14-Jun-2021

Bruce Rabe
ERM, Inc
3352 128th Ave
Holland, MI 49424

Re: **Manistique STWCS (0594938.0040)-PFAS Biosolids** Work Order: **21060440**

Dear Bruce,

ALS Environmental received 1 sample on 04-Jun-2021 08:30 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 22.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Ehrland Bosworth

Electronically approved by: Ehrland Bosworth

Ehrland Bosworth
Project Manager

Report of Laboratory Analysis

ALS Group, USA

Date: 14-Jun-21

Client: ERM, Inc
Project: Manistique STWCS (0594938.0040)-PFAS Biosolids
Work Order: **21060440**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
21060440-01	Digester BioSolids	Wastewater		6/3/2021 13:10	6/4/2021 08:30	☐

ALS Group, USA

Date: 14-Jun-21

Client: ERM, Inc
Project: Manistique STWCS (0594938.0040)-PFAS Biosolids
WorkOrder: **21060440**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample

Client:	ERM, Inc
Project:	Manistique STWCS (0594938.0040)-PFAS Biosolids
Work Order:	21060440

Case Narrative

Samples for the above noted Work Order were received on 06/04/2021. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Extractable Organics:
Batch 178026, Method D7968-17a, Sample MBLK1-178026: The concentration in the Method Blank was greater than the quantitation limit. All samples in the batch were non-detect; therefore, no qualification is needed for this analyte: 6:2 FTS

Batch 178026, Method D7968-17a, Sample Digester BioSolids (21060440-01A): One or more surrogate recoveries were below the lower control limits. The sample results may be biased low, 13C2-PFTeA,

Batch 178026, Method D7968-17a, Sample Digester BioSolids (21060440-01A): One or more surrogate recoveries were above the upper control limits. The sample was non-detect, therefore, no qualification is needed. 13C2-FtS 4:2, 13C2-FtS 6:2, 13C2-FtS 8:2, d5-N-EtFOSAA

Batch 178026, Method D7968-17a, Sample LCS1-178026: The LCS recovery was above the upper control limit. All sample results in the batch were non-detect. No qualification is necessary for this analyte: PFDS

Batch 178026, Method D7968-17a, Sample LCS2-178026: The LCS recovery was above the upper control limit. All sample results in the batch were non-detect. No qualification is necessary for this analyte: PFTeA

No other deviations or anomalies were noted.

Wet Chemistry:
No deviations or anomalies were noted.

ALS Group, USA

Date: *14-Jun-2021*

Client: ERM, Inc
Project: Manistique STWCS (0594938.0040)-PFAS Biosolids **Work Order:** 21060440
Sample ID: Digester BioSolids **Lab ID:** 21060440-01
Collection Date: 6/3/2021 01:10 PM **Matrix:** WASTEWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
PFAS BY LC-MS-MS			**D7968-17A**	Prep: D7968-17a 6/4/21 17:00		Analyst: **SK**
Perfluorobutanoic Acid (PFBA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluoropentanoic Acid (PFPeA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorohexanoic Acid (PFHxA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluoroheptanoic Acid (PFHpA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorooctanoic Acid (PFOA)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorononanoic Acid (PFNA)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorodecanoic Acid (PFDA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluoroundecanoic Acid (PFUnA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorododecanoic Acid (PFDoA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorotridecanoic Acid (PFTriA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorotetradecanoic Acid (PFTeA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorobutanesulfonic Acid (PFBS)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluoropentanesulfonic Acid (PFPeS)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorohexanesulfonic Acid (PFHxS)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluoroheptanesulfonic Acid (PFHpS)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorooctanesulfonic Acid (PFOS)	**9,300**		**2,100**	**ng/Kg-dry**	1	6/5/2021 03:03 AM
Perfluorononanesulfonic Acid (PFNS)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorodecanesulfonic Acid (PFDS)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Fluorotelomer Sulphonic Acid 4:2 (FtS 4:2)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Perfluorooctanesulfonamide (PFOSA)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
N-Ethylperfluorooctanesulfonamidoacetic Acid	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
N-Methylperfluorooctanesulfonamidoacetic Acid	**19,000**		**11,000**	**ng/Kg-dry**	1	6/5/2021 03:03 AM
11Cl-Pf3OUdS	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
4,8-Dioxa-3H-perfluorononanoic Acid (DONA)	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
9Cl-PF3ONS	ND		2,100	ng/Kg-dry	1	6/5/2021 03:03 AM
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND		11,000	ng/Kg-dry	1	6/5/2021 03:03 AM
Surr: 13C4-PFBA	*80.4*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C5-PFPeA	*76.8*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-PFHxA	*86.3*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C4-PFHpA	*88.4*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C4-PFOA	*80.4*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C5-PFNA	*85.2*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-PFDA	*83.4*		*70-130*	*%REC*	1	6/5/2021 03:03 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: ERM, Inc
Project: Manistique STWCS (0594938.0040)-PFAS Biosolids **Work Order:** 21060440
Sample ID: Digester BioSolids **Lab ID:** 21060440-01
Collection Date: 6/3/2021 01:10 PM **Matrix:** WASTEWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 13C2-PFUnA	*78.5*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-PFDoA	*84.7*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-PFTeA	*29.5*	S	*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C3-PFBS	*75.1*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 18O2-PFHxS	*80.1*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C4-PFOS	*72.4*		*70-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-FtS 4:2	*137*	S	*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-FtS 6:2	*132*	S	*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C2-FtS 8:2	*135*	S	*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C8-FOSA	*76.7*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: d3-N-MeFOSAA	*117*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: d5-N-EtFOSAA	*141*	S	*50-130*	*%REC*	1	6/5/2021 03:03 AM
Surr: 13C3-HFPO-DA	*83.2*		*50-130*	*%REC*	1	6/5/2021 03:03 AM
MOISTURE			**SW3550C**			Analyst: **KTP**
Moisture	**99**		**0.10**	**% of sample**	1	6/9/2021 04:12 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK1 Sample ID: **MBLK1-178026-178026** Units: **ng/Kg** Analysis Date: **6/5/2021 01:18 AM**

