

Chemical Analysis Report

TLH-ROC-2019-08-08-01

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

Event Description: **Run 4**
Request ID: **RQ-2019-07-01-51**
Customer: **TLH-ROC**
Project ID: **SMP**

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

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Certified by: Colin Wright, Program Administrator

Date Certified: 04-SEP-2019 09:33

A handwritten signature in black ink, appearing to read "Colin Wright", is shown on a light-colored 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: Apalachicola River 0.8 miles upstream Owl Creek

Collection Date/Time: 08/08/2019 11:30

Field ID: G2TLHR0042

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2110145	EPA 180.1 Rev. 2.0	Turbidity	8.3	A	NTU	P368738	
	EPA 300.0 Rev. 2.1	Chloride	4.9		mg Cl/L	P369215	
		Sulfate	5.5		mg SO4/L	P369218	
		Color (true)	18		PCU	P368727	
	SM 2320 B-97	Total Alkalinity	51		mg CaCO3/L	P369142	
	SM 2540 C-97	TDS	82		mg/L	P368993	
	SM 2540 D-97	TSS	11		mg/L	P368997	
	SM 4500 F-C-97	Fluoride	0.063	I	mg F/L	P369146	
2110146	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P369169	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.24		mg N/L	P369042	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.43		mg N/L	P369031	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P368932	
	SM 5310 B-00	Organic Carbon	3.0		mg C/L	P368815	
2110147	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P368770	
2110150	EPA 200.7 Rev. 4.4	Barium	19.8		ug/L	P368852	
		Calcium	17.0		mg/L	P368852	
		Iron	350		ug/L	P368852	
		Magnesium	2.25		mg/L	P368852	
		Potassium	1.6		mg/L	P368852	
		Sodium	6.3		mg/L	P368852	
		Zinc	5.0	U	ug/L	P368852	
	EPA 200.8 Rev. 5.4	Aluminum	170		ug/L	P368852	
		Antimony	0.050	U	ug/L	P368852	
		Arsenic	0.47		ug/L	P368852	
		Boron**	15.3		ug/L	P368852	
		Cadmium	0.020	U	ug/L	P368852	
		Chromium	0.41	I	ug/L	P368852	
		Copper	0.51	I	ug/L	P368852	
		Lead	0.22	I	ug/L	P368852	
		Nickel	0.50	U	ug/L	P368852	
		Selenium	0.20	U	ug/L	P368852	
		Silver	0.010	U	ug/L	P368852	
		Thallium	0.10	U	ug/L	P368852	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P368738

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368852

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
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: P368852

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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: P369215

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369218

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369169

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: P369042

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369031

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368932

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368770

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

Reference Method: SM 2120 B
Batch ID: P368727

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P369142

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

Reference Method: SM 2540 C-97
Batch ID: P368993

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P368997

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P369146

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P368815

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: P368852

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	98.8		P	85 - 115
Calcium	105		P	85 - 115
Iron	99.9		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	103		P	85 - 115
Sodium	112		P	85 - 115
Zinc	95.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P368852

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	104		P	85 - 115
Boron	101		P	85 - 115
Cadmium	106		P	85 - 115
Chromium	105		P	85 - 115
Copper	101		P	85 - 115
Lead	105		P	85 - 115
Nickel	101		P	85 - 115
Selenium	105		P	85 - 115
Silver	106		P	85 - 115
Thallium	105		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369215

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369218

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369169

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	106		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369042

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.6		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369031

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368932

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368770

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.7		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P368727

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	104		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P369142

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P369146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P368815

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109729	Barium	97.3	96.7	P/P	80 - 120
2109729	Calcium	102	104	P/P	80 - 120
2109729	Iron	97.4	98.0	P/P	80 - 120
2109729	Magnesium	102	103	P/P	80 - 120
2109729	Potassium	105	106	P/P	80 - 120
2109729	Sodium	104	103	P/P	80 - 120
2109729	Zinc	94.5	93.0	P/P	80 - 120
2110452	Barium	96.6		P	80 - 120
2110452	Calcium	97.8		P	80 - 120
2110452	Iron	98.1		P	80 - 120
2110452	Magnesium	98.6		P	80 - 120
2110452	Potassium	99.2		P	80 - 120
2110452	Sodium	105		P	80 - 120
2110452	Zinc	94.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P368852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109729	Aluminum	99.3	101	P/P	80 - 120
2109729	Antimony	103	103	P/P	80 - 120
2109729	Arsenic	105	104	P/P	80 - 120
2109729	Boron	99.4	101	P/P	80 - 120
2109729	Cadmium	105	107	P/P	80 - 120
2109729	Chromium	105	105	P/P	80 - 120
2109729	Copper	103	103	P/P	80 - 120
2109729	Lead	104	105	P/P	80 - 120
2109729	Nickel	101	100	P/P	80 - 120
2109729	Selenium	108	105	P/P	80 - 120
2109729	Silver	106	106	P/P	80 - 120
2109729	Thallium	105	105	P/P	80 - 120
2110452	Aluminum	100		P	80 - 120
2110452	Antimony	103		P	80 - 120
2110452	Arsenic	105		P	80 - 120
2110452	Boron	99.1		P	80 - 120
2110452	Cadmium	104		P	80 - 120
2110452	Chromium	104		P	80 - 120
2110452	Copper	104		P	80 - 120
2110452	Lead	105		P	80 - 120
2110452	Nickel	102		P	80 - 120
2110452	Selenium	105		P	80 - 120
2110452	Silver	106		P	80 - 120
2110452	Thallium	107		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109676	Chloride	97.4	97.6	P/P	90 - 110
2110277	Chloride	97.0		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369218

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109676	Sulfate	101	102	P/P	90 - 110
2110277	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110292	Ammonia-N	106	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369042

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110298	Kjeldahl Nitrogen	96.8	92.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369031

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110154	NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110155	Total-P	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368770

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109725	O-Phosphate-P	97.6	97.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P369146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110276	Fluoride	99.3	99.3	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P368815

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109679	Organic Carbon	99.2	99.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P368738

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110145	Turbidity	10.4	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109729	Barium	0.607	Spike	P	0 - 20
2109729	Calcium	2.32	Spike	P	0 - 20
2109729	Iron	0.661	Spike	P	0 - 20
2109729	Magnesium	0.659	Spike	P	0 - 20
2109729	Potassium	0.435	Spike	P	0 - 20
2109729	Sodium	0.597	Spike	P	0 - 20
2109729	Zinc	1.62	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P368852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109729	Aluminum	1.27	Spike	P	0 - 20
2109729	Antimony	0.140	Spike	P	0 - 20
2109729	Arsenic	0.730	Spike	P	0 - 20
2109729	Boron	1.40	Spike	P	0 - 20
2109729	Cadmium	1.34	Spike	P	0 - 20
2109729	Chromium	0.179	Spike	P	0 - 20
2109729	Copper	0.0753	Spike	P	0 - 20
2109729	Lead	0.434	Spike	P	0 - 20
2109729	Nickel	0.861	Spike	P	0 - 20
2109729	Selenium	2.68	Spike	P	0 - 20
2109729	Silver	0.228	Spike	P	0 - 20
2109729	Thallium	0.712	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109676	Chloride	0.194	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369218

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109676	Sulfate	0.544	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110292	Ammonia-N	0.366	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110298	Kjeldahl Nitrogen	2.44	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369031

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110154	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110155	Total-P	1.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368770

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109725	O-Phosphate-P	0.307	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P368727

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109676	Color (true)	1.93	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P369142

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110276	Total Alkalinity	1.15	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P368993

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109612	TDS	1.02	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P369146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110276	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P368815

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109679	Organic Carbon	0.396	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B
Run ID: A93368
Included Lab Sample IDs: 2110145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	104	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A93369
Included Lab Sample IDs: 2110145

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A93388
Included Lab Sample IDs: 2110147

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

Reference Method: SM 5310 B-00
Run ID: A93412
Included Lab Sample IDs: 2110146

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A93484
Included Lab Sample IDs: 2110150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	97.7	97.9	P/P	90 - 110
Calcium	98.7	98.1	P/P	90 - 110
Iron	97.5	97.9	P/P	90 - 110
Magnesium	96.7	97.0	P/P	90 - 110
Potassium	97.5	97.8	P/P	90 - 110
Sodium	104	106	P/P	90 - 110
Zinc	94.6	94.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A93486
Included Lab Sample IDs: 2110145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.0	97.4	P/P	90 - 110
Sulfate	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A93505
Included Lab Sample IDs: 2110146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	98.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A93511

Included Lab Sample IDs: 2110146

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

Reference Method: SM 2320 B-97

Run ID: A93545

Included Lab Sample IDs: 2110145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	103	104	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A93545

Included Lab Sample IDs: 2110145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A93563

Included Lab Sample IDs: 2110146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	106	109	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A93578

Included Lab Sample IDs: 2110146

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	95.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93758

Included Lab Sample IDs: 2110150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.1	P/P	90 - 110
Antimony	99.0	98.0	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Cadmium	102	102	P/P	90 - 110
Chromium	105	102	P/P	90 - 110
Copper	100	100	P/P	90 - 110
Lead	104	103	P/P	90 - 110
Nickel	99.8	100	P/P	90 - 110
Selenium	102	103	P/P	90 - 110
Silver	106	106	P/P	90 - 110
Thallium	98.6	98.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93935

Included Lab Sample IDs: 2110150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	97.3	99.0	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					10.4	
EPA 200.7 Rev. 4.4	Barium	98.8		97.3	96.7		0.607
	Calcium	105		102	104		2.32
	Iron	99.9		97.4	98.0		0.661
	Magnesium	106		102	103		0.659
	Potassium	103		105	106		0.435
	Sodium	112		104	103		0.597
	Zinc	95.3		94.5	93.0		1.62
EPA 200.8 Rev. 5.4	Aluminum	100		99.3	101		1.27
	Antimony	102		103	103		0.140
	Arsenic	104		105	104		0.730
	Boron	101		99.4	101		1.40
	Cadmium	106		105	107		1.34
	Chromium	105		105	105		0.179
	Copper	101		103	103		0.0753
	Lead	105		104	105		0.434
	Nickel	101		101	100		0.861
	Selenium	105		108	105		2.68
	Silver	106		106	106		0.228
	Thallium	105		105	105		0.712
EPA 300.0 Rev. 2.1	Chloride	97.2		97.4	97.6		0.194
	Sulfate	102		101	102		0.544
EPA 350.1 Rev. 2.0	Ammonia-N	106		106	106		0.366
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.6		96.8	92.8		2.44
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102		100	101		0.496
EPA 365.1 Rev. 2.0	Total-P	98.7		101	102		1.13
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.7		97.6	97.9		0.307
SM 2120 B	Color (true)	104				1.93	
SM 2320 B-97	Total Alkalinity	104				1.15	
SM 2540 C-97	TDS					1.02	
SM 4500 F-C-97	Fluoride	97.9		99.3	99.3		0.0
SM 5310 B-00	Organic Carbon	101		99.2	99.7		0.396

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2110145
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2110150
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2110150
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2110145
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2110145
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2110146
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2110146
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2110146
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2110146

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2110147
SM 2120 B / E31780	True Color measured at 450 nm	2110145
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2110145
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2110145
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2110145
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2110145
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2110146

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	08/08/2019			08/08/2019 17:07	Rosalyn Ballman	2110145
EPA 200.7 Rev. 4.4	08/08/2019	08/12/2019 14:45	Elliott D. Healy	08/13/2019 15:37	Betina Topolski	2110150
EPA 200.8 Rev. 5.4	08/08/2019	08/12/2019 14:45	Elliott D. Healy	08/23/2019 07:38	Martin Acosta	2110150
	08/08/2019	08/12/2019 14:45	Elliott D. Healy	08/30/2019 17:04	Robert K Palmer	2110150
EPA 300.0 Rev. 2.1	08/08/2019			08/16/2019 02:51	Jhamieka S. Greenwood	2110145
EPA 350.1 Rev. 2.0	08/08/2019			08/15/2019 13:15	Ping Hua	2110146
EPA 351.2 Rev. 2.0	08/08/2019	08/14/2019 18:11	Sima Feizi	08/15/2019 21:37	Julia Storbeck	2110146
EPA 353.2 Rev. 2.0	08/08/2019			08/14/2019 11:50	Beverly Y. Sanders	2110146
EPA 365.1 Rev. 2.0	08/08/2019	08/13/2019 12:35	Vijayalakshmi Reddy	08/14/2019 13:02	Lipi Saha	2110146
EPA 365.1 Rev. 2.0 dissolved	08/08/2019			08/08/2019 15:33	Jhamieka S. Greenwood	2110147
SM 2120 B	08/08/2019			08/08/2019 16:48	Madeline Funaro	2110145
SM 2320 B-97	08/08/2019			08/15/2019 12:14	Dale L. Simmons	2110145
SM 2540 C-97	08/08/2019			08/09/2019 15:30	Sima Feizi	2110145
SM 2540 D-97	08/08/2019			08/13/2019 15:51	Rosalyn Ballman	2110145
SM 4500 F-C-97	08/08/2019			08/15/2019 12:14	Dale L. Simmons	2110145
SM 5310 B-00	08/08/2019			08/09/2019 22:30	Madeline Funaro	2110146