TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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

TestAmerica Job ID: 320-44461-1
Client Project/Site: 2018 PFAS Phase II
Revision: 1

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

Attn: Sheila Hinkley

Authorized for release by:
12/9/2018 10:34:58 AM

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Definitions/Glossary

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

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Qualifiers

LCMS

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

Glossary

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

Job ID: 320-44461-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-44461-1

Receipt
The samples were received on 10/24/2018 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.1° C.

LCMS
Method(s) 537 (modified): Results for samples MW-316-15 (320-44461-2) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

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

Organic Prep
Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-256781.

Method(s) 3535: The following samples were observed to be a light orange color and contained sediment prior to extraction: MW-316-15 (320-44461-2) and MW-156A-15 (320-44461-8). Although they contained sediment the whole sample was able to go through the SPE extraction disk.

Method(s) 3535: The following samples were observed to contain sediment prior to extraction: MW-318-20 (320-44461-5) and MW-158A-15 (320-44461-7). Although they contained sediment the whole sample was able to go through the SPE extraction disk.

Method(s) 3535: The following sample was observed to be a light yellow color and contained sediment prior to extraction: MW-357-115 (320-44461-4). Due to these samples having non-settleable particulate matter, it ended up plugging the SPE extraction disk. The amount of sample remaining is recorded in the "Notes" field of the prep batch. The "Tare Weight" recorded is the weight of the emptied bottle. The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: The following sample was observed to be a light yellow/green color after extraction: MW-158A-15 (320-44461-7).

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

Detection Summary

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-327-15 — Lab Sample ID: 320-44461-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.1		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.7		1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.2		1.8	0.76	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.67	J	1.8	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	4.1		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.3	B	1.8	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.2	B	1.8	0.48	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-316-15 — Lab Sample ID: 320-44461-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	180		1.8	0.54	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	180		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	280		1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	12		1.8	0.29	ng/L	1		537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	16		1.8	1.0	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.30	J	1.8	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	43		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	2400		18	2.5	ng/L	10		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	440	B	18	1.6	ng/L	10		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	790	B	18	5.0	ng/L	10		537 (modified)	Total/NA

Client Sample ID: MW-357-15 — Lab Sample ID: 320-44461-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.87	J B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	J B	1.8	0.49	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-357-115 — Lab Sample ID: 320-44461-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.79	J B	1.8	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7	J B	1.8	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-318-20 — Lab Sample ID: 320-44461-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.51	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.8	0.75	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	2.1		1.8	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.44	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.5	B	1.8	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.3	B	1.8	0.48	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-184-45 — Lab Sample ID: 320-44461-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	3.6		1.7	0.50	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-184-45 (Continued) — Lab Sample ID: 320-44461-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	2.2		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		1.7	0.73	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.45	J	1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.38	J	1.7	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.0	J	1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.4	B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.4	B	1.7	0.46	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-158A-15 — Lab Sample ID: 320-44461-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	11		1.7	0.50	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.3		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	5.7		1.7	0.73	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	16		1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.1		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.8	B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.9	B	1.7	0.46	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-156A-15 — Lab Sample ID: 320-44461-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	19		1.7	0.51	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	13		1.7	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	14		1.7	0.74	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	41		1.7	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.61	J	1.7	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.0		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	B	1.7	0.15	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	25	B	1.7	0.47	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-327-15
Date Collected: 10/22/18 16:14
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**5.1**		1.8	0.52	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluoroheptanoic acid (PFHpA)	**2.7**		1.8	0.22	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorooctanoic acid (PFOA)	**4.2**		1.8	0.76	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorononanoic acid (PFNA)	**0.67**	**J**	1.8	0.24	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.98	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorobutanesulfonic acid (PFBS)	**4.1**		1.8	0.18	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorohexanesulfonic acid (PFHxS)	**9.3**	**B**	1.8	0.15	ng/L		11/03/18 07:15	11/06/18 01:52	1
Perfluorooctanesulfonic acid (PFOS)	**2.2**	**B**	1.8	0.48	ng/L		11/03/18 07:15	11/06/18 01:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*85*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C2 PFHxA	*88*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C4 PFHpA	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C4 PFOA	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C5 PFNA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C2 PFDA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C2 PFUnA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C2 PFDoA	*90*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C2 PFTeDA	*101*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C3 PFBS	*86*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
18O2 PFHxS	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*
13C4 PFOS	*99*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:52*	*1*

