Chemical Analysis Report

TLH-ROC-2022-03-10-02

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

Event Description: **Run 10**
Request ID: **RQ-2022-02-21-74**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
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Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 29-MAR-2022 10:34

NON-CONFORMANCE REPORT INCLUDED

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: Sandy Branch @ SR229 **Collection Date/Time: 03/10/2022 10:25**

Field ID: G3TLHR0027 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2311898	DEP SOP: NU-094-1	Color (true)**	110		PCU	P410961	
	EPA 180.1 Rev. 2.0	Turbidity	7.8		NTU	P410964	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P411237	
		Sulfate	3.1		mg SO4/L	P411239	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P411166	
	SM 2540 C-2011	TDS	51		mg/L	P411396	
	SM 2540 D-2011	TSS	2	I	mg/L	P411376	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P411168	
2311899	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P410995	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P411110	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.2		mg N/L	P411228	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P411146	
	SM 5310 B-2011	Organic Carbon	21		mg C/L	P411154	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

Sample Location: Apalachicola River 500m from Lola Landing Boat Ramp **Collection Date/Time: 03/10/2022 11:00**

Field ID: G2TLHR0044 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2311906	DEP SOP: NU-094-1	Color (true)**	13		PCU	P410963	
	EPA 180.1 Rev. 2.0	Turbidity	15		NTU	P410964	
	EPA 300.0 Rev. 2.1	Chloride	4.7		mg Cl/L	P411237	
		Sulfate	6.2		mg SO4/L	P411239	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P411166	
	SM 2540 C-2011	TDS	65		mg/L	P411396	
	SM 2540 D-2011	TSS	10		mg/L	P411376	
	SM 4500 F-C-2011	Fluoride	0.053	I	mg F/L	P411168	
2311907	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P410995	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38		mg N/L	P411110	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.60		mg N/L	P411090	
	EPA 365.1 Rev. 2.0	Total-P	0.040		mg P/L	P411146	
	SM 5310 B-2011	Organic Carbon	3.2		mg C/L	P411351	
2311909	EPA 200.7 Rev. 4.4	Calcium	12.9		mg/L	P411036	
		Iron	600		ug/L	P411036	
		Magnesium	1.73		mg/L	P411036	
		Potassium	1.9		mg/L	P411036	
		Sodium	6.0		mg/L	P411036	
		Strontium	28.5		ug/L	P411036	
		Tin	3.0	U	ug/L	P411036	
		Titanium	4.0		ug/L	P411036	
		Vanadium	2.0	U	ug/L	P411036	
		Zinc	5.0	U	ug/L	P411036	
	EPA 200.8 Rev. 5.4	Aluminum	146		ug/L	P411036	
		Antimony	0.059	I	ug/L	P411036	
		Arsenic	0.34		ug/L	P411036	
		Barium	21.5		ug/L	P411036	
		Beryllium	0.032	I	ug/L	P411036	
		Boron**	15.0		ug/L	P411036	
		Cadmium	0.020	U	ug/L	P411036	
		Chromium	0.40	U	ug/L	P411036	
		Cobalt	0.176		ug/L	P411036	
		Copper	0.74	I	ug/L	P411036	
		Lead	0.32	I	ug/L	P411036	
		Manganese	52.7		ug/L	P411036	
		Molybdenum	0.18	I	ug/L	P411036	
		Nickel	0.50	U	ug/L	P411036	
		Selenium	0.20	U	ug/L	P411036	
		Silver	0.010	U	ug/L	P411036	
		Thallium	0.10	U	ug/L	P411036	
	SM 2340B	Hardness	39.2		mg/L	P411036	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

Non-Conformance Report

NCR ID: 9292

Event(s)	Job(s)	Sample(s)	Test(s)
TLH-ROC-2022-03-10-02	TLH-2022-03-10-86	2311900	
TLH-ROC-2022-03-10-02	TLH-2022-03-10-90	2311908	

NCR Type: SHIPPING/RECEIVING **NCR Category: Receiving**

Observation: Samples left out at room temperature overnight.

Resolution: Customer contacted.
Samples canceled per customer request.

Authorized by/Date: Kyle Klug 3/11/2022

The Non-Conformance Report details exceptions or problems encountered with the events/jobs/samples/test.
Please address questions to:

Chemistry	Colin Wright	(850) 245-8085
Biology	Cheryl Swanson	(850) 245-8177

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P410961

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P410963

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P410964

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411036

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: P411036

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: P411237

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411239

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410995

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411110

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411090

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411228

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411146

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

Reference Method: SM 2320 B-2011
Batch ID: P411166

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

Reference Method: SM 2540 C-2011
Batch ID: P411396

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P411376

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P411168

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P411154

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

Reference Method: SM 5310 B-2011
Batch ID: P411351

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: P410961

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

Reference Method: DEP SOP: NU-094-1
Batch ID: P410963

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.3		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P410964

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.9		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411036

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	109		P	85 - 115
Magnesium	111		P	85 - 115
Potassium	102		P	85 - 115
Sodium	101		P	85 - 115
Strontium	104		P	85 - 115
Tin	106		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	96.4		P	85 - 115
Zinc	109		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411036

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.6		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	102		P	85 - 115
Barium	103		P	85 - 115
Beryllium	98.6		P	85 - 115
Boron	104		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	97.0		P	85 - 115
Cobalt	102		P	85 - 115
Copper	98.8		P	85 - 115
Lead	97.1		P	85 - 115
Manganese	98.1		P	85 - 115
Molybdenum	99.1		P	85 - 115
Nickel	100		P	85 - 115
Selenium	101		P	85 - 115
Silver	98.7		P	85 - 115
Thallium	99.6		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411237

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411239

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410995

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411110

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411090

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411228

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411146

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

Reference Method: SM 2320 B-2011
Batch ID: P411166

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.1		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P411168

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.6		P	93 - 104

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P411154

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.9		P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P411351

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411036

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311909	Calcium	108		P	80 - 120
2311909	Iron	107	110	P/P	80 - 120
2311909	Magnesium	109	110	P/P	80 - 120
2311909	Potassium	102	103	P/P	80 - 120
2311909	Sodium	103		P	80 - 120
2311909	Strontium	102	104	P/P	80 - 120
2311909	Tin	106	109	P/P	80 - 120
2311909	Titanium	99.2	102	P/P	80 - 120
2311909	Vanadium	97.1	99.0	P/P	80 - 120
2311909	Zinc	109	111	P/P	80 - 120
2312059	Calcium	108		P	80 - 120
2312059	Iron	108		P	80 - 120
2312059	Magnesium	108		P	80 - 120
2312059	Potassium	101		P	80 - 120
2312059	Sodium	104		P	80 - 120
2312059	Tin	105		P	80 - 120
2312059	Titanium	102		P	80 - 120
2312059	Vanadium	96.1		P	80 - 120
2312059	Zinc	106		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411036

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311909	Aluminum	105	111	P/P	80 - 120
2311909	Antimony	103	102	P/P	80 - 120
2311909	Arsenic	103	103	P/P	80 - 120
2311909	Barium	105	105	P/P	80 - 120
2311909	Beryllium	99.9	99.3	P/P	80 - 120
2311909	Boron	107	107	P/P	80 - 120
2311909	Cadmium	103	105	P/P	80 - 120
2311909	Chromium	101	103	P/P	80 - 120
2311909	Cobalt	101	102	P/P	80 - 120
2311909	Copper	99.5	99.9	P/P	80 - 120
2311909	Lead	100	99.6	P/P	80 - 120
2311909	Manganese	104	97.9	P/P	80 - 120
2311909	Molybdenum	102	101	P/P	80 - 120
2311909	Nickel	101	102	P/P	80 - 120
2311909	Selenium	102	101	P/P	80 - 120
2311909	Silver	101	101	P/P	80 - 120
2311909	Thallium	106	104	P/P	80 - 120
2312059	Aluminum	99.5		P	80 - 120
2312059	Antimony	101		P	80 - 120
2312059	Arsenic	102		P	80 - 120
2312059	Barium	103		P	80 - 120
2312059	Beryllium	93.9		P	80 - 120
2312059	Boron	110		P	80 - 120
2312059	Cadmium	102		P	80 - 120
2312059	Chromium	98.4		P	80 - 120
2312059	Cobalt	100		P	80 - 120
2312059	Copper	97.2		P	80 - 120
2312059	Lead	98.1		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411036

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312059	Manganese	99.1		P	80 - 120
2312059	Molybdenum	102		P	80 - 120
2312059	Nickel	98.3		P	80 - 120
2312059	Selenium	87.3		P	80 - 120
2312059	Silver	101		P	80 - 120
2312059	Thallium	102		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311708	Chloride	102		P	90 - 110
2311906	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311906	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410995

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311748	Ammonia-N	99.2	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411110

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311907	Kjeldahl Nitrogen	98.0	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411090

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311604	NO2NO3-N	98.5	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411228

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312682	NO2NO3-N	97.5	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311929	Total-P	98.6	98.7	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P411168

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311963	Fluoride	101	101	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P411154

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311971	Organic Carbon	89.8	91.1	P/P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P411351

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312914	Organic Carbon	95.3	98.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P410961

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311844	Color (true)	0.717	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P410963

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311847	Color (true)	0.558	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P410964

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311754	Turbidity	1.44	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411036

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311909	Calcium	1.03	Spike	P	0 - 20
2311909	Iron	2.29	Spike	P	0 - 20
2311909	Magnesium	0.305	Spike	P	0 - 20
2311909	Potassium	0.325	Spike	P	0 - 20
2311909	Sodium	0.605	Spike	P	0 - 20
2311909	Strontium	1.95	Spike	P	0 - 20
2311909	Tin	2.33	Spike	P	0 - 20
2311909	Titanium	2.67	Spike	P	0 - 20
2311909	Vanadium	1.90	Spike	P	0 - 20
2311909	Zinc	1.19	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411036

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311909	Aluminum	4.97	Spike	P	0 - 20
2311909	Antimony	0.312	Spike	P	0 - 20
2311909	Arsenic	0.277	Spike	P	0 - 20
2311909	Barium	0.267	Spike	P	0 - 20
2311909	Beryllium	0.524	Spike	P	0 - 20
2311909	Boron	0.186	Spike	P	0 - 20
2311909	Cadmium	1.84	Spike	P	0 - 20
2311909	Chromium	1.95	Spike	P	0 - 20
2311909	Cobalt	0.915	Spike	P	0 - 20
2311909	Copper	0.317	Spike	P	0 - 20
2311909	Lead	0.608	Spike	P	0 - 20
2311909	Manganese	2.50	Spike	P	0 - 20
2311909	Molybdenum	0.146	Spike	P	0 - 20
2311909	Nickel	0.658	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411036

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311909	Selenium	1.87	Spike	P	0 - 20
2311909	Silver	0.283	Spike	P	0 - 20
2311909	Thallium	1.03	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311708	Chloride	0.145	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311708	Sulfate	0.503	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410995

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311748	Ammonia-N	4.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411110

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311907	Kjeldahl Nitrogen	0.585	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411090

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311604	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411228

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312682	NO2NO3-N	0.282	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411146

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

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311929	Total-P	0.101	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P411166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311963	Total Alkalinity	0.661	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P411396

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312000	TDS	5.97	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P411376

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312000	TSS	6.90	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P411168

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311963	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P411154

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311971	Organic Carbon	0.802	Spike	P	0 - 20

Reference Method: SM 5310 B-2011
Batch ID: P411351

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312914	Organic Carbon	2.09	Spike	P	0 - 20

* 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: A110867
Included Lab Sample IDs: 2311898, 2311906

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	85 - 115
Color (true)	102	100	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A110868
Included Lab Sample IDs: 2311898, 2311906

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A110884
Included Lab Sample IDs: 2311899, 2311907

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	97.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A110924
Included Lab Sample IDs: 2311909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	98.0	101	P/P	90 - 110
Arsenic	104	103	P/P	90 - 110
Barium	102	104	P/P	90 - 110
Beryllium	99.0	99.6	P/P	90 - 110
Boron	102	107	P/P	90 - 110
Cadmium	101	104	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Cobalt	103	104	P/P	90 - 110
Copper	103	103	P/P	90 - 110
Lead	99.2	101	P/P	90 - 110
Manganese	99.8	104	P/P	90 - 110
Molybdenum	101	104	P/P	90 - 110
Nickel	103	104	P/P	90 - 110
Selenium	101	104	P/P	90 - 110
Silver	99.0	101	P/P	90 - 110
Thallium	102	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A110932
Included Lab Sample IDs: 2311907

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A110937
Included Lab Sample IDs: 2311909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A110937
Included Lab Sample IDs: 2311909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	106	106	P/P	90 - 110
Iron	107	110	P/P	90 - 110
Magnesium	107	110	P/P	90 - 110
Potassium	104	106	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Strontium	99.2	99.4	P/P	90 - 110
Tin	101	104	P/P	90 - 110
Titanium	98.3	98.6	P/P	90 - 110
Vanadium	98.0	98.2	P/P	90 - 110
Zinc	106	108	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A110946
Included Lab Sample IDs: 2311909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	104	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A110958
Included Lab Sample IDs: 2311899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.2	95.5	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A110961
Included Lab Sample IDs: 2311898, 2311906

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.9	95.9	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A110961
Included Lab Sample IDs: 2311898, 2311906

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A110993
Included Lab Sample IDs: 2311899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A110994
Included Lab Sample IDs: 2311898, 2311906

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A110994
Included Lab Sample IDs: 2311898, 2311906

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

Reference Method: SM 5310 B-2011
Run ID: A111056
Included Lab Sample IDs: 2311907

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	103	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A111063
Included Lab Sample IDs: 2311899, 2311907

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.2	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111066
Included Lab Sample IDs: 2311899, 2311907

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	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					0.717	
	Color (true)	99.3					0.558	
EPA 180.1 Rev. 2.0	Turbidity	96.9					1.44	
EPA 200.7 Rev. 4.4	Calcium	105	108	108				1.03
	Iron	109	107	110	108			2.29
	Magnesium	111	109	110	108			0.305
	Potassium	102	102	103	101			0.325
	Sodium	101	103	104				0.605
	Strontium	104	102	104				1.95
	Tin	106	106	109	105			2.33
	Titanium	103	99.2	102	102			2.67
	Vanadium	96.4	97.1	99.0	96.1			1.90
	Zinc	109	109	111	106			1.19
EPA 200.8 Rev. 5.4	Aluminum	99.6	105	111	99.5			4.97
	Antimony	100	103	102	101			0.312
	Arsenic	102	103	103	102			0.277
	Barium	103	105	105	103			0.267
	Beryllium	98.6	99.9	99.3	93.9			0.524
	Boron	104	110	107	107			0.186
	Cadmium	100	103	105	102			1.84
	Chromium	97.0	101	103	98.4			1.95
	Cobalt	102	101	102	100			0.915
	Copper	98.8	99.5	99.9	97.2			0.317
	Lead	97.1	100	99.6	98.1			0.608
	Manganese	98.1	104	97.9	99.1			2.50
	Molybdenum	99.1	102	101	102			0.146
	Nickel	100	101	102	98.3			0.658
	Selenium	101	102	101	87.3			1.87
	Silver	98.7	101	101	101			0.283
	Thallium	99.6	106	104	102			1.03
EPA 300.0 Rev. 2.1	Chloride	100	102	100			0.145	
	Sulfate	101	103				0.503	
EPA 350.1 Rev. 2.0	Ammonia-N	100	99.2	104				4.50
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	98.0	98.8				0.585
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	98.5	98.5				0.0
	NO2NO3-N	98.5	97.5	97.0				0.282
EPA 365.1 Rev. 2.0	Total-P	101	98.6	98.7				0.101
SM 2320 B-2011	Total Alkalinity	95.1					0.661	
SM 2540 C-2011	TDS						5.97	
SM 2540 D-2011	TSS						6.90	
SM 4500 F-C-2011	Fluoride	99.6	101	101				0.0
SM 5310 B-2011	Organic Carbon	94.9	89.8	91.1				0.802
	Organic Carbon	93.1	95.3	98.6				2.09

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2311898, 2311906
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2311898, 2311906
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2311909
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2311909

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2311898, 2311906
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2311898, 2311906
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2311899, 2311907
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2311899, 2311907
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2311899, 2311907
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2311899, 2311907
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2311898, 2311906
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2311909
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2311898, 2311906
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2311898, 2311906
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2311898, 2311906
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2311899, 2311907

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	03/10/2022			03/10/2022 15:46	Anna M. Plaviak	2311898
	03/10/2022			03/10/2022 15:56	Anna M. Plaviak	2311906
EPA 180.1 Rev. 2.0	03/10/2022			03/10/2022 14:52	Khloe J Berg	2311898
	03/10/2022			03/10/2022 14:54	Khloe J Berg	2311906
EPA 200.7 Rev. 4.4	03/10/2022	03/14/2022 10:34	Megan Whitefoot	03/14/2022 22:11	Josef B Mick	2311909
EPA 200.8 Rev. 5.4	03/10/2022	03/14/2022 10:34	Megan Whitefoot	03/14/2022 17:22	Alexander Thompson	2311909
	03/10/2022	03/14/2022 10:34	Megan Whitefoot	03/15/2022 11:58	McKinley C Carter	2311909
EPA 300.0 Rev. 2.1	03/10/2022			03/17/2022 00:17	Anna M. Plaviak	2311906
	03/10/2022			03/17/2022 03:54	Anna M. Plaviak	2311898
EPA 350.1 Rev. 2.0	03/10/2022			03/11/2022 10:14	Judith K. Clark	2311899
	03/10/2022			03/11/2022 10:15	Judith K. Clark	2311907
EPA 351.2 Rev. 2.0	03/10/2022	03/17/2022 10:56	Samantha L Bates	03/21/2022 12:26	Alexandra J Mattheus	2311899
	03/10/2022	03/17/2022 10:56	Samantha L Bates	03/21/2022 12:28	Alexandra J Mattheus	2311907
EPA 353.2 Rev. 2.0	03/10/2022			03/15/2022 09:40	Beverly Y. Sanders	2311907
	03/10/2022			03/17/2022 11:34	Beverly Y. Sanders	2311899
EPA 365.1 Rev. 2.0	03/10/2022	03/17/2022 15:15	Simonne.V. Calhoun	03/21/2022 15:13	James L Waggerby	2311899
	03/10/2022	03/17/2022 15:15	Simonne.V. Calhoun	03/21/2022 15:14	James L Waggerby	2311907
SM 2320 B-2011	03/10/2022			03/16/2022 01:59	Dale L. Simmons	2311898
	03/10/2022			03/16/2022 02:12	Dale L. Simmons	2311906
SM 2340B	03/10/2022			03/14/2022 22:11	Josef B Mick	2311909
SM 2540 C-2011	03/10/2022			03/14/2022 14:02	Yijie Li	2311906
SM 2540 D-2011	03/10/2022			03/14/2022 15:03	Yijie Li	2311898
SM 4500 F-C-2011	03/10/2022			03/16/2022 01:59	Dale L. Simmons	2311898
	03/10/2022			03/16/2022 02:12	Dale L. Simmons	2311906
SM 5310 B-2011	03/10/2022			03/15/2022 21:17	Khloe J Berg	2311899
	03/10/2022			03/18/2022 19:56	Khloe J Berg	2311907