Client ID: Run ID: **LCMS1_210604D** SeqNo: **7463750** Prep Date: **6/4/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	ND	120	0	0	0		0			
Perfluoropentanoic Acid (PFPeA)	ND	120	0	0	0		0			
Perfluorohexanoic Acid (PFHxA)	ND	120	0	0	0		0			
Perfluoroheptanoic Acid (PFHpA)	ND	120	0	0	0		0			
Perfluorooctanoic Acid (PFOA)	ND	25	0	0	0		0			
Perfluorononanoic Acid (PFNA)	ND	25	0	0	0		0			
Perfluorodecanoic Acid (PFDA)	ND	120	0	0	0		0			
Perfluoroundecanoic Acid (PFUnA)	ND	120	0	0	0		0			
Perfluorododecanoic Acid (PFDoA)	ND	120	0	0	0		0			
Perfluorotridecanoic Acid (PFTriA)	ND	120	0	0	0		0			
Perfluorotetradecanoic Acid (PFTeA)	ND	120	0	0	0		0			
Perfluorobutanesulfonic Acid (PFBS)	ND	25	0	0	0		0			
Perfluoropentanesulfonic Acid (PFPeS	ND	25	0	0	0		0			
Perfluorohexanesulfonic Acid (PFHxS)	ND	120	0	0	0		0			
Perfluoroheptanesulfonic Acid (PFHpS	ND	120	0	0	0		0			
Perfluorooctanesulfonic Acid (PFOS)	ND	25	0	0	0		0			
Perfluorononanesulfonic Acid (PFNS)	ND	120	0	0	0		0			
Perfluorodecanesulfonic Acid (PFDS)	ND	25	0	0	0		0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	ND	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	198.8	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	ND	120	0	0	0		0			
Perfluorooctanesulfonamide (PFOSA)	ND	25	0	0	0		0			
N-Ethylperfluorooctanesulfonamidoace	ND	120	0	0	0		0			
N-Methylperfluorooctanesulfonamidoa	ND	120	0	0	0		0			
11Cl-Pf3OUdS	ND	25	0	0	0		0			
4,8-Dioxa-3H-perfluorononanoic Acid (	ND	25	0	0	0		0			
9Cl-PF3ONS	ND	25	0	0	0		0			
Hexafluoropropylene oxide dimer acid	ND	120	0	0	0		0			
Surr: 13C4-PFBA	*380.3*	0	*400*	0	*95.1*	*50-130*	0			
Surr: 13C5-PFPeA	*394.5*	0	*400*	0	*98.6*	*50-130*	0			
Surr: 13C2-PFHxA	*419.6*	0	*400*	0	*105*	*50-130*	0			
Surr: 13C4-PFHpA	*394.8*	0	*400*	0	*98.7*	*50-130*	0			
Surr: 13C4-PFOA	*399.4*	0	*400*	0	*99.8*	*70-130*	0			
Surr: 13C5-PFNA	*423.3*	0	*400*	0	*106*	*70-130*	0			
Surr: 13C2-PFDA	*422.6*	0	*400*	0	*106*	*70-130*	0			
Surr: 13C2-PFUnA	*427.8*	0	*400*	0	*107*	*70-130*	0			
Surr: 13C2-PFDoA	*426.5*	0	*400*	0	*107*	*70-130*	0			
Surr: 13C2-PFTeA	*442.8*	0	*400*	0	*111*	*50-130*	0			
Surr: 13C3-PFBS	*381.7*	0	*400*	0	*95.4*	*50-130*	0			
Surr: 18O2-PFHxS	*383.5*	0	*378*	0	*101*	*70-130*	0			
Surr: 13C4-PFOS	*358.9*	0	*383*	0	*93.7*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 4:2	*342.6*	0	*373*	0	*91.8*	*50-130*	0	
Surr: 13C2-FtS 6:2	*321.2*	0	*380*	0	*84.5*	*50-130*	0	
Surr: 13C2-FtS 8:2	*389.3*	0	*383*	0	*102*	*50-130*	0	
Surr: 13C8-FOSA	*407*	0	*400*	0	*102*	*50-130*	0	
Surr: d3-N-MeFOSAA	*444.5*	0	*400*	0	*111*	*50-130*	0	
Surr: d5-N-EtFOSAA	*520.6*	0	*400*	0	*130*	*50-130*	0	*S*
Surr: 13C3-HFPO-DA	*384.3*	0	*400*	0	*96.1*	*50-130*	0	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK2	Sample ID: **MBLK2-178026-178026**				Units: **ng/Kg**		Analysis Date: **6/5/2021 02:00 AM**			
