

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-44239-4

Client Project/Site: 2018 PFAS Phase 2

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Sheila Hinkley



Authorized for release by:

10/31/2018 10:25:30 AM

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

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

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Job ID: 320-44239-4

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-44239-4

Receipt

The samples were received on 10/16/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.0° C and 3.4° C.

LCMS

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

Organic Prep

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-253030.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Client Sample ID: [REDACTED] -2018PFAS-P2Post

Lab Sample ID: 320-44239-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.24	J B	1.7	0.14	ng/L	1		537 (modified)	Total/NA

Client Sample ID: [REDACTED] -2018PFAS-P2Pre

Lab Sample ID: 320-44239-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	22		1.7	0.50	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	14		1.7	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	13		1.7	0.73	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	35		1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.2		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	19	B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16		1.7	0.47	ng/L	1		537 (modified)	Total/NA

Client Sample ID: [REDACTED] -P2Pre

Lab Sample ID: 320-44239-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	23		1.8	0.53	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	14		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	15		1.8	0.77	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	37		1.8	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.2		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18	B	1.8	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16		1.8	0.49	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Client Sample ID: [REDACTED] -2018PFAS-P2Post

Lab Sample ID: 320-44239-6

Date Collected: 10/10/18 10:00

Matrix: Water

Date Received: 10/16/18 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.49	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.21	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.72	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.93	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.46	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.24	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorohexanesulfonic acid (PFHxS)	0.24	J B	1.7	0.14	ng/L		10/18/18 07:58	10/24/18 19:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	0.46	ng/L		10/18/18 07:58	10/24/18 19:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C5-PFPeA DNU	94		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C2 PFHxA	90		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C4 PFHpA	95		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C4 PFOA	98		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C5 PFNA	94		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C2 PFDA	89		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C2 PFUnA	95		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C2 PFDoA	86		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C2 PFTeDA	86		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C3 PFBS	91		25 - 150				10/18/18 07:58	10/24/18 19:17	1
18O2 PFHxS	89		25 - 150				10/18/18 07:58	10/24/18 19:17	1
13C4 PFOS	97		25 - 150				10/18/18 07:58	10/24/18 19:17	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Client Sample ID: [REDACTED] -2018PFAS-P2Pre

Lab Sample ID: 320-44239-7

Date Collected: 10/10/18 10:05

Matrix: Water

Date Received: 10/16/18 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	22		1.7	0.50	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluoroheptanoic acid (PFHpA)	14		1.7	0.22	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorooctanoic acid (PFOA)	13		1.7	0.73	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorononanoic acid (PFNA)	35		1.7	0.23	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.95	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorobutanesulfonic acid (PFBS)	2.2		1.7	0.17	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorohexanesulfonic acid (PFHxS)	19 B		1.7	0.15	ng/L		10/18/18 07:58	10/24/18 19:24	1
Perfluorooctanesulfonic acid (PFOS)	16		1.7	0.47	ng/L		10/18/18 07:58	10/24/18 19:24	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5-PFPeA DNU	88		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C2 PFHxA	90		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C4 PFHpA	90		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C4 PFOA	92		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C5 PFNA	90		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C2 PFDA	86		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C2 PFUnA	85		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C2 PFDoA	74		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C2 PFTeDA	74		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C3 PFBS	87		25 - 150	10/18/18 07:58	10/24/18 19:24	1
18O2 PFHxS	85		25 - 150	10/18/18 07:58	10/24/18 19:24	1
13C4 PFOS	89		25 - 150	10/18/18 07:58	10/24/18 19:24	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Client Sample ID: [REDACTED] -P2Pre

