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: 320-44239-6
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 10:27:25 AM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

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

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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.
¤	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)

Job ID: 320-44239-6

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-44239-6

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 3.0º C and 3.4º C.

Receipt Exceptions

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC): [redacted] n2018PFAS-P2Post (320-44239-11) and [redacted] -P2Pre (320-44239-12). Sample#11 labeled [redacted] -2018PFAS-P2 Post, while COC list [redacted] -2018PFAS-P2Post. Sample#12 labeled [redacted] n-2018PFAS-P2Pre, while COC list [redacted] -2018PFAS-P2Pre. Labled according to COC.

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

Organic Prep
Method(s) 3535: The following sample was observed to be a light yellow color and contained sediment prior to extraction: [redacted] 8PFAS-P2Pre (320-44239-12). All the samples were still able to go through the SPE extraction disk.

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: 320-44239-6

Client Sample ID: [redacted]-P2Post — Lab Sample ID: 320-44239-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.21	J B	1.8	0.15	ng/L	1		537 (modified)	Total/NA

Client Sample ID: [redacted]-P2Pre — Lab Sample ID: 320-44239-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	9.3		1.7	0.48	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.6		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	6.9		1.7	0.71	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	15		1.7	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.4	J	1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.8	B	1.7	0.14	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.2		1.7	0.45	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

TestAmerica Job ID: 320-44239-6

Client Sample ID: [redacted]-P2Post **Lab Sample ID: 320-44239-11**
Date Collected: 10/11/18 11:26 **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		1.8	0.51	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.22	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.75	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.27	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.96	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.48	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.1	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.25	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorohexanesulfonic acid (PFHxS)	**0.21**	**J B**	1.8	0.15	ng/L		10/18/18 07:58	10/24/18 20:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.47	ng/L		10/18/18 07:58	10/24/18 20:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5-PFPeA DNU	*90*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C2 PFHxA	*89*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C4 PFHpA	*90*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C4 PFOA	*96*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C5 PFNA	*94*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C2 PFDA	*90*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C2 PFUnA	*94*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C2 PFDoA	*82*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C2 PFTeDA	*83*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C3 PFBS	*89*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
18O2 PFHxS	*89*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*
13C4 PFOS	*93*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:01*	*1*

Client Sample Results

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

TestAmerica Job ID: 320-44239-6

Client Sample ID: [redacted]-P2Pre **Lab Sample ID: 320-44239-12**
Date Collected: 10/11/18 11:30 **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)	**9.3**		1.7	0.48	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluoroheptanoic acid (PFHpA)	**5.6**		1.7	0.21	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorooctanoic acid (PFOA)	**6.9**		1.7	0.71	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorononanoic acid (PFNA)	**15**		1.7	0.22	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.91	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.46	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.24	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorobutanesulfonic acid (PFBS)	**1.4**	**J**	1.7	0.17	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorohexanesulfonic acid (PFHxS)	**8.8**	**B**	1.7	0.14	ng/L		10/18/18 07:58	10/24/18 20:09	1
Perfluorooctanesulfonic acid (PFOS)	**9.2**		1.7	0.45	ng/L		10/18/18 07:58	10/24/18 20:09	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5-PFPeA DNU	*85*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C2 PFHxA	*85*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C4 PFHpA	*91*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C4 PFOA	*90*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C5 PFNA	*86*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C2 PFDA	*84*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C2 PFUnA	*91*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C2 PFDoA	*79*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C2 PFTeDA	*75*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C3 PFBS	*77*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
18O2 PFHxS	*85*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*
13C4 PFOS	*85*		*25 - 150*	*10/18/18 07:58*	*10/24/18 20:09*	*1*

Isotope Dilution Summary

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

TestAmerica Job ID: 320-44239-6

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA
Lab Sample ID	**Client Sample ID**	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-44239-11	[redacted]	90	89	90	96	94	90	94	82
320-44239-12	[redacted] 2018PFAS-P2Pre	85	85	91	90	86	84	91	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)			
		PFTDA	3C3-PFBS	PFHxS	PFOS
Lab Sample ID	**Client Sample ID**	(25-150)	(25-150)	(25-150)	(25-150)
320-44239-11	[redacted]	83	89	89	93
320-44239-12	[redacted] 2018PFAS-P2Pre	75	77	85	85
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
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
13C3-PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS

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	%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

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 Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
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

Isotope Dilution	*LCSD %Recovery*	*LCSD 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*

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

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
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: 320-44239-6

LCMS

Prep Batch: 253030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44239-11	[redacted]-P2Post	Total/NA	Water	3535	
320-44239-12	[redacted]-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
320-44239-11	[redacted]-P2Post	Total/NA	Water	537 (modified)	253030
320-44239-12	[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: 320-44239-6

Client Sample ID: [redacted]-P2Post — Lab Sample ID: 320-44239-11

Date Collected: 10/11/18 11:26
Date Received: 10/16/18 10:15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			285.2 mL	10.00 mL	253030	10/18/18 07:58	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			254640	10/24/18 20:01	S1M	TAL SAC

Client Sample ID: [redacted]-P2Pre — Lab Sample ID: 320-44239-12

Date Collected: 10/11/18 11:30
Date Received: 10/16/18 10:15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			301.2 mL	10.00 mL	253030	10/18/18 07:58	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			254640	10/24/18 20:09	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: 320-44239-6

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.

Method Summary

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

TestAmerica Job ID: 320-44239-6

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: 320-44239-6

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44239-11	[redacted]-P2Post	Water	10/11/18 11:26	10/16/18 10:15
320-44239-12	[redacted]-P2Pre	Water	10/11/18 11:30	10/16/18 10:15

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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	
Please Specify	J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 12-analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	FAS-P2 Post	1030	10/4/18	2							2	GW
	-P2 Pre	1035	10/4/18	2							2	GW

320-44239 Chain of Custody

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

Sample Receipt	
Total No. of Containers:	4
COC Seals/Intact? Y/N/NA	Y
Received Good Cond./Cold	Cold
Temp:	3.0c
Delivery Method:	Gold Streak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: [signature] Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinkley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1015	Signature: Time:	Signature: Time:
Printed Name: David Ho Date: 10/16/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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

30c

No. 35651

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Laboratory Test America
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Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	J-Flags: ☒ Yes ☐ No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 13-analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	15-P2 Post	0936	10/5/18	2							2	GW
	5-P2 Pre	0940	10/5/18	2							2	GW

Project Information		Sample Receipt	
Number:	101965-002	Total No. of Containers:	4
Name:	2018 PFAS Phase 2	COC Seals/Intact? Y/N/NA	Y
Contact:	SMH	Received Good Cond./Cold	Cold
Ongoing Project?	Yes ☐ No ☐	Temp:	3.0
Sampler:	SMH	Delivery Method:	Gold Streak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1015	Signature: Time:	Signature: Time:
Printed Name: David Hu Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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

3.0 c

No. 35652

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Page 1 of 1

Laboratory: Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 18-Analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	5-P2	1506	10/9/18	2							2	GW

Project Information		Sample Receipt	
Number:	101965-002	Total No. of Containers:	2
Name:	2018 PFAS Phase 2	COC Seals/Intact? Y/N/NA	Y
Contact:	SMH	Received Good Cond./Cold	Good/Cold
Ongoing Project?	Yes ☒ No ☐	Temp:	3.0
Sampler:	SMH	Delivery Method:	Goldstreak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/11/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1015	Signature: Time:	Signature: Time:
Printed Name: David Her Date: 10/10/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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. 35691

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Page 1 of 1

Laboratory Test America
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Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 12-Analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	PFAS-P2 Post	1000	10/10/18	2							2	GW
[redacted]	FAS-P2 Pre	1005	10/10/18	2							2	GW
[redacted]	S-P2 Pre	0955	10/10/18	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	Y
Received Good Cond./Cold	Cold
Temp:	3.0c
Delivery Method:	Goldstreak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1015	Signature: Time:	Signature: Time:
Printed Name: David Hr Date: 10/16/18	Printed Name: Date:	Printed Name: Date:
Company: TA-Sac	Company:	Company:

Notes:

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

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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory: Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 12-Analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	P2 Post	1122	10/10/18	2							2	GW
	P2 Pre	1125	10/10/18	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:	4
COC Seals/Intact? Y/N/NA	Y
Received Good Cond./Cold	Cold
Temp:	3.0c
Delivery Method:	Goldstreak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 10/15	Signature: Time:	Signature: Time:
Printed Name: David Hu Date: 10/16/18	Printed Name: Date:	Printed Name: Date:
Company: H-Sac	Company:	Company:

Notes:

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. 35598

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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [ ] Yes [ ] No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 13 Analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
* [redacted]	018 PFAS-P2 Post	1126	10/11/18	2							2	GW
[redacted]	PFAS-P2 Pre	1130	10/11/18	2							2	GW

Project Information		Sample Receipt	
Number:	101965-002	Total No. of Containers:	4
Name:	2018 PFAS Phase 2	COC Seals/Intact? Y/N/NA	Ø
Contact:	SMH	Received Good Cond./Cold	Cold
Ongoing Project?	Yes [X] No [ ]	Temp:	3.0c
Sampler:	SMH	Delivery Method:	Goldstreak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: [signature] Time: 1500	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1015	Signature: Time:	Signature: Time:
Printed Name: David Her Date: 10/16/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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

Labeled 2310 Richardson - 2018 PFAS-P2 Post / 2310 Richardson - 2018 PFA-P2 pre

No. 35659

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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
☒ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 12-Analytes							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
[redacted]	-P2 Post	1237	10/15/18	2							2	GW
	-P2 Pre	1240	10/15/18	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:	4
COC Seals/Intact? Y/N/NA	Y
Received Good Cond./Cold	Cold
Temp:	3-4
Delivery Method:	Goldstreak

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 15:00	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/15/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 10/16	Signature: Time:	Signature: Time:
Printed Name: Dave Hu Date: 10/16/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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. 35658

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-44239-6

Login Number: 44239
List Number: 1
Creator: Her, David A

List Source: TestAmerica Sacramento

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