Chemical Analysis Report

CEN-DIST-2022-04-19-02

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Run 14**
Request ID: **RQ-2022-04-18-22**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 09-MAY-2022 17:16

B. Steinbock

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Crooked Lake @ Center of N Lobe **Collection Date/Time: 04/18/2022 13:15**

Field ID: G2CE0265 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2320046	DEP SOP: NU-094-1	Color (true)**	120		PCU	P412563	
	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P412572	
	EPA 300.0 Rev. 2.1	Chloride	15		mg Cl/L	P412953	
		Sulfate	3.4		mg SO4/L	P412956	
	SM 2320 B-2011	Total Alkalinity	14		mg CaCO3/L	P413141	
	SM 2540 C-2011	TDS	89		mg/L	P413063	
	SM 2540 D-2011	TSS	15	I	mg/L	P412990	
	SM 4500-F- C-2011	Fluoride	0.060	I	mg F/L	P413148	
2320048	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P412707	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.5		mg N/L	P413005	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P412789	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P413048	
	SM 5310 B-2011	Organic Carbon	23		mg C/L	P412742	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample. The PQL was elevated because of sample matrix interference.

Sample Location: Lake Lotta at Center of southern lobe **Collection Date/Time: 04/18/2022 12:32**

Field ID: G2CE0093 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2320050	DEP SOP: NU-094-1	Color (true)**	79		PCU	P412563	
	EPA 180.1 Rev. 2.0	Turbidity	5.3	A	NTU	P412573	
	EPA 300.0 Rev. 2.1	Chloride	10	A	mg Cl/L	P412954	
		Sulfate	10	A	mg SO4/L	P412957	
	SM 2320 B-2011	Total Alkalinity	45		mg CaCO3/L	P413141	
	SM 2540 C-2011	TDS	110		mg/L	P413063	
	SM 2540 D-2011	TSS	4	I	mg/L	P412990	
	SM 4500-F- C-2011	Fluoride	0.11		mg F/L	P413148	
2320051	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P412707	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P413094	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P412789	
	EPA 365.1 Rev. 2.0	Total-P	0.075		mg P/L	P413048	
	SM 5310 B-2011	Organic Carbon	13		mg C/L	P412742	
2320056	EPA 200.7 Rev. 4.4	Calcium	19.0		mg/L	P412588	
		Iron	35	I	ug/L	P412588	
		Magnesium	2.89		mg/L	P412588	
		Potassium	2.4		mg/L	P412588	
		Sodium	6.4		mg/L	P412588	
		Strontium	42.2		ug/L	P412588	
		Tin	3.0	U	ug/L	P412588	
		Titanium	0.75	U	ug/L	P412588	
		Vanadium	2.0	U	ug/L	P412588	
		Zinc	5.0	U	ug/L	P412588	
	EPA 200.8 Rev. 5.4	Aluminum	15	I	ug/L	P412588	
		Antimony	0.20		ug/L	P412588	
		Arsenic	0.63		ug/L	P412588	
		Barium	9.31		ug/L	P412588	
		Beryllium	0.010	U	ug/L	P412588	
		Boron**	25.3		ug/L	P412588	
		Cadmium	0.020	U	ug/L	P412588	
		Chromium	0.40	U	ug/L	P412588	
		Cobalt	0.037	I	ug/L	P412588	
		Copper	0.40	U	ug/L	P412588	
		Lead	0.20	U	ug/L	P412588	
		Manganese	12.6		ug/L	P412588	
		Molybdenum	0.88		ug/L	P412588	
		Nickel	0.50	U	ug/L	P412588	
		Selenium	0.20	U	ug/L	P412588	
		Silver	0.010	U	ug/L	P412588	
		Thallium	0.10	U	ug/L	P412588	
	SM 2340 B-2011	Hardness	59.4		mg/L	P412588	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Ingram East **Collection Date/Time: 04/18/2022 11:28**

