

ANALYTICAL REPORT

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Laboratory Job ID: 320-71799-1
Client Project/Site: PFAS
Revision: 1

For:
Shannon & Wilson, Inc
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Attn: Kristen Freiburger



Authorized for release by:
4/2/2021 2:35:40 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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



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Definitions/Glossary

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

Job ID: 320-71799-1

Qualifiers

LCMS

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

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

Job ID: 320-71799-1

Job ID: 320-71799-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

**Job Narrative
320-71799-1**

Revision

The report being provided is a revision of the original report sent on 4/2/2021. The report (revision 1) is being revised due to: missing case narrative.

Receipt

The samples were received on 3/29/2021 11:55 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.4° C.

LCMS

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte. Asphalt-2 (320-71799-2) and (CCVL 320-475544/2)

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

General Chemistry

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

Organic Prep

Method SHAKE: Due to the matrix, the initial volumes used for the following samples deviated from the standard procedure: Asphalt-1 (320-71799-1), Asphalt-2 (320-71799-2), (320-71799-A-1 MS) and (320-71799-A-1 MSD). The reporting limits (RLs) have been adjusted proportionately.

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: PFAS

Job ID: 320-71799-1

Client Sample ID: Asphalt-1

Lab Sample ID: 320-71799-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.25	J	0.77	0.16	ug/Kg	1	✳	EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.097	J	0.77	0.097	ug/Kg	1	✳	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	0.77	0.12	ug/Kg	1	✳	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.2		1.9	0.77	ug/Kg	1	✳	EPA 537(Mod)	Total/NA

Client Sample ID: Asphalt-2

Lab Sample ID: 320-71799-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.35	J I	0.76	0.16	ug/Kg	1	✳	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.44	J	0.76	0.12	ug/Kg	1	✳	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.5		1.9	0.76	ug/Kg	1	✳	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Client Sample Results

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

Job ID: 320-71799-1

Client Sample ID: Asphalt-1

Lab Sample ID: 320-71799-1

Date Collected: 03/24/21 13:30

Matrix: Solid

Date Received: 03/29/21 11:55

Percent Solids: 95.7

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.25	J	0.77	0.16	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluoroheptanoic acid (PFHpA)	ND		0.77	0.11	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorooctanoic acid (PFOA)	ND		0.77	0.33	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorononanoic acid (PFNA)	ND		0.77	0.14	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorodecanoic acid (PFDA)	ND		0.77	0.085	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluoroundecanoic acid (PFUnA)	ND		0.77	0.14	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorododecanoic acid (PFDoA)	ND		0.77	0.26	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorotridecanoic acid (PFTriA)	ND		0.77	0.20	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.77	0.21	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorobutanesulfonic acid (PFBS)	0.097	J	0.77	0.097	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	0.77	0.12	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Perfluorooctanesulfonic acid (PFOS)	6.2		1.9	0.77	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.7	1.5	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.7	1.4	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.77	0.10	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.97	0.43	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		0.77	0.085	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.77	0.070	ug/Kg	☼	03/30/21 11:34	04/01/21 03:00	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	105		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C4 PFHpA	108		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C4 PFOA	102		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C5 PFNA	108		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C2 PFDA	105		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C2 PFUnA	101		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C2 PFDoA	104		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C2 PFTeDA	114		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C3 PFBS	94		50 - 150	03/30/21 11:34	04/01/21 03:00	1
18O2 PFHxS	94		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C4 PFOS	92		50 - 150	03/30/21 11:34	04/01/21 03:00	1
d3-NMeFOSAA	103		50 - 150	03/30/21 11:34	04/01/21 03:00	1
d5-NEtFOSAA	105		50 - 150	03/30/21 11:34	04/01/21 03:00	1
13C3 HFPO-DA	106		50 - 150	03/30/21 11:34	04/01/21 03:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	4.3		0.1	0.1	%			03/30/21 16:04	1
Percent Solids	95.7		0.1	0.1	%			03/30/21 16:04	1

