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

TRACE
ANALYTICAL LABORATORIES, INC.

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

August 30, 2021

Shane Parquette
Fleis and Vandenbrink Engineers
2960 Lucerne Drive, SE
Grand Rapids, MI 49546

Phone: (616) 977-1000
Fax: (616) 977-1005

RE: Trace ID: 21G1016

Enclosed are your analytical results associated with your project for Biosolids PFAS - Berrien Springs. 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.

Sincerely,

Tim Brewer
Project Manager

Enclosures

ACCREDITED IN ACCORDANCE WITH nelac
NJDEP Accreditation No. MI008

Analytical Laboratory Report

Report ID: S26654.01(01)
Generated on 08/27/2021

Report to

Attention: Tim Brewer
Trace Analytical Laboratories
2241 Black Creek Rd.
Muskegon, MI 49444

Phone: O: 231-773-5998 x238 FAX:
Email: TBrewer@trace-labs.com

Addtional Contacts: Jon Mink

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 Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S26654.01
Project: 21G1016
Collected Date(s): 07/27/2021
Submitted Date/Time: 07/29/2021 10:10
Sampled by: GH
P.O. #: 21G1016

Table of Contents

Maya Murshak
Technical Director

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).
40 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.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full 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.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)
PFAS 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 FRB 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
DOD ELAP/ISO 17025	#69699
WBENC	#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
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
ASTM D7968-17M	ASTM Method D7968 - 17 Modified (Isotopic Dilution)
SM2540B	Standard Method 2540 B 2011

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6

Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S26654.01	Berrian Springs 21G1016-01	Sludge	07/27/21 00:00

Merit Laboratories, Inc.

Analytical Laboratory Report

Lab Sample ID: S26654.01
Sample Tag: Berrian Springs 21G1016-01
Collected Date/Time: 07/27/2021 00:00
Matrix: Sludge
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	4.7	IR
1	15ml Centrifuge Tube	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	8.36/7.01/10	ASTM D7968-17M	08/19/21 16:00	KCV	

Inorganics

Method: SM2540B, Run Date: 07/29/21 15:30, Analyst: ELR

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	0.25	1		%	1		

Organics

28 PFAs, Method: ASTM D7968-17M, Run Date: 08/23/21 00:27, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	30		ug/kg	2960	375-22-4	
PFPeA*	25	15		ug/kg	2960	2706-90-3	
4:2 FTSA*	Not detected	15		ug/kg	2960	757124-72-4	I
PFHxA*	24	15		ug/kg	2960	307-24-4	
PFBS*	Not detected	15		ug/kg	2960	375-73-5	
PFHpA*	Not detected	15		ug/kg	2960	375-85-9	
PFPeS*	Not detected	15		ug/kg	2960	2706-91-4	
6:2 FTSA*	Not detected	15		ug/kg	2960	27619-97-2	I
PFOA*	Not detected	15		ug/kg	2960	335-67-1	
PFHxS*	Not detected	15		ug/kg	2960	355-46-4	
PFHxS-LN*	Not detected	15		ug/kg	2960	355-46-4-LN	
PFHxS-BR*	Not detected	15		ug/kg	2960	355-46-4-BR	
PFNA*	Not detected	15		ug/kg	2960	375-95-1	
8:2 FTSA*	Not detected	15		ug/kg	2960	39108-34-4	I
PFHpS*	Not detected	15		ug/kg	2960	375-92-8	
PFDA*	Not detected	15		ug/kg	2960	335-76-2	
N-MeFOSAA*	Not detected	15		ug/kg	2960	2355-31-9	
EtFOSAA*	Not detected	15		ug/kg	2960	2991-50-6	
PFOS*	Not detected	15		ug/kg	2960	1763-23-1	
PFOS-LN*	Not detected	15		ug/kg	2960	1763-23-1-LN	
PFOS-BR*	Not detected	15		ug/kg	2960	1763-23-1-BR	
PFUnDA*	Not detected	15		ug/kg	2960	2058-94-8	
PFNS*	Not detected	15		ug/kg	2960	68259-12-1	
PFDoDA*	Not detected	15		ug/kg	2960	307-55-1	
PFDS*	Not detected	15		ug/kg	2960	335-77-3	
PFTrDA*	Not detected	15		ug/kg	2960	72629-94-8	
FOSA*	Not detected	15		ug/kg	2960	754-91-6	
PFTeDA*	Not detected	15		ug/kg	2960	376-06-7	
11Cl-PF3OUdS*	Not detected	15		ug/kg	2960	763051-92-9	
9Cl-PF3ONS*	Not detected	15		ug/kg	2960	756426-58-1	

I-Matrix interference with internal standard

Lab Sample ID: S26654.01 (continued)
Sample Tag: Berrian Springs 21G1016-01

28 PFAs, Method: ASTM D7968-17M, Run Date: 08/23/21 00:27, Analyst: KCV (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
ADONA*	Not detected	15		ug/kg	2960	919005-14-4	
HFPO-DA*	Not detected	15		ug/kg	2960	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S26654
Client:TRACE (Trace Analytical Laboratories)
Project: 21G1016
Submitted:07/29/2021 10:10 Login User: MMC

Attention: Tim Brewer
Address: Trace Analytical Laboratories
2241 Black Creek Rd.
Muskegon, MI 49444

Phone: O: 231-773-5998 FAX:
Email: TBrewer@trace-labs.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.7
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	UPS
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[ ] Yes	[X] No	[ ] N/A	Subcontracting needed? Subcontacted to:	
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[ ] Yes	[ ] No	[X] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[ ] No	[X] 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: _____

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SUBCONTRACT ORDER

21G1016

SENDING LABORATORY:

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

Project Manager:Jon Mink

RECEIVING LABORATORY:

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

PO # 21G1016

Matrix: Sludge Sampled: 07/27/21 00:00 TAT: Standard

Sample ID: Berrian Springs 21G1016-01

26654.01

Sampled By: GH-Trace

Analysis Needed:

PFAS- Biosolids- EGLE List

Released By	Date	Received By	Date
	7/27/21		
UPS	7/29/21 1010	M Chilcote	7/29/21 1010
Released By	Date	Received By	Date

IR 4.7

Trace Analytical Laboratories, Inc.
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TRACE
ANALYTICAL LABORATORIES, INC.

CHAIN-OF-CUSTODY RECORD

Trace Analytical Laboratories, Inc.
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Phone 231.773.5998
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www.trace-labs.com

Page ____ of ____

Trace ID No. 21G1016

Report Results To:

Company Name: Bio Solids
Report To:
Mailing Address:
City, State, Zip Code:
Office Phone: Cell Phone:
Email Address:

Bill To:

PO #:
Contact Name:
Billing Address (if different):
City, State, Zip Code:
Phone Number:
Billing Email Address:

Trace Use:

Logged By: NC
Checked By: JF
Soil Volatiles Preserved (circle if applicable): MeOH Low Level Lab
Sampling Time:

Turnaround Requirements:

☐ Standard, 5-10 Days
☐ 3 Day*
☐ 1 Day*

*Results provided end of business day, requires prior approval.

Matrix Key:

S = Soil / Solid
W = Water
SL = Sludge
OI = Oil
WI = Wipes
LW = Liquid Waste
A = Air
D = Drinking Water

Project Name: Bio Solids
Sampled By: GH

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	Analysis Requested	Possible Health Hazards?
1			Ronan Anchors		SL	4						X	PFAS Bio solids	
2			Ronan Anchors		SL	4						X		

Please Sign

	Released By	Received By	Date	Time	Released By	Received By	Date	Time
1)			7/27/21	16:07	2)			
3)					4)			

☐ Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at www.trace-labs.com/downloads.

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

Form 70-Z.1

CERTIFICATE OF ANALYSIS

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

TRACE ANALYTICAL LABORATORIES, INC.

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

21G1016

Fleis and Vandenbrink Engi
Project Manager: Jon Mink

Sample Log In Checklist

	Original Observation	Corrected Temperature	IR-9 (CF: +0.1°C)	IR-10 (CF: +0.1°C)	20B12743 (CF: -0.3°C)	Temp Blank	Client Sample
Date: 7/27/21							
Time: 16:30							
Logged by: DKS							
Package Description: Cooler							
Package Temp °C	-0.9	-0.8	✓				
Representative Sample Temp °C	1.0	0.7			✓	✓	

Sample Receipt

Yes / No

- [x] Received on ice or other coolant
- [x] Ice still present upon receipt
- [ ] [x] Custody seals present — [x] Yes [ ] No Custody seals intact (if applicable)
- [x] Trace Courier [ ] Client Drop-off [ ] UPS [ ] Fex Ex [ ] US Mail [ ] Other

Sample Condition

Yes / No / N/A

- [x] [ ] [ ] All sample containers arrived unbroken and labeled
- [x] [ ] [ ] Sufficient sample to run requested analyses
- [ ] [ ] [x] Correct chemical preservative added to samples
- [ ] [ ] [x] Samples preserved at Trace _____
- [ ] [ ] [x] Chemical preservation verified, check EMD pH test strip used (if applicable)
  [ ] pH 0-2.5 (Lot: HC029115) [ ] pH 11.0-13.0 (Lot: HC022540) [ ] Other
- [ ] [ ] [x] Air bubbles absent from VOAs _____

Chain of Custody (COC)

Yes / No

- [x] All bottle labels agree with COC
- [x] COC filled out properly
- [x] COC signed by client

Notes:

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

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS