eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Michigan
10448 Citation Drive
Suite 200
Brighton, MI 48116
Tel: (810)229-2763

Laboratory Job ID: 190-27920-1
Client Project/Site: Annual Biosolids PFAS

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

Attn: Kenneth Burch

Sue Schafer

Authorized for release by:
2/24/2022 8:53:10 PM

Sue Schafer, Project Manager II
(810)229-2763
Sue.Schafer@Eurofinset.com

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 10
QC Association Summary 11
Lab Chronicle 12
Method Summary 13
Certification Summary 14
Chain of Custody 15
Isotope Dilution Summary 18

Sample Summary

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
190-27920-1	Biosolid	Solid	02/04/22 10:30	02/04/22 13:55

Case Narrative

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Job ID: 190-27920-1

Laboratory: Eurofins Michigan

Narrative

Job Narrative
190-27920-1

Comments
The PFC_IDA Perfluorinated Hydrocarbons analysis was performed at the Eurofins Environment Testing, Sacramento laboratory.
Receipt
The sample was received on 2/4/2022 1:55 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 2.6º C.

LCMS
Method 537 (modified): The continuing calibration verification (CCV) associated with batch 320-563898 recovered below the recommended control limit for M2-8:2 FTS, an isotope dilution analyte (IDA) used to quantitate the concentration of the associated native analyte 8:2 FTS. This analyte was in control in the CCV, the CCVIS, CCVL, LCS and the other CCV aliquots, indicating no adverse impact on target analyte quantitation. 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 CCV. Consequently, the associated sample results have been reported (CCV 320-563898/13).

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was above 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 judgment was used to positively identify the analyte.
Biosolid (190-27920-1)

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery of 13C2 PFTeDA associated with the following sample is below the method recommended limit: Biosolid (190-27920-1). 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.

Method 537 (modified): The Isotope Dilution Analyte (IDA) recovery of 13C4 PFBA associated with the following sample is below the method recommended limit: Biosolid (190-27920-1). 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. The associated sample was re-prepared and/or re-analyzed outside holding time at lower volume with concurring results; therefore, the data has been reported.

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 adjusting to the final volume:
Biosolid (190-27920-1)

PFC_IDA
Solid
preparation batch 320-563761

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

Client Sample ID: Biosolid

Date Collected: 02/04/22 10:30
Date Received: 02/04/22 13:55

Lab Sample ID: 190-27920-1

Matrix: Solid
Percent Solids: 28.9

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
4:2 FTS	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
6:2 FTS	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
8:2 FTS	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	**6.7**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	**15**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorobutanesulfonic acid (PFBS)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorobutanoic acid (PFBA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorodecanesulfonic acid (PFDS)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorodecanoic acid (PFDA)	**4.7**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorododecanoic acid (PFDoA)	**2.1**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluoroheptanesulfonic Acid (PFHpS)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluoroheptanoic acid (PFHpA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorohexanesulfonic acid (PFHxS)	**1.4**	I	0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorohexanoic acid (PFHxA)	**2.7**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorononanesulfonic acid (PFNS)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorononanoic acid (PFNA)	**0.82**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorooctanesulfonamide (FOSA)	**2.6**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorooctanesulfonic acid (PFOS)	**18**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorooctanoic acid (PFOA)	**2.9**		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluoropentanesulfonic acid (PFPeS)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluoropentanoic acid (PFPeA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorotetradecanoic acid (PFTeA)	**0.78**	I	0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluorotridecanoic acid (PFTriA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1
Perfluoroundecanoic acid (PFUnA)	<0.67		0.67		ug/Kg	☼	02/06/22 18:59	02/07/22 12:28	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*80*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C3 HFPO-DA	*61*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C4 PFBA	*4*	*5-	*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C3 PFBS	*95*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C2 PFDA	*106*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C2 PFDoA	*42*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C4 PFHpA	*73*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C2 PFHxA	*70*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C5 PFNA	*97*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*
13C4 PFOA	*99*		*25 - 150*	*02/06/22 18:59*	*02/07/22 12:28*	*1*

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Client Sample ID: Biosolid

Date Collected: 02/04/22 10:30
Date Received: 02/04/22 13:55

Lab Sample ID: 190-27920-1

Matrix: Solid
Percent Solids: 28.9

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	85		25 - 150	02/06/22 18:59	02/07/22 12:28	1
13C5 PFPeA	31		25 - 150	02/06/22 18:59	02/07/22 12:28	1
13C2 PFTeDA	17	*5-	25 - 150	02/06/22 18:59	02/07/22 12:28	1
13C2 PFUnA	74		25 - 150	02/06/22 18:59	02/07/22 12:28	1
d5-NEtFOSAA	55		25 - 150	02/06/22 18:59	02/07/22 12:28	1
d3-NMeFOSAA	55		25 - 150	02/06/22 18:59	02/07/22 12:28	1
M2-4:2 FTS	109		25 - 150	02/06/22 18:59	02/07/22 12:28	1
M2-6:2 FTS	139		25 - 150	02/06/22 18:59	02/07/22 12:28	1
M2-8:2 FTS	128		25 - 150	02/06/22 18:59	02/07/22 12:28	1
18O2 PFHxS	90		25 - 150	02/06/22 18:59	02/07/22 12:28	1

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	71.1		0.1		%			02/07/22 14:27	1
Percent Solids	28.9		0.1		%			02/07/22 14:27	1

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-563761/1-A
Matrix: Solid
Analysis Batch: 563898

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 563761

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		02/06/22 18:59	02/07/22 10:03	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
4:2 FTS	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
6:2 FTS	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
8:2 FTS	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorobutanesulfonic acid (PFBS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorobutanoic acid (PFBA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorodecanesulfonic acid (PFDS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorodecanoic acid (PFDA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorododecanoic acid (PFDoA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluoroheptanesulfonic Acid (PFHpS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluoroheptanoic acid (PFHpA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorohexanesulfonic acid (PFHxS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorohexanoic acid (PFHxA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorononanesulfonic acid (PFNS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorononanoic acid (PFNA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorooctanesulfonamide (FOSA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorooctanesulfonic acid (PFOS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorooctanoic acid (PFOA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluoropentanesulfonic acid (PFPeS)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluoropentanoic acid (PFPeA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorotetradecanoic acid (PFTeA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluorotridecanoic acid (PFTriA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1
Perfluoroundecanoic acid (PFUnA)	<0.20		0.20		ug/Kg		02/06/22 18:59	02/07/22 10:03	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*114*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C3 HFPO-DA	*116*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C4 PFBA	*61*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C3 PFBS	*112*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C2 PFDA	*104*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C2 PFDoA	*121*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C4 PFHpA	*116*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C2 PFHxA	*119*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C5 PFNA	*111*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C4 PFOA	*105*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C4 PFOS	*105*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*
13C5 PFPeA	*107*		*25 - 150*	*02/06/22 18:59*	*02/07/22 10:03*	*1*

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

Lab Sample ID: MB 320-563761/1-A
Matrix: Solid
Analysis Batch: 563898

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 563761

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	122		25 - 150	02/06/22 18:59	02/07/22 10:03	1
13C2 PFUnA	107		25 - 150	02/06/22 18:59	02/07/22 10:03	1
d5-NEtFOSAA	138		25 - 150	02/06/22 18:59	02/07/22 10:03	1
d3-NMeFOSAA	129		25 - 150	02/06/22 18:59	02/07/22 10:03	1
M2-4:2 FTS	60		25 - 150	02/06/22 18:59	02/07/22 10:03	1
M2-6:2 FTS	60		25 - 150	02/06/22 18:59	02/07/22 10:03	1
M2-8:2 FTS	61		25 - 150	02/06/22 18:59	02/07/22 10:03	1
18O2 PFHxS	108		25 - 150	02/06/22 18:59	02/07/22 10:03	1

Lab Sample ID: LCS 320-563761/2-A
Matrix: Solid
Analysis Batch: 563898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 563761

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.88	2.09		ug/Kg		111	66 - 136
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.86	1.72		ug/Kg		92	74 - 134
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.88	1.88		ug/Kg		100	79 - 139
4:2 FTS	1.87	2.33		ug/Kg		125	68 - 143
6:2 FTS	1.90	2.02		ug/Kg		107	73 - 139
8:2 FTS	1.92	2.11		ug/Kg		110	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	1.85		ug/Kg		93	53 - 158
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	1.95		ug/Kg		98	72 - 132
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	1.86		ug/Kg		93	72 - 132
Perfluorobutanesulfonic acid (PFBS)	1.77	1.79		ug/Kg		101	69 - 129
Perfluorobutanoic acid (PFBA)	2.00	2.05		ug/Kg		103	76 - 136
Perfluorodecanesulfonic acid (PFDS)	1.93	1.94		ug/Kg		101	71 - 131
Perfluorodecanoic acid (PFDA)	2.00	2.10		ug/Kg		105	72 - 132
Perfluorododecanoic acid (PFDoA)	2.00	2.29		ug/Kg		115	71 - 131
Perfluoroheptanesulfonic Acid (PFHpS)	1.90	1.85		ug/Kg		97	76 - 136
Perfluoroheptanoic acid (PFHpA)	2.00	2.14		ug/Kg		107	71 - 131
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.90		ug/Kg		104	62 - 122
Perfluorohexanoic acid (PFHxA)	2.00	2.01		ug/Kg		101	71 - 131
Perfluorononanesulfonic acid (PFNS)	1.92	1.88		ug/Kg		98	72 - 132
Perfluorononanoic acid (PFNA)	2.00	2.05		ug/Kg		103	73 - 133
Perfluorooctanesulfonamide (FOSA)	2.00	2.14		ug/Kg		107	77 - 137
Perfluorooctanesulfonic acid (PFOS)	1.86	1.69		ug/Kg		91	68 - 141
Perfluorooctanoic acid (PFOA)	2.00	1.87		ug/Kg		93	72 - 132
Perfluoropentanesulfonic acid (PFPeS)	1.88	2.14		ug/Kg		114	66 - 126

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

Lab Sample ID: LCS 320-563761/2-A
Matrix: Solid
Analysis Batch: 563898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 563761

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoropentanoic acid (PFPeA)	2.00	1.95		ug/Kg		98	69 - 129
Perfluorotetradecanoic acid (PFTeA)	2.00	1.84		ug/Kg		92	67 - 127
Perfluorotridecanoic acid (PFTriA)	2.00	2.38		ug/Kg		119	71 - 131
Perfluoroundecanoic acid (PFUnA)	2.00	2.11		ug/Kg		105	66 - 126

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*118*		*25 - 150*
13C3 HFPO-DA	*107*		*25 - 150*
13C4 PFBA	*60*		*25 - 150*
13C3 PFBS	*111*		*25 - 150*
13C2 PFDA	*110*		*25 - 150*
13C2 PFDoA	*119*		*25 - 150*
13C4 PFHpA	*112*		*25 - 150*
13C2 PFHxA	*125*		*25 - 150*
13C5 PFNA	*108*		*25 - 150*
13C4 PFOA	*113*		*25 - 150*
13C4 PFOS	*120*		*25 - 150*
13C5 PFPeA	*106*		*25 - 150*
13C2 PFTeDA	*125*		*25 - 150*
13C2 PFUnA	*118*		*25 - 150*
d5-NEtFOSAA	*140*		*25 - 150*
d3-NMeFOSAA	*122*		*25 - 150*
M2-4:2 FTS	*59*		*25 - 150*
M2-6:2 FTS	*66*		*25 - 150*
M2-8:2 FTS	*58*		*25 - 150*
18O2 PFHxS	*109*		*25 - 150*

Method: D 2216 - Percent Moisture

Lab Sample ID: 190-27920-1 DU
Matrix: Solid
Analysis Batch: 563921

Client Sample ID: Biosolid
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	71.1		71.4		%		0.4	20
Percent Solids	28.9		28.6		%		1	20

Definitions/Glossary

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
I	Value is EMPC (estimated maximum possible concentration).