Field ID: G4CE0155 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2320047	DEP SOP: NU-094-1	Color (true)**	20		PCU	P412563	
	EPA 180.1 Rev. 2.0	Turbidity	0.80	I	NTU	P412572	
	EPA 300.0 Rev. 2.1	Chloride	9.7		mg Cl/L	P412954	
		Sulfate	3.0		mg SO4/L	P412957	
	SM 2320 B-2011	Total Alkalinity	8.2		mg CaCO3/L	P413141	
	SM 2540 C-2011	TDS	47		mg/L	P413063	
	SM 2540 D-2011	TSS	2	U	mg/L	P412990	
	SM 4500-F- C-2011	Fluoride	0.035	U	mg F/L	P413148	
2320049	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P412707	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P413093	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P412789	
	EPA 365.1 Rev. 2.0	Total-P	0.010		mg P/L	P413048	
	SM 5310 B-2011	Organic Carbon	9.1		mg C/L	P412742	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P412563

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412572

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412573

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P412588

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412953

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412954

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412956

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412957

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412707

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413005

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413094

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412789

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413048

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: SM 2320 B-2011
Batch ID: P413141

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 C-2011
Batch ID: P413063

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P412990

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P413148

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P412742

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P412563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412572

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	95.5		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412573

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	95.7		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P412588

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	101		P	85 - 115
Sodium	104		P	85 - 115
Strontium	105		P	85 - 115
Tin	98.0		P	85 - 115
Titanium	97.2		P	85 - 115
Vanadium	93.3		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	102		P	85 - 115
Barium	105		P	85 - 115
Beryllium	100		P	85 - 115
Boron	99.8		P	85 - 115
Cadmium	99.2		P	85 - 115
Chromium	99.9		P	85 - 115
Cobalt	103		P	85 - 115
Copper	99.9		P	85 - 115
Lead	99.6		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	100		P	85 - 115
Nickel	101		P	85 - 115
Selenium	99.9		P	85 - 115
Silver	104		P	85 - 115
Thallium	103		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412953

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412954

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412956

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412957

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412707

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413005

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	92.3		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413094

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	94.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412789

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	101		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413048

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	104		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P413141

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	96.7		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P413148

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.1		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P412742

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P412588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319897	Calcium	97.8		P	80 - 120
2319897	Iron	105	106	P/P	80 - 120
2319897	Magnesium	104	104	P/P	80 - 120
2319897	Potassium	101	102	P/P	80 - 120
2319897	Sodium	103	102	P/P	80 - 120
2319897	Strontium	106	105	P/P	80 - 120
2319897	Tin	97.1	97.9	P/P	80 - 120
2319897	Titanium	97.7	99.0	P/P	80 - 120
2319897	Vanadium	94.1	95.1	P/P	80 - 120
2319897	Zinc	98.9	97.5	P/P	80 - 120
2320056	Calcium	99.6		P	80 - 120
2320056	Iron	105		P	80 - 120
2320056	Magnesium	107		P	80 - 120
2320056	Potassium	99.1		P	80 - 120
2320056	Sodium	101		P	80 - 120
2320056	Strontium	105		P	80 - 120
2320056	Tin	98.9		P	80 - 120
2320056	Titanium	99.9		P	80 - 120
2320056	Vanadium	96.4		P	80 - 120
2320056	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319897	Aluminum	99.1	101	P/P	80 - 120
2319897	Antimony	102	104	P/P	80 - 120
2319897	Arsenic	101	102	P/P	80 - 120
2319897	Barium	104	105	P/P	80 - 120
2319897	Beryllium	99.3	102	P/P	80 - 120
2319897	Boron	98.7	101	P/P	80 - 120
2319897	Cadmium	100	104	P/P	80 - 120
2319897	Chromium	100	102	P/P	80 - 120
2319897	Cobalt	102	104	P/P	80 - 120
2319897	Copper	97.7	99.1	P/P	80 - 120
2319897	Lead	98.7	101	P/P	80 - 120
2319897	Manganese	100	103	P/P	80 - 120
2319897	Molybdenum	100	102	P/P	80 - 120
2319897	Nickel	98.5	100	P/P	80 - 120
2319897	Selenium	98.9	100	P/P	80 - 120
2319897	Silver	103	105	P/P	80 - 120
2319897	Thallium	103	106	P/P	80 - 120
2320056	Aluminum	102		P	80 - 120
2320056	Antimony	103		P	80 - 120
2320056	Arsenic	103		P	80 - 120
2320056	Barium	105		P	80 - 120
2320056	Beryllium	102		P	80 - 120
2320056	Boron	105		P	80 - 120
2320056	Cadmium	103		P	80 - 120
2320056	Chromium	102		P	80 - 120
2320056	Cobalt	104		P	80 - 120
2320056	Copper	103		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320056	Lead	102		P	80 - 120
2320056	Manganese	104		P	80 - 120
2320056	Molybdenum	102		P	80 - 120
2320056	Nickel	102		P	80 - 120
2320056	Selenium	99.9		P	80 - 120
2320056	Silver	103		P	80 - 120
2320056	Thallium	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412953

