

ANALYTICAL REPORT

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Laboratory Job ID: 190-26004-1
Client Project/Site: Biosolid-PFAS
Revision: 2

For:
Oakland County Water Resources
Commissioner
4860 Pontiac Lake Road
Waterford, Michigan 48328

Attn: Kenneth Burch

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Authorized for release by:
6/23/2021 11:52:46 AM

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

Table of Contents

Cover Page	1
Table of Contents	2
Sample Summary	3
Case Narrative	4
Client Sample Results	5
QC Sample Results	7
Definitions/Glossary	13
QC Association Summary	14
Lab Chronicle	15
Method Summary	16
Certification Summary	17
Chain of Custody	18
Isotope Dilution Summary	21



Sample Summary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
190-26004-1	Bio-Solid PFAS Land App	Solid	05/21/21 10:15	05/21/21 13:35	

Case Narrative

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Job ID: 190-26004-1

Laboratory: Eurofins TestAmerica, Michigan

Narrative

Job Narrative 190-26004-1

Comments

No additional comments.

Receipt

The sample was received on 5/21/2021 1:35 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.2° C.

LCMS

Method 537 (modified): 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, and the reported value may have some high bias. However, analyst judgement was used to positively identify the analyte.

Bio-Solid PFAS Land App (190-26004-1), (190-26004-A-1-D MS) and (190-26004-A-1-E MSD)

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for M2-4:2 FTS and M2-6:2 FTS the following samples: Bio-Solid PFAS Land App (190-26004-1), (190-26004-A-1-D MS) and (190-26004-A-1-E MSD). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit for 13C2 PFTeDA and d5-NEtFOSAA: Bio-Solid PFAS Land App (190-26004-1), (190-26004-A-1-D MS) and (190-26004-A-1-E MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

Method 537 (modified): The matrix spike / matrix spike duplicate (MS/MSD) recoveries for 11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid preparation batch 320-494577 and analytical batch 320-494854 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 537 (modified): The matrix spike duplicate (MSD) recoveries for several analytes in preparation batch 320-494577 and analytical batch 320-494854 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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: The following sample was yellow after final volume/extraction: Bio-Solid PFAS Land App (190-26004-1).

preparation batch 320-491959
Method: PFC_IDA/Shake_Bath_14D
Matrix: Solid

Method SHAKE: The following samples are yellow after extraction/final volume: Bio-Solid PFAS Land App (190-26004-1), (190-26004-A-1 MS) and (190-26004-A-1 MSD).

PFC_IDA
Solid
<AnalyticalBatch>

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

Client Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Client Sample ID: Bio-Solid PFAS Land App

Lab Sample ID: 190-26004-1

Date Collected: 05/21/21 10:15

Matrix: Solid

Date Received: 05/21/21 13:35

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	<1.6	F1	1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
4:2 FTS	<16		16	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
6:2 FTS	<16		16	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
8:2 FTS	<16		16	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<2.0		2.0	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
N-ethylperfluorooctanesulfonamidoac etic acid (NETFOSAA)	<16	F1	16	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	30	F1	16	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorobutanesulfonic acid (PFBS)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorobutanoic acid (PFBA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorodecanesulfonic acid (PFDS)	1.9		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorodecanoic acid (PFDA)	6.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorododecanoic acid (PFDoA)	4.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluoroheptanoic acid (PFHpA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorohexanesulfonic acid (PFHxS)	2.9	I	1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorohexanoic acid (PFHxA)	14		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorononanesulfonic acid (PFNS)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorononanoic acid (PFNA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorooctanesulfonamide (FOSA)	2.8		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorooctanesulfonic acid (PFOS)	18	I	4.0	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorooctanoic acid (PFOA)	5.7		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluoropentanesulfonic acid (PFPeS)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluoropentanoic acid (PFPeA)	2.4		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorotetradecanoic acid (PFTeA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluorotridecanoic acid (PFTriA)	<1.6	F1	1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1
Perfluoroundecanoic acid (PFUnA)	<1.6		1.6	ug/Kg	☼	06/01/21 19:22	06/02/21 17:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	54		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C3 HFPO-DA	90		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C4 PFBA	76		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C3 PFBS	91		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C2 PFDA	89		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C2 PFDoA	31		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C4 PFHpA	88		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C2 PFHxA	88		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C5 PFNA	91		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C4 PFOA	94		25 - 150	06/01/21 19:22	06/02/21 17:20	1

