Chemical Analysis Report

CEN-DIST-2022-04-26-01

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

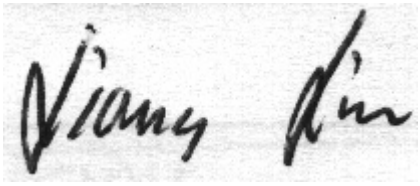
Event Description: **Ivanhoe and Johns Outlet**
Request ID: **RQ-2022-04-25-15**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 19-MAY-2022 10:26



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Lake Ivanhoe @ Center of W Lobe **Collection Date/Time: 04/25/2022 09:59**

Field ID: G2CE0262 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2322001	DEP SOP: NU-094-1	Color (true)**	6.8		PCU	P412920	
	EPA 180.1 Rev. 2.0	Turbidity	0.40	I	NTU	P412917	
	EPA 300.0 Rev. 2.1	Chloride	25		mg Cl/L	P413252	
		Sulfate	21		mg SO4/L	P413255	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P413551	
	SM 2540 C-2011	TDS	109		mg/L	P413422	
	SM 2540 D-2011	TSS	2	U	mg/L	P413470	
	SM 4500-F- C-2011	Fluoride	0.049	I	mg F/L	P413554	
2322002	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P413432	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32		mg N/L	P413476	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P413216	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P413053	
	SM 5310 B-2011	Organic Carbon	3.5		mg C/L	P413244	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Johns Lake @ Conservation area dock **Collection Date/Time: 04/25/2022 12:43**

Field ID: G1CE0111 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2321999	DEP SOP: NU-094-1	Color (true)**	190		PCU	P412920	
	EPA 180.1 Rev. 2.0	Turbidity	5.4		NTU	P412917	
	EPA 300.0 Rev. 2.1	Chloride	31		mg Cl/L	P413252	
		Sulfate	9.8		mg SO4/L	P413255	
	SM 2320 B-2011	Total Alkalinity	36		mg CaCO3/L	P413551	
	SM 2540 C-2011	TDS	147	A	mg/L	P413422	
	SM 2540 D-2011	TSS	4	I A	mg/L	P413470	
	SM 4500-F- C-2011	Fluoride	0.097	I	mg F/L	P413554	
2322000	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P413112	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P413476	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P413216	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P413052	
	SM 5310 B-2011	Organic Carbon	18		mg C/L	P413244	
2322008	EPA 200.7 Rev. 4.4	Calcium	14.2		mg/L	P413013	
		Iron	170		ug/L	P413013	
		Magnesium	4.07		mg/L	P413013	
		Potassium	5.2		mg/L	P413013	
		Sodium	17.2		mg/L	P413013	
		Strontium	40.9		ug/L	P413013	
		Tin	3.0	U	ug/L	P413013	
		Titanium	1.0	I	ug/L	P413013	
		Vanadium	2.0	U	ug/L	P413013	
		Zinc	5.0	U	ug/L	P413013	
	EPA 200.8 Rev. 5.4	Aluminum	101		ug/L	P413385	
		Antimony	0.16	I	ug/L	P413013	
		Arsenic	1.11		ug/L	P413013	
		Barium	11.3		ug/L	P413013	
		Beryllium	0.010	U	ug/L	P413013	
		Boron**	36.2		ug/L	P413013	
		Cadmium	0.020	U	ug/L	P413013	
		Chromium	0.40	U	ug/L	P413013	
		Cobalt	0.058	I	ug/L	P413013	
		Copper	1.60		ug/L	P413013	
		Lead	0.36	I	ug/L	P413013	
		Manganese	8.70		ug/L	P413013	
		Molybdenum	0.95		ug/L	P413013	
		Nickel	0.50	U	ug/L	P413013	
		Selenium	0.20	U	ug/L	P413013	
		Silver	0.010	U	ug/L	P413013	
		Thallium	0.10	U	ug/L	P413013	
	SM 2340 B-2011	Hardness	52.3		mg/L	P413013	

