

Chemical Analysis Report

WQAP-2018-07-31-03

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

Event Description: **Cow Creek (2952) Volusia Co.**

Request ID: **RQ-2018-05-21-20**

Customer: **WQAP**

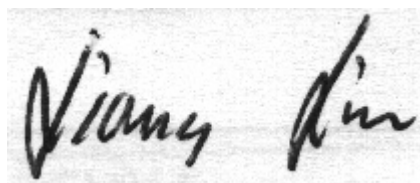
Project ID: **SMP**

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 15-AUG-2018 16:48

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: Cow Creek at Osteen-Maytown Road (2952)

Collection Date/Time: 07/30/2018 11:10

Field ID: G2CE0086

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2011948	EPA 180.1 Rev. 2.0	Turbidity	0.65		NTU	P349464	
	EPA 300.0 Rev. 2.1	Chloride	8.9		mg Cl/L	P349593	MS
		Sulfate	0.20	U	mg SO4/L	P349596	
	SM 2120 B	Color (true)	730		PCU	P349459	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P349652	
	SM 2540 C-97	TDS	92		mg/L	P349796	
	SM 2540 D-97	TSS	2	I	mg/L	P349951	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P349655	
2011949	EPA 350.1 Rev. 2.0	Ammonia-N	0.025		mg N/L	P349574	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P349662	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P349492	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P349561	
	SM 5310 B-00	Organic Carbon	47		mg C/L	P349691	
2011950	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P349454	
2011953	EPA 200.7 Rev. 4.4	Calcium	3.39		mg/L	P349496	
		Iron	1.28E+03		ug/L	P349496	
		Magnesium	1.00		mg/L	P349496	
		Potassium	0.30	U	mg/L	P349496	
		Sodium	5.6		mg/L	P349496	
		Zinc	6.1	I	ug/L	P349496	
	EPA 200.8 Rev. 5.4	Arsenic	0.48		ug/L	P349496	
		Cadmium	0.020	U	ug/L	P349496	
		Chromium	0.40	I	ug/L	P349496	
		Copper	0.31	I	ug/L	P349496	
		Lead	0.50		ug/L	P349496	
		Nickel	0.50	I	ug/L	P349496	
		Silver	0.010	U	ug/L	P349496	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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: P349464

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P349496

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: P349496

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349593

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349596

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349574

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349662

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P349492

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349561

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P349454

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

Reference Method: SM 2120 B
Batch ID: P349459

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P349652

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

Reference Method: SM 2540 C-97
Batch ID: P349796

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P349951

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P349655

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P349691

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: P349496

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	108		P	85 - 115
Magnesium	111		P	85 - 115
Potassium	106		P	85 - 115
Sodium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349496

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	94.3		P	85 - 115
Copper	95.4		P	85 - 115
Lead	95.4		P	85 - 115
Nickel	97.5		P	85 - 115
Silver	97.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349593

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349596

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349574

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349662

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P349492

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349561

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: P349454

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

Reference Method: SM 2120 B
Batch ID: P349459

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.6		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P349652

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P349655

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.8		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P349691

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.5		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P349496

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011929	Calcium	104		P	80 - 120
2011929	Iron	110		P	80 - 120
2011929	Magnesium	113		P	80 - 120
2011929	Potassium	110		P	80 - 120
2011929	Sodium	103		P	80 - 120
2011929	Zinc	105		P	80 - 120
2011931	Calcium	106		P	80 - 120
2011931	Iron	108	107	P/P	80 - 120
2011931	Magnesium	110	108	P/P	80 - 120
2011931	Potassium	105	103	P/P	80 - 120
2011931	Sodium	104		P	80 - 120
2011931	Zinc	105	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349496

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011929	Arsenic	102		P	80 - 120
2011929	Cadmium	102		P	80 - 120
2011929	Chromium	95.9		P	80 - 120
2011929	Copper	96.4		P	80 - 120
2011929	Lead	96.9		P	80 - 120
2011929	Nickel	98.8		P	80 - 120
2011929	Silver	96.4		P	80 - 120
2011931	Arsenic	106	104	P/P	80 - 120
2011931	Cadmium	105	105	P/P	80 - 120
2011931	Chromium	98.6	97.7	P/P	80 - 120
2011931	Copper	99.4	98.8	P/P	80 - 120
2011931	Lead	98.0	98.2	P/P	80 - 120
2011931	Nickel	102	100	P/P	80 - 120
2011931	Silver	98.4	95.3	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349593

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011870	Chloride	99.0		P	90 - 110
2011973	Chloride	113		F	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349596

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011870	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349574

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011881	Ammonia-N	95.2	99.2	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349662

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2012287	Kjeldahl Nitrogen	95.7	95.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P349492

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011880	NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011976	Total-P	99.2	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P349454

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011883	O-Phosphate-P	94.3	97.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P349655

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011974	Fluoride	102	102	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P349691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2011976	Organic Carbon	94.0	95.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P349464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011890	Turbidity	1.22	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P349496

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011931	Calcium	1.48	Spike	P	0 - 20
2011931	Iron	1.04	Spike	P	0 - 20
2011931	Magnesium	0.990	Spike	P	0 - 20
2011931	Potassium	0.826	Spike	P	0 - 20
2011931	Sodium	0.705	Spike	P	0 - 20
2011931	Zinc	3.08	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P349496

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011931	Arsenic	1.31	Spike	P	0 - 20
2011931	Cadmium	0.318	Spike	P	0 - 20
2011931	Chromium	0.877	Spike	P	0 - 20
2011931	Copper	0.580	Spike	P	0 - 20
2011931	Lead	0.197	Spike	P	0 - 20
2011931	Nickel	1.82	Spike	P	0 - 20
2011931	Silver	3.27	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011870	Chloride	0.772	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P349596

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011870	Sulfate	1.99	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P349574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011881	Ammonia-N	3.74	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P349662

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2012287	Kjeldahl Nitrogen	0.211	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P349492

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011880	NO2NO3-N	0.487	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P349561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011976	Total-P	2.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P349454

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011883	O-Phosphate-P	3.64	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P349459

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011890	Color (true)	0.649	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P349652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011974	Total Alkalinity	1.13	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P349796

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011875	TDS	4.00	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P349655

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011974	Fluoride	0.0	Spike	P	0 - 3.5

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P349691

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2011976	Organic Carbon	1.43	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A85560

Included Lab Sample IDs: 2011948

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A85586

Included Lab Sample IDs: 2011950

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	98.6	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A85589

Included Lab Sample IDs: 2011948

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A85591

Included Lab Sample IDs: 2011948

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A85611

Included Lab Sample IDs: 2011949

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A85648

Included Lab Sample IDs: 2011949

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.2	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A85663

Included Lab Sample IDs: 2011953

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	101	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Sodium	103	101	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A85668

Included Lab Sample IDs: 2011949

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A85689

Included Lab Sample IDs: 2011953

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	104	102	P/P	90 - 110
Cadmium	102	99.5	P/P	90 - 110
Chromium	98.0	98.4	P/P	90 - 110
Copper	101	100	P/P	90 - 110
Lead	97.5	96.0	P/P	90 - 110
Nickel	101	99.3	P/P	90 - 110
Silver	96.1	94.8	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A85692

Included Lab Sample IDs: 2011948

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

Reference Method: SM 4500 F-C-97

Run ID: A85692

Included Lab Sample IDs: 2011948

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

Reference Method: SM 5310 B-00

Run ID: A85704

Included Lab Sample IDs: 2011949

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.4	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A85727

Included Lab Sample IDs: 2011949

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.0	97.7	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					1.22	
EPA 200.7 Rev. 4.4	Calcium	105	104	106			1.48
	Iron	108	110	108	107		1.04
	Magnesium	111	113	110	108		0.990
	Potassium	106	110	105	103		0.826
	Sodium	103	103	104			0.705
	Zinc	102	105	105	102		3.08
EPA 200.8 Rev. 5.4	Arsenic	100	102	106	104		1.31
	Cadmium	101	102	105	105		0.318
	Chromium	94.3	95.9	98.6	97.7		0.877
	Copper	95.4	96.4	99.4	98.8		0.580
	Lead	95.4	96.9	98.0	98.2		0.197
	Nickel	97.5	98.8	102	100		1.82
	Silver	97.3	96.4	98.4	95.3		3.27
EPA 300.0 Rev. 2.1	Chloride	99.3	99.0	113		0.772	
	Sulfate	98.4	100			1.99	
EPA 350.1 Rev. 2.0	Ammonia-N	101	95.2	99.2			3.74
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	94.6	95.7	95.4			0.211
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	103			0.487
EPA 365.1 Rev. 2.0	Total-P	103	99.2	102			2.54
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.2	94.3	97.8			3.64
SM 2120 B	Color (true)	98.6				0.649	
SM 2320 B-97	Total Alkalinity	103				1.13	
SM 2540 C-97	TDS					4.00	
SM 4500 F-C-97	Fluoride	97.8	102	102			0.0
SM 5310 B-00	Organic Carbon	93.5	94.0	95.7			1.43

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2011948
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2011953
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2011953
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2011948
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2011948
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2011949
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2011949
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2011949
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2011949
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2011950
SM 2120 B / E31780	True Color measured at 450 nm	2011948
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2011948
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2011948
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2011948
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2011948

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2011949

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	07/31/2018			07/31/2018 14:19	Megan Treadwell	2011948
EPA 200.7 Rev. 4.4	07/31/2018	08/01/2018 15:30	Elliott D. Healy	08/02/2018 15:53	Betina Topolski	2011953
EPA 200.8 Rev. 5.4	07/31/2018	08/01/2018 15:30	Elliott D. Healy	08/04/2018 03:45	Allison Taylor	2011953
EPA 300.0 Rev. 2.1	07/31/2018			08/03/2018 02:41	Lipi Saha	2011948
EPA 350.1 Rev. 2.0	07/31/2018			08/02/2018 12:56	Ping Hua	2011949
EPA 351.2 Rev. 2.0	07/31/2018	08/06/2018 15:40	Adrian Shelby	08/07/2018 10:30	Joseph Suarez	2011949
EPA 353.2 Rev. 2.0	07/31/2018			08/01/2018 12:07	Lauren Bottorf	2011949
EPA 365.1 Rev. 2.0	07/31/2018	08/02/2018 11:50	Sima Feizi	08/03/2018 11:08	Beverly Y. Sanders	2011949
EPA 365.1 Rev. 2.0 dissolved	07/31/2018			07/31/2018 14:54	Julia Storbeck	2011950
SM 2120 B	07/31/2018			07/31/2018 15:26	Tanya Welborn	2011948
SM 2320 B-97	07/31/2018			08/03/2018 03:37	Dale L. Simmons	2011948
SM 2540 C-97	07/31/2018			08/03/2018 16:45	Yijie Li	2011948
SM 2540 D-97	07/31/2018			08/03/2018 16:45	Yijie Li	2011948
SM 4500 F-C-97	07/31/2018			08/03/2018 03:37	Dale L. Simmons	2011948
SM 5310 B-00	07/31/2018			08/04/2018 07:33	Julia Storbeck	2011949