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

July 09, 2021

Mr. Tom Strand
Hartford, City of
19 W. Main St.
Hartford, MI 49057

Phone: (269) 621-2289
Fax: 269-621-2054

RE: Trace ID: 21F0772

Dear Mr. Strand:

Enclosed are your analytical results associated with your project for PFAS Biosolids - June 2021. 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: S25507.01(01)
Generated on 07/08/2021

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): S25507.01
Project: 21F0772
Collected Date(s): 06/18/2021
Submitted Date/Time: 06/22/2021 11:10
Sampled by: Unknown
P.O. #: 21F0772

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
S25507.01	Biosolids 21F0772-01	Sludge	06/18/21 08:00

Analytical Laboratory Report

Lab Sample ID: S25507.01
Sample Tag: Biosolids 21F0772-01
Collected Date/Time: 06/18/2021 08:00
Matrix: Sludge
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.7	IR
1	500ml Plastic	None	Yes	5.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	7.93/6.94/10	ASTM D7968-17M	06/25/21 08:45	KCV	

Inorganics

Method: SM2540B, Run Date: 06/22/21 18:10, Analyst: ELR

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	4.2	1		%	1		

Organics

28 PFAs, Method: ASTM D7968-17M, Run Date: 06/26/21 01:04, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	2.4		ug/kg	241	375-22-4	I
PFPeA*	Not detected	1.2		ug/kg	241	2706-90-3	
4:2 FTSA*	Not detected	1.2		ug/kg	241	757124-72-4	I
PFHxA*	Not detected	1.2		ug/kg	241	307-24-4	
PFBS*	Not detected	1.2		ug/kg	241	375-73-5	
PFHpA*	Not detected	1.2		ug/kg	241	375-85-9	
PFPeS*	Not detected	1.2		ug/kg	241	2706-91-4	
6:2 FTSA*	Not detected	1.2		ug/kg	241	27619-97-2	I
PFOA*	Not detected	1.2		ug/kg	241	335-67-1	
PFHxS*	Not detected	1.2		ug/kg	241	355-46-4	
PFHxS-LN*	Not detected	1.2		ug/kg	241	355-46-4-LN	
PFHxS-BR*	Not detected	1.2		ug/kg	241	355-46-4-BR	
PFNA*	Not detected	1.2		ug/kg	241	375-95-1	
8:2 FTSA*	Not detected	1.2		ug/kg	241	39108-34-4	I
PFHpS*	Not detected	1.2		ug/kg	241	375-92-8	
PFDA*	Not detected	1.2		ug/kg	241	335-76-2	
N-MeFOSAA*	Not detected	1.2		ug/kg	241	2355-31-9	
EtFOSAA*	1.4	1.2		ug/kg	241	2991-50-6	
PFOS*	Not detected	1.2		ug/kg	241	1763-23-1	
PFOS-LN*	Not detected	1.2		ug/kg	241	1763-23-1-LN	
PFOS-BR*	Not detected	1.2		ug/kg	241	1763-23-1-BR	
PFUnDA*	Not detected	1.2		ug/kg	241	2058-94-8	
PFNS*	Not detected	1.2		ug/kg	241	68259-12-1	
PFDoDA*	Not detected	1.2		ug/kg	241	307-55-1	I
PFDS*	Not detected	1.2		ug/kg	241	335-77-3	
PFTrDA*	Not detected	1.2		ug/kg	241	72629-94-8	I
FOSA*	Not detected	1.2		ug/kg	241	754-91-6	
PFTeDA*	Not detected	1.2		ug/kg	241	376-06-7	
11Cl-PF3OUdS*	Not detected	1.2		ug/kg	241	763051-92-9	
9Cl-PF3ONS*	Not detected	1.2		ug/kg	241	756426-58-1	

I-Matrix interference with internal standard

Lab Sample ID: S25507.01 (continued)