Client ID:		Run ID: **LCMS1_210604D**			SeqNo: **7463754**		Prep Date: **6/4/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	ND	120	0	0	0		0			
Perfluoropentanoic Acid (PFPeA)	ND	120	0	0	0		0			
Perfluorohexanoic Acid (PFHxA)	ND	120	0	0	0		0			
Perfluoroheptanoic Acid (PFHpA)	ND	120	0	0	0		0			
Perfluorooctanoic Acid (PFOA)	ND	25	0	0	0		0			
Perfluorononanoic Acid (PFNA)	ND	25	0	0	0		0			
Perfluorodecanoic Acid (PFDA)	ND	120	0	0	0		0			
Perfluoroundecanoic Acid (PFUnA)	ND	120	0	0	0		0			
Perfluorododecanoic Acid (PFDoA)	ND	120	0	0	0		0			
Perfluorotridecanoic Acid (PFTriA)	ND	120	0	0	0		0			
Perfluorotetradecanoic Acid (PFTeA)	ND	120	0	0	0		0			
Perfluorobutanesulfonic Acid (PFBS)	ND	25	0	0	0		0			
Perfluoropentanesulfonic Acid (PFPeS	ND	25	0	0	0		0			
Perfluorohexanesulfonic Acid (PFHxS)	ND	120	0	0	0		0			
Perfluoroheptanesulfonic Acid (PFHpS	ND	120	0	0	0		0			
Perfluorooctanesulfonic Acid (PFOS)	ND	25	0	0	0		0			
Perfluorononanesulfonic Acid (PFNS)	ND	120	0	0	0		0			
Perfluorodecanesulfonic Acid (PFDS)	ND	25	0	0	0		0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	ND	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	ND	120	0	0	0		0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	ND	120	0	0	0		0			
Perfluorooctanesulfonamide (PFOSA)	ND	25	0	0	0		0			
N-Ethylperfluorooctanesulfonamidoace	ND	120	0	0	0		0			
N-Methylperfluorooctanesulfonamidoa	ND	120	0	0	0		0			
11Cl-Pf3OUdS	ND	25	0	0	0		0			
4,8-Dioxa-3H-perfluorononanoic Acid (	ND	25	0	0	0		0			
9Cl-PF3ONS	ND	25	0	0	0		0			
Hexafluoropropylene oxide dimer acid	ND	120	0	0	0		0			
Surr: 13C4-PFBA	*380.8*	0	*400*	0	*95.2*	*50-130*	0			
Surr: 13C5-PFPeA	*383.6*	0	*400*	0	*95.9*	*50-130*	0			
Surr: 13C2-PFHxA	*397.6*	0	*400*	0	*99.4*	*50-130*	0			
Surr: 13C4-PFHpA	*375.2*	0	*400*	0	*93.8*	*50-130*	0			
Surr: 13C4-PFOA	*377.3*	0	*400*	0	*94.3*	*70-130*	0			
Surr: 13C5-PFNA	*403.8*	0	*400*	0	*101*	*70-130*	0			
Surr: 13C2-PFDA	*387*	0	*400*	0	*96.7*	*70-130*	0			
Surr: 13C2-PFUnA	*367*	0	*400*	0	*91.8*	*70-130*	0			
Surr: 13C2-PFDoA	*393.1*	0	*400*	0	*98.3*	*70-130*	0			
Surr: 13C2-PFTeA	*408.8*	0	*400*	0	*102*	*50-130*	0			
Surr: 13C3-PFBS	*376*	0	*400*	0	*94*	*50-130*	0			
Surr: 18O2-PFHxS	*371.3*	0	*378*	0	*98.2*	*70-130*	0			
Surr: 13C4-PFOS	*365.9*	0	*383*	0	*95.5*	*70-130*	0			
Surr: 13C2-FtS 4:2	*316.2*	0	*373*	0	*84.8*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*325.1*	0	*380*	0	*85.6*	*50-130*	0
Surr: 13C2-FtS 8:2	*346.2*	0	*383*	0	*90.4*	*50-130*	0
Surr: 13C8-FOSA	*402.1*	0	*400*	0	*101*	*50-130*	0
Surr: d3-N-MeFOSAA	*401.6*	0	*400*	0	*100*	*50-130*	0
Surr: d5-N-EtFOSAA	*461.3*	0	*400*	0	*115*	*50-130*	0
Surr: 13C3-HFPO-DA	*412.6*	0	*400*	0	*103*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

MS Sample ID: **21060057-03A MS** Units: **ng/Kg** Analysis Date: **6/5/2021 02:31 AM**

Client ID: Run ID: **LCMS1_210604D** SeqNo: **7463756** Prep Date: **6/4/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	442.3	120	500	81.08	72.2	50-130	0			
Perfluoropentanoic Acid (PFPeA)	398.1	120	500	32.2	73.2	70-130	0			
Perfluorohexanoic Acid (PFHxA)	559.5	120	500	88.22	94.3	50-130	0			
Perfluoroheptanoic Acid (PFHpA)	425	120	500	11.58	82.7	50-130	0			
Perfluorooctanoic Acid (PFOA)	508.5	25	500	81.92	85.3	70-130	0			
Perfluorononanoic Acid (PFNA)	444	25	500	29.11	83	70-130	0			
Perfluorodecanoic Acid (PFDA)	539	120	500	121.6	83.5	70-130	0			
Perfluoroundecanoic Acid (PFUnA)	422.4	120	500	25.82	79.3	70-130	0			
Perfluorododecanoic Acid (PFDoA)	324.1	120	500	46.03	55.6	70-130	0			S
Perfluorotridecanoic Acid (PFTriA)	95.94	120	500	12	16.8	70-130	0			JS
Perfluorotetradecanoic Acid (PFTeA)	ND	120	500	0	0	70-130	0			S
Perfluorobutanesulfonic Acid (PFBS)	353.8	25	442	0	80.1	70-130	0			
Perfluoropentanesulfonic Acid (PFPeS	363.8	25	469	0	77.6	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	319.8	120	455	0	70.3	70-130	0			
Perfluoroheptanesulfonic Acid (PFHpS	414.8	120	476	0	87.2	70-130	0			
Perfluorooctanesulfonic Acid (PFOS)	541.8	25	464	246.2	63.7	70-130	0			S
Perfluorononanesulfonic Acid (PFNS)	324.4	120	480	0	67.6	70-130	0			S
Perfluorodecanesulfonic Acid (PFDS)	303.9	25	482	0	63.1	70-130	0			S
Fluorotelomer Sulphonic Acid 4:2 (FtS	1263	120	467	0	270	70-130	0			S
Fluorotelomer Sulphonic Acid 6:2 (FtS	1967	120	474	0	415	70-130	0			BS
Fluorotelomer Sulphonic Acid 8:2 (FtS	2494	120	479	107.2	498	70-130	0			S
Perfluorooctanesulfonamide (PFOSA)	134.9	25	500	13.96	24.2	70-130	0			S
N-Ethylperfluorooctanesulfonamidoace	864.5	120	500	239.7	125	70-130	0			
N-Methylperfluorooctanesulfonamidoa	821.7	120	500	300.7	104	70-130	0			
11Cl-Pf3OUdS	224.5	25	471	2.525	47.1	70-130	0			S
4,8-Dioxa-3H-perfluorononanoic Acid (	386.8	25	471	0	82.1	70-130	0			
9Cl-PF3ONS	332	25	466	0	71.3	70-130	0			
Hexafluoropropylene oxide dimer acid	413.9	120	500	0	82.8	50-130	0			
Surr: 13C4-PFBA	*302.2*	0	*400*	0	*75.6*	*50-130*	0			
Surr: 13C5-PFPeA	*305.9*	0	*400*	0	*76.5*	*50-130*	0			
Surr: 13C2-PFHxA	*347.9*	0	*400*	0	*87*	*50-130*	0			
Surr: 13C4-PFHpA	*340.5*	0	*400*	0	*85.1*	*50-130*	0			
Surr: 13C4-PFOA	*344.3*	0	*400*	0	*86.1*	*70-130*	0			
Surr: 13C5-PFNA	*342.1*	0	*400*	0	*85.5*	*70-130*	0			
Surr: 13C2-PFDA	*326.9*	0	*400*	0	*81.7*	*70-130*	0			
Surr: 13C2-PFUnA	*296.9*	0	*400*	0	*74.2*	*70-130*	0			
Surr: 13C2-PFDoA	*203.9*	0	*400*	0	*51*	*70-130*	0			*S*
Surr: 13C2-PFTeA	*26.13*	0	*400*	0	*6.53*	*50-130*	0			*S*
Surr: 13C3-PFBS	*287.6*	0	*400*	0	*71.9*	*50-130*	0			
Surr: 18O2-PFHxS	*298.3*	0	*378*	0	*78.9*	*70-130*	0			
Surr: 13C4-PFOS	*293.6*	0	*383*	0	*76.6*	*70-130*	0			
Surr: 13C2-FtS 4:2	*903.3*	0	*373*	0	*242*	*50-130*	0			*S*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*1272*	0	*380*	0	*335*	*50-130*	0	*S*
Surr: 13C2-FtS 8:2	*1623*	0	*383*	0	*424*	*50-130*	0	*S*
Surr: 13C8-FOSA	*109.6*	0	*400*	0	*27.4*	*50-130*	0	*S*
Surr: d3-N-MeFOSAA	*387.2*	0	*400*	0	*96.8*	*50-130*	0	
Surr: d5-N-EtFOSAA	*479.6*	0	*400*	0	*120*	*50-130*	0	
Surr: 13C3-HFPO-DA	*339*	0	*400*	0	*84.8*	*50-130*	0	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

MSD Sample ID: **21060057-03A MSD** Units: **ng/Kg** Analysis Date: **6/5/2021 02:42 AM**

Client ID: Run ID: **LCMS1_210604D** SeqNo: **7463757** Prep Date: **6/4/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	408.6	120	500	81.08	65.5	50-130	442.3	7.92	30	
Perfluoropentanoic Acid (PFPeA)	377.5	120	500	32.2	69.1	70-130	398.1	5.3	30	S
Perfluorohexanoic Acid (PFHxA)	467.3	120	500	88.22	75.8	50-130	559.5	18	30	
Perfluoroheptanoic Acid (PFHpA)	449.8	120	500	11.58	87.6	50-130	425	5.67	30	
Perfluorooctanoic Acid (PFOA)	484.9	25	500	81.92	80.6	70-130	508.5	4.76	30	
Perfluorononanoic Acid (PFNA)	441.2	25	500	29.11	82.4	70-130	444	0.637	30	
Perfluorodecanoic Acid (PFDA)	486	120	500	121.6	72.9	70-130	539	10.3	30	
Perfluoroundecanoic Acid (PFUnA)	342.9	120	500	25.82	63.4	70-130	422.4	20.8	30	S
Perfluorododecanoic Acid (PFDoA)	282.6	120	500	46.03	47.3	70-130	324.1	13.7	30	S
Perfluorotridecanoic Acid (PFTriA)	84.99	120	500	12	14.6	70-130	95.94	0	30	JS
Perfluorotetradecanoic Acid (PFTeA)	ND	120	500	0	0	70-130	28.52	0	30	S
Perfluorobutanesulfonic Acid (PFBS)	336.2	25	442	0	76.1	70-130	353.8	5.11	30	
Perfluoropentanesulfonic Acid (PFPeS	330.8	25	469	0	70.5	70-130	363.8	9.49	30	
Perfluorohexanesulfonic Acid (PFHxS)	307.6	120	455	0	67.6	70-130	319.8	3.89	30	S
Perfluoroheptanesulfonic Acid (PFHpS	357.3	120	476	0	75.1	70-130	414.8	14.9	30	
Perfluorooctanesulfonic Acid (PFOS)	531.9	25	464	246.2	61.6	70-130	541.8	1.84	30	S
Perfluorononanesulfonic Acid (PFNS)	292.6	120	480	0	61	70-130	324.4	10.3	30	S
Perfluorodecanesulfonic Acid (PFDS)	215.1	25	482	0	44.6	70-130	303.9	34.2	30	SR
Fluorotelomer Sulphonic Acid 4:2 (FtS	1154	120	467	0	247	70-130	1263	9.02	30	S
Fluorotelomer Sulphonic Acid 6:2 (FtS	1724	120	474	0	364	70-130	1967	13.2	30	BS
Fluorotelomer Sulphonic Acid 8:2 (FtS	2213	120	479	107.2	440	70-130	2494	12	30	S
Perfluorooctanesulfonamide (PFOSA)	123.6	25	500	13.96	21.9	70-130	134.9	8.79	30	S
N-Ethylperfluorooctanesulfonamidoace	932.8	120	500	239.7	139	70-130	864.5	7.6	30	S
N-Methylperfluorooctanesulfonamidoa	900.6	120	500	300.7	120	70-130	821.7	9.17	30	
11Cl-Pf3OUdS	225.7	25	471	2.525	47.4	70-130	224.5	0.529	30	S
4,8-Dioxa-3H-perfluorononanoic Acid (	359.1	25	471	0	76.2	70-130	386.8	7.45	30	
9Cl-PF3ONS	316.1	25	466	0	67.8	70-130	332	4.92	30	S
Hexafluoropropylene oxide dimer acid	333	120	500	0	66.6	50-130	413.9	21.6	30	
Surr: 13C4-PFBA	*314.6*	0	*400*	0	*78.6*	*50-130*	302.2	*4*	*30*	
Surr: 13C5-PFPeA	*305*	0	*400*	0	*76.3*	*50-130*	305.9	*0.273*	*30*	
Surr: 13C2-PFHxA	*332.7*	0	*400*	0	*83.2*	*50-130*	347.9	*4.47*	*30*	
Surr: 13C4-PFHpA	*338.7*	0	*400*	0	*84.7*	*50-130*	340.5	*0.53*	*30*	
Surr: 13C4-PFOA	*336.4*	0	*400*	0	*84.1*	*70-130*	344.3	*2.3*	*30*	
Surr: 13C5-PFNA	*338.6*	0	*400*	0	*84.7*	*70-130*	342.1	*1.02*	*30*	
Surr: 13C2-PFDA	*327.3*	0	*400*	0	*81.8*	*70-130*	326.9	*0.112*	*30*	
Surr: 13C2-PFUnA	*270.2*	0	*400*	0	*67.5*	*70-130*	296.9	*9.42*	*30*	*S*
Surr: 13C2-PFDoA	*214.2*	0	*400*	0	*53.6*	*70-130*	203.9	*4.92*	*30*	*S*
Surr: 13C2-PFTeA	*23.75*	0	*400*	0	*5.94*	*50-130*	26.13	*9.55*	*30*	*S*
Surr: 13C3-PFBS	*277.3*	0	*400*	0	*69.3*	*50-130*	287.6	*3.67*	*30*	
Surr: 18O2-PFHxS	*283.2*	0	*378*	0	*74.9*	*70-130*	298.3	*5.2*	*30*	
Surr: 13C4-PFOS	*231.8*	0	*383*	0	*60.5*	*70-130*	293.6	*23.5*	*30*	*S*
Surr: 13C2-FtS 4:2	*890.3*	0	*373*	0	*239*	*50-130*	903.3	*1.45*	*30*	*S*

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 6:2	*1232*	0	*380*	0	*324*	*50-130*	1272	*3.19*	*30*	*S*
Surr: 13C2-FtS 8:2	*1362*	0	*383*	0	*356*	*50-130*	1623	*17.5*	*30*	*S*
Surr: 13C8-FOSA	*104.5*	0	*400*	0	*26.1*	*50-130*	109.6	*4.83*	*30*	*S*
Surr: d3-N-MeFOSAA	*389*	0	*400*	0	*97.3*	*50-130*	387.2	*0.466*	*30*	
Surr: d5-N-EtFOSAA	*423.4*	0	*400*	0	*106*	*50-130*	479.6	*12.5*	*30*	
Surr: 13C3-HFPO-DA	*355*	0	*400*	0	*88.8*	*50-130*	339	*4.61*	*30*	

LCS1 Sample ID: **LCS1-178026-178026** Units: **ng/Kg** Analysis Date: **6/5/2021 01:28 AM**

