Chemical Analysis Report

WAS-SECT-2018-06-07-01

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

Event Description: **Swamp Creek SCI**
Request ID: **RQ-2018-06-04-36**
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: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 02-JUL-2018 11:27

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: Swamp Creek upstream of Railroad **Collection Date/Time: 06/07/2018 08:10**

Field ID: G1WA0052 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1998789	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P346576	
	EPA 300.0 Rev. 2.1	Chloride	9.4	A	mg Cl/L	P346891	
		Sulfate	2.7	A	mg SO4/L	P346894	
	SM 2120 B	Color (true)	130		PCU	P346560	
	SM 2320 B-97	Total Alkalinity	22		mg CaCO3/L	P347034	RPD
	SM 2540 C-97	TDS	90		mg/L	P346825	
	SM 2540 D-97	TSS	10		mg/L	P346713	
	SM 4500 F-C-97	Fluoride	0.15		mg F/L	P347038	
1998790	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P347106	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.57		mg N/L	P347195	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.14		mg N/L	P346917	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P346974	
	SM 5310 B-00	Organic Carbon	10		mg C/L	P346718	
1998791	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.065		mg P/L	P346573	
1998831	EPA 200.7 Rev. 4.4	Calcium	7.29		mg/L	P346690	
		Iron	2.23E+03		ug/L	P346690	
		Magnesium	2.96		mg/L	P346690	
		Potassium	1.6		mg/L	P346690	
		Sodium	6.0		mg/L	P346690	
		Zinc	5.0	U	ug/L	P346690	
	EPA 200.8 Rev. 5.4	Arsenic	1.29		ug/L	P346690	
		Cadmium	0.020	U	ug/L	P346690	
		Chromium	0.97	I	ug/L	P346690	
		Copper	0.53	I	ug/L	P346690	
		Lead	0.43		ug/L	P346690	
		Nickel	0.39	I	ug/L	P346690	
		Silver	0.010	U	ug/L	P346690	

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: P346576

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346690

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: P346690

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: P346891

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346894

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347106

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347195

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: P346917

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P346974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346573

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

Reference Method: SM 2120 B
Batch ID: P346560

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P347034

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

Reference Method: SM 2540 C-97
Batch ID: P346825

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P346713

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P347038

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P346718

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: P346690

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	104		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	101		P	85 - 115
Sodium	100		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346690

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	99.7		P	85 - 115
Chromium	94.0		P	85 - 115
Copper	95.3		P	85 - 115
Lead	95.0		P	85 - 115
Nickel	99.7		P	85 - 115
Silver	98.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346891

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346894

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347106

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: P347195

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P346917

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: P346974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346573

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

Reference Method: SM 2320 B-97
Batch ID: P347034

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P347038

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P346718

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346690

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998652	Calcium	103		P	80 - 120
1998652	Iron	104		P	80 - 120
1998652	Magnesium	107		P	80 - 120
1998652	Potassium	100		P	80 - 120
1998652	Sodium	98.7		P	80 - 120
1998652	Zinc	103		P	80 - 120
1999156	Calcium	107	107	P/P	80 - 120
1999156	Iron	105	105	P/P	80 - 120
1999156	Magnesium	108	109	P/P	80 - 120
1999156	Potassium	106	106	P/P	80 - 120
1999156	Sodium	101	102	P/P	80 - 120
1999156	Zinc	105	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346690

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998652	Arsenic	99.1		P	80 - 120
1998652	Cadmium	98.8		P	80 - 120
1998652	Chromium	93.7		P	80 - 120
1998652	Copper	95.5		P	80 - 120
1998652	Lead	95.2		P	80 - 120
1998652	Nickel	97.9		P	80 - 120
1998652	Silver	98.4		P	80 - 120
1999156	Arsenic	102	100	P/P	80 - 120
1999156	Cadmium	103	102	P/P	80 - 120
1999156	Chromium	97.1	96.3	P/P	80 - 120
1999156	Copper	98.5	97.9	P/P	80 - 120
1999156	Lead	98.4	97.1	P/P	80 - 120
1999156	Nickel	100	99.1	P/P	80 - 120
1999156	Silver	102	100	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346891

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998789	Chloride	94.6		P	90 - 110
1999065	Chloride	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346894

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998789	Sulfate	94.4		P	90 - 110
1999065	Sulfate	99.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347106

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998734	Ammonia-N	103	105	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347195

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998739	Kjeldahl Nitrogen	95.9	94.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P346917

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998740	NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P346974

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998733	Total-P	101	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346573

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998741	O-Phosphate-P	96.0	96.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P347038

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2000390	Fluoride	93.8	93.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P346718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1998733	Organic Carbon	100	100	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P346576

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998648	Turbidity	7.58	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P346690

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999156	Calcium	0.0492	Spike	P	0 - 20
1999156	Iron	0.344	Spike	P	0 - 20
1999156	Magnesium	0.676	Spike	P	0 - 20
1999156	Potassium	0.169	Spike	P	0 - 20
1999156	Sodium	0.390	Spike	P	0 - 20
1999156	Zinc	0.393	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P346690

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1999156	Arsenic	1.38	Spike	P	0 - 20
1999156	Cadmium	0.886	Spike	P	0 - 20
1999156	Chromium	0.884	Spike	P	0 - 20
1999156	Copper	0.648	Spike	P	0 - 20
1999156	Lead	1.35	Spike	P	0 - 20
1999156	Nickel	1.37	Spike	P	0 - 20
1999156	Silver	1.34	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346891

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998789	Chloride	1.30	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346894

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998789	Sulfate	0.0844	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347106

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998734	Ammonia-N	1.45	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P347195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998739	Kjeldahl Nitrogen	0.949	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P346917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998740	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P346974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998733	Total-P	4.09	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P346573

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998741	O-Phosphate-P	0.157	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P346560

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998729	Color (true)	0.433	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P347034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2000390	Total Alkalinity	9.16	Sample	F	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P346825

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998726	TDS	7.73	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P347038

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2000390	Fluoride	0.0	Spike	P	0 - 3.5

Quality Assurance Report
Precision

Reference Method: SM 5310 B-00
Batch ID: P346718

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1998733	Organic Carbon	0.150	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: A84433
Included Lab Sample IDs: 1998789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	100	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A84438
Included Lab Sample IDs: 1998791

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	96.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A84439
Included Lab Sample IDs: 1998789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.0	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A84498
Included Lab Sample IDs: 1998789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.5	102	P/P	90 - 110
Sulfate	95.9	102	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A84511
Included Lab Sample IDs: 1998790

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.8	97.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A84532
Included Lab Sample IDs: 1998831

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	100	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Chromium	98.3	96.9	P/P	90 - 110
Copper	99.3	98.3	P/P	90 - 110
Lead	98.2	97.4	P/P	90 - 110
Nickel	100	98.6	P/P	90 - 110
Silver	100	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A84559
Included Lab Sample IDs: 1998831

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	100	P/P	90 - 110
Iron	99.6	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A84559
Included Lab Sample IDs: 1998831

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	101	102	P/P	90 - 110
Potassium	97.7	99.2	P/P	90 - 110
Sodium	95.8	97.3	P/P	90 - 110
Zinc	102	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A84590
Included Lab Sample IDs: 1998790

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: A84646
Included Lab Sample IDs: 1998789

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

Reference Method: SM 4500 F-C-97
Run ID: A84646
Included Lab Sample IDs: 1998789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A84661
Included Lab Sample IDs: 1998790

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A84675
Included Lab Sample IDs: 1998790

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A84816
Included Lab Sample IDs: 1998790

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.8	95.9	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		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						7.58	
EPA 200.7 Rev. 4.4	Calcium	106	103	107	107			0.0492
	Iron	104	104	105	105			0.344
	Magnesium	108	107	108	109			0.676
	Potassium	101	100	106	106			0.169
	Sodium	100	98.7	101	102			0.390
	Zinc	103	103	105	105			0.393
EPA 200.8 Rev. 5.4	Arsenic	100	99.1	102	100			1.38
	Cadmium	99.7	98.8	103	102			0.886
	Chromium	94.0	93.7	97.1	96.3			0.884
	Copper	95.3	95.5	98.5	97.9			0.648
	Lead	95.0	95.2	98.4	97.1			1.35
	Nickel	99.7	97.9	100	99.1			1.37
	Silver	98.1	98.4	102	100			1.34
EPA 300.0 Rev. 2.1	Chloride	99.4	94.6	98.5			1.30	
	Sulfate	97.7	94.4	99.3			0.0844	
EPA 350.1 Rev. 2.0	Ammonia-N	106	103	105				1.45
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.5	95.9	94.9				0.949
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.0					0.0
EPA 365.1 Rev. 2.0	Total-P	102	101	105				4.09
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.0	96.2				0.157
SM 2120 B	Color (true)						0.433	
SM 2320 B-97	Total Alkalinity	100					9.16	
SM 2540 C-97	TDS						7.73	
SM 4500 F-C-97	Fluoride	98.1	93.8	93.8				0.0
SM 5310 B-00	Organic Carbon	98.2	100	100				0.150

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1998789
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1998831
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1998831
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1998789
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1998789
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1998790
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1998790
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1998790
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1998790
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1998791
SM 2120 B / E31780	True Color measured at 450 nm	1998789
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1998789
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1998789
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	1998789
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1998789

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1998790

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	06/07/2018			06/07/2018 16:41	William L. Brown IV	1998789
EPA 200.7 Rev. 4.4	06/07/2018	06/11/2018 17:10	Elliott D. Healy	06/12/2018 17:11	Betina Topolski	1998831
EPA 200.8 Rev. 5.4	06/07/2018	06/11/2018 17:10	Elliott D. Healy	06/12/2018 17:59	Nadine Brooks	1998831
EPA 300.0 Rev. 2.1	06/07/2018			06/13/2018 21:58	Lipi Saha	1998789
EPA 350.1 Rev. 2.0	06/07/2018			06/18/2018 10:27	Ping Hua	1998790
EPA 351.2 Rev. 2.0	06/07/2018	06/20/2018 11:00	Adrian Shelby	06/22/2018 14:27	Tanya Welborn	1998790
EPA 353.2 Rev. 2.0	06/07/2018			06/14/2018 12:44	Lauren Bottorf	1998790
EPA 365.1 Rev. 2.0	06/07/2018	06/14/2018 12:39	Sima Feizi	06/18/2018 11:39	Beverly Y. Sanders	1998790
EPA 365.1 Rev. 2.0 dissolved	06/07/2018			06/07/2018 16:54	Megan Treadwell	1998791
SM 2120 B	06/07/2018			06/07/2018 15:14	Julia Storbeck	1998789
SM 2320 B-97	06/07/2018			06/16/2018 12:29	Dale L. Simmons	1998789
SM 2540 C-97	06/07/2018			06/08/2018 15:41	William L. Brown IV	1998789
SM 2540 D-97	06/07/2018			06/08/2018 16:15	William L. Brown IV	1998789
SM 4500 F-C-97	06/07/2018			06/16/2018 12:29	Dale L. Simmons	1998789
SM 5310 B-00	06/07/2018			06/11/2018 23:55	Megan Treadwell	1998790