

Chemical Analysis Report

NW-DIST-2022-12-13-01

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

Event Description: **Rest Area Run**
Request ID: **RQ-2022-11-28-11**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 W Government Street
Suite 208
Pensacola, FL 32502-5794
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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 06-JAN-2023 09:30



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: Beaver Pond Creek

Collection Date/Time: 12/12/2022 10:40

Field ID: 33010066

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2374612	DEP SOP: NU-094-1	Color (true)	39	A	PCU	P423476	
	EPA 180.1 Rev. 2.0	Turbidity	50		NTU	P423467	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P423713	
		Sulfate	4.9		mg SO4/L	P423716	
	SM 2320 B-2011	Total Alkalinity	34		mg CaCO3/L	P423927	
	SM 2540 C-2015	TDS	75		mg/L	P423892	
	SM 2540 D-2015	TSS	51		mg/L	P423785	
2374614	SM 4500-F- C-2011	Fluoride	0.051	I	mg F/L	P423931	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.066		mg N/L	P424099	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P423519	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.072		mg N/L	P423524	
	EPA 365.1 Rev. 2.0	Total-P	0.043		mg P/L	P423482	
2374624	SM 5310 B-2011	Organic Carbon	8.7		mg C/L	P423645	
	EPA 200.7 Rev. 4.4	Barium	24.5		ug/L	P423497	
		Calcium	11.6		mg/L	P423497	
		Iron	5.70E+03		ug/L	P423497	
		Magnesium	2.38		mg/L	P423497	
		Potassium	2.8		mg/L	P423497	
		Sodium	8.2		mg/L	P423497	
		Strontium	33.9		ug/L	P423497	
		Tin	3.0	U	ug/L	P423497	
		Titanium	43.7		ug/L	P423497	
		Vanadium	3.3	I	ug/L	P423497	
		Zinc	5.3	I	ug/L	P423497	
	EPA 200.8 Rev. 5.4	Aluminum	1.23E+03		ug/L	P423497	
		Antimony	0.061	I	ug/L	P423497	
		Arsenic	1.74		ug/L	P423497	
		Barium	21.7		ug/L	P423497	
		Beryllium	0.035	I	ug/L	P423497	
		Boron	48.9		ug/L	P423497	
		Cadmium	0.020	U	ug/L	P423497	
		Chromium	1.5	I	ug/L	P423497	
		Cobalt	0.860		ug/L	P423497	
		Copper	0.88		ug/L	P423497	
		Lead	0.83		ug/L	P423497	
		Manganese	480		ug/L	P423497	
		Molybdenum	0.15	U	ug/L	P423497	
		Nickel	0.73	I	ug/L	P423497	
		Selenium	0.20	U	ug/L	P423497	
		Silver	0.010	U	ug/L	P423497	
		Thallium	0.10	U	ug/L	P423497	
	SM 2340 B-2011	Hardness	38.9		mg/L	P423497	

Ref. Method and Comment:

SM 2540 C-2015: The reported result is consistent with the conductivity calculated by the laboratory, 118 µmhos/cm.

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

Sample Location: Rest Area Run below Beaver Pond Creek

Collection Date/Time: 12/12/2022 10:30

Field ID: G5NW0068

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2374613	DEP SOP: NU-094-1	Color (true)	37		PCU	P423471	
	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P423467	
	EPA 300.0 Rev. 2.1	Chloride	7.7		mg Cl/L	P423713	
		Sulfate	2.5		mg SO4/L	P423716	
	SM 2320 B-2011	Total Alkalinity	5.7		mg CaCO3/L	P423927	
	SM 2540 C-2015	TDS	27		mg/L	P423892	
	SM 2540 D-2015	TSS	2	I	mg/L	P423785	
2374615	SM 4500-F- C-2011	Fluoride	0.025	U	mg F/L	P423931	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P424099	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.24		mg N/L	P423519	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P423524	
	EPA 365.1 Rev. 2.0	Total-P	0.005	I	mg P/L	P423482	
2374625	SM 5310 B-2011	Organic Carbon	3.4		mg C/L	P423645	
	EPA 200.7 Rev. 4.4	Barium	22.7		ug/L	P423497	
		Calcium	2.64		mg/L	P423497	
		Iron	360		ug/L	P423497	
		Magnesium	1.16		mg/L	P423497	
		Potassium	0.99	I	mg/L	P423497	
		Sodium	4.2		mg/L	P423497	
		Strontium	13.7		ug/L	P423497	
		Tin	3.0	U	ug/L	P423497	
		Titanium	1.4	I	ug/L	P423497	
		Vanadium	2.0	U	ug/L	P423497	
		Zinc	5.0	U	ug/L	P423497	
	EPA 200.8 Rev. 5.4	Aluminum	82		ug/L	P423497	
		Antimony	0.050	U	ug/L	P423497	
		Arsenic	0.22		ug/L	P423497	
		Barium	19.9		ug/L	P423497	
		Beryllium	0.013	I	ug/L	P423497	
		Boron	20.6		ug/L	P423497	
		Cadmium	0.020	U	ug/L	P423497	
		Chromium	0.40	U	ug/L	P423497	
		Cobalt	0.081		ug/L	P423497	
		Copper	0.40	U	ug/L	P423497	
		Lead	0.20	U	ug/L	P423497	
		Manganese	7.37		ug/L	P423497	
		Molybdenum	0.15	U	ug/L	P423497	
		Nickel	0.50	U	ug/L	P423497	
		Selenium	0.20	U	ug/L	P423497	
		Silver	0.010	U	ug/L	P423497	
		Thallium	0.10	U	ug/L	P423497	
	SM 2340 B-2011	Hardness	11.3		mg/L	P423497	

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: P423471

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P423476

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P423467

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P423497

Component	Result	Code	Units
Barium	1.0	U	ug/L
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: P423497

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: P423713

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423716

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

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

Reference Method: SM 2320 B-2011
Batch ID: P423927

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

Reference Method: SM 2540 C-2015
Batch ID: P423892

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P423785

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500-F- C-2011
Batch ID: P423931

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P423645

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: P423471

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

Reference Method: DEP SOP: NU-094-1
Batch ID: P423476

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.6		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P423467

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P423497

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	93.2		P	85 - 115
Calcium	96.4		P	85 - 115
Iron	99.3		P	85 - 115
Magnesium	95.6		P	85 - 115
Potassium	90.8		P	85 - 115
Sodium	92.5		P	85 - 115
Strontium	94.6		P	85 - 115
Tin	91.7		P	85 - 115
Titanium	92.8		P	85 - 115
Vanadium	91.4		P	85 - 115
Zinc	89.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P423497

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	96.1		P	85 - 115
Arsenic	104		P	85 - 115
Barium	100		P	85 - 115
Beryllium	97.3		P	85 - 115
Boron	103		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	95.3		P	85 - 115
Cobalt	98.4		P	85 - 115
Copper	100		P	85 - 115
Lead	94.9		P	85 - 115
Manganese	95.0		P	85 - 115
Molybdenum	98.5		P	85 - 115
Nickel	102		P	85 - 115
Selenium	103		P	85 - 115
Silver	101		P	85 - 115
Thallium	95.2		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423713

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423716

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

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

Reference Method: SM 2320 B-2011
Batch ID: P423927

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.6		P	94 - 106

Reference Method: SM 2540 C-2015
Batch ID: P423892

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

Reference Method: SM 2540 D-2015
Batch ID: P423785

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	101		P	85 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P423931

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P423645

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P423497

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374625	Barium	108	106	P/P	80 - 120
2374625	Calcium	108	103	P/P	80 - 120
2374625	Iron	109	106	P/P	80 - 120
2374625	Magnesium	105	101	P/P	80 - 120
2374625	Potassium	101	98.8	P/P	80 - 120
2374625	Sodium	105		P	80 - 120
2374625	Strontium	106	103	P/P	80 - 120
2374625	Tin	104	103	P/P	80 - 120
2374625	Titanium	108	105	P/P	80 - 120
2374625	Vanadium	106	104	P/P	80 - 120
2374625	Zinc	105	103	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P423497

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374625	Aluminum	105	104	P/P	80 - 120
2374625	Antimony	98.6	98.9	P/P	80 - 120
2374625	Arsenic	106	104	P/P	80 - 120
2374625	Barium	103	102	P/P	80 - 120
2374625	Beryllium	95.5	96.5	P/P	80 - 120
2374625	Boron	110	110	P/P	80 - 120
2374625	Cadmium	102	103	P/P	80 - 120
2374625	Chromium	99.1	98.7	P/P	80 - 120
2374625	Cobalt	98.8	98.9	P/P	80 - 120
2374625	Copper	104	104	P/P	80 - 120
2374625	Lead	97.1	97.3	P/P	80 - 120
2374625	Manganese	98.3	97.9	P/P	80 - 120
2374625	Molybdenum	102	101	P/P	80 - 120
2374625	Nickel	104	104	P/P	80 - 120
2374625	Selenium	103	101	P/P	80 - 120
2374625	Silver	105	105	P/P	80 - 120
2374625	Thallium	98.3	99.4	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423713

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374495	Chloride	99.1		P	90 - 110
2374676	Chloride	96.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374495	Sulfate	99.7		P	90 - 110
2374676	Sulfate	94.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374616	Ammonia-N	96.6	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374504	Kjeldahl Nitrogen	108	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374614	NO2NO3-N	95.2	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374615	Total-P	105	104	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P423931

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374629	Fluoride	98.1	97.5	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P423645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374424	Organic Carbon	96.8	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P423471

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374537	Color (true)	0.912	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P423476

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374612	Color (true)	1.94	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P423467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374474	Turbidity	3.14	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P423497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374625	Barium	1.65	Spike	P	0 - 20
2374625	Calcium	3.24	Spike	P	0 - 20
2374625	Iron	2.30	Spike	P	0 - 20
2374625	Magnesium	2.74	Spike	P	0 - 20
2374625	Potassium	2.08	Spike	P	0 - 20
2374625	Sodium	3.26	Spike	P	0 - 20
2374625	Strontium	2.92	Spike	P	0 - 20
2374625	Tin	0.827	Spike	P	0 - 20
2374625	Titanium	2.54	Spike	P	0 - 20
2374625	Vanadium	2.00	Spike	P	0 - 20
2374625	Zinc	1.17	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P423497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374625	Aluminum	0.920	Spike	P	0 - 20
2374625	Antimony	0.302	Spike	P	0 - 20
2374625	Arsenic	2.00	Spike	P	0 - 20
2374625	Barium	0.370	Spike	P	0 - 20
2374625	Beryllium	0.996	Spike	P	0 - 20
2374625	Boron	0.307	Spike	P	0 - 20
2374625	Cadmium	1.35	Spike	P	0 - 20
2374625	Chromium	0.432	Spike	P	0 - 20
2374625	Cobalt	0.111	Spike	P	0 - 20
2374625	Copper	0.188	Spike	P	0 - 20
2374625	Lead	0.141	Spike	P	0 - 20
2374625	Manganese	0.297	Spike	P	0 - 20
2374625	Molybdenum	0.561	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P423497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374625	Nickel	0.460	Spike	P	0 - 20
2374625	Selenium	1.88	Spike	P	0 - 20
2374625	Silver	0.291	Spike	P	0 - 20
2374625	Thallium	1.12	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374495	Chloride	0.182	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P423716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374495	Sulfate	0.227	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374616	Ammonia-N	0.314	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374504	Kjeldahl Nitrogen	0.758	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374614	NO2NO3-N	0.381	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374615	Total-P	1.06	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P423927

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374629	Total Alkalinity	1.30	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2015
Batch ID: P423892

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374477	TDS	5.39	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P423931

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374629	Fluoride	0.472	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P423645

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374424	Organic Carbon	0.471	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A116398

Included Lab Sample IDs: 2374612, 2374613

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A116410

Included Lab Sample IDs: 2374612, 2374613

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: A116411

Included Lab Sample IDs: 2374613

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.1	98.1	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A116412

Included Lab Sample IDs: 2374612

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.4	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116429

Included Lab Sample IDs: 2374614, 2374615

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.5	97.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A116454

Included Lab Sample IDs: 2374624, 2374625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	99.3	P/P	90 - 110
Aluminum	98.2	102	P/P	90 - 110
Antimony	94.3	94.4	P/P	90 - 110
Antimony	94.4	90.0	P/P	90 - 110
Arsenic	102	99.2	P/P	90 - 110
Arsenic	104	102	P/P	90 - 110
Barium	97.8	95.4	P/P	90 - 110
Barium	98.4	97.8	P/P	90 - 110
Beryllium	97.0	95.0	P/P	90 - 110
Beryllium	97.2	97.0	P/P	90 - 110
Boron	103	103	P/P	90 - 110
Boron	97.5	103	P/P	90 - 110
Cadmium	98.4	98.8	P/P	90 - 110
Cadmium	98.8	96.1	P/P	90 - 110
Chromium	95.0	91.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A116454

Included Lab Sample IDs: 2374624, 2374625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	95.7	95.0	P/P	90 - 110
Cobalt	94.7	91.5	P/P	90 - 110
Cobalt	97.6	94.7	P/P	90 - 110
Copper	102	98.8	P/P	90 - 110
Copper	98.8	95.5	P/P	90 - 110
Lead	96.0	95.9	P/P	90 - 110
Lead	96.0	96.0	P/P	90 - 110
Manganese	94.9	94.9	P/P	90 - 110
Manganese	94.9	91.1	P/P	90 - 110
Molybdenum	98.1	96.6	P/P	90 - 110
Molybdenum	98.4	98.1	P/P	90 - 110
Nickel	102	97.8	P/P	90 - 110
Nickel	97.8	94.9	P/P	90 - 110
Selenium	101	100	P/P	90 - 110
Selenium	103	101	P/P	90 - 110
Silver	97.7	97.3	P/P	90 - 110
Silver	98.6	97.7	P/P	90 - 110
Thallium	96.0	96.9	P/P	90 - 110
Thallium	96.9	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116467

Included Lab Sample IDs: 2374614, 2374615

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	98.8	P/P	90 - 110
Total-P	99.2	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116476

Included Lab Sample IDs: 2374614, 2374615

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	94.4	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A116493

Included Lab Sample IDs: 2374614, 2374615

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A116524

Included Lab Sample IDs: 2374624, 2374625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	102	P/P	90 - 110
Barium	102	105	P/P	90 - 110
Calcium	101	107	P/P	90 - 110
Calcium	107	106	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A116524

Included Lab Sample IDs: 2374624, 2374625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	102	109	P/P	90 - 110
Iron	109	107	P/P	90 - 110
Magnesium	101	107	P/P	90 - 110
Magnesium	107	105	P/P	90 - 110
Potassium	105	104	P/P	90 - 110
Potassium	98.2	105	P/P	90 - 110
Sodium	106	105	P/P	90 - 110
Sodium	99.6	106	P/P	90 - 110
Strontium	100	104	P/P	90 - 110
Strontium	98.2	100	P/P	90 - 110
Tin	101	101	P/P	90 - 110
Tin	101	105	P/P	90 - 110
Titanium	101	104	P/P	90 - 110
Titanium	99.3	101	P/P	90 - 110
Vanadium	100	102	P/P	90 - 110
Vanadium	97.7	100	P/P	90 - 110
Zinc	98.9	103	P/P	90 - 110
Zinc	99.0	98.9	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A116645

Included Lab Sample IDs: 2374612, 2374613

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	94.6	101	P/P	90 - 110
Total Alkalinity	96.3	94.6	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A116645

Included Lab Sample IDs: 2374612, 2374613

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116722

Included Lab Sample IDs: 2374614, 2374615

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	98.7	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		LCS	Precision	MS
						SMP	
DEP SOP: NU-094-1	Color (true)	101				0.912	
	Color (true)	98.6				1.94	
EPA 180.1 Rev. 2.0	Turbidity	100				3.14	
EPA 200.7 Rev. 4.4	Barium	93.2	108	106			1.65
	Calcium	96.4	108	103			3.24
	Iron	99.3	109	106			2.30
	Magnesium	95.6	105	101			2.74
	Potassium	90.8	101	98.8			2.08
	Sodium	92.5	105				3.26
	Strontium	94.6	106	103			2.92
	Tin	91.7	104	103			0.827
	Titanium	92.8	108	105			2.54
	Vanadium	91.4	106	104			2.00
	Zinc	89.7	105	103			1.17
EPA 200.8 Rev. 5.4	Aluminum	101	105	104			0.920
	Antimony	96.1	98.6	98.9			0.302
	Arsenic	104	106	104			2.00
	Barium	100	103	102			0.370
	Beryllium	97.3	95.5	96.5			0.996
	Boron	103	110	110			0.307
	Cadmium	101	102	103			1.35
	Chromium	95.3	99.1	98.7			0.432
	Cobalt	98.4	98.8	98.9			0.111
	Copper	100	104	104			0.188
	Lead	94.9	97.1	97.3			0.141
	Manganese	95.0	98.3	97.9			0.297
	Molybdenum	98.5	102	101			0.561
	Nickel	102	104	104			0.460
	Selenium	103	103	101			1.88
	Silver	101	105	105			0.291
	Thallium	95.2	98.3	99.4			1.12
EPA 300.0 Rev. 2.1	Chloride	98.5	99.1	96.0		0.182	
	Sulfate	97.9	99.7	94.7		0.227	
EPA 350.1 Rev. 2.0	Ammonia-N	101	96.6	97.0			0.314
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	108	106			0.758
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	95.2	95.8			0.381
EPA 365.1 Rev. 2.0	Total-P	101	105	104			1.06
SM 2320 B-2011	Total Alkalinity	97.6				1.30	
SM 2540 C-2015	TDS	96.7				5.39	
SM 2540 D-2015	TSS	101					
SM 4500-F- C-2011	Fluoride	101	98.1	97.5			0.472
SM 5310 B-2011	Organic Carbon	99.2	96.8	97.6			0.471

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2374612, 2374613
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2374612, 2374613
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2374624, 2374625
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2374624, 2374625
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2374612, 2374613

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2374612, 2374613
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2374614, 2374615
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2374614, 2374615
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2374614, 2374615
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2374614, 2374615
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2374612, 2374613
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2374624, 2374625
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2374612, 2374613
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2374612, 2374613
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2374612, 2374613
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2374614, 2374615

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	12/13/2022			12/13/2022 14:31	Alexis Price	2374613
	12/13/2022			12/13/2022 16:03	Alexis Price	2374612
EPA 180.1 Rev. 2.0	12/13/2022			12/13/2022 14:29	Chandler E Cox	2374612
	12/13/2022			12/13/2022 14:31	Chandler E Cox	2374613
EPA 200.7 Rev. 4.4	12/13/2022	12/14/2022 10:40	George D Taylor	12/16/2022 15:56	Betina Topolski	2374624
	12/13/2022	12/14/2022 10:40	George D Taylor	12/16/2022 16:30	Betina Topolski	2374625
EPA 200.8 Rev. 5.4	12/13/2022	12/14/2022 10:40	George D Taylor	12/15/2022 01:56	Emily M Philpot	2374625
	12/13/2022	12/14/2022 10:40	George D Taylor	12/15/2022 03:22	Emily M Philpot	2374624
EPA 300.0 Rev. 2.1	12/13/2022			12/17/2022 02:00	Anna M. Plaviak	2374612
	12/13/2022			12/17/2022 02:15	Anna M. Plaviak	2374613
EPA 350.1 Rev. 2.0	12/13/2022			01/04/2023 11:47	Ping Hua	2374614
	12/13/2022			01/04/2023 11:48	Ping Hua	2374615
EPA 351.2 Rev. 2.0	12/13/2022	12/14/2022 13:18	Simonne.V. Calhoun	12/15/2022 13:51	Samantha L Bates	2374614
	12/13/2022	12/14/2022 13:18	Simonne.V. Calhoun	12/15/2022 13:52	Samantha L Bates	2374615
EPA 353.2 Rev. 2.0	12/13/2022			12/14/2022 10:10	Beverly Y. Sanders	2374614
	12/13/2022			12/14/2022 10:11	Beverly Y. Sanders	2374615
EPA 365.1 Rev. 2.0	12/13/2022	12/14/2022 13:07	Adam P Silver	12/15/2022 12:38	Simonne.V. Calhoun	2374615
	12/13/2022	12/14/2022 13:07	Adam P Silver	12/15/2022 12:47	Simonne.V. Calhoun	2374614
SM 2320 B-2011	12/13/2022			12/22/2022 08:15	Dale L. Simmons	2374612
	12/13/2022			12/22/2022 08:55	Dale L. Simmons	2374613
SM 2340 B-2011	12/13/2022			12/16/2022 15:56	Betina Topolski	2374624
	12/13/2022			12/16/2022 16:30	Betina Topolski	2374625
SM 2540 C-2015	12/13/2022			12/15/2022 16:01	Yijie Li	2374612, 2374613
SM 2540 D-2015	12/13/2022			12/15/2022 16:01	Yijie Li	2374612, 2374613
SM 4500-F- C-2011	12/13/2022			12/22/2022 08:15	Dale L. Simmons	2374612
	12/13/2022			12/22/2022 08:55	Dale L. Simmons	2374613
SM 5310 B-2011	12/13/2022			12/16/2022 07:07	Khloe J Berg	2374614
	12/13/2022			12/16/2022 07:21	Khloe J Berg	2374615