Chemical Analysis Report

NE-DIST-2016-11-15-01

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

Event Description: **Suwannee 4**
Request ID: **RQ-2016-11-07-32**
Customer: **NE-DIST**
Project ID: **SMP**

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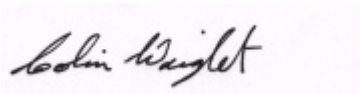
Certified by: Colin Wright, Environmental Administrator

Date Certified: 07-DEC-2016 12:44



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: Suwannee at Cone Bridge **Collection Date/Time: 11/14/2016 10:10**

Field ID: G1NE0238 11142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850010	EPA 180.1 Rev. 2.0	Turbidity	0.95		NTU	P315248	
	EPA 300.0 Rev. 2.1	Chloride	7.7	A	mg Cl/L	P315882	
		Sulfate	3.3	A	mg SO4/L	P315884	
	SM 2120 B	Color (true)	410		PCU	P315226	
	SM 2320 B-97	Total Alkalinity	22		mg CaCO3/L	P315335	
	SM 2540 C-97	TDS	117		mg/L	P315617	
	SM 2540 D-97	TSS	2	U	mg/L	P315628	
	SM 4500 F-C-97	Fluoride	0.15		mg F/L	P315337	
1850013	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P315661	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P315873	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.098		mg N/L	P315532	
	EPA 365.1 Rev. 2.0	Total-P	0.29		mg P/L	P315762	
	SM 5310 B-00	Organic Carbon	41		mg C/L	P315311	
1850016	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.25		mg P/L	P315188	
1850022	EPA 200.7 Rev. 4.4	Calcium	8.36		mg/L	P315302	
		Iron	640		ug/L	P315302	
		Magnesium	4.40		mg/L	P315302	
		Potassium	0.41	I	mg/L	P315302	
		Sodium	6.0		mg/L	P315302	
		Zinc	5.0	U	ug/L	P315302	
	EPA 200.8 Rev. 5.4	Arsenic	0.82		ug/L	P315302	
		Cadmium	0.022	I	ug/L	P315302	
		Chromium	0.49		ug/L	P315302	
		Copper	0.30	I	ug/L	P315302	
		Lead	0.36		ug/L	P315302	
		Nickel	0.62		ug/L	P315302	
		Silver	0.0050	U	ug/L	P315302	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Suwannee at Turner bt.rmp **Collection Date/Time: 11/14/2016 11:00**

Field ID: G1NE0471 11142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850011	EPA 180.1 Rev. 2.0	Turbidity	1.5		NTU	P315248	
	EPA 300.0 Rev. 2.1	Chloride	7.9		mg Cl/L	P315883	
		Sulfate	1.4		mg SO4/L	P315885	
	SM 2120 B	Color (true)	410		PCU	P315226	
	SM 2320 B-97	Total Alkalinity	3.6		mg CaCO3/L	P315335	
	SM 2540 C-97	TDS	78		mg/L	P315617	
	SM 2540 D-97	TSS	2	I	mg/L	P315628	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P315337	
1850014	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P315661	

Field ID: G1NE0471 11142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850014	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P315873	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.016		mg N/L	P315532	
	EPA 365.1 Rev. 2.0	Total-P	0.25		mg P/L	P315762	
	SM 5310 B-00	Organic Carbon	44		mg C/L	P315311	
1850017	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.22		mg P/L	P315189	
1850023	EPA 200.7 Rev. 4.4	Calcium	4.07		mg/L	P315302	
		Iron	670		ug/L	P315302	
		Magnesium	2.25		mg/L	P315302	
		Potassium	0.31	I	mg/L	P315302	
		Sodium	5.3		mg/L	P315302	
		Zinc	5.0	U	ug/L	P315302	
	EPA 200.8 Rev. 5.4	Arsenic	0.69		ug/L	P315302	
		Cadmium	0.025	I	ug/L	P315302	
		Chromium	0.46		ug/L	P315302	
		Copper	0.26	I	ug/L	P315302	
		Lead	0.50		ug/L	P315302	
		Nickel	0.61		ug/L	P315302	
		Silver	0.0050	U	ug/L	P315302	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Suwannee at SR6 **Collection Date/Time: 11/14/2016 11:20**

Field ID: G1NE0460 11142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850012	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P315248	
	EPA 300.0 Rev. 2.1	Chloride	7.8		mg Cl/L	P315883	
		Sulfate	1.4		mg SO4/L	P315885	
	SM 2120 B	Color (true)	420		PCU	P315226	
	SM 2320 B-97	Total Alkalinity	3.4		mg CaCO3/L	P315336	
	SM 2540 C-97	TDS	89		mg/L	P315617	
	SM 2540 D-97	TSS	3	I	mg/L	P315628	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P315338	
1850015	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P315661	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P315873	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P315532	
	EPA 365.1 Rev. 2.0	Total-P	0.26		mg P/L	P315764	
	SM 5310 B-00	Organic Carbon	45		mg C/L	P315311	
1850018	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.22		mg P/L	P315189	
1850024	EPA 200.7 Rev. 4.4	Calcium	4.17		mg/L	P315302	
		Iron	700		ug/L	P315302	
		Magnesium	2.35		mg/L	P315302	
		Potassium	0.31	I	mg/L	P315302	
		Sodium	5.3		mg/L	P315302	

Field ID: G1NE0460 11142016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850024	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P315302	
	EPA 200.8 Rev. 5.4	Arsenic	0.75		ug/L	P315302	
		Cadmium	0.028	I	ug/L	P315302	
		Chromium	0.48		ug/L	P315302	
		Copper	0.28	I	ug/L	P315302	
		Lead	0.49		ug/L	P315302	
		Nickel	0.62		ug/L	P315302	
		Silver	0.0050	U	ug/L	P315302	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315248

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315302

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: P315302

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: P315882

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315883

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315883

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315884

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315885

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315661

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315873

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315532

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315762

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315764

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315188

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315189

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

Reference Method: SM 2120 B
Batch ID: P315226

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P315335

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

Reference Method: SM 2320 B-97
Batch ID: P315336

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

Reference Method: SM 2540 C-97
Batch ID: P315617

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P315628

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P315337

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P315338

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P315311

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: P315302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	103		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	100		P	85 - 115
Sodium	102		P	85 - 115
Zinc	99.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	102		P	85 - 115
Copper	100		P	85 - 115
Lead	103		P	85 - 115
Nickel	105		P	85 - 115
Silver	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315883

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315884

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315885

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	93.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315661

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315873

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315532

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315762

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315764

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: P315188

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315189

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

Reference Method: SM 2320 B-97
Batch ID: P315335

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P315336

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P315337

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	92 - 103

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P315338

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.4		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P315311

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849961	Calcium	106	104	P/P	80 - 120
1849961	Iron	104	104	P/P	80 - 120
1849961	Magnesium	105	105	P/P	80 - 120
1849961	Potassium	99.6	99.6	P/P	80 - 120
1849961	Sodium	102	101	P/P	80 - 120
1849961	Zinc	99.8	97.9	P/P	80 - 120
1850131	Calcium	101		P	80 - 120
1850131	Iron	104		P	80 - 120
1850131	Magnesium	104		P	80 - 120
1850131	Potassium	101		P	80 - 120
1850131	Sodium	103		P	80 - 120
1850131	Zinc	98.2		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849961	Arsenic	104	102	P/P	80 - 120
1849961	Cadmium	101	101	P/P	80 - 120
1849961	Chromium	99.9	99.5	P/P	80 - 120
1849961	Copper	101	101	P/P	80 - 120
1849961	Lead	106	104	P/P	80 - 120
1849961	Nickel	105	102	P/P	80 - 120
1849961	Silver	105	102	P/P	80 - 120
1850131	Arsenic	102		P	80 - 120
1850131	Cadmium	102		P	80 - 120
1850131	Chromium	101		P	80 - 120
1850131	Copper	96.8		P	80 - 120
1850131	Lead	104		P	80 - 120
1850131	Nickel	101		P	80 - 120
1850131	Silver	103		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315882

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850010	Chloride	99.4		P	90 - 110
1850105	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315883

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1848212	Chloride	99.7		P	90 - 110
1850222	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315884

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850010	Sulfate	96.0		P	90 - 110
1850105	Sulfate	96.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315885

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1848212	Sulfate	95.7		P	90 - 110
1850222	Sulfate	96.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315873

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849988	Kjeldahl Nitrogen	97.0	91.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849828	NO2NO3-N	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315762

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849691	Total-P	98.3	96.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850173	Total-P	92.0	92.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315188

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315188

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849864	O-Phosphate-P	96.5	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315189

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850031	O-Phosphate-P	95.8	96.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P315337

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849597	Fluoride	95.2	96.3	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P315338

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850105	Fluoride	95.7	96.8	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315311

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849688	Organic Carbon	98.4	99.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P315248

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849998	Turbidity	0.304	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315302

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849961	Calcium	0.949	Spike	P	0 - 20
1849961	Iron	0.273	Spike	P	0 - 20
1849961	Magnesium	0.118	Spike	P	0 - 20
1849961	Potassium	0.00947	Spike	P	0 - 20
1849961	Sodium	0.664	Spike	P	0 - 20
1849961	Zinc	1.75	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315302

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849961	Arsenic	2.10	Spike	P	0 - 20
1849961	Cadmium	0.535	Spike	P	0 - 20
1849961	Chromium	0.333	Spike	P	0 - 20
1849961	Copper	0.353	Spike	P	0 - 20
1849961	Lead	0.966	Spike	P	0 - 20
1849961	Nickel	2.15	Spike	P	0 - 20
1849961	Silver	2.28	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850010	Chloride	0.0226	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315883

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1848212	Chloride	0.299	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315884

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850010	Sulfate	0.907	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P315885

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1848212	Sulfate	0.894	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315661

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849829	Ammonia-N	0.222	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315873

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849988	Kjeldahl Nitrogen	5.43	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849828	NO2NO3-N	0.541	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849691	Total-P	2.32	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315764

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850173	Total-P	0.0276	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315188

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849864	O-Phosphate-P	0.277	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850031	O-Phosphate-P	0.710	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P315226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850001	Color (true)	1.81	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P315335

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849597	Total Alkalinity	0.101	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P315336

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850105	Total Alkalinity	2.52	Sample	P	0 - 4.8

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P315617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849687	TDS	2.89	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P315337

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849597	Fluoride	1.00	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P315338

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850105	Fluoride	1.04	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P315311

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849688	Organic Carbon	0.498	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: A72815
Included Lab Sample IDs: 1850016, 1850017, 1850018

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.4	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A72826
Included Lab Sample IDs: 1850010, 1850011, 1850012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	100	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A72831
Included Lab Sample IDs: 1850010, 1850011, 1850012

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A72849
Included Lab Sample IDs: 1850013, 1850014, 1850015

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

Reference Method: SM 2320 B-97
Run ID: A72857
Included Lab Sample IDs: 1850010, 1850011, 1850012

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

Reference Method: SM 4500 F-C-97
Run ID: A72857
Included Lab Sample IDs: 1850010, 1850011, 1850012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	P/P	90 - 110
Fluoride	99.0	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A72925
Included Lab Sample IDs: 1850013, 1850014, 1850015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A72936
Included Lab Sample IDs: 1850022, 1850023, 1850024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	99.8	P/P	90 - 110
Iron	99.3	99.0	P/P	90 - 110
Magnesium	101	99.8	P/P	90 - 110
Potassium	99.6	98.8	P/P	90 - 110
Sodium	100	99.2	P/P	90 - 110
Zinc	99.5	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72965
Included Lab Sample IDs: 1850022, 1850023, 1850024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	102	P/P	90 - 110
Cadmium	98.8	99.9	P/P	90 - 110
Chromium	99.4	99.8	P/P	90 - 110
Lead	101	102	P/P	90 - 110
Nickel	103	102	P/P	90 - 110
Silver	102	103	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A72977
Included Lab Sample IDs: 1850013, 1850014, 1850015

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A72985
Included Lab Sample IDs: 1850022, 1850023, 1850024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	99.2	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A73043
Included Lab Sample IDs: 1850013, 1850014, 1850015

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A73064
Included Lab Sample IDs: 1850010, 1850011, 1850012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	99.6	100	P/P	90 - 110
Sulfate	97.5	98.0	P/P	90 - 110
Sulfate	98.2	96.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A73124
Included Lab Sample IDs: 1850013, 1850014, 1850015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	101	P/P	90 - 110

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

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.304	
EPA 200.7 Rev. 4.4	Calcium	105	106	104	101			0.949
	Iron	103	104	104	104			0.273
	Magnesium	106	105	105	104			0.118
	Potassium	100	99.6	99.6	101			0.0094
	Sodium	102	102	101	103			0.664
	Zinc	99.4	99.8	97.9	98.2			1.75

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 200.8 Rev. 5.4	Arsenic	104	104	102	102			2.10
	Cadmium	101	101	101	102			0.535
	Chromium	102	99.9	99.5	101			0.333
	Copper	100	101	101	96.8			0.353
	Lead	103	106	104	104			0.966
	Nickel	105	105	102	101			2.15
	Silver	103	105	102	103			2.28
EPA 300.0 Rev. 2.1	Chloride	98.7	99.4	100			0.0226	
	Chloride	96.0	99.7	101			0.299	
	Sulfate	95.8	96.0	96.9			0.907	
	Sulfate	93.4	95.7	96.7			0.894	
EPA 350.1 Rev. 2.0	Ammonia-N	99.9						0.222
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	97.0	91.0				5.43
EPA 353.2 Rev. 2.0	NO2NO3-N	103	99.0	100				0.541
EPA 365.1 Rev. 2.0	Total-P	100	98.3	96.0				2.32
	Total-P	101	92.0	92.0				0.0276
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	96.5	96.9				0.277
	O-Phosphate-P	102	95.8	96.9				0.710
SM 2120 B	Color (true)						1.81	
SM 2320 B-97	Total Alkalinity	101					0.101	
	Total Alkalinity	101					2.52	
SM 2540 C-97	TDS						2.89	
SM 4500 F-C-97	Fluoride	97.4	95.2	96.3				1.00
	Fluoride	98.4	95.7	96.8				1.04
SM 5310 B-00	Organic Carbon	99.4	98.4	99.2				0.498

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1850010, 1850011, 1850012
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1850022, 1850023, 1850024
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1850022, 1850023, 1850024
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1850010, 1850011, 1850012
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1850010, 1850011, 1850012
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1850013, 1850014, 1850015
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1850013, 1850014, 1850015
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1850013, 1850014, 1850015
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1850013, 1850014, 1850015
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1850016, 1850017, 1850018
SM 2120 B / E31780	True Color measured at 450 nm	1850010, 1850011, 1850012
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1850010, 1850011, 1850012
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1850010, 1850011, 1850012
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1850010, 1850011, 1850012
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1850010, 1850011, 1850012
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1850013, 1850014, 1850015

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	11/15/2016			11/15/2016 16:29	Sima Feizi	1850010, 1850011, 1850012
EPA 200.7 Rev. 4.4	11/15/2016	11/16/2016	Elliott D. Healy	11/18/2016	Joshua Ayres	1850022, 1850023, 1850024
EPA 200.8 Rev. 5.4	11/15/2016	11/16/2016	Elliott D. Healy	11/21/2016	Charles J. Peterson	1850022, 1850023, 1850024
	11/15/2016	11/16/2016	Elliott D. Healy	11/22/2016	Charles J. Peterson	1850022, 1850023, 1850024
EPA 300.0 Rev. 2.1	11/15/2016			11/29/2016	Ping Hua	1850010
	11/15/2016			11/30/2016	Ping Hua	1850011, 1850012
EPA 350.1 Rev. 2.0	11/15/2016			11/21/2016	Sofia Elnemr	1850013, 1850014, 1850015
EPA 351.2 Rev. 2.0	11/15/2016	11/30/2016	Adrian Shelby	12/01/2016	Peter D. Kaus	1850013, 1850014, 1850015
EPA 353.2 Rev. 2.0	11/15/2016			11/21/2016	Beverly Y. Sanders	1850013, 1850014, 1850015
EPA 365.1 Rev. 2.0	11/15/2016	11/28/2016	Adrian Shelby	11/29/2016	Lipi Saha	1850013, 1850014, 1850015
EPA 365.1 Rev. 2.0 dissolved	11/15/2016			11/15/2016 16:35	Julia Storbeck	1850016
	11/15/2016			11/15/2016 16:36	Julia Storbeck	1850017
	11/15/2016			11/15/2016 16:37	Julia Storbeck	1850018
SM 2120 B	11/15/2016			11/15/2016 17:14	Jared I. Manley	1850010
	11/15/2016			11/15/2016 17:15	Jared I. Manley	1850011
	11/15/2016			11/15/2016 17:16	Jared I. Manley	1850012
SM 2320 B-97	11/15/2016			11/16/2016	Dale L. Simmons	1850010, 1850011
	11/15/2016			11/17/2016	Dale L. Simmons	1850012
SM 2540 C-97	11/15/2016			11/18/2016	Yijie Li	1850010, 1850011, 1850012
SM 2540 D-97	11/15/2016			11/18/2016	Yijie Li	1850010, 1850011, 1850012
SM 4500 F-C-97	11/15/2016			11/16/2016	Dale L. Simmons	1850010, 1850011
	11/15/2016			11/17/2016	Dale L. Simmons	1850012
SM 5310 B-00	11/15/2016			11/16/2016	Julie Michelle Frank	1850013, 1850014, 1850015