Eurofins TestAmerica, Sacramento

Client Sample Results

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

Job ID: 320-71799-1

Client Sample ID: Asphalt-2

Lab Sample ID: 320-71799-2

Date Collected: 03/24/21 13:40

Matrix: Solid

Date Received: 03/29/21 11:55

Percent Solids: 99.6

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.35	J I	0.76	0.16	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluoroheptanoic acid (PFHpA)	ND		0.76	0.11	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorooctanoic acid (PFOA)	ND		0.76	0.32	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorononanoic acid (PFNA)	ND		0.76	0.14	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorodecanoic acid (PFDA)	ND		0.76	0.083	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluoroundecanoic acid (PFUnA)	ND		0.76	0.14	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorododecanoic acid (PFDoA)	ND		0.76	0.25	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorotridecanoic acid (PFTriA)	ND		0.76	0.19	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.76	0.20	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.76	0.094	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorohexanesulfonic acid (PFHxS)	0.44	J	0.76	0.12	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Perfluorooctanesulfonic acid (PFOS)	4.5		1.9	0.76	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.6	1.5	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.6	1.4	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.76	0.10	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.94	0.42	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.76	0.083	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.76	0.068	ug/Kg	☼	03/30/21 11:34	04/01/21 03:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C4 PFHpA	100		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C4 PFOA	100		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C5 PFNA	98		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C2 PFDA	95		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C2 PFUnA	89		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C2 PFDoA	92		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C2 PFTeDA	114		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C3 PFBS	85		50 - 150	03/30/21 11:34	04/01/21 03:28	1
18O2 PFHxS	93		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C4 PFOS	87		50 - 150	03/30/21 11:34	04/01/21 03:28	1
d3-NMeFOSAA	84		50 - 150	03/30/21 11:34	04/01/21 03:28	1
d5-NEtFOSAA	89		50 - 150	03/30/21 11:34	04/01/21 03:28	1
13C3 HFPO-DA	89		50 - 150	03/30/21 11:34	04/01/21 03:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	0.4		0.1	0.1	%			03/30/21 16:04	1
Percent Solids	99.6		0.1	0.1	%			03/30/21 16:04	1

Eurofins TestAmerica, Sacramento

Isotope Dilution Summary

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

Job ID: 320-71799-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDaA (50-150)	PFTDA (50-150)
320-71799-1	Asphalt-1	105	108	102	108	105	101	104	114
320-71799-1 MS	Asphalt-1	94	105	97	94	96	96	99	107
320-71799-1 MSD	Asphalt-1	99	108	103	109	106	100	101	110
320-71799-2	Asphalt-2	91	100	100	98	95	89	92	114
LCS 320-475024/2-A	Lab Control Sample	102	102	99	94	94	87	91	109
MB 320-475024/1-A	Method Blank	106	105	105	106	97	88	86	100

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-71799-1	Asphalt-1	94	94	92	103	105	106
320-71799-1 MS	Asphalt-1	91	91	89	95	93	99
320-71799-1 MSD	Asphalt-1	93	104	93	95	100	104
320-71799-2	Asphalt-2	85	93	87	84	89	89
LCS 320-475024/2-A	Lab Control Sample	87	96	90	91	85	93
MB 320-475024/1-A	Method Blank	94	102	91	87	90	105

Surrogate Legend

PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDaA = 13C2 PFDaA
PFTDA = 13C2 PFTeDA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
HFPODA = 13C3 HFPO-DA

QC Sample Results

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

Job ID: 320-71799-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Lab Sample ID: MB 320-475024/1-A
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 475024