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Client Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Client Sample ID: Bio-Solid PFAS Land App

Lab Sample ID: 190-26004-1

Date Collected: 05/21/21 10:15

Matrix: Solid

Date Received: 05/21/21 13:35

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

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOS	85		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C5 PFPeA	82		25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C2 PFTeDA	13	*5-	25 - 150	06/01/21 19:22	06/02/21 17:20	1
13C2 PFUnA	48		25 - 150	06/01/21 19:22	06/02/21 17:20	1
d5-NEtFOSAA	21	*5-	25 - 150	06/01/21 19:22	06/02/21 17:20	1
d3-NMeFOSAA	35		25 - 150	06/01/21 19:22	06/02/21 17:20	1
M2-4:2 FTS	233	*5+	25 - 150	06/01/21 19:22	06/02/21 17:20	1
M2-6:2 FTS	256	*5+	25 - 150	06/01/21 19:22	06/02/21 17:20	1
M2-8:2 FTS	126		25 - 150	06/01/21 19:22	06/02/21 17:20	1
18O2 PFHxS	92		25 - 150	06/01/21 19:22	06/02/21 17:20	1

QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-494577/1-A

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 494577

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
4:2 FTS	<2.0		2.0	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
6:2 FTS	<2.0		2.0	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
8:2 FTS	<2.0		2.0	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<0.25		0.25	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<2.0		2.0	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<2.0		2.0	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorobutanoic acid (PFBA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorodecanesulfonic acid (PFDS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorodecanoic acid (PFDA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorododecanoic acid (PFDoA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluoroheptanesulfonic Acid (PFHpS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluoroheptanoic acid (PFHpA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorohexanesulfonic acid (PFHxS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorohexanoic acid (PFHxA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorononanesulfonic acid (PFNS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorononanoic acid (PFNA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorooctanesulfonamide (FOSA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorooctanesulfonic acid (PFOS)	<0.50		0.50	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorooctanoic acid (PFOA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluoropentanesulfonic acid (PFPeS)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluoropentanoic acid (PFPeA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorotetradecanoic acid (PFTeA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluorotridecanoic acid (PFTriA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1
Perfluoroundecanoic acid (PFUnA)	<0.20		0.20	ug/Kg		06/01/21 19:22	06/02/21 16:43	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	66		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C3 HFPO-DA	90		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C4 PFBA	88		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C3 PFBS	76		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C2 PFDA	94		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C2 PFDoA	87		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C4 PFHpA	94		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C2 PFHxA	92		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C5 PFNA	93		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C4 PFOA	88		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C4 PFOS	74		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C5 PFPeA	90		25 - 150	06/01/21 19:22	06/02/21 16:43	1

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QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

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

Lab Sample ID: MB 320-494577/1-A

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 494577

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	85		25 - 150	06/01/21 19:22	06/02/21 16:43	1
13C2 PFUnA	83		25 - 150	06/01/21 19:22	06/02/21 16:43	1
d5-NEtFOSAA	82		25 - 150	06/01/21 19:22	06/02/21 16:43	1
d3-NMeFOSAA	81		25 - 150	06/01/21 19:22	06/02/21 16:43	1
M2-4:2 FTS	75		25 - 150	06/01/21 19:22	06/02/21 16:43	1
M2-6:2 FTS	90		25 - 150	06/01/21 19:22	06/02/21 16:43	1
M2-8:2 FTS	91		25 - 150	06/01/21 19:22	06/02/21 16:43	1
18O2 PFHxS	80		25 - 150	06/01/21 19:22	06/02/21 16:43	1

Lab Sample ID: LCS 320-494577/2-A

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 494577

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	1.88	1.96		ug/Kg		104	66 - 136
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.86	1.97		ug/Kg		106	74 - 134
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	2.20		ug/Kg		117	79 - 139
4:2 FTS	1.87	2.11		ug/Kg		113	68 - 143
6:2 FTS	1.90	1.93	J	ug/Kg		102	73 - 139
8:2 FTS	1.92	2.17		ug/Kg		113	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.08		ug/Kg		104	53 - 158
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	2.10		ug/Kg		105	72 - 132
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	2.00		ug/Kg		100	72 - 132
Perfluorobutanesulfonic acid (PFBS)	1.77	1.80		ug/Kg		102	69 - 129
Perfluorobutanoic acid (PFBA)	2.00	2.09		ug/Kg		104	76 - 136
Perfluorodecanesulfonic acid (PFDS)	1.93	1.93		ug/Kg		100	71 - 131
Perfluorodecanoic acid (PFDA)	2.00	2.11		ug/Kg		106	72 - 132
Perfluorododecanoic acid (PFDoA)	2.00	2.04		ug/Kg		102	71 - 131
Perfluoroheptanesulfonic Acid (PFHpS)	1.90	1.98		ug/Kg		104	76 - 136
Perfluoroheptanoic acid (PFHpA)	2.00	2.16		ug/Kg		108	71 - 131
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.87		ug/Kg		103	62 - 122
Perfluorohexanoic acid (PFHxA)	2.00	1.92		ug/Kg		96	71 - 131
Perfluorononanesulfonic acid (PFNS)	1.92	1.87		ug/Kg		97	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.02		ug/Kg		101	73 - 133
Perfluorooctanesulfonamide (FOSA)	2.00	1.98		ug/Kg		99	77 - 137
Perfluorooctanesulfonic acid (PFOS)	1.86	1.86		ug/Kg		100	68 - 141
Perfluorooctanoic acid (PFOA)	2.00	2.08		ug/Kg		104	72 - 132
Perfluoropentanesulfonic acid (PFPeS)	1.88	1.89		ug/Kg		101	66 - 126

Eurofins TestAmerica, Michigan

QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

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

Lab Sample ID: LCS 320-494577/2-A

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 494577

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoropentanoic acid (PFPeA)	2.00	2.13		ug/Kg		106	69 - 129
Perfluorotetradecanoic acid (PFTeA)	2.00	2.00		ug/Kg		100	67 - 127
Perfluorotridecanoic acid (PFTriA)	2.00	2.10		ug/Kg		105	71 - 131
Perfluoroundecanoic acid (PFUnA)	2.00	2.12		ug/Kg		106	66 - 126

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C8 FOSA	70		25 - 150
13C3 HFPO-DA	94		25 - 150
13C4 PFBA	89		25 - 150
13C3 PFBS	80		25 - 150
13C2 PFDA	91		25 - 150
13C2 PFDoA	86		25 - 150
13C4 PFHpA	95		25 - 150
13C2 PFHxA	89		25 - 150
13C5 PFNA	91		25 - 150
13C4 PFOA	89		25 - 150
13C4 PFOS	74		25 - 150
13C5 PFPeA	83		25 - 150
13C2 PFTeDA	88		25 - 150
13C2 PFUnA	82		25 - 150
d5-NEtFOSAA	79		25 - 150
d3-NMeFOSAA	78		25 - 150
M2-4:2 FTS	75		25 - 150
M2-6:2 FTS	83		25 - 150
M2-8:2 FTS	90		25 - 150
18O2 PFHxS	80		25 - 150

