

Chemical Analysis Report

CEN-DIST-2016-11-15-03

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

Event Description: **Horse Creek/Elbow Creek**
Request ID: **RQ-2016-11-14-44**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 12-DEC-2016 14:15



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: Horse Creek W of US Highway 1 Bridge

Collection Date/Time: 11/14/2016 11:15

Field ID: G5CE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1849998	EPA 180.1 Rev. 2.0	Turbidity	3.3	A	NTU	P315248	
	SM 2320 B-97	Total Alkalinity	109		mg CaCO3/L	P315425	
	SM 2540 D-97	TSS	3	U	mg/L	P315635	
	SM 4500 F-C-97	Fluoride	0.39		mg F/L	P315593	
1849999	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P315662	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P315802	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P315373	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P315763	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P315739	
1850000	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.063		mg P/L	P315190	
1850006	EPA 200.7 Rev. 4.4	Iron	210	I	ug/L	P315644	
	EPA 200.8 Rev. 5.4	Arsenic	3.54		ug/L	P315644	
		Cadmium	0.060	U	ug/L	P315644	
		Chromium	0.35	I	ug/L	P315644	
		Copper	1.5	U	ug/L	P316456	
		Lead	0.26	I	ug/L	P315644	
		Nickel	0.49	I	ug/L	P315644	
		Silver	0.015	U	ug/L	P315644	
		Zinc	3.0	U	ug/L	P315644	

Ref. Method and Comment:

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

Sample Location: Elbow Creek @ 504m Downstream of Apollo

Collection Date/Time: 11/14/2016 11:35

Field ID: G5CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1850001	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P315248	
	EPA 300.0 Rev. 2.1	Chloride	89		mg Cl/L	P315883	
		Sulfate	31		mg SO4/L	P315885	
	SM 2120 B	Color (true)	90	A	PCU	P315226	
	SM 2320 B-97	Total Alkalinity	132		mg CaCO3/L	P315335	
	SM 2540 C-97	TDS	334		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	
1850002	EPA 350.1 Rev. 2.0	Ammonia-N	0.086		mg N/L	P315661	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P315873	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P315532	
	EPA 365.1 Rev. 2.0	Total-P	0.075		mg P/L	P315668	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P315310	
1850003	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.055		mg P/L	P315188	

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: P315644

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315644

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L
Zinc	1.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	Result	Code	Units
Copper	0.50	U	ug/L

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: 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 350.1 Rev. 2.0
Batch ID: P315662

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315802

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	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: P315373

Component	Result	Code	Units
NO2NO3-N	0.004	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: P315668

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315763

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P315190

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

Quality Assurance Report

Method Blank Results

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

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2320 B-97
Batch ID: P315425

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /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 2540 D-97
Batch ID: P315635

Component	Result	Code	Units
TSS	3	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: P315593

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P315310

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P315739

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: P315644

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315644

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.6		P	85 - 115
Cadmium	99.8		P	85 - 115
Chromium	104		P	85 - 115
Lead	100		P	85 - 115
Nickel	95.4		P	85 - 115
Silver	99.5		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	97.9		P	80 - 120

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: 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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P315662

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	105		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315802

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	106		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: P315373

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		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: P315668

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

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P315763

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	103		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: P315190

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

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

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

Reference Method: SM 2320 B-97
 Batch ID: P315425

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

Quality Assurance Report Laboratory Control Sample Accuracy

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

Reference Method: SM 4500 F-C-97
Batch ID: P315593

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.4		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315310

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

Reference Method: SM 5310 B-00
Batch ID: P315739

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P315644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849923	Iron	103	103	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849923	Arsenic	107	106	P/P	70 - 130
1849923	Cadmium	100	99.3	P/P	70 - 130
1849923	Chromium	93.4	92.2	P/P	70 - 130
1849923	Lead	104	105	P/P	70 - 130
1849923	Nickel	97.1	96.6	P/P	70 - 130
1849923	Silver	95.5	96.6	P/P	70 - 130
1849923	Zinc	96.0	95.7	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849922	Copper	83.2		P	70 - 130
1850586	Copper	89.5	92.1	P/P	70 - 130

Quality Assurance Report Matrix Spike Accuracy

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: 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 350.1 Rev. 2.0
Batch ID: P315662

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849906	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850051	Kjeldahl Nitrogen	110	114	F/F	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: P315373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849986	NO2NO3-N	106	105	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: P315668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850002	Total-P	96.7	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315763

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1850054	Total-P	96.2	95.8	P/P	90 - 110

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: P315190

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849720	O-Phosphate-P	97.2	98.6	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: P315593

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849998	Fluoride	97.2	97.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P315310

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849856	Organic Carbon	102	98.6	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P315739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1849999	Organic Carbon	96.1	95.7	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: P315644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849923	Iron	0.375	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P315644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849923	Arsenic	0.770	Spike	P	0 - 20
1849923	Cadmium	0.987	Spike	P	0 - 20
1849923	Chromium	1.26	Spike	P	0 - 20
1849923	Lead	0.497	Spike	P	0 - 20
1849923	Nickel	0.587	Spike	P	0 - 20
1849923	Silver	1.24	Spike	P	0 - 20
1849923	Zinc	0.292	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P316456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850586	Copper	2.82	Spike	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: 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 350.1 Rev. 2.0
Batch ID: P315662

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849906	Ammonia-N	1.79	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P315802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850051	Kjeldahl Nitrogen	2.78	Spike	P	0 - 20

Quality Assurance Report Precision

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P315373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849986	NO2NO3-N	0.493	Spike	P	0 - 20

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: P315668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850002	Total-P	4.67	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P315763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1850054	Total-P	0.391	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: P315190

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849720	O-Phosphate-P	1.26	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

Quality Assurance Report Precision

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: P315425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849899	Total Alkalinity	0.102	Sample	P	0 - 4.8

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: P315593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849998	Fluoride	0.494	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P315310

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849856	Organic Carbon	1.79	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P315739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1849999	Organic Carbon	0.309	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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A72815

Included Lab Sample IDs: 1850000, 1850003

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: 1850001

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A72831

Included Lab Sample IDs: 1849998, 1850001

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

Reference Method: SM 5310 B-00

Run ID: A72849

Included Lab Sample IDs: 1850002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.8	100	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A72857

Included Lab Sample IDs: 1850001

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

Reference Method: SM 4500 F-C-97

Run ID: A72857

Included Lab Sample IDs: 1850001

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A72859

Included Lab Sample IDs: 1849999

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

Reference Method: SM 2320 B-97

Run ID: A72887

Included Lab Sample IDs: 1849998

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A72925

Included Lab Sample IDs: 1850002

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

Reference Method: SM 4500 F-C-97

Run ID: A72956

Included Lab Sample IDs: 1849998

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A72977

Included Lab Sample IDs: 1849999, 1850002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	103	P/P	90 - 110
Ammonia-N	103	93.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73006

Included Lab Sample IDs: 1850006

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	98.5	99.9	P/P	90 - 110
Cadmium	97.0	96.1	P/P	90 - 110
Chromium	97.4	93.2	P/P	90 - 110
Lead	97.3	96.1	P/P	90 - 110
Nickel	96.3	99.1	P/P	90 - 110
Silver	98.7	98.2	P/P	90 - 110
Zinc	96.8	99.1	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A73009

Included Lab Sample IDs: 1849999

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	97.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73018

Included Lab Sample IDs: 1850002

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73031

Included Lab Sample IDs: 1850006

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73043

Included Lab Sample IDs: 1849999

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73064

Included Lab Sample IDs: 1850001

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73119

Included Lab Sample IDs: 1849999

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73124

Included Lab Sample IDs: 1850002

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73273

Included Lab Sample IDs: 1850006

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	101	97.9	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					0.304	
EPA 200.7 Rev. 4.4	Iron	105	103	103			0.375
EPA 200.8 Rev. 5.4	Arsenic	98.6	107	106			0.770
	Cadmium	99.8	100	99.3			0.987
	Chromium	104	93.4	92.2			1.26
	Copper	97.9	89.5	92.1	83.2		2.82
	Lead	100	104	105			0.497
	Nickel	95.4	97.1	96.6			0.587
	Silver	99.5	95.5	96.6			1.24
	Zinc	101	96.0	95.7			0.292

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision	
					LCS	MS
EPA 300.0 Rev. 2.1	Chloride	96.0	99.7	101	0.299	
	Sulfate	93.4	95.7	96.7	0.894	
EPA 350.1 Rev. 2.0	Ammonia-N	99.9				0.222
	Ammonia-N	105	103	105		1.79
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	110	114		2.78
	Kjeldahl Nitrogen	100	97.0	91.0		5.43
EPA 353.2 Rev. 2.0	NO2NO3-N	102	106	105		0.493
	NO2NO3-N	103	99.0	100		0.541
EPA 365.1 Rev. 2.0	Total-P	103	96.7	102		4.67
	Total-P	103	96.2	95.8		0.391
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	96.5	96.9		0.277
	O-Phosphate-P	99.6	97.2	98.6		1.26
SM 2120 B	Color (true)				1.81	
SM 2320 B-97	Total Alkalinity	101			0.101	
	Total Alkalinity	101			0.102	
SM 2540 C-97	TDS				2.89	
SM 4500 F-C-97	Fluoride	97.4	95.2	96.3		1.00
	Fluoride	94.4	97.2	97.9		0.494
SM 5310 B-00	Organic Carbon	99.2	102	98.6		1.79
	Organic Carbon	97.8	96.1	95.7		0.309

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1849998, 1850001
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1850006
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1850006
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1850001
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1850001
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1849999, 1850002
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1849999, 1850002
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1849999, 1850002
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1849999, 1850002
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1850000, 1850003
SM 2120 B / E31780	True Color measured at 450 nm	1850001
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1849998, 1850001
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1850001
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1849998, 1850001
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1849998, 1850001
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1849999, 1850002

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	1849998, 1850001
EPA 200.7 Rev. 4.4	11/15/2016	11/22/2016	Elliott D. Healy	11/28/2016	Joshua Ayres	1850006
EPA 200.8 Rev. 5.4	11/15/2016	11/22/2016	Elliott D. Healy	11/24/2016	Charles J. Peterson	1850006
	11/15/2016	12/08/2016	Elliott D. Healy	12/09/2016	Robert K Palmer	1850006
EPA 300.0 Rev. 2.1	11/15/2016			11/30/2016	Ping Hua	1850001
EPA 350.1 Rev. 2.0	11/15/2016			11/21/2016	Sofia Elnemr	1849999, 1850002
EPA 351.2 Rev. 2.0	11/15/2016	11/29/2016	Martin Acosta	12/01/2016	Christopher Armour	1849999
	11/15/2016	11/30/2016	Adrian Shelby	12/01/2016	Peter D. Kaus	1850002
EPA 353.2 Rev. 2.0	11/15/2016			11/17/2016	Beverly Y. Sanders	1849999
	11/15/2016			11/21/2016	Beverly Y. Sanders	1850002
EPA 365.1 Rev. 2.0	11/15/2016	11/23/2016	Adrian Shelby	11/28/2016	Lipi Saha	1850002
	11/15/2016	11/28/2016	Adrian Shelby	11/29/2016	Lipi Saha	1849999
EPA 365.1 Rev. 2.0 dissolved	11/15/2016			11/15/2016 16:40	Julia Storbeck	1850000, 1850003
SM 2120 B	11/15/2016			11/15/2016 17:04	Jared I. Manley	1850001
SM 2320 B-97	11/15/2016			11/16/2016	Dale L. Simmons	1850001
	11/15/2016			11/18/2016	Dale L. Simmons	1849998
SM 2540 C-97	11/15/2016			11/18/2016	Yijie Li	1850001
SM 2540 D-97	11/15/2016			11/18/2016	Yijie Li	1849998, 1850001
SM 4500 F-C-97	11/15/2016			11/16/2016	Dale L. Simmons	1850001
	11/15/2016			11/21/2016	Dale L. Simmons	1849998
SM 5310 B-00	11/15/2016			11/16/2016	Julie Michelle Frank	1850002
	11/15/2016			11/23/2016	Julie Michelle Frank	1849999