

Chemical Analysis Report

SE-DIST-2023-02-16-02

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

Event Description: **Sebastian Deploy and Pickup**
Request ID: **RQ-2023-01-23-04**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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

Certified by: Colin Wright, Program Administrator

Date Certified: 10-MAR-2023 13:27

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light blue 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: C-54 confluence with Sebastian near Mockingbird Lane Dock

Collection Date/Time: 02/15/2023 10:00

Field ID: G5SE0106

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2388185	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P425972	
	SM 2320 B-2011	Total Alkalinity	163		mg CaCO3/L	P426294	
	SM 2540 D-2015	TSS	9	IA	mg/L	P426379	
	SM 4500-F- C-2011	Fluoride	0.61		mg F/L	P426644	
2388186	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P426474	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P426400	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.046		mg N/L	P426236	
	EPA 365.1 Rev. 2.0	Total-P	0.063		mg P/L	P426380	
	SM 5310 B-2011	Organic Carbon	8.3		mg C/L	P426334	
2388189	EPA 200.7 Rev. 4.4	Calcium	211		mg/L	P426273	
		Iron	350	I	ug/L	P426273	
		Magnesium	511		mg/L	P426273	
		Strontium	4.64E+03		ug/L	P426273	
		Tin	9.3	I	ug/L	P426273	
		Titanium	4.2	I	ug/L	P426273	
		Vanadium	6.0	U	ug/L	P426273	
		Zinc	15	U	ug/L	P426273	
		Aluminum	52	I	ug/L	P426273	
		Antimony	0.20	U	ug/L	P426273	
	EPA 200.8 Rev. 5.4	Arsenic	1.21		ug/L	P426273	
		Beryllium	0.040	U	ug/L	P426273	
		Cadmium	0.080	U	ug/L	P426273	
		Chromium	1.6	U	ug/L	P426273	
		Cobalt	0.17	I	ug/L	P426273	
		Copper	1.6	U	ug/L	P426273	
		Lead	2.0	U	ug/L	P426273	
		Manganese	11.6		ug/L	P426273	
		Molybdenum	5.8		ug/L	P426273	
		Nickel	2.0	U	ug/L	P426273	
		Selenium	0.80	U	ug/L	P426273	
		Silver	0.040	U	ug/L	P426586	
		Thallium	0.40	U	ug/L	P426273	

Ref. Method and Comment:

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

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium and strontium are unavailable because of high analyte concentration in the QC sample.

Sample Location: FB

Collection Date/Time: 02/15/2023 10:15

Field ID: FB_02152023

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2388190	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P426158	
		Iron	30	U	ug/L	P426158	
		Magnesium	0.040	U	mg/L	P426158	
		Strontium	2.0	U	ug/L	P426158	
		Tin	3.0	U	ug/L	P426158	
		Titanium	0.75	U	ug/L	P426158	
		Vanadium	2.0	U	ug/L	P426158	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P426158	
		Aluminum	5.0	U	ug/L	P426158	
		Antimony	0.050	U	ug/L	P426158	
		Arsenic	0.050	U	ug/L	P426158	
		Beryllium	0.010	U	ug/L	P426158	
		Cadmium	0.020	U	ug/L	P426158	
		Chromium	0.40	U	ug/L	P426158	
		Cobalt	0.020	U	ug/L	P426158	
		Copper	0.40	U	ug/L	P426158	
		Lead	0.20	U	ug/L	P426158	
		Manganese	0.10	U	ug/L	P426158	
		Molybdenum	0.15	U	ug/L	P426158	
		Nickel	0.50	U	ug/L	P426158	
		Selenium	0.20	U	ug/L	P426158	
		Silver	0.010	U	ug/L	P426328	
		Thallium	0.10	U	ug/L	P426158	
	SM 2340 B-2011	Hardness	0.35	U	mg/L	P426158	

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P425972

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P426158

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 200.7 Rev. 4.4
Batch ID: P426273

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: P426158

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
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426273

Component	Result	Code	Units
Aluminum	5.0	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426273

Component	Result	Code	Units
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	0.60	I	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
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426328

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426586

Component	Result	Code	Units
Silver	0.010	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P426474

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P426400

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P426236

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P426380

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P426294

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 D-2015
Batch ID: P426379

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P426644

Component	Result	Code	Units
Fluoride	0.025	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P426334

