

Chemical Analysis Report

TLH-ROC-2022-06-20-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Run1 Wekiva Spring, Waccasassa, Metals Blank**
Request ID: **RQ-2022-06-20-60**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Chris Green

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Certified by: Colin Wright, Program Administrator

Date Certified: 11-JUL-2022 13:59

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: Waccasassa River @ Boat Ramp

Collection Date/Time: 06/20/2022 11:10

Field ID: G1TLHR0032

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335655	EPA 200.7 Rev. 4.4	Calcium	35.2		mg/L	P415464	
		Iron	370		ug/L	P415464	
		Magnesium	6.98		mg/L	P415464	
		Strontium	115		ug/L	P415464	
		Tin	3.0	U	ug/L	P415464	
		Titanium	2.0	I	ug/L	P415464	
		Vanadium	2.0	U	ug/L	P415464	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P415464	
		Aluminum	86		ug/L	P415464	
		Antimony	0.050	U	ug/L	P415464	
		Arsenic	0.36		ug/L	P415464	
		Beryllium	0.012	I	ug/L	P415464	
		Cadmium	0.020	U	ug/L	P415464	
		Chromium	0.76	I	ug/L	P415464	
		Cobalt	0.049	I	ug/L	P415464	
		Copper	0.40	U	ug/L	P415464	
		Lead	0.20	U	ug/L	P415464	
		Manganese	15.5		ug/L	P415464	
		Molybdenum	0.71		ug/L	P415464	
		Nickel	0.50	U	ug/L	P415464	
		Selenium	0.20	U	ug/L	P415464	
		Silver	0.010	U	ug/L	P415464	
		Thallium	0.10	U	ug/L	P415464	

Sample Location: FB

Collection Date/Time: 06/20/2022 11:10

Field ID: FB_06202022

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335657	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P415464	
		Iron	30	U	ug/L	P415464	
		Magnesium	0.040	U	mg/L	P415464	
		Strontium	2.0	U	ug/L	P415464	
		Tin	3.0	U	ug/L	P415464	
		Titanium	0.75	U	ug/L	P415464	
		Vanadium	2.0	U	ug/L	P415464	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P415464	
		Aluminum	5.0	U	ug/L	P415464	
		Antimony	0.050	U	ug/L	P415464	
		Arsenic	0.050	U	ug/L	P415464	
		Beryllium	0.010	U	ug/L	P415464	
		Cadmium	0.020	U	ug/L	P415464	
		Chromium	0.40	U	ug/L	P415464	
		Cobalt	0.020	U	ug/L	P415464	
		Copper	0.40	U	ug/L	P415464	
		Lead	0.20	U	ug/L	P415464	
		Manganese	0.10	U	ug/L	P415464	
		Molybdenum	0.15	U	ug/L	P415464	
		Nickel	0.50	U	ug/L	P415464	
		Selenium	0.20	U	ug/L	P415464	
		Silver	0.010	U	ug/L	P415464	
		Thallium	0.10	U	ug/L	P415464	

Sample Location: Waccasassa River @ Otter Creek

Collection Date/Time: 06/20/2022 11:25

Field ID: G1TLHR0101

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335656	EPA 200.7 Rev. 4.4	Calcium	77.5		mg/L	P415464	
		Iron	490		ug/L	P415464	
		Magnesium	115		mg/L	P415464	
		Strontium	773		ug/L	P415464	
		Tin	30	U	ug/L	P415464	
		Titanium	4.7		ug/L	P415464	
		Vanadium	2.0	U	ug/L	P415464	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P415464	
		Aluminum	189		ug/L	P415464	
		Antimony	0.077	I	ug/L	P415464	
		Arsenic	0.97		ug/L	P415464	
		Beryllium	0.021	I	ug/L	P415464	
		Cadmium	0.020	U	ug/L	P415464	
		Chromium	0.95	I	ug/L	P415464	
		Cobalt	0.073	I	ug/L	P415464	
		Copper	0.40	U	ug/L	P415464	
		Lead	0.20	I	ug/L	P415464	
		Manganese	44.5		ug/L	P415464	
		Molybdenum	1.89		ug/L	P415464	
		Nickel	0.50	U	ug/L	P415464	
		Selenium	0.22	I	ug/L	P415464	
		Silver	0.010	U	ug/L	P415464	
		Thallium	0.10	U	ug/L	P415464	

