Chemical Analysis Report

SW-DIST-2022-09-22-02

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

Event Description: **Metals**
Request ID: **RQ-2022-09-19-70**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
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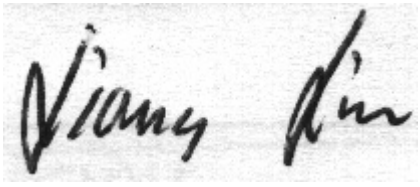
Date Certified: 05-OCT-2022 10:27



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: Bear Creek @ Beacon **Collection Date/Time: 09/21/2022 12:10**

Field ID: G5SW0102 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2358861	EPA 200.7 Rev. 4.4	Calcium	63.5		mg/L	P420081	
		Iron	470		ug/L	P420081	
		Magnesium	4.33		mg/L	P420081	
		Potassium	2.4		mg/L	P420081	
		Sodium	53.4		mg/L	P420081	
		Strontium	154		ug/L	P420081	
		Tin	3.0	U	ug/L	P420081	
		Titanium	0.75	U	ug/L	P420081	
		Vanadium	2.0	U	ug/L	P420081	
		Zinc	5.0	U	ug/L	P420081	
	EPA 200.8 Rev. 5.4	Aluminum	26		ug/L	P420081	
		Antimony	0.069	I	ug/L	P420081	
		Arsenic	2.67		ug/L	P420081	
		Barium	10.1		ug/L	P420081	
		Beryllium	0.010	U	ug/L	P420081	
		Boron	53.5		ug/L	P420081	
		Cadmium	0.020	U	ug/L	P420081	
		Chromium	0.40	U	ug/L	P420081	
		Cobalt	0.083		ug/L	P420081	
		Copper	1.27		ug/L	P420081	
		Lead	0.20	U	ug/L	P420081	
		Manganese	12.7		ug/L	P420081	
		Molybdenum	1.37		ug/L	P420081	
		Nickel	0.67	I	ug/L	P420081	
		Selenium	0.20	U	ug/L	P420081	
		Silver	0.010	U	ug/L	P420081	
		Thallium	0.10	U	ug/L	P420081	
	SM 2340 B-2011	Hardness	176		mg/L	P420081	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420081

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: P420081

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: P420081

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	109		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	101		P	85 - 115
Sodium	103		P	85 - 115
Strontium	105		P	85 - 115
Tin	103		P	85 - 115
Titanium	105		P	85 - 115
Vanadium	104		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420081

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	98.8		P	85 - 115
Arsenic	102		P	85 - 115
Barium	101		P	85 - 115
Beryllium	97.2		P	85 - 115
Boron	99.2		P	85 - 115
Cadmium	97.4		P	85 - 115
Chromium	100		P	85 - 115
Cobalt	100		P	85 - 115
Copper	101		P	85 - 115
Lead	92.5		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	97.0		P	85 - 115
Nickel	101		P	85 - 115
Selenium	101		P	85 - 115
Silver	115		P	85 - 115
Thallium	97.3		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420081

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2358024	Calcium	102		P	80 - 120
2358024	Iron	102	108	P/P	80 - 120
2358024	Magnesium	97.9	105	P/P	80 - 120
2358024	Potassium	96.3	102	P/P	80 - 120
2358024	Sodium	102		P	80 - 120
2358024	Strontium	98.5	104	P/P	80 - 120
2358024	Tin	97.4	100	P/P	80 - 120
2358024	Titanium	100	103	P/P	80 - 120
2358024	Vanadium	98.4	102	P/P	80 - 120
2358024	Zinc	98.1	101	P/P	80 - 120
2358025	Calcium	99.1		P	80 - 120
2358025	Iron	105		P	80 - 120
2358025	Magnesium	97.2		P	80 - 120
2358025	Potassium	99.7		P	80 - 120
2358025	Sodium	100		P	80 - 120
2358025	Strontium	100		P	80 - 120
2358025	Tin	97.8		P	80 - 120
2358025	Titanium	102		P	80 - 120
2358025	Vanadium	100		P	80 - 120
2358025	Zinc	98.1		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420081

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2358024	Aluminum	98.0	98.5	P/P	80 - 120
2358024	Antimony	103	103	P/P	80 - 120
2358024	Arsenic	105	105	P/P	80 - 120
2358024	Barium	104	103	P/P	80 - 120
2358024	Beryllium	100	100	P/P	80 - 120
2358024	Boron	104	103	P/P	80 - 120
2358024	Cadmium	98.3	100	P/P	80 - 120
2358024	Chromium	102	104	P/P	80 - 120
2358024	Cobalt	101	100	P/P	80 - 120
2358024	Copper	103	104	P/P	80 - 120
2358024	Lead	94.6	94.4	P/P	80 - 120
2358024	Manganese	103	101	P/P	80 - 120
2358024	Molybdenum	99.9	99.9	P/P	80 - 120
2358024	Nickel	102	102	P/P	80 - 120
2358024	Selenium	99.8	103	P/P	80 - 120
2358024	Silver	112	114	P/P	80 - 120
2358024	Thallium	99.4	101	P/P	80 - 120
2358025	Aluminum	102		P	80 - 120
2358025	Antimony	107		P	80 - 120
2358025	Arsenic	104		P	80 - 120
2358025	Barium	106		P	80 - 120
2358025	Beryllium	102		P	80 - 120
2358025	Boron	104		P	80 - 120
2358025	Cadmium	103		P	80 - 120
2358025	Chromium	108		P	80 - 120
2358025	Cobalt	101		P	80 - 120
2358025	Copper	103		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420081

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2358025	Lead	97.9		P	80 - 120
2358025	Manganese	105		P	80 - 120
2358025	Molybdenum	102		P	80 - 120
2358025	Nickel	103		P	80 - 120
2358025	Selenium	104		P	80 - 120
2358025	Silver	116		P	80 - 120
2358025	Thallium	101		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420081

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2358024	Calcium	5.22	Spike	P	0 - 20
2358024	Iron	5.10	Spike	P	0 - 20
2358024	Magnesium	4.78	Spike	P	0 - 20
2358024	Potassium	4.16	Spike	P	0 - 20
2358024	Sodium	5.12	Spike	P	0 - 20
2358024	Strontium	5.55	Spike	P	0 - 20
2358024	Tin	2.99	Spike	P	0 - 20
2358024	Titanium	3.13	Spike	P	0 - 20
2358024	Vanadium	3.75	Spike	P	0 - 20
2358024	Zinc	3.21	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420081

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2358024	Aluminum	0.529	Spike	P	0 - 20
2358024	Antimony	0.347	Spike	P	0 - 20
2358024	Arsenic	0.189	Spike	P	0 - 20
2358024	Barium	1.26	Spike	P	0 - 20
2358024	Beryllium	0.0243	Spike	P	0 - 20
2358024	Boron	0.523	Spike	P	0 - 20
2358024	Cadmium	2.23	Spike	P	0 - 20
2358024	Chromium	1.36	Spike	P	0 - 20
2358024	Cobalt	0.836	Spike	P	0 - 20
2358024	Copper	1.43	Spike	P	0 - 20
2358024	Lead	0.221	Spike	P	0 - 20
2358024	Manganese	1.02	Spike	P	0 - 20
2358024	Molybdenum	0.0374	Spike	P	0 - 20
2358024	Nickel	0.350	Spike	P	0 - 20
2358024	Selenium	2.93	Spike	P	0 - 20
2358024	Silver	1.92	Spike	P	0 - 20
2358024	Thallium	1.24	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: A114977
Included Lab Sample IDs: 2358861

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	100	P/P	90 - 110
Antimony	100	102	P/P	90 - 110
Arsenic	100	101	P/P	90 - 110
Barium	101	102	P/P	90 - 110
Beryllium	101	104	P/P	90 - 110
Boron	98.3	92.8	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Chromium	102	103	P/P	90 - 110
Cobalt	96.9	95.7	P/P	90 - 110
Lead	93.3	91.9	P/P	90 - 110
Manganese	102	101	P/P	90 - 110
Molybdenum	99.4	99.2	P/P	90 - 110
Nickel	98.9	97.2	P/P	90 - 110
Selenium	105	102	P/P	90 - 110
Silver	101	101	P/P	90 - 110
Thallium	98.1	96.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A115004
Included Lab Sample IDs: 2358861

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A115060
Included Lab Sample IDs: 2358861

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	107	100	P/P	90 - 110
Iron	108	101	P/P	90 - 110
Magnesium	105	98.8	P/P	90 - 110
Potassium	105	98.9	P/P	90 - 110
Sodium	107	102	P/P	90 - 110
Strontium	104	104	P/P	90 - 110
Tin	103	104	P/P	90 - 110
Titanium	104	105	P/P	90 - 110
Vanadium	103	104	P/P	90 - 110
Zinc	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	104	102	99.1				5.22
	Iron	109	102	108	105			5.10
	Magnesium	106	97.9	105	97.2			4.78
	Potassium	101	96.3	102	99.7			4.16
	Sodium	103	102	100				5.12
	Strontium	105	98.5	104	100			5.55
	Tin	103	97.4	100	97.8			2.99
	Titanium	105	100	103	102			3.13
	Vanadium	104	98.4	102	100			3.75
	Zinc	101	98.1	101	98.1			3.21
EPA 200.8 Rev. 5.4	Aluminum	100	98.0	98.5	102			0.529
	Antimony	98.8	103	103	107			0.347
	Arsenic	102	105	105	104			0.189
	Barium	101	104	103	106			1.26
	Beryllium	97.2	100	100	102			0.0243
	Boron	99.2	104	103	104			0.523
	Cadmium	97.4	98.3	100	103			2.23
	Chromium	100	102	104	108			1.36
	Cobalt	100	101	100	101			0.836
	Copper	101	103	104	103			1.43
	Lead	92.5	94.6	94.4	97.9			0.221
	Manganese	102	103	101	105			1.02
	Molybdenum	97.0	99.9	99.9	102			0.0374
	Nickel	101	102	102	103			0.350
	Selenium	101	99.8	103	104			2.93
	Silver	115	112	114	116			1.92
	Thallium	97.3	99.4	101	101			1.24

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	2358861
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2358861
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2358861

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	09/22/2022	09/26/2022 10:00	Megan Whitefoot	09/30/2022 23:54	McKinley C Carter	2358861
EPA 200.8 Rev. 5.4	09/22/2022	09/26/2022 10:00	Megan Whitefoot	09/27/2022 21:38	Alexander Thompson	2358861
	09/22/2022	09/26/2022 10:00	Megan Whitefoot	09/28/2022 17:05	Alexander Thompson	2358861
SM 2340 B-2011	09/22/2022			09/30/2022 23:54	McKinley C Carter	2358861