Client Sample ID: MW-316-15

Date Collected: 10/22/18 15:03
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	180		1.8	0.54	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluoroheptanoic acid (PFHpA)	180		1.8	0.23	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorooctanoic acid (PFOA)	280		1.8	0.78	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorodecanoic acid (PFDA)	12		1.8	0.29	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluoroundecanoic acid (PFUnA)	16		1.8	1.0	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorotetradecanoic acid (PFTeA)	0.30	J	1.8	0.27	ng/L		11/03/18 07:15	11/06/18 01:59	1
Perfluorobutanesulfonic acid (PFBS)	43		1.8	0.18	ng/L		11/03/18 07:15	11/06/18 01:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*77*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C2 PFHxA	*89*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C4 PFHpA	*91*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C4 PFOA	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C2 PFDA	*110*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C2 PFUnA	*115*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C2 PFDoA	*102*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C2 PFTeDA	*103*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C3 PFBS	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*
13C4 PFOS	*70*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:59*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	2400		18	2.5	ng/L		11/03/18 07:15	11/08/18 22:32	10
Perfluorohexanesulfonic acid (PFHxS)	440	B	18	1.6	ng/L		11/03/18 07:15	11/08/18 22:32	10
Perfluorooctanesulfonic acid (PFOS)	790	B	18	5.0	ng/L		11/03/18 07:15	11/08/18 22:32	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFNA	*89*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:32*	*10*
18O2 PFHxS	*88*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:32*	*10*
13C4 PFOS	*83*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:32*	*10*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-357-15
Date Collected: 10/22/18 13:33
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorohexanesulfonic acid (PFHxS)	**0.87**	**J B**	1.8	0.16	ng/L		11/03/18 07:15	11/08/18 22:39	1
Perfluorooctanesulfonic acid (PFOS)	**1.4**	**J B**	1.8	0.49	ng/L		11/03/18 07:15	11/08/18 22:39	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*88*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C2 PFHxA	*93*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C4 PFHpA	*93*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C4 PFOA	*89*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C5 PFNA	*91*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C2 PFDA	*96*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C2 PFUnA	*95*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C2 PFDoA	*92*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C2 PFTeDA	*90*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C3 PFBS	*88*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
18O2 PFHxS	*89*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/03/18 07:15*	*11/08/18 22:39*	*1*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-357-115
Date Collected: 10/22/18 13:23
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.27	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorohexanesulfonic acid (PFHxS)	**0.79**	**J B**	1.8	0.16	ng/L		11/03/18 07:15	11/06/18 02:14	1
Perfluorooctanesulfonic acid (PFOS)	**1.7**	**J B**	1.8	0.50	ng/L		11/03/18 07:15	11/06/18 02:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*83*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C2 PFHxA	*81*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C4 PFHpA	*88*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C4 PFOA	*80*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C5 PFNA	*86*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C2 PFDA	*79*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C2 PFUnA	*76*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C2 PFDoA	*63*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C2 PFTeDA	*63*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C3 PFBS	*83*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
18O2 PFHxS	*82*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*
13C4 PFOS	*80*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:14*	*1*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-318-20
Date Collected: 10/22/18 11:57