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.042	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.029	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.086	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.036	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.022	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.036	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.067	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.051	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.054	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.025	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.031	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.50	0.20	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.0	0.39	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.0	0.37	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.027	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.11	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.022	ug/Kg		03/30/21 11:34	04/01/21 02:41	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.018	ug/Kg		03/30/21 11:34	04/01/21 02:41	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	106		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C4 PFHpA	105		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C4 PFOA	105		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C5 PFNA	106		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C2 PFDA	97		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C2 PFUnA	88		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C2 PFDoA	86		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C2 PFTeDA	100		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C3 PFBS	94		50 - 150	03/30/21 11:34	04/01/21 02:41	1
18O2 PFHxS	102		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C4 PFOS	91		50 - 150	03/30/21 11:34	04/01/21 02:41	1
d3-NMeFOSAA	87		50 - 150	03/30/21 11:34	04/01/21 02:41	1
d5-NEtFOSAA	90		50 - 150	03/30/21 11:34	04/01/21 02:41	1
13C3 HFPO-DA	105		50 - 150	03/30/21 11:34	04/01/21 02:41	1

Lab Sample ID: LCS 320-475024/2-A
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	2.00	2.19		ug/Kg		110	71 - 131
Perfluorooctanoic acid (PFOA)	2.00	2.04		ug/Kg		102	69 - 133
Perfluorononanoic acid (PFNA)	2.00	2.23		ug/Kg		111	72 - 129

Eurofins TestAmerica, Sacramento

QC Sample Results

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

Job ID: 320-71799-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCS 320-475024/2-A
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorodecanoic acid (PFDA)	2.00	2.10		ug/Kg		105	69 - 133
Perfluoroundecanoic acid (PFUnA)	2.00	2.31		ug/Kg		116	64 - 136
Perfluorododecanoic acid (PFDoA)	2.00	1.98		ug/Kg		99	69 - 135
Perfluorotridecanoic acid (PFTriA)	2.00	2.02		ug/Kg		101	66 - 139
Perfluorotetradecanoic acid (PFTeA)	2.00	1.97		ug/Kg		99	69 - 133
Perfluorobutanesulfonic acid (PFBS)	1.77	1.76		ug/Kg		100	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	1.82	2.05		ug/Kg		113	67 - 130
Perfluorooctanesulfonic acid (PFOS)	1.86	1.79		ug/Kg		96	68 - 136
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	2.00	1.96	J	ug/Kg		98	63 - 144
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	2.00	1.88	J	ug/Kg		94	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.86	2.10		ug/Kg		113	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.18		ug/Kg		109	77 - 137
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.88	1.89		ug/Kg		100	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	2.19		ug/Kg		116	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	102		50 - 150
13C4 PFHpA	102		50 - 150
13C4 PFOA	99		50 - 150
13C5 PFNA	94		50 - 150
13C2 PFDA	94		50 - 150
13C2 PFUnA	87		50 - 150
13C2 PFDoA	91		50 - 150
13C2 PFTeDA	109		50 - 150
13C3 PFBS	87		50 - 150
18O2 PFHxS	96		50 - 150
13C4 PFOS	90		50 - 150
d3-NMeFOSAA	91		50 - 150
d5-NEtFOSAA	85		50 - 150
13C3 HFPO-DA	93		50 - 150

Lab Sample ID: 320-71799-1 MS
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Asphalt-1
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.25	J	7.62	8.53		ug/Kg	✳	109	70 - 132
Perfluoroheptanoic acid (PFHpA)	ND		7.62	7.98		ug/Kg	✳	105	71 - 131
Perfluorooctanoic acid (PFOA)	ND		7.62	8.17		ug/Kg	✳	107	69 - 133

