

Chemical Analysis Report

TLH-ROC-2022-01-26-02

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

Event Description: **Run 2**
Request ID: **RQ-2022-01-17-44**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 17-FEB-2022 10:03

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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: Direct Runoff Gulf ENCOC FCOLI

Collection Date/Time: 01/26/2022 11:10

Field ID: G1TLHR0116

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2301965	EPA 180.1 Rev. 2.0	Turbidity	3.9		NTU	P409103	
	SM 2320 B-2011	Total Alkalinity	87		mg CaCO3/L	P409143	
	SM 2540 D-2011	TSS	8	I	mg/L	P409497	
	SM 4500 F-C-2011	Fluoride	0.26		mg F/L	P409146	
2301967	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P409634	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P409190	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.32		mg N/L	P409317	
	EPA 365.1 Rev. 2.0	Total-P	0.085		mg P/L	P409102	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P409830	
2301969	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.059		mg P/L	P409046	

Ref. Method and Comment:

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

Sample Location: Direct Runoff Gulf @ Mouth

Collection Date/Time: 01/26/2022 11:20

Field ID: G1TLHR0115

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2301966	EPA 180.1 Rev. 2.0	Turbidity	4.2		NTU	P409103	
	SM 2320 B-2011	Total Alkalinity	85		mg CaCO3/L	P409143	
	SM 2540 D-2011	TSS	4	IA	mg/L	P409497	
	SM 4500 F-C-2011	Fluoride	0.26		mg F/L	P409146	
2301968	EPA 350.1 Rev. 2.0	Ammonia-N	0.036		mg N/L	P409634	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P409190	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.33		mg N/L	P409317	
	EPA 365.1 Rev. 2.0	Total-P	0.088		mg P/L	P409102	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P409830	
2301970	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.061		mg P/L	P409046	

Ref. Method and Comment:

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

Sample Location: Steinhatchee River 40m N of Yearling Rd.

Collection Date/Time: 01/26/2022 12:45

Field ID: G1TLHR0065

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2301979	EPA 200.7 Rev. 4.4	Calcium	61.1		mg/L	P409205	
		Iron	570		ug/L	P409205	
		Magnesium	7.17		mg/L	P409205	
		Potassium	0.30	U	mg/L	P409205	
		Sodium	4.6		mg/L	P409205	
		Strontium	107		ug/L	P409205	
		Tin	3.0	U	ug/L	P409205	
		Titanium	1.9	I	ug/L	P409205	
		Vanadium	2.0	U	ug/L	P409205	
		Zinc	5.0	U	ug/L	P409205	
	EPA 200.8 Rev. 5.4	Aluminum	135		ug/L	P409205	
		Antimony	0.050	U	ug/L	P409205	
		Arsenic	0.18	I	ug/L	P409205	
		Barium	9.23		ug/L	P409205	
		Beryllium	0.013	I	ug/L	P409205	
		Boron**	9.4		ug/L	P409205	
		Cadmium	0.020	U	ug/L	P409205	
		Chromium	0.48	I	ug/L	P409205	
		Cobalt	0.127		ug/L	P409205	
		Copper	0.40	U	ug/L	P409205	
		Lead	0.20	U	ug/L	P409205	
		Manganese	45.5		ug/L	P409205	
		Molybdenum	0.15	U	ug/L	P409205	
		Nickel	0.50	U	ug/L	P409205	
		Selenium	0.20	U	ug/L	P409205	
		Silver	0.010	U	ug/L	P409205	
		Thallium	0.10	U	ug/L	P409205	
	SM 2340B	Hardness	182		mg/L	P409205	

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P409103

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P409205

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: P409205

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P409634

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409190

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P409317

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P409102

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P409046

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2320 B-2011
Batch ID: P409143

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

Reference Method: SM 2540 D-2011
Batch ID: P409497

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P409146

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P409830

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P409205

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	106		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Strontium	100		P	85 - 115
Tin	107		P	85 - 115
Titanium	105		P	85 - 115
Vanadium	105		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P409205

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	102		P	85 - 115
Barium	107		P	85 - 115
Beryllium	98.5		P	85 - 115
Boron	100		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	103		P	85 - 115
Copper	102		P	85 - 115
Lead	100		P	85 - 115
Manganese	99.8		P	85 - 115
Molybdenum	102		P	85 - 115
Nickel	103		P	85 - 115
Selenium	101		P	85 - 115
Silver	105		P	85 - 115
Thallium	107		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P409634

