

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



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

May 27, 2021

Mr. Jon Foley
Coldwater, City of
100 Jay ST.
Coldwater, MI 49036

Phone: 517-278-4118

RE: Trace ID: 21E0409

Dear Mr. Foley:

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.

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: S24209.01(01)
Generated on 05/26/2021

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): S24209.01
Project: 21E0409
Collected Date(s): 05/12/2021
Submitted Date/Time: 05/14/2021 11:00
Sampled by: JF
P.O. #: 21E0409

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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

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 |
| PFTTrDA | 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 |
|-----------|----------------------|------------|---------------------|
| S24209.01 | Biosolids 21E0409-01 | Wastewater | 05/12/21 09:00 |



Analytical Laboratory Report

Lab Sample ID: S24209.01

Sample Tag: Biosolids 21E0409-01

Collected Date/Time: 05/12/2021 09:00

Matrix: Wastewater

COC Reference:

Sample Containers

| # | Type | Preservative(s) | Refrigerated? | Arrival Temp. (C) | Thermometer # |
|---|----------------------|-----------------|---------------|-------------------|---------------|
| 1 | 15ml Centrifuge Tube | None | Yes | 3.8 | IR |
| 1 | 250ml Plastic | None | Yes | 3.8 | IR |

Extraction / Prep.

| Parameter | Result | Method | Run Date | Analyst | Flags |
|--|--------------|----------------|----------------|---------|-------|
| Initial wt. (g) / Final wt. (g) / Volume (ml)* | 8.47/6.82/10 | ASTM D7968-17M | 05/21/21 11:00 | KCV | |

Inorganics

Method: SM2540B, Run Date: 05/16/21 10:50, Analyst: ELR

| Parameter | Result | RL | MDL | Units | Dilution | CAS# | Flags |
|--------------|--------|----|-----|-------|----------|------|-------|
| Total Solids | 7.1 | 1 | | % | 1 | | |

Organics

28 PFAs, Method: ASTM D7968-17M, Run Date: 05/22/21 13:18, Analyst: KCV

| Parameter | Result | RL | MDL | Units | Dilution | CAS# | Flags |
|---------------|--------------|------|-----|-------|----------|--------------|-------|
| PFBA* | Not detected | 1.7 | | ug/kg | 85.4 | 375-22-4 | |
| PFPeA* | Not detected | 0.85 | | ug/kg | 85.4 | 2706-90-3 | |
| 4:2 FTSA* | Not detected | 0.85 | | ug/kg | 85.4 | 757124-72-4 | I |
| PFHxA* | 1.2 | 0.85 | | ug/kg | 85.4 | 307-24-4 | |
| PFBS* | Not detected | 0.85 | | ug/kg | 85.4 | 375-73-5 | |
| PFHpA* | Not detected | 0.85 | | ug/kg | 85.4 | 375-85-9 | |
| PFPeS* | Not detected | 0.85 | | ug/kg | 85.4 | 2706-91-4 | |
| 6:2 FTSA* | Not detected | 0.85 | | ug/kg | 85.4 | 27619-97-2 | I |
| PFOA* | Not detected | 0.85 | | ug/kg | 85.4 | 335-67-1 | |
| PFHxS* | Not detected | 0.85 | | ug/kg | 85.4 | 355-46-4 | |
| PFHxS-LN* | Not detected | 0.85 | | ug/kg | 85.4 | 355-46-4-LN | |
| PFHxS-BR* | Not detected | 0.85 | | ug/kg | 85.4 | 355-46-4-BR | |
| PFNA* | Not detected | 0.85 | | ug/kg | 85.4 | 375-95-1 | |
| 8:2 FTSA* | Not detected | 0.85 | | ug/kg | 85.4 | 39108-34-4 | I |
| PFHpS* | Not detected | 0.85 | | ug/kg | 85.4 | 375-92-8 | |
| PFDA* | 1.1 | 0.85 | | ug/kg | 85.4 | 335-76-2 | |
| N-MeFOSAA* | 5.8 | 0.85 | | ug/kg | 85.4 | 2355-31-9 | |
| EtFOSAA* | 35 | 0.85 | | ug/kg | 85.4 | 2991-50-6 | |
| PFOS* | 3 | 0.85 | | ug/kg | 85.4 | 1763-23-1 | |
| PFOS-LN* | 2.2 | 0.85 | | ug/kg | 85.4 | 1763-23-1-LN | |
| PFOS-BR* | Not detected | 0.85 | | ug/kg | 85.4 | 1763-23-1-BR | |
| PFUnDA* | Not detected | 0.85 | | ug/kg | 85.4 | 2058-94-8 | I |
| PFNS* | Not detected | 0.85 | | ug/kg | 85.4 | 68259-12-1 | |
| PFDoDA* | 2 | 0.85 | | ug/kg | 85.4 | 307-55-1 | I |
| PFDS* | 2.4 | 0.85 | | ug/kg | 85.4 | 335-77-3 | |
| PFTeDA* | Not detected | 0.85 | | ug/kg | 85.4 | 72629-94-8 | I |
| FOSA* | 1.8 | 0.85 | | ug/kg | 85.4 | 754-91-6 | |
| PFTeDA* | Not detected | 0.85 | | ug/kg | 85.4 | 376-06-7 | |
| 11CI-PF3OUdS* | Not detected | 0.85 | | ug/kg | 85.4 | 763051-92-9 | |
| 9CI-PF3ONS* | Not detected | 0.85 | | ug/kg | 85.4 | 756426-58-1 | |

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S24209.01 (continued)

Sample Tag: Biosolids 21E0409-01

28 PFAs, Method: ASTM D7968-17M, Run Date: 05/22/21 13:18, Analyst: KCV (continued)

| Parameter | Result | RL | MDL | Units | Dilution | CAS# | Flags |
|-----------|--------------|------|-----|-------|----------|-------------|-------|
| ADONA* | Not detected | 0.85 | | ug/kg | 85.4 | 919005-14-4 | |
| HFPO-DA* | Not detected | 0.85 | | ug/kg | 85.4 | 13252-13-6 | I |

I-Matrix interference with internal standard

Merit Laboratories Login Checklist

Lab Set ID:S24209

Client:TRACE (Trace Analytical Laboratories)

Project: 21E0409

Submitted:05/14/2021 11:00 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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 3.8 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input 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: _____

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



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

SUBCONTRACT ORDER

21E0409

SENDING LABORATORY:

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

RECEIVING LABORATORY:

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

Project Manager: Tim Brewer

PO # 21E0409

Sample ID: Biosolids 21E0409-01

Matrix: Sludge

Sampled: 05/12/21 09:00

TAT: Standard

Sampled By: if

Analysis Needed:

PFAS- Biosolids- EGLE List

24209.01

(Trace) MAT

Released By

WPS

Date

5/13/21

Received By

M. Calvert

Date

5/14/21 1100

Released By

IK 3.8

Date

CHAIN-OF-CUSTODY RECORD

TRIUMPH

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

Phone 231.773.5998
Fax 888.979.4469
www.trace-labs.com

Page ____ of ____

Trace ID No. 2130409

Report Results To:

Bill To:

| | |
|--|--|
| Company Name: Coldwater Board of Public Utilities-WRRF | PO #: |
| Report To: Jon Foley | Contact Name: Tammy Worden |
| Mailing Address: 1 Grand St. | Billing Address (if different): |
| City, State, Zip Code: Coldwater, MI 49036 | City, State, Zip Code: |
| Office Phone: (517) 278-4118 | Cell Phone: |
| | Phone Number: (517) 279-9531 |
| Email Address: jfoley@coldwater.org | Billing Email Address: tworden@coldwater.org |

Trace Use:

| | |
|--|-----------|
| Logged By: | UC |
| Checked By: | SL |
| Soil Volatiles Preserved (circle if applicable): | |
| MeOH | Low Level |
| | Lab |
| Sampling Time: | |

Turnaround Requirements:

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

Matrix Key:

S = Soil / Solid
W = Water
SL = Sludge
OI = Oil

WI = Wipes
LW = Liquid Waster
A = Air
D = Drinking Water

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

[illegible]

7

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

Form 70-Z.1

CERTIFICATE OF ANALYSIS

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

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



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

SAMPLE LOG IN CHECKLIST

Trace ID #: 21E0409 Date: 5/13/21 Package Description: Cooler Temperature: -0.1
Client Name: Coldwater board of Time: 11:07 Logged in by: JH

Public Utilities

Cooler Receipt

Cooler/samples delivered by:

Trace courier ☒

Hand delivered ☐

Commercial courier ☐

Name of delivery person: _____

UPS ☐

FED EX ☐

US Mail ☐

Tracking Number: _____

☒ Not Applicable

Tracking #: _____

COC Seals present and intact on cooler? ☒ Not Applicable ☐ No ☐ Yes

Custody seals signed by Client? ☐ No ☐ Yes

Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? ☒

Multiple bags of ice around samples? ☐

Ice Packs/ Blue Ice: ☐

No Coolant Present: ☐

Ice still present upon receipt (circle one):

(Yes)

No

N/A

Cooler Temperature

Correction Factors:

•Digital Stick Thermometer CF = -0.4°C (20B12743)

•IR Thermometer CF = -0.5°C (IR #8)

Representative Sample Temperature: 3.3 °C (check one below)

☒ Temp Blank (Stick Thermometer)

☐ Client Sample (IR Thermometer)

Melt Water: None °C (Use Digital Stick Thermometer)

General

| | Yes | No | NA | Comments |
|---|-------------------------------------|-------------------------------------|-------------------------------------|----------|
| All bottles arrived unbroken with labels in good condition? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Each sample point is in a sealed plastic bag? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Labels filled out completely? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| All bottle labels agree with Chain of Custody (COC)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Sufficient sample to run tests requested? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| *pH checked - samples at correct pH and labeled as such? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Correct chemical preservative added to samples? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Air bubbles absent from VOAs? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| COC filled out properly and signed by client? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| COC signed in by TRACE sample custodian? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Was project manager called and samples discussed? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |

Notes:

*EMD pH Test Strips Used:

☐ pH 0-2.5 Lot: HC029115 ☐ pH 11.0-13.0 Lot: HC729101

☐ Other: _____

Form 70-A.37
Effective 4/20/21

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.

Report ID: 21E0409 TRACE_Farmed_Out FINAL 05 27 21 0847