Lab Sample ID: 320-44239-8

Date Collected: 10/10/18 09:55

Matrix: Water

Date Received: 10/16/18 10:15

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	23		1.8	0.53	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluoroheptanoic acid (PFHpA)	14		1.8	0.23	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorooctanoic acid (PFOA)	15		1.8	0.77	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorononanoic acid (PFNA)	37		1.8	0.25	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorobutanesulfonic acid (PFBS)	2.2		1.8	0.18	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorohexanesulfonic acid (PFHxS)	18 B		1.8	0.15	ng/L		10/18/18 07:58	10/24/18 19:39	1
Perfluorooctanesulfonic acid (PFOS)	16		1.8	0.49	ng/L		10/18/18 07:58	10/24/18 19:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C5-PFPeA DNU	87		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C2 PFHxA	88		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C4 PFHpA	94		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C4 PFOA	92		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C5 PFNA	87		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C2 PFDA	85		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C2 PFUnA	88		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C2 PFDoA	79		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C2 PFTeDA	79		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C3 PFBS	90		25 - 150				10/18/18 07:58	10/24/18 19:39	1
18O2 PFHxS	88		25 - 150				10/18/18 07:58	10/24/18 19:39	1
13C4 PFOS	96		25 - 150				10/18/18 07:58	10/24/18 19:39	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFPeA (25-150)	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDaA (25-150)
320-44239-6	[REDACTED]-2018PFAS-P2	94	90	95	98	94	89	95	86
320-44239-7	[REDACTED]-2018PFAS-P2Pre	88	90	90	92	90	86	85	74
320-44239-8	[REDACTED]-2018PFAS-P2Pre	87	88	94	92	87	85	88	79
LCS 320-253030/2-A	Lab Control Sample	87	86	92	94	90	90	90	81
LCSD 320-253030/3-A	Lab Control Sample Dup	93	83	95	94	88	91	89	82
MB 320-253030/1-A	Method Blank	89	88	94	91	89	85	85	79

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFTDA (25-150)	3C3-PFBs (25-150)	PFHxS (25-150)	PFOS (25-150)
320-44239-6	[REDACTED]-2018PFAS-P2	86	91	89	97
320-44239-7	[REDACTED]-2018PFAS-P2Pre	74	87	85	89
320-44239-8	[REDACTED]-2018PFAS-P2Pre	79	90	88	96
LCS 320-253030/2-A	Lab Control Sample	86	78	89	92
LCSD 320-253030/3-A	Lab Control Sample Dup	86	88	91	95
MB 320-253030/1-A	Method Blank	85	86	85	92

Surrogate Legend

PFPeA = 13C5-PFPeA DNU
PFHxA = 13C2 PFHxA
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDaA = 13C2 PFDaA
PFTDA = 13C2 PFTeDA
13C3-PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-253030/1-A

Matrix: Water

Analysis Batch: 254640

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 253030

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorohexanesulfonic acid (PFHxS)	0.274	J	2.0	0.17	ng/L		10/18/18 07:58	10/24/18 18:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/18/18 07:58	10/24/18 18:17	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5-PFPeA DNU	89		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C2 PFHxA	88		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C4 PFHpA	94		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C4 PFOA	91		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C5 PFNA	89		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C2 PFDA	85		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C2 PFUnA	85		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C2 PFDoA	79		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C2 PFTeDA	85		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C3 PFBS	86		25 - 150	10/18/18 07:58	10/24/18 18:17	1
18O2 PFHxS	85		25 - 150	10/18/18 07:58	10/24/18 18:17	1
13C4 PFOS	92		25 - 150	10/18/18 07:58	10/24/18 18:17	1

Lab Sample ID: LCS 320-253030/2-A

Matrix: Water

Analysis Batch: 254640

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 253030

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	40.0	38.3		ng/L		96	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	36.1		ng/L		90	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	38.5		ng/L		96	64 - 124
Perfluorononanoic acid (PFNA)	40.0	40.9		ng/L		102	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	36.8		ng/L		92	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	41.2		ng/L		103	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	37.9		ng/L		95	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	42.1		ng/L		105	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	38.5		ng/L		96	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	37.8		ng/L		107	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.0		ng/L		88	63 - 123

