Chemical Analysis Report

NE-DIST-2018-04-05-01

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

Event Description: **Rice Creek-GP**
Request ID: **RQ-2018-04-02-19**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Jacksonville, FL 32256-7577
Attn: Jeremy Parrish

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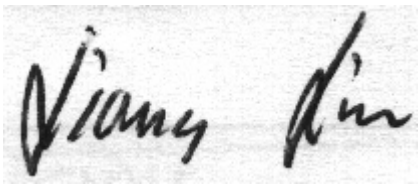
Certified by: Liang Lin, Environmental Administrator

Date Certified: 07-MAY-2018 14:19



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: RICE CR @ WOODEN BR BELOW GA PACIFIC Collection Date/Time: 04/04/2018 09:30

Field ID: 20030252 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1981442	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P342867	
	EPA 300.0 Rev. 2.1	Chloride	48		mg Cl/L	P343051	
		Sulfate	8.2		mg SO4/L	P343054	
	SM 2120 B	Color (true)	200		PCU	P342842	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P343413	
	SM 2540 C-97	TDS	176		mg/L	P343515	
	SM 2540 D-97	TSS	2	U	mg/L	P343163	
	SM 4500 F-C-97	Fluoride	0.076	I	mg F/L	P343417	
1981445	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P343429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P343008	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P343205	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P343123	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P343332	
1981448	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.16		mg P/L	P342887	
1981454	EPA 200.7 Rev. 4.4	Calcium	18.7		mg/L	P343117	
		Iron	570		ug/L	P343117	
		Magnesium	5.68		mg/L	P343117	
		Potassium	1.1	I	mg/L	P343117	
		Sodium	26.2		mg/L	P343117	
		Zinc	5.0	U	ug/L	P343117	
	EPA 200.8 Rev. 5.4	Arsenic	0.42		ug/L	P343117	
		Cadmium	0.020	U	ug/L	P343117	
		Chromium	0.54	I	ug/L	P343117	
		Copper	0.21	I	ug/L	P343117	
		Lead	0.21		ug/L	P343117	
		Nickel	0.92		ug/L	P343117	
		Silver	0.010	U	ug/L	P343117	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: RICE CR-150M AB WOODEN BRDG BL GA PAC EFF Collection Date/Time: 04/04/2018 10:00

Field ID: 20030050 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1981443	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P342867	
	EPA 300.0 Rev. 2.1	Chloride	49		mg Cl/L	P343051	
		Sulfate	8.2		mg SO4/L	P343054	
	SM 2120 B	Color (true)	200		PCU	P342842	
	SM 2320 B-97	Total Alkalinity	35		mg CaCO3/L	P343413	
	SM 2540 C-97	TDS	175		mg/L	P343515	
	SM 2540 D-97	TSS	2	U	mg/L	P343163	
	SM 4500 F-C-97	Fluoride	0.077	I	mg F/L	P343417	

Field ID: 20030050 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1981446	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P343429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.59		mg N/L	P343008	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P343205	
	EPA 365.1 Rev. 2.0	Total-P	0.21	I	mg P/L	P343123	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P343332	
1981449	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.18		mg P/L	P342888	
1981455	EPA 200.7 Rev. 4.4	Calcium	18.8		mg/L	P343117	
		Iron	570		ug/L	P343117	
		Magnesium	5.78		mg/L	P343117	
		Potassium	1.1	I	mg/L	P343117	
		Sodium	26.4		mg/L	P343117	
		Zinc	5.0	U	ug/L	P343117	
	EPA 200.8 Rev. 5.4	Arsenic	0.42		ug/L	P343117	
		Cadmium	0.020	U	ug/L	P343117	
		Chromium	0.50	I	ug/L	P343117	
		Copper	0.20	U	ug/L	P343117	
		Lead	0.21		ug/L	P343117	
		Nickel	0.84		ug/L	P343117	
		Silver	0.010	U	ug/L	P343117	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: RICE CREEK @ 309B **Collection Date/Time: 04/04/2018 10:50**

Field ID: 20030254 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1981444	EPA 180.1 Rev. 2.0	Turbidity	4.5		NTU	P342867	
	EPA 300.0 Rev. 2.1	Chloride	33		mg Cl/L	P343051	
		Sulfate	10		mg SO4/L	P343054	
	SM 2120 B	Color (true)	200		PCU	P342842	
	SM 2320 B-97	Total Alkalinity	41		mg CaCO3/L	P343413	
	SM 2540 C-97	TDS	144		mg/L	P343515	
	SM 2540 D-97	TSS	6	I	mg/L	P343164	
	SM 4500 F-C-97	Fluoride	0.088	I	mg F/L	P343417	
1981447	EPA 350.1 Rev. 2.0	Ammonia-N	0.043		mg N/L	P343429	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P343008	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P343205	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P343123	
	SM 5310 B-00	Organic Carbon	12		mg C/L	P343332	
1981450	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.048		mg P/L	P342888	
1981456	EPA 200.7 Rev. 4.4	Calcium	17.9		mg/L	P343117	
		Iron	630		ug/L	P343117	
		Magnesium	6.05		mg/L	P343117	
		Potassium	0.55	I	mg/L	P343117	

Field ID: 20030254 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1981456	EPA 200.7 Rev. 4.4	Sodium	18.3		mg/L	P343117	
		Zinc	5.0	U	ug/L	P343117	
	EPA 200.8 Rev. 5.4	Arsenic	0.29		ug/L	P343117	
		Cadmium	0.020	U	ug/L	P343117	
		Chromium	0.40	U	ug/L	P343117	
		Copper	0.20	U	ug/L	P343117	
		Lead	0.26		ug/L	P343117	
		Nickel	0.24	I	ug/L	P343117	
		Silver	0.010	U	ug/L	P343117	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.
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: P342867

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343117

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: P343117

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: P343051

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343054

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343429

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343008

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343205

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343123

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342887

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342888

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

Reference Method: SM 2120 B
Batch ID: P342842

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P343413

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P343515

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P343163

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P343164

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P343417

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P343332

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: P343117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	99.9		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	98.0		P	85 - 115
Sodium	98.8		P	85 - 115
Zinc	94.2		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343117

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	102		P	85 - 115
Copper	101		P	85 - 115
Lead	99.6		P	85 - 115
Nickel	102		P	85 - 115
Silver	114		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343051

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343054

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343429

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343008

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343205

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343123

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342887

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342888

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.8		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P343413

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P343417

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.9		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P343332

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343117

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981617	Calcium	102		P	80 - 120
1981617	Iron	97.3		P	80 - 120
1981617	Magnesium	103		P	80 - 120
1981617	Potassium	93.6		P	80 - 120
1981617	Sodium	103		P	80 - 120
1981617	Zinc	89.7		P	80 - 120
1981841	Calcium	106	108	P/P	80 - 120
1981841	Iron	104	107	P/P	80 - 120
1981841	Magnesium	109	111	P/P	80 - 120
1981841	Potassium	100	102	P/P	80 - 120
1981841	Sodium	100	103	P/P	80 - 120
1981841	Zinc	96.5	97.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343117

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981617	Arsenic	101		P	80 - 120
1981617	Cadmium	104		P	80 - 120
1981617	Chromium	96.1		P	80 - 120
1981617	Copper	94.0		P	80 - 120
1981617	Lead	98.5		P	80 - 120
1981617	Nickel	94.1		P	80 - 120
1981617	Silver	105		P	80 - 120
1981841	Arsenic	101	99.4	P/P	80 - 120
1981841	Cadmium	107	105	P/P	80 - 120
1981841	Chromium	104	102	P/P	80 - 120
1981841	Copper	100	97.7	P/P	80 - 120
1981841	Lead	102	101	P/P	80 - 120
1981841	Nickel	99.1	96.1	P/P	80 - 120
1981841	Silver	110	108	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343051

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343051

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981347	Chloride	99.0		P	90 - 110
1981406	Chloride	97.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343054

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981406	Sulfate	97.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343429

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981445	Ammonia-N	97.4	98.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343008

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981472	Kjeldahl Nitrogen	99.2	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981411	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981471	Total-P	106	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981400	O-Phosphate-P	95.9	96.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342888

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981473	O-Phosphate-P	98.2	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P343417

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1980944	Fluoride	96.8	98.9	P/P	91 - 105

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P343332

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1981461	Organic Carbon	96.0	97.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P342867

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981408	Turbidity	3.48	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981841	Calcium	1.69	Spike	P	0 - 20
1981841	Iron	2.61	Spike	P	0 - 20
1981841	Magnesium	1.66	Spike	P	0 - 20
1981841	Potassium	1.75	Spike	P	0 - 20
1981841	Sodium	2.36	Spike	P	0 - 20
1981841	Zinc	1.36	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981841	Arsenic	1.42	Spike	P	0 - 20
1981841	Cadmium	1.37	Spike	P	0 - 20
1981841	Chromium	1.37	Spike	P	0 - 20
1981841	Copper	2.30	Spike	P	0 - 20
1981841	Lead	1.51	Spike	P	0 - 20
1981841	Nickel	3.09	Spike	P	0 - 20
1981841	Silver	1.49	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343051

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981347	Chloride	0.182	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343054

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981347	Sulfate	0.377	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343429

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981445	Ammonia-N	1.00	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343008

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981472	Kjeldahl Nitrogen	0.129	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343205

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981411	NO2NO3-N	0.471	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981471	Total-P	2.93	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981400	O-Phosphate-P	0.140	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P342888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981473	O-Phosphate-P	0.305	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P342842

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981408	Color (true)	2.08	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P343413

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1980944	Total Alkalinity	0.799	Sample	P	0 - 1.6

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P343515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981408	TDS	1.72	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P343417

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1980944	Fluoride	1.47	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P343332

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1981461	Organic Carbon	1.01	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: EPA 300.0 Rev. 2.1
Run ID: A83001
Included Lab Sample IDs: 1981442, 1981443, 1981444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Chloride	102	100	P/P	90 - 110
Sulfate	99.8	99.6	P/P	90 - 110
Sulfate	99.9	99.8	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A83061
Included Lab Sample IDs: 1981442, 1981443, 1981444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.0	98.6	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83067
Included Lab Sample IDs: 1981442, 1981443, 1981444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	98.0	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83075
Included Lab Sample IDs: 1981448, 1981449, 1981450

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	93.4	91.2	P/P	90 - 110
O-Phosphate-P	95.8	94.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83164
Included Lab Sample IDs: 1981445, 1981446, 1981447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A83173
Included Lab Sample IDs: 1981445, 1981446, 1981447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	105	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A83178
Included Lab Sample IDs: 1981454, 1981455, 1981456

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Iron	100	101	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	100	101	P/P	90 - 110
Zinc	99.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83191
Included Lab Sample IDs: 1981445, 1981446, 1981447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110
Total-P	104	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83200
Included Lab Sample IDs: 1981454, 1981455, 1981456

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.9	98.2	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Chromium	98.7	99.2	P/P	90 - 110
Copper	96.4	95.6	P/P	90 - 110
Lead	98.5	98.2	P/P	90 - 110
Nickel	95.9	95.9	P/P	90 - 110
Silver	101	99.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A83211
Included Lab Sample IDs: 1981445, 1981446, 1981447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.0	97.2	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A83241
Included Lab Sample IDs: 1981442, 1981443, 1981444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.7	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A83241
Included Lab Sample IDs: 1981442, 1981443, 1981444

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A83245
Included Lab Sample IDs: 1981445, 1981446, 1981447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	102	P/P	90 - 110
Ammonia-N	102	102	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						3.48	
EPA 200.7 Rev. 4.4	Calcium	102	102	106	108			1.69
	Iron	99.9	97.3	104	107			2.61
	Magnesium	104	103	109	111			1.66
	Potassium	98.0	93.6	100	102			1.75
	Sodium	98.8	103	100	103			2.36
	Zinc	94.2	89.7	96.5	97.8			1.36
EPA 200.8 Rev. 5.4	Arsenic	104	101	101	99.4			1.42
	Cadmium	105	104	107	105			1.37
	Chromium	102	96.1	104	102			1.37
	Copper	101	94.0	100	97.7			2.30
	Lead	99.6	98.5	102	101			1.51
	Nickel	102	94.1	99.1	96.1			3.09
	Silver	114	105	110	108			1.49
EPA 300.0 Rev. 2.1	Chloride	98.6	99.0	97.4			0.182	
	Sulfate	98.4	97.7				0.377	
EPA 350.1 Rev. 2.0	Ammonia-N	97.6	97.4	98.9				1.00

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.4	99.2	99.0			0.129
EPA 353.2 Rev. 2.0	NO2NO3-N	106	106	106			0.471
EPA 365.1 Rev. 2.0	Total-P	101	106	103			2.93
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	95.9	96.1			0.140
	O-Phosphate-P	97.8	98.2	98.5			0.305
SM 2120 B	Color (true)					2.08	
SM 2320 B-97	Total Alkalinity	101				0.799	
SM 2540 C-97	TDS					1.72	
SM 4500 F-C-97	Fluoride	96.9	96.8	98.9			1.47
SM 5310 B-00	Organic Carbon	97.8	96.0	97.9			1.01

