

Chemical Analysis Report

NE-DIST-2018-02-14-01

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

Event Description: **Ocklawaha lakes**
Request ID: **RQ-2018-02-12-17**
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

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 14-MAR-2018 13:22



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: PENNER POND CENTER

Collection Date/Time: 02/13/2018 09:40

Field ID: G1NE0864

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1967125	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P339986	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P340131	
		Sulfate	0.20	U	mg SO4/L	P340136	
	SM 2120 B	Color (true)	140		PCU	P339975	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P340527	
	SM 2540 C-97	TDS	31		mg/L	P340572	
	SM 2540 D-97	TSS	2	U	mg/L	P340231	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P340769	
1967126	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P340466	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.70		mg N/L	P339997	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P340371	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P340099	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P340335	
1967127	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P339923	
1967138	EPA 200.7 Rev. 4.4	Calcium	0.80		mg/L	P340030	
		Iron	280		ug/L	P340030	
		Magnesium	0.61		mg/L	P340030	
		Potassium	0.30	U	mg/L	P340030	
		Sodium	2.7		mg/L	P340030	
		Zinc	5.4	I	ug/L	P340030	
	EPA 200.8 Rev. 5.4	Arsenic	0.24		ug/L	P340030	
		Cadmium	0.020	U	ug/L	P340030	
		Chromium	0.40	U	ug/L	P340446	
		Copper	0.23	I	ug/L	P340030	
		Lead	0.15	I	ug/L	P340030	
		Nickel	0.22	I	ug/L	P340446	
		Silver	0.010	U	ug/L	P340030	

Ref. Method and Comment:

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

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: HEWITT LAKE CENTER

Collection Date/Time: 02/13/2018 11:00

Field ID: G1NE0865

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1967119	EPA 180.1 Rev. 2.0	Turbidity	0.80		NTU	P339986	
	EPA 300.0 Rev. 2.1	Chloride	8.6	A	mg Cl/L	P340131	
		Sulfate	7.5	A	mg SO4/L	P340136	
	SM 2120 B	Color (true)	11		PCU	P339975	
	SM 2320 B-97	Total Alkalinity	1.3	I	mg CaCO3/L	P340526	
	SM 2540 C-97	TDS	23	I	mg/L	P340572	
	SM 2540 D-97	TSS	2	U	mg/L	P340231	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P340530	
1967121	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P340466	

Field ID: G1NE0865

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1967121	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.22		mg N/L	P339997	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P340371	
	EPA 365.1 Rev. 2.0	Total-P	0.007		mg P/L	P340099	
	SM 5310 B-00	Organic Carbon	2.5		mg C/L	P340335	
1967123	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P339993	

Ref. Method and Comment:

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

Sample Location: PEGRAM LAKE CENTER

Collection Date/Time: 02/13/2018 11:55

Field ID: G1NE0866

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1967120	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P339986	
	EPA 300.0 Rev. 2.1	Chloride	10		mg Cl/L	P340131	
		Sulfate	3.1		mg SO4/L	P340136	
	SM 2120 B	Color (true)	33		PCU	P339975	
	SM 2320 B-97	Total Alkalinity	2.5	I	mg CaCO3/L	P340526	
	SM 2540 C-97	TDS	45		mg/L	P340572	
	SM 2540 D-97	TSS	2	U	mg/L	P340231	
	SM 4500 F-C-97	Fluoride	0.039	I	mg F/L	P340530	
1967122	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P340466	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P339997	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P340371	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P340099	
	SM 5310 B-00	Organic Carbon	8.0		mg C/L	P340335	
1967124	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P339993	

Ref. Method and Comment:

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P339986

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P340030

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340030

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340446

Component	Result	Code	Units
Chromium	0.40	U	ug/L
Nickel	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340131

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340136

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340466

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339997

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340371

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340099

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339923

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339993

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

Reference Method: SM 2120 B
Batch ID: P339975

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P340526

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

Reference Method: SM 2320 B-97
Batch ID: P340527

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

Reference Method: SM 2540 C-97
Batch ID: P340572

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P340231

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P340530

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P340769

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P340335

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: P340030

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	107		P	85 - 115
Magnesium	111		P	85 - 115
Potassium	102		P	85 - 115
Sodium	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340030

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	102		P	85 - 115
Copper	103		P	85 - 115
Lead	105		P	85 - 115
Silver	87.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340446

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	104		P	85 - 115
Nickel	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340131

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340136

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340466

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339997

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340371

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340099

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339923

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339993

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

Reference Method: SM 2320 B-97
Batch ID: P340526

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.1		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P340527

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P340530

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.9		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P340769

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.2		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P340335

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P340030

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967095	Calcium	101		P	80 - 120
1967095	Iron	104		P	80 - 120
1967095	Magnesium	106		P	80 - 120
1967095	Potassium	101		P	80 - 120
1967095	Sodium	104		P	80 - 120
1967095	Zinc	98.0		P	80 - 120
1967504	Iron	101	104	P/P	80 - 120
1967504	Magnesium	102	107	P/P	80 - 120
1967504	Potassium	99.5	103	P/P	80 - 120
1967504	Sodium	100		P	80 - 120
1967504	Zinc	98.7	97.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340030

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967095	Arsenic	103		P	80 - 120
1967095	Cadmium	103		P	80 - 120
1967095	Copper	101		P	80 - 120
1967095	Lead	106		P	80 - 120
1967095	Silver	86.3		P	80 - 120
1967504	Arsenic	106	107	P/P	80 - 120
1967504	Cadmium	103	104	P/P	80 - 120
1967504	Copper	100	100	P/P	80 - 120
1967504	Lead	107	110	P/P	80 - 120
1967504	Silver	85.5	87.2	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P340446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966788	Chromium	102	101	P/P	80 - 120
1966788	Nickel	98.9	98.3	P/P	80 - 120
1967164	Chromium	97.9		P	80 - 120
1967164	Nickel	95.0		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967119	Chloride	102		P	90 - 110
1967125	Chloride	103		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340136

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967119	Sulfate	104		P	90 - 110
1967125	Sulfate	104		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340466

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967121	Ammonia-N	98.7	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339997

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967122	Kjeldahl Nitrogen	97.6	96.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340371

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967122	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967093	Total-P	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339923

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967248	O-Phosphate-P	96.4	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339993

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967123	O-Phosphate-P	96.2	96.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P340530

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966697	Fluoride	97.2	96.0	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P340769

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967700	Fluoride	92.7	92.7	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
 Batch ID: P340335

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1967002	Organic Carbon	96.8	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P339986

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967417	Turbidity	2.15	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P340030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967504	Calcium	2.66	Spike	P	0 - 20
1967504	Iron	2.53	Spike	P	0 - 20
1967504	Magnesium	2.88	Spike	P	0 - 20
1967504	Potassium	3.23	Spike	P	0 - 20
1967504	Sodium	2.41	Spike	P	0 - 20
1967504	Zinc	0.924	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P340030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967504	Arsenic	1.20	Spike	P	0 - 20
1967504	Cadmium	1.59	Spike	P	0 - 20
1967504	Copper	0.275	Spike	P	0 - 20
1967504	Lead	2.27	Spike	P	0 - 20
1967504	Silver	2.03	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P340446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966788	Chromium	0.356	Spike	P	0 - 20
1966788	Nickel	0.637	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P340131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967119	Chloride	0.0798	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340136

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967119	Sulfate	0.0468	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340466

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967121	Ammonia-N	0.389	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339997

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967122	Kjeldahl Nitrogen	1.07	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340371

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967122	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967093	Total-P	0.189	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967248	O-Phosphate-P	2.41	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339993

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967123	O-Phosphate-P	0.622	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P339975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967001	Color (true)	2.56	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
Batch ID: P340526

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966697	Total Alkalinity	0.378	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P340527

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967700	Total Alkalinity	0.112	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P340572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967097	TDS	2.29	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P340530

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966697	Fluoride	0.992	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P340769

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967700	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P340335

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1967002	Organic Carbon	0.694	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: A82003
Included Lab Sample IDs: 1967119, 1967120, 1967125

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A82003

Included Lab Sample IDs: 1967119, 1967120, 1967125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	103	107	P/P	90 - 110
Sulfate	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A82052

Included Lab Sample IDs: 1967127

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

Reference Method: SM 2120 B

Run ID: A82072

Included Lab Sample IDs: 1967119, 1967120, 1967125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	107	104	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A82076

Included Lab Sample IDs: 1967119, 1967120, 1967125

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: A82081

Included Lab Sample IDs: 1967123, 1967124

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A82124

Included Lab Sample IDs: 1967138

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	102	P/P	90 - 110
Cadmium	99.8	98.6	P/P	90 - 110
Copper	99.7	101	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Silver	97.7	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A82125

Included Lab Sample IDs: 1967121, 1967122, 1967126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A82127

Included Lab Sample IDs: 1967138

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.7	101	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	98.3	98.0	P/P	90 - 110
Sodium	98.7	98.1	P/P	90 - 110
Zinc	101	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A82141

Included Lab Sample IDs: 1967121, 1967122, 1967126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.8	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A82196

Included Lab Sample IDs: 1967121, 1967122, 1967126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	95.0	P/P	90 - 110
Organic Carbon	95.0	94.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A82217

Included Lab Sample IDs: 1967121, 1967122, 1967126

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A82241

Included Lab Sample IDs: 1967121, 1967122, 1967126

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A82264

Included Lab Sample IDs: 1967138

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	95.1	94.1	P/P	90 - 110
Nickel	96.3	96.5	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A82266

Included Lab Sample IDs: 1967119, 1967120, 1967125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.0	99.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A82266

Included Lab Sample IDs: 1967119, 1967120, 1967125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.0	97.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A82266

Included Lab Sample IDs: 1967119, 1967120

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	96.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A82351

Included Lab Sample IDs: 1967125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.6	97.6	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						2.15	
EPA 200.7 Rev. 4.4	Calcium	105	101					2.66
	Iron	107	104	101	104			2.53
	Magnesium	111	106	102	107			2.88
	Potassium	102	101	99.5	103			3.23
	Sodium	101	104	100				2.41
	Zinc	100	98.0	98.7	97.8			0.924
EPA 200.8 Rev. 5.4	Arsenic	104	103	106	107			1.20
	Cadmium	102	103	103	104			1.59
	Chromium	104	102	101	97.9			0.356
	Copper	103	101	100	100			0.275
	Lead	105	106	107	110			2.27
	Nickel	103	98.9	98.3	95.0			0.637
	Silver	87.3	86.3	85.5	87.2			2.03
EPA 300.0 Rev. 2.1	Chloride	102	102	103			0.0798	
	Sulfate	102	104	104			0.0468	
EPA 350.1 Rev. 2.0	Ammonia-N	101	98.7	98.3				0.389
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	97.6	96.0				1.07
EPA 353.2 Rev. 2.0	NO2NO3-N	102	104	104				0.0
EPA 365.1 Rev. 2.0	Total-P	102	102	101				0.189
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.4	99.9				2.41
	O-Phosphate-P	96.4	96.2	96.8				0.622
SM 2120 B	Color (true)						2.56	
SM 2320 B-97	Total Alkalinity	99.1					0.378	
	Total Alkalinity	100					0.112	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision SMP	MS
					LCS	
SM 2540 C-97	TDS				2.29	
SM 4500 F-C-97	Fluoride	95.9	97.2	96.0		0.992
	Fluoride	94.2	92.7	92.7		0.0
SM 5310 B-00	Organic Carbon	97.0	96.8	97.6		0.694

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1967119, 1967120, 1967125
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1967138
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1967138
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1967119, 1967120, 1967125
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1967119, 1967120, 1967125
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1967121, 1967122, 1967126
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1967121, 1967122, 1967126
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1967121, 1967122, 1967126
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1967121, 1967122, 1967126
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1967123, 1967124, 1967127
SM 2120 B / E31780	True Color measured at 450 nm	1967119, 1967120, 1967125
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1967119, 1967120, 1967125
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1967119, 1967120, 1967125
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1967119, 1967120, 1967125
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1967119, 1967120, 1967125
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1967121, 1967122, 1967126

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	02/14/2018			02/14/2018 17:19	Sima Feizi	1967119, 1967120, 1967125
EPA 200.7 Rev. 4.4	02/14/2018	02/15/2018	Elliott D. Healy	02/16/2018	Betina Topolski	1967138
EPA 200.8 Rev. 5.4	02/14/2018	02/15/2018	Elliott D. Healy	02/16/2018	Nadine Brooks	1967138
	02/14/2018	02/22/2018	Elliott D. Healy	02/23/2018	Robert K Palmer	1967138
EPA 300.0 Rev. 2.1	02/14/2018			02/16/2018	Julia Storbeck	1967119, 1967120, 1967125
EPA 350.1 Rev. 2.0	02/14/2018			02/22/2018	Ping Hua	1967121, 1967122, 1967126
EPA 351.2 Rev. 2.0	02/14/2018	02/15/2018	Adrian Shelby	02/16/2018	Joseph Suarez	1967121, 1967122, 1967126
EPA 353.2 Rev. 2.0	02/14/2018			02/21/2018	Lauren Bottorf	1967121, 1967122, 1967126
EPA 365.1 Rev. 2.0	02/14/2018	02/16/2018	Sima Feizi	02/19/2018	Beverly Y. Sanders	1967121, 1967122, 1967126
EPA 365.1 Rev. 2.0 dissolved	02/14/2018			02/14/2018 13:29	Megan Treadwell	1967127
	02/14/2018			02/14/2018 16:22	Megan Treadwell	1967123
	02/14/2018			02/14/2018 16:25	Megan Treadwell	1967124
SM 2120 B	02/14/2018			02/14/2018 15:18	Tanya Welborn	1967119, 1967120
	02/14/2018			02/14/2018 15:19	Tanya Welborn	1967125
SM 2320 B-97	02/14/2018			02/23/2018	Dale L. Simmons	1967119, 1967120
	02/14/2018			02/24/2018	Dale L. Simmons	1967125
SM 2540 C-97	02/14/2018			02/16/2018	DeAsia Armster	1967119, 1967120, 1967125
SM 2540 D-97	02/14/2018			02/16/2018	DeAsia Armster	1967119, 1967120, 1967125
SM 4500 F-C-97	02/14/2018			02/23/2018	Dale L. Simmons	1967119, 1967120
	02/14/2018			02/28/2018	Dale L. Simmons	1967125
SM 5310 B-00	02/14/2018			02/20/2018	Megan Treadwell	1967121, 1967122, 1967126