Client ID: Run ID: **LCMS1_210604D** SeqNo: **7463751** Prep Date: **6/4/2021** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorooctanoic Acid (PFOA)	35.07	25	25	0	140	35-150	0			
Perfluorononanoic Acid (PFNA)	25.96	25	25	0	104	35-150	0			
Perfluorobutanesulfonic Acid (PFBS)	25.89	25	22	0	118	35-150	0			
Perfluoropentanesulfonic Acid (PFPeS	22.17	25	23.5	0	94.4	35-150	0			J
Perfluorooctanesulfonic Acid (PFOS)	16.32	25	23	0	71	35-150	0			J
Perfluorodecanesulfonic Acid (PFDS)	40.55	25	24	0	169	35-150	0			S
Perfluorooctanesulfonamide (PFOSA)	35.54	25	25	0	142	35-150	0			
11Cl-Pf3OUdS	27.07	25	23.5	0	115	35-150	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	25.79	25	23.5	0	110	35-150	0			
9Cl-PF3ONS	24.92	25	23	0	108	35-150	0			J
Surr: 13C4-PFBA	*391.7*	0	*400*	0	*97.9*	*50-130*	0			
Surr: 13C5-PFPeA	*382.5*	0	*400*	0	*95.6*	*50-130*	0			
Surr: 13C2-PFHxA	*410.2*	0	*400*	0	*103*	*50-130*	0			
Surr: 13C4-PFHpA	*397.7*	0	*400*	0	*99.4*	*50-130*	0			
Surr: 13C4-PFOA	*388.5*	0	*400*	0	*97.1*	*70-130*	0			
Surr: 13C5-PFNA	*394.1*	0	*400*	0	*98.5*	*70-130*	0			
Surr: 13C2-PFDA	*410.3*	0	*400*	0	*103*	*70-130*	0			
Surr: 13C2-PFUnA	*396.4*	0	*400*	0	*99.1*	*70-130*	0			
Surr: 13C2-PFDoA	*421.2*	0	*400*	0	*105*	*70-130*	0			
Surr: 13C2-PFTeA	*414.4*	0	*400*	0	*104*	*50-130*	0			
Surr: 13C3-PFBS	*368.1*	0	*400*	0	*92*	*50-130*	0			
Surr: 18O2-PFHxS	*362.6*	0	*378*	0	*95.9*	*70-130*	0			
Surr: 13C4-PFOS	*378.8*	0	*383*	0	*98.9*	*70-130*	0			
Surr: 13C2-FtS 4:2	*328.9*	0	*373*	0	*88.2*	*50-130*	0			
Surr: 13C2-FtS 6:2	*304.4*	0	*380*	0	*80.1*	*50-130*	0			
Surr: 13C2-FtS 8:2	*324*	0	*383*	0	*84.6*	*50-130*	0			
Surr: 13C8-FOSA	*408.4*	0	*400*	0	*102*	*50-130*	0			
Surr: d3-N-MeFOSAA	*411.4*	0	*400*	0	*103*	*50-130*	0			
Surr: d5-N-EtFOSAA	*468.5*	0	*400*	0	*117*	*50-130*	0			
Surr: 13C3-HFPO-DA	*396.5*	0	*400*	0	*99.1*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

LCS2	Sample ID: **LCS2-178026-178026**				Units: **ng/Kg**			Analysis Date: **6/5/2021 01:49 AM**			
Client ID:		Run ID: **LCMS1_210604D**			SeqNo: **7463753**			Prep Date: **6/4/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	482	120	500	0	96.4	50-130	0			
Perfluoropentanoic Acid (PFPeA)	475.1	120	500	0	95	70-130	0			
Perfluorohexanoic Acid (PFHxA)	482.5	120	500	0	96.5	50-130	0			
Perfluoroheptanoic Acid (PFHpA)	475.5	120	500	0	95.1	50-130	0			
Perfluorooctanoic Acid (PFOA)	479	25	500	0	95.8	70-130	0			
Perfluorononanoic Acid (PFNA)	516.5	25	500	0	103	70-130	0			
Perfluorodecanoic Acid (PFDA)	500.6	120	500	0	100	70-130	0			
Perfluoroundecanoic Acid (PFUnA)	464.4	120	500	0	92.9	70-130	0			
Perfluorododecanoic Acid (PFDoA)	510	120	500	0	102	70-130	0			
Perfluorotridecanoic Acid (PFTriA)	589.2	120	500	0	118	70-130	0			
Perfluorotetradecanoic Acid (PFTeA)	695.4	120	500	0	139	70-130	0			S
Perfluorobutanesulfonic Acid (PFBS)	431.3	25	442	0	97.6	70-130	0			
Perfluoropentanesulfonic Acid (PFPeS	465.8	25	469	0	99.3	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	423	120	455	0	93	70-130	0			
Perfluoroheptanesulfonic Acid (PFHpS	448.1	120	476	0	94.1	70-130	0			
Perfluorooctanesulfonic Acid (PFOS)	452.7	25	464	0	97.6	70-130	0			
Perfluorononanesulfonic Acid (PFNS)	444.9	120	480	0	92.7	70-130	0			
Perfluorodecanesulfonic Acid (PFDS)	486.1	25	482	0	101	70-130	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	432.4	120	467	0	92.6	70-130	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	497	120	474	0	105	70-130	0			B
Fluorotelomer Sulphonic Acid 8:2 (FtS	584.4	120	479	0	122	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	521.4	25	500	0	104	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	590.4	120	500	0	118	70-130	0			
N-Methylperfluorooctanesulfonamidoa	563.2	120	500	0	113	70-130	0			
11Cl-Pf3OUdS	521.2	25	471	0	111	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	473.9	25	471	0	101	70-130	0			
9Cl-PF3ONS	461.3	25	466	0	99	70-130	0			
Hexafluoropropylene oxide dimer acid	463.4	120	500	0	92.7	50-130	0			
Surr: 13C4-PFBA	*384.1*	0	*400*	0	*96*	*50-130*	0			
Surr: 13C5-PFPeA	*388.2*	0	*400*	0	*97*	*50-130*	0			
Surr: 13C2-PFHxA	*395.3*	0	*400*	0	*98.8*	*50-130*	0			
Surr: 13C4-PFHpA	*387.6*	0	*400*	0	*96.9*	*50-130*	0			
Surr: 13C4-PFOA	*403.4*	0	*400*	0	*101*	*70-130*	0			
Surr: 13C5-PFNA	*396.8*	0	*400*	0	*99.2*	*70-130*	0			
Surr: 13C2-PFDA	*400*	0	*400*	0	*100*	*70-130*	0			
Surr: 13C2-PFUnA	*364.4*	0	*400*	0	*91.1*	*70-130*	0			
Surr: 13C2-PFDoA	*426.4*	0	*400*	0	*107*	*70-130*	0			
Surr: 13C2-PFTeA	*439.3*	0	*400*	0	*110*	*50-130*	0			
Surr: 13C3-PFBS	*368.6*	0	*400*	0	*92.1*	*50-130*	0			
Surr: 18O2-PFHxS	*383.4*	0	*378*	0	*101*	*70-130*	0			
Surr: 13C4-PFOS	*368.6*	0	*383*	0	*96.2*	*70-130*	0			
Surr: 13C2-FtS 4:2	*335.3*	0	*373*	0	*89.9*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **178026**	Instrument ID **LCMS1**		Method: **D7968-17a**				
Surr: 13C2-FtS 6:2	*339.5*	0	*380*	0	*89.3*	*50-130*	0
Surr: 13C2-FtS 8:2	*323.5*	0	*383*	0	*84.5*	*50-130*	0
Surr: 13C8-FOSA	*406.3*	0	*400*	0	*102*	*50-130*	0
Surr: d3-N-MeFOSAA	*434.3*	0	*400*	0	*109*	*50-130*	0
Surr: d5-N-EtFOSAA	*481*	0	*400*	0	*120*	*50-130*	0
Surr: 13C3-HFPO-DA	*413.1*	0	*400*	0	*103*	*50-130*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026** Instrument ID **LCMS1** Method: **D7968-17a**

LCS3	Sample ID: **LCS3-178026-178026**				Units: **ng/Kg**			Analysis Date: **6/5/2021 01:39 AM**			
Client ID:		Run ID: **LCMS1_210604D**			SeqNo: **7463752**			Prep Date: **6/4/2021**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	117.5	120	125	0	94	35-150	0			J
Perfluoropentanoic Acid (PFPeA)	109.2	120	125	0	87.3	35-150	0			J
Perfluorohexanoic Acid (PFHxA)	121.8	120	125	0	97.4	35-150	0			
Perfluoroheptanoic Acid (PFHpA)	116.4	120	125	0	93.1	35-150	0			J
Perfluorooctanoic Acid (PFOA)	118.1	25	125	0	94.5	35-150	0			
Perfluorononanoic Acid (PFNA)	126.2	25	125	0	101	35-150	0			
Perfluorodecanoic Acid (PFDA)	123.2	120	125	0	98.6	35-150	0			
Perfluoroundecanoic Acid (PFUnA)	110.9	120	125	0	88.7	35-150	0			J
Perfluorododecanoic Acid (PFDoA)	107.9	120	125	0	86.3	35-150	0			J
Perfluorotridecanoic Acid (PFTriA)	131.8	120	125	0	105	35-150	0			
Perfluorotetradecanoic Acid (PFTeA)	143.4	120	125	0	115	35-150	0			
Perfluorobutanesulfonic Acid (PFBS)	93.75	25	110	0	85.2	35-150	0			
Perfluoropentanesulfonic Acid (PFPeS	123.5	25	118	0	105	35-150	0			
Perfluorohexanesulfonic Acid (PFHxS)	106.7	120	115	0	92.8	35-150	0			J
Perfluoroheptanesulfonic Acid (PFHpS	112.6	120	120	0	93.9	35-150	0			J
Perfluorooctanesulfonic Acid (PFOS)	88.75	25	115	0	77.2	35-150	0			
Perfluorononanesulfonic Acid (PFNS)	107.5	120	120	0	89.6	35-150	0			J
Perfluorodecanesulfonic Acid (PFDS)	105.6	25	120	0	88	35-150	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	104.1	120	118	0	88.2	35-150	0			J
Fluorotelomer Sulphonic Acid 6:2 (FtS	128.5	120	118	0	109	35-150	0			B
Fluorotelomer Sulphonic Acid 8:2 (FtS	132.3	120	120	0	110	35-150	0			
Perfluorooctanesulfonamide (PFOSA)	126.8	25	125	0	101	35-150	0			
N-Ethylperfluorooctanesulfonamidoace	136.6	120	125	0	109	35-150	0			
N-Methylperfluorooctanesulfonamidoa	103.1	120	125	0	82.5	35-150	0			J
11Cl-Pf3OUdS	109.5	25	118	0	92.8	35-150	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	110.1	25	118	0	93.3	35-150	0			
9Cl-PF3ONS	108.2	25	118	0	91.7	35-150	0			
Hexafluoropropylene oxide dimer acid	100.8	120	125	0	80.6	35-150	0			J
Surr: 13C4-PFBA	*394.1*	0	*400*	0	*98.5*	*50-130*	0			
Surr: 13C5-PFPeA	*395.3*	0	*400*	0	*98.8*	*50-130*	0			
Surr: 13C2-PFHxA	*414.2*	0	*400*	0	*104*	*50-130*	0			
Surr: 13C4-PFHpA	*391.6*	0	*400*	0	*97.9*	*50-130*	0			
Surr: 13C4-PFOA	*396.1*	0	*400*	0	*99*	*70-130*	0			
Surr: 13C5-PFNA	*414.7*	0	*400*	0	*104*	*70-130*	0			
Surr: 13C2-PFDA	*418.6*	0	*400*	0	*105*	*70-130*	0			
Surr: 13C2-PFUnA	*391.6*	0	*400*	0	*97.9*	*70-130*	0			
Surr: 13C2-PFDoA	*415.4*	0	*400*	0	*104*	*70-130*	0			
Surr: 13C2-PFTeA	*381.6*	0	*400*	0	*95.4*	*50-130*	0			
Surr: 13C3-PFBS	*378.5*	0	*400*	0	*94.6*	*50-130*	0			
Surr: 18O2-PFHxS	*360.7*	0	*378*	0	*95.4*	*70-130*	0			
Surr: 13C4-PFOS	*384.3*	0	*383*	0	*100*	*70-130*	0			
Surr: 13C2-FtS 4:2	*331.7*	0	*373*	0	*88.9*	*50-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **178026**	Instrument ID **LCMS1**		Method: **D7968-17a**				
Surr: 13C2-FtS 6:2	*324.3*	0	*380*	0	*85.3*	*50-130*	0
Surr: 13C2-FtS 8:2	*377*	0	*383*	0	*98.4*	*50-130*	0
Surr: 13C8-FOSA	*404.7*	0	*400*	0	*101*	*50-130*	0
Surr: d3-N-MeFOSAA	*427*	0	*400*	0	*107*	*50-130*	0
Surr: d5-N-EtFOSAA	*495.9*	0	*400*	0	*124*	*50-130*	0
Surr: 13C3-HFPO-DA	*409*	0	*400*	0	*102*	*50-130*	0

