

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
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Tel: (916)373-5600

TestAmerica Job ID: 320-45876-2
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:
12/27/2018 9:10:30 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: 320-45876-2

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: 320-45876-2

Job ID: 320-45876-2

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-45876-2

Receipt

The samples were received on 12/5/2018 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

LCMS

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

Organic Prep

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike (MS) associated with preparation batch 320-263953.

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: 320-45876-2

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Post**

Lab Sample ID: 320-45876-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.23	J B	1.6	0.14	ng/L	1		537 (modified)	Total/NA

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre**

Lab Sample ID: 320-45876-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	25		1.7	0.51	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	17		1.7	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	15		1.7	0.74	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	41		1.7	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.6		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18	B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	20		1.7	0.47	ng/L	1		537 (modified)	Total/NA

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre**

Lab Sample ID: 320-45876-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	24		1.8	0.51	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	18		1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	15		1.8	0.75	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	46		1.8	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.7		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)	19		1.8	0.48	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: 320-45876-2

Client Sample ID: ██████████ -2018 PFAS-P2 Post

Lab Sample ID: 320-45876-3

Date Collected: 11/28/18 11:56

Matrix: Water

Date Received: 12/05/18 11:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.6	0.48	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluoroheptanoic acid (PFHpA)	ND		1.6	0.21	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorooctanoic acid (PFOA)	ND		1.6	0.70	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorononanoic acid (PFNA)	ND		1.6	0.22	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorodecanoic acid (PFDA)	ND		1.6	0.26	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluoroundecanoic acid (PFUnA)	ND		1.6	0.91	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorododecanoic acid (PFDoA)	ND		1.6	0.45	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorotridecanoic acid (PFTriA)	ND		1.6	1.1	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.6	0.24	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.6	0.16	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorohexanesulfonic acid (PFHxS)	0.23	J B	1.6	0.14	ng/L		12/08/18 08:37	12/13/18 08:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.6	0.44	ng/L		12/08/18 08:37	12/13/18 08:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C5 PFPeA	106		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C2 PFHxA	105		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C4 PFHpA	103		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C4 PFOA	103		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C5 PFNA	102		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C2 PFDA	102		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C2 PFUnA	98		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C2 PFDoA	96		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C2 PFTeDA	95		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C3 PFBS	99		25 - 150				12/08/18 08:37	12/13/18 08:36	1
18O2 PFHxS	103		25 - 150				12/08/18 08:37	12/13/18 08:36	1
13C4 PFOS	107		25 - 150				12/08/18 08:37	12/13/18 08:36	1

Client Sample Results

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

TestAmerica Job ID: 320-45876-2

Client Sample ID: ██████████ -2018 PFAS-P2 Pre

Lab Sample ID: 320-45876-4

Date Collected: 11/28/18 12:08

Matrix: Water

Date Received: 12/05/18 11:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	25		1.7	0.51	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluoroheptanoic acid (PFHpA)	17		1.7	0.22	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorooctanoic acid (PFOA)	15		1.7	0.74	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorononanoic acid (PFNA)	41		1.7	0.24	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.96	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.48	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorobutanesulfonic acid (PFBS)	2.6		1.7	0.17	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorohexanesulfonic acid (PFHxS)	18	B	1.7	0.15	ng/L		12/08/18 08:37	12/13/18 08:44	1
Perfluorooctanesulfonic acid (PFOS)	20		1.7	0.47	ng/L		12/08/18 08:37	12/13/18 08:44	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	101		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C2 PFHxA	100		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C4 PFHpA	100		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C4 PFOA	99		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C5 PFNA	99		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C2 PFDA	98		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C2 PFUnA	96		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C2 PFDoA	92		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C2 PFTeDA	93		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C3 PFBS	103		25 - 150	12/08/18 08:37	12/13/18 08:44	1
18O2 PFHxS	99		25 - 150	12/08/18 08:37	12/13/18 08:44	1
13C4 PFOS	104		25 - 150	12/08/18 08:37	12/13/18 08:44	1