Eurofins TestAmerica, Sacramento

QC Sample Results

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

Job ID: 320-71799-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: 320-71799-1 MS
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Asphalt-1
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorononanoic acid (PFNA)	ND		7.62	8.95		ug/Kg	⊛	117	72 - 129
Perfluorodecanoic acid (PFDA)	ND		7.62	8.71		ug/Kg	⊛	114	69 - 133
Perfluoroundecanoic acid (PFUnA)	ND		7.62	8.28		ug/Kg	⊛	109	64 - 136
Perfluorododecanoic acid (PFDoA)	ND		7.62	7.93		ug/Kg	⊛	104	69 - 135
Perfluorotridecanoic acid (PFTriA)	ND		7.62	7.65		ug/Kg	⊛	100	66 - 139
Perfluorotetradecanoic acid (PFTeA)	ND		7.62	8.12		ug/Kg	⊛	107	69 - 133
Perfluorobutanesulfonic acid (PFBS)	0.097	J	6.74	6.99		ug/Kg	⊛	104	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	6.94	8.40		ug/Kg	⊛	113	67 - 130
Perfluorooctanesulfonic acid (PFOS)	6.2		7.08	11.1		ug/Kg	⊛	70	68 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.62	6.96	J	ug/Kg	⊛	91	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.62	7.46	J	ug/Kg	⊛	98	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		7.11	8.01		ug/Kg	⊛	113	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		7.62	7.30		ug/Kg	⊛	96	77 - 137
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		7.18	7.50		ug/Kg	⊛	104	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.18	8.31		ug/Kg	⊛	116	79 - 139

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C2 PFHxA	94		50 - 150
13C4 PFHpA	105		50 - 150
13C4 PFOA	97		50 - 150
13C5 PFNA	94		50 - 150
13C2 PFDA	96		50 - 150
13C2 PFUnA	96		50 - 150
13C2 PFDoA	99		50 - 150
13C2 PFTeDA	107		50 - 150
13C3 PFBS	91		50 - 150
18O2 PFHxS	91		50 - 150
13C4 PFOS	89		50 - 150
d3-NMeFOSAA	95		50 - 150
d5-NEtFOSAA	93		50 - 150
13C3 HFPO-DA	99		50 - 150

Lab Sample ID: 320-71799-1 MSD
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Asphalt-1
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	0.25	J	7.36	7.96		ug/Kg	⊛	105	70 - 132	7	30
Perfluoroheptanoic acid (PFHpA)	ND		7.36	8.52		ug/Kg	⊛	116	71 - 131	7	30

Eurofins TestAmerica, Sacramento

QC Sample Results

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

Job ID: 320-71799-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: 320-71799-1 MSD
Matrix: Solid
Analysis Batch: 475544

Client Sample ID: Asphalt-1
Prep Type: Total/NA
Prep Batch: 475024

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	ND		7.36	7.88		ug/Kg	⊛	107	69 - 133	4	30
Perfluorononanoic acid (PFNA)	ND		7.36	8.01		ug/Kg	⊛	109	72 - 129	11	30
Perfluorodecanoic acid (PFDA)	ND		7.36	7.52		ug/Kg	⊛	102	69 - 133	15	30
Perfluoroundecanoic acid (PFUnA)	ND		7.36	8.82		ug/Kg	⊛	120	64 - 136	6	30
Perfluorododecanoic acid (PFDoA)	ND		7.36	6.84		ug/Kg	⊛	93	69 - 135	15	30
Perfluorotridecanoic acid (PFTriA)	ND		7.36	7.33		ug/Kg	⊛	100	66 - 139	4	30
Perfluorotetradecanoic acid (PFTeA)	ND		7.36	7.01		ug/Kg	⊛	95	69 - 133	15	30
Perfluorobutanesulfonic acid (PFBS)	0.097	J	6.50	6.79		ug/Kg	⊛	104	72 - 128	3	30
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	6.69	7.66		ug/Kg	⊛	106	67 - 130	9	30
Perfluorooctanesulfonic acid (PFOS)	6.2		6.83	11.6		ug/Kg	⊛	80	68 - 136	4	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		7.36	7.20	J	ug/Kg	⊛	98	63 - 144	3	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		7.36	6.82	J	ug/Kg	⊛	93	61 - 139	9	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		6.86	7.70		ug/Kg	⊛	112	75 - 135	4	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		7.36	6.86		ug/Kg	⊛	93	77 - 137	6	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		6.93	6.93		ug/Kg	⊛	100	76 - 136	8	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		6.93	7.61		ug/Kg	⊛	110	79 - 139	9	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C2 PFHxA	99		50 - 150
13C4 PFHpA	108		50 - 150
13C4 PFOA	103		50 - 150
13C5 PFNA	109		50 - 150
13C2 PFDA	106		50 - 150
13C2 PFUnA	100		50 - 150
13C2 PFDoA	101		50 - 150
13C2 PFTeDA	110		50 - 150
13C3 PFBS	93		50 - 150
18O2 PFHxS	104		50 - 150
13C4 PFOS	93		50 - 150
d3-NMeFOSAA	95		50 - 150
d5-NEtFOSAA	100		50 - 150
13C3 HFPO-DA	104		50 - 150

QC Association Summary

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

Job ID: 320-71799-1

LCMS

Prep Batch: 475024

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-71799-1	Asphalt-1	Total/NA	Solid	SHAKE	
320-71799-2	Asphalt-2	Total/NA	Solid	SHAKE	
MB 320-475024/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-475024/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-71799-1 MS	Asphalt-1	Total/NA	Solid	SHAKE	
320-71799-1 MSD	Asphalt-1	Total/NA	Solid	SHAKE	

Analysis Batch: 475544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-71799-1	Asphalt-1	Total/NA	Solid	EPA 537(Mod)	475024
320-71799-2	Asphalt-2	Total/NA	Solid	EPA 537(Mod)	475024
MB 320-475024/1-A	Method Blank	Total/NA	Solid	EPA 537(Mod)	475024
LCS 320-475024/2-A	Lab Control Sample	Total/NA	Solid	EPA 537(Mod)	475024
320-71799-1 MS	Asphalt-1	Total/NA	Solid	EPA 537(Mod)	475024
320-71799-1 MSD	Asphalt-1	Total/NA	Solid	EPA 537(Mod)	475024

General Chemistry

Analysis Batch: 475169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-71799-1	Asphalt-1	Total/NA	Solid	D 2216	
320-71799-2	Asphalt-2	Total/NA	Solid	D 2216	

Lab Chronicle

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

Job ID: 320-71799-1

Client Sample ID: Asphalt-1
Date Collected: 03/24/21 13:30
Date Received: 03/29/21 11:55

Lab Sample ID: 320-71799-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			475169	03/30/21 16:04	KDB	TAL SAC

Client Sample ID: Asphalt-1
Date Collected: 03/24/21 13:30
Date Received: 03/29/21 11:55

Lab Sample ID: 320-71799-1
Matrix: Solid
Percent Solids: 95.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.35 g	10.00 mL	475024	03/30/21 11:34	HK	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1			475544	04/01/21 03:00	JC	TAL SAC

Client Sample ID: Asphalt-2
Date Collected: 03/24/21 13:40
Date Received: 03/29/21 11:55

Lab Sample ID: 320-71799-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			475169	03/30/21 16:04	KDB	TAL SAC

Client Sample ID: Asphalt-2
Date Collected: 03/24/21 13:40
Date Received: 03/29/21 11:55

Lab Sample ID: 320-71799-2
Matrix: Solid
Percent Solids: 99.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.33 g	10.00 mL	475024	03/30/21 11:34	HK	TAL SAC
Total/NA	Analysis	EPA 537(Mod)		1			475544	04/01/21 03:28	JC	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 320-71799-1

Laboratory: Eurofins TestAmerica, Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
D 2216		Solid	Percent Moisture
D 2216		Solid	Percent Solids

Method Summary

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

Job ID: 320-71799-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod)	PFAS for QSM 5.3, Table B-15	EPA	TAL SAC
D 2216	Percent Moisture	ASTM	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

