Chemical Analysis Report

WAS-SECT-2018-10-24-01

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

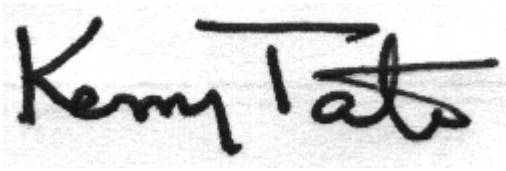
Event Description: **Group 1 LVIs**
Request ID: **RQ-2018-10-22-10**
Customer: **WAS-SECT**
Project ID: **SMP**

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

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 15-NOV-2018 14:41



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 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: JUNIPER CREEK UPSTREAM OF JUNIPER CREEK RD **Collection Date/Time: 10/24/2018 09:01**

Field ID: G1WA0059 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2035493	EPA 180.1 Rev. 2.0	Turbidity	1.7		NTU	P353758	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P353867	
		Sulfate	3.4		mg SO4/L	P353869	
	SM 2120 B	Color (true)	140		PCU	P353618	
	SM 2320 B-97	Total Alkalinity	8.5		mg CaCO3/L	P353898	
	SM 2540 C-97	TDS	72		mg/L	P354124	
	SM 2540 D-97	TSS	4	I	mg/L	P354020	
	SM 4500 F-C-97	Fluoride	0.059	I	mg F/L	P353903	
2035495	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P354089	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P353913	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P353963	
	EPA 365.1 Rev. 2.0	Total-P	0.087		mg P/L	P353664	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P353794	
2035497	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.060		mg P/L	P353642	
2035503	EPA 200.7 Rev. 4.4	Calcium	3.50		mg/L	P353655	
		Iron	810		ug/L	P353655	
		Magnesium	2.23		mg/L	P353655	
		Potassium	3.3		mg/L	P353655	
		Sodium	7.2		mg/L	P353655	
		Zinc	5.0	U	ug/L	P353655	
	EPA 200.8 Rev. 5.4	Arsenic	0.49		ug/L	P353655	
		Cadmium	0.020	U	ug/L	P353655	
		Chromium	0.44	I	ug/L	P353655	
		Copper	0.38	I	ug/L	P353655	
		Lead	0.13	I	ug/L	P353655	
		Nickel	0.25	I	ug/L	P353655	
		Silver	0.010	U	ug/L	P353655	

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

Sample Location: LAKE TOM JOHN MIDDLE **Collection Date/Time: 10/24/2018 11:33**

Field ID: G1WA0043 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2035494	EPA 180.1 Rev. 2.0	Turbidity	0.75		NTU	P353758	
	EPA 300.0 Rev. 2.1	Chloride	7.1		mg Cl/L	P353867	
		Sulfate	0.20	U	mg SO4/L	P353869	
	SM 2120 B	Color (true)	9.1		PCU	P353618	
	SM 2320 B-97	Total Alkalinity	13		mg CaCO3/L	P353898	
	SM 2540 C-97	TDS	30		mg/L	P354124	
	SM 2540 D-97	TSS	2	I	mg/L	P354020	
	SM 4500 F-C-97	Fluoride	0.047	I	mg F/L	P353903	
2035496	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P354089	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38		mg N/L	P353913	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P353963	
	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P353664	
	SM 5310 B-00	Organic Carbon	4.7		mg C/L	P353794	
2035498	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P353642	
2035504	EPA 200.7 Rev. 4.4	Calcium	4.43		mg/L	P353655	
		Iron	100	I	ug/L	P353655	
		Magnesium	2.13		mg/L	P353655	
		Potassium	0.30	U	mg/L	P353655	
		Sodium	3.0		mg/L	P353655	
		Zinc	5.0	U	ug/L	P353655	
	EPA 200.8 Rev. 5.4	Arsenic	1.09		ug/L	P353655	
		Cadmium	0.020	U	ug/L	P353655	
		Chromium	0.40	U	ug/L	P353655	
		Copper	0.20	U	ug/L	P353655	
		Lead	0.050	U	ug/L	P353655	
		Nickel	0.20	U	ug/L	P353655	
		Silver	0.010	U	ug/L	P353655	

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: P353758

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P353655

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
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353655

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353867

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353869

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354089

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P353913

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: P353963

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P353664

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P353642

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

Reference Method: SM 2120 B
Batch ID: P353618

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P353898

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

Reference Method: SM 2540 C-97
Batch ID: P354124

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P354020

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P353903

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P353794

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: P353655

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	102		P	85 - 115
Sodium	103		P	85 - 115
Zinc	99.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353655

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.9		P	85 - 115
Cadmium	96.3		P	85 - 115
Chromium	97.3		P	85 - 115
Copper	99.0		P	85 - 115
Lead	93.1		P	85 - 115
Nickel	99.5		P	85 - 115
Silver	96.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353867

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353869

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354089

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P353913

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P353963

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P353664

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P353642

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

Reference Method: SM 2120 B
Batch ID: P353618

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

Reference Method: SM 2320 B-97
Batch ID: P353898

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P353903

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P353794

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P353655

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2034830	Calcium	104		P	80 - 120
2034830	Iron	106	104	P/P	80 - 120
2034830	Magnesium	107	104	P/P	80 - 120
2034830	Potassium	105	103	P/P	80 - 120
2034830	Sodium	105		P	80 - 120
2034830	Zinc	102	100	P/P	80 - 120
2035504	Calcium	102		P	80 - 120
2035504	Iron	105		P	80 - 120
2035504	Magnesium	107		P	80 - 120
2035504	Potassium	105		P	80 - 120
2035504	Sodium	109		P	80 - 120
2035504	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353655

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2034830	Arsenic	102	100	P/P	80 - 120
2034830	Cadmium	99.2	97.9	P/P	80 - 120
2034830	Chromium	98.6	96.6	P/P	80 - 120
2034830	Copper	99.6	98.3	P/P	80 - 120
2034830	Lead	95.7	94.8	P/P	80 - 120
2034830	Nickel	99.0	97.0	P/P	80 - 120
2034830	Silver	96.3	96.0	P/P	80 - 120
2035504	Arsenic	101		P	80 - 120
2035504	Cadmium	101		P	80 - 120
2035504	Chromium	99.5		P	80 - 120
2035504	Copper	102		P	80 - 120
2035504	Lead	97.2		P	80 - 120
2035504	Nickel	99.5		P	80 - 120
2035504	Silver	97.6		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353867

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035468	Chloride	96.4		P	90 - 110
2035859	Chloride	99.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353869

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035468	Sulfate	98.8		P	90 - 110
2035859	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354089

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035461	Ammonia-N	103	102	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P353913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035471	Kjeldahl Nitrogen	101	99.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P353963

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035473	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P353664

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035471	Total-P	98.8	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P353642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035474	O-Phosphate-P	96.6	97.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P353903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035886	Fluoride	98.9	100	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P353794

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2035305	Organic Carbon	95.2	95.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P353758

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035470	Turbidity	1.48	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P353655

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2034830	Calcium	2.34	Spike	P	0 - 20
2034830	Iron	2.41	Spike	P	0 - 20
2034830	Magnesium	2.09	Spike	P	0 - 20
2034830	Potassium	1.74	Spike	P	0 - 20
2034830	Sodium	1.76	Spike	P	0 - 20
2034830	Zinc	2.39	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P353655

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2034830	Arsenic	1.63	Spike	P	0 - 20
2034830	Cadmium	1.34	Spike	P	0 - 20
2034830	Chromium	2.01	Spike	P	0 - 20
2034830	Copper	1.23	Spike	P	0 - 20
2034830	Lead	0.874	Spike	P	0 - 20
2034830	Nickel	2.12	Spike	P	0 - 20
2034830	Silver	0.283	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353867

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035468	Chloride	0.272	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P353869

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035468	Sulfate	0.0136	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035461	Ammonia-N	0.605	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P353913

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035471	Kjeldahl Nitrogen	0.703	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P353963

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035473	NO2NO3-N	0.962	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P353664

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035471	Total-P	2.96	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P353642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035474	O-Phosphate-P	0.722	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P353618

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035460	Color (true)	3.82	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P353898

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035886	Total Alkalinity	0.504	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P354124

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035460	TDS	7.96	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P353903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035886	Fluoride	0.940	Spike	P	0 - 3.5

Quality Assurance Report
Precision

Reference Method: SM 5310 B-00
Batch ID: P353794

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2035305	Organic Carbon	0.231	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: A87259
Included Lab Sample IDs: 2035493, 2035494

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A87273
Included Lab Sample IDs: 2035497, 2035498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A87310
Included Lab Sample IDs: 2035495

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A87319
Included Lab Sample IDs: 2035496

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A87320
Included Lab Sample IDs: 2035493, 2035494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	101	P/P	95 - 105

Reference Method: SM 5310 B-00
Run ID: A87335
Included Lab Sample IDs: 2035495, 2035496

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.8	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A87368
Included Lab Sample IDs: 2035493, 2035494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	104	104	P/P	90 - 110
Sulfate	102	103	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A87382
Included Lab Sample IDs: 2035493, 2035494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A87382
Included Lab Sample IDs: 2035493, 2035494

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A87399
Included Lab Sample IDs: 2035503, 2035504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	104	P/P	90 - 110
Calcium	104	102	P/P	90 - 110
Iron	101	103	P/P	90 - 110
Iron	103	101	P/P	90 - 110
Magnesium	100	102	P/P	90 - 110
Magnesium	102	100	P/P	90 - 110
Potassium	102	105	P/P	90 - 110
Potassium	105	103	P/P	90 - 110
Sodium	105	107	P/P	90 - 110
Sodium	107	104	P/P	90 - 110
Zinc	101	100	P/P	90 - 110
Zinc	98.5	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A87400
Included Lab Sample IDs: 2035503, 2035504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.3	98.5	P/P	90 - 110
Arsenic	99.5	98.3	P/P	90 - 110
Cadmium	97.6	98.1	P/P	90 - 110
Cadmium	98.1	97.4	P/P	90 - 110
Chromium	100	99.2	P/P	90 - 110
Chromium	99.1	100	P/P	90 - 110
Copper	101	102	P/P	90 - 110
Copper	101	101	P/P	90 - 110
Lead	95.8	96.4	P/P	90 - 110
Lead	96.4	96.7	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Silver	95.2	95.4	P/P	90 - 110
Silver	95.4	95.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A87412
Included Lab Sample IDs: 2035495, 2035496

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A87414
Included Lab Sample IDs: 2035495, 2035496

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	109	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A87465
Included Lab Sample IDs: 2035495, 2035496

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	105	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
EPA 180.1 Rev. 2.0	Turbidity						1.48	
EPA 200.7 Rev. 4.4	Calcium	103	104	102				2.34
	Iron	105	106	104	105			2.41
	Magnesium	107	107	104	107			2.09
	Potassium	102	105	103	105			1.74
	Sodium	103	105	109				1.76
	Zinc	99.2	102	100	101			2.39
EPA 200.8 Rev. 5.4	Arsenic	99.9	102	100	101			1.63
	Cadmium	96.3	99.2	97.9	101			1.34
	Chromium	97.3	98.6	96.6	99.5			2.01
	Copper	99.0	99.6	98.3	102			1.23
	Lead	93.1	95.7	94.8	97.2			0.874
	Nickel	99.5	99.0	97.0	99.5			2.12
	Silver	96.0	96.3	96.0	97.6			0.283
EPA 300.0 Rev. 2.1	Chloride	101	96.4	99.8			0.272	
	Sulfate	99.7	98.8	100			0.0136	
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	102				0.605
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	101	99.9				0.703
EPA 353.2 Rev. 2.0	NO2NO3-N	101	104	104				0.962
EPA 365.1 Rev. 2.0	Total-P	99.0	98.8	102				2.96
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	96.6	97.3				0.722
SM 2120 B	Color (true)	102					3.82	
SM 2320 B-97	Total Alkalinity	102					0.504	
SM 2540 C-97	TDS						7.96	
SM 4500 F-C-97	Fluoride	99.1	98.9	100				0.940
SM 5310 B-00	Organic Carbon	96.1	95.2	95.6				0.231

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2035493, 2035494
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2035503, 2035504
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2035503, 2035504
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2035493, 2035494
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2035493, 2035494
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2035495, 2035496
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2035495, 2035496
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2035495, 2035496
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2035495, 2035496
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2035497, 2035498
SM 2120 B / E31780	True Color measured at 450 nm	2035493, 2035494
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2035493, 2035494
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2035493, 2035494
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2035493, 2035494
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2035493, 2035494

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2035495, 2035496

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	10/24/2018			10/24/2018 17:02	Megan Treadwell	2035493, 2035494
EPA 200.7 Rev. 4.4	10/24/2018	10/25/2018 15:04	Devin Thornton	10/30/2018 21:55	Betina Topolski	2035503
	10/24/2018	10/25/2018 15:04	Devin Thornton	10/30/2018 22:27	Betina Topolski	2035504
EPA 200.8 Rev. 5.4	10/24/2018	10/25/2018 15:04	Devin Thornton	10/31/2018 03:03	Robert K Palmer	2035503
	10/24/2018	10/25/2018 15:04	Devin Thornton	10/31/2018 03:31	Robert K Palmer	2035504
EPA 300.0 Rev. 2.1	10/24/2018			10/30/2018 01:11	Irina Carbone	2035493
	10/24/2018			10/30/2018 01:23	Irina Carbone	2035494
EPA 350.1 Rev. 2.0	10/24/2018			11/01/2018 12:29	Ping Hua	2035495
	10/24/2018			11/01/2018 12:30	Ping Hua	2035496
EPA 351.2 Rev. 2.0	10/24/2018	10/30/2018 11:55	Adrian Shelby	10/31/2018 12:28	Virginia P. Brown	2035495
	10/24/2018	10/30/2018 11:55	Adrian Shelby	10/31/2018 12:30	Virginia P. Brown	2035496
EPA 353.2 Rev. 2.0	10/24/2018			10/31/2018 10:13	Beverly Y. Sanders	2035495
	10/24/2018			10/31/2018 10:14	Beverly Y. Sanders	2035496
EPA 365.1 Rev. 2.0	10/24/2018	10/25/2018 12:50	Sima Feizi	10/26/2018 09:42	Beverly Y. Sanders	2035495
	10/24/2018	10/25/2018 12:50	Sima Feizi	10/26/2018 13:41	Beverly Y. Sanders	2035496
EPA 365.1 Rev. 2.0 dissolved	10/24/2018			10/24/2018 18:17	Julia Storbeck	2035497
	10/24/2018			10/24/2018 18:18	Julia Storbeck	2035498
SM 2120 B	10/24/2018			10/24/2018 16:32	Chelsea Hernandez	2035493
	10/24/2018			10/24/2018 16:33	Chelsea Hernandez	2035494
SM 2320 B-97	10/24/2018			10/29/2018 05:28	Dale L. Simmons	2035493
	10/24/2018			10/29/2018 05:39	Dale L. Simmons	2035494
SM 2540 C-97	10/24/2018			10/25/2018 15:41	Yijie Li	2035493, 2035494
SM 2540 D-97	10/24/2018			10/25/2018 15:41	Yijie Li	2035493, 2035494
SM 4500 F-C-97	10/24/2018			10/29/2018 05:28	Dale L. Simmons	2035493
	10/24/2018			10/29/2018 05:39	Dale L. Simmons	2035494
SM 5310 B-00	10/24/2018			10/27/2018 01:07	Megan Treadwell	2035495
	10/24/2018			10/27/2018 01:22	Megan Treadwell	2035496