Chemical Analysis Report

CEN-DIST-2022-03-30-01

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

Event Description: **Johns Lake Outlet**
Request ID: **RQ-2022-03-28-36**
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: Matthew Bearden

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 19-APR-2022 08:43

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: Johns Lake @ Conservation area dock **Collection Date/Time: 03/29/2022 10:47**

Field ID: G1CE0111 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2315497	DEP SOP: NU-094-1	Color (true)**	150		PCU	P411757	
	EPA 180.1 Rev. 2.0	Turbidity	4.5		NTU	P411773	
	EPA 300.0 Rev. 2.1	Chloride	42		mg Cl/L	P411907	
		Sulfate	14		mg SO4/L	P411910	
	SM 2320 B-2011	Total Alkalinity	48		mg CaCO3/L	P411968	
	SM 2540 C-2011	TDS	188		mg/L	P412030	
	SM 2540 D-2011	TSS	3	I	mg/L	P411902	
	SM 4500-F- C-2011	Fluoride	0.11		mg F/L	P411972	
2315498	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P412024	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P412167	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P411863	
	EPA 365.1 Rev. 2.0	Total-P	0.073		mg P/L	P412088	
	SM 5310 B-2011	Organic Carbon	18		mg C/L	P412045	
2315500	EPA 200.7 Rev. 4.4	Calcium	20.4		mg/L	P411895	
		Iron	140		ug/L	P411895	
		Magnesium	5.96		mg/L	P411895	
		Potassium	5.8		mg/L	P411895	
		Sodium	21.8		mg/L	P411895	
		Strontium	55.2		ug/L	P411895	
		Tin	3.0	U	ug/L	P411895	
		Titanium	1.0	I	ug/L	P411895	
		Vanadium	2.0	U	ug/L	P411895	
		Zinc	5.0	U	ug/L	P411895	
	EPA 200.8 Rev. 5.4	Aluminum	103		ug/L	P411895	
		Antimony	0.15	I	ug/L	P411895	
		Arsenic	1.15		ug/L	P411895	
		Barium	14.6		ug/L	P411895	
		Beryllium	0.010	U	ug/L	P411895	
		Boron**	43.9		ug/L	P411895	
		Cadmium	0.020	U	ug/L	P411895	
		Chromium	0.40	U	ug/L	P411895	
		Cobalt	0.058	I	ug/L	P411895	
		Copper	1.62		ug/L	P411895	
		Lead	0.37	I	ug/L	P411895	
		Manganese	7.60		ug/L	P411895	
		Molybdenum	1.06		ug/L	P411895	
		Nickel	0.50	U	ug/L	P411895	
		Selenium	0.20	U	ug/L	P411895	
		Silver	0.010	U	ug/L	P411895	
		Thallium	0.10	U	ug/L	P411895	
	SM 2340 B-2011	Hardness	75.5		mg/L	P411895	

Ref. Method and Comment:
EPA 180.1 Rev. 2.0: Batch relative percent difference is unavailable due to analytical difficulties.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P411757

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P411773

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	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
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	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: P411907

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411910

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412024

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411863

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412088

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

Reference Method: SM 2320 B-2011
Batch ID: P411968

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

Reference Method: SM 2540 C-2011
Batch ID: P412030

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P411902

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P411972

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: P412045

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P411757

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

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P411773

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.7		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	104		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	95.7		P	85 - 115
Sodium	96.5		P	85 - 115
Strontium	95.5		P	85 - 115
Tin	101		P	85 - 115
Titanium	97.4		P	85 - 115
Vanadium	92.5		P	85 - 115
Zinc	98.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.1		P	80 - 120
Antimony	96.7		P	80 - 120
Arsenic	100		P	80 - 120
Barium	101		P	80 - 120
Beryllium	94.1		P	80 - 120
Boron	103		P	80 - 120
Cadmium	97.1		P	80 - 120
Chromium	95.3		P	80 - 120
Cobalt	100		P	80 - 120
Copper	97.7		P	80 - 120
Lead	98.4		P	80 - 120
Manganese	94.9		P	80 - 120
Molybdenum	98.4		P	80 - 120
Nickel	99.0		P	80 - 120
Selenium	98.8		P	80 - 120
Silver	101		P	80 - 120
Thallium	99.9		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411907

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411910

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411863

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	94.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412088

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

Reference Method: SM 2320 B-2011
Batch ID: P411968

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: P411972

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P412045

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315224	Calcium	101		P	80 - 120
2315224	Iron	102		P	80 - 120
2315224	Magnesium	104		P	80 - 120
2315224	Potassium	95.5		P	80 - 120
2315224	Sodium	99.8		P	80 - 120
2315224	Strontium	94.9		P	80 - 120
2315224	Tin	99.4		P	80 - 120
2315224	Titanium	103		P	80 - 120
2315224	Vanadium	98.7		P	80 - 120
2315224	Zinc	100		P	80 - 120
2315487	Calcium	100		P	80 - 120
2315487	Iron	101	103	P/P	80 - 120
2315487	Magnesium	102	105	P/P	80 - 120
2315487	Potassium	93.6	94.9	P/P	80 - 120
2315487	Sodium	94.8		P	80 - 120
2315487	Strontium	98.0	103	P/P	80 - 120
2315487	Tin	103	105	P/P	80 - 120
2315487	Titanium	102	105	P/P	80 - 120
2315487	Vanadium	99.1	102	P/P	80 - 120
2315487	Zinc	105	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315224	Aluminum	109		P	80 - 120
2315224	Antimony	97.9		P	80 - 120
2315224	Arsenic	99.5		P	80 - 120
2315224	Barium	99.5		P	80 - 120
2315224	Beryllium	94.9		P	80 - 120
2315224	Boron	102		P	80 - 120
2315224	Cadmium	97.9		P	80 - 120
2315224	Chromium	96.7		P	80 - 120
2315224	Cobalt	98.9		P	80 - 120
2315224	Copper	94.8		P	80 - 120
2315224	Lead	96.8		P	80 - 120
2315224	Manganese	95.7		P	80 - 120
2315224	Molybdenum	99.9		P	80 - 120
2315224	Nickel	97.5		P	80 - 120
2315224	Selenium	97.6		P	80 - 120
2315224	Silver	101		P	80 - 120
2315224	Thallium	100		P	80 - 120
2315487	Aluminum	98.7	96.4	P/P	80 - 120
2315487	Antimony	97.9	96.8	P/P	80 - 120
2315487	Arsenic	99.3	98.6	P/P	80 - 120
2315487	Barium	99.4	98.2	P/P	80 - 120
2315487	Beryllium	95.9	94.4	P/P	80 - 120
2315487	Boron	105	105	P/P	80 - 120
2315487	Cadmium	97.0	96.5	P/P	80 - 120
2315487	Chromium	98.4	97.3	P/P	80 - 120
2315487	Cobalt	98.4	96.6	P/P	80 - 120
2315487	Copper	96.4	95.1	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315487	Lead	98.7	97.4	P/P	80 - 120
2315487	Manganese	96.0	94.3	P/P	80 - 120
2315487	Molybdenum	101	99.3	P/P	80 - 120
2315487	Nickel	97.9	96.3	P/P	80 - 120
2315487	Selenium	98.1	96.1	P/P	80 - 120
2315487	Silver	100	98.9	P/P	80 - 120
2315487	Thallium	101	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411907

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315405	Chloride	97.3		P	90 - 110
2315497	Chloride	99.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411910

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315405	Sulfate	99.4		P	90 - 110
2315497	Sulfate	99.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315476	Ammonia-N	96.2	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315498	Kjeldahl Nitrogen	97.6	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411863

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315513	NO2NO3-N	94.5	94.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412088

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315715	Total-P	104	104	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P411972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315505	Fluoride	101	101	P/P	92 - 107

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P412045

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315447	Organic Carbon	97.7	97.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P411757

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315446	Color (true)	0.152	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P411895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315487	Calcium	0.836	Spike	P	0 - 20
2315487	Iron	1.21	Spike	P	0 - 20
2315487	Magnesium	1.55	Spike	P	0 - 20
2315487	Potassium	1.16	Spike	P	0 - 20
2315487	Sodium	0.893	Spike	P	0 - 20
2315487	Strontium	4.58	Spike	P	0 - 20
2315487	Tin	2.06	Spike	P	0 - 20
2315487	Titanium	2.37	Spike	P	0 - 20
2315487	Vanadium	2.48	Spike	P	0 - 20
2315487	Zinc	2.70	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P411895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315487	Aluminum	1.99	Spike	P	0 - 20
2315487	Antimony	1.13	Spike	P	0 - 20
2315487	Arsenic	0.695	Spike	P	0 - 20
2315487	Barium	1.09	Spike	P	0 - 20
2315487	Beryllium	1.63	Spike	P	0 - 20
2315487	Boron	0.432	Spike	P	0 - 20
2315487	Cadmium	0.488	Spike	P	0 - 20
2315487	Chromium	1.06	Spike	P	0 - 20
2315487	Cobalt	1.78	Spike	P	0 - 20
2315487	Copper	1.33	Spike	P	0 - 20
2315487	Lead	1.25	Spike	P	0 - 20
2315487	Manganese	1.51	Spike	P	0 - 20
2315487	Molybdenum	1.49	Spike	P	0 - 20
2315487	Nickel	1.61	Spike	P	0 - 20
2315487	Selenium	2.06	Spike	P	0 - 20
2315487	Silver	1.24	Spike	P	0 - 20
2315487	Thallium	0.0325	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411907

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315405	Chloride	0.933	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P411910

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315405	Sulfate	0.390	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315476	Ammonia-N	1.74	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315498	Kjeldahl Nitrogen	5.26	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411863

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315513	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315715	Total-P	0.131	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P411968

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315505	Total Alkalinity	1.79	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P412030

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315502	TDS	0.313	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P411972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315505	Fluoride	0.490	Spike	P	0 - 2.1

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P412045

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315447	Organic Carbon	0.593	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A111208
Included Lab Sample IDs: 2315497

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Sulfate	100	101	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1
Run ID: A111233
Included Lab Sample IDs: 2315497

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A111239
Included Lab Sample IDs: 2315497

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A111270
Included Lab Sample IDs: 2315498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.0	95.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A111293
Included Lab Sample IDs: 2315500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.8	99.3	P/P	90 - 110
Antimony	97.7	98.5	P/P	90 - 110
Arsenic	99.2	99.0	P/P	90 - 110
Barium	97.0	96.3	P/P	90 - 110
Beryllium	93.8	93.7	P/P	90 - 110
Boron	102	105	P/P	90 - 110
Cadmium	97.8	98.4	P/P	90 - 110
Chromium	96.9	97.0	P/P	90 - 110
Cobalt	97.9	98.0	P/P	90 - 110
Copper	98.0	97.9	P/P	90 - 110
Lead	96.9	97.0	P/P	90 - 110
Manganese	95.6	96.3	P/P	90 - 110
Molybdenum	97.1	97.8	P/P	90 - 110
Nickel	97.4	97.1	P/P	90 - 110
Selenium	97.6	97.5	P/P	90 - 110
Silver	103	103	P/P	90 - 110
Thallium	97.4	96.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-2011
Run ID: A111305
Included Lab Sample IDs: 2315497

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.0	96.6	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A111305
Included Lab Sample IDs: 2315497

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A111345
Included Lab Sample IDs: 2315498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.9	99.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A111353
Included Lab Sample IDs: 2315498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	96.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111402
Included Lab Sample IDs: 2315500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Strontium	99.6	100	P/P	90 - 110
Tin	103	105	P/P	90 - 110
Titanium	103	104	P/P	90 - 110
Vanadium	103	104	P/P	90 - 110
Zinc	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111430
Included Lab Sample IDs: 2315498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.3	99.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A111453
Included Lab Sample IDs: 2315498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111501
Included Lab Sample IDs: 2315500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	103	99.0	P/P	90 - 110
Iron	102	98.7	P/P	90 - 110
Magnesium	102	98.9	P/P	90 - 110
Potassium	99.4	97.5	P/P	90 - 110
Sodium	98.0	95.5	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
DEP SOP: NU-094-1	Color (true)	101					0.152	
EPA 180.1 Rev. 2.0	Turbidity	96.7						
EPA 200.7 Rev. 4.4	Calcium	101	101	100				0.836
	Iron	104	102	101	103			1.21
	Magnesium	107	104	102	105			1.55
	Potassium	95.7	95.5	93.6	94.9			1.16
	Sodium	96.5	99.8	94.8				0.893
	Strontium	95.5	94.9	98.0	103			4.58
	Tin	101	99.4	103	105			2.06
	Titanium	97.4	103	102	105			2.37
	Vanadium	92.5	98.7	99.1	102			2.48
	Zinc	98.7	100	105	107			2.70
EPA 200.8 Rev. 5.4	Aluminum	99.1	109	98.7	96.4			1.99
	Antimony	96.7	97.9	97.9	96.8			1.13
	Arsenic	100	99.5	99.3	98.6			0.695
	Barium	101	99.5	99.4	98.2			1.09
	Beryllium	94.1	94.9	95.9	94.4			1.63
	Boron	103	102	105	105			0.432
	Cadmium	97.1	97.9	97.0	96.5			0.488
	Chromium	95.3	96.7	98.4	97.3			1.06
	Cobalt	100	98.9	98.4	96.6			1.78
	Copper	97.7	94.8	96.4	95.1			1.33
	Lead	98.4	96.8	98.7	97.4			1.25
	Manganese	94.9	95.7	96.0	94.3			1.51
	Molybdenum	98.4	99.9	101	99.3			1.49
	Nickel	99.0	97.5	97.9	96.3			1.61
	Selenium	98.8	97.6	98.1	96.1			2.06
	Silver	101	101	100	98.9			1.24
	Thallium	99.9	100	101	101			0.0325
EPA 300.0 Rev. 2.1	Chloride	102	97.3	99.2			0.933	
	Sulfate	100	99.4	99.8			0.390	
EPA 350.1 Rev. 2.0	Ammonia-N	98.8	96.2	98.0				1.74
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.2	97.6	107				5.26
EPA 353.2 Rev. 2.0	NO2NO3-N	94.5	94.5	94.5				0.0
EPA 365.1 Rev. 2.0	Total-P	101	104	104				0.131
SM 2320 B-2011	Total Alkalinity	98.1					1.79	
SM 2540 C-2011	TDS						0.313	
SM 4500-F- C-2011	Fluoride	97.5	101	101				0.490
SM 5310 B-2011	Organic Carbon	94.8	97.7	97.0				0.593

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2315497
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2315497
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2315500
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2315500
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2315497
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2315497
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2315498
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2315498

Reference Method Descriptions

Method	Description	Associated Samples
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2315498
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2315498
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2315497
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2315500
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2315497
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2315497
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2315497
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2315498

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	03/30/2022			03/30/2022 15:45	Samantha L Bates	2315497
EPA 180.1 Rev. 2.0	03/30/2022			03/30/2022 15:31	Anna M. Plaviak	2315497
EPA 200.7 Rev. 4.4	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/08/2022 22:45	McKinley C Carter	2315500
	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/13/2022 15:18	McKinley C Carter	2315500
EPA 200.8 Rev. 5.4	03/30/2022	04/04/2022 10:40	Megan Whitefoot	04/05/2022 03:45	Alexander Thompson	2315500
EPA 300.0 Rev. 2.1	03/30/2022			04/02/2022 00:52	Anna M. Plaviak	2315497
EPA 350.1 Rev. 2.0	03/30/2022			04/06/2022 11:41	Ping Hua	2315498
EPA 351.2 Rev. 2.0	03/30/2022	04/13/2022 07:54	Samantha L Bates	04/13/2022 12:34	Alexandra J Mattheus	2315498
EPA 353.2 Rev. 2.0	03/30/2022			04/01/2022 11:09	Beverly Y. Sanders	2315498
EPA 365.1 Rev. 2.0	03/30/2022	04/11/2022 17:15	Simonne.V. Calhoun	04/12/2022 12:29	Sarah A Nixon	2315498
SM 2320 B-2011	03/30/2022			04/02/2022 14:12	Dale L. Simmons	2315497
SM 2340 B-2011	03/30/2022			04/13/2022 15:18	McKinley C Carter	2315500
SM 2540 C-2011	03/30/2022			03/31/2022 16:15	Simonne.V. Calhoun	2315497
SM 2540 D-2011	03/30/2022			03/31/2022 16:15	Simonne.V. Calhoun	2315497
SM 4500-F- C-2011	03/30/2022			04/02/2022 14:12	Dale L. Simmons	2315497
SM 5310 B-2011	03/30/2022			04/06/2022 15:16	Khloe J Berg	2315498