

August 31, 2021

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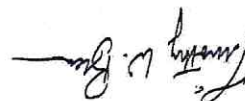
RE: Trace ID: 21H0243

Enclosed are your analytical results associated with your project for Biosolids PFAS. The results of this report relate only to the samples listed in the body of this report.

The results were obtained from Merit Laboratories, Inc

Thank you for working with Trace. If you have questions concerning this report, please contact me at 231.773.5998 or by email at [tbrewer@trace-labs.com](mailto:tbrewer@trace-labs.com).

Sincerely,



Tim Brewer

Project Manager

Enclosures





# Analytical Laboratory Report

Report ID: S27092.01(01)  
Generated on 08/30/2021

Report to  
Attention: Tim Brewer  
Trace Analytical Laboratories  
241 Black Creek Rd.  
Muskegon, MI 49444  
Phone: O: 231-773-5998 x238 FAX:  
Email: TBrewer@trace-labs.com

Report produced by  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823  
Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:  
John Laverly (johnlaverly@meritlabs.com)  
Barbara Ball (bball@meritlabs.com)

Additional Contacts: Jon Mink

Report Summary

Lab Sample ID(s): S27092.01

Project: 21H0243

Collected Date(s): 08/05/2021

Submitted Date/Time: 08/11/2021 09:10

Sampled by: Unknown

Lab. O. #: 21H0243

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Maya Murshak  
Technical Director

Report to Trace Analytical Laboratories

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# Analytical Laboratory Report

## General Report Notes

analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

0 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

VA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

All accreditation certificates are available upon request. Starred (\*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

'FAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the RB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

## Report Narrative

There is no additional narrative for this analytical report



Laboratory Certifications

Authority Certification ID

Michigan DEQ #9956

VBENC #2005110032

Ohio VAP #CL0002

Indiana DOH #C-MI-07

New York NELAC #11814

North Carolina DENR #680

North Carolina DOH #26702

Alaska CSLAP #17-001

Pennsylvania DEP #68-05884

Qualifier Descriptions

Qualifier Description

Result is outside of stated limit criteria

Compound also found in associated method blank

Concentration exceeds calibration range

Analysis run outside of holding time

Estimated result due to extraction run outside of holding time

Sample submitted and run outside of holding time

Matrix interference with internal standard

Estimated value less than reporting limit, but greater than MDL

Elevated reporting limit due to low sample amount

Result reported to MDL not RDL

Analysis performed by outside laboratory. See attached report.

Preliminary result

Surrogate recovery outside of control limits

No correction for total solids

Elevated reporting limit due to matrix interference

Elevated reporting limit due to high target concentration

Value detected less than reporting limit, but greater than MDL

Reported value estimated due to interference

Analyte also found in associated method blank

Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.

Preserved from bulk sample

Glossary of Abbreviations

Abbreviation Description

MDL

Method Detection Limit

MS

Matrix Spike

MSD

Matrix Spike Duplicate

EPA SW 846 (Soil and Wastewater) Methods

EPA Methods

Standard Methods

N

Linear

IR

Branched



# Analytical Laboratory Report

## Method Summary

Method ASTM D7968-17M  
Version  
ASTM Method D7968 - 17 Modified (Isotopic Dilution)  
Standard Method 2540 B 2011

## Parameter Summary

Parameter	Synonym	Cas #
'FBA	Perfluorobutanoic Acid	375-22-4
'FPeA	Perfluoropentanoic Acid	2706-90-3
'2:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
'FHxA	Perfluorohexanoic Acid	307-24-4
'FBS	Perfluorobutane sulfonic Acid	375-73-5
'FHpA	Perfluorohexanoic Acid	375-85-9
'FPeS	Perfluoropentane Sulfonic Acid	2706-91-4
'2:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
'FOA	Perfluorooctanoic Acid	335-67-1
'FHxS	Perfluorohexane Sulfonic Acid	355-46-4
'FHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
'FHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
'FNA	Perfluorononanoic Acid	375-95-1
'2:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
'FHpS	Perfluorohexanoic Acid	375-92-8
'FDA	Perfluorodecanoic Acid	335-76-2
'MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
'FOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
'FOS	Perfluorooctane Sulfonic Acid	1763-23-1
'FOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
'FOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
'Funda	Perfluoroundecanoic Acid	2058-94-8
'FNS	Perfluorononane Sulfonic Acid	68259-12-1
'FDODA	Perfluorododecanoic Acid	307-55-1
'FDS	Perfluorodecane Sulfonic Acid	335-77-3
'FTDA	Perfluorotridecanoic Acid	72629-94-8
'OSA	Perfluorooctane Sulfonamide	754-91-6
'FTeDA	Perfluorotetradecanoic Acid	376-06-7
'1Cl-PF30US	1-chloro-1,1,1-trifluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
'Cl-PF30NS	9-chlorohexadecan-3-oxanon-1-sulfonic acid	756426-58-1
'DONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
'FPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



# Analytical Laboratory Report

## Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
27092.01	Biosolids 21H0243-01	Sludge	08/05/21 08:30





# Analytical Laboratory Report

Lab Sample ID: S27092.01  
Sample Tag: Biosolids 21 H0243-01  
Collected Date/Time: 08/05/2021 08:30  
Matrix: Sludge  
OC Reference:

Sample Containers

Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
500ml Plastic	None	Yes	5.6	IR
15ml Centrifuge Tube	None	Yes	5.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	10.66/6.91/10	ASTM D7968-17M	08/19/21 16:00	KCV	

Organics

Method: SM2540B, Run Date: 08/12/21 14:30, Analyst: ELR

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	7.8	1		%	1		

Organics

8 PFAs, Method: ASTM D7968-17M, Run Date: 08/23/21 03:42, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
FBA*	Not detected	0.68		ug/kg	34.2		
PeA*	Not detected	0.34		ug/kg	34.2		
:2 FTSA*	Not detected	0.34		ug/kg	34.2		
FHA*	1	0.34		ug/kg	34.2		
FBS*	Not detected	0.34		ug/kg	34.2		
FHPA*	Not detected	0.34		ug/kg	34.2		
PeS*	Not detected	0.34		ug/kg	34.2		
:2 FTSA*	Not detected	0.34		ug/kg	34.2		
FOA*	Not detected	0.34		ug/kg	34.2		
FHS*	Not detected	0.34		ug/kg	34.2		
FHS-LN*	Not detected	0.34		ug/kg	34.2		
FHS-BR*	Not detected	0.34		ug/kg	34.2		
FNA*	Not detected	0.34		ug/kg	34.2		
:2 FTSA*	Not detected	0.34		ug/kg	34.2		
FHP*	Not detected	0.34		ug/kg	34.2		
FDA*	0.49	0.34		ug/kg	34.2		
MeFOSAA*	4.5	0.34		ug/kg	34.2		
FOSAA*	2.5	0.34		ug/kg	34.2		
FOS*	5.4	0.34		ug/kg	34.2		
FOS-LN*	5.4	0.34		ug/kg	34.2		
FOS-BR*	Not detected	0.34		ug/kg	34.2		
FUnDA*	0.36	0.34		ug/kg	34.2		
FNS*	Not detected	0.34		ug/kg	34.2		
FDOA*	0.45	0.34		ug/kg	34.2		
FDS*	0.49	0.34		ug/kg	34.2		
FTDA*	Not detected	0.34		ug/kg	34.2		
OSA*	0.38	0.34		ug/kg	34.2		
FTEDA*	Not detected	0.34		ug/kg	34.2		
1Cl-PF3OUds*	Not detected	0.34		ug/kg	34.2		

Matrix interference with internal standard  
-IS recovery < 10%



Analytical Laboratory Report

ab Sample ID: S27092.01 (continued)  
Sample Tag: Biosolids 21H0243-01

8 PFAs, Method: ASTM D7968-17M, Run Date: 08/23/21 03:42, Analyst: KCV (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Cl-PF3ONS*	Not detected	0.34		ug/kg	34.2	756426-58-1	I
DONA*	Not detected	0.34		ug/kg	34.2	919005-14-4	
IFPO-DA*	Not detected	0.34		ug/kg	34.2	13252-13-6	I

Matrix interference with internal standard



Selection	Description	Note
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**Sample Receiving**

01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Samples are received at 4C +/- 2C	Thermometer #	IR 5.6
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Received on ice/ cooling process begun		
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Samples shipped		
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Samples left in 24 hr. drop box		
05.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Are there custody seals/tape or is the drop box locked		

**Chain of Custody**

06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	COC adequately filled out		
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	COC signed and relinquished to the lab		
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Sample tag on bottles match COC		
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Subcontracting needed? Subcontracted to:		

**Preservation**

10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Do sample have correct chemical preservation		
11.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Completed pH checks on preserved samples? (no VOAs)		
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Did any samples need to be preserved in the lab?		

**Bottle Conditions**

13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	All bottles intact		
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Appropriate analytical bottles are used		
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Merit bottles used		
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Sufficient sample volume received		
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Samples require laboratory filtration		
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	N/A	Samples submitted within holding time		
19.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	Do water VOC or TOX bottles contain headspace		

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: \_\_\_\_\_ Date: \_\_\_\_\_

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673

**TRACE**  
ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone  
888-679-4468 Fax  
www.trace-labs.com

### SUBCONTRACT ORDER

21H0243

#### SENDING LABORATORY:

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444  
Phone: 231.773.5998

#### RECEIVING LABORATORY:

Mett Laboratories, Inc  
2680 East Lansing Dr.  
East Lansing, MI 48823  
Phone (517) 332-0167

Project Manager: Tim Brewer

**PO # 21H0243**

Sample ID: Biosolids PFAS 21H0243-01

Matrix: Sludge

Sampled: 08/05/21 08:30

TAT: Standard

27092, 01

#### Analysis Needed:

PFAS- Biosolids- EGLE List

Released By	<i>Shayla Schultz</i>	Date	8/05/21	Received By		Date	
Released By	TRACE	Date	8/11/21 0910	Received By	<i>Pat</i>	Date	8/11/21 0910





231-773-5998 Phone  
888-979-4469 Fax  
www.trace-labs.com

**TRACE**  
ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673

Sample Log in Checklist

Date:	8/06/21
Time:	9:07
Logged by:	NC
Package Description:	Cooler
Package Temp °C	-1.6
Representative Sample Temp °C	-1.8
Original Observation	
Corrected Temperature	-1.5
IR-9 (CF: +0.1°C)	✓
IR-30 (CF: +0.1°C)	✓
20B12743 (CF: -0.3°C)	
Temp Blank	
Client Sample	✓

Sample Receipt

Yes ☒ No ☐  
Received on ice or other coolant  
Ice still present upon receipt  
Custody seals present  
Trace Courier ☒ Client Drop-off ☐

Yes ☐ No ☐  
Custody seals intact (if applicable)  
US Mail ☐ FedEx ☐ UPS ☐ Other ☐

Sample Condition

Yes ☒ No ☐ N/A ☐  
All sample containers arrived unbroken and labeled  
Sufficient sample to run requested analyses  
Correct chemical preservative added to samples  
Samples preserved at Trace  
Chemical preservation verified, check EMD pH test strip used (if applicable)  
Air bubbles absent from VOAs  
pH 0-2.5 (Lot: HC029115) ☐ pH 11.0-13.0 (Lot: HC022540) ☐ Other ☐

Chain of Custody (COC)

Yes ☒ No ☐  
All bottle labels agree with COC  
COC filled out properly  
COC signed by client

Notes:

Form 70-A.39  
Effective 7/2/21

Trace Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Trace Analytical Laboratories, Inc.