

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



231-773-5998 Phone
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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: 21G1015

Enclosed are your analytical results associated with your project for Andrews University - Biosolids PFAS 07/27/21. 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,

A handwritten signature in black ink that reads "Timothy W. Brewer".

Tim Brewer
Project Manager

Enclosures



NJDEP Accreditation No. MI008

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Analytical Laboratory Report

Report ID: S26653.01(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

Additional 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 Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S26653.01
Project: 21G1015
Collected Date(s): 07/27/2021
Submitted Date/Time: 07/29/2021 10:10
Sampled by: GH
P.O. #: 21G1015

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



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).

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.

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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



Analytical Laboratory 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



Analytical Laboratory Report

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
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11CI-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9CI-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
S26653.01	Andrews 21G1015-01	Sludge	07/27/21 00:00



Analytical Laboratory Report

Lab Sample ID: S26653.01

Sample Tag: Andrews 21G1015-01

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)*	8.89/6.98/10	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*	0.83	1		%	1		

Organics

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

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	6.3		ug/kg	631	375-22-4	
PFPa*	Not detected	3.2		ug/kg	631	2706-90-3	
4:2 FTSA*	Not detected	3.2		ug/kg	631	757124-72-4	I
PFHxA*	Not detected	3.2		ug/kg	631	307-24-4	
PFBS*	Not detected	3.2		ug/kg	631	375-73-5	
PFHpA*	Not detected	3.2		ug/kg	631	375-85-9	
PFPeS*	Not detected	3.2		ug/kg	631	2706-91-4	
6:2 FTSA*	220	3.2		ug/kg	631	27619-97-2	I
PFOA*	5.8	3.2		ug/kg	631	335-67-1	
PFHxS*	Not detected	3.2		ug/kg	631	355-46-4	
PFHxS-LN*	Not detected	3.2		ug/kg	631	355-46-4-LN	
PFHxS-BR*	Not detected	3.2		ug/kg	631	355-46-4-BR	
PFNA*	Not detected	3.2		ug/kg	631	375-95-1	
8:2 FTSA*	Not detected	3.2		ug/kg	631	39108-34-4	I
PFHpS*	Not detected	3.2		ug/kg	631	375-92-8	
PFDA*	Not detected	3.2		ug/kg	631	335-76-2	
N-MeFOSAA*	Not detected	3.2		ug/kg	631	2355-31-9	
EtFOSAA*	Not detected	3.2		ug/kg	631	2991-50-6	
PFOS*	4	3.2		ug/kg	631	1763-23-1	
PFOS-LN*	3.2	3.2		ug/kg	631	1763-23-1-LN	
PFOS-BR*	Not detected	3.2		ug/kg	631	1763-23-1-BR	
PFUnDA*	Not detected	3.2		ug/kg	631	2058-94-8	
PFNS*	Not detected	3.2		ug/kg	631	68259-12-1	
PFDoDA*	Not detected	3.2		ug/kg	631	307-55-1	
PFDS*	Not detected	3.2		ug/kg	631	335-77-3	
PFTTrDA*	Not detected	3.2		ug/kg	631	72629-94-8	
FOSA*	Not detected	3.2		ug/kg	631	754-91-6	
PFTeDA*	Not detected	3.2		ug/kg	631	376-06-7	
11Cl-PF3OUdS*	Not detected	3.2		ug/kg	631	763051-92-9	
9Cl-PF3ONS*	Not detected	3.2		ug/kg	631	756426-58-1	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S26653.01 (continued)

Sample Tag: Andrews 21G1015-01

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

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
ADONA*	Not detected	3.2		ug/kg	631	919005-14-4	
HFPO-DA*	Not detected	3.2		ug/kg	631	13252-13-6	I

I-Matrix interference with internal standard

Merit Laboratories Login Checklist

Lab Set ID:S26653

Client:TRACE (Trace Analytical Laboratories)

Project:21G1015

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. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.7
02. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun	
03. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped	UPS
04. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box	
05. <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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 <input type="checkbox"/> N/A	COC adequately filled out	
07. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab	
08. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC	
09. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:	
Preservation		
10. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation	
11. <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)	
12. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact	
14. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used	
15. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used	
16. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received	
17. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration	
18. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time	
19. <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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: _____

SUBCONTRACT ORDER

21G1015

SENDING LABORATORY:

RECEIVING LABORATORY:

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

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

Project Manager: Tim Brewer

PO # 21G1015

Sample ID: Andrews 21G1015-01
Matrix: Sludge
Sampled: 07/27/21 00:00 TAT: Standard

26653.01

Sampled By: GH-Trace

Analysis Needed:

PFAS- Biosolids- EGLE List

Released By <i>WPS</i>	Date 7/29/21	Received By <i>M. Alcott</i>	Date 7/29/21
Released By <i>WPS</i>	Date 7/27/21	Received By <i>M. Alcott</i>	Date 7/29/21

TRACE
ANALYTICAL LABORATORIES, INC.

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TERRE
ANALYTICAL LABORATORIES, INC.

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

Phone 231.773.5998
Fax 888.979.4469
www.trace-labs.com

CHAIN-OF-CUSTODY RECORD

Page _____ of _____

Trace ID No. 2161015

Report Results To:	Bill To:
Company Name: <i>Bertina</i>	P.O. #:
Report To:	Contact Name:
Mailing Address:	Billing Address (if different):
City, State, Zip Code:	City, State, Zip Code:
Office Phone:	Phone Number:
Email Address:	Billing Email Address:

Trace Use:	
Logged By:	NC
Checked By:	SLK
Soil Volatiles Preserved (circle if applicable)	
MeOH	Low Level
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

CI = Oil

WI = Wipes

LW = Liquid Waste

A = Air

D = Drinking Water

[illegible]

CERTIFICATE OF ANALYSIS

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Report ID: 21G1015 TRACE_Farmed_Out FINAL 08 30 21 1503

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



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

21G1015
Fleis and Vandenbrink Engi
Project Manager: Tim Brewer

Sample Log In Checklist

Date: 7/27/21	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
Time: 16:30							
Logged by: <i>tkl</i>							
Package Description: <i>Cooler</i>							
Package Temp °C	-0.9	-0.8	✓				
Representative Sample Temp °C	1.0	0.7			✓	✓	

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)

☐ UPS ☐ Fex Ex ☐ US Mail ☐ 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)

☐ ☐ ☐ pH 0-2.5 (Lot: HC029115) ☐ pH 11.0-13.0 (Lot: HC022540) ☐ Other

☐ ☐ ☒ Air bubbles absent from VOAs

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.

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Report ID: 21G1015 TRACE_Farmed_Out FINAL 08 30 21 1503