The following samples were analyzed in this batch: 21060440-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: ERM, Inc
Work Order: 21060440
Project: Manistique STWCS (0594938.0040)-PFAS Biosoli

QC BATCH REPORT

Batch ID: **R319439** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R319439** Units: **% of sample** Analysis Date: **6/9/2021 04:12 PM**
Client ID: Run ID: **MOIST_210609C** SeqNo: **7474199** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.10								

LCS Sample ID: **LCS-R319439** Units: **% of sample** Analysis Date: **6/9/2021 04:12 PM**
Client ID: Run ID: **MOIST_210609C** SeqNo: **7474198** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	99.99	0.10	100	0	100	98-102	0			

DUP Sample ID: **21060606-03A DUP** Units: **% of sample** Analysis Date: **6/9/2021 04:12 PM**
Client ID: Run ID: **MOIST_210609C** SeqNo: **7474187** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.10	0	0	0	0-0	0.01	0	10	

DUP Sample ID: **21060703-05B DUP** Units: **% of sample** Analysis Date: **6/9/2021 04:12 PM**
Client ID: Run ID: **MOIST_210609C** SeqNo: **7474193** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	7.03	0.10	0	0	0	0-0	7.24	2.94	10	

The following samples were analyzed in this batch: 21060440-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
Holland, MI +1 616 399 6070
Houston, TX +1 281 530 5656
Spring City, PA +1 610 948 4903
South Charleston, WV +1 304 356 3168
Middletown, PA +1 717 944 5541
Salt Lake City, UT +1 801 266 7700
York, PA +1 717 505 5280

Chain of Custody Form

Page ____ of ____

COC ID: 231309

ALS Project Manager: EB

ALS Work Order #: 21060440

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name		A	PFAS in Biosolids - MI-28 (D7968)
Work Order		Project Number		B	Moisture
Company Name	ERM, Inc	Bill To Company	ERM, Inc	C	
Send Report To	Bruce Rabe	Invoice Attn	Debra Muse - Accounts Payable	D	
Address	3352 128th Ave	Address	One Continental Towers 1701 Golf Road, Suite 1-700	E F	
City/State/Zip	Holland, MI 49424	City/State/Zip	Rolling Meadows, IL 60008	G	
Phone	(616) 393-3500	Phone		H	
Fax	(616) 393-3777	Fax		I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Digester BioSolids	6-3-21	1:10 pm	WW	—	3	X										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Corey Burr Corey Burr

Shipment Method: Fed Ex Overnight Air

Required Turnaround Time: (Check Box) ☐ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☒ Other agreement

Results Due Date:

Relinquished by: Corey Burr	Date: 6-3-21	Time: 1:15 pm	Received by: FED EX	
Relinquished by: FED EX	Date: 6/4/21	Time: 0830	Received by (Laboratory):	
Logged by (Laboratory): DES	Date: 6/4/21	Time: 1000	Checked by (Laboratory): EB	

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Notes:

Cooler ID	Cooler Temp.
IR1	5.4°C

QC Package: (Check One Box Below)
☑ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS Group, USA

Sample Receipt Checklist

Client Name: **ERM-HOLL-AT** Date/Time Received: **04-Jun-21 08:30**

Work Order: **21060440** Received by: **DS**

Checklist completed by Diane Shaw (eSignature) 04-Jun-21 (Date) Reviewed by: Ehrland Bosworth (eSignature) 04-Jun-21 (Date)

Matrices: Wastewater
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	5.4/5.4 c	IR1	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	6/4/2021 10:02:35 AM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction: