

Chemical Analysis Report

CEN-DIST-2016-09-09-02

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-2016-09-05-66**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 30-SEP-2016 16:59

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored 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: ELBOW CREEK @ 540M DS OF APOLLO BLVD Collection Date/Time: 09/08/2016 10:55

Field ID: G5CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830083	EPA 180.1 Rev. 2.0	Turbidity	2.5		NTU	P310908	
	SM 2320 B-97	Total Alkalinity	121		mg CaCO3/L	P311258	
	SM 2540 D-97	TSS	6	I	mg/L	P311491	
	SM 4500 F-C-97	Fluoride	0.10		mg F/L	P311261	
1830084	EPA 350.1 Rev. 2.0	Ammonia-N	0.085		mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P311099	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P311589	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P311493	
	SM 5310 B-00	Organic Carbon	17		mg C/L	P311339	
1830085	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.071		mg P/L	P310921	

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: HORSE CREEK WEST OF US HWY 1 BRIDGE Collection Date/Time: 09/08/2016 11:27

Field ID: G5CE0071

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830086	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P310908	
	EPA 300.0 Rev. 2.1	Chloride	5.2E+03		mg Cl/L	P311574	
		Sulfate	760		mg SO4/L	P311408	
	SM 2120 B	Color (true)	65		PCU	P310927	
	SM 2320 B-97	Total Alkalinity	90		mg CaCO3/L	P311452	
	SM 2540 C-97	TDS	8.92E+03		mg/L	P311460	
	SM 2540 D-97	TSS	4	I	mg/L	P311489	
	SM 4500 F-C-97	Fluoride	0.44		mg F/L	P311627	
1830087	EPA 350.1 Rev. 2.0	Ammonia-N	0.064		mg N/L	P311171	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.78		mg N/L	P311200	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.093		mg N/L	P311697	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P311482	
	SM 5310 B-00	Organic Carbon	16		mg C/L	P311339	
1830088	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.066		mg P/L	P310922	
1831089	EPA 200.7 Rev. 4.4	Iron	270		ug/L	P311144	
	EPA 200.8 Rev. 5.4	Arsenic	2.78		ug/L	P311144	
		Cadmium	0.060	U	ug/L	P311144	
		Chromium	0.53	I	ug/L	P311144	
		Copper	0.98	I	ug/L	P311144	
		Lead	0.27	I	ug/L	P311144	
		Nickel	0.47	I	ug/L	P311144	
		Silver	0.015	U	ug/L	P311144	
		Zinc	3.4	I	ug/L	P311144	

Ref. Method and Comment:

SM 2540 C-97: The reported result is consistent with the laboratory conductivity, 15950 umhos/cm.

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: P310908

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311144

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311144

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
Zinc	1.0	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311408

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311574

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311171

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311099

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

Quality Assurance Report

Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311200

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311697

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311482

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310921

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310922

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

Reference Method: SM 2120 B
Batch ID: P310927

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P311258

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

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P311452

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

Reference Method: SM 2540 C-97
Batch ID: P311460

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P311489

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P311491

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P311627

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P311339

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: P311144

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311144

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311144

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	98.3		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Copper	95.8		P	85 - 115
Lead	96.3		P	85 - 115
Nickel	95.6		P	85 - 115
Silver	98.1		P	85 - 115
Zinc	98.7		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311408

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311574

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311171

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311099

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311200

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311697

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: P311482

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: P311493

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310921

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310922

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

Reference Method: SM 2320 B-97
Batch ID: P311258

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P311452

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P311627

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P311339

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830681	Iron	101	102	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830681	Arsenic	108	106	P/P	70 - 130
1830681	Cadmium	105	101	P/P	70 - 130
1830681	Chromium	96.0	94.7	P/P	70 - 130
1830681	Copper	95.3	93.7	P/P	70 - 130
1830681	Lead	104	104	P/P	70 - 130
1830681	Nickel	97.6	95.9	P/P	70 - 130
1830681	Silver	94.5	93.6	P/P	70 - 130
1830681	Zinc	97.5	95.5	P/P	70 - 130

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311408

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829977	Sulfate	98.9		P	90 - 110
1830051	Sulfate	99.1		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1832106	Chloride	97.0		P	90 - 110
1832336	Chloride	99.2	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830052	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829748	Ammonia-N	101	95.6	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830034	Kjeldahl Nitrogen	96.6	95.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829766	Kjeldahl Nitrogen	101	89.2	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830084	NO2NO3-N	102	102	P/P	90 - 110
1830084	NO2NO3-N	104		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311697

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830087	NO2NO3-N	101	103	P/P	90 - 110
1830087	NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830073	Total-P	91.4	91.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830036	Total-P	97.8	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830038	O-Phosphate-P	98.1	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P310922

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829751	O-Phosphate-P	97.5	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830451	Fluoride	98.2	98.2	P/P	91 - 105

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P311627

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1831182	Fluoride	97.0	97.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P311339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829982	Organic Carbon	101	103	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P310908

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830023	Turbidity	1.88	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830681	Iron	0.524	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830681	Arsenic	1.82	Spike	P	0 - 20
1830681	Cadmium	3.34	Spike	P	0 - 20
1830681	Chromium	1.40	Spike	P	0 - 20
1830681	Copper	1.64	Spike	P	0 - 20
1830681	Lead	0.316	Spike	P	0 - 20
1830681	Nickel	1.76	Spike	P	0 - 20
1830681	Silver	0.963	Spike	P	0 - 20
1830681	Zinc	2.03	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829977	Sulfate	4.88	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311574

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1832336	Chloride	0.772	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830052	Ammonia-N	1.04	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829748	Ammonia-N	2.68	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830034	Kjeldahl Nitrogen	0.535	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829766	Kjeldahl Nitrogen	10.9	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830084	NO2NO3-N	0.489	Spike	P	0 - 15

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311697

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830087	NO2NO3-N	0.776	Spike	P	0 - 15

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311482

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830073	Total-P	0.464	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P311493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830036	Total-P	0.0449	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P310921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830038	O-Phosphate-P	1.12	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P310922

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829751	O-Phosphate-P	0.931	Spike	P	0 - 20

Reference Method: SM 2120 B

Batch ID: P310927

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829960	Color (true)	2.09	Sample	P	0 - 20

Reference Method: SM 2320 B-97

Batch ID: P311258

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830451	Total Alkalinity	1.74	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97

Batch ID: P311452

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831182	Total Alkalinity	0.284	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97

Batch ID: P311460

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830023	TDS	2.95	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97

Batch ID: P311261

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830451	Fluoride	0.0	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-97
Batch ID: P311627

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1831182	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P311339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829982	Organic Carbon	2.05	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 180.1 Rev. 2.0
Run ID: A71511
Included Lab Sample IDs: 1830083, 1830086

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A71518
Included Lab Sample IDs: 1830085, 1830088

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	97.9	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A71519
Included Lab Sample IDs: 1830086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	94.8	97.0	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A71566
Included Lab Sample IDs: 1830084

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71576
Included Lab Sample IDs: 1830086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	101	98.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A71633

Included Lab Sample IDs: 1830087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71656

Included Lab Sample IDs: 1830084

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.7	96.6	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A71657

Included Lab Sample IDs: 1830083

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	105	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A71657

Included Lab Sample IDs: 1830083

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

Reference Method: SM 5310 B-00

Run ID: A71682

Included Lab Sample IDs: 1830084, 1830087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A71691

Included Lab Sample IDs: 1830087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.1	101	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A71720

Included Lab Sample IDs: 1830086

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71721

Included Lab Sample IDs: 1831089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.8	99.5	P/P	90 - 110
Cadmium	99.8	98.3	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A71721

Included Lab Sample IDs: 1831089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	101	99.7	P/P	90 - 110
Copper	95.6	97.1	P/P	90 - 110
Lead	94.8	94.2	P/P	90 - 110
Nickel	95.6	97.3	P/P	90 - 110
Silver	95.5	96.2	P/P	90 - 110
Zinc	98.2	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71734

Included Lab Sample IDs: 1830084

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A71744

Included Lab Sample IDs: 1831089

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A71749

Included Lab Sample IDs: 1830086

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71755

Included Lab Sample IDs: 1830084

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A71756

Included Lab Sample IDs: 1830087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A71764

Included Lab Sample IDs: 1830086

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A71785

Included Lab Sample IDs: 1830087

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	100	P/P	90 - 110

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

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery		LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.88	
EPA 200.7 Rev. 4.4	Iron	102		101	102			0.524
EPA 200.8 Rev. 5.4	Arsenic	98.3		108	106			1.82
	Cadmium	101		105	101			3.34
	Chromium	101		96.0	94.7			1.40
	Copper	95.8		95.3	93.7			1.64
	Lead	96.3		104	104			0.316
	Nickel	95.6		97.6	95.9			1.76
	Silver	98.1		94.5	93.6			0.963
	Zinc	98.7		97.5	95.5			2.03
EPA 300.0 Rev. 2.1	Chloride	99.5		99.2	100	97.0		0.772
	Sulfate	98.3		99.1	98.9		4.88	
EPA 350.1 Rev. 2.0	Ammonia-N	102		103	105			1.04
	Ammonia-N	102		101	95.6			2.68
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101		96.6	95.7			0.535
	Kjeldahl Nitrogen	97.5		101	89.2			10.9
EPA 353.2 Rev. 2.0	NO2NO3-N	104		102	104	102		0.489 RSD
	NO2NO3-N	104		101	103	103		0.776 RSD
EPA 365.1 Rev. 2.0	Total-P	103		91.4	91.0			0.464
	Total-P	98.1		97.8	97.8			0.0449
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101		98.1	99.5			1.12
	O-Phosphate-P	104		97.5	98.5			0.931
SM 2120 B	Color (true)						2.09	
SM 2320 B-97	Total Alkalinity	103					1.74	
	Total Alkalinity	104					0.284	
SM 2540 C-97	TDS						2.95	
SM 4500 F-C-97	Fluoride	100		98.2	98.2			0.0
	Fluoride	98.4		97.0	97.0			0.0
SM 5310 B-00	Organic Carbon	102		101	103			2.05

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1830083, 1830086
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1831089
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1831089

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1830086
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1830086
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1830084, 1830087
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1830084, 1830087
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1830084, 1830087
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1830084, 1830087
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1830085, 1830088
SM 2120 B / E31780	True Color measured at 450 nm	1830086
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1830083, 1830086
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1830086
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1830083, 1830086
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1830083, 1830086
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1830084, 1830087

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	09/09/2016			09/09/2016 14:47	Sima Feizi	1830083, 1830086
EPA 200.7 Rev. 4.4	09/09/2016	09/14/2016	Elliott D. Healy	09/20/2016	Joshua Ayres	1831089
EPA 200.8 Rev. 5.4	09/09/2016	09/14/2016	Elliott D. Healy	09/19/2016	Charles J. Peterson	1831089
EPA 300.0 Rev. 2.1	09/09/2016			09/17/2016	Ping Hua	1830086
	09/09/2016			09/21/2016	Ping Hua	1830086
EPA 350.1 Rev. 2.0	09/09/2016			09/09/2016	Joseph Suarez	1830087
	09/09/2016			09/13/2016	Sofia Elnemr	1830084
EPA 351.2 Rev. 2.0	09/09/2016	09/14/2016	Adrian Shelby	09/15/2016	Christopher Armour	1830084
	09/09/2016	09/15/2016	Adrian Shelby	09/16/2016	Virginia P. Brown	1830087
EPA 353.2 Rev. 2.0	09/09/2016			09/20/2016	Beverly Y. Sanders	1830084
	09/09/2016			09/21/2016	Beverly Y. Sanders	1830087
EPA 365.1 Rev. 2.0	09/09/2016	09/20/2016	Lipi Saha	09/21/2016	Lipi Saha	1830084, 1830087
EPA 365.1 Rev. 2.0 dissolved	09/09/2016			09/09/2016 16:02	Julia Storbeck	1830088
	09/09/2016			09/09/2016 16:03	Julia Storbeck	1830085
SM 2120 B	09/09/2016			09/09/2016 17:35	Julie Michelle Frank	1830086
SM 2320 B-97	09/09/2016			09/15/2016	Dale L. Simmons	1830083
	09/09/2016			09/19/2016	Dale L. Simmons	1830086
SM 2540 C-97	09/09/2016			09/13/2016	Yijie Li	1830086
SM 2540 D-97	09/09/2016			09/13/2016	Yijie Li	1830083, 1830086
SM 4500 F-C-97	09/09/2016			09/15/2016	Dale L. Simmons	1830083
	09/09/2016			09/21/2016	Dale L. Simmons	1830086
SM 5310 B-00	09/09/2016			09/15/2016	Sofia Elnemr	1830084, 1830087