Sample Tag: Biosolids 21F0772-01

28 PFAs, Method: ASTM D7968-17M, Run Date: 06/26/21 01:04, Analyst: KCV (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
ADONA*	Not detected	1.2		ug/kg	241	919005-14-4	
HFPO-DA*	Not detected	1.2		ug/kg	241	13252-13-6	

Quality Control Report

Report ID: QC-S25507-01
Generated on 07/08/2021

Report to

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

Phone: O: 231-773-5998 x238 FAX:

Report Produced by

Merit Laboratories
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Report Summary

Lab Sample ID(s): S25507.01
Project: 21F0772
Submitted Date/Time: 06/22/2021 11:10
Sampled by: Unknown
P.O. #: 21F0772

QC Report Sections

Report Flag Descriptions

*: QC result is outside of indicated control limits
W: Surrogate result not applicable due to sample dilution

I certify that this data package is in compliance with the terms and conditions of the program, and project, and contractual requirements both technically and for completeness. Release of the data contained in this hardcopy data package and its computer-readable data submitted has been authorized by the Quality Assurance Manager and his/her designee, as verified by the following signature.

Barbara Ball

Barbara Ball
Quality Assurance Manager

QC Report - Analysis Summary

Lab Sample ID: S25507.01
Sample Tag: Biosolids 21F0772-01
Collected Date/Time: 06/18/2021 08:00
Matrix: Sludge
COC Reference:

Analysis	Method	Run Date/Time	Batch ID	Prep ID	Surr	QC Types
Inorganics						
Total Solids	SM2540B	06/22/21 18:10	TS210622D	TS210622D	No	BLK/LCS/DUP
Organics - Volatiles						
28 PFAs	ASTM D7968-17M	06/26/21 01:04	AK210625	PF210625S1	Yes	BLK/LCS/LCSD/MS/DU

QC Report - Prep Batch Summary

Inorganics, Prep Batch ID: TS210622D

Surrogates: No, QC Types: BLK/LCS/DUP

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S25507.01	Total Solids	SM2540B	06/22/21 18:10	TS210622D

Organics - Volatiles, Prep Batch ID: PF210625S1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Sample ID	Analysis	Method	Run Date/Time	Batch ID
S25507.01	28 PFAs	ASTM D7968-17M	06/26/21 01:04	AK210625

QC Report - Internal Standards per Lab Sample

Lab Sample ID: S25507.01

Sample Tag: Biosolids 21F0772-01

Collected Date/Time: 06/18/2021 08:00

Matrix: Sludge

COC Reference:

Organics - Volatiles, Analysis: 28 PFAs

Run in Batch: AK210625, Run Date: 06/26/2021 01:04, Matrix: SO, Dilution: 241

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA	*	**252.0**	50.0	150.0
M2-6:2FTSA	*	**201.3**	50.0	150.0
M2-8:2FTSA	*	**175.0**	50.0	150.0
M2PFTeDA		**12.9**	12.0	218.0
M3PFBS		**94.9**	50.0	150.0
M3PFHxS		**98.8**	50.0	150.0
M4PFHpA		**93.8**	50.0	150.0
M5PFHxA		**93.6**	50.0	150.0
M5PFPeA		**96.2**	50.0	150.0
M6PFDA		**92.5**	50.0	150.0
M7PFUnDA		**67.9**	50.0	150.0
M8FOSA		**106.3**	50.0	150.0
M8PFOA		**118.3**	50.0	150.0
M8PFOS		**84.1**	50.0	150.0
M9-PFNA		**86.5**	50.0	150.0
MPFBA	*	**23.5**	50.0	150.0
MPFDoDA	*	**36.4**	50.0	150.0
d3N-MeFOSAA		**115.0**	50.0	150.0
d5EtFOSAA		**114.4**	50.0	150.0
MHFPO-DA		**127.2**	50.0	150.0

QC Report - Internal Standards per QC Sample

Organics - Volatiles, Prep Batch ID: PF210625S1

QC Types: BLK/LCS/LCSD/MS/DUP

Blank (BLK)