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319884	Chloride	101		P	90 - 110
2319984	Chloride	99.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412954

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320050	Chloride	101		P	90 - 110
2320486	Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412956

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319884	Sulfate	99.4		P	90 - 110
2319984	Sulfate	97.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412957

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320050	Sulfate	96.7		P	90 - 110
2320486	Sulfate	99.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412707

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320007	Ammonia-N	97.8	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320033	Kjeldahl Nitrogen	94.8	98.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320049	Kjeldahl Nitrogen	109	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412789

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319680	NO2NO3-N	99.8	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413048

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321462	Total-P	104	105	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P413148

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320031	Fluoride	98.6	98.6	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P412742

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2320074	Organic Carbon	99.7	98.4	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P412563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320004	Color (true)	3.52	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320005	Turbidity	2.14	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320050	Turbidity	11.6	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P412588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319897	Calcium	1.33	Spike	P	0 - 20
2319897	Iron	0.711	Spike	P	0 - 20
2319897	Magnesium	0.124	Spike	P	0 - 20
2319897	Potassium	0.912	Spike	P	0 - 20
2319897	Sodium	0.696	Spike	P	0 - 20
2319897	Strontium	1.15	Spike	P	0 - 20
2319897	Tin	0.828	Spike	P	0 - 20
2319897	Titanium	1.31	Spike	P	0 - 20
2319897	Vanadium	1.05	Spike	P	0 - 20
2319897	Zinc	1.42	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319897	Aluminum	1.64	Spike	P	0 - 20
2319897	Antimony	1.83	Spike	P	0 - 20
2319897	Arsenic	1.67	Spike	P	0 - 20
2319897	Barium	1.06	Spike	P	0 - 20
2319897	Beryllium	2.70	Spike	P	0 - 20
2319897	Boron	1.97	Spike	P	0 - 20
2319897	Cadmium	3.23	Spike	P	0 - 20
2319897	Chromium	1.30	Spike	P	0 - 20
2319897	Cobalt	1.61	Spike	P	0 - 20
2319897	Copper	1.46	Spike	P	0 - 20
2319897	Lead	2.21	Spike	P	0 - 20
2319897	Manganese	2.23	Spike	P	0 - 20
2319897	Molybdenum	2.14	Spike	P	0 - 20
2319897	Nickel	2.00	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P412588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319897	Selenium	1.52	Spike	P	0 - 20
2319897	Silver	2.52	Spike	P	0 - 20
2319897	Thallium	2.34	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412953

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319884	Chloride	5.81	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412954

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320050	Chloride	0.403	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319884	Sulfate	4.79	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P412957

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320050	Sulfate	0.497	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320007	Ammonia-N	0.542	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320033	Kjeldahl Nitrogen	3.11	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413093

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320049	Kjeldahl Nitrogen	4.42	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413094

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320130	Kjeldahl Nitrogen	9.97	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412789

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319680	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413048

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321462	Total-P	0.503	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P413141

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320031	Total Alkalinity	0.296	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P413063

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320032	TDS	2.11	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P413148

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320031	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P412742

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2320074	Organic Carbon	0.755	Spike	P	0 - 20

Quality Assurance Report
Precision

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: DEP SOP: NU-094-1
Run ID: A111556
Included Lab Sample IDs: 2320046, 2320047, 2320050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A111559
Included Lab Sample IDs: 2320046, 2320047, 2320050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.5	P/P	95 - 105
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A111601
Included Lab Sample IDs: 2320048, 2320049, 2320051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.4	98.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A111617
Included Lab Sample IDs: 2320056

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Arsenic	101	102	P/P	90 - 110
Barium	102	100	P/P	90 - 110
Beryllium	99.4	98.2	P/P	90 - 110
Boron	99.0	98.5	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Chromium	100	99.9	P/P	90 - 110
Cobalt	102	103	P/P	90 - 110
Copper	102	102	P/P	90 - 110
Lead	98.4	98.5	P/P	90 - 110
Manganese	101	102	P/P	90 - 110
Molybdenum	99.6	99.6	P/P	90 - 110
Nickel	101	102	P/P	90 - 110
Selenium	100	100	P/P	90 - 110
Silver	105	105	P/P	90 - 110
Thallium	99.6	98.8	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A111622
Included Lab Sample IDs: 2320048, 2320049, 2320051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.8	97.8	P/P	90 - 110
Organic Carbon	97.8	98.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A111649
Included Lab Sample IDs: 2320048, 2320049, 2320051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111687
Included Lab Sample IDs: 2320056

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.2	99.5	P/P	90 - 110
Iron	99.3	101	P/P	90 - 110
Magnesium	99.6	101	P/P	90 - 110
Potassium	100	102	P/P	90 - 110
Sodium	99.3	100	P/P	90 - 110
Strontium	108	107	P/P	90 - 110
Tin	99.3	99.6	P/P	90 - 110
Titanium	98.6	99.6	P/P	90 - 110
Vanadium	99.7	101	P/P	90 - 110
Zinc	101	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A111715
Included Lab Sample IDs: 2320046, 2320047, 2320050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Chloride	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A111807
Included Lab Sample IDs: 2320046, 2320047, 2320050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.3	94.4	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A111807
Included Lab Sample IDs: 2320046, 2320047, 2320050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A111862
Included Lab Sample IDs: 2320049, 2320051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	92.6	P/P	90 - 110
Kjeldahl Nitrogen	92.6	99.3	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111879
Included Lab Sample IDs: 2320048, 2320051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A111882
Included Lab Sample IDs: 2320048

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111924
Included Lab Sample IDs: 2320049

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	101	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
DEP SOP: NU-094-1	Color (true)	101					3.52	
EPA 180.1 Rev. 2.0	Turbidity	95.5					2.14	
	Turbidity	95.7					11.6	
EPA 200.7 Rev. 4.4	Calcium	102	97.8	99.6				1.33
	Iron	105	105	106	105			0.711
	Magnesium	107	104	104	107			0.124
	Potassium	101	101	102	99.1			0.912
	Sodium	104	103	102	101			0.696
	Strontium	105	106	105	105			1.15
	Tin	98.0	97.1	97.9	98.9			0.828
	Titanium	97.2	97.7	99.0	99.9			1.31
	Vanadium	93.3	94.1	95.1	96.4			1.05
	Zinc	100	98.9	97.5	101			1.42
EPA 200.8 Rev. 5.4	Aluminum	102	99.1	101	102			1.64
	Antimony	102	102	104	103			1.83
	Arsenic	102	101	102	103			1.67
	Barium	105	104	105	105			1.06
	Beryllium	100	99.3	102	102			2.70
	Boron	99.8	98.7	101	105			1.97
	Cadmium	99.2	100	104	103			3.23
	Chromium	99.9	100	102	102			1.30
	Cobalt	103	102	104	104			1.61
	Copper	99.9	97.7	99.1	103			1.46
	Lead	99.6	98.7	101	102			2.21
	Manganese	101	100	103	104			2.23
	Molybdenum	100	100	102	102			2.14
	Nickel	101	98.5	100	102			2.00
	Selenium	99.9	98.9	100	99.9			1.52
	Silver	104	103	105	103			2.52
	Thallium	103	103	106	105			2.34
EPA 300.0 Rev. 2.1	Chloride	99.4	101	99.1			5.81	
	Chloride	101	101	99.6			0.403	
	Sulfate	99.3	99.4	97.3			4.79	
	Sulfate	100	96.7	99.5			0.497	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	97.8	98.4				0.542
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	92.3	94.8	98.1				3.11
	Kjeldahl Nitrogen	97.2	109	102				4.42
	Kjeldahl Nitrogen	94.9						9.97
EPA 353.2 Rev. 2.0	NO2NO3-N	101	99.8	99.8				0.0
EPA 365.1 Rev. 2.0	Total-P	104	104	105				0.503
SM 2320 B-2011	Total Alkalinity	96.7					0.296	
SM 2540 C-2011	TDS						2.11	
SM 4500-F- C-2011	Fluoride	99.1	98.6	98.6				0.0
SM 5310 B-2011	Organic Carbon	95.0	99.7	98.4				0.755

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2320046, 2320047, 2320050
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2320046, 2320047, 2320050
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2320056

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2320056
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2320046, 2320047, 2320050
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2320046, 2320047, 2320050
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2320048, 2320049, 2320051
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2320048, 2320049, 2320051
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2320048, 2320049, 2320051
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2320048, 2320049, 2320051
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2320046, 2320047, 2320050
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2320056
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2320046, 2320047, 2320050
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2320046, 2320047, 2320050
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2320046, 2320047, 2320050
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2320048, 2320049, 2320051

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	04/19/2022			04/19/2022 15:42	Anna M. Plaviak	2320046, 2320047
	04/19/2022			04/19/2022 15:43	Anna M. Plaviak	2320050
EPA 180.1 Rev. 2.0	04/19/2022			04/19/2022 14:29	Sarah A Nixon	2320046
	04/19/2022			04/19/2022 14:31	Sarah A Nixon	2320047
	04/19/2022			04/19/2022 14:37	Sarah A Nixon	2320050
EPA 200.7 Rev. 4.4	04/19/2022	04/20/2022 10:20	Megan Whitefoot	04/25/2022 17:01	McKinley C Carter	2320056
EPA 200.8 Rev. 5.4	04/19/2022	04/20/2022 10:20	Megan Whitefoot	04/21/2022 22:29	Alexander Thompson	2320056
EPA 300.0 Rev. 2.1	04/19/2022			04/26/2022 23:01	Anna M. Plaviak	2320046
	04/19/2022			04/27/2022 00:26	Anna M. Plaviak	2320050
	04/19/2022			04/27/2022 01:15	Anna M. Plaviak	2320047
EPA 350.1 Rev. 2.0	04/19/2022			04/21/2022 11:24	Ping Hua	2320048
	04/19/2022			04/21/2022 11:25	Ping Hua	2320049
	04/19/2022			04/21/2022 11:27	Ping Hua	2320051
EPA 351.2 Rev. 2.0	04/19/2022	04/29/2022 09:35	Samantha L Bates	05/02/2022 15:32	Alexandra J Mattheus	2320049
	04/19/2022	04/29/2022 09:35	Samantha L Bates	05/02/2022 15:53	Alexandra J Mattheus	2320051
	04/19/2022	04/29/2022 11:06	Alexandra J Mattheus	05/03/2022 12:56	Alexandra J Mattheus	2320048
EPA 353.2 Rev. 2.0	04/19/2022			04/22/2022 15:08	Nathaniel J Jones	2320048
	04/19/2022			04/22/2022 15:09	Nathaniel J Jones	2320049
	04/19/2022			04/22/2022 15:10	Nathaniel J Jones	2320051
EPA 365.1 Rev. 2.0	04/19/2022	04/29/2022 13:00	Simonne.V. Calhoun	05/03/2022 11:27	Sarah A Nixon	2320048
	04/19/2022	04/29/2022 13:00	Simonne.V. Calhoun	05/03/2022 11:29	Sarah A Nixon	2320051
	04/19/2022	04/29/2022 13:00	Simonne.V. Calhoun	05/03/2022 14:34	James L Waggerby	2320049
SM 2320 B-2011	04/19/2022			04/28/2022 20:45	Dale L. Simmons	2320046
	04/19/2022			04/28/2022 20:55	Dale L. Simmons	2320047
	04/19/2022			04/28/2022 21:07	Dale L. Simmons	2320050
SM 2340 B-2011	04/19/2022			04/25/2022 17:01	McKinley C Carter	2320056
SM 2540 C-2011	04/19/2022			04/20/2022 15:36	Yijie Li	2320046, 2320047, 2320050
SM 2540 D-2011	04/19/2022			04/20/2022 15:36	Yijie Li	2320046, 2320047, 2320050
SM 4500-F- C-2011	04/19/2022			04/28/2022 20:45	Dale L. Simmons	2320046
	04/19/2022			04/28/2022 20:55	Dale L. Simmons	2320047
	04/19/2022			04/28/2022 21:07	Dale L. Simmons	2320050
SM 5310 B-2011	04/19/2022			04/21/2022 20:37	Khloe J Berg	2320048
	04/19/2022			04/21/2022 20:51	Khloe J Berg	2320049
	04/19/2022			04/21/2022 21:31	Khloe J Berg	2320051