

Chemical Analysis Report

TLH-ROC-2021-02-25-01

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

Event Description: **Run 4a**
Request ID: **RQ-2021-02-22-35**
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.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 19-MAR-2021 09:46

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: Alapaha River Rise @ Suwannee River

Collection Date/Time: 02/25/2021 11:10

Field ID: G1TLHR0046

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2227590	EPA 200.7 Rev. 4.4	Barium	13.5		ug/L	P394326	
		Calcium	2.97		mg/L	P394326	
		Iron	700		ug/L	P394326	
		Magnesium	1.40		mg/L	P394326	
		Manganese	25.0		ug/L	P394326	
		Potassium	2.6		mg/L	P394326	
		Sodium	3.0		mg/L	P394326	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P394326	
		Aluminum	492		ug/L	P394326	
		Antimony	0.050	U	ug/L	P394326	
		Arsenic	0.47		ug/L	P394326	
		Beryllium	0.031	I	ug/L	P394326	
		Boron**	15.9		ug/L	P394326	
		Cadmium	0.020	U	ug/L	P394326	
		Chromium	0.70	I	ug/L	P394326	
		Copper	0.85		ug/L	P394326	
		Lead	0.49		ug/L	P394326	
		Nickel	0.50	U	ug/L	P394326	
		Selenium	0.20	U	ug/L	P394326	
		Silver	0.010	U	ug/L	P394326	
		Thallium	0.10	U	ug/L	P394326	
	SM 2340B	Hardness	13.2		mg/L	P394326	

Sample Location: Middle of Cherry Lake

Collection Date/Time: 02/25/2021 10:05

Field ID: G1TLHR0048

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2227585	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P394234	
	EPA 300.0 Rev. 2.1	Chloride	6.9		mg Cl/L	P394366	
		Sulfate	1.0		mg SO4/L	P394367	
	SM 2120 B-2011	Color (true)	6.8		PCU	P394269	
	SM 2320 B-2011	Total Alkalinity	7.7		mg CaCO3/L	P394513	
	SM 2540 C-2011	TDS	38		mg/L	P394604	
	SM 2540 D-2011	TSS	2	U	mg/L	P394531	
	SM 4500 F-C-2011	Fluoride	0.042	I	mg F/L	P394516	
2227586	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P394330	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.58		mg N/L	P394318	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P394321	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P394334	
	SM 5310 B-2011	Organic Carbon	4.9		mg C/L	P394783	
2227587	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P394224	

Ref. Method and Comment:

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

SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P394234

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P394326

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P394326

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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
Copper	0.40	U	ug/L
Lead	0.20	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 300.0 Rev. 2.1
Batch ID: P394366

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394367

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394330

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P394318

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394321

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394334

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394224

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

Reference Method: SM 2120 B-2011
Batch ID: P394269

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P394513

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

Reference Method: SM 2540 C-2011
Batch ID: P394604

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P394531

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P394516

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P394783

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: P394326

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	111		P	85 - 115
Iron	106		P	85 - 115
Magnesium	105		P	85 - 115
Manganese	101		P	85 - 115
Potassium	103		P	85 - 115
Sodium	108		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P394326

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.6		P	85 - 115
Antimony	98.0		P	85 - 115
Arsenic	98.2		P	85 - 115
Beryllium	89.7		P	85 - 115
Boron	99.4		P	85 - 115
Cadmium	98.0		P	85 - 115
Chromium	95.3		P	85 - 115
Copper	96.2		P	85 - 115
Lead	104		P	85 - 115
Nickel	96.2		P	85 - 115
Selenium	97.6		P	85 - 115
Silver	104		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394366

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394367

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394330

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: P394318

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394321

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394334

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394224

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

Reference Method: SM 2120 B-2011
Batch ID: P394269

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

Reference Method: SM 2320 B-2011
Batch ID: P394513

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	93.6		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P394516

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P394783

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P394326

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227481	Barium	103		P	80 - 120
2227481	Calcium	105		P	80 - 120
2227481	Iron	104		P	80 - 120
2227481	Magnesium	102		P	80 - 120
2227481	Manganese	102		P	80 - 120
2227481	Potassium	101		P	80 - 120
2227481	Sodium	105		P	80 - 120
2227481	Zinc	106		P	80 - 120
2228011	Barium	103	100	P/P	80 - 120
2228011	Calcium	105		P	80 - 120
2228011	Iron	106	103	P/P	80 - 120
2228011	Magnesium	102	99.0	P/P	80 - 120
2228011	Manganese	102	99.3	P/P	80 - 120
2228011	Potassium	102	98.5	P/P	80 - 120
2228011	Sodium	102		P	80 - 120
2228011	Zinc	110	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P394326

