

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



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

June 28, 2021

Ed Carstens
Croswell, City of
5580 Lancaster Rd.
Croswell, MI 48422

Phone: (810) 679-2459

RE: Trace Project 21F0129
Client Project Sludge Sample

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at tbrewer@trace-labs.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy W. Brewer".

Tim Brewer
Project Manager
Enclosures



NJDEP Accreditation No. MI008

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Muskegon, MI 49444-2673



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SAMPLE SUMMARY

Trace Project ID: 21F0129
Client Project ID: Sludge Sample

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
21F0129-01	Croswell Biosolids	Sludge	gw	06/03/21 11:00	06/03/21 11:15

CERTIFICATE OF ANALYSIS

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AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the laboratory is not accredited by NELAP for this compound
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

DATA QUALIFIERS

Trace ID: 21F0129-01

Analysis: EPA 300.0 Rev. 2.1

Nitrate as N

Note 204 : The MSD recovery was out of control low, resulting in an out of control RPD between the MS and the MSD. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated.

Trace ID: T110917-MSD1

Analysis: EPA 300.0 Rev. 2.1

Nitrate as N

Note 204 : The MSD recovery was out of control low, resulting in an out of control RPD between the MS and the MSD. The result and reporting limit for this analyte, in the non-spiked version of the sample, must be considered estimated.

Trace ID: T111136-MS1

Analysis: EPA 350.1 Rev. 2.0

Ammonia as N

Note 243.1 : The MS recovery was out of control. Because the background concentration of this analyte is greater than the spike amount, no data require qualification.

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ANALYTICAL RESULTS

Trace Project ID: 21F0129
Client Project ID: Sludge Sample

Trace ID: 21F0129-01 Matrix: Sludge Date Collected: 06/03/21 11:00
Sample ID: Croswell Biosolids Date Received: 06/03/21 11:15

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
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METALS, TOTAL

Analysis Method: EPA 7471B

Batch: T110924

Mercury	0.43 mg/kg dry	0.14	1	06/04/21	mrh	06/07/21	dc		
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METALS, TOTAL

Analysis Method: EPA 6010D

Batch: T110965

Phosphorus	3.0 % by Wt.	0.062	100	06/07/21	mrh	06/09/21	dc	N	
Potassium	0.22 % by Wt.	0.020	5	06/07/21	mrh	06/09/21	dc		

Analysis Method: EPA 6020B

Batch: T110965

Arsenic	6.6 mg/kg dry	2.0	10	06/07/21	mrh	06/09/21	acs		
Cadmium	0.95 mg/kg dry	0.20	10	06/07/21	mrh	06/09/21	acs		
Chromium	84 mg/kg dry	2.0	10	06/07/21	mrh	06/09/21	acs		
Copper	420 mg/kg dry	1.0	10	06/07/21	mrh	06/09/21	acs		
Lead	<10 mg/kg dry	10	10	06/07/21	mrh	06/09/21	acs		
Molybdenum	15 mg/kg dry	2.9	10	06/07/21	mrh	06/09/21	acs	N	
Nickel	23 mg/kg dry	1.0	10	06/07/21	mrh	06/09/21	acs		
Selenium	3.0 mg/kg dry	0.59	10	06/07/21	mrh	06/09/21	acs		
Silver	0.73 mg/kg dry	0.49	10	06/07/21	mrh	06/09/21	acs		
Zinc	480 mg/kg dry	4.9	10	06/07/21	mrh	06/09/21	acs		

WET CHEMISTRY

Analysis Method: ASTM D2974-07a

Batch: T110996

% Solids	22 % by Wt.	0.10	1	06/07/21	cm	06/07/21	cm	N	
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Analysis Method: Calculation

Batch: [CALC]

Total Nitrogen	39000 mg/kg dry	4500	1	06/10/21		06/11/21	rg	N	
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Analysis Method: EPA 300.0 Rev. 2.1

Batch: T110917

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ANALYTICAL RESULTS

Trace Project ID: 21F0129
Client Project ID: Sludge Sample

Trace ID: 21F0129-01 Matrix: Sludge Date Collected: 06/03/21 11:00
Sample ID: Croswell Biosolids Date Received: 06/03/21 11:15

