-PFHxS	403 > 102.6	4.357e3	9.998e3	0.449	0.126	4.07	95.9	97.0
8	20	13C2-6:2 FTS	429.1 > 408.9	2.812e3	4.540e3	1.073	0.126	4.31	57.1	57.7
9	21	13C2-PFOA	414.9 > 369.7	1.637e4	7.261e3	2.262	0.126	4.36	98.5	99.7
10	22	13C8-PFOS	507.0 > 79.9	5.225e3	5.178e3	0.944	0.126	4.76	106	107
11	23	13C5-PFNA	468.2 > 422.9	7.625e3	8.490e3	1.082	0.126	4.70	82.1	83.0
12	24	13C2-PFDA	515.1 > 469.9	4.903e3	6.551e3	1.019	0.126	5.00	72.6	73.4
13	25	13C2-8:2 FTS	529.1 > 508.7	1.724e3	4.540e3	0.569	0.126	4.97	66.0	66.7
14	26	13C4-PFBA	217 > 171.8	1.673e4	1.673e4	1.000	0.126	1.85	98.9	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.540e3	4.540e3	1.000	0.126	3.35	98.9	100
16	28	13C5-PFHxA	318.0 > 272.9	1.854e4	1.854e4	1.000	0.126	3.45	98.9	100
17	29	13C3-PFHxS	401.9 > 79.9	9.998e3	9.998e3	1.000	0.126	4.07	98.9	100
18	30	13C8-PFOA	421.3 > 376	7.261e3	7.261e3	1.000	0.126	4.36	98.9	100
19	31	13C4-PFOS	503.0 > 79.9	5.178e3	5.178e3	1.000	0.126	4.76	98.9	100
20	34	Total PFBS	299 > 79.7		4.357e3		0.126		0.680	
21	36	Total PFOA	413 > 368.7		1.637e4		0.126		0.254	
22	37	Total PFOS	499 > 79.9		5.225e3		0.126			

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-32.qld

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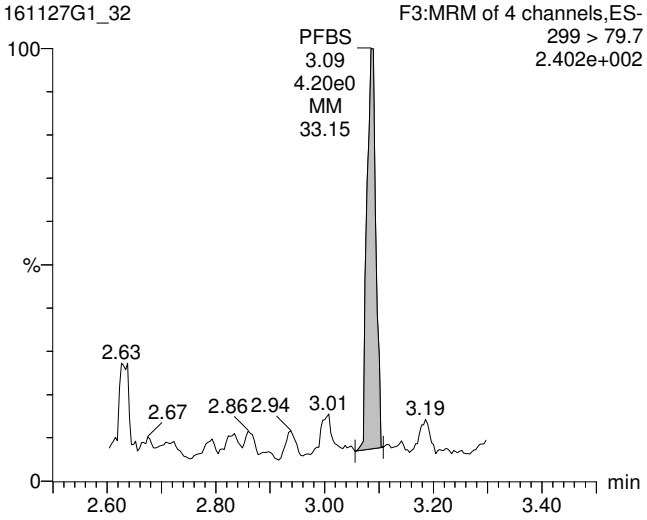
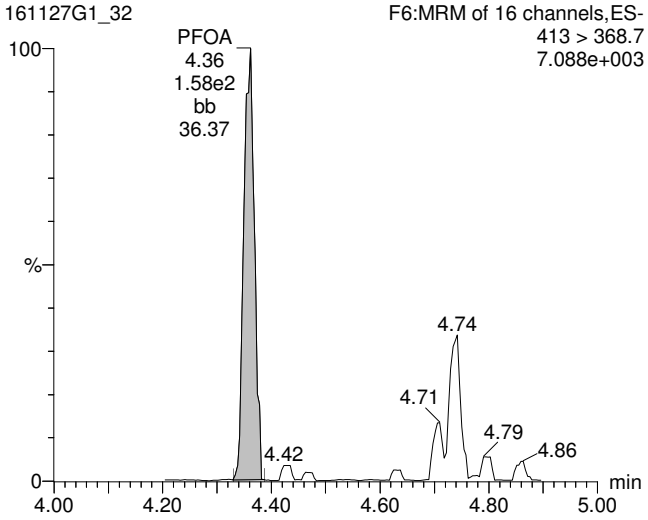
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-02 EB01-20161114 0.12642, Description: EB01-20161114, Name: 161127G1_32, Date: 27-Nov-2016, Time: 19:57:06, Instrument: , Lab: , User:

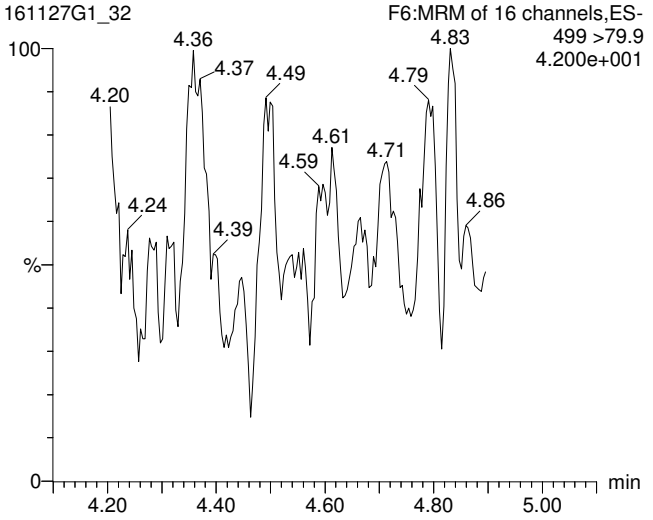
Total PFBS



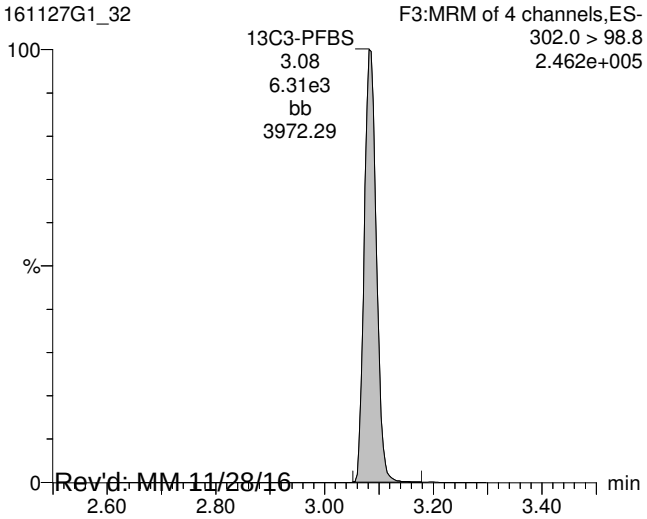
Total PFOA



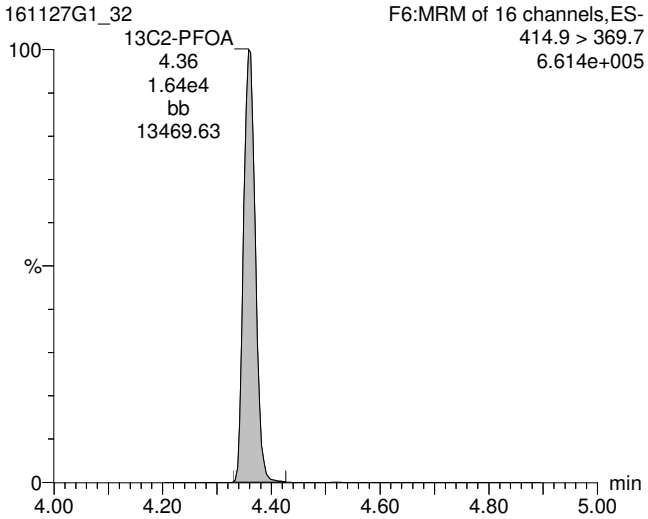
Total PFOS



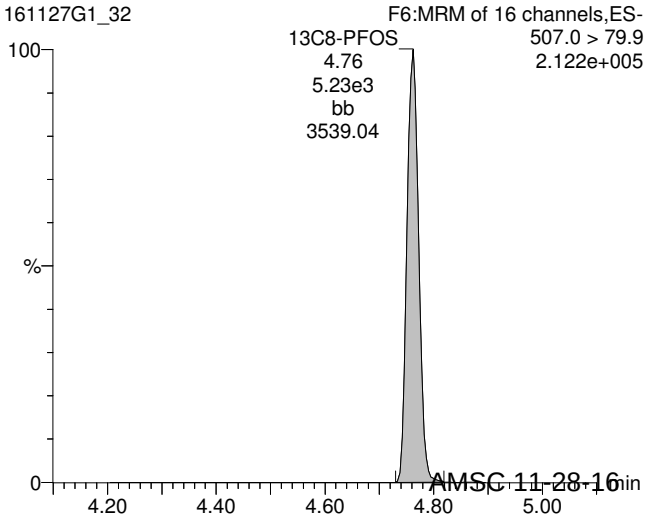
13C3-PFBS



13C2-PFOA



13C8-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

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Printed: Monday, November 28, 2016 14:01:02 Pacific Standard Time

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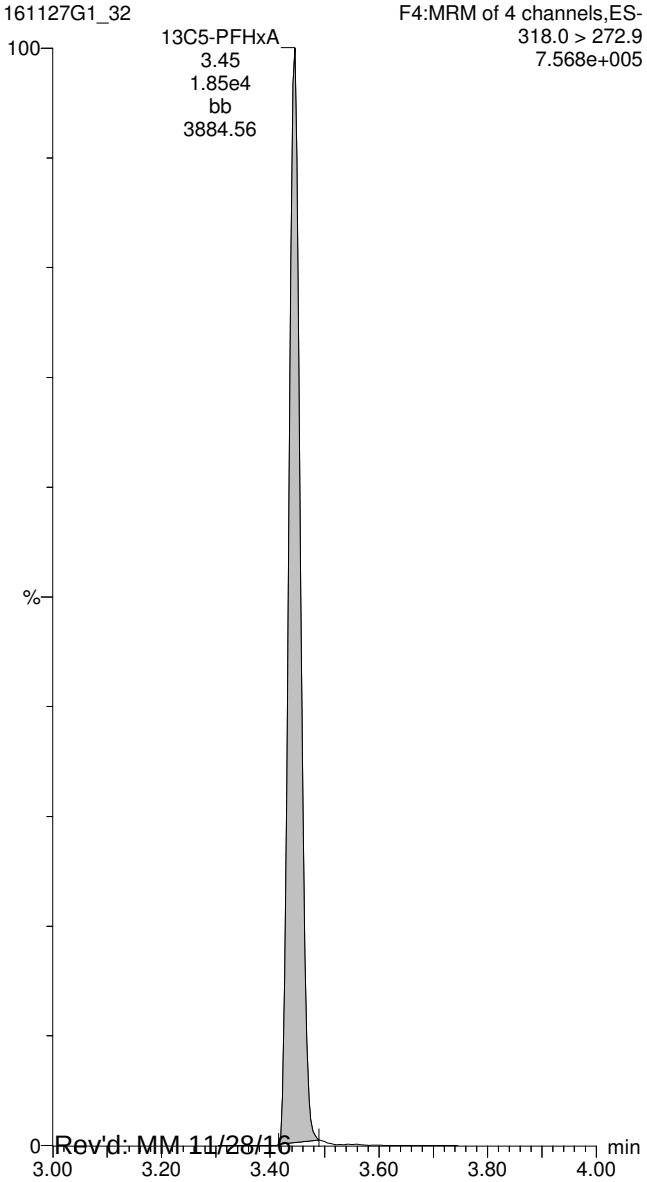
13C5-PFHxA



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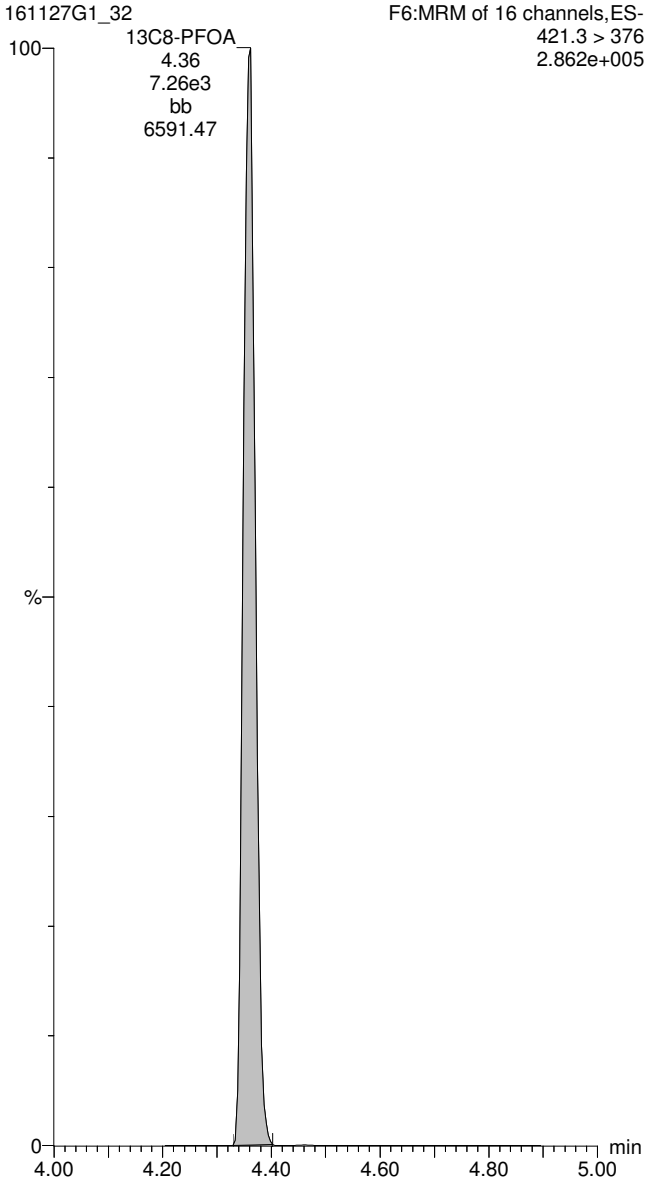

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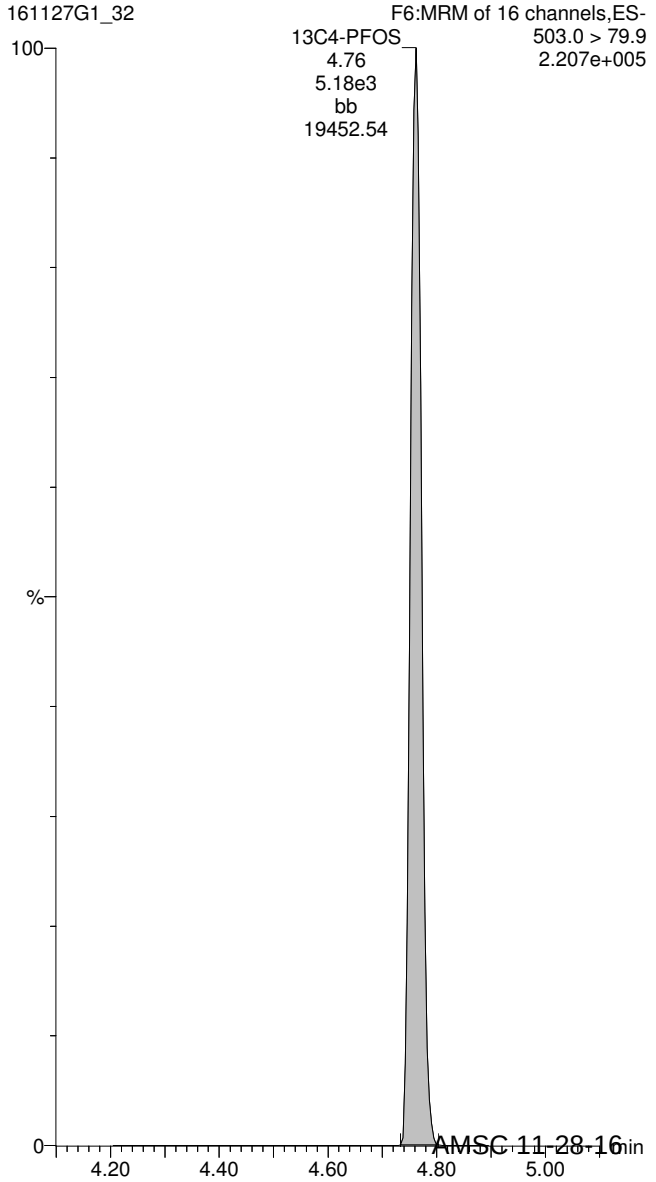

Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-33.qld

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Printed: Monday, November 28, 2016 14:04:14 Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-03 OUAI-MW13-20161114 0.13048, Description: OUAI-MW13-20161114, Name: 161127G1_33, Date: 27-Nov-2016, Time: 20:09:41

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	2.994e4	6.050e3		0.130	3.08	265	
2	8	PFOA	413 > 368.7	1.074e4	2.098e4		0.130	4.35	53.7	
3	10	PFOS	499 >79.9	2.067e3	8.345e3		0.130	4.76	30.0	
4	16	13C3-PFBS	302.0 > 98.8	6.050e3	1.565e4	0.302	0.130	3.08	123	128
5	17	13C2-PFHxA	315 > 269.8	4.015e3	1.565e4	0.620	0.130	3.44	39.7	104
6	18	13C4-PFHpA	367.2 > 321.8	1.376e4	1.151e4	1.139	0.130	3.96	101	105
7	19	18O2-PFHxS	403 > 102.6	5.097e3	1.151e4	0.449	0.130	4.07	94.4	98.6
8	20	13C2-6:2 FTS	429.1 > 408.9	3.724e3	6.106e3	1.073	0.130	4.31	54.5	56.8
9	21	13C2-PFOA	414.9 > 369.7	2.098e4	9.469e3	2.262	0.130	4.36	93.8	98.0
10	22	13C8-PFOS	507.0 > 79.9	8.345e3	7.249e3	0.944	0.130	4.76	117	122
11	23	13C5-PFNA	468.2 > 422.9	1.103e4	1.057e4	1.082	0.130	4.70	92.4	96.5
12	24	13C2-PFDA	515.1 > 469.9	7.021e3	9.686e3	1.019	0.130	5.00	68.1	71.1
13	25	13C2-8:2 FTS	529.1 > 508.7	5.232e3	6.106e3	0.569	0.130	4.97	144	151
14	26	13C4-PFBA	217 > 171.8	1.582e4	1.582e4	1.000	0.130	1.85	95.8	100
15	27	13C2-4:2 FTS	329.2 > 308.9	6.106e3	6.106e3	1.000	0.130	3.35	95.8	100
16	28	13C5-PFHxA	318.0 > 272.9	1.565e4	1.565e4	1.000	0.130	3.44	95.8	100
17	29	13C3-PFHxS	401.9 > 79.9	1.151e4	1.151e4	1.000	0.130	4.07	95.8	100
18	30	13C8-PFOA	421.3 > 376	9.469e3	9.469e3	1.000	0.130	4.35	95.8	100
19	31	13C4-PFOS	503.0 > 79.9	7.249e3	7.249e3	1.000	0.130	4.76	95.8	100
20	34	Total PFBS	299 > 79.7		5.097e3		0.130		275	
21	36	Total PFOA	413 > 368.7		2.098e4		0.130		62.5	
22	37	Total PFOS	499 > 79.9		8.345e3		0.130		71.6	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-33.qld

Last Altered: Monday, November 28, 2016 14:03:13 Pacific Standard Time
Printed: Monday, November 28, 2016 14:04:14 Pacific Standard Time

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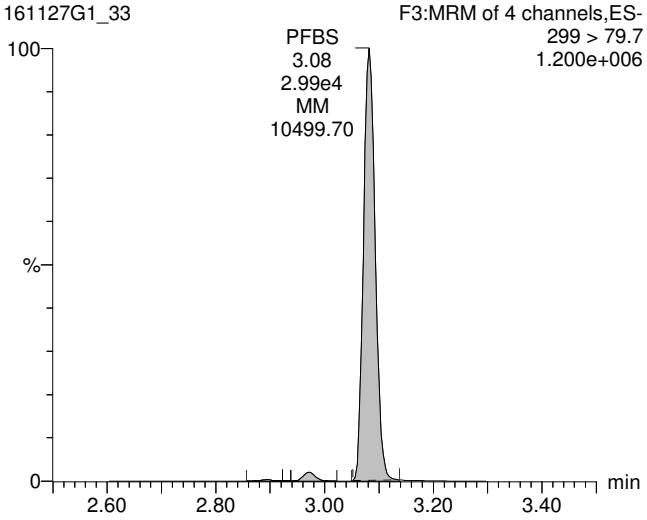
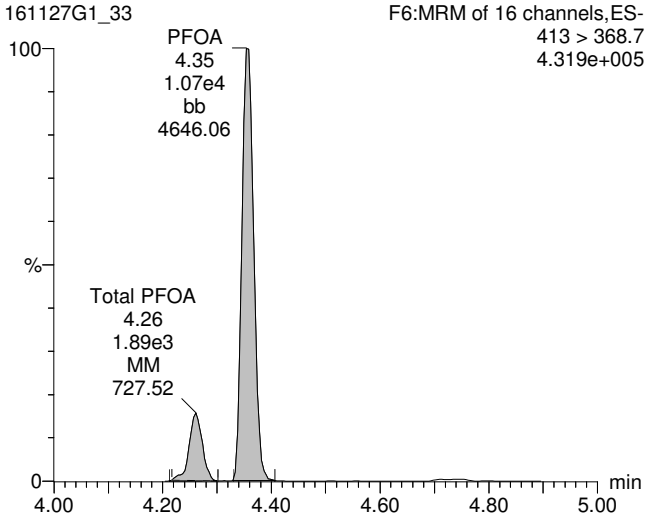
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-03 OUAI-MW13-20161114 0.13048, Description: OUAI-MW13-20161114, Name: 161127G1_33, Date: 27-Nov-2016, Time: 20:09:41, Instrument: , Lab: , User:

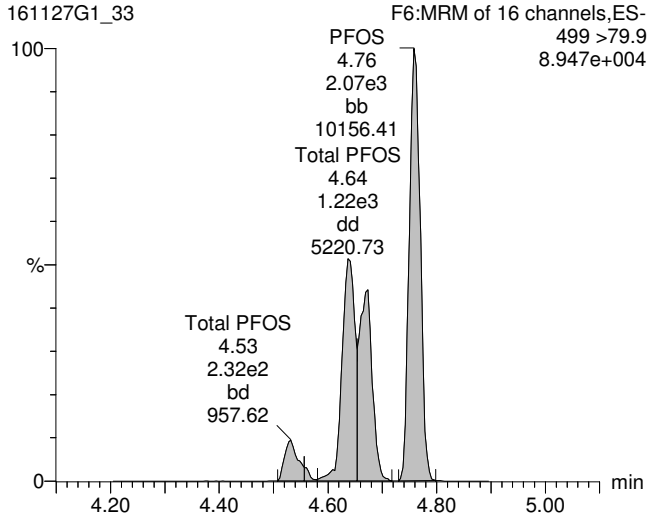
Total PFBS



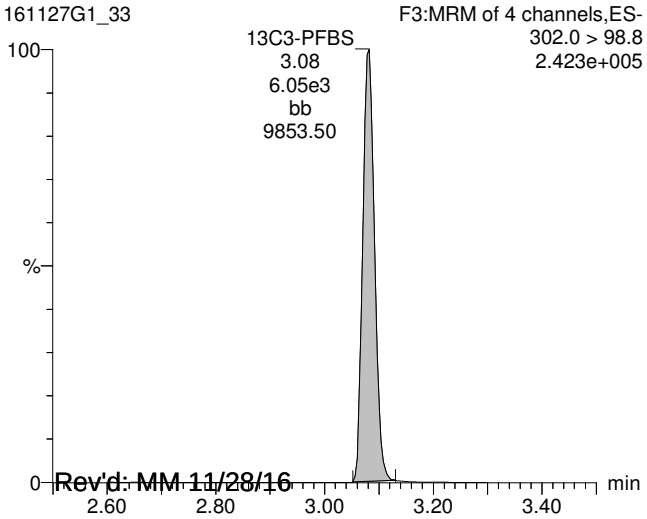
Total PFOA



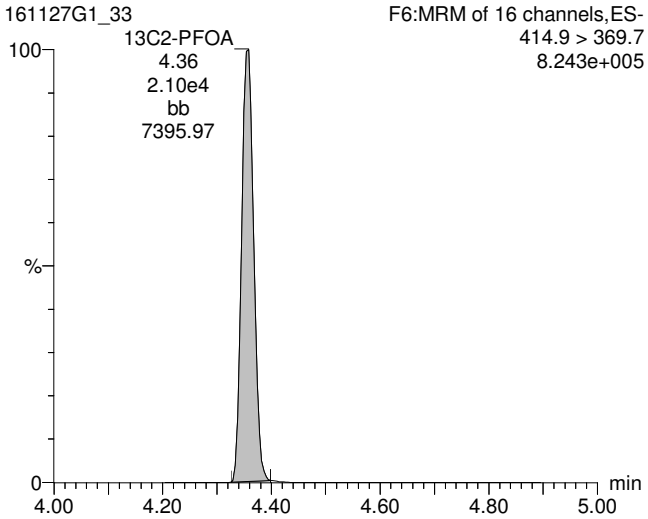
Total PFOS



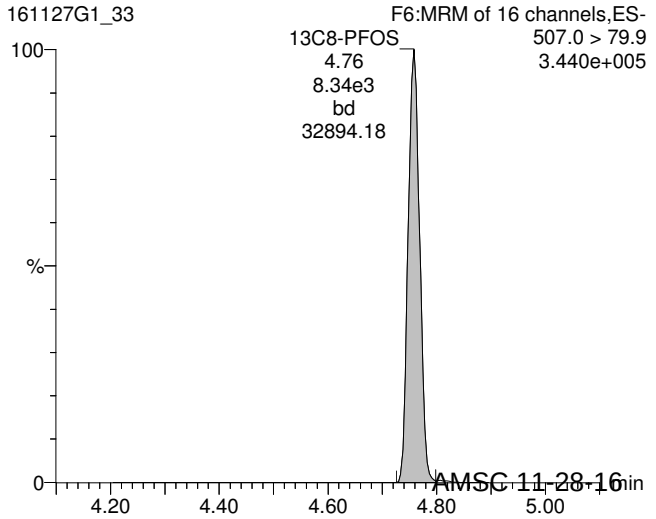
13C3-PFBS



13C2-PFOA



13C8-PFOS



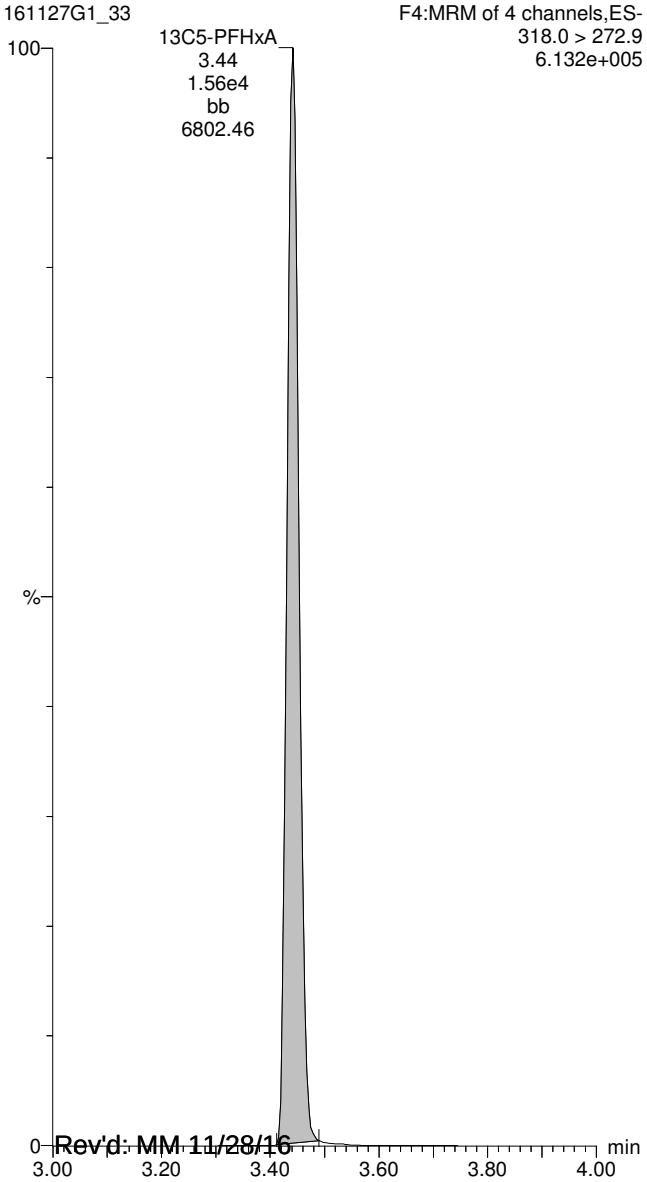
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-33.qld

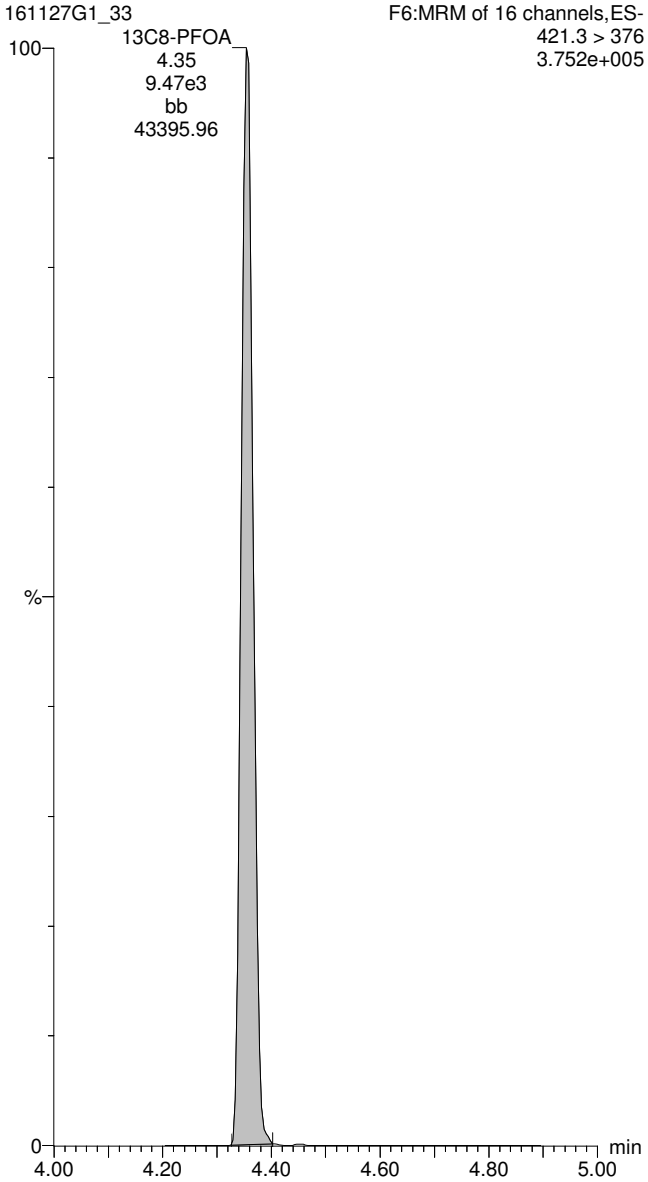
Last Altered: Monday, November 28, 2016 14:03:13 Pacific Standard Time
Printed: Monday, November 28, 2016 14:04:14 Pacific Standard Time

ID: 1601451-03 OUAI-MW13-20161114 0.13048, Description: OUAI-MW13-20161114, Name: 161127G1_33, Date: 27-Nov-2016, Time: 20:09:41, Instrument: , Lab: , User:

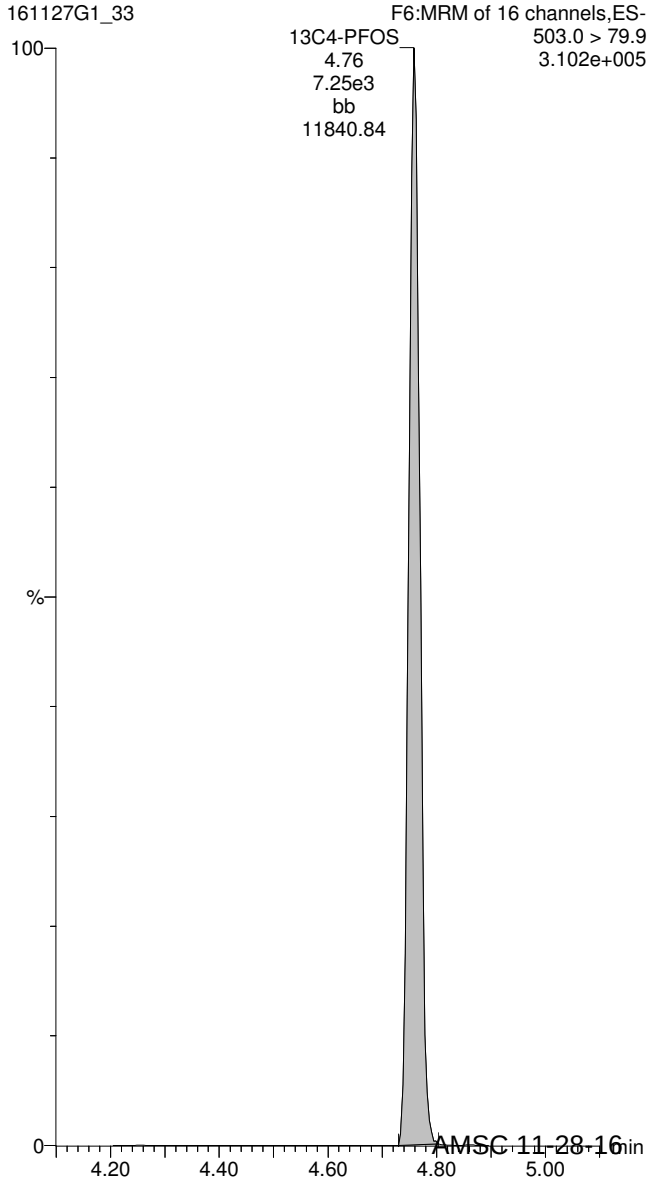
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-34.qld

Last Altered: Monday, November 28, 2016 3:06:05 PM Pacific Standard Time
Printed: Monday, November 28, 2016 3:06:15 PM Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-04 OUAI-MW37-20161114 0.13083, Description: OUAI-MW37-20161114, Name: 161127G1_34, Date: 27-Nov-2016, Time: 20:22:16

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	1.634e4	6.281e3		0.131	3.08	139	
2	8	PFOA	413 > 368.7	4.663e3	2.174e4		0.131	4.36	22.0	
3	10	PFOS	499 >79.9	6.546e2	7.849e3		0.131	4.76	11.1	
4	16	13C3-PFBS	302.0 > 98.8	6.281e3	1.603e4	0.302	0.131	3.08	124	130
5	17	13C2-PFHxA	315 > 269.8	4.339e3	1.603e4	0.620	0.131	3.44	41.7	109
6	18	13C4-PFHpA	367.2 > 321.8	1.365e4	1.072e4	1.139	0.131	3.96	107	112
7	19	18O2-PFHxS	403 > 102.6	5.742e3	1.072e4	0.449	0.131	4.07	114	119
8	20	13C2-6:2 FTS	429.1 > 408.9	4.775e3	4.424e3	1.073	0.131	4.31	96.1	101
9	21	13C2-PFOA	414.9 > 369.7	2.174e4	9.605e3	2.262	0.131	4.35	95.6	100
10	22	13C8-PFOS	507.0 > 79.9	7.849e3	6.434e3	0.944	0.131	4.76	124	129
11	23	13C5-PFNA	468.2 > 422.9	9.858e3	9.740e3	1.082	0.131	4.70	89.4	93.5
12	24	13C2-PFDA	515.1 > 469.9	7.391e3	9.109e3	1.019	0.131	4.99	76.1	79.6
13	25	13C2-8:2 FTS	529.1 > 508.7	3.492e3	4.424e3	0.569	0.131	4.97	133	139
14	26	13C4-PFBA	217 > 171.8	1.546e4	1.546e4	1.000	0.131	1.85	95.5	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.424e3	4.424e3	1.000	0.131	3.35	95.5	100
16	28	13C5-PFHxA	318.0 > 272.9	1.603e4	1.603e4	1.000	0.131	3.44	95.5	100
17	29	13C3-PFHxS	401.9 > 79.9	1.072e4	1.072e4	1.000	0.131	4.07	95.5	100
18	30	13C8-PFOA	421.3 > 376	9.605e3	9.605e3	1.000	0.131	4.36	95.5	100
19	31	13C4-PFOS	503.0 > 79.9	6.434e3	6.434e3	1.000	0.131	4.76	95.5	100
20	34	Total PFBS	299 > 79.7		5.742e3		0.131		145	
21	36	Total PFOA	413 > 368.7		2.174e4		0.131		26.2	
22	37	Total PFOS	499 > 79.9		7.849e3		0.131		25.0	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-34.qld

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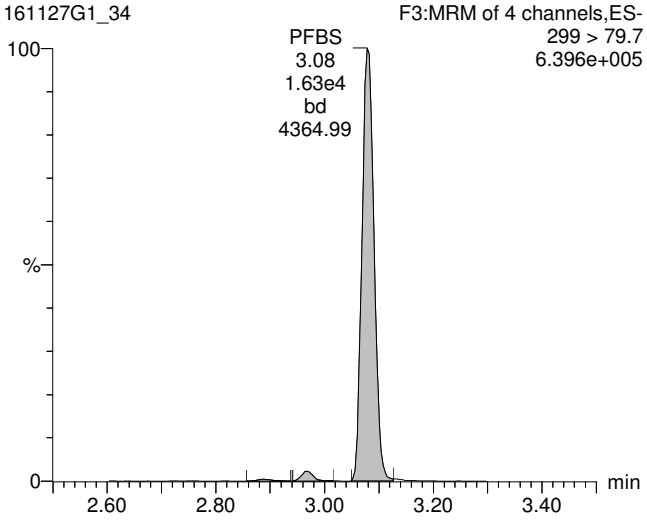
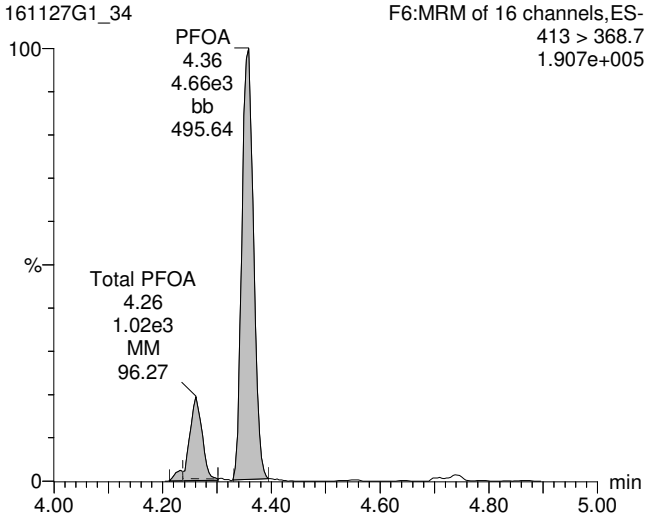
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-04 OUAI-MW37-20161114 0.13083, Description: OUAI-MW37-20161114, Name: 161127G1_34, Date: 27-Nov-2016, Time: 20:22:16, Instrument: , Lab: , User:

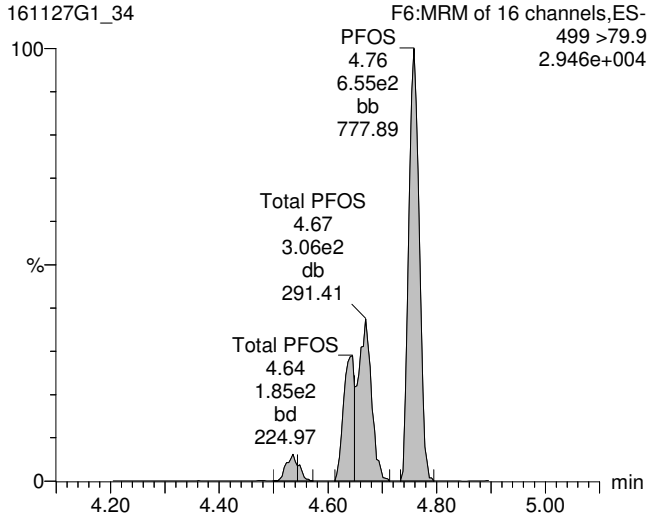
Total PFBS



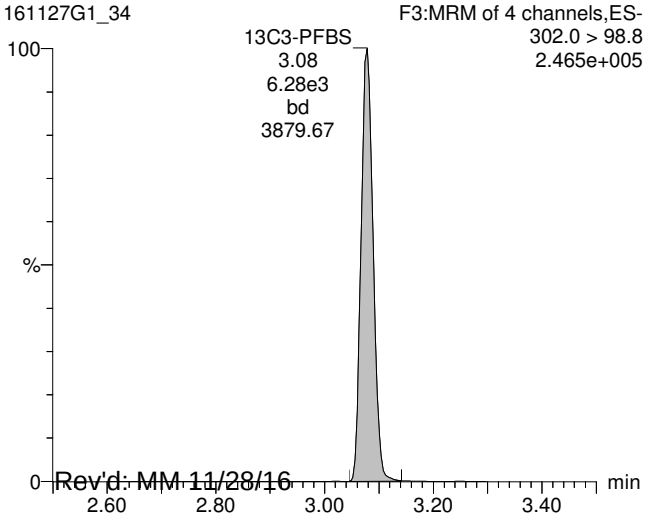
Total PFOA



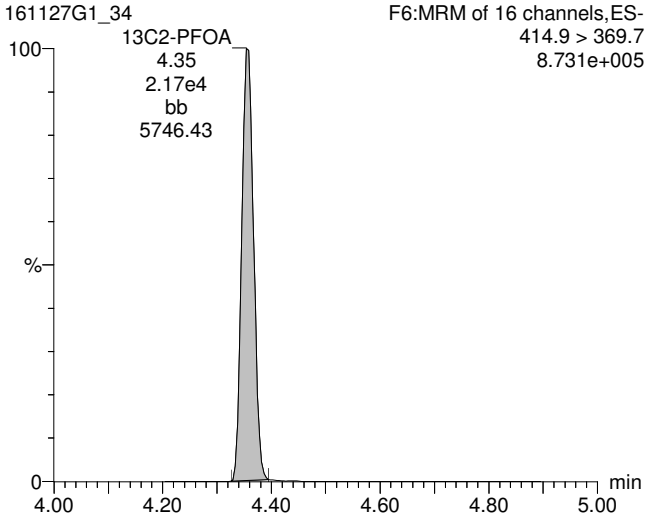
Total PFOS



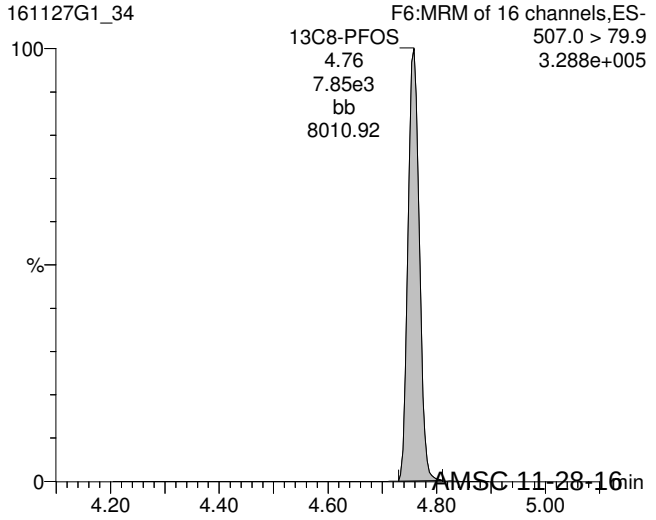
13C3-PFBS



13C2-PFOA



13C8-PFOS



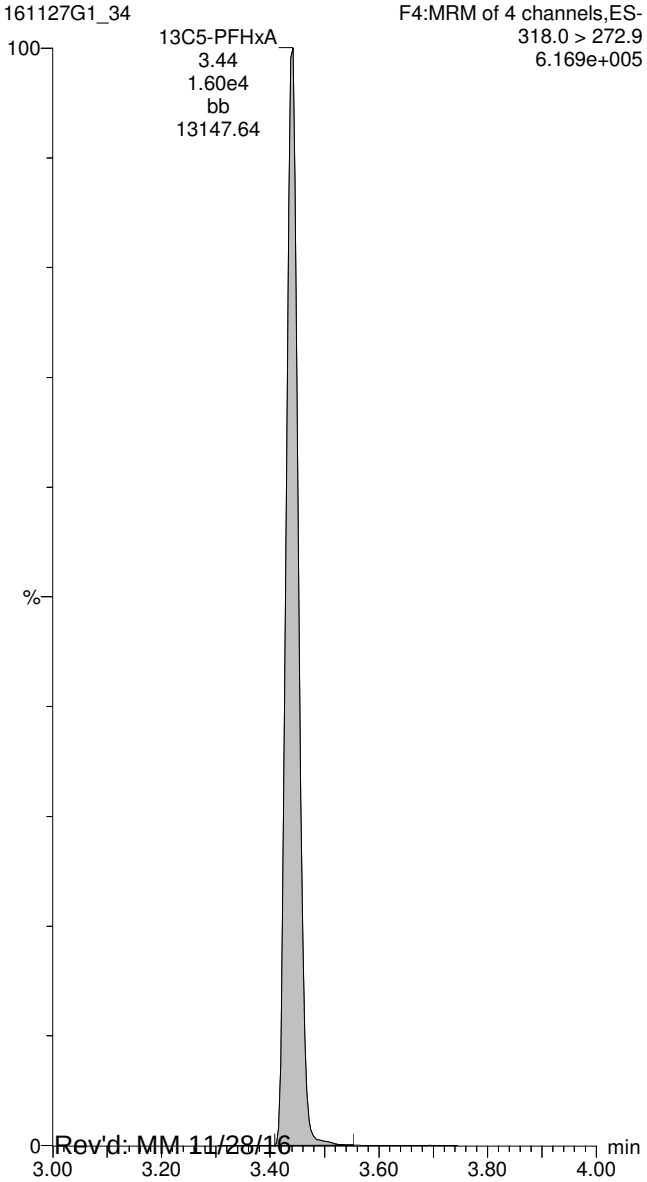
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-34.qld

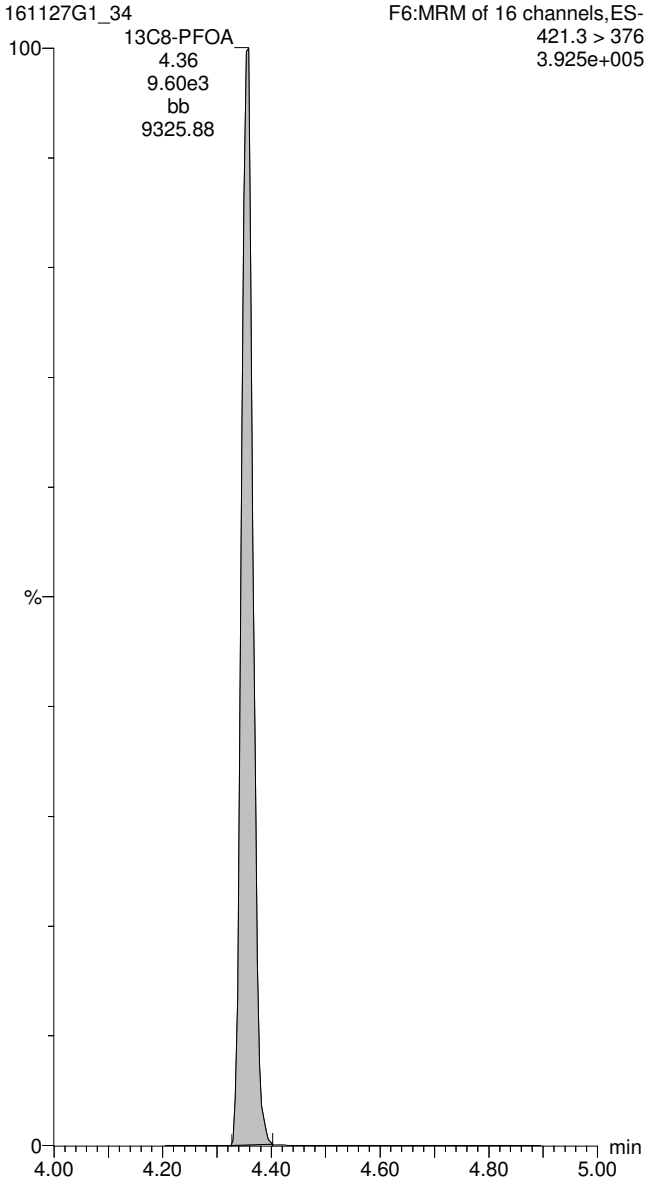
Last Altered: Monday, November 28, 2016 3:06:05 PM Pacific Standard Time
Printed: Monday, November 28, 2016 3:06:15 PM Pacific Standard Time

ID: 1601451-04 OUAI-MW37-20161114 0.13083, Description: OUAI-MW37-20161114, Name: 161127G1_34, Date: 27-Nov-2016, Time: 20:22:16, Instrument: , Lab: , User:

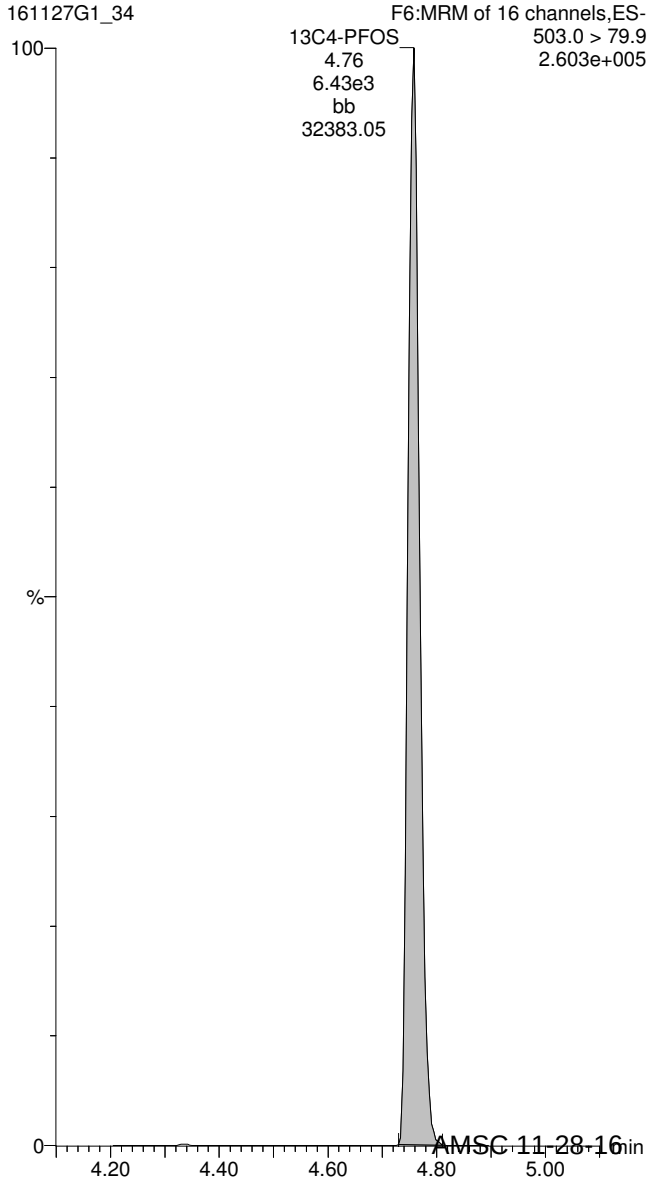
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-35.qld

Last Altered: Monday, November 28, 2016 14:08:09 Pacific Standard Time
Printed: Monday, November 28, 2016 14:09:00 Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-05 OUAI-MW37A-20161114 0.13037, Description: OUAI-MW37A-20161114, Name: 161127G1_35, Date: 27-Nov-2016, Time: 20:34:53

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	1.539e4	6.190e3		0.130	3.08	134	
2	8	PFOA	413 > 368.7	5.028e3	2.061e4		0.130	4.36	25.2	
3	10	PFOS	499 >79.9	6.758e2	7.367e3		0.130	4.76	12.1	
4	16	13C3-PFBS	302.0 > 98.8	6.190e3	1.539e4	0.302	0.130	3.08	128	133
5	17	13C2-PFHxA	315 > 269.8	4.194e3	1.539e4	0.620	0.130	3.45	42.2	110
6	18	13C4-PFHpA	367.2 > 321.8	1.310e4	1.066e4	1.139	0.130	3.96	104	108
7	19	18O2-PFHxS	403 > 102.6	5.568e3	1.066e4	0.449	0.130	4.07	111	116
8	20	13C2-6:2 FTS	429.1 > 408.9	3.278e3	4.799e3	1.073	0.130	4.31	61.0	63.6
9	21	13C2-PFOA	414.9 > 369.7	2.061e4	8.332e3	2.262	0.130	4.36	105	109
10	22	13C8-PFOS	507.0 > 79.9	7.367e3	6.858e3	0.944	0.130	4.76	109	114
11	23	13C5-PFNA	468.2 > 422.9	1.054e4	1.039e4	1.082	0.130	4.70	89.9	93.8
12	24	13C2-PFDA	515.1 > 469.9	7.696e3	8.703e3	1.019	0.130	5.00	83.2	86.8
13	25	13C2-8:2 FTS	529.1 > 508.7	2.836e3	4.799e3	0.569	0.130	4.97	99.6	104
14	26	13C4-PFBA	217 > 171.8	1.491e4	1.491e4	1.000	0.130	1.85	95.9	100
15	27	13C2-4:2 FTS	329.2 > 308.9	4.799e3	4.799e3	1.000	0.130	3.35	95.9	100
16	28	13C5-PFHxA	318.0 > 272.9	1.539e4	1.539e4	1.000	0.130	3.45	95.9	100
17	29	13C3-PFHxS	401.9 > 79.9	1.066e4	1.066e4	1.000	0.130	4.07	95.9	100
18	30	13C8-PFOA	421.3 > 376	8.332e3	8.332e3	1.000	0.130	4.36	95.9	100
19	31	13C4-PFOS	503.0 > 79.9	6.858e3	6.858e3	1.000	0.130	4.76	95.9	100
20	34	Total PFBS	299 > 79.7		5.568e3		0.130		139	
21	36	Total PFOA	413 > 368.7		2.061e4		0.130		28.9	
22	37	Total PFOS	499 > 79.9		7.367e3		0.130		27.8	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-35.qld

Last Altered: Monday, November 28, 2016 14:08:09 Pacific Standard Time
Printed: Monday, November 28, 2016 14:09:00 Pacific Standard Time

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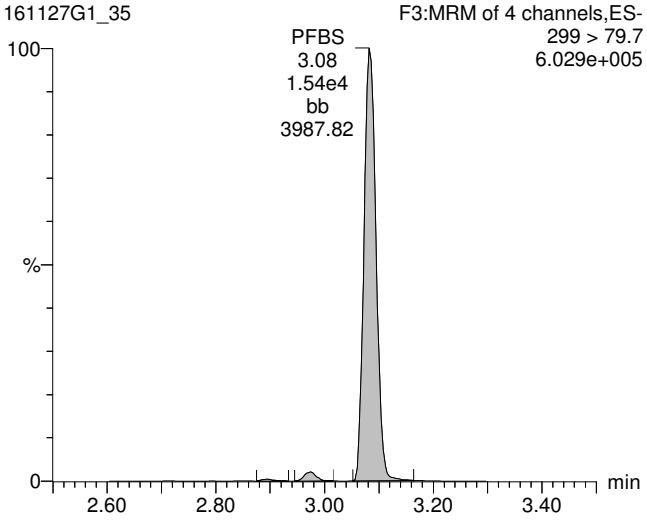
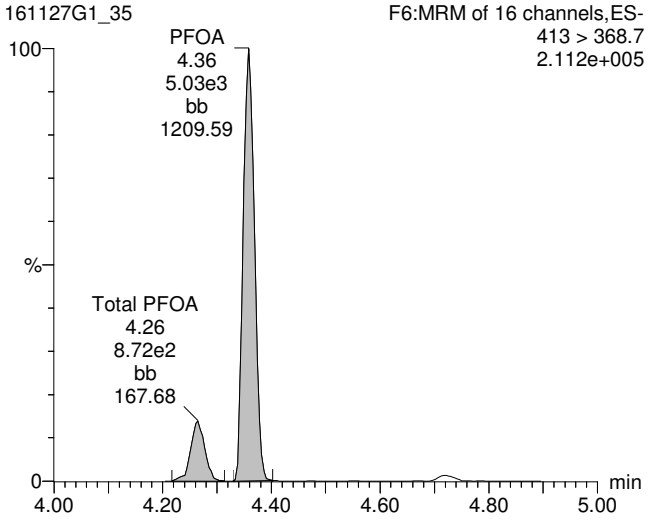
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-05 OUAI-MW37A-20161114 0.13037, Description: OUAI-MW37A-20161114, Name: 161127G1_35, Date: 27-Nov-2016, Time: 20:34:53, Instrument: , Lab: , User:

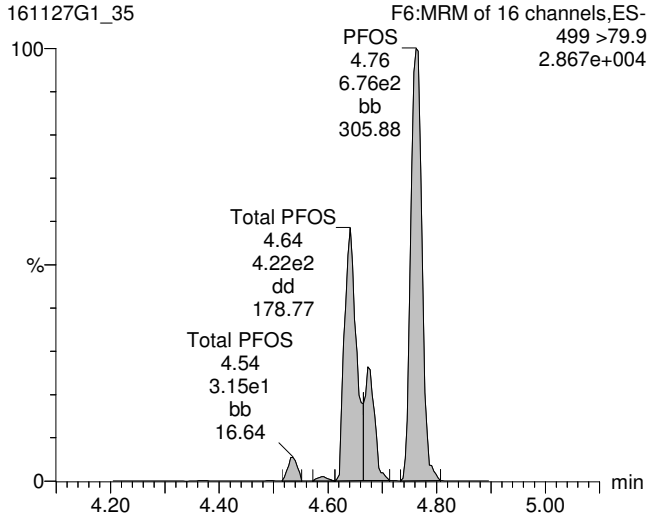
Total PFBS



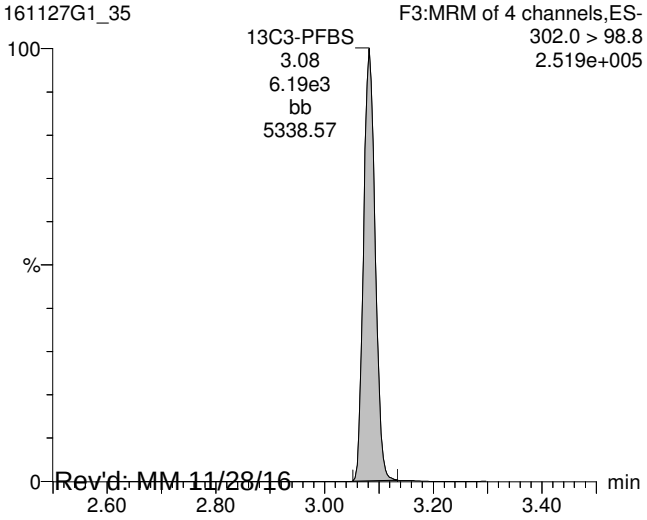
Total PFOA



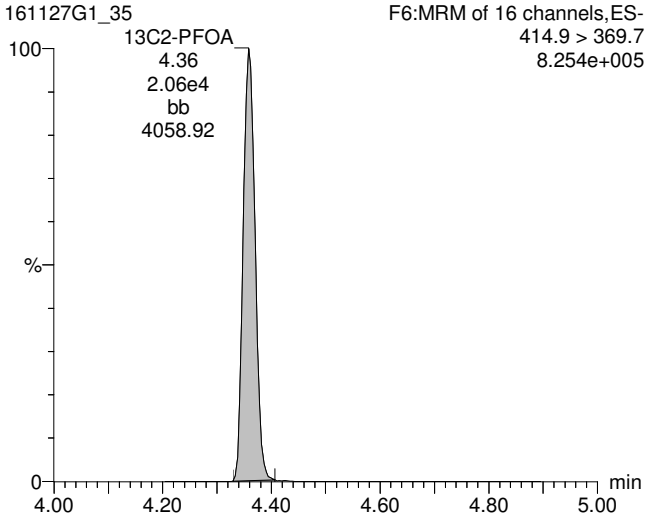
Total PFOS



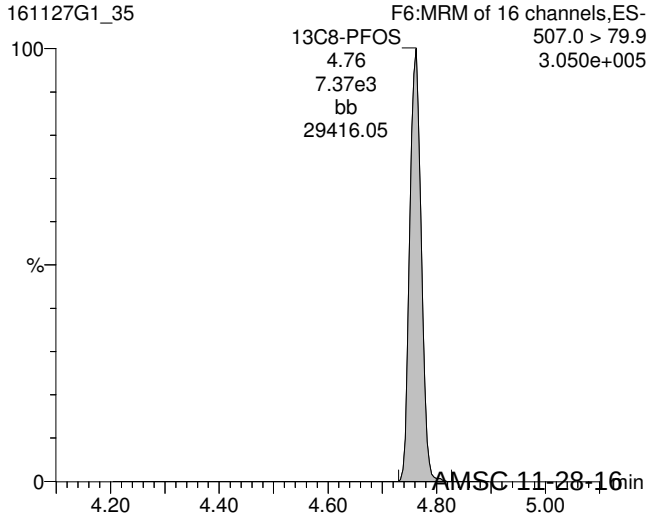
13C3-PFBS



13C2-PFOA



13C8-PFOS



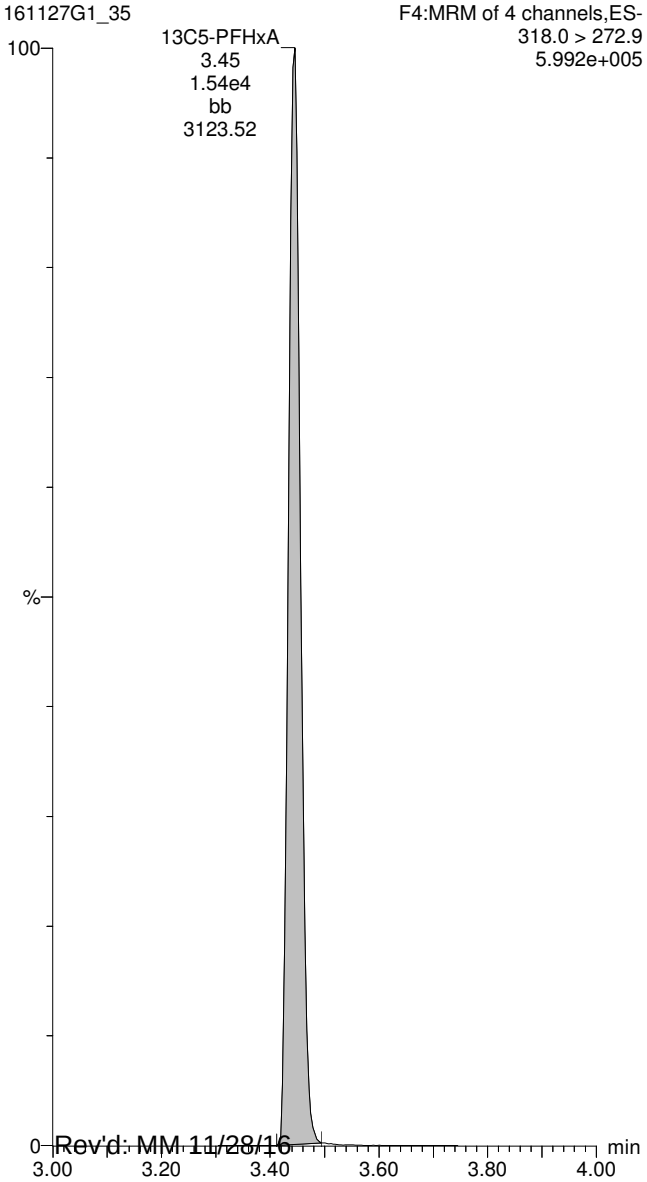
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-35.qld

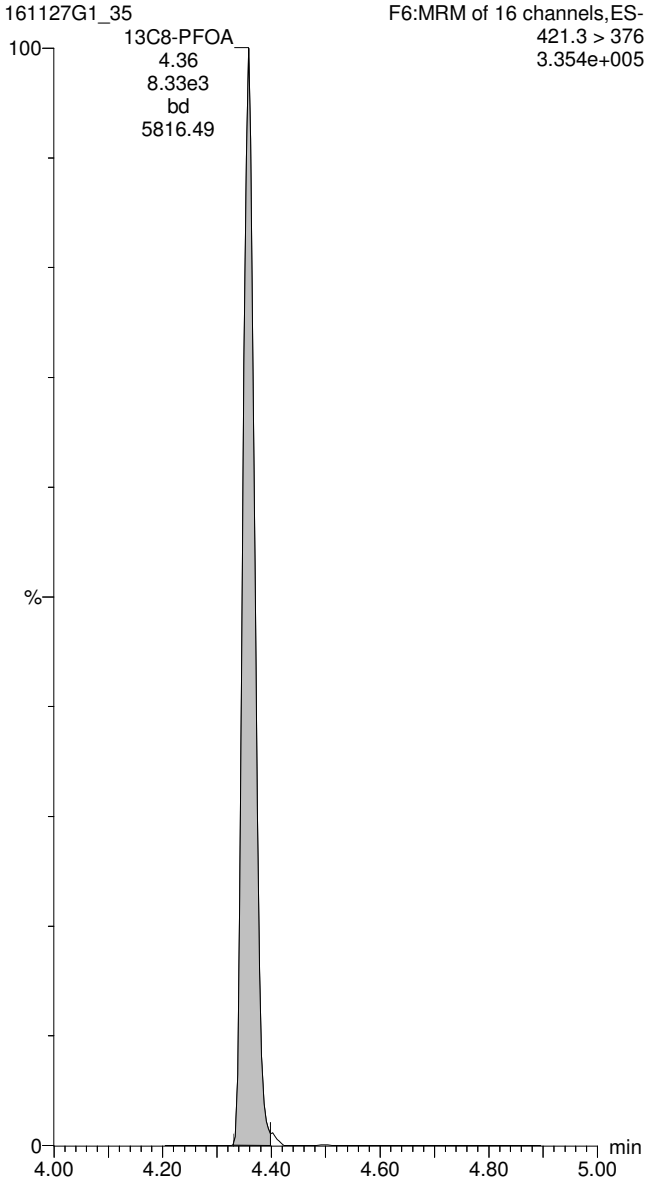
Last Altered: Monday, November 28, 2016 14:08:09 Pacific Standard Time
Printed: Monday, November 28, 2016 14:09:00 Pacific Standard Time

ID: 1601451-05 OUAI-MW37A-20161114 0.13037, Description: OUAI-MW37A-20161114, Name: 161127G1_35, Date: 27-Nov-2016, Time: 20:34:53, Instrument: , Lab: , User:

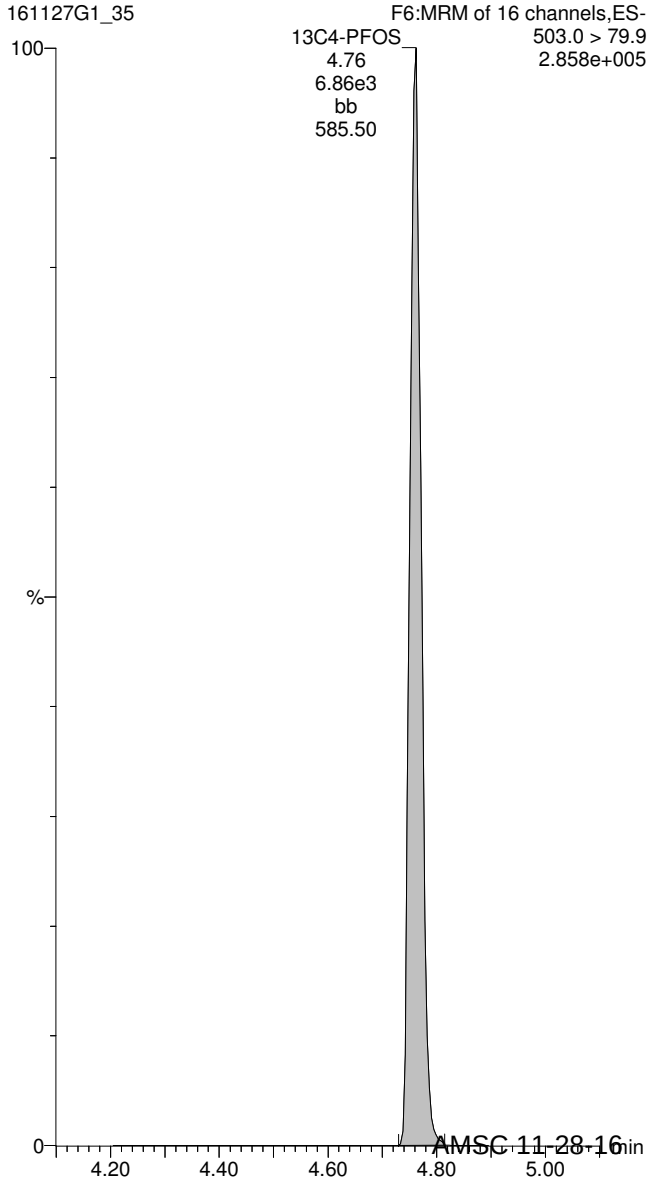
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-36.qld

Last Altered: Monday, November 28, 2016 14:10:47 Pacific Standard Time
Printed: Monday, November 28, 2016 14:11:22 Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-06 OUAI-HS03-20161114 0.12985, Description: OUAI-HS03-20161114, Name: 161127G1_36, Date: 27-Nov-2016, Time: 20:47:29

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	3.155e4	6.109e3		0.130	3.08	278	
2	8	PFOA	413 > 368.7	5.780e3	2.130e4		0.130	4.36	28.2	
3	10	PFOS	499 >79.9		7.497e3		0.130			
4	16	13C3-PFBS	302.0 > 98.8	6.109e3	1.476e4	0.302	0.130	3.08	132	137
5	17	13C2-PFHxA	315 > 269.8	3.867e3	1.476e4	0.620	0.130	3.45	40.7	106
6	18	13C4-PFHpA	367.2 > 321.8	1.450e4	1.108e4	1.139	0.130	3.96	111	115
7	19	18O2-PFHxS	403 > 102.6	5.591e3	1.108e4	0.449	0.130	4.07	108	112
8	20	13C2-6:2 FTS	429.1 > 408.9	4.356e3	5.684e3	1.073	0.130	4.31	68.7	71.4
9	21	13C2-PFOA	414.9 > 369.7	2.130e4	9.572e3	2.262	0.130	4.36	94.7	98.4
10	22	13C8-PFOS	507.0 > 79.9	7.497e3	6.794e3	0.944	0.130	4.76	113	117
11	23	13C5-PFNA	468.2 > 422.9	1.030e4	9.528e3	1.082	0.130	4.70	96.2	99.9
12	24	13C2-PFDA	515.1 > 469.9	8.091e3	9.857e3	1.019	0.130	5.00	77.5	80.5
13	25	13C2-8:2 FTS	529.1 > 508.7	4.074e3	5.684e3	0.569	0.130	4.97	121	126
14	26	13C4-PFBA	217 > 171.8	1.328e4	1.328e4	1.000	0.130	1.85	96.3	100
15	27	13C2-4:2 FTS	329.2 > 308.9	5.684e3	5.684e3	1.000	0.130	3.35	96.3	100
16	28	13C5-PFHxA	318.0 > 272.9	1.476e4	1.476e4	1.000	0.130	3.45	96.3	100
17	29	13C3-PFHxS	401.9 > 79.9	1.108e4	1.108e4	1.000	0.130	4.08	96.3	100
18	30	13C8-PFOA	421.3 > 376	9.572e3	9.572e3	1.000	0.130	4.36	96.3	100
19	31	13C4-PFOS	503.0 > 79.9	6.794e3	6.794e3	1.000	0.130	4.76	96.3	100
20	34	Total PFBS	299 > 79.7		5.591e3		0.130		289	
21	36	Total PFOA	413 > 368.7		2.130e4		0.130		36.3	
22	37	Total PFOS	499 > 79.9		7.497e3		0.130			

Vista Analytical Laboratory Q1

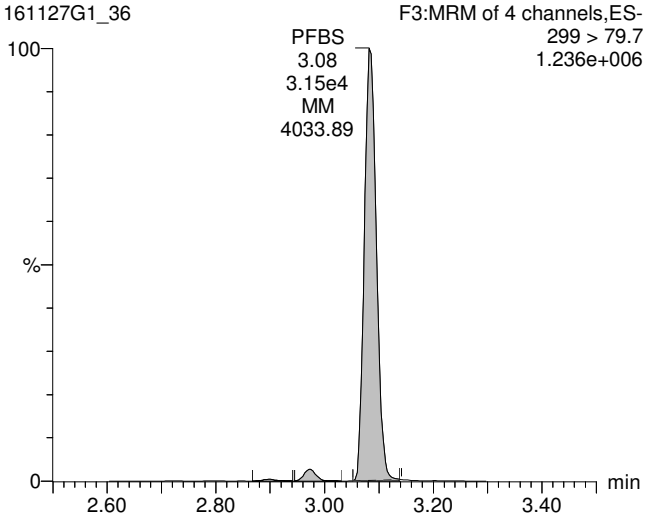
Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-36.qld

Last Altered: Monday, November 28, 2016 14:10:47 Pacific Standard Time
Printed: Monday, November 28, 2016 14:11:22 Pacific Standard Time

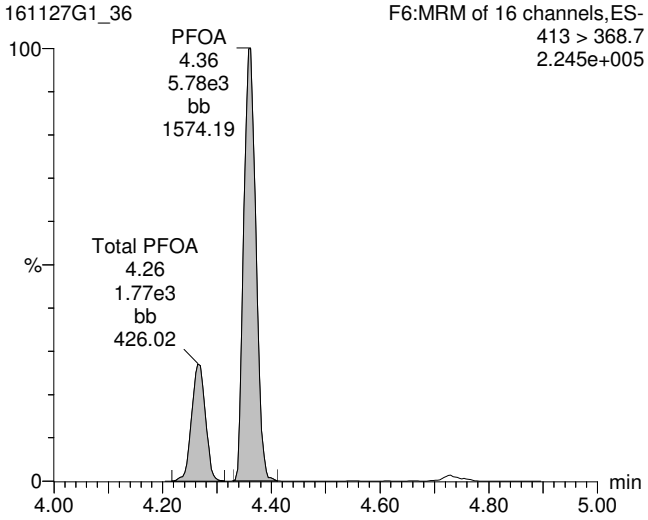
Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-06 OUAI-HS03-20161114 0.12985, Description: OUAI-HS03-20161114, Name: 161127G1_36, Date: 27-Nov-2016, Time: 20:47:29, Instrument: , Lab: , User:

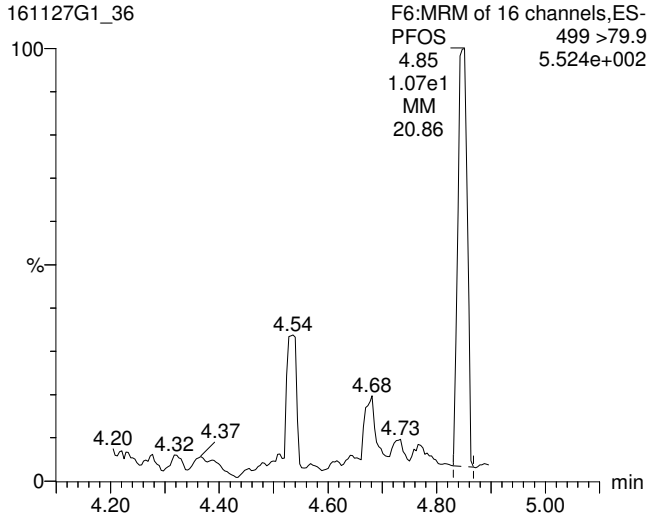
Total PFBS



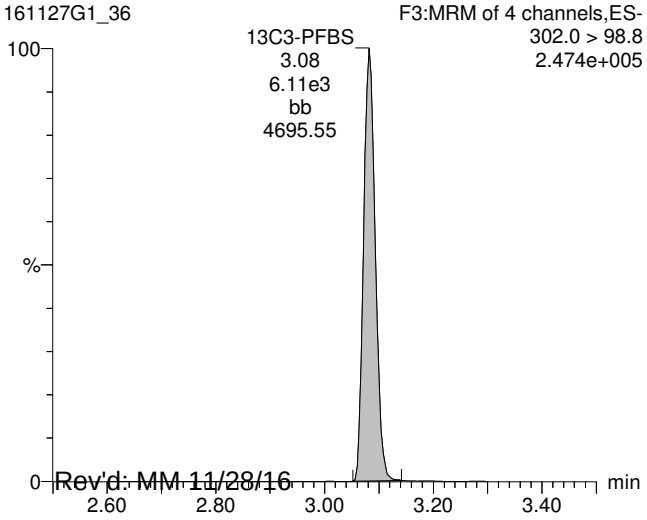
Total PFOA



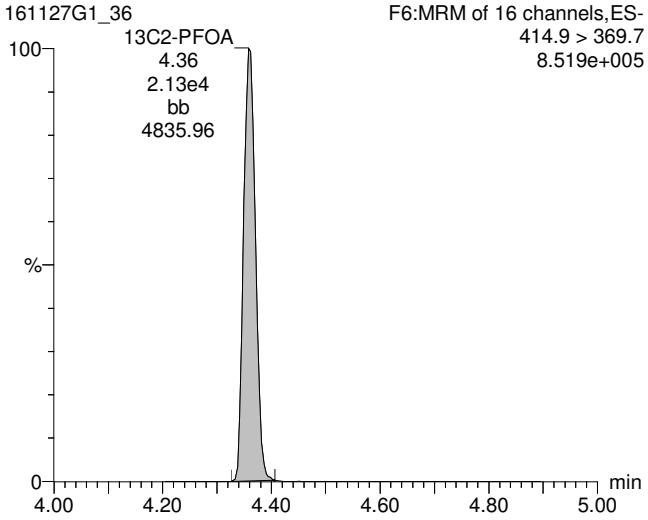
Total PFOS



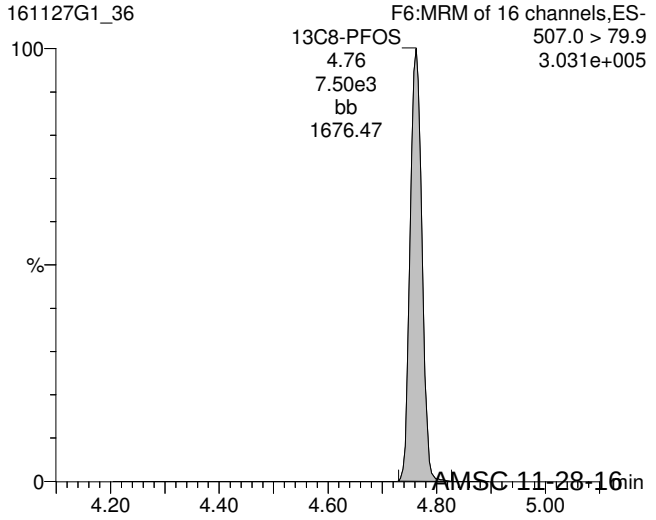
13C3-PFBS



13C2-PFOA



13C8-PFOS



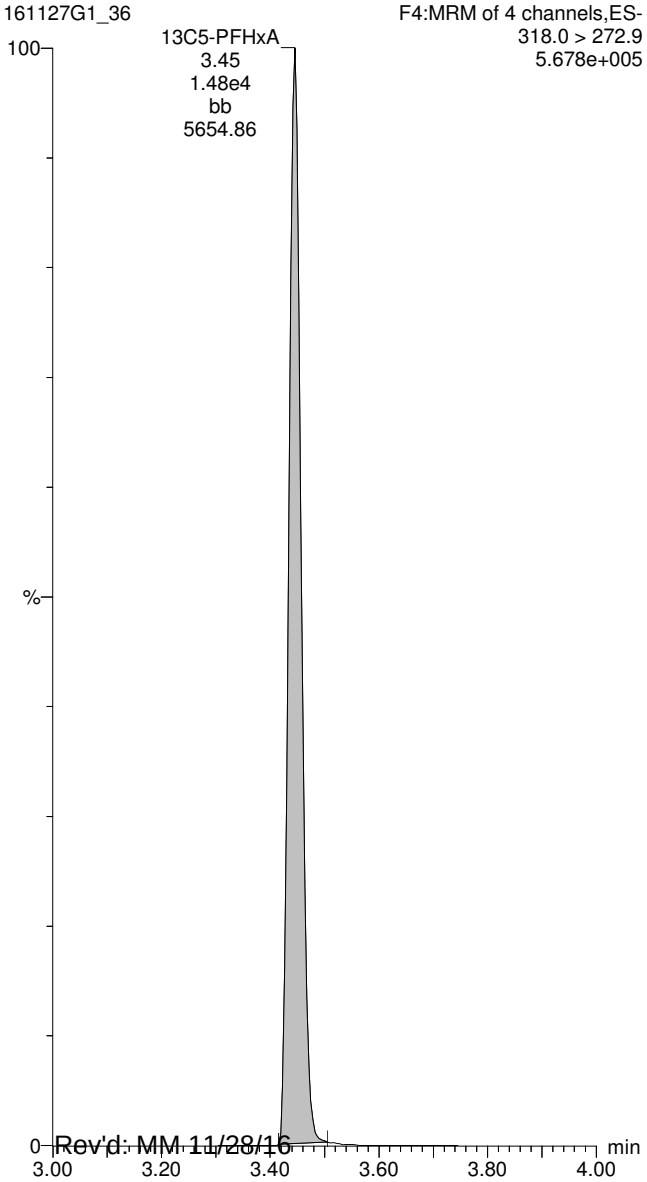
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-36.qld

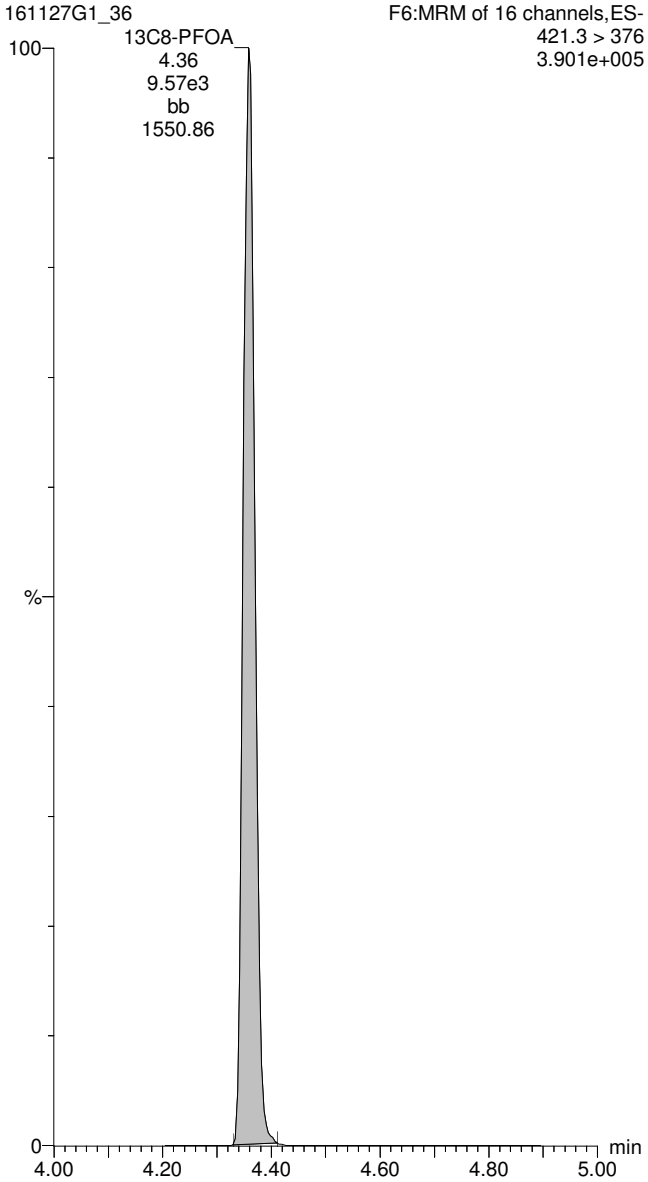
Last Altered: Monday, November 28, 2016 14:10:47 Pacific Standard Time
Printed: Monday, November 28, 2016 14:11:22 Pacific Standard Time

ID: 1601451-06 OUAI-HS03-20161114 0.12985, Description: OUAI-HS03-20161114, Name: 161127G1_36, Date: 27-Nov-2016, Time: 20:47:29, Instrument: , Lab: , User:

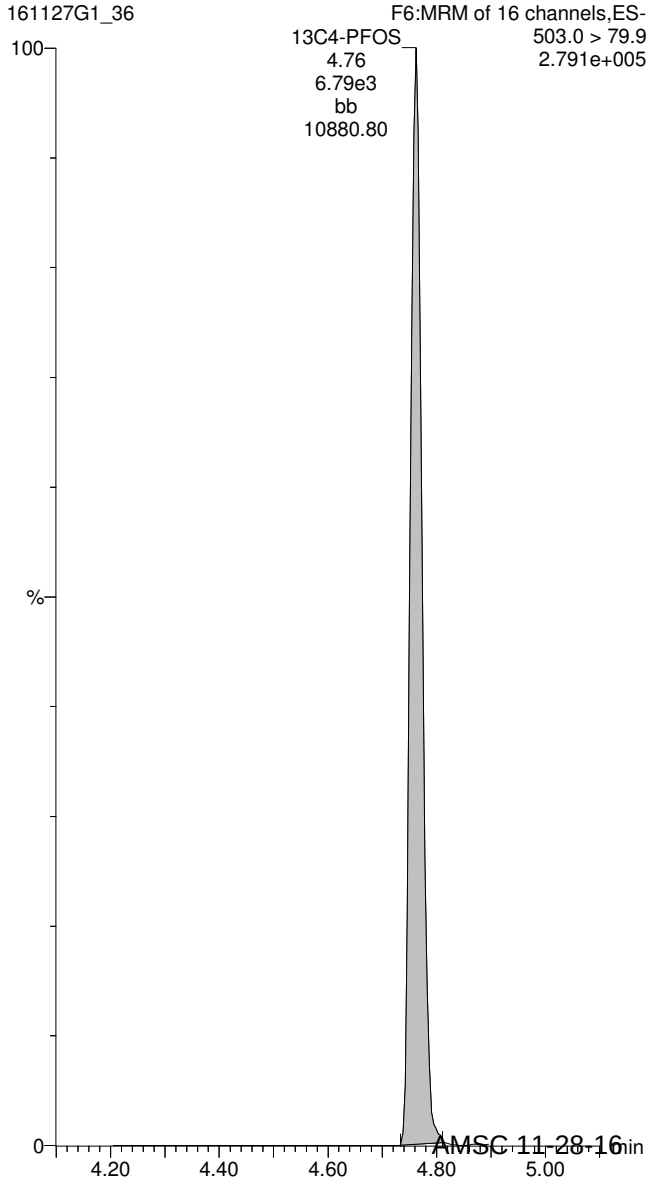
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-37.qld

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Printed: Monday, November 28, 2016 14:13:43 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-MS1 Matrix Spike 0.12605, Description: Matrix Spike, Name: 161127G1_37, Date: 27-Nov-2016, Time: 21:00:07

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	3.864e4	6.028e3		0.126	3.08	355	
2	8	PFOA	413 > 368.7	2.060e4	2.140e4		0.126	4.35	105	
3	10	PFOS	499 >79.9	4.103e3	7.273e3		0.126	4.76	68.6	
4	16	13C3-PFBS	302.0 > 98.8	6.028e3	1.430e4	0.302	0.126	3.08	138	140
5	17	13C2-PFHxA	315 > 269.8	3.921e3	1.430e4	0.620	0.126	3.45	43.9	111
6	18	13C4-PFHpA	367.2 > 321.8	1.427e4	1.149e4	1.139	0.126	3.96	108	109
7	19	18O2-PFHxS	403 > 102.6	5.372e3	1.149e4	0.449	0.126	4.07	103	104
8	20	13C2-6:2 FTS	429.1 > 408.9	4.390e3	5.586e3	1.073	0.126	4.31	72.6	73.2
9	21	13C2-PFOA	414.9 > 369.7	2.140e4	9.058e3	2.262	0.126	4.35	104	104
10	22	13C8-PFOS	507.0 > 79.9	7.273e3	6.509e3	0.944	0.126	4.76	117	118
11	23	13C5-PFNA	468.2 > 422.9	9.754e3	1.103e4	1.082	0.126	4.70	81.0	81.7
12	24	13C2-PFDA	515.1 > 469.9	7.408e3	9.117e3	1.019	0.126	4.99	79.1	79.7
13	25	13C2-8:2 FTS	529.1 > 508.7	3.737e3	5.586e3	0.569	0.126	4.97	117	118
14	26	13C4-PFBA	217 > 171.8	1.259e4	1.259e4	1.000	0.126	1.86	99.2	100
15	27	13C2-4:2 FTS	329.2 > 308.9	5.586e3	5.586e3	1.000	0.126	3.35	99.2	100
16	28	13C5-PFHxA	318.0 > 272.9	1.430e4	1.430e4	1.000	0.126	3.45	99.2	100
17	29	13C3-PFHxS	401.9 > 79.9	1.149e4	1.149e4	1.000	0.126	4.07	99.2	100
18	30	13C8-PFOA	421.3 > 376	9.058e3	9.058e3	1.000	0.126	4.35	99.2	100
19	31	13C4-PFOS	503.0 > 79.9	6.509e3	6.509e3	1.000	0.126	4.76	99.2	100
20	34	Total PFBS	299 > 79.7		5.372e3		0.126		366	
21	36	Total PFOA	413 > 368.7		2.140e4		0.126		114	
22	37	Total PFOS	499 > 79.9		7.273e3		0.126		68.6	

AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-37.qld

Last Altered: Monday, November 28, 2016 14:13:28 Pacific Standard Time
Printed: Monday, November 28, 2016 14:13:43 Pacific Standard Time

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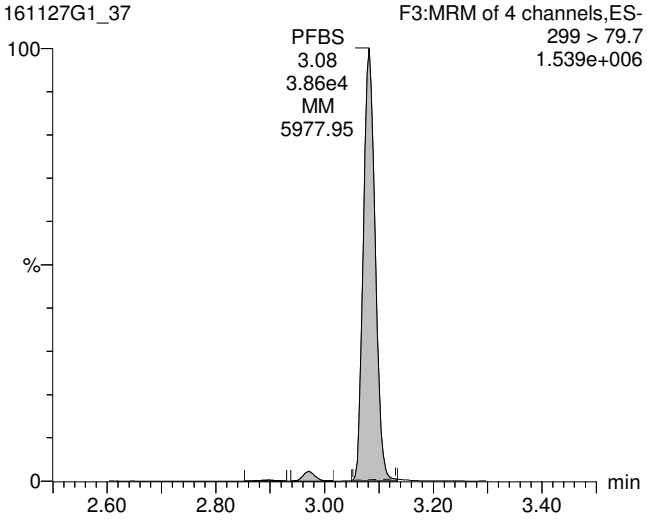
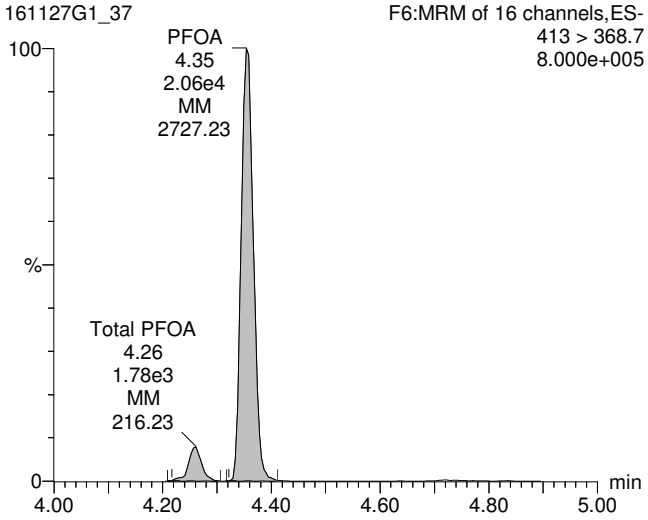
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-MS1 Matrix Spike 0.12605, Description: Matrix Spike, Name: 161127G1_37, Date: 27-Nov-2016, Time: 21:00:07, Instrument: , Lab: , User:

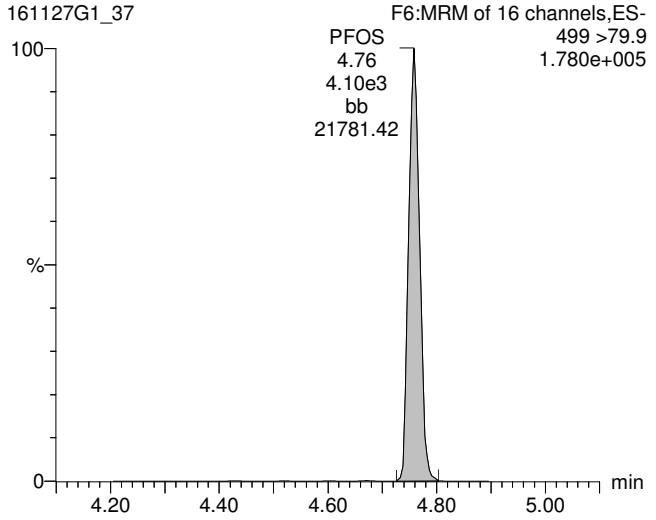
Total PFBS



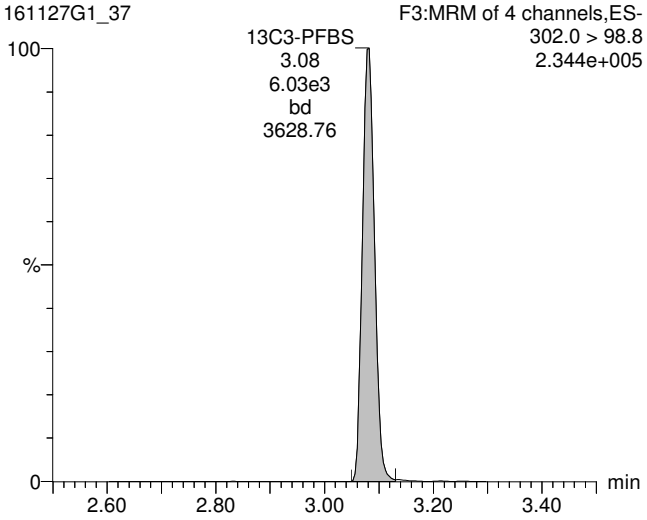
Total PFOA



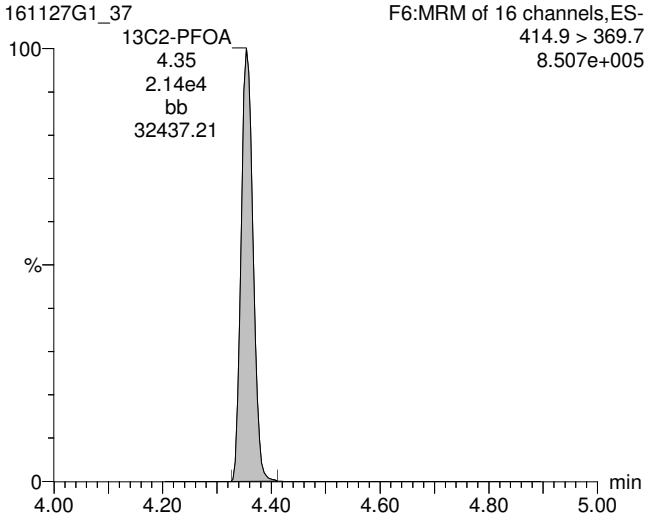
Total PFOS



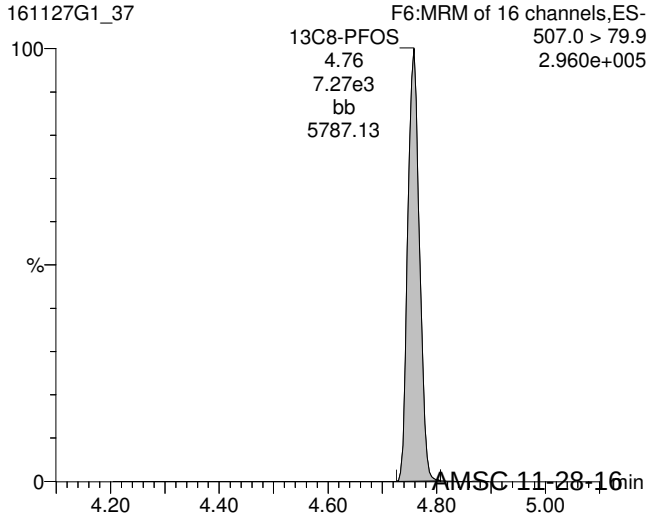
13C3-PFBS



13C2-PFOA



13C8-PFOS



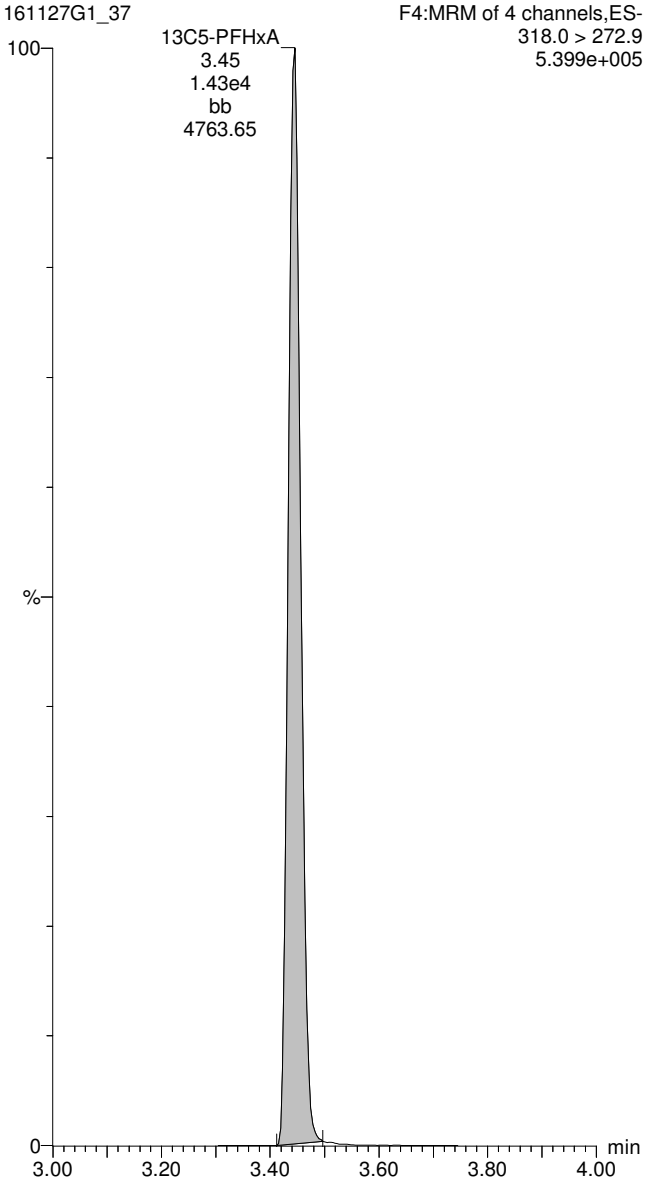
AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-37.qld

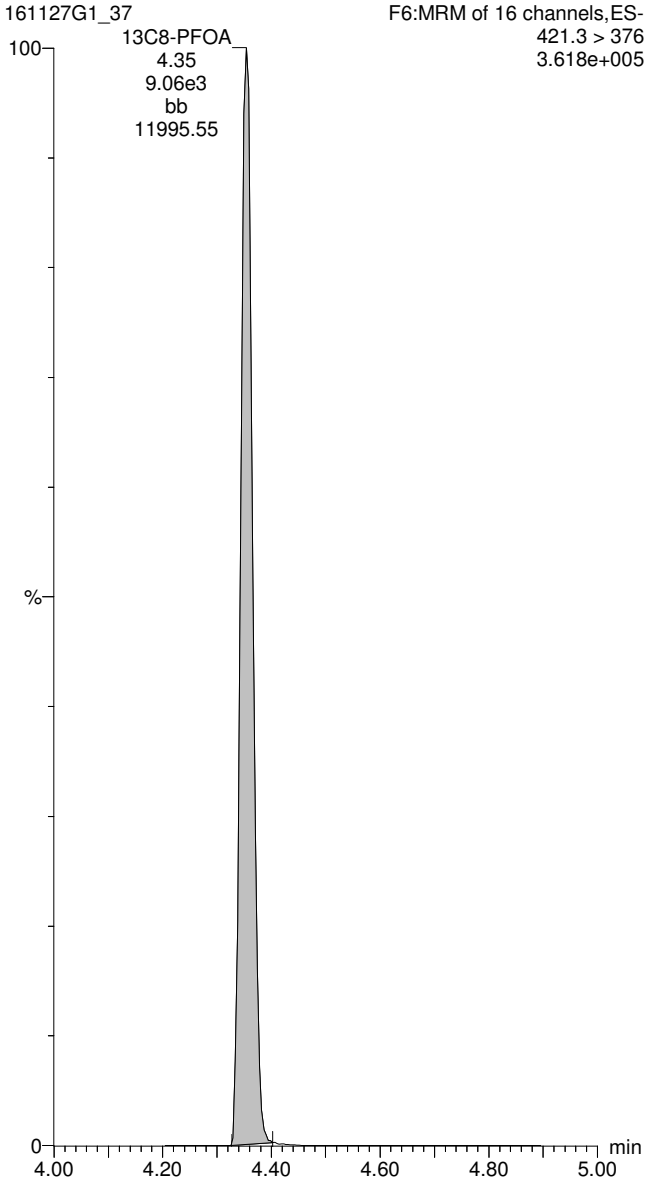
Last Altered: Monday, November 28, 2016 14:13:28 Pacific Standard Time
Printed: Monday, November 28, 2016 14:13:43 Pacific Standard Time

ID: B6K0143-MS1 Matrix Spike 0.12605, Description: Matrix Spike, Name: 161127G1_37, Date: 27-Nov-2016, Time: 21:00:07, Instrument: , Lab: , User:

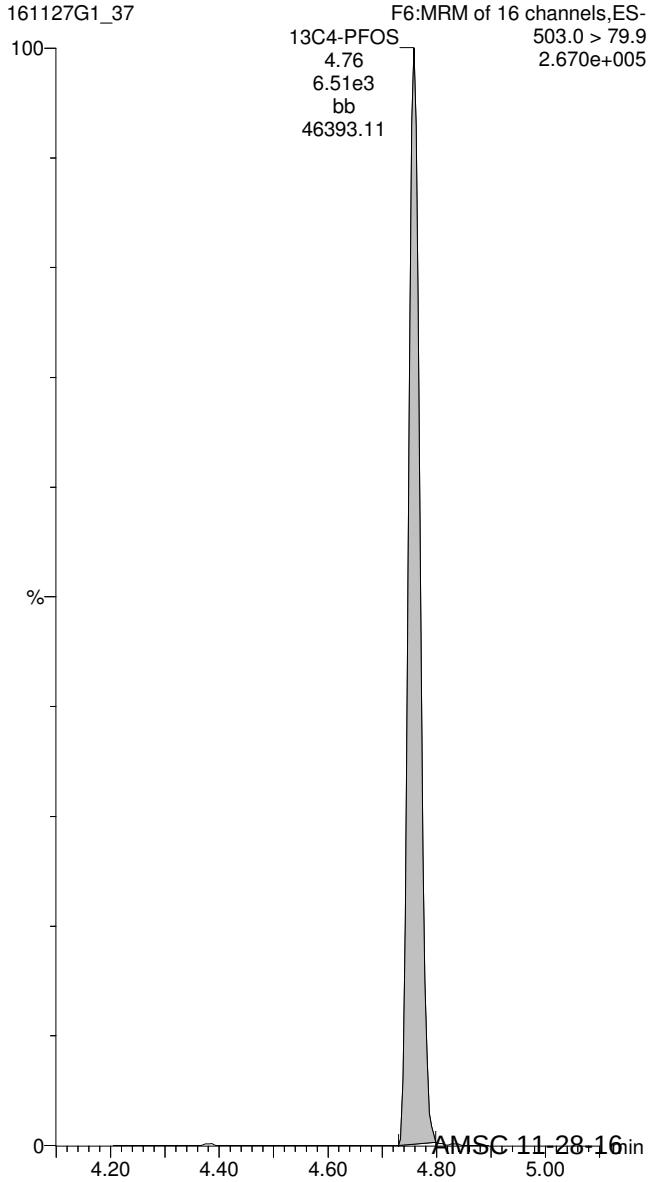
13C5-PFHxA



13C8-PFOA



13C4-PFOS



AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-38.qld

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Printed: Monday, November 28, 2016 14:16:29 Pacific Standard Time

Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-MSD1 Matrix Spike Dup 0.12681, Description: Matrix Spike Dup, Name: 161127G1_38, Date: 27-Nov-2016, Time: 21:12:45

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	3.685e4	5.692e3		0.127	3.08	357	
2	8	PFOA	413 > 368.7	2.053e4	2.076e4		0.127	4.35	108	
3	10	PFOS	499 >79.9	3.892e3	6.983e3		0.127	4.76	67.4	
4	16	13C3-PFBS	302.0 > 98.8	5.692e3	1.368e4	0.302	0.127	3.08	136	138
5	17	13C2-PFHxA	315 > 269.8	3.615e3	1.368e4	0.620	0.127	3.45	42.1	107
6	18	13C4-PFHpA	367.2 > 321.8	1.326e4	1.159e4	1.139	0.127	3.96	99.0	100
7	19	18O2-PFHxS	403 > 102.6	5.497e3	1.159e4	0.449	0.127	4.07	104	106
8	20	13C2-6:2 FTS	429.1 > 408.9	4.769e3	5.120e3	1.073	0.127	4.31	85.6	86.8
9	21	13C2-PFOA	414.9 > 369.7	2.076e4	9.056e3	2.262	0.127	4.35	99.9	101
10	22	13C8-PFOS	507.0 > 79.9	6.983e3	6.329e3	0.944	0.127	4.76	115	117
11	23	13C5-PFNA	468.2 > 422.9	8.903e3	9.539e3	1.082	0.127	4.70	85.0	86.3
12	24	13C2-PFDA	515.1 > 469.9	7.113e3	9.384e3	1.019	0.127	4.99	73.3	74.4
13	25	13C2-8:2 FTS	529.1 > 508.7	3.450e3	5.120e3	0.569	0.127	4.97	117	118
14	26	13C4-PFBA	217 > 171.8	1.299e4	1.299e4	1.000	0.127	1.86	98.6	100
15	27	13C2-4:2 FTS	329.2 > 308.9	5.120e3	5.120e3	1.000	0.127	3.35	98.6	100
16	28	13C5-PFHxA	318.0 > 272.9	1.368e4	1.368e4	1.000	0.127	3.45	98.6	100
17	29	13C3-PFHxS	401.9 > 79.9	1.159e4	1.159e4	1.000	0.127	4.07	98.6	100
18	30	13C8-PFOA	421.3 > 376	9.056e3	9.056e3	1.000	0.127	4.35	98.6	100
19	31	13C4-PFOS	503.0 > 79.9	6.329e3	6.329e3	1.000	0.127	4.76	98.6	100
20	34	Total PFBS	299 > 79.7		5.497e3		0.127		367	
21	36	Total PFOA	413 > 368.7		2.076e4		0.127		115	
22	37	Total PFOS	499 > 79.9		6.983e3		0.127		69.2	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-38.qld

Last Altered: Monday, November 28, 2016 14:16:21 Pacific Standard Time
Printed: Monday, November 28, 2016 14:16:29 Pacific Standard Time

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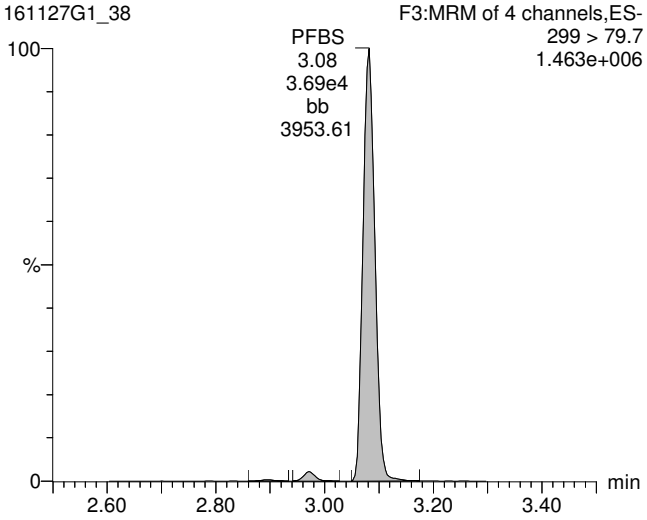
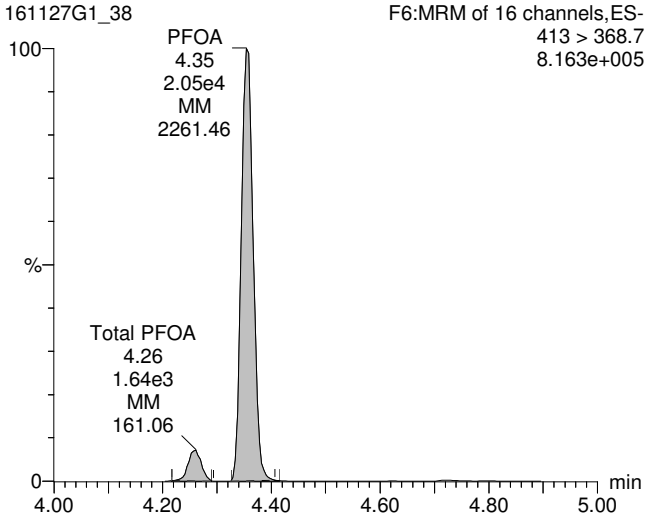
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: B6K0143-MSD1 Matrix Spike Dup 0.12681, Description: Matrix Spike Dup, Name: 161127G1_38, Date: 27-Nov-2016, Time: 21:12:45, Instrument: , Lab: , User:

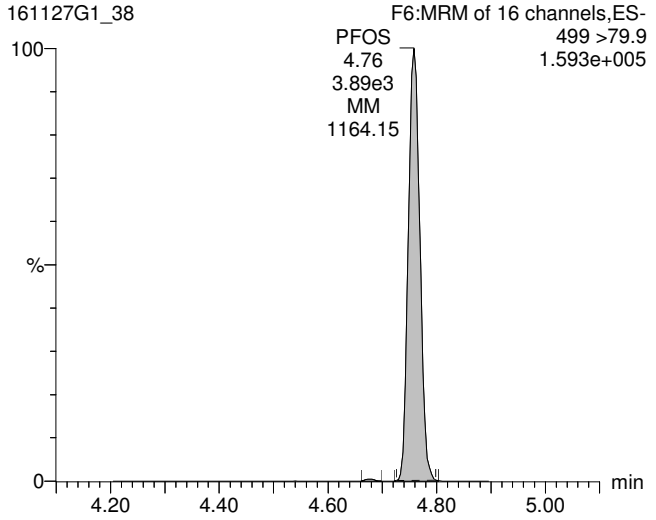
Total PFBS



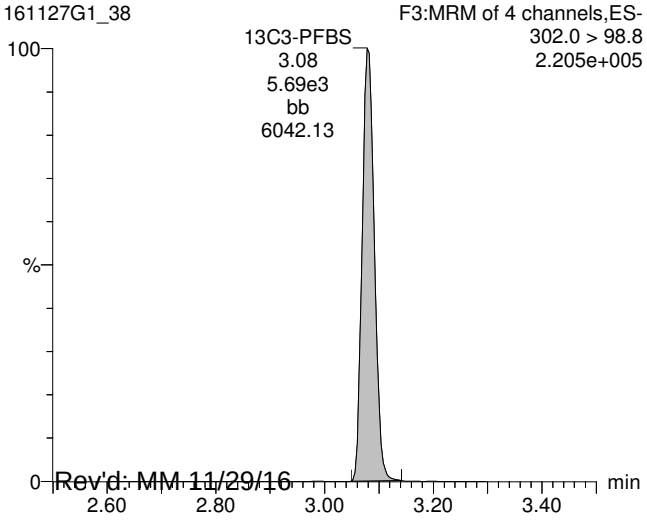
Total PFOA



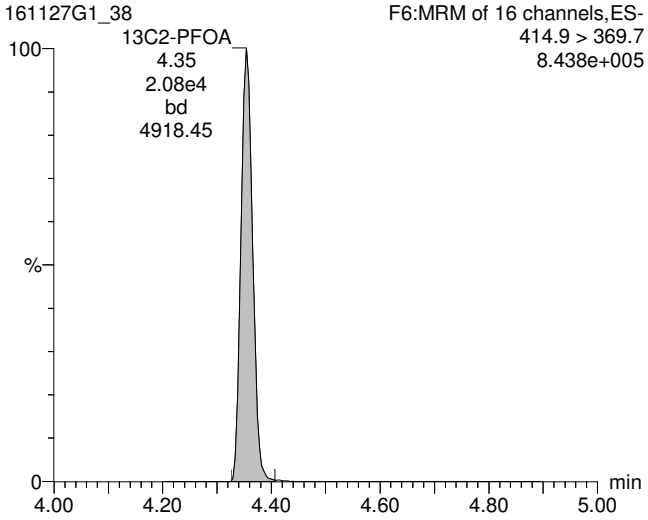
Total PFOS



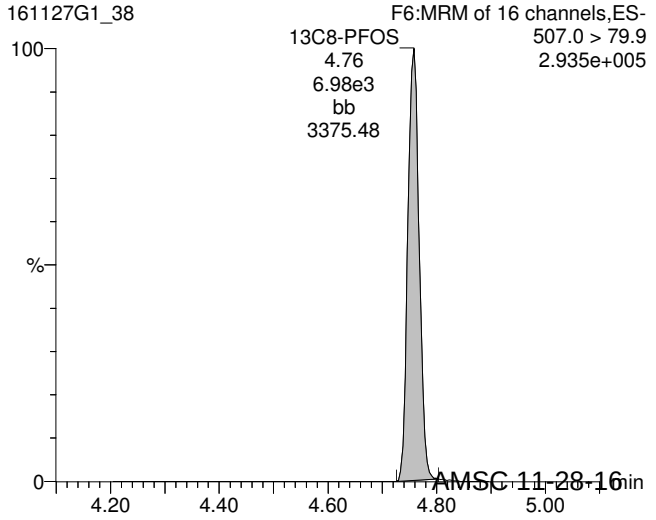
13C3-PFBS



13C2-PFOA



13C8-PFOS



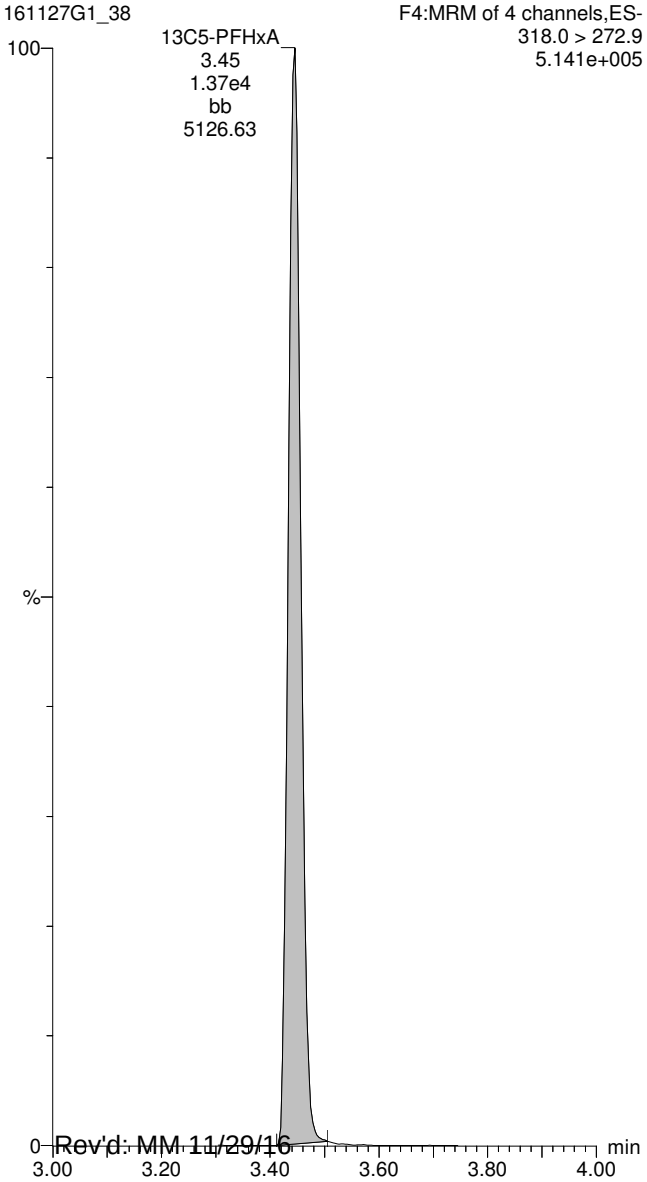
Rev'd: MM 11/29/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-38.qld

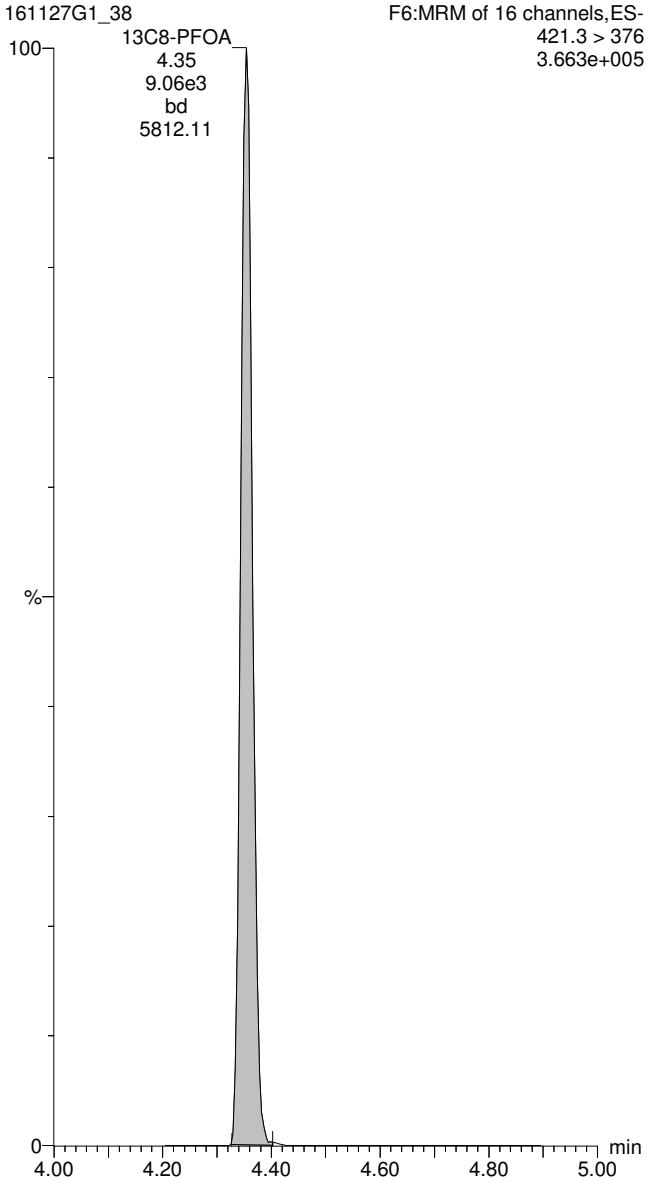
Last Altered: Monday, November 28, 2016 14:16:21 Pacific Standard Time
Printed: Monday, November 28, 2016 14:16:29 Pacific Standard Time

ID: B6K0143-MSD1 Matrix Spike Dup 0.12681, Description: Matrix Spike Dup, Name: 161127G1_38, Date: 27-Nov-2016, Time: 21:12:45, Instrument: , Lab: , User:

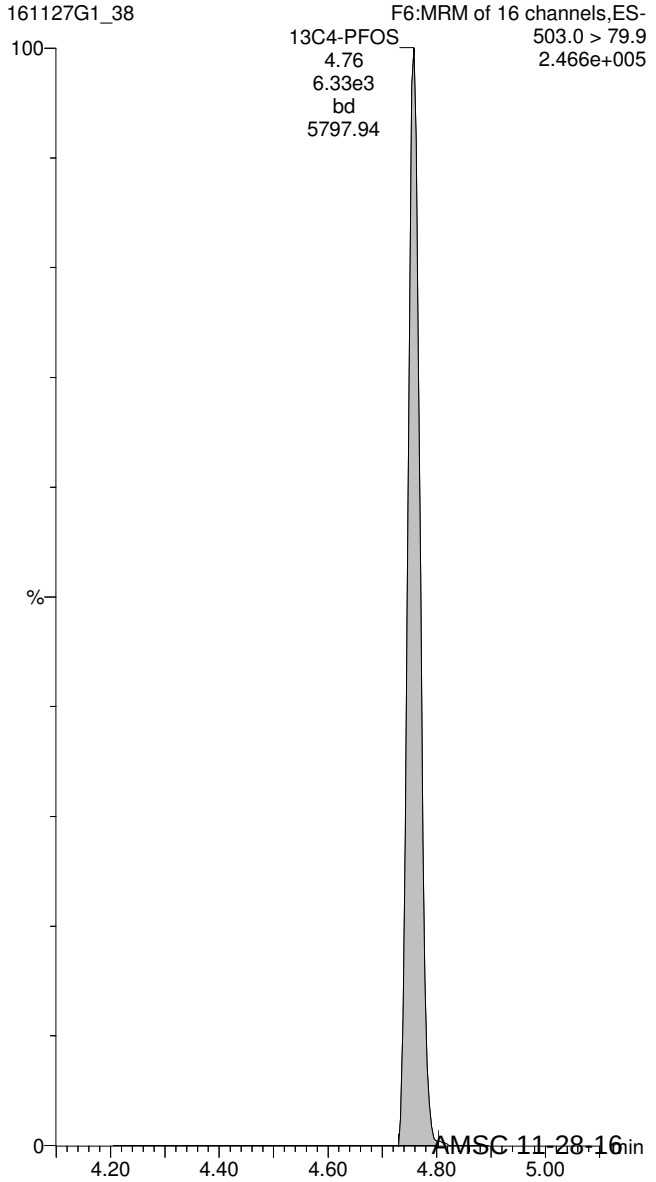
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/29/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-39.qld

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Printed: Monday, November 28, 2016 14:18:42 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-07 OUAI-MW19-20161114 0.13066, Description: OUAI-MW19-20161114, Name: 161127G1_39, Date: 27-Nov-2016, Time: 21:25:23

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	1.949e3	7.451e3		0.131	3.07	14.6	
2	8	PFOA	413 > 368.7	1.652e4	2.312e4		0.131	4.35	75.2	
3	10	PFOS	499 >79.9	4.165e3	8.247e3		0.131	4.75	59.4	
4	16	13C3-PFBS	302.0 > 98.8	7.451e3	1.801e4	0.302	0.131	3.07	131	137
5	17	13C2-PFHxA	315 > 269.8	4.869e3	1.801e4	0.620	0.131	3.44	41.7	109
6	18	13C4-PFHpA	367.2 > 321.8	1.450e4	1.428e4	1.139	0.131	3.95	85.3	89.2
7	19	18O2-PFHxS	403 > 102.6	6.751e3	1.428e4	0.449	0.131	4.07	101	105
8	20	13C2-6:2 FTS	429.1 > 408.9	4.133e3	6.020e3	1.073	0.131	4.31	61.2	64.0
9	21	13C2-PFOA	414.9 > 369.7	2.312e4	9.969e3	2.262	0.131	4.35	98.1	103
10	22	13C8-PFOS	507.0 > 79.9	8.247e3	7.205e3	0.944	0.131	4.75	116	121
11	23	13C5-PFNA	468.2 > 422.9	1.095e4	1.106e4	1.082	0.131	4.69	87.5	91.5
12	24	13C2-PFDA	515.1 > 469.9	8.399e3	1.003e4	1.019	0.131	4.99	78.6	82.1
13	25	13C2-8:2 FTS	529.1 > 508.7	4.926e3	6.020e3	0.569	0.131	4.96	138	144
14	26	13C4-PFBA	217 > 171.8	1.636e4	1.636e4	1.000	0.131	1.84	95.7	100
15	27	13C2-4:2 FTS	329.2 > 308.9	6.020e3	6.020e3	1.000	0.131	3.35	95.7	100
16	28	13C5-PFHxA	318.0 > 272.9	1.801e4	1.801e4	1.000	0.131	3.44	95.7	100
17	29	13C3-PFHxS	401.9 > 79.9	1.428e4	1.428e4	1.000	0.131	4.07	95.7	100
18	30	13C8-PFOA	421.3 > 376	9.969e3	9.969e3	1.000	0.131	4.35	95.7	100
19	31	13C4-PFOS	503.0 > 79.9	7.205e3	7.205e3	1.000	0.131	4.75	95.7	100
20	34	Total PFBS	299 > 79.7		6.751e3		0.131		14.6	
21	36	Total PFOA	413 > 368.7		2.312e4		0.131		79.3	
22	37	Total PFOS	499 > 79.9		8.247e3		0.131		106	

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-39.qld

Last Altered: Monday, November 28, 2016 14:18:32 Pacific Standard Time
Printed: Monday, November 28, 2016 14:18:42 Pacific Standard Time

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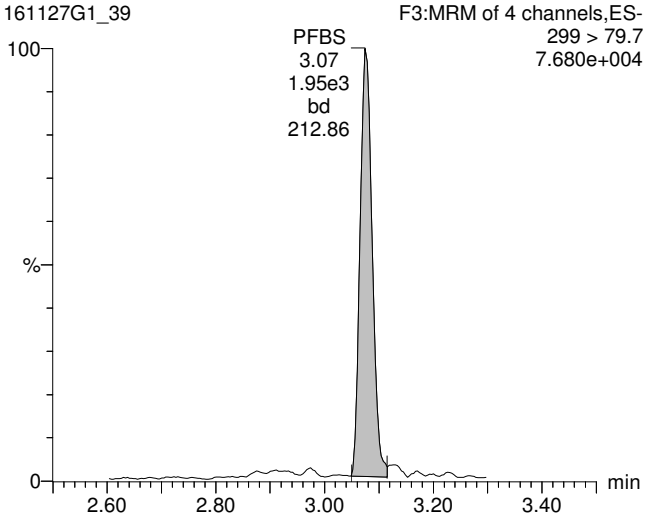
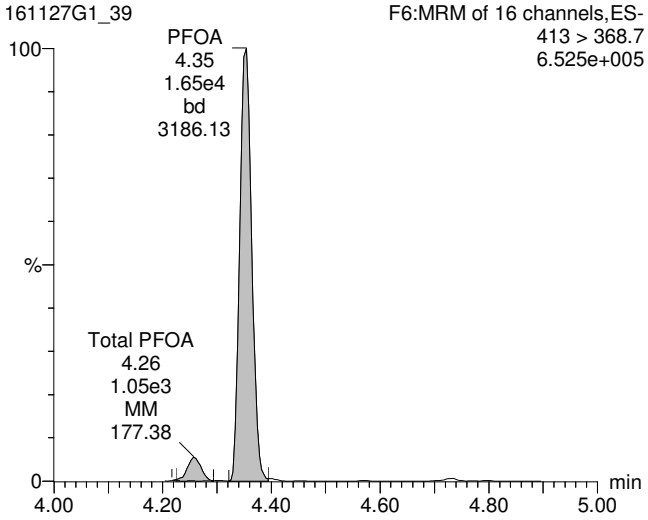
ID: 1601451-07 OUAI-MW19-20161114 0.13066, Description: OUAI-MW19-20161114, Name: 161127G1_39, Date: 27-Nov-2016, Time: 21:25:23, Instrument: , Lab: , User:

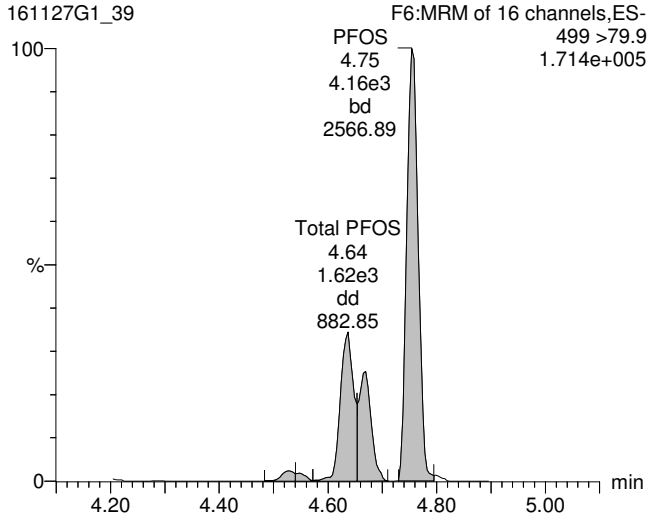
Total PFBS



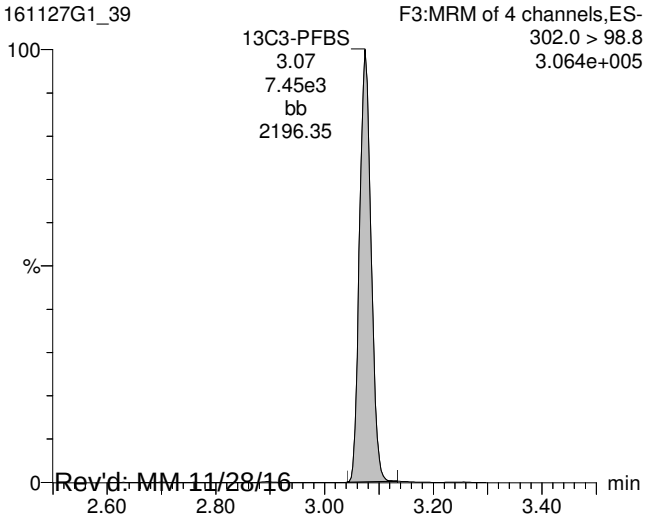
Total PFOA



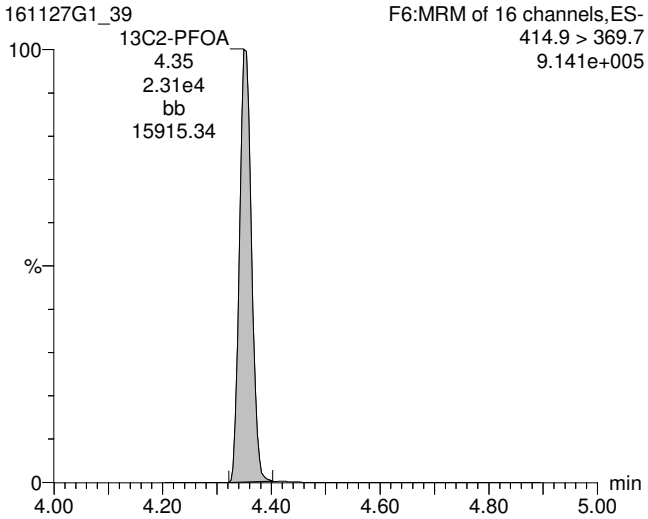
Total PFOS



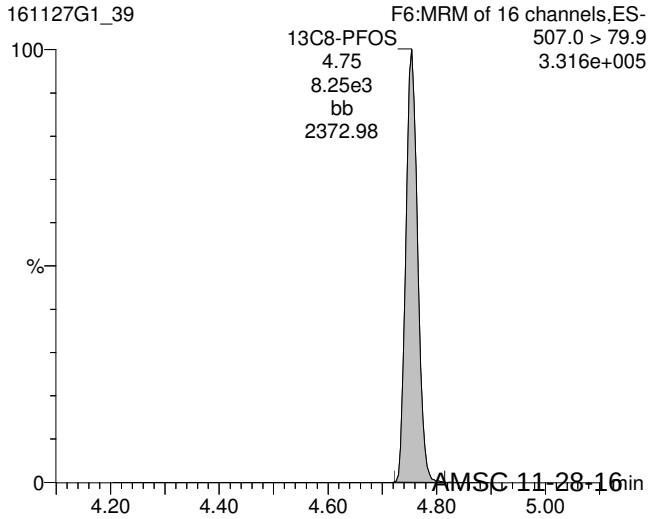
13C3-PFBS



13C2-PFOA



13C8-PFOS



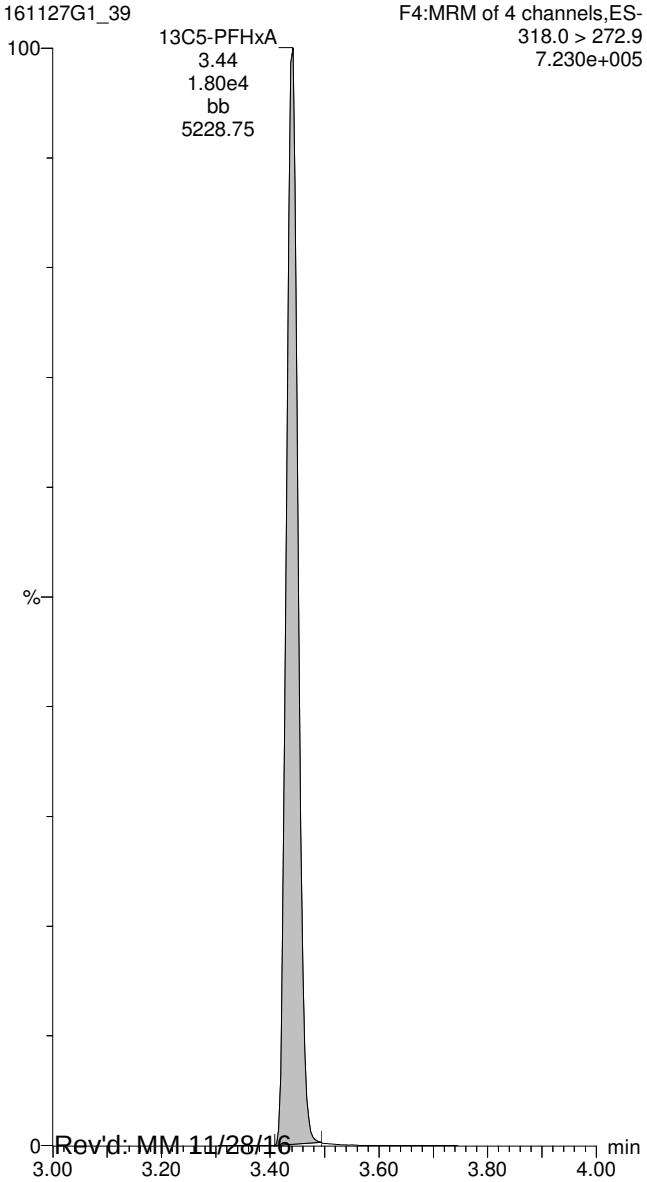
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-39.qld

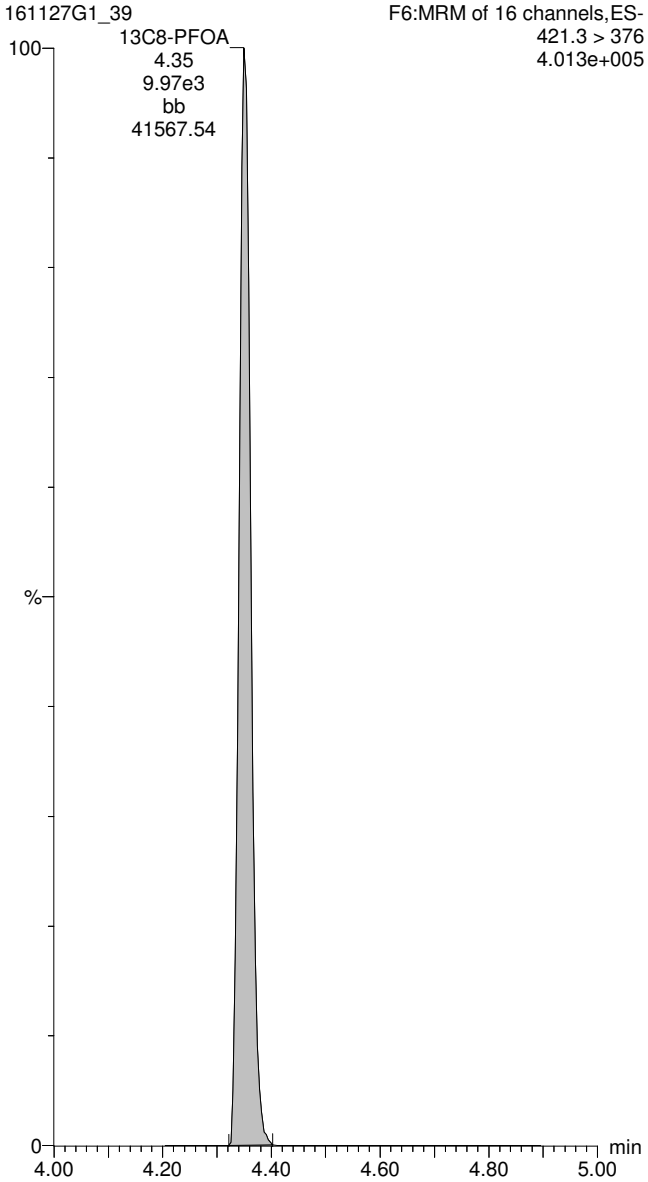
Last Altered: Monday, November 28, 2016 14:18:32 Pacific Standard Time
Printed: Monday, November 28, 2016 14:18:42 Pacific Standard Time

ID: 1601451-07 OUAI-MW19-20161114 0.13066, Description: OUAI-MW19-20161114, Name: 161127G1_39, Date: 27-Nov-2016, Time: 21:25:23, Instrument: , Lab: , User:

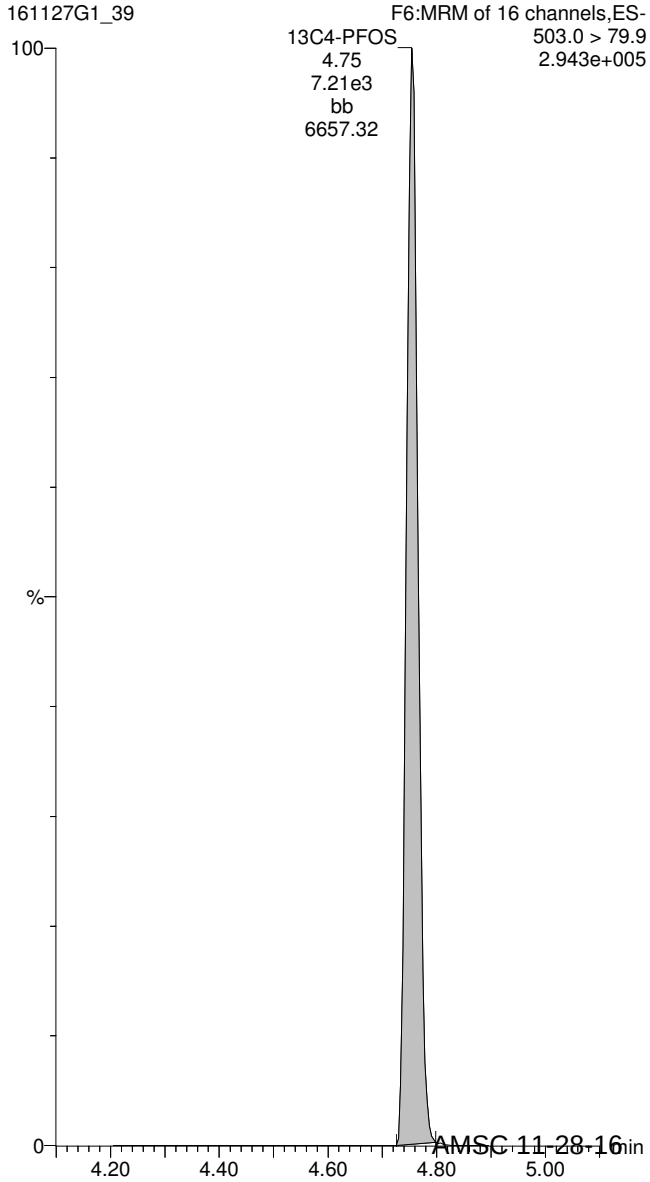
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-40.qld

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Printed: Monday, November 28, 2016 14:20:21 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-08 OUAI-MW18-20161114 0.12409, Description: OUAI-MW18-20161114, Name: 161127G1_40, Date: 27-Nov-2016, Time: 21:37:58

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	1.333e3	7.701e3		0.124	3.08	10.4	
2	8	PFOA	413 > 368.7	7.245e2	2.382e4		0.124	4.35	2.58	
3	10	PFOS	499 >79.9	3.573e2	7.390e3		0.124	4.76	7.44	
4	16	13C3-PFBS	302.0 > 98.8	7.701e3	1.990e4	0.302	0.124	3.08	129	128
5	17	13C2-PFHxA	315 > 269.8	5.185e3	1.990e4	0.620	0.124	3.45	42.4	105
6	18	13C4-PFHpA	367.2 > 321.8	1.528e4	1.294e4	1.139	0.124	3.96	104	104
7	19	18O2-PFHxS	403 > 102.6	6.839e3	1.294e4	0.449	0.124	4.07	118	118
8	20	13C2-6:2 FTS	429.1 > 408.9	4.217e3	6.703e3	1.073	0.124	4.31	59.1	58.6
9	21	13C2-PFOA	414.9 > 369.7	2.382e4	9.791e3	2.262	0.124	4.35	108	108
10	22	13C8-PFOS	507.0 > 79.9	7.390e3	7.072e3	0.944	0.124	4.76	112	111
11	23	13C5-PFNA	468.2 > 422.9	1.095e4	1.059e4	1.082	0.124	4.70	96.3	95.6
12	24	13C2-PFDA	515.1 > 469.9	8.785e3	1.080e4	1.019	0.124	5.00	80.4	79.8
13	25	13C2-8:2 FTS	529.1 > 508.7	3.744e3	6.703e3	0.569	0.124	4.97	98.9	98.2
14	26	13C4-PFBA	217 > 171.8	1.657e4	1.657e4	1.000	0.124	1.85	101	100
15	27	13C2-4:2 FTS	329.2 > 308.9	6.703e3	6.703e3	1.000	0.124	3.35	101	100
16	28	13C5-PFHxA	318.0 > 272.9	1.990e4	1.990e4	1.000	0.124	3.44	101	100
17	29	13C3-PFHxS	401.9 > 79.9	1.294e4	1.294e4	1.000	0.124	4.07	101	100
18	30	13C8-PFOA	421.3 > 376	9.791e3	9.791e3	1.000	0.124	4.35	101	100
19	31	13C4-PFOS	503.0 > 79.9	7.072e3	7.072e3	1.000	0.124	4.76	101	100
20	34	Total PFBS	299 > 79.7		6.839e3		0.124		12.1	
21	36	Total PFOA	413 > 368.7		2.382e4		0.124		2.58	
22	37	Total PFOS	499 > 79.9		7.390e3		0.124		12.2	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-40.qld

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Printed: Monday, November 28, 2016 14:20:21 Pacific Standard Time

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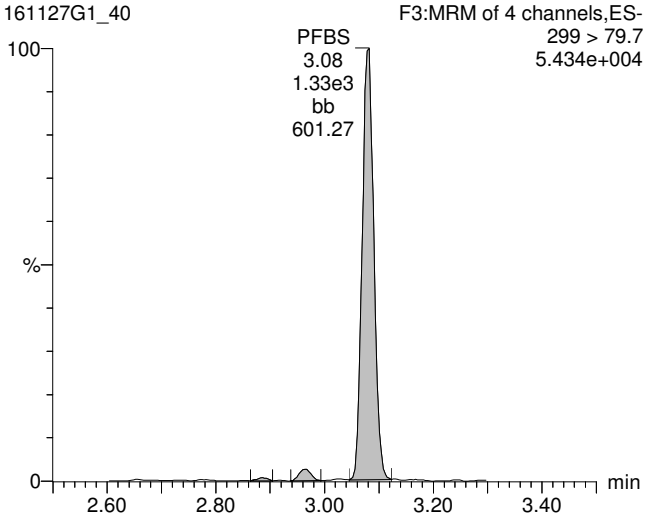
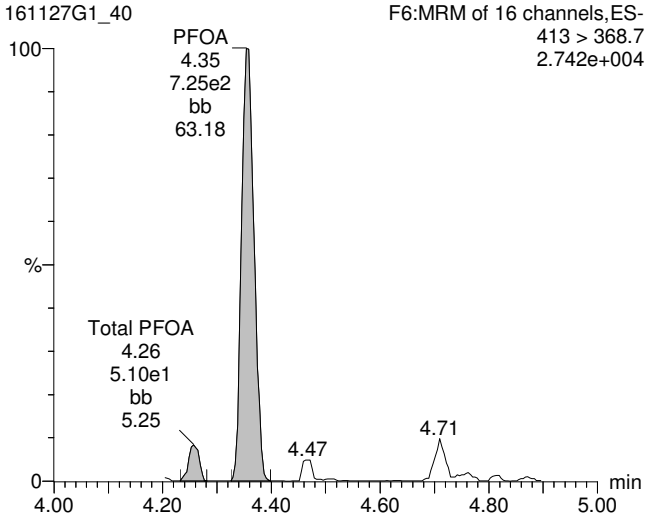
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-08 OUAI-MW18-20161114 0.12409, Description: OUAI-MW18-20161114, Name: 161127G1_40, Date: 27-Nov-2016, Time: 21:37:58, Instrument: , Lab: , User:

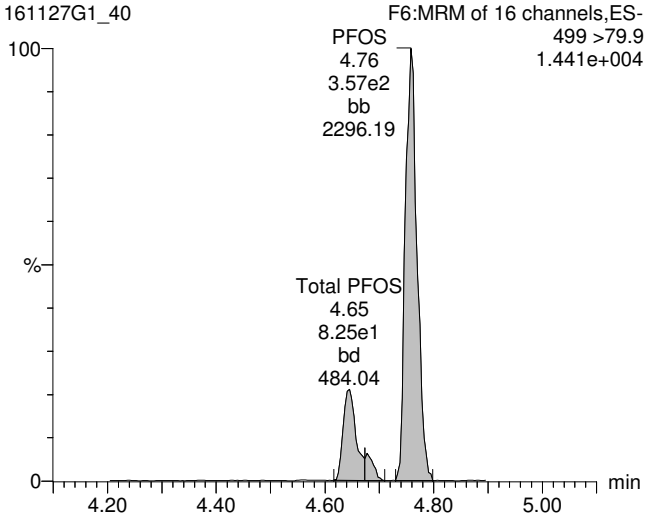
Total PFBS



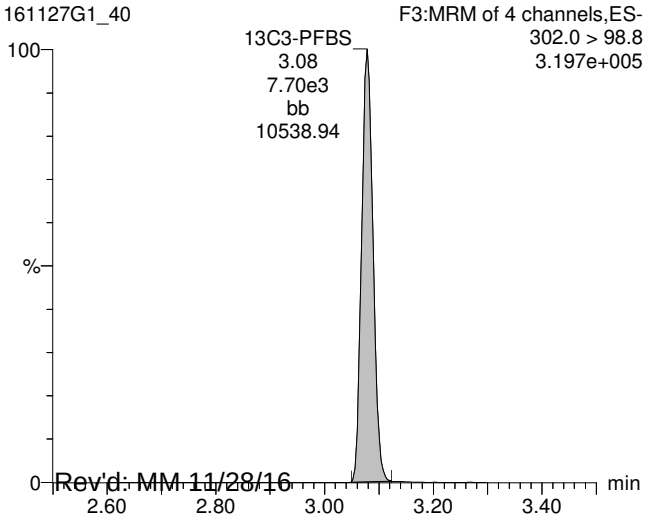
Total PFOA



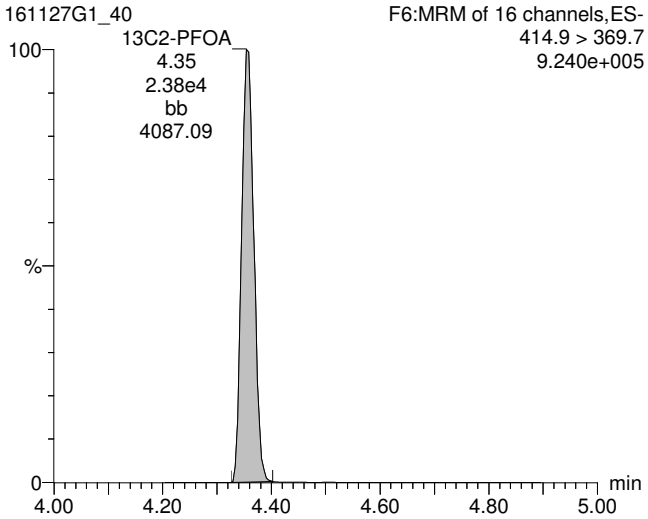
Total PFOS



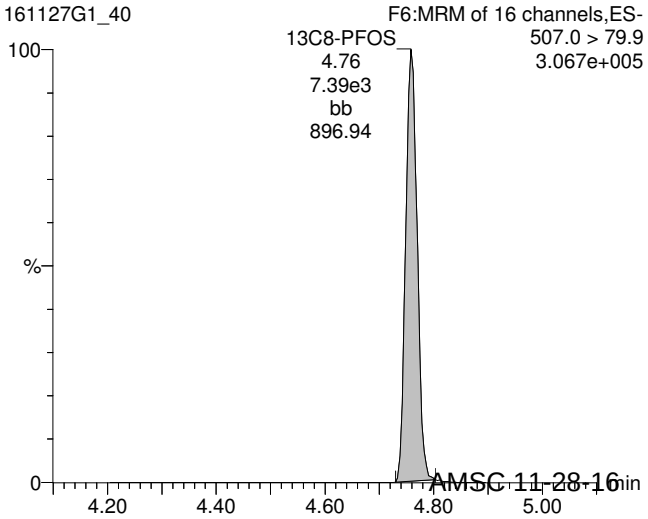
13C3-PFBS



13C2-PFOA



13C8-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-40.qld

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Printed: Monday, November 28, 2016 14:20:21 Pacific Standard Time

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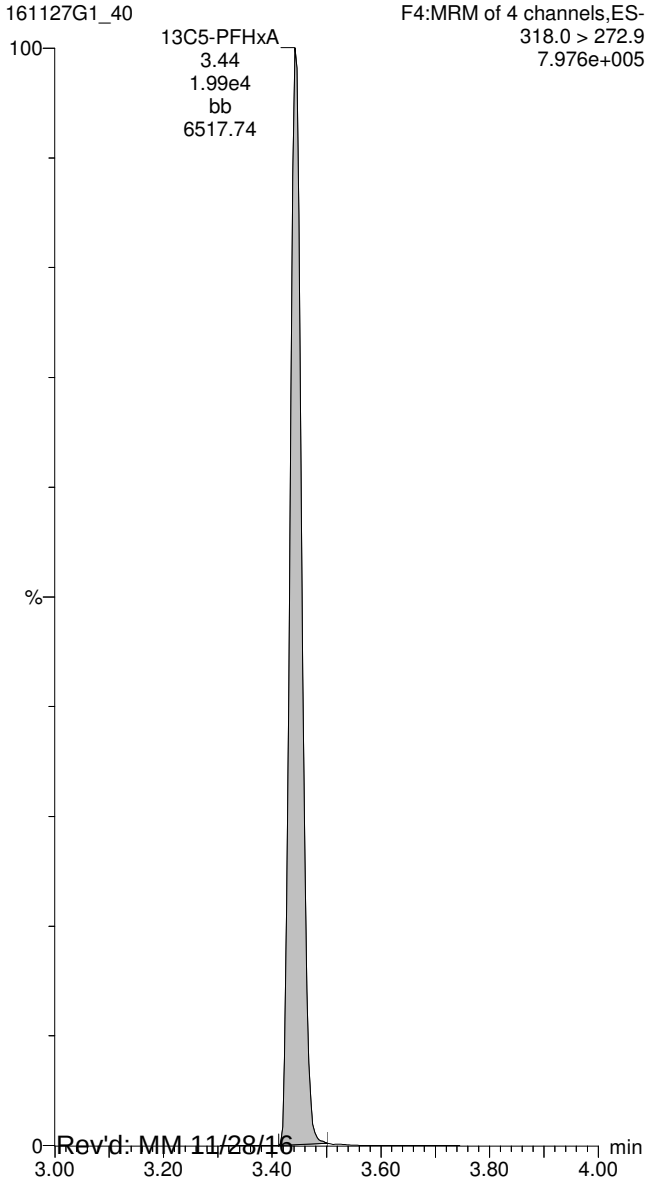
13C5-PFHxA



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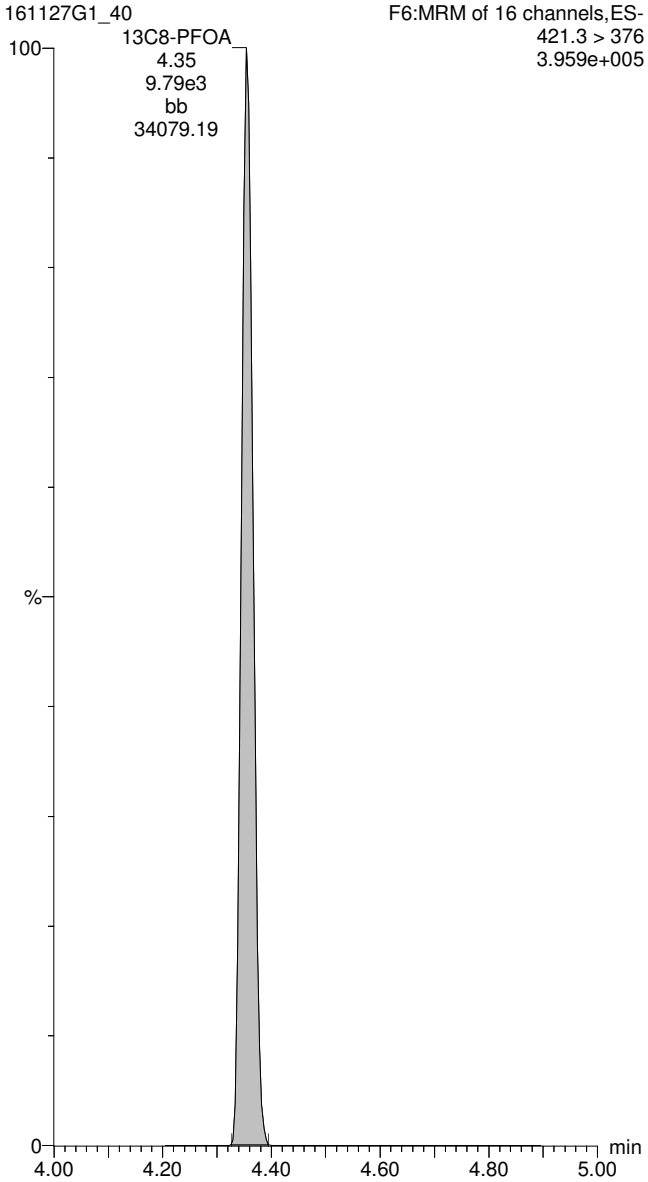
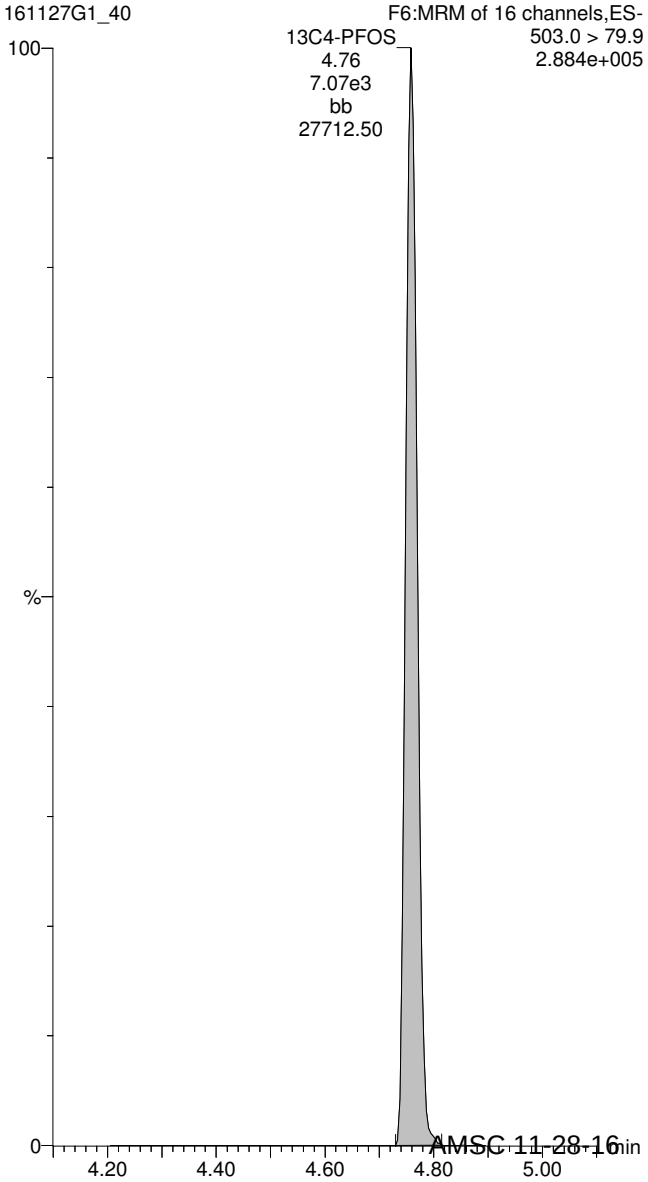


13C4-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-44.qld

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Printed: Monday, November 28, 2016 14:22:25 Pacific Standard Time

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-09 OUAI-MW08-20161114 0.12647, Description: OUAI-MW08-20161114, Name: 161127G1_44, Date: 27-Nov-2016, Time: 22:28:25

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.		%Rec
1	3	PFBS	299 > 79.7	1.760e5	3.522e3		0.126	3.09	2760	E	
2	8	PFOA	413 > 368.7	2.682e4	2.212e4		0.126	4.36	132		
3	10	PFOS	499 >79.9	3.145e2	8.718e3		0.126	4.77	5.84		
4	16	13C3-PFBS	302.0 > 98.8	3.522e3	8.437e3	0.302	0.126	3.08	137		138
5	17	13C2-PFHxA	315 > 269.8	2.435e3	8.437e3	0.620	0.126	3.45	46.0		116
6	18	13C4-PFHpA	367.2 > 321.8	1.238e4	8.787e3	1.139	0.126	3.96	122		124
7	19	18O2-PFHxS	403 > 102.6	4.247e3	8.787e3	0.449	0.126	4.08	106		108
8	20	13C2-6:2 FTS	429.1 > 408.9	5.769e3	5.733e3	1.073	0.126	4.31	92.7		93.8
9	21	13C2-PFOA	414.9 > 369.7	2.212e4	9.031e3	2.262	0.126	4.36	107		108
10	22	13C8-PFOS	507.0 > 79.9	8.718e3	6.911e3	0.944	0.126	4.76	132		134
11	23	13C5-PFNA	468.2 > 422.9	1.021e4	1.069e4	1.082	0.126	4.71	87.3		88.3
12	24	13C2-PFDA	515.1 > 469.9	7.545e3	9.389e3	1.019	0.126	5.00	77.9		78.8
13	25	13C2-8:2 FTS	529.1 > 508.7	3.846e3	5.733e3	0.569	0.126	4.98	117		118
14	26	13C4-PFBA	217 > 171.8	1.067e4	1.067e4	1.000	0.126	1.85	98.8		100
15	27	13C2-4:2 FTS	329.2 > 308.9	5.733e3	5.733e3	1.000	0.126	3.36	98.8		100
16	28	13C5-PFHxA	318.0 > 272.9	8.437e3	8.437e3	1.000	0.126	3.45	98.8		100
17	29	13C3-PFHxS	401.9 > 79.9	8.787e3	8.787e3	1.000	0.126	4.08	98.8		100
18	30	13C8-PFOA	421.3 > 376	9.031e3	9.031e3	1.000	0.126	4.36	98.8		100
19	31	13C4-PFOS	503.0 > 79.9	6.911e3	6.911e3	1.000	0.126	4.77	98.8		100
20	34	Total PFBS	299 > 79.7		4.247e3		0.126		2840		
21	36	Total PFOA	413 > 368.7		2.212e4		0.126		145		
22	37	Total PFOS	499 > 79.9		8.718e3		0.126		13.6		

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-44.qld

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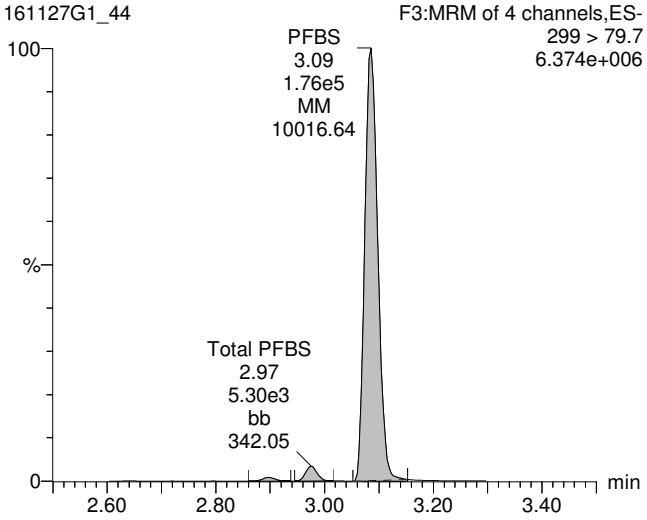
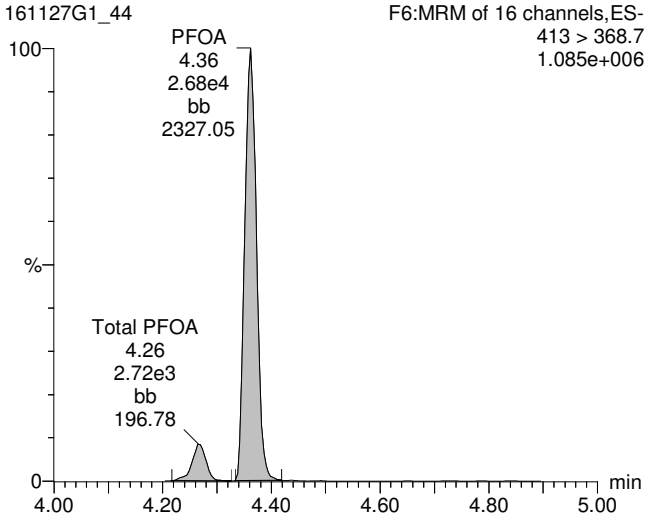
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-09 OUAI-MW08-20161114 0.12647, Description: OUAI-MW08-20161114, Name: 161127G1_44, Date: 27-Nov-2016, Time: 22:28:25, Instrument: , Lab: , User:

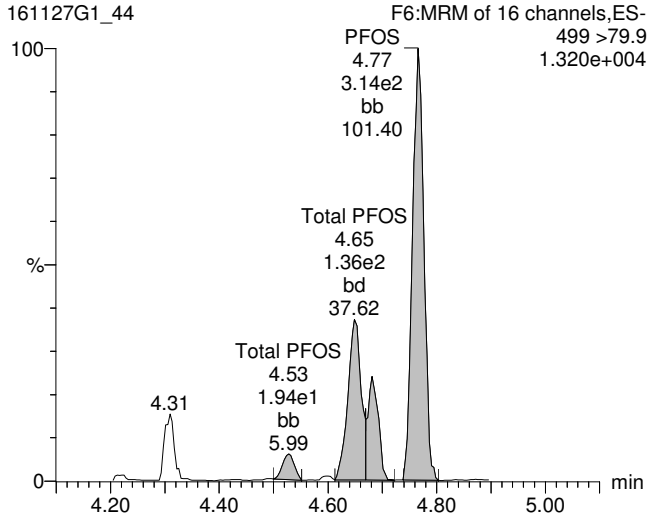
Total PFBS



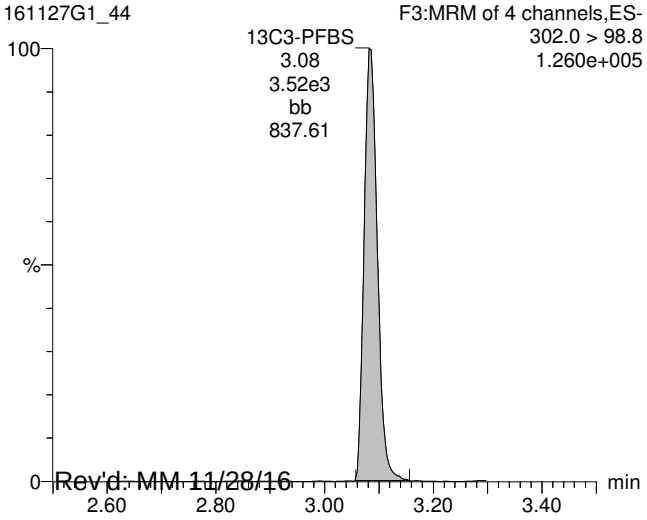
Total PFOA



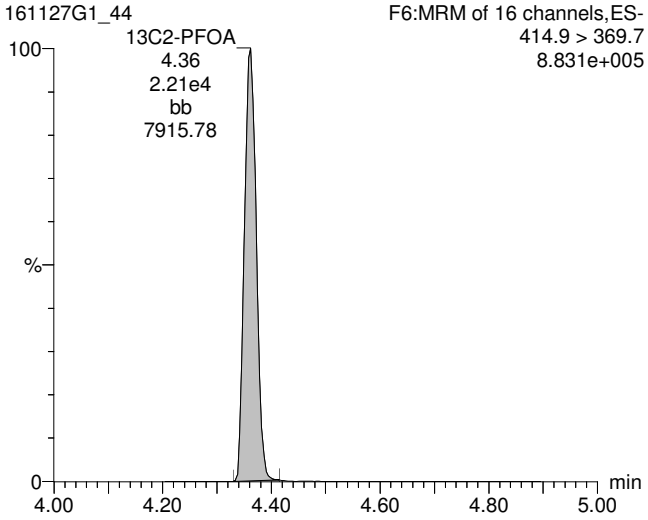
Total PFOS



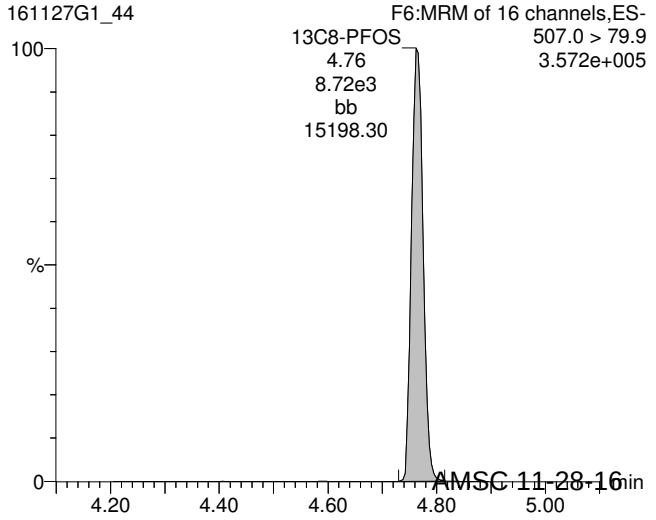
13C3-PFBS



13C2-PFOA



13C8-PFOS



Rev'd: MM 11/28/16 AMSC 11-28-16

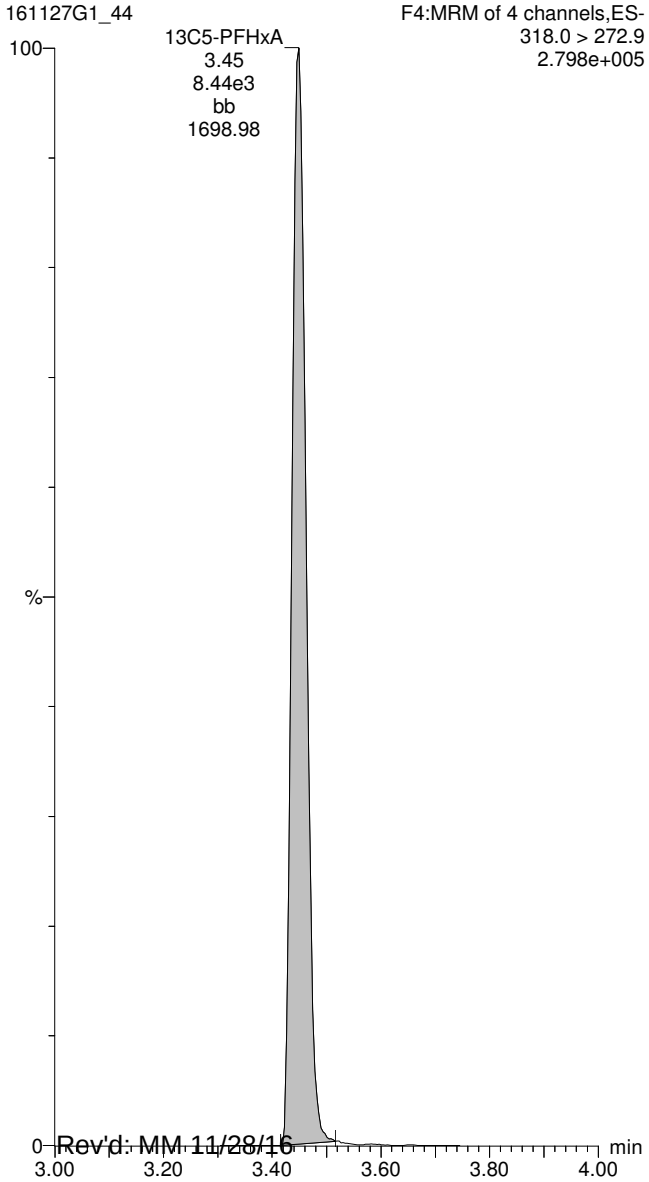
Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-44.qld

Last Altered: Monday, November 28, 2016 14:22:03 Pacific Standard Time
Printed: Monday, November 28, 2016 14:22:25 Pacific Standard Time

ID: 1601451-09 OUAI-MW08-20161114 0.12647, Description: OUAI-MW08-20161114, Name: 161127G1_44, Date: 27-Nov-2016, Time: 22:28:25, Instrument: , Lab: , User:

13C5-PFHxA



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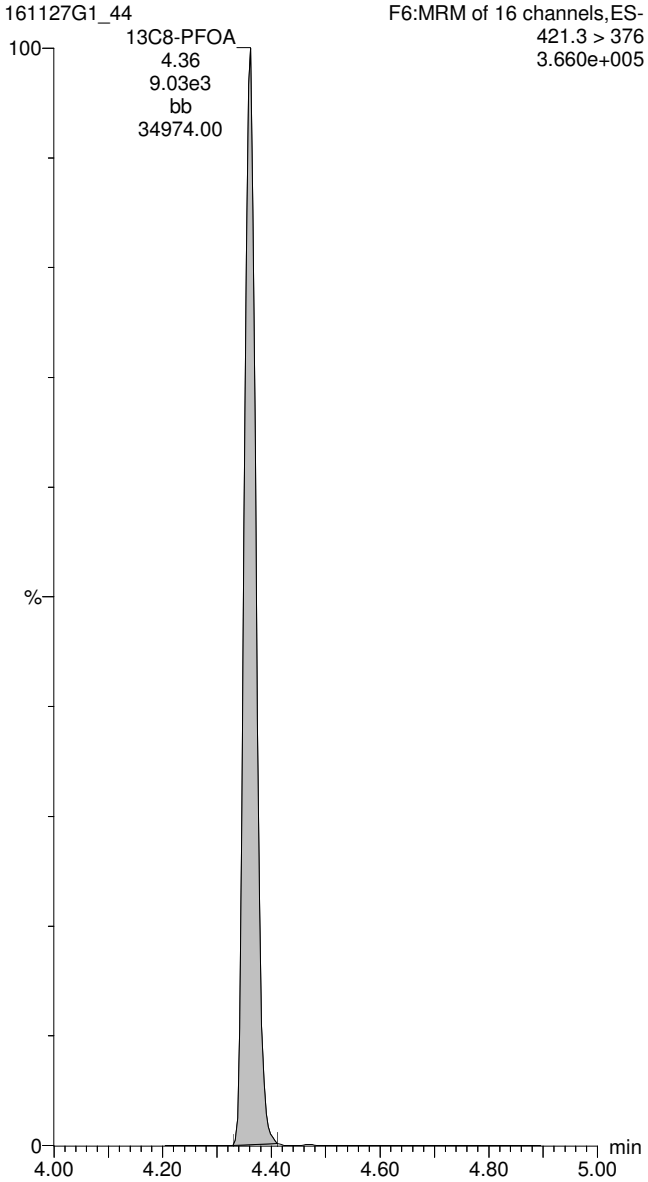

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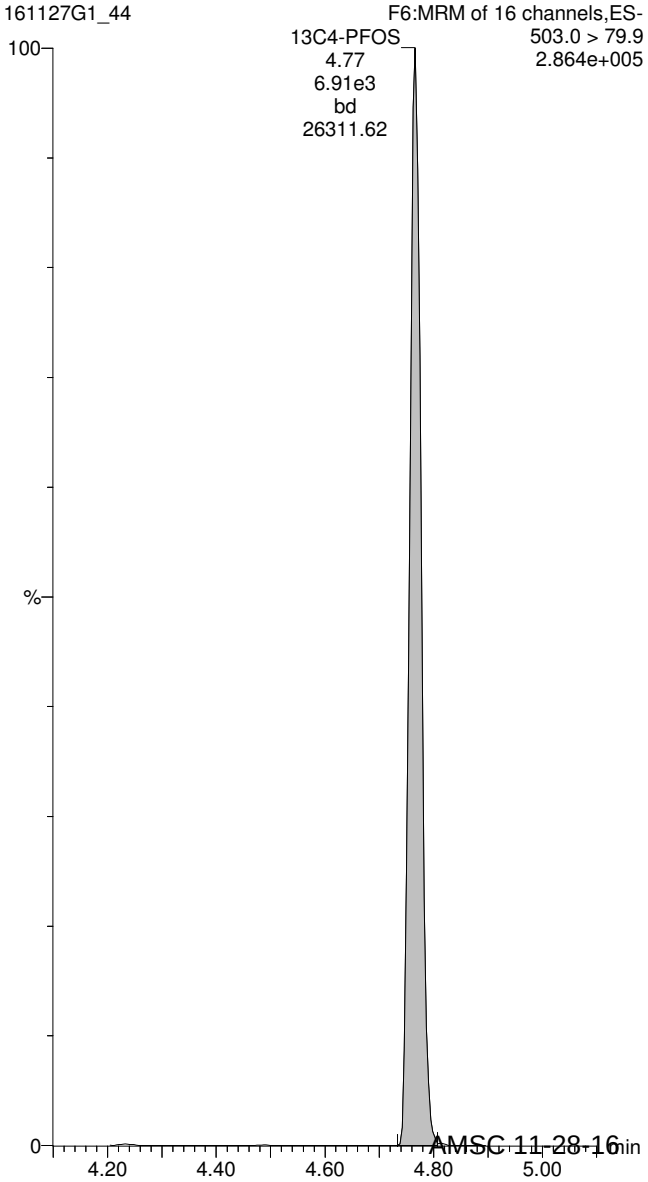

Rev'd: MM 11/28/16 AMSC 11-28-16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-8.qld

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Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-09@5X OUAI-MW08-20161114 0.12647, Description: OUAI-MW08-20161114, Name: 161128G1_8, Date: 28-Nov-2016, Time: 10:22:38

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	4.994e4	1.117e3		0.126	3.11	2470	
2	16	13C3-PFBS	302.0 > 98.8	1.117e3	2.744e3	0.302	0.126	3.10	133	135
3	28	13C5-PFHxA	318.0 > 272.9	2.744e3	2.744e3	1.000	0.126	3.48	98.8	100
4	34	Total PFBS	299 > 79.7		1.079e3		0.126		2540	

Rev'd: MM 11/28/16 AC 11/28/16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-8.qld

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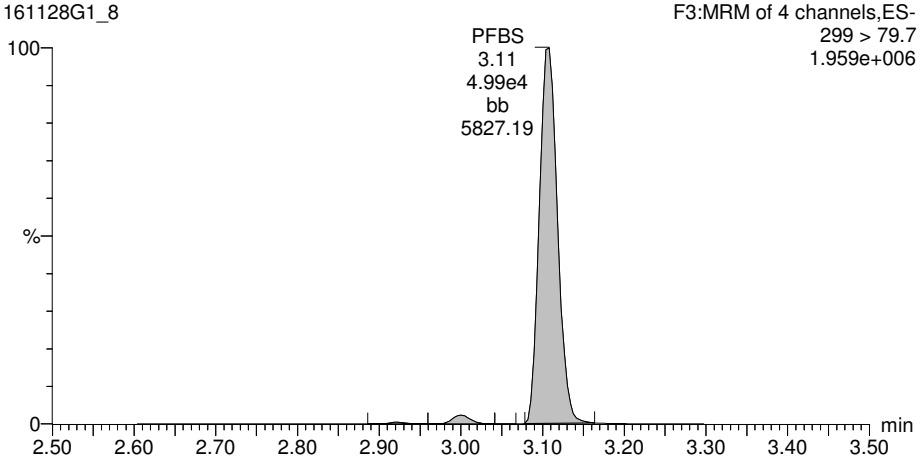
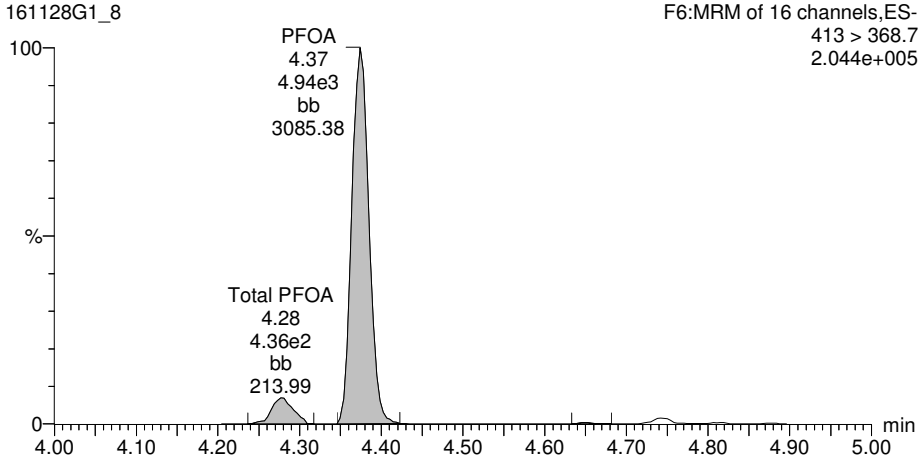
ID: 1601451-09@5X OUAI-MW08-20161114 0.12647, Description: OUAI-MW08-20161114, Name: 161128G1_8, Date: 28-Nov-2016, Time: 10:22:38, Instrument: , Lab: , User:

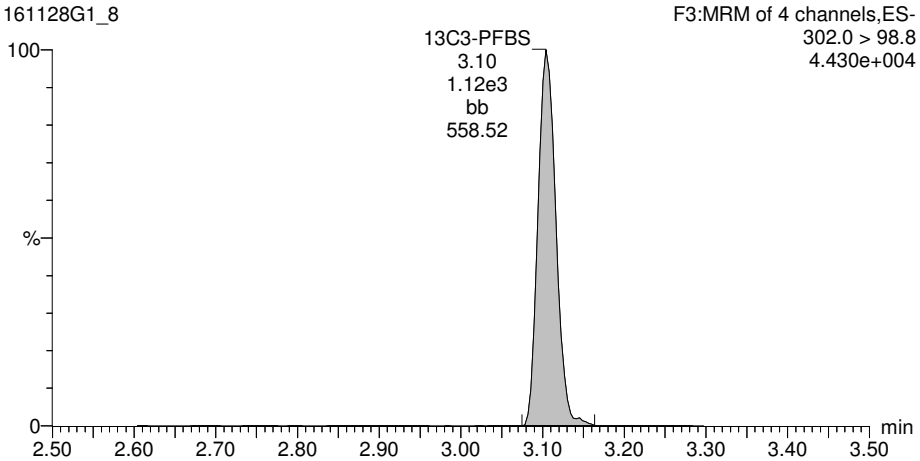
Total PFBS



Total PFOA



13C3-PFBS



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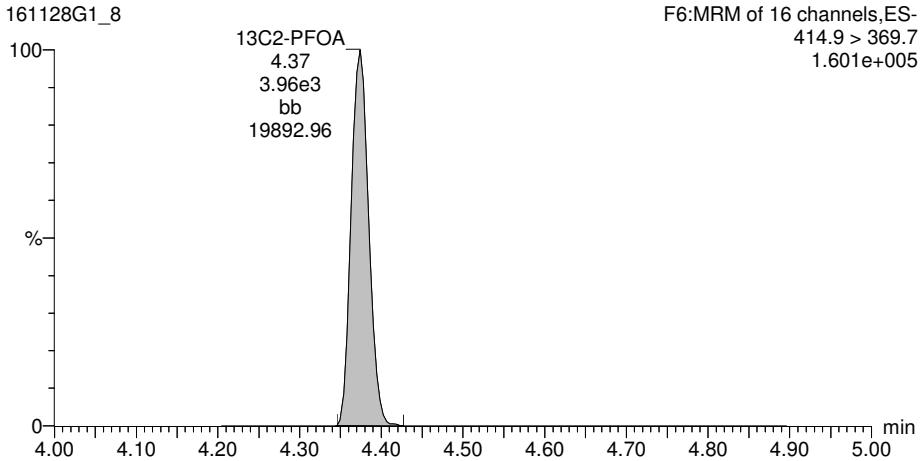
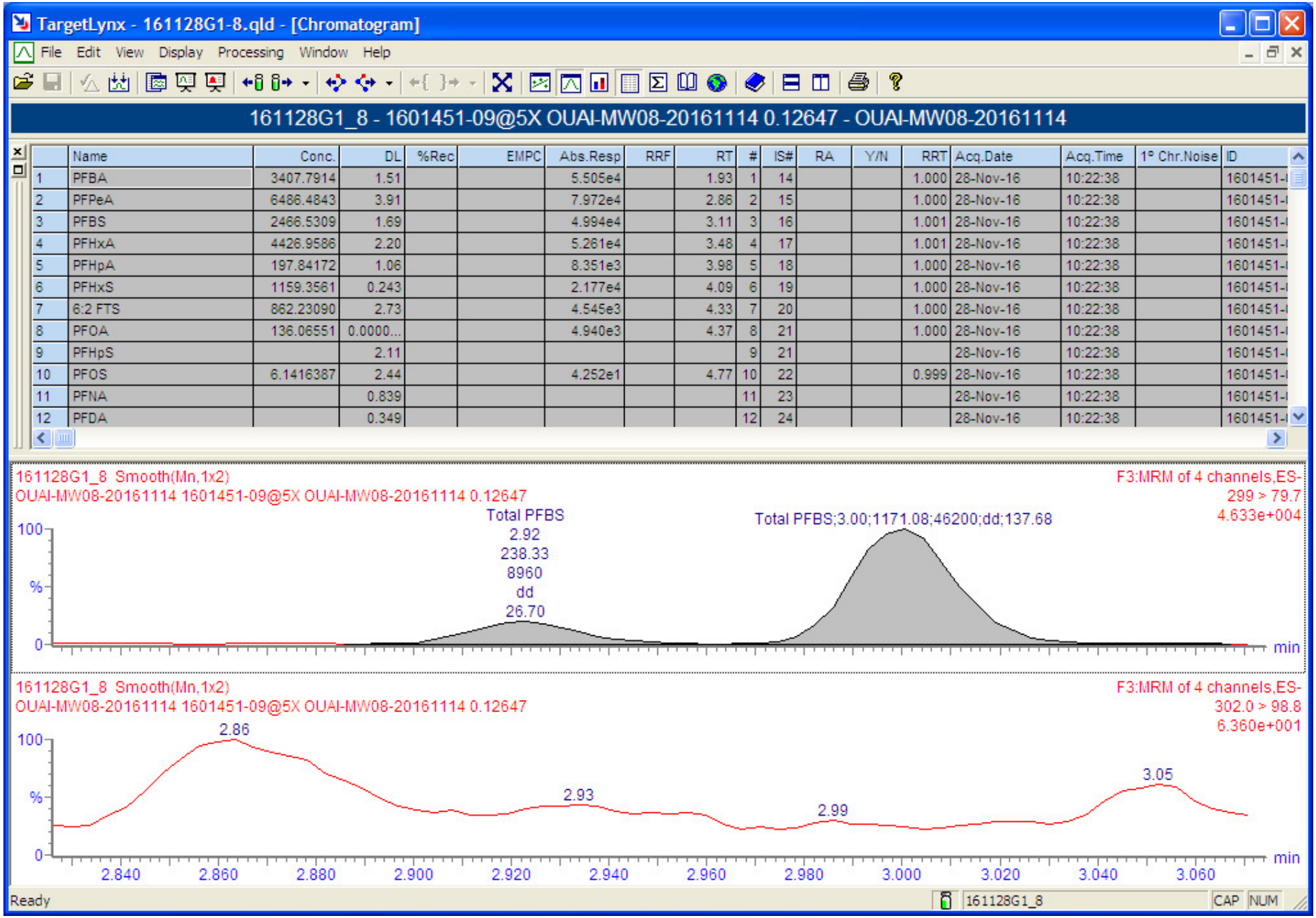


Rev'd: MM 11/28/16 AC 11/28/16



	Name	Conc.	DL	%Rec	EMPC	Abs.Resp	RRF	RT	#	IS#	RA	Y/N	RRT	Acq.Date	Acq.Time	1° Chr.Noise	ID
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2	PFPeA	6486.4843	3.91			7.972e4		2.86	2	15			1.000	28-Nov-16	10:22:38		1601451-I
3	PFBS	2466.5309	1.69			4.994e4		3.11	3	16			1.001	28-Nov-16	10:22:38		1601451-I
4	PFHxA	4426.9586	2.20			5.261e4		3.48	4	17			1.001	28-Nov-16	10:22:38		1601451-I
5	PFHpA	197.84172	1.06			8.351e3		3.98	5	18			1.000	28-Nov-16	10:22:38		1601451-I
6	PFHxS	1159.3561	0.243			2.177e4		4.09	6	19			1.000	28-Nov-16	10:22:38		1601451-I
7	6:2 FTS	862.23090	2.73			4.545e3		4.33	7	20			1.000	28-Nov-16	10:22:38		1601451-I
8	PFOA	136.06551	0.0000...			4.940e3		4.37	8	21			1.000	28-Nov-16	10:22:38		1601451-I
9	PFHpS		2.11						9	21				28-Nov-16	10:22:38		1601451-I
10	PFOS	6.1416387	2.44			4.252e1		4.77	10	22			0.999	28-Nov-16	10:22:38		1601451-I
11	PFNA		0.839						11	23				28-Nov-16	10:22:38		1601451-I
12	PFDA		0.349						12	24				28-Nov-16	10:22:38		1601451-I

Rev'd: MM 11/28/16

AC 11/28/16

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-8.qld

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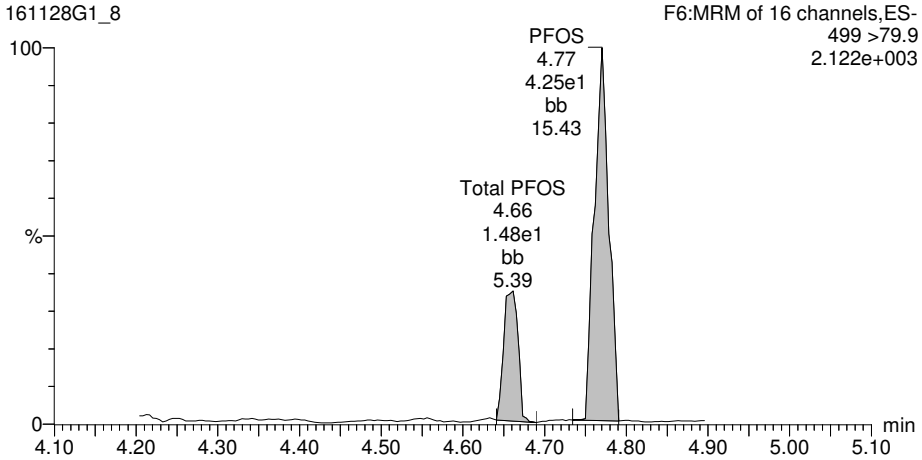
Total PFOS



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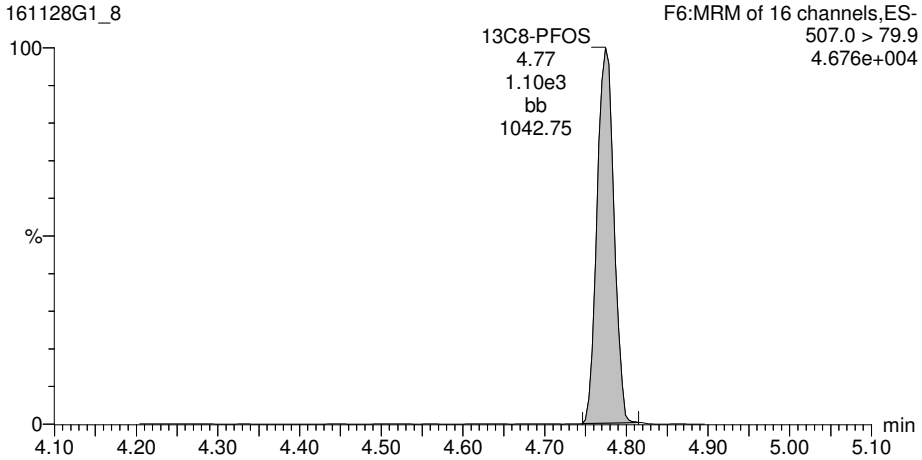

Rev'd: MM 11/28/16 AC 11/28/16

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-8.qld

Last Altered: Monday, November 28, 2016 14:14:09 Pacific Standard Time
Printed: Monday, November 28, 2016 14:15:33 Pacific Standard Time

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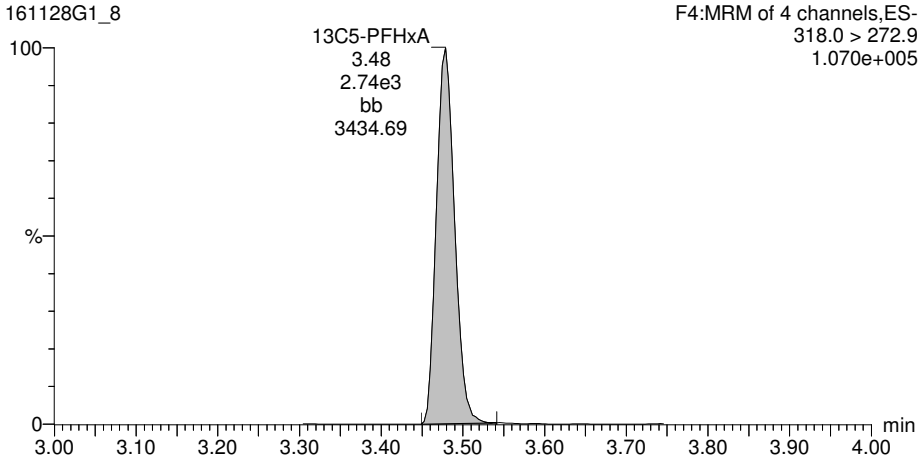
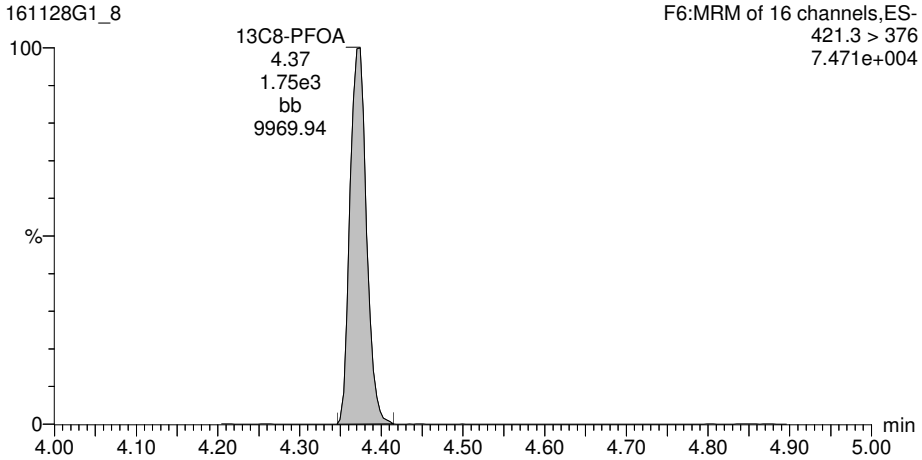
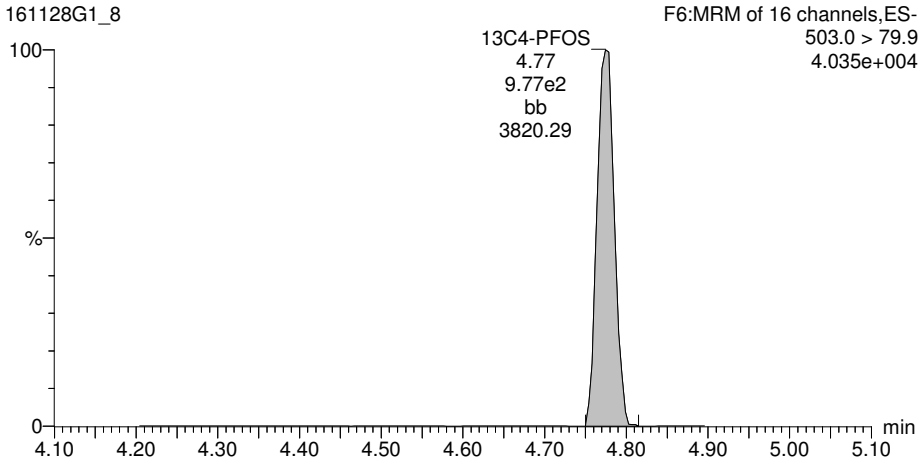
13C5-PFHxA



13C8-PFOA



13C4-PFOS



Rev'd: MM 11/28/16 AC 11/28/16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-45.qld

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Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-10 OUAI-MW06-20161114 0.12271, Description: OUAI-MW06-20161114, Name: 161127G1_45, Date: 27-Nov-2016, Time: 22:41:00

	#	Name	Trace	Peak Area	IS Resp	RRF Mean	wt/vol	RT	Conc.	%Rec
1	3	PFBS	299 > 79.7	1.457e4	7.071e3		0.123	3.08	118	
2	8	PFOA	413 > 368.7	2.200e4	2.800e4		0.123	4.36	88.1	
3	10	PFOS	499 >79.9	8.017e1	1.141e4		0.123	4.76	2.48	
4	16	13C3-PFBS	302.0 > 98.8	7.071e3	1.991e4	0.302	0.123	3.08	120	118
5	17	13C2-PFHxA	315 > 269.8	5.055e3	1.991e4	0.620	0.123	3.44	41.7	102
6	18	13C4-PFHpA	367.2 > 321.8	1.496e4	1.233e4	1.139	0.123	3.96	109	107
7	19	18O2-PFHxS	403 > 102.6	6.153e3	1.233e4	0.449	0.123	4.07	113	111
8	20	13C2-6:2 FTS	429.1 > 408.9	5.309e3	1.063e4	1.073	0.123	4.31	47.4	46.5
9	21	13C2-PFOA	414.9 > 369.7	2.800e4	1.169e4	2.262	0.123	4.36	108	106
10	22	13C8-PFOS	507.0 > 79.9	1.141e4	1.183e4	0.944	0.123	4.76	104	102
11	23	13C5-PFNA	468.2 > 422.9	1.532e4	1.522e4	1.082	0.123	4.70	94.8	93.0
12	24	13C2-PFDA	515.1 > 469.9	1.450e4	1.749e4	1.019	0.123	5.00	82.9	81.4
13	25	13C2-8:2 FTS	529.1 > 508.7	9.377e3	1.063e4	0.569	0.123	4.97	158	155
14	26	13C4-PFBA	217 > 171.8	1.635e4	1.635e4	1.000	0.123	1.85	102	100
15	27	13C2-4:2 FTS	329.2 > 308.9	1.063e4	1.063e4	1.000	0.123	3.35	102	100
16	28	13C5-PFHxA	318.0 > 272.9	1.991e4	1.991e4	1.000	0.123	3.44	102	100
17	29	13C3-PFHxS	401.9 > 79.9	1.233e4	1.233e4	1.000	0.123	4.07	102	100
18	30	13C8-PFOA	421.3 > 376	1.169e4	1.169e4	1.000	0.123	4.35	102	100
19	31	13C4-PFOS	503.0 > 79.9	1.183e4	1.183e4	1.000	0.123	4.76	102	100
20	34	Total PFBS	299 > 79.7		6.153e3		0.123		121	
21	36	Total PFOA	413 > 368.7		2.800e4		0.123		113	
22	37	Total PFOS	499 > 79.9		1.141e4		0.123		4.38	

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-45.qld

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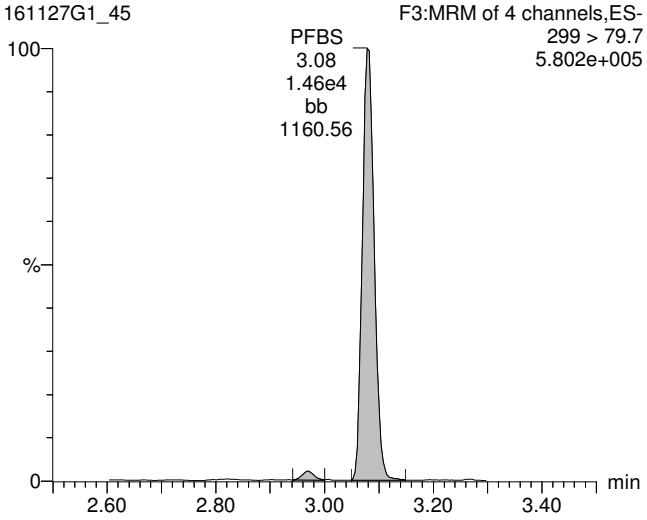
Printed: Monday, November 28, 2016 2:31:06 PM Pacific Standard Time

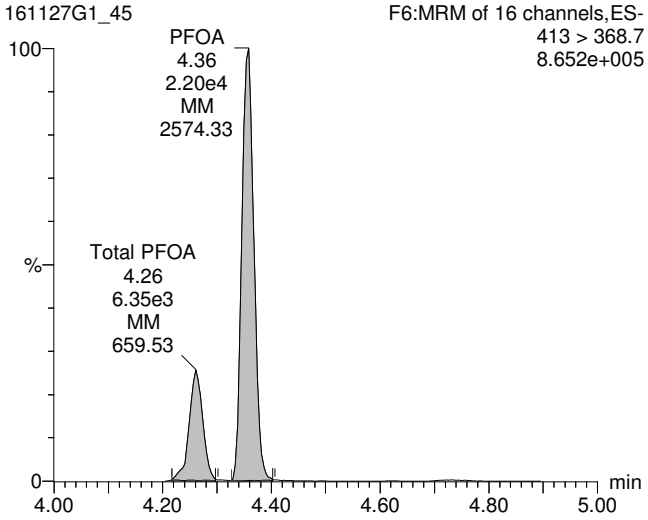
Method: U:\G1.pro\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.pro\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

ID: 1601451-10 OUAI-MW06-20161114 0.12271, Description: OUAI-MW06-20161114, Name: 161127G1_45, Date: 27-Nov-2016, Time: 22:41:00, Instrument: , Lab: , User:

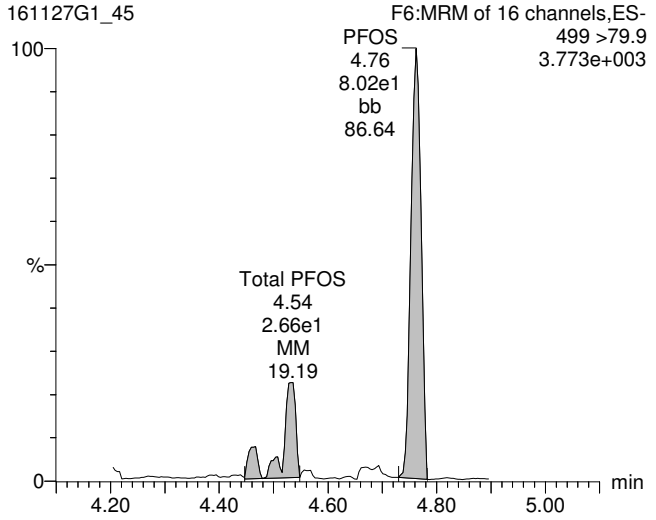
Total PFBS



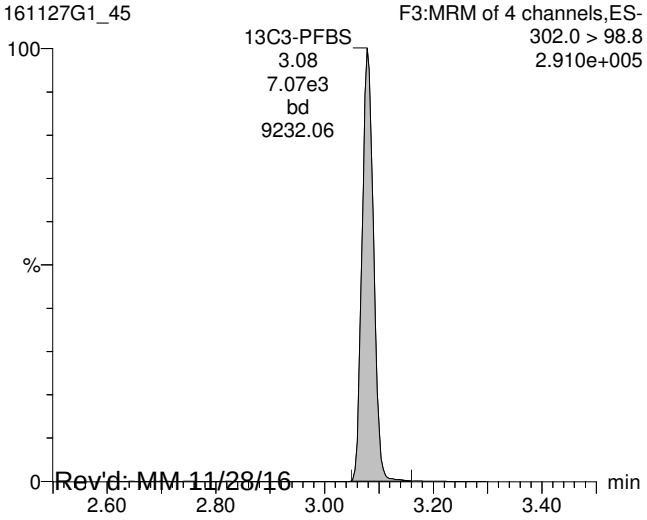
Total PFOA



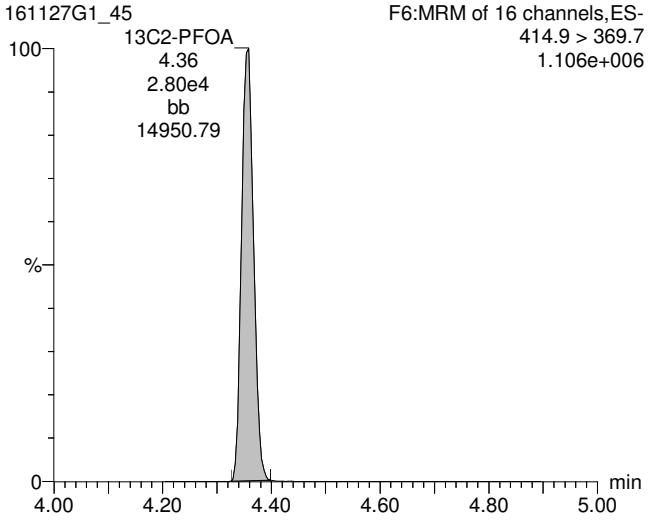
Total PFOS



13C3-PFBS



13C2-PFOA



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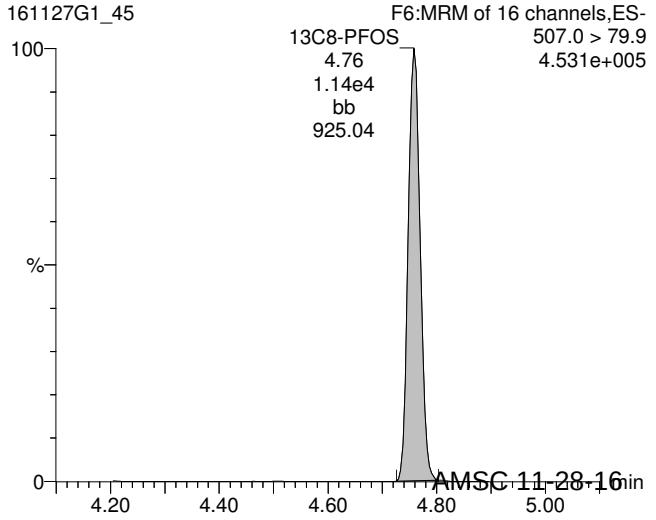


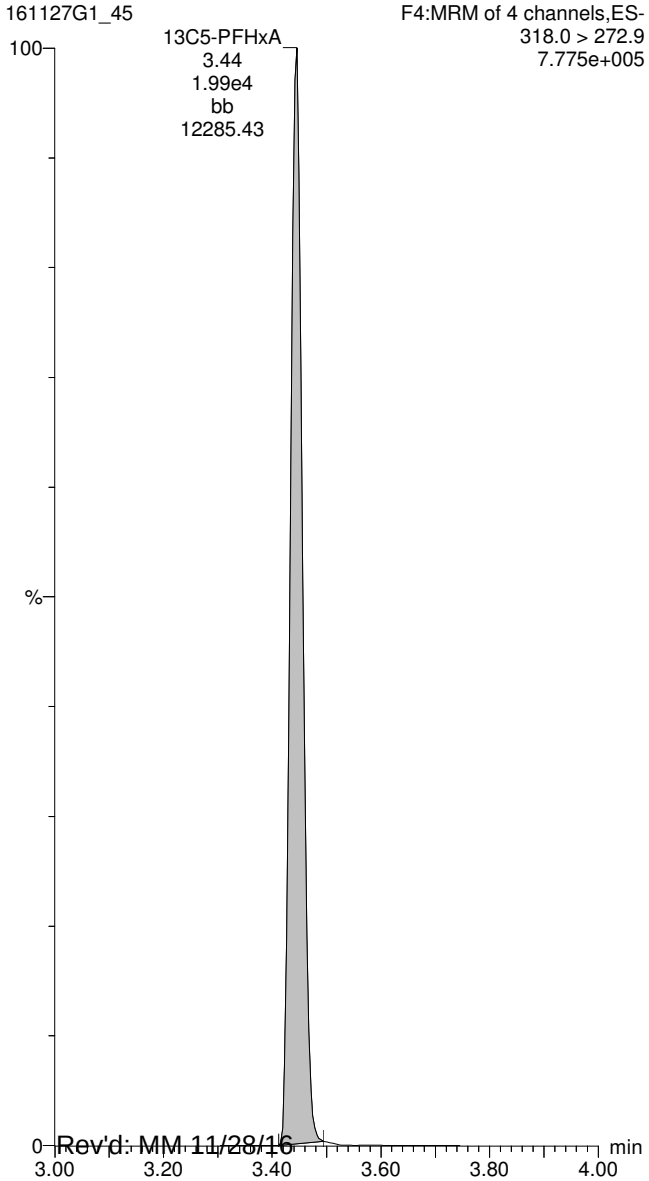
Rev'd: MM 11/28/16 AMSC 11-28-16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-45.qld

Last Altered: Monday, November 28, 2016 2:30:57 PM Pacific Standard Time
Printed: Monday, November 28, 2016 2:31:06 PM Pacific Standard Time

ID: 1601451-10 OUAI-MW06-20161114 0.12271, Description: OUAI-MW06-20161114, Name: 161127G1_45, Date: 27-Nov-2016, Time: 22:41:00, Instrument: , Lab: , User:

13C5-PFHxA



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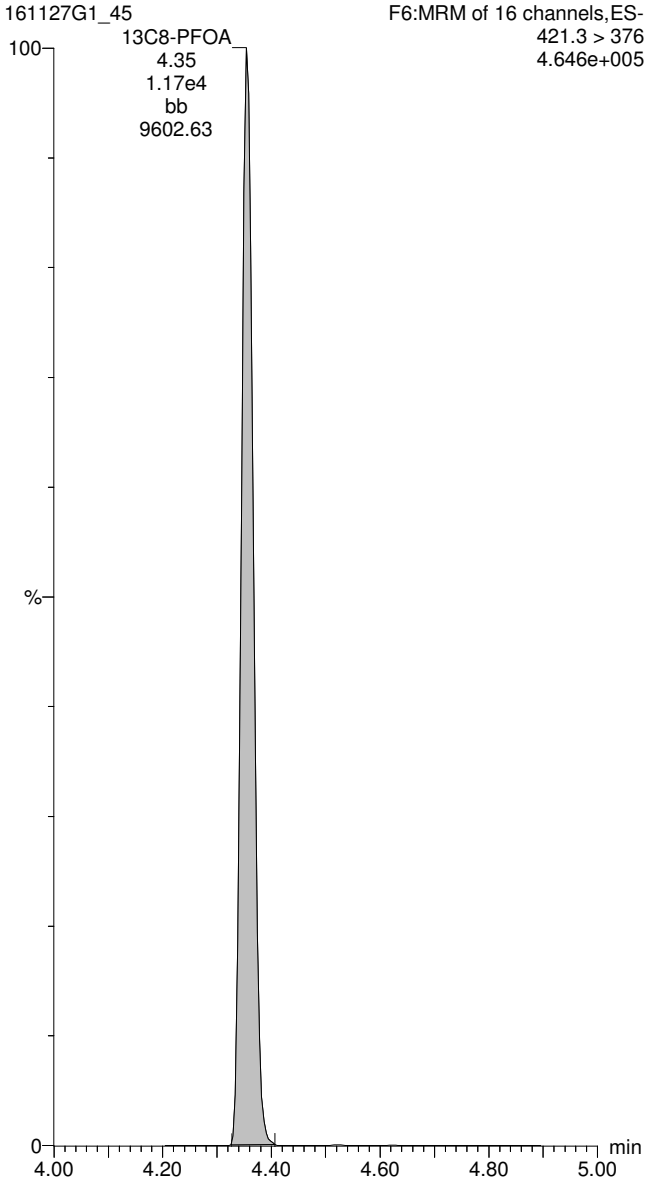

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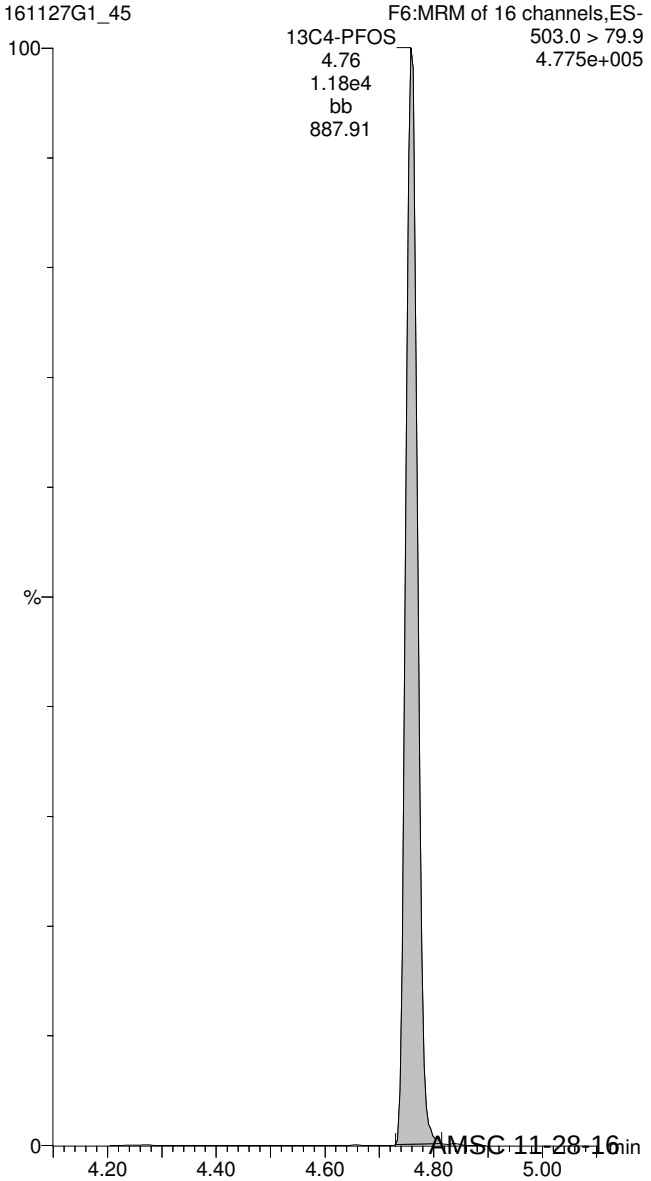

Rev'd: MM 11/28/16 AMSC 11-28-16

CONTINUING CALIBRATION

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-2.qld

Last Altered: Monday, November 28, 2016 08:47:38 Pacific Standard Time
Printed: Monday, November 28, 2016 08:49:43 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#.Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1 PFBA	213.1 > 168.8	2.21e4	2.36e4		1.000	1.89	23.8	95.3
2	2 PFPeA	263.1 > 218.9	1.86e4	8.49e3		1.000	2.82	27.4	109.5
3	3 PFBS	299 > 79.7	2.12e4	6.08e3		1.000	3.07	24.4	97.7
4	4 PFHxA	313.2 > 268.9	1.51e4	4.94e3		1.000	3.43	25.6	102.2
5	5 PFHpA	363 > 318.9	4.13e4	1.31e4		1.000	3.95	25.4	101.5
6	6 PFHxS	398.9 > 79.6	1.88e4	5.62e3		1.000	4.07	24.3	97.1
7	7 6:2 FTS	427.1 > 407	5.03e3	5.19e3		1.000	4.30	27.1	108.3
8	8 PFOA	413 > 368.7	4.13e4	2.16e4		1.000	4.35	26.5	105.9
9	9 PFHpS	449 > 98.7	4.58e3	2.16e4		1.000	4.43	29.0	115.9
10	10 PFOS	499 >79.9	1.36e4	6.69e3		1.000	4.75	30.7	122.7
11	11 PFNA	463 > 418.8	3.52e4	1.12e4		1.000	4.69	24.0	96.0
12	12 PFDA	513 > 468.8	9.61e3	7.22e3		1.000	5.00	27.9	111.7
13	13 8:2 FTS	527 > 506.9	3.30e3	3.23e3		1.000	4.97	26.0	104.2
14	14 13C3-PFBA	216.1 > 171.8	2.36e4	1.76e4	1.205	1.000	1.88	14.0	111.7
15	15 13C3-PFPeA	266>221.8	8.49e3	1.91e4	0.448	1.000	2.82	12.4	99.2
16	16 13C3-PFBS	302.0 > 98.8	6.08e3	1.91e4	0.302	1.000	3.07	13.2	105.3
17	17 13C2-PFHxA	315 > 269.8	4.94e3	1.91e4	0.620	1.000	3.43	5.22	104.4
18	18 13C4-PFHpA	367.2 > 321.8	1.31e4	1.21e4	1.139	1.000	3.95	11.9	95.5
19	19 18O2-PFHxS	403 > 102.6	5.62e3	1.21e4	0.449	1.000	4.06	12.9	103.6
20	20 13C2-6:2 FTS	429.1 > 408.9	5.19e3	5.06e3	1.073	1.000	4.31	12.0	95.7
21	21 13C2-PFOA	414.9 > 369.7	2.16e4	1.07e4	2.262	1.000	4.35	11.2	89.6
22	22 13C8-PFOS	507.0 > 79.9	6.69e3	7.41e3	0.944	1.000	4.75	12.0	95.7
23	23 13C5-PFNA	468.2 > 422.9	1.12e4	1.02e4	1.082	1.000	4.69	12.7	101.4
24	24 13C2-PFDA	515.1 > 469.9	7.22e3	8.08e3	1.019	1.000	5.00	11.0	87.7
25	25 13C2-8:2 FTS	529.1 > 508.7	3.23e3	5.06e3	0.569	1.000	4.97	14.0	112.3
26	26 13C4-PFBA	217 > 171.8	1.76e4	1.76e4	1.000	1.000	1.88	12.5	100.0
27	27 13C2-4:2 FTS	329.2 > 308.9	5.06e3	5.06e3	1.000	1.000	3.34	12.5	100.0
28	28 13C5-PFHxA	318.0 > 272.9	1.91e4	1.91e4	1.000	1.000	3.43	12.5	100.0
29	29 13C3-PFHxS	401.9 > 79.9	1.21e4	1.21e4	1.000	1.000	4.06	12.5	100.0
30	30 13C8-PFOA	421.3 > 376	1.07e4	1.07e4	1.000	1.000	4.35	12.5	100.0
31	31 13C4-PFOS	503.0 > 79.9	7.41e3	7.41e3	1.000	1.000	4.75	12.5	100.0

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

AC 11/28/16
PW 11/28/16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-2.qld

Last Altered: Monday, November 28, 2016 08:47:38 Pacific Standard Time
Printed: Monday, November 28, 2016 08:49:43 Pacific Standard Time

Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32	13C9-PFNA	472.2 > 426.9	1.02e4	1.02e4	1.000	1.000	4.69	12.5	100.0
33	33	13C6-PFDA	519.1 > 473.7	8.08e3	8.08e3	1.000	1.000	5.00	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161127G1_1	IPA	27-Nov-16	13:25:59
2	161127G1_2	ST161127G1-1 PFC CS3.5 16K2701	27-Nov-16	13:38:36
3	161127G1_3	IPA	27-Nov-16	13:51:12
4	161127G1_4	B6K0123-BS1 OPR 0.125	27-Nov-16	14:03:49
5	161127G1_5	B6K0142-BS1 OPR 1	27-Nov-16	14:16:25
6	161127G1_6	B6K0142-BSD1 LCS Dup 1	27-Nov-16	14:29:02
7	161127G1_7	B6K0143-BS1 OPR 0.125	27-Nov-16	14:41:38
8	161127G1_8	B6K0146-BS1 OPR 0.125	27-Nov-16	14:54:16
9	161127G1_9	IPA	27-Nov-16	15:06:54
10	161127G1_10	B6K0123-BLK1 Method Blank 0.125	27-Nov-16	15:19:32
11	161127G1_11	B6K0142-BLK1 Method Blank 1	27-Nov-16	15:32:11
12	161127G1_12	B6K0143-BLK1 Method Blank 0.125	27-Nov-16	15:44:49
13	161127G1_13	B6K0146-BLK1 Method Blank 0.125	27-Nov-16	15:57:25
14	161127G1_14	1601395-08RE2 EB-26SW04_161101 0.13015	27-Nov-16	16:10:00
15	161127G1_15	1601395-11RE2 FB-26SW04_161101 0.12796	27-Nov-16	16:22:37
16	161127G1_16	1601416-01 TW-2C 0.12384	27-Nov-16	16:35:13
17	161127G1_17	1601414-12 PFAS-SED01-110116 7.13	27-Nov-16	16:47:51
18	161127G1_18	1601414-13 PFAS-SED02-110116 1.6	27-Nov-16	17:00:28
19	161127G1_19	1601414-14 PFAS-SED03-110116 1.55	27-Nov-16	17:13:07
20	161127G1_20	1601414-15 PFAS-SED04-110216 1.41	27-Nov-16	17:25:45
21	161127G1_21	B6K0142-MS1 Matrix Spike 1.42	27-Nov-16	17:38:20
22	161127G1_22	B6K0142-MSD1 Matrix Spike Dup 1.56	27-Nov-16	17:50:56
23	161127G1_23	1601414-16 PFAS-SED05-110216 1.36	27-Nov-16	18:03:31
24	161127G1_24	1601414-17 PFAS-SED06-110216 1.39	27-Nov-16	18:16:08
25	161127G1_25	1601414-18 PFAS-SED07-110216 1.12	27-Nov-16	18:28:44
26	161127G1_26	IPA	27-Nov-16	18:41:22
27	161127G1_27	ST161127G1-2 PFC CS3.5 16K2701	27-Nov-16	18:53:59
28	161127G1_28	IPA	27-Nov-16	19:06:35
29	161127G1_29	1601414-19 PFAS-SED08-110216 1.24	27-Nov-16	19:19:13
30	161127G1_30	1601414-20 PFAS-SED-DUP1-110216 1.36	27-Nov-16	19:31:52
31	161127G1_31	1601451-01 SB01-20161114 0.12236	27-Nov-16	19:44:30

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Compound name: PFBA

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32	161127G1_32	1601451-02 EB01-20161114 0.12642	27-Nov-16	19:57:06
33	161127G1_33	1601451-03 OUAI-MW13-20161114 0.13048	27-Nov-16	20:09:41
34	161127G1_34	1601451-04 OUAI-MW37-20161114 0.13083	27-Nov-16	20:22:16
35	161127G1_35	1601451-05 OUAI-MW37A-20161114 0.13037	27-Nov-16	20:34:53
36	161127G1_36	1601451-06 OUAI-HS03-20161114 0.12985	27-Nov-16	20:47:29
37	161127G1_37	B6K0143-MS1 Matrix Spike 0.12605	27-Nov-16	21:00:07
38	161127G1_38	B6K0143-MSD1 Matrix Spike Dup 0.12681	27-Nov-16	21:12:45
39	161127G1_39	1601451-07 OUAI-MW19-20161114 0.13066	27-Nov-16	21:25:23
40	161127G1_40	1601451-08 OUAI-MW18-20161114 0.12409	27-Nov-16	21:37:58
41	161127G1_41	IPA	27-Nov-16	21:50:34
42	161127G1_42	ST161127G1-3 PFC CS3.5 16K2701	27-Nov-16	22:03:12
43	161127G1_43	IPA	27-Nov-16	22:15:47
44	161127G1_44	1601451-09 OUAI-MW08-20161114 0.12647	27-Nov-16	22:28:25
45	161127G1_45	1601451-10 OUAI-MW06-20161114 0.12271	27-Nov-16	22:41:00
46	161127G1_46	1601461-01 EB02-20161115 0.12859	27-Nov-16	22:53:37
47	161127G1_47	1601461-02 OUAI-MW14-20161115 0.12795	27-Nov-16	23:06:13
48	161127G1_48	1601461-03 OUAI-MW15-20161115 0.12968	27-Nov-16	23:18:51
49	161127G1_49	1601461-04 OUAI-MW07-20161115 0.12742	27-Nov-16	23:31:28
50	161127G1_50	1601461-05 OUAI-MW23-20161115 0.12602	27-Nov-16	23:44:07
51	161127G1_51	1601461-06 OUAI-MW55-20161115 0.12709	27-Nov-16	23:56:41
52	161127G1_52	1601461-07 OUAI-MW55A-20161115 0.12204	28-Nov-16	00:09:16
53	161127G1_53	1601461-08 OUAI-MW27-20161115 0.12966	28-Nov-16	00:21:52
54	161127G1_54	IPA	28-Nov-16	00:34:30
55	161127G1_55	ST161127G1-4 PFC CS3.5 16K2701	28-Nov-16	00:47:08
56	161127G1_56	IPA	28-Nov-16	00:59:43

LC Calibration Standards Review Checklist Q1

		ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manaul Integrations	N/A
Calibration ID:	ST161127G1-1 L [✓ M] H	N/A ☐	☑	☑	☑	☑	☑	☐
Calibration ID:	-2 L [✓ M] H	☐	☑ Ⓐ	☑	☑	☑	☑	☐
Calibration ID:	-3 L [✓ M] H	☐	☑ Ⓑ	☑	☑	☑	☑	☐
Calibration ID:	-4 L [✓ M] H	☑	☑ Ⓑ	☑	☑	☑	☑	☑
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 11/21/16

Comments:
Ⓐ Not used for 6:2 FTS
Ⓑ Not used for 8:2 FTS
AC 11/28/16

Reviewed By: PW 11/28/16
Initials/Date

Vista Analytical Laboratory Q1

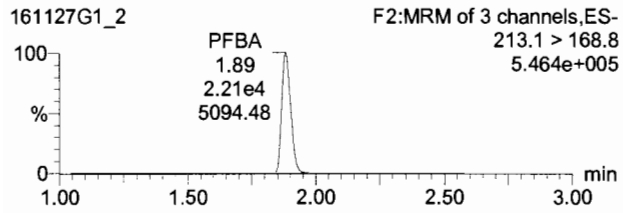
Dataset: Untitled

Last Altered: Monday, November 28, 2016 08:41:38 Pacific Standard Time
Printed: Monday, November 28, 2016 08:43:58 Pacific Standard Time

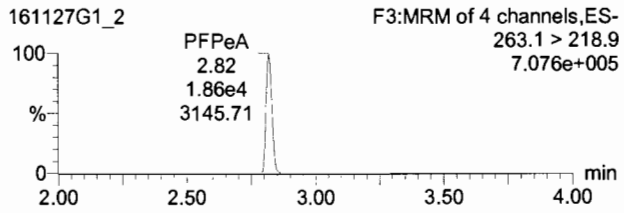
Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

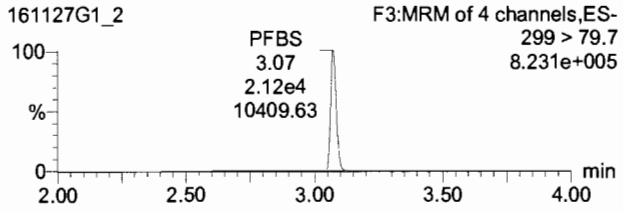
PFBA



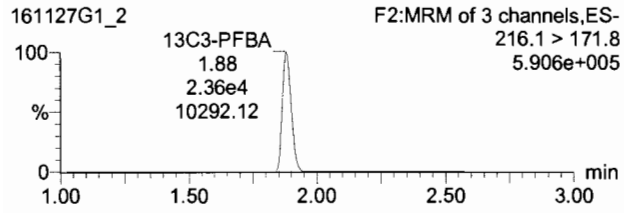
PFPeA



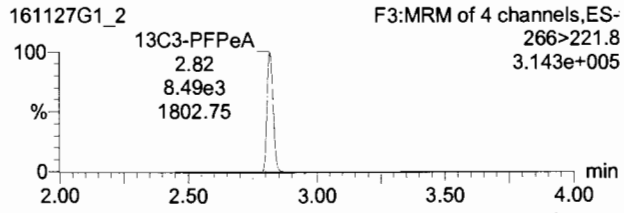
PFBS



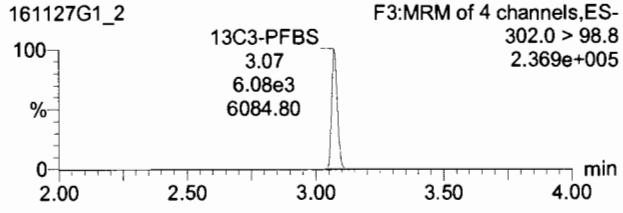
13C3-PFBA



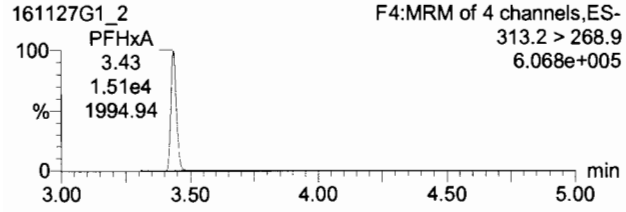
13C3-PFPeA



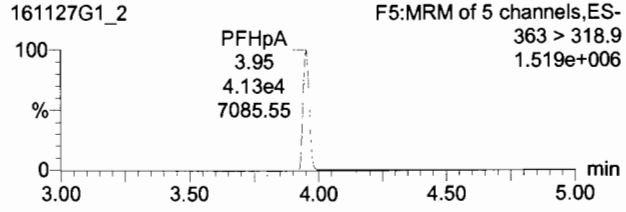
13C3-PFBS



PFHxA



PFHpA



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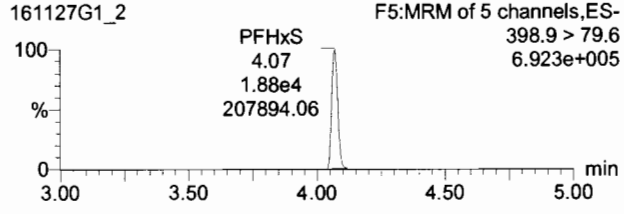
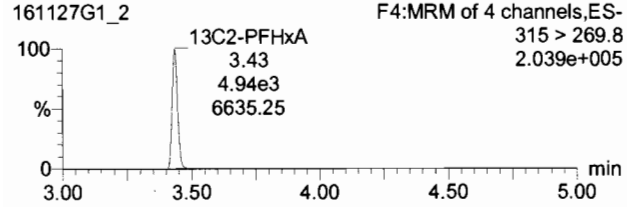
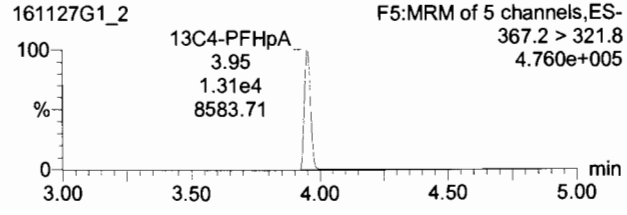


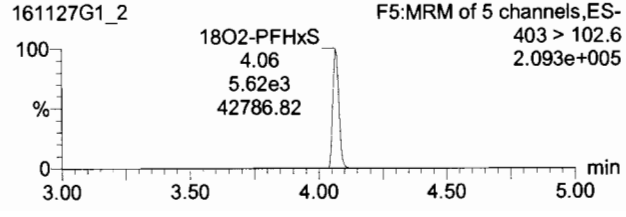
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



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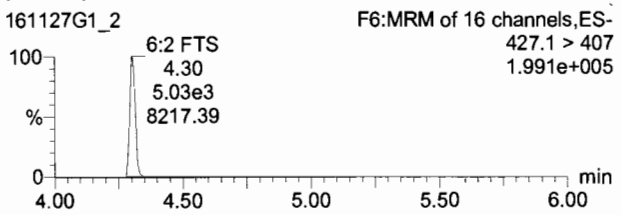
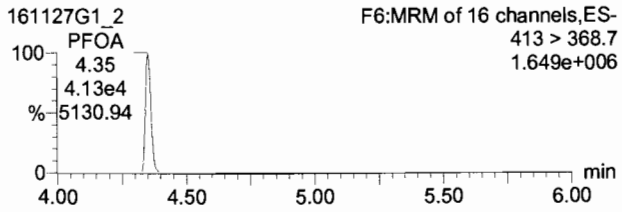
Printed: Monday, November 28, 2016 08:43:58 Pacific Standard Time

Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

6:2 FTS



PFOA



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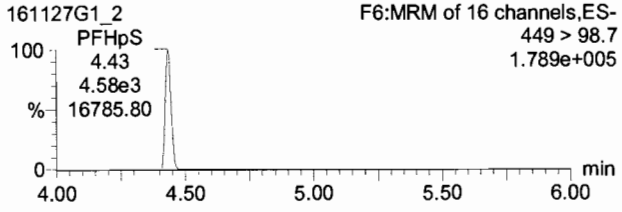
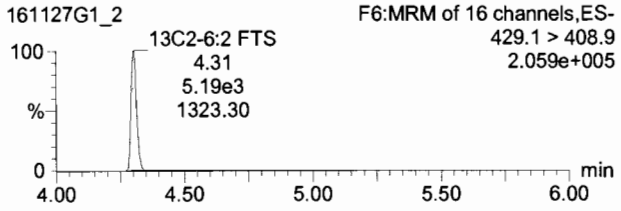
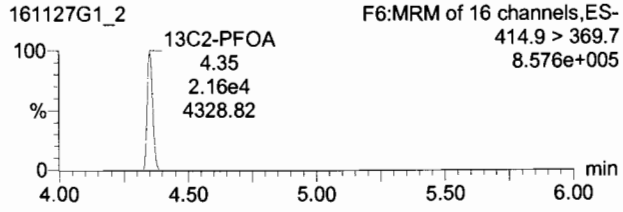


13C2-6:2 FTS



13C2-PFOA



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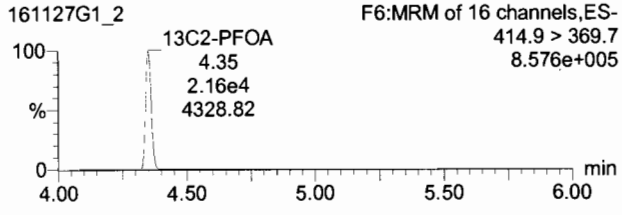
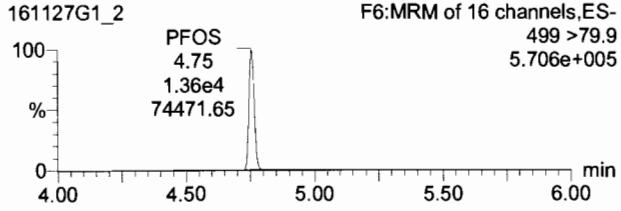


PFOS



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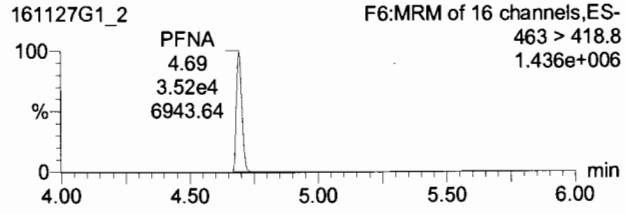
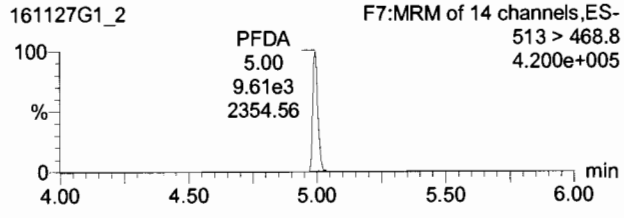
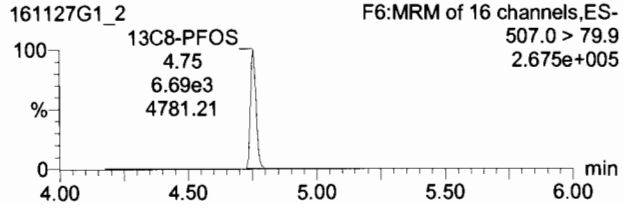


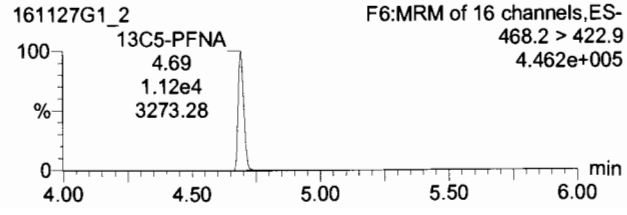
PFDA



13C8-PFOS



13C5-PFNA



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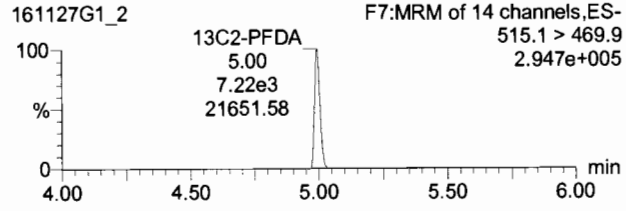

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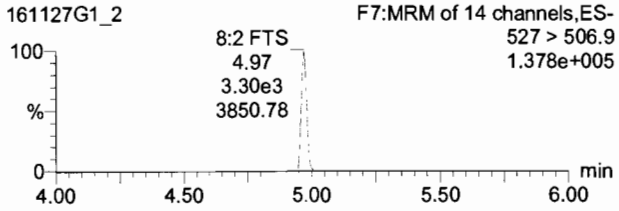
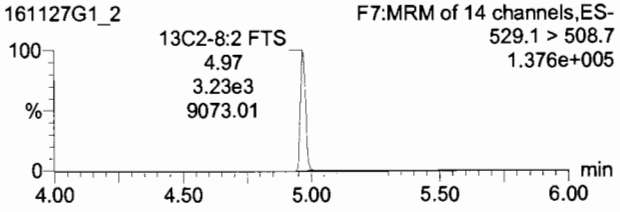
Last Altered: Monday, November 28, 2016 08:41:38 Pacific Standard Time
Printed: Monday, November 28, 2016 08:43:58 Pacific Standard Time

Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

8:2 FTS



13C2-8:2 FTS



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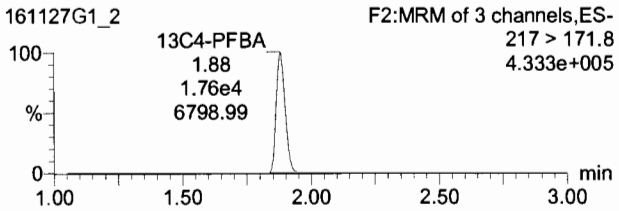
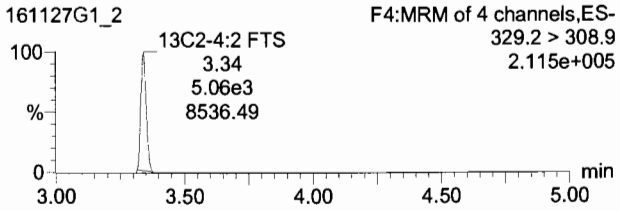
Name: 161127G1_2, Date: 27-Nov-2016, Time: 13:38:36, ID: ST161127G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

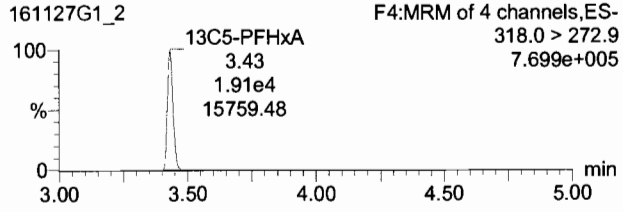
13C4-PFBA



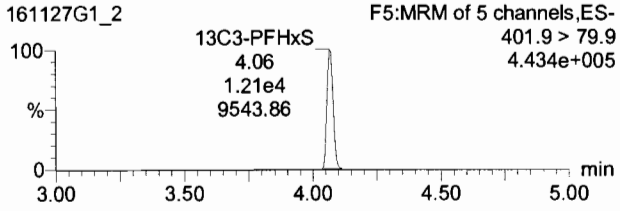
13C2-4:2 FTS



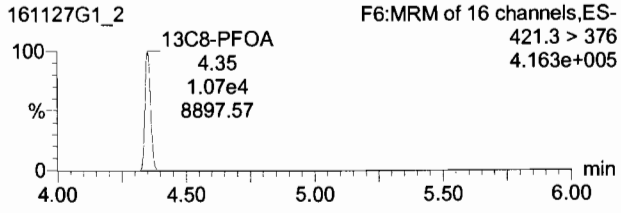
13C5-PFHxA



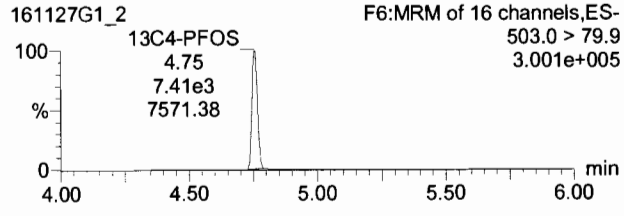
13C3-PFHxS



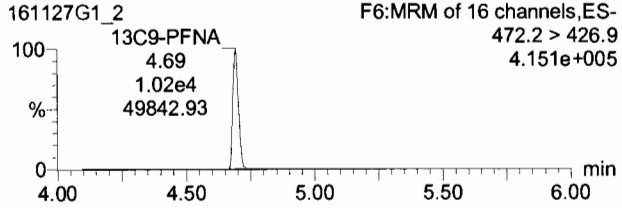
13C8-PFOA



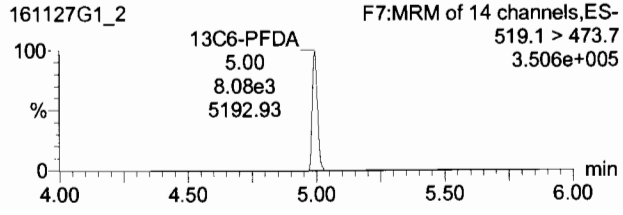
13C4-PFOS



13C9-PFNA



13C6-PFDA



Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-27.qld

Last Altered: Monday, November 28, 2016 08:51:10 Pacific Standard Time
Printed: Monday, November 28, 2016 08:51:39 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_27, Date: 27-Nov-2016, Time: 18:53:59, ID: ST161127G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec	
1	1	PFBA	213.1 > 168.8	2.45e4	2.61e4		1.000	1.90	23.9	95.6	75-125
2	2	PFPeA	263.1 > 218.9	2.05e4	9.90e3		1.000	2.83	25.9	103.7	
3	3	PFBS	299 > 79.7	2.49e4	6.66e3		1.000	3.08	26.2	104.7	
4	4	PFHxA	313.2 > 268.9	1.70e4	5.47e3		1.000	3.44	26.0	103.8	
5	5	PFHpA	363 > 318.9	4.73e4	1.55e4		1.000	3.96	24.6	98.4	
6	6	PFHxS	398.9 > 79.6	2.14e4	6.35e3		1.000	4.07	24.4	97.8	
7	7	6:2 FTS	427.1 > 407	5.22e3	4.32e3		1.000	4.31	33.2	132.7	(A)
8	8	PFOA	413 > 368.7	5.01e4	2.64e4		1.000	4.36	26.3	105.1	
9	9	PFHpS	449 > 98.7	3.63e3	2.64e4		1.000	4.44	18.9	75.6	
10	10	PFOS	499 >79.9	1.18e4	7.15e3		1.000	4.76	25.0	99.8	
11	11	PFNA	463 > 418.8	3.90e4	1.20e4		1.000	4.70	24.9	99.8	
12	12	PFDA	513 > 468.8	8.67e3	7.48e3		1.000	5.00	24.3	97.3	
13	13	8:2 FTS	527 > 506.9	3.56e3	4.10e3		1.000	4.97	22.1	88.3	
14	14	13C3-PFBA	216.1 > 171.8	2.61e4	2.03e4	1.205	1.000	1.90	13.3	106.6	60-150
15	15	13C3-PFPeA	266>221.8	9.90e3	2.19e4	0.448	1.000	2.83	12.6	101.2	
16	16	13C3-PFBS	302.0 > 98.8	6.66e3	2.19e4	0.302	1.000	3.08	12.6	100.8	
17	17	13C2-PFHxA	315 > 269.8	5.47e3	2.19e4	0.620	1.000	3.44	5.04	100.9	
18	18	13C4-PFHpA	367.2 > 321.8	1.55e4	1.46e4	1.139	1.000	3.96	11.7	93.6	
19	19	18O2-PFHxS	403 > 102.6	6.35e3	1.46e4	0.449	1.000	4.07	12.1	97.0	
20	20	13C2-6:2 FTS	429.1 > 408.9	4.32e3	6.03e3	1.073	1.000	4.31	8.34	66.7	40-150
21	21	13C2-PFOA	414.9 > 369.7	2.64e4	1.13e4	2.262	1.000	4.36	13.0	103.6	60-150
22	22	13C8-PFOS	507.0 > 79.9	7.15e3	6.96e3	0.944	1.000	4.76	13.6	108.8	
23	23	13C5-PFNA	468.2 > 422.9	1.20e4	1.15e4	1.082	1.000	4.70	12.0	96.0	50-150
24	24	13C2-PFDA	515.1 > 469.9	7.48e3	8.60e3	1.019	1.000	5.00	10.7	85.3	60-150
25	25	13C2-8:2 FTS	529.1 > 508.7	4.10e3	6.03e3	0.569	1.000	4.97	14.9	119.6	40-150
26	26	13C4-PFBA	217 > 171.8	2.03e4	2.03e4	1.000	1.000	1.89	12.5	100.0	
27	27	13C2-4:2 FTS	329.2 > 308.9	6.03e3	6.03e3	1.000	1.000	3.35	12.5	100.0	
28	28	13C5-PFHxA	318.0 > 272.9	2.19e4	2.19e4	1.000	1.000	3.44	12.5	100.0	
29	29	13C3-PFHxS	401.9 > 79.9	1.46e4	1.46e4	1.000	1.000	4.07	12.5	100.0	
30	30	13C8-PFOA	421.3 > 376	1.13e4	1.13e4	1.000	1.000	4.36	12.5	100.0	
31	31	13C4-PFOS	503.0 > 79.9	6.96e3	6.96e3	1.000	1.000	4.76	12.5	100.0	

(A) Not used for 6:2 FTS.

AC 11/28/16

PW 11/28/16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-27.qld

Last Altered: Monday, November 28, 2016 08:51:10 Pacific Standard Time
Printed: Monday, November 28, 2016 08:51:39 Pacific Standard Time

Name: 161127G1_27, Date: 27-Nov-2016, Time: 18:53:59, ID: ST161127G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#.Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32 13C9-PFNA	472.2 > 426.9	1.15e4	1.15e4	1.000	1.000	4.70	12.5	100.0
33	33 13C6-PFDA	519.1 > 473.7	8.60e3	8.60e3	1.000	1.000	5.00	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

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Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161127G1_1	IPA	27-Nov-16	13:25:59
2	161127G1_2	ST161127G1-1 PFC CS3.5 16K2701	27-Nov-16	13:38:36
3	161127G1_3	IPA	27-Nov-16	13:51:12
4	161127G1_4	B6K0123-BS1 OPR 0.125	27-Nov-16	14:03:49
5	161127G1_5	B6K0142-BS1 OPR 1	27-Nov-16	14:16:25
6	161127G1_6	B6K0142-BSD1 LCS Dup 1	27-Nov-16	14:29:02
7	161127G1_7	B6K0143-BS1 OPR 0.125	27-Nov-16	14:41:38
8	161127G1_8	B6K0146-BS1 OPR 0.125	27-Nov-16	14:54:16
9	161127G1_9	IPA	27-Nov-16	15:06:54
10	161127G1_10	B6K0123-BLK1 Method Blank 0.125	27-Nov-16	15:19:32
11	161127G1_11	B6K0142-BLK1 Method Blank 1	27-Nov-16	15:32:11
12	161127G1_12	B6K0143-BLK1 Method Blank 0.125	27-Nov-16	15:44:49
13	161127G1_13	B6K0146-BLK1 Method Blank 0.125	27-Nov-16	15:57:25
14	161127G1_14	1601395-08RE2 EB-26SW04_161101 0.13015	27-Nov-16	16:10:00
15	161127G1_15	1601395-11RE2 FB-26SW04_161101 0.12796	27-Nov-16	16:22:37
16	161127G1_16	1601416-01 TW-2C 0.12384	27-Nov-16	16:35:13
17	161127G1_17	1601414-12 PFAS-SED01-110116 7.13	27-Nov-16	16:47:51
18	161127G1_18	1601414-13 PFAS-SED02-110116 1.6	27-Nov-16	17:00:28
19	161127G1_19	1601414-14 PFAS-SED03-110116 1.55	27-Nov-16	17:13:07
20	161127G1_20	1601414-15 PFAS-SED04-110216 1.41	27-Nov-16	17:25:45
21	161127G1_21	B6K0142-MS1 Matrix Spike 1.42	27-Nov-16	17:38:20
22	161127G1_22	B6K0142-MSD1 Matrix Spike Dup 1.56	27-Nov-16	17:50:56
23	161127G1_23	1601414-16 PFAS-SED05-110216 1.36	27-Nov-16	18:03:31
24	161127G1_24	1601414-17 PFAS-SED06-110216 1.39	27-Nov-16	18:16:08
25	161127G1_25	1601414-18 PFAS-SED07-110216 1.12	27-Nov-16	18:28:44
26	161127G1_26	IPA	27-Nov-16	18:41:22
27	161127G1_27	ST161127G1-2 PFC CS3.5 16K2701	27-Nov-16	18:53:59
28	161127G1_28	IPA	27-Nov-16	19:06:35
29	161127G1_29	1601414-19 PFAS-SED08-110216 1.24	27-Nov-16	19:19:13
30	161127G1_30	1601414-20 PFAS-SED-DUP1-110216 1.36	27-Nov-16	19:31:52
31	161127G1_31	1601451-01 SB01-20161114 0.12236	27-Nov-16	19:44:30

Vista Analytical Laboratory VG-9

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Compound name: PFBA

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34	161127G1_34	1601451-04 OUAI-MW37-20161114 0.13083	27-Nov-16	20:22:16
35	161127G1_35	1601451-05 OUAI-MW37A-20161114 0.13037	27-Nov-16	20:34:53
36	161127G1_36	1601451-06 OUAI-HS03-20161114 0.12985	27-Nov-16	20:47:29
37	161127G1_37	B6K0143-MS1 Matrix Spike 0.12605	27-Nov-16	21:00:07
38	161127G1_38	B6K0143-MSD1 Matrix Spike Dup 0.12681	27-Nov-16	21:12:45
39	161127G1_39	1601451-07 OUAI-MW19-20161114 0.13066	27-Nov-16	21:25:23
40	161127G1_40	1601451-08 OUAI-MW18-20161114 0.12409	27-Nov-16	21:37:58
41	161127G1_41	IPA	27-Nov-16	21:50:34
42	161127G1_42	ST161127G1-3 PFC CS3.5 16K2701	27-Nov-16	22:03:12
43	161127G1_43	IPA	27-Nov-16	22:15:47
44	161127G1_44	1601451-09 OUAI-MW08-20161114 0.12647	27-Nov-16	22:28:25
45	161127G1_45	1601451-10 OUAI-MW06-20161114 0.12271	27-Nov-16	22:41:00
46	161127G1_46	1601461-01 EB02-20161115 0.12859	27-Nov-16	22:53:37
47	161127G1_47	1601461-02 OUAI-MW14-20161115 0.12795	27-Nov-16	23:06:13
48	161127G1_48	1601461-03 OUAI-MW15-20161115 0.12968	27-Nov-16	23:18:51
49	161127G1_49	1601461-04 OUAI-MW07-20161115 0.12742	27-Nov-16	23:31:28
50	161127G1_50	1601461-05 OUAI-MW23-20161115 0.12602	27-Nov-16	23:44:07
51	161127G1_51	1601461-06 OUAI-MW55-20161115 0.12709	27-Nov-16	23:56:41
52	161127G1_52	1601461-07 OUAI-MW55A-20161115 0.12204	28-Nov-16	00:09:16
53	161127G1_53	1601461-08 OUAI-MW27-20161115 0.12966	28-Nov-16	00:21:52
54	161127G1_54	IPA	28-Nov-16	00:34:30
55	161127G1_55	ST161127G1-4 PFC CS3.5 16K2701	28-Nov-16	00:47:08
56	161127G1_56	IPA	28-Nov-16	00:59:43

Vista Analytical Laboratory Q1

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Printed: Monday, November 28, 2016 08:45:08 Pacific Standard Time

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Name: 161127G1_27, Date: 27-Nov-2016, Time: 18:53:59, ID: ST161127G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

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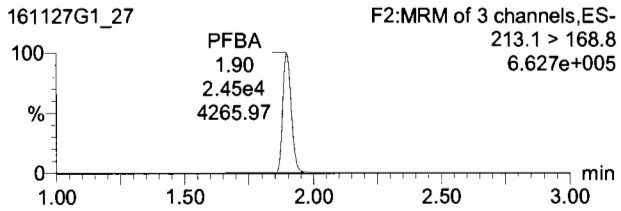

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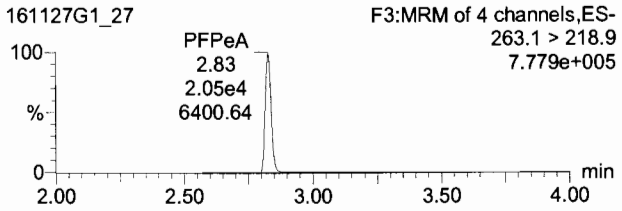

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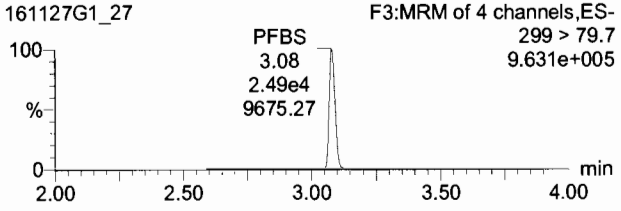

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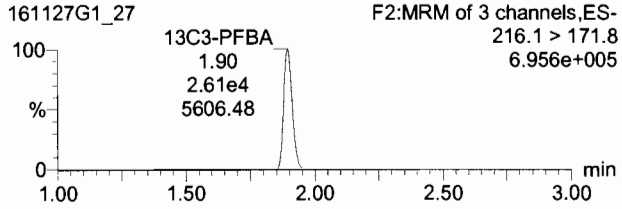

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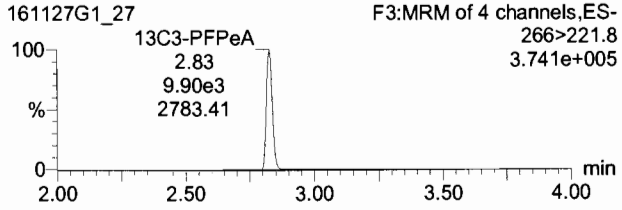

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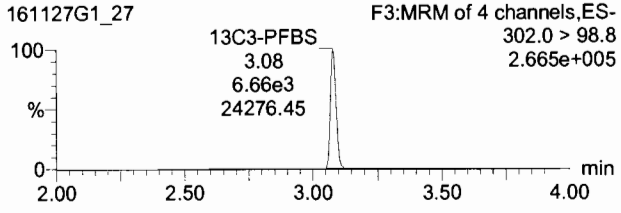

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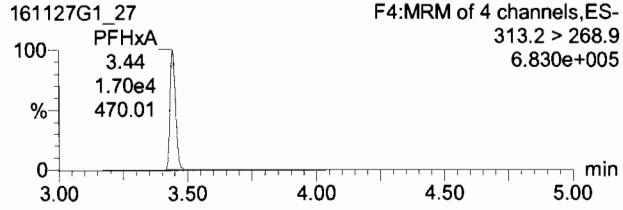

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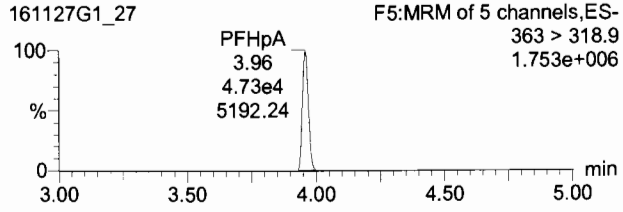

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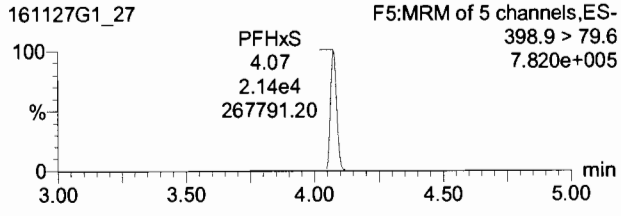

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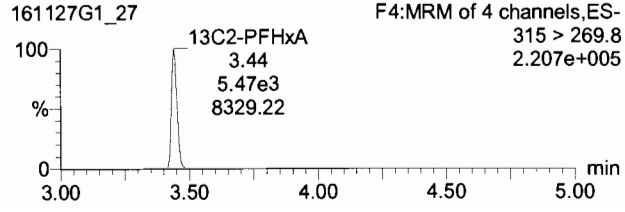

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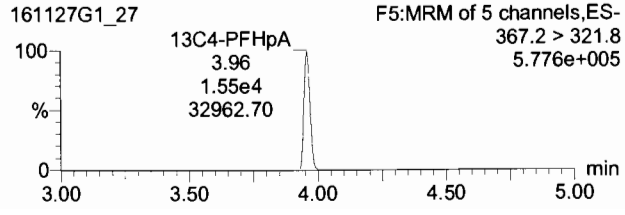

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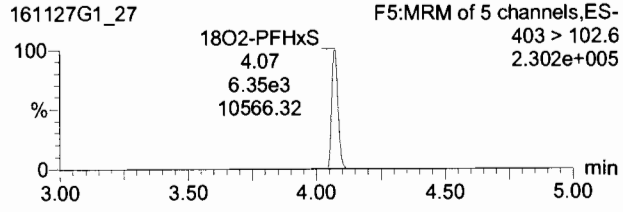

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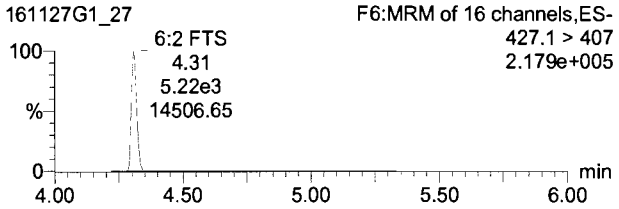
Name: 161127G1_27, Date: 27-Nov-2016, Time: 18:53:59, ID: ST161127G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

6:2 FTS



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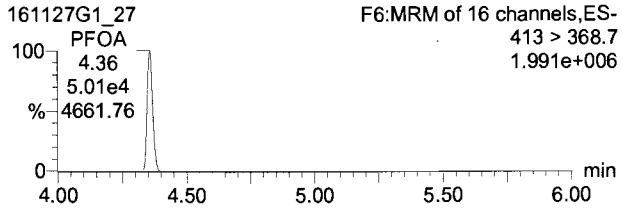

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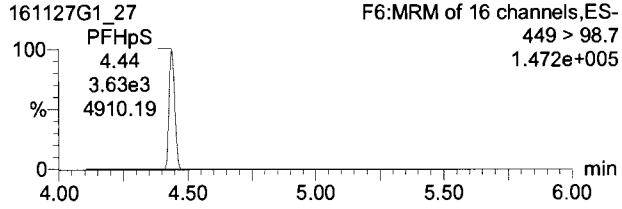

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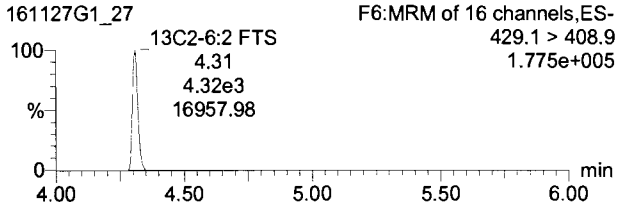

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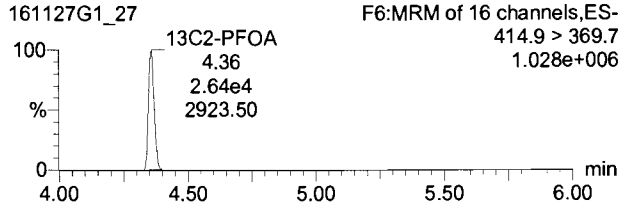

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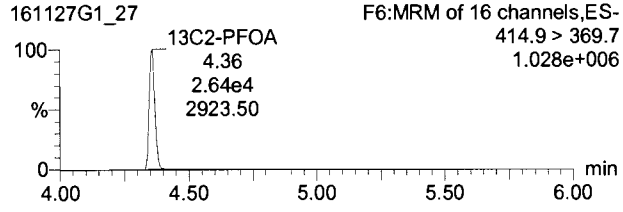

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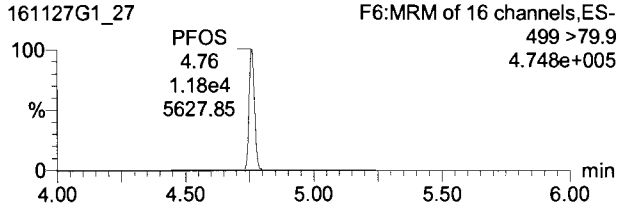

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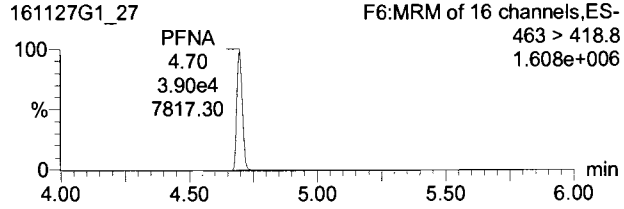

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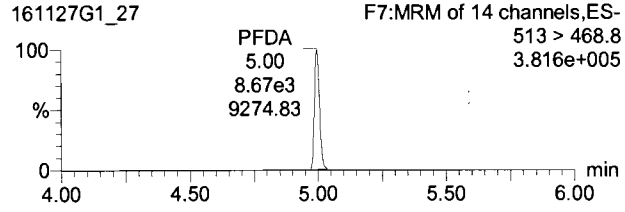

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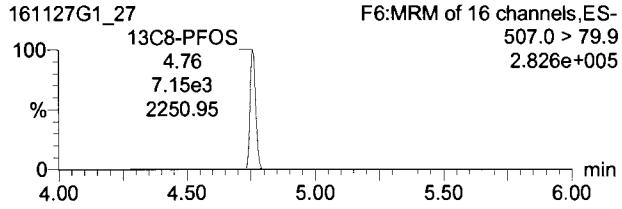

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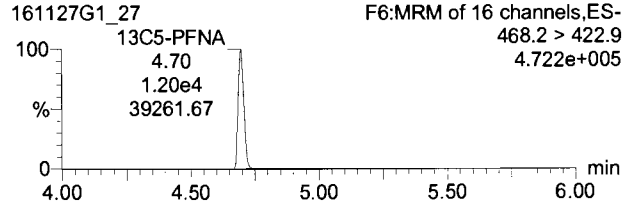

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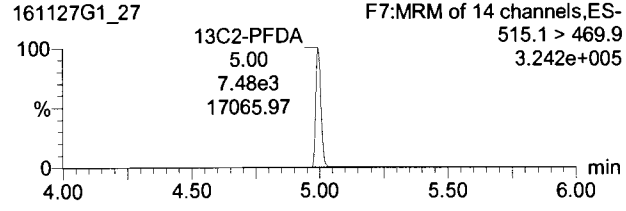

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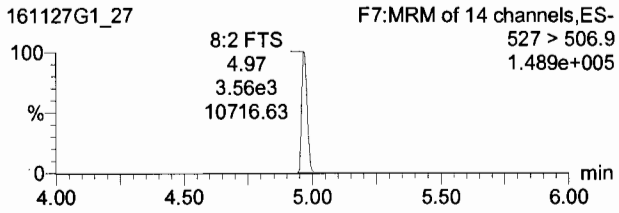

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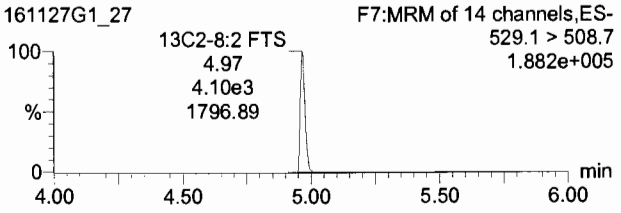

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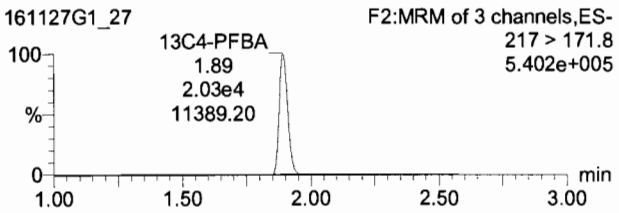

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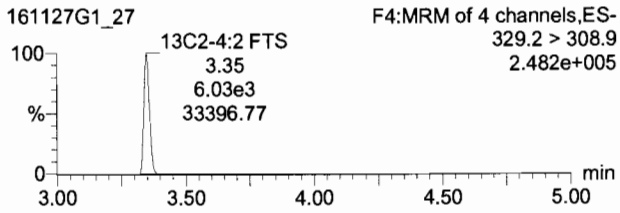

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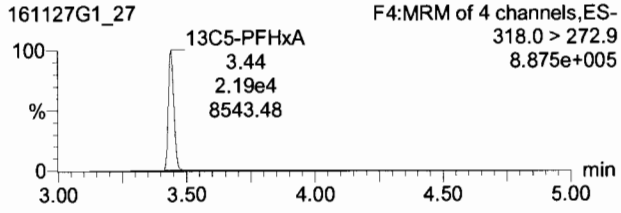

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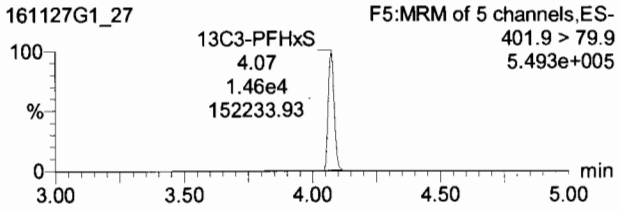

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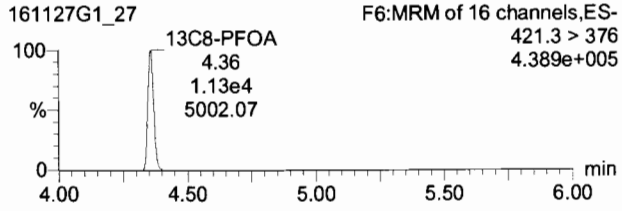

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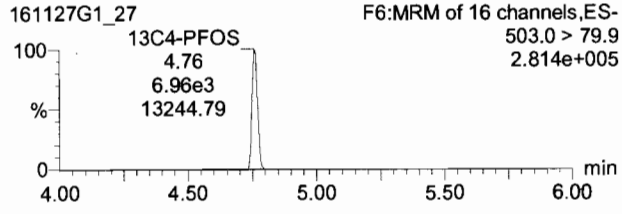

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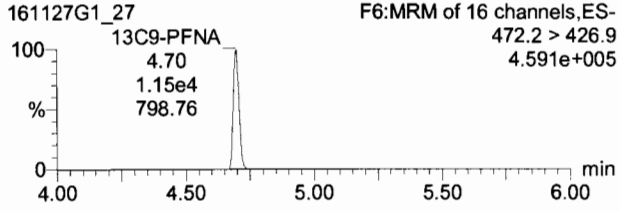
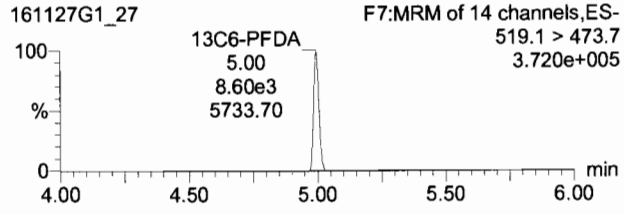


13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-42.qld

Last Altered: Monday, November 28, 2016 08:57:14 Pacific Standard Time
Printed: Monday, November 28, 2016 08:57:57 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec	
1	1	PFBA	213.1 > 168.8	2.47e4	2.55e4		1.000	1.90	24.7	98.6	75-125
2	2	PFPeA	263.1 > 218.9	2.02e4	9.84e3		1.000	2.83	25.7	102.7	
3	3	PFBS	299 > 79.7	2.48e4	6.78e3		1.000	3.09	25.6	102.5	
4	4	PFHxA	313.2 > 268.9	1.75e4	5.38e3		1.000	3.45	27.2	108.7	
5	5	PFHpA	363 > 318.9	4.83e4	1.52e4		1.000	3.96	25.7	102.9	
6	6	PFHxS	398.9 > 79.6	2.15e4	6.51e3		1.000	4.08	24.0	96.1	
7	7	6:2 FTS	427.1 > 407	5.90e3	5.80e3		1.000	4.31	28.3	113.3	
8	8	PFOA	413 > 368.7	4.73e4	2.39e4		1.000	4.36	27.4	109.4	
9	9	PFHpS	449 > 98.7	4.57e3	2.39e4		1.000	4.44	26.2	104.8	
10	10	PFOS	499 >79.9	9.31e3	6.18e3		1.000	4.76	22.8	91.1	
11	11	PFNA	463 > 418.8	3.65e4	1.18e4		1.000	4.70	23.7	94.8	
12	12	PFDA	513 > 468.8	7.77e3	6.63e3		1.000	5.00	24.6	98.5	
13	13	8:2 FTS	527 > 506.9	1.99e3	2.92e3		1.000	4.97	17.2	68.7 (A)	
14	14	13C3-PFBA	216.1 > 171.8	2.55e4	1.99e4	1.205	1.000	1.90	13.2	106.0	60-150
15	15	13C3-PFPeA	266>221.8	9.84e3	2.16e4	0.448	1.000	2.83	12.7	101.9	
16	16	13C3-PFBS	302.0 > 98.8	6.78e3	2.16e4	0.302	1.000	3.09	13.0	104.0	
17	17	13C2-PFHxA	315 > 269.8	5.38e3	2.16e4	0.620	1.000	3.45	5.03	100.7	
18	18	13C4-PFHpA	367.2 > 321.8	1.52e4	1.41e4	1.139	1.000	3.96	11.8	94.3	
19	19	18O2-PFHxS	403 > 102.6	6.51e3	1.41e4	0.449	1.000	4.07	12.8	102.6	
20	20	13C2-6:2 FTS	429.1 > 408.9	5.80e3	5.93e3	1.073	1.000	4.31	11.4	91.3	40-150
21	21	13C2-PFOA	414.9 > 369.7	2.39e4	1.11e4	2.262	1.000	4.36	11.9	95.4	60-150
22	22	13C8-PFOS	507.0 > 79.9	6.18e3	5.29e3	0.944	1.000	4.76	15.5	123.6	
23	23	13C5-PFNA	468.2 > 422.9	1.18e4	1.10e4	1.082	1.000	4.70	12.4	99.2	50-150
24	24	13C2-PFDA	515.1 > 469.9	6.63e3	7.35e3	1.019	1.000	5.00	11.1	88.5	60-150
25	25	13C2-8:2 FTS	529.1 > 508.7	2.92e3	5.93e3	0.569	1.000	4.97	10.8	86.8	40-150
26	26	13C4-PFBA	217 > 171.8	1.99e4	1.99e4	1.000	1.000	1.90	12.5	100.0	
27	27	13C2-4:2 FTS	329.2 > 308.9	5.93e3	5.93e3	1.000	1.000	3.36	12.5	100.0	
28	28	13C5-PFHxA	318.0 > 272.9	2.16e4	2.16e4	1.000	1.000	3.45	12.5	100.0	
29	29	13C3-PFHxS	401.9 > 79.9	1.41e4	1.41e4	1.000	1.000	4.08	12.5	100.0	
30	30	13C8-PFOA	421.3 > 376	1.11e4	1.11e4	1.000	1.000	4.36	12.5	100.0	
31	31	13C4-PFOS	503.0 > 79.9	5.29e3	5.29e3	1.000	1.000	4.76	12.5	100.0	

(A) Not used for 8:2 FTS.

AC 11/28/16

PW 11/28/16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-42.qld

Last Altered: Monday, November 28, 2016 08:57:14 Pacific Standard Time
Printed: Monday, November 28, 2016 08:57:57 Pacific Standard Time

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32	13C9-PFNA	472.2 > 426.9	1.10e4	1.10e4	1.000	1.000	4.70	12.5	100.0
33	33	13C6-PFDA	519.1 > 473.7	7.35e3	7.35e3	1.000	1.000	5.00	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq Date	Acq Time
1	161127G1_1	IPA	27-Nov-16	13:25:59
2	161127G1_2	ST161127G1-1 PFC CS3.5 16K2701	27-Nov-16	13:38:36
3	161127G1_3	IPA	27-Nov-16	13:51:12
4	161127G1_4	B6K0123-BS1 OPR 0.125	27-Nov-16	14:03:49
5	161127G1_5	B6K0142-BS1 OPR 1	27-Nov-16	14:16:25
6	161127G1_6	B6K0142-BSD1 LCS Dup 1	27-Nov-16	14:29:02
7	161127G1_7	B6K0143-BS1 OPR 0.125	27-Nov-16	14:41:38
8	161127G1_8	B6K0146-BS1 OPR 0.125	27-Nov-16	14:54:16
9	161127G1_9	IPA	27-Nov-16	15:06:54
10	161127G1_10	B6K0123-BLK1 Method Blank 0.125	27-Nov-16	15:19:32
11	161127G1_11	B6K0142-BLK1 Method Blank 1	27-Nov-16	15:32:11
12	161127G1_12	B6K0143-BLK1 Method Blank 0.125	27-Nov-16	15:44:49
13	161127G1_13	B6K0146-BLK1 Method Blank 0.125	27-Nov-16	15:57:25
14	161127G1_14	1601395-08RE2 EB-26SW04_161101 0.13015	27-Nov-16	16:10:00
15	161127G1_15	1601395-11RE2 FB-26SW04_161101 0.12796	27-Nov-16	16:22:37
16	161127G1_16	1601416-01 TW-2C 0.12384	27-Nov-16	16:35:13
17	161127G1_17	1601414-12 PFAS-SED01-110116 7.13	27-Nov-16	16:47:51
18	161127G1_18	1601414-13 PFAS-SED02-110116 1.6	27-Nov-16	17:00:28
19	161127G1_19	1601414-14 PFAS-SED03-110116 1.55	27-Nov-16	17:13:07
20	161127G1_20	1601414-15 PFAS-SED04-110216 1.41	27-Nov-16	17:25:45
21	161127G1_21	B6K0142-MS1 Matrix Spike 1.42	27-Nov-16	17:38:20
22	161127G1_22	B6K0142-MSD1 Matrix Spike Dup 1.56	27-Nov-16	17:50:56
23	161127G1_23	1601414-16 PFAS-SED05-110216 1.36	27-Nov-16	18:03:31
24	161127G1_24	1601414-17 PFAS-SED06-110216 1.39	27-Nov-16	18:16:08
25	161127G1_25	1601414-18 PFAS-SED07-110216 1.12	27-Nov-16	18:28:44
26	161127G1_26	IPA	27-Nov-16	18:41:22
27	161127G1_27	ST161127G1-2 PFC CS3.5 16K2701	27-Nov-16	18:53:59
28	161127G1_28	IPA	27-Nov-16	19:06:35
29	161127G1_29	1601414-19 PFAS-SED08-110216 1.24	27-Nov-16	19:19:13
30	161127G1_30	1601414-20 PFAS-SED-DUP1-110216 1.36	27-Nov-16	19:31:52
31	161127G1_31	1601451-01 SB01-20161114 0.12236	27-Nov-16	19:44:30

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Compound name: PFBA

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32	161127G1_32	1601451-02 EB01-20161114 0.12642	27-Nov-16	19:57:06
33	161127G1_33	1601451-03 OUAI-MW13-20161114 0.13048	27-Nov-16	20:09:41
34	161127G1_34	1601451-04 OUAI-MW37-20161114 0.13083	27-Nov-16	20:22:16
35	161127G1_35	1601451-05 OUAI-MW37A-20161114 0.13037	27-Nov-16	20:34:53
36	161127G1_36	1601451-06 OUAI-HS03-20161114 0.12985	27-Nov-16	20:47:29
37	161127G1_37	B6K0143-MS1 Matrix Spike 0.12605	27-Nov-16	21:00:07
38	161127G1_38	B6K0143-MSD1 Matrix Spike Dup 0.12681	27-Nov-16	21:12:45
39	161127G1_39	1601451-07 OUAI-MW19-20161114 0.13066	27-Nov-16	21:25:23
40	161127G1_40	1601451-08 OUAI-MW18-20161114 0.12409	27-Nov-16	21:37:58
41	161127G1_41	IPA	27-Nov-16	21:50:34
42	161127G1_42	ST161127G1-3 PFC CS3.5 16K2701	27-Nov-16	22:03:12
43	161127G1_43	IPA	27-Nov-16	22:15:47
44	161127G1_44	1601451-09 OUAI-MW08-20161114 0.12647	27-Nov-16	22:28:25
45	161127G1_45	1601451-10 OUAI-MW06-20161114 0.12271	27-Nov-16	22:41:00
46	161127G1_46	1601461-01 EB02-20161115 0.12859	27-Nov-16	22:53:37
47	161127G1_47	1601461-02 OUAI-MW14-20161115 0.12795	27-Nov-16	23:06:13
48	161127G1_48	1601461-03 OUAI-MW15-20161115 0.12968	27-Nov-16	23:18:51
49	161127G1_49	1601461-04 OUAI-MW07-20161115 0.12742	27-Nov-16	23:31:28
50	161127G1_50	1601461-05 OUAI-MW23-20161115 0.12602	27-Nov-16	23:44:07
51	161127G1_51	1601461-06 OUAI-MW55-20161115 0.12709	27-Nov-16	23:56:41
52	161127G1_52	1601461-07 OUAI-MW55A-20161115 0.12204	28-Nov-16	00:09:16
53	161127G1_53	1601461-08 OUAI-MW27-20161115 0.12966	28-Nov-16	00:21:52
54	161127G1_54	IPA	28-Nov-16	00:34:30
55	161127G1_55	ST161127G1-4 PFC CS3.5 16K2701	28-Nov-16	00:47:08
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Vista Analytical Laboratory Q1

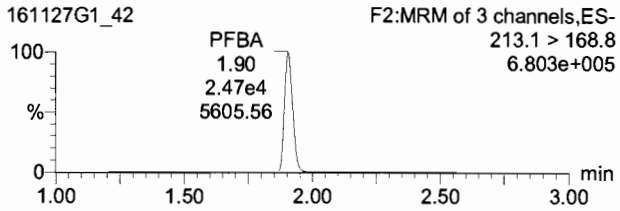
Dataset: Untitled

Last Altered: Monday, November 28, 2016 08:45:47 Pacific Standard Time
Printed: Monday, November 28, 2016 08:45:50 Pacific Standard Time

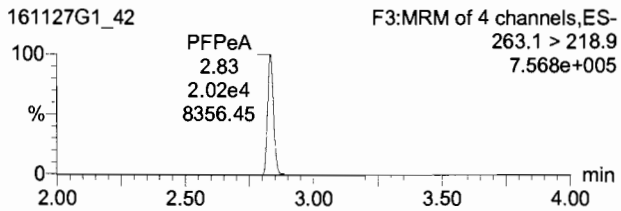
Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

PFBA



PFPeA



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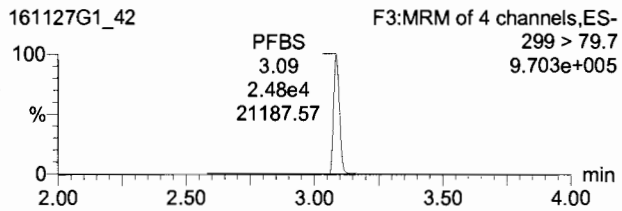

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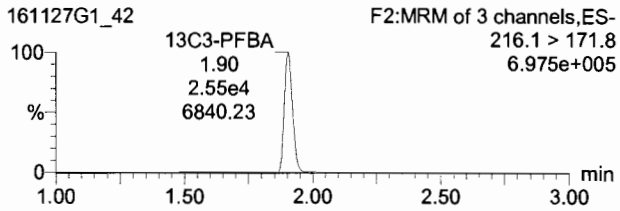

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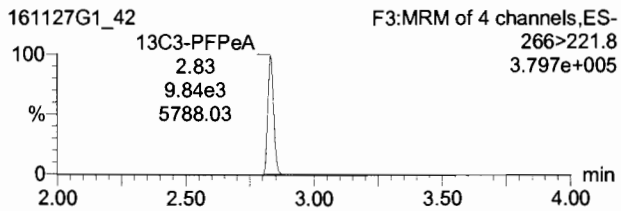

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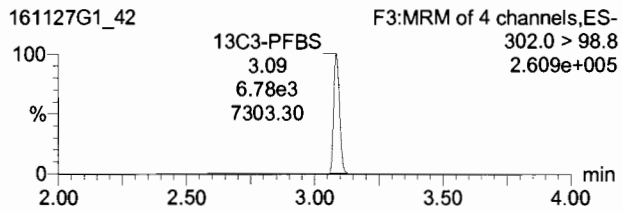

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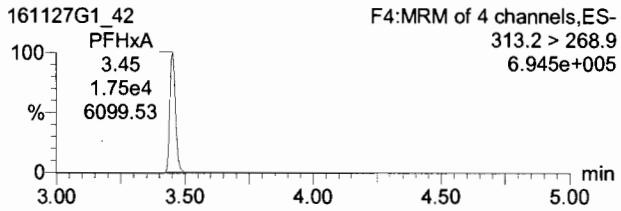

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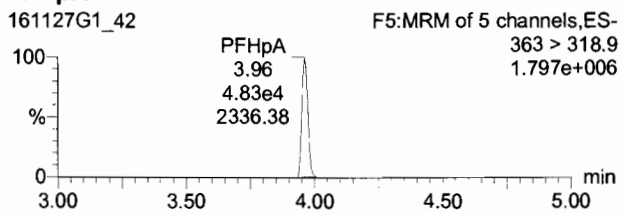

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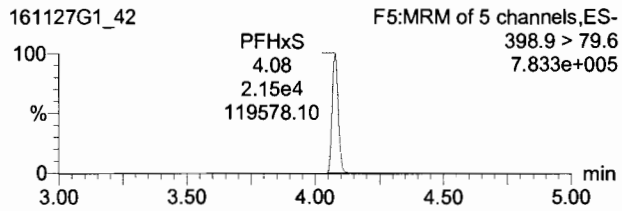

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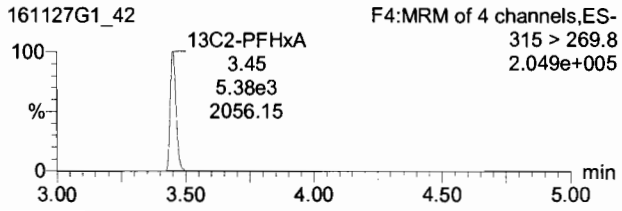
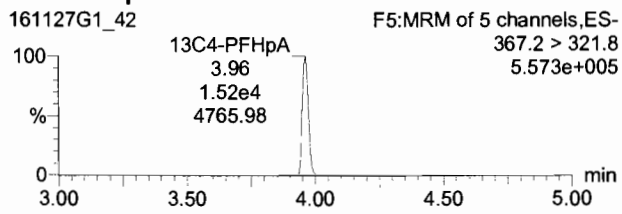
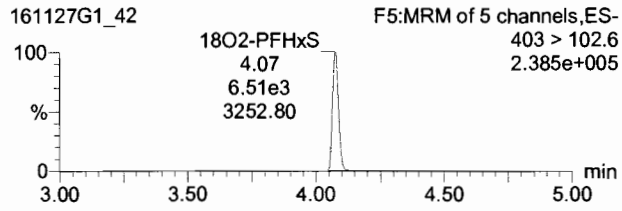


13C4-PFHpA



18O2-PFHxS



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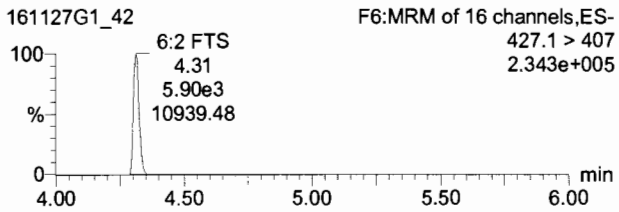
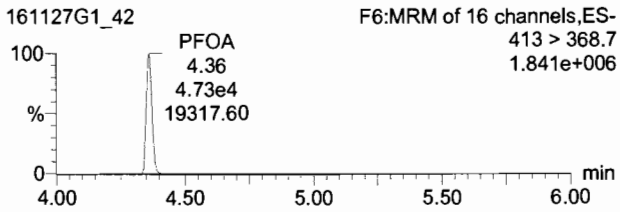
Last Altered: Monday, November 28, 2016 08:45:47 Pacific Standard Time
Printed: Monday, November 28, 2016 08:45:50 Pacific Standard Time

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

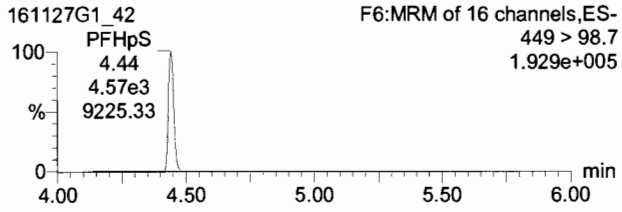
6:2 FTS



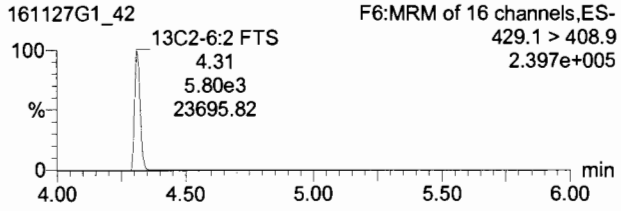
PFOA



PFHpS



13C2-6:2 FTS



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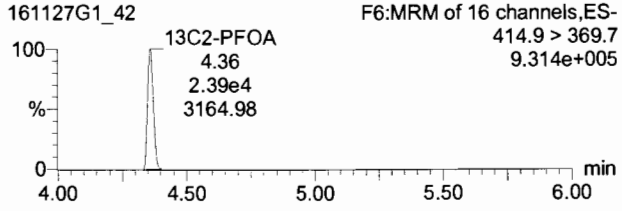

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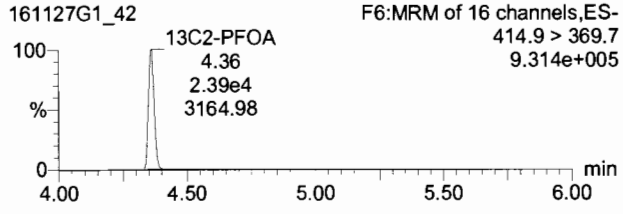
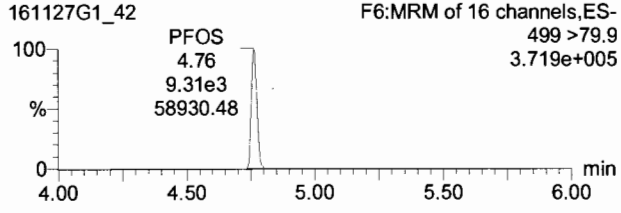
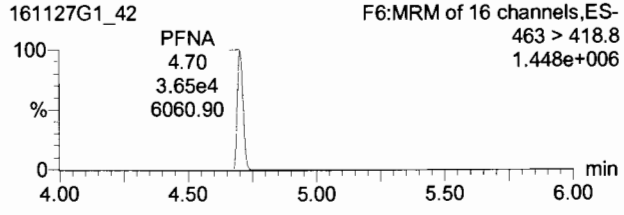


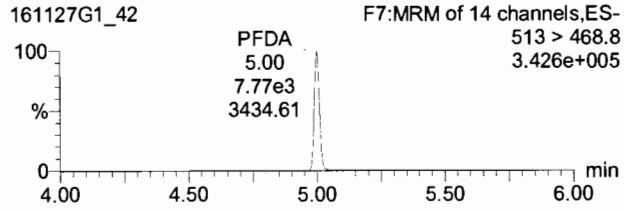
PFOS



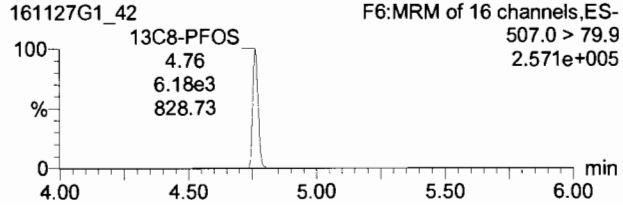
PFNA



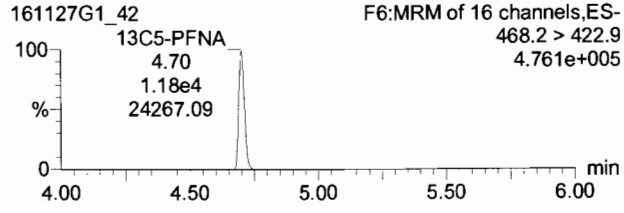
PFDA



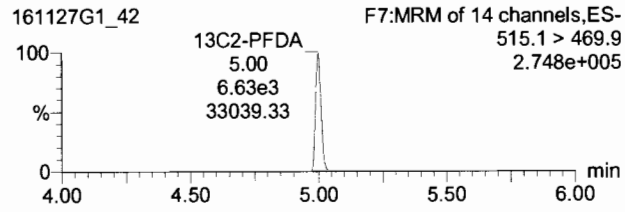
13C8-PFOS



13C5-PFNA



13C2-PFDA



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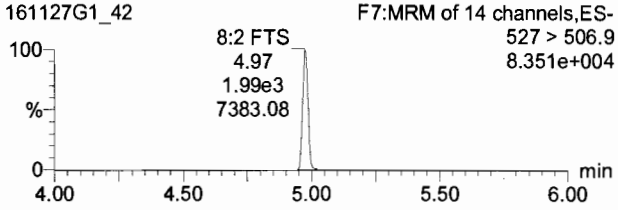
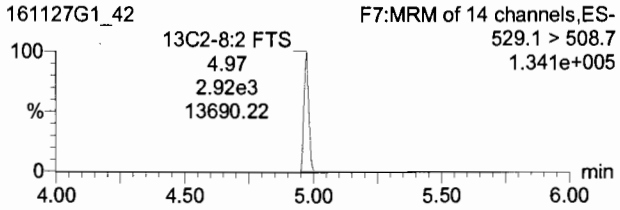
Last Altered: Monday, November 28, 2016 08:45:47 Pacific Standard Time
Printed: Monday, November 28, 2016 08:45:50 Pacific Standard Time

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

8:2 FTS



13C2-8:2 FTS



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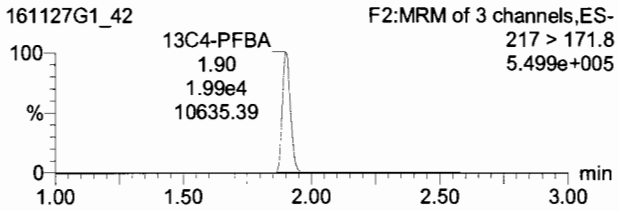
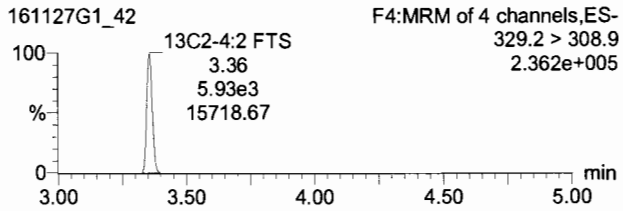
Printed: Monday, November 28, 2016 08:45:50 Pacific Standard Time

Name: 161127G1_42, Date: 27-Nov-2016, Time: 22:03:12, ID: ST161127G1-3 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

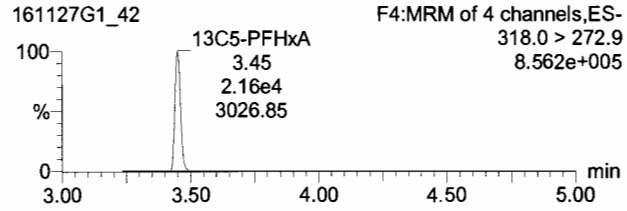
13C4-PFBA



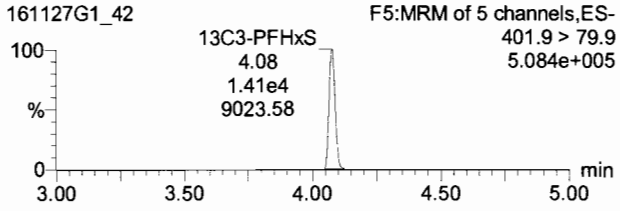
13C2-4:2 FTS



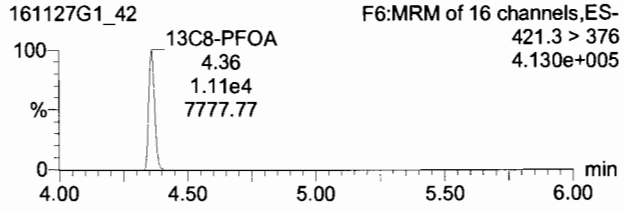
13C5-PFHxA



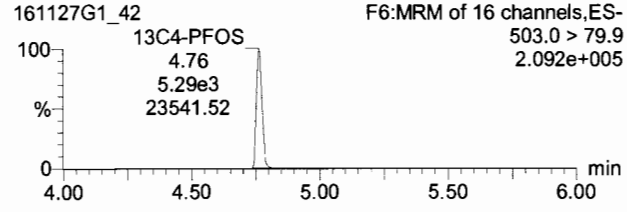
13C3-PFHxS



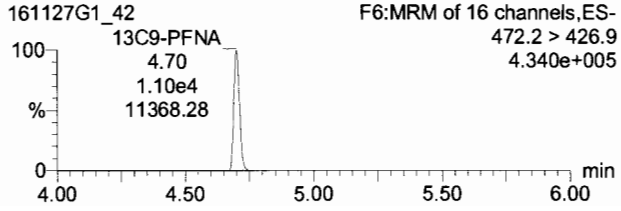
13C8-PFOA



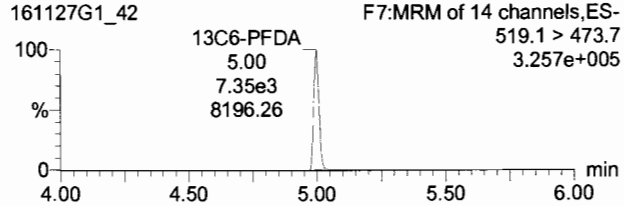
13C4-PFOS



13C9-PFNA



13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-55.qld

Last Altered: Monday, November 28, 2016 08:59:45 Pacific Standard Time
Printed: Monday, November 28, 2016 09:01:03 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec	
1	1	PFBA	213.1 > 168.8	2.42e4	2.53e4		1.000	1.92	24.3	97.2	75-125
2	2	PFPeA	263.1 > 218.9	1.99e4	1.02e4		1.000	2.84	24.5	98.1	
3	3	PFBS	299 > 79.7	2.53e4	6.78e3		1.000	3.09	26.1	104.6	
4	4	PFHxA	313.2 > 268.9	1.70e4	5.74e3		1.000	3.46	24.7	98.9	
5	5	PFHpA	363 > 318.9	5.10e4	1.57e4		1.000	3.97	26.2	104.6	
6	6	PFHxS	398.9 > 79.6	2.29e4	6.42e3		1.000	4.08	25.9	103.7	
7	7	6:2 FTS	427.1 > 407	5.53e3	6.13e3		1.000	4.32	25.4	101.5	
8	8	PFOA	413 > 368.7	4.94e4	2.69e4		1.000	4.37	25.4	101.7	
9	9	PFHpS	449 > 98.7	4.87e3	2.69e4		1.000	4.45	24.8	99.2	
10	10	PFOS	499 >79.9	9.40e3	6.15e3		1.000	4.77	23.1	92.4	
11	11	PFNA	463 > 418.8	3.62e4	1.12e4		1.000	4.71	24.7	98.8	
12	12	PFDA	513 > 468.8	5.67e3	5.34e3		1.000	5.00	22.3	89.2	
13	13	8:2 FTS	527 > 506.9	1.91e3	1.41e3		1.000	4.98	34.9	(A) 139.6	
14	14	13C3-PFBA	216.1 > 171.8	2.53e4	2.00e4	1.205	1.000	1.91	13.1	105.2	60-150
15	15	13C3-PFPeA	266>221.8	1.02e4	2.26e4	0.448	1.000	2.84	12.6	100.5	
16	16	13C3-PFBS	302.0 > 98.8	6.78e3	2.26e4	0.302	1.000	3.09	12.4	99.3	
17	17	13C2-PFHxA	315 > 269.8	5.74e3	2.26e4	0.620	1.000	3.46	5.12	102.5	
18	18	13C4-PFHpA	367.2 > 321.8	1.57e4	1.41e4	1.139	1.000	3.97	12.2	97.9	
19	19	18O2-PFHxS	403 > 102.6	6.42e3	1.41e4	0.449	1.000	4.08	12.6	101.1	
20	20	13C2-6:2 FTS	429.1 > 408.9	6.13e3	6.08e3	1.073	1.000	4.32	11.7	93.9	40-150
21	21	13C2-PFOA	414.9 > 369.7	2.69e4	1.11e4	2.262	1.000	4.37	13.4	107.0	60-150
22	22	13C8-PFOS	507.0 > 79.9	6.15e3	5.86e3	0.944	1.000	4.77	13.9	111.2	
23	23	13C5-PFNA	468.2 > 422.9	1.12e4	1.12e4	1.082	1.000	4.71	11.5	92.4	50-150
24	24	13C2-PFDA	515.1 > 469.9	5.34e3	5.68e3	1.019	1.000	5.00	11.5	92.3	60-150
25	25	13C2-8:2 FTS	529.1 > 508.7	1.41e3	6.08e3	0.569	1.000	4.98	5.08	40.6	40-150
26	26	13C4-PFBA	217 > 171.8	2.00e4	2.00e4	1.000	1.000	1.91	12.5	100.0	
27	27	13C2-4:2 FTS	329.2 > 308.9	6.08e3	6.08e3	1.000	1.000	3.36	12.5	100.0	
28	28	13C5-PFHxA	318.0 > 272.9	2.26e4	2.26e4	1.000	1.000	3.46	12.5	100.0	
29	29	13C3-PFHxS	401.9 > 79.9	1.41e4	1.41e4	1.000	1.000	4.08	12.5	100.0	
30	30	13C8-PFOA	421.3 > 376	1.11e4	1.11e4	1.000	1.000	4.37	12.5	100.0	
31	31	13C4-PFOS	503.0 > 79.9	5.86e3	5.86e3	1.000	1.000	4.77	12.5	100.0	

(A) Not used for ~~6~~ 8:2 FTS
AC 11/28/16

NC 11/28/16

PLW 11/28/16

Dataset: U:\G1.PRO\Results\2016\161127G1\161127G1-55.qld

Last Altered: Monday, November 28, 2016 08:59:45 Pacific Standard Time
Printed: Monday, November 28, 2016 09:01:03 Pacific Standard Time

Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32	13C9-PFNA	472.2 > 426.9	1.12e4	1.12e4	1.000	1.000	4.71	12.5	100.0
33	33	13C6-PFDA	519.1 > 473.7	5.68e3	5.68e3	1.000	1.000	5.00	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161127G1_1	IPA	27-Nov-16	13:25:59
2	161127G1_2	ST161127G1-1 PFC CS3.5 16K2701	27-Nov-16	13:38:36
3	161127G1_3	IPA	27-Nov-16	13:51:12
4	161127G1_4	B6K0123-BS1 OPR 0.125	27-Nov-16	14:03:49
5	161127G1_5	B6K0142-BS1 OPR 1	27-Nov-16	14:16:25
6	161127G1_6	B6K0142-BSD1 LCS Dup 1	27-Nov-16	14:29:02
7	161127G1_7	B6K0143-BS1 OPR 0.125	27-Nov-16	14:41:38
8	161127G1_8	B6K0146-BS1 OPR 0.125	27-Nov-16	14:54:16
9	161127G1_9	IPA	27-Nov-16	15:06:54
10	161127G1_10	B6K0123-BLK1 Method Blank 0.125	27-Nov-16	15:19:32
11	161127G1_11	B6K0142-BLK1 Method Blank 1	27-Nov-16	15:32:11
12	161127G1_12	B6K0143-BLK1 Method Blank 0.125	27-Nov-16	15:44:49
13	161127G1_13	B6K0146-BLK1 Method Blank 0.125	27-Nov-16	15:57:25
14	161127G1_14	1601395-08RE2 EB-26SW04_161101 0.13015	27-Nov-16	16:10:00
15	161127G1_15	1601395-11RE2 FB-26SW04_161101 0.12796	27-Nov-16	16:22:37
16	161127G1_16	1601416-01 TW-2C 0.12384	27-Nov-16	16:35:13
17	161127G1_17	1601414-12 PFAS-SED01-110116 7.13	27-Nov-16	16:47:51
18	161127G1_18	1601414-13 PFAS-SED02-110116 1.6	27-Nov-16	17:00:28
19	161127G1_19	1601414-14 PFAS-SED03-110116 1.55	27-Nov-16	17:13:07
20	161127G1_20	1601414-15 PFAS-SED04-110216 1.41	27-Nov-16	17:25:45
21	161127G1_21	B6K0142-MS1 Matrix Spike 1.42	27-Nov-16	17:38:20
22	161127G1_22	B6K0142-MSD1 Matrix Spike Dup 1.56	27-Nov-16	17:50:56
23	161127G1_23	1601414-16 PFAS-SED05-110216 1.36	27-Nov-16	18:03:31
24	161127G1_24	1601414-17 PFAS-SED06-110216 1.39	27-Nov-16	18:16:08
25	161127G1_25	1601414-18 PFAS-SED07-110216 1.12	27-Nov-16	18:28:44
26	161127G1_26	IPA	27-Nov-16	18:41:22
27	161127G1_27	ST161127G1-2 PFC CS3.5 16K2701	27-Nov-16	18:53:59
28	161127G1_28	IPA	27-Nov-16	19:06:35
29	161127G1_29	1601414-19 PFAS-SED08-110216 1.24	27-Nov-16	19:19:13
30	161127G1_30	1601414-20 PFAS-SED-DUP1-110216 1.36	27-Nov-16	19:31:52
31	161127G1_31	1601451-01 SB01-20161114 0.12236	27-Nov-16	19:44:30

Dataset: Untitled

Last Altered: Monday, November 28, 2016 09:04:49 Pacific Standard Time
Printed: Monday, November 28, 2016 09:06:19 Pacific Standard Time

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
32	161127G1_32	1601451-02 EB01-20161114 0.12642	27-Nov-16	19:57:06
33	161127G1_33	1601451-03 OUAI-MW13-20161114 0.13048	27-Nov-16	20:09:41
34	161127G1_34	1601451-04 OUAI-MW37-20161114 0.13083	27-Nov-16	20:22:16
35	161127G1_35	1601451-05 OUAI-MW37A-20161114 0.13037	27-Nov-16	20:34:53
36	161127G1_36	1601451-06 OUAI-HS03-20161114 0.12985	27-Nov-16	20:47:29
37	161127G1_37	B6K0143-MS1 Matrix Spike 0.12605	27-Nov-16	21:00:07
38	161127G1_38	B6K0143-MSD1 Matrix Spike Dup 0.12681	27-Nov-16	21:12:45
39	161127G1_39	1601451-07 OUAI-MW19-20161114 0.13066	27-Nov-16	21:25:23
40	161127G1_40	1601451-08 OUAI-MW18-20161114 0.12409	27-Nov-16	21:37:58
41	161127G1_41	IPA	27-Nov-16	21:50:34
42	161127G1_42	ST161127G1-3 PFC CS3.5 16K2701	27-Nov-16	22:03:12
43	161127G1_43	IPA	27-Nov-16	22:15:47
44	161127G1_44	1601451-09 OUAI-MW08-20161114 0.12647	27-Nov-16	22:28:25
45	161127G1_45	1601451-10 OUAI-MW06-20161114 0.12271	27-Nov-16	22:41:00
46	161127G1_46	1601461-01 EB02-20161115 0.12859	27-Nov-16	22:53:37
47	161127G1_47	1601461-02 OUAI-MW14-20161115 0.12795	27-Nov-16	23:06:13
48	161127G1_48	1601461-03 OUAI-MW15-20161115 0.12968	27-Nov-16	23:18:51
49	161127G1_49	1601461-04 OUAI-MW07-20161115 0.12742	27-Nov-16	23:31:28
50	161127G1_50	1601461-05 OUAI-MW23-20161115 0.12602	27-Nov-16	23:44:07
51	161127G1_51	1601461-06 OUAI-MW55-20161115 0.12709	27-Nov-16	23:56:41
52	161127G1_52	1601461-07 OUAI-MW55A-20161115 0.12204	28-Nov-16	00:09:16
53	161127G1_53	1601461-08 OUAI-MW27-20161115 0.12966	28-Nov-16	00:21:52
54	161127G1_54	IPA	28-Nov-16	00:34:30
55	161127G1_55	ST161127G1-4 PFC CS3.5 16K2701	28-Nov-16	00:47:08
56	161127G1_56	IPA	28-Nov-16	00:59:43

Vista Analytical Laboratory Q1

Dataset: Untitled

Last Altered: Monday, November 28, 2016 08:46:03 Pacific Standard Time
Printed: Monday, November 28, 2016 08:46:06 Pacific Standard Time

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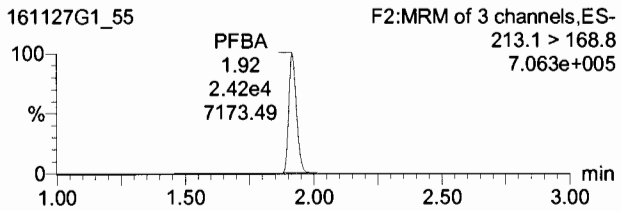
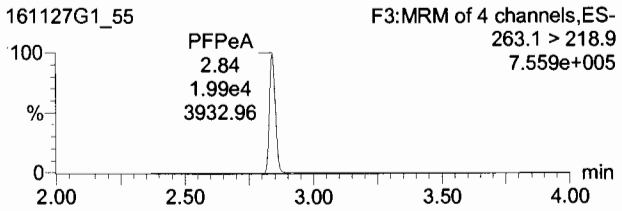
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

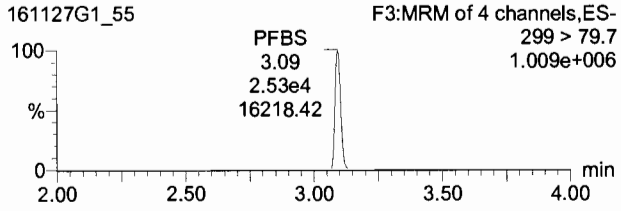
PFBA



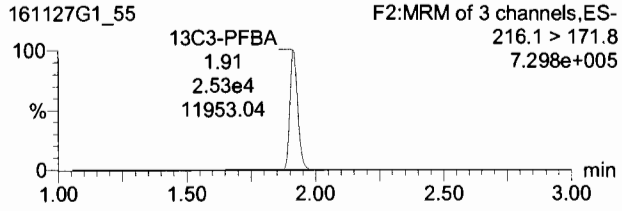
PFPeA



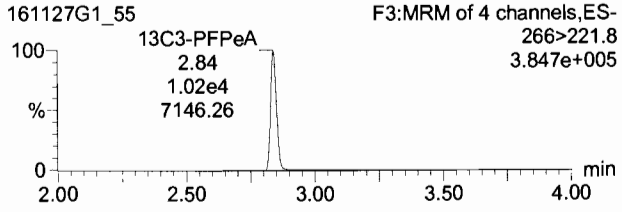
PFBS



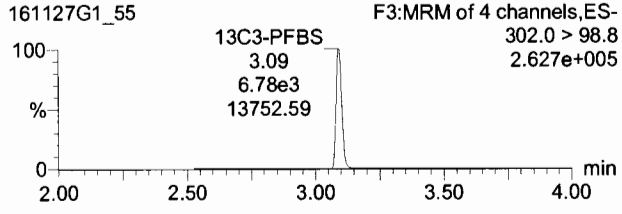
13C3-PFBA



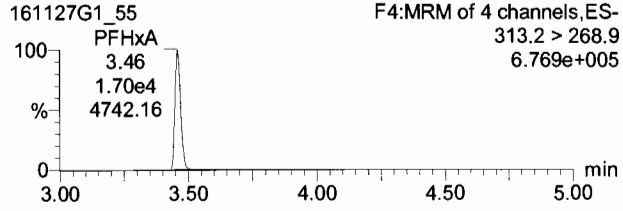
13C3-PFPeA



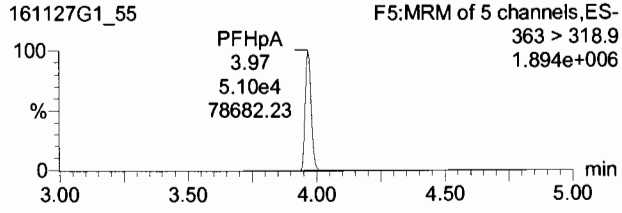
13C3-PFBS



PFHxA



PFHpA



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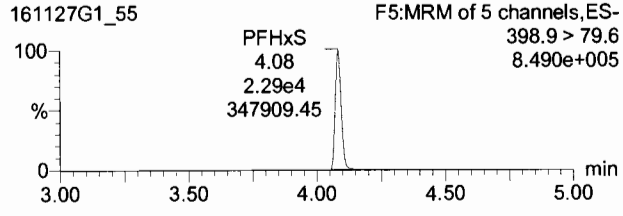
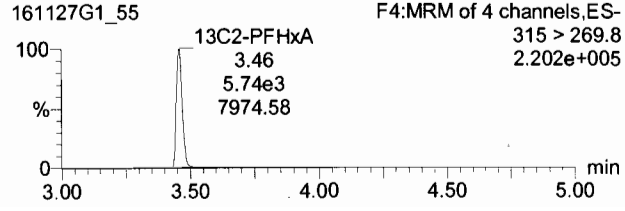
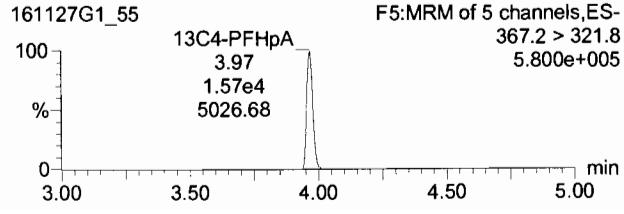


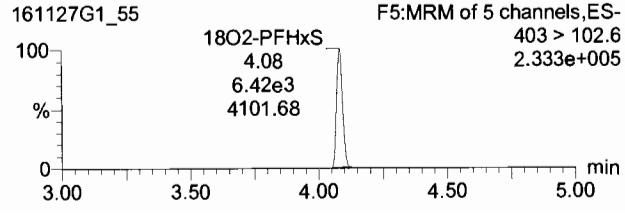
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



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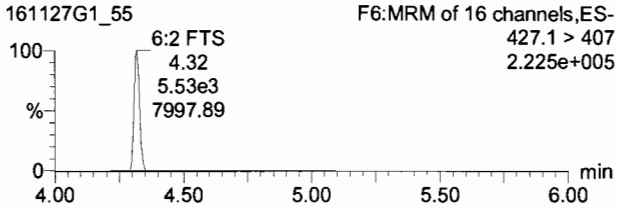
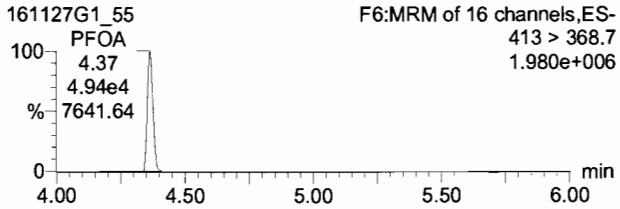
Last Altered: Monday, November 28, 2016 08:46:03 Pacific Standard Time
Printed: Monday, November 28, 2016 08:46:06 Pacific Standard Time

Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

6:2 FTS



PFOA



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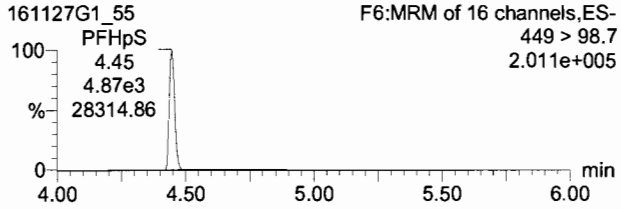
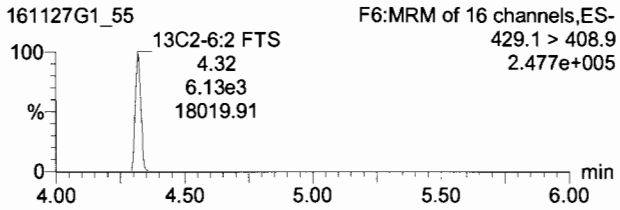
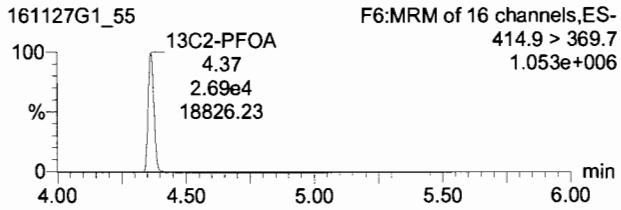


13C2-6:2 FTS



13C2-PFOA



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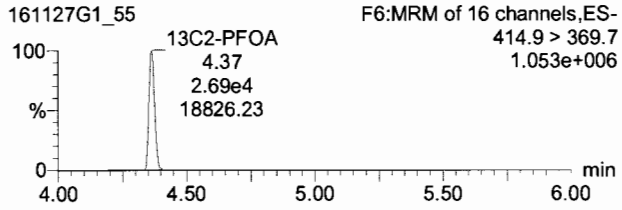
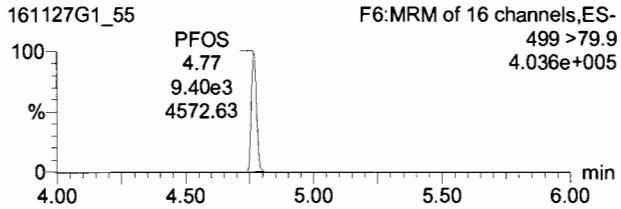
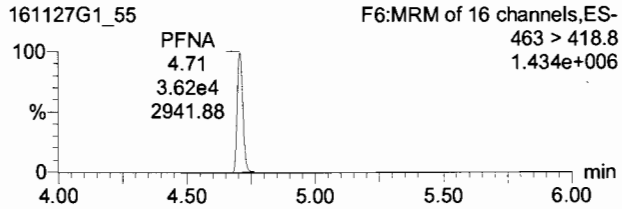


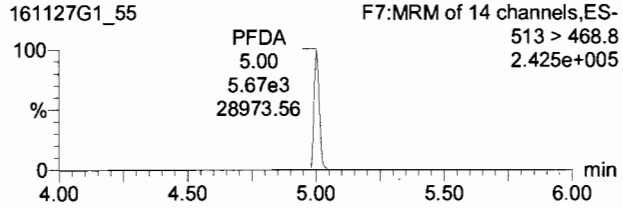
PFOS



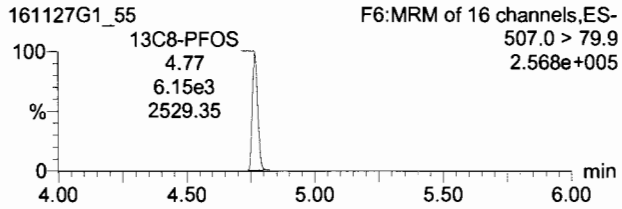
PFNA



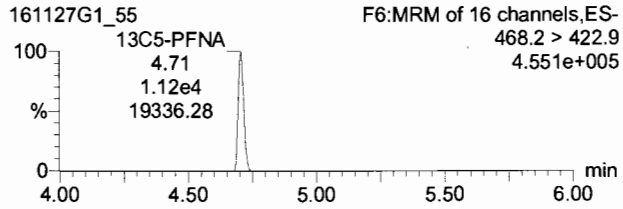
PFDA



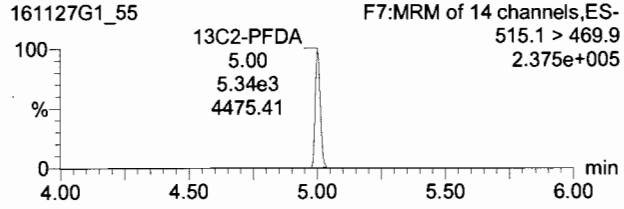
13C8-PFOS



13C5-PFNA



13C2-PFDA



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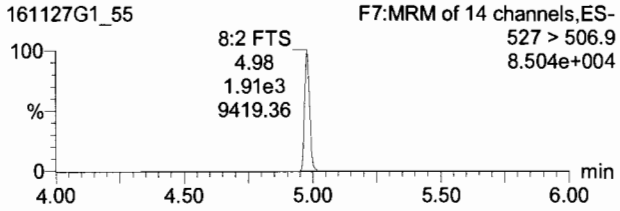
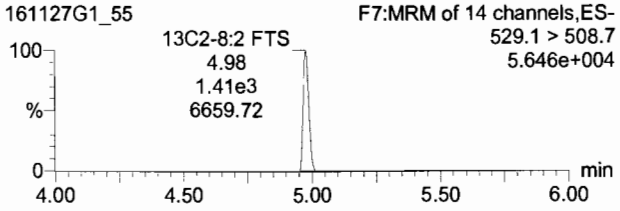
Printed: Monday, November 28, 2016 08:46:06 Pacific Standard Time

Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

8:2 FTS



13C2-8:2 FTS



Dataset: Untitled

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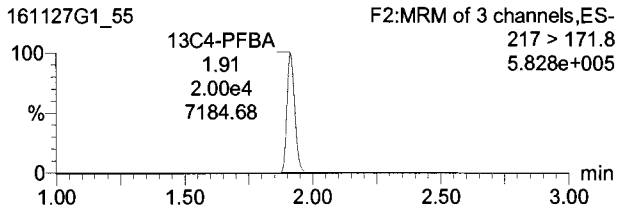
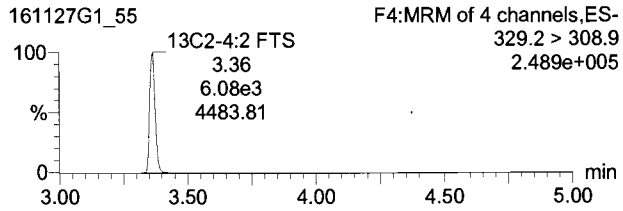
Name: 161127G1_55, Date: 28-Nov-2016, Time: 00:47:08, ID: ST161127G1-4 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

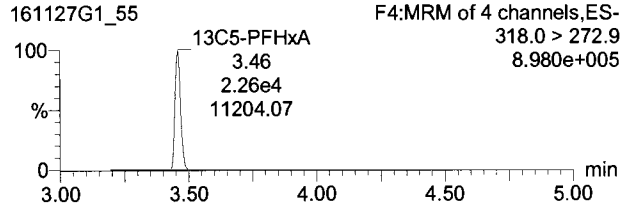
13C4-PFBA



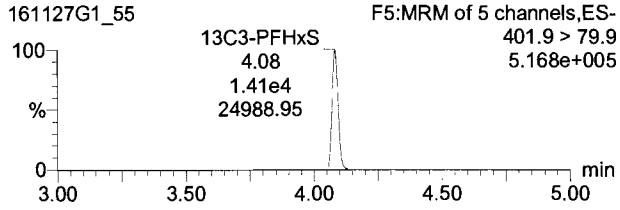
13C2-4:2 FTS



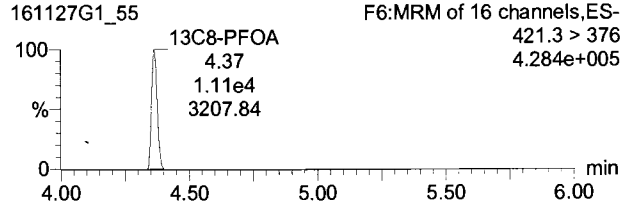
13C5-PFHxA



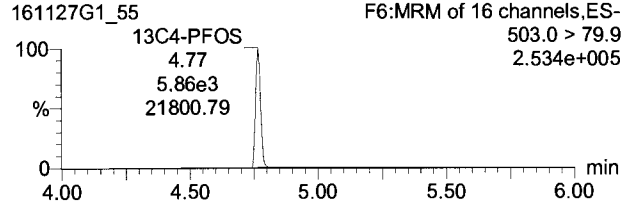
13C3-PFHxS



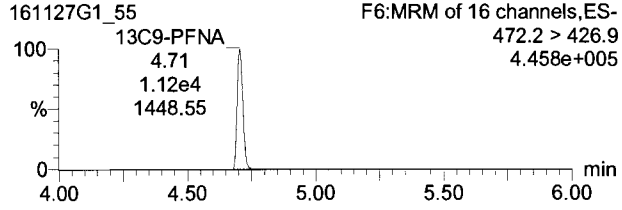
13C8-PFOA



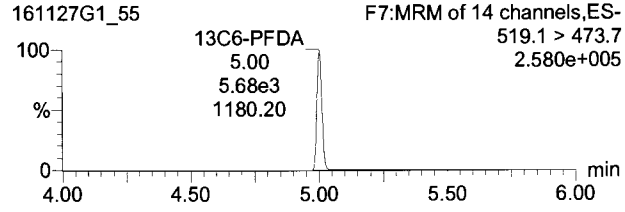
13C4-PFOS



13C9-PFNA



13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-2.qld

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Printed: Monday, November 28, 2016 14:10:53 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161128G1_2, Date: 28-Nov-2016, Time: 09:06:57, ID: ST161128G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec	
1	1	PFBA	213.1 > 168.8	2.05e4	2.15e4		1.000	1.94	24.2	96.9	75-125
2	2	PFPeA	263.1 > 218.9	1.83e4	9.71e3		1.000	2.86	23.6	94.6	
3	3	PFBS	299 > 79.7	2.33e4	6.37e3		1.000	3.11	25.6	102.6	
4	4	PFHxA	313.2 > 268.9	1.51e4	5.03e3		1.000	3.48	25.1	100.5	
5	5	PFHpA	363 > 318.9	4.45e4	1.41e4		1.000	3.98	25.5	102.1	
6	6	PFHxS	398.9 > 79.6	2.14e4	5.93e3		1.000	4.09	26.2	104.8	
7	7	6:2 FTS	427.1 > 407	5.20e3	4.30e3		1.000	4.33	33.2	(A) 132.9	
8	8	PFOA	413 > 368.7	4.99e4	2.61e4		1.000	4.37	26.5	105.8	
9	9	PFHpS	449 > 98.7	5.15e3	2.61e4		1.000	4.46	27.0	108.1	
10	10	PFOS	499 >79.9	1.32e4	9.10e3		1.000	4.77	21.9	87.5	
11	11	PFNA	463 > 418.8	4.02e4	1.20e4		1.000	4.71	25.7	102.6	
12	12	PFDA	513 > 468.8	7.46e3	9.32e3		1.000	5.01	16.8	(A) 67.2	
13	13	8:2 FTS	527 > 506.9	2.93e3	3.14e3		1.000	4.99	23.8	95.2	
14	14	13C3-PFBA	216.1 > 171.8	2.15e4	1.66e4	1.205	1.000	1.94	13.5	107.7	60-150
15	15	13C3-PFPeA	266>221.8	9.71e3	2.03e4	0.448	1.000	2.86	13.4	107.2	
16	16	13C3-PFBS	302.0 > 98.8	6.37e3	2.03e4	0.302	1.000	3.10	13.0	104.1	
17	17	13C2-PFHxA	315 > 269.8	5.03e3	2.03e4	0.620	1.000	3.48	5.01	100.2	
18	18	13C4-PFHpA	367.2 > 321.8	1.41e4	1.34e4	1.139	1.000	3.98	11.6	92.5	
19	19	18O2-PFHxS	403 > 102.6	5.93e3	1.34e4	0.449	1.000	4.09	12.3	98.6	
20	20	13C2-6:2 FTS	429.1 > 408.9	4.30e3	5.16e3	1.073	1.000	4.33	9.70	77.6	40-150
21	21	13C2-PFOA	414.9 > 369.7	2.61e4	9.60e3	2.262	1.000	4.37	15.0	120.2	60-150
22	22	13C8-PFOS	507.0 > 79.9	9.10e3	7.82e3	0.944	1.000	4.77	15.4	123.2	
23	23	13C5-PFNA	468.2 > 422.9	1.20e4	1.15e4	1.082	1.000	4.71	12.1	96.8	50-150
24	24	13C2-PFDA	515.1 > 469.9	9.32e3	8.79e3	1.019	1.000	5.01	13.0	104.1	60-150
25	25	13C2-8:2 FTS	529.1 > 508.7	3.14e3	5.16e3	0.569	1.000	4.99	13.4	106.9	40-150
26	26	13C4-PFBA	217 > 171.8	1.66e4	1.66e4	1.000	1.000	1.94	12.5	100.0	
27	27	13C2-4:2 FTS	329.2 > 308.9	5.16e3	5.16e3	1.000	1.000	3.38	12.5	100.0	
28	28	13C5-PFHxA	318.0 > 272.9	2.03e4	2.03e4	1.000	1.000	3.48	12.5	100.0	
29	29	13C3-PFHxS	401.9 > 79.9	1.34e4	1.34e4	1.000	1.000	4.09	12.5	100.0	
30	30	13C8-PFOA	421.3 > 376	9.60e3	9.60e3	1.000	1.000	4.37	12.5	100.0	
31	31	13C4-PFOS	503.0 > 79.9	7.82e3	7.82e3	1.000	1.000	4.77	12.5	100.0	

(A) Not used for 6:2 FTS or PFDA.

AC 11/28/16

AMSC 11/29/16

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161128G1\161128G1-2.qld

Last Altered: Monday, November 28, 2016 14:09:35 Pacific Standard Time
Printed: Monday, November 28, 2016 14:10:53 Pacific Standard Time

Name: 161128G1_2, Date: 28-Nov-2016, Time: 09:06:57, ID: ST161128G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32	13C9-PFNA	472.2 > 426.9	1.15e4	1.15e4	1.000	1.000	4.71	12.5	100.0
33	33	13C6-PFDA	519.1 > 473.7	8.79e3	8.79e3	1.000	1.000	5.01	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Tuesday, November 29, 2016 07:55:03 Pacific Standard Time
Printed: Tuesday, November 29, 2016 07:55:40 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161128G1_1	IPA	28-Nov-16	08:54:20
2	161128G1_2	ST161128G1-1 PFC CS3.5 16K2701	28-Nov-16	09:06:57
3	161128G1_3	IPA	28-Nov-16	09:19:33
4	161128G1_4	B6K0165-BS1 OPR 0.125	28-Nov-16	09:32:10
5	161128G1_5	IPA	28-Nov-16	09:44:45
6	161128G1_6	B6K0165-BLK1 Method Blank 0.125	28-Nov-16	09:57:24
7	161128G1_7	1601433-16@5X WURTS-VAS11022-27-30 0....	28-Nov-16	10:10:00
8	161128G1_8	1601451-09@5X OUAI-MW08-20161114 0.12...	28-Nov-16	10:22:38
9	161128G1_9	1601461-09 OUAI-MW25-20161115 0.11991	28-Nov-16	10:35:17
10	161128G1_10	1601461-10 OUAI-MW11-20161115 0.1289	28-Nov-16	10:47:53
11	161128G1_11	1601460-01 Outfall-5 (420-113272-1) 0.125	28-Nov-16	11:00:31
12	161128G1_12	1601460-02 Outfall-4 (420-113272-2) 0.125	28-Nov-16	11:13:09
13	161128G1_13	1601460-03 Outfall-7 (420-113272-4) 0.125	28-Nov-16	11:25:46
14	161128G1_14	1601460-04 Outfall-6 (420-113272-5) 0.125	28-Nov-16	11:38:24
15	161128G1_15	1601460-05 Outfall-9A (420-113272-6) 0.125	28-Nov-16	11:51:02
16	161128G1_16	1601460-06 Outfall-9B (420-113272-7) 0.125	28-Nov-16	12:03:41
17	161128G1_17	IPA	28-Nov-16	12:16:16
18	161128G1_18	ST161128G1-2 PFC CS3.5 16K2701	28-Nov-16	12:28:54
19	161128G1_19	IPA	28-Nov-16	12:41:29

LC Calibration Standards Review Checklist Q1

			ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manaul Integrations	N/A
Calibration ID:	ST161128G1-1	L [✓ M] H	N/A	☑	☑	☑	☑	☑	☐
Calibration ID:	↓ -2	L [✓ M] H	☑	☑	☑	☑	☑	☑	☑
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:		L M H	☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 11/21/16

Comments:

Reviewed By: AMGC 11/29/16
Initials/Date

Vista Analytical Laboratory Q1

Dataset: Untitled

Last Altered: Monday, November 28, 2016 13:58:40 Pacific Standard Time
Printed: Monday, November 28, 2016 13:59:40 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161128G1_2, Date: 28-Nov-2016, Time: 09:06:57, ID: ST161128G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

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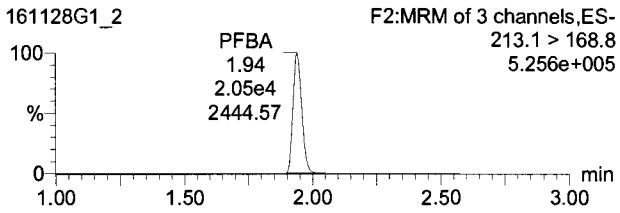
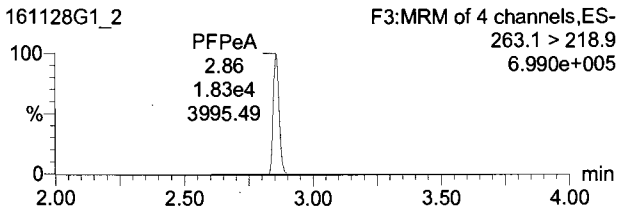
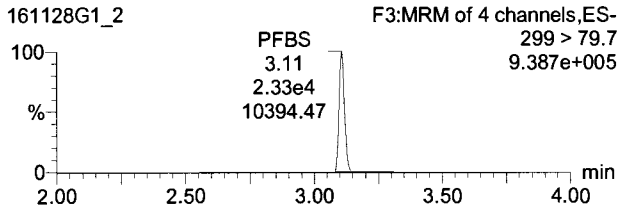


PFPeA



PFBS



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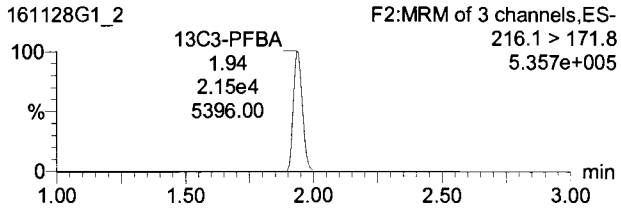

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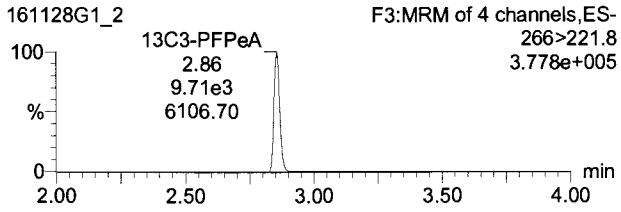

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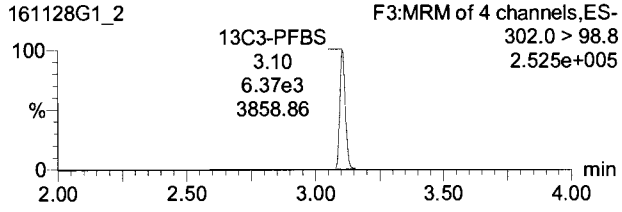

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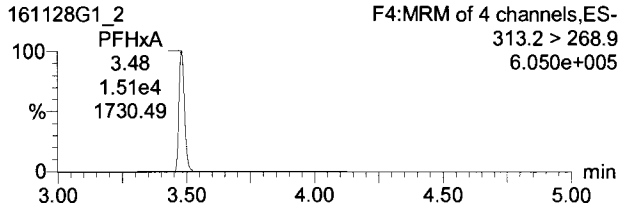
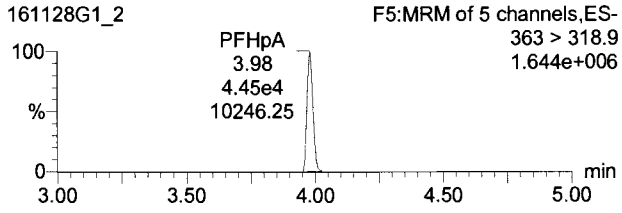
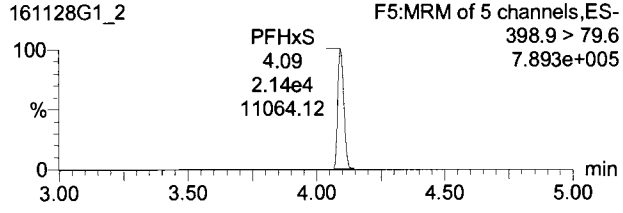


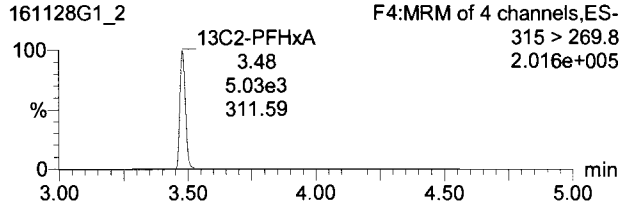
PFHpA



PFHxS



13C2-PFHxA



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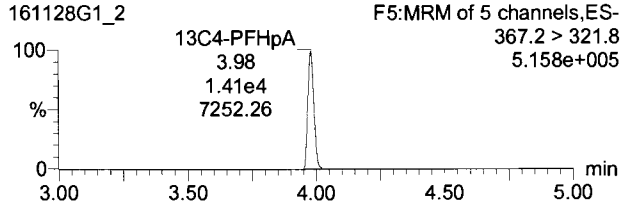
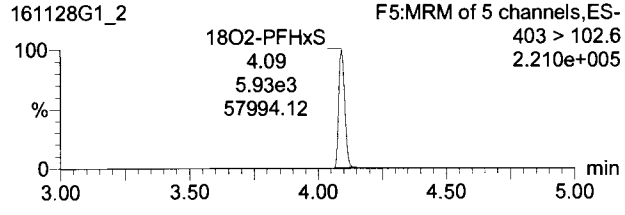


18O2-PFHxS



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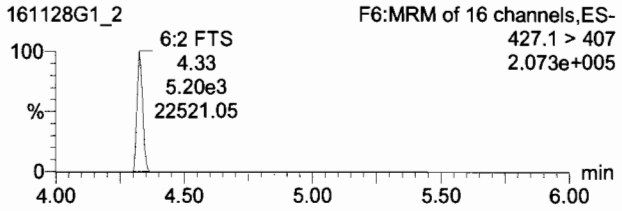
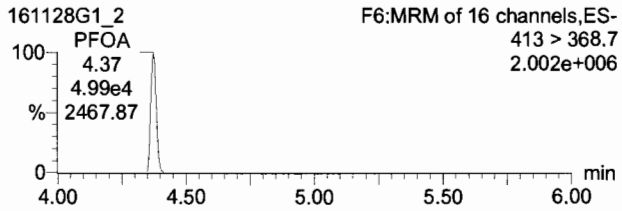
Printed: Monday, November 28, 2016 13:59:40 Pacific Standard Time

Name: 161128G1_2, Date: 28-Nov-2016, Time: 09:06:57, ID: ST161128G1-1 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

6:2 FTS



PFOA



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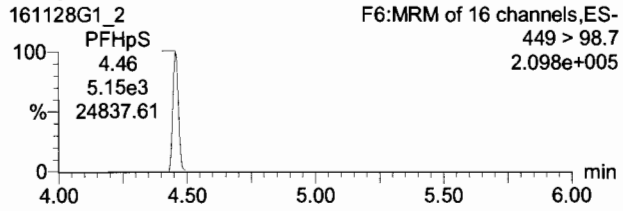
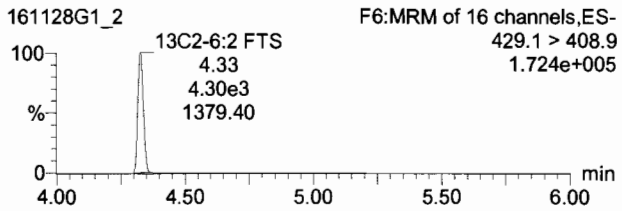


13C2-6:2 FTS



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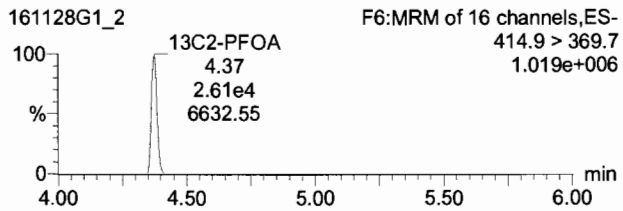

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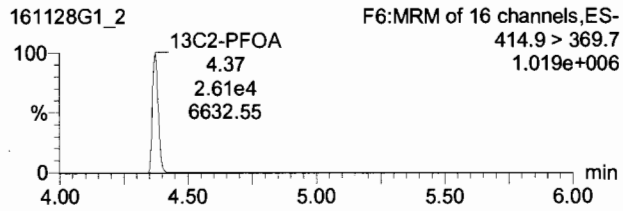
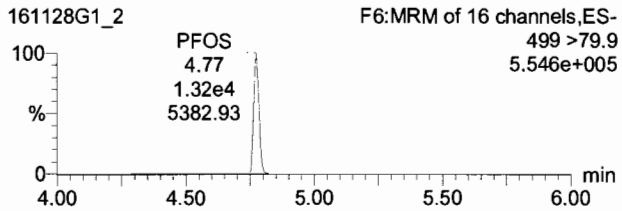


PFOS



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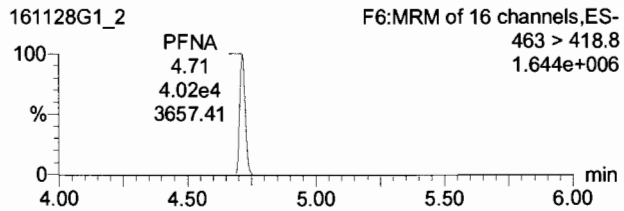

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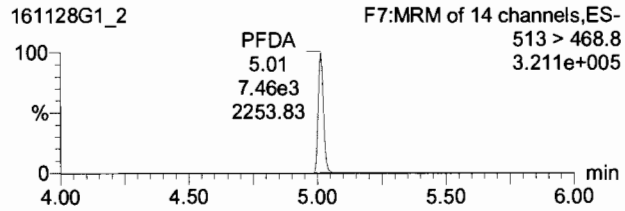

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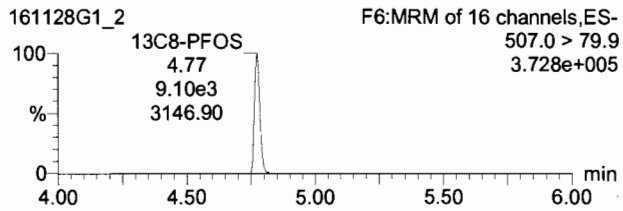

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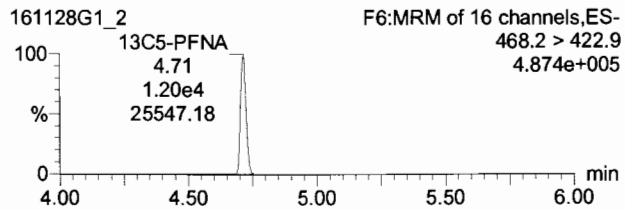

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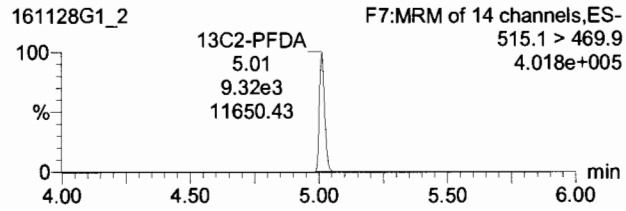

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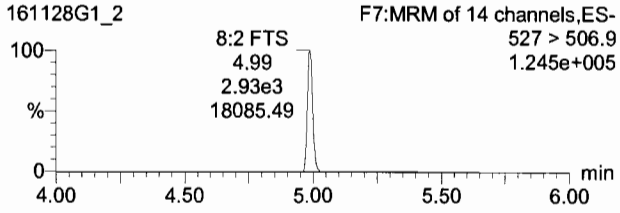
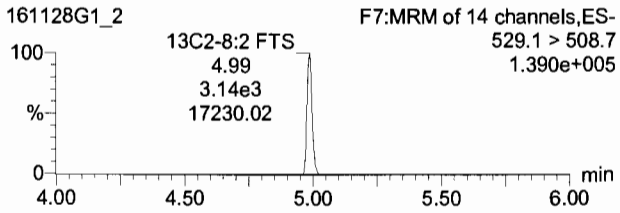
8:2 FTS



13C2-8:2 FTS



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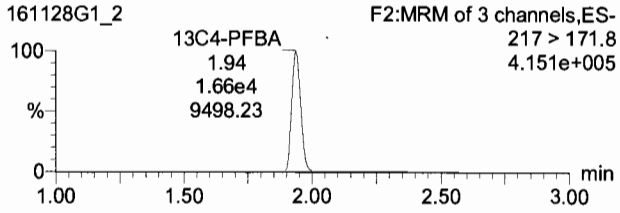

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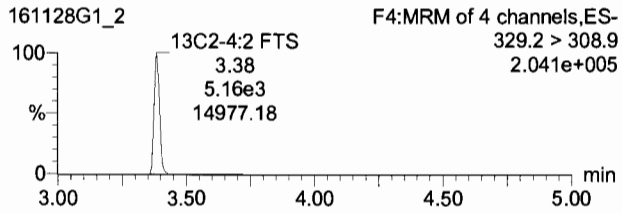

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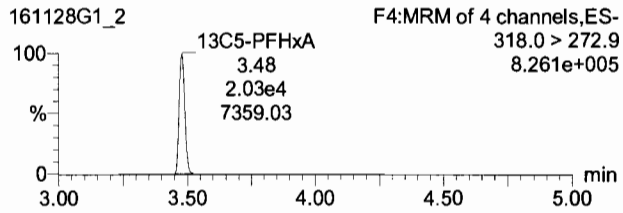

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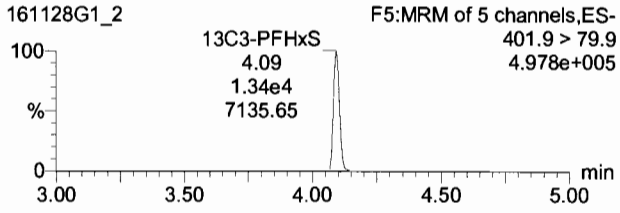

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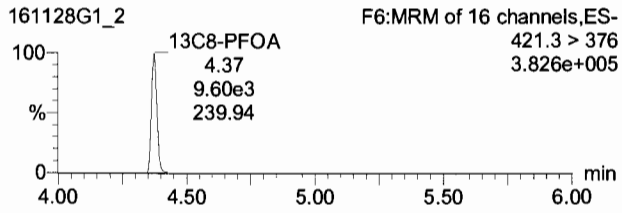

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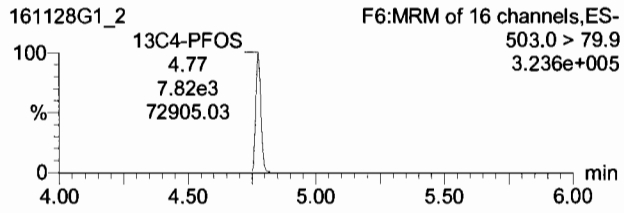

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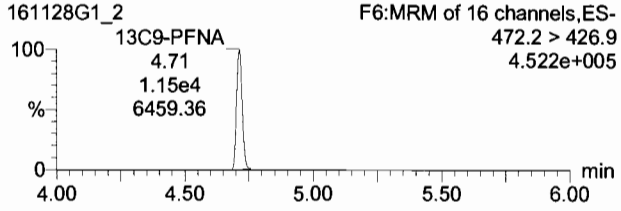

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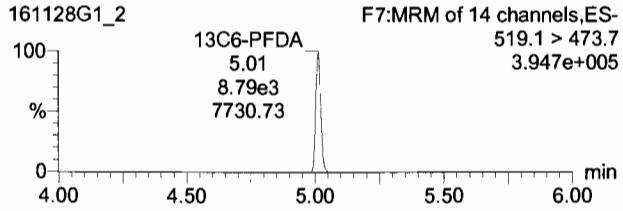

Quantify Sample Summary Report **MassLynx 4.1**
Vista Analytical Laboratory Q1

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Printed: Monday, November 28, 2016 14:05:16 Pacific Standard Time

