

Chemical Analysis Report

SO-DIST-2016-03-16-01

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

Event Description: **SMP: Pollywog and OK Branch**

Request ID: **RQ-2016-03-14-35**

Customer: **SO-DIST**

Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
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Date Certified: 06-APR-2016 13:16



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: 03/15/2016 13:45

Field ID: G3SD03152016-4

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1780179	EPA 180.1 Rev. 2.0	Turbidity	5.2	A	NTU	P300515	
	EPA 300.0 Rev. 2.1	Chloride	25	A	mg Cl/L	P300654	
		Sulfate	11	A	mg SO4/L	P300656	
	SM 2120 B	Color (true)	160		PCU	P300495	
	SM 2320 B-97	Total Alkalinity	49		mg CaCO3/L	P300688	
	SM 2540 C-97	TDS	136		mg/L	P301165	
	SM 2540 D-97	TSS	6	I	mg/L	P300949	
	SM 4500 F-C-97	Fluoride	0.30		mg F/L	P300691	
1780182	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P300975	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P300928	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.045		mg N/L	P300735	
	EPA 365.1 Rev. 2.0	Total-P	0.87		mg P/L	P300830	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P300877	
1780185	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.77		mg P/L	P300512	
1780194	EPA 200.7 Rev. 4.4	Calcium	20.1		mg/L	P300731	
		Iron	1.52E+03		ug/L	P300731	
		Magnesium	5.83		mg/L	P300731	
		Potassium	1.3		mg/L	P300731	
		Sodium	15.6		mg/L	P300731	
		Zinc	5.0	U	ug/L	P300731	
	EPA 200.8 Rev. 5.4	Arsenic	1.13		ug/L	P300731	
		Cadmium	0.020	U	ug/L	P300731	
		Chromium	1.15		ug/L	P300731	
		Copper	0.50	U	ug/L	P300731	
		Lead	0.17	I	ug/L	P300731	
		Nickel	1.18		ug/L	P300731	
		Silver	0.0050	U	ug/L	P300731	

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.

Sample Location: POLLYWOG CREEK @ pollwog pt.

Collection Date/Time: 03/15/2016 13:30

Field ID: G3SD03152016-5

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1780180	EPA 180.1 Rev. 2.0	Turbidity	4.7		NTU	P300515	
	EPA 300.0 Rev. 2.1	Chloride	27		mg Cl/L	P300654	
		Sulfate	7.8		mg SO4/L	P300656	
	SM 2120 B	Color (true)	170		PCU	P300496	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P300688	
	SM 2540 C-97	TDS	125		mg/L	P301165	
	SM 2540 D-97	TSS	4	I	mg/L	P300949	
	SM 4500 F-C-97	Fluoride	0.23		mg F/L	P300691	
1780183	EPA 350.1 Rev. 2.0	Ammonia-N	0.050		mg N/L	P300975	

Field ID: G3SD03152016-5

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1780183	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.78		mg N/L	P300929	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.055		mg N/L	P300735	
	EPA 365.1 Rev. 2.0	Total-P	0.73		mg P/L	P300831	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P300877	
1780186	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.62		mg P/L	P300512	
1780195	EPA 200.7 Rev. 4.4	Calcium	14.7		mg/L	P300731	
		Iron	1.45E+03		ug/L	P300731	
		Magnesium	4.94		mg/L	P300731	
		Potassium	1.2		mg/L	P300731	
		Sodium	15.5		mg/L	P300731	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P300731	
		Arsenic	1.10		ug/L	P300731	
		Cadmium	0.020	U	ug/L	P300731	
		Chromium	1.22		ug/L	P300731	
		Copper	0.50	U	ug/L	P300731	
		Lead	0.16	I	ug/L	P300731	
		Nickel	1.05		ug/L	P300731	
		Silver	0.0050	U	ug/L	P300731	

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 365.1 Rev. 2.0: Total-P: Matrix spike recovery data is unavailable due to high analyte concentration in the QC sample.

Sample Location: OK BRANCH @ EUCALYPTUS BLD.

Collection Date/Time: 03/15/2016 14:10

Field ID: G3SD03152016-6

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1780181	EPA 180.1 Rev. 2.0	Turbidity	4.3		NTU	P300515	
	EPA 300.0 Rev. 2.1	Chloride	50		mg Cl/L	P300654	
		Sulfate	19		mg SO4/L	P300656	
		Color (true)	71		PCU	P300496	
	SM 2320 B-97	Total Alkalinity	252		mg CaCO3/L	P300688	
	SM 2540 C-97	TDS	385	A	mg/L	P301165	
	SM 2540 D-97	TSS	3	I	mg/L	P300949	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P300691	
1780184	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P300975	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P300929	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P300736	
	EPA 365.1 Rev. 2.0	Total-P	0.044		mg P/L	P300831	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P300877	
1780187	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P300512	
1780196	EPA 200.7 Rev. 4.4	Calcium	102		mg/L	P300731	
		Iron	450		ug/L	P300731	
		Magnesium	5.31		mg/L	P300731	
		Potassium	2.6		mg/L	P300731	
		Sodium	35.2		mg/L	P300731	

Field ID: G3SD03152016-6

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1780196	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P300731	
	EPA 200.8 Rev. 5.4	Arsenic	1.58		ug/L	P300731	
		Cadmium	0.020	U	ug/L	P300731	
		Chromium	0.42		ug/L	P300731	
		Copper	0.50	U	ug/L	P300731	
		Lead	0.050	U	ug/L	P300731	
		Nickel	0.56		ug/L	P300731	
		Silver	0.0050	U	ug/L	P300731	

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 365.1 Rev. 2.0: Total-P: 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: P300515

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P300731

Component	Result	Code	Units
Calcium	0.15	I	mg/L
Iron	30	U	ug/L
Magnesium	0.045	I	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: P300731

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.88	I	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: P300654

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300656

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300975

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300928

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300929

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300735

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300736

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300830

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300831

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300512

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2120 B
 Batch ID: P300495

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
 Batch ID: P300496

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
 Batch ID: P300688

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

Reference Method: SM 2540 C-97
 Batch ID: P301165

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
 Batch ID: P300949

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
 Batch ID: P300691

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
 Batch ID: P300877

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: P300731

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	102		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	103		P	85 - 115
Sodium	105		P	85 - 115
Zinc	97.0		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300731

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.2		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	95.3		P	85 - 115
Copper	96.5		P	85 - 115
Lead	89.6		P	85 - 115
Nickel	96.7		P	85 - 115
Silver	94.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300654

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300656

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300975

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: P300928

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300929

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300735

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	102		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300736

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	104		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300830

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300831

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300512

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

Reference Method: SM 2320 B-97
Batch ID: P300688

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

Reference Method: SM 4500 F-C-97
Batch ID: P300691

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.8		P	94 - 108

Reference Method: SM 5310 B-00
Batch ID: P300877

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.7		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P300731

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780071	Calcium	106		P	80 - 120
1780071	Iron	104	99.4	P/P	80 - 120
1780071	Magnesium	105	97.0	P/P	80 - 120
1780071	Potassium	105	98.7	P/P	80 - 120
1780071	Sodium	107	98.7	P/P	80 - 120
1780071	Zinc	101	93.2	P/P	80 - 120
1780521	Calcium	109		P	80 - 120
1780521	Iron	104		P	80 - 120
1780521	Magnesium	105		P	80 - 120
1780521	Potassium	101		P	80 - 120
1780521	Sodium	106		P	80 - 120
1780521	Zinc	98.1		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300731

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780071	Arsenic	98.5	96.7	P/P	80 - 120
1780071	Cadmium	98.3	97.4	P/P	80 - 120
1780071	Chromium	93.5	93.0	P/P	80 - 120
1780071	Copper	94.6	90.0	P/P	80 - 120
1780071	Lead	90.8	89.6	P/P	80 - 120
1780071	Nickel	95.0	93.4	P/P	80 - 120
1780071	Silver	96.0	93.4	P/P	80 - 120
1780521	Arsenic	98.9		P	80 - 120
1780521	Cadmium	101		P	80 - 120
1780521	Chromium	95.8		P	80 - 120
1780521	Copper	91.9		P	80 - 120
1780521	Lead	98.1		P	80 - 120
1780521	Nickel	92.2		P	80 - 120
1780521	Silver	94.4		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300654

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780179	Chloride	102		P	90 - 110
1780180	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300656

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780179	Sulfate	99.6		P	90 - 110
1780180	Sulfate	99.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300928

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780109	Kjeldahl Nitrogen	105	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300929

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780184	Kjeldahl Nitrogen	99.7	95.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300735

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780154	NO2NO3-N	99.0	97.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300736

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780205	NO2NO3-N	91.8	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780108	Total-P	101	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780302	O-Phosphate-P	98.6	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P300691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780201	Fluoride	99.6	101	P/P	94 - 107

Reference Method: SM 5310 B-00
Batch ID: P300877

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1780107	Organic Carbon	96.4	95.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P300515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780179	Turbidity	1.53	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P300731

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780071	Calcium	3.80	Spike	P	0 - 20
1780071	Iron	4.86	Spike	P	0 - 20
1780071	Magnesium	4.58	Spike	P	0 - 20
1780071	Potassium	5.39	Spike	P	0 - 20
1780071	Sodium	5.56	Spike	P	0 - 20
1780071	Zinc	7.65	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300731

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780071	Arsenic	1.84	Spike	P	0 - 20
1780071	Cadmium	0.978	Spike	P	0 - 20
1780071	Chromium	0.448	Spike	P	0 - 20
1780071	Copper	4.98	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P300731

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780071	Lead	1.28	Spike	P	0 - 20
1780071	Nickel	1.62	Spike	P	0 - 20
1780071	Silver	2.78	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300654

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780179	Chloride	0.0791	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P300656

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780179	Sulfate	0.628	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P300975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780182	Ammonia-N	0.0717	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300928

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780109	Kjeldahl Nitrogen	0.510	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P300929

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780184	Kjeldahl Nitrogen	2.54	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300735

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780154	NO2NO3-N	1.37	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
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Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P300736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780205	NO2NO3-N	6.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780108	Total-P	3.06	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P300831

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780183	Total-P	0.392	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P300512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780302	O-Phosphate-P	1.61	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P300495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780101	Color (true)	1.52	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P300496

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780311	Color (true)	0.285	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P300688

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780201	Total Alkalinity	0.0829	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P301165

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780181	TDS	3.64	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P300691

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780201	Fluoride	0.979	Spike	P	0 - 3.7

Reference Method: SM 5310 B-00
Batch ID: P300877

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1780107	Organic Carbon	0.754	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A68261
Included Lab Sample IDs: 1780179, 1780180, 1780181

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	100	P/P	90 - 110
Chloride	99.8	102	P/P	90 - 110
Sulfate	100	97.7	P/P	90 - 110
Sulfate	97.9	100	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A68263
Included Lab Sample IDs: 1780179, 1780180, 1780181

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.1	98.1	P/P	85 - 115
Color (true)	99.5	98.5	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A68269
Included Lab Sample IDs: 1780185, 1780186, 1780187

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	97.5	P/P	90 - 110
O-Phosphate-P	99.2	98.7	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A68270
Included Lab Sample IDs: 1780179, 1780180, 1780181

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.0	P/P	95 - 105

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A68331

Included Lab Sample IDs: 1780179, 1780180, 1780181

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A68331

Included Lab Sample IDs: 1780179, 1780180, 1780181

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A68345

Included Lab Sample IDs: 1780182, 1780183, 1780184

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

Reference Method: SM 5310 B-00

Run ID: A68400

Included Lab Sample IDs: 1780182, 1780183, 1780184

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.6	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A68408

Included Lab Sample IDs: 1780182, 1780183, 1780184

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A68410

Included Lab Sample IDs: 1780194, 1780195, 1780196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	102	P/P	90 - 110
Iron	99.8	101	P/P	90 - 110
Magnesium	100	101	P/P	90 - 110
Potassium	99.5	100	P/P	90 - 110
Sodium	100	102	P/P	90 - 110
Zinc	102	98.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A68420

Included Lab Sample IDs: 1780194, 1780195, 1780196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	98.8	P/P	90 - 110
Arsenic	98.8	98.9	P/P	90 - 110
Cadmium	100	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A68420

Included Lab Sample IDs: 1780194, 1780195, 1780196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	100	101	P/P	90 - 110
Chromium	96.2	97.7	P/P	90 - 110
Chromium	96.9	96.2	P/P	90 - 110
Lead	96.5	96.8	P/P	90 - 110
Lead	96.8	97.6	P/P	90 - 110
Nickel	97.2	95.9	P/P	90 - 110
Nickel	97.9	97.2	P/P	90 - 110
Silver	94.3	94.4	P/P	90 - 110
Silver	94.4	95.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A68434

Included Lab Sample IDs: 1780182, 1780183

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A68453

Included Lab Sample IDs: 1780182, 1780183, 1780184

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A68454

Included Lab Sample IDs: 1780194, 1780195, 1780196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	100	100	P/P	90 - 110
Copper	100	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A68485

Included Lab Sample IDs: 1780184

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

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

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				1.53	
EPA 200.7 Rev. 4.4	Calcium	105	106 109			3.80

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 200.7 Rev. 4.4	Iron	102	104	99.4	104		4.86
	Magnesium	106	105	97.0	105		4.58
	Potassium	103	105	98.7	101		5.39
	Sodium	105	107	98.7	106		5.56
	Zinc	97.0	101	93.2	98.1		7.65
EPA 200.8 Rev. 5.4	Arsenic	98.2	98.5	96.7	98.9		1.84
	Cadmium	100	98.3	97.4	101		0.978
	Chromium	95.3	93.5	93.0	95.8		0.448
	Copper	96.5	94.6	90.0	91.9		4.98
	Lead	89.6	90.8	89.6	98.1		1.28
	Nickel	96.7	95.0	93.4	92.2		1.62
	Silver	94.6	96.0	93.4	94.4		2.78
EPA 300.0 Rev. 2.1	Chloride	104	102	101		0.0791	
	Sulfate	101	99.6	99.1		0.628	
EPA 350.1 Rev. 2.0	Ammonia-N	100					0.0717
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	105	106			0.510
	Kjeldahl Nitrogen	99.0	99.7	95.4			2.54
EPA 353.2 Rev. 2.0	NO2NO3-N	102	99.0	97.5			1.37
	NO2NO3-N	104	91.8	101			6.45
EPA 365.1 Rev. 2.0	Total-P	99.2	101	97.2			3.06
	Total-P	98.5					0.392
EPA 365.1 Rev. 2.0 dissolved SM 2120 B	O-Phosphate-P	102	98.6	100			1.61
	Color (true)					1.52	
	Color (true)					0.285	
SM 2320 B-97	Total Alkalinity	103				0.0829	
SM 2540 C-97	TDS					3.64	
SM 4500 F-C-97	Fluoride	99.8	99.6	101			0.979
SM 5310 B-00	Organic Carbon	96.7	96.4	95.2			0.754

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1780179, 1780180, 1780181
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1780194, 1780195, 1780196
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1780194, 1780195, 1780196
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1780179, 1780180, 1780181
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1780179, 1780180, 1780181
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1780182, 1780183, 1780184
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1780182, 1780183, 1780184
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1780182, 1780183, 1780184
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1780182, 1780183, 1780184
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1780185, 1780186, 1780187
SM 2120 B / E31780	True Color measured at 450 nm	1780179, 1780180, 1780181
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1780179, 1780180, 1780181
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1780179, 1780180, 1780181

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1780179, 1780180, 1780181
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1780179, 1780180, 1780181
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1780182, 1780183, 1780184

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	03/16/2016			03/16/2016 16:50	Sima Feizi	1780179, 1780180, 1780181
EPA 200.7 Rev. 4.4	03/16/2016	03/21/2016	Elliott D. Healy	03/23/2016	Joshua Ayres	1780194, 1780195, 1780196
EPA 200.8 Rev. 5.4	03/16/2016	03/21/2016	Elliott D. Healy	03/23/2016	Charles J. Peterson	1780194, 1780195, 1780196
	03/16/2016	03/21/2016	Elliott D. Healy	03/25/2016	Robert K Palmer	1780194, 1780195, 1780196
EPA 300.0 Rev. 2.1	03/16/2016			03/18/2016	Ping Hua	1780179, 1780180, 1780181
EPA 350.1 Rev. 2.0	03/16/2016			03/23/2016	Diana M. Turner	1780182, 1780183, 1780184
EPA 351.2 Rev. 2.0	03/16/2016	03/24/2016	Sofia Elnemr	03/27/2016	Rochelle Y Jackson	1780182, 1780183, 1780184
EPA 353.2 Rev. 2.0	03/16/2016			03/21/2016	Diana M. Turner	1780182, 1780183, 1780184
EPA 365.1 Rev. 2.0	03/16/2016	03/23/2016	Christopher Armour	03/24/2016	Lipi Saha	1780182, 1780183
	03/16/2016	03/23/2016	Christopher Armour	03/25/2016	Lipi Saha	1780184
EPA 365.1 Rev. 2.0 dissolved	03/16/2016			03/16/2016 17:00	Julia Storbeck	1780187
	03/16/2016			03/16/2016 17:06	Julia Storbeck	1780185, 1780186
SM 2120 B	03/16/2016			03/16/2016 15:28	Blanca Fach	1780181
	03/16/2016			03/16/2016 15:50	Blanca Fach	1780179
	03/16/2016			03/16/2016 15:53	Blanca Fach	1780180
SM 2320 B-97	03/16/2016			03/18/2016	Dale L. Simmons	1780179, 1780180, 1780181
SM 2540 C-97	03/16/2016			03/21/2016	Yijie Li	1780179, 1780180, 1780181
SM 2540 D-97	03/16/2016			03/21/2016	Yijie Li	1780179, 1780180, 1780181
SM 4500 F-C-97	03/16/2016			03/18/2016	Dale L. Simmons	1780179, 1780180, 1780181
SM 5310 B-00	03/16/2016			03/21/2016	Sofia Elnemr	1780182, 1780183, 1780184