Chemical Analysis Report

CEN-DIST-2023-08-04-01

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

Event Description: **Run 7**
Request ID: **RQ-2023-07-31-12**
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: 23-AUG-2023 08:13

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: Lake Hart at Center **Collection Date/Time: 08/03/2023 10:16**

Field ID: G4CE0243 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2428944	EPA 200.7 Rev. 4.4	Calcium	7.93		mg/L	P433553	
		Iron	810		ug/L	P433553	
		Magnesium	2.19		mg/L	P433553	
		Potassium	1.8		mg/L	P433553	
		Sodium	14.7		mg/L	P433553	
		Strontium	63.5		ug/L	P433553	
		Tin	3.0	U	ug/L	P433553	
		Titanium	1.1	I	ug/L	P433553	
		Vanadium	2.0	U	ug/L	P433553	
		Zinc	5.0	U	ug/L	P433553	
	EPA 200.8 Rev. 5.4	Aluminum	234		ug/L	P433553	
		Antimony	0.092	I	ug/L	P433553	
		Arsenic	0.86		ug/L	P433553	
		Barium	14.0		ug/L	P433553	
		Beryllium	0.018	I	ug/L	P433553	
		Boron	31.0		ug/L	P433553	
		Cadmium	0.020	U	ug/L	P433553	
		Chromium	0.49	I	ug/L	P433553	
		Cobalt	0.081		ug/L	P433553	
		Copper	0.81		ug/L	P433553	
		Lead	0.46		ug/L	P433553	
		Manganese	6.14		ug/L	P433553	
		Molybdenum	0.15	U	ug/L	P433553	
		Nickel	0.50	U	ug/L	P433553	
		Selenium	0.20	U	ug/L	P433553	
		Silver	0.010	U	ug/L	P433553	
		Thallium	0.10	U	ug/L	P433553	
	SM 2340 B-2011	Hardness	28.8		mg/L	P433553	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P433553

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: P433553

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: P433553

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	101		P	85 - 115
Iron	103		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	102		P	85 - 115
Sodium	101		P	85 - 115
Strontium	105		P	85 - 115
Tin	103		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: P433553

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.9		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	101		P	85 - 115
Barium	104		P	85 - 115
Beryllium	102		P	85 - 115
Boron	103		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	99.7		P	85 - 115
Cobalt	98.0		P	85 - 115
Copper	98.3		P	85 - 115
Lead	94.3		P	85 - 115
Manganese	99.7		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	99.1		P	85 - 115
Selenium	101		P	85 - 115
Silver	112		P	85 - 115
Thallium	85.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P433553

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428843	Calcium	95.9		P	80 - 120
2428843	Iron	103	98.8	P/P	80 - 120
2428843	Magnesium	103	95.5	P/P	80 - 120
2428843	Potassium	99.8	93.6	P/P	80 - 120
2428843	Sodium	99.6		P	80 - 120
2428843	Strontium	106	101	P/P	80 - 120
2428843	Tin	101	99.3	P/P	80 - 120
2428843	Titanium	103	102	P/P	80 - 120
2428843	Vanadium	104	102	P/P	80 - 120
2428843	Zinc	104	103	P/P	80 - 120
2428959	Calcium	96.7		P	80 - 120
2428959	Iron	103		P	80 - 120
2428959	Magnesium	98.0		P	80 - 120
2428959	Potassium	99.8		P	80 - 120
2428959	Sodium	105		P	80 - 120
2428959	Strontium	105		P	80 - 120
2428959	Tin	101		P	80 - 120
2428959	Titanium	100		P	80 - 120
2428959	Vanadium	100		P	80 - 120
2428959	Zinc	98.0		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P433553

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428843	Aluminum	98.5	99.2	P/P	80 - 120
2428843	Antimony	102	103	P/P	80 - 120
2428843	Arsenic	99.8	101	P/P	80 - 120
2428843	Barium	104	103	P/P	80 - 120
2428843	Beryllium	99.7	104	P/P	80 - 120
2428843	Boron	101	102	P/P	80 - 120
2428843	Cadmium	102	101	P/P	80 - 120
2428843	Chromium	96.6	97.5	P/P	80 - 120
2428843	Cobalt	94.9	95.8	P/P	80 - 120
2428843	Copper	96.5	96.6	P/P	80 - 120
2428843	Lead	96.8	96.1	P/P	80 - 120
2428843	Manganese	97.0	97.8	P/P	80 - 120
2428843	Molybdenum	101	101	P/P	80 - 120
2428843	Nickel	95.3	96.2	P/P	80 - 120
2428843	Selenium	97.8	99.3	P/P	80 - 120
2428843	Silver	108	110	P/P	80 - 120
2428843	Thallium	103	102	P/P	80 - 120
2428859	Beryllium	101		P	80 - 120
2428959	Aluminum	100		P	80 - 120
2428959	Antimony	106		P	80 - 120
2428959	Arsenic	101		P	80 - 120
2428959	Barium	106		P	80 - 120
2428959	Boron	104		P	80 - 120
2428959	Cadmium	105		P	80 - 120
2428959	Chromium	99.9		P	80 - 120
2428959	Cobalt	94.8		P	80 - 120
2428959	Copper	94.2		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P433553

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428959	Lead	96.0		P	80 - 120
2428959	Manganese	99.8		P	80 - 120
2428959	Molybdenum	102		P	80 - 120
2428959	Nickel	95.2		P	80 - 120
2428959	Selenium	98.6		P	80 - 120
2428959	Silver	112		P	80 - 120
2428959	Thallium	84.6		P	80 - 120

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P433553

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428843	Calcium	5.14	Spike	P	0 - 20
2428843	Iron	4.52	Spike	P	0 - 20
2428843	Magnesium	4.42	Spike	P	0 - 20
2428843	Potassium	4.89	Spike	P	0 - 20
2428843	Sodium	4.86	Spike	P	0 - 20
2428843	Strontium	5.12	Spike	P	0 - 20
2428843	Tin	1.81	Spike	P	0 - 20
2428843	Titanium	1.39	Spike	P	0 - 20
2428843	Vanadium	1.38	Spike	P	0 - 20
2428843	Zinc	0.814	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P433553

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428843	Aluminum	0.690	Spike	P	0 - 20
2428843	Antimony	0.985	Spike	P	0 - 20
2428843	Arsenic	0.832	Spike	P	0 - 20
2428843	Barium	0.809	Spike	P	0 - 20
2428843	Beryllium	3.92	Spike	P	0 - 20
2428843	Boron	1.08	Spike	P	0 - 20
2428843	Cadmium	1.21	Spike	P	0 - 20
2428843	Chromium	0.972	Spike	P	0 - 20
2428843	Cobalt	1.02	Spike	P	0 - 20
2428843	Copper	0.101	Spike	P	0 - 20
2428843	Lead	0.715	Spike	P	0 - 20
2428843	Manganese	0.650	Spike	P	0 - 20
2428843	Molybdenum	0.400	Spike	P	0 - 20
2428843	Nickel	0.950	Spike	P	0 - 20
2428843	Selenium	1.50	Spike	P	0 - 20
2428843	Silver	1.43	Spike	P	0 - 20
2428843	Thallium	1.35	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: A120955
Included Lab Sample IDs: 2428944

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	101	P/P	90 - 110
Antimony	104	101	P/P	90 - 110
Arsenic	101	97.8	P/P	90 - 110
Barium	103	101	P/P	90 - 110
Beryllium	97.5	96.9	P/P	90 - 110
Boron	99.7	101	P/P	90 - 110
Cadmium	103	101	P/P	90 - 110
Chromium	102	98.3	P/P	90 - 110
Cobalt	97.1	95.1	P/P	90 - 110
Copper	97.3	95.2	P/P	90 - 110
Lead	95.1	93.8	P/P	90 - 110
Manganese	101	99.8	P/P	90 - 110
Molybdenum	98.8	97.7	P/P	90 - 110
Nickel	97.9	95.2	P/P	90 - 110
Selenium	103	100	P/P	90 - 110
Silver	99.4	98.3	P/P	90 - 110
Thallium	106	104	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A121137
Included Lab Sample IDs: 2428944

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	99.5	P/P	90 - 110
Iron	101	99.3	P/P	90 - 110
Magnesium	101	98.9	P/P	90 - 110
Potassium	99.1	96.7	P/P	90 - 110
Sodium	102	101	P/P	90 - 110
Strontium	100	99.0	P/P	90 - 110
Tin	95.7	96.5	P/P	90 - 110
Titanium	98.0	96.9	P/P	90 - 110
Vanadium	97.0	96.5	P/P	90 - 110
Zinc	97.6	96.0	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	95.9	96.7				5.14
	Iron	103	103	98.8	103			4.52
	Magnesium	104	103	95.5	98.0			4.42
	Potassium	102	99.8	93.6	99.8			4.89
	Sodium	101	99.6	105				4.86
	Strontium	105	106	101	105			5.12
	Tin	103	101	99.3	101			1.81
	Titanium	103	100	103	102			1.39
	Vanadium	103	104	102	100			1.38
	Zinc	103	104	103	98.0			0.814
EPA 200.8 Rev. 5.4	Aluminum	99.9	98.5	99.2	100			0.690
	Antimony	103	102	103	106			0.985
	Arsenic	101	99.8	101	101			0.832
	Barium	104	104	103	106			0.809
	Beryllium	102	99.7	104	101			3.92
	Boron	103	101	102	104			1.08
	Cadmium	104	102	101	105			1.21
	Chromium	99.7	96.6	97.5	99.9			0.972
	Cobalt	98.0	94.9	95.8	94.8			1.02
	Copper	98.3	96.5	96.6	94.2			0.101
	Lead	94.3	96.8	96.1	96.0			0.715
	Manganese	99.7	97.0	97.8	99.8			0.650
	Molybdenum	101	101	101	102			0.400
	Nickel	99.1	95.3	96.2	95.2			0.950
	Selenium	101	97.8	99.3	98.6			1.50
	Silver	112	108	110	112			1.43
	Thallium	85.6	103	102	84.6			1.35

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	2428944
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2428944
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2428944

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	08/04/2023	08/08/2023 11:55	George D Taylor	08/18/2023 15:02	McKinley C Carter	2428944
EPA 200.8 Rev. 5.4	08/04/2023	08/08/2023 11:55	George D Taylor	08/09/2023 19:31	Emily M Philpot	2428944
SM 2340 B-2011	08/04/2023			08/18/2023 15:02	McKinley C Carter	2428944