Chemical Analysis Report

CEN-DIST-2023-03-21-01

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

Event Description: **Run 19**
Request ID: **RQ-2023-03-20-11**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

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: 06-APR-2023 10:46

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: Sweetwater Creek @ Howard Ave **Collection Date/Time: 03/20/2023 12:03**

Field ID: G2CE0273 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2395302	EPA 200.7 Rev. 4.4	Calcium	61.3		mg/L	P427491	
		Iron	150		ug/L	P427491	
		Magnesium	26.6		mg/L	P427491	
		Potassium	8.5		mg/L	P427491	
		Sodium	196		mg/L	P427491	
		Strontium	566		ug/L	P427491	
		Tin	3.0	U	ug/L	P427491	
		Titanium	0.75	U	ug/L	P427491	
		Vanadium	2.0	U	ug/L	P427491	
		Zinc	6.9	I	ug/L	P427491	
	EPA 200.8 Rev. 5.4	Aluminum	75		ug/L	P427491	
		Antimony	0.072	I	ug/L	P427491	
		Arsenic	1.24		ug/L	P427491	
		Barium	25.9		ug/L	P427491	
		Beryllium	0.010	U	ug/L	P427491	
		Boron	112		ug/L	P427491	
		Cadmium	0.020	U	ug/L	P427491	
		Chromium	0.40	U	ug/L	P427491	
		Cobalt	0.051	I	ug/L	P427491	
		Copper	2.18		ug/L	P427491	
		Lead	0.20	U	ug/L	P427491	
		Manganese	14.9		ug/L	P427491	
		Molybdenum	0.47	I	ug/L	P427491	
		Nickel	0.50	U	ug/L	P427491	
		Selenium	0.20	U	ug/L	P427491	
		Silver	0.010	U	ug/L	P427491	
		Thallium	0.10	U	ug/L	P427491	
	SM 2340 B-2011	Hardness	263		mg/L	P427491	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P427491

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: P427491

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: P427491

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	105		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	102		P	85 - 115
Sodium	99.4		P	85 - 115
Strontium	98.4		P	85 - 115
Tin	101		P	85 - 115
Titanium	102		P	85 - 115
Vanadium	99.9		P	85 - 115
Zinc	98.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427491

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	104		P	85 - 115
Barium	105		P	85 - 115
Beryllium	96.7		P	85 - 115
Boron	102		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	105		P	85 - 115
Copper	103		P	85 - 115
Lead	97.1		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	102		P	85 - 115
Nickel	105		P	85 - 115
Selenium	102		P	85 - 115
Silver	101		P	85 - 115
Thallium	102		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P427491

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2395064	Calcium	96.8		P	80 - 120
2395064	Iron	103	103	P/P	80 - 120
2395064	Magnesium	102	101	P/P	80 - 120
2395064	Potassium	99.6	99.8	P/P	80 - 120
2395064	Sodium	95.9	96.9	P/P	80 - 120
2395064	Strontium	95.9	96.4	P/P	80 - 120
2395064	Tin	101	101	P/P	80 - 120
2395064	Titanium	101	100	P/P	80 - 120
2395064	Vanadium	99.0	98.2	P/P	80 - 120
2395064	Zinc	94.8	94.5	P/P	80 - 120
2395069	Calcium	97.1		P	80 - 120
2395069	Iron	103		P	80 - 120
2395069	Magnesium	101		P	80 - 120
2395069	Potassium	100		P	80 - 120
2395069	Sodium	92.9		P	80 - 120
2395069	Strontium	96.2		P	80 - 120
2395069	Tin	101		P	80 - 120
2395069	Titanium	98.3		P	80 - 120
2395069	Vanadium	97.4		P	80 - 120
2395069	Zinc	95.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427491

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2395064	Aluminum	101	99.9	P/P	80 - 120
2395064	Antimony	105	105	P/P	80 - 120
2395064	Arsenic	103	103	P/P	80 - 120
2395064	Barium	104	103	P/P	80 - 120
2395064	Beryllium	96.7	95.7	P/P	80 - 120
2395064	Boron	101	102	P/P	80 - 120
2395064	Cadmium	105	105	P/P	80 - 120
2395064	Chromium	103	103	P/P	80 - 120
2395064	Cobalt	104	103	P/P	80 - 120
2395064	Copper	99.5	99.3	P/P	80 - 120
2395064	Lead	95.9	96.4	P/P	80 - 120
2395064	Manganese	103	102	P/P	80 - 120
2395064	Molybdenum	104	105	P/P	80 - 120
2395064	Nickel	104	102	P/P	80 - 120
2395064	Selenium	99.2	103	P/P	80 - 120
2395064	Silver	100	100	P/P	80 - 120
2395064	Thallium	102	104	P/P	80 - 120
2395069	Aluminum	101		P	80 - 120
2395069	Antimony	105		P	80 - 120
2395069	Arsenic	102		P	80 - 120
2395069	Barium	104		P	80 - 120
2395069	Beryllium	97.2		P	80 - 120
2395069	Boron	105		P	80 - 120
2395069	Cadmium	107		P	80 - 120
2395069	Chromium	105		P	80 - 120
2395069	Cobalt	102		P	80 - 120
2395069	Copper	98.5		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427491

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2395069	Lead	96.5		P	80 - 120
2395069	Manganese	104		P	80 - 120
2395069	Molybdenum	103		P	80 - 120
2395069	Nickel	101		P	80 - 120
2395069	Selenium	101		P	80 - 120
2395069	Silver	102		P	80 - 120
2395069	Thallium	104		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P427491

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2395064	Calcium	0.388	Spike	P	0 - 20
2395064	Iron	0.0746	Spike	P	0 - 20
2395064	Magnesium	0.266	Spike	P	0 - 20
2395064	Potassium	0.164	Spike	P	0 - 20
2395064	Sodium	0.649	Spike	P	0 - 20
2395064	Strontium	0.486	Spike	P	0 - 20
2395064	Tin	0.00955	Spike	P	0 - 20
2395064	Titanium	0.415	Spike	P	0 - 20
2395064	Vanadium	0.770	Spike	P	0 - 20
2395064	Zinc	0.320	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P427491

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2395064	Aluminum	0.568	Spike	P	0 - 20
2395064	Antimony	0.279	Spike	P	0 - 20
2395064	Arsenic	0.0733	Spike	P	0 - 20
2395064	Barium	0.404	Spike	P	0 - 20
2395064	Beryllium	1.03	Spike	P	0 - 20
2395064	Boron	1.74	Spike	P	0 - 20
2395064	Cadmium	0.310	Spike	P	0 - 20
2395064	Chromium	0.755	Spike	P	0 - 20
2395064	Cobalt	1.15	Spike	P	0 - 20
2395064	Copper	0.197	Spike	P	0 - 20
2395064	Lead	0.545	Spike	P	0 - 20
2395064	Manganese	0.522	Spike	P	0 - 20
2395064	Molybdenum	1.03	Spike	P	0 - 20
2395064	Nickel	1.60	Spike	P	0 - 20
2395064	Selenium	3.28	Spike	P	0 - 20
2395064	Silver	0.434	Spike	P	0 - 20
2395064	Thallium	1.12	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: A118172
Included Lab Sample IDs: 2395302

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	100	P/P	90 - 110
Antimony	100	100	P/P	90 - 110
Arsenic	98.3	98.7	P/P	90 - 110
Barium	99.0	98.4	P/P	90 - 110
Beryllium	96.5	96.4	P/P	90 - 110
Boron	103	103	P/P	90 - 110
Cadmium	101	99.9	P/P	90 - 110
Chromium	98.9	99.2	P/P	90 - 110
Cobalt	97.0	98.3	P/P	90 - 110
Copper	96.2	96.8	P/P	90 - 110
Lead	93.9	92.8	P/P	90 - 110
Manganese	99.8	100	P/P	90 - 110
Molybdenum	98.2	97.7	P/P	90 - 110
Nickel	96.6	97.3	P/P	90 - 110
Selenium	99.2	100	P/P	90 - 110
Silver	98.5	98.1	P/P	90 - 110
Thallium	99.2	97.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A118291
Included Lab Sample IDs: 2395302

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.2	98.8	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Magnesium	99.6	100	P/P	90 - 110
Potassium	99.2	99.4	P/P	90 - 110
Sodium	92.8	92.8	P/P	90 - 110
Strontium	95.9	97.0	P/P	90 - 110
Tin	98.7	99.0	P/P	90 - 110
Titanium	98.9	99.4	P/P	90 - 110
Vanadium	98.0	98.5	P/P	90 - 110
Zinc	96.5	96.8	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	101	96.8	97.1				0.388
	Iron	105	103	103	103			0.0746
	Magnesium	105	102	101	101			0.266
	Potassium	102	99.6	99.8	100			0.164
	Sodium	99.4	95.9	96.9	92.9			0.649
	Strontium	98.4	95.9	96.4	96.2			0.486
	Tin	101	101	101	101			0.0095
	Titanium	102	101	100	98.3			0.415
	Vanadium	99.9	99.0	98.2	97.4			0.770
	Zinc	98.5	94.8	94.5	95.4			0.320
EPA 200.8 Rev. 5.4	Aluminum	103	101	99.9	101			0.568
	Antimony	104	105	105	105			0.279
	Arsenic	104	103	103	102			0.0733
	Barium	105	104	103	104			0.404
	Beryllium	96.7	96.7	95.7	97.2			1.03
	Boron	102	101	102	105			1.74
	Cadmium	102	105	105	107			0.310
	Chromium	103	103	103	105			0.755
	Cobalt	105	104	103	102			1.15
	Copper	103	99.5	99.3	98.5			0.197
	Lead	97.1	95.9	96.4	96.5			0.545
	Manganese	102	103	102	104			0.522
	Molybdenum	102	104	105	103			1.03
	Nickel	105	104	102	101			1.60
	Selenium	102	99.2	103	101			3.28
	Silver	101	100	100	102			0.434
	Thallium	102	102	104	104			1.12

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	2395302
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2395302
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2395302

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	03/21/2023	03/22/2023 12:15	George D Taylor	03/29/2023 20:38	McKinley C Carter	2395302
EPA 200.8 Rev. 5.4	03/21/2023	03/22/2023 12:15	George D Taylor	03/23/2023 18:34	Emily M Philpot	2395302
SM 2340 B-2011	03/21/2023			03/29/2023 20:38	McKinley C Carter	2395302