

Chemical Analysis Report

SE-DIST-2023-03-16-01

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

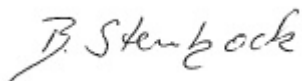
Event Description: **SMP -Port St. Lucie Boat**
Request ID: **RQ-2023-03-06-36**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
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2199 South Rock Road
Fort Pierce, FL 34945
Attn: Andrew Luering

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

Date Certified: 04-APR-2023 16:33



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 group are included in this report: Metals.

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: North Fork St. Lucie River - Prima Vista Blvd

Collection Date/Time: 03/15/2023 10:30

Field ID: G2SE0071

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2394375	EPA 200.7 Rev. 4.4	Calcium	127		mg/L	P427307	
		Iron	430		ug/L	P427307	
		Magnesium	78.2		mg/L	P427307	
		Potassium	20.1		mg/L	P427307	
		Sodium	554		mg/L	P427307	
		Strontium	4.69E+03		ug/L	P427307	
		Tin	3.0	U	ug/L	P427307	
		Titanium	9.2		ug/L	P427307	
		Vanadium	2.0	U	ug/L	P427307	
		Zinc	5.0	U	ug/L	P427307	
	EPA 200.8 Rev. 5.4	Aluminum	193		ug/L	P427307	
		Antimony	0.10	I	ug/L	P427307	
		Arsenic	1.73		ug/L	P427307	
		Barium	49.6		ug/L	P427307	
		Beryllium	0.012	I	ug/L	P427307	
		Boron	239		ug/L	P427307	
		Cadmium	0.020	U	ug/L	P427307	
		Chromium	0.52	I	ug/L	P427307	
		Cobalt	0.084		ug/L	P427307	
		Copper	2.20		ug/L	P427307	
		Lead	0.26	I	ug/L	P427307	
		Manganese	28.4		ug/L	P427307	
		Molybdenum	3.23		ug/L	P427307	
		Nickel	0.50	U	ug/L	P427307	
		Selenium	0.24	I	ug/L	P427307	
		Silver	0.010	U	ug/L	P427307	
		Thallium	0.10	U	ug/L	P427307	
	SM 2340 B-2011	Hardness	639		mg/L	P427307	

Sample Location: North Fork St. Lucie River - north of Port St. Lucie Blvd

Collection Date/Time: 03/15/2023 11:10

Field ID: G2SE0070

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2394376	EPA 200.7 Rev. 4.4	Calcium	198		mg/L	P427303	
		Iron	160	I	ug/L	P427303	
		Magnesium	390		mg/L	P427303	
		Potassium	112		mg/L	P427303	
		Sodium	2.91E+03		mg/L	P427303	
		Strontium	4.68E+03		ug/L	P427303	
		Tin	9.0	U	ug/L	P427303	
		Titanium	2.2	U	ug/L	P427303	
		Vanadium	6.0	U	ug/L	P427303	
	EPA 200.8 Rev. 5.4	Zinc	15	U	ug/L	P427303	
		Aluminum	178		ug/L	P427303	
		Antimony	0.50	U	ug/L	P427303	
		Arsenic	2.16		ug/L	P427303	
		Barium	45.4		ug/L	P427303	
		Beryllium	0.040	U	ug/L	P427303	
		Boron	1.26E+03		ug/L	P427303	
		Cadmium	0.080	U	ug/L	P427303	
		Chromium	1.6	U	ug/L	P427303	
		Cobalt	0.12	I	ug/L	P427303	
		Copper	1.9	I	ug/L	P427303	
		Lead	0.80	U	ug/L	P427303	
		Manganese	29.8		ug/L	P427303	
		Molybdenum	5.0		ug/L	P427303	
		Nickel	2.0	U	ug/L	P427303	
		Selenium	0.80	U	ug/L	P427303	
		Silver	0.040	U	ug/L	P427303	
		Thallium	0.40	U	ug/L	P427303	
	SM 2340 B-2011	Hardness	2.10E+03		mg/L	P427303	

Ref. Method and Comment:

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

SM 2340 B-2011: Batch matrix spike recoveries for calcium, magnesium, potassium, sodium and strontium are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427303

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 200.7 Rev. 4.4

Batch ID: P427307

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: P427303

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P427307

Component	Result	Code	Units
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Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427307

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427303

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	107		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	101		P	85 - 115
Sodium	96.6		P	85 - 115
Strontium	100		P	85 - 115
Tin	106		P	85 - 115
Titanium	104		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	106		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	94.7		P	85 - 115
Sodium	99.9		P	85 - 115
Strontium	100		P	85 - 115
Tin	98.7		P	85 - 115
Titanium	101		P	85 - 115
Vanadium	99.7		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P427303

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	108		P	85 - 115
Arsenic	103		P	85 - 115
Barium	104		P	85 - 115
Beryllium	93.3		P	85 - 115
Boron	93.3		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	104		P	85 - 115
Copper	101		P	85 - 115
Lead	100		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	103		P	85 - 115
Nickel	103		P	85 - 115
Selenium	102		P	85 - 115
Silver	105		P	85 - 115
Thallium	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P427307

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

Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	102		P	85 - 115
Barium	103		P	85 - 115
Beryllium	98.8		P	85 - 115
Boron	100		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	100		P	85 - 115
Copper	99.5		P	85 - 115
Lead	97.6		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	101		P	85 - 115
Selenium	103		P	85 - 115
Silver	99.8		P	85 - 115
Thallium	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427303

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2394376	Iron	107	104	P/P	70 - 130
2394376	Tin	88.9	92.9	P/P	70 - 130
2394376	Titanium	106	106	P/P	70 - 130
2394376	Vanadium	105	104	P/P	70 - 130
2394376	Zinc	99.8	99.6	P/P	70 - 130

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2393776	Calcium	102		P	80 - 120
2393776	Iron	112	105	P/P	80 - 120
2393776	Magnesium	109	98.5	P/P	80 - 120
2393776	Potassium	104	97.9	P/P	80 - 120
2393776	Sodium	108	98.2	P/P	80 - 120
2393776	Strontium	108	101	P/P	80 - 120
2393776	Tin	105	97.7	P/P	80 - 120
2393776	Titanium	109	103	P/P	80 - 120
2393776	Vanadium	108	101	P/P	80 - 120
2393776	Zinc	105	99.0	P/P	80 - 120
2394382	Calcium	106		P	80 - 120
2394382	Iron	114		P	80 - 120
2394382	Magnesium	116		P	80 - 120
2394382	Potassium	101		P	80 - 120
2394382	Sodium	109		P	80 - 120
2394382	Strontium	108		P	80 - 120
2394382	Tin	105		P	80 - 120
2394382	Titanium	109		P	80 - 120
2394382	Vanadium	107		P	80 - 120
2394382	Zinc	104		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P427303

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2394376	Aluminum	108	108	P/P	70 - 130
2394376	Antimony	103	102	P/P	70 - 130
2394376	Arsenic	118	120	P/P	70 - 130
2394376	Barium	107	108	P/P	70 - 130
2394376	Beryllium	103	101	P/P	70 - 130
2394376	Boron	101	107	P/P	70 - 130
2394376	Cadmium	99.8	103	P/P	70 - 130
2394376	Chromium	102	103	P/P	70 - 130
2394376	Cobalt	119	119	P/P	70 - 130
2394376	Copper	108	108	P/P	70 - 130
2394376	Lead	111	112	P/P	70 - 130
2394376	Manganese	98.5	97.3	P/P	70 - 130
2394376	Molybdenum	121	123	P/P	70 - 130
2394376	Nickel	115	116	P/P	70 - 130
2394376	Selenium	105	106	P/P	70 - 130
2394376	Silver	96.9	98.1	P/P	70 - 130
2394376	Thallium	118	118	P/P	70 - 130

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2393776	Aluminum	98.9	98.0	P/P	80 - 120
2393776	Antimony	99.5	99.1	P/P	80 - 120
2393776	Arsenic	99.9	99.1	P/P	80 - 120
2393776	Barium	102	100	P/P	80 - 120
2393776	Beryllium	98.0	97.2	P/P	80 - 120
2393776	Boron	99.5	98.3	P/P	80 - 120
2393776	Cadmium	102	101	P/P	80 - 120
2393776	Chromium	99.6	99.1	P/P	80 - 120
2393776	Cobalt	98.4	97.4	P/P	80 - 120
2393776	Copper	98.6	97.8	P/P	80 - 120
2393776	Lead	97.6	95.7	P/P	80 - 120
2393776	Manganese	101	101	P/P	80 - 120
2393776	Molybdenum	103	101	P/P	80 - 120
2393776	Nickel	99.0	98.5	P/P	80 - 120
2393776	Selenium	101	101	P/P	80 - 120
2393776	Silver	99.2	98.7	P/P	80 - 120
2393776	Thallium	102	101	P/P	80 - 120
2394382	Aluminum	99.8		P	80 - 120
2394382	Antimony	100		P	80 - 120
2394382	Arsenic	99.4		P	80 - 120
2394382	Barium	103		P	80 - 120
2394382	Beryllium	97.7		P	80 - 120
2394382	Boron	100		P	80 - 120
2394382	Cadmium	100		P	80 - 120
2394382	Chromium	99.3		P	80 - 120
2394382	Cobalt	96.6		P	80 - 120
2394382	Copper	98.5		P	80 - 120
2394382	Lead	97.2		P	80 - 120
2394382	Manganese	100		P	80 - 120
2394382	Molybdenum	102		P	80 - 120
2394382	Nickel	99.4		P	80 - 120
2394382	Selenium	102		P	80 - 120
2394382	Silver	98.1		P	80 - 120
2394382	Thallium	101		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427303

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2394376	Calcium	1.64	Spike	P	0 - 20
2394376	Iron	3.08	Spike	P	0 - 20
2394376	Magnesium	1.69	Spike	P	0 - 20
2394376	Potassium	1.81	Spike	P	0 - 20
2394376	Sodium	1.65	Spike	P	0 - 20
2394376	Strontium	2.86	Spike	P	0 - 20
2394376	Tin	4.36	Spike	P	0 - 20
2394376	Titanium	0.0511	Spike	P	0 - 20
2394376	Vanadium	1.37	Spike	P	0 - 20
2394376	Zinc	0.239	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P427307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2393776	Calcium	6.47	Spike	P	0 - 20
2393776	Iron	6.85	Spike	P	0 - 20
2393776	Magnesium	7.10	Spike	P	0 - 20
2393776	Potassium	5.77	Spike	P	0 - 20
2393776	Sodium	6.04	Spike	P	0 - 20
2393776	Strontium	6.67	Spike	P	0 - 20
2393776	Tin	6.95	Spike	P	0 - 20
2393776	Titanium	5.71	Spike	P	0 - 20
2393776	Vanadium	6.99	Spike	P	0 - 20
2393776	Zinc	5.70	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P427303

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2394376	Aluminum	0.314	Spike	P	0 - 20
2394376	Antimony	0.400	Spike	P	0 - 20
2394376	Arsenic	1.37	Spike	P	0 - 20
2394376	Barium	0.919	Spike	P	0 - 20
2394376	Beryllium	2.59	Spike	P	0 - 20
2394376	Boron	0.827	Spike	P	0 - 20
2394376	Cadmium	2.80	Spike	P	0 - 20
2394376	Chromium	0.993	Spike	P	0 - 20
2394376	Cobalt	0.0631	Spike	P	0 - 20
2394376	Copper	0.404	Spike	P	0 - 20
2394376	Lead	0.715	Spike	P	0 - 20
2394376	Manganese	0.829	Spike	P	0 - 20
2394376	Molybdenum	1.48	Spike	P	0 - 20
2394376	Nickel	1.09	Spike	P	0 - 20
2394376	Selenium	0.971	Spike	P	0 - 20
2394376	Silver	1.22	Spike	P	0 - 20
2394376	Thallium	0.186	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2393776	Aluminum	0.861	Spike	P	0 - 20
2393776	Antimony	0.381	Spike	P	0 - 20
2393776	Arsenic	0.861	Spike	P	0 - 20
2393776	Barium	1.01	Spike	P	0 - 20
2393776	Beryllium	0.873	Spike	P	0 - 20
2393776	Boron	1.14	Spike	P	0 - 20
2393776	Cadmium	0.694	Spike	P	0 - 20
2393776	Chromium	0.403	Spike	P	0 - 20
2393776	Cobalt	1.09	Spike	P	0 - 20
2393776	Copper	0.858	Spike	P	0 - 20
2393776	Lead	1.96	Spike	P	0 - 20
2393776	Manganese	0.00361	Spike	P	0 - 20
2393776	Molybdenum	1.52	Spike	P	0 - 20
2393776	Nickel	0.547	Spike	P	0 - 20
2393776	Selenium	0.631	Spike	P	0 - 20
2393776	Silver	0.507	Spike	P	0 - 20
2393776	Thallium	0.952	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A118085

Included Lab Sample IDs: 2394375

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.0	99.8	P/P	90 - 110
Antimony	97.2	98.1	P/P	90 - 110
Arsenic	99.3	98.8	P/P	90 - 110
Barium	99.8	100	P/P	90 - 110
Beryllium	98.0	98.5	P/P	90 - 110
Boron	96.8	97.5	P/P	90 - 110
Cadmium	99.1	99.7	P/P	90 - 110
Chromium	97.5	96.7	P/P	90 - 110
Cobalt	95.8	94.9	P/P	90 - 110
Copper	96.4	97.3	P/P	90 - 110
Lead	94.5	96.2	P/P	90 - 110
Manganese	100	98.1	P/P	90 - 110
Molybdenum	98.0	98.0	P/P	90 - 110
Nickel	97.4	96.4	P/P	90 - 110
Selenium	100	99.5	P/P	90 - 110
Silver	96.7	96.4	P/P	90 - 110
Thallium	101	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A118086

Included Lab Sample IDs: 2394376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	105	P/P	90 - 110
Arsenic	105	106	P/P	90 - 110
Barium	103	103	P/P	90 - 110
Beryllium	101	102	P/P	90 - 110
Boron	103	105	P/P	90 - 110
Cadmium	102	102	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Cobalt	104	105	P/P	90 - 110
Copper	103	104	P/P	90 - 110
Lead	98.8	99.9	P/P	90 - 110
Manganese	100	102	P/P	90 - 110
Molybdenum	102	103	P/P	90 - 110
Nickel	104	105	P/P	90 - 110
Selenium	103	105	P/P	90 - 110
Silver	104	104	P/P	90 - 110
Thallium	103	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A118132

Included Lab Sample IDs: 2394376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	98.8	97.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A118244

Included Lab Sample IDs: 2394376

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	105	105	P/P	90 - 110
Iron	106	104	P/P	90 - 110
Magnesium	106	104	P/P	90 - 110
Potassium	102	100	P/P	90 - 110
Sodium	96.2	94.4	P/P	90 - 110
Strontium	101	102	P/P	90 - 110
Tin	102	102	P/P	90 - 110
Titanium	103	103	P/P	90 - 110
Vanadium	103	103	P/P	90 - 110
Zinc	102	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A118283

Included Lab Sample IDs: 2394375

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	99.5	106	P/P	90 - 110
Iron	102	108	P/P	90 - 110
Magnesium	99.2	105	P/P	90 - 110
Potassium	94.1	99.5	P/P	90 - 110
Sodium	96.4	101	P/P	90 - 110
Strontium	103	99.4	P/P	90 - 110
Tin	103	100	P/P	90 - 110
Titanium	102	98.6	P/P	90 - 110
Vanadium	101	98.0	P/P	90 - 110
Zinc	102	101	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 200.7 Rev. 4.4	Calcium	106						1.64
	Calcium	105	102	106				6.47
	Iron	107	107	104				3.08
	Iron	106	112	105	114			6.85
	Magnesium	104						1.69
	Magnesium	102	109	98.5	116			7.10
	Potassium	101						1.81
	Potassium	94.7	104	97.9	101			5.77
	Sodium	96.6						1.65
	Sodium	99.9	108	98.2	109			6.04
	Strontium	100						2.86
	Strontium	100	108	101	108			6.67
	Tin	106	88.9	92.9				4.36
	Tin	98.7	105	97.7	105			6.95
	Titanium	104	106	106				0.0511
	Titanium	101	109	103	109			5.71
	Vanadium	103	105	104				1.37
	Vanadium	99.7	108	101	107			6.99
	Zinc	104	99.8	99.6				0.239
	Zinc	103	105	99.0	104			5.70
EPA 200.8 Rev. 5.4	Aluminum	103	108	108				0.314
	Aluminum	101	98.9	98.0	99.8			0.861
	Antimony	108	103	102				0.400
	Antimony	100	99.5	99.1	100			0.381
	Arsenic	103	118	120				1.37
	Arsenic	102	99.9	99.1	99.4			0.861
	Barium	104	107	108				0.919
	Barium	103	102	100	103			1.01
	Beryllium	93.3	103	101				2.59
	Beryllium	98.8	98.0	97.2	97.7			0.873
	Boron	93.3	101	107				0.827
	Boron	100	99.5	98.3	100			1.14
	Cadmium	105	99.8	103				2.80
	Cadmium	102	102	101	100			0.694
	Chromium	103	102	103				0.993
	Chromium	101	99.6	99.1	99.3			0.403
	Cobalt	104	119	119				0.0631
	Cobalt	100	98.4	97.4	96.6			1.09
	Copper	101	108	108				0.404
	Copper	99.5	98.6	97.8	98.5			0.858
	Lead	100	111	112				0.715
	Lead	97.6	97.6	95.7	97.2			1.96
	Manganese	102	98.5	97.3				0.829
	Manganese	101	101	101	100			0.0036
	Molybdenum	103	121	123				1.48
	Molybdenum	101	103	101	102			1.52
	Nickel	103	115	116				1.09
	Nickel	101	99.0	98.5	99.4			0.547
	Selenium	102	105	106				0.971
	Selenium	103	101	101	102			0.631
	Silver	105	96.9	98.1				1.22
	Silver	99.8	99.2	98.7	98.1			0.507
	Thallium	105	118	118				0.186
	Thallium	101	102	101	101			0.952

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2394375, 2394376
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2394375, 2394376
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2394375, 2394376

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 200.7 Rev. 4.4	03/16/2023	03/17/2023 12:20	George D Taylor	03/28/2023 23:09	McKinley C Carter	2394376
	03/16/2023	03/17/2023 12:20	George D Taylor	03/28/2023 23:40	McKinley C Carter	2394376
	03/16/2023	03/17/2023 12:20	George D Taylor	03/29/2023 18:17	Chase Roberts	2394375
	03/16/2023	03/17/2023 12:20	George D Taylor	03/29/2023 18:25	Chase Roberts	2394375
EPA 200.8 Rev. 5.4	03/16/2023	03/17/2023 12:20	George D Taylor	03/20/2023 17:28	Conrad Hartmann	2394375
	03/16/2023	03/17/2023 12:20	George D Taylor	03/20/2023 18:13	Emily M Philpot	2394376
	03/16/2023	03/17/2023 12:20	George D Taylor	03/21/2023 19:50	Emily M Philpot	2394376
SM 2340 B-2011	03/16/2023			03/28/2023 23:40	McKinley C Carter	2394376
	03/16/2023			03/29/2023 18:17	Chase Roberts	2394375