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-253030/2-A

Matrix: Water

Analysis Batch: 254640

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 253030

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	37.1	33.7		ng/L		91	67 - 127
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C5-PFPeA DNU	87		25 - 150				
13C2 PFHxA	86		25 - 150				
13C4 PFHpA	92		25 - 150				
13C4 PFOA	94		25 - 150				
13C5 PFNA	90		25 - 150				
13C2 PFDA	90		25 - 150				
13C2 PFUnA	90		25 - 150				
13C2 PFDoA	81		25 - 150				
13C2 PFTeDA	86		25 - 150				
13C3 PFBS	78		25 - 150				
18O2 PFHxS	89		25 - 150				
13C4 PFOS	92		25 - 150				

Lab Sample ID: LCSD 320-253030/3-A

Matrix: Water

Analysis Batch: 254640

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 253030

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Added	Result	Qualifier			Limits	Limits		
Perfluorohexanoic acid (PFHxA)	40.0	40.4		ng/L		101	66 - 126	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	34.9		ng/L		87	66 - 126	3	30
Perfluorooctanoic acid (PFOA)	40.0	39.7		ng/L		99	64 - 124	3	30
Perfluorononanoic acid (PFNA)	40.0	43.8		ng/L		109	68 - 128	7	30
Perfluorodecanoic acid (PFDA)	40.0	38.7		ng/L		97	69 - 129	5	30
Perfluoroundecanoic acid (PFUnA)	40.0	41.7		ng/L		104	60 - 120	1	30
Perfluorododecanoic acid (PFDoA)	40.0	37.4		ng/L		94	71 - 131	1	30
Perfluorotridecanoic acid (PFTriA)	40.0	40.5		ng/L		101	72 - 132	4	30
Perfluorotetradecanoic acid (PFTeA)	40.0	37.3		ng/L		93	68 - 128	3	30
Perfluorobutanesulfonic acid (PFBS)	35.4	33.7		ng/L		95	73 - 133	11	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.1		ng/L		88	63 - 123	0	30
Perfluorooctanesulfonic acid (PFOS)	37.1	33.2		ng/L		90	67 - 127	1	30
	LCSD	LCSD							
Isotope Dilution	%Recovery	Qualifier	Limits						
13C5-PFPeA DNU	93		25 - 150						
13C2 PFHxA	83		25 - 150						
13C4 PFHpA	95		25 - 150						
13C4 PFOA	94		25 - 150						
13C5 PFNA	88		25 - 150						
13C2 PFDA	91		25 - 150						
13C2 PFUnA	89		25 - 150						

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-253030/3-A

Matrix: Water

Analysis Batch: 254640

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 253030

<i>Isotope Dilution</i>	<i>LCSD</i>	<i>LCSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFDoA	82		25 - 150
13C2 PFTeDA	86		25 - 150
13C3 PFBS	88		25 - 150
18O2 PFHxS	91		25 - 150
13C4 PFOS	95		25 - 150

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

LCMS

Prep Batch: 253030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44239-6	[REDACTED]-2018PFAS-P2Post	Total/NA	Water	3535	
320-44239-7	[REDACTED]-2018PFAS-P2Pre	Total/NA	Water	3535	
320-44239-8	[REDACTED]2018PFAS-P2Pre	Total/NA	Water	3535	
MB 320-253030/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253030/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-253030/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 254640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44239-6	[REDACTED]-2018PFAS-P2Post	Total/NA	Water	537 (modified)	253030
320-44239-7	[REDACTED]-2018PFAS-P2Pre	Total/NA	Water	537 (modified)	253030
320-44239-8	[REDACTED]-P2Pre	Total/NA	Water	537 (modified)	253030
MB 320-253030/1-A	Method Blank	Total/NA	Water	537 (modified)	253030
LCS 320-253030/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	253030
LCSD 320-253030/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	253030

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Client Sample ID: [REDACTED]-2018PFAS-P2Post

Lab Sample ID: 320-44239-6

Date Collected: 10/10/18 10:00

Matrix: Water

Date Received: 10/16/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			296.3 mL	10.00 mL	253030	10/18/18 07:58	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			254640	10/24/18 19:17	S1M	TAL SAC

Client Sample ID: [REDACTED]-2018PFAS-P2Pre

Lab Sample ID: 320-44239-7

Date Collected: 10/10/18 10:05

Matrix: Water

Date Received: 10/16/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			289.8 mL	10.00 mL	253030	10/18/18 07:58	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			254640	10/24/18 19:24	S1M	TAL SAC

