

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

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Tel: (916)373-5600

TestAmerica Job ID: 320-45051-5  
Client Project/Site: 2018 PFAS Phase 2  
Revision: 1

For:  
Shannon & Wilson, Inc  
2355 Hill Rd.  
Fairbanks, Alaska 99709-5244

Attn: Sheila Hinkley



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Authorized for release by:  
12/9/2018 11:42:58 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: 320-45051-5

## 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: 320-45051-5

**Job ID: 320-45051-5**

**Laboratory: TestAmerica Sacramento**

## Narrative

**Job Narrative**  
**320-45051-5**

### Receipt

The samples were received on 11/8/2018 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 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: The following samples were observed to be a yellow color prior to extraction: [REDACTED]-2018PFAS-P2Pre (320-45051-8) and [REDACTED]-2018PFAS-P2Pre (320-45051-9).

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-259571.

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: 320-45051-5

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

**Lab Sample ID:** 320-45051-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.20	J B	1.7	0.14	ng/L	1		537 (modified)	Total/NA

**Client Sample ID:** [REDACTED] -P2Pre

**Lab Sample ID:** 320-45051-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	8.1		1.7	0.49	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.2		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		1.7	0.72	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	12		1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.95	J	1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.7	B	1.7	0.14	ng/L	1		537 (modified)	Total/NA
Perfluorooctane sulfonate (PFOS)	6.7		1.7	0.46	ng/L	1		537 (modified)	Total/NA

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

**Lab Sample ID:** 320-45051-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	7.6		1.7	0.49	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.4		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	6.3		1.7	0.72	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	12		1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.48	J	1.7	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.5	J	1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.9	B	1.7	0.14	ng/L	1		537 (modified)	Total/NA
Perfluorooctane sulfonate (PFOS)	6.6		1.7	0.46	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

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# Client Sample Results

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

TestAmerica Job ID: 320-45051-5

**Client Sample ID:** ██████████-2018PFAS-P2Post  
**Date Collected:** 11/02/18 12:55  
**Date Received:** 11/08/18 11:10

**Lab Sample ID:** 320-45051-7  
**Matrix:** Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.48	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.21	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.71	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.92	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.46	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.24	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		11/16/18 05:39	11/20/18 08:26	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.20</b>	<b>J B</b>	1.7	0.14	ng/L		11/16/18 05:39	11/20/18 08:26	1
Perfluorooctane sulfonate (PFOS)	ND		1.7	0.45	ng/L		11/16/18 05:39	11/20/18 08:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C4 PFOA	101		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C5 PFNA	107		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C2 PFDA	101		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C2 PFUnA	96		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C2 PFDoA	99		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C2 PFTeDA	116		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C3 PFBS	93		25 - 150				11/16/18 05:39	11/20/18 08:26	1
18O2 PFHxS	95		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C4 PFOS	96		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C4 PFHpA	94		25 - 150				11/16/18 05:39	11/20/18 08:26	1
13C5 PFPeA	96		25 - 150				11/16/18 05:39	11/20/18 08:26	1

# Client Sample Results

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

TestAmerica Job ID: 320-45051-5

**Client Sample ID:** ██████████ **2018PFAS-P2Pre**

**Lab Sample ID: 320-45051-8**

**Date Collected: 11/02/18 12:53**

**Matrix: Water**

**Date Received: 11/08/18 11:10**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	8.1		1.7	0.49	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluoroheptanoic acid (PFHpA)	5.2		1.7	0.21	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorooctanoic acid (PFOA)	5.1		1.7	0.72	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorononanoic acid (PFNA)	12		1.7	0.23	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.93	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorobutanesulfonic acid (PFBS)	0.95	J	1.7	0.17	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorohexanesulfonic acid (PFHxS)	6.7	B	1.7	0.14	ng/L		11/16/18 05:39	11/20/18 08:41	1
Perfluorooctane sulfonate (PFOS)	6.7		1.7	0.46	ng/L		11/16/18 05:39	11/20/18 08:41	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	81		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C4 PFOA	96		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C5 PFNA	94		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C2 PFDA	91		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C2 PFUnA	98		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C2 PFDoA	90		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C2 PFTeDA	92		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C3 PFBS	78		25 - 150	11/16/18 05:39	11/20/18 08:41	1
18O2 PFHxS	86		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C4 PFOS	84		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C4 PFHpA	82		25 - 150	11/16/18 05:39	11/20/18 08:41	1
13C5 PFPeA	75		25 - 150	11/16/18 05:39	11/20/18 08:41	1

# Client Sample Results

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

TestAmerica Job ID: 320-45051-5

**Client Sample ID:** ██████████-2018PFAS-P2Pre

**Lab Sample ID: 320-45051-9**

**Date Collected: 11/02/18 13:03**

**Matrix: Water**

**Date Received: 11/08/18 11:10**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	7.6		1.7	0.49	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluoroheptanoic acid (PFHpA)	5.4		1.7	0.21	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorooctanoic acid (PFOA)	6.3		1.7	0.72	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorononanoic acid (PFNA)	12		1.7	0.23	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorodecanoic acid (PFDA)	0.48	J	1.7	0.26	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.93	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.46	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.24	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorobutanesulfonic acid (PFBS)	1.5	J	1.7	0.17	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorohexanesulfonic acid (PFHxS)	7.9	B	1.7	0.14	ng/L		11/16/18 05:39	11/20/18 08:48	1
Perfluorooctane sulfonate (PFOS)	6.6		1.7	0.46	ng/L		11/16/18 05:39	11/20/18 08:48	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	92		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C4 PFOA	95		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C5 PFNA	104		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C2 PFDA	93		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C2 PFUnA	94		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C2 PFDoA	97		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C2 PFTeDA	96		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C3 PFBS	88		25 - 150	11/16/18 05:39	11/20/18 08:48	1
18O2 PFHxS	90		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C4 PFOS	94		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C4 PFHpA	90		25 - 150	11/16/18 05:39	11/20/18 08:48	1
13C5 PFPeA	86		25 - 150	11/16/18 05:39	11/20/18 08:48	1



# Isotope Dilution Summary

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

TestAmerica Job ID: 320-45051-5

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

Matrix: Water

Prep Type: Total/NA

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)	3C3-PFBs (25-150)
320-45051-7	██████████-2018PFAS-P2Posi	96	101	107	101	96	99	116	93
320-45051-8	██████████-2018PFAS-P2Pre	81	96	94	91	98	90	92	78
320-45051-9	2244 Peridot-2018PFAS-P2Pre	92	95	104	93	94	97	96	88
LCS 320-259571/2-A	Lab Control Sample	95	98	100	95	102	102	112	92
LCSD 320-259571/3-A	Lab Control Sample Dup	92	99	101	96	94	97	108	91
MB 320-259571/1-A	Method Blank	91	95	103	98	92	98	114	83

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	PFHpA (25-150)	PFPeA (25-150)
320-45051-7	██████████-2018PFAS-P2Posi	95	96	94	96
320-45051-8	██████████-2018PFAS-P2Pre	86	84	82	75
320-45051-9	2244 Peridot-2018PFAS-P2Pre	90	94	90	86
LCS 320-259571/2-A	Lab Control Sample	96	105	92	94
LCSD 320-259571/3-A	Lab Control Sample Dup	92	93	88	88
MB 320-259571/1-A	Method Blank	94	96	93	90

#### Surrogate Legend

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

# QC Sample Results

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

TestAmerica Job ID: 320-45051-5

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

**Lab Sample ID: MB 320-259571/1-A**

**Matrix: Water**

**Analysis Batch: 260228**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 259571**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorohexanesulfonic acid (PFHxS)	0.334	J	2.0	0.17	ng/L		11/16/18 05:39	11/20/18 05:55	1
Perfluorooctane sulfonate (PFOS)	ND		2.0	0.54	ng/L		11/16/18 05:39	11/20/18 05:55	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C4 PFOA	95		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C5 PFNA	103		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C2 PFDA	98		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C2 PFUnA	92		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C2 PFDoA	98		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C2 PFTeDA	114		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C3 PFBS	83		25 - 150	11/16/18 05:39	11/20/18 05:55	1
18O2 PFHxS	94		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C4 PFOS	96		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C4 PFHpA	93		25 - 150	11/16/18 05:39	11/20/18 05:55	1
13C5 PFPeA	90		25 - 150	11/16/18 05:39	11/20/18 05:55	1

**Lab Sample ID: LCS 320-259571/2-A**

**Matrix: Water**

**Analysis Batch: 260228**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 259571**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorohexanoic acid (PFHxA)	40.0	40.4		ng/L		101	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	43.3		ng/L		108	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	40.7		ng/L		102	64 - 124
Perfluorononanoic acid (PFNA)	40.0	41.0		ng/L		102	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	41.5		ng/L		104	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	40.2		ng/L		101	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	40.9		ng/L		102	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	40.6		ng/L		101	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	42.4		ng/L		106	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	39.0		ng/L		110	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.0		ng/L		96	63 - 123

TestAmerica Sacramento

# QC Sample Results

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

TestAmerica Job ID: 320-45051-5

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

**Lab Sample ID: LCS 320-259571/2-A**

**Matrix: Water**

**Analysis Batch: 260228**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 259571**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctane sulfonate (PFOS)	37.1	33.0		ng/L		89	67 - 127

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
13C2 PFHxA	95		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	100		25 - 150
13C2 PFDA	95		25 - 150
13C2 PFUnA	102		25 - 150
13C2 PFDoA	102		25 - 150
13C2 PFTeDA	112		25 - 150
13C3 PFBS	92		25 - 150
18O2 PFHxS	96		25 - 150
13C4 PFOS	105		25 - 150
13C4 PFHpA	92		25 - 150
13C5 PFPeA	94		25 - 150

**Lab Sample ID: LCSD 320-259571/3-A**

**Matrix: Water**

**Analysis Batch: 260228**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

**Prep Batch: 259571**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	39.1		ng/L		98	66 - 126	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	43.0		ng/L		108	66 - 126	1	30
Perfluorooctanoic acid (PFOA)	40.0	38.8		ng/L		97	64 - 124	5	30
Perfluorononanoic acid (PFNA)	40.0	40.0		ng/L		100	68 - 128	3	30
Perfluorodecanoic acid (PFDA)	40.0	38.4		ng/L		96	69 - 129	8	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.6		ng/L		102	60 - 120	1	30
Perfluorododecanoic acid (PFDoA)	40.0	37.8		ng/L		95	71 - 131	8	30
Perfluorotridecanoic acid (PFTriA)	40.0	41.7		ng/L		104	72 - 132	3	30
Perfluorotetradecanoic acid (PFTeA)	40.0	37.5		ng/L		94	68 - 128	12	30
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0		ng/L		102	73 - 133	8	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.2		ng/L		91	63 - 123	5	30
Perfluorooctane sulfonate (PFOS)	37.1	37.0		ng/L		100	67 - 127	11	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	92		25 - 150
13C4 PFOA	99		25 - 150
13C5 PFNA	101		25 - 150
13C2 PFDA	96		25 - 150
13C2 PFUnA	94		25 - 150
13C2 PFDoA	97		25 - 150
13C2 PFTeDA	108		25 - 150

TestAmerica Sacramento

# QC Sample Results

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

TestAmerica Job ID: 320-45051-5

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

Lab Sample ID: LCSD 320-259571/3-A

Matrix: Water

Analysis Batch: 260228

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 259571

<i>Isotope Dilution</i>	<i>LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C3 PFBS	91		25 - 150
18O2 PFHxS	92		25 - 150
13C4 PFOS	93		25 - 150
13C4 PFHpA	88		25 - 150
13C5 PFPeA	88		25 - 150

# QC Association Summary

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

TestAmerica Job ID: 320-45051-5

## LCMS

### Prep Batch: 259571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45051-7	[REDACTED] 2018PFAS-P2Post	Total/NA	Water	3535	
320-45051-8	[REDACTED] 2018PFAS-P2Pre	Total/NA	Water	3535	
320-45051-9	2244 Peridot-2018PFAS-P2Pre	Total/NA	Water	3535	
MB 320-259571/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-259571/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-259571/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

### Analysis Batch: 260228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45051-7	[REDACTED] -2018PFAS-P2Post	Total/NA	Water	537 (modified)	259571
320-45051-8	[REDACTED] -2018PFAS-P2Pre	Total/NA	Water	537 (modified)	259571
320-45051-9	2244 Peridot-2018PFAS-P2Pre	Total/NA	Water	537 (modified)	259571
MB 320-259571/1-A	Method Blank	Total/NA	Water	537 (modified)	259571
LCS 320-259571/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	259571
LCSD 320-259571/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	259571

# Lab Chronicle

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

TestAmerica Job ID: 320-45051-5

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

Lab Sample ID: 320-45051-7

Date Collected: 11/02/18 12:55

Matrix: Water

Date Received: 11/08/18 11:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			299 mL	10.00 mL	259571	11/16/18 05:39	MNV	TAL SAC
Total/NA	Analysis	537 (modified)		1			260228	11/20/18 08:26	S1M	TAL SAC

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

Lab Sample ID: 320-45051-8

Date Collected: 11/02/18 12:53

Matrix: Water

Date Received: 11/08/18 11:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			295 mL	10.00 mL	259571	11/16/18 05:39	MNV	TAL SAC
Total/NA	Analysis	537 (modified)		1			260228	11/20/18 08:41	S1M	TAL SAC

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

Lab Sample ID: 320-45051-9

Date Collected: 11/02/18 13:03

Matrix: Water

Date Received: 11/08/18 11:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			296.4 mL	10.00 mL	259571	11/16/18 05:39	MNV	TAL SAC
Total/NA	Analysis	537 (modified)		1			260228	11/20/18 08:48	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: 320-45051-5

## 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	11-30-18
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

# Method Summary

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

TestAmerica Job ID: 320-45051-5

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: 320-45051-5

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-45051-7	██████████-2018PFAS-P2Post	Water	11/02/18 12:55	11/08/18 11:10
320-45051-8	██████████-2018PFAS-P2Pre	Water	11/02/18 12:53	11/08/18 11:10
320-45051-9	██████████-2018PFAS-P2Pre	Water	11/02/18 13:03	11/08/18 11:10



# 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 537  
 12-Analytes

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	1255	11/2/18	2					2	GW
[REDACTED]	S-P2 Pre	1253	1	2					2	GW
[REDACTED]	S-P2 Pre	1303	1	2					2	GW

**Project Information**  
 Number: 101965-002  
 Name: 2018 PFAS Phase 2  
 Contact: SMH  
 Ongoing Project? Yes  No   
 Sampler: SMH

**Sample Receipt**  
 Total No. of Containers: 6  
 COC Seals/intact? Y/N/NA  
 Received Good Cond./Cold  
 Temp:  
 Delivery Method: Goldstreak

**Relinquished By: 1.**  
 Signature: Morgan S. Cumbo    Time: 12/5  
 Printed Name: Morgan S. Cumbo    Date: 11/7/18  
 Company: Shannon & Wilson, Inc.

**Relinquished By: 2.**  
 Signature: \_\_\_\_\_    Time: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_    Date: \_\_\_\_\_  
 Company: \_\_\_\_\_

**Relinquished By: 3.**  
 Signature: \_\_\_\_\_    Time: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_    Date: \_\_\_\_\_  
 Company: \_\_\_\_\_

**Notes:**  
Bill to SWI

**Received By: 1.**  
 Signature: David Hu    Time: 11/3  
 Printed Name: David Hu    Date: 11/8/18  
 Company: TA-CU

**Received By: 2.**  
 Signature: \_\_\_\_\_    Time: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_    Date: \_\_\_\_\_  
 Company: \_\_\_\_\_

**Received By: 3.**  
 Signature: \_\_\_\_\_    Time: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_    Date: \_\_\_\_\_  
 Company: \_\_\_\_\_

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

# Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-45051-5

**Login Number: 45051**

**List Source: TestAmerica Sacramento**

**List Number: 1**

**Creator: Gooch, Mayce**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
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 <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	