

Chemical Analysis Report

WQAP-2016-11-17-03

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

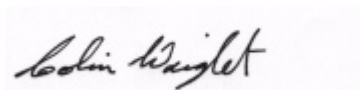
Event Description: **Alford Arm Trib, Lake Arrowhead, Sally Ward Spring, Black Creek and Ochlockonee**
Request ID: **RQ-2016-11-14-40**
Customer: **WQAP**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
MS #3560
Tallahassee, FL 32399-2400
Attn: Katrina Sanders

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Certified by: Colin Wright, Environmental Administrator

Date Certified: 13-DEC-2016 12:34

A handwritten signature in black ink, appearing to read "Colin Wright", is placed over a light blue rectangular background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: SALLY WARD SPRING @ WAKULLA PARK DR. Collection Date/Time: 11/17/2016 08:48

Field ID: G1WA0021-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851136	EPA 180.1 Rev. 2.0	Turbidity	0.10		NTU	P315420	
	EPA 300.0 Rev. 2.1	Chloride	9.3		mg Cl/L	P316065	
	SM 2120 B	Color (true)	2.5	U	PCU	P315395	
	SM 2320 B-97	Total Alkalinity	148	A	mg CaCO3/L	P315673	
	SM 2540 C-97	TDS	184	A	mg/L	P316004	
	SM 2540 D-97	TSS	2	U	mg/L	P315756	
	SM 4500 F-C-97	Fluoride	0.14		mg F/L	P315676	
1851138	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P315789	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P316206	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.67		mg N/L	P315842	
	EPA 365.1 Rev. 2.0	Total-P	0.033		mg P/L	P315908	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P315408	
1851140	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.034		mg P/L	P315387	

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: OCHLOCKONEE RIVER 350M UPSTREAM
SR12**

Collection Date/Time: 11/17/2016 10:50

Field ID: G1WA0042-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851130	EPA 180.1 Rev. 2.0	Turbidity	8.2		NTU	P315419	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P316065	
	SM 2120 B	Color (true)	46	A	PCU	P315395	
	SM 2320 B-97	Total Alkalinity	51		mg CaCO3/L	P315673	
	SM 2540 C-97	TDS	157		mg/L	P316003	
	SM 2540 D-97	TSS	6	I	mg/L	P315755	
	SM 4500 F-C-97	Fluoride	0.18		mg F/L	P315676	
1851132	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P315789	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P316207	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.68		mg N/L	P315842	
	EPA 365.1 Rev. 2.0	Total-P	0.082		mg P/L	P315908	
	SM 5310 B-00	Organic Carbon	5.1		mg C/L	P315408	
1851134	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.046		mg P/L	P315387	
1851148	EPA 200.7 Rev. 4.4	Calcium	15.3		mg/L	P315524	
		Iron	1.16E+03		ug/L	P315524	
		Magnesium	6.54		mg/L	P315524	
		Potassium	3.4		mg/L	P315524	
		Sodium	13.1		mg/L	P315524	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P315524	
		Arsenic	0.51		ug/L	P315524	
		Cadmium	0.020	U	ug/L	P315524	
		Chromium	0.48		ug/L	P315524	

Field ID: G1WA0042-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851148	EPA 200.8 Rev. 5.4	Copper	0.42		ug/L	P315524	
		Lead	0.23		ug/L	P315524	
		Nickel	0.36		ug/L	P315524	
		Silver	0.0050	U	ug/L	P315524	

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: OCHLOCKONEE RIVER UPSTREAM SR12

Collection Date/Time: 11/17/2016 10:30

Field ID: G1WA0038-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851131	EPA 180.1 Rev. 2.0	Turbidity	7.7	A	NTU	P315420	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P316065	
	SM 2120 B	Color (true)	46		PCU	P315395	
	SM 2320 B-97	Total Alkalinity	51		mg CaCO3/L	P315673	
	SM 2540 C-97	TDS	117		mg/L	P316003	
	SM 2540 D-97	TSS	6	I	mg/L	P315755	
	SM 4500 F-C-97	Fluoride	0.17		mg F/L	P315676	
1851133	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P315789	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P316207	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.68		mg N/L	P315842	
	EPA 365.1 Rev. 2.0	Total-P	0.082		mg P/L	P315908	
	SM 5310 B-00	Organic Carbon	5.1		mg C/L	P315408	
1851135	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.046		mg P/L	P315387	
1851149	EPA 200.7 Rev. 4.4	Calcium	15.6		mg/L	P315524	
		Iron	1.13E+03		ug/L	P315524	
		Magnesium	6.54		mg/L	P315524	
		Potassium	3.5		mg/L	P315524	
		Sodium	13.3		mg/L	P315524	
		Zinc	5.0	U	ug/L	P315524	
	EPA 200.8 Rev. 5.4	Arsenic	0.52		ug/L	P315524	
		Cadmium	0.020	U	ug/L	P315524	
		Chromium	0.49		ug/L	P315524	
		Copper	0.40		ug/L	P315524	
		Lead	0.22		ug/L	P315524	
		Nickel	0.36		ug/L	P315524	
		Silver	0.0050	U	ug/L	P315524	

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: LAKE ARROWHEAD @ BOAT DOCK

Collection Date/Time: 11/17/2016 11:45

Field ID: G1WA0004-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851137	EPA 180.1 Rev. 2.0	Turbidity	7.3		NTU	P315420	

Field ID: G1WA0004-11172016

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1851137	EPA 300.0 Rev. 2.1	Chloride	3.3		mg Cl/L	P316065	
	SM 2120 B	Color (true)	8.6		PCU	P315395	
	SM 2320 B-97	Total Alkalinity	26		mg CaCO3/L	P315673	
	SM 2540 C-97	TDS	47		mg/L	P316004	
	SM 2540 D-97	TSS	9	I	mg/L	P315756	
	SM 4500 F-C-97	Fluoride	0.055	I	mg F/L	P315676	
1851139	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P315790	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P316210	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P315842	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P315910	
	SM 5310 B-00	Organic Carbon	6.7		mg C/L	P315408	
1851141	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P315388	

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P315419

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
 Batch ID: P315420

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P315524

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: P315524

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316065

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315789

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315790

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316206

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316207

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316210

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315842

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315908

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315910

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315387

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315388

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

Reference Method: SM 2120 B
Batch ID: P315395

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P315673

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

Reference Method: SM 2540 C-97
Batch ID: P316003

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P316004

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P315755

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P315756

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P315676

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P315408

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: P315524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	106		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	101		P	85 - 115
Sodium	103		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.7		P	85 - 115
Cadmium	98.7		P	85 - 115
Chromium	98.7		P	85 - 115
Copper	95.2		P	85 - 115
Lead	99.6		P	85 - 115
Nickel	97.2		P	85 - 115
Silver	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316065

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315789

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315790

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316206

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316207

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316210

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315842

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: P315908

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	95.3		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315910

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315387

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315388

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

Reference Method: SM 2320 B-97
Batch ID: P315673

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

Reference Method: SM 4500 F-C-97
Batch ID: P315676

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.3		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P315408

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850733	Calcium	102		P	80 - 120
1850733	Iron	105		P	80 - 120
1850733	Magnesium	101		P	80 - 120
1850733	Potassium	98.9		P	80 - 120
1850733	Sodium	101		P	80 - 120
1850733	Zinc	97.6		P	80 - 120
1851401	Calcium	103		P	80 - 120
1851401	Iron	106	105	P/P	80 - 120
1851401	Magnesium	106	107	P/P	80 - 120
1851401	Potassium	100	103	P/P	80 - 120
1851401	Sodium	108	108	P/P	80 - 120
1851401	Zinc	96.1	97.7	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850733	Arsenic	101		P	80 - 120
1850733	Cadmium	100		P	80 - 120
1850733	Chromium	100		P	80 - 120
1850733	Copper	97.5		P	80 - 120
1850733	Lead	102		P	80 - 120
1850733	Nickel	96.3		P	80 - 120
1850733	Silver	101		P	80 - 120
1851401	Arsenic	99.4	99.7	P/P	80 - 120
1851401	Cadmium	101	102	P/P	80 - 120
1851401	Chromium	100	102	P/P	80 - 120
1851401	Copper	91.8	91.9	P/P	80 - 120
1851401	Lead	99.4	101	P/P	80 - 120
1851401	Nickel	94.6	95.2	P/P	80 - 120
1851401	Silver	101	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316065

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849598	Chloride	100		P	90 - 110
1851137	Chloride	95.4		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315789

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851121	Ammonia-N	101	98.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315790

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851139	Ammonia-N	99.2	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316206

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851183	Kjeldahl Nitrogen	100	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316207

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851511	Kjeldahl Nitrogen	101	97.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316210

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851514	Kjeldahl Nitrogen	109	111	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315842

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851119	NO2NO3-N	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315910

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851139	Total-P	93.2	93.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315387

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850862	O-Phosphate-P	99.0	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851141	O-Phosphate-P	99.7	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P315676

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1851136	Fluoride	100	101	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315408

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850840	Organic Carbon	97.2	99.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315419

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851072	Turbidity	3.34	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315420

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851131	Turbidity	0.259	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851401	Calcium	0.947	Spike	P	0 - 20
1851401	Iron	1.19	Spike	P	0 - 20
1851401	Magnesium	0.391	Spike	P	0 - 20
1851401	Potassium	1.74	Spike	P	0 - 20
1851401	Sodium	0.0745	Spike	P	0 - 20
1851401	Zinc	1.44	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851401	Arsenic	0.392	Spike	P	0 - 20
1851401	Cadmium	1.11	Spike	P	0 - 20
1851401	Chromium	1.13	Spike	P	0 - 20
1851401	Copper	0.130	Spike	P	0 - 20
1851401	Lead	1.19	Spike	P	0 - 20
1851401	Nickel	0.685	Spike	P	0 - 20
1851401	Silver	0.269	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P316065

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849598	Chloride	0.0783	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315789

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851121	Ammonia-N	2.27	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315790

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851139	Ammonia-N	1.94	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851183	Kjeldahl Nitrogen	0.860	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316207

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851511	Kjeldahl Nitrogen	3.82	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P316210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851514	Kjeldahl Nitrogen	1.64	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315842

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851119	NO2NO3-N	0.438	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315908

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851121	Total-P	1.16	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315910

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851139	Total-P	0.220	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315387

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850862	O-Phosphate-P	0.621	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851141	O-Phosphate-P	1.49	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P315395

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851130	Color (true)	0.514	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P315673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851136	Total Alkalinity	0.452	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P316003

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850879	TDS	2.14	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P316004

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851136	TDS	1.09	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P315676

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1851136	Fluoride	0.494	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P315408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850840	Organic Carbon	2.45	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: A72868
Included Lab Sample IDs: 1851134, 1851135, 1851140, 1851141

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

Reference Method: SM 2120 B
Run ID: A72873
Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	85 - 115

Reference Method: SM 5310 B-00
Run ID: A72882
Included Lab Sample IDs: 1851132, 1851133, 1851138, 1851139

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72884
Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

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

Reference Method: SM 2320 B-97
Run ID: A72982
Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	103	101	P/P	90 - 110
Total Alkalinity	99.9	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A72982
Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

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

Reference Method: SM 4500 F-C-97

Run ID: A72982

Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	101	P/P	90 - 110
Fluoride	99.5	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73006

Included Lab Sample IDs: 1851148, 1851149

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.8	97.5	P/P	90 - 110
Cadmium	96.7	97.9	P/P	90 - 110
Chromium	98.9	100	P/P	90 - 110
Copper	93.3	93.6	P/P	90 - 110
Lead	96.7	96.5	P/P	90 - 110
Nickel	95.3	94.4	P/P	90 - 110
Silver	98.5	98.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73012

Included Lab Sample IDs: 1851148, 1851149

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	99.9	101	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Zinc	100	99.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73030

Included Lab Sample IDs: 1851132, 1851133, 1851138, 1851139

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73050

Included Lab Sample IDs: 1851132, 1851133, 1851138, 1851139

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: A73099

Included Lab Sample IDs: 1851132, 1851133

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73115

Included Lab Sample IDs: 1851138, 1851139

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73131

Included Lab Sample IDs: 1851130, 1851131, 1851136, 1851137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	102	P/P	90 - 110
Chloride	102	98.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73229

Included Lab Sample IDs: 1851132, 1851133, 1851138

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	95.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73242

Included Lab Sample IDs: 1851139

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	94.3	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						3.34	
	Turbidity						0.259	
EPA 200.7 Rev. 4.4	Calcium	106	102	103				0.947
	Iron	106	105	106	105			1.19
	Magnesium	108	101	106	107			0.391
	Potassium	101	98.9	100	103			1.74
	Sodium	103	101	108	108			0.0745
	Zinc	100	97.6	96.1	97.7			1.44
EPA 200.8 Rev. 5.4	Arsenic	98.7	101	99.4	99.7			0.392
	Cadmium	98.7	100	101	102			1.11
	Chromium	98.7	100	100	102			1.13
	Copper	95.2	97.5	91.8	91.9			0.130
	Lead	99.6	102	99.4	101			1.19
	Nickel	97.2	96.3	94.6	95.2			0.685
	Silver	101	101	101	101			0.269
EPA 300.0 Rev. 2.1	Chloride	101	100	95.4			0.0783	

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 350.1 Rev. 2.0	Ammonia-N	100	101	98.9		2.27
	Ammonia-N	101	99.2	97.2		1.94
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	100	101		0.860
	Kjeldahl Nitrogen	99.1	101	97.3		3.82
	Kjeldahl Nitrogen	103	111	109		1.64
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	103		0.438
EPA 365.1 Rev. 2.0	Total-P	95.3			1.16	
	Total-P	101	93.2	93.4		0.220
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	99.0	99.7		0.621
	O-Phosphate-P	102	99.7	101		1.49
SM 2120 B	Color (true)				0.514	
SM 2320 B-97	Total Alkalinity	102			0.452	
SM 2540 C-97	TDS				2.14	
	TDS				1.09	
SM 4500 F-C-97	Fluoride	97.3	100	101		0.494
SM 5310 B-00	Organic Carbon	103	97.2	99.7		2.45

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1851130, 1851131, 1851136, 1851137
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1851148, 1851149
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1851148, 1851149
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1851130, 1851131, 1851136, 1851137
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1851132, 1851133, 1851138, 1851139
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1851132, 1851133, 1851138, 1851139
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1851132, 1851133, 1851138, 1851139
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1851132, 1851133, 1851138, 1851139
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1851134, 1851135, 1851140, 1851141
SM 2120 B / E31780	True Color measured at 450 nm	1851130, 1851131, 1851136, 1851137
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1851130, 1851131, 1851136, 1851137
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1851130, 1851131, 1851136, 1851137
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1851130, 1851131, 1851136, 1851137
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1851130, 1851131, 1851136, 1851137
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1851132, 1851133, 1851138, 1851139

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	11/17/2016			11/17/2016 16:41	Sima Feizi	1851130, 1851131, 1851136, 1851137
EPA 200.7 Rev. 4.4	11/17/2016	11/21/2016	Elliott D. Healy	11/22/2016	Joshua Ayres	1851148, 1851149
EPA 200.8 Rev. 5.4	11/17/2016	11/21/2016	Elliott D. Healy	11/23/2016	Charles J. Peterson	1851148, 1851149
EPA 300.0 Rev. 2.1	11/17/2016			12/02/2016	Ping Hua	1851130, 1851131, 1851136, 1851137
EPA 350.1 Rev. 2.0	11/17/2016			11/28/2016	Sofia Elnemr	1851132, 1851133, 1851138, 1851139
EPA 351.2 Rev. 2.0	11/17/2016	12/06/2016	Martin Acosta	12/07/2016	Joseph Suarez	1851132, 1851133, 1851138
	11/17/2016	12/06/2016	Martin Acosta	12/08/2016	Joseph Suarez	1851139
EPA 353.2 Rev. 2.0	11/17/2016			11/29/2016	Beverly Y. Sanders	1851132, 1851133, 1851138, 1851139
EPA 365.1 Rev. 2.0	11/17/2016	11/30/2016	Adrian Shelby	11/30/2016	Lipi Saha	1851132, 1851133
	11/17/2016	11/30/2016	Adrian Shelby	12/01/2016	Lipi Saha	1851138, 1851139
EPA 365.1 Rev. 2.0 dissolved	11/17/2016			11/17/2016 15:14	Julia Storbeck	1851141
	11/17/2016			11/17/2016 15:31	Julia Storbeck	1851134
	11/17/2016			11/17/2016 15:32	Julia Storbeck	1851135
	11/17/2016			11/17/2016 15:33	Julia Storbeck	1851140
SM 2120 B	11/17/2016			11/17/2016 16:08	Jared I. Manley	1851130
	11/17/2016			11/17/2016 16:12	Jared I. Manley	1851131, 1851136
	11/17/2016			11/17/2016 16:13	Jared I. Manley	1851137
SM 2320 B-97	11/17/2016			11/22/2016	Dale L. Simmons	1851136
	11/17/2016			11/23/2016	Dale L. Simmons	1851130, 1851131, 1851137
SM 2540 C-97	11/17/2016			11/21/2016	Sima Feizi	1851130, 1851131, 1851136, 1851137
SM 2540 D-97	11/17/2016			11/21/2016	Sima Feizi	1851130, 1851131, 1851136, 1851137
SM 4500 F-C-97	11/17/2016			11/22/2016	Dale L. Simmons	1851136
	11/17/2016			11/23/2016	Dale L. Simmons	1851130, 1851131, 1851137
SM 5310 B-00	11/17/2016			11/17/2016	Julie Michelle Frank	1851132, 1851133, 1851138, 1851139