Lab Sample ID: AK210625.BLK210625S

Run in Batch: AK210625, Run Date: 06/25/2021 20:11, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**90.7**	50.0	150.0
M2-6:2FTSA		**92.4**	50.0	150.0
M2-8:2FTSA		**90.6**	50.0	150.0
M2PFTeDA		**111.4**	12.0	218.0
M3PFBS		**99.1**	50.0	150.0
M3PFHxS		**101.4**	50.0	150.0
M4PFHpA		**92.2**	50.0	150.0
M5PFHxA		**92.7**	50.0	150.0
M5PFPeA		**101.3**	50.0	150.0
M6PFDA		**97.7**	50.0	150.0
M7PFUnDA		**120.5**	50.0	150.0
M8FOSA		**103.5**	50.0	150.0
M8PFOA		**102.0**	50.0	150.0
M8PFOS		**103.3**	50.0	150.0
M9-PFNA		**90.2**	50.0	150.0
MPFBA		**101.2**	50.0	150.0
MPFDoDA		**90.4**	50.0	150.0
d3N-MeFOSAA		**107.0**	50.0	150.0
d5EtFOSAA		**100.2**	50.0	150.0
MHFPO-DA		**93.1**	50.0	150.0

Laboratory Control Sample (LCS)

Lab Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:32, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**85.9**	50.0	150.0
M2-6:2FTSA		**80.2**	50.0	150.0
M2-8:2FTSA		**94.7**	50.0	150.0
M2PFTeDA		**124.6**	12.0	218.0
M3PFBS		**97.7**	50.0	150.0
M3PFHxS		**96.7**	50.0	150.0
M4PFHpA		**91.6**	50.0	150.0
M5PFHxA		**98.4**	50.0	150.0
M5PFPeA		**97.1**	50.0	150.0
M6PFDA		**94.7**	50.0	150.0
M7PFUnDA		**113.4**	50.0	150.0
M8FOSA		**93.4**	50.0	150.0
M8PFOA		**103.3**	50.0	150.0
M8PFOS		**106.9**	50.0	150.0
M9-PFNA		**92.8**	50.0	150.0
MPFBA		**96.8**	50.0	150.0
MPFDoDA		**99.9**	50.0	150.0
d3N-MeFOSAA		**92.2**	50.0	150.0
d5EtFOSAA		**104.8**	50.0	150.0
MHFPO-DA		**92.3**	50.0	150.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: AK210625.LCSD210625S, Parent Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:52, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**93.3**	50.0	150.0
M2-6:2FTSA		**76.3**	50.0	150.0
M2-8:2FTSA		**82.4**	50.0	150.0
M2PFTeDA		**119.3**	12.0	218.0
M3PFBS		**101.3**	50.0	150.0
M3PFHxS		**98.6**	50.0	150.0
M4PFHpA		**93.7**	50.0	150.0
M5PFHxA		**97.3**	50.0	150.0
M5PFPeA		**95.5**	50.0	150.0
M6PFDA		**108.4**	50.0	150.0
M7PFUnDA		**100.7**	50.0	150.0
M8FOSA		**94.7**	50.0	150.0
M8PFOA		**107.8**	50.0	150.0
M8PFOS		**94.1**	50.0	150.0
M9-PFNA		**90.0**	50.0	150.0
MPFBA		**98.8**	50.0	150.0
MPFDoDA		**103.0**	50.0	150.0
d3N-MeFOSAA		**102.6**	50.0	150.0
d5EtFOSAA		**107.6**	50.0	150.0
MHFPO-DA		**93.3**	50.0	150.0

Matrix Spike (MS)

Lab Sample ID: AK210628.2540101RM, Parent Sample ID: S25401.01

Run in Batch: AK210628, Run Date: 06/28/2021 13:51, Prep Date: 06/25/2021, Matrix: SO, Dilution: 6.55