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227481	Aluminum	93.1		P	80 - 120
2227481	Antimony	98.1		P	80 - 120
2227481	Arsenic	95.3		P	80 - 120
2227481	Beryllium	89.4		P	80 - 120
2227481	Boron	98.0		P	80 - 120
2227481	Cadmium	98.6		P	80 - 120
2227481	Chromium	94.7		P	80 - 120
2227481	Copper	95.1		P	80 - 120
2227481	Lead	105		P	80 - 120
2227481	Nickel	94.7		P	80 - 120
2227481	Selenium	91.1		P	80 - 120
2227481	Silver	102		P	80 - 120
2227481	Thallium	105		P	80 - 120
2228011	Aluminum	92.3	91.0	P/P	80 - 120
2228011	Antimony	97.0	94.7	P/P	80 - 120
2228011	Arsenic	94.9	94.4	P/P	80 - 120
2228011	Beryllium	91.7	89.4	P/P	80 - 120
2228011	Boron	93.6	93.0	P/P	80 - 120
2228011	Cadmium	96.7	95.1	P/P	80 - 120
2228011	Chromium	94.8	93.6	P/P	80 - 120
2228011	Copper	94.4	92.9	P/P	80 - 120
2228011	Lead	104	100	P/P	80 - 120
2228011	Nickel	94.2	93.4	P/P	80 - 120
2228011	Selenium	93.8	92.7	P/P	80 - 120
2228011	Silver	100	101	P/P	80 - 120
2228011	Thallium	105	102	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P394366

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394366

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227381	Chloride	100	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394367

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227381	Sulfate	98.6	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394330

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227586	Ammonia-N	97.0	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P394318

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227586	Kjeldahl Nitrogen	108	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394321

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227586	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227404	Total-P	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394224

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227405	O-Phosphate-P	98.3	97.9	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P394783

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2227332	Organic Carbon	93.9	93.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P394234

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227520	Turbidity	13.3	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P394326

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2228011	Barium	2.52	Spike	P	0 - 20
2228011	Calcium	3.03	Spike	P	0 - 20
2228011	Iron	2.27	Spike	P	0 - 20
2228011	Magnesium	2.29	Spike	P	0 - 20
2228011	Manganese	2.65	Spike	P	0 - 20
2228011	Potassium	2.57	Spike	P	0 - 20
2228011	Sodium	2.38	Spike	P	0 - 20
2228011	Zinc	2.58	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P394326

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2228011	Aluminum	1.33	Spike	P	0 - 20
2228011	Antimony	2.36	Spike	P	0 - 20
2228011	Arsenic	0.478	Spike	P	0 - 20
2228011	Beryllium	2.51	Spike	P	0 - 20
2228011	Boron	0.486	Spike	P	0 - 20
2228011	Cadmium	1.64	Spike	P	0 - 20
2228011	Chromium	1.28	Spike	P	0 - 20
2228011	Copper	1.62	Spike	P	0 - 20
2228011	Lead	3.39	Spike	P	0 - 20
2228011	Nickel	0.919	Spike	P	0 - 20
2228011	Selenium	1.13	Spike	P	0 - 20
2228011	Silver	0.493	Spike	P	0 - 20
2228011	Thallium	2.40	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P394366

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227381	Chloride	1.23	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P394367

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227381	Sulfate	1.35	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P394330

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227586	Ammonia-N	0.184	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P394318

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227586	Kjeldahl Nitrogen	0.796	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P394321

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227586	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P394334

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227404	Total-P	0.641	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P394224

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227405	O-Phosphate-P	0.381	Spike	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P394269

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227403	Color (true)	1.77	Sample	P	0 - 20

Reference Method: SM 2320 B-2011

Batch ID: P394513

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227604	Total Alkalinity	0.101	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011

Batch ID: P394604

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226811	TDS	8.40	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P394516

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227604	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P394783

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2227332	Organic Carbon	0.740	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: A103775

Included Lab Sample IDs: 2227587

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	98.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A103778

Included Lab Sample IDs: 2227585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A103794

Included Lab Sample IDs: 2227585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A103820

Included Lab Sample IDs: 2227586

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103827

Included Lab Sample IDs: 2227586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	98.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A103842

Included Lab Sample IDs: 2227585

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103858

Included Lab Sample IDs: 2227586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A103898

Included Lab Sample IDs: 2227590

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A103898

Included Lab Sample IDs: 2227590

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.9	99.4	P/P	90 - 110
Iron	96.8	100	P/P	90 - 110
Magnesium	96.2	99.6	P/P	90 - 110
Manganese	101	100	P/P	90 - 110
Potassium	96.2	100	P/P	90 - 110
Sodium	96.7	98.6	P/P	90 - 110
Zinc	94.6	95.2	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A103902

Included Lab Sample IDs: 2227585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	94.2	91.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A103902

Included Lab Sample IDs: 2227585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A103913

Included Lab Sample IDs: 2227586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	107	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A103955

Included Lab Sample IDs: 2227590

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.3	96.0	P/P	90 - 110
Antimony	96.7	96.2	P/P	90 - 110
Arsenic	98.5	97.1	P/P	90 - 110
Beryllium	97.3	96.4	P/P	90 - 110
Boron	103	102	P/P	90 - 110
Cadmium	98.4	98.1	P/P	90 - 110
Chromium	98.3	97.1	P/P	90 - 110
Copper	97.5	95.2	P/P	90 - 110
Lead	108	107	P/P	90 - 110
Nickel	98.8	97.1	P/P	90 - 110
Selenium	98.0	96.7	P/P	90 - 110
Silver	101	101	P/P	90 - 110
Thallium	106	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A104005

Included Lab Sample IDs: 2227586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.0	95.4	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					13.3	
EPA 200.7 Rev. 4.4	Barium	101	103	103	100		2.52
	Calcium	111	105	105			3.03
	Iron	106	104	106	103		2.27
	Magnesium	105	102	102	99.0		2.29
	Manganese	101	102	102	99.3		2.65
	Potassium	103	101	102	98.5		2.57
	Sodium	108	105	102			2.38
	Zinc	104	106	110	107		2.58
EPA 200.8 Rev. 5.4	Aluminum	95.6	92.3	91.0	93.1		1.33
	Antimony	98.0	97.0	94.7	98.1		2.36
	Arsenic	98.2	94.9	94.4	95.3		0.478
	Beryllium	89.7	91.7	89.4	89.4		2.51
	Boron	99.4	93.6	93.0	98.0		0.486
	Cadmium	98.0	96.7	95.1	98.6		1.64
	Chromium	95.3	94.8	93.6	94.7		1.28
	Copper	96.2	94.4	92.9	95.1		1.62
	Lead	104	104	100	105		3.39
	Nickel	96.2	94.2	93.4	94.7		0.919
	Selenium	97.6	93.8	92.7	91.1		1.13
	Silver	104	100	101	102		0.493
	Thallium	103	105	102	105		2.40
EPA 300.0 Rev. 2.1	Chloride	101	100	102			1.23
	Sulfate	102	98.6	100			1.35
EPA 350.1 Rev. 2.0	Ammonia-N	100	97.0	96.8			0.184
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	108	107			0.796
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	101	101			0.0
EPA 365.1 Rev. 2.0	Total-P	107	104	103			0.641
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.4	98.3	97.9			0.381
SM 2120 B-2011	Color (true)	101				1.77	
SM 2320 B-2011	Total Alkalinity	93.6				0.101	
SM 2540 C-2011	TDS					8.40	
SM 4500 F-C-2011	Fluoride	97.1					0.0
SM 5310 B-2011	Organic Carbon	94.6	93.9	93.0			0.740

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2227585
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2227590
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2227590
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2227585
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2227585
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2227586
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2227586
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2227586
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2227586
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2227587
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2227585
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2227585

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2227590
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2227585
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2227585
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2227585
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2227586

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	02/25/2021			02/25/2021 15:03	Yen Ta	2227585
EPA 200.7 Rev. 4.4	02/25/2021	03/01/2021 13:35	Elliott D. Healy	03/04/2021 14:23	Betina Topolski	2227590
EPA 200.8 Rev. 5.4	02/25/2021	03/01/2021 13:35	Elliott D. Healy	03/08/2021 21:06	Alexander Thompson	2227590
EPA 300.0 Rev. 2.1	02/25/2021			03/01/2021 21:09	Lipi Saha	2227585
EPA 350.1 Rev. 2.0	02/25/2021			03/01/2021 18:28	Ping Hua	2227586
EPA 351.2 Rev. 2.0	02/25/2021	03/01/2021 11:47	Yen Ta	03/05/2021 12:02	Virginia P. Brown	2227586
EPA 353.2 Rev. 2.0	02/25/2021			03/01/2021 10:14	Beverly Y. Sanders	2227586
EPA 365.1 Rev. 2.0	02/25/2021	03/02/2021 12:03	Shengyu Wang	03/03/2021 11:46	Shengyu Wang	2227586
EPA 365.1 Rev. 2.0 dissolved	02/25/2021			02/25/2021 14:47	Blanca Fach	2227587
SM 2120 B-2011	02/25/2021			02/25/2021 18:00	Benjamin T. Nordmann	2227585
SM 2320 B-2011	02/25/2021			03/04/2021 02:59	Dale L. Simmons	2227585
SM 2340B	02/25/2021			03/04/2021 14:23	Betina Topolski	2227590
SM 2540 C-2011	02/25/2021			02/26/2021 14:36	Yijie Li	2227585
SM 2540 D-2011	02/25/2021			02/26/2021 14:36	Yijie Li	2227585
SM 4500 F-C-2011	02/25/2021			03/04/2021 02:59	Dale L. Simmons	2227585
SM 5310 B-2011	02/25/2021			03/11/2021 03:22	Madeline Gruver	2227586