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P409190

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: P409317

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P409102

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P409046

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

Reference Method: SM 2320 B-2011
Batch ID: P409143

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.1		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P409146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P409830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P409205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2302002	Calcium	103		P	80 - 120
2302002	Iron	111	106	P/P	80 - 120
2302002	Magnesium	110	104	P/P	80 - 120
2302002	Potassium	108	105	P/P	80 - 120
2302002	Sodium	106	101	P/P	80 - 120
2302002	Strontium	103	99.2	P/P	80 - 120
2302002	Tin	108	106	P/P	80 - 120
2302002	Titanium	107	105	P/P	80 - 120
2302002	Vanadium	106	106	P/P	80 - 120
2302002	Zinc	105	104	P/P	80 - 120
2302107	Calcium	102		P	80 - 120
2302107	Iron	108		P	80 - 120
2302107	Magnesium	106		P	80 - 120
2302107	Potassium	103		P	80 - 120
2302107	Sodium	98.4		P	80 - 120
2302107	Strontium	101		P	80 - 120
2302107	Tin	107		P	80 - 120
2302107	Titanium	106		P	80 - 120
2302107	Vanadium	106		P	80 - 120
2302107	Zinc	108		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P409205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2302002	Aluminum	102	99.8	P/P	80 - 120
2302002	Antimony	103	102	P/P	80 - 120
2302002	Arsenic	98.3	97.9	P/P	80 - 120
2302002	Barium	105	103	P/P	80 - 120
2302002	Beryllium	93.9	92.5	P/P	80 - 120
2302002	Boron	100	97.5	P/P	80 - 120
2302002	Cadmium	103	101	P/P	80 - 120
2302002	Chromium	103	102	P/P	80 - 120
2302002	Cobalt	99.9	98.8	P/P	80 - 120
2302002	Copper	99.4	98.4	P/P	80 - 120
2302002	Lead	98.0	98.0	P/P	80 - 120
2302002	Manganese	96.3	93.0	P/P	80 - 120
2302002	Molybdenum	100	100	P/P	80 - 120
2302002	Nickel	106	100	P/P	80 - 120
2302002	Selenium	96.3	95.3	P/P	80 - 120
2302002	Silver	103	103	P/P	80 - 120
2302002	Thallium	107	107	P/P	80 - 120
2302107	Aluminum	101		P	80 - 120
2302107	Antimony	104		P	80 - 120
2302107	Arsenic	100		P	80 - 120
2302107	Barium	104		P	80 - 120
2302107	Beryllium	95.5		P	80 - 120
2302107	Boron	101		P	80 - 120
2302107	Cadmium	102		P	80 - 120
2302107	Chromium	101		P	80 - 120
2302107	Cobalt	102		P	80 - 120
2302107	Copper	101		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P409205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2302107	Lead	102		P	80 - 120
2302107	Manganese	99.5		P	80 - 120
2302107	Molybdenum	103		P	80 - 120
2302107	Nickel	101		P	80 - 120
2302107	Selenium	99.1		P	80 - 120
2302107	Silver	104		P	80 - 120
2302107	Thallium	109		P	80 - 120

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P409634

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301967	Ammonia-N	97.8	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P409190

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301487	Kjeldahl Nitrogen	95.2	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P409317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301487	NO2NO3-N	98.3	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P409102

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301968	Total-P	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P409046

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301969	O-Phosphate-P	94.2	99.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Batch ID: P409146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2301760	Fluoride	98.6	99.2	P/P	92 - 107

Reference Method: SM 5310 B-2011

Batch ID: P409830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2302038	Organic Carbon	97.1	97.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P409103

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2302040	Turbidity	5.26	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P409205

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2302002	Calcium	3.68	Spike	P	0 - 20
2302002	Iron	3.92	Spike	P	0 - 20
2302002	Magnesium	3.98	Spike	P	0 - 20
2302002	Potassium	3.38	Spike	P	0 - 20
2302002	Sodium	3.42	Spike	P	0 - 20
2302002	Strontium	3.81	Spike	P	0 - 20
2302002	Tin	1.12	Spike	P	0 - 20
2302002	Titanium	1.18	Spike	P	0 - 20
2302002	Vanadium	0.592	Spike	P	0 - 20
2302002	Zinc	1.05	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P409205

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2302002	Aluminum	1.73	Spike	P	0 - 20
2302002	Antimony	1.20	Spike	P	0 - 20
2302002	Arsenic	0.374	Spike	P	0 - 20
2302002	Barium	1.02	Spike	P	0 - 20
2302002	Beryllium	1.33	Spike	P	0 - 20
2302002	Boron	2.41	Spike	P	0 - 20
2302002	Cadmium	2.02	Spike	P	0 - 20
2302002	Chromium	1.01	Spike	P	0 - 20
2302002	Cobalt	1.06	Spike	P	0 - 20
2302002	Copper	1.01	Spike	P	0 - 20
2302002	Lead	0.0354	Spike	P	0 - 20
2302002	Manganese	1.42	Spike	P	0 - 20
2302002	Molybdenum	0.0554	Spike	P	0 - 20
2302002	Nickel	5.52	Spike	P	0 - 20
2302002	Selenium	1.08	Spike	P	0 - 20
2302002	Silver	0.236	Spike	P	0 - 20
2302002	Thallium	0.0833	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P409634

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301967	Ammonia-N	0.716	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409190

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301487	Kjeldahl Nitrogen	3.99	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P409317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301487	NO2NO3-N	0.494	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P409102

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301968	Total-P	0.456	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P409046

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301969	O-Phosphate-P	3.08	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P409143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301760	Total Alkalinity	0.620	Sample	P	0 - 5.2

Reference Method: SM 4500 F-C-2011
Batch ID: P409146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2301760	Fluoride	0.480	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P409830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2302038	Organic Carbon	0.442	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A110067

Included Lab Sample IDs: 2301969, 2301970

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.6	P/P	90 - 110
O-Phosphate-P	99.6	99.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A110086

Included Lab Sample IDs: 2301965, 2301966

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

Reference Method: SM 2320 B-2011

Run ID: A110099

Included Lab Sample IDs: 2301965, 2301966

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.8	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A110099

Included Lab Sample IDs: 2301965, 2301966

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A110160

Included Lab Sample IDs: 2301979

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	102	P/P	90 - 110
Antimony	103	104	P/P	90 - 110
Arsenic	102	101	P/P	90 - 110
Barium	102	102	P/P	90 - 110
Beryllium	95.4	96.7	P/P	90 - 110
Boron	101	103	P/P	90 - 110
Cadmium	102	102	P/P	90 - 110
Chromium	99.9	99.6	P/P	90 - 110
Cobalt	99.9	98.2	P/P	90 - 110
Copper	99.9	98.3	P/P	90 - 110
Lead	98.2	97.5	P/P	90 - 110
Manganese	99.2	99.3	P/P	90 - 110
Molybdenum	102	100	P/P	90 - 110
Nickel	100	98.5	P/P	90 - 110
Selenium	102	101	P/P	90 - 110
Silver	105	104	P/P	90 - 110
Thallium	106	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A110171

Included Lab Sample IDs: 2301967, 2301968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A110187

Included Lab Sample IDs: 2301979

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	101	P/P	95 - 105
Iron	103	102	P/P	95 - 105
Magnesium	102	101	P/P	95 - 105
Potassium	99.5	97.4	P/P	95 - 105
Sodium	102	99.5	P/P	95 - 105
Strontium	103	101	P/P	95 - 105
Tin	102	102	P/P	95 - 105
Titanium	102	101	P/P	95 - 105
Vanadium	101	101	P/P	95 - 105
Zinc	100	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A110201

Included Lab Sample IDs: 2301967, 2301968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	103	P/P	90 - 110
Total-P	103	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A110228

Included Lab Sample IDs: 2301967, 2301968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.4	98.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A110313

Included Lab Sample IDs: 2301967, 2301968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	97.3	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A110410

Included Lab Sample IDs: 2301967, 2301968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.9	97.9	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					5.26	
EPA 200.7 Rev. 4.4	Calcium	104	103	102			3.68
	Iron	106	111	106	108		3.92
	Magnesium	106	110	104	106		3.98
	Potassium	103	108	105	103		3.38
	Sodium	104	106	101	98.4		3.42
	Strontium	100	103	99.2	101		3.81
	Tin	107	108	106	107		1.12
	Titanium	105	107	105	106		1.18
	Vanadium	105	106	106	106		0.592
	Zinc	104	105	104	108		1.05
EPA 200.8 Rev. 5.4	Aluminum	103	102	99.8	101		1.73
	Antimony	103	103	102	104		1.20
	Arsenic	102	98.3	97.9	100		0.374
	Barium	107	105	103	104		1.02
	Beryllium	98.5	93.9	92.5	95.5		1.33
	Boron	100	100	97.5	101		2.41
	Cadmium	101	103	101	102		2.02
	Chromium	101	103	102	101		1.01
	Cobalt	103	99.9	98.8	102		1.06
	Copper	102	99.4	98.4	101		1.01
	Lead	100	98.0	98.0	102		0.0354
	Manganese	99.8	96.3	93.0	99.5		1.42
	Molybdenum	102	100	100	103		0.0554
	Nickel	103	106	100	101		5.52
	Selenium	101	96.3	95.3	99.1		1.08
	Silver	105	103	103	104		0.236
	Thallium	107	107	107	109		0.0833
EPA 350.1 Rev. 2.0	Ammonia-N	95.0	97.8	99.0			0.716
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	95.2	100			3.99
EPA 353.2 Rev. 2.0	NO2NO3-N	100	98.3	98.8			0.494
EPA 365.1 Rev. 2.0	Total-P	105	105	105			0.456
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.5	94.2	99.0			3.08
SM 2320 B-2011	Total Alkalinity	98.1				0.620	
SM 4500 F-C-2011	Fluoride	97.9	98.6	99.2			0.480
SM 5310 B-2011	Organic Carbon	94.2	97.1	97.8			0.442

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2301965, 2301966
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2301979
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2301979
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2301967, 2301968
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2301967, 2301968
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2301967, 2301968
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2301967, 2301968
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2301969, 2301970
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2301965, 2301966
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2301979

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2301965, 2301966
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2301965, 2301966
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2301967, 2301968

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	01/26/2022			01/27/2022 15:28	Khloe J Berg	2301965, 2301966
EPA 200.7 Rev. 4.4	01/26/2022	02/01/2022 10:00	Vijayalakshmi Reddy	02/02/2022 11:53	Josef B Mick	2301979
EPA 200.8 Rev. 5.4	01/26/2022	02/01/2022 10:00	Vijayalakshmi Reddy	02/01/2022 15:47	Alexander Thompson	2301979
EPA 350.1 Rev. 2.0	01/26/2022			02/09/2022 11:42	Roberta Tatti	2301967
	01/26/2022			02/09/2022 11:46	Roberta Tatti	2301968
EPA 351.2 Rev. 2.0	01/26/2022	02/01/2022 09:14	Samantha L Bates	02/03/2022 10:54	Alexandra J Mattheus	2301967
	01/26/2022	02/01/2022 09:14	Samantha L Bates	02/03/2022 10:56	Alexandra J Mattheus	2301968
EPA 353.2 Rev. 2.0	01/26/2022			02/02/2022 09:57	Beverly Y. Sanders	2301967
	01/26/2022			02/02/2022 09:59	Beverly Y. Sanders	2301968
EPA 365.1 Rev. 2.0	01/26/2022	01/28/2022 14:50	Simonne.V. Calhoun	02/02/2022 17:22	Sarah A Nixon	2301967
	01/26/2022	01/28/2022 14:50	Simonne.V. Calhoun	02/02/2022 17:38	Sarah A Nixon	2301968
EPA 365.1 Rev. 2.0 dissolved	01/26/2022			01/27/2022 10:51	James L Waggeberby	2301969
	01/26/2022			01/27/2022 10:58	James L Waggeberby	2301970
SM 2320 B-2011	01/26/2022			01/28/2022 02:12	Dale L. Simmons	2301965
	01/26/2022			01/28/2022 02:41	Dale L. Simmons	2301966
SM 2340B	01/26/2022			02/02/2022 11:53	Josef B Mick	2301979
SM 2540 D-2011	01/26/2022			01/28/2022 14:02	Yijie Li	2301965, 2301966
SM 4500 F-C-2011	01/26/2022			01/28/2022 02:12	Dale L. Simmons	2301965
	01/26/2022			01/28/2022 02:41	Dale L. Simmons	2301966
SM 5310 B-2011	01/26/2022			02/14/2022 19:16	Khloe J Berg	2301967
	01/26/2022			02/14/2022 19:31	Khloe J Berg	2301968