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA	*	**237.8**	50.0	150.0
M2-6:2FTSA	*	**186.9**	50.0	150.0
M2-8:2FTSA	*	**234.2**	50.0	150.0
M2PFTeDA		**93.0**	12.0	218.0
M3PFBS		**95.5**	50.0	150.0
M3PFHxS		**104.3**	50.0	150.0
M4PFHpA		**104.3**	50.0	150.0
M5PFHxA		**91.4**	50.0	150.0
M5PFPeA		**55.5**	50.0	150.0
M6PFDA		**95.6**	50.0	150.0
M7PFUnDA		**91.2**	50.0	150.0
M8FOSA		**123.7**	50.0	150.0
M8PFOA		**98.4**	50.0	150.0
M8PFOS		**99.5**	50.0	150.0
M9-PFNA		**105.9**	50.0	150.0
MPFBA		**92.9**	50.0	150.0
MPFDoDA		**102.7**	50.0	150.0
d3N-MeFOSAA		**129.8**	50.0	150.0
d5EtFOSAA		**145.9**	50.0	150.0
MHFPO-DA		**80.6**	50.0	150.0

Duplicate (DUP)

Lab Sample ID: AK210628.2540102RD, Parent Sample ID: S25401.02

Run in Batch: AK210628, Run Date: 06/28/2021 14:30, Prep Date: 06/25/2021, Matrix: SO, Dilution: 5.46

Internal Standard	Flags	%Rec	LCL	UCL
M2-4:2FTSA		**131.6**	50.0	150.0
M2-6:2FTSA		**126.9**	50.0	150.0
M2-8:2FTSA		**127.0**	50.0	150.0
M2PFTeDA		**50.0**	12.0	218.0
M3PFBS		**92.0**	50.0	150.0
M3PFHxS		**105.3**	50.0	150.0
M4PFHpA		**99.9**	50.0	150.0
M5PFHxA		**97.4**	50.0	150.0
M5PFPeA		**96.3**	50.0	150.0
M6PFDA		**103.2**	50.0	150.0
M7PFUnDA		**88.0**	50.0	150.0
M8FOSA		**95.6**	50.0	150.0
M8PFOA		**83.5**	50.0	150.0
M8PFOS		**100.2**	50.0	150.0
M9-PFNA		**105.0**	50.0	150.0
MPFBA		**100.3**	50.0	150.0
MPFDoDA		**86.0**	50.0	150.0
d3N-MeFOSAA		**107.0**	50.0	150.0
d5EtFOSAA		**122.1**	50.0	150.0
MHFPO-DA		**89.9**	50.0	150.0

Inorganics, Prep Batch ID: TS210622D

Surrogates: No, QC Types: BLK/LCS/DUP

Blank (BLK)

Lab Sample ID: TS210622D.LRB1

Run in Batch: TS210622D, Run Date: 06/22/2021 18:10, Prep Date: 06/22/2021, Matrix: Liquid, Dilution: 1

Analyte	Flags	Conc	RDL	Units
Total Solids		ND	1	%

Laboratory Control Sample (LCS)

Lab Sample ID: TS210622D.LCS1

Run in Batch: TS210622D, Run Date: 06/22/2021 18:10, Prep Date: 06/22/2021, Matrix: Liquid, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
Total Solids		100	90	110

Duplicate (DUP)

Lab Sample ID: TS210622D.DP1, Parent Sample ID: S25483.03

Run in Batch: TS210622D, Run Date: 06/22/2021 18:10, Prep Date: 06/22/2021, Matrix: Soil, Dilution: 1

Analyte	Flags	RPD	RPD CL
Total Solids		0	5

Duplicate (DUP)

Lab Sample ID: TS210622D.DP2, Parent Sample ID: S25439.01

Run in Batch: TS210622D, Run Date: 06/22/2021 18:10, Prep Date: 06/22/2021, Matrix: Soil, Dilution: 1

Analyte	Flags	RPD	RPD CL
Total Solids		0	5

Organics - Volatiles, Prep Batch ID: PF210625S1

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Blank (BLK)

Lab Sample ID: AK210625.BLK210625S

Run in Batch: AK210625, Run Date: 06/25/2021 20:11, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Analyte	Flags	Conc	RDL	Units
PFBA		ND	10	ng/kg
PFPeA		ND	4	ng/kg
4:2 FTSA		ND	2	ng/kg
PFHxA		ND	2	ng/kg
PFBS		ND	2	ng/kg
HFPO-DA		ND	2	ng/kg
PFHpA		ND	2	ng/kg
PFPeS		ND	2	ng/kg
ADONA		ND	2	ng/kg
6:2 FTSA	*	2.22	2	ng/kg
PFOA		ND	2	ng/kg
PFHxS-BR		ND	2	ng/kg
PFHxS		ND	2	ng/kg
PFHxS-LN		ND	2	ng/kg
PFNA		ND	2	ng/kg
8:2 FTSA	*	5.20	2	ng/kg
PFHpS		ND	2	ng/kg
N-MeFOSAA		ND	2	ng/kg
PFDA		ND	2	ng/kg
PFOS-BR		ND	2	ng/kg
PFOS		ND	2	ng/kg
EtFOSAA		ND	4	ng/kg
PFOS-LN		ND	2	ng/kg
PFUnDA		ND	2	ng/kg
9CL-PF3ONS		ND	2	ng/kg
PFNS		ND	2	ng/kg
PFDoDA		ND	2	ng/kg
PFDS		ND	2	ng/kg
PFTrDA		ND	2	ng/kg
11CL-PF3OUdS		ND	2	ng/kg
FOSA		ND	2	ng/kg
PFTeDA		ND	4	ng/kg

Laboratory Control Sample (LCS)

Lab Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:32, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
PFBA		114.0	70.0	130.0
PFPeA		102.0	70.0	130.0
4:2 FTSA		124.0	70.0	130.0
PFHxA		96.3	70.0	130.0
PFBS		121.0	70.0	130.0
HFPO-DA		120.0	70.0	130.0
PFHpA		112.0	70.0	130.0
PFPeS		112.0	70.0	130.0
ADONA		111.0	70.0	130.0

Organics - Volatiles, Prep Batch ID: PF210625S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Laboratory Control Sample (LCS) (continued)

Lab Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:32, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL
6:2 FTSA		112.0	70.0	130.0
PFOA		106.0	70.0	130.0
PFHxS		105.0	70.0	130.0
PFNA		93.1	70.0	130.0
8:2 FTSA		114.0	70.0	130.0
PFHpS		92.0	70.0	130.0
N-MeFOSAA		123.0	70.0	130.0
PFDA		117.0	70.0	130.0
PFOS		86.9	70.0	130.0
EtFOSAA		110.0	70.0	130.0
PFUnDA		106.0	70.0	130.0
9CL-PF3ONS		105.0	70.0	130.0
PFNS		90.9	70.0	130.0
PFDoDA		113.0	70.0	130.0
PFDS		92.0	70.0	130.0
PFTrDA		119.0	70.0	130.0
11CL-PF3OUdS		119.0	70.0	130.0
FOSA		112.0	70.0	130.0
PFTeDA		101.0	70.0	130.0

Laboratory Control Sample Duplicate (LCSD)