Sample Location: Wekiva Spring

Collection Date/Time: 06/20/2022 12:00

Field ID: G1TLHR0167

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335661	DEP SOP: NU-094-1	Color (true)**	2.5	U	PCU	P415505	
	EPA 180.1 Rev. 2.0	Turbidity	0.20	I	NTU	P415502	
	EPA 300.0 Rev. 2.1	Chloride	5.1		mg Cl/L	P415805	
		Sulfate	4.9		mg SO4/L	P415807	
	SM 2320 B-2011	Total Alkalinity	90	A	mg CaCO3/L	P415767	
	SM 2540 C-2011	TDS	126	A	mg/L	P415902	
	SM 2540 D-2011	TSS	2	UA	mg/L	P415891	
	SM 4500-F- C-2011	Fluoride	0.078	I	mg F/L	P415771	
2335662	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P415880	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P415787	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.7		mg N/L	P416128	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P415812	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P415622	

Ref. Method and Comment:

SM 2540 D-2011: 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: P415505

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415502

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415464

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	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: P415464

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415805

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415807

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416128

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

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

Reference Method: SM 2320 B-2011
Batch ID: P415767

Component	Result	Code	Units
Total Alkalinity	1.0	U	mg CaCO3/L

Reference Method: SM 2540 C-2011
Batch ID: P415902

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P415891

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P415771

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P415622

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: P415505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.1		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415502

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.5		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	107		P	85 - 115
Iron	105		P	85 - 115
Magnesium	106		P	85 - 115
Strontium	104		P	85 - 115
Tin	109		P	85 - 115
Titanium	105		P	85 - 115
Vanadium	96.3		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	100		P	85 - 115
Beryllium	97.3		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	99.3		P	85 - 115
Cobalt	100		P	85 - 115
Copper	97.7		P	85 - 115
Lead	96.1		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	99.1		P	85 - 115
Selenium	101		P	85 - 115
Silver	101		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415805

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415807

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416128

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: P415812

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

Reference Method: SM 2320 B-2011
Batch ID: P415767

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P415771

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.9		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415622

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P415464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335646	Calcium	106		P	80 - 120
2335646	Iron	105	104	P/P	80 - 120
2335646	Magnesium	105	105	P/P	80 - 120
2335646	Strontium	104	103	P/P	80 - 120
2335646	Tin	105	104	P/P	80 - 120
2335646	Titanium	97.0	97.7	P/P	80 - 120
2335646	Vanadium	96.9	97.1	P/P	80 - 120
2335646	Zinc	103	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P415464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335646	Aluminum	109	110	P/P	80 - 120
2335646	Antimony	110	104	P/P	80 - 120
2335646	Arsenic	104	101	P/P	80 - 120
2335646	Beryllium	103	97.3	P/P	80 - 120
2335646	Cadmium	107	103	P/P	80 - 120
2335646	Chromium	105	100	P/P	80 - 120
2335646	Cobalt	105	100	P/P	80 - 120
2335646	Copper	100	95.2	P/P	80 - 120
2335646	Lead	100	96.9	P/P	80 - 120
2335646	Manganese	115	108	P/P	80 - 120
2335646	Molybdenum	108	103	P/P	80 - 120
2335646	Nickel	103	97.8	P/P	80 - 120
2335646	Selenium	105	99.8	P/P	80 - 120
2335646	Silver	105	101	P/P	80 - 120
2335646	Thallium	107	105	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P415805

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335624	Chloride	96.3		P	90 - 110
2335626	Chloride	94.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P415807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335624	Sulfate	95.9		P	90 - 110
2335626	Sulfate	95.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415880

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335662	Ammonia-N	101	103	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335631	Kjeldahl Nitrogen	90.8	85.9	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416128

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337755	NO2NO3-N	98.8	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335450	Total-P	103	105	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P415771

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335661	Fluoride	99.9	99.9	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415622

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335689	Organic Carbon	97.1	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P415505

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335624	Color (true)	6.24	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P415502

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335624	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335646	Calcium	1.25	Spike	P	0 - 20
2335646	Iron	0.831	Spike	P	0 - 20
2335646	Magnesium	0.0454	Spike	P	0 - 20
2335646	Strontium	0.987	Spike	P	0 - 20
2335646	Tin	0.704	Spike	P	0 - 20
2335646	Titanium	0.670	Spike	P	0 - 20
2335646	Vanadium	0.254	Spike	P	0 - 20
2335646	Zinc	0.452	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335646	Aluminum	1.31	Spike	P	0 - 20
2335646	Antimony	5.54	Spike	P	0 - 20
2335646	Arsenic	2.93	Spike	P	0 - 20
2335646	Beryllium	4.96	Spike	P	0 - 20
2335646	Cadmium	3.75	Spike	P	0 - 20
2335646	Chromium	5.11	Spike	P	0 - 20
2335646	Cobalt	5.14	Spike	P	0 - 20
2335646	Copper	4.50	Spike	P	0 - 20
2335646	Lead	3.41	Spike	P	0 - 20
2335646	Manganese	2.40	Spike	P	0 - 20
2335646	Molybdenum	4.90	Spike	P	0 - 20
2335646	Nickel	5.25	Spike	P	0 - 20
2335646	Selenium	5.09	Spike	P	0 - 20
2335646	Silver	4.21	Spike	P	0 - 20
2335646	Thallium	2.27	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415805

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335624	Chloride	0.146	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P415807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335624	Sulfate	0.0244	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335662	Ammonia-N	1.96	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335631	Kjeldahl Nitrogen	4.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416128

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337755	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335450	Total-P	1.44	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P415767

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335661	Total Alkalinity	0.256	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2011
Batch ID: P415902

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335661	TDS	2.39	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P415771

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335661	Fluoride	0.0	Spike	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 5310 B-2011
Batch ID: P415622

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335689	Organic Carbon	0.372	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: A112963

Included Lab Sample IDs: 2335661

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

Reference Method: DEP SOP: NU-094-1

Run ID: A112965

Included Lab Sample IDs: 2335661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.4	100	P/P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A112976

Included Lab Sample IDs: 2335661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.7	98.4	P/P	90 - 110
Sulfate	99.8	99.8	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A113000

Included Lab Sample IDs: 2335662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.4	98.4	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A113067

Included Lab Sample IDs: 2335661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.9	100	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A113067

Included Lab Sample IDs: 2335661

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113085

Included Lab Sample IDs: 2335655, 2335656, 2335657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Aluminum	102	104	P/P	90 - 110
Antimony	102	104	P/P	90 - 110
Antimony	104	104	P/P	90 - 110
Arsenic	102	99.6	P/P	90 - 110
Arsenic	99.6	101	P/P	90 - 110
Beryllium	99.0	98.5	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113085

Included Lab Sample IDs: 2335655, 2335656, 2335657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	102	102	P/P	90 - 110
Chromium	96.7	98.9	P/P	90 - 110
Chromium	98.9	101	P/P	90 - 110
Cobalt	97.7	99.0	P/P	90 - 110
Cobalt	99.0	101	P/P	90 - 110
Copper	97.2	97.6	P/P	90 - 110
Copper	97.6	100	P/P	90 - 110
Lead	94.3	95.3	P/P	90 - 110
Lead	95.3	95.3	P/P	90 - 110
Manganese	102	104	P/P	90 - 110
Manganese	98.1	102	P/P	90 - 110
Molybdenum	100	99.6	P/P	90 - 110
Molybdenum	99.6	100	P/P	90 - 110
Nickel	97.1	98.5	P/P	90 - 110
Nickel	98.5	99.9	P/P	90 - 110
Selenium	101	102	P/P	90 - 110
Selenium	102	102	P/P	90 - 110
Silver	101	102	P/P	90 - 110
Silver	99.9	101	P/P	90 - 110
Thallium	98.2	99.3	P/P	90 - 110
Thallium	99.3	97.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A113122

Included Lab Sample IDs: 2335657

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113138

Included Lab Sample IDs: 2335662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	98.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A113147

Included Lab Sample IDs: 2335655, 2335656, 2335657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	105	103	P/P	90 - 110
Calcium	105	105	P/P	90 - 110
Iron	101	100	P/P	90 - 110
Iron	105	101	P/P	90 - 110
Magnesium	102	100	P/P	90 - 110
Magnesium	104	102	P/P	90 - 110
Strontium	104	99.0	P/P	90 - 110
Strontium	98.5	104	P/P	90 - 110
Tin	100	104	P/P	90 - 110
Tin	104	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A113147

Included Lab Sample IDs: 2335655, 2335656, 2335657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Titanium	101	99.1	P/P	90 - 110
Titanium	98.5	101	P/P	90 - 110
Vanadium	102	99.4	P/P	90 - 110
Vanadium	98.1	102	P/P	90 - 110
Zinc	102	105	P/P	90 - 110
Zinc	105	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113179

Included Lab Sample IDs: 2335662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113208

Included Lab Sample IDs: 2335662

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113268

Included Lab Sample IDs: 2335662

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	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)	98.1			6.24	
EPA 180.1 Rev. 2.0	Turbidity	96.5			0.0	
EPA 200.7 Rev. 4.4	Calcium	107	106			1.25
	Iron	105	105 104			0.831
	Magnesium	106	105 105			0.0454
	Strontium	104	104 103			0.987
	Tin	109	105 104			0.704
	Titanium	105	97.0 97.7			0.670
	Vanadium	96.3	96.9 97.1			0.254
	Zinc	105	103 102			0.452
EPA 200.8 Rev. 5.4	Aluminum	103	109 110			1.31
	Antimony	104	110 104			5.54
	Arsenic	100	104 101			2.93
	Beryllium	97.3	103 97.3			4.96
	Cadmium	101	107 103			3.75
	Chromium	99.3	105 100			5.11
	Cobalt	100	105 100			5.14
	Copper	97.7	100 95.2			4.50
	Lead	96.1	100 96.9			3.41
	Manganese	101	115 108			2.40
	Molybdenum	101	108 103			4.90
	Nickel	99.1	103 97.8			5.25
	Selenium	101	105 99.8			5.09
	Silver	101	105 101			4.21
	Thallium	101	107 105			2.27
EPA 300.0 Rev. 2.1	Chloride	97.0	96.3 94.0		0.146	
	Sulfate	99.3	95.9 95.4		0.0244	
EPA 350.1 Rev. 2.0	Ammonia-N	97.0	101 103			1.96
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.6	90.8 85.9			4.29
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.5	98.8 99.4			0.475
EPA 365.1 Rev. 2.0	Total-P	102	103 105			1.44
SM 2320 B-2011	Total Alkalinity	101			0.256	
SM 2540 C-2011	TDS				2.39	
SM 4500-F- C-2011	Fluoride	99.9	99.9 99.9			0.0
SM 5310 B-2011	Organic Carbon	94.0	97.1 97.6			0.372

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2335661
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2335661
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2335655, 2335656, 2335657
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2335655, 2335656, 2335657
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2335661
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2335661
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2335662
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2335662
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2335662
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2335662
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2335661
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2335661

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2335661
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2335661
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2335662

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	06/20/2022			06/21/2022 15:31	Anna M. Plaviak	2335661
EPA 180.1 Rev. 2.0	06/20/2022			06/21/2022 15:13	Khloe J Berg	2335661
EPA 200.7 Rev. 4.4	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/28/2022 18:02	McKinley C Carter	2335657
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/28/2022 20:13	McKinley C Carter	2335655
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/28/2022 20:21	McKinley C Carter	2335656
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/28/2022 20:29	McKinley C Carter	2335656
EPA 200.8 Rev. 5.4	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/24/2022 12:58	Emily M Philpot	2335657
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/24/2022 15:40	Emily M Philpot	2335655
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/24/2022 15:49	Emily M Philpot	2335656
	06/20/2022	06/21/2022 10:02	Megan Whitefoot	06/27/2022 15:08	Emily M Philpot	2335657
EPA 300.0 Rev. 2.1	06/20/2022			06/24/2022 21:35	Anna M. Plaviak	2335661
EPA 350.1 Rev. 2.0	06/20/2022			06/28/2022 10:36	Ping Hua	2335662
EPA 351.2 Rev. 2.0	06/20/2022	06/28/2022 09:59	Samantha L Bates	06/29/2022 14:58	Alexandra J Mattheus	2335662
EPA 353.2 Rev. 2.0	06/20/2022			07/05/2022 09:23	Beverly Y. Sanders	2335662
EPA 365.1 Rev. 2.0	06/20/2022	06/28/2022 16:02	Adam P Silver	06/30/2022 14:25	James L Waggeberby	2335662
SM 2320 B-2011	06/20/2022			06/25/2022 03:28	Dale L. Simmons	2335661
SM 2540 C-2011	06/20/2022			06/24/2022 15:21	Yijie Li	2335661
SM 2540 D-2011	06/20/2022			06/24/2022 15:21	Yijie Li	2335661
SM 4500-F- C-2011	06/20/2022			06/25/2022 03:17	Dale L. Simmons	2335661
SM 5310 B-2011	06/20/2022			06/22/2022 16:39	Khloe J Berg	2335662