

Chemical Analysis Report

SO-DIST-2016-06-28-04

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-2016-06-13-41**
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: Timothy Fitzpatrick, Program Administrator

Date Certified: 20-JUL-2016 09:54

A handwritten signature in black ink, appearing to read "Timothy Fitzpatrick", with a stylized flourish at the end.

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 @ SR80

Collection Date/Time: 06/27/2016 11:00

Field ID: G3SD06272016-4

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811763	EPA 180.1 Rev. 2.0	Turbidity	6.5		NTU	P307033	
	EPA 300.0 Rev. 2.1	Chloride	17	A	mg Cl/L	P307885	
		Sulfate	4.2	A	mg SO4/L	P307887	
	SM 2120 B	Color (true)	550		PCU	P307039	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P307512	
	SM 2540 C-97	TDS	110		mg/L	P307345	
	SM 2540 D-97	TSS	13		mg/L	P307316	
	SM 4500 F-C-97	Fluoride	0.086	I	mg F/L	P307514	
1811765	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P307415	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P307182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.026		mg N/L	P307224	
	EPA 365.1 Rev. 2.0	Total-P	0.25		mg P/L	P307144	
	SM 5310 B-00	Organic Carbon	39		mg C/L	P307474	
1811767	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P307020	
1811771	EPA 200.7 Rev. 4.4	Calcium	12.7		mg/L	P307149	
		Iron	2.24E+03		ug/L	P307149	
		Magnesium	2.94		mg/L	P307149	
		Potassium	0.82	I	mg/L	P307149	
		Sodium	10.9		mg/L	P307149	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P307149	
		Arsenic	2.16		ug/L	P307149	
		Cadmium	0.020	U	ug/L	P307149	
		Chromium	1.17		ug/L	P307149	
		Copper	0.54		ug/L	P307149	
		Lead	0.55		ug/L	P307149	
		Nickel	0.96		ug/L	P307149	
		Silver	0.0050	U	ug/L	P307149	

Ref. Method and Comment:

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: Pollywog Creek @ Pollywog Pt

Collection Date/Time: 06/27/2016 10:45

Field ID: G3SD06272016-5

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811764	EPA 180.1 Rev. 2.0	Turbidity	4.6		NTU	P307033	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P307885	
		Sulfate	4.6		mg SO4/L	P307887	
	SM 2120 B	Color (true)	530		PCU	P307039	
	SM 2320 B-97	Total Alkalinity	26		mg CaCO3/L	P307512	
	SM 2540 C-97	TDS	121		mg/L	P307345	
	SM 2540 D-97	TSS	7	I	mg/L	P307316	
	SM 4500 F-C-97	Fluoride	0.10		mg F/L	P307514	
1811766	EPA 350.1 Rev. 2.0	Ammonia-N	0.036		mg N/L	P307415	

Field ID: G3SD06272016-5

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811766	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P307182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.032		mg N/L	P307224	
	EPA 365.1 Rev. 2.0	Total-P	0.28		mg P/L	P307144	
	SM 5310 B-00	Organic Carbon	38		mg C/L	P307474	
1811768	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.20		mg P/L	P307020	
1811772	EPA 200.7 Rev. 4.4	Calcium	13.6		mg/L	P307149	
		Iron	2.17E+03		ug/L	P307149	
		Magnesium	3.15		mg/L	P307149	
		Potassium	0.75	I	mg/L	P307149	
		Sodium	11.0		mg/L	P307149	
		Zinc	5.0	U	ug/L	P307149	
	EPA 200.8 Rev. 5.4	Arsenic	2.14		ug/L	P307149	
		Cadmium	0.020	U	ug/L	P307149	
		Chromium	1.15		ug/L	P307149	
		Copper	0.58		ug/L	P307149	
		Lead	0.49		ug/L	P307149	
		Nickel	1.68		ug/L	P307149	
		Silver	0.0050	U	ug/L	P307149	

Ref. Method and Comment:

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: OK Branch @ Eucalyptus Bld

Collection Date/Time: 06/27/2016 11:45

Field ID: G3SD06272016-6

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811865	EPA 180.1 Rev. 2.0	Turbidity	4.1	A	NTU	P307034	
	EPA 300.0 Rev. 2.1	Chloride	50		mg Cl/L	P307885	
		Sulfate	17		mg SO4/L	P307887	
	SM 2120 B	Color (true)	150		PCU	P307039	
	SM 2320 B-97	Total Alkalinity	179		mg CaCO3/L	P307512	
	SM 2540 C-97	TDS	336	A	mg/L	P307692	
	SM 2540 D-97	TSS	8	I	mg/L	P307684	
	SM 4500 F-C-97	Fluoride	0.17		mg F/L	P307514	
1811867	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P307415	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P307182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.052		mg N/L	P307224	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P307144	
	SM 5310 B-00	Organic Carbon	20		mg C/L	P307474	
1811869	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P307020	
1811872	EPA 200.7 Rev. 4.4	Calcium	75.8		mg/L	P307149	
		Iron	1.20E+03		ug/L	P307149	
		Magnesium	5.26		mg/L	P307149	
		Potassium	3.6		mg/L	P307149	
		Sodium	36.4		mg/L	P307149	

