

Chemical Analysis Report

SW-DIST-2022-10-13-01

Florida DEP Laboratory
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DOH Accreditation E31780

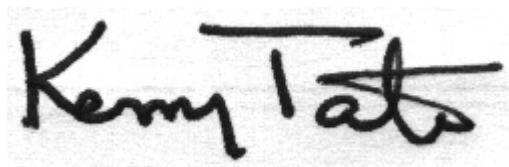
Event Description: **Metals**
Request ID: **RQ-2022-10-10-64**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
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13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 24-OCT-2022 09:47

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: Horsehole Creek @19

Collection Date/Time: 10/12/2022 12:45

Field ID: G1SW0103

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2362316	EPA 200.7 Rev. 4.4	Calcium	23.8		mg/L	P420914	
		Iron	890		ug/L	P420914	
		Magnesium	3.17		mg/L	P420914	
		Potassium	0.30	U	mg/L	P420914	
		Sodium	4.5		mg/L	P420914	
		Strontium	29.7		ug/L	P420914	
		Tin	3.0	I	ug/L	P420914	
		Titanium	1.4	I	ug/L	P420914	
		Vanadium	2.0	U	ug/L	P420914	
		Zinc	5.0	U	ug/L	P420914	
	EPA 200.8 Rev. 5.4	Aluminum	188		ug/L	P420914	
		Antimony	0.050	U	ug/L	P420914	
		Arsenic	0.83		ug/L	P420914	
		Barium	6.37		ug/L	P420914	
		Beryllium	0.019	I	ug/L	P420914	
		Boron	17.6		ug/L	P420914	
		Cadmium	0.020	U	ug/L	P420914	
		Chromium	0.61	I	ug/L	P420914	
		Cobalt	0.201		ug/L	P420914	
		Copper	0.40	U	ug/L	P420914	
		Lead	0.20	U	ug/L	P420914	
		Manganese	101		ug/L	P420914	
		Molybdenum	0.15	U	ug/L	P420914	
		Nickel	0.50	U	ug/L	P420914	
		Selenium	0.20	U	ug/L	P420914	
		Silver	0.010	U	ug/L	P420914	
		Thallium	0.10	U	ug/L	P420914	
	SM 2340 B-2011	Hardness	72.4		mg/L	P420914	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P420914

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: P420914

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: P420914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	100		P	85 - 115
Iron	106		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	104		P	85 - 115
Sodium	100		P	85 - 115
Strontium	105		P	85 - 115
Tin	104		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P420914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.5		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	100		P	85 - 115
Barium	104		P	85 - 115
Beryllium	94.2		P	85 - 115
Boron	105		P	85 - 115
Cadmium	98.7		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	96.9		P	85 - 115
Copper	98.0		P	85 - 115
Lead	94.8		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	97.0		P	85 - 115
Nickel	97.8		P	85 - 115
Selenium	97.6		P	85 - 115
Silver	101		P	85 - 115
Thallium	90.3		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362199	Calcium	100		P	80 - 120
2362199	Iron	105	112	P/P	80 - 120
2362199	Magnesium	103	114	P/P	80 - 120
2362199	Potassium	104	109	P/P	80 - 120
2362199	Sodium	102		P	80 - 120
2362199	Strontium	105	108	P/P	80 - 120
2362199	Tin	104	103	P/P	80 - 120
2362199	Titanium	105	106	P/P	80 - 120
2362199	Vanadium	104	105	P/P	80 - 120
2362199	Zinc	102	104	P/P	80 - 120
2362445	Calcium	100		P	80 - 120
2362445	Iron	102		P	80 - 120
2362445	Magnesium	97.4		P	80 - 120
2362445	Potassium	102		P	80 - 120
2362445	Sodium	102		P	80 - 120
2362445	Strontium	99.6		P	80 - 120
2362445	Tin	101		P	80 - 120
2362445	Titanium	105		P	80 - 120
2362445	Vanadium	106		P	80 - 120
2362445	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362199	Aluminum	97.3	101	P/P	80 - 120
2362199	Antimony	103	104	P/P	80 - 120
2362199	Arsenic	100	102	P/P	80 - 120
2362199	Barium	103	105	P/P	80 - 120
2362199	Beryllium	93.1	95.9	P/P	80 - 120
2362199	Boron	101	103	P/P	80 - 120
2362199	Cadmium	98.9	98.7	P/P	80 - 120
2362199	Chromium	100	103	P/P	80 - 120
2362199	Cobalt	96.2	98.0	P/P	80 - 120
2362199	Copper	98.2	99.9	P/P	80 - 120
2362199	Lead	94.1	96.2	P/P	80 - 120
2362199	Manganese	99.1	101	P/P	80 - 120
2362199	Molybdenum	96.8	98.5	P/P	80 - 120
2362199	Nickel	98.2	99.5	P/P	80 - 120
2362199	Selenium	97.5	98.5	P/P	80 - 120
2362199	Silver	99.2	101	P/P	80 - 120
2362199	Thallium	92.5	96.7	P/P	80 - 120
2362445	Aluminum	98.2		P	80 - 120
2362445	Antimony	107		P	80 - 120
2362445	Arsenic	103		P	80 - 120
2362445	Barium	106		P	80 - 120
2362445	Beryllium	93.1		P	80 - 120
2362445	Boron	101		P	80 - 120
2362445	Cadmium	101		P	80 - 120
2362445	Chromium	102		P	80 - 120
2362445	Cobalt	97.9		P	80 - 120
2362445	Copper	97.2		P	80 - 120

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362445	Lead	95.0		P	80 - 120
2362445	Manganese	102		P	80 - 120
2362445	Molybdenum	99.8		P	80 - 120
2362445	Nickel	98.5		P	80 - 120
2362445	Selenium	101		P	80 - 120
2362445	Silver	101		P	80 - 120
2362445	Thallium	93.3		P	80 - 120

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P420914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362199	Calcium	3.30	Spike	P	0 - 20
2362199	Iron	6.04	Spike	P	0 - 20
2362199	Magnesium	6.13	Spike	P	0 - 20
2362199	Potassium	3.12	Spike	P	0 - 20
2362199	Sodium	4.14	Spike	P	0 - 20
2362199	Strontium	3.24	Spike	P	0 - 20
2362199	Tin	0.217	Spike	P	0 - 20
2362199	Titanium	1.24	Spike	P	0 - 20
2362199	Vanadium	1.19	Spike	P	0 - 20
2362199	Zinc	1.61	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P420914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362199	Aluminum	3.29	Spike	P	0 - 20
2362199	Antimony	0.836	Spike	P	0 - 20
2362199	Arsenic	1.89	Spike	P	0 - 20
2362199	Barium	1.16	Spike	P	0 - 20
2362199	Beryllium	2.99	Spike	P	0 - 20
2362199	Boron	1.87	Spike	P	0 - 20
2362199	Cadmium	0.212	Spike	P	0 - 20
2362199	Chromium	2.07	Spike	P	0 - 20
2362199	Cobalt	1.88	Spike	P	0 - 20
2362199	Copper	1.70	Spike	P	0 - 20
2362199	Lead	2.19	Spike	P	0 - 20
2362199	Manganese	1.58	Spike	P	0 - 20
2362199	Molybdenum	1.69	Spike	P	0 - 20
2362199	Nickel	1.29	Spike	P	0 - 20
2362199	Selenium	1.05	Spike	P	0 - 20
2362199	Silver	1.53	Spike	P	0 - 20
2362199	Thallium	4.42	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A115346

Included Lab Sample IDs: 2362316

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.4	96.6	P/P	90 - 110
Iron	99.8	98.5	P/P	90 - 110
Magnesium	99.0	97.2	P/P	90 - 110
Potassium	99.1	98.1	P/P	90 - 110
Sodium	101	99.7	P/P	90 - 110
Strontium	100	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	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A115378

Included Lab Sample IDs: 2362316

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Barium	101	102	P/P	90 - 110
Beryllium	99.4	99.4	P/P	90 - 110
Boron	99.4	101	P/P	90 - 110
Cadmium	102	101	P/P	90 - 110
Chromium	99.4	100	P/P	90 - 110
Cobalt	96.3	96.6	P/P	90 - 110
Copper	98.1	97.9	P/P	90 - 110
Lead	93.3	93.4	P/P	90 - 110
Manganese	99.1	100	P/P	90 - 110
Molybdenum	99.0	99.4	P/P	90 - 110
Nickel	98.3	98.4	P/P	90 - 110
Selenium	101	103	P/P	90 - 110
Silver	98.7	99.4	P/P	90 - 110
Thallium	96.3	96.2	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 SMP	MS
			LCS				
EPA 200.7 Rev. 4.4	Calcium	100	100	100			3.30
	Iron	106	105	112	102		6.04
	Magnesium	107	103	114	97.4		6.13
	Potassium	104	104	109	102		3.12
	Sodium	100	102	102			4.14
	Strontium	105	105	108	99.6		3.24
	Tin	104	104	103	101		0.217
	Titanium	103	105	106	105		1.24
	Vanadium	103	104	105	106		1.19
	Zinc	103	102	104	101		1.61
EPA 200.8 Rev. 5.4	Aluminum	99.5	97.3	101	98.2		3.29
	Antimony	104	103	104	107		0.836
	Arsenic	100	100	102	103		1.89
	Barium	104	103	105	106		1.16
	Beryllium	94.2	93.1	95.9	93.1		2.99
	Boron	105	101	103	101		1.87
	Cadmium	98.7	98.9	98.7	101		0.212
	Chromium	101	100	103	102		2.07
	Cobalt	96.9	96.2	98.0	97.9		1.88
	Copper	98.0	98.2	99.9	97.2		1.70
	Lead	94.8	94.1	96.2	95.0		2.19
	Manganese	101	99.1	101	102		1.58
	Molybdenum	97.0	96.8	98.5	99.8		1.69
	Nickel	97.8	98.2	99.5	98.5		1.29
	Selenium	97.6	97.5	98.5	101		1.05
	Silver	101	99.2	101	101		1.53
	Thallium	90.3	92.5	96.7	93.3		4.42

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	2362316
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2362316
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2362316

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	10/13/2022	10/14/2022 11:20	George D Taylor	10/17/2022 18:28	McKinley C Carter	2362316
EPA 200.8 Rev. 5.4	10/13/2022	10/14/2022 11:20	George D Taylor	10/18/2022 19:37	Emily M Philpot	2362316
SM 2340 B-2011	10/13/2022			10/17/2022 18:28	McKinley C Carter	2362316