

Chemical Analysis Report

CEN-DIST-2016-06-03-02

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

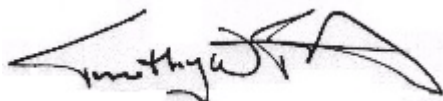
Event Description: **Lake Reams**
Request ID: **RQ-2016-05-30-57**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Timothy Fitzpatrick, Program Administrator

Date Certified: 23-JUN-2016 09:58

A handwritten signature in black ink, appearing to read "Timothy Fitzpatrick", is written over a light gray rectangular background.

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: Lake Reams @ NE of Center

Collection Date/Time: 06/02/2016 10:55

Field ID: G4CE0121

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804815	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P305578	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P305849	
		Sulfate	11		mg SO4/L	P305851	
	SM 2120 B	Color (true)	260		PCU	P305572	
	SM 2320 B-97	Total Alkalinity	6.6		mg CaCO3/L	P305934	
	SM 2540 C-97	TDS	116		mg/L	P306108	
	SM 2540 D-97	TSS	2	I	mg/L	P306134	
	SM 4500 F-C-97	Fluoride	0.068	I	mg F/L	P305937	
1804819	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P305909	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.77		mg N/L	P305771	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P305698	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P306060	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P306205	
1804823	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P305562	
1804831	EPA 200.7 Rev. 4.4	Calcium	5.19		mg/L	P305643	
		Iron	170		ug/L	P305643	
		Magnesium	4.22		mg/L	P305643	
		Potassium	7.2		mg/L	P305643	
		Sodium	15.4		mg/L	P305643	
		Zinc	5.0	U	ug/L	P305643	
	EPA 200.8 Rev. 5.4	Arsenic	0.35		ug/L	P305643	
		Cadmium	0.020	U	ug/L	P305643	
		Chromium	0.29		ug/L	P305643	
		Copper	0.66		ug/L	P305643	
		Lead	0.23		ug/L	P305643	
		Nickel	0.29		ug/L	P305643	
		Silver	0.0050	U	ug/L	P305643	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Matrix spike recovery data for one of two spiked samples is unavailable due to high analyte concentration in the QC sample.

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Lake Reams @ NW of Center

Collection Date/Time: 06/02/2016 11:10

Field ID: G4CE0122

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804816	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P305578	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P305850	
		Sulfate	12		mg SO4/L	P305852	
	SM 2120 B	Color (true)	260		PCU	P305572	
	SM 2320 B-97	Total Alkalinity	5.5		mg CaCO3/L	P305934	
	SM 2540 C-97	TDS	117		mg/L	P306108	
	SM 2540 D-97	TSS	2	U	mg/L	P306134	
	SM 4500 F-C-97	Fluoride	0.070	I	mg F/L	P305937	
1804820	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P305909	

Field ID: G4CE0122

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804820	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.76		mg N/L	P305771	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P305698	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P306060	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P306205	
1804824	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P305562	
1804832	EPA 200.7 Rev. 4.4	Calcium	5.17		mg/L	P305643	
		Iron	180		ug/L	P305643	
		Magnesium	4.20		mg/L	P305643	
		Potassium	7.1		mg/L	P305643	
		Sodium	15.2		mg/L	P305643	
		Zinc	5.0	U	ug/L	P305643	
	EPA 200.8 Rev. 5.4	Arsenic	0.34		ug/L	P305643	
		Cadmium	0.020	U	ug/L	P305643	
		Chromium	0.27		ug/L	P305643	
		Copper	0.55		ug/L	P305643	
		Lead	0.24		ug/L	P305643	
		Nickel	0.23		ug/L	P305643	
		Silver	0.0050	U	ug/L	P305643	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Lake Reams @ Center

Collection Date/Time: 06/02/2016 11:30

Field ID: G4CE0123

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804817	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P305578	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P305850	
		Sulfate	12		mg SO4/L	P305852	
	SM 2120 B	Color (true)	260		PCU	P305572	
	SM 2320 B-97	Total Alkalinity	5.6		mg CaCO3/L	P305934	
	SM 2540 C-97	TDS	118		mg/L	P306108	
	SM 2540 D-97	TSS	2	U	mg/L	P306134	
	SM 4500 F-C-97	Fluoride	0.070	I	mg F/L	P305937	
1804821	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P305909	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.73		mg N/L	P305771	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P305698	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P306060	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P306205	
1804825	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P305562	
1804833	EPA 200.7 Rev. 4.4	Calcium	5.23		mg/L	P305643	
		Iron	180		ug/L	P305643	
		Magnesium	4.21		mg/L	P305643	
		Potassium	7.1		mg/L	P305643	
		Sodium	15.1		mg/L	P305643	
		Zinc	5.0	U	ug/L	P305643	

Field ID: G4CE0123

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804833	EPA 200.8 Rev. 5.4	Arsenic	0.35		ug/L	P305643	
		Cadmium	0.020	U	ug/L	P305643	
		Chromium	0.30		ug/L	P305643	
		Copper	0.60		ug/L	P305643	
		Lead	0.28		ug/L	P305643	
		Nickel	0.27		ug/L	P305643	
		Silver	0.0050	U	ug/L	P305643	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: Lake Reams @ SE Center

Collection Date/Time: 06/02/2016 11:45

Field ID: G4CE0125

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1804818	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P305578	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P305850	
		Sulfate	11		mg SO4/L	P305852	
	SM 2120 B	Color (true)	260		PCU	P305572	
	SM 2320 B-97	Total Alkalinity	5.4		mg CaCO3/L	P305978	
	SM 2540 C-97	TDS	129	A	mg/L	P306108	
	SM 2540 D-97	TSS	2	U	mg/L	P306134	
	SM 4500 F-C-97	Fluoride	0.068	I	mg F/L	P305937	
1804822	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P305909	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P305771	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P305699	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P306060	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P306205	
1804826	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P305562	
1804834	EPA 200.7 Rev. 4.4	Calcium	5.12		mg/L	P305643	
		Iron	180		ug/L	P305643	
		Magnesium	4.23		mg/L	P305643	
		Potassium	6.9		mg/L	P305643	
		Sodium	14.8		mg/L	P305643	
		Zinc	5.0	U	ug/L	P305643	
	EPA 200.8 Rev. 5.4	Arsenic	0.34		ug/L	P305643	
		Cadmium	0.020	U	ug/L	P305643	
		Chromium	0.30		ug/L	P305643	
		Copper	0.66		ug/L	P305643	
		Lead	0.36		ug/L	P305643	
		Nickel	0.31		ug/L	P305643	
		Silver	0.0050	U	ug/L	P305643	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low 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: P305578

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P305643

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: P305643

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305849

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305850

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305851

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305852

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P305909

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P305771

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305698

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305699

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306060

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P305562

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

Reference Method: SM 2120 B
Batch ID: P305572

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P305934

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

Reference Method: SM 2320 B-97
Batch ID: P305978

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: P306108

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P306134

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P305937

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P306205

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: P305643

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	109		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	103		P	85 - 115
Sodium	105		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P305643

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	99.9		P	85 - 115
Cadmium	98.5		P	85 - 115
Chromium	99.2		P	85 - 115
Copper	98.3		P	85 - 115
Lead	100		P	85 - 115
Nickel	98.7		P	85 - 115
Silver	96.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305849

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305850

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305851

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305852

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P305909

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P305771

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305698

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	98.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305699

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306060

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: P305562

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P305934

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 105

Reference Method: SM 2320 B-97
Batch ID: P305978

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P305937

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P306205

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.1		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P305643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1803728	Calcium	109		P	80 - 120
1803728	Iron	108		P	80 - 120
1803728	Magnesium	105		P	80 - 120
1803728	Potassium	106		P	80 - 120
1803728	Sodium	107		P	80 - 120
1803728	Zinc	97.8		P	80 - 120
1804052	Calcium	108		P	80 - 120
1804052	Iron	108	110	P/P	80 - 120
1804052	Magnesium	110		P	80 - 120
1804052	Potassium	107		P	80 - 120
1804052	Sodium	106		P	80 - 120
1804052	Zinc	98.8	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P305643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1803728	Arsenic	98.7		P	80 - 120
1803728	Cadmium	97.7		P	80 - 120
1803728	Chromium	98.0		P	80 - 120
1803728	Copper	92.5		P	80 - 120
1803728	Lead	98.6		P	80 - 120
1803728	Nickel	94.7		P	80 - 120
1803728	Silver	96.3		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P305643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804052	Arsenic	103	102	P/P	80 - 120
1804052	Cadmium	102	99.9	P/P	80 - 120
1804052	Chromium	100	99.4	P/P	80 - 120
1804052	Copper	96.8	95.1	P/P	80 - 120
1804052	Lead	102	101	P/P	80 - 120
1804052	Nickel	96.4	97.1	P/P	80 - 120
1804052	Silver	97.0	96.1	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804078	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305850

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804942	Chloride	102		P	90 - 110
1804995	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305851

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804078	Sulfate	99.0		P	90 - 110
1804161	Sulfate	99.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804942	Sulfate	99.7		P	90 - 110
1804995	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P305909

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804784	Ammonia-N	98.5	99.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P305771

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804809	Kjeldahl Nitrogen	94.6	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305698

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804784	NO2NO3-N	96.1	97.6	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305699

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804822	NO2NO3-N	94.0	96.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1803975	Total-P	102	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P305562

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804823	O-Phosphate-P	97.6	99.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P305937

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804783	Fluoride	99.9	99.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P306205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1804819	Organic Carbon	103		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P305578

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804927	Turbidity	4.18	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P305643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804052	Calcium	6.01	Spike	P	0 - 20
1804052	Iron	1.84	Spike	P	0 - 20
1804052	Magnesium	3.84	Spike	P	0 - 20
1804052	Potassium	3.08	Spike	P	0 - 20
1804052	Sodium	4.89	Spike	P	0 - 20
1804052	Zinc	2.06	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P305643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804052	Arsenic	1.16	Spike	P	0 - 20
1804052	Cadmium	2.44	Spike	P	0 - 20
1804052	Chromium	0.993	Spike	P	0 - 20
1804052	Copper	1.75	Spike	P	0 - 20
1804052	Lead	0.550	Spike	P	0 - 20
1804052	Nickel	0.697	Spike	P	0 - 20
1804052	Silver	0.999	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804078	Chloride	0.160	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305850

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804942	Chloride	0.0803	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305851

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804078	Sulfate	0.158	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P305852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804942	Sulfate	0.680	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P305909

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804784	Ammonia-N	1.18	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P305771

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804809	Kjeldahl Nitrogen	2.13	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804784	NO2NO3-N	1.50	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P305699

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804822	NO2NO3-N	2.11	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1803975	Total-P	4.16	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P305562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804823	O-Phosphate-P	1.73	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P305572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804783	Color (true)	0.280	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P305934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804783	Total Alkalinity	0.154	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P305978

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1806444	Total Alkalinity	0.0595	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P306108

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804818	TDS	9.30	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P305937

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804783	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P306205

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1804819	Organic Carbon	0.373	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 365.1 Rev. 2.0 dissolved
Run ID: A69836
Included Lab Sample IDs: 1804823, 1804824, 1804825, 1804826

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	101	P/P	90 - 110
O-Phosphate-P	99.8	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A69838
Included Lab Sample IDs: 1804815, 1804816, 1804817, 1804818

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	103	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A69839
Included Lab Sample IDs: 1804815, 1804816, 1804817, 1804818

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	98.5	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A69898
Included Lab Sample IDs: 1804819, 1804820, 1804821, 1804822

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A69904
Included Lab Sample IDs: 1804831, 1804832, 1804833, 1804834

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A69904

Included Lab Sample IDs: 1804831, 1804832, 1804833, 1804834

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	105	P/P	90 - 110
Iron	101	104	P/P	90 - 110
Magnesium	102	105	P/P	90 - 110
Potassium	100	102	P/P	90 - 110
Sodium	101	103	P/P	90 - 110
Zinc	99.5	97.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A69924

Included Lab Sample IDs: 1804815, 1804816, 1804817, 1804818

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Chloride	101	101	P/P	90 - 110
Chloride	102	101	P/P	90 - 110
Sulfate	98.5	99.8	P/P	90 - 110
Sulfate	98.7	100	P/P	90 - 110
Sulfate	99.8	98.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69929

Included Lab Sample IDs: 1804819, 1804820, 1804821, 1804822

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.6	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69936

Included Lab Sample IDs: 1804831, 1804832, 1804833, 1804834

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.2	98.4	P/P	90 - 110
Cadmium	98.1	97.4	P/P	90 - 110
Chromium	99.9	99.6	P/P	90 - 110
Copper	97.3	97.3	P/P	90 - 110
Lead	97.0	96.4	P/P	90 - 110
Nickel	97.7	97.3	P/P	90 - 110
Silver	95.1	95.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A69948

Included Lab Sample IDs: 1804819, 1804820, 1804821, 1804822

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.6	P/P	90 - 110
Ammonia-N	101	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A69953

Included Lab Sample IDs: 1804815, 1804816, 1804817

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.7	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A69953

Included Lab Sample IDs: 1804815, 1804816, 1804817, 1804818

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

Reference Method: SM 2320 B-97

Run ID: A69968

Included Lab Sample IDs: 1804818

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70039

Included Lab Sample IDs: 1804819, 1804820, 1804821, 1804822

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	98.5	P/P	90 - 110
Total-P	99.2	98.8	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A70044

Included Lab Sample IDs: 1804819, 1804820, 1804821, 1804822

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.1	95.0	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					4.18	
EPA 200.7 Rev. 4.4	Calcium	107	109	108			6.01
	Iron	109	108	108	110		1.84
	Magnesium	106	105	110			3.84
	Potassium	103	106	107			3.08
	Sodium	105	107	106			4.89
	Zinc	100	97.8	98.8	101		2.06
EPA 200.8 Rev. 5.4	Arsenic	99.9	98.7	103	102		1.16
	Cadmium	98.5	97.7	102	99.9		2.44

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision LCS	SMP	MS
EPA 200.8 Rev. 5.4	Chromium	99.2	98.0	100	99.4			0.993
	Copper	98.3	92.5	96.8	95.1			1.75
	Lead	100	98.6	102	101			0.550
	Nickel	98.7	94.7	96.4	97.1			0.697
	Silver	96.5	96.3	97.0	96.1			0.999
EPA 300.0 Rev. 2.1	Chloride	102	100				0.160	
	Chloride	103	102	102			0.0803	
	Sulfate	100	99.0	99.0			0.158	
	Sulfate	101	99.7	101			0.680	
EPA 350.1 Rev. 2.0	Ammonia-N	101	98.5	99.9				1.18
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.8	94.6	98.8				2.13
EPA 353.2 Rev. 2.0	NO2NO3-N	98.0	96.1	97.6				1.50
	NO2NO3-N	99.0	94.0	96.0				2.11
EPA 365.1 Rev. 2.0	Total-P	101	102	98.2				4.16
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.6	99.3				1.73
SM 2120 B	Color (true)						0.280	
SM 2320 B-97	Total Alkalinity	103					0.154	
	Total Alkalinity	103					0.0595	
SM 2540 C-97	TDS						9.30	
SM 4500 F-C-97	Fluoride	98.5	99.9	99.9				0.0
SM 5310 B-00	Organic Carbon	96.1	103					0.373

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1804815, 1804816, 1804817, 1804818
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1804831, 1804832, 1804833, 1804834
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1804831, 1804832, 1804833, 1804834
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1804815, 1804816, 1804817, 1804818
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1804815, 1804816, 1804817, 1804818
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1804819, 1804820, 1804821, 1804822
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1804819, 1804820, 1804821, 1804822
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1804819, 1804820, 1804821, 1804822
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1804819, 1804820, 1804821, 1804822
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1804823, 1804824, 1804825, 1804826
SM 2120 B / E31780	True Color measured at 450 nm	1804815, 1804816, 1804817, 1804818
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1804815, 1804816, 1804817, 1804818
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1804815, 1804816, 1804817, 1804818
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1804815, 1804816, 1804817, 1804818
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1804815, 1804816, 1804817, 1804818
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1804819, 1804820, 1804821, 1804822

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	06/03/2016			06/03/2016 16:06	Rochelle Y Jackson	1804815, 1804816, 1804817, 1804818
EPA 200.7 Rev. 4.4	06/03/2016	06/06/2016	Elliott D. Healy	06/07/2016	Joshua Ayres	1804831, 1804832, 1804833, 1804834
EPA 200.8 Rev. 5.4	06/03/2016	06/06/2016	Elliott D. Healy	06/08/2016	Charles J. Peterson	1804831, 1804832, 1804833, 1804834
EPA 300.0 Rev. 2.1	06/03/2016			06/09/2016	Julia Storbeck	1804815, 1804816, 1804817, 1804818
EPA 350.1 Rev. 2.0	06/03/2016			06/09/2016	Diana M. Turner	1804819, 1804820, 1804821, 1804822
EPA 351.2 Rev. 2.0	06/03/2016	06/08/2016	Sofia Elnemr	06/09/2016	Christopher Armour	1804819, 1804820, 1804821, 1804822
EPA 353.2 Rev. 2.0	06/03/2016			06/07/2016	Beverly Y. Sanders	1804819, 1804820, 1804821, 1804822
EPA 365.1 Rev. 2.0	06/03/2016	06/13/2016	Vijayalakshmi Reddy	06/14/2016	Lipi Saha	1804819, 1804820, 1804821, 1804822
EPA 365.1 Rev. 2.0 dissolved	06/03/2016			06/03/2016 14:32	Julia Storbeck	1804823
	06/03/2016			06/03/2016 15:08	Julia Storbeck	1804824
	06/03/2016			06/03/2016 15:09	Julia Storbeck	1804825
	06/03/2016			06/03/2016 15:10	Julia Storbeck	1804826
SM 2120 B	06/03/2016			06/03/2016 16:55	Chrisoulla Rakowski	1804815, 1804816
	06/03/2016			06/03/2016 16:56	Chrisoulla Rakowski	1804817
	06/03/2016			06/03/2016 16:57	Chrisoulla Rakowski	1804818
SM 2320 B-97	06/03/2016			06/09/2016	Dale L. Simmons	1804815, 1804816, 1804817, 1804818
SM 2540 C-97	06/03/2016			06/08/2016	Yijie Li	1804815, 1804816, 1804817, 1804818
SM 2540 D-97	06/03/2016			06/08/2016	Yijie Li	1804815, 1804816, 1804817, 1804818
SM 4500 F-C-97	06/03/2016			06/09/2016	Dale L. Simmons	1804815, 1804816, 1804817, 1804818
SM 5310 B-00	06/03/2016			06/14/2016	Diana M. Turner	1804819, 1804820, 1804821, 1804822