Chemical Analysis Report

SE-DIST-2024-05-21-02

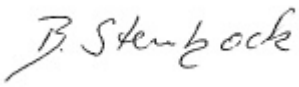
Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **SMP - Sebastian**
Request ID: **RQ-2024-04-29-38**
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: Andrew Luering

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

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 06-JUN-2024 12:21



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: SOUTH PRONG SEBASTIAN AT PARK DOCK **Collection Date/Time: 05/09/2024 11:10**

Field ID: G5SE0079 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2488542	EPA 200.7 Rev. 4.4	Calcium	292		mg/L	P445619	
		Iron	180	I	ug/L	P445619	
		Magnesium	765		mg/L	P445619	
		Potassium	225		mg/L	P445619	
		Sodium	6.17E+03		mg/L	P445619	
		Strontium	7.80E+03		ug/L	P445619	
		Tin	12	U	ug/L	P445619	
		Titanium	5.8	I	ug/L	P445619	
		Vanadium	8.0	U	ug/L	P445619	
		Zinc	30	I	ug/L	P445619	
	EPA 200.8 Rev. 5.4	Aluminum	160	I	ug/L	P445619	
		Antimony	0.20	U	ug/L	P445619	
		Arsenic	1.40		ug/L	P445619	
		Barium	41.0		ug/L	P445619	
		Beryllium	0.15	U	ug/L	P445619	
		Boron	2.40E+03		ug/L	P445619	
		Cadmium	0.080	U	ug/L	P445619	
		Chromium	4.0	U	ug/L	P445619	
		Cobalt	0.20	I	ug/L	P445619	
		Copper	1.6	U	ug/L	P445619	
		Lead	0.80	U	ug/L	P445619	
		Manganese	10.7		ug/L	P445619	
		Molybdenum	8.0		ug/L	P445619	
		Nickel	2.0	U	ug/L	P445619	
		Selenium	0.80	U	ug/L	P445619	
		Silver	0.040	U	ug/L	P445619	
		Thallium	0.40	U	ug/L	P445619	
	SM 2340 B-2011	Hardness	3.88E+03		mg/L	P445619	

Ref. Method and Comment:
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium, potassium and sodium are unavailable because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for boron are unavailable because of high analyte concentration in the QC sample.

Sample Location: FB **Collection Date/Time: 05/09/2024 11:15**

Field ID: FB_05092024 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2488543	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P445726	
		Iron	30	U	ug/L	P445726	
		Magnesium	0.040	U	mg/L	P445726	
		Potassium	0.30	U	mg/L	P445726	
		Sodium	0.50	U	mg/L	P445726	
		Strontium	2.0	U	ug/L	P445726	
		Tin	3.0	U	ug/L	P445726	
		Titanium	0.75	U	ug/L	P445726	
		Vanadium	2.0	U	ug/L	P445726	
		Zinc	5.0	U	ug/L	P445726	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P445726	
		Antimony	0.050	U	ug/L	P445726	
		Arsenic	0.050	U	ug/L	P445726	
		Barium	0.20	U	ug/L	P445726	
		Beryllium	0.010	U	ug/L	P445726	
		Boron	2.0	U	ug/L	P445726	
		Cadmium	0.020	U	ug/L	P445726	
		Chromium	0.40	U	ug/L	P445889	
		Cobalt	0.020	U	ug/L	P445726	
		Copper	0.40	U	ug/L	P445726	
		Lead	0.20	U	ug/L	P445726	
		Manganese	0.10	U	ug/L	P445726	
		Molybdenum	0.15	U	ug/L	P445726	
		Nickel	0.50	U	ug/L	P445726	
		Selenium	0.20	U	ug/L	P445726	
		Silver	0.010	U	ug/L	P445889	
		Thallium	0.10	U	ug/L	P445726	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445619

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: P445726

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: P445619

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: P445726

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

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
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: P445889

Component	Result	Code	Units
Chromium	0.40	U	ug/L
Silver	0.010	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	98.7		P	85 - 115
Iron	102		P	85 - 115
Magnesium	97.6		P	85 - 115
Potassium	95.4		P	85 - 115
Sodium	98.6		P	85 - 115
Strontium	93.6		P	85 - 115
Tin	96.2		P	85 - 115
Titanium	97.6		P	85 - 115
Vanadium	95.1		P	85 - 115
Zinc	95.8		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445726

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	100		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	96.8		P	85 - 115
Sodium	102		P	85 - 115
Strontium	98.3		P	85 - 115
Tin	94.7		P	85 - 115
Titanium	97.3		P	85 - 115
Vanadium	96.9		P	85 - 115
Zinc	96.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	103		P	85 - 115
Barium	103		P	85 - 115
Beryllium	101		P	85 - 115
Boron	104		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	99.8		P	85 - 115
Copper	98.9		P	85 - 115
Lead	103		P	85 - 115
Manganese	104		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	99.9		P	85 - 115
Selenium	104		P	85 - 115
Silver	95.6		P	85 - 115
Thallium	98.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	108		P	85 - 115
Arsenic	105		P	85 - 115
Barium	105		P	85 - 115
Beryllium	106		P	85 - 115
Boron	109		P	85 - 115
Cadmium	105		P	85 - 115
Cobalt	105		P	85 - 115
Copper	101		P	85 - 115
Lead	103		P	85 - 115
Manganese	105		P	85 - 115
Molybdenum	104		P	85 - 115
Nickel	104		P	85 - 115
Selenium	109		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	106		P	85 - 115
Silver	110		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445619

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2487818	Iron	101	103	P/P	70 - 130
2487818	Strontium	93.5	92.5	P/P	70 - 130
2487818	Tin	96.5	98.3	P/P	70 - 130
2487818	Titanium	96.0	98.1	P/P	70 - 130
2487818	Vanadium	97.6	99.2	P/P	70 - 130
2487818	Zinc	99.0	99.8	P/P	70 - 130

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445726

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2488540	Calcium	101	100	P/P	80 - 120
2488540	Iron	98.9	99.0	P/P	80 - 120
2488540	Magnesium	100	101	P/P	80 - 120
2488540	Potassium	98.2	99.8	P/P	80 - 120
2488540	Sodium	96.0	95.5	P/P	80 - 120
2488540	Strontium	95.9	97.4	P/P	80 - 120
2488540	Tin	93.7	94.6	P/P	80 - 120
2488540	Titanium	95.8	97.1	P/P	80 - 120
2488540	Vanadium	95.8	96.8	P/P	80 - 120
2488540	Zinc	96.5	96.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445619

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2487818	Aluminum	102	104	P/P	70 - 130
2487818	Antimony	110	109	P/P	70 - 130
2487818	Arsenic	116	116	P/P	70 - 130
2487818	Barium	110	108	P/P	70 - 130
2487818	Beryllium	94.3	101	P/P	70 - 130
2487818	Cadmium	103	99.1	P/P	70 - 130
2487818	Chromium	97.5	98.4	P/P	70 - 130
2487818	Cobalt	96.1	96.9	P/P	70 - 130
2487818	Copper	100	100	P/P	70 - 130
2487818	Lead	110	109	P/P	70 - 130
2487818	Manganese	98.3	97.8	P/P	70 - 130
2487818	Molybdenum	114	113	P/P	70 - 130
2487818	Nickel	100	101	P/P	70 - 130
2487818	Selenium	111	110	P/P	70 - 130
2487818	Silver	91.7	91.1	P/P	70 - 130
2487818	Thallium	106	105	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2488540	Aluminum	102	102	P/P	80 - 120
2488540	Antimony	105	105	P/P	80 - 120
2488540	Arsenic	103	103	P/P	80 - 120
2488540	Barium	102	103	P/P	80 - 120
2488540	Beryllium	103	105	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2488540	Boron	110	108	P/P	80 - 120
2488540	Cadmium	101	101	P/P	80 - 120
2488540	Cobalt	105	105	P/P	80 - 120
2488540	Copper	104	104	P/P	80 - 120
2488540	Lead	103	103	P/P	80 - 120
2488540	Manganese	104	103	P/P	80 - 120
2488540	Molybdenum	101	101	P/P	80 - 120
2488540	Nickel	104	103	P/P	80 - 120
2488540	Selenium	106	104	P/P	80 - 120
2488540	Thallium	102	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2489618	Chromium	101	99.7	P/P	80 - 120
2489618	Silver	108	107	P/P	80 - 120
2489914	Chromium	102		P	80 - 120
2489914	Silver	107		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2487818	Calcium	1.44	Spike	P	0 - 20
2487818	Iron	2.10	Spike	P	0 - 20
2487818	Magnesium	0.722	Spike	P	0 - 20
2487818	Potassium	1.86	Spike	P	0 - 20
2487818	Sodium	0.417	Spike	P	0 - 20
2487818	Strontium	0.574	Spike	P	0 - 20
2487818	Tin	1.91	Spike	P	0 - 20
2487818	Titanium	1.94	Spike	P	0 - 20
2487818	Vanadium	1.67	Spike	P	0 - 20
2487818	Zinc	0.821	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P445726

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2488540	Calcium	0.176	Spike	P	0 - 20
2488540	Iron	0.0756	Spike	P	0 - 20
2488540	Magnesium	0.208	Spike	P	0 - 20
2488540	Potassium	1.60	Spike	P	0 - 20
2488540	Sodium	0.291	Spike	P	0 - 20
2488540	Strontium	1.60	Spike	P	0 - 20
2488540	Tin	0.956	Spike	P	0 - 20
2488540	Titanium	1.43	Spike	P	0 - 20
2488540	Vanadium	1.07	Spike	P	0 - 20
2488540	Zinc	0.457	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2487818	Aluminum	1.89	Spike	P	0 - 20
2487818	Antimony	1.09	Spike	P	0 - 20
2487818	Arsenic	0.366	Spike	P	0 - 20
2487818	Barium	0.898	Spike	P	0 - 20
2487818	Beryllium	6.76	Spike	P	0 - 20
2487818	Boron	0.0748	Spike	P	0 - 20
2487818	Cadmium	3.81	Spike	P	0 - 20
2487818	Chromium	0.938	Spike	P	0 - 20
2487818	Cobalt	0.814	Spike	P	0 - 20
2487818	Copper	0.0323	Spike	P	0 - 20
2487818	Lead	0.879	Spike	P	0 - 20
2487818	Manganese	0.395	Spike	P	0 - 20
2487818	Molybdenum	0.863	Spike	P	0 - 20
2487818	Nickel	0.632	Spike	P	0 - 20
2487818	Selenium	0.513	Spike	P	0 - 20
2487818	Silver	0.662	Spike	P	0 - 20
2487818	Thallium	0.808	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445726

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2488540	Aluminum	0.0565	Spike	P	0 - 20
2488540	Antimony	0.150	Spike	P	0 - 20
2488540	Arsenic	0.363	Spike	P	0 - 20
2488540	Barium	1.00	Spike	P	0 - 20
2488540	Beryllium	2.08	Spike	P	0 - 20
2488540	Boron	1.60	Spike	P	0 - 20
2488540	Cadmium	0.518	Spike	P	0 - 20
2488540	Cobalt	0.376	Spike	P	0 - 20
2488540	Copper	0.00346	Spike	P	0 - 20
2488540	Lead	0.0822	Spike	P	0 - 20
2488540	Manganese	0.689	Spike	P	0 - 20
2488540	Molybdenum	0.350	Spike	P	0 - 20
2488540	Nickel	0.893	Spike	P	0 - 20
2488540	Selenium	1.56	Spike	P	0 - 20
2488540	Thallium	0.00765	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P445889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2489618	Chromium	0.884	Spike	P	0 - 20
2489618	Silver	0.956	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: A125863
Included Lab Sample IDs: 2488542

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	102	P/P	90 - 110
Antimony	103	101	P/P	90 - 110
Arsenic	102	104	P/P	90 - 110
Barium	103	101	P/P	90 - 110
Beryllium	99.4	99.1	P/P	90 - 110
Boron	98.9	99.9	P/P	90 - 110
Cadmium	105	100	P/P	90 - 110
Chromium	100	98.7	P/P	90 - 110
Cobalt	98.6	100	P/P	90 - 110
Copper	99.4	101	P/P	90 - 110
Lead	103	103	P/P	90 - 110
Manganese	100	99.0	P/P	90 - 110
Molybdenum	101	99.8	P/P	90 - 110
Nickel	100	101	P/P	90 - 110
Selenium	103	103	P/P	90 - 110
Silver	101	99.3	P/P	90 - 110
Thallium	101	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A125865
Included Lab Sample IDs: 2488542

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.9	97.7	P/P	90 - 110
Iron	97.7	96.2	P/P	90 - 110
Magnesium	97.7	96.4	P/P	90 - 110
Potassium	97.8	96.1	P/P	90 - 110
Sodium	98.8	97.5	P/P	90 - 110
Strontium	98.9	94.7	P/P	90 - 110
Tin	99.0	98.3	P/P	90 - 110
Titanium	96.7	97.9	P/P	90 - 110
Vanadium	94.2	92.6	P/P	90 - 110
Zinc	96.6	98.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A125902
Included Lab Sample IDs: 2488543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.2	98.5	P/P	95 - 105
Iron	96.4	95.5	P/P	95 - 105
Magnesium	96.6	96.1	P/P	95 - 105
Potassium	97.2	97.2	P/P	95 - 105
Sodium	98.1	97.6	P/P	95 - 105
Strontium	102	97.0	P/P	95 - 105
Tin	97.8	97.3	P/P	95 - 105
Titanium	96.4	97.3	P/P	95 - 105
Vanadium	95.8	96.1	P/P	95 - 105
Zinc	97.3	98.9	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A125910
Included Lab Sample IDs: 2488543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	101	P/P	90 - 110
Antimony	106	103	P/P	90 - 110
Arsenic	103	103	P/P	90 - 110
Barium	101	98.7	P/P	90 - 110
Beryllium	102	102	P/P	90 - 110
Boron	102	102	P/P	90 - 110
Cadmium	104	103	P/P	90 - 110
Cobalt	103	103	P/P	90 - 110
Copper	102	102	P/P	90 - 110
Lead	103	101	P/P	90 - 110
Manganese	102	99.6	P/P	90 - 110
Molybdenum	101	101	P/P	90 - 110
Nickel	104	104	P/P	90 - 110
Selenium	105	104	P/P	90 - 110
Thallium	103	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A125959
Included Lab Sample IDs: 2488543

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	103	102	P/P	90 - 110
Silver	101	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
EPA 200.7 Rev. 4.4	Calcium	98.7					1.44
	Calcium	104	101	100			0.176
	Iron	102	101	103			2.10
	Iron	100	98.9	99.0			0.0756
	Magnesium	97.6					0.722
	Magnesium	102	100	101			0.208
	Potassium	95.4					1.86
	Potassium	96.8	98.2	99.8			1.60
	Sodium	98.6					0.417
	Sodium	102	96.0	95.5			0.291
	Strontium	93.6	93.5	92.5			0.574
	Strontium	98.3	95.9	97.4			1.60
	Tin	96.2	96.5	98.3			1.91
	Tin	94.7	93.7	94.6			0.956
	Titanium	97.6	96.0	98.1			1.94
	Titanium	97.3	95.8	97.1			1.43
	Vanadium	95.1	97.6	99.2			1.67
	Vanadium	96.9	95.8	96.8			1.07
	Zinc	95.8	99.0	99.8			0.821
	Zinc	96.8	96.5	96.9			0.457
EPA 200.8 Rev. 5.4	Aluminum	102	102	104			1.89
	Aluminum	103	102	102			0.0565
	Antimony	102	110	109			1.09
	Antimony	108	105	105			0.150
	Arsenic	103	116	116			0.366
	Arsenic	105	103	103			0.363
	Barium	103	110	108			0.898
	Barium	105	102	103			1.00
	Beryllium	101	94.3	101			6.76
	Beryllium	106	103	105			2.08
	Boron	104					0.0748
	Boron	109	110	108			1.60
	Cadmium	101	99.1	103			3.81
	Cadmium	105	101	101			0.518
	Chromium	101	97.5	98.4			0.938
	Chromium	106	102	101	99.7		0.884
	Cobalt	99.8	96.1	96.9			0.814
	Cobalt	105	105	105			0.376
	Copper	98.9	100	100			0.0323
	Copper	101	104	104			0.0034
	Lead	103	110	109			0.879
	Lead	103	103	103			0.0822
	Manganese	104	98.3	97.8			0.395
	Manganese	105	104	103			0.689
	Molybdenum	101	114	113			0.863
	Molybdenum	104	101	101			0.350
	Nickel	99.9	100	101			0.632
	Nickel	104	104	103			0.893
	Selenium	104	111	110			0.513
	Selenium	109	106	104			1.56
	Silver	95.6	91.7	91.1			0.662
	Silver	110	108	107	107		0.956
	Thallium	98.4	106	105			0.808
	Thallium	103	102	102			0.0076

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2488542, 2488543
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2488542, 2488543
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2488542

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	05/20/2024	05/22/2024 12:25	George D Taylor	05/23/2024 15:05	Conrad Hartmann	2488542
	05/20/2024	05/22/2024 12:25	George D Taylor	05/23/2024 15:13	Conrad Hartmann	2488542
	05/20/2024	05/28/2024 11:30	George D Taylor	05/29/2024 12:58	McKinley C Carter	2488543
EPA 200.8 Rev. 5.4	05/20/2024	05/22/2024 12:25	George D Taylor	05/23/2024 16:14	Emily M Philpot	2488542
	05/20/2024	05/22/2024 12:25	George D Taylor	05/23/2024 17:25	Emily M Philpot	2488542
	05/20/2024	05/22/2024 12:25	George D Taylor	05/23/2024 17:43	Emily M Philpot	2488542
	05/20/2024	05/28/2024 11:30	George D Taylor	05/29/2024 16:38	McKinley C Carter	2488543
	05/20/2024	05/31/2024 13:10	George D Taylor	06/03/2024 18:27	McKinley C Carter	2488543
SM 2340 B-2011	05/20/2024			05/23/2024 15:13	Conrad Hartmann	2488542