Chemical Analysis Report

NW-DIST-2023-04-13-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lake Powell Deployment Run**
Request ID: **RQ-2023-04-10-40**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 W Government Street
Suite 208
Pensacola, FL 32502-5794
Attn: Myranda Butler

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
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: 09-MAY-2023 10:45

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: TUCKER BAYOU E CHOCTAWHATCHEE BAY **Collection Date/Time: 04/12/2023 13:55**

Field ID: G3NW0010 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2400015	DEP SOP: NU-094-1	Color (true)	19		PCU	P428461	
	EPA 180.1 Rev. 2.0	Turbidity	8.4		NTU	P428491	
	EPA 300.0 Rev. 2.1	Chloride	7.7E+03		mg Cl/L	P428766	
		Sulfate	1.1E+03		mg SO4/L	P428769	
	SM 2320 B-2011	Total Alkalinity	59		mg CaCO3/L	P428655	
	SM 2540 C-2015	TDS	1.29E+04		mg/L	P428905	
	SM 2540 D-2015	TSS	10	I	mg/L	P428824	
	SM 4500-F- C-2011	Fluoride	0.50		mg F/L	P429443	
2400016	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P428643	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.42		mg N/L	P428536	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.060		mg N/L	P428860	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P428601	
	SM 5310 B-2011	Organic Carbon	5.1		mg C/L	P429038	

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500-F- C-2011: LFB is unavailable because of analytical difficulties.

Sample Location: SISTER RIVER MOUTH **Collection Date/Time: 04/12/2023 10:40**

Field ID: G3NW0154 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2400026	EPA 200.7 Rev. 4.4	Calcium	7.49		mg/L	P428501	
		Iron	1.59E+03		ug/L	P428501	
		Magnesium	1.53		mg/L	P428501	
		Potassium	1.3		mg/L	P428501	
		Sodium	3.0		mg/L	P428501	
		Strontium	20.5		ug/L	P428501	
		Tin	3.0	U	ug/L	P428501	
		Titanium	5.0		ug/L	P428501	
		Vanadium	2.4	I	ug/L	P428501	
		Zinc	5.0	U	ug/L	P428501	
	EPA 200.8 Rev. 5.4	Aluminum	602		ug/L	P428501	
		Antimony	0.058	I	ug/L	P428501	
		Arsenic	0.70		ug/L	P428501	
		Barium	17.0		ug/L	P428501	
		Beryllium	0.044		ug/L	P428501	
		Boron	13.3		ug/L	P428501	
		Cadmium	0.020	U	ug/L	P428501	
		Chromium	1.3	I	ug/L	P428501	
		Cobalt	0.233		ug/L	P428501	
		Copper	0.75	I	ug/L	P428501	
		Lead	0.61		ug/L	P428501	
		Manganese	28.9		ug/L	P428501	
		Molybdenum	0.15	I	ug/L	P428501	
		Nickel	0.62	I	ug/L	P428501	
		Selenium	0.20	U	ug/L	P428501	
		Silver	0.010	U	ug/L	P428501	
		Thallium	0.10	U	ug/L	P428501	
	SM 2340 B-2011	Hardness	25.0		mg/L	P428501	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The lead result was confirmed on 04/27/2023.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P428461

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P428491

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P428501

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: P428501

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: P428766

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: P428769

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428643

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428536

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428860

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428601

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

Reference Method: SM 2320 B-2011
Batch ID: P428655

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

Reference Method: SM 2540 C-2015
Batch ID: P428905

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P428824

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P429443

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P429038

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: P428461

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P428491

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P428501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	105		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	104		P	85 - 115
Sodium	104		P	85 - 115
Strontium	99.6		P	85 - 115
Tin	103		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P428501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	101		P	85 - 115
Barium	103		P	85 - 115
Beryllium	99.1		P	85 - 115
Boron	103		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	105		P	85 - 115
Cobalt	107		P	85 - 115
Copper	103		P	85 - 115
Lead	108		P	85 - 115
Manganese	106		P	85 - 115
Molybdenum	102		P	85 - 115
Nickel	105		P	85 - 115
Selenium	97.4		P	85 - 115
Silver	109		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P428766

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: P428769

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428643

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428536

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428860

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428601

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.2		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P428655

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.4		P	94 - 106

Reference Method: SM 2540 C-2015
Batch ID: P428905

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TDS	96.8		P	90 - 110

Reference Method: SM 2540 D-2015
Batch ID: P428824

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	102		P	85 - 106

Reference Method: SM 5310 B-2011
Batch ID: P429038

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400047	Calcium	101		P	80 - 120
2400047	Iron	105	105	P/P	80 - 120
2400047	Magnesium	103		P	80 - 120
2400047	Potassium	101	103	P/P	80 - 120
2400047	Sodium	104	107	P/P	80 - 120
2400047	Strontium	98.6	100	P/P	80 - 120
2400047	Tin	98.8	101	P/P	80 - 120
2400047	Titanium	101	101	P/P	80 - 120
2400047	Vanadium	101	102	P/P	80 - 120
2400047	Zinc	100	99.9	P/P	80 - 120
2400258	Calcium	103		P	80 - 120
2400258	Iron	103		P	80 - 120
2400258	Magnesium	106		P	80 - 120
2400258	Potassium	102		P	80 - 120
2400258	Sodium	105		P	80 - 120
2400258	Strontium	100		P	80 - 120
2400258	Tin	99.4		P	80 - 120
2400258	Titanium	103		P	80 - 120
2400258	Vanadium	103		P	80 - 120
2400258	Zinc	105		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400047	Aluminum	103	105	P/P	80 - 120
2400047	Antimony	108	109	P/P	80 - 120
2400047	Arsenic	102	103	P/P	80 - 120
2400047	Barium	102	104	P/P	80 - 120
2400047	Beryllium	96.1	93.7	P/P	80 - 120
2400047	Boron	106	104	P/P	80 - 120
2400047	Cadmium	105	104	P/P	80 - 120
2400047	Chromium	106	105	P/P	80 - 120
2400047	Cobalt	104	103	P/P	80 - 120
2400047	Copper	99.9	101	P/P	80 - 120
2400047	Lead	106	107	P/P	80 - 120
2400047	Manganese	104	106	P/P	80 - 120
2400047	Molybdenum	104	105	P/P	80 - 120
2400047	Nickel	101	103	P/P	80 - 120
2400047	Selenium	96.3	97.4	P/P	80 - 120
2400047	Silver	110	109	P/P	80 - 120
2400047	Thallium	99.1	106	P/P	80 - 120
2400258	Aluminum	101		P	80 - 120
2400258	Antimony	105		P	80 - 120
2400258	Arsenic	101		P	80 - 120
2400258	Barium	99.6		P	80 - 120
2400258	Beryllium	95.8		P	80 - 120
2400258	Boron	106		P	80 - 120
2400258	Cadmium	104		P	80 - 120
2400258	Chromium	108		P	80 - 120
2400258	Cobalt	107		P	80 - 120
2400258	Copper	105		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P428501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400258	Lead	108		P	80 - 120
2400258	Manganese	103		P	80 - 120
2400258	Molybdenum	102		P	80 - 120
2400258	Nickel	104		P	80 - 120
2400258	Selenium	96.5		P	80 - 120
2400258	Silver	108		P	80 - 120
2400258	Thallium	99.6		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P428766

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400028	Chloride	104		P	90 - 110
2400031	Chloride	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P428769

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400028	Sulfate	102		P	90 - 110
2400031	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2399577	Ammonia-N	96.8	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428536

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2399844	Kjeldahl Nitrogen	106	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428860

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2399831	NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428601

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400016	Total-P	95.0	96.7	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P429443

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2400123	Fluoride	101	101	P/P	94 - 104

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P429038

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2399578	Organic Carbon	96.6	96.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P428461

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399942	Color (true)	1.21	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P428491

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399940	Turbidity	8.60	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P428501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400047	Calcium	1.77	Spike	P	0 - 20
2400047	Iron	0.694	Spike	P	0 - 20
2400047	Magnesium	1.51	Spike	P	0 - 20
2400047	Potassium	1.40	Spike	P	0 - 20
2400047	Sodium	1.89	Spike	P	0 - 20
2400047	Strontium	1.50	Spike	P	0 - 20
2400047	Tin	2.49	Spike	P	0 - 20
2400047	Titanium	0.770	Spike	P	0 - 20
2400047	Vanadium	1.02	Spike	P	0 - 20
2400047	Zinc	0.194	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P428501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400047	Aluminum	1.73	Spike	P	0 - 20
2400047	Antimony	1.44	Spike	P	0 - 20
2400047	Arsenic	1.55	Spike	P	0 - 20
2400047	Barium	2.22	Spike	P	0 - 20
2400047	Beryllium	2.51	Spike	P	0 - 20
2400047	Boron	2.24	Spike	P	0 - 20
2400047	Cadmium	1.15	Spike	P	0 - 20
2400047	Chromium	1.43	Spike	P	0 - 20
2400047	Cobalt	0.899	Spike	P	0 - 20
2400047	Copper	1.32	Spike	P	0 - 20
2400047	Lead	1.50	Spike	P	0 - 20
2400047	Manganese	2.04	Spike	P	0 - 20
2400047	Molybdenum	0.841	Spike	P	0 - 20
2400047	Nickel	1.97	Spike	P	0 - 20
2400047	Selenium	1.16	Spike	P	0 - 20
2400047	Silver	0.892	Spike	P	0 - 20
2400047	Thallium	6.56	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P428766

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400028	Chloride	1.37	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P428769

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400028	Sulfate	1.83	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399577	Ammonia-N	1.33	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428536

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399844	Kjeldahl Nitrogen	2.28	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428860

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399831	NO2NO3-N	0.693	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428601

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400016	Total-P	1.65	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P428655

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400031	Total Alkalinity	1.68	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2015
Batch ID: P428905

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399855	TDS	1.87	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500-F- C-2011
Batch ID: P429443

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2400123	Fluoride	0.483	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P429038

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399578	Organic Carbon	0.238	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: DEP SOP: NU-094-1
Run ID: A118558
Included Lab Sample IDs: 2400015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.8	99.9	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A118570
Included Lab Sample IDs: 2400015

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A118640
Included Lab Sample IDs: 2400016

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.4	98.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A118641
Included Lab Sample IDs: 2400015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.7	98.3	P/P	90 - 110
Sulfate	99.0	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A118644
Included Lab Sample IDs: 2400016

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

Reference Method: SM 2320 B-2011
Run ID: A118645
Included Lab Sample IDs: 2400015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	94.8	93.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A118647
Included Lab Sample IDs: 2400026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.3	101	P/P	90 - 110
Antimony	104	105	P/P	90 - 110
Arsenic	99.9	99.1	P/P	90 - 110
Barium	99.4	98.9	P/P	90 - 110
Beryllium	97.9	98.6	P/P	90 - 110
Cadmium	99.7	101	P/P	90 - 110
Copper	101	101	P/P	90 - 110
Lead	104	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A118647
Included Lab Sample IDs: 2400026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Manganese	103	103	P/P	90 - 110
Molybdenum	99.5	99.7	P/P	90 - 110
Selenium	99.2	98.0	P/P	90 - 110
Silver	106	106	P/P	90 - 110
Thallium	101	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A118672
Included Lab Sample IDs: 2400026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	91.9	93.5	P/P	90 - 110
Chromium	102	103	P/P	90 - 110
Cobalt	102	102	P/P	90 - 110
Nickel	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A118678
Included Lab Sample IDs: 2400016

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A118725
Included Lab Sample IDs: 2400016

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A118729
Included Lab Sample IDs: 2400026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	101	P/P	90 - 110
Iron	104	102	P/P	90 - 110
Magnesium	103	101	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Sodium	99.9	102	P/P	90 - 110
Strontium	98.4	100	P/P	90 - 110
Tin	99.3	99.2	P/P	90 - 110
Titanium	100	99.4	P/P	90 - 110
Vanadium	100	101	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A118807
Included Lab Sample IDs: 2400016

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-2011
Run ID: A118807
Included Lab Sample IDs: 2400016

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.9	98.9	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A118968
Included Lab Sample IDs: 2400015

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	103	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)	100					1.21	
EPA 180.1 Rev. 2.0	Turbidity	99.5					8.60	
EPA 200.7 Rev. 4.4	Calcium	103	101	103				1.77
	Iron	105	105	105	103			0.694
	Magnesium	103	103	106				1.51
	Potassium	104	101	103	102			1.40
	Sodium	104	104	107	105			1.89
	Strontium	99.6	98.6	100	100			1.50
	Tin	103	98.8	101	99.4			2.49
	Titanium	102	101	101	103			0.770
	Vanadium	102	101	102	103			1.02
	Zinc	102	100	99.9	105			0.194
EPA 200.8 Rev. 5.4	Aluminum	103	103	105	101			1.73
	Antimony	105	108	109	105			1.44
	Arsenic	101	102	103	101			1.55
	Barium	103	102	104	99.6			2.22
	Beryllium	99.1	96.1	93.7	95.8			2.51
	Boron	103	106	104	106			2.24
	Cadmium	102	105	104	104			1.15
	Chromium	105	106	105	108			1.43
	Cobalt	107	104	103	107			0.899
	Copper	103	99.9	101	105			1.32
	Lead	108	106	107	108			1.50
	Manganese	106	104	106	103			2.04
	Molybdenum	102	104	105	102			0.841
	Nickel	105	101	103	104			1.97
	Selenium	97.4	96.3	97.4	96.5			1.16
	Silver	109	110	109	108			0.892
	Thallium	100	99.1	106	99.6			6.56
EPA 300.0 Rev. 2.1	Chloride	102	104	104			1.37	
	Sulfate	103	102	102			1.83	
EPA 350.1 Rev. 2.0	Ammonia-N	97.2	96.8	98.4				1.33
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	106	103				2.28
EPA 353.2 Rev. 2.0	NO2NO3-N	104	100	99.5				0.693
EPA 365.1 Rev. 2.0	Total-P	97.2	95.0	96.7				1.65
SM 2320 B-2011	Total Alkalinity	95.4					1.68	
SM 2540 C-2015	TDS	96.8					1.87	
SM 2540 D-2015	TSS	102						
SM 4500-F- C-2011	Fluoride		101	101				0.483
SM 5310 B-2011	Organic Carbon	98.2	96.6	96.9				0.238

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2400015
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2400015
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2400026
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2400026
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2400015
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2400015
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2400016

Reference Method Descriptions

Method	Description	Associated Samples
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2400016
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2400016
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2400016
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2400015
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2400026
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2400015
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2400015
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2400015
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2400016

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	04/13/2023			04/13/2023 15:24	Alexis Price	2400015
EPA 180.1 Rev. 2.0	04/13/2023			04/13/2023 14:09	Anna M. Plaviak	2400015
EPA 200.7 Rev. 4.4	04/13/2023	04/14/2023 13:20	George D Taylor	04/21/2023 16:34	McKinley C Carter	2400026
EPA 200.8 Rev. 5.4	04/13/2023	04/14/2023 13:20	George D Taylor	04/18/2023 19:11	Conrad Hartmann	2400026
	04/13/2023	04/14/2023 13:20	George D Taylor	04/19/2023 13:59	Conrad Hartmann	2400026
EPA 300.0 Rev. 2.1	04/13/2023			04/20/2023 06:38	James L Waggerby	2400015
EPA 350.1 Rev. 2.0	04/13/2023			04/18/2023 13:18	Khloe J Berg	2400016
EPA 351.2 Rev. 2.0	04/13/2023	04/17/2023 12:04	Simonne.V. Calhoun	04/18/2023 15:05	Samantha L Bates	2400016
EPA 353.2 Rev. 2.0	04/13/2023			04/21/2023 14:26	Anna M. Plaviak	2400016
EPA 365.1 Rev. 2.0	04/13/2023	04/18/2023 13:49	Adam P Silver	04/19/2023 12:54	Simonne.V. Calhoun	2400016
SM 2320 B-2011	04/13/2023			04/18/2023 17:23	Dale L. Simmons	2400015
SM 2340 B-2011	04/13/2023			04/21/2023 16:34	McKinley C Carter	2400026
SM 2540 C-2015	04/13/2023			04/14/2023 15:46	Yijie Li	2400015
SM 2540 D-2015	04/13/2023			04/14/2023 15:46	Yijie Li	2400015
SM 4500-F- C-2011	04/13/2023			05/05/2023 01:35	Adam P Silver	2400015
SM 5310 B-2011	04/13/2023			04/27/2023 02:10	Elise M. Gillis	2400016