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
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: Annual Biosolids PFAS

Job ID: 190-27920-1

LCMS

Prep Batch: 563761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-27920-1	Biosolid	Total/NA	Solid	SHAKE	
MB 320-563761/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-563761/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	

Analysis Batch: 563898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-27920-1	Biosolid	Total/NA	Solid	537 (modified)	563761
MB 320-563761/1-A	Method Blank	Total/NA	Solid	537 (modified)	563761
LCS 320-563761/2-A	Lab Control Sample	Total/NA	Solid	537 (modified)	563761

General Chemistry

Analysis Batch: 563921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-27920-1	Biosolid	Total/NA	Solid	D 2216	
190-27920-1 DU	Biosolid	Total/NA	Solid	D 2216	

Lab Chronicle

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Client Sample ID: Biosolid
Date Collected: 02/04/22 10:30
Date Received: 02/04/22 13:55

Lab Sample ID: 190-27920-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1	563921	02/07/22 14:27	DJW	TAL SAC

Client Sample ID: Biosolid
Date Collected: 02/04/22 10:30
Date Received: 02/04/22 13:55

Lab Sample ID: 190-27920-1
Matrix: Solid
Percent Solids: 28.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			563761	02/06/22 18:59	AM	TAL SAC
Total/NA	Analysis	537 (modified)		1	563898	02/07/22 12:28	K1S	TAL SAC

Laboratory References:

TAL SAC = Eurofins 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

DJW = Darian Wong

K1S = Kotechakon Sorndee

Method Summary

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	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 Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Oakland County Water Resources
Job ID: 190-27920-1
Project/Site: Annual Biosolids PFAS

Laboratory: Eurofins 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	08-11-22
Arkansas DEQ	State	88-0691	06-17-22
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-22
Florida	NELAP	E87570	06-30-22
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-18-22
Kansas	NELAP	E-10375	02-28-22
Louisiana	NELAP	01944	06-30-22
Maine	State	CA00004	04-14-22
Michigan	State	9947	01-29-22 *
Nevada	State	CA00044	08-31-22
New Hampshire	NELAP	2997	04-18-22
New Jersey	NELAP	CA005	06-30-22
New York	NELAP	11666	04-01-22
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-22
US Fish & Wildlife	US Federal Programs	58448	07-31-22
USDA	US Federal Programs	P330-18-00239	07-31-24
Utah	NELAP	CA000442021-12	03-01-22
Virginia	NELAP	460278	03-14-22
Washington	State	C581	05-05-22
West Virginia (DW)	State	9930C	12-31-22
Wisconsin	State	998204680	08-31-22
Wyoming	State Program	8TMS-L	01-28-19 *

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

Chain of Custody Record

Eurofins TestAmerica - Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-229-2763

eurofins | Environment Testing TestAmerica

Regulatory program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other wastewater permit

Client Contact			
Company Name: Oakland Co. WRC	**Client Project Manager:** Sue Schafer	**Site Contact:** Kenny Burch	**Lab Contact:** Sue Schafer
Address: 4840 Pontiac Lake Rd.	**Telephone:** 810-229-2763 ext. 1	**Telephone:** 248-613-1939	**Telephone:** 810-229-2763 ext 1
City/State/Zip: Waterford, MI 48328	**Email:** sue.schafer@eurofinset.com	**Analysis Turnaround Time**	**COC No:** 1 of 1 COCs
Phone: 248-413-1939		TAT if different from below 10 bus ☐ 3 weeks ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day	
Project Name: Annual Biosolid PFAS	**Method of Shipment/Carrier:** Eurofins TestAmerica Field Services		
PO #	**Shipping/Tracking No:**		

Sample Identification	Sample Date	Sample Time	Matrix: Air	Aqueous	Sediment	Solid	Other:	Containers & Preservatives: H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Unpres	Other:	Filtered Sample (Y / N)	Composite=C / Grab=G	Analyses: PFAS-28 Biosolids	For lab use only / Sample Specific Notes / Special Instructions:
Biosolid	2/4/22	1030				X							X			G	X	

190-27920 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ kin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal By Lab ☐ Archive For ☐ Months

Special Instructions/QC Requirements & Comments:

(Print Name) Eurofins TestAmerica Field Technician - Mackenzie Smith

Relinquished by:	Company: EET4	Date/Time: 2/4/22 1240	Received by:	Company: EET4	Date/Time: 2/4/22 1355
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	**Received in Laboratory by:**	**Company:**	**Date/Time:**

2/24/2022

eurofins | Environment Testing TestAmerica

☐ SDS or Known Hazard Information Supplied by Client
☐ Discrepancies
☐ Short Hold
Client ID: Oakland CO-Biosolids
Work Oder #: 190-27920
☐ Rush ☐ 24 Hr ☐ 2-Day ☐ 3-Day ☐ 5-Day ☐ Other: _____
Receipt Evaluation Performed by: Initials: TRH Date: 2/4/22 Time: 1355

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 Courier
Other 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? Yes	Frozen? No	Rec'd Within 2 Hrs? Yes	Rec'd Within 2 Hrs? No	Sample Flagged? Yes	Sample Flagged? No

Received on same day sampled? (Yes) No
Additional Sheets Required? Yes (No)

Receipt Temperatures

Thermometer ID	Observed (°C)	Corrected (°C)	Temp Blank	Sample Temp	Acceptable	Cooler ID	Affected Samples
CP3JB209	2.6	2.6		X	(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?	✓			
Containers and Labels in good condition? *(unbroken, not leaking, appropriately filled, labels legible & attached)*	✓			
Appropriate containers used and adequate volume provided?	✓			Preserved bottles checked for pH?* Yes No
Number of sample containers match CoC?	✓			pH strip lot # _____
Samples received within hold?	✓			
Samples submitted for GRO and Volatiles analysis (8260, 624, 524) received without headspace?			✓	
Was a Trip Blank received with VOA samples?			✓	
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.)	✓			
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?	✓			
**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 _____ Date: 2/4/22

WI-MI-010_020720

Eurofins Michigan
10448 Citation Drive Suite 200
Brighton, MI 48116
Phone: 810-229-2763 Fax: 810-229-0000

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schafer, Sue	Carrier Tracking No(s):	COC No: 190-31418.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Sue.Schafer@Eurofinset.com	State of Origin: Michigan	Page: Page 1 of 1
Company: Eurofins Environment Testing Northern Ca		Accreditations Required (See note):		Job #: 190-27920-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 2/17/2022			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605	PO #:			
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	WO #:			
Email:	Project #: 19001220			
Project Name: Annual Biosolids	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitnc Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	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)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Moisture/ Percent Moisture	PFC_IDA/Shake_Bath_14D (MOD) PFAS, Standard List (24 Analytes)	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
Biosolid (190-27920-1)	2/4/22	Eastern		Solid			X	X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon out 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 Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing North Central, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Jen Hall	2/4/22 1700			2/5/22 1100	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Custody Seal No.: 185572

Cooler Temperature(s) °C and Other Remarks: 1.4

Page 17 of 18

2/24/2022

Isotope Dilution Summary

Client: Oakland County Water Resources
Project/Site: Annual Biosolids PFAS

Job ID: 190-27920-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Solid

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFOSA	HFPODA	PFBA	C3PFBS	PFDA	PFDoA	C4PFHA	PFHxA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
190-27920-1	Biosolid	80	61	4 *5-	95	106	42	73	70
LCS 320-563761/2-A	Lab Control Sample	118	107	60	111	110	119	112	125
MB 320-563761/1-A	Method Blank	114	116	61	112	104	121	116	119

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFNA	PFOA	PFOS	PFPeA	PFTDA	PFUnA	d5NEFOS	d3NMFOS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
190-27920-1	Biosolid	97	99	85	31	17 *5-	74	55	55
LCS 320-563761/2-A	Lab Control Sample	108	113	120	106	125	118	140	122
MB 320-563761/1-A	Method Blank	111	105	105	107	122	107	138	129

		Percent Isotope Dilution Recovery (Acceptance Limits)			
		M242FTS	M262FTS	M282FTS	PFHxS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)
190-27920-1	Biosolid	109	139	128	90
LCS 320-563761/2-A	Lab Control Sample	59	66	58	109
MB 320-563761/1-A	Method Blank	60	60	61	108

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