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY									
Nitrate as N	0.00025 % by Wt. dry	0.00010	1	06/04/21	rg	06/04/21	rg	204	
Nitrite as N	<1.0 mg/kg dry	1.0	1	06/04/21	rg	06/04/21	rg		
Analysis Method: EPA 350.1 Rev. 2.0 Batch: T111136									
Ammonia as N	1.1 % by Wt. dry	0.0097	10	06/10/21	ans	06/11/21	ans	N	
Analysis Method: EPA 351.2 Rev. 2.0 Batch: T111126									
Total Kjeldahl Nitrogen	3.9 % by Wt. dry	0.10	1	06/10/21	rg	06/11/21	rg	N	
Analysis Method: EPA 9012B Batch: T111146									
Cyanide (total)	21 mg/kg dry	0.86	1	06/10/21	jma	06/11/21	jma	N	

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Analytical Laboratory Report

Report ID: S24978.01(01)
Generated on 06/28/2021

Report to

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

Phone: O: 231-773-5998 x238 FAX:
Email: TBrewer@trace-labs.com

Additional Contacts: Jon Mink

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

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

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S24978.01
Project: 21F0129-01
Collected Date(s): 06/03/2021
Submitted Date/Time: 06/07/2021 11:25
Sampled by: gw
P.O. #: 21F0129-01

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

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Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
ASTM D7968-17M	ASTM Method D7968 - 17 Modified (Isotopic Dilution)
SM2540B	Standard Method 2540 B 2011

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S24978.01	Croswell Biosolids 21F0129-01	Sludge	06/03/21 11:00



Analytical Laboratory Report

Lab Sample ID: S24978.01

Sample Tag: Croswell Biosolids 21F0129-01

Collected Date/Time: 06/03/2021 11:00

Matrix: Sludge

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	25.2	IR
1	500ml Plastic	None	Yes	25.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	8.69/6.82/10	ASTM D7968-17M	06/07/21 12:00	KCV	

Inorganics

Method: SM2540B, Run Date: 06/10/21 12:00, Analyst: ELR

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Solids*	22	1		%	1		

Organics

28 PFAs, Method: ASTM D7968-17M, Run Date: 06/09/21 10:26, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	0.49		ug/kg	24.3	375-22-4	
PFPeA*	Not detected	0.24		ug/kg	24.3	2706-90-3	
4:2 FTSA*	Not detected	0.24		ug/kg	24.3	757124-72-4	I
PFHxA*	0.63	0.24		ug/kg	24.3	307-24-4	
PFBS*	Not detected	0.24		ug/kg	24.3	375-73-5	
PFHpA*	Not detected	0.24		ug/kg	24.3	375-85-9	
PFPeS*	Not detected	0.24		ug/kg	24.3	2706-91-4	
6:2 FTSA*	Not detected	0.24		ug/kg	24.3	27619-97-2	I
PFOA*	Not detected	0.24		ug/kg	24.3	335-67-1	
PFHxS*	Not detected	0.24		ug/kg	24.3	355-46-4	
PFHxS-LN*	Not detected	0.24		ug/kg	24.3	355-46-4-LN	
PFHxS-BR*	Not detected	0.24		ug/kg	24.3	355-46-4-BR	
PFNA*	Not detected	0.24		ug/kg	24.3	375-95-1	
8:2 FTSA*	Not detected	0.24		ug/kg	24.3	39108-34-4	
PFHpS*	Not detected	0.24		ug/kg	24.3	375-92-8	
PFDA*	Not detected	0.24		ug/kg	24.3	335-76-2	I
N-MeFOSAA*	0.92	0.24		ug/kg	24.3	2355-31-9	
EtFOSAA*	1.2	0.24		ug/kg	24.3	2991-50-6	
PFOS*	0.87	0.24		ug/kg	24.3	1763-23-1	
PFOS-LN*	0.45	0.24		ug/kg	24.3	1763-23-1-LN	
PFOS-BR*	0.39	0.24		ug/kg	24.3	1763-23-1-BR	
PFUnDA*	Not detected	0.24		ug/kg	24.3	2058-94-8	I
PFNS*	Not detected	0.24		ug/kg	24.3	68259-12-1	
PFDoDA*	Not detected	0.24		ug/kg	24.3	307-55-1	I
PFDS*	Not detected	0.24		ug/kg	24.3	335-77-3	
PFTTrDA*	Not detected	0.24		ug/kg	24.3	72629-94-8	I
FOSA*	0.27	0.24		ug/kg	24.3	754-91-6	
PFTeDA*	Not detected	0.24		ug/kg	24.3	376-06-7	
11Cl-PF3OUdS*	Not detected	0.24		ug/kg	24.3	763051-92-9	
9Cl-PF3ONS*	Not detected	0.24		ug/kg	24.3	756426-58-1	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S24978.01 (continued)
Sample Tag: Croswell Biosolids 21F0129-01

28 PFAs, Method: ASTM D7968-17M, Run Date: 06/09/21 10:26, Analyst: KCV (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
ADONA*	Not detected	0.24		ug/kg	24.3	919005-14-4	
HFPO-DA*	Not detected	0.24		ug/kg	24.3	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S24978

Client:TRACE (Trace Analytical Laboratories)

Project: 21F0129-01

Submitted:06/07/2021 11:25 Login User: SRS

Attention: Tim Brewer

Address: Trace Analytical Laboratories
2241 Black Creek Rd.
Muskegon, MI 49444

Phone: O: 231-773-5998 FAX:

Email: TBrewer@trace-labs.com

Selection	Description	Note
Sample Receiving		
01.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 25.2
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped UPS
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

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Muskegon, MI 49444-2673



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SUBCONTRACT ORDER

21F0129

SENDING LABORATORY:

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

RECEIVING LABORATORY:

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

Project Manager: Tim Brewer

PO # 21F0129

24978.01

Matrix: Sludge

Sampled: 06/03/21 11:00 TAT: Standard

Sample ID: Croswell Biosolids 21F0129-01

Sampled By: gw

Analysis Needed:

PFAS- Biosolids- EGLE List

Released By: *Hayley Abbott* 6/03/21

Date

6/17/21 1125

Date

Received By: *Sam Smith*

Received By

Received By

25.2

Date

Date

6/17/21 11:25

Trace Analytical Laboratories, Inc.
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QUALITY CONTROL RESULTS

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T110924

Analysis Description: Mercury, Total, EPA 7470/7471

QC Batch Method: EPA 7471B Prep

Analysis Method: EPA 7471B

METHOD BLANK: T110924-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Mercury	mg/kg wet	<0.050	0.050	

LABORATORY CONTROL SAMPLE: T110924-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Mercury	mg/kg wet	0.800	0.782	98	80-120	

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T110965

Analysis Description: Phosphorus, Total

QC Batch Method: EPA 3051 Microwave Assisted Digestions
for Solids

Analysis Method: EPA 6010D

METHOD BLANK: T110965-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Potassium	% by Wt.	<0.020	0.020	
Phosphorus	% by Wt.	<0.00063	0.00063	

LABORATORY CONTROL SAMPLE: T110965-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Potassium	% by Wt.	0.0400	0.0348	87	80-120	
Phosphorus	% by Wt.	0.0400	0.0373	93	80-120	

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T110965

Analysis Description: Lead, Total

QC Batch Method: EPA 3051 Microwave Assisted Digestions
for Solids

Analysis Method: EPA 6020B

METHOD BLANK: T110965-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Silver	mg/kg dry	<0.50	0.50	

CERTIFICATE OF ANALYSIS

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METHOD BLANK: T110965-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Arsenic	mg/kg dry	<2.0	2.0	
Cadmium	mg/kg dry	<0.20	0.20	
Chromium	mg/kg dry	<2.0	2.0	
Copper	mg/kg dry	<1.0	1.0	
Molybdenum	mg/kg dry	<3.0	3.0	
Nickel	mg/kg dry	<1.0	1.0	
Lead	mg/kg dry	<10	10	
Selenium	mg/kg dry	<0.60	0.60	
Zinc	mg/kg dry	<5.0	5.0	

LABORATORY CONTROL SAMPLE: T110965-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Silver	mg/kg dry	5.00	4.77	95	80-120	
Arsenic	mg/kg dry	5.00	4.42	88	80-120	
Cadmium	mg/kg dry	40.0	35.4	89	80-120	
Chromium	mg/kg dry	40.0	34.3	86	80-120	
Copper	mg/kg dry	40.0	35.7	89	80-120	
Molybdenum	mg/kg dry	40.0	35.6	89	80-120	
Nickel	mg/kg dry	40.0	36.7	92	80-120	
Lead	mg/kg dry	40.0	37.1	93	80-120	
Selenium	mg/kg dry	5.00	4.03	81	80-120	
Zinc	mg/kg dry	40.0	33.5	84	80-120	

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T110996

Analysis Description: Solids, Dry Weight

QC Batch Method: % Solids

Analysis Method: ASTM D2974-07a

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: [CALC]

Analysis Description: Total Nitrogen (individual components)

QC Batch Method:

Analysis Method: Calculation

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T110917

Analysis Description: Nitrite

QC Batch Method: IC Prep S

Analysis Method: EPA 300.0 Rev. 2.1

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METHOD BLANK: T110917-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Nitrate as N	% by Wt. wet	<0.00010	0.00010	
Nitrite as N	mg/kg wet	<1.0	1.0	

LABORATORY CONTROL SAMPLE: T110917-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Nitrate as N	% by Wt. wet	0.000941	0.000949	101	80-120	
Nitrite as N	mg/kg wet	9.41	8.56	91	80-120	

MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T110917-MSD1

Original: 21F0129-01

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Notes
Nitrate as N	% by Wt. dry	0.000251	0.00427	0.00428	0.00329	95	71	75-125	29	20	204
Nitrite as N	mg/kg dry	0	42.7	41.9	44.8	99	105	75-125	5	20	

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T111136

Analysis Description: Nitrogen, Ammonia

QC Batch Method: EPA 350.1 Rev. 2.0

Analysis Method: EPA 350.1 Rev. 2.0

METHOD BLANK: T111136-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Ammonia as N	% by Wt. wet	<0.000060	0.000060	

LABORATORY CONTROL SAMPLE: T111136-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Ammonia as N	% by Wt. wet	0.00300	0.00314	105	90-110	

LABORATORY CONTROL SAMPLE: T111136-BS2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Ammonia as N	% by Wt. wet	0.00300	0.00302	101	90-110	

LABORATORY CONTROL SAMPLE: T111136-BS3

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Ammonia as N	% by Wt. wet	0.00300	0.00318	106	90-110	

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LABORATORY CONTROL SAMPLE: T111136-BS4

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Ammonia as N	% by Wt. wet	0.00300	0.00305	102	90-110	

LABORATORY CONTROL SAMPLE: T111136-BS5

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Ammonia as N	% by Wt. wet	0.00300	0.00313	104	90-110	

MATRIX SPIKE: T111136-MS1 Original: **21F0129-01**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Ammonia as N	% by Wt. dry	1.08	0.125	1.15	59	90-110	243.1

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T111126

Analysis Description: Total Kjeldahl Nitrogen

QC Batch Method: EPA 351.2 Rev. 2.0

Analysis Method: EPA 351.2 Rev. 2.0

METHOD BLANK: T111126-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Kjeldahl Nitrogen	% by Wt. wet	<0.0020	0.0020	

LABORATORY CONTROL SAMPLE: T111126-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Kjeldahl Nitrogen	% by Wt. wet	0.0250	0.0252	101	90-110	

Trace Project ID: 21F0129

Client Project ID: Sludge Sample

QC Batch: T111146

Analysis Description: Cyanide, Total

QC Batch Method: EPA 9012B

Analysis Method: EPA 9012B

METHOD BLANK: T111146-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Cyanide (total)	mg/kg wet	<0.20	0.20	

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LABORATORY CONTROL SAMPLE: T111146-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Cyanide (total)	mg/kg wet	1.00	1.03	103	81-111	

LABORATORY CONTROL SAMPLE: T111146-BS2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Cyanide (total)	mg/kg wet	4.00	3.89	97	81-111	

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21F0129

Croswell, City of

Project Manager: Tim Brewer

Sample Log In Checklist

Date: 6/8/21	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
Time: 16:00							
Logged by: TB							
Package Description: Cooler							
Package Temp °C	-0.8	-0.8					
Representative Sample Temp °C	1.0	0.6					

Sample Receipt

Yes No

☒ ☐ Received on ice or other coolant

☒ ☐ Ice still present upon receipt

☐ ☒ Custody seals present

☒ Trace Courier ☐ Client Drop-off

☐ Yes ☐ No Custody seals intact (if applicable)

☐ UPS ☐ Fed Ex ☐ US Mail ☐ Other

Sample Condition

Yes No N/A

☒ ☐ ☐ All sample containers arrived unbroken and labeled

☐ ☐ ☒ Sufficient sample to run requested analyses

☐ ☐ ☒ Correct chemical preservative added to samples

☐ ☐ ☒ Samples preserved at Trace

☐ ☐ ☒ Chemical preservation verified, check EMD pH test strip used (if applicable)

☐ ☐ ☐ pH 0-2.5 (Lot: HC029115) ☐ pH 11.0-13.0 (Lot: HC729101) ☐ Other

☐ ☐ ☒ Air bubbles absent from VOAs

Chain of Custody (COC)

Yes No

☒ ☐ All bottle labels agree with COC

☒ ☐ COC filled out properly

☒ ☐ COC signed by client

Notes:

Form 70-A.38
Effective 5/19/21

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