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**1.7**	**J**	1.8	0.51	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluoroheptanoic acid (PFHpA)	**1.4**	**J**	1.8	0.22	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorooctanoic acid (PFOA)	**1.5**	**J**	1.8	0.75	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorononanoic acid (PFNA)	**2.1**		1.8	0.24	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.27	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.97	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.1	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.26	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorobutanesulfonic acid (PFBS)	**0.44**	**J**	1.8	0.18	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorohexanesulfonic acid (PFHxS)	**2.5**	**B**	1.8	0.15	ng/L		11/03/18 07:15	11/06/18 02:22	1
Perfluorooctanesulfonic acid (PFOS)	**3.3**	**B**	1.8	0.48	ng/L		11/03/18 07:15	11/06/18 02:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*75*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C2 PFHxA	*88*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C4 PFHpA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C4 PFOA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C5 PFNA	*90*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C2 PFDA	*99*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C2 PFUnA	*104*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C2 PFDoA	*96*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C2 PFTeDA	*97*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C3 PFBS	*77*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
18O2 PFHxS	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*
13C4 PFOS	*96*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:22*	*1*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-184-45
Date Collected: 10/22/18 13:26
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**3.6**		1.7	0.50	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluoroheptanoic acid (PFHpA)	**2.2**		1.7	0.21	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorooctanoic acid (PFOA)	**2.5**		1.7	0.73	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorononanoic acid (PFNA)	**0.45**	**J**	1.7	0.23	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.94	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorotetradecanoic acid (PFTeA)	**0.38**	**J**	1.7	0.25	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorobutanesulfonic acid (PFBS)	**1.0**	**J**	1.7	0.17	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorohexanesulfonic acid (PFHxS)	**7.4**	**B**	1.7	0.15	ng/L		11/03/18 07:15	11/06/18 02:29	1
Perfluorooctanesulfonic acid (PFOS)	**3.4**	**B**	1.7	0.46	ng/L		11/03/18 07:15	11/06/18 02:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*91*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C2 PFHxA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C4 PFHpA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C4 PFOA	*91*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C5 PFNA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C2 PFDA	*90*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C2 PFUnA	*101*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C2 PFDoA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C2 PFTeDA	*99*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C3 PFBS	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
18O2 PFHxS	*96*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*
13C4 PFOS	*97*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:29*	*1*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-158A-15
Date Collected: 10/22/18 15:00
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-7
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**11**		1.7	0.50	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluoroheptanoic acid (PFHpA)	**9.3**		1.7	0.21	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorooctanoic acid (PFOA)	**5.7**		1.7	0.73	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorononanoic acid (PFNA)	**16**		1.7	0.23	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.94	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorobutanesulfonic acid (PFBS)	**2.1**		1.7	0.17	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorohexanesulfonic acid (PFHxS)	**5.8**	**B**	1.7	0.15	ng/L		11/03/18 07:15	11/06/18 02:37	1
Perfluorooctanesulfonic acid (PFOS)	**8.9**	**B**	1.7	0.46	ng/L		11/03/18 07:15	11/06/18 02:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*58*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C2 PFHxA	*73*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C4 PFHpA	*86*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C4 PFOA	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C5 PFNA	*102*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C2 PFDA	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C2 PFUnA	*96*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C2 PFDoA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C2 PFTeDA	*81*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C3 PFBS	*74*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
18O2 PFHxS	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*
13C4 PFOS	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:37*	*1*

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-156A-15
Date Collected: 10/22/18 16:05
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-8
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**19**		1.7	0.51	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluoroheptanoic acid (PFHpA)	**13**		1.7	0.22	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorooctanoic acid (PFOA)	**14**		1.7	0.74	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorononanoic acid (PFNA)	**41**		1.7	0.24	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorodecanoic acid (PFDA)	**0.61**	**J**	1.7	0.27	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.96	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.48	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorobutanesulfonic acid (PFBS)	**2.0**		1.7	0.17	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorohexanesulfonic acid (PFHxS)	**12**	**B**	1.7	0.15	ng/L		11/03/18 07:15	11/06/18 02:52	1
Perfluorooctanesulfonic acid (PFOS)	**25**	**B**	1.7	0.47	ng/L		11/03/18 07:15	11/06/18 02:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*79*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C2 PFHxA	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C4 PFHpA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C4 PFOA	*95*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C5 PFNA	*98*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C2 PFDA	*99*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C2 PFUnA	*103*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C2 PFDoA	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C2 PFTeDA	*100*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C3 PFBS	*79*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
18O2 PFHxS	*96*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*
13C4 PFOS	*98*		*25 - 150*	*11/03/18 07:15*	*11/06/18 02:52*	*1*

Isotope Dilution Summary

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

TestAmerica Job ID: 320-44461-1

Method: 537 (modified) - Fluorinated Alkyl Substances

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFPeA (25-150)	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)
320-44461-1	MW-327-15	85	88	93	92	94	94	95	90
320-44461-2	MW-316-15	77	89	91	92		110	115	102
320-44461-2 - DL	MW-316-15					89			
320-44461-3	MW-357-15	88	93	93	89	91	96	95	92
320-44461-4	MW-357-115	83	81	88	80	86	79	76	63
320-44461-5	MW-318-20	75	88	95	95	90	99	104	96
320-44461-6	MW-184-45	91	94	95	91	95	90	101	94
320-44461-7	MW-158A-15	58	73	86	93	102	92	96	95
320-44461-8	MW-156A-15	79	87	94	95	98	99	103	92
LCS 320-256781/2-A	Lab Control Sample	85	87	88	89	92	89	90	84
LCSD 320-256781/3-A	Lab Control Sample Dup	85	82	80	89	87	89	87	90
MB 320-256781/1-A	Method Blank	89	89	87	88	87	93	93	89

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	PFTDA (25-150)	3C3-PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)
320-44461-1	MW-327-15	101	86	92	99
320-44461-2	MW-316-15	103	87		70
320-44461-2 - DL	MW-316-15			88	83
320-44461-3	MW-357-15	90	88	89	92
320-44461-4	MW-357-115	63	83	82	80
320-44461-5	MW-318-20	97	77	93	96
320-44461-6	MW-184-45	99	87	96	97
320-44461-7	MW-158A-15	81	74	87	93
320-44461-8	MW-156A-15	100	79	96	98
LCS 320-256781/2-A	Lab Control Sample	86	82	86	87
LCSD 320-256781/3-A	Lab Control Sample Dup	83	80	83	83
MB 320-256781/1-A	Method Blank	94	87	84	92

Surrogate Legend

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

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-256781/1-A
Matrix: Water
Analysis Batch: 257086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 256781

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.500	J	2.0	0.17	ng/L		11/03/18 07:15	11/06/18 01:29	1
Perfluorooctanesulfonic acid (PFOS)	1.15	J	2.0	0.54	ng/L		11/03/18 07:15	11/06/18 01:29	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*89*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C2 PFHxA	*89*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C4 PFHpA	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C4 PFOA	*88*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C5 PFNA	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C2 PFDA	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C2 PFUnA	*93*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C2 PFDoA	*89*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C2 PFTeDA	*94*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C3 PFBS	*87*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
18O2 PFHxS	*84*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/03/18 07:15*	*11/06/18 01:29*	*1*

Lab Sample ID: LCS 320-256781/2-A
Matrix: Water
Analysis Batch: 257086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 256781

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	40.0	40.1		ng/L		100	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	40.4		ng/L		101	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	40.9		ng/L		102	64 - 124
Perfluorononanoic acid (PFNA)	40.0	39.9		ng/L		100	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	42.2		ng/L		105	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	41.8		ng/L		104	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	39.5		ng/L		99	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	42.5		ng/L		106	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	37.0		ng/L		92	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	40.2		ng/L		114	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7		ng/L		95	63 - 123

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

Lab Sample ID: LCS 320-256781/2-A
Matrix: Water
Analysis Batch: 257086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 256781

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	37.1	36.0		ng/L		97	67 - 127

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C5 PFPeA	*85*		*25 - 150*
13C2 PFHxA	*87*		*25 - 150*
13C4 PFHpA	*88*		*25 - 150*
13C4 PFOA	*89*		*25 - 150*
13C5 PFNA	*92*		*25 - 150*
13C2 PFDA	*89*		*25 - 150*
13C2 PFUnA	*90*		*25 - 150*
13C2 PFDoA	*84*		*25 - 150*
13C2 PFTeDA	*86*		*25 - 150*
13C3 PFBS	*82*		*25 - 150*
18O2 PFHxS	*86*		*25 - 150*
13C4 PFOS	*87*		*25 - 150*

Lab Sample ID: LCSD 320-256781/3-A
Matrix: Water
Analysis Batch: 257086

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 256781

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	41.6		ng/L		104	66 - 126	4	30
Perfluoroheptanoic acid (PFHpA)	40.0	44.6		ng/L		112	66 - 126	10	30
Perfluorooctanoic acid (PFOA)	40.0	39.0		ng/L		98	64 - 124	5	30
Perfluorononanoic acid (PFNA)	40.0	45.5		ng/L		114	68 - 128	13	30
Perfluorodecanoic acid (PFDA)	40.0	43.0		ng/L		107	69 - 129	2	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.2		ng/L		101	60 - 120	4	30
Perfluorododecanoic acid (PFDoA)	40.0	36.8		ng/L		92	71 - 131	7	30
Perfluorotridecanoic acid (PFTriA)	40.0	37.9		ng/L		95	72 - 132	11	30
Perfluorotetradecanoic acid (PFTeA)	40.0	37.3		ng/L		93	68 - 128	1	30
Perfluorobutanesulfonic acid (PFBS)	35.4	40.3		ng/L		114	73 - 133	0	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.1		ng/L		94	63 - 123	2	30
Perfluorooctanesulfonic acid (PFOS)	37.1	36.4		ng/L		98	67 - 127	1	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C5 PFPeA	*85*		*25 - 150*
13C2 PFHxA	*82*		*25 - 150*
13C4 PFHpA	*80*		*25 - 150*
13C4 PFOA	*89*		*25 - 150*
13C5 PFNA	*87*		*25 - 150*
13C2 PFDA	*89*		*25 - 150*
13C2 PFUnA	*87*		*25 - 150*

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

Lab Sample ID: LCSD 320-256781/3-A
Matrix: Water
Analysis Batch: 257086

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 256781

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C2 PFDoA	90		25 - 150
13C2 PFTeDA	83		25 - 150
13C3 PFBS	80		25 - 150
18O2 PFHxS	83		25 - 150
13C4 PFOS	83		25 - 150

QC Association Summary

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

TestAmerica Job ID: 320-44461-1

LCMS

Prep Batch: 256781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44461-1	MW-327-15	Total/NA	Water	3535	
320-44461-2 - DL	MW-316-15	Total/NA	Water	3535	
320-44461-2	MW-316-15	Total/NA	Water	3535	
320-44461-3	MW-357-15	Total/NA	Water	3535	
320-44461-4	MW-357-115	Total/NA	Water	3535	
320-44461-5	MW-318-20	Total/NA	Water	3535	
320-44461-6	MW-184-45	Total/NA	Water	3535	
320-44461-7	MW-158A-15	Total/NA	Water	3535	
320-44461-8	MW-156A-15	Total/NA	Water	3535	
MB 320-256781/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-256781/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-256781/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 257086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44461-1	MW-327-15	Total/NA	Water	537 (modified)	256781
320-44461-2	MW-316-15	Total/NA	Water	537 (modified)	256781
320-44461-4	MW-357-115	Total/NA	Water	537 (modified)	256781
320-44461-5	MW-318-20	Total/NA	Water	537 (modified)	256781
320-44461-6	MW-184-45	Total/NA	Water	537 (modified)	256781
320-44461-7	MW-158A-15	Total/NA	Water	537 (modified)	256781
320-44461-8	MW-156A-15	Total/NA	Water	537 (modified)	256781
MB 320-256781/1-A	Method Blank	Total/NA	Water	537 (modified)	256781
LCS 320-256781/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	256781
LCSD 320-256781/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	256781

Analysis Batch: 257965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44461-2 - DL	MW-316-15	Total/NA	Water	537 (modified)	256781
320-44461-3	MW-357-15	Total/NA	Water	537 (modified)	256781