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: P412920

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412917

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413013

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: P413013

Component	Result	Code	Units
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413385

Component	Result	Code	Units
Aluminum	5.0	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413252

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413255

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413112

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413432

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413476

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413216

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413052

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413053

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

Reference Method: SM 2320 B-2011
Batch ID: P413551

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P413422

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P413470

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P413554

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P413244

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: P412920

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.3		P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412917

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	95.9		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413013

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	100		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	103		P	85 - 115
Sodium	101		P	85 - 115
Strontium	101		P	85 - 115
Tin	102		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	95.9		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413013

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Antimony	97.3		P	85 - 115
Arsenic	98.9		P	85 - 115
Barium	104		P	85 - 115
Beryllium	91.3		P	85 - 115
Boron	103		P	85 - 115
Cadmium	98.6		P	85 - 115
Chromium	98.5		P	85 - 115
Cobalt	98.9		P	85 - 115
Copper	94.7		P	85 - 115
Lead	96.5		P	85 - 115
Manganese	99.4		P	85 - 115
Molybdenum	96.1		P	85 - 115
Nickel	97.7		P	85 - 115
Selenium	96.3		P	85 - 115
Silver	99.5		P	85 - 115
Thallium	97.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413385

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.1		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413252

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413255

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413112

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413432

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413476

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413216

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413052

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413053

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

Reference Method: SM 2320 B-2011
Batch ID: P413551

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.3		P	94 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P413554

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P413244

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	87.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413013

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322145	Calcium	98.4		P	80 - 120
2322145	Iron	101	105	P/P	80 - 120
2322145	Magnesium	101	105	P/P	80 - 120
2322145	Potassium	102	104	P/P	80 - 120
2322145	Sodium	100	103	P/P	80 - 120
2322145	Strontium	102	104	P/P	80 - 120
2322145	Tin	102	104	P/P	80 - 120
2322145	Titanium	93.8	94.6	P/P	80 - 120
2322145	Vanadium	97.5	99.5	P/P	80 - 120
2322145	Zinc	101	103	P/P	80 - 120
2322146	Calcium	97.9		P	80 - 120
2322146	Iron	102		P	80 - 120
2322146	Magnesium	102		P	80 - 120
2322146	Potassium	108		P	80 - 120
2322146	Sodium	101		P	80 - 120
2322146	Strontium	101		P	80 - 120
2322146	Tin	101		P	80 - 120
2322146	Titanium	94.7		P	80 - 120
2322146	Vanadium	97.8		P	80 - 120
2322146	Zinc	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413013

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322145	Antimony	95.4	99.3	P/P	80 - 120
2322145	Arsenic	98.6	101	P/P	80 - 120
2322145	Barium	106	107	P/P	80 - 120
2322145	Beryllium	94.9	93.1	P/P	80 - 120
2322145	Boron	103	107	P/P	80 - 120
2322145	Cadmium	99.5	103	P/P	80 - 120
2322145	Chromium	99.8	102	P/P	80 - 120
2322145	Cobalt	100	103	P/P	80 - 120
2322145	Copper	98.4	100	P/P	80 - 120
2322145	Lead	97.8	98.6	P/P	80 - 120
2322145	Manganese	99.1	104	P/P	80 - 120
2322145	Molybdenum	95.3	98.2	P/P	80 - 120
2322145	Nickel	100	103	P/P	80 - 120
2322145	Selenium	96.0	98.1	P/P	80 - 120
2322145	Silver	99.5	101	P/P	80 - 120
2322145	Thallium	101	103	P/P	80 - 120
2322146	Antimony	100		P	80 - 120
2322146	Arsenic	99.2		P	80 - 120
2322146	Barium	106		P	80 - 120
2322146	Beryllium	91.2		P	80 - 120
2322146	Boron	110		P	80 - 120
2322146	Cadmium	103		P	80 - 120
2322146	Chromium	101		P	80 - 120
2322146	Cobalt	99.0		P	80 - 120
2322146	Copper	96.4		P	80 - 120
2322146	Lead	98.7		P	80 - 120
2322146	Manganese	103		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413013

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322146	Molybdenum	98.4		P	80 - 120
2322146	Nickel	98.7		P	80 - 120
2322146	Selenium	94.6		P	80 - 120
2322146	Silver	101		P	80 - 120
2322146	Thallium	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413385

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322072	Aluminum	96.6	97.2	P/P	80 - 120
2322183	Aluminum	97.0		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413252

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321936	Chloride	99.6		P	90 - 110
2322001	Chloride	97.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413255

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321936	Sulfate	96.7		P	90 - 110
2322001	Sulfate	93.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413112

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321995	Ammonia-N	104	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413432

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322002	Ammonia-N	99.8	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413476

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322002	Kjeldahl Nitrogen	104	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321972	NO2NO3-N	96.2	94.6	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413052

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321972	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413053

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322062	Total-P	101	104	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P413554

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321990	Fluoride	99.0	99.0	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P413244

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321994	Organic Carbon	98.1	99.6	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P412920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321991	Color (true)	0.154	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P412917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321936	Turbidity	2.82	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P413013

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322145	Calcium	0.761	Spike	P	0 - 20
2322145	Iron	3.50	Spike	P	0 - 20
2322145	Magnesium	2.30	Spike	P	0 - 20
2322145	Potassium	1.09	Spike	P	0 - 20
2322145	Sodium	2.23	Spike	P	0 - 20
2322145	Strontium	1.44	Spike	P	0 - 20
2322145	Tin	1.56	Spike	P	0 - 20
2322145	Titanium	0.814	Spike	P	0 - 20
2322145	Vanadium	2.06	Spike	P	0 - 20
2322145	Zinc	1.64	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413013

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322145	Antimony	3.99	Spike	P	0 - 20
2322145	Arsenic	2.34	Spike	P	0 - 20
2322145	Barium	0.901	Spike	P	0 - 20
2322145	Beryllium	1.88	Spike	P	0 - 20
2322145	Boron	3.54	Spike	P	0 - 20
2322145	Cadmium	3.19	Spike	P	0 - 20
2322145	Chromium	1.75	Spike	P	0 - 20
2322145	Cobalt	2.59	Spike	P	0 - 20
2322145	Copper	1.72	Spike	P	0 - 20
2322145	Lead	0.766	Spike	P	0 - 20
2322145	Manganese	2.27	Spike	P	0 - 20
2322145	Molybdenum	2.95	Spike	P	0 - 20
2322145	Nickel	2.49	Spike	P	0 - 20
2322145	Selenium	2.14	Spike	P	0 - 20
2322145	Silver	1.69	Spike	P	0 - 20
2322145	Thallium	1.47	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P413385

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322072	Aluminum	0.571	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413252

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321936	Chloride	0.952	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P413255

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321936	Sulfate	0.846	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413112

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321995	Ammonia-N	0.919	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413432

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322002	Ammonia-N	0.946	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413476

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322002	Kjeldahl Nitrogen	2.36	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321972	NO2NO3-N	1.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413052

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321972	Total-P	0.683	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413053

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322062	Total-P	2.59	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P413551

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321990	Total Alkalinity	1.68	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P413422

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321999	TDS	4.08	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P413554

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321990	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P413244

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321994	Organic Carbon	0.955	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: A111700
Included Lab Sample IDs: 2321999, 2322001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	98.5	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1
Run ID: A111702
Included Lab Sample IDs: 2321999, 2322001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.2	100	P/P	85 - 115
Color (true)	99.8	102	P/P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A111715
Included Lab Sample IDs: 2321999, 2322001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	100	P/P	90 - 110
Chloride	99.8	101	P/P	90 - 110
Sulfate	101	102	P/P	90 - 110
Sulfate	102	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A111801
Included Lab Sample IDs: 2322000

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.7	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A111841
Included Lab Sample IDs: 2322000, 2322002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	96.5	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A111856
Included Lab Sample IDs: 2322000, 2322002

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A111858
Included Lab Sample IDs: 2322008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	99.6	99.4	P/P	90 - 110
Arsenic	101	96.5	P/P	90 - 110
Barium	101	98.7	P/P	90 - 110
Beryllium	94.3	91.1	P/P	90 - 110
Boron	99.0	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A111858
Included Lab Sample IDs: 2322008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	101	100	P/P	90 - 110
Chromium	100	98.3	P/P	90 - 110
Cobalt	101	96.1	P/P	90 - 110
Copper	98.8	92.8	P/P	90 - 110
Lead	99.8	97.9	P/P	90 - 110
Manganese	101	98.3	P/P	90 - 110
Molybdenum	96.8	93.7	P/P	90 - 110
Nickel	101	95.0	P/P	90 - 110
Selenium	99.0	96.8	P/P	90 - 110
Silver	102	101	P/P	90 - 110
Thallium	96.4	95.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111879
Included Lab Sample IDs: 2322000

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A111897
Included Lab Sample IDs: 2322008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	96.7	97.2	P/P	90 - 110
Iron	99.6	99.9	P/P	90 - 110
Magnesium	99.0	99.5	P/P	90 - 110
Potassium	100	100	P/P	90 - 110
Sodium	98.9	98.8	P/P	90 - 110
Strontium	98.9	99.3	P/P	90 - 110
Tin	99.5	100	P/P	90 - 110
Titanium	100	98.0	P/P	90 - 110
Vanadium	99.5	100	P/P	90 - 110
Zinc	101	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111924
Included Lab Sample IDs: 2322002

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A111943
Included Lab Sample IDs: 2322002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	97.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A111948
Included Lab Sample IDs: 2322008

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.4	98.6	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A111985
Included Lab Sample IDs: 2321999, 2322001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.1	95.8	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A111985
Included Lab Sample IDs: 2321999, 2322001

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112052
Included Lab Sample IDs: 2322000, 2322002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	91.5	P/P	90 - 110
Kjeldahl Nitrogen	91.5	95.3	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)	98.3					0.154	
EPA 180.1 Rev. 2.0	Turbidity	95.9					2.82	
EPA 200.7 Rev. 4.4	Calcium	100	98.4	97.9				0.761
	Iron	104	101	105	102			3.50
	Magnesium	103	101	105	102			2.30
	Potassium	103	102	104	108			1.09
	Sodium	101	100	103	101			2.23
	Strontium	101	102	104	101			1.44
	Tin	102	102	104	101			1.56
	Titanium	102	94.7	93.8	94.6			0.814
	Vanadium	95.9	97.5	99.5	97.8			2.06
	Zinc	101	101	103	102			1.64
EPA 200.8 Rev. 5.4	Aluminum	98.1	96.6	97.2	97.0			0.571
	Antimony	97.3	95.4	99.3	100			3.99
	Arsenic	98.9	98.6	101	99.2			2.34
	Barium	104	106	107	106			0.901
	Beryllium	91.3	94.9	93.1	91.2			1.88
	Boron	103	103	107	110			3.54
	Cadmium	98.6	99.5	103	103			3.19
	Chromium	98.5	99.8	102	101			1.75
	Cobalt	98.9	100	103	99.0			2.59
	Copper	94.7	98.4	100	96.4			1.72
	Lead	96.5	97.8	98.6	98.7			0.766
	Manganese	99.4	99.1	104	103			2.27
	Molybdenum	96.1	95.3	98.2	98.4			2.95
	Nickel	97.7	100	103	98.7			2.49
	Selenium	96.3	96.0	98.1	94.6			2.14
	Silver	99.5	99.5	101	101			1.69
	Thallium	97.5	101	103	101			1.47
EPA 300.0 Rev. 2.1	Chloride	100	99.6	97.9			0.952	
	Sulfate	99.7	96.7	93.0			0.846	
EPA 350.1 Rev. 2.0	Ammonia-N	96.4	104	106				0.919
	Ammonia-N	103	99.8	101				0.946
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	104	101				2.36
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	96.2	94.6				1.13
EPA 365.1 Rev. 2.0	Total-P	104	103	103				0.683
	Total-P	99.5	101	104				2.59
SM 2320 B-2011	Total Alkalinity	97.3					1.68	
SM 2540 C-2011	TDS						4.08	
SM 4500-F- C-2011	Fluoride	100	99.0	99.0				0.0
SM 5310 B-2011	Organic Carbon	87.7	98.1	99.6				0.955

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2321999, 2322001
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2321999, 2322001
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2322008
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2322008
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2321999, 2322001
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2321999, 2322001

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2322000, 2322002
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2322000, 2322002
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2322000, 2322002
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2322000, 2322002
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2321999, 2322001
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2322008
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2321999, 2322001
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2321999, 2322001
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2321999, 2322001
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2322000, 2322002

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	04/26/2022			04/26/2022 16:21	Anna M. Plaviak	2322001
	04/26/2022			04/26/2022 16:52	Anna M. Plaviak	2321999
EPA 180.1 Rev. 2.0	04/26/2022			04/26/2022 14:46	Khloe J Berg	2321999
	04/26/2022			04/26/2022 14:49	Khloe J Berg	2322001
EPA 200.7 Rev. 4.4	04/26/2022	04/28/2022 10:10	Megan Whitefoot	05/03/2022 14:13	Josef B Mick	2322008
EPA 200.8 Rev. 5.4	04/26/2022	04/28/2022 10:10	Megan Whitefoot	05/02/2022 18:17	Emily M Philpot	2322008
	04/26/2022	05/05/2022 10:00	Megan Whitefoot	05/05/2022 16:02	Emily M Philpot	2322008
EPA 300.0 Rev. 2.1	04/26/2022			04/29/2022 22:56	James L Waggerby	2322001
	04/26/2022			04/30/2022 01:21	James L Waggerby	2321999
EPA 350.1 Rev. 2.0	04/26/2022			04/29/2022 10:18	Judith K. Clark	2322000
	04/26/2022			05/05/2022 14:25	Judith K. Clark	2322002
EPA 351.2 Rev. 2.0	04/26/2022	05/09/2022 16:29	Alexandra J Mattheus	05/10/2022 12:55	Alexandra J Mattheus	2322000
	04/26/2022	05/09/2022 16:29	Alexandra J Mattheus	05/10/2022 12:59	Alexandra J Mattheus	2322002
EPA 353.2 Rev. 2.0	04/26/2022			05/02/2022 09:52	Beverly Y. Sanders	2322000
	04/26/2022			05/02/2022 09:53	Beverly Y. Sanders	2322002
EPA 365.1 Rev. 2.0	04/26/2022	04/29/2022 13:00	Simonne.V. Calhoun	05/03/2022 12:29	Sarah A Nixon	2322000
	04/26/2022	04/29/2022 13:00	Simonne.V. Calhoun	05/03/2022 15:20	James L Waggerby	2322002
SM 2320 B-2011	04/26/2022			05/04/2022 04:25	Dale L. Simmons	2321999
	04/26/2022			05/04/2022 04:37	Dale L. Simmons	2322001
SM 2340 B-2011	04/26/2022			05/03/2022 14:13	Josef B Mick	2322008
SM 2540 C-2011	04/26/2022			04/29/2022 15:42	Yijie Li	2321999, 2322001
SM 2540 D-2011	04/26/2022			04/29/2022 15:42	Yijie Li	2321999, 2322001
SM 4500-F- C-2011	04/26/2022			05/04/2022 04:25	Dale L. Simmons	2321999
	04/26/2022			05/04/2022 04:37	Dale L. Simmons	2322001
SM 5310 B-2011	04/26/2022			05/02/2022 20:19	Khloe J Berg	2322000
	04/26/2022			05/02/2022 20:33	Khloe J Berg	2322002