Chemical Analysis Report

NW-DIST-2018-05-16-01

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

Event Description: **Escambia River Run**
Request ID: **RQ-2018-05-14-24**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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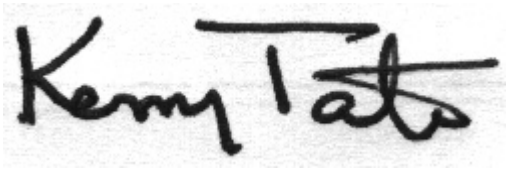
Date Certified: 18-JUN-2018 14:31



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: Escambia River upstream of Mitchell Creek **Collection Date/Time: 05/15/2018 11:20**

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1992934	EPA 180.1 Rev. 2.0	Turbidity	7.4		NTU	P345455	
	EPA 300.0 Rev. 2.1	Chloride	8.3		mg Cl/L	P345580	
		Sulfate	15		mg SO4/L	P345583	
	SM 2120 B	Color (true)	32		PCU	P345423	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P345631	
	SM 2540 C-97	TDS	83		mg/L	P346039	
	SM 2540 D-97	TSS	12		mg/L	P345880	
	SM 4500 F-C-97	Fluoride	0.041	I	mg F/L	P345632	
1992936	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P345574	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.24		mg N/L	P345566	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P345509	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P345514	
	SM 5310 B-00	Organic Carbon	3.5		mg C/L	P345625	
1992938	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.018		mg P/L	P345462	
1992956	EPA 200.7 Rev. 4.4	Calcium	13.9		mg/L	P345478	
		Iron	1.04E+03		ug/L	P345478	
		Magnesium	1.52		mg/L	P345478	
		Potassium	1.1	I	mg/L	P345478	
		Sodium	11.2		mg/L	P345478	
		Zinc	5.0	U	ug/L	P345478	
	EPA 200.8 Rev. 5.4	Arsenic	0.58		ug/L	P345478	
		Cadmium	0.020	U	ug/L	P345478	
		Chromium	0.59	I	ug/L	P345478	
		Copper	0.32	I	ug/L	P345478	
		Lead	0.26		ug/L	P345478	
		Nickel	0.58	I	ug/L	P345478	
		Silver	0.010	U	ug/L	P345478	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Escambia River downstream of Cotton Lake **Collection Date/Time: 05/15/2018 12:30**

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1992935	EPA 180.1 Rev. 2.0	Turbidity	6.6		NTU	P345455	
	EPA 300.0 Rev. 2.1	Chloride	8.3		mg Cl/L	P345580	
		Sulfate	14		mg SO4/L	P345583	
	SM 2120 B	Color (true)	35		PCU	P345423	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P345631	
	SM 2540 C-97	TDS	77		mg/L	P346039	
	SM 2540 D-97	TSS	15		mg/L	P345880	
	SM 4500 F-C-97	Fluoride	0.039	I	mg F/L	P345632	
1992937	EPA 350.1 Rev. 2.0	Ammonia-N	0.030		mg N/L	P345574	

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1992937	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P345566	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.39		mg N/L	P345509	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P345514	
	SM 5310 B-00	Organic Carbon	3.3		mg C/L	P345625	
1992939	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.014		mg P/L	P345462	
1992957	EPA 200.7 Rev. 4.4	Calcium	13.5		mg/L	P345478	
		Iron	1.11E+03		ug/L	P345478	
		Magnesium	1.52		mg/L	P345478	
		Potassium	1.1	I	mg/L	P345478	
		Sodium	11.3		mg/L	P345478	
		Zinc	5.0	U	ug/L	P345478	
	EPA 200.8 Rev. 5.4	Arsenic	0.59		ug/L	P345478	
		Cadmium	0.020	U	ug/L	P345478	
		Chromium	0.64	I	ug/L	P345478	
		Copper	0.33	I	ug/L	P345478	
		Lead	0.31		ug/L	P345478	
		Nickel	0.58	I	ug/L	P345478	
		Silver	0.010	U	ug/L	P345478	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Escambia River upstream Golf Power Discharge **Collection Date/Time: 05/15/2018 14:05**

Field ID: G4NW0264 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1992940	EPA 180.1 Rev. 2.0	Turbidity	5.2		NTU	P345455	
	EPA 300.0 Rev. 2.1	Chloride	990		mg Cl/L	P345580	
		Sulfate	150		mg SO4/L	P345583	
	SM 2120 B	Color (true)	18		PCU	P345423	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P345631	
	SM 2540 C-97	TDS	1.76E+03		mg/L	P346039	
	SM 2540 D-97	TSS	4	I	mg/L	P345880	
	SM 4500 F-C-97	Fluoride	0.093	I	mg F/L	P345632	
1992941	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P345574	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.23		mg N/L	P345566	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.37		mg N/L	P345509	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P345514	
	SM 5310 B-00	Organic Carbon	3.2		mg C/L	P345625	
1992942	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P345462	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P345455

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345478

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: P345478

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: P345580

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345583

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P345574

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P345566

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: P345509

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345514

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345462

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

Reference Method: SM 2120 B
Batch ID: P345423

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P345631

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

Reference Method: SM 2540 C-97
Batch ID: P346039

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P345880

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P345632

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P345625

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: P345478

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	103		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	98.4		P	85 - 115
Sodium	99.7		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345478

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	91.9		P	85 - 115
Copper	97.8		P	85 - 115
Lead	96.3		P	85 - 115
Nickel	101		P	85 - 115
Silver	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345580

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345583

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P345574

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P345566

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345509

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345514

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345462

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

Reference Method: SM 2320 B-97
Batch ID: P345631

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

Reference Method: SM 4500 F-C-97
Batch ID: P345632

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.8		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P345625

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1993037	Calcium	99.1		P	80 - 120
1993037	Iron	104	102	P/P	80 - 120
1993037	Magnesium	101		P	80 - 120
1993037	Potassium	97.1	94.0	P/P	80 - 120
1993037	Sodium	98.0		P	80 - 120
1993037	Zinc	102	99.4	P/P	80 - 120
1993209	Calcium	101		P	80 - 120
1993209	Iron	102		P	80 - 120
1993209	Magnesium	102		P	80 - 120
1993209	Potassium	97.7		P	80 - 120
1993209	Sodium	99.4		P	80 - 120
1993209	Zinc	99.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1993037	Arsenic	102	101	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1993037	Cadmium	99.8	98.6	P/P	80 - 120
1993037	Chromium	91.2	89.1	P/P	80 - 120
1993037	Copper	96.7	95.2	P/P	80 - 120
1993037	Lead	96.8	95.2	P/P	80 - 120
1993037	Nickel	99.5	98.5	P/P	80 - 120
1993037	Silver	100	97.9	P/P	80 - 120
1993209	Arsenic	102		P	80 - 120
1993209	Cadmium	103		P	80 - 120
1993209	Chromium	91.6		P	80 - 120
1993209	Copper	95.6		P	80 - 120
1993209	Lead	97.0		P	80 - 120
1993209	Nickel	98.9		P	80 - 120
1993209	Silver	102		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345580

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992902	Chloride	100		P	90 - 110
1992964	Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345583

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992902	Sulfate	99.9		P	90 - 110
1992964	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P345574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992825	Ammonia-N	99.3	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345509

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992907	NO2NO3-N	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992907	Total-P	97.8	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345462

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992908	O-Phosphate-P	96.8	97.0	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P345632

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992904	Fluoride	95.0	95.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P345625

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1992936	Organic Carbon	99.6	98.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P345455

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992963	Turbidity	8.05	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1993037	Calcium	2.40	Spike	P	0 - 20
1993037	Iron	1.23	Spike	P	0 - 20
1993037	Magnesium	2.10	Spike	P	0 - 20
1993037	Potassium	1.86	Spike	P	0 - 20
1993037	Sodium	1.73	Spike	P	0 - 20
1993037	Zinc	2.77	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1993037	Arsenic	1.05	Spike	P	0 - 20
1993037	Cadmium	1.17	Spike	P	0 - 20
1993037	Chromium	2.29	Spike	P	0 - 20
1993037	Copper	1.57	Spike	P	0 - 20
1993037	Lead	1.64	Spike	P	0 - 20
1993037	Nickel	0.979	Spike	P	0 - 20
1993037	Silver	2.23	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345580

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992902	Chloride	0.774	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P345583

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992902	Sulfate	1.36	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P345574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992825	Ammonia-N	1.90	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P345566

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992915	Kjeldahl Nitrogen	1.99	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345509

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992907	NO2NO3-N	1.07	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992907	Total-P	2.95	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345462

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992908	O-Phosphate-P	0.126	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P345423

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992904	Color (true)	0.171	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P345631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992904	Total Alkalinity	0.528	Sample	P	0 - 1.6

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P346039

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992904	TDS	5.83	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P345632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992904	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P345625

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1992936	Organic Carbon	0.598	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: A83942
Included Lab Sample IDs: 1992934, 1992935, 1992940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.3	100	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83955
Included Lab Sample IDs: 1992934, 1992935, 1992940

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83956
Included Lab Sample IDs: 1992938, 1992939, 1992942

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83979
Included Lab Sample IDs: 1992936, 1992937, 1992941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A84014
Included Lab Sample IDs: 1992936, 1992937, 1992941

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A84015
Included Lab Sample IDs: 1992934, 1992935, 1992940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	98.5	P/P	90 - 110
Chloride	98.5	99.0	P/P	90 - 110
Sulfate	101	99.8	P/P	90 - 110
Sulfate	99.8	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A84027
Included Lab Sample IDs: 1992956, 1992957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	100	P/P	90 - 110
Cadmium	98.6	99.7	P/P	90 - 110
Chromium	92.9	91.9	P/P	90 - 110
Copper	99.1	98.2	P/P	90 - 110
Lead	96.5	96.5	P/P	90 - 110
Nickel	98.5	98.9	P/P	90 - 110
Silver	99.0	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A84029
Included Lab Sample IDs: 1992956, 1992957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	101	P/P	90 - 110
Iron	99.5	99.8	P/P	90 - 110
Magnesium	100	100	P/P	90 - 110
Potassium	96.9	97.5	P/P	90 - 110
Sodium	98.2	99.3	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A84034
Included Lab Sample IDs: 1992936, 1992937, 1992941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	101	99.8	P/P	90 - 110
Organic Carbon	99.8	101	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A84037
Included Lab Sample IDs: 1992934, 1992935, 1992940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A84037
Included Lab Sample IDs: 1992934, 1992935, 1992940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.8	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A84037
Included Lab Sample IDs: 1992934, 1992935, 1992940

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.1	97.6	P/P	90 - 110
Fluoride	97.2	97.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A84102
Included Lab Sample IDs: 1992941

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A84104
Included Lab Sample IDs: 1992936, 1992937

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A84127
Included Lab Sample IDs: 1992936, 1992937, 1992941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.2	97.7	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						8.05	
EPA 200.7 Rev. 4.4	Calcium	103	99.1	101				2.40
	Iron	103	104	102	102			1.23
	Magnesium	103	101	102				2.10
	Potassium	98.4	97.1	94.0	97.7			1.86
	Sodium	99.7	98.0	99.4				1.73
	Zinc	104	102	99.4	99.4			2.77
EPA 200.8 Rev. 5.4	Arsenic	103	102	101	102			1.05
	Cadmium	101	99.8	98.6	103			1.17
	Chromium	91.9	91.2	89.1	91.6			2.29

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.8 Rev. 5.4	Copper	97.8	96.7	95.2	95.6			1.57
	Lead	96.3	96.8	95.2	97.0			1.64
	Nickel	101	99.5	98.5	98.9			0.979
	Silver	101	100	97.9	102			2.23
EPA 300.0 Rev. 2.1	Chloride	100	100	99.6			0.774	
	Sulfate	101	99.9	101			1.36	
EPA 350.1 Rev. 2.0	Ammonia-N	101	99.3	103				1.90
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.9						1.99
EPA 353.2 Rev. 2.0	NO2NO3-N	103	103	104				1.07
EPA 365.1 Rev. 2.0	Total-P	100	97.8	101				2.95
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	96.8	97.0				0.126
SM 2120 B	Color (true)						0.171	
SM 2320 B-97	Total Alkalinity	102					0.528	
SM 2540 C-97	TDS						5.83	
SM 4500 F-C-97	Fluoride	94.8	95.0	95.0				0.0
SM 5310 B-00	Organic Carbon	99.4	99.6	98.9				0.598

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1992934, 1992935, 1992940
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1992956, 1992957
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1992956, 1992957
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1992934, 1992935, 1992940
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1992934, 1992935, 1992940
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1992936, 1992937, 1992941
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1992936, 1992937, 1992941
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1992936, 1992937, 1992941
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1992936, 1992937, 1992941
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1992938, 1992939, 1992942
SM 2120 B / E31780	True Color measured at 450 nm	1992934, 1992935, 1992940
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1992934, 1992935, 1992940
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1992934, 1992935, 1992940
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	1992934, 1992935, 1992940
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1992934, 1992935, 1992940
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1992936, 1992937, 1992941

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	05/16/2018			05/16/2018 16:23	William L. Brown IV	1992934, 1992935, 1992940
EPA 200.7 Rev. 4.4	05/16/2018	05/17/2018 13:30	Allison Taylor	05/18/2018 18:21	Betina Topolski	1992956
	05/16/2018	05/17/2018 13:30	Allison Taylor	05/18/2018 18:28	Betina Topolski	1992957
EPA 200.8 Rev. 5.4	05/16/2018	05/17/2018 13:30	Allison Taylor	05/18/2018 16:21	Nadine Brooks	1992956
	05/16/2018	05/17/2018 13:30	Allison Taylor	05/18/2018 16:30	Nadine Brooks	1992957
EPA 300.0 Rev. 2.1	05/16/2018			05/18/2018 03:28	Lipi Saha	1992934
	05/16/2018			05/18/2018 04:04	Lipi Saha	1992935
	05/16/2018			05/18/2018 04:16	Lipi Saha	1992940
EPA 350.1 Rev. 2.0	05/16/2018			05/18/2018 11:42	Julia Storbeck	1992936
	05/16/2018			05/18/2018 11:44	Julia Storbeck	1992937
	05/16/2018			05/18/2018 11:45	Julia Storbeck	1992941
EPA 351.2 Rev. 2.0	05/16/2018	05/18/2018 13:15	Adrian Shelby	05/24/2018 09:41	Joseph Suarez	1992936
	05/16/2018	05/18/2018 13:15	Adrian Shelby	05/24/2018 09:42	Joseph Suarez	1992937
	05/16/2018	05/18/2018 13:15	Adrian Shelby	05/24/2018 09:44	Joseph Suarez	1992941
EPA 353.2 Rev. 2.0	05/16/2018			05/17/2018 11:20	Lauren Bottorf	1992936
	05/16/2018			05/17/2018 11:21	Lauren Bottorf	1992937
	05/16/2018			05/17/2018 11:23	Lauren Bottorf	1992941
EPA 365.1 Rev. 2.0	05/16/2018	05/17/2018 13:40	Sima Feizi	05/22/2018 14:25	Beverly Y. Sanders	1992936
	05/16/2018	05/17/2018 13:40	Sima Feizi	05/22/2018 14:26	Beverly Y. Sanders	1992937
	05/16/2018	05/17/2018 13:40	Sima Feizi	05/23/2018 09:21	Beverly Y. Sanders	1992941
EPA 365.1 Rev. 2.0 dissolved	05/16/2018			05/16/2018 16:26	Megan Treadwell	1992938
	05/16/2018			05/16/2018 16:27	Megan Treadwell	1992939
	05/16/2018			05/16/2018 16:28	Megan Treadwell	1992942
SM 2120 B	05/16/2018			05/16/2018 14:06	Tanya Welborn	1992934
	05/16/2018			05/16/2018 14:07	Tanya Welborn	1992935
	05/16/2018			05/16/2018 14:08	Tanya Welborn	1992940
SM 2320 B-97	05/16/2018			05/18/2018 20:50	Dale L. Simmons	1992940
	05/16/2018			05/18/2018 22:18	Dale L. Simmons	1992934
	05/16/2018			05/18/2018 22:28	Dale L. Simmons	1992935
SM 2540 C-97	05/16/2018			05/19/2018 23:10	Yijie Li	1992934, 1992935, 1992940
SM 2540 D-97	05/16/2018			05/19/2018 23:10	Yijie Li	1992934, 1992935, 1992940
SM 4500 F-C-97	05/16/2018			05/18/2018 20:50	Dale L. Simmons	1992940
	05/16/2018			05/18/2018 22:18	Dale L. Simmons	1992934
	05/16/2018			05/18/2018 22:28	Dale L. Simmons	1992935
SM 5310 B-00	05/16/2018			05/18/2018 22:01	Julia Storbeck	1992936
	05/16/2018			05/19/2018 02:52	Julia Storbeck	1992937
	05/16/2018			05/19/2018 03:06	Julia Storbeck	1992941