Client Sample ID: [REDACTED]n2018PFAS-P2Pre

Lab Sample ID: 320-44239-8

Date Collected: 10/10/18 09:55

Matrix: Water

Date Received: 10/16/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			275.3 mL	10.00 mL	253030	10/18/18 07:58	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			254640	10/24/18 19:39	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18 *
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

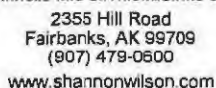
TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-44239-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44239-6	[REDACTED]-P2Post	Water	10/10/18 10:00	10/16/18 10:15
320-44239-7	[REDACTED]-2018PFAS-P2Pre	Water	10/10/18 10:05	10/16/18 10:15
320-44239-8	[REDACTED]-P2Pre	Water	10/10/18 09:55	10/16/18 10:15



Laboratory Test America Page 1 of 1
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	
☒ Normal	☐ Rush
Please Specify	

Quote No:

J-Flags: ☒ Yes ☐ No

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101965-002	Total No. of Containers: 4	Signature: [Signature]	Time: 1:00	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Name: 2018 PFAS Phase 2	COC Seals/Intact? Y/N/NA Y	Printed Name: [Signature]	Date: 12/15/18	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: smH	Received Good Cond./Cold Cold	Company: [Signature]		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes ☒ No ☐	Temp: 3.0c	Shannon Wilson, Inc.							
Sampler: smH	Delivery Method: Gold Streak	Received By: 1.		Received By: 2.		Received By: 3.			
Notes: Bill to SWI		Signature: [Signature]	Time: 10:15	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
		Printed Name: [Signature]	Date: 10/16/18	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
		Company: [Signature]		Company: _____		Company: _____		Company: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - lab file									

30c

No. 35651

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: _____

Analytical Methods (include preservative if used)

Turn Around Time:
☒ Normal ☐ Rush
Please Specify _____

Quote No: _____

J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	Analytical Methods (include preservative if used)					Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[REDACTED]	S-P2 Post	0936	10/5/18	2					2	GW
[REDACTED]	S-P2 Pre	0940	10/5/18	2					2	GW

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: <u>101965-002</u>	Total No. of Containers: <u>4</u>	Signature: <u>[Signature]</u> Time: <u>1500</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Name: <u>2018 PFAS Phase 2</u>	CDC Seals/Intact? Y/N/NA <u>Y</u>	Printed Name: <u>Sheila Hinkley</u> Date: <u>10/10/18</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Contact: <u>SMH</u>	Received Good Cond./Cold <u>Cold</u>	Company: <u>Shannon & Wilson, Inc.</u>	Company: _____	Company: _____
Ongoing Project? Yes ☐ No ☐	Temp: <u>3.0</u>			
Sampler: <u>SMH</u>	Delivery Method: <u>Cold streak</u>			
Notes:	Received By: 1.	Received By: 2.	Received By: 3.	
<u>B.11 to SW1</u>	Signature: <u>[Signature]</u> Time: <u>1015</u>	Signature: _____ Time: _____	Signature: _____ Time: _____	
	Printed Name: <u>David H</u> Date: <u>10/10/18</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____	
	Company: <u>DA Sam</u>	Company: _____	Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - job file

3.0 c

No. 35652



Page 1 of 1
Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	
☒ Normal	☐ Rush
Please Specify	

Quote No: _____

J-Flags: ☐ Yes ☐ No

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101965-002	Total No. of Containers: 2	Signature: [Signature]	Time: 1500	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Name: 2018 PEAS Phase 2	COC Seals/Intact? Y/N/NA Y	Printed Name: [Signature]	Date: 10/15/14	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: SMH	Received Good Cond./Cold Good/Cold	Company: [Signature]		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes ☒ No ☐	Temp: 3.0	Shannon Wilson Inc							
Sampler: SMH	Delivery Method: Goldstreak								
Notes:		Received By: 1.		Received By: 2.		Received By: 3.			
Bill to SWI		Signature: [Signature]	Time: 1015	Signature: _____	Time: _____	Signature: _____	Time: _____		
		Printed Name: [Signature]	Date: 10/16/14	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____		
		Company: [Signature]		Company: _____		Company: _____			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - lab file		TA Sae							

