Chemical Analysis Report

CEN-DIST-2023-05-16-02

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

Event Description: **Run 10**
Request ID: **RQ-2023-05-15-18**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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3319 Maguire Blvd., Suite 232
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Certified by: Colin Wright, Program Administrator

Date Certified: 01-JUN-2023 08:56

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 Fairhope at Center **Collection Date/Time: 05/15/2023 15:22**

Field ID: G2CE0016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2409892	DEP SOP: NU-094-1	Color (true)	38		PCU	P429922	
	EPA 180.1 Rev. 2.0	Turbidity	18		NTU	P429917	
	EPA 300.0 Rev. 2.1	Chloride	36		mg Cl/L	P430145	
		Sulfate	1.8		mg SO4/L	P430147	
	SM 2320 B-2011	Total Alkalinity	81		mg CaCO3/L	P430438	
	SM 2540 C-2015	TDS	220		mg/L	P430416	
	SM 2540 D-2015	TSS	44	I	mg/L	P430221	
	SM 4500-F- C-2011	Fluoride	0.091	I	mg F/L	P430529	
2409893	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P430327	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.9		mg N/L	P430048	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P430230	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P430024	
	SM 5310 B-2011	Organic Carbon	23		mg C/L	P430226	
2409898	EPA 200.7 Rev. 4.4	Calcium	34.2		mg/L	P429965	
		Iron	190		ug/L	P429965	
		Magnesium	2.68		mg/L	P429965	
		Potassium	3.5		mg/L	P429965	
		Sodium	19.8		mg/L	P429965	
		Strontium	83.8		ug/L	P429965	
		Tin	3.0	U	ug/L	P429965	
		Titanium	2.4	I	ug/L	P429965	
		Vanadium	3.1	I	ug/L	P429965	
		Zinc	5.7	I	ug/L	P429965	
	EPA 200.8 Rev. 5.4	Aluminum	332		ug/L	P429965	
		Antimony	3.59		ug/L	P429965	
		Arsenic	3.28		ug/L	P429965	
		Barium	14.3		ug/L	P429965	
		Beryllium	0.010	U	ug/L	P429965	
		Boron	28.5		ug/L	P429965	
		Cadmium	0.020	U	ug/L	P429965	
		Chromium	0.40	U	ug/L	P429965	
		Cobalt	0.096		ug/L	P429965	
		Copper	1.36		ug/L	P429965	
		Lead	3.16		ug/L	P429965	
		Manganese	34.6		ug/L	P429965	
		Molybdenum	1.17		ug/L	P429965	
		Nickel	0.68	I	ug/L	P429965	
		Selenium	0.20	U	ug/L	P429965	
		Silver	0.010	U	ug/L	P429965	
		Thallium	0.10	U	ug/L	P429965	
	SM 2340 B-2011	Hardness	96.4		mg/L	P429965	

Field ID: G2CE0016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Ref. Method and Comment:
SM 2540 D-2015: The PQL was elevated because of sample matrix interference.
SM 4500-F- C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of analytical difficulties.
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 05/22/2023.

Sample Location: Lake Reems @ Center **Collection Date/Time: 05/15/2023 13:00**

Field ID: G4CE0242 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2409899	EPA 200.7 Rev. 4.4	Calcium	7.05		mg/L	P429965	
		Iron	170		ug/L	P429965	
		Magnesium	3.54		mg/L	P429965	
		Potassium	6.9		mg/L	P429965	
		Sodium	23.2		mg/L	P429965	
		Strontium	23.4		ug/L	P429965	
		Tin	3.0	U	ug/L	P429965	
		Titanium	0.75	U	ug/L	P429965	
		Vanadium	2.0	U	ug/L	P429965	
		Zinc	5.0	U	ug/L	P429965	
	EPA 200.8 Rev. 5.4	Aluminum	66		ug/L	P429965	
		Antimony	0.25		ug/L	P429965	
		Arsenic	0.35		ug/L	P429965	
		Barium	9.53		ug/L	P429965	
		Beryllium	0.010	U	ug/L	P429965	
		Boron	48.5		ug/L	P429965	
		Cadmium	0.020	U	ug/L	P429965	
		Chromium	0.40	U	ug/L	P429965	
		Cobalt	0.031	I	ug/L	P429965	
		Copper	1.14		ug/L	P429965	
		Lead	0.25	I	ug/L	P429965	
		Manganese	4.85		ug/L	P429965	
		Molybdenum	0.18	I	ug/L	P429965	
		Nickel	0.50	U	ug/L	P429965	
		Selenium	0.20	U	ug/L	P429965	
		Silver	0.010	U	ug/L	P429965	
		Thallium	0.10	U	ug/L	P429965	
	SM 2340 B-2011	Hardness	32.2		mg/L	P429965	

Sample Location: Lake Ingram East **Collection Date/Time: 05/15/2023 11:18**

Field ID: G4CE0155 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2409894	DEP SOP: NU-094-1	Color (true)	48		PCU	P429921	
	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P429917	
	EPA 300.0 Rev. 2.1	Chloride	13		mg Cl/L	P430145	
		Sulfate	4.1		mg SO4/L	P430147	
	SM 2320 B-2011	Total Alkalinity	22		mg CaCO3/L	P430438	
	SM 2540 C-2015	TDS	78		mg/L	P430416	
	SM 2540 D-2015	TSS	2	I	mg/L	P430221	
	SM 4500-F- C-2011	Fluoride	0.045	I	mg F/L	P430529	
2409895	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P430327	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P430048	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P430230	
	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P430024	
	SM 5310 B-2011	Organic Carbon	12		mg C/L	P430226	

Ref. Method and Comment:
SM 4500-F- C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of analytical difficulties.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P429921

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P429922

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P429917

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429965

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: P429965

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430145

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430147

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430327

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430048

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430230

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430024

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

Reference Method: SM 2320 B-2011
Batch ID: P430438

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

Reference Method: SM 2540 C-2015
Batch ID: P430416

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P430221

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500-F- C-2011
Batch ID: P430529

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P430226

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: P429921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	90 - 110

Reference Method: DEP SOP: NU-094-1
Batch ID: P429922

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	103		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P429917

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: P429965

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	99.9		P	80 - 120
Iron	101		P	80 - 120
Magnesium	100		P	80 - 120
Potassium	103		P	80 - 120
Sodium	95.1		P	80 - 120
Strontium	98.2		P	80 - 120
Tin	101		P	80 - 120
Titanium	101		P	80 - 120
Vanadium	100		P	80 - 120
Zinc	98.9		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429965

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.3		P	85 - 115
Antimony	98.4		P	85 - 115
Arsenic	98.6		P	85 - 115
Barium	100		P	85 - 115
Beryllium	93.2		P	85 - 115
Boron	103		P	85 - 115
Cadmium	95.5		P	85 - 115
Chromium	96.2		P	85 - 115
Cobalt	96.5		P	85 - 115
Copper	99.7		P	85 - 115
Lead	92.1		P	85 - 115
Manganese	95.4		P	85 - 115
Molybdenum	97.8		P	85 - 115
Nickel	99.6		P	85 - 115
Selenium	99.8		P	85 - 115
Silver	97.3		P	85 - 115
Thallium	98.2		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430145

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430147

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430048

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430230

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430024

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

Reference Method: SM 2320 B-2011
Batch ID: P430438

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.6		P	92 - 105

Reference Method: SM 2540 C-2015
Batch ID: P430416

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TDS	93.1		P	90 - 110

Reference Method: SM 2540 D-2015
Batch ID: P430221

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	93.8		P	85 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P430529

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	94 - 106

Reference Method: SM 5310 B-2011
Batch ID: P430226

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429965

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409628	Calcium	98.6		P	80 - 120
2409628	Iron	101	102	P/P	80 - 120
2409628	Magnesium	98.5	99.4	P/P	80 - 120
2409628	Potassium	107	106	P/P	80 - 120
2409628	Sodium	94.1		P	80 - 120
2409628	Strontium	97.1	98.1	P/P	80 - 120
2409628	Tin	98.9	98.1	P/P	80 - 120
2409628	Titanium	100	100	P/P	80 - 120
2409628	Vanadium	99.3	98.8	P/P	80 - 120
2409628	Zinc	97.6	95.9	P/P	80 - 120
2409837	Calcium	100		P	80 - 120
2409837	Iron	98.6		P	80 - 120
2409837	Magnesium	102		P	80 - 120
2409837	Potassium	101		P	80 - 120
2409837	Sodium	94.0		P	80 - 120
2409837	Strontium	98.3		P	80 - 120
2409837	Tin	98.9		P	80 - 120
2409837	Titanium	100		P	80 - 120
2409837	Vanadium	101		P	80 - 120
2409837	Zinc	99.8		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429965

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409628	Aluminum	99.0	97.2	P/P	80 - 120
2409628	Antimony	100	97.9	P/P	80 - 120
2409628	Arsenic	101	99.2	P/P	80 - 120
2409628	Barium	102	102	P/P	80 - 120
2409628	Beryllium	94.1	93.9	P/P	80 - 120
2409628	Boron	106	105	P/P	80 - 120
2409628	Cadmium	102	98.0	P/P	80 - 120
2409628	Chromium	97.6	96.1	P/P	80 - 120
2409628	Cobalt	99.0	97.5	P/P	80 - 120
2409628	Copper	96.6	92.5	P/P	80 - 120
2409628	Lead	94.2	91.9	P/P	80 - 120
2409628	Manganese	97.0	96.2	P/P	80 - 120
2409628	Molybdenum	101	100	P/P	80 - 120
2409628	Nickel	101	99.4	P/P	80 - 120
2409628	Selenium	100	97.9	P/P	80 - 120
2409628	Silver	98.5	96.1	P/P	80 - 120
2409628	Thallium	102	102	P/P	80 - 120
2409837	Aluminum	114		P	80 - 120
2409837	Antimony	87.1		P	80 - 120
2409837	Arsenic	97.6		P	80 - 120
2409837	Barium	96.4		P	80 - 120
2409837	Beryllium	90.3		P	80 - 120
2409837	Boron	105		P	80 - 120
2409837	Cadmium	97.4		P	80 - 120
2409837	Chromium	92.0		P	80 - 120
2409837	Cobalt	95.9		P	80 - 120
2409837	Copper	98.7		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429965

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409837	Lead	103		P	80 - 120
2409837	Manganese	96.3		P	80 - 120
2409837	Molybdenum	93.9		P	80 - 120
2409837	Nickel	98.0		P	80 - 120
2409837	Selenium	94.9		P	80 - 120
2409837	Silver	94.0		P	80 - 120
2409837	Thallium	99.9		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409971	Chloride	103		P	90 - 110
2410135	Chloride	106		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430147

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409971	Sulfate	100		P	90 - 110
2410135	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409813	Ammonia-N	94.2	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430048

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409977	Kjeldahl Nitrogen	109	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430230

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409893	NO2NO3-N	99.5	98.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P430226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409757	Organic Carbon	98.0	96.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P429921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409812	Color (true)	5.83	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P429922

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409579	Color (true)	15.4	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P429917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409812	Turbidity	1.87	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P429965

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409628	Calcium	1.32	Spike	P	0 - 20
2409628	Iron	0.625	Spike	P	0 - 20
2409628	Magnesium	0.693	Spike	P	0 - 20
2409628	Potassium	0.510	Spike	P	0 - 20
2409628	Sodium	1.54	Spike	P	0 - 20
2409628	Strontium	1.03	Spike	P	0 - 20
2409628	Tin	0.847	Spike	P	0 - 20
2409628	Titanium	0.207	Spike	P	0 - 20
2409628	Vanadium	0.485	Spike	P	0 - 20
2409628	Zinc	1.83	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429965

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409628	Aluminum	1.85	Spike	P	0 - 20
2409628	Antimony	2.59	Spike	P	0 - 20
2409628	Arsenic	2.20	Spike	P	0 - 20
2409628	Barium	0.0956	Spike	P	0 - 20
2409628	Beryllium	0.226	Spike	P	0 - 20
2409628	Boron	0.621	Spike	P	0 - 20
2409628	Cadmium	3.91	Spike	P	0 - 20
2409628	Chromium	1.58	Spike	P	0 - 20
2409628	Cobalt	1.49	Spike	P	0 - 20
2409628	Copper	4.29	Spike	P	0 - 20
2409628	Lead	2.51	Spike	P	0 - 20
2409628	Manganese	0.841	Spike	P	0 - 20
2409628	Molybdenum	0.823	Spike	P	0 - 20
2409628	Nickel	1.41	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P429965

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409628	Selenium	2.36	Spike	P	0 - 20
2409628	Silver	2.42	Spike	P	0 - 20
2409628	Thallium	0.535	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409971	Chloride	3.09	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P430147

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409971	Sulfate	2.73	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409813	Ammonia-N	2.58	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430048

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409977	Kjeldahl Nitrogen	2.94	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430230

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409893	NO2NO3-N	1.52	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409949	Total-P	0.586	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P430438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits

Quality Assurance Report
Precision

Reference Method: SM 2320 B-2011
Batch ID: P430438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410591	Total Alkalinity	3.90	Sample	P	0 - 3.9

Reference Method: SM 2540 C-2015
Batch ID: P430416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409745	TDS	4.72	Sample	P	0 - 10

Reference Method: SM 2540 D-2015
Batch ID: P430221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409745	TSS	3.31	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P430529

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409948	Fluoride	0.945	Spike	P	0 - 1.9

Reference Method: SM 5310 B-2011
Batch ID: P430226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409757	Organic Carbon	1.26	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A119194
Included Lab Sample IDs: 2409892, 2409894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1
Run ID: A119195
Included Lab Sample IDs: 2409892, 2409894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	90 - 110
Color (true)	103	103	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A119211
Included Lab Sample IDs: 2409892, 2409894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	99.3	P/P	90 - 110
Sulfate	100	99.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A119263
Included Lab Sample IDs: 2409898, 2409899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.2	99.0	P/P	90 - 110
Antimony	95.9	95.4	P/P	90 - 110
Arsenic	99.6	97.3	P/P	90 - 110
Barium	96.1	96.1	P/P	90 - 110
Beryllium	96.0	95.1	P/P	90 - 110
Boron	102	102	P/P	90 - 110
Cadmium	96.8	95.4	P/P	90 - 110
Chromium	97.4	96.5	P/P	90 - 110
Cobalt	96.8	96.6	P/P	90 - 110
Copper	99.9	97.6	P/P	90 - 110
Manganese	96.9	98.0	P/P	90 - 110
Molybdenum	98.4	96.8	P/P	90 - 110
Nickel	100	97.7	P/P	90 - 110
Selenium	96.3	95.7	P/P	90 - 110
Silver	97.3	94.7	P/P	90 - 110
Thallium	102	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A119269
Included Lab Sample IDs: 2409898, 2409899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.0	98.5	P/P	90 - 110
Iron	101	100	P/P	90 - 110
Magnesium	99.0	98.7	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Sodium	93.8	93.6	P/P	90 - 110
Strontium	94.0	93.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A119269
Included Lab Sample IDs: 2409898, 2409899

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Tin	95.9	95.3	P/P	90 - 110
Titanium	95.2	95.0	P/P	90 - 110
Vanadium	93.9	93.8	P/P	90 - 110
Zinc	91.8	92.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A119274
Included Lab Sample IDs: 2409893

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A119280
Included Lab Sample IDs: 2409893, 2409895

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A119283
Included Lab Sample IDs: 2409895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	97.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A119301
Included Lab Sample IDs: 2409898, 2409899

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

Reference Method: SM 5310 B-2011
Run ID: A119341
Included Lab Sample IDs: 2409893, 2409895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.5	95.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A119342
Included Lab Sample IDs: 2409893, 2409895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	97.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A119375
Included Lab Sample IDs: 2409893, 2409895

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

Reference Method: SM 2320 B-2011
Run ID: A119421
Included Lab Sample IDs: 2409892, 2409894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.4	98.0	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A119457
Included Lab Sample IDs: 2409892, 2409894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	102	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)	102					5.83	
	Color (true)	103					15.4	
EPA 180.1 Rev. 2.0	Turbidity	99.5					1.87	
EPA 200.7 Rev. 4.4	Calcium	99.9	98.6	100				1.32
	Iron	101	101	102	98.6			0.625
	Magnesium	100	98.5	99.4	102			0.693
	Potassium	103	107	106	101			0.510
	Sodium	95.1	94.1	94.0				1.54
	Strontium	98.2	97.1	98.1	98.3			1.03
	Tin	101	98.9	98.1	98.9			0.847
	Titanium	101	100	100	100			0.207
	Vanadium	100	99.3	98.8	101			0.485
	Zinc	98.9	97.6	95.9	99.8			1.83
EPA 200.8 Rev. 5.4	Aluminum	98.3	99.0	97.2	114			1.85
	Antimony	98.4	100	97.9	87.1			2.59
	Arsenic	98.6	101	99.2	97.6			2.20
	Barium	100	102	102	96.4			0.0956
	Beryllium	93.2	94.1	93.9	90.3			0.226
	Boron	103	106	105	105			0.621
	Cadmium	95.5	102	98.0	97.4			3.91
	Chromium	96.2	97.6	96.1	92.0			1.58
	Cobalt	96.5	99.0	97.5	95.9			1.49
	Copper	99.7	96.6	92.5	98.7			4.29
	Lead	92.1	94.2	91.9	103			2.51
	Manganese	95.4	97.0	96.2	96.3			0.841
	Molybdenum	97.8	101	100	93.9			0.823
	Nickel	99.6	101	99.4	98.0			1.41
	Selenium	99.8	100	97.9	94.9			2.36
	Silver	97.3	98.5	96.1	94.0			2.42
	Thallium	98.2	102	102	99.9			0.535
EPA 300.0 Rev. 2.1	Chloride	99.6	103	106			3.09	
	Sulfate	99.6	100	102			2.73	
EPA 350.1 Rev. 2.0	Ammonia-N	95.0	94.2	97.8				2.58
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	110	109	106				2.94
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	99.5	98.0				1.52
EPA 365.1 Rev. 2.0	Total-P	98.8						0.586
SM 2320 B-2011	Total Alkalinity	97.6					3.90	
SM 2540 C-2015	TDS	93.1					4.72	
SM 2540 D-2015	TSS	93.8					3.31	
SM 4500-F- C-2011	Fluoride	99.0						0.945
SM 5310 B-2011	Organic Carbon	97.0	98.0	96.5				1.26

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2409892, 2409894
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2409892, 2409894
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2409898, 2409899
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2409898, 2409899
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2409892, 2409894
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2409892, 2409894

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2409893, 2409895
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2409893, 2409895
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2409893, 2409895
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2409893, 2409895
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2409892, 2409894
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2409898, 2409899
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2409892, 2409894
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2409892, 2409894
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2409892, 2409894
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2409893, 2409895

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	05/16/2023			05/16/2023 13:51	Chandler E Cox	2409894
	05/16/2023			05/16/2023 13:56	Chandler E Cox	2409892
EPA 180.1 Rev. 2.0	05/16/2023			05/16/2023 13:04	Alexis Price	2409892
	05/16/2023			05/16/2023 13:05	Alexis Price	2409894
EPA 200.7 Rev. 4.4	05/16/2023	05/17/2023 12:20	George D Taylor	05/19/2023 00:46	McKinley C Carter	2409898
	05/16/2023	05/17/2023 12:20	George D Taylor	05/19/2023 00:54	McKinley C Carter	2409899
EPA 200.8 Rev. 5.4	05/16/2023	05/17/2023 12:20	George D Taylor	05/18/2023 20:06	Emily M Philpot	2409898
	05/16/2023	05/17/2023 12:20	George D Taylor	05/18/2023 20:16	Emily M Philpot	2409899
	05/16/2023	05/17/2023 12:20	George D Taylor	05/20/2023 02:06	Conrad Hartmann	2409898
	05/16/2023	05/17/2023 12:20	George D Taylor	05/20/2023 02:12	Conrad Hartmann	2409899
EPA 300.0 Rev. 2.1	05/16/2023			05/18/2023 19:48	James L Waggerby	2409892
	05/16/2023			05/18/2023 20:03	James L Waggerby	2409894
EPA 350.1 Rev. 2.0	05/16/2023			05/24/2023 11:43	Ping Hua	2409893
	05/16/2023			05/24/2023 11:45	Ping Hua	2409895
EPA 351.2 Rev. 2.0	05/16/2023	05/18/2023 11:55	Simonne.V. Calhoun	05/19/2023 12:25	Ping Hua	2409893
	05/16/2023	05/18/2023 11:55	Simonne.V. Calhoun	05/19/2023 12:30	Ping Hua	2409895
EPA 353.2 Rev. 2.0	05/16/2023			05/23/2023 10:24	Beverly Y. Sanders	2409893
	05/16/2023			05/23/2023 10:33	Beverly Y. Sanders	2409895
EPA 365.1 Rev. 2.0	05/16/2023	05/18/2023 13:13	Adam P Silver	05/19/2023 11:17	Chandler E Cox	2409893
	05/16/2023	05/18/2023 13:13	Adam P Silver	05/19/2023 14:06	Chandler E Cox	2409895
SM 2320 B-2011	05/16/2023			05/24/2023 23:13	Dale L. Simmons	2409892
	05/16/2023			05/24/2023 23:27	Dale L. Simmons	2409894
SM 2340 B-2011	05/16/2023			05/19/2023 00:46	McKinley C Carter	2409898
	05/16/2023			05/19/2023 00:54	McKinley C Carter	2409899
SM 2540 C-2015	05/16/2023			05/17/2023 16:36	Yijie Li	2409892, 2409894
SM 2540 D-2015	05/16/2023			05/17/2023 16:36	Yijie Li	2409892, 2409894
SM 4500-F- C-2011	05/16/2023			05/27/2023 05:34	Dale L. Simmons	2409892
	05/16/2023			05/27/2023 05:40	Dale L. Simmons	2409894
SM 5310 B-2011	05/16/2023			05/22/2023 19:31	Elise M. Gillis	2409893
	05/16/2023			05/22/2023 19:46	Elise M. Gillis	2409895