05-May-2022

Jeff Lampi
City of Escanaba WWTP
P.O. Box 948
Escanaba, MI 49829

Re: **Sludge Analyses** Work Order: **22042243**

Dear Jeff,

ALS Environmental received 1 sample on 26-Apr-2022 09:00 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 28.

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,

Julienn C. Williams

Electronically approved by: Julienn Williams

Julienn Williams
Project Manager

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS Group, USA

Date: 05-May-22

Client: City of Escanaba WWTP
Project: Sludge Analyses
Work Order: **22042243**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22042243-01	Tank #5 Biosolids	Sludge		4/25/2022 11:20	4/26/2022 09:00	☐

Client: City of Escanaba WWTP
Project: Sludge Analyses
WorkOrder: **22042243**

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
n	Analyte accreditation is not offered
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
mg/Kg-dry	Milligrams per Kilogram Dry Weight

Client: City of Escanaba WWTP
Project: Sludge Analyses
Work Order: 22042243

Case Narrative

The attached "Sample Receipt Checklist" documents the date of receipt, 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. A copy of the laboratory's scope of accreditation is available upon request.

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.

Any flags on MS/MSD samples not addressed in this narrative are unrelated to samples in this report.

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

Batch 195481, Method D7968-17a, Sample Tank #5 Biosolids (22042243-01A): One or more surrogate recoveries were below the lower control limits. The sample results may be biased low. 13C2-PFTeA

Batch 195481, Method D7968-17a, Sample Tank #5 Biosolids (22042243-01A): Surrogate high due to matrix interference. d5-NEtFOSAA

Batch 195481, Method D7968-17a, Sample LCSD2-195481: The RPD between the LCS2 and LCSD2 was outside of the control limit. The sample results should be considered estimated for this analyte: FTS 8:2

ALS Group, USA

Date: *05-May-2022*

Client: City of Escanaba WWTP
Project: Sludge Analyses
Sample ID: Tank #5 Biosolids
Collection Date: 4/25/2022 11:20 AM

Work Order: 22042243
Lab ID: 22042243-01
Matrix: SLUDGE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7471B**	Prep: SW7471 5/2/22 13:01		Analyst: **EJC**
Mercury	**1.9**		**0.32**	**mg/Kg-dry**	1	5/2/2022 05:22 PM
METALS BY ICP-MS			**SW6020B**	Prep: SW3050B 5/3/22 08:04		Analyst: **DSC**
Arsenic	**6.3**		**0.78**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Barium	**320**		**6.5**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Cadmium	ND		1.3	mg/Kg-dry	1	5/3/2022 10:49 PM
Calcium	**32,000**		**130**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Chromium	**90**		**13**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Copper	**750**		**6.5**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Lead	**32**		**2.6**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Magnesium	**3,800**		**26**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Molybdenum	**14**		**6.5**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Nickel	**21**		**6.5**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Potassium	**1,400**	B	**26**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Selenium	**5.4**		**1.8**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Silver	**2.9**		**0.65**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Sodium	**1,900**		**65**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
Zinc	**1,000**		**6.5**	**mg/Kg-dry**	1	5/3/2022 10:49 PM
PFAS BY LC-MS-MS			**D7968-17A**	Prep: D7968-17a 4/28/22 17:10		Analyst: **ENS**
Perfluorobutanoic Acid (PFBA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluoropentanoic Acid (PFPeA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorohexanoic Acid (PFHxA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluoroheptanoic Acid (PFHpA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorooctanoic Acid (PFOA)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorononanoic Acid (PFNA)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorodecanoic Acid (PFDA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluoroundecanoic Acid (PFUnA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorododecanoic Acid (PFDoA)	ND		2,200	ng/Kg-dry	1	5/4/2022 03:09 AM
Perfluorotridecanoic Acid (PFTriA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorotetradecanoic Acid (PFTeA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorobutanesulfonic Acid (PFBS)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluoropentanesulfonic Acid (PFPeS)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorohexanesulfonic Acid (PFHxS)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorooctanesulfonic Acid (PFOS)	**3,600**		**440**	**ng/Kg-dry**	1	5/3/2022 01:55 AM
Perfluorononanesulfonic Acid (PFNS)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorodecanesulfonic Acid (PFDS)	**840**		**440**	**ng/Kg-dry**	1	5/3/2022 01:55 AM
Fluorotelomer Sulphonic Acid 4:2 (FtS 4:2)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM

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

Client: City of Escanaba WWTP
Project: Sludge Analyses **Work Order:** 22042243
Sample ID: Tank #5 Biosolids **Lab ID:** 22042243-01
Collection Date: 4/25/2022 11:20 AM **Matrix:** SLUDGE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Perfluorooctanesulfonamide (PFOSA)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
N-Ethylperfluorooctanesulfonamidoacetic Acid	**2,800**		**2,200**	**ng/Kg-dry**	1	5/4/2022 03:09 AM
N-Methylperfluorooctanesulfonamidoacetic Acid	**6,700**		**2,200**	**ng/Kg-dry**	1	5/3/2022 01:55 AM
11Cl-Pf3OUdS	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
4,8-Dioxa-3H-perfluorononanoic Acid (DONA)	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
9Cl-PF3ONS	ND		440	ng/Kg-dry	1	5/3/2022 01:55 AM
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND		2,200	ng/Kg-dry	1	5/3/2022 01:55 AM
Surr: 13C4-PFBA	*90.8*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C5-PFPeA	*95.9*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-PFHxA	*91.8*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C4-PFHpA	*95.0*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C4-PFOA	*105*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C5-PFNA	*114*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-PFDA	*118*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-PFUnA	*118*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-PFDoA	*70.1*		*70-130*	*%REC*	1	5/4/2022 03:09 AM
Surr: 13C2-PFTeA	*6.77*	S	*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C3-PFBS	*77.2*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 18O2-PFHxS	*81.4*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C4-PFOS	*83.6*		*70-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-FtS 4:2	*204*	S	*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-FtS 6:2	*350*	S	*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C2-FtS 8:2	*278*	S	*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: 13C8-FOSA	*64.8*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: d3-N-MeFOSAA	*118*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
Surr: d5-N-EtFOSAA	*140*	S	*50-130*	*%REC*	1	5/4/2022 03:09 AM
Surr: 13C3-HFPO-DA	*73.2*		*50-130*	*%REC*	1	5/3/2022 01:55 AM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**	Prep: EXTRACT 4/29/22 16:17		Analyst: **QTN**
Chloride	**2,600**		**180**	**mg/Kg-dry**	1	4/30/2022 03:46 AM
MOISTURE			**SW3550C**			Analyst: **ALG**
Moisture	**94**		**0.10**	**% of sample**	1	4/28/2022 03:05 PM
AMMONIA AS NITROGEN (DISTILLED)			**A4500-NH3 G-11**	Prep: A4500-NH3 B 5/2/22 13:14		Analyst: **JMT**

