Chemical Analysis Report

NW-DIST-2020-02-22-01

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

Event Description: **Monthly Crestview/ Laurel Hill Run**
Request ID: **RQ-2020-02-17-21**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Cheryl Bunch

For additional information please contact
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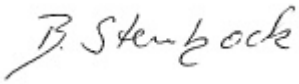
Phone (850) 245-8085

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 17-MAR-2020 13:32



NON-CONFORMANCE REPORT INCLUDED

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 by the Florida Department of Health Environmental Laboratory Certification Program 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: Bear Creek @ Forest Rd. 0.7 Miles West of Bear Lake **Collection Date/Time: 02/20/2020 11:40**

Field ID: G4NW0380 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2160220	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P379399	
	EPA 300.0 Rev. 2.1	Chloride	2.8		mg Cl/L	P380075	
		Sulfate	0.94		mg SO4/L	P380077	
	SM 2120 B-2011	Color (true)	46		PCU	P379397	
	SM 2320 B-2011	Total Alkalinity	6.1		mg CaCO3/L	P380174	
	SM 2540 C-2011	TDS	25		mg/L	P379925	
	SM 2540 D-2011	TSS	2	I A	mg/L	P379828	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P380177	
2160221	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P379911	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.28		mg N/L	P379756	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.033		mg N/L	P380157	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P380038	
	SM 5310 B-2011	Organic Carbon	4.7		mg C/L	P379928	
2160222	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I Q	mg P/L	P379394	
2160227	EPA 200.7 Rev. 4.4	Barium	10.7		ug/L	P379576	
		Calcium	2.32		mg/L	P379576	
		Iron	560		ug/L	P379576	
		Magnesium	0.97		mg/L	P379576	
		Potassium	0.30	U	mg/L	P379576	
		Sodium	2.0		mg/L	P379576	
		Zinc	5.0	U	ug/L	P379576	
	EPA 200.8 Rev. 5.4	Aluminum	61		ug/L	P380050	
		Antimony	0.050	U	ug/L	P380050	
		Arsenic	0.29		ug/L	P380050	
		Boron**	7.3	I	ug/L	P380050	
		Cadmium	0.020	U	ug/L	P380050	
		Chromium	0.40	U	ug/L	P380050	
		Copper	0.40	U	ug/L	P380050	
		Lead	0.20	U	ug/L	P380050	
		Nickel	0.50	U	ug/L	P380050	
		Selenium	0.20	U	ug/L	P380050	
		Silver	0.010	U	ug/L	P380050	
		Thallium	0.10	U	ug/L	P380050	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample expired upon receipt.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium, potassium and sodium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Non-Conformance Report

NCR ID: 8204

Event(s)	Job(s)	Sample(s)	Test(s)
NW-DIST-2020-02-22-01			

NCR Type: SHIPPING/RECEIVING **NCR Category: Samples arrived late**

Observation: Samples arrived one or more days late by FedEx, samples received within the acceptable temperature range.

Resolution: Customer contacted, email correspondence attached to sample submittal forms. Data will be qualified as appropriate.

Authorized by/Date: Joshua Ayres 3/4/2020

The Non-Conformance Report details exceptions or problems encountered with the events/jobs/samples/test.
Please address questions to:

Chemistry	Colin Wright	(850) 245-8085
Biology	Cheryl Swanson	(850) 245-8177

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P379399

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P379576

Component	Result	Code	Units
Barium	1.0	U	ug/L
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: P380050

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380075

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380077

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379911

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: P379756

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380157

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380038

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P379394

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

Reference Method: SM 2120 B-2011
Batch ID: P379397

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P380174

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

Reference Method: SM 2540 C-2011
Batch ID: P379925

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P379828

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P380177

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P379928

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: P379576

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	105		P	85 - 115
Calcium	102		P	85 - 115
Iron	105		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	99.3		P	85 - 115
Sodium	98.9		P	85 - 115
Zinc	107		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380050

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.4		P	85 - 115
Antimony	90.4		P	85 - 115
Arsenic	95.8		P	85 - 115
Boron	95.2		P	85 - 115
Cadmium	94.2		P	85 - 115
Chromium	105		P	85 - 115
Copper	99.8		P	85 - 115
Lead	92.7		P	85 - 115
Nickel	103		P	85 - 115
Selenium	94.9		P	85 - 115
Silver	95.4		P	85 - 115
Thallium	93.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380075

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380077

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379911

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379756

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.9		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380157

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380038

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P379394

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

Reference Method: SM 2120 B-2011
Batch ID: P379397

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

Reference Method: SM 2320 B-2011
Batch ID: P380174

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P380177

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	92 - 103

Reference Method: SM 5310 B-2011
Batch ID: P379928

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P379576

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159218	Barium	104		P	80 - 120
2159218	Calcium	104		P	80 - 120
2159218	Iron	107		P	80 - 120
2159218	Magnesium	110		P	80 - 120
2159218	Potassium	100		P	80 - 120
2159218	Sodium	100		P	80 - 120
2159218	Zinc	111		P	80 - 120
2159489	Barium	106	106	P/P	80 - 120
2159489	Iron	110	107	P/P	80 - 120
2159489	Zinc	109	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159453	Aluminum	89.7		P	80 - 120
2159453	Antimony	92.0		P	80 - 120
2159453	Arsenic	96.4		P	80 - 120
2159453	Boron	93.1		P	80 - 120
2159453	Cadmium	96.0		P	80 - 120
2159453	Chromium	96.3		P	80 - 120
2159453	Copper	96.5		P	80 - 120
2159453	Lead	90.7		P	80 - 120
2159453	Nickel	97.5		P	80 - 120
2159453	Selenium	95.1		P	80 - 120
2159453	Silver	94.4		P	80 - 120
2159453	Thallium	94.0		P	80 - 120
2159920	Aluminum	91.6	91.4	P/P	80 - 120
2159920	Antimony	93.7	93.3	P/P	80 - 120
2159920	Arsenic	97.8	98.2	P/P	80 - 120
2159920	Boron	97.0	95.6	P/P	80 - 120
2159920	Cadmium	98.0	97.2	P/P	80 - 120
2159920	Chromium	100	101	P/P	80 - 120
2159920	Copper	98.9	99.1	P/P	80 - 120
2159920	Lead	92.8	92.7	P/P	80 - 120
2159920	Nickel	100	101	P/P	80 - 120
2159920	Selenium	96.6	98.2	P/P	80 - 120
2159920	Silver	95.9	94.5	P/P	80 - 120
2159920	Thallium	94.6	94.3	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380075

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160190	Chloride	99.9		P	90 - 110
2160192	Chloride	95.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160190	Sulfate	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160192	Sulfate	96.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379911

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160199	Ammonia-N	98.5	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379756

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160201	Kjeldahl Nitrogen	98.7	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380157

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160201	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380038

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160201	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P379394

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160137	O-Phosphate-P	95.3	95.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P380177

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160193	Fluoride	101	102	P/P	89 - 106

Reference Method: SM 5310 B-2011
Batch ID: P379928

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160197	Organic Carbon	96.6	97.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P379399

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160192	Turbidity	4.65	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P379576

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159489	Barium	0.587	Spike	P	0 - 20
2159489	Calcium	2.10	Spike	P	0 - 20
2159489	Iron	2.57	Spike	P	0 - 20
2159489	Magnesium	2.18	Spike	P	0 - 20
2159489	Potassium	0.920	Spike	P	0 - 20
2159489	Sodium	1.71	Spike	P	0 - 20
2159489	Zinc	0.336	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159920	Aluminum	0.199	Spike	P	0 - 20
2159920	Antimony	0.439	Spike	P	0 - 20
2159920	Arsenic	0.432	Spike	P	0 - 20
2159920	Boron	1.24	Spike	P	0 - 20
2159920	Cadmium	0.790	Spike	P	0 - 20
2159920	Chromium	0.366	Spike	P	0 - 20
2159920	Copper	0.179	Spike	P	0 - 20
2159920	Lead	0.105	Spike	P	0 - 20
2159920	Nickel	0.609	Spike	P	0 - 20
2159920	Selenium	1.67	Spike	P	0 - 20
2159920	Silver	1.42	Spike	P	0 - 20
2159920	Thallium	0.236	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380075

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160190	Chloride	0.686	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160190	Sulfate	0.355	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379911

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160199	Ammonia-N	2.23	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379756

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160201	Kjeldahl Nitrogen	2.81	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380157

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160201	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380038

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160201	Total-P	0.0679	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P379394

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160137	O-Phosphate-P	0.0706	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P379397

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160192	Color (true)	4.91	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P380174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160193	Total Alkalinity	0.632	Sample	P	0 - 2.8

Reference Method: SM 2540 C-2011
Batch ID: P379925

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159917	TDS	0.418	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P380177

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160193	Fluoride	0.513	Spike	P	0 - 2.5

Reference Method: SM 5310 B-2011
Batch ID: P379928

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160197	Organic Carbon	0.374	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A97733
Included Lab Sample IDs: 2160222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	98.7	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A97735
Included Lab Sample IDs: 2160220

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	103	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A97736
Included Lab Sample IDs: 2160220

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A97876
Included Lab Sample IDs: 2160227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	107	109	P/P	90 - 110
Calcium	105	107	P/P	90 - 110
Iron	106	107	P/P	90 - 110
Magnesium	105	107	P/P	90 - 110
Potassium	103	104	P/P	90 - 110
Sodium	103	104	P/P	90 - 110
Zinc	108	110	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A97905
Included Lab Sample IDs: 2160221

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.2	99.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A97928
Included Lab Sample IDs: 2160221

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

Reference Method: SM 5310 B-2011
Run ID: A97937
Included Lab Sample IDs: 2160221

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.6	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A97979
Included Lab Sample IDs: 2160221

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A98001
Included Lab Sample IDs: 2160220

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

Reference Method: SM 2320 B-2011
Run ID: A98031
Included Lab Sample IDs: 2160220

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

Reference Method: SM 4500 F-C-2011
Run ID: A98031
Included Lab Sample IDs: 2160220

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98050
Included Lab Sample IDs: 2160227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	95.7	96.5	P/P	90 - 110
Antimony	90.3	91.8	P/P	90 - 110
Arsenic	98.0	98.2	P/P	90 - 110
Boron	96.7	92.8	P/P	90 - 110
Cadmium	94.9	96.0	P/P	90 - 110
Copper	98.7	98.0	P/P	90 - 110
Lead	94.5	94.3	P/P	90 - 110
Selenium	95.7	96.2	P/P	90 - 110
Silver	92.7	92.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A98071
Included Lab Sample IDs: 2160221

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98087
Included Lab Sample IDs: 2160227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98087
Included Lab Sample IDs: 2160227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	100	99.0	P/P	90 - 110
Nickel	103	104	P/P	90 - 110
Thallium	92.2	91.6	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						4.65	
EPA 200.7 Rev. 4.4	Barium	105	104	106	106			0.587
	Calcium	102	104					2.10
	Iron	105	107	110	107			2.57
	Magnesium	103	110					2.18
	Potassium	99.3	100					0.920
	Sodium	98.9	100					1.71
	Zinc	107	111	109	109			0.336
EPA 200.8 Rev. 5.4	Aluminum	94.4	89.7	91.6	91.4			0.199
	Antimony	90.4	92.0	93.7	93.3			0.439
	Arsenic	95.8	96.4	97.8	98.2			0.432
	Boron	95.2	93.1	97.0	95.6			1.24
	Cadmium	94.2	96.0	98.0	97.2			0.790
	Chromium	105	100	101	96.3			0.366
	Copper	99.8	96.5	98.9	99.1			0.179
	Lead	92.7	90.7	92.8	92.7			0.105
	Nickel	103	100	101	97.5			0.609
	Selenium	94.9	95.1	96.6	98.2			1.67
	Silver	95.4	94.4	95.9	94.5			1.42
	Thallium	93.6	94.6	94.3	94.0			0.236
EPA 300.0 Rev. 2.1	Chloride	102	99.9	95.8			0.686	
	Sulfate	102	101	96.0			0.355	
EPA 350.1 Rev. 2.0	Ammonia-N	103	98.5	101				2.23
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.9	98.7	103				2.81
EPA 353.2 Rev. 2.0	NO2NO3-N	102	100	100				0.0
EPA 365.1 Rev. 2.0	Total-P	105	103	103				0.0679
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	95.3	95.2				0.0706
SM 2120 B-2011	Color (true)	100					4.91	
SM 2320 B-2011	Total Alkalinity	104					0.632	
SM 2540 C-2011	TDS						0.418	
SM 4500 F-C-2011	Fluoride	101	101	102				0.513
SM 5310 B-2011	Organic Carbon	95.6	96.6	97.2				0.374

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2160220
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2160227
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2160227
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2160220
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2160220
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2160221
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2160221
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2160221
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2160221
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2160222
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2160220
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2160220
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2160220
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2160220

Reference Method Descriptions

Method	Description	Associated Samples
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2160220
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2160221

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	02/22/2020			02/22/2020 11:21	Julia Storbeck	2160220
EPA 200.7 Rev. 4.4	02/22/2020	02/25/2020 16:40	Elliott D. Healy	02/27/2020 21:38	Vijayalakshmi Reddy	2160227
EPA 200.8 Rev. 5.4	02/22/2020	03/04/2020 16:05	Elliott D. Healy	03/06/2020 22:19	Justin Cutchin	2160227
	02/22/2020	03/04/2020 16:05	Elliott D. Healy	03/09/2020 17:12	Justin Cutchin	2160227
EPA 300.0 Rev. 2.1	02/22/2020			03/05/2020 00:30	Lipi Saha	2160220
EPA 350.1 Rev. 2.0	02/22/2020			03/02/2020 12:12	Ping Hua	2160221
EPA 351.2 Rev. 2.0	02/22/2020	02/27/2020 11:50	Sima Feizi	02/28/2020 11:28	Jhamieka S. Greenwood	2160221
EPA 353.2 Rev. 2.0	02/22/2020			03/04/2020 10:57	Beverly Y. Sanders	2160221
EPA 365.1 Rev. 2.0	02/22/2020	03/04/2020 13:06	Yen Ta	03/09/2020 11:54	Benjamin T. Nordmann	2160221
EPA 365.1 Rev. 2.0 dissolved	02/22/2020			02/22/2020 11:41	Jhamieka S. Greenwood	2160222
SM 2120 B-2011	02/22/2020			02/22/2020 11:27	Julia Storbeck	2160220
SM 2320 B-2011	02/22/2020			03/05/2020 06:17	Dale L. Simmons	2160220
SM 2540 C-2011	02/22/2020			02/25/2020 13:41	Yijie Li	2160220
SM 2540 D-2011	02/22/2020			02/25/2020 13:41	Yijie Li	2160220
SM 4500 F-C-2011	02/22/2020			03/05/2020 06:17	Dale L. Simmons	2160220
SM 5310 B-2011	02/22/2020			03/02/2020 19:03	Lauren Lees	2160221