No. 35691

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: _____

Analytical Methods (include preservative if used)

Turn Around Time:
☒ Normal ☐ Rush
Please Specify _____

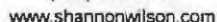
Quote No: _____
J-Flags: ☐ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	Analytical Methods (include preservative if used)					Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[Redacted]	PFAS-P2 Post	1000	10/10/18	2					2	GW
	PFAS-P2 Pre	1005	10/10/18	2					2	GW
	PFAS-P2 Pre	0955	10/10/18	2					2	GW

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: <u>101965-002</u>		Total No. of Containers: <u>6</u>		Signature: <u>[Signature]</u> Time: <u>1500</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name: <u>2018 PFAS Phase 2</u>		COC Seals/Intact? <u>Y/N/NA</u> <u>Y</u>		Printed Name: <u>Sheila Hinckley</u> Date: <u>10/14/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>JMH</u>		Received Good Cond./Cold <u>Cold</u>		Company: <u>Shannon & Wilson Inc</u>		Company: _____		Company: _____	
Ongoing Project? Yes ☒ No ☐		Temp: <u>2.0C</u>		Received By: 1. Signature: <u>[Signature]</u> Time: <u>1015</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>JMH</u>		Delivery Method: <u>Goldstreak</u>		Printed Name: <u>Daniel H</u> Date: <u>10/16/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Notes:				Company: <u>TA-Sac</u>		Company: _____		Company: _____	
Bill to SWI									

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - job file

No. 35625



Page 1 of 1
Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	
☒ Normal	☐ Rush
Please Specify	

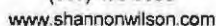
Quote No: _____

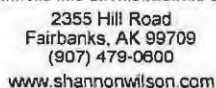
J-Flags: ☐ Yes ☐ No

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101965-002		Total No. of Containers: 4		Signature: [Signature]	Time: 1500	Signature:	Time:	Signature:	Time:
Name: 2018 PFAS Phase 2		COC Seals/Intact? Y/N/NA Y		Printed Name: [Signature]	Date: 10/15/18	Printed Name:	Date:	Printed Name:	Date:
Contact: SMH		Received Good Cond./Cold Cold		Company: Shannon & Wilson, Inc.		Company:		Company:	
Ongoing Project? Yes ☒ No ☐		Temp: 3.0c							
Sampler: SMH		Delivery Method: Coldstreet							
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
Bill to SWI				Signature: [Signature]	Time: 10/1	Signature:	Time:	Signature:	Time:
				Printed Name: David H	Date: 10/16/18	Printed Name:	Date:	Printed Name:	Date:
				Company: H-Sac		Company:		Company:	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file									

No. 35598





Laboratory Test America Page 1 of 1
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	
☒ Normal	☐ Rush
Please Specify	

Quote No: _____

J-Flags: ☐ Yes ☐ No

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101965-002	Total No. of Containers: 4	Signature: [Signature]	Time: 15:00	Signature:	Time:	Signature:	Time:	Signature:	Time:
Name: 2018 PFAS Phase 2	COC Seals/Intact? N/A	Printed Name: Sheila Hinkle	Date: 10/15/18	Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Contact: SMH	Received Good Cond./Cold Cold	Company: Shannon Wilson, Inc.		Company:		Company:		Company:	
Ongoing Project? Yes ☒ No ☐	Temp: 3-4								
Sampler: SMH	Delivery Method: Goldstream								
Notes:		Received By: 1.		Received By: 2.		Received By: 3.			
Bill to SWI		Signature: [Signature]	Time: 10:15	Signature:	Time:	Signature:	Time:		
		Printed Name: Daniel H	Date: 10/16/18	Printed Name:	Date:	Printed Name:	Date:		
		Company: TA Sam		Company:		Company:			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - lab file									

No. 35658

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-44239-4

Login Number: 44239

List Number: 1

Creator: Her, David A

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	GEL PACKS
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	