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P425972

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P426158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	101		P	85 - 115
Magnesium	105		P	85 - 115
Strontium	98.7		P	85 - 115
Tin	102		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	98.6		P	85 - 115
Zinc	106		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P426273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	105		P	85 - 115
Magnesium	105		P	85 - 115
Strontium	101		P	85 - 115
Tin	99.2		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	98.6		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.7		P	85 - 115
Antimony	99.6		P	85 - 115
Arsenic	96.7		P	85 - 115
Beryllium	93.0		P	85 - 115
Cadmium	98.0		P	85 - 115
Chromium	100		P	85 - 115
Cobalt	98.7		P	85 - 115
Copper	97.6		P	85 - 115
Lead	95.5		P	85 - 115
Manganese	99.3		P	85 - 115
Molybdenum	95.6		P	85 - 115
Nickel	99.9		P	85 - 115
Selenium	98.1		P	85 - 115
Thallium	97.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.8		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Antimony	97.1		P	85 - 115
Arsenic	94.1		P	85 - 115
Beryllium	89.0		P	85 - 115
Cadmium	97.2		P	85 - 115
Chromium	95.0		P	85 - 115
Cobalt	97.1		P	85 - 115
Copper	94.1		P	85 - 115
Lead	93.3		P	85 - 115
Manganese	95.5		P	85 - 115
Molybdenum	94.4		P	85 - 115
Nickel	94.8		P	85 - 115
Selenium	93.5		P	85 - 115
Thallium	97.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426328

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Silver	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426586

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Silver	98.5		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P426474

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P426400

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	105		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P426236

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P426380

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-2011
Batch ID: P426294

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.5		P	94 - 106

Reference Method: SM 2540 D-2015
Batch ID: P426379

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	104		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P426644

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.4		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P426334

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P426158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388015	Calcium	98.1		P	80 - 120
2388015	Iron	99.9	102	P/P	80 - 120
2388015	Magnesium	103	105	P/P	80 - 120
2388015	Strontium	97.4	98.8	P/P	80 - 120
2388015	Tin	102	102	P/P	80 - 120
2388015	Titanium	103	104	P/P	80 - 120
2388015	Vanadium	100	101	P/P	80 - 120
2388015	Zinc	104	105	P/P	80 - 120
2388431	Calcium	97.2		P	80 - 120
2388431	Iron	100		P	80 - 120
2388431	Magnesium	101		P	80 - 120
2388431	Strontium	96.4		P	80 - 120
2388431	Tin	99.4		P	80 - 120
2388431	Titanium	103		P	80 - 120
2388431	Vanadium	101		P	80 - 120
2388431	Zinc	105		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P426273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388189	Iron	102	104	P/P	80 - 120
2388189	Tin	91.3	94.2	P/P	80 - 120
2388189	Titanium	100	104	P/P	80 - 120
2388189	Vanadium	106	110	P/P	80 - 120
2388189	Zinc	103	105	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P426158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388015	Aluminum	112	95.6	P/P	80 - 120
2388015	Antimony	99.9	99.6	P/P	80 - 120
2388015	Arsenic	96.7	96.1	P/P	80 - 120
2388015	Beryllium	94.6	94.7	P/P	80 - 120
2388015	Cadmium	99.8	96.9	P/P	80 - 120
2388015	Chromium	99.4	99.1	P/P	80 - 120
2388015	Cobalt	97.3	96.5	P/P	80 - 120
2388015	Copper	97.1	95.8	P/P	80 - 120
2388015	Lead	96.7	95.0	P/P	80 - 120
2388015	Manganese	101	98.2	P/P	80 - 120
2388015	Molybdenum	97.1	97.0	P/P	80 - 120
2388015	Nickel	99.2	98.2	P/P	80 - 120
2388015	Selenium	96.7	95.7	P/P	80 - 120
2388015	Thallium	98.7	98.8	P/P	80 - 120
2388431	Aluminum	95.8		P	80 - 120
2388431	Antimony	99.4		P	80 - 120
2388431	Arsenic	94.4		P	80 - 120
2388431	Beryllium	91.0		P	80 - 120
2388431	Cadmium	97.2		P	80 - 120
2388431	Chromium	97.4		P	80 - 120
2388431	Cobalt	94.8		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388431	Copper	92.6		P	80 - 120
2388431	Lead	96.0		P	80 - 120
2388431	Manganese	97.1		P	80 - 120
2388431	Molybdenum	94.9		P	80 - 120
2388431	Nickel	97.8		P	80 - 120
2388431	Selenium	95.2		P	80 - 120
2388431	Thallium	97.7		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388189	Aluminum	98.5	99.3	P/P	70 - 130
2388189	Antimony	95.5	96.3	P/P	70 - 130
2388189	Arsenic	104	105	P/P	70 - 130
2388189	Beryllium	89.0	88.3	P/P	70 - 130
2388189	Cadmium	87.3	89.6	P/P	70 - 130
2388189	Chromium	92.0	93.5	P/P	70 - 130
2388189	Cobalt	107	108	P/P	70 - 130
2388189	Copper	96.6	98.5	P/P	70 - 130
2388189	Lead	98.2	102	P/P	70 - 130
2388189	Manganese	88.3	90.8	P/P	70 - 130
2388189	Molybdenum	109	110	P/P	70 - 130
2388189	Nickel	103	104	P/P	70 - 130
2388189	Selenium	90.5	91.9	P/P	70 - 130
2388189	Thallium	106	107	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426328

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388014	Silver	101	102	P/P	80 - 120
2388432	Silver	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426586

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2390063	Silver	90.7	91.5	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P426474

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2389308	Ammonia-N	101	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P426400

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388186	Kjeldahl Nitrogen	103	99.8	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P426236

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388067	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P426380

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388186	Total-P	100	101	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P426644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2389384	Fluoride	97.6	97.6	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P426334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2388186	Organic Carbon	85.0	87.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P425972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2387918	Turbidity	4.23	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P426158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388015	Calcium	0.501	Spike	P	0 - 20
2388015	Iron	1.72	Spike	P	0 - 20
2388015	Magnesium	1.20	Spike	P	0 - 20
2388015	Strontium	1.36	Spike	P	0 - 20
2388015	Tin	0.475	Spike	P	0 - 20
2388015	Titanium	0.653	Spike	P	0 - 20
2388015	Vanadium	0.561	Spike	P	0 - 20
2388015	Zinc	0.557	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P426273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388189	Calcium	1.44	Spike	P	0 - 20
2388189	Iron	1.74	Spike	P	0 - 20
2388189	Magnesium	7.02	Spike	P	0 - 20
2388189	Strontium	1.79	Spike	P	0 - 20
2388189	Tin	2.79	Spike	P	0 - 20
2388189	Titanium	3.17	Spike	P	0 - 20
2388189	Vanadium	3.13	Spike	P	0 - 20
2388189	Zinc	2.42	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P426158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388015	Aluminum	15.6	Spike	P	0 - 20
2388015	Antimony	0.378	Spike	P	0 - 20
2388015	Arsenic	0.653	Spike	P	0 - 20
2388015	Beryllium	0.118	Spike	P	0 - 20
2388015	Cadmium	3.01	Spike	P	0 - 20
2388015	Chromium	0.334	Spike	P	0 - 20
2388015	Cobalt	0.811	Spike	P	0 - 20
2388015	Copper	1.30	Spike	P	0 - 20
2388015	Lead	1.82	Spike	P	0 - 20
2388015	Manganese	1.44	Spike	P	0 - 20
2388015	Molybdenum	0.127	Spike	P	0 - 20
2388015	Nickel	1.06	Spike	P	0 - 20
2388015	Selenium	0.982	Spike	P	0 - 20
2388015	Thallium	0.113	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P426273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388189	Aluminum	0.821	Spike	P	0 - 20
2388189	Antimony	0.880	Spike	P	0 - 20
2388189	Arsenic	1.54	Spike	P	0 - 20
2388189	Beryllium	0.805	Spike	P	0 - 20
2388189	Cadmium	2.54	Spike	P	0 - 20
2388189	Chromium	1.58	Spike	P	0 - 20
2388189	Cobalt	1.23	Spike	P	0 - 20
2388189	Copper	2.04	Spike	P	0 - 20
2388189	Lead	3.59	Spike	P	0 - 20
2388189	Manganese	2.37	Spike	P	0 - 20
2388189	Molybdenum	0.775	Spike	P	0 - 20
2388189	Nickel	0.870	Spike	P	0 - 20
2388189	Selenium	1.51	Spike	P	0 - 20
2388189	Thallium	1.15	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P426328

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388014	Silver	0.206	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P426586

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2390063	Silver	0.874	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P426474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2389308	Ammonia-N	1.76	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P426400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388186	Kjeldahl Nitrogen	2.62	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P426236

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388067	NO2NO3-N	0.0	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P426380

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388186	Total-P	0.302	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P426294

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388336	Total Alkalinity	0.540	Sample	P	0 - 3.8

Reference Method: SM 4500-F- C-2011
Batch ID: P426644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2389384	Fluoride	0.0	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P426334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2388186	Organic Carbon	2.56	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: A117492

Included Lab Sample IDs: 2388185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	102	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A117596

Included Lab Sample IDs: 2388186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A117613

Included Lab Sample IDs: 2388190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.8	99.3	P/P	90 - 110
Iron	99.5	98.9	P/P	90 - 110
Magnesium	99.9	99.4	P/P	90 - 110
Strontium	94.3	100	P/P	90 - 110
Tin	97.3	104	P/P	90 - 110
Titanium	96.7	103	P/P	90 - 110
Vanadium	96.5	103	P/P	90 - 110
Zinc	99.1	108	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A117614

Included Lab Sample IDs: 2388190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.9	96.0	P/P	90 - 110
Antimony	98.9	98.3	P/P	90 - 110
Arsenic	97.7	96.3	P/P	90 - 110
Beryllium	95.6	96.2	P/P	90 - 110
Cadmium	95.5	95.8	P/P	90 - 110
Chromium	97.6	97.3	P/P	90 - 110
Cobalt	96.7	95.3	P/P	90 - 110
Copper	96.4	92.9	P/P	90 - 110
Lead	94.3	93.4	P/P	90 - 110
Manganese	95.7	98.0	P/P	90 - 110
Molybdenum	95.5	94.5	P/P	90 - 110
Nickel	97.2	94.8	P/P	90 - 110
Selenium	97.7	96.9	P/P	90 - 110
Thallium	96.9	96.8	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A117622

Included Lab Sample IDs: 2388185

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A117645

Included Lab Sample IDs: 2388186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	90.9	93.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A117690

Included Lab Sample IDs: 2388190

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A117692

Included Lab Sample IDs: 2388189

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	93.3	93.5	P/P	90 - 110
Antimony	93.0	92.1	P/P	90 - 110
Arsenic	94.0	94.1	P/P	90 - 110
Beryllium	92.8	92.5	P/P	90 - 110
Cadmium	91.9	91.5	P/P	90 - 110
Chromium	91.6	91.8	P/P	90 - 110
Cobalt	95.7	95.5	P/P	90 - 110
Copper	93.1	93.0	P/P	90 - 110
Lead	90.2	90.1	P/P	90 - 110
Manganese	92.4	92.0	P/P	90 - 110
Molybdenum	92.2	92.2	P/P	90 - 110
Nickel	93.7	93.1	P/P	90 - 110
Selenium	92.3	91.8	P/P	90 - 110
Thallium	93.0	92.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A117701

Included Lab Sample IDs: 2388186

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A117718

Included Lab Sample IDs: 2388186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	95.2	95.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A117742

Included Lab Sample IDs: 2388189

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A117742

Included Lab Sample IDs: 2388189

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Strontium	99.9	102	P/P	90 - 110
Tin	99.0	101	P/P	90 - 110
Titanium	99.6	102	P/P	90 - 110
Vanadium	98.7	102	P/P	90 - 110
Zinc	97.9	101	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A117776

Included Lab Sample IDs: 2388185

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A117796

Included Lab Sample IDs: 2388186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A117811

Included Lab Sample IDs: 2388189

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	95.4	95.5	P/P	90 - 110

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

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

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity	101					4.23	
EPA 200.7 Rev. 4.4	Calcium	101	98.1	97.2				0.501
	Calcium	105						1.44
	Iron	101	99.9	102	100			1.72
	Iron	105	102	104				1.74
	Magnesium	105	103	105	101			1.20
	Magnesium	105						7.02
	Strontium	98.7	97.4	98.8	96.4			1.36
	Strontium	101						1.79
	Tin	102	102	102	99.4			0.475
	Tin	99.2	91.3	94.2				2.79
	Titanium	101	103	104	103			0.653
	Titanium	102	100	104				3.17
	Vanadium	98.6	100	101	101			0.561
	Vanadium	98.6	106	110				3.13
	Zinc	106	104	105	105			0.557
	Zinc	103	103	105				2.42
EPA 200.8 Rev. 5.4	Aluminum	96.7	112	95.6	95.8			15.6
	Aluminum	96.8	98.5	99.3				0.821
	Antimony	99.6	99.9	99.6	99.4			0.378
	Antimony	97.1	95.5	96.3				0.880
	Arsenic	96.7	96.7	96.1	94.4			0.653
	Arsenic	94.1	104	105				1.54
	Beryllium	93.0	94.6	94.7	91.0			0.118
	Beryllium	89.0	89.0	88.3				0.805
	Cadmium	98.0	99.8	96.9	97.2			3.01
	Cadmium	97.2	87.3	89.6				2.54
	Chromium	100	99.4	99.1	97.4			0.334
	Chromium	95.0	92.0	93.5				1.58
	Cobalt	98.7	97.3	96.5	94.8			0.811
	Cobalt	97.1	107	108				1.23
	Copper	97.6	97.1	95.8	92.6			1.30
	Copper	94.1	96.6	98.5				2.04
	Lead	95.5	96.7	95.0	96.0			1.82
	Lead	93.3	98.2	102				3.59
	Manganese	99.3	101	98.2	97.1			1.44
	Manganese	95.5	88.3	90.8				2.37
	Molybdenum	95.6	97.1	97.0	94.9			0.127
	Molybdenum	94.4	109	110				0.775
	Nickel	99.9	99.2	98.2	97.8			1.06
	Nickel	94.8	103	104				0.870
	Selenium	98.1	96.7	95.7	95.2			0.982
	Selenium	93.5	90.5	91.9				1.51
	Silver	103	102	101	102			0.206
	Silver	98.5	90.7	91.5				0.874
	Thallium	97.9	98.7	98.8	97.7			0.113
	Thallium	97.8	106	107				1.15
EPA 350.1 Rev. 2.0	Ammonia-N	98.2	101	99.0				1.76
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	103	99.8				2.62
EPA 353.2 Rev. 2.0	NO2NO3-N	100	104	104				0.0
EPA 365.1 Rev. 2.0	Total-P	101	100	101				0.302
SM 2320 B-2011	Total Alkalinity	99.5					0.540	
SM 2540 D-2015	TSS	104						
SM 4500-F- C-2011	Fluoride	99.4	97.6	97.6				0.0

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	LCS	Precision SMP	MS
SM 5310 B-2011	Organic Carbon	95.4	85.0 87.8			2.56

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2388185
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2388189, 2388190
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2388189, 2388190
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2388186
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2388186
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2388186
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2388186
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2388185
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2388190
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2388185
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2388185
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2388186

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	02/16/2023			02/16/2023 15:18	Khloe J Berg	2388185
EPA 200.7 Rev. 4.4	02/16/2023	02/21/2023 12:40	George D Taylor	02/22/2023 16:28	McKinley C Carter	2388190
	02/16/2023	02/23/2023 11:15	Vijayalakshmi Reddy	03/01/2023 20:36	McKinley C Carter	2388189
	02/16/2023	02/23/2023 11:15	Vijayalakshmi Reddy	03/01/2023 21:30	McKinley C Carter	2388189
EPA 200.8 Rev. 5.4	02/16/2023	02/21/2023 12:40	George D Taylor	02/22/2023 13:55	Conrad Hartmann	2388190
	02/16/2023	02/23/2023 11:15	Vijayalakshmi Reddy	02/27/2023 16:12	Emily M Philpot	2388189
	02/16/2023	02/23/2023 11:15	Vijayalakshmi Reddy	02/27/2023 17:39	Emily M Philpot	2388189
	02/16/2023	02/24/2023 10:50	George D Taylor	02/27/2023 14:27	Conrad Hartmann	2388190
	02/16/2023	03/02/2023 10:15	Vijayalakshmi Reddy	03/03/2023 21:51	Emily M Philpot	2388189
EPA 350.1 Rev. 2.0	02/16/2023			02/28/2023 12:21	Ping Hua	2388186
EPA 351.2 Rev. 2.0	02/16/2023	02/27/2023 12:30	Simonne.V. Calhoun	03/03/2023 15:21	Judith K. Clark	2388186
EPA 353.2 Rev. 2.0	02/16/2023			02/22/2023 11:40	Beverly Y. Sanders	2388186
EPA 365.1 Rev. 2.0	02/16/2023	02/27/2023 14:45	Alexis Price	02/28/2023 14:47	James L Waggeberby	2388186
SM 2320 B-2011	02/16/2023			02/23/2023 03:37	Chandler E Cox	2388185
SM 2340 B-2011	02/16/2023			02/22/2023 16:28	McKinley C Carter	2388190
SM 2540 D-2015	02/16/2023			02/20/2023 15:46	Yijie Li	2388185
SM 4500-F- C-2011	02/16/2023			03/02/2023 17:09	Chandler E Cox	2388185
SM 5310 B-2011	02/16/2023			02/23/2023 03:28	Elise M. Gillis	2388186