Field ID: G3SD06272016-6

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811872	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P307149	
	EPA 200.8 Rev. 5.4	Arsenic	1.78		ug/L	P307149	
		Cadmium	0.020	U	ug/L	P307149	
		Chromium	0.75		ug/L	P307149	
		Copper	0.28	I	ug/L	P307149	
		Lead	0.090	I	ug/L	P307149	
		Nickel	0.40		ug/L	P307149	
		Silver	0.0050	U	ug/L	P307149	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: G3SD-BLANK

Collection Date/Time: 06/27/2016 11:55

Field ID: G3SD-BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1811866	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P307034	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P307885	
		Sulfate	0.20	U	mg SO4/L	P307887	
	SM 2120 B	Color (true)	2.5	U	PCU	P307039	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P307512	
	SM 2540 C-97	TDS	15	U	mg/L	P307692	
	SM 2540 D-97	TSS	2	U	mg/L	P307684	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P307514	
1811868	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P307415	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P307183	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P307224	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P307144	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P307474	
1811870	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P307020	
1811873	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P307149	
		Iron	30	U	ug/L	P307149	
		Magnesium	0.040	U	mg/L	P307149	
		Potassium	0.30	U	mg/L	P307149	
		Sodium	0.50	U	mg/L	P307149	
		Zinc	5.0	U	ug/L	P307149	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P307149	
		Cadmium	0.020	U	ug/L	P307149	
		Chromium	0.050	U	ug/L	P307149	
		Copper	0.10	U	ug/L	P307149	
		Lead	0.050	U	ug/L	P307149	
		Nickel	0.050	U	ug/L	P307149	
		Silver	0.0050	U	ug/L	P307149	

Ref. Method and Comment:

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

EPA 350.1 Rev. 2.0: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307033

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307034

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P307149

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: P307149

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: P307885

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307887

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307415

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307182

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307183

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P307224

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P307144

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307020

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

Reference Method: SM 2120 B
Batch ID: P307039

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P307512

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

Reference Method: SM 2540 C-97
Batch ID: P307345

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P307692

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P307316

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P307684

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P307514

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P307474

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: P307149

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	109		P	85 - 115
Magnesium	112		P	85 - 115
Potassium	101		P	85 - 115
Sodium	98.8		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307149

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	98.9		P	85 - 115
Chromium	99.2		P	85 - 115
Copper	97.8		P	85 - 115
Lead	98.0		P	85 - 115
Nickel	99.6		P	85 - 115
Silver	96.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307885

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.7		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307887

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307415

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.5		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307182

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307183

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	92.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P307224

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: P307144

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307020

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

Reference Method: SM 2320 B-97
Batch ID: P307512

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P307514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.2		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P307474

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	100		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P307149

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1812091	Calcium	106		P	80 - 120
1812091	Iron	107	113	P/P	80 - 120
1812091	Magnesium	108	115	P/P	80 - 120
1812091	Potassium	95.7	100	P/P	80 - 120
1812091	Sodium	101		P	80 - 120
1812091	Zinc	104	106	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307149

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1812091	Arsenic	103	102	P/P	80 - 120
1812091	Cadmium	102	99.3	P/P	80 - 120
1812091	Chromium	102	100	P/P	80 - 120
1812091	Copper	99.9	100	P/P	80 - 120
1812091	Lead	100	99.5	P/P	80 - 120
1812091	Nickel	100	98.4	P/P	80 - 120
1812091	Silver	98.2	97.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307885

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811763	Chloride	98.6		P	90 - 110
1811764	Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811763	Sulfate	99.4		P	90 - 110
1811764	Sulfate	98.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307183

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811879	Kjeldahl Nitrogen	85.6	100	F/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P307224

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811747	NO2NO3-N	101	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P307144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811723	Total-P	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811684	O-Phosphate-P	98.4	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P307514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811876	Fluoride	100	99.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P307474

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811696	Organic Carbon	99.0	99.4	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307033

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811718	Turbidity	1.98	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P307034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811865	Turbidity	2.43	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P307149

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1812091	Calcium	4.32	Spike	P	0 - 20
1812091	Iron	4.38	Spike	P	0 - 20
1812091	Magnesium	3.87	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P307149

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1812091	Potassium	3.09	Spike	P	0 - 20
1812091	Sodium	4.01	Spike	P	0 - 20
1812091	Zinc	2.63	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P307149

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1812091	Arsenic	1.28	Spike	P	0 - 20
1812091	Cadmium	2.98	Spike	P	0 - 20
1812091	Chromium	1.51	Spike	P	0 - 20
1812091	Copper	0.212	Spike	P	0 - 20
1812091	Lead	0.686	Spike	P	0 - 20
1812091	Nickel	1.89	Spike	P	0 - 20
1812091	Silver	0.509	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811763	Chloride	0.0668	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811763	Sulfate	0.0966	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307415

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811867	Ammonia-N	0.155	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307182

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811748	Kjeldahl Nitrogen	4.12	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P307183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811879	Kjeldahl Nitrogen	14.3	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P307224

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811747	NO2NO3-N	1.83	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P307144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811723	Total-P	0.745	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P307020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811684	O-Phosphate-P	1.81	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P307039

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811745	Color (true)	1.39	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P307512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811876	Total Alkalinity	0.346	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P307345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811719	TDS	2.48	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P307692

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811865	TDS	1.79	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P307316

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811719	TSS	6.67	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P307514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811876	Fluoride	0.470	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P307474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811696	Organic Carbon	0.208	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: A70279
Included Lab Sample IDs: 1811767, 1811768, 1811869, 1811870

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	102	102	P/P	90 - 110
O-Phosphate-P	99.0	99.3	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A70283
Included Lab Sample IDs: 1811763, 1811764, 1811865, 1811866

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

Reference Method: SM 2120 B
Run ID: A70284
Included Lab Sample IDs: 1811865, 1811866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.0	98.2	P/P	90 - 115
Color (true)	97.4	97.0	P/P	90 - 115

Reference Method: SM 2120 B
Run ID: A70285
Included Lab Sample IDs: 1811763, 1811764

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.1	95.8	P/P	90 - 115

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A70350

Included Lab Sample IDs: 1811765, 1811766, 1811867, 1811868

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70368

Included Lab Sample IDs: 1811765, 1811766, 1811867

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A70396

Included Lab Sample IDs: 1811771, 1811772, 1811872, 1811873

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	101	P/P	95 - 105
Calcium	101	101	P/P	90 - 110
Iron	102	103	P/P	95 - 105
Iron	103	103	P/P	90 - 110
Magnesium	101	101	P/P	95 - 105
Magnesium	101	101	P/P	90 - 110
Potassium	97.0	98.4	P/P	95 - 105
Potassium	98.4	98.5	P/P	90 - 110
Sodium	97.4	98.1	P/P	90 - 110
Sodium	97.9	97.4	P/P	95 - 105
Zinc	99.7	99.7	P/P	95 - 105
Zinc	99.7	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A70409

Included Lab Sample IDs: 1811765, 1811766, 1811867, 1811868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.7	90.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70410

Included Lab Sample IDs: 1811868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	97.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70419

Included Lab Sample IDs: 1811765, 1811766, 1811867, 1811868

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A70435

Included Lab Sample IDs: 1811765, 1811766, 1811867, 1811868

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

Reference Method: SM 2320 B-97

Run ID: A70440

Included Lab Sample IDs: 1811763, 1811764, 1811865, 1811866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A70440

Included Lab Sample IDs: 1811763, 1811764, 1811865, 1811866

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70477

Included Lab Sample IDs: 1811771, 1811772, 1811872, 1811873

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.6	98.9	P/P	90 - 110
Cadmium	96.4	97.9	P/P	90 - 110
Chromium	97.8	99.3	P/P	90 - 110
Copper	97.2	98.0	P/P	90 - 110
Lead	93.7	95.1	P/P	90 - 110
Nickel	97.8	98.4	P/P	90 - 110
Silver	94.3	96.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A70540

Included Lab Sample IDs: 1811763, 1811764, 1811865, 1811866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.2	99.4	P/P	90 - 110
Chloride	99.4	98.8	P/P	90 - 110
Sulfate	95.1	99.2	P/P	90 - 110
Sulfate	99.2	95.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A70553

Included Lab Sample IDs: 1811873

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	96.7	96.6	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	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					1.98	
	Turbidity					2.43	
EPA 200.7 Rev. 4.4	Calcium	103	106				4.32
	Iron	109	107	113			4.38
	Magnesium	112	108	115			3.87
	Potassium	101	95.7	100			3.09
	Sodium	98.8	101				4.01
	Zinc	101	104	106			2.63
EPA 200.8 Rev. 5.4	Arsenic	100	103	102			1.28
	Cadmium	98.9	102	99.3			2.98
	Chromium	99.2	102	100			1.51
	Copper	97.8	99.9	100			0.212
	Lead	98.0	100	99.5			0.686
	Nickel	99.6	100	98.4			1.89
	Silver	96.6	98.2	97.7			0.509
EPA 300.0 Rev. 2.1	Chloride	97.7	98.6	98.3		0.0668	
	Sulfate	98.9	99.4	98.6		0.0966	
EPA 350.1 Rev. 2.0	Ammonia-N	97.5					0.155
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.7					4.12
	Kjeldahl Nitrogen	92.0	85.6	100			14.3
EPA 353.2 Rev. 2.0	NO2NO3-N	104	101	103			1.83
EPA 365.1 Rev. 2.0	Total-P	106	100	101			0.745
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.4	100			1.81
SM 2120 B	Color (true)					1.39	
SM 2320 B-97	Total Alkalinity	102				0.346	
SM 2540 C-97	TDS					2.48	
	TDS					1.79	
SM 2540 D-97	TSS					6.67	
SM 4500 F-C-97	Fluoride	98.2	100	99.6			0.470
SM 5310 B-00	Organic Carbon	100	99.0	99.4			0.208

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1811763, 1811764, 1811865, 1811866
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1811771, 1811772, 1811872, 1811873
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1811771, 1811772, 1811872, 1811873
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1811763, 1811764, 1811865, 1811866
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1811763, 1811764, 1811865, 1811866
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1811765, 1811766, 1811867, 1811868
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1811765, 1811766, 1811867, 1811868
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1811765, 1811766, 1811867, 1811868
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1811765, 1811766, 1811867, 1811868
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1811767, 1811768, 1811869, 1811870
SM 2120 B / E31780	True Color measured at 450 nm	1811763, 1811764, 1811865, 1811866

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1811763, 1811764, 1811865, 1811866
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1811763, 1811764, 1811865, 1811866
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1811763, 1811764, 1811865, 1811866
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1811763, 1811764, 1811865, 1811866
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1811765, 1811766, 1811867, 1811868

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	06/28/2016			06/28/2016 16:16	Sima Feizi	1811865, 1811866
EPA 200.7 Rev. 4.4	06/28/2016	06/30/2016	Elliott D. Healy	07/05/2016	Joshua Ayres	1811771, 1811772
EPA 200.8 Rev. 5.4	06/28/2016	06/30/2016	Elliott D. Healy	07/08/2016	Charles J. Peterson	1811872, 1811873
	06/28/2016	06/30/2016	Elliott D. Healy	07/13/2016	Charles J. Peterson	1811873
EPA 300.0 Rev. 2.1	06/28/2016			07/12/2016	Ping Hua	1811763, 1811764
EPA 350.1 Rev. 2.0	06/28/2016			07/06/2016	Diana M. Turner	1811867, 1811868
EPA 351.2 Rev. 2.0	06/28/2016	07/01/2016	Sofia Elnemr	07/06/2016	Christopher Armour	1811765, 1811766
EPA 353.2 Rev. 2.0	06/28/2016			06/30/2016	Beverly Y. Sanders	1811867, 1811868
EPA 365.1 Rev. 2.0	06/28/2016	06/30/2016	Vijayalakshmi Reddy	07/01/2016	Lipi Saha	1811765, 1811766
	06/28/2016	06/30/2016	Vijayalakshmi Reddy	07/05/2016	Lipi Saha	1811868
EPA 365.1 Rev. 2.0 dissolved	06/28/2016			06/28/2016 14:53	Julia Storbeck	1811767
	06/28/2016			06/28/2016 14:54	Julia Storbeck	1811768
	06/28/2016			06/28/2016 15:41	Julia Storbeck	1811870
	06/28/2016			06/28/2016 15:44	Julia Storbeck	1811869
SM 2120 B	06/28/2016			06/28/2016 17:16	Rochelle Y Jackson	1811866
	06/28/2016			06/28/2016 17:41	Rochelle Y Jackson	1811865
	06/28/2016			06/28/2016 17:56	Rochelle Y Jackson	1811763
	06/28/2016			06/28/2016 17:57	Rochelle Y Jackson	1811764
SM 2320 B-97	06/28/2016			07/07/2016	Dale L. Simmons	1811865, 1811866
SM 2540 C-97	06/28/2016			06/29/2016	Yijie Li	1811763, 1811764
	06/28/2016			07/01/2016	Yijie Li	1811865, 1811866
SM 2540 D-97	06/28/2016			06/29/2016	Yijie Li	1811763, 1811764
	06/28/2016			07/01/2016	Yijie Li	1811865, 1811866
SM 4500 F-C-97	06/28/2016			07/07/2016	Dale L. Simmons	1811865, 1811866
SM 5310 B-00	06/28/2016			07/06/2016	Sofia Elnemr	1811867, 1811868