Lab Sample ID: AK210625.LCSD210625S, Parent Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:52, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
PFBA		110.0	70.0	130.0	3.6	30.0
PFPeA		107.0	70.0	130.0	4.8	30.0
4:2 FTSA		112.0	70.0	130.0	10.2	30.0
PFHxA		103.0	70.0	130.0	6.7	30.0
PFBS		116.0	70.0	130.0	4.2	30.0
HFPO-DA		120.0	70.0	130.0	0.0	30.0
PFHpA		103.0	70.0	130.0	8.4	30.0
PFPeS		113.0	70.0	130.0	0.9	30.0
ADONA		102.0	70.0	130.0	8.5	30.0
6:2 FTSA		124.0	70.0	130.0	10.2	30.0
PFOA		93.3	70.0	130.0	12.7	30.0
PFHxS		107.0	70.0	130.0	1.9	30.0
PFNA		101.0	70.0	130.0	8.1	30.0
8:2 FTSA		119.0	70.0	130.0	4.3	30.0
PFHpS		90.8	70.0	130.0	1.3	30.0
N-MeFOSAA		117.0	70.0	130.0	5.0	30.0
PFDA		102.0	70.0	130.0	13.7	30.0
PFOS		92.9	70.0	130.0	6.7	30.0
EtFOSAA		112.0	70.0	130.0	1.8	30.0
PFUnDA		115.0	70.0	130.0	8.1	30.0
9CL-PF3ONS		110.0	70.0	130.0	4.7	30.0
PFNS		105.0	70.0	130.0	14.4	30.0

Organics - Volatiles, Prep Batch ID: PF210625S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Laboratory Control Sample Duplicate (LCSD) (continued)

Lab Sample ID: AK210625.LCSD210625S, Parent Sample ID: AK210625.LCS210625S

Run in Batch: AK210625, Run Date: 06/25/2021 19:52, Prep Date: 06/25/2021, Matrix: SO, Dilution: 1

Analyte	Flags	% Rec	LCL	UCL	RPD	RPD CL
PFDoDA		106.0	70.0	130.0	6.4	30.0
PFDS		105.0	70.0	130.0	13.2	30.0
PFTrDA		109.0	70.0	130.0	8.8	30.0
11CL-PF3OUdS		129.0	70.0	130.0	8.1	30.0
FOSA		111.0	70.0	130.0	0.9	30.0
PFTeDA		97.4	70.0	130.0	3.6	30.0

Matrix Spike (MS)

Lab Sample ID: AK210628.2540101RM, Parent Sample ID: S25401.01

Run in Batch: AK210628, Run Date: 06/28/2021 13:51, Prep Date: 06/25/2021, Matrix: SO, Dilution: 6.55

Analyte	Flags	% Rec	LCL	UCL
PFBA		94.5	70.0	130.0
PFPeA		112.8	70.0	130.0
4:2 FTSA		106.7	70.0	130.0
PFHxA		115.9	70.0	130.0
PFBS		128.0	70.0	130.0
PFHpA		109.8	70.0	130.0
PFPeS		109.8	70.0	130.0
6:2 FTSA	*	137.2	70.0	130.0
PFOA		94.5	70.0	130.0
PFHxS		112.8	70.0	130.0
PFNA		109.8	70.0	130.0
8:2 FTSA		109.8	70.0	130.0
PFHpS		97.6	70.0	130.0
PFDA		118.9	70.0	130.0
N-MeFOSAA		118.9	70.0	130.0
EtFOSAA		128.0	70.0	130.0
PFOS		106.7	70.0	130.0
PFUnDA		128.0	70.0	130.0
PFNS		106.7	70.0	130.0
PFDoDA		115.9	70.0	130.0
PFDS		94.5	70.0	130.0
PFTrDA		118.9	70.0	130.0
FOSA		100.6	70.0	130.0
PFTeDA		100.6	70.0	130.0

Duplicate (DUP)

Lab Sample ID: AK210628.2540102RD, Parent Sample ID: S25401.02

Run in Batch: AK210628, Run Date: 06/28/2021 14:30, Prep Date: 06/25/2021, Matrix: SO, Dilution: 5.46

Analyte	Flags	RPD	RPD CL
PFBA		NC	30.0
PFPeA		NC	30.0
4:2 FTSA		NC	30.0
PFHxA		NC	30.0
PFBS		NC	30.0
PFHpA		NC	30.0

Organics - Volatiles, Prep Batch ID: PF210625S1 (continued)

Surrogates: Yes, QC Types: BLK/LCS/LCSD/MS/DUP

Duplicate (DUP) (continued)