Client Sample Results

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

TestAmerica Job ID: 320-45876-2

Client Sample ID: ██████████ -2018 PFAS-P2 Pre

Lab Sample ID: 320-45876-5

Date Collected: 11/28/18 11:58

Matrix: Water

Date Received: 12/05/18 11:00

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	24		1.8	0.51	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluoroheptanoic acid (PFHpA)	18		1.8	0.22	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorooctanoic acid (PFOA)	15		1.8	0.75	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorononanoic acid (PFNA)	46		1.8	0.24	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.27	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.97	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.1	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorobutanesulfonic acid (PFBS)	2.7		1.8	0.18	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorohexanesulfonic acid (PFHxS)	18	B	1.8	0.15	ng/L		12/08/18 08:37	12/13/18 08:51	1
Perfluorooctanesulfonic acid (PFOS)	19		1.8	0.48	ng/L		12/08/18 08:37	12/13/18 08:51	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	95		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C2 PFHxA	99		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C4 PFHpA	97		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C4 PFOA	98		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C5 PFNA	95		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C2 PFDA	96		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C2 PFUnA	94		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C2 PFDoA	96		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C2 PFTeDA	92		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C3 PFBS	100		25 - 150	12/08/18 08:37	12/13/18 08:51	1
18O2 PFHxS	98		25 - 150	12/08/18 08:37	12/13/18 08:51	1
13C4 PFOS	108		25 - 150	12/08/18 08:37	12/13/18 08:51	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-45876-2

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)
320-45876-3	[REDACTED]-2018 PFAS	106	105	103	103	102	102	98	96
320-45876-4	[REDACTED] 2018	101	100	100	99	99	98	96	92
320-45876-5	PFAS-P2 Pre								
	[REDACTED]-2018	95	99	97	98	95	96	94	96
LCS 320-263953/2-A	Lab Control Sample	103	99	96	96	99	94	90	94
LCSD 320-263953/3-A	Lab Control Sample Dup	95	98	99	98	95	98	92	94
MB 320-263953/1-A	Method Blank	99	97	93	100	95	93	90	96

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)
320-45876-3	[REDACTED]-2018 PFAS	95	99	103	107
320-45876-4	[REDACTED]	93	103	99	104
320-45876-5	PFAS-P2 Pre				
	[REDACTED]	92	100	98	108
LCS 320-263953/2-A	Lab Control Sample	98	96	95	103
LCSD 320-263953/3-A	Lab Control Sample Dup	95	97	95	100
MB 320-263953/1-A	Method Blank	106	95	94	104

Surrogate Legend

- PFPeA = 13C5 PFPeA
- 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: 320-45876-2

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-263953/1-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 263953

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorohexanesulfonic acid (PFHxS)	0.295	J	2.0	0.17	ng/L		12/08/18 08:37	12/13/18 06:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		12/08/18 08:37	12/13/18 06:51	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	99		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C2 PFHxA	97		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C4 PFHpA	93		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C4 PFOA	100		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C5 PFNA	95		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C2 PFDA	93		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C2 PFUnA	90		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C2 PFDoA	96		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C2 PFTeDA	106		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C3 PFBS	95		25 - 150	12/08/18 08:37	12/13/18 06:51	1
18O2 PFHxS	94		25 - 150	12/08/18 08:37	12/13/18 06:51	1
13C4 PFOS	104		25 - 150	12/08/18 08:37	12/13/18 06:51	1

Lab Sample ID: LCS 320-263953/2-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 263953

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	40.0	40.0		ng/L		100	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	41.2		ng/L		103	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	44.7		ng/L		112	64 - 124
Perfluorononanoic acid (PFNA)	40.0	41.3		ng/L		103	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	41.3		ng/L		103	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	38.7		ng/L		97	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	38.5		ng/L		96	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	41.3		ng/L		103	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	38.3		ng/L		96	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	37.8		ng/L		107	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.2		ng/L		99	63 - 123

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-45876-2

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

Lab Sample ID: LCS 320-263953/2-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 263953

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	37.1	35.5		ng/L		96	67 - 127

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
13C5 PFPeA	103		25 - 150
13C2 PFHxA	99		25 - 150
13C4 PFHpA	96		25 - 150
13C4 PFOA	96		25 - 150
13C5 PFNA	99		25 - 150
13C2 PFDA	94		25 - 150
13C2 PFUnA	90		25 - 150
13C2 PFDoA	94		25 - 150
13C2 PFTeDA	98		25 - 150
13C3 PFBS	96		25 - 150
18O2 PFHxS	95		25 - 150
13C4 PFOS	103		25 - 150

Lab Sample ID: LCSD 320-263953/3-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 263953

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	42.2		ng/L		106	66 - 126	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.7		ng/L		97	66 - 126	6	30
Perfluorooctanoic acid (PFOA)	40.0	42.1		ng/L		105	64 - 124	6	30
Perfluorononanoic acid (PFNA)	40.0	41.1		ng/L		103	68 - 128	0	30
Perfluorodecanoic acid (PFDA)	40.0	39.5		ng/L		99	69 - 129	4	30
Perfluoroundecanoic acid (PFUnA)	40.0	39.9		ng/L		100	60 - 120	3	30
Perfluorododecanoic acid (PFDoA)	40.0	37.2		ng/L		93	71 - 131	4	30
Perfluorotridecanoic acid (PFTriA)	40.0	42.2		ng/L		106	72 - 132	2	30
Perfluorotetradecanoic acid (PFTeA)	40.0	37.7		ng/L		94	68 - 128	1	30
Perfluorobutanesulfonic acid (PFBS)	35.4	34.7		ng/L		98	73 - 133	9	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.9		ng/L		104	63 - 123	5	30
Perfluorooctanesulfonic acid (PFOS)	37.1	35.7		ng/L		96	67 - 127	1	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C5 PFPeA	95		25 - 150
13C2 PFHxA	98		25 - 150
13C4 PFHpA	99		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	95		25 - 150
13C2 PFDA	98		25 - 150
13C2 PFUnA	92		25 - 150

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-45876-2

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

Lab Sample ID: LCSD 320-263953/3-A

Matrix: Water

Analysis Batch: 264917

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 263953

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFDoA	94		25 - 150
13C2 PFTeDA	95		25 - 150
13C3 PFBS	97		25 - 150
18O2 PFHxS	95		25 - 150
13C4 PFOS	100		25 - 150

QC Association Summary

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

TestAmerica Job ID: 320-45876-2

LCMS

Prep Batch: 263953

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45876-3	2390#1 Richardson-2018 PFAS-P2 Post	Total/NA	Water	3535	
320-45876-4	2390#1 Richardson-2018 PFAS-P2 Pre	Total/NA	Water	3535	
320-45876-5	9999#1 Richardson-2018 PFAS-P2 Pre	Total/NA	Water	3535	
MB 320-263953/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-263953/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-263953/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 264917

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45876-3	2390#1 Richardson-2018 PFAS-P2 Post	Total/NA	Water	537 (modified)	263953
320-45876-4	2390#1 Richardson-2018 PFAS-P2 Pre	Total/NA	Water	537 (modified)	263953
320-45876-5	9999#1 Richardson-2018 PFAS-P2 Pre	Total/NA	Water	537 (modified)	263953
MB 320-263953/1-A	Method Blank	Total/NA	Water	537 (modified)	263953
LCS 320-263953/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	263953
LCSD 320-263953/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	263953

Lab Chronicle

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

TestAmerica Job ID: 320-45876-2

Client Sample ID: [REDACTED] **PFAS-P2 Post**

Lab Sample ID: 320-45876-3

Date Collected: 11/28/18 11:56

Matrix: Water

Date Received: 12/05/18 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			303.6 mL	10.00 mL	263953	12/08/18 08:37	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			264917	12/13/18 08:36	S1M	TAL SAC

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre**

Lab Sample ID: 320-45876-4

Date Collected: 11/28/18 12:08

Matrix: Water

Date Received: 12/05/18 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			286.7 mL	10.00 mL	263953	12/08/18 08:37	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			264917	12/13/18 08:44	S1M	TAL SAC

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre**

Lab Sample ID: 320-45876-5

Date Collected: 11/28/18 11:58

Matrix: Water

Date Received: 12/05/18 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			282.8 mL	10.00 mL	263953	12/08/18 08:37	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			264917	12/13/18 08:51	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: 320-45876-2

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
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

Method Summary

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

TestAmerica Job ID: 320-45876-2

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: 320-45876-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-45876-3	[REDACTED]	PFAS-P2 Post	Water	11/28/18 11:56 12/05/18 11:00
320-45876-4	[REDACTED]	PFAS-P2 Pre	Water	11/28/18 12:08 12/05/18 11:00
320-45876-5	[REDACTED]-2018	PFAS-P2 Pre	Water	11/28/18 11:58 12/05/18 11:00



CHAIN-OF-CUSTODY RECORD

Analytical Methods (include preservative if used)

Turn Around Time:
 Normal Rush
 Please Specify

Quote No: _____
J-Flags: Yes No

PFAS EPA 539
 12-Analytes

Sample Identity	Lab No.	Time	Date Sampled	Analytical Methods				Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[REDACTED]	8 PFAS-P2 Pre	1156	11/28/18	2				2	GW
[REDACTED]	PFAS-P2 Pre	1208	L	2				2	GW
[REDACTED]	FAJ-P2 Pre	1158	L	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>1:400</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name: <u>2018 PFAS Phase 2</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Sheila Hineckley</u> Date: <u>12/4/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>SMH</u>		Received Good Cond./Cold		Company: <u>Shannon & Wilson, Inc.</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp:		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler: <u>SMH</u>		Delivery Method: <u>Goldstreak</u>		Signature: <u>[Signature]</u> Time: <u>1:00</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Notes: <u>Bill to SWI</u>				Printed Name: <u>David</u> Date: <u>12/5/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file				Company: <u>TASac</u>		Company: _____		Company: _____	

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12/27/2018



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-45876-2

Login Number: 45876

List Source: TestAmerica Sacramento

List Number: 1

Creator: Horner, Nathaniel A

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	
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.	True	
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 <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