Lab Sample ID: 190-26004-1 MS

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Bio-Solid PFAS Land App

Prep Type: Total/NA

Prep Batch: 494577

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid	<1.6	F1	13.8	8.14	F1	ug/Kg	✱	59	66 - 136
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<1.6		13.6	16.9		ug/Kg	✱	124	74 - 134
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		13.8	15.6		ug/Kg	✱	113	79 - 139
4:2 FTS	<16		13.7	<15		ug/Kg	✱	102	68 - 143
6:2 FTS	<16		13.9	<15		ug/Kg	✱	108	73 - 139
8:2 FTS	<16		14.0	17.5		ug/Kg	✱	125	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<2.0		14.6	15.0		ug/Kg	✱	102	53 - 158
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<16	F1	14.6	30.0		ug/Kg	✱	117	72 - 132
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	30	F1	14.6	48.3		ug/Kg	✱	124	72 - 132

Eurofins TestAmerica, Michigan

QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

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

Lab Sample ID: 190-26004-1 MS

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Bio-Solid PFAS Land App

Prep Type: Total/NA

Prep Batch: 494577

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	<1.6		12.9	15.2		ug/Kg	☼	110	69 - 129
Perfluorobutanoic acid (PFBA)	<1.6		14.6	15.7		ug/Kg	☼	99	76 - 136
Perfluorodecanesulfonic acid (PFDS)	1.9		14.1	17.5		ug/Kg	☼	110	71 - 131
Perfluorodecanoic acid (PFDA)	6.6		14.6	22.9		ug/Kg	☼	111	72 - 132
Perfluorododecanoic acid (PFDoA)	4.6		14.6	20.1		ug/Kg	☼	106	71 - 131
Perfluoroheptanesulfonic Acid (PFHpS)	<1.6		13.9	18.0		ug/Kg	☼	129	76 - 136
Perfluoroheptanoic acid (PFHpA)	<1.6		14.6	16.1		ug/Kg	☼	103	71 - 131
Perfluorohexanesulfonic acid (PFHxS)	2.9	I	13.3	15.1		ug/Kg	☼	92	62 - 122
Perfluorohexanoic acid (PFHxA)	14		14.6	29.9		ug/Kg	☼	106	71 - 131
Perfluorononanesulfonic acid (PFNS)	<1.6		14.0	11.5		ug/Kg	☼	82	72 - 132
Perfluorononanoic acid (PFNA)	<1.6		14.6	16.0		ug/Kg	☼	102	73 - 133
Perfluorooctanesulfonamide (FOSA)	2.8		14.6	18.1		ug/Kg	☼	105	77 - 137
Perfluorooctanesulfonic acid (PFOS)	18	I	13.6	30.9	I	ug/Kg	☼	95	68 - 141
Perfluorooctanoic acid (PFOA)	5.7		14.6	22.6		ug/Kg	☼	116	72 - 132
Perfluoropentanesulfonic acid (PFPeS)	<1.6		13.7	14.6		ug/Kg	☼	107	66 - 126
Perfluoropentanoic acid (PFPeA)	2.4		14.6	17.7		ug/Kg	☼	105	69 - 129
Perfluorotetradecanoic acid (PFTeA)	<1.6		14.6	17.9		ug/Kg	☼	118	67 - 127
Perfluorotridecanoic acid (PFTriA)	<1.6	F1	14.6	10.7		ug/Kg	☼	73	71 - 131
Perfluoroundecanoic acid (PFUnA)	<1.6		14.6	18.6		ug/Kg	☼	118	66 - 126

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C8 FOSA	51		25 - 150
13C3 HFPO-DA	91		25 - 150
13C4 PFBA	70		25 - 150
13C3 PFBS	76		25 - 150
13C2 PFDA	79		25 - 150
13C2 PFDoA	31		25 - 150
13C4 PFHpA	87		25 - 150
13C2 PFHxA	89		25 - 150
13C5 PFNA	80		25 - 150
13C4 PFOA	85		25 - 150
13C4 PFOS	74		25 - 150
13C5 PFPeA	77		25 - 150
13C2 PFTeA	12	*5-	25 - 150
13C2 PFUnA	47		25 - 150
d5-NEtFOSAA	20	*5-	25 - 150
d3-NMeFOSAA	28		25 - 150
M2-4:2 FTS	239	*5+	25 - 150
M2-6:2 FTS	218	*5+	25 - 150
M2-8:2 FTS	109		25 - 150

Eurofins TestAmerica, Michigan

QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

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

Lab Sample ID: 190-26004-1 MS

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Bio-Solid PFAS Land App

Prep Type: Total/NA

Prep Batch: 494577

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
18O2 PFHxS	87		25 - 150

Lab Sample ID: 190-26004-1 MSD

Matrix: Solid

Analysis Batch: 494854

Client Sample ID: Bio-Solid PFAS Land App

Prep Type: Total/NA

Prep Batch: 494577

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	<1.6	F1	15.5	6.40	F1	ug/Kg	✱	41	66 - 136	24	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<1.6		15.4	14.9		ug/Kg	✱	97	74 - 134	13	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		15.5	14.4		ug/Kg	✱	93	79 - 139	8	30
4:2 FTS	<16		15.4	<17		ug/Kg	✱	109	68 - 143	19	30
6:2 FTS	<16		15.6	18.4		ug/Kg	✱	118	73 - 139	21	30
8:2 FTS	<16		15.8	19.0		ug/Kg	✱	120	75 - 135	8	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<2.0		16.5	16.7		ug/Kg	✱	101	53 - 158	11	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<16	F1	16.5	35.2	F1	ug/Kg	✱	135	72 - 132	16	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	30	F1	16.5	54.1	F1	ug/Kg	✱	145	72 - 132	11	30
Perfluorobutanesulfonic acid (PFBS)	<1.6		14.6	16.2		ug/Kg	✱	104	69 - 129	7	30
Perfluorobutanoic acid (PFBA)	<1.6		16.5	16.8		ug/Kg	✱	94	76 - 136	7	30
Perfluorodecanesulfonic acid (PFDS)	1.9		15.9	15.0		ug/Kg	✱	82	71 - 131	15	30
Perfluorodecanoic acid (PFDA)	6.6		16.5	26.4		ug/Kg	✱	120	72 - 132	14	30
Perfluorododecanoic acid (PFDoA)	4.6		16.5	20.4		ug/Kg	✱	95	71 - 131	1	30
Perfluoroheptanesulfonic Acid (PFHpS)	<1.6		15.7	17.0		ug/Kg	✱	108	76 - 136	6	30
Perfluoroheptanoic acid (PFHpA)	<1.6		16.5	18.6		ug/Kg	✱	107	71 - 131	14	30
Perfluorohexanesulfonic acid (PFHxS)	2.9	I	15.0	17.0		ug/Kg	✱	94	62 - 122	12	30
Perfluorohexanoic acid (PFHxA)	14		16.5	28.6		ug/Kg	✱	86	71 - 131	4	30
Perfluorononanesulfonic acid (PFNS)	<1.6		15.8	12.0		ug/Kg	✱	76	72 - 132	4	30
Perfluorononanoic acid (PFNA)	<1.6		16.5	19.0		ug/Kg	✱	109	73 - 133	17	30
Perfluorooctanesulfonamide (FOSA)	2.8		16.5	20.0		ug/Kg	✱	104	77 - 137	10	30
Perfluorooctanesulfonic acid (PFOS)	18	I	15.3	31.8	I	ug/Kg	✱	90	68 - 141	3	30
Perfluorooctanoic acid (PFOA)	5.7		16.5	24.0		ug/Kg	✱	111	72 - 132	6	30
Perfluoropentanesulfonic acid (PFPeS)	<1.6		15.5	15.2		ug/Kg	✱	98	66 - 126	4	30
Perfluoropentanoic acid (PFPeA)	2.4		16.5	20.5		ug/Kg	✱	110	69 - 129	14	30
Perfluorotetradecanoic acid (PFTeA)	<1.6		16.5	18.5		ug/Kg	✱	108	67 - 127	3	30
Perfluorotridecanoic acid (PFTriA)	<1.6	F1	16.5	10.3	F1	ug/Kg	✱	63	71 - 131	4	30
Perfluoroundecanoic acid (PFUnA)	<1.6		16.5	22.2		ug/Kg	✱	126	66 - 126	18	30

Eurofins TestAmerica, Michigan

QC Sample Results

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

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

Isotope Dilution	MSD		Limits
	%Recovery	Qualifier	
13C8 FOSA	48		25 - 150
13C3 HFPO-DA	91		25 - 150
13C4 PFBA	76		25 - 150
13C3 PFBS	83		25 - 150
13C2 PFDA	78		25 - 150
13C2 PFDoA	33		25 - 150
13C4 PFHpA	90		25 - 150
13C2 PFHxA	95		25 - 150
13C5 PFNA	87		25 - 150
13C4 PFOA	88		25 - 150
13C4 PFOS	88		25 - 150
13C5 PFPeA	79		25 - 150
13C2 PFTeDA	11	*5-	25 - 150
13C2 PFUnA	44		25 - 150
d5-NEtFOSAA	21	*5-	25 - 150
d3-NMeFOSAA	33		25 - 150
M2-4:2 FTS	224	*5+	25 - 150
M2-6:2 FTS	219	*5+	25 - 150
M2-8:2 FTS	120		25 - 150
18O2 PFHxS	84		25 - 150

Definitions/Glossary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.
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

QC Association Summary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

LCMS

Prep Batch: 494577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-26004-1	Bio-Solid PFAS Land App	Total/NA	Solid	SHAKE	
MB 320-494577/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-494577/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
190-26004-1 MS	Bio-Solid PFAS Land App	Total/NA	Solid	SHAKE	
190-26004-1 MSD	Bio-Solid PFAS Land App	Total/NA	Solid	SHAKE	

Analysis Batch: 494854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-26004-1	Bio-Solid PFAS Land App	Total/NA	Solid	537 (modified)	494577
MB 320-494577/1-A	Method Blank	Total/NA	Solid	537 (modified)	494577
LCS 320-494577/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	494577
190-26004-1 MS	Bio-Solid PFAS Land App	Total/NA	Solid	537 (modified)	494577
190-26004-1 MSD	Bio-Solid PFAS Land App	Total/NA	Solid	537 (modified)	494577

Lab Chronicle

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Client Sample ID: Bio-Solid PFAS Land App

Lab Sample ID: 190-26004-1

Date Collected: 05/21/21 10:15

Matrix: Solid

Date Received: 05/21/21 13:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			494577	06/01/21 19:22	AM	TAL SAC
Total/NA	Analysis	537 (modified)		1	494854	06/02/21 17:20	S1M	TAL SAC

Laboratory References:

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

Analyst References:

Lab: TAL SAC

Batch Type: Prep

AM = Andrew Martin

Batch Type: Analysis

S1M = Sudarat Mongkol

Method Summary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	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 = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-29-22
Hawaii	State	<cert No.>	01-29-22
Illinois	NELAP	200060	03-18-22
Kansas	NELAP	E-10375	10-31-21
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	01-29-22
Nevada	State	CA000442021-2	07-31-21
New Hampshire	NELAP	2997	04-18-22
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-22
Ohio	State	41252	01-29-22
Oregon	NELAP	4040	01-30-23
Texas	NELAP	T104704399-19-13	05-31-22
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442021-12	03-01-22
Virginia	NELAP	460278	03-14-22
Washington	State	C581	05-05-22
West Virginia (DW)	State	9930C	12-31-21
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Michigan

Environment Testing
TestAmerica

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☐ SDS or Known Hazard Information Supplied by Client☐ DiscrepanciesClient ID: Oakland Co☐ Short HoldWork Order #: 190-26004☐ Rush ☐ 24 Hr ☐ 2-Day ☐ 3-Day ☐ 5-Day ☐ Other: _____Receipt Evaluation Performed by: Initials: TRH Date: 5/21/21 Time: 1:35

Cooler / Sample Receipt

After hours receipt: complete gray areas. Place cooler in walk-in, place

form in Receiving box. Date: _____ Time: _____

Method of Shipment:

Walk-In Client ☒ Eurofins TA Field CourierOther Client / 3rd Party Courier: _____

Fed Ex Tracking #: _____

UPS Tracking #: _____

Other: _____

Shipping Container Type:

☒ Cooler ☐ Box☐ None ☐ Other: _____

Packing Materials:

☒ Plastic Bags ☐ Foam☐ Bubble Wrap ☐ Paper☐ Packing Peanuts ☐ None☐ Other: _____

Custody Seals Intact:

☐ Yes ☐ No☒ NA (not used or required)

Cooling Materials:

☒ Ice (Solid) ☐ Ice (Melted)☐ Blue Ice ☐ None☐ Other: _____

Bacteriological Samples	Temp Corrected (°C)	Frozen?		Rec'd Within 2 Hrs?		Sample Flagged?	
		Yes	No	Yes	No	Yes	No

Received on same day sampled? ☒ Yes ☐ NoAdditional Sheets Required? ☐ Yes ☒ No

Receipt Temperatures

Thermometer ID	Observed (°C)	Corrected (°C)	Temp Blank	Sample Temp	Acceptable	Cooler ID	Affected Samples
CP313207	3.2	3.2			Y N		
					Y N		
					Y N		

Receipt Questions**	Y	N	NA	"No" answers require additional comment
CoC present and ETA receipt signature, date, and time properly documented?	<input checked="" type="checkbox"/>			
Containers and Labels in good condition? (unbroken, not leaking, appropriately filled, labels legible & attached)	<input checked="" type="checkbox"/>			
Appropriate containers used and adequate volume provided?	<input checked="" type="checkbox"/>			Preserved bottles checked for pH? * Yes No
Number of sample containers match CoC?	<input checked="" type="checkbox"/>			pH strip lot # _____
Samples received within hold?	<input checked="" type="checkbox"/>			
Samples submitted for GRO and Volatiles analysis (8260, 624, 524) received without headspace?			<input checked="" type="checkbox"/>	
Was a Trip Blank received with VOA samples?			<input checked="" type="checkbox"/>	
Were the samples free of any questionable physical conformities? (i.e.: field duplicates or multiple bottles of the same sample do not significantly vary in appearance – color, solid proportions, etc.)	<input checked="" type="checkbox"/>			
Were the CoC bottle labels and all other items free of all other discrepancies or issues that would need to be addressed with the Project Manager and/or Client?	<input checked="" type="checkbox"/>			
**May not be applicable if samples are not for compliance testing				*Excludes FOG, VOAs, TOC Vials, HEM

Client Contact Record

Contact Via: ☐ Phone ☐ Email ☐ Other: _____ Person Contacted: _____ Date/Time: _____☐ Discrepancy allowance agreement is on record in the client project file

Discussion / Resolution

Any additional documentation and clarification from the client must be noted in the narrative and/or scanned into the CoC directory.

Reviewed by Jenichal Date: 5/21/21

WI-MI-010_020720

Chain of Custody Record

Environment Testing
America

Client Information (Sub Contract Lab) Client Contact: Schafer, Sue Shipping/Receiving: Sue Schafer@Eurofinset.com Company: TestAmerica Laboratories, Inc. Address: 880 Riverside Parkway, West Sacramento, CA 95605 Phone: 916-373-5600(Tel) 916-372-1059(Fax) Email: Project # 19001220 Biosolid-PFAS Site:		Sampler: Schafer, Sue Phone: Sue Schafer@Eurofinset.com Accreditations Required (See note):	Lab PM: Schafer, Sue E-Mail: Sue Schafer@Eurofinset.com State of Origin: Michigan Carrier Tracking No(s):	COC No: 190-29419.1 Page: Page 1 of 1 Job #: 190-26004-1
Due Date Requested: 6/6/2021 TAT Requested (days):		Analysis Requested A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Anichlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify) Other:		
Sample Identification - Client ID (Lab ID) Bio-Solid PFAS Land App (190-26004-1)		Matrix (W=water, S=solid, O=wastefoil) Sample Type (C=comp, G=grab) BT=tissue, A=air Sample Time 10:15 Eastern Sample Date 5/21/21	Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Moisture/Percent Moisture <input checked="" type="checkbox"/> PFC_IDA/Shake_Bath_14D (MOD) PFAS Standard <input checked="" type="checkbox"/> List (24 Analytes)	Total Number of Containers 2 Special Instructions/Note:
Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.				
Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)				
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months				
Special Instructions/QC Requirements:				
Empty Kit Relinquished by:				
Relinquished by: See above Date: 5/21/21 Time: 1700 Company:				
Relinquished by: Date/Time: Company:				
Relinquished by: Date/Time: Company:				
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Custody Seal No.:				
Cooler Temperature(s) °C and Other Remarks: 3.9				

Isotope Dilution Summary

Client: Oakland County Water Resources
Project/Site: Biosolid-PFAS

Job ID: 190-26004-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	HFPODA (25-150)	PFBA (25-150)	C3PFBS (25-150)	PFDA (25-150)	PFDoA (25-150)	C4PFHA (25-150)	PFHxA (25-150)
190-26004-1	Bio-Solid PFAS Land App	54	90	76	91	89	31	88	88
190-26004-1 MS	Bio-Solid PFAS Land App	51	91	70	76	79	31	87	89
190-26004-1 MSD	Bio-Solid PFAS Land App	48	91	76	83	78	33	90	95
LCS 320-494577/2-A	Lab Control Sample	70	94	89	80	91	86	95	89
MB 320-494577/1-A	Method Blank	66	90	88	76	94	87	94	92

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFNA (25-150)	PFOA (25-150)	PFOS (25-150)	PFPeA (25-150)	PFTDA (25-150)	PFUnA (25-150)	d5NEFOS (25-150)	d3NMFOS (25-150)
190-26004-1	Bio-Solid PFAS Land App	91	94	85	82	13 *5-	48	21 *5-	35
190-26004-1 MS	Bio-Solid PFAS Land App	80	85	74	77	12 *5-	47	20 *5-	28
190-26004-1 MSD	Bio-Solid PFAS Land App	87	88	88	79	11 *5-	44	21 *5-	33
LCS 320-494577/2-A	Lab Control Sample	91	89	74	83	88	82	79	78
MB 320-494577/1-A	Method Blank	93	88	74	90	85	83	82	81

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	PFHxS (25-150)
190-26004-1	Bio-Solid PFAS Land App	233 *5+	256 *5+	126	92
190-26004-1 MS	Bio-Solid PFAS Land App	239 *5+	218 *5+	109	87
190-26004-1 MSD	Bio-Solid PFAS Land App	224 *5+	219 *5+	120	84
LCS 320-494577/2-A	Lab Control Sample	75	83	90	80
MB 320-494577/1-A	Method Blank	75	90	91	80

Surrogate Legend

PFOSA = 13C8 FOSA
HFPODA = 13C3 HFPO-DA
PFBA = 13C4 PFBA
C3PFBS = 13C3 PFBS
PFDA = 13C2 PFDA
PFDoA = 13C2 PFDoA
C4PFHA = 13C4 PFHpA
PFHxA = 13C2 PFHxA
PFNA = 13C5 PFNA
PFOA = 13C4 PFOA
PFOS = 13C4 PFOS
PFPeA = 13C5 PFPeA
PFTDA = 13C2 PFTeDA
PFUnA = 13C2 PFUnA
d5NEFOS = d5-NEtFOSAA
d3NMFOS = d3-NMeFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
PFHxS = 18O2 PFHxS