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



Sample Summary

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

Job ID: 320-71799-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-71799-1	Asphalt-1	Solid	03/24/21 13:30	03/29/21 11:55	
320-71799-2	Asphalt-2	Solid	03/24/21 13:40	03/29/21 11:55	

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 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
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CHAIN-OF-CUSTODY RECORD

Laboratory Page 1 of 1
Test America
 Attn: D. Alltucker

Analytical Methods (include preservative if used)

Quote No: _____

Turn Around Time: Normal Rush

J-Flags: Yes No

Please Specify _____

Sample Identity	Lab No.	Time	Date Sampled	Remarks/Matrix Composition/Grab? Sample Containers	Total Number of Containers
Asphalt - 1		1330	3/24/21		2
Asphalt - 2		1340	3/24/21		2



320-71799 Chain of Custody

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: <u>102599-005</u>	Total No. of Containers:	Signature: _____	Signature: _____	Signature: _____
Name: <u>GUS PRAS</u>	COC Seals/Intact? <u>Y/N/NA</u>	Printed Name: _____	Printed Name: _____	Printed Name: _____
Contact: <u>KRF</u>	Received Good Cond./Cold	Date: <u>3/26/21</u>	Date: _____	Date: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temp: _____	Company: <u>A. Masters</u>	Company: _____	Company: _____
Sampler: <u>ALM</u>	Delivery Method: _____	Company: <u>Shannon + Wilson, Inc.</u>	Company: _____	Company: _____
Notes:		Received By: 1.	Received By: 2.	Received By: 3.
<u>*Rush*</u>		Signature: _____	Signature: _____	Signature: _____
		Time: <u>1:55</u>	Time: _____	Time: _____
		Date: <u>03/29/21</u>	Date: _____	Date: _____
		Printed Name: <u>EIA SAC</u>	Printed Name: _____	Printed Name: _____
		Company: _____	Company: _____	Company: _____

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

3.4



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-71799-1

Login Number: 71799

List Source: Eurofins TestAmerica, Sacramento

List Number: 1

Creator: Guzman, Juan

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1029558 & 1029556
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Contaminants of Concern and Regulatory Levels

The ADEC Contaminated Sites Program soil- and groundwater-cleanup levels for PFOS and PFOA were promulgated on November 6, 2016. Prior to publication of these levels, there were no state-level cleanup levels established for PFOS or PFOA.

The table below lists ADEC soil cleanup levels in 18 AAC 75.341, Method Two, Tables B1 and B2 for each zone and groundwater-cleanup levels in 18 AAC 75.345 Table C. Please note the different reporting units for various media.

CONTAMINANTS OF CONCERN AND REGULATORY LEVELS

Contaminant of Potential Concern	Human Health Soil Cleanup Level	Migration-to-Groundwater Soil Cleanup Level	Groundwater Cleanup Level	Drinking Water Lifetime Health Advisory (LHA) Level
Arctic Zone				
PFOA	2,200 µg/kg (ppb)	1.7 µg/kg (ppb)	400 ng/L (ppt)	70 ppt
PFOS	2,200 µg/kg (ppb)	3.0 µg/kg (ppb)	400 ng/L (ppt)	
Under 40 Inch Zone				
PFOA	1,600 µg/kg (ppb)	1.7 µg/kg (ppb)	400 ng/L (ppt)	70 ppt
PFOS	1,600 µg/kg (ppb)	3.0 µg/kg (ppb)	400 ng/L (ppt)	
Over 40 Inch Zone				
PFOA	1,300 µg/kg (ppb)	1.7 µg/kg (ppb)	400 ng/L (ppt)	70 ppt
PFOS	1,300 µg/kg (ppb)	3.0 µg/kg (ppb)	400 ng/L (ppt)	

µg/kg micrograms per kilogram - equivalent to parts per billion (ppb)

ng/L nanogram per liter - equivalent to parts per trillion (ppt)