Lab Chronicle

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-327-15
Date Collected: 10/22/18 16:14
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.4 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 01:52	S1M	TAL SAC

Client Sample ID: MW-316-15
Date Collected: 10/22/18 15:03
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			270.8 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 01:59	S1M	TAL SAC
Total/NA	Prep	3535	DL		270.8 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)	DL	10			257965	11/08/18 22:32	CBW	TAL SAC

Client Sample ID: MW-357-15
Date Collected: 10/22/18 13:33
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			273.7 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257965	11/08/18 22:39	CBW	TAL SAC

Client Sample ID: MW-357-115
Date Collected: 10/22/18 13:23
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.1 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 02:14	S1M	TAL SAC

Client Sample ID: MW-318-20
Date Collected: 10/22/18 11:57
Date Received: 10/24/18 10:10

Lab Sample ID: 320-44461-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			283.5 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 02:22	S1M	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-44461-1

Client Sample ID: MW-184-45

Lab Sample ID: 320-44461-6

Date Collected: 10/22/18 13:26

Matrix: Water

Date Received: 10/24/18 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	3535			291.8 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 02:29	S1M	TAL SAC

Client Sample ID: MW-158A-15

Lab Sample ID: 320-44461-7

Date Collected: 10/22/18 15:00

Matrix: Water

Date Received: 10/24/18 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	3535			291.2 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 02:37	S1M	TAL SAC

Client Sample ID: MW-156A-15

Lab Sample ID: 320-44461-8

Date Collected: 10/22/18 16:05

Matrix: Water

Date Received: 10/24/18 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	3535			286.3 mL	10.00 mL	256781	11/03/18 07:15	MYV	TAL SAC
Total/NA	Analysis	537 (modified)		1			257086	11/06/18 02:52	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 320-44461-1

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
Kansas	NELAP	7	E-10375	11-30-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

Method Summary

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

TestAmerica Job ID: 320-44461-1

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

Protocol References:

EPA = US Environmental Protection Agency

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

Laboratory References:

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

Sample Summary

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

TestAmerica Job ID: 320-44461-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44461-1	MW-327-15	Water	10/22/18 16:14	10/24/18 10:10
320-44461-2	MW-316-15	Water	10/22/18 15:03	10/24/18 10:10
320-44461-3	MW-357-15	Water	10/22/18 13:33	10/24/18 10:10
320-44461-4	MW-357-115	Water	10/22/18 13:23	10/24/18 10:10
320-44461-5	MW-318-20	Water	10/22/18 11:57	10/24/18 10:10
320-44461-6	MW-184-45	Water	10/22/18 13:26	10/24/18 10:10
320-44461-7	MW-158A-15	Water	10/22/18 15:00	10/24/18 10:10
320-44461-8	MW-156A-15	Water	10/22/18 16:05	10/24/18 10:10

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: David Althurker

Turn Around Time: ☐ Normal ☐ Rush — Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS EPA 537 +13 Analytes	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
MW-327-15		1614	10/22/18	2	2	Groundwater
MW-316-15		1503			2	
MW-357-15		1333			2	
MW-357-115		1323			2	
MW-318-20		1157			2	
MW-184-45		1326			2	
MW-158A-15		1500			2	
MW-156A-15		1605			2	

320-44461 Chain of Custody

Project Information		Sample Receipt	
Number:	101965-001	Total No. of Containers:	16
Name:	2018 PFAS Phase II	COC Seals/Intact? Y/N/NA	Yes
Contact:	SMH	Received Good Cond./Cold	Yes
Ongoing Project?	Yes ☒ No ☐	Temp:	5.1°C
Sampler:	CAB, KLC	Delivery Method:	Goldstreak

Notes:

Bill to SWI

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1615	Signature: Time:	Signature: Time:
Printed Name: Sheila Hinckley Date: 10/22/18	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 1010	Signature: Time:	Signature: Time:
Printed Name: David Althurker Date: 10/24/18	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

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

5.1c

No. 35722

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-44461-1

Login Number: 44461
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	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	