Chemical Analysis Report

SO-DIST-2016-12-15-02

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

Event Description: **SMP: Pollywog OK Branch**
Request ID: **RQ-2016-12-12-16**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901
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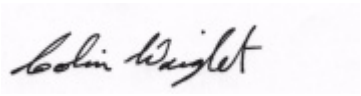
Certified by: Colin Wright, Program Administrator

Date Certified: 10-JAN-2017 11:04



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: Pollywog Creek @ SR78 **Collection Date/Time: 12/14/2016 11:00**

Field ID: G3SD121416-6 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1858180	EPA 180.1 Rev. 2.0	Turbidity	7.3	A	NTU	P316880	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P317356	
		Sulfate	13		mg SO4/L	P317360	
	SM 2120 B	Color (true)	64		PCU	P316877	
	SM 2320 B-97	Total Alkalinity	58		mg CaCO3/L	P317133	
	SM 2540 C-97	TDS	172	A	mg/L	P317434	
	SM 2540 D-97	TSS	6	I	mg/L	P317153	
	SM 4500 F-C-97	Fluoride	0.36		mg F/L	P317331	
1858183	EPA 350.1 Rev. 2.0	Ammonia-N	0.055		mg N/L	P317604	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.42		mg N/L	P317015	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.057		mg N/L	P317297	
	EPA 365.1 Rev. 2.0	Total-P	1.3		mg P/L	P317229	
	SM 5310 B-00	Organic Carbon	10		mg C/L	P316950	
1858186	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.99		mg P/L	P316872	
1858192	EPA 200.7 Rev. 4.4	Calcium	22.9		mg/L	P317014	
		Iron	1.63E+03		ug/L	P317014	
		Magnesium	6.79		mg/L	P317014	
		Potassium	1.8		mg/L	P317014	
		Sodium	17.3		mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	
	EPA 200.8 Rev. 5.4	Arsenic	0.85		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	1.27		ug/L	P317014	
		Copper	0.50	U	ug/L	P317714	
		Lead	0.19	I	ug/L	P317014	
		Nickel	1.09		ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

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: Pollywog Creek @ Pollywog Pt. **Collection Date/Time: 12/14/2016 10:50**

Field ID: G3SD121416-7 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1858181	EPA 180.1 Rev. 2.0	Turbidity	8.0		NTU	P316880	
	EPA 300.0 Rev. 2.1	Chloride	25		mg Cl/L	P317356	
		Sulfate	9.0		mg SO4/L	P317360	
	SM 2120 B	Color (true)	77		PCU	P316877	
	SM 2320 B-97	Total Alkalinity	45		mg CaCO3/L	P317133	
	SM 2540 C-97	TDS	144		mg/L	P317434	
	SM 2540 D-97	TSS	5	I	mg/L	P317153	
	SM 4500 F-C-97	Fluoride	0.30		mg F/L	P317331	
1858184	EPA 350.1 Rev. 2.0	Ammonia-N	0.060		mg N/L	P317679	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.40		mg N/L	P317015	

Field ID: G3SD121416-7 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1858184	EPA 353.2 Rev. 2.0	NO2NO3-N	0.060		mg N/L	P317297	
	EPA 365.1 Rev. 2.0	Total-P	1.3		mg P/L	P317244	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P316950	
1858187	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.91		mg P/L	P316872	
1858193	EPA 200.7 Rev. 4.4	Calcium	17.6		mg/L	P317014	
		Iron	1.78E+03		ug/L	P317014	
		Magnesium	5.68		mg/L	P317014	
		Potassium	1.6		mg/L	P317014	
		Sodium	13.7		mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	
	EPA 200.8 Rev. 5.4	Arsenic	0.80		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	1.42		ug/L	P317014	
		Copper	0.50	U	ug/L	P317714	
		Lead	0.14	I	ug/L	P317014	
		Nickel	1.10		ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: OK Branch @ Eucalyptus Bld **Collection Date/Time: 12/14/2016 11:45**

Field ID: G3SD121416-8 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1858182	EPA 180.1 Rev. 2.0	Turbidity	6.9		NTU	P316881	
	EPA 300.0 Rev. 2.1	Chloride	39		mg Cl/L	P317395	
		Sulfate	23		mg SO4/L	P317398	
	SM 2120 B	Color (true)	40		PCU	P316877	
	SM 2320 B-97	Total Alkalinity	268		mg CaCO3/L	P317133	
	SM 2540 C-97	TDS	375		mg/L	P317434	
	SM 2540 D-97	TSS	7	I	mg/L	P317153	
	SM 4500 F-C-97	Fluoride	0.18		mg F/L	P317331	
1858185	EPA 350.1 Rev. 2.0	Ammonia-N	0.060		mg N/L	P317606	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.18	I	mg N/L	P317015	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P317297	
	EPA 365.1 Rev. 2.0	Total-P	0.064		mg P/L	P317244	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P316950	
1858188	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P316872	
1858194	EPA 200.7 Rev. 4.4	Calcium	108		mg/L	P317014	
		Iron	630		ug/L	P317014	
		Magnesium	6.12		mg/L	P317014	
		Potassium	3.3		mg/L	P317014	
		Sodium	30.2		mg/L	P317014	
		Zinc	5.0	U	ug/L	P317014	

Field ID: G3SD121416-8 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1858194	EPA 200.8 Rev. 5.4	Arsenic	1.53		ug/L	P317014	
		Cadmium	0.020	U	ug/L	P317014	
		Chromium	0.34		ug/L	P317014	
		Copper	0.50	U	ug/L	P317714	
		Lead	0.075	I	ug/L	P317014	
		Nickel	0.96		ug/L	P317014	
		Silver	0.0050	U	ug/L	P317014	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P316880

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P316881

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

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: P317014

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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317714

Component	Result	Code	Units
Copper	0.50	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317360

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317395

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317398

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317604

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317606

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317679

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317015

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317297

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317229

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317244

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316872

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

Reference Method: SM 2120 B
Batch ID: P316877

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P317133

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

Reference Method: SM 2540 C-97
Batch ID: P317434

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317153

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P316950

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: P317014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	107		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	104		P	85 - 115
Sodium	107		P	85 - 115
Zinc	99.1		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	101		P	85 - 115
Lead	99.5		P	85 - 115
Nickel	97.7		P	85 - 115
Silver	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317714

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	93.5		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317360

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317398

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317604

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317604

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317606

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317679

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317015

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317297

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317229

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317244

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316872

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.6		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P317133

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.9		P	95 - 108

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P317331

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

Reference Method: SM 5310 B-00
Batch ID: P316950

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	102		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857859	Calcium	105		P	80 - 120
1857859	Iron	108		P	80 - 120
1857859	Magnesium	104		P	80 - 120
1857859	Potassium	101		P	80 - 120
1857859	Sodium	104		P	80 - 120
1857859	Zinc	97.2		P	80 - 120
1857893	Calcium	101		P	80 - 120
1857893	Iron	107	109	P/P	80 - 120
1857893	Magnesium	107	110	P/P	80 - 120
1857893	Potassium	104	106	P/P	80 - 120
1857893	Sodium	104	106	P/P	80 - 120
1857893	Zinc	96.9	97.1	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857859	Arsenic	98.6		P	80 - 120
1857859	Cadmium	99.3		P	80 - 120
1857859	Chromium	98.8		P	80 - 120
1857859	Lead	99.5		P	80 - 120
1857859	Nickel	93.4		P	80 - 120
1857859	Silver	98.9		P	80 - 120
1857893	Arsenic	97.6	98.8	P/P	80 - 120
1857893	Cadmium	101	102	P/P	80 - 120
1857893	Chromium	101	102	P/P	80 - 120
1857893	Lead	100	99.9	P/P	80 - 120
1857893	Nickel	93.1	94.6	P/P	80 - 120
1857893	Silver	99.8	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317714

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859040	Copper	89.8		P	80 - 120
1859355	Copper	90.8	89.8	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857880	Chloride	100		P	90 - 110
1858180	Chloride	96.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317360

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857880	Sulfate	95.9		P	90 - 110
1858180	Sulfate	91.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857477	Chloride	99.1		P	90 - 110
1859067	Chloride	98.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317398

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857477	Sulfate	95.8		P	90 - 110
1859067	Sulfate	95.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317604

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858183	Ammonia-N	99.2	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858185	Ammonia-N	95.2	96.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317679

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859373	Ammonia-N	97.6	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317015

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858315	Kjeldahl Nitrogen	104	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317297

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317297

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858156	NO2NO3-N	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317229

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858142	Total-P	98.4	96.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316872

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858188	O-Phosphate-P	97.5	99.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1857882	Fluoride	96.3	95.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P316950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858010	Organic Carbon	95.1	98.1	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P316880

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858180	Turbidity	7.96	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P316881

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858312	Turbidity	1.63	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857893	Calcium	0.416	Spike	P	0 - 20
1857893	Iron	1.75	Spike	P	0 - 20
1857893	Magnesium	1.66	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857893	Potassium	2.30	Spike	P	0 - 20
1857893	Sodium	1.55	Spike	P	0 - 20
1857893	Zinc	0.228	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857893	Arsenic	1.22	Spike	P	0 - 20
1857893	Cadmium	1.06	Spike	P	0 - 20
1857893	Chromium	1.42	Spike	P	0 - 20
1857893	Lead	0.182	Spike	P	0 - 20
1857893	Nickel	1.59	Spike	P	0 - 20
1857893	Silver	1.44	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317714

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859355	Copper	1.08	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857880	Chloride	0.151	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317360

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857880	Sulfate	0.927	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317395

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857477	Chloride	0.00303	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317398

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857477	Sulfate	0.0475	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317604

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858183	Ammonia-N	1.94	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858185	Ammonia-N	0.573	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317679

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859373	Ammonia-N	0.461	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317015

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858315	Kjeldahl Nitrogen	0.442	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317297

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858156	NO2NO3-N	0.795	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317229

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858142	Total-P	1.35	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317244

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858184	Total-P	0.423	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P316872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858188	O-Phosphate-P	1.45	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B
Batch ID: P316877

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858171	Color (true)	1.33	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P317133

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858028	Total Alkalinity	0.298	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P317434

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858180	TDS	0.580	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P317331

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1857882	Fluoride	0.539	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P316950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858010	Organic Carbon	2.23	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: A73406
Included Lab Sample IDs: 1858186, 1858187, 1858188

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.0	96.8	P/P	90 - 110
O-Phosphate-P	98.5	97.8	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A73407
Included Lab Sample IDs: 1858180, 1858181, 1858182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.8	101	P/P	85 - 115

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A73408
Included Lab Sample IDs: 1858180, 1858181, 1858182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.0	P/P	95 - 105
Turbidity	99.0	98.5	P/P	95 - 105

Reference Method: SM 5310 B-00
Run ID: A73434
Included Lab Sample IDs: 1858183, 1858184, 1858185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	100	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A73503
Included Lab Sample IDs: 1858180, 1858181, 1858182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.0	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A73504
Included Lab Sample IDs: 1858183, 1858184, 1858185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A73513
Included Lab Sample IDs: 1858192, 1858193, 1858194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.3	96.5	P/P	90 - 110
Cadmium	99.6	100	P/P	90 - 110
Chromium	102	102	P/P	90 - 110
Lead	97.0	98.1	P/P	90 - 110
Nickel	94.3	93.6	P/P	90 - 110
Silver	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A73524
Included Lab Sample IDs: 1858183, 1858184, 1858185

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A73532
Included Lab Sample IDs: 1858192, 1858193, 1858194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	105	P/P	90 - 110
Calcium	103	102	P/P	90 - 110
Iron	102	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A73532
Included Lab Sample IDs: 1858192, 1858193, 1858194

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

Reference Method: SM 4500 F-C-97
Run ID: A73565
Included Lab Sample IDs: 1858180, 1858181, 1858182

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A73569
Included Lab Sample IDs: 1858183, 1858184, 1858185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	104	P/P	90 - 110
Total-P	103	102	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A73576
Included Lab Sample IDs: 1858180, 1858181, 1858182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	101	102	P/P	90 - 110
Sulfate	96.0	93.8	P/P	90 - 110
Sulfate	98.6	96.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A73671
Included Lab Sample IDs: 1858183, 1858185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.3	98.2	P/P	90 - 110
Ammonia-N	98.3	97.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A73714
Included Lab Sample IDs: 1858184

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A73764
Included Lab Sample IDs: 1858192, 1858193, 1858194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	98.1	97.4	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						7.96	
	Turbidity						1.63	
EPA 200.7 Rev. 4.4	Calcium	105	105	101				0.416
	Iron	107	108	107	109			1.75
	Magnesium	108	104	107	110			1.66
	Potassium	104	101	104	106			2.30
	Sodium	107	104	104	106			1.55
	Zinc	99.1	97.2	96.9	97.1			0.228
EPA 200.8 Rev. 5.4	Arsenic	98.7	98.6	97.6	98.8			1.22
	Cadmium	102	99.3	101	102			1.06
	Chromium	101	98.8	101	102			1.42
	Copper	93.5	89.8	90.8	89.8			1.08
	Lead	99.5	99.5	100	99.9			0.182
	Nickel	97.7	93.4	93.1	94.6			1.59
	Silver	100	98.9	99.8	101			1.44
EPA 300.0 Rev. 2.1	Chloride	100	100	96.0			0.151	
	Chloride	99.6	99.1	98.8			0.0030	
	Sulfate	94.3	95.9	91.8			0.927	
	Sulfate	96.3	95.8	95.8			0.0475	
EPA 350.1 Rev. 2.0	Ammonia-N	103	99.2	103				1.94
	Ammonia-N	101	95.2	96.4				0.573
	Ammonia-N	100	97.6	98.3				0.461
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	104	105				0.442
EPA 353.2 Rev. 2.0	NO2NO3-N	104	106	104				0.795
EPA 365.1 Rev. 2.0	Total-P	98.1	98.4	96.2				1.35
	Total-P	99.6						0.423
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	97.5	99.2				1.45
SM 2120 B	Color (true)						1.33	
SM 2320 B-97	Total Alkalinity	99.9					0.298	
SM 2540 C-97	TDS						0.580	
SM 4500 F-C-97	Fluoride	98.5	96.3	95.7				0.539
SM 5310 B-00	Organic Carbon	102	95.1	98.1				2.23

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1858180, 1858181, 1858182

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1858192, 1858193, 1858194
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1858192, 1858193, 1858194
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1858180, 1858181, 1858182
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1858180, 1858181, 1858182
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1858183, 1858184, 1858185
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1858183, 1858184, 1858185
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1858183, 1858184, 1858185
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1858183, 1858184, 1858185
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1858186, 1858187, 1858188
SM 2120 B / E31780	True Color measured at 450 nm	1858180, 1858181, 1858182
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1858180, 1858181, 1858182
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1858180, 1858181, 1858182
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1858180, 1858181, 1858182
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1858180, 1858181, 1858182
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1858183, 1858184, 1858185

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	12/15/2016			12/15/2016 15:19	Julie Michelle Frank	1858180, 1858181, 1858182
EPA 200.7 Rev. 4.4	12/15/2016	12/19/2016	Elliott D. Healy	12/21/2016	Joshua Ayres	1858192, 1858193, 1858194
EPA 200.8 Rev. 5.4	12/15/2016	01/04/2017	Elliott D. Healy	01/05/2017	Robert K Palmer	1858192, 1858193, 1858194
	12/15/2016	12/19/2016	Elliott D. Healy	12/21/2016	Charles J. Peterson	1858192, 1858193, 1858194
EPA 300.0 Rev. 2.1	12/15/2016			12/22/2016	Ping Hua	1858180, 1858181
	12/15/2016			12/23/2016	Ping Hua	1858182
EPA 350.1 Rev. 2.0	12/15/2016			01/03/2017	Sofia Elnemr	1858184
	12/15/2016			12/29/2016	Sofia Elnemr	1858183, 1858185
EPA 351.2 Rev. 2.0	12/15/2016	12/19/2016	Adrian Shelby	12/21/2016	Joseph Suarez	1858183, 1858184, 1858185
EPA 353.2 Rev. 2.0	12/15/2016			12/21/2016	Beverly Y. Sanders	1858183, 1858184, 1858185
EPA 365.1 Rev. 2.0	12/15/2016	12/22/2016	Vijayalakshmi Reddy	12/23/2016	Lipi Saha	1858183, 1858184, 1858185
EPA 365.1 Rev. 2.0 dissolved	12/15/2016			12/15/2016 14:25	Julia Storbeck	1858188
	12/15/2016			12/15/2016 15:02	Julia Storbeck	1858186
	12/15/2016			12/15/2016 15:04	Julia Storbeck	1858187
SM 2120 B	12/15/2016			12/15/2016 16:10	Jared I. Manley	1858180
	12/15/2016			12/15/2016 16:11	Jared I. Manley	1858181
	12/15/2016			12/15/2016 16:12	Jared I. Manley	1858182
SM 2320 B-97	12/15/2016			12/17/2016	Dale L. Simmons	1858180, 1858181, 1858182
SM 2540 C-97	12/15/2016			12/19/2016	Sima Feizi	1858180, 1858181, 1858182
SM 2540 D-97	12/15/2016			12/19/2016	Sima Feizi	1858180, 1858181, 1858182
SM 4500 F-C-97	12/15/2016			12/23/2016	Dale L. Simmons	1858180, 1858181, 1858182
SM 5310 B-00	12/15/2016			12/16/2016	Julie Michelle Frank	1858183, 1858184, 1858185