Appendix C

# Laboratory Reports and ADEC Data Review Checklists

31-1-20060-002 March 2019



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: 320-39183-1

TestAmerica Sample Delivery Group: 20060.001

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Ottom

Authorized for release by: 5/16/2018 3:14:28 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-39183-1 SDG: 20060.001

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39183-1 Project/Site: FAI SDG: 20060.001

### **Qualifiers**

### **LCMS**

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)

ND Not Detected at the reporting limit (or MDL or EDL if shown)

PQL **Practical Quantitation Limit** 

Not Calculated

QC **Quality Control** 

NC

**RER** Relative Error Ratio (Radiochemistry)

RLReporting 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

TestAmerica Job ID: 320-39183-1 Project/Site: FAI SDG: 20060.001

Job ID: 320-39183-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-39183-1

### Receipt

The sample was received on 5/10/2018 3:20 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6° C.

#### **LCMS**

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-223243.

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: FAI

TestAmerica Job ID: 320-39183-1

SDG: 20060.001

# Client Sample ID: 176729

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.95	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.1		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Lab Sample ID: 320-39183-1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39183-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 176729 Lab Sample ID: 320-39183-1 Date Collected: 05/09/18 12:32 **Matrix: Water** 

Date Received: 05/11/18 15:20

Method: WS-LC-0025 At1 - Fl Analyte		Qualifier	ances RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.95	J	2.0	0.92	ng/L		05/15/18 09:26	05/15/18 16:30	1
Perfluorohexanesulfonic acid (PFHxS)	5.1		2.0	0.87	ng/L		05/15/18 09:26	05/15/18 16:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/15/18 09:26	05/15/18 16:30	1
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L		05/15/18 09:26	05/15/18 16:30	1
Perfluorooctanesulfonic acid (PFOS)	2.3		2.0	1.3	ng/L		05/15/18 09:26	05/15/18 16:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/15/18 09:26	05/15/18 16:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	103		25 - 150				05/15/18 09:26	05/15/18 16:30	1
13C4-PFHpA	107		25 - 150				05/15/18 09:26	05/15/18 16:30	1
13C4 PFOA	107		25 - 150				05/15/18 09:26	05/15/18 16:30	1
13C4 PFOS	102		25 - 150				05/15/18 09:26	05/15/18 16:30	1
13C5 PFNA	109		25 - 150				05/15/18 09:26	05/15/18 16:30	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39183-1 SDG: 20060.001

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

_			Perce	ent Isotope	Dilution Re	covery (Acc
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-39183-1	176729	103	107	107	102	109
CS 320-223243/2-A	Lab Control Sample	99	101	106	98	104
.CSD 320-223243/3-A	Lab Control Sample Dup	96	105	104	99	99
MB 320-223243/1-A	Method Blank	95	97	101	94	100

Surrogate	Legend
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PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-39183-1

Project/Site: FAI

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-223243/1-A

**Matrix: Water** 

**Analysis Batch: 223388** 

Client: Shannon & Wilson, Inc

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

Prep Batch: 223243

SDG: 20060.001

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		05/15/18 09:26	05/15/18 10:59	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		05/15/18 09:26	05/15/18 10:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/15/18 09:26	05/15/18 10:59	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		05/15/18 09:26	05/15/18 10:59	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		05/15/18 09:26	05/15/18 10:59	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/15/18 09:26	05/15/18 10:59	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	95		25 - 150				05/15/18 09:26	05/15/18 10:59	1

13C4-PFHpA 97 25 - 150 05/15/18 09:26 05/15/18 10:59 13C4 PFOA 101 25 - 150 05/15/18 09:26 05/15/18 10:59 25 - 150 13C4 PFOS 94 05/15/18 09:26 05/15/18 10:59 13C5 PFNA 100 25 - 150 05/15/18 09:26 05/15/18 10:59

Lab Sample ID: LCS 320-223243/2-A

**Matrix: Water** 

**Analysis Batch: 223388** 

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

Prep Batch: 223243

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits 17.7 20.1 ng/L 114 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 19.8 109 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 23.1 ng/L 116 71 - 138 20.0 22.1 Perfluorooctanoic acid (PFOA) 70 - 140 ng/L 110 18.6 21.1 114 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS) Perfluorononanoic acid (PFNA) 20.0 23.1 ng/L 116 73 - 147

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	99		25 - 150
13C4-PFHpA	101		25 - 150
13C4 PFOA	106		25 - 150
13C4 PFOS	98		25 - 150
13C5 PFNA	104		25 - 150

Lab Sample ID: LCSD 320-223243/3-A **Client Sample ID: Lab Control Sample Dup** 

**Analysis Batch: 223388** 

**Matrix: Water** 

Prep Batch: 223243 Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier Analyte Unit %Rec Limits RPD Limit 17.7 20.5 72 - 151 ng/L 116 30 Perfluorobutanesulfonic acid (PFBS) 18.2 20.6 113 73 - 157 30 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 21.1 30 ng/L 106 71 - 1389 Perfluorooctanoic acid (PFOA) 70 - 140 20.0 23.1 ng/L 115 30 Perfluorooctanesulfonic acid 18.6 19.9 ng/L 107 69 - 144 30 ng/L Perfluorononanoic acid (PFNA) 20.0 22.8 114 73 \_ 147 30

TestAmerica Sacramento

Prep Type: Total/NA

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39183-1

SDG: 20060.001

,	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	96		25 - 150
13C4-PFHpA	105		25 - 150
13C4 PFOA	104		25 - 150
13C4 PFOS	99		25 - 150
13C5 PFNA	99		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39183-1 SDG: 20060.001

# LCMS

## Prep Batch: 223243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method Prep Batch
320-39183-1	176729	Total/NA	Water	PFAS Prep
MB 320-223243/1-A	Method Blank	Total/NA	Water	PFAS Prep
LCS 320-223243/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep
LCSD 320-223243/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep

### **Analysis Batch: 223388**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39183-1	176729	Total/NA	Water	WS-LC-0025	223243
				At1	
MB 320-223243/1-A	Method Blank	Total/NA	Water	WS-LC-0025	223243
				At1	
LCS 320-223243/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	223243
				At1	
LCSD 320-223243/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	223243
				At1	

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## **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39183-1

SDG: 20060.001

Client Sample ID: 176729 Lab Sample ID: 320-39183-1

Matrix: Water

Date Collected: 05/09/18 12:32 Date Received: 05/11/18 15:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	223243	05/15/18 09:26	ABH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			223388	05/15/18 16:30	SHK	TAL SAC

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc
Project/Site: FAI

TestAmerica Job ID: 320-39183-1
SDG: 20060.001

### **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	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Ilinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
√irginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-18 *
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

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<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39183-1

SDG: 20060.001

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **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: FAI

TestAmerica Job ID: 320-39183-1

SDG: 20060.001

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39183-1	176729	Water	05/09/18 12:32	05/11/18 15:20

No. 9 10

Client: Shannon & Wilson, Inc

Job Number: 320-39183-1 SDG Number: 20060.001

List Source: TestAmerica Sacramento

Login Number: 39183

List Number: 1

Creator: Nelson, Kym D

Creator: Nelson, Kym D		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	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.	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	

# **Laboratory Data Review Checklist**

Completed By:
Kristen Freiburger
Title:
Senior Chemist
Date:
May 17, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
May 16, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-39183-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

1. ]	Laboratory
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?
	☐ Yes ☐ No Comments:
	ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
	☐ Yes ☐ No Comments:
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.
2.	Chain of Custody (CoC)
	a. CoC information completed, signed, and dated (including released/received by)?
	Yes No Comments:
	b. Correct Analyses requested?
	☑ Yes ☑ No Comments:
3.	Laboratory Sample Receipt Documentation
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?
	Yes No Comments:
	The sample cooler was recorded at 5.6° C upon receipt at the laboratory.
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
	© Yes □ No Comments:
	Analysis of PFASs does not require a preservative other than temperature control.
	c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
	Yes No Comments:
	The sample receipt form notes that the samples were received in good condition.

320-39183-1

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	TYes	<b>⊙</b> No	Comments:
The	ere were no	discrepancies no	ted in the sample receipt documentation.
e.	Data quality	or usability affe	ected?
			Comments:
Dat	ta quality or	usability is not a	affected; see above.
<u>Ca</u>	se Narrative	2	
a.	Present and	d understandable	?
	• Yes		Comments:
	<del></del>		
b.	Discrepanc	eies, errors, or Q	C failures identified by the lab?
	• Yes	□ No	Comments:
			mples arrived in good condition, properly preserved, and that the er upon receipt at the laboratory was 5.6° C.
			was insufficient sample volume available to perform a matrix spike ) with preparation batch 320-223243.
c.	Were all co	orrective actions	documented?
	C Yes	<b>☑</b> No	Comments:
Th	ere were no	corrective action	ns documented in the case narrative.
d.	What is the	e effect on data q	quality/usability according to the case narrative?
			Comments:
Th	ne case narra	tive does not not	te an effect on data quality.
amp]	les Results		
a.	Correct ana	alyses performed	I/reported as requested on COC?
		• •	•

320-39183-1					
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	Yes	□ No	Comments:
	s. The 28		ne water samples were analyzed using direct injection and in-line for analysis using direct aqueous injection (DAI) was met for all
c. All s	soils rep	orted on a dry	weight basis?
	Yes	<b>©</b> No	Comments:
N/A; so	il sampl	les were not sub	omitted with this work order.
	the repoproject?	orted LOQs less	s than the Cleanup Level or the minimum required detection level for
	• Yes	□ No	Comments:
			stAmerica Reporting Limit (RL), is less than applicable EPA lifeting levels and ADEC groundwater cleanup levels for PFOS and PFOA
e. Data	a quality	or usability af	fected?
	Yes	<b>☑</b> No	Comments:
The data	a quality	y and usability	were not affected.
7.0 1			
C Sample	es <u>.</u>		
-		1,	
a. Meti	hod Bla		renorted per matriy, analysis and 20 samples?
a. Meti	hod Bla i. One	method blank r	reported per matrix, analysis and 20 samples?
a. Meti	hod Bla		reported per matrix, analysis and 20 samples?  Comments:
a. Metl	hod Bla i. One	method blank r	
a. Meth	hod Bla i. One	method blank r	Comments:
a. Meth	hod Bla i. One Yes ii. All r	method blank r  No  nethod blank re	Comments: esults less than limit of quantitation (LOQ)?
a. Meth	hod Bla i. One Yes ii. All r	method blank r  No  nethod blank re	Comments: esults less than limit of quantitation (LOQ)? Comments:
a. Meth	hod Bla i. One Yes ii. All r Yes iii. If ab	method blank renethod	Comments:  esults less than limit of quantitation (LOQ)?  Comments:  t samples are affected?
a. Meth	hod Bla i. One Yes ii. All r Yes iii. If ab	method blank renethod	Comments:  csults less than limit of quantitation (LOQ)?  Comments:  t samples are affected?  Comments:

320-39183-1
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v. Data quality	or usability affected?
	Comments:
The data quality and us	sability were not affected.
b. Laboratory Control	Sample/Duplicate (LCS/LCSD)
	One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD AK methods, LCS required per SW846)
Yes No	Comments:
ii. Metals/Inor 20 samples	ganics – one LCS and one sample duplicate reported per matrix, analysis and
Yes No	Comments:
Metals and inorganics	were not analyzed as part of this work order.
And project	All percent recoveries (%R) reported and within method or laboratory limits? specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, 6-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
Yes No	Comments:
laboratory l LCS/LCSD	All relative percent differences (RPD) reported and less than method or imits? And project specified DQOs, if applicable. RPD reported from , MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all ses see the laboratory QC pages)
☑ Yes ☑ No	Comments:
v. If %R or RF	PD is outside of acceptable limits, what samples are affected?
	Comments:
N/A; analytical accurae	cy and precision were within acceptable limits.
vi. Do the affec	eted sample(s) have data flags? If so, are the data flags clearly defined?
Yes No	Comments:
Qualification of the dat	ta was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

		Comments:
The data qualit	y and usability were not a	ffected.
c. Surrogates	- Organics Only	
i. Are	surrogate recoveries repo	rted for organic analyses – field, QC and laboratory samples?
• Yes	■ No	Comments:
target analyte,		s IDA recovery, which entails adding a 13C-isotope of each y of each analyte. The isotopically-labeled compounds are
And		eries (%R) reported and within method or laboratory limits? if applicable. (AK Petroleum methods 50-150 %R; all other port pages)
Yes	■ No	Comments:
	the sample results with fairs clearly defined?	lled surrogate recoveries have data flags? If so, are the data
TYes	<b>©</b> No	Comments:
N/A; there wer	e no IDA recovery failure	es associated with this work order.
iv. Data	a quality or usability affec	ted?
		Comments:
The data qualit	y and usability are not aff	ected; see above.
d. Trip blank - Soil	- Volatile analyses only (	GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and
sam	trip blank reported per m ples? not, enter explanation belo	atrix, analysis and for each cooler containing volatile w.)
T Yes	<b>©</b> No	Comments:
PFASs are not	volatile compounds; there	efore, a trip blank is not required.
		the trip blank and VOA samples clearly indicated on the laining why must be entered below)
TYes	<b>©</b> No	Comments:
N/A; a trip blan	nk is not required.	

iii. All r	results less than LOQ?	
C Yes	<b>©</b> No	Comments:
N/A; a trip blan	ık is not required.	
iv. If ab	ove LOQ, what samples a	are affected?
		Comments:
None; a trip bla	nk was not submitted wit	h this work order.
v. Data	quality or usability affec	ted?
		Comments:
The data quality	y and usability were not a	ffected; see above.
e. Field Duplie	cate	
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?
☐ Yes	<b>©</b> No	Comments:
_	te sample was not submitt the proper frequency for	ted with this work order. However, field duplicate samples the overall project.
ii. Subi	mitted blind to lab?	
Yes	<b>©</b> No	Comments:
N/A; a field du	plicate was not submitted	with this work order.
	ision – All relative percer commended: 30% water, 5 RPD (%) = Absolute	,
	Where	$R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
TYes	<b>©</b> No	Comments:
N/A; a field du	plicate was not submitted	with this work order.
iv. Data	quality or usability affec	ted? (Use the comment box to explain why or why not.)
		Comments:
The data quality	y and usability were not a	ffected.

22	$\sim$	101	00	
4.71	11) 4	(U)	183	
) _ '	.,-	, , ,	(1)	-

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
☐ Yes ☐ No ☐ Not Applicable
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
☐ Yes ☐ No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
☐ Yes ☐ No Comments:
There were no additional flags/qualifiers required for this work order.



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: 320-39184-1

TestAmerica Sample Delivery Group: 20060.001

Client Project/Site: FAI

### For:

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

Attn: Marcy Nadel



Authorized for release by: 5/30/2018 12:54:23 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-39184-1 SDG: 20060.001

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI SDG: 20060.001

TestAmerica Job ID: 320-39184-1

### **Qualifiers**

### **LCMS**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# Glossary

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
Percent Recovery
Contains Free Liquid
Contains No Free Liquid
Duplicate Error Ratio (normalized absolute difference)
Dilution Factor
Detection Limit (DoD/DOE)
Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
Decision Level Concentration (Radiochemistry)
Estimated Detection Limit (Dioxin)
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)

RLReporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

TestAmerica Sacramento

5/30/2018

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### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Job ID: 320-39184-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-39184-1

### Receipt

The samples were received on 5/10/2018~3:20~PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $5.6^{\circ}$  C.

#### LCMS

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

### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-225947.

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

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TestAmerica Job ID: 320-39184-1 SDG: 20060.001

Client: Shannon & Wilson, Inc

Client Sample ID: 569712

Client Sample ID: 151637

Project/Site: FAI

Lab Sample	ID: 320-39184-1
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	190		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	15		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	9.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

# Lab Sample ID: 320-39184-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.9		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.88	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.2		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 176044 Lab Sample ID: 320-39184-3

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.5	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	32	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	15	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	42	2.0	1.3	ng/L	1		WS-LC-0025	Total/NA

#### Client Sample ID: 174271 Lab Sample ID: 320-39184-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	11		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	21		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	7.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	52		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 176222 Lab Sample ID: 320-39184-5

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.6 J	2.0	0.92 ng/L		WS-LC-0025	Total/NA
					At1	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Client Sample ID: 176222 (Continued)

Project/Site: FAI

Lab Sample ID: 320-39184-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	10	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.96 J	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.4	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.3	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 550124 Lab Sample ID: 320-39184-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.3		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	11		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 550116 Lab Sample ID: 320-39184-7

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	10	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.7	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.5	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 550216 Lab Sample ID: 320-39184-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.5		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	40		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 151203 Lab Sample ID: 320-39184-9

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# **Detection Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

# Client Sample ID: 151203 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.2		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

# Client Sample ID: 173908

Client Sample ID: 173908						Lab San	Lab Sample ID: 320-39184-10				
– Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type			
Perfluorobutanesulfonic acid (PFBS)	49		2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA			
Perfluorohexanesulfonic acid (PFHxS)	220		2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA			
Perfluoroheptanoic acid (PFHpA)	18		2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA			
Perfluorooctanoic acid (PFOA)	9.8		2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA			
Perfluorooctanesulfonic acid (PFOS)	6.7		2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA			

Lab Sample ID: 320-39184-9

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 569712 Lab Sample ID: 320-39184-1 Date Collected: 05/08/18 10:37

**Matrix: Water** Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 16:23	1
Perfluorohexanesulfonic acid (PFHxS)	190		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 16:23	1
Perfluoroheptanoic acid (PFHpA)	15		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 16:23	1
Perfluorooctanoic acid (PFOA)	9.2		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 16:23	1
Perfluorooctanesulfonic acid (PFOS)	6.8		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 16:23	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 16:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	96		25 - 150				05/29/18 11:04	05/29/18 16:23	1
13C4-PFHpA	102		25 - 150				05/29/18 11:04	05/29/18 16:23	1
13C4 PFOA	102		25 - 150				05/29/18 11:04	05/29/18 16:23	1
13C4 PFOS	91		25 - 150				05/29/18 11:04	05/29/18 16:23	1
13C5 PFNA	100		25 - 150				05/29/18 11:04	05/29/18 16:23	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 151637 Lab Sample ID: 320-39184-2 Date Collected: 05/08/18 09:29

**Matrix: Water** Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2.0	0.92	ng/L		05/29/18 11:04	05/29/18 16:42	1
Perfluorohexanesulfonic acid (PFHxS)	2.9		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 16:42	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 16:42	1
Perfluorooctanoic acid (PFOA)	0.88	J	2.0	0.75	ng/L		05/29/18 11:04	05/29/18 16:42	1
Perfluorooctanesulfonic acid (PFOS)	6.2		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 16:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 16:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	95		25 - 150				05/29/18 11:04	05/29/18 16:42	1
13C4-PFHpA	103		25 - 150				05/29/18 11:04	05/29/18 16:42	1
13C4 PFOA	105		25 - 150				05/29/18 11:04	05/29/18 16:42	1
13C4 PFOS	94		25 - 150				05/29/18 11:04	05/29/18 16:42	1
13C5 PFNA	107		25 - 150				05/29/18 11:04	05/29/18 16:42	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1 SDG: 20060.001

Lab Sample ID: 320-39184-3

**Matrix: Water** 

Client Sample ID: 176044 Date Collected: 05/08/18 12:18

Date Received: 05/10/18 15:20

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances Result Qualifier RL **MDL** Unit Dil Fac Analyte D Prepared Analyzed Perfluorobutanesulfonic acid 4.5 2.0 0.92 ng/L 05/29/18 11:04 05/29/18 17:00 (PFBS) 05/29/18 11:04 05/29/18 17:00 Perfluorohexanesulfonic acid **32** 2.0 0.87 ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) ND 2.0 0.80 ng/L 05/29/18 11:04 05/29/18 17:00 2.0 0.75 ng/L 05/29/18 11:04 05/29/18 17:00 Perfluorooctanoic acid (PFOA) 15 2.0 1.3 ng/L 05/29/18 11:04 05/29/18 17:00 Perfluorooctanesulfonic acid 42 (PFOS) Perfluorononanoic acid (PFNA) ND 2.0 0.65 ng/L 05/29/18 11:04 05/29/18 17:00 Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 1802 PFHxS 97 25 - 150 05/29/18 11:04 05/29/18 17:00 13C4-PFHpA 101 25 - 150 05/29/18 11:04 05/29/18 17:00 13C4 PFOA 105 05/29/18 11:04 05/29/18 17:00 25 - 150 1 13C4 PFOS 95 25 - 150 05/29/18 11:04 05/29/18 17:00 13C5 PFNA 109 25 - 150 05/29/18 11:04 05/29/18 17:00

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Client Sample ID: 174271

Date Collected: 05/08/18 11:33 Date Received: 05/10/18 15:20 Lab Sample ID: 320-39184-4

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	11		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 17:37	1
Perfluorohexanesulfonic acid (PFHxS)	21		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 17:37	1
Perfluoroheptanoic acid (PFHpA)	4.9		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 17:37	1
Perfluorooctanoic acid (PFOA)	7.5		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 17:37	1
Perfluorooctanesulfonic acid (PFOS)	52		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 17:37	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 17:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				05/29/18 11:04	05/29/18 17:37	1
13C4-PFHpA	104		25 - 150				05/29/18 11:04	05/29/18 17:37	1
13C4 PFOA	110		25 - 150				05/29/18 11:04	05/29/18 17:37	1
13C4 PFOS	92		25 - 150				05/29/18 11:04	05/29/18 17:37	1
13C5 PFNA	97		25 - 150				05/29/18 11:04	05/29/18 17:37	1

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Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 176222 Lab Sample ID: 320-39184-5 Date Collected: 05/08/18 14:22

**Matrix: Water** Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L		05/29/18 11:04	05/29/18 17:55	1
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 17:55	1
Perfluoroheptanoic acid (PFHpA)	0.96	J	2.0	0.80	ng/L		05/29/18 11:04	05/29/18 17:55	1
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 17:55	1
Perfluorooctanesulfonic acid (PFOS)	6.3		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 17:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 17:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	108		25 - 150				05/29/18 11:04	05/29/18 17:55	1
13C4-PFHpA	115		25 - 150				05/29/18 11:04	05/29/18 17:55	1
13C4 PFOA	116		25 - 150				05/29/18 11:04	05/29/18 17:55	1
13C4 PFOS	99		25 - 150				05/29/18 11:04	05/29/18 17:55	1
13C5 PFNA	114		25 - 150				05/29/18 11:04	05/29/18 17:55	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI

Client Sample ID: 550124 Lab Sample ID: 320-39184-6 Date Collected: 05/08/18 15:48 **Matrix: Water** 

Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.3		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 18:14	1
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 18:14	1
Perfluoroheptanoic acid (PFHpA)	11		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 18:14	1
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 18:14	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 18:14	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 18:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				05/29/18 11:04	05/29/18 18:14	1
13C4-PFHpA	110		25 - 150				05/29/18 11:04	05/29/18 18:14	1
13C4 PFOA	110		25 - 150				05/29/18 11:04	05/29/18 18:14	1
13C4 PFOS	100		25 - 150				05/29/18 11:04	05/29/18 18:14	1
13C5 PFNA	115		25 - 150				05/29/18 11:04	05/29/18 18:14	1

SDG: 20060.001

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Client Sample ID: 550116 Lab Sample ID: 320-39184-7 Date Collected: 05/09/18 11:18

**Matrix: Water** 

Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 18:32	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 18:32	1
Perfluoroheptanoic acid (PFHpA)	2.7		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 18:32	1
Perfluorooctanoic acid (PFOA)	5.5		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 18:32	1
Perfluorooctanesulfonic acid (PFOS)	12		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 18:32	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 18:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				05/29/18 11:04	05/29/18 18:32	1
13C4-PFHpA	106		25 - 150				05/29/18 11:04	05/29/18 18:32	1
13C4 PFOA	109		25 - 150				05/29/18 11:04	05/29/18 18:32	1
13C4 PFOS	93		25 - 150				05/29/18 11:04	05/29/18 18:32	1
13C5 PFNA	103		25 - 150				05/29/18 11:04	05/29/18 18:32	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 550216 Lab Sample ID: 320-39184-8 Date Collected: 05/09/18 11:08 **Matrix: Water** 

Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.5		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 18:50	1
Perfluorohexanesulfonic acid (PFHxS)	40		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 18:50	1
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 18:50	1
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 18:50	1
Perfluorooctanesulfonic acid (PFOS)	12		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 18:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 18:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98		25 - 150				05/29/18 11:04	05/29/18 18:50	1
13C4-PFHpA	103		25 - 150				05/29/18 11:04	05/29/18 18:50	1
13C4 PFOA	104		25 - 150				05/29/18 11:04	05/29/18 18:50	1
13C4 PFOS	93		25 - 150				05/29/18 11:04	05/29/18 18:50	1
13C5 PFNA	101		25 - 150				05/29/18 11:04	05/29/18 18:50	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Client Sample ID: 151203 Lab Sample ID: 320-39184-9 Date Collected: 05/09/18 13:15

**Matrix: Water** Date Received: 05/10/18 15:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.2		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 19:09	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 19:09	1
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	ng/L		05/29/18 11:04	05/29/18 19:09	1
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 19:09	1
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 19:09	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 19:09	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				05/29/18 11:04	05/29/18 19:09	1
13C4-PFHpA	105		25 - 150				05/29/18 11:04	05/29/18 19:09	1
13C4 PFOA	109		25 - 150				05/29/18 11:04	05/29/18 19:09	1
13C4 PFOS	97		25 - 150				05/29/18 11:04	05/29/18 19:09	1
13C5 PFNA	105		25 - 150				05/29/18 11:04	05/29/18 19:09	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39184-1 Project/Site: FAI SDG: 20060.001

Lab Sample ID: 320-39184-10

Client Sample ID: 173908 Date Collected: 05/09/18 14:32 Date Received: 05/10/18 15:20

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	49		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 19:27	1
Perfluorohexanesulfonic acid (PFHxS)	220		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 19:27	1
Perfluoroheptanoic acid (PFHpA)	18		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 19:27	1
Perfluorooctanoic acid (PFOA)	9.8		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 19:27	1
Perfluorooctanesulfonic acid (PFOS)	6.7		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 19:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 19:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				05/29/18 11:04	05/29/18 19:27	1
13C4-PFHpA	101		25 - 150				05/29/18 11:04	05/29/18 19:27	1
13C4 PFOA	106		25 - 150				05/29/18 11:04	05/29/18 19:27	1
13C4 PFOS	96		25 - 150				05/29/18 11:04	05/29/18 19:27	1
13C5 PFNA	106		25 - 150				05/29/18 11:04	05/29/18 19:27	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Ad
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-39184-1	569712	96	102	102	91	100
320-39184-2	151637	95	103	105	94	107
320-39184-3	176044	97	101	105	95	109
320-39184-4	174271	97	104	110	92	97
320-39184-5	176222	108	115	116	99	114
320-39184-6	550124	99	110	110	100	115
320-39184-7	550116	97	106	109	93	103
320-39184-8	550216	98	103	104	93	101
320-39184-9	151203	97	105	109	97	105
320-39184-10	173908	97	101	106	96	106
LCS 320-225947/2-A	Lab Control Sample	99	98	105	97	97
LCSD 320-225947/3-A	Lab Control Sample Dup	96	102	99	94	103
MB 320-225947/1-A	Method Blank	97	96	99	94	98

### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Job ID: 320-39184-1

Client: Shannon & Wilson, Inc Project/Site: FAI SDG: 20060.001

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-225947/1-A Client Sample ID: Method Blank **Matrix: Water** 

Analysis Batch: 225992								Prep Batch:	
•	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		05/29/18 11:04	05/29/18 14:15	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		05/29/18 11:04	05/29/18 14:15	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/29/18 11:04	05/29/18 14:15	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		05/29/18 11:04	05/29/18 14:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		05/29/18 11:04	05/29/18 14:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/29/18 11:04	05/29/18 14:15	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	97		25 - 150				05/29/18 11:04	05/29/18 14:15	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150	05/29/18 11:04	05/29/18 14:15	1
13C4-PFHpA	96		25 - 150	05/29/18 11:04	05/29/18 14:15	1
13C4 PFOA	99		25 - 150	05/29/18 11:04	05/29/18 14:15	1
13C4 PFOS	94		25 - 150	05/29/18 11:04	05/29/18 14:15	1
13C5 PFNA	98		25 - 150	05/29/18 11:04	05/29/18 14:15	1
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Lab Sample ID: LCS 320-225947/2-A Matrix: Water				Clie	nt Saı	mple ID	Prep Type: Total/N	NΑ
Analysis Batch: 225992							Prep Batch: 2259	47
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid	17.7	19.1		ng/L		108	72 - 151	
(PFBS)				_				
Perfluorohexanesulfonic acid	18.2	19.0		ng/L		104	73 - 157	

Perfluoroheptanoic acid (PFHpA) 20.0 21.7 Perfluorooctanoic acid (PFOA) 20.0 19.7 18.6 18.8 Perfluorooctanesulfonic acid (PFOS) Perfluorononanoic acid (PFNA) 20.0 21.5 LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	99		25 - 150
13C4-PFHpA	98		25 - 150
13C4 PFOA	105		25 - 150
13C4 PFOS	97		25 - 150
13C5 PFNA	97		25 - 150

Lab Sample ID: LCSD 320-225947/3-A

Matrix: Water Analysis Batch: 225992							Prep Typ Prep Ba		
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.5		ng/L		111	72 - 151	2	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.7		ng/L		103	73 - 157	1	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.1		ng/L		105	71 - 138	3	30
Perfluorooctanoic acid (PFOA)	20.0	20.6		ng/L		103	70 - 140	5	30
Perfluorooctanesulfonic acid (PFOS)	18.6	19.0		ng/L		102	69 - 144	1	30
Perfluorononanoic acid (PFNA)	20.0	20.9		ng/L		104	73 - 147	3	30

TestAmerica Sacramento

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ng/L

ng/L

ng/L

ng/L

108

98

101

107

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

71 - 138

70 - 140

69 - 144

73 - 147

**Prep Type: Total/NA** 

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	96		25 - 150
13C4-PFHpA	102		25 - 150
13C4 PFOA	99		25 - 150
13C4 PFOS	94		25 - 150
13C5 PFNA	103		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1 SDG: 20060.001

## LCMS

### **Prep Batch: 225947**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39184-1	569712	Total/NA	Water	PFAS Prep	
320-39184-2	151637	Total/NA	Water	PFAS Prep	
320-39184-3	176044	Total/NA	Water	PFAS Prep	
320-39184-4	174271	Total/NA	Water	PFAS Prep	
320-39184-5	176222	Total/NA	Water	PFAS Prep	
320-39184-6	550124	Total/NA	Water	PFAS Prep	
320-39184-7	550116	Total/NA	Water	PFAS Prep	
320-39184-8	550216	Total/NA	Water	PFAS Prep	
320-39184-9	151203	Total/NA	Water	PFAS Prep	
320-39184-10	173908	Total/NA	Water	PFAS Prep	
MB 320-225947/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-225947/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-225947/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 225992**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39184-1	569712	Total/NA	Water	WS-LC-0025 At1	225947
320-39184-2	151637	Total/NA	Water	WS-LC-0025	225947
320-39184-3	176044	Total/NA	Water	At1 WS-LC-0025 At1	225947
320-39184-4	174271	Total/NA	Water	WS-LC-0025	225947
320-39184-5	176222	Total/NA	Water	At1 WS-LC-0025 At1	225947
320-39184-6	550124	Total/NA	Water	WS-LC-0025 At1	225947
320-39184-7	550116	Total/NA	Water	WS-LC-0025 At1	225947
320-39184-8	550216	Total/NA	Water	WS-LC-0025 At1	225947
320-39184-9	151203	Total/NA	Water	WS-LC-0025 At1	225947
320-39184-10	173908	Total/NA	Water	WS-LC-0025 At1	225947
MB 320-225947/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	225947
LCS 320-225947/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	225947
LCSD 320-225947/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	225947

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Client Sample ID: 569712

Client: Shannon & Wilson, Inc

Project/Site: FAI

Date Collected: 05/08/18 10:37 Date Received: 05/10/18 15:20

Lab Sample ID: 320-39184-1

**Matrix: Water** 

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 16:23	SHK	TAL SAC

Lab Sample ID: 320-39184-2 Client Sample ID: 151637

**Matrix: Water** 

Date Collected: 05/08/18 09:29 Date Received: 05/10/18 15:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 16:42	SHK	TAL SAC

Client Sample ID: 176044 Lab Sample ID: 320-39184-3

**Matrix: Water** 

Date Collected: 05/08/18 12:18 Date Received: 05/10/18 15:20

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 17:00	SHK	TAL SAC

Client Sample ID: 174271 Lab Sample ID: 320-39184-4

Date Collected: 05/08/18 11:33

**Matrix: Water** Date Received: 05/10/18 15:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 17:37	SHK	TAL SAC

Client Sample ID: 176222 Lab Sample ID: 320-39184-5

Date Collected: 05/08/18 14:22 **Matrix: Water** 

Date Received: 05/10/18 15:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 17:55	SHK	TAL SAC

Client Sample ID: 550124 Lab Sample ID: 320-39184-6

Date Collected: 05/08/18 15:48 **Matrix: Water** 

Date Received: 05/10/18 15:20

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 18:14	SHK	TAL SAC

### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Client Sample ID: 550116

Date Collected: 05/09/18 11:18 Date Received: 05/10/18 15:20

Lab Sample ID: 320-39184-7

**Matrix: Water** 

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 18:32	SHK	TAL SAC

Lab Sample ID: 320-39184-8 Client Sample ID: 550216

Date Collected: 05/09/18 11:08

Date Received: 05/10/18 15:20

**Matrix: Water** 

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 18:50	SHK	TAL SAC

Client Sample ID: 151203 Lab Sample ID: 320-39184-9 **Matrix: Water** 

Date Collected: 05/09/18 13:15

Date Received: 05/10/18 15:20

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 19:09	SHK	TAL SAC

Client Sample ID: 173908 Lab Sample ID: 320-39184-10 **Matrix: Water** 

Date Collected: 05/09/18 14:32

Date Received: 05/10/18 15:20

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	225947	05/29/18 11:04	AAR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			225992	05/29/18 19:27	SHK	TAL SAC

### **Laboratory References:**

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

TestAmerica Sacramento

# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc
Project/Site: FAI

TestAmerica Job ID: 320-39184-1
SDG: 20060.001

### **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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
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

TestAmerica Sacramento

5/30/2018

# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39184-1

SDG: 20060.001

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39184-1	569712	Water	05/08/18 10:37 05	/10/18 15:20
320-39184-2	151637	Water	05/08/18 09:29 05	/10/18 15:20
320-39184-3	176044	Water	05/08/18 12:18 05	/10/18 15:20
320-39184-4	174271	Water	05/08/18 11:33 05	/10/18 15:20
320-39184-5	176222	Water	05/08/18 14:22 05	/10/18 15:20
320-39184-6	550124	Water	05/08/18 15:48 05	/10/18 15:20
320-39184-7	550116	Water	05/09/18 11:18 05	/10/18 15:20
320-39184-8	550216	Water	05/09/18 11:08 05	/10/18 15:20
320-39184-9	151203	Water	05/09/18 13:15 05	/10/18 15:20
320-39184-10	173908	Water	05/09/18 14:32 05	/10/18 15:20

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# CHAIN-OF-CUSTODY

SHANNON & WILSON, INC. Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020

2355 Hill Road Fairbanks, AK 99709 (907) 479-0600

5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120

	Analysis Parameters/Sample C	Cinclinde preservative
2705 Saint Andrews Loop, Suite A	Pasco, WA 99301-3378	(509) 946-6309
2043 Westport Center Drive	St. Louis, MO 63146-3564	(314) 699-9660

Analysis Parameters/Sample Container Description

1 1	1
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groundwates

Remarks/Matrix

2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147	1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800		ć	1	100	/	/	/
Sample Identity	Lab No.	Time	Sampled	QE TO THE OF	127	/	/	1800X
9712		1637	31/8/5	7	×			Ce
537		0929	5/8/18	X	×			6
270		1218	8/8/18	X	×			6
1,18		1133	5/8/18	X	×			8
CER 9		Maa	5/8/18	X	×			8
124		1548	5/8/18	X	×			B
1.3.		1333	8/6/8	*	*			1
911		8111	5/9/18	X	X			
316		1108	5/9/18	7	X			
203		1315	5/4/18	×	*			C

Project Information	Sample Receipt	Relinquished By: 1.	Relinquish
Project Number: 20060 -001	Total Number of Containers	Signature: Time: 15/5	Signature: ///
Project Name: [A]	COC Seals/Intact? Y/N/NA	Defend Name Color E' IO Lie	My Mu
Contact: MDU	Received Good Cond./Cold	A Marie Date 3 14 18	J// C
Ongoing Project? Yes 🔀 No	Delivery Method:	Company	Company
Sampler: ALM, CAB	(attach shipping bill, if any)	Shennon Huilson, Inc	1/30
Instru	Instructions	Received By: 1.	Received
Requested Turnaround Time: Stand and		Signature: 15 CD	Signature:
Special Instructions: B. 11 - 10		My my = 6.10	
		Printed Name: // Date: 7/19/1/2	Printed Name:
31-1-20060-00	(00)	Divid H	
Distribution: White - w/shipment - returned to Shannor Yellow - w/shipment - for consignee files	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files	Company: Sty	Company:

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Relinquished By:

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hed By: Time:

Signature

Date:

Printed Name:

3/01/25

Company:

THE PERSON

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Received By

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By:

Signature:

Date:

Printed Name:

Date:

Company:

F-19-91/UR

Attn: D. a II but for an article ainer Description Ised)  Sed)  Remarks/Matrix  Con duark	Relinquished By: 3. Signature: Time: Company: Signature: Time: Signature: Time: Company: Company:
/Sample Conti	Signature: Time: The Interest Name: Time: Time: The Interest Name: Date: Time: Time: Date:
CUSIODY X X X X X X X X X X X X X X X X X X X	Relinquished By: 1. Signature. Time: 1515 Fringed Name: Date: 54118 Company: Signature: Time 500 Ex Received By: 1. Signature: Time 500 Fringed Name: Date: 511416 Company: Time 500 Company: Ti
2705 S Pasco, (509) 93 1 Time	ect Information Sample Receipt  Instructions: B: No □  Instructions: B: No □  Instructions: B: No □  Instructions
Geotechnical and Environmental Consultants 400 N. 34th Street, Suite 100 Seattle, WA 98103 (200) 632-8020 2365 Filli Road Fairbanks, AK 99709 (503) 223-6147  Sample Identity  Lab No.	Project Information Si Project Number: Aのピーの Total Num Project Name: 七科 COC Sea Contact: MDN Received Ongoing Project? Yes No 口 Delivery to Sampler: AcM Instructions Requested Turnaround Time: Sたいdの Special Instructions: B: Il も Special Instructions: B: Illes Special Instructions

Client: Shannon & Wilson, Inc

Job Number: 320-39184-1 SDG Number: 20060.001

List Source: TestAmerica Sacramento

Login Number: 39184 List Number: 1

Creator: Nelson, Kym D

Creator: Nelson, Kym D		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	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.	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	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Adam Wyborny
Title:
Environmental Engineering Staff
Date:
May 30, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
May 30, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-39184-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	-3918	84-1				
1.	<u>Labo</u>	<u>ratory</u>				
	a.	Did an ADI	EC CS approv	ed laboratory	ry receive and <u>perform</u> all of the submitted sample analyses?	
		O Yes	<ul><li>No</li></ul>		Comments:	
	ce	rtified for per	fluorinated al	kyl acids in o	drinking water analysis by the National Environmental AP) in Oregon.	
			1		another "network" laboratory or sub-contracted to an ratory performing the analyses ADEC CS approved?	
		O Yes	No		Comments:	
	Aı	nalyses were	performed by	TestAmerica	ca Laboratories, Inc. in West Sacramento, CA.	
2.	Chair	n of Custody	(CoC)			
	a.	CoC inform	ation complet	ted, signed, a	and dated (including released/received by)?	
		Yes	O No		Comments:	
	b.	Correct Ana	alyses requeste	ed?		
		• Yes	O No		Comments:	
3.	Labo	ratory Sampl	e Receipt Doo	cumentation		
	a.	Sample/coo	ler temperatur	re documente	ted and within range at receipt (0° to 6° C)?	
		Yes	O No		Comments:	
	b.		servation acce lorinated Solv		dified waters, Methanol preserved VOC soil (GRO, BTEX,	
		Yes	O No		Comments:	
	Aı	nalysis of PF	ASs does not i	require a pres	eservative other than temperature control.	
	c.	Sample con	dition docume	ented – broke	ten, leaking (Methanol), zero headspace (VOC vials)?	
		<ul><li>Yes</li></ul>	O No		Comments:	
	Th	ne sample rec	eipt form note	es that the sar	amples were received in good condition.	

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	samples, etc	2.?	
	O Yes	No	Comments:
Th	ere were no	discrepancies no	eted in the sample receipt documentation.
e.	Data quality	or usability aff	ected?
			Comments:
Da	ta quality or	usability is not a	affected; see above.
C	ase Narrative	2	
0	Dragant and	d understandable	59
a.			
	• Yes	O No	Comments:
	D.:	. 0	
b.	•	, , , ,	C failures identified by the lab?
		O No	Comments:
			imples arrived in good condition, properly preserved, and that the ler upon receipt at the laboratory was 5.6° C.
			was insufficient sample volume available to perform a matrix spike ) with preparation batch 320-225947.
c.	Were all co	orrective actions	documented?
	© Yes	No	Comments:
Tl	here were no	corrective actio	ons documented in the case narrative.
d.	What is the	e effect on data of	quality/usability according to the case narrative?
			Comments:
Tl	he case narra	tive does not no	te an effect on data quality.
	les Results		
amp	ics ixcsuits		
•			d/reported as requested on COC?

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	O No	Comments:
•		mples were analyzed using direct injection and in-line is using direct aqueous injection (DAI) was met for all
c. All soils repo	orted on a dry weight bas	is?
O Yes	• No	Comments:
N/A; soil sample	es were not submitted wit	th this work order.
d. Are the repo the project?	rted LOQs less than the C	Cleanup Level or the minimum required detection level fo
Yes	O No	Comments:
drinking water h	nealth advisory levels and	Reporting Limit (RL), is less than applicable EPA lifetim ADEC groundwater cleanup levels for PFOS and PFOA.
1 2	or usability affected?	
© Yes	© No	Comments:
The data quality	and usability were not af	fected.
C Samples		
a. Method Blar	ık	
i. One i	method blank reported pe	r matrix, analysis and 20 samples?
Yes	O No	Comments:
411	nethod blank results less t	han limit of quantitation (LOQ)?
11. All n		1 1
• Yes	O No	Comments:
• Yes		Comments:
• Yes	C No	Comments:
• Yes	O No	Comments: re affected?
iii. If abo	O No ove LOQ, what samples a	Comments:  re affected?  Comments:

v. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
b. Laboratory Control Sample/Duplicate (LCS/LCSD)
<ul> <li>Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>
• Yes • No Comments:
ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
○ Yes • No Comments:
Metals and inorganics were not analyzed as part of this work order.
iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
• Yes • No Comments:
iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
• Yes • No Comments:
v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments:
N/A; analytical accuracy and precision were within acceptable limits.
vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
O Yes O No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
© Yes © No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>
• Yes • No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes © No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
© Yes © No Comments:
PFASs are not volatile compounds; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
© Yes • No Comments:
N/A; a trip blank is not required.

39184-1			
iii. A	All r	esults less	nan LOQ?
OY	es	No	Comments:
N/A; a trip	olan	k is not rec	uired.
iv. I	f ab	ove LOQ,	what samples are affected?
			Comments:
None; a trip	bla	nk was not	submitted with this work order.
v. I	ata	quality or	sability affected?
			Comments:
The data qu	ality	y and usabi	ity were not affected; see above.
e. Field Du	ıplio	cate	
i. (	ne	field duplic	ate submitted per matrix, analysis and 10 project samples?
⊙ Y	es	O No	Comments:
ii. S	ubr	nitted blind	to lab?
⊙ Y	es	O No	Comments:
The field-du	ıplio	cate sample	s 550116 and 550216 were submitted with this work order.
		ommended	elative percent differences (RPD) less than specified DQOs?  30% water, 50% soil)  (R <sub>1</sub> -R <sub>2</sub> ) × 100

 $((R_1+R_2)/2)$ 

Where  $R_1 = Sample Concentration$  $R_2$  = Field Duplicate Concentration

• Yes • No Comments:

Analytical precision between the field-duplicate samples 550116 and 550216 was found to be within the recommended DQO of 30%.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected.

Page 7 **July 2017** 

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No Not Applicable
Samples for this project are not collected with reusable equipment; therefore, a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
O Yes O No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
O Yes O No Comments:
There were no additional flags/qualifiers required for this work order.



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: 320-39463-1

Client Project/Site: FIA

For:

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

Attn: Marcy Nadel

Vania Oltima

Authorized for release by: 5/22/2018 1:48:04 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FIA TestAmerica Job ID: 320-39463-1

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

# Glossary

TEQ

Toxicity Equivalent Quotient (Dioxin)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

5/22/2018

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### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

Job ID: 320-39463-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-39463-1

### Receipt

The sample was received on 5/17/2018 11:35 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.1° C.

#### LCMS

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

### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-224565.

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 521809

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

Lab Sample ID: 320-39463-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac I	) Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.4	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.4	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	13	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

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Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

Lab Sample ID: 320-39463-1

**Matrix: Water** 

Client Sample ID: 521809 Date Collected: 05/15/18 11:12 Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.4		2.0	0.92	ng/L		05/21/18 14:13	05/22/18 03:43	1
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L		05/21/18 14:13	05/22/18 03:43	1
Perfluoroheptanoic acid (PFHpA)	7.4		2.0	0.80	ng/L		05/21/18 14:13	05/22/18 03:43	1
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L		05/21/18 14:13	05/22/18 03:43	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		05/21/18 14:13	05/22/18 03:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/21/18 14:13	05/22/18 03:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	106		25 - 150				05/21/18 14:13	05/22/18 03:43	1
13C4-PFHpA	111		25 - 150				05/21/18 14:13	05/22/18 03:43	1
13C4 PFOA	114		25 - 150				05/21/18 14:13	05/22/18 03:43	1
13C4 PFOS	105		25 - 150				05/21/18 14:13	05/22/18 03:43	1
13C5 PFNA	115		25 - 150				05/21/18 14:13	05/22/18 03:43	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Acce	ptance Limit
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
320-39463-1	521809	106	111	114	105	115	
LCS 320-224565/2-A	Lab Control Sample	101	103	111	98	105	
LCSD 320-224565/3-A	Lab Control Sample Dup	94	98	101	98	99	
MB 320-224565/1-A	Method Blank	91	95	98	92	96	

_			
Surr	ogate	lea	end

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

Page 7 of 16

TestAmerica Job ID: 320-39463-1

Client: Shannon & Wilson, Inc Project/Site: FIA

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-224565/1-A

**Matrix: Water** 

**Analysis Batch: 224677** 

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

**Prep Batch: 224565** 

-	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		05/21/18 14:13	05/21/18 21:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		05/21/18 14:13	05/21/18 21:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/21/18 14:13	05/21/18 21:53	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		05/21/18 14:13	05/21/18 21:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		05/21/18 14:13	05/21/18 21:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		05/21/18 14:13	05/21/18 21:53	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

Isotope Dilution	%Recovery Qua	lifier Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	91	25 - 150	05/21/18 14:13	05/21/18 21:53	1
13C4-PFHpA	95	25 - 150	05/21/18 14:13	05/21/18 21:53	1
13C4 PFOA	98	25 - 150	05/21/18 14:13	05/21/18 21:53	1
13C4 PFOS	92	25 - 150	05/21/18 14:13	05/21/18 21:53	1
13C5 PFNA	96	25 - 150	05/21/18 14:13	05/21/18 21:53	1

Lab Sample ID: LCS 320-224565/2-A

**Matrix: Water** 

**Analysis Batch: 224677** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Prep Batch: 224565** 

	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier L	Init D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	18.3	n	g/L	103	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.6	n	g/L	96	73 <sub>-</sub> 157	
Perfluoroheptanoic acid (PFHpA)	20.0	20.0	n	g/L	100	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	18.4	n	g/L	92	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	19.3	n	g/L	104	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	20.3	n	g/L	102	73 - 147	
100							

LCS	LCS
-----	-----

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	101		25 - 150
13C4-PFHpA	103		25 - 150
13C4 PFOA	111		25 - 150
13C4 PFOS	98		25 - 150
13C5 PFNA	105		25 - 150

Lab Sample ID: LCSD 320-224565/3-A

**Matrix: Water** 

Analysis Batch: 224677

Client Sample	ID: L	_ab	Control	Sam	ple Dup
			Pren Ty	me: T	otal/NA

**Prep Batch: 224565** 

Analysis Baton: 22-torr							i icp be		_
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.7		ng/L		100	72 - 151	3	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.0		ng/L		99	73 - 157	3	30
Perfluoroheptanoic acid (PFHpA)	20.0	20.1		ng/L		100	71 - 138	1	30
Perfluorooctanoic acid (PFOA)	20.0	19.3		ng/L		96	70 - 140	4	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.0		ng/L		97	69 - 144	7	30
Perfluorononanoic acid (PFNA)	20.0	21.0		ng/L		105	73 - 147	3	30

TestAmerica Sacramento

Page 8 of 16 5/22/2018

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

.,	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	94		25 - 150
13C4-PFHpA	98		25 - 150
13C4 PFOA	101		25 - 150
13C4 PFOS	98		25 - 150
13C5 PFNA	99		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

## LCMS

### **Prep Batch: 224565**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39463-1	521809	Total/NA	Water	PFAS Prep	
MB 320-224565/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-224565/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-224565/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 224677**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39463-1	521809	Total/NA	Water	WS-LC-0025 At1	224565
MB 320-224565/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	224565
LCS 320-224565/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	224565
LCSD 320-224565/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	224565

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

Lab Sample ID: 320-39463-1

**Matrix: Water** 

Client Sample ID: 521809 Date Collected: 05/15/18 11:12 Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	224565	05/21/18 14:13	ABH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			224677	05/22/18 03:43	ABH	TAL SAC

#### **Laboratory References:**

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

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## **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

### **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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
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

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## **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FIA

TestAmerica Job ID: 320-39463-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **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: FIA

TestAmerica Job ID: 320-39463-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39463-1	521809	Water	05/15/18 11:12	05/17/18 11:35

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Laboratory Test Anterica		Logical Semanks/Matrix	2 Groundwater		320-39463 Chain of Custody	2.	Signature: Time:	Printed Name: Date:	Company:	2. Received By: 3.	Signature: Time:	Printed Name: Date:	Company:
ECORD	Analysis Parameters/Sample Container Description (include preservative if used)					Relinquished By:	Signature: Time	Printed Name: Date:	Company:	Received By:	Signature: Time	Printed Name: Date:	Company:
AIN-OF-CUSTODY RECORD		1200 0 + 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1	×			Relinquished By; 1.	Signature: 78 / Time: 16:50	Printed Name. Date: 5/16/18	Shannord Wilson, Inc	Received By: 1.	Signature, Time: 1133	Printed Name: Date: 5/11/18	Company: THSal
딩	enter Drive 2705 Saint Andrews Loop, Suite A 146-3564 Pasco, WA 99301-3378 (509) 946-6309	s Street, Suite 3 ( 99518 ) Street, Suite 200 204 Lab No. Time Sampled	11:13 5/15/18			Sample Receipt	Total Number of Containers	COC Seals/Intact? Y/N/NA Received Good Cond./Cold 5.12c	Delivery Method:  Sold Sheek (attach shipping bill, if any)	ons		to.	Shannon & Wilson w/ laboratory report nee files le
SHANNON & WILSON, INC.  Geotechnical and Environmental Consultants	eet, Suite 100 103	2355 Hill Road 5430 Fairbanks Street, Suite 3 Fairbanks, AK 99709 Anchorage, AK 99518 (907) 479-0600 (907) 561-2120 Portland, OR 97201-2498 Denver, CO 80204 (503) 223-6147 (303) 825-3800 Lab No.	521809			Project Information	20060		Ongoing Project? Yes IM No II De Sampler: ARM (at	Instructions	Requested Turnaround Time: Rush	31-1-20060-60	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File

Client: Shannon & Wilson, Inc

List Source: TestAmerica Sacramento

Job Number: 320-39463-1

Login Number: 39463

List Number: 1

Creator: Turpen, Troy

Creator: Turpen, Troy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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	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?	False	
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	

**TestAmerica Sacramento** 

## **Laboratory Data Review Checklist**

Completed By:
Michael Jaramillo
itle:
Environmental Chemist
Date:
May 23, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
May 22, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-39463-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

**July 2017** Page 1

1.	<u>Laboratory</u>								
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?								
	© Yes								
	ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.								
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?								
	© Yes								
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.								
2.	Chain of Custody (CoC)								
	a. CoC information completed, signed, and dated (including released/received by)?								
	© Yes © No Comments:								
	b. Correct Analyses requested?								
	© Yes © No Comments:								
3.	Laboratory Sample Receipt Documentation								
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?								
	© Yes © No Comments:								
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?								
	• Yes • No Comments:								
	Analysis of PFASs does not require a preservative other than temperature control.								
	c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?								
	© Yes © No Comments:								
	The sample receipt form notes that the samples were received in good condition.								

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320-39463-1

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7/	\ <i>)</i> -	- 7	74	+0	רו	<b>)</b> –

O Yes	c.? • No	Comments:
_	_	ted in the sample receipt documentation.
	<u> </u>	<del>-</del> <del>-</del>
e. Data quant	y or usability affe	Comments:
D : 11:	1.11.	
Data quality or	usability is not a	affected; see above.
Case Narrative	<u>e</u>	
a. Present an	d understandable	?
Yes	© No	Comments:
b. Discrepand	cies, errors, or Q0	C failures identified by the lab?
•	O No	Comments:
		mples arrived in good condition, properly preserved, and that the er upon receipt at the laboratory was 5.1° C.
		was insufficient sample volume available to perform a matrix spike with preparation batch 320-224565.
c. Were all c	orrective actions	documented?
O Yes	No	Comments:
There were no	corrective action	ns documented in the case narrative.
d. What is the	e effect on data q	uality/usability according to the case narrative?
	_	Comments:
The case narra	ative does not not	te an effect on data quality.
amples Results		

**July 2017** Page 3

320-3	9463-1								
	b. All applicat	ole holding times me	et?						
	<ul><li>Yes</li></ul>	O No	Comments:						
	The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.								
	c. All soils rep	oorted on a dry weig	tht basis?						
	C Yes	⊙ No	Comments:						
	N/A; soil samp	les were not submit	ted with this work order.						
	d. Are the repo	•	n the Cleanup Level or the minimum required detection level f	or					
	Yes	C No	Comments:						
	~ 1		merica Reporting Limit (RL), is less than applicable EPA lifetings and ADEC groundwater cleanup levels for PFOS and PFOA						
	e. Data quality	y or usability affecte	d?						
	C Yes	© No	Comments:						
	The data quality	y and usability were	not affected.						
6. <u>Q</u>	C Samples								
	a. Method Bla	nnk							
	i. One	method blank repor	ted per matrix, analysis and 20 samples?						

Yes O No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes O No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No Comments:

Qualification of the results was not required; see above.

Page 4 **July 2017** 

V.	Data	quality or us	sability affects	ed?
				Comments:
The data q	uality	y and usabilit	y were not af	fected.
b. Labora	tory	Control Sam	ple/Duplicate	(LCS/LCSD)
i.	_		-	ported per matrix, analysis and 20 samples? (LCS/LCSD S required per SW846)
•	Yes	C No		Comments:
ii.		als/Inorganics amples?	s – one LCS a	and one sample duplicate reported per matrix, analysis and
C	Yes	<ul><li>No</li></ul>		Comments:
Metals and	d inor	ganics were	not analyzed a	as part of this work order.
iii.	And	project spec	ified DQOs, it	ries (%R) reported and within method or laboratory limits? If applicable. (AK Petroleum methods: AK101 60%-120%, 0%-120%; all other analyses see the laboratory QC pages)
•	Yes	C No		Comments:
iv.	labo	ratory limits? /LCSD, MS/	And project MSD, and or	t differences (RPD) reported and less than method or specified DQOs, if applicable. RPD reported from sample/sample duplicate. (AK Petroleum methods 20%; all bry QC pages)
⊙ '	Yes	C No		Comments:
v.	If %	R or RPD is	outside of acc	ceptable limits, what samples are affected?
				Comments:
N/A; analy	ytical	accuracy and	d precision we	ere within acceptable limits.
vi.	Do t	he affected sa	ample(s) have	e data flags? If so, are the data flags clearly defined?
C	Yes	<b>⊙</b> No		Comments:
Qualificati	ion of	f the data was	not required	l; see above.

**July 2017** Page 5

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
• Yes • No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes • No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
C Yes • No Comments:
PFASs are not volatile compounds; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
C Yes • No Comments:
N/A; a trip blank is not required.

Page 6 **July 2017** 

iii. All results less than LOQ?
C Yes • No Comments:
N/A; a trip blank is not required.
iv. If above LOQ, what samples are affected?
Comments:
None; a trip blank was not submitted with this work order.
v. Data quality or usability affected?
Comments:
The data quality and usability were not affected; see above.
e. Field Duplicate
i. One field duplicate submitted per matrix, analysis and 10 project samples?
C Yes
A field duplicate sample was not submitted with this work order. However, field duplicate samples are collected at the proper frequency for the overall project.
ii. Submitted blind to lab?
C Yes No Comments:
N/A; a field duplicate was not submitted with this work order.
iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
© Yes © No Comments:
N/A; a field duplicate was not submitted with this work order.
iv. Data quality or usability affected? (Use the comment box to explain why or why not.)  Comments:
The data quality and usability were not affected.

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No O Not Applicable
Samples for this project are not collected with reusable equipment; therefore, a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
© Yes © No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
© Yes
There were no additional flags/qualifiers required for this work order

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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: 320-39517-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel



Authorized for release by: 6/6/2018 2:21:47 PM Jill Kellmann, Manager of Project Management (916)374-4402 jill.kellmann@testamericainc.com

Designee for

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

LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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: FAI

TestAmerica Job ID: 320-39517-1

### **Qualifiers**

#### **LCMS**

J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

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)

TestAmerica Sacramento

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### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Job ID: 320-39517-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

#### Receipt

The samples were received on 5/17/2018 11:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.1° C.

#### **LCMS**

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-226898.

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

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 176095 Lab Sample ID: 320-39517-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.96	J –	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.1		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 176397 Lab Sample ID: 320-39517-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	78		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	74		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	40		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173916 Lab Sample ID: 320-39517-3

Analyte	Result Q	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.0		2.0	0.87	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.87 J		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7 J		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173860 Lab Sample ID: 320-39517-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	40		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 407364 Lab Sample ID: 320-39517-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.1	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.80 J	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Client Sample ID: 407364 (Continued)

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.9	J	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 407372 Lab Sample ID: 320-39517-6

No Detections.

Lab Sample ID: 320-39517-7 Client Sample ID: 542512

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	83		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	250		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	21		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 550132 Lab Sample ID: 320-39517-8

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.9	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.1	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10	2.0	1.3	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: 153915 Lab Sample ID: 320-39517-9

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	18	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	71	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.5	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	7.6	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	93	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.1 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 153907 Lab Sample ID: 320-39517-10

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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Project/Site: FAI

Client: Shannon & Wilson, Inc

Client Sample ID: 153907 (Continued)

Lab Sample ID: 320-39517-10

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	21	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	60	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.0	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	100	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.4 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 153699 Lab Sample ID: 320-39517-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	41		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	38		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.3		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.9		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Lab Sample ID: 320-39517-12 Client Sample ID: 510220.1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	43	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	170	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	21	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	63	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	140	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 510320.1 Lab Sample ID: 320-39517-13

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	44	2.0	0.92 ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	170	2.0	0.87 ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.5	2.0	0.80 ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	62	2.0	0.75 ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	140	2.0	1.3 ng/L	1	WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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6/6/2018

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 510220.2 Lab Sample ID: 320-39517-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	55		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	210		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	11		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	83		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 526932 Lab Sample ID: 320-39517-15

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	17	2.0	0.92	ng/L		WS-LC-0025	Total/NA
P (	07	0.0	0.07			At1	T ( 1014
Perfluorohexanesulfonic acid (PFHxS)	27	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.6	2.0	0.80	ng/L	1	WS-LC-0025	Total/NA
						At1	
Perfluorooctanoic acid (PFOA)	6.6	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	60	2.0	1.3	ng/L	1	WS-LC-0025	Total/NA
D (	0.70		0.05		4	At1	T ( 1014
Perfluorononanoic acid (PFNA)	0.76 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 120513 Lab Sample ID: 320-39517-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	23		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.6		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	450		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: 120413 Lab Sample ID: 320-39517-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	23		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	470		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 174254 Lab Sample ID: 320-39517-18

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.1	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	25	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.4	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	10	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	71	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.3 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 542547 Lab Sample ID: 320-39517-19

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	100	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	130	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	34	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	31	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.9 J	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 152617 Lab Sample ID: 320-39517-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	94		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	6.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-1

**Matrix: Water** 

Client Sample ID: 176095 Date Collected: 05/09/18 15:35 Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.96	J	2.0	0.92	ng/L		06/04/18 06:59	06/05/18 09:53	1
Perfluorohexanesulfonic acid (PFHxS)	5.1		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 09:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 09:53	1
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 09:53	1
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 09:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 09:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				06/04/18 06:59	06/05/18 09:53	1
13C4-PFHpA	99		25 - 150				06/04/18 06:59	06/05/18 09:53	1
13C4 PFOA	103		25 - 150				06/04/18 06:59	06/05/18 09:53	1
13C4 PFOS	98		25 - 150				06/04/18 06:59	06/05/18 09:53	1
13C5 PFNA	104		25 - 150				06/04/18 06:59	06/05/18 09:53	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-2

**Matrix: Water** 

Client Sample ID: 176397
Date Collected: 05/09/18 16:47
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 10:11	1
Perfluorohexanesulfonic acid (PFHxS)	78		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 10:11	1
Perfluoroheptanoic acid (PFHpA)	74		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 10:11	1
Perfluorooctanoic acid (PFOA)	40		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 10:11	1
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 10:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 10:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				06/04/18 06:59	06/05/18 10:11	1
13C4-PFHpA	97		25 - 150				06/04/18 06:59	06/05/18 10:11	1
13C4 PFOA	109		25 - 150				06/04/18 06:59	06/05/18 10:11	1
13C4 PFOS	99		25 - 150				06/04/18 06:59	06/05/18 10:11	1
13C5 PFNA	107		25 - 150				06/04/18 06:59	06/05/18 10:11	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-3

**Matrix: Water** 

Client Sample ID: 173916 Date Collected: 05/09/18 17:22 Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 10:29	1
Perfluorohexanesulfonic acid (PFHxS)	2.0		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 10:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 10:29	1
Perfluorooctanoic acid (PFOA)	0.87	J	2.0	0.75	ng/L		06/04/18 06:59	06/05/18 10:29	1
Perfluorooctanesulfonic acid (PFOS)	1.7	J	2.0	1.3	ng/L		06/04/18 06:59	06/05/18 10:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 10:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				06/04/18 06:59	06/05/18 10:29	1
13C4-PFHpA	102		25 - 150				06/04/18 06:59	06/05/18 10:29	1
13C4 PFOA	107		25 - 150				06/04/18 06:59	06/05/18 10:29	1
13C4 PFOS	100		25 - 150				06/04/18 06:59	06/05/18 10:29	1
13C5 PFNA	104		25 - 150				06/04/18 06:59	06/05/18 10:29	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Client Sample ID: 173860

Date Collected: 05/09/18 18:28

Lab Sample ID: 320-39517-4

Matrix: Water

Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 10:48	1
Perfluorohexanesulfonic acid (PFHxS)	40		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 10:48	1
Perfluoroheptanoic acid (PFHpA)	5.8		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 10:48	1
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 10:48	1
Perfluorooctanesulfonic acid (PFOS)	6.7		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 10:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 10:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				06/04/18 06:59	06/05/18 10:48	1
13C4-PFHpA	104		25 - 150				06/04/18 06:59	06/05/18 10:48	1
13C4 PFOA	110		25 - 150				06/04/18 06:59	06/05/18 10:48	1
13C4 PFOS	103		25 - 150				06/04/18 06:59	06/05/18 10:48	1
13C5 PFNA	114		25 - 150				06/04/18 06:59	06/05/18 10:48	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-5

**Matrix: Water** 

Client Sample ID: 407364
Date Collected: 05/10/18 10:38
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 11:06	1
Perfluorohexanesulfonic acid (PFHxS)	2.1		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 11:06	1
Perfluoroheptanoic acid (PFHpA)	0.80	J	2.0	0.80	ng/L		06/04/18 06:59	06/05/18 11:06	1
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 11:06	1
Perfluorooctanesulfonic acid (PFOS)	1.9	J	2.0	1.3	ng/L		06/04/18 06:59	06/05/18 11:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 11:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		25 - 150				06/04/18 06:59	06/05/18 11:06	1
13C4-PFHpA	102		25 - 150				06/04/18 06:59	06/05/18 11:06	1
13C4 PFOA	109		25 - 150				06/04/18 06:59	06/05/18 11:06	1
13C4 PFOS	100		25 - 150				06/04/18 06:59	06/05/18 11:06	1
13C5 PFNA	108		25 - 150				06/04/18 06:59	06/05/18 11:06	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-6

**Matrix: Water** 

Client Sample ID: 407372
Date Collected: 05/10/18 11:39
Date Received: 05/17/18 11:35

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	ances RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 14:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 14:47	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 14:47	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 14:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 14:47	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 14:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	100		25 - 150				06/04/18 06:59	06/05/18 14:47	1
13C4-PFHpA	102		25 - 150				06/04/18 06:59	06/05/18 14:47	1
13C4 PFOA	105		25 - 150				06/04/18 06:59	06/05/18 14:47	1
13C4 PFOS	99		25 - 150				06/04/18 06:59	06/05/18 14:47	1
13C5 PFNA	105		25 - 150				06/04/18 06:59	06/05/18 14:47	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-7

**Matrix: Water** 

Client Sample ID: 542512
Date Collected: 05/10/18 13:38
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	83		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 15:05	1
Perfluorohexanesulfonic acid (PFHxS)	250		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 15:05	1
Perfluoroheptanoic acid (PFHpA)	21		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 15:05	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 15:05	1
Perfluorooctanesulfonic acid (PFOS)	6.3		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 15:05	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 15:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				06/04/18 06:59	06/05/18 15:05	1
13C4-PFHpA	98		25 - 150				06/04/18 06:59	06/05/18 15:05	1
13C4 PFOA	105		25 - 150				06/04/18 06:59	06/05/18 15:05	1
13C4 PFOS	97		25 - 150				06/04/18 06:59	06/05/18 15:05	1
13C5 PFNA	104		25 - 150				06/04/18 06:59	06/05/18 15:05	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-8

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

Client Sample ID: 550132 Date Collected: 05/11/18 11:31 Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.9		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 15:42	1
Perfluorohexanesulfonic acid (PFHxS)	13		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 15:42	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 15:42	1
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 15:42	1
Perfluorooctanesulfonic acid (PFOS)	10		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 15:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 15:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	95		25 - 150				06/04/18 06:59	06/05/18 15:42	1
13C4-PFHpA	96		25 - 150				06/04/18 06:59	06/05/18 15:42	1
13C4 PFOA	101		25 - 150				06/04/18 06:59	06/05/18 15:42	1
13C4 PFOS	96		25 - 150				06/04/18 06:59	06/05/18 15:42	1
13C5 PFNA	102		25 - 150				06/04/18 06:59	06/05/18 15:42	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-9

**Matrix: Water** 

Client Sample ID: 153915
Date Collected: 05/11/18 12:26
Date Received: 05/17/18 11:35

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	18		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 16:00	1
Perfluorohexanesulfonic acid (PFHxS)	71		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 16:00	1
Perfluoroheptanoic acid (PFHpA)	7.5		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 16:00	1
Perfluorooctanoic acid (PFOA)	7.6		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 16:00	1
Perfluorooctanesulfonic acid (PFOS)	93		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 16:00	1
Perfluorononanoic acid (PFNA)	1.1	J	2.0	0.65	ng/L		06/04/18 06:59	06/05/18 16:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	94		25 - 150				06/04/18 06:59	06/05/18 16:00	1
13C4-PFHpA	101		25 - 150				06/04/18 06:59	06/05/18 16:00	1
13C4 PFOA	106		25 - 150				06/04/18 06:59	06/05/18 16:00	1
13C4 PFOS	93		25 - 150				06/04/18 06:59	06/05/18 16:00	1
13C5 PFNA	108		25 - 150				06/04/18 06:59	06/05/18 16:00	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-10

TestAmerica Job ID: 320-39517-1

Matrix: Water

Date Collected: 05/11/18 12:47 Date Received: 05/17/18 11:35

Client Sample ID: 153907

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	21		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 16:19	1
Perfluorohexanesulfonic acid (PFHxS)	60		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 16:19	1
Perfluoroheptanoic acid (PFHpA)	7.0		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 16:19	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 16:19	1
Perfluorooctanesulfonic acid (PFOS)	100		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 16:19	1
Perfluorononanoic acid (PFNA)	1.4	J	2.0	0.65	ng/L		06/04/18 06:59	06/05/18 16:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				06/04/18 06:59	06/05/18 16:19	1
13C4-PFHpA	100		25 - 150				06/04/18 06:59	06/05/18 16:19	1
13C4 PFOA	112		25 - 150				06/04/18 06:59	06/05/18 16:19	1
13C4 PFOS	101		25 - 150				06/04/18 06:59	06/05/18 16:19	1
13C5 PFNA	101		25 - 150				06/04/18 06:59	06/05/18 16:19	1

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Client: Shannon & Wilson, Inc

Client Sample ID: 153699

Date Collected: 05/11/18 13:39

Date Received: 05/17/18 11:35

Project/Site: FAI

13C5 PFNA

Lab Sample ID: 320-39517-11

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

06/04/18 06:59 06/05/18 16:37

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	41		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 16:37	1
Perfluorohexanesulfonic acid (PFHxS)	38		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 16:37	1
Perfluoroheptanoic acid (PFHpA)	5.1		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 16:37	1
Perfluorooctanoic acid (PFOA)	2.3		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 16:37	1
Perfluorooctanesulfonic acid (PFOS)	4.9		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 16:37	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 16:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	105		25 - 150				06/04/18 06:59	06/05/18 16:37	1
13C4-PFHpA	103		25 - 150				06/04/18 06:59	06/05/18 16:37	1
13C4 PFOA	111		25 - 150				06/04/18 06:59	06/05/18 16:37	1
13C4 PFOS	98		25 - 150				06/04/18 06:59	06/05/18 16:37	1

25 - 150

Client: Shannon & Wilson, Inc

Client Sample ID: 510220.1

Project/Site: FAI

Lab Sample ID: 320-39517-12

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

Date Collected: 05/11/18 14:40 Date Received: 05/17/18 11:35

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances Analyte Result Qualifier RL **MDL** Unit Dil Fac Prepared Analyzed Perfluorobutanesulfonic acid 43 2.0 0.92 ng/L 06/04/18 06:59 06/05/18 16:55 (PFBS) 06/04/18 06:59 06/05/18 16:55 Perfluorohexanesulfonic acid 170 2.0 0.87 ng/L (PFHxS) 2.0 0.80 ng/L 06/04/18 06:59 06/05/18 16:55 Perfluoroheptanoic acid (PFHpA) **21** Perfluorooctanoic acid (PFOA) 63 2.0 0.75 ng/L 06/04/18 06:59 06/05/18 16:55 06/04/18 06:59 06/05/18 16:55 2.0 Perfluorooctanesulfonic acid 140 1.3 ng/L

Perfluorononanoic acid (PFNA)	ND	2.0	0.65 ng/L	06/04/18 06:59	06/05/18 16:55	1
Isotope Dilution	%Recovery Qualifier	Limits		Prepared	Analyzed	Dil Fac
1802 PFHxS	99	25 - 150		06/04/18 06:59	06/05/18 16:55	1
13C4-PFHpA	98	25 - 150		06/04/18 06:59	06/05/18 16:55	1
13C4 PFOA	106	25 - 150		06/04/18 06:59	06/05/18 16:55	1
13C4 PFOS	97	25 - 150		06/04/18 06:59	06/05/18 16:55	1
13C5 PFNA	103	25 - 150		06/04/18 06:59	06/05/18 16:55	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-13

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

Client Sample ID: 510320.1
Date Collected: 05/11/18 14:50
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	44		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 17:14	1
Perfluorohexanesulfonic acid (PFHxS)	170		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 17:14	1
Perfluoroheptanoic acid (PFHpA)	7.5		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 17:14	1
Perfluorooctanoic acid (PFOA)	62		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 17:14	1
Perfluorooctanesulfonic acid (PFOS)	140		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 17:14	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 17:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	109		25 - 150				06/04/18 06:59	06/05/18 17:14	1
13C4-PFHpA	111		25 - 150				06/04/18 06:59	06/05/18 17:14	1
13C4 PFOA	117		25 - 150				06/04/18 06:59	06/05/18 17:14	1
13C4 PFOS	100		25 - 150				06/04/18 06:59	06/05/18 17:14	1
13C5 PFNA	121		25 - 150				06/04/18 06:59	06/05/18 17:14	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-14

**Matrix: Water** 

TestAmerica Job ID: 320-39517-1

Date Collected: 05/11/18 15:13 Date Received: 05/17/18 11:35

Client Sample ID: 510220.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	55		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 17:32	1
Perfluorohexanesulfonic acid (PFHxS)	210		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 17:32	1
Perfluoroheptanoic acid (PFHpA)	11		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 17:32	1
Perfluorooctanoic acid (PFOA)	83		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 17:32	1
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 17:32	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 17:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	106		25 - 150				06/04/18 06:59	06/05/18 17:32	1
13C4-PFHpA	107		25 - 150				06/04/18 06:59	06/05/18 17:32	1
13C4 PFOA	109		25 - 150				06/04/18 06:59	06/05/18 17:32	1
13C4 PFOS	100		25 - 150				06/04/18 06:59	06/05/18 17:32	1
13C5 PFNA	110		25 - 150				06/04/18 06:59	06/05/18 17:32	1

Client: Shannon & Wilson, Inc

Client Sample ID: 526932 Date Collected: 05/15/18 10:12

Project/Site: FAI

Lab Sample ID: 320-39517-15

Matrix: Water

TestAmerica Job ID: 320-39517-1

Date Received: 05/17/18 11:35

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	17		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 17:50	1
Perfluorohexanesulfonic acid (PFHxS)	27		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 17:50	1
Perfluoroheptanoic acid (PFHpA)	4.6		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 17:50	1
Perfluorooctanoic acid (PFOA)	6.6		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 17:50	1
Perfluorooctanesulfonic acid (PFOS)	60		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 17:50	1
Perfluorononanoic acid (PFNA)	0.76	J	2.0	0.65	ng/L		06/04/18 06:59	06/05/18 17:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				06/04/18 06:59	06/05/18 17:50	1
13C4-PFHpA	103		25 - 150				06/04/18 06:59	06/05/18 17:50	1
13C4 PFOA	111		25 - 150				06/04/18 06:59	06/05/18 17:50	1
13C4 PFOS	102		25 - 150				06/04/18 06:59	06/05/18 17:50	1
13C5 PFNA	116		25 - 150				06/04/18 06:59	06/05/18 17:50	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-16

**Matrix: Water** 

Client Sample ID: 120513
Date Collected: 05/15/18 12:04
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	23		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 18:09	,
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 18:09	,
Perfluoroheptanoic acid (PFHpA)	6.6		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 18:09	•
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 18:09	•
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 18:09	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	106		25 - 150				06/04/18 06:59	06/05/18 18:09	
13C4-PFHpA	109		25 - 150				06/04/18 06:59	06/05/18 18:09	
13C4 PFOA	117		25 - 150				06/04/18 06:59	06/05/18 18:09	
13C5 PFNA	114		25 - 150				06/04/18 06:59	06/05/18 18:09	•
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	450		20	13	ng/L		06/04/18 06:59	06/06/18 09:09	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	95		25 - 150				06/04/18 06:59	06/06/18 09:09	

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-17

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

Date Collected: 05/15/18 12:14 Date Received: 05/17/18 11:35

Client Sample ID: 120413

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	23		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 18:27	1
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 18:27	1
Perfluoroheptanoic acid (PFHpA)	6.8		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 18:27	1
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 18:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 18:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98		25 - 150				06/04/18 06:59	06/05/18 18:27	1
13C4-PFHpA	101		25 - 150				06/04/18 06:59	06/05/18 18:27	1
13C4 PFOA	109		25 - 150				06/04/18 06:59	06/05/18 18:27	1
13C5 PFNA	97		25 - 150				06/04/18 06:59	06/05/18 18:27	1

Method: WS-LC-0025 At1 - F	luorinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	470		20	13	ng/L		06/04/18 06:59	06/06/18 09:27	10
Isotope Dilution  13C4 PFOS	- %Recovery	Qualifier	25 - 150				Prepared	Analyzed 06/06/18 09:27	Dil Fac
1304 FF03	90		25 - 150				00/04/10 00.39	00/00/10 09.21	10

Client: Shannon & Wilson, Inc

Client Sample ID: 174254

Date Collected: 05/16/18 09:45

Date Received: 05/17/18 11:35

Project/Site: FAI

Lab Sample ID: 320-39517-18

**Matrix: Water** 

TestAmerica Job ID: 320-39517-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances Result Qualifier RL **MDL** Unit Dil Fac Analyte D Prepared Analyzed Perfluorobutanesulfonic acid 9.1 2.0 0.92 ng/L 06/04/18 06:59 06/05/18 19:04 (PFBS) 06/04/18 06:59 06/05/18 19:04 Perfluorohexanesulfonic acid 25 2.0 0.87 ng/L (PFHxS) 2.0 0.80 ng/L 06/04/18 06:59 06/05/18 19:04 Perfluoroheptanoic acid (PFHpA) 5.4 2.0 0.75 ng/L 06/04/18 06:59 06/05/18 19:04 Perfluorooctanoic acid (PFOA) 10 2.0 1.3 ng/L 06/04/18 06:59 06/05/18 19:04 Perfluorooctanesulfonic acid 71 (PFOS) Perfluorononanoic acid (PFNA) 1.3 J 2.0 0.65 ng/L 06/04/18 06:59 06/05/18 19:04 Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 1802 PFHxS 100 25 - 150 06/04/18 06:59 06/05/18 19:04 13C4-PFHpA 101 25 - 150 06/04/18 06:59 06/05/18 19:04 13C4 PFOA 25 - 150 06/04/18 06:59 06/05/18 19:04 112 1 13C4 PFOS 98 25 - 150 06/04/18 06:59 06/05/18 19:04 13C5 PFNA 105 25 - 150 06/04/18 06:59 06/05/18 19:04

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-19

TestAmerica Job ID: 320-39517-1

**Matrix: Water** 

Client Sample ID: 542547
Date Collected: 05/16/18 10:29
Date Received: 05/17/18 11:35

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	100		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 19:22	1
Perfluorohexanesulfonic acid (PFHxS)	130		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 19:22	1
Perfluoroheptanoic acid (PFHpA)	34		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 19:22	1
Perfluorooctanoic acid (PFOA)	31		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 19:22	1
Perfluorooctanesulfonic acid (PFOS)	1.9	J	2.0	1.3	ng/L		06/04/18 06:59	06/05/18 19:22	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 19:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	93		25 - 150				06/04/18 06:59	06/05/18 19:22	1
13C4-PFHpA	94		25 - 150				06/04/18 06:59	06/05/18 19:22	1
13C4 PFOA	103		25 - 150				06/04/18 06:59	06/05/18 19:22	1
13C4 PFOS	93		25 - 150				06/04/18 06:59	06/05/18 19:22	1
13C5 PFNA	103		25 - 150				06/04/18 06:59	06/05/18 19:22	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39517-20

Matrix: Water

TestAmerica Job ID: 320-39517-1

Date Collected: 05/16/18 11:12 Date Received: 05/17/18 11:35

Client Sample ID: 152617

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	94		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 19:41	1
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 19:41	1
Perfluoroheptanoic acid (PFHpA)	6.1		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 19:41	1
Perfluorooctanoic acid (PFOA)	6.8		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 19:41	1
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 19:41	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 19:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98		25 - 150				06/04/18 06:59	06/05/18 19:41	1
13C4-PFHpA	104		25 - 150				06/04/18 06:59	06/05/18 19:41	1
13C4 PFOA	109		25 - 150				06/04/18 06:59	06/05/18 19:41	1
13C4 PFOS	99		25 - 150				06/04/18 06:59	06/05/18 19:41	1
13C5 PFNA	106		25 - 150				06/04/18 06:59	06/05/18 19:41	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

_			Perc	ent Isotope	Dilution Re	covery (A
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-39517-1	176095	99	99	103	98	104
320-39517-2	176397	97	97	109	99	107
320-39517-3	173916	104	102	107	100	104
320-39517-4	173860	104	104	110	103	114
320-39517-5	407364	102	102	109	100	108
320-39517-6	407372	100	102	105	99	105
320-39517-7	542512	97	98	105	97	104
320-39517-8	550132	95	96	101	96	102
320-39517-9	153915	94	101	106	93	108
320-39517-10	153907	102	100	112	101	101
320-39517-11	153699	105	103	111	98	105
320-39517-12	510220.1	99	98	106	97	103
320-39517-13	510320.1	109	111	117	100	121
320-39517-14	510220.2	106	107	109	100	110
320-39517-15	526932	102	103	111	102	116
320-39517-16	120513	106	109	117		114
320-39517-16 - DL	120513				95	
320-39517-17	120413	98	101	109		97
320-39517-17 - DL	120413				95	
320-39517-18	174254	100	101	112	98	105
320-39517-19	542547	93	94	103	93	103
320-39517-20	152617	98	104	109	99	106
LCS 320-226898/2-A	Lab Control Sample	101	97	105	101	108
LCSD 320-226898/3-A	Lab Control Sample Dup	93	90	97	92	94
MB 320-226898/1-A	Method Blank	99	96	104	98	104

#### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-39517-1

06/04/18 06:59 06/05/18 08:58

Client: Shannon & Wilson, Inc

Project/Site: FAI

13C5 PFNA

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

104

Lab Sample ID: MB 320-226898/1-A Client Sample ID: Method Blank **Matrix: Water Prep Type: Total/NA** 

Analysis Batch: 227071								Prep Batch:	226898
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/04/18 06:59	06/05/18 08:58	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/04/18 06:59	06/05/18 08:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/04/18 06:59	06/05/18 08:58	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/04/18 06:59	06/05/18 08:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/04/18 06:59	06/05/18 08:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/04/18 06:59	06/05/18 08:58	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				06/04/18 06:59	06/05/18 08:58	1
13C4-PFHpA	96		25 - 150				06/04/18 06:59	06/05/18 08:58	1
13C4 PFOA	104		25 - 150				06/04/18 06:59	06/05/18 08:58	1
13C4 PFOS	98		25 - 150				06/04/18 06:59	06/05/18 08:58	1

Lab Sample ID: LCS 320-226898/2-A **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

25 - 150

**Prep Batch: 226898 Analysis Batch: 227071** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	19.6		ng/L		111	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.1		ng/L		105	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	21.9		ng/L		109	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	20.9		ng/L		105	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	18.7		ng/L		101	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	20.6		ng/L		103	73 - 147	

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	101		25 - 150
13C4-PFHpA	97		25 - 150
13C4 PFOA	105		25 - 150
13C4 PFOS	101		25 - 150
13C5 PFNA	108		25 - 150

Lab Sample ID: LCSD 320-226898/3-A **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA **Prep Batch: 226898** Analysis Batch: 227071

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.4		ng/L		110	72 - 151	1	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.8		ng/L		103	73 - 157	1	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.9		ng/L		109	71 - 138	0	30
Perfluorooctanoic acid (PFOA)	20.0	21.4		ng/L		107	70 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.3		ng/L		99	69 - 144	2	30
Perfluorononanoic acid (PFNA)	20.0	21.3		ng/L		106	73 - 147	3	30

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

1 10,000 0110. 1711			
	LCSD L	.CSD	
Isotope Dilution	%Recovery 0	Qualifier	Limits
1802 PFHxS	93		25 - 150
13C4-PFHpA	90		25 - 150
13C4 PFOA	97		25 - 150
13C4 PFOS	92		25 - 150
13C5 PENA	94		25 - 150

TestAmerica Job ID: 320-39517-1

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TestAmerica Job ID: 320-39517-1

Client: Shannon & Wilson, Inc Project/Site: FAI

# LCMS

### **Prep Batch: 226898**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39517-1	176095	Total/NA	Water	PFAS Prep	
320-39517-2	176397	Total/NA	Water	PFAS Prep	
320-39517-3	173916	Total/NA	Water	PFAS Prep	
320-39517-4	173860	Total/NA	Water	PFAS Prep	
320-39517-5	407364	Total/NA	Water	PFAS Prep	
320-39517-6	407372	Total/NA	Water	PFAS Prep	
320-39517-7	542512	Total/NA	Water	PFAS Prep	
320-39517-8	550132	Total/NA	Water	PFAS Prep	
320-39517-9	153915	Total/NA	Water	PFAS Prep	
320-39517-10	153907	Total/NA	Water	PFAS Prep	
320-39517-11	153699	Total/NA	Water	PFAS Prep	
320-39517-12	510220.1	Total/NA	Water	PFAS Prep	
320-39517-13	510320.1	Total/NA	Water	PFAS Prep	
320-39517-14	510220.2	Total/NA	Water	PFAS Prep	
320-39517-15	526932	Total/NA	Water	PFAS Prep	
320-39517-16	120513	Total/NA	Water	PFAS Prep	
320-39517-16 - DL	120513	Total/NA	Water	PFAS Prep	
320-39517-17	120413	Total/NA	Water	PFAS Prep	
320-39517-17 - DL	120413	Total/NA	Water	PFAS Prep	
320-39517-18	174254	Total/NA	Water	PFAS Prep	
320-39517-19	542547	Total/NA	Water	PFAS Prep	
320-39517-20	152617	Total/NA	Water	PFAS Prep	
MB 320-226898/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-226898/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-226898/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 227071**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39517-1	176095	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-2	176397	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-3	173916	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-4	173860	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-5	407364	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-6	407372	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-7	542512	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-8	550132	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-9	153915	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-10	153907	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-11	153699	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-12	510220.1	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-13	510320.1	Total/NA	Water	WS-LC-0025 At1	226898

TestAmerica Sacramento

# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

# **LCMS (Continued)**

### **Analysis Batch: 227071 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39517-14	510220.2	Total/NA	Water	WS-LC-0025	226898
320-39517-15	526932	Total/NA	Water	At1 WS-LC-0025 At1	226898
320-39517-16	120513	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-17	120413	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-18	174254	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-19	542547	Total/NA	Water	WS-LC-0025 At1	226898
320-39517-20	152617	Total/NA	Water	WS-LC-0025 At1	226898
MB 320-226898/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	226898
LCS 320-226898/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	226898
LCSD 320-226898/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	226898

### **Analysis Batch: 227416**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39517-16 - DL	120513	Total/NA	Water	WS-LC-0025	226898
320-39517-17 - DL	120413	Total/NA	Water	At1 WS-LC-0025 At1	226898

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 176095 Lab Sample ID: 320-39517-1 Date Collected: 05/09/18 15:35 **Matrix: Water** 

Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 09:53	SHK	TAL SAC

Client Sample ID: 176397 Lab Sample ID: 320-39517-2 **Matrix: Water** 

Date Collected: 05/09/18 16:47

Date Received: 05/17/18 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 10:11	SHK	TAL SAC

Client Sample ID: 173916 Lab Sample ID: 320-39517-3 Date Collected: 05/09/18 17:22 **Matrix: Water** 

Date Received: 05/17/18 11:35

Dil Initial Batch Batch Final Batch Prepared **Prep Type** Type Method Run **Factor** Amount Amount Number or Analyzed Analyst Lab Prep Total/NA **PFAS Prep** 1.00 mL 1.66 mL 226898 06/04/18 06:59 TWL TAL SAC Total/NA Analysis WS-LC-0025 At1 227071 06/05/18 10:29 SHK TAL SAC 1

Client Sample ID: 173860 Lab Sample ID: 320-39517-4

Date Collected: 05/09/18 18:28

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 10:48	SHK	TAL SAC

Client Sample ID: 407364 Lab Sample ID: 320-39517-5 Date Collected: 05/10/18 10:38

Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 11:06	SHK	TAL SAC

Lab Sample ID: 320-39517-6 Client Sample ID: 407372 Date Collected: 05/10/18 11:39 **Matrix: Water** 

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 14:47	SHK	TAL SAC

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**Matrix: Water** 

**Matrix: Water** 

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 542512 Lab Sample ID: 320-39517-7 Date Collected: 05/10/18 13:38 **Matrix: Water** 

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 15:05	SHK	TAL SAC

Lab Sample ID: 320-39517-8 Client Sample ID: 550132

Date Collected: 05/11/18 11:31 Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 15:42	SHK	TAL SAC

Client Sample ID: 153915 Lab Sample ID: 320-39517-9 **Matrix: Water** 

Date Collected: 05/11/18 12:26 Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 16:00	SHK	TAL SAC

Client Sample ID: 153907 Lab Sample ID: 320-39517-10 **Matrix: Water** 

Date Collected: 05/11/18 12:47 Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 16:19	SHK	TAL SAC

Lab Sample ID: 320-39517-11 Client Sample ID: 153699 Date Collected: 05/11/18 13:39

Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC

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Client Sample ID: 510220.1 Lab Sample ID: 320-39517-12

227071

06/05/18 16:37 SHK

Date Collected: 05/11/18 14:40 Date Received: 05/17/18 11:35

Analysis

WS-LC-0025 At1

Total/NA

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 16:55	SHK	TAL SAC

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6/6/2018

**Matrix: Water** 

**Matrix: Water** 

TAL SAC

**Matrix: Water** 

Project/Site: FAI

Lab Sample ID: 320-39517-13 Client Sample ID: 510320.1 Date Collected: 05/11/18 14:50

**Matrix: Water** 

Date Received: 05/17/18 11:35

Client: Shannon & Wilson, Inc

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 17:14	SHK	TAL SAC

Lab Sample ID: 320-39517-14 Client Sample ID: 510220.2

Date Collected: 05/11/18 15:13 **Matrix: Water** 

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 17:32	SHK	TAL SAC

Client Sample ID: 526932 Lab Sample ID: 320-39517-15

Date Collected: 05/15/18 10:12 **Matrix: Water** Date Received: 05/17/18 11:35

Batch Dil Initial Batch Batch Final Prepared Method or Analyzed **Prep Type** Type Run **Factor** Amount **Amount** Number Analyst Total/NA Prep **PFAS Prep** 1.00 mL 1.66 mL 226898 06/04/18 06:59 TWL TAL SAC Total/NA Analysis WS-LC-0025 At1 1 227071 06/05/18 17:50 SHK TAL SAC

Client Sample ID: 120513 Lab Sample ID: 320-39517-16 **Matrix: Water** 

Date Collected: 05/15/18 12:04 Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 18:09	SHK	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			227416	06/06/18 09:09	SHK	TAL SAC

Lab Sample ID: 320-39517-17 Client Sample ID: 120413 Date Collected: 05/15/18 12:14

Date Received: 05/17/18 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 18:27	SHK	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			227416	06/06/18 09:27	SHK	TAL SAC

TestAmerica Sacramento

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Client Sample ID: 174254

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID: 320-39517-18

. Matrix: Water

Date Collected: 05/16/18 09:45 Date Received: 05/17/18 11:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 19:04	SHK	TAL SAC

Client Sample ID: 542547 Lab Sample ID: 320-39517-19

Date Collected: 05/16/18 10:29 Matrix: Water

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 19:22	SHK	TAL SAC

Client Sample ID: 152617 Lab Sample ID: 320-39517-20

Date Collected: 05/16/18 11:12 Matrix: Water

Date Received: 05/17/18 11:35

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	226898	06/04/18 06:59	TWL	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			227071	06/05/18 19:41	SHK	TAL SAC

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

### **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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39517-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39517-1	176095	Water	05/09/18 15:35	05/17/18 11:35
320-39517-2	176397	Water	05/09/18 16:47 0	05/17/18 11:35
320-39517-3	173916	Water	05/09/18 17:22 0	05/17/18 11:35
320-39517-4	173860	Water	05/09/18 18:28 0	05/17/18 11:35
320-39517-5	407364	Water	05/10/18 10:38 0	05/17/18 11:35
320-39517-6	407372	Water	05/10/18 11:39 0	05/17/18 11:35
320-39517-7	542512	Water	05/10/18 13:38 0	05/17/18 11:35
320-39517-8	550132	Water	05/11/18 11:31 0	05/17/18 11:35
320-39517-9	153915	Water	05/11/18 12:26 0	05/17/18 11:35
320-39517-10	153907	Water	05/11/18 12:47 0	05/17/18 11:35
320-39517-11	153699	Water	05/11/18 13:39 0	05/17/18 11:35
320-39517-12	510220.1	Water	05/11/18 14:40 0	05/17/18 11:35
320-39517-13	510320.1	Water	05/11/18 14:50 0	05/17/18 11:35
320-39517-14	510220.2	Water	05/11/18 15:13 0	05/17/18 11:35
320-39517-15	526932	Water	05/15/18 10:12 0	05/17/18 11:35
320-39517-16	120513	Water	05/15/18 12:04 0	05/17/18 11:35
320-39517-17	120413	Water	05/15/18 12:14 0	05/17/18 11:35
320-39517-18	174254	Water	05/16/18 09:45 0	05/17/18 11:35
320-39517-19	542547	Water	05/16/18 10:29 0	05/17/18 11:35
320-39517-20	152617	Water	05/16/18 11:12 0	05/17/18 11:35

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Laboratory Test America			Seale la constant	Remarks/Matrix	2 Greendwater	2	a	8	2.	R	Q	2	2	φ	y: 2. Relinquished By: 3.	Signature: Time:	Printed Name: Date:		Company:	2. Received By: 3.	Time:	Date:		of Custody
ECORD	Auri		/	///	,										Relinquished By:	Signature. Time:	Printed Name: Date:		Company:	Received By:	Signature	Printed		Compa 320-39517 Chain of Custody
AIN-OF-CUSTODY RECORD		Co !!		1000	_	×	×	×	XXX	XX	XXX	× ×	×	×	Relinquished By: 1.	Signature: 2 1 Time: 16:50	Project Name Date 5/16/18	Craid Seep	Shannart W. BURTR	Received By: 1.	Signature/// Time: [15]	Printed Name; Date: 5/17/16	Douglitz	company TH Sac
S	er Drive 2705 Saint Andrews Loop, Suite A 5-3564 Pasco, WA 99301-3378 (509) 946-6309	et, Suite 3 18	t, Suite 200	Time Sc	81/6/5   5/6/18	1647 5/9/18	1722 511/18	81/6/5 8881	1038 5/10/16	1139 5/10/1	1338 5/10/18	11:31 5/11/18	12:26 5/11/18	13:47 5/11/18	Sample Receipt	Total Number of Containers	COC Seals/Intact? Y/N (NA)		(attagh shipping bill, if any)	St	y Pa		201	White - w/shipment - returned to Shannon & Wilson w/ laboratory report. Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	eet, Suite 100	7355 Hill Road 5430 Fairbanks Street, Suite 3 Fairbanks, AK 99709 Anchorage, AK 99518 (907) 561-2120	2255 S.W. Canyon Road 1321 Bannock Street, Suite 200 Portland, OR 97201-2498 Denver, CO 80204 (503) 223-6147 (303) 825-3800	ple Identity	176095	176397	173916	173860	407364	407373	Syasia	550132	153915	153907	Project Information	Project Number:314-20060 Total	Project Name: FTA COC	- A	Sampler: CAR, Art.M (attag	Instructions	Requested Turnaround Time: Standard	Special Instructions: Please Dill to	31-1-20060-00	Distribution: White - w/shipment - returned to Shannor Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File

က က် Trond wat of America Alltorker Remarks/Matrix Relinquished By: Page 2 Date: Date: Received By: Sequence to legal Laboratory Test Printed Name: Printed Name Company Signature Company Signature Analysis Parameters/Sample Container Description do d R 3 ch a 3 C B 9 ri d (include preservative if used) Relinquished By: Date: Date: Received By: CHAIN-OF-CUSTODY RECORD Printed Name Printed Name Signature Company Signature Company 4 55 to 100 35 Date: **9/6/19** Spannent Wilson, Inc Date: 1/1/1/ ime: 16.50 Relinquished By: 45a Received By: Crain Beebl X X mobile X X × × Dung( × X X X X Signature: Company: 2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309 5/15/18 8/19/18 5/15/18 O:29 5/16/18 Date 8//1/8 81/11/5 2/11/18 5/11/18 White - w/shipment - returned to Shannon & Wilson w/ laboratory report 5/15/ 20 Received Good Cond./Cold 5.1 Sample Receipt COC Seals/Intact? Y/N/NA Total Number of Containers 074 204 710 1450 54.60 Time 513 Delivery Method: 31-1-20060-00 1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800 5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120 2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660 I SHANNON & WILSON, INC. Geotechnical and Environmental Consultants Please bill to Requested Turnaround Time: Standard Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File Lab No. Instructions Project Number: 31-1-2000 Ongoing Project? Yes I No Project Information ARK 400 N. 34th Street, Suite 100 Seattle, WA 98103 C.OCCO 933 Sample Identity Project Name: FIA 2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147 Special Instructions: 510320, 510220, 542547 53699 Contact: MDN Sampler: CAB, 44054 2355 Hill Road Fairbanks, AK 99709 30 % (907) 479-0600 (206) 632-8020 0 **Distribution**: 8

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Laboratory Test America		Septimino Paris	2 Grandwater			2. Relinquished By: 3.	Signature: Time:	Printed Name: Date:	Company:	2. Received By: 3.	Signature: Time:	Printed Name. Date:	Company:
	Attn: Agyris Analysis Parameters/Sample Container Description (include preservative it used)	X.				Relinquished By:	Signature: Time:	Printed Name: Date:	Company:	Received By:	Signature: Time:	Printed Name: Date:	Company
CHAIN-OF-CUSTODY RECORD		9 \$ 5 × 130 00 00 00 00 00 00 00 00 00 00 00 00 0				Relinquished By: 1.	Signature R Time: 16:50	Printed Name. Date: 5/16/18		Received By: 1,	Signatuse [[J]	Printed Name: Date 5/71/10	Company: WS an
	Center Drive 2705 Saint Andrews Loop, Suite A 3146-3564 Pasco, WA 99301-3378 (509) 946-6309	5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120 1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800	II. 2			Sample Receipt		NA) 7. (2	Delivery Method:	tions	dare	1 P. OO.	o Shannon & Wilson w/ laboratory report
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	400 N. 34th Street, Suite 100 2043 Westport Center Drive Seattle, WA 98103 St. Louis, MO 63146-3564 (206) 632-8020 (314) 699-9660	Fairbanks, AK 99709 Fairba				Project Information	1-1-20060		Ongoing Project? Yes You Do Co	Instructions	Requested Turnaround Time: Standare	Special Instructions: Please 5:11 to.	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report professional wayshipment - for consignee files prints - Shannon & Wilson whitehouse in the Electron Community of th

Client: Shannon & Wilson, Inc Job Number: 320-39517-1

Login Number: 39517 List Source: TestAmerica Sacramento

List Number: 1

**Creator: Turpen, Troy** 

Creator. Turpen, Troy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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?	False	
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	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Amber Masters
Title:
Environmental Scientist
Date:
January 30, 2019
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
June 6, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-39517-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	)-3951	17-1			
1.	Labo	<u>ratory</u>			
	a.	Did an ADI	EC CS approved	laboratory receive and <u>perform</u> all of the submitted sample analyses?	
		O Yes	<ul><li>No</li></ul>	Comments:	
	ce	rtified for per	fluorinated alky	lytical laboratory for analysis of PFASs. However, the laboratory is l acids in drinking water analysis by the National Environmental am (NELAP) in Oregon.	
			1	sferred to another "network" laboratory or sub-contracted to an the laboratory performing the analyses ADEC CS approved?	
		O Yes	No	Comments:	
	N/	A; all analys	es were performe	ed by TestAmerica Laboratories, Inc. in West Sacramento, CA.	
2.	Chair	n of Custody	(CoC)		
	a.	CoC inform	nation completed	, signed, and dated (including released/received by)?	
		Yes	O No	Comments:	
	b.	Correct Ana	alyses requested?		
		Yes	O No	Comments:	
3.	<u>Labo</u>	ratory Sampl	e Receipt Docum	nentation	
	a.	Sample/coo	ler temperature o	documented and within range at receipt (0° to 6° C)?	
		Yes	O No	Comments:	
	b.	1 1	servation accepta lorinated Solven	able – acidified waters, Methanol preserved VOC soil (GRO, BTEX, ts, etc.)?	
		Yes	O No	Comments:	
	Aı	nalysis of PF	ASs does not req	uire a preservative other than temperature control.	
	c.	Sample con	dition document	ed – broken, leaking (Methanol), zero headspace (VOC vials)?	
		Yes	O No	Comments:	

The sample receipt form notes that the samples were received in good condition.

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	c.?		sing
Yes	O No	Comments:	
		istody seals as "N/A" and notes that the field samplers' names warment appears to be in error as the field sampler initials are prese	
e. Data quality	y or usability affe	ected?	
		Comments:	
The data qualit	y and/or usability	y is not affected; see above.	
Case Narrativ	<u>e</u>		
a. Present an	d understandable	??	
© Yes	© No	Comments:	
b. Discrepand	cies, errors, or Q	C failures identified by the lab?	
Yes	O No	Comments:	
		mples arrived in good condition, properly preserved, and that the ler upon receipt at the laboratory was 5.1° C.	<del></del>
		was insufficient sample volume available to perform a matrix sp ) associated with preparation batch 320-226898.	ike
c. Were all c	orrective actions	documented?	
O Yes	No	Comments:	
There were no	corrective action	ns documented in the case narrative.	
d. What is th	e effect on data c	quality/usability according to the case narrative?	
		Comments:	
The case narra	ative does not no	te an effect on data quality.	
amples Results			
ampies results			
-	alvses nerformed	d/reported as requested on COC?	

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	11	le holding times	
	Yes	O No	Comments:
an	•		e water samples were analyzed using direct injection and in-line for analysis using direct aqueous injection (DAI) was met for all
c.	All soils rep	orted on a dry w	eight basis?
·	O Yes	• No	Comments:
N/	A; soil sampl	es were not subr	mitted with this work order.
d.	Are the reporthe project?	orted LOQs less	than the Cleanup Level or the minimum required detection level for
	Yes	O No	Comments:
dri	nking water l	nealth advisory l	tAmerica Reporting Limit (RL), is less than applicable EPA lifetime evels and ADEC groundwater cleanup levels for PFOS and PFOA.
e.	Data quality	or usability affe	cted?
	O Yes	• No	Comments:
Th	e data quality	and usability w	ere not affected.
C Sa	<u>imples</u>		
a.	Method Blan	nk	
	i. One	method blank re	ported per matrix, analysis and 20 samples?
	• Yes	O No	Comments:
	ii. All n	nethod blank res	ults less than limit of quantitation (LOQ)?
	• Yes	O No	Comments:
	iii. If ab	ove LOQ, what	samples are affected?
			Comments:
No	one; PFAS co	mpounds were n	ot detected in method blank sample.
	iv. Do tl	ne affected samp	ele(s) have data flags? If so, are the data flags clearly defined?
	O Yes	No	Comments:

V.	Data	quality or usa	ability affected?	
			Comments	:
The data q	uality	and/or usabi	lity are not affected.	
b. Labora	tory (	Control Samp	le/Duplicate (LCS/LCS	D)
i.	_		CS/LCSD reported per rethods, LCS required p	matrix, analysis and 20 samples? (LCS/LCSD er SW846)
•	Yes	O No	Comments	:
ii.		ls/Inorganics amples?	– one LCS and one sam	aple duplicate reported per matrix, analysis and
0	Yes	No	Comments	:
Metals and	l inor	ganics were n	ot analyzed as part of th	is work order.
iii.	And	project specif	ied DQOs, if applicable	eported and within method or laboratory limits? e. (AK Petroleum methods: AK101 60%-120%, ll other analyses see the laboratory QC pages)
•	Yes	O No	Comments	:
iv.	labor LCS	ratory limits? /LCSD, MS/N	And project specified D	s (RPD) reported and less than method or PQOs, if applicable. RPD reported from apple duplicate. (AK Petroleum methods 20%; all s)
<b>⊙</b> '	Yes	O No	Comments	:
V.	If %I	R or RPD is o	utside of acceptable lim	its, what samples are affected?
			Comm	nents:
None; anal	lytica	l accuracy and	d precision were within	acceptable limits.
vi.	Do th	ne affected sai	mple(s) have data flags?	If so, are the data flags clearly defined?
0	Yes	• No	Comments	;
Qualificati	ion of	the data was	not required; see above	

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and/or usability are not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
• Yes • No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>
• Yes • No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
○ Yes • No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and/or usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
© Yes © No Comments:
PFASs are not volatile compounds; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
C Yes No Comments:
N/A; a trip blank is not required.

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iii. All r	results less than LOQ?									
O Yes	No	Comments:								
N/A; a trip blan	nk is not required.									
iv. If ab	ove LOQ, what samples	are affected?								
		Comments:								
None; a trip bla	ink was not submitted wi	th this work order.								
v. Data	quality or usability affect	cted?								
		Comments:								
The data quality	y and usability were not a	affected; see above.								
e. Field Duplic	cate									
i. One	field duplicate submitted	d per matrix, analysis and 10 project samples?								
Yes	O No	Comments:								
ii. Subr	ii. Submitted blind to lab?									
• Yes	O No	Comments:								
The field duplic order	cate pairs 510220.1 / 510	320.1 and 120413 / 120513 were submitted with this work								
	commended: 30% water, RPD (%) = Absolut	te value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ $R_1 = \text{Sample Concentration}$								
		$R_2$ = Field Duplicate Concentration								
© Yes	<b>⊙</b> No	Comments:								
_		ween the PFHpA results of the field duplicate samples e recommended DQO of 30%.								
iv. Data	quality or usability affect	cted? (Use the comment box to explain why or why not.)								
		Comments:								

The PFHpA results of the field duplicate samples 510220.1 and 510320.1 are considered estimated and flagged 'J' to identify the imprecision.

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July 2017

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No Not Applicable
Samples for this project are not collected with reusable equipment; therefore, a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
O Yes O No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
O Yes O No Comments:
There were no additional flags/qualifiers required for this work order.



# THE LEADER IN ENVIRONMENTAL TESTING

**TestAmerica** 

# ANALYTICAL REPORT

### TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

### TestAmerica Job ID: 320-39845-1

TestAmerica Sample Delivery Group: 20060-001

Client Project/Site: FAI

Revision: 1

#### For:

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

Attn: Marcy Nadel



Authorized for release by: 6/15/2018 10:31:40 AM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

**Review your project** results through Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-39845-1 SDG: 20060-001

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

### **Qualifiers**

### **LCMS**

Qualifier	Qualifier Description
-----------	-----------------------

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### **Glossary**

Abbreviation	previation 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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

TestAmerica Sacramento

### **Case Narrative**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

Job ID: 320-39845-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-39845-1

#### Receipt

The samples were received on 5/30/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

#### **LCMS**

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

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-228082.

Method(s) PFAS Prep: Samples 153982 (320-39845-2), 120227 (320-39845-3), 375896 (320-39845-4), 152471 (320-39845-5) and 120782 (320-39845-6) in preparation batch 320-228082 were observed to be a light orange color.

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

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

Lab Sample ID: 320-39845-1

Lab Sample ID: 320-39845-2

Lab Sample ID: 320-39845-3

SDG: 20060-001

# Client Sample ID: 153419

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac I	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	23	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.0	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	30	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	0.66 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

# Client Sample ID: 153982

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	16	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	51	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.8	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	6.6	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	81	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	0.99 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

### Client Sample ID: 120227

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.1	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.7	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	6.0	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	250	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

### Client Sample ID: 375896

Client Sample ID: 375896						Lab Sample ID: 320-39845-4			
Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type		
Perfluorobutanesulfonic acid (PFBS)	11	2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA		
Perfluorohexanesulfonic acid (PFHxS)	46	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA		
Perfluoroheptanoic acid (PFHpA)	6.3	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA		
Perfluorooctanoic acid (PFOA)	8.6	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA		
Perfluorooctanesulfonic acid (PFOS)	91	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA		

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client: Shannon & Wilson, Inc Project/Site: FAI

Client Sample ID: 152471

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Lab Sample II	D: 320-39845-4
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorononanoic acid (PFNA)	1.2	J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

# Lab Sample ID: 320-39845-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.2	2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	22	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.7	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.3	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	74	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	0.95 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

### Client Sample ID: 120782 Lab Sample ID: 320-39845-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.9		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

### Client Sample ID: 120782-EB Lab Sample ID: 320-39845-7

No Detections.

This Detection Summary does not include radiochemical test results.

6/15/2018 (Rev. 1)

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Client Sample ID: 153419

Lab Sample ID: 320-39845-1 Matrix:

Date Collected: 05/24/18 12:05 Date Received: 05/30/18 09:30

W	at	er	

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	23		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 19:42	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 19:42	1
Perfluoroheptanoic acid (PFHpA)	9.0		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 19:42	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 19:42	1
Perfluorooctanesulfonic acid (PFOS)	30		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 19:42	1
Perfluorononanoic acid (PFNA)	0.66	J	2.0	0.65	ng/L		06/08/18 12:05	06/11/18 19:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				06/08/18 12:05	06/11/18 19:42	1
13C4-PFHpA	108		25 - 150				06/08/18 12:05	06/11/18 19:42	1
13C4 PFOA	111		25 - 150				06/08/18 12:05	06/11/18 19:42	1
13C4 PFOS	97		25 - 150				06/08/18 12:05	06/11/18 19:42	1
13C5 PFNA	105		25 - 150				06/08/18 12:05	06/11/18 19:42	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1 SDG: 20060-001

Client Sample ID: 153982

Lab Sample ID: 320-39845-2

**Matrix: Water** 

Date Collected: 05/24/18 11:40 Date Received: 05/30/18 09:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	16		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 20:00	1
Perfluorohexanesulfonic acid (PFHxS)	51		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 20:00	1
Perfluoroheptanoic acid (PFHpA)	6.8		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 20:00	1
Perfluorooctanoic acid (PFOA)	6.6		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 20:00	1
Perfluorooctanesulfonic acid (PFOS)	81		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 20:00	1
Perfluorononanoic acid (PFNA)	0.99	J	2.0	0.65	ng/L		06/08/18 12:05	06/11/18 20:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	109		25 - 150				06/08/18 12:05	06/11/18 20:00	1
13C4-PFHpA	107		25 - 150				06/08/18 12:05	06/11/18 20:00	1
13C4 PFOA	116		25 - 150				06/08/18 12:05	06/11/18 20:00	1
13C4 PFOS	102		25 - 150				06/08/18 12:05	06/11/18 20:00	1
13C5 PFNA	108		25 - 150				06/08/18 12:05	06/11/18 20:00	1

Client: Shannon & Wilson, Inc

Client Sample ID: 120227

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

Lab Sample ID: 320-39845-3

Date Collected: 05/24/18 10:29 **Matrix: Water** Date Received: 05/30/18 09:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.1		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 20:18	1
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 20:18	1
Perfluoroheptanoic acid (PFHpA)	4.7		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 20:18	1
Perfluorooctanoic acid (PFOA)	6.0		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 20:18	1
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 20:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/08/18 12:05	06/11/18 20:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				06/08/18 12:05	06/11/18 20:18	1
13C4-PFHpA	108		25 - 150				06/08/18 12:05	06/11/18 20:18	1
13C4 PFOA	112		25 - 150				06/08/18 12:05	06/11/18 20:18	1
13C4 PFOS	97		25 - 150				06/08/18 12:05	06/11/18 20:18	1
13C5 PFNA	104		25 - 150				06/08/18 12:05	06/11/18 20:18	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Client Sample ID: 375896

Lab Sample ID: 320-39845-4

**Matrix: Water** 

Date Collected: 05/24/18 11:16 Date Received: 05/30/18 09:30

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	11		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 20:37	1
Perfluorohexanesulfonic acid (PFHxS)	46		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 20:37	1
Perfluoroheptanoic acid (PFHpA)	6.3		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 20:37	1
Perfluorooctanoic acid (PFOA)	8.6		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 20:37	1
Perfluorooctanesulfonic acid (PFOS)	91		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 20:37	1
Perfluorononanoic acid (PFNA)	1.2	J	2.0	0.65	ng/L		06/08/18 12:05	06/11/18 20:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	103		25 - 150				06/08/18 12:05	06/11/18 20:37	1
13C4-PFHpA	104		25 - 150				06/08/18 12:05	06/11/18 20:37	1
13C4 PFOA	107		25 - 150				06/08/18 12:05	06/11/18 20:37	1
13C4 PFOS	96		25 - 150				06/08/18 12:05	06/11/18 20:37	1
13C5 PFNA	102		25 - 150				06/08/18 12:05	06/11/18 20:37	1

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Client: Shannon & Wilson, Inc

Date Received: 05/30/18 09:30

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

Client Sample ID: 152471 Lab Sample ID: 320-39845-5 Date Collected: 05/24/18 09:16

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.2		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 20:55	1
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 20:55	1
Perfluoroheptanoic acid (PFHpA)	3.7		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 20:55	1
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 20:55	1
Perfluorooctanesulfonic acid (PFOS)	74		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 20:55	1
Perfluorononanoic acid (PFNA)	0.95	J	2.0	0.65	ng/L		06/08/18 12:05	06/11/18 20:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				06/08/18 12:05	06/11/18 20:55	1
13C4-PFHpA	110		25 - 150				06/08/18 12:05	06/11/18 20:55	1
13C4 PFOA	108		25 - 150				06/08/18 12:05	06/11/18 20:55	1
13C4 PFOS	102		25 - 150				06/08/18 12:05	06/11/18 20:55	1
13C5 PFNA	105		25 - 150				06/08/18 12:05	06/11/18 20:55	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

Client Sample ID: 120782 Lab Sample ID: 320-39845-6 Date Collected: 05/29/18 16:49 **Matrix: Water** 

Date Received: 05/30/18 09:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		06/08/18 12:05	06/11/18 21:13	1
Perfluorohexanesulfonic acid (PFHxS)	6.9		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 21:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 21:13	1
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 21:13	1
Perfluorooctanesulfonic acid (PFOS)	4.8		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 21:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/08/18 12:05	06/11/18 21:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				06/08/18 12:05	06/11/18 21:13	1
13C4-PFHpA	105		25 - 150				06/08/18 12:05	06/11/18 21:13	1
13C4 PFOA	114		25 - 150				06/08/18 12:05	06/11/18 21:13	1
13C4 PFOS	104		25 - 150				06/08/18 12:05	06/11/18 21:13	1
13C5 PFNA	112		25 - 150				06/08/18 12:05	06/11/18 21:13	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-39845-1 Project/Site: FAI SDG: 20060-001

Client Sample ID: 120782-EB

Lab Sample ID: 320-39845-7 Date Collected: 05/29/18 17:00 **Matrix: Water** 

Date Received: 05/30/18 09:30

Method: WS-LC-0025 At1 - Flu	orinated A	kyl Subst	ances						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/08/18 12:05	06/11/18 21:32	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/08/18 12:05	06/11/18 21:32	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/08/18 12:05	06/11/18 21:32	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/08/18 12:05	06/11/18 21:32	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/08/18 12:05	06/11/18 21:32	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/08/18 12:05	06/11/18 21:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				06/08/18 12:05	06/11/18 21:32	1
13C4-PFHpA	101		25 - 150				06/08/18 12:05	06/11/18 21:32	1
13C4 PFOA	110		25 - 150				06/08/18 12:05	06/11/18 21:32	1
13C4 PFOS	100		25 - 150				06/08/18 12:05	06/11/18 21:32	1
13C5 PFNA	98		25 - 150				06/08/18 12:05	06/11/18 21:32	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

_			Perce	ent Isotope	Dilution Re	covery (Ac
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-39845-1	153419	102	108	111	97	105
320-39845-2	153982	109	107	116	102	108
320-39845-3	120227	107	108	112	97	104
320-39845-4	375896	103	104	107	96	102
320-39845-5	152471	104	110	108	102	105
320-39845-6	120782	105	105	114	104	112
320-39845-7	120782-EB	102	101	110	100	98
LCS 320-228082/2-A	Lab Control Sample	98	98	108	99	101
LCSD 320-228082/3-A	Lab Control Sample Dup	101	105	102	98	102
MB 320-228082/1-A	Method Blank	98	100	102	94	101

### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

TestAmerica Job ID: 320-39845-1

Client: Shannon & Wilson, Inc Project/Site: FAI SDG: 20060-001

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

MR MR

Lab Sample ID: MB 320-228082/1-A

**Matrix: Water** 

Analysis Batch: 228511

**Client Sample ID: Method Blank Prep Type: Total/NA** 

Prep Batch: 228082

Analyte	Result Qualifie	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.92	ng/L		06/08/18 12:05	06/11/18 18:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	0.87	ng/L		06/08/18 12:05	06/11/18 18:46	1
Perfluoroheptanoic acid (PFHpA)	ND	2.0	0.80	ng/L		06/08/18 12:05	06/11/18 18:46	1
Perfluorooctanoic acid (PFOA)	ND	2.0	0.75	ng/L		06/08/18 12:05	06/11/18 18:46	1
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	1.3	ng/L		06/08/18 12:05	06/11/18 18:46	1
Perfluorononanoic acid (PFNA)	ND	2.0	0.65	ng/L		06/08/18 12:05	06/11/18 18:46	1
	MB MB							

Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 1802 PFHxS 98 25 - 150 <u>06/08/18 12:05</u> <u>06/11/18 18:46</u> 13C4-PFHpA 100 25 - 150 06/08/18 12:05 06/11/18 18:46 13C4 PFOA 102 25 - 150 06/08/18 12:05 06/11/18 18:46 25 - 150 13C4 PFOS 94 06/08/18 12:05 06/11/18 18:46 13C5 PFNA 101 25 - 150 06/08/18 12:05 06/11/18 18:46

Lab Sample ID: LCS 320-228082/2-A

Lab Sample ID: LCSD 320-228082/3-A

**Matrix: Water** 

Analysis Batch: 228511

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

Prep Batch: 228082

	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier l	Jnit	D %Red	Limits	
Perfluorobutanesulfonic acid	17.7	20.1	r	ng/L	114	72 - 151	
(PFBS)							
Perfluorohexanesulfonic acid	18.2	19.5	r	ng/L	107	7 73 - 157	
(PFHxS)							
Perfluoroheptanoic acid (PFHpA)	20.0	21.8	r	ng/L	109	9 71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	20.8	r	ng/L	104	4 70 - 140	
Perfluorooctanesulfonic acid	18.6	19.7	r	ng/L	106	69 - 144	
(PFOS)							
Perfluorononanoic acid (PFNA)	20.0	21.7	r	ng/L	109	9 73 - 147	

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	98		25 - 150
13C4-PFHpA	98		25 - 150
13C4 PFOA	108		25 - 150
13C4 PFOS	99		25 - 150
13C5 PFNA	101		25 - 150

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

**Matrix: Water** Prep Type: Total/NA Analysis Batch: 228511 **Prep Batch: 228082** 

7 thatyolo Batom 220011						400 <b></b>	
	Spike	LCSD LC	SD		%Rec.		RPD
Analyte	Added	Result Qu	ualifier Unit	D %Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.0	ng/L		72 - 151	6	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.1	ng/L	99	73 - 157	8	30
Perfluoroheptanoic acid (PFHpA)	20.0	20.3	ng/L	102	71 - 138	7	30
Perfluorooctanoic acid (PFOA)	20.0	20.9	ng/L	105	70 - 140	0	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.5	ng/L	99	69 - 144	7	30
Perfluorononanoic acid (PFNA)	20.0	21.5	ng/L	108	73 - 147	1	30

TestAmerica Sacramento

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	101		25 - 150
13C4-PFHpA	105		25 - 150
13C4 PFOA	102		25 - 150
13C4 PFOS	98		25 - 150
13C5 PFNA	102		25 - 150

# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1 SDG: 20060-001

# LCMS

# **Prep Batch: 228082**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39845-1	153419	Total/NA	Water	PFAS Prep	
320-39845-2	153982	Total/NA	Water	PFAS Prep	
320-39845-3	120227	Total/NA	Water	PFAS Prep	
320-39845-4	375896	Total/NA	Water	PFAS Prep	
320-39845-5	152471	Total/NA	Water	PFAS Prep	
320-39845-6	120782	Total/NA	Water	PFAS Prep	
320-39845-7	120782-EB	Total/NA	Water	PFAS Prep	
MB 320-228082/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-228082/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-228082/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 228511**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39845-1	153419	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-2	153982	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-3	120227	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-4	375896	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-5	152471	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-6	120782	Total/NA	Water	WS-LC-0025 At1	228082
320-39845-7	120782-EB	Total/NA	Water	WS-LC-0025 At1	228082
MB 320-228082/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	228082
LCS 320-228082/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	228082
LCSD 320-228082/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	228082

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TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Client Sample ID: 153419

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-39845-1

Date Collected: 05/24/18 12:05 Date Received: 05/30/18 09:30

**Matrix: Water** 

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 19:42	SHK	TAL SAC

Lab Sample ID: 320-39845-2 Client Sample ID: 153982 Date Collected: 05/24/18 11:40

**Matrix: Water** 

Date Received: 05/30/18 09:30

<del>_</del>	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 20:00	SHK	TAL SAC

Client Sample ID: 120227 Lab Sample ID: 320-39845-3

**Matrix: Water** 

Date Collected: 05/24/18 10:29 Date Received: 05/30/18 09:30

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 20:18	SHK	TAL SAC

Client Sample ID: 375896 Lab Sample ID: 320-39845-4 **Matrix: Water** 

Date Collected: 05/24/18 11:16

Date Received: 05/30/18 09:30

_	Batch	Batch	_	Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 20:37	SHK	TAL SAC

Client Sample ID: 152471 Lab Sample ID: 320-39845-5 Date Collected: 05/24/18 09:16

Date Received: 05/30/18 09:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 20:55	SHK	TAL SAC

Client Sample ID: 120782 Lab Sample ID: 320-39845-6 Date Collected: 05/29/18 16:49 **Matrix: Water** 

Date Received: 05/30/18 09:30

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 21:13	SHK	TAL SAC

TestAmerica Sacramento

**Matrix: Water** 

# **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Client Sample ID: 120782-EB Lab Sample ID: 320-39845-7

Date Collected: 05/29/18 17:00 Matrix: Water

Date Collected: 05/29/18 17:00 Matrix: Water Date Received: 05/30/18 09:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	228082	06/08/18 12:05	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			228511	06/11/18 21:32	SHK	TAL SAC

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc
Project/Site: FAI

TestAmerica Job ID: 320-39845-1
SDG: 20060-001

# **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	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1

SDG: 20060-001

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-39845-1 SDG: 20060-001

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39845-1	153419	Water	05/24/18 12:05	05/30/18 09:30
320-39845-2	153982	Water	05/24/18 11:40	05/30/18 09:30
320-39845-3	120227	Water	05/24/18 10:29	05/30/18 09:30
320-39845-4	375896	Water	05/24/18 11:16	05/30/18 09:30
320-39845-5	152471	Water	05/24/18 09:16	05/30/18 09:30
320-39845-6	120782	Water	05/29/18 16:49	05/30/18 09:30
320-39845-7	120782-EB	Water	05/29/18 17:00	05/30/18 09:30

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SHANNON & WILSON, INC.	fILSON, INC.	CHAIN	CHAIN-OF-CUSTODY RECORD	Y REC	ORD	Labor	Laboratory Lest America
00 N. 34th Street, Suite 100 2043 We eattle, WA 96103 St. Louis 206),632-8020 (314) 69	2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660	2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309	pp, Suite A	Analysis I	Analysis Parameters/Sample Container Description	Container D	Description
355 Hill Road 5430 Fairbanks airbanks, AK 99709 Anchorage, AK 907) 479-0600 (907) 561-2120	5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120			(9)			
255 S.W. Canyon Road 1321 Ba ortland, OR 97201-2498 Denver, 503) 223-6147 (303) 823	1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800	otec	DS ASS	1	1	/	Sallena Sallena
Sample Identity	Lab No.	Time Sampled	18 10 100 N		1		Remarks/Matrix
151688		1205 SIZU					2 groundwater
153982		1140 S/24/18	X X X				رد در
120227		1029 5/21/	X X X				CA
375896		1116 5/24	X X X				(8
152471		14518 di PO	18 X X				8
120782		1649 51291	XX				a
120182-EB		1700 Slag	XX XI				173
Project Information	Samp	Sample Receipt	Relinquished By:		Relinquished By:	By: 2.	Relinquished By: 3.
Project Number: 20066-06	Total Number of Containers	f Containers 12	Signature: Time: S	8	Signature: Tir	lime:	Signature: Time:
Project Name: F/A   Contact: MD N	COC Seals/Intact? Y/N/NA Received Good Cond./Cold	ct? Y/N/NA	Mes	Date: Staff Prin	Printed Name: Da	Date:	Printed Name: Date:
Ongoing Project? Yes 🖄 No Sampler: 🕂 🗥	Gold Strace (attach shipping bill, if any)	d: Sill, if any)	Shannon + Lu. Ison, 201	j	Company		Company:
sul	Instructions		Received By:	÷	Received By:	2	Received By: 3.
Requested Turnaround Time:	Standord		Signature/ (h. Time: -	Sign Sign	Signature: Ti	ime:	Signature: Time:
			Printed Name: L Date: S	Date: \$150/14 Prin	Printed Name: Di	Date:	Printed Name: Date:
Distribution: W Ye Pi		oratory report	Company	Con	Company		Company:
320-39845 Chain of Custody	of Custody						

F-19-91/UR

Client: Shannon & Wilson, Inc

Job Number: 320-39845-1 SDG Number: 20060-001

Login Number: 39845 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Creator, Neison, Kylli D		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	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.	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	

# **Laboratory Data Review Checklist**

Completed By:
Kristen Freiburger
Title:
Senior Chemist
Date:
June 19, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
June 15, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-39845-1 REV1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

**July 2017** Page 1

1. <u>I</u>	_aboratory				
	a Did a	an ADI	EC CS approve	ed laborators	y receive and <u>perform</u> all of the submitted sample analyses?
		Yes	© No	ed idoordior.	Comments:
				nalytical lah	poratory for analysis of PFASs. However, the laboratory is
	certified	for per	rfluorinated all	kyl acids in	drinking water analysis by the National Environmental AP) in Oregon.
					another "network" laboratory or sub-contracted to an ratory performing the analyses ADEC CS approved?
		Yes	• No		Comments:
	Analyses	s were	performed by	TestAmeric	a Laboratories, Inc. in West Sacramento, CA.
2. <u>C</u>	Chain of Cu	<u>ustody</u>	(CoC)		
	a. CoC	inform	nation complete	ed, signed, a	and dated (including released/received by)?
	9	Yes	O No		Comments:
	b. Corre	ect Ana	alyses requeste	ed?	
	(	Yes	O No		Comments:
3. <u>I</u>	aboratory	Sampl	e Receipt Doc	umentation	
	a. Samr	ole/coo	ler temperatur	e documento	ed and within range at receipt (0° to 6° C)?
			© No		Comments:
	-	-	servation acceptorinated Solve	-	dified waters, Methanol preserved VOC soil (GRO, BTEX,
	9	Yes	O No		Comments:
	Analysis	of PF	ASs does not r	equire a pre	eservative other than temperature control.
	c. Samp	ole con	dition docume	ented – broke	en, leaking (Methanol), zero headspace (VOC vials)?
	(	Yes	O No		Comments:
	The sam	ple rec	eipt form note	s that the sa	imples were received in good condition.

320-39845-1 REV1

320-39845-1 REV	320	_30	1845	-1 R	FV1
-----------------	-----	-----	------	------	-----

O Yes	No	Comments:
The laboratory 151688.	report was revis	ed to correct a sample naming error. The COC lists sample 153419 a
e. Data quality	y or usability aff	ected?
		Comments:
Data quality or	usability is not a	affected; see above.
. <u>Case Narrative</u>	<u>e</u>	
a Draggart an	d van damatan dalah l	-O
	d understandable	
© Yes	© No	Comments:
b. Discrepand	cies, errors, or Q	C failures identified by the lab?
• Yes	O No	Comments:
The case narra	tive notes the sa	imples arrived in good condition, properly preserved, and that the
		ler upon receipt at the laboratory was 3.1° C.
The case narra	f the sample coo	
temperature of The case narra (MS) and MS	f the sample cood ative notes there duplicate (MSD	ler upon receipt at the laboratory was 3.1° C. was insufficient sample volume available to perform a matrix spike
The case narra (MS) and MS The case narra	f the sample cood ative notes there duplicate (MSD	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.
The case narra (MS) and MS The case narra	tive notes there duplicate (MSD ative also notes sometive actions	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.
temperature of The case narra (MS) and MS The case narra c. Were all co	tive notes there duplicate (MSD ative also notes sorrective actions  No	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?
temperature of The case narra (MS) and MS The case narra c. Were all co	tive notes there duplicate (MSD ative also notes sometive actions  No corrective action	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.
temperature of The case narra (MS) and MS The case narra c. Were all co	tive notes there duplicate (MSD ative also notes sometive actions  No corrective action	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.  quality/usability according to the case narrative?
temperature of The case narra (MS) and MS The case narra c. Were all co C Yes There were no d. What is the	tive notes there duplicate (MSD ative also notes sorrective actions)  No corrective action ac	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.  quality/usability according to the case narrative?  Comments:
temperature of The case narra (MS) and MS The case narra c. Were all co C Yes There were no d. What is the	tive notes there duplicate (MSD ative also notes sorrective actions)  No corrective action ac	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.  quality/usability according to the case narrative?
temperature of The case narra (MS) and MS The case narra c. Were all co C Yes There were no d. What is the	tive notes there duplicate (MSD ative also notes sorrective actions)  No corrective action ac	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.  quality/usability according to the case narrative?  Comments:
temperature of The case narra (MS) and MS The case narra c. Were all co C Yes There were no d. What is the	tive notes there duplicate (MSD ative also notes sometive actions  No corrective actions ce effect on data of the effect on data of the effect on the corrective actions	ler upon receipt at the laboratory was 3.1° C.  was insufficient sample volume available to perform a matrix spike b) with preparation batch 320-228082.  several samples arrived with an orange color.  documented?  Comments:  ons documented in the case narrative.  quality/usability according to the case narrative?  Comments:

320-39	9845-1 REV1							
	b. All applicab	ole holding times met?						
	• Yes	C No	Comments:					
			mples were analyzed using direct injection and in-line is using direct aqueous injection (DAI) was met for all					
	c. All soils rep	orted on a dry weight bas	is?					
	© Yes © No Comments:							
	N/A; soil sampl	les were not submitted wit	th this work order.					
	d. Are the repo	orted LOQs less than the C	Cleanup Level or the minimum required detection level for					
	Yes	C No	Comments:					
	~ 1		Reporting Limit (RL), is less than applicable EPA lifetime /or ADEC groundwater cleanup levels for PFOS and PFOA.					
	e. Data quality	or usability affected?						
·	C Yes	© No	Comments:					
	The data quality	y and usability were not af	ffected.					
6. <u>QC</u>	C Samples							
	a. Method Bla	nk						
	i. One	method blank reported pe	r matrix, analysis and 20 samples?					
	• Yes	C No	Comments:					
	ii. All r	nethod blank results less t	han limit of quantitation (LOQ)?					
	• Yes	C No	Comments:					
	iii. If ab	ove LOQ, what samples a	re affected?					
			Comments:					
	None; PFAS co	mpounds were not detecte	ed in method blank sample.					
•	iv. Do th	he affected sample(s) have	e data flags? If so, are the data flags clearly defined?					
	© Yes	© No	Comments:					

Qualification of the results was not required; see above.

v. Data quality or usability affected? Comments: The data quality and usability were not affected. b. Laboratory Control Sample/Duplicate (LCS/LCSD) i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846) Yes O No Comments: ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples? Yes No Comments: Metals and inorganics were not analyzed as part of this work order. iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) Yes O No Comments: iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages) Yes O No Comments: v. If %R or RPD is outside of acceptable limits, what samples are affected? Comments: N/A; analytical accuracy and precision were within acceptable limits. vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes No Comments: Qualification of the data was not required; see above.

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vii. Data quality or usability affected? (Use comment box to explain.)

		Comments:						
The data quality	y and usability were not a	ffected.						
c. Surrogates -	c. Surrogates – Organics Only							
i. Are	surrogate recoveries repor	rted for organic analyses – field, QC and laboratory samples?						
• Yes	C No	Comments:						
target analyte, a		s IDA recovery, which entails adding a 13C-isotope of each of each analyte. The isotopically-labeled compounds are						
And		eries (%R) reported and within method or laboratory limits? if applicable. (AK Petroleum methods 50-150 %R; all other port pages)						
Yes	O No	Comments:						
	he sample results with fais clearly defined?	led surrogate recoveries have data flags? If so, are the data						
© Yes	⊙ No	Comments:						
N/A; there were	e no IDA recovery failure	s associated with this work order.						
iv. Data quality or usability affected?								
	Comments:							
The data quality	y and usability are not affe	ected; see above.						
d. Trip blank – Soil	- Volatile analyses only (C	GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and						
samj	trip blank reported per maples? ot, enter explanation belo	atrix, analysis and for each cooler containing volatile w.)						
O Yes	⊙ No	Comments:						
PFASs are not v	volatile compounds; there	fore, a trip blank is not required.						
		the trip blank and VOA samples clearly indicated on the laining why must be entered below)						
O Yes	⊙ No	Comments:						
N/A; a trip blan	k is not required.							

Page 6 July 2017

iii. All re	esults less than LOQ?	
C Yes	© No	Comments:
N/A; a trip blank	s is not required.	
iv. If abo	ove LOQ, what samples a	are affected?
		Comments:
None; a trip blar	nk was not submitted with	h this work order.
v. Data	quality or usability affect	ted?
		Comments:
The data quality	and usability were not a	ffected; see above.
e. Field Duplic	ate	
i. One f	field duplicate submitted	per matrix, analysis and 10 project samples?
C Yes	No	Comments:
	e sample was not submitt the proper frequency for	ted with this work order. However, field duplicate samples the overall project.
ii. Subm	nitted blind to lab?	
C Yes	⊙ No	Comments:
N/A; a field dup	licate was not submitted	with this work order.
	ommended: 30% water, 5 RPD (%) = Absolute	,
		$R_2$ = Field Duplicate Concentration
C Yes	No     No	Comments:
N/A; a field dup	licate was not submitted	with this work order.
iv. Data	quality or usability affect	ted? (Use the comment box to explain why or why not.)  Comments:
The data quality	and usability were not a	ffected.

320-39845-1 REV1
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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
	Equipment blank 120782-EB was submitted to the laboratory for analysis of PFAS.
	i. All results less than LOQ?
	© Yes © No Comments:
	PFAS reported for this project were not detected in the EB sample.
	ii. If above LOQ, what samples are affected?
	Comments:
	None; see above.
	iii. Data quality or usability affected?
	Comments:
	The data quality and usability were not affected.
. <u>O</u> 1	ther Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
	a. Defined and appropriate?
	© Yes
	There were no additional flags/qualifiers required for this work order.



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: 320-40406-1

TestAmerica Sample Delivery Group: 20060-001

Client Project/Site: FAI

### For:

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

Attn: Marcy Nadel



Authorized for release by: 7/3/2018 3:32:32 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

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Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-40406-1 SDG: 20060-001

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-40406-1 Project/Site: FAI SDG: 20060-001

### **Qualifiers**

### **LCMS**

Qualifier	Qualifier Description
-----------	-----------------------

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# Glossary

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)
1.00	Limit of Overhibetion (DeD/DOC)

LOQ Limit of Quantitation (DoD/DOE)

MDA Minimum Detectable Activity (Radiochemistry) MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit ML Minimum Level (Dioxin) Not Calculated NC

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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

TestAmerica Sacramento

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7/3/2018

### **Case Narrative**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-40406-1 Project/Site: FAI SDG: 20060-001

Job ID: 320-40406-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-40406-1

### Receipt

The samples were received on 6/19/2018 10:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.2° C.

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

### **Organic Prep**

Method(s) PFAS Prep: Samples 174947 (320-40406-1) and 152315 (320-40406-5) in preparation batch 320-231086 were observed to be a vellow color.

Method(s) PFAS Prep: Samples 120081 (320-40406-3), 120181 (320-40406-4) and 173924 (320-40406-8) in preparation batch 320-231086 are observed to be a light yellow color.

Method(s) PFAS Prep: Samples 153826 (320-40406-2), 153354 (320-40406-6) and 120006 (320-40406-7) in preparation batch 320-231086 were observed to be a light brown color.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-231086.

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

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 174947

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-40406-1

Analyte	Result Q	ualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	58		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	10		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	340		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

### Client Sample ID: 153826 Lab Sample ID: 320-40406-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	31	2.0	0.92	ng/L		WS-LC-0025	Total/NA
D (1 1 1/25/10)	00	0.0				At1	T
Perfluorohexanesulfonic acid (PFHxS)	80	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	10	2.0	0.80	ng/L	1	WS-LC-0025	Total/NA
						At1	
Perfluorooctanoic acid (PFOA)	43	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	90	2.0	1.3	ng/L	1	WS-LC-0025	Total/NA
Derflueren en en eig (DENA)	4.0	0.0	0.05		4	At1	T-4-1/NIA
Perfluorononanoic acid (PFNA)	1.3 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

### Client Sample ID: 120081 Lab Sample ID: 320-40406-3

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	32	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	21	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	27	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	3.3	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	940	20	13	ng/L	10		WS-LC-0025 At1	Total/NA

### Lab Sample ID: 320-40406-4 Client Sample ID: 120181

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	33		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	21		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	4.4		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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TestAmerica Job ID: 320-40406-1 SDG: 20060-001

Client: Shannon & Wilson, Inc

Client Sample ID: 120181 (Continued)

Project/Site: FAI

Lab Sample ID: 320-40406-4

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS) -	1300	20	13 ng/L	10	WS-LC-0025	Total/NA
DL					At1	

# Client Sample ID: 152315 Lab Sample ID: 320-40406-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D N	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.3	2.0	0.92	ng/L	1	-	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	25	2.0	0.87	ng/L	1	٧	NS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.6	2.0	0.80	ng/L	1	٧	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	7.3	2.0	0.75	ng/L	1	V	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120	2.0	1.3	ng/L	1	-	NS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.6 J	2.0	0.65	ng/L	1	٧	WS-LC-0025 At1	Total/NA

# Client Sample ID: 153354 Lab Sample ID: 320-40406-6

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	34	2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	55	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.0	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	76	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.7 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

## Client Sample ID: 120006 Lab Sample ID: 320-40406-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	33		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	130		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	16		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	22		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	590		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

# Client Sample ID: 173924 Lab Sample ID: 320-40406-8

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.5	2.0	0.92	ng/L		WS-LC-0025	Total/NA
						At1	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

# Client Sample ID: 173924 (Continued)

Lab Sample ID: 320-40406-	-8
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	3.7		2.0	0.87	ng/L	1	_	WS-LC-0025	Total/NA
								At1	

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 174947

Date Collected: 06/11/18 10:20 Date Received: 06/19/18 10:05 Lab Sample ID: 320-40406-1

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 06:40	,
Perfluorohexanesulfonic acid (PFHxS)	58		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 06:40	
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 06:40	
Perfluorooctanoic acid (PFOA)	10		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 06:40	
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 06:40	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	92		25 - 150				06/26/18 14:22	06/30/18 06:40	
13C4-PFHpA	82		25 - 150				06/26/18 14:22	06/30/18 06:40	
13C4 PFOA	81		25 - 150				06/26/18 14:22	06/30/18 06:40	
13C5 PFNA	67		25 - 150				06/26/18 14:22	06/30/18 06:40	
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	340		20	13	ng/L		06/26/18 14:22	07/03/18 07:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	98		25 - 150				06/06/49 44:00	07/03/18 07:14	

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-40406-1

Project/Site: FAI SDG: 20060-001

Client Sample ID: 153826 Lab Sample ID: 320-40406-2 Date Collected: 06/11/18 11:20 **Matrix: Water** 

Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	31		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 06:59	1
Perfluorohexanesulfonic acid (PFHxS)	80		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 06:59	1
Perfluoroheptanoic acid (PFHpA)	10		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 06:59	1
Perfluorooctanoic acid (PFOA)	43		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 06:59	1
Perfluorooctanesulfonic acid (PFOS)	90		2.0	1.3	ng/L		06/26/18 14:22	06/30/18 06:59	1
Perfluorononanoic acid (PFNA)	1.3	J	2.0	0.65	ng/L		06/26/18 14:22	06/30/18 06:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				06/26/18 14:22	06/30/18 06:59	1
13C4-PFHpA	83		25 - 150				06/26/18 14:22	06/30/18 06:59	1
13C4 PFOA	77		25 - 150				06/26/18 14:22	06/30/18 06:59	1
13C4 PFOS	89		25 - 150				06/26/18 14:22	06/30/18 06:59	1
13C5 PFNA	70		25 - 150				06/26/18 14:22	06/30/18 06:59	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 120081

Lab Sample ID: 320-40406-3

Date Collected: 06/15/18 11:28 Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	32		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 07:17	
Perfluorohexanesulfonic acid (PFHxS)	150		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 07:17	1
Perfluoroheptanoic acid (PFHpA)	21		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 07:17	1
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 07:17	
Perfluorononanoic acid (PFNA)	3.3		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 07:17	•
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	97		25 - 150				06/26/18 14:22	06/30/18 07:17	
13C4-PFHpA	82		25 - 150				06/26/18 14:22	06/30/18 07:17	
13C4 PFOA	83		25 - 150				06/26/18 14:22	06/30/18 07:17	
13C5 PFNA	63		25 - 150				06/26/18 14:22	06/30/18 07:17	
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	940		20	13	ng/L		06/26/18 14:22	07/03/18 07:32	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	103		25 - 150				06/26/18 14:22	07/03/18 07:32	10

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 120181

Lab Sample ID: 320-40406-4 Date Collected: 06/15/18 11:18 Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	33		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 07:35	
Perfluorohexanesulfonic acid (PFHxS)	150		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 07:35	•
Perfluoroheptanoic acid (PFHpA)	21		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 07:35	
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 07:35	
Perfluorononanoic acid (PFNA)	4.4		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 07:35	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
18O2 PFHxS	86		25 - 150				06/26/18 14:22	06/30/18 07:35	
13C4-PFHpA	72		25 - 150				06/26/18 14:22	06/30/18 07:35	
13C4 PFOA	76		25 - 150				06/26/18 14:22	06/30/18 07:35	
13C5 PFNA	56		25 - 150				06/26/18 14:22	06/30/18 07:35	
- Method: WS-LC-0025 At1 - Flu	uorinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	1300		20	13	ng/L		06/26/18 14:22	07/03/18 07:51	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	97		25 - 150				06/26/18 14:22	07/03/18 07:51	

Client: Shannon & Wilson, Inc

Date Received: 06/19/18 10:05

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 152315 Lab Sample ID: 320-40406-5 Date Collected: 06/13/18 15:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.3		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 07:54	1
Perfluorohexanesulfonic acid (PFHxS)	25		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 07:54	1
Perfluoroheptanoic acid (PFHpA)	4.6		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 07:54	1
Perfluorooctanoic acid (PFOA)	7.3		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 07:54	1
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L		06/26/18 14:22	06/30/18 07:54	1
Perfluorononanoic acid (PFNA)	1.6	J	2.0	0.65	ng/L		06/26/18 14:22	06/30/18 07:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				06/26/18 14:22	06/30/18 07:54	1
13C4-PFHpA	85		25 - 150				06/26/18 14:22	06/30/18 07:54	1
13C4 PFOA	87		25 - 150				06/26/18 14:22	06/30/18 07:54	1
13C4 PFOS	92		25 - 150				06/26/18 14:22	06/30/18 07:54	1
13C5 PFNA	72		25 - 150				06/26/18 14:22	06/30/18 07:54	1

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-40406-1 Project/Site: FAI SDG: 20060-001

Client Sample ID: 153354 Lab Sample ID: 320-40406-6 Date Collected: 06/18/18 13:28

**Matrix: Water** Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	34		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 08:30	1
Perfluorohexanesulfonic acid (PFHxS)	55		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 08:30	1
Perfluoroheptanoic acid (PFHpA)	9.0		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 08:30	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 08:30	1
Perfluorooctanesulfonic acid (PFOS)	76		2.0	1.3	ng/L		06/26/18 14:22	06/30/18 08:30	1
Perfluorononanoic acid (PFNA)	1.7	J	2.0	0.65	ng/L		06/26/18 14:22	06/30/18 08:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				06/26/18 14:22	06/30/18 08:30	1
13C4-PFHpA	86		25 - 150				06/26/18 14:22	06/30/18 08:30	1
13C4 PFOA	90		25 - 150				06/26/18 14:22	06/30/18 08:30	1
13C4 PFOS	93		25 - 150				06/26/18 14:22	06/30/18 08:30	1
13C5 PFNA	76		25 - 150				06/26/18 14:22	06/30/18 08:30	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1 SDG: 20060-001

Lab Sample ID: 320-40406-7

**Matrix: Water** 

Client Sample ID: 120006 Date Collected: 06/18/18 11:55

Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	33		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 08:49	1
Perfluorohexanesulfonic acid (PFHxS)	130		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 08:49	1
Perfluoroheptanoic acid (PFHpA)	16		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 08:49	1
Perfluorooctanoic acid (PFOA)	22		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 08:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 08:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				06/26/18 14:22	06/30/18 08:49	1
13C4-PFHpA	85		25 - 150				06/26/18 14:22	06/30/18 08:49	1
13C4 PFOA	89		25 - 150				06/26/18 14:22	06/30/18 08:49	1
13C5 PFNA	73		25 - 150				06/26/18 14:22	06/30/18 08:49	1
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	inces - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	590		20	13	ng/L		06/26/18 14:22	07/03/18 08:09	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	95		25 - 150				06/26/18 14:22	07/03/18 08:09	

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-40406-1

Project/Site: FAI SDG: 20060-001

Client Sample ID: 173924 Lab Sample ID: 320-40406-8 Date Collected: 06/18/18 14:00

**Matrix: Water** Date Received: 06/19/18 10:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.5		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 09:07	1
Perfluorohexanesulfonic acid (PFHxS)	3.7		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 09:07	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 09:07	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 09:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/26/18 14:22	06/30/18 09:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 09:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103	-	25 - 150				06/26/18 14:22	06/30/18 09:07	1
13C4-PFHpA	88		25 - 150				06/26/18 14:22	06/30/18 09:07	1
13C4 PFOA	91		25 - 150				06/26/18 14:22	06/30/18 09:07	1
13C4 PFOS	92		25 - 150				06/26/18 14:22	06/30/18 09:07	1
13C5 PFNA	77		25 - 150				06/26/18 14:22	06/30/18 09:07	1

## **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Acceptanc	) Limi
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
ab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
20-40406-1	174947	92	82	81		67	
20-40406-1 - DL	174947				98		
20-40406-2	153826	97	83	77	89	70	
20-40406-3	120081	97	82	83		63	
20-40406-3 - DL	120081				103		
20-40406-4	120181	86	72	76		56	
20-40406-4 - DL	120181				97		
20-40406-5	152315	99	85	87	92	72	
20-40406-6	153354	97	86	90	93	76	
0-40406-7	120006	101	85	89		73	
20-40406-7 - DL	120006				95		
20-40406-8	173924	103	88	91	92	77	
CS 320-231086/2-A	Lab Control Sample	93	81	87	88	70	
CSD 320-231086/3-A	Lab Control Sample Dup	98	84	87	90	68	
1B 320-231086/1-A	Method Blank	94	79	84	90	68	

### Surrogate Legend

PFHxS = 1802 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Job ID: 320-40406-1

Client: Shannon & Wilson, Inc Project/Site: FAI SDG: 20060-001

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-231086/1-A

**Matrix: Water** 

Analysis Batch: 231792

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

Prep Batch: 231086

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/18 14:22	06/30/18 01:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/26/18 14:22	06/30/18 01:46	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/18 14:22	06/30/18 01:46	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/26/18 14:22	06/30/18 01:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/26/18 14:22	06/30/18 01:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/18 14:22	06/30/18 01:46	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	94		25 - 150				06/26/18 14:22	06/30/18 01:46	1
13C4-PFHpA	79		25 - 150				06/26/18 14:22	06/30/18 01:46	1

25 - 150

25 - 150

25 - 150

0-:1--

Lab Sample ID: LCS 320-231086/2-A

Lab Sample ID: LCSD 320-231086/3-A

**Matrix: Water** 

**Matrix: Water** 

13C4 PFOA

13C4 PFOS

13C5 PFNA

**Analysis Batch: 231792** 

**Client Sample ID: Lab Control Sample** 

06/26/18 14:22 06/30/18 01:46

06/26/18 14:22 06/30/18 01:46

06/26/18 14:22 06/30/18 01:46

**Prep Type: Total/NA** Prep Batch: 231086

	Spike	LCS L	.cs		%Rec.	
Analyte	Added	Result (	Qualifier Unit	D %Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	20.3	ng/L	115	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.4	ng/L	101	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	20.7	ng/L	103	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	19.0	ng/L	95	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	18.3	ng/L	98	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	19.9	ng/L	99	73 - 147	

LCS LCS

84

90

68

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	93		25 - 150
13C4-PFHpA	81		25 - 150
13C4 PFOA	87		25 - 150
13C4 PFOS	88		25 - 150
13C5 PFNA	70		25 - 150

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

Prep Type: Total/NA

Analysis Batch: 231792	Spike	LCSD	LCSD				Prep Ba %Rec.	itch: 23	31086 RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	18.6		ng/L		105	72 - 151	9	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.7		ng/L		97	73 - 157	4	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.8		ng/L		99	71 - 138	4	30
Perfluorooctanoic acid (PFOA)	20.0	20.3		ng/L		101	70 - 140	7	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.4		ng/L		94	69 - 144	5	30
Perfluorononanoic acid (PFNA)	20.0	20.0		ng/L		100	73 - 147	1	30

TestAmerica Sacramento

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7/3/2018

## **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

1 10,000 010. 171			
	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	98		25 - 150
13C4-PFHpA	84		25 - 150
13C4 PFOA	87		25 - 150
13C4 PFOS	90		25 - 150
13C5 PFNA	68		25 - 150

## **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1 SDG: 20060-001

## LCMS

### Prep Batch: 231086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40406-1 - DL	174947	Total/NA	Water	PFAS Prep	
320-40406-1	174947	Total/NA	Water	PFAS Prep	
320-40406-2	153826	Total/NA	Water	PFAS Prep	
320-40406-3	120081	Total/NA	Water	PFAS Prep	
320-40406-3 - DL	120081	Total/NA	Water	PFAS Prep	
320-40406-4 - DL	120181	Total/NA	Water	PFAS Prep	
320-40406-4	120181	Total/NA	Water	PFAS Prep	
320-40406-5	152315	Total/NA	Water	PFAS Prep	
320-40406-6	153354	Total/NA	Water	PFAS Prep	
320-40406-7	120006	Total/NA	Water	PFAS Prep	
320-40406-7 - DL	120006	Total/NA	Water	PFAS Prep	
320-40406-8	173924	Total/NA	Water	PFAS Prep	
MB 320-231086/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-231086/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-231086/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 231792**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40406-1	174947	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-2	153826	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-3	120081	Total/NA	Water	WS-LC-0025	231086
		· · · · · · · · · · · · · · · · · · ·		At1	
320-40406-4	120181	Total/NA	Water	WS-LC-0025	231086
220 40406 E	150015	Total/NIA	Motor	At1	224006
320-40406-5	152315	Total/NA	Water	WS-LC-0025	231086
320-40406-6	153354	Total/NA	Water	At1 WS-LC-0025	231086
020 40400 0	100004	rotal/14/	vvator	At1	201000
320-40406-7	120006	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-8	173924	Total/NA	Water	WS-LC-0025	231086
				At1	
MB 320-231086/1-A	Method Blank	Total/NA	Water	WS-LC-0025	231086
				At1	
LCS 320-231086/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	231086
				At1	
LCSD 320-231086/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	231086
				At1	

### **Analysis Batch: 231911**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40406-1 - DL	174947	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-3 - DL	120081	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-4 - DL	120181	Total/NA	Water	WS-LC-0025	231086
				At1	
320-40406-7 - DL	120006	Total/NA	Water	WS-LC-0025	231086
				At1	

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-40406-1

**Matrix: Water** 

Date Collected: 06/11/18 10:20 Date Received: 06/19/18 10:05

Client Sample ID: 174947

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 06:40	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			231911	07/03/18 07:14	AAR	TAL SAC

Lab Sample ID: 320-40406-2 Client Sample ID: 153826 Date Collected: 06/11/18 11:20 **Matrix: Water** 

Date Received: 06/19/18 10:05

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 06:59	S1M	TAL SAC

Client Sample ID: 120081 Lab Sample ID: 320-40406-3 **Matrix: Water** 

Date Collected: 06/15/18 11:28

Date Received: 06/19/18 10:05

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 07:17	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			231911	07/03/18 07:32	AAR	TAL SAC

**Client Sample ID: 120181** Lab Sample ID: 320-40406-4 **Matrix: Water** 

Date Collected: 06/15/18 11:18 Date Received: 06/19/18 10:05

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 07:35	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			231911	07/03/18 07:51	AAR	TAL SAC

Client Sample ID: 152315 Lab Sample ID: 320-40406-5 Date Collected: 06/13/18 15:09 **Matrix: Water** 

Date Received: 06/19/18 10:05

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 07:54	S1M	TAL SAC

TestAmerica Sacramento

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Client Sample ID: 153354 Lab Sample ID: 320-40406-6 Date Collected: 06/18/18 13:28

**Matrix: Water** 

Date Received: 06/19/18 10:05

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 08:30	S1M	TAL SAC

Lab Sample ID: 320-40406-7 Client Sample ID: 120006

Date Collected: 06/18/18 11:55 **Matrix: Water** 

Date Received: 06/19/18 10:05

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep		·	1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 08:49	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			231911	07/03/18 08:09	AAR	TAL SAC

Client Sample ID: 173924 Lab Sample ID: 320-40406-8

Date Collected: 06/18/18 14:00 **Matrix: Water** 

Date Received: 06/19/18 10:05

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	231086	06/26/18 14:22	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			231792	06/30/18 09:07	S1M	TAL SAC

### **Laboratory References:**

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

TestAmerica Sacramento

## **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc
Project/Site: FAI

TestAmerica Job ID: 320-40406-1
SDG: 20060-001

### **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	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
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	07-31-18
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	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
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

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## **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **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: FAI

TestAmerica Job ID: 320-40406-1

SDG: 20060-001

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-40406-1	174947	Water	06/11/18 10:20	06/19/18 10:05
320-40406-2	153826	Water	06/11/18 11:20	06/19/18 10:05
320-40406-3	120081	Water	06/15/18 11:28	06/19/18 10:05
320-40406-4	120181	Water	06/15/18 11:18	06/19/18 10:05
320-40406-5	152315	Water	06/13/18 15:09	06/19/18 10:05
320-40406-6	153354	Water	06/18/18 13:28	06/19/18 10:05
320-40406-7	120006	Water	06/18/18 11:55	06/19/18 10:05
320-40406-8	173924	Water	06/18/18 14:00	06/19/18 10:05

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of o America Remarks/Matrix By: Laboratory 165+ Am Attn: D A 111-70 Ke 95 45¢ Solieno 10 Analysis Parameters/Sample Container Description (include preservative if used) N d 4 4 CHAIN-OF-CUSTODY RECORD St SKA X X 320-40406 Chain of Custody X 2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309 7/15/16 6/18/18 6/13/18 21/11/9 \$1/5/19 81/81/9 Date 18/19 1400 000 201 00 328 500 128 1155 Time 1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800 5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120 SHANNON & WILSON, INC. Geotechnical and Environmental Consultants 2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660 Lab No. 400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020 Sample Identity フィタムプ 2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147 52315 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 73924 153826 30 18 53354 30000 120081

	Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished E
	Project Number: 20060 -001 Total Number	Total Number of Containers	Signature: Time: [64]()	Signature: Time:	Signature: Tim
	Project Name: 74   Contact: MON	COC Seals/Intact? Y/N/NA Received Good Cond./Cold	Printed Name. Date: C/15/18 Printed Name.	Printed Name: Date:	Printed Name: Dat
	Sampler: A'LM (attach shipping bill, if	Delivery Method: (Old Shreak (attach shipping bill, if any)	Sha onen + Wi Bon, Inc	Company:	Company:
	Instru	Instructions	Received By: 1.	Received By: 2.	Received By:
	Requested Turnaround Time:		Signature: 1403	Signature: Time:	Signature: Tim
	3-1-20060 COR		Anted Name: 6 14/19	Printed Name; Date:	Printed Name: Date
7/2/	Distribution: White - w/shipment - returned to Shannon Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File	72 h m5- the	Company:	Company.

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F-19-91/UR

Client: Shannon & Wilson, Inc

Job Number: 320-40406-1 SDG Number: 20060-001

List Source: TestAmerica Sacramento

Login Number: 40406 List Number: 1

Creator: Her, David A

•		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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 PACK
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs  Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").  Multiphasic samples are not present.  Samples do not require splitting or compositing.	True N/A True True	

## **Laboratory Data Review Checklist**

Completed By:	
Adam Wyborny	
Title:	
Environmental Engineering Staff	
Date:	
July 5, 2018	
CS Report Name:	
Fairbanks International Airport (FA	AI)
Report Date:	
July 3, 2018	
Consultant Firm:	
Shannon & Wilson, Inc.	
Laboratory Name:	
TestAmerica Laboratories, Inc.	
Laboratory Report Number:	
320-40406-1	
ADEC File Number:	
100.38.277	
Hazard Identification Number:	
26816	

320-4	1040	06-1		
1. <u>L</u>	abo	<u>oratory</u>		
	a.	Did an ADI	EC CS approved laborator	ry receive and <u>perform</u> all of the submitted sample analyses?
		O Yes	<b>⊙</b> No	Comments:
	ce	rtified for per		drinking water analysis by the National Environmental AP) in Oregon.
				another "network" laboratory or sub-contracted to an ratory performing the analyses ADEC CS approved?
		O Yes	<ul><li>No</li></ul>	Comments:
	A	nalyses were	performed by TestAmeric	ca Laboratories, Inc. in West Sacramento, CA.
2. <u>C</u>	<u>'hai</u>	n of Custody	(CoC)	
	a.	CoC inform	nation completed, signed,	and dated (including released/received by)?
		• Yes	C No	Comments:
	b.	Correct Ana	alyses requested?	
		Yes	C No	Comments:
3. <u>L</u>	abo	ratory Sampl	e Receipt Documentation	
	a.	Sample/coo	ler temperature document	ted and within range at receipt (0° to 6° C)?
		Yes	O No	Comments:
	b.		servation acceptable – aci lorinated Solvents, etc.)?	dified waters, Methanol preserved VOC soil (GRO, BTEX,
		Yes	O No	Comments:
	A	nalysis of PF	ASs does not require a pre	eservative other than temperature control.
	c.	Sample con	dition documented – brok	ten, leaking (Methanol), zero headspace (VOC vials)?
		Yes	O No	Comments:
	Tł	ne sample rec	eipt form notes that the sa	amples were received in good condition.

3	2	Λ	-4	N	14	U	6	_ 1	١
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		reservation, s	ancies, were they documented? For example, incorrect sample ample temperature outside of acceptable range, insufficient or missing
	O Yes	No	Comments:
	There were no	discrepancies	noted in the sample receipt documentation.
-	e. Data quality	or usability a	affected?
			Comments:
	Data quality or	usability is no	ot affected; see above.
4.	Case Narrative	<u> </u>	
	a. Present and	l understanda	hle?
		© No	Comments:
	7 103	9110	Сопинено.
	b Discrepand	ies errors or	QC failures identified by the lab?
	-	© No	Comments:
	The case narra	tive notes the	samples arrived in good condition, properly preserved, and that the poler upon receipt at the laboratory was 4.2° C.
			re was insufficient sample volume available to perform a matrix spike SD) with preparation batch 320-231086.
	The case narra	tive also note	s several samples arrived with a yellowish color.
	c. Were all co	orrective action	ns documented?
	O Yes	No	Comments:
	There were no	corrective ac	tions documented in the case narrative.
	d. What is the	e effect on dat	a quality/usability according to the case narrative?
			Comments:
	The case narra	tive does not	note an effect on data quality.
5. <u>S</u> a	amples Results		
	_	lvaga nanfa	and/raparted as requested on COC?
			ned/reported as requested on COC?
	• Yes	O No	Comments:

320-40	0406-1			
	b. All applica	able holding	times met?	
	Yes	O No	Comments:	
	-		nat the water samples were analyzed using direct injection time for analysis using direct aqueous injection (DAI) was a superior of the control of the contr	
	c. All soils re	eported on a	dry weight basis?	
	O Yes	No	Comments:	
	N/A; soil samp	ples were no	t submitted with this work order.	
·	d. Are the rep	-	s less than the Cleanup Level or the minimum required of	letection level for
	Yes	O No	Comments:	
			e TestAmerica Reporting Limit (RL), is less than applications and/or ADEC groundwater cleanup levels for	
	e. Data qualit	ty or usabilit	y affected?	
	O Yes	No	Comments:	
	The data quali	ty and usabil	lity were not affected.	
6. <u>Q</u> Q	C Samples			
	a. Method Bl	ank		
	i. One	e method bla	ank reported per matrix, analysis and 20 samples?	
	Yes	O No	Comments:	
•	ii. All	method blan	nk results less than limit of quantitation (LOQ)?	
	Yes	O No	Comments:	

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

Qualification of the results was not required; see above.

iii. If above LOQ, what samples are affected?

None; PFAS compounds were not detected in method blank sample.

**July 2017** Page 4

No

O Yes

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v. Data quality or usability affected?	
Comments:	
The data quality and usability were not affected.	
b. Laboratory Control Sample/Duplicate (LCS/LCSD)	
<ul> <li>i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (required per AK methods, LCS required per SW846)</li> </ul>	(LCS/LCSD
• Yes • No Comments:	
ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, 20 samples?	, analysis and
© Yes © No Comments:	
Metals and inorganics were not analyzed as part of this work order.	
iii. Accuracy – All percent recoveries (%R) reported and within method or laborator And project specified DQOs, if applicable. (AK Petroleum methods: AK10 AK102 75%-125%, AK103 60%-120%; all other analyses see the laborator	1 60%-120%,
• Yes • No Comments:	
iv. Precision – All relative percent differences (RPD) reported and less than me laboratory limits? And project specified DQOs, if applicable. RPD reported LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum me other analyses see the laboratory QC pages)	l from
• Yes • No Comments:	
v. If %R or RPD is outside of acceptable limits, what samples are affected?	
Comments:	
N/A; analytical accuracy and precision were within acceptable limits.	
vi. Do the affected sample(s) have data flags? If so, are the data flags clearly de	efined?
© Yes • No Comments:	
Qualification of the data was not required; see above.	

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
• Yes • No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>
© Yes © No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes • No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
© Yes • No Comments:
PFASs are not volatile compounds; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
© Yes © No Comments:
N/A; a trip blank is not required.

40406-1					
	iii. All r	esults less tha	ın LOQ?		
	O Yes	No	C	Comments:	
N/A;	a trip blan	k is not requi	red.		
	iv. If abo	ove LOQ, wh	nat samples are	affected?	
			C	Comments	:
None	e; a trip bla	nk was not su	ıbmitted with th	nis work c	rder.
	v. Data	quality or us	ability affected	?	
			C	Comments	:
The o	lata quality	and usability	y were not affec	eted; see a	bove.
e. F	ield Duplic	eate			
	i. One	field duplicat	e submitted per	matrix, a	nalysis and 10 project samples?
	• Yes	O No	C	Comments:	
	ii. Subn	nitted blind to			
	Yes	O No		Comments:	
The f	ield duplic	ate samples <i>I</i>		181 were	submitted with this work order.
		ommended: 3	lative percent di 80% water, 50% ) = Absolute va	6 soil)	(RPD) less than specified DQOs? $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where  $R_1$  = Sample Concentration  $R_2$  = Field Duplicate Concentration

© Yes © No Comments:

The relative precision between the detected analyte concentrations for samples 120081 and 120181 were within the project-specific DQO of 30% for all analytes except PFOS.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The PFOS results of the samples 120081 and 120181 are considered estimated due to the field duplicate precision failure. These results are flagged 'J\*' for reporting purposes.

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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).							
	C Yes C No O Not Applicable							
	Due to accessibility issues, sample 153354 was collected using the property owner's rubber hose. The other samples submitted with this work order were not collected with reusable equipment. With the exception of sample 153354, an equipment blank was not required.							
	i. All results less than LOQ?							
	• Yes • No Comments:							
	N/A; an equipment blank was not submitted with this work order.							
	ii. If above LOQ, what samples are affected?							
	Comments:							
	None; see above.							
	iii. Data quality or usability affected?							
	Comments:							
	The PFAS results for sample 153354 are considered estimated and flagged 'J*' for reporting purposes.							
7.	Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)							
	a. Defined and appropriate?							
	© Yes • No Comments:							
	There were no additional flags/qualifiers required for this work order.							



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: 320-40844-1

TestAmerica Sample Delivery Group: 20060-002

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Oltima

Authorized for release by: 7/17/2018 1:15:54 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-40844-1 SDG: 20060-002

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## **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-40844-1 Project/Site: FAI

SDG: 20060-002

## Glossary

TEQ

Toxicity Equivalent Quotient (Dioxin)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

7/17/2018

### **Case Narrative**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-40844-1 Project/Site: FAI

SDG: 20060-002

Job ID: 320-40844-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-40844-1

### Receipt

The samples were received on 7/3/2018 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

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

### **Organic Prep**

Method(s) PFAS Prep: Sample 174751 (320-40844-1) is a yellowish orange color.

Method(s) PFAS Prep: Sample 443239 (320-40844-2) is a slightly gray color.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-232738.

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: FAI

TestAmerica Job ID: 320-40844-1

Lab Sample ID: 320-40844-1

SDG: 20060-002

## Client Sample ID: 174751

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	18		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	68		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	8.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	360		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

## Client Sample ID: 443239

Client Sample ID: 443239							Lab Sample ID: 320-40844-2			
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type	
Perfluorohexanesulfonic acid (PFHxS)	5.8		2.0	0.87	ng/L	1	_	WS-LC-0025 At1	Total/NA	
Perfluorooctanoic acid (PFOA)	5.9		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA	

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

Client Sample ID: 174751

Date Collected: 06/19/18 13:20 Date Received: 07/03/18 09:35 Lab Sample ID: 320-40844-1

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorobutanesulfonic acid (PFBS)	18		2.0	0.92	ng/L		07/06/18 13:03	07/08/18 00:56	
Perfluorohexanesulfonic acid (PFHxS)	68		2.0	0.87	ng/L		07/06/18 13:03	07/08/18 00:56	
Perfluoroheptanoic acid (PFHpA)	8.5		2.0	0.80	ng/L		07/06/18 13:03	07/08/18 00:56	
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L		07/06/18 13:03	07/08/18 00:56	
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/06/18 13:03	07/08/18 00:56	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	106		25 - 150				07/06/18 13:03	07/08/18 00:56	
13C4-PFHpA	107		25 - 150				07/06/18 13:03	07/08/18 00:56	
13C4 PFOA	104		25 - 150				07/06/18 13:03	07/08/18 00:56	
13C5 PFNA	95		25 - 150				07/06/18 13:03	07/08/18 00:56	
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	nces - DL						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	360		20	13	ng/L		07/06/18 13:03	07/16/18 15:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	97		25 - 150				07/06/18 13:03	07/16/18 15:29	1

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Client: Shannon & Wilson, Inc

Date Received: 07/03/18 09:35

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

Client Sample ID: 443239 Lab Sample ID: 320-40844-2 Date Collected: 06/21/18 13:27

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/06/18 13:03	07/08/18 01:14	1
Perfluorohexanesulfonic acid (PFHxS)	5.8		2.0	0.87	ng/L		07/06/18 13:03	07/08/18 01:14	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/06/18 13:03	07/08/18 01:14	1
Perfluorooctanoic acid (PFOA)	5.9		2.0	0.75	ng/L		07/06/18 13:03	07/08/18 01:14	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/06/18 13:03	07/08/18 01:14	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/06/18 13:03	07/08/18 01:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				07/06/18 13:03	07/08/18 01:14	1
13C4-PFHpA	107		25 - 150				07/06/18 13:03	07/08/18 01:14	1
13C4 PFOA	108		25 - 150				07/06/18 13:03	07/08/18 01:14	1
13C4 PFOS	98		25 - 150				07/06/18 13:03	07/08/18 01:14	1
13C5 PFNA	98		25 - 150				07/06/18 13:03	07/08/18 01:14	1

## **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1 SDG: 20060-002

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptan							
		PFHxS	PFHpA	PFOA	PFOS	PFNA			
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)			
320-40844-1	174751	106	107	104		95			
320-40844-1 - DL	174751				97				
320-40844-2	443239	107	107	108	98	98			
LCS 320-233065/2-A	Lab Control Sample	103	106	101	98	96			
LCSD 320-233065/3-A	Lab Control Sample Dup	100	98	103	93	96			
MB 320-233065/1-A	Method Blank	102	103	101	94	92			

### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

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TestAmerica Job ID: 320-40844-1

Client: Shannon & Wilson, Inc Project/Site: FAI SDG: 20060-002

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-233065/1-A

**Matrix: Water** 

**Analysis Batch: 233092** 

**Client Sample ID: Method Blank Prep Type: Total/NA** 

Prep Batch: 233065

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/06/18 13:03	07/08/18 00:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/06/18 13:03	07/08/18 00:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/06/18 13:03	07/08/18 00:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		07/06/18 13:03	07/08/18 00:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/06/18 13:03	07/08/18 00:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/06/18 13:03	07/08/18 00:01	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				07/06/18 13:03	07/08/18 00:01	1

13C4-PFHpA 103 25 - 150 07/06/18 13:03 07/08/18 00:01 13C4 PFOA 101 25 - 150 07/06/18 13:03 07/08/18 00:01 25 - 150 13C4 PFOS 94 07/06/18 13:03 07/08/18 00:01 13C5 PFNA 92 25 - 150 07/06/18 13:03 07/08/18 00:01

Lab Sample ID: LCS 320-233065/2-A

Lab Sample ID: LCSD 320-233065/3-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 233092** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Prep Batch: 233065** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 17.7 18.1 ng/L 103 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 17.3 95 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 19.5 ng/L 97 71 - 138 20.0 Perfluorooctanoic acid (PFOA) 19.5 98 70 - 140 ng/L 18.6 16.8 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS) Perfluorononanoic acid (PFNA) 20.0 19.5 ng/L 97 73 - 147

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	103		25 - 150
13C4-PFHpA	106		25 - 150
13C4 PFOA	101		25 - 150
13C4 PFOS	98		25 - 150
13C5 PFNA	96		25 - 150

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

Prep Type: Total/NA

Analysis Batch: 233092							Prep Batch: 233065		
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid	17.7	19.5		ng/L		110	72 - 151	7	30
(PFBS)									
Perfluorohexanesulfonic acid	18.2	17.9		ng/L		99	73 - 157	4	30
(PFHxS)									
Perfluoroheptanoic acid (PFHpA)	20.0	21.3		ng/L		106	71 - 138	9	30
Perfluorooctanoic acid (PFOA)	20.0	20.0		ng/L		100	70 - 140	2	30
Perfluorooctanesulfonic acid	18.6	18.6		ng/L		100	69 - 144	10	30
(PFOS)									
Perfluorononanoic acid (PFNA)	20.0	21.0		ng/L		105	73 - 147	8	30

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## **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

	LCSD		
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	100		25 - 150
13C4-PFHpA	98		25 - 150
13C4 PFOA	103		25 - 150
13C4 PFOS	93		25 - 150
13C5 PENA	96		25 - 150

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## **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

## LCMS

### **Prep Batch: 233065**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40844-1 - DL	174751	Total/NA	Water	PFAS Prep	
320-40844-1	174751	Total/NA	Water	PFAS Prep	
320-40844-2	443239	Total/NA	Water	PFAS Prep	
MB 320-233065/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-233065/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-233065/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

## Analysis Batch: 233092

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40844-1	174751	Total/NA	Water	WS-LC-0025	233065
320-40844-2	443239	Total/NA	Water	At1 WS-LC-0025	233065
MB 320-233065/1-A	Method Blank	Total/NA	Water	At1 WS-LC-0025	233065
LCS 320-233065/2-A	Lab Control Sample	Total/NA	Water	At1 WS-LC-0025 At1	233065
LCSD 320-233065/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	233065

### **Analysis Batch: 234208**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40844-1 - DL	174751	Total/NA	Water	WS-LC-0025	233065
				At1	

#### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

TAL SAC

TAL SAC

Client Sample ID: 174751 Lab S
Date Collected: 06/19/18 13:20

DL

DL

Lab Sample ID: 320-40844-1

Matrix: Water

07/06/18 13:03 MNV

07/16/18 15:29 D1R

Date Received: 07/03/18 09:35

Prep

Analysis

PFAS Prep

WS-LC-0025 At1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	233065	07/06/18 13:03	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			233092	07/08/18 00:56	D1R	TAL SAC

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Client Sample ID: 443239 Lab Sample ID: 320-40844-2

Date Collected: 06/21/18 13:27 Matrix: Water

1.00 mL

1.66 mL

233065

234208

Date Received: 07/03/18 09:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	233065	07/06/18 13:03	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			233092	07/08/18 01:14	D1R	TAL SAC

**Laboratory References:** 

Total/NA

Total/NA

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

## **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc
Project/Site: FAI

TestAmerica Job ID: 320-40844-1
SDG: 20060-002

### **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	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
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	07-31-18 *
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	07-31-18 *
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
√irginia	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

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<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

## **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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## **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-40844-1

SDG: 20060-002

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-40844-1	174751	Water	06/19/18 13:20	07/03/18 09:35
320-40844-2	443239	Water	06/21/18 13:27	07/03/18 09:35

	SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	CHAIN	AIN-OF-CUSTODY RECORI	0	Laboratory Tost America
_	eet, Suite 100 103	303 Wellsian Way Richland, WA 99352 (509) 946-6309	Analys	Attn: 1) . A UTT Analysis Parameters/Sample Container Description (include preservative if used)	tn: J) . A II to C.C.C. er Description d)
	2955-HIII Road Fairbanks, AK 99709 Fairbanks, AK 99709 Fairbanks, AK 99709 Fairbanks, AK 99709 Fordiand, OH 97201-2498 Fordian	Date Time Sampled	2+ 3×4 × 300 300 300 300 300 300 300 300 300 3		Acid Colling Remarks/Matrix
_	174751	1320 6/19/18			2 Goondowths
	443339	1327 6/21	X X 8		de
_					
_					
	Project Information Samp	Sample Receipt	Relinquished By: 1.	Relinquished By:	2. Relinquished By: 3.
	Project Number: 200 16-00 2 Total Number of Containers	of Containers	Signature: Time:// 33	Signature: Time:	Signature: Time:
	Contact: MCN Received Good Cond./Cold	14	Printed Name. Date:7/2/18	Printed Name: Date:	Printed Name: Date:
_	ect? Yes K No	od: ALCS MC Selpuis	Someth Wilson In	Company:	Company:
-	Instructions		Received By: 1,	Received B	Descrived Rur 3.
-	Requested Turnaround Time: 51-4		Time: 0.955	Signature:	
	Special Instructions:		nted Name: Date: 75/18	Printed Name:	320 A D L C C C C C C C C C C C C C C C C C C
	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File	filson w/ laboratory report	-5H	Company:	Cuall of Custody
ii.	F-19-91/UR		2.5.2		2022

Client: Shannon & Wilson, Inc

Job Number: 320-40844-1 SDG Number: 20060-002

List Source: TestAmerica Sacramento

Login Number: 40844 List Number: 1

**Creator: Turpen, Troy** 

Creator. Turpen, Troy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	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	

## **Laboratory Data Review Checklist**

Com	npleted By:
I	Kristen Freiburger
Title	): ::
5	Senior Chemist
Date	); ::
J	July 20, 2018
CS I	Report Name:
I	Fairbanks International Airport (FAI)
Repo	ort Date:
J	July 17, 2018
Cons	sultant Firm:
S	Shannon & Wilson, Inc.
Labo	oratory Name:
-	ΓestAmerica Laboratories, Inc.
Labo	pratory Report Number:
3	320-40844-1
ADE	EC File Number:
1	100.38.277
Haza	ard Identification Number:
2	26816

320-4	1084	4-1						
1. <u>L</u>	<u>abo</u>	<u>ratory</u>						
	a.	Did an ADI	EC CS approved laborate	ory receive and <u>perform</u> all of the submitted sample analyses?				
		Yes	<b>☑</b> No	Comments:				
	ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.							
<ul> <li>If the samples were transferred to another "network" laborator alternate laboratory, was the laboratory performing the analyst</li> </ul>								
		Yes	<b>©</b> No	Comments:				
	Ar	alyses were	performed by TestAmer	rica Laboratories, Inc. in West Sacramento, CA.				
2. Chain of Custody (CoC)								
	a.	a. CoC information completed, signed, and dated (including released/received by)?						
		Yes Yes	☑ No	Comments:				
	b.	b. Correct Analyses requested?						
		Yes	□ No	Comments:				
3. <u>L</u>	3. <u>Laboratory Sample Receipt Documentation</u>							
	a.	Sample/coo	ler temperature docume	nted and within range at receipt (0° to 6° C)?				
		• Yes	□ No	Comments:				
	b.		servation acceptable – ad lorinated Solvents, etc.)	cidified waters, Methanol preserved VOC soil (GRO, BTEX, ?				
		• Yes	□ No	Comments:				
	Ar	alysis of PF.	ASs does not require a p	preservative other than temperature control.				
	c.	Sample con	dition documented – bro	oken, leaking (Methanol), zero headspace (VOC vials)?				
		Yes	□ No	Comments:				
	Th	e sample rec	eipt form notes that the	samples were received in good condition.				

