Chemical Analysis Report

WQAP-2017-01-25-02

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

Event Description: **Suwannee North**
Request ID: **RQ-2017-01-23-09**
Customer: **WQAP**
Project ID: **SMP**

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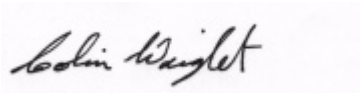
Certified by: Colin Wright, Program Administrator

Date Certified: 07-MAR-2017 11:20



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: Suwannee River @ Cone Brige Rd. **Collection Date/Time: 01/24/2017 10:50**

Field ID: G1NE0238 01242017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1866327	EPA 180.1 Rev. 2.0	Turbidity	6.1		NTU	P318724	
	EPA 300.0 Rev. 2.1	Chloride	7.6		mg Cl/L	P319054	
		Sulfate	2.4		mg SO4/L	P319057	
	SM 2120 B	Color (true)	330		PCU	P318734	
	SM 2320 B-97	Total Alkalinity	0.80	I	mg CaCO3/L	P318853	
	SM 2540 C-97	TDS	102		mg/L	P319187	
	SM 2540 D-97	TSS	16		mg/L	P319308	
	SM 4500 F-C-97	Fluoride	0.077	I	mg F/L	P318857	
1866329	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P318945	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P318753	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P318938	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P318778	
	SM 5310 B-00	Organic Carbon	40		mg C/L	P318781	
1866331	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P318729	
1866351	EPA 200.7 Rev. 4.4	Calcium	3.80		mg/L	P318799	
		Iron	720		ug/L	P318799	
		Magnesium	2.21		mg/L	P318799	
		Potassium	0.43	I	mg/L	P318799	
		Sodium	4.4		mg/L	P318799	
		Zinc	5.0	U	ug/L	P318799	
	EPA 200.8 Rev. 5.4	Arsenic	0.62		ug/L	P318799	
		Cadmium	0.031	I	ug/L	P318799	
		Chromium	0.86	I	ug/L	P318799	
		Copper	0.29	I	ug/L	P320537	
		Lead	0.76		ug/L	P318799	
		Nickel	0.63	I	ug/L	P318799	
		Silver	0.010	U	ug/L	P320537	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed on 03/01/2017.

Sample Location: Suwannee River @ Turner Boat Ramp **Collection Date/Time: 01/24/2017 11:35**

Field ID: G1NE0471 01242017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1866328	EPA 180.1 Rev. 2.0	Turbidity	11		NTU	P318724	
	EPA 300.0 Rev. 2.1	Chloride	7.6		mg Cl/L	P319054	
		Sulfate	2.2		mg SO4/L	P319057	
	SM 2120 B	Color (true)	340		PCU	P318734	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P318853	
	SM 2540 C-97	TDS	115		mg/L	P319187	
	SM 2540 D-97	TSS	10		mg/L	P319308	
	SM 4500 F-C-97	Fluoride	0.051	I	mg F/L	P318857	
1866330	EPA 350.1 Rev. 2.0	Ammonia-N	0.068		mg N/L	P318945	

Field ID: G1NE0471 01242017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1866330	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P318753	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.028		mg N/L	P318938	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P318778	
	SM 5310 B-00	Organic Carbon	42		mg C/L	P318781	
1866332	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P318729	
1866352	EPA 200.7 Rev. 4.4	Calcium	2.36		mg/L	P318799	
		Iron	640		ug/L	P318799	
		Magnesium	1.59		mg/L	P318799	
		Potassium	0.64	I	mg/L	P318799	
		Sodium	4.5		mg/L	P318799	
		Zinc	5.7	I	ug/L	P318799	
	EPA 200.8 Rev. 5.4	Arsenic	0.68		ug/L	P318799	
		Cadmium	0.027	I	ug/L	P318799	
		Chromium	0.78	I	ug/L	P318799	
		Copper	0.43	I	ug/L	P320537	
		Lead	0.81		ug/L	P318799	
		Nickel	0.61	I	ug/L	P318799	
		Silver	0.010	U	ug/L	P320537	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed on 03/01/2017.

Sample Location: Rocky Creek @ Woodpecker Rd. **Collection Date/Time: 01/24/2017 12:05**

Field ID: G1NE0250 01242017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1866324	EPA 180.1 Rev. 2.0	Turbidity	3.4	A	NTU	P318724	
	EPA 300.0 Rev. 2.1	Chloride	9.3		mg Cl/L	P319053	
		Sulfate	7.2		mg SO4/L	P319056	
	SM 2120 B	Color (true)	630		PCU	P318734	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P318853	
	SM 2540 C-97	TDS	184		mg/L	P319187	
	SM 2540 D-97	TSS	2	U	mg/L	P319308	
	SM 4500 F-C-97	Fluoride	0.14		mg F/L	P318857	
1866325	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P318945	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P318753	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P318938	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P318778	
	SM 5310 B-00	Organic Carbon	72		mg C/L	P318781	
1866326	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P318729	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 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: P318724

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P318799

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: P318799

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320537

Component	Result	Code	Units
Copper	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319053

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319054

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319056

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319057

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319057

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P318945

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P318753

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P318938

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P318778

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P318729

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

Reference Method: SM 2120 B
Batch ID: P318734

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P318853

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

Reference Method: SM 2540 C-97
Batch ID: P319187

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P319308

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P318857

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P318781

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: P318799

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	102		P	85 - 115
Magnesium	99.0		P	85 - 115
Potassium	96.0		P	85 - 115
Sodium	100		P	85 - 115
Zinc	98.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P318799

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	105		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	102		P	85 - 115
Lead	101		P	85 - 115
Nickel	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320537

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	90.4		P	85 - 115
Silver	88.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319053

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319054

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319056

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319057

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P318945

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P318753

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P318938

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P318778

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P318729

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

Reference Method: SM 2320 B-97
Batch ID: P318853

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P318857

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P318781

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P318799

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866138	Calcium	95.4		P	80 - 120
1866138	Iron	100		P	80 - 120
1866138	Magnesium	96.9		P	80 - 120
1866138	Potassium	95.1		P	80 - 120
1866138	Sodium	98.2		P	80 - 120
1866138	Zinc	94.3		P	80 - 120
1866192	Calcium	97.3		P	80 - 120
1866192	Iron	102	103	P/P	80 - 120
1866192	Magnesium	96.1		P	80 - 120
1866192	Potassium	98.3	96.5	P/P	80 - 120
1866192	Sodium	98.8	97.8	P/P	80 - 120
1866192	Zinc	96.0	96.5	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P318799

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866138	Arsenic	104		P	80 - 120
1866138	Cadmium	107		P	80 - 120
1866138	Chromium	104		P	80 - 120
1866138	Lead	102		P	80 - 120
1866138	Nickel	99.6		P	80 - 120
1866192	Arsenic	104	103	P/P	80 - 120
1866192	Cadmium	106	104	P/P	80 - 120
1866192	Chromium	102	101	P/P	80 - 120
1866192	Lead	101	99.6	P/P	80 - 120
1866192	Nickel	98.1	97.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320537

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1874202	Copper	92.1		P	80 - 120
1874202	Silver	87.8		P	80 - 120
1874203	Copper	90.9	91.7	P/P	80 - 120
1874203	Silver	86.4	88.2	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319053

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866104	Chloride	102		P	90 - 110
1866250	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319054

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866464	Chloride	102		P	90 - 110
1866725	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319056

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866104	Sulfate	97.2		P	90 - 110
1866250	Sulfate	97.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319057

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866464	Sulfate	97.0		P	90 - 110
1866725	Sulfate	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P318753

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866254	Kjeldahl Nitrogen	97.2	94.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P318938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866255	NO2NO3-N	91.0	90.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P318778

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866262	Total-P	94.4	95.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P318729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866258	O-Phosphate-P	100	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P318857

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P318857

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866165	Fluoride	97.1	97.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P318781

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1866114	Organic Carbon	92.6	90.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P318724

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866324	Turbidity	2.99	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P318799

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866192	Calcium	1.35	Spike	P	0 - 20
1866192	Iron	0.568	Spike	P	0 - 20
1866192	Magnesium	0.373	Spike	P	0 - 20
1866192	Potassium	1.43	Spike	P	0 - 20
1866192	Sodium	0.586	Spike	P	0 - 20
1866192	Zinc	0.609	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P318799

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866192	Arsenic	0.341	Spike	P	0 - 20
1866192	Cadmium	2.13	Spike	P	0 - 20
1866192	Chromium	0.560	Spike	P	0 - 20
1866192	Lead	1.16	Spike	P	0 - 20
1866192	Nickel	0.229	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320537

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1874203	Copper	0.817	Spike	P	0 - 20
1874203	Silver	1.95	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319053

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866104	Chloride	0.496	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319054

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866464	Chloride	0.592	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319056

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866104	Sulfate	1.72	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319057

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866464	Sulfate	0.420	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P318945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866330	Ammonia-N	1.66	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P318753

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866254	Kjeldahl Nitrogen	2.88	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P318938

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866255	NO2NO3-N	1.10	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P318778

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866262	Total-P	1.59	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P318729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866258	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P318734

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866372	Color (true)	3.17	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P318853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866165	Total Alkalinity	0.491	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P319187

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866372	TDS	3.41	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P318857

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866165	Fluoride	0.492	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P318781

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1866114	Organic Carbon	1.48	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 180.1 Rev. 2.0
Run ID: A74103
Included Lab Sample IDs: 1866324, 1866327, 1866328

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A74104
Included Lab Sample IDs: 1866326, 1866331, 1866332

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

Reference Method: SM 2120 B
Run ID: A74106
Included Lab Sample IDs: 1866324, 1866327, 1866328

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	102	P/P	85 - 115

Reference Method: SM 5310 B-00
Run ID: A74125
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.1	96.6	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A74143
Included Lab Sample IDs: 1866324, 1866327, 1866328

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

Reference Method: SM 4500 F-C-97
Run ID: A74143
Included Lab Sample IDs: 1866324, 1866327, 1866328

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: A74144
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.4	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A74162
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	95.0	92.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A74164
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	99.2	P/P	90 - 110
Ammonia-N	99.1	97.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A74164
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.8	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A74166
Included Lab Sample IDs: 1866325, 1866329, 1866330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	108	107	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A74175
Included Lab Sample IDs: 1866351, 1866352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.3	96.6	P/P	90 - 110
Iron	98.9	97.4	P/P	90 - 110
Magnesium	98.1	97.0	P/P	90 - 110
Potassium	96.6	95.7	P/P	90 - 110
Sodium	97.2	97.0	P/P	90 - 110
Zinc	98.6	99.1	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A74206
Included Lab Sample IDs: 1866324, 1866327, 1866328

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	102	P/P	90 - 110
Chloride	102	101	P/P	90 - 110
Sulfate	93.3	98.4	P/P	90 - 110
Sulfate	98.4	94.3	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A74276
Included Lab Sample IDs: 1866351, 1866352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.2	97.9	P/P	90 - 110
Cadmium	99.5	100	P/P	90 - 110
Chromium	98.6	99.5	P/P	90 - 110
Lead	97.0	97.2	P/P	90 - 110
Nickel	97.4	96.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A74817
Included Lab Sample IDs: 1866351, 1866352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	101	99.8	P/P	90 - 110
Copper	99.8	99.4	P/P	90 - 110
Silver	97.6	98.7	P/P	90 - 110
Silver	98.7	97.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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						2.99	
EPA 200.7 Rev. 4.4	Calcium	101	95.4	97.3				1.35
	Iron	102	100	102	103			0.568
	Magnesium	99.0	96.9	96.1				0.373
	Potassium	96.0	95.1	98.3	96.5			1.43
	Sodium	100	98.2	98.8	97.8			0.586
	Zinc	98.0	94.3	96.0	96.5			0.609
EPA 200.8 Rev. 5.4	Arsenic	105	104	104	103			0.341
	Cadmium	102	107	106	104			2.13
	Chromium	102	104	102	101			0.560
	Copper	90.4	90.9	92.1	91.7			0.817
	Lead	101	102	101	99.6			1.16
	Nickel	103	99.6	98.1	97.9			0.229
	Silver	88.2	87.8	86.4	88.2			1.95
EPA 300.0 Rev. 2.1	Chloride	101	102	102			0.496	
	Chloride	102	102	102			0.592	
	Sulfate	100	97.2	97.0			1.72	
	Sulfate	101	97.0	97.4			0.420	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6						1.66
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	97.2	94.2				2.88
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	91.0	90.0				1.10
EPA 365.1 Rev. 2.0	Total-P	94.2	94.4	95.9				1.59
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	100	102				1.09
SM 2120 B	Color (true)						3.17	
SM 2320 B-97	Total Alkalinity	104					0.491	
SM 2540 C-97	TDS						3.41	
SM 4500 F-C-97	Fluoride	97.8	97.1	97.6				0.492
SM 5310 B-00	Organic Carbon	96.8	92.6	90.8				1.48

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1866324, 1866327, 1866328
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1866351, 1866352
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1866351, 1866352
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1866324, 1866327, 1866328
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1866324, 1866327, 1866328
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1866325, 1866329, 1866330
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1866325, 1866329, 1866330

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1866325, 1866329, 1866330
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1866325, 1866329, 1866330
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1866326, 1866331, 1866332
SM 2120 B / E31780	True Color measured at 450 nm	1866324, 1866327, 1866328
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1866324, 1866327, 1866328
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1866324, 1866327, 1866328
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1866324, 1866327, 1866328
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1866324, 1866327, 1866328
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1866325, 1866329, 1866330

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	01/25/2017			01/25/2017 15:28	Sima Feizi	1866324, 1866327, 1866328
EPA 200.7 Rev. 4.4	01/25/2017	01/26/2017	Elliott D. Healy	01/30/2017	Joshua Ayres	1866351, 1866352
EPA 200.8 Rev. 5.4	01/25/2017	01/26/2017	Elliott D. Healy	02/04/2017	Betina Topolski	1866351, 1866352
	01/25/2017	02/27/2017	Elliott D. Healy	03/01/2017	Betina Topolski	1866351, 1866352
EPA 300.0 Rev. 2.1	01/25/2017			02/01/2017	Ping Hua	1866324, 1866327, 1866328
EPA 350.1 Rev. 2.0	01/25/2017			01/27/2017	Sofia Elnemr	1866325, 1866329, 1866330
EPA 351.2 Rev. 2.0	01/25/2017	01/26/2017	Adrian Shelby	01/30/2017	Joseph Suarez	1866325, 1866329, 1866330
EPA 353.2 Rev. 2.0	01/25/2017			01/30/2017	Beverly Y. Sanders	1866325, 1866329, 1866330
EPA 365.1 Rev. 2.0	01/25/2017	01/26/2017	Vijayalakshmi Reddy	01/27/2017	Lipi Saha	1866325, 1866329, 1866330
EPA 365.1 Rev. 2.0 dissolved	01/25/2017			01/25/2017 16:18	Julia Storbeck	1866326
	01/25/2017			01/25/2017 16:19	Julia Storbeck	1866331
	01/25/2017			01/25/2017 16:20	Julia Storbeck	1866332
SM 2120 B	01/25/2017			01/25/2017 17:17	Jared I. Manley	1866324
	01/25/2017			01/25/2017 17:18	Jared I. Manley	1866327
	01/25/2017			01/25/2017 17:19	Jared I. Manley	1866328
SM 2320 B-97	01/25/2017			01/27/2017	Dale L. Simmons	1866324, 1866327, 1866328
SM 2540 C-97	01/25/2017			01/30/2017	Blanca Fach	1866324, 1866327, 1866328
SM 2540 D-97	01/25/2017			01/30/2017	Blanca Fach	1866324, 1866327, 1866328
SM 4500 F-C-97	01/25/2017			01/27/2017	Dale L. Simmons	1866324, 1866327, 1866328
SM 5310 B-00	01/25/2017			01/26/2017	Julie Michelle Frank	1866325, 1866329, 1866330