

ANALYTICAL RESULTS

Sample ID: Method Blank						PFAS Isotope Dilution Method					
Client Data Name: SKOOKUM Contract Services Project: AFFF Skid, 6-Barrel Efficiency Check						Laboratory Data Lab Sample: B8K0215-BLK1 Column: BEH C18					
Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFHxA	307-24-4	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFHpA	375-85-9	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFHxS	355-46-4	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFOA	335-67-1	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFNA	375-95-1	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFOS	1763-23-1	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFDA	335-76-2	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
MeFOSAA	2355-31-9	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
EtFOSAA	2991-50-6	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFA	2058-94-8	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFDoA	307-55-1	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFTDA	72629-94-8	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
PFTeDA	376-06-7	ND	2.74	4.00	8.00		B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers		Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	92.0	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFHxA	IS	92.9	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C4-PFHxA	IS	89.2	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
18O2-PFHxS	IS	77.5	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFOA	IS	79.2	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C5-PFNA	IS	64.8	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C8-PFOS	IS	59.4	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFDA	IS	52.4	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
d3-MeFOSAA	IS	52.6	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
d5-EtFOSAA	IS	57.0	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFA	IS	50.1	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFDoA	IS	53.6	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1
13C2-PFTeDA	IS	63.9	50 - 150				B8K0215	02-Dec-18	0.125 L	04-Dec-18 17:31	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

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

Sample ID: LCSD

PFAS Isotope Dilution Method

Name:	SKOOKUM Contract Services	Lab Sample:	B8K0215-BS1/B8K0215-BSD1	Date Extracted:	02-Dec-18
Project:	AFFF Skid, 6-Barrel Efficiency Check	QC Batch:	B8K0215	Column:	BEH C18
Matrix:	Aqueous	Samp Size:	0.125/0.125 L		

Analyte	CAS Number	LCS (ng/L)	LCS Spike Amt	LCS % Rec	LCS Quals	LCSD (ng/L)	LCSD Spike Amt	LCSD % Rec	RPD	LCSD Quals	%Rec Limits	RPD Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
PFBS	375-73-5	89.9	80.0	112		88.4	80.0	110	1.72		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFHxA	307-24-4	85.2	80.0	107		92.3	80.0	115	7.94		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFHpA	375-85-9	94.1	80.0	118		92.0	80.0	115	2.21		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFHxS	355-46-4	86.4	80.0	108		88.0	80.0	110	1.87		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFOA	335-67-1	85.1	80.0	106		87.1	80.0	109	2.38		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFNA	375-95-1	82.8	80.0	103		87.5	80.0	109	5.57		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFOS	1763-23-1	88.6	80.0	111		87.5	80.0	109	1.19		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFDA	335-76-2	91.1	80.0	114		89.3	80.0	112	2.01		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
MeFOSAA	2355-31-9	89.0	80.0	111		82.5	80.0	103	7.55		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
EtFOSAA	2991-50-6	84.6	80.0	106		87.5	80.0	109	3.33		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFUnA	2058-94-8	85.6	80.0	107		88.0	80.0	110	2.74		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFDaA	307-55-1	81.2	80.0	101		85.0	80.0	106	4.57		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFTDA	72629-94-8	89.5	80.0	112		97.3	80.0	122	8.31		60-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1
PFTeDA	376-06-7	80.3	80.0	100		81.5	80.0	102	1.52		70-130	30	04-Dec-18 17:09	1	04-Dec-18 17:20	1

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBS	IS	92.9		89.3		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFHxA	IS	92.4		94.7		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C4-PFHpA	IS	88.7		94.5		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
18O2-PFHxS	IS	80.2		79.7		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFOA	IS	76.1		77.9		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C5-PFNA	IS	67.7		69.6		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C8-PFOS	IS	62.7		67.1		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFDA	IS	56.4		57.0		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
d3-MeFOSAA	IS	50.4		57.8		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
d5-EtFOSAA	IS	54.0		58.8		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFUnA	IS	52.3		55.5		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFDaA	IS	61.1		57.4		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1
13C2-PFTeDA	IS	67.0		72.9		50-150	04-Dec-18 17:09	1	04-Dec-18 17:20	1

Sample ID: PFC-AF-01-03-112918	PFAS Isotope Dilution Method
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Client Data	Laboratory Data
Name: SKOOKUM Contract Services Project: AFFF Skid, 6-Barrel Efficiency Check Location: E Property, Map Grid E13	Matrix: Aqueous Date Collected: 29-Nov-18 12:20 Lab Sample: 1803788-03 Date Received: 30-Nov-18 10:50 Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	10.5	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFHxA	307-24-4	27.9	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFHpA	375-85-9	11.2	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFHxS	355-46-4	56.5	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFOA	335-67-1	31.6	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFNA	375-95-1	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFOS	1763-23-1	124	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFDA	335-76-2	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
MeFOSAA	2355-31-9	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
EtFOSAA	2991-50-6	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFUnA	2058-94-8	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFDaA	307-55-1	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFTDA	72629-94-8	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
PFTeDA	376-06-7	ND	2.92	4.27	8.52		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	93.0	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFHxA	IS	96.2	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C4-PFHpA	IS	93.4	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
18O2-PFHxS	IS	93.4	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFOA	IS	96.1	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C5-PFNA	IS	84.8	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C8-PFOS	IS	82.4	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFDA	IS	76.6	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
d3-MeFOSAA	IS	73.9	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
d5-EtFOSAA	IS	66.9	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFUnA	IS	74.5	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFDaA	IS	66.2	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1
13C2-PFTeDA	IS	61.2	50 - 150		B8K0215	02-Dec-18	0.117 L	04-Dec-18 18:02	1

DL - Detection Limit

LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

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

DATA QUALIFIERS & ABBREVIATIONS

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

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

Vista Analytical Laboratory Certifications

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

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

NELAP Accredited Test Methods

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

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

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

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

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