320-40844-1	
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5.

	d.		reservation, sample tem	re they documented? For example, incorrect sample aperature outside of acceptable range, insufficient or missing					
		C Yes	<b>⊙</b> No	Comments:					
	There were no discrepancies noted in the sample receipt documentation.								
	e.	Data quality	or usability affected?						
_				Comments:					
Data quality or usability is not affected; see above.  4. <u>Case Narrative</u>									
							a.	Present and	l understandable?
		• Yes	□ No	Comments:					
	b.	Discrepanc	ies, errors, or QC failure	es identified by the lab?					
		Yes	□ No	Comments:					
	The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 2.5° C.								
				ufficient sample volume available to perform a matrix spike reparation batch 320-232738.					
		he case narra	tive also notes a sample	arrived with a yellowish color and another with a slightly gray					
	c.	Were all co	rrective actions docume	ented?					
		TYes	<b>⊙</b> No	Comments:					
	There were no corrective actions documented in the case narrative.								
	d. What is the effect on data quality/usability according to the case narrative?								
				Comments:					
	T	The case narrative does not note an effect on data quality.							
Sa	amp	oles Results							
	a.	Correct ana	llvses performed/reporte	ed as requested on COC?					
		• Yes	□ No	Comments:					
	<u> </u>								

320-40	0844-1							
	h All annlicat	ole holding times met?						
		□ No	Comments:					
	The laboratory	The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.						
	c. All soils rep	c. All soils reported on a dry weight basis?						
	C Yes	<b>©</b> No	Comments:					
	N/A; soil samples were not submitted with this work order.							
	d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?							
	<b>☑</b> Yes	□ No	Comments:					
	The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and/or ADEC groundwater cleanup levels for PFOS and PFOA.							
	e. Data quality	or usability affected?						
	C Yes	<b>©</b> No	Comments:					
	The data quality and usability were not affected.							
6. <u>Q</u> (	C Samples							
	a. Method Bla	nk						
	i. One	method blank reported pe	er matrix, analysis and 20 samples?					
	<b>©</b> Yes	□ No	Comments:					
	ii. All r	nethod blank results less t	than limit of quantitation (LOQ)?					
	<b>©</b> Yes	□ No	Comments:					
	iii. If ab	ove LOQ, what samples a	are affected?					
			Comments:					

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

None; PFAS compounds were not detected in method blank sample.

Qualification of the results was not required; see above.

**July 2017** Page 4

No

TYes

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v. Data quality or usab	vility affected?
	Comments:
The data quality and usability	were not affected.
b. Laboratory Control Sample	/Duplicate (LCS/LCSD)
_	S/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD ethods, LCS required per SW846)
☑ Yes ☑ No	Comments:
ii. Metals/Inorganics – 20 samples?	one LCS and one sample duplicate reported per matrix, analysis and
☐ Yes	Comments:
Metals and inorganics were no	t analyzed as part of this work order.
And project specific	eent recoveries (%R) reported and within method or laboratory limits? ed DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK103 60%-120%; all other analyses see the laboratory QC pages)
☑ Yes   □ No	Comments:
laboratory limits? A LCS/LCSD, MS/M	tive percent differences (RPD) reported and less than method or and project specified DQOs, if applicable. RPD reported from SD, and or sample/sample duplicate. (AK Petroleum methods 20%; all the laboratory QC pages)
☑ Yes   ☐ No	Comments:
v. If %R or RPD is ou	tside of acceptable limits, what samples are affected?
	Comments:
N/A; analytical accuracy and p	recision were within acceptable limits.
vi. Do the affected sam	ple(s) have data flags? If so, are the data flags clearly defined?
☐ Yes	Comments:
Qualification of the data was n	ot required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
Yes No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>
☑ Yes ☑ No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
Yes No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
Yes No Comments:
PFASs are not volatile compounds; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
Yes No Comments:
N/A; a trip blank is not required.

320-40844-1			
		esults less than LOQ?	Comments:
N/A; a	a trip blan	k is not required.	
	iv. If ab	ove LOQ, what samples a	are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

- e. Field Duplicate
  - i. One field duplicate submitted per matrix, analysis and 10 project samples?
  - Yes No

Comments:

Field duplicates were not submitted with this work order, but have been submitted at the proper frequency for the overall project.

- ii. Submitted blind to lab?
- ☑ Yes ☑ No

Comments:

N/A; see above.

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of:  $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ 

☑ Yes ☑ No Comments:

N/A; see above.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected; see above.

320-40844-1	
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7.

	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
	Yes No Not Applicable
	Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
	i. All results less than LOQ?
	☑ Yes ☑ No Comments:
	N/A; an equipment blank was not submitted with this work order.
_	ii. If above LOQ, what samples are affected?
	Comments:
	None; see above.
	iii. Data quality or usability affected?
	Comments:
	The data quality and usability were not affected; see above.
<u>Ot</u> l	her Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
	a. Defined and appropriate?
	Yes No Comments:
	There were no additional flags/qualifiers required for this work order.



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: 320-41182-1

TestAmerica Sample Delivery Group: 20060-002

Client Project/Site: FAI

#### For:

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

Attn: Marcy Nadel



Authorized for release by: 7/25/2018 12:45:50 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

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**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-41182-1 SDG: 20060-002

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-41182-1 Project/Site: FAI SDG: 20060-002

### **Qualifiers**

#### **LCMS**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

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) Not Calculated NC

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)

RLReporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

TestAmerica Sacramento

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

Job ID: 320-41182-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-41182-1

#### Receipt

The sample was received on 7/17/2018 9:35 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.4° C.

#### LCMS

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-234966.

Method(s) PFAS Prep: The sample was observed to be a light brown color: 152889 (320-41182-1)

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

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## **Detection Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

Lab Sample ID: 320-41182-1

SDG: 20060-002

### Client Sample ID: 152889

Analyte	Result Qual	lifier RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	20	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.0	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	8.1	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	88	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	0.84 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

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## **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

Client Sample ID: 152889

Lab Sample ID: 320-41182-1 Date Collected: 07/03/18 14:03 Date Received: 07/17/18 09:35

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L		07/19/18 15:21	07/23/18 00:39	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		07/19/18 15:21	07/23/18 00:39	1
Perfluoroheptanoic acid (PFHpA)	7.0		2.0	0.80	ng/L		07/19/18 15:21	07/23/18 00:39	1
Perfluorooctanoic acid (PFOA)	8.1		2.0	0.75	ng/L		07/19/18 15:21	07/23/18 00:39	1
Perfluorooctanesulfonic acid (PFOS)	88		2.0	1.3	ng/L		07/19/18 15:21	07/23/18 00:39	1
Perfluorononanoic acid (PFNA)	0.84	J	2.0	0.65	ng/L		07/19/18 15:21	07/23/18 00:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	91		25 - 150				07/19/18 15:21	07/23/18 00:39	1
13C4-PFHpA	79		25 - 150				07/19/18 15:21	07/23/18 00:39	1
13C4 PFOA	83		25 - 150				07/19/18 15:21	07/23/18 00:39	1
13C4 PFOS	86		25 - 150				07/19/18 15:21	07/23/18 00:39	1
13C5 PFNA	74		25 - 150				07/19/18 15:21	07/23/18 00:39	1

## **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Accep	tance Limit
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
320-41182-1	152889	91	79	83	86	74	
LCS 320-234966/2-A	Lab Control Sample	94	84	77	86	66	
LCSD 320-234966/3-A	Lab Control Sample Dup	97	84	82	89	67	
MB 320-234966/1-A	Method Blank	93	86	81	87	67	

#### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-41182-1 SDG: 20060-002

Client: Shannon & Wilson, Inc

Project/Site: FAI

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-234966/1-A

**Matrix: Water** 

Analysis Batch: 235463

**Client Sample ID: Method Blank** Prep Type: Total/NA

Prep Batch: 234966

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/19/18 15:20	07/22/18 18:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/19/18 15:20	07/22/18 18:51	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/19/18 15:20	07/22/18 18:51	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		07/19/18 15:20	07/22/18 18:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/19/18 15:20	07/22/18 18:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/19/18 15:20	07/22/18 18:51	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	93		25 - 150				07/19/18 15:20	07/22/18 18:51	1

13C4-PFHpA 86 25 - 150 07/19/18 15:20 07/22/18 18:51 13C4 PFOA 81 25 - 150 07/19/18 15:20 07/22/18 18:51 25 - 150 13C4 PFOS 87 07/19/18 15:20 07/22/18 18:51 13C5 PFNA 67 25 - 150 07/19/18 15:20 07/22/18 18:51

Lab Sample ID: LCS 320-234966/2-A

Lab Sample ID: LCSD 320-234966/3-A

**Matrix: Water** 

**Matrix: Water** 

Analysis Batch: 235463

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Prep Batch: 234966** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 17.7 18.6 ng/L 105 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 17.6 97 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 21.4 ng/L 107 71 - 138 20.0 20.7 Perfluorooctanoic acid (PFOA) 104 70 - 140 ng/L 18.6 18.3 99 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS) Perfluorononanoic acid (PFNA) 20.0 21.4 ng/L 107 73 - 147

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	94		25 - 150
13C4-PFHpA	84		25 - 150
13C4 PFOA	77		25 - 150
13C4 PFOS	86		25 - 150
13C5 PFNA	66		25 - 150

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

Prep Type: Total/NA

						Prep Ba	itch: 23	34966
Spike	LCSD	LCSD				%Rec.		RPD
Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
17.7	18.3		ng/L		104	72 - 151	2	30
18.2	18.0		ng/L		99	73 - 157	2	30
20.0	20.8		ng/L		104	71 - 138	3	30
20.0	20.4		ng/L		102	70 - 140	2	30
18.6	17.9		ng/L		97	69 - 144	2	30
20.0	20.7		ng/L		104	73 - 147	3	30
	Added 17.7 18.2 20.0 20.0 18.6	Added         Result           17.7         18.3           18.2         18.0           20.0         20.8           20.0         20.4           18.6         17.9	Added         Result         Qualifier           17.7         18.3           18.2         18.0           20.0         20.8           20.0         20.4           18.6         17.9	Added         Result         Qualifier         Unit           17.7         18.3         ng/L           18.2         18.0         ng/L           20.0         20.8         ng/L           20.0         20.4         ng/L           18.6         17.9         ng/L	Added         Result         Qualifier         Unit         D           17.7         18.3         ng/L         D           18.2         18.0         ng/L         ng/L           20.0         20.8         ng/L         ng/L           20.0         20.4         ng/L         ng/L           18.6         17.9         ng/L	Added         Result         Qualifier         Unit         D         %Rec           17.7         18.3         ng/L         104           18.2         18.0         ng/L         99           20.0         20.8         ng/L         104           20.0         20.4         ng/L         102           18.6         17.9         ng/L         97	Spike Added Added Pesult 200.0         LCSD LCSD Result 200.0         Unit No. 200.0         Description of the No. 200.0         Weec Limits (No. 200.0)         Meec Limits (No. 200.0)         Meec Limits (No. 200.0)         No. 200.0         No. 20	Added         Result         Qualifier         Unit         D         %Rec         Limits         RPD           17.7         18.3         ng/L         104         72 - 151         2           18.2         18.0         ng/L         99         73 - 157         2           20.0         20.8         ng/L         104         71 - 138         3           20.0         20.4         ng/L         102         70 - 140         2           18.6         17.9         ng/L         97         69 - 144         2

TestAmerica Sacramento

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## **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	97		25 - 150
13C4-PFHpA	84		25 - 150
13C4 PFOA	82		25 - 150
13C4 PFOS	89		25 - 150
13C5 PFNA	67		25 - 150

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## **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

### LCMS

### **Prep Batch: 234966**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41182-1	152889	Total/NA	Water	PFAS Prep	
MB 320-234966/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-234966/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-234966/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Analysis Batch: 235463**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41182-1	152889	Total/NA	Water	WS-LC-0025	234966
MB 320-234966/1-A	Method Blank	Total/NA	Water	At1 WS-LC-0025 At1	234966
LCS 320-234966/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	234966
LCSD 320-234966/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	234966

### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

Client Sample ID: 152889 Lab Sample ID: 320-41182-1 Date Collected: 07/03/18 14:03

**Matrix: Water** 

Date Received: 07/17/18 09:35

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	234966	07/19/18 15:21	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			235463	07/23/18 00:39	D1R	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 TestAmerica Job ID: 320-41182-1 SDG: 20060-002 Project/Site: FAI

#### **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	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
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	07-31-18 *
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	07-31-18 *
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
√irginia	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

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

## **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **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: FAI

TestAmerica Job ID: 320-41182-1

SDG: 20060-002

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-41182-1	152889	Water	07/03/18 14:03	07/17/18 09:35

#### က် es. lof Laboratory Test Amorica Attn: D. All tucke Gerdach Gerdach Remarks/Matrix Relinquished By: Date Received By: Sellello So Printed Name: Printed Name Company Company Analysis Parameters/Sample Container Description (include preservative if used) Signature CR ai d Relinquished By: Date Date Received By: CHAIN-OF-CUSTODY RECORD Printed Name Printed Name ompany. Signature Signature 7/16/18 Thill Shament Wilson, Inc Time: 16.00 Relinquished By: Received By: A Masters 4 San BNE Company: Signature 7/3/14 Date ratory report 303 Wellsian Way Richland, WA 99352 (509) 946-6309 Sample Receipt Received Good Cond./Cold COC Seals/Intact? Y/N/NA Total Number of Containers 403 Delivery Method: Time 5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120 Requested Turnaround Time: Standarc 1200 17th Street, Suite 1024 Denver, Co 80202 (303) 825-3800 SHANNON & WILSON, INC. Geotechnical and Environmental Consultants 2043 Westport Center Drive St. Louis, MO 63146-3564 (314) 699-9660 Instructions 320-41182 Chain of Custody Lab No Project Number: 20060-003 Ongoing Project? Yes X No Project Information 400 N. 34th Street, Suite 100 Seattle, WA 98103 (206) 632-8020 Sample Identity 2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147 Special Instructions: Project Name: 74 52889 Contact: MDIN 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 Yell Pinl Distribution: Sampler:

Client: Shannon & Wilson, Inc

Job Number: 320-41182-1 SDG Number: 20060-002

List Source: TestAmerica Sacramento

Login Number: 41182 List Number: 1

**Creator: Turpen, Troy** 

Creator. rurpen, rroy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	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	

## **Laboratory Data Review Checklist**

Com	npleted By:
	Kristen Freiburger
Title	
5	Senior Chemist
Date	e:
1	August 8, 2018
CS I	Report Name:
]	Fairbanks International Airport (FAI)
Rep	ort Date:
J	July 25, 2018
Con	sultant Firm:
\$	Shannon & Wilson, Inc.
Labo	oratory Name:
-	TestAmerica Laboratories, Inc.
Labo	oratory Report Number:
3	320-41182-1
ADI	EC File Number:
	100.38.277
Haza	ard Identification Number:
2	26816

1. ]	Laboratory			
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?			
	Yes No Comments:			
	ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.			
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?			
	☐ Yes ☐ No Comments:			
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.			
2.	Chain of Custody (CoC)			
	a. CoC information completed, signed, and dated (including released/received by)?			
	© Yes □ No Comments:			
	b. Correct Analyses requested?			
	☑ Yes ☑ No Comments:			
3.	Laboratory Sample Receipt Documentation			
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?			
	Yes No Comments:			
	The sample cooler was recorded at 4.4° C upon receipt at the laboratory.			
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?			
	© Yes □ No Comments:			
	Analysis of PFASs does not require a preservative other than temperature control.			
	c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?			
	Yes No Comments:			
	The sample receipt form notes that the samples were received in good condition.			

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320-41182-1

22	0-4	1 1	27	1
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TYes	No	Comments:
There were no	discrepancies not	ed in the sample receipt documentation.
e. Data quality	y or usability affe	cted?
		Comments:
Data quality or	usability are not	affected; see above.
Case Narrative	<u>e</u>	
a Dresent an	d understandable'	)
a. Tresent and		Comments:
165	INO	Comments.
b Discrepand	cies errors or OC	C failures identified by the lab?
© Yes		Comments:
The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 4.4° C.  The case narrative notes there was insufficient sample volume available to perform a matrix spi (MS) and MS duplicate (MSD) with preparation batch 320-234966. It also notes the sample 152 was observed to be a light brown color.		
☐ Yes	<b>©</b> No	Comments:
There were no corrective actions documented in the case narrative.  d. What is the effect on data quality/usability according to the case narrative?		
The case narra	ative does not not	e an effect on data quality.
amples Results		
amples Results  a. Correct an	alvege performed	/reported as requested on COC?

320-41	1182-1			
	b. All applicat	ole holding times n	net?	
	<b>©</b> Yes	□ No	Comments:	
	The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.			
	c. All soils reported on a dry weight basis?			
	☐ Yes	<b>⊙</b> No	Comments:	
	N/A; soil samp	les were not submi	itted with this work order.	
	d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?			
	<b>©</b> Yes	□ No	Comments:	
	The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC groundwater cleanup levels for PFOS and PFOA.			
	e. Data quality or usability affected?			
	Yes No Comments:			
	The data quality	y and usability wer	re not affected.	
6. <u>Q</u> Q	C Samples			
	a. Method Bla	nk		
	i. One method blank reported per matrix, analysis and 20 samples?			
	• Yes	C No	Comments:	
	ii. All 1	nethod blank resul	Its less than limit of quantitation (LOQ)?	
	• Yes	□ No	Comments:	

Qualification of the results was not required; see above.

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

iii. If above LOQ, what samples are affected?

None; PFAS compounds were not detected in method blank sample.

**July 2017** Page 4

🖸 No

TYes

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v. Data quality or usability affected?					
	Comments:				
The data qualit	y and usability were not a	affected.			
b. Laboratory	Control Sample/Duplicat	te (LCS/LCSD)			
	<ul> <li>i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>				
C Yes	<b>□</b> No	Comments:			
	ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?				
TYes	<b>©</b> No	Comments:			
Metals and ino	rganics were not analyzed	d as part of this work order.			
And	iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)				
• Yes	□ No	Comments:			
iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)					
• Yes	□ No	Comments:			
v. If %R or RPD is outside of acceptable limits, what samples are affected?					
Comments:					
N/A; analytical accuracy and precision were within acceptable limits.					
vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?					
Yes No Comments:					
01:6:4:	f the data yayan met menaning	Qualification of the data was not required; see above.			

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:				
The data quality and usability were not affected.				
c. Surrogates	c. Surrogates – Organics Only			
i. Are	surrogate recoveries repo	orted for organic analyses – field, QC and laboratory samples?		
• Yes	□ No	Comments:		
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.				
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>				
• Yes	□ No	Comments:		
	the sample results with fa s clearly defined?	iled surrogate recoveries have data flags? If so, are the data		
C Yes	<b>⊙</b> No	Comments:		
N/A; there wer	re no IDA recovery failure	es associated with this work order.		
iv. Data	a quality or usability affect	cted?		
		Comments:		
The data qualit	y and usability are not aff	fected; see above.		
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>				
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>				
T Yes	<b>©</b> No	Comments:		
PFASs are not	volatile compounds; there	efore, a trip blank is not required.		
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)				
Yes	<b>☑</b> No	Comments:		
N/A; a trip blan	nk is not required.			

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iii. All r	esults less than LOQ?	
☐ Yes	<b>©</b> No	Comments:
N/A; a trip blan	k is not required.	
iv. If ab	ove LOQ, what samples	are affected?
		Comments:
None; a trip bla	nk was not submitted wit	h this work order.
v. Data	quality or usability affect	ted?
		Comments:
The data quality	y and usability were not a	ffected; see above.
e. Field Duplic	cate	
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?
C Yes	<b>⊙</b> No	Comments:
	the proper frequency for	ted with this work order. However, field duplicate samples the overall project.
ii. Subr	mitted blind to lab?	
Yes	<b>©</b> No	Comments:
N/A; a field dup	olicate was not submitted	with this work order.
	ision – All relative percer commended: 30% water, : RPD (%) = Absolut	
	Where	$R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
Yes	<b>©</b> No	Comments:
N/A; a field dup	olicate was not submitted	with this work order.
iv. Data	quality or usability affect	ted? (Use the comment box to explain why or why not.)
		Comments:
The data quality	y and usability were not a	ffected.

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).							
Yes No Not Applicable							
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.							
i. All results less than LOQ?							
☐ Yes ☐ No Comments:							
N/A; an equipment blank was not submitted.							
ii. If above LOQ, what samples are affected?							
Comments:							
N/A; an equipment blank was not submitted.							
iii. Data quality or usability affected?							
Comments:							
The data quality and usability were not affected.							
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)							
a. Defined and appropriate?							
☐ Yes ☐ No Comments:							
There were no additional flags/qualifiers required for this work order.							

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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: 320-41852-1

TestAmerica Sample Delivery Group: 20060-002

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Oltima

Authorized for release by: 8/14/2018 6:50:38 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

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

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-41852-1 SDG: 20060-002

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

TestAmerica Job ID: 320-41852-1 Project/Site: FAI SDG: 20060-002

### **Qualifiers**

#### **LCMS**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossarv

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)

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)

RLReporting 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)

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Job ID: 320-41852-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-41852-1

#### Receipt

The samples were received on 8/7/2018 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6° C.

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-239052.

Method(s) PFAS Prep: The following samples: 462659 (320-41852-1) and 569712 (320-41852-2) are a yellow color.

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: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Client Sample ID: 462659 Lab Sample ID: 320-41852-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac I	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 569712	Lab Sample ID: 320-41852-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	53	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	240	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	17	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.2	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.8 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

### **Client Sample Results**

Client: Shannon & Wilson, Inc

Date Received: 08/07/18 10:10

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Client Sample ID: 462659 Lab Sample ID: 320-41852-1 Date Collected: 08/02/18 09:59

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/09/18 14:06	08/09/18 20:01	1
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	2.0	0.87	ng/L		08/09/18 14:06	08/09/18 20:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/09/18 14:06	08/09/18 20:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		08/09/18 14:06	08/09/18 20:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		08/09/18 14:06	08/09/18 20:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/09/18 14:06	08/09/18 20:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	110		25 - 150				08/09/18 14:06	08/09/18 20:01	1
13C4-PFHpA	116		25 - 150				08/09/18 14:06	08/09/18 20:01	1
13C4 PFOA	117		25 - 150				08/09/18 14:06	08/09/18 20:01	1
13C4 PFOS	104		25 - 150				08/09/18 14:06	08/09/18 20:01	1
13C5 PFNA	112		25 - 150				08/09/18 14:06	08/09/18 20:01	1

### **Client Sample Results**

Client: Shannon & Wilson, Inc

Date Received: 08/07/18 10:10

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Client Sample ID: 569712 Lab Sample ID: 320-41852-2 Date Collected: 08/03/18 14:38

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	53		2.0	0.92	ng/L		08/09/18 14:06	08/09/18 20:19	1
Perfluorohexanesulfonic acid (PFHxS)	240		2.0	0.87	ng/L		08/09/18 14:06	08/09/18 20:19	1
Perfluoroheptanoic acid (PFHpA)	17		2.0	0.80	ng/L		08/09/18 14:06	08/09/18 20:19	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		08/09/18 14:06	08/09/18 20:19	1
Perfluorooctanesulfonic acid (PFOS)	7.2		2.0	1.3	ng/L		08/09/18 14:06	08/09/18 20:19	1
Perfluorononanoic acid (PFNA)	1.8	J	2.0	0.65	ng/L		08/09/18 14:06	08/09/18 20:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	93		25 - 150				08/09/18 14:06	08/09/18 20:19	1
13C4-PFHpA	103		25 - 150				08/09/18 14:06	08/09/18 20:19	1
13C4 PFOA	112		25 - 150				08/09/18 14:06	08/09/18 20:19	1
13C4 PFOS	100		25 - 150				08/09/18 14:06	08/09/18 20:19	1
13C5 PFNA	109		25 - 150				08/09/18 14:06	08/09/18 20:19	1

### **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

		Percent Isotope Dilution Recovery (Accepta						
		PFHxS	PFHpA	PFOA	PFOS	PFNA		
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)		
320-41852-1	462659	110	116	117	104	112		
320-41852-2	569712	93	103	112	100	109		
LCS 320-239052/2-A	Lab Control Sample	105	111	106	101	104		
LCSD 320-239052/3-A	Lab Control Sample Dup	103	108	106	103	101		
MB 320-239052/1-A	Method Blank	106	108	105	96	100		

#### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

8/14/2018

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SDG: 20060-002

Client: Shannon & Wilson, Inc

Matrix: Water

Lab Sample ID: MB 320-239052/1-A

TestAmerica Job ID: 320-41852-1 Project/Site: FAI

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

Matrix. Water								riep Type. It	Juli IIA
Analysis Batch: 239127								Prep Batch:	239052
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/09/18 14:05	08/09/18 17:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		08/09/18 14:05	08/09/18 17:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/09/18 14:05	08/09/18 17:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		08/09/18 14:05	08/09/18 17:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		08/09/18 14:05	08/09/18 17:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/09/18 14:05	08/09/18 17:34	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	106		25 - 150				08/09/18 14:05	08/09/18 17:34	1
13C4-PFHpA	108		25 - 150				08/09/18 14:05	08/09/18 17:34	1
13C4 PFOA	105		25 - 150				08/09/18 14:05	08/09/18 17:34	1
13C4 PFOS	96		25 - 150				08/09/18 14:05	08/09/18 17:34	1

Lab Sample ID: LCS 320-239052/2-A

Lab Sample ID: LCSD 320-239052/3-A

**Matrix: Water** 

**Matrix: Water** 

13C5 PFNA

**Analysis Batch: 239127** 

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

08/09/18 14:05 08/09/18 17:34

**Prep Batch: 239052** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits 17.7 20.0 ng/L 113 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 20.1 110 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 22.7 ng/L 113 71 - 138 Perfluorooctanoic acid (PFOA) 20.0 23.6 ng/L 70 - 140 118 18.6 21.6 ng/L 116 69 - 144 Perfluorooctanesulfonic acid (PFOS) Perfluorononanoic acid (PFNA) 20.0 22.6 ng/L 113 73 - 147

25 - 150

LCS LCS

100

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	105		25 - 150
13C4-PFHpA	111		25 - 150
13C4 PFOA	106		25 - 150
13C4 PFOS	101		25 - 150
13C5 PFNA	104		25 - 150

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

Prep Type: Total/NA Prep Batch: 239052

**Analysis Batch: 239127** LCSD LCSD Spike %Rec. **RPD** Added Result Qualifier Analyte Unit D %Rec Limits RPD Limit 17.7 19.2 109 72 - 151 30 ng/L Perfluorobutanesulfonic acid (PFBS) 18.2 18.7 103 73 - 157 30 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 108 30 21.7 ng/L 71 - 138 Perfluorooctanoic acid (PFOA) 20.0 70 - 140 23.4 ng/L 117 30 Perfluorooctanesulfonic acid 18.6 19.7 ng/L 106 69 - 144 30 Perfluorononanoic acid (PFNA) 20.0 22.5 ng/L 113 73 \_ 147 n 30

TestAmerica Sacramento

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### **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

,	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	103		25 - 150
13C4-PFHpA	108		25 - 150
13C4 PFOA	106		25 - 150
13C4 PFOS	103		25 - 150
13C5 PFNA	101		25 - 150

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## **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

### LCMS

### **Prep Batch: 239052**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41852-1	462659	Total/NA	Water	PFAS Prep	
320-41852-2	569712	Total/NA	Water	PFAS Prep	
MB 320-239052/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-239052/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-239052/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### **Analysis Batch: 239127**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41852-1	462659	Total/NA	Water	WS-LC-0025 At1	239052
320-41852-2	569712	Total/NA	Water	WS-LC-0025 At1	239052
MB 320-239052/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	239052
LCS 320-239052/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	239052
LCSD 320-239052/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	239052

### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Lab Sample ID: 320-41852-1 Client Sample ID: 462659 Date Collected: 08/02/18 09:59

**Matrix: Water** 

Date Received: 08/07/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	239052	08/09/18 14:06	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			239127	08/09/18 20:01	S1M	TAL SAC

Lab Sample ID: 320-41852-2 Client Sample ID: 569712

Date Collected: 08/03/18 14:38 **Matrix: Water** 

Date Received: 08/07/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	239052	08/09/18 14:06	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			239127	08/09/18 20:19	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: FAI

TestAmerica Job ID: 320-41852-1
SDG: 20060-002

### **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	<b>Identification Number</b>	<b>Expiration Date</b>
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	11-06-18
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

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### **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-41852-1

SDG: 20060-002

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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### **Sample Summary**

Matrix

Water

Water

Client: Shannon & Wilson, Inc

Client Sample ID

462659

569712

Project/Site: FAI

Lab Sample ID

320-41852-1

320-41852-2

TestAmerica Job ID: 320-41852-1 SDG: 20060-002

08/02/18 09:59 08/07/18 10:10

08/03/18 14:38 08/07/18 10:10

Collected	Received

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SHANNON & WILSON, INC. 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 www.shannonwilson.com		CHAIN-OF-CUSTODY RECORI	(include pres	Attn: D. All H. C. C.
Turn Around Time:    Normal   Rush     Please Specify     Sample Identity     Sample I	Quote No:         J-Flags:          \text{Yes}  \text{No}         \text{Dail Dail Lab No.}	Date Sampled X X S/3/18 X		Remarks/Matrix  Logical Composition/Grab?  Sample Containers  A GOUAC WARK  Sample Containers
Project Information	Sample Receipt	Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Number: 2000 0-00	Total No. of Containers:	Signature: Time: 1600	Signaturie: Time: Time:	Signature: Time:
Contact: MDN Ongoing Project? YesK No	Received Good Cond./Cold	Printed Name: Date 3/6/19	Printed Name: Date: M. O. A. A. D. Date: M. D. A. A. D.	Date: Date:
3	2	Shermen + Wilson Inc	Company:	Company:
		Received By: 1.	Received By: 2.	Received By: 3.
		Signature: Time:	Signature: Time 43.5	Signature: Time:
320-41852 Chain of Custody	ustody	Printed Name: Date:	Printed Name: Date: \$77/15	Printed Name: Date:
Distribution: White - w/shipment - returned to Shannor Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file	Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file	Company:	Company: 74-5HC	Company:

Client: Shannon & Wilson, Inc

Job Number: 320-41852-1 SDG Number: 20060-002

List Source: TestAmerica Sacramento

Login Number: 41852 List Number: 1

**Creator: Turpen, Troy** 

Creator: Turpen, Troy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**TestAmerica Sacramento** 

### **Laboratory Data Review Checklist**

Completed By:
Adam Wyborny
itle:
Environmental Engineering Staff
Pate:
August 27, 2018
S Report Name:
Fairbanks International Airport (FAI)
Leport Date:
August 14, 2018
Consultant Firm:
Shannon & Wilson, Inc.
aboratory Name:
TestAmerica Laboratories, Inc.
aboratory Report Number:
320-41852-1
DEC File Number:
100.38.277
Iazard Identification Number:
26816

320	20-41852-1				
1.	Labo	ratory			
	a.	Did an ADI	EC CS approved laborate	ory receive and <u>perform</u> all of the submitted sample analyses?	
		O Yes	• No	Comments:	
	ce	rtified for per		aboratory for analysis of PFASs. However, the laboratory is n drinking water analysis by the National Environmental LAP) in Oregon.	
			*	to another "network" laboratory or sub-contracted to an oratory performing the analyses ADEC CS approved?	
		O Yes	• No	Comments:	
	Ar	nalyses were	performed by TestAmer	ica Laboratories, Inc. in West Sacramento, CA.	
2.	Chair	n of Custody	(CoC)		
	a.	CoC inform	nation completed, signed	, and dated (including released/received by)?	
		Yes	C No	Comments:	
	b.	Correct Ana	alyses requested?		
		Yes	O No	Comments:	
3.	Labo	ratory Sampl	e Receipt Documentation	<u>n</u>	
	a.	Sample/coo	ler temperature docume	nted and within range at receipt (0° to 6° C)?	
		Yes	O No	Comments:	
	Th	ne sample coo	oler was recorded at 3.6°	C upon receipt at the laboratory.	
	b.		servation acceptable – ac lorinated Solvents, etc.)	eidified waters, Methanol preserved VOC soil (GRO, BTEX,	
		Yes	O No	Comments:	
	Ar	nalysis of PF	AS compounds does not	require a preservative other than temperature control.	
	c.	Sample con	dition documented – bro	oken, leaking (Methanol), zero headspace (VOC vials)?	
		<ul><li>Yes</li></ul>	O No	Comments:	
	The sample receipt form notes that the samples were received in good condition.				

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		reservation,	pancies, were they documented? For example, incorrect sample sample temperature outside of acceptable range, insufficient or missing			
	O Yes	No	Comments:			
	There were no	discrepancies	s noted in the sample receipt documentation.			
_	e. Data quality	or usability	affected?			
			Comments:			
	Data quality or	usability are	not affected; see above.			
4.	Case Narrative	<u>.</u>				
	a. Present and	l understanda	able?			
	Yes	O No	Comments:			
	b. Discrepancies, errors, or QC failures identified by the lab?					
	© Yes © No Comments:					
	The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 3.6° C.					
	The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) with preparation batch 320-239052. It also notes the samples were observed to have a yellowish color.					
	c. Were all corrective actions documented?					
	© Yes © No Comments:					
	There were no corrective actions documented in the case narrative.					
	d. What is the effect on data quality/usability according to the case narrative?					
	Comments:					
	The case narra	tive does not	note an effect on data quality.			
<u>Sa</u>	mples Results					
	a. Correct and	alyses perform	med/reported as requested on COC?			
	Yes	O No	Comments:			

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100	O No	Comments:		
· ·	•	he water samples were analyzed using direct injection and in-line e for analysis using direct aqueous injection (DAI) was met for all		
c. All soils reported on a dry weight basis?				
O Yes	• No	Comments:		
N/A; soil sam	ples were not su	bmitted with this work order.		
d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?				
Yes	O No	Comments:		
drinking wate	r health advisory	estAmerica Reporting Limit (RL), is less than applicable EPA lifeting levels and ADEC groundwater cleanup levels for PFOS and PFOA		
•	ty or usability af			
© Yes		Comments:		
The data qual	ity and usability	were not affected.		
C Samples				
a. Method B	lank			
i. One method blank reported per matrix, analysis and 20 samples?				
• Yes	O No	Comments:		
ii. All method blank results less than limit of quantitation (LOQ)?				
• Yes	O No	Comments:		
iii. If above LOQ, what samples are affected?				
Comments:				
None; PFAS	compounds were	not detected in method blank sample.		
iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?				
iv. Do	the affected san	ipic(s) have data mags? If so, are the data mags clearly defined?		

V.	Data	quality or u	sability affected?			
			Comments:			
The data	The data quality and usability were not affected.					
b. Labor	atory	Control Sam	ple/Duplicate (LCS/LCSD)			
i.	_		LCS/LCSD reported per mata methods, LCS required per S	rix, analysis and 20 samples? (LCS/LCSD SW846)		
•	Yes	O No	Comments:			
ii.		als/Inorganic amples?	s – one LCS and one sample	duplicate reported per matrix, analysis and		
0	Yes	No	Comments:			
Metals an	nd/or i	norganics we	ere not analyzed as part of thi	is work order.		
iii	iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)					
•	Yes	O No	Comments:			
iv	<ul> <li>iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)</li> </ul>					
•	Yes	O No	Comments:			
V.	If%	R or RPD is	outside of acceptable limits,	what samples are affected?		
			Comment	CS:		
N/A; anal	lytical	accuracy an	d precision were within acce	ptable limits.		
vi	. Do t	he affected s	ample(s) have data flags? If	so, are the data flags clearly defined?		
0	Yes	<ul><li>No</li></ul>	Comments:			
Qualifica	tion o	f the data wa	s not required; see above.			

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:				
The data quality and usability were not affected.				
c. Surrogates – Organics Only				
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?				
• Yes • No Comments:				
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.				
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>				
• Yes • No Comments:				
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?				
○ Yes • No Comments:				
N/A; there were no IDA recovery failures associated with this work order.				
iv. Data quality or usability affected?				
Comments:				
The data quality and usability are not affected; see above.				
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>				
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>				
© Yes © No Comments:				
PFAS compounds are not volatile; therefore, a trip blank is not required.				
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)				
O Yes O No Comments:				
N/A; a trip blank is not required.				

iii. All result	ts less than LOQ?				
O Yes O	No	Comments:			
N/A; a trip blank is a	N/A; a trip blank is not required.				
iv. If above LOQ, what samples are affected?					
	Comments:				
None; a trip blank w	was not submitted with t	his work order.			
v. Data qual	v. Data quality or usability affected?				
	•	Comments:			
The data quality and usability were not affected; see above.					
e. Field Duplicate					
i. One field duplicate submitted per matrix, analysis and 10 project samples?					
A field duplicate sample was not submitted with this work order. However, field duplicate samples are collected at the proper frequency for the overall project.					
ii. Submitted	ed blind to lab?				
O Yes O 1	No	Comments:			
N/A; a field duplicate was not submitted with this work order.					
iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration					
○ Yes • 1	R	2 = Field Duplicate Concentration  Comments:			
N/A; a field duplicat	ate was not submitted w	ith this work order.			
iv. Data qual	lity or usability affected	d? (Use the comment box to explain why or why not.)			
•	•	Comments:			
The data quality and	d usability were not affe	ected.			

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No O Not Applicable
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
© Yes © No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
○ Yes • No Comments:
There were no additional flags/qualifiers required for this work order



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: 320-42091-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Oltina

Authorized for release by: 8/20/2018 2:33:39 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-42091-1

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

### **Qualifiers**

#### **LCMS**

Qualifier	Qualifier Description
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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 (Padicehomistry)

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)

TestAmerica Sacramento

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Job ID: 320-42091-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-42091-1

#### Receipt

The samples were received on 8/14/2018 1:15 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.7° C.

#### **Receipt Exceptions**

One of two poly bottles were received without a label. The sample was in the same bag a pair with the one that had the label. 176095 (320-42091-1)

#### **LCMS**

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-240272.

Method(s) PFAS Prep: The samples have a slight brown color with brown sediment at the bottom: 550132 (320-42091-2), 151203 (320-42091-5), 542512 (320-42091-6), 176222 (320-42091-7), 407464 (320-42091-8), 407364 (320-42091-9) and 407313 (320-42091-10)

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

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TestAmerica Job ID: 320-42091-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Client Sample ID: 176095 Lab Sample ID: 320-42091-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	4.9		2.0	0.87	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.4		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	6.9		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 550132 Lab Sample ID: 320-42091-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	7.0		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 550124 Lab Sample ID: 320-42091-3

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.0	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	26	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	12	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	16	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	17	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	46	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 176397 Lab Sample ID: 320-42091-4

Analyte	Result (	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.7		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	65		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	60		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	53		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: Shannon & Wilson, Inc

Client Sample ID: 176397 (Continued)

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-	420	91-	4
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·		RL	MDL	Unit	Diriac	ט	Method	Prep Type
Perfluorononanoic acid (PFNA)	4	2.0	0.65	ng/L	1	_	WS-LC-0025 At1	Total/NA

#### Client Sample ID: 151203 Lab Sample ID: 320-42091-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.5	2.0	0.92	ng/L		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	2.0	0.87	ng/L	1	At1 WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.9 J	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.4	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	40	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.6 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

#### Client Sample ID: 542512 Lab Sample ID: 320-42091-6

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	69	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	240	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	19	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.0	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.8 J	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

#### Client Sample ID: 176222 Lab Sample ID: 320-42091-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D I	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3	J –	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.2		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.2		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	9.3		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 407464 Lab Sample ID: 320-42091-8

This Detection Summary does not include radiochemical test results.

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Project/Site: FAI

Client: Shannon & Wilson, Inc

Client Sample ID: 407464 (Continued)

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-8

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.3	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	23	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.8	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	17	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.5	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	10	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 407364 Lab Sample ID: 320-42091-9

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.2	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	23	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.2	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	17	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.7	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	11	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 407313 Lab Sample ID: 320-42091-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.92	J	2.0	0.87	ng/L	1	WS-LC-0025	Total/NA
							At1	

This Detection Summary does not include radiochemical test results.

### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-1

**Matrix: Water** 

Client Sample ID: 176095
Date Collected: 08/07/18 13:36
Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 00:01	1
Perfluorohexanesulfonic acid (PFHxS)	4.9		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 00:01	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L		08/16/18 10:31	08/18/18 00:01	1
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 00:01	1
Perfluorooctanesulfonic acid (PFOS)	3.4		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 00:01	1
Perfluorononanoic acid (PFNA)	6.9		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 00:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	110	-	25 - 150				08/16/18 10:31	08/18/18 00:01	1
13C4-PFHpA	119		25 - 150				08/16/18 10:31	08/18/18 00:01	1
13C4 PFOA	121		25 - 150				08/16/18 10:31	08/18/18 00:01	1
13C4 PFOS	106		25 - 150				08/16/18 10:31	08/18/18 00:01	1
13C5 PFNA	117		25 - 150				08/16/18 10:31	08/18/18 00:01	1

### **Client Sample Results**

Client: Shannon & Wilson, Inc

Client Sample ID: 550132

Date Collected: 08/08/18 09:21

Date Received: 08/14/18 13:15

Project/Site: FAI

13C5 PFNA

08/16/18 10:31 08/18/18 00:19

Lab Sample ID: 320-42091-2

TestAmerica Job ID: 320-42091-1

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 00:19	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 00:19	1
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L		08/16/18 10:31	08/18/18 00:19	1
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 00:19	1
Perfluorooctanesulfonic acid (PFOS)	10		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 00:19	1
Perfluorononanoic acid (PFNA)	7.0		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 00:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		25 - 150				08/16/18 10:31	08/18/18 00:19	1
13C4-PFHpA	110		25 - 150				08/16/18 10:31	08/18/18 00:19	1
13C4 PFOA	112		25 - 150				08/16/18 10:31	08/18/18 00:19	1
13C4 PFOS	98		25 - 150				08/16/18 10:31	08/18/18 00:19	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-3

Matrix: Water

Client Sample ID: 550124
Date Collected: 08/08/18 10:42
Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.0		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 00:38	1
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 00:38	1
Perfluoroheptanoic acid (PFHpA)	12		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 00:38	1
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 00:38	1
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 00:38	1
Perfluorononanoic acid (PFNA)	46		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 00:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	108	-	25 - 150				08/16/18 10:31	08/18/18 00:38	1
13C4-PFHpA	117		25 - 150				08/16/18 10:31	08/18/18 00:38	1
13C4 PFOA	120		25 - 150				08/16/18 10:31	08/18/18 00:38	1
13C4 PFOS	107		25 - 150				08/16/18 10:31	08/18/18 00:38	1
13C5 PFNA	118		25 - 150				08/16/18 10:31	08/18/18 00:38	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-4

**Matrix: Water** 

Client Sample ID: 176397
Date Collected: 08/08/18 11:35
Date Received: 08/14/18 13:15

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.7		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 00:56	1
Perfluorohexanesulfonic acid (PFHxS)	65		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 00:56	1
Perfluoroheptanoic acid (PFHpA)	60		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 00:56	1
Perfluorooctanoic acid (PFOA)	53		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 00:56	1
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 00:56	1
Perfluorononanoic acid (PFNA)	54		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 00:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				08/16/18 10:31	08/18/18 00:56	1
13C4-PFHpA	111		25 - 150				08/16/18 10:31	08/18/18 00:56	1
13C4 PFOA	112		25 - 150				08/16/18 10:31	08/18/18 00:56	1
13C4 PFOS	104		25 - 150				08/16/18 10:31	08/18/18 00:56	1
13C5 PFNA	111		25 - 150				08/16/18 10:31	08/18/18 00:56	1

TestAmerica Sacramento

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-5

Matrix: Water

Client Sample ID: 151203 Date Collected: 08/08/18 13:22 Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.5		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 01:15	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 01:15	1
Perfluoroheptanoic acid (PFHpA)	1.9	J	2.0	0.80	ng/L		08/16/18 10:31	08/18/18 01:15	1
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 01:15	1
Perfluorooctanesulfonic acid (PFOS)	40		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 01:15	1
Perfluorononanoic acid (PFNA)	1.6	J	2.0	0.65	ng/L		08/16/18 10:31	08/18/18 01:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				08/16/18 10:31	08/18/18 01:15	1
13C4-PFHpA	110		25 - 150				08/16/18 10:31	08/18/18 01:15	1
13C4 PFOA	114		25 - 150				08/16/18 10:31	08/18/18 01:15	1
13C4 PFOS	97		25 - 150				08/16/18 10:31	08/18/18 01:15	1
13C5 PFNA	111		25 - 150				08/16/18 10:31	08/18/18 01:15	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-6

Matrix: Water

Client Sample ID: 542512 Date Collected: 08/10/18 11:07 Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	69		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 01:51	1
Perfluorohexanesulfonic acid (PFHxS)	240		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 01:51	1
Perfluoroheptanoic acid (PFHpA)	19		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 01:51	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 01:51	1
Perfluorooctanesulfonic acid (PFOS)	6.0		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 01:51	1
Perfluorononanoic acid (PFNA)	1.8	J	2.0	0.65	ng/L		08/16/18 10:31	08/18/18 01:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				08/16/18 10:31	08/18/18 01:51	1
13C4-PFHpA	110		25 - 150				08/16/18 10:31	08/18/18 01:51	1
13C4 PFOA	114		25 - 150				08/16/18 10:31	08/18/18 01:51	1
13C4 PFOS	105		25 - 150				08/16/18 10:31	08/18/18 01:51	1
13C5 PFNA	115		25 - 150				08/16/18 10:31	08/18/18 01:51	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-7

Matrix: Water

Client Sample ID: 176222 Date Collected: 08/10/18 10:12 Date Received: 08/14/18 13:15

Method: WS-LC-0025 At1 - Flu Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.3	J	2.0	0.92	ng/L		08/16/18 10:31	08/18/18 02:10	1
Perfluorohexanesulfonic acid (PFHxS)	8.2		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 02:10	1
Perfluoroheptanoic acid (PFHpA)	2.2		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 02:10	1
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 02:10	1
Perfluorooctanesulfonic acid (PFOS)	5.3		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 02:10	1
Perfluorononanoic acid (PFNA)	9.3		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 02:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				08/16/18 10:31	08/18/18 02:10	1
13C4-PFHpA	111		25 - 150				08/16/18 10:31	08/18/18 02:10	1
13C4 PFOA	111		25 - 150				08/16/18 10:31	08/18/18 02:10	1
13C4 PFOS	104		25 - 150				08/16/18 10:31	08/18/18 02:10	1
13C5 PFNA	113		25 - 150				08/16/18 10:31	08/18/18 02:10	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-8

**Matrix: Water** 

Client Sample ID: 407464
Date Collected: 08/10/18 14:12
Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.3		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 02:28	1
Perfluorohexanesulfonic acid (PFHxS)	23		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 02:28	1
Perfluoroheptanoic acid (PFHpA)	6.8		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 02:28	1
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 02:28	1
Perfluorooctanesulfonic acid (PFOS)	4.5		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 02:28	1
Perfluorononanoic acid (PFNA)	10		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 02:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				08/16/18 10:31	08/18/18 02:28	1
13C4-PFHpA	112		25 - 150				08/16/18 10:31	08/18/18 02:28	1
13C4 PFOA	119		25 - 150				08/16/18 10:31	08/18/18 02:28	1
13C4 PFOS	104		25 - 150				08/16/18 10:31	08/18/18 02:28	1
13C5 PFNA	110		25 - 150				08/16/18 10:31	08/18/18 02:28	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-9

Matrix: Water

Client Sample ID: 407364 Date Collected: 08/10/18 14:22 Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.2		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 02:46	1
Perfluorohexanesulfonic acid (PFHxS)	23		2.0	0.87	ng/L		08/16/18 10:31	08/18/18 02:46	1
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 02:46	1
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 02:46	1
Perfluorooctanesulfonic acid (PFOS)	4.7		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 02:46	1
Perfluorononanoic acid (PFNA)	11		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 02:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	108		25 - 150				08/16/18 10:31	08/18/18 02:46	1
13C4-PFHpA	114		25 - 150				08/16/18 10:31	08/18/18 02:46	1
13C4 PFOA	118		25 - 150				08/16/18 10:31	08/18/18 02:46	1
13C4 PFOS	107		25 - 150				08/16/18 10:31	08/18/18 02:46	1
13C5 PFNA	111		25 - 150				08/16/18 10:31	08/18/18 02:46	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-10

Matrix: Water

Client Sample ID: 407313

Date Collected: 08/10/18 13:42

Date Received: 08/14/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/16/18 10:31	08/18/18 03:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.92	J	2.0	0.87	ng/L		08/16/18 10:31	08/18/18 03:05	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/16/18 10:31	08/18/18 03:05	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		08/16/18 10:31	08/18/18 03:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		08/16/18 10:31	08/18/18 03:05	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/16/18 10:31	08/18/18 03:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				08/16/18 10:31	08/18/18 03:05	1
13C4-PFHpA	115		25 - 150				08/16/18 10:31	08/18/18 03:05	1
13C4 PFOA	118		25 - 150				08/16/18 10:31	08/18/18 03:05	1
13C4 PFOS	103		25 - 150				08/16/18 10:31	08/18/18 03:05	1
13C5 PFNA	115		25 - 150				08/16/18 10:31	08/18/18 03:05	1

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# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Acceptance Li
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-42091-1	176095	110	119	121	106	117
320-42091-2	550132	102	110	112	98	111
320-42091-3	550124	108	117	120	107	118
320-42091-4	176397	105	111	112	104	111
320-42091-5	151203	102	110	114	97	111
320-42091-6	542512	101	110	114	105	115
320-42091-7	176222	104	111	111	104	113
320-42091-8	407464	107	112	119	104	110
320-42091-9	407364	108	114	118	107	111
320-42091-10	407313	107	115	118	103	115
LCS 320-240272/2-A	Lab Control Sample	96	102	106	96	98
LCSD 320-240272/3-A	Lab Control Sample Dup	99	102	109	99	99
MB 320-240272/1-A	Method Blank	102	105	112	100	104

#### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-42091-1

08/16/18 10:31 08/17/18 22:29

08/16/18 10:31 08/17/18 22:29

Client: Shannon & Wilson, Inc Project/Site: FAI

13C4 PFOS

13C5 PFNA

#### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

100

104

Lab Sample ID: MB 320-240272/1-A
Matrix: Water
Analysis Batch: 240433

MB MB

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 240272

Analysis Batch: 240433								Prep Batch:	240272
•	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/16/18 10:31	08/17/18 22:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		08/16/18 10:31	08/17/18 22:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/16/18 10:31	08/17/18 22:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		08/16/18 10:31	08/17/18 22:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		08/16/18 10:31	08/17/18 22:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/16/18 10:31	08/17/18 22:29	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		25 - 150				08/16/18 10:31	08/17/18 22:29	1
13C4-PFHpA	105		25 - 150				08/16/18 10:31	08/17/18 22:29	1
13C4 PFOA	112		25 - 150				08/16/18 10:31	08/17/18 22:29	1

Lab Sample ID: LCS 320-240272/2-A

Client Sample ID: Lab Control Sample Matrix: Water

Prep Type: Total/NA

25 - 150

25 - 150

Analysis Batch: 240433

Prep Batch: 240272

Snike LCS LCS %Rec

	<b>Бріке</b>	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D '	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	20.4		ng/L		115	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	20.1		ng/L		110	73 <sub>-</sub> 157	
Perfluoroheptanoic acid (PFHpA)	20.0	23.3		ng/L		116	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	22.8		ng/L		114	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	20.0		ng/L		108	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	22.4		ng/L		112	73 - 147	

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	96		25 - 150
13C4-PFHpA	102		25 - 150
13C4 PFOA	106		25 - 150
13C4 PFOS	96		25 - 150
13C5 PFNA	98		25 - 150

Lab Sample ID: LCSD 320-240272/3-A

Matrix: Water

Analysis Batch: 240433

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 240272

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.4		ng/L		109	72 - 151	5	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.3		ng/L		106	73 - 157	4	30
Perfluoroheptanoic acid (PFHpA)	20.0	22.0		ng/L		110	71 - 138	5	30
Perfluorooctanoic acid (PFOA)	20.0	21.8		ng/L		109	70 - 140	5	30
Perfluorooctanesulfonic acid (PFOS)	18.6	19.9		ng/L		107	69 - 144	1	30
Perfluorononanoic acid (PFNA)	20.0	23.4		ng/L		117	73 - 147	5	30

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

_	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	99		25 - 150
13C4-PFHpA	102		25 - 150
13C4 PFOA	109		25 - 150
13C4 PFOS	99		25 - 150
13C5 PFNA	99		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

### LCMS

#### **Prep Batch: 240272**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42091-1	176095	Total/NA	Water	PFAS Prep	
320-42091-2	550132	Total/NA	Water	PFAS Prep	
320-42091-3	550124	Total/NA	Water	PFAS Prep	
320-42091-4	176397	Total/NA	Water	PFAS Prep	
320-42091-5	151203	Total/NA	Water	PFAS Prep	
320-42091-6	542512	Total/NA	Water	PFAS Prep	
320-42091-7	176222	Total/NA	Water	PFAS Prep	
320-42091-8	407464	Total/NA	Water	PFAS Prep	
320-42091-9	407364	Total/NA	Water	PFAS Prep	
320-42091-10	407313	Total/NA	Water	PFAS Prep	
MB 320-240272/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-240272/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-240272/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Analysis Batch: 240433**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42091-1	176095	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-2	550132	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-3	550124	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-4	176397	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-5	151203	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-6	542512	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-7	176222	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-8	407464	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-9	407364	Total/NA	Water	WS-LC-0025 At1	240272
320-42091-10	407313	Total/NA	Water	WS-LC-0025 At1	240272
MB 320-240272/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	240272
LCS 320-240272/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	240272
LCSD 320-240272/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	240272

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 176095 Lab Sample ID: 320-42091-1 Date Collected: 08/07/18 13:36 **Matrix: Water** 

Date Received: 08/14/18 13:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 00:01	S1M	TAL SAC

Lab Sample ID: 320-42091-2 Client Sample ID: 550132 **Matrix: Water** 

Date Collected: 08/08/18 09:21

Date Received: 08/14/18 13:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 00:19	S1M	TAL SAC

Client Sample ID: 550124 Lab Sample ID: 320-42091-3 Date Collected: 08/08/18 10:42 **Matrix: Water** 

Date Received: 08/14/18 13:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 00:38	S1M	TAL SAC

Client Sample ID: 176397 Lab Sample ID: 320-42091-4 **Matrix: Water** 

Date Collected: 08/08/18 11:35

Date Received: 08/14/18 13:15

_	Batch	Batch	_	Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 00:56	S1M	TAL SAC

Client Sample ID: 151203 Lab Sample ID: 320-42091-5 **Matrix: Water** 

Date Collected: 08/08/18 13:22

Date Received: 08/14/18 13:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 01:15	S1M	TAL SAC

Client Sample ID: 542512 Lab Sample ID: 320-42091-6 Date Collected: 08/10/18 11:07 **Matrix: Water** 

Date Received: 08/14/18 13:15

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 01:51	S1M	TAL SAC

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#### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID: 320-42091-7

Date Collected: 08/10/18 10:12 **Matrix: Water** 

Date Received: 08/14/18 13:15

Client Sample ID: 176222

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 02:10	S1M	TAL SAC

Lab Sample ID: 320-42091-8 Client Sample ID: 407464

Date Collected: 08/10/18 14:12 Date Received: 08/14/18 13:15

Dil Batch Batch Initial Final Batch Prepared **Prep Type** Type Method Run **Factor Amount Amount** Number or Analyzed **Analyst** Lab Prep Total/NA **PFAS Prep** 1.00 mL 1.66 mL 240272 08/16/18 10:31 QCP TAL SAC Total/NA Analysis WS-LC-0025 At1 240433 08/18/18 02:28 S1M TAL SAC 1

Client Sample ID: 407364 Lab Sample ID: 320-42091-9 **Matrix: Water** 

Date Collected: 08/10/18 14:22 Date Received: 08/14/18 13:15

Dil Initial Batch Batch Batch Final Prepared Method **Prep Type** Type Run **Factor Amount** Amount Number or Analyzed **Analyst** Total/NA **PFAS Prep** 1.00 mL 1.66 mL 240272 08/16/18 10:31 QCP TAL SAC Prep 240433 Total/NA Analysis WS-LC-0025 At1 08/18/18 02:46 S1M TAL SAC 1

Client Sample ID: 407313 Lab Sample ID: 320-42091-10 **Matrix: Water** 

Date Collected: 08/10/18 13:42 Date Received: 08/14/18 13:15

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	240272	08/16/18 10:31	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			240433	08/18/18 03:05	S1M	TAL SAC

**Laboratory References:** 

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

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**Matrix: Water** 

# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

#### **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	<b>Expiration Date</b>
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
-lawaii	State Program	9	N/A	01-29-19
Ilinois	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	11-06-18
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42091-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **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: FAI

TestAmerica Job ID: 320-42091-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
320-42091-1	176095	Water	08/07/18 13:36 08/14/18 13:15
320-42091-2	550132	Water	08/08/18 09:21 08/14/18 13:15
320-42091-3	550124	Water	08/08/18 10:42 08/14/18 13:15
320-42091-4	176397	Water	08/08/18 11:35 08/14/18 13:15
320-42091-5	151203	Water	08/08/18 13:22 08/14/18 13:15
320-42091-6	542512	Water	08/10/18 11:07 08/14/18 13:15
320-42091-7	176222	Water	08/10/18 10:12 08/14/18 13:15
320-42091-8	407464	Water	08/10/18 14:12 08/14/18 13:15
320-42091-9	407364	Water	08/10/18 14:22 08/14/18 13:15
320-42091-10	407313	Water	08/10/18 13:42 08/14/18 13:15

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8/20/201

Client: Shannon & Wilson, Inc

Job Number: 320-42091-1

Login Number: 42091 List Source: TestAmerica Sacramento

List Number: 1 Creator: Her, David A

Creator: Her, David A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	#1-1 of 2 poly bottle were received without a label
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	

# **Laboratory Data Review Checklist**

Completed By:	
Adam Wyborny	
Title:	
Environmental Engineering Staff	
Date:	
August 27, 2018	
CS Report Name:	
Fairbanks International Airport (FAI	)
Report Date:	
August 20, 2018	
Consultant Firm:	
Shannon & Wilson, Inc.	
Laboratory Name:	
TestAmerica Laboratories, Inc.	
Laboratory Report Number:	
320-42091-1	
ADEC File Number:	
100.38.277	
Hazard Identification Number:	
26816	

320-42	2091-1							
1. <u>Lal</u>	1. <u>Laboratory</u>							
;	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?							
	O Yes	No	Comments:					
	ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.							
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?							
	O Yes	No	Comments:					
	Analyses were	performed by TestAmeric	ea Laboratories, Inc. in West Sacramento, CA.					
2. <u>Ch</u>	ain of Custody	(CoC)						
;	a. CoC inforn	nation completed, signed,	and dated (including released/received by)?					
	Yes	O No	Comments:					
1	b. Correct An	alyses requested?						
_	• Yes	C No	Comments:					
3. <u>Lal</u>	boratory Samp	le Receipt Documentation						
;	a. Sample/coo	oler temperature document	ted and within range at receipt (0° to 6° C)?					
	Yes	O No	Comments:					
	The sample co	oler was recorded at 4.7° (	C upon receipt at the laboratory.					
1	1 1	servation acceptable – acid	dified waters, Methanol preserved VOC soil (GRO, BTEX,					
	Yes	O No	Comments:					
_	Analysis of PF	AS compounds does not r	equire a preservative other than temperature control.					
•	c. Sample cor	ndition documented – brok	en, leaking (Methanol), zero headspace (VOC vials)?					
_	Yes	C No	Comments:					
,	The sample receipt form notes that the samples were received in good condition.							

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,	d. If there were any discrepancies, were they documented? For econtainers/preservation, sample temperature outside of accept samples, etc.?	± '						
	• Yes • No Comments:							
	The sample receipt checklist notes that one sample container was	received without a label.						
	e. Data quality or usability affected?							
	Comments:							
	Data quality or usability are not affected. The container lacking a associated with sample 176095. The second container was labeled same bag. For this reason, the identity of the sample container was	d, and the pair was contained in the						
4.	4. <u>Case Narrative</u>							
	a. Present and understandable?							
Г	© Yes © No Comments:							
	b. Discrepancies, errors, or QC failures identified by the lab?	b. Discrepancies, errors, or QC failures identified by the lab?						
	• Yes • No Comments:							
	The case narrative notes the samples arrived in good condition, I temperature of the sample cooler upon receipt at the laboratory v							
	The case narrative notes that one of two containers for the samplabel.	e 176095 was received without a						
	The case narrative notes there was insufficient sample volume at (MS) and MS duplicate (MSD) with preparation batch 320-2402 contained sediment and were observed to have a slight brown co	72. It also notes that several samples						
	c. Were all corrective actions documented?							
	○ Yes • No Comments:							
	There were no corrective actions documented in the case narrative	ve.						
	d. What is the effect on data quality/usability according to the c	ase narrative?						
	Comments:							
	The case narrative does not note an effect on data quality.							

320-4	2091	-1							
5. <u>Sa</u>	ample	es Results							
	a.	Correct ana	lyses performed/repo	rted as requested on COC?					
		• Yes	O No	Comments:					
	L								
	b.		ole holding times met						
	771	• Yes	O No	Comments:					
	ana	•		ter samples were analyzed using direct injection and in-line nalysis using direct aqueous injection (DAI) was met for all					
	c.	All soils rep	oorted on a dry weigh	t basis?					
		O Yes	⊙ No	Comments:					
	N/A	N/A; soil samples were not submitted with this work order.							
	d.	Are the report the project?	_	the Cleanup Level or the minimum required detection level for					
		Yes		Comments:					
				erica Reporting Limit (RL), is less than applicable EPA lifetime s and ADEC groundwater cleanup levels for PFOS and PFOA.					
	e.	Data quality	or usability affected	?					
		O Yes	<ul><li>No</li></ul>	Comments:					
	The	e data quality	y and usability were i	not affected.					
6. <u>Q</u>	C Sa	mples							
	a.	Method Bla	nk						
		i. One	method blank reporte	ed per matrix, analysis and 20 samples?					
		• Yes	C No	Comments:					
		ii. All r	method blank results	less than limit of quantitation (LOQ)?					
		• Yes	O No	Comments:					
		iii. If ab	ove LOQ, what samp	ples are affected?					
				Comments:					

None; PFAS compounds were not detected in method blank sample.

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iv. Do t	he affected sample(s) hav	re data flags? If so, are the data flags clearly defined?
O Yes	© No	Comments:
Qualification of	f the results was not requi	red; see above.
v. Data	quality or usability affec	ted?
		Comments:
The data quality	y and usability were not a	ffected.
b. Laboratory	Control Sample/Duplicate	e (LCS/LCSD)
_	nnics – One LCS/LCSD reired per AK methods, LC	eported per matrix, analysis and 20 samples? (LCS/LCSD S required per SW846)
Yes	O No	Comments:
	als/Inorganics – one LCS amples?	and one sample duplicate reported per matrix, analysis and
O Yes	<ul><li>No</li></ul>	Comments:
Metals and/or in	norganics were not analyz	zed as part of this work order.
And	project specified DQOs,	eries (%R) reported and within method or laboratory limits? if applicable. (AK Petroleum methods: AK101 60%-120%, 0%-120%; all other analyses see the laboratory QC pages)
Yes	O No	Comments:
labo LCS	ratory limits? And project	nt differences (RPD) reported and less than method or t specified DQOs, if applicable. RPD reported from r sample/sample duplicate. (AK Petroleum methods 20%; all bry QC pages)
Yes	O No	Comments:
v. If %	R or RPD is outside of ac	ceptable limits, what samples are affected?
		Comments:
N/A; analytical	accuracy and precision w	vere within acceptable limits.

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vi. Do t	he affected	sample(s) have data flags? If so, are the data flags clearly defined?	
O Yes	No	Comments:	
Qualification of	f the data w	as not required; see above.	
vii. Data	quality or	usability affected? (Use comment box to explain.)	
		Comments:	
The data quality	y and usabil	lity were not affected.	
c. Surrogates -	- Organics (	Only	
i. Are	surrogate re	ecoveries reported for organic analyses - field, QC and laboratory sampl	les?
• Yes	O No	Comments:	
	and assessin	-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each generated the recovery of each analyte. The isotopically-labeled compounds are this method.	
And	project spe	percent recoveries (%R) reported and within method or laboratory limits crified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other laboratory report pages)	
• Yes	O No	Comments:	
	he sample r	results with failed surrogate recoveries have data flags? If so, are the data fined?	a
O Yes	No	Comments:	
N/A; there were	e no IDA re	covery failures associated with this work order.	
iv. Data	quality or	usability affected?	
		Comments:	
The data quality	y and usabil	lity are not affected; see above.	
d. Trip blank - Soil	- Volatile ar	nalyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water a	and
samj	ples?	reported per matrix, analysis and for each cooler containing volatile planation below.)	
© Yes	No	Comments:	
PFAS compour	ids are not v	volatile; therefore, a trip blank is not required.	

		the trip blank and VOA samples clearly indicated on the laining why must be entered below)
O Yes	• No	Comments:
N/A; a trip blan	k is not required.	
iii. All re	esults less than LOQ?	
O Yes	• No	Comments:
N/A; a trip blan	k is not required.	
iv. If abo	ove LOQ, what samples a	are affected?
		Comments:
None; a trip blan	nk was not submitted witl	h this work order.
v. Data	quality or usability affect	ted?
		Comments:
The data quality	and usability were not at	ffected; see above.
e. Field Duplic	eate	
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?
Yes	O No	Comments:
ii. Subn	nitted blind to lab?	
© Yes	• No	Comments:
The field duplic	ate samples 407364 and 4	407464 were submitted with this work order.
	ommended: 30% water, 5 RPD (%) = Absolute Where	
• Yes	C No	Comments:
	precision between the PFA DQO of 30% for all analy	AS results of the field duplicate samples was within the ytes.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:
The data quality and usability were not affected.
f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
O Yes O No O Not Applicable
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
O Yes O No Comments:
N/A; an equipment blank was not submitted.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
© Yes © No Comments:
There were no additional flags/qualifiers required for this work order.

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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: 320-42344-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jamil Oltimo

Authorized for release by: 9/6/2018 1:32:13 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

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**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-42344-1

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

#### **Qualifiers**

#### **LCMS**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Ciossary	
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) Not Calculated NC

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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

TestAmerica Sacramento

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Job ID: 320-42344-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-42344-1

#### Receipt

The samples were received on 8/21/2018 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6° C.

#### LCMS

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-241948.

Method(s) PFAS Prep: The samples are brown in color and have brown sediment at the bottom of the container: 176044.4 (320-42344-2), 176044.5 (320-42344-3), 176435 (320-42344-4), 579645 (320-42344-5), 120332 (320-42344-6), 173908 (320-42344-10), 120472 (320-42344-11) and 521809 (320-42344-12).

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

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TestAmerica Job ID: 320-42344-1

Client: Shannon & Wilson, Inc

Client Sample ID: 173916

Project/Site: FAI

Lab Sample ID: 320-42344-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac [	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.8	J	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.77	J	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

#### Lab Sample ID: 320-42344-2 Client Sample ID: 176044.4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	45		2.0	0.92	ng/L	1	_	WS-LC-0025	Total/NA
Perfluoroheptanoic acid (PFHpA)	87		2.0	0.80	ng/L	1		At1 WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	86		2.0	0.75	ng/L	1		At1 WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	310		20	8.7	ng/L	10		At1 WS-LC-0025	Total/NA
- DL					Ü			At1	
Perfluorooctanesulfonic acid (PFOS) - DL	450		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 176044.5 Lab Sample ID: 320-42344-3

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	68	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	170	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	470	20	8.7	ng/L	10		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1000	20	13	ng/L	10		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 176435 Lab Sample ID: 320-42344-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.4		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.5		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 579645 Lab Sample ID: 320-42344-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.5	2.0	0.92	ng/L		WS-LC-0025	Total/NA
						At1	
Perfluorohexanesulfonic acid (PFHxS)	59	2.0	0.87	ng/L	1	WS-LC-0025	Total/NA
						At1	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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TestAmerica Job ID: 320-42344-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Client Sample ID: 579645 (Continued) Lab Sample ID: 320-42344-5

Analyte Perfluoroheptanoic acid (PFHpA)	Result 3.5	Qualifier	2.0 —		Unit ng/L	<u>Dil Fac</u> <u>D</u>	WS-LC-0025	Prep Type Total/NA
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.75	ng/L	1	At1 WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.5		2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 120332 Lab Sample ID: 320-42344-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	78		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	15		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	470		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: 483541 Lab Sample ID: 320-42344-7

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	18	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	71	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.5	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.8	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.6	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173002 Lab Sample ID: 320-42344-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.1		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	29		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 391247 Lab Sample ID: 320-42344-9

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.7	2.0	0.92 ng/L		WS-LC-0025	Total/NA
					At1	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

9/6/2018

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TestAmerica Job ID: 320-42344-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Client Sample ID: 391247 (Continued)

Lab Sample ID: 320-42344-9

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	31	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.7	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.1	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

#### Client Sample ID: 173908 Lab Sample ID: 320-42344-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	42		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	8.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.2		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 120472 Lab Sample ID: 320-42344-11

Analyte	Result C	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	97		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	12		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	530		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 521809 Lab Sample ID: 320-42344-12

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.2	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	23	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	15	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	20	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-42344-1

TestAmerica Job ID: 320-42344-1

**Matrix: Water** 

Client Sample ID: 173916 Date Collected: 08/15/18 11:22 Date Received: 08/21/18 10:10

Method: WS-LC-0025 At1 - FI	uorinated A	lkyl Substa	ances						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 15:54	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	J	2.0	0.87	ng/L		08/24/18 15:15	08/26/18 15:54	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 15:54	1
Perfluorooctanoic acid (PFOA)	0.77	J	2.0	0.75	ng/L		08/24/18 15:15	08/26/18 15:54	1
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L		08/24/18 15:15	08/26/18 15:54	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 15:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	106	-	25 - 150				08/24/18 15:15	08/26/18 15:54	1
13C4-PFHpA	107		25 - 150				08/24/18 15:15	08/26/18 15:54	1
13C4 PFOA	111		25 - 150				08/24/18 15:15	08/26/18 15:54	1
13C4 PFOS	106		25 - 150				08/24/18 15:15	08/26/18 15:54	1
13C5 PFNA	109		25 - 150				08/24/18 15:15	08/26/18 15:54	1

Client: Shannon & Wilson, Inc

Client Sample ID: 176044.4 Date Collected: 08/15/18 12:41

Date Received: 08/21/18 10:10

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-2

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	45		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 16:12	1
Perfluoroheptanoic acid (PFHpA)	87		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 16:12	1
Perfluorooctanoic acid (PFOA)	86		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 16:12	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 16:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				08/24/18 15:15	08/26/18 16:12	1
13C4-PFHpA	100		25 - 150				08/24/18 15:15	08/26/18 16:12	1
13C4 PFOA	108		25 - 150				08/24/18 15:15	08/26/18 16:12	1
13C5 PFNA	103		25 - 150				08/24/18 15:15	08/26/18 16:12	1

Method: WS-LC-0025 At1 - F	luorinated Al	kyl Subst	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	310		20	8.7	ng/L		08/24/18 15:15	08/28/18 15:32	10
Perfluorooctanesulfonic acid (PFOS)	450		20	13	ng/L		08/24/18 15:15	08/28/18 15:32	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	114		25 - 150				08/24/18 15:15	08/28/18 15:32	10
13C4 PFOS	107		25 - 150				08/24/18 15:15	08/28/18 15:32	10

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-3

**Matrix: Water** 

Client Sample ID: 176044.5 Date Collected: 08/15/18 13:04 Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	68		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 16:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 16:31	1
Perfluorooctanoic acid (PFOA)	170		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 16:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 16:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	100		25 - 150				08/24/18 15:15	08/26/18 16:31	1
13C4-PFHpA	99		25 - 150				08/24/18 15:15	08/26/18 16:31	1
13C4 PFOA	111		25 - 150				08/24/18 15:15	08/26/18 16:31	1
13C5 PFNA	99		25 - 150				08/24/18 15:15	08/26/18 16:31	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	470		20	8.7	ng/L		08/24/18 15:15	08/28/18 15:50	10
Perfluorooctanesulfonic acid (PFOS)	1000		20	13	ng/L		08/24/18 15:15	08/28/18 15:50	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	116		25 - 150				08/24/18 15:15	08/28/18 15:50	10
13C4 PFOS	114		25 - 150				08/24/18 15:15	08/28/18 15:50	10

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-4

**Matrix: Water** 

Client Sample ID: 176435
Date Collected: 08/15/18 14:38
Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.4		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 16:49	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 16:49	1
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 16:49	1
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 16:49	1
Perfluorooctanesulfonic acid (PFOS)	7.5		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 16:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 16:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	109		25 - 150				08/24/18 15:15	08/26/18 16:49	1
13C4-PFHpA	108		25 - 150				08/24/18 15:15	08/26/18 16:49	1
13C4 PFOA	116		25 - 150				08/24/18 15:15	08/26/18 16:49	1
13C4 PFOS	107		25 - 150				08/24/18 15:15	08/26/18 16:49	1
13C5 PFNA	109		25 - 150				08/24/18 15:15	08/26/18 16:49	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-5

**Matrix: Water** 

Client Sample ID: 579645
Date Collected: 08/14/18 13:30
Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.5		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 17:07	1
Perfluorohexanesulfonic acid (PFHxS)	59		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 17:07	1
Perfluoroheptanoic acid (PFHpA)	3.5		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 17:07	1
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 17:07	1
Perfluorooctanesulfonic acid (PFOS)	4.5		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 17:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 17:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				08/24/18 15:15	08/26/18 17:07	1
13C4-PFHpA	107		25 - 150				08/24/18 15:15	08/26/18 17:07	1
13C4 PFOA	111		25 - 150				08/24/18 15:15	08/26/18 17:07	1
13C4 PFOS	100		25 - 150				08/24/18 15:15	08/26/18 17:07	1
13C5 PFNA	111		25 - 150				08/24/18 15:15	08/26/18 17:07	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-6

**Matrix: Water** 

Client Sample ID: 120332 Date Collected: 08/17/18 11:25 Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 17:26	1
Perfluorohexanesulfonic acid (PFHxS)	78		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 17:26	,
Perfluoroheptanoic acid (PFHpA)	7.1		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 17:26	
Perfluorooctanoic acid (PFOA)	15		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 17:26	
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 17:26	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	108		25 - 150				08/24/18 15:15	08/26/18 17:26	-
13C4-PFHpA	102		25 - 150				08/24/18 15:15	08/26/18 17:26	
13C4 PFOA	106		25 - 150				08/24/18 15:15	08/26/18 17:26	
13C5 PFNA	100		25 - 150				08/24/18 15:15	08/26/18 17:26	
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	ances - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	470		20	13	ng/L		08/24/18 15:15	08/28/18 16:09	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	108		25 - 150				08/24/18 15:15	08/28/18 16:09	10

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-7

**Matrix: Water** 

Client Sample ID: 483541
Date Collected: 08/16/18 14:20
Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	18		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 17:44	1
Perfluorohexanesulfonic acid (PFHxS)	71		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 17:44	1
Perfluoroheptanoic acid (PFHpA)	5.5		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 17:44	1
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 17:44	1
Perfluorooctanesulfonic acid (PFOS)	3.6		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 17:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 17:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	111		25 - 150				08/24/18 15:15	08/26/18 17:44	1
13C4-PFHpA	112		25 - 150				08/24/18 15:15	08/26/18 17:44	1
13C4 PFOA	121		25 - 150				08/24/18 15:15	08/26/18 17:44	1
13C4 PFOS	107		25 - 150				08/24/18 15:15	08/26/18 17:44	1
13C5 PFNA	119		25 - 150				08/24/18 15:15	08/26/18 17:44	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-8

**Matrix: Water** 

Client Sample ID: 173002 Date Collected: 08/16/18 10:34 Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.1		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 18:21	1
Perfluorohexanesulfonic acid (PFHxS)	29		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 18:21	1
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 18:21	1
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 18:21	1
Perfluorooctanesulfonic acid (PFOS)	4.7		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 18:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 18:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				08/24/18 15:15	08/26/18 18:21	1
13C4-PFHpA	107		25 - 150				08/24/18 15:15	08/26/18 18:21	1
13C4 PFOA	112		25 - 150				08/24/18 15:15	08/26/18 18:21	1
13C4 PFOS	100		25 - 150				08/24/18 15:15	08/26/18 18:21	1
13C5 PFNA	108		25 - 150				08/24/18 15:15	08/26/18 18:21	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-9

**Matrix: Water** 

Client Sample ID: 391247
Date Collected: 08/16/18 10:14
Date Received: 08/21/18 10:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid	4.7		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 18:39	1
(PFBS)									
Perfluorohexanesulfonic acid (PFHxS)	31		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 18:39	1
Perfluoroheptanoic acid (PFHpA)	2.3		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 18:39	1
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 18:39	1
Perfluorooctanesulfonic acid (PFOS)	4.1		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 18:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 18:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				08/24/18 15:15	08/26/18 18:39	1
13C4-PFHpA	103		25 - 150				08/24/18 15:15	08/26/18 18:39	1
13C4 PFOA	111		25 - 150				08/24/18 15:15	08/26/18 18:39	1
13C4 PFOS	103		25 - 150				08/24/18 15:15	08/26/18 18:39	1
13C5 PFNA	108		25 - 150				08/24/18 15:15	08/26/18 18:39	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-42344-10

**Matrix: Water** 

TestAmerica Job ID: 320-42344-1

Date Collected: 08/16/18 14:53 Date Received: 08/21/18 10:10

Client Sample ID: 173908

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	42		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 18:58	1
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 18:58	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 18:58	1
Perfluorooctanoic acid (PFOA)	8.4		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 18:58	1
Perfluorooctanesulfonic acid (PFOS)	6.2		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 18:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 18:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				08/24/18 15:15	08/26/18 18:58	1
13C4-PFHpA	105		25 - 150				08/24/18 15:15	08/26/18 18:58	1
13C4 PFOA	115		25 - 150				08/24/18 15:15	08/26/18 18:58	1
13C4 PFOS	104		25 - 150				08/24/18 15:15	08/26/18 18:58	1
13C5 PFNA	108		25 - 150				08/24/18 15:15	08/26/18 18:58	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-42344-11

**Matrix: Water** 

TestAmerica Job ID: 320-42344-1

Date Collected: 08/16/18 12:13 Date Received: 08/21/18 10:10

Client Sample ID: 120472

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 19:16	,
Perfluorohexanesulfonic acid (PFHxS)	97		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 19:16	
Perfluoroheptanoic acid (PFHpA)	12		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 19:16	
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 19:16	
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 19:16	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	112		25 - 150				08/24/18 15:15	08/26/18 19:16	
13C4-PFHpA	109		25 - 150				08/24/18 15:15	08/26/18 19:16	
13C4 PFOA	124		25 - 150				08/24/18 15:15	08/26/18 19:16	
13C5 PFNA	109		25 - 150				08/24/18 15:15	08/26/18 19:16	
Method: WS-LC-0025 At1 - Flu	orinated Al	kyl Substa	ances - DL						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorooctanesulfonic acid (PFOS)	530		20	13	ng/L		08/24/18 15:15	08/31/18 00:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	101		25 - 150				08/24/18 15:15	08/31/18 00:08	

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-42344-12

TestAmerica Job ID: 320-42344-1

**Matrix: Water** 

Date Collected: 08/16/18 13:30 Date Received: 08/21/18 10:10

Client Sample ID: 521809

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.2		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 19:34	1
Perfluorohexanesulfonic acid (PFHxS)	23		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 19:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 19:34	1
Perfluorooctanoic acid (PFOA)	15		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 19:34	1
Perfluorooctanesulfonic acid (PFOS)	20		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 19:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 19:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				08/24/18 15:15	08/26/18 19:34	1
13C4-PFHpA	108		25 - 150				08/24/18 15:15	08/26/18 19:34	1
13C4 PFOA	112		25 - 150				08/24/18 15:15	08/26/18 19:34	1
13C4 PFOS	102		25 - 150				08/24/18 15:15	08/26/18 19:34	1
13C5 PFNA	108		25 - 150				08/24/18 15:15	08/26/18 19:34	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Acceptance Limi	its)
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
320-42344-1	173916	106	107	111	106	109	
320-42344-2	176044.4	101	100	108		103	
320-42344-2 - DL	176044.4	114			107		
320-42344-3	176044.5	100	99	111		99	
320-42344-3 - DL	176044.5	116			114		
320-42344-4	176435	109	108	116	107	109	
320-42344-5	579645	107	107	111	100	111	
320-42344-6	120332	108	102	106		100	
320-42344-6 - DL	120332				108		
320-42344-7	483541	111	112	121	107	119	
320-42344-8	173002	105	107	112	100	108	
320-42344-9	391247	104	103	111	103	108	
320-42344-10	173908	102	105	115	104	108	
320-42344-11	120472	112	109	124		109	
320-42344-11 - DL	120472				101		
320-42344-12	521809	104	108	112	102	108	
_CS 320-241948/2-A	Lab Control Sample	114	113	117	109	106	
.CSD 320-241948/3-A	Lab Control Sample Dup	109	111	109	105	109	
MB 320-241948/1-A	Method Blank	107	109	110	106	106	

#### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-42344-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

MD MD

Lab Sample ID: MB 320-241948/1-A **Matrix: Water** 

**Analysis Batch: 242058** 

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

**Prep Batch: 241948** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		08/24/18 15:15	08/26/18 14:59	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		08/24/18 15:15	08/26/18 14:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		08/24/18 15:15	08/26/18 14:59	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		08/24/18 15:15	08/26/18 14:59	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		08/24/18 15:15	08/26/18 14:59	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		08/24/18 15:15	08/26/18 14:59	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PEHvS	107		25 150				08/24/18 15:15	08/26/18 14:50	

1802 PFHxS 107 25 - 150 08/24/18 15:15 08/26/18 14:59 13C4-PFHpA 109 25 - 150 08/24/18 15:15 08/26/18 14:59 08/24/18 15:15 08/26/18 14:59 13C4 PFOA 110 25 - 150 25 - 150 13C4 PFOS 106 08/24/18 15:15 08/26/18 14:59 13C5 PFNA 106 25 - 150 08/24/18 15:15 08/26/18 14:59

Lab Sample ID: LCS 320-241948/2-A

Lab Sample ID: LCSD 320-241948/3-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 242058** 

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Prep Batch: 241948** %Rec.

LCS LCS Spike Analyte Added Result Qualifier Unit %Rec Limits 17.7 17.0 ng/L 96 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 16.5 91 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 19.0 ng/L 95 71 - 138 20.0 Perfluorooctanoic acid (PFOA) 19.2 96 70 - 140 ng/L 18.6 16.5 89 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS) Perfluorononanoic acid (PFNA) 20.0 19.5 ng/L ٩R 73 - 147 LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	114		25 - 150
13C4-PFHpA	113		25 - 150
13C4 PFOA	117		25 - 150
13C4 PFOS	109		25 - 150
13C5 PFNA	106		25 - 150

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

Prep Type: Total/NA Prep Batch: 241948

**Analysis Batch: 242058** Spike LCSD LCSD %Rec. **RPD** Added Analyte Result Qualifier Unit D %Rec Limits RPD Limit 17.7 72 - 151 0 17.0 ng/L 96 30 Perfluorobutanesulfonic acid (PFBS) 18.2 17.1 94 73 - 157 30 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 97 30 19.5 ng/L 71 - 138 3 Perfluorooctanoic acid (PFOA) 20.0 19.9 ng/L 100 70 - 140 30 Perfluorooctanesulfonic acid 18.6 17.1 ng/L 92 69 - 144 30 Perfluorononanoic acid (PFNA) 20.0 18.6 ng/L 73 \_ 147 5 30

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

	LCSD I	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	109		25 - 150
13C4-PFHpA	111		25 - 150
13C4 PFOA	109		25 - 150
13C4 PFOS	105		25 - 150
13C5 PFNA	109		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-42344-1

Project/Site: FAI

### LCMS

#### **Prep Batch: 241948**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42344-1	173916	Total/NA	Water	PFAS Prep	
320-42344-2	176044.4	Total/NA	Water	PFAS Prep	
320-42344-2 - DL	176044.4	Total/NA	Water	PFAS Prep	
320-42344-3 - DL	176044.5	Total/NA	Water	PFAS Prep	
320-42344-3	176044.5	Total/NA	Water	PFAS Prep	
320-42344-4	176435	Total/NA	Water	PFAS Prep	
320-42344-5	579645	Total/NA	Water	PFAS Prep	
320-42344-6	120332	Total/NA	Water	PFAS Prep	
320-42344-6 - DL	120332	Total/NA	Water	PFAS Prep	
320-42344-7	483541	Total/NA	Water	PFAS Prep	
320-42344-8	173002	Total/NA	Water	PFAS Prep	
320-42344-9	391247	Total/NA	Water	PFAS Prep	
320-42344-10	173908	Total/NA	Water	PFAS Prep	
320-42344-11	120472	Total/NA	Water	PFAS Prep	
320-42344-11 - DL	120472	Total/NA	Water	PFAS Prep	
320-42344-12	521809	Total/NA	Water	PFAS Prep	
MB 320-241948/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-241948/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-241948/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Analysis Batch: 242058**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42344-1	173916	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-2	176044.4	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-3	176044.5	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-4	176435	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-5	579645	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-6	120332	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-7	483541	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-8	173002	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-9	391247	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-10	173908	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-11	120472	Total/NA	Water	WS-LC-0025 At1	241948
320-42344-12	521809	Total/NA	Water	WS-LC-0025 At1	241948
MB 320-241948/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	241948
LCS 320-241948/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	241948
LCSD 320-241948/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	241948

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

### **LCMS (Continued)**

#### **Analysis Batch: 242603**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42344-2 - DL	176044.4	Total/NA	Water	WS-LC-0025	241948
				At1	
320-42344-3 - DL	176044.5	Total/NA	Water	WS-LC-0025	241948
				At1	
320-42344-6 - DL	120332	Total/NA	Water	WS-LC-0025	241948
				At1	

#### **Analysis Batch: 243099**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42344-11 - DL	120472	Total/NA	Water	WS-LC-0025	241948
				At1	

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-42344-1

**Matrix: Water** 

Date Collected: 08/15/18 11:22 Date Received: 08/21/18 10:10

Client Sample ID: 173916

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 15:54	D1R	TAL SAC

Client Sample ID: 176044.4 Lab Sample ID: 320-42344-2

Date Collected: 08/15/18 12:41 **Matrix: Water** 

Date Received: 08/21/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 16:12	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			242603	08/28/18 15:32	D1R	TAL SAC

Client Sample ID: 176044.5 Lab Sample ID: 320-42344-3 **Matrix: Water** 

Date Collected: 08/15/18 13:04

Date Received: 08/21/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 16:31	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			242603	08/28/18 15:50	D1R	TAL SAC

Client Sample ID: 176435 Lab Sample ID: 320-42344-4

Date Collected: 08/15/18 14:38

Date Received: 08/21/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 16:49	D1R	TAL SAC

Client Sample ID: 579645 Lab Sample ID: 320-42344-5 **Matrix: Water** 

Date Collected: 08/14/18 13:30 Date Received: 08/21/18 10:10

Batch Batch Dil Initial Final Batch Prepared Type Method Number or Analyzed **Prep Type** Run **Factor** Amount Amount Analyst Lab Total/NA Prep **PFAS Prep** 1.00 mL 1.66 mL 241948 08/24/18 15:15 QCP TAL SAC 242058 TAL SAC Total/NA Analysis WS-LC-0025 At1 08/26/18 17:07 D1R

TestAmerica Sacramento

**Matrix: Water** 

Project/Site: FAI

Client: Shannon & Wilson, Inc

Client Sample ID: 120332 Lab Sample ID: 320-42344-6 Date Collected: 08/17/18 11:25 **Matrix: Water** 

Date Received: 08/21/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 17:26	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			242603	08/28/18 16:09	D1R	TAL SAC

Client Sample ID: 483541 Lab Sample ID: 320-42344-7 Date Collected: 08/16/18 14:20 **Matrix: Water** 

Date Received: 08/21/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 17:44	D1R	TAL SAC

Client Sample ID: 173002 Lab Sample ID: 320-42344-8 Date Collected: 08/16/18 10:34 **Matrix: Water** 

Date Received: 08/21/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 18:21	D1R	TAL SAC

Client Sample ID: 391247 Lab Sample ID: 320-42344-9 Date Collected: 08/16/18 10:14 **Matrix: Water** 

Date Received: 08/21/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 18:39	D1R	TAL SAC

Lab Sample ID: 320-42344-10 Client Sample ID: 173908 Date Collected: 08/16/18 14:53 **Matrix: Water** 

Date Received: 08/21/18 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep	Kuii		1.00 mL	1.66 mL	241948	08/24/18 15:15		TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 18:58	D1R	TAL SAC

Lab Sample ID: 320-42344-11 Client Sample ID: 120472

Date Collected: 08/16/18 12:13

Date Received: 08/21/18 10:10

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC

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**Matrix: Water** 

#### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Client Sample ID: 120472

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID: 320-42344-11

Matrix: Water

Date Collected: 08/16/18 12:13
Date Received: 08/21/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 19:16	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			243099	08/31/18 00:08	D1R	TAL SAC

Client Sample ID: 521809 Lab Sample ID: 320-42344-12

Date Collected: 08/16/18 13:30 Matrix: Water

Date Received: 08/21/18 10:10

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	241948	08/24/18 15:15	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			242058	08/26/18 19:34	D1R	TAL SAC

**Laboratory References:** 

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

#### **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	<b>Expiration Date</b>
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
-lawaii	State Program	9	N/A	01-29-19
Ilinois	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	11-06-18
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42344-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **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: FAI

TestAmerica Job ID: 320-42344-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42344-1	173916	Water	08/15/18 11:22	08/21/18 10:10
320-42344-2	176044.4	Water	08/15/18 12:41	08/21/18 10:10
320-42344-3	176044.5	Water	08/15/18 13:04	08/21/18 10:10
320-42344-4	176435	Water	08/15/18 14:38	08/21/18 10:10
320-42344-5	579645	Water	08/14/18 13:30	08/21/18 10:10
320-42344-6	120332	Water	08/17/18 11:25	08/21/18 10:10
320-42344-7	483541	Water	08/16/18 14:20	08/21/18 10:10
320-42344-8	173002	Water	08/16/18 10:34	08/21/18 10:10
320-42344-9	391247	Water	08/16/18 10:14	08/21/18 10:10
320-42344-10	173908	Water	08/16/18 14:53	08/21/18 10:10
320-42344-11	120472	Water	08/16/18 12:13	08/21/18 10:10
320-42344-12	521809	Water	08/16/18 13:30	08/21/18 10:10

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No. 35600

Client: Shannon & Wilson, Inc

Job Number: 320-42344-1

List Source: TestAmerica Sacramento

Login Number: 42344

List Number: 1

Creator: Nelson, Kym D

Creator: Nelson, Kym D		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	SEAL
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.	False	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.	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	
viultiphasic samples are not present.	Irue	

True

N/A

**TestAmerica Sacramento** 

Samples do not require splitting or compositing.

Residual Chlorine Checked.

# **Laboratory Data Review Checklist**

Con	Completed By:						
	Kristen Freiburger						
Title	a. v.						
	Senior Chemist						
Date	2:						
	September 8, 2018						
CS ]	Report Name:						
	Fairbanks International Airport (FAI)						
Rep	ort Date:						
	September 6, 2018						
Con	sultant Firm:						
	Shannon & Wilson, Inc.						
Lab	oratory Name:						
	TestAmerica Laboratories, Inc.						
Lab	oratory Report Number:						
	320-42344-1						
AD]	EC File Number:						
	100.38.277						
Haz	ard Identification Number:						
	26816						

320-4	12344-1		
1 7	1		
1. <u>L</u>	<u>aboratory</u>		
	a. Did an AD	EC CS approved laborar	tory receive and <u>perform</u> all of the submitted sample analyses?
	TYes	<b>☑</b> No	Comments:
	certified for pe		laboratory for analysis of PFASs. However, the laboratory is in drinking water analysis by the National Environmental ELAP) in Oregon.
			to another "network" laboratory or sub-contracted to an boratory performing the analyses ADEC CS approved?
	Yes	<b>©</b> No	Comments:
	Analyses were	performed by TestAme	erica Laboratories, Inc. in West Sacramento, CA.
2. <u>C</u>	hain of Custody	(CoC)	
	a. CoC inform	nation completed, signe	d, and dated (including released/received by)?
	<b>©</b> Yes	☑ No	Comments:
	b. Correct An	alyses requested?	
	• Yes	□ No	Comments:
3. <u>L</u>	aboratory Samp	le Receipt Documentation	<u>on</u>
	a. Sample/coo	oler temperature docume	ented and within range at receipt (0° to 6° C)?
	<b>©</b> Yes	□ No	Comments:
	The sample co	oler was recorded at 5.6	° C upon receipt at the laboratory.
		servation acceptable – a alorinated Solvents, etc.	acidified waters, Methanol preserved VOC soil (GRO, BTEX, )?
	• Yes	□ No	Comments:
	Analysis of PF	AS compounds does no	t require a preservative other than temperature control.
	c. Sample cor	ndition documented – br	roken, leaking (Methanol), zero headspace (VOC vials)?
	<b>©</b> Yes	☑ No	Comments:
	The sample rec	ceipt form notes the sam	pples were received in good condition.

2	2	Λ	-423	2/	1/	l_1	١

Yes	<b>⊙</b> No	Comments:
There were no	discrepancies note	ed in the sample receipt documentation.
e. Data quality	or usability affec	eted?
		Comments:
Data quality or	usability are not a	affected; see above.
. Case Narrative	<u> </u>	
a Present and	d understandable?	
E Yes	□ No	Comments:
103		Confinence.
b. Discrepanc	eies, errors, or QC	failures identified by the lab?
•	□ No	Comments:
		aples arrived in good condition, properly preserved, and that the r upon receipt at the laboratory was 5.6° C.
(MS) and MS	duplicate (MSD)	as insufficient sample volume available to perform a matrix spike with preparation batch 320-241948. It also notes several samples wand sediment in the bottom.
c. Were all co	orrective actions d	ocumented?
☐ Yes	<b>©</b> No	Comments:
There were no	corrective actions	s documented in the case narrative.
d. What is the	e effect on data qu	ality/usability according to the case narrative?
		Comments:
The case narra	tive does not note	an effect on data quality.
amples Results		
	alvses nerformed/t	reported as requested on COC?

-42344-1		
b All applical	ole holding time	es met?
	□ No	Comments:
The laboratory	indicates that th	ne water samples were analyzed using direct injection and in-line for analysis using direct aqueous injection (DAI) was met for all
c. All soils rep	orted on a dry v	weight basis?
TYes	<b>⊙</b> No	Comments:
N/A; soil samp	les were not sub	omitted with this work order.
d. Are the repo	-	s than the Cleanup Level or the minimum required detection level for
• Yes	□ No	Comments:
~ 1		stAmerica Reporting Limit (RL), is less than applicable EPA lifetime levels and ADEC groundwater cleanup levels for PFOS and PFOA.
e. Data quality	or usability aff	fected?
TYes	<b>⊙</b> No	Comments:
The data quality	y and usability v	were not affected.
QC Samples		
a Mathad Dla	"1 <sub>2</sub>	
a. Method Bla		reported per matrix, analysis and 20 samples?
<b>©</b> Yes	□ No	Comments:
ii. All 1	nethod blank re	sults less than limit of quantitation (LOQ)?
C Yes	□ No	Comments:
iii If ah	ove LOO what	t samples are affected?

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

Qualification of the results was not required; see above.

None; PFAS compounds were not detected in method blank sample.

**July 2017** Page 4

🖸 No

TYes

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4	71	1_4 /	44	14	_

v. Data quality or usa	ability affected?
	Comments:
The data quality and usability	were not affected.
b. Laboratory Control Sampl	le/Duplicate (LCS/LCSD)
	CS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD nethods, LCS required per SW846)
Yes No	Comments:
ii. Metals/Inorganics 20 samples?	- one LCS and one sample duplicate reported per matrix, analysis and
Yes No	Comments:
Metals and/or inorganics were	e not analyzed as part of this work order.
And project specific	recent recoveries (%R) reported and within method or laboratory limits? Tied DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, 6, AK103 60%-120%; all other analyses see the laboratory QC pages)
☑ Yes ☑ No	Comments:
laboratory limits? A LCS/LCSD, MS/M	ative percent differences (RPD) reported and less than method or And project specified DQOs, if applicable. RPD reported from ASD, and or sample/sample duplicate. (AK Petroleum methods 20%; all the laboratory QC pages)
☑ Yes    No	Comments:
v. If %R or RPD is or	utside of acceptable limits, what samples are affected?
	Comments:
N/A; analytical accuracy and	precision were within acceptable limits.
vi. Do the affected sar	mple(s) have data flags? If so, are the data flags clearly defined?
Yes No	Comments:
Qualification of the data was	not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
☑ Yes ☑ No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
© Yes □ No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
Yes No Comments:
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
☐ Yes ☐ No Comments:
PFAS compounds are not volatile; therefore, a trip blank is not required.
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
☐ Yes    No    Comments:
N/A; a trip blank is not required.

2344-1			
iii.	All	results less than	ı LOQ?
<b>C</b>	l'es	<b>©</b> No	Comments:
N/A; a trip	bla	nk is not require	ed.
iv.	If al	bove LOQ, wha	at samples are affected?
			Comments:
None; a tr	p bl	ank was not sub	omitted with this work order.
v.	Dat	a quality or usal	bility affected?
			Comments:
The data q	ıalit	ty and usability	were not affected; see above.
e. Field I	upli	icate	
i.	One	e field duplicate	e submitted per matrix, analysis and 10 project samples?
0	l'es	□ No	Comments:
		•	not submitted with this work order. However, field duplicate samp quency for the overall project.
ii.	Sub	mitted blind to	lab?
g-9 1	<i>l</i> es	<b>☑</b> No	Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  $(R_1-R_2)$  x 100 RPD (%) = Absolute value of:  $((R_1+R_2)/2)$ 

> Where  $R_1 = Sample Concentration$  $R_2$  = Field Duplicate Concentration

No TYes Comments:

N/A; a field duplicate was not submitted with this work order.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected.

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7 21	()-4	- 2	14	4	- 1

	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).			
	☐ Yes ☐ No   Not Applicable			
	Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.			
	i. All results less than LOQ?			
	☐ Yes ☐ No Comments:			
	N/A; an equipment blank was not submitted.			
	ii. If above LOQ, what samples are affected?			
	Comments:			
	N/A; an equipment blank was not submitted.			
	iii. Data quality or usability affected?			
	Comments:			
	The data quality and usability were not affected.			
7. <u>Ot</u>	her Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)			
	a. Defined and appropriate?			
	Yes No Comments:			
	Due to pump failures and sampling technique needed for sample 120332 we consider the results estimated, flagged with a "J" in the analytical table.			



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: 320-42568-1

Client Project/Site: FAI

Revision: 1

For:

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

Attn: Marcy Nadel



Authorized for release by: 9/10/2018 3:43:11 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

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Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

# 2

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

#### **Qualifiers**

#### **LCMS**

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)

RLReporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Job ID: 320-42568-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-42568-1

#### Receipt

The samples were received on 8/28/2018 1:09 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $5.7^{\circ}$  C.

#### LCMS

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

#### **Organic Prep**

Method(s) PFAS Prep: The following samples were observed to be a light orange color, with some dark orange residue on the bottom of the sample containers:120774 (320-42568-1), 120874 (320-42568-2), 153699 (320-42568-3), 173860 (320-42568-5), 151637 (320-42568-6) and 136891 (320-42568-7).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243729.

Method(s) PFAS Prep: The samples are brown in color and have brown sediment at the bottom of the containers: 151637 (320-42568-6) and 136891 (320-42568-7).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243730.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243916.

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

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TestAmerica Job ID: 320-42568-1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 120774 Lab Sample ID: 320-42568-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.0		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.1		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Lab Sample ID: 320-42568-2 Client Sample ID: 120874

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.4	J –	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.1		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 153699 Lab Sample ID: 320-42568-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	42		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	43		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.4		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 152617 Lab Sample ID: 320-42568-4

Analyte	Result (	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	73		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	21		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	7.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173860 Lab Sample ID: 320-42568-5

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	53	2.0	0.92 ng/L		WS-LC-0025	Total/NA
					At1	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

TestAmerica Job ID: 320-42568-1

Project/Site: FAI

Client: Shannon & Wilson, Inc

Client Sample ID: 173860 (Continued)

Lab Sample ID: 320-42568-5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	I	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	43	2.0	0.87	ng/L	1	WS-LC-	-0025	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.0	2.0	0.80	ng/L	1	WS-LC- At1	-0025	Total/NA
Perfluorooctanoic acid (PFOA)	3.4	2.0	0.75	ng/L	1	WS-LC- At1	0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.7	2.0	1.3	ng/L	1	WS-LC- At1	-0025	Total/NA

# Client Sample ID: 151637 Lab Sample ID: 320-42568-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.9		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.6		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 136891 Lab Sample ID: 320-42568-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	44		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.7		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-1

**Matrix: Water** 

Client Sample ID: 120774
Date Collected: 08/21/18 10:09
Date Received: 08/28/18 13:09

Method: WS-LC-0025 At1 - F	luorinated A	kyl Substa	ances						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.92	ng/L		09/04/18 13:13	09/06/18 12:48	1
Perfluorohexanesulfonic acid (PFHxS)	6.0		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 12:48	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:13	09/06/18 12:48	1
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L		09/04/18 13:13	09/06/18 12:48	1
Perfluorooctanesulfonic acid (PFOS)	3.1		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 12:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 12:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				09/04/18 13:13	09/06/18 12:48	1
13C4-PFHpA	107		25 - 150				09/04/18 13:13	09/06/18 12:48	1
13C4 PFOA	121		25 - 150				09/04/18 13:13	09/06/18 12:48	1
13C4 PFOS	110		25 - 150				09/04/18 13:13	09/06/18 12:48	1
13C5 PFNA	118		25 - 150				09/04/18 13:13	09/06/18 12:48	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-2

**Matrix: Water** 

Client Sample ID: 120874 Date Collected: 08/21/18 09:59 Date Received: 08/28/18 13:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.92	ng/L		09/04/18 13:13	09/06/18 12:30	1
Perfluorohexanesulfonic acid (PFHxS)	6.1		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 12:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:13	09/06/18 12:30	1
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.75	ng/L		09/04/18 13:13	09/06/18 12:30	1
Perfluorooctanesulfonic acid (PFOS)	3.0		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 12:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 12:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				09/04/18 13:13	09/06/18 12:30	1
13C4-PFHpA	106		25 - 150				09/04/18 13:13	09/06/18 12:30	1
13C4 PFOA	115		25 - 150				09/04/18 13:13	09/06/18 12:30	1
13C4 PFOS	108		25 - 150				09/04/18 13:13	09/06/18 12:30	1
13C5 PFNA	110		25 - 150				09/04/18 13:13	09/06/18 12:30	1

TestAmerica Sacramento

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-3

**Matrix: Water** 

Client Sample ID: 153699
Date Collected: 08/21/18 11:47
Date Received: 08/28/18 13:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	42		2.0	0.92	ng/L		09/05/18 12:29	09/07/18 01:02	1
Perfluorohexanesulfonic acid (PFHxS)	43		2.0	0.87	ng/L		09/05/18 12:29	09/07/18 01:02	1
Perfluoroheptanoic acid (PFHpA)	5.4		2.0	0.80	ng/L		09/05/18 12:29	09/07/18 01:02	1
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L		09/05/18 12:29	09/07/18 01:02	1
Perfluorooctanesulfonic acid (PFOS)	5.4		2.0	1.3	ng/L		09/05/18 12:29	09/07/18 01:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/05/18 12:29	09/07/18 01:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	114		25 - 150				09/05/18 12:29	09/07/18 01:02	1
13C4-PFHpA	116		25 - 150				09/05/18 12:29	09/07/18 01:02	1
13C4 PFOA	138		25 - 150				09/05/18 12:29	09/07/18 01:02	1
13C4 PFOS	121		25 - 150				09/05/18 12:29	09/07/18 01:02	1
13C5 PFNA	127		25 - 150				09/05/18 12:29	09/07/18 01:02	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-4

**Matrix: Water** 

Client Sample ID: 152617
Date Collected: 08/21/18 12:23
Date Received: 08/28/18 13:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	73		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 21:12	1
Perfluorohexanesulfonic acid (PFHxS)	21		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 21:12	1
Perfluoroheptanoic acid (PFHpA)	5.8		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 21:12	1
Perfluorooctanoic acid (PFOA)	7.4		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 21:12	1
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 21:12	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 21:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				09/04/18 13:07	09/05/18 21:12	1
13C4-PFHpA	111		25 - 150				09/04/18 13:07	09/05/18 21:12	1
13C4 PFOA	119		25 - 150				09/04/18 13:07	09/05/18 21:12	1
13C4 PFOS	108		25 - 150				09/04/18 13:07	09/05/18 21:12	1
13C5 PFNA	118		25 - 150				09/04/18 13:07	09/05/18 21:12	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

13C5 PFNA

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-5

09/04/18 13:13 09/06/18 12:11

**Matrix: Water** 

Client Sample ID: 173860 Date Collected: 08/23/18 17:56

Date Received: 08/28/18 13:09

	•		MDI	Unit	<b>D</b>	Dranarad	Analyzad	Dil Fac
	Qualifier							DII Fac
53		2.0	0.92	ng/L		09/04/18 13:13	09/06/18 12:11	1
43		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 12:11	1
6.0		2.0	0.80	ng/L		09/04/18 13:13	09/06/18 12:11	1
3.4		2.0	0.75	ng/L		09/04/18 13:13	09/06/18 12:11	1
6.7		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 12:11	1
ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 12:11	1
%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
103		25 - 150				09/04/18 13:13	09/06/18 12:11	1
101		25 - 150				09/04/18 13:13	09/06/18 12:11	1
119		25 - 150				09/04/18 13:13	09/06/18 12:11	1
112		25 - 150				09/04/18 13:13	09/06/18 12:11	1
	Result 53 43 6.0 3.4 6.7 ND %Recovery 103 101 119	Result Qualifier  53  43  6.0  3.4  6.7  ND  %Recovery  103  101  119	53     2.0       43     2.0       6.0     2.0       3.4     2.0       6.7     2.0       ND     2.0       **Recovery Qualifier Limits       103     25-150       101     25-150       119     25-150	Result 53         Qualifier 2.0         RL 2.0         MDL 0.92           43         2.0         0.87           6.0         2.0         0.80           3.4         2.0         0.75           6.7         2.0         1.3           ND         2.0         0.65           %Recovery 101         Qualifier 25 - 150         Limits 25 - 150           101         25 - 150         25 - 150           119         25 - 150         25 - 150	Result 53         Qualifier         RL 2.0         MDL nit ng/L           43         2.0         0.87 ng/L           6.0         2.0         0.80 ng/L           3.4         2.0         0.75 ng/L           6.7         2.0         1.3 ng/L           ND         2.0         0.65 ng/L           %Recovery Qualifier         Limits           103         25 - 150           101         25 - 150           119         25 - 150	Result         Qualifier         RL         MDL         Unit         D           53         2.0         0.92         ng/L         ng/L           43         2.0         0.87         ng/L           6.0         2.0         0.80         ng/L           3.4         2.0         0.75         ng/L           6.7         2.0         1.3         ng/L           ND         2.0         0.65         ng/L           %Recovery         Qualifier         Limits           101         25 - 150           119         25 - 150	Result 53         Qualifier         RL 2.0         MDL ng/L 0.0         D prepared 09/04/18 13:13           43         2.0         0.87 ng/L 09/04/18 13:13           6.0         2.0         0.80 ng/L 09/04/18 13:13           3.4         2.0         0.75 ng/L 09/04/18 13:13           6.7         2.0         1.3 ng/L 09/04/18 13:13           ND         2.0         0.65 ng/L 09/04/18 13:13           %Recovery 103         Qualifier 103         Limits 103           103         25-150 09/04/18 13:13           101         25-150 09/04/18 13:13           119         25-150 09/04/18 13:13	Result Qualifier         RL Qualifier         MDL Qualifier         Unit Qualifier         Description         Prepared Qualifier         Analyzed Qualifier           43         2.0         0.87 ng/L         09/04/18 13:13         09/06/18 12:11           6.0         2.0         0.80 ng/L         09/04/18 13:13         09/06/18 12:11           3.4         2.0         0.75 ng/L         09/04/18 13:13         09/06/18 12:11           6.7         2.0         1.3 ng/L         09/04/18 13:13         09/06/18 12:11           ND         2.0         0.65 ng/L         09/04/18 13:13         09/06/18 12:11           **Recovery Qualifier         **Limits         **Prepared Qualifier         **Analyzed Qualifier           103         25 - 150         09/04/18 13:13         09/06/18 12:11           101         25 - 150         09/04/18 13:13         09/06/18 12:11           119         25 - 150         09/04/18 13:13         09/06/18 12:11

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-6

**Matrix: Water** 

Client Sample ID: 151637 Date Collected: 08/27/18 14:57 Date Received: 08/28/18 13:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		09/04/18 13:07	09/05/18 21:31	1
Perfluorohexanesulfonic acid (PFHxS)	3.9		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 21:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 21:31	1
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L		09/04/18 13:07	09/05/18 21:31	1
Perfluorooctanesulfonic acid (PFOS)	6.6		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 21:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 21:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	106		25 - 150				09/04/18 13:07	09/05/18 21:31	1
13C4-PFHpA	114		25 - 150				09/04/18 13:07	09/05/18 21:31	1
13C4 PFOA	131		25 - 150				09/04/18 13:07	09/05/18 21:31	1
13C4 PFOS	106		25 - 150				09/04/18 13:07	09/05/18 21:31	1
13C5 PFNA	127		25 - 150				09/04/18 13:07	09/05/18 21:31	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-7

**Matrix: Water** 

Client Sample ID: 136891
Date Collected: 08/27/18 13:57
Date Received: 08/28/18 13:09

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	44		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 21:49	1
Perfluoroheptanoic acid (PFHpA)	3.7		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 21:49	1
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 21:49	1
Perfluorooctanesulfonic acid (PFOS)	8.0		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 21:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				09/04/18 13:07	09/05/18 21:49	1
13C4-PFHpA	111		25 - 150				09/04/18 13:07	09/05/18 21:49	1
13C4 PFOA	123		25 - 150				09/04/18 13:07	09/05/18 21:49	1
13C4 PFOS	107		25 - 150				09/04/18 13:07	09/05/18 21:49	1
13C5 PFNA	122		25 - 150				09/04/18 13:07	09/05/18 21:49	1

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# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

-			Perce	ent Isotope	Dilution Re	covery (A
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-42568-1	120774	105	107	121	110	118
20-42568-2	120874	104	106	115	108	110
20-42568-3	153699	114	116	138	121	127
20-42568-4	152617	102	111	119	108	118
20-42568-5	173860	103	101	119	112	115
20-42568-6	151637	106	114	131	106	127
20-42568-7	136891	102	111	123	107	122
S 320-243729/2-A	Lab Control Sample	98	117	118	104	121
S 320-243730/2-A	Lab Control Sample	105	105	118	113	128
CS 320-243916/2-A	Lab Control Sample	121	120	125	124	126
CSD 320-243729/3-A	Lab Control Sample Dup	100	114	119	108	117
CSD 320-243730/3-A	Lab Control Sample Dup	107	110	121	114	123
CSD 320-243916/3-A	Lab Control Sample Dup	109	115	129	118	120
IB 320-243729/1-A	Method Blank	101	115	114	106	118
IB 320-243730/1-A	Method Blank	101	98	117	112	116
ИВ 320-243916/1-A	Method Blank	122	124	128	122	126

#### Surrogate Legend

PFHxS = 1802 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

MB MB

Lab Sample ID: MB 320-243729/1-A

**Matrix: Water** 

Analysis Batch: 243992

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

Prep Batch: 243729

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.92	ng/L		09/04/18 13:05	09/05/18 17:14	1
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	0.87	ng/L		09/04/18 13:05	09/05/18 17:14	1
Perfluoroheptanoic acid (PFHpA)	ND	2.0	0.80	ng/L		09/04/18 13:05	09/05/18 17:14	1
Perfluorooctanoic acid (PFOA)	ND	2.0	0.75	ng/L		09/04/18 13:05	09/05/18 17:14	1
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	1.3	ng/L		09/04/18 13:05	09/05/18 17:14	1
Perfluorononanoic acid (PFNA)	ND	2.0	0.65	ng/L		09/04/18 13:05	09/05/18 17:14	1
	MR MR							

%Recovery Qualifier Limits Prepared Analyzed Dil Fac 25 - 150 09/04/18 13:05 09/05/18 17:14 101 115 25 - 150 09/04/18 13:05 09/05/18 17:14 114 25 - 150 09/04/18 13:05 09/05/18 17:14 106 25 - 150 09/04/18 13:05 09/05/18 17:14

13C5 PFNA 118 25 - 150 09/04/18 13:05 09/05/18 17:14

Lab Sample ID: LCS 320-243729/2-A

**Matrix: Water** 

Isotope Dilution

1802 PFHxS

13C4-PFHpA

13C4 PFOA

13C4 PFOS

**Analysis Batch: 243992** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA Prep Batch: 243729

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 17.7 22.4 126 72 - 151 ng/L Perfluorobutanesulfonic acid (PFBS) 18.2 22.6 124 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 23.1 ng/L 115 71 - 138 20.0 Perfluorooctanoic acid (PFOA) 23.4 70 - 140 ng/L 117 18.6 20.9 112 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS) Perfluorononanoic acid (PFNA) 20.0 23.3 ng/L 116 73 - 147

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	98		25 - 150
13C4-PFHpA	117		25 - 150
13C4 PFOA	118		25 - 150
13C4 PFOS	104		25 - 150
13C5 PFNA	121		25 - 150

Lab Sample ID: LCSD 320-243729/3-A

**Matrix: Water** 

Analysis Batch: 243992

Client Sample ID:	Lab	Control	Sam	ple Dup
		Pren Ty	ne. T	otal/NA

**Prep Batch: 243729** 

•	Analysis Daton. 240002							i icp De	Iton. Z-	10120
	-	Spike	LCSD	LCSD				%Rec.		RPD
1	Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Perfluorobutanesulfonic acid PFBS)	17.7	21.3		ng/L		120	72 - 151	5	30
	Perfluorohexanesulfonic acid PFHxS)	18.2	21.9		ng/L		120	73 - 157	3	30
F	Perfluoroheptanoic acid (PFHpA)	20.0	23.3		ng/L		116	71 - 138	1	30
F	Perfluorooctanoic acid (PFOA)	20.0	23.7		ng/L		118	70 - 140	1	30
	Perfluorooctanesulfonic acid PFOS)	18.6	20.1		ng/L		108	69 - 144	4	30
F	Perfluorononanoic acid (PFNA)	20.0	24.7		ng/L		124	73 - 147	6	30

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Project/Site: FAI

	LCSD LCS	SD
Isotope Dilution	%Recovery Qua	lifier Limits
1802 PFHxS	100	25 - 150
13C4-PFHpA	114	25 - 150
13C4 PFOA	119	25 - 150
13C4 PFOS	108	25 - 150
13C5 PFNA	117	25 - 150

Client Sample ID: Method Blank

Prep Type: Total/NA

**Prep Batch: 243730** 

Lab Sample ID: MB 320-243730/1-A

**Matrix: Water** 

**Analysis Batch: 244213** 

	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:13	09/06/18 07:36	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 07:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:13	09/06/18 07:36	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/04/18 13:13	09/06/18 07:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 07:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 07:36	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				09/04/18 13:13	09/06/18 07:36	1
13C4-PFHnA	98		25 - 150				09/04/18 13:13	09/06/18 07:36	1

isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Anaiyzea	DII Fac
1802 PFHxS	101		25 - 150	09/04/18 13:13	09/06/18 07:36	1
13C4-PFHpA	98		25 - 150	09/04/18 13:13	09/06/18 07:36	1
13C4 PFOA	117		25 - 150	09/04/18 13:13	09/06/18 07:36	1
13C4 PFOS	112		25 - 150	09/04/18 13:13	09/06/18 07:36	1
13C5 PFNA	116		25 - 150	09/04/18 13:13	09/06/18 07:36	1
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Lab Sample ID: LCS 320-243730/2-A

**Matrix: Water** 

**Analysis Batch: 244213** 

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

Prep Batch: 243730

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	20.2		ng/L		114	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	21.4		ng/L		118	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	23.4		ng/L		117	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	24.7		ng/L		123	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	20.4		ng/L		110	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	23.2		ng/L		116	73 - 147	

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	105		25 - 150
13C4-PFHpA	105		25 - 150
13C4 PFOA	118		25 - 150
13C4 PFOS	113		25 - 150
13C5 PFNA	128		25 - 150

Lab Sample ID: LCSD 320-243730/3-A

Matrix: Water

**Analysis Batch: 244213** 

Client Sample ID: La	b Control Sample Dup
	District Total Transfer LANDA

Prep Type: Total/NA Prep Batch: 243730 %Rec. RPD

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid	<u> </u>	21.0		ng/L		119	72 - 151	4	30
(PFBS)									
Perfluorohexanesulfonic acid	18.2	22.1		ng/L		121	73 - 157	3	30
(PFHxS)									

TestAmerica Sacramento

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TestAmerica Job ID: 320-42568-1

Client: Shannon & Wilson, Inc

Project/Site: FAI

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-243730/3-A Clie			Client Sa	lient Sample ID: Lab Control Sample Dup					
Matrix: Water						Prep Ty	pe: Tot	al/NA	
Analysis Batch: 244213							Prep Ba	itch: 24	13730
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	20.0	22.5		ng/L		113	71 - 138	4	30
Perfluorooctanoic acid (PFOA)	20.0	24.4		ng/L		122	70 - 140	1	30
Perfluorooctanesulfonic acid (PFOS)	18.6	20.7		ng/L		111	69 - 144	1	30
Perfluorononanoic acid (PFNA)	20.0	23.3		ng/L		117	73 - 147	1	30

	LCSD LCSD	
Isotope Dilution	%Recovery Qualifie	er Limits
1802 PFHxS	107	25 - 150
13C4-PFHpA	110	25 - 150
13C4 PFOA	121	25 - 150
13C4 PFOS	114	25 - 150
13C5 PFNA	123	25 - 150

Lab Sample ID: MB 320-243916/1-A

**Matrix: Water** 

**Analysis Batch: 244261** 

Client Sample I	D: Method Bla	ınk
Pre	p Type: Total/	NA

Prep Batch: 243916

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Perfluorobutanesulfonic acid (PFBS) ND 09/05/18 12:28 09/07/18 00:07 2.0 0.92 ng/L 0.87 ng/L Perfluorohexanesulfonic acid (PFHxS) ND 2.0 09/05/18 12:28 09/07/18 00:07 Perfluoroheptanoic acid (PFHpA) ND 2.0 0.80 ng/L 09/05/18 12:28 09/07/18 00:07 Perfluorooctanoic acid (PFOA) ND 2.0 0.75 ng/L 09/05/18 12:28 09/07/18 00:07 Perfluorooctanesulfonic acid (PFOS) ND 2.0 1.3 ng/L 09/05/18 12:28 09/07/18 00:07 Perfluorononanoic acid (PFNA) ND 2.0 0.65 ng/L 09/05/18 12:28 09/07/18 00:07 MB MB

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	122		25 - 150	09/05/18 12:28	09/07/18 00:07	1
13C4-PFHpA	124		25 - 150	09/05/18 12:28	09/07/18 00:07	1
13C4 PFOA	128		25 - 150	09/05/18 12:28	09/07/18 00:07	1
13C4 PFOS	122		25 - 150	09/05/18 12:28	09/07/18 00:07	1
13C5 PFNA	126		25 - 150	09/05/18 12:28	09/07/18 00:07	1

Lab Sample ID: LCS 320-243916/2-A

**Matrix: Water** 

Analysis Batch: 244261

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** Prep Batch: 243916

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid	17.7	17.5		ng/L		99	72 - 151	
(PFBS) Perfluorohexanesulfonic acid	18.2	18.2		ng/L		100	73 - 157	
(PFHxS) Perfluoroheptanoic acid (PFHpA)	20.0	21.0		ng/L		105	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	21.4		ng/L		107	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	17.1		ng/L		92	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	19.8		ng/L		99	73 - 147	

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	121		25 - 150
13C4-PFHpA	120		25 - 150

TestAmerica Sacramento

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## **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

#### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-243916/2-A

Lab Sample ID: LCSD 320-243916/3-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 244261** 

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Prep Batch: 243916** 

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFOA	125		25 - 150
13C4 PFOS	124		25 - 150
13C5 PFNA	126		25 - 150

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

Prep Type: Total/NA

Prep Batch: 243916

**Analysis Batch: 244261** Spike LCSD LCSD **RPD** %Rec. Added Limits Analyte Result Qualifier Unit D %Rec **RPD** Limit 17.7 18.6 ng/L 105 72 - 151 6 30 Perfluorobutanesulfonic acid (PFBS) 18.2 105 73 - 157 19.1 ng/L 5 Perfluorohexanesulfonic acid (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 20.0 ng/L 100 71 - 138 5 30 Perfluorooctanoic acid (PFOA) 20.0 20.3 70 - 140 5 30 ng/L 102 ng/L 18.6 17.7 95 69 - 144 3 30 Perfluorooctanesulfonic acid (PFOS) Perfluorononanoic acid (PFNA) 20.0 20.6 ng/L 103 73 - 147 4

LCSD LCSD

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	109		25 - 150
13C4-PFHpA	115		25 - 150
13C4 PFOA	129		25 - 150
13C4 PFOS	118		25 - 150
13C5 PFNA	120		25 - 150

TestAmerica Job ID: 320-42568-1

Client: Shannon & Wilson, Inc

Project/Site: FAI

## LCMS

## **Prep Batch: 243729**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-4	152617	Total/NA	Water	PFAS Prep	
320-42568-6	151637	Total/NA	Water	PFAS Prep	
320-42568-7	136891	Total/NA	Water	PFAS Prep	
MB 320-243729/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-243729/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-243729/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Prep Batch: 243730**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-1	120774	Total/NA	Water	PFAS Prep	
320-42568-2	120874	Total/NA	Water	PFAS Prep	
320-42568-5	173860	Total/NA	Water	PFAS Prep	
MB 320-243730/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-243730/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-243730/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Prep Batch: 243916**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-3	153699	Total/NA	Water	PFAS Prep	
MB 320-243916/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-243916/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-243916/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

# Analysis Batch: 243992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-4	152617	Total/NA	Water	WS-LC-0025	243729
				At1	
320-42568-6	151637	Total/NA	Water	WS-LC-0025	243729
				At1	
320-42568-7	136891	Total/NA	Water	WS-LC-0025	243729
				At1	
MB 320-243729/1-A	Method Blank	Total/NA	Water	WS-LC-0025	243729
				At1	
LCS 320-243729/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	243729
				At1	
LCSD 320-243729/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	243729
				At1	

## **Analysis Batch: 244213**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-1	120774	Total/NA	Water	WS-LC-0025	243730
				At1	
320-42568-2	120874	Total/NA	Water	WS-LC-0025	243730
				At1	
320-42568-5	173860	Total/NA	Water	WS-LC-0025	243730
				At1	
MB 320-243730/1-A	Method Blank	Total/NA	Water	WS-LC-0025	243730
				At1	
LCS 320-243730/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	243730
				At1	
LCSD 320-243730/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	243730
_				At1	

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

# **LCMS (Continued)**

## **Analysis Batch: 244261**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42568-3	153699	Total/NA	Water	WS-LC-0025	243916
				At1	
MB 320-243916/1-A	Method Blank	Total/NA	Water	WS-LC-0025	243916
				At1	
LCS 320-243916/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	243916
				At1	
LCSD 320-243916/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	243916
				At1	

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 120774 Lab Sample ID: 320-42568-1

Date Collected: 08/21/18 10:09 **Matrix: Water** Date Received: 08/28/18 13:09

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243730	09/04/18 13:13	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244213	09/06/18 12:48	D1R	TAL SAC

Lab Sample ID: 320-42568-2 Client Sample ID: 120874 **Matrix: Water** 

Date Collected: 08/21/18 09:59 Date Received: 08/28/18 13:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243730	09/04/18 13:13	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244213	09/06/18 12:30	D1R	TAL SAC

Client Sample ID: 153699 Lab Sample ID: 320-42568-3 Date Collected: 08/21/18 11:47 **Matrix: Water** 

Date Received: 08/28/18 13:09

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/05/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244261	09/07/18 01:02	S1M	TAL SAC

Client Sample ID: 152617 Lab Sample ID: 320-42568-4 Date Collected: 08/21/18 12:23 **Matrix: Water** 

Date Received: 08/28/18 13:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 21:12	S1M	TAL SAC

Client Sample ID: 173860 Lab Sample ID: 320-42568-5

Date Collected: 08/23/18 17:56 Date Received: 08/28/18 13:09

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243730	09/04/18 13:13	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244213	09/06/18 12:11	D1R	TAL SAC

Client Sample ID: 151637 Lab Sample ID: 320-42568-6 Date Collected: 08/27/18 14:57 **Matrix: Water** 

Date Received: 08/28/18 13:09

Dran Tuna	Batch	Batch	Dum	Dil	Initial	Final	Batch	Prepared	Amalyzat	l ab
Prep Type Total/NA	Type Prep	Method PFAS Prep	Run	Factor	1.00 mL	Amount 1.66 mL	Number 243729	or Analyzed 09/04/18 13:07	Analyst	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1	1.00 IIIL	1.00 IIIL	243992	09/05/18 21:31		TAL SAC

TestAmerica Sacramento

**Matrix: Water** 

## **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID: 320-42568-7

Date Collected: 08/27/18 13:57 Matrix: Water

Date Received: 08/28/18 13:09

Client Sample ID: 136891

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 21:49	S1M	TAL SAC

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

## **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	<b>Identification Number</b>	<b>Expiration Date</b>	
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	11-06-18	
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	

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-42568-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42568-1	120774	Water	08/21/18 10:09	08/28/18 13:09
320-42568-2	120874	Water	08/21/18 09:59	08/28/18 13:09
320-42568-3	153699	Water	08/21/18 11:47	08/28/18 13:09
320-42568-4	152617	Water	08/21/18 12:23	08/28/18 13:09
320-42568-5	173860	Water	08/23/18 17:56	08/28/18 13:09
320-42568-6	151637	Water	08/27/18 14:57	08/28/18 13:09
320-42568-7	136891	Water	08/27/18 13:57	08/28/18 13:09

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Client: Shannon & Wilson, Inc Job Number: 320-42568-1

Login Number: 42568 List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

Creator: Her, David A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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 <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Marcy Nadel
Title:
Geologist
Date:
September 14, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
September 10, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-42568-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320-4	320-42568-1						
1. <u>L</u>	1. <u>Laboratory</u>						
	a.	Did an ADI	EC CS approved laborator	ry receive and <u>perform</u> all of the submitted sample analyses?			
		C Yes	<b>⊙</b> No	Comments:			
	ADEC has not approved an analytical laboratory for analysis of PFAS. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.						
			•	another "network" laboratory or sub-contracted to an oratory performing the analyses ADEC CS approved?			
		C Yes	<b>⊙</b> No	Comments:			
	Aı	nalyses were	performed by TestAmeric	ca Laboratories, Inc. in West Sacramento, CA.			
2. <u>C</u>	hai	n of Custody	(CoC)				
	a.	CoC inform	nation completed, signed,	and dated (including released/received by)?			
		© Yes	C No	Comments:			
	Sa	mple 151637	is listed on the COC inco	orrectly as sample 151673.			
	b.	Correct Ana	alyses requested?				
		• Yes	C No	Comments:			
3. <u>L</u>	<u>abo</u>	ratory Sampl	e Receipt Documentation	1			
	a.	Sample/coo	ler temperature documen	ted and within range at receipt (0° to 6° C)?			
		• Yes	© No	Comments:			
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?						
		• Yes	C No	Comments:			
	Aı	nalysis of PF	AS does not require a pre	servative other than temperature control.			
	c.	Sample con	dition documented – brok	ken, leaking (Methanol), zero headspace (VOC vials)?			
		• Yes	C No	Comments:			
	The sample receipt form notes that the samples were received in good condition.						

320-42568-1
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	O Yes	No	Comments:				
Sa			COC incorrectly. The laboratory revised the sample name upon requ				
		or usability affe					
٠.	z um quumy	or abactivy arro	Comments:				
Da	ata quality or	usability is not a	ffected; see above.				
	Case Narrative	<u> </u>					
a	. Present and	d understandable					
	• Yes	C No	Comments:				
b	. Discrepanc	eies, errors, or QC	C failures identified by the lab?				
	Yes	C No	Comments:				
te	The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 5.7° C. It also notes some samples contained sediment, orange residue, or were a light orange color.						
	The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) with each preparation batch.						
C.	. Were all co	orrective actions	documented?				
	C Yes	No	Comments:				
N	J/A; there wer	re no corrective a	ctions documented in the case narrative.				
d	. What is the	e effect on data q	uality/usability according to the case narrative?				
			Comments:				
Т	he case narra	tive does not not	e an effect on data quality.				
amr	oles Results						
, arri	•						
a	. Correct ana	alyses performed	reported as requested on COC?				

320-42	2568-1					
	b. A	ll applicat	ole holding tin	nes met?		
		Yes	O No		Comments:	
		rsis. The 2			_	alyzed using direct injection and in-line aqueous injection (DAI) was met for all
	c. A	ll soils rep	oorted on a dry	y weight bas	is?	
		O Yes	No		Comments:	
	N/A;	soil samp	les were not s	ubmitted wit	th this work ord	der.
·		re the repose project?	-	ss than the C	Cleanup Level (	or the minimum required detection level for
		Yes	O No		Comments:	
		~ 1				nit (RL), is less than applicable ADEC action p levels for PFOS and PFOA.
	e. D	ata quality	or usability a	affected?		
		C Yes	No		Comments:	
	The c	lata qualit	y and usability	y were not af	fected.	
6. <u>Q</u> (	C Samj	<u>ples</u>				
	a. M	lethod Bla	nk			
		i. One	method blank	reported pe	r matrix, analy	vsis and 20 samples?
		• Yes	C No		Comments:	
•		ii. All r	method blank	results less t	han limit of qu	uantitation (LOQ)?
		• Yes	C No		Comments:	

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

Qualification of the results was not required; see above.

None; PFAS compounds were not detected in method blank sample.

iii. If above LOQ, what samples are affected?

**July 2017** Page 4

No

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v. I	v. Data quality or usability affected?						
			Com	ments:			
The data qu	The data quality and usability were not affected.						
b. Laborate	b. Laboratory Control Sample/Duplicate (LCS/LCSD)						
	<ul> <li>i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>						
© Y	es	O No	Com	nments:			
		als/Inorganics amples?	- one LCS and on	ne sample duplicate reported per matrix, analysis and			
C Y	es	No	Com	ments:			
Metals and	inor	ganics were i	not analyzed as par	t of this work order.			
1	And	project speci	fied DQOs, if appl	%R) reported and within method or laboratory limits? licable. (AK Petroleum methods: AK101 60%-120%, 20%; all other analyses see the laboratory QC pages)			
© Y	es	O No	Com	ments:			
] ]	<ul> <li>iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)</li> </ul>						
© Y	es	O No	Com	ments:			
v. I	[f %]	R or RPD is	outside of acceptab	le limits, what samples are affected?			
	Comments:						
N/A; analyt	N/A; analytical accuracy and precision were within acceptable limits.						
vi. I	Do tl	ne affected sa	mple(s) have data	flags? If so, are the data flags clearly defined?			
O Y	es	© No	Com	ments:			
Qualification	on of	Qualification of the data was not required; see above.					

vii. Data quality or usability affected? (Use comment box to explain.)

#### Comments

Comments:					
The data quality and usability were not affected.					
c. Surrogates – Organics Only					
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?					
© Yes © No Comments:					
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.					
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)					
• Yes • No Comments:					
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?					
© Yes © No Comments:					
N/A; there were no IDA recovery failures associated with this work order.					
iv. Data quality or usability affected?					
Comments:					
The data quality and usability are not affected; see above.					
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>					
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>					
© Yes					
PFAS are not volatile compounds; therefore, a trip blank is not required.					
PFAS are not volatile compounds; therefore, a trip blank is not required.  ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)					
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the					

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© Yes	results less th		
		Comments:	
N/A; a trip blan			
iv. If ab	ove LOQ, w	hat samples are affected?	
		Comments:	
None; a trip bla	ınk was not s	submitted with this work ord	er.
v. Data	ı quality or u	sability affected?	
		Comments:	
The data quality	y and usabili	ity were not affected; see abo	ove.
e. Field Dupli	cate		
i. One	field duplica	ate submitted per matrix, and	alysis and 10 project samples?
• Yes	O No	Comments:	
Yes, a field dup	olicate was si	ubmitted with this work orde	er.
ii. Subi	mitted blind	to lab?	
Yes	O No	Comments:	
Field duplicate	pair 120774	/ 120874 was submitted wit	h this work order.
	commended:	30% water, 50% soil) %) = Absolute value of:	RPD) less than specified DQOs? $\frac{(R_1-R_2)}{(R_1+R_2)/2)} \times 100$
		Where $R_1 = \text{Sample C}$ $R_2 = \text{Field Dup}$	oncentration plicate Concentration
• Yes	O No	Comments:	
The RPD, when		for detected values, was less	s than 30% for each analyte. The RPDs were
iv. Data	ı quality or u	sability affected? (Use the comments:	omment box to explain why or why not.)
The data quality	v and usabili	ity were not affected; see abo	ove.

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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).						
	C Yes C No € Not Applicable						
	Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.						
	i. All results less than LOQ?						
	N/A; an equipment blank was not submitted with this work order.						
	ii. If above LOQ, what samples are affected?						
	Comments:						
	None; see above.						
	iii. Data quality or usability affected?						
	Comments:						
	The data quality and usability were not affected; see above.						
7. <u>O</u>	Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)						
	a. Defined and appropriate?						
	○ Yes						
	There were no additional flags/qualifiers required for this work order.						



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: 320-43141-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jamin altina

Authorized for release by: 9/24/2018 10:41:27 AM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-43141-1

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## **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

#### **Qualifiers**

#### **LCMS**

Qualifier	Qualifier Description
-----------	-----------------------

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.
a	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)

Estimated Detection Limit (Dioxin) **EDL** 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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

9/24/2018

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Job ID: 320-43141-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-43141-1

#### Receipt

The samples were received on 9/13/2018 3:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 7.1° C.

#### LCMS

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-246215.

Method(s) PFAS Prep: The samples have brown sediment at the bottom of the containers and are a slight brown color: 407372 (320-43141-1) and 550116 (320-43141-2).

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 407372

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Lab Sample ID: 320-43141-1

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D Me	ethod	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.0 J	2.0	0.87 ng/L	1 W:	S-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.85 J	2.0	0.75 ng/L		S-LC-0025	Total/NA

Client Sample ID: 550116	Lab Sample ID: 320-43141-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.9		2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	36		2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	8.4		2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

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# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Lab Sample ID: 320-43141-1

**Matrix: Water** 

Client Sample ID: 407372 Date Collected: 09/07/18 11:12 Date Received: 09/13/18 15:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/18/18 11:20	09/20/18 01:31	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	J	2.0	0.87	ng/L		09/18/18 11:20	09/20/18 01:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/18/18 11:20	09/20/18 01:31	1
Perfluorooctanoic acid (PFOA)	0.85	J	2.0	0.75	ng/L		09/18/18 11:20	09/20/18 01:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/18/18 11:20	09/20/18 01:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/18/18 11:20	09/20/18 01:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98		25 - 150				09/18/18 11:20	09/20/18 01:31	1
13C4-PFHpA	97		25 - 150				09/18/18 11:20	09/20/18 01:31	1
13C4 PFOA	92		25 - 150				09/18/18 11:20	09/20/18 01:31	1
13C4 PFOS	92		25 - 150				09/18/18 11:20	09/20/18 01:31	1
13C5 PFNA	83		25 - 150				09/18/18 11:20	09/20/18 01:31	1

# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Lab Sample ID: 320-43141-2

**Matrix: Water** 

Client Sample ID: 550116
Date Collected: 08/29/18 12:28
Date Received: 09/13/18 15:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.9		2.0	0.92	ng/L		09/18/18 11:20	09/20/18 01:50	1
Perfluorohexanesulfonic acid (PFHxS)	36		2.0	0.87	ng/L		09/18/18 11:20	09/20/18 01:50	1
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L		09/18/18 11:20	09/20/18 01:50	1
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L		09/18/18 11:20	09/20/18 01:50	1
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L		09/18/18 11:20	09/20/18 01:50	1
Perfluorononanoic acid (PFNA)	8.4		2.0	0.65	ng/L		09/18/18 11:20	09/20/18 01:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	100	-	25 - 150				09/18/18 11:20	09/20/18 01:50	1
13C4-PFHpA	92		25 - 150				09/18/18 11:20	09/20/18 01:50	1
13C4 PFOA	91		25 - 150				09/18/18 11:20	09/20/18 01:50	1
13C4 PFOS	93		25 - 150				09/18/18 11:20	09/20/18 01:50	1
13C5 PFNA	81		25 - 150				09/18/18 11:20	09/20/18 01:50	1

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# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFHxS	PFHpA	PFOA	PFOS	PFNA			
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)			
320-43141-1	407372	98	97	92	92	83			
320-43141-2	550116	100	92	91	93	81			
LCS 320-246215/2-A	Lab Control Sample	95	89	85	92	77			
LCSD 320-246215/3-A	Lab Control Sample Dup	100	96	88	100	82			
MB 320-246215/1-A	Method Blank	103	95	94	100	85			

#### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4-PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-43141-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-246215/1-A **Matrix: Water** 

Analysis Batch: 246727

**Client Sample ID: Method Blank Prep Type: Total/NA** 

**Prep Batch: 246215** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/18/18 11:20	09/20/18 00:18	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/18/18 11:20	09/20/18 00:18	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/18/18 11:20	09/20/18 00:18	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/18/18 11:20	09/20/18 00:18	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/18/18 11:20	09/20/18 00:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/18/18 11:20	09/20/18 00:18	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PEHyS	103		25 150				09/18/18 11:20	09/20/18 00:18	

1802 PFHxS 25 - 150 13C4-PFHpA 95 25 - 150 09/18/18 11:20 09/20/18 00:18 13C4 PFOA 94 25 - 150 09/18/18 11:20 09/20/18 00:18 13C4 PFOS 100 25 - 150 09/18/18 11:20 09/20/18 00:18 13C5 PFNA 85 25 - 150 09/18/18 11:20 09/20/18 00:18

Lab Sample ID: LCS 320-246215/2-A

Lab Sample ID: LCSD 320-246215/3-A

**Matrix: Water** 

**Matrix: Water** 

Analysis Batch: 246727

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Prep Batch: 246215** 

	Spike	LCS	LCS		%Rec.	
Analyte	Added	Result	Qualifier Unit	D %Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	19.3	ng/L	109	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.6	ng/L	108	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	20.9	ng/L	105	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	20.0	ng/L	100	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	18.5	ng/L	99	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	21.6	ng/L	108	73 - 147	
1.00	1.00					

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	95		25 - 150
13C4-PFHpA	89		25 - 150
13C4 PFOA	85		25 - 150
13C4 PFOS	92		25 - 150
13C5 PFNA	77		25 - 150

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

Prep Type: Total/NA

Analysis Batch: 246727	Spike	LCSD	LCSD				Prep Ba %Rec.	atch: 24	46215 RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.5		ng/L		111	72 - 151	1	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.3		ng/L		106	73 - 157	2	30
Perfluoroheptanoic acid (PFHpA)	20.0	20.9		ng/L		104	71 - 138	0	30
Perfluorooctanoic acid (PFOA)	20.0	21.5		ng/L		107	70 - 140	7	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.2		ng/L		98	69 - 144	1	30
Perfluorononanoic acid (PFNA)	20.0	20.9		ng/L		104	73 - 147	3	30

TestAmerica Sacramento

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

_	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	100		25 - 150
13C4-PFHpA	96		25 - 150
13C4 PFOA	88		25 - 150
13C4 PFOS	100		25 - 150
13C5 PFNA	82		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

# LCMS

#### **Prep Batch: 246215**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43141-1	407372	Total/NA	Water	PFAS Prep	
320-43141-2	550116	Total/NA	Water	PFAS Prep	
MB 320-246215/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-246215/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-246215/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

#### **Analysis Batch: 246727**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43141-1	407372	Total/NA	Water	WS-LC-0025	246215
320-43141-2	550116	Total/NA	Water	At1 WS-LC-0025 At1	246215
MB 320-246215/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	246215
LCS 320-246215/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	246215
LCSD 320-246215/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	246215

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#### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Lab Sample ID: 320-43141-1

**Matrix: Water** 

Client Sample ID: 407372
Date Collected: 09/07/18 11:12
Date Received: 09/13/18 15:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	246215	09/18/18 11:20	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			246727	09/20/18 01:31	S1M	TAL SAC

Client Sample ID: 550116 Lab Sample ID: 320-43141-2

**Matrix: Water** 

Date Collected: 08/29/18 12:28 Date Received: 09/13/18 15:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	246215	09/18/18 11:20	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			246727	09/20/18 01:50	S1M	TAL SAC

**Laboratory References:** 

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

# **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	<b>Identification Number</b>	<b>Expiration Date</b>
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	11-06-18
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43141-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43141-1	407372	Water	09/07/18 11:12	09/13/18 15:30
320-43141-2	550116	Water	08/29/18 12:28	09/13/18 15:30

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Client: Shannon & Wilson, Inc

Job Number: 320-43141-1

List Source: TestAmerica Sacramento

Login Number: 43141

List Number: 1

Creator: Her, David A

Creator: Her, David A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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 PACK
Cooler Temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler Temperature is recorded.	True	7.1
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Marcy Nadel
Title:
Geologist
Date:
September 26, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
September 24, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-43141-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	-43141-1			
1.	<u>Laboratory</u>			
	a. Did an AD	EC CS approv	ed laboratory receive and perform all of the submitted sample analyses?	?
	O Yes	© No	Comments:	
	certified for pe	rfluorinated al	nalytical laboratory for analysis of PFAS. However, the laboratory is kyl acids in drinking water analysis by the National Environmental gram (NELAP) in Oregon.	
			ansferred to another "network" laboratory or sub-contracted to an vas the laboratory performing the analyses ADEC CS approved?	
	© Yes	No	Comments:	
	Analyses were	performed by	TestAmerica Laboratories, Inc. in West Sacramento, CA.	
2.	Chain of Custody	(CoC)		
	a. CoC inform	nation comple	ed, signed, and dated (including released/received by)?	
	© Yes	© No	Comments:	
	- 100			
	b. Correct An	alyses request	rd?	
	• Yes	© No	Comments:	
3.	Laboratory Samp	le Receipt Do	<u>umentation</u>	
	a Sample/coo	oler temperatu	e documented and within range at receipt (0° to 6° C)?	
	-	© No	Comments:	
		re blank was n	easured outside the acceptable temperature range of 0 °C to 6 °C upon	
		servation acce	otable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, ents, etc.)?	
	• Yes	O No	Comments:	
	samples was ac preservative. In	dversely affect n an e-mail da nist, who "agre	biological stability of PFAS, it is unlikely the integrity of the project ed by the high cooler temperature. Analysis of PFAS does not require a ed August 3, 2015, the ADEC project manager noted that he had spoker es the high temperature probably would not affect the PFC results."	
	c. Sample cor	ndition docum	nted – broken, leaking (Methanol), zero headspace (VOC vials)?	
	• Yes	O No	Comments:	
	The sample rec	ceipt form note	s that the samples were received in good condition.	_
	·			

320-43141-1
-------------

samples	etc.	.?	
<b>⊙</b> Y	es	O No	Comments:
The sample	rece	eipt document	tation notes the cooler temperature was outside the accepted range.
e. Data qu	lity	or usability a	affected?
			Comments:
Data quality	or 1	usability is no	ot affected; see above.
. Case Narra	<u>tive</u>		
a. Present	and	l understandal	ole?
© 7	es.	O No	Comments:
b. Discrep	anc	ies, errors, or	QC failures identified by the lab?
© `	es.	O No	Comments:
			samples arrived in good condition, properly preserved, and that the coler upon receipt at the laboratory was 7.1° C.
(MS) and I	AS c	duplicate (MS	re was insufficient sample volume available to perform a matrix spike SD) with preparation batch 320-246215. It further notes the two samples e a slight brown color.
c. Were a	1 co	rrective actio	ns documented?
O.	es es	© No	Comments:
N/A; there	wer	e no correctiv	ve actions documented in the case narrative.
d. What is	the	effect on dat	a quality/usability according to the case narrative?
			Comments:
The case n	arrat	tive does not	note an effect on data quality.
amples Resul			
a. Correct			ned/reported as requested on COC?
© `		O No	Comments:

1314	1-1		
b.	All applicat	ole holding time	es met?
	Yes	C No	Comments:
an	•		he water samples were analyzed using direct injection and in-line e for analysis using direct aqueous injection (DAI) was met for all
c.	All soils rep	oorted on a dry	weight basis?
	O Yes	No	Comments:
N/	A; soil samp	les were not sul	bmitted with this work order.
d.	Are the reported the project?	_	s than the Cleanup Level or the minimum required detection level fo
	Yes	O No	Comments:
	~ .		estAmerica Reporting Limit (RL), is less than applicable ADEC action DEC groundwater cleanup levels for PFOS and PFOA.
		y or usability af	
	C Yes	© No	Comments:
Th	ne data qualit	y and usability	were not affected.
C Sa	amples		
a.	Method Bla		
	i. One	method blank	reported per matrix, analysis and 20 samples?
	© Yes	O No	Comments:
		mathad blank ra	esults less than limit of quantitation (LOQ)?
	ii. All 1	inculou bialik it	1

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

Qualification of the results was not required; see above.

iii. If above LOQ, what samples are affected?

None; PFAS compounds were not detected in method blank sample.

**July 2017** Page 4

No

O Yes

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v. Da	ta quality or usability affec	cted?
		Comments:
The data qual	ity and usability were not a	affected.
b. Laboratory	y Control Sample/Duplicat	te (LCS/LCSD)
	ganics – One LCS/LCSD r Juired per AK methods, LC	reported per matrix, analysis and 20 samples? (LCS/LCSD CS required per SW846)
• Yes	C No	Comments:
	etals/Inorganics – one LCS samples?	and one sample duplicate reported per matrix, analysis and
C Yes	⊙ No	Comments:
Metals and in	organics were not analyzed	d as part of this work order.
An	d project specified DQOs,	veries (%R) reported and within method or laboratory limits? , if applicable. (AK Petroleum methods: AK101 60%-120%, 60%-120%; all other analyses see the laboratory QC pages)
• Yes	C No	Comments:
lab LC	oratory limits? And project	ent differences (RPD) reported and less than method or et specified DQOs, if applicable. RPD reported from or sample/sample duplicate. (AK Petroleum methods 20%; all tory QC pages)
© Yes	C No	Comments:
v. If	%R or RPD is outside of a	cceptable limits, what samples are affected?
		Comments:
N/A; analytica	al accuracy and precision v	were within acceptable limits.
vi. Do	the affected sample(s) have	ve data flags? If so, are the data flags clearly defined?
© Yes	• No	Comments:
Qualification	of the data was not require	ed; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
• Yes • No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
• Yes • No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
iv. Data quality or usability affected?  Comments:
Comments:
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  (If not, enter explanation below.)
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  (If not, enter explanation below.)  C Yes No Comments:
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  (If not, enter explanation below.)
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  (If not, enter explanation below.)  C Yes No Comments:
Comments:  The data quality and usability are not affected; see above.  d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil  i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  (If not, enter explanation below.)  Yes No Comments:  PFAS are not volatile compounds; therefore, a trip blank is not required.  ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the

Page 6 July 2017

iii. All results less than LOQ?
C Yes No Comments:
N/A; a trip blank is not required.
iv. If above LOQ, what samples are affected?
Comments:
None; a trip blank was not submitted with this work order.
v. Data quality or usability affected?
Comments:
The data quality and usability were not affected; see above.
e. Field Duplicate
i. One field duplicate submitted per matrix, analysis and 10 project samples?
© Yes © No Comments:
A field duplicate was not included in this work order. However, field duplicate samples are submitted at the appropriate frequency for the overall project.
ii. Submitted blind to lab?
© Yes © No Comments:
N/A; a field duplicate was not included.
iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
C Yes • No Comments:
N/A; a field duplicate was not included.
iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:
The data quality and usability were not affected; see above.

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f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).	
C Yes C No C Not Applicable	
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.	
i. All results less than LOQ?	
© Yes © No Comments:	
N/A; an equipment blank was not submitted with this work order.	
ii. If above LOQ, what samples are affected?	
Comments:	
None; see above.	
iii. Data quality or usability affected?	
Comments:	
The data quality and usability were not affected; see above.	
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)	
a. Defined and appropriate?	
© Yes © No Comments:	
There were no additional flags/qualifiers required for this work order.	



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: 320-43820-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jamin altina

Authorized for release by: 10/15/2018 4:06:01 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-43820-1

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

#### **Qualifiers**

#### **LCMS**

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.
Н	Sample was prepped or analyzed beyond the specified holding time

### Glossary

TEF

TEQ

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

<del>Giocoui y</del>	
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

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Job ID: 320-43820-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-43820-1

#### Receipt

The samples were received on 10/3/2018 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

#### **LCMS**

Method(s) WS-LC-0025 At1: Reanalysis of a dilution of the following sample was performed outside of the analytical holding time due to analyst error: 152251 (320-43820-1).

Method(s) WS-LC-0025 At1: The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following sample exceeded the instrument calibration range: 152251 (320-43820-1). The analyte has been qualified; however, the peak did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range. The sample was analyzed at a dilution although outside the analytical holding time. Both sets of data are reported.

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-250333.

Method(s) PFAS Prep: The following samples are a yellow color prior to extraction: 152251 (320-43820-1) and 152480 (320-43820-2).

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 152251

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Lab Sample ID: 320-43820-1

Analyte	Result C	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	71		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	390 E	Ξ	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.9 J	J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	400 H	Ⅎ	20	13	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: 152480 Lab Sample ID: 320-43820-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	15	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	39	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.7	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	4.5	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	55	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	0.65 J	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

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# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Lab Sample ID: 320-43820-1

**Matrix: Water** 

Client Sample ID: 152251
Date Collected: 09/14/18 14:05
Date Received: 10/03/18 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L		10/08/18 04:26	10/11/18 23:31	1
Perfluorohexanesulfonic acid (PFHxS)	71		2.0	0.87	ng/L		10/08/18 04:26	10/11/18 23:31	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		10/08/18 04:26	10/11/18 23:31	1
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L		10/08/18 04:26	10/11/18 23:31	1
Perfluorooctanesulfonic acid (PFOS)	390	E	2.0	1.3	ng/L		10/08/18 04:26	10/11/18 23:31	1
Perfluorononanoic acid (PFNA)	1.9	J	2.0	0.65	ng/L		10/08/18 04:26	10/11/18 23:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	110		25 - 150				10/08/18 04:26	10/11/18 23:31	1
13C4 PFHpA	110		25 - 150				10/08/18 04:26	10/11/18 23:31	1
13C4 PFOA	123		25 - 150				10/08/18 04:26	10/11/18 23:31	1
13C4 PFOS	109		25 - 150				10/08/18 04:26	10/11/18 23:31	1
13C5 PFNA	120		25 - 150				10/08/18 04:26	10/11/18 23:31	1
Method: WS-LC-0025 At1 - Flu	orinated A	kyl Substa	ances - DL						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	400	Н	20	13	ng/L		10/08/18 04:26	10/14/18 14:54	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	107		25 - 150				10/08/18 04:26	10/14/18 14:54	10

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# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Lab Sample ID: 320-43820-2

**Matrix: Water** 

Client Sample ID: 152480
Date Collected: 09/26/18 09:53
Date Received: 10/03/18 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L		10/08/18 04:26	10/12/18 00:08	1
Perfluorohexanesulfonic acid (PFHxS)	39		2.0	0.87	ng/L		10/08/18 04:26	10/12/18 00:08	1
Perfluoroheptanoic acid (PFHpA)	4.7		2.0	0.80	ng/L		10/08/18 04:26	10/12/18 00:08	1
Perfluorooctanoic acid (PFOA)	4.5		2.0	0.75	ng/L		10/08/18 04:26	10/12/18 00:08	1
Perfluorooctanesulfonic acid (PFOS)	55		2.0	1.3	ng/L		10/08/18 04:26	10/12/18 00:08	1
Perfluorononanoic acid (PFNA)	0.65	J	2.0	0.65	ng/L		10/08/18 04:26	10/12/18 00:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	110		25 - 150				10/08/18 04:26	10/12/18 00:08	1
13C4 PFHpA	114		25 - 150				10/08/18 04:26	10/12/18 00:08	1
13C4 PFOA	127		25 - 150				10/08/18 04:26	10/12/18 00:08	1
13C4 PFOS	106		25 - 150				10/08/18 04:26	10/12/18 00:08	1
13C5 PFNA	121		25 - 150				10/08/18 04:26	10/12/18 00:08	1

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# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Lim						
		PFHxS	PFHpA	PFOA	PFOS	PFNA		
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)		
320-43820-1	152251	110	110	123	109	120		
320-43820-1 - DL	152251				107			
320-43820-2	152480	110	114	127	106	121		
LCS 320-250333/2-A	Lab Control Sample	108	117	117	105	110		
LCSD 320-250333/3-A	Lab Control Sample Dup	111	115	123	108	121		
MB 320-250333/1-A	Method Blank	111	119	120	109	119		

Surrogate	Legend
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PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

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TestAmerica Job ID: 320-43820-1

Client: Shannon & Wilson, Inc Project/Site: FAI

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-250333/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Prep Batch: 250333 Analysis Batch: 251333** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		10/05/18 11:54	10/11/18 17:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		10/05/18 11:54	10/11/18 17:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/05/18 11:54	10/11/18 17:25	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		10/05/18 11:54	10/11/18 17:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		10/05/18 11:54	10/11/18 17:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/05/18 11:54	10/11/18 17:25	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1000 DELIVE	111		0F 1F0				10/05/19 11:51	10/11/10 17:05	

Isotope Dilution	%Recovery Qu	ualifier Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111	25 - 150	10/05/18 11:54	10/11/18 17:25	1
13C4 PFHpA	119	25 - 150	10/05/18 11:54	10/11/18 17:25	1
13C4 PFOA	120	25 - 150	10/05/18 11:54	10/11/18 17:25	1
13C4 PFOS	109	25 - 150	10/05/18 11:54	10/11/18 17:25	1
13C5 PFNA	119	25 - 150	10/05/18 11:54	10/11/18 17:25	1

Lab Sample ID: LCS 320-250333/2-A **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 251333	Spike	LCS	LCS				Prep Batch: 250333 %Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.5		ng/L		99	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.1		ng/L		94	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	19.6		ng/L		98	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	19.2		ng/L		96	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	16.9		ng/L		91	69 - 144
Perfluorononanoic acid (PFNA)	20.0	17.9		ng/L		89	73 - 147

	LCS LCS	
Isotope Dilution	%Recovery Qualifie	er Limits
1802 PFHxS	108	25 - 150
13C4 PFHpA	117	25 - 150
13C4 PFOA	117	25 - 150
13C4 PFOS	105	25 - 150
13C5 PFNA	110	25 - 150

Lab Sample ID: LCSD 320-250333/3-A **Client Sample ID: Lab Control Sample Dup** Matrix: Water

Matrix: Water Analysis Batch: 251333							Prep Typ Prep Ba		
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.3		ng/L		98	72 - 151	1	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.7		ng/L		97	73 - 157	4	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.6		ng/L		108	71 - 138	10	30
Perfluorooctanoic acid (PFOA)	20.0	19.1		ng/L		95	70 - 140	0	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.7		ng/L		95	69 - 144	5	30
Perfluorononanoic acid (PFNA)	20.0	19.0		ng/L		95	73 - 147	6	30

TestAmerica Sacramento

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	111		25 - 150
13C4 PFHpA	115		25 - 150
13C4 PFOA	123		25 - 150
13C4 PFOS	108		25 - 150
13C5 PFNA	121		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-43820-1

Project/Site: FAI

LCMS

**Prep Batch: 250333** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43820-1 - DL	152251	Total/NA	Water	PFAS Prep	
320-43820-1	152251	Total/NA	Water	PFAS Prep	
320-43820-2	152480	Total/NA	Water	PFAS Prep	
MB 320-250333/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-250333/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-250333/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 251333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43820-1	152251	Total/NA	Water	WS-LC-0025 At1	250333
320-43820-2	152480	Total/NA	Water	WS-LC-0025 At1	250333
MB 320-250333/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	250333
LCS 320-250333/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	250333
LCSD 320-250333/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	250333

**Analysis Batch: 251696** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43820-1 - DL	152251	Total/NA	Water	WS-LC-0025	250333
				At1	

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#### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Lab Sample ID: 320-43820-1

**Matrix: Water** 

Client Sample ID: 152251
Date Collected: 09/14/18 14:05

Date Received: 10/03/18 10:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250333	10/08/18 04:26	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251333	10/11/18 23:31	ABH	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	250333	10/08/18 04:26	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			251696	10/14/18 14:54	S1M	TAL SAC

Client Sample ID: 152480

Date Collected: 09/26/18 09:53

Lab Sample ID: 320-43820-2

Matrix: Water

Date Collected: 09/26/18 09:53
Date Received: 10/03/18 10:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250333	10/08/18 04:26	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251333	10/12/18 00:08	ABH	TAL SAC

**Laboratory References:** 

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-43820-1

Project/Site: FAI

#### **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	<b>Expiration Date</b>
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
llinois	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
JS 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
∕irginia	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

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<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43820-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43820-1	152251	Water	09/14/18 14:05	10/03/18 10:00
320-43820-2	152480	Water	09/26/18 09:53	10/03/18 10:00

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Client: Shannon & Wilson, Inc Job Number: 320-43820-1

Login Number: 43820 List Source: TestAmerica Sacramento

List Number: 1

**Creator: Turpen, Troy** 

Creator: Turpen, Troy		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	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	

**TestAmerica Sacramento** 

### **Laboratory Data Review Checklist**

Complete	ed By:
Marc	y Nadel
Title:	
Geol	ogist
Date:	
Octo	ber 16, 2018
CS Repo	rt Name:
Fairb	anks International Airport (FAI)
Report D	pate:
Octo	ber 15, 2018
Consulta	nt Firm:
Shan	non & Wilson, Inc.
Laborato	ry Name:
TestA	America Laboratories, Inc.
Laborato	ry Report Number:
320-4	43820-1
ADEC F	ile Number:
100.3	38.277
Hazard I	dentification Number:
2681	6

320-43820-1					
<ol> <li>Laboratory</li> <li>a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?</li> </ol>					
ADEC has not approved an analytical laboratory for analysis of PFAS. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.					
b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?					
Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.					
2. Chain of Custody (CoC)					
a. CoC information completed, signed, and dated (including released/received by)?					
b. Correct Analyses requested?					
3. Laboratory Sample Receipt Documentation					
a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?					
e e					
b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?					

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Analysis of PFAS does not require a preservative other than temperature control.

The sample receipt form notes that the samples were received in good condition.

**July 2017** Page 2

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			re any discrepancies, were they documented? For example, incorrect sample preservation, sample temperature outside of acceptable range, insufficient or missing to.?		
_			©		
	e.	Data qualit	ty or usability affected?		
_			Comments:		
	Dat	ta quality o	r usability is not affected; see above.		
4.	<u>Ca</u>	ase Narrativ	<u>ve</u>		
	a.	Present ar	nd understandable?		
		Ø			
	b.	Discrepan	icies, errors, or QC failures identified by the lab?		
		0			
			rative notes the samples arrived in good condition, properly preserved, and that the of the sample cooler upon receipt at the laboratory was 5.0° C.		
	The PFOS result for sample 152251 exceeded the instrument calibration range; analyte has been qualified.				
	(N		rative notes there was insufficient sample volume available to perform a matrix spike duplicate (MSD) with preparation batch 320-250333. It further notes the two samples in color.		
	c.	Were all o	corrective actions documented?		
		O			
			S result for sample 152251 was re-analyzed outside of hold time, at a dilution, are original result. Both sets of data are reported.		
	d.	What is th	ne effect on data quality/usability according to the case narrative?		
			Comments:		
			rative notes the original PFOS result for sample 152251 is qualified. The result is stimated, flagged with a "J" in the analytical tables and database.		

320-4382	0-1	
5. <u>Samp</u>	les Results	
0	Correct or	valvese parformed/reported as requested on COC?
a.		nalyses performed/reported as requested on COC?
	0	
b.	All applic	able holding times met?
		0
an	nalysis. The	ry indicates that the water samples were analyzed using direct injection and in-line 28-day hold time for analysis using direct aqueous injection (DAI) was met for the yes. However, the PFOS result for sample 152251 was re-analyzed outside of hold time.
c.	All soils r	reported on a dry weight basis?
N	/A; soil sam	nples were not submitted with this work order.
d.	Are the re	eported LOQs less than the Cleanup Level or the minimum required detection level for et?
	0	
		uivalent to the TestAmerica Reporting Limit (RL), is less than applicable ADEC action king water and ADEC groundwater cleanup levels for PFOS and PFOA.
e.	Data qual	ity or usability affected?
		©
Tl	he data qual	lity and usability were not affected.
<u> </u>	amples	
0. <u>QC B</u>	<del>-</del>	
a.		
	i. Or	ne method blank reported per matrix, analysis and 20 samples?
	0	
	ii. Al	l method blank results less than limit of quantitation (LOQ)?
	0	
	iii. If	above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in method blank sample.

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	Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
0	©
Qualificat	ion of the results was not required; see above.
v.	Data quality or usability affected?
	Comments:
The data q	uality and usability were not affected.
b. Labora	atory Control Sample/Duplicate (LCS/LCSD)
i.	Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)
0	
ii.	Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
0	© .
Metals and	d inorganics were not analyzed as part of this work order.
iii.	Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
0	C
iv.	Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
0	
V.	If %R or RPD is outside of acceptable limits, what samples are affected?
	Comments:
N/A: analy	ytical accuracy and precision were within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Qualification of the data was not required; see above.
vii. Data quality or usability affected? (Use comment box to explain.)
Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
C ©
N/A; a trip blank is not required.
iii. All results less than LOQ?
N/A; a trip blank is not required.
iv. If above LOQ, what samples are affected?
Comments:
None; a trip blank was not submitted with this work order.
v. Data quality or usability affected?
Comments:
The data quality and usability were not affected; see above.
e. Field Duplicate
i. One field duplicate submitted per matrix, analysis and 10 project samples?
A field duplicate was not included in this work order. However, field duplicate samples are submitted at the appropriate frequency for the overall project.
ii. Submitted blind to lab?
N/A; a field duplicate was not included.
iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
N/A; a field duplicate was not included.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)					
Comments:					
The data quality and usability were not affected; see above.	The data quality and usability were not affected; see above.				
f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).	Tr r · · · · · · · · · · · · · · · · · ·				
Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.	r				
i. All results less than LOQ?					
N/A; an equipment blank was not submitted with this work order.					
ii. If above LOQ, what samples are affected?					
Comments:					
None; see above.					
iii. Data quality or usability affected?					
Comments:					
The data quality and usability were not affected; see above.					
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)					
a. Defined and appropriate?					
There were no additional flags/qualifiers required for this work order.					



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: 320-43916-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Karen Dadl

Authorized for release by: 10/11/2018 1:39:47 PM Karen Dahl, Senior Project Manager (916)374-4384 karen.dahl@testamericainc.com

Designee for

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

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-43916-1

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

### Glossary

TEF

TEQ

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

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
Percent Recovery
Contains Free Liquid
Contains No Free Liquid
Duplicate Error Ratio (normalized absolute difference)
Dilution Factor
Detection Limit (DoD/DOE)
Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
Decision Level Concentration (Radiochemistry)
Estimated Detection Limit (Dioxin)
Limit of Detection (DoD/DOE)
Limit of Quantitation (DoD/DOE)
Minimum Detectable Activity (Radiochemistry)
Minimum Detectable Concentration (Radiochemistry)
Method Detection Limit
Minimum Level (Dioxin)
Not Calculated
Not Detected at the reporting limit (or MDL or EDL if shown)
Practical Quantitation Limit
Quality Control
Relative Error Ratio (Radiochemistry)
Reporting Limit or Requested Limit (Radiochemistry)
Relative Percent Difference, a measure of the relative difference between two points

TestAmerica Sacramento

10/11/2018

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#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Job ID: 320-43916-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-43916-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/5/2018 1:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 7.9° C.

#### **Receipt Exceptions**

The following samples were received at the laboratory outside the required temperature criteria: 510238.1 (320-43916-1), 510238.2 (320-43916-2) and 510238.2-EB (320-43916-3).

#### **LCMS**

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

#### **Organic Prep**

Method(s) PFAS Prep: The following sample is brown in color: 510238.1 (320-43916-1).

Method(s) PFAS Prep: The following sample is light brown in color: 510238.2 (320-43916-2).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-250420.

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

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### **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 510238.1

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID: 320-43916-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	38	2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	190	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	100	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	76	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 510238.2 Lab Sample ID: 320-43916-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	51	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	240	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	100	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	70	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 510238.2-EB Lab Sample ID: 320-43916-3

No Detections.

This Detection Summary does not include radiochemical test results.

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### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID: 320-43916-1

**Matrix: Water** 

Client Sample ID: 510238.1 Date Collected: 10/03/18 16:26 Date Received: 10/05/18 13:40

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	38		2.0	0.92	ng/L		10/08/18 11:28	10/10/18 02:55	1
Perfluorohexanesulfonic acid (PFHxS)	190		2.0	0.87	ng/L		10/08/18 11:28	10/10/18 02:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/08/18 11:28	10/10/18 02:55	1
Perfluorooctanoic acid (PFOA)	100		2.0	0.75	ng/L		10/08/18 11:28	10/10/18 02:55	1
Perfluorooctanesulfonic acid (PFOS)	76		2.0	1.3	ng/L		10/08/18 11:28	10/10/18 02:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/08/18 11:28	10/10/18 02:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	123		25 - 150				10/08/18 11:28	10/10/18 02:55	1
13C4 PFHpA	122		25 - 150				10/08/18 11:28	10/10/18 02:55	1
13C4 PFOA	133		25 - 150				10/08/18 11:28	10/10/18 02:55	1
13C4 PFOS	120		25 - 150				10/08/18 11:28	10/10/18 02:55	1
13C5 PFNA	137		25 - 150				10/08/18 11:28	10/10/18 02:55	1

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### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID: 320-43916-2

**Matrix: Water** 

Client Sample ID: 510238.2 Date Collected: 10/04/18 13:35

Date Received: 10/05/18 13:40

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	51		2.0	0.92	ng/L		10/08/18 11:28	10/10/18 03:13	1
Perfluorohexanesulfonic acid (PFHxS)	240		2.0	0.87	ng/L		10/08/18 11:28	10/10/18 03:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/08/18 11:28	10/10/18 03:13	1
Perfluorooctanoic acid (PFOA)	100		2.0	0.75	ng/L		10/08/18 11:28	10/10/18 03:13	1
Perfluorooctanesulfonic acid (PFOS)	70		2.0	1.3	ng/L		10/08/18 11:28	10/10/18 03:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/08/18 11:28	10/10/18 03:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	116		25 - 150				10/08/18 11:28	10/10/18 03:13	1
13C4 PFHpA	118		25 - 150				10/08/18 11:28	10/10/18 03:13	1
13C4 PFOA	123		25 - 150				10/08/18 11:28	10/10/18 03:13	1
13C4 PFOS	116		25 - 150				10/08/18 11:28	10/10/18 03:13	1
13C5 PFNA	133		25 - 150				10/08/18 11:28	10/10/18 03:13	1

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### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID: 320-43916-3

Matrix: Water

Client Sample ID: 510238.2-EB Date Collected: 10/04/18 13:45

Date Received: 10/05/18 13:40

Method: WS-LC-0025 At1 - Flu		•				_	_		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		10/08/18 11:28	10/10/18 03:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		10/08/18 11:28	10/10/18 03:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/08/18 11:28	10/10/18 03:31	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		10/08/18 11:28	10/10/18 03:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		10/08/18 11:28	10/10/18 03:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/08/18 11:28	10/10/18 03:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	115		25 - 150				10/08/18 11:28	10/10/18 03:31	1
13C4 PFHpA	119		25 - 150				10/08/18 11:28	10/10/18 03:31	1
13C4 PFOA	136		25 - 150				10/08/18 11:28	10/10/18 03:31	1
13C4 PFOS	112		25 - 150				10/08/18 11:28	10/10/18 03:31	1
13C5 PFNA	134		25 - 150				10/08/18 11:28	10/10/18 03:31	1

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### **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

### Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (A
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-43916-1	510238.1	123	122	133	120	137
320-43916-2	510238.2	116	118	123	116	133
320-43916-3	510238.2-EB	115	119	136	112	134
LCS 320-250420/2-A	Lab Control Sample	116	124	126	116	131
LCSD 320-250420/3-A	Lab Control Sample Dup	114	123	135	111	124
MB 320-250420/1-A	Method Blank	113	114	126	107	114

#### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Job ID: 320-43916-1

Client: Shannon & Wilson, Inc Project/Site: FAI

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-250420/1-A

**Matrix: Water** 

**Analysis Batch: 250736** 

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 250420
MB MB

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.92	ng/L		10/08/18 11:28	10/10/18 02:00	1
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	0.87	ng/L		10/08/18 11:28	10/10/18 02:00	1
Perfluoroheptanoic acid (PFHpA)	ND	2.0	0.80	ng/L		10/08/18 11:28	10/10/18 02:00	1
Perfluorooctanoic acid (PFOA)	ND	2.0	0.75	ng/L		10/08/18 11:28	10/10/18 02:00	1
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	1.3	ng/L		10/08/18 11:28	10/10/18 02:00	1
Perfluorononanoic acid (PFNA)	ND	2.0	0.65	ng/L		10/08/18 11:28	10/10/18 02:00	1
	MR MR							

	MB	MR				
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	113		25 - 150	10/08/18 11:28	10/10/18 02:00	1
13C4 PFHpA	114		25 - 150	10/08/18 11:28	10/10/18 02:00	1
13C4 PFOA	126		25 - 150	10/08/18 11:28	10/10/18 02:00	1
13C4 PFOS	107		25 - 150	10/08/18 11:28	10/10/18 02:00	1
13C5 PFNA	114		25 - 150	10/08/18 11:28	10/10/18 02:00	1

Lab Sample ID: LCS 320-250420/2-A

**Matrix: Water** 

**Analysis Batch: 250736** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 250420

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	17.5		ng/L		99	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.9		ng/L		93	73 <sub>-</sub> 157	
Perfluoroheptanoic acid (PFHpA)	20.0	18.5		ng/L		93	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	19.4		ng/L		97	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	16.9		ng/L		91	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	18.2		ng/L		91	73 - 147	

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Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	116		25 - 150
13C4 PFHpA	124		25 - 150
13C4 PFOA	126		25 - 150
13C4 PFOS	116		25 - 150
13C5 PFNA	131		25 - 150

Lab Sample ID: LCSD 320-250420/3-A

**Matrix: Water** 

Analysis Batch: 250736

Client Sample ID: Lab	<b>Control</b>	Sam	ple D	up
	Prep Tv	pe: T	otal/l	NA

Prep Type: Total/NA
Prep Batch: 250420
%Rec. RPD

Allalysis Datcii. 200700							i icp De	itoii. Z	JUTEU
-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	16.8		ng/L		95	72 - 151	4	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.2		ng/L		94	73 - 157	1	30
Perfluoroheptanoic acid (PFHpA)	20.0	18.4		ng/L		92	71 - 138	1	30
Perfluorooctanoic acid (PFOA)	20.0	18.3		ng/L		91	70 - 140	6	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.8		ng/L		96	69 - 144	5	30
Perfluorononanoic acid (PFNA)	20.0	18.3		ng/L		91	73 - 147	1	30

TestAmerica Sacramento

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10/11/2018

### **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

•	LCSD	LCSD		
Isotope Dilution	%Recovery	Qualifier	Limits	
1802 PFHxS	114		25 - 150	
13C4 PFHpA	123		25 - 150	
13C4 PFOA	135		25 - 150	
13C4 PFOS	111		25 - 150	
13C5 PFNA	124		25 - 150	

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### **QC Association Summary**

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-43916-1

Project/Site: FAI

LCMS

**Prep Batch: 250420** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43916-1	510238.1	Total/NA	Water	PFAS Prep	
320-43916-2	510238.2	Total/NA	Water	PFAS Prep	
320-43916-3	510238.2-EB	Total/NA	Water	PFAS Prep	
MB 320-250420/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-250420/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-250420/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 250736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43916-1	510238.1	Total/NA	Water	WS-LC-0025	250420
				At1	
320-43916-2	510238.2	Total/NA	Water	WS-LC-0025	250420
				At1	
320-43916-3	510238.2-EB	Total/NA	Water	WS-LC-0025	250420
				At1	
MB 320-250420/1-A	Method Blank	Total/NA	Water	WS-LC-0025	250420
				At1	
LCS 320-250420/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	250420
				At1	
LCSD 320-250420/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	250420
				At1	

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID: 320-43916-1

Matrix: Water

Date Collected: 10/03/18 16:26 Date Received: 10/05/18 13:40

Client Sample ID: 510238.1

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250420	10/08/18 11:28	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			250736	10/10/18 02:55	D1R	TAL SAC

Client Sample ID: 510238.2 Lab Sample ID: 320-43916-2

**Matrix: Water** 

Date Collected: 10/04/18 13:35 Date Received: 10/05/18 13:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250420	10/08/18 11:28	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			250736	10/10/18 03:13	D1R	TAL SAC

Date Collected: 10/04/18 13:45 Matrix: Water

Date Received: 10/05/18 13:40

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250420	10/08/18 11:28	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			250736	10/10/18 03:31	D1R	TAL SAC

#### **Laboratory References:**

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

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### **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

#### **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	<b>Identification Number</b>	<b>Expiration Date</b>
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

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

### **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

TestAmerica Sacramento

## **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43916-1

Lab Sample ID	Client Sample ID	Matrix	Collected Receiv	ved
320-43916-1	510238.1	Water	10/03/18 16:26 10/05/18	13:40
320-43916-2	510238.2	Water	10/04/18 13:35 10/05/18	13:40
320-43916-3	510238.2-EB	Water	10/04/18 13:45 10/05/18	13:40

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Client: Shannon & Wilson, Inc

Job Number: 320-43916-1

Login Number: 43916

List Source: TestAmerica Sacramento

List Number: 1 Creator: Her, David A

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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 Pack
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	7.9c
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

### **Laboratory Data Review Checklist**

Completed By:
Marcy Nadel
Title:
Geologist
Date:
October 16, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
October 11, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-43916-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	-43916-1			
1.	<u>Laboratory</u>			
	a. Did an AD	EC CS approv	ed laboratory receive and perform all of the submitted sample analyse	es?
	© Yes	No	Comments:	
	certified for pe	erfluorinated al	nalytical laboratory for analysis of PFAS. However, the laboratory is kyl acids in drinking water analysis by the National Environmental ogram (NELAP) in Oregon.	3
			ansferred to another "network" laboratory or sub-contracted to an was the laboratory performing the analyses ADEC CS approved?	
	C Yes	No	Comments:	
	Analyses were	performed by	TestAmerica Laboratories, Inc. in West Sacramento, CA.	
2.	Chain of Custody	<u> (CoC)</u>		
	<ul><li>a. CoC inforn</li></ul>	nation comple	red, signed, and dated (including released/received by)?	
	© Yes	© No	Comments:	
	100			
	b. Correct An	alyses request	ed?	
	• Yes	© No	Comments:	
3.	Laboratory Samp	le Receipt Do	cumentation	
	a. Sample/coo	oler temperatu	re documented and within range at receipt (0° to 6° C)?	
	-	© No	Comments:	
		re blank was n	neasured outside the acceptable temperature range of 0 °C to 6 °C upo	on
		eservation acce alorinated Solv	ptable – acidified waters, Methanol preserved VOC soil (GRO, BTE) ents, etc.)?	Χ,
	• Yes	C No	Comments:	
	samples was ac preservative. In	dversely affect n an e-mail dan nist, who "agro	biological stability of PFAS, it is unlikely the integrity of the projected by the high cooler temperature. Analysis of PFAS does not required August 3, 2015, the ADEC project manager noted that he had spotes the high temperature probably would not affect the PFC results."	e a
	c. Sample cor	ndition docum	ented – broken, leaking (Methanol), zero headspace (VOC vials)?	
	• Yes	O No	Comments:	
	The sample rec	ceipt form note	es that the samples were received in good condition.	_

sumpres,	etc.?	<i>:</i>	
⊙ Ye	S	O No	Comments:
The sample	recei	pt document	ation notes the cooler temperature was outside the accepted range.
e. Data qua	lity (	or usability a	ffected?
			Comments:
Data quality	or us	sability is no	t affected; see above.
. Case Narra	<u>tive</u>		
a. Present	and 1	understandab	ole?
⊙ Y	es	C No	Comments:
b. Discrep	ancie	es, errors, or	QC failures identified by the lab?
<b>⊙</b> Y	'es	O No	Comments:
			samples arrived in good condition, properly preserved, and that the oler upon receipt at the laboratory was 7.9° C.
(MS) and M	1S dı	uplicate (MS	e was insufficient sample volume available to perform a matrix spike D) with preparation batch 320-250420. It further notes that two of the light brown in color.
c. Were al	l cor	rective action	ns documented?
CY	'es	No	Comments:
N/A; there	were	no correctiv	e actions documented in the case narrative.
d. What is	the 6	effect on data	quality/usability according to the case narrative?
			Comments:
The case na	ırrati	ve does not 1	note an effect on data quality.
amples Resul			
allipies resur	<u>s</u>		
a. Correct	anal <sup>,</sup>	yses perform	ed/reported as requested on COC?

320-43	3916-	-1						
	b.	All applicat  • Yes	ole holding ti	mes met?	Comments:			
	The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.							
	c.	All soils rep	orted on a di	ry weight bas	sis?			
		© Yes	No		Comments:			
	N/A	A; soil samp	les were not	submitted wit	ith this work order.			
		Are the report the project?	-	ess than the C	Cleanup Level or the minimum required detection lev	el for		
		• Yes	C No		Comments:			
	The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.							
	e. Data quality or usability affected?							
		O Yes	<ul><li>No</li></ul>		Comments:			
	The	data qualit	y and usabili	ty were not at	iffected.			
6. <u>Q</u> (	C Sar	<u>mples</u>						
	a.	Method Bla	nk					
		i. One	method blan	k reported pe	er matrix, analysis and 20 samples?			
		• Yes	C No		Comments:			
		ii. All r	nethod blank	results less t	than limit of quantitation (LOQ)?			
		• Yes	O No		Comments:			

Qualification of the results was not required; see above.

Comments:

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

**July 2017** Page 4

No

O Yes

iii. If above LOQ, what samples are affected?

None; PFAS compounds were not detected in method blank sample.

v. Data	a quality or usability affe	ected?
		Comments:
The data qualit	y and usability were not	affected.
b. Laboratory	Control Sample/Duplica	ate (LCS/LCSD)
		reported per matrix, analysis and 20 samples? (LCS/LCSD CS required per SW846)
• Yes	C No	Comments:
	als/Inorganics – one LCsamples?	S and one sample duplicate reported per matrix, analysis and
C Yes	No	Comments:
Metals and ino	rganics were not analyze	ed as part of this work order.
And	d project specified DQOs	veries (%R) reported and within method or laboratory limits? s, if applicable. (AK Petroleum methods: AK101 60%-120%, 60%-120%; all other analyses see the laboratory QC pages)
• Yes	C No	Comments:
labo LCS	oratory limits? And proje	ent differences (RPD) reported and less than method or ect specified DQOs, if applicable. RPD reported from or sample/sample duplicate. (AK Petroleum methods 20%; all atory QC pages)
• Yes	C No	Comments:
v. If %	oR or RPD is outside of a	acceptable limits, what samples are affected?
		Comments:
N/A; analytical	l accuracy and precision	were within acceptable limits.
vi. Do t	the affected sample(s) ha	ave data flags? If so, are the data flags clearly defined?
C Yes	• No	Comments:
Qualification o	of the data was not requir	red; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:	
The data quality and usability were not affected.	
c. Surrogates – Organics Only	
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?	?
• Yes • No Comments:	
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.	
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>	
• Yes • No Comments:	
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?	
© Yes	
N/A; there were no IDA recovery failures associated with this work order.	
iv. Data quality or usability affected?	
Comments:	
The data quality and usability are not affected; see above.	
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>	<u>l</u>
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>	
© Yes	
PFAS are not volatile compounds; therefore, a trip blank is not required.	
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)	
© Yes © No Comments:	
N/A; a trip blank is not required.	

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-4391	6-1			
	::: A 11	14 1 41	- 1 002	
		sults less than	~	
	O Yes	No     No     ■     No     No     ■     No     ■     No     No     ■     No     No     ■     No     No	Comments:	
N.	/A; a trip blank	is not require	ed.	
	iv. If abo	ve LOQ, wha	at samples are affected?	
			Comments	:
N	one; a trip blan	k was not sub	omitted with this work o	rder.
	v. Data o	quality or usa	bility affected?	
			Comments	:
Tl	he data quality	and usability	were not affected; see a	bove.
e.	Field Duplica	ite		
	i. One fi	ield duplicate	submitted per matrix, a	nalysis and 10 project samples?
	Yes	O No	Comments:	
Sa	ample <i>510238</i> .	<i>l</i> is associated	d with field duplicate sai	mple <i>510338.1</i> in work order 320-43917.
	ii. Subm	itted blind to	lab?	
	© Yes	C No	Comments:	
		mmended: 30	ative percent differences 0% water, 50% soil) = Absolute value of:	(RPD) less than specified DQOs? $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$
			Where $R_1 = Sample$	Concentration

 $R_2$  = Field Duplicate Concentration

Yes No Comments:

Field duplicate RPDs are within the recommended range for PFBS, PFOA, PFHxS, and PFOS. PFHpA and PFNA are not detected in sample 510238.1; however, they are detected above the reporting range in sample 510338.1. The results for PFHpA and PFNA are considered estimated, flagged "J" for both project samples.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Yes, the PFHpA and PFNA results are considered estimated and flagged 'J' in the field-duplicate pair.

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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
	• Yes • No • Not Applicable
	Equipment blank sample 510238.2-EB was submitted for determination of PFAS. Samples 510238.2 and 510238.2-EB were collected using a rented submersible Mega-Monsoon pump. Sample 510238.1 was not collected using reusable equipment.
	i. All results less than LOQ?
	• Yes • No Comments:
	PFAS reported for this project were not detected in the equipment blank sample.
	ii. If above LOQ, what samples are affected?
	Comments:
	None; see above.
	iii. Data quality or usability affected?
	Comments:
	The data quality and usability were not affected; see above.
7.	Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
	a. Defined and appropriate?
	© Yes    O No Comments:
	There were no additional flags/qualifiers required for this work order.



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: 320-43917-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Oltina

Authorized for release by: 10/15/2018 4:19:47 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI

TestAmerica Job ID: 320-43917-1

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

# **Glossary**

TEQ

Toxicity Equivalent Quotient (Dioxin)

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)

10/15/2018

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### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Job ID: 320-43917-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-43917-1

### Receipt

The sample was received on 10/5/2018 1:40 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 7.9° C.

### **Receipt Exceptions**

The following sample was received at the laboratory outside the required temperature criteria of 0-6° C.: 510338.1 (320-43917-1).

### **LCMS**

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

### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-250808.

Method(s) PFAS Prep: The following sample is brown in color: 510338.1 (320-43917-1).

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 510338.1

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Lab Sample ID: 320-43917-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	38	2.0	0.92	ng/L		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	200	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	29	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	100	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	77	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	12	2.0	0.65	ng/L	1	WS-LC-0025 At1	Total/NA

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Lab Sample ID: 320-43917-1

**Matrix: Water** 

Client Sample ID: 510338.1
Date Collected: 10/03/18 16:30
Date Received: 10/05/18 13:40

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	38		2.0	0.92	ng/L		10/09/18 13:35	10/14/18 14:17	1
Perfluorohexanesulfonic acid (PFHxS)	200		2.0	0.87	ng/L		10/09/18 13:35	10/14/18 14:17	1
Perfluoroheptanoic acid (PFHpA)	29		2.0	0.80	ng/L		10/09/18 13:35	10/14/18 14:17	1
Perfluorooctanoic acid (PFOA)	100		2.0	0.75	ng/L		10/09/18 13:35	10/14/18 14:17	1
Perfluorooctanesulfonic acid (PFOS)	77		2.0	1.3	ng/L		10/09/18 13:35	10/14/18 14:17	1
Perfluorononanoic acid (PFNA)	12		2.0	0.65	ng/L		10/09/18 13:35	10/14/18 14:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	121	-	25 - 150				10/09/18 13:35	10/14/18 14:17	1
13C4 PFHpA	117		25 - 150				10/09/18 13:35	10/14/18 14:17	1
13C4 PFOA	131		25 - 150				10/09/18 13:35	10/14/18 14:17	1
13C4 PFOS	116		25 - 150				10/09/18 13:35	10/14/18 14:17	1
13C5 PFNA	126		25 - 150				10/09/18 13:35	10/14/18 14:17	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

_			Perce	ent Isotope	Dilution Re	covery (Accept	ance Limits)
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
320-43917-1	510338.1	121	117	131	116	126	
LCS 320-250808/2-A	Lab Control Sample	112	124	133	115	126	
LCSD 320-250808/3-A	Lab Control Sample Dup	120	130	142	119	127	
MB 320-250808/1-A	Method Blank	115	120	123	117	121	

### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-43917-1

Client: Shannon & Wilson, Inc Project/Site: FAI

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-250808/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA Analysis Batch: 251696 **Prep Batch: 250808** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		10/09/18 13:35	10/14/18 00:32	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		10/09/18 13:35	10/14/18 00:32	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/09/18 13:35	10/14/18 00:32	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		10/09/18 13:35	10/14/18 00:32	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		10/09/18 13:35	10/14/18 00:32	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/09/18 13:35	10/14/18 00:32	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PEHvS	115		25 150				10/00/18 13:35	10/14/18 00:32	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	115		25 - 150	10/09/18 13:35	10/14/18 00:32	1
13C4 PFHpA	120		25 - 150	10/09/18 13:35	10/14/18 00:32	1
13C4 PFOA	123		25 - 150	10/09/18 13:35	10/14/18 00:32	1
13C4 PFOS	117		25 - 150	10/09/18 13:35	10/14/18 00:32	1
13C5 PFNA	121		25 - 150	10/09/18 13:35	10/14/18 00:32	1
_						

Lab Sample ID: LCS 320-250808/2-A **Client Sample ID: Lab Control Sample Matrix: Water** 

**Prep Type: Total/NA Prep Batch: 250808** Analysis Batch: 251696 0-:1--

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	16.8		ng/L		95	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.7		ng/L		97	73 <sub>-</sub> 157	
Perfluoroheptanoic acid (PFHpA)	20.0	19.0		ng/L		95	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	17.4		ng/L		87	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	16.1		ng/L		87	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	17.6		ng/L		88	73 - 147	

	LCS LC	S	
Isotope Dilution	%Recovery Qι	ıalifier	Limits
1802 PFHxS	112		25 - 150
13C4 PFHpA	124		25 - 150
13C4 PFOA	133		25 - 150
13C4 PFOS	115		25 - 150
13C5 PFNA	126		25 - 150

Lab Sample ID: LCSD 320-250808/3-A **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA **Prep Batch: 250808** Analysis Batch: 251696

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	15.8		ng/L		89	72 - 151	6	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.1		ng/L		88	73 - 157	9	30
Perfluoroheptanoic acid (PFHpA)	20.0	17.0		ng/L		85	71 - 138	11	30
Perfluorooctanoic acid (PFOA)	20.0	16.4		ng/L		82	70 - 140	6	30
Perfluorooctanesulfonic acid (PFOS)	18.6	15.1		ng/L		81	69 - 144	7	30
Perfluorononanoic acid (PFNA)	20.0	16.8		ng/L		84	73 - 147	5	30

TestAmerica Sacramento

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

•	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	120		25 - 150
13C4 PFHpA	130		25 - 150
13C4 PFOA	142		25 - 150
13C4 PFOS	119		25 - 150
13C5 PENA	127		25 - 150

TestAmerica Job ID: 320-43917-1

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

## LCMS

### **Prep Batch: 250808**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43917-1	510338.1	Total/NA	Water	PFAS Prep	
MB 320-250808/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-250808/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-250808/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### Analysis Batch: 251696

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43917-1	510338.1	Total/NA	Water	WS-LC-0025	250808
MB 320-250808/1-A	Method Blank	Total/NA	Water	At1 WS-LC-0025 At1	250808
LCS 320-250808/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	250808
LCSD 320-250808/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	250808

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Lab Sample ID: 320-43917-1

**Matrix: Water** 

Client Sample ID: 510338.1 Date Collected: 10/03/18 16:30 Date Received: 10/05/18 13:40

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	250808	10/09/18 13:35	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251696	10/14/18 14:17	S1M	TAL SAC

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

### **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	<b>Expiration Date</b>
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

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-43917-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43917-1	510338.1	Water	10/03/18 16:30	10/05/18 13:40

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Client: Shannon & Wilson, Inc

Job Number: 320-43917-1

Login Number: 43917

List Source: TestAmerica Sacramento

List Number: 1 Creator: Her, David A

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	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.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	7.9c
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# **Laboratory Data Review Checklist**

Completed By:
Marcy Nadel
Title:
Geologist
Date:
October 16, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
October 15, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-43917-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	320-43917-1					
1.	Laboratory					
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?					
	© Yes    O No Comments:					
	ADEC has not approved an analytical laboratory for analysis of PFAS. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.					
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?					
	© Yes					
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.					
2.	Chain of Custody (CoC)					
	a. CoC information completed, signed, and dated (including released/received by)?					
	© Yes © No Comments:					
	b. Correct Analyses requested?					
	© Yes © No Comments:					
3.	Laboratory Sample Receipt Documentation					
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?					
	© Yes • No Comments:					
	The temperature blank was measured outside the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory (7.9 °C). Work order 320-43917 was submitted in the same cooler as the samples included in work order 320-43916.					
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?					
	© Yes © No Comments:					
	Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the high cooler temperature. Analysis of PFAS does not require a preservative. In an e-mail dated August 3, 2015, the ADEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results."					

PFAS are also known as PFCs.

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	c.	Sample cond	dition documented -	- broken, leaking (Methanol), zero headspace (VOC vials)?			
_		Yes	C No	Comments:			
	Th	e sample rece	eipt form notes that	the samples were received in good condition.			
	d.	d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?					
		• Yes	C No	Comments:			
Ī	Th	e sample rece	eipt documentation	notes the cooler temperature was outside the accepted range.			
	e.	Data quality	or usability affecte	d?			
				Comments:			
	Da	ta quality or	usability is not affe	cted; see above.			
_ 4.	C	ase Narrative					
	a.	Present and	understandable?				
		© Yes	O No	Comments:			
	b.	Discrepanc	ies, errors, or QC fa	ailures identified by the lab?			
		• Yes	© No	Comments:			
			-	les arrived in good condition, properly preserved, and that the upon receipt at the laboratory was 7.9° C.			
	(N	The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) with preparation batch 320-250808. It further notes the sample was brown in color.					
	c.	Were all co	rrective actions do	cumented?			
		C Yes	No	Comments:			
	N.	/A; there wer	e no corrective acti	ons documented in the case narrative.			
	d.	What is the	effect on data qual	ity/usability according to the case narrative?			
				Comments:			
	Tl	ne case narrat	tive does not note a	n effect on data quality.			

20-439	-4391/-1					
. <u>Sam</u>	ples Results					
i	a. Correct anal	lyses performed/reported	d as requested on COC?			
	Yes	C No	Comments:			
1	b. All applicable holding times met?					
	• Yes	C No	Comments:			
1	The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.					
(	e. All soils rep	oorted on a dry weight ba	asis?			
_	C Yes	• No	Comments:			
]	N/A; soil samp	les were not submitted w	vith this work order.			
(	d. Are the repo	_	Cleanup Level or the minimum required detection level for			
	• Yes	© No	Comments:			
			ea Reporting Limit (RL), is less than the applicable ADEC EC groundwater cleanup levels for PFOS and PFOA.			
(	e. Data quality	or usability affected?				
_	C Yes	© No	Comments:			
,	The data quality	y and usability were not	affected.			
. <u>QC</u>	<u>Samples</u>					
į	a. Method Bla	nk				
	i. One	method blank reported p	per matrix, analysis and 20 samples?			
	• Yes	© No	Comments:			
	ii. All r	method blank results less	s than limit of quantitation (LOQ)?			
	• Yes	C No	Comments:			
	iii. If ab	ove LOQ, what samples	are affected?			
			Comments:			

None; PFAS compounds were not detected in method blank sample.

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iv. Do t	he affected sam	nple(s) have data flags? If so, are the	e data flags clearly defined?
© Yes	<ul><li>No</li></ul>	Comments:	
Qualification of	f the results wa	s not required; see above.	
v. Data	quality or usal	bility affected?	
		Comments:	
The data quality	y and usability	were not affected.	
b. Laboratory	Control Sample	e/Duplicate (LCS/LCSD)	
_		S/LCSD reported per matrix, analyse ethods, LCS required per SW846)	sis and 20 samples? (LCS/LCSD
• Yes	C No	Comments:	
	als/Inorganics - amples?	one LCS and one sample duplicate	e reported per matrix, analysis and
O Yes	No	Comments:	
Metals and inor	rganics were no	ot analyzed as part of this work orde	r.
And	project specifi	cent recoveries (%R) reported and ved DQOs, if applicable. (AK Petrolo, AK103 60%-120%; all other analyses.)	eum methods: AK101 60%-120%,
• Yes	C No	Comments:	
labo LCS	ratory limits? A S/LCSD, MS/M	tive percent differences (RPD) report And project specified DQOs, if appl (SD, and or sample/sample duplicate the laboratory QC pages)	
• Yes	C No	Comments:	
v. If %	R or RPD is ou	itside of acceptable limits, what sam	nples are affected?
		Comments:	
N/A; analytical	accuracy and p	precision were within acceptable lin	nits.

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vi. Do tl	he affected	I sample(s) have data flags? If so, are the data flags clearly	defined?						
C Yes	No	Comments:							
Qualification of	the data w	vas not required; see above.							
vii. Data	vii. Data quality or usability affected? (Use comment box to explain.)								
		Comments:							
The data quality	and usabi	ility were not affected.							
c. Surrogates -	- Organics	Only							
i. Are	surrogate r	recoveries reported for organic analyses - field, QC and lab	oratory samples?						
• Yes	O No	Comments:							
_	and assessin	S-LC-0025 uses IDA recovery, which entails adding a 13C ng the recovery of each analyte. The isotopically-labeled or this method.	-						
And	project spe	percent recoveries (%R) reported and within method or la ecified DQOs, if applicable. (AK Petroleum methods 50-1: e laboratory report pages)							
• Yes	O No	Comments:							
	he sample is clearly de	results with failed surrogate recoveries have data flags? If efined?	so, are the data						
O Yes	No	Comments:							
N/A; there were	no IDA re	ecovery failures associated with this work order.							
iv. Data	quality or	usability affected?							
		Comments:							
The data quality	and usabi	ility are not affected; see above.							
d. Trip blank – Soil	- Volatile a	analyses only (GRO, BTEX, Volatile Chlorinated Solvents,	, etc.): Water and						
samı	ples?	reported per matrix, analysis and for each cooler containing explanation below.)	g volatile						
© Yes	• No	Comments:							
		npounds; therefore, a trip blank is not required.							

	<u>*</u>	the trip blank and VOA samples clearly indicated on the laining why must be entered below)
O Yes	© No	Comments:
N/A; a trip blan	ık is not required.	
iii. All r	results less than LOQ?	
C Yes	© No	Comments:
N/A; a trip blan	ık is not required.	
iv. If ab	ove LOQ, what samples a	are affected?
		Comments:
None; a trip bla	ink was not submitted with	h this work order.
v. Data	quality or usability affect	ted?
		Comments:
The data quality	y and usability were not a	ffected; see above.
e. Field Duplie	cate	
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?
• Yes	C No	Comments:
Field duplicate	sample <i>510338.1</i> is assoc	iated with sample <i>510238.1</i> in work order 320-43916.
ii. Subr	mitted blind to lab?	
© Yes	C No	Comments:
	commended: 30% water, 5 RPD (%) = Absolute Where	
C Yes	© No	Comments:
PFHpA and PF reporting range	NA are not detected in sar	mmended range for PFBS, PFOA, PFHxS, and PFOS. mple <i>510238.1</i> ; however, they are detected above the results for PFHpA and PFNA are considered estimated,

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:
Yes, the PFHpA and PFNA results are considered estimated and flagged 'J' in the field-duplicate pair.
f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No
Sample 510338.1 was not collected using reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
© Yes
N/A; an equipment blank was not submitted with this work order.
ii. If above LOQ, what samples are affected?
Comments:
None; see above.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?
-----------------------------

C Yes • No

Comments:

There were no additional flags/qualifiers required for this work order.



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: 320-45444-3

Client Project/Site: FAI

Revision: 1

For:

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

Attn: Marcy Nadel

Jamil Ottom

Authorized for release by: 12/5/2018 3:01:09 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

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**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-45444-3

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

### **Qualifiers**

### **LCMS**

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

TEF

TEQ

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

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
Percent Recovery
Contains Free Liquid
Contains No Free Liquid
Duplicate Error Ratio (normalized absolute difference)
Dilution Factor
Detection Limit (DoD/DOE)
Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
Decision Level Concentration (Radiochemistry)
Estimated Detection Limit (Dioxin)
Limit of Detection (DoD/DOE)
Limit of Quantitation (DoD/DOE)
Minimum Detectable Activity (Radiochemistry)
Minimum Detectable Concentration (Radiochemistry)
Method Detection Limit
Minimum Level (Dioxin)
Not Calculated
Not Detected at the reporting limit (or MDL or EDL if shown)
Practical Quantitation Limit
Quality Control
Relative Error Ratio (Radiochemistry)
Reporting Limit or Requested Limit (Radiochemistry)
Relative Percent Difference, a measure of the relative difference between two points

### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Job ID: 320-45444-3

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-45444-3

#### Receipt

The samples were received on 11/20/2018 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.1° C and 4.7° C.

### **LCMS**

Method(s) WS-LC-0025 At1: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for 13C5 PFNA for the following samples: 1736363 (320-45444-11). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

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

### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-262055.

Method(s) PFAS Prep: The following samples were orange in color. 151637 (320-45444-5), 407313 (320-45444-6), 407364 (320-45444-7), 153699 (320-45444-8), 120804 (320-45444-10), 1736363 (320-45444-11), 173463 (320-45444-12), 483532 (320-45444-13), 173916 (320-45444-14), 407372 (320-45444-15), 174016 (320-45444-16), 176435 (320-45444-17), 550132 (320-45444-18), 173002 (320-45444-19), 561711 (320-45444-20), 136891 (320-45444-21) and 173860 (320-45444-22)

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

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TestAmerica Job ID: 320-45444-3

Client: Shannon & Wilson, Inc

Project/Site: FAI

Client Sample ID: 151637 Lab Sample ID: 320-45444-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.9	J –	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.0		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.79	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.4		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Lab Sample ID: 320-45444-6 Client Sample ID: 407313

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 407364 Lab Sample ID: 320-45444-7

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.1	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.2	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	11	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.2	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 153699 Lab Sample ID: 320-45444-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	43		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	42		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.2		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.9		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 151203 Lab Sample ID: 320-45444-9

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.4	2.0	0.92	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8 J	2.0	0.80	ng/L	1	WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

TestAmerica Job ID: 320-45444-3

Project/Site: FAI

Client: Shannon & Wilson, Inc

Client Sample ID: 151203 (Continued) Lab Sample ID: 320-45444-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 120804 Lab Sample ID: 320-45444-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	49		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	59		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	49		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173363 Lab Sample ID: 320-45444-11

No Detections.

Client Sample ID: 173463 Lab Sample ID: 320-45444-12

No Detections.

Client Sample ID: 483532 Lab Sample ID: 320-45444-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.3		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5	J	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 173916 Lab Sample ID: 320-45444-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.78	J	2.0	0.75	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

Client Sample ID: 407372 Lab Sample ID: 320-45444-15

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

TestAmerica Job ID: 320-45444-3

Client: Shannon & Wilson, Inc

Client Sample ID: 174016

Client Sample ID: 176435

Project/Site: FAI

Lab Sample ID: 320-45444-16

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.3	2.0	0.87	ng/L	1	WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6 J	2.0	1.3	ng/L	1	WS-LC-0025 At1	Total/NA

# Lab Sample ID: 320-45444-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	47		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.0		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 550132 Lab Sample ID: 320-45444-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 173002 Lab Sample ID: 320-45444-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.9		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.5	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

#### Client Sample ID: 561711 Lab Sample ID: 320-45444-20

Analyte	Result Qu	ualifier RL	MDL	Unit	Dil Fac	D Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.97 J	2.0	0.75	ng/L	1	WS-LC-0025	Total/NA
						At1	

#### Client Sample ID: 136891 Lab Sample ID: 320-45444-21

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# **Detection Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Client Sample ID: 136891 (Continued)							Lab Sample ID: 320-45444-2					
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type			
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA			
Perfluorohexanesulfonic acid (PFHxS)	52		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA			
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA			
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA			
Perfluorooctanesulfonic acid (PFOS)	7.1		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA			

Client Sample ID: 173860	Lab Sample ID: 320-45444-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.7		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

12/5/2018 (Rev. 1)

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-5

**Matrix: Water** 

Client Sample ID: 151637
Date Collected: 11/15/18 10:23
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L		11/29/18 17:03	12/01/18 15:39	1
Perfluorohexanesulfonic acid (PFHxS)	4.0		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 15:39	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 15:39	1
Perfluorooctanoic acid (PFOA)	0.79	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 15:39	1
Perfluorooctanesulfonic acid (PFOS)	6.4		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 15:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 15:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	81		25 - 150				11/29/18 17:03	12/01/18 15:39	1
13C4 PFHpA	99		25 - 150				11/29/18 17:03	12/01/18 15:39	1
13C4 PFOA	112		25 - 150				11/29/18 17:03	12/01/18 15:39	1
13C4 PFOS	85		25 - 150				11/29/18 17:03	12/01/18 15:39	1
13C5 PFNA	111		25 - 150				11/29/18 17:03	12/01/18 15:39	1

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-6

**Matrix: Water** 

Client Sample ID: 407313
Date Collected: 11/15/18 12:25
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 15:58	1
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L		11/29/18 17:03	12/01/18 15:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 15:58	1
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 15:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 15:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 15:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	100		25 - 150				11/29/18 17:03	12/01/18 15:58	1
13C4 PFHpA	132		25 - 150				11/29/18 17:03	12/01/18 15:58	1
13C4 PFOA	140		25 - 150				11/29/18 17:03	12/01/18 15:58	1
13C4 PFOS	106		25 - 150				11/29/18 17:03	12/01/18 15:58	1
13C5 PFNA	146		25 - 150				11/29/18 17:03	12/01/18 15:58	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-7

**Matrix: Water** 

Client Sample ID: 407364
Date Collected: 11/15/18 11:32
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.1		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 16:16	1
Perfluorohexanesulfonic acid (PFHxS)	15		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 16:16	1
Perfluoroheptanoic acid (PFHpA)	4.2		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 16:16	1
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 16:16	1
Perfluorooctanesulfonic acid (PFOS)	5.2		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 16:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 16:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102		25 - 150				11/29/18 17:03	12/01/18 16:16	1
13C4 PFHpA	126		25 - 150				11/29/18 17:03	12/01/18 16:16	1
13C4 PFOA	134		25 - 150				11/29/18 17:03	12/01/18 16:16	1
13C4 PFOS	109		25 - 150				11/29/18 17:03	12/01/18 16:16	1
13C5 PFNA	145		25 - 150				11/29/18 17:03	12/01/18 16:16	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-8

**Matrix: Water** 

Client Sample ID: 153699
Date Collected: 11/15/18 13:28
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	43		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 16:35	1
Perfluorohexanesulfonic acid (PFHxS)	42		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 16:35	1
Perfluoroheptanoic acid (PFHpA)	5.2		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 16:35	1
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 16:35	1
Perfluorooctanesulfonic acid (PFOS)	4.9		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 16:35	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 16:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				11/29/18 17:03	12/01/18 16:35	1
13C4 PFHpA	128		25 - 150				11/29/18 17:03	12/01/18 16:35	1
13C4 PFOA	139		25 - 150				11/29/18 17:03	12/01/18 16:35	1
13C4 PFOS	109		25 - 150				11/29/18 17:03	12/01/18 16:35	1
13C5 PFNA	149		25 - 150				11/29/18 17:03	12/01/18 16:35	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-9

**Matrix: Water** 

Client Sample ID: 151203
Date Collected: 11/15/18 14:29
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.4		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 16:53	1
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 16:53	1
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L		11/29/18 17:03	12/01/18 16:53	1
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 16:53	1
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 16:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 16:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				11/29/18 17:03	12/01/18 16:53	1
13C4 PFHpA	129		25 - 150				11/29/18 17:03	12/01/18 16:53	1
13C4 PFOA	144		25 - 150				11/29/18 17:03	12/01/18 16:53	1
13C4 PFOS	109		25 - 150				11/29/18 17:03	12/01/18 16:53	1
13C5 PFNA	150		25 - 150				11/29/18 17:03	12/01/18 16:53	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-10

Matrix: Water

TestAmerica Job ID: 320-45444-3

Client Sample ID: 120804 Date Collected: 11/15/18 13:24 Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	49		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 17:11	1
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 17:11	1
Perfluoroheptanoic acid (PFHpA)	59		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 17:11	1
Perfluorooctanoic acid (PFOA)	49		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 17:11	1
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 17:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 17:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	100		25 - 150				11/29/18 17:03	12/01/18 17:11	1
13C4 PFHpA	122		25 - 150				11/29/18 17:03	12/01/18 17:11	1
13C4 PFOA	134		25 - 150				11/29/18 17:03	12/01/18 17:11	1
13C4 PFOS	108		25 - 150				11/29/18 17:03	12/01/18 17:11	1
13C5 PFNA	140		25 - 150				11/29/18 17:03	12/01/18 17:11	1

TestAmerica Sacramento

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-11

TestAmerica Job ID: 320-45444-3

**Matrix: Water** 

Client Sample ID: 173363
Date Collected: 11/15/18 12:36
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 17:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 17:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 17:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 17:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 17:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 17:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	104		25 - 150				11/29/18 17:03	12/01/18 17:30	1
13C4 PFHpA	129		25 - 150				11/29/18 17:03	12/01/18 17:30	1
13C4 PFOA	138		25 - 150				11/29/18 17:03	12/01/18 17:30	1
13C4 PFOS	109		25 - 150				11/29/18 17:03	12/01/18 17:30	1
13C5 PFNA	151	*	25 - 150				11/29/18 17:03	12/01/18 17:30	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-12

TestAmerica Job ID: 320-45444-3

**Matrix: Water** 

Client Sample ID: 173463
Date Collected: 11/15/18 12:33
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 18:06	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 18:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 18:06	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 18:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 18:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 18:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	103		25 - 150				11/29/18 17:03	12/01/18 18:06	1
13C4 PFHpA	129		25 - 150				11/29/18 17:03	12/01/18 18:06	1
13C4 PFOA	134		25 - 150				11/29/18 17:03	12/01/18 18:06	1
13C4 PFOS	104		25 - 150				11/29/18 17:03	12/01/18 18:06	1
13C5 PFNA	148		25 - 150				11/29/18 17:03	12/01/18 18:06	1

Client: Shannon & Wilson, Inc

Client Sample ID: 483532 Date Collected: 11/14/18 11:56

Date Received: 11/20/18 11:00

Project/Site: FAI

Lab Sample ID: 320-45444-13

Matrix: Water

TestAmerica Job ID: 320-45444-3

Method: WS-LC-0025 At1 - Flu		•							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 18:25	1
Perfluorohexanesulfonic acid (PFHxS)	9.3		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 18:25	1
Perfluoroheptanoic acid (PFHpA)	1.0	J	2.0	0.80	ng/L		11/29/18 17:03	12/01/18 18:25	1
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 18:25	1
Perfluorooctanesulfonic acid (PFOS)	1.5	J	2.0	1.3	ng/L		11/29/18 17:03	12/01/18 18:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 18:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				11/29/18 17:03	12/01/18 18:25	1
13C4 PFHpA	131		25 - 150				11/29/18 17:03	12/01/18 18:25	1
13C4 PFOA	143		25 - 150				11/29/18 17:03	12/01/18 18:25	1
13C4 PFOS	112		25 - 150				11/29/18 17:03	12/01/18 18:25	1
13C5 PFNA	148		25 - 150				11/29/18 17:03	12/01/18 18:25	1

TestAmerica Sacramento

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-14

**Matrix: Water** 

Client Sample ID: 173916
Date Collected: 11/14/18 10:35
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 18:43	1
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 18:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 18:43	1
Perfluorooctanoic acid (PFOA)	0.78	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 18:43	1
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L		11/29/18 17:03	12/01/18 18:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 18:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				11/29/18 17:03	12/01/18 18:43	1
13C4 PFHpA	124		25 - 150				11/29/18 17:03	12/01/18 18:43	1
13C4 PFOA	133		25 - 150				11/29/18 17:03	12/01/18 18:43	1
13C4 PFOS	102		25 - 150				11/29/18 17:03	12/01/18 18:43	1
13C5 PFNA	140		25 - 150				11/29/18 17:03	12/01/18 18:43	1

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Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-45444-3

Project/Site: FAI

Client Sample ID: 407372

Date Collected: 11/12/18 14:57

Lab Sample ID: 320-45444-15

Matrix: Water

Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 19:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 19:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 19:01	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 19:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 19:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 19:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	102	-	25 - 150				11/29/18 17:03	12/01/18 19:01	1
13C4 PFHpA	124		25 - 150				11/29/18 17:03	12/01/18 19:01	1
13C4 PFOA	131		25 - 150				11/29/18 17:03	12/01/18 19:01	1
13C4 PFOS	102		25 - 150				11/29/18 17:03	12/01/18 19:01	1
13C5 PFNA	139		25 - 150				11/29/18 17:03	12/01/18 19:01	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-16

**Matrix: Water** 

Client Sample ID: 174016
Date Collected: 11/14/18 10:32
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 19:20	1
Perfluorohexanesulfonic acid (PFHxS)	2.3		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 19:20	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 19:20	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 19:20	1
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L		11/29/18 17:03	12/01/18 19:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 19:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98	-	25 - 150				11/29/18 17:03	12/01/18 19:20	1
13C4 PFHpA	125		25 - 150				11/29/18 17:03	12/01/18 19:20	1
13C4 PFOA	132		25 - 150				11/29/18 17:03	12/01/18 19:20	1
13C4 PFOS	104		25 - 150				11/29/18 17:03	12/01/18 19:20	1
13C5 PFNA	146		25 - 150				11/29/18 17:03	12/01/18 19:20	1

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Client: Shannon & Wilson, Inc

Client Sample ID: 176435

Date Collected: 11/14/18 14:23

Date Received: 11/20/18 11:00

Project/Site: FAI

13C5 PFNA

Lab Sample ID: 320-45444-17

11/29/18 17:03 12/01/18 19:38

Matrix: Water

TestAmerica Job ID: 320-45444-3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 19:38	1
Perfluorohexanesulfonic acid (PFHxS)	47		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 19:38	1
Perfluoroheptanoic acid (PFHpA)	3.0		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 19:38	1
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 19:38	1
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 19:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 19:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				11/29/18 17:03	12/01/18 19:38	1
13C4 PFHpA	128		25 - 150				11/29/18 17:03	12/01/18 19:38	1
13C4 PFOA	136		25 - 150				11/29/18 17:03	12/01/18 19:38	1
13C4 PFOS	109		25 - 150				11/29/18 17:03	12/01/18 19:38	1

25 - 150

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-18

TestAmerica Job ID: 320-45444-3

Matrix: Water

Date Collected: 11/14/18 13:28 Date Received: 11/20/18 11:00

Client Sample ID: 550132

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 19:56	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 19:56	1
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L		11/29/18 17:03	12/01/18 19:56	1
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 19:56	1
Perfluorooctanesulfonic acid (PFOS)	10		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 19:56	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 19:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	101		25 - 150				11/29/18 17:03	12/01/18 19:56	1
13C4 PFHpA	133		25 - 150				11/29/18 17:03	12/01/18 19:56	1
13C4 PFOA	142		25 - 150				11/29/18 17:03	12/01/18 19:56	1
13C4 PFOS	107		25 - 150				11/29/18 17:03	12/01/18 19:56	1
13C5 PFNA	147		25 - 150				11/29/18 17:03	12/01/18 19:56	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID: 320-45444-19

Matrix: Water

Client Sample ID: 173002
Date Collected: 11/12/18 13:42
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.9		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 20:15	1
Perfluorohexanesulfonic acid (PFHxS)	18		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 20:15	1
Perfluoroheptanoic acid (PFHpA)	1.5	J	2.0	0.80	ng/L		11/29/18 17:03	12/01/18 20:15	1
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 20:15	1
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 20:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 20:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	97		25 - 150				11/29/18 17:03	12/01/18 20:15	1
13C4 PFHpA	123		25 - 150				11/29/18 17:03	12/01/18 20:15	1
13C4 PFOA	129		25 - 150				11/29/18 17:03	12/01/18 20:15	1
13C4 PFOS	101		25 - 150				11/29/18 17:03	12/01/18 20:15	1
13C5 PFNA	143		25 - 150				11/29/18 17:03	12/01/18 20:15	1

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Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-20

TestAmerica Job ID: 320-45444-3

Matrix: Water

Client Sample ID: 561711 Date Collected: 11/12/18 15:30 Date Received: 11/20/18 11:00

Method: WS-LC-0025 At1 - Flu	orinated A	lkyl Substa	ances						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 20:33	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 20:33	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 20:33	1
Perfluorooctanoic acid (PFOA)	0.97	J	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 20:33	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 20:33	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 20:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	101		25 - 150				11/29/18 17:03	12/01/18 20:33	1
13C4 PFHpA	122		25 - 150				11/29/18 17:03	12/01/18 20:33	1
13C4 PFOA	134		25 - 150				11/29/18 17:03	12/01/18 20:33	1
13C4 PFOS	101		25 - 150				11/29/18 17:03	12/01/18 20:33	1
13C5 PFNA	141		25 - 150				11/29/18 17:03	12/01/18 20:33	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-21

TestAmerica Job ID: 320-45444-3

Matrix: Water

Client Sample ID: 136891
Date Collected: 11/14/18 15:39
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 20:52	1
Perfluorohexanesulfonic acid (PFHxS)	52		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 20:52	1
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 20:52	1
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 20:52	1
Perfluorooctanesulfonic acid (PFOS)	7.1		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 20:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 20:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	99		25 - 150				11/29/18 17:03	12/01/18 20:52	1
13C4 PFHpA	124		25 - 150				11/29/18 17:03	12/01/18 20:52	1
13C4 PFOA	138		25 - 150				11/29/18 17:03	12/01/18 20:52	1
13C4 PFOS	100		25 - 150				11/29/18 17:03	12/01/18 20:52	1
13C5 PFNA	143		25 - 150				11/29/18 17:03	12/01/18 20:52	1

Client: Shannon & Wilson, Inc

Project/Site: FAI

Lab Sample ID: 320-45444-22

Jampie ID. 320-4344-22

TestAmerica Job ID: 320-45444-3

Matrix: Water

Client Sample ID: 173860
Date Collected: 11/14/18 18:18
Date Received: 11/20/18 11:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	50		2.0	0.92	ng/L		11/29/18 17:03	12/01/18 21:28	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		11/29/18 17:03	12/01/18 21:28	1
Perfluoroheptanoic acid (PFHpA)	5.7		2.0	0.80	ng/L		11/29/18 17:03	12/01/18 21:28	1
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L		11/29/18 17:03	12/01/18 21:28	1
Perfluorooctanesulfonic acid (PFOS)	6.0		2.0	1.3	ng/L		11/29/18 17:03	12/01/18 21:28	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/29/18 17:03	12/01/18 21:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	98		25 - 150				11/29/18 17:03	12/01/18 21:28	1
13C4 PFHpA	121		25 - 150				11/29/18 17:03	12/01/18 21:28	1
13C4 PFOA	136		25 - 150				11/29/18 17:03	12/01/18 21:28	1
13C4 PFOS	102		25 - 150				11/29/18 17:03	12/01/18 21:28	1
13C5 PFNA	144		25 - 150				11/29/18 17:03	12/01/18 21:28	1

## **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Acc
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-45444-5	151637	81	99	112	85	111
320-45444-6	407313	100	132	140	106	146
320-45444-7	407364	102	126	134	109	145
320-45444-8	153699	105	128	139	109	149
320-45444-9	151203	104	129	144	109	150
320-45444-10	120804	100	122	134	108	140
320-45444-11	173363	104	129	138	109	151 *
320-45444-12	173463	103	129	134	104	148
320-45444-13	483532	101	131	143	112	148
320-45444-14	173916	99	124	133	102	140
320-45444-15	407372	102	124	131	102	139
320-45444-16	174016	98	125	132	104	146
320-45444-17	176435	105	128	136	109	148
320-45444-18	550132	101	133	142	107	147
320-45444-19	173002	97	123	129	101	143
320-45444-20	561711	101	122	134	101	141
320-45444-21	136891	99	124	138	100	143
320-45444-22	173860	98	121	136	102	144
LCS 320-262055/2-A	Lab Control Sample	100	119	119	104	126
LCSD 320-262055/3-A	Lab Control Sample Dup	107	130	125	112	129
MB 320-262055/1-A	Method Blank	98	117	125	110	124

### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Sacramento

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TestAmerica Job ID: 320-45444-3

Client: Shannon & Wilson, Inc Project/Site: FAI

## Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

MD MD

Lab Sample ID: MB 320-262055/1-A

**Matrix: Water** 

Analysis Batch: 262285

**Client Sample ID: Method Blank Prep Type: Total/NA** 

**Prep Batch: 262055** 

Analyte	Result Qua	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	0.92	ng/L		11/29/18 17:03	12/01/18 14:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	0.87	ng/L		11/29/18 17:03	12/01/18 14:44	1
Perfluoroheptanoic acid (PFHpA)	ND	2.0	0.80	ng/L		11/29/18 17:03	12/01/18 14:44	1
Perfluorooctanoic acid (PFOA)	ND	2.0	0.75	ng/L		11/29/18 17:03	12/01/18 14:44	1
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	1.3	ng/L		11/29/18 17:03	12/01/18 14:44	1
Perfluorononanoic acid (PFNA)	ND	2.0	0.65	ng/L		11/29/18 17:03	12/01/18 14:44	1
	MB MB							

Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 1802 PFHxS 98 25 - 150 <u>11/29/18 17:03</u> <u>12/01/18 14:44</u> 13C4 PFHpA 117 25 - 150 11/29/18 17:03 12/01/18 14:44 13C4 PFOA 125 25 - 150 11/29/18 17:03 12/01/18 14:44 25 - 150 13C4 PFOS 110 11/29/18 17:03 12/01/18 14:44 13C5 PFNA 124 25 - 150 11/29/18 17:03 12/01/18 14:44

Lab Sample ID: LCS 320-262055/2-A

**Matrix: Water** 

**Analysis Batch: 262285** 

**Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Prep Batch: 262055** 

	Spike	LCS L	LCS		%Rec.	
Analyte	Added	Result (	Qualifier Unit	D %Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	17.5	ng/L	99	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.3	ng/L	100	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	20.1	ng/L	100	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	19.5	ng/L	97	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	17.5	ng/L	94	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	20.3	ng/L	102	73 - 147	
1.00	1.00					

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	100		25 - 150
13C4 PFHpA	119		25 - 150
13C4 PFOA	119		25 - 150
13C4 PFOS	104		25 - 150
13C5 PFNA	126		25 - 150

Lab Sample ID: LCSD 320-262055/3-A

**Matrix: Water** 

Analysis Batch: 262285

<b>Client Sample ID: Lab</b>	<b>Control Samp</b>	ole Dup
	Prep Type: To	otal/NA

Prep Batch: 262055

Allalysis Datcil. 202200							1 Tep De	,2000	
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.0		ng/L		96	72 - 151	3	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.9		ng/L		98	73 - 157	2	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.4		ng/L		97	71 - 138	3	30
Perfluorooctanoic acid (PFOA)	20.0	19.1		ng/L		95	70 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	18.6	16.8		ng/L		90	69 - 144	4	30
Perfluorononanoic acid (PFNA)	20.0	19.3		ng/L		96	73 - 147	5	30

TestAmerica Sacramento

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

		LCSD	LCSD	
Iso	tope Dilution	%Recovery	Qualifier	Limits
180	D2 PFHxS	107		25 - 150
130	C4 PFHpA	130		25 - 150
130	C4 PFOA	125		25 - 150
130	C4 PFOS	112		25 - 150
130	C5 PFNA	129		25 - 150

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TestAmerica Job ID: 320-45444-3

Client: Shannon & Wilson, Inc Project/Site: FAI

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## LCMS

**Prep Batch: 262055** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45444-5	151637	Total/NA	Water	PFAS Prep	
320-45444-6	407313	Total/NA	Water	PFAS Prep	
320-45444-7	407364	Total/NA	Water	PFAS Prep	
320-45444-8	153699	Total/NA	Water	PFAS Prep	
320-45444-9	151203	Total/NA	Water	PFAS Prep	
320-45444-10	120804	Total/NA	Water	PFAS Prep	
320-45444-11	173363	Total/NA	Water	PFAS Prep	
320-45444-12	173463	Total/NA	Water	PFAS Prep	
320-45444-13	483532	Total/NA	Water	PFAS Prep	
320-45444-14	173916	Total/NA	Water	PFAS Prep	
320-45444-15	407372	Total/NA	Water	PFAS Prep	
320-45444-16	174016	Total/NA	Water	PFAS Prep	
320-45444-17	176435	Total/NA	Water	PFAS Prep	
320-45444-18	550132	Total/NA	Water	PFAS Prep	
320-45444-19	173002	Total/NA	Water	PFAS Prep	
320-45444-20	561711	Total/NA	Water	PFAS Prep	
320-45444-21	136891	Total/NA	Water	PFAS Prep	
320-45444-22	173860	Total/NA	Water	PFAS Prep	
MB 320-262055/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-262055/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-262055/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

**Analysis Batch: 262285** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45444-5	151637	Total/NA	Water	WS-LC-0025 At1	26205
320-45444-6	407313	Total/NA	Water	WS-LC-0025	26205
320-45444-7	407364	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-8	153699	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-9	151203	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-10	120804	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-11	173363	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-12	173463	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-13	483532	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-14	173916	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-15	407372	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-16	174016	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-17	176435	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-18	550132	Total/NA	Water	At1 WS-LC-0025	26205
320-45444-19	173002	Total/NA	Water	At1 WS-LC-0025 At1	26205

TestAmerica Sacramento

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

## **LCMS (Continued)**

### **Analysis Batch: 262285 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45444-20	561711	Total/NA	Water	WS-LC-0025	262055
				At1	
320-45444-21	136891	Total/NA	Water	WS-LC-0025	262055
				At1	
320-45444-22	173860	Total/NA	Water	WS-LC-0025	262055
				At1	
MB 320-262055/1-A	Method Blank	Total/NA	Water	WS-LC-0025	262055
				At1	
LCS 320-262055/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	262055
				At1	
LCSD 320-262055/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	262055
				At1	

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Project/Site: FAI

Client Sample ID: 151637 Lab Sample ID: 320-45444-5 Date Collected: 11/15/18 10:23

**Matrix: Water** 

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 15:39	S1M	TAL SAC

Client Sample ID: 407313 Lab Sample ID: 320-45444-6

**Matrix: Water** 

Date Collected: 11/15/18 12:25 Date Received: 11/20/18 11:00

Bron Typo	Batch	Batch Method	Dun	Dil Factor	Initial	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Prep Type	Туре		Run		Amount					
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 15:58	S1M	TAL SAC

Client Sample ID: 407364 Lab Sample ID: 320-45444-7 Date Collected: 11/15/18 11:32

**Matrix: Water** 

Date Received: 11/20/18 11:00

Dil Batch Batch Initial Final Batch Prepared **Prep Type** Type Method Run **Factor** Amount Amount Number or Analyzed Analyst Lab Prep Total/NA **PFAS Prep** 1.00 mL 1.66 mL 262055 11/29/18 17:03 DTH TAL SAC Total/NA Analysis WS-LC-0025 At1 262285 12/01/18 16:16 S1M TAL SAC 1

Client Sample ID: 153699 Lab Sample ID: 320-45444-8 **Matrix: Water** 

Date Collected: 11/15/18 13:28

Date Received: 11/20/18 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	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 16:35	S1M	TAL SAC

Client Sample ID: 151203 Lab Sample ID: 320-45444-9 **Matrix: Water** 

Date Collected: 11/15/18 14:29

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 16:53	S1M	TAL SAC

Lab Sample ID: 320-45444-10 Client Sample ID: 120804

Date Collected: 11/15/18 13:24

Date Received: 11/20/18 11:00

Dran Tun	Batch	Batch	Dun	Dil	Initial	Final	Batch	Prepared	Amaluet	l ab
Prep Type Total/NA		Method PFAS Prep	Run	Factor	Amount 1.00 mL	Amount 1.66 mL	Number 262055	or Analyzed 11/29/18 17:03	Analyst	TAL SAC
	Prep			4	1.00 IIIL	1.00 IIIL				
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 17:11	S1M	TAL SAC

TestAmerica Sacramento

**Matrix: Water** 

Project/Site: FAI

Client Sample ID: 173363 Lab Sample ID: 320-45444-11 Date Collected: 11/15/18 12:36 **Matrix: Water** 

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 17:30	S1M	TAL SAC

Client Sample ID: 173463 Lab Sample ID: 320-45444-12 **Matrix: Water** 

Date Collected: 11/15/18 12:33 Date Received: 11/20/18 11:00

Batch Batch Dil Initial Final **Batch** Prepared **Prep Type** Type Method Run **Factor Amount Amount** Number or Analyzed **Analyst** Lab Total/NA Prep **PFAS Prep** 1.00 mL 1.66 mL 262055 11/29/18 17:03 DTH TAL SAC Total/NA Analysis WS-LC-0025 At1 262285 12/01/18 18:06 S1M TAL SAC 1

Client Sample ID: 483532 Lab Sample ID: 320-45444-13 **Matrix: Water** 

Date Collected: 11/14/18 11:56 Date Received: 11/20/18 11:00

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Type Method Run **Factor Amount** Amount Number or Analyzed **Analyst** Lab Total/NA **PFAS Prep** 1.00 mL 1.66 mL 262055 11/29/18 17:03 DTH TAL SAC Prep Total/NA Analysis WS-LC-0025 At1 262285 12/01/18 18:25 S1M TAL SAC 1

Client Sample ID: 173916 Lab Sample ID: 320-45444-14

Date Collected: 11/14/18 10:35 Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 18:43	S1M	TAL SAC

Client Sample ID: 407372 Lab Sample ID: 320-45444-15

Date Collected: 11/12/18 14:57 Date Received: 11/20/18 11:00

Batch Dil Initial Final Batch Batch **Prepared Prep Type** Type Method Run **Factor Amount** Amount Number or Analyzed **Analyst** Lab Total/NA Prep **PFAS Prep** 1.00 mL 1.66 mL 262055 11/29/18 17:03 DTH TAL SAC Total/NA Analysis WS-LC-0025 At1 262285 12/01/18 19:01 S1M TAL SAC 1

Client Sample ID: 174016 Lab Sample ID: 320-45444-16

Date Collected: 11/14/18 10:32 Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 19:20	S1M	TAL SAC

TestAmerica Sacramento

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**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

Project/Site: FAI

Client Sample ID: 176435 Lab Sample ID: 320-45444-17 Date Collected: 11/14/18 14:23 **Matrix: Water** 

Date Received: 11/20/18 11:00

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 19:38	S1M	TAL SAC

Lab Sample ID: 320-45444-18 Client Sample ID: 550132 **Matrix: Water** 

Date Collected: 11/14/18 13:28 Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 19:56	S1M	TAL SAC

Client Sample ID: 173002 Lab Sample ID: 320-45444-19 Date Collected: 11/12/18 13:42 **Matrix: Water** 

Date Received: 11/20/18 11:00

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 20:15	S1M	TAL SAC

Client Sample ID: 561711 Lab Sample ID: 320-45444-20 Date Collected: 11/12/18 15:30 **Matrix: Water** 

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 20:33	S1M	TAL SAC

Lab Sample ID: 320-45444-21 Client Sample ID: 136891 Date Collected: 11/14/18 15:39 **Matrix: Water** 

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 20:52	S1M	TAL SAC

Client Sample ID: 173860 Lab Sample ID: 320-45444-22 Date Collected: 11/14/18 18:18 **Matrix: Water** 

Date Received: 11/20/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262055	11/29/18 17:03	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262285	12/01/18 21:28	S1M	TAL SAC

TestAmerica Sacramento

### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

## **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	<b>Identification Number</b>	<b>Expiration Date</b>
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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45444-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-45444-5	151637	Water	11/15/18 10:23	11/20/18 11:00
320-45444-6	407313	Water	11/15/18 12:25	11/20/18 11:00
320-45444-7	407364	Water	11/15/18 11:32	11/20/18 11:00
320-45444-8	153699	Water	11/15/18 13:28	11/20/18 11:00
320-45444-9	151203	Water	11/15/18 14:29	11/20/18 11:00
320-45444-10	120804	Water	11/15/18 13:24	11/20/18 11:00
320-45444-11	173363	Water	11/15/18 12:36	11/20/18 11:00
320-45444-12	173463	Water	11/15/18 12:33	11/20/18 11:00
320-45444-13	483532	Water	11/14/18 11:56	11/20/18 11:00
320-45444-14	173916	Water	11/14/18 10:35	11/20/18 11:00
320-45444-15	407372	Water	11/12/18 14:57	11/20/18 11:00
320-45444-16	174016	Water	11/14/18 10:32	11/20/18 11:00
320-45444-17	176435	Water	11/14/18 14:23	11/20/18 11:00
320-45444-18	550132	Water	11/14/18 13:28	11/20/18 11:00
320-45444-19	173002	Water	11/12/18 13:42	11/20/18 11:00
320-45444-20	561711	Water	11/12/18 15:30	11/20/18 11:00
320-45444-21	136891	Water	11/14/18 15:39	11/20/18 11:00
320-45444-22	173860	Water	11/14/18 18:18	11/20/18 11:00

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53699 407364

D890

Sample Identity

7313

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15/63

2255 S.W. Canyon Road Portland, OR 97204-2498 (503) 223-6147

2355 Hill Road Fairbanks, AK 99709 (907) 479-0600

Distribution:

Special Instructions:

Project Name: MA

Contact: MDN

Sampler: ARM

SHANNON & WILSON, INC.  Geotechnical and Environmental Consultants	ON, INC.	ਠ	HAIN	OF-CL	CHAIN-OF-CUSTODY RECORD	Y RE	CORD	1,	Laboratory	ry Test America	11
200 N. 34th Street, Suite 100 2043 Westport Center Drive certite, WA 98103 St. Louis, MO 63146-3564 (314) 699-9660	Center Drive 63146-3564 0	2705 Saint / Pasco, WA (509) 946-60	2705 Saint Andrews Loop, Suite A Pasco, WA 99301-3378 (509) 946-6309	p, Suite A		Analys	is Parameters	Aunitation Analysis Parameters/Sample Container Description	ainer Desc	ription	1
355 Hill Road 5430 Fairbanks Street And 99709 Anchorage, AK 99518 (907) 479-0600 (907) 561-2120	5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120				Phys.	1					
255 S.W. Carryon Road 1321 Bannock Stre ortland, OR 97201-2498 Denver, CO 80204 603) 223-6147 (303) 825-3800	1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800		Ogto	1 /	1/5	1	/	/	/	Sellelle Sellelle	
Sample Identity	Lab No.	Time	Sampled	Serio Livo	AU	/	/	/	No.	Remarks/Matrix	1
\$353A		9511	81/21/n		X				R	2 Groundwater	
9		1035	M/4/18	8	R				-		
73		1457	1/21/11	91,	X						
9		633	11/14/18	60	X						
6435		1423	81/H/11	6	×						
50132		3281	11/14/18	<i>6</i> 0	×						
800		1343	81/x1/18	S	X						
		1530	1/2/1	500	X						
		1539	1/4//	900	×						
73860		1818	11/14/18	ν.	メ						_
Project Information	Samp	Sample Receipt	)t	Relinge	Relinquished By:	÷	Relinqui	Relinquished By:	2.	Relinquished By: 3.	_
200-000	Total Number of Containers	of Containers		Signation	Time: 14	34=	Signature:	Time:		Signature: Time:	
1	Received Good Cond./Cold	d Cond./Cold	- 73	Suhted Name.	Merissa Dut	Le lan	Printed Name:	Date:		Printed Name. Date:	1 .
Sampler: All GCD, HDIN (	GOLD SHEW (attach shipping bill, if an	Acea C		Survivo	MANAGA & Wilson		Company:		0	Company:	
Instructions	tions			Received By:	ed By:	٦,	Received By:	d By:	2.	Received By: 3.	
Requested Turnaround Time: Stewol's	dard			Signature.	Time II	00	Signature	Time:		Signature: Time.	1
				Printed Name:	hang Date: 11	81/04)	Printed Name:	Date.		Printed Name: Date:	î .
White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Plok - Shannon & Wilson - Joh File	to Shannon & Wignee files	ilson w/ labora	•	Company 74-5/4C	SAC	9	Company:		0	Company:	
N Granting to commerce of	- Dec										

Job Number: 320-45444-3

List Source: TestAmerica Sacramento

Login Number: 45444

List Number: 1

Creator: Gooch, Mayce

Creator. Gooch, mayce		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	SEALS
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	
s 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	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Marcy Nadel
Title:
Geologist
Date:
December 6, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
December 5, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-45444-3 Rev 1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

1.	<u>Laboratory</u>
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?
	© Yes
	ADEC has not approved an analytical laboratory for analysis of PFAS. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
	© Yes
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.
2.	Chain of Custody (CoC)
	a. CoC information completed, signed, and dated (including released/received by)?
	© Yes © No Comments:
	b. Correct Analyses requested?
	© Yes © No Comments:
3.	Laboratory Sample Receipt Documentation
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?
	© Yes © No Comments:
	The sample coolers were recorded at 3.1° C and 4.7° C upon receipt at the laboratory.
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?
	© Yes © No Comments:
	Analysis of PFAS compounds does not require a preservative other than temperature control.
	c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
	© Yes © No Comments:
	The sample receipt form notes that the samples were received in good condition.

320-45444-3 Rev 1

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d.		reservation, sa	cies, were they documented? For example, incorrect sample mple temperature outside of acceptable range, insufficient or missing
	C Yes	O No	Comments:
Th	nere were no d	iscrepancies n	oted in the sample receipt documentation.
e.	Data quality	or usability af	fected?
			Comments:
Da	ata quality or ı	usability is not	affected; see above.
. <u>C</u>	Case Narrative		
a.	. Present and	understandab	e?
	• Yes	O No	Comments:
b.	. Discrepanci	ies, errors, or (	OC failures identified by the lab?
	• Yes	O No	Comments:
			amples arrived in good condition, properly preserved, and that the supon receipt at the laboratory were 3.1° C and 4.7° C.
	•		thod recommended limit for 13C5 PFNA for sample <i>1736363</i> . The atory was a mistake and should be <i>173363</i> .
(1		duplicate (MSI	was insufficient sample volume available to perform a matrix spike (i) with preparation batch 320-262055. It further notes most samples
c.	. Were all co	rrective action	s documented?
	O Yes	© No	Comments:
N	J/A; there wer	e no corrective	actions documented in the case narrative.
d	. What is the	effect on data	quality/usability according to the case narrative?
			Comments:
T	he laboratory	notes quantita	tion by isotope dilution generally precludes any adverse effect on data

quality due to elevated IDA recoveries. However, the IDA recovery failure is discussed in section 6c.

a. Correct analyses performed/reported as requested on COC?	<u>Samp</u>	oles Results		
b. All applicable holding times met?      Yes No Comments:  The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.  c. All soils reported on a dry weight basis?      Yes No Comments:  N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?      Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?      Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  iii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:	a.	Correct anal	lyses perform	ed/reported as requested on COC?
The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.  c. All soils reported on a dry weight basis?  C Yes No Comments:  N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  iii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:		• Yes	C No	Comments:
The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.  c. All soils reported on a dry weight basis?  C Yes No Comments:  N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  iii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:				
The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.  c. All soils reported on a dry weight basis?  C Yes ONO Comments:  N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  Yes ONO Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes ONO Comments:  iii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:	b.	All applicab	ole holding tin	nes met?
analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.  c. All soils reported on a dry weight basis?  C Yes No Comments:  N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:		Yes	O No	Comments:
N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  c. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  QC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:	an	nalysis. The 28		1 0 0
N/A; soil samples were not submitted with this work order.  d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  • Yes • No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  • Yes • No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  • Yes • No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  • Yes • No Comments:	c.	All soils rep	orted on a dry	weight basis?
d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?  • Yes • No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  • Yes • No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  • Yes • No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  • Yes • No Comments:		C Yes	No	Comments:
the project?  Yes No Comments:  The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  QC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:	N.	/A; soil samp	les were not s	ubmitted with this work order.
The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  C Yes No Comments:  The data quality and usability were not affected.  QC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  C Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:	d.	-	_	ss than the Cleanup Level or the minimum required detection level for
action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.  e. Data quality or usability affected?  C Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  C Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:  iii. If above LOQ, what samples are affected?		Yes	O No	Comments:
e. Data quality or usability affected?  Yes No Comments:  The data quality and usability were not affected.  OC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:  iii. If above LOQ, what samples are affected?				- · · · · · · · · · · · · · · · · · · ·
The data quality and usability were not affected.  QC Samples  a. Method Blank  i. One method blank reported per matrix, analysis and 20 samples?  Yes No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  Yes No Comments:  iii. If above LOQ, what samples are affected?				
a. Method Blank i. One method blank reported per matrix, analysis and 20 samples?  • Yes • No Comments:  ii. All method blank results less than limit of quantitation (LOQ)?  • Yes • No Comments:  iii. If above LOQ, what samples are affected?		C Yes	No	Comments:
<ul> <li>a. Method Blank <ol> <li>i. One method blank reported per matrix, analysis and 20 samples?</li> <li>Yes No Comments:</li> <li>ii. All method blank results less than limit of quantitation (LOQ)?</li> <li>Yes No Comments:</li> <li>iii. If above LOQ, what samples are affected?</li> </ol> </li></ul>	Tl	he data quality	y and usability	were not affected.
<ul> <li>i. One method blank reported per matrix, analysis and 20 samples?</li> <li>• Yes O No Comments:</li> <li>ii. All method blank results less than limit of quantitation (LOQ)?</li> <li>• Yes O No Comments:</li> <li>iii. If above LOQ, what samples are affected?</li> </ul>	QC S	amples		
<ul> <li>i. One method blank reported per matrix, analysis and 20 samples?</li> <li>• Yes O No Comments:</li> <li>ii. All method blank results less than limit of quantitation (LOQ)?</li> <li>• Yes O No Comments:</li> <li>iii. If above LOQ, what samples are affected?</li> </ul>	a.	Method Bla	nk	
ii. All method blank results less than limit of quantitation (LOQ)?  • Yes • No Comments:  iii. If above LOQ, what samples are affected?		i. One	method blank	reported per matrix, analysis and 20 samples?
• Yes • No Comments:  iii. If above LOQ, what samples are affected?		• Yes	C No	Comments:
• Yes • No Comments:  iii. If above LOQ, what samples are affected?				
iii. If above LOQ, what samples are affected?		ii. All r	method blank	results less than limit of quantitation (LOQ)?
		• Yes	O No	Comments:
		iii. If ab	ove LOQ, wh	at samples are affected?
Comments:				Comments:

320-45444-3 Rev 1

320-45444-3 Rev	1
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iv. Do t	he affected sample(s) hav	re data flags? If so, are the data flags clearly defined?
© Yes	⊙ No	Comments:
Qualification of	f the results was not requi	red; see above.
v. Data	quality or usability affec	ted?
		Comments:
The data quality	y and usability were not a	ffected.
b. Laboratory	Control Sample/Duplicate	e (LCS/LCSD)
_	nnics – One LCS/LCSD reired per AK methods, LC	eported per matrix, analysis and 20 samples? (LCS/LCSD 'S required per SW846)
• Yes	C No	Comments:
	als/Inorganics – one LCS amples?	and one sample duplicate reported per matrix, analysis and
© Yes	⊙ No	Comments:
Metals and inor	ganics were not analyzed	as part of this work order.
And	project specified DQOs,	eries (%R) reported and within method or laboratory limits? if applicable. (AK Petroleum methods: AK101 60%-120%, 0%-120%; all other analyses see the laboratory QC pages)
• Yes	O No	Comments:
labo LCS	ratory limits? And projec	nt differences (RPD) reported and less than method or t specified DQOs, if applicable. RPD reported from r sample/sample duplicate. (AK Petroleum methods 20%; all ory QC pages)
• Yes	C No	Comments:
v. If %	R or RPD is outside of ac	ceptable limits, what samples are affected?
		Comments:
N/A: analytical	accuracy and precision v	vere within acceptable limits.

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vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
© Yes    O No Comments:
Qualification of the data was not required; see above.
vii. Data quality or usability affected? (Use comment box to explain.)
Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples'
© Yes © No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
© Yes © No Comments:
The percent recovery for 13C5 PFNA was above laboratory limits for sample 173363. The other IDA recoveries were within laboratory limits.
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes O No Comments:
The PFNA result for sample 173363 is considered estimated, no direction of bias, and is flagged 'UJ.'
iv. Data quality or usability affected?
Comments:
Yes; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
© Yes    O No Comments:
PFAS are not volatile compounds; therefore, a trip blank is not required.

	ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)				
C Yes	<ul><li>No</li></ul>	Comments:			
N/A; a trip blan	k is not required.				
iii. All r	esults less than LOQ?				
C Yes	⊙ No	Comments:			
N/A; a trip blan	k is not required.				
iv. If abo	ove LOQ, what samples a	re affected?			
		Comments:			
None; a trip bla	nk was not submitted with	n this work order.			
v. Data	quality or usability affect	red?			
		Comments:			
The data quality	and usability were not at	ffected; see above.			
e. Field Duplic	eate				
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?			
• Yes	C No	Comments:			
Two field dupli	cate samples were submit	ted with this work order.			
ii. Subn	nitted blind to lab?				
• Yes	O No	Comments:			
Field duplicate associated with		ted with sample 173363; field duplicate sample 174016 is			
	ommended: 30% water, 5 RPD (%) = Absolute Where	· · · · · · · · · · · · · · · · · · ·			
• Yes	C No	Comments:			
Field duplicate	RPDs are within the recor	mmended ranges, where calculable for detected analytes.			

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:
The data quality and usability were not affected.
f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).
C Yes C No
Samples in this work order were not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.
i. All results less than LOQ?
© Yes    O No Comments:
N/A; an equipment blank was not submitted with this work order.
ii. If above LOQ, what samples are affected?
Comments:
N/A; an equipment blank was not submitted.
iii. Data quality or usability affected?
Comments:
The data quality and usability were not affected.
7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
a. Defined and appropriate?
© Yes © No Comments:
There were no additional flags/qualifiers required for this work order.



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: 320-45633-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jamil altimo

Authorized for release by: 12/7/2018 1:16:08 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

..... LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-45633-1

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

## **Qualifiers**

### **LCMS**

J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# **Glossary**

Giossary	
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)

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### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Job ID: 320-45633-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-45633-1

### Receipt

The sample was received on  $11/28/2018\ 1:00\ PM$ ; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $5.0^{\circ}\ C$ .

### LCMS

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

### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-262970.

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 176095

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Lab Sample ID: 320-45633-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.0	J	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.5		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

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# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Lab Sample ID: 320-45633-1

**Matrix: Water** 

Client Sample ID: 176095 Date Collected: 11/20/18 15:24 Date Received: 11/28/18 13:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	J	2.0	0.92	ng/L		12/04/18 10:44	12/05/18 14:10	1
Perfluorohexanesulfonic acid (PFHxS)	5.5		2.0	0.87	ng/L		12/04/18 10:44	12/05/18 14:10	1
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	ng/L		12/04/18 10:44	12/05/18 14:10	1
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L		12/04/18 10:44	12/05/18 14:10	1
Perfluorooctanesulfonic acid (PFOS)	3.8		2.0	1.3	ng/L		12/04/18 10:44	12/05/18 14:10	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/04/18 10:44	12/05/18 14:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	116		25 - 150				12/04/18 10:44	12/05/18 14:10	1
13C4 PFHpA	120		25 - 150				12/04/18 10:44	12/05/18 14:10	1
13C4 PFOA	125		25 - 150				12/04/18 10:44	12/05/18 14:10	1
13C4 PFOS	115		25 - 150				12/04/18 10:44	12/05/18 14:10	1
13C5 PFNA	123		25 - 150				12/04/18 10:44	12/05/18 14:10	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (Accep	tance Limits)
		PFHxS	PFHpA	PFOA	PFOS	PFNA	
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	
320-45633-1	176095	116	120	125	115	123	
LCS 320-262970/2-A	Lab Control Sample	110	108	113	109	115	
LCSD 320-262970/3-A	Lab Control Sample Dup	102	103	112	102	110	
MB 320-262970/1-A	Method Blank	107	110	116	106	112	

### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

Page 7 of 16

TestAmerica Job ID: 320-45633-1

**Client Sample ID: Lab Control Sample** 

Client: Shannon & Wilson, Inc Project/Site: FAI

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-262970/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 262935 Prep Batch: 262970** 

Analysis Daton. 202000								i rep Dateil.	202310
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/04/18 10:44	12/05/18 09:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/04/18 10:44	12/05/18 09:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/04/18 10:44	12/05/18 09:53	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/04/18 10:44	12/05/18 09:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/04/18 10:44	12/05/18 09:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/04/18 10:44	12/05/18 09:53	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	107		25 - 150				12/04/18 10:44	12/05/18 09:53	1
13C4 PFHnA	110		25 150				12/04/18 10:44	12/05/18 00:53	1

isotope Dilution	76Recovery	Qualifier	LIIIIII	riepareu	Allalyzeu	DII Fac
1802 PFHxS	107		25 - 150	12/04/18 10:44	12/05/18 09:53	1
13C4 PFHpA	110		25 - 150	12/04/18 10:44	12/05/18 09:53	1
13C4 PFOA	116		25 - 150	12/04/18 10:44	12/05/18 09:53	1
13C4 PFOS	106		25 - 150	12/04/18 10:44	12/05/18 09:53	1
13C5 PFNA	112		25 - 150	12/04/18 10:44	12/05/18 09:53	1
_						

Lab Sample ID: LCS 320-262970/2-A **Matrix: Water** 

**Prep Type: Total/NA Prep Batch: 262970** Analysis Batch: 262935 Snike LCS LCS

	Spike	LUS	LUS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	17.0		ng/L		96	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.9		ng/L		93	73 - 157	
Perfluoroheptanoic acid (PFHpA)	20.0	20.1		ng/L		101	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	19.1		ng/L		95	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	17.1		ng/L		92	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	19.0		ng/L		95	73 - 147	

	LCS LCS	5
Isotope Dilution	%Recovery Qua	lifier Limits
1802 PFHxS	110	25 - 150
13C4 PFHpA	108	25 - 150
13C4 PFOA	113	25 - 150
13C4 PFOS	109	25 - 150
13C5 PFNA	115	25 - 150

Lab Sample ID: LCSD 320-262970/3-A	Client Sample ID: Lab Control Sample Dup
Matrix: Water	Prep Type: Total/NA

Analysis Batch: 262935						Prep Ba	atch: 20	52970	
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.9		ng/L		101	72 - 151	5	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.0		ng/L		99	73 - 157	6	30
Perfluoroheptanoic acid (PFHpA)	20.0	20.6		ng/L		103	71 - 138	2	30
Perfluorooctanoic acid (PFOA)	20.0	18.9		ng/L		94	70 - 140	1	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.7		ng/L		101	69 - 144	9	30
Perfluorononanoic acid (PFNA)	20.0	18.8		ng/L		94	73 - 147	1	30

TestAmerica Sacramento

Page 8 of 16 12/7/2018

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	102		25 - 150
13C4 PFHpA	103		25 - 150
13C4 PFOA	112		25 - 150
13C4 PFOS	102		25 - 150
13C5 PFNA	110		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

# LCMS

# **Analysis Batch: 262935**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45633-1	176095	Total/NA	Water	WS-LC-0025	262970
MB 320-262970/1-A	Method Blank	Total/NA	Water	At1 WS-LC-0025	262970
LCS 320-262970/2-A	Lab Control Sample	Total/NA	Water	At1 WS-LC-0025	262970
LCSD 320-262970/3-A	Lab Control Sample Dup	Total/NA	Water	At1 WS-LC-0025 At1	262970

## **Prep Batch: 262970**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45633-1	176095	Total/NA	Water	PFAS Prep	
MB 320-262970/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-262970/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-262970/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

# **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Lab Sample ID: 320-45633-1

**Matrix: Water** 

Client Sample ID: 176095
Date Collected: 11/20/18 15:24
Date Received: 11/28/18 13:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	262970	12/04/18 10:44	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			262935	12/05/18 14:10	D1R	TAL SAC

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

## **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 Dat
Alaska (UST)	State Program	10 Identification Number 17-020 L2468		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

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# **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45633-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-45633-1	176095	Water	11/20/18 15:24	11/28/18 13:00

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= 2		CHAIN-OF-CUSTODY RECORD		Laboratory Test Amer. Ca.
400 N. 34th Street, Suite 100 2043 Westport Center Drive Seattle, WA 98103 St. Louis, MO 63146-3564 (206) 632-8020 (314) 699-9660 (314) 699-9660 Center Drive Street Stree	Drive 2705 Saint Andrews Loop, Surte A 64 Pasco, WA 99301-3378 (509) 946-6309		Analysis Parameters/Sample Container Description (include preservative if used)	Description
7009) yon Road 201-2498	uite 200  Date Time Sampled	The Sales of the S		A STATE OF THE STA
56091	1524 1420/18			2 Groundwater
		320-45633 Chain of Custody	stody	
Project Information S	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Project Number: 2006 0 - CO 3 Total Num	Total Number of Containers	Signature: Time: [5]	Signature: Time:	Signature: Time:
172	Received Good Cond./Cold	Primed Name Date: 1/3/2/6	Printed Name: Date:	Printed Name: Date:
Ongoing Project? Yes No U Delivery Sampler: ATTM (attach sh	Control of the contro	Shannen twitson, INC.	Company:	Company:
Instructions		Received By: 12, 12,	Received By: 2.	Received By: 3.
Requested Turnaround Time: 57%.		Signature: Time: (S	Signature: Time:	Signature: Time;
Special Instructions: $B, U \neq SMI$		Famed Named (120/10)	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	ion & Wilson w/ laboratory report	Company	Company:	Company:
THE DIRECTOR STREET				

Client: Shannon & Wilson, Inc Job Number: 320-45633-1

Login Number: 45633 List Source: TestAmerica Sacramento

List Number: 1

Creator: Gooch, Mayce

Creator: Gooch, Mayce		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	SEAL
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	

**TestAmerica Sacramento** 

# **Laboratory Data Review Checklist**

Completed By:
Michael Jaramillo
Title:
Chemist
Date:
December 26, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
December 7, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-45633-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

**July 2017** Page 1

1.	<u>Laboratory</u>							
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?							
	C Yes • No Comments:							
	ADEC has not approved an analytical laboratory for analysis of PFAS. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.							
	b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?							
	C Yes O No Comments:							
	Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.							
2.	Chain of Custody (CoC)							
	a. CoC information completed, signed, and dated (including released/received by)?							
	© Yes © No Comments:							
	b. Correct Analyses requested?							
	© Yes © No Comments:							
3.	Laboratory Sample Receipt Documentation							
	a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?							
	• Yes • No Comments:							
	b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?							
	© Yes © No Comments:							
	Analysis of PFAS does not require a preservative other than temperature control.							
	c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?							
	© Yes © No Comments:							
	The sample receipt form notes that the samples were received in good condition.							

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320-45633-1

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	d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?								
_	C Yes • No Comments:								
	There were no d	liscrepancies to document							
	e. Data quality or usability affected?								
			Comments:						
	No; see above.								
4.	Case Narrative	<u>.</u>							
	a. Present and	l understandable?							
	• Yes	C No	Comments:						
	b. Discrepancies, errors, or QC failures identified by the lab?								
	• Yes • No Comments:								
	The samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 5.0° C.								
	There was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) with each preparation batch.								
	c. Were all corrective actions documented?								
	© Yes	<b>⊙</b> No	Comments:						
	N/A; there were no corrective actions documented in the case narrative.								
	d. What is the effect on data quality/usability according to the case narrative?								
	Comments:								
	The case narrat	tive does not note an effec	et on data quality.						
Sa	mples Results								
	a. Correct ana	alyses performed/reported	as requested on COC?						
	• Yes	C No	Comments:						

**July 2017** Page 3

320-45633-1	
b. All applicable holding times met?	

	0. A	п аррисао	ne notaing times met?				
		Yes	O No	Comments:			
	The laboratory indicates that the water samples were analyzed using direct injection and in-lin analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for a samples.						
	c. All soils reported on a dry weight basis?						
		C Yes	<b>⊙</b> No	Comments:			
	N/A;	soil sampl	es were not submitted wit	th this work order.			
		re the repone project?	orted LOQs less than the C	Cleanup Level or the minimum required detection level for			
		Yes	C No	Comments:			
		~ 1		Reporting Limit (RL), is less than applicable ADEC action indwater cleanup levels for PFOS and PFOA.			
	e. D	ata quality	or usability affected?				
		C Yes	<ul><li>No</li></ul>	Comments:			
	The c	lata quality	and usability were not at	ffected.			
6. <u>Q</u> (	QC Samples						
	a. Method Blank						
	i. One method blank reported per matrix, analysis and 20 samples?						
		© Yes	C No	Comments:			
		ii. All n	nethod blank results less t	han limit of quantitation (LOQ)?			
• Yes • No Comments:							
iii. If above LOQ, what samples are affected?  Comments:							
		iv. Do tl	he affected sample(s) have	e data flags? If so, are the data flags clearly defined?			
		C Yes	<b>⊙</b> No	Comments:			

**July 2017** Page 4

Qualification of the results was not required; see above.

v. Data quality or usability affected?								
Comments:								
The data quality and usability were not affected.								
b. Laboratory Control Sample/Duplicate (LCS/LCSD)								
<ul> <li>i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>								
© Yes © No Comments:								
LCS/LCSD samples were reported for PFAS analyses.								
ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?								
C Yes • No Comments:								
Metals and inorganics were not analyzed as part of this work order.								
iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)								
• Yes • No Comments:								
iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)								
• Yes • No Comments:								
v. If %R or RPD is outside of acceptable limits, what samples are affected?								
Comments:								
N/A; analytical accuracy and precision were within acceptable limits.								
vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?								
C Yes • No Comments:								
Qualification of the data was not required; see above.								

**July 2017** Page 5

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:									
The data quality and usability were not affected.									
c. Surrogates – Organics Only									
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?	?								
• Yes • No Comments:									
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.									
<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>									
• Yes • No Comments:									
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?									
© Yes									
N/A; there were no IDA recovery failures associated with this work order.									
iv. Data quality or usability affected?									
Comments:									
The data quality and usability are not affected; see above.									
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil									
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>									
C Yes									
PFAS are not volatile compounds; therefore, a trip blank is not required.									
ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)									
C Yes • No Comments:									
N/A; a trip blank is not required.									

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iii. All r	results less than LOQ?					
C Yes	⊙ No	Comments:				
N/A; a trip blan	k is not required.					
iv. If ab	ove LOQ, what samples a	are affected?				
		Comments:				
None; a trip bla	nk was not submitted wit	h this work order.				
v. Data	quality or usability affec	ted?				
		Comments:				
The data quality	y and usability were not a	ffected; see above.				
e. Field Duplic	cate					
i. One	field duplicate submitted	per matrix, analysis and 10 project samples?				
O Yes	© No	Comments:				
	te was not submitted with quency of the overall pro	this work order. However, field-duplicates were submitted at ject.				
ii. Subr	mitted blind to lab?					
C Yes	⊙ No	Comments:				
N/A; a field-dup	plicate was not submitted	with this work order.				
	commended: 30% water, 5 RPD (%) = Absolute Where					
		R <sub>2</sub> – Ficia Duplicate Concentration				
O Yes	© No	Comments:				
N/A; a field-dup	plicate was not submitted	with this work order.				
iv. Data quality or usability affected? (Use the comment box to explain why or why not.)						
		Comments:				
The data quality	y and usability were not a	ffected; see above.				

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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).								
	C Yes C No O Not Applicable								
	Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.								
	i. All results less than LOQ?								
	© Yes © No Comments:								
	N/A; an equipment blank was not submitted with this work order.								
	ii. If above LOQ, what samples are affected?								
	Comments:								
	None; see above.								
	iii. Data quality or usability affected?								
	Comments:								
	The data quality and usability were not affected; see above.								
7. <u>Ot</u>	ther Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)								
	a. Defined and appropriate?								
	© Yes © No Comments:								
	There were no additional flags/qualifiers required for this work order.								

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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: 320-45879-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani altino

Authorized for release by: 12/13/2018 3:29:29 PM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-45879-1

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# **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

## **Qualifiers**

### **LCMS**

Qualifier Qualifier Description

J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# Glossary

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

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## **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Job ID: 320-45879-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-45879-1

### Receipt

The sample was received on 12/5/2018 11:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $0.6^{\circ}$  C.

### LCMS

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

### **Organic Prep**

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

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# **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 173975

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Lab Sample ID: 320-45879-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.7	J	2.0	0.87	ng/L	1	_	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7	J	2.0	1.3	ng/L	1		At1 WS-LC-0025 At1	Total/NA

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# **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Lab Sample ID: 320-45879-1

**Matrix: Water** 

Client Sample ID: 173975
Date Collected: 11/30/18 10:23
Date Received: 12/05/18 11:00

Method: WS-LC-0025 At1 - Flo	uorinated A	kyl Substa	ances						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/10/18 10:58	12/11/18 06:28	1
Perfluorohexanesulfonic acid (PFHxS)	1.7	J	2.0	0.87	ng/L		12/10/18 10:58	12/11/18 06:28	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/10/18 10:58	12/11/18 06:28	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/10/18 10:58	12/11/18 06:28	1
Perfluorooctanesulfonic acid (PFOS)	1.7	J	2.0	1.3	ng/L		12/10/18 10:58	12/11/18 06:28	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/10/18 10:58	12/11/18 06:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 150				12/10/18 10:58	12/11/18 06:28	1
13C4 PFHpA	114		25 - 150				12/10/18 10:58	12/11/18 06:28	1
13C4 PFOA	122		25 - 150				12/10/18 10:58	12/11/18 06:28	1
13C4 PFOS	112		25 - 150				12/10/18 10:58	12/11/18 06:28	1
13C5 PFNA	114		25 - 150				12/10/18 10:58	12/11/18 06:28	1

# **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

		Percent Isotope Dilution Recovery (Acceptance Limits)						
		PFHxS	PFHpA	PFOA	PFOS	PFNA		
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)		
320-45879-1	173975	114	114	122	112	114		
LCS 320-264218/2-A	Lab Control Sample	108	107	106	107	108		
LCSD 320-264218/3-B	Lab Control Sample Dup	113	116	112	115	116		
MB 320-264218/1-A	Method Blank	108	107	111	110	112		

### **Surrogate Legend**

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

TestAmerica Job ID: 320-45879-1

Client: Shannon & Wilson, Inc

Project/Site: FAI

# Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-264218/1-A Client Sample ID: Method Blank **Matrix: Water Prep Type: Total/NA** Analysis Batch: 264296 **Prep Batch: 264218** 

	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/10/18 10:58	12/11/18 02:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/10/18 10:58	12/11/18 02:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/10/18 10:58	12/11/18 02:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/10/18 10:58	12/11/18 02:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/10/18 10:58	12/11/18 02:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/10/18 10:58	12/11/18 02:30	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	108		25 - 150				12/10/18 10:58	12/11/18 02:30	1
400 4 BELL 4	407		05 450				10/10/10 10 50	10/11/10 00 00	

isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Anaiyzea	DII Fac
1802 PFHxS	108		25 - 150	12/10/18 10:58	12/11/18 02:30	1
13C4 PFHpA	107		25 - 150	12/10/18 10:58	12/11/18 02:30	1
13C4 PFOA	111		25 - 150	12/10/18 10:58	12/11/18 02:30	1
13C4 PFOS	110		25 - 150	12/10/18 10:58	12/11/18 02:30	1
13C5 PFNA	112		25 - 150	12/10/18 10:58	12/11/18 02:30	1
<del>-</del>						

Lab Sample ID: LCS 320-264218/2-A **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

**Prep Batch: 264218** Analysis Batch: 264296

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorobutanesulfonic acid (PFBS)	17.7	19.3		ng/L		109	72 - 151	
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.9		ng/L		104	73 <sub>-</sub> 157	
Perfluoroheptanoic acid (PFHpA)	20.0	21.4		ng/L		107	71 - 138	
Perfluorooctanoic acid (PFOA)	20.0	21.7		ng/L		108	70 - 140	
Perfluorooctanesulfonic acid (PFOS)	18.6	19.2		ng/L		103	69 - 144	
Perfluorononanoic acid (PFNA)	20.0	21.1		ng/L		105	73 - 147	

	LCS	LUS		
Isotope Dilution	%Recovery	Qualifier	Limits	
1802 PFHxS	108		25 - 150	
13C4 PFHpA	107		25 - 150	
13C4 PFOA	106		25 - 150	
13C4 PFOS	107		25 - 150	
13C5 PFNA	108		25 - 150	

Lab Sample ID: LCSD 320-264218/3-B			Client Sample ID: Lab Control	Sample Dup
Matrix: Water			•	/pe: Total/NA
Analysis Batch: 264296				Batch: 264218
•	Spike	LCSD LCSD	%Rec.	RPD

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.7		ng/L		112	72 - 151	2	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	20.1		ng/L		110	73 - 157	6	30
Perfluoroheptanoic acid (PFHpA)	20.0	22.4		ng/L		112	71 - 138	5	30
Perfluorooctanoic acid (PFOA)	20.0	21.7		ng/L		108	70 - 140	0	30
Perfluorooctanesulfonic acid (PFOS)	18.6	19.7		ng/L		106	69 - 144	3	30
Perfluorononanoic acid (PFNA)	20.0	22.4		ng/L		112	73 - 147	6	30

TestAmerica Sacramento

Page 8 of 16 12/13/2018

# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	113		25 - 150
13C4 PFHpA	116		25 - 150
13C4 PFOA	112		25 - 150
13C4 PFOS	115		25 - 150
13C5 PFNA	116		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

# LCMS

# **Prep Batch: 264218**

La	ab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
32	20-45879-1	173975	Total/NA	Water	PFAS Prep	
М	IB 320-264218/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LO	CS 320-264218/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
L	CSD 320-264218/3-B	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

# Analysis Batch: 264296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-45879-1	173975	Total/NA	Water	WS-LC-0025	264218
MB 320-264218/1-A	Method Blank	Total/NA	Water	At1 WS-LC-0025	264218
LCS 320-264218/2-A	Lab Control Sample	Total/NA	Water	At1 WS-LC-0025 At1	264218
LCSD 320-264218/3-B	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	264218

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# **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Lab Sample ID: 320-45879-1

**Matrix: Water** 

Client Sample ID: 173975 Date Collected: 11/30/18 10:23 Date Received: 12/05/18 11:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	264218	12/10/18 10:58	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			264296	12/11/18 06:28	D1R	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: FAI

TestAmerica Job ID: 320-45879-1

## **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	

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### **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-45879-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-45879-1	173975	Water	11/30/18 10:23	12/05/18 11:00

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tory	Attn: V. Att For C.C. Container Description e if used)	Kola Control Remarks/Matrix	2 Groundwat		320-45879 Chain of Custody	y: 2. Relinquished By: 3.	Signature: Time:	Printed Name: Date:	Company:	2. Received By: 3.	Signature: Time:	Printed Name: Date:	Company:
AIN-OF-CUSTODY RECORD	Attn: V. Att	2+ 30 0 00 00 00 00 00 00 00 00 00 00 00 0				Relinquished By: 1. Relinquished By:	Signature: Time: 14.00 Signature: Time	Printed Name: Date: 12 1/1/8 Printed Name: Date	Showner + W. Bon, Inch.	Received By: PM. Received By:	Time. Time. It is Signature. Time	Printed Name: Date: 125/14 Printed Name: Date:	School Company.
J SHANNON & WILSON, INC. CHAIN-		5430 Fairbanks Street, Suite 3 Anchorage, AK 99518 (907) 561-2120 1321 Bannock Street, Suite 200 Denver, CO 80204 (303) 825-3800 Lab No. Time Sampled	1023 11/30/2018			rmation Sample Receipt	Total Number of Containers	Received Good Cond./Cold	Yes No U Deliyery Method:	Instructions	Requested Turnaround Time: Stanclarch	The second secon	White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File
SHANN Geotechnica	400 N. 34th Street, Suite 100 Seattle, WA 98103 (205) 632-8020	2355 Hill Road Fairbanks, AK 99709 Fairbanks, AK 99709 2255 S.W. Canyon Road Portland, OR 97201-2498 (503) 223-6147 Sample Identity	173975			Project Information	Project Number: 30060-000		Ongoing Project? Yes		Requested Turnarour	Special Instructions:	Distribution: White - w/s Yellow - w/f

Client: Shannon & Wilson, Inc Job Number: 320-45879-1

Login Number: 45879 List Source: TestAmerica Sacramento

List Number: 1

Creator: Horner, Nathaniel A

Creator: Horner, Nathaniel A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	seals
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**TestAmerica Sacramento** 

### **Laboratory Data Review Checklist**

Completed By:
Michael Jaramillo
Title:
Chemist
Date:
December 26, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
December 13, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-45879-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320-4	587	79-1						
1. <u>L</u> a	abo	<u>ratory</u>						
	a. Did an ADEC CS approved laboratory receive and <u>perform</u> all of the submitted sample analyses?							
_		C Yes	No	Comments:				
	ce	rtified for per	rfluorinated alkyl a	tical laboratory for analysis of PFAS. However, the laboratory is ucids in drinking water analysis by the National Environmental (NELAP) in Oregon.				
				erred to another "network" laboratory or sub-contracted to an ne laboratory performing the analyses ADEC CS approved?				
		© Yes	No	Comments:				
	Aı	nalyses were	performed by Test	America Laboratories, Inc. in West Sacramento, CA.				
2. <u>C</u>	haiı	n of Custody	(CoC)					
	a.	CoC inform	nation completed, s	igned, and dated (including released/received by)?				
_		• Yes	O No	Comments:				
	b.	Correct Ana	alyses requested?					
г		• Yes	O No	Comments:				
3. <u>La</u>	<u>abo</u>	ratory Sampl	e Receipt Docume	<u>ntation</u>				
	a.	Sample/coo	ler temperature do	cumented and within range at receipt (0° to 6° C)?				
		© Yes	C No	Comments:				
	b.		servation acceptable lorinated Solvents	le – acidified waters, Methanol preserved VOC soil (GRO, BTEX, etc.)?				
F		• Yes	C No	Comments:				
	Aı	nalysis of PF.	AS does not requir	e a preservative other than temperature control.				
	c.	Sample con	dition documented	- broken, leaking (Methanol), zero headspace (VOC vials)?				
F		• Yes	C No	Comments:				
	Th	e sample rec	eipt form notes tha	at the samples were received in good condition.				

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	samples, e		
	O Yes	⊙ No	Comments:
T	here were no	discrepancies to	document.
e.	. Data quali	ty or usability affe	ected?
			Comments:
N	lo; see above		
<u>(</u>	Case Narrativ	<u>ve</u>	
í	a. Present ai	nd understandable	??
	<b>⊙</b> Ye	s © No	Comments:
1	b. Discrepar	ncies, errors, or Q	C failures identified by the lab?
	• Ye	s O No	Comments:
		arrived in good co	ondition, properly preserved, and that the temperature of the sample ratory was 0.6° C.
(	c. Were all	corrective actions	documented?
	C Ye	s • No	Comments:
]	N/A; there w	ere no corrective a	actions documented in the case narrative.
_	d. What is th	ne effect on data q	quality/usability according to the case narrative?
			Comments:
,	The case narr	rative does not not	te an effect on data quality.
am	ples Results		
	-		Almomentad on magazated on COC?
i		•	d/reported as requested on COC?
	<b>⊙</b> Ye	s © No	Comments:
1	b. All applic	cable holding time	es met?
	Ye	s C No	Comments:

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	c.	All soils rep	orted on a dry weight bas	is?
		C Yes	© No	Comments:
	N/	A; soil sampl	es were not submitted wit	th this work order.
	d.	Are the report the project?	orted LOQs less than the C	Cleanup Level or the minimum required detection level for
		• Yes	O No	Comments:
				Reporting Limit (RL), is less than applicable ADEC action adwater cleanup levels for PFOS and PFOA.
	e.	Data quality	or usability affected?	
		C Yes	<b>⊙</b> No	Comments:
	Th	e data quality	and usability were not at	ffected.
6. <u>Q</u>	C Sa	amples		
	a.	Method Blan	nk	
		i. One	method blank reported pe	er matrix, analysis and 20 samples?
		Yes	O No	Comments:
		ii. All n	nethod blank results less t	chan limit of quantitation (LOQ)?
		• Yes	O No	Comments:
		iii. If ab	ove LOQ, what samples a	are affected?
				Comments:
	No	one; PFAS co	mpounds were not detected	ed in method blank sample.
		iv. Do th	ne affected sample(s) have	e data flags? If so, are the data flags clearly defined?
		C Yes	• No	Comments:
	Qι	ualification of	the results was not require	red; see above.
		v. Data	quality or usability affect	ted?
				Comments:
	Th	e data quality	and usability were not at	ffected.

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b. L	aboratory	Control Sam	ple/Duplicate (LCS/LCSD)					
	<ul> <li>Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>							
	• Yes	O No	Comments:					
LCS/	LCSD sar	nples were re	ported for PFAS analyses.					
		als/Inorganics amples?	- one LCS and one sample duplicate reported per matrix, analysis and					
	O Yes	No	Comments:					
Meta	ls and ino	rganics were	not analyzed as part of this work order.					
	And	project speci	ercent recoveries (%R) reported and within method or laboratory limits? fied DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, %, AK103 60%-120%; all other analyses see the laboratory QC pages)					
	• Yes	C No	Comments:					
	labo LCS	ratory limits? S/LCSD, MS/	lative percent differences (RPD) reported and less than method or And project specified DQOs, if applicable. RPD reported from MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all ethe laboratory QC pages)					
	• Yes	C No	Comments:					
	v If%	R or RPD is	outside of acceptable limits, what samples are affected?					
	,, 11 / 0		Comments:					
NI/Λ·	analytical	accuracy and	I precision were within acceptable limits.					
1 <b>\</b> /A,			· · ·					
	vi. Do t	he affected sa	imple(s) have data flags? If so, are the data flags clearly defined?					
	O Yes	• No	Comments:					
Quali	ification o	f the data was	not required; see above.					
	vii. Data	quality or us	ability affected? (Use comment box to explain.)					
			Comments:					
The c	The data quality and usability were not affected.							

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c. Surrogates	- Organics Only									
i. Are	surrogate recoveries repor	rted for organic analyses – field, QC and laboratory samples?								
Yes	C No	Comments:								
target analyte,		s IDA recovery, which entails adding a 13C-isotope of each y of each analyte. The isotopically-labeled compounds are								
And	<ul> <li>ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits?</li> <li>And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)</li> </ul>									
• Yes	C No	Comments:								
	the sample results with fairs clearly defined?	led surrogate recoveries have data flags? If so, are the data								
C Yes	<b>⊙</b> No	Comments:								
N/A; there wer	e no IDA recovery failure	s associated with this work order.								
iv. Data	a quality or usability affec	ted?								
		Comments:								
The data qualit	y and usability are not aff	ected; see above.								
d. Trip blank - Soil	- Volatile analyses only (	GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and								
sam	trip blank reported per maples? not, enter explanation belo	atrix, analysis and for each cooler containing volatile								
© Yes	• No	Comments:								
		Fore, a trip blank is not required.								
	1 /	, ,								
		the trip blank and VOA samples clearly indicated on the laining why must be entered below)								
© Yes	<b>⊙</b> No	Comments:								
N/A; a trip blan	nk is not required.									
iii. All 1	results less than LOQ?									
C Yes	⊙ No	Comments:								
N/A; a trip blan	nk is not required.									

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iv. If above LOQ, what samples are affected?
Comments:
None; a trip blank was not submitted with this work order.
v. Data quality or usability affected?
Comments:
The data quality and usability were not affected; see above.
e. Field Duplicate
i. One field duplicate submitted per matrix, analysis and 10 project samples?
© Yes
A field-duplicate was not submitted with this work order. However, field-duplicates were submitted at the required frequency of the overall project.
ii. Submitted blind to lab?
© Yes
N/A; a field-duplicate was not submitted with this work order.
iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
© Yes    O No Comments:
N/A; a field-duplicate was not submitted with this work order.
iv. Data quality or usability affected? (Use the comment box to explain why or why not.)  Comments:
The data quality and usability were not affected; see above.
f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

**July 2017** Page 7

O No O Not Applicable

i. All results less th	an LOQ?	
• Yes • No	Comments:	
N/A; an equipment blank w	as not submitted with this work order.	
ii. If above LOQ, w	hat samples are affected?	
	Comments:	
None; see above.		
iii. Data quality or u	sability affected?	
	Comments:	
The data quality and usabili	ty were not affected; see above.	

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

O Yes O No

Comments:

There were no additional flags/qualifiers required for this work order.



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: 320-46123-1

Client Project/Site: FAI

For:

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

Attn: Marcy Nadel

Jani Oltimo

Authorized for release by: 12/19/2018 8:19:42 AM

David Alltucker, Project Manager I (916)374-4383

david.alltucker@testamericainc.com

.....LINKS .....

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Total Access

**Have a Question?** 



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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

Client: Shannon & Wilson, Inc Project/Site: FAI TestAmerica Job ID: 320-46123-1

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### **Definitions/Glossary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

#### **Qualifiers**

#### **LCMS**

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

Percent Recovery %R **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

Decision Level Concentration (Radiochemistry) DLC

Estimated Detection Limit (Dioxin) **EDL** 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)

RLReporting Limit or Requested Limit (Radiochemistry)

**RPD** Relative Percent Difference, a measure of the relative difference between two points

**TEF** Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

#### **Case Narrative**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Job ID: 320-46123-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-46123-1

#### Receipt

The samples were received on 12/13/2018 11:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $5.2^{\circ}$  C.

#### LCMS

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

#### **Organic Prep**

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-265282.

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

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### **Detection Summary**

Client: Shannon & Wilson, Inc

Client Sample ID: 176222

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Lab Sample ID: 320-46123-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.4		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 604691	Lab Sample ID: 320-46123-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.8	2.0	0.92	ng/L	1	_	WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.1	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.9	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

EID: 320-46123-1

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### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Lab Sample ID: 320-46123-1

**Matrix: Water** 

Client Sample ID: 176222
Date Collected: 12/05/18 14:45
Date Received: 12/13/18 11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L		12/14/18 10:59	12/15/18 04:31	1
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L		12/14/18 10:59	12/15/18 04:31	1
Perfluoroheptanoic acid (PFHpA)	2.8		2.0	0.80	ng/L		12/14/18 10:59	12/15/18 04:31	1
Perfluorooctanoic acid (PFOA)	5.8		2.0	0.75	ng/L		12/14/18 10:59	12/15/18 04:31	1
Perfluorooctanesulfonic acid (PFOS)	6.4		2.0	1.3	ng/L		12/14/18 10:59	12/15/18 04:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/14/18 10:59	12/15/18 04:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	119		25 - 150				12/14/18 10:59	12/15/18 04:31	1
13C4 PFHpA	120		25 - 150				12/14/18 10:59	12/15/18 04:31	1
13C4 PFOA	117		25 - 150				12/14/18 10:59	12/15/18 04:31	1
13C4 PFOS	115		25 - 150				12/14/18 10:59	12/15/18 04:31	1
13C5 PFNA	115		25 - 150				12/14/18 10:59	12/15/18 04:31	1

### **Client Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Lab Sample ID: 320-46123-2

**Matrix: Water** 

Client Sample ID: 604691 Date Collected: 12/12/18 14:32 Date Received: 12/13/18 11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.8		2.0	0.92	ng/L		12/14/18 10:59	12/15/18 04:49	1
Perfluorohexanesulfonic acid (PFHxS)	6.1		2.0	0.87	ng/L		12/14/18 10:59	12/15/18 04:49	1
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L		12/14/18 10:59	12/15/18 04:49	1
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L		12/14/18 10:59	12/15/18 04:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/14/18 10:59	12/15/18 04:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/14/18 10:59	12/15/18 04:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 150				12/14/18 10:59	12/15/18 04:49	1
13C4 PFHpA	109		25 - 150				12/14/18 10:59	12/15/18 04:49	1
13C4 PFOA	117		25 - 150				12/14/18 10:59	12/15/18 04:49	1
13C4 PFOS	109		25 - 150				12/14/18 10:59	12/15/18 04:49	1
13C5 PFNA	119		25 - 150				12/14/18 10:59	12/15/18 04:49	1

### **Isotope Dilution Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

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

			Perce	ent Isotope	Dilution Re	covery (A
		PFHxS	PFHpA	PFOA	PFOS	PFNA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-46123-1	176222	119	120	117	115	115
320-46123-2	604691	110	109	117	109	119
LCS 320-265282/2-A	Lab Control Sample	114	111	110	114	115
LCSD 320-265282/3-A	Lab Control Sample Dup	113	110	106	110	113
MB 320-265282/1-A	Method Blank	114	113	111	111	116

#### Surrogate Legend

PFHxS = 18O2 PFHxS

PFHpA = 13C4 PFHpA

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

PFNA = 13C5 PFNA

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TestAmerica Job ID: 320-46123-1

12/14/18 10:59 12/15/18 03:36

12/14/18 10:59 12/15/18 03:36

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Project/Site: FAI

13C4 PFOS

13C5 PFNA

Perfluorononanoic acid (PFNA)

Client: Shannon & Wilson, Inc

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

111

116

Lab Sample ID: MB 320-265282/1-A
Matrix: Water
Analysis Batch: 265413

MB MB

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 265282

Analysis Batch: 265413								Prep Batch:	265282
-	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		12/14/18 10:59	12/15/18 03:36	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		12/14/18 10:59	12/15/18 03:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/14/18 10:59	12/15/18 03:36	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/14/18 10:59	12/15/18 03:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/14/18 10:59	12/15/18 03:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/14/18 10:59	12/15/18 03:36	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 150				12/14/18 10:59	12/15/18 03:36	1
13C4 PFHpA	113		25 - 150				12/14/18 10:59	12/15/18 03:36	1
13C4 PFOA	111		25 - 150				12/14/18 10:59	12/15/18 03:36	1

Lab Sample ID: LCS 320-265282/2-A

Matrix: Water

Analysis Batch: 265413

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 265282

25 - 150

25 - 150

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits 17.7 18.7 106 72 - 151 ng/L Perfluorobutanesulfonic acid (PFBS) 18.2 18.8 103 73 - 157 Perfluorohexanesulfonic acid ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 21.7 ng/L 109 71 - 138 Perfluorooctanoic acid (PFOA) 20.0 20.0 100 ng/L 70 - 140 18.6 18.9 102 69 - 144 Perfluorooctanesulfonic acid ng/L (PFOS)

20.7

ng/L

20.0

LCS LCS Isotope Dilution %Recovery Qualifier Limits 1802 PFHxS 114 25 - 150 13C4 PFHpA 25 - 150 111 13C4 PFOA 25 - 150 110 13C4 PFOS 114 25 - 150 13C5 PFNA 115 25 - 150

**Client Sample ID: Lab Control Sample Dup** Lab Sample ID: LCSD 320-265282/3-A **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 265413** Prep Batch: 265282 Spike LCSD LCSD %Rec. **RPD** Added Analyte Result Qualifier Unit %Rec Limits RPD Limit 17.7 19.0 ng/L 107 72 - 151 Perfluorobutanesulfonic acid (PFBS) 18.2 107 73 - 157 30 Perfluorohexanesulfonic acid 19.5 ng/L (PFHxS) Perfluoroheptanoic acid (PFHpA) 20.0 22.8 ng/L 114 71 - 138 5 30 Perfluorooctanoic acid (PFOA) 20.0 22.3 ng/L 111 70 - 140 30 11 Perfluorooctanesulfonic acid 18.6 19.9 ng/L 107 69 - 144 5 30 ng/L Perfluorononanoic acid (PFNA) 20.0 22.8 114 73 \_ 147 10 30

TestAmerica Sacramento

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# **QC Sample Results**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

_	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	113		25 - 150
13C4 PFHpA	110		25 - 150
13C4 PFOA	106		25 - 150
13C4 PFOS	110		25 - 150
13C5 PFNA	113		25 - 150

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# **QC Association Summary**

Client: Shannon & Wilson, Inc TestAmerica Job ID: 320-46123-1

Project/Site: FAI

LCMS

**Prep Batch: 265282** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-46123-1	176222	Total/NA	Water	PFAS Prep	
320-46123-2	604691	Total/NA	Water	PFAS Prep	
MB 320-265282/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-265282/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-265282/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

**Analysis Batch: 265413** 

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-46123-1	176222	Total/NA	Water	WS-LC-0025 At1	265282
320-46123-2	604691	Total/NA	Water	WS-LC-0025 At1	265282
MB 320-265282/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	265282
LCS 320-265282/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	265282
LCSD 320-265282/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	265282

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### **Lab Chronicle**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Lab Sample ID: 320-46123-1

**Matrix: Water** 

Client Sample ID: 176222
Date Collected: 12/05/18 14:45
Date Received: 12/13/18 11:30

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265282	12/14/18 10:59	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 04:31	D1R	TAL SAC

Client Sample ID: 604691 Lab Sample ID: 320-46123-2

**Matrix: Water** 

Date Collected: 12/12/18 14:32 Date Received: 12/13/18 11:30

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265282	12/14/18 10:59	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 04:49	D1R	TAL SAC

**Laboratory References:** 

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

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### **Accreditation/Certification Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

### **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

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### **Method Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

#### **Protocol References:**

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

#### **Laboratory References:**

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

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# **Sample Summary**

Client: Shannon & Wilson, Inc

Project/Site: FAI

TestAmerica Job ID: 320-46123-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-46123-1	176222	Water	12/05/18 14:45	12/13/18 11:30
320-46123-2	604691	Water	12/12/18 14:32	12/13/18 11:30

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Client: Shannon & Wilson, Inc

Job Number: 320-46123-1

Login Number: 46123 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Creator. Neison, Kyni D		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	True	188201, 188202
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	

**TestAmerica Sacramento** 

### **Laboratory Data Review Checklist**

Completed By:
Michael Jaramillo
Title:
Chemist
Date:
December 26, 2018
CS Report Name:
Fairbanks International Airport (FAI)
Report Date:
December 19, 2018
Consultant Firm:
Shannon & Wilson, Inc.
Laboratory Name:
TestAmerica Laboratories, Inc.
Laboratory Report Number:
320-46123-1
ADEC File Number:
100.38.277
Hazard Identification Number:
26816

320	320-46123-1					
1.	1. <u>Laboratory</u>					
	a. Did an ADEC CS approved	laboratory receive and <u>perform</u> all of the submitted sample analyses?				
	○ Yes	Comments:				
		lytical laboratory for analysis of PFAS. However, the laboratory is lacids in drinking water analysis by the National Environmental am (NELAP) in Oregon.				
	*	sferred to another "network" laboratory or sub-contracted to an sthe laboratory performing the analyses ADEC CS approved?				
	© Yes	Comments:				
	Analyses were performed by To	estAmerica Laboratories, Inc. in West Sacramento, CA.				
2.	2. Chain of Custody (CoC)					
	a. CoC information completed	, signed, and dated (including released/received by)?				
	• Yes • No	Comments:				
	the receipt date and time on the	The laboratory signature for receiving the samples was in the incorrect location on the COC. However, the receipt date and time on the COC match the receipt date and time in the case narrative. This discrepancy does not affect the sample results.				
	b. Correct Analyses requested	?				
	• Yes • No	Comments:				
3.	3. <u>Laboratory Sample Receipt Documents</u>	<u>nentation</u>				
	a. Sample/cooler temperature	documented and within range at receipt (0° to 6° C)?				
	• Yes • No	Comments:				
	b. Sample preservation accept Volatile Chlorinated Solver	able – acidified waters, Methanol preserved VOC soil (GRO, BTEX, tts, etc.)?				
	⊙ Yes ○ No	Comments:				
	Analysis of PFAS does not requ	uire a preservative other than temperature control.				
	c. Sample condition document	red – broken, leaking (Methanol), zero headspace (VOC vials)?				
	⊙ Yes ○ No	Comments:				
	The sample receipt form notes	that the samples were received in good condition.				

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	Yes	No	Comments:
Th	ere were no	discrepancies to d	locument.
e.	Data quality	or usability affe	cted?
			Comments:
No	; see above.		
С	ase Narrative	2	
		_	
a.		d understandable?	
	• Yes	© No	Comments:
	D.:	. 00	
b.	•	, , , ,	C failures identified by the lab?
		C No	Comments:
		rrived in good corceipt at the labora	ndition, properly preserved, and that the temperature of the sample atory was 5.2° C.
		afficient sample vach preparation ba	volume available to perform a matrix spike (MS) and MS duplicate atch.
c.	Were all co	orrective actions of	documented?
	C Yes	© No	Comments:
N	/A; there we	re no corrective a	ctions documented in the case narrative.
d.	. What is the	e effect on data qu	uality/usability according to the case narrative?
			Comments:
T	he case narra	tive does not note	e an effect on data quality.
amp	oles Results		

320-40	6123-1				
	b. All applical	_			
	© Yes	O No	Comments:		
	-			lyzed using direct injection and in-line queous injection (DAI) was met for all	
	c. All soils rep	ported on a d	ry weight basis?		
	C Yes	No	Comments:		
	N/A; soil samp	les were not	submitted with this work orde	er.	
	d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?				
	Yes	O No	Comments:		
	The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.				
	e. Data quality	y or usability	affected?		
	C Yes	No	Comments:		
	The data qualit	y and usabili	ty were not affected.		
6. <u>Q</u> (	C Samples				
	a. Method Bla	ank			
	i. One method blank reported per matrix, analysis and 20 samples?				
	• Yes	C No	Comments:		
	ii. All	method blank	x results less than limit of qua	ntitation (LOQ)?	
	Yes	O No	Comments:		

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Comments:

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iii. If above LOQ, what samples are affected?

None; PFAS compounds were not detected in method blank sample.

v. Data quality or usability affected?				
Comments:				
The data quality and usability were not affected.				
b. Laboratory Control Sample/Duplicate (LCS/LCSD)				
<ul> <li>i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)</li> </ul>				
• Yes • No Comments:				
LCS/LCSD samples were reported for PFAS analyses.				
ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?				
© Yes				
Metals and inorganics were not analyzed as part of this work order.				
iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)				
• Yes • No Comments:				
iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)				
• Yes • No Comments:				
v. If %R or RPD is outside of acceptable limits, what samples are affected?				
Comments:				
N/A; analytical accuracy and precision were within acceptable limits.				
vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?				
© Yes © No Comments:				
Qualification of the data was not required; see above.				

vii. Data quality or usability affected? (Use comment box to explain.)

#### Comments

Comments:
The data quality and usability were not affected.
c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
© Yes © No Comments:
The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.
ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
© Yes © No Comments:
iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
© Yes
N/A; there were no IDA recovery failures associated with this work order.
iv. Data quality or usability affected?
Comments:
The data quality and usability are not affected; see above.
d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil
<ul> <li>i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?</li> <li>(If not, enter explanation below.)</li> </ul>
samples?
samples? (If not, enter explanation below.)
samples? (If not, enter explanation below.)  C Yes • No Comments:
samples? (If not, enter explanation below.)  C Yes No Comments:  PFAS are not volatile compounds; therefore, a trip blank is not required.  ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the

iii. All results	s less than LOQ?
C Yes © N	No Comments:
N/A; a trip blank is n	oot required.
iv. If above L	OQ, what samples are affected?
	Comments:
None; a trip blank wa	as not submitted with this work order.
v. Data quali	ity or usability affected?
	Comments:
The data quality and	usability were not affected; see above.
e. Field Duplicate	
i. One field	duplicate submitted per matrix, analysis and 10 project samples?
C Yes © N	
	s not submitted with this work order. However, field-duplicates were submitted at by of the overall project.
ii. Submitted	blind to lab?
C Yes O N	No Comments:
N/A; a field-duplicate	e was not submitted with this work order.
(Recomme	- All relative percent differences (RPD) less than specified DQOs? ended: 30% water, 50% soil)  RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$ Where $R_1$ = Sample Concentration $R_2$ = Field Duplicate Concentration
○ Yes	No Comments:
N/A; a field-duplicate	e was not submitted with this work order.
iv. Data quali	ity or usability affected? (Use the comment box to explain why or why not.)
	Comments:
The data quality and	usability were not affected; see above.

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	f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).				
	C Yes C No O Not Applicable				
	Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.				
	i. All results less than LOQ?				
_	• Yes • No Comments:				
	N/A; an equipment blank was not submitted with this work order.				
-	ii. If above LOQ, what samples are affected?				
	Comments:				
	None; see above.				
	iii. Data quality or usability affected?				
	Comments:				
	The data quality and usability were not affected; see above.				
7. <u>Otl</u>	her Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)				
	a. Defined and appropriate?				
_	© Yes				
	There were no additional flags/qualifiers required for this work order.				