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

ALS Group, USA

Date: *05-May-2022*

Client: City of Escanaba WWTP
Project: Sludge Analyses
Sample ID: Tank #5 Biosolids
Collection Date: 4/25/2022 11:20 AM

Work Order: 22042243
Lab ID: 22042243-01
Matrix: SLUDGE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Ammonia as Nitrogen	**14,000**		**4,900**	**mg NH3-N/Kg-dry**	20	5/2/2022 03:12 PM
PHOSPHORUS, TOTAL			**E365.1 R2.0**	Prep: E365.1 R2.0 4/29/22 10:50		Analyst: **JMT**
Phosphorus, Total	**23,000**		**8,200**	**mg/Kg-dry**	20	5/3/2022 06:37 PM

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

ALS Group, USA

Date: 05-May-22

Client: City of Escanaba WWTP

Work Order: 22042243

Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195598** Instrument ID **HG4** Method: **SW7471B**

MBLK Sample ID: **MBLK-195598-195598** Units: **mg/Kg** Analysis Date: **5/2/2022 04:46 PM**

Client ID: Run ID: **HG4_220502A** SeqNo: **8380890** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.020								

LCS Sample ID: **LCS-195598-195598** Units: **mg/Kg** Analysis Date: **5/2/2022 04:48 PM**

Client ID: Run ID: **HG4_220502A** SeqNo: **8380891** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.1725	0.020	0.1665	0	104	80-120	0			

MS Sample ID: **22042336-03AMS** Units: **mg/Kg** Analysis Date: **5/2/2022 05:36 PM**

Client ID: Run ID: **HG4_220502A** SeqNo: **8380917** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.173	0.018	0.1516	0.01853	102	75-125	0			

MSD Sample ID: **22042336-03AMSD** Units: **mg/Kg** Analysis Date: **5/2/2022 05:38 PM**

Client ID: Run ID: **HG4_220502A** SeqNo: **8380918** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.1748	0.018	0.1518	0.01853	103	75-125	0.173	1.03	35	

The following samples were analyzed in this batch: 22042243-01B

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195633** Instrument ID **ICPMS4** Method: **SW6020B**

MBLK Sample ID: **MBLK-195633-195633** Units: **mg/Kg** Analysis Date: **5/3/2022 09:59 PM**
Client ID: Run ID: **ICPMS4_220503B** SeqNo: **8385833** Prep Date: **5/3/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.25								
Barium	ND	0.25								
Cadmium	ND	0.10								
Calcium	ND	25								
Chromium	ND	0.25								
Copper	ND	0.25								
Lead	ND	0.25								
Magnesium	ND	10								
Molybdenum	ND	0.25								
Nickel	ND	0.25								
Potassium	ND	10								
Selenium	ND	0.25								
Silver	ND	0.25								
Sodium	ND	15								
Zinc	ND	0.50								

LCS Sample ID: **LCS-195633-195633** Units: **mg/Kg** Analysis Date: **5/3/2022 10:01 PM**
Client ID: Run ID: **ICPMS4_220503B** SeqNo: **8385834** Prep Date: **5/3/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	4.844	0.25	5	0	96.9	80-120	0			
Barium	5.067	0.25	5	0	101	80-120	0			
Cadmium	4.947	0.10	5	0	98.9	80-120	0			
Calcium	516.8	25	500	0	103	80-120	0			
Chromium	5.044	0.25	5	0	101	80-120	0			
Copper	4.999	0.25	5	0	100	80-120	0			
Lead	4.957	0.25	5	0	99.1	80-120	0			
Magnesium	507.6	10	500	0	102	80-120	0			
Molybdenum	4.963	0.25	5	0	99.3	80-120	0			
Nickel	4.97	0.25	5	0	99.4	80-120	0			
Potassium	515.8	10	500	0	103	80-120	0			
Selenium	4.767	0.25	5	0	95.3	80-120	0			
Silver	4.776	0.25	5	0	95.5	80-120	0			
Sodium	505.2	15	500	0	101	80-120	0			
Zinc	4.995	0.50	5	0	99.9	80-120	0			

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195633** Instrument ID **ICPMS4** Method: **SW6020B**

MS Sample ID: **22042162-21CMS** Units: **mg/Kg** Analysis Date: **5/3/2022 10:26 PM**
Client ID: Run ID: **ICPMS4_220503B** SeqNo: **8385848** Prep Date: **5/3/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.413	0.37	7.418	1.109	98.5	75-125	0			
Barium	13.49	0.37	7.418	4.698	118	75-125	0			
Cadmium	7.116	0.15	7.418	0.01109	95.8	75-125	0			
Calcium	1356	37	741.8	490.3	117	75-125	0			
Chromium	9.554	0.37	7.418	1.655	106	75-125	0			
Copper	8.086	0.37	7.418	0.6795	99.8	75-125	0			
Lead	9.411	0.37	7.418	2.038	99.4	75-125	0			
Magnesium	1195	15	741.8	365.8	112	75-125	0			
Molybdenum	7.367	0.37	7.418	0.0745	98.3	75-125	0			
Nickel	9.011	0.37	7.418	1.375	103	75-125	0			
Potassium	926.1	15	741.8	71.7	115	75-125	0			
Selenium	7.12	0.37	7.418	-0.04946	96.6	75-125	0			
Silver	6.944	0.37	7.418	0.001628	93.6	75-125	0			
Sodium	769.2	22	741.8	13.89	102	75-125	0			
Zinc	12.47	0.74	7.418	4.483	108	75-125	0			

MSD Sample ID: **22042162-21CMSD** Units: **mg/Kg** Analysis Date: **5/3/2022 10:28 PM**
Client ID: Run ID: **ICPMS4_220503B** SeqNo: **8385849** Prep Date: **5/3/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.167	0.38	7.53	1.109	93.7	75-125	8.413	2.97	20	
Barium	12.54	0.38	7.53	4.698	104	75-125	13.49	7.27	20	
Cadmium	6.961	0.15	7.53	0.01109	92.3	75-125	7.116	2.21	20	
Calcium	1283	38	753	490.3	105	75-125	1356	5.55	20	
Chromium	9.112	0.38	7.53	1.655	99	75-125	9.554	4.73	20	
Copper	7.829	0.38	7.53	0.6795	94.9	75-125	8.086	3.24	20	
Lead	8.953	0.38	7.53	2.038	91.8	75-125	9.411	4.98	20	
Magnesium	1128	15	753	365.8	101	75-125	1195	5.8	20	
Molybdenum	7.158	0.38	7.53	0.0745	94.1	75-125	7.367	2.88	20	
Nickel	8.751	0.38	7.53	1.375	98	75-125	9.011	2.92	20	
Potassium	883.4	15	753	71.7	108	75-125	926.1	4.72	20	
Selenium	6.827	0.38	7.53	-0.04946	91.3	75-125	7.12	4.21	20	
Silver	6.857	0.38	7.53	0.001628	91	75-125	6.944	1.26	20	
Sodium	747.9	23	753	13.89	97.5	75-125	769.2	2.81	20	
Zinc	11.85	0.75	7.53	4.483	97.8	75-125	12.47	5.12	20	

The following samples were analyzed in this batch: 22042243-01B

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK1	Sample ID: **MBLK1-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/3/2022 12:23 AM**			
Client ID:		Run ID: **LCMS1_220502C**			SeqNo: **8381764**			Prep Date: **4/28/2022**		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	*447.2*	0	*400*	0	*112*	*50-130*	0			
Surr: 13C5-PFPeA	*402*	0	*400*	0	*101*	*50-130*	0			
Surr: 13C2-PFHxA	*393.5*	0	*400*	0	*98.4*	*50-130*	0			
Surr: 13C4-PFHpA	*405.1*	0	*400*	0	*101*	*50-130*	0			
Surr: 13C4-PFOA	*458.7*	0	*400*	0	*115*	*70-130*	0			
Surr: 13C5-PFNA	*469*	0	*400*	0	*117*	*70-130*	0			
Surr: 13C2-PFDA	*466*	0	*400*	0	*116*	*70-130*	0			
Surr: 13C2-PFUnA	*469.6*	0	*400*	0	*117*	*70-130*	0			
Surr: 13C2-PFTeA	*406.7*	0	*400*	0	*102*	*50-130*	0			
Surr: 13C3-PFBS	*370.4*	0	*400*	0	*92.6*	*50-130*	0			
Surr: 18O2-PFHxS	*424.3*	0	*378*	0	*112*	*70-130*	0			
Surr: 13C4-PFOS	*383.9*	0	*383*	0	*100*	*70-130*	0			
Surr: 13C2-FtS 4:2	*308.6*	0	*373*	0	*82.7*	*50-130*	0			
Surr: 13C2-FtS 6:2	*348.4*	0	*380*	0	*91.7*	*50-130*	0			

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

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 8:2	*311.5*	0	*383*	0	*81.3*	*50-130*	0
Surr: 13C8-FOSA	*400.4*	0	*400*	0	*100*	*50-130*	0
Surr: d3-N-MeFOSAA	*435.2*	0	*400*	0	*109*	*50-130*	0
Surr: 13C3-HFPO-DA	*357.5*	0	*400*	0	*89.4*	*50-130*	0

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

MBLK2	Sample ID: **MBLK2-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/3/2022 12:40 AM**			
Client ID:		Run ID: **LCMS1_220502C**			SeqNo: **8381766**			Prep Date: **4/28/2022**		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	*423.9*	0	*400*	0	*106*	*50-130*	0			
Surr: 13C5-PFPeA	*432.2*	0	*400*	0	*108*	*50-130*	0			
Surr: 13C2-PFHxA	*413.9*	0	*400*	0	*103*	*50-130*	0			
Surr: 13C4-PFHpA	*419.1*	0	*400*	0	*105*	*50-130*	0			
Surr: 13C4-PFOA	*448.7*	0	*400*	0	*112*	*70-130*	0			
Surr: 13C5-PFNA	*443.1*	0	*400*	0	*111*	*70-130*	0			
Surr: 13C2-PFDA	*463.5*	0	*400*	0	*116*	*70-130*	0			
Surr: 13C2-PFUnA	*497.7*	0	*400*	0	*124*	*70-130*	0			
Surr: 13C2-PFTeA	*393.8*	0	*400*	0	*98.5*	*50-130*	0			
Surr: 13C3-PFBS	*386*	0	*400*	0	*96.5*	*50-130*	0			
Surr: 18O2-PFHxS	*339.2*	0	*378*	0	*89.7*	*70-130*	0			
Surr: 13C4-PFOS	*390.9*	0	*383*	0	*102*	*70-130*	0			
Surr: 13C2-FtS 4:2	*326.7*	0	*373*	0	*87.6*	*50-130*	0			
Surr: 13C2-FtS 6:2	*349.5*	0	*380*	0	*92*	*50-130*	0			

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

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C2-FtS 8:2	*335.5*	0	*383*	0	*87.6*	*50-130*	0
Surr: 13C8-FOSA	*446.8*	0	*400*	0	*112*	*50-130*	0
Surr: d3-N-MeFOSAA	*493.5*	0	*400*	0	*123*	*50-130*	0
Surr: 13C3-HFPO-DA	*413*	0	*400*	0	*103*	*50-130*	0

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

LCSD2	Sample ID: **LCSD2-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/3/2022 01:05 AM**			
Client ID:		Run ID: **LCMS1_220502C**			SeqNo: **8381769**			Prep Date: **4/28/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	557.3	120	500	0	111	50-130	521.4	6.66	30	
Perfluoropentanoic Acid (PFPeA)	576.5	120	500	0	115	70-130	580.7	0.716	30	
Perfluorohexanoic Acid (PFHxA)	496.9	120	500	0	99.4	50-130	494.5	0.485	30	
Perfluoroheptanoic Acid (PFHpA)	518.3	120	500	0	104	50-130	539.2	3.96	30	
Perfluorooctanoic Acid (PFOA)	575.8	25	500	0	115	70-130	548.4	4.87	30	
Perfluorononanoic Acid (PFNA)	603.9	25	500	0	121	70-130	570.6	5.67	30	
Perfluoroundecanoic Acid (PFUnA)	706.9	120	500	0	141	70-130	626.6	12.1	30	S
Perfluorododecanoic Acid (PFDoA)	571.8	120	500	0	114	70-130	569.3	0.444	30	
Perfluorotridecanoic Acid (PFTriA)	671.4	120	500	0	134	70-130	539.9	21.7	30	S
Perfluorotetradecanoic Acid (PFTeA)	526.8	120	500	0	105	70-130	459.5	13.7	30	
Perfluorobutanesulfonic Acid (PFBS)	427.2	25	442	0	96.6	70-130	396.2	7.52	30	
Perfluoropentanesulfonic Acid (PFPeS	513.9	25	469	0	110	70-130	484.2	5.94	30	
Perfluorohexanesulfonic Acid (PFHxS)	483.1	120	455	0	106	70-130	471.4	2.45	30	
Perfluoroheptanesulfonic Acid (PFHpS	443	120	476	0	93.1	70-130	461.6	4.12	30	
Perfluorooctanesulfonic Acid (PFOS)	509.7	25	464	0	110	70-130	458	10.7	30	
Perfluorononanesulfonic Acid (PFNS)	516.6	120	480	0	108	70-130	461	11.4	30	
Perfluorodecanesulfonic Acid (PFDS)	466.7	25	482	0	96.8	70-130	413.7	12	30	
Fluorotelomer Sulphonic Acid 4:2 (FtS	508.3	120	467	0	109	70-130	422.8	18.4	30	
Fluorotelomer Sulphonic Acid 6:2 (FtS	531.1	120	474	0	112	70-130	583.6	9.42	30	
Fluorotelomer Sulphonic Acid 8:2 (FtS	617.8	120	479	0	129	70-130	450.6	31.3	30	R
Perfluorooctanesulfonamide (PFOSA)	494.7	25	500	0	98.9	70-130	497.4	0.546	30	
N-Ethylperfluorooctanesulfonamidoace	647.6	120	500	0	130	70-130	648.5	0.139	30	
N-Methylperfluorooctanesulfonamidoa	575.9	120	500	0	115	70-130	600.2	4.13	30	
11Cl-Pf3OUdS	568.9	25	471	0	121	70-130	572.7	0.66	30	
4,8-Dioxa-3H-perfluorononanoic Acid (	483.3	25	471	0	103	70-130	459.2	5.12	30	
9Cl-PF3ONS	542.8	25	466	0	116	70-130	531.4	2.12	30	
Hexafluoropropylene oxide dimer acid	433.2	120	500	0	86.6	50-130	531.1	20.3	30	
Surr: 13C4-PFBA	*404.9*	0	*400*	0	*101*	*50-130*	402.6	*0.574*	*30*	
Surr: 13C5-PFPeA	*421.2*	0	*400*	0	*105*	*50-130*	403.6	*4.28*	*30*	
Surr: 13C2-PFHxA	*402.4*	0	*400*	0	*101*	*50-130*	419.3	*4.11*	*30*	
Surr: 13C4-PFHpA	*448.4*	0	*400*	0	*112*	*50-130*	437.3	*2.5*	*30*	
Surr: 13C4-PFOA	*441.1*	0	*400*	0	*110*	*70-130*	424.3	*3.87*	*30*	
Surr: 13C5-PFNA	*468.2*	0	*400*	0	*117*	*70-130*	430	*8.49*	*30*	
Surr: 13C2-PFDA	*489.9*	0	*400*	0	*122*	*70-130*	476.5	*2.76*	*30*	
Surr: 13C2-PFUnA	*505.2*	0	*400*	0	*126*	*70-130*	432.4	*15.5*	*30*	
Surr: 13C2-PFTeA	*372.1*	0	*400*	0	*93*	*50-130*	314.3	*16.9*	*30*	
Surr: 13C3-PFBS	*371.4*	0	*400*	0	*92.8*	*50-130*	385.7	*3.8*	*30*	
Surr: 18O2-PFHxS	*367*	0	*378*	0	*97.1*	*70-130*	363.6	*0.937*	*30*	
Surr: 13C4-PFOS	*378.5*	0	*383*	0	*98.8*	*70-130*	376.5	*0.527*	*30*	
Surr: 13C2-FtS 4:2	*374.1*	0	*373*	0	*100*	*50-130*	308.9	*19.1*	*30*	
Surr: 13C2-FtS 6:2	*405.3*	0	*380*	0	*107*	*50-130*	364.1	*10.7*	*30*	
Surr: 13C2-FtS 8:2	*358.7*	0	*383*	0	*93.7*	*50-130*	406.7	*12.5*	*30*	

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

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C8-FOSA	*425.5*	0	*400*	0	*106*	*50-130*	435.7	*2.37*	*30*	
Surr: d3-N-MeFOSAA	*455.7*	0	*400*	0	*114*	*50-130*	469.6	*3*	*30*	
Surr: d5-N-EtFOSAA	*515.8*	0	*400*	0	*129*	*50-130*	510.9	*0.965*	*30*	
Surr: 13C3-HFPO-DA	*434.8*	0	*400*	0	*109*	*50-130*	481.8	*10.3*	*30*	

LCSD2 Sample ID: **LCSD2-195481-195481** Units: **ng/Kg** Analysis Date: **5/5/2022 11:16 AM**

Client ID: Run ID: **LCMS1_220505A** SeqNo: **8390941** Prep Date: **4/28/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorodecanoic Acid (PFDA)	534	120	500	0	107	70-130	603.8	12.3	30	

LCS1 Sample ID: **LCS1-195481-195481** Units: **ng/Kg** Analysis Date: **5/3/2022 12:32 AM**

Client ID: Run ID: **LCMS1_220502C** SeqNo: **8381765** Prep Date: **4/28/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorooctanoic Acid (PFOA)	28.51	25	25	0	114	35-150	0			
Perfluorononanoic Acid (PFNA)	31.32	25	25	0	125	35-150	0			
Perfluoropentanesulfonic Acid (PFPeS	23.43	25	23.5	0	99.7	35-150	0			J
Perfluorooctanesulfonic Acid (PFOS)	20.8	25	23	0	90.5	35-150	0			J
Perfluorodecanesulfonic Acid (PFDS)	28.74	25	24	0	120	35-150	0			
Perfluorooctanesulfonamide (PFOSA)	36.62	25	25	0	146	35-150	0			
11Cl-Pf3OUdS	33.23	25	23.5	0	141	35-150	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	23.06	25	23.5	0	98.1	35-150	0			J
9Cl-PF3ONS	23.47	25	23	0	102	35-150	0			J
Surr: 13C4-PFBA	*409.2*	0	*400*	0	*102*	*50-130*	0			
Surr: 13C5-PFPeA	*414.1*	0	*400*	0	*104*	*50-130*	0			
Surr: 13C2-PFHxA	*418.5*	0	*400*	0	*105*	*50-130*	0			
Surr: 13C4-PFHpA	*437.3*	0	*400*	0	*109*	*50-130*	0			
Surr: 13C4-PFOA	*452.1*	0	*400*	0	*113*	*70-130*	0			
Surr: 13C5-PFNA	*448.2*	0	*400*	0	*112*	*70-130*	0			
Surr: 13C2-PFDA	*447.4*	0	*400*	0	*112*	*70-130*	0			
Surr: 13C2-PFUnA	*458.3*	0	*400*	0	*115*	*70-130*	0			
Surr: 13C2-PFTeA	*468.4*	0	*400*	0	*117*	*50-130*	0			
Surr: 13C3-PFBS	*368.1*	0	*400*	0	*92*	*50-130*	0			
Surr: 18O2-PFHxS	*416.8*	0	*378*	0	*110*	*70-130*	0			
Surr: 13C4-PFOS	*398.5*	0	*383*	0	*104*	*70-130*	0			
Surr: 13C2-FtS 4:2	*302.1*	0	*373*	0	*81*	*50-130*	0			
Surr: 13C2-FtS 6:2	*312.7*	0	*380*	0	*82.3*	*50-130*	0			
Surr: 13C2-FtS 8:2	*430.8*	0	*383*	0	*112*	*50-130*	0			
Surr: 13C8-FOSA	*431.4*	0	*400*	0	*108*	*50-130*	0			
Surr: d3-N-MeFOSAA	*485.5*	0	*400*	0	*121*	*50-130*	0			
Surr: 13C3-HFPO-DA	*440.8*	0	*400*	0	*110*	*50-130*	0			

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

LCS1	Sample ID: **LCS1-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/4/2022 01:05 AM**			
Client ID:		Run ID: **LCMS1_220503B**			SeqNo: **8386823**			Prep Date: **4/28/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanesulfonic Acid (PFBS)	18.61	25	22	0	84.6	35-150	0			J
Surr: 13C2-PFDoA	*515.3*	0	*400*	0	*129*	*70-130*	0			
Surr: d5-N-EtFOSAA	*462.8*	0	*400*	0	*116*	*50-130*	0			

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

LCS2	Sample ID: **LCS2-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/3/2022 12:56 AM**			
Client ID:		Run ID: **LCMS1_220502C**			SeqNo: **8381768**			Prep Date: **4/28/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	521.4	120	500	0	104	50-130	0			
Perfluoropentanoic Acid (PFPeA)	580.7	120	500	0	116	70-130	0			
Perfluorohexanoic Acid (PFHxA)	494.5	120	500	0	98.9	50-130	0			
Perfluoroheptanoic Acid (PFHpA)	539.2	120	500	0	108	50-130	0			
Perfluorooctanoic Acid (PFOA)	548.4	25	500	0	110	70-130	0			
Perfluorononanoic Acid (PFNA)	570.6	25	500	0	114	70-130	0			
Perfluoroundecanoic Acid (PFUnA)	626.6	120	500	0	125	70-130	0			
Perfluorododecanoic Acid (PFDoA)	569.3	120	500	0	114	70-130	0			
Perfluorotridecanoic Acid (PFTriA)	539.9	120	500	0	108	70-130	0			
Perfluorotetradecanoic Acid (PFTeA)	459.5	120	500	0	91.9	70-130	0			
Perfluorobutanesulfonic Acid (PFBS)	396.2	25	442	0	89.6	70-130	0			
Perfluoropentanesulfonic Acid (PFPeS	484.2	25	469	0	103	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	471.4	120	455	0	104	70-130	0			
Perfluoroheptanesulfonic Acid (PFHpS	461.6	120	476	0	97	70-130	0			
Perfluorooctanesulfonic Acid (PFOS)	458	25	464	0	98.7	70-130	0			
Perfluorononanesulfonic Acid (PFNS)	461	120	480	0	96	70-130	0			
Perfluorodecanesulfonic Acid (PFDS)	413.7	25	482	0	85.8	70-130	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	422.8	120	467	0	90.5	70-130	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	583.6	120	474	0	123	70-130	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	450.6	120	479	0	94.1	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	497.4	25	500	0	99.5	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	648.5	120	500	0	130	70-130	0			
N-Methylperfluorooctanesulfonamidoa	600.2	120	500	0	120	70-130	0			
11Cl-Pf3OUdS	572.7	25	471	0	122	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	459.2	25	471	0	97.5	70-130	0			
9Cl-PF3ONS	531.4	25	466	0	114	70-130	0			
Hexafluoropropylene oxide dimer acid	531.1	120	500	0	106	50-130	0			
Surr: 13C4-PFBA	*402.6*	0	*400*	0	*101*	*50-130*	0			
Surr: 13C5-PFPeA	*403.6*	0	*400*	0	*101*	*50-130*	0			
Surr: 13C2-PFHxA	*419.3*	0	*400*	0	*105*	*50-130*	0			
Surr: 13C4-PFHpA	*437.3*	0	*400*	0	*109*	*50-130*	0			
Surr: 13C4-PFOA	*424.3*	0	*400*	0	*106*	*70-130*	0			
Surr: 13C5-PFNA	*430*	0	*400*	0	*108*	*70-130*	0			
Surr: 13C2-PFDA	*476.5*	0	*400*	0	*119*	*70-130*	0			
Surr: 13C2-PFUnA	*432.4*	0	*400*	0	*108*	*70-130*	0			
Surr: 13C2-PFTeA	*314.3*	0	*400*	0	*78.6*	*50-130*	0			
Surr: 13C3-PFBS	*385.7*	0	*400*	0	*96.4*	*50-130*	0			
Surr: 18O2-PFHxS	*363.6*	0	*378*	0	*96.2*	*70-130*	0			
Surr: 13C4-PFOS	*376.5*	0	*383*	0	*98.3*	*70-130*	0			
Surr: 13C2-FtS 4:2	*308.9*	0	*373*	0	*82.8*	*50-130*	0			
Surr: 13C2-FtS 6:2	*364.1*	0	*380*	0	*95.8*	*50-130*	0			
Surr: 13C2-FtS 8:2	*406.7*	0	*383*	0	*106*	*50-130*	0			

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

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

Surr: 13C8-FOSA	*435.7*	0	*400*	0	*109*	*50-130*	0
Surr: d3-N-MeFOSAA	*469.6*	0	*400*	0	*117*	*50-130*	0
Surr: d5-N-EtFOSAA	*510.9*	0	*400*	0	*128*	*50-130*	0
Surr: 13C3-HFPO-DA	*481.8*	0	*400*	0	*120*	*50-130*	0

LCS2 Sample ID: **LCS2-195481-195481** Units: **ng/Kg** Analysis Date: **5/5/2022 11:07 AM**

Client ID: Run ID: **LCMS1_220505A** SeqNo: **8390940** Prep Date: **4/28/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorodecanoic Acid (PFDA)	603.8	120	500	0	121	70-130	0			
Surr: 13C2-PFDoA	*539.8*	0	*400*	0	*135*	*70-130*	0			*S*

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481** Instrument ID **LCMS1** Method: **D7968-17a**

LCS3	Sample ID: **LCS3-195481-195481**				Units: **ng/Kg**			Analysis Date: **5/3/2022 12:48 AM**			
Client ID:		Run ID: **LCMS1_220502C**			SeqNo: **8381767**			Prep Date: **4/28/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	107.2	120	125	0	85.7	35-150	0			J
Perfluoropentanoic Acid (PFPeA)	114.4	120	125	0	91.5	35-150	0			J
Perfluorohexanoic Acid (PFHxA)	116.9	120	125	0	93.5	35-150	0			J
Perfluoroheptanoic Acid (PFHpA)	115.2	120	125	0	92.1	35-150	0			J
Perfluorooctanoic Acid (PFOA)	131.1	25	125	0	105	35-150	0			
Perfluorononanoic Acid (PFNA)	127.7	25	125	0	102	35-150	0			
Perfluorodecanoic Acid (PFDA)	128	120	125	0	102	35-150	0			
Perfluoroundecanoic Acid (PFUnA)	163.6	120	125	0	131	35-150	0			
Perfluorododecanoic Acid (PFDoA)	141	120	125	0	113	35-150	0			
Perfluorotridecanoic Acid (PFTriA)	151.5	120	125	0	121	35-150	0			
Perfluorotetradecanoic Acid (PFTeA)	148.5	120	125	0	119	35-150	0			
Perfluorobutanesulfonic Acid (PFBS)	90.6	25	110	0	82.4	35-150	0			
Perfluoropentanesulfonic Acid (PFPeS	103.8	25	118	0	88	35-150	0			
Perfluorohexanesulfonic Acid (PFHxS)	121.8	120	115	0	106	35-150	0			
Perfluoroheptanesulfonic Acid (PFHpS	93.91	120	120	0	78.3	35-150	0			J
Perfluorooctanesulfonic Acid (PFOS)	111.2	25	115	0	96.7	35-150	0			
Perfluorononanesulfonic Acid (PFNS)	119.2	120	120	0	99.3	35-150	0			J
Perfluorodecanesulfonic Acid (PFDS)	126.1	25	120	0	105	35-150	0			
Fluorotelomer Sulphonic Acid 4:2 (FtS	132.8	120	118	0	112	35-150	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	94.37	120	118	0	80	35-150	0			J
Fluorotelomer Sulphonic Acid 8:2 (FtS	119.3	120	120	0	99.4	35-150	0			J
Perfluorooctanesulfonamide (PFOSA)	113.5	25	125	0	90.8	35-150	0			
N-Ethylperfluorooctanesulfonamidoace	128.5	120	125	0	103	35-150	0			
N-Methylperfluorooctanesulfonamidoa	102.1	120	125	0	81.7	35-150	0			J
11Cl-Pf3OUdS	131.4	25	118	0	111	35-150	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	111.9	25	118	0	94.8	35-150	0			
9Cl-PF3ONS	114.9	25	118	0	97.4	35-150	0			
Hexafluoropropylene oxide dimer acid	112	120	125	0	89.6	35-150	0			J
Surr: 13C4-PFBA	*418.7*	0	*400*	0	*105*	*50-130*	0			
Surr: 13C5-PFPeA	*407.6*	0	*400*	0	*102*	*50-130*	0			
Surr: 13C2-PFHxA	*391.5*	0	*400*	0	*97.9*	*50-130*	0			
Surr: 13C4-PFHpA	*400.4*	0	*400*	0	*100*	*50-130*	0			
Surr: 13C4-PFOA	*433.7*	0	*400*	0	*108*	*70-130*	0			
Surr: 13C5-PFNA	*437*	0	*400*	0	*109*	*70-130*	0			
Surr: 13C2-PFDA	*448.3*	0	*400*	0	*112*	*70-130*	0			
Surr: 13C2-PFUnA	*448.3*	0	*400*	0	*112*	*70-130*	0			
Surr: 13C2-PFTeA	*441.2*	0	*400*	0	*110*	*50-130*	0			
Surr: 13C3-PFBS	*376.7*	0	*400*	0	*94.2*	*50-130*	0			
Surr: 18O2-PFHxS	*357.5*	0	*378*	0	*94.6*	*70-130*	0			
Surr: 13C4-PFOS	*380.7*	0	*383*	0	*99.4*	*70-130*	0			
Surr: 13C2-FtS 4:2	*317.9*	0	*373*	0	*85.2*	*50-130*	0			
Surr: 13C2-FtS 6:2	*334.7*	0	*380*	0	*88.1*	*50-130*	0			

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195481**	Instrument ID **LCMS1**		Method: **D7968-17a**				
Surr: 13C2-FtS 8:2	*306*	0	*383*	0	*79.9*	*50-130*	0
Surr: 13C8-FOSA	*408.3*	0	*400*	0	*102*	*50-130*	0
Surr: d3-N-MeFOSAA	*465*	0	*400*	0	*116*	*50-130*	0
Surr: 13C3-HFPO-DA	*374.5*	0	*400*	0	*93.6*	*50-130*	0

The following samples were analyzed in this batch: 22042243-01A

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195549** Instrument ID **IC3** Method: **SW9056A**

MBLK	Sample ID: **MBLK-195549-195549**				Units: **mg/Kg**			Analysis Date: **4/30/2022 02:50 AM**			
Client ID:	Run ID: **IC3_220429A**				SeqNo: **8378450**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	10								

LCS	Sample ID: **LCS-195549-195549**				Units: **mg/Kg**			Analysis Date: **4/30/2022 03:01 AM**			
Client ID:	Run ID: **IC3_220429A**				SeqNo: **8378451**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	89.6	10	99.6	0	90	80-116	0			

MS	Sample ID: **22042397-01A MS**				Units: **mg/Kg**			Analysis Date: **4/30/2022 04:20 AM**			
Client ID:	Run ID: **IC3_220429A**				SeqNo: **8378458**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	131.5	10	100	15.96	116	80-116	0			

MSD	Sample ID: **22042397-01A MSD**				Units: **mg/Kg**			Analysis Date: **4/30/2022 04:31 AM**			
Client ID:	Run ID: **IC3_220429A**				SeqNo: **8378459**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	131.6	10	100	15.96	116	80-116	131.5	0.0593	20	

The following samples were analyzed in this batch: 22042243-01B

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195626** Instrument ID **LACHAT2** Method: **A4500-NH3 G-11**

MBLK Sample ID: **MBLK-195626-195626** Units: **mg NH3-N/Kg** Analysis Date: **5/2/2022 02:55 PM**
Client ID: Run ID: **LACHAT2_220502A** SeqNo: **8380390** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ammonia as Nitrogen	ND	15								

LCS Sample ID: **LCS-195626-195626** Units: **mg NH3-N/Kg** Analysis Date: **5/2/2022 02:56 PM**
Client ID: Run ID: **LACHAT2_220502A** SeqNo: **8380391** Prep Date: **5/2/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ammonia as Nitrogen	48.68	15	50	0	97.4	71-119	0			

MS Sample ID: **22042243-01B MS** Units: **mg NH3-N/Kg** Analysis Date: **5/2/2022 03:13 PM**
Client ID: **Tank #5 Biosolids** Run ID: **LACHAT2_220502A** SeqNo: **8380405** Prep Date: **5/2/2022** DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ammonia as Nitrogen	914.2	290	49.02	807.9	217	71-119	0			SO

MSD Sample ID: **22042243-01B MSD** Units: **mg NH3-N/Kg** Analysis Date: **5/2/2022 03:14 PM**
Client ID: **Tank #5 Biosolids** Run ID: **LACHAT2_220502A** SeqNo: **8380406** Prep Date: **5/2/2022** DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ammonia as Nitrogen	843.9	280	47.17	807.9	76.2	71-119	914.2	8	25	O

The following samples were analyzed in this batch: 22042243-01B

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **195685** Instrument ID **LACHAT2** Method: **E365.1 R2.0**

MBLK	Sample ID: **MBLK-195685-195685**				Units: **mg/Kg**			Analysis Date: **5/3/2022 06:10 PM**			
Client ID:	Run ID: **LACHAT2_220503C**				SeqNo: **8385738**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total	ND	5.0								

LCS	Sample ID: **LCS-195685-195685**				Units: **mg/Kg**			Analysis Date: **5/3/2022 06:11 PM**			
Client ID:	Run ID: **LACHAT2_220503C**				SeqNo: **8385739**			Prep Date: **4/29/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total	8.973	5.0	10	0	89.7	76-128	0			

MS	Sample ID: **22042243-01B MS**				Units: **mg/Kg**			Analysis Date: **5/3/2022 06:38 PM**			
Client ID: **Tank #5 Biosolids**	Run ID: **LACHAT2_220503C**				SeqNo: **8385762**			Prep Date: **4/29/2022**		DF: **20**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total	1444	460	46.3	1267	381	76-128	0			SO

MSD	Sample ID: **22042243-01B MSD**				Units: **mg/Kg**			Analysis Date: **5/3/2022 06:39 PM**			
Client ID: **Tank #5 Biosolids**	Run ID: **LACHAT2_220503C**				SeqNo: **8385763**			Prep Date: **4/29/2022**		DF: **20**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total	1694	460	46.3	1267	921	76-128	1444	15.9	20	SO

The following samples were analyzed in this batch: 22042243-01B

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

Client: City of Escanaba WWTP
Work Order: 22042243
Project: Sludge Analyses

QC BATCH REPORT

Batch ID: **R343212** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R343212** Units: **% of sample** Analysis Date: **4/28/2022 03:05 PM**
Client ID: Run ID: **MOIST_220428B** SeqNo: **8372726** 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-R343212** Units: **% of sample** Analysis Date: **4/28/2022 03:05 PM**
Client ID: Run ID: **MOIST_220428B** SeqNo: **8372725** 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: **22042162-20B DUP** Units: **% of sample** Analysis Date: **4/28/2022 03:05 PM**
Client ID: Run ID: **MOIST_220428B** SeqNo: **8372702** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	20.52	0.10	0	0	0	0-0	21.2	3.26	10	

DUP Sample ID: **22042243-01B DUP** Units: **% of sample** Analysis Date: **4/28/2022 03:05 PM**
Client ID: **Tank #5 Biosolids** Run ID: **MOIST_220428B** SeqNo: **8372717** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	94.39	0.10	0	0	0	0-0	94.38	0.0106	10	

The following samples were analyzed in this batch: 22042243-01B

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

Chain of Custody Form

Page _____ of _____

22042243

ESCWWTP: City of Escanaba WWTP
Project: Sludge Analyses

ALS Project Manager:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name		A	PFAS
Work Order		Project Number		B	Hg, IC, Metals, Moist, NH3, P
Company Name	City of Escanaba WWTP	Bill To Company	City of Escanaba WWTP	C	
Send Report To	Jeff Lampi	Invoice Attn.	Jeff Lampi	D	
Address	P.O. Box 948	Address	P.O. Box 948	E	
				F	
City/State/Zip	Escanaba, MI 49829	City/State/Zip	Escanaba, MI 49829	G	
Phone	906 786-1301	Phone	906 786-1301	H	
Fax	906 789-3800	Fax	906 789-3800	I	
e-Mail Address	jlampi@escanaba.org			J	

No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
	Tank #5 Biosolids	4/25/22	11:20 AM	Sludge	N/A	1	X										
	Tank #5 Biosolids	4/25/22	11:20 AM	Sludge	N/A	2	~~JV~~	X									

Sampler(s): Please Print & Sign
Jeremy Veesar — Jeremy Veesar
Chris Barran — Chris Barran

Shipment Method: UPS

Turnaround Time: (Business Days) ☐ 10 BD ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD ☐ Other _____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:	Notes:
Jeremy Veesar	4-25-22	11:55 A.M.	UPS			
Relinquished by: UPS	Date: 4/26/22	Time: 0900	Received by (Laboratory): 2	Date:	Time:	
Logged by (Laboratory):	Date: 4/26/22	Time: 1439	Checked by (Laboratory):			

ALS Cooler ID	Cooler Temp	QC Package: (Check Box Below)	
IR3	4.2°C	☐ Level II: Standard QC	☐ Level III: Raw Data
		☐ TRRP LRC	☐ TRRP Level IV
		☐ Level IV: SW846 Methods/CLP like	
		☐ Other:	

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

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

ALS Group, USA

Sample Receipt Checklist

Client Name: **ESCWWTP** Date/Time Received: **26-Apr-22 09:00**

Work Order: **22042243** Received by: **LYS**

Checklist completed by Lydia Sweet (eSignature) 26-Apr-22 (Date) Reviewed by: (eSignature) (Date)

Matrices: Sludge
Carrier name: UPS

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):	4.2/5.2c	IR3	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	4/26/2022 2:42:23 PM		
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: