Chemical Analysis Report

CEN-DIST-2021-06-03-01

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

Event Description: **Cow Creek**
Request ID: **RQ-2021-06-07-68**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
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Certified by: Colin Wright, Program Administrator

Date Certified: 24-JUN-2021 09:04

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: Cow Creek at OsteenMaytown Road (2952) **Collection Date/Time: 06/02/2021 13:02**

Field ID: G2CE0086 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2251812	EPA 180.1 Rev. 2.0	Turbidity	6.7		NTU	P399180	
	EPA 300.0 Rev. 2.1	Chloride	24		mg Cl/L	P399478	
		Sulfate	0.38	I	mg SO4/L	P399481	
	SM 2120 B-2011	Color (true)	390		PCU	P399177	
	SM 2320 B-2011	Total Alkalinity	27		mg CaCO3/L	P399338	
	SM 2540 C-2011	TDS	151		mg/L	P399524	
	SM 2540 D-2011	TSS	8	I	mg/L	P399315	
	SM 4500 F-C-2011	Fluoride	0.038	I	mg F/L	P399342	
2251813	EPA 350.1 Rev. 2.0	Ammonia-N	0.39		mg N/L	P399413	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.4		mg N/L	P399233	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P399218	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P399287	
	SM 5310 B-2011	Organic Carbon	41		mg C/L	P399730	
2251814	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.044		mg P/L	P399171	
2251825	EPA 200.7 Rev. 4.4	Barium	13.6		ug/L	P399356	
		Calcium	15.6		mg/L	P399356	
		Iron	1.73E+03		ug/L	P399356	
		Magnesium	2.00		mg/L	P399356	
		Manganese	18.9		ug/L	P399356	
		Potassium	0.99	I	mg/L	P399356	
		Sodium	13.3		mg/L	P399356	
		Zinc	7.3	I	ug/L	P399356	
	EPA 200.8 Rev. 5.4	Aluminum	219		ug/L	P399356	
		Antimony	0.062	I	ug/L	P399356	
		Arsenic	0.64		ug/L	P399356	
		Beryllium	0.014	I	ug/L	P399356	
		Boron**	30.2		ug/L	P399356	
		Cadmium	0.020	U	ug/L	P399356	
		Chromium	0.88	I	ug/L	P399356	
		Copper	0.40	U	ug/L	P399356	
		Lead	0.67		ug/L	P399356	
		Nickel	0.50	U	ug/L	P399356	
		Selenium	0.20	U	ug/L	P399356	
		Silver	0.010	U	ug/L	P399356	
		Thallium	0.10	U	ug/L	P399356	
	SM 2340B	Hardness	47.1		mg/L	P399356	

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.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399180

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399356

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
Manganese	1.0	U	ug/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: P399356

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	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: P399478

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399481

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399413

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: P399233

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399218

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399287

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

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

Reference Method: SM 2120 B-2011
Batch ID: P399177

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P399338

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

Reference Method: SM 2540 C-2011
Batch ID: P399524

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P399315

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

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: P399730

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: P399356

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	98.8		P	85 - 115
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	104		P	85 - 115
Manganese	99.7		P	85 - 115
Potassium	99.2		P	85 - 115
Sodium	101		P	85 - 115
Zinc	97.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P399356

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.8		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	104		P	85 - 115
Beryllium	94.9		P	85 - 115
Boron	101		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	100		P	85 - 115
Copper	104		P	85 - 115
Lead	113		P	85 - 115
Nickel	104		P	85 - 115
Selenium	101		P	85 - 115
Silver	101		P	85 - 115
Thallium	105		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399478

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399481

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399413

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: P399233

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399218

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399287

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

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

Reference Method: SM 2120 B-2011
Batch ID: P399177

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P399338

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.1		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.5		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P399730

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.9		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399356

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251773	Barium	99.7	99.9	P/P	80 - 120
2251773	Calcium	102		P	80 - 120
2251773	Iron	105	107	P/P	80 - 120
2251773	Magnesium	103		P	80 - 120
2251773	Manganese	101	101	P/P	80 - 120
2251773	Potassium	97.4	99.0	P/P	80 - 120
2251773	Sodium	101		P	80 - 120
2251773	Zinc	102	103	P/P	80 - 120
2251954	Barium	102		P	80 - 120
2251954	Calcium	107		P	80 - 120
2251954	Iron	106		P	80 - 120
2251954	Magnesium	110		P	80 - 120
2251954	Manganese	103		P	80 - 120
2251954	Potassium	104		P	80 - 120
2251954	Sodium	102		P	80 - 120
2251954	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P399356

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251773	Aluminum	93.4	95.4	P/P	80 - 120
2251773	Antimony	101	102	P/P	80 - 120
2251773	Arsenic	101	103	P/P	80 - 120
2251773	Beryllium	92.0	93.4	P/P	80 - 120
2251773	Boron	101	101	P/P	80 - 120
2251773	Cadmium	103	103	P/P	80 - 120
2251773	Chromium	98.4	100	P/P	80 - 120
2251773	Copper	97.2	98.7	P/P	80 - 120
2251773	Lead	111	112	P/P	80 - 120
2251773	Nickel	96.8	98.6	P/P	80 - 120
2251773	Selenium	96.6	97.8	P/P	80 - 120
2251773	Silver	98.8	100	P/P	80 - 120
2251773	Thallium	107	108	P/P	80 - 120
2251954	Aluminum	94.4		P	80 - 120
2251954	Antimony	100		P	80 - 120
2251954	Arsenic	99.3		P	80 - 120
2251954	Beryllium	90.1		P	80 - 120
2251954	Boron	102		P	80 - 120
2251954	Cadmium	103		P	80 - 120
2251954	Chromium	98.0		P	80 - 120
2251954	Copper	98.2		P	80 - 120
2251954	Lead	110		P	80 - 120
2251954	Nickel	95.8		P	80 - 120
2251954	Selenium	95.7		P	80 - 120
2251954	Silver	100		P	80 - 120
2251954	Thallium	103		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399478

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251761	Chloride	96.5		P	90 - 110
2251977	Chloride	94.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399481

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251761	Sulfate	96.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399413

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251783	Ammonia-N	97.4	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251711	Kjeldahl Nitrogen	95.3	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399218

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251764	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399287

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251813	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251925	O-Phosphate-P	99.9	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251710	Fluoride	98.8	98.8	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P399730

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251927	Organic Carbon	98.6	98.7	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251713	Turbidity	3.81	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251773	Barium	0.256	Spike	P	0 - 20
2251773	Calcium	1.56	Spike	P	0 - 20
2251773	Iron	1.37	Spike	P	0 - 20
2251773	Magnesium	1.63	Spike	P	0 - 20
2251773	Manganese	0.0197	Spike	P	0 - 20
2251773	Potassium	0.840	Spike	P	0 - 20
2251773	Sodium	1.71	Spike	P	0 - 20
2251773	Zinc	1.02	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P399356

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251773	Aluminum	1.87	Spike	P	0 - 20
2251773	Antimony	0.400	Spike	P	0 - 20
2251773	Arsenic	1.38	Spike	P	0 - 20
2251773	Beryllium	1.46	Spike	P	0 - 20
2251773	Boron	0.189	Spike	P	0 - 20
2251773	Cadmium	0.473	Spike	P	0 - 20
2251773	Chromium	2.04	Spike	P	0 - 20
2251773	Copper	1.38	Spike	P	0 - 20
2251773	Lead	0.791	Spike	P	0 - 20
2251773	Nickel	1.80	Spike	P	0 - 20
2251773	Selenium	1.16	Spike	P	0 - 20
2251773	Silver	1.50	Spike	P	0 - 20
2251773	Thallium	1.07	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251761	Chloride	1.35	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399481

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251761	Sulfate	1.71	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399413

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251783	Ammonia-N	2.38	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399233

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251711	Kjeldahl Nitrogen	3.40	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399218

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251764	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399287

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251813	Total-P	0.609	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251925	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P399177

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251710	Color (true)	0.724	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P399338

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251710	Total Alkalinity	1.18	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P399524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251306	TDS	4.13	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 D-2011
Batch ID: P399315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251306	TSS	8.00	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251710	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P399730

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251927	Organic Carbon	0.0454	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: A105855
Included Lab Sample IDs: 2251814

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.0	96.7	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A105856
Included Lab Sample IDs: 2251812

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A105857
Included Lab Sample IDs: 2251812

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105874
Included Lab Sample IDs: 2251813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A105917
Included Lab Sample IDs: 2251813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	98.1	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A105930
Included Lab Sample IDs: 2251812

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.8	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A105930
Included Lab Sample IDs: 2251812

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A105954
Included Lab Sample IDs: 2251813

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A105956
Included Lab Sample IDs: 2251812

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	100	P/P	90 - 110
Sulfate	99.3	99.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105961
Included Lab Sample IDs: 2251813

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	98.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A105976
Included Lab Sample IDs: 2251825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	90 - 110
Calcium	101	103	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	104	105	P/P	90 - 110
Manganese	102	102	P/P	90 - 110
Potassium	100	102	P/P	90 - 110
Sodium	100	101	P/P	90 - 110
Zinc	104	105	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A106083
Included Lab Sample IDs: 2251813

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A106086
Included Lab Sample IDs: 2251825

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.2	97.1	P/P	90 - 110
Antimony	98.3	99.5	P/P	90 - 110
Arsenic	101	99.6	P/P	90 - 110
Beryllium	97.0	94.9	P/P	90 - 110
Boron	97.4	100	P/P	90 - 110
Cadmium	98.3	99.7	P/P	90 - 110
Chromium	96.8	96.0	P/P	90 - 110
Copper	98.5	95.5	P/P	90 - 110
Lead	110	108	P/P	90 - 110
Nickel	98.8	95.6	P/P	90 - 110
Selenium	100	99.8	P/P	90 - 110
Silver	96.4	96.9	P/P	90 - 110
Thallium	94.2	95.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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						3.81	
EPA 200.7 Rev. 4.4	Barium	98.8	99.7	99.9	102			0.256
	Calcium	103	102	107				1.56
	Iron	104	105	107	106			1.37
	Magnesium	104	103	110				1.63
	Manganese	99.7	101	101	103			0.0197
	Potassium	99.2	97.4	99.0	104			0.840
	Sodium	101	101	102				1.71
	Zinc	97.0	102	103	101			1.02
EPA 200.8 Rev. 5.4	Aluminum	98.8	93.4	95.4	94.4			1.87
	Antimony	102	101	102	100			0.400
	Arsenic	104	101	103	99.3			1.38
	Beryllium	94.9	92.0	93.4	90.1			1.46
	Boron	101	101	101	102			0.189
	Cadmium	103	103	103	103			0.473
	Chromium	100	98.4	100	98.0			2.04
	Copper	104	97.2	98.7	98.2			1.38
	Lead	113	111	112	110			0.791
	Nickel	104	96.8	98.6	95.8			1.80
	Selenium	101	96.6	97.8	95.7			1.16
	Silver	101	100	98.8	100			1.50
	Thallium	105	107	108	103			1.07
EPA 300.0 Rev. 2.1	Chloride	98.1	96.5	94.0			1.35	
	Sulfate	98.1	96.5				1.71	
EPA 350.1 Rev. 2.0	Ammonia-N	102	97.4	100				2.38
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	95.3	100				3.40
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	100				0.0
EPA 365.1 Rev. 2.0	Total-P	100	105	104				0.609
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	99.9	99.9				0.0
SM 2120 B-2011	Color (true)	101					0.724	
SM 2320 B-2011	Total Alkalinity	98.1					1.18	
SM 2540 C-2011	TDS						4.13	
SM 2540 D-2011	TSS						8.00	
SM 4500 F-C-2011	Fluoride	99.5	98.8	98.8				0.0
SM 5310 B-2011	Organic Carbon	99.9	98.6	98.7				0.0454

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2251812
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2251825
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2251825
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2251812
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2251812
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2251813
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2251813
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2251813
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2251813
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2251814
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2251812

Reference Method Descriptions

Method	Description	Associated Samples
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2251812
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2251825
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2251812
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2251812
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2251812
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2251813

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	06/03/2021			06/03/2021 15:20	Yen Ta	2251812
EPA 200.7 Rev. 4.4	06/03/2021	06/08/2021 15:25	Elliott D. Healy	06/09/2021 17:03	Betina Topolski	2251825
EPA 200.8 Rev. 5.4	06/03/2021	06/08/2021 15:25	Elliott D. Healy	06/15/2021 19:31	Alexander Thompson	2251825
EPA 300.0 Rev. 2.1	06/03/2021			06/10/2021 00:34	Lipi Saha	2251812
EPA 350.1 Rev. 2.0	06/03/2021			06/08/2021 14:06	Ping Hua	2251813
EPA 351.2 Rev. 2.0	06/03/2021	06/04/2021 13:04	Benjamin T. Nordmann	06/07/2021 12:56	Virginia P. Brown	2251813
EPA 353.2 Rev. 2.0	06/03/2021			06/04/2021 10:57	Beverly Y. Sanders	2251813
EPA 365.1 Rev. 2.0	06/03/2021	06/07/2021 13:53	Yen Ta	06/07/2021 16:38	Shengyu Ding	2251813
EPA 365.1 Rev. 2.0 dissolved	06/03/2021			06/03/2021 14:48	Blanca Fach	2251814
SM 2120 B-2011	06/03/2021			06/03/2021 15:57	Sarah A Nixon	2251812
SM 2320 B-2011	06/03/2021			06/07/2021 23:12	Dale L. Simmons	2251812
SM 2340B	06/03/2021			06/09/2021 17:03	Betina Topolski	2251825
SM 2540 C-2011	06/03/2021			06/04/2021 14:29	Yijie Li	2251812
SM 2540 D-2011	06/03/2021			06/04/2021 14:29	Yijie Li	2251812
SM 4500 F-C-2011	06/03/2021			06/07/2021 23:12	Dale L. Simmons	2251812
SM 5310 B-2011	06/03/2021			06/15/2021 04:43	Madeline Gruver	2251813