Lab Sample ID: AK210628.2540102RD, Parent Sample ID: S25401.02

Run in Batch: AK210628, Run Date: 06/28/2021 14:30, Prep Date: 06/25/2021, Matrix: SO, Dilution: 5.46

Analyte	Flags	RPD	RPD CL
PFPeS		NC	30.0
6:2 FTSA		NC	30.0
PFOA		NC	30.0
PFHxS		NC	30.0
PFHxS-LN		NC	30.0
PFHxS-BR		NC	30.0
PFNA		NC	30.0
8:2 FTSA		NC	30.0
PFHpS		NC	30.0
PFDA		NC	30.0
N-MeFOSAA		NC	30.0
EtFOSAA		NC	30.0
PFOS		15.4	30.0
PFOS-LN		18.2	30.0
PFOS-BR		NC	30.0
PFUnDA		NC	30.0
PFNS		NC	30.0
PFDoDA		NC	30.0
PFDS		NC	30.0
PFTrDA		NC	30.0
FOSA		NC	30.0
PFTeDA		NC	30.0

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

SUBCONTRACT ORDER

21F0772

SENDING LABORATORY:

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

Project Manager:Tim Brewer

RECEIVING LABORATORY:

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

PO # 21F0772

Matrix: Sludge Sampled: 06/18/21 08:00 TAT: Standard

Sample ID: Biosolids 21F0772-01

Analysis Needed:

PFAS- Biosolids- EGLE List

25507.01

Released By	Date	Received By	Date
	6/18/21		
WPS	6/22/21 1110	M Chilcote	6/22/21 1110
Released By	Date	Received By	Date

IR 5.7

Merit Laboratories Login Checklist

Lab Set ID: S25507
Client: TRACE (Trace Analytical Laboratories)
Project: 21F0772
Submitted: 06/22/2021 11:10 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 5.7
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[X] Yes	[ ] No	[ ] N/A	Samples shipped	UPS
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[X] Yes	[ ] No	[ ] 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.	[ ] Yes	[X] 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: _____

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

SUBCONTRACT ORDER

21F0772

SENDING LABORATORY:

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

Project Manager:Tim Brewer

RECEIVING LABORATORY:

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

PO # 21F0772

Matrix: Sludge Sampled: 06/18/21 08:00 TAT: Standard

Sample ID: Biosolids 21F0772-01

Analysis Needed:

PFAS- Biosolids- EGLE List

25507.01

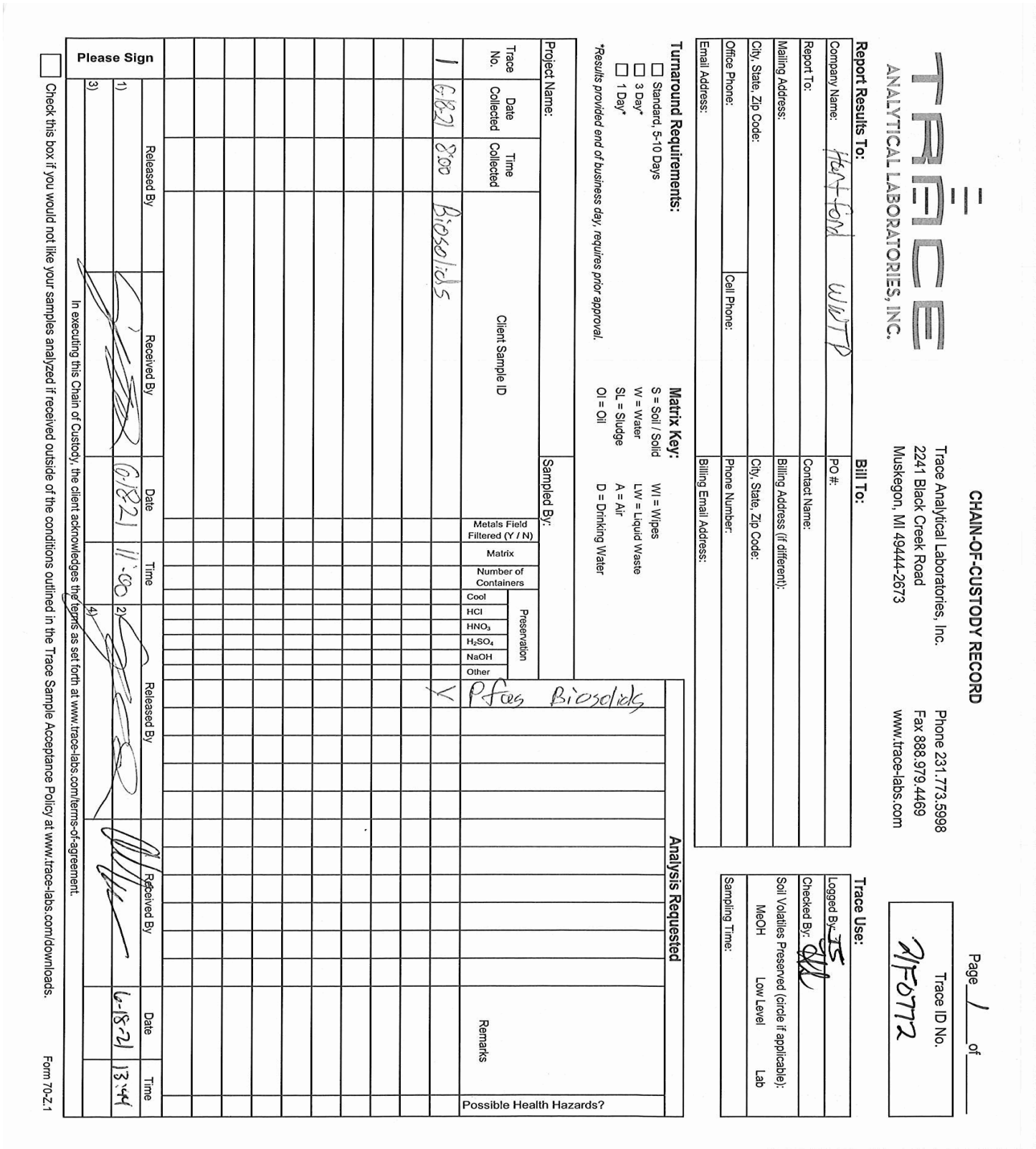
Released By	Date	Received By	Date
	6/18/21		
WPS	6/22/21 1110	M Chilcote	6/22/21 1110
Released By	Date	Received By	Date

IR 5.7

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



CHAIN-OF-CUSTODY RECORD

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 1 of

Trace ID No. 21F0772

Report Results To:

Company Name: Hart-Ford WWTP
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: JS
Checked By:
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
Ol = Oil
WI = Wipes
LW = Liquid Waste
A = Air
D = Drinking Water

Project Name:
Sampled By:

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	6/8/21	2:00	Biosolids									X	PFAS Biosolids	

Please Sign	Released By	Received By	Date	Time
1)			6/8/21	11:00
2)				
3)				
4)				

Remarks	Received By	Date	Time
		6-18-21	13:44

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

☐ 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

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

21F0772
Hartford, City of
Project Manager: Tim Brewer

Sample Log In Checklist

	Original Observation	Corrected Temperature	IR-8 (CF: -0.5°C)	IR-9 (CF: 0.0°C)	20B12743 (CF: -0.4°C)	Temp Blank	Client Sample
Date: 6-18-21							
Time: 13:44							
Logged by: AU							
Package Description: Cooler							
Package Temp °C	-0.5	-0.5		✓			
Representative Sample Temp °C	2.7	2.3			✓	✓	

Sample Receipt

Yes / No

- [x] / [ ] Received on ice or other coolant
- [x] / [ ] Ice still present upon receipt
- [ ] / [x] Custody seals present — [ ] 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: HC729101) [ ] 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.38
Effective 5/19/21

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS