

Chemical Analysis Report

CEN-DIST-2023-09-06-01

Florida DEP Laboratory
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DOH Accreditation E31780

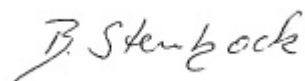
Event Description: **Run 3**
Request ID: **RQ-2023-09-04-35**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 22-SEP-2023 12:52



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: ADDISON CREEK AT ENCHANTED FOREST
 NATURE PRESERVE**

Collection Date/Time: 09/05/2023 10:44

Field ID: G5CE0112

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2434185	DEP SOP: NU-094-1	Color (true)	100	A	PCU	P434637	
	EPA 180.1 Rev. 2.0	Turbidity	26		NTU	P434624	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P434876	
		Sulfate	33		mg SO4/L	P434879	
	SM 2320 B-2011	Total Alkalinity	94		mg CaCO3/L	P434707	
	SM 2540 C-2015	TDS	409		mg/L	P435122	
	SM 2540 D-2015	TSS	10	I	mg/L	P435046	
	SM 4500-F- C-2011	Fluoride	0.056	I	mg F/L	P434710	
2434186	EPA 350.1 Rev. 2.0	Ammonia-N	0.18		mg N/L	P434684	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P434765	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.074		mg N/L	P434871	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P434663	
	SM 5310 B-2011	Organic Carbon	18		mg C/L	P434775	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries and relative percent difference are unavailable because of analytical difficulties.

Sample Location: UNNAMED SLOUGH AT ZOLTAN DRIVE

Collection Date/Time: 09/05/2023 11:08

Field ID: G3CE0054

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2434183	DEP SOP: NU-094-1	Color (true)	91	A	PCU	P434632	
	EPA 180.1 Rev. 2.0	Turbidity	3.5		NTU	P434624	
	EPA 300.0 Rev. 2.1	Chloride	77		mg Cl/L	P434876	
		Sulfate	56		mg SO4/L	P434879	
	SM 2320 B-2011	Total Alkalinity	104		mg CaCO3/L	P434707	
	SM 2540 C-2015	TDS	360	A	mg/L	P435122	
	SM 2540 D-2015	TSS	5	IA	mg/L	P435046	
	SM 4500-F- C-2011	Fluoride	0.041	I	mg F/L	P434710	
2434184	EPA 350.1 Rev. 2.0	Ammonia-N	0.22		mg N/L	P434682	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P434765	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.035		mg N/L	P434871	
	EPA 365.1 Rev. 2.0	Total-P	0.095		mg P/L	P434663	
	SM 5310 B-2011	Organic Carbon	16		mg C/L	P434775	
2434192	EPA 200.7 Rev. 4.4	Calcium	57.8		mg/L	P434673	
		Iron	1.0E+03		ug/L	P434673	
		Magnesium	6.27		mg/L	P434673	
		Potassium	4.1		mg/L	P434673	
		Sodium	47.9		mg/L	P434673	
		Strontium	508		ug/L	P434673	
		Tin	3.0	U	ug/L	P434673	
		Titanium	0.93	I	ug/L	P434673	
	EPA 200.8 Rev. 5.4	Vanadium	2.0	U	ug/L	P434673	
		Zinc	5.0	U	ug/L	P434673	
		Aluminum	101		ug/L	P434673	
		Antimony	0.11	I	ug/L	P434673	
		Arsenic	2.36		ug/L	P434673	
		Barium	16.5		ug/L	P434673	
		Beryllium	0.022	I	ug/L	P434673	
		Boron	62.8		ug/L	P434673	
		Cadmium	0.020	U	ug/L	P434673	
		Chromium	0.79	I	ug/L	P434673	
		Cobalt	0.078	I	ug/L	P434673	
		Copper	0.40	U	ug/L	P434673	
		Lead	0.20	U	ug/L	P434673	
		Manganese	24.9		ug/L	P434673	
		Molybdenum	0.90		ug/L	P434673	
		Nickel	0.50	U	ug/L	P434673	
		Selenium	0.23	I	ug/L	P434673	
		Silver	0.010	U	ug/L	P434673	
		Thallium	0.10	U	ug/L	P434673	
	SM 2340 B-2011	Hardness	170		mg/L	P434673	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries and relative percent difference are unavailable because of analytical difficulties.

Sample Location: COW CREEK AT OSTEEN MAYTOWN ROAD

Collection Date/Time: 09/05/2023 12:02

Field ID: G2CE0086

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2434193	EPA 200.7 Rev. 4.4	Calcium	3.63		mg/L	P434673	
		Iron	960		ug/L	P434673	
		Magnesium	0.95		mg/L	P434673	
		Potassium	0.30	U	mg/L	P434673	
		Sodium	5.7		mg/L	P434673	
		Strontium	22.0		ug/L	P434673	
		Tin	3.0	U	ug/L	P434673	
		Titanium	1.3	I	ug/L	P434673	
		Vanadium	2.0	U	ug/L	P434673	
		Zinc	5.0	U	ug/L	P434673	
	EPA 200.8 Rev. 5.4	Aluminum	285		ug/L	P434673	
		Antimony	0.050	U	ug/L	P434673	
		Arsenic	0.38		ug/L	P434673	
		Barium	7.26		ug/L	P434673	
		Beryllium	0.016	I	ug/L	P434673	
		Boron	21.5		ug/L	P434673	
		Cadmium	0.020	U	ug/L	P434673	
		Chromium	0.40	U	ug/L	P434673	
		Cobalt	0.113		ug/L	P434673	
		Copper	0.40	U	ug/L	P434673	
		Lead	0.34	I	ug/L	P434673	
		Manganese	7.31		ug/L	P434673	
		Molybdenum	0.15	U	ug/L	P434673	
		Nickel	0.50	U	ug/L	P434673	
		Selenium	0.20	U	ug/L	P434673	
		Silver	0.010	U	ug/L	P434673	
		Thallium	0.10	U	ug/L	P434673	
	SM 2340 B-2011	Hardness	13.0		mg/L	P434673	

Quality Assurance Report

Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P434632

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P434637

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P434624

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434673

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: P434673

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: P434876

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434879

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434682

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434684

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434765

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434871

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434663

Component	Result	Code	Units
Total-P	0.010	U	mg P/L

Reference Method: SM 2320 B-2011
Batch ID: P434707

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

Reference Method: SM 2540 C-2015
Batch ID: P435122

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-2015
Batch ID: P435046

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P434710

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P434775

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: P434632

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

Reference Method: DEP SOP: NU-094-1
Batch ID: P434637

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: P434624

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434673

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	110		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	103		P	85 - 115
Sodium	104		P	85 - 115
Strontium	104		P	85 - 115
Tin	102		P	85 - 115
Titanium	100		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434673

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	100		P	85 - 115
Barium	105		P	85 - 115
Beryllium	93.6		P	85 - 115
Boron	104		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	99.3		P	85 - 115
Cobalt	101		P	85 - 115
Copper	100		P	85 - 115
Lead	102		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	99.2		P	85 - 115
Nickel	100		P	85 - 115
Selenium	98.7		P	85 - 115
Silver	114		P	85 - 115
Thallium	104		P	85 - 115

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434876

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	94.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434879

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	91.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434682

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434684

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434765

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434871

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434663

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

Reference Method: SM 2320 B-2011
Batch ID: P434707

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.8		P	92 - 105

Reference Method: SM 2540 C-2015
Batch ID: P435122

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 2540 D-2015
Batch ID: P435046

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	98.9		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P434710

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.3		P	94 - 106

Reference Method: SM 5310 B-2011
Batch ID: P434775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P434673

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434133	Calcium	105	105	P/P	80 - 120
2434133	Iron	105	107	P/P	80 - 120
2434133	Magnesium	105	107	P/P	80 - 120
2434133	Potassium	102	102	P/P	80 - 120
2434133	Sodium	102	103	P/P	80 - 120
2434133	Strontium	103	103	P/P	80 - 120
2434133	Tin	99.4	102	P/P	80 - 120
2434133	Titanium	99.5	102	P/P	80 - 120
2434133	Vanadium	102	104	P/P	80 - 120
2434133	Zinc	102	105	P/P	80 - 120
2434446	Calcium	105		P	80 - 120
2434446	Iron	106		P	80 - 120
2434446	Magnesium	106		P	80 - 120
2434446	Potassium	106		P	80 - 120
2434446	Sodium	101		P	80 - 120
2434446	Strontium	105		P	80 - 120
2434446	Tin	101		P	80 - 120
2434446	Titanium	100		P	80 - 120
2434446	Vanadium	103		P	80 - 120
2434446	Zinc	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P434673

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434133	Aluminum	102	105	P/P	80 - 120
2434133	Antimony	103	103	P/P	80 - 120
2434133	Arsenic	99.7	100	P/P	80 - 120
2434133	Barium	104	104	P/P	80 - 120
2434133	Beryllium	90.8	92.7	P/P	80 - 120
2434133	Boron	104	106	P/P	80 - 120
2434133	Cadmium	101	102	P/P	80 - 120
2434133	Chromium	97.7	99.0	P/P	80 - 120
2434133	Cobalt	99.2	101	P/P	80 - 120
2434133	Copper	99.8	100	P/P	80 - 120
2434133	Lead	101	103	P/P	80 - 120
2434133	Manganese	97.9	105	P/P	80 - 120
2434133	Molybdenum	98.0	100	P/P	80 - 120
2434133	Nickel	99.4	101	P/P	80 - 120
2434133	Selenium	99.9	99.0	P/P	80 - 120
2434133	Silver	110	113	P/P	80 - 120
2434133	Thallium	105	106	P/P	80 - 120
2434446	Aluminum	101		P	80 - 120
2434446	Antimony	105		P	80 - 120
2434446	Arsenic	98.8		P	80 - 120
2434446	Barium	105		P	80 - 120
2434446	Beryllium	93.6		P	80 - 120
2434446	Boron	101		P	80 - 120
2434446	Cadmium	101		P	80 - 120
2434446	Chromium	96.5		P	80 - 120
2434446	Cobalt	96.8		P	80 - 120
2434446	Copper	97.5		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434673

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434446	Lead	101		P	80 - 120
2434446	Manganese	98.9		P	80 - 120
2434446	Molybdenum	99.5		P	80 - 120
2434446	Nickel	96.8		P	80 - 120
2434446	Selenium	97.6		P	80 - 120
2434446	Silver	112		P	80 - 120
2434446	Thallium	104		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434876

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434257	Chloride	97.4		P	90 - 110
2434511	Chloride	95.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434879

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434257	Sulfate	94.0		P	90 - 110
2434511	Sulfate	91.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434682

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434027	Ammonia-N	98.4	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434684

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434214	Ammonia-N	97.2	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434871

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433643	NO2NO3-N	92.1	91.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434175	Total-P	106	108	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P434710

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434064	Fluoride	99.2	99.8	P/P	94 - 106

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P434775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434444	Organic Carbon	93.5	96.1	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P434632

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434183	Color (true)	5.81	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P434637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434185	Color (true)	6.95	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P434624

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434141	Turbidity	1.21	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P434673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434133	Calcium	0.465	Spike	P	0 - 20
2434133	Iron	1.22	Spike	P	0 - 20
2434133	Magnesium	1.52	Spike	P	0 - 20
2434133	Potassium	0.0772	Spike	P	0 - 20
2434133	Sodium	0.238	Spike	P	0 - 20
2434133	Strontium	0.421	Spike	P	0 - 20
2434133	Tin	2.23	Spike	P	0 - 20
2434133	Titanium	2.15	Spike	P	0 - 20
2434133	Vanadium	2.16	Spike	P	0 - 20
2434133	Zinc	2.90	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434133	Aluminum	1.53	Spike	P	0 - 20
2434133	Antimony	0.704	Spike	P	0 - 20
2434133	Arsenic	0.231	Spike	P	0 - 20
2434133	Barium	0.293	Spike	P	0 - 20
2434133	Beryllium	1.73	Spike	P	0 - 20
2434133	Boron	2.07	Spike	P	0 - 20
2434133	Cadmium	0.536	Spike	P	0 - 20
2434133	Chromium	1.28	Spike	P	0 - 20
2434133	Cobalt	1.37	Spike	P	0 - 20
2434133	Copper	0.506	Spike	P	0 - 20
2434133	Lead	1.33	Spike	P	0 - 20
2434133	Manganese	1.77	Spike	P	0 - 20
2434133	Molybdenum	2.19	Spike	P	0 - 20
2434133	Nickel	1.36	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P434673

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434133	Selenium	0.908	Spike	P	0 - 20
2434133	Silver	1.98	Spike	P	0 - 20
2434133	Thallium	1.52	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434876

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434257	Chloride	1.43	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P434879

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434257	Sulfate	1.55	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434682

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434027	Ammonia-N	1.78	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434684

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434214	Ammonia-N	1.26	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434871

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433643	NO2NO3-N	0.545	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434175	Total-P	0.944	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P434707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
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Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P434707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434064	Total Alkalinity	1.79	Sample	P	0 - 3.9

Reference Method: SM 2540 C-2015
Batch ID: P435122

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434183	TDS	1.94	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P434710

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434064	Fluoride	0.480	Spike	P	0 - 1.9

Reference Method: SM 5310 B-2011
Batch ID: P434775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434444	Organic Carbon	1.47	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: A121379

Included Lab Sample IDs: 2434183, 2434185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.0	97.5	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1

Run ID: A121382

Included Lab Sample IDs: 2434183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A121384

Included Lab Sample IDs: 2434185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121407

Included Lab Sample IDs: 2434184, 2434186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	100	P/P	90 - 110
Ammonia-N	99.0	101	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A121417

Included Lab Sample IDs: 2434183, 2434185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.5	94.9	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A121417

Included Lab Sample IDs: 2434183, 2434185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A121423

Included Lab Sample IDs: 2434184, 2434186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110
Total-P	99.5	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A121436

Included Lab Sample IDs: 2434192, 2434193

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A121436

Included Lab Sample IDs: 2434192, 2434193

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	97.8	P/P	90 - 110
Antimony	97.8	97.9	P/P	90 - 110
Arsenic	96.6	96.0	P/P	90 - 110
Barium	98.8	98.7	P/P	90 - 110
Beryllium	93.4	91.9	P/P	90 - 110
Boron	97.0	95.1	P/P	90 - 110
Cadmium	97.7	97.8	P/P	90 - 110
Chromium	95.8	94.7	P/P	90 - 110
Cobalt	96.4	94.7	P/P	90 - 110
Copper	95.3	93.4	P/P	90 - 110
Lead	97.4	96.4	P/P	90 - 110
Manganese	97.9	96.3	P/P	90 - 110
Molybdenum	95.2	95.4	P/P	90 - 110
Nickel	95.2	93.4	P/P	90 - 110
Selenium	96.7	96.6	P/P	90 - 110
Silver	97.8	96.6	P/P	90 - 110
Thallium	97.5	95.3	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A121443

Included Lab Sample IDs: 2434184, 2434186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.8	96.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A121481

Included Lab Sample IDs: 2434184, 2434186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.5	97.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A121485

Included Lab Sample IDs: 2434183, 2434185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	101	P/P	90 - 110
Chloride	98.5	102	P/P	90 - 110
Sulfate	100	104	P/P	90 - 110
Sulfate	104	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A121499

Included Lab Sample IDs: 2434192, 2434193

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	98.0	P/P	90 - 110
Iron	100	98.7	P/P	90 - 110
Magnesium	99.6	98.6	P/P	90 - 110
Potassium	98.6	97.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A121499

Included Lab Sample IDs: 2434192, 2434193

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	98.8	97.6	P/P	90 - 110
Strontium	98.2	98.9	P/P	90 - 110
Tin	96.7	97.3	P/P	90 - 110
Titanium	96.5	97.1	P/P	90 - 110
Vanadium	96.8	97.5	P/P	90 - 110
Zinc	96.7	96.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A121510

Included Lab Sample IDs: 2434184, 2434186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.1	95.5	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision	MS
						SMP	
DEP SOP: NU-094-1	Color (true)	101				5.81	
	Color (true)	103				6.95	
EPA 180.1 Rev. 2.0	Turbidity	100				1.21	
EPA 200.7 Rev. 4.4	Calcium	105	105	105	105		0.465
	Iron	110	105	107	106		1.22
	Magnesium	105	105	107	106		1.52
	Potassium	103	102	102	106		0.0772
	Sodium	104	102	103	101		0.238
	Strontium	104	103	103	105		0.421
	Tin	102	99.4	102	101		2.23
	Titanium	100	99.5	102	100		2.15
	Vanadium	102	102	104	103		2.16
	Zinc	102	102	105	102		2.90
EPA 200.8 Rev. 5.4	Aluminum	103	102	105	101		1.53
	Antimony	104	103	103	105		0.704
	Arsenic	100	99.7	100	98.8		0.231
	Barium	105	104	104	105		0.293
	Beryllium	93.6	90.8	92.7	93.6		1.73
	Boron	104	104	106	101		2.07
	Cadmium	101	101	102	101		0.536
	Chromium	99.3	97.7	99.0	96.5		1.28
	Cobalt	101	99.2	101	96.8		1.37
	Copper	100	99.8	100	97.5		0.506
	Lead	102	101	103	101		1.33
	Manganese	102	97.9	105	98.9		1.77
	Molybdenum	99.2	98.0	100	99.5		2.19
	Nickel	100	99.4	101	96.8		1.36
	Selenium	98.7	99.9	99.0	97.6		0.908
	Silver	114	110	113	112		1.98
	Thallium	104	105	106	104		1.52
EPA 300.0 Rev. 2.1	Chloride	94.6	97.4	95.8		1.43	
	Sulfate	91.0	94.0	91.8		1.55	
EPA 350.1 Rev. 2.0	Ammonia-N	97.6	98.4	101			1.78
	Ammonia-N	96.8	97.2	99.2			1.26
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.6					
EPA 353.2 Rev. 2.0	NO2NO3-N	101	92.1	91.6			0.545
EPA 365.1 Rev. 2.0	Total-P	104	106	108			0.944
SM 2320 B-2011	Total Alkalinity	95.8				1.79	
SM 2540 C-2015	TDS	99.4				1.94	
SM 2540 D-2015	TSS	98.9					
SM 4500-F- C-2011	Fluoride	98.3	99.2	99.8			0.480
SM 5310 B-2011	Organic Carbon	93.6	93.5	96.1			1.47

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2434183, 2434185
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2434183, 2434185
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2434192, 2434193
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2434192, 2434193
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2434183, 2434185

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2434183, 2434185
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2434184, 2434186
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2434184, 2434186
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2434184, 2434186
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2434184, 2434186
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2434183, 2434185
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2434192, 2434193
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2434183, 2434185
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2434183, 2434185
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2434183, 2434185
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2434184, 2434186

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	09/06/2023			09/06/2023 15:56	Chandler E Cox	2434183
	09/06/2023			09/06/2023 17:06	Chandler E Cox	2434185
EPA 180.1 Rev. 2.0	09/06/2023			09/06/2023 14:34	Khloe J Berg	2434183
	09/06/2023			09/06/2023 14:35	Khloe J Berg	2434185
EPA 200.7 Rev. 4.4	09/06/2023	09/07/2023 12:50	George D Taylor	09/12/2023 20:45	McKinley C Carter	2434192
	09/06/2023	09/07/2023 12:50	George D Taylor	09/12/2023 20:52	McKinley C Carter	2434193
EPA 200.8 Rev. 5.4	09/06/2023	09/07/2023 12:50	George D Taylor	09/08/2023 15:59	Conrad Hartmann	2434192
	09/06/2023	09/07/2023 12:50	George D Taylor	09/08/2023 16:07	Conrad Hartmann	2434193
EPA 300.0 Rev. 2.1	09/06/2023			09/11/2023 21:19	James L Waggeberby	2434183
	09/06/2023			09/11/2023 22:04	James L Waggeberby	2434185
EPA 350.1 Rev. 2.0	09/06/2023			09/07/2023 12:42	Khloe J Berg	2434186
	09/06/2023			09/07/2023 13:10	Khloe J Berg	2434184
EPA 351.2 Rev. 2.0	09/06/2023	09/11/2023 14:51	Simonne.V. Calhoun	09/13/2023 14:12	Samantha L Bates	2434184
	09/06/2023	09/11/2023 14:51	Simonne.V. Calhoun	09/13/2023 14:14	Samantha L Bates	2434186
EPA 353.2 Rev. 2.0	09/06/2023			09/12/2023 12:25	Anna M. Plaviak	2434184
	09/06/2023			09/12/2023 12:26	Anna M. Plaviak	2434186
EPA 365.1 Rev. 2.0	09/06/2023	09/07/2023 14:07	Adam P Silver	09/08/2023 11:46	James L Waggeberby	2434184
	09/06/2023	09/07/2023 14:07	Adam P Silver	09/08/2023 11:48	James L Waggeberby	2434186
SM 2320 B-2011	09/06/2023			09/07/2023 21:11	Dale L. Simmons	2434183
	09/06/2023			09/07/2023 21:25	Dale L. Simmons	2434185
SM 2340 B-2011	09/06/2023			09/12/2023 20:45	McKinley C Carter	2434192
	09/06/2023			09/12/2023 20:52	McKinley C Carter	2434193
SM 2540 C-2015	09/06/2023			09/11/2023 15:46	Yijie Li	2434183, 2434185
SM 2540 D-2015	09/06/2023			09/11/2023 15:46	Yijie Li	2434183, 2434185
SM 4500-F- C-2011	09/06/2023			09/07/2023 21:11	Dale L. Simmons	2434183
	09/06/2023			09/07/2023 21:25	Dale L. Simmons	2434185
SM 5310 B-2011	09/06/2023			09/07/2023 18:59	Elise M. Gillis	2434184
	09/06/2023			09/07/2023 19:13	Elise M. Gillis	2434186