Chemical Analysis Report

NW-DIST-2023-08-17-02

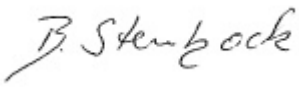
Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lake Powell Deployment Run**
Request ID: **RQ-2023-08-14-25**
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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 12-SEP-2023 14:38



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: LAKE POWELL DRAIN EAST ARM **Collection Date/Time: 08/16/2023 12:45**

Field ID: G3NW0009 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431895	DEP SOP: NU-094-1	Color (true)	38		PCU	P433992	
	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P434000	
	EPA 300.0 Rev. 2.1	Chloride	9.1E+03		mg Cl/L	P434299	
		Sulfate	1.2E+03		mg SO4/L	P434304	
	SM 2320 B-2011	Total Alkalinity	57		mg CaCO3/L	P434400	
	SM 2540 C-2015	TDS	1.43E+04		mg/L	P434488	
	SM 2540 D-2015	TSS	4	I	mg/L	P434271	
	SM 4500-F- C-2011	Fluoride	0.52		mg F/L	P434552	
2431897	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P434390	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.41		mg N/L	P434458	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P434557	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P434272	
	SM 5310 B-2011	Organic Carbon	5.5		mg C/L	P434204	

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: SISTER RIVER MOUTH **Collection Date/Time: 08/16/2023 10:35**

Field ID: G3NW0154 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431915	EPA 200.7 Rev. 4.4	Calcium	17.4		mg/L	P434050	
		Iron	450		ug/L	P434050	
		Magnesium	3.22		mg/L	P434050	
		Potassium	1.1	I	mg/L	P434050	
		Sodium	7.8		mg/L	P434050	
		Strontium	45.5		ug/L	P434050	
		Tin	3.0	U	ug/L	P434050	
		Titanium	0.90	I	ug/L	P434050	
		Vanadium	2.0	U	ug/L	P434050	
		Zinc	5.0	U	ug/L	P434050	
	EPA 200.8 Rev. 5.4	Aluminum	71		ug/L	P434050	
		Antimony	0.050	U	ug/L	P434050	
		Arsenic	0.53		ug/L	P434050	
		Barium	16.8		ug/L	P434050	
		Beryllium	0.011	I	ug/L	P434050	
		Boron	17.6		ug/L	P434050	
		Cadmium	0.020	U	ug/L	P434050	
		Chromium	0.40	U	ug/L	P434050	
		Cobalt	0.140		ug/L	P434050	
		Copper	0.40	U	ug/L	P434050	
		Lead	0.20	U	ug/L	P434050	
		Manganese	112		ug/L	P434050	
		Molybdenum	0.31	I	ug/L	P434050	
		Nickel	0.50	U	ug/L	P434050	
		Selenium	0.20	U	ug/L	P434050	
		Silver	0.010	U	ug/L	P434050	
		Thallium	0.10	U	ug/L	P434050	
	SM 2340 B-2011	Hardness	56.7		mg/L	P434050	

Sample Location: POWELL LAKE CENTER N OF CAIN RD AREA **Collection Date/Time: 08/16/2023 12:10**

Field ID: G3NW0012 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431896	DEP SOP: NU-094-1	Color (true)	22		PCU	P433992	
	EPA 180.1 Rev. 2.0	Turbidity	0.85	I	NTU	P434000	
	EPA 300.0 Rev. 2.1	Chloride	1.3E+04		mg Cl/L	P434299	
		Sulfate	1.8E+03		mg SO4/L	P434304	
	SM 2320 B-2011	Total Alkalinity	75		mg CaCO3/L	P434400	
	SM 2540 C-2015	TDS	2.07E+04		mg/L	P434488	
	SM 2540 D-2015	TSS	4	I	mg/L	P434271	
	SM 4500-F- C-2011	Fluoride	0.77		mg F/L	P434552	
2431898	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P434435	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26	I	mg N/L	P434647	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P434557	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P434272	
	SM 5310 B-2011	Organic Carbon	5.1		mg C/L	P434204	

Ref. Method and Comment:
SM 2540 D-2015: 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: P433992

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P434000

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434050

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: P434050

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: P434299

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: P434304

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434390

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434435

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434458

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434647

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434557

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

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

Reference Method: SM 2320 B-2011
Batch ID: P434400

Component	Result	Code	Units
Total Alkalinity	1.1	I	mg CaCO3/L

Reference Method: SM 2540 C-2015
Batch ID: P434488

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2015
Batch ID: P434271

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P434552

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P434204

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: P433992

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

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P434000

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434050

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	104		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	102		P	85 - 115
Sodium	102		P	85 - 115
Strontium	98.3		P	85 - 115
Tin	102		P	85 - 115
Titanium	98.1		P	85 - 115
Vanadium	100		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434050

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	98.3		P	85 - 115
Arsenic	98.9		P	85 - 115
Barium	101		P	85 - 115
Beryllium	93.9		P	85 - 115
Boron	104		P	85 - 115
Cadmium	95.9		P	85 - 115
Chromium	96.7		P	85 - 115
Cobalt	97.9		P	85 - 115
Copper	98.5		P	85 - 115
Lead	92.5		P	85 - 115
Manganese	96.0		P	85 - 115
Molybdenum	97.1		P	85 - 115
Nickel	98.6		P	85 - 115
Selenium	99.3		P	85 - 115
Silver	110		P	85 - 115
Thallium	98.7		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434299

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: P434304

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434390

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434435

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434458

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434647

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434557

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	106		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P434400

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	96.9		P	92 - 105

Reference Method: SM 2540 C-2015
Batch ID: P434488

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2540 D-2015
Batch ID: P434271

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	93.1		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P434552

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.9		P	94 - 106

Reference Method: SM 5310 B-2011
Batch ID: P434204

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431836	Calcium	104	103	P/P	80 - 120
2431836	Iron	106	104	P/P	80 - 120
2431836	Magnesium	106	105	P/P	80 - 120
2431836	Potassium	104	103	P/P	80 - 120
2431836	Sodium	107	104	P/P	80 - 120
2431836	Strontium	103	102	P/P	80 - 120
2431836	Tin	104	104	P/P	80 - 120
2431836	Titanium	103	101	P/P	80 - 120
2431836	Vanadium	104	102	P/P	80 - 120
2431836	Zinc	106	105	P/P	80 - 120
2431916	Calcium	103		P	80 - 120
2431916	Iron	106		P	80 - 120
2431916	Magnesium	106		P	80 - 120
2431916	Potassium	101		P	80 - 120
2431916	Sodium	106		P	80 - 120
2431916	Strontium	104		P	80 - 120
2431916	Tin	102		P	80 - 120
2431916	Titanium	102		P	80 - 120
2431916	Vanadium	105		P	80 - 120
2431916	Zinc	107		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431836	Aluminum	99.6	100	P/P	80 - 120
2431836	Antimony	98.2	98.3	P/P	80 - 120
2431836	Arsenic	100	99.8	P/P	80 - 120
2431836	Barium	100	101	P/P	80 - 120
2431836	Beryllium	93.0	91.2	P/P	80 - 120
2431836	Boron	103	105	P/P	80 - 120
2431836	Cadmium	96.8	97.4	P/P	80 - 120
2431836	Chromium	96.7	96.0	P/P	80 - 120
2431836	Cobalt	98.4	97.7	P/P	80 - 120
2431836	Copper	99.5	99.6	P/P	80 - 120
2431836	Lead	92.7	93.2	P/P	80 - 120
2431836	Manganese	96.4	96.7	P/P	80 - 120
2431836	Molybdenum	96.3	97.0	P/P	80 - 120
2431836	Nickel	99.7	98.7	P/P	80 - 120
2431836	Selenium	101	99.2	P/P	80 - 120
2431836	Silver	108	109	P/P	80 - 120
2431836	Thallium	101	103	P/P	80 - 120
2431916	Aluminum	99.0		P	80 - 120
2431916	Antimony	97.2		P	80 - 120
2431916	Arsenic	98.2		P	80 - 120
2431916	Barium	99.1		P	80 - 120
2431916	Beryllium	93.5		P	80 - 120
2431916	Boron	106		P	80 - 120
2431916	Cadmium	96.0		P	80 - 120
2431916	Chromium	97.0		P	80 - 120
2431916	Cobalt	94.7		P	80 - 120
2431916	Copper	96.6		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431916	Lead	92.8		P	80 - 120
2431916	Manganese	95.3		P	80 - 120
2431916	Molybdenum	97.6		P	80 - 120
2431916	Nickel	95.6		P	80 - 120
2431916	Selenium	97.1		P	80 - 120
2431916	Silver	108		P	80 - 120
2431916	Thallium	102		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434299

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431932	Chloride	103		P	90 - 110
2432064	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431932	Sulfate	98.8		P	90 - 110
2432064	Sulfate	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434390

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431897	Ammonia-N	99.8	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434435

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431898	Ammonia-N	99.4	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2430973	Kjeldahl Nitrogen	95.3	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432936	Kjeldahl Nitrogen	101	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434557

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431897	NO2NO3-N	96.2	96.7	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431289	Total-P	104	105	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P434552

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432583	Fluoride	102	102	P/P	94 - 106

Reference Method: SM 5310 B-2011
Batch ID: P434204

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432200	Organic Carbon	88.5	91.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P433992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431766	Color (true)	2.58	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P434000

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431801	Turbidity	1.26	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431836	Calcium	0.638	Spike	P	0 - 20
2431836	Iron	1.52	Spike	P	0 - 20
2431836	Magnesium	1.22	Spike	P	0 - 20
2431836	Potassium	1.59	Spike	P	0 - 20
2431836	Sodium	1.75	Spike	P	0 - 20
2431836	Strontium	1.76	Spike	P	0 - 20
2431836	Tin	0.340	Spike	P	0 - 20
2431836	Titanium	1.69	Spike	P	0 - 20
2431836	Vanadium	1.88	Spike	P	0 - 20
2431836	Zinc	0.620	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431836	Aluminum	0.703	Spike	P	0 - 20
2431836	Antimony	0.180	Spike	P	0 - 20
2431836	Arsenic	0.655	Spike	P	0 - 20
2431836	Barium	0.798	Spike	P	0 - 20
2431836	Beryllium	1.87	Spike	P	0 - 20
2431836	Boron	1.63	Spike	P	0 - 20
2431836	Cadmium	0.626	Spike	P	0 - 20
2431836	Chromium	0.719	Spike	P	0 - 20
2431836	Cobalt	0.722	Spike	P	0 - 20
2431836	Copper	0.123	Spike	P	0 - 20
2431836	Lead	0.503	Spike	P	0 - 20
2431836	Manganese	0.363	Spike	P	0 - 20
2431836	Molybdenum	0.682	Spike	P	0 - 20
2431836	Nickel	0.946	Spike	P	0 - 20
2431836	Selenium	1.75	Spike	P	0 - 20
2431836	Silver	0.200	Spike	P	0 - 20
2431836	Thallium	1.31	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434299

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431932	Chloride	1.49	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431932	Sulfate	1.27	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434390

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431897	Ammonia-N	1.79	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434435

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431898	Ammonia-N	0.907	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2430973	Kjeldahl Nitrogen	1.70	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432936	Kjeldahl Nitrogen	1.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431897	NO2NO3-N	0.518	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431289	Total-P	0.607	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-2011
Batch ID: P434400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431629	Total Alkalinity	0.603	Sample	P	0 - 3.9

Reference Method: SM 2540 C-2015
Batch ID: P434488

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431220	TDS	2.25	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P434552

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432583	Fluoride	0.0	Spike	P	0 - 1.9

Reference Method: SM 5310 B-2011
Batch ID: P434204

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432200	Organic Carbon	2.22	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: A121099
Included Lab Sample IDs: 2431895, 2431896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A121101
Included Lab Sample IDs: 2431895, 2431896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	97.5	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A121158
Included Lab Sample IDs: 2431915

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.6	99.9	P/P	90 - 110
Antimony	97.2	97.3	P/P	90 - 110
Arsenic	96.3	97.9	P/P	90 - 110
Barium	98.0	97.1	P/P	90 - 110
Beryllium	94.8	94.2	P/P	90 - 110
Boron	103	101	P/P	90 - 110
Cadmium	97.4	97.8	P/P	90 - 110
Chromium	97.9	98.7	P/P	90 - 110
Cobalt	95.0	95.6	P/P	90 - 110
Copper	95.2	96.1	P/P	90 - 110
Lead	91.2	91.2	P/P	90 - 110
Manganese	97.5	98.5	P/P	90 - 110
Molybdenum	97.0	96.0	P/P	90 - 110
Nickel	95.1	96.1	P/P	90 - 110
Selenium	96.6	98.2	P/P	90 - 110
Silver	94.9	94.7	P/P	90 - 110
Thallium	96.3	95.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A121182
Included Lab Sample IDs: 2431895, 2431896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.9	99.9	P/P	90 - 110
Sulfate	99.0	99.4	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A121186
Included Lab Sample IDs: 2431897, 2431898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.4	93.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A121191
Included Lab Sample IDs: 2431915

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	103	P/P	90 - 110
Iron	103	104	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Sodium	103	104	P/P	90 - 110
Strontium	97.4	104	P/P	90 - 110
Tin	96.8	98.7	P/P	90 - 110
Titanium	94.5	97.7	P/P	90 - 110
Vanadium	95.0	98.5	P/P	90 - 110
Zinc	94.8	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A121256
Included Lab Sample IDs: 2431897, 2431898

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A121257
Included Lab Sample IDs: 2431897

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	98.9	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A121265
Included Lab Sample IDs: 2431895, 2431896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.7	96.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A121289
Included Lab Sample IDs: 2431898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	102	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A121345
Included Lab Sample IDs: 2431895, 2431896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A121351
Included Lab Sample IDs: 2431897, 2431898

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A121351
Included Lab Sample IDs: 2431897, 2431898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A121368
Included Lab Sample IDs: 2431897

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A121418
Included Lab Sample IDs: 2431898

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	104	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)	99.9					2.58	
EPA 180.1 Rev. 2.0	Turbidity	98.1					1.26	
EPA 200.7 Rev. 4.4	Calcium	104	104	103	103			0.638
	Iron	104	106	104	106			1.52
	Magnesium	104	106	105	106			1.22
	Potassium	102	104	103	101			1.59
	Sodium	102	107	104	106			1.75
	Strontium	98.3	103	102	104			1.76
	Tin	102	104	104	102			0.340
	Titanium	98.1	103	101	102			1.69
	Vanadium	100	104	102	105			1.88
	Zinc	102	106	105	107			0.620
EPA 200.8 Rev. 5.4	Aluminum	100	99.6	100	99.0			0.703
	Antimony	98.3	98.2	98.3	97.2			0.180
	Arsenic	98.9	100	99.8	98.2			0.655
	Barium	101	100	101	99.1			0.798
	Beryllium	93.9	93.0	91.2	93.5			1.87
	Boron	104	103	105	106			1.63
	Cadmium	95.9	96.8	97.4	96.0			0.626
	Chromium	96.7	96.7	96.0	97.0			0.719
	Cobalt	97.9	98.4	97.7	94.7			0.722
	Copper	98.5	99.5	99.6	96.6			0.123
	Lead	92.5	92.7	93.2	92.8			0.503
	Manganese	96.0	96.4	96.7	95.3			0.363
	Molybdenum	97.1	96.3	97.0	97.6			0.682
	Nickel	98.6	99.7	98.7	95.6			0.946
	Selenium	99.3	101	99.2	97.1			1.75
	Silver	110	108	109	108			0.200
	Thallium	98.7	101	103	102			1.31
EPA 300.0 Rev. 2.1	Chloride	102	103	102			1.49	
	Sulfate	99.1	98.8	99.0			1.27	
EPA 350.1 Rev. 2.0	Ammonia-N	94.0	99.8	102				1.79
	Ammonia-N	100	99.4	100				0.907
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.5	95.3	97.2				1.70
	Kjeldahl Nitrogen	104	101	103				1.86
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	96.2	96.7				0.518
EPA 365.1 Rev. 2.0	Total-P	106	104	105				0.607
SM 2320 B-2011	Total Alkalinity	96.9					0.603	
SM 2540 C-2015	TDS	101					2.25	
SM 2540 D-2015	TSS	93.1						
SM 4500-F- C-2011	Fluoride	98.9	102	102				0.0
SM 5310 B-2011	Organic Carbon	95.1	88.5	91.2				2.22

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2431895, 2431896
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2431895, 2431896
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2431915
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2431915
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2431895, 2431896

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2431895, 2431896
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2431897, 2431898
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2431897, 2431898
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2431897, 2431898
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2431897, 2431898
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2431895, 2431896
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2431915
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2431895, 2431896
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2431895, 2431896
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2431895, 2431896
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2431897, 2431898

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	08/17/2023			08/17/2023 15:18	Alexis Price	2431895
	08/17/2023			08/17/2023 15:19	Alexis Price	2431896
EPA 180.1 Rev. 2.0	08/17/2023			08/17/2023 14:01	Khloe J Berg	2431895
	08/17/2023			08/17/2023 14:06	Khloe J Berg	2431896
EPA 200.7 Rev. 4.4	08/17/2023	08/18/2023 13:25	George D Taylor	08/22/2023 17:09	McKinley C Carter	2431915
EPA 200.8 Rev. 5.4	08/17/2023	08/18/2023 13:25	George D Taylor	08/21/2023 19:12	Conrad Hartmann	2431915
EPA 300.0 Rev. 2.1	08/17/2023			08/24/2023 06:05	James L Waggerby	2431895
	08/17/2023			08/24/2023 06:28	James L Waggerby	2431896
EPA 350.1 Rev. 2.0	08/17/2023			08/25/2023 13:35	Khloe J Berg	2431897
	08/17/2023			08/28/2023 13:44	Khloe J Berg	2431898
EPA 351.2 Rev. 2.0	08/17/2023	09/01/2023 13:37	Simonne.V. Calhoun	09/06/2023 10:33	Samantha L Bates	2431897
	08/17/2023	09/07/2023 13:14	Simonne.V. Calhoun	09/08/2023 11:38	Samantha L Bates	2431898
EPA 353.2 Rev. 2.0	08/17/2023			08/29/2023 11:29	Anna M. Plaviak	2431897
	08/17/2023			08/29/2023 11:40	Anna M. Plaviak	2431898
EPA 365.1 Rev. 2.0	08/17/2023	08/24/2023 14:28	Alexis Price	08/25/2023 12:25	James L Waggerby	2431897
	08/17/2023	08/24/2023 14:28	Alexis Price	08/25/2023 12:26	James L Waggerby	2431898
SM 2320 B-2011	08/17/2023			08/25/2023 21:54	Sarah A Nixon	2431895
	08/17/2023			08/25/2023 22:05	Sarah A Nixon	2431896
SM 2340 B-2011	08/17/2023			08/22/2023 17:09	McKinley C Carter	2431915
SM 2540 C-2015	08/17/2023			08/18/2023 16:04	Yijie Li	2431895, 2431896
SM 2540 D-2015	08/17/2023			08/18/2023 16:04	Yijie Li	2431895, 2431896
SM 4500-F- C-2011	08/17/2023			09/02/2023 02:54	Dale L. Simmons	2431895
	08/17/2023			09/02/2023 02:59	Dale L. Simmons	2431896
SM 5310 B-2011	08/17/2023			08/22/2023 21:28	Elise M. Gillis	2431897
	08/17/2023			08/22/2023 21:41	Elise M. Gillis	2431898