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	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1	PFBA	213.1 > 168.8	1.96e4	2.03e4		1.000	1.95	24.6	98.6
2	2	PFPeA	263.1 > 218.9	1.75e4	8.38e3		1.000	2.86	26.1	104.4
3	3	PFBS	299 > 79.7	2.34e4	6.31e3		1.000	3.11	26.0	104.0
4	4	PFHxA	313.2 > 268.9	1.51e4	4.38e3		1.000	3.48	28.8	115.1
5	5	PFHpA	363 > 318.9	4.54e4	1.46e4		1.000	3.99	25.1	100.4
6	6	PFHxS	398.9 > 79.6	2.07e4	6.06e3		1.000	4.10	24.8	99.2
7	7	6:2 FTS	427.1 > 407	5.86e3	5.18e3		1.000	4.33	31.2	124.8
8	8	PFOA	413 > 368.7	4.86e4	2.57e4		1.000	4.38	26.2	104.7
9	9	PFHpS	449 > 98.7	4.91e3	2.57e4		1.000	4.46	26.1	104.6
10	10	PFOS	499 >79.9	1.15e4	8.98e3		1.000	4.77	19.4	77.7
11	11	PFNA	463 > 418.8	3.80e4	1.32e4		1.000	4.71	22.0	87.9
12	12	PFDA	513 > 468.8	9.07e3	7.56e3		1.000	5.01	25.2	100.8
13	13	8:2 FTS	527 > 506.9	3.14e3	2.64e3		1.000	4.99	30.4	121.6
14	14	13C3-PFBA	216.1 > 171.8	2.03e4	1.61e4	1.205	1.000	1.95	13.0	104.4
15	15	13C3-PFPeA	266>221.8	8.38e3	1.85e4	0.448	1.000	2.86	12.6	101.0
16	16	13C3-PFBS	302.0 > 98.8	6.31e3	1.85e4	0.302	1.000	3.11	14.1	112.7
17	17	13C2-PFHxA	315 > 269.8	4.38e3	1.85e4	0.620	1.000	3.48	4.76	95.3
18	18	13C4-PFHpA	367.2 > 321.8	1.46e4	1.33e4	1.139	1.000	3.98	12.1	96.9
19	19	18O2-PFHxS	403 > 102.6	6.06e3	1.33e4	0.449	1.000	4.09	12.7	101.7
20	20	13C2-6:2 FTS	429.1 > 408.9	5.18e3	5.16e3	1.073	1.000	4.33	11.7	93.6
21	21	13C2-PFOA	414.9 > 369.7	2.57e4	1.22e4	2.262	1.000	4.38	11.7	93.5
22	22	13C8-PFOS	507.0 > 79.9	8.98e3	7.71e3	0.944	1.000	4.77	15.4	123.3
23	23	13C5-PFNA	468.2 > 422.9	1.32e4	1.25e4	1.082	1.000	4.71	12.3	98.0
24	24	13C2-PFDA	515.1 > 469.9	7.56e3	9.70e3	1.019	1.000	5.01	9.56	76.4
25	25	13C2-8:2 FTS	529.1 > 508.7	2.64e3	5.16e3	0.569	1.000	4.99	11.3	90.1
26	26	13C4-PFBA	217 > 171.8	1.61e4	1.61e4	1.000	1.000	1.94	12.5	100.0
27	27	13C2-4:2 FTS	329.2 > 308.9	5.16e3	5.16e3	1.000	1.000	3.38	12.5	100.0
28	28	13C5-PFHxA	318.0 > 272.9	1.85e4	1.85e4	1.000	1.000	3.48	12.5	100.0
29	29	13C3-PFHxS	401.9 > 79.9	1.33e4	1.33e4	1.000	1.000	4.09	12.5	100.0
30	30	13C8-PFOA	421.3 > 376	1.22e4	1.22e4	1.000	1.000	4.38	12.5	100.0
31	31	13C4-PFOS	503.0 > 79.9	7.71e3	7.71e3	1.000	1.000	4.77	12.5	100.0

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

AC 11/28/16
AMS C 11/29/16

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Printed: Monday, November 28, 2016 14:05:16 Pacific Standard Time

Name: 161128G1_18, Date: 28-Nov-2016, Time: 12:28:54, ID: ST161128G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32	13C9-PFNA	472.2 > 426.9	1.25e4	1.25e4	1.000	1.000	4.71	12.5	100.0
33	33	13C6-PFDA	519.1 > 473.7	9.70e3	9.70e3	1.000	1.000	5.01	12.5	100.0

Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Tuesday, November 29, 2016 07:55:03 Pacific Standard Time
Printed: Tuesday, November 29, 2016 07:55:40 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 28 Nov 2016 07:43:22
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161128G1_1	IPA	28-Nov-16	08:54:20
2	161128G1_2	ST161128G1-1 PFC CS3.5 16K2701	28-Nov-16	09:06:57
3	161128G1_3	IPA	28-Nov-16	09:19:33
4	161128G1_4	B6K0165-BS1 OPR 0.125	28-Nov-16	09:32:10
5	161128G1_5	IPA	28-Nov-16	09:44:45
6	161128G1_6	B6K0165-BLK1 Method Blank 0.125	28-Nov-16	09:57:24
7	161128G1_7	1601433-16@5X WURTS-VAS11022-27-30 0....	28-Nov-16	10:10:00
8	161128G1_8	1601451-09@5X OUAI-MW08-20161114 0.12...	28-Nov-16	10:22:38
9	161128G1_9	1601461-09 OUAI-MW25-20161115 0.11991	28-Nov-16	10:35:17
10	161128G1_10	1601461-10 OUAI-MW11-20161115 0.1289	28-Nov-16	10:47:53
11	161128G1_11	1601460-01 Outfall-5 (420-113272-1) 0.125	28-Nov-16	11:00:31
12	161128G1_12	1601460-02 Outfall-4 (420-113272-2) 0.125	28-Nov-16	11:13:09
13	161128G1_13	1601460-03 Outfall-7 (420-113272-4) 0.125	28-Nov-16	11:25:46
14	161128G1_14	1601460-04 Outfall-6 (420-113272-5) 0.125	28-Nov-16	11:38:24
15	161128G1_15	1601460-05 Outfall-9A (420-113272-6) 0.125	28-Nov-16	11:51:02
16	161128G1_16	1601460-06 Outfall-9B (420-113272-7) 0.125	28-Nov-16	12:03:41
17	161128G1_17	IPA	28-Nov-16	12:16:16
18	161128G1_18	ST161128G1-2 PFC CS3.5 16K2701	28-Nov-16	12:28:54
19	161128G1_19	IPA	28-Nov-16	12:41:29

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Last Altered: Monday, November 28, 2016 14:00:45 Pacific Standard Time
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Name: 161128G1_18, Date: 28-Nov-2016, Time: 12:28:54, ID: ST161128G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

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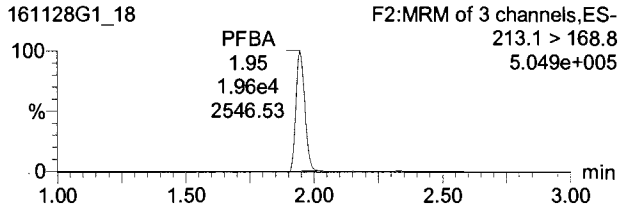

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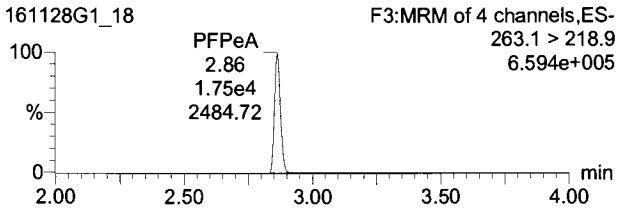

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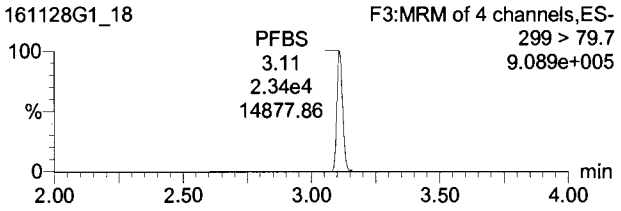

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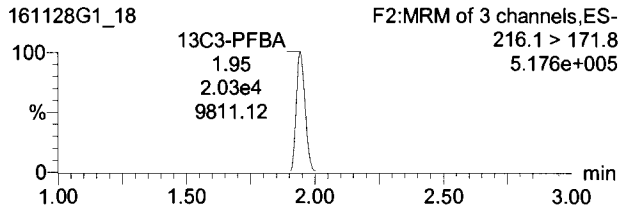

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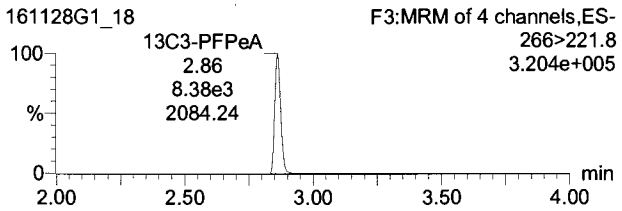

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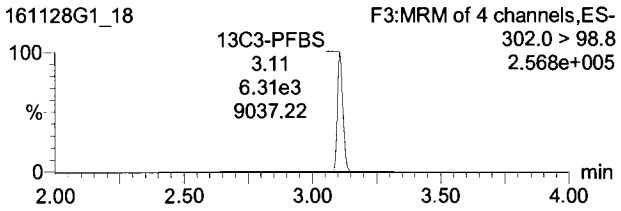

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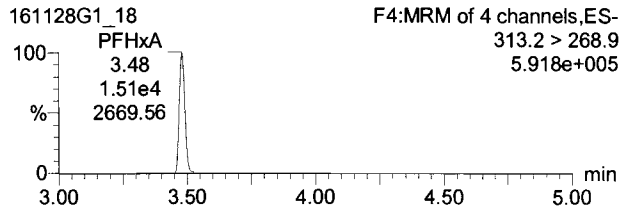
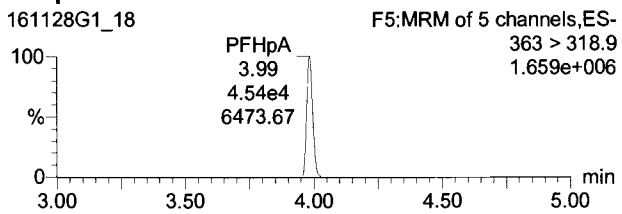


PFHpA



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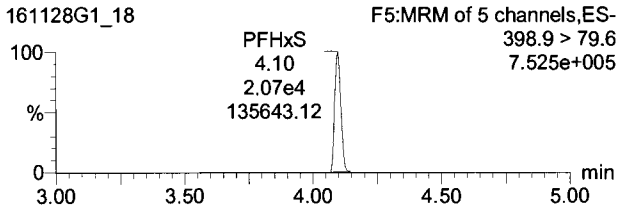

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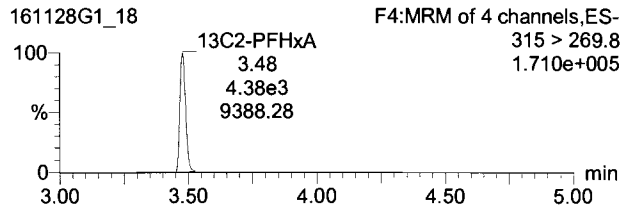
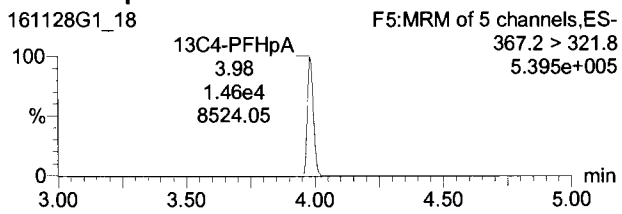
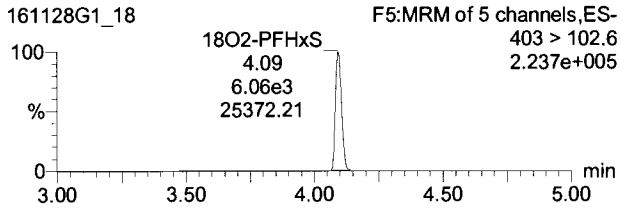


13C4-PFHpA



18O2-PFHxS



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Last Altered: Monday, November 28, 2016 14:00:45 Pacific Standard Time
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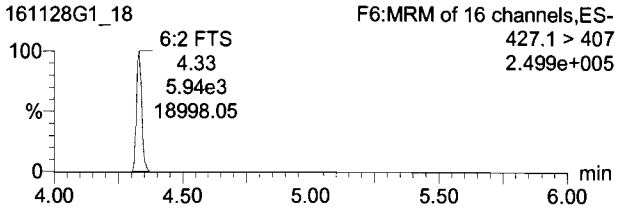
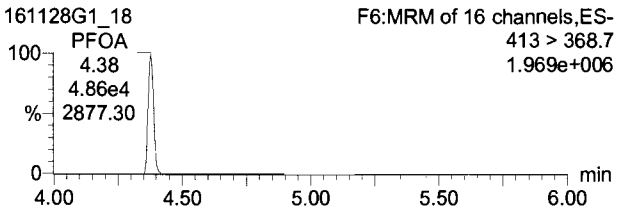
Name: 161128G1_18, Date: 28-Nov-2016, Time: 12:28:54, ID: ST161128G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

6:2 FTS



PFOA



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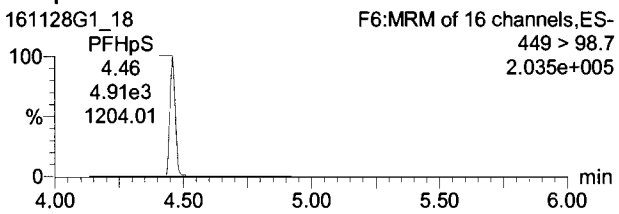

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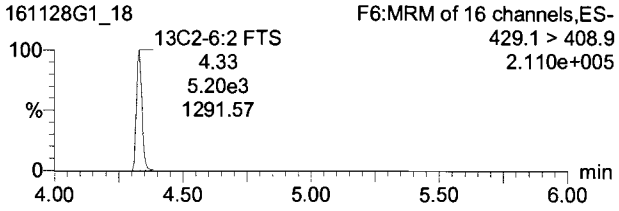

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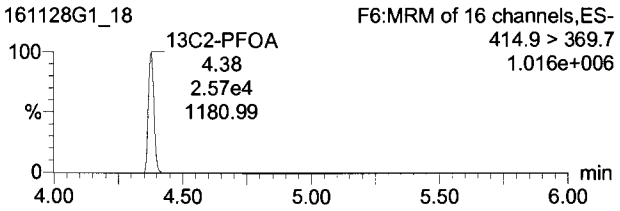

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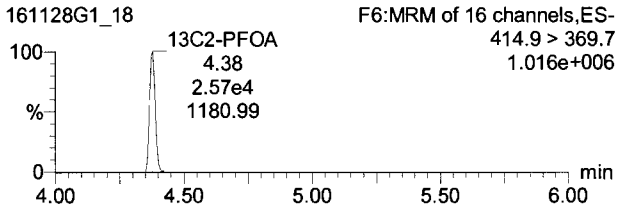

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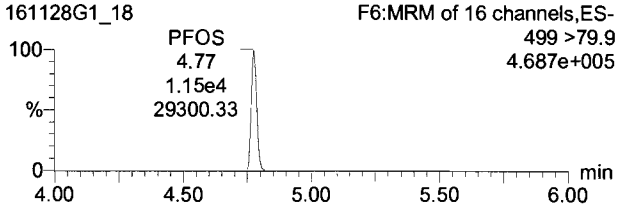

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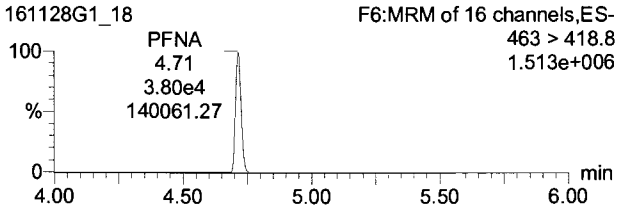

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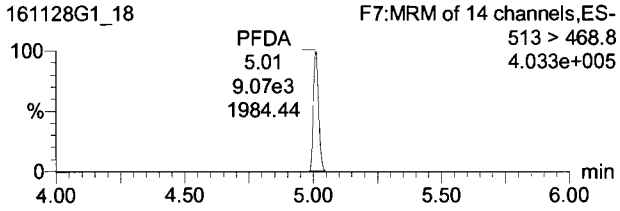
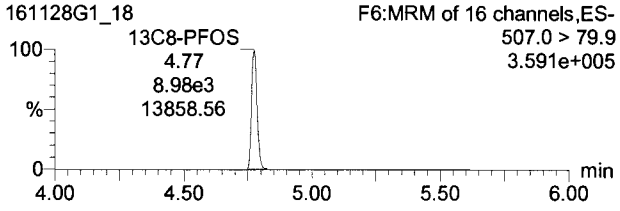


13C8-PFOS



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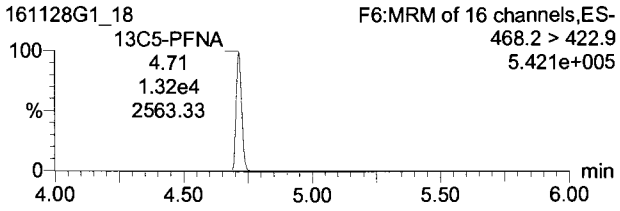

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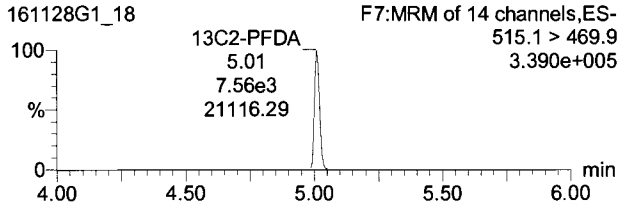

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File Edit View Display Processing Window Help

161128G1_18 - ST161128G1-2 PFC CS3.5 16K2701 - PFC CS3.5 16K2701 A

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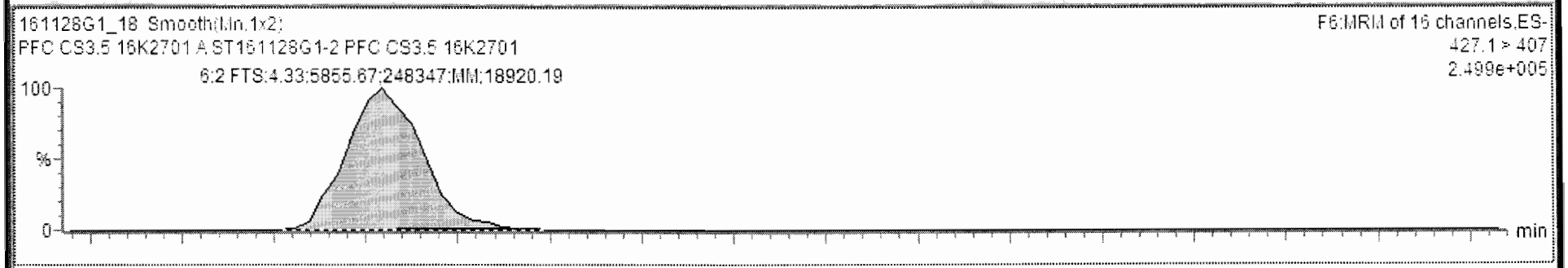
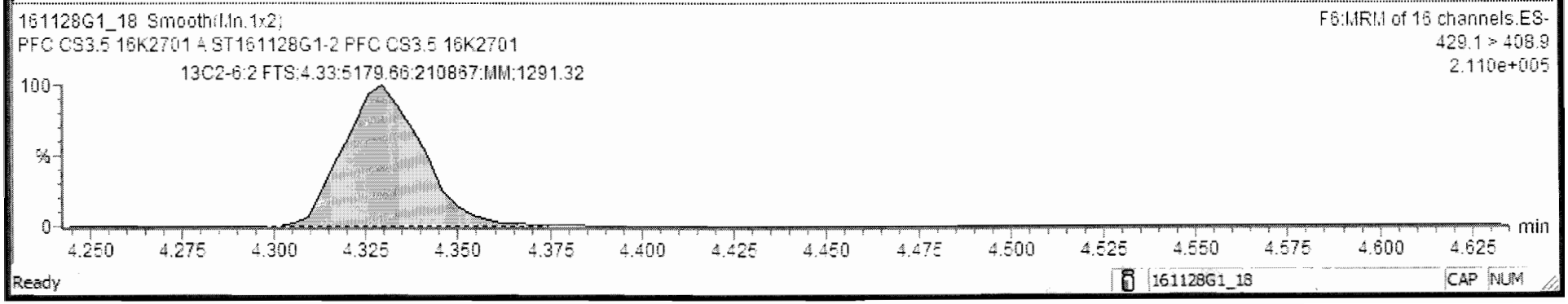
1	PFBA	213.1 > 168.8	1.96e4	12.106	0.484	1.000	1.95	24.6	98.6	0.1075564		0.9984
2	PFPeA	263.1 > 218.9	1.75e4	26.054	1.042	1.000	2.88	26.1	104.4	0.1455074		0.9987
3	PFBS	299 > 79.7	2.34e4	46.440	1.858	1.000	3.11	26.0	104.0	0.0854324		0.9986
4	PFHxA	313.2 > 268.9	1.51e4	17.237	0.689	1.000	3.48	28.8	115.1	0.0111786		0.9985
5	PFHpA	363 > 318.9	4.54e4	38.826	1.553	1.000	3.99	25.1	100.4	0.0966956		0.9993
6	PFHxS	398.9 > 79.6	2.07e4	42.661	1.706	1.000	4.10	24.8	99.2	0.0159222		0.9975
7	6:2 FTS	427.1 > 407	5.88e3	14.131	0.565	1.000	4.33	31.2	124.8	0.2820661		0.9789
8	PFOA	413 > 368.7	4.86e4	23.640	0.946	1.000	4.38	26.2	104.7	0.0000000		0.9990
9	PFHpS	449 > 98.7	4.91e3	2.387	0.095	1.000	4.46	26.1	104.6	0.3042877		0.9956
10	PFOS	499 >79.9	1.15e4	16.044	0.642	1.000	4.77	19.4	77.7	0.2004210		0.9935
11	PFNA	463 > 418.8	3.80e4	35.895	1.436	1.000	4.71	22.0	87.9	0.1043076		0.9954
12	PFDA	513 > 468.8	9.07e3	15.009	0.600	1.000	5.01	25.2	100.8	0.0649822		0.9973
13	8:2 FTS	527 > 508.9	3.14e3	14.826	0.593	1.000	4.99	30.4	121.6	0.0000000		0.9841





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Last Altered: Monday, November 28, 2016 14:00:45 Pacific Standard Time
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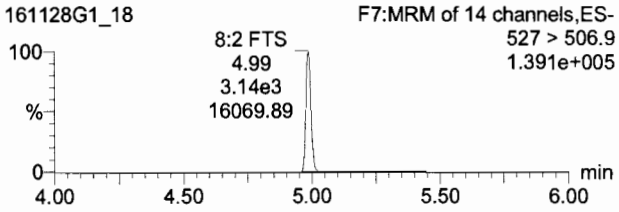
Name: 161128G1_18, Date: 28-Nov-2016, Time: 12:28:54, ID: ST161128G1-2 PFC CS3.5 16K2701, Description: PFC CS3.5 16K2701 A

8:2 FTS



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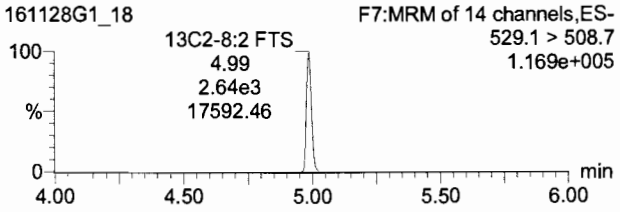

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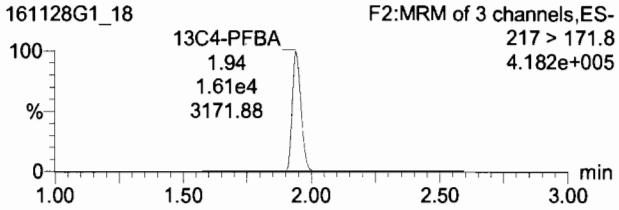
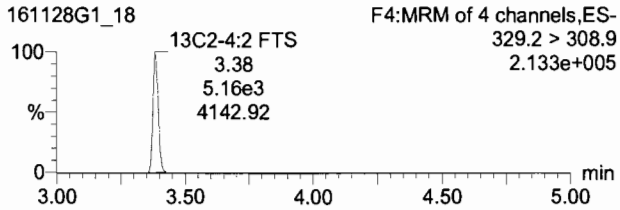
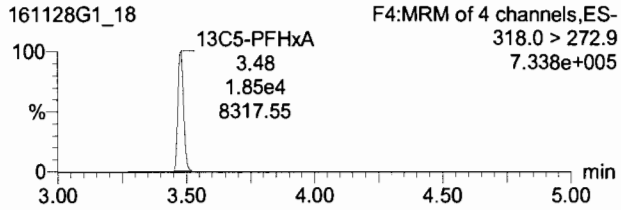


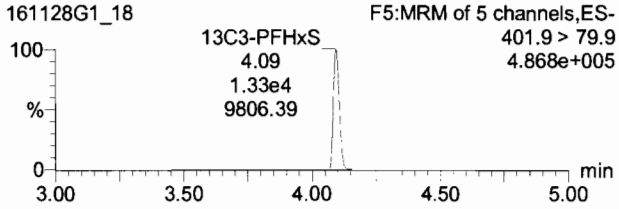
13C2-4:2 FTS



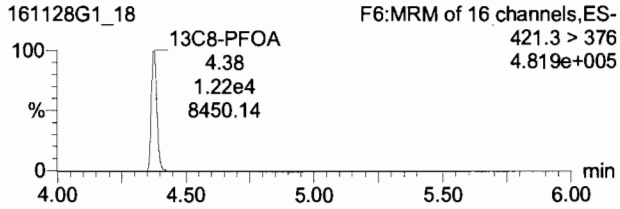
13C5-PFHxA



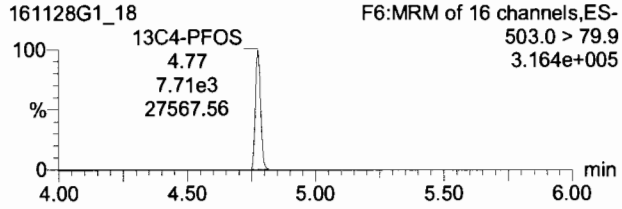
13C3-PFHxS



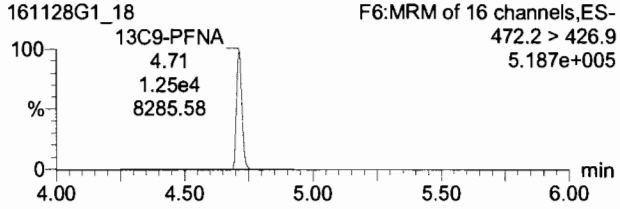
13C8-PFOA



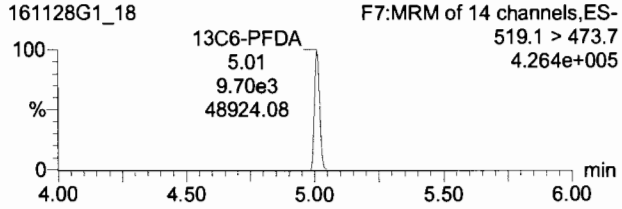
13C4-PFOS



13C9-PFNA



13C6-PFDA



INITIAL CALIBRATION

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
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Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 22 Nov 2016 14:48:05
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA
Correlation coefficient: r = 0.999216, r^2 = 0.998432
Calibration curve: 0.492927 * x + -0.0410615
Response type: Internal Std (Ref 14), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	1.93	4.29e2	2.07e4	0.608	0.518	21.7
2	2 161122G2_3	1.00	1.93	7.79e2	2.25e4	0.959	0.432	-4.1
3	3 161122G2_4	2.00	1.93	1.63e3	2.32e4	1.86	0.439	-6.8
4	4 161122G2_5	5.00	1.93	3.55e3	2.31e4	3.97	0.383	-20.6
5	5 161122G2_6	10.0	1.93	8.96e3	2.17e4	10.6	0.516	5.6
6	6 161122G2_7	25.0	1.93	1.94e4	1.87e4	26.4	0.519	5.5
7	7 161122G2_8	50.0	1.93	3.75e4	1.90e4	50.0	0.492	0.0
8	8 161122G2_9	75.0	1.93	5.74e4	1.98e4	73.5	0.482	-2.0
9	9 161122G2_10	100	1.93	7.24e4	1.83e4	101	0.496	0.7

AC
11/22/16

CS 4.5 & 5 excluded from 6:2FTS regression.

Compound name: PFPeA
Correlation coefficient: r = 0.999341, r^2 = 0.998683
Calibration curve: 1.00273 * x + -0.119981
Response type: Internal Std (Ref 15), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	2.85	3.66e2	9.28e3	0.611	0.986	22.2
2	2 161122G2_3	1.00	2.85	6.80e2	9.67e3	0.996	0.879	-0.4
3	3 161122G2_4	2.00	2.86	1.32e3	9.90e3	1.79	0.836	-10.6
4	4 161122G2_5	5.00	2.85	3.20e3	1.02e4	4.02	0.782	-19.6
5	5 161122G2_6	10.0	2.85	8.05e3	9.55e3	10.6	1.05	6.4
6	6 161122G2_7	25.0	2.85	1.68e4	8.18e3	25.7	1.03	2.7
7	7 161122G2_8	50.0	2.85	3.26e4	8.27e3	49.3	0.986	-1.5
8	8 161122G2_9	75.0	2.85	4.96e4	8.14e3	76.0	1.01	1.4
9	9 161122G2_10	100	2.85	5.76e4	7.23e3	99.5	0.996	-0.5

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

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Compound name: PFBS
Correlation coefficient: r = 0.999283, r^2 = 0.998566
Calibration curve: 1.79216 * x + -0.145672
Response type: Internal Std (Ref 16), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	3.10	4.84e2	6.26e3	0.620	1.93	24.1
2	2 161122G2_3	1.00	3.10	8.53e2	6.27e3	1.03	1.70	3.1
3	3 161122G2_4	2.00	3.10	1.59e3	6.78e3	1.72	1.47	-14.0
4	4 161122G2_5	5.00	3.10	4.15e3	7.36e3	4.01	1.41	-19.7
5	5 161122G2_6	10.0	3.10	9.73e3	6.40e3	10.7	1.90	7.0
6	6 161122G2_7	25.0	3.10	2.06e4	5.76e3	25.0	1.79	-0.1
7	7 161122G2_8	50.0	3.10	3.75e4	5.35e3	48.9	1.75	-2.2
8	8 161122G2_9	75.0	3.10	5.77e4	5.29e3	76.2	1.82	1.6
9	9 161122G2_10	100	3.10	7.03e4	4.89e3	100	1.80	0.4

Compound name: PFHxA
Correlation coefficient: r = 0.999245, r^2 = 0.998491
Calibration curve: 0.598427 * x + 0.0095449
Response type: Internal Std (Ref 17), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	3.47	3.91e2	5.21e3	0.612	0.751	22.3
2	2 161122G2_3	1.00	3.47	6.55e2	5.44e3	0.989	0.602	-1.1
3	3 161122G2_4	2.00	3.47	1.13e3	5.54e3	1.69	0.512	-15.3
4	4 161122G2_5	5.00	3.47	2.82e3	5.55e3	4.23	0.508	-15.5
5	5 161122G2_6	10.0	3.47	6.63e3	5.30e3	10.4	0.625	4.3
6	6 161122G2_7	25.0	3.47	1.40e4	4.52e3	25.9	0.621	3.6
7	7 161122G2_8	50.0	3.47	2.69e4	4.31e3	52.1	0.624	4.2
8	8 161122G2_9	75.0	3.47	4.00e4	4.48e3	74.5	0.594	-0.7
9	9 161122G2_10	100	3.47	4.95e4	4.22e3	98.0	0.587	-2.0

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

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Compound name: PFHpA
Correlation coefficient: r = 0.999639, r^2 = 0.999279
Calibration curve: 1.55279 * x + -0.138431
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	3.98	9.73e2	1.51e4	0.608	1.61	21.5
2	2 161122G2_3	1.00	3.98	1.74e3	1.58e4	0.979	1.38	-2.1
3	3 161122G2_4	2.00	3.98	3.68e3	1.71e4	1.82	1.34	-9.2
4	4 161122G2_5	5.00	3.98	8.49e3	1.63e4	4.28	1.30	-14.3
5	5 161122G2_6	10.0	3.98	2.03e4	1.60e4	10.3	1.58	3.0
6	6 161122G2_7	25.0	3.98	4.48e4	1.42e4	25.4	1.57	1.7
7	7 161122G2_8	50.0	3.98	8.30e4	1.36e4	49.2	1.52	-1.7
8	8 161122G2_9	75.0	3.98	1.27e5	1.35e4	75.5	1.56	0.7
9	9 161122G2_10	100	3.98	1.54e5	1.23e4	100	1.56	0.4

Compound name: PFHxS
Correlation coefficient: r = 0.998761, r^2 = 0.997524
Calibration curve: 1.72095 * x + -0.0266266
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.09	4.64e2	6.01e3	0.576	1.93	15.3
2	2 161122G2_3	1.00	4.09	8.63e2	6.30e3	1.01	1.71	1.1
3	3 161122G2_4	2.00	4.09	1.70e3	7.02e3	1.78	1.51	-11.2
4	4 161122G2_5	5.00	4.09	3.79e3	6.33e3	4.36	1.49	-12.8
5	5 161122G2_6	10.0	4.09	8.81e3	6.15e3	10.4	1.79	4.1
6	6 161122G2_7	25.0	4.09	2.00e4	5.33e3	27.2	1.87	8.9
7	7 161122G2_8	50.0	4.09	3.53e4	5.46e3	47.1	1.62	-5.9
8	8 161122G2_9	75.0	4.09	5.41e4	5.36e3	73.4	1.68	-2.2
9	9 161122G2_10	100	4.09	7.00e4	4.95e3	103	1.77	2.7

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

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Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.978941
Calibration curve: 0.00135992 * x^2 + 0.414129 * x + -0.114975
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x^2, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.33	4.92e1	6.03e3	0.523	0.204	4.6
2	2 161122G2_3	1.00	4.33	1.34e2	6.29e3	0.919	0.267	-8.1
3	3 161122G2_4	2.00	4.33	3.55e2	6.05e3	2.03	0.366	1.7
4	4 161122G2_5	5.00	4.32	9.08e2	6.94e3	4.17	0.327	-16.6
5	5 161122G2_6	10.0	4.32	1.95e3	5.43e3	10.7	0.449	7.3
6	6 161122G2_7	25.0	4.32	5.91e3	5.54e3	29.6	0.534	18.5
7	7 161122G2_8	50.0	4.32	9.32e3	5.35e3	45.9	0.436	-8.1
8	8 161122G2_9	75.0	4.32	1.61e4	7.05e3	58.2	0.381	-22.5
9	9 161122G2_10	100	4.32	2.02e4	6.58e3	74.5	0.383	-25.5

Compound name: PFOA
Correlation coefficient: r = 0.999524, r^2 = 0.999048
Calibration curve: 0.899906 * x + 0.0917344
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.37	1.09e3	2.40e4	0.527	1.13	5.5
2	2 161122G2_3	1.00	4.37	2.24e3	2.87e4	0.983	0.976	-1.7
3	3 161122G2_4	2.00	4.37	4.08e3	2.79e4	1.93	0.915	-3.4
4	4 161122G2_5	5.00	4.37	9.24e3	2.85e4	4.40	0.811	-11.9
5	5 161122G2_6	10.0	4.37	2.04e4	2.60e4	10.8	0.982	8.1
6	6 161122G2_7	25.0	4.37	4.59e4	2.44e4	26.0	0.941	4.2
7	7 161122G2_8	50.0	4.37	8.53e4	2.35e4	50.3	0.908	0.7
8	8 161122G2_9	75.0	4.37	1.30e5	2.38e4	75.6	0.908	0.8
9	9 161122G2_10	100	4.37	1.53e5	2.17e4	97.9	0.882	-2.1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

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Compound name: PFHpS
Correlation coefficient: r = 0.997800, r^2 = 0.995604
Calibration curve: 0.0921515 * x + -0.0228444
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.45	5.82e1	2.40e4	0.577	0.0606	15.3
2	2 161122G2_3	1.00	4.45	1.24e2	2.87e4	0.834	0.0540	-16.6
3	3 161122G2_4	2.00	4.45	3.98e2	2.79e4	2.18	0.0892	9.2
4	4 161122G2_5	5.00	4.45	9.47e2	2.85e4	4.76	0.0832	-4.8
5	5 161122G2_6	10.0	4.45	1.65e3	2.60e4	8.86	0.0794	-11.4
6	6 161122G2_7	25.0	4.45	5.10e3	2.44e4	28.6	0.105	14.5
7	7 161122G2_8	50.0	4.45	8.06e3	2.35e4	46.8	0.0858	-6.4
8	8 161122G2_9	75.0	4.45	1.27e4	2.38e4	72.8	0.0891	-3.0
9	9 161122G2_10	100	4.45	1.64e4	2.17e4	103	0.0948	3.1

Compound name: PFOS
Correlation coefficient: r = 0.996761, r^2 = 0.993532
Calibration curve: 0.83439 * x + -0.165838
Response type: Internal Std (Ref 22), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.78	1.21e2	5.26e3	0.543	0.574	8.5
2	2 161122G2_3	1.00	4.77	3.67e2	7.35e3	0.947	0.624	-5.3
3	3 161122G2_4	2.00	4.77	8.56e2	8.95e3	1.63	0.598	-18.4
4	4 161122G2_5	5.00	4.77	2.17e3	6.87e3	4.93	0.790	-1.4
5	5 161122G2_6	10.0	4.77	4.69e3	7.23e3	9.90	0.810	-1.0
6	6 161122G2_7	25.0	4.77	1.42e4	6.95e3	30.8	1.02	23.3
7	7 161122G2_8	50.0	4.78	1.92e4	5.80e3	49.9	0.830	-0.1
8	8 161122G2_9	75.0	4.77	3.52e4	7.19e3	73.6	0.817	-1.8
9	9 161122G2_10	100	4.77	4.44e4	6.93e3	96.1	0.800	-3.9

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

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Compound name: PFNA
Correlation coefficient: r = 0.997674, r^2 = 0.995354
Calibration curve: 1.64181 * x + -0.17063
Response type: Internal Std (Ref 23), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	4.72	5.63e2	1.06e4	0.509	1.33	1.7
2	2 161122G2_3	1.00	4.71	1.61e3	1.33e4	1.02	1.51	2.5
3	3 161122G2_4	2.00	4.71	3.31e3	1.23e4	2.16	1.68	7.8
4	4 161122G2_5	5.00	4.71	7.19e3	1.28e4	4.37	1.40	-12.5
5	5 161122G2_6	10.0	4.71	1.72e4	1.33e4	10.0	1.63	0.1
6	6 161122G2_7	25.0	4.71	4.06e4	1.21e4	25.6	1.67	2.3
7	7 161122G2_8	50.0	4.71	6.88e4	1.04e4	50.5	1.65	1.0
8	8 161122G2_9	75.0	4.71	1.10e5	1.23e4	68.0	1.49	-9.3
9	9 161122G2_10	100	4.71	1.49e5	1.07e4	106	1.74	6.3

Compound name: PFDA
Correlation coefficient: r = 0.998669, r^2 = 0.997340
Calibration curve: 0.596457 * x + -0.0200723
Response type: Internal Std (Ref 24), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	0.500	5.01	1.30e2	6.01e3	0.486	0.540	-2.7
2	2 161122G2_3	1.00	5.01	3.72e2	8.51e3	0.949	0.546	-5.1
3	3 161122G2_4	2.00	5.01	8.65e2	8.73e3	2.11	0.620	5.6
4	4 161122G2_5	5.00	5.01	1.70e3	8.07e3	4.44	0.526	-11.1
5	5 161122G2_6	10.0	5.01	3.83e3	7.02e3	11.5	0.683	14.8
6	6 161122G2_7	25.0	5.01	1.25e4	1.01e4	26.1	0.622	4.4
7	7 161122G2_8	50.0	5.01	1.45e4	6.60e3	46.1	0.550	-7.7
8	8 161122G2_9	75.0	5.01	3.19e4	8.88e3	75.4	0.599	0.5
9	9 161122G2_10	100	5.01	4.34e4	8.96e3	101	0.605	1.5

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Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.984052
Calibration curve: -0.000479329 * x^2 + 0.502189 * x + 0.00235356
Response type: Internal Std (Ref 25), 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.	RRF	%Dev
1	1 161122G2_2	0.500	4.99	4.13e1	2.12e3	0.479	0.486	-4.1
2	2 161122G2_3	1.00	4.99	1.45e2	3.66e3	0.984	0.496	-1.6
3	3 161122G2_4	2.00	4.99	2.64e2	2.69e3	2.44	0.613	22.1
4	4 161122G2_5	5.00	4.99	4.56e2	2.74e3	4.16	0.416	-16.8
5	5 161122G2_6	10.0	4.99	1.14e3	3.15e3	9.07	0.452	-9.3
6	6 161122G2_7	25.0	4.99	4.23e3	3.62e3	29.9	0.584	19.7
7	7 161122G2_8	50.0	4.99	4.24e3	2.69e3	40.8	0.394	-18.4
8	8 161122G2_9	75.0	4.99	1.23e4	3.97e3	84.1	0.518	12.1
9	9 161122G2_10	100	4.99	1.62e4	4.58e3	96.8	0.441	-3.2

Compound name: 13C3-PFBA
Response Factor: 1.20506
RRF SD: 0.0553973, Relative SD: 4.59706
Response type: Internal Std (Ref 26), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	1.93	2.07e4	1.76e4	12.2	1.18	-2.2
2	2 161122G2_3	12.5	1.93	2.25e4	1.85e4	12.6	1.22	1.0
3	3 161122G2_4	12.5	1.93	2.32e4	1.80e4	13.4	1.29	7.0
4	4 161122G2_5	12.5	1.93	2.31e4	1.91e4	12.6	1.21	0.8
5	5 161122G2_6	12.5	1.93	2.17e4	1.69e4	13.3	1.29	6.8
6	6 161122G2_7	12.5	1.93	1.87e4	1.58e4	12.3	1.18	-2.0
7	7 161122G2_8	12.5	1.93	1.90e4	1.64e4	12.1	1.16	-3.6
8	8 161122G2_9	12.5	1.93	1.98e4	1.66e4	12.4	1.20	-0.7
9	9 161122G2_10	12.5	1.93	1.83e4	1.63e4	11.6	1.12	-7.1

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Compound name: 13C3-PFPeA
Response Factor: 0.447597
RRF SD: 0.0175301, Relative SD: 3.9165
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	2.85	9.28e3	2.07e4	12.5	0.448	0.1
2	2 161122G2_3	12.5	2.85	9.67e3	2.17e4	12.4	0.445	-0.6
3	3 161122G2_4	12.5	2.85	9.90e3	2.11e4	13.1	0.469	4.8
4	4 161122G2_5	12.5	2.85	1.02e4	2.20e4	13.0	0.466	4.1
5	5 161122G2_6	12.5	2.85	9.55e3	2.15e4	12.4	0.445	-0.6
6	6 161122G2_7	12.5	2.85	8.18e3	1.89e4	12.1	0.434	-3.1
7	7 161122G2_8	12.5	2.85	8.27e3	1.78e4	13.0	0.465	3.9
8	8 161122G2_9	12.5	2.85	8.14e3	1.84e4	12.4	0.443	-1.0
9	9 161122G2_10	12.5	2.85	7.23e3	1.75e4	11.6	0.414	-7.5

Compound name: 13C3-PFBS
Response Factor: 0.302055
RRF SD: 0.0171236, Relative SD: 5.66905
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	3.10	6.26e3	2.07e4	12.5	0.302	0.1
2	2 161122G2_3	12.5	3.10	6.27e3	2.17e4	11.9	0.288	-4.6
3	3 161122G2_4	12.5	3.10	6.78e3	2.11e4	13.3	0.321	6.4
4	4 161122G2_5	12.5	3.10	7.36e3	2.20e4	13.8	0.335	10.8
5	5 161122G2_6	12.5	3.10	6.40e3	2.15e4	12.3	0.298	-1.4
6	6 161122G2_7	12.5	3.10	5.76e3	1.89e4	12.6	0.306	1.1
7	7 161122G2_8	12.5	3.10	5.35e3	1.78e4	12.5	0.301	-0.4
8	8 161122G2_9	12.5	3.10	5.29e3	1.84e4	11.9	0.288	-4.7
9	9 161122G2_10	12.5	3.10	4.89e3	1.75e4	11.6	0.280	-7.3

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Compound name: 13C2-PFHxA
Response Factor: 0.619528
RRF SD: 0.0178176, Relative SD: 2.876
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	5.00	3.47	5.21e3	2.07e4	5.07	0.628	1.4
2	2 161122G2_3	5.00	3.47	5.44e3	2.17e4	5.05	0.626	1.0
3	3 161122G2_4	5.00	3.47	5.54e3	2.11e4	5.29	0.656	5.9
4	4 161122G2_5	5.00	3.47	5.55e3	2.20e4	5.09	0.631	1.8
5	5 161122G2_6	5.00	3.47	5.30e3	2.15e4	4.98	0.617	-0.4
6	6 161122G2_7	5.00	3.47	4.52e3	1.89e4	4.83	0.598	-3.4
7	7 161122G2_8	5.00	3.47	4.31e3	1.78e4	4.89	0.606	-2.2
8	8 161122G2_9	5.00	3.47	4.48e3	1.84e4	4.92	0.610	-1.5
9	9 161122G2_10	5.00	3.47	4.22e3	1.75e4	4.87	0.603	-2.6

Compound name: 13C4-PFHpA
Response Factor: 1.13869
RRF SD: 0.046436, Relative SD: 4.078
Response type: Internal Std (Ref 29), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	3.98	1.51e4	1.32e4	12.6	1.14	0.5
2	2 161122G2_3	12.5	3.97	1.58e4	1.36e4	12.7	1.16	1.9
3	3 161122G2_4	12.5	3.98	1.71e4	1.42e4	13.2	1.21	5.8
4	4 161122G2_5	12.5	3.97	1.63e4	1.48e4	12.1	1.10	-3.3
5	5 161122G2_6	12.5	3.97	1.60e4	1.44e4	12.2	1.11	-2.4
6	6 161122G2_7	12.5	3.97	1.42e4	1.23e4	12.7	1.16	1.7
7	7 161122G2_8	12.5	3.97	1.36e4	1.16e4	12.8	1.17	2.7
8	8 161122G2_9	12.5	3.97	1.35e4	1.17e4	12.7	1.15	1.3
9	9 161122G2_10	12.5	3.97	1.23e4	1.18e4	11.5	1.05	-8.2

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Compound name: 18O2-PFHxS
Response Factor: 0.449434
RRF SD: 0.0241405, Relative SD: 5.37132
Response type: Internal Std (Ref 29), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.09	6.01e3	1.32e4	12.6	0.455	1.1
2	2 161122G2_3	12.5	4.09	6.30e3	1.36e4	12.9	0.463	3.1
3	3 161122G2_4	12.5	4.09	7.02e3	1.42e4	13.7	0.494	9.8
4	4 161122G2_5	12.5	4.09	6.33e3	1.48e4	11.9	0.428	-4.8
5	5 161122G2_6	12.5	4.09	6.15e3	1.44e4	11.9	0.427	-5.0
6	6 161122G2_7	12.5	4.09	5.33e3	1.23e4	12.1	0.434	-3.4
7	7 161122G2_8	12.5	4.08	5.46e3	1.16e4	13.0	0.468	4.2
8	8 161122G2_9	12.5	4.09	5.36e3	1.17e4	12.7	0.456	1.5
9	9 161122G2_10	12.5	4.09	4.95e3	1.18e4	11.7	0.420	-6.6

Compound name: 13C2-6:2 FTS
Response Factor: 1.07309
RRF SD: 0.0967215, Relative SD: 9.01333
Response type: Internal Std (Ref 27), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.33	6.03e3	5.89e3	11.9	1.02	-4.5
2	2 161122G2_3	12.5	4.33	6.29e3	5.82e3	12.6	1.08	0.7
3	3 161122G2_4	12.5	4.33	6.05e3	5.56e3	12.7	1.09	1.3
4	4 161122G2_5	12.5	4.32	6.94e3	5.84e3	13.8	1.19	10.8
5	5 161122G2_6	12.5	4.32	5.43e3	5.76e3	11.0	0.942	-12.2
6	6 161122G2_7	12.5	4.32	5.54e3	4.77e3	13.5	1.16	8.2
7	7 161122G2_8	12.5	4.32	5.35e3	5.78e3	10.8	0.925	-13.8
8	8 161122G2_9	12.5	4.32	7.05e3	5.95e3	13.8	1.18	10.3
9	9 161122G2_10	12.5	4.32	6.58e3	6.18e3	12.4	1.06	-0.8

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Compound name: 13C2-PFOA
Response Factor: 2.26193
RRF SD: 0.103705, Relative SD: 4.58481
Response type: Internal Std (Ref 30), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.37	2.40e4	1.14e4	11.7	2.12	-6.4
2	2 161122G2_3	12.5	4.37	2.87e4	1.22e4	13.0	2.36	4.4
3	3 161122G2_4	12.5	4.37	2.79e4	1.22e4	12.6	2.28	0.8
4	4 161122G2_5	12.5	4.37	2.85e4	1.19e4	13.3	2.40	6.0
5	5 161122G2_6	12.5	4.37	2.60e4	1.12e4	12.9	2.33	3.0
6	6 161122G2_7	12.5	4.37	2.44e4	1.17e4	11.5	2.09	-7.7
7	7 161122G2_8	12.5	4.37	2.35e4	1.03e4	12.6	2.28	0.9
8	8 161122G2_9	12.5	4.37	2.38e4	1.06e4	12.4	2.24	-1.2
9	9 161122G2_10	12.5	4.37	2.17e4	9.56e3	12.5	2.27	0.2

Compound name: 13C8-PFOS
Response Factor: 0.943547
RRF SD: 0.0953243, Relative SD: 10.1028
Response type: Internal Std (Ref 31), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.77	5.26e3	6.09e3	11.4	0.863	-8.5
2	2 161122G2_3	12.5	4.77	7.35e3	8.00e3	12.2	0.918	-2.7
3	3 161122G2_4	12.5	4.77	8.95e3	7.63e3	15.5	1.17	24.2
4	4 161122G2_5	12.5	4.77	6.87e3	7.71e3	11.8	0.892	-5.5
5	5 161122G2_6	12.5	4.77	7.23e3	7.12e3	13.5	1.02	7.6
6	6 161122G2_7	12.5	4.77	6.95e3	7.59e3	12.1	0.917	-2.9
7	7 161122G2_8	12.5	4.77	5.80e3	6.40e3	12.0	0.906	-4.0
8	8 161122G2_9	12.5	4.77	7.19e3	7.90e3	12.1	0.910	-3.5
9	9 161122G2_10	12.5	4.77	6.93e3	7.73e3	11.9	0.898	-4.9

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Compound name: 13C5-PFNA
Response Factor: 1.08198
RRF SD: 0.109173, Relative SD: 10.0901
Response type: Internal Std (Ref 32), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.71	1.06e4	9.86e3	12.4	1.07	-0.7
2	2 161122G2_3	12.5	4.71	1.33e4	1.10e4	14.0	1.21	11.8
3	3 161122G2_4	12.5	4.71	1.23e4	1.19e4	12.0	1.04	-4.3
4	4 161122G2_5	12.5	4.71	1.28e4	1.06e4	14.0	1.21	12.3
5	5 161122G2_6	12.5	4.71	1.33e4	1.18e4	13.0	1.13	4.1
6	6 161122G2_7	12.5	4.71	1.21e4	1.04e4	13.4	1.16	7.4
7	7 161122G2_8	12.5	4.71	1.04e4	1.14e4	10.5	0.909	-16.0
8	8 161122G2_9	12.5	4.71	1.23e4	1.16e4	12.3	1.07	-1.4
9	9 161122G2_10	12.5	4.71	1.07e4	1.14e4	10.8	0.938	-13.3

Compound name: 13C2-PFDA
Response Factor: 1.01921
RRF SD: 0.0876435, Relative SD: 8.59913
Response type: Internal Std (Ref 33), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	5.01	6.01e3	6.35e3	11.6	0.947	-7.1
2	2 161122G2_3	12.5	5.01	8.51e3	9.85e3	10.6	0.864	-15.2
3	3 161122G2_4	12.5	5.01	8.73e3	8.39e3	12.8	1.04	2.1
4	4 161122G2_5	12.5	5.01	8.07e3	7.46e3	13.3	1.08	6.1
5	5 161122G2_6	12.5	5.01	7.02e3	6.59e3	13.1	1.07	4.5
6	6 161122G2_7	12.5	5.01	1.01e4	9.85e3	12.5	1.02	0.3
7	7 161122G2_8	12.5	5.01	6.60e3	5.70e3	14.2	1.16	13.6
8	8 161122G2_9	12.5	5.01	8.88e3	8.46e3	12.9	1.05	2.9
9	9 161122G2_10	12.5	5.01	8.96e3	9.48e3	11.6	0.945	-7.3

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Compound name: 13C2-8:2 FTS
Response Factor: 0.568768
RRF SD: 0.137212, Relative SD: 24.1245
Response type: Internal Std (Ref 27), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.99	2.12e3	5.89e3	7.93	0.361	-36.6
2	2 161122G2_3	12.5	4.99	3.66e3	5.82e3	13.8	0.629	10.6
3	3 161122G2_4	12.5	4.99	2.69e3	5.56e3	10.6	0.483	-15.1
4	4 161122G2_5	12.5	4.99	2.74e3	5.84e3	10.3	0.468	-17.7
5	5 161122G2_6	12.5	4.99	3.15e3	5.76e3	12.0	0.546	-4.1
6	6 161122G2_7	12.5	4.99	3.62e3	4.77e3	16.7	0.759	33.4
7	7 161122G2_8	12.5	4.99	2.69e3	5.78e3	10.2	0.466	-18.0
8	8 161122G2_9	12.5	4.99	3.97e3	5.95e3	14.7	0.667	17.3
9	9 161122G2_10	12.5	4.99	4.58e3	6.18e3	16.3	0.740	30.1

Compound name: 13C4-PFBA
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.	RRF	%Dev
1	1 161122G2_2	12.5	1.93	1.76e4	1.76e4	12.5	1.00	0.0
2	2 161122G2_3	12.5	1.92	1.85e4	1.85e4	12.5	1.00	0.0
3	3 161122G2_4	12.5	1.93	1.80e4	1.80e4	12.5	1.00	0.0
4	4 161122G2_5	12.5	1.93	1.91e4	1.91e4	12.5	1.00	0.0
5	5 161122G2_6	12.5	1.93	1.69e4	1.69e4	12.5	1.00	0.0
6	6 161122G2_7	12.5	1.93	1.58e4	1.58e4	12.5	1.00	0.0
7	7 161122G2_8	12.5	1.93	1.64e4	1.64e4	12.5	1.00	0.0
8	8 161122G2_9	12.5	1.93	1.66e4	1.66e4	12.5	1.00	0.0
9	9 161122G2_10	12.5	1.92	1.63e4	1.63e4	12.5	1.00	0.0

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Compound name: 13C2-4:2 FTS
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 27), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	3.37	5.89e3	5.89e3	12.5	1.00	0.0
2	2 161122G2_3	12.5	3.37	5.82e3	5.82e3	12.5	1.00	0.0
3	3 161122G2_4	12.5	3.37	5.56e3	5.56e3	12.5	1.00	0.0
4	4 161122G2_5	12.5	3.38	5.84e3	5.84e3	12.5	1.00	0.0
5	5 161122G2_6	12.5	3.38	5.76e3	5.76e3	12.5	1.00	0.0
6	6 161122G2_7	12.5	3.38	4.77e3	4.77e3	12.5	1.00	0.0
7	7 161122G2_8	12.5	3.38	5.78e3	5.78e3	12.5	1.00	0.0
8	8 161122G2_9	12.5	3.38	5.95e3	5.95e3	12.5	1.00	0.0
9	9 161122G2_10	12.5	3.38	6.18e3	6.18e3	12.5	1.00	0.0

Compound name: 13C5-PFHxA
Response Factor: 1
RRF SD: 3.92523e-017, Relative SD: 3.92523e-015
Response type: Internal Std (Ref 28), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	3.47	2.07e4	2.07e4	12.5	1.00	0.0
2	2 161122G2_3	12.5	3.46	2.17e4	2.17e4	12.5	1.00	0.0
3	3 161122G2_4	12.5	3.47	2.11e4	2.11e4	12.5	1.00	0.0
4	4 161122G2_5	12.5	3.47	2.20e4	2.20e4	12.5	1.00	0.0
5	5 161122G2_6	12.5	3.47	2.15e4	2.15e4	12.5	1.00	0.0
6	6 161122G2_7	12.5	3.47	1.89e4	1.89e4	12.5	1.00	0.0
7	7 161122G2_8	12.5	3.47	1.78e4	1.78e4	12.5	1.00	0.0
8	8 161122G2_9	12.5	3.47	1.84e4	1.84e4	12.5	1.00	-0.0
9	9 161122G2_10	12.5	3.47	1.75e4	1.75e4	12.5	1.00	0.0

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
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Compound name: 13C3-PFHxS
Response Factor: 1
RRF SD: 7.85046e-017, Relative SD: 7.85046e-015
Response type: Internal Std (Ref 29), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.09	1.32e4	1.32e4	12.5	1.00	0.0
2	2 161122G2_3	12.5	4.09	1.36e4	1.36e4	12.5	1.00	0.0
3	3 161122G2_4	12.5	4.09	1.42e4	1.42e4	12.5	1.00	0.0
4	4 161122G2_5	12.5	4.09	1.48e4	1.48e4	12.5	1.00	0.0
5	5 161122G2_6	12.5	4.09	1.44e4	1.44e4	12.5	1.00	0.0
6	6 161122G2_7	12.5	4.09	1.23e4	1.23e4	12.5	1.00	0.0
7	7 161122G2_8	12.5	4.09	1.16e4	1.16e4	12.5	1.00	0.0
8	8 161122G2_9	12.5	4.09	1.17e4	1.17e4	12.5	1.00	0.0
9	9 161122G2_10	12.5	4.09	1.18e4	1.18e4	12.5	1.00	0.0

Compound name: 13C8-PFOA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 30), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.37	1.14e4	1.14e4	12.5	1.00	0.0
2	2 161122G2_3	12.5	4.37	1.22e4	1.22e4	12.5	1.00	0.0
3	3 161122G2_4	12.5	4.37	1.22e4	1.22e4	12.5	1.00	0.0
4	4 161122G2_5	12.5	4.37	1.19e4	1.19e4	12.5	1.00	0.0
5	5 161122G2_6	12.5	4.37	1.12e4	1.12e4	12.5	1.00	0.0
6	6 161122G2_7	12.5	4.37	1.17e4	1.17e4	12.5	1.00	0.0
7	7 161122G2_8	12.5	4.37	1.03e4	1.03e4	12.5	1.00	0.0
8	8 161122G2_9	12.5	4.37	1.06e4	1.06e4	12.5	1.00	0.0
9	9 161122G2_10	12.5	4.37	9.56e3	9.56e3	12.5	1.00	0.0

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:27:47 Pacific Standard Time

Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 7.85046e-017, Relative SD: 7.85046e-015
Response type: Internal Std (Ref 31), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.78	6.09e3	6.09e3	12.5	1.00	0.0
2	2 161122G2_3	12.5	4.77	8.00e3	8.00e3	12.5	1.00	0.0
3	3 161122G2_4	12.5	4.78	7.63e3	7.63e3	12.5	1.00	0.0
4	4 161122G2_5	12.5	4.77	7.71e3	7.71e3	12.5	1.00	0.0
5	5 161122G2_6	12.5	4.77	7.12e3	7.12e3	12.5	1.00	0.0
6	6 161122G2_7	12.5	4.77	7.59e3	7.59e3	12.5	1.00	0.0
7	7 161122G2_8	12.5	4.78	6.40e3	6.40e3	12.5	1.00	0.0
8	8 161122G2_9	12.5	4.77	7.90e3	7.90e3	12.5	1.00	0.0
9	9 161122G2_10	12.5	4.77	7.73e3	7.73e3	12.5	1.00	0.0

Compound name: 13C9-PFNA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 32), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	4.71	9.86e3	9.86e3	12.5	1.00	0.0
2	2 161122G2_3	12.5	4.71	1.10e4	1.10e4	12.5	1.00	0.0
3	3 161122G2_4	12.5	4.71	1.19e4	1.19e4	12.5	1.00	0.0
4	4 161122G2_5	12.5	4.71	1.06e4	1.06e4	12.5	1.00	0.0
5	5 161122G2_6	12.5	4.71	1.18e4	1.18e4	12.5	1.00	0.0
6	6 161122G2_7	12.5	4.71	1.04e4	1.04e4	12.5	1.00	0.0
7	7 161122G2_8	12.5	4.71	1.14e4	1.14e4	12.5	1.00	0.0
8	8 161122G2_9	12.5	4.71	1.16e4	1.16e4	12.5	1.00	0.0
9	9 161122G2_10	12.5	4.71	1.14e4	1.14e4	12.5	1.00	0.0

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
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Compound name: 13C6-PFDA
Response Factor: 1
RRF SD: 3.92523e-017, Relative SD: 3.92523e-015
Response type: Internal Std (Ref 33), Area * (IS Conc. / IS Area)
Curve type: RF

	#-Name	Std. Conc	RT	Resp	IS Resp	Conc.	RRF	%Dev
1	1 161122G2_2	12.5	5.01	6.35e3	6.35e3	12.5	1.00	0.0
2	2 161122G2_3	12.5	5.01	9.85e3	9.85e3	12.5	1.00	0.0
3	3 161122G2_4	12.5	5.01	8.39e3	8.39e3	12.5	1.00	0.0
4	4 161122G2_5	12.5	5.01	7.46e3	7.46e3	12.5	1.00	0.0
5	5 161122G2_6	12.5	5.01	6.59e3	6.59e3	12.5	1.00	0.0
6	6 161122G2_7	12.5	5.01	9.85e3	9.85e3	12.5	1.00	0.0
7	7 161122G2_8	12.5	5.01	5.70e3	5.70e3	12.5	1.00	0.0
8	8 161122G2_9	12.5	5.01	8.46e3	8.46e3	12.5	1.00	-0.0
9	9 161122G2_10	12.5	5.01	9.48e3	9.48e3	12.5	1.00	0.0

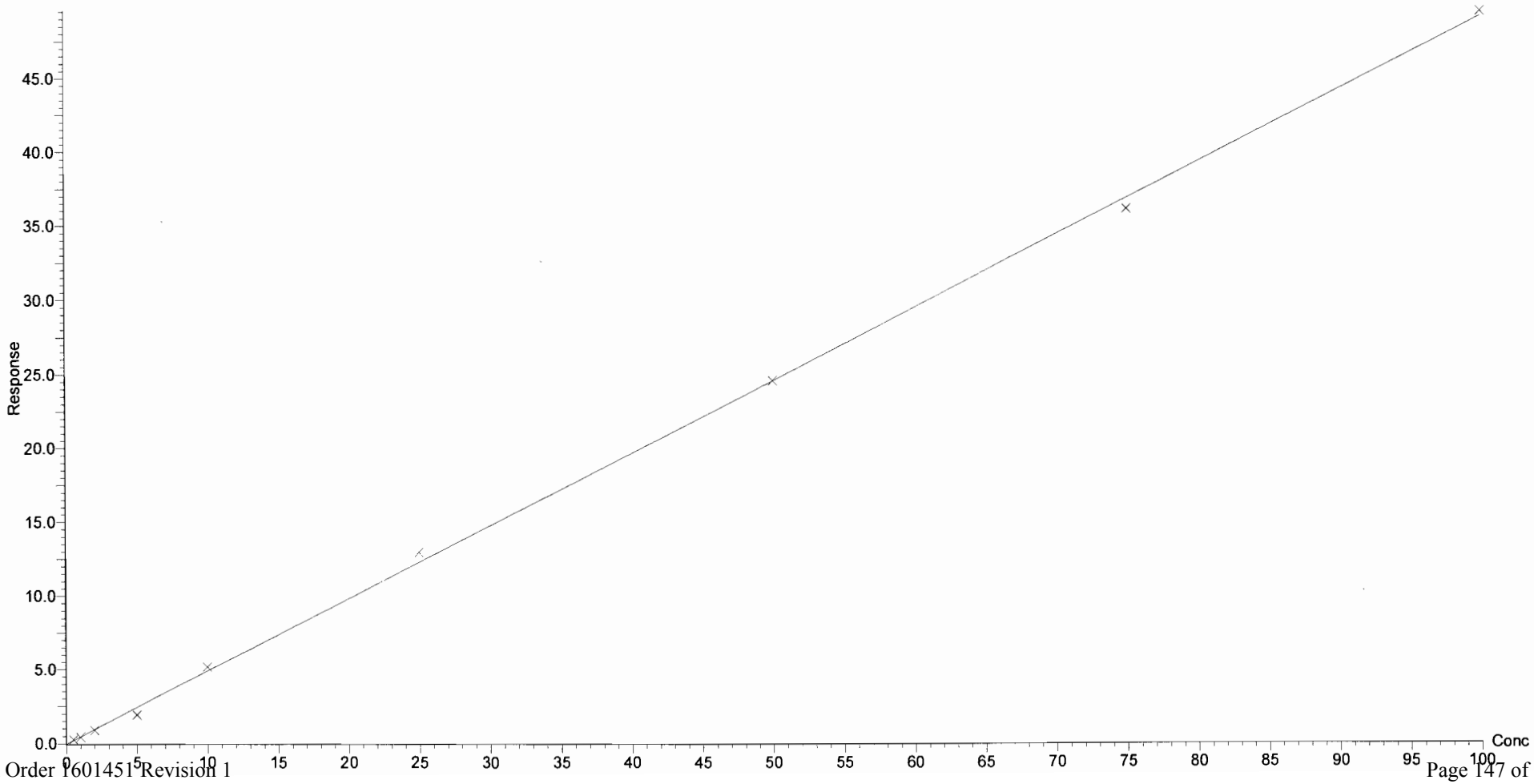
Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 22 Nov 2016 14:48:05
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Compound name: PFBA
Correlation coefficient: r = 0.999216, r^2 = 0.998432
Calibration curve: 0.492927 * x + -0.0410615
Response type: Internal Std (Ref 14), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

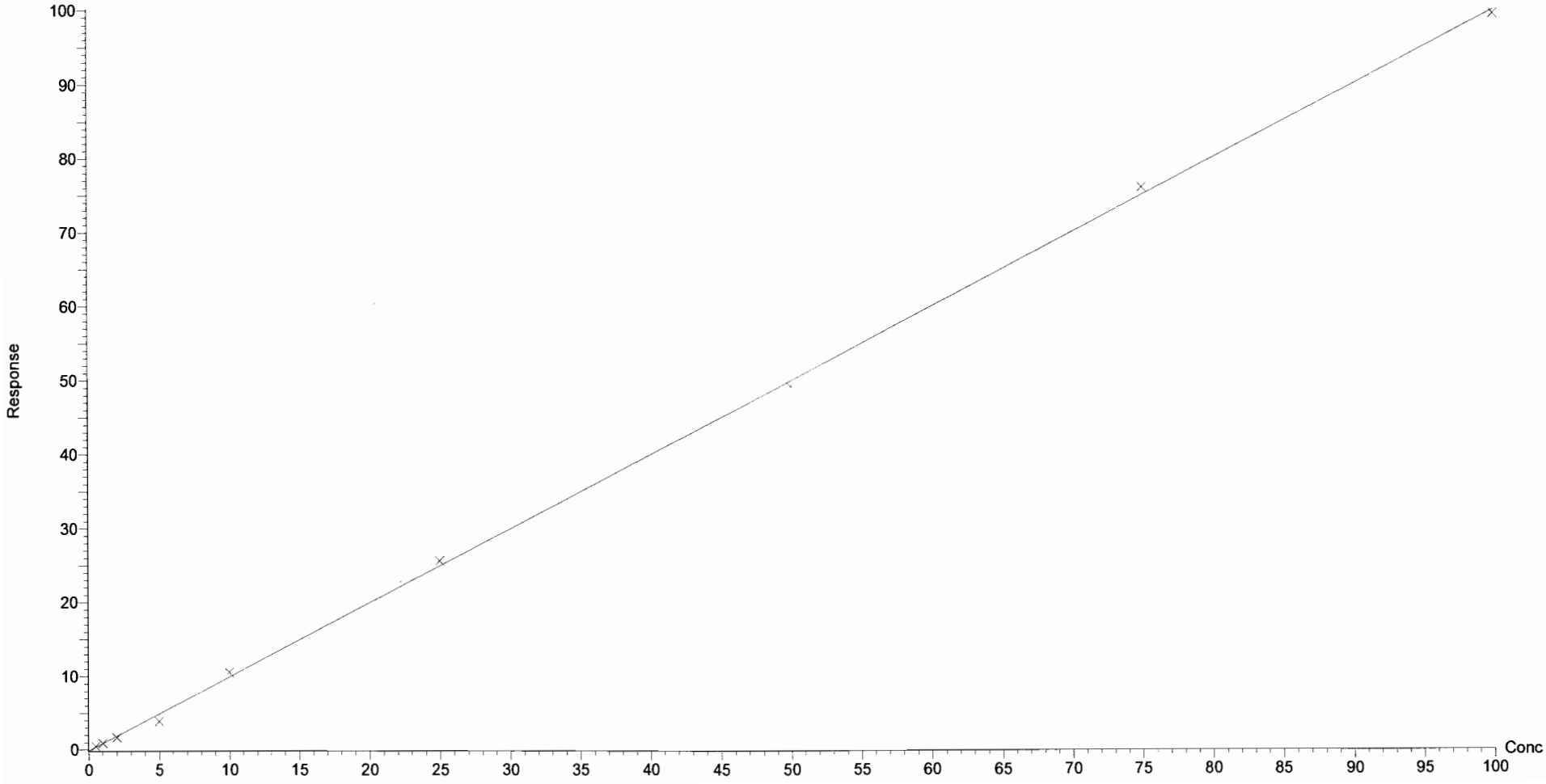


Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

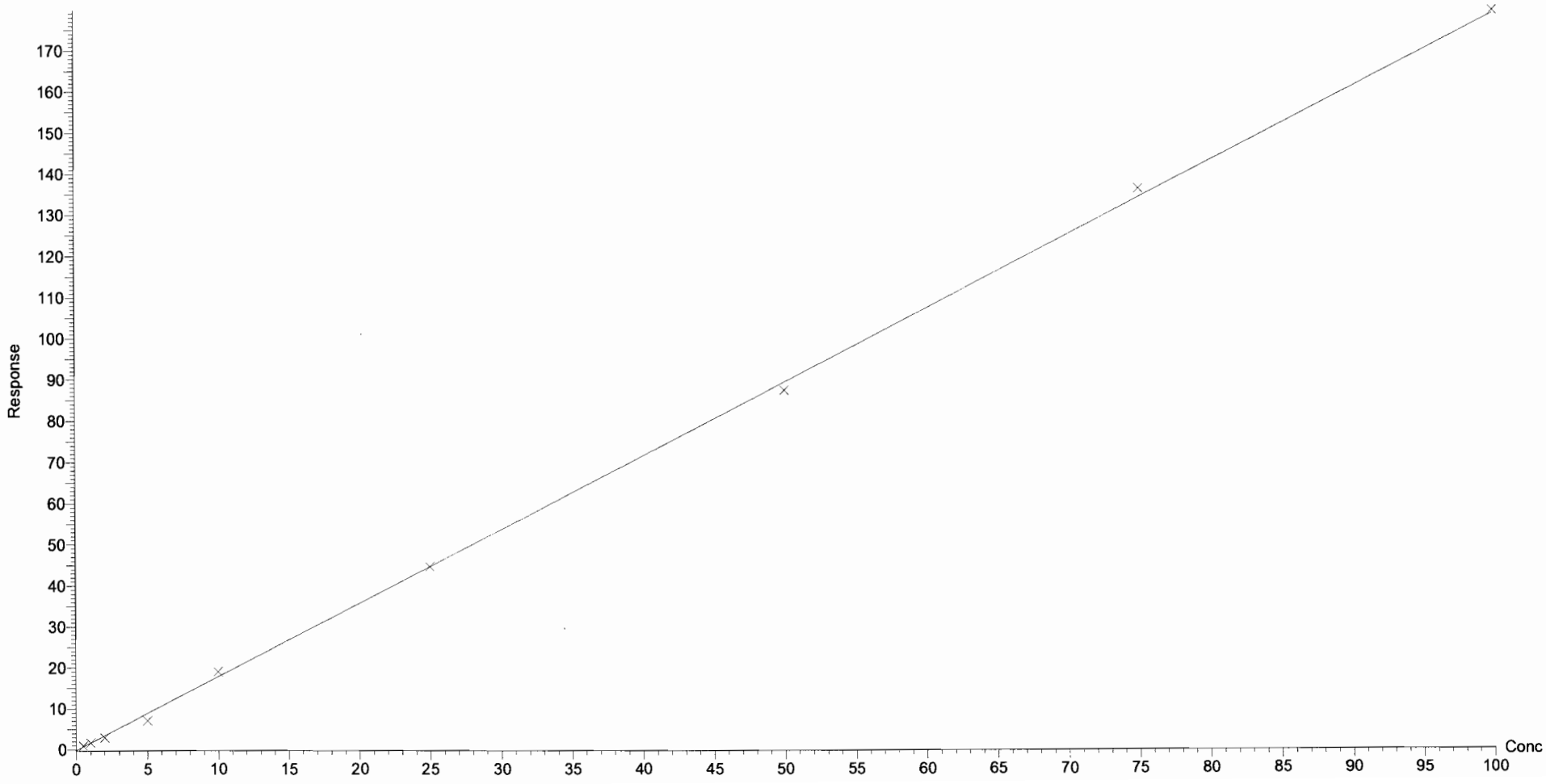
Compound name: PFPeA
Correlation coefficient: r = 0.999341, r^2 = 0.998683
Calibration curve: 1.00273 * x + -0.119981
Response type: Internal Std (Ref 15), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

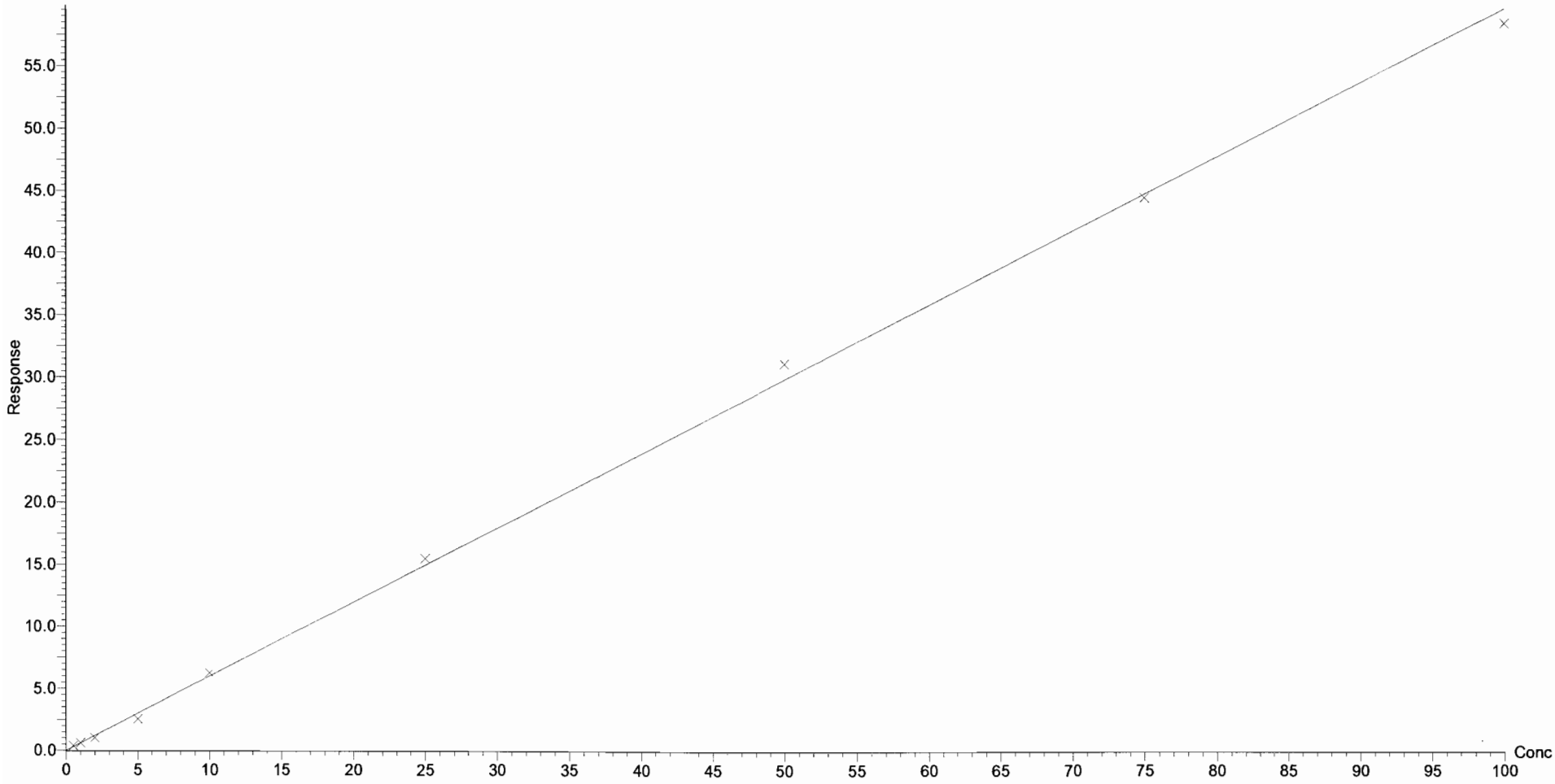
Compound name: PFBS
Correlation coefficient: r = 0.999283, r^2 = 0.998566
Calibration curve: 1.79216 * x + -0.145672
Response type: Internal Std (Ref 16), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

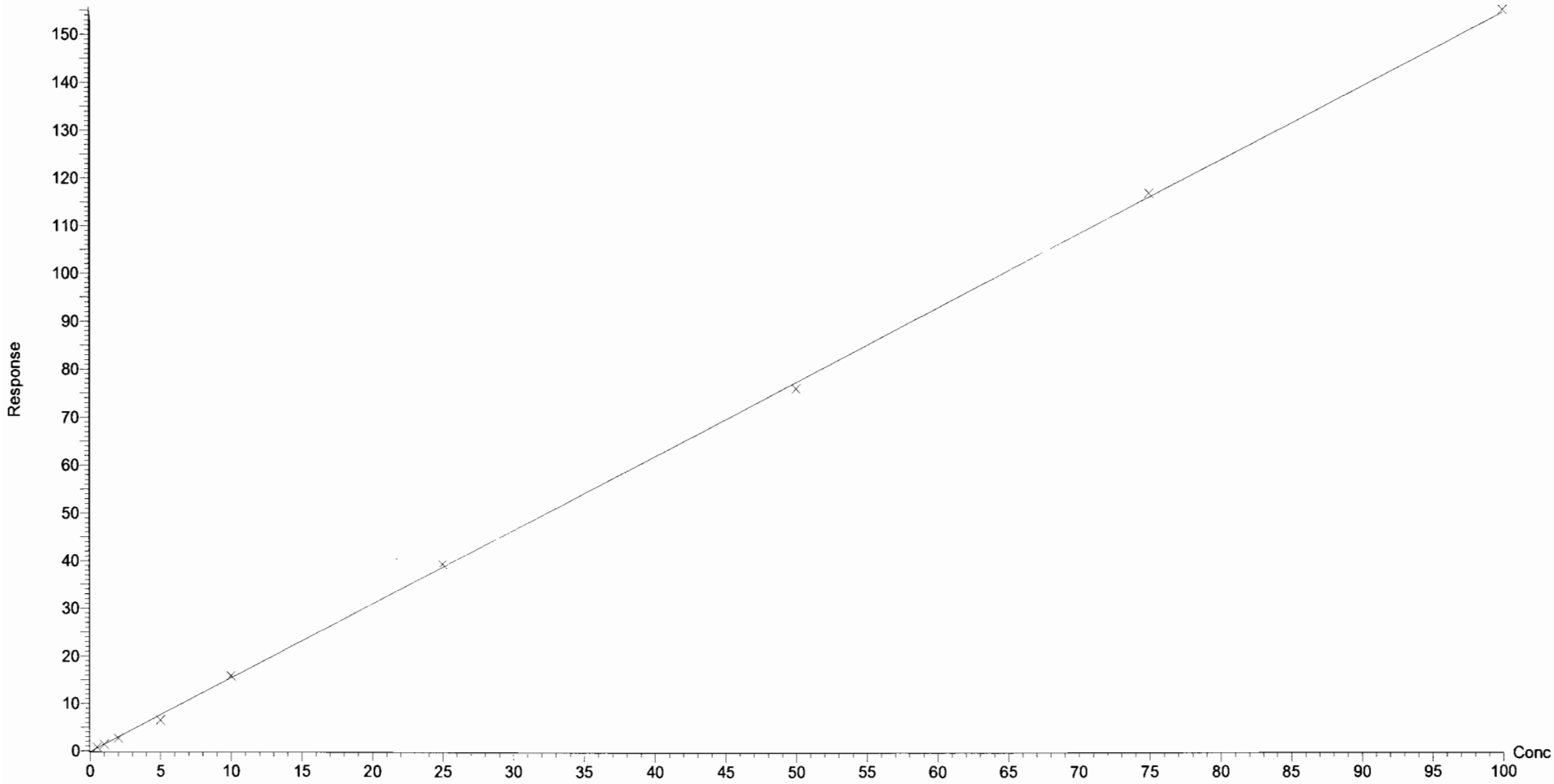
Compound name: PFHxA
Correlation coefficient: r = 0.999245, r^2 = 0.998491
Calibration curve: 0.598427 * x + 0.0095449
Response type: Internal Std (Ref 17), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

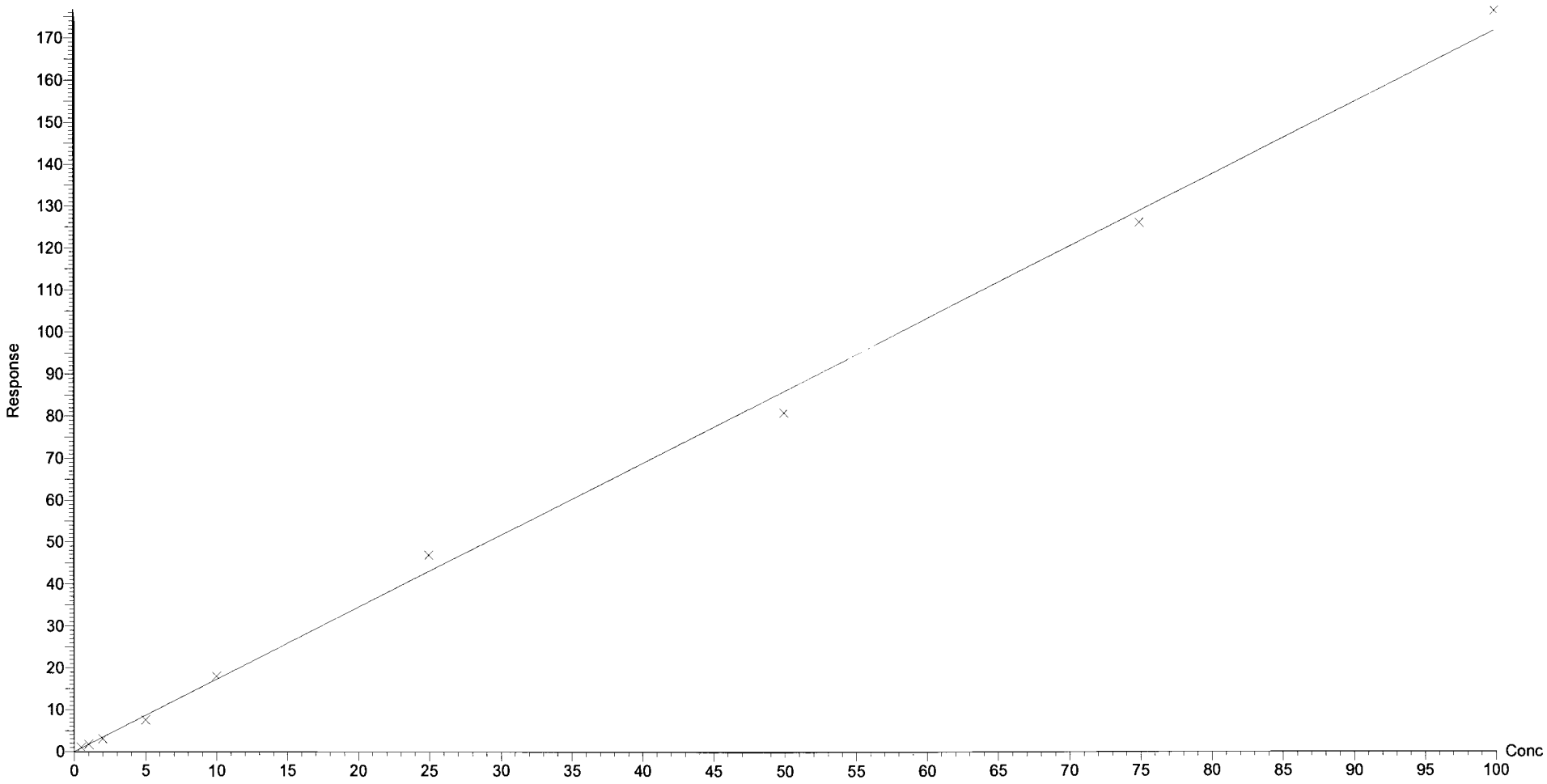
Compound name: PFHpA
Correlation coefficient: r = 0.999639, r^2 = 0.999279
Calibration curve: 1.55279 * x + -0.138431
Response type: Internal Std (Ref 18), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

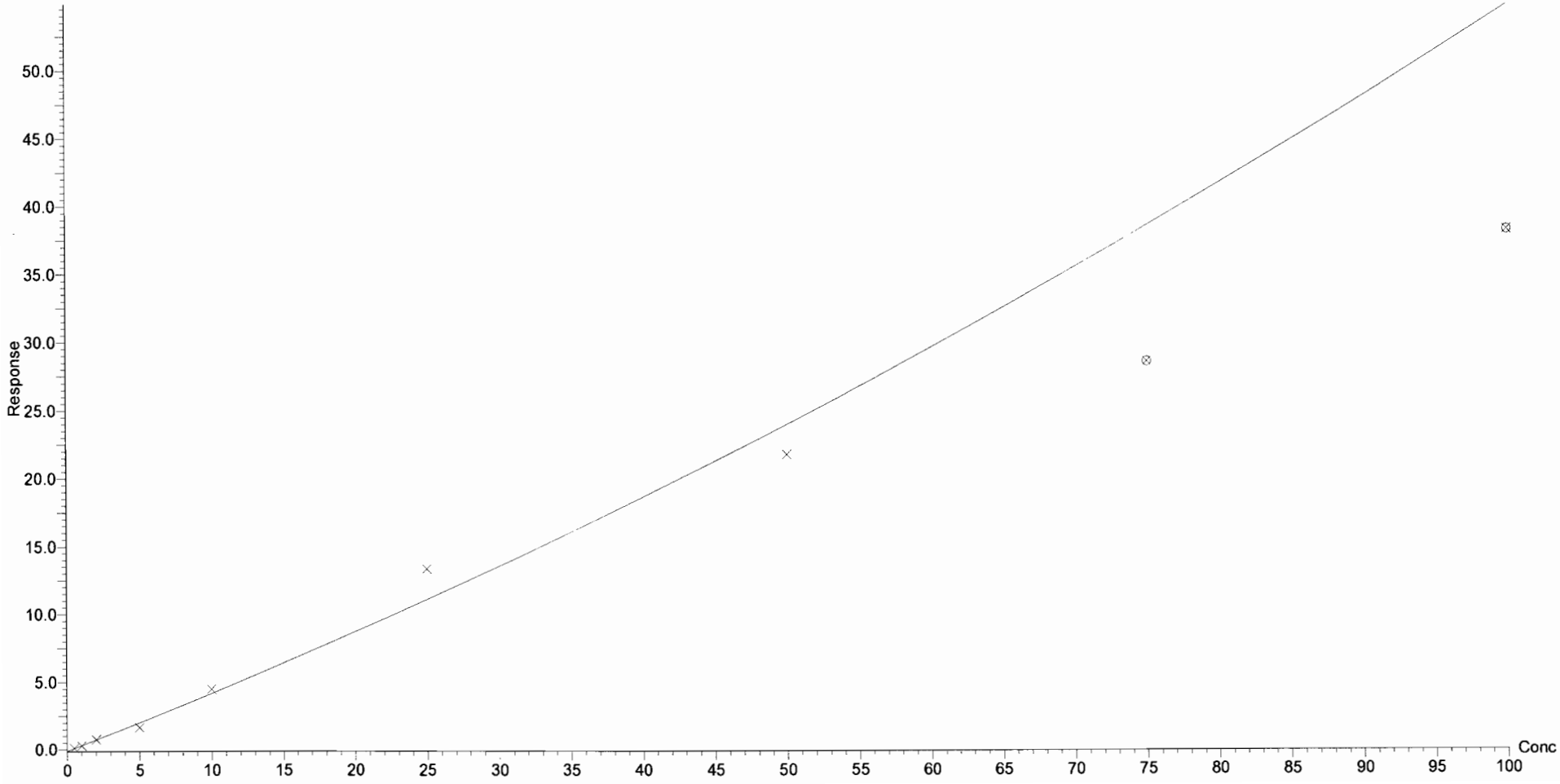
Compound name: PFHxS
Correlation coefficient: r = 0.998761, r^2 = 0.997524
Calibration curve: 1.72095 * x + -0.0266266
Response type: Internal Std (Ref 19), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

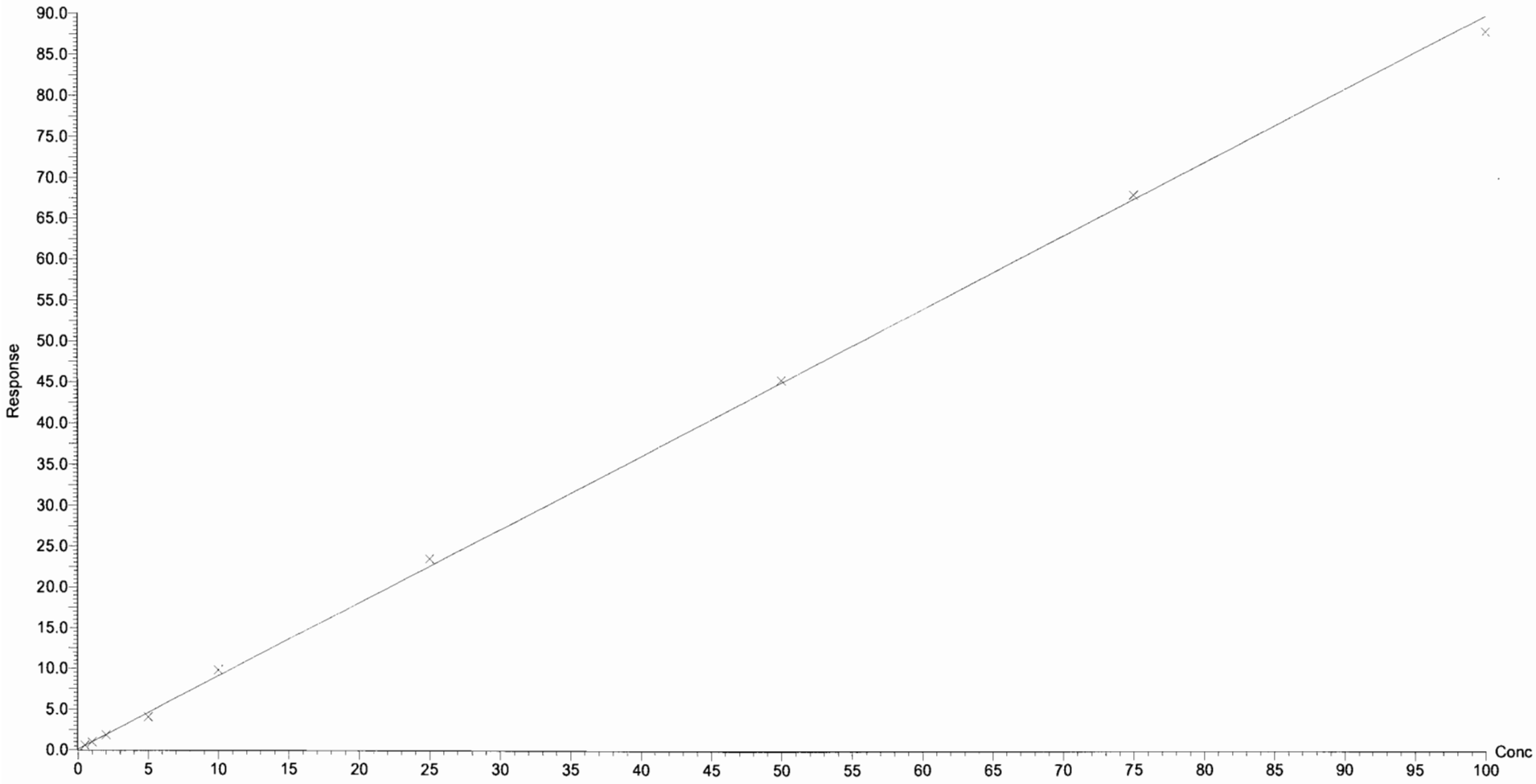
Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.978941
Calibration curve: 0.00135992 * x^2 + 0.414129 * x + -0.114975
Response type: Internal Std (Ref 20), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x^2, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

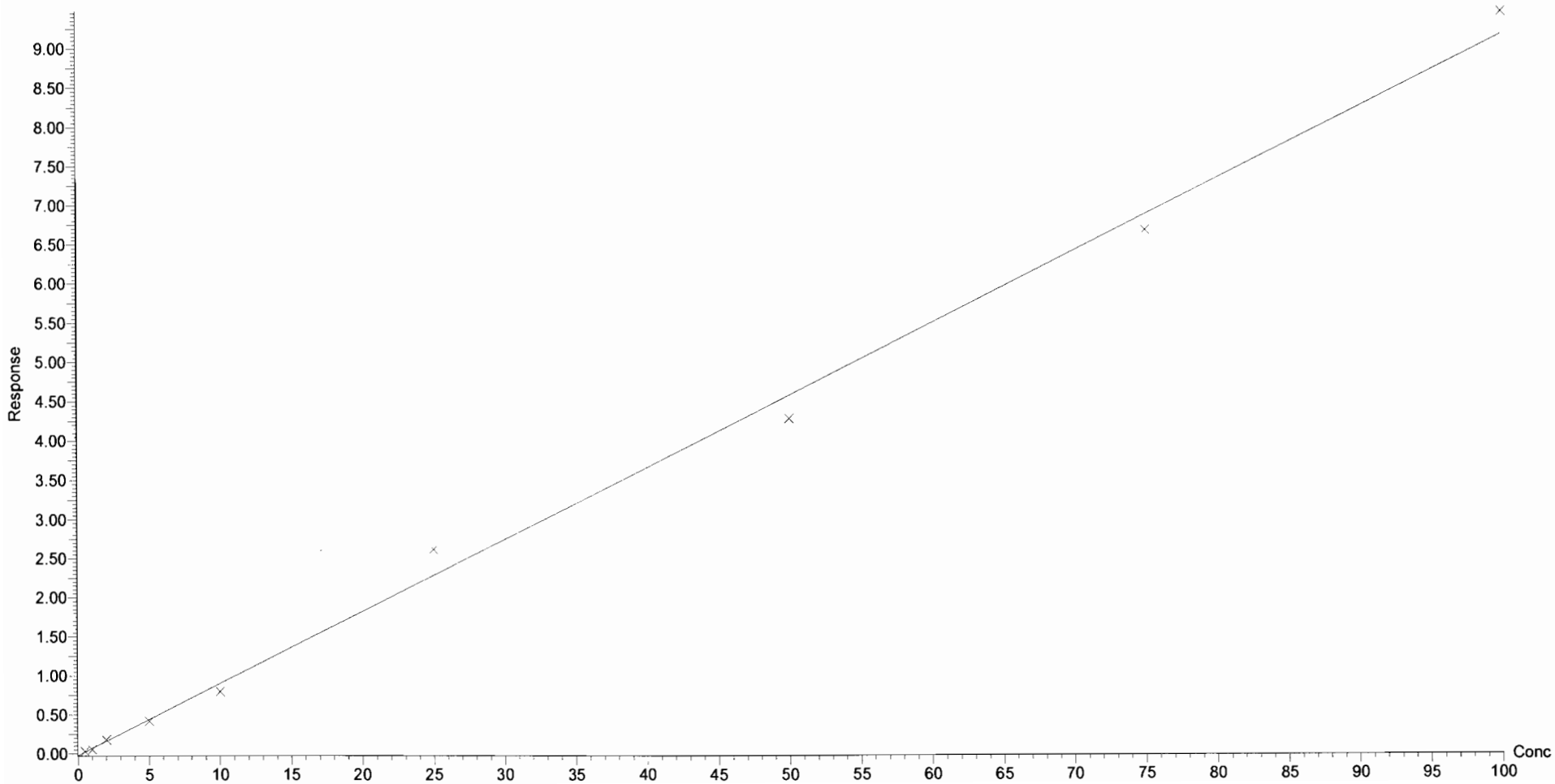
Compound name: PFOA
Correlation coefficient: r = 0.999524, r^2 = 0.999048
Calibration curve: 0.899906 * x + 0.0917344
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

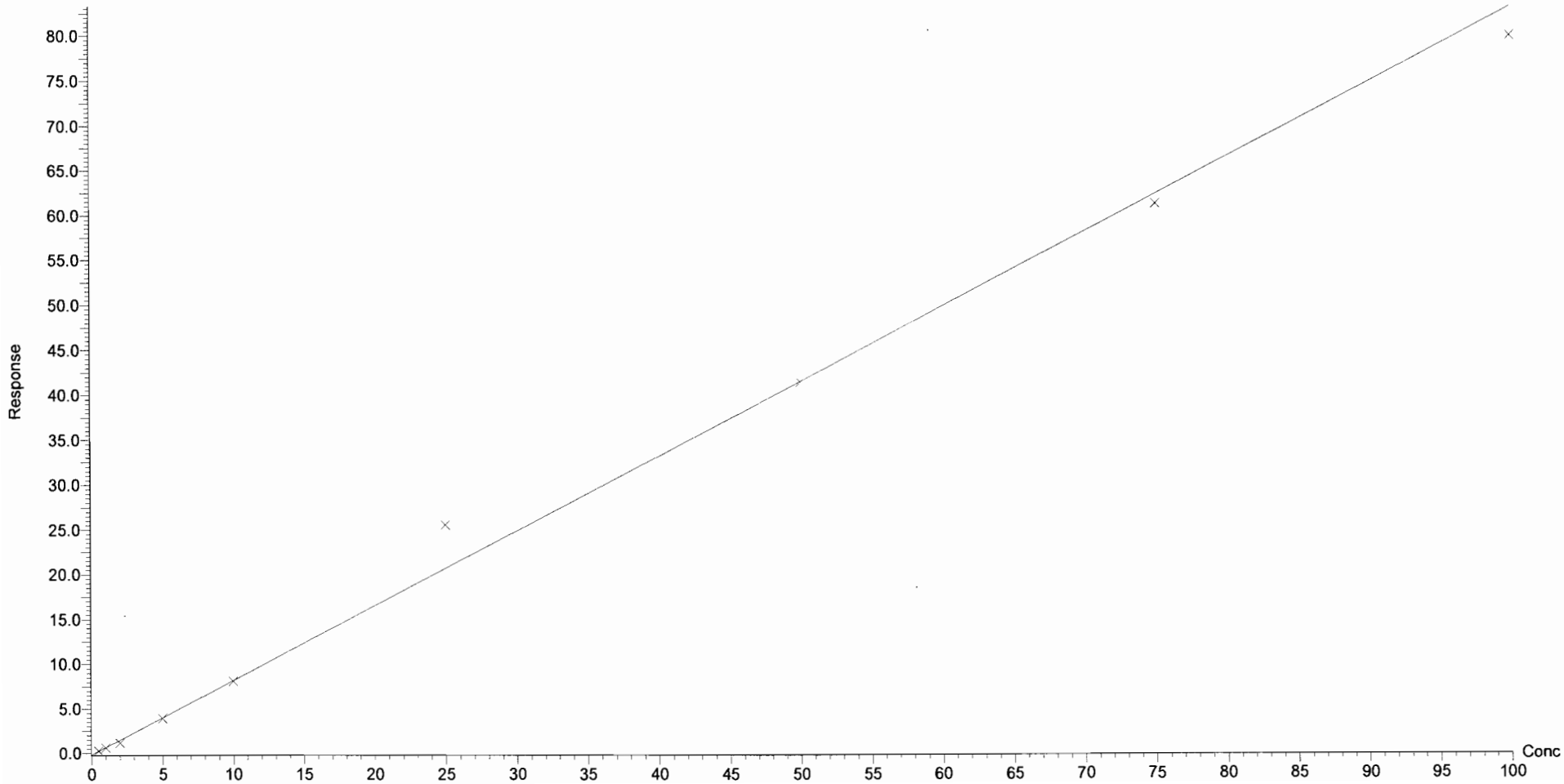
Compound name: PFHpS
Correlation coefficient: r = 0.997800, r^2 = 0.995604
Calibration curve: 0.0921515 * x + -0.0228444
Response type: Internal Std (Ref 21), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

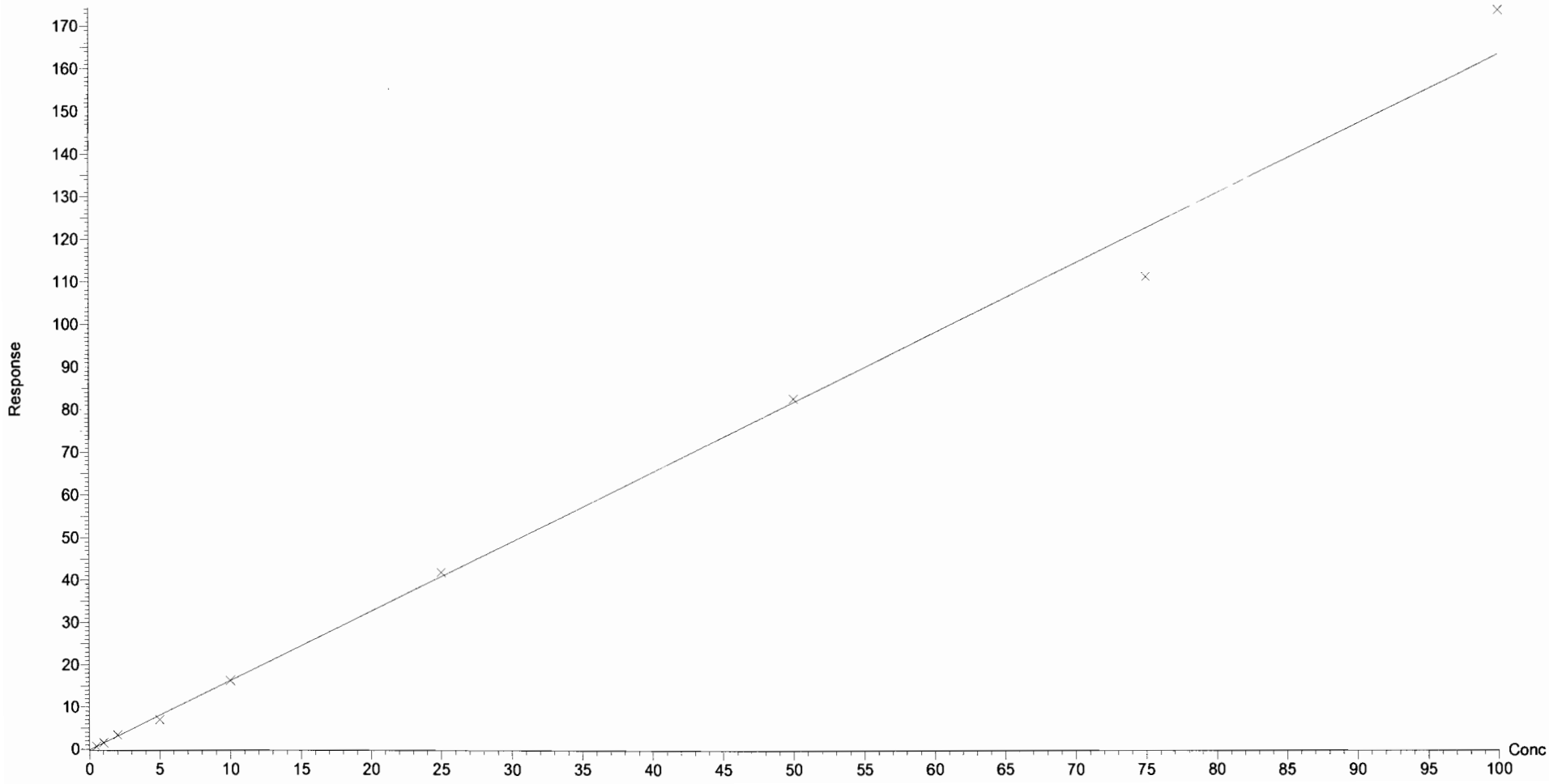
Compound name: PFOS
Correlation coefficient: r = 0.996761, r^2 = 0.993532
Calibration curve: 0.83439 * x + -0.165838
Response type: Internal Std (Ref 22), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

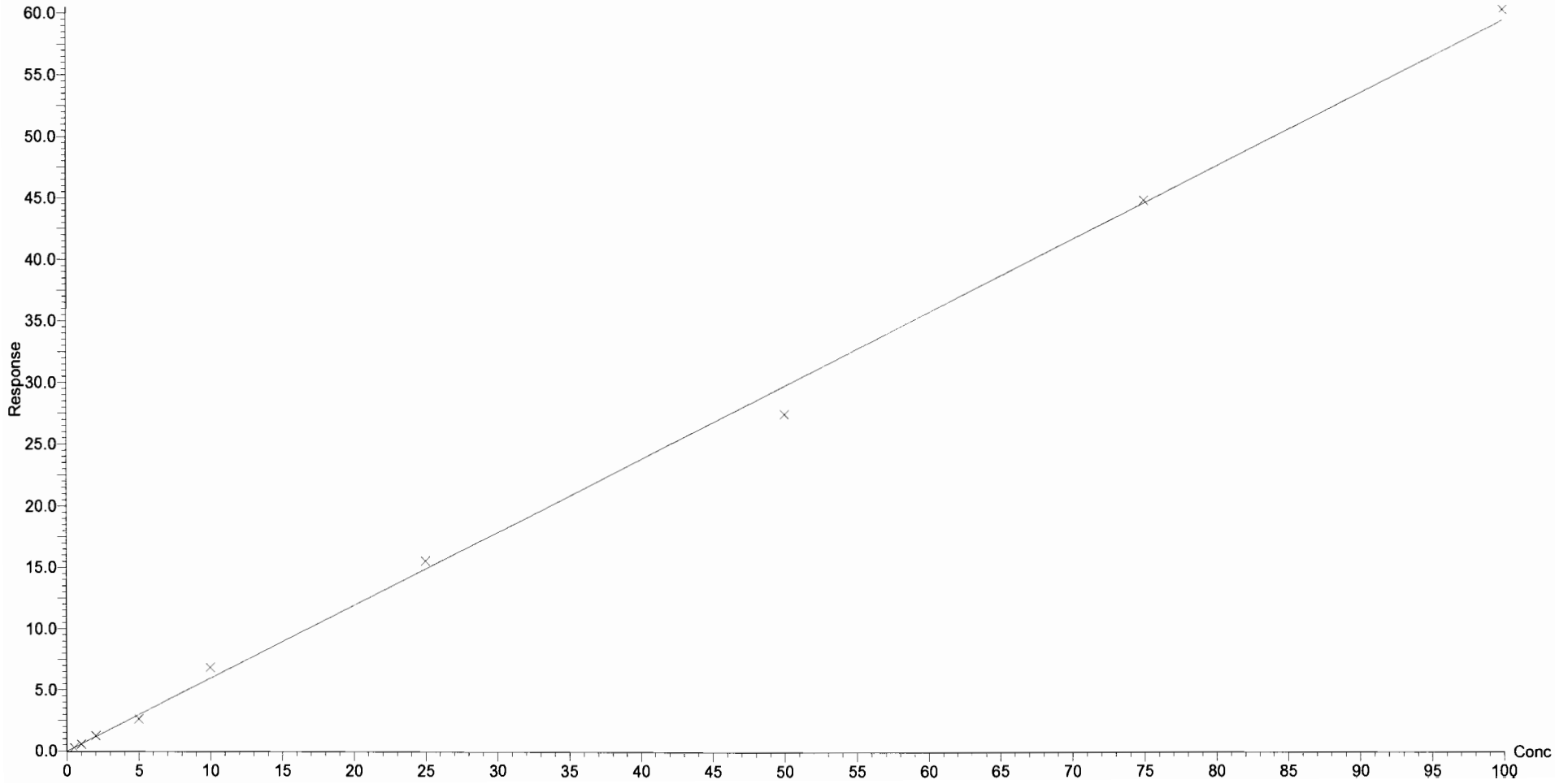
Compound name: PFNA
Correlation coefficient: r = 0.997674, r^2 = 0.995354
Calibration curve: 1.64181 * x + -0.17063
Response type: Internal Std (Ref 23), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

Compound name: PFDA
Correlation coefficient: r = 0.998669, r^2 = 0.997340
Calibration curve: 0.596457 * x + -0.0200723
Response type: Internal Std (Ref 24), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

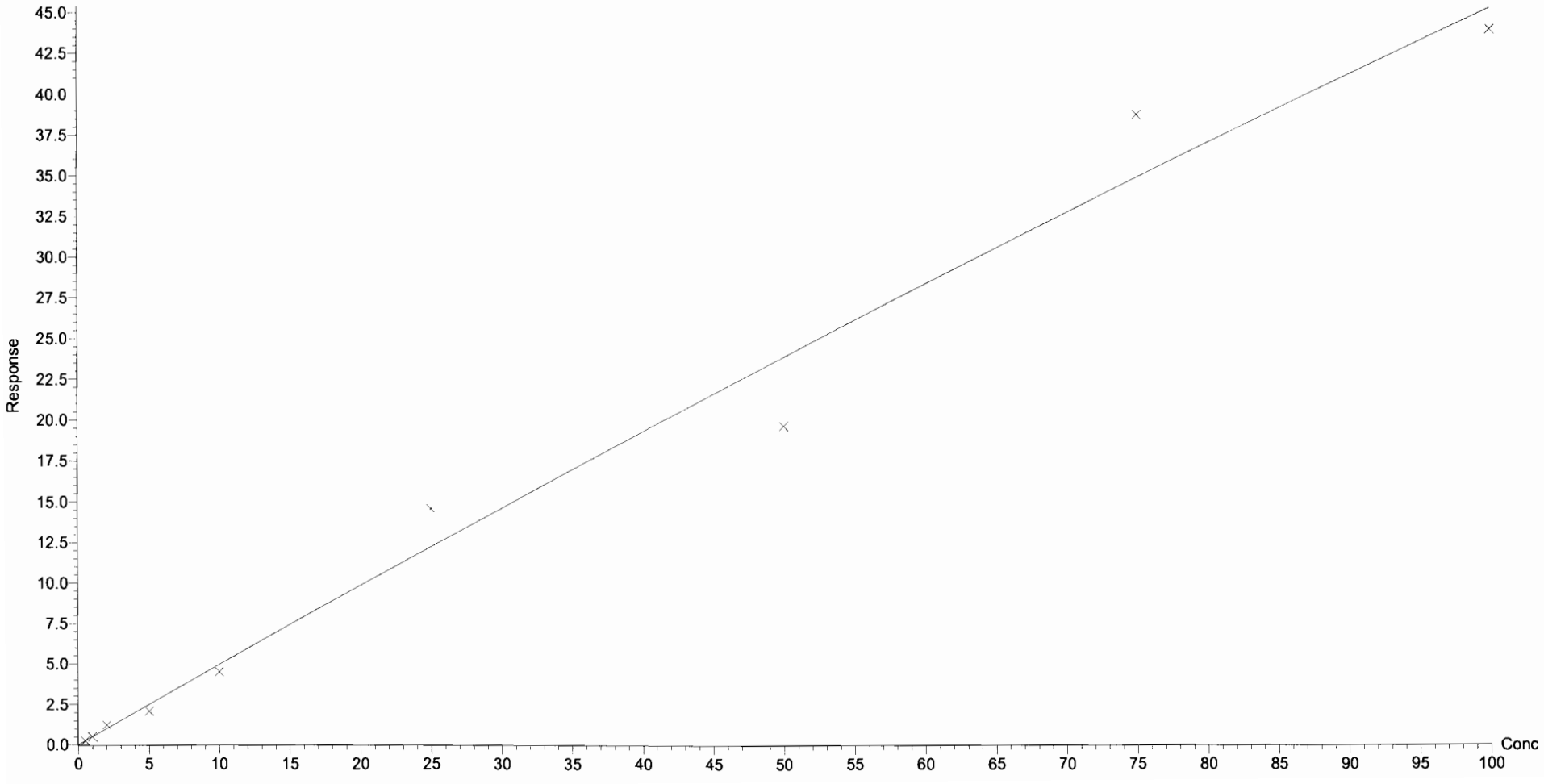


Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-CRV.qld

Last Altered: Tuesday, November 22, 2016 15:25:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:26:22 Pacific Standard Time

Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.984052
Calibration curve: -0.000479329 * x^2 + 0.502189 * x + 0.00235356
Response type: Internal Std (Ref 25), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Quantify Compound Summary Report **MassLynx 4.1**
Vista Analytical Laboratory VG-9

Dataset: Untitled

Last Altered: Tuesday, November 22, 2016 15:08:21 Pacific Standard Time
Printed: Tuesday, November 22, 2016 15:09:10 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 22 Nov 2016 14:48:20
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 14:59:27

Compound name: PFBA

	Name	ID	Acq.Date	Acq.Time
1	161122G2_1	IPA	22-Nov-16	09:47:54
2	161122G2_2	ST161122G2-2 PFC CS-1 16K1705	22-Nov-16	10:00:32
3	161122G2_3	ST161122G2-3 PFC CS0 16K1706	22-Nov-16	10:13:07
4	161122G2_4	ST161122G2-4 PFC CS1 16K1707	22-Nov-16	10:25:42
5	161122G2_5	ST161122G2-5 PFC CS2 16K1708	22-Nov-16	10:38:18
6	161122G2_6	ST161122G2-6 PFC CS3 16K1709	22-Nov-16	10:50:54
7	161122G2_7	ST161122G2-7 PFC CS3.5 16K1710	22-Nov-16	11:03:32
8	161122G2_8	ST161122G2-8 PFC CS4 16K1711	22-Nov-16	11:16:11
9	161122G2_9	ST161122G2-9 PFC CS4.5 16K1712	22-Nov-16	11:28:50
10	161122G2_10	ST161122G2-10 PFC CS5 16K1713	22-Nov-16	11:41:28
11	161122G2_11	IPA	22-Nov-16	11:54:03
12	161122G2_12	SS161122G2-1 PFC SS 16K2201	22-Nov-16	12:06:50
13	161122G2_13	IPA	22-Nov-16	12:19:32

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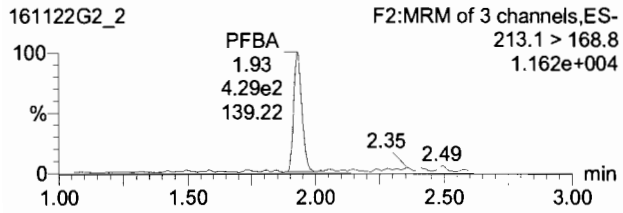
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

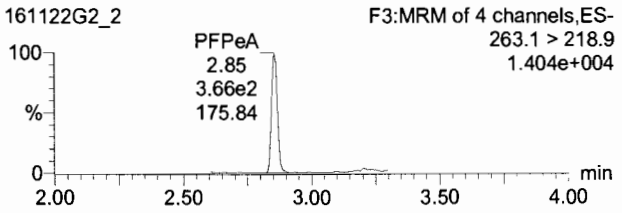
Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 22 Nov 2016 14:48:05
Calibration: 22 Nov 2016 14:43:00

Name: 161122G2_2, Date: 22-Nov-2016, Time: 10:00:32, ID: ST161122G2-2 PFC CS-1 16K1705, Description: PFC CS-1 16K1705 A

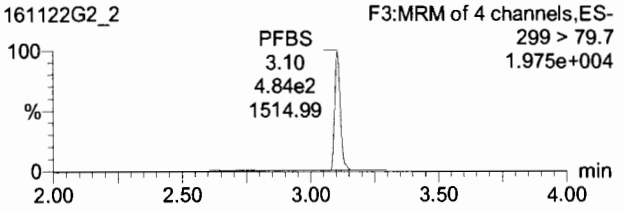
PFBA



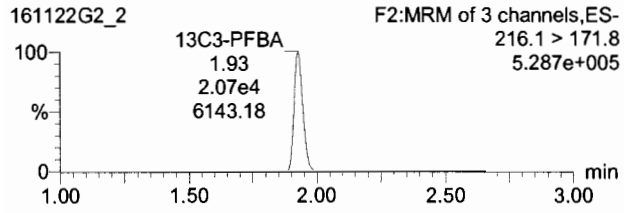
PFPeA



PFBS



13C3-PFBA



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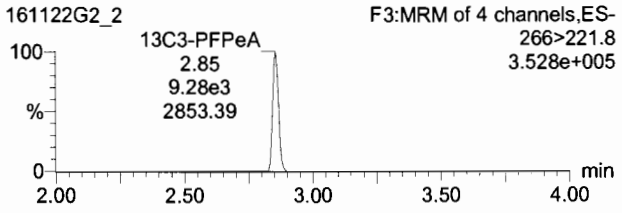

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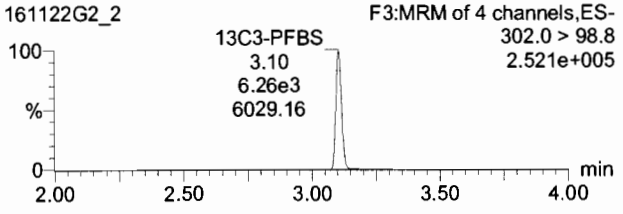

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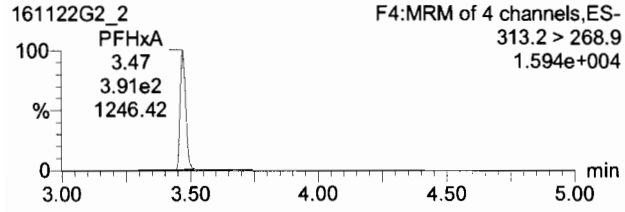

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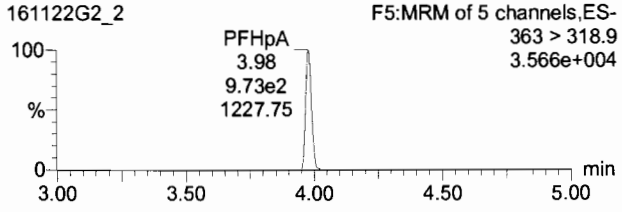
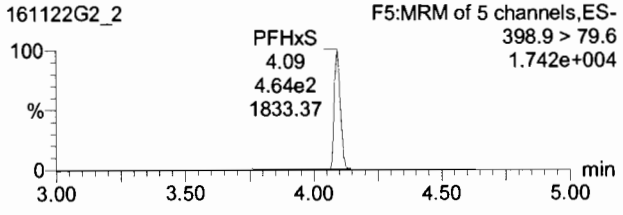


PFHxS



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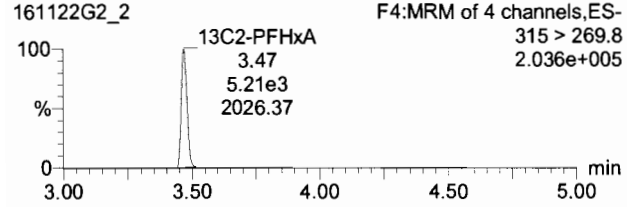

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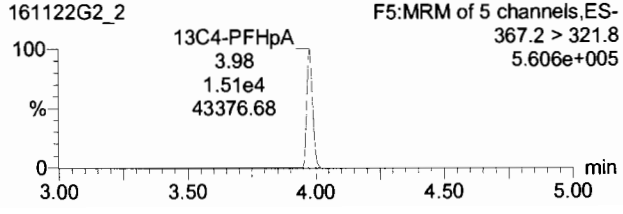
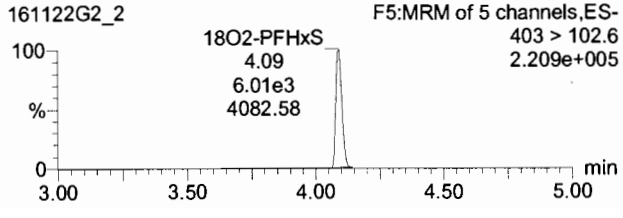


18O2-PFHxS



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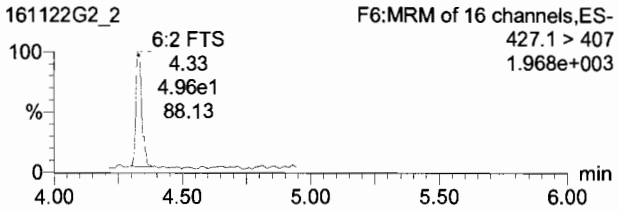
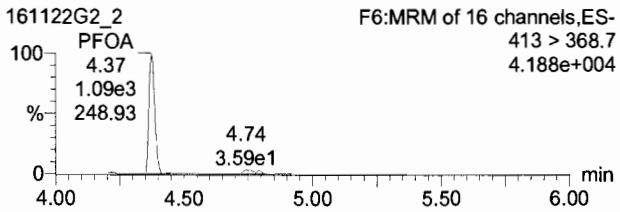
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_2, Date: 22-Nov-2016, Time: 10:00:32, ID: ST161122G2-2 PFC CS-1 16K1705, Description: PFC CS-1 16K1705 A

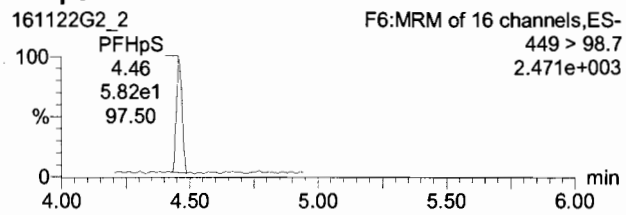
6:2 FTS



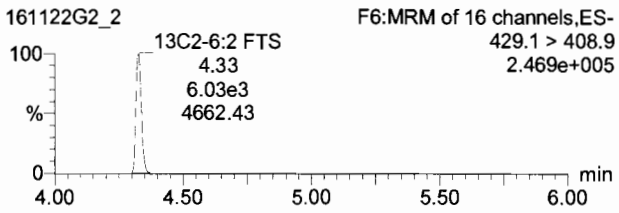
PFOA



PFHpS



13C2-6:2 FTS



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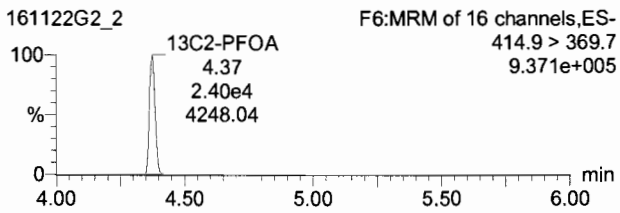

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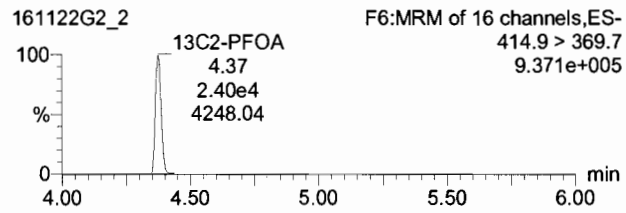
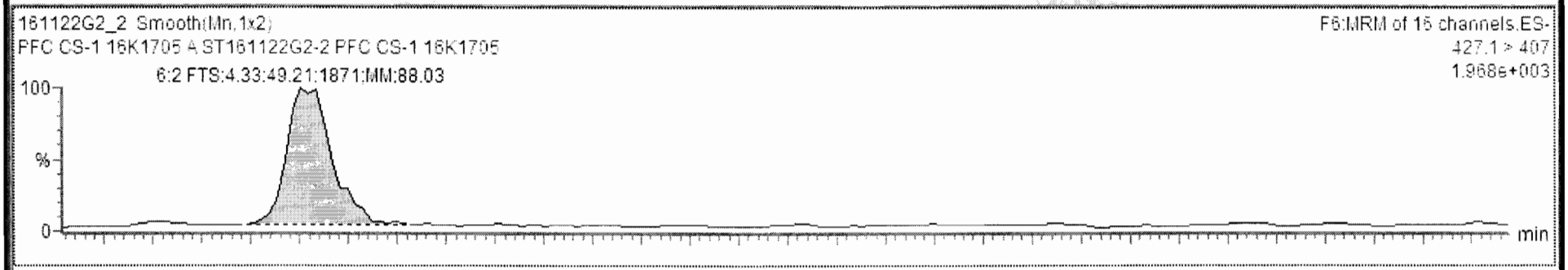


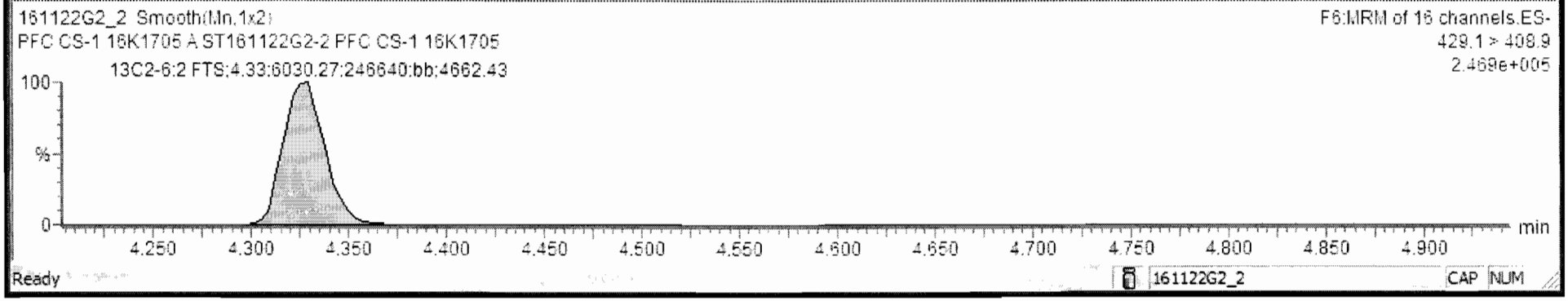
TargetLynx - 161122G2-CRV.qld - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_2 - ST161122G2-2 PFC CS-1 16K1705 - PFC CS-1 16K1705 A

	Name	Trace	Area	Response	RRF	Wt/VoL	RT	Conc.	%Rec	DL	%RSD	Coeff. Of D...
1	PFBA	213.1 > 168.8	4.29e2	0.259	0.518	1.000	1.93	0.608	121.7	0.0932282		0.9984
2	PFPeA	263.1 > 218.9	3.66e2	0.493	0.986	1.000	2.85	0.611	122.2	0.1266747		0.9987
3	PFBS	299 > 79.7	4.84e2	0.966	1.932	1.000	3.10	0.620	124.1	0.0821816		0.9986
4	PFHxA	313.2 > 268.9	3.91e2	0.376	0.751	1.000	3.47	0.612	122.3	0.0000000		0.9985
5	PFHpA	363 > 318.9	9.73e2	0.805	1.610	1.000	3.98	0.608	121.5	0.0901896		0.9993
6	PFHxS	398.9 > 79.8	4.64e2	0.965	1.931	1.000	4.09	0.576	115.3	0.0162512		0.9975
7	6:2 FTS	427.1 > 407	4.92e1	0.102	0.204	1.000	4.33	0.523	104.6	0.2838680		0.9769
8	PFOA	413 > 368.7	1.09e3	0.566	1.133	1.000	4.37	0.527	105.5	0.0000000		0.9990
9	PFHpS	449 > 98.7	5.82e1	0.030	0.061	1.000	4.46	0.577	115.3	0.2567614		0.9956
10	PFOS	499 >79.9	1.21e2	0.287	0.574	1.000	4.76	0.543	108.5	0.2386134		0.9935
11	PFNA	463 > 418.8	5.63e2	0.664	1.329	1.000	4.72	0.509	101.7	0.1047001		0.9954
12	PFDA	513 > 468.8	1.30e2	0.270	0.540	1.000	5.01	0.486	97.3	0.0368964		0.9973
13	8:2 FTS	527 > 506.9	4.13e1	0.243	0.486	1.000	4.99	0.485	97.0	0.0169968		0.9823





Ready 161122G2_2 CAP NUM

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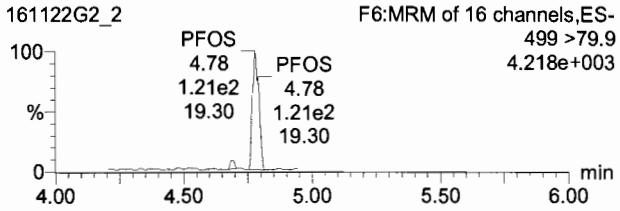
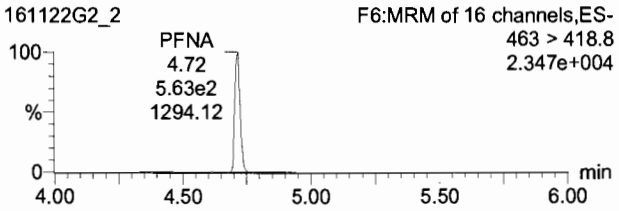
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_2, Date: 22-Nov-2016, Time: 10:00:32, ID: ST161122G2-2 PFC CS-1 16K1705, Description: PFC CS-1 16K1705 A

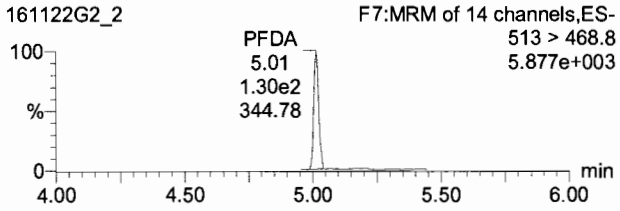
PFOS



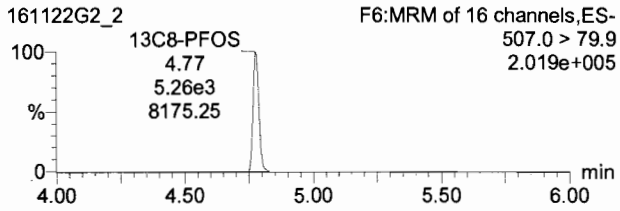
PFNA



PFDA



13C8-PFOS



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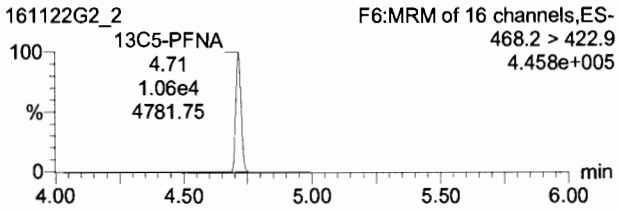
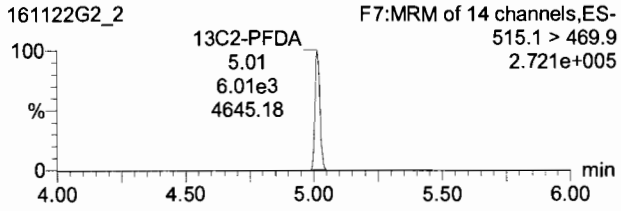


13C2-PFDA



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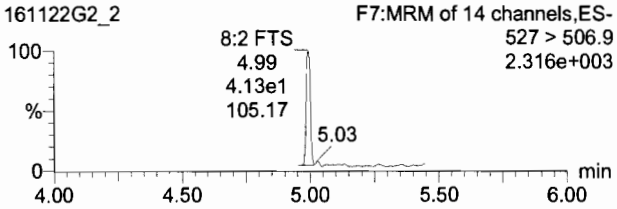
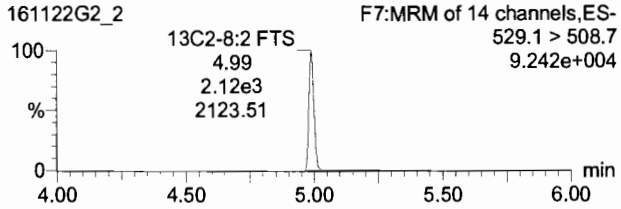
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_2, Date: 22-Nov-2016, Time: 10:00:32, ID: ST161122G2-2 PFC CS-1 16K1705, Description: PFC CS-1 16K1705 A

8:2 FTS



13C2-8:2 FTS

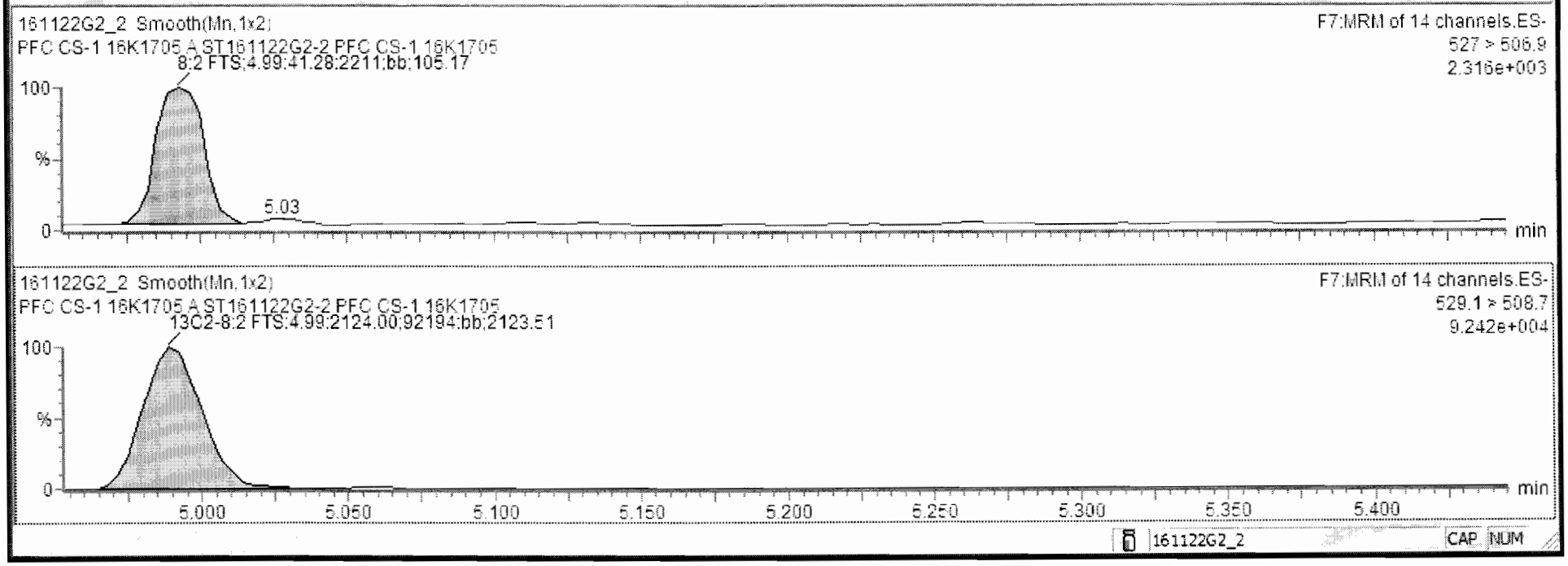


TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_2 - ST161122G2-2 PFC CS-1 16K1705 - PFC CS-1 16K1705 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	3.91e2		1.000	3.47	3.47	0.612	NO	122.3	0.0000000
5	PFHpA	363 > 318.9	9.73e2		1.000	3.98	3.98	0.608	NO	121.5	0.0903976
6	PFHxS	398.9 > 79.6	4.64e2		1.000	4.09	4.09	0.576	NO	115.3	0.0164070
7	6:2 FTS	427.1 > 407	4.92e1		1.000	4.33	4.33	0.645	NO	129.1	0.4501268
8	PFOA	413 > 368.7	1.09e3		1.000	4.37	4.37	0.527	NO	105.5	0.0000000
9	PFHpS	449 > 98.7	5.82e1		1.000	4.37	4.45	0.577	NO	115.3	0.2585335
10	PFOS	499 >79.9	1.21e2		1.000	4.78	4.78	0.543	NO	108.5	0.2465854
11	PFNA	463 > 418.8	5.63e2		1.000	4.71	4.72	0.509	NO	101.7	0.1048546
12	PFDA	513 > 468.8	1.30e2		1.000	5.01	5.01	0.486	NO	97.3	0.0375452
13	8:2 FTS	527 > 506.9	4.13e1		1.000	4.99	4.99	0.479	NO	95.9	0.0123962
14	13C3-PFBA	216.1 > 171.8	2.07e4	1.21	1.000	1.93	1.93	12.2	NO	97.8	0.0060004
15	13C3-PFPeA	266>221.8	9.28e3	0.448	1.000	2.83	2.86	12.5	NO	100.1	0.0125741
16	13C3-PFBS	302.0 > 98.8	6.26e3	0.302	1.000	3.09	3.10	12.5	NO	100.1	0.0062980



161122G2_2 CAP NUM

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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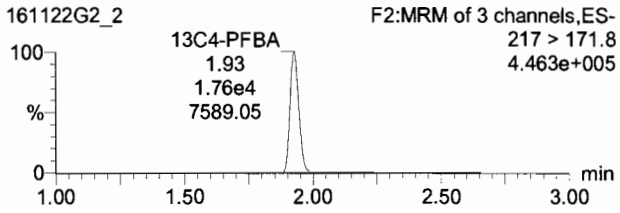
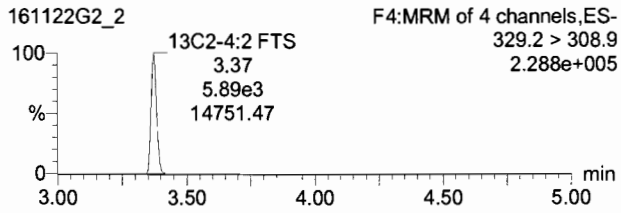
Name: 161122G2_2, Date: 22-Nov-2016, Time: 10:00:32, ID: ST161122G2-2 PFC CS-1 16K1705, Description: PFC CS-1 16K1705 A

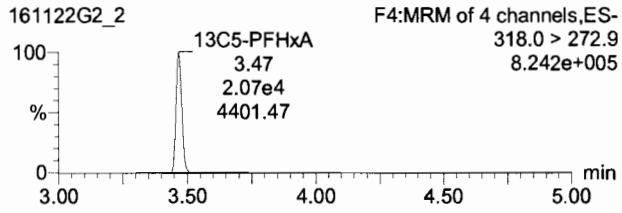
13C4-PFBA



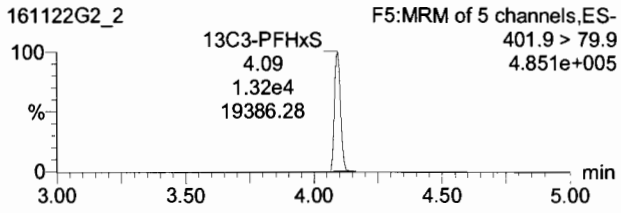
13C2-4:2 FTS



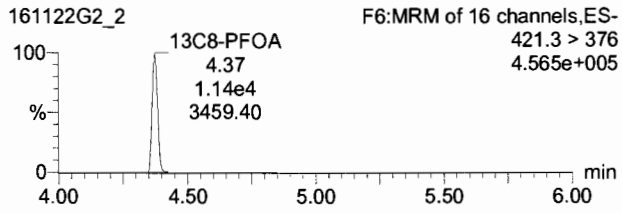
13C5-PFHxA



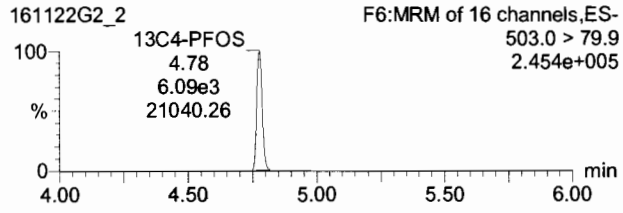
13C3-PFHxS



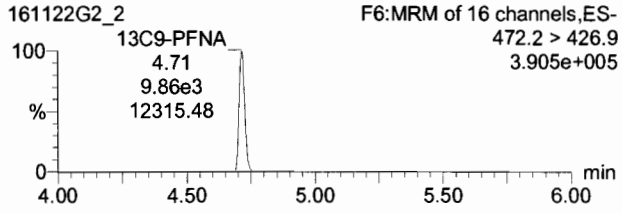
13C8-PFOA



13C4-PFOS



13C9-PFNA



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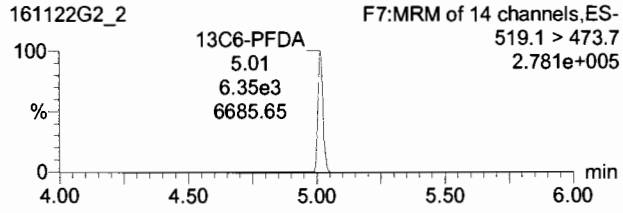

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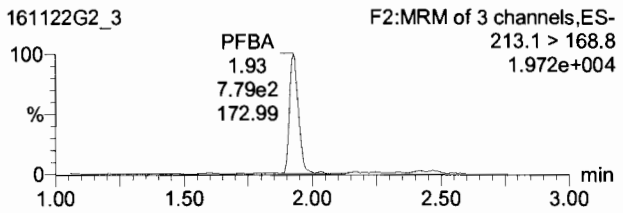

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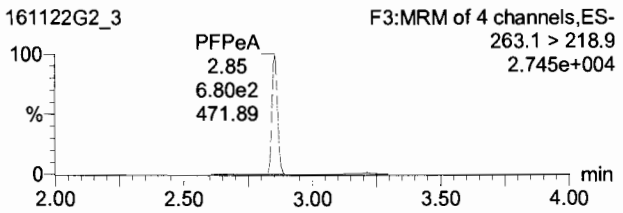

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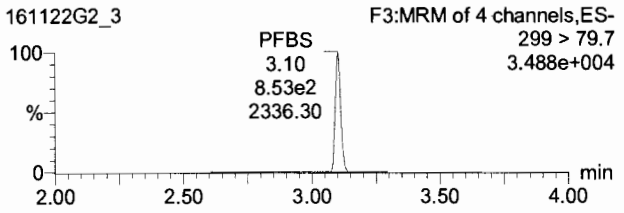

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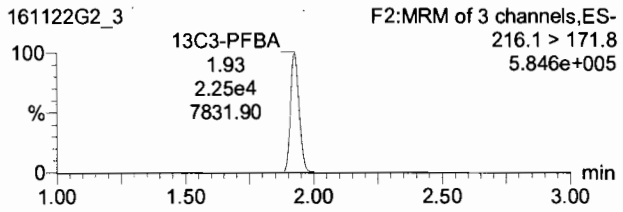

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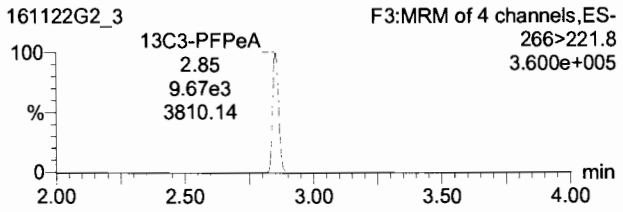

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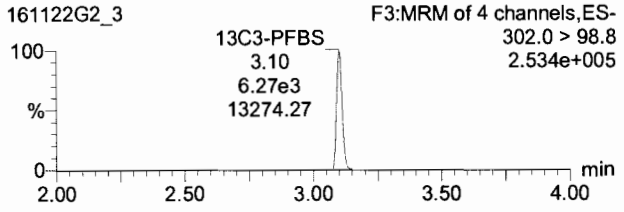

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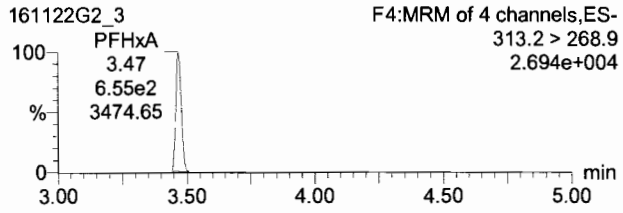

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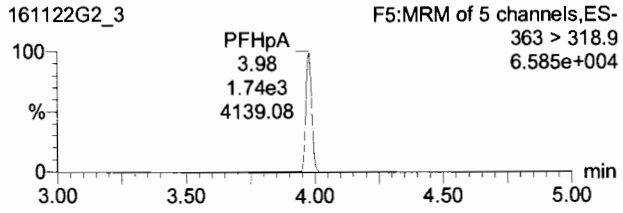

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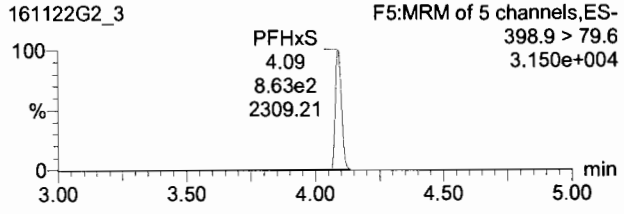

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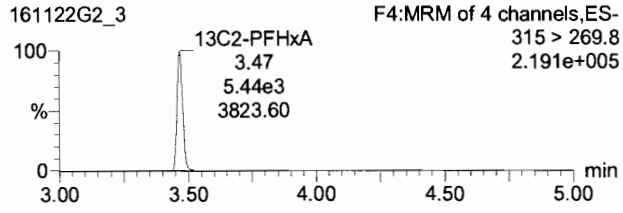

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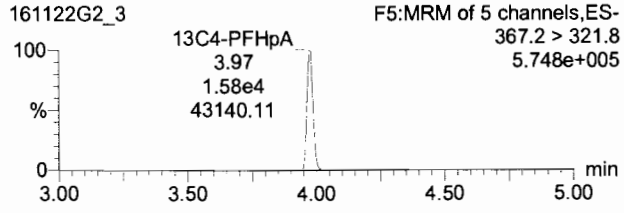
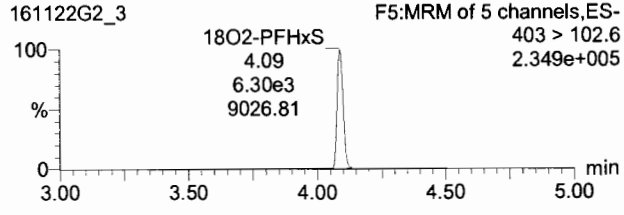


18O2-PFHxS



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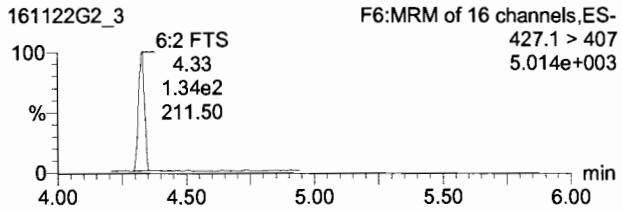
Name: 161122G2_3, Date: 22-Nov-2016, Time: 10:13:07, ID: ST161122G2-3 PFC CS0 16K1706, Description: PFC CS0 16K1706 A

6:2 FTS



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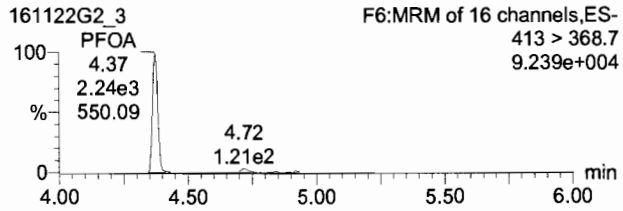

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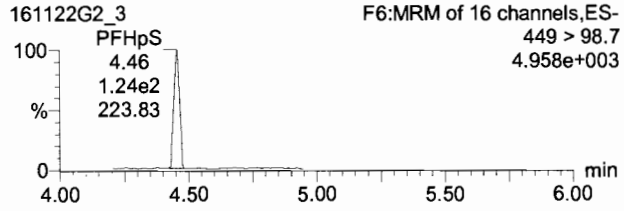

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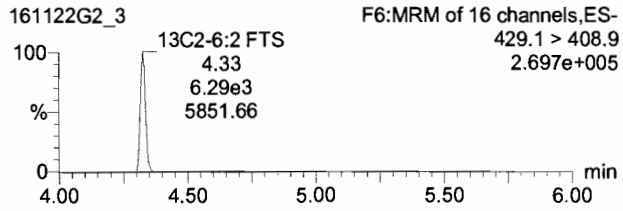

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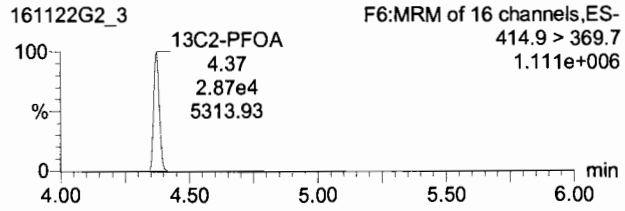

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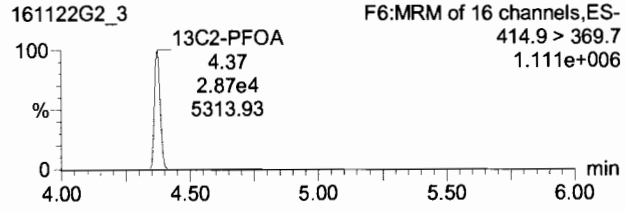

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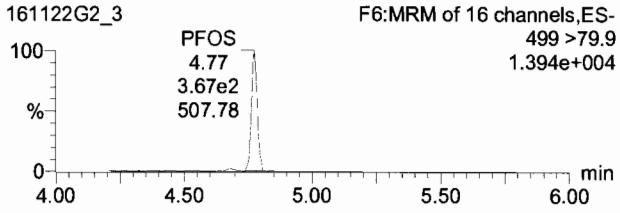

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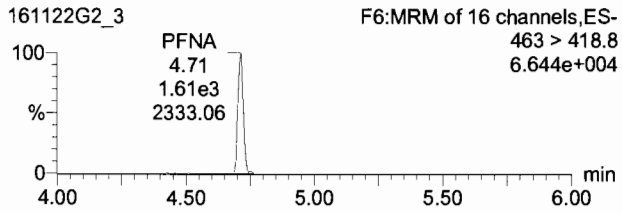

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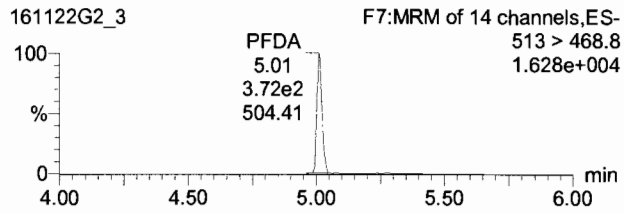

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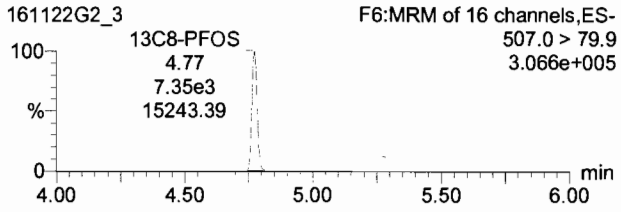

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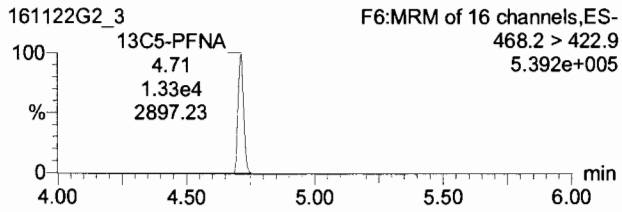

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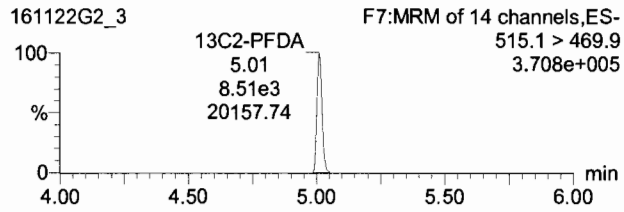

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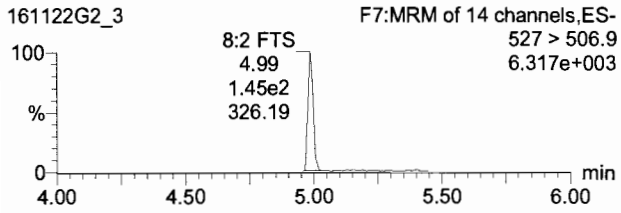
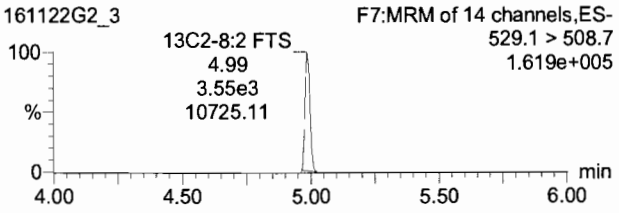


13C2-8:2 FTS

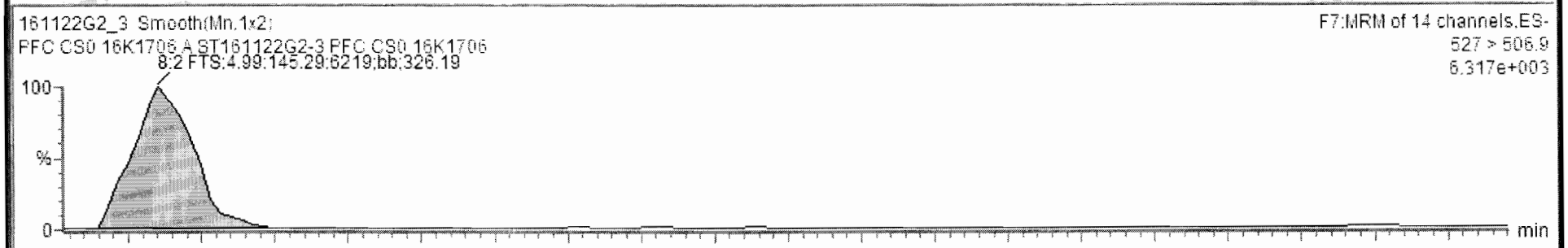


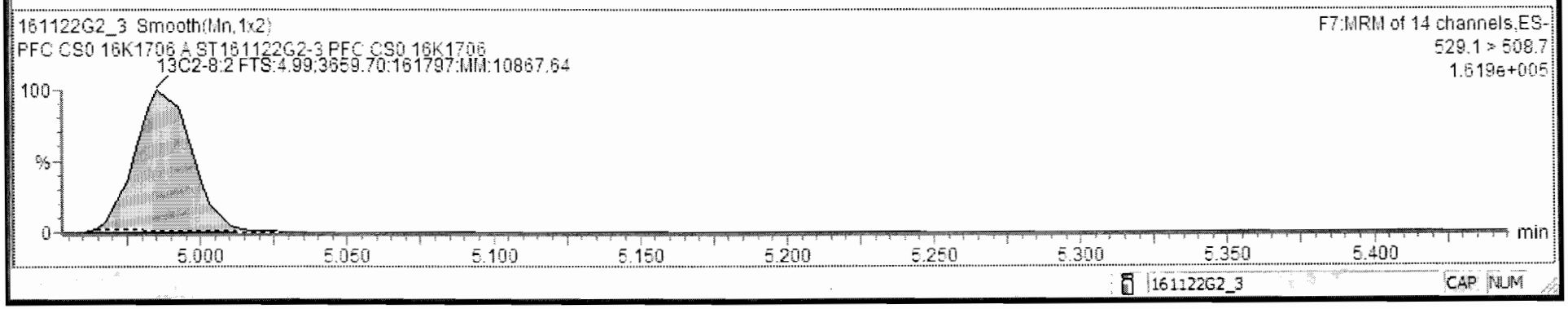
TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_3 - ST161122G2-3 PFC CS0 16K1706 - PFC CS0 16K1706 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	6.55e2		1.000	3.47	3.47	0.989	NO	98.9	0.0000000
5	PFHpA	363 > 318.9	1.74e3		1.000	3.97	3.98	0.979	NO	97.9	0.0897062
6	PFHxS	398.9 > 79.6	8.63e2		1.000	4.09	4.09	1.01	NO	101.1	0.0165248
7	6:2 FTS	427.1 > 407	1.34e2		1.000	4.33	4.33	0.971	NO	97.1	0.4490742
8	PFOA	413 > 368.7	2.24e3		1.000	4.37	4.37	0.983	NO	98.3	0.0000000
9	PFHpS	449 > 98.7	1.24e2		1.000	4.37	4.45	0.834	NO	83.4	0.2545461
10	PFOS	499 >79.9	3.67e2		1.000	4.78	4.77	0.947	NO	94.7	0.2020921
11	PFNA	463 > 418.8	1.61e3		1.000	4.71	4.71	1.02	NO	102.5	0.1049328
12	PFDA	513 > 468.8	3.72e2		1.000	5.01	5.01	0.949	NO	94.9	0.0381871
13	8:2 FTS	527 > 506.9	1.45e2		1.000	4.99	4.99	0.984	NO	98.4	0.0027010
14	13C3-PFBA	216.1 > 171.8	2.25e4	1.21	1.000	1.92	1.93	12.6	NO	101.0	0.0041450
15	13C3-PFPeA	266>221.8	9.67e3	0.448	1.000	2.83	2.85	12.4	NO	99.4	0.0077179
16	13C3-PFBS	302.0 > 98.8	6.27e3	0.302	1.000	3.09	3.10	11.9	NO	95.4	0.0023082





161122G2_3 CAP NUM

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Name: 161122G2_3, Date: 22-Nov-2016, Time: 10:13:07, ID: ST161122G2-3 PFC CS0 16K1706, Description: PFC CS0 16K1706 A

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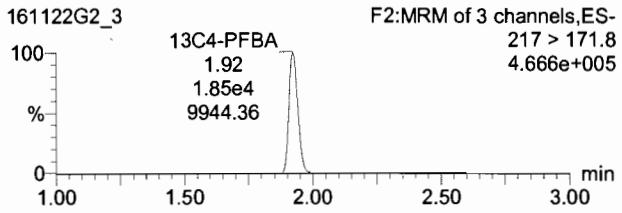

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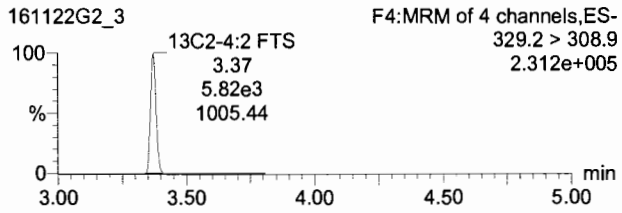

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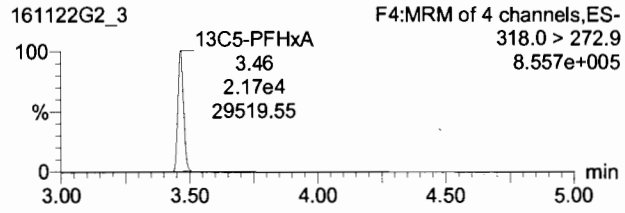

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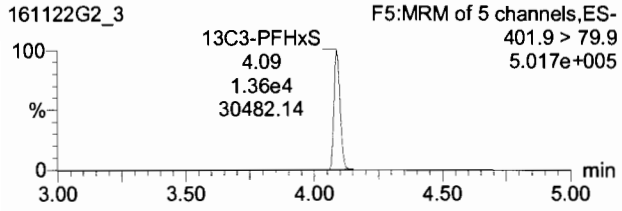

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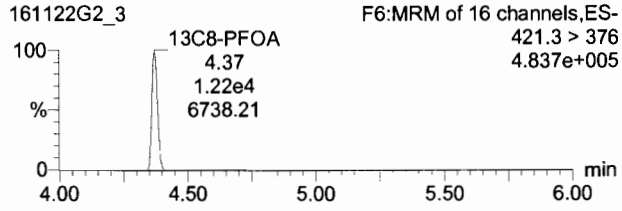

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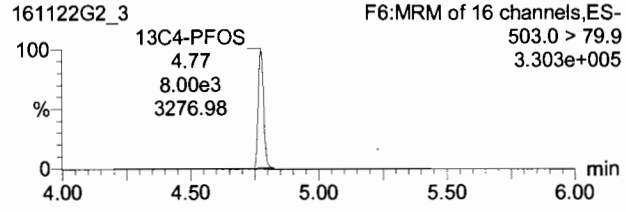

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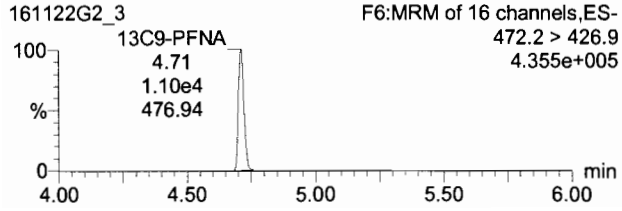

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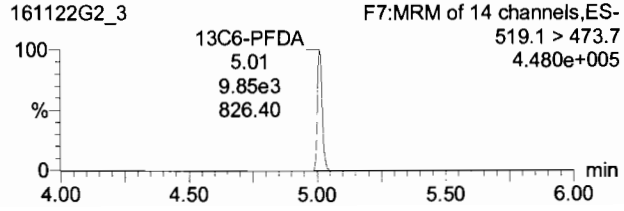

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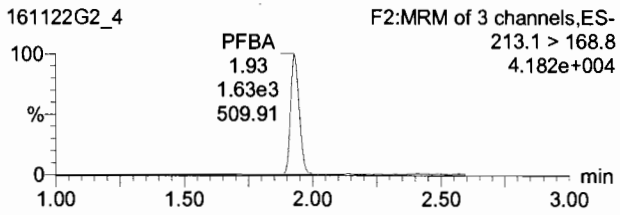

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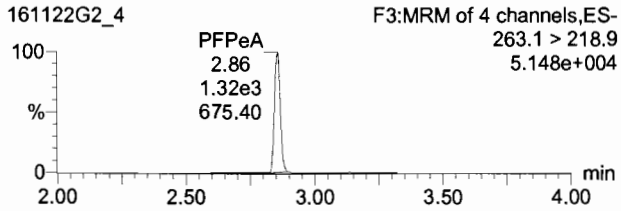
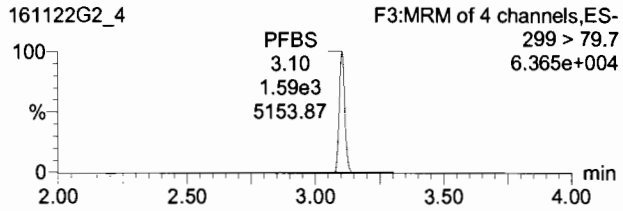


PFBS



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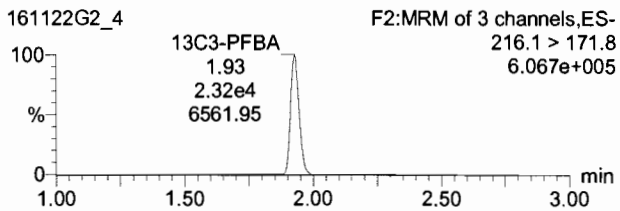

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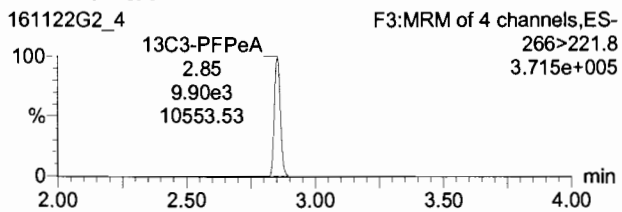

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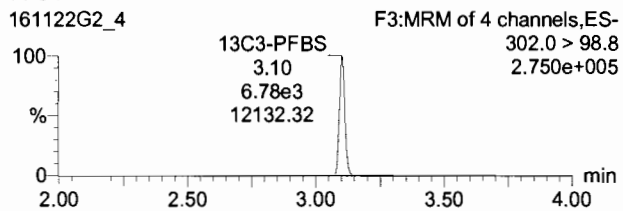

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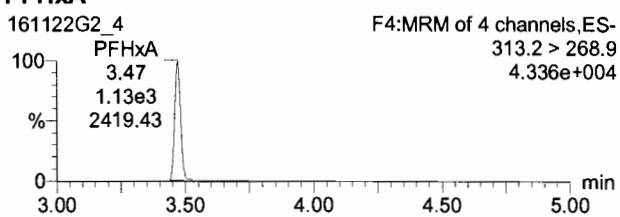

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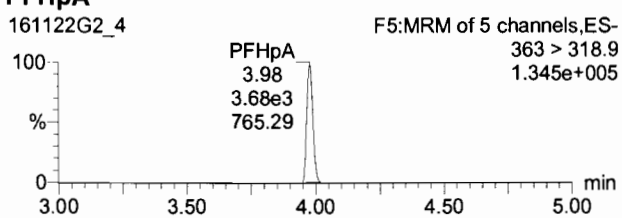

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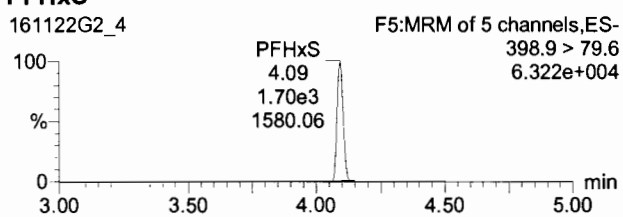

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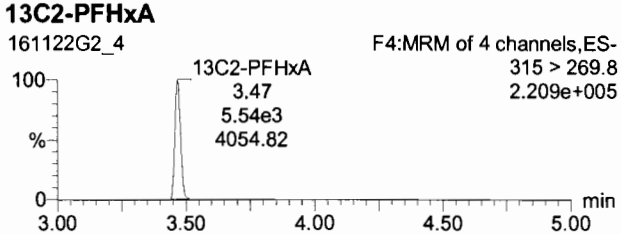

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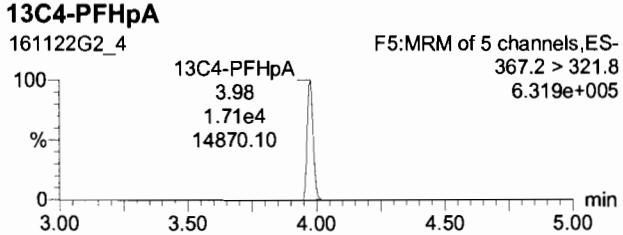

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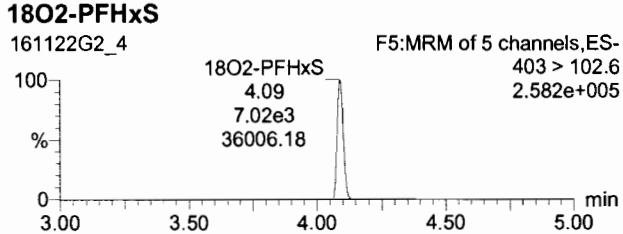

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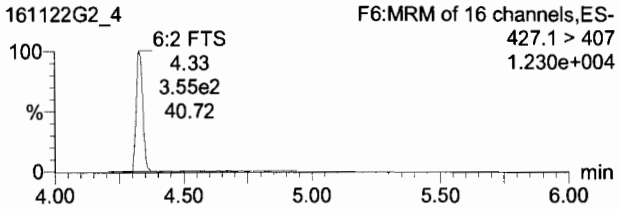
Name: 161122G2_4, Date: 22-Nov-2016, Time: 10:25:42, ID: ST161122G2-4 PFC CS1 16K1707, Description: PFC CS1 16K1707 A

6:2 FTS



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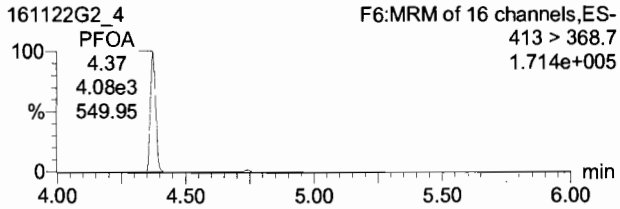

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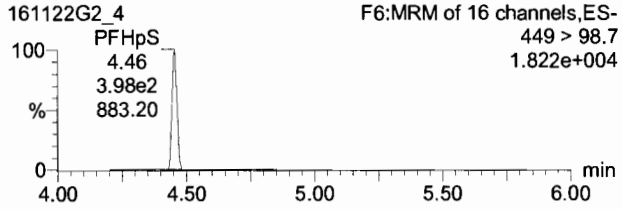

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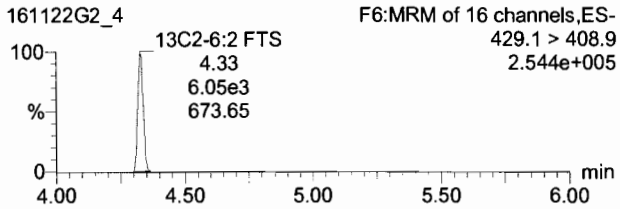

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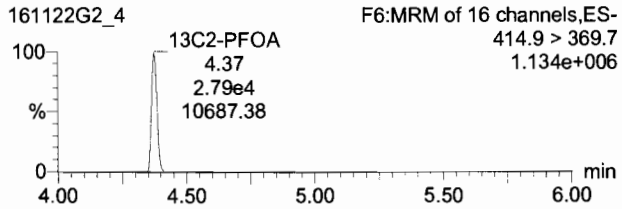

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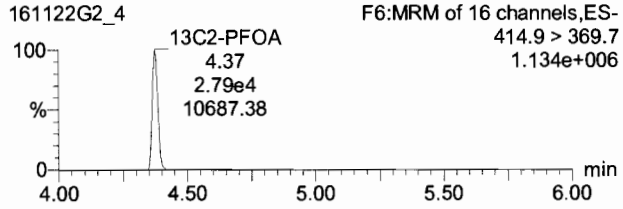

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Name: 161122G2_4, Date: 22-Nov-2016, Time: 10:25:42, ID: ST161122G2-4 PFC CS1 16K1707, Description: PFC CS1 16K1707 A

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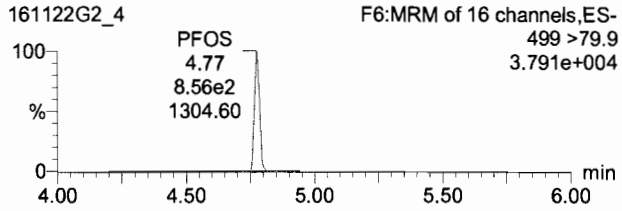

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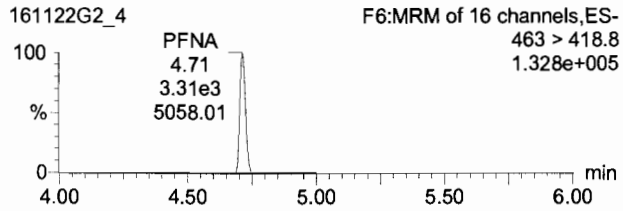

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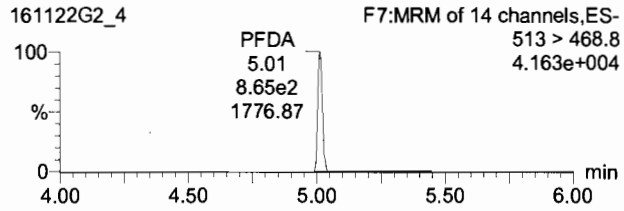

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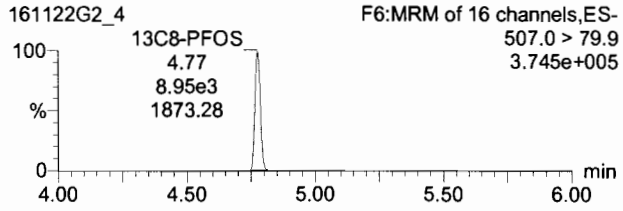

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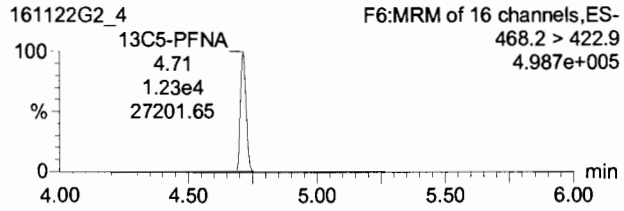

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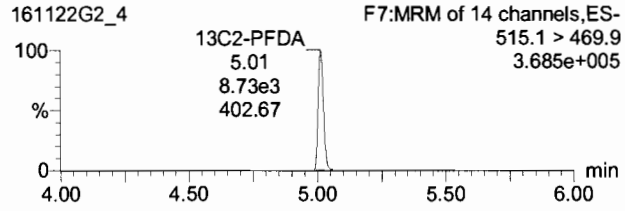

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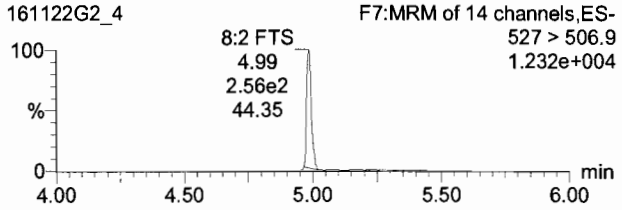
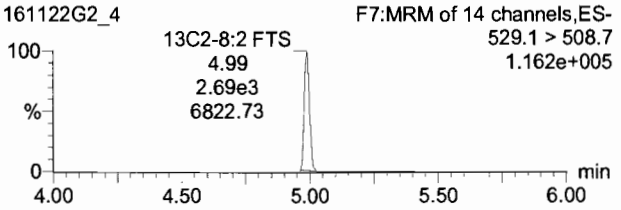
Name: 161122G2_4, Date: 22-Nov-2016, Time: 10:25:42, ID: ST161122G2-4 PFC CS1 16K1707, Description: PFC CS1 16K1707 A

8:2 FTS



13C2-8:2 FTS

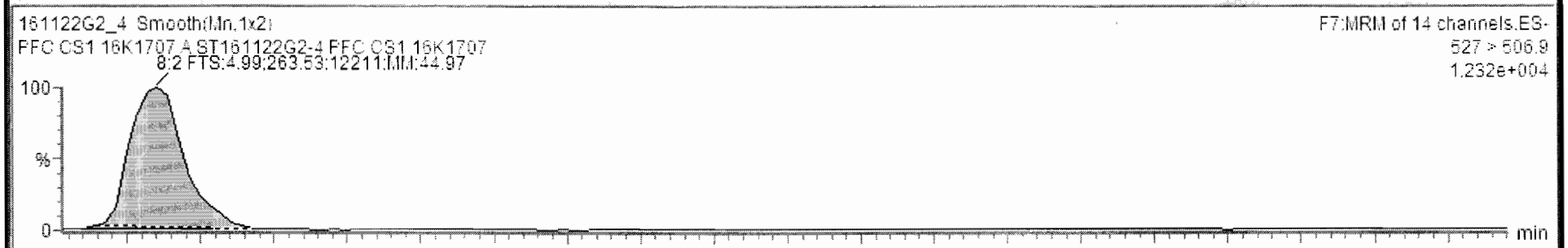


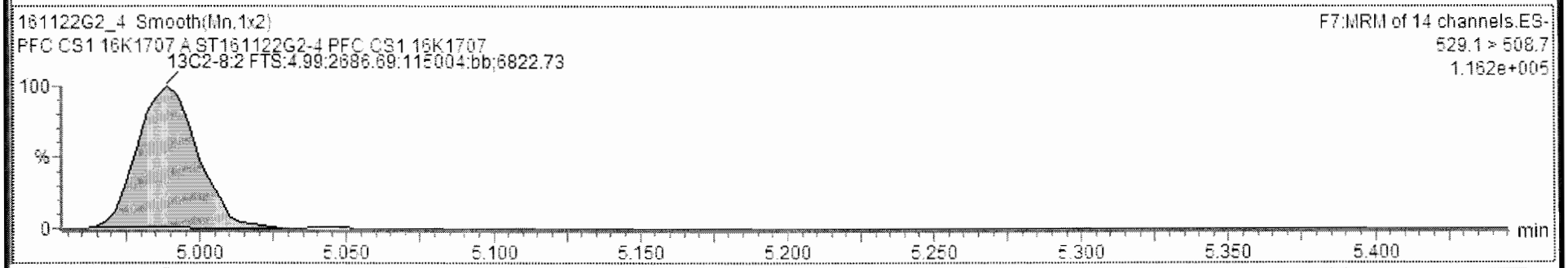
TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_4 - ST161122G2-4 PFC CS1 16K1707 - PFC CS1 16K1707 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	1.13e3		1.000	3.47	3.47	1.69	NO	84.7	0.0000000
5	PFHpA	363 > 318.9	3.68e3		1.000	3.98	3.98	1.82	NO	90.8	0.0947461
6	PFHxS	398.9 > 79.6	1.70e3		1.000	4.09	4.09	1.78	NO	88.8	0.0182811
7	6:2 FTS	427.1 > 407	3.55e2		1.000	4.33	4.33	1.90	NO	94.8	0.5167321
8	PFOA	413 > 368.7	4.08e3		1.000	4.37	4.37	1.93	NO	96.6	0.0000000
9	PFHpS	449 > 98.7	3.98e2		1.000	4.37	4.45	2.18	NO	109.2	0.2540463
10	PFOS	499 >79.9	8.56e2		1.000	4.78	4.77	1.63	NO	81.6	0.2016580
11	PFNA	463 > 418.8	3.31e3		1.000	4.71	4.71	2.16	NO	107.8	0.1049312
12	PFDA	513 > 468.8	8.65e2		1.000	5.01	5.01	2.11	NO	105.6	0.0369790
13	8:2 FTS	527 > 506.9	2.64e2		1.000	4.99	4.99	2.44	NO	122.1	0.1423108
14	13C3-PFBA	216.1 > 171.8	2.32e4	1.21	1.000	1.93	1.93	13.4	NO	107.0	0.0051901
15	13C3-PFPeA	266>221.8	9.90e3	0.448	1.000	2.83	2.85	13.1	NO	104.8	0.0029331
16	13C3-PFBS	302.0 > 98.8	6.78e3	0.302	1.000	3.09	3.10	13.3	NO	106.4	0.0028004





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Name: 161122G2_4, Date: 22-Nov-2016, Time: 10:25:42, ID: ST161122G2-4 PFC CS1 16K1707, Description: PFC CS1 16K1707 A

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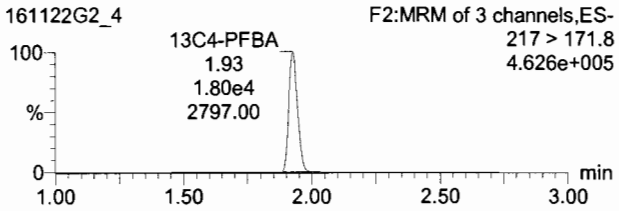

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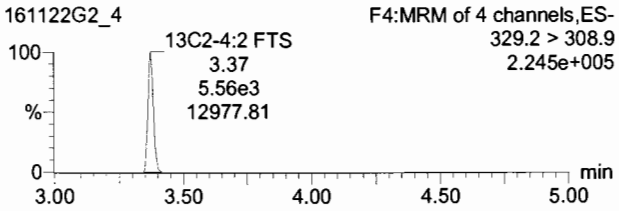

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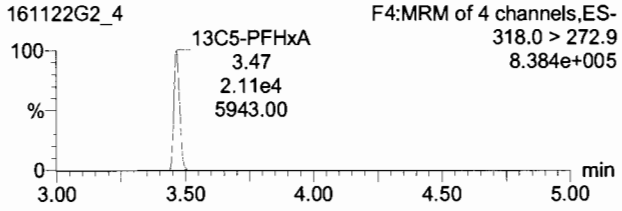

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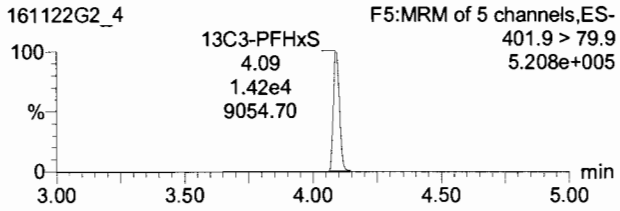

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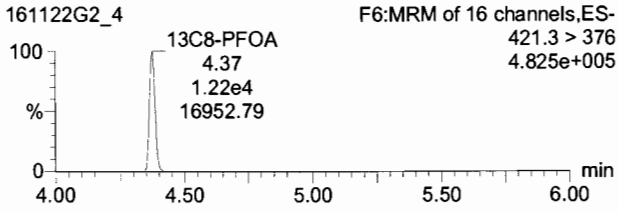

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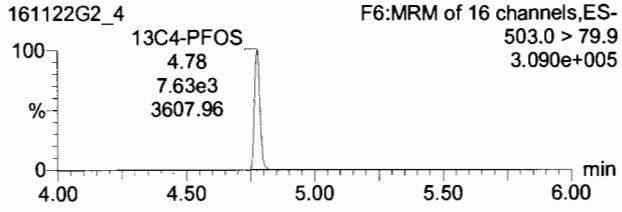

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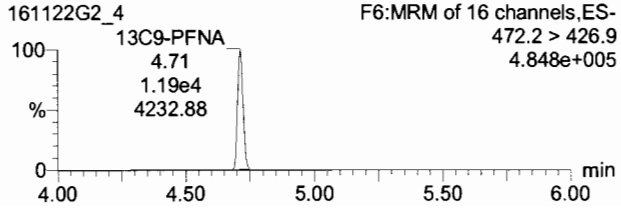

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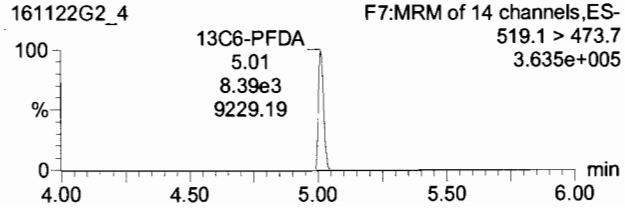

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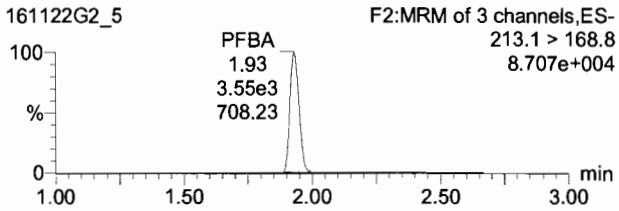

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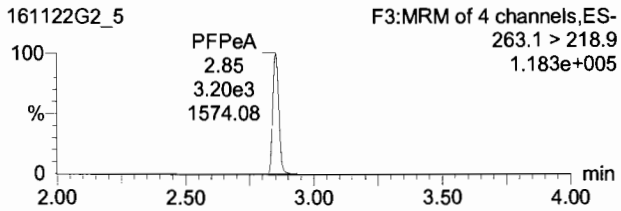

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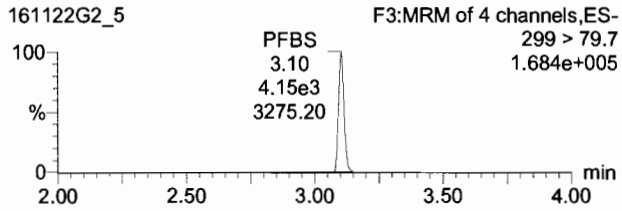

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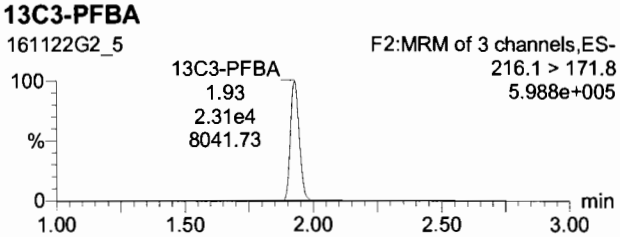

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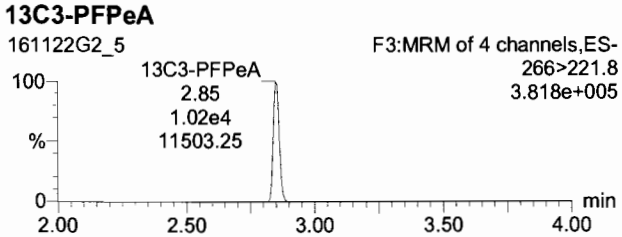

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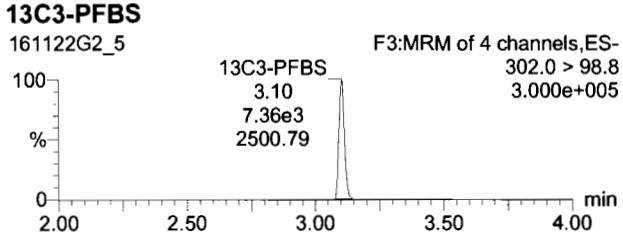

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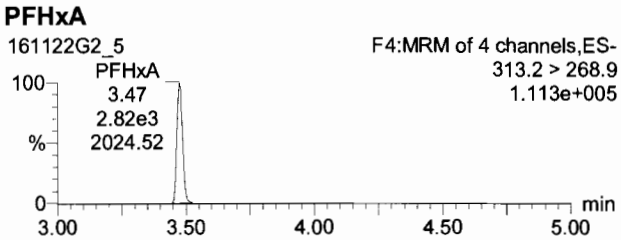

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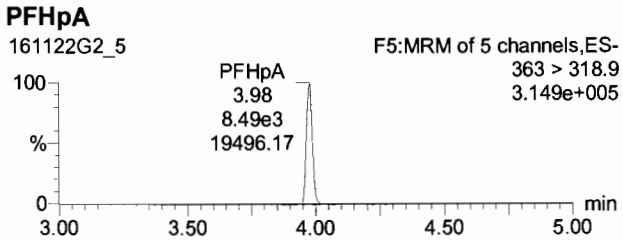

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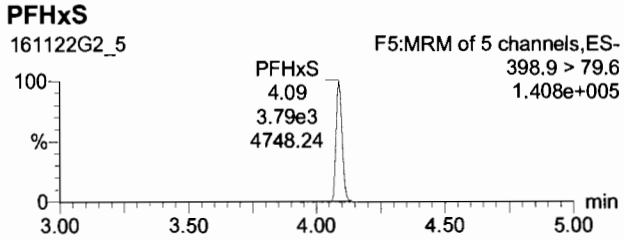
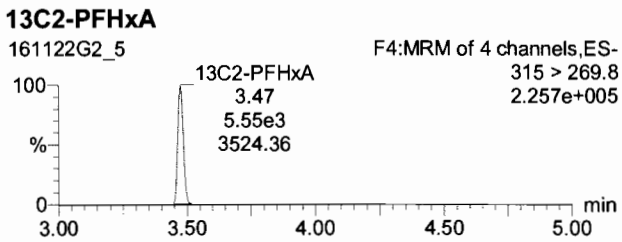


13C2-PFHxA



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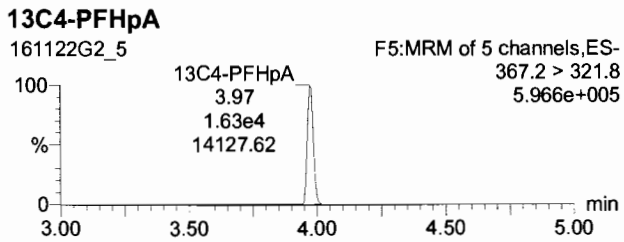
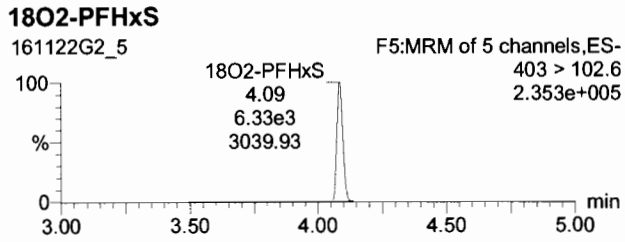


18O2-PFHxS



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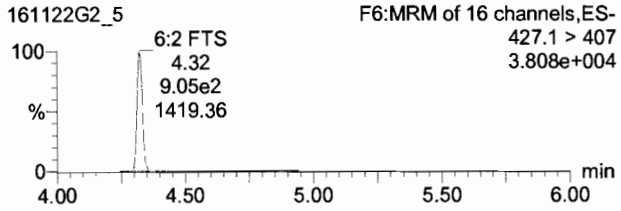
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_5, Date: 22-Nov-2016, Time: 10:38:18, ID: ST161122G2-5 PFC CS2 16K1708, Description: PFC CS2 16K1708 A

6:2 FTS



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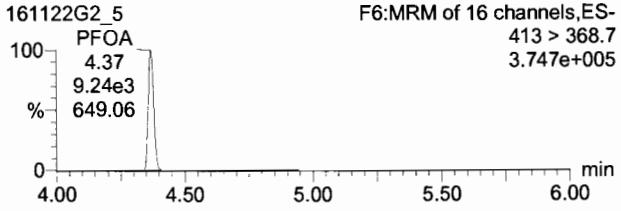

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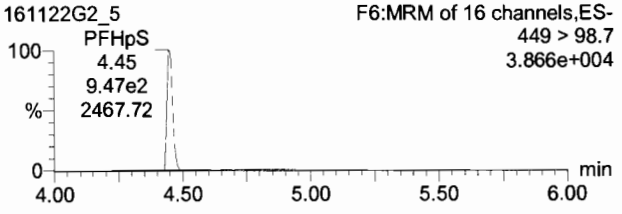
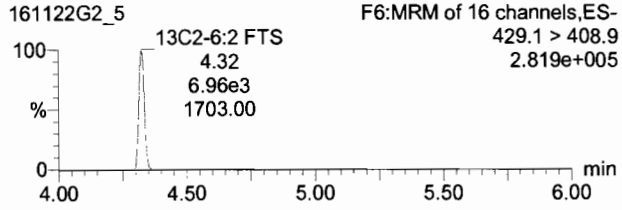


13C2-6:2 FTS



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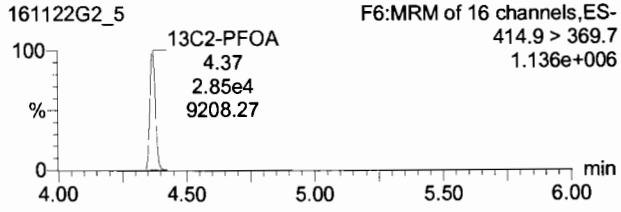

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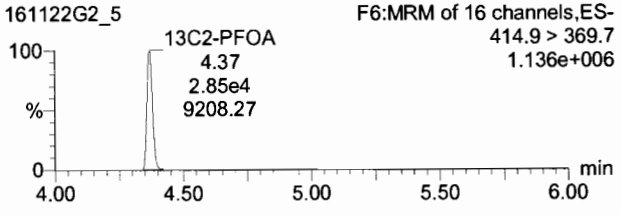
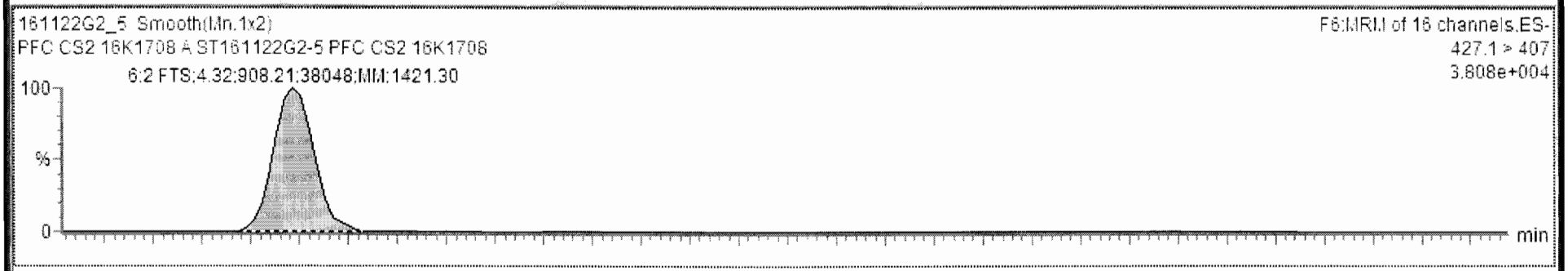


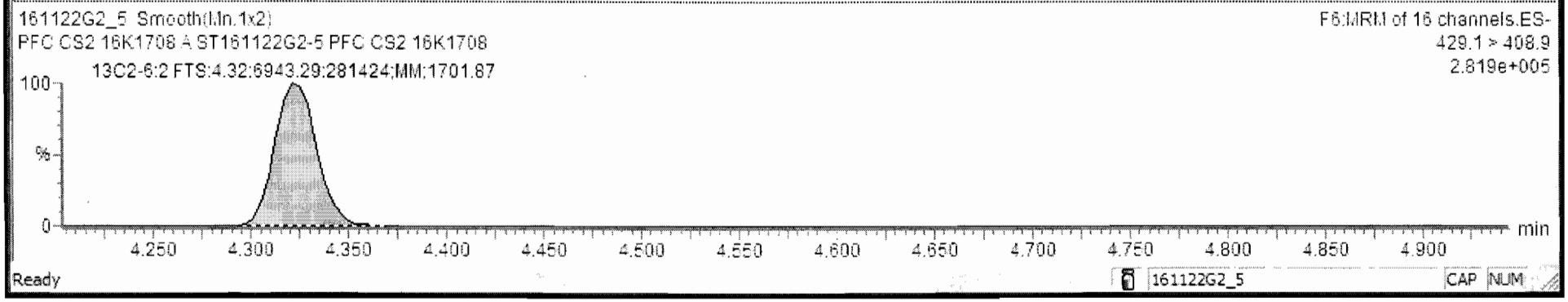
TargetLynx - untitled * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_5 - ST161122G2-5 PFC CS2 16K1708 - PFC CS2 16K1708 A

	Name	Trace	Area	Response	RRF	Wt/VoL	RT	Conc.	%Rec	DL	%RSD	Coeff. Of D...
4	PFHxA	313.2 > 268.9	2.82e3	2.538	0.508	1.000	3.47	4.23	84.5	0.0000000		0.9985
5	PFHpA	363 > 318.9	8.49e3	8.514	1.303	1.000	3.98	4.28	85.7	0.0898946		0.9993
6	PFHxS	398.9 > 79.6	3.79e3	7.475	1.495	1.000	4.09	4.36	87.2	0.0177628		0.9975
7	6:2 FTS	427.1 > 407	9.08e2	1.635	0.327	1.000	4.32	4.17	83.4	0.2827957		0.9789
8	PFOA	413 > 368.7	9.24e3	4.054	0.811	1.000	4.37	4.40	88.1	0.0000000		0.9990
9	PFHpS	449 > 98.7	9.47e2	0.416	0.083	1.000	4.45	4.76	95.2	0.2525704		0.9956
10	PFOS	499 >79.9	2.17e3	3.949	0.790	1.000	4.77	4.93	98.6	0.2032607		0.9935
11	PFNA	463 > 418.8	7.19e3	7.012	1.402	1.000	4.71	4.37	87.5	0.1046439		0.9954
12	PFDA	513 > 468.8	1.70e3	2.630	0.526	1.000	5.01	4.44	88.9	0.0382137		0.9973
13	8:2 FTS	527 > 506.9	4.40e2	2.081	0.416	1.000	4.99	4.15	82.9	0.0148202		0.9823
14	13C3-PFBA	216.1 > 171.8	2.31e4	15.177	1.214	1.000	1.93	12.6	100.8	0.0039178	4.60	
15	13C3-PFPeA	266>221.8	1.02e4	5.822	0.466	1.000	2.85	13.0	104.1	0.0026412	3.92	
16	13C3-PFBS	302.0 > 98.8	7.36e3	4.183	0.335	1.000	3.10	13.8	110.8	0.0141320	5.67	





Ready 161122G2_5 CAP NUM

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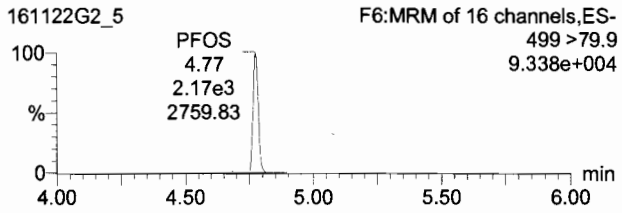
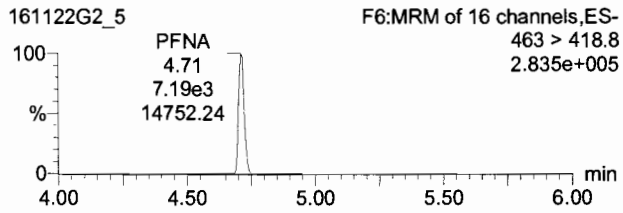
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_5, Date: 22-Nov-2016, Time: 10:38:18, ID: ST161122G2-5 PFC CS2 16K1708, Description: PFC CS2 16K1708 A

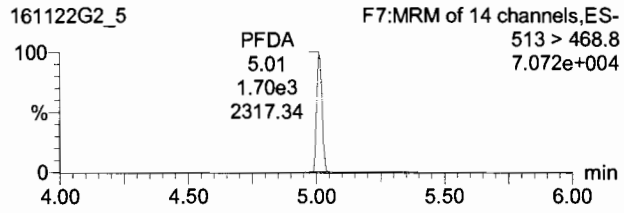
PFOS



PFNA



PFDA



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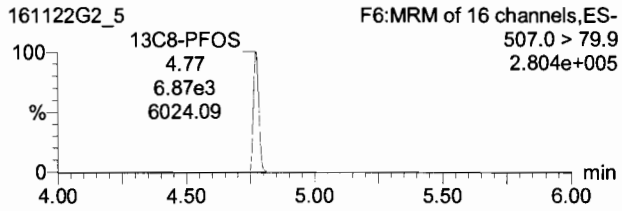
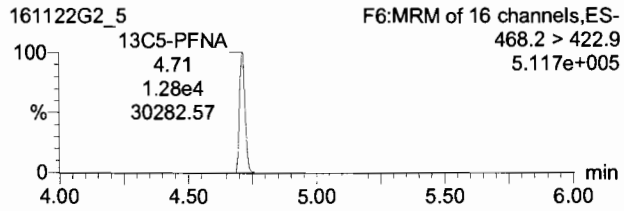
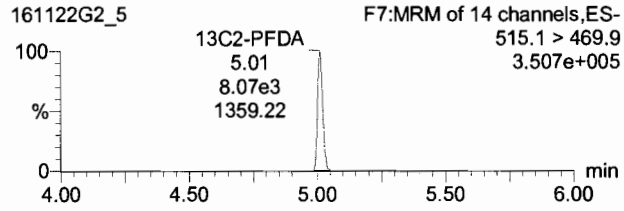


13C5-PFNA



13C2-PFDA



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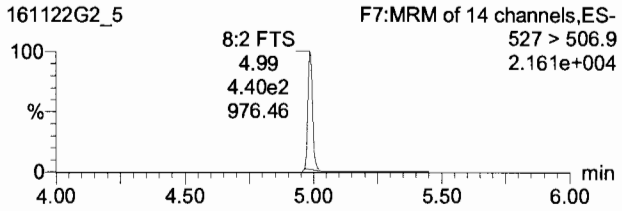
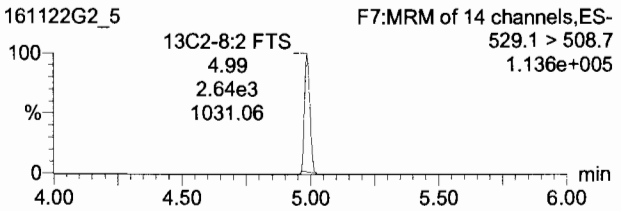
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_5, Date: 22-Nov-2016, Time: 10:38:18, ID: ST161122G2-5 PFC CS2 16K1708, Description: PFC CS2 16K1708 A

8:2 FTS



13C2-8:2 FTS

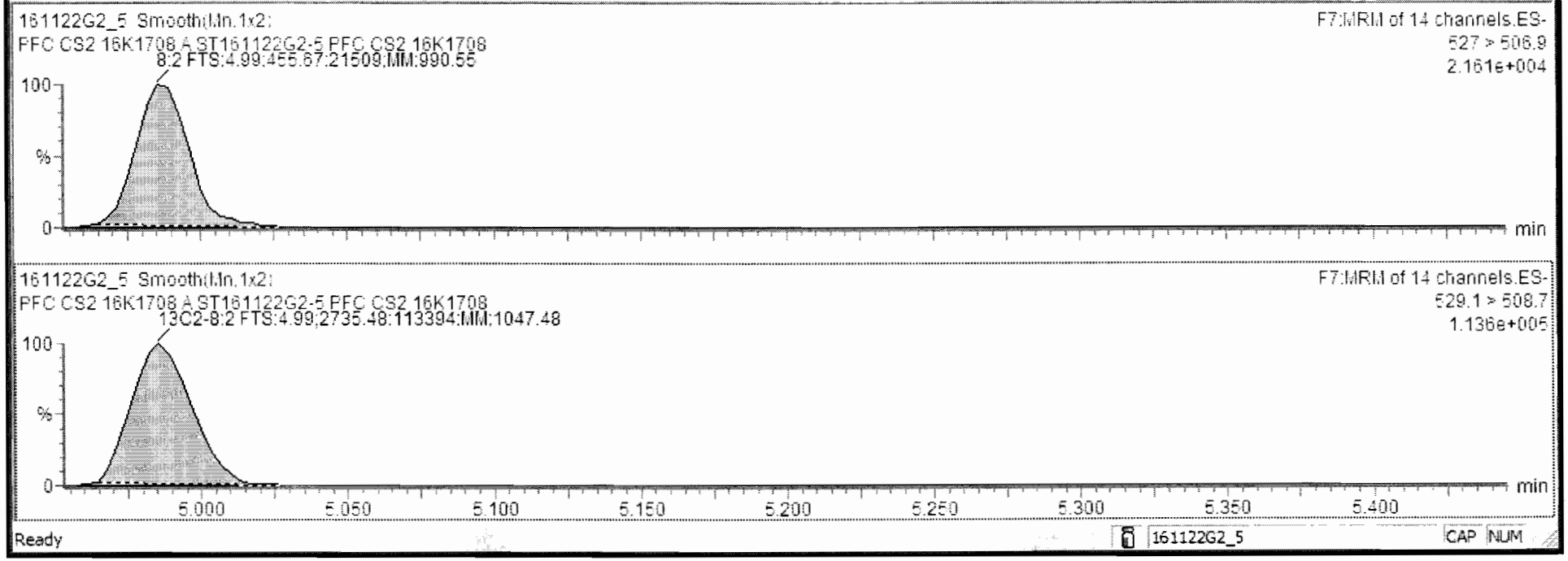


TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_5 - ST161122G2-5 PFC CS2 16K1708 - PFC CS2 16K1708 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	2.82e3		1.000	3.47	3.47	4.23	NO	84.5	0.0000000
5	PFHpA	363 > 318.9	8.49e3		1.000	3.97	3.98	4.28	NO	85.7	0.0896946
6	PFHxS	398.9 > 79.6	3.79e3		1.000	4.09	4.09	4.36	YES	87.2	0.0177626
7	6:2 FTS	427.1 > 407	9.08e2		1.000	4.32	4.32	3.69	NO	73.9	0.4496157
8	PFOA	413 > 368.7	9.24e3		1.000	4.37	4.37	4.40	YES	88.1	0.0000000
9	PFHpS	449 > 98.7	9.47e2		1.000	4.37	4.45	4.76	YES	95.2	0.2525704
10	PFOS	499 >79.9	2.17e3		1.000	4.77	4.77	4.93	YES	98.6	0.2032607
11	PFNA	463 > 418.8	7.19e3		1.000	4.71	4.71	4.37	YES	87.5	0.1046439
12	PFDA	513 > 468.8	1.70e3		1.000	5.01	5.01	4.44	NO	88.9	0.0382137
13	8:2 FTS	527 > 506.9	4.56e2		1.000	4.99	4.99	4.16	NO	83.2	0.0072296
14	13C3-PFBA	216.1 > 171.8	2.31e4	1.21	1.000	1.93	1.93	12.6	NO	100.8	0.0039178
15	13C3-PFPeA	266>221.8	1.02e4	0.448	1.000	2.84	2.85	13.0	NO	104.1	0.0026412
16	13C3-PFBS	302.0 > 98.8	7.36e3	0.302	1.000	3.10	3.10	13.8	NO	110.8	0.0141320



Ready 161122G2_5 CAP NUM

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_5, Date: 22-Nov-2016, Time: 10:38:18, ID: ST161122G2-5 PFC CS2 16K1708, Description: PFC CS2 16K1708 A

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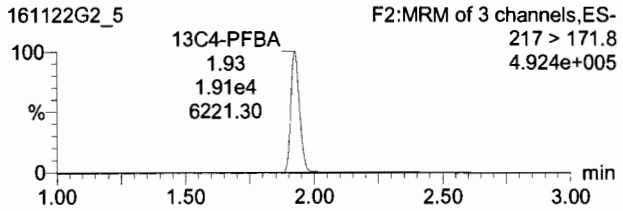
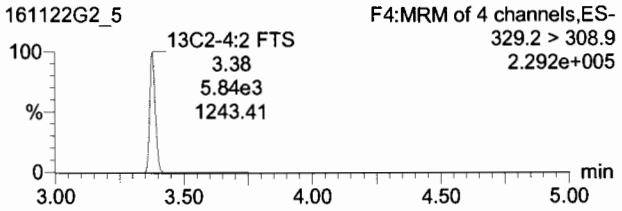


13C2-4:2 FTS



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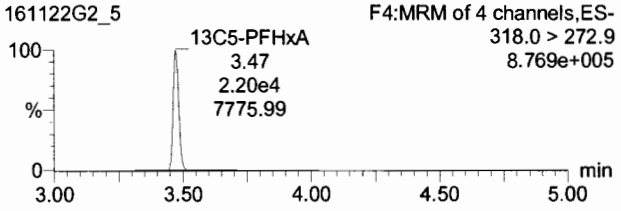

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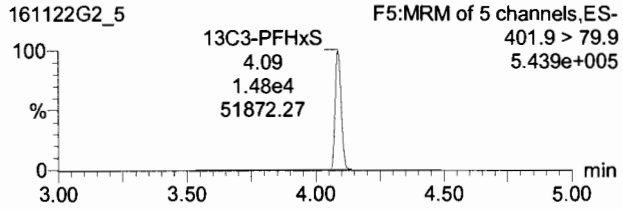

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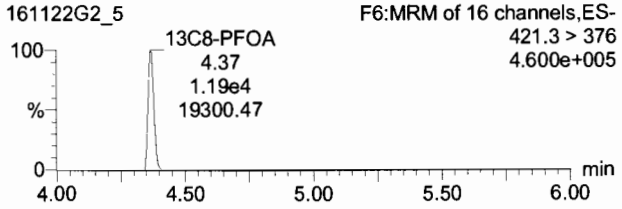
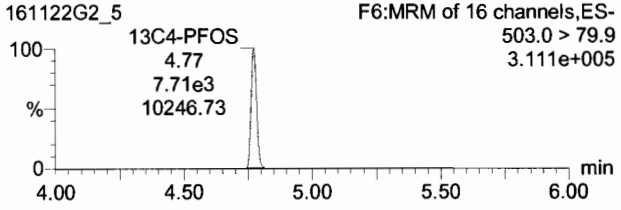


13C4-PFOS



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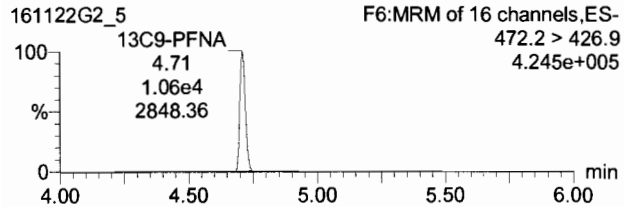
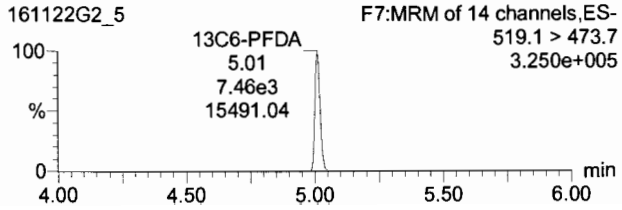


13C6-PFDA



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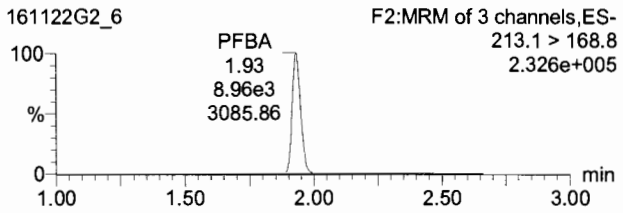
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_6, Date: 22-Nov-2016, Time: 10:50:54, ID: ST161122G2-6 PFC CS3 16K1709, Description: PFC CS3 16K1709 A

PFBA



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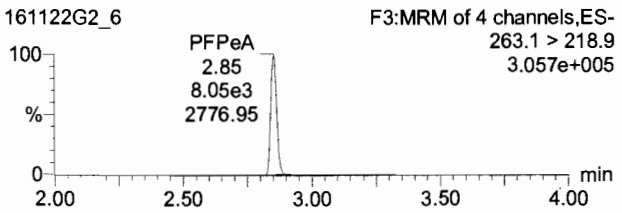
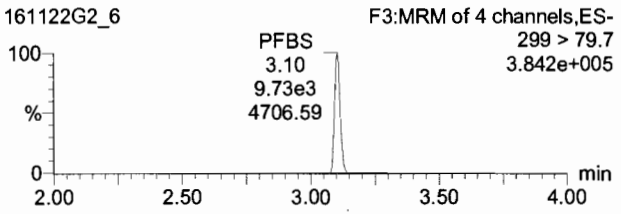


PFBS



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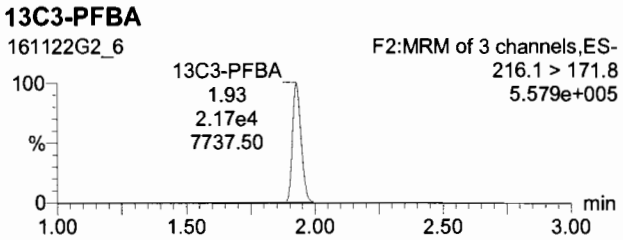

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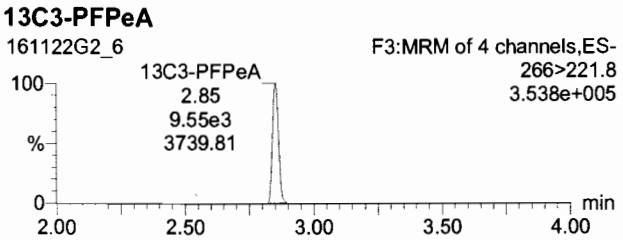

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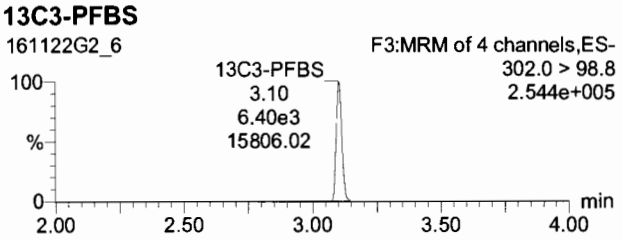
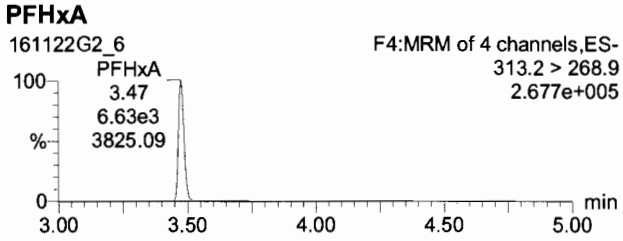


PFHxA



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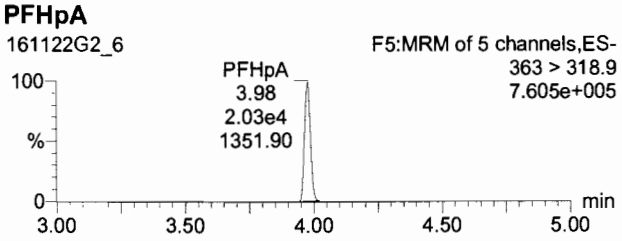

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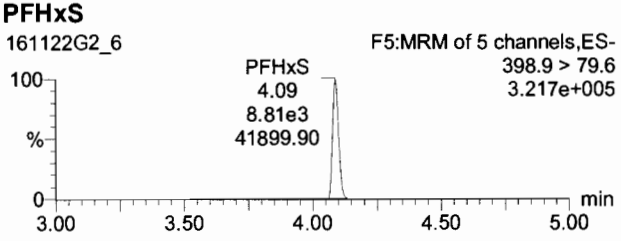

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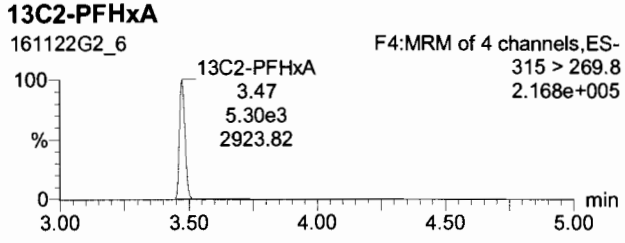

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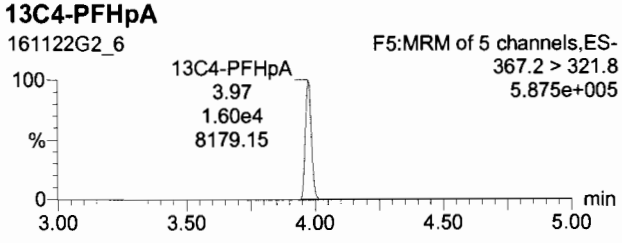
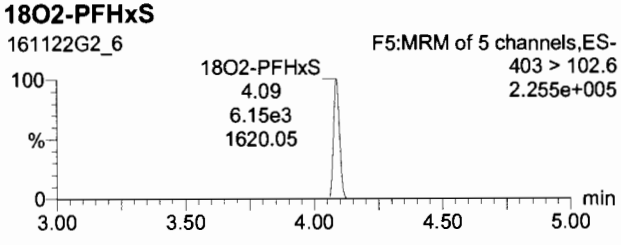


18O2-PFHxS



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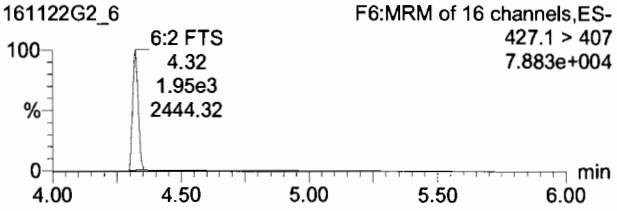
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_6, Date: 22-Nov-2016, Time: 10:50:54, ID: ST161122G2-6 PFC CS3 16K1709, Description: PFC CS3 16K1709 A

6:2 FTS



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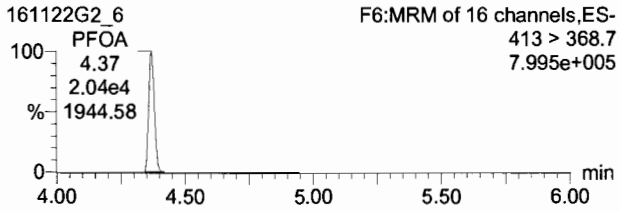

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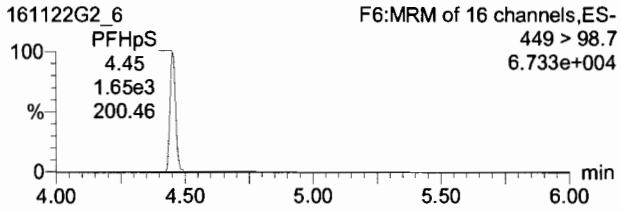

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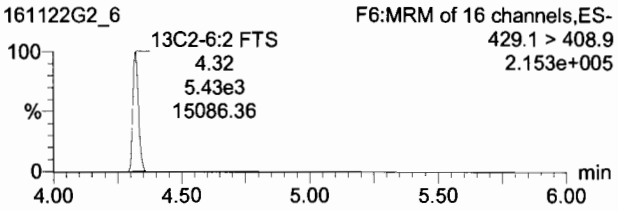

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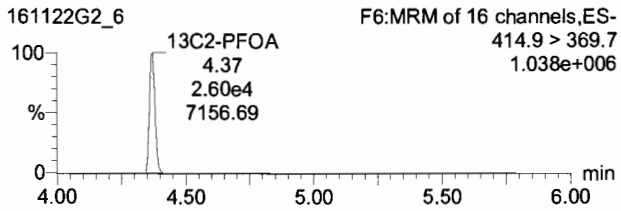

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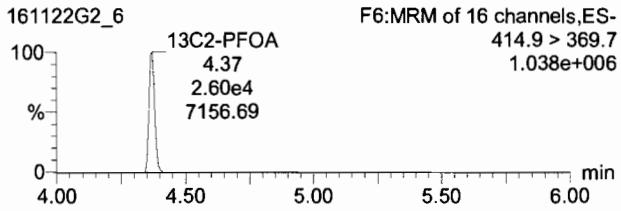

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Name: 161122G2_6, Date: 22-Nov-2016, Time: 10:50:54, ID: ST161122G2-6 PFC CS3 16K1709, Description: PFC CS3 16K1709 A

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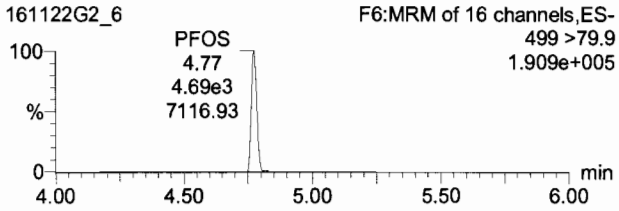

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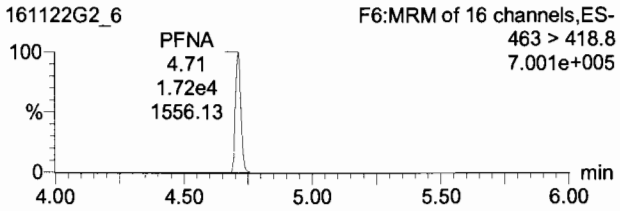

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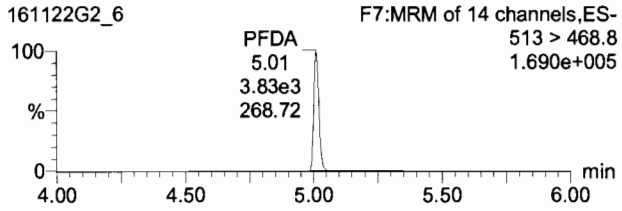

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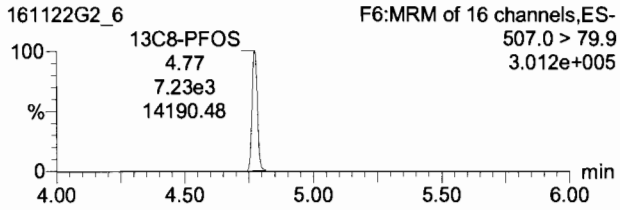

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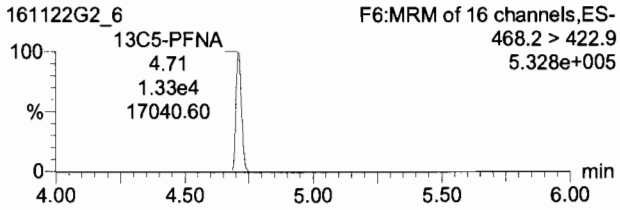

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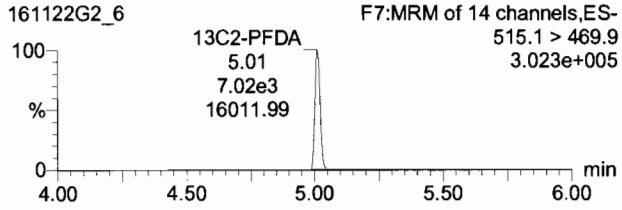

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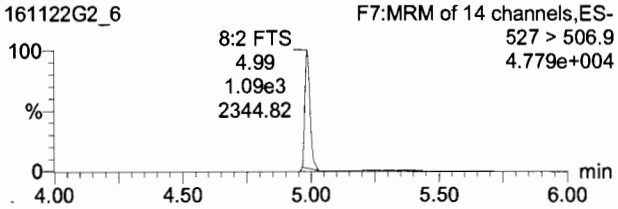
8:2 FTS



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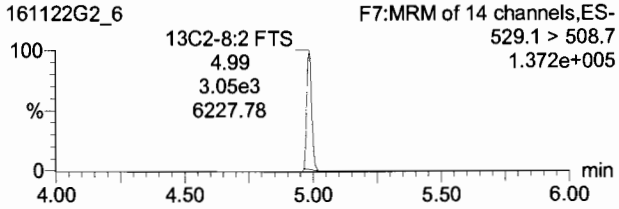
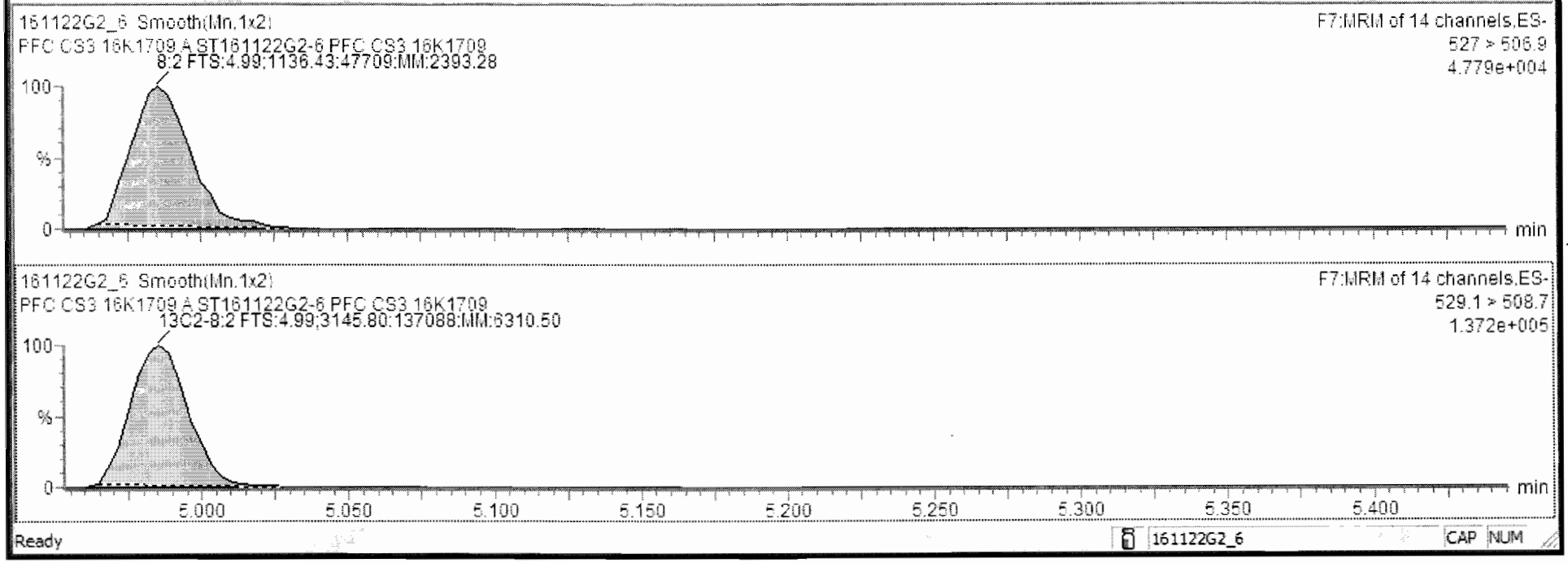


TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_6 - ST161122G2-6 PFC CS3 16K1709 - PFC CS3 16K1709 A

	Name	Trace	Area	RRF	Wt/Vol	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	6.63e3		1.000	3.47	3.47	10.4	YES	104.3	0.0000000
5	PFHpA	363 > 318.9	2.03e4		1.000	3.97	3.98	10.3	YES	103.0	0.1083914
6	PFHxS	398.9 > 79.6	8.81e3		1.000	4.09	4.09	10.4	YES	104.1	0.0160911
7	6:2 FTS	427.1 > 407	1.95e3		1.000	4.32	4.32	9.48	YES	94.8	0.4528547
8	PFOA	413 > 368.7	2.04e4		1.000	4.37	4.37	10.8	YES	108.1	0.0000000
9	PFHpS	449 > 98.7	1.65e3		1.000	4.37	4.45	8.86	YES	88.6	0.3575371
10	PFOS	499 >79.9	4.65e3		1.000	4.76	4.77	9.90	YES	99.0	0.2020896
11	PFNA	463 > 418.8	1.72e4		1.000	4.71	4.71	10.0	YES	100.1	0.1200018
12	PFDA	513 > 468.8	3.83e3		1.000	5.01	5.01	11.5	NO	114.8	0.1427597
13	8:2 FTS	527 > 506.9	1.14e3		1.000	4.99	4.99	9.07	YES	90.7	0.0043622
14	13C3-PFBA	216.1 > 171.8	2.17e4	1.21	1.000	1.93	1.93	13.3	NO	106.8	0.0044280
15	13C3-PFPeA	266>221.8	9.55e3	0.448	1.000	2.84	2.85	12.4	NO	99.4	0.0076173
16	13C3-PFBS	302.0 > 98.8	6.40e3	0.302	1.000	3.10	3.10	12.3	NO	98.6	0.0019245



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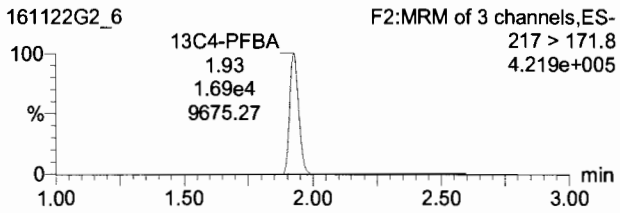
Name: 161122G2_6, Date: 22-Nov-2016, Time: 10:50:54, ID: ST161122G2-6 PFC CS3 16K1709, Description: PFC CS3 16K1709 A

13C4-PFBA



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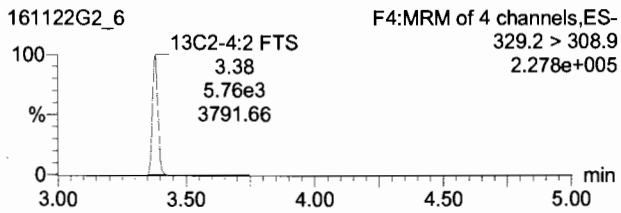

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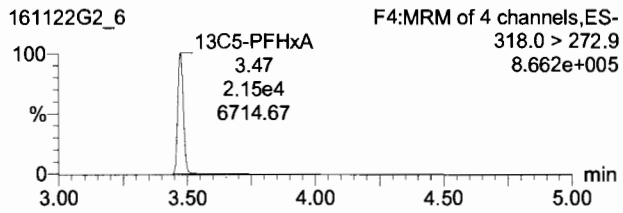

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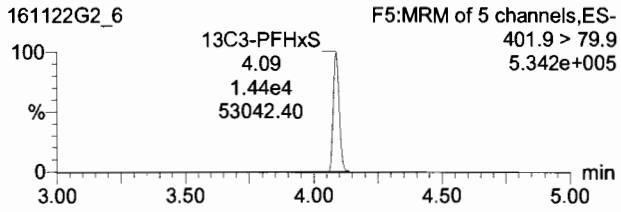

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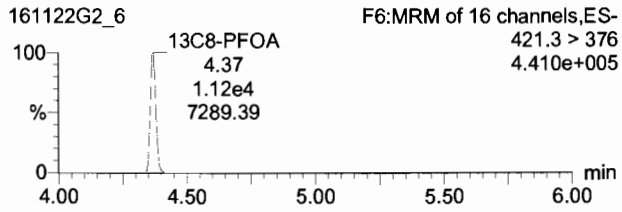

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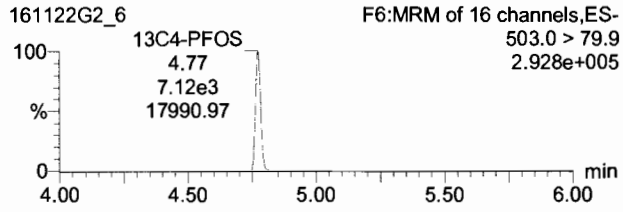

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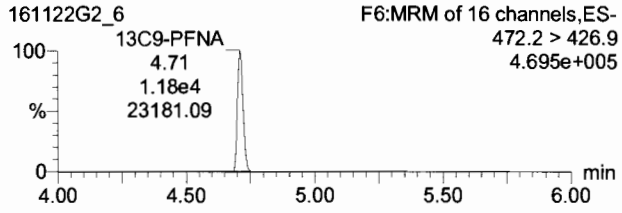

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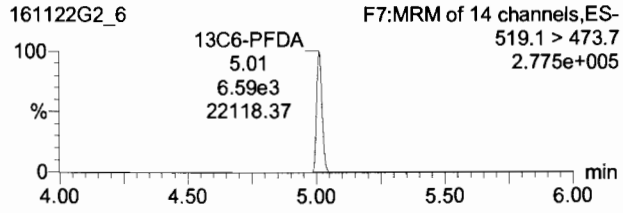

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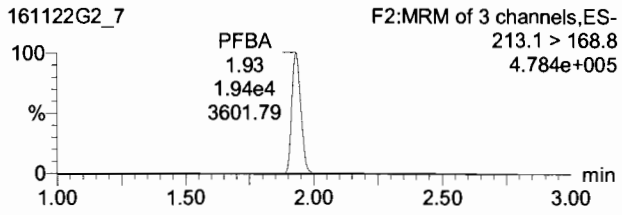

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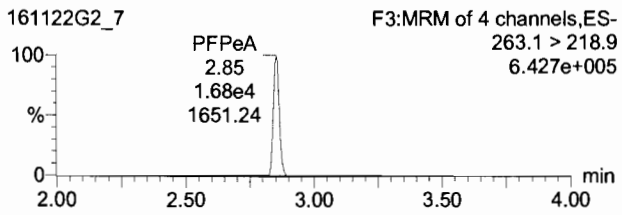

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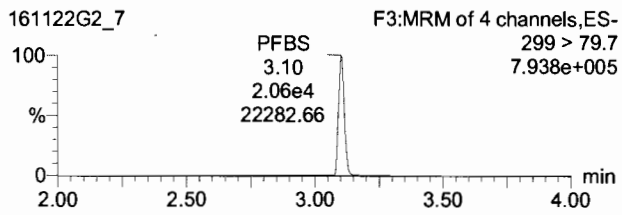

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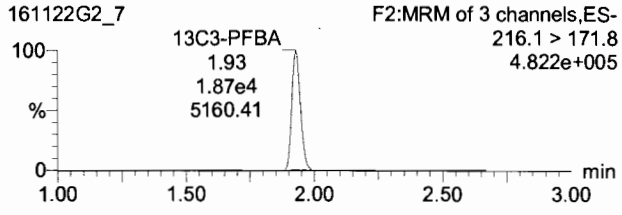

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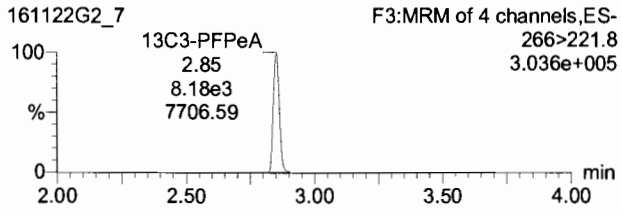

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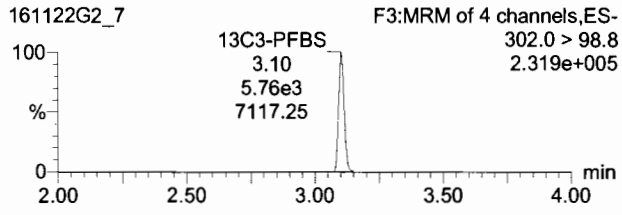

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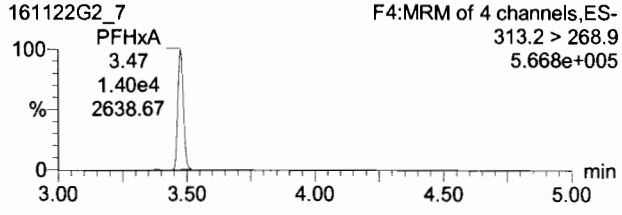

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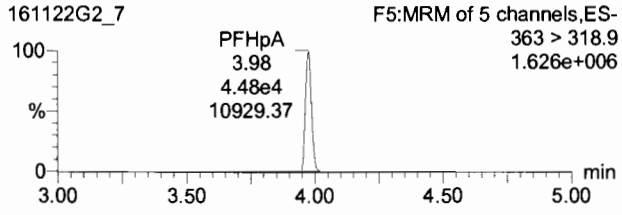

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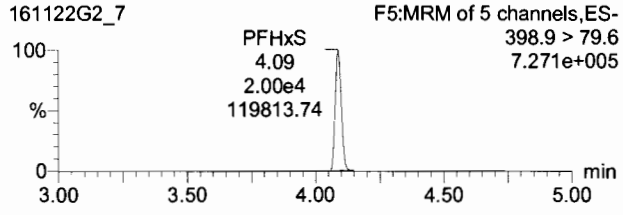

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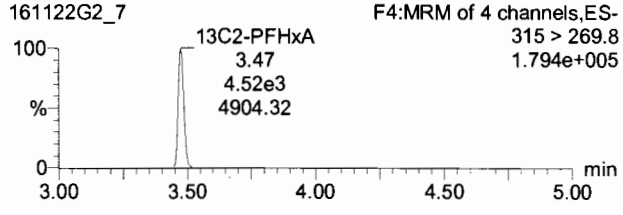

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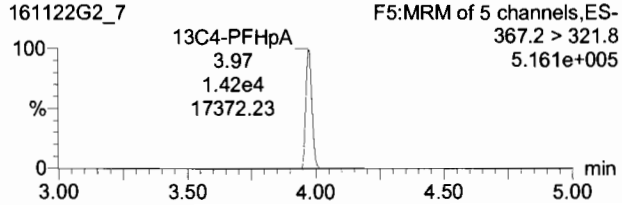

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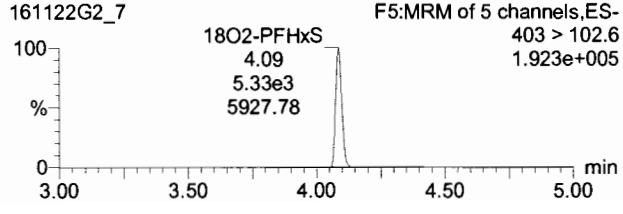

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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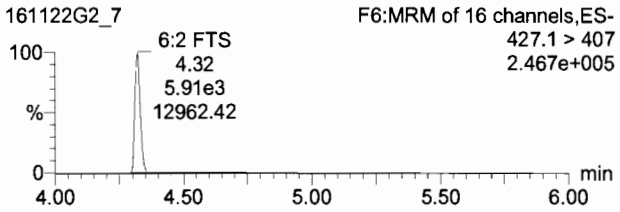
Name: 161122G2_7, Date: 22-Nov-2016, Time: 11:03:32, ID: ST161122G2-7 PFC CS3.5 16K1710, Description: PFC CS3.5 16K1710 A

6:2 FTS



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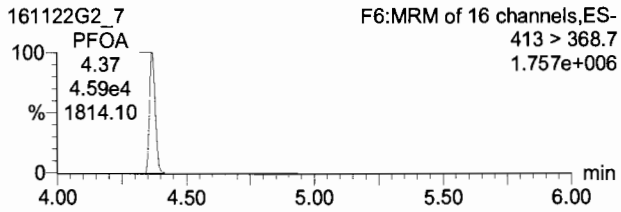

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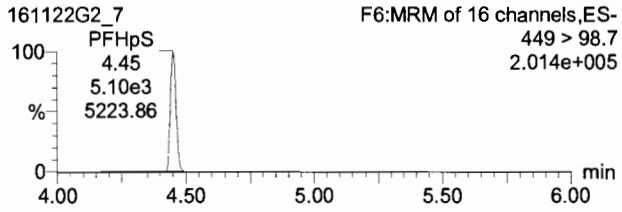

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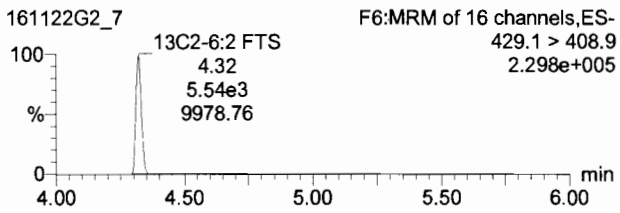

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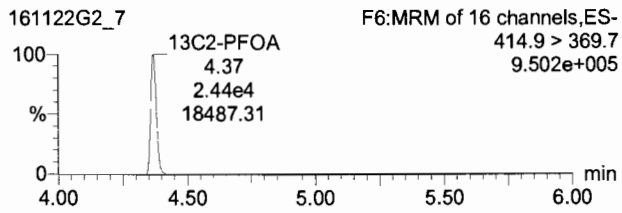

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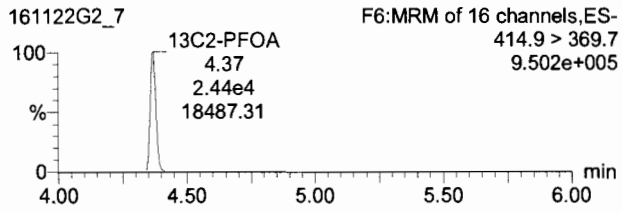

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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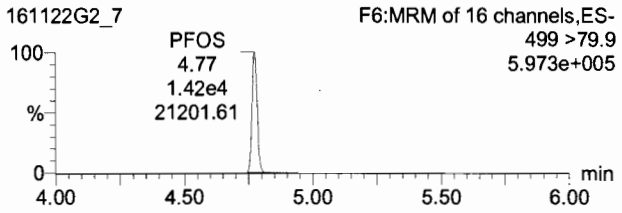
Name: 161122G2_7, Date: 22-Nov-2016, Time: 11:03:32, ID: ST161122G2-7 PFC CS3.5 16K1710, Description: PFC CS3.5 16K1710 A

PFOS



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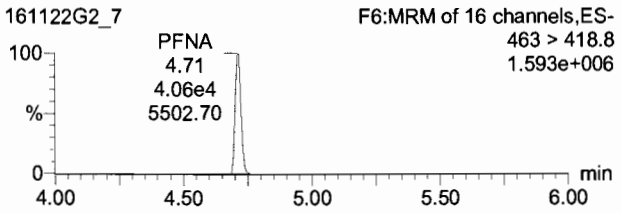

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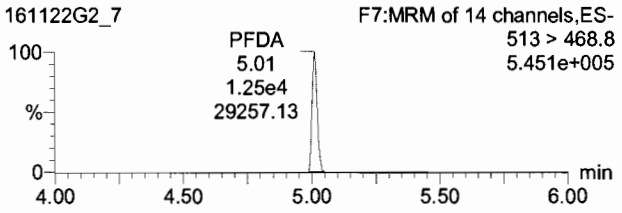

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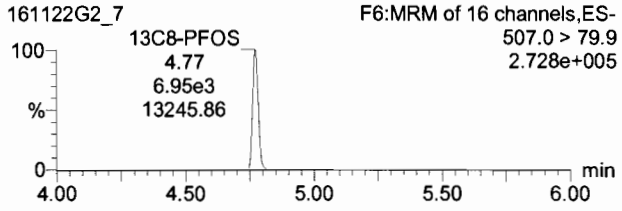

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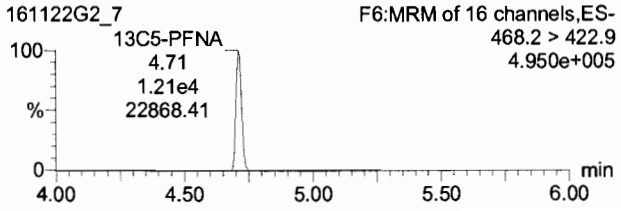

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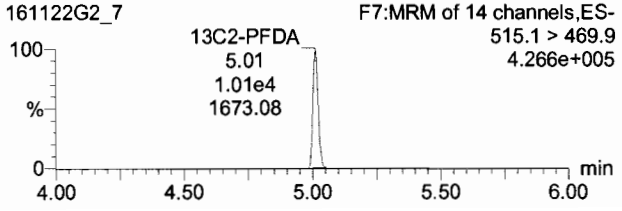

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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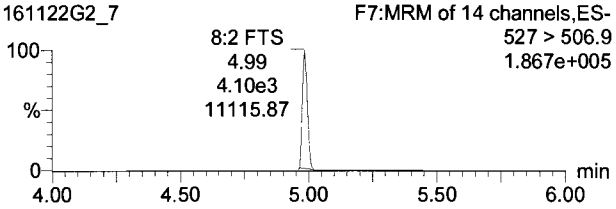
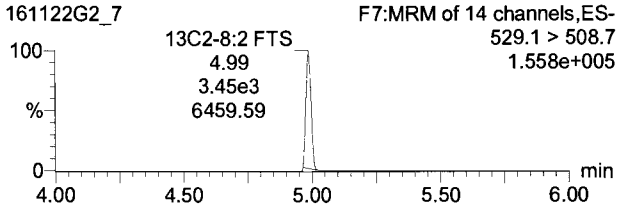
Name: 161122G2_7, Date: 22-Nov-2016, Time: 11:03:32, ID: ST161122G2-7 PFC CS3.5 16K1710, Description: PFC CS3.5 16K1710 A

8:2 FTS



13C2-8:2 FTS

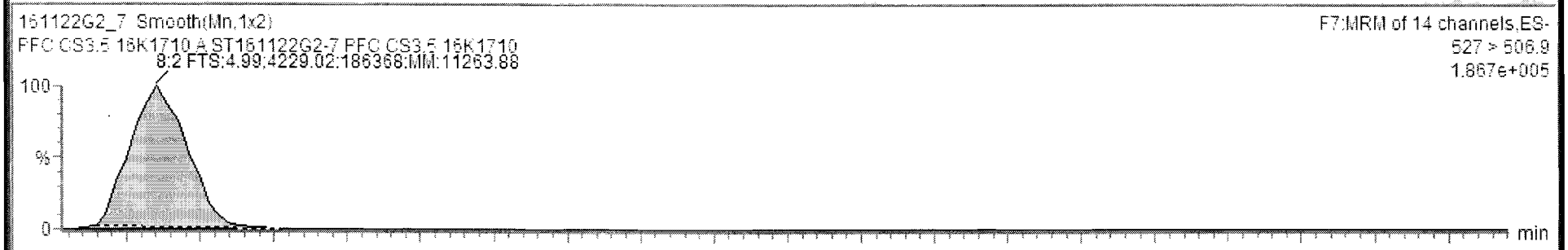


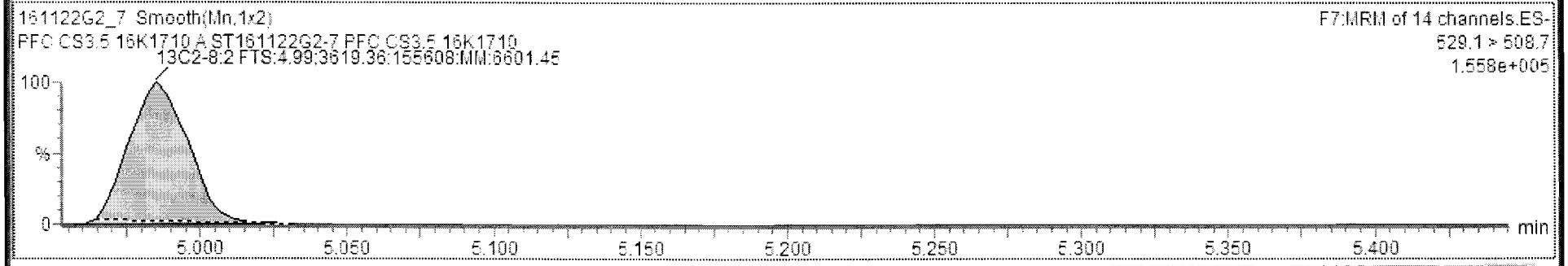
TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_7 - ST161122G2-7 PFC CS3.5 16K1710 - PFC CS3.5 16K1710 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	1.40e4		1.000	3.47	3.47	25.9	YES	103.6	0.0090379
5	PFHpA	363 > 318.9	4.48e4		1.000	3.97	3.98	25.4	YES	101.7	0.0949494
6	PFHxS	398.9 > 79.6	2.00e4		1.000	4.09	4.09	27.2	YES	108.9	0.0160447
7	6:2 FTS	427.1 > 407	5.91e3		1.000	4.32	4.32	28.5	YES	113.9	0.4488633
8	PFOA	413 > 368.7	4.59e4		1.000	4.37	4.37	26.0	YES	104.2	0.0000000
9	PFHpS	449 > 98.7	5.10e3		1.000	4.37	4.45	28.6	YES	114.5	0.2616468
10	PFOS	499 >79.9	1.42e4		1.000	4.77	4.77	30.8	YES	123.3	0.2026154
11	PFNA	463 > 418.8	4.06e4		1.000	4.71	4.71	25.6	YES	102.3	0.1150546
12	PFDA	513 > 468.8	1.25e4		1.000	5.01	5.01	26.1	NO	104.4	0.0359399
13	8:2 FTS	527 > 506.9	4.23e3		1.000	4.99	4.99	29.9	YES	119.7	0.0019300
14	13C3-PFBA	216.1 > 171.8	1.87e4	1.21	1.000	1.93	1.93	12.3	NO	98.0	0.0059610
15	13C3-PFPeA	266>221.8	8.18e3	0.448	1.000	2.84	2.85	12.1	NO	96.9	0.0036860
16	13C3-PFBS	302.0 > 98.8	5.76e3	0.302	1.000	3.10	3.10	12.6	NO	101.1	0.0045187





161122G2_7 CAP NUM

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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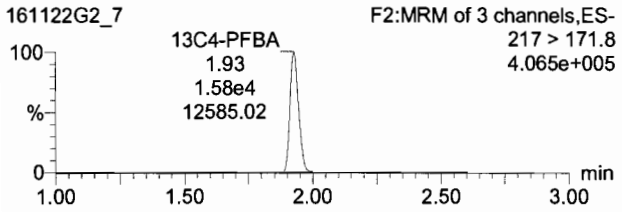
Name: 161122G2_7, Date: 22-Nov-2016, Time: 11:03:32, ID: ST161122G2-7 PFC CS3.5 16K1710, Description: PFC CS3.5 16K1710 A

13C4-PFBA



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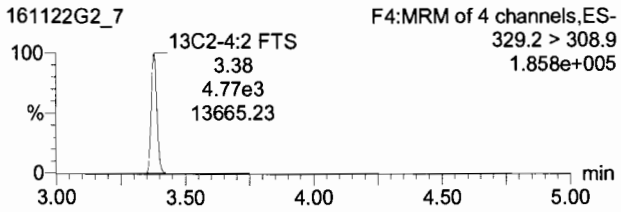

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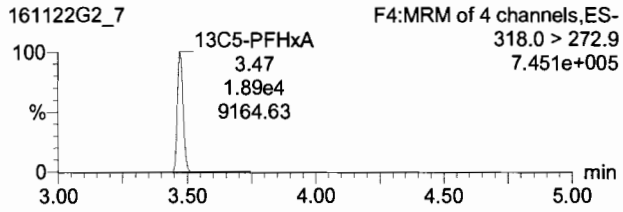

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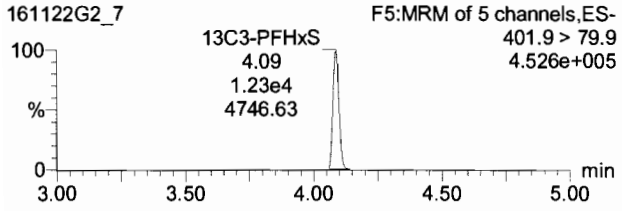

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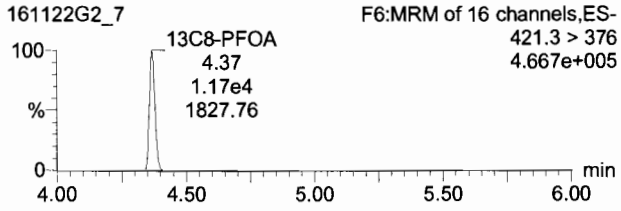

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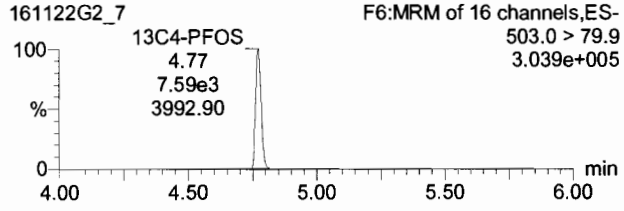

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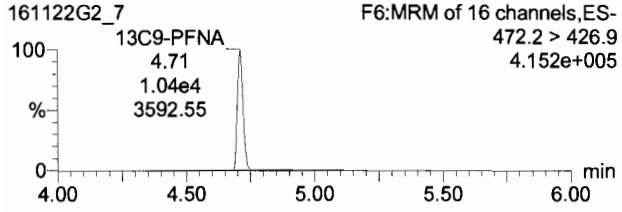

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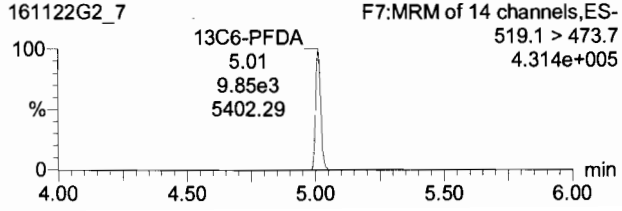

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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Name: 161122G2_8, Date: 22-Nov-2016, Time: 11:16:11, ID: ST161122G2-8 PFC CS4 16K1711, Description: PFC CS4 16K1711 A

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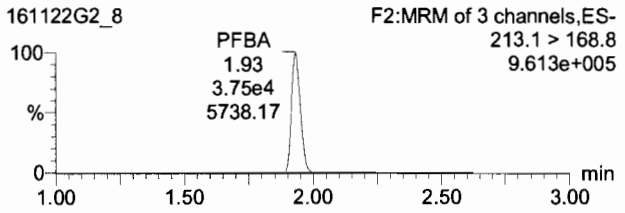

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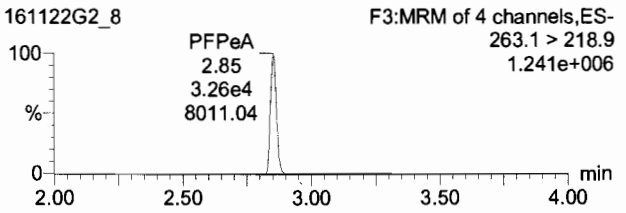

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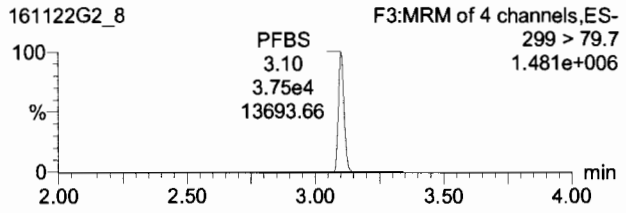

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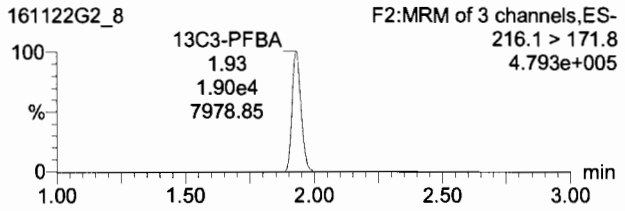

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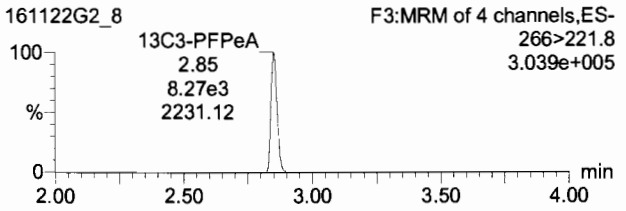

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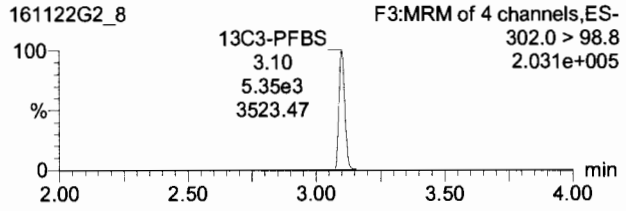

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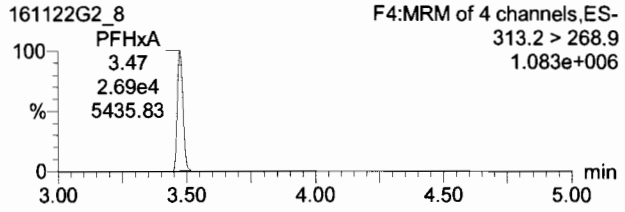

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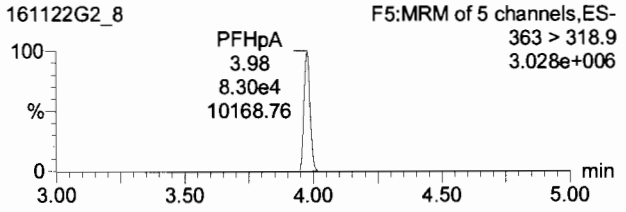

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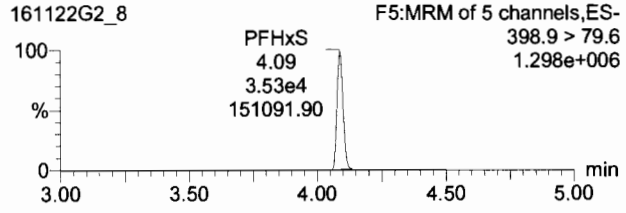

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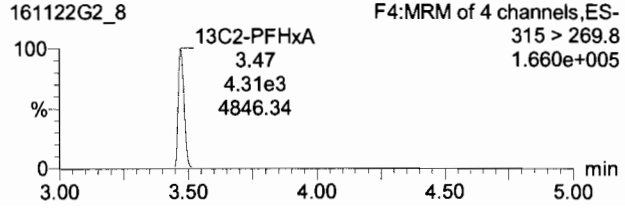

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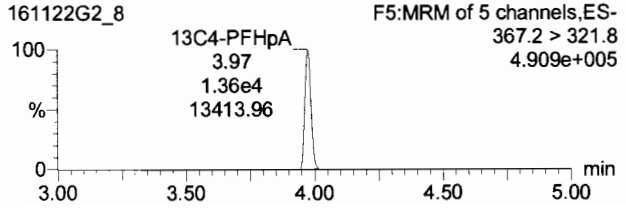

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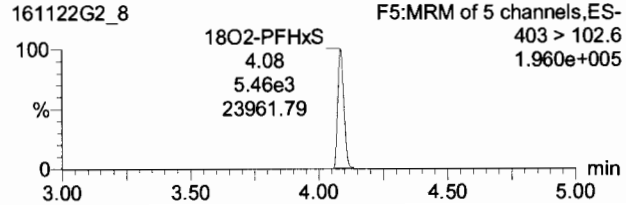

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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Name: 161122G2_8, Date: 22-Nov-2016, Time: 11:16:11, ID: ST161122G2-8 PFC CS4 16K1711, Description: PFC CS4 16K1711 A

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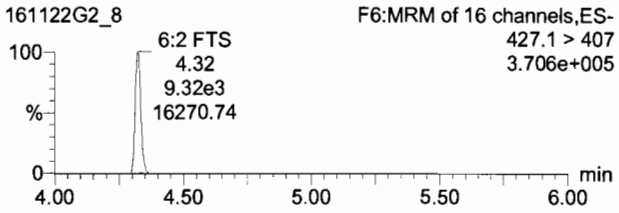

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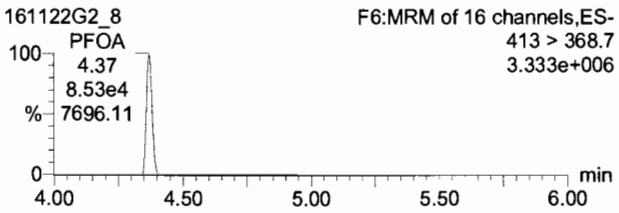

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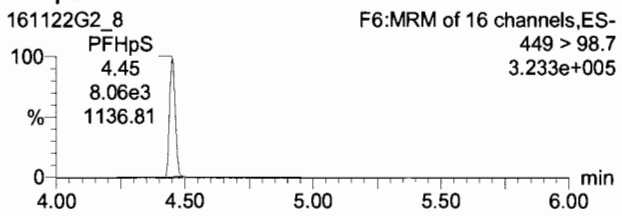

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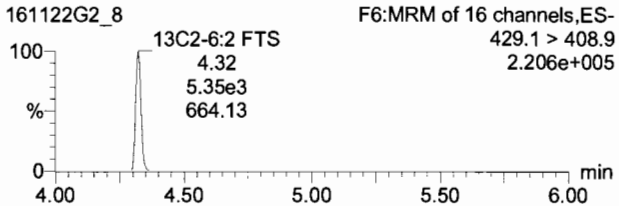

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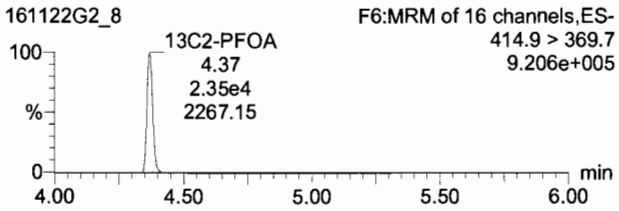
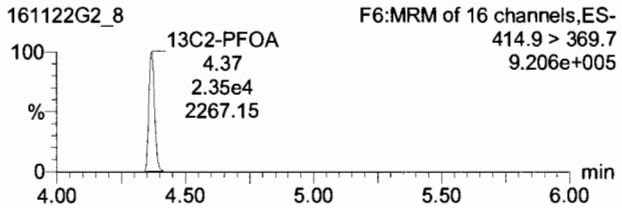


13C2-PFOA



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Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_8, Date: 22-Nov-2016, Time: 11:16:11, ID: ST161122G2-8 PFC CS4 16K1711, Description: PFC CS4 16K1711 A

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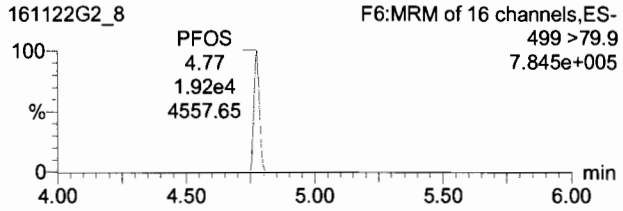

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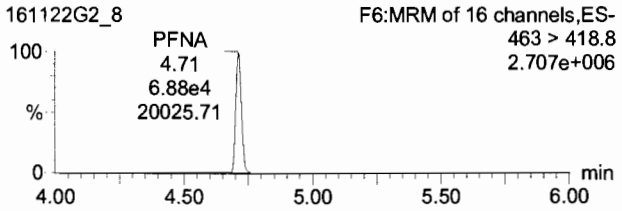

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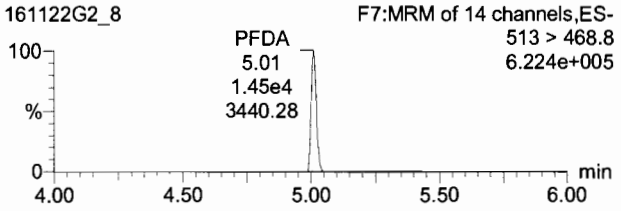

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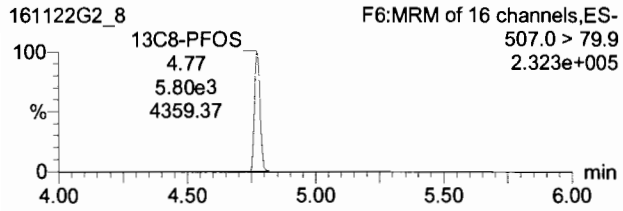

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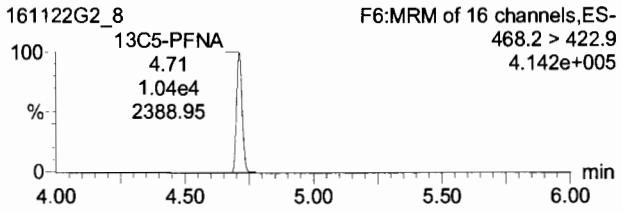

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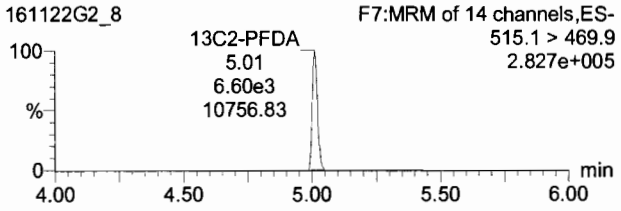

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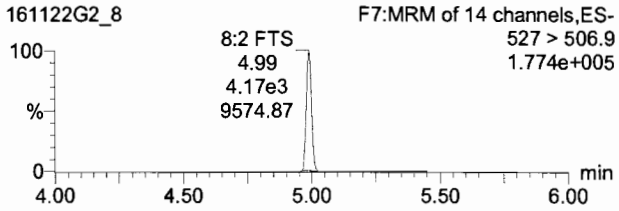
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_8, Date: 22-Nov-2016, Time: 11:16:11, ID: ST161122G2-8 PFC CS4 16K1711, Description: PFC CS4 16K1711 A

8:2 FTS



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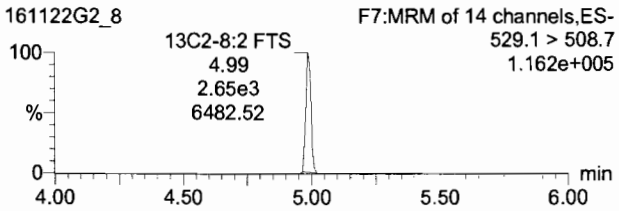
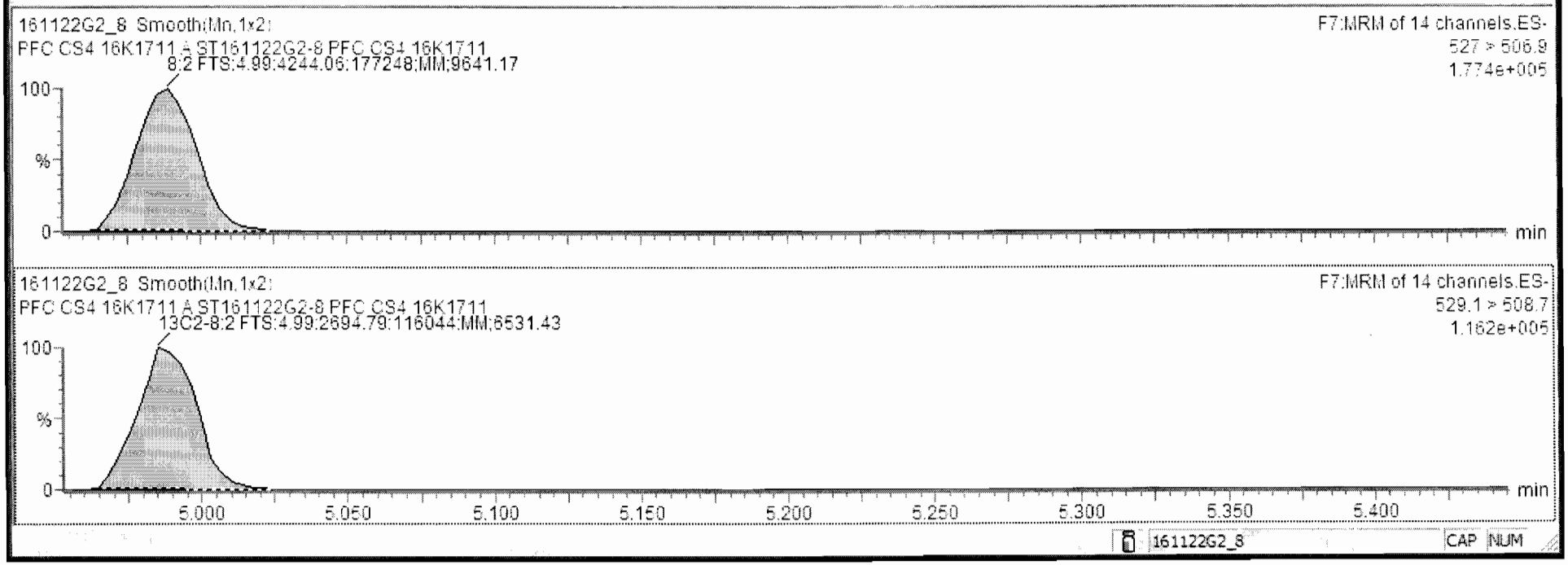


TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_8 - ST161122G2-8 PFC CS4 16K1711 - PFC CS4 16K1711 A

	Name	Trace	Area	RRF	Wt/Vol	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	2.69e4		1.000	3.47	3.47	52.1	YES	104.2	0.0090824
5	PFHpA	363 > 318.9	8.30e4		1.000	3.97	3.98	49.2	YES	98.3	0.1013540
6	PFHxS	398.9 > 79.8	3.53e4		1.000	4.08	4.09	47.1	YES	94.1	0.0162677
7	6:2 FTS	427.1 > 407	9.32e3		1.000	4.32	4.32	48.3	YES	96.7	0.4501120
8	PFOA	413 > 368.7	8.53e4		1.000	4.37	4.37	50.3	YES	100.7	0.0000000
9	PFHpS	449 > 98.7	8.06e3		1.000	4.37	4.45	46.8	YES	93.6	0.3525158
10	PFOS	499 >79.9	1.92e4		1.000	4.78	4.78	49.9	YES	99.9	0.2265026
11	PFNA	463 > 418.8	8.88e4		1.000	4.71	4.71	50.5	YES	101.0	0.1101360
12	PFDA	513 > 468.8	1.45e4		1.000	5.01	5.01	46.1	NO	92.3	0.0671726
13	8:2 FTS	527 > 506.9	4.24e3		1.000	4.99	4.99	40.8	YES	81.6	0.0051719
14	13C3-PFBA	216.1 > 171.8	1.90e4	1.21	1.000	1.93	1.93	12.1	NO	96.4	0.0037281
15	13C3-PFPeA	266>221.8	8.27e3	0.448	1.000	2.84	2.85	13.0	NO	103.9	0.0135113
16	13C3-PFBS	302.0 > 98.8	5.35e3	0.302	1.000	3.10	3.10	12.5	NO	99.6	0.0084692



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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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Name: 161122G2_8, Date: 22-Nov-2016, Time: 11:16:11, ID: ST161122G2-8 PFC CS4 16K1711, Description: PFC CS4 16K1711 A

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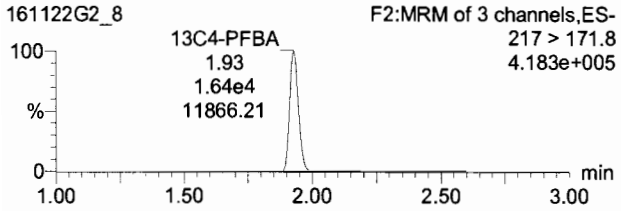

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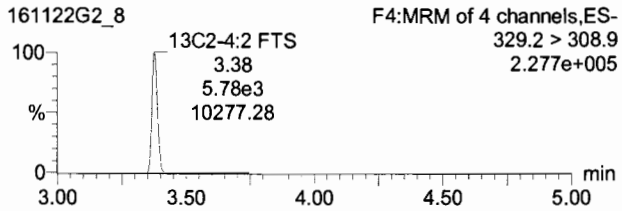

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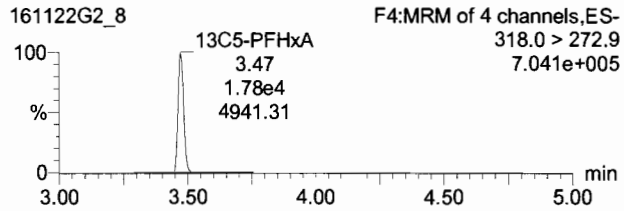

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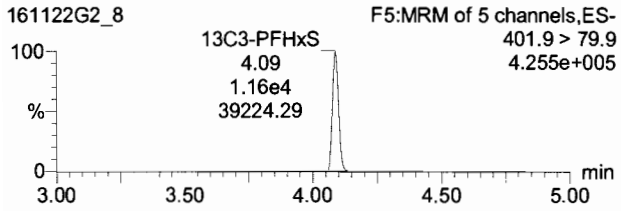

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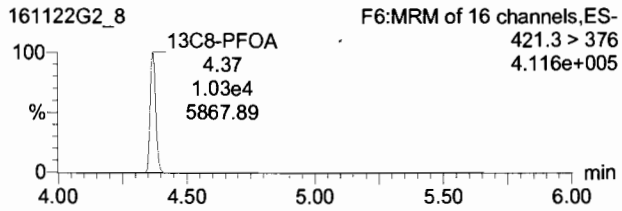

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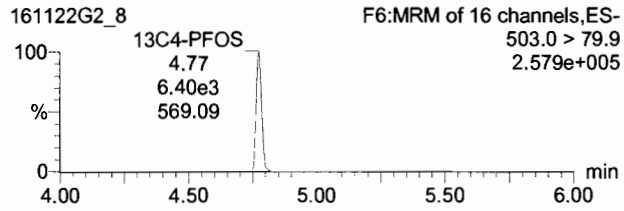

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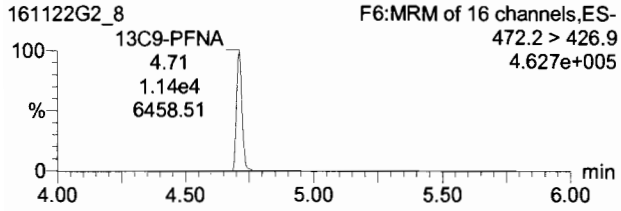

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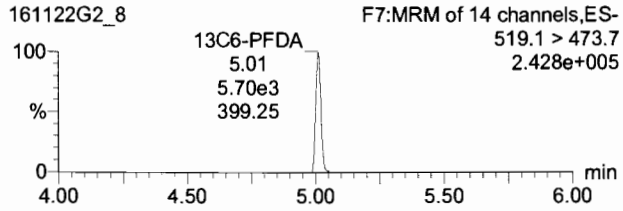

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Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
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Name: 161122G2_9, Date: 22-Nov-2016, Time: 11:28:50, ID: ST161122G2-9 PFC CS4.5 16K1712, Description: PFC CS4.5 16K17121 A

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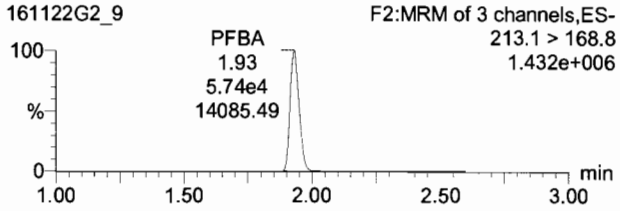

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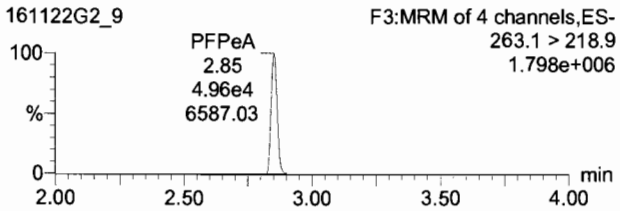

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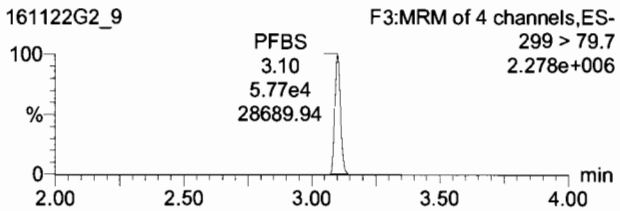

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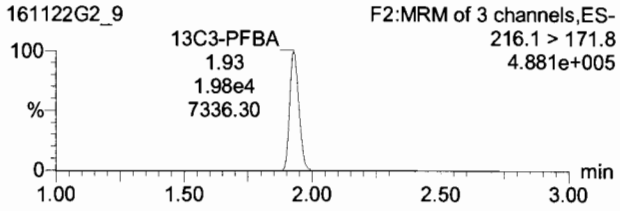

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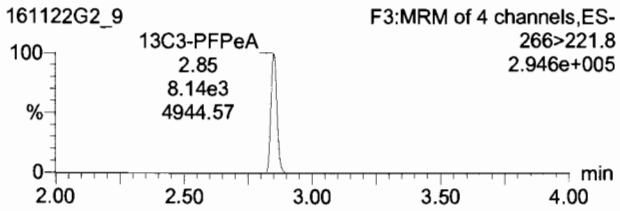

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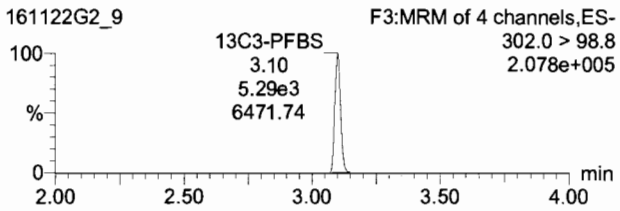

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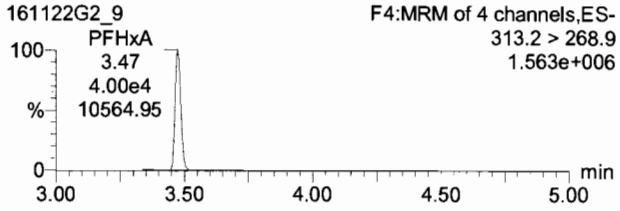

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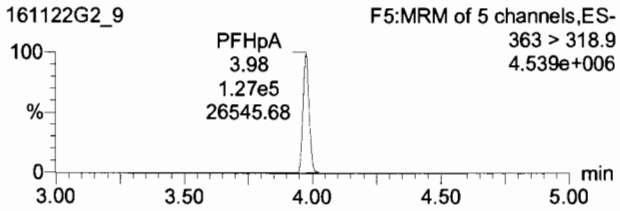

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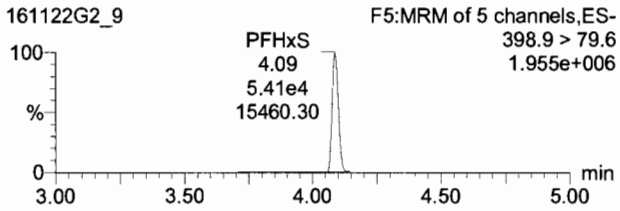

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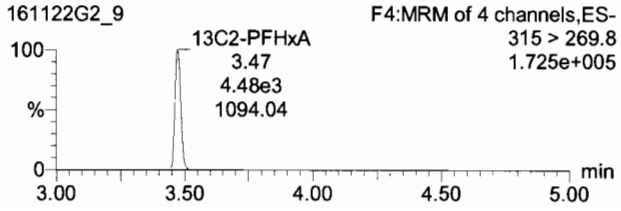

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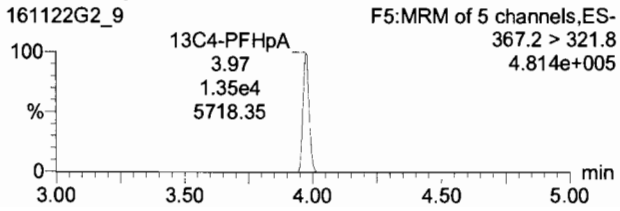

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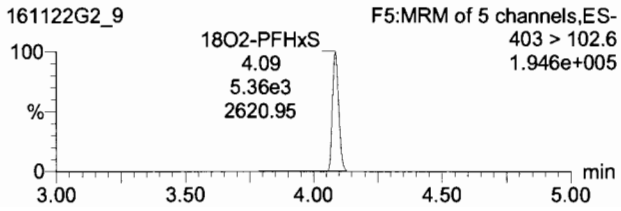

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Name: 161122G2_9, Date: 22-Nov-2016, Time: 11:28:50, ID: ST161122G2-9 PFC CS4.5 16K1712, Description: PFC CS4.5 16K17121 A

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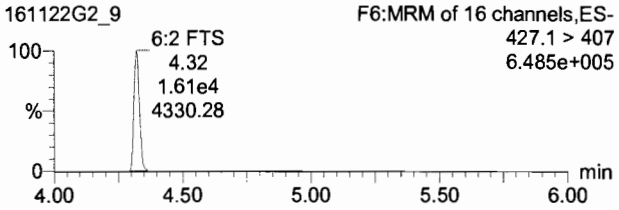

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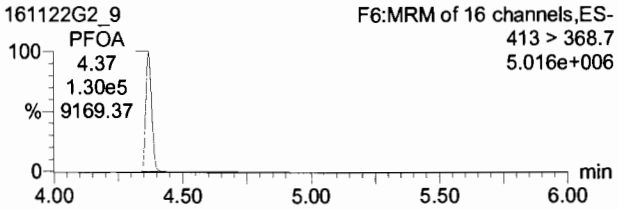

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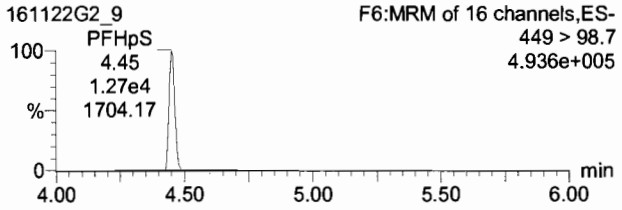

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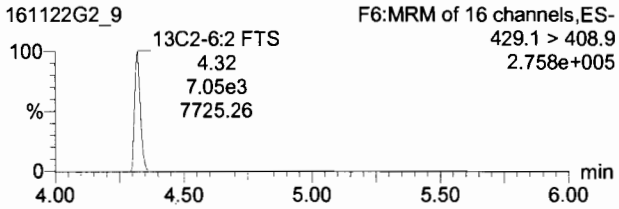

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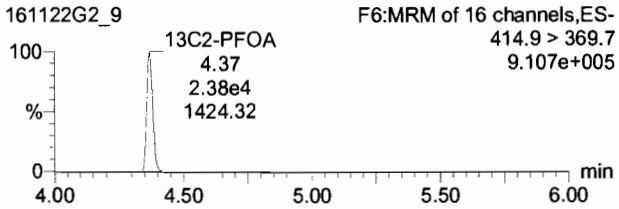

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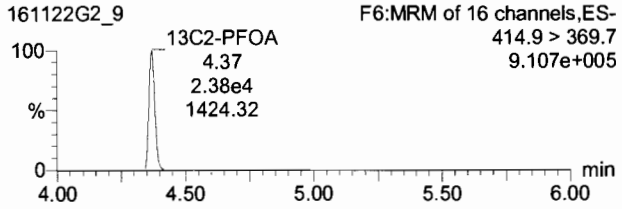

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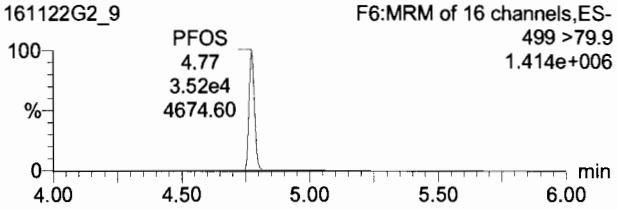

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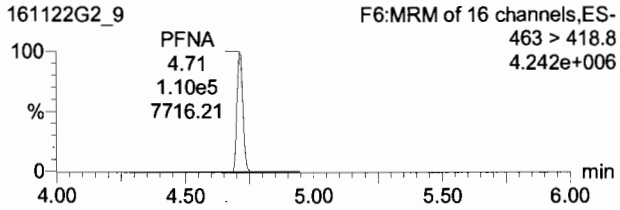

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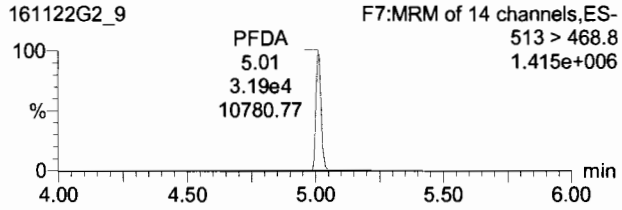

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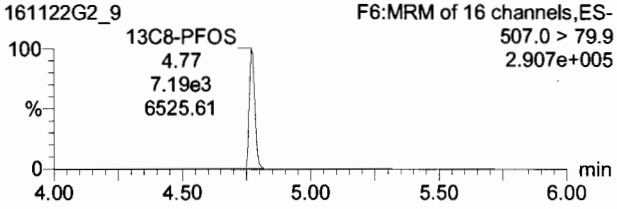
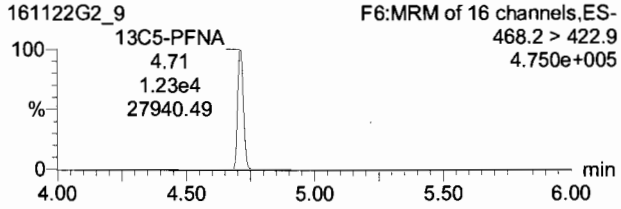


13C5-PFNA



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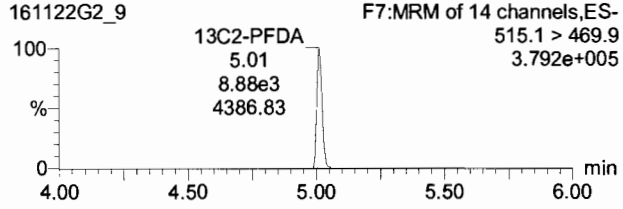

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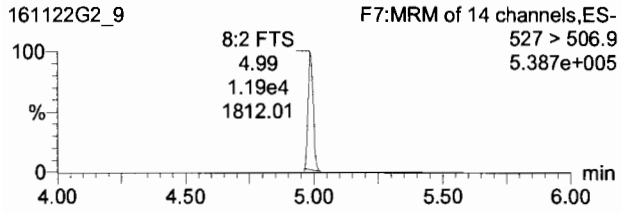
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_9, Date: 22-Nov-2016, Time: 11:28:50, ID: ST161122G2-9 PFC CS4.5 16K1712, Description: PFC CS4.5 16K17121 A

8:2 FTS



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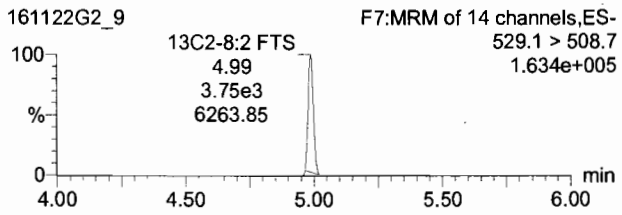
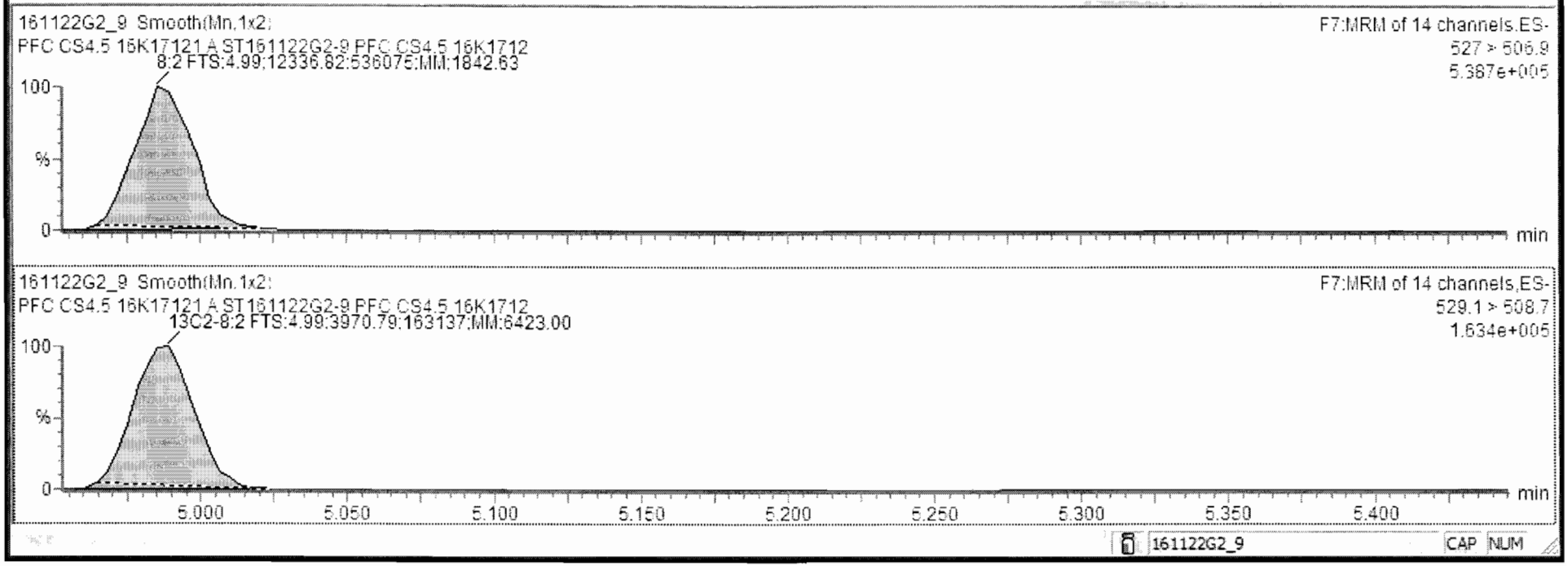


TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_9 - ST161122G2-9 PFC CS4.5 16K1712 - PFC CS4.5 16K17121 A

	Name	Trace	Area	RRF	Wt/VoL	Pred.RT	RT	Conc.	>MDL	%Rec	DL
4	PFHxA	313.2 > 268.9	4.00e4		1.000	3.47	3.47	74.5	YES	99.3	0.0019930
5	PFHpA	363 > 318.9	1.27e5		1.000	3.97	3.98	75.5	YES	100.7	0.0962936
6	PFHxS	398.9 > 79.6	5.41e4		1.000	4.09	4.09	73.4	YES	97.8	0.0272887
7	6:2 FTS	427.1 > 407	1.61e4		1.000	4.32	4.32	66.1	YES	88.1	0.4772740
8	PFOA	413 > 368.7	1.30e5		1.000	4.37	4.37	75.6	YES	100.8	0.0000000
9	PFHpS	449 > 98.7	1.27e4		1.000	4.37	4.46	72.8	YES	97.0	0.3559161
10	PFOS	499 >79.9	3.52e4		1.000	4.77	4.77	73.6	YES	98.2	0.2377618
11	PFNA	463 > 418.8	1.10e5		1.000	4.71	4.71	68.0	YES	90.7	0.1259394
12	PFDA	513 > 468.8	3.19e4		1.000	5.01	5.01	75.4	NO	100.5	0.0517738
13	8:2 FTS	527 > 506.9	1.23e4		1.000	4.99	4.99	84.1	YES	112.1	0.1062973
14	13C3-PFBA	216.1 > 171.8	1.98e4	1.21	1.000	1.93	1.93	12.4	NO	99.3	0.0041429
15	13C3-PFPeA	266>221.8	8.14e3	0.448	1.000	2.84	2.85	12.4	NO	99.0	0.0056902
16	13C3-PFBS	302.0 > 98.8	5.28e3	0.302	1.000	3.10	3.10	11.9	NO	95.3	0.0045397



161122G2_9 CAP NUM

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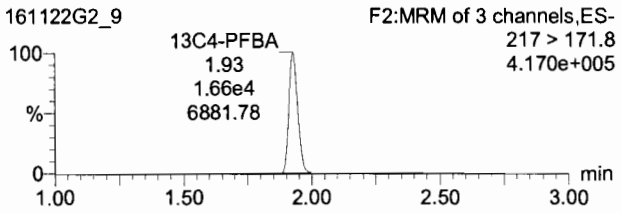
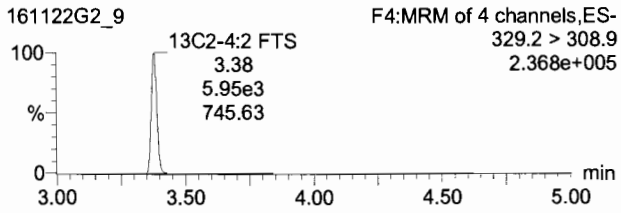
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_9, Date: 22-Nov-2016, Time: 11:28:50, ID: ST161122G2-9 PFC CS4.5 16K1712, Description: PFC CS4.5 16K17121 A

13C4-PFBA



13C2-4:2 FTS



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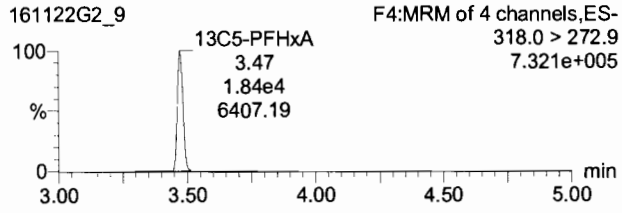

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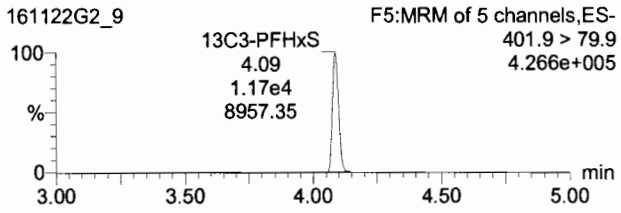

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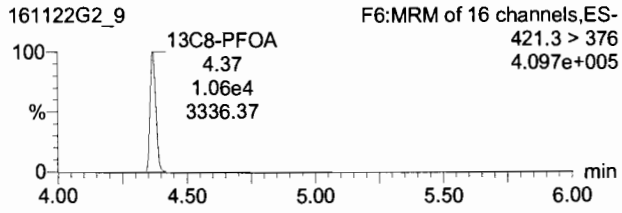

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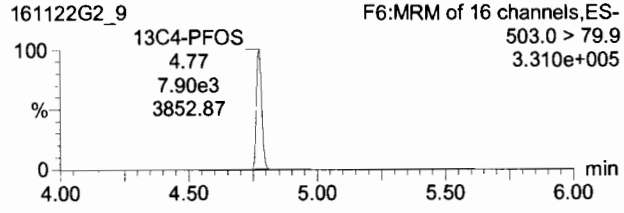

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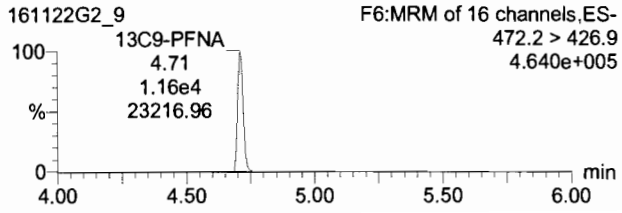

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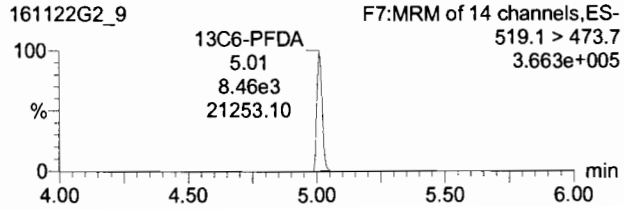

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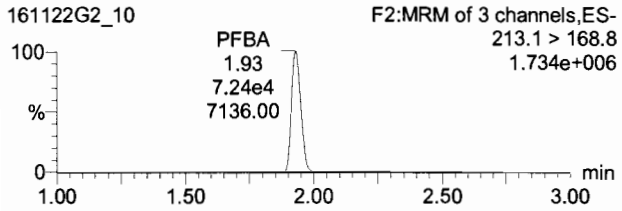
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_10, Date: 22-Nov-2016, Time: 11:41:28, ID: ST161122G2-10 PFC CS5 16K1713, Description: PFC CS5 16K1713 A

PFBA



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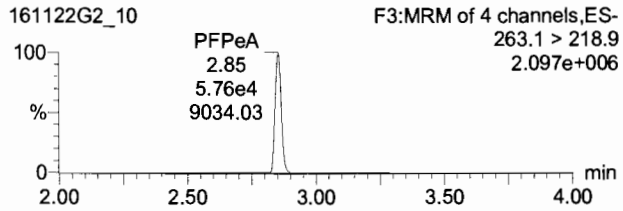

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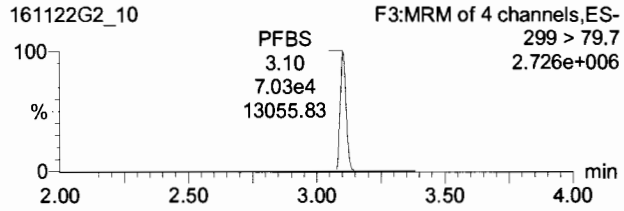

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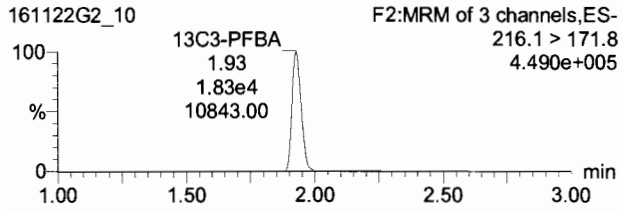

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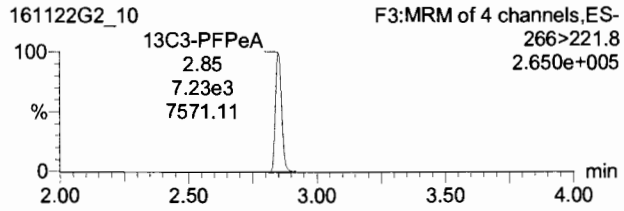

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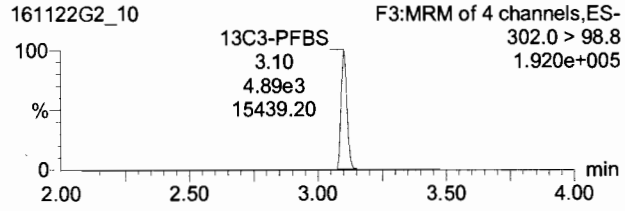

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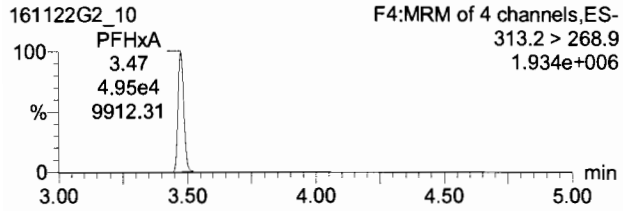

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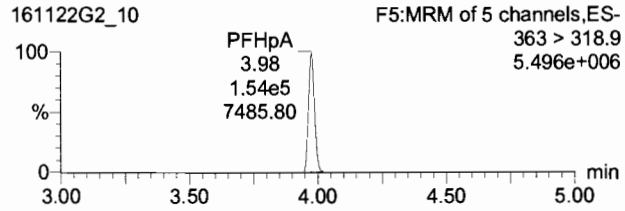

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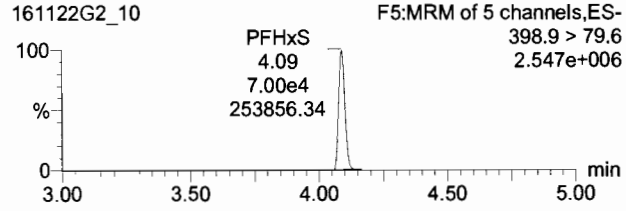

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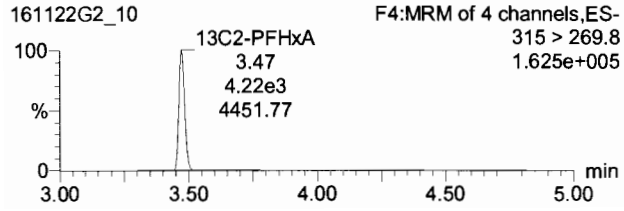

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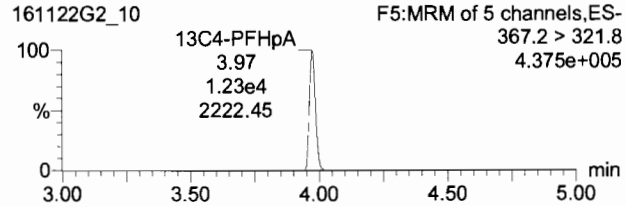

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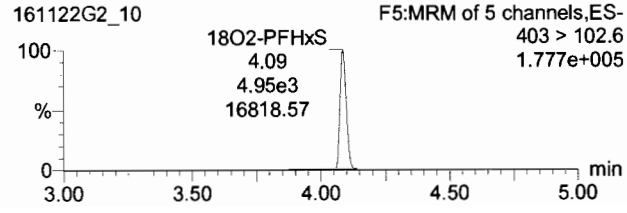

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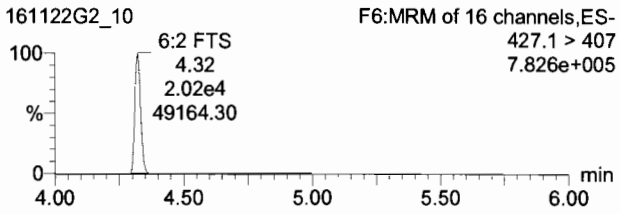
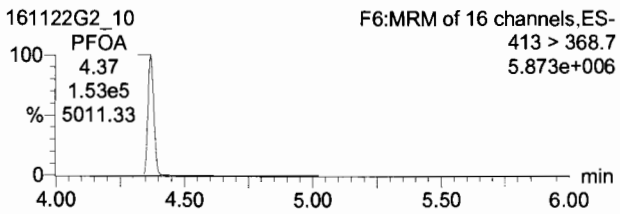
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_10, Date: 22-Nov-2016, Time: 11:41:28, ID: ST161122G2-10 PFC CS5 16K1713, Description: PFC CS5 16K1713 A

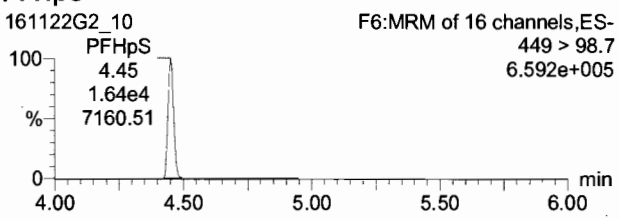
6:2 FTS



PFOA



PFHpS



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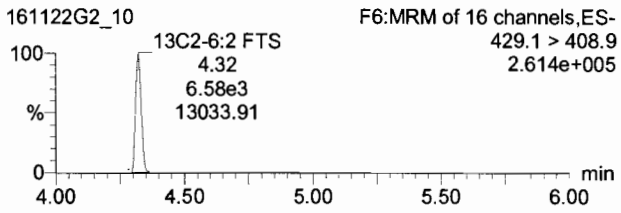

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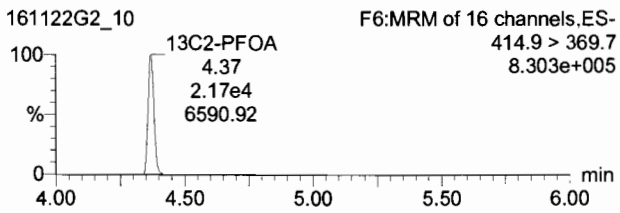

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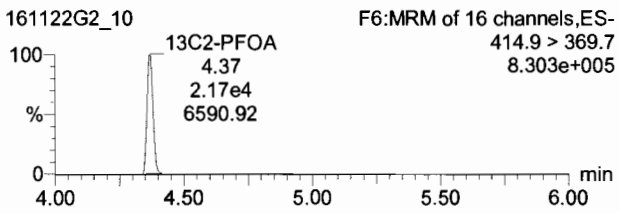

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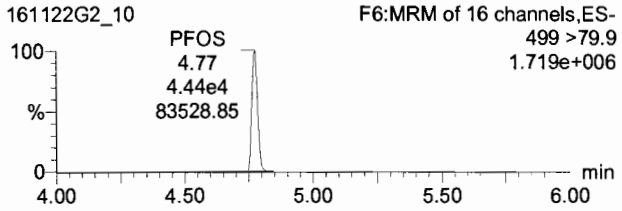
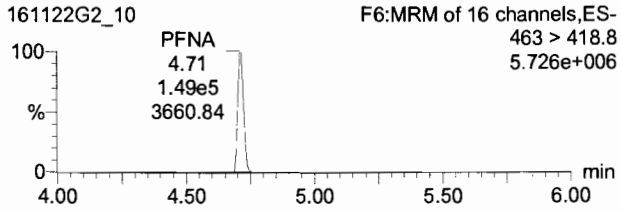
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_10, Date: 22-Nov-2016, Time: 11:41:28, ID: ST161122G2-10 PFC CS5 16K1713, Description: PFC CS5 16K1713 A

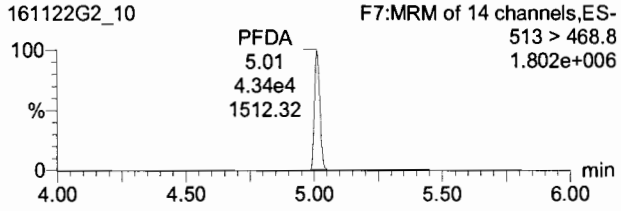
PFOS



PFNA



PFDA



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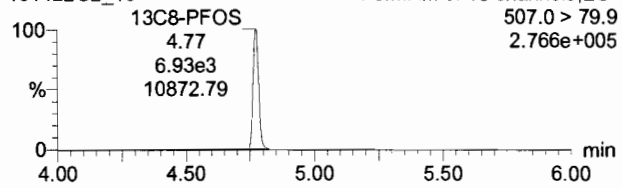

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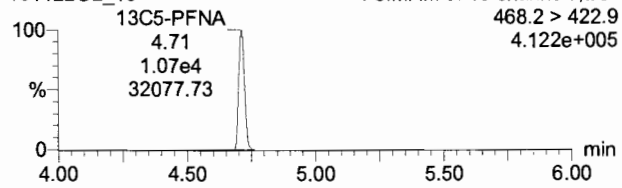

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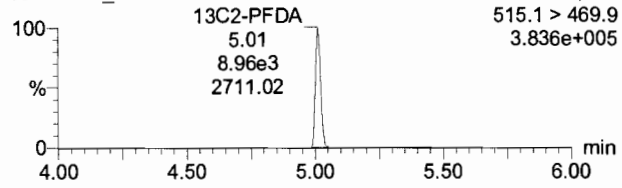

Vista Analytical Laboratory Q1

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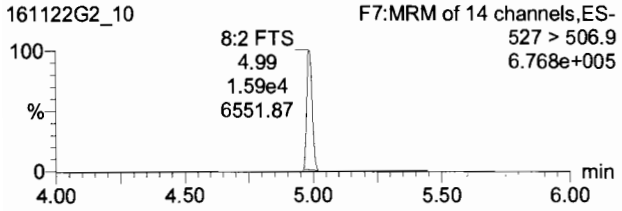
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_10, Date: 22-Nov-2016, Time: 11:41:28, ID: ST161122G2-10 PFC CS5 16K1713, Description: PFC CS5 16K1713 A

8:2 FTS



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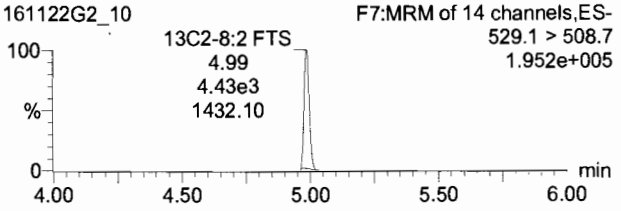

TargetLynx - 161122G2-CRV.qld * - [Chromatogram]

File Edit View Display Processing Window Help

161122G2_10 - ST161122G2-10 PFC CS5 16K1713 - PFC CS5 16K1713 A

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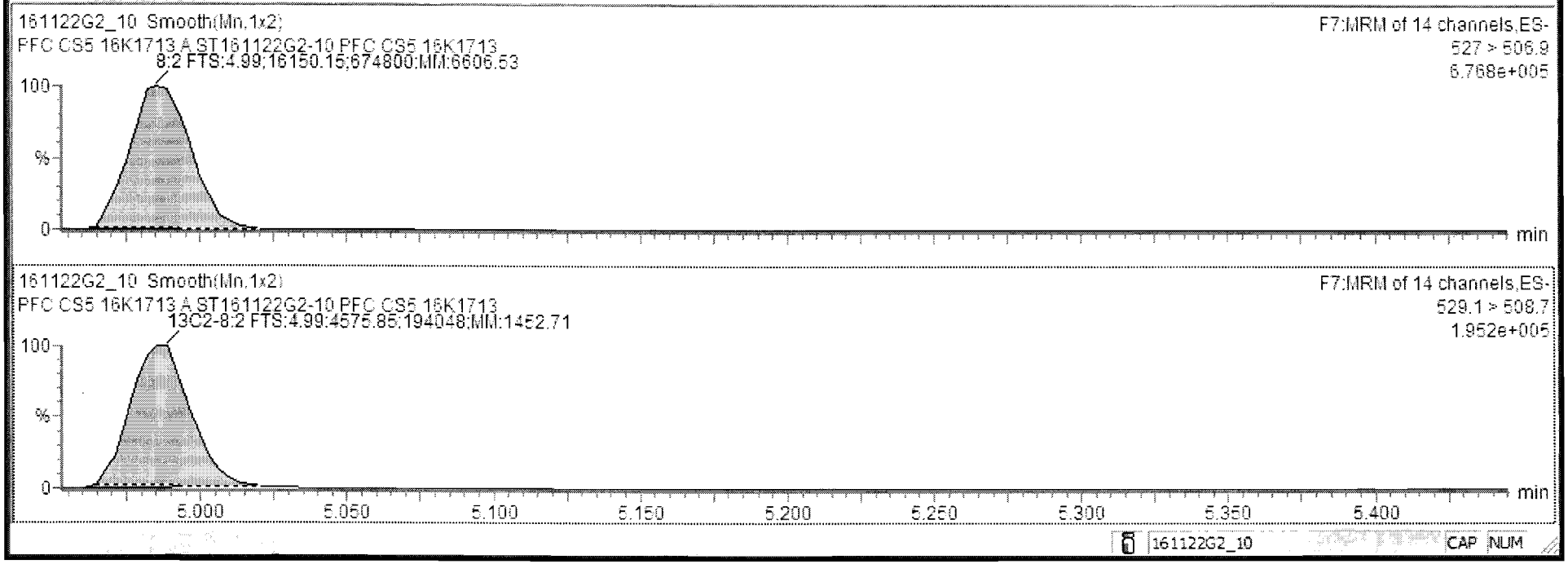
5	PFHpA	363 > 318.9	1.54e5		1.000	3.97	3.98	100	YES	100.4	0.1228809
6	PFHxS	398.9 > 79.8	7.00e4		1.000	4.09	4.09	103	YES	102.7	0.0164978
7	6:2 FTS	427.1 > 407	2.02e4		1.000	4.32	4.32	95.3	YES	95.3	0.4475018
8	PFOA	413 > 368.7	1.53e5		1.000	4.37	4.37	97.9	YES	97.9	0.0000000
9	PFHpS	449 > 98.7	1.64e4		1.000	4.37	4.45	103	YES	103.1	0.2859073
10	PFOS	499 >79.9	4.44e4		1.000	4.78	4.77	96.1	YES	96.1	0.2015386
11	PFNA	463 > 418.8	1.49e5		1.000	4.71	4.71	106	YES	106.3	0.1762378
12	PFDA	513 > 468.8	4.34e4		1.000	5.01	5.01	101	NO	101.5	0.1963398
13	8:2 FTS	527 > 506.9	1.62e4		1.000	4.99	4.99	96.8	YES	96.8	0.0280690
14	13C3-PFBA	216.1 > 171.8	1.83e4	1.21	1.000	1.92	1.93	11.6	NO	92.9	0.0026509
15	13C3-PFPeA	266>221.8	7.23e3	0.448	1.000	2.84	2.85	11.6	NO	92.5	0.0036027
16	13C3-PFBS	302.0 > 98.8	4.89e3	0.302	1.000	3.10	3.10	11.6	NO	92.7	0.0018920



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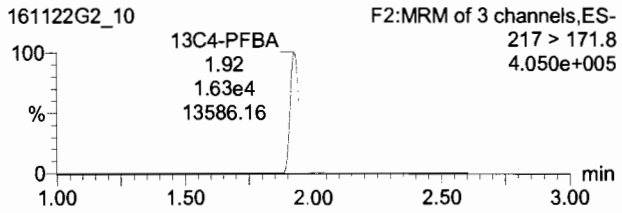
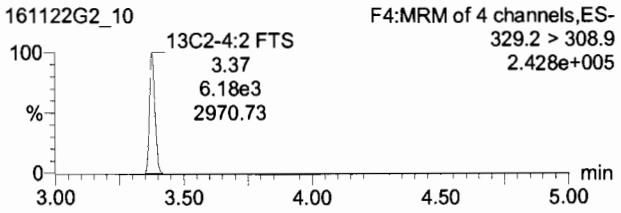
Last Altered: Tuesday, November 22, 2016 14:43:00 Pacific Standard Time
Printed: Tuesday, November 22, 2016 14:47:59 Pacific Standard Time

Name: 161122G2_10, Date: 22-Nov-2016, Time: 11:41:28, ID: ST161122G2-10 PFC CS5 16K1713, Description: PFC CS5 16K1713 A

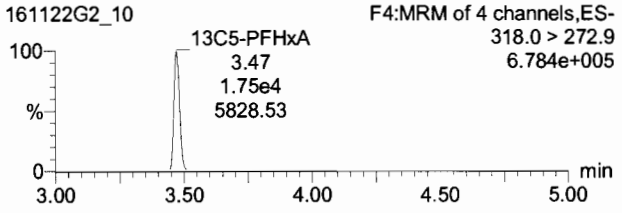
13C4-PFBA



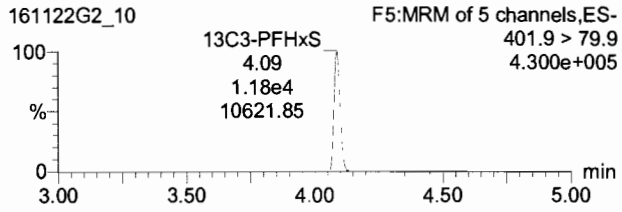
13C2-4:2 FTS



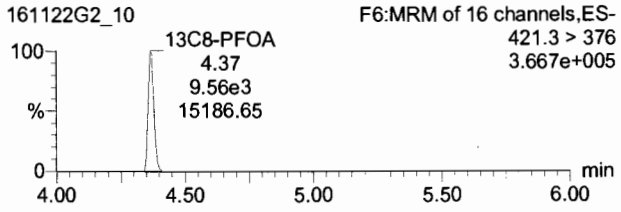
13C5-PFHxA



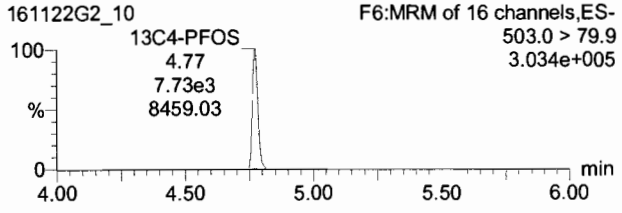
13C3-PFHxS



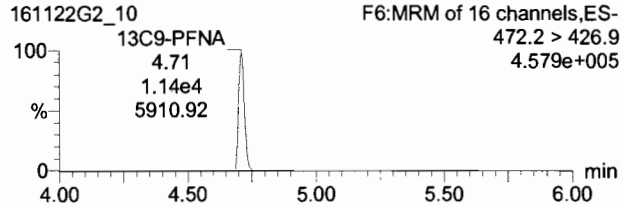
13C8-PFOA



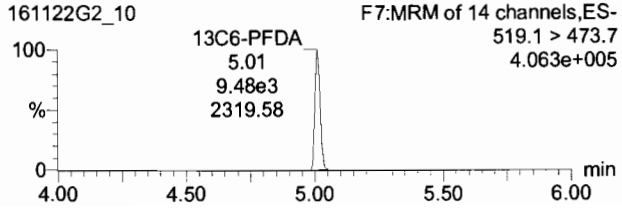
13C4-PFOS



13C9-PFNA



13C6-PFDA



Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-12.qld

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Printed: Tuesday, November 22, 2016 15:30:54 Pacific Standard Time

Method: U:\G1.PRO\MethDB\PFAS_A_FULL_LINEAR.mdb 22 Nov 2016 14:48:20
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 15:25:21

Name: 161122G2_12, Date: 22-Nov-2016, Time: 12:06:50, ID: SS161122G2-1 PFC SS 16K2201, Description: PFC SS 16K2201

	#	Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
1	1	PFBA	213.1 > 168.8	1.99e4	1.93e4		1.000	1.94	26.3	105.2
2	2	PFPeA	263.1 > 218.9	1.36e4	8.81e3		1.000	2.85	19.4	77.4
3	3	PFBS	299 > 79.7	1.87e4	6.07e3		1.000	3.10	21.5	86.2
4	4	PFHxA	313.2 > 268.9	1.51e4	4.56e3		1.000	3.47	27.6	110.5
5	5	PFHpA	363 > 318.9	4.67e4	1.40e4		1.000	3.98	26.9	107.5
6	6	PFHxS	398.9 > 79.6	1.55e4	5.82e3		1.000	4.09	19.4	95.8 ~~77.7~~ (A)
7	7	6:2 FTS	427.1 > 407	4.23e3	5.80e3		1.000	4.32	20.8	83.4
8	8	PFOA	413 > 368.7	3.78e4	2.49e4		1.000	4.37	21.0	106.2 ~~83.9~~ (A)
9	9	PFHpS	449 > 98.7	4.68e3	2.49e4		1.000	4.45	25.7	103.0
10	10	PFOS	499 >79.9	9.75e3	7.54e3		1.000	4.77	19.6	99.4 ~~78.3~~ (A)
11	11	PFNA	463 > 418.8	4.01e4	1.20e4		1.000	4.71	25.5	102.1
12	12	PFDA	513 > 468.8	1.01e4	9.03e3		1.000	5.01	23.6	94.4
13	13	8:2 FTS	527 > 506.9	2.65e3	2.91e3		1.000	4.99	23.2	92.8
14	14	13C3-PFBA	216.1 > 171.8	1.93e4	1.41e4	1.205	1.000	1.94	14.2	113.8
15	15	13C3-PFPeA	266>221.8	8.81e3	1.61e4	0.448	1.000	2.85	15.3	122.1
16	16	13C3-PFBS	302.0 > 98.8	6.07e3	1.61e4	0.302	1.000	3.10	15.6	124.7
17	17	13C2-PFHxA	315 > 269.8	4.56e3	1.61e4	0.620	1.000	3.47	5.71	114.1
18	18	13C4-PFHpA	367.2 > 321.8	1.40e4	1.10e4	1.139	1.000	3.97	14.1	112.6
19	19	18O2-PFHxS	403 > 102.6	5.82e3	1.10e4	0.449	1.000	4.09	14.8	118.2
20	20	13C2-6:2 FTS	429.1 > 408.9	5.80e3	4.58e3	1.073	1.000	4.32	14.8	118.1
21	21	13C2-PFOA	414.9 > 369.7	2.49e4	8.18e3	2.262	1.000	4.37	16.8	134.6
22	22	13C8-PFOS	507.0 > 79.9	7.54e3	6.29e3	0.944	1.000	4.77	15.9	127.2
23	23	13C5-PFNA	468.2 > 422.9	1.20e4	9.84e3	1.082	1.000	4.71	14.1	113.0
24	24	13C2-PFDA	515.1 > 469.9	9.03e3	6.86e3	1.019	1.000	5.01	16.1	129.0
25	25	13C2-8:2 FTS	529.1 > 508.7	2.91e3	4.58e3	0.569	1.000	4.99	14.0	111.7
26	26	13C4-PFBA	217 > 171.8	1.41e4	1.41e4	1.000	1.000	1.94	12.5	100.0
27	27	13C2-4:2 FTS	329.2 > 308.9	4.58e3	4.58e3	1.000	1.000	3.38	12.5	100.0
28	28	13C5-PFHxA	318.0 > 272.9	1.61e4	1.61e4	1.000	1.000	3.47	12.5	100.0
29	29	13C3-PFHxS	401.9 > 79.9	1.10e4	1.10e4	1.000	1.000	4.09	12.5	100.0
30	30	13C8-PFOA	421.3 > 376	8.18e3	8.18e3	1.000	1.000	4.37	12.5	100.0
31	31	13C4-PFOS	503.0 > 79.9	6.29e3	6.29e3	1.000	1.000	4.77	12.5	100.0

75-125

AC
11/22/16
PW
11/23/16

(A) Percent recovery based on linear isomer only.

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-12.qld

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Printed: Tuesday, November 22, 2016 15:30:54 Pacific Standard Time

Name: 161122G2_12, Date: 22-Nov-2016, Time: 12:06:50, ID: SS161122G2-1 PFC SS 16K2201, Description: PFC SS 16K2201

	#-Name	Trace	Response	IS Resp	RRF	Wt/Vol	RT	Conc.	%Rec
32	32 13C9-PFNA	472.2 > 426.9	9.84e3	9.84e3	1.000	1.000	4.71	12.5	100.0
33	33 13C6-PFDA	519.1 > 473.7	6.86e3	6.86e3	1.000	1.000	5.01	12.5	100.0

Vista Analytical Laboratory Q1

Dataset: U:\G1.PRO\Results\2016\161122G2\161122G2-1.qld

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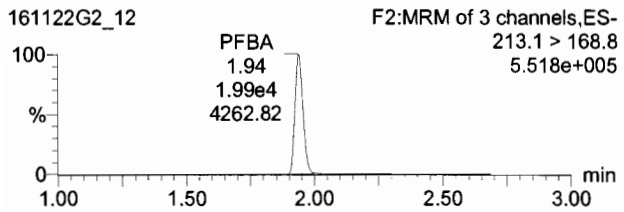
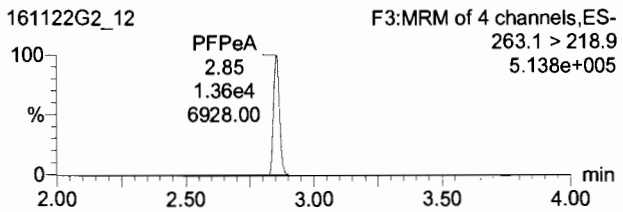
Calibration: U:\G1.PRO\CurveDB\C18_VAL-PFC_Q1_11-22-16_FULL_A.cdb 22 Nov 2016 14:59:27

Name: 161122G2_12, Date: 22-Nov-2016, Time: 12:06:50, ID: SS161122G2-1 PFC SS 16K2201, Description: PFC SS 16K2201

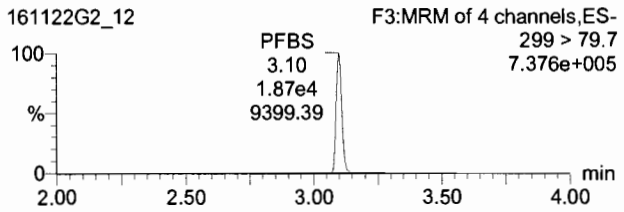
PFBA



PFPeA



PFBS



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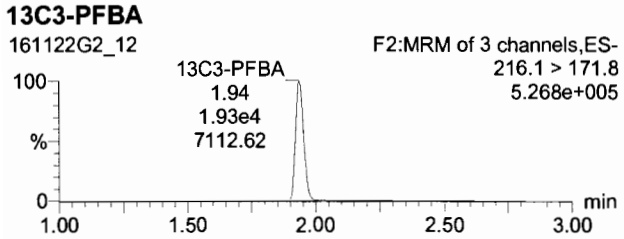
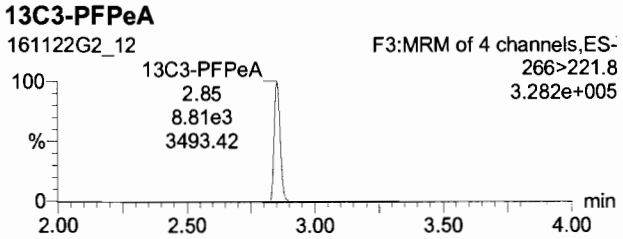


13C3-PFPeA



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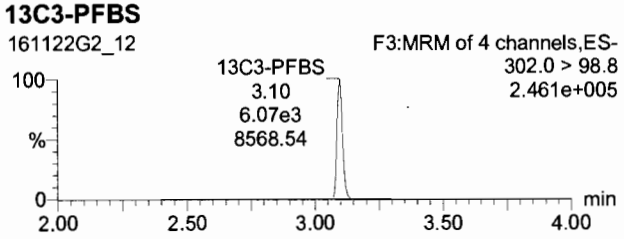
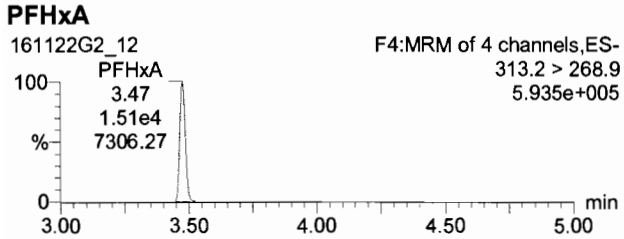
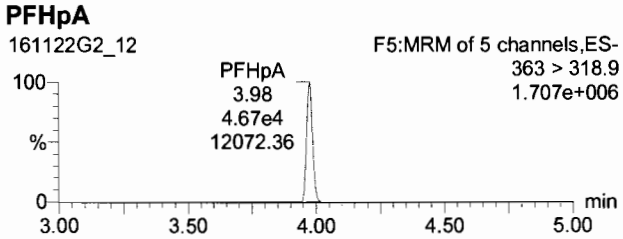


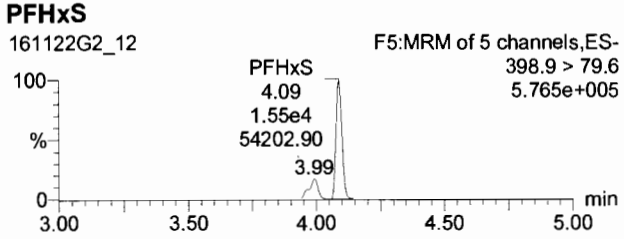
PFHxA



PFHpA



PFHxS



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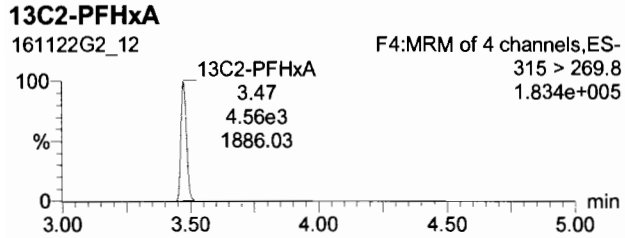
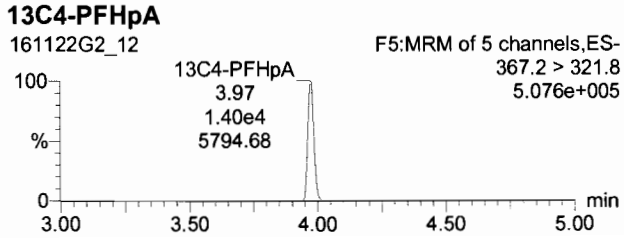
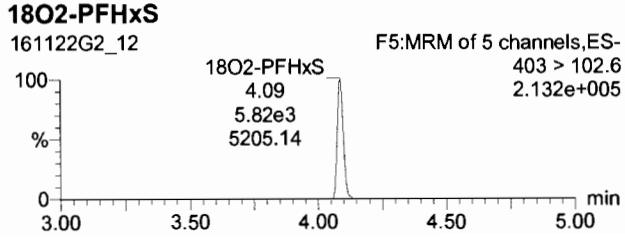


13C4-PFHpA



18O2-PFHxS



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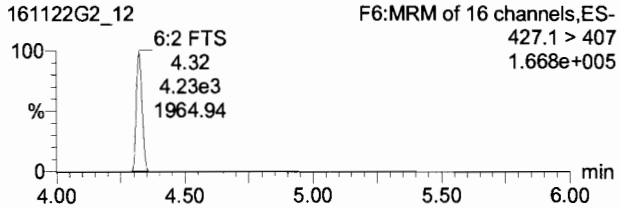
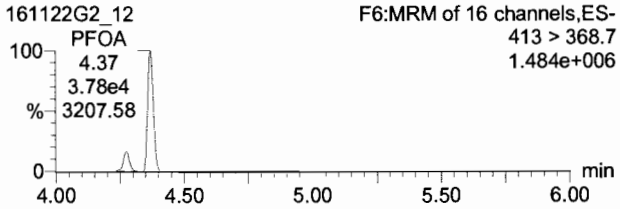
Printed: Tuesday, November 22, 2016 15:11:00 Pacific Standard Time

Name: 161122G2_12, Date: 22-Nov-2016, Time: 12:06:50, ID: SS161122G2-1 PFC SS 16K2201, Description: PFC SS 16K2201

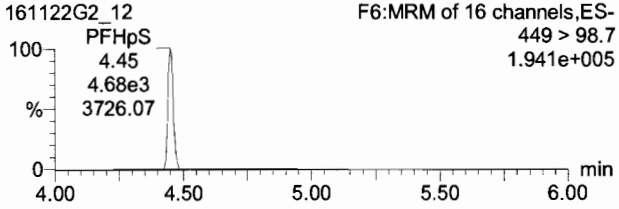
6:2 FTS



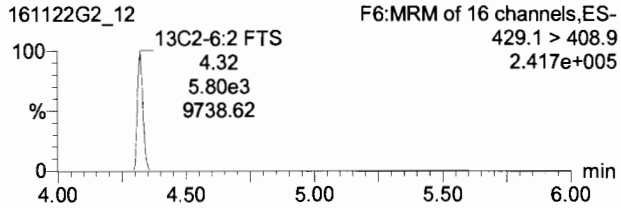
PFOA



PFHpS



13C2-6:2 FTS



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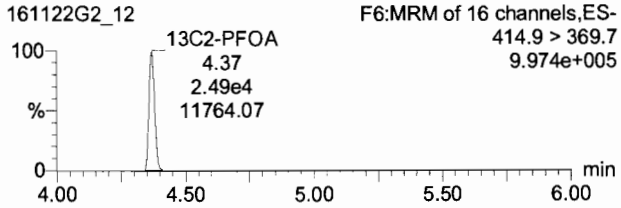
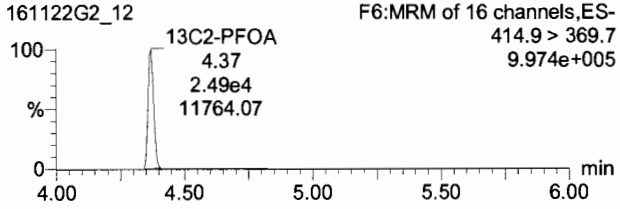


13C2-PFOA



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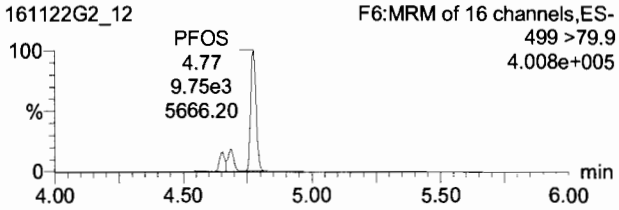
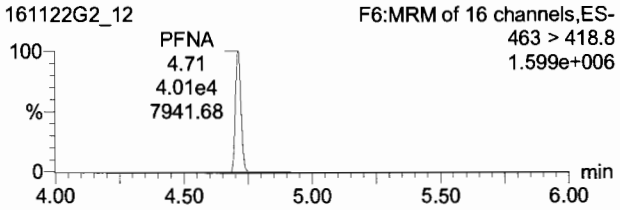
Name: 161122G2_12, Date: 22-Nov-2016, Time: 12:06:50, ID: SS161122G2-1 PFC SS 16K2201, Description: PFC SS 16K2201

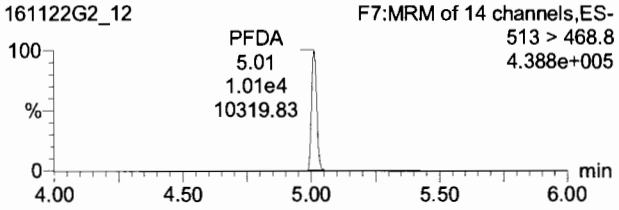
PFOS



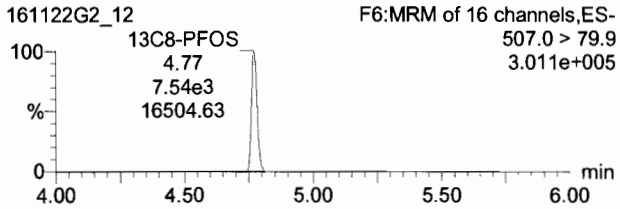
PFNA



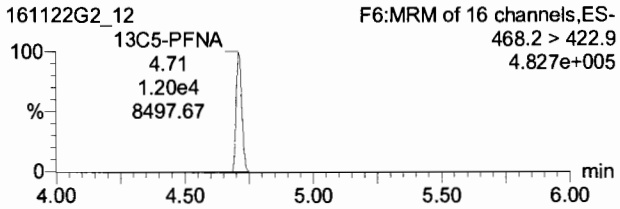
PFDA



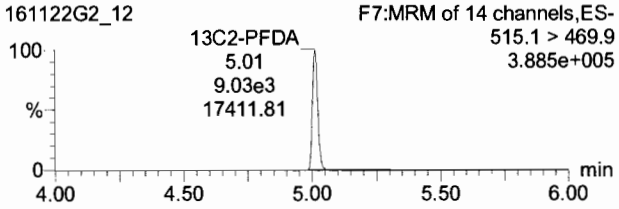
13C8-PFOS



13C5-PFNA



13C2-PFDA



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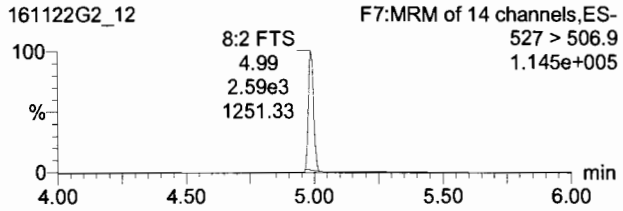
8:2 FTS



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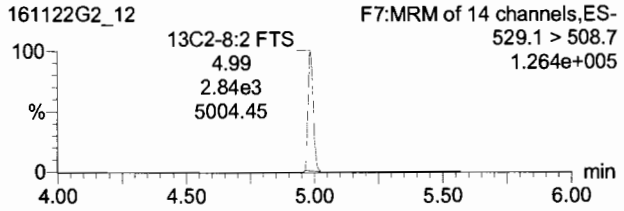

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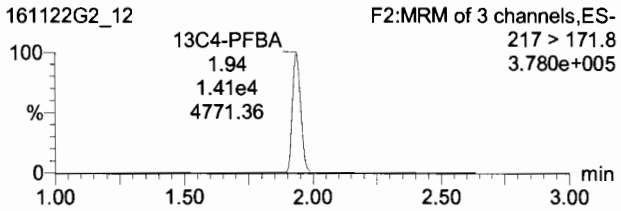
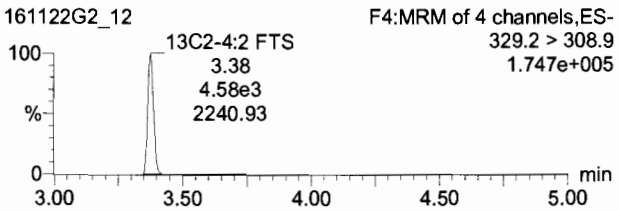
13C4-PFBA



13C2-4:2 FTS



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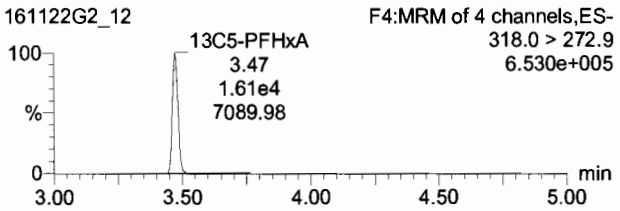
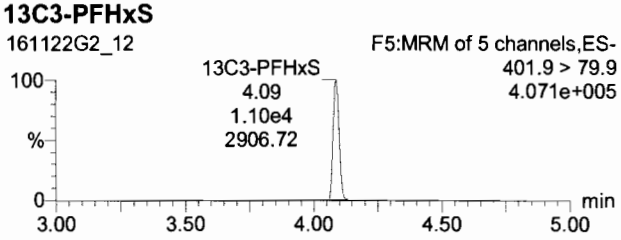
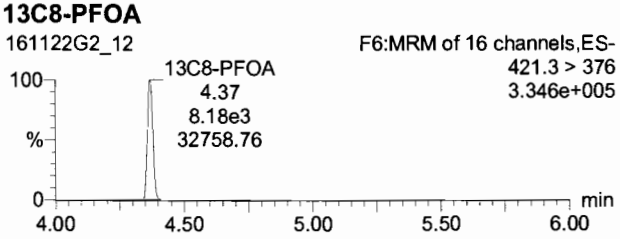


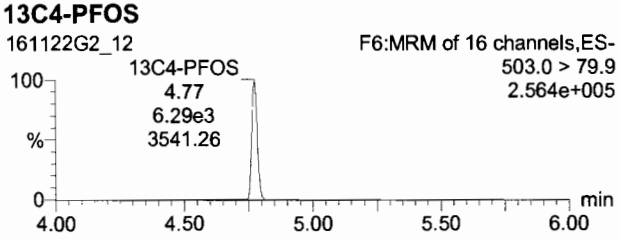
13C3-PFHxS



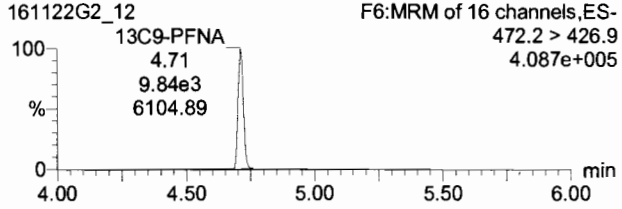
13C8-PFOA



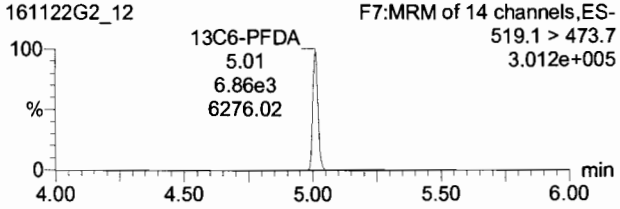
13C4-PFOS



13C9-PFNA



13C6-PFDA



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"OUAI-MW08-20161114","537_MOD","11/27/16","22:28","N","NA","000","13C2-PFOA","13C2-
PFOA","108","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","108","108","","","","","","60","150","","
","",""
"OUAI-MW08-20161114","537_MOD","11/27/16","22:28","N","NA","000","13C8-PFOS","13C8-
PFOS","134","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","134","134","","","","","","60","150","",""
,"",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","375-73-
5","PFBS","121","","TRG","Yes","Y","","Y","1.82","4.07","8.15","NG_L","NG_L","","","","","","","","","","","","",
"","","","",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","335-67-1","PERFLUOROOCTANOIC
ACID
(PFOA)","113","","TRG","Yes","Y","","Y","0.663","2.03","8.15","NG_L","NG_L","","","","","","","","","","","","","
","","",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","4.38","","TRG","Yes","Y","J","Y","0.822","0.915","8.15","NG_L","NG_L","","","","","","","","","","","","","","",
"",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","13C3-PFBS","13C3-
PFBS","118","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","118","118","","","","","","60","150","",""
,"",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","13C2-PFOA","13C2-
PFOA","106","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","106","106","","","","","","60","150","","
","",""
"OUAI-MW06-20161114","537_MOD","11/27/16","22:41","N","NA","000","13C8-PFOS","13C8-
PFOS","102","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","102","102","","","","","","60","150","",""
,"",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","375-73-
5","PFBS","","","TRG","Yes","N","","Y","1.79","4.00","8.00","NG_L","NG_L","","","","","","","","","","","","","
","",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID
(PFOA)","","","TRG","Yes","N","","Y","0.651","2.00","8.00","NG_L","NG_L","","","","","","","","","","","","","",""
,"",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","1763-23-
1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION
","","","TRG","Yes","N","","Y","0.807","0.900","8.00","NG_L","NG_L","","","","","","","","","","","","","","",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","13C3-PFBS","13C3-
PFBS","116","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","116","116","","","","","","60","150","",""
,"",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","13C2-PFOA","13C2-

PFOA","97.1","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","97.1","97.1","","","","","","60","150","","","","",""
"B6K0143-BLK1","537_MOD","11/27/16","15:44","N","NA","000","13C8-PFOS","13C8-PFOS","90.0","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","90.0","90.0","","","","","","60","150","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","375-73-5","PFBS","78.9","","TRG","Yes","Y","","Y","1.79","4.00","8.00","NG_L","NG_L","","","","80.0","78.9","98.6","","","","","","","60","130","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","86.0","","TRG","Yes","Y","","Y","0.651","2.00","8.00","NG_L","NG_L","","","","80.0","86.0","107","","","","","","","70","130","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION","74.4","","TRG","Yes","Y","","Y","0.807","0.900","8.00","NG_L","NG_L","","","","80.0","74.4","93.0","","","","","","70","130","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","13C3-PFBS","13C3-PFBS","116","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","116","116","","","","","","60","150","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","13C2-PFOA","13C2-PFOA","106","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","106","106","","","","","","60","150","","","","",""
"B6K0143-BS1","537_MOD","11/27/16","14:41","N","NA","000","13C8-PFOS","13C8-PFOS","126","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","126","126","","","","","","60","150","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","375-73-5","PFBS","366","","TRG","Yes","Y","","Y","1.78","3.97","7.93","NG_L","NG_L","","","289","79.3","366","98.0","","","","","","60","130","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","114","","TRG","Yes","Y","","Y","0.646","1.98","7.93","NG_L","NG_L","","","36.3","79.3","114","97.5","","","","","","70","130","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION","68.6","","TRG","Yes","Y","","Y","0.800","0.893","7.93","NG_L","NG_L","","","0.00","79.3","68.6","86.5","","","","","","70","130","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","13C3-PFBS","13C3-PFBS","140","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","140","140","","","","","","60","150","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","13C2-PFOA","13C2-PFOA","104","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","104","104","","","","","","60","150","","","","",""
"B6K0143-MS1","537_MOD","11/27/16","21:00","N","NA","000","13C8-PFOS","13C8-PFOS","118","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","118","118","","","","","","60","150","","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","375-73-5","PFBS","367","","TRG","Yes","Y","","Y","1.76","3.94","7.89","NG_L","NG_L","","","289","78.9","367","99.0","366","78.9","367","99.0","1.02","60","130","25","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","335-67-1","PERFLUOROOCTANOIC ACID (PFOA)","115","","TRG","Yes","Y","","Y","0.642","1.97","7.89","NG_L","NG_L","","","36.3","78.9","115","100","114","78.9","115","100","2.53","70","130","25","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","1763-23-1","HEPTADECAFLUOROACTANESULFONIC ACID SOLUTION","69.2","","TRG","Yes","Y","","Y","0.795","0.886","7.89","NG_L","NG_L","","","0.00","78.9","69.2","87.7","68.6","78.9","69.2","87.7","1.38","70","130","25","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","13C3-PFBS","13C3-

PFBS","138","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","138","138","","","","","","60","150","","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","13C2-PFOA","13C2-PFOA","101","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","101","101","","","","","","60","150","","","","",""
"B6K0143-MSD1","537_MOD","11/27/16","21:12","N","NA","000","13C8-PFOS","13C8-PFOS","117","","IS","Yes","Y","","Y","","","","PCT_REC","","","","","100","117","117","","","","","","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.

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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 #: 37197A

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: q
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 #: 31749A1

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: 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

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	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\37797A6.wpd

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

Page: 1 of 1
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: 9
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: Q

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	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD_inorganic\37797B6.wpd

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			

V:\FIELD DUPLICATES\37797C2b.wpd

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 #: 37797C6

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^{++}]
	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 #: 37797D1

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

Page: 2 of 2
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 #: 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 #: 37797D2b

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 #: 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	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 = $\frac{\left(\frac{9.9\text{4e}3 \times 12.5}{2.61\text{e}4} - 0.0917344\right)}{(0.899906)(0.128)} = 40.44 \text{ ng/L}$

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:

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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	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37A-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37A-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	A1-MW-37	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441675.7197	605691.9325	OUA1-MW37A-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	A1-MW-13	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441121.7924	605643.0455	OUA1-MW13-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	A1-MW-13	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441121.7924	605643.0455	OUA1-MW13-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	A1-MW-13	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441121.7924	605643.0455	OUA1-MW13-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	A1-MW-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442155.8248	605599.4029	OUA1-MW19-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	A1-MW-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442155.8248	605599.4029	OUA1-MW19-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	A1-MW-19	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442155.8248	605599.4029	OUA1-MW19-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	16-HS-03	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441712.6895	605539.6474	OUA1-HS03-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	16-HS-03	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441712.6895	605539.6474	OUA1-HS03-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	16-HS-03	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	441712.6895	605539.6474	OUA1-HS03-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	A1-MW-18	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442390.7249	605493.1429	OUA1-MW18-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	A1-MW-18	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442390.7249	605493.1429	OUA1-MW18-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	A1-MW-18	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442390.7249	605493.1429	OUA1-MW18-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	16-MW-08	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442128.793	605331.0117	OUA1-MW08-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	16-MW-08	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442128.793	605331.0117	OUA1-MW08-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	16-MW-08	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442128.793	605331.0117	OUA1-MW08-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)
MCAS YUMA	1601451	16-MW-06	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442562.7747	605123.5928	OUA1-MW06-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanesulfonic Acid (PFOS)
MCAS YUMA	1601451	16-MW-06	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442562.7747	605123.5928	OUA1-MW06-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorooctanoic Acid (PFOA)
MCAS YUMA	1601451	16-MW-06	SITE 00019	YUMA_MCAS	WLM	MONITORING WELL	442562.7747	605123.5928	OUA1-MW06-20161114	WG	GROUNDWATER	14-Nov-16	Perfluorobutanesulfonic Acid (PFBS)