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1981442, 1981443, 1981444
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1981454, 1981455, 1981456
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1981454, 1981455, 1981456
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1981442, 1981443, 1981444
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1981442, 1981443, 1981444
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1981445, 1981446, 1981447
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1981445, 1981446, 1981447
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1981445, 1981446, 1981447
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1981445, 1981446, 1981447
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1981448, 1981449, 1981450
SM 2120 B / E31780	True Color measured at 450 nm	1981442, 1981443, 1981444
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1981442, 1981443, 1981444
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1981442, 1981443, 1981444
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1981442, 1981443, 1981444
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1981442, 1981443, 1981444
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1981445, 1981446, 1981447

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	04/05/2018			04/05/2018 16:26	William L. Brown IV	1981442, 1981443, 1981444
EPA 200.7 Rev. 4.4	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/11/2018 16:08	Martin Acosta	1981454
	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/11/2018 16:15	Martin Acosta	1981455
	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/11/2018 16:23	Martin Acosta	1981456
EPA 200.8 Rev. 5.4	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/12/2018 17:15	Nadine Brooks	1981454
	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/12/2018 17:24	Nadine Brooks	1981455
	04/05/2018	04/10/2018 15:35	Elliott D. Healy	04/12/2018 17:33	Nadine Brooks	1981456
EPA 300.0 Rev. 2.1	04/05/2018			04/07/2018 00:06	Lipi Saha	1981442
	04/05/2018			04/07/2018 00:18	Lipi Saha	1981443
	04/05/2018			04/07/2018 00:54	Lipi Saha	1981444
EPA 350.1 Rev. 2.0	04/05/2018			04/13/2018 13:43	Ping Hua	1981445
	04/05/2018			04/13/2018 13:56	Ping Hua	1981446
	04/05/2018			04/13/2018 13:58	Ping Hua	1981447
EPA 351.2 Rev. 2.0	04/05/2018	04/09/2018 10:15	Adrian Shelby	04/11/2018 12:30	Joseph Suarez	1981445
	04/05/2018	04/09/2018 10:15	Adrian Shelby	04/11/2018 12:32	Joseph Suarez	1981446
	04/05/2018	04/09/2018 10:15	Adrian Shelby	04/11/2018 12:33	Joseph Suarez	1981447
EPA 353.2 Rev. 2.0	04/05/2018			04/11/2018 12:59	Lauren Bottorf	1981445
	04/05/2018			04/11/2018 13:00	Lauren Bottorf	1981446
	04/05/2018			04/11/2018 13:01	Lauren Bottorf	1981447
EPA 365.1 Rev. 2.0	04/05/2018	04/10/2018 13:53	Sima Feizi	04/12/2018 11:41	Beverly Y. Sanders	1981445
	04/05/2018	04/10/2018 13:53	Sima Feizi	04/12/2018 11:43	Beverly Y. Sanders	1981447
	04/05/2018	04/10/2018 13:53	Sima Feizi	04/12/2018 12:37	Beverly Y. Sanders	1981446
EPA 365.1 Rev. 2.0 dissolved	04/05/2018			04/05/2018 15:55	Megan Treadwell	1981450
	04/05/2018			04/05/2018 16:25	Megan Treadwell	1981448
	04/05/2018			04/05/2018 16:26	Megan Treadwell	1981449
SM 2120 B	04/05/2018			04/05/2018 15:35	Tanya Welborn	1981442, 1981443
	04/05/2018			04/05/2018 15:36	Tanya Welborn	1981444
SM 2320 B-97	04/05/2018			04/14/2018 09:38	Dale L. Simmons	1981442
	04/05/2018			04/14/2018 09:48	Dale L. Simmons	1981443
	04/05/2018			04/14/2018 09:59	Dale L. Simmons	1981444
SM 2540 C-97	04/05/2018			04/06/2018 15:15	DeAsia Armster	1981442, 1981443, 1981444
SM 2540 D-97	04/05/2018			04/06/2018 16:00	DeAsia Armster	1981442, 1981443, 1981444
SM 4500 F-C-97	04/05/2018			04/14/2018 09:38	Dale L. Simmons	1981442
	04/05/2018			04/14/2018 09:48	Dale L. Simmons	1981443
	04/05/2018			04/14/2018 09:59	Dale L. Simmons	1981444
SM 5310 B-00	04/05/2018			04/12/2018 04:20	Julia Storbeck	1981445
	04/05/2018			04/12/2018 04:35	Julia Storbeck	1981446
	04/05/